B 223
03.10.05 LB

COMPENSATING CONTROLLER

C ◄RING

RTE 611 Eng C2

- **Digital controller for boiler plant :**
  – control of temperature boilers at fixed point or variable value
  – compensated control of heating zone
  – On-Off control of auxiliary zone (DHW) or On-Off time switch control
- **Communication systems :**
  – **C-Ring** for exchange data between local controllers.
- **Power supply 230 V ~ ; DIN rail mounting**

1. APPLICATION

RTE 611 controller is designed for winter compensated control of centralised plants :
– in administration and commercial buildings
– in public buildings and schools
– in residential complexes

2. FUNCTIONS

The principal functions of RTE 611 are :
- Control of temperature of boiler(s) at fixed point or at variable value in relation to actual thermal load, comprising: outside temperature; DHW ; heating zone or heating zones regulated by other controllers wired in C-Ring with RTE 611.
  – control of a one- or two-stage burner or two one-stage burners in sequence.
- Compensated control of heating plant by three-wire control of valve :
  – control of plant pump according to current programme with delay in switching off
  – ambient frost protection
  – minimum and maximum flow temperature limits
  – correction of heating curve origin
  – self-adapting
  – Eco Off
- Control of temperature of an auxiliary zone (DHW storage tank):
  – control loading pump by detector or only according to programme timed events
  – DHW priority, anticondensing and antibacteria functions
- Programme of timed events, 24-hour and 7-day
- Automatic switching GMT/BST
- Metering of operating hours of burners
- Remote control for changing timed events programme in use
- C-Ring connection for local exchange of data with other controllers;

3. DETECTORS, REMOTE CONTROLS & ACCESSORIES

No.	Description	Type	Sensing element	Code	Data sheet
1	Heating flow temperature detector - surface [1)]	**SCH 010**	NTC 10 kΩ	B1	–
1	Outside temperature detector	**SAE 001**	NTC 1kΩ	B2	–
1	Boiler temperature detector - immersion [2)]	**SIH 010**	NTC 10 kΩ	B4	–
1	DHW temperature detector - immersion[3)]	**SIH 010**	NTC 10 kΩ	B5	–
	Accessories :				
1	Ambient temperature detector	**SAB 010**	NTC 10 kΩ	B3	–
1	Remote control for changing current programme	**CDB 300**	–	R	–
	Alternatives :				
1	1) Temperature detector - immersion	**SIH 010**	NTC 10 kΩ	B1	–
1	2) Temperature detector - cable-type	**SAF 010**	NTC 10 kΩ	B4	–
1	3) Temperature detector - cable-type	**SAF 010**	NTC 10 kΩ	B5	–

4. TECHNICAL DATA

• Electrical

Power supply	230 Volt ~ ±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 switching voltage	250 V~
maximum switching current	5 (1) A
Construction standards	Italian Electrotec. Committee (CEI)
Storage data in memory	5 years

• Mechanical

Case	DIN 6E module
Mounting	DIN 35 rail
Materials:	
base	NYLON
cover	ABS
Ambient temperature:	
operation	0 … 45°C
storage	– 25 … + 60°C
Ambient humidity	Class F DIN 40040
Dimensions	105 x 115 x 71,5
Weight	1.0 kg

• Programmes & periods

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

• Measurement ranges

Flow temperature	0 … 99 °C
Outside temperature	– 30 … + 40 °C
Ambient temperature	0 … 40 °C
Boiler temperature	0 ... 99 °C
DHW temperature	0 ... 99 °C

• Heating

Flow temperature :	
radiators	40 ... **70** ... 99 °C
fan coil	40 ... **80** ... 99 °C
panels	20 ... **40** ... 50 °C
minimum limit	**1** ... 99 °C
maximum limit	1 ... **99** °C
Design outside temperature	– 30 … **– 5** … + 20 °C
Correction curve origin	**20** ... 40 °C
Valve actuator run time	30 ... **630** ... 3,600 s
Delay switching off pump	2 ... **30** ... 60 minutes
Ambient authority	**0** ... 20 °C/°C
Mode temperatures :	
ambient Normal mode	0 … **20** … 30 °C
ambient Setback mode	0 … **16** … 30 °C
ambient Frostprot mode	0 … **6.0** … 30 °C

• Control boiler

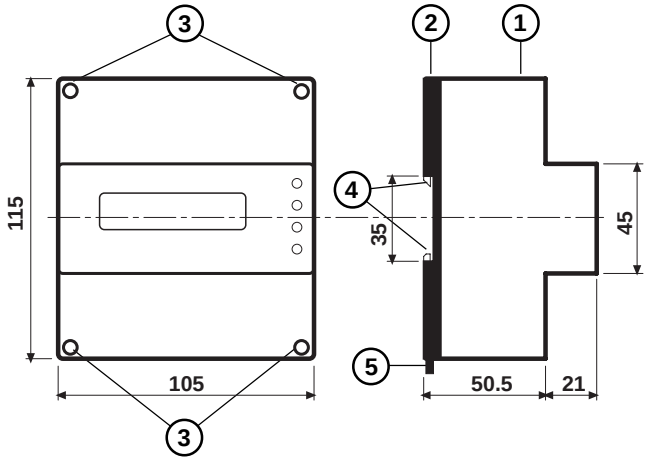
Temperatures	0 ... **80.0** ... 99.0 °C
Differential	0.5 ... **5.0** ... 50.0 °C
Increase on heating	0.5 ... **5.0** ... 50.0 °C
Maximum limit	1 ... **99** °C
Minimum limit	**1** ... 99 °C
Minimum operation of burner	1 minute fixed

• Auxiliary control

Temperature	0 ... **50.0** ... 99.0 °C
Differential	0.5 ... **3.0** ... 30.0 °C

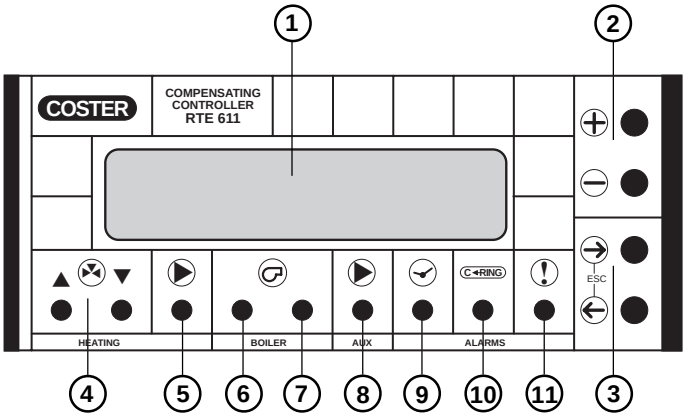
WARNING : *in the presence of electrical disturbances the output controls of the controller may change status but this will be restored automatically.*

