

THERMSHARE SYSTEM
CONTROL UNIT FOR FLAT

ICS 618 - 628 C1 Eng.



- By means of room thermostat controls up to 15 radiators.
- Radiator valves to be used: model HGT ... in 4 diameters (3/8" to 1") straight or elbow.
- Connection with CDR 061 actuators by means of a single thin wire.
- Send to UCR 668 metering unit data for allocating heating costs.
- Automatic check with alarm for all faults and tampering 24 hours a day.
- Power supply: 24 V~ (ICS 618) or 230 V~ (ICS 628).
- Mounting on DIN rail (6 units).

1. APPLICATION

ICS 6.. control unit forms part of the "THERMSHARE" system for metering, supervising and controlling individual zones (flats, shops, offices, etc) in a building with central heating with rising columns or zones.

2. FUNCTIONS

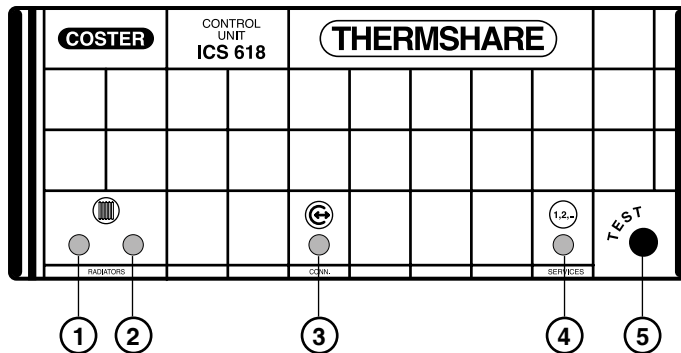
Receives switching on and off instructions from any type of thermostat.

Control : – by means of a single thin wire; the opening or closing of the radiator valves operated by model CDR 061 actuators (max 15).
– by means of the output which repeats the instruction from the thermostat, a zone valve (in zoned heating plants).

Simultaneously sends coded signals to the UCR 668 metering unit for:
– metering the heat consumption for each single zone.
– recording and signalling each operational fault in the zone controlled (e.g. tampering with or damage to the actuators, short or open connections). The detection of tampering or damage results from an automatic check every 8 hours or when the "TEST" button (3.5) is pressed

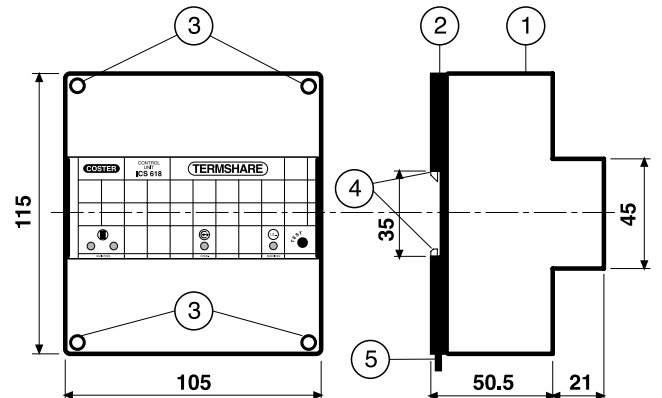
Controls any minimum room temperature set (e.g. 12°C) with the aim of reducing the heat exchange between adjacent flats when the dividing walls have poor thermal insulation: the so-called "heat theft".

3. FACIA



- 1 - Control thermostat On Red LED = radiators open
- 2 - Control thermostat Off Green LED = radiators closed
- 3 - Control or check of CDR 061 actuator in progress
- 4 - LEDs e.g. metering, alarms faults, etc
- 5 - Test key

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

5. TECHNICAL DATA

• Electrical

Power supply:	
ICS 618	24 V ~ ± 10%
ICS 628	230 V ~ ± 10%
Frequency	50 ... 60 Hz
Consumption - maximum	10 VA
Consumption - mean	2 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
Output control valves (max 15)	24 V ~
Construction standards	Italian Electrotech. Committee (CEI)

