A 212
21.05.10 LB
REV. 02

TEMPERATURE PROGRAMMING SEQUENCING CONTROLLER FOR 2, 3, OR 4 BOILERS

RTC 604 C1 Eng.

- **Temperature programming sequencing controller for 2, 3 or 4 boilers with time programming**
  – control output temperature of the heating zone
  – control DHW temperature with control pump, diverting valve, dedicated boilers
- **drives 2, 3 or 4 one-stage boilers without shut-off valves:**
- **power supply 230 V, DIN rail mounting**

CE

1. APPLICATION

The RTC 604 controller is designed to drive 2, 3 or 4 one-stage boilers for the automatic temperature regulation of the heating zone and for the fix-point regulation of the DHW plant

2. FUNCTIONS

The main functions of the RTC 604 are:
- control of temperature manifold boilers at **fixed point** or at variable value in relation to **outside temperature**
  – ON-OFF control one-stage burners
  – control of minimum and maximum limits of manifold temperature
  – correction heating curve origins
  – fixed sequence or with automatic time switching
  – theoretical metering of operating hours of boilers
  – economic function
- control of temperature of DHW storage with timed programming of:
  – control loading-pump and (if used) diverting valve for dedicated boilers
  – antibacteria function
- 7, 24-hour programmes and 2, 7-day programmes
- heating season, summer time
- input remote on control (c1): switching on of plant for special reasons
- remote controller to modify set timed programme
- simulation of operation for testing wiring at commissioning stage

3. DETECTORS AND ACCESSORIES

No.	Description	Type	Sensing element	Code	Data sheet
1	immersion flow temperature detector [1]	**SIH 010**	NTC 10 kΩ	B1	N 140
1	outside temperature detector	**SAE 001**	NTC 1kΩ	B2	N 120
	Accessories				
1	ambient temperature detector	**SAB 010**	NTC 10 kΩ	B3	N 111
1	boiler immersion temperature detector[2]	**SIH 010**	NTC 10 kΩ	B5	N 140
1	remote control for changing programme in use	**CDB 300**	–	R	N 710
1	remote control for changing progr. in use with sensor (included)	**CDB 300/S1**	NTC 10 kΩ	R	N 710
	alternativies				
1	1) surface temperature detector	**SCH 010**	NTC 10 kΩ	B1	N 130
1	2) cable-type temperature detector	**SAF 010**	NTC 10 kΩ	B5	N 145

4. TECHNICAL DATA (factory setting in bold type)

• Electrical

power supply	230 V~ ± 10%
frequency	50 … 60 Hz
consumption	5 VA
protection	IP40
radio disturbances	VDE0875/0871
vibration test	with 2g (DIN 40 046)
voltage-free output contacts	
maximum switched voltage	250 V~
maximum switched current	5 (1) A
construction stndards	Italian Electrotech. Comm. (CEI)
storage data	5 years

• Mechanical

case	module DIN 6E
mounting	on DIN 35 rail
materials:	
base	NYLON
cover	ABS
ambient temperature:	
operation	0 … 45 °C
storage	– 25 … + 60 °C
ambient humidity	class F DIN 40040
weight	1.0 kg

• Programmes and Periods

7-day programmes	**0** … 2
24-hour programmes	**1** … 7
24-hour periods	**2** … 6

• Measurement ranges

temperature mainfold and boilers	0 … 99 °C
outside temperature	– 30 … + 40 °C
ambient temperature	0 … 30 °C
DHW temperature	0 … 99 °C

• Heating

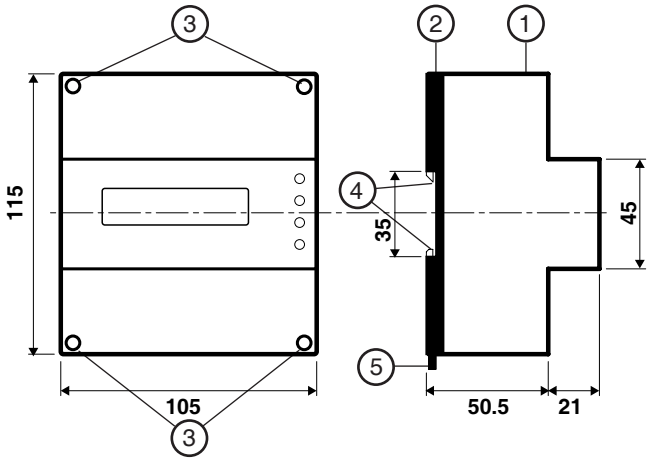
flow temperature	
radiators	40 … **70** … 99 °C
convectors	40 … **80** … 99 °C
panels	20 … **40** … 50 °C
minimum limit	**1** … 99 °C
maximum limit	1 … **99** °C
outside design temperature	– 30 … **– 5** … + 20 °C
correction curve origin	**20** … 40 °C
ambient authority on flow	**0** … 20 °C
boiler differential temperature	1 … **4** … 50 °C
integral time	0 … **20** … 255 min.
total sequencing boilers	2 … **4**
days authomatic change over	1 … **15** … 255 g
delay switching off pump	0 … **30** … 60 min.
desired set temperatures:	
ambient of the 5 normal modes	0 … **19...21** … 30 °C
ambient of the 2 setback modes	0 … **14...16** … 30 °C
ambient of frost protection mode	0 … **6.0** … 30 °C
water of flow modes	0 … **20...30** … 99 °C
correction desired temperature	– 3 … **0** … + 3 °C

• DHW adjustment range

DHW desired temperature	0 … **50** … 99 °C
DHW differential temperature	0.5 … **3** … 30 °C

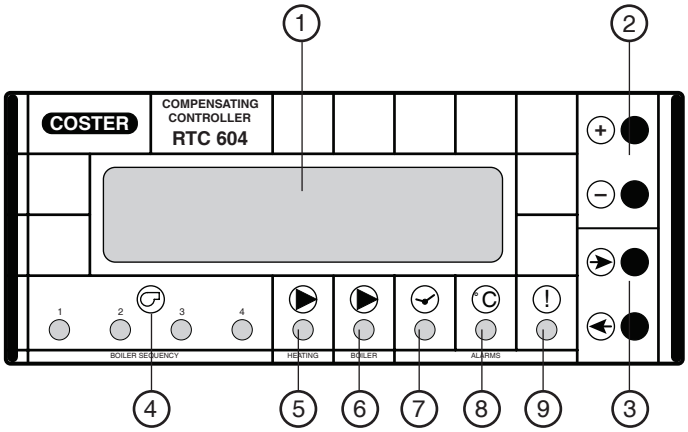
Should there be any electrical disturbances the output controls of the equipment may change status to then right themselves automatically.