5. OVERALL DIMENSIONS



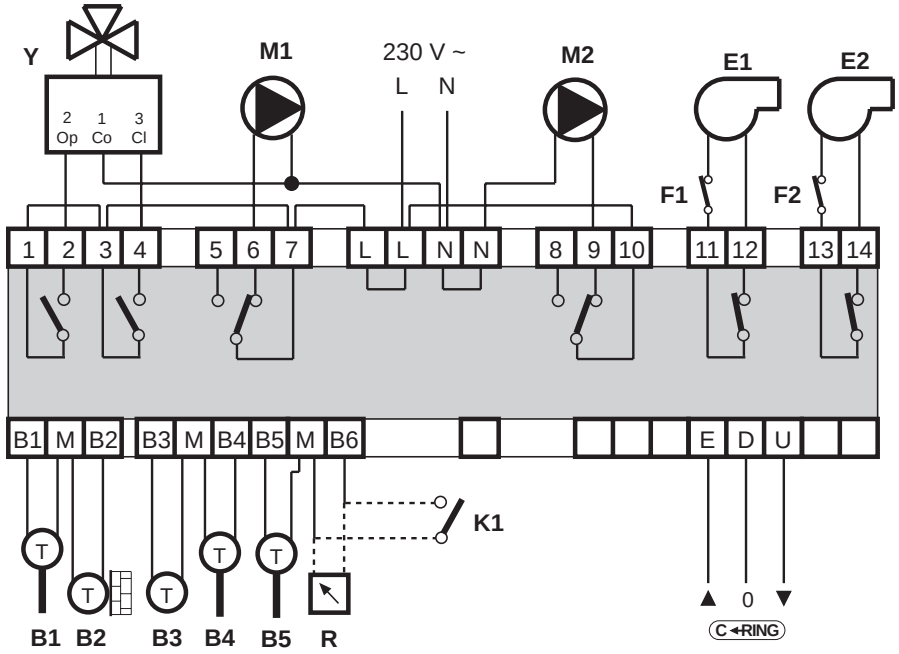
1 – Protective cover for electronic components
2 – Base with transformer, relay & terminal blocks
3 – Screws for fixing cover- base
4 – DIN rail securing elements
5 – DIN rail release lever

6. FACIA



1 - Backlighted two-line alphanumeric display
2 - + and – operating keys
3 - ← and → operating keys
4 - Control valve LEDs
5 - Control pump LED
6 - Burner 1 or 1st stage On LED
7 - Burner 2 or 2nd stage On LED
8 - DHW or auxiliary zone On LED
9 - Real time clock alarm LED
10 - C-Ring alarm LED
11 - Defective controller alarm LED

7. WIRING DIAGRAM



B1 – Plant flow temp.detector
B2 – Outside temp. detector
B3 – Ambient temp. detector
B4 – Boiler temp. detector
B5 – DHW temp. detector
E1 – Boiler 1 or 1st stage boiler
E2 – Boiler 2 or 2nd stage boiler
K1 – "REMOTE OFF" switch as alternative to "R"

F1 and F2 – Boiler thermostats
L – Line 230 V ~
N – Neutral
M1 – Heating pump
M2 – Auxiliary zone pump
R – Remote control for changing programmes
Y – Motorised heating valve
C-Ring – Transmission data between controllers

8. SITING CONTROLLER & DETECTORS

8.1 Controller

The controller must be sited in a dry space, in observance of the ambiental limits shown under 4. TECHNICAL DATA. If sited in spaces classified as "Dangerous" it must be installed in a cabinet for electrical apparatus constructed according to the regulations in force on the basis of the danger class involved.
The controller can be installed on a DIN rail or in a DIN modular enclosure.

8.2 Flow temperature detector zone B1

With plant pump on flow detector must be installed downstream of this ; with pump on return it must be installed at least 1.5 meters downstream of regulating valve.

8.3 Outside temperature detector B2

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

8.4 Ambient temperature detector B3

This must be installed at a point which represents the average temperature of a significant space (eg living room) at a height of 1.5 ... 1.6 meters from the floor, on an internal wall as far as possible from windows, doors and sources of heat ; corners, shelving and curtains should be avoided.

8.5 Boiler detector B4

This must be used with boilers fitted with anticondensing pump and must be installed on the flow piping of the boiler between the boiler itself and the anticondensing pump connector.

8.6 DHW temperature detector B5

This must be installed on the DHW storage tank, preferably on the lower part (1/3 height) using cable-type detectors for deep pockets.

9. WIRING

Proceed as follows :

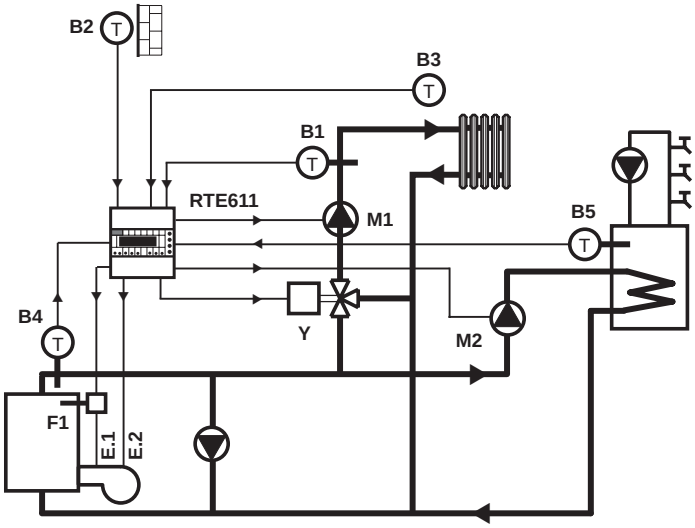
- Separate base and cover
- Mount base on DIN rail and check that the securing elements (5.4) hold it firmly in place.
- Carry out the wiring according to the diagram and in observance of the regulations in force, using cables of :
  - 1.5 mm^2 for power and relay control outputs
  - 1 mm^2 for detectors and remote control
  - 1 mm^2 for C-Ring. For limits of cable length please see technical data sheets T 02 and T 022
- Switch on power (230 V ~) and check voltage across terminals L and N
- Switch off power, replace cover on base and secure it with the four screws supplied (5.3).

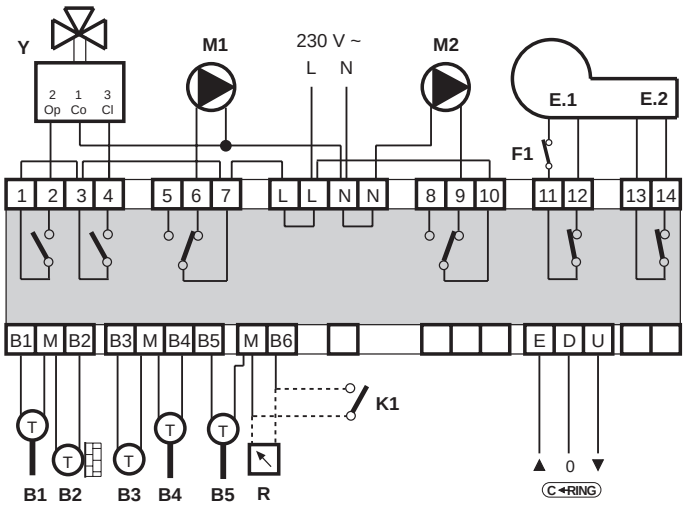
You are advised not to insert more than two cables in a single terminal of the controller and if necessary to use external junction boxes.

