T 022
28.04.08 DA
REV. 01

SYSTEM FOR DATA TRANSMISSION BETWEEN CONTROLLERS

C ◄RING

1. GENERAL

C-Ring is a serial communication system between Coster controllers designed for this type of function. The controllers are connected in a three-wire ring which permits the transmission of data and measurements of common interest.

2.APPLICATION

Communication between a controller defined as **Primary** and controllers and associated devices defined as **Secondaries** or **Slaves** for the transmission of the following data:

– outside temperature
– minimum temperature of return-to-boiler water (anticondensing)
– temperature of DHW (priority over heating and control boiler)
– temperature of flow (request by controllers of DHW/heating/auxiliary circuits as desired boiler value)
– permission to operate as **Slave** controllers

3. TECHNICAL DATA

The C-Ring consists of **a single Primary controller** to which are connected controllers or associated devices configured as **Secondaries** together with **Slave** controllers or associated devices. If 1mm^2 wire is used for the C-Ring connections, in order to ensure the functioning of the communication system, the maximum distances between the devices are as follows:

– **300 meters** between : Primary and Secondary
Primary and Slave
Secondary and Secondary
Secondary and Slave

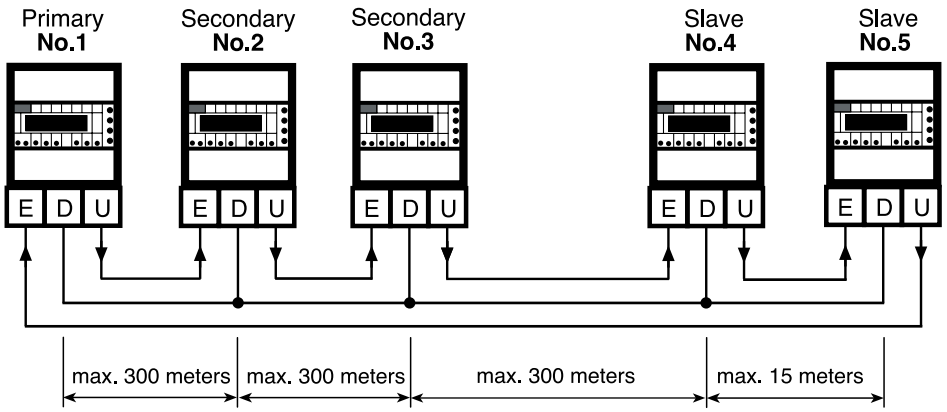
– **15 meters** between : Slave and Slave

– **2,000 meters** : Permitted distance with the use of two **PCR 308** signal amplifiers

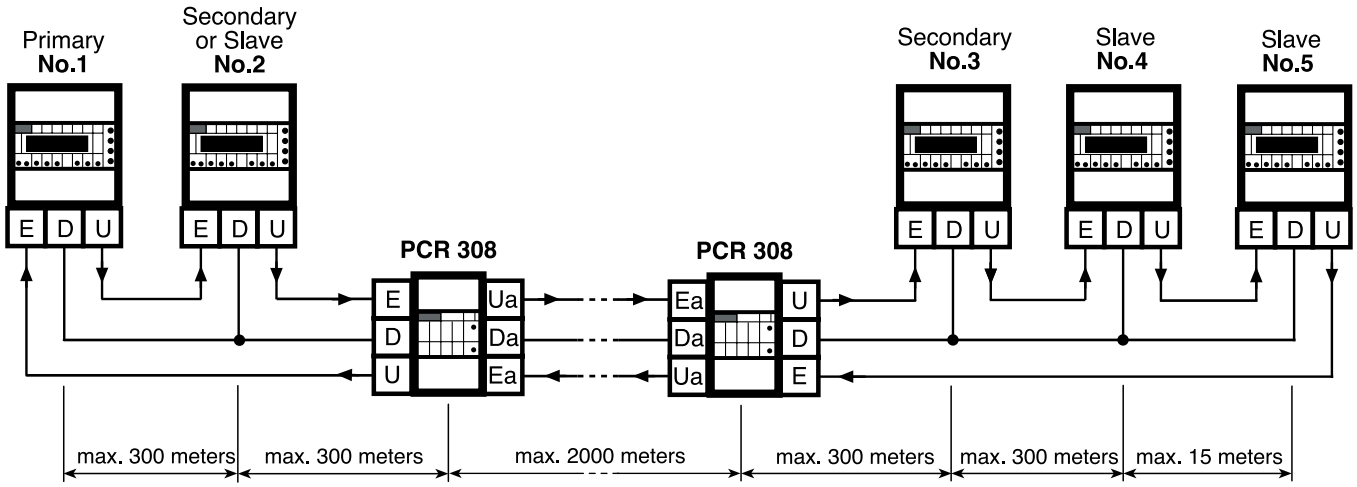
Warning:
– keep the C-Ring separate from the power lines.
– a break in the C-Ring, or a fault in the Primary controller will, after about 15 minutes, prevent the operation of the Slave controllers, while the Secondary controllers will continue to function with their own data.

