

Installation and use manual

Roburbox100

Plant Control Interface



EDITION: 06/2014 – FW version 1.002

Code: D-LBR468

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FOREWORD

This "Installation and Use Manual" is a guide for installation and use of RB100 (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 a proper "commissioning";
- a section showing operations for a "service configuration".

The descriptions provided in this manual refer to RB100 interface device, version 1.000.

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.

APPENDIX contains operating code tables and relevant instructions.



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

References

In order to operate RB100 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 273)
(for installation and service technicians);



DDC Use and Programming Manual (D-LBR 249)
(for the user of the DDC).

Meaning of terminology and icons

Appliance: by this term we mean to indicate the interface device between an external system and DDC Direct Digital Controller, named RB100 (or Robur Box).

Service request: by this expression we mean to indicate every single request for plant turning on, sent from appliance to DDC; in particular, the following request services are supported: cold request service, hot request service; DHW (domestic hot water) request service.

DHW: this term literally means Domestic Hot Water and is used to indicate the relevant DHW0 and DHW1 services.

Valve service: by this term we mean to indicate RB100 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).

Basic Group: by this term we mean to indicate the portion of plant including all units, except for those which can be separated from the installation itself.

Separable Group: by this term we mean to indicate the portion of plant which can separate from the basic installation and work stand-alone.

Basic sanitary plant (Basic DHW): domestic hot water service obtained with the basic group.

Separable sanitary (separable/separated DHW): domestic hot water service obtained with the separable group.

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






	Danger signal
	Warning
	Note
	Start of operating procedure
	Reference to another part of the manual or to another manual/book

Table 1 Descriptive icons






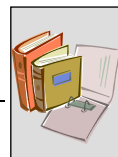
	"GENERAL AND TECHNICAL FEATURES" section
	"ELECTRIC INSTALLER" section
	"COMMISSIONING" section
	"USER INTERFACE" section
	"BOARD SETTINGS" section

Table 2 Section icons

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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

RB100 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 1.5 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 usage is consider as improper, thus 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.



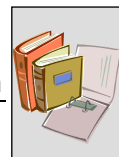
The "professionally qualified personnel" has specific technical competence in the sectors of electric systems and live appliances.

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 46.



Contact local Robur Authorised Technical Assistance Centres only (TAC).
In order to know the local TAC, contact Robur S.p.a (phone +39 035 888.111).

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

Operation of appliance

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 RB100 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 72.



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 SHORT DESCRIPTIONS OF APPLIANCE OPERATION

RB100: description

Robur Box RB100 device (Figure 1), interfaces the requests from one or more external control systems with GA and GAHP series Direct Digital Controller (DDC). It also provides for a valve activation service to be used by a DDC.



Figure 1 RB100

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

Parameters can be easily changed and/or set by proper knob (encoder) on the right side.

General features

RB100 interface device only operates if coupled with a Direct Digital Controller.



Before installing RB100 interface, DDC-firmware compatibility is to be checked, as it must be equal or higher than FW 4.000.

Remember that DDC can support and manage up to 32 modules; a module is a machine able to produce refrigerated or hot water (e.g. an ACF 60-00 and an AY 00-119 are considered as two separate modules. See possible combination in table below).

Direct Digital Controller can manage several hot and/or refrigerated water production systems, especially:

1. No. 2 systems for **simultaneous** production of hot and cold water. Two ACF, AYF 60-119/4 etc.-type units can be connected up to **16 “cold” modules and 16 “hot” modules maximum**.
2. No. 2 plants for **alternate** production (summer/winter) of hot and cold water. This is a two-pipe plant, serving, for example, heating piping in winter and conditioning piping in summer. Up to max. 16 AYD 60-119/2 can be connected.
3. No. 1 system for producing refrigerated water **only**. Up to 16 ACF 60 maximum can be connected.

4. No. 1 system for producing hot water **only**. Up to 16 AY 00-119 maximum can be connected.

The Direct Digital Controller (DDC) can be connected to two more DDCs maximum, to control a 48 units (96 modules: 48 cold modules and 48 hot modules). Each DDC can be connected to 16 cold/hot units maximum (each one supporting 1 hot module and 1 cold module, for 32 total modules) or 32 units, with 16 hot and 16 cold maximum (always 32 total modules).

On a network consisting of the maximum number of installable modules, it is also possible to connect two extra modules, supported by RB100 interface. Each RB100 interface can manage two modules: one for request services, the other for valve service, described below (Paragraphs: Short descriptions of appliance operation; Service operation). For example: network consisting of the maximum number of installable modules + 1 RB100 where both modules are used, or network consisting of the maximum number of installable modules + 2 RB100 where service request module is only used for each one.

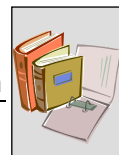
For each (cold and hot) module not available on the network, 1 RB100 can be added. For example, on a network with 3 DDCs and 47 cold/hot units (2 modules less of the maximum number allowed), 2 RB100 interfaces can be added, each one managing 2 modules.

In compliance with limits affecting the maximum number of configurable modules, 8 RB100 interfaces maximum can exist on the same network.

GA-GAHP SERIES: possible combinations

Direct Digital Controller can manage ACF60 AY00-119-type modules, equipped with electronic boards S 60 and S 70, respectively. To calculate the number of units to be connected to the Digital Controller, RTCF and RTYF-series appliance are to be considered as follows:

- GAHP-A = No. 1 hot module
- GAHP-AR = No. 2 modules (1 "cold" + 1 "hot")
- GAHP-W = No. 2 modules (1 "cold" + 1 "hot")
- GA HR = No. 1 "cold" module
- ACF 60-00 = No. 1 "cold" module
- AYF 60-119/2 = No. 2 modules (1 "cold" + 1 "hot")
- AYF 60-119/4 = No. 2 modules (1 "cold" + 1 "hot")
- RTCF 120-00 = No. 2 "cold" module
- RTCF 180-00 = No. 3 "cold" module
- RTCF 240-00 = No. 4 "cold" module
- RTCF 300-00 = No. 5 "cold" module
- RTYF 120-119 = No. 3 modules (2 "cold" + 1 "hot")
- RTYF 120-238 = No. 4 modules (2 "cold" + 2 "hot")
- RTYF 180-238 = No. 5 modules (3 "cold" + 2 "hot")
- RTYF 180-357 = No. 6 modules (3 "cold" + 3 "hot")
- RTYF 240-238 = No. 6 modules (4 "cold" + 2 "hot")
- RTYF 240-357 = No. 7 modules (4 "cold" + 3 "hot")
- RTYF 240-476 = No. 8 modules (4 "cold" + 4 "hot")



Short description of device operation

Connect appliance to a 24 Vac electric power supply line (paragraph 2.2 on page 25).

When turned on, the appliance performs a series of internal tests to check proper software and hardware operation, checks any set-up errors on operating parameters, shows an identification string (rb10, name of electric board) and, finally, keeps the leftmost decimal point flashing only.

This interface is used to collect requests (max 4 request for each RB100) for cold, hot and DHW services coming from external controllers where analogue and/or digital output signals are available; after collection, these requests are sent to DDCs which supply the relevant services.

Besides, interface has an auxiliary mode to connect any DDC-controlled valve, to separate or include the separable DHW group on the basic plant or switch a plant operating mode from hot to cold and vice versa.

Finally, there are digital outputs to signal any non-availability of request services (e.g. cold service not available as plant is switched on heating) and a general alarm output shared by all services, which always accompanies the non-available service and signal any other anomaly (e.g. valve anomaly).

RB100 interface device requires at least a Direct Digital Controller (DDC, see Figure 2). The switching between RB100 and DCC is performed by CAN network, (the same used for communication between DCC and machine).



In this case, for DDC use and configuration/programming instructions, refer to two booklets: DDC Installation Manual (D-LBR 273) and DDC Use and Programming Manual (D-LBR 249).



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)

Operation of services

As already said before, the interface device can receive, for each one of four services available, an analogue (0-10 V) or digital (clean contact) input signal. For each request received on input, the appliance sends a proper request to DDC; to this point, the Direct Digital Controller is in charge of machine management to meet such request.

The following services are available on each RB100 interface device:

Cold service: when an input signal is received on this service, the appliance provides for a DDC request, so that DDC can control the turning-on of cold modules on the plant and properly manage them to meet such request;

Hot service: when an input signal is received on this service, the appliance provides for a DDC request, so that DDC can control the turning-on of hot modules on the plant and properly manage them to meet such request;

DHW0 and DHW1 service: when an input signal is received on these services, the appliance provides for a DDC request, so that DDC can control the turning-on of hot modules on the plant and properly manage them to meet such request. Especially, each service can be configured so that separable sanitary-type requests or basic plant sanitary –type requests can be made;

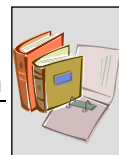
Valve service: this service is used to control three-way motorized valve, allowing for management of hydraulic separation of unit separable from the basic unit or switching plant operation from heating to cooling and vice versa.



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

WATER FLOW	OPERATING MODE		TYPE OF ROBUR UNIT					
			ACF 60-00	AY00-119	GAHP-AR	GAHP-A	GAHP-W	GAHP-W LB
			l/h	l/h	l/h	l/h	l/h	l/h
	HEATING	MINIMUM		1500	1400	1400	1400	1400
		MAXIMUM		3200	5000	5000	5000	5000
	COOLING	MINIMUM	2500		2500		2300	2000
		MAXIMUM	3200		3200		4700	4000

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



Operation of inputs for request services

One of the following types apply to each request service used:

Analogue input: this configuration allows receiving a 0-10 Volt input signal. RB100 interface sends to Direct Digital Controller a setpoint request proportional with input voltage. Thus, setpoint is provided for by RB100.

Digital input with local setpoint: this configuration allows receiving an input digital signal (clean contact). When received on input, RB100 sends to Direct Digital Controller a setpoint request with a well-defined value, previously set in a proper interface parameter.

Digital input with remote setpoint: this configuration allows receiving an input digital signal (clean contact). When received on input, RB100 only sends to Direct Digital Controller a turning-on request; the setpoint value to be used by DDC to meet such request is set on DDC itself [ref. to DDC Use and Programming Manual (D-LBR 249)].

Operation of valve service

As already said before, this service is used to control three-way motorized valves, which allow acting directly on hydraulic plant, mainly meeting one of the following two needs:

- manage hydraulic separation of separable unit from basic group;
- switch plant operation from heating to cooling and vice versa.

2 digital inputs support the valve, to connect valve auxiliary contacts (clean contacts to signal valve position). Position information is used by DDC [ref. to DDC Installation Manual (D-LBR 273) and DDC Use and Programming Manual (D-LBR 249)] to manage valves and the whole plant more accurately.

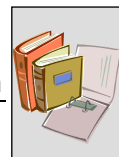
Water flow to be ensured by valves during their activation is specified in Table 3 on page 10.

Operation of outputs (general alarm, non-available request service)

RB100 interface has a general alarm output common for all services. It activates when error conditions occur on at least a service or when a DDC receiving a request service signals a machine or DDC warning/error.

For each service on RB100 interface, a digital output is available to signal service non-availability. This service is only generated if service is enabled.

Service non-availability warning is always accompanied by an error code flashing on display, to identify abnormality (APPENDIX on page 72).



1.3 MANUFACTURING TECHNICAL FEATURES

RB100 interface has the manufacturing technical features listed below.

- Shell structure:
 - cover in polycarbonate;
 - container in polycarbonate;
 - terminal-cover in polycarbonate;
 - protection level IP20;
 - external connections:
 - 3.5-pitch screw-type input terminals; sect. 0.14 to 1.5 mm²;
 - 5.08-pitch screw-type input terminals; sect. 0.2 to 2.5 mm²;
 - CAN connection terminals and screw-type cable protection screen; 3.5 pitch, sect 0.14 to 1.5 mm².
- Appliance installation (Figure 3):
 - installation in electric panel on 35 mm DIN guide(EN 60715);
 - space covered by appliance in electric panel accounts for 9 modules (paragraph 1.6 on page 21).



Figure 3 Appliance installation on DIN guide (EN 60715)

➤ Device check (Figure 4):

- electronic board with integrated microprocessor, display and knob (encoder) for adjustment;
- electronic board inputs:
 - for request services, they are named XI1, XI2, XI3, XI4, respectively;
 - they can be configured as analogue or digital according to the position of jumpers located on each input side, to parameter value 63, 83, 103, 123 (depending on service referred 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);
 - they are named DI5, DI6 for the auxiliary contacts of limit switches;
- electronic board outputs:
 - they are named 1, 2, 3, 4, 5, 6 respectively;
 - they are clean contacts;
 - 250Vac maximum voltage;
 - maximum current:
 - 4 A for resistive loads;
 - 3 A for inductive loads.

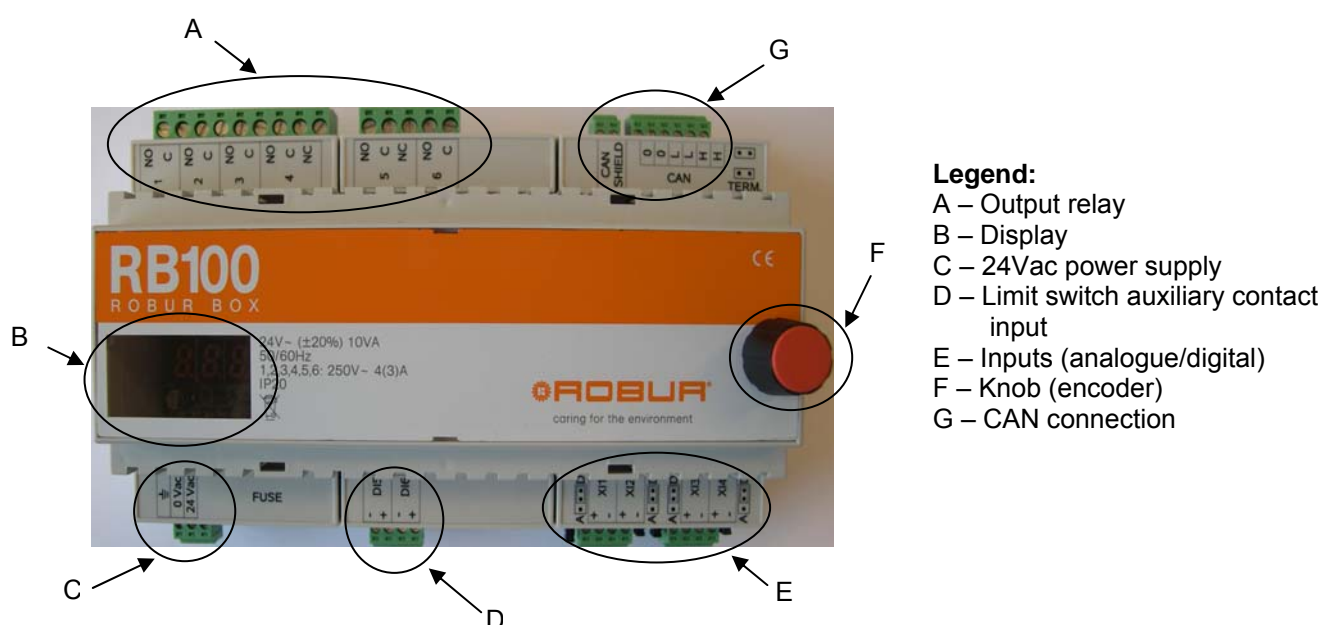


Figure 4 Connections of RB100 interface



1.4 OPERATING TECHNICAL FEATURES

Input management

For each request service on interface (4 in total), according to input configuration (analogue/digital), RB100 sends turning-on or setpoint request to its DDC in different ways.



