



ECONCEPT SOLAR ST



CE INSTRUCTIONS FOR USE, INSTALLATION AND MAINTENANCE

- Carefully read the warnings in this instruction booklet since they provide important information on safe installation, use and maintenance.
- This instruction booklet is an integral part of the product and must be carefully kept by the user for future reference.
- If the unit is sold or transferred to another owner or if it is to be moved, always make sure that the booklet accompanies the boiler so that it can be consulted by the new owner and/or installer.
- Installation and maintenance must be carried out by professionally qualified personnel, according to current regulations and the manufacturer's instructions.
- Incorrect installation or poor maintenance can cause damage or physical injury. The manufacturer declines any responsibility for damage caused by errors in installation and use or by failure to follow the manufacturer's instructions.
- Before carrying out any cleaning or maintenance operation, disconnect the unit from the electrical power supply using the switch and/or the special cut-off devices.

- In case the unit breaks down and/or functions poorly, deactivate it, do not make any attempt to repair it or directly intervene. Contact professionally qualified personnel. Any repair/replacement of products must only be carried out by qualified professional personnel using exclusively genuine parts. Failure to comply with the above could affect the safety of the unit.
- Periodical maintenance carried out by qualified personnel is essential for guaranteeing good operation of the unit.
- This unit must only be used for the purpose for which it was designed. Any other use is considered improper and therefore hazardous.
- After removing the packing, check the integrity of the contents. Packing materials must not be left within the reach of children as they are potentially hazardous.
- In case of doubt do not use the unit, and contact the supplier.
- The images shown in this manual are a simplified representation of the product. In this representation there may be slight, unimportant differences with the supplied product.

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This symbol indicates **"Caution"** and is placed next to all safety warnings. Strictly follow these instructions in order to avoid danger and damage to persons, animals and things.

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This symbols calls attention to a note or important notice.

Declaration of conformity

Manufacturer: FERROLI S.p.A.

Address: Via Ritonda 78/a 37047 San Bonifacio VR Italy

declares that this unit complies with the following EU directives:

- Gas Appliance Directive 2009/142
- Efficiency Directive 92/42
- Low Voltage Directive 73/23 (amended by 93/68)
- Electromagnetic Compatibility Directive 89/336 (amended by 93/68)

President and Legal Representative Cav. del Lavoro Dante Ferroli

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1. Operating instructions

1.1 Introduction

Thank you for choosing **ECONCEPT SOLAR ST**, a floor-standing boiler with incorporated **solar hot water tankFER-ROLI** featuring advanced design, cutting-edge technology, high reliability and quality construction . Please read this manual carefully since it provides important information on safe installation, use and maintenance

ECONCEPT SOLAR ST is a high-efficiency, low emissions, sealed chamber **premix condensing** heat generator for heating and hot water production, running on natural gas or LPG and equipped with a microprocessor control system. The **boiler shell** consists of an aluminium lamellar exchanger and a ceramic **premix burner** equipped with electronic ignition and ionisation flame control, modulating speed fan and modulating gas valve.

The boiler is arranged for connection to one or more solar collectors, which are used for domestic hot water production . In fact, the unit has a special, incorporated stratified solar **hot water tank** and an advanced circuit with variable-speed solar pump , for maximising the saving obtainable from a solar panel system.

Regarding the production of hot water for heating, **ECONCEPT SOLAR ST** it is fitted standard with a double internal circulation, enabling the simultaneous and independent management of two heating zones: a **low temperature** zone (floor system) and a **high temperature** zone (radiators, towel warmers, etc.).

1.2 Control panel



fig. 1 - Control panel

Key

- 1 = DHW temperature setting decrease button
- **2** = DHW temperature setting increase button
- **3** = Heating system temperature setting decrease button (high temperature zone)
- **4** = Heating system temperature setting increase button (high temperature zone)
- 5 = Display
- **6** = Summer / Winter mode selection button
- 7 = Economy / Comfort mode selection button
- 8 = Reset button
- 9 = Unit On / Off button
- **10 =** "Sliding Temperature" menu button (high temperature zone)
- 11 = Set DHW temperature reached
- 12 = DHW symbol
- 13 = DHW mode
- 14 = DHW outlet temperature / setting (flashing during "Exchanger protection" function)
- 15 = Eco (Economy) or Comfort mode
- **16 =** External sensor temperature (with optional external probe)
- 17 = Appears on connecting the external Probe or the Remote Timer Control (optionals)
- 18 = Room temperature (with optional Remote Timer Control - low temperature zone)
- **19** = Burner lit and actual power (flashing during "Flame protection" function)
- **20 =** Antifreeze operation
- 21 = Heating system pressure
- 22 = Fault

23 = Heating delivery temperature / setting - high temperature zone (flashing during "Exchanger protection" function)

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- 24 = Heating symbol
- 25 = Heating mode
- 26 = Set heating delivery temperature reached
- 27 = Summer mode

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Indication during operation

Heating

A heating demand (generated by the Room Thermostat or Remote Timer Control) is indicated by flashing of the hot air above the radiator (details 24 and 25 - fig. 1).

