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INSERTOR IN C-RING OF VARIOUS CONTROLS FOR ONE OR MORE BOILERS

C ◄RING

OCR 34.. Eng.

- **Inserts in C-Ring, in order to control the desired temperature of the boiler/s:**
  - a temperature measured by means of a standard sensor
  - a 0…10 V- input which can be calibrated to any scale
  - a CDB 100 type remote control
  - a generic switch
- **Alarm relay + limit relay**
- **Power supply: OCR 344: 24 V a.c.; OCR 348: 230Va.c. (or 240 V a.c. for UK market)**

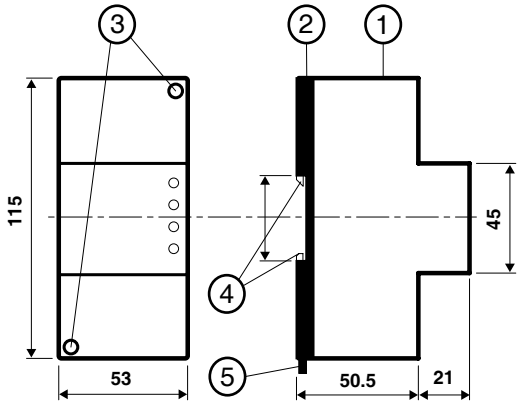
1. APPLICATION

Permits making standard inputs and controls compatible with controllers equipped with C-Ring.
Any COSTER controller not provided with C-Ring, or non-COSTER controllers with standard outputs, can be inserted in the C-Ring chain so as to have the desired temperature set point for the boiler/s system.
OCR 34.. can also be used with other devices provided with C-Ring as a data monitor of the C-Ring itself.
It is a way of communicating standard information to the boiler/s so as to obtain the required temperature.

2. SENSOR & ACCESSORIES

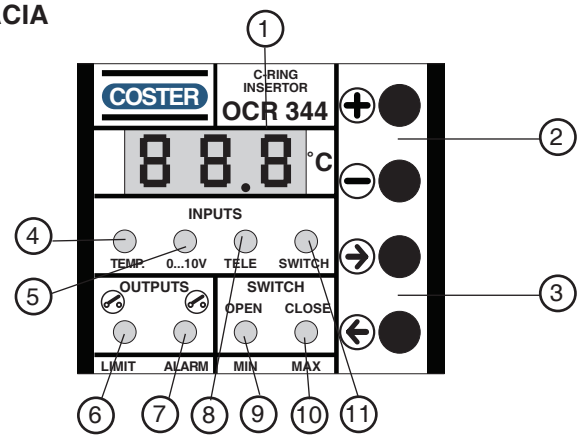
No.	Description	Model	Sensing element t°	Code	Data sheet
1	Temperature sensor – immersion	**SIH 010**	NTC 10 kΩ	B1	N 140
1	contact	**SCH 010**	NTC 10 kΩ	B1	N 130
1	Temperature adjuster	**CDB 100**	–	R	N 710

3. 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

4. FACIA



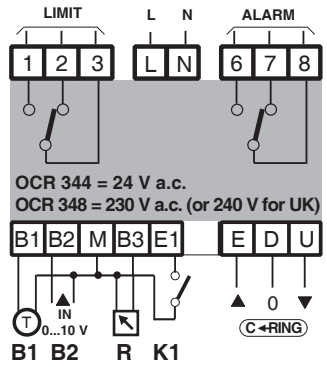
1 – Three-digit display
2 – + and – keys
3 – ← and → keys
4 – Temperature from sensor
5 – Temperature from 0…10V
6 – Temperature limit reached
7 – Alarm reached
8 – Remote control temperature
9 – Desired temperature with switch open
10 – Desired temperature with switch closed
11 – Temperature from switch