Input specifications only apply if service is active, otherwise no request is transmitted to DDC:

In particular:

➤ Input configured as digital setpoint:

- the corresponding turning-on or setpoint request is sent to DDC if service contact status is “closed”;
- turning-off request is sent to DDC service if contact is “opened”.

Example of digital input management

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

When hot service contact closes, the appliance sends a setpoint request to DDC, thus DDC manages hot units to meet such request.

Example:

Settings

PARAMETERS	VALUE
WATER THERMOSTAT ADJUSTMENT (set on DDC)	DELIVERY
LOCAL SETPOINT PARAMETER FOR DIGITAL INPUT (Setpoint sent from RB100 to DDC)	+60°C
DIFFERENTIAL (set on DDC)	-10°C

Operating sequence:

- hot service contact is closed on RB100 interface;
- the +60°C setpoint request is sent to DDC (value set);
- DDC turns on hot machines (if plant is switched to heating, otherwise non-available service relay activates (APPENDIX);
- machines are operating: plant water heats up to setpoint temperature = +60°C;
- machines turn off: plant water, returning from line, gradually cools down to 50°C = 60°C – 10°C (setpoint + differential);
- DDC restarts the machines: plant water heats up again.
- The cycle repeats until the service contact corresponding to the request (in this case the hot service) remains closed; if contact opens, the turning-off request reaches DDC and DDC-controlled units turn off.



If no request arrives from RB100, 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. to DDC Installation Manual (D-LBR 273) and DDC Use and Programming Manual (D-LBR 249)] which allows system to operate with the only requests coming from RB100 or with the only DDC internal request or both.

➤ Input configured as analogue setpoint:

- Depending on input voltage value, turning-off or setpoint request is sent to Control Panel.



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 72).

Example of analogue input management

For convenience, we refer to heating operation, but the same principle applies to all request services (attention: if plant operates in cooling, temperature is managed by the opposite logics).

Example:

Settings

PARAMETERS	VALUE
WATER THERMOSTAT ADJUSTMENT (set on DDC)	DELIVERY
TEMPERATURE CORRESPONDING TO MINIMUM SETPOINT (setpoint sent from RB100 to DDC when input voltage is 0V)	+40°C
TEMPERATURE CORRESPONDING TO MAXIMUM SETPOINT (setpoint sent from RB100 to DDC when input voltage is 10V)	+80°C
TEMPERATURE CORRESPONDING TO REQUEST OFF (the request sent from RB100 to DDC when input voltage equal to or lower than is 2.5V is MACHINES OFF)	+50°C
DIFFERENTIAL (set on DDC)	-10°C

Operating sequence

- an input reaches hot service on RB100 interface equal to 10V;
- the +80°C setpoint request is sent to DDC (value set);
- DDC turns on hot machines (if plant is switched to heating, otherwise non-available service relay activates (APPENDIX on page 72);
- machines are operating: plant water heats up to setpoint temperature = +80°C;
- machines turn off: plant water, returning from line, gradually cools down to 70°C = 80°C – 10°C (setpoint + differential);
- DDC restarts the machines: plant water heats up again.
- The cycle repeats until the service input corresponding to the request (in this case the hot service) has 10V voltage; if voltage decreases to 2.5V, no setpoint request reaches DDC and DDC-controlled units turn off.
- For each input voltage value between 2.5V and 10V, the corresponding setpoint (e.g.: 7.5V = +70°C) is sent to DDC, which controls machines to meet such temperature value.



If no request arrives from RB100, 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. to DDC Installation Manual (D-LBR 273) and DDC Use and Programming Manual (D-LBR 249)] which allows system to operate with the only requests coming from RB100 or with the only DDC internal request or both.

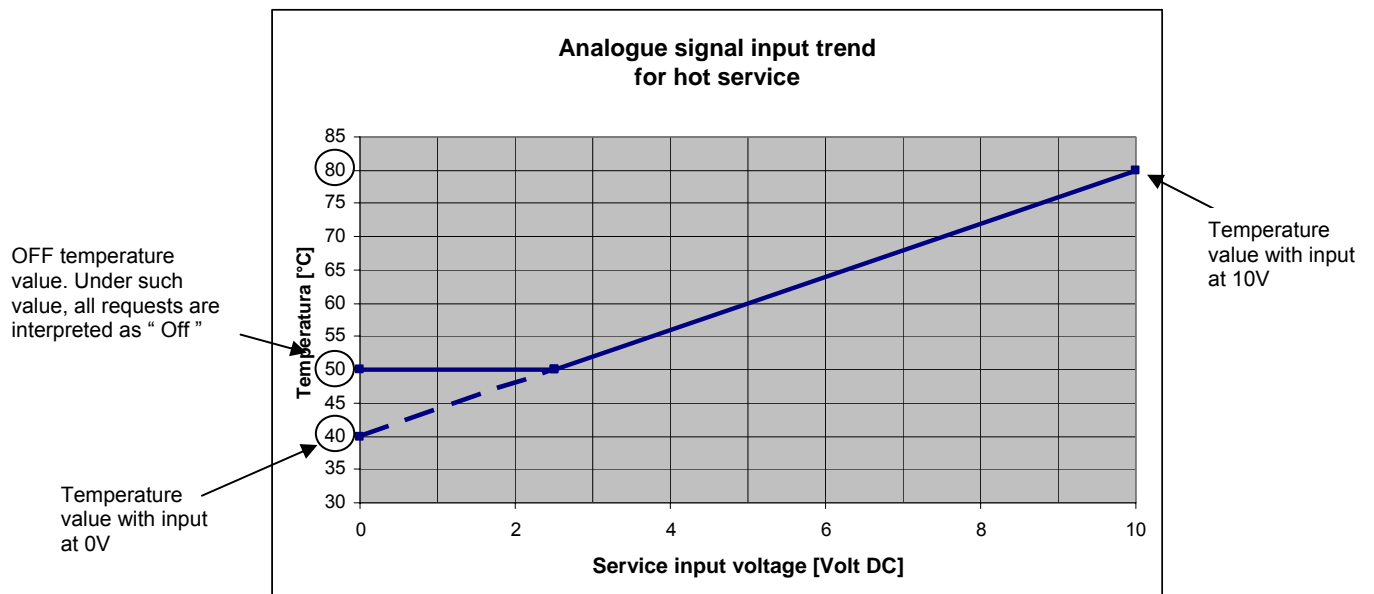


Figure 5 Voltage signal input trend for hot analogue service

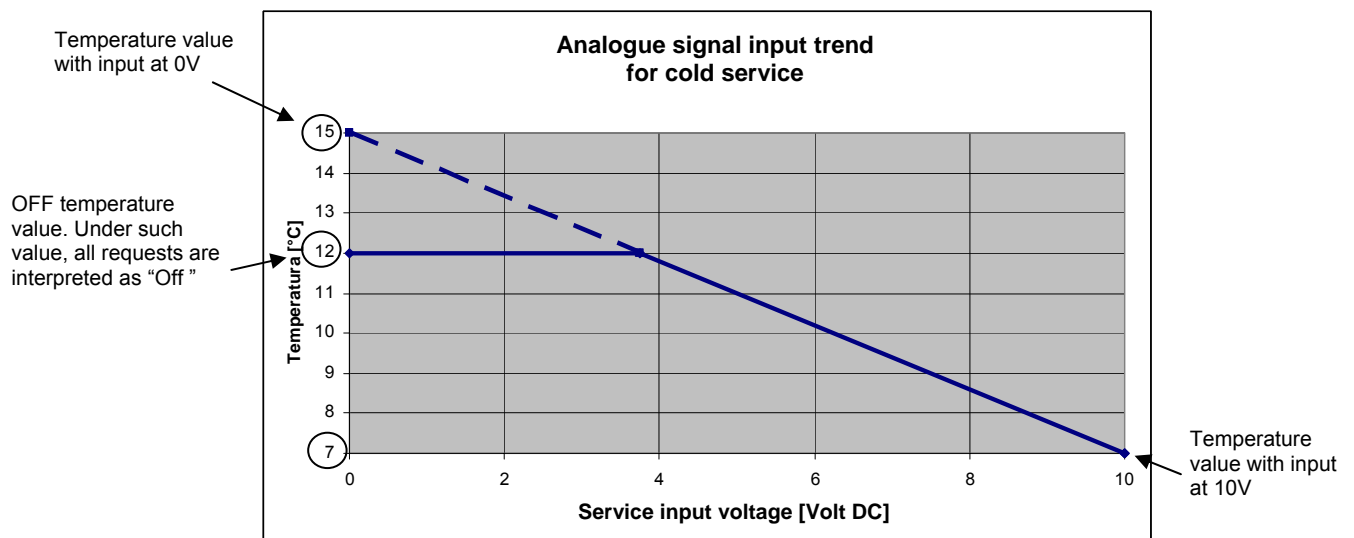


Figure 6 Voltage signal input trend for cold analogue service

Output management

Service non-availability is signalled:

- when a “permanent” non-availability exists, due to wrong configuration of Direct Digital Controller (DDC), RB100 interface or abnormality on CAN communication;
- when a “temporary” non-availability exists, since service is not temporarily provided for by DDC.

Permanent non-availability

Permanent non-availability is found in product installation and configuration phase, as problems can arise from firmware incompatibility between different products of the plant (DDC, RB100) or their wrong configuration.

This type of warning can remain after installation, due to problems arising from CAN communication between interface and Control Panel or single machine boards.

Temporary non-availability

Temporary non-availability is signalled in the following cases:

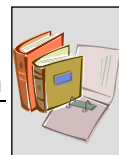
- for 2-pipe cooling/heating service: non-availability output activates when plant is switching to an operating mode opposite to the current one, or when plant is turned to opposite from current request (E.g.: plant in cooling phase with hot service request from RB100: hot service non-availability relay activates);
- for basic plant DHW service to be only used when plant is operating in hot mode: non-availability output is always active when the plant is switched to cooling or activated when the plant is switching to the operating mode opposite to the current one.

Non-available service output is always deactivated in the following cases:

- for basic plant DHW service also available when plant is cooling;
- for separable DHW.



(See APPENDIX on page 72).



Valve service

To manage valve service operation, valve service must be enabled and valve configured on Direct Digital Controller (DDC).

Each valve is controlled when RB100 receives from DDC a switching request (cold/hot or separable/basic). Now, RB100, after reversing, sends to Control Panel the status of limit switch auxiliary contacts, by which DDC can diagnose good or bad result of switching.

It has to be noted that valve operation does not depend on the existence of limit switch auxiliary contacts as possible configurations allow for using the valve service also with no limit switch auxiliary contacts.

Water flow to be ensured by valves during their activation is specified in Table 3 on page 10.



(See paragraph 5.7 on page 71)



If limit switch auxiliary contacts are used, the wrong status of their contacts compared with proper valve position, originates an error signal by DDC, with specific flashing code, with immediate system shutdown.



(See APPENDIX on page 72).



(See DDC Installation Manual (D-LBR 273) and DDC Use and Programming Manual (D-LBR 249))

1.5 TECHNICAL DATA

TECHNICAL FEATURES: RB100 INTERFACE

ROBUR BOX SERIES			
GENERAL TECHNICAL DATA		meas. units	Value/Feature
OPERATING FEATURES			
OPERATING FIELD (T _{EMPERATURE})	MINIMUM	°C	0
	MAXIMUM	°C	55
CLASSIFICATIONS EN 60730-1			
TYPE DEFINITION ACCORDING TO MANUFACTURE			CONTROL DEVICE FOR INDEPENDENT INSTALLATION
PROTECTION LEVEL			IP20
ACTION TYPE 1 OR 2			TYPE 1
COMPLEMENTARY FEATURES OF ACTION TYPE 1 OR 2			1B
POLLUTION LEVEL			2
SOFTWARE STRUCTURE AND CLASS			CLASS A
TEMPERATURE IN TEST WITH SPHERE		°C	75
RATED PULSE VOLTAGE		V	4000
REFERENCE STANDARDS FOR ELECTROMAGNETIC COMPATIBILITY TESTS			CEI EN 60730-1
ELECTRIC FEATURES			
RATED VOLTAGE		V	24 Vac (± 20%)
RATED ELECTRIC POWER		VA	10
FREQUENCY		Hz	50/60
VOLTAGE AND CURRENT STATED FOR ELECTROMAGNETIC TEST PURPOSE ⁽¹⁾		V	
ON OUTPUTS			230 Vac
ON BOARD			24 Vac
INPUT ELECTRIC CONNECTIONS			
TERMINALS			SCREW ⁽²⁾
ANALOGUE	VOLTAGE	V	0-10 Vdc
MAX CABLE LENGTH		m	300 - 100
MAX CABLE SECTION		mm²	1.5 – 0.5
DIGITAL	VOLTAGE CURRENT	V	12 Vdc
CONTACT SENSIBILITY		mA	5 mA
MAX CABLE LENGTH		m	300
MAX RESISTANCE FOR ON		Ω	200
MIN RESISTANCE FOR OFF		kΩ	50
OUTPUT ELECTRIC CONNECTIONS			
TERMINALS			SCREW ⁽³⁾
MAX CABLE LENGTH		m	300
LOAD TYPE AND RATED CURRENT			
RESISTIVE LOAD		A	4
INDUCTIVE LOAD		A	3
PHYSICAL DATA			
WEIGHT		kg	0.320
OVERALL DIMENSIONS	WIDTH	mm	158
	DEPTH ⁽⁴⁾	mm	74.6
	HEIGHT ⁽⁵⁾	mm	106.5

Table 4 Operating technical features: RB100 interface

NOTES

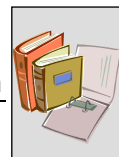
(1) **EMC EMISSION TESTS**

(2) **PITCH 3.5 Sect. 0.14 to 1.5 mm²**

(3) **PITCH 5.08 Sect. 0.2 to 2.5 mm²**

(4) **OVERALL DIMENSIONS, KNOB INCLUDED**

(5) **OVERALL DIMENSIONS, TERMINALS INCLUDED**



1.6 OVERALL DIMENSIONS

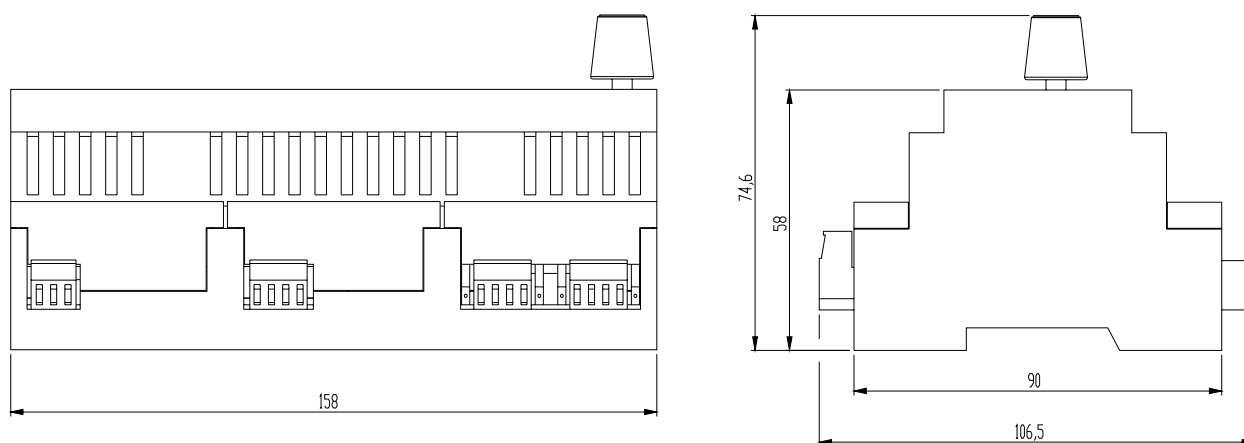


Figure 7 Dimensions of Robur Box series: front and side view



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. ELECTRIC CONNECTIONS FOR REQUEST SERVICES
3. ELECTRIC CONNECTIONS FOR VALVE SERVICE
4. USAGE OF DIRECT DIGITAL CONTROLLER (DDC).



