ROBUR

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Installation and use manual

Roburbox200

System Control Interface

EDITION: 03/2013 – FW version 1.002

Code: D-LBR656

FOREWORD

This “Installation and Use Manual” is a guide for installation and use of RB200 (Robur Box) interface device, between one or more external control system and GA and GAHP series Direct digital controller (DDC).

This manual is specifically intended for:

- installation technicians for the carrying out of a correct installation of Robur appliances;
- installation technicians and Robur Authorised Technical Assistance Centres (TACs) for the correct configuration.

The manual also includes:

- a section showing operations for “commissioning”;
- a section showing operations for “service configuration”.

The descriptions provided in this manual refer to RB200 interface device, version 1.002.

Summary

The manual is divided into 5 sections and one appendix:

SECTION 1 is intended for user, hydraulic and electric installer, as well as authorized technical assistant. It provides general warnings, short descriptions on appliance operation and its manufacturing features. This section also contains appliance technical data and dimensional drawings.

SECTION 2 is intended for the electric installer. It provides information necessary to the electrician to electrically connect the appliance;

SECTION 3 is intended for authorized service technician. It provides instructions necessary for the whole commissioning procedure (preliminary conformity checks on system, “First turning-on”).

SECTION 4 is intended for Robur assistant and installer (TAC). It provides information on appliance menus.

SECTION 5 is intended for Robur assistant and installer (TAC). It provides instructions necessary for appliance configuration.

The APPENDIX contains operating code tables and relevant instructions.

To quickly access to sections, refer to the relevant graphic icons (see Table 2, Page IV) located on the right margin of odd pages.

References

In order to operate RB200 device, it is necessary to connect the appliance to a Direct Digital Controller (DDC) and refer to the following documents, which accompany it:

 DDC Installation Manual (D-LBR 257) (for installation and service technicians).

 DDC Use and Programming Manual (D-LBR 246) (for the user of the DDC).

 Applications Manual (D-LBR 630).

Meaning of terminology and icons

Device: by this term we mean to indicate the interface device between an external system and DDC Direct Digital Controller, named RB200 (or Robur Box).

Generator: general term indicating machines for the production of hot and/or chilled water. In the text they are also referred to as machines or units.

Robur generator: generator (heat pump, boiler or refrigerator) produced by Robur. All types of Robur generator can be directly managed from the Robur Direct Digital Controller (DDC) using the CANBus communication bus.

Third party generator: generator (usually a boiler or refrigerator) not produced by Robur, which cannot be directly managed from the DDC via the CANBus and thus requires an additional interface device (Robur Box RB200).

Network ID: unique identification number identifying a Robur generator on the CANBus BUS, a Direct Digital Controller (DDC), the valve service of an RB100 device, or each of the services provided by an RB200. It acts as an address for the data communication network; it must be set to a different value for each generator, DDC or RB100/RB200 device present. For RB200 devices a base network ID is set, then the system automatically assigns from this a network ID for each configured service.

In the documentation it is also referred to as a CAN ID or, when referred to Robur generators, unit ID or machine ID.

Base plant part: this term refers to the portion of the plant including all generators, excluding those which can be hydraulically separated via a specific three-way valve.

Separable plant part: this term refers to the part of the plant which can be hydraulically separately from the base plant part via a three-way valve and run independently to provide a type of service for Domestic Hot Water (DHW).

This part of the system can be in two distinct states, on the basis of the position of the hydraulic separation motorised valve:

- **Separated:** in this status, the machines from the separable part of the system are managed independently from those of the basis system, in order to satisfy the request for the separable DHW service.
- **Included:** in this state the machines from the separable part of the plant are managed together with those of the base part, to satisfy heating and/or base DHW services; in particular the machines are made available if at least the heating request is active; in the presence of only the base DHW request, the machines on the separable part of the plant are not used.

Separate plant part: variant of the separable part of the plant, which has no three-way separation valve; it is therefore permanently sectioned off from the base plant part.

Base DHW service: domestic hot water service obtained with the base plant part.
Separable/separated DHW service: domestic hot water service obtained with the separable/separate plant part.

Base group: set of generators on the base plant part.

Separable/separate group: set of generators on the separable/separate plant part.

Plant ID: identification number between 0 and 15, set by a specific parameter in the Robur generators to indicate that they belong to a given plant, understood as the hydraulic circuit they are connected to. One or more plant IDs (cold plant ID and/or hot plant ID) must be set on the RB200 device if this manages third party generators.

> **NOTE**: The plant ID does not vary between the base and separable/separate plant parts. To indicate on which part of the plant a Robur generator is found we use another parameter to be set on it (group to which the unit belongs); to indicate on which part of the plant a Third Party generator managed via an RB200 device is found, we use a parameter to be set on that device.

Service request: by this expression we mean to indicate a request for plant turning on, sent from appliance to DDC; in particular, the following requests are supported:

- **Cooling service request**: when this input signal is enabled, the equipment sends a request to the DDC so that the latter can drive the switching on of the cold modules present on the plant and can manage them in order to meet the request appropriately;
- **Heating service request:** when this input signals is enabled, the equipment sends a request to the DDC so that the latter can drive the switching on of the hot modules present on the plant and can manage them in order to meet the request appropriately;
- **DHW0 and DHW1 service request:** when one of these input signal is enabled, the equipment sends a request to the DDC so that the latter can drive the switching on of the hot modules present on the plant and can manage them in order to meet the domestic hot water request appropriately. In particular, each of these inputs can be configured to make separable or base domestic water requests; it is also possible to enable both inputs and therefore manage two DHW service requests at the same time. The basic DHW service is normally used to provide a DHW service at circuit temperatures that are compatible with Robur GAHP high efficiency heat pumps. The separable or separate DHW service is normally used to provide a DHW service (complete or integrating the base DHW service) which requires higher circuit temperatures, which are not compatible with the GAHP heat pump units, therefore delivered by conventional heat generators (boilers) installed on the separable or separate part of the plant.

Valve service: by this term we mean to indicate RB200 functionality, allowing DDC to control one or more valves. This feature can be used to separate the group of units which meet DHW request from basic plant (otherwise, to include them in the basic plant) or, switch plant operating mode (hot/cold and vice versa).

Generator service: type of service provided by RB200, for the integrated control of generators (boilers and refrigerators) not produced by Robur by the Robur Direct Digital Controller (DDC).

Circulator service: type of service provided by RB200 allowing the DDC to control one of more water circulators required by specific types of systems.

Temperature sensor service: type of service provided by RB200 allowing the DDC to read the temperature of the various system manifolds for regulation purposes.

The icons shown in the margin of this manual have the following meanings:

	Danger
	Warning
	Note
	Start of operational procedure
	Reference to another part of the manual or to a different manual/booklet

Table 1 Descriptive icons

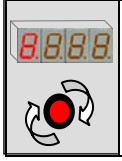
	“GENERAL AND TECHNICAL FEATURES” section
	“ELECTRIC INSTALLER” section
	“COMMISSIONING” section
	“USER INTERFACE” section
	“SETTINGS” section

Table 2 Section icons

TABLE OF CONTENTS

SECTION 1 GENERAL AND TECHNICAL FEATURES

This section, intended for all installers and TACs, contains general warnings, short descriptions of appliance operation and its manufacturing features. It also contains appliance technical data and dimensional drawings.

1.1 WARNINGS

This manual is integral and essential for the product and must be delivered to the final user together with the appliance.

Conformity with standards CE

RB200 devices are CE certified and comply with essential requirements of the following Directives:

- 89/336/CEE Electromagnetic Compatibility Directive and following amendments and integrations thereof;
- 73/23/CEE Low Voltage Directive and following amendments and integrations thereof.

Data for the above-mentioned EC certifications are specified in paragraph 1.4 on page 20, as well as on appliance itself.

Product Safety Standards

- CEI EN 60730-1 Italian standard on automatic electric control device for domestic and similar usage.

Safety

Appliance must only be used for the purpose it is intended for. Any other use must be considered inappropriate and therefore dangerous.
Any contract and extra-contract liability of the manufacturer is excluded for any damage arising from improper use of appliance.

Do not operate appliance if dangerous conditions arise when it has to be used: problems on electric network; appliance components submerged in water or damaged; control and safety components by-passed or not properly operating. Ask for the support of professionally-qualified personnel.

Do not leave appliance packaging parts (plastic bags, insulators and spacers in expanded polystyrene or others) within the reach of children, as they can be dangerous.

The electric safety of this appliance is only ensured when it is properly connected to an effective grounding system, as provided for by electric safety standards enforced.

Installation and reference standards

Before starting appliance installation phases, visually inspect that no sign of breaking or damage to the packaging appears, as this could indicate that a damage has occurred during transport.

☞ After the packaging is removed, ensure appliance is integral and complete.

The appliance can only be installed by an authorized firm, under legislation enforced in the installation country or by professionally qualified personnel.

The “professionally qualified personnel” has specific technical competence in the sectors of electric systems and live appliances.

The appliance must only be installed following manufacturer’s instructions and under national and local standards enforced.

In particular, it is necessary to comply with the standards concerning:

- Live appliances

Any contract and extra-contract liability of manufacturer is excluded for any damage arising from wrong installation and/or non-compliance with the above-mentioned standards, as well as manufacturer’s indications and instructions.

After appliance installation

Before contacting Robur Authorised Technical Assistance Centres (TACs) for the first turning-on, the Company must ensure that:

- data in electric grid complies with plate data;
- electric system complies with necessary appliance capacity and that all safety and control devices, provided for by standards enforced, are installed.

Commissioning procedure

The whole procedure for appliance commissioning is to be performed by a Robur Authorised Technical Assistance Centres only (TAC) following manufacturer's instructions.

To properly perform the whole procedure, carefully follow instructions in paragraph 3.1 on page 48.

☞ Contact local Robur Authorised Technical Assistance Centres only (TAC).
To find out who your local TAC is, contact Robur S.p.A. (tel. 035 888111).

Warranty could be void if commissioning is not performed (and validated) by a Robur TAC.

Machine operation

In order to avoid dangerous situation when it is necessary to act on appliance, turning-on and off must be exclusively performed by a switch on power supply circuit. Also ensure that all connections to output relays and services have no live parts.

The appliance can only operate if connected to a Direct Digital Controller (DDC, available as plant accessory); the lack of Direct Digital Controller on the plant affects the usage of the RB200 device.

☞ **Even though the appliance can require for plant hot and cold turning-on, it cannot require the Direct Digital Controller to switch from cooling to heating operating mode and vice versa. Operation type switch must be carried out on the DDC.**

In case of appliance malfunction, with following warning of operating code, follow instructions contained in APPENDIX on page 82.

☞ In case of appliance malfunction and/or breaking of its components, do not attempt to repair and/or restore by direct operation, but act as follows:

- disconnect appliance from electric power supply, by stopping electric current supply through external isolating switch set by the electric installer on the proper panel.

Any appliance repair is to be performed by a Robur Authorised Technical Assistance Centres only (TAC).

☞ The non-respect of the above-mentioned indications can affect appliance operation and safety and possibly make its warranty void, if active.

If appliance is dismissed, for proper disposal, consider that the product contains electric and electronic components which cannot be disposed of as home waste. Thus, comply with the relevant standards and legislations enforced.

Should appliance be sold or transferred to another owner, ensure that this “Installation and Use Manual” is delivered to the new owner and/or installer.

1.2 MACHINE OPERATION

RB200: description

The Robur Box RB200 (Figure 1), Robur Box, is an optional device that extends the functions of the Robur control system based on the Direct Digital Controller (DDC). Briefly, by using this device it is possible to:

- Request the enabling of heating, cooling and DHW services via an external control system.
- Manage third party produced generators (boilers and/or refrigerators) integrating their control into systems using Robur heat pumps, refrigerators and boilers.
- Manage some parts (valves, water circulators, temperature sensors) needed to implement certain types of systems.

To implement these functions:

- The RB200 makes available digital and analogue inputs and outputs to make connections with the external control systems, third party generators, manifold temperature sensors, and water circulators and valves required to produce some system plumbing diagrams.
- The DDC ensures the integrated control logic of the Robur and third party generators, as well as the water circulators and the valves. A range of control logics can be selected, according tot he type of system and the specific control needs.

For more information on the types of systems that can be managed, the control logics and the DDC programming, refer to Applications Manual (D-LBR 630), DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246).

Figure 1 RB200

This appliance is provided with a four-figure display to both highlight a series of operation codes and view and edit board operating parameters, accessing specific menus.

Menu access and parameter viewing and editing is done using a special knob (encoder) on the right side.

Compatibility of the RB200

RB200 interface device only operates if coupled with one or more Direct Digital Controllers.

Before installing RB200 interface, DDC-firmware compatibility is to be checked, as it must be equal or higher than FW 4.013.

Control system expandability using RB200 devices

Briefly, a single DDC can support and manage up to 32 modules (16 for heating and 16 for cooling), where module refers to the capacity of a machine to produce cooled water or hot water. Therefore the ACF 60-00 comprises a module to produce cooled water, and the AY 00-120 and GAHP-A each comprise a module for hot water production; on the other hand, the GAHP-AR and GAHP-GS/WS comprise two modules, one for the production of cooled water, the other for hot water.

It is also possible to use one or two additional DDCs to extend to 64 (with one extra DDC) or 96 (with two extra DDCs) the maximum number of manageable modules.

For more information on the types and maximum dimensions of the manageable systems, refer to DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246).

When one or more RB200 devices are added to a system comprising DDCs and Robur heating or chilling modules, the following rules apply:

1. On any system, also with maximum expansion (three DDCs, 48 heating modules and 48 chilling modules) it is possible to add an RB200 device used fully, i.e.:
   - with the heating, cooling and DHW requests enabled;
   - with all circulator, temperature probe and valve services enabled;
   - with both the third party generator service enabled; however it must be considered that every third party generator occupies a heating or chilling module, which must therefore be included in the calculation of the total number of modules.
2. It is also possible to add up to seven more RB200 devices, used only to manage other third party generators, again considering that every generator occupies a heating or chilling module, to be included in the calculation of the total.

RB200 operation

Starting the device

The device is powered following the instructions given in SECTION 2 “ELECTRIC INSTALLER” on page 23.

When turned on, the appliance performs a series of internal tests to check proper software and hardware operation, checks any operating parameter setting errors, shows an identification string (rb20) and, finally, keeps the leftmost decimal point flashing only.

RB200 interface device requires at least a Direct Digital Controller (DDC, see Figure 2). The switching between RB200 and DCC is performed by CAN network, (the same used for communication between DCC and machine).

For DDC use and configuration/programming instructions, refer to two booklets: DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246).

DDC configuration/programming operations must be performed by Robur Authorised Technical Assistance Centres (TAC) during first turning-on procedures and following manufacturer’s instructions.

DIRECT DIGITAL CONTROLLER (DDC)

Figure 2 Direct Digital Controller (DDC, available as accessory)

Below is a description of the operation of the request inputs and various services provided by RB200.

For detailed instructions for configuring the request inputs and services on RB200 see Sections 4 and 5.

Refer to the design manual, the DDC Installation Manual (D-LBR 257) and the DDC Use and Programming Manual (D-LBR 246) for more information on the operation of the request inputs and services provided by RB200, as well as the types and functionalities of the systems that use them.

Operation of heating, cooling and DHW request inputs

The RB200 provides 4 request inputs, which can be used by external control systems to request the DDC to enable the following services:

- **Cooling:** when an input signal is received on this service, the RB200 sends a request to DDC, so that DDC can control the turning-on of cold modules on the plant and properly manage them to meet such request;
- **Heating:** when an input signal is received on this service, the RB200 sends a request to DDC, so that DDC can control the turning-on of hot modules on the plant and properly manage them to meet such request;
- **DHW (two request "channels" DHW0 and DHW1):** when a signal is received on one or both inputs for these services, the RB200 sends a request to DDC, so that DDC can control the turning-on of hot modules on the plant and properly manage them to meet such request(s). Especially, each input DHW0 and DHW1 can be configured for use for separable sanitary-type requests or basic plant sanitary – type requests can be made.

Each input can be configured as digital (to control with a clean contact) or analogue (0-10V). The configuration is done using a jumper (Figure 10 and Figure 11) and subsequent parameter programming in the programming menu of the user interface (see SECTION 5). There are effectively three available configurations:

Analogue input: this configuration allows receipt of a 0-10 Volt input signal from an external control system. RB200 interface sends to Direct Digital Controller a setpoint request proportional with input voltage. The setpoint is then provided to DDC by RB200, according to the signal received from the external control system; moreover, a voltage lower than a given threshold value (settable) corresponds to a request to switch off the service.

This type of configuration is used when the external control system is requires to modify the requested setpoint according to, for example, a temperature curve or programming timer it manages; having selected this type of configurations, three parameters must be set:

- Temperature corresponding to 0V voltage
- Temperature corresponding to 10V voltage
- Temperature corresponding to the OFF REQUEST threshold voltage

Example of setting and operation

For convenience, we refer to heating operation (Figure 3), but the same principle applies to all request services. Warning: for cooling, the input management has an inverse logic (Figure 4).

Settings:

PARAMETERS	VALUE
TEMPERATURE CORRESPONDING TO 0 V VOLTAGE	+40°C
TEMPERATURE CORRESPONDING TO 10V VOLTAGE (setpoint sent from RB200 to DDC when input voltage is 10V)	+80°C
TEMPERATURE CORRESPONDING TO OFF REQUEST THRESHOLD VOLTAGE [off] (the request sent from RB200 to DDC when input voltage equal to or lower than is 2.5V is MACHINES OFF, see Fig. 6)	+50°C

Operation:

- A voltage of 10V is applied to the RB200 heating input;
- Consequently, RB200 sends DDC a heating request with setpoint 80 °C.
- The DDC begins to control by switching the machines on and off to heat the water to 80 °C and keep it at that temperature; the control is done on both delivery and return, according to the DDC settings.
- If the input voltage is varied the setpoint is consequently modified; in this example, if the applied voltage is taken to 7.5V, the setpoint becomes 70 °C; the DDC cuts in to heat to and maintain the water at that temperature.
- If the voltage applied to the input is less that the value of the OFF threshold, in the example 2.5V, the request becomes OFF; the external control system is no longer requesting the heating service.

☞ If input voltage is lower than -0.3 V or higher than 10.3 V, a proper out-of-scale error code is displayed. (APPENDIX on page 82).

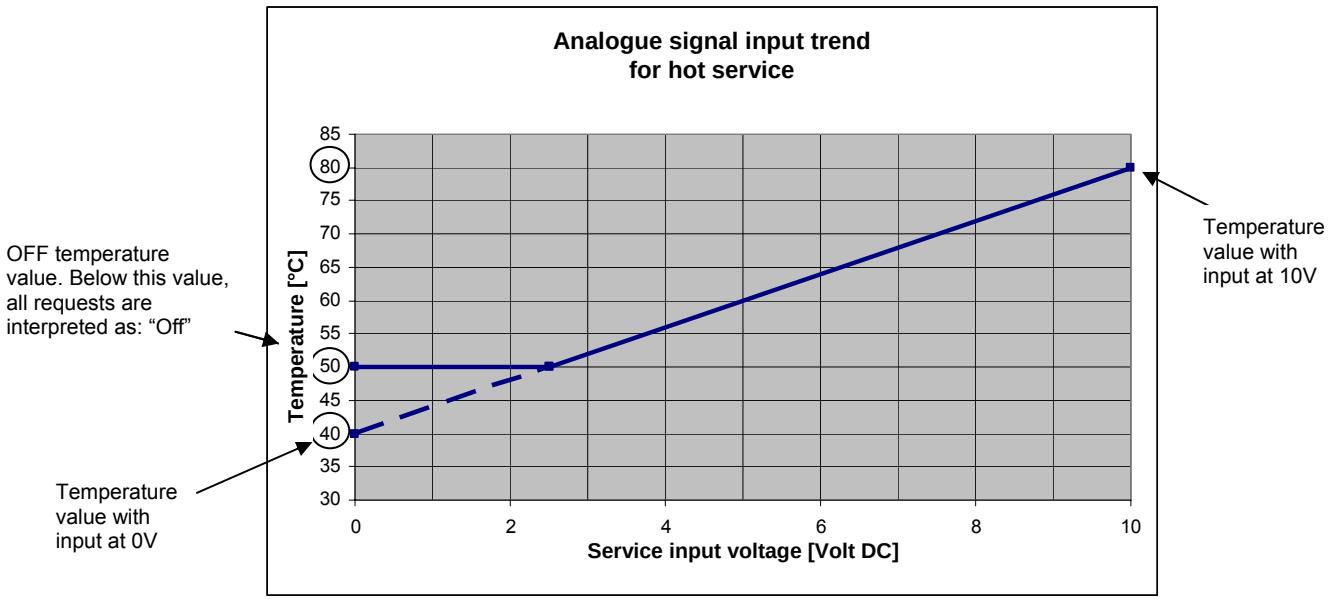


Figure 3 Voltage signal input trend for hot analogue service (heating, DHW0 and DHW1)

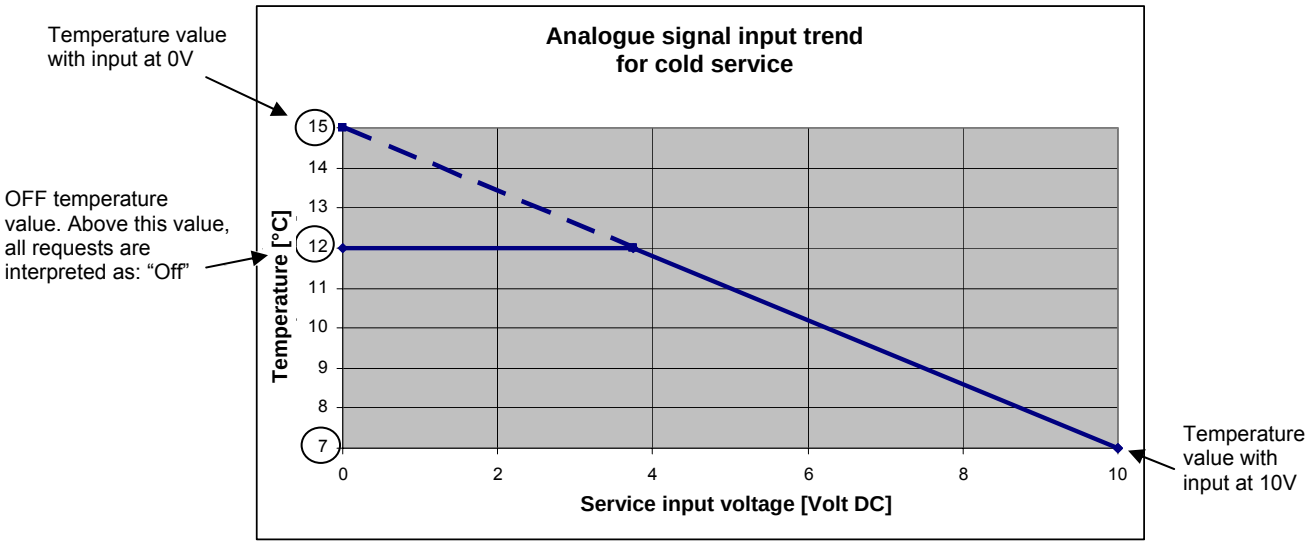


Figure 4 Voltage signal input trend for cooling analogue service

Digital input with local setpoint: this configuration is used to receive digital signal inputs from an external control system (OPEN/CLOSED,controlled by clean contact). When the input is closed, the RB200 sends a service enable request to the Direct Digital Controller with a fixed setpoint, set previously in a specific parameter on the device. The setpoint is thus sent by RB200 to DDC; the open input corresponds to the service off request.

