

C-RING TEMPERATURE INSERTOR

C ←RING



LCR 348 Eng.

- Via C-Ring reads the maximum desired temperature of all the COSTER controllers equipped with this Bus (e.g. maximum among several flows)
- Converts this temperature, corrected if necessary positively or negatively, into 0...10 V output adjustable as desired
- Relay output when measured temperature exceeds an adjustable threshold
- C-Ring alarm output.
- Power supply 230 V a.c. (or 240 V a.c. for UK market); DIN 3 unit mounting

1. APPLICATION

Permits sending the desired temperature from any C-Ring-enabled COSTER controller to any system (including non-COSTER) provided with a 0...10 V input, representing the desired temperature (set-point).

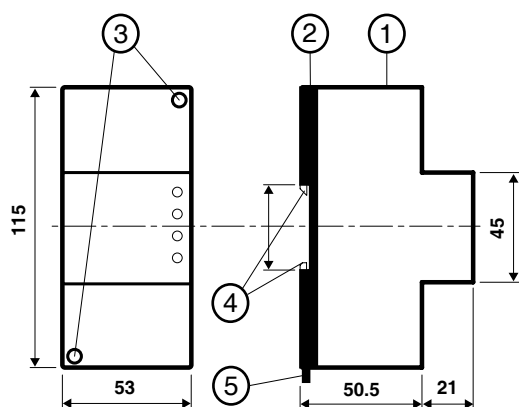
It is possible to add or remove a certain number of degrees centigrade (+/- 30°C) to/from the temperature received from C-Ring, so as to be able to program sequences or precedents if required.

Essentially, LCR 348 permits a very simple dialogue between a system comprising one or more COSTER controllers and any other system provided with a 0...10 V input (temperature set-point).

Example of application:

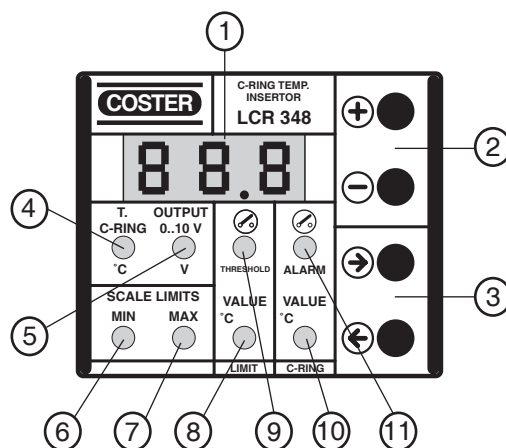
An HVAC site with a large number of flows and consumer uses controlled by C-Ring enabled COSTER controllers. LCR 348 measures the maximum temperature desired by these controllers, converts it into a 0...10V output which is sent to the boiler/boilers provided with a 0...10 V input which controls the desired temperature.

2. OVERALL DIMENSIONS



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

3. FACIA

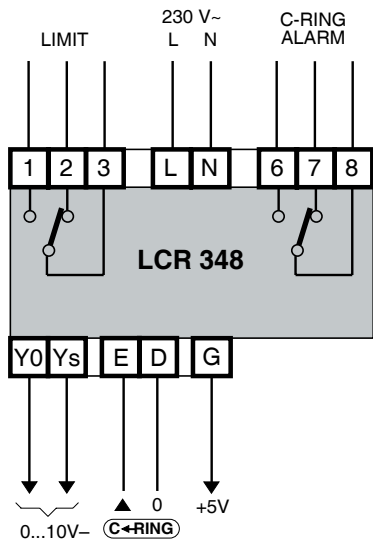


- 1 – Three-digit display
- 2 – + and - keys
- 3 – ← and → keys
- 4 – Display shows temperature required by C-Ring
- 5 – Display shows value in volts of temperature required by C-Ring
- 6 – Setting values start scale temperature/volts
- 7 – Setting values bottom scale temperature/volts
- 8 – Setting limit threshold
- 9 – Threshold limit relay
- 10 – Temperature value with C-Ring not received
- 11 – C-Ring relay alarm not received

4. TECHNICAL DATA

Input	from C-Ring	Construction standards	Italian Electrotech. Committee (CEI)
Output	0...10 V – (max. 10 mA)	Enclosure	DIN 3E module
Voltage-free output contacts:		Installation	DIN 35 rail
maximum switched voltage	250 V~	Materials :	
maximum switched current	5 (1) A	base	NYLON
Power supply	230 V a.c. ± 10%	cover	ABS
	or 240 V a.c. for UK market	Ambient temperature :	
Frequency	50...60 Hz	operating	0...45 °C
Consumption	2 VA	storage	- 25...+ 60 °C
Protection	IP40	Ambient humidity	Class F DIN 40040
Radio disturbances	VDE0875/0871	Weight	0.23 kg
Vibration test	with 2g (DIN 40 046)		