• Mechanical

Case	DIN 6E module on DIN 35 rail
Mounting	
Materials:	
Base	NYLON
Cover	ABS
Ambient temperature:	
Operating	0 ... 45°C
Storage	- 25 ... + 60°C
Ambient humidity	Class F DIN 40040
Dimensions	105 x 115 x 71.5
Weight	0.5 kg

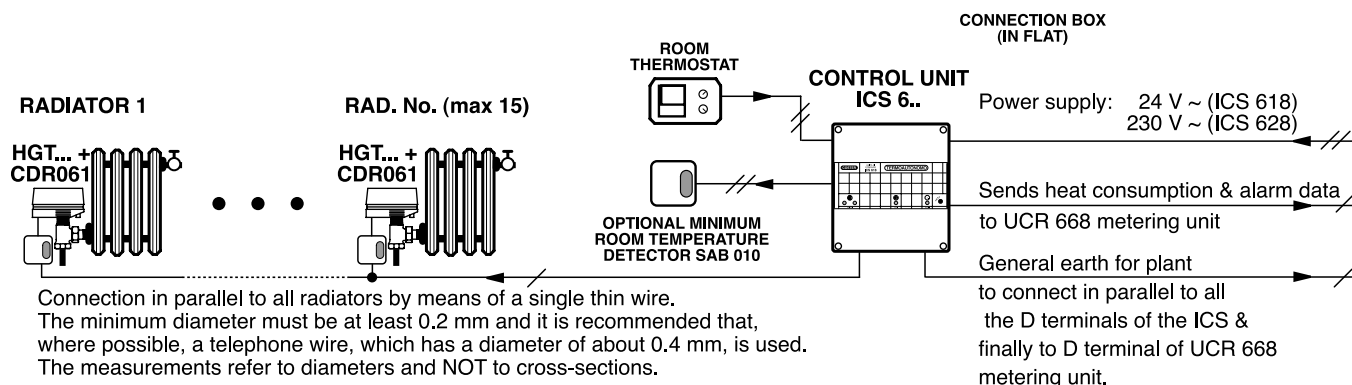
6. VERSIONS

Code	Description	Power supply
ICS 618	Control unit for radiators (max. 15)	24 V~
ICS 628	Control unit for radiators (max. 15)	230 V~

7. SYSTEM ACCESSORIES

No.	Description	Type	Sensing element	Code	Data sheet
1	Room T° limit detector (not supplied)	SAB 010	NTC 10 kΩ	B1	-

