HEAT METERING UNITS

C ←BUS

UCR 668 C1 Eng.

- **Measures consumption using the compensated hours method (UNI / TR 11388)**
- **14 inputs for metering times in use:**
  - Total metering of effective and compensated hours
  - Seasonal metering of effective and compensated hours
- **Historic recording of a year's metering**
- **On-Off control plant pump in relation to plant demands**
- **Control plant valve for boosting by manual control**
- **Communication systems:**
  - **C-Bus** for telemanagement;
- **Power supply 230 V~; DIN rail mounting**

CE

1. APPLICATION

UCR 668 is a microprocessor-based device for metering the consumptions of individual consumers (max 14) in central heating plants:
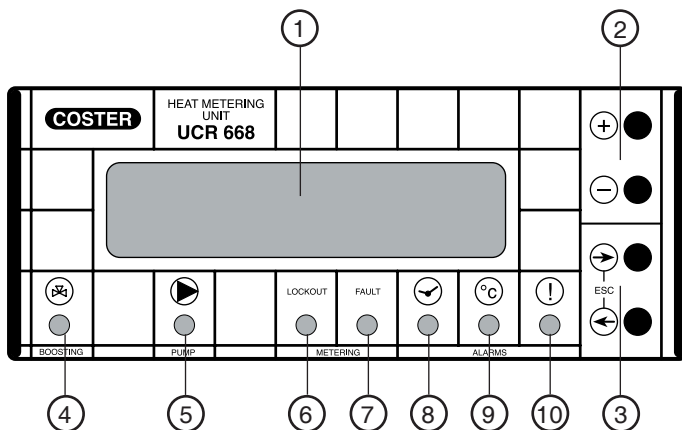- Vertical distribution with a shut-off valve for each radiator;
- Horizontal distribution with a zone valve for each consumer.

## 2. FUNCTIONS

The main functions are:
- Metering operating times as:
  - total effective and seasonal hours;
  - hours compensated in relation to total and seasonal flow temperature.
- Recording of events (tests, tampering or faults) of the flat-located control units (ICS 6..) :
  - date and time of start event for each local command unit;
  - date and time of end event for each local command unit.
- Stored in a data logger all the recordings made for a year.
- Auxiliary On-Off switch to control plant according to heat demand from flats.
- Control opening valve for compensated by boosting by manual control.
- Input to stop metering (pump idle or fault in boiler plant.
- Control for external signalling of fault in the local control units.
- Alarm for short or open detector circuit and for fault in controllers, etc.
- Simulation of operation for testing electrical connections when commissioning.
- Option of connecting in C-Bus for telemanagement by central PC and/or local PCs.

3.FACIA

1 – Alphanumeric display
2 – + and – keys
3 – ← and → keys
   Warning LEDs :
4 – Boosting heating
5 – Heating pump
6 – Block metering
7 – Fault metering
8 – Timer alarm
9 – Measurements alarms
10 – Unit fault alarm

4. OVERALL DIMENSIONS
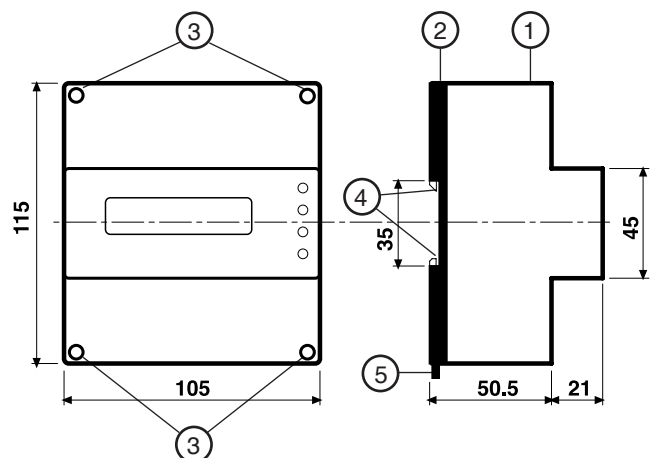
1 – Protective cover for electronic components
2 – Base with transformer, relay and terminal blocks
3 – Screws for securing base and cover
4 – DIN rail securing elements
5 – DIN rail release lever

COSTER

5. TECHNICAL DATA (default values 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 standards	Italian Electrotech. Committee (CEI)
Data storage in memory	5 years
Software	Class A

• Mechanical
Case	DIN 6E module
Mounting	on DIN 35 rail

Materials:
Base	NYLON
Cover	ABS

Ambient temperature:	
Operating	0 … 45 °C
Storage	− 25 … + 60 °C
Ambient humidity	Class F DIN 40040
Weight	0.5 kg

• Measurement ranges
Temperature flow heating	0 … 99.5 °C
Number metering inputs	1…14
Total metering heating	99,999 hours
Partial metering heating	9,999 hours

• Setting ranges
Maximum flow temperature	1 … **80** … 99 °C
Minimum flow temperature	1 … **25** … 99 °C
Boosting time heating	0 … **1** … 99 hours
Delay switching off pump	0 … **30** … 240 min

• Setting ranges telemanagement (setting by PC)
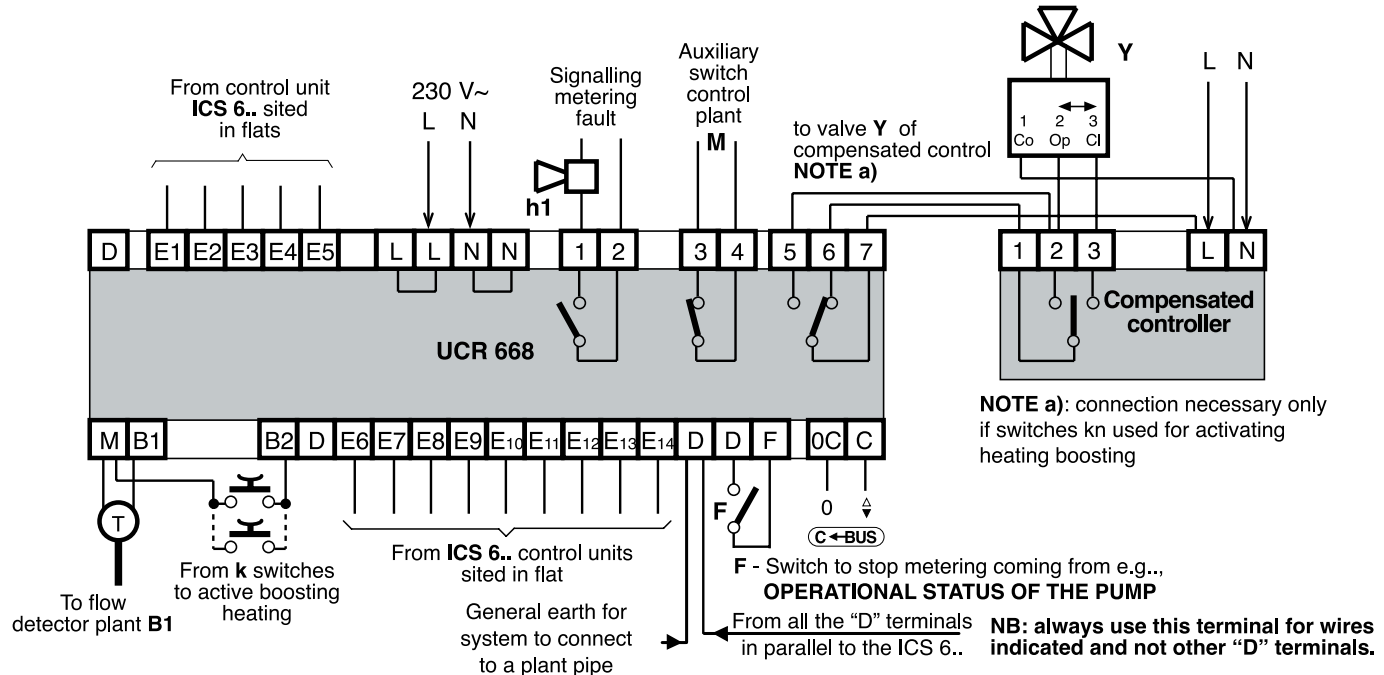|	
Telemanagement password	**0** … 65535
Attempts to send alarms	1 … **5** … 255
Interval between alarm calls	2 … **10** … 255 min

In the presence of electrical disturbances the output controls of the controller may change status but this will automatically return to normal.