5. WIRING DIAGRAM



- L – Phase
- N – Neutral
- 1, 2, 3 – Relay temperature-limit contacts
 - Threshold exceeded** = relay de-energised = 3 – 2 closed
 - Threshold not exceeded** = relay energised = 3 – 1 closed
- This relay is fail to safe: it is de-energised even when C-Ring is not received to ensure total safety**
- 6, 7, 8 – Alarm relay contacts: C-Ring not received
 - C-Ring not received** = relay energised = 8 – 6 closed
 - C-Ring received** = relay de-energised = 8 – 7 closed
- This relay is controlled in a manner complementary to previous relay for increased security
- Y0 – Cold pole (0 volts) output 0... 10 V–
- Ys – Hot pole (volts) output 0... 10 V–
- The output 0... 10V (max. 10mA) is galvanically insulated so it can be connected safely to any input.
- E – C-Ring input
- D – Earth
- G – Output 5 volts auxiliary power supply (max 20 mA)

6. INSTALLATION

LCR 348 should be sited in a dry environment which meets the relevant conditions given under 4. 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.

7. ELECTRICAL CONNECTIONS

Proceed as follows :

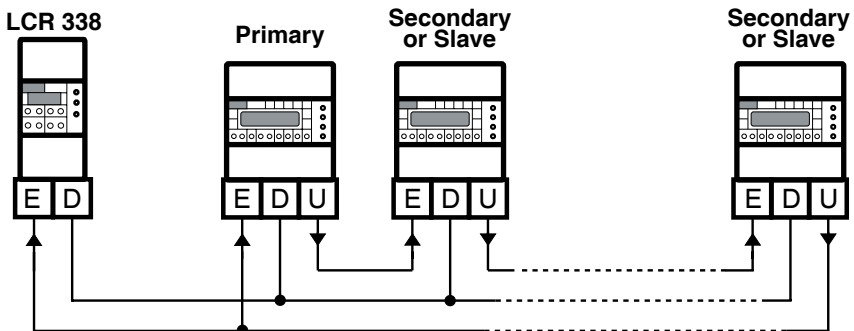
- Separate base and cover after having removed the securing screws (2.3),
- Mount the base on the DIN rail and check that the securing elements (2.4) anchor it securely
- Make the electrical connections strictly according to the diagram and in respect of the safety regulations in force using the following cables :
 - 1.5 mm² for power supply and relay control outputs,
 - 1 mm² 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) .

It is advisable not to insert more than two cables in a single terminal and, if necessary, to use an external terminal block.

8. C-RING CONNECTION

The E input and the C-Ring input of LCR 338 is connected directly in parallel to the E input of the primary controller: in this way it monitors the maximum temperature desired by all the secondary controllers and by the primary controller.

The input E of the primary controller is obviously connected to the output U of the secondary controller, the last in the Ring. If LCR should be connected to the output of any secondary controller which is not the last in the ring it would monitor the maximum temperature of the primary and of the first part of the secondary controllers, up to the point of connection..



WARNING: C-Ring is activated about every 60 seconds and so the temperature received by LCR 348 is updated accordingly.

9. OPERATION

LCR 348 insertor reads the maximum desired temperature of the controllers connected in the C-Ring since it is placed at the end of the whole ring, precisely in the position of the Primary controller.

The operations it carries out are :

- converts the temperature measured, adjusted, if necessary, by a value from – 30 to +30°C, into a 0... 10 V output, adjustable as required (free scale); this 0... 10 V output can be connected to any input with these features, of any heat generator such as: boiler/s, heat exchanger, co-generation systems and the like.
 - controls the limit relay when the temperature, received via C-Ring but without corrections, exceeds an adjustable threshold (see 5. Electrical Connections).
- The relay is normally energised so that it operates safely (fail to safe).

Alarms and safe operation:

If, for any reason, the C-Ring should be interrupted (e.g. short-circuit or cable breakage), LCR 348 is provided with alarm and safety systems in order to ensure continuity of operation..