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



The appliance can only be installed by an authorized firm, based on 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.

2.1 GENERAL INFORMATION

- The power supply transformer must be SELV/PELV (min. 10VA) and comply with CEI EN 61558-2-6 standard.
- Check that power supply voltage is 24 Vac ($\pm 20\%$).
- Electric components necessary for connections (e.g.: fuses) must be located in a proper electric panel by the installer, close to the appliance.
- Do not power appliance with voltage higher than operating rated voltage.



Before performing electric connection, ensure elements are not live.

Figure 10 shows RB100 main elements

Table 5 shows a legend of elements in Figure 8.

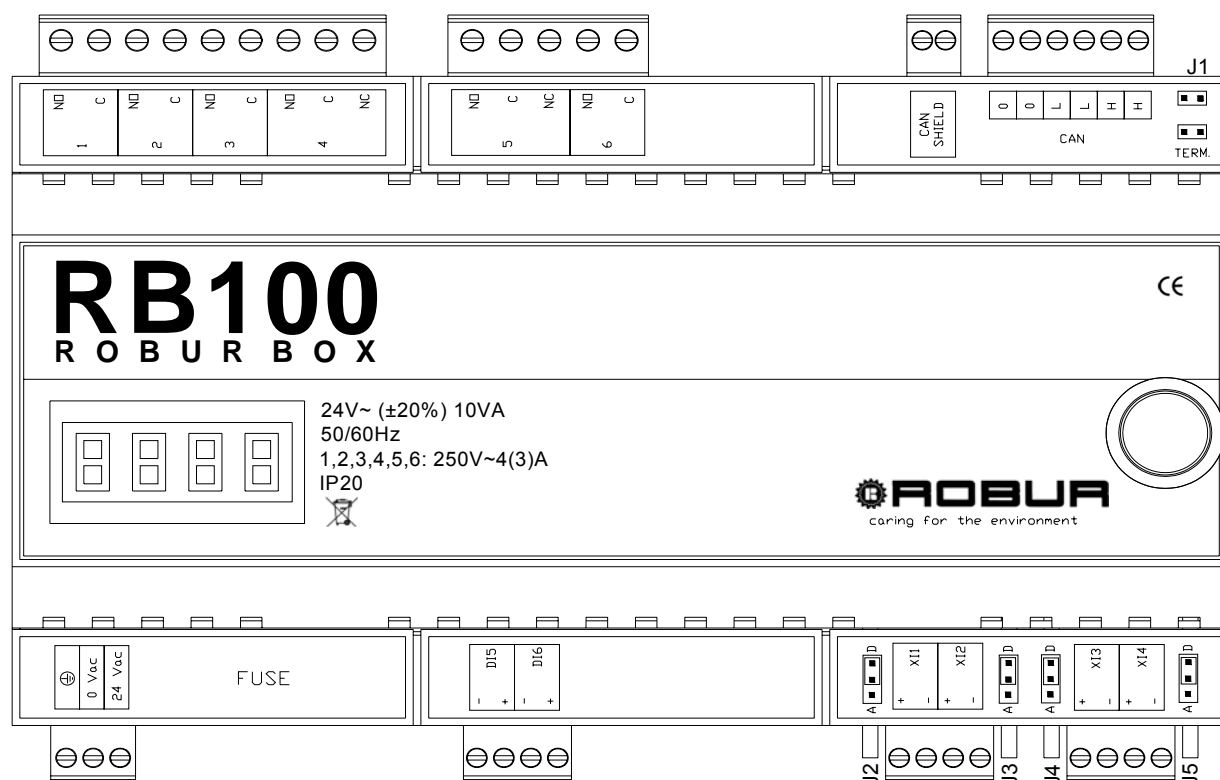


Figure 8 RB100 - representation scheme of main elements

LEGEND OF RB100 ELEMENTS SHOWN IN FIGURE 10 (above)	
LEGEND	DESCRIPTION
elements along upper horizontal margin	
1	N.O. CONTACT OF COLD REQUEST SERVICE NON-AVAILABLE
2	N.O. CONTACT OF HOT REQUEST SERVICE NON-AVAILABLE
3	N.O. CONTACT OF DHW20 REQUEST SERVICE NON-AVAILABLE
4	N.O.-N.C. OF CONTACT VALVE SERVICE
5	N.O.-N.C. CONTACT OF GENERAL ALARM
6	N.O. CONTACT OF DHW1 REQUEST SERVICE NON-AVAILABLE
CAN SHIELD	CONNECTOR FOR BUS CAN CABLE SHIELD CONNECTION
CAN	CAN BUS CABLE CONNECTOR
J1	JUMPERS CAN BUS
elements along lower horizontal margin	
0 – 24 Vac	CONNECTOR FOR BOARD POWER SUPPLY
FUSE	PROTECTION FUSE (2 A)
DI5	INPUT FOR LIMIT SWITCH AUXILIARY CONTACT OF COLD SIDE/BASIC PLANT VALVE
DI6	INPUT FOR LIMIT SWITCH AUXILIARY CONTACT OF HOT SIDE/SEPARABLE PLANT VALVE
X11	ANALOGUE/DIGITAL INPUT FOR COLD REQUEST SERVICE
J2	INPUT TYPE SELECTION JUMPER (ANALOGUE/DIGITAL) FOR COLD REQUEST SERVICE
X12	ANALOGUE/DIGITAL INPUT FOR HOT REQUEST SERVICE
J3	INPUT TYPE SELECTION JUMPER (ANALOGUE/DIGITAL) FOR HOT REQUEST SERVICE
X13	ANALOGUE/DIGITAL INPUT FOR DHW0 REQUEST SERVICE
J4	INPUT TYPE SELECTION JUMPER (ANALOGUE/DIGITAL) FOR DHW0 REQUEST SERVICE
X14	ANALOGUE/DIGITAL INPUT FOR DHW1 REQUEST SERVICE
J5	INPUT TYPE SELECTION JUMPER (ANALOGUE/DIGITAL) FOR DHW1 REQUEST SERVICE

Table 5 Legend of RB100 elements shown 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.

Operations to properly install the appliance are listed below:

1. cut off voltage from electric panel where interface is to be installed to;
2. find, inside the panel, the area where RB100 board (9 modules) can be located;
3. install interface on DIN 35 mm guide (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 by 0.75-mm² minimum section wires, as shown in Figure 9, respecting polarity.



Terminal 0 V is internally connected with GND terminal, then grounded; if transformer used already has a grounded wire, it must be definitely connected to such terminal.

5. Complete all operations and close electric panel.

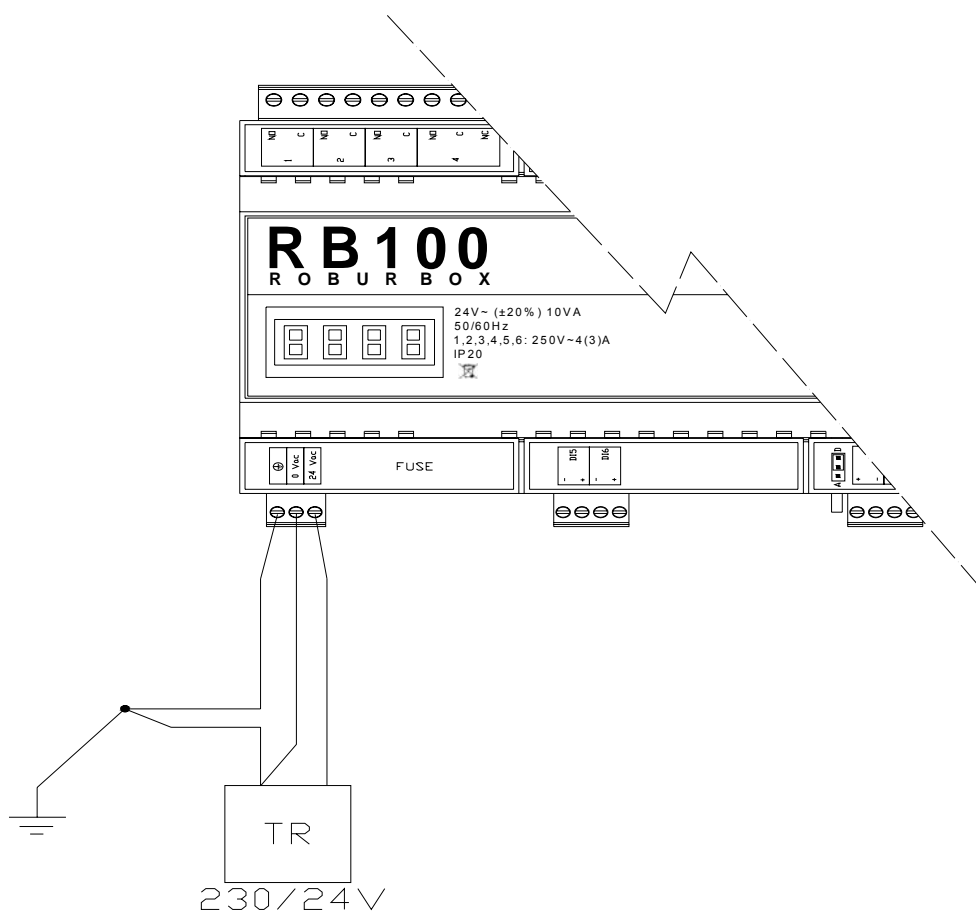


Figure 9 RB100. Example of connection to network: 24 Vac 10VA power supply

2.3 ELECTRIC CONNECTIONS FOR REQUEST SERVICES

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 can be configured both as analogue and as 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 and service is to be properly configured (SECTION 5).



Analogue Input

For connecting the service as analogue input, we remind that the input voltage must range between 0 and 10 Vdc.

The maximum allowable length of the connection cables to the inputs of the request services is not less important and not to be neglected at all.

Max cable length (m)	Cable section (mm ²)
300	1.5
100	0.5

Given that the examples of cable length mentioned above are only two, in case of different cable section (in any case smaller than or equal to 1.5 mm²) you can calculate the maximum allowable length by using the following formula:

$$l = s \times 200$$

where:

l = length [m]

s = section [mm²]



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



Maximum error of measurement, including the error due to the cable resistance: ± 40 mV ($\pm 0.4\%$ f. s.).

Connection Scheme

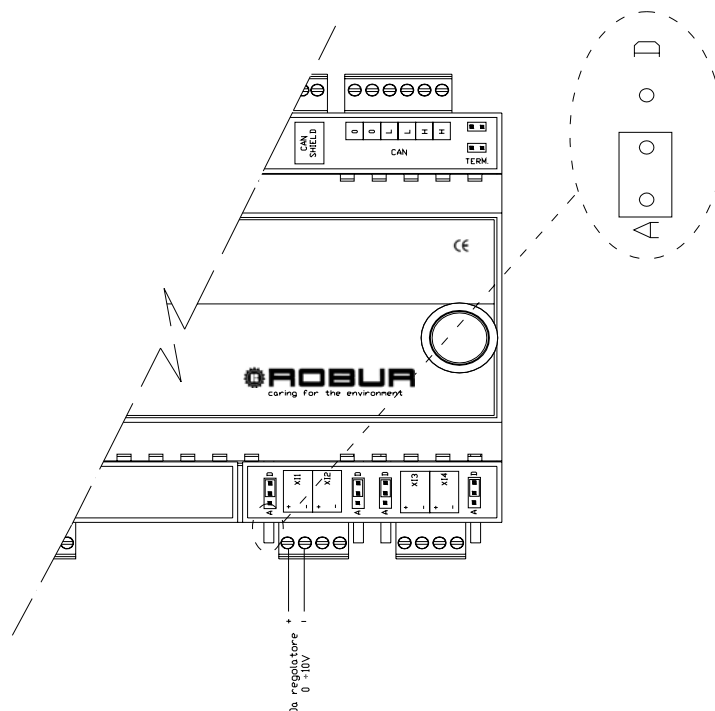


Figure 10 RB100: electric connection for analogue input

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.

The maximum allowable length of the service connecting cables for this type of inputs is not less important and not to be neglected at all.