8. OPERATIONAL DIAGRAM & ELECTRICAL WIRING IN SINGLE FLAT OR ZONE



8.1 COMMENTS ON OPERATIONAL DIAGRAM

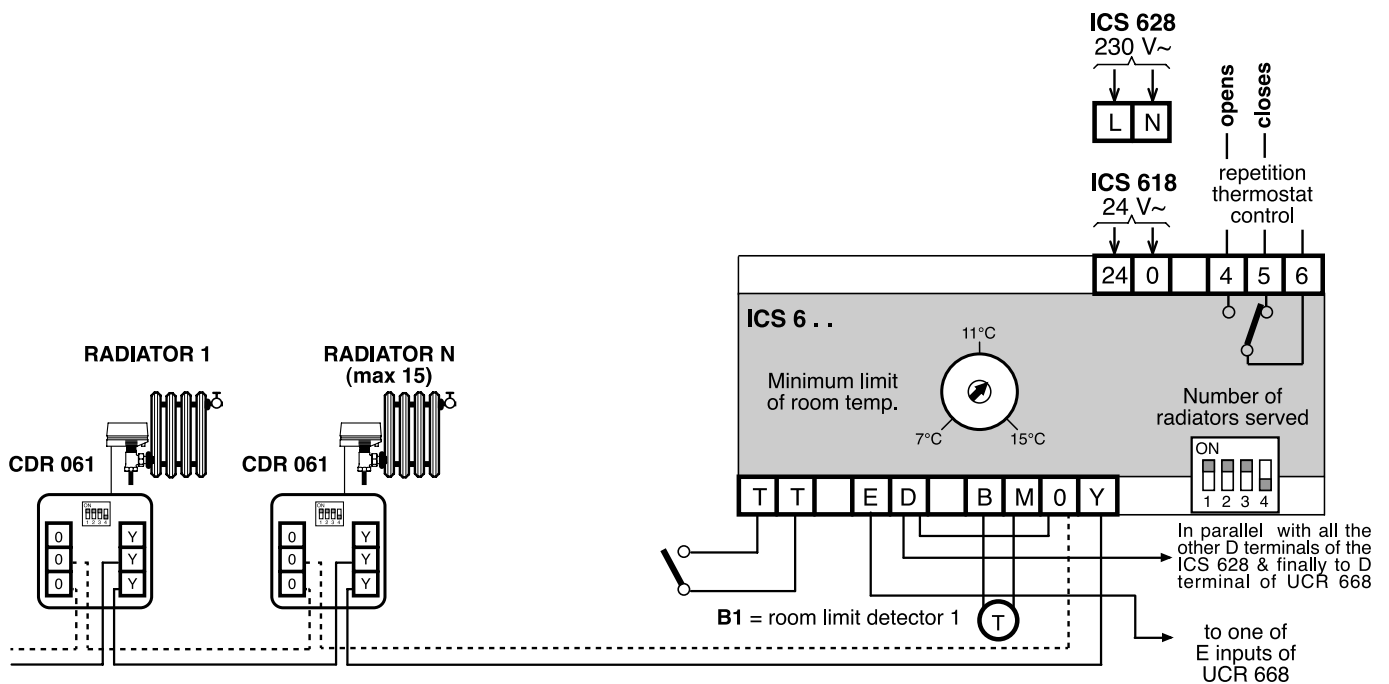
- **On each radiator** to be part of "Thermshare" system (max. 15 radiators), you must:
 - **replace the existing holder** on the return pipe with a model HGT ... radiator valve of the same diameter, straight or elbow.
 - **mount the actuator** (CDR 061) on the new valve comprising:
 - the actual actuator to control the valve, to be sealed against tampering.
 - the "intelligent" unit (pre-wired to the actuator): this has the task of interpreting and carrying out the opening and closing of the valve in accordance with the data coming from the control unit (ICS 6..).
- **Room thermostat:** any room thermostat can be used; it should be installed at a point representative of the temperature of the flat. It is connected to the connection box (ATD 038) by two wires which can be as thin as desired provided they are of sufficient mechanical strength. The voltage and relative current are practically nil.
- **Optional room detector for minimum temperature limit:** should its use be requested by the flat dwellers in the block, the detector is mounted near to the thermostat. In view of the normally thin dividing walls (low thermal insulation), and in order not to disadvantage the neighbours, the room detector can be set so that there is always a minimum temperature in the flat. To connect the detector to ICS 6.. two wires are used. The voltage and the relative current are practically nil.

• **Installation of ICS 6.. control unit :**

- **ICS 618** (powered by 24V ~) can be installed in the flat. It is suggested siting it near the consumer unit (fuseboard), where it is easy to find the cables going to the room in the flat block where the meters and 230/24V~ transformers for all the flats are situated. This room generally houses the boiler plant; an adjoining space would be preferable but it should be easy to reach from the individual flats so as to facilitate reading the meters during the heating season.
- **ICS 628** (powered at 230V ~) must be installed outside the flat in an appropriate housing for electrical equipment serving the block, where the central 230V ~ power supply for the flats can be found.
- the two power supply cables (at 230V ~ or 24V ~) must be minimum 1.5 mm²; all the ICS 6..units in all the flats are powered in parallel.
- the wire for connection to the metallic earth of the plant must be 1.5 mm² minimum; it must be connected to any pipe of the heating plant: all the ICS 6.. units in all the flats are earthed in parallel.
- for transmitting the consumptions of the individual flats to the UCR 668 unit, one wire for each flat is required (the use of a multipole cable is recommended).

9. WIRING DIAGRAM

WARNING: keep the jumper between the terminals "B - M" when the detector B1 is not installed.