6. ACCESSORIES

No.	Description	Type	Sensing element	Code	Data sheet
1	Immersion-type flow temperature detector (0 … 99 °C)	**SIH 010**	NTC 10 kΩ	B1	–

7. WIRING DIAGRAMS

7.1 Wiring diagram with UCR 668 connected to ICS 6… ("THERMSHARE" system)

NOTE a): connection necessary only if switches kn used for activating heating boosting

F - Switch to stop metering coming from e.g.., **OPERATIONAL STATUS OF THE PUMP**

From all the "D" terminals in parallel to the ICS 6.. **NB: always use this terminal for wires indicated and not other "D" terminals.**

7.1 Wiring diagram with UCR 668 connected directly to the end of run of the zone valves (valve open = switch closed)
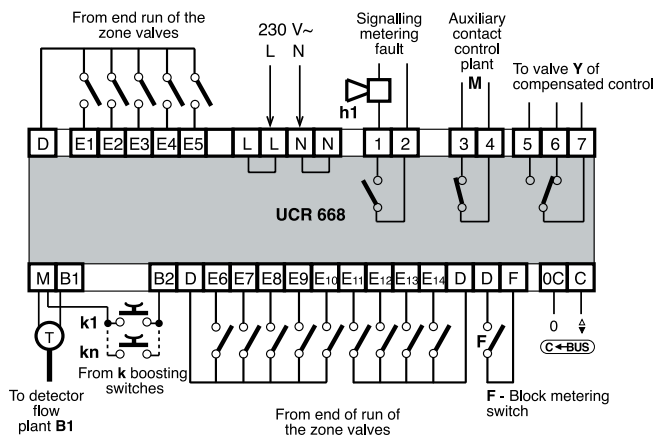
8. WIRING

Proceed as follows :
- Separate base and cover
- Mount base on DIN rail and check that the securing elements (4.4) hold it tightly.
- Eseguire i collegamenti elettrici come da schema rispettando le normative vigenti e usando conduttori da :
  – two cables minimum 1.5 mm^2 cross section for power supply from 230 V~ domestic supply.
  – two cables minimum 0.5 mm^2 cross section for site flow sensor..
  – one cable 1.5 mm^2 cross section for connection to earth consisting of any metallic pipe of the heating site (dotted line), to be used only if electrical continuity from the heating site to earth is guaranteed.
  – one cable for upper floors of building 2 x 1.5 mm^2 minimum cross section (for distances of 1 to 50 metres) and 2 x 2.5 mm^2 cross section (for distances of 50 to 100 metres) deriving from terminals L/N or 0/24 volts towards the ICS 6… devices control unit to the UCR or UCA units, or directly from the thermostats or from the end-of-runs of the zone valves.
  – one cable 1.5 mm^2 minimum cross section (for distances from 1 to 50 meters), and 2 x 2.5 mm^2 cross section (for distances of 50 to 100 metres) deriving from the earth terminal "D" of the ICS 6.. control unit.
  – 1 to 14 cables 0.75 mm^2 minimum cross section (for distances from 1 to 50 meters); or a cable 1.5 mm^2 cross section for distances from 50 to100 meters. Connections from the ICS 6….
  – For C-Bus refer to Technical Data Sheet T 021.
- Switch on power (230 V~) and check its presence at terminals L and N.
- Switch off power, replace cover on base/terminal block and secure it with the four screws provided (4.3).

To facilitate the calculation of the total power supply or for groups, see the table in section 8.1.

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

8.1 Table of cable cross-sections for THERMSHARE system

Description	Power supply terminals	Controllers	CROSS-SECTION Distance from 1 to 50 meters	CROSS-SECTION Distance > 50 meters
Cable rising to floors	Power supply 24 V or 230 V~ - Terminals **L/N or 0/24 ~**	From **UCR 668** to **ICS …**	1.5 mm^2	2.5 mm^2
System earth cable	Earth - **D** Terminals	From **UCR 668** to **ICS …**	1.5 mm^2	2.5 mm^2
Cable for metering unit	Signalling metering pulses Terminals **E** from **1** to **14** or from total number of users or zones	From **UCR 668** to **ICS …**	0.75 mm^2	1.5 mm^2

8.2 Table for sizing of transformers for THERMSHARE system
Example: 14 users; for each user 1 ICS 618 + 9 CDR 061 making a total of 10 devices

Number user devices		Unit absorption devices VA	Total absorption per user		Number users	Total absorption of site VA
10	x	3	= 30	x	14	= 420

9. SITING CONTROLLERS

9.1 Metering unit

The metering unit must be sited in a dry location that respects the relevant ambiental conditions given under Technical Data. If sited in a location classified as "Hazardous" it must be installed in a cabinet for electrical equipment constructed according to the current regulations for the class of danger involved.
The metering unit can be installed on a DIN rail or in DIN modular units. If possible it should be installed in a space in the block serving all the flats (e.g. utility room near the boiler plant).

9.2 Flow temperature detector B1

With the plant pump on flow, the detector should be installed downstream of the pump; if the pump is on the return it should be installed at least 1.5 meters downstream of the control valve.

10. COMMUNICATION

10.1 C-Bus communication for Telemanagement (for details please see Data Sheet T 021)

By means of the C-Bus output UCR 668 can be telemanaged - two-way communication of data with one or more local PCs and/or a remote central control via telephone land lines.
From the PC(s) you can :
– see displayed and/or modify the data and values set on the display pages of the controller and the configuration data dedicated exclusively to telemanagement (see "Technical Data");
– receive alarms coming from the plant;
– read the measurements of the temperature detectors;
– read all the values recorded by the controller (partial meterings, total meterings, recordings of events, etc).

10.2 C-Bus electrical connections
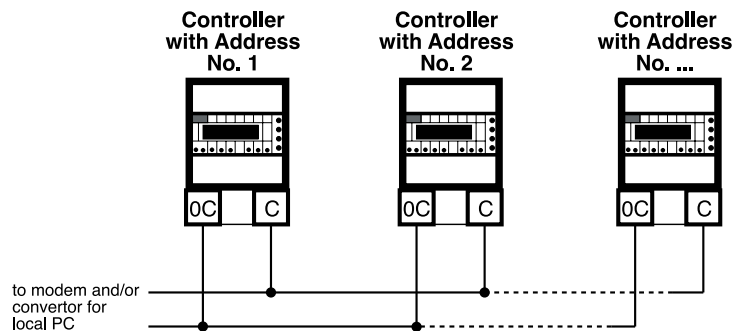
10.3 Address for telemanagement

21.7

```
Address:      –
Group   :      –
```

Under telemanagement, the controllers, in order to be identified by the central PC and/or by the local PCs, must have a progressive address number.
If required, the controllers can be organized into groups according to certain shared characteristics (e.g. geographical location, type of building e.g. school, hospital).

Note:

When telemanagement is not scheduled, leave the address in memory (–).
To cancel the values keep + and – keys pressed at the same time.