4. FUNCTIONAL DIAGRAMS

4.1 Without PCR 308 amplifiers



4.2 With PCR 308 amplifiers



5. OPERATION

The following examples illustrate the most important uses of data in the C-Ring.

5.1 Outside temperature

Purpose :

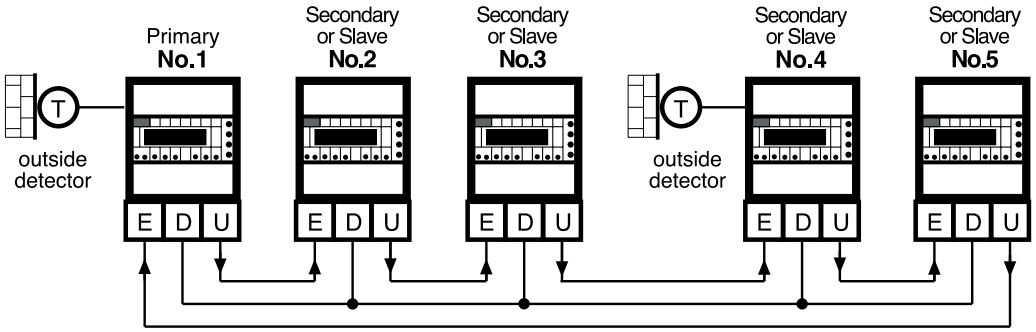
Use of a single outside detector for several controllers thereby saving on detectors and electrical connections.

This is possible when the outside temperature value can be considered homogeneous for all the DHW/heating/auxiliary circuits connected; otherwise it is necessary to measure with two or more detectors.

Operation :

The controller with the outside detector connected transmits the temperature measured to the other controllers without detectors which follow it in the ring. When another controller in the ring has an outside detector, it uses the value measured by this detector and transmits this (substituting it for the previous value) to the devices following it in the ring. In this way the DHW/heating/auxiliary circuit devices having the same exposition, or groups of devices a long distance from each other and which, therefore, operate in different climatic conditions.

Example :



Controller **No.1** transmits the measurement of the outside temperature made by its detector to controllers **No.2** and **No.3**; controller **No.4** uses the outside temperature from its own detector and transmits it to controller **No.5**.

5.2 Anticondensing temperature

Purpose :

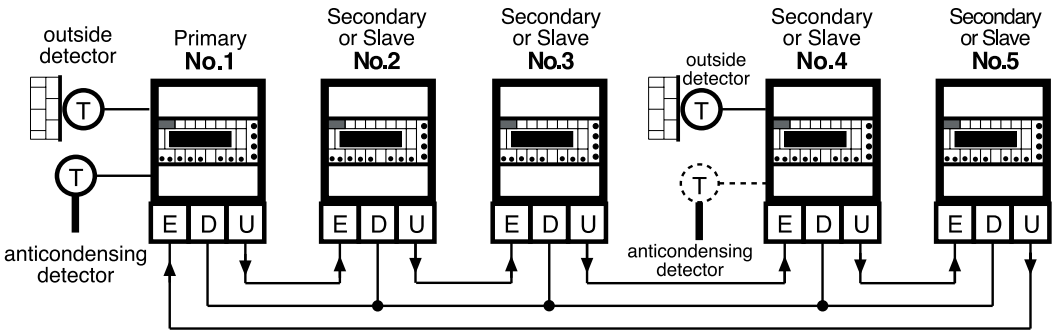
To avoid the phenomenon of condensation it is essential that the return-to-boiler water temperature does not fall below a pre-set value. In a heating circuit with several flows, each with its own controller, and a single central boiler, it is possible to use a single return-to-boiler temperature detector.