5. OVERALL DIMENSIONS



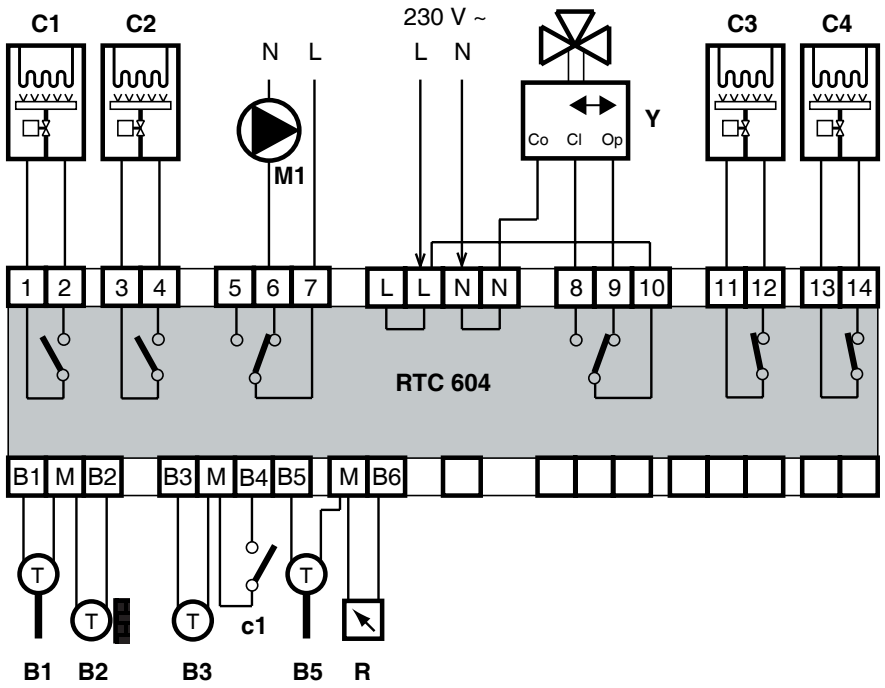
1 – protective cover for electronic components
2 – base with transformer, relay and terminal blocks
3 – screws for securing cover to base
4 – DIN rail securing elements
5 – DIN rail release lever

6. FACIA



1 – two-line backlighted alphanumeric display
2 – + and – operating keys
3 – ← and → operating keys
LED indicators:
4 – on-off boilers control
5 – plant pump
6 – DHW pump
7 – RTC clock fault alarm
8 – detector fault alarm
9 – controller fault alarm

7. WIRING DIAGRAM



B1 – plant flow temperature detector
B2 – outside temperature detector
B3 – ambient temperature detector
B5 – DHW temperature detector
C 1…4 – boilers

c1 – remote switch-on contact
M1 – heating pump
Y – DHW circuit diverting valve
R – remote control for modifying programmes

8. SITING OF CONTROLLER AND DETECTORS

8.1 Controller

The controller must be sited in a dry ambience in accordance with the permitted ambiental limits as in "technical data". If placed in an ambience classified as "dangerous" it must be enclosed in an electrical cabinet constructed according to the current regulations for the class of danger involved.
The cabinet can be installed on a DIN rail or in a DIN modular enclosure

8.1 plant flow temperature detector B1

It must be installed dowstream of the heating pump

8.2 outside detector B2

It must be installed outside the building either on the north or north-west side, at least 3 m. from the ground, protected from direct sunlight and away from windows, doors, chimneys, and other possible sources of thermal disturbance.

8.4 ambient temperature detector B3

It must be installed at a point which represents the average temperature of a typical space (living-room) at a height of 1.5 - 1.6 meters from the ground; on an internal wall away from windows, doors, and thermal sources. Niches shelving and curtains must be avoided.

8.3 DHW detector B5

It must be installed in the DHW storage tank just above the heat exchanger

9. WIRING

Proceed as follow:

- separate the base and cover
- mount the base on the DIN rail and check that the securing elements (**5**.4) hold it firmly in place.
- carry out the wiring as shown in the diagram, in accordance with current regulations and using cables of:
  - 1.5 mm^2 for power and relay control outputs
  - 1 mm^2 for the detectors and remote control
- switch on power (230 V~) and check the voltage across terminals L and N
- switch off power, replace cover on base/terminal block and secure it with the four screws supplied (**5**.3).

You are advice not to insert more than 2 cables in a single terminal of the controller. If necessary use junction

