FANTINI COSMI
THE ITALIAN TECHNOLOGY

ECCM32 Energy calculator
for heat metering

CE **M13** 1259

**MID examination certificate
CH-MI004-13017**
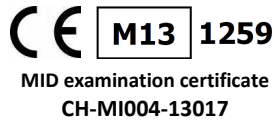
INSTALLATION MANUAL

ℹ️ This manual is intended for **qualified, previously trained personnel**: therefore, it does not provide basic information concerning the general application context.
The "**Advanced programming and user's guide**" and the "**ECCM Service**" configuration software can be downloaded from "**www.fantinicosmi.it**" web site.

⚠️ **Warning!** This unit contains "lithium-thionyl chloride" batteries that may be potentially dangerous.
Read through the safety precautions for use in chapter 14.

1. Introduction

The ECCM32 unit is an electronic device used for heat sub metering in heating and cooling systems as well as the volumes of cold and hot sanitary water meters.
The calculator features separate sections able to simultaneously record the following:

• thermal energy in a heating and cooling circuit;
• sanitary cold water volume;
• sanitary hot water volume.

The unit has been designed to facilitate the installation and reduce the time needed for the commissioning operations.
The ECCM32 unit is equipped with a wired "M-Bus" interface and a wired "Local-bus" interface that allow the user to read, by means of compatible equipment, the consumption from inside one's own apartment.

2. Package contents

• Calculator;
• Installation kit including:
  one supporting bracket- two screws 3x6mm – one screw 2,9x9,5mm – one O-ring – two security seals;
• Installation manual.

3. General information

• Read through and strictly comply with the instructions and specifications contained in this manual.
• The unit shall be installed, maintained and repaired by qualified personnel, in accordance with the general prescriptions concerning the electric equipment installation.
• This type of product is ruled by the EN1434 Standard (parts 1÷6) and the 2004/22/CE Directive (Annex MI-004). Moreover, the national standards concerning the calibration, verification and validity, as applicable in the country where the equipment is operated, shall be complied with.
• The certified manufacturing process guarantees the correct operation of the unit and the conformity to the safety standards. The warranty will be null and void if the seals inside the unit are damaged or have been removed, or if any arbitrary modification is made to the unit itself.

• The unit shall be cleaned, if necessary, by using only a cloth moistened with water.
• The flow meter and the electronic unit shall have the same impulse rate.
• The cables shall be kept at least 20 cm far from electromagnetic interference sources (e.g. switches, regulators, circulation pumps, etc.) and, also, at least 5 cm far from other electric cables.

4. Installation

4.1. Installing the calculator

ℹ️ The calculator is factory-set to the "delivery" mode, as evidenced by the OFF writing on the display.
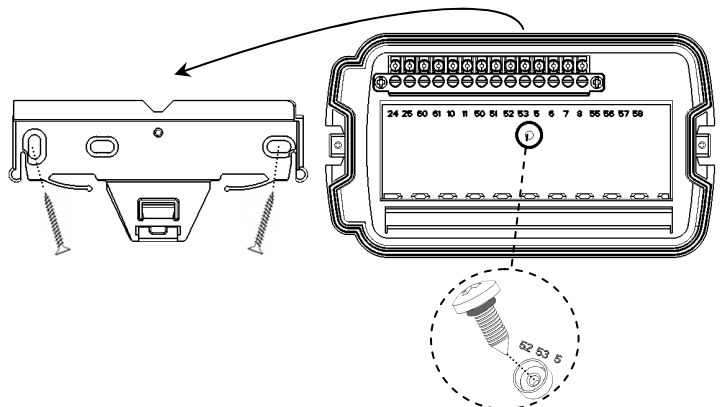The keys shall be pressed only to proceed with "commissioning" (refer to chapter 11) upon completion of the installation and connection operations.
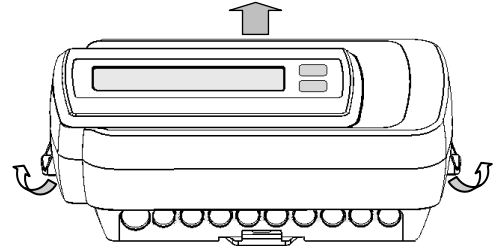
Open the calculator by acting on the two side hooks to remove the upper assembly with the electronic section.
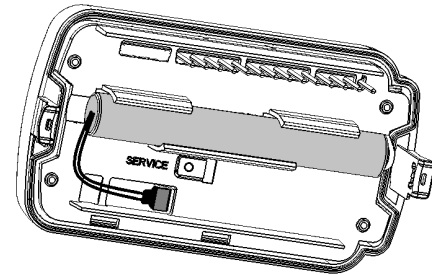

Carefully put the electronic section aside in the package.

Remove the fastening bracket from the bottom section and fix it to the wall; then, fit the bottom onto the bracket and fix it by making use of the "anti-removal" kit (i.e. screw and O-ring) supplied together with the unit.

The special seals shall be put onto the calculator following the installation and commissioning operations.
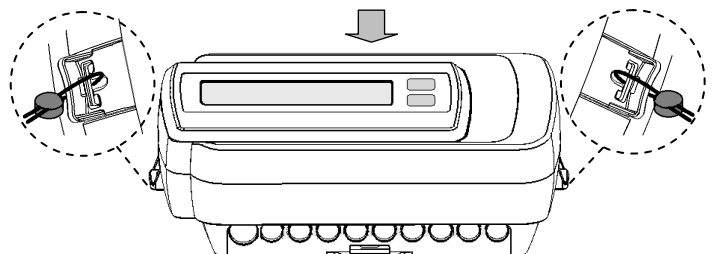
4.2. Installing the temperature sensors

Refer to the installation instructions and prescriptions relative to the temperature sensors.

4.3. Installing the flow meter

Refer to the installation instructions and prescriptions relative to the flow meters.

5. Connecting the external components

i It is recommended that you should draw in advance a wiring diagram with the various connections to be made depending on the planned system application.

The electrical connections with the external devices (e.g. temperature sensors, flow meters) and the communication infrastructures (e.g. M-Bus and Local-bus) shall be made on the terminal block fitted to the unit's bottom section.

One dedicated through-hole shall be used for each cable (by acting on the predrilled rubber block).

5.1. Description of the terminal block

The fourteen **pole numbering complies to the EN1434-2 numeric identification,** as shown below:
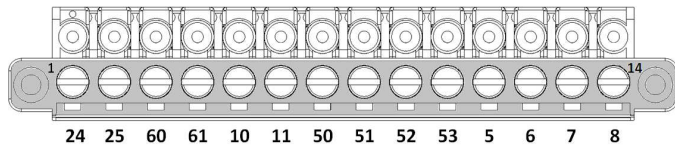

EN1434 Numbering	Acronym	Description of the connection
24	**M-Bus**	M-Bus communication line
25	**M-Bus**	M-Bus communication line
60	**Loc B**	Local bus communication line
61	**Loc B**	Local bus communication line
10	**Vol1**	Flow sensor C1 input
11	**Gnd**	Flow sensor C1 reference
50	**n.c.**	Not used
51	**Vol3**	Flow sensor C3 input
52	**Gnd**	Flow sensor C3/C4 reference
53	**Vol4**	Flow sensor C4 input
5	**Tf1**	Circuit 1 forward temperature sensor
6	**Tf1**	Circuit 1 forward temperature sensor
7	**Tr1**	Circuit 1 return temperature sensor
8	**Tr1**	Circuit 1 return temperature sensor

i Tighten the terminals down and verify that the connections are made firmly.

