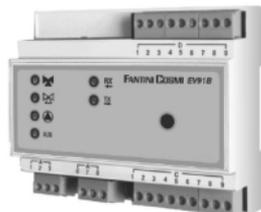




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EV91B - SLAVE SANITARY WATER TEMPERATURE REGULATION MODULE



USE

The EV91B module is suitable to be used on all types of centralised sanitary water regulation plants.

This module is mainly used for regulating the temperature of sanitary water, however it may also be used for regulating generic temperatures of rooms, greenhouses, swimming-pools, etc...

The EV91B is provided with a special program for thermal sterilization of the system to prevent the risk of Legionellosis (Legionnaires' disease).

OPERATION

The EV91B module works properly only when it is connected through a two-wire serial bus (FANBUS) to a Master device called MASTER EV90, otherwise it will not work. The EV91B is an electronic device designed for regulating the opening and closing of a mixing valve according to the temperature required and to the temperature read.

Regulation is carried out by a control unit of the proportional-integrator type featuring proportional/integration constants that can be modified by the user according to the type of plant and user's habits.

The comparison between the water delivery temperature and the required reference temperature pinpoints an error that defines the valve position on the basis of the proportional band and the integration time. This position is expressed in percentage: 0% indicates that the valve has to move to fully close position and, 100% indicates that the valve has to move to fully open position. The time the valve takes for passing from full close to full open position is equal to the time specified on the valve rating plate.

CIRCULATION PUMP

The circulation pump is switched on when the program selected is "Always ON" or "Automatic" and when within the programmed period.

PROGRAMMING

In the Automatic programming mode the user can set daily programming with three on/off time bands.

THERMAL STERILIZATION

The EV91B module features a special sterilization function to prevent the risk of Legionellosis (infectious disease also known as legionnaires' disease). This function enables to program the sterilization temperature (which must obviously be higher than the normal water temperature), the day, the cycle length and also the starting and ending times. To exclude this function cancel either time or both.

You are recommended to program sterilization at night when there is less use of hot water, thereby preventing the risk of burns due to high water temperature.

N.B.: If deciding to use this program it is compulsory to adopt suitable heat protections for the involved water delivering devices in order to stop water delivery over a set temperature or to mix automatically the water of the different delivering devices in order to protect users from scalds. Water temperature over 50 °C can cause burns in a few seconds.

ADJUSTMENT

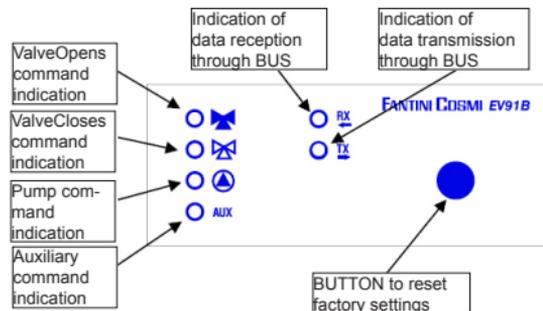
The output of the control unit that varies from 0% to 100% is compared with valve position (also expressed in percentage) and if the comparison is posi-

tive the valve is triggered to open, otherwise it is triggered to close.

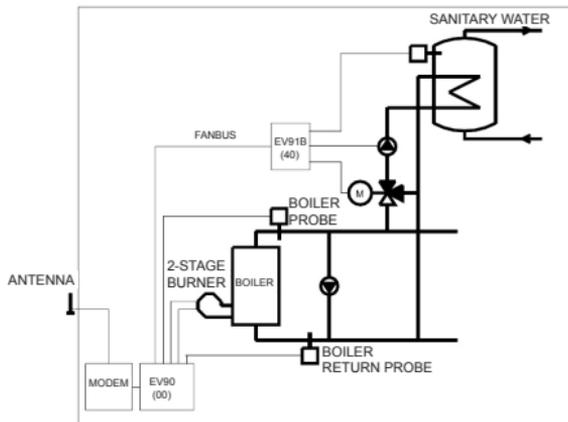
If the percentage error is falling between a certain programmable value the valve remains still.

DESIGN CHARACTERISTICS

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



EXAMPLE OF SANITARY WATER TEMPERATURE REGULATION PLANT



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. Connecting leads to the control unit must have a section of at least 1 mm² and a length of 1000 metres.

INSTALLING THE DELIVERY PROBE EC15-EC16

Install the water delivery temperature probe EC15 onto the water pipe with the clamp provided for the purpose and with heat conducting paste interposed in order to guarantee correct heat conduction.

The immersion probe EC16 must be fitted in the elbow provided in the piping.