Max Resistance for On [Ω]	Min Resistance for Off [$k\Omega$]	Max cable length (m)
200 [Ω]	50 [$k\Omega$]	300 (m)



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

Connection Scheme

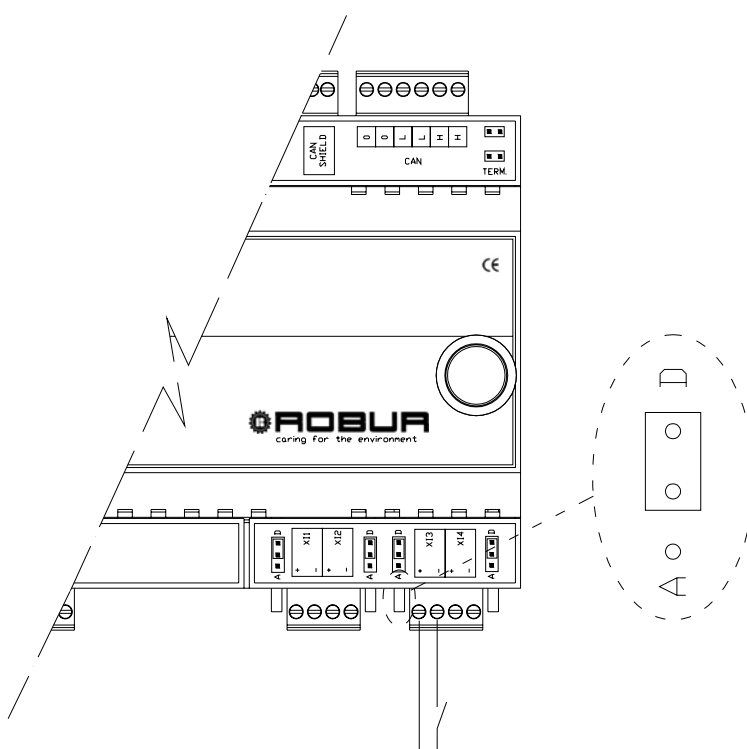


Figure 11 RB100: electric connection for digital input

Outputs

For connecting the outputs to the unavailable service relay, remember that:

- the unavailable service output consists of a (NO) free contact;
- the maximum applicable voltage is 250 Vac;
- the maximum applicable current is:
 - o resistive loads: 4A;
 - o inductive loads: 3A;
- cable maximum length is 300 metres.



2.4 ELECTRIC CONNECTIONS FOR VALVE SERVICE

Outputs

- The valve control output is composed of a free (NO/NC) diverter contact:
 - the NO contact is closed when the system requires that the position of the valve is towards the heating side or towards the separable group;
 - the NC contact is closed when the system requires that the position of the valve is towards the cooling side or towards the basic group;
- the output control relay is of toggle type (in case of power cut to the appliance, the contact remains in the original position);
- the maximum applicable voltage is 250 Vac;
- the maximum applicable current is:
 - resistive loads: 4A;
 - inductive loads: 3A;
- cable maximum length is 300 metres.

Inputs

There are two digital inputs for the management of auxiliary limit switch contacts, if any.

Maximum allowable length of connection cables for inputs:

Max Resistance for On [Ω]	Max Resistance for Off [$k\Omega$]	Max cable length (m)
200 [Ω]	50 [$k\Omega$]	300 (m)



Digital input cable must be shielded by grounded screen on each end.

Connection Scheme

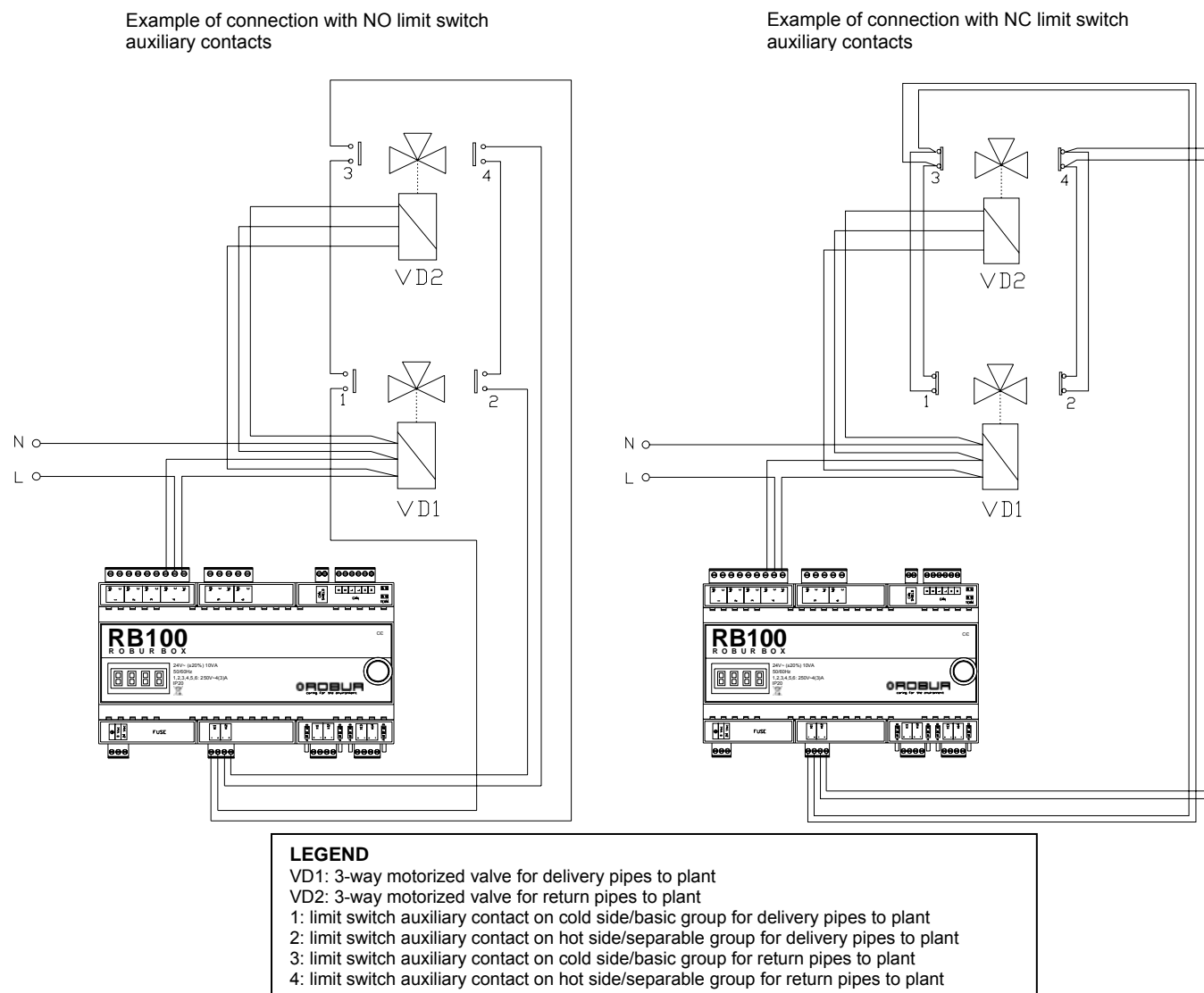


Figure 12 RB100: Example of electric connection for valve service



For valve management, valve service must be properly configured, with reference to paragraph 5.7 on page 71.

2.5 ELECTRIC CONNECTION FOR COMMON ALARM SIGNAL

As for common alarm output connection, please note that:

- the common alarm output consists of a (NO/NC) diverter contact;
- the maximum applicable voltage is 250 Vac;
- the maximum applicable current is:
 - o resistive loads: 4A;
 - o inductive loads: 3A;
- cable maximum length is 300 metres.



2.6 USAGE OF DIRECT DIGITAL CONTROLLER (DDC).

This paragraph describes the following procedures to be performed by installer:

- How to power supply Direct Digital Controller (DDC)
(see instructions on Page 32 and detail C in Figure 13/Page 31).
- How to connect Direct Digital Controller (DDC) with RB100, on CAN network (see instructions on Page 33 and detail E in Figure 13/Page 31).



Instructions for operations concerning other connections (optional: to be made by electric installer, depending on user's needs) are described in the relevant "DDC Installation Manual (D-LBR 273)" for DDC itself.



Instructions for DDC programming/configuring and use are described in the relevant "DDC Use and Programming Manual (D-LBR 249)" for DDC itself.

Figure 13 shows DDC front and rear views with relevant electric connections; details "C" and "E" have been suitably pointed out in figure, as useful for connections in two procedures above.

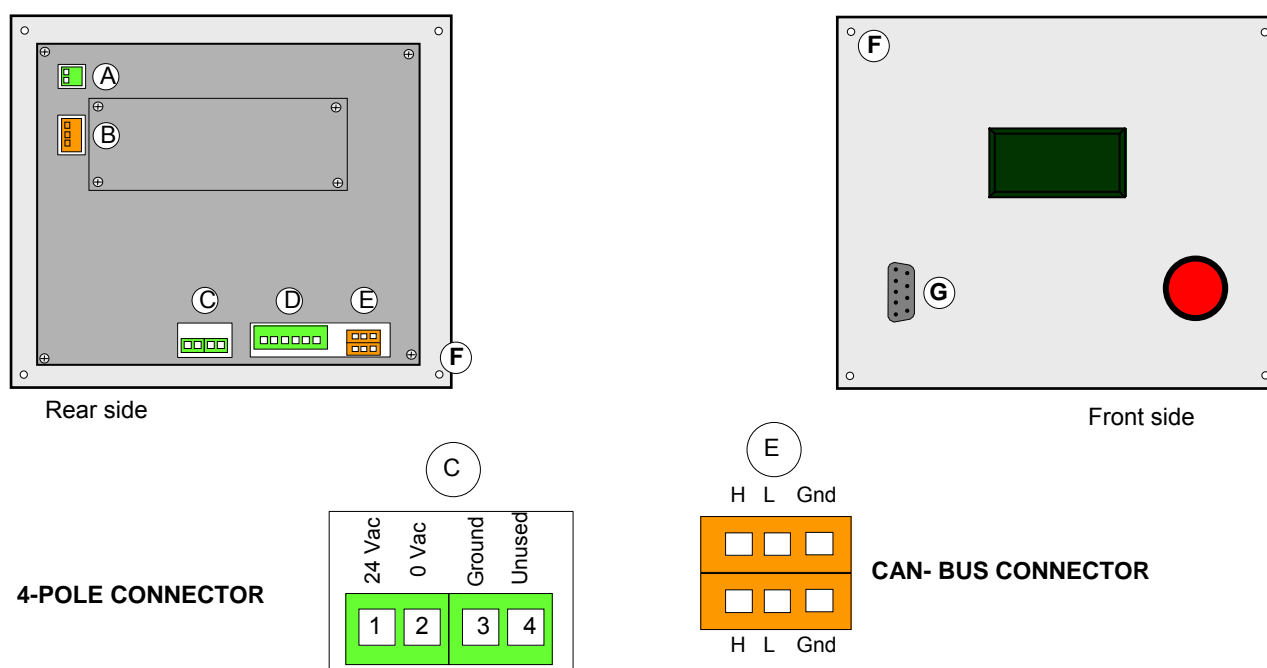


Figure 13 DDC rear view and details of electric connections

LEGEND OF Figure 13		
DDC details		
A	2-POLE CONNECTOR	terminals for any connection of a room air temperature sensor
B	3-POLE CONNECTOR	terminals for any connection of external alarm systems
C	4-POLE CONNECTOR	24 Vac DDC power supply terminals
D	6-POLE CONNECTOR	terminals for any connection of external authorizations
E	CAN-BUS CONNECTOR	terminals for DDC connection to appliance, on CAN network
F	DDC FASTENING HOLES	position of no. 4 holes for fastening DDC to panel
G	9-WAY CONNECTOR	232 serial port for any serial connection with Personal Computer

Table 6 Legend of Figure 13: DDC details

Table 7 shows the legend of DDC connection schemes contained in the paragraph, from Figure 14 on page 33.

LEGEND OF DDC CONNECTION SCHEMES (from Figure 14 on page 33)			
LEGEND		DESCRIPTION	
components on connection line			
DDC		DIRECT DIGITAL CONTROLLER	
DDCTR		230/24 Vac, 50/60 Hz SAFETY TRANSFORMER	
elements/terminals on DDC board			
H, L, GND (P8) CAN port/connector		H high data signal	L low data signal
J21		JUMPERS CAN-BUS	
		GND common data signal	

Table 7 - Legend of DDC connection schemes



Before any DDC fastening/connection operation, disconnect appliance power supply by external isolating switch.

a. How to power supply Direct Digital Controller (DDC)



DDC needs low-voltage (24 V) power supply with 230/24 Vac, 50/60 Hz safety transformer; minimum power necessary is 20 VA.
The transformer must be located in a proper external panel, to be set by installed (see Figure 14).
For connection, use a basic feature 2 x 0.75 mm² cable.

How to power supply DDC from an external transformer



Have appliance disconnected from electric network

1. Set a 2-pole power cable (min. 2x0.75 mm²) and a 230/24 Vac. - 50/60 Hz safety transformer with at least 20-VA power.
2. Remove DDC rear cover by untightening 4 fastening screws.
3. Insert power cable (DDC side) through the relevant opening in DDC cover and connect as shown in Figure 14, respecting polarity:
 TERMINAL 1 = 24 V TERMINAL 2 = 0 V TERMINAL 3 = GROUND



Ground on transformer terminal, connected to terminal 2 of DDC 4-pole connector. Terminal 2 is internally connected with terminal 3, then grounded; if transformer used already has a grounded wire, it must be definitely connected to such terminal. Terminal 3 of DDC 4-pole connector must be safety grounded, in any case ($r \leq 0,1\Omega$).

4. When all operations are completed, close previously-removed DDC rear cover by tightening 4 fastening screws.

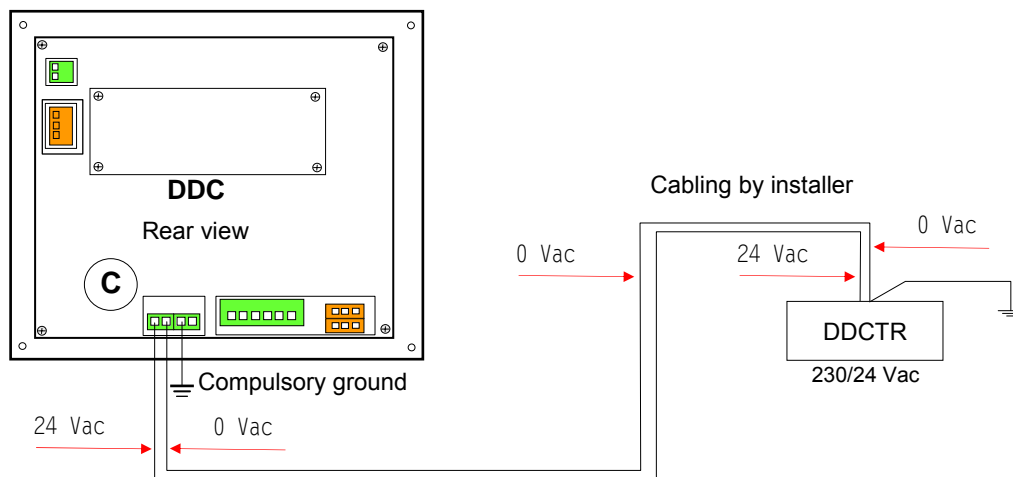


Figure 14 DDC power supply taken from external transformer to be set up by installer



If CAN-BUS cable has already been connected with DDC (procedure "c" described below), be careful with 4-mm eyelet (or two eyelets) of CAN BUS cable shield: use fastening screws close to CAN-BUS socket (bottom right) to fasten eyelet (or two eyelets) as shown in Figure 17, on page 35.