10. EXAMPLES OF BOILER PLANT CONTROL

25.1

10.1 Control of a single-stage boiler (config. : Type of boiler 1BOILER 1STAGE) or two-stage (config. : Type of boiler 1BOILER 2STAGES),with compensated heating circuit and DHW at constant value.



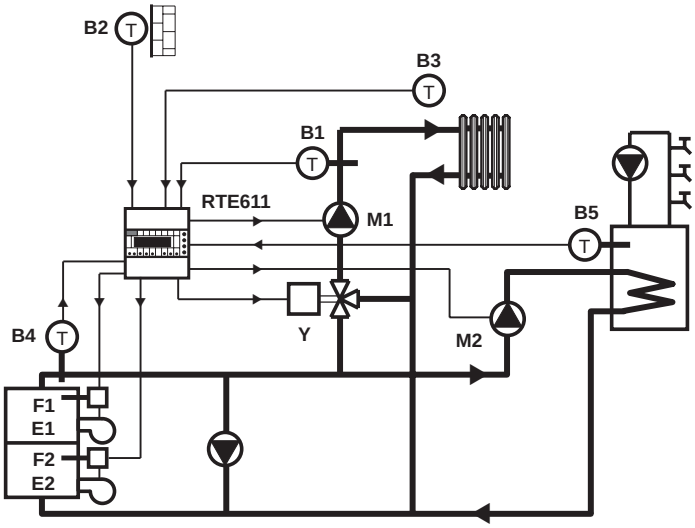


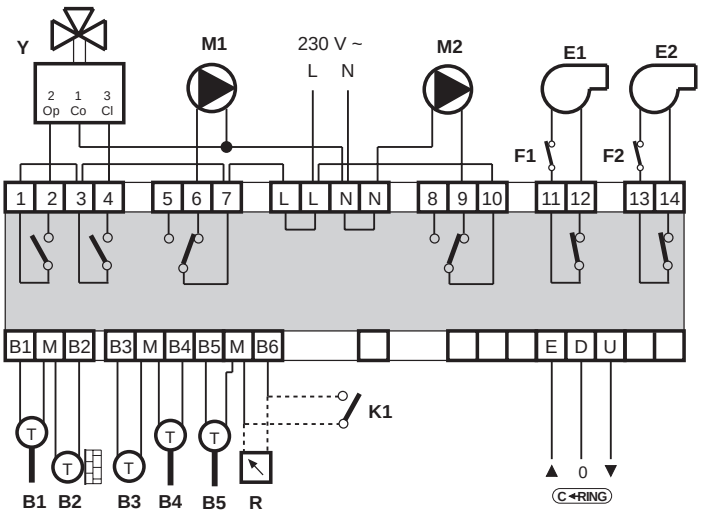
B1 – Plant flow temp.detector
B2 – Outside temp. detector
B3 – Ambient temp. detector
B4 – Boiler temp. detector
B5 – DHW temp. detector
E1.1 – Boiler or 1st stage boiler
E1.2 – 2nd stage boiler
F1 – Boiler thermostat

K1 – "REMOTE OFF" external switch
L – Line 230 V ~
N – Neutral
M1 – Heating pump
M2 – DHW pump
R – Remote control for modifying programmes
Y – Motorised heating valve
C-Ring – Transmission data between controllers

25.1

10.2 Control in sequence of a two burners (config. : Type of boiler 2BOILERS IN SEQU) with compensated heating circuit and DHW at constant value





B1 – Plant flow temp.detector
B2 – Outside temp. detector
B3 – Ambient temp. detector
B4 – Boiler temp. detector
B5 – DHW temp. detector
E.1 – Boiler 1
E.2 – Boiler 2
F1 - F2 – Boiler thermostats

K1 – "REMOTE OFF"external switch
L – Line 230 V ~
N – Neutral
M1 – Heating pump
M2 – DHW pump
R – Remote control for modifying programmes
Y – Motorised heating valve
C-Ring – Transmission data between controllers

11. COMMUNICATION

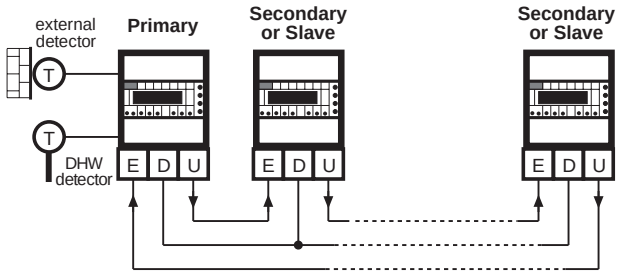
11.1 C-Ring : communication between controllers (for detailed information please see technical data sheet T 022)

RTE 611 controller is **always "Primary"**.
In C-Ring following signals are transmitted :
- permission to operate as **Slave** controllers
- value of **outside temperature** (use of a single detector for several controllers)
- value of **flow temperature requested** by controllers wired in C-Ring; used by "PRIMARY"controller for control of temperature boilers (if scheduled).
- **DHW priority** and/or **anticondensing** = closure valves of heating zones by modulating action.

26.1
CRing connection NO

NO = controller not wired in C-Ring
YES= controller wired in C-Ring

11.2 C-Ring wiring diagram



12. OPERATION

RTE 611 is a digital controller with microprocessor designed for :
- control with compensation, or at a constant value, of a boiler with single- or two-stage burner or two single-stage burners in sequence (without shut-off valves).
- compensated control, with or without ambient authority, of the heating zone. Three-wire control of motorised valve and On-Off control of pump.
- control of temperature at a constant value of an auxiliary zone for DHW, fan coils, etc. On-Off control of plant component.
- signalling alarm for malfunctioning of controller.

To configure the controller please see sections " Sequence of display pages".

13. BOILER

13.1 Type of boiler

25.1
Type of boiler 1BOILER 1STAGE

Configuration of type of boiler and burner of plant :
- *1 BOILER 1 STAGE* = boiler with single-stage burner
- *1 BOILER 2 STAGES* = boiler with two-stage burner
- *2 BOILERS IN SEQU* = two boilers with single-stage burner in sequence (without shut-off valves) or one boiler with two single-stage burners in sequence.

13.2 Operating mode

25.2
Operation boiler ALWAYS ON

Choice of type of operation of boiler(s) :
- *ALWAYS ON* = control of burner(s) by boiler thermostats. Emergency or temporary operation for special needs.
- *AUTOMATIC* = detector B4 is indispensable (see 7 WIRING DIAGRAM). Regulation by controller of burner(s) according to type of boiler plant.
  - *1 boiler 1stage* = start / stop of burner according to differential.
  - *1 boiler 2stages* = start / stop in sequence of stages of burner according to differential value set.

Only if in **25.1** **Type of boiler 2BOILERS IN SEQU** choice is 2 BOILERS IN SEQ

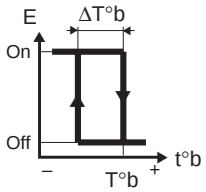
- *SET SEQUENCE 1 - 2*
- *SET SEQUENCE 2 - 1*
- *AUTOMAT SEQUENCE*
  - *2 boilers in sequence* = start / stop in sequence of the two single-stage burners each according to differential value set.