5. TECHNICAL DATA

Inputs :	from 0...10 Volt sensor, remote control and switch
Output	C-Ring
Output relay switches:	
maximum switched voltage	250 V a.c.
maximum switched current	5 (1) A
Power supply:	
OCR 348	230 V a.c ± 10%
	or 240 V a.c. for UK market
OCR 344	24 V a.c. ± 10%
Frequency	50…60 Hz
Assorbimento	3 VA
Protection	IP40
Radio disturbances	VDE0875/0871
Construction standards	Italian Electrotech. Committee (CEI)
Enclosure	DIN 3E module
Installation	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	0.23 kg
Inputs:	
B1= temperature sensor	NTC 10 KΩ 0...99 C
B2 = adjustable analogue	0...10 V–
B3 = configurable remote control	0...99 C adjuster
E1 = On-Off configurabile	digital switch
Outputs:	2 relays
Communication :	C-Ring secondary

6. WIRING DIAGRAM



L – Phase : OCR 344 = 24 Volt a.c.
OCR 348 = 230 Volt a.c. (or 240 V a.c. for UK market)
N – Neutral
1, 2, 3– Temperature limit relay (FAIL TO SAFE)
Threshold exceeded = relay de-energised = 3 – 2 closed
Threshold not exceeded = relay energised = 3 – 1 closed
6, 7, 8 – Alarm relay: alarm in progress
Alarm on = relay energised = 8 – 6 closed
Alarm off = relay de-energised = 8 – 7 closed
B1 – Analogue input for NTC 10 KW sensor (0...99.5°C)
B2 – Analogue input 0…10 V –
M – Earth
B3 – Analogue input for remote control "R"
K1 – Digital input
E, D, U – Connection to C-Ring

7.INSTALLATION

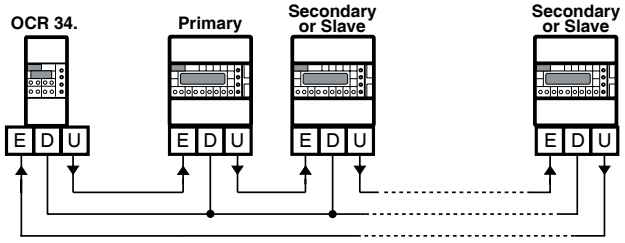
OCR 34.. should be sited in a dry environment which meets the relevant conditions given under 5. TECHNICAL DATA ". If installed in a location classified as "Hazardous" it must be installed in a cabinet for electrical equipment constructed according to the regulations in force for the class of danger concerned.
The controller can be mounted on a DIN rail and housed in a standard DIN enclosure.

8. ELECTRICAL CONNECTIONS

Proceed as follows :
• Separate base and cover after having removed the securing screws (3.3),
• Mount the base on the DIN rail and check that the securing elements (3.4) anchor it securely,
• Make the electrical connections strictly according to the diagram and in respect of the safety regulations in force, using the following cables :
– 1.5 mm^2 for power supply and relay control outputs,
– 1 mm^2 for all the other connections,
• Switch on power (230 V a.c., or 240 V a.c. for UK market) and check its presence at terminals L and N,
• Switch off power, replace cover on base/terminal block and secure it with the two screws supplied (3.3) .
It is advisable not to insert more than two cables in a single terminal and, if necessary, to use an external terminal block.

9. C-RING CONNECTION

The OCR 34.. controller can be only "Slave".
In the C-Ring the following signals are transmitted:
– permission for the controllers to operate
– measurement of **outside temperature**; use of a single sensor for several controllers
– value of **flow temperature** requested by the controllers, used by the PRIMARY controller for the regulation of the temperature of the boilers (if programmed).
– **priority of calorifier** and/or of **anticondensing** = modulating closure of valves of heating zones.