5.2. Connecting the temperature sensors

Use only **Pt500 temperature sensors** compliant to the EN1434-2 Standard and certified by MID (2004/22/CE).

Forward   **Return**

Circuit 1
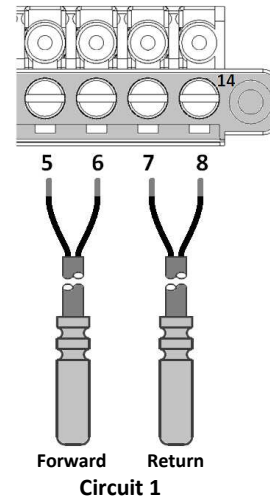
The "Service" menu (refer to paragraphs 10.2 and 10.3) allows you to set, for each pair of sensors, the cable length depending on the special system application:
- lenght 2,5÷3 m   (standard, factory set)
- lenght 5÷6 m   (type 1)
- lenght 10÷12 m   (type 2)

i It is mandatory that the cables of the two sensors of each circuit (i.e. forward and return) are of the same length.

5.3. Connecting flow meter C1

Use only flow meters equipped with class OA (reed output) and class OC (open-collector) pulse outputs, with pulse rate "k" (liters/pulse) compatible with the ones managed by the calculator. Refer to chapter 6 and chapter 10 (paragraphs 10.2 and 10.3) for more details.

i When flow meters with class OC (open-collector) outputs are used, the connection polarity shall be complied with.

10   11   50

+   -

Circuit C1 Flow meter
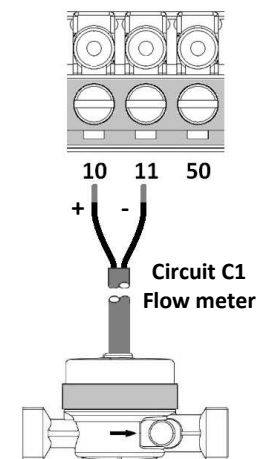
5.4. Connecting flow meters C3 and e C4

Pulse inputs **C3 and C4 are used** to record the **sanitary hot and cold water** volumes. Refer to chapter 8 for more details. Refer to chapter 8 for more details.

Use only flow meters equipped with class OA (reed output) and class OC (open-collector) pulse outputs, with pulse rate "k" (liters/pulse) compatible with the ones managed by the calculator. Refer to chapter 6 and chapter 10 (paragraphs 10.2 and 10.3) for more details.

ⓘ When flow meters with class OC (open-collector) outputs are used, the connection polarity shall be complied with.
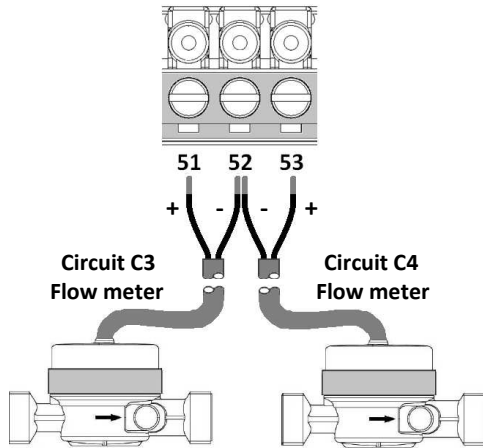

The connection example refers to the use of both pulse inputs. If one or both inputs are not used, their respective terminals shall be left open (not connected).

5.5. M-Bus network and Local-bus line connections

To connect the calculator communication interfaces, follow the instructions below. The cable access to terminals 60 and 61 is protected by a plastic membrane (to be removed) used to prevent making wrong connections.

⚠ **Warning!** The M-Bus network operates at a rated voltage of 48 V_{DC}; therefore, any wrong connection of the M-Bus network cables to other terminals of the calculator may cause irreparable damage to the unit.
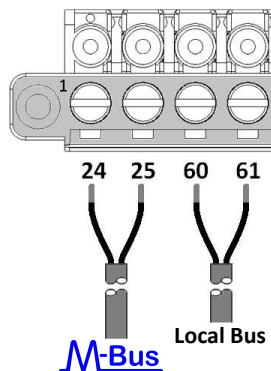
ⓘ **Polarity needs not be complied with** for both connections; however, it may be recommended that you should keep the same polarity for the entire wiring, due to system-related reasons.

Both the length and the section of the M-Bus network cables shall be adequate to the communication speed. Except for special applications, a **telephone cable** of the **J-Y(ST)** type, **Y2x2x0.8 mm²**, can be used for connecting with the M-Bus network. The **maximum length** of the **Local-Bus** line shall be **50 meters**. Use ordinary duplex cables (**2x0.6mm²**) for the connection.

⚠ **Warning!** Only data consultation units (master units) compliant to the safety requirements provided for by the EN 13757-6 Standard shall be connected to the Local-Bus line.

6. Measurement representation format

The representation format, i.e. the decimal digits, for the **energy and power** measurements and the **volume and flow rate** measurements will be determined in accordance with pulse rate "k" (liters/pulse) as set on the unit. The **pulse rate will also determine the maximum power** that will turn out to be, in conformity to paragraph 6.3.7 of the EN1434-2, as follows:
when k <100 the maximum power will be 33333 kW
when k ≥100 the maximum power will be 333333 kW

ⓘ **Important!** After a volume input has acquired pulses, the respective pulse rate "k" will no longer be able to be changed. Therefore, **the parameter shall be programmed prior to** applying the unit to the base and **starting the unit**.

Tables below show the representation formats for the "k" value (litres/pulse) and for the units of measurement adopted for energy and power and for volume and flow rate.

Pulse rate "k"	Energy and power [**MWh**] * o [GJ]	[kW]	Energy and power [kWh] o [MJ]	[W]
1	0.000	0.00	0.00	0
2.5	0.000	0.00	0.00	0
10 *	**0.000**	**0.00**	0.00	0
25	0.000	0.00	0.00	0
100	0.00	0.00	0.00	0
250	0.00	0.00	0.00	0
1000	0.00	0.00	0.00	0
2500	0.00	0.00	0.00	0

Pulse rate "k"	Volume and flow rate [**m³**] *	[m³/h]	Volume and flow rate [litro]	[l/h]
1	0.000	0.000	0	0
2.5	0.000	0.000	0	0
10 *	**0.000**	**0.000**	0	0
25	0.000	0.000	0	0
100	0.00	0.000	0	0
250	0.00	0.000	0	0
1000	0.00	0.000	0	0
2500	0.00	0.000	0	0

(*) Factory setup values.

7. Communication interfaces

The calculator is equipped with two wired serial communication interfaces: one M-Bus port and one "Local-Bus" port.

7.1. M-Bus interface

The wired M-Bus communication port features galvanic insulation and makes it possible to remotely read the data by means of data collection devices conforming to the communication standards as per EN1434-3 and EN13757 (parts 2 and 3). The factory-set communication speed (baud rate) is 2,400 baud; moreover, two additional speeds can be selected (i.e. 300 and 9600 baud).