10. ELECTRICAL CONNECTIONS

- Mount the base on the DIN rail and check that it is firmly anchored by the securing elements (4.4)
- Carry out the wiring according to the diagram and in compliance with current safety regulations and using:
 - two 1.5 mm² minimum cables for power supply (both at 230V ~ and at 24V ~) from the central power supply to the block of flats.
 - two 0.2 mm² minimum wires for room limit temperature detector (**remove jumper B - M**).
 - two 0.2 mm² minimum wires for room thermostat.
 - one 1.5 mm² minimum wire for connection to the metallic earth: any pipe of the central heating plant.
 - one 0.2 mm² minimum wire for connection to actuators of radiator valves (max.15 radiators);
 or two wires of the same dimension in the event that electrical continuity via all the radiators in the flat to earth is not guaranteed e.g. plastic radiator pipes (dotted line in diagram).
In this situation do not make the connection between terminals "D - 0"
 - one 0.2 mm² minimum wire for connection to UCR 668 metering unit.

11. CONFIGURATION

11.1 Setting the number of radiators on ICS 6..

It is essential to set on ICS 6.. the number of radiators connected, bearing in mind that the maximum number it can serve is 15.

To do this, you must use the series of four dipswitches situated under the protective cover, on the printed circuit. Position each dipswitch as shown in the table so that the required number is composed.

WARNING:

This configuration is important for the correct operation of the "Thermshare" system and must always be carried out before sealing the ICS 6...

AN INCORRECT SETTING IS THE CAUSE OF:

- No control of some radiators if the number set is less than the actual number of radiators controlled.
- signals of malfunctioning or tampering being sent to the UCR 668 metering unit if the number set were greater than the actual number of radiators controlled.

COMPARATIVE TABLE SHOWING DIPSWITCHES - NO. ACTUATORS										
ON ↑	1	2	3	4	number	1	2	3	4	number
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	for control zone valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15

11.2 Setting number of radiators in the applications in zoned plants

If ICS 6.. is used in central heating plants of the "zoned" type, the "number of radiators" connected must be configured in the following ways :

- **equal to 1**: when a single zone valve is controlled by CDR 061 actuator.
- **equal to 0**: when a single zone valve is controlled by a traditional actuator with two or three points (output terminals 4 - 5 - 6).

WARNING: should it be necessary to change the setting of the number of radiators controlled from "0" to another number, it is essential to switch the device Off, and then On again, before using it.

11.3 Entering code of single radiator on CDR 061 intelligent unit

In the CDR 061 intelligent unit enter the code of each radiator, following the order established in the preparatory phase and entered on form "E" - NUMBERING RADIATORS", using the same table of dipswitches for ICS 6... The code is the number shown at the side of each combination of four dipswitches.

WARNING:

The exact assigning of the code to each radiator (as shown on form "E") is essential for the satisfactory operation of the system and for the subsequent correct allocation of charges. The codes must start from "1" and progress without omissions and without double assignments up to the last radiator (the code of the last radiator should be equal to the number of radiators entered on ICS 6..).

AN ERRONEOUS SETTING CAUSES:

- no control of radiators with code number greater than the number of radiators entered on the ICS 6...
- signalling of malfunctioning if the codes have been missed or assigned twice.

11.4 Setting the value of the room temperature minimum limit (if requested by the at owners)

This is the minimum temperature of the at or zone (measured by detector B1) below which the ICS 6.. opens automatically all the radiators in order not to disadvantage the neighbours during periods of non-occupation.

Use the potentiometer under the protective cover, on the printed circuit; using a screwdriver, rotate the potentiometer towards the desired value, choosing from 7 to 15°C (factory setting 12°C).

WARNING: the configuration must be carried out only if the B1 room detector is installed and must always be carried out before sealing ICS 618.

It must be remembered that the detector has to be connected to the M - B terminals after having removed the jumper (installed in the factory).

12. TESTING OF ICS 6..

When the electrical installation and the configuration have been completed, switch on ICS 6.. and carry out the testing.