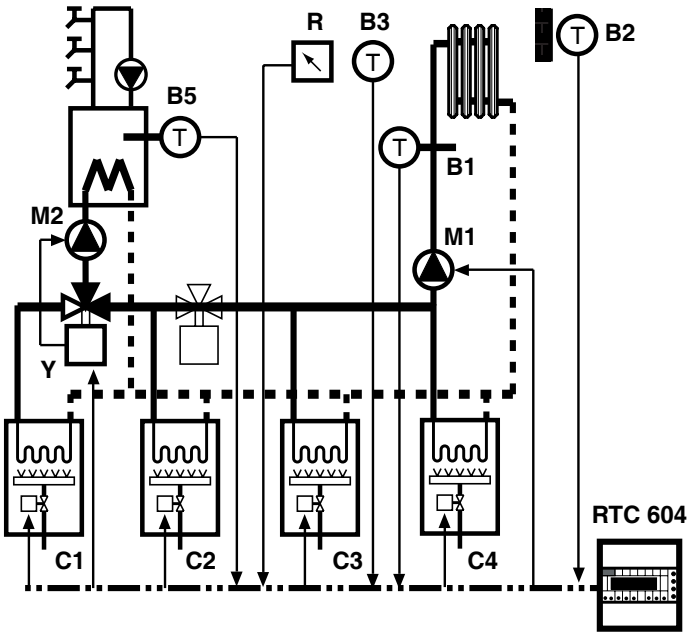
10. EXAMPLES OF APPLICATION

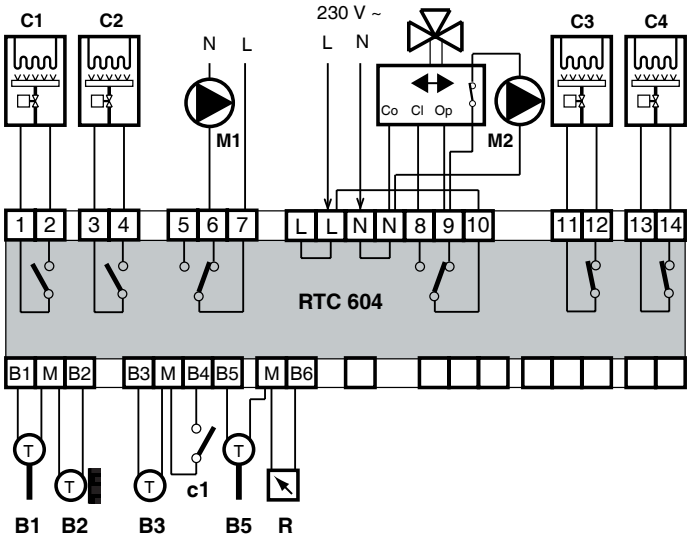
10.1 DHWS with 1 or 2 dedicated boilers

22.11

Control use
BOILER 1

Control use
BOILER 2



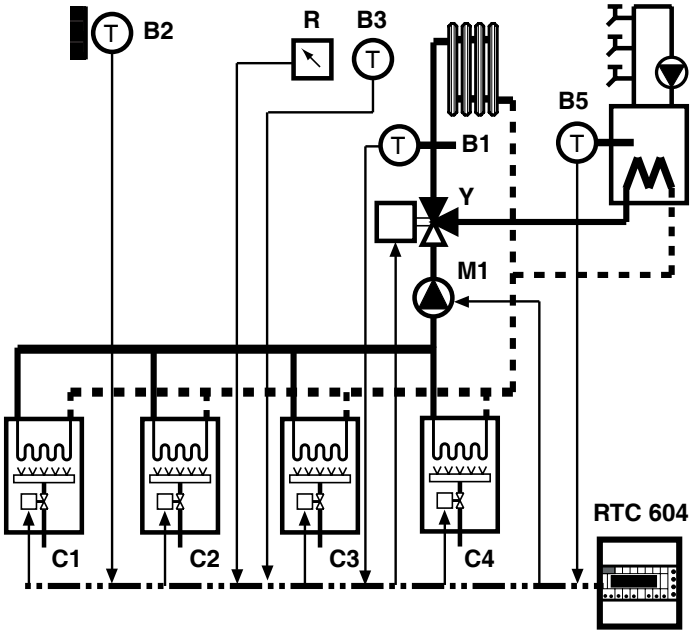


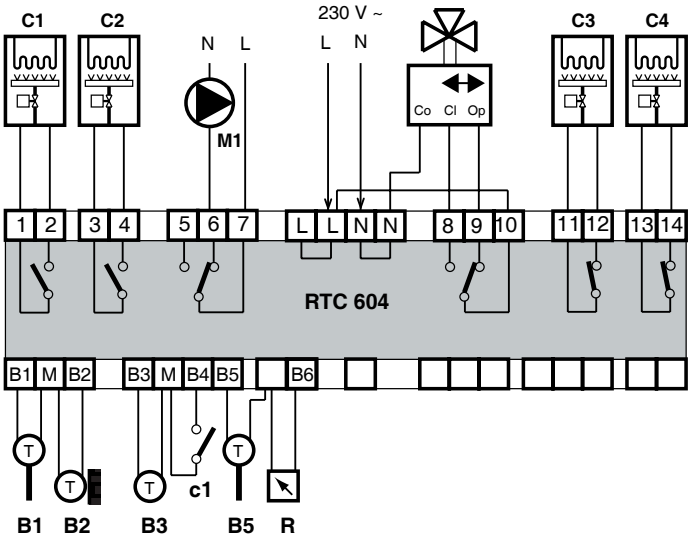
B1 – plant flow temperature detector
B2 – outside temperature detector
B3 – ambient temperature detector
B5 – DHW temperature detector
C 1…4 – boilers
c1 – remote switch-on contact
M1 – heating pump
M2 – DHW pump
Y – DHW circuit diverting valve
R – remote control for modifying programmes

10.2 DHWS uses heating pump and all boilers

22.11

Control use
HEATING PUMP

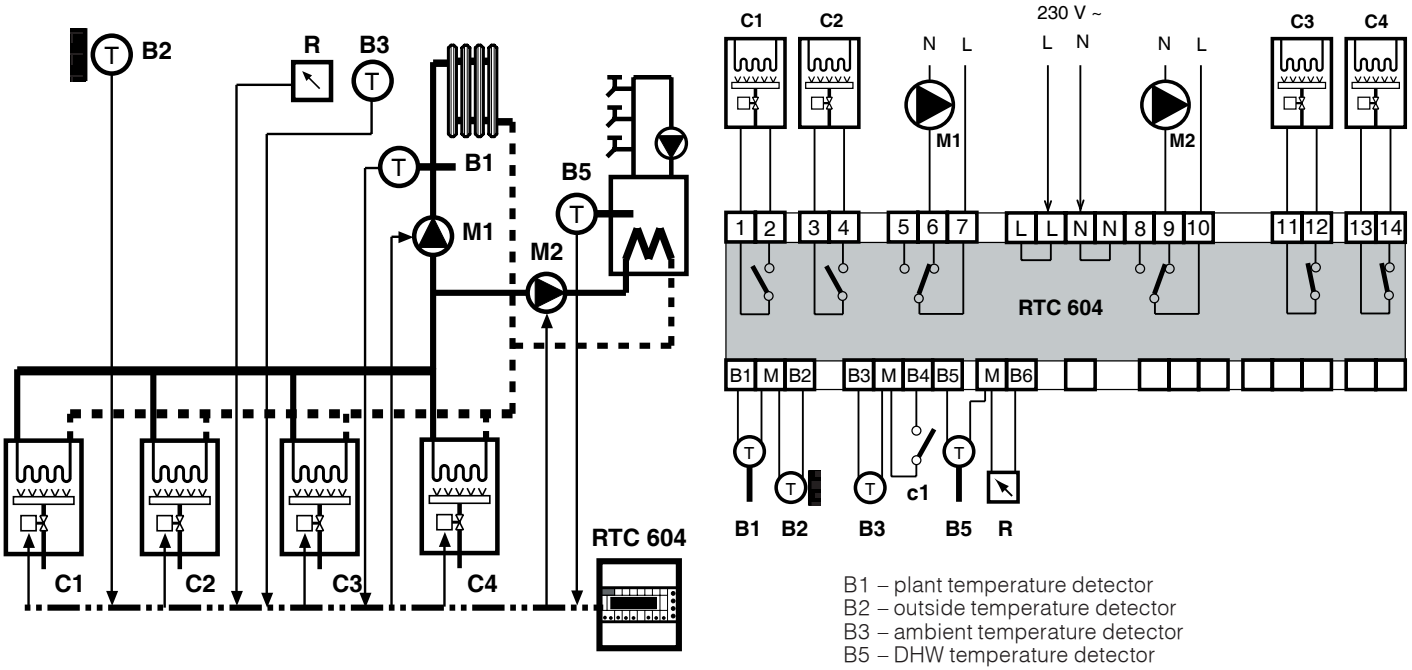




B1 – DHW flow temperature detector
B2 – outside temperature detector
B3 – ambient temperature detector
B5 – DHW temperature detector
C 1…4 – boilers
c1 – remote switch-on contact
M1 – heating pump and boiler
Y – DHW circuit diverting valve
R – remote control for modifying programmes