10. OPERATION

OCR 34.. processes and examines the temperatures acquired from those, of the four inputs, which are used (sensor, 0…10 V, Remote Control and switch); at the same time it measures the temperature which is read in C-Ring.
Selects the highest of these five temperatures and re-transmits it in the C-Ring to the Primary.
The Primary usually controls the boiler or boilers and, via C-Ring, receives the set point which represents the desired temperature. The inputs have the following significance:
– **input represented by the temperature sensor (B1)** : the value of this temperature, which enters as one of the four values, is measured. This input can serve to give to the boiler a desired temperature slightly above that measured at any other point.
– **0…10 V input:** this input **(always enabled)** can be calibrated with any desired temperature scale and permits any device provided with a 0…10 V output to communicate the desired temperature to the boiler..
– **Remote control (CDB 100)**: to control the boiler temperature manually.
– **Switch**, the opening or closing of which can be associated with two different desired temperature values.

OCR 34.. has two digital outputs (switching relays)
– **Limit**: this relay switches off (safety = FAIL SAFE) when the maximum temperature chosen by OCR exceeds a desired pre-set level. This output can be used to know when the system requests the boiler to provide a temperature above a certain level, and to act accordingly (e.g. call up a second boiler when the first has been asked for too high a temperature). When the requested temperature falls below the limit (with differential 1°C) the relay becomes energized again.
– **Alarm**: this relay is energised when the controller goes into the alarm state for:
- lack of C-Ring reception,
- input B1 sensor (if enabled) with short- or open- circuit
- B3 remote control input (if enabled) with short- or open- circuit

11. USER INTERFACE

11.1 Normal display

Normally the controller displays the highest temperature value among those of its enabled inputs, keeping lit the LED for the input that has generated this value.
If the temperature limit has been exceeded the respective LED lights; the alarm LED indicates the presence of this state.

11.2 Display of inputs

Press ⊕ : on display appears "**Sen**" alternating with "**XX.X**", the temperature value of the sensor.
If this input is not enabled there will appear "no" (default = "no")

Press ⊕ : on display appears "**InG**" alternating with "**XX.X**", the temperature value communicated from the 0…10 V input.
This input is always enabled.

Press ⊕ : on display appears "**Rem**" alternating with "**XX.X**", the temperature value communicated by the remote control.
If this input is not enabled there will appear "**no**" (default = "**no**")

Press ⊕ : on display appears "**Swi**" alternating with "**XX.X**", the temperature value communicated by the switch.
If this input is not enabled there will appear "**no**" (default = "**no**")

Press ⊕ : on display appears "Cri" alternating with "XX.X", the temperature value received from the C-Ring.
Obviously, this display is always present.

Press ⊕ : to return to the normal display; in any event, you return to this position after 15 minutes

12. CONFIGURATION & TESTING

Press ⊕ for at least 10 seconds until "**– – –** " appears; **release the key**

Configuration of temperature sensor (B1)

LED sensor B1 lit, with ⊕ and ⊖ select: "**Yes**" = sensor used; "**no**" = sensor not used. If "Yes":

Press ⊕ LED sensor B1 lit & ALARM LED lit, with ⊕ and ⊖ set the simulated temperature you require when the sensor has open or short circuit..

Configuration 0...10 V input

Press ⊕ LED 0…10 V input lit, and LED MIN lit, appears "**InG**" alternating with "**XX.X**" with ⊕ and ⊖ you set lowest value in volts on the input scale.

Press ⊕ LED 0…10V input lit, and LED MIN lit, appears "**tE**" alternating with "**XX.X**" with ⊕ and ⊖ you set temperature value you want to associate with lowest value in volts on the input scale.

Press ⊕ LED 0…10 V input lit, and LED MAX lit, appears "**InG**" alternating with "**XX.X**" with ⊕ and ⊖ you set the temperature value you want to associate with highest value in volts on the input scale.

Press ⊕ LED 0…10 V input lit, and LED MAX lit, appears "**tE**" alternating with "**XX.X**" with ⊕ and ⊖ you set the temperature value you want to associate with highest value in volts on the input scale.

Configuration Telecontrol input

Press ⊕ LED TELE lit, with ⊕ and ⊖ you choose: "**Yes**" = Telecontrol used; "**no**" = not used. If "Yes"

Press ⊕ LED TELE lit, with ⊕ and ⊖ set temperature value which corresponds to Telecontrol set in central position (index vertical).