12.1 Testing connections to the room thermostat

- Increase the desired room temperature on the thermostat until the switching on (On) instruction is obtained.
- Check that on ICS 6.. the red LED (3.1) located above the word “RADIATORS” lights up; this indicates: “Plant On”.
- Reduce the desired room temperature on the thermostat until you obtain the “Off” instruction.
- Check that on ICS 6.. the green LED (3.2) located above the words “RADIATORS” lights up: this indicates “Plant Off”.
- If:
 - the red and green LEDs (3.1 and 3.2) on ICS 6.. light up in the wrong order: check if the connections have been made with the terminals reversed to the thermostat and correct them.
 - the green LED remains lit: the connection to the thermostat is always open.
 - the red LED remains lit: the connection to the thermostat is always short circuited (or, if the room detector is connected, the minimum room temperature has intervened).

12.2 Testing connections to actuators of radiator valves – “TEST” function

Before making this test check that the addresses on the “intelligent” actuators have been correctly configured; **and that, above all, the setting of the number of radiators controlled by the ICS 6.. is correct**, because if the number set were less than the number of radiators this would not be detected by the automatic testing.

The testing can be carried out at any time without worrying about what the ICS 6.. is doing. Indeed, at the start of testing each operation is interrupted and the operation is carried out starting from actuator No. 1.

Now the testing can start.

Press, for about five seconds, the “TEST” key (3.5), located bottom right on the ICS 6.. facia, until the LED “CONN”(3.3) lights (if already lit, you must switch it Off and then On again); at the same time the “SERVICES” LED (3.4) starts to flash, indicating, by the number of flashes, the actuator you are testing (one flash indicates that actuator 1 is under test, two flashes indicate that actuator 2 is under test and so on).

If everything is connected correctly, about 25 seconds is required for each actuator and the whole testing procedure will take not less than about three minutes.

At the end of testing the “CONN” LED(3.3) will go out, while the “SERVICES” LED (3.4) will remain off for a short time and then return to indicate the operating status of ICS 6..

At the end of the automatic testing there can be two results:

- **positive test:** the “SERVICES” LED (3.4) restarts the regular flashing:
 - Off for 4 seconds and On for 1 second = thermostat signalling “valves closed”.
 - Off for 1 second and On for 4 seconds = thermostat signalling “valves open”.
- **negative test:** the “SERVICES” LED flashes rapidly (about three times a second).

The possible reasons for malfunctioning can be.

 - a single actuator not connected: press “TEST” key (3.5) for about a second: the “SERVICES” LED (3.4) will flash a number of times equal to the address of the radiator not connected.

After this indication the LED starts to flash rapidly again.

Check the actuator concerned; this may be disconnected, not mounted on the valve or damaged.

Re-start correct operation and repeat the test.
 - several actuators not connected: press “TEST” key (3.5) for about a second: the “SERVICES” LED (3.4) flashes, in sequence, a number of times equal to the address of each radiator not connected.

After these indications the LED starts to flash rapidly again.

Check the actuators concerned which may be disconnected, not inserted in the valves or damaged.

Start correct operation again and repeat the test.
 - incorrect addresses of actuators: this error may be caused by a missing code (e.g. the seven radiators have been numbered: 1, 2, 3, 5, 6, 7, 8) or with a code number repeated (e.g. 1, 2, 2, 4, 5, 6, 7) or by other similar mistakes.

The same operations described above, in the first case, will indicate an error on the 4, in the second case an error on the 3; in fact, both are missing

Check the radiator with the number corresponding to the error, restart correct operation and repeat the test until you get a positive result.

WARNING: Each time the testing procedure is started by pressing the “TEST” key (3.5) communication with the UCR 668 metering unit is suspended (for about three minutes).

When this testing operation has been completed, the correct installation so far as acts or zones is concerned is assured. Testing of the UCR 668 metering unit is described in the relative documentation.