This type of configuration is used when the system has to work at a fixed setpoint; having selected this type of configuration, only one parameter needs to be set:

- Service setpoint temperature

Example of setting and operation

For convenience, we refer to heating operation, but the same principle applies to all request services.

Settings

PARAMETERS	VALUE
LOCAL SETPOINT PARAMETER FOR DIGITAL INPUT (Setpoint sent from RB200 to DDC)	+60°C

Operation:

- The RB200 heating input is closed.
- Consequently, RB200 sends DDC a heating request with setpoint 60 °C.
- The DDC begins to control by switching the machines on and off to heat the water to 60 °C and keep it at that temperature; the control is done on both delivery and return, according to the DDC settings.
- If the RB200 input is opened, the request becomes OFF; the external control system is no longer requesting heating.

Digital input with remote setpoint: this configuration is used to receive digital signal inputs from an external control system (OPEN/CLOSED,controlled by clean contact). When the input is closed, the RB200 sends a service enable request to the Direct Digital Controller without specifying the setpoint; the open input corresponds to the service off request. The setpoint is then determined by the DDC according to its settings [ref. DDC Use and Programming Manual (D-LBR 246)].

This type of configuration is used when the system has to work, for example with variable setpoint according to the timer programmed by on the DDC; having selected this type of configuration, it is not necessary to set any other associated parameters.

In this case we shall not give an example of settings and operation, as it is very similar to the previous one. The only difference is, as already illustrated, that the setpoint value is determined by the DDC and not by RB200.

The following is valid for all three input types:

If no request arrives from RB200, it does not mean that DDC-controlled units remain off; this depends on the set-up of a specific menu on the Control Panel [ref. DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246)] which allows system to operate with the only requests coming from RB200 or with the only DDC internal request or both.

The description for each input applies only if the relative service is enabled. If the service is not enabled there will be no request to the DDC.

Operation of valve services

RB200 provides 2 clean contact outputs, each comprising a single-pole exchange contact (NO-C-NC) controlled by a toggle relay, used to control two 3-way diverter valves. Moreover, for only one of the two valves, as an option it is possible to manage two limit switch contacts on the valve (clean contacts), by connecting them to two digital inputs available on RB200; the position information is used by DDC [ref. DDC Installation Manual (D-LBR 257) DDC Use and Programming Manual (D-LBR 246)] to more accurately manage the valves and the whole plant.

Two different functions of the three-way valve are supported:

- Hydraulic separation valve separable from the basic group, used when the DHW service on the separable group is present; when there is a request for this service, the valve is commuted to hydraulically separate the machines in the separable group from those in the basic group and connect them instead to the DHW exchanger, enabling the separable DHW service, while the machines in the basic group remain available for the other services.
- Centralised cooling/heating switching valve, used on 2-pipe cooling/heating plants; used for:
    - hydraulically connecting alternatively the cooling generation manifolds and the heating generation manifolds to the common plant cooling/heating manifolds; **or:**
    - hydraulically connecting the common cooling/heating generation manifolds alternatively to the cooling and heating plant manifolds.

For more information on the functions of the valve services, the types of systems that use them and the DDC programming, refer to Applications Manual (D-LBR 630), DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246).

☞ During the switching phase, the valves installed must ensure the minimum flow specified in Table 3.

WATER FLOW (L/H)				
MODEL	HEATING		COOLING	
	Minimum	Maximum	Minimum	Maximum
ACF 60-00	--	--	2500	3200
GAHP-AR	1400	5000	2500	3200
AY 00-119	1500	3200	--	--
AY 00-120 condensing unit	1500	3200	--	--
GAHP A on/off - E^3 A - GAHP A condensing unit	1400	4000	--	--
GAHP W LB - E^3 GS - GAHP GS condensing unit	1400	4000	2000	4000
GAHP W - E^3 WS - GAHP WS condensing unit	1400	4000	2300	4700

Table 3 Flow values to be provided to the Robur units during switching phase.

Operation of generator services

These services are used to manage third party (not Robur) boilers or refrigerators (chillers). Every RB200 used has a maximum of two generator services.

For each service, allocating the value to a given parameter, a specific type can be configured:

- **None**

  Generator service not enabled.
- **Simple**

  A single relay output (clean contact) is made available for generator on consent.
- **With error signalling**

  In addition to the simple output, a digital input is available (to control with a clean contact) for generator alarm signals; it allows the generator alarm status to be viewed on the DDC.
- **With circulator control**

  In addition to the simple output, a relay output (clean contact) is available to control the generator circulator; through this, the DDC controls the switching on of a water circulator specific to the generator.
- **With error signalling and circulator control**

  In addition to the simple output, there is both an alarm signal input and a water circulator control output.

For each type of generator there is also a 0-10V analogue output to send the required water setpoint to the generator; the use of this output is optional.

If you intend to use the analogue output, you must configure three parameters to adapt the voltage-temperature correspondence line to that used by the third party generator (see Figure 5).

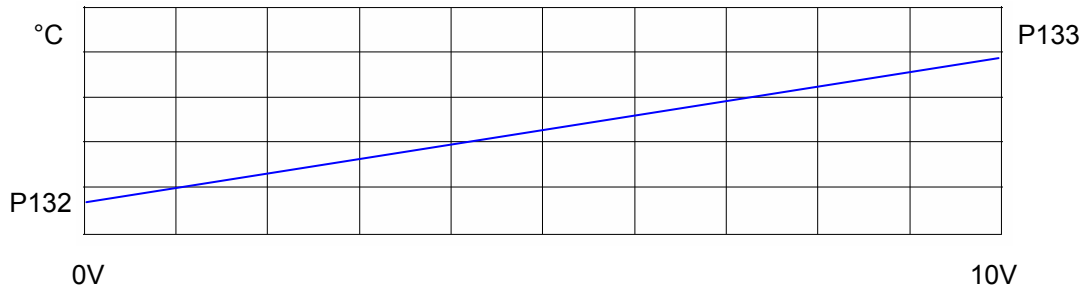


Figure 5 Correspondence between generator service temperature and voltage

The first parameter (P132 for the first generator service, P142 for the second) determines the temperature corresponding to 0V; the second (P133/P143) the temperature corresponding to 10V.

A line is therefore identified that establishes the correspondence between the setpoint value expressed in °C and the voltage applied to the output expressed in Volts.

Note that the set line may be both positive (P133 > P132) and negative (P133 < P132), independently of whether the generator is a refrigerator or a boiler.

Finally, the third parameter (P134/P144) determines the temperature (and consequently the voltage) applied to the analogue output when you wish to switch off the generator. This parameter is used when the generator to control has no dedicated input for switch-on consent, but uses the analogue input both the receive the setpoint and to receive the switch-on consent.

It is clear that the analogue value used to switch off must be beyond the temperature field normally used for plant operation. Moreover, in the most common cases, it will coincide with one end of the line, P132/P142 or, less frequently P133/P143; however there are particular cases in which a different value must be set; for example, the case in which the generator generates an alarm if the voltage applied is 0V, identifying this value and an unconnected input, and therefore requires a different value, such as 1V, to indicate the generator off request.

These three parameters can be set in the range (-25°C) ÷ (+90°C).

Having configured and wired to RB200, the generator can be configured on the DDC in the same way used to configure the Robur units on the CAN network.

Operation of circulator services

These services are used to directly control via the RB200 some types of plant circulator. There are five available types of service:

- **Primary circulator for 2-pipe cooling only or cooling/heating systems**
  Used as a common circulator on the primary circuit of these types of plants, with third party generators; or, in the case of plants with independent circulators (i.e. dedicated machine circulators) with third party generators that autonomously control their own circulator, in order to always be able to guarantee the circulation of water on the primary circuit when requested.
- **Primary circulator for heating only plants**
  Used for the same purposes as described for the previous type, for a heating plant.

- **Primary circulator for the separable system part**
  Used for the same purposes as described for the first type, for the separable part of a "hot" plant.
- **Secondary circulator for 2-pipe cooling only or cooling/heating systems**
  Used as a secondary circuit circulator on these types of plants.
- **Secondary circulator for heating only plants**
  Used as a secondary circuit circulator on this type of plant.

The RB200 has 5 circulator services, each of which can be assigned by a special parameter to one of the above-described types (it makes no sense however to assign the same type to more than one circulator service); each circulator service is also associated to a specific relay output (clean contact) to connect the circulator to be controlled to.

Some relay outputs can be alternatively assigned to different services.
For example, relay 1 is also used for some types of generator 1 service; if used for this purpose, it will not be available for the circulator service. For more details see Table 25 on page 80.

Having been configured and wired on RB200, the circulators can be configured on the DDC that will appropriately manage them.

Operation of the temperature sensor services

With these services it is possible to read some temperature sensor readings (NTC 10k) on the delivery and return manifolds of the plants and send them to the DDC. The use of the manifold sensors is **necessary** with third party generators, as in this case it is not possible to calculate the virtual temperature of the manifolds as the DDC cannot acquire the water temperature of these generators; on plants fitted with primary and secondary water circuits, even without third party generators, it is possible to adjust the water temperature on the secondary and not the primary circuit, which is evidently impossible when using the sensors on the machines.

There are four types of service:

- **Pair of delivery and return manifold sensors for 2-pipe cooling only or cooling/heating plants**

  These are positioned on the manifolds of the primary or secondary circuit on these types of plant; when this pair of sensors is present and configured, independently of the presence or not of third party generators, the DDC uses them to control the water temperature and calculate the virtual temperatures of the manifolds starting from the machine temperatures.

- **Pair of delivery and return manifold sensors for heating only plants**

  Used as described above, but for heating only plants.

- **Pair of delivery and return manifold sensors for separable plant part**

  Used as described above, for the separable part of the "hot" plant.

- **return manifold sensor on GAHP heat pumps**

  This single sensor is placed on the return manifold dedicated to the GAHP heat pumps, present in some specific types of plant, and used by the DDC with a specific optional control algorithm.

Having been configured and wired on RB200, the sensors can be configured on the DDC that will appropriately manage them.

Operation of the signalling outputs (general alarm, unavailable services)

The RB200 interface makes available five relay outputs (clean contact) for status signalling. The available outputs are:

- **General alarm**
  It is activated when error conditions occur on at least a service or when a DDC receiving a service request signals a machine or DDC warning/error, or finally when the RB200 is not powered.

- **Unavailability of cooling, heating, DHW0 and DHW1 service**
  Each of these four outputs are activated when the corresponding service is not available; a service may be unavailable:
  - If there is no fault
    - Cooling not available on 2-pipe cooling/heating plant working in heating mode (or in switching)
    - Heating or DHW service on part of the basic plant not available on the 2-pipe cooling/heating plant working in cooling mode (or in switching)
  - Due to a fault
    - Fault during configuration: incorrect configuration of the Direct Digital Controller (DDC) and/or the RB200 interface, firmware incompatibility
    - Fault during operation: problems with CAN communication

  When one or more services are unavailable due to a fault, in addition to the unavailability signalling outputs the general alarm output is also activated.

  Service non-availability warning is always accompanied by an operating code flashing on the display.

(See APPENDIX on page 82).

1.3 TECHNICAL CHARACTERISTICS

RB200 interface has the manufacturing technical features listed below.

- Shell structure:
  - container in polycarbonate;
  - type: for installation in electric panel on 35 mm DIN guide (EN 60715);
  - dimensions: 9 modules (paragraph 1.5 on page 22);
  - protection level IP20;
  - external connections:
    - 3.5-pitch screw-type input power connectors; cable sect. 0.14 to 1.5 mm²

- 5.08 mm pitch screw-type 1, 2, 3, 4, 5, 6 output connectors, cable section from 0.2 to 2.5 mm²
- 3.5 mm pitch screw-type 7, 8, 9, 10, 11, AO1, AO2, AO3 output connectors, cable section from 0.14 to 1.5 mm²
- 5.08 mm screw-type 12 output connectors, cable section from 0.14 to 1.5 mm²
- Bus CAN connection terminal blocks and 3.5 mm pitch screw-type cable shield, cable section from 0.14 to 1.5 mm²

➢ Functional features:

- electronic board with integrated microprocessor, display and knob (encoder) for adjustment;
- power supply 24Vac (± 20%) **SELV (Safety Extra Low Voltage)**

The SELV classification requires the use of a safety power transformer compliant with standard CEI EN 61558-2-6, or this will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 device and the Direct Digital Controller (DDC).

- cooling, heating, DHW0 and DHW1 service request input, respectively called XI1, XI2, XI3, XI4: can be configured as analogue (0 - 10V) or digital (to control with clean contact) according to the position of the jumpers placed next to each input and the value, respectively, of parameters 63, 83, 103, 123 (depending on the service it refers to):
  - position “A” for analogue input, parameter valued to 0;
  - position “D” for digital input, parameter valued to 1 (remote setpoint) or 2 (local setpoint);
- inputs for valve limit switch, called DI5 and DI6, third party generator alarms inputs DI7 and DI8, and input unused, DI9: these are opto-isolated digital inputs, to control with clean contact.
- temperature sensors inputs, called TP1, TP2, TP3, TP4, TP5, TP6, TP7: dedicated analogue inputs for resistive NTC 10k temperature sensors.

All inputs use SELV signals; all external devices connected to them and the connection wires must maintain this classification, or this will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 device and the Direct Digital Controller (DDC).

- relay outputs (configurable functions), called 1, 2, 3, 4, 5, 6, 12:
  - 1, 2, 3, 5, 6: NO-C clean contact
  - 4, 12: NO-C-NC clean exchange contact
  - maximum voltage: 250Vac
  - maximum current:
    - 4 A for resistive loads
    - 3 A for inductive loads

It is not possible to connect a mix of SELV and non-SELV signals to outputs 1, 2, 3, 4, 5, 6 (they must all be SELV or all non-SELV), or this will invalidate the

ELECTRICAL SAFETY compliance of the external devices requesting SELV signals.

- relay outputs for general alarm and unavailability of cooling, heating, DHW0 and DHW1 services, respectively called 7, 8, 9, 10, 11:
  - NO-C-NC clean exchange contact
  - maximum voltage: SELV (max 42 VDC/AC)
  - maximum current:
    - 0.5 A for resistive loads
    - 0.3 A for inductive loads

These outputs can only be connected to SELV signals; all external devices connected to them and the connection wires must maintain this classification, or this will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 device and the Direct Digital Controller (DDC).

- outputs for communicating setpoint to third party generators, called AO1 and AO2, and unused output AO3:

  these are analogue outputs (0 -10 V)
  - maximum current for each output: 2 mA
  - the "-" terminal of each output is connected to earth.

These outputs use SELV signals; all external devices connected to them and the connection wires must maintain this classification, or this will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 device and the Direct Digital Controller (DDC).

1.4 TECHNICAL DATA

TECHNICAL FEATURES: RB200 INTERFACE

ROBUR BOX SERIES		
GENERAL TECHNICAL DATA	**meas. units**	**Value / Feature**
OPERATING FEATURES		
OPERATING FIELD ($T_{EMPERATURE}$) MINIMUM	°C	0
MAXIMUM	°C	50
CLASSIFICATIONS EN 60730-1		
TYPE OF DEFINITION ACCORDING TO MANUFACTURE		CONTROL DEVICE FOR INDEPENDENT INSTALLATION
PROTECTION LEVEL		IP20
ACTION TYPE 1 OR 2		TYPE 1
COMPLEMENTARY FEATURES OF ACTIONS TYPE 1 OR 2		1B
POLLUTION LEVEL		2
SOFTWARE STRUCTURE AND CLASS		CLASS A
TEMPERATURE IN TEST WITH SPHERE	°C	75
HEAT AND FIRE RESISTANCE CATEGORY		CATEGORY D
RATED PULSE VOLTAGE	V	4000
REFERENCE STANDARDS FOR ELECTROMAGNETIC COMPATIBILITY TESTS		CEI EN 60730-1
ELECTRIC FEATURES		
RATED VOLTAGE	V	24 Vac (± 20%) SELV [(1)]
RATED ELECTRIC POWER	VA	11.5
FREQUENCY	Hz	50/60
VOLTAGE AND CURRENT STATED FOR ELECTROMAGNETIC TEST PURPOSE[(2)]		
ON OUTPUTS	V	230 Vac
ON BOARD		24 Vac
INPUT ELECTRIC CONNECTIONS		
CONNECTORS		SCREW [(3)]
ANALOGUE (0 - 10 V) XI1 - XI4 (SELV) (JUMPER IN POSITION A)		
VOLTAGE	V	0-10 Vdc
MAX CABLE LENGTH	m	300 - 100
MINIMUM CABLE SECTION ACCORDING TO LENGTH	mm²	1.5 – 0.5
DIGITAL XI1 – XI4 (SELV) (JUMPER IN POSITION D)		
CONTACT SENSITIVITY		
VOLTAGE	V	12 Vdc
CURRENT	mA	5
MAX CABLE LENGTH	m	300
MAX RESISTANCE FOR ON	Ω	200
MIN RESISTANCE FOR OFF	kΩ	50
ANALOGUE FOR TEMPERATURE SENSORS NTC 10k TP1 - TP7 (SELV)		
MAX CABLE LENGTH	m	300 - 100
MINIMUM CABLE SECTION ACCORDING TO LENGTH [(7)]	mm²	1.5 – 0.5
DIGITAL D5 - D9 (SELV)		
CONTACT SENSITIVITY		
VOLTAGE	V	24 Vac
CURRENT	mA	5
MAX CABLE LENGTH	m	300
MAX RESISTANCE FOR ON	Ω	200
MIN RESISTANCE FOR OFF	kΩ	50
OUTPUT ELECTRIC CONNECTIONS		
CONNECTORS		SCREW [(4)]
RELAY OUTPUTS 1, 2, 3, 4, 5, 6, 12		
MAX VOLTAGE	V	250 Vac
MAX CABLE LENGTH	m	300
LOAD TYPE AND RATED CURRENT		
RESISTIVE LOAD	A	4
INDUCTIVE LOAD (COS φ = 0.6)	A	3

USEFUL LIFE OF CONTACTS – 250 Vac 3 A COS φ = 0.6		
C - NO	Cycles	100000
C - NC (OUTPUTS 4, 12)	Cycles	80000
C - NC (OUTPUT 5)	Cycles	50000
RELAY OUTPUTS 7, 8, 9, 10, 11 (SELV)		
MAX VOLTAGE	V	42V dc/ac SELV
MAX CABLE LENGTH	m	300
LOAD TYPE AND RATED CURRENT		
RESISTIVE LOAD	A	0.5
INDUCTIVE LOAD (COS φ = 0.6)	A	0.3
USEFUL LIFE OF CONTACTS – 42VAC 0.3 A COS φ = 0.6		
C - NO	Cycles	100000
C - NC	Cycles	100000
ANALOGUE OUTPUTS (0 – 10 V) AO1 - AO3 (SELV)		
VOLTAGE	V	0 - 10 Vdc
MAX CABLE LENGTH	m	300 - 100
MINIMUM CABLE SECTION ACCORDING TO LENGTH (7)	mm²	1.5 – 0.5
RATED CURRENT	mA	2
PHYSICAL DATA		
WEIGHT	kg	0,455
SIZE WIDTH	mm	158
SIZE DEPTH(5)	mm	75
SIZE HEIGHT(6)	mm	107
ASSEMBLY		in electric panel on guide DIN 35 mm (EN 60715)

Table 4 Operating technical features: RB200 interface

NOTES

*(1) **THE SELV CLASSIFICATION REQUIRES THE USE OF A SAFETY POWER TRANSFORMER** COMPLIANT WITH STANDARD CEI EN 61558-2-6*

(2) EMC EMISSION TESTS

(3) PITCH 3.5 mm. Cable section from 0.14 to 1.5 mm²

(4) 1, 2, 3, 4, 5, 6: PITCH 5.08 mm. Cable section from 0.2 to 2.5 mm²
7, 8, 9, 10, 11, AO1, AO2, AO3: PITCH 3.5 mm. Cable section from 0.14 to 1.5 mm²
12: PITCH 5.08 mm. Cable section from 0.14 to 1.5 mm²

(5) DIMENSIONS INCLUDING KNOB

(6) DIMENSIONS INCLUDING CONNECTORS

(7 SMIN = L / 200 L: REQUIRED LENGTH [M]; SMIN: MINIMUM SECTION [MM²]

The SELV classification requires the use of a safety transformer, or this will invalidate the **ELECTRICAL SAFETY** compliance of the external devices requiring SELV signals.

All inputs use SELV signals; all external devices connected to them and the connection wires must maintain this classification, or this will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 device and the Direct Digital Controller (DDC).

It is not possible to connect a mix of SELV and non-SELV signals to outputs 1, 2, 3, 4, 5, 6 (they must all be SELV or all non-SELV), or this will invalidate the **ELECTRICAL SAFETY** compliance of the external devices requesting SELV signals.

Outputs **7, 8, 9, 10, 11** can only be connected to SELV signals; all external devices connected to them and the connection wires must comply with this requirement, or will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 and the Direct Digital Controller (DDC).

Outputs **AO1, AO2, AO3** use SELV signals; all external devices connected to them and the connection wires must comply with this requirement, or will invalidate the **ELECTRICAL SAFETY** compliance of the RB200 and the Direct Digital Controller (DDC).

1.5 OVERALL DIMENSIONS

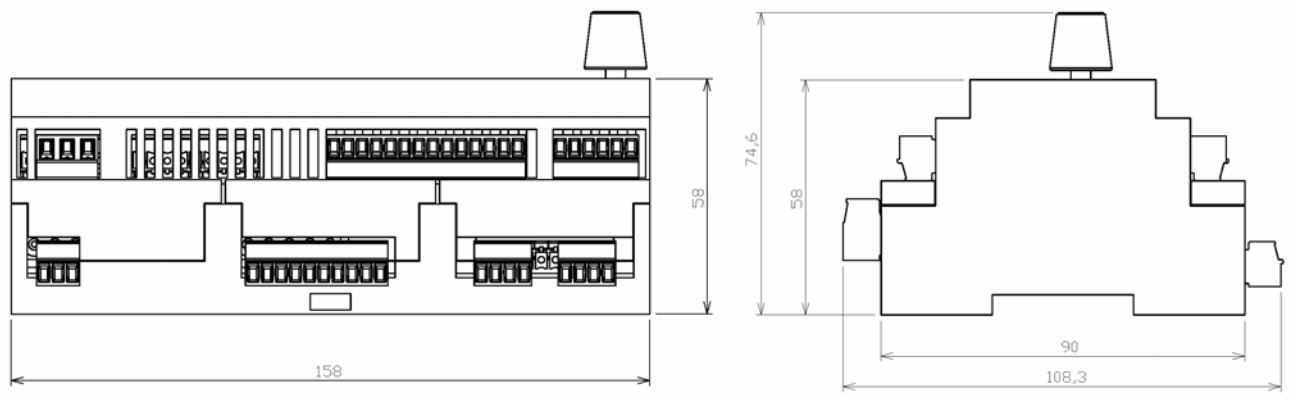


Figure 6 Dimensions of the Robur Box series: front and side view

In figure, appliance depth includes knob exposure.