The communication with the unit can be established by means of the primary address (which can be set through the "Service" menu) or the secondary address (i.e. the unit's serial number) available in page 22 of the "consultation" menu.

7.2. Local-Bus interface

The "Local-Bus" communication port features an interface conforming to the EN 13757-6 Standard as well as a proprietary protocol. It allows the users to read, by means of a compatible display (i.e. a chronothermostat or domotic system), the consumption data (i.e. the current ones and the ones found in the twelve monthly logs as well as logs 'A' and 'B'). Contact the technical support office for more details.

ⓘ In accordance with the 2004/22/CE Directive, this data collection method does not replace the consumption data consultation/collection by means of the unit's display or the M-Bus data line.

8. Description of the functional aspects

The ECCM32 calculator is equipped with one section (made up of one pulse input and two inputs for the Pt500 sensors) to measure the thermal energy of a heating circuit and/or a cooling circuit, as well as two pulse inputs used to acquire the consumption data from the sanitary hot and cold water meters.

Therefore, the unit can be used with a wide range of system applications, e.g. in household and tertiary environments featuring **systems equipped with two pipes** (refer to figure 1) or **central heating plant** (refer to figure 2) or **solar power installations**, considering that the unit can be configured to record the energy in circuits making use of heat carrier fluids based on water and glycol (refer to figure 3).

The unit will record the following values at the end of each month:
- Energy accounted in the heating and/or cooling mode;
- Volume accounted in the heating and/or cooling mode;
- Volume accounted for the sanitary hot and cold water;
- Day and month of the logging.

The loggings for the last twelve months are stored into a "circular log" together with two additional recording periods (logs 'A' and 'B'), the recording intervals of which (day/month) can be programmed during the installation phase.

The unit will record, for diagnostic purposes, the maximum flow rate of the heat carrier fluid as well as the maximum peak power reached, in addition to the list of the anomalies and alarms, if any, that have been detected (i.e. type of event and date).
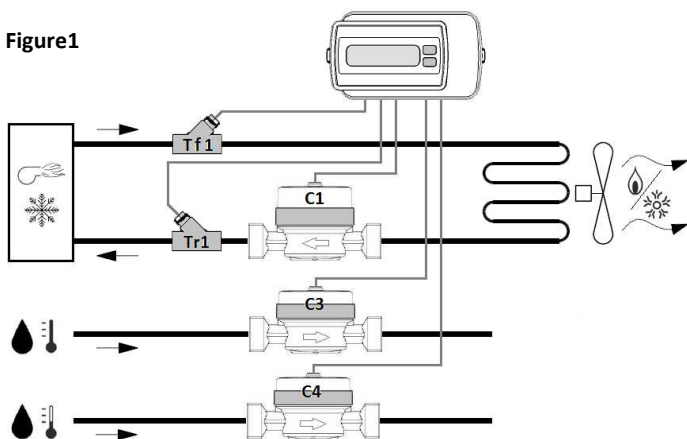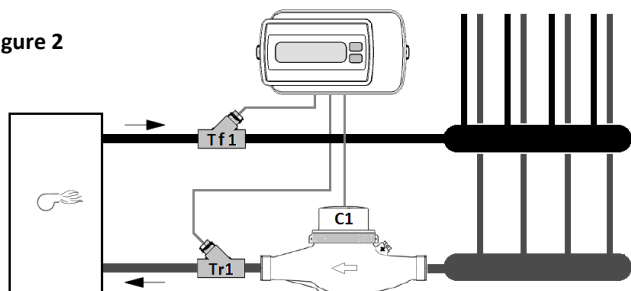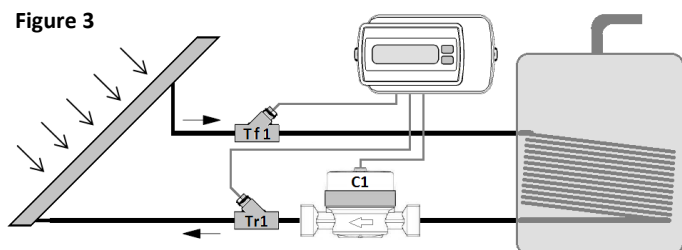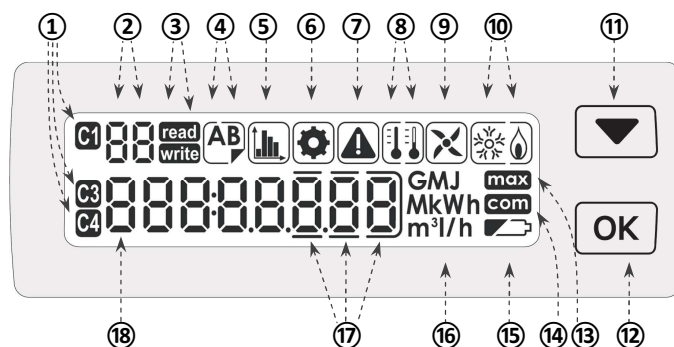
Figure1

Figure 2

Figure 3

9. User Interface

The unit is equipped with a liquid-crystal display featuring a set of **eight digits used for representing the data**, as well as one set of two digits that allow you, together with the icons and the two button, to browse through the "**Consultation**" and "**Service**" **menus** in an indexed mode.

Legend

Ref.	Description
①	Flow meters C1-C3-C4 indicators
②	Menu level two-digit numeric index
③	"Consultation" (read) menu and "Service" (write) menu indicators
④	Data logs 'A' and 'B' indicators
⑤	"Statistic" level menu indicator
⑥	"Technical" level menu indicator
⑦	Alarm and anomaly memory indicator
⑧	"Forward" and "Return " temperature indicators
⑨	Indicator for pulse detection from flow meters
⑩	Heating or cooling energy circuit indicators
⑪	Menu option "scroll" button
⑫	Menu option "confirm" button
⑬	Power and flow rate maximum values indicator
⑭	M-Bus port and Local-Bus communication activity indicator
⑮	Low battery indicator
⑯	Measurement unit indicators
⑰	Segments pointing out the decimal values
⑱	Eight-digit numeric field with the quantity values

10. Consultation and Service menus

The information for the user and mantainer is displayed in a special "**consultation**" menu (always accessible) and a "**Service**" menu for the installer (the latter menu can be accessed either when the unit exit from "delivey"mode or by pressing the "SERVICE" button).

Refer to paragraphs 10.3 and 10.5 for more details.

Two buttons are used to browse through the menus (one used to "scroll", one used to "confirm" the options):

▼ it allows you to scroll through the various levels and sub-levels or scroll the options within the "Service" menu levels.

OK it allows you to enter or exit the sub-levels or confirm the service parameter options.

Refer to paragraphs 10.2 and 10.4 for more details.

ℹ The "**ECCM Service**" **software** is available, which allows you to program the unit by means of a Personal Computer connected on the M-Bus line. Contact the technical support office for more details.

10.1. Accessing the "Service" menu

The "Service" menu can be accessed by exiting the "delivery" mode ("OFF" writing on the display) **prior to commissioning the unit**, or after that, by means of the "SERVICE" button located at the rear of the electronic section.