13. OPERATION

13.1 Normal operation

- With actual room temperature equal to or higher than the desired one, there is no request to start the plant. In this situation, on ICS 6.., the green "RADIATORS" LED (3.1) is lit and the "SERVICES" LED (3.4) is intermittent: Off for 4 seconds and On for 1 second.
- When the measured room temperature falls below the value set on the thermostat this gives an instruction to switch on the plant (On).
- The ICS 6.. receives from the thermostat the instruction to start the plant (red "RADIATORS" LED (3.1) lights) and:
 - repeats the instruction received from the thermostat closing the output switch between terminals "5 - 6", (this output can be used to control any electrically-operated device, for example, a zone valve, or to start a timer if one is connected to ICS 6).
 - controls the opening of all the radiators: "CONN" LED (3.3) lit and "SERVICES" LED (3.4) flashing slowly.

At the same time sends to the UCR 668 metering unit the instruction to start metering.

This operation takes several minutes to complete: about 1 minute for each radiator connected.

On completion, the "CONN" LED (3.3) goes out and the "SERVICES" LED (3.4) lights intermittently: 4 seconds On, 1 second Off.

Warning: the instruction for opening the valve is sent to one radiator at a time, following the progressive order of the actuator addresses.

- When the room temperature reaches the desired value, the thermostat sends the request for switching off the plant (Off), communicating it to the ICS 6..; this unit will carry out all the operations previously described, but in reverse order.
 - On completion the "CONN" LED (3.3) goes out and the "SERVICES" LED (3.4) lights intermittently: 4 seconds Off; 1 second On.

13.2 "Minimum room temperature" (optional) function

This function is enabled only if B1 detector is installed and the jumper between terminals "M - B" is removed.

Its purpose is to maintain a minimum room temperature (set on ICS 6.. by means of the potentiometer under the protective cover - see 9. WIRING DIAGRAM) so as not to disadvantage the neighbours during periods when the at is unoccupied.

When the room temperature (measured by B1 detector) falls below the minimum value set, ICS 6.. opens all the radiator valves until the room temperature is brought above the minimum value.

13.3 "Re-alignment and check of valves" function

At eight-hour intervals the control unit carries out a re-alignment and check of all the valves.

During this operation ("SERVICES" LED (3.4) flashing a number of times corresponding to the number of the valve being tested) all the operations carried out during the "TEST" function and described in section "12.2 - Testing connections to actuators of radiator valves - "TEST" function" are repeated. On completion there will be the same indications already described for the testing.

Its purpose is to ascertain, periodically, that the system is operating correctly and that all the valves are in position: completely open if the plant is On; or completely shut if the plant is Off.

Any faults, encountered during the re-alignment, are communicated to the UCR 668 metering unit.

WARNING: where ICS 6.. is used to control normal zone valves and, for this reason, the number of radiators to check is set at "0", the "re-alignment and check of valves" function is not carried out.

13.4 Recording the last alarm

This function permits knowing the last alarm situation recorded by ICS 6.. even when this has been reset by a further "automatic re-alignment and check of valves".

Press "TEST" button (3.5) for a second, even if on ICS 6.. no fault is indicated, and by the flashing of the "SERVICES" LED (3.4), the device will indicate the address of the valve or valves which have previously signalled an operating fault.

WARNING: if a manual "Test" is carried out, by pressing the "TEST" button (3.5) until the "CONN" LED (3.3), lights, the memory is cancelled.

13.5 Operating indications by the "SERVICES" LED (3.4).

1) NORMAL OPERATION

- plant On (metering enabled) intermittent: On for 4 seconds, Off for 1 second.
- plant Off (metering disabled) intermittent: Off for 4 seconds, On for 1 second.

2) DURING COMMUNICATION WITH THE ACTUATORS (LED "CONN" - 3.3 - ON):

intermittent:

On for 4 seconds & Off for 1 second if actuator instructed to open.

Off for 4 seconds and On for 1 second if the actuator instructed to close.

3) SIGNALLING DEFECTS OR BREAKDOWN : rapid flashing.

4) INDICATION OF BREAKDOWN: flashing, the number of flashes indicates the radiator or radiators in which faults noted during the "test".

5) DURING THE AUTOMATIC & MANUAL "TEST" FUNCTION: flashing, the number of flashes indicates the number of the radiator checked.

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