DDC also consists of a buffer battery which, when power supply is cut off, can store set values; **buffer battery lasts for about 7 years** and must be replaced afterwards (contact Robur Authorised Technical Assistance Centre).

b. How to connect Direct Digital Controller (DDC) with RB100

Appliance and DDC communicate by CAN BUS network (Figure 15, on page 34).

CAN-BUS network consists of a set of elements (appliances or DDC) named nodes, connected by a cable (CAN-BUS cable), with 3 DDCs maximum.



8 RB100 interfaces maximum can be connected on the same plant (ref. to Paragraph 1.2 on page 7).



Features of CAN-BUS cable are described below and specified in the relevant Table 8.



Nodes can be final and intermediate.

A DDC and a RB100 can be located on any position of CAN BUS network: DDC and appliance can be indifferently located as final or intermediate nodes.

Final nodes are appliances or DDCs connected with one single element.

Intermediate nodes are appliances or DDCs connected with two more elements.

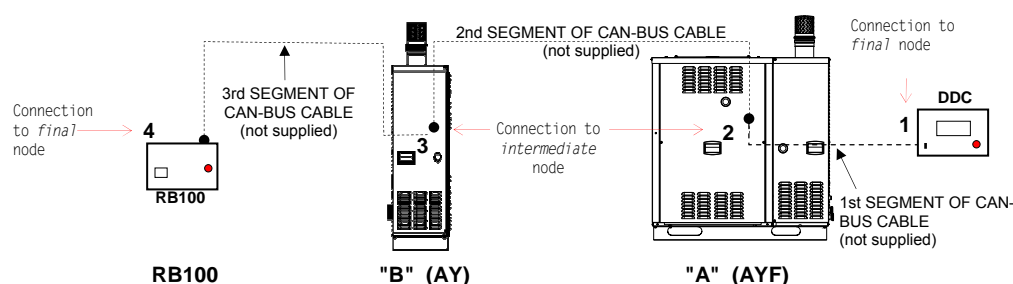


Figure 15 Examples for CAN BUS network with 4 nodes = 2 Robur units + 1 RB100 + 1 DDC

CAN-BUS network shown in scheme in Figure 15 has the following nodes:

- No. 2 final nodes: node 1 (DDC) and node 4 (RB100).
DDC is only connected with another element: unit "A".
RB100 is only connected with another element: unit "B".
- No. 2 intermediate nodes: node 2 (unit "A") and node 3 (unit "B").
Unit "A" is connected to two more elements: DDC and unit "B".
Unit "B" is connected to two more elements: unit "A" and RB100.

Features of CAN-BUS cable



The BUS CAN cable must comply with Honeywell SDS standard.

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

CABLE NAME	SIGNALS / COLOUR			MAX LENGTH	Note
Robur					-----
ROBUR NETBUS	H = BLACK	L = WHITE	GND = BROWN	450 m	
Honeywell SDS 1620					In any case, the fourth conductor must 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 8 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 RB100 + 1 DDC) a simple 3x0.75 mm² shielded cable can be used.

As shown in table, CAN connection needs a 3-wire CAN BUS cable. If cable available consists of more than 3 coloured wires, select colours to be used and cut the useless ones.

ROBUR NETBUS cable is available as accessory.



Instructions for specific operations to be made for CAN-BUS cable connection, i.e.:

- How to connect CAN-BUS cable to Direct Digital Controller (DDC)
- How to connect CAN-BUS cable to RB100 interface

How to connect CAN-BUS cable to Direct Digital Controller (DDC)

The CAN BUS cable connects with "P8" orange connector supplied with (DDC), supplied in Figure 16.

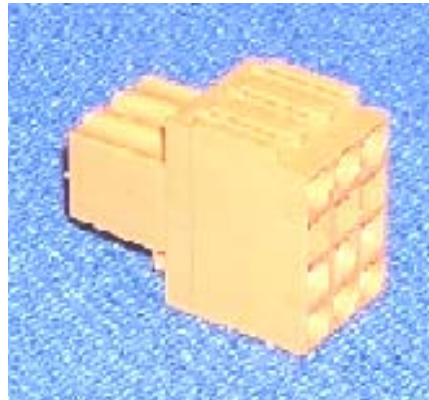


Figure 16 "P8" orange connector supplier with DDC for CAN BUS cable wire connection



Before operating on DDC, ensure it is off. As electric board on appliance, some DDC jumpers must be moved to reach intermediate and final node configurations. The position of "J21" jumpers on a new DDC is CLOSED, as shown in Figure 17:

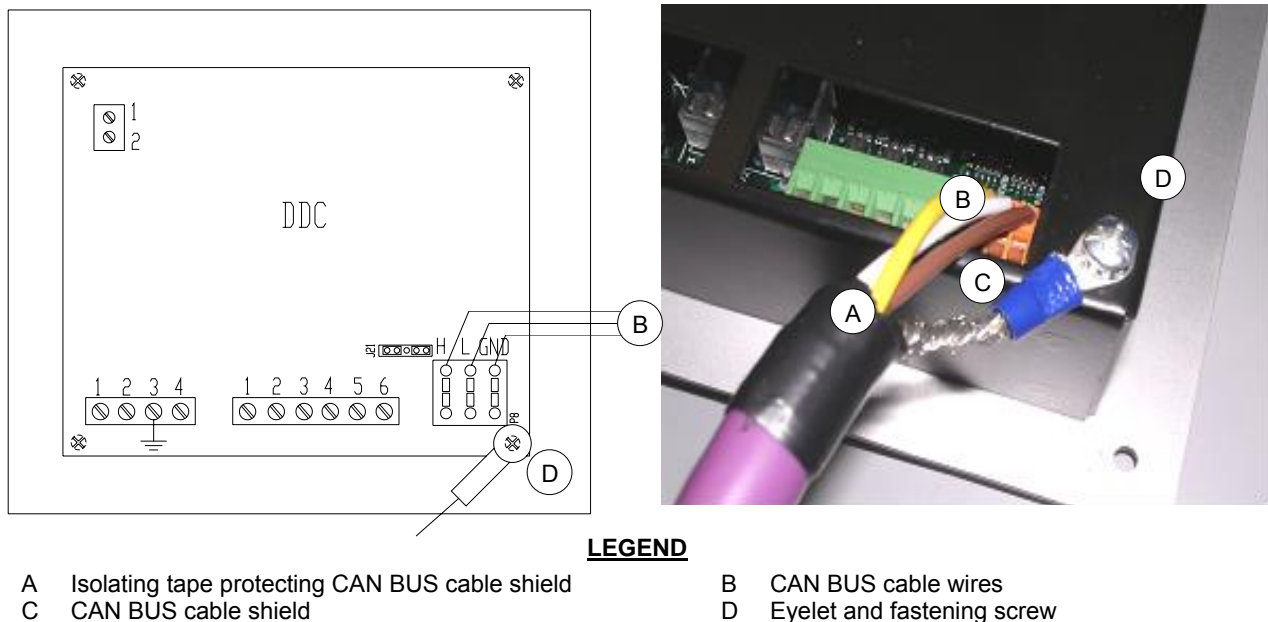


Figure 17 Direct Digital Controller (DDC) – cabling scheme and partial rear view.

How to connect a CAN BUS cable to a DDC



Have access to DDC rear cover.

1. Place jumpers on DDC according to node type to be configured. If necessary, open DDC rear cover by untightening four screws; after properly positioning jumpers, re-close the cover and re-tighten 4 screws.

"J21" jumper positions are shown in two figures below:

- if DDC is an **intermediate node** on the network (6 wires in "P8" orange connector): locate jumpers on DDC as shown in Figure 18: OPENED.

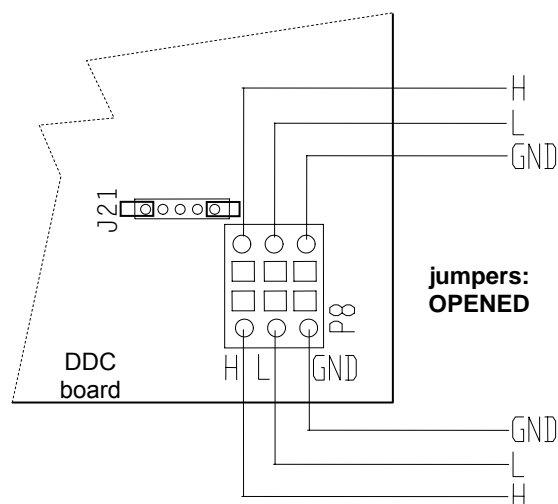


Figure 18 - Connection of 2 CAN BUS cables to DDC: DDC IS AN INTERMEDIATE NODE. The positions of CAN BUS cable wires and "H21" jumpers are pointed out: OPENED.

- if DDC is a **final node** on the network (3 wires in "P8" orange connector): locate jumpers on DDC as shown in Figure 19: CLOSED.

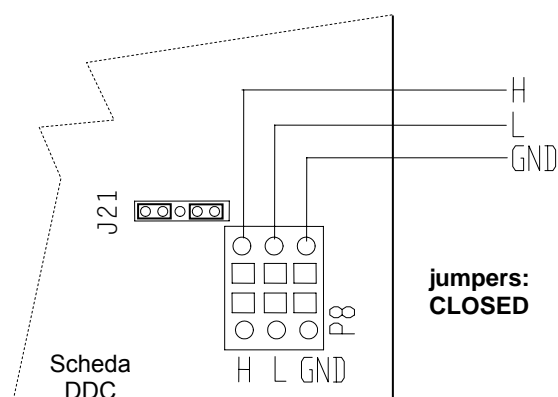


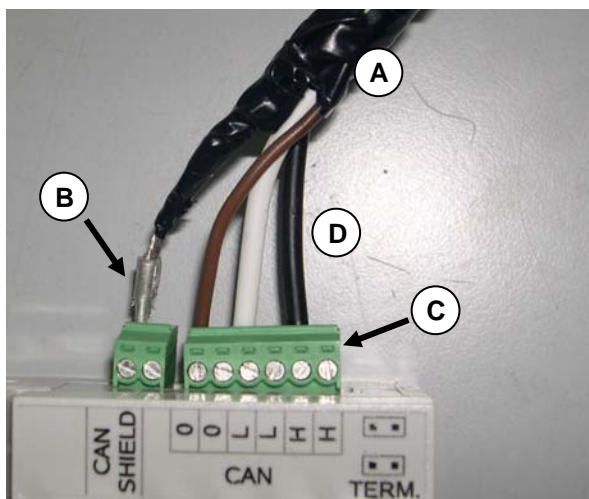
Figure 19 - Connection of 1 CAN BUS cable to DDC: DDC IS A FINAL NODE. The positions of CAN BUS cable wires and "H21" jumpers are pointed out: CLOSED.



1. Set up orange CAN-BUS connector after removing it from its packaging.
2. Cut a cable section of measure allowing installation without any sharp bending.
3. Select a cable section end, remove sheath for about 70-80 mm, carefully preventing any cut on shield (braiding and/or aluminium sheet and, if any, naked connector in contact with braiding) and wires inside.
4. Wind shield and connect it to a 4-mm eyelet, as shown in Figure 17, Page 35, details C and D. Then, act as follows:
5. Connect three coloured wires to "P8" orange connector, following scheme in Figure 19, Page 36.
Comply with proper indications L, H, GND shown in Table 8, Page 34, Figure 19 and DDC board on the basis of "P8" connector.
 - If DDC is an **intermediate node** on network (see Figure 15/Page 34): also perform point 7;
 - If DDC is a **final node** on network, do not perform point 7 and directly go to point 8.
6. **For intermediate nodes only:** Repeat operations in points 1 to 4 for the other CAN BUS section end necessary. Also follow point 5, but refer to Figure 18, Page 36 for connecting cable to "P8" connector. Then, go to point 8.
7. Insert "P8" orange connector with wires before opening set up on DDC cover, then in the relevant DDC socket, carefully checking it is properly inserted.
8. Use rear cover fastening screw located close to CAN BUS socket to fasten eyelet (or two 4-mm eyelets) (detail D, Figure 17 Page 35).

How to connect CAN-BUS cable to RB100 interface

The CAN BUS cable connects with proper connector (CAN and CAN SHIELD) or RB100 appliance, see Figure 8 on page 24 (or Figure 4 on page 14) and Figure 20 or Figure 21. Act as follows.



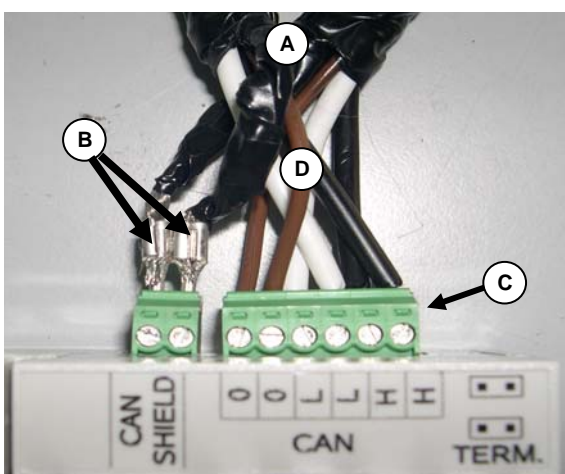
LEGEND

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

- A Isolating tape
- B CAN-BUS cable shield
- C Connector for CAN-BUS cable terminal connection
- D Wires (no. 3) of CAN-BUS cable

CAN cable on RB100

Figure 20 Example of CAN BUS cable connection to RB100 (appliance is a final node)



LEGEND

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

- A Isolating tape
- B CAN-BUS cable shield
- C Connector for CAN-BUS cable terminal connection
- D Wires (no. 6) of CAN-BUS cables

CAN cable on RB100

Figure 21 Example of 2 CAN BUS cable connection to RB100 (appliance is an intermediate node)

How to connect a CAN BUS cable to RB100 (refer to Figure 20, Figure 21):



Have appliance located in its final position.



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

1. Cut a cable section of measure allowing installation without any sharp bending.



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 conductor in contact with braiding) and terminals inside.
3. Separate part of cable shield (as sufficient to fill in the available tip); plait it and apply the tip to its end. (Figure 22 details A and B).
4. Wind previously-separated shield around the shield where tip has been applied; finally, apply isolating tape to shield section between cable and tip (Figure 22 details C and D).
5. Connect shield to "CAN SHIELD" connector (Figure 20 detail B).



If shield is made of aluminium sheets, not braiding: connect to "CAN SHIELD" connector the naked conductor, in contact with shield (usually present) and wind shield around conductor itself, protecting it by isolating tape.