Accessing through "delivery" mode   **Accessing bu means the "SERVICE" button**
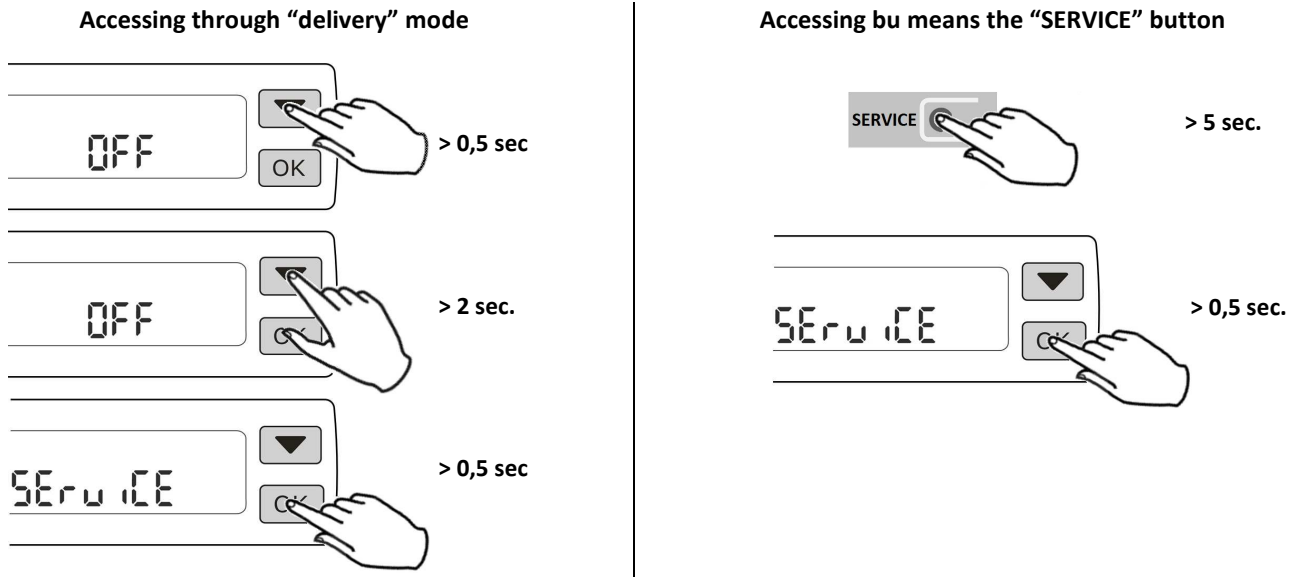
Following the functions described above, level "00" of the "Service" menu will be accessed (the structure and contents of the menu are described in paragraphs 10.2 and 10.3).

10.2. Service (write) menu structure

The "Service" menu is organized into **twenty-seven levels**, which are identified by numeric index **and by the write icon**. Each level displays the current setting (i.e. the factory setup at first) for the relevant parameter, which may consist of one or several fields (depending on the individual cases). The mode of browsing through the various menu levels, the respective parameters and the respective fields able to be modified is shown in the examples below:
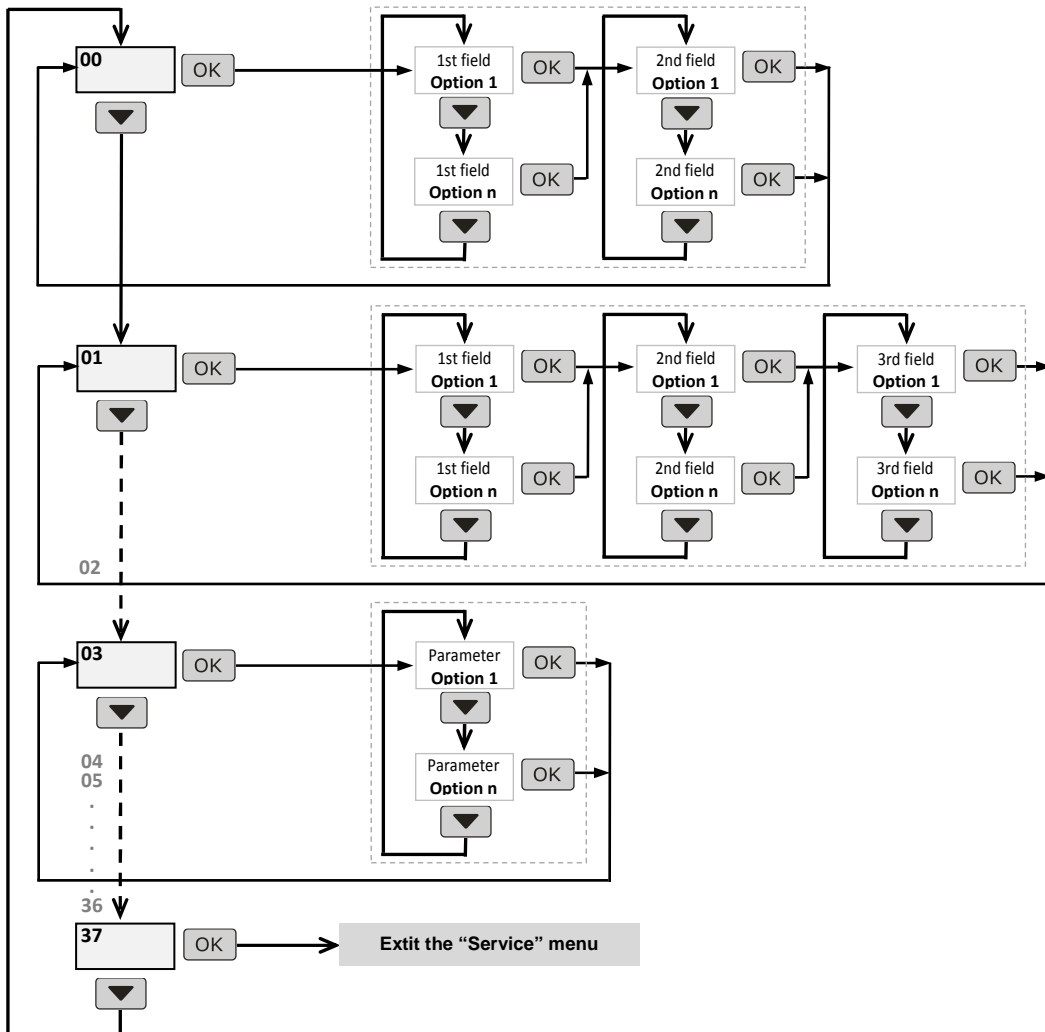
10.3. "Service" (write) menu contents

The "Service" menu levels are described in the table below together with the respective options available and with the "factory setup" value. Browsing through the menu is made quite intuitive by the appearance of icons relative to the pages that are selected each time.

The unit will automatically exit the menu 5 minutes after no button is pressed.