SECTION 2 ELECTRIC INSTALLER

This section provides all the instructions necessary to connect appliance and Direct Digital Controller (DDC) from the electric point of view.

The following procedures apply to the whole electric installation process of appliance:

1. APPLIANCE INSTALLATION AND CONNECTION TO POWER GRID
2. ELECTRICAL CONNECTIONS FOR COOLING, HEATING, DHW0 AND DHW1 SERVICE REQUESTS
3. ELECTRICAL CONNECTIONS FOR COOLING, HEATING, DHW0 AND DHW1 SERVICE UNAVAILABILITY OUTPUTS
4. ELECTRIC CONNECIONS FOR VALVE SERVICES
5. ELECTRIC CONNECTIONS FOR GENERATOR SERVICES
6. ELECTRIC CONNECTIONS FOR CIRCULATOR SERVICES
7. ELECTRIC CONNECTIONS FOR TEMPERATURE SENSOR SERVICES
8. CONNECTION TO THE CAN BUS DATA NETWORK

The appliance only operates if properly connected with Direct Digital Controller (DDC).

The appliance can only be installed by an authorized firm, complying with the applicable laws of the installation country or by professionally qualified personnel.

Wrong installation or non-compliance with law can provoke damages to persons, animals and things; Robur S.p.A is not responsible for damages due to wrong installation or non-compliance with law.

Ensure strict compliance with the **ELECTRICAL SAFETY** requirements laid down in Paragraph 1.4 TECHNICAL DATA.

2.1 DESCRIPTION OF CONNECTIONS

- The power supply transformer must be SELV/PELV (min. 12VA) and comply with CEI EN 61558-2-6 standard.
- Check that power supply voltage is 24 Vac (±20%).
- The electrical components used for connection (e.g. fuses, etc.) must be mounted in an external electric panel located by the installer in the vicinity of the unit.

Before performing electric connection, ensure elements are not live.

Figure 7 shows the main elements of RB200 and highlights the connections present on the lower level of the container.
Table 5 provides a description of the connections shown in Figure 7.

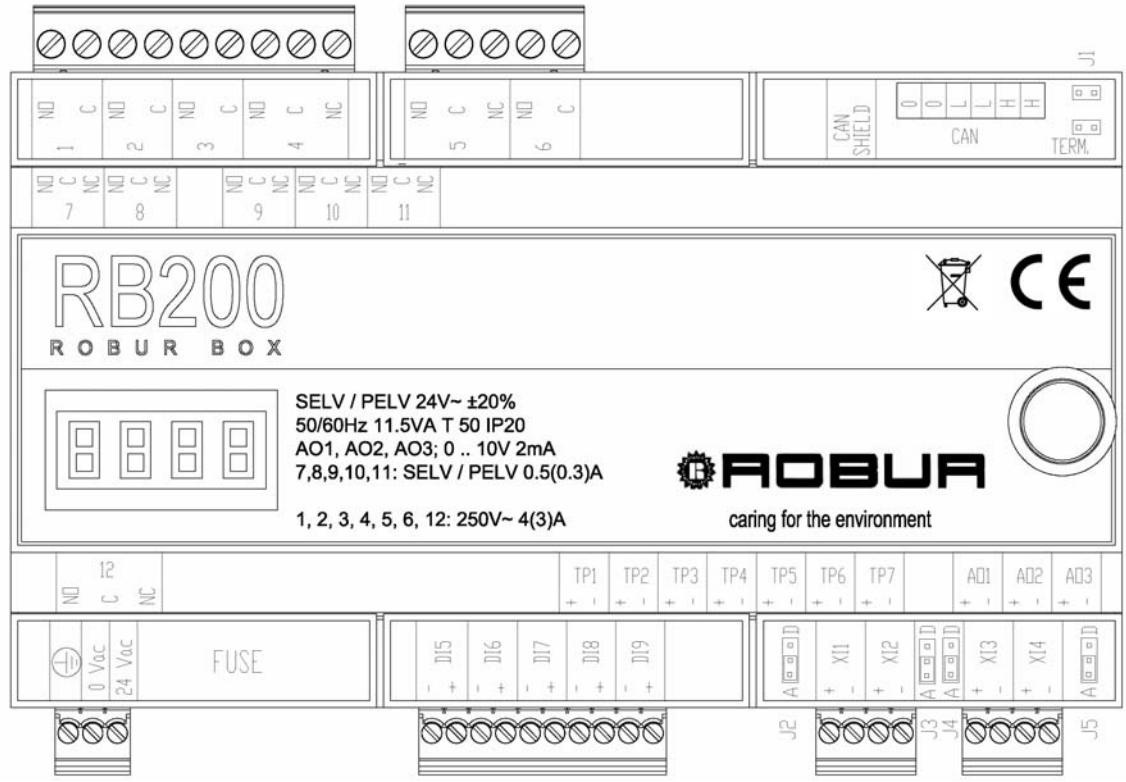


Figure 7 RB200 - representative diagram of the lower level connections

DESCRIPTION OF RB200 CONNECTIONS SHOWN IN FIGURE 9 (above)	
REFERENCE	**DESCRIPTION**
connections along the upper horizontal edge, on the lower level	
1	N.O. GENERATOR 1 CIRCULATOR OR CIRCULATOR 1 SERVICE
2	N.O. GENERATOR 2 CIRCULATOR OR CIRCULATOR 2 SERVICE
3	N.O. CIRCULATOR 3 SERVICE
4	N.O.-N.C. VALVE 1 SERVICE OR CIRCULATOR 4 SERVICE
5	N.O.-(N.C.) GENERATOR 1 ON
6	N.O. GENERATOR 2 ON
CAN SHIELD	TERMINAL BLOCK FOR CONNECTING CAN BUS CABLE SHIELD (LOCKING SCREWS UNDER THE TERMINAL PROTECTION)
CAN	CAN BUS CABLE TERMINAL BLOCK (LOCKING SCREWS UNDER THE TERMINAL PROTECTION)
J1	CAN BUS BUS TERMINATION JUMPERS (UNDER THE TERMINAL PROTECTION)
connections along the lower horizontal edge, on the lower level	
⏚ 0 – 24 Vac	BOARD POWER CONNECTOR AND EARTH CONNECTION
FUSE	PROTECTION FUSE (5 X 20 mm 250Vac 2 AT) (UNDER THE TERMINAL PROTECTION)
DI5	INPUT FOR VALVE LIMIT SWITCH AUXILIARY CONTACT: COOLING SIDE CONTACT/NON SEPARATE SEPARABLE GROUP IF THE CONTACT **CLOSES** IN THE LIMIT SWITCH POSITION; OR HEATING SIDE CONTACT/SEPARATE SEPARABLE GROUP IF THE CONTACT **OPENS** IN THE LIMIT SWITCH POSITION.
DI6	INPUT FOR VALVE LIMIT SWITCH AUXILIARY CONTACT: HEATING SIDE CONTACT/NON SEPARATE SEPARABLE GROUP IF THE CONTACT **CLOSES** IN THE LIMIT SWITCH POSITION; OR COOLING SIDE CONTACT/SEPARATE SEPARABLE GROUP IF THE CONTACT **OPENS** IN THE LIMIT SWITCH POSITION
DI7	GENERATOR 1 ALARM SIGNAL INPUT
DI8	GENERATOR 2 ALARM SIGNAL INPUT
DI9	UNUSED
XI1	ANALOGUE/DIGITAL INPUT FOR COOLING SERVICE REQUEST
J2	JUMPER SELECT INPUT TYPE (ANALOGUE/DIGITAL) FOR COOLING SERVICE REQUEST (UNDER THE TERMINAL PROTECTION)
XI2	ANALOGUE/DIGITAL INPUT FOR HEATING SERVICE REQUEST

J3	JUMPER SELECT INPUT TYPE (ANALOGUE/DIGITAL) FOR HEATING SERVICE REQUEST (UNDER THE TERMINAL PROTECTION)
XI3	ANALOGUE/DIGITAL INPUT FOR DHW0 SERVICE REQUEST
J4	JUMPER SELECT INPUT TYPE (ANALOGUE/DIGITAL) FOR DHW0 SERVICE REQUEST (UNDER THE TERMINAL PROTECTION)
XI4	ANALOGUE/DIGITAL INPUT FOR DHW1 SERVICE REQUEST
J5	JUMPER SELECT INPUT TYPE (ANALOGUE/DIGITAL) FOR DHW1 SERVICE REQUEST (UNDER THE TERMINAL PROTECTION)

Table 5 Description of RB200 connections represented in Figure 7

Figure 8 shows the connections on the upper level of the container.
Table 6 provides a description of the connections shown in Figure 8.

☞ **Please note that the connectors on the upper level are inserted in the device with the locking screws pointing downwards. Bear this in mind in order to correctly connect the various wires to the different terminals on these connectors**.

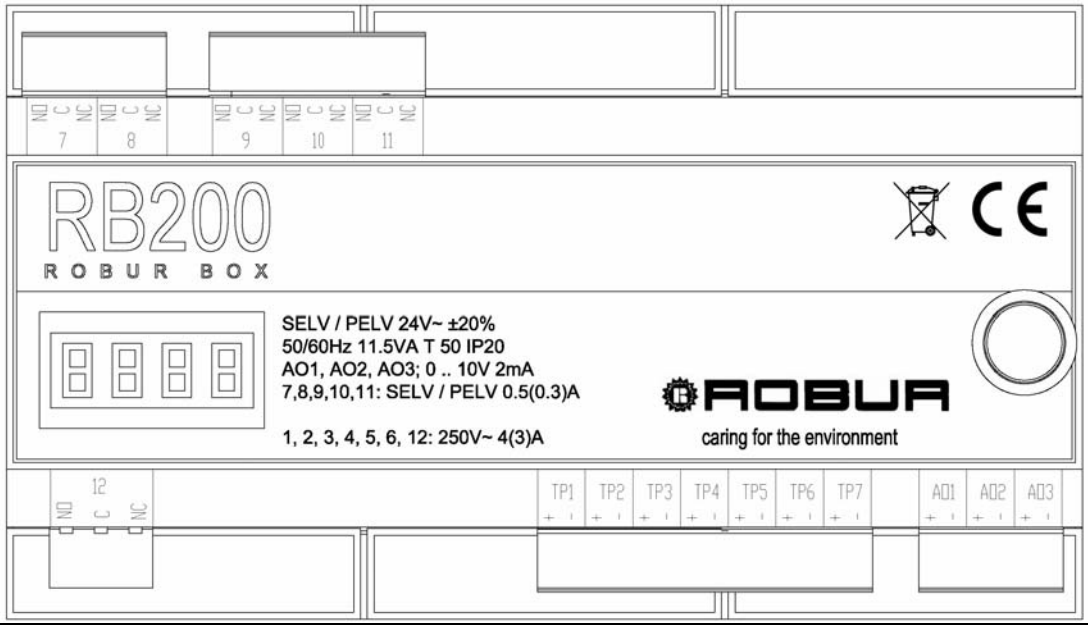


Figure 8 RB200 - representative diagram of the upper level connections

DESCRIPTION OF RB200 CONNECTIONS SHOWN IN FIGURE 10 (above)	
REFERENCE	**DESCRIPTION**
connections along the upper horizontal edge, on the upper level	
7	N.O.-N.C. CONTACT OF GENERAL ALARM
8	N.O.-N.C. COOLING SERVICE UNAVAILABLE
9	N.O.-N.C. HEATING SERVICE UNAVAILABLE
10	N.O.-N.C. DHW0 SERVICE UNAVAILABLE
11	N.O.-N.C. DHW1 SERVICE UNAVAILABLE
connections along the lower horizontal edge, on the upper level	
12	N.O.-N.C. VALVE 2 SERVICE OR CIRCULATOR 5 SERVICE
TP1	SENSOR 1 PAIR RETURN TEMPERATURE SENSOR INPUT (COOLING)
TP2	SENSOR 1 PAIR DELIVERY TEMPERATURE SENSOR INPUT (COOLING)
TP3	SENSOR 2 PAIR RETURN TEMPERATURE SENSOR INPUT (HEATING)
TP4	SENSOR 2 PAIR DELIVERY TEMPERATURE SENSOR INPUT (HEATING)
TP5	SENSOR 3 PAIR RETURN TEMPERATURE SENSOR INPUT (DHW SEPARABLE)
TP6	SENSOR 3 PAIR DELIVERY TEMPERATURE SENSOR INPUT (DHW SEPARABLE)
TP7	RETURN TEMPERATURE SENSOR INPUT GAHP HEAT PUMPS
AO1	ANALOGUE OUTPUT 0 ... 10V SETPOINT GENERATOR 1
AO2	ANALOGUE OUTPUT 0 ... 10V SETPOINT GENERATOR 2
AO3	UNUSED

Table 6 - Description of RB200 connections represented in **Figure 8**

2.2 APPLIANCE INSTALLATION AND CONNECTION TO POWER GRID

The appliance can only be installed by an authorized firm, complying with the applicable laws of the installation country or by professionally qualified personnel.

Wrong installation or non-compliance with law can provoke damages to persons, animals and things; Robur S.p.A is not responsible for damages due to wrong installation or non-compliance with law.

Before performing electric connection, ensure elements are not live.

The device must be installed in an electric panel designed to house standard devices fixed on DIN 35 mm guide. When the device is installed, access to live part must only be possible by opening and removing parts of the electric panel using special tools.

Proper installation of appliance must allow for easy access to the knob and the display.

Operations to properly install the appliance are listed below:

1. cut off voltage from electric panel where the RB200 is to be installed;
2. identify a free area in the panel of at least 9 modules;
3. assemble the device on guide DIN 35 mm (EN 60715).

Remember that appliance is equipped with knob, which must be easily accessible without danger, its installation height must provide for easy display view.

4. Connect to the safety transformer 230 Vac/24Vac with a cable minimum section 3 x 0.75 mm^2, as shown in Figure 9, respecting the polarity.
   The maximum length of the cable is **1 m**.

Terminal 0 V is internally connected with the earth terminal ⏚, then grounded; if transformer used already has a secondary winding terminal grounded, it must be definitely connected to such the 0 V terminal.

5. Complete all operations and close electric panel.

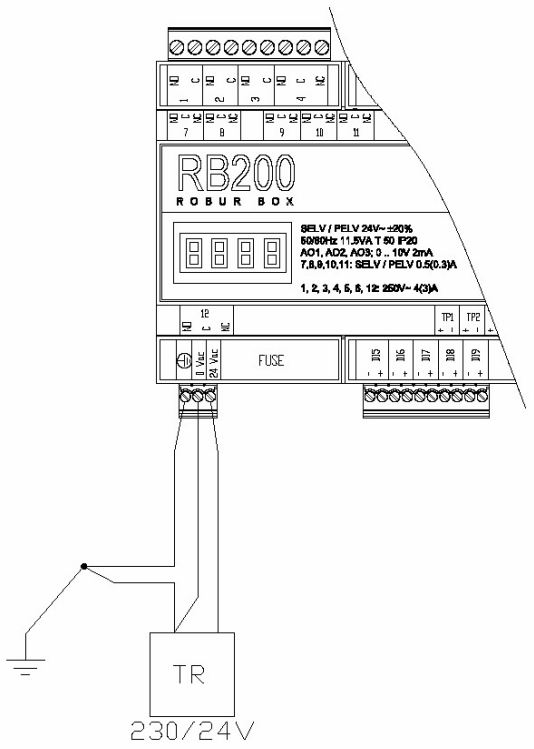


Figure 9 RB200. Example of mains connection: power supply 24 Vac 12VA SELV/PELV

2.3 ELECTRICAL CONNECTIONS FOR COOLING, HEATING, DHW0 AND DHW1 SERVICE REQUESTS

Inputs

The electric installer must properly connect input of each service used, depending on its configuration, i.e.:

- analogue input
- digital input

In particular, it is necessary to underline again that each one of the 4 services (XI1, XI2, XI3, XI4) can be configured as analogue or digital; therefore, only one scheme for each one of the two types of connection, which can be applied to each service independently, will be represented here below.

Do not forget that jumpers on input terminal sides of service involved must be properly located under the terminal protection and service is to be properly configured (SECTION 5).
To facilitate the jumper configuration, the device is supplied with the terminal protection disassembled. After configuration, mount the terminal protection as shown in Figure 10 and Figure 11 by pushing into the seat until the retaining tooth clicks into place.

Analogue Input

In this case the input is an analogue input 0 - 10 Vdc.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for other information on the features of these inputs and the cable sections to be used according to length; in any case the maximum cable length is **300 m** with section **1.5 mm^2**.

☞ The cables must be shielded with the shield connected to earth at one end.

Connection Scheme

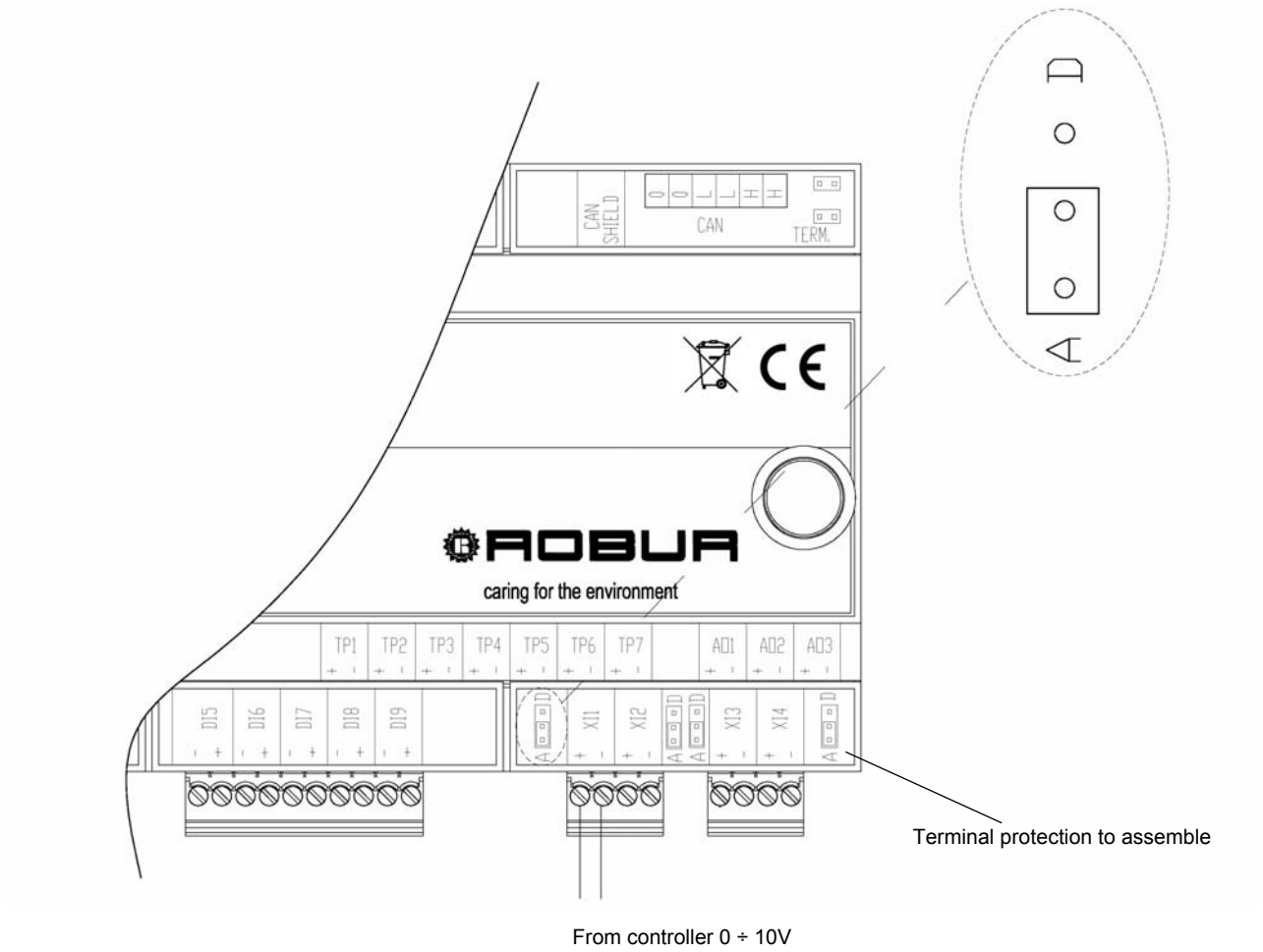


Figure 10 RB200: electrical connection for analogue input

Digital Input

For the input used as digital, remember that the external contact must have an operating voltage of at least 12 Vdc and must ensure the closure with a minimum 5 mA current.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these inputs.

The maximum length of the cables is **300 m**.

☞ The cable must be shielded with the shield connected to earth at one end.

Connection Scheme

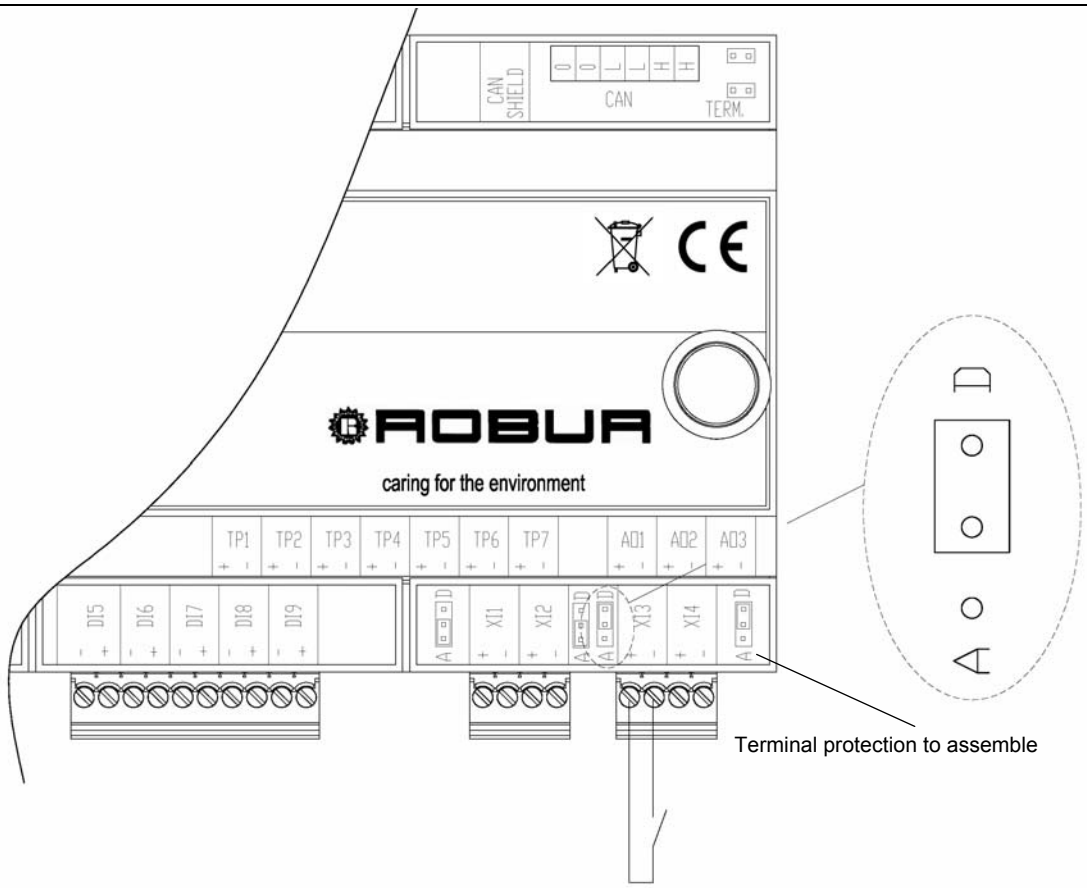


Figure 11 RB200: electrical connection for digital input

2.4 ELECTRICAL CONNECTIONS FOR COOLING, HEATING, DHW0 AND DHW1 SERVICE UNAVAILABILITY OUTPUTS

Every output comprises a clean exchange contact N.O.- N.C. (contacts 8, 9, 10, 11); the unavailability status causes the NO contact to close.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these outputs.