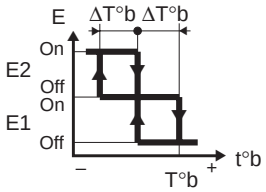
Minimum operating time of burners = one minute (cannot be changed)

13.3 Differential

25.5
Differential boiler : 05.0c

The differential is the difference in temperature which brings about the start / stop of a single-stage burner or the control in sequence of each of the two stages or of two single-stage burners.





E = boiler
E1 = boiler 1 or 1st stage
E2 = boiler 2 or 2nd stage
ΔT°c = differential in °C
T°c = desired temperature boiler
t°c = actual temperature boiler

13.4 Control of the temperature

25.3
```
Control boiler
FIXED POINT
```

25.4
```
Desired boiler
temp     : 80.0c
```

25.3
```
Control boiler
COMPENSATED
```

The operation of the boiler can be configured for the control of temperature at :

– *FIXED POINT* = Control with constant temperaure at value set

– *COMPENSATED* = Control with variable temperature in relation to the highest thermal load between that requested by own controller and, if wired in C-Ring , by other controllers connected.
WARNING: When auxiliary zone requests heat (pump M2 On) the desired boiler temperature moves to "*FIXED POINT*" value.

13.5 Increase in the curve (only with COMPENSATED control of boiler)

25.4
```
Increase boiler
on Heating  5.0c
```

To ensure that with the compensation function the boiler is always able to meet the request for heat from the zones it is necessary to increase the value of the maximum temperature requested.

13.6 Maximum and minimum limits (only with COMPENSATED control of boiler)

25.6
```
Boiler T limits
Min: 1c  Max: 99c
```

Both the limits enter into the calculation of the boiler operating temperature.
When the boiler temperature reaches one of the limit values it is kept constant at that value (controller no longer follows the maximum temperature requested).

13.7 Operation of boiler with zones (heating + DHW) Off

25.7
```
Boiler with
heating:OFF
```

The operation of the boiler when the zones are off (including those in C-Ring) can be configured as :
– *ON* = boiler always in operation, and in particular :
• *with compensation* = at minimum limit temperature set
• *at fixed point* = at the same desired operating temperature
– *OFF* = burners Off, but in relation to the normal operating temperature (fixed point or compensated) on request for heat :
– from DHW
– from heating zone of controller
– from controllers connected in C-Ring.

Safety of operation :
Boiler in operation controlled by own thermostats for :
– short or open circuit detector B4
– break in C-Ring (if connected)

13.8 Eco Off

21.5
```
Eco Off
NO
```

If configured "*PLANT + BOILER*", this function brings about the switching off of the boiler.
For further details please see "Eco Off" in section "Heating circuit" (14.8).

13.9 Control for outside temperature (only with one two-stage boiler or two boilers in sequence)

25.9
```
Off Stage  2: NO
Outside T:  3.0c
```

For operation with reduced thermal load in intermediate seasons.
• *Off stage 2 :* *NO* = function excluded
YES = 2nd stage or 2nd boiler excluded when outside temperature exceeds value set.

13.10 Metering of operating hours

20.11
```
Boiler1: xxxx hrs
Boiler2: xxxx hrs
```

The controller memorises the start times of the stages or of the two burners.
Permits making a good approximation of fuel consumption thereby enabling rationalisation of fuel deliveries.
To cancel the value keep pressed + and – keys at the same time.

14. HEATING ZONE

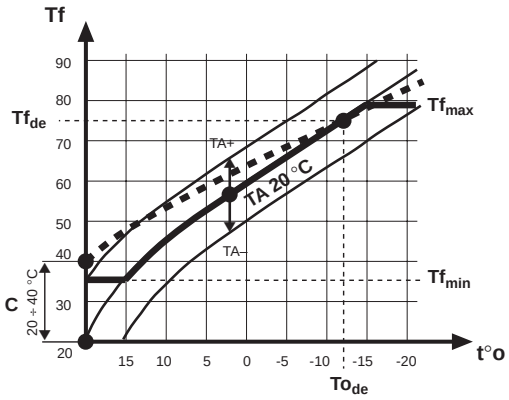
14.1 Type of heat emitters

23.1
```
Heat emitters
RADIATORS
```

The controller must be configured according to the type of heat emitters :
• *Tiype of plant :* *RADIATORS*
PANELS
FAN COILS

14.2 Control curve

The flow temperature requested by the controller (detector B1) is adjusted in relation to the *outside* temperature (detector B2 or value transmitted via C-Ring) and to the *heating control curve*.
The controller compares the actual value of the flow temperature with the temperature corresponding to the curve and, if there is a difference, regulates, with PI control action (proportional band Pb and integral time It set) the motorised valve to eliminate the difference.



C	= correction curve origin
T°f	= desired flow temperature
T°fde	= design winter flow temperature
T°ode	= design winter outside temperature
T°fmax	= winter maximum flow limit
T°fmin	= winter minimum flow limit
t°e	= outside temperature

The *heating control curve*, having reference to a desired ambient temperature of 20 °C, is established by :

23.2
```
Design outside
temp      :– 5.0c
```

- *design outside temperature* , used for the calculation of winter heat loss from the building ; depends on the climatic area in which the building is situated.

23.3
```
Design flow
temp      : 70.0c
```

- *design flow temperature* , used for determining the thermal requirements of the plant (eg : radiators = 70 °C, fan coils = 80 °C, panels = 40 °C).
- *origin of heating curve* = winter flow temperature with outside temperature of 20 °C.

The flow temperature requested by the controller depends also on the value of the *ambient temperature requested* by the operating mode *Normal* , *Setback* , *Frostprot* (parallel ± shift of curve).

14.3 Origin of heating curve

23.4
```
CurveOrigin TO20
Flow T    : 20.0c
```

The conventional point of origin of the heating curve (+ 20 °C flow at + 20 °C outside) can be adjusted by an increase in the flow temperature (max. + 20 °C).The adjustment may be necessary to avoid possible imbalances in the output of the heat emitters at high outside temperatures (intermediate seasons).