10.3 DHWS uses all boilers with priority on heating

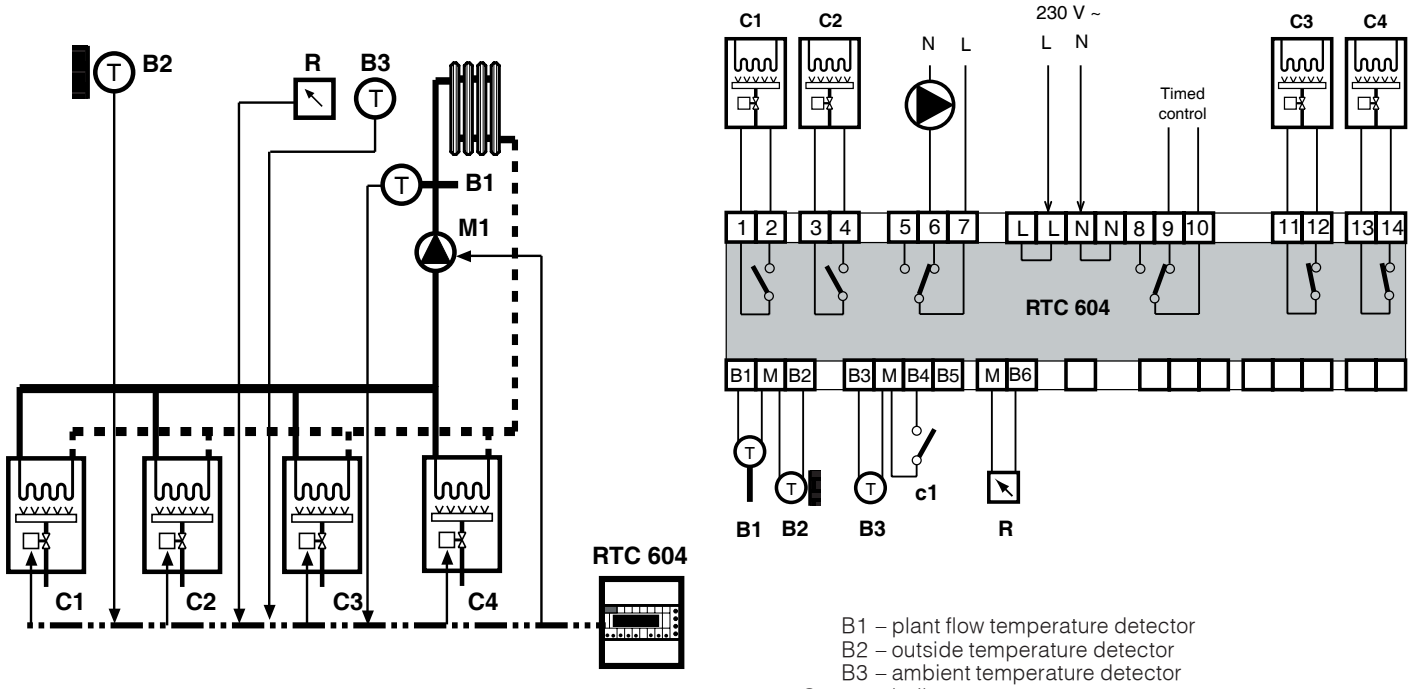
22.11
Control use
HEATING PRIORITY



B1 – plant temperature detector
B2 – outside temperature detector
B3 – ambient temperature detector
B5 – DHW temperature detector
C 1…4 – boilers
c1 – remote switch-on contact
M1 – heating pump
M2 – DHW pump
R – remote control for modifying programmes

10.4 DHWS not in use - DHW output as possible time controller

22.10
DHW output
TIME CONTROL



B1 – plant flow temperature detector
B2 – outside temperature detector
B3 – ambient temperature detector
C 1…4 – boilers
c1 – remote switch-on contact
M1 – heating pump
R – remote control for modifying programmes

11. OPERATION

RTC 604 is a microprocessor digital controller designed for the flow temperature regulation of the heating plant and for the regulation at a fixed point of the DHW plant with control of 2, 3 or 4 one-stage boilers without shut-off valves.

12. SEQUENCING OF BOILERS

12.1 Number of boilers

22.13

```
Total boilers
in sequence:  4
```

• Total sequencing boilers: – – = number of required boilers in sequence

12.2 Boilers operation

19.7

```
Boiler 1:AUTOMAT
Boiler 2:AUTOMAT
```

19.8

```
Boiler 3:AUTOMAT
Boiler 4:AUTOMAT
```

To configure the controller to the plant, set the required control in each boiler.

• Boiler ... : – AUTOMAT. = boiler entered in the sequence controlled by the controller
– ON = boiler always on, controlled by its thermostat
– OFF = boiler off or in temporary no-operation

12.3 Sequencing set

The entering in sequence of the boilers depends on the **deviation** between real flow temperature (detector B1) and the desired one.

22.5

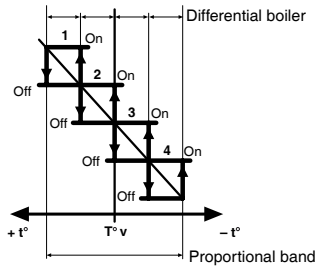
```
Differential
boiler :      4c
```

• Differential boiler : - . - c = differential temperature for the switching on and off of each boiler. The total of differentials for each boiler corresponds to **proportional band.**

22.6

```
Integral time
     20m
```

• Integral time : - - m = allows the regulator to take into account not only the temperature deviation but also the time of the deviation itself. If the real temperature does not tend to raise the regulator in any case sets the boilers, which were not inserted by the proportional control,progressively.



19.5

```
Choice sequence
AUTO CHANGE OVER
```

The sequencing can be:

• choice of sequence: BASE MODULE ... = fixed sequence with choice of basic boiler
AUTOMAT. SWITCH = sequence with automatic rotation of the basic boiler with set time based on number of days:

22.14

```
Auto change over
sequence:    15g
```

19.6

```
Current sequence
LEAD 1
```

At any time it is possible to modify the given basic boiler using the automatic switch, without modifying the chosen sequence.In case of modification, the new sequence remains for the left days before the automatic switch.

Example :

Choice of sequence: AUTOMATIC SWITCH; Automatic switch sequence: 15 days;
Present sequence: BASE MODULE 1

For 15 days : Base module 1 and Sequence = 1-2-3-4
After 15 days : Base module 2 and Sequence = 2-3-4-1
After 30 days : Base module 3 and sequence = 3-4-1-2
After 45 days : Base module 4 and sequence = 4-1-2-3

If after 5 days the present sequence is modified: Base module 1 in present sequence: Base module 3

For the following 10 days : Base module 3 and sequence = 3-4-1-2
After 15 days: Base module 4 and sequence = 4-1-2-3
After 30 days: Base module 1 and sequence = 1-2-3-4
After 45 days: Base module 2 and sequence = 2-3-4-1

13. WEATHER COMPENSATION

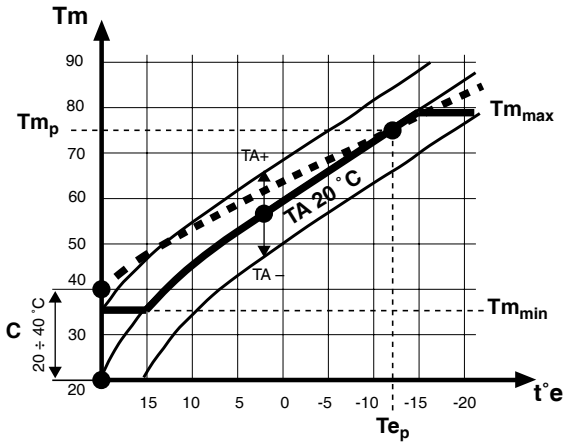
13.1 At fixed point

22.1
Heat emitters
RADIATORS

The regulator must be set in relation to the set plant:
- Type of plant : RADIATORS
  PANELS
  CONVECTORS

13.2 Heating Curve

The flow temperature required by the controller (detector B1) is modified depending on the outside temperature and the heating control curve
The controller compares the actual value of the flow temperature with the corresponding one on the curve, and if there is a difference, it regulates with the PI control action (proportional band Pb and integral time It set) the sequence of the set boilers.



C = correction curve origin
T°m = desired flow temperature
T°mp = design winter flow temperature
T°ep = design external winter temperature
T°mmax = maximum winter limit flow
T°mmin = minimum winter limit flow
t°e = outside temperature

The heating control curve, referring to a desired ambient temperature of 20°C, is given by:

22.2
Design outside
temp : – 5.0c

- design external temperature used for the calculation of the winter dispertion of the building, depending on the climatic zone of ubication of the latter.

22.3
Design flow
temp : 80.0c

- design flow temperature used for the dimensioning of the plant (eg radiators = 70°C, fan coils = 80°C, panels = 40°C).
- heating curve origin = winter flow temperature with an external temperature of 20°C.