6. Connect three coloured wires to "CAN" connector, following scheme in Figure 26, Page 41.
Comply with proper indications L, H, GND shown in Table 8, Page 34, in figure and on terminal board cover, in correspondence with connector.
 - If appliance is an **intermediate node** on network (Figure 15/Page 34) also perform point 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 in points 2 to 5 for the other CAN BUS section end necessary. Also follow point 6, but refer to Figure 24, Page 40 for connecting cable to "CAN" connector.
8. Insert "CAN" connector with wires in the relevant socket on board (if previously extracted).

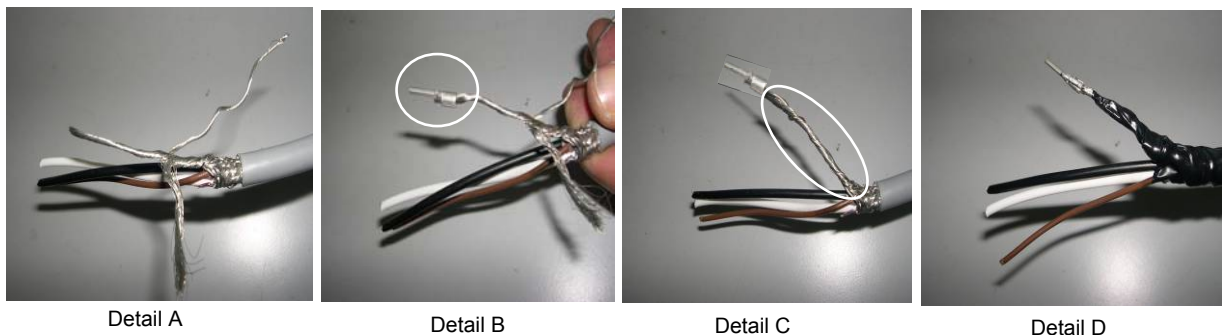


Figure 22 Connection for CAN BUS cable shield

How to locate CAN terminal jumpers on RB100 according to the type on node to be configured:



Have access to RB100 interface electronic device.



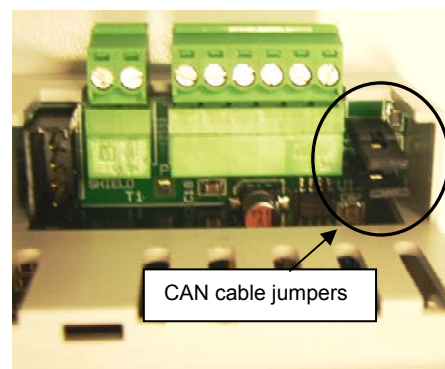
Remove terminal board cover in correspondence with CAN writing (see Figure 23). Use a screwdriver to lever in correspondence with hook located on cover intermediate position.



“A”



“B”



“C”

Figure 23 Removal of CAN jumpers cover.

- if appliance is an **intermediate node** on the network (6 wires in "CAN" connector in board): locate jumpers opened as shown in Figure 24:

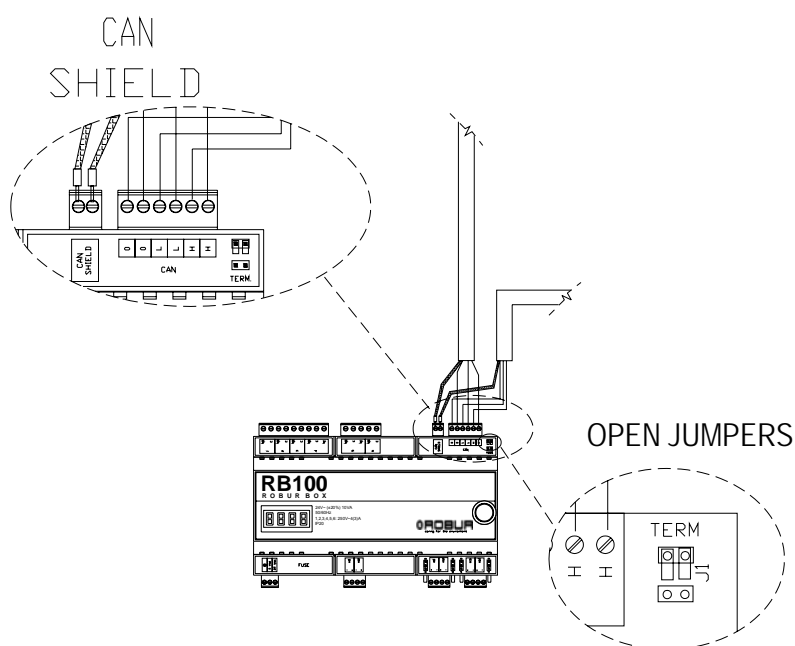


Figure 24 - Connection of 2 CAN BUS cables to RB100: Appliance IS AN INTERMEDIATE NODE. Positions for CAN BUS cable wires and jumpers are pointed out: OPENED.



As for INTERMEDIATE NODE, it is recommended to locate jumpers (opened) as shown in Figure 25. This ensures easy re-positioning of previously-removed cover on the terminal board, as some combinations can make such operation difficult.

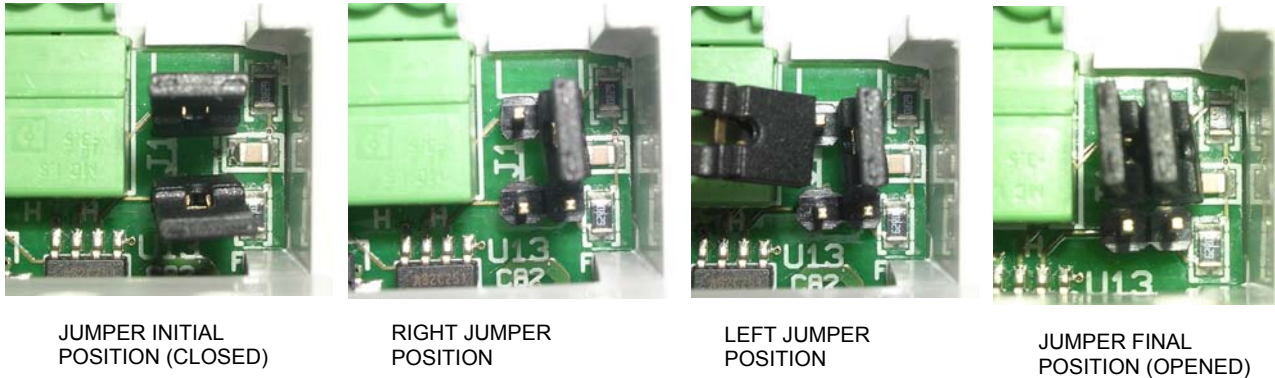


Figure 25 INTERMEDIATE NODE: the position recommended for jumpers, OPENED, is pointed out.

- if appliance is a **final node** on the network (3 wires in "CAN" connector in board): locate jumpers closed as shown in Figure 26:

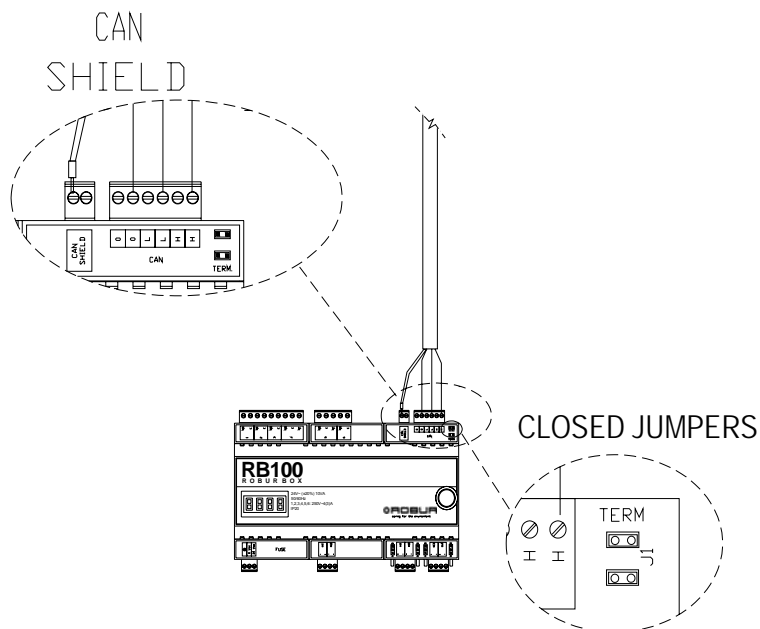


Figure 26 - Connection of 1 CAN BUS cable to RB100: Appliance IS A FINAL NODE. Positions for CAN BUS cable wires and jumpers are pointed out: CLOSED.

After performing all operations, re-install previously-removed cover of terminal board on appliance (to be positioned by a slight pressure).

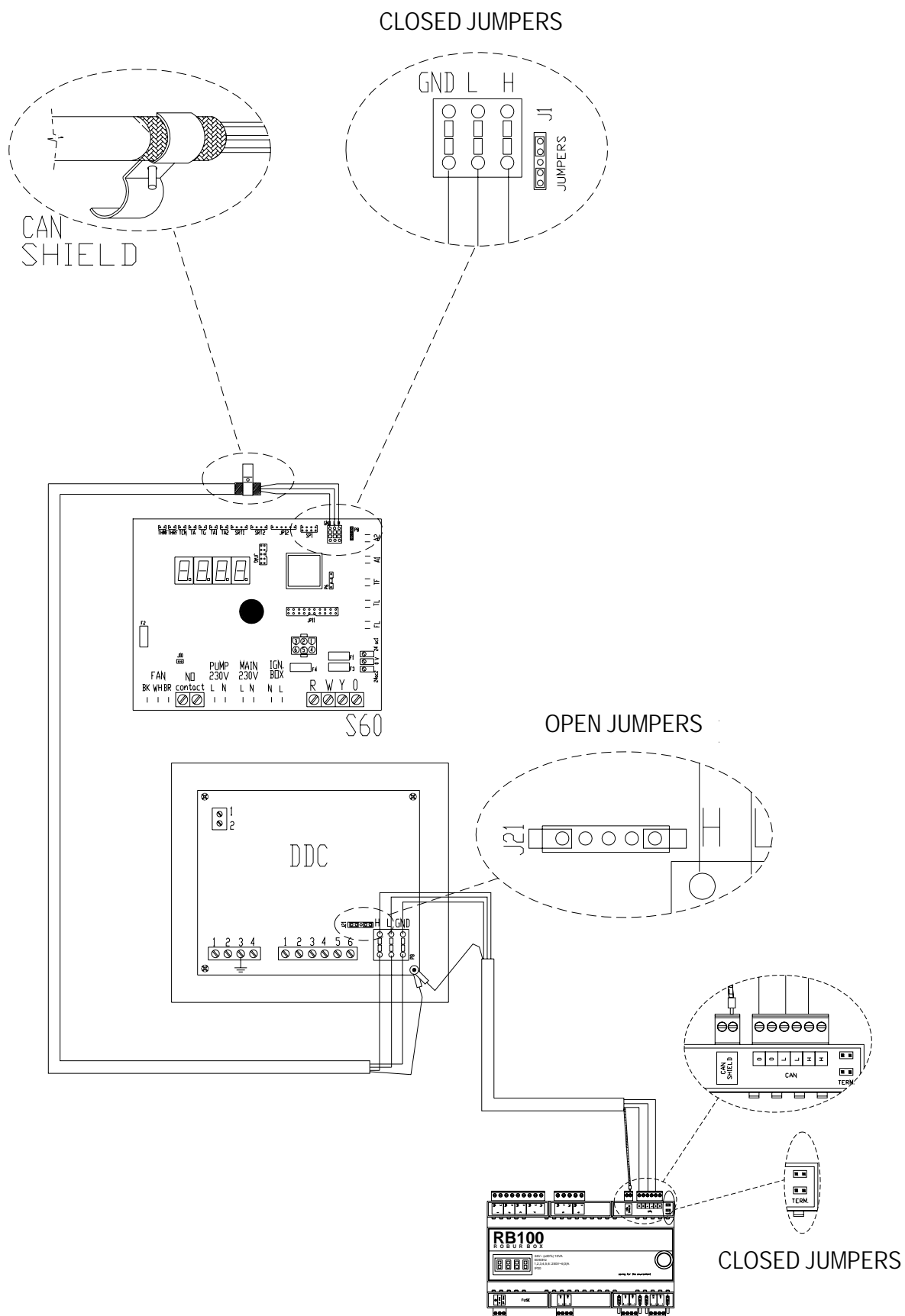


Figure 27 Example of RB100 connection as final node.

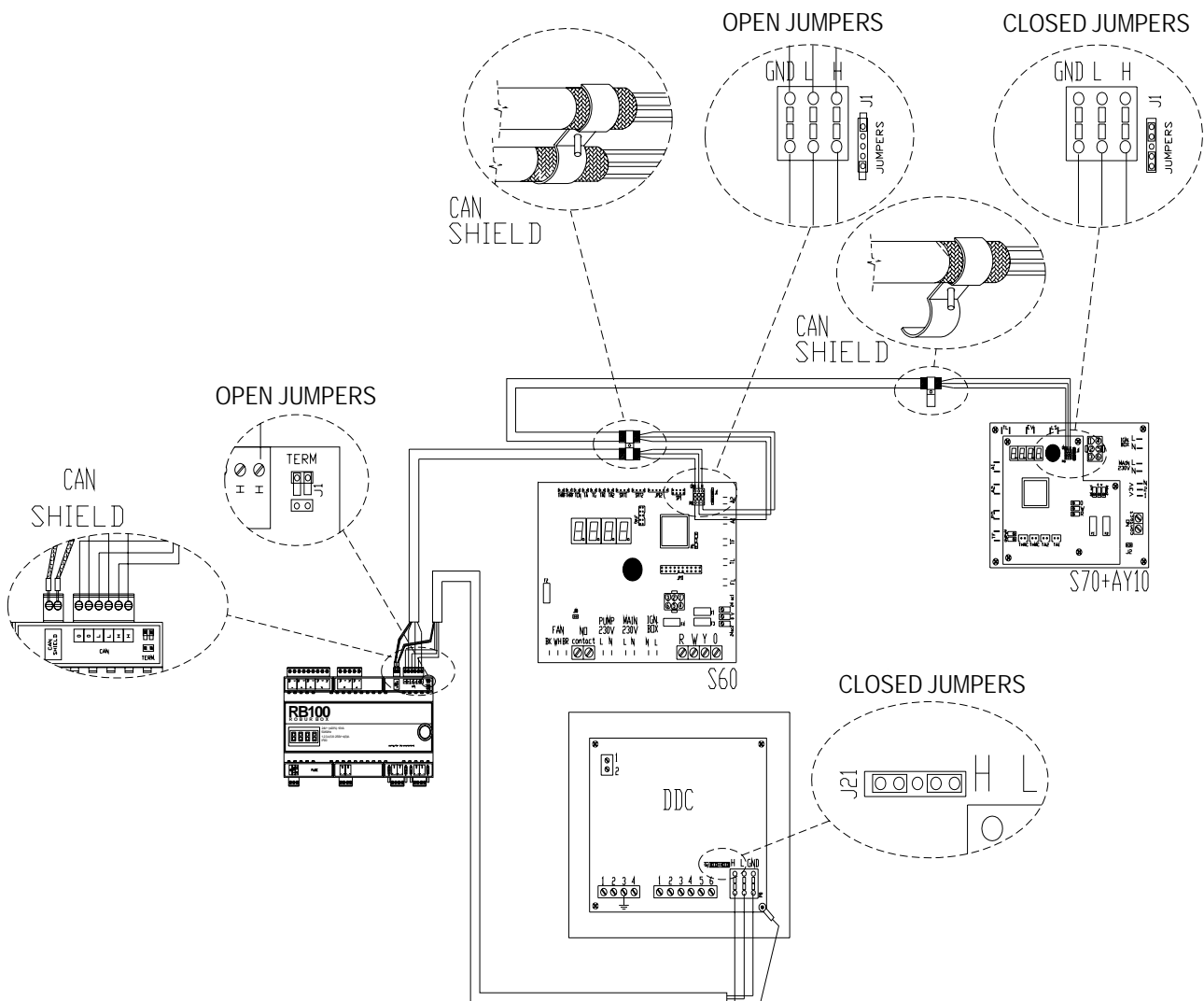


Figure 28 Example of RB100 connection as intermediate node.