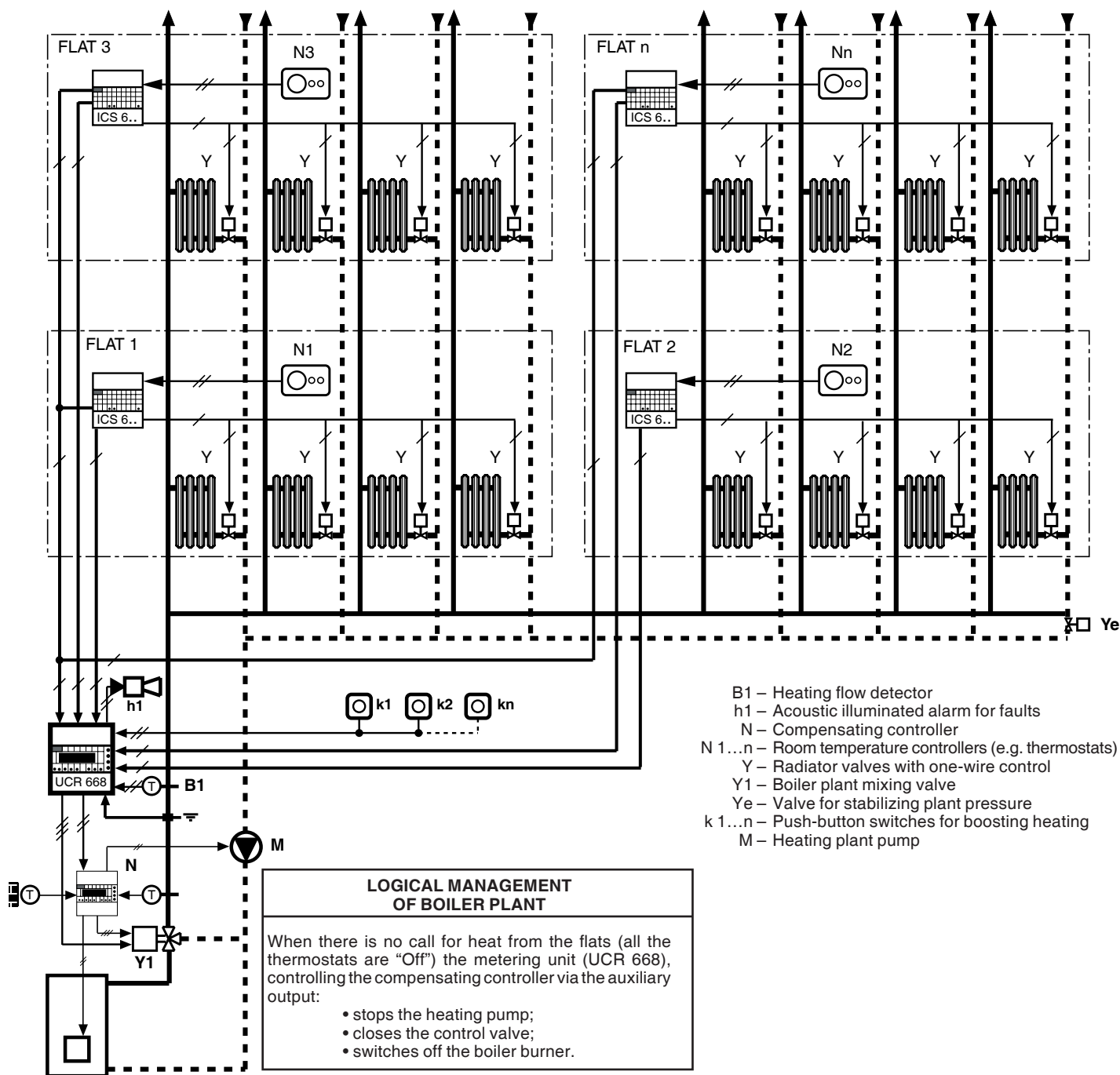### 10.4 Sending alarms

21.6

```
Send  Alarms:NO
PassWTeleman:NO
```

• **Send alarms** : NO = alarms not sent.
                      YES = alarms sent to central PC and shown by momentaryappearance of word "ALARM" on display
• **PassWTeleman** : NO = password not entered.
                       YES = password enabled.

11. EXAMPLE OF INSTALLATIONS

11.1 "THERMSHARE": Installation with rising columns and one-wire control radiator valves.

B1 – Heating flow detector
h1 – Acoustic illuminated alarm for faults
N – Compensating controller
N 1…n – Room temperature controllers (e.g. thermostats)
Y – Radiator valves with one-wire control
Y1 – Boiler plant mixing valve
Ye – Valve for stabilizing plant pressure
k 1…n – Push-button switches for boosting heating
M – Heating plant pump

**LOGICAL MANAGEMENT
OF BOILER PLANT**

When there is no call for heat from the flats (all the thermostats are "Off") the metering unit (UCR 668), controlling the compensating controller via the auxiliary output:

- stops the heating pump;
- closes the control valve;
- switches off the boiler burner.

Configuration of UCR 668 for the application descibed above.

1) `21.2` `Flat number` `Fr:001 to:004` — Numbering of flats connected (remember that for each UCR 668 up to 14 can be connected). Warning! This numbering has to correspond to the respective flat codes.

2) `21.3` `Input meters` `CODED` — UCR 668 connected to a control unit ICS 6.. from which it receives coded metering signals.

3) `21.4` `Flow T detector` `CONNECTED` — Detector B1 connected to flow of heating plant.

4) `20.6` `Aux : AUTOMATIC` `DelayOn:xxOff:xx` — Plant pump "M" is controlled automatically by UCR 668 according to heat demand from flats.

11.2 TRADITIONAL ZONE INSTALLATION with local control by thermostat and centralized metering

B1 – Heating flow detector
h1 – Acoustic illuminated alarm for faults
N – Compensating controller
N 1…n – Room temperature controllers (e.g. thermostats)
Y – Zone valves
Y1 – Boiler plant mixing valve
Ye – Valve for stabilizing plant pressure
k 1…n – Push-button switches for boosting heating
M – Heating plant pump

**LOGICAL MANAGEMENT
OF BOILER PLANT**

When there is no call for heat from the flats (all the thermostats are "Off") the metering unit (UCR 668), which controls compensating controller via auxiliary output:
- stops the heating pump;
- closes the control valve;
- switches off the boiler burner.

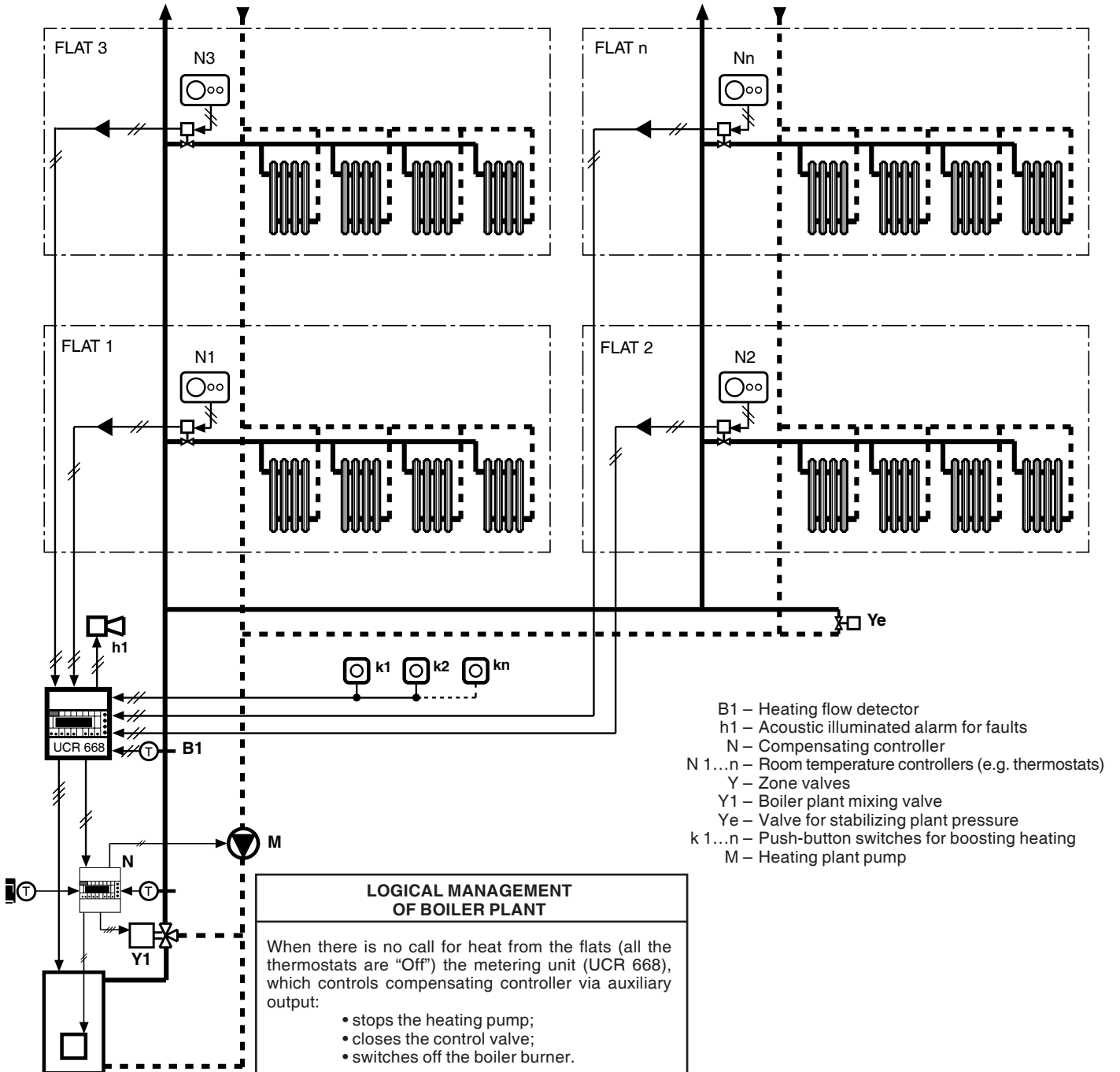**Configuration of UCR 668 for the application described above.**

1)
21.2
```
Flat number
Fr: 001 to: 004
```
Numbering of flats connected (remember that for each UCR 668 up to 14 can be connected). Warning! This numbering has to correspond to the respective flat codes.