The flow temperature required by the regulator also depends on the desired ambient temperature and the operational modes: NORMAL, SETBACK, FROSTPROTECTION (corresponding shift of curve)

13.3 Heating curve orgin

22.4
CurveOrigin TO20
Flow T : 20.0c

The conventional point of origin of the heating curve (+ 20°C at manifold with an external temperature of + 20°C) can be modified by an increase of the flow temperature (maximum + 20°C). The change can be necessary to avoid possible unbalanced heating performance of the radiators when high external temperature (Spring and Autumn time).

13.4 Operating temperature

RTC 604 allows you to set, even with different values from the desired temperature, the various functioning modes available. That is to say:

20.1÷20.5
Desired temp
NORMAL 1 20.0c

– NORMAL 1…5 tures = operation of compensating control at confortable ambient tempera- (during the day or when building inhabited)

20.6–20.7
Desired temp
SETBACK 1 16.0c

– SETBACK 1-2 = operation of compensated control at reduced ambient temperatures (at night or when building not inhabited)

22.8
Desired temp
FROSTPROT 6.0c

– FROSTPROT ted) = operation of control at safety temperature (holiday or building not inhabi-

20.9–20.10
Desired temp
FLOW 1 30.0c

– FLOW 1-2 = operation of control at constant flow temperature value (compensation curve not taken into account)

– OFF = valve closed and pump idle

13.5 Minimum and maximum limits of flow temperature

22.7
```
Flow T limits
Min: 1c  Max:99c
```

When the requested flow temperature reaches one of its limit values it is kept constant at that value.

Examples :- minimum limit to avoid circulation of cold air in fan coils
- maximum limit to avoid dangerous overheating of the panels

Warning: the maximum heating temperature does not substitute the observance of the safety regulations in force.

13.6 Ambient authority

22.8
```
AmbientAuthority
on FLOW   :----c
```

When B3 ambient controller is connected, the controller is able to adjust the desired flow temperature according to the ambient authority set.

- Ambient authority on flow = value in °C of change (increase / decrease) in flow temperature for each degree of difference in ambient temperature.

13.7 Eco Off

20.12
```
Eco Off      :NO
Outside T: 20.0c
```

Permits to exclude heating when the outside temperature reaches the set value

- Eco Off : – NO = function off
  – YES = function on
- Outside T: – –.– c = desired outside temperature at which the ECO OFF is switched on.In that case the boilers are switched off and the pump of the heating plant is stopped.

13.8 Operating programmes

19.2
```
Plnt:----------
24HOUR       1
```

Choice of operating programme of the heating plant according to requirements:
– 24 HOUR 1...7; – 7 DAY 1 - 2, – NORMAL 1...5; – SETBACK 1 - 2; FROSTPROT;
– FLOW 1 - 2; OFF

In place of the programme the following can appear:
– SUMMER = controller is in summer period
– REMOTE NORMAL 1 = the external remote control "R" is in "Normal" position
– REMOTE SETBACK 1 = the external remote control "R" is in "Setback" position
– REMOTE FROSTPROT= the external remote control "R" is in "Frostprot" position
– REMOTE OFF = the external remote control "R" is in "Off" position
– REMOTE + 2c = the external remote control "R" is in "Automatic+2°C" position
– REMOTE ON = the external remote control "c1" is closed (position On)

13.9 Operating mode and adjustment of temperature

19.3
```
Mode : NORMAL
Td21.0c Var+0.0c
```

The mode in use depends on the programme set in 19.2 `Plnt:---------- 24HOUR 1` and it is shown on the page of display

- NORMAL Td - -.- c
  SETBACK Td - -.- c
  FLOW Td - -.- c
  FROSTPROT Td - -.- c
  OFF

In the NORMAL / SETBACK operating modes it is possible to adjust the desired temperature value

- Var + = variation of ± 3°C

13.10 Remote control for modifying programmes

Two external remote controls can be installed to modify the programme in use
a) by connecting the remote control R (CDB 300), see wiring diagram, which allows:
– OFF : plant excluded
– FROSTPROT : continuous operation at desired Frostprot ambient temperature
– NORMAL : continuous operation at desired Normal 1 ambient temperature
– SETBACK : continuous operation at desired Setback 1 ambient temperature
– AUTOMATIC +2c : increase of 2°C in desired temperature of mode in use
– AUTOMATIC : operation with chosen programme on controller

b) by installing an external switch "c1", see wiring diagram, which allows:
– OPEN : operation with chosen programme on controller;
– CLOSED : switch on of the set boilers in 20.13 `Remote On : boilers 1 2 3 4` at maximum limit value set in 22.7 `Flow T limits Min: 1c Max:99c`

13.11 Control plant pump

22.9
```
Heating pump:AUT
Delay Off  :30min
```

The heating plant pump can be controlled in two ways.
- Pump : MAN = pump always in operation
  AUT = pump controlled by times of programmes in use
- Delay Off : ....min = delay in switching off for dissipating heat accumulated in plant.

14. DHW CONTROL

22.10
DHW output
TEMP CONTROL

The mainfold can be set to be used as:
– TEMP. CONTROL = adjustment of the auxiliary circuit in relation to the times of the chosen programme and the desired temperature.
– TIME CONTROL = comand at the mainfold in relation to the times of the chosen progrogramme.

14.1 Desired temperature and differential

It appears only if in 22.10 DHW output TEMP CONTROL :

20.11
Des DHW T :50.0c
Diff : 3.0c

- DHW temperature : 50.0c = desired DHW temperature
- Differential: 3.0c = differential temperature for the DHW regulation

14.2 Operating programmes

The choice of the operating programmes for DHW regulation is indipendent from the regulation of the heating plant.
– 24 HOUR 1…7;
– 7 DAY 1 or 2;
– ALWAYS ON;
– ALWAYS OFF;

19.4
DHW programme
ALWAYS ON

14.3 Operating modes

DHW control uses one of the programmes available on the controller. It is important to note that when a 24hour programme is prepared specifically for DHW, the operating modes available have the following significance:

- NORMAL 1...7; SETBACK 1 - 2 ; = ON(On) = desired T. DHW (20.11 Des DHW T :50.0c / Diff : 3.0c)
- FLOW 1 - 2; FROSTPROT; OFF =OFF (Off) = desired T. DHW (20.8 Desired temp / FROSTPROT 6.0c)

14.4 DHW control priority

22.11
Control use :
1 BOILER

Configuration of DHW control priority:
– 1 BOILER = to a thermal demand from DHWS:
- boiler 1 is selected (C1) via the use of valve Y;
- boiler 1 (1) is switched on and controlled by its thermostat (see diagram **10**.1).
– 2 BOILERS = to the thermal demand from DHWS:
- boiler 1 (C1) and 2 (C2) are selected via the use of valve Y;
- boiler1 and 2 are switched on and controlled by their thermostats (see diagram **10**.1).
– HEATING PUMP = to a thermal demand from DHWS
- heating circuit is shut off via the use of valve Y
- all the boilers are switched on and controlled by their thermostats (see diagram **10**.2).
– DHWS PRIORITY = to a thermal demand from DHWS:
- the pump of the boiler circuit M2 is switched on
- the pump of the heating circuit M1 is switched off
- all the boilers controlled by their thermostats are switched on (see diagram **10**.3).