The maximum length of the cables is **300 m**.

Take particular care when replacing an RB100 with the new RB200. The devices use different contacts and signal levels!! Refer to the following table:

	RB100		RB200	
DESCRIPTION	**CONTACT**	**MAX V / I**	**CONTACT**	**MAX V / I**
Unavailable. Condit.	1	250 Vac / 4(3) A	8	42V SELV / 0.5 (0.3) A
Unavailable. Heating.	2	250 Vac / 4(3) A	9	42V SELV / 0.5 (0.3) A
Unavailable. DHW0	3	250 Vac / 4(3) A	10	42V SELV / 0.5 (0.3) A
Unavailable. DHW1	6	250 Vac / 4(3) A	11	42V SELV / 0.5 (0.3) A

☞ Please note that the connectors used for this contact are fitted into the device with the locking screws pointing downwards. Bear this in mind in order to correctly connect the various wires to the different terminals on these connectors.

2.5 ELECTRIC CONNECIONS FOR VALVE SERVICES

Outputs

The valve control outputs are composed of clean diverter contacts (exchange contacts) N.O. - N.C. (contacts 4 and 12)

- the NO contact is closed when the system requests the valve to be in heating position (or separated separable group);
- the NC contact is closed when the system requests the valve to be in cooling position (or non-separated separable group);

The output control relays are toggle type (in case of power cut to the appliance, the contacts remain in the original position).

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these outputs.

The maximum length of the cables is **300 m**.

☞ Please note that the connector used for contact 12 is fitted into the device with the locking screws pointing downwards. Bear this in mind in order to correctly connect the various wires to the different terminals on these connectors.

Inputs

There are two digital inputs (DI5, DI6) for the -optional- management of the auxiliary limit switch contacts of the valve 1 service, the one activated by contact 4; the valve 2 services, activated by contact 12, has no inputs for managing limit switch contacts.

Both limit switch contact logics are supported.

In the case of **closed** contacts with valve in the respective limit switch position:

- Input DI5 must be connected to the active limit switch contact when the valve is in the “Cooling” or “NON separate separable group” position, depending on the configured type of valve service.
- Input DI6 must be connected to the active limit switch contact when the valve is in the “Heating” or “separate separable group” position, depending on the configured type of valve service.

In the case of **open** contacts with valve in the respective limit switch position:

- The connections must be inverted compared to what stated for the previous case.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these inputs.

The maximum length of the cables is **300 m**.

The cables of these digital inputs must be shielded with the shield connected to earth at one end.

Valve connection diagram for valve 1 service

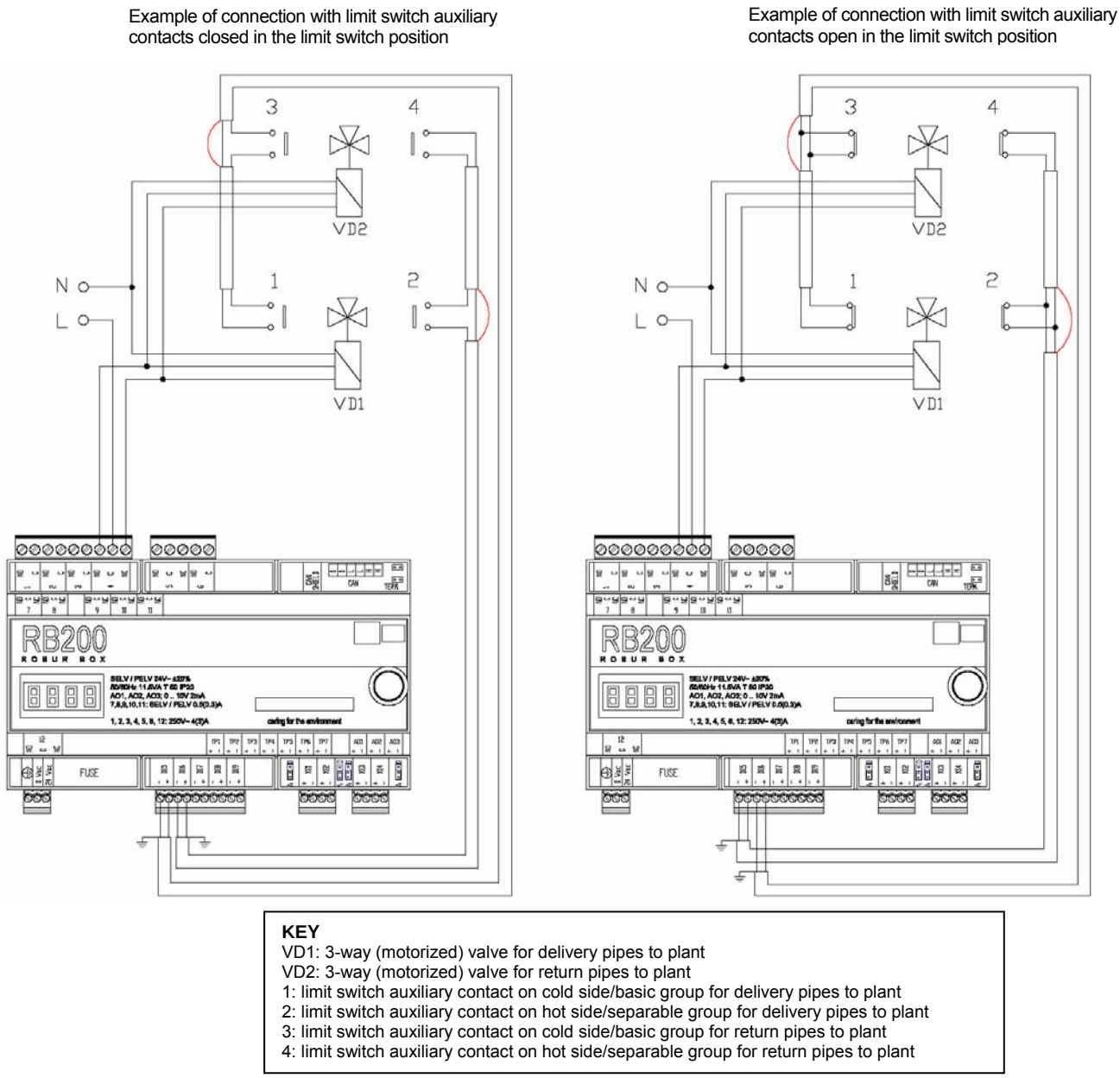


Figure 12 RB200: Example of electric connection for valve 1 service

Valve connection diagram for valve 2 service

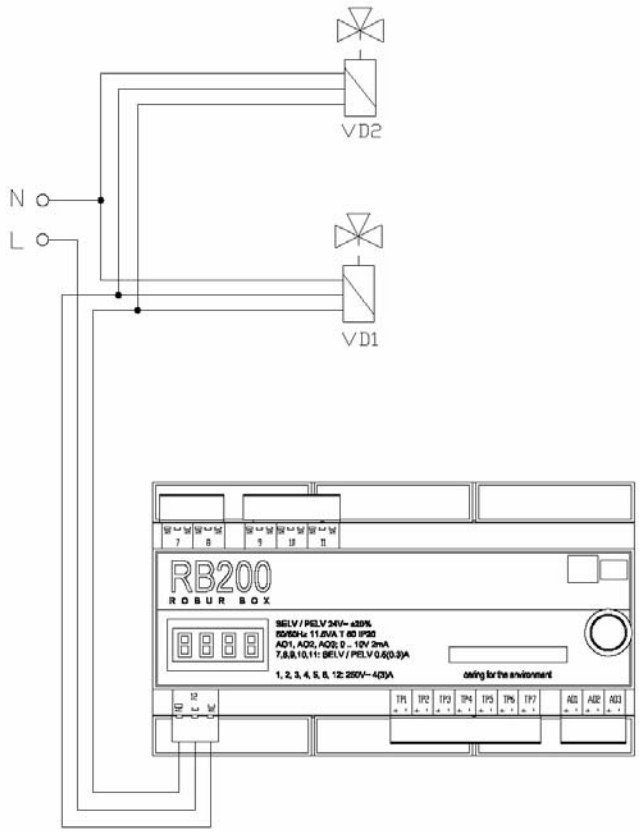


Figure 13 RB200: Example of electric connection for valve 2 service

☞ For valve management, valve service must be properly configured, with reference to paragraph. 5.7 “Service configuration” on page 78.

2.6 ELECTRIC CONNECTIONS FOR GENERATOR SERVICES

Outputs

- The ON/OFF control outputs of the generators are N.O. clean contacts. (contact 5 for the generator 1 service, contact 6 for the generator 2 service)
    - o the NO contact is closed when the system requests the generator to be switched on (ON).
    - o NOTE: these outputs are available for all types of generator, however they are not used for controls via signals 0 – 10V with activation threshold.
- The ON/OFF control outputs of the circulators dedicated tot he generators are N.O. clean contacts. (contact 1 for the generator 1 service, contact 2 for the generator 2 service)
    - o the NO contact is closed when the system requests the circulator to be switched on (ON).
    - o NOTE: these outputs are available as options, if types of generators that require them are configured.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these outputs.

The maximum length of the cables is **300 m**.

- The Setpoint signalling outputs to the generators are analogue outputs 0 - 10 V (output AO1 for generator 1 service, output AO2 for generator 2 service)
    - For operating details see **Operation of generator services** in Paragraph 1.2 MACHINE OPERATION**.**
    - NOTE: these outputs are available for all types of generator, however they are not used in the case of pure ON/OFF controls.

Refer to Table 4 shown in Paragraph 1.4 TECHNICAL DATA for more information on the features of these outputs and the cable section to use according to length; in any case the maximum cable length is **300 m** with section **1.5 mm^2**.

☞ The cables of these analogue outputs must be shielded with the shield connected to earth at one end.

☞ Please note that the connector used for these analogue outputs is fitted into the device with the locking screws pointing downwards. Bear this in mind in order to correctly connect the various wires to the different terminals on this connector.

Inputs

- There are two - optional - digital inputs (DI7, DI8) for signalling generator alarms (input DI7 for generator 1 service, input DI8 for generator 2 service), to control with clean contacts.
    - The alarm signal is active with the contact **closed**.
    - NOTE: these inputs are available as options, if types of generators that require them are configured.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these inputs.

The maximum length of the cables is **300 m**.

☞ The cables of these digital inputs must be shielded with the shield connected to earth at one end.

Generator connection diagram for generator 1 service

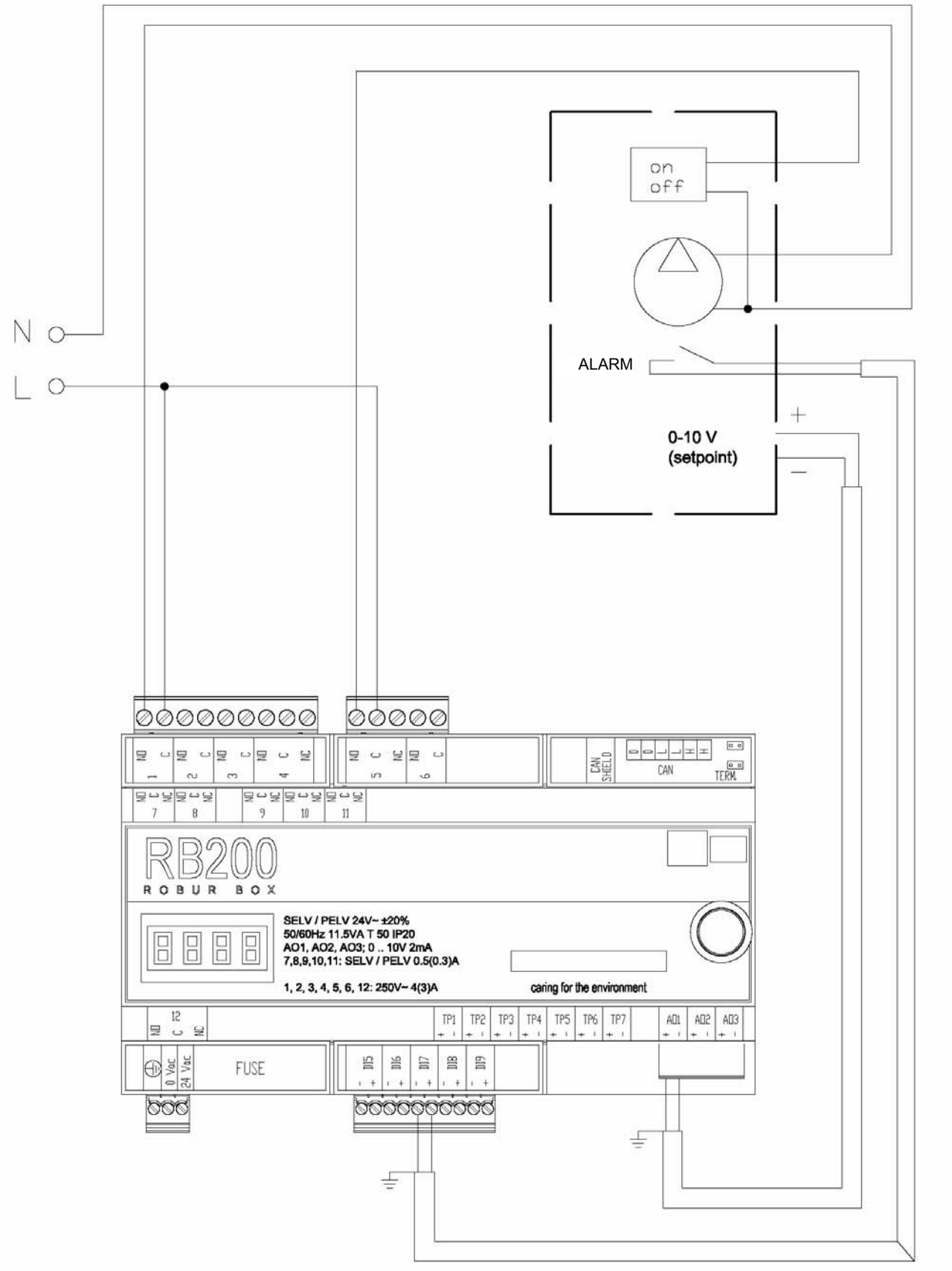


Figure 14 RB200: Example of electric connection for generator 1 service

Generator connection diagram for generator 2 service

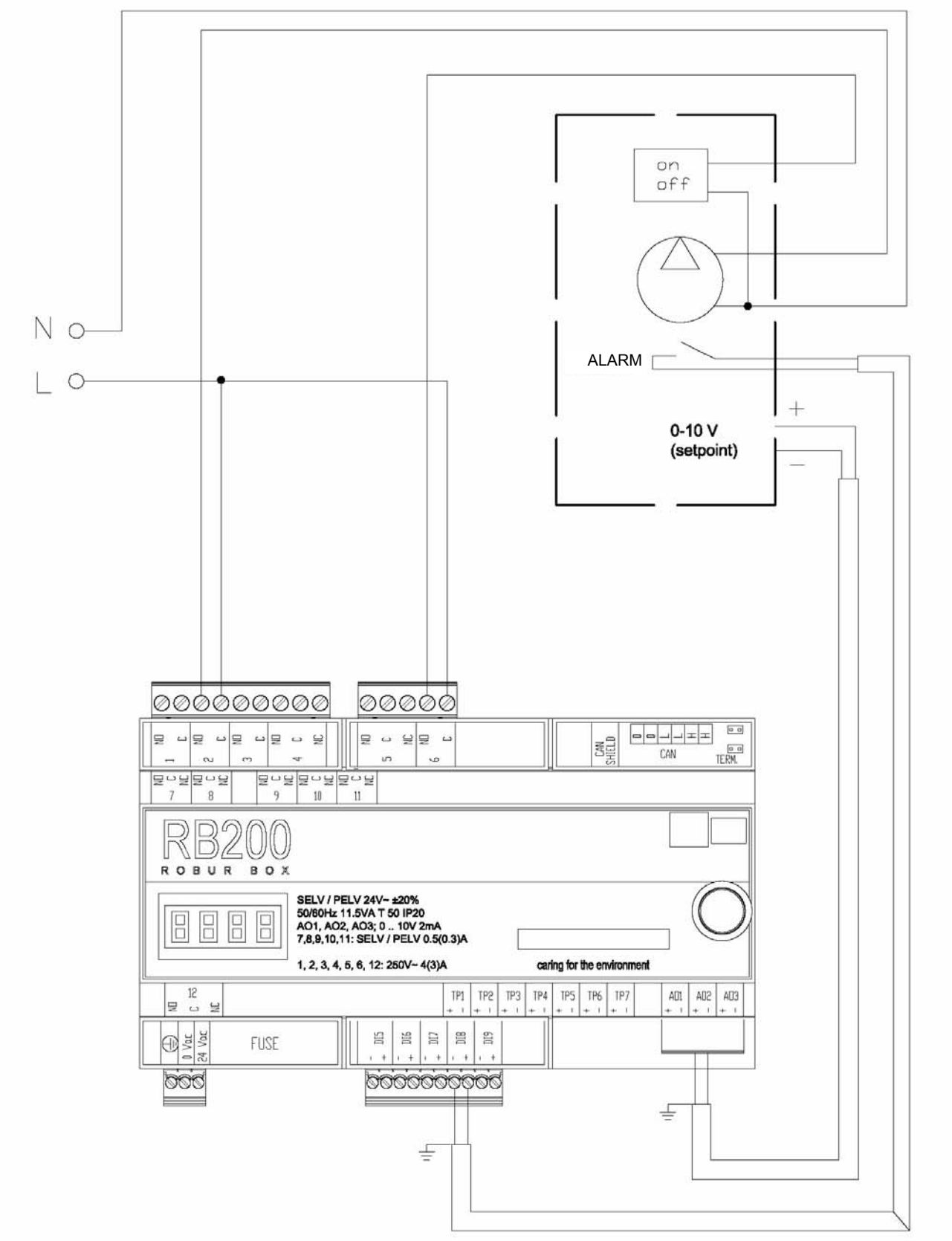


Figure 15 RB200: Example of electric connection for generator 2 service

☞ For generator management, the respective service must be properly configured, with reference to paragraph 5.7 “Service configuration” on page 78.

2.7 ELECTRIC CONNECTIONS FOR CIRCULATOR SERVICES

- The ON/OFF control outputs of the circulators are N.O. clean contacts. (contacts 1, 2, 3, 4, 12 for circulator services 1, 2, 3, 4, 5 respectively);
    - o the NO contact is closed when the system requests the circulator to be switched on (ON).

☞ Contact 1 is also used to control the circulator dedicated to generator 1; therefore if the generator 1 service is configured and is of a type that requires the circulator control, the circulator 1 service is not available.

☞ Contact 2 is also used to control the circulator dedicated to generator 2; therefore if the generator 2 service is configured and is of a type that requires the circulator control, the circulator 2 service is not available.

☞ Contact 12 is also used to implement the valve 2 service valve; therefore if valve 2 service is configured, the circulator 5 service is not available.

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of these outputs.

The maximum length of the cables is **300 m**.

Circulator connection diagram for circulator 3 service

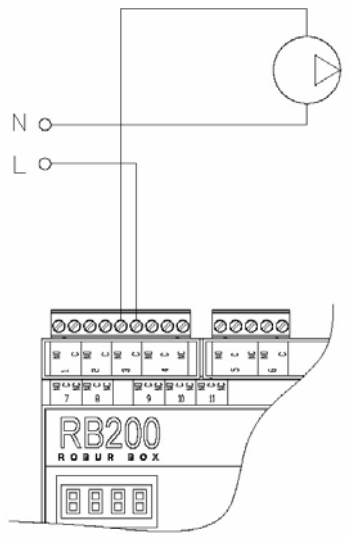


Figure 16 RB200: Example of electric connection for circulator 3 service

☞ The connection of circulators to other circulator services is identical; only the contact affected by RB200 is different.

☞ For circulator management, the respective service must be properly configured, with reference to paragraph 5.7 “Service configuration” on page 78.

2.8 ELECTRIC CONNECTIONS FOR TEMPERATURE SENSOR SERVICES

Inputs TP1 -TP7 are analogue inputs dedicated to resistive temperature sensors type NTC 10k; the temperature range is –29 °C – 110 °C.

- TP1/TP2: Cooling or 2-pipe cooling/heating manifold return/delivery.
- TP3/TP4: Heating manifold return/delivery.
- TP5/TP6: Separable DHW manifold return/delivery.
- TP7: GAHP heat pump return manifold.

Refer to Table 4 shown in Paragraph 1.4 TECHNICAL DATA for more information on the features of these inputs and the cable sections to be used according to length; in any case the maximum cable length is **300 m** with section **1.5 mm^2**.

Example of connection for heating manifold return/delivery sensor pair

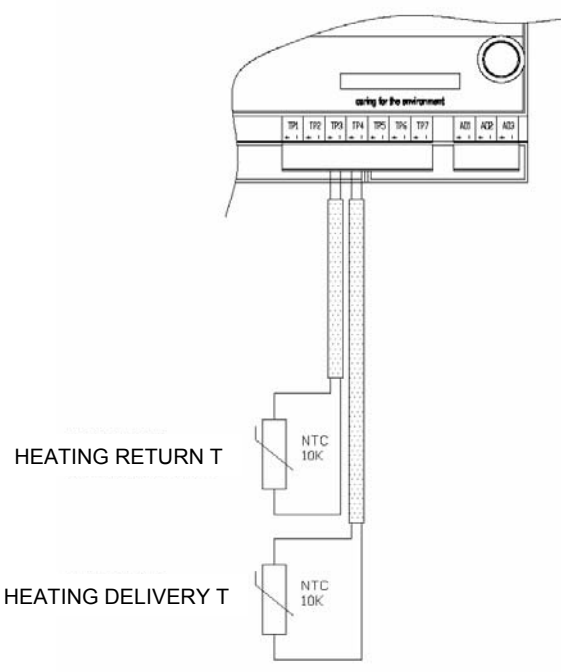


Figure 17 RB200: Example of connection for heating manifold return/delivery sensor pair

☞ The connection of other pairs of sensors is identical; only the inputs affected by RB200 are different.