14.4 Operating temperatures

RTE 611 permits the configuration, even with values different from the desired temperature, of the various operating modes available, that is :

21.1
```
Desired temp
NORMAL      20.0c
```

– *NORMAL* = operation of compensated control at comfortable ambient temperatures (during the day or when building occupied)

21.2
```
Desired temp
SETBACK     16.0c
```

– *SETBACK* = operation of compensated control at reduced ambient temperatures (at night or when building not occupied)

21.3
```
Desired temp
FROSTPROT   6.0c
```

– *FROSTPROT* = operation of control at safety temperature (holidays or building unoccupied)

– *OFF* = valve closed and pump idle

14.5 Minimum and maximum limits of flow temperature

23.5
```
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 temperature limit does not substitute observance of the safety regulations in force

14.6 Actuator run time

23.6

```
Control: VALVE
Time :    630sec
```

This is the time taken for a complete run (open/closed) of valve actuator, **necessary** for correct control operation.

14.7 Ambient authority

23.7

```
AmbientAuthority
on flow    :00.0c
```

When ambient detector B3 is connected, the controller is able to correct 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 + or –.

14.8 Eco Off

21.5

```
Eco Off
NO
```

Permits excluding heating when the weather conditions do not require it :
– *NO* = not enabled
– *PLANT ONLY* = enabled only for heating (valve closed & pump idle)
– *PLANT + BOILER* = enabled for heating and boiler (the boiler starts up at request of DHW or C-Ring)

Functions only in *Normal / Setback* modes for :

To ≥ Ta desired = Eco Off On

To < Ta desired – 1°C = Eco Off Off

where: To = actual outside temperature

14.9 Operating programmes

20.2

```
Htg:------------
24HOUR       1
```

Choice of operating programme for heating zone according to use requirements :
– 24HOUR 1...7; – 7DAY 1 - 2, – NORMAL; – SETBACK; FROSTPROT; OFF.

In place of the programme the following words can appear on display :

– *REMOTE NORMAL* = external remote control “R” is in “Normal” position;
– *REMOTE SETBACK* = external remote control “R” is in “Setback” position.
– *REMOTE FROSTPROT* = external remote control “R” is in “Frost Protection” position;
– *REMOTE OFF* = external remote control “R” is in the “Off” position, or switch K1 is closed;
– *REMOTE +2c* = external remote control “R” is in the “Automatic + 2 °C” position.

14.10 Operating mode & adjustment of temperature

The current mode depends on programme set in 20.2

```
Htg:------------
24HOUR       1
```

and is shown on the page of display :

20.3

```
Mode   : NORMAL
Td20.0c Var+0.0c
```

• *NORMAL* Td - -.- c
SETBACK Td - -.- c
FROSTPROT Td - -.- c
OFF
ECO PLANT
ECO P+B

In NORMAL / SETBACK operating modes it is possible to make an adjustment to desired temperature value :

• *Var ±* = variation of + 3°C

14.11 Modifying programmes by remote control

Two alternatives are available for modifying the current programme by remote control :

a) By connecting the remote control R (CDB 300) : (please see 7. WIRING DIAGRAM). This permits :
– *OFF* : plant excluded.
– *FROSTPROT* : continuous operation at desired *Frostprot.* ambient temperature
– *NORMAL* : continuous operation at desired *Normal* ambienttemperature
– *SETBACK* : continuous operation at desired *Setback* ambient temperature
– *AUTOMATIC + 2c* : increase of 2 °C in temperature requested by current mode
– *AUTOMATIC* : operation with programme chosen on controller.

b) By installing an external switch K1 (please see 7. WIRING DIAGRAM), which permits :
– *OPEN* : operation with programme chosen on controller.
– *CLOSED* : plant excluded (Remote Off).

14.12 Control plant pump

23.8
Heating pump:AUT
Delay Off: 30min

The heating plant pump can be controlled in two ways :
- *MAN* = pump always in operation (always On).
  AUT = pump M1 controlled according to operating *mode* :
  – Off : pump always Off.
  – Eco Off : pump always Off.
  – Normal : pump always On.
  – Setback & Frostprot:
  a) with ambient detector B3 installed :
  pump Off after delayed switching off.
  Pump On when actual ambient temperature is below calculated flow temperature.
  b) with ambient detector B3 not installed :
  pump always On.

- *Delay Off :* *2 min* = delay in switching off for dissipating heat accumulated in plant.

15. CONTROL AUXILIARY (DHW) ZONE

24.1
Auxiliary output
CONTROL ON-OFF

The Auxiliary output can be configured for use as
– *ON-OFF CONTROL* = control of auxiliary zone by control of pump M2 in relation to event times of chosen programme of timed events and of desired temperature.
– *TIME SWITCH* = control of pump M2 in relation to event times of chosen programme.

15.1 Desired temperature

24.4
Desired temp
DHW 50.0c

Appears only if in 24.1 Auxiliary output ON–OFF CONTROL "*ON - OFF CONTROL*" control is entered

Value of desired temperature for stored DHW.

15.2 Differential

24.2
Differential T
BOILER 05.0c

Appears only if in 24.1 Auxiliary output ON–OFF CONTROL "*ON - OFF CONTROL*" is entered

The differential is the temperature difference for the control of the zone auxiliary pump M2.

15.3 Operating programmes

24.4
Prog DHW
ALWAYS ON

Choice of operating programme for auxiliary zone (DHW) :
– 24HOUR 1...7; – 7DAY 1 - 2, – ALWAYS ON; – ALWAYS OFF;

15.4 Operating modes

The DHW control uses one of programmes available on controller.
Please note that, when preparing a 24-hour programme specially for DHW, the available operating modes are to be understood as follows :

- NORMAL ; SETBACK ; *= ON (On)* = Desired temp DHW — 21.4 Desired temp DHW 50.0c
- FROST PROT; OFF = *OFF (Off)* = Desired temp DHW — 21.3 Desired temp FROSTPROT 6.0c

15.5 Delay switching off pump

24.3
Delay pump Off
DHW :NO

Appears only if in 24.1 Auxiliary output ON–OFF CONTROL "*ON - OFF CONTROL*" is entered

Delay in switching off DHW pump when desired DHW temperature reached :
– *NO* = no delay
– *YES* = delay of five minutes (fixed) before switching off

15.6 Antibacteria function

24.4
Antibacteria
DHW :NO

Antibacteria = increase in DHW temperature to 70 °C for 90 minutes every Wednesday at 12 noon in order to prevent growth of bacteria in storage tank.
– *NO* = function disabled
– *YES* = function enabled

15.7 Denomination auxiliary zone

24.5
Name Aux zone
BOILER

Composition of name of auxiliary zone which appears on relevant display pages.
Using + and – keys, each dash can be replaced by a letter of the alphabet (A ... Z) or by a number (0 ... 9). The → key serves to position the cursor.

16. PROGRAMMES & SUMMER TIME

All programmes of timed events are available both for compensated and for auxiliary control.

16.1 24-hour programmes

22.1
```
How many 24hour
programmes  ? 1
```

Set the number of 24-hour programmes you wish to use (1 ... 7).
In each 24-hour programme (**P1 ... P7**) you can set a maximum of six event start times (**h1 ... h6**) assigning to each one of following modes :

22.2
```
P1 Event 1 06.00
NORMAL     21.0c
```
⇓⇓
22.7
```
P1 Event 6 22.00
SETBACK    16.0c
```

– *NORMAL* = compensated control with NORMAL ambient temperature
– *SETBACK* = compensated control with SETBACK ambient temperature
– *FROSTPROT* = compensated control with FROSTPROT ambient temp.
– *OFF* = plant Off, valve closed & pump idle

The event start times must be entered in increasing order.
The unused events must be excluded by pressing + and – keys at the same time.
You must not leave unused events (– – –) between programmed events.

16.2 7-day programmes

22.8
```
How many 7day
programmes  ?  0
```

Enter the number of programmes you wish to use (max. 2).

22.9
```
7day 1 MONDAY
24HOUR       1
```
⇓⇓
22.15
```
7day 1 SUNDAY
24HOUR       1
```

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

– *24HOUR 1 ... 7*
– *NORMAL*
– *SETBACK*
– *FROSTPROT*
– *OFF*.

16.3 Summer time

22.16
```
Summer Time
Fr:29.03to:26.10
```

The controller automatically changes the actual time in relation to the summer time (BST) period.
– *Fr - -.- -* = the night of the last Saturday in March the real time clock is automatically put forward one hour
– *to - -.- -* = the night of the last Saturday in October the real time clock is automatically put back one hour
To cancel the period keep + and – keys pressed at the same time.

17. COMPLEMENTARY FUNCTIONS

17.1 Auxiliary zone (DHW) priority & anticondensing

25.8
```
DHW priority
Anticondens : NO
```

The same function controls anticondensing and DHW priority :
– *NO* = function excluded
– *YES* = When boiler temperature (measured by detector B4) falls by three times the differential set in respect of the desired value, the controller closes the heating valve with modulating control action.
The DHW pump functions only when actual boiler temperature exceeds by 3 °C actual DHW temperature.

17.2 Access keynumber

26.2
```
Choice Keynumber
     ----
```

Choice and enabling of access keynumber. The latter, when enabled, prevents use of + and –keys for modifying any data. Enter the number (1900 ... 1999) using + and – keys.
To eliminate keynumber press + and – keys at the same time when the dashes will reappear.