14.5 Antibacteria and summer operation

22.12
Antibacteria:NO
DHW summer :NO

The antibacteria function prevents the formation of bacterial colonies in the storage tank
- Antibacteria : NO = function not enabled
YES = every Wednesday at 02:00 a.m. the DHW temperature is raised to 70°C for 90 minutes

It is possible to programme the summer operation of DHWS.
- DHWS summer : NO= DHW off
YES = DHW on and controlled according to setting in 19.4 DHW programme ALWAYS ON / 20.11 Des DHW T :50.0c Diff : 3.0c

15. PROGRAMMES AND PERIODS WITH DATES

15.1 24-hour programmes

21.1

```
How many 24hour
programmes  ?  1
```

Enter number of programmes you wish to use (from 1 to 7)

In each 24-hour programme (DP1...DP7) it is possible to set a maximum of 6 ON times (1hr...6hrs) giving to each of them one of the modes:

21.2

```
P1 Event 1   6.00
NORMAL   1  20.0c
```

⇩
⇩

21.7

```
P1 Event 6  22.00
SETBACK 1   16.0c
```

– NORMAL 1...5 = temperature regulation with NORMAL ambient temperature
– SETBACK 1 - 2 = temperature regulation with SETBACK ambient temperature
– FLOW 1 - 2 = regulation with fixed FLOW temperature
– FROSTPROT = temperature regulation with FROSTPROT. ambient temperature
– OFF = DHWS off, shut valve and pump idle

The times of start of period must be entered in increasing order.
The times not used must be excluded by pressing the two keys + and – at the same time (– – –).
Times not used (– – –) must not be left between programmed times.

15.2 7-day programmes

21.8

```
How many 7 day
programmes  ? 0
```

Enter number of programmes you wish to use (maximum 2)

In each 7-day programme you can assign one of the following programmes to each day of the week:

21.9

```
7day 1:MONDAY
24HOUR       1
```

⇩
⇩

21.15

```
7day 1:SUNDAY
24HOUR       1
```

– 24-HOUR 1 ...7;
– NORMAL 1 ... 5;
– SETBACK 1 - 2 ;
– FLOW 1 - 2 ;
– FROSTPROTECTION;
– OFF.

15.3 Heating season

Defines the period of heating according to the regulations of the various climatic zones.

21.16

```
Heating season
frm15.10to 15.04
```

Enter the day and month of the start and end of the heating period.
To cancel the period, keep the + and – keys pressed at the same time.

Also applicable to the boiler if it is on

22.12

```
Antibacteria :NO
DHW summer   :NO
```

15.4 BST (British Summer Time)

The controller is able to automatically change the current time of day in relation to the BTS period.

21.17

```
BST
frm29.03to 26.10
```

– frm - - . - - = on the last Saturday night in March, the time of day is automatically put forward one hour
– to - - . - - = on the last Saturday night in October, the time of day is automatically put back one hour

To cancel the period, keep the + and – keys pressed at the same time.

16. COMPLEMENTARY FUNCTIONS

16.1 Heating pump control

22.9
```
Heating pump:AUT
Delay Off  :30min
```

The manifold pump can be controlled in two ways:
- Manifold pump : MAN = pump always on
  AUT = pump controlled by times of the programme in use
- Delay Off : - - min = switch-off time delay to allow the pump to dispose the heat storaged in the boilers

16.2 Summer plant exercise

20.14
```
Summer plant
Exercise:     NO
```

This function avoids the block age of the pumps when the plant is not used for a long period of time.
– Heating pump: each Sunday at 12 noon the pump is automatically switched on for 5 minutes.
– Manifold: if it is cut off during the summer, each Sunday at 12 noon the manifold is automatically switched on for 5 minutes.

16.3 Access keynumber

22.15
```
Choice keynumber
      ----
```

Choice and enabling of access keynumber which disables use of + and – keys therefore preventing any modification of the data. Enter the number (1900...1999) using + and – keys
To cancel keynumber press + and – at the same time until dashes appear again.

```
Choice keynumber
      ----
```

When keynumber is enabled, if you press + and – keys, it appears the request to enter the key-number on the diplay. Only after having entered the correct keynumber it is possible to use the + and – keys.
The keynumber will automatically be re-activated if no key is pressed within 15 minutes.

16.4 Denomination of site and outputs

22.16
```
Name plant
  ----------
```

Entering name of site which appears on first display page.
Each dash can be replaced, using the + and – keys, either by a letter of the alphabet (A...Z) or by a number (0...9). The → key must be used to position the cursor.

16.5 Displaying measurements

19.10
```
Des amb  T:20.0c
Act amb  T:20.0c
```

The controller displays all the measurements made by the detectors and the data which serve to monitor the operational status of the plant:

- **Ambient temperature** desired by the operating mode and actual ambient temperature measured by detector B3.
  If detector B3 is not connected ACT AMB T : - - .- c will appear on display.

19.11
```
Des flow T:80.0c
Act flow T:80.0c
```

- **Flow temperature** desired by the operating mode and actual one measured by detector B1

19.12
```
Outside temp
actual   :– 2.0c
```

- **Outside temperature** actual

19.13
```
Des DHW  T:50.0c
Act DHW  T:50.0c
```

- **DHW temperature** desired by the operating mode and actual one measured by detector B5
  If detector B5 is not connected DHW T: - - .- c will appear on display.

19.14
```
Boiler1 :0000hrs
Boiler2 :0000hrs
```

19.15
```
Boiler3 :0000hrs
Boiler4 :0000hrs
```

- **Boilers operational hours calculation:** to calculate the boilers theoretical operational hours, press + and – keys at the same time to reset the calculation

19.16
```
Output control
boilers     : 50%
```

- **Total PI value controller.** 0% all boilers are switched off ; 100% all boilers are switched on

16.6 Alarms

The alarms processed by the controller are of 4 types:
– clock alarm = indicated by a LED on the controller facia (pict. **6.**7), shows that the internal controller clock does not work.
– flow and outside controllers alarm = indicated by a LED on the controller facia (pict. **6.**8), shows the open or short circuit of the detectors B1 and B2
Warning: in case of alarm the boiler controller is cut off.
– boiler detector alarm = indicated by a LED on the controller facia (pict. **6.**8), shows the open or short circuit of the detector B5
Warning: in case of alarm the boiler controller is cut off.
– fault alarm: indicated by a LED on the controller facia (pict. **6.**9), shows a fault in the micro-processor of the controller.

17. COMMISSIONING PLANT

Testing to be carried out when installation has been completed and the wiring and configuration carried out and tested.