☞ Please note that the connector used for these inputs is fitted into the device with the locking screws pointing downwards. Bear this in mind in order to correctly connect the various wires to the different terminals on this connector.

To manage the sensor pairs TP1/TP2, TP3/TP4, TP5/TP6 and sensor TP7 you must correctly configure the respective services, referring to paragraph 5.7 “Service configuration” on page 78.

2.9 ELECTRIC CONNECTION FOR COMMON ALARM SIGNAL

The common alarm output comprises a clean exchange contact N.O.- N.C. (contact 7); the alarm state causes the NC contact to close (the relay is powered if there is no alarm).

Refer to Table 4 in Paragraph 1.4 TECHNICAL DATA for more information on the features of this output.

The maximum length of the cables is **300 m**.

Take particular care when replacing an RB100 with the new RB200. **The devices use different contacts and signal levels.** Refer to the following table:

	RB100		RB200	
DESCRIPTION	**CONTACT**	**MAX V / I**	**CONTACT**	**MAX V / I**
COMMON ALARM	5	250 VAC / 4(3) A	7	42V SELV / 0.5 (0.3) A

Please note that the connector used for this contact is fitted into the device with the locking screws pointing downwards. Bear this in mind in order to correctly connect the various wires to the different terminals on this connector.

2.10 CONNECTION TO THE CAN BUS DATA NETWORK

To be able to communicate with the Direct Digital Controller (DDC), the RB200 device must also be connected to the CAN Bus data network; this is the same data network the DDC and the Robur units are connected to.

The instructions for connection operations to the DDC, including those to the CAN Bus data network, are given in the specific “DDC Installation Manual (D-LBR 257)” of the DDC.

Instructions for DDC programming/configuring and use are described in the relevant “DDC Use and Programming Manual (D-LBR 246)” for DDC itself.

The instructions for connection operations to the Robur units, including those to the CAN Bus data network, are given in the specific manuals of the units.

The CAN bus network has a series of elements (units, DDCs and RB200) called nodes, connected to each other by a cable (CAN-BUS cable).

The Features of CAN-BUS cable are described below and specified in the relevant Table 7.

Nodes can be final and intermediate.
Robur units, DDCs and RB200 devices can be indifferently located as final or intermediate nodes.
Final nodes are connected to only one other node.
Intermediate nodes are connected to two other nodes.

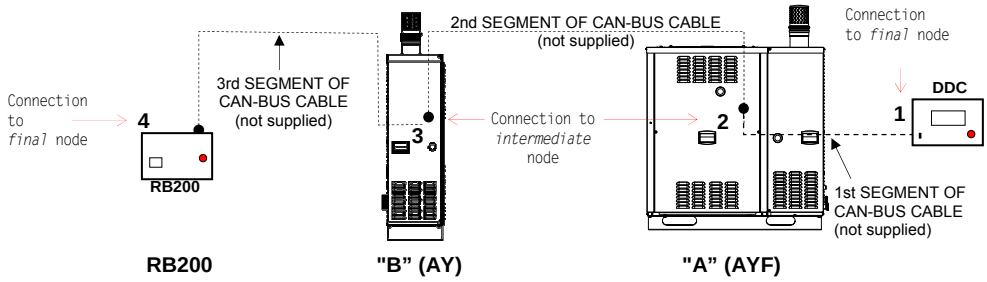


Figure 18 Examples of CAN BUS network with 4 nodes = 2 Robur units + 1 RB200 + 1 DDC

For example, the CAN-BUS network shown in the diagram in Figure 18 has the following nodes:

a) 2 final nodes: node 1 (DDC) and node 4 (RB200).
DDC is connected to only one other node: unit “A”.
RB200 is connected to only one other node: unit “B”.

b) 2 intermediate node 2 (unit “A”) and node 3 (unit “B”).
Unit “A” is connected to two other nodes: DDC and unit “B”.
Unit “B” is connected to two other nodes: unit “A” and RB200.

Features of CAN-BUS cable

The BUS CAN cable must comply with Honeywell SDS or Devicenet standard.

The following table shows some types of CAN BUS cable, grouped according to maximum distance covered by each type.

NAME OF CABLE	MARKINGS / COLOURS			MAXIMUM LENGTH	note
Robur					**Order code O-CVO008**
ROBUR NETBUS	H = BLACK	L = WHITE	GND = BROWN	450 m	
Honeywell SDS 1620					**In all cases, the fourth wire may not be used**
BELDEN 3086A	H = BLACK	L = WHITE	GND = BROWN	450 m	
TURCK type 530					
DeviceNet Mid Cable					
TURCK type 5711	H = BLUE	L = WHITE	GND = BLACK	450 m	
Honeywell SDS 2022					
TURCK type 531	H = BLACK	L = WHITE	GND = BROWN	200 m	

Table 7 Example of cable types used for can-bus cable

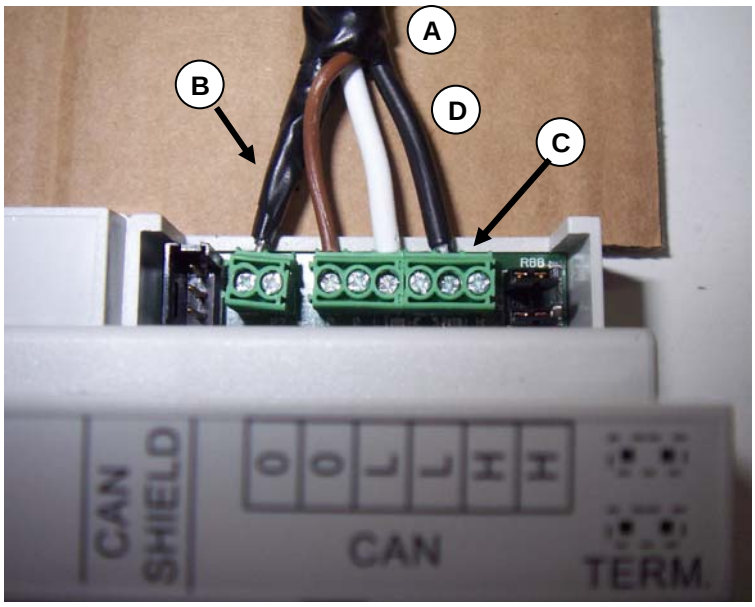
For maximum distance to be covered ≤200 m and network with max 6 nodes (example: 4 Robur units + 1 RB200 + 1 DDC) a simple 3x0.75 mm² shielded cable can be used.

As shown in the table, the CAN connection requires a CAN BUS cable with 3 wires (two data plus (GND or 0). If the available cable has more than three coloured wires, select the colours shown in the table and cut the useless ones.

ROBUR NETBUS cable is available as accessory.

Instructions for specific operations to be made for CAN-BUS cable connection to the RB200

The CAN BUS cable connects to the relative terminal blocks (CAN and CAN SHIELD) on the RB200, see Figure 7 on page 24 and Figure 19 or Figure 20, below. Act as follows.



KEY

CONNECTION WITH A CAN BUS CABLE
(APPLIANCE IS A FINAL NODE)

A Isolating tape

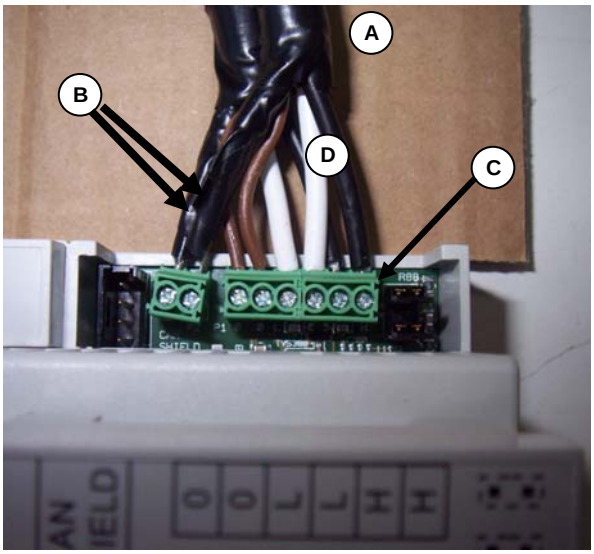
B CAN-BUS cable shield

C Terminal block for CAN-BUS cable terminal connection

D Wires (no. 3) of CAN-BUS cable

Cavo CAN su RB200

Figure 19 Example of CAN BUS cable connection to RB200 (appliance is a final node)



KEY

CONNECTION WITH TWO CAN BUS CABLES
(APPLIANCE IS AN INTERMEDIATE NODE)

A Isolating tape

B Shields (2) for CAN-BUS cables

C Terminal block for CAN-BUS cable terminal connection

D Wires (no. 6) of CAN-BUS cables

CAN cable on RB200

Figure 20 Example of 2 CAN BUS cable connection to RB200 (appliance is an intermediate node)

How to connect a CAN BUS cable to RB200 (refer to Figure 19, Figure 20):

You will need: The appliance located in its final position, which must be accessible.

Before acting on appliance, ensure power supply is cut off and do not operate on live parts.

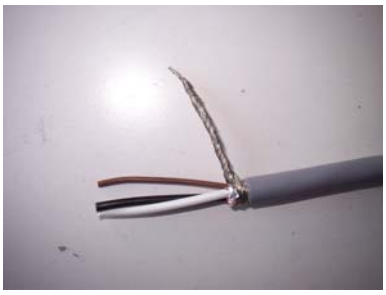
To facilitate the cable connection and jumper configuration, the device is supplied with the terminal protection disassembled (visible in Figure 19 and Figure 20). If it is subsequently required to access the connections and jumpers, refer to Figure 24 and relative instructions.

1. Cut a cable section of measure allowing installation without any sharp bends.
2. Select a cable section end, remove sheath for about 50-60 mm, carefully preventing any cut on shield (braiding and/or aluminium sheet and, if any, naked connector in contact with braiding) and terminals inside.
3. If the bare cable is in contact with the shield, wrap the shield tightly round it leaving a free length of 5-6 mm. If it is not, separate a part of the wires from the shield (in a quantity that will then be possible to fit into the terminal block) and plait to obtain a cable, then wind the rest of the shield tightly round it as above, leaving a free length of 5-6 mm. (Figure 21 details A and B).
4. Apply isolating tape to shield section between cable and the end of the wire, leaving a free length of 5-6 mm, (Figure 21 part C).

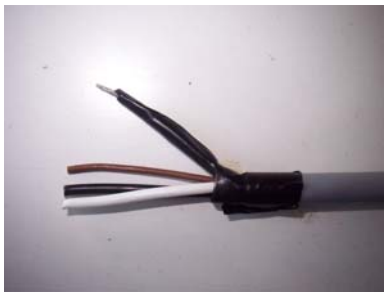
If the shield is made of aluminium foil and not a metal shield: connect the bare cable in contact with the shield to the “CAN SHIELD” terminal block (in this case it must be present) and wind the shield around the cable, leaving a free length of 5-6 mm, then protect with isolating tape.

5. Also prepare the three coloured wires, removing 5-6 mm of insulation, then connect the shield cable to the "CAN SHIELD" terminal block (Figure 19 part B).
6. Connect the three coloured wires to the "CAN" terminal block, referring to Figure 19 parts C and D and to the figure shown in Figure 22.
   Comply with the indications L, H, GND shown in Table 7, Page 39, on the figure and the terminal board cover at the connector.
   - if the appliance is an **intermediate node** on the network, also complete step 7.
   - On the contrary, if appliance is a **final node** on network do not perform point 7 and directly go to point 8.
7. **For intermediate nodes only**: Repeat operations from points 1 to 6 for the other CAN BUS cable section end necessary, referring to Figure 20. Figure 21 and the diagram shown in Figure 23.

Detail A
The bare cable and the shield



Detail B
The shield wound round the bare cable



Detail C
Applying the isolating tape

Figure 21 Connection for CAN BUS cable shield

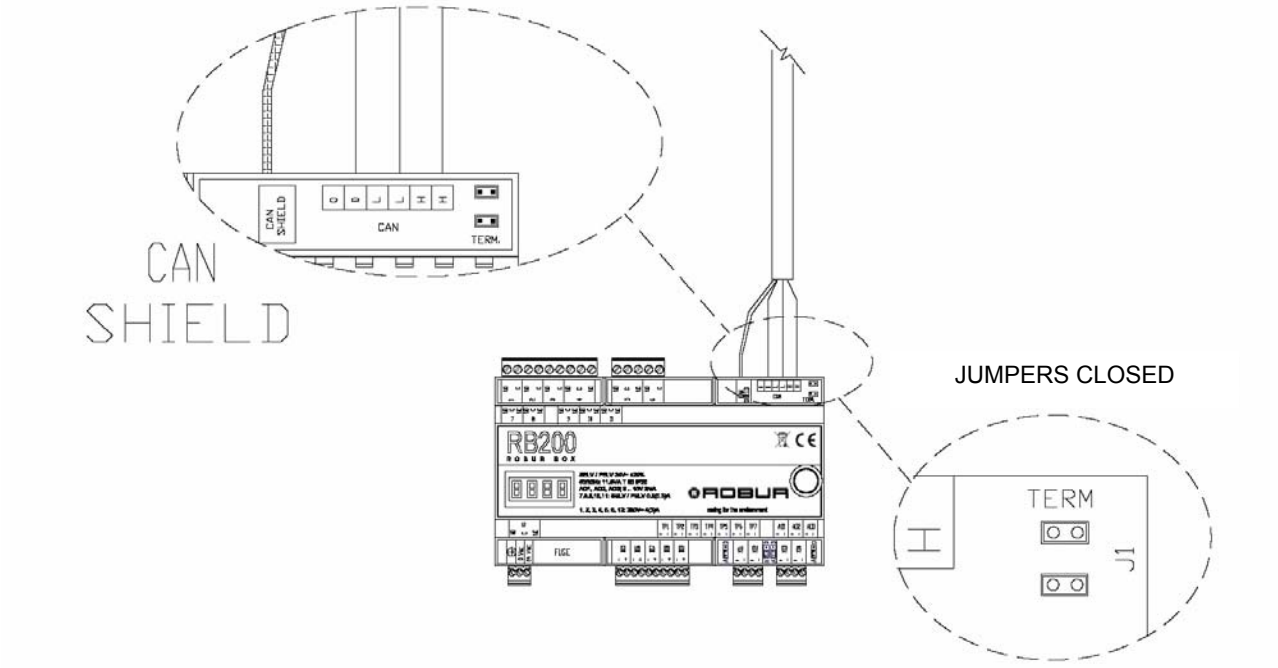


Figure 22 - Connection of 1 CAN BUS cable to RB200: Appliance IS A FINAL NODE. Positions for CAN BUS cable wires and jumpers are pointed out: CLOSED.

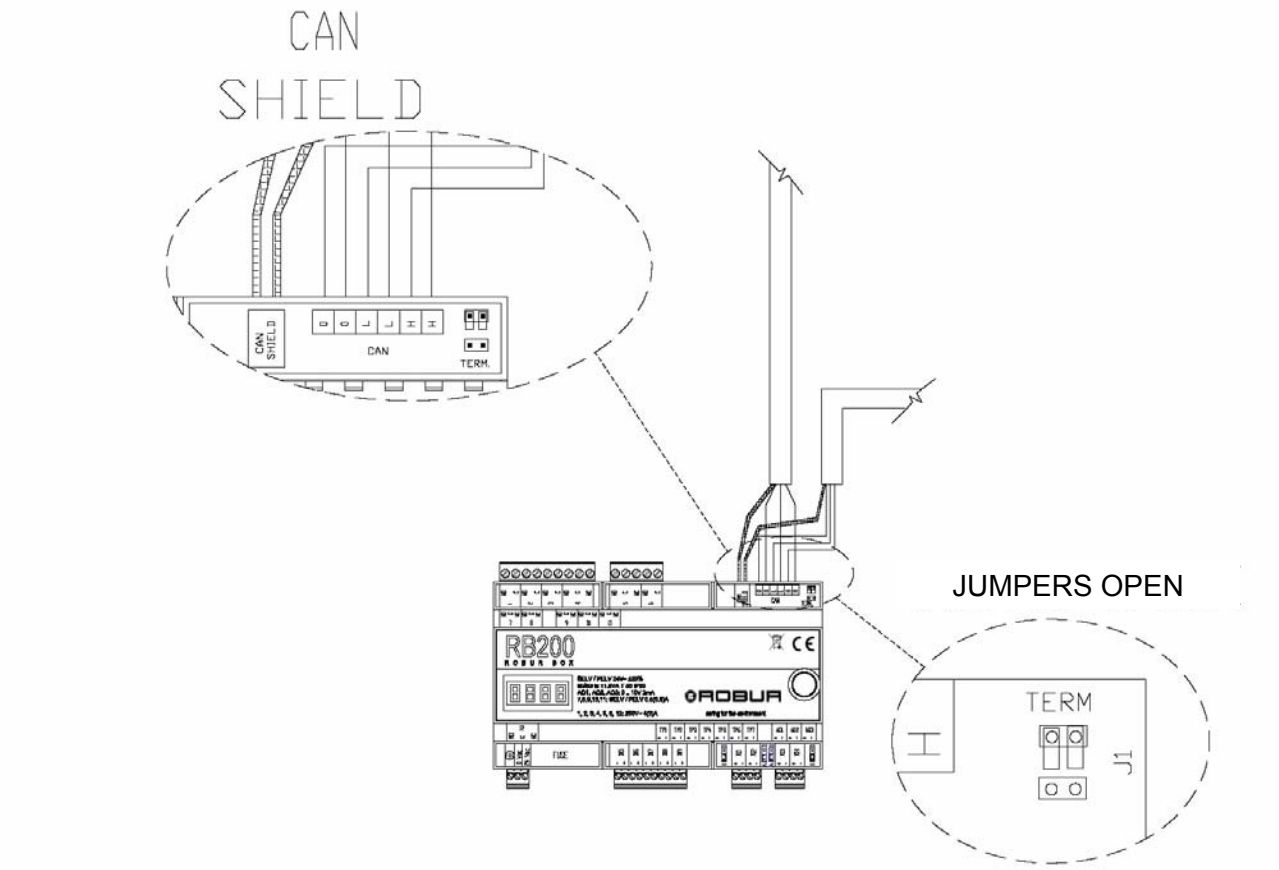
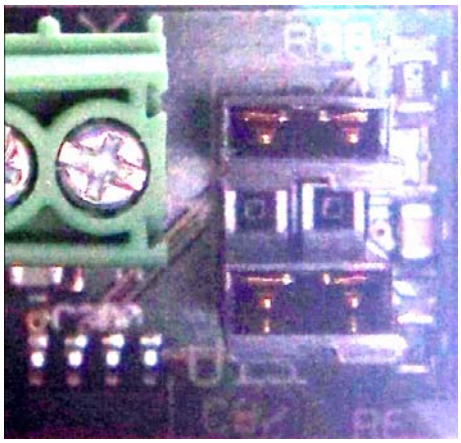


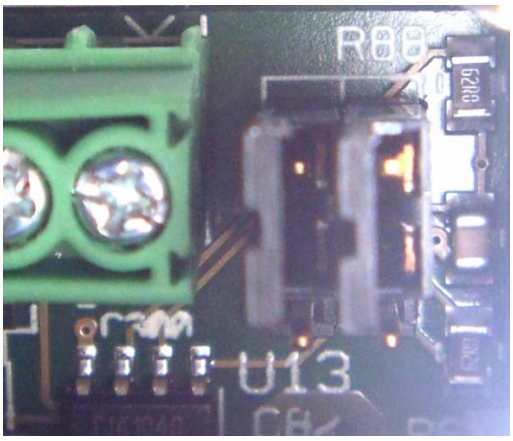
Figure 23 - Connection of 2 CAN BUS cables to RB200: Appliance IS AN INTERMEDIATE NODE. Positions for CAN BUS cable wires and jumpers are pointed out: OPENED.

8. Position the CAN terminal jumpers on RB200 according to the type on node to be configured:
   - If the appliance is a **final node** of the network (in the "CAN" connected on the board there are 3 wires): place the jumpers closed, as shown in Figure 22 and Figure 24**, in the first photo on the left**.
   - If the appliance is an **intermediate node** of the network (in the "CAN" connected on the board there are 6 wires): place the jumpers open, as shown in Figure 23 and Figure 24**, in the last photo on the right**.

☞ In this case, the jumpers (open) should be positioned as shown in Figure 24, in the photo on the right. This ensures easy re-assembly of the previously-removed cover on the terminal board, other positions of open jumpers can make such operation difficult.



JUMPERS CLOSED:
FINAL NODE



JUMPERS OPEN:
INTERMEDIATE NODE

Figure 24 JUMPERS PER FINAL NODE (FIRST PHOTO ON THE LEFT) AND PER INTERMEDIATE NODE (LAST PHOTO ON THE RIGHT): position recommended for OPEN jumpers highlighted.

Having completed all operations, mount the terminal protection indicated in Figure 19 and in Figure 20, slot into play pressing slightly until the retaining tooth clicks into place.

Instructions for removing the terminal protection

Referring to Figure 25, insert a small screwdriver in the slot between the body of the device and the terminal protection (in the centre), lever **slightly** and pull the terminal protection upwards.

“A”

“B”

“C”

Figure 25 Removing the CAN jumper cover (when necessary.