Menu index	Description	Data item formato or possible options	Factory setup	User setup
00	Time	HH:MM	**Current time**	-
01	Date	YY-MM-DD	**Current date**	-
02	Primary address	000÷253	**000**	
03	Flow meter C1 operating mode	riS-rAFF (heating and cooling) riS (heating only) rAFF (cooling only) non UtiL (volume measurement only)	**riS-rAFF**	
05	Energy measurement unit	kWh MWh MJ GJ	**MWh**	
06	Volume measurement unit	m3 - l	**m^3**	
07	Flow meter C1 litres/pulse	1 – 10 –100 - 1000 – 2.5 – 25 – 250 – 2500	**10**	
09	Flow meters C3 and C4 liters/pulse	1 – 10 –100 - 1000 – 2.5 – 25 – 250 – 2500	**10**	
10	Flow meter C1 position	ritorno – AndAtA (return-forward)	**ritorno**	
12	Flow meter C1 max. flow rate	0000.0 (control OFF) ÷ 9999.9 (max. value)	**0000.0** m^3/h	
13	Flow meter C1 min. flow rate	00.000 (control OFF) ÷ 99.999 (max. value)	**00.000** m^3/h	
16	Flow meter C3 max. flow rate	0000.0 (control OFF) ÷ 9999.9 (max. value)	**0000.0** m^3/h	-
18	Flow meter C4 max. flow rate	0000.0 (control OFF) ÷ 9999.9 (max. value)	**0000.0** m^3/h	
20	Date of battery replacement	YY-MM-DD	**11 years** (from date of manufact.)	
21	Date of registration (period 'A')	MM-DD	**01-01**	
22	Date of registration (period 'B')	MM-DD	**06-01**	
23	Glycol percentage (circuit 1)	00 – 20 – 30 – 40 – 50 – 60 (% values of solution)	**00 SOL1**	
25	Type of glycol used	0 (none) - 1 (monoethylene) - 2 (polyethylene)	**0**	
26	Circuit 1 sensor length	Std (up to 2.5 m) - 1 (up to 6 m) - 2 (up to 12 m)	**Std**	
28	Anomaly log reset	no rESEt (not requested) – rESEt (reset request)	**no rESEt**	-
29	Statistic max. value reset	no rESEt (not requested) – rESEt (reset request)	**no rESEt**	-
30	Factory setup restore	no rESEt (not requested) – rESEt (reset request)	**no rESEt**	-
31	Date of instrument calibration	YY-MM-DD	**30 years** (from date of manufact.)	
32	M-Bus baud rates	300 - 2400 – 9600 (baud)	**2400**	
35	Flow meter C3 volume alignment	00000.000	-	
36	Flow meter C4 volume alignment	00000.000	-	
37	Menu exit	uSCitA (exit)	-	-

Note: the values of the programming made should, as a reminder, be written down in the "user setup" column.

ℹ️ The first option proposed concerns the factory setting or the parameters set during a previous programming.
The appearance of the read icon instead of the write one indicates that **the parameter cannot be modified**.
Some parameters will be unable to be modified if the relevant circuit/section has already recorded the energy.

Important! The factory setup will set the unit *to such a functional configuration as the one shown in the* **diagram of Figure 1 under chapter 8***, i.e. circuit 1 for heating and cooling recording, energy expressed by the MWh and volume expressed by m^3, flow meters C1, C2 and C4 with a pulse rate of 10 liters/pulse, circuit 1 flow meter on the return piping, heat carrier fluid made up of water only, sensors with a wiring length of 2,5m and M-Bus baud rate equal to 2400 bit/s.*

10.4. Consultation (read) menu structure

The consultation menu is organized into **ten levels**, which are identified by the numeric **index 00÷90 and the** `read` **icon** and are divided into two **main levels**, two **technical levels**, five **statistic levels** and one **alarm level**. Each level features its respective sub-levels for a total 149 pages available.
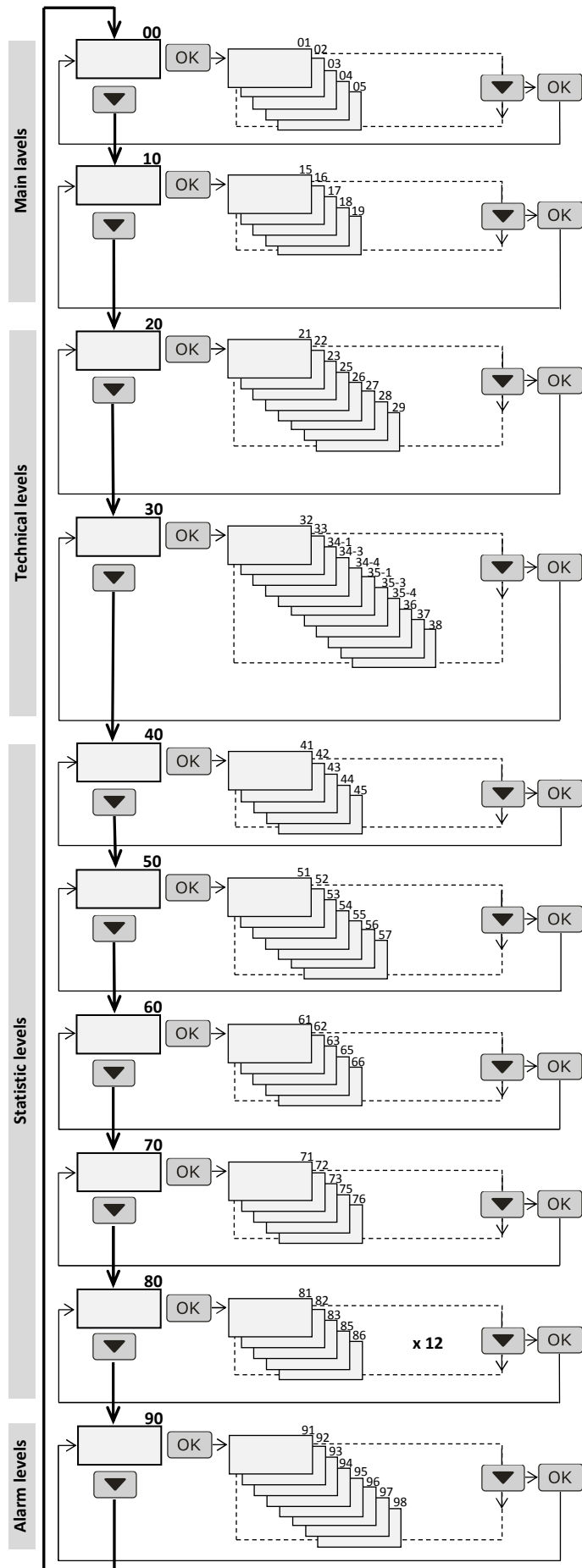
10.5. Consultation (read) menu contents

Browsing through the various menu levels (shown in the table below) goes along with the appearance of the icons relative to the pages that are selected each time.