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 RB100 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 4.000 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 RB100 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 implemented as designed, following manufacturer's instructions and under standards enforced (Project must be drawn by a certified professional);
- personally check that (hydraulic/gas and electric) Robur external units on the plant have been properly performed;
- personally check that (electric) connection of RB100 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 RB100 from power switch set by installer upstream of it.

To adjust operating parameters of the whole plant:

- refer to SECTION 5: BOARD SETTINGS for parameter setting on RB100 interface.
- refer to DDC manual for setting parameters of control panel.



Configuration of Direct Digital Controller (DDC): for adjustment of plant operating parameters depending on user's needs, refer to "DDC Use and Programming Manual (D-LBR 249)" delivered with it.



When turned on for the first time, an operating code could appear on RB100 display (and/or on DDC display).

If operating code is issued by RB100, see the list of codes in APPENDIX on page 72; if operating code is issued by DDC, see the list of codes in "DDC Installation Manual (D-LBR 273)" (delivered with it).



The positive result of commissioning only CERTIFIES proper operation of appliance (and DDC).

It does CERTIFY plant compliance with standards enforced.



RB100 devices do not need special maintenance, except for normal cleaning at regular intervals.



SECTION 4 USER INTERFACE

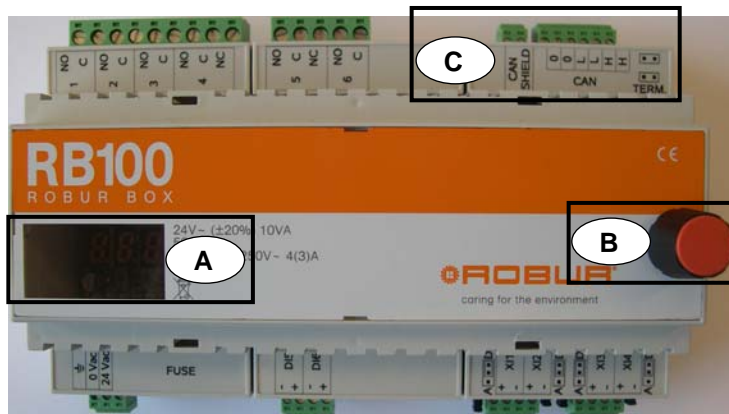
RB100 receives input signals, generates output signals and displays data and codes during operations. Programming, check and monitoring of appliance are performed by interacting with display and encoder. CAN BUS port allows connecting one or more RB100 to one or more Direct Digital Controllers (DDC).



The following descriptions refer to RB100 electronic boards with firmware version 1.000.



For settings on DDC (Direct Digital Controller) refer to DDC Installation Manual (D-LBR 273) and DDC Use and Programming Manual (D-LBR 249).



LEGEND

- 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 29 Complete RB100 interface. Display, Encoder and CAN-BUS port are pointed out.

4.1 MENU DESCRIPTION

Parameters and settings are grouped in menus in RB100:

MENU	MENU DESCRIPTION	DISPLAY
Menu 0	STATUS VIEW (TEMPERATURES, VOLTAGE, ETC.)	0.8888
Menu 1	PARAMETERS VIEW	1.8888
Menu 2	RESTORATION OF DEFAULT PARAMETERS	2.8888
Menu 3	USER SETTINGS (UNUSED)	3.8888
Menu 4	INSTALLER SETTINGS	4.8888
Menu 5	ASSISTANCE CENTRE SETTINGS	5.8888
Menu 6	ASSISTANCE CENTRE SETTINGS (SYSTEM TYPE)	6.8888

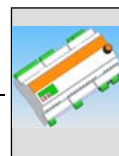
Table 9 RB100 menus



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



Operating states identified by RB100 (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



This menu shows valve and request service statuses.

MENU 0 – STATUS VIEW	
PARAMETER	DESCRIPTION
	SYSTEM: INPUT VOLTAGE
	SYSTEM: COMMON ALARM OUTPUT RELAY ([0] INACTIVE; [1] ACTIVE)
	COLD SERVICE REQUEST: TEMPERATURE (°C-°F) CORRESPONDING TO INPUT VOLTAGE, IF INPUT IS CONFIGURED AS ANALOGUE; STATUS (ON, 1-OFF, 0) IF INPUT IS CONFIGURED AS DIGITAL
	COLD SERVICE: INPUT VOLTAGE (V)
	COLD SERVICE: SERVICE NON-AVAILABILITY RELAY OUTPUT (0 SERVICE AVAILABLE, 1 SERVICE NON AVAILABLE)
	HOT SERVICE REQUEST: TEMPERATURE (°C-°F) CORRESPONDING TO INPUT VOLTAGE, IF INPUT IS CONFIGURED AS ANALOGUE; STATUS (ON, 1-OFF, 0) IF INPUT IS CONFIGURED AS DIGITAL
	HOT SERVICE: INPUT VOLTAGE (V)
	HOT SERVICE: SERVICE NON-AVAILABILITY RELAY OUTPUT (0 SERVICE AVAILABLE, 1 SERVICE NON AVAILABLE)
	DHW0 SERVICE REQUEST: TEMPERATURE (°C-°F) CORRESPONDING TO INPUT VOLTAGE, IF INPUT IS CONFIGURED AS ANALOGUE; STATUS (ON, 1-OFF, 0) IF INPUT IS CONFIGURED AS DIGITAL
	DHW0 SERVICE: INPUT VOLTAGE (V)
	DHW0 SERVICE: SERVICE NON-AVAILABILITY RELAY OUTPUT (0 SERVICE AVAILABLE, 1 SERVICE NON AVAILABLE)
	DHW1 SERVICE REQUEST: TEMPERATURE (°C-°F) CORRESPONDING TO INPUT VOLTAGE, IF INPUT IS CONFIGURED AS ANALOGUE; STATUS (ON, 1-OFF, 0) IF INPUT IS CONFIGURED AS DIGITAL
	DHW1 SERVICE: INPUT VOLTAGE (V)
	DHW1 SERVICE: SERVICE NON-AVAILABILITY RELAY OUTPUT (0 SERVICE AVAILABLE, 1 SERVICE NON AVAILABLE)

Table 10 Parameters of menu 0

to be continued →→→





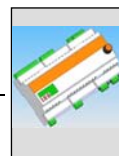
MENU 0 – STATUS VIEW	
PARAMETER	DESCRIPTION
	OUTPUT STATUS OF VALVE CONTROL. IF CONFIGURED AS COLD/HOT VALVE: [0] COLD, [1] HOT, [2] POSITION UNKNOWN IF CONFIGURED AS SEPARATION VALVE: [0] SWITCHED TO BASIC GROUP, [1] SWITCHED TO SEPARABLE GROUP LINE, [2] POSITION UNKNOWN
	STATUS OF LIMIT SWITCH AUXILIARY CONTACT OF VALVE SERVICE, COLD SIDE/SEPARABLE GROUP INCLUDED, INPUT DI5: [0] OPENED, [1] CLOSED (IN POSITION)
	STATUS OF LIMIT SWITCH AUXILIARY CONTACT OF VALVE SERVICE, HOT SIDE/SEPARABLE GROUP SEPARATED, INPUT DI6: [0] OPENED, [1] CLOSED (IN POSITION)
	EXIT

Table 11 “to be continued from Table 10” Parameters of menu 0



4.3 MENU 1 – PARAMETERS VIEW

- Table 12 shows hardware and firmware parameters of RB100 interface.



This menu allows viewing all parameters.



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

- I: installer
- A: authorized technical assistance centre
- N: unchangeable

MENU 1 – PARAMETERS VIEW		
BOARD PARAMETERS		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
1.8880	SERIAL NUMBER (N)	
1.8882	FIRMWARE VERSION (MAJOR) (N)	
1.8883	FIRMWARE VERSION (MINOR) (N)	
1.8884	HARDWARE VERSION (N)	
1.8885	BOOTLOADER VERSION (N)	
1.8886	FIRMWARE VERSION (INTERNAL) (N)	
1.8887	FILLING-IN OPTIONS (N)	
1.8888	RESULT OF SERIAL NUMBER TEST, HW, ENCRYPTION KEY (N)	
1.8889	RESULT OF ANALOGUE CALIBRATION PARAMETERS TEST (N)	

Table 12 Parameters of menu 1: board parameters

- Table 13 shows typical parameters of RB100 interface.






MENU 1 – PARAMETERS VIEW		
MACHINE TYPE PARAMETERS (SETTING FROM MENU 6)		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	SYSTEM TYPE (A)	0. 4 request services + 1 valve service
	MOD0 TYPE (MAJOR) (A)	
	MOD0 TYPE (MINOR) (A)	
	MOD1 TYPE (MAJOR) (A)	
	MOD1 TYPE (MINOR) (A)	

Table 13 Parameters of menu 1: typical parameters of board configuration

- Table 14 shows parameters of RB100 common to all services.



Any change to a single parameter below shall apply to all RB100 services.



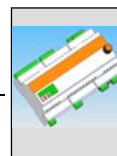
MENU 1 – PARAMETERS VIEW		
PARAMETERS COMMON TO ALL SERVICES		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	BOARD CODE (COMMUNICATION WITH DDC) (I, A)	471 to 478
	MEAS. UNITS FOR TEMPERATURES DISPLAYED (I, A)	0. ° Celsius 1. ° Fahrenheit

Table 14 Parameters of menu 1: board parameters common to all services



- Table 15 shows board parameters for **cold service** on RB100 interface.

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

Table 15 Parameters of menu 1: board parameters for cold service

- (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) ONLY USED 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 16 shows board parameters for **hot service** on RB100 interface.










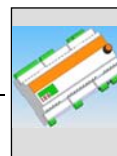
MENU 1 – PARAMETERS VIEW		
HOT SERVICE PARAMETERS		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	ACTIVE HOT SERVICE (I,A)	0. inactive 1. active
	DDC ID THE HOT REQUEST IS ISSUED TO ⁽¹⁾ (I,A)	960 to 1023
	UNUSED	
	TYPE OF SETPOINT INPUT FOR HOT SERVICE ⁽²⁾ (I, A)	0. analogue 0-10V 1. digital with remote setpoint 2. digital with local setpoint
	TEMPERATURE CORRESPONDING TO MIN SETPOINT FOR HOT SERVICE ⁽³⁾ (I, A)	0 °C to +90 °C
	TEMPERATURE CORRESPONDING TO MAX SETPOINT FOR HOT SERVICE ⁽⁴⁾ (I, A)	0 °C to +90 °C
	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR HOT SERVICE ⁽⁵⁾ (I, A)	0 °C to +90 °C
	SETPOINT RESOLUTION FOR HOT SERVICE ⁽⁶⁾ (I, A)	0 °C to +2 °C
	LOCAL SETPOINT FOR HOT SERVICE DIGITAL INPUT ⁽⁷⁾ (I, A)	0 °C to +90 °C

Table 16 Parameters of menu 1: board parameters for hot service

- (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) ONLY USED 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 HOT 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 17 shows board parameters for **DHW0 service** on RB100 interface.

MENU 1 – PARAMETERS VIEW		
DHW0 SERVICE PARAMETERS		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	ACTIVE DHW0 SERVICE (I,A)	0. inactive 1. active
	DDC ID THE DHW0 REQUEST IS SENT TO ⁽¹⁾ (I,A)	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 2. digital with local setpoint
	TEMPERATURE CORRESPONDING TO MIN SETPOINT FOR DHW0 SERVICE ⁽⁴⁾ (I, A)	0 °C to +90 °C
	TEMPERATURE CORRESPONDING TO MAX SETPOINT FOR DHW0 SERVICE ⁽⁵⁾ (I, A)	0 °C to +90 °C
	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR DHW0 SERVICE ⁽⁶⁾ (I, A)	0 °C to +90 °C
	SETPOINT RESOLUTION FOR DHW0 SERVICE ⁽⁷⁾ (I, A)	0 °C to +2 °C
	LOCAL SETPOINT FOR DHW0 SERVICE DIGITAL INPUT ⁽⁸⁾ (I, A)	0 °C to +90 °C

Table 17 Parameters of menu 1: board parameters for DHW0 service

- (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) ONLY USED 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 18 shows board parameters for **DHW1 service** on RB100 interface.





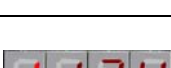


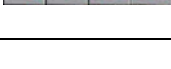

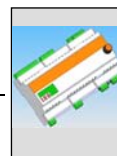
MENU 1 – PARAMETERS VIEW		
DHW1 SERVICE PARAMETERS		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	ACTIVE DHW1 SERVICE (I,A)	0. inactive 1. active
	DDC ID THE DHW1 REQUEST IS SENT TO ⁽¹⁾ (I,A)	960 to 1023
	TYPE OF GROUP THE REQUEST COMES FROM ⁽²⁾	0. basic group 1. separable group
	TYPE OF SETPOINT INPUT FOR DHW1 SERVICE ⁽³⁾ (I, A)	0. analogue 0-10V 1. digital with remote setpoint 2. digital with local setpoint
	TEMPERATURE CORRESPONDING TO MIN SETPOINT FOR DHW1 SERVICE ⁽⁴⁾ (I, A)	0 °C to +90 °C
	TEMPERATURE CORRESPONDING TO MAX SETPOINT FOR DHW1 SERVICE ⁽⁵⁾ (I, A)	0 °C to +90 °C
	MINIMUM TEMPERATURE CORRESPONDING TO OFF REQUEST FOR DHW1 SERVICE ⁽⁶⁾ (I, A)	0 °C to +90 °C
	SETPOINT RESOLUTION FOR DHW1 SERVICE ⁽⁷⁾ (I, A)	0 °C to +2 °C
	LOCAL SETPOINT FOR DHW1 SERVICE DIGITAL INPUT ⁽⁸⁾ (I, A)	0 °C to +90 °C

Table 18 Parameters of menu 1: board parameters for service DHW1

- (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) ONLY USED 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 19 shows board parameters for **valve service** on RB100 interface.