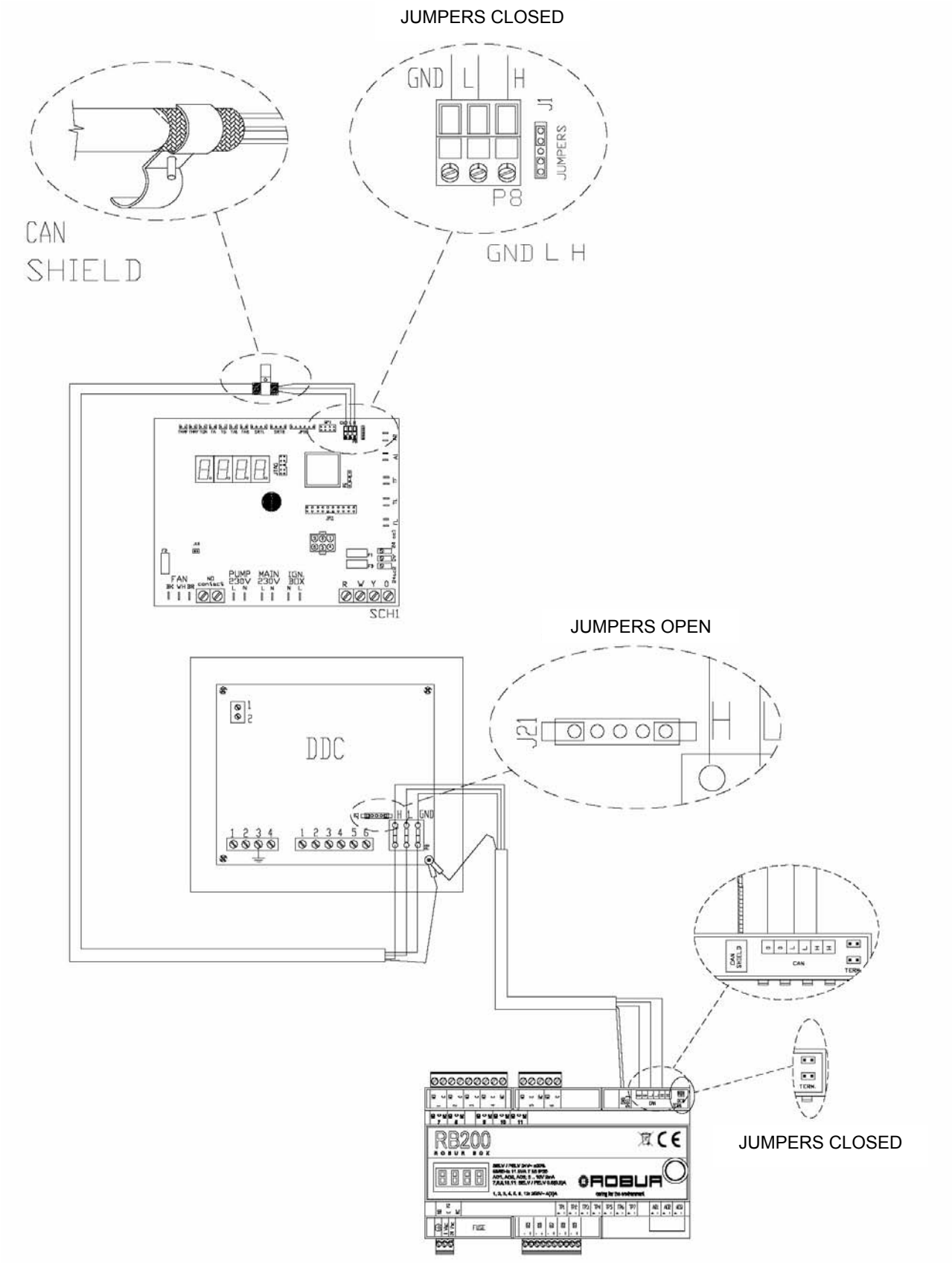


Figure 26 Example of RB200 connection as final node.

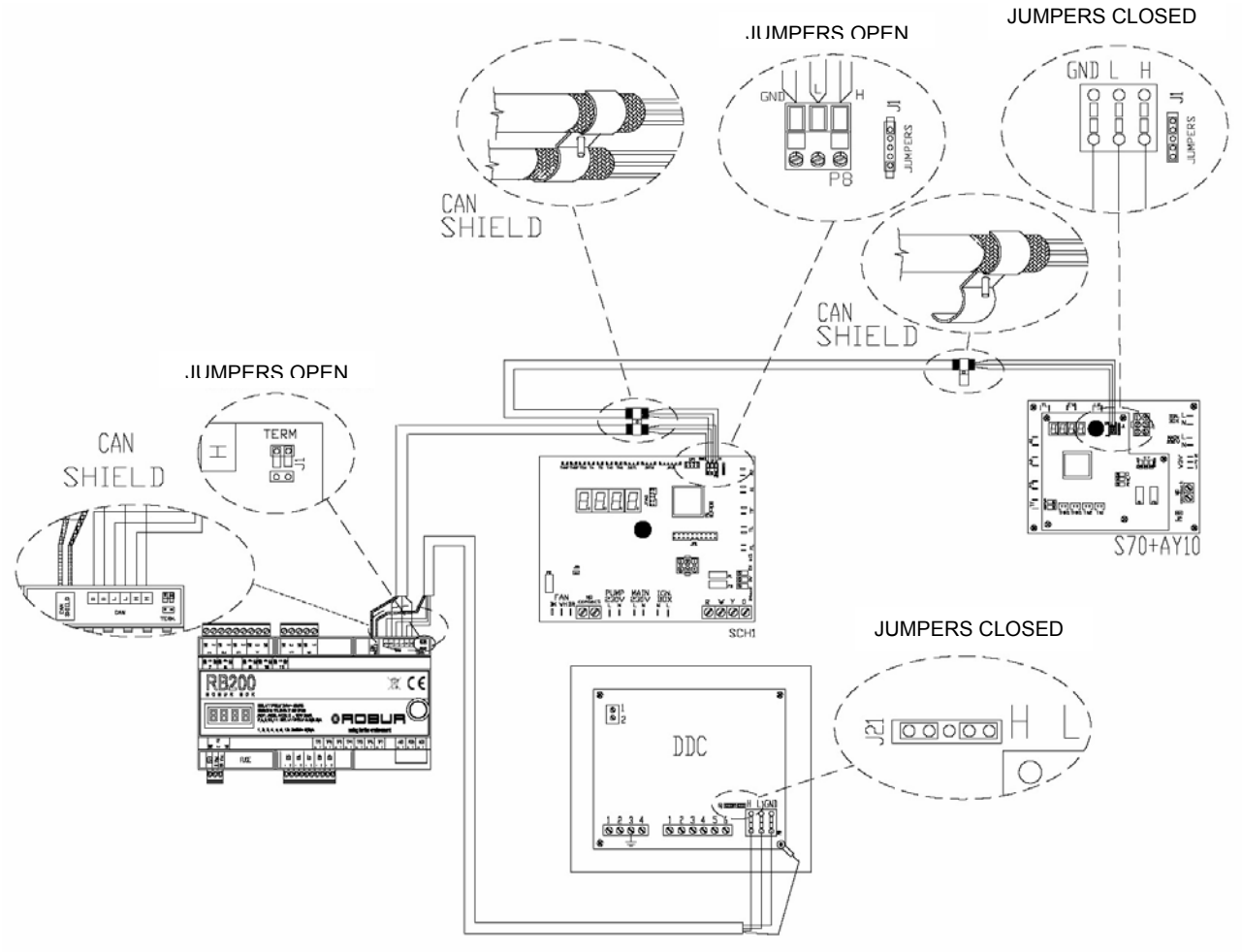


Figure 27 Example of RB200 connection as intermediate node.

SECTION 3 COMMISSIONING

This section provides the following information on appliance:

- Instructions necessary to Robur Authorised Technical Assistance Centre (TAC) for the whole commissioning procedure on appliance (see Paragraph 3.1);

The whole procedure for appliance commissioning provides for the performance of the following (main) operating phases:
- preliminary checks on plant configuration;
- adjustment of plant operating parameters through RB200 and DDC.

Before operating as described in this section, the technician must read Paragraph 1.1 on page 3.

The appliance must be connected to a DDC (version 4.013 or higher, configured as controller); for control panel configuration phases, refer to two booklets about it.

3.1 COMMISSIONING PROCEDURE

☞ The whole procedure for appliance commissioning is to be performed by a Robur Authorised Technical Assistance Centres only (TAC) following manufacturer's instructions.
Warranty could be void if procedure is not performed by TAC.

Appliance proper operation and duration depend on its proper usage:

- proper installation;
- proper use.

 When released from factory, the appliance is reliable and tested.

To properly perform the whole commissioning procedure on appliance, act in the following order:

- preliminary checks on plant conformity;
- adjustment of RB200 and DDC operating parameters;
- adjustment of plant operating parameters depending on user's needs.

Preliminary checks on plant conformity

Robur TAC must:

- check that the whole plant has been manufactured in accordance with its design, following the instructions supplied by the manufacturer and respecting current legislation.
  (The design must have been drawn up by a qualified self-employed professional person);
- personally check that (hydraulic/gas and electric) Robur external units on the plant have been properly performed;
- personally check that (electric) connection of RB200 and DDC interfaces (as well as their connections to external units) have been properly performed;
- check that plant compliance condition really exist (as stated by authorized firm in charge of installation to the user).

☞ The Declaration of Conformity CERTIFIES that the plant complies with standards enforced.
It is a **compulsory** document, thus, authorized firm in charge of appliance installation must issue it to the owner, under the Law.

If all the above-listed conditions apply, the TAC can operate the appliance "commissioning".

In case of plant non-compliance found during preliminary checks, the TAC could decide not to operate the appliance “Commissioning”.

If so, Robur TAC must:

- warn any installation abnormality to user/installer;
- warn any situation, dangerous for appliance and persons, to user/installer;
- warn any lack in appliance documents;
- considering warnings issued, indicate any corrective operations on plant to be performed by installer in order to operate the appliance “Commissioning”.

☞ The user/installer must perform any corrective operation on plant as required by TAC.
After corrective operations by installer, TAC must assess the plant again.
Now, if TAC identifies plant conformity and safety conditions, it can operate for commissioning.

⚠ Dangerous plant situations for persons and appliance.
Should one of the following situations arise, no commissioning is performed by TAC:

- appliance installed in unsuitable area (e.g. outdoor, not in safety electric panel);
- appliance installed in such conditions preventing safe access and operations;
- situations arising from appliance defects or malfunctions during its transport or installation;
- all situations arising from non-compliant plants and considered (after on-field assessment) as potentially dangerous.

☞ Abnormal plant situations.
Should one of the following situations arise, TAC, upon its discretion, can perform commissioning, but appliance remains off until manufacturer’s conditions are restored:

- installations (potentially non dangerous) not performed at best, non complying with national and local standards enforced;
- installations (potentially non dangerous) not performed at best, non complying with manufacturer’s instructions;
- installations possibly implying appliance malfunctions.

Adjustment of main operating parameters

To operate appliance commissioning, the operations below must be performed according to the sequence specified.

- Access to panel where appliance is installed.
- If off, turn on RB200 from power switch set by installer upstream of it.

To adjust operating parameters of the whole plant:

- refer to SECTION 5: SETTINGS THE RB200 device for parameter setting on RB200 interface.
- refer to DDC manual for setting parameters of control panel.

Configuring the Direct Digital Controller (DDC): for adjustment of plant operating parameters depending on user's needs, refer to "DDC Use and Programming Manual (D-LBR 246)" delivered with it.

When turned on for the first time, an operating code could appear on RB200 display (and/or on DDC display).
If operating code is issued by RB200, see the list of codes in APPENDIX on page 82; if operating code is issued by DDC, see the list of codes in "DDC Installation Manual (D-LBR 257)" (delivered with it).

The positive result of commissioning only CERTIFIES proper operation of appliance (and DDC).
It does CERTIFY plant compliance with standards enforced.

RB200 devices do not need special maintenance, except for normal cleaning at regular intervals.

SECTION 4 USER INTERFACE

RB200 receives input signals, generates output signals and displays data and codes during operations. Programming, check and monitoring of appliance are performed by interacting with display and encoder. CAN BUS port allows connecting one or more RB200 to one or more Direct Digital Controllers (DDC).

The following descriptions refer to RB200 with firmware version 1.000.

For settings on DDC (Direct Digital Controller) refer to DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246).

KEY

A 4-figure DISPLAY to view operating data and error codes
B KNOB (encoder) for browsing/selecting operating data
C CAN PORT to connect CAN-BUS network cable

Figure 28 Complete RB200 device. Display, Encoder and CAN-BUS port are pointed out.

4.1 MENU DESCRIPTION

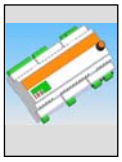
The parameters and settings are separated into menus as shown below:

MENU	MENU DESCRIPTION	SEEN ON THE DISPLAY
Menu 0	STATUS VIEW (TEMPERATURES, VOLTAGE, ETC.)	
Menu 1	PARAMETERS VIEW	
Menu 2	ACTIONS	
Menu 3	USER SETTINGS (UNUSED)	
Menu 4	INSTALLER SETTINGS	
Menu 5	SERVICE CENTRE SETTINGS	
Menu 6	ASSISTANCE CENTRE SETTINGS (SYSTEM TYPE)	

Table 8 RB200 menus

Menus 0 and 1 are View menus, to display information (not edit).

Operating states identified by RB200 (input and output value) can be displayed from menu 0; appliance operating parameters and their current values can be displayed from menu 1.



4.2 MENU 0 – STATUS VIEW

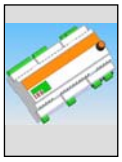
Menu 0 physically and logically displays the inputs and outputs. The physical view (from parameter 0 to parameter 40) is ALWAYS possible and refers to the terminal codes. The logical view (from parameter 41) is possible according to the configured service requests and services. The logical view refers to the names of the various configured service requests and services.

MENU 0 – PHYSICAL STATUS VIEW	
PARAMETER	**DESCRIPTION**
0.00	VALUE OF INPUT XI1 (V)
0.01	VALUE OF INPUT XI2 (V)
0.02	VALUE OF INPUT XI3 (V)
0.03	VALUE OF INPUT XI4 (V)
0.04	VALUE OF INPUT TP1 (°C - °F)
0.05	VALUE OF INPUT TP2 (°C - °F)
0.06	VALUE OF INPUT TP3 (°C - °F)
0.07	VALUE OF INPUT TP4 (°C - °F)
0.08	VALUE OF INPUT TP5 (°C - °F)
0.09	VALUE OF INPUT TP6 (°C - °F)
0.10	VALUE OF INPUT TP7 (°C - °F)
0.11	INPUT STATUS DI5 (0: OPEN; 1: CLOSED)
0.12	INPUT STATUS DI6 (0: OPEN; 1: CLOSED)
0.13	INPUT STATUS DI7 (0: OPEN; 1: CLOSED)
0.14	INPUT STATUS DI8 (0: OPEN; 1: CLOSED)
0.15	INPUT STATUS DI9 (0: OPEN; 1: CLOSED)
0.19	VALUES OF OUTPUT AO1 (V)
0.21	VALUES OF OUTPUT AO2 (V)
0.23	VALUES OF OUTPUT AO3 (V)
0.25	OUTPUT STATUS RELAY 1 (0: N.O. OPEN; 1: N.O. CLOSED)
0.26	OUTPUT STATUS RELAY 2 (0: N.O. OPEN; 1: N.O. CLOSED)
0.27	OUTPUT STATUS RELAY 3 (0: N.O. OPEN; 1: N.O. CLOSED)

MENU 0 – PHYSICAL STATUS VIEW	
	OUTPUT STATUS TOGGLE RELAY 4 (0: N.O. OPEN; 1: N.O. CLOSED; 2: STATUS UNKNOWN)
	OUTPUT STATUS RELAY 5 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS RELAY 6 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS RELAY 7 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS RELAY 8 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS RELAY 9 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS RELAY 10 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS RELAY 11 (0: N.O. OPEN; 1: N.O. CLOSED)
	OUTPUT STATUS TOGGLE RELAY 12 (0: N.O. OPEN; 1: N.O. CLOSED; 2: STATUS UNKNOWN)
	SYSTEM: RECTIFIED POWER VOLTAGE (V)

Table 9 Menu 0 parameters (physical view)

MENU 0 – LOGICAL STATUS VIEW	
PARAMETER	**DESCRIPTION**
	GENERAL ALARM OUTPUT STATUS (0: NO ALARM; 1: ALARM)
	COLD SERVICE REQUEST: TEMPERATURE VALUE (°C -°F) CORRESPONDING TO THE INPUT VOLTAGE, IF THE INPUT IS CONFIGURED AS ANALOGUE; STATUS (0: OFF; 1: ON) IF THE INPUT IS CONFIGURED AS DIGITAL
	COLD SERVICE: INPUT VOLTAGE VALUE (V)
	COLD SERVICE: COLD SERVICE UNAVAILABILITY RELAY OUTPUT STATUS (0 SERVICE AVAILABLE, 1 SERVICE UNAVAILABLE)
	HEATING SERVICE REQUEST: TEMPERATURE VALUE (°C -°F) CORRESPONDING TO THE INPUT VOLTAGE, IF THE INPUT IS CONFIGURED AS ANALOGUE; STATUS (0: OFF; 1: ON) IF THE INPUT IS CONFIGURED AS DIGITAL
	HEATING SERVICE: INPUT VOLTAGE VALUE (V)
	HEATING SERVICE: SERVICE UNAVAILABILITY RELAY OUTPUT STATUS (0 SERVICE AVAILABLE, 1 SERVICE UNAVAILABLE)
	DHW0 SERVICE REQUEST: TEMPERATURE (°C -°F) CORRESPONDING TO THE INPUT VOLTAGE, IF THE INPUT IS CONFIGURED AS ANALOGUE; STATUS (0: OFF; 1: ON) IF THE INPUT IS CONFIGURED AS DIGITAL
	DHW0 SERVICE: INPUT VOLTAGE VALUE (V)
	DHW0 SERVICE: SERVICE UNAVAILABILITY RELAY OUTPUT STATUS (0 SERVICE AVAILABLE, 1 SERVICE UNAVAILABLE)
	DHW1 SERVICE REQUEST: TEMPERATURE (°C -°F) CORRESPONDING TO THE INPUT VOLTAGE, IF THE INPUT IS CONFIGURED AS ANALOGUE; STATUS (0: OFF; 1: ON) IF THE INPUT IS CONFIGURED AS DIGITAL



MENU 0 – LOGICAL STATUS VIEW	
0.121	DHW1 SERVICE: INPUT VOLTAGE VALUE (V)
0.122	DHW1 SERVICE: SERVICE UNAVAILABILITY RELAY OUTPUT STATUS (0 SERVICE AVAILABLE, 1 SERVICE UNAVAILABLE)
0.130	GENERATOR 1 SETPOINT OUTPUT VALUE (°C -°F)
0.131	GENERATOR 1 ERROR INPUT STATUS (0: NOT IN ERROR; 1: IN ERROR)
0.132	GENERATOR 1 ACTIVATION OUTPUT STATUS (0: OFF; 1: ON)
0.133	GENERATOR 1 CIRCULATOR OUTPUT STATUS (0: OFF; 1: ON)
0.140	GENERATOR 2 SETPOINT OUTPUT VALUE (°C -°F)
0.141	GENERATOR 2 ERROR INPUT STATUS (0: NOT IN ERROR; 1: IN ERROR)
0.142	GENERATOR 2 ACTIVATION OUTPUT STATUS (0: OFF; 1: ON)
0.143	GENERATOR 2 CIRCULATOR OUTPUT STATUS (0: OFF; 1: ON)
0.160	DHW SEPARATION VALVE SERVICE STATUS (0: NOT SEPARATED; 1: SEPARATED; 2: STATUS UNKNOWN)
0.161	DHW SEPARATION VALVE POSITION (ONLY WITH LIMIT SWITCH AUXILIARY CONTACTS) (0: NOT SEPARATED SIDE LIMIT SWITCH; 1: SEPARATED SIDE LIMIT SWITCH; 2: POSITION UNKNOWN)
0.165	HOT/COLD INVERSION VALVE SERVICE STATUS (0: COLD; 1: HOT; 2: STATUS UNKNOWN)
0.166	HOT/COLD INVERSION VALVE POSITION (ONLY WITH LIMIT SWITCH AUXILIARY CONTACTS) (0: COLD SIDE LIMIT SWITCH; 1: HOT SIDE LIMIT SWITCH; 2: POSITION UNKNOWN)
0.170	COLD PRIMARY CIRCULATOR OUTPUT STATUS (0: OFF; 1: ON)
0.171	BASIC HOT PRIMARY CIRCULATOR OUTPUT STATUS (0: OFF; 1: ON)
0.172	SEPARABLE HOT PRIMARY CIRCULATOR OUTPUT STATUS (0: OFF; 1: ON)
0.173	COLD SECONDARY CIRCULATOR STATUS (0: OFF; 1: ON)
0.174	BASIC HOT SECONDARY CIRCULATOR OUTPUT STATUS (0: OFF; 1: ON)
0.180	COLD (OR 2-PIPE HOT/COLD) DELIVERY SENSOR TEMPERATURE VALUE (°C -°F)
0.181	COLD (OR 2-PIPE HOT/COLD) RETURN SENSOR TEMPERATURE VALUE (°C -°F)
0.182	BASIC HOT DELIVERY SENSOR TEMPERATURE VALUE (°C -°F)
0.183	BASIC HOT RETURN SENSOR TEMPERATURE VALUE (°C -°F)
0.184	SEPARABLE HOT DELIVERY SENSOR TEMPERATURE VALUE (°C -°F)
0.185	SEPARABLE HOT RETURN SENSOR TEMPERATURE VALUE (°C -°F)

MENU 0 – LOGICAL STATUS VIEW	
	GAHP RETURN SENSOR TEMPERATURE VALUE (°C -°F)

Table 10 Menu 0 parameters (logical view)

4.3 MENU 1 – PARAMETERS VIEW

- Table 11 shows hardware and firmware parameters of RB200 interface.

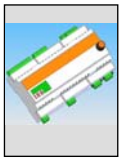
This menu allows viewing all parameters.

In “PARAMETER DESCRIPTION” column, the letter in brackets indicates that programming is possible by:

- I: installer
- A: authorised technical assistance centre
- N: not editable

MENU 1 – PARAMETERS VIEW		
BOARD PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	SERIAL NUMBER (N)	
	FIRMWARE VERSION (MAJOR) (N)	
	FIRMWARE VERSION (MINOR) (N)	
	HARDWARE VERSION (N)	
	BOOTLOADER VERSION (N)	
	FIRMWARE VERSION (INTERNAL) (N)	
	FILLING IN OPTIONS (N)	
	RESULT OF SERIAL NUMBER TEST, HW, ENCRYPTION KEY (N)	
	RESULT OF ANALOGUE CALIBRATION PARAMETERS TEST (N)	

Table 11 Menu 1 parameters: board parameters



- Table 12 shows typical parameters of RB200 interface.

MENU 1 – PARAMETERS VIEW		
MACHINE TYPE PARAMETERS (SETTING FROM MENU 6)		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
1.810	SYSTEM TYPE (A)	0: RB200 standard
1.820	MOD0 TYPE (MAJOR) (A)	
1.821	MOD0 TYPE (MINOR) (A)	
1.830	MOD1 TYPE (MAJOR) (A)	
1.831	MOD1 TYPE (MINOR) (A)	

Table 12 Menu 1 parameters: board configuration type parameters

- Table 13 shows parameters of RB200 common to all services.

Any change to a single parameter below shall apply to all RB200 services.