Menu index	Description
00	Thermal energy accounted in the heating mode
01	Volume accounted by flow meter C1
02	Liquid crystal display verification test
03, 04	Circuit C1 forward/return temperatures
05	Circuit C1 forward/return Δt
10	Thermal energy accounted in the cooling mode
15, 16	Volume accounted by flow meters C3 and C4
17, 18	Error type indication
19	Date of battery replacement
20	Operation hour counter
21, 22	Primary and secondary M-Bus address (serial no.)
23	Pulse rate (l./pulse) for C1
25	Pulse rate (l./pulse) for C3 and C4 inputs
26	Position of installation for meters C1
27	Glycol percent concentration in circuits C1
28	Type of glycol used
29	Software release
30	Circuits C1 operating mode
32	Energy measurement unit
33	Volume measurement unit
34$_{/1}$÷34$_{/4}$	Flow meters C1, C3, C4 max. flow rate values
35$_{/1}$÷35$_{/4}$	Flow meters C1, C3, C4 min. flow rate values
36	Date of next calibration (DD-MM-YY)
37	M-Bus baud rate
38	Circuits C1 sensor cable length
40, 41	Current date and time
42, 43	Heating circuit instant and max. power
44, 45	Cooling circuit instant and max. power
50, 51	Flow meter C1 instant and max. flow rate
54, 55	Flow meter C3 instant and max. flow rate
56, 57	Flow meter C4 instant and max. flow rate
60	Date set for recording the consumption during period 'A'
61÷66	Period 'A' consumption data
70	Date set for recording the consumption during period 'B'
71÷76	Period 'B' consumption data
80	Date of the monthly reference log (x 12 month) *
81÷86	Reference month consumption data *
90, 91	Last error code and event date
92, 93	3rd error code and event date
94, 95	2nd error code and event date
96, 97	1st error code and event date
98	Date of last access to the "Service" menu (DD-MM-YY)

__Note__: level 80 and its respective sub-levels (81÷86) are repeated for each of the twelve monthly consumption recording logs.

11. Commissioning

The procedures described in this section shall be implemented when the installation phases have been completed and the connections have been made and, in any case, **only after the functional tests have been performed on the hydronic systems** (e.g. heating and cooling systems, sanitary water systems, etc.).

ℹ️ **Important!** Since the unit has recorded both energy and volume, some of the configuration parameters will no longer be able to be modified.
You must carefully check the unit's settings before fitting the unit onto the base and starting the equipment.

Commissioning procedure

- **Verify that the electric wiring is made correctly.**
- **Access the "Service" menu** (cf. paragraph 10.1)**:**
  - Verify the current time and date settings.
  - Set the primary address for M-Bus communication.
  - Set the C1 input operating mode.
  - Verify the energy and volume measurement unit settings.
  - Verify the pulse rate settings.
  - Verify the C1 flow meter position settings.
  - Set the flow meters diagnostic parameters (option).
  - Set the period 'A' and 'B' registration dates (option).
  - Set the water/glycol mix parameters (if requested by the application).
  - Verify the sensors cable length settings.
  - Set the date of calibration (option).
  - Verify the M-Bus baud rate settings.
  - Align the flow meter volumes (option – if necessary).
- **Keep the unit in the "Service" menu.**
- **Apply the unit to the bottom section.**
- **Exit the "Service" menu.**
- **Activate the heating system:**
  - Check the coherency of the forward /return temperature values.
  - Check the recorded volume and the instant power.
- **Activate the cooling system** (if required by the application)**:**
  - Check the coherency of the forward /return temperature values.
  - Check the recorded volume and the instant power.
- **Activate the sanitary hot and cold water circuit:**
  - Check the recorded volume and the instant power.
- **Verify that the unit will not notify any functional anomaly.**
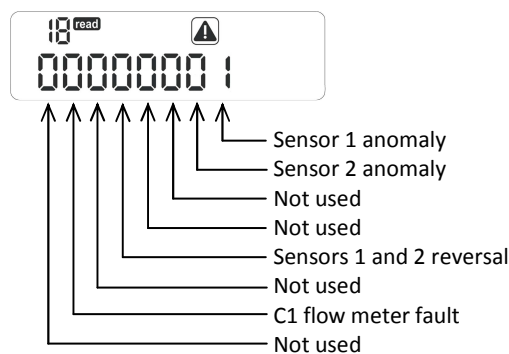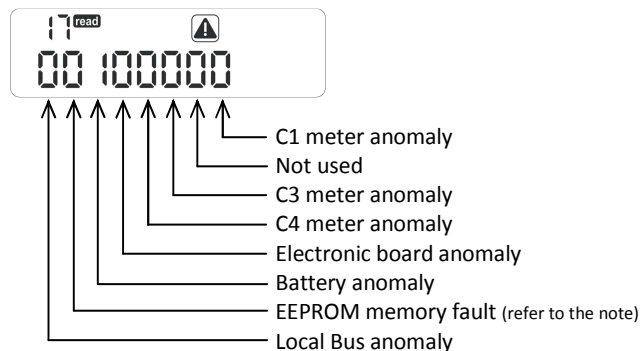- **Put the security seals.**

ℹ️ The initial factory setup sets the unit in such a manner that the values of the main parameters will be compatible with the applications most often used. Therefore, many parameters shall, in the list of the operations needed to commission the unit, be merely verified: only the parameters to be adapted to the specific system application will have to be modified.

12. Anomaly diagnosis

The unit features a self-diagnosis characteristic capable of detecting up to **eleven different types of anomalies**. The presence of one or several anomalies will be notified by the appearance of the ⚠️ icon.
When an anomaly occurs, the unit will store its date and type into the "anomaly log" (refer to chapter 13).
The **details of the anomalies** found are given in **pages 17 and 18 of the "consultation" menu** (refer to paragraphs 10.4 and 10.5) where the presence of digit "1" at a specific position will identify the corresponding anomaly.

- C1 meter anomaly
- Not used
- C3 meter anomaly
- C4 meter anomaly
- Electronic board anomaly
- Battery anomaly
- EEPROM memory fault (refer to the note)
- Local Bus anomaly

- Sensor 1 anomaly
- Sensor 2 anomaly
- Not used
- Not used
- Sensors 1 and 2 reversal
- Not used
- C1 flow meter fault
- Not used

Note: The example refers to the simultaneous presence of two anomalies, i.e. "Sensor 1 anomaly" and "Battery anomaly".

ℹ️ In case of "EEPROM memory fault", the unit will interrupt any operation; refer to chapter 12.1 for more details.

The anomaly indications will, except for the electronic board anomaly and the EEPROM memory fault, disappear when the conditions that caused them are withdrawn. In such an instance, the ⚠️ icon (indicating the presence of anomalies and previously ON steadily) will start flashing and indicate the "anomaly memory" until the "anomaly log" is reset (refer to chapter 13).

12.1. EEPROM memory fault "Error 15"

In case of "EEPROM memory fault", the unit will interrupt any operation and this condition will be notified on the display by alternating the "Error-15" writing with the date of the event.

Below is an example where the unit shows alternatively the error condition and the event date.

On 19th May 2013 occurred the EEPROM memory fault "error 15"
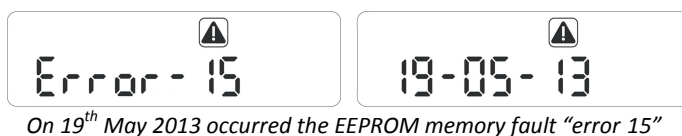
ℹ️ In this case, the unit shall be replaced and sent to the manufacturer in order to be duly inspected.

13. Anomaly log and error codes

The unit features an "anomaly log" where, every time an anomaly event occurs, the corresponding "error code" as well as the date of the event will be stored.

The "anomaly log" can store up to four events and will always keep in the memory the last error event and the first three events that occurred.

The events will be kept in the memory for an indefinite period of time even when the anomalies are no longer found. The **"anomaly log" can be deleted by accessing page 28 of the "Service" menu.**

The anomaly log **can be checked by accessing pages 90÷97 of the consultation menu** (refer to paragraphs 10.4 and 10.5), which show the date of the event occurrence for the individual error codes (if any).

