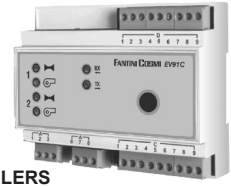
FANTINI COSMI S.P.A. VIA DELL'OSIO 6
20090 CALEPPIO DI SETTALA (MI) ITALIA
Phone no. +39 02 95682.222 Fax no. +39 02 95307006
E-mail: export@fantinicosmi.it
Web: www.fantinicosmi.it

CE



EV91C - SLAVE
MODULE FOR REGULATING TWO OR MORE CASCADED BOILERS

USE
The EV91C module is suitable to be used on all types of heating plants where it is required to portion out power over several cascaded boilers.
The module with address 0 enables full management of two cascaded boilers by controlling automatically both the butterfly valves and the burners.
When more than two boilers are present, add as many EV91C modules as necessary to cover system requirements. The maximum number of EV91C mo-dules that may be connected is four, for a total of eight cascaded boilers.

OPERATION
The device uses a measuring probe to read the temperature value of the delivery header and if the temperature drops below a set value and for a fixed time, the device will switch on the first auxiliary boiler by opening the butterfly valve and turning on the relevant burner.
If after a certain period of time one boiler is not enough, the second one will be turned on, and so on.
When the number of turned on boilers becomes excessive, the control unit will turn them off by shutting off first the burner and then, after an adjustable delay, the butterfly valves.

CALCULATED BOILER TEMPERATURE
The boiler temperature calculated by the control unit may be fixed or sliding. When it is fixed, the temperature value stays unvaried (i.e.: exactly like the set value), whereas when it is sliding, the value set is added to the highest temperature value required by the connected slaves. It is thereby possible to regulate the boiler with a temperature that constantly varies according to plant requirements.
N.B.: when setting the required boiler temperature value, take into account that with the fixed point regulation this will be the value used by the control unit whereas, with the sliding point regulation the value set will represent the increase with respect to the max. value established by the various control units

of the plant.

LIMITS

The EV91C module also enables to set min. and max. boiler temperature limits within which the calculated temperature may vary. The control unit will ensure that these values are not exceeded.

REGULATION

The device controls automatically both the burners and the relevant butterfly valves. The valve of the main boiler is always open; when the auxiliary boiler intervention is required the relevant valve and burner will open in sequence.

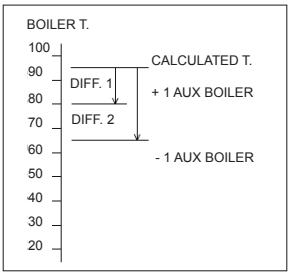
The temperature value (that may be fixed or sliding) calculated by the control unit is used as max. boiler temperature value. Should this value be exceeded, all burners are turned off whereas the main boiler butterfly valve stays open and the auxiliary boiler butterfly valves are opened or closed as necessary.

When the measured temperature drops below Diff 1 value the main burner will switch on and it will switch off as soon as the calculated boiler temperature (TCC value) is exceeded.

If the temperature drops below Diff 2 value and stays at this value for a certain period of time (to be set on the control unit) then, an auxiliary boiler will be switched on (in addition to other boilers operating yet).

When a new boiler is switched on, the relevant butterfly valve will open and after a certain time (to be set on the control unit) the burner will turn on.

Auxiliary boilers are cut off (always one at a time), when the measured temperature exceeds Diff 1 value and stays at this value for a certain period of time.



DIFFERENTIAL 1

Main boiler differential: it indicates the temperature difference, referred to the one calculated by the control unit, below which the main boiler burner is switched on.

DIFFERENTIAL 2

Auxiliary boiler differential: it indicates the temperature difference, always referred to the one calculated

by the control unit, below which an auxiliary boiler is switched on.

BOILER ROTATION

To obtain even power consumption of the different boilers, the main boiler is rotated automatically after a set number of days.
The control unit at the set time will replace the main boiler with the next one. Set “FIXED BOILERS” in the configuration menu if this function is unnecessary.

MAIN CONTROL UNIT

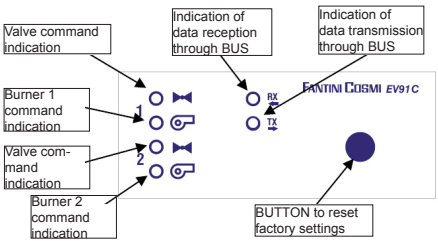
The main control unit (or master) has address 20 (no address bridge). The measuring probe shall always be connected to this control unit.
This control unit implements all logic and regulation functions and it is adequate for controlling automatically two boilers (boiler no. 1 and boiler no. 2). The master control unit determines the operation of all auxiliary cascaded control units through the bus.