Press ⊕ and LED MIN and MAX lit; with ⊕ and ⊖ you set temperature interval (plus or minus in respect of central value) that you wish to have at the two Telecontrol limits.

Press ⊕ LED TELE sensor lit, and LED ALARM lit; with ⊕ and ⊖ you set the simulated temperature you want when the Telecontrol has open or short circuit.

Configuration switch

Press ⊕ LED SWITCH on; with ⊕ and ⊖ select: "**Yes**" = switch used; "**no**" = not used. If "Yes"

Press ⊕ LED SWITCH on and LED MIN on; with ⊕ and ⊖ set temperature value you want to have when switch is open

Press ⊕ LED SWITCH on and LED MAX on; with ⊕ and ⊖ set temperature value you want to have when switch is closed.

Configuration relay for maximum temperature limit

Press ⊕ LED LIMIT on; with ⊕ and ⊖ set temperature value above which you want to operate on limit relay.

Readout program version and return to first page

Press ⊕ appears "**Tes**" (position able to lead to TESTING)

Press ⊕ for less than 3 seconds appears "**XXP**" = version of the software (and you do not enter TESTING)

Press ⊕ to return to normal; display; in any event, you return to display after 15 minutes.
You can return to the normal display at any time by pressing the ⊖ and ⊕ keys at the same time.

Testing

To really enter in TESTING you have to start from the "**Tes**" position and:

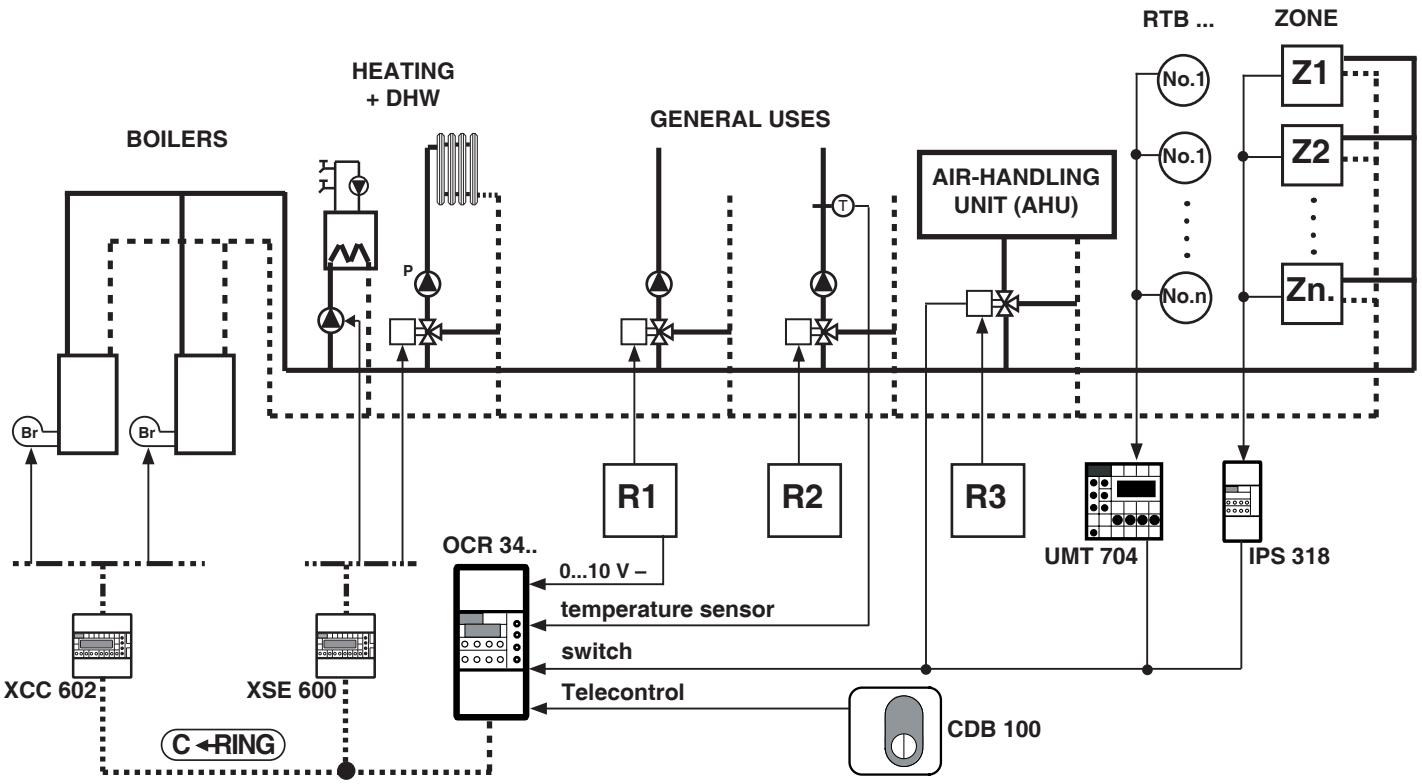
Press ⊕ for at least 5 second; there will appear: "**– – –**", **release the button** when there will appear:
LED LIMIT flashing; with ⊕ and ⊖ you can set the limit relay "**on**" or "**oFF**".