Below are the error codes and their respective descriptions.

Error code	Description
01	**Sensor 1 anomaly** due to possible cable cut, short-circuit or measurement out of range.
02	**Sensor 2 anomaly** due to possible cable cut, short-circuit or measurement out of range.
03	*Code not used (reserved)*
04	*Code not used (reserved)*
05	**Sensors 1 and 2 reversal**, or wrong flow meter C1 operating mode setting.
06	*Code not used (reserved)*
07	Flow Meter C1 fault
08	*Code not used (reserved)*
09	**Flow Meter C1 anomaly** due to pulse frequency or max./min. flow rate values out of range (*****).
10	*Code not used (reserved)*
11	**Flow Meter C3 anomaly** due to pulse frequency or maximum flow rate values out of range (*****).
12	**Flow Meter C4 anomaly** due to pulse frequency or maximum flow rate values out of range (*****).
13	**Electronic board anomaly** detected by the internal self-diagnosis processes.
14	**Miscellaneous anomalies:** low battery level, date of battery replacement expired, calibration period expired or date not set.
15	**EEPROM memory fault**
16	**Local BUS anomaly** due to exceeding the max number of data requests (150 times) permitted each day.

*Notes:

1) The max./min. flow rate controls (for meter C1) and max. flow rate controls (for meters C3 and C4) are activated by setting the limit values (refer to pages 12÷18 in the menu) which shall be consistent with the system's features.

2) To cancel an anomaly (if any) due to "flow rate out of range", you will have to cancel both the anomaly log and the statistical max. values by means of the commands on pages 28 and 29 of the "Service" menu.

Below is an example where the anomaly log shows a sequence of events in which anomalies "14" and "05" correspond to the last and the first events occurred, respectively.

On 1st July 2013, the last anomaly occurred: "error 14"

*On 10th May 2013, one more (i.e. 3rd) anomaly occurred: "error 02"*

On 10th May 2013, one more (i.e. 2nd) anomaly occurred: "error 01"

On 10th May 2013, the 1st anomaly occurred: "error 05"

14. Battery and replacement procedures

The unit continuously checks the battery voltage and the date of battery replacement and, also, notifies (by means of the corresponding icons ⚠️ 🔋) when the battery needs replacing (refer to paragraph 14.1).

The occurrence of this event is stored into the "anomaly log" (refer to chapter 13, error "14") and is concurrently recorded into a specific field of the M-Bus communication port data exchange path.

⚠️ **Warning!** The unit makes use of lithium-thionyl chloride batteries that may be potentially dangerous is they are used, either electrically or mechanically, in an improper way.

To minimize the risks, the following precautions shall be taken:
- do not short-circuit or try to recharge the battery;
- do not expose the battery to a temperature of more than 80°C;
- do not put the battery into fire (the battery might explode);
- do not open the battery or cause the latter to come into contact with water.

The batteries shall be disposed of in accordance with the laws and regulations in force.

⚠️ **Warning!** To replace the battery, **use the Fantini Cosmi genuine spare part (code 1592269).** Using inadequate battery may cause irreparable damage to the unit.

14.1. Battery discharged or replacement data expired
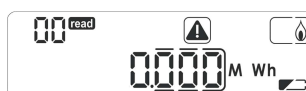
The example shows that either the battery is down or the date of battery replacement has expired.

In this case, follow the procedure below.

Procedura sostituzione della batteria

- Remove the security seals and open the unit.
- Press the **"SERVICE" button** for at least **5 seconds.**
- **Replace the battery within 15 seconds.**
- Press the **"OK" button** to enter the "Service" menu.
- Update (*****) the **date of "battery replacement"** (page 20 in the menu).
- Reset the **"anomaly log"** (page 28 in the menu).
- Close the unit and put the security seals.
- Exit the Service menu (page 37 in the menu).

*Note: the new date of "battery replacement" shall be entered considering that the battery has an estimated lifetime of 10 years.

15. Troubleshooting

Problem	Possible cause	Proposed solution
The unit does not record the energy and the volume.	1) If the recording on the display is = 000.00 2) If the recording on the display is > 000.00	1) Check the flow meter and the sensors. 2) Check the error codes in the anomaly log.
The unit records the volume but does not record the energy.	1) The sensors (or their connections) are reversed. 2) The meter operation setting is wrong.	1) Fit the sensors correctly into place. 2) Change the device setting.
The unit does not record the volume.	The flow meter emits no pulses, or the latter do not reach the unit.	Check the flow rate direction and the connections between the unit and the flow meter.
The unit records the volumes in a wrong manner.	1) Flow meter anomaly. 2) Flow meter reversed. 3) Incorrect pulse rate setting. 4) Flow meter not suitable for the system.	1) Check and replace (if needed) the flow meter. 2) Correctly install the flow meter. 3) Change the pulse rate setting. 4) Replace the flow meter.
The unit displays not coherent forward /return temperatures.	Faulty pair of sensors.	Replace the pair of sensors.
The unit displays too low forward or return temperatures and energy values.	1) Faulty pocket/sensor coupling. 2) Excessive heat dissipation in the pocket 3) Too short sensor pocket	1) Push the sensors down into the pockets 2) Isolate the sensor holding pockets 3) Replace the inadequate pockets with proper ones.
Symbol ⚠ ON steadily.	One or several anomalies occurring.	Refer to the anomaly log and the menu pages with details of the anomalies found.
Symbol ⚠ flashing.	A temporary anomalous condition has occurred.	Refer to the anomaly log and verify the error codes found.
Symbols ⚠ 🔋 ON.	1) Either the battery is down or the date of battery replacement has expired. 2) The instrument calibration period has expired.	1) Replace the battery and update the date of battery replacement. 2) Carry out the procedures laid down by the laws and regulations in force and applying to the new calibration.
The unit shows "Error 15" alternating with the event date.	EEPROM memory fault	Replaced the unit and sent to the manufacturer in order to be duly inspected

Notes:

16. Specifications

Power supply:	Battery-operated
Battery rated voltage:	3,6V
Tipo di batteria:	Lithium-thionyl chloride
Type of battery:	Pre-wrapped package (2xAA – capacity: 4.8 Ah - spare part code: 1592269)
Battery life:	10 years operation + 1 year stock
Ambient operating temperature:	+5 ÷ +55 °C
Storage temperature:	-20 ÷ +55 °C
Dimensions:	141 x 77,5 x 47 mm
Degree of protection:	IP52
Certification:	2004/22/CE MID (B+D type examination), certificate no. CH-MI004-130xx
Environmental class:	A (E1, M1)
Maximum value of thermal power:	33000 kW with a pulse rate < 100 l/pulse; 330000 kW with a pulse rate ≥ 100 l/pulse
Temperature measurement range:	2 ÷ 150°C (Θ_{min}=2°C Θ_{max}=150°C)
Temperature difference:	3 ÷ 148°C ($\Delta\Theta_{min}$=3°C $\Delta\Theta_{max}$=148°C)
Heating/cooling switching:	According to the sign of temperature difference between sensors ($\Delta\Theta$); in any case, no energy recording takes place in case of –3°C < $\Delta\Theta$ < +3°C
Display unit features:	Liquid crystal display (LCD) with 8 digits, 19 icons and 2 auxiliary digits
Energy measurement unit on the LCD:	MWh (standard), configurable kWh, MJ and GJ
Dynamic behaviour:	The temperature measurements are made upon each flow meter pulse to a resolution of 30 seconds, provided that the time elapsing between the pulses is greater than or equal to 30 seconds. If the time elapsing between the pulses is smaller than 30 seconds, then the measurements will be made every 30 seconds. In case of no pulses, the temperature measurement will be updated every 60 minutes. The measurement will be updated every 10 seconds in the temperature displaying menu.
Type of sensors:	Pt500 sensors pairs with 2-wire lead (Platinum precision resistor, IEC 60751 compliant)
Lunghezza max. cavi sonde:	2,5m (standard), configurabile per 5m e 10m
Type of sensor cables:	Unshielded
RMS Sensor current value:	< 72 µA (measurements made every 30 seconds)
Pulse inputs:	One input for the heating/cooling flow meter; two inputs for the sanitary water flow meters
Pulse inputs class:	IB (in accordance with the EN 1434-2 Standard)
Pulse inputs circuit type:	Pull-up (1 MΩ) with reference to ground (GND terminal); voltage: +3.6 V
Pulse input compatibility:	Flow Meters with class OA (reed output) and class OC (open-collector) pulse outputs
Max. frequency / Pulse min. duration:	5Hz - 100ms
Flow Meter installation position:	Return (standard), configurable on the forward
Pulse rate:	1 - 2,5 – 10 – 25 – 100 – 250 – 1000 – 2500 litres/pulse
Heat carrier fluid:	Water (standard), configurable for water and glycol solution
M-Bus communication interface:	Compliant to EN 1434-3, with galvanic separation
M-Bus baud rate:	2400 baud (standard), also configurable to 300 or 9600 baud
Type of cable for M-Bus connection:	Telephone cable J-Y(ST) Y2 x 2 x 0,8mm^2
Local Bus interface:	Compliant to EN 13757-6, 2400 baud, proprietary unidirectional protocol
Type of cable for Local Bus connection:	Two wire cable (2 x 0.6mm^2, max. length: 50m)
Billing recording:	12 fixed monthly recordings, two periods with programmable dates (DD/MM)
Anomaly/alarm recording:	Circular log, four events (type of event and date)
Other recordings:	Heat carrier fluid max. flow rate and max. power
Type of connections:	Removable, 14-pole terminal block (5mm pitch)

## 17. Declaration of conformity

Fantini Cosmi S.p.A. **declares that the "ECCM32 – Heat calculator" device conforms to the 2004/22/CE and the 2004/108/CE Directives,** as indicated in the **"CH-MI004-13017" MID certificate**. The full EC Declaration is available for download from "**www.fantinicosmi.it**" web site.

Wiring diagrams

System with **2 pipes** and the sanitary hot and cold water meters.
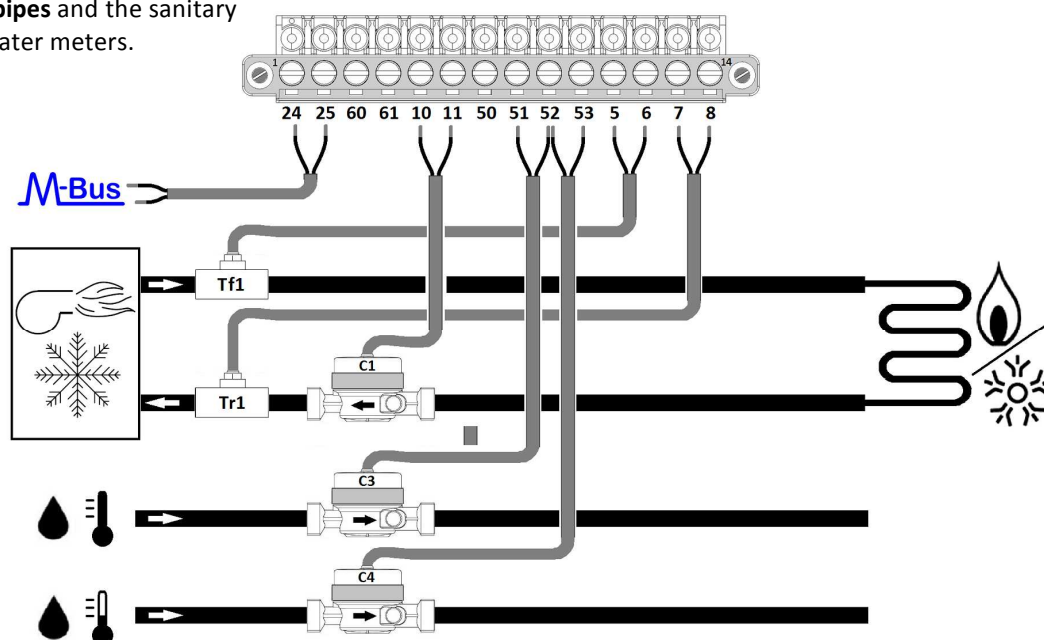
Central heating plant.
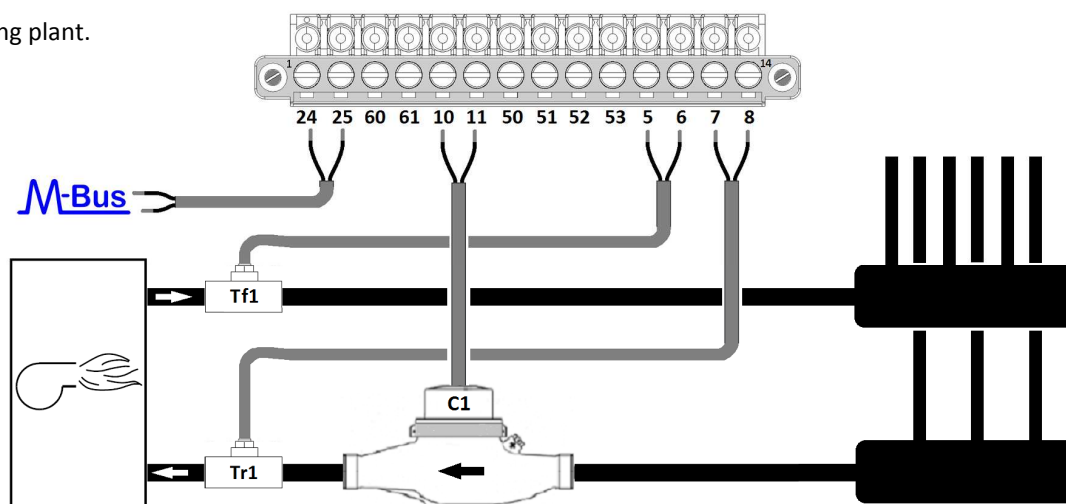
The hydraulic systems on the drawings are only indicated for example.

Nr.	Signal	Cable color and description	Nr.	Signal	Cable color and description
24	M-Bus		51	Vol3	
25	M-Bus		52	Gnd	
60	Loc B		53	Vol4	
61	Loc B		5	Tm1	
10	Vol1		6	Tm1	
11	Gnd		7	Tr1	
50	Vol2		8	Tr1	

Note: the type of device connected and the type/color of the cable made should, as a reminder, be written down in the table.