Operation :

The controller with anticondensing detector measures the difference between the value measured and that set. If the difference is negative (temperature measured below that set), the controller and those that follow it in the ring, provided they have the anticondensing function enabled, reduce, in proportion to the difference, the flow temperature of the heating circuit controlled by them with consequent modulating closure of the control valve.

If in the ring there is present another controller with anticondensing detector, to the value measured by this detector will refer both the controller connected as well as those that follow it in the ring with the function enabled.

Example :



Controllers **No.2**, **No.3** and **No.4**, enabled for the anticondensing function, receive the measurement of the anticondensing temperature from controller **N1** and, as a consequence, adjust their respective heating control valves. Controller **No.4**, since it controls an air-handling plant, does not have the anticondensing function enabled and so does not take it into consideration.

If controller **No.4** were provided with an anticondensing detector (dotted line), both this controller and controller **No.5** would refer to the value measured by this detector and not to that transmitted by controller **No.1**.

5.3 Priority in the production of DHW

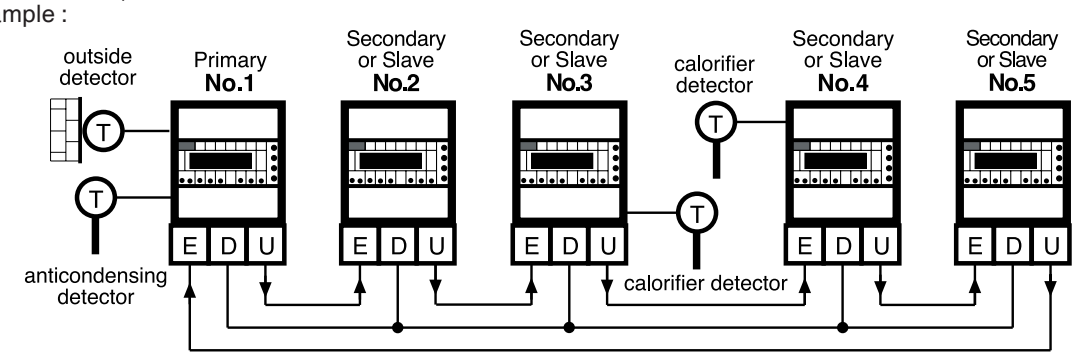
Purpose :

Ensure the availability of DHW by transferring all the available thermal energy to the calorifier and withdrawing it temporarily from the heating circuits.

Operation :

The behaviour of the priority function is similar to that described for the anticondensing temperature.
If the actual temperature of the calorifier is below that desired (negative difference), the heating control valve is modulated towards closure, simulating a reduction in the desired flow temperature (4°C for each 1°C of difference).

Example :



The priority functions of the calorifier take place:

– on controller **No.3** by means of its own calorifier
– on controller **No.4** by means of its own calorifier
– on controller **No.5**, if enabled, by means of the signal transmitted by controller **N4**