- switches on alarm relay when C-Ring absent for 10 minutes.
- simultaneous control of the limit relay, since not knowing the temperature it is put on safety status
- sends to 0...10 V output a voltage value corresponding to a temperature chosen at will: in practice, you control the generator with an emergency temperature that ensures continuity of service, whilst at the same time you can send an alarm via the dedicated relay.

LCR 348, when switched on, uses a special procedure to ensure that a lack of power does not provoke pointless temperature controls:




- when switched on there appears the writing **At.C** = awaiting C-Ring: the 0...10 V output is kept at 0 (zero)
- when the first C-Ring arrives, normal operation starts.
- if C-Ring does not arrive within a certain period of time, the output is automatically set at the pre-set C-Ring alarm value.


10. READOUT INPUT/OUTPUTS

Normalmente (prima pagina) il display presenta **value received from C-Ring: XX.X °C**.

If the temperature should not be received from C-Ring, you read the emergency temperature which is in any event programmed to send to the output, so as to ensure continuity of service.

In this event the LED C-RING ALARM (3.11) flashes..

Press  flashing there appears the correction you want to make to the temperature received from the C-Ring: 00
Press  and  keys to select the value you want between - 30 and + 30 °C.

Press  to read **the value in volts of the output: X.X V**, corresponding to the temperature received and corrected.

Press  to return to the first page.



11. SETTING

The most important part of the setting is the calibration of the 0...10 V output in regard to the temperature to be communicated to the system to be controlled.



The setting scale can be any in order to render LCR 348 adapted to the type of burner, boiler or heat generator provided with a 0...10 V input.

Example of scale: 1 V = 20°C (low point or MIN); 9 V = 95°C (high point or MAX).



Press  **for at least 10 seconds:** you enter setting mode. Three dashes appear (---) release button

- LED MIN (3.6) flashes with LED T./C-Ring (3.4) lit: using  and  keys **set the temperature corresponding to the start scale of 0...10 V output** (in example 20°C).

Press  :

- LED MIN (3.6) flashes with LED OUTPUT 0...10 V (3.5): with  and  keys **set value in volts corresponding to start of temperature scale** (in example: 1 V).



Press  :

- LED MAX (3.7) flashes with LED T./C-Ring (3.4) on: with  and  keys **set temperature corresponding to bottom of scale of 0...10 V output** (in example: 95°C).



Press  :

- LED MAX (3.7) flashes with LED OUTPUT 0...10 V (3.5) lit: with  and  keys **set value in volts corresponding to bottom of temperature scale** (in example: 9 V)

Press  :

- LED LIMIT VALUE (3.8) flashes with THRESHOLD LED (3.9) lit: with  and  keys **set the temperature value (THRESHOLD) beyond which you want limit relay to switch off** (see 5. Wiring Diagram on page 2). Remember that this relay is fail safe. The threshold differential is 1°C. The threshold value is directly linked to the temperature value received from C-Ring, without any corrections.



Press  :

- LED C-RING VALUE (3.10) flashes with ALARM LED (3.11) lit: with  and  keys **set the temperature value you require at the output (converted on the 0...10 V scale) when there is an irregularity on the C-Ring line.**

This is the set-point you want in any event to assign to the output so as to ensure the continuity of service even in the absence of C-Ring. This temperature value does not include any corrections which may be made.

Press  :

- All the four lower LEDs (3.6, 3.7, 3.8 & 3.10) flash and LED T./C-Ring (3.4) is lit: you enter **testing**.

With  and  keys you can **choose a temperature value to send to the output (converted to the 0...10 V scale)**, and check that the user also receives the same temperature value (derived from control in volts).

In short, you test if the scale has been correctly calibrated and coupled to the type of use.

Press  :

- The **software version** is displayed. e.g.: 02 P.

Press  :

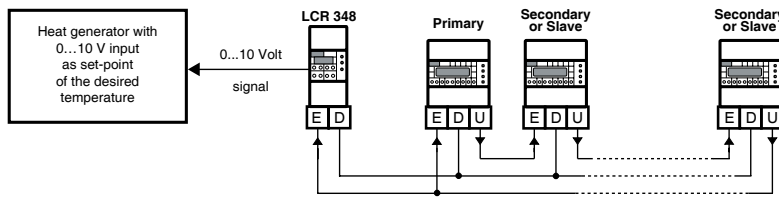
- You return **to the first page**

In any event, you return to the first page 15 minutes after the last depression of any button.