2)
21.3
```
Input meters
ON-OFF
```
UCR 668 connected directly to room thermostats from which it receives On-Off metering signals.
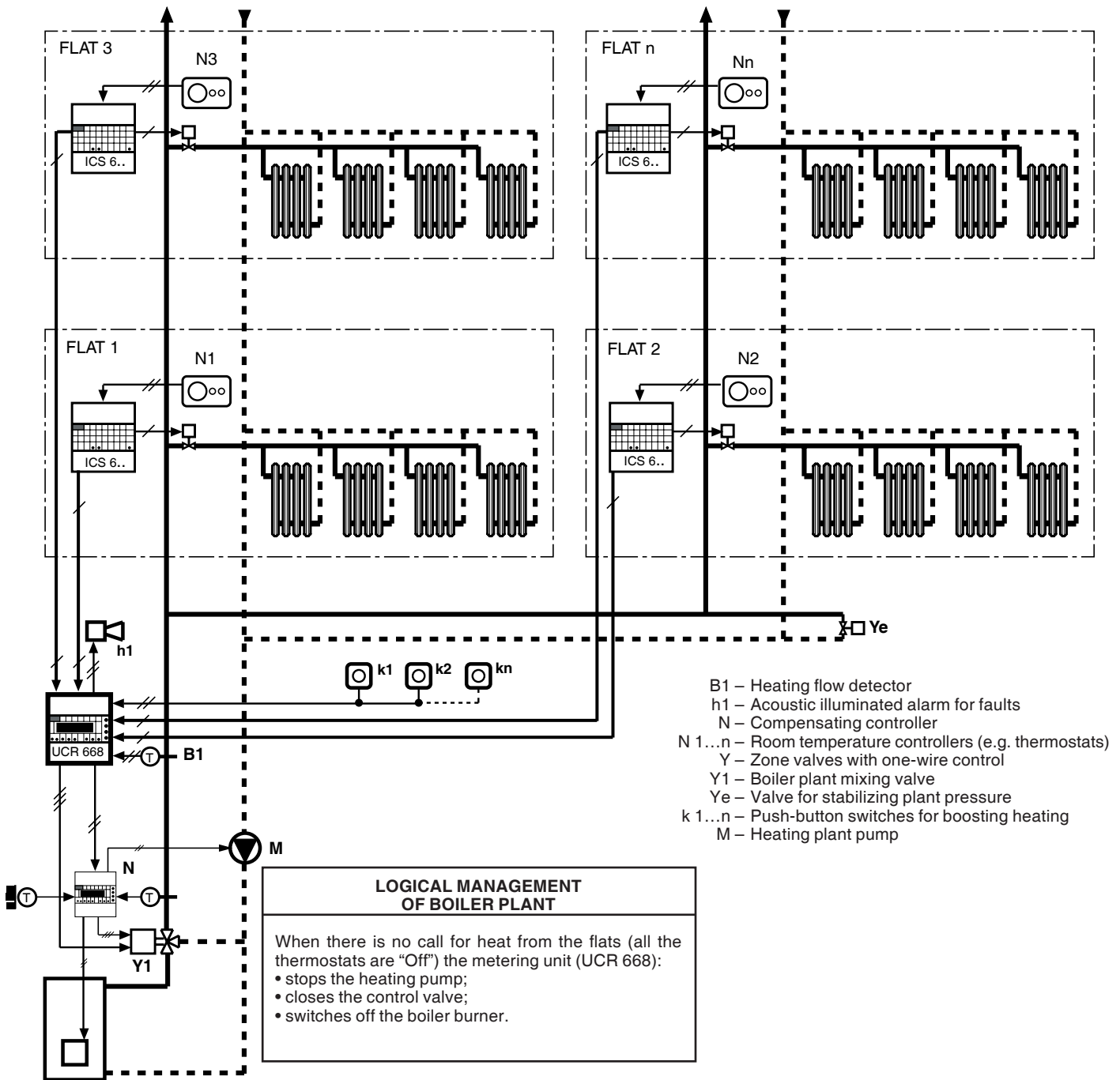
3)
21.4
```
Flow T detector
CONNECTED
```
Detector B1 connected to flow of heating plant. .

4)
20.6
```
Aux : AUTOMATIC
DelayOn:xxOff:xx
```
Plant pump "M" is controlled automatically by UCR 668 according to heat demand from flats.

11.3 TRADITIONAL ZONED PLANT WITH SAFETY CONTROL

B1 – Heating flow detector
h1 – Acoustic illuminated alarm for faults
N – Compensating controller
N 1…n – Room temperature controllers (e.g. thermostats)
Y – Zone valves with one-wire control
Y1 – Boiler plant mixing valve
Ye – Valve for stabilizing plant pressure
k 1…n – Push-button switches for boosting heating
M – Heating plant pump

**LOGICAL MANAGEMENT
OF BOILER PLANT**

When there is no call for heat from the flats (all the thermostats are "Off") the metering unit (UCR 668):
• stops the heating pump;
• closes the control valve;
• switches off the boiler burner.

Configuration of UCR 668 for the application described above.

1) | **21.2** Flat number Fr:001 to:004 | Numbering of flats connected (remember that for each UCR 668 up to 14 can be connected). Warning! This numbering has to correspond to the respective flat codes.

2) | **21.3** Input meters CODED | UCR 668 connected to ICS.18 control unit from which it receives coded metering signals.

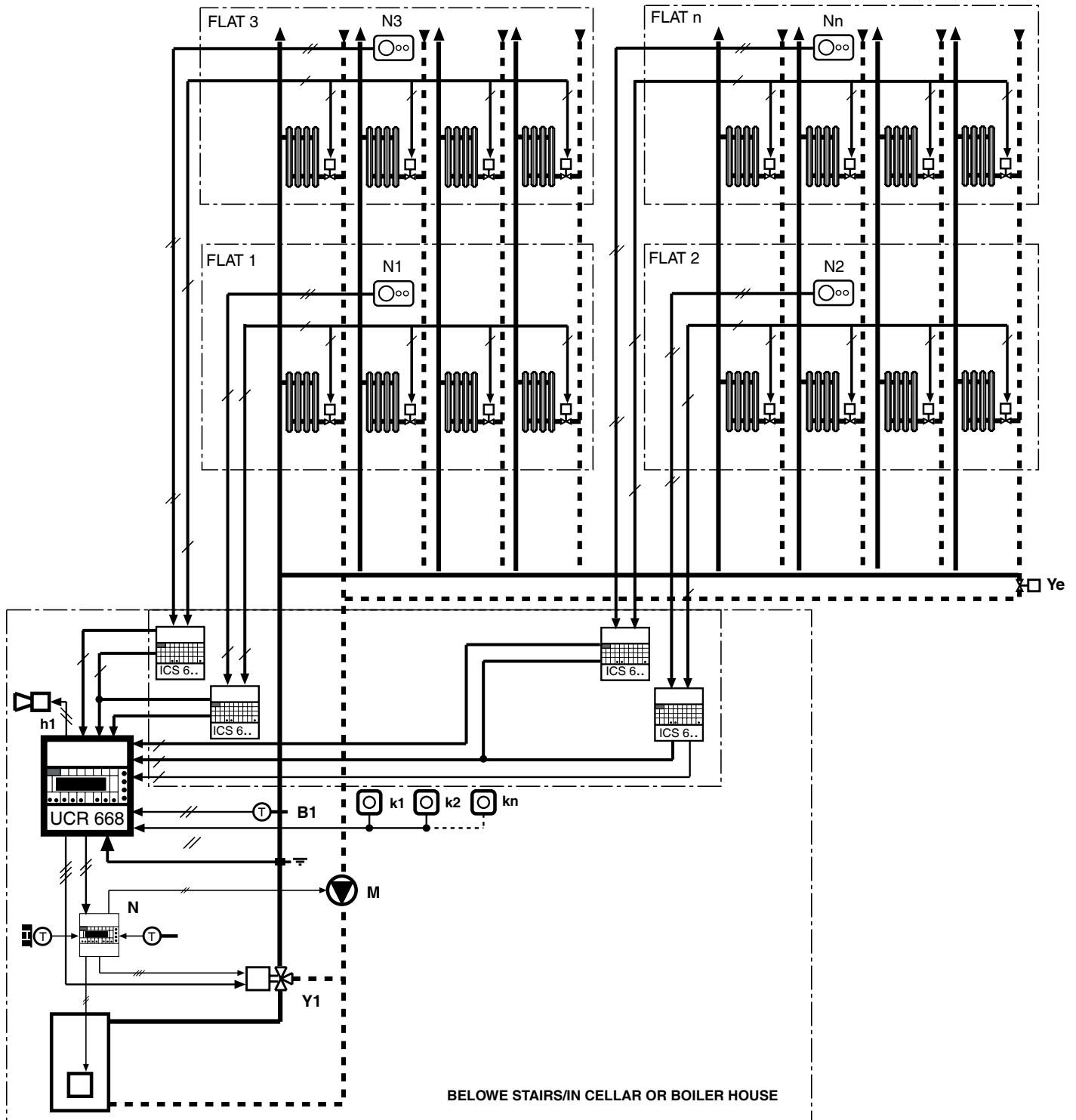**3)** | **21.4** Flow T detector CONNECTED | Detector B1 connected to flow of heating plant.