```
Access keynumber
     ----
```

When keynumber is enabled, if + or – keys pressed there will appear on display a request to enter keynumber. Only after having entered the exact keynumber can + and – keys be used to modify data.
If no key is pressed for 15 minutes the keynumber is automatically enabled.

17.3 Name site (plant)

23.9
```
NameHeatingPlant
  ----------
```

Entering name of site (plant) which appears on first page of display.
Each dash can be replaced, using + and – keys, by a letter of the alphabet (A ... Z) or by a digit (0 ... 9). The -> key serves to position the cursor.

17.4 Display measurements

20.6
```
Des Amb  T:21.0c
Act Amb  T:21.0c
```

The controller displays all the values measured by the detectors and the data whichs erves to monitor the operational status of the plant :

• **ambient temperature** *requested* by current mode and *actual* measured by detector B3. If detector B3 is not connected, there will appear *Act Amb T :- - - - c* .

20.7
```
Des Flow T:65.0c
Act Flow T:64.0c
```

•**flow temperature** *requested* by current mode and *actual* measured by detector B1.

20.8
```
Outside temp
Actual  :-02.0c
```

• *actual* **outside temperature**. If detector B2 is not connected to controller, in place of "*actual*" will appear "*C-Ring* " and value is that coming via C-Ring.

20.9
```
DHW   D :50.0c
DHW   A :58.0c
```

• **DHW temperature** *requested* by current mode and *actual* measured by detector B5. If detector B5 not connected there will appear *DHW A :- - - - c.*

20.10
```
DesBoilerT:70.0c
ActBoilerT:67.0c
```

• **Boiler temperature** *requested* by current mode and *actual* measured by detector B4. If detector B4 not connected there will appear *ActBoilerT :- - - - c.*

17.5 Signalling of alarm situations

The controller processes three alarms for faultly operation :
- *real time clock alarm* = Signalled by a LED (fig. 6.9) on the facia. Indicates that the real time clock inside the controller is defective .
- *C- Ring alarm* = Signalled by a LED (fig. 6.10) on the facia. Indicates that C-Ring is faultly.
- *fault alarm* = Signalled by a LED (fig. 6.11) on the facia. Indicates that the controller microprocessor is defective.

18. COMMISSIONING PLANT

Testing to be carried out on completion and testing of installation, wiring and configuration.

18.1 Testing C-Ring

26.1
```
CRing connection
YES
```

The page of C-Ring testing appears only if configured "YES" in

Ensure that all the other controllers wired in C-Ring are :

27.1
```
CRing:??
```

– correctly powered by mains voltage (230 V ~)

– Slave controllers or configured as SECONDARIES in
```
CRing connection
SECONDARY
```

– selected on testing page
```
CRing:??
```

The "PRIMARY" controller sends via C-Ring a signal every five seconds ; on all the displays appears "??". If the connection is correct "OK" replaces "??" on all the displays. If on one or more displays "OK" does not appear, this indicates that there is a wiring or controller fault between the last controller with "OK" and the first with "??" .
Examples of testing a C-Ring circuit with four controllers :
– Cont1 "OK" – Cont2 "OK" – Cont3 "OK" – Cont4 "OK" : *C-Ring OK*
– Cont1 "??" – Cont2 "OK" – Cont3 "OK" – Cont4 "OK" : *C-Ring faulty between 4 and 1*
– Cont1 "??" – Cont2 "OK" – Cont3 "??" – Cont4 "??" : *C-Ring faulty between 2 and 3*
– Cont1 "??" – Cont2 "??" – Cont3 "??" – Cont4 "??" : *C-Ring faulty between 1 and 2*

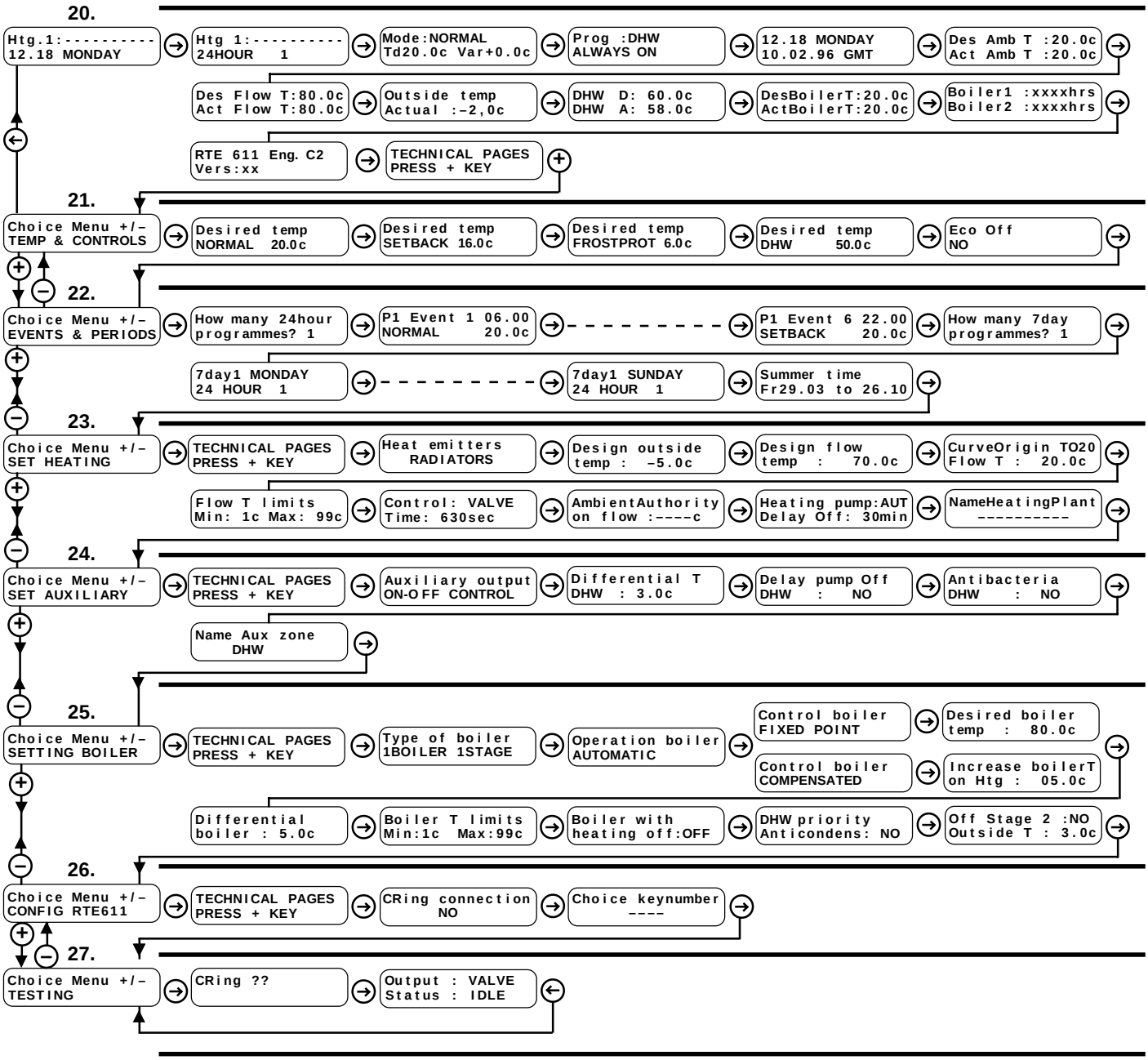
18.2 Testing output

27.2
```
Output:VALVE
Status:CLOSED
```

Using + and – keys, choose :
- •output to be tested :
  - – *VALVE;*
  - – *PUMP;*
  - – *AUXILIARY*
  - – *BOILER 1;*
  - – *BOILER 2.*
- • the status :
  - – with VALVE : IDLE ; CLOSES ; OPENS
  - – with PUMP, AUXILIARY, BOILER 1, BOILER 2 : ON or OFF

Check the results.

19. SEQUENCE OF DISPLAY PAGES (the data and the functions are those in memory at time of delivery)



Keys for scrolling the pages on the display and positioning the cursor z on the data which can be changed.
The data which can be changed, in the following descriptive list of display pages, are highlighted thus
By pressing these keys at the same time (or in any event after 15 minutes) the first page appears on the display.

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

Keys for : - changing the values highlighted by the cursor z
– viewing the configuration options of a function, for example :
– passing directly from one menu (series of pages) to another.

Heat emitters
FAN-COIL
or
Heat emitters
PANELS

20. NORMAL USE

Ref.	Display	Description	Notes	Sect