AUXILIARY CONTROL UNITS

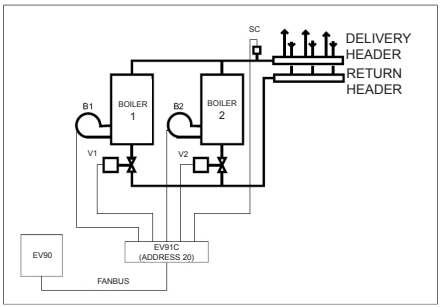
Auxiliary control units are used when there are more than two boilers. Their address determines the boilers sequence according to the following logic:
Address 21: boilers 3 and 4
Address 22: boilers 5 and 6
Address 23: boilers 7 and 8
The chief thing is to give addresses in progressive sequence without intermediate skipping. Since processing is implemented by the master control unit no measuring probe is to be connected to slaves.

DESIGN CHARACTERISTICS

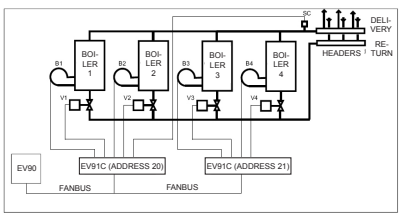
6-module DIN container; removable terminal boards facilitate replacement.



EXAMPLE OF PLANT WITH 2 CASCADED BOILERS



EXAMPLE OF PLANT WITH 4 CASCADED BOILERS



INSTALLATION

INSTALLING THE CONTROL UNIT

Mount the device onto the DIN rail inside a panel in order to provide suitable protection. Removable terminal boards facilitate wiring and replacement.

INSTALLING THE MEASURING PROBE

Install the temperature measuring probe (EC15 or EC16) onto the delivery header downstream all the boilers.

The contact probe EC15 must be fixed to the water pipe with the special clamp provided for the purpose. Place heat conducting paste between them to guarantee correct heat conduction For the same reason the immersion probe EC16 shall be fitted into the sheath filled with mineral oil or silicone grease. Connecting leads to the control unit must have a section of at least 1 mm2 and a length of 1000 metres.

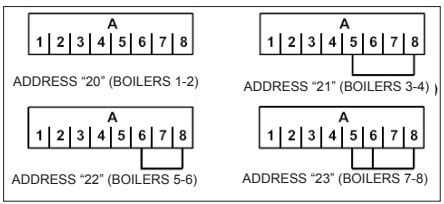
NB: The control unit also works with probes: EC82 (contact probe) and EC83 (immersion probe).

CONNECTION TO THE FANBUS

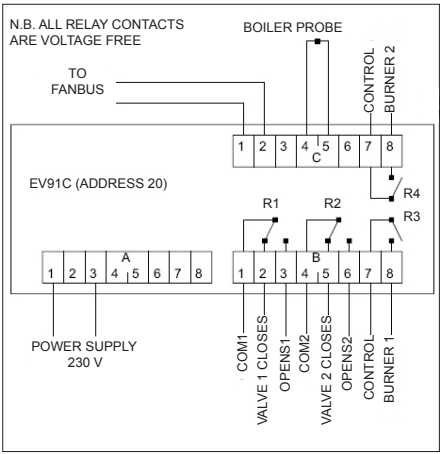
Connect the EV91C control unit to the Master EV90 through the Fanbus. Bear in mind that the bus has low voltage and it is not polarised, terminals can therefore be inverted with each other without causing malfunction.

CONTROL UNIT ADDRESS

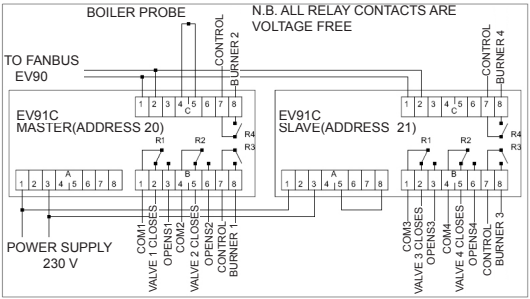
The control units must be addressed through the terminal board to work properly and to be queried by the remote management (see auxiliary control units).
The address of the EV91C unit is made up of a high part that corresponds to number “2” , and a low part that may take on a value between “0” and “3” which is set with the jumpers on the terminal board A5-A8.
The diagrams below show how to set the low part of the address.