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

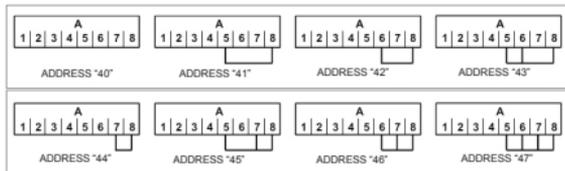
CONNECTION TO THE FANBUS

Connect the EV91B 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.

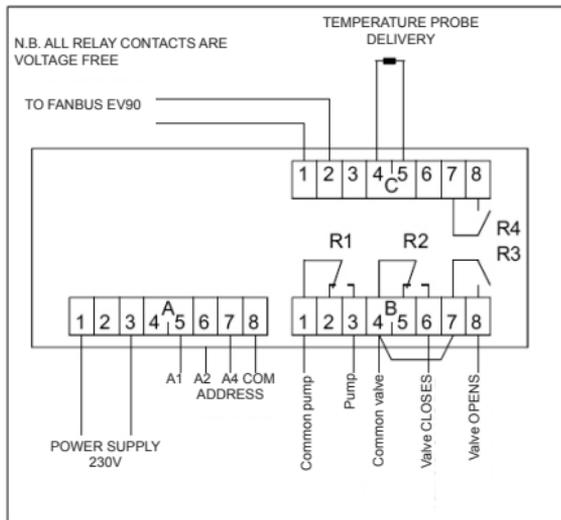
CONTROL UNIT ADDRESS

The control units must be addressed through the terminal board to work properly. The address of the EV91B unit is made up of a high part that corresponds to number "4", and a low part that may take on a value between "0" and "7". The MASTER unit starts a progressive search of SLAVES EV91B from address "40" and it will stop if it gets no reply. It is therefore necessary that connected slaves have different consecutive addresses starting from address "40".

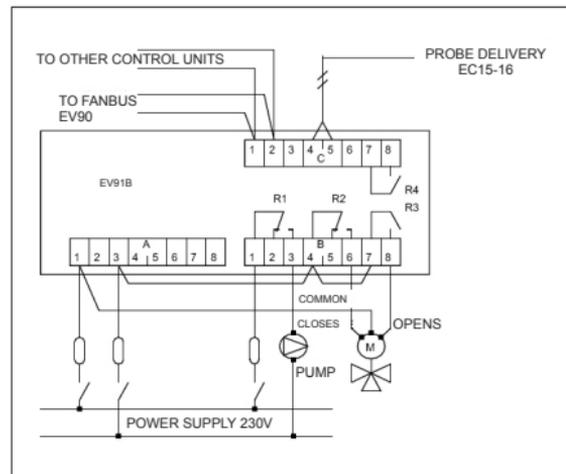
The diagrams below show how to set the low part of the address through terminal board 'A' :



WIRING DIAGRAM



EXAMPLE OF CONNECTIONS



SETTINGS AND ADJUSTMENTS

FACTORY SETTINGS

The EV91B 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 DEVICE

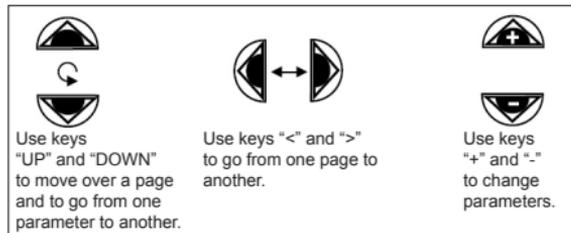
Each time the control unit is powered, the leds set on the front panel will start flashing simultaneously until the Master EV90 starts communicating with the relevant device by selecting its address or transmitting time data through the bus. As from this moment the control unit will start working regularly.

SETTINGS AND ADJUSTMENTS

To modify EV91B data it is necessary to use the Master EV90 that will act like the display and the remote keyboard of the EV91B. Data is entered through special menus provided for the purpose which may contain a number of submenus. Press the "MORE" "LESS" "FORWARD" "BACK" "UP" and "DOWN" keys to scroll the different menus and to modify parameters.

COMMANDS ON THE FRONT PANEL OF MASTER EV90 FOR CONTROLLING SLAVE EV91B

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).



EV91B CONTROL UNIT MENUS

| | | |
|----------------|----|--|
| Device Type | | |
| | | |
| EV90 | 00 | |
| GYM | 10 | |
| BUILDING SOUTH | | |
| SIDE | 11 | |
| SANITARY | 40 | |
| BOILERS 1-2 | 20 | |
| BOILERS 3-4 | 21 | |
| INPUTS | 50 | |
| OUTPUTS | 30 | |
| | | |

EV91B control unit
List of submenus

- EV91B MENU -->
- >Program
- >Information
- >Set Temperature
- >PI Config.
- >Valve Config.
- >Prog. Times
- >Sterilization

PROGRAM SUBMENU

Use this program to select the required EV91B operating mode. The following three operating modes are available:

Automatic. To turn on the control unit automatically following the time programming described below.