17.1 Testing control outputs

23.1

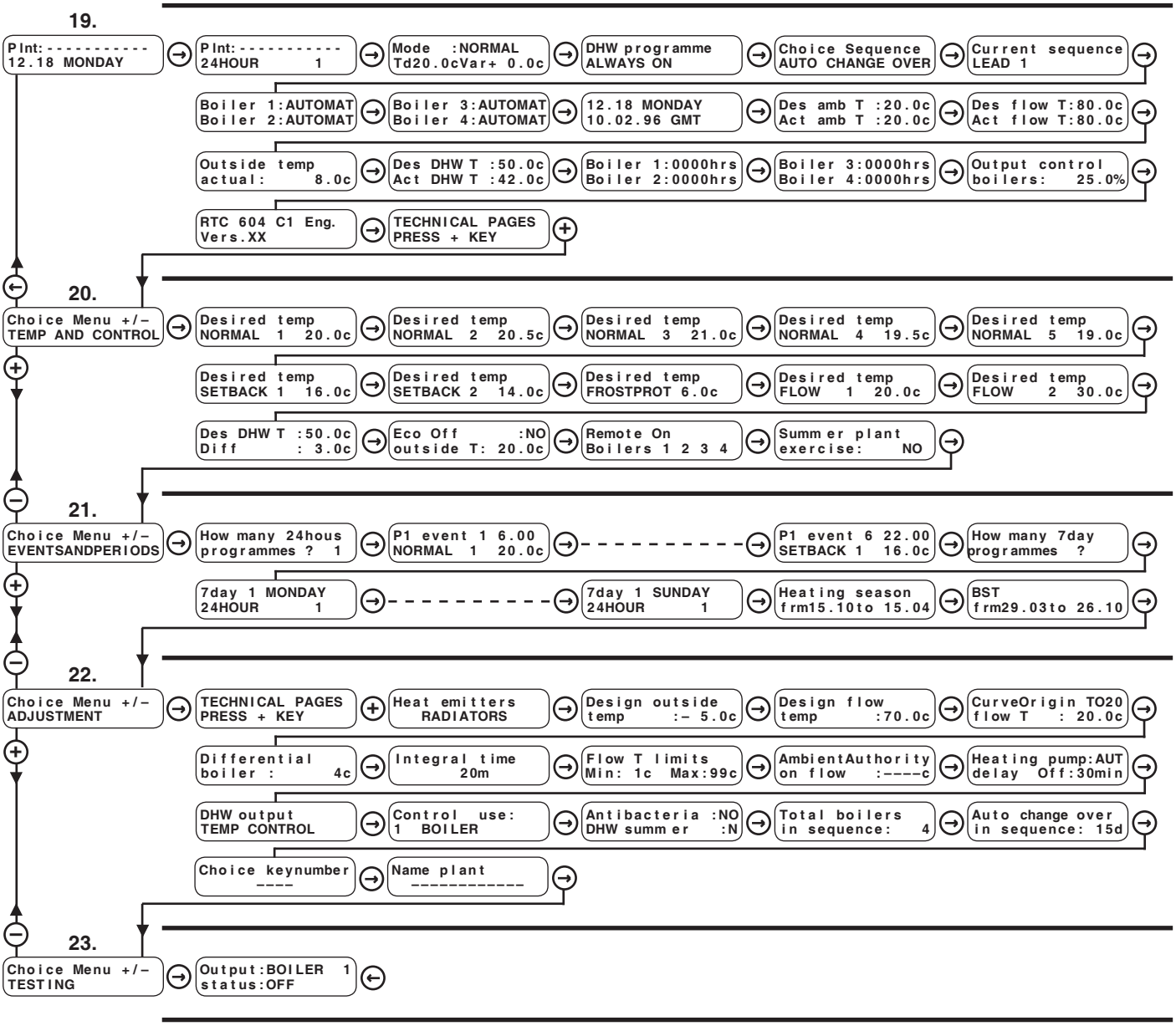
```
Output:BOILER   1
Status:OFF
```

By pressing + and – keys choose:

- Outlet to be tested = BOILER 1; BOILER 2; BOILER 3; BOILER 4; HEATING PUMP; DHWS.
- Setting : – OFF = off
  – ON = on

Check the result.

18. SEQUENCE OF DISPLAY PAGES (the data and functions are those set by factory)



⊖ ⊕ Keys for scrolling the display pages and positioning the cursor on data which can be adjusted on the pages.

In the following descriptive list of display pages the data which can be adjusted is highlighted thus

By pressing the two keys at the same time for a few seconds, or in any case after 15 minutes,

the first page is displayed.

```
Htg:------------
12.18 MONDAY
```

⊖ ⊕ Keys for : – adjusting the values indicated by the cursor

– displaying the possibilities of configuring a function, eg:

```
Heat emitters
RADIATORS
```

or

```
Heat emitters
PANELS
```

– passing directly from a menu (sequence of pages) to another.

19. NORMAL USE

Ref.	Display	Description	Notes	Sect.
19.1	Plnt:---------- 12.18 MONDAY	Site name Current time and day	Set on **22.16** Set on **19.9**	
19.2	Plnt:---------- 24HOUR 1	Programme selection: 24HOUR 1…7; DAY 1-2; NORMAL 1…5; SETBACK 1-2; FROST- PROTECTION ; FLOW 1-2 ; OFF.	Instead of programme you may read: :SUMMER; REMOTE NORMAL 1; REMOTE SETBACK 1; REMOTE+2C; REMOTE FROSTPROT; REMOTE ON; REMOTE OFF.	13.8
19.3	Mode :NORMAL Td20.0 Var+ 0.0c	Current operational mode. Td : Temperature desired by mode. Var : Variation of desired temperature (max ± 3 °C), only with NORMAL or SETBACK	Modes : NORMAL; SETBACK; FROST-PROTECTION; ECO ON	13.9
19.4	DHW Programme ALWAYS ON	Programme selection for DHW control: 24HOUR 1…7; 7 DAY1-2; ALWAYS ON; ALWAYS OFF.		14.2
19.5	Choice Sequence AUTO CHANGE OVER	Choice type of sequence :AUTOCHANGE OVER; BASE - -.	BASE - - : you can choose between 1 and the number of boilers in sequence control set in **22.13**	12.3
19.6	Current Sequence LEAD 1	Current type of sequence 1…4.	Appears only if at ref. **19.5** there is AUT. Press + and – to change the number of the lag boiler	12.3
19.7	Boiler 1:AUTOMAT Boiler 2:AUTOMAT	Manual control boilers 1 and 2 : ON : controlled by its own thermostats OFF : always off AUTOMAT; : controlled by regulator		12.2
19.8	Boiler 3:AUTOMAT Boiler 4:AUTOMAT	Manual control boilers 3 and 4: same **19.7**	Boiler 3 : appears only if **22.13** is set on 3 Boiler 4 : appears only if **22.13** is set on 4	12.2
19.9	12.18 MONDAY 10.02.96 GMT	Setting : time, day of the week and date Current timed period: Summer or GMT	According to GMT dates set in **21.17**	
19.10	Des amb T :20.0c Act amb T :20.0c	Des : desired ambient temperature Act : ambient temperature (B3).	If B3 is not connected, appears – – – – c.	16.5
19.11	Des flow T:80.0c Act flow T:80.0c	Des: desired ambient temperature Act : flow temperature (B1).		16.5
19.12	Outside Temp Actual :– 2.0c	Real: External temperature measured by B2	If B2 is not connected, appears – – – – c.	16.5
19.13	Des DHW T:50.0c Act DHW T:50.0c	Des : desired flow temperature Act : burner temperature (B5)	If B5 is not connected, appears – – – – c.	16.5
19.14	Boiler 1:0000hrs Boiler 2:0000hrs	ON theoretical calculation, boilers 1 and 2 To zero press + and – keys for some seconds.		16.5
19.15	Boiler 3:0000hrs Boiler 4:0000hrs	ON theoretical calculation, boilers 3 and 4 To zero press + and – keys for some seconds.	Boiler 3 : appears only if **22.13** is set on 3 Boiler 4 : appears only if **22.13** is set on 4	16.5
19.16	Output control Boilers: 00.0%	Value of output signal calculated by the controller.	00 % = all boilers OFF 100 % = all boilers ON	17.5
19.17	RTC 604 C1 Eng. Vers.xx	Identity data of the controller		