4) | **20.6** Aux : AUTOMATIC DelayOn:xxOff:xx | Plant pump "M" is controlled automatically by UCR 668 according to heat demand from flats.

11.4 TRADITIONAL ZONED PLANT WITH SAFETY CONTROL
siting switchboards below stairs/in cellar or in boiler house

Configuration of UCR 668 for the application described above.

1) **21.2**
| Flat number Fr:001 to:004 | Numbering of flats connected (remember that for each UCR 668 up to 14 can be connected). Warning! This numbering has to correspond to the respective flat codes. |

2) **21.3**
| Input meters CODED | UCR 668 connected to ICS.18 control unit from which it receives coded metering signals. |

3) **21.4**
| Flow T detector CONNECTED | Detector B1 connected to flow of heating plant. |

4) **20.6**
| Aux : AUTOMATIC DelayOn:xxOff:xx | Plant pump "M" is controlled automatically by UCR 668 according to heat demand from flats. |

12. OPERATION

UCR 668 is a metering unit that measures heat consumption so that its cost can be shared among 14 zones.

12.1 Flat code

21.2

```
Flat code
Fr:xxx to:xxx
```

This is the code on which is based the whole system of metering and allocation of costs.
If this number is not correct all subsequent calculations will be affected so it is essential that no errors are made when assigning this flat or zone code.
In the "PREPARATORY WORK FORM", page 2, point 1, the significance of "flat or zone code" is explained in detail.
Since the metering unit can handle a maximum of 14 flats or zones (there are 14 inputs E1…E14) it is necessary to use more than one UCR 668 when the number of flats or zones exceeds this number. In this event, it is necessary, for each UCR 668, to enter the first and last code numbers of the flats connected to it so as to create a corresponding readout on the display.

Example: three UCR 668 units with a total of 32 flats:

1st Unit; Flats from No.1 to No.14

21.2
```
Flat code
Fr:001 to:014
```

Flat 1 : connected to D-E1; Flat 2: connected to D-E2 ; …………………… ; Flat. 14 : connected to D-E14

2nd unit; Flats from No.15 to No. 28

21.2
```
Flat code
Fr:015 to:028
```

Flat. 15 : connected to D-E1 ; Flat. 16 : connected to D-E2 ; ………………...; Flat. 28 : connected to D-E14

3rd Unit : Flats from No. 29 to No. 32

21.2
```
Flat code
Fr:029 to:032
```

Flat 29 : connected to D-E1 ; Flat 30 : connected to D-E2 ; Flat 31 : connected to D-E3 ; Flat 32 : connected to D-E4.

12.2 Method of metering

UCR 668 is able to meter:

• **"HEAT CONSUMPTION" :** also called in standards seasonal "compensated hours" after the season start date set as desired, and totals, for "Thermshare" flats or radiators.
Heat consumption is calculated in the following way:

It is first necessary to establish

20.3
```
Design flow
temp      :80.0
```

the design flow temperature is the temperature which the radiators must reach when the outside temperature is the design minimum. In Milan, for example, the minimum outside temperature is - 5°C and the design flow for radiators is 80°C; if the minimum were different a different value would be set.
Even if the value set is not exact, its influence on the total calculation is small because this value is the same for all the flats.

Next it is necessary to establish:

20.4
```
Flow temperature
Minimum Off:25.0
```

this Minimum flow "Off" temp. is the temperature at which the radiators give out practically no heat to the room.
In this example the minimum flow temperature is set at 25°C, a reasonable value below which the radiators no longer give out heat.
The calorie consumption (**Cc**) is obtained as follows:

$$Cc = \text{time On} \quad x \quad \frac{\textbf{actual flow temperature} - 25}{80 - 25}$$

time On = actual time in which the thermostat in the flat calls for heat;
actual flow temp. = flow temperature of plant (radiators) measured by detector B1
Example:
When temperature B1 is equal to or above 80 °C
1 hour of metering = 1 hour compensated
When temperature B1 is equal to or below 25°C
1 hour of metering = 0 hours compensated
When temperature B1 is equal to 52.5°C
1 hour of metering = 1/2 hour compensated

The graph of this formula is :
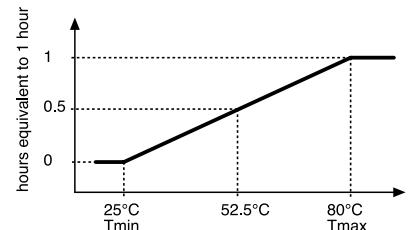
In practice, at the end of the season, the heat consumption is equal to all the hours in which the heating plant of the single flat has been On (thermostat On), moment by moment calculated on the thermal power emitted by the radiators: it is a coefficient proportional to the kCal consumed.

• **"HOURLY CONSUMPTION":** for "Thermshare" flats or radiators; a total is made of the hours in which the thermostat of the single flat has called for heat during the whole season. It is the old system of an hour meter in zoned plants.
This information serves also to give an idea of the true occupation figure for the flat used as a second home.
• **CENTRALISED "HEAT CONSUMPTION" AND "HOURLY CONSUMPTION :** these are the same data just illustrated but referring to flats and radiators that remain centralized (see"Specific system technique"). In practice, these values are calculated in the same way as the previous ones but assuming that the thermostat always calls for heat (always On), as in fact happens with centralised flats or radiators. This information is important for allocating heating expenses when not all the flat occupiers participate in "Thermshare".

12.3 Available readings

17.3

```
Flat        :xxx
Heat  :   xxxx.x
```

17.4

```
Flat Central htg
Hours :   xxxx.x
```

17.5

```
Flat        :xxx
Heat  :   xxxx.x
```

17.6

```
Flat Central htg
Hours:    xxxx.x
```

• **Accessible to all without the use of access keynumber - partial (seasonal) metering**

– Flat xxx	= user code.
– Heat : xxxx.x	= seasonal heat consumption (compensated hours).
– Heat : xxxx.x	= seasonal heat consumption (compensated hours) for radiators or flats that have remained with central heating.
– Flat xxx	= user code.
– Hours : xxxx	= effective seasonal operating hours.
– Hours : xxxx.x	= effective seasonal operating hours for radiators or flats that have remained with central heating.

• **Accessible only using access keynumber – total metering (multi-seasonal)**

18.1

```
Flat.xxx:       On
C:xxxxx   h:xxxxx
```

– Flat xxx	= user code.
– On ; Off; Fault	= operating status of user.
– C : xxxxx	= total hours of compensated operation (or heat consumption).
– h : xxxxx	= total effective operating hours.

18.2

```
Flat Central htg
C:xxxxx   h:xxxxx
```

– C : xxxxx	= total hours of compensated operation (or heat consumption).
– h : xxxxx	= total effective operating hours.

12.4 Stop metering

20.7

```
Stop metering:
EXCLUDED
```

By using the "**F**" switch (e.g. switching off or lockout pump) it is possible to stop all the metering using the following procedure:

– Stop metering : EXCLUDED : Stop unused meterings.
SWITCH OPEN : stop metering with switch open (LED 3.6 lit).
SWITCH CLOSED : stop metering with switch closed (LED 3.6 lit).

12.5 Control plant pump

Using the auxiliary switch 3-4 it is possible to control the operation of the heating plant.

20.5

```
Auxiliary switch
NORMALY OPEN
```

– Auxiliary switch : NORMALLY CLOSED = switch opened when auxiliary output On.
NORMALLY OPEN = switch closed when auxiliary output On.

– Aux : ALWAYS ON = auxiliary always On;
AUTOMATIC = auxiliary On when at least one of flats or zones calls for heat: optimisation of use of pump and/or boiler.

20.6

```
Aux : AUTOMATIC
DelayOn:xxOff:xx
```

– DelayOn : xx = Delay time at startup.
– DelayOff : xx = Delay time at shutdown.

Warning: both when the auxiliary control is "ALWAYS ON" and "AUTOMATIC" it is advisable for the heating plant to be equipped with a balancing control system so that it keeps constant the pressure downstream of the pump independently of the water flow.

12.6 Boosting heating

20.8

```
Boosting heating
for hours: xx
```

By pressing for a few seconds one of the push-button switches (k1…Kn) connected in parallel (M-B2) it is possible, by means of output relay 5-6-7, to open fully the centralised control valve for a pre-determined time (= xx).
This function permits increasing the plant flow temperature to speed up heating after a long period of absence from the flat, and is mainly used for the holiday homes in the mountains.

13. CONFIGURATION

21.3

| Input meters |
| CODED |

Type of communication with the flats or zones; choice between:
  – CODED : used in the "**Thermshare**" system; signals coming from ICS 6.. control units**;**
    The ICS 6.. units send special codes to the UCR 668 to communicate: if the unit calls for heat; does not call for heat; tampering or malfunctioning; thereby continuously monitoring the status of each single flat.
  – ON - OFF: signals coming from simple voltage-free switches (e.g. thermostat or end-of-run zone valve).