Always ON. To keep the control unit always on

Always OFF. To keep the control unit always off with the pump shut down and the valve closed.

Press keys +/- to select the required program type.

When the control unit is on, the pump is always on and the valve is open or closed according to the error between the temperature read and the reference temperature.



EV91B
Program Type
-> AUTOMATIC

DESCRIPTION SUBMENU

It consists of two pages, one contains the system description and the other gives the control unit identification data.

The system description is a 16-character string that is sent to the MASTER when it searches the SLAVES on the bus. The first 14 characters of the string may be changed using the keys located on the EV90 front panel. ASCII characters that may be entered include

numbers 0 to 9, letters 'A' to 'Z' and other characters. Signs '<' and '>' are not included.



Description

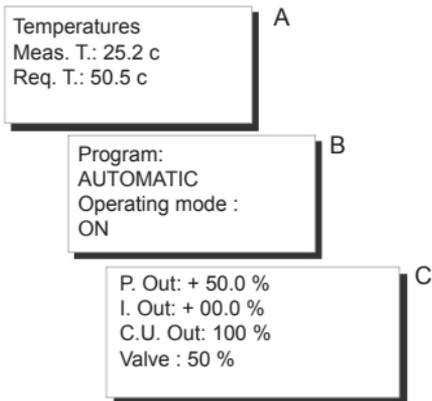
EV91B REV:00 4x



FANTINI COSMI
Via Dell'Osio, 6
Caleppio MILANO
EV91B Rev:00 4x

INFORMATION SUBMENU:

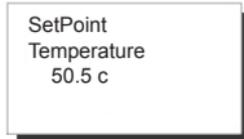
It consists of three pages giving general information about the device state.



- A Temperatures. It gives information about the measured temperature and the required temperature. The required temperature is the one relevant to the normal operation of the control unit or that relevant to the sterilization temperature when within the programmed period.
- B It indicates the program type being used (Automatic - Always ON - Always OFF) and the current operating mode (ON OFF)
- C Control Unit. It gives information in percentage about the proportional output value, the integrator output value, the control unit total output value required and the valve position. All values are expressed in percentage.

SET TEMPERATURE SUBMENU

It shall be used to change the required temperature value within a range between 0°C and +99.9°C. Use keys +/- to set temperature.



PI CONFIG. SUBMENU

This item shall be used to change the parameters of the control unit that operates the valve on the basis of the error between the temperature set in “SET TEMPERATURE” and the temperature read.

The parameters that may be set are displayed on three different pages and are the following ones:

Proportional Band: it is expressed in +/- °C and it may vary from +/- 0.5 °C to +/- 20°C. The valve position is calculated in percentage on the basis of this parameter and the error. With error equal to zero the control unit output will indicate 50%, with error equal

to or higher than the proportional band the control unit output will indicate 100% with a positive error and 0% with a negative error.

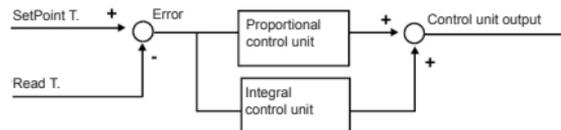
Proportional Band
+/- 10.0 c

Integration Time: it is expressed in seconds and it indicates the time the integrator output takes to pass from zero to +/- 50% with an error equal to or higher than the one set in the Proportional Band. The integration time may vary from a minimum of 0 sec to a maximum of 5400 sec.

Integration time
0140 sec

N.B.: To cut off the integral action clear the integration time.

The figure below shows the functional diagram of the Proportional-Integral control unit:



VALVE CONFIG. SUBMENU

It consists of two pages to be used for programming the following:

Valve Opening Time (expressed in seconds). This parameter is essential for the regular operation of the control units. The opening time may range between 0 sec and 2500 sec.

Neutral Zone: it is expressed in +/- % and it indicates how much the valve position can shift away from the control unit output to keep the valve in rest condition. The neutral zone may range from a minimum of 0% to a maximum of 20%.

Valve opening time
0140 sec

Press keys +/- to change parameters

Neutral zone
+/- 05.5 %

PROGR. TIME SUBMENU

As previously described, the EV91B also works in automatic operating mode. This operating mode considers the three daily on/off time bands set in this menu. If the current time is within one of these time bands the control unit is turned on, otherwise it is turned off.

| | | | |
|-------|-------|---|-------|
| Orari | ON | - | OFF |
| | 06,00 | | 23,00 |
| | --,-- | | --,-- |
| | --,-- | | --,-- |

Use keys UP and DOWN to change times

STERILIZATION SUBMENU

For guidance, to kill the Legionella bacterium and to prevent its growth the water temperature must be higher than 60°C. To guarantee safe and reliable water sterilization, this operation shall be repeated regularly (once a week), and the specified water temperature (> 60°C) shall be kept for at least one hour.

| |
|--------------------|
| Anti-Legionellosis |
| T.: 75c |
| Day: SUN |
| Time On : 02.15 |
| Time Off : 02.45 |

Use keys UP and DOWN to change parameters

REMOTE MANAGEMENT

Like with all SLAVE devices connected to the MASTER EV90, certain EV91B parameters may be changed remotely using an analog or GSM modem connected to the MASTER EV90.