WIRING DIAGRAM OF A PLANT WITH 2 CASCADED BOILERS



WIRING DIAGRAM OF A PLANT WITH 4 CASCADED BOILERS



SETTINGS AND ADJUSTMENTS

FACTORY SETTINGS

The EV91C leaves the factory with all parameters set for standard operation. Should it be necessary to reset factory parameters (default data), turn off the power supply, then turn it on again while pressing the key on the front panel. All data entered will be lost, whereas factory parameters will be reset.

INITIALISING THE CONTROL UNIT

Each time the control unit is powered, the leds set on the front panel will start flashing simultaneously until a communication is received; regular operation will start afterwards. This procedure is important to start regulation with valid parameters.

SETTINGS AND ADJUSTMENTS

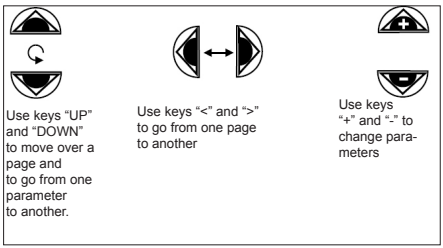
To modify EV91C data it is necessary to use the Master EV90 that will act like the display and the remote keyboard of the EV91C.

Data is entered through special menus provided for the purpose which may contain several pages of submenus.

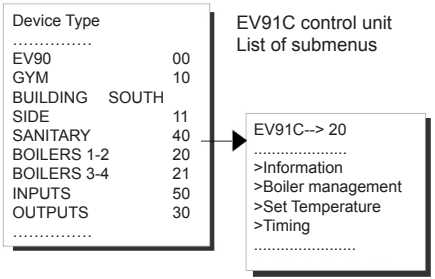
Information given and the type of data that may be modified change automatically depending on whether the address set is 20, and therefore the master control unit, or one of the others relevant to the slaves (21,22, or 23). E.g.: the temperature measured by the probe will only be read by the master control unit since it is connected to this device only; likewise, all regulation parameters may be set on this device only, whereas information on valve and burner management can be displayed on the auxiliary slaves.

COMMANDS ON THE FRONT PANEL OF MASTER EV90 FOR CONTROLLING SLAVE EV91C

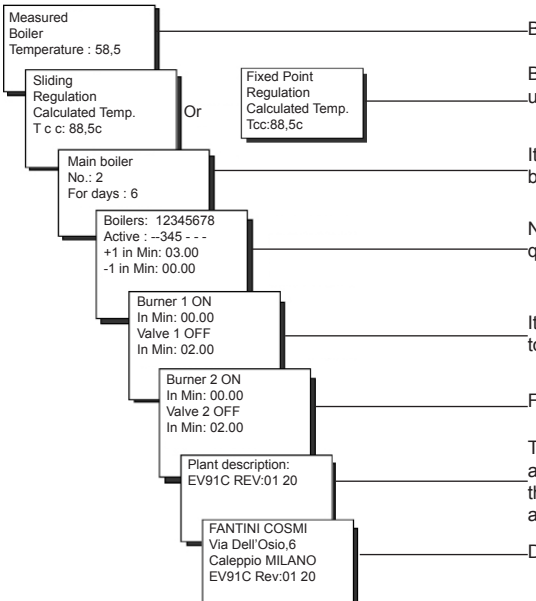
The highlighted cursor indicates which menu item is currently selected. Each item has a number of pages that can be scrolled through by keys “Forward/Back” (MASTER).



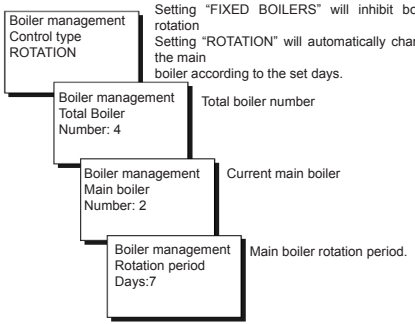
EV91C CONTROL UNIT MENUS PRESENT ON MASTER EV90