MENU 1 – PARAMETERS VIEW		
PARAMETERS COMMON TO ALL SERVICES		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
1.840	BASIC CAN ID (COMMUNICATION WITH DDC) (I, A)	Possible values: 336, 352, 368, 384, 400, 416, 432, 448
1.842	MEAS. UNITS FOR TEMPERATURES DISPLAYED (L, A)	0 °Celsius 1 °Fahrenheit
1.850	COLD PLANT ID (I, A)	from 0 to 15
1.851	HOT PLANT ID (I, A)	from 0 to 15

Table 13 Menu 1 parameters: board parameters common to all services

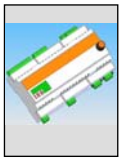
- Table 14 shows board parameters for the **cold service request** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
COLD SERVICE REQUEST PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	COLD SERVICE REQUEST ENABLED (I, A)	0. disabled 1. enabled
	DDC ID THE COLD REQUEST IS ISSUED TO(1) (I, A)	From 960 to 1023
	UNUSED	
	TYPE OF SETPOINT INPUT FOR COLD SERVICE(2) (I, A)	0. analogue 0 - 10V 1. digital with remote setpoint (on DDC) 2. digital with local setpoint
	TEMPERATURE CORRESPONDING TO MAX SETPOINT FOR COLD SERVICE(3) (I, A)	From -25 °C to +20 °C
	TEMPERATURE CORRESPONDING TO MIN SETPOINT FOR COLD SERVICE(4) (I, A)	From -25 °C to +20 °C
	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR COLD SERVICE(5) (I, A)	From -25 °C to +20 °C
	SETPOINT RESOLUTION FOR COLD SERVICE(6) (I, A)	From 0 °C to +2 °C
	LOCAL SETPOINT FOR COLD SERVICE DIGITAL INPUT(7) (I, A)	From -25 °C to +20 °C

Table 14 Menu 1 parameters: board parameters for cold service request

(1) DIGITAL DIRECT CONTROLLER [DDC] ID THE COLD MACHINE TURNING-ON REQUEST IS SENT TO
(2) INPUT CONFIGURATION
(3) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 0V
(4) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 10V
(5) ONLY USED FOR ANALOGUE INPUT. ABOVE THIS TEMPERATURE, OFF REQUEST IS SENT (THE ON REQUEST, WITH PROPER SETPOINT, IS SENT WHEN INPUT VOLTAGE CORRESPONDS TO A TEMPERATURE VALUE BETWEEN THIS PARAMETER VALUE AND VALUE OF PARAMETER 65)
(6) USED ONLY FOR ANALOGUE INPUT. RESOLUTION APPLIED FOR SENDING SETPOINT VALUE TO DDC
(7) ONLY USED FOR DIGITAL INPUT WITH LOCAL SETPOINT. IT CORRESPONDS TO SETPOINT SENT TO DDC WHEN COLD SERVICE IS REQUIRED

If value 0.0°C is set up for parameter 67, the system applies the minimum resolution used for temperatures (0.1°C).



- Table 15 shows board parameters for the **heating service request** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
HEATING SERVICE REQUEST PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
1.80	HEATING SERVICE REQUEST ENABLED (I,A)	0. disabled 1. enabled
1.81	DDC ID THE HEATING REQUEST IS ISSUED TO(1) (I,A)	From 960 to 1023
1.82	UNUSED	
1.83	TYPE OF SETPOINT INPUT FOR HEATING SERVICE(2) (I, A)	0. analogue 0-10V 1. digital with remote setpoint (on DDC) 2. digital with local setpoint
1.84	TEMPERATURE CORRESPONDING TO MIN. SETPOINT FOR HEATING SERVICE(3) (I, A)	From 0 °C to +90 °C
1.85	TEMPERATURE CORRESPONDING TO MAX. SETPOINT FOR HEATING SERVICE(4) (I, A)	From 0 °C to +90 °C
1.86	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR HEATING SERVICE(5) (I, A)	From 0 °C to +90 °C
1.87	SETPOINT RESOLUTION FOR HEATING SERVICE(6) (I, A)	From 0 °C to +2 °C
1.88	LOCAL SETPOINT FOR HEATING SERVICE DIGITAL INPUT(7) (I, A)	From 0 °C to +90 °C

Table 15 Menu 1 parameters: board parameters for heating service request

(1) DIGITAL DIRECT CONTROLLER [DDC] ID THE HOT MACHINE TURNING-ON REQUEST IS SENT TO
(2) INPUT CONFIGURATION
(3) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 0V
(4) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 10V
(5) ONLY USED FOR ANALOGUE INPUT. UNDER THIS TEMPERATURE, OFF REQUEST IS SENT (THE ON REQUEST, WITH PROPER SETPOINT, IS SENT WHEN INPUT VOLTAGE CORRESPONDS TO A TEMPERATURE VALUE BETWEEN THIS PARAMETER VALUE AND VALUE OF PARAMETER 85)
(6) USED ONLY FOR ANALOGUE INPUT. RESOLUTION APPLIED FOR SENDING SETPOINT VALUE TO DDC
(7) ONLY USED FOR DIGITAL INPUT WITH LOCAL SETPOINT. IT CORRESPONDS TO SETPOINT SENT TO DDC WHEN HEATING SERVICE IS REQUIRED

If value 0.0°C is set up for parameter 87, the system applies the minimum resolution used for temperatures (0.1°C).

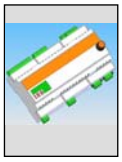
- Table 16 shows board parameters for the **DHW0 service request** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
DHW0 SERVICE REQUEST PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	DHW0 SERVICE REQUEST ENABLED (I,A)	0. disabled 1. enabled
	DDC ID THE DHW0 REQUEST IS SENT TO(1) (I,A)	From 960 to 1023
	TYPE OF GROUP THE REQUEST COMES FROM(2) (I,A)	0. basic group 1. separable group
	TYPE OF SETPOINT INPUT FOR DHW0 SERVICE(3) (I, A)	0. analogue 0-10V 1. digital with remote setpoint (on DDC) 2. digital with local setpoint
	TEMPERATURE CORRESPONDING TO MIN SETPOINT FOR DHW0 SERVICE(4) (I, A)	From 0 °C to +90 °C
	TEMPERATURE CORRESPONDING TO MAX SETPOINT FOR DHW0 SERVICE(5) (I, A)	From 0 °C to +90 °C
	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR DHW0 SERVICE(6) (I, A)	From 0 °C to +90 °C
	SETPOINT RESOLUTION FOR DHW0 SERVICE(7) (I, A)	From 0 °C to +2 °C
	LOCAL SETPOINT FOR DHW0 SERVICE DIGITAL INPUT(8) (I, A)	From 0 °C to +90 °C

Table 16 Menu 1 parameters: board parameters for DHW0 service request

(1) DIGITAL DIRECT CONTROLLER [DDC] ID THE REQUEST IS SENT TO
(2) THIS PARAMETER DEFINES THE GROUP THE REQUEST IS TO BE SENT TO (BASIC GROUP/SEPARABLE GROUP)
(3) INPUT CONFIGURATION
(4) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 0V
(5) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 10V
(6) ONLY USED FOR ANALOGUE INPUT. UNDER THIS TEMPERATURE, OFF REQUEST IS SENT (THE ON REQUEST, WITH PROPER SETPOINT, IS SENT WHEN INPUT VOLTAGE CORRESPONDS TO A TEMPERATURE VALUE BETWEEN THIS PARAMETER VALUE AND VALUE OF PARAMETER 105)
(7) USED ONLY FOR ANALOGUE INPUT. RESOLUTION APPLIED FOR SENDING SETPOINT VALUE TO DDC
(8) ONLY USED FOR DIGITAL INPUT WITH LOCAL SETPOINT. IT CORRESPONDS TO SETPOINT SENT TO DDC WHEN DHW0 SERVICE IS REQUIRED

If value 0.0°C is set up for parameter 107, the system applies the minimum resolution used for temperatures (0.1°C).



- Table 17 shows board parameters for the **DHW1 service request** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
DHW1 SERVICE REQUEST PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
1.120	DHW1 SERVICE REQUEST ENABLED (I,A)	0. disabled 1. enabled
1.121	DDC ID THE DHW1 REQUEST IS SENT TO(1) (I,A)	From 960 to 1023
1.122	TYPE OF GROUP THE REQUEST COMES FROM(2)	0. basic group 1. separable group
1.123	TYPE OF SETPOINT INPUT FOR DHW1 SERVICE(3) (I, A)	0. analogue 0-10V 1. digital with remote setpoint (on DDC) 2. digital with local setpoint
1.124	TEMPERATURE CORRESPONDING TO MIN SETPOINT FOR DHW1 SERVICE(4) (I, A)	From 0 °C to +90 °C
1.125	TEMPERATURE CORRESPONDING TO MAX SETPOINT FOR DHW1 SERVICE(5) (I, A)	From 0 °C to +90 °C
1.126	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR DHW1 SERVICE(6) (I, A)	From 0 °C to +90 °C
1.127	SETPOINT RESOLUTION FOR DHW1 SERVICE(7) (I, A)	From 0 °C to +2 °C
1.128	LOCAL SETPOINT FOR DHW1 SERVICE DIGITAL INPUT(8) (I, A)	From 0 °C to +90 °C

Table 17 Menu 1 parameters: board parameters for DHW1 service request

(1) DIGITAL DIRECT CONTROLLER [DDC] ID THE REQUEST IS SENT TO
(2) THIS PARAMETER DEFINES THE GROUP THE REQUEST IS TO BE SENT TO (BASIC GROUP/SEPARABLE GROUP)
(3) INPUT CONFIGURATION
(4) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 0V
(5) ONLY USED FOR ANALOGUE INPUT. IT CORRESPONDS TO TEMPERATURE EQUAL TO 10V
(6) ONLY USED FOR ANALOGUE INPUT. UNDER THIS TEMPERATURE, OFF REQUEST IS SENT (THE ON REQUEST, WITH PROPER SETPOINT, IS SENT WHEN INPUT VOLTAGE CORRESPONDS TO A TEMPERATURE VALUE BETWEEN THIS PARAMETER VALUE AND VALUE OF PARAMETER 125)
(7) USED ONLY FOR ANALOGUE INPUT. RESOLUTION APPLIED FOR SENDING SETPOINT VALUE TO DDC
(8) ONLY USED FOR DIGITAL INPUT WITH LOCAL SETPOINT. IT CORRESPONDS TO SETPOINT SENT TO DDC WHEN DHW1 SERVICE IS REQUIRED

If value 0.0°C is set up for parameter 127, the system applies the minimum resolution used for temperatures (0.1°C).

- Table 18 shows board parameters for **GENERATOR 1 service** on RB200 interface.

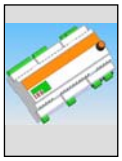
MENU 1 – PARAMETERS VIEW		
GENERATOR 1 SERVICE PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	TYPE OF USE OF GENERATOR 1 (I,A)	0. None 1. Simple 2. With error signal 3. With circulator 4. With error signal and circulator
	GENERATOR 1 PLANT TYPE (I,A)	0. Cold 1. Basic group hot 2. Separable group hot
	TEMPERATURE CORRESPONDING TO 0V GENERATOR 1 (I, A)	from -25°C to +120°C
	TEMPERATURE CORRESPONDING TO 10V GENERATOR 1 (I, A)	from -25°C to +120°C
	TEMPERATURE CORRESPONDING TO GENERATOR 1 OFF REQUEST (I, A)	from -25°C to +120°C

Table 18 Menu 1 parameters: RB200 parameters for generator 1 service

- Table 19 shows board parameters for **GENERATOR 2 service** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
GENERATOR 2 SERVICE PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	TYPE OF USE OF GENERATOR 2 (I,A)	0. None 1. Simple 2. With error signal 3. With circulator 4. With error signal and circulator
	GENERATOR 2 PLANT TYPE (I,A)	0. Cold 1. Basic group hot 2. Separable group hot
	TEMPERATURE CORRESPONDING TO 0V GENERATOR 2 (I, A)	from -25°C to +120°C
	TEMPERATURE CORRESPONDING TO 10V GENERATOR 2 (I, A)	from -25°C to +120°C
	TEMPERATURE CORRESPONDING TO GENERATOR 2 OFF REQUEST (I,A)	from -25°C to +120°C

Table 19 Menu 1 parameters: RB200 parameters for generator 2 service



- Table 20 shows board parameters for **valve 1 and 2 service** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
VALVE 1 and 2 SERVICE PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
1.160	TYPE OF USE VALVE 1 (I,A)	0. none 1. separation valve for DHW without limit switch 2. 2-pipe hot/cold plant switching valve without limit switch 3. separation valve for DHW with limit switch 4. 2-pipe hot/cold plant switching valve with limit switch
1.162	TYPE OF USE VALVE 2 (I,A)	0. none 1. separation valve for DHW without limit switch 2. 2-pipe hot/cold plant switching valve without limit switch

Table 20 Menu 1 parameters: RB200 parameters for valve services

- Table 21 shows board parameters for **circulator services 1 - 2 - 3 - 4 -5 services** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
CIRCULATOR SERVICE PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
1.170	TYPE OF USE CIRCULATOR 1 (I,A)	0. none 1. 2-pipe cold or hot/cold plant primary circulator 2. basic hot plant primary circulator 3. separable hot plant primary circulator 4. 2-pipe cold or hot/cold plant secondary circulator 5. basic hot plant secondary circulator
1.171	TYPE OF USE CIRCULATOR 2 (I,A)	0. none 1. 2-pipe cold or hot/cold plant primary circulator 2. basic hot plant primary circulator 3. separable hot plant primary circulator 4. 2-pipe cold or hot/cold plant secondary circulator 5. basic hot plant secondary circulator

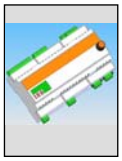
MENU 1 – PARAMETERS VIEW		
CIRCULATOR SERVICE PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	TYPE OF USE CIRCULATOR 3 (I,A)	0. none 1. 2-pipe cold or hot/cold plant primary circulator 2. basic hot plant primary circulator 3. separable hot plant primary circulator 4. 2-pipe cold or hot/cold plant secondary circulator 5. basic hot plant secondary circulator
	TYPE OF USE CIRCULATOR 4 (I,A)	0. none 1. 2-pipe cold or hot/cold plant primary circulator 2. basic hot plant primary circulator 3. separable hot plant primary circulator 4. 2-pipe cold or hot/cold plant secondary circulator 5. basic hot plant secondary circulator
	TYPE OF USE CIRCULATOR 5 (I,A)	0. none 1. 2-pipe cold or hot/cold plant primary circulator 2. basic hot plant primary circulator 3. separable hot plant primary circulator 4. 2-pipe cold or hot/cold plant secondary circulator 5. basic hot plant secondary circulator

Table 21 Menu 1 parameters: RB200 parameters for circulator services

- Table 22 shows board parameters for **sensor service** on RB200 interface.

MENU 1 – PARAMETERS VIEW		
SENSOR SERVICE PARAMETERS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
	COLD SENSOR PRESENCE (OR 2-PIPE HOT/COLD) (I,A)	0. no sensors 1. sensors
	BASIC HOT SENSOR PRESENCE (I,A)	0. no sensors 1. sensors
	SEPARABLE HOT SENSOR PRESENCE (I,A)	0. no sensors 1. sensors
	GAHP UNIT RETURN SENSOR PRESENCE (I,A)	0. no sensor 1. sensor

Table 22 Menu 1 parameters: RB200 parameters for sensor service



4.4 MENU 2: – ACTIONS

Menu 2 is used for the actions indicated in Table 23.

Access to menu 2 is only allowed to installer and Authorised Technical Assistance Centres.

Menu 2 is protected by password: 1111.

Resetting the default parameters (parameter 2.0) sets all the parameters to the factory settings; this therefore requires the subsequent complete configuration of the RB200.

Parameter 2.1 disables all the active forcings in a single operation.
In any case the system disables the forcings 5 minutes after their activation.

MENU 2 – ACTIONS		
PARAMETER	**PARAMETER DESCRIPTION**	**VALUE DESCRIPTION**
2.00	RESTORATION OF DEFAULT PARAMETERS (I,A)	
2.01	FORCING DISABLING (I,A)	
2.18	FORCING ENABLING OUTPUT AO1 (I,A)	0. forcing disabled 1. forcing enabled
2.19	FORCING OUTPUT AO1 (V) (I,A)	from 0.0 V to 10.0 (V)
2.20	FORCING ENABLING OUTPUT AO2 (I,A)	0. forcing disabled 1. forcing enabled
2.21	FORCING OUTPUT AO2 (V) (I,A)	from 0.0 V to 10.0 (V)
2.22	FORCING ENABLING OUTPUT AO3 (I,A)	0. forcing disabled 1. forcing enabled
2.23	FORCING OUTPUT AO3 (V) (I,A)	from 0.0 V to 10.0 (V)
2.25	FORCING OUTPUT RELAY 1 (I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
2.26	FORCING OUTPUT RELAY 2 (I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
2.27	FORCING OUTPUT RELAY 3 (I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled

MENU 2 – ACTIONS			
	FORCING OUTPUT RELAY 4	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 5	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 6	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 7	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 8	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 9	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 10	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 11	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled
	FORCING OUTPUT RELAY 12	(I,A)	0. forcing N.O. contact open 1. forcing N.O. contact closed 2. forcing disabled

Table 23 - Menu 2 parameters.

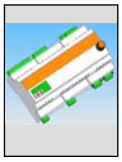
4.5 MENU 3 – USER SETTINGS

Menu 3 is unused.

4.6 MENU 4 – INSTALLER SETTINGS

Menu 4 is used to set the relevant installer parameters, which in the tables in Paragraph 4.3, are marked by letter “I”.

Menu 4 is protected by password: 1111.



4.7 MENU 5 – ASSISTANCE CENTRE SETTINGS

Menu 5 allows setting installer and Authorized Technical Assistance Centre relevant parameters, which in tables in Paragraph 4.3 are marked by letters “I” and “A”, respectively.

Menu 5 is protected by password and exclusively managed by Robur Authorised Technical Assistance Centres.

4.8 MENU 6 – SYSTEM SETTINGS (assistance centres)

Menu 6 allows setting parameters of system type, which in Table 12 are marked by letter “A” (managed by Authorized Technical Assistance Centres).

Menu 6 is protected by password and exclusively managed by Authorized Robur Technical Assistance Centres.

SECTION 5 SETTINGS THE RB200 DEVICE

5.1 Access to RB200 menus

When RB200 is turned on, all display leds switch on for about 3 seconds, then the abbreviated name of the device appears (rb20). Thereafter the decimal place of the first figure on the left of the display continues to flash indicating correct operation; moreover, if there is correct data communication between the CAN bus with one or more DDCs, also the decimal point of the first figure on the right of the display flashes.

In the event of faults, one or more warning and/or error codes are displayed.

Table 24 shows examples of display view for an operating appliance in an error-free system, with warning and errors:

OPERATING MODE	
OPERATING DATA	**SEEN ON THE DISPLAY**
PROPER OPERATION	
WARNINGS	
ERRORS	

Table 24 Display view during operation

The knob is used to surf the menus to view and set the parameters.

- To use the knob, open the electric panel the RB200 is housed in.

Properly close electric panel when necessary settings are completed.

- To navigate by knob:

Have: access to electric panel (see previous procedure).

1. Press knob once for access to menu selection.
2. Browse on display items by rotating knobs in 2 directions, clockwise to display the following item and counter-clockwise for the previous one.
3. Stop on the required value and press the knob. This allows access to the selected menu and its parameters.
4. Rotate the knob again to display letter E (exit) and press to return to previous sections.

5.2 Further detail on access to the menus

The following procedure shows how to have access board menus. Information given is sufficient for access to display menus 0 and 1; for access to other menus, further information is necessary contained in the paragraphs specified (paragraphs 5.3 to 5.7).

For access to menus and display parameter current value:

1. Press the knob; display shows the first menu 0:  .
2. Press the knob again: access to menu 0 displayed; display shows the number of menu (left) and the first parameter of menu (right):  .
3. Browse the other parameters of current menu by rotating the knob. Display shows all parameters of menu; letter E is the last displayed:  ; press knob on E, to exit current menu.
4. For access to a parameter, locate on the relevant one and press the knob.
   For example, for access to parameter 0 (input XI1 status), rotate knob to display it,  , then press for access.
   The display shows the current parameter value; press the knob again to return to the current parameter.
   Repeat point 4 to view another parameter 4.
   Exit menu by acting as described in point 3.
5. For access to other displayed menus, select menu desired in point 1 and press knob.
6. For exit menu section, perform point 3, rotate knob until letter E appears  then press it again.  appears.

5.3 Configuration of common parameters

Parameter 40: NETWORK ID

1. locate on menu 4 (installer) or 5 (CAT);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 40 (network ID) and click, the number on display flashes;
4. at this point it is possible to enter the correct network ID (choosing from 336 – 352 – 368 – 384 – 400 – 416 – 432 – 448);
5. click to confirm value entered;
6. rotate knob until E appears for exit menu;
7. rotate knob until E appears for return to main page  (leftmost point flashing).

If more RB200 are installed on the same CAN network, each one must have a unequivocal NETWORK ID, parameter 40.

Parameter 50: COLD PLANT ID

1. locate on menu 4 (installer) or 5 (CAT);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 50 (cold plant ID) and click, the number on display flashes;
4. at this point it is possible to enter the cold plant ID (from 0 to 15);
5. click to confirm value entered;
6. rotate knob until E appears for exit menu;
7. rotate knob until E appears for return to main page  (leftmost point flashing).

Parameter 51: HOT PLANT ID

1. locate on menu 4 (installer) or 5 (CAT);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 51 (hot plant ID) and click, the number on display flashes;
4. at this point it is possible to enter the hot plant ID (from 0 to 15);
5. click to confirm value entered;
6. rotate knob until E appears for exit menu;
7. rotate knob until E appears for return to main page  (leftmost point flashing).

5.4 Cold service request configuration

To use the cold service request, activate it by setting a specific parameter. DDC ID must also be specified, the request must be sent to.

1. Locate on menu 4 (installer);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 60 (cold service active) and click, the number on display flashes;
4. now, cold service can be enabled or disabled by rotating the knob (0 inactive, -1 active);
5. click to confirm value entered;
6. locate on parameter 61 (ID of DDC receiving the request) and click, the number on display flashes;
7. enter ID of DDC receiving the cold service request (see DDC manual for proper ID of Direct Digital Controller);
8. click to confirm value entered;

Now, the setpoint input type must be entered; according to it, different operating parameters are set up and a proper hardware configuration is obtained for proper operation (see paragraph 2.3 on page 27: analogue/digital input and jumper position diagrams).

9. locate on parameter 63 (setpoint input type) and click, the number on display flashes;
10. enter:
    a. 0 for analogue input (0-10 V);
    b. 1 for digital input with remote setpoint;
    c. 2 for digital input with local setpoint;
11. click to confirm value entered.

For selecting analogue parameters to be setting afterwards, refer to paragraph 1.2 “MACHINE OPERATION” point “analogue input”.

If “analogue (0-10V)” input type is set up:

1. position on parameter 64 and click, the number on display flashes;
2. enter temperature corresponding to max setpoint (10 Volts);
3. click to confirm value entered;
4. position on parameter 65 and click, the number on display flashes;
5. enter temperature corresponding to minimum setpoint (0 Volt);
6. click to confirm value entered;
7. position on parameter 66 and click, the number on display flashes;
8. enter temperature corresponding to OFF request (off);

9. click to confirm value entered;
10. position on parameter 67 and click, the number on display flashes;
11. enter setpoint resolution;
12. click to confirm value entered;
13. rotate knob until E appears for exit menu;
14. rotate knob until E appears for return to main page  (leftmost point flashing).