21.4

| Flow T detector |
| CONNECTED |

Choice between**:**
  – CONNECTED   : the B1 detector (flow temperature) is connected so that heat consumption can be calculated**.**
  – NOT CONNECTED   : the B1 detector is not used and so the heat consumption cannot be calculated: the system will measure and indicate only the hourly consumption**;**

21.8

| Various alarms |
| – 2   7 8 |

To enable the alarms, using + and – keys replace the dash with the number 1 and 2**.**

When the number flashes = alarm triggered

The effect of the alarm situations is delayed by about a minute

Type of alarm, reasons and effects:

1 = plant flow detector, to be enabled only when detector B1 is connected .
  – when there is a short or open detector circuit
  – LED "°C" 3.9 is lit and, during the whole time in which detector is faulty, the metering of the heat consumption is considered to be 50% (mean seasonal value).

2 = fault or tampering in flat:
  – this type of alarm can be used only if the metering signals come from an ICS 6.. control unit since this unit is able to send a fault or tampering signal.
    Can be caused by:
    - power failure (min. 2 minutes) or breakage of internal transformer;
    - no connections to valve actuators (min. 2 minutes) :
    - general fault or tampering with electronic components or cables (e.g. attempted burglary).
  – LED 3.7 is lit and metering is stopped in the flat with alarm status.
    UCR 668 closes switch 1-2 to activate an external alarm signal (optional) and memorizes data and start and end times of fault.

7 = memory – *cannot be disabled*
  – when principal memory of system signals meaningless values;
  – LED 3.9 lit: the memory of meter concerned has to be reset.

8 = internal clock – *cannot be disabled*
  – when clock shows meaningless values;
  – LED 3.8 lit.

13.1 Access code

21.9

| Access code |
| - - - - |

Choice and enabling of access code which prevents use of + and - keys and consequently any changes being made to the data.
Enter a code of four characters (alphanumeric) :
  – with ← and → keys position cursor;
  – with + and – keys replace each dash with a character.

When the code is different from "- - - - ", if + or – keys are pressed, on the display appears the request to enter the access code. Only after having entered the exact code can you use the + and – keys.
If for 15 minutes no key is pressed the protection is automatically re-activated.
It is essential always to enter the access code in order to protect the settings and the configurations from tampering which would compromise the meter readings.

13.2 Name of plant site

21.1

| Name plant site |
| - - - - - - - - - - - |

Entering name of plant site; this appears on first page of display **17.1**.
Each dash can be replaced, using + and - keys, by a letter of the alphabet (A…Z) or by a number (0…9). The → key serves to position the cursor .

13.3 Start of a new season (cancelling of partial meter readings of previous season)

17.2

```
New data after
   xx/xx/xxxx
```

Establishes the date from which a new heating season starts and from which start the new partial meter readings, cancelling the partial readings of the previous season and the whole of the "RECORD EVENTS".

xx.xx.xxxx   = day and month and year on which the new *heating season* starts.

Procedure for starting a new season:

17.9

```
Start new
season? NO  ->
```

– NO   = do not wish start a new metering season.
– YES   = wish to start a new metering season,
               after which appears:

17.10

```
Enter Access
Code: - - - -
```

21.9
```
Access Code
   - - - -
```

– - - - - = enter Access Code set in the display. , and then follow the instructions on

17.11

```
Everything read
carefully? NO->
```

– enter YES and then press → key if you want to proceed, then:

17.12

```
Confirm start
season ? NO  ->
```

– enter YES and then press → key to start new season:

17.13

```
New season
starting...
```

17.14

```
New season
started...  ->
```

press → key to exit this display page.

13.4 Summer time

20.2

```
BST
Fr: — — . — — t o : — — . — —
```

UCR 668 changes automatically the present time according to the British Summer Time (BST) period.
   – Fr : - -.- - = enter the date of the last Sunday in March: the clock automatically goes forward one hour.
   – to : - -.- - = enter the date of the last Saturday in October: the clock automatically goes back one hour..
To cancel the period keep + and – keys pressed at the same time.

14. RECORDERS

UCR 668 incorporates :
– a memory space available for recording events taking place in each flat or zone connected and events regarding the UCR 668 controller itself.
   All the recordings are cancelled as soon as the new season starts so that new recordings refer only to the new season.
– a memory space dedicated to the internal data logger.

14.1 Recording of tampering or faults in individual flats or zones only if served by ICS 6..

21.3
```
Input meters
CODED
```

• Remember that has to be set on "CODED".
   Whenever there are: tamperings, faults, breaks in the cables, short circuits in the connections between ICS 6.. and UCR 668; or when there is tampering or a fault in the flat in the connections between ICS 6.. and radiators; or when ICS 6.. is made to operate in "test" mode by a sustained pressing of the "Test" button (see ICS 6.. Data Sheet), UCR 668 makes a recording, as follows:

19.1

```
Flat xxx Fault x
12.18 of10.02.99
```

– Flat. xxx   = code of flat or zone
– Fault x   = progressive number of event (max 3), of tampering, etc.
– 12.18 of 10.02.99 = time and date when ICS 6.. made test and found fault.

19.2

```
Flat xxx EndEv x
12.18 of10.02.99
```

– Flat. xxx   = code of flat or zone
– End Ev. x   = progressive number of end of event (max. 3).
– 12.18 of 10.02.99 = time and date when ICS 6.. made test and found fault had ended.

• Each new recording cancels the oldest one.

14.2 Recording of events in each single flat or zone, if not serviced by ICS 6.. (e.g. traditional zoned plants)

21.3

    Input meters
    ON-OFF

• We recall that [Input meters ON-OFF] has to be set on "On-Off" (thermostat or valve switch).

• Each time the metering signals change state UCR 668 records:

19.1

    Flat xxx On x
    12.18 on10.02.99

– Flat xxx   = code of flat or zone.
– On x   = progressive number of start "On" state (max 3).
– 12.18 on 10.02.99 = time and date of the event.

19.2

    Flat xxx Off x
    12.18 on10.02.99

– Flat xxx   = code of flat or zone
– Off x   = progressive number of start "Off" state (max 3).
– 12.18 on 10.02.99 = time and date of the event.

14.3 Recording time and date of charging UCR 668

With these data it is possible to return to the exact periods in which UCR 668 was unable to carry out the metering because it was switched off for maintenance or on account of tampering.
If the hours switched off are few in relation to those over the entire season, this does not have any relevant effect on the allocation of metered costs; otherwise it is necessary to bear in mind:

19.3

    On:xx Hours:xxxx
    12.18 of10.02.99

– On : xx   = progressive number of times UCR 668 is switched on 12.18 of 10.02.03 (max. 16) after being switched off.
– Hours : xxxx   = total time in hours of the period in which UCR 668 has remained switched on, from the event of the first switching on until the moment in which the reading is taken. These hours and events are cancelled at the moment in which the new season starts.
– 12.18 of 10.02.99 = time and date of the event.

14.4 Historic recording

21.5

    Recording
    EACH WEEK

UCR 668 incorporates a data logger that permits making 52 recordings.
The recorder is of the type "First in - first out", that is, with each new recording the oldest recording is cancelled.
This data logger is always available in the memory of UCR 668 and can be displayed when UCR 668 is read with a computer.

15. TESTING AT COMMISSIONING

15.1 Testing electrical connections in the boiler plant

Testing to be carried out when installation, electrical wiring and configuration have been completed and tested.

With + and – keys select :
   • Output: BOOSTING
           AUX
           FAULT
   • Status : – OFF =   Output off.
          – ON =   Output on.

22.1

    Output :BOOSTING
    Status :OFF

Check that the relative components respond correctly to the controls.

15.2 Testing connections to the flats

After having checked the electrical connections to UCR 668 in the boiler plant it is necessary to check the wiring from UCR 668 to the flats.

First, UCR 668 has to be configured with the correct codes for flats or zones (see **12.1** "Flat code").

Before proceeding make absolutely sure that the instructions in 12.1 have been carried out and checked.

There are two methods of testing according to whether UCR 668 is connected to the flats or zones with ICS 6.. control unit or with On-Off controls (e.g. thermostats).

• Inputs to meters coming from ICS 6..

21.3
```
Input meters
CODED
```
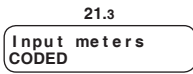
Check that the configuration of UCR 668 is adapted to receive coded signals.

At this point you can make a first check, after UCR 668 has been switched on for at least three minutes:

– if the LED "METERING - FAULT" (3.7) does not light, this means that all the ICS 6.. are at least connected to UCR 668;

– if the LED "METERING - FAULT" (3.7) lights, this means that one or more ICS 6.. are not connected, or that numbers of users who do not exist have been entered on UCR 668.