20. TEMPERATURES AND CONTROLS

Ref.	Display	Description	Notes	Sect.
20.1	Desired temp NORMAL 1 20.0c	Value of desired ambient temperature NORMAL 1		13.4
20.2	Desired temp NORMAL 2 20.5c	Value of desired ambient temperature NORMAL 2		13.4
20.3	Desired temp NORMAL 3 21.0c	Value of desired ambient temperature NORMAL 3		13.4
20.4	Desired temp NORMAL 4 19.5c	Value of desired ambient temperature NORMAL 4		13.4
20.5	Desired temp NORMAL 5 19.0c	Value of desired ambient temperature NORMAL 5		13.4
20.6	Desired temp SETBACK 1 16.0c	Value of desired ambient temperature SETBACK 1		13.4
20.7	Desired temp SETBACK 2 14.0c	Value of desired ambient temperature SETBACK 2		13.4
20.8	Desired temp FROSTPROT 6.0c	Value of desired ambient temperature FROSTPROTEC		13.4
20.9	Desired temp FLOW 1 20.0c	Value of desired temperature FLOW 1		13.4
20.10	Desired temp FLOW 2 30.0c	Value of desired temperature FLOW 2		13.4
20.11	Des DHW T :50.0c diff : 3.0c	Desired temperature for boiler regulation Differential for boiler regulation	Appears only if in **22.10** choice is TEMP	14.1
20.12	Eco Off :NO outside T: 20.0c	Eco Off : YES ; NO Value of eco off external temperature	with higher external temperatures = boilers heating pump off.	13.7
20.13	Remote on : boilers 1 2 3 4	Choice operating boilers (with boiler termostats) when remote-on c1 contact is closed	– = boiler off; number = boiler on. Factory setting: 1, 2, 3 and 4.	13.10
20.14	Summer plant exercise: NO	Plan exercise function : YES; NO		16.2

21. EVENTS AND PERIODS

Ref.	Display	Description	Notes	Sect
21.1	How many 24hour programmes ? 1	Choice of number of 24-hour programmes to be used (1 … 7).	It only shows the display pages connected to the number of programmes set.	15.1
21.2 ⇩ ⇩ 21.7	P1event 1 6.00 NORMAL 1 20.0c **Other 5 pages for DP1 h2, h3, h4, h5, h6.**	Programme number (DP 1...7), and start time event (h 1...6). Mode to give to event: NORMAL 1…5; SETBACK 1-2; FROST PROTECTION ; FLOW 1-2 ; OFF.	max. 6 events. To erase a not used period press + and – together until - - . - - appears in the display. Events must be in increasing order. Do not leave - - . - - between set events	15.1
	Other groups of 6 pages for each 24-hour programme according to the choice made in 23.1.			
21.8	How many 7day programmes ? 0	Choice of number of 7-day programmes to be used (0...2)	It only shows the display pages connected to the number of programmes set.	15.2
21.9 ⇩ ⇩ 21.15	7day 1:MONDAY 24HOUR 1 **Other 6 pages for the other days of the week**	Programme for each day of the week: 24HOUR 1…7 ; NORMAL 1…5 ; SETBACK 1-2 ; FROST PROTECTION ; FLOW 1-2 ; OFF.	Appears only if in **21.8** is 1 or 2.	15.2
	Other group of 7 pages for the 7-day programme 2 if choice made in 22.8 is 2.			
21.16	Heating season frm 15.10 to 15.04	Start and end dates for heating season		15.3
21.17	BST frm 29.03 to 26.10	Start and end dates for BTS period		15.4

22. ADJUSTMENT

Ref.	Display	Description	Notes	Sect.
22.1	Heat emitters RADIATORS	Choice of heat emitters : RADIATORS ; FAN COILS; PANELS.		13.1
22.2	Design outside temp :– 5.0c	Design external temperature for weather compensation		13.2
22.3	Design flow temp : 70.0c	Design flow temperature for weather compensation		13.2
22.4	Curve originTO20 flow T : 20.0c	Correction of heating curve origin		13.3
22.5	Differential boiler : 4c	Temperature differential ON-OFF for each boiler.		12.3
22.6	Integral time 20m	Integral time for sequence regulation		12.3
22.7	Flow T limits Min: 1c Max:99c	Minimum and maximum values for flow heating temperature.		13.5
22.8	AmbientAuthority on Flow :----c	Variation in ± °C of flow temperature, with ± 1 °C difference from ambient temperature	Only if connected to B3.	13.6
22.9	Heating pump:AUT Delay Off: 30min	Control of plant pump : MAN ; AUT. Delay in switching off pump	MAN : always ON ; AUT : with current times in set programme	13.11
22.10	DHW output TEMP CONTROL	Choice in the use of DHW output (8-9-10): TEMP. CONTROL ; TIME CONTROL		14.
22.11	Control use : 1 BOILER	Type of DHW circuit: 1 BOILER ; 2 BOILERS; HEATING PUMP ; HEATING PRIORITY.	Appears only if **22.10** choice is TEMPERATURE CONTROL	14.4
22.12	Antibacteria :NO DHW summ er :NO	Enabling of DHW antibacterial function. Shows if the boiler is either On or Off during the summer.	Appears only if **22.10** choice is TEMPERATURE CONTROL	14.5
22.13	Total boilers in sequence: 4	Number of connected boilers: 2 … 4.		12.1
22.14	Auto change over in sequence: 15d	Number of days for automatic switching sequence	Appears only if **19.5** choice is AUTO CHANGE OVER	12.3
22.15	Choice keynumber ----	Choice keynumber preventing access to + and – : 1901 … 1999	To cancel access to key control press + and –together.	16.3
22.16	Name plant ----------	Setting of plant name	Use + and – to enter letters and numbers Use ← and → to position cursor	16.4

23. TESTING

Ref.	Display	Description	Notes	Sect.
23.1	Output:BOILER 1 Status:OFF	Choice outputs Choice output status	Output : BOILER 1 ; BOLIER 2 ; BOILER 3 ; BOILER 4 ; HEATING PUMP; DHW. Status : OFF ; ON.	17.1

Amendments to data sheet

Date	Revision No.	Page	Section	Details of amendments	Firmware version	Software version
13.12.05 LB		13 8	23. SETTING DHW HEATING 14.1 Desired DHW temperature	Added page Display 26.21 for setting increase desired DHW temp. to send to C-Ring. DHW temperature increase in C-Ring.		
28.12.05 LB		2	4. TECHNICAL DATA	Added item: "Increase C-Ring over desired DHW temperature"		
09.10.07 LB	01	1 3,4,5	3. DETECTORS AND ... 7. WIRING DIAGRAM	Add new remote control CDB 300/S1 The numbers of the terminals shown in the actuators have been eliminated	≥ 03	≥ 0.98.2295
21.05.10 VM	01	9	14.5 Antibacteria and summer operation	Changed antibacteria function's time	≥ 03	≥ 0.98.2295

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