MENU 1 – PARAMETERS VIEW		
DHW1 SERVICE PARAMETERS		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	PLANT CODE ⁽¹⁾ (I,A)	0 to 15
	TYPE OF USE OF THE VALVE (I,A)	0. unused 1. used as separation valve for DHW with no limit switch auxiliary contacts 2. used as separation valve for DHW with limit switch auxiliary contacts 3. used as hot/cold switching valve with no limit switch auxiliary contacts 4. used as hot/cold switching valve with limit switch auxiliary contacts

Table 19 Parameters of menu 1: RB100 parameters for valve service

NOTES

(1) ID OF PLANT THE VALVE SHALL OPERATE ON.



If valve is unused (par. 151 = 0), the plant code set has no effect.

4.4 MENU 2: – RESTORATION OF DEFAULT PARAMETERS

Menu 2 allows restoring default parameters.



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



Menu 2 is protected by password: 1111



The restoration of default parameters implies the need of re-configuring all services (temperatures, RB100 board code, etc.).


MENU 1 – RESTORATION OF DEFAULT PARAMETERS		
PARAMETER	PARAMETER DESCRIPTION	VALUE DESCRIPTION
	RESTORATION OF DEFAULT PARAMETERS (I,A)	

Table 20 - Action of menu 2: RB100 default parameters

4.5 MENU 3 – USER SETTINGS



Menu 3 is unused.

4.6 MENU 4 – INSTALLER SETTINGS



Menu 4 allows setting installer relevant parameters, which in tables container 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 contained in Paragraph 4.3 are marked by letters “I” and “A”, respectively.



Menu 5 is covered by password and exclusively managed by Robur Authorized Technical Assistance Centres.

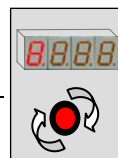
4.8 MENU 6 – SYSTEM SETTINGS (assistance centres)



Menu 6 allows setting parameters of system type, which in Table 13 are marked by letter “A” (managed by Authorized Technical Assistance Centres).



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



SECTION 5 BOARD SETTINGS

5.1 Access to RB100 menus

When RB100 is turned on, all display leds switch on for about 3 seconds, then, board name appears (rb10). Afterwards, the leftmost point on display continues flashing. During proper operation, leftmost point on display flashes, unless an error code is generated by system abnormalities.

Table 21 shows an example of display view for an operating appliance in an error-free system, with warning and errors:




OPERATING MODE	
OPERATING DATUM	DISPLAY
PROPER OPERATION	
WARNINGS	
ERRORS	

Table 21 Display view during operation

The knob allows menu navigation, parameter display and setting, when possible.

- To act on the knob:

1. Open electric panel housing RB100 interface, if existing;



Proper installation of appliance must allow for easy access to control device.



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 relevant value and press knob to have access to menu selected and its parameters.
4. Rotate the knob again to display letter E (exit) and press to return to previous sections.

5.2 Access to board 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: menu 0:
2. Press 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 (rectified electric voltage), rotate knob to display it, , then press for access.
Display shows the current value of parameter, such as:
Press again knob to return to 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

Following instructions of previous parameter:

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 (board code) and click, the number on display flashes;
4. now, enter the correct board code;
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 RB100 are installed on the same CAN network, each one must have an univocal board code, parameter 40.

5.4 Configuration of cold request service

To use cold request service, 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 26: analogue/digital input schemes and jumper positions).


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 1.4 "OPERATING TECHNICAL FEATURES" point "Inlet configured as analogue setpoint".


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-LBR 246);
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 Configuration of hot request service

To use hot request service, 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, hot 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 ID of DDC receiving the hot 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 26: analogue/digital input schemes and jumper positions).


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 set afterwards, refer to paragraph 1.4 "OPERATING TECHNICAL FEATURES" point "Inlet configured as analogue setpoint".

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. setpoint is set up on DDC (DDC Use and Programming Manual: D-LBR 246);
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. locate 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 request service (Domestic hot water)

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

1. Position 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 26: analogue/digital input schemes and jumper positions).

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 select analogue parameters to be set afterwards, refer to paragraph 1.4 "OPERATING TECHNICAL FEATURES" point "Input configured as analogue setpoint".


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

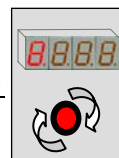
1. position on parameter 104/124 (DHW0/DHW1 service active) and click, the number on display flashes;
2. enter temperature corresponding to max setpoint (10 Volts);
3. click to confirm value entered;
4. position on parameter 105/125 (DHW0/DHW1 service active) and click, the number on display flashes;
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. setpoint is set up on DDC (DDC Use and Programming Manual: D-LBR 246);
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 Configuration of valve service

To use valve service, activate it by setting a specific parameter. ID must also be specified of plant where valve should operate.

1. Locate on menu 4 (installer);
2. enter correct password of menu selected (for access to parameters of menu);
3. locate on parameter 150 (Plant code) and click, the number on display flashes;
4. enter plant ID where valve should operate on;
5. click to confirm value entered;



now, enter the type of valve use, depending on usage and connection made (see paragraph 2.4 on page 29: valve connection schemes and limit switch auxiliary contacts).

6. position on parameter 151 (Valve use type) and click, the number on display flashes;
7. enter:
 - a. 0 no use (valve service unused);
 - b. 1 separation valve for DHW with no limit switch auxiliary contacts;
 - c. 2 separation valve for DHW with limit switch auxiliary contacts;
 - d. 3 hot/cold switching valve with no limit switch auxiliary contacts;
 - e. 4 hot/cold switching valve with limit switch auxiliary contacts;
8. click to confirm value entered;
9. rotate knob until E appears for exit menu;
10. rotate knob until E appears for return to main page  (leftmost point flashing).

APPENDIX

OPERATING CODES

If, during appliance operation, RB100 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 RB100, refer to tables below.
The list of operating codes issued by DDC is contained in "DDC Installation Manual (D-LBR 273)".



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

TABLES OF OPERATING CODES ISSUED BY RB100 (firmware version 1.000)

CODES FOR RB100 BOARD	
<p style="text-align: center;">U 80 INCOMPLETE PARAMETERS</p> <p>INTERVENTION CONDITIONS: Incomplete parameters.</p> <p>RESET MODE: Code remains until operating parameters are entered and completed. Contact ROBUR TAC.</p>	
<p style="text-align: center;">E 80 INVALID PARAMETERS</p> <p>INTERVENTION CONDITIONS: Invalid parameters or parameter memory damaged.</p> <p>RESET MODE: Restoration is automatic when correct parameters are entered: if parameters are wrong, operating parameters, typical of RB100 board, must be entered and completed. If error remains in spite of such operation, memory is damaged and board must be replaced. Contact ROBUR TAC.</p>	
<p style="text-align: center;">U 81 - U 82 INVALID PARAMETERS ON PAGE 1 - INVALID PARAMETERS ON PAGE 2</p> <p>INTERVENTION CONDITIONS: Invalid data on page 1 - Invalid data on page 2.</p> <p>RESET MODE: Restoration is automatic 5 seconds after code generation.</p>	
<p style="text-align: center;">E 81 - E 82 INVALID PARAMETERS ON PAGE 1 - INVALID PARAMETERS ON PAGE 2</p> <p>INTERVENTION CONDITIONS: Invalid data on page 1 - Invalid data on page 2.</p> <p>RESET MODE: Contact ROBUR TAC: reset can be performed by RB100 board through menu 2, parameter 0. If code persists, replace RB100.</p>	
<p style="text-align: center;">E 84 RB100 POWER VOLTAGE LOW</p> <p>INTERVENTION CONDITIONS: Board power voltage lower than 16.6 Vac.</p> <p>RESET MODE: Check fuses and 0-24 Vac power connections on board. Reset is automatic when board input voltage exceeds 18 Vac. If problem persists, contact ROBUR TAC</p>	
<p style="text-align: center;">E 85 WRONG MODULE TYPES (from menu 6)</p> <p>INTERVENTION CONDITIONS: Types of module set (from menu 6) do not correspond to modules managed by RB100.</p> <p>RESET MODE: Contact ROBUR TAC: reset is automatic when proper parameters are entered.</p>	
<p style="text-align: center;">E 86 - E 87 - E 88 - E 89 TEST DI MEMORIA FALLITO</p> <p>INTERVENTION CONDITIONS: Processor errors.</p> <p>RESET MODE: Contact ROBUR TAC.</p>	
<p style="text-align: center;">E 91 FIRMWARE ANOMALY</p> <p>INTERVENTION CONDITIONS: Wrong firmware operating parameters.</p> <p>RESET MODE: Code remains until operating parameters are entered and completed. Contact ROBUR TAC.</p>	

Table 22 -Operating codes generated by RB100 for board errors.

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

CODES FOR RB100 BOARD COLD SERVICE	
E 0	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	Error occurs if board cannot communicate with DDC set as receiver of cold request.
RESET MODE:	Check connections on CAN network and setting of parameter 61 (it must be equal to ID of DDC the request is sent to). If error persists, contact ROBUR TAC.
E 1	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs is firmware of DDC the request is sent to is not compatible with RB100 board firmware.
RESET MODE:	Contact ROBUR TAC.
E 2	
NO SERVICE	
INTERVENTION CONDITIONS:	Error is generated if DDC the request is sent to cannot provide for the service. Example: hot service is enabled on board and cold only units are configured on DDC.
RESET MODE:	Check that hot service is provided for by DDC; otherwise, disable hot service. If problem persists, contact ROBUR TAC.
U 3	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	Error occurs if cold service is required when plant is switched on heating.
RESET MODE:	Error disappears if system is switched or turned to cooling.
U 4	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: error occurs if cold service 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:	Error disappears if opening and closing resistance is within values allowed. If problem persists, contact ROBUR TAC.

Table 23 Operating codes generated by RB100 for cold service.

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

CODES FOR RB100 BOARD HOT SERVICE	
E 10	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	Error occurs if board cannot communicate with DDC set as receiver of hot request.
RESET MODE:	Check connections on CAN network and setting of parameter 81 (it must be equal to ID of DDC the request is sent to). If error persists, contact ROBUR TAC.
E 11	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs is firmware of DDC the request is sent to is not compatible with RB100 board firmware.
RESET MODE:	Contact ROBUR TAC.
E 12	
NO SERVICE	
INTERVENTION CONDITIONS:	Error is generated if DDC the request is sent to cannot provide for the service. Example: cold service is enabled on board and hot only units are configured on DDC.
RESET MODE:	Check that cold service is provided for by DDC; otherwise, disable hot service. If problem persists, contact ROBUR TAC.
U 13	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	Error occurs if hot service is required when plant is switched on cooling.
RESET MODE:	Error disappears if system is switched or turned to heating.

U 14	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: error occurs if hot service 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:	Error disappears if opening and closing resistance is within values allowed. If problem persists, contact ROBUR TAC

Table 24 -Operating codes generated by RB100 for hot service

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

CODES FOR RB100 BOARD DHW0 SERVICE	
E 20	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	Error occurs if board cannot communicate with DDC set as receiver of requests DHW0.
RESET MODE:	Check connections on CAN network and setting of parameter 101 (it must be equal to ID of DDC the request is sent to). If error persists, contact ROBUR TAC.
E 21	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs is firmware of DDC the request is sent to is not compatible with RB100 board firmware.
RESET MODE:	Contact ROBUR TAC.
E 22	
NO SERVICE	
INTERVENTION CONDITIONS:	Error is generated if DDC the request is sent to cannot provide for the service.
RESET MODE:	Check that DHW0 service is provided for by DDC; otherwise, disable DHW0 service. If problem persists, contact ROBUR TAC.
U 23	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	Error occurs if DHW0 service is required when plant is switched on the opposite side; then, service is supported by system, but not available at the moment (cannot be met).
RESET MODE:	Error disappears if system is switched or turned to the right side (depending on request).
U 24	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: error occurs if DHW0 service 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:	Error disappears if opening and closing resistance is within values allowed. If problem persists, contact ROBUR TAC.

Table 25 Operating codes generated by RB100 for DHW0 service

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

CODES FOR RB100 BOARD DHW1 SERVICE	
E 30	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	Error occurs if board cannot communicate with DDC set as receiver of DHW1 request.
RESET MODE:	Check connections on CAN network and setting of parameter 121 (it must be equal to ID of DDC the request is sent to). If error persists, contact ROBUR TAC.
E 31	
FIRMWARE INCOMPATIBILITY	
INTERVENTION CONDITIONS:	Error occurs if firmware of DDC the request is sent to is not compatible with RB100 board firmware.
RESET MODE:	Contact ROBUR TAC.
E 32	
NO SERVICE	
INTERVENTION CONDITIONS:	Error is generated if DDC the request is sent to cannot provide for the service.
RESET MODE:	Check that DHW1 service is provided for by DDC; otherwise, disable DHW1 service. If problem persists, contact ROBUR TAC.
U 33	
UNAVAILABLE SERVICE	
INTERVENTION CONDITIONS:	Error occurs if DHW1 service is required when plant is switched on the opposite side; then, service is supported by system, but not available at the moment (cannot be met).
RESET MODE:	Error disappears if system is switched or turned to the right side (depending on request).
U 34	
INVALID SETPOINT VALUE	
INTERVENTION CONDITIONS:	For analogue input: error occurs if DHW1 service 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:	Error disappears if opening and closing resistance is within values allowed. If problem persists, contact ROBUR TAC.

Table 26 Operating codes generated by RB100 for DHW1 service

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

CODES FOR RB100 BOARD VALVE SERVICE	
E 100	
INTERRUPTION OF CAN COMMUNICATION	
INTERVENTION CONDITIONS:	Error occurs if no DDC communicates with valve service.
RESET MODE:	Check connections on CAN network and that the relevant valve has been configured on DDC (as well as setting of RB100 parameters 150-151). If error persists, contact ROBUR TAC.

Table 27 Operating codes generated by RB100 for valve service

IN TABLE, TAC = ROBUR AUTHORIZED TECHNICAL ASSISTANCE CENTRE

Robur is dedicated to dynamic progression
in research, development and promotion
of safe, environmentally-friendly, energy-efficiency products,
through the commitment and caring
of its employees and partners.

Robur Mission



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