Go to the menu page "TOTAL METERING", scan the metering pages of all the flats, take note of those indicating a flashing "FAULT" and check the relative connections.
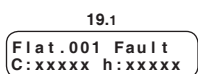
19.1
```
Flat.001 Fault
C:xxxxx h:xxxxx
```
When the checks have been completed and any corrections made, after about two minutes, the "METERING - FAULT" LED (3.7) should switch off.

Re-check that in all the metering pages the word "FAULT" disappears and if replaced by the words "ON" or "OFF" according to the control signal sent by the ICS 6... .

Having checked in this way that all the ICS 6.. are connected to UCR 668, you must then ensure that each of these is connected to its respective input; that is, that flat or zone codes correspond to the actual flats and zones.

You must check that, although all the wires have been connected, there are no switched connections (e.g. so that Mr Brown would pay Mr White's bill and vice versa) To avoid having to go continually up and down the stairs, (between the flats and the boiler room) in order to check the connections one wire at a time, or remove one ICS 6..unit at a time and check on UCR 668 the corresponding fault at the relative flat, UCR 668 has its procedure already programmed internally. This procedure is based on the use of the menu "RECORD EVENTS" **:**

• Synchronise your watch with the UCR 668 clock.

• Go to the first flat or zone and keep pressed the "TEST" button on ICS 6.. until a test cycle starts (see ICS 6.. data sheet); make a note of the exact time this operation was carried out referring it to the flat or zone code.

Wait about two minutes before carrying out the same procedure in the second flat, and continue in this way.

• When the above operations have been completed for all the flats or zones, return to the UCR 668 and scroll to the menu page "RECORD EVENTS".

The "TEST" function on the ICS 6.. units triggers, for each flat or zone, a recording of start fault and one for end fault on UCR 668.

19.1
```
Flat.001 Fault
xx.xx ofxx.xx.xx
```
19.2
```
Flat 001 End G1
xx.xx ofxx.xx.xx
```
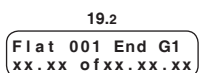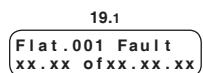
The time of the "FAULT" in relation to the flat code must be about 2 minutes later than that signalled.

The time of "End F" (end of fault) must be about 2 minutes plus 20 seconds per radiator, later than that just indicated (start of fault).

It is clear that in this way you can discover if any flats have been mistakenly exchanged for one another and, if so, which ones.

• Input meters deriving from switches (thermostats or zone valves)

Check that the configuration of UCR 668
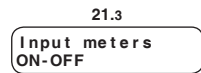
21.3
```
Input meters
ON-OFF
```
is adapted to receive signals from open or closed switches.

The procedure is similar to the previous one: instead of using, for each flat or zone, the "TEST" button on ICS 6.., you must switch on (or off) for at least three minutes and then switch off (or on) the plant (e.g. with the thermostat), wait two minutes for each flat, and then go to the UCR 668.

19.1
```
Flat 001  On 1
xx.xx ofxx.xx.xx
```
19.2
```
Flat 001  Off 1
xx.xx ofxx.xx.xx
```
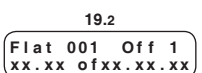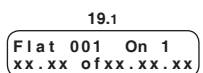
16. SEQUENCE OF DISPLAY PAGES (the data and functions are the factory settings)

17.

| Site:(name)-----
Flat:Fr 001 to014 | → | New data after
xx/xx/2000 | → | Flat :   001
Heat :   0000.0 | → | - - - - - - | → | Flat   014
Heat :   0000.0 | → | Flat Central hgt
Heat :   0000.0 | → |

| Flat :   001
Hours : 0000.0 | → | - - - - - - | → | Flat :   014
Hours : 0000.0 | → | Flat Central htg
Hours : 0000.0 | → | Heating flow
temp   : 60.0c | → |

| 12.18 MONDAY
10.02.99 BST | → | Start new
season ? NO   –> | → | UCR 668 C1 Eng.
Vers.xx | TECHNICAL PAGES
PRESS + KEY | + |

| | | Start new
season ? YES –> | → | Enter Access
Code : - - - - | → | Everything read
carefully?YES –> | → | Confirm start
season ? YES   –> | → |

| New season
starting...   –> | ... | New season
Started   –> | → | UCR 668 C1 Eng.
Vers.xx | TECHNICAL PAGES
PRESS + KEY | + |

18.

| Choice Menu +/–
TOTAL METERING | → | Flat 001 On
C:00000   h:00000 | → | - - - - - - | → | Flat 014 On
C:00000   h:00000 | → | Flat Central htg
C:00000   h:00000 | → | TECHNICAL PAGES
PRESS + KEY | → |

19.

| Choice Menu +/–
REGISTER EVENTS | → | Flat 001 Fault 1
xx.xx ofxx.xx.xx | → | Flat 001 End F1
xx.xx ofxx.xx.xx | → | - - - - - - | → | Flat 001 Fault 5
xx.xx ofxx.xx.xx | → | Flat 001 End F5
xx.xx ofxx.xx.xx | → |

| Flat 014 Fault 1
xx.xx ofxx.xx.xx | → | Flat 014 End F1
xx.xx ofxx.xx.xx | → | - - - - - - | → | Flat 014 Fault 5
xx.xx ofxx.xx.xx | → | Flat. 014 End F5
xx.xxdelxx.xx.xx | → |

| On:01 Hours:0000
xx.xx ofxx.xx.xx | + | - - - - - - | + | On:16 Hours:0000
xx.xx ofxx.xx.xx | → |

| TO CONTINUE
PRESS + KEY | + |

20.

| Choice Menu +/–
SETTING | → | 12.18 MONDAY
10.02.99 | → | BST
Fr:31.03to:27.10 | → | Design flow
temp   :80.0 | → | Flow temperature
Minimum Off:25.0 | → | Aux switch
NORMALLY OPEN | → |

| Aux : AUTOMATIC
DelayOn:00Off:30 | → | Stop metering
EXCLUDED | → | Boosting heating
for hours: xx | → | TO CONTINUE
PRESS + KEY | + |

21.

| Choice Menu +/–
CONFIGURATION | → | Name plant site
- - - - - - - - - - - | → | Flat code
Fr:xxx to:xxx | → | Input meters
CODED | → | Recordings
EVERY WEEK | → | Flow T detector
NOT CONNECTED | → |

| Send Alarms :NO
PassWTeleman :NO | → | Address :   - - -
Group   :   - | → | Various alarms
– 2   7 8 | → | Access code
- - - - | → | TO CONTINUE
PRESS + KEY | + |

22.

| Choice Menu +/–
TESTING | → | Output:BOOSTING
Status :OFF | ← |

← → Keys for scrolling pages on the display and positioning the cursor ▮ on data to be adjusted.
Adjustable data, in the following descriptions of the display pages, are highlighted thus ▒▒▒

By pressing these keys at the same time (or, in any event after 15 minutes) the first page appears | Site:(name)-----
FlatFr001 to 014 |

– ⊕ Keys for : – adjusting the values indicated by the cursor ▮
– displaying the configuration options of a function, e.g. | Stop metering :
EXCLUDED | or | Stop metering:
SWITCH OPEN |
– passing directly from one menu (series of pages) to another.

17. NORMAL USE

Ref.	Display	Description	Notes	Sect.
17.1	`Site(nome)------` `Flat Fr:001to014`	Name plant site. Numbering flats.	Set in **21.1** Set in **21.2**	.
17.2	`New data after` `   xx/xx/2000`	The date from which the new season starts & in which have been cancelled all the partial meterings & "RECORD EVENTS"	.	**13.3**
17.3 ⇓ ⇓	`Flat :001` `Heat :   xxxx.x` `Flat   :xxx` `Heat   :xxxx.x`	Code of flat where you want to read consumption. Heat = partial consumption heat, also called "compensated hours". *There follow a number of pages equal to number of flats or zones metered.*	Appears only if **B1** detector is "connected" in **21.4**. .	**12.3**
17.4	`Flat Central htg` `Heat :   xxxx.x`	Heat consumption in flats or zones which have not adhered to "THERMSHARE" and to radiators still centralized	Appears only if detector **B1** is configured in **21.4**.	**12.3**
17.5 ⇓ ⇓	`Flat :001` `Hours   : xxxx.x` `Flat   :xxx` `Hours   :xxxx.x`	Code of flat where you want to read partial seasonal consumptions. Hours = number of hours of heat consumption. **There follow a number of pages equal to number of flats or zones metered.**	. .	**12.3**
17.6	`Flat Central htg` `Hours :   xxxx.x`	Hourly consumption for flats or zones which have not adhered to "THERMSHARE", and to radiators still centralized		**12.3**
17.7	`Heating flow` `temp      :60.0c`	Heating flow temperature measured by **B1** detector.	Appears only if **B1** detector is "connected" in **21.4**.	
17.8	`12.18 MONDAY` `10.02.99 BST`	Time and day of week Date and current time period: GMT or BST.	According dates BST entered in **20.1**	
17.9	`Start new` `season?   NO  –>`	Starting new season involves starting all the partial consumption meterings from the current date and cancelling "RECORD EVENTS" – NO: start season not requested; – YES : start season requested.	Choose "YES" then press → key to start season .	**13.3**
17.10	`Enter Access` `Code:       ----`	Enter Access Code set in: Access Code " **21.9**.	Enter the code and then press → key and follow the instructions for starting the season.	**13.3**
17.11	`Everithing read` `carefully? NO –>`	– NO: terminate start of season; – YES : proceed with start of season	Press → key and follow instructions for carrying out start of season	**13.3**
17.12	`Confirm start` `season?   NO  –>`	– NO: terminate start of season; – YES : proceed with start of season	Press → key	**13.3**
17.13	`New season` `starting...`	Appears only if **17.12** is "YES".		**13.3**
17.14	`New season` `started        –>`	Appears only if **17.12** is "YES".	Press → key to exit the page.	**13.3**
17.15	`UCR 668 C1 Eng.` `Vers.xx`	Identifying data of unit.		