20.1	Htg:---------- 12.18 MONDAY	Name (site) plant Current time & day	Set in **23.9** Set in **20.5**	
20.2	Htg:---------- 24HOUR 1	Choice current programme : *7DAY 1-2* ; *24HOUR 1…7; NORMAL; SETBACK; FROSTPROT; OFF*.	Instead of programme can appear : *REMOTE NORMAL; REMOTE SETBACK; REMOTE FROSTPROT; REMOTE OFF*; *REMOTE +2C*.	**14.9**
20.3	Mode :NORMAL Td20.0c Var+0.0c	Current mode. *Td* : Temperature required by mode. *Var* : Variation in desired temp. (max + 3 °C)	Current mode : *NORMAL; SETBACK; FROSTPROT; OFF*; *ECO PLANT; ECO P+B.*	**14.10**
20.4	Prog DHW ALWAYS ON	Choice programme auxiliary zone (DHW) : *7DAY 1-2; 24HOUR 1…7; ALWAYS ON; ALWAYS OFF*.		**15.3**
20.5	12.18 MONDAY 10.02.96 GMT	Setting : Time, day of week and date. Current time : GMT or BST	Dates BST set in **22.16**.	
20.6	Des Amb T:20.0c Act Amb T:80.0c	Ambient temp. required by current mode. Temp. measured by ambient detector B3.		**17.4**
20.7	Des Flow T:80.0c Act Flow T:80.0c	Flow temp. required by current mode. Temp. measured by flow detector B1.		**17.4**
20.8	Outside temp Actual :– 2.0c	*Actual* outside temperature measured, by B2 or coming from *C- Ring* .	If outside detector B2 not connected & value comes from C- Ring, *Acual* is replaced by *C Ring* .	**17.4**
20.9	DHW :60.0c DHW :58.0c	Desired DHW temperature. Temp. measured by DHW detector B5.	Appears only if in **24.1** choice is "*ON-OFF CONTROL*".	**17.4**
20.10	DesBoilerT:60.0c ActBoilerT:58.0c	Desired boiler temperature. Temp. measured by DHW detector B4.		**17.4**
20.11	Boiler1:xxxx hrs Boiler2:xxxx hrs	Operating hours boiler 1 or stage 1. Operating hours boiler 2 or stage 2.	Press + and – together to cancel values.	**13.10**
20.12	RTE 611 Eng. C2 Vers.xx	Identifying data of controller.		

21. TEMPERATURES & CONTROLS

Ref.	Display	Description	Notes	Sect
21.1	Desired temp NORMAL 20.0c	Value of desired NORMAL ambient temperature to be used in 24-hour programmes in **22.2**.		**14.4**
21.2	Desired temp SETBACK 16.0c	Value of desired SETBACK ambient temperature to be used in 24-hour programmes in **22.2**.		**14.4**
21.3	Desired temp FROSTPROT 6.0c	Value of desired FROSTPROT ambient temperature to be used in 24-hour programmes in **22.2**.		**14.4**
21.4	Desired temp DHW 50.0c	Value of desired DHW temperature.	Appears only if in **24.1** "*ON - OFF control*" is chosen	**15.1**
21.5	Eco Off NO	Eco Off : NO ; ECO PLANT; *P +B*	In Normal or Setback modes : • *Eco Off : ON =* actual outside temp. ≥ desired ambient temp., valve closed, heating pump Off and (if scheduled) boiler Off. • *Eco Off : OFF =* actual outside temp. < desired ambient temp.	**13.8**

22. EVENTS & PERIODS

Ref.	Display	Description	Notes	Sect
22.1	How many 24hour programmes ? 1	Value of desired SETBACK ambient temperature to be used in 24-hour programmes in (1…7).	Avoids unnecesary scrolling of display pages.	**16.1**
22.2 ⇓ ⇓ 22.7	P1 Event 1 06.00 NORMAL 3 21.0c P1 Event 6 22.00 SETBACK 16.0c	Number of programme, number of event & time of start event in programme Choice of programme for each day of week *NORMAL ; SETBACK ; FROSTPROT; OFF*. **Further groups of 6 pages according number in 22.1**	Max. 6 events. To cancel an unused event press + & – keys together : there will appear **- - - -** Events must be in increasing order. Do not leave **- - - -** between programmed events.	**16.1**
22.8	How many 7day programmes ? 0	Choice of number of 7-day programmes to be used (1- 2).	Avoids unnecesary scrolling of display pages.	**16.2**
22.9 ⇓ ⇓ 22.15	7day 1 MONDAY 24HOUR 1 7day 1 SUNDAY 24HOUR 1	Choice of programme for each day of week : *24HOUR 1…7 ; NORMAL; SETBACK; FROSTPROT; OFF*.	Appears only if in **28.1** number is greater than 0.	**16.2**
22.16	Summer time Fr 29.03 to 26.10	Dates of start and end of summer time period.		**16.3**

23. SET HEATING

Ref.	Display	Description	Notes	Sect
23.1	Heat emitters RADIATORS	Choice type heat emitters : *RADIATORS; PANELS; FAN COILS.*		14.1
23.2	Design outside temp :– 5.0c	Value of design outside temp. for compensated control.		14.2
23.3	Design flow temp : 70.0c	Value of design flow temp. for compensated control.		14.2
23.4	CurveOrigin TO20 FLOW T : 20.0c	Correction of heating curve origin.		14.3
23.5	Flow T limits Min: 1c Max:99c	Minimum & maximum flow temp. limits.		14.5
23.6	Control: VALVE Time : 630sec	Actuator run time		14.6
23.7	AmbientAuthority on FLOW :----c	Ambient authority. Variation in ± °C of flow temp. with ± 1 °C difference in ambient temp.	Appears only if ambient detector B3 is connected and configured.	14.7