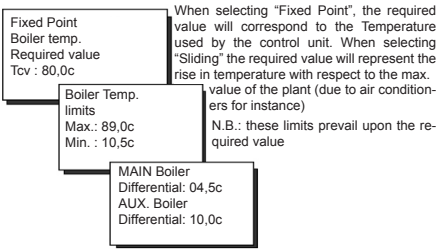
INFORMATION SUBMENU



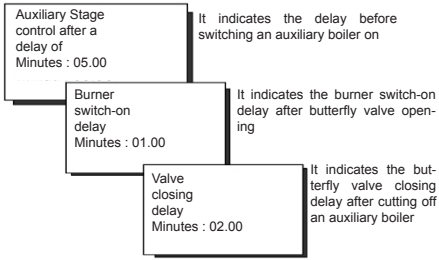
BOILER MANAGEMENT SUBMENU



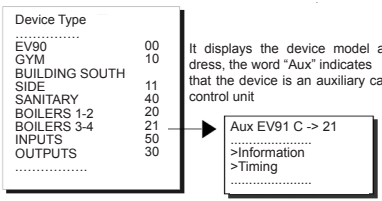
SET TEMPERATURE SUBMENU



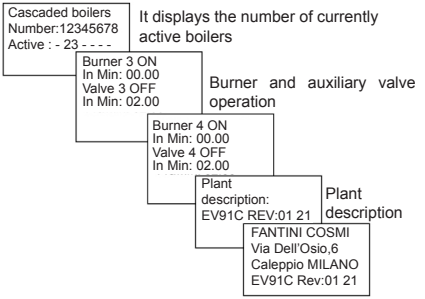
TIMING SUBMENU



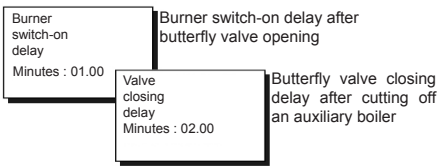
EV91C AUXILIARY SLAVE CONTROL UNITS MENUS



AUXILIARY SLAVE CONTROL UNIT INFORMATION SUBMENU



AUXILIARY SLAVE CONTROL UNIT TIMING SUBMENU



REMOTE MANAGEMENT

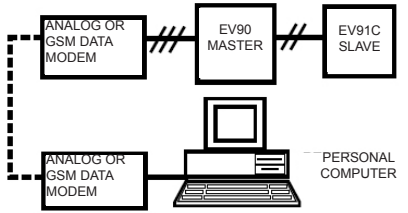
When a GSM or analog modem is connected to the MASTER EV90, certain EV91C parameters may be read or changed remotely.

When the MASTER EV90 receives a command for the EV91C control unit from the modem, it will send the command to it through the FANBUS. It then waits for reply and sends it to the sender, which may be a mobile phone, if a GSM modem in voice mode is used or a PC if an analog modem or GSM modem in data mode is used.

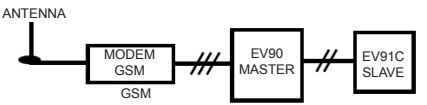
In order to communicate properly with the required device, every command must be preceded by two digits that represents the address of the device.

E.g.: to communicate with the main control unit (address 20): “20“ followed by the command; to communicate with an auxiliary control unit (address 21): “21” followed by the command.

DATA CONNECTION:



SMS CONNECTION:



N.B: Management software for Personal Computer is available in Italian language only.

REMOTE MANAGEMENT COMMANDS

???

Use this command to know which commands may be sent
EV91C replies to this question with:
<INFO>
<TCALDAIA=xx,x>
<TCALDAIA=xx,xFISSA-SCORREVOLE>"

INFO

Use this command to display info on system condition
EV91C replies to this question with:
<T.CALDAIA=xx,x> temperature value read
<T.VOLUTA=xx,x> set value
<T.CALCOLATA=xx.x value currently used by the control unit
<T.FISSA> or <T.SCORREVOLE> fixed or sliding temperature

TCALDAIA=xx.x

Use this command to set the boiler temperature value
EV91C replies to this question with: the reply is the same as for the "INFO" command

TCALDAIA=xx.xy

Use this command to set a temperature value and at the same time y = F(fixed) or S(sliding) if the required temperature shall be fixed or sliding EV91C replies to this question with: the reply is the same as for the “INFO” command

TECHNICAL DATA

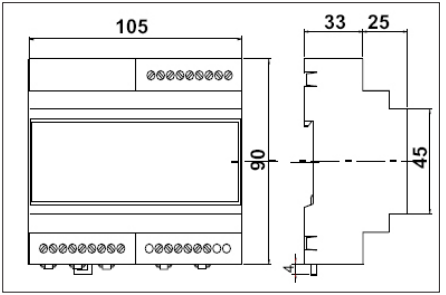
Power supply	230V 50Hz
Consumption	5 VA
Contact rating	8(5)A 250Vac

Voltage free contacts
Max ambient temperature T45

Protecion degree	IP40 (rear panel mounting)
Pollution degree	2
Impulse voltage	4000V

Class A software
Removable terminal boards for friendly wiring
Direct command of two mixing valves
Direct command of two burners
Measuring probes: NTC type EC15 or EC16
(Compatible with EC82 or EC83)
Compliance with EN60730-1 Standards

Dimensions (mm)



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