18. TOTAL METERING

Ref.	Display	Description	Notes	Sect.
18.1 ⇓ ⇓	`Flat 001: On` `C:00000  h:00000` `Flat xxx: On` `C:00000  h:00000`	Status flat 1: – *On*; – *Off*; – *Fault*. Total heat metering: : C : heat consumption (compensated hours); h = effective hours. **There follow as many pages as there are flats or zones metered.**	"FAULT" appears only if **21.3** is "CODED".	**12.3**
18.2	`Flat Central htg` `C:00000  h:00000`	Total metering of flats or zones that have not adhered to "THERMSHARE" and have remained with non-independent central heating. C : heat consumption (compensated hours); h = effective hours.	C = heat consumption, appears only if in **21.4** B1 is connected.	**12.3**

19. RECORD

Ref.	Display	Description	Notes	Sect.
19.1	Flat001 Fault 1 ––.–– of––.––.––	Code of flat displayed From xxx to xxx at point **21.2**. . 1 = progressive number of fault: from: from 1 to 3 Time, minutes and date of the fault.	+ and – keys to pass quickly to other flat codes. The most recent recording cancels the oldest one.	**14.1**
19.2	Flat 001 End F 1 ––.–– of––.––.–– FlatXXX Fault X ––.–– of––.––.–– Flat XXX End F X ––.–– of––.––.––	Code of flat displayed:: From xxx to xxx as at point **21.2**. . 1 = progressive number of fault: from: from 1 to 3 Time, minutes and date of end of fault. <u>There follows as many pages as there are flats or zones controlled.</u> The pages of fault and end of fault appear only if UCR 668 is connected to the various ICS 6..: if, in practice the **"THERMSHARE"**.system is used. For each of the 14 flats appear three pages of faults and three pages of end faults. **If UCR 668 is not connected with "THERMSHARE" i.e. if it is used with any type of switch (e.g. traditional zone plant) the following pages will appear)**	Keys + and – to pass quickly to other flat codes. The most recent recording cancels the oldest one. All the recordings will be cancelled at the start of a new season.	**14.1**
19.1	Flat001 On 1 ––.–– of––.––.––	Code of flat displayed: From xxx to xxx as at point **21.2**. . 1 = number of event of switching on heating from 1 to 3 Hour, minutes and date of switching on.	Keys + and – for pasing quickly to other flat codes. The latest recording cancels the oldest one.	**14.2**
19.2	Flat001 Off 1 ––.–– of––.––.–– FlatXXX On X ––.–– of––.––.–– FlatXXX Off X ––.–– of––.––.––	Code of flat displayed: From xxx to xxx as at point **21.2**. . 1 = number of event of switching off heating from 1 to 3. Hour, minutes and date of switching off. For each of 14 flats there appear three pages of On and three pages of Off	+ and – keys for passing quickly to other flat codes.. The most recent recording cancels the oldest one. All the recordings will be cancelled at the start of a new season, indicating as the first event the date of the start of the season..	**14.2**
19.3	On:01 Hours:0000 ––.–– of––.––.––	On: xx = varies from 1 to 16 is the progressive number of order of switching on of the devices. Hours: complete number of hours recorded at the last switching off. Time and date of last switching on.	+ and – keys for passing quickly to the other flat codes. The hour metering will be cancelled at the stat of a new season..	**14.3**

20. SETTING

Rif.	Display	Description	Notes	Sect.
20.1	12.18 MONDAY 10.02.99 BST	Setting: Time, day of week & date Current time period: GMT or BST	.	
20.2	BST Fr:31.03to 27.10	British Summer Time (BST) period.	.	**13.4**
20.3	Design flow temp: 80.0	Design flow temperature.	Appears only if **21.4** is "CONNECTED".	**12.2**
20.4	Flow temperature Minimum Off:25.0	Minimum flow temperature.	Appears only if **21.4** is "CONNECTED".	**12.2**
20.5	Auxiliary switch NORMALY CLOSED	"Auxiliary" control switch: NORMALLY CLOSED, NORMALLY OPEN.	NORMALLY CLOSED: switch open when auxiliary control is switched on; NORMALLY OPEN: switch closed when auxiliary control is switched off;	**12.5**
20.6	Aux : AUTOMATIC DelayOn:––Off:30	Auxiliary control: ALWAYS ON; AUTOMATIC Delay in switching on and off.	ALWAYS ON: auxiliary control always On; AUTOMATIC: auxiliary control On only if at least one flat or zone calls for heat, or in event of fault. .	**12.5**
20.7	Stop metering : EXCLUDED	Stop metering by switch "F" : EXCLUDED ; SWITCH OPEN; SWITCH CLOSED.	.	**12.4**
20.8	Boosted heating for hours : 1	Period of boosted heating (valve open) started by switches k1…kn.	.	**12.6**

21. CONFIGURATION METERING UNIT

Ref.	Display	Description	Notes	Sect.
21.1	Name plant site - - - - - - - - - - -	Entering name plant site.	Use + and − keys to enter letters or numbers. Use ← and → keys to change cursor position.	13.2
21.2	Flat code Fr:001 to:014	Codes of flats connected. Take great care to number correctly since on this depends the correct allocation of all the heating costs.	.	12.1
21.3	Input meters CODED	CODED = UCR 668 is connected in "THERMSHARE" system to ICS 6.. units. ON - OFF = UCR 668 is connected to a normal voltage-free closure switch ? which can derive from the organ providing the heating.	= "THERMSHARE" plant. = zoned plant	13
21.4	Flow T detector CONNECTED	CONNECTED = when it exists & is connected. NOT CONNECTED = when does not exist.		13
21.5	Recordings EVERY WEEK	Setting frequency of recordings: EVERY HOUR = intervals of an hour between recordings. EVERY DAY = intervals of a day between recordings. EVERY WEEK = intervals of a week between recordings	The daily or weekly recordings take place at 0.00 hours.	14.4
21.6	Send Alarms :NO PassWTeleman :NO	Enabling alarms to send to telemanagement PC. Enabling telemanagement password.	Necessary only if connected in C-Bus.	10.4
21.7	Address : - - - Group : -	Telematic address of controller Group to which controller assigned	Only if connected in C-Bus.	10.3
21.8	Various alarms − 2 7 8	Alarms 7 and 8 cannot be disabled.	Use + and − to enable or disable the sending of an alarm. Use ← and → to change position of cursor. **1** : Flow detector **B1.** **2 :** Alarm for fault in flats. **7 :** Data storage alarm**.** **8 :** Internal clock alarm**.**	13
21.9	Access code - - - -	Choice code for preventing use + and − keys. The code can be alphanumeric.	Use + and − to enter letters or numbers Use ← and → to change position cursor..	13.1

22. TESTING

Ref.	Display	Description	Notes	Sect.
22.1	Output:BOOSTING Status:OFF	Choice output to test : − BOOSTING − AUX − FAULT Choice output status : − OFF = Output Off.. − ON = Output On.	.	15.1

Amendments to data sheet

Data	Revisione n.	Pagina	Paragrafo	Descrizione modifiche	Versione Firmware	Versione Software
09.02.07 SD		3 8	8. WIRING 11.4 TRADITIONAL ZONED PLANT..	Section amended and summary tables added. Added operational diagram for siting switchboards below stairs/in cellar or in boiler house.		
22.04.11 VM	**01**	1		Note about UNI / TR 11388 certification		

We reserve the right to make changes without notice