23.8	Heating pump:AUT Delay Off:30min	Control of plant pump : *MAN ; AUT.* Delay in switching off pump.	*MAN:* always on; *AUT:* On with event times of current programme.	14.12
23.9	NameHeatingPlant ----------	Entering name of plant	Use + and – keys to enter letters or numbers. Use ← and → keys to position cursor.	17.3

24. SETTING AUXILIARY ZONE

Ref.	Display	Description	Notes	Sect
24.1	Auxiliary output ON-OFF CONTROL	Choice of type of use for auxiliary output : *ON - OFF CONTROL ; TIME SWITCH*	*ON-OFF CONTROL* = On-Off type control of auxiliary zone in relation to desired temp. & timed events programmed. *TIME SWITCH* = control auxiliary output timed events.	15.
24.2	Differential DHW 3.0c	Value of differential for control pump.	Appears only if in **24.1** On- Off is entered.	15.2
24.3	Delay pump Off DHW :NO	Delay switching off pump.	Appears only if in **24.1** On- Off is entered. *NO:* without delay ; *YES:* five minutes delay.	15.5
24.4	Antibacteria DHW :NO	Value of differential for control pump. Enabling of antibacteria function : *NO; YES.*	Appears only if in **24.1** On- Off is entered. *NO:* antibacteria function excluded *YES:* every Wednesday at 12 noon DHW temperature is raised to 70 °C.	15.6
24.5	Name Aux zone DHW	Entering name of auxiliary zone. Appears in all display pages regarding auxiliary zone.	Use + and – keys for entering letters or numbers. Use ← and → keys to position cursor.	15.7

25. SET BOILER

Ref.	Display	Description	Notes	Sect
25.1	Type of boiler 1BOILER 1STAGE	Choice of type of boiler(s) controlled : *1BOILER 1STAGE; 1BOILER 2 STAGES* *2 BOILERS IN SEQU.*		13.1
25.2	Operation boiler AUTOMATIC	Boiler operational mode : *ALWAYS ON; AUTOMATIC;* *SET SEQUENCE 1-2; SET SEQUENCE 2-1;* *AUTOMAT, SEQUENCE; ALWAYS ON.*	*ALWAyS ON:* Boilers piloted by own thermostats. *AUTOMATIC:* boilers piloted by controller. If in **25.1** *2 BOILERS IN SEQU* entered, there will also appear : *SET SEQUENCE 1-2:* controller pilots boilers keeping sequence 1 - 2; *SET SEQUENCE 2-1:* controller pilots boilers keeping sequence 2 - 1; *AUTOMAT SEQUENCE:* controller pilots boilers inverting sequence every 100 hours.	13.2
25.3	Control boiler FIXED POINT	Choice type control of boiler(s). *FIXED POINT; COMPENSATED.*	*COMPENSATED:* The temperature calculated for boilers follows maximum desired for heating zone ; or of a zone connected in C- Ring increased by ΔT set in **25.5**.	13.4
25.4	Desired boiler temp : 80.0c	Value of desired boiler temperature.		13.4
	Increase boilerT on Heating: 5.0c	Value of desired increase in boiler temp. in temp.in respect max. temprequested by zone	Appears if in **25.3** *COMPENSATED* is entered	13.5
25.5	Differential boiler : 5.0c	Value of temperature differential for On-Off control of burner or stage.		13.3

25. SET BOILER

Ref.	Display	Description	Notes	Sect.
25.6	**Boiler T limits** **Min: 1c Max:99c**	Minimum & maximum boiler flow temperature limits	Appears if in **25.3** *COMPENSATED* is set	**13.6**
25.7	**Boiler with heating Off:OFF**	Operation of boiler with heating mode off: *OFF; ON*	*OFF:* with heating in Off mode boilers switch off and switch on at request of DHW or external controllers. *ON:* with heating in Off mode boilers remain On.	**13.7**
25.8	**DHW priority Anticondensa:NO**	Enabling of priority function auxiliary zone and anticondensing	*NO:* function excluded. *YES:* If temp. boiler B4 ≤ 3 x ΔT boiler (set in **25.5**) controller closes heating valve with modulating action.	**17.1**
25.9	**Off Stage 2: NO** **T.Outside: 3.0c**	Enabling of switching off function of 2nd boiler or 2nd stage at value of external temp. set.	Appears if in **25.1** is set *1BOILER 2 STAGE or 2 BOILERS IN SEQU.*	**13.9**

26. CONFIGURATION RTE 611

Ref.	Display	Description	Notes	Sect
26.1	**CRing connection** **NO**	*NO* : not connected in C- Ring. *YES*: Connected as Primary.		**11.1**
26.2	**Choice Keynumber** **----**	Choice keynumber to prevent use + and – keys. – *1901 ... 1999*	To eliminate keynumber press + and – keys together.	**17.2**

27. TESTING

Ref.	Display	Description	Notes	Sect
27.1	**CRing:??**	Page of testing C- Ring connections. *??*= C- Ring test in progress or test fails. *YES* = test OK	Appears only if in **26.1** *YES is entered.*	**18.1**
27.2	**Output:VALVE** **Status:IDLE**	Choice outputs to be tested. Choice status of output.	Choice output : *VALVE*; *PUMP*; *AUXILIARY; BOILER 1; BOILER 2.* Choice status: With VALVE : *IDLE*; *CLOSES*; *OPENS*. With PUMP, AUXILIARY; BOILER 1; BOILER 2: *ON*; *OFF*.	**18.2**

LB 09.12.04; Rev.: LB 03.10.05

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D 33102