Press ⊕ ALARM LED flashing; with ⊕ and ⊖ you can switch the alarm relay "on" or "off" with the same logic as the limit relay

Press ⊕ the version of the program re-appears.

Press ⊕ to return to the normal display; in any event, you return to this position after 15 minutes.
You can return to the normal display at any time by pressing the ⊖ and ⊕ buttons together.

13. EXAMPLE OF A TYPICAL APPLICATION



In this example of an HVAC site are illustrated various automations which can be obtained via OCR 34..

– **XSE 600** : this is the site controller for heating and the production of DHW, which, via C-Ring, send its request for temperature to the boilers control
– **R1** : this is a generic controller from COSTER or other manufacturer. It has a 0…10 V output, tied to the temperature of the manifold. Via the 0…10 V input it communicates this temperature to OCR 34…
– **R2** : another generic controller from COSTER or other manufacturer, not provided with output. The sensor measures the temperature continuously at the user output. This temperature is sent to OCR 34… If this value is the maximum received by OCR 34.., it is sent via C-Ring for the control of the boilers. The desired temperature for the boilers is set a few degrees above this value.
The temperature at the output of the boilers will continue to increase until the temperature of the site (measured by the sensor) no longer increases, since the R2 controller is satisfied. At this point the temperature of the boilers also becomes stabilized. This way of piloting a set point (desired temperature for the manifold) is known as "AUTO-TRACKING".
The two temperatures follow each other until the one in control stops, thereby stopping also the controlled temperature too.
– **R3** : an auxiliary switch of the valve actuator is used to communicate to OCR 34… that this use requires a certain temperature. If this is the maximum it will be the one which controls.
– **UMT 704** : the output switch of UMT 704 is used; this closes when there is a demand for heat by the RTB....
The function is similar to that described for R3
– **IPS 318** : this application refers to a zoned site. When any zone calls for heat you use the end run of the relative zone valve to control IPS 318. When at least one zone is active a switch is sent to OCR 34.., which operates in the same way as that described for R3.
– **CDB 100** : by means of this remote control you send a temperature value, which represents the minimum temperature you required at the manifold, when all the other requests are below this value.
This is a further service that can fulfil other requirements which cannot be met in any other way.
The Telecontrol can also be supplemented by one or more timers which, in accordance with a program, can choose various CDB 100 thereby creating a large variety of set-point.
– **XCC 602** : this is the terminal of the whole system: its C-Ring is programmed as PRIMARY in order to be able to activate any Slaves and to control OCR 34...

When the site is even more complex several OCR 34.. controllers can be used in order to increase as required the number of input functions.
In the C-Ring, OCR 34.. behaves like any other secondary controller, since each unit processes all the data before sending it in the C-Ring.

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