12. EXAMPLES OF APPLICATION

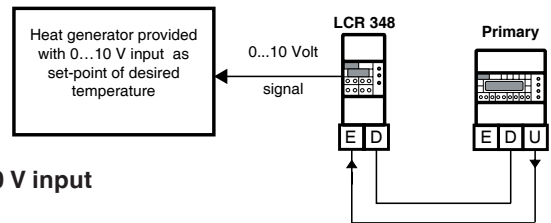
12.1 Control of temperature of a heat generator with 0...10 V input

Via C-Ring the maximum of all the desired temperature values of the various controllers is sent to LCR 348. This maximum value, converted into 0...10 V, is sent to the temperature controller of the heat generator, which can be of any type.



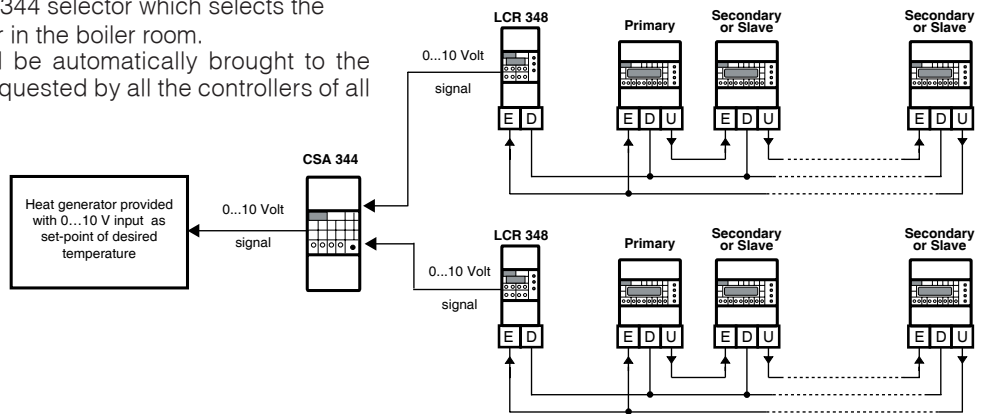
12.2 Example of connection with a single primary controller

This system includes a single primary controller, which sends through C-Ring a LCR 348 desired temperature value. The primary controller's C-Ring alarm must be disabled.



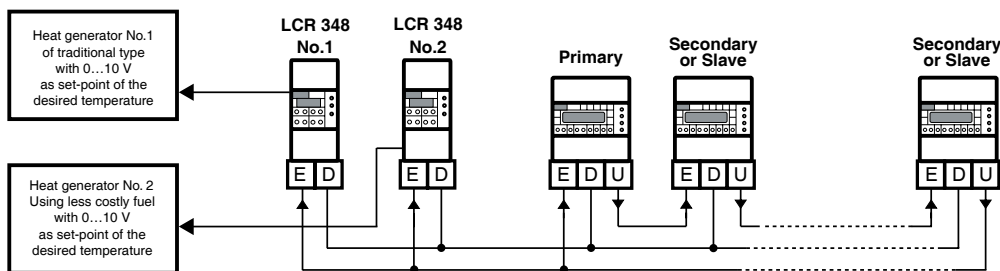
12.3 Temperature control, on multiple sites, of a heat generator with 0...10 V input

This site comprises several groups of controllers. Each group controls a building separated from the others (e.g. a single boiler room which powers several buildings). Each group sends via LCR 348 the 0...10 V signal to the CSA 344 selector which selects the maximum value to send to the controller in the boiler room. Heat generator in the boiler room will be automatically brought to the maximum temperature among those requested by all the controllers of all the buildings.



12.4 Control of temperature of two or more generators in sequence

Here we consider a system comprising traditional boilers and a second generator using less costly fuel (e.g. co-generator). The more economic generator must have precedence over the traditional generators. The normal boilers are controlled by the maximum temperature requested by the zones, without correction, whilst the generator running on cheaper energy is controlled by the second LCR 348, with a higher temperature. The traditional generator will come into operation only when the second (more economic) generator is no longer able to provide the required temperature. Multiple and more complex systems can be put in sequence as required by combining one or more LCR 348 with other sequential systems.



Amended to data sheet

Data	Revision No.	Page	Section	Amendment description	Firmware Verion	Software Version
15.11.06 AM		2 2,4 3	5. WIRING DIAGRAM 8., 12. 10., 11.	AUpdated description relay switches in the legend Updated diagrams C-Ring & examples applications. Various explanations & corrections		
18.10.10 VM	01	4	Section 12.2 added			