5.4 Operating temperature of boiler(s) (when the **Primary** controller controls also the boiler(s))

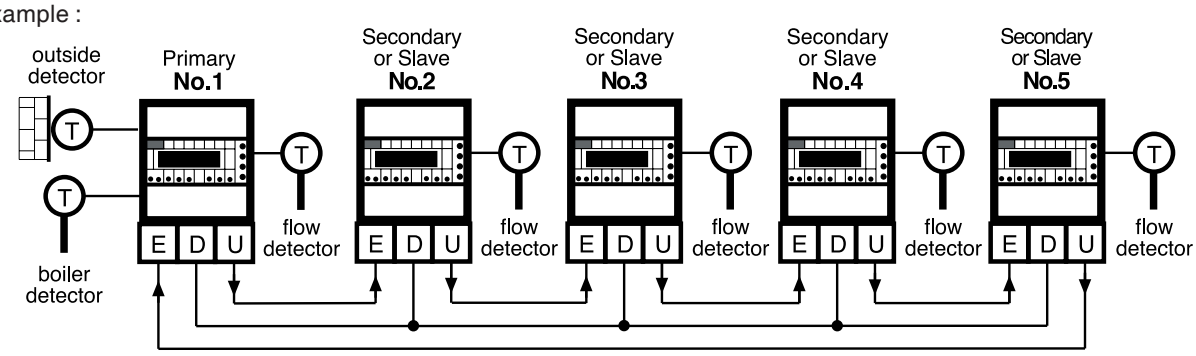
Purpose (when the **Primary** controller controls also the boiler(s):

Ensure that the operating temperature of the boiler(s) can always meet the request for heat from the DHW/heating/auxiliary circuits.

Function:

Each controller receives, via C-Ring, the value of the flow temperature requested by the controller preceding it in the ring, compares this value with its own and sends to the next controller the higher of the two.
Then the last controller in the C-Ring transmits the highest temperature value to the **Primary** controller which compares this value with its own; the higher of the two values is taken as the operating temperature of the boiler (s). In this case the operation of the boiler (s) is ensured even if only one of the controllers in the C-Ring calls for heat.

Example :



6. COMMISSIONING

Check the electrical connections, ensuring that the C-Ring is closed (“U” terminal of the last controller connected to terminal “E” of the first controller).
Test the C-Ring using the procedure given in the data sheets of the individual controllers.

7. PERMITTED COMBINATIONS

Primaries	Secondary controllers	Slave	Convertors	Data sheet
DCC 602	**–**	**–**		**A 311**
DTC 648	**–**	**–**		**A 410**
DTC 618	**–**	**–**		**A 510**
DTE 611	**–**	**–**		**B 251**
DTE 600	**DTE 600**	**–**		**B 260**
DTE 602	**DTE 602**	**–**		**B 261**
RTE 611	**–**	**–**		**B 223**
RTE 602	**RTE 602**	**–**		**B 224**
RTE 643	**RTE 643**	**–**		**B 222**
RCS 633	**RCS 633**	**–**		**B 231**
–	**–**	**DSE 600**		**B 265**
–	**–**	**DSE 602**		**B 266**
DCS 633	**DCS 633**	**–**		**B 270**
DTT 618	**–**	**–**		**B 280**
DTT 608	**–**	**–**		**B 281**
DTR 628	**DTR 628**	**–**		**D 211**
RTR 628	**RTR 628**	**–**		**D 216**
DPS 638	**DPS 638**	**–**		**D 310**
RPS 638	**RPS 638**	**–**		**D 315**
UPT 678	**UPT 678**	**–**		**D 511**
XCC 602	**–**	**–**		**A 312**
XCC 618	**XCC 618**	**–**		**A 621**
XCC 638	**XCC 638**	**–**		**A 620**
XTC 638	**XTC 638**	**–**		**A 612**
XTE 611	**–**	**–**		**B 252**
XTE 600	**XTE 600**	**–**		**B 241**
XTE 602	**XTE 602**	**–**		**B 242**
–		**XSE 600**		**B 267**
–		**XSE 602**		**B 268**
XCS 633	**XCS 633**	**–**		**B 232**
XTT 618	**–**	**–**		**B 283**
XTT 608	**–**	**–**		**B 284**
XTP 600	**XTP 600**			**B 243**
XTR 628	**XTR 628**	**–**		**D 212**
			LCR 348	**D 661**

Amendments to data sheets

Date	Revision No.	Page	Section	Amendment description
17.01.07 DA		4	7. PERMITTED COMBINATIONS	Update PERMITTED COMBINATIONS table
28.04.08 DA	**01**	4	7. PERMITTED COMBINATIONS	Update table

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