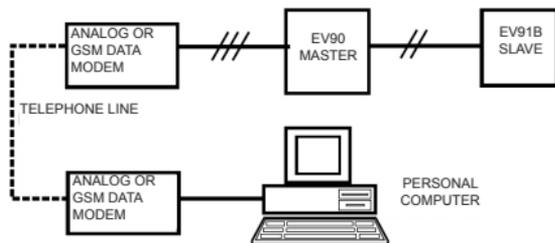
When the MASTER receives a command from the modem (analog or GSM) from the EV91B unit, it sends it back through the FANBUS. It then waits for reply and sends it to the sender, which may be a mobile phone, if a GSM modem in voice mode is used or a PC if an analog modem or GSM modem in data mode is used.

In order to communicate properly with the required device, every command must be preceded by the address of the relevant SLAVE:

E.g.: to communicate with SLAVE EV91B add \$40: "40" followed by the command

To communicate with SLAVE EV91B add \$41: "41" 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.

EV91B replies to this question with:

<16 characters of description>

<INF=?>

<CONF=?>

<PROG=?>

<PROG=08.00-09.00...>

(example)

<BP=xx.x>

<TI=xxx>

<ZN=xx.x>

<TV=xx.x>

<PAUT>

<PON>

<POFF>

INF= ? Use this command to display info on system condition.

EV91B replies to this question with:

<16 characters of description>

<TMIS= xx.x c> Measured temperature

<TVOL= xx.x c> Required temperature

<PROG=AUTOMATICO/SEMPREACCESO/SEMPRESENTO>

<REGIME=SPENTO/ACCESO>

Current program
Current operating mode

CONF=? Use this command to display the control unit settings.

EV91B replies to this question with:

<16 characters of description>

<B.PROP=+/- xx.x c> Proportional band

<T.INT= xxxx s> Integration time

<Z.NEUTRA= xx.x%> Neutral zone

PROG=? Use this command to check the programming of the three time bands relevant to the automatic operation of the EV91B.

EV91B replies to this question with:

<16 characters of description>

<ORARI= 08.00-09.00 12.00-14.00 18.00-22.00>

(example)

PROG=08.00-09.00 12.00-14.00 18.00-22.00> (example) Use this command to change the programming of the three time bands relevant to the automatic operation of the EV91B.

N.B. Leave a space between each time band

EV91B replies with the new time bands set.

<16 characters of description>

<ORARI= 08.00-09.00 12.00-14.00 18.00-22.00>

(example)

BP=xx.x Use this command to change the proportional band value. It is compulsory to enter the tens, the units and the tenths. Enter 0 if they are not required.

The reply is the same as for the CONF=? command

TI=xxxx Use this command to change the integration time value. It is compulsory to enter the thousands, the hundreds, the tens and the units. Enter 0 if they are not required.

The reply is the same as for the CONF=? command

ZN=xx.x Use this command to change the neutral zone value. It is compulsory to enter the tens, the units and the tenths. Enter 0 if they are not required.

The reply is the same as for the CONF=? command

TV=xx.x Use this command to change the required temperature value. It is compulsory to enter the tens, the units and the tenths. Enter 0 if they are not required.

The reply is the same as for the INF=? command

PAUT Use this command to set the AUTOMATIC program

The reply is the same as for the INF=? command

PON Use this command to set the ALWAYS ON program

The reply is the same as for the INF=? command

POFF Use this command to set the ALWAYS OFF program.

The reply is the same as for the INF=? command

TECHNICAL DATA

| | |
|--------------------------------------------------------------------------|----------------------------|
| Power supply | 230V 50Hz |
| Consumption | 5 VA |
| Contact rating | 8(5)A 250Vac |
| Voltage free contacts | |
| Max ambient temperature T45 | |
| Protection degree | IP40 (rear panel mounting) |
| Pollution degree | 2 |
| Impulse voltage | 4000V |
| Class A software | |
| Removable terminal boards | for friendly wiring |
| Direct command of one mixing valve | |
| Direct command of one circulation pump | |
| Measuring probe: NTC type EC15 or Ec16 (Compatible with EC82 or EC83) | |
| Compliance with EN60730-1 Standards | |