If "digital with remote setpoint" input type is set up:

1. setpoint is set up on DDC (DDC Use and Programming Manual: D-LBR246);
2. rotate knob until E appears for exit menu;
3. rotate knob until E appears for return to main page  (leftmost point flashing).

If "digital with local setpoint" input type is set up:

1. position on parameter 68 and click, the number on display flashes;
2. enter setpoint temperature that board sends to DDC upon request;
3. click to confirm value entered;
4. rotate knob until E appears for exit menu;
5. rotate knob until E appears for return to main page  (leftmost point flashing).

5.5 Heating service request configuration

To use the heating service request, activate it by setting a specific parameter. DDC ID must also be specified, the request must be sent to.

1. Locate on menu 4 (installer);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 80 (hot service active) and click, the number on display flashes;
4. now, the heating service can be enabled or disabled by rotating the knob (0 inactive, - 1 active);
5. click to confirm value entered;
6. locate on parameter 81 (ID of DDC receiving the request) and click, the number on display flashes;
7. enter the ID of DDC receiving the heating service request (see DDC manual for proper ID of Direct Digital Controller);
8. click to confirm value entered;

Now, the setpoint input type must be entered; according to it, different operating parameters are set up and a proper hardware configuration is obtained for proper operation (see paragraph 2.3 on page 27: analogue/digital input and jumper position diagrams).

9. locate on parameter 83 (setpoint input type) and click, the number on display flashes;
10. enter:
    a. 0 for analogue input (0-10 V);
    b. 1 for digital input with remote setpoint;
    c. 2 for digital input with local setpoint;
11. click to confirm value entered.

For selecting analogue parameters to be setting afterwards, refer to paragraph 1.2 “MACHINE OPERATION” point “analogue input”.

If “analogue (0-10V)” input type is set up:

1. position on parameter 84 and click, the number on display flashes;
2. enter temperature corresponding to max setpoint (10 Volts);
3. click to confirm value entered;
4. position on parameter 85 and click, the number on display flashes;
5. enter temperature corresponding to minimum setpoint (0 Volt);
6. click to confirm value entered;
7. position on parameter 86 and click, the number on display flashes;
8. enter temperature corresponding to OFF request (off);
9. click to confirm value entered;
10. position on parameter 87 and click, the number on display flashes;
11. enter setpoint resolution;
12. click to confirm value entered;
13. rotate knob until E appears for exit menu;
14. rotate knob until E appears for return to main page  (leftmost point flashing).

If “digital with remote setpoint” input type is set up:

1. The setpoint is set on the DDC: (DDC Use and Programming Manual: D-LBR246);
2. rotate knob until E appears for exit menu;
3. rotate knob until E appears for return to main page  (leftmost point flashing).

If “digital with local setpoint” input type is set up:

1. position on parameter 88 and click, the number on display flashes;
2. enter setpoint temperature that board sends to DDC upon request;
3. click to confirm value entered;
4. rotate knob until E appears for exit menu;
5. rotate knob until E appears for return to main page  (leftmost point flashing).

5.6 Configuration of DHW service request (Domestic hot water)

To use the DHW service request, activate it by setting a specific parameter. DDC ID must also be specified, the request must be sent to.

1. Locate on menu 4 (installer);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 100/120 (DHW0/DHW1 service active) and click, the number on display flashes;
4. now, DHW service can be enabled or disabled by rotating the knob (0 inactive, - 1 active);
5. click to confirm value entered;
6. position on parameter 101/121 (ID of DDC receiving DHW0/DHW1 request) and click, the number on display flashes;
7. enter ID of DDC receiving the DHW service request (see DDC manual for proper ID of Direct Digital Controller);
8. click to confirm value entered;
9. position on parameter 102/122 (DHW0/DHW1 group type) and click, the number on display flashes;
10. enter the type of group the request is sent to (0 basic plant – 1 separable);
11. click to confirm value entered;

now, the setpoint input type must be entered; according to it, different operating parameters are set up and a proper hardware configuration is obtained for proper operation (see paragraph 2.3 on page 27: analogue/digital input and jumper position diagrams).

12. position on parameter 103/123 (DHW0/DHW1 setpoint input type) and click, the number on display flashes;
13. enter:
    a. 0 for analogue input (0-10 V);
    b. 1 for digital input with remote setpoint;
    c. 2 for digital input with local setpoint;
14. click to confirm value entered.

To choose the analogue parameters to be set afterwards, consult paragraph 1.2 “MACHINE OPERATION” under “analogue input”.

If “analogue (0-10V)” input type is set up:

1. position on parameter 104/124 (DHW0/DHW1) and click, the number on display flashes;
2. enter temperature corresponding to max setpoint (10 Volts);
3. click to confirm value entered;
4. position on parameter 105/125 (DHW0/DHW1 service active) and click, the number on display flashes;
5. enter temperature corresponding to minimum setpoint (0 Volt);
6. click to confirm value entered;
7. position on parameter 106/126 (DHW0/DHW1 service active) and click, the number on display flashes;
8. enter temperature corresponding to OFF request (off);
9. click to confirm value entered;
10. position on parameter 107/127 (DHW0/DHW1 service active) and click, the number on display flashes;
11. enter setpoint resolution;
12. click to confirm value entered;
13. rotate knob until E appears for exit menu;
14. rotate knob until E appears for return to main page  (leftmost point flashing).

If “digital with remote setpoint” input type is set up:

1. The setpoint is set on the DDC: (DDC Use and Programming Manual: D-LBR246);
2. rotate knob until E appears for exit menu;
3. rotate knob until E appears for return to main page  (leftmost point flashing).

If “digital with local setpoint” input type is set up:

1. position on parameter 108/128 (DHW0/DHW1 service active) and click, the number on display flashes;
2. enter setpoint temperature that board sends to DDC upon request;
3. click to confirm value entered;
4. rotate knob until E appears for exit menu;
5. rotate knob until E appears for return to main page  (leftmost point flashing).

5.7 Service configuration

Table 25 on page 80 gives the required instructions for configuring the services on RB200, in particular:

- Valve 1 and valve 2 service
- Generator 1 and generator 2 service
- Circulator 1, circulator 2, circulator 3, circulator 4 and circulator 5 service
- Sensor pair 1, sensor pair 2 and sensor pair 3 service
- Single sensor 4 service

In Table 25 the **Hardware** column indicates the inputs/outputs used by the corresponding service.

The **ID** column indicates by how much the basic network ID must be increased to obtain the network ID of the configured service. For example, if the basic network ID is 336 (see parameter 40), when configuring the valve 1 service the system allocates to this service the network ID 338A (=336 + 2A); this network ID will be displayed on the Direct Digital Controller (DDC) during configuration; refer to the DDC Installation Manual (D-LBR 257) and DDC Use and Programming Manual (D-LBR 246).

Relays 1, 2, 4 and 12 are shared by more than one service, but only one of the available services can be allocated to each relay. For example, relay 1 is shared by the generator 1 service and the circulator 1 service; therefore if the generator 1 service is configured and it is a type with a circulator (parameter value 130: 3 or 4), the circulator 1 service cannot be configured.

HARDWARE	SERVICE	NOTES	HOT/ COLD	TYPE	ID
5 - Generator 1 ON relay **1** - Circulator 1 relay[(1)] **DI7** - Alarm 1 input **AO1** - Setpoint 1 output	GENERATOR 1	See also: **P 132** **P 133** **P 134** Setpoint 1 output management parameters	**P 131** 0. Cold 1. Basic hot 2. Separable hot	**P 130** 0. none 1. simple 2. with error signalling 3. with circulator[(1)] 4. with error signalling and circulator[(1)]	+0
6 - Generator 2 ON relay **2** - Circulator 2 relay[(2)] **DI8** - Alarm 2 input **AO2** - Setpoint 2 output	GENERATOR 2	See also: **P 142** **P 143** **P 144** Setpoint 2 output management parameters	**P 141** 0. Cold 1. Basic hot 2. Separable hot	**P 140** 0. none 1. simple 2. with error signalling 3. with circulator[(2)] 4. with error signalling and circulator[(2)]	+1
4 - Toggle relay 1[(3)] **DI5** -Limit switch 1 input **DI6** -Limit switch 2 input	VALVE 1		-	**P 160** 0. none 1. DHW separation valve without limit switch 2. cold/hot plant switching valve without limit switch 3. DHW separation valve with limit switch 4. cold/hot plant switching valve with limit switch	+2 A

HARDWARE	SERVICE	NOTES	HOT/ COLD	TYPE	ID
12 - Toggle relay 2[4]	VALVE 2	Only types without limit switch	-	**P 162** 0. none 1. DHW separation valve without limit switch 2. cold/hot plant switching valve without limit switch	+2 B
1 - Circulator 1 relay[1]	CIRCULATOR 1	Available ONLY if the GENERATOR 1 service is absent or without circulator	-	**P 170** 0. none 1. cold primary circulator (or 2-pipe hot/cold) 2. basic hot primary circulator 3. separable hot primary circulator 4. cold-cold secondary circulator (or 2-pipe hot/cold) 5. basic hot secondary circulator	+3 A
2 - Circulator 2 relay[2]	CIRCULATOR 2	Available ONLY if the GENERATOR 2 service is absent or without circulator	-	**P 171** 0. none 1. cold primary circulator (or 2-pipe hot/cold) 2. basic hot primary circulator 3. separable hot primary circulator 4. cold secondary circulator (or 2-pipe hot/cold) 5. basic hot secondary circulator	+3 B
3 - Circulator 3 relay	CIRCULATOR 3		-	**P 172** 0. none 1. cold primary circulator (or 2-pipe hot/cold) 2. basic hot primary circulator 3. separable hot primary circulator 4. cold secondary circulator (or 2-pipe hot/cold) 5. basic hot secondary circulator	+4 A
4 - Toggle relay 1[3]	CIRCULATOR 4	Available ONLY if the VALVE 1 service is absent	-	**P 173** 0. none 1. cold primary circulator (or 2-pipe hot/cold) 2. basic hot primary circulator 3. separable hot primary circulator 4. cold secondary circulator (or 2-pipe hot/cold) 5. basic hot secondary circulator	+4 B

HARDWARE	SERVICE	NOTES	HOT/ COLD	TYPE	ID
12 - Toggle relay 2[4]	CIRCULATOR 5	Available ONLY if the VALVE 2 service is absent	-	**P 174** 0. none 1. cold primary circulator (or 2-pipe hot/cold) 2. basic hot primary circulator 3. separable hot primary circulator 4. cold secondary circulator (or 2-pipe hot/cold) 5. basic hot secondary circulator	+5 A
TP1 – return sensor 1 **TP2** – delivery sensor 1	SENSOR PAIR 1		-	**P 180** 0. cold sensors (or 2-pipe hot/cold) absent 1. cold sensors (or 2-pipe hot/cold) present	+5 B
TP3 – return sensor 2 **TP4** – delivery sensor 2	SENSOR PAIR 2		-	**P 182** 0. basic hot sensors absent 1. basic hot sensors present	+6 A
TP5 – return sensor 3 **TP6** – delivery sensor 3	SENSOR PAIR 3		-	**P 184** 0. separable hot sensors absent 1. separable hot sensors present	+6 B
TP7 – sensor 4	SENSOR 4		-	**P 186** 0. GAHP unit return sensor absent 1. GAHP unit return sensor present	+7 A

Table 25 – Service configuration

(1) RELAY 1 IS AVAILABLE FOR GENERATOR 1 SERVICE (PARAMETER 130: 3 - WITH/CIRCULATOR OR 4 - WITH ERROR SIG. AND CIRC.) OR FOR CIRCULATOR 1 SERVICE.
(2) RELAY 2 IS AVAILABLE FOR GENERATOR 2 SERVICE (PARAMETER 140: 3 - WITH/CIRCULATOR OR 4 - WITH ERROR SIG. AND CIRC.) OR FOR CIRCULATOR 2 SERVICE.
(3) RELAY 4 IS AVAILABLE FOR VALVE 1 SERVICE OR CIRCULATOR 4 SERVICE.
(4) RELAY 12 IS AVAILABLE FOR VALVE 2 SERVICE OR CIRCULATOR 5 SERVICE.

Managing services when reconfiguring RB200 and/or DDC or loss of communication between RB200 and DDC

Generator services

- The system prevents the modification of the RB200 configuration if outputs are active on one or more generator services.
- If the configuration is cancelled on the DDC or when off-line, RB200 does the following:
  - Generator ON output: immediate setting to OFF status.
  - Circulator output: setting to OFF status after fixed delay on circulator (currently 3 minutes).
  - Setpoint analogue output: immediate setting to the value corresponding to the OFF status (parameters 134 and 144).
- In the case of output forcing, this prevails over the normal functional value, but for a maximum of 5 minutes.
- If the setpoint analogue output parameters are modified, the output value will immediately be modified as a consequence.

Valve services

- If the RB200 configuration is modified, there are no constraints.
  The relay maintains the status it had prior to the modification.
- If the configuration is cancelled on the DDC or when off-line, the valve toggle relay maintains its current status.
- In the case of relay forcing, this always prevails over the normal functional value, but for a maximum of 5 minutes.

Circulator services

- The system prevents the modification of the RB200 configuration if outputs are active on one or more circulator services.
- If the configuration is cancelled on the DDC or when off-line, the RB200 places the circulator output to OFF after the fixed delay of the circulator (currently 3 minutes).
- In the case of output forcing, this always prevails over the normal functional value, but for a maximum of 5 minutes.

Temperature sensor services

- No special management.

Specific management of toggle relays (4 and 12) when switching on RB200

If used to control valves, or when not used by any service, the on status remains unchanged; if used to control circulators, the status moves to OFF.

APPENDIX

OPERATING CODES

If, during appliance operation, RB200 display (or also display of Direct Digital Controller) views an operating code:

- note indications on display;
- refer to the list of operating codes;
- ask for direct intervention of a Robur Authorized Technical Assistance Centre (TAC), communicating the operating code found.

For the list of operating codes generated by RB200, refer to tables below.
The list of operating codes issued by DDC is contained in “DDC Installation Manual (D-LBR 257)”.

Ask for direct intervention of a Robur Authorized Technical Assistance Centre (TAC), communicating the operating code found.

TABLES OF OPERATING CODES ISSUED BY RB200
(firmware version 1.002)

RB200 INTERNAL FAULT CODES	
u 80	
WRONG OR INCOMPLETE COMMON PARAMETERS	
INTERVENTION CONDITIONS:	Common parameters (see paragraph 5.3 Configuration of common parameters on page 71) wrong or incomplete.
RESET MODE:	Remains until the parameters are correctly entered.
E 80	
INVALID SYSTEM PARAMETER	
INTERVENTION CONDITIONS:	“System type” parameter value (Parameter 10, accessible from Menu 6) invalid.
RESET MODE:	The reset is automatic when re-entering the correct values of parameters 10, 20, 21, 30, 31 in Menu 6. This operation is managed by ROBUR TAC.
u 81 - u 82	
COPY 1 PARAMETERS INVALID (u81) – COPY 2 PARAMETERS INVALID (u82)	
INTERVENTION CONDITIONS:	Copy 1 or copy 2 parameter data damaged
RESET MODE:	Automatic system reset by realigning the damaged copy with the intact copy.
E 81 - E 82	
COPY 1 PARAMETERS INVALID (E81) – COPY 2 PARAMETERS INVALID (E82)	
INTERVENTION CONDITIONS:	The system was not able to correct the damaged copy 1 or copy 2 of the parameters.
RESET MODE:	Contact authorised Robur TAC
E 84	
RB200 POWER VOLTAGE LOW	
INTERVENTION CONDITIONS:	Power voltage of the device less than 23.5 Vcc (ac power less than 16.6 Vac).
RESET MODE:	Check fuses and 0-24 Vac power connections on the device. Automatic reset when the input voltage exceeds 25.5 Vcc (ac power greater than 18.0 Vac). If problem persists, contact ROBUR TAC
E 85	
INVALID MODULE PARAMETERS	
INTERVENTION CONDITIONS:	Types of module set (20, 21, 30, 31, from menu 6) do not correspond to modules managed by RB200.
RESET MODE:	Contact ROBUR TAC: reset is automatic when correct parameters are entered.
E 86 - E 87 - E 88 - E 89	
DEVICE PROCESSOR INTERNAL ERROR	
INTERVENTION CONDITIONS:	Processor fault.
RESET MODE:	Contact ROBUR TAC.
E 91	
FIRMWARE ANOMALY	
INTERVENTION CONDITIONS:	Internal Firmware parameters wrong or incomplete
RESET MODE:	Contact ROBUR TAC.
E 92	
SATELLITE ELECTRONIC BOARD FAULT	
INTERVENTION CONDITIONS:	Communication error between the two electronic boards on the device
RESET MODE:	In the event of a short temporary fault, the error is reset automatically. If problem persists, contact ROBUR TAC

Table 26 - Operating codes generated by RB200 for internal faults.

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

COLD SERVICE REQUEST CODES FOR RB200	
E 0	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	The error occurs if RB200 cannot communicate with the DDC the cold service request is sent to.
RESET MODE:	Check the connections on the CAN network and the value of parameter 61 (it must match the ID of the DDC specified above). If error persists, contact ROBUR TAC.
E 1	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs if the firmware of the DDC the cold service request is sent to is incompatible with that of the RB200.
RESET MODE:	Contact ROBUR TAC.
E 2	
NO SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DDC the cold service request is sent to is not able to provide the service; i.e. it provides only heating and/or DHW services.
RESET MODE:	Check that the DDC provides the cold service; if not check that the cold service request enabled on RB200 is not caused by a configuration error. If problem persists, contact ROBUR TAC.
U 3	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DDC the cold service request is sent to manages a 2-pipe hot/cold plant which is currently in heating mode.
RESET MODE:	The error disappears if the plant enters transition (or commutes directly, if off) to cooling mode.
U 4	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: the error occurs if the voltage on the cold service request input is less than -0.3V or more than 10.3V. For digital input: error occurs if the value of contact closing or opening resistance is not compatible with input technical specifications.
RESET MODE:	The error disappears if the voltage or contact resistance values return to within the permitted ranges. If problem persists, contact ROBUR TAC.

Table 27 Operating codes generated by the RB200 device concerning the cold services.

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

HEATING SERVICE REQUEST CODES FOR RB200	
E 10	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	The error occurs if RB200 cannot communicate with the DDC the heating service request is sent to.
RESET MODE:	Check the connections on the CAN network and the value of parameter 81 (it must match the ID of the DDC specified above). If error persists, contact ROBUR TAC.
E 11	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs if the firmware of the DDC the heating service request is sent to is incompatible with that of the RB200.
RESET MODE:	Contact ROBUR TAC.
E 12	
NO SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DDC the heating service request is sent to is not able to provide the service; i.e. it provides only cold and/or DHW services.
RESET MODE:	Check that the DDC provides the heating service; if not check that the heating service request enabled on RB200 is not caused by a configuration error. If problem persists, contact ROBUR TAC.
U 13	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DDC the heating service request is sent to manages a 2-pipe hot/cold plant which is currently in cooling mode.
RESET MODE:	The error disappears if the plant enters transition (or commutes directly, if off) to heating mode.
U 14	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: the error occurs if the voltage on the heating service request input is less than -0.3V or more than 10.3V. For digital input: error occurs if the value of contact closing or opening resistance is not compatible with input technical specifications.
RESET MODE:	The error disappears if the voltage or contact resistance values return to within the permitted ranges. If problem persists, contact ROBUR TAC.

Table 28 Operating codes generated by the RB200 device concerning the heating services

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

DHW0SERVICE REQUEST CODES FOR RB200	
E 20	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	The error occurs if RB200 cannot communicate with the DDC the DHW0 service request is sent to.
RESET MODE:	Check the connections on the CAN network and the value of parameter 101 (it must match the ID of the DDC specified above). If error persists, contact ROBUR TAC.
E 21	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs if the firmware of the DDC the DHW0 service request is sent to is incompatible with that of the RB200.
RESET MODE:	Contact ROBUR TAC.
E 22	
NO SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DDC the DHW0 service request is sent to is not able to provide the service; i.e. it provides only heating and/or DHW1 services.
RESET MODE:	Check that the DDC provides the DHW0 service; if not check that the DHW0 service request enabled on RB200 is not caused by a configuration error. If problem persists, contact ROBUR TAC.
U 23	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DHW0 service request is configured to work on the based plant part and the DDC the request is sent to manages a 2-pipe hot/cold plant (not with split manifolds, able to provide both cold services and basic DHW) is currently in cooling mode.
RESET MODE:	The error disappears if the plant enters transition (or commutes directly, if off) to heating mode.
U 24	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: the error occurs if the voltage on the DHW0 service request input is less than -0.3V or more than 10.3V. For digital input: error occurs if the value of contact closing or opening resistance is not compatible with input technical specifications.
RESET MODE:	The error disappears if the voltage or contact resistance values return to within the permitted ranges. If problem persists, contact ROBUR TAC.

Table 29 Operating codes generated by the RB200 device concerning the DHW0 services

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

DHW1 SERVICE REQUEST CODES FOR RB200	
E 30	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	The error occurs if RB200 cannot communicate with the DDC the DHW1 service request is sent to.
RESET MODE:	Check the connections on the CAN network and the value of parameter 101 (it must match the ID of the DDC specified above). If error persists, contact ROBUR TAC.
E 31	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs if the firmware of the DDC the DHW1 service request is sent to is incompatible with that of the RB200.
RESET MODE:	Contact ROBUR TAC.
E 32	
NO SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DDC the DHW1 service request is sent to is not able to provide the service; i.e. it provides only heating and/or DHW0 services.
RESET MODE:	Check that the DDC provides the DHW1 service; if not check that the DHW1 service request enabled on RB200 is not caused by a configuration error. If problem persists, contact ROBUR TAC.
U 33	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	The error occurs if the DHW1 service request is configured to work on the based plant part and the DDC the request is sent to manages a 2-pipe hot/cold plant (not with split manifolds, able to provide both cold services and basic DHW) is currently in cooling mode.
RESET MODE:	The error disappears if the plant enters transition (or commutes directly, if off) to heating mode.
U 34	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: error occurs if DHW1 service request input voltage is lower than -0.3V or higher than 10.3V. For digital input: error occurs if the value of contact closing or opening resistance is not compatible with input technical specifications.
RESET MODE:	The error disappears if the voltage or contact resistance values return to within the permitted ranges. If problem persists, contact ROBUR TAC.

Table 30 Operating codes generated by the RB200 device concerning the DHW1 services

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

CODES FOR VALVE, GENERATOR, CIRCULATOR AND TEMPERATURE PROBE SERVICES SUPPLIED BY RB200	
E 100	
INTERRUPTION OF CAN BUS DATA COMMUNICATION	
INTERVENTION CONDITIONS:	The error occurs if at least one of the services configured on the RB200 does not communicate with a DDC.
RESET MODE:	Check the connections on the CAN Bus network and that all the services configured on RB200 have also been configured on DDC. If problem persists, contact ROBUR TAC.

Table 31 Operating codes generated by the RB200 device concerning the services supplied.

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

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in research, development and promotion of safe,
environmentally-friendly, and energy-efficient products,
through the commitment and caring
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