The display (detail 23 - fig. 1) shows the actual heating delivery temperature and, during heating standby time, the message "d2".

The heating graduation marks (detail 26 - fig. 1) light up as the heating sensor temperature reaches the set value.





Domestic hot water (DHW)

A hot water tank heating demand is indicated by flashing of the hot water under the tap (details 12 and 13 - fig. 1). The display (detail 14 - fig. 1) shows the actual hot water outlet temperature and, during DHW standby time, the message **"d1"**.

The DHW graduation marks (detail 11 - fig. 1) light up as the hot water tank sensor temperature reaches the set value.





Exclude hot water tank (economy)

Hot water tank temperature maintaining/heating can be excluded by the user. If excluded, domestic hot water will only be delivered by the solar circuit; the latter is managed by the controller DBM29 whose specifications are given in cap. 4.7 "DBM29 (ECOTRONIC tech) - Solar Controller".

When hot water tank heating is activated (default setting), the COMFORT symbol (detail 15 - fig. 1) is activated on the display, and when off, the ECO symbol (detail 15 - fig. 1) is activated on the display.

The hot water tank can be deactivated by the user (ECO mode) by pressing the **economy/comfort** button (detail 7 - fig. 1). To activate the COMFORT mode, press the**economy/comfort** button (detail 7 - fig. 1) again.

1.3 Lighting and turning off

Boiler not electrically powered



fig. 4 - Boiler not powered



The antifreeze system does not work when the power and/or gas to the unit are turned off. To avoid damage caused by freezing during long idle periods in winter, it is advisable to drain all the water from the boiler, DHW circuit and system; or drain just the DHW circuit and add a suitable antifreeze to the heating system, complying with that prescribed in sec. 2.3.

Boiler lighting

Switch on the power to the unit.





- For the following 180 seconds the display will show FH which identifies the heating system air venting cycle.
- During the first 5 seconds the display will also show the card software version.
- Open the gas cock ahead of the boiler.
- When the message FH disappears, the boiler is ready to operate automatically whenever domestic hot water is drawn or in case of a room thermostat demand.

Turning the boiler off

Press the button $\binom{\text{on}_{\text{off}}}{\text{othermal}}$ (detail 9 - fig. 1) for 1 second.



fig. 6 - Turning the boiler off

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When the boiler is turned off, the electronic board is still powered.

Domestic hot water and heating operation are disabled. The antifreeze system remains activated.

To re-light the boiler, press the button $\binom{\circ n_{off}}{}$ (detail 9 fig. 1) again for 1 second.



fig. 7

The boiler will be immediately ready to operate whenever domestic hot water is drawn or in case of a room thermostat demand.

1.4 Adjustments

Summer/Winter Switchover

Press the button (* (part 6 - fig. 1) for 1 second.



fig. 8

The display will activate the Summer symbol (part 27 - fig. 1): the boiler will deliver tap water only. The antifreeze system stays on.

To turn off Summer mode, press button (part 6 - fig. 1) again for 1 second.

Heating temperature adjustment (high temperature zone)

Use the heating buttons (details 3 and 4 - fig. 1) to adjust the temperature from a min. of 20°C to a max. of 90°C.



fig. 9

This temperature becomes the maximum system delivery temperature also for the low temperature zone. Do not set a lower value than that of "Heating temperature adjustment (low temperature zone)":



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Heating temperature adjustment (low temperature zone)

With optional remote timer control installed

Use the "Heating temperature adjustment" button (see relevant manual) to adjust the temperature from a min. of 10°C to a max. of 40°C.

Without optional remote timer control installed

The heating temperature adjustment for the low temperature zone is fixed at 40°C.

This setting must only be modified by qualified Personnel.

Room temperature adjustment

Room temperature adjustment of the high temperature zone can only be managed by a room thermostat; whereas room temperature adjustment of the low temperature can be managed by a room thermostat or a remote timer control.

Room temperature adjustment (with optional room thermostat)

Using the room thermostat, set the temperature required in the rooms. If the room thermostat is not present, the boiler will keep the system at the set system delivery set point temperature.

Room temperature adjustment (with optional remote timer control)

Using the remote timer control, set the required temperature in the rooms. The boiler will adjust the system water according to the required room temperature. For operation with remote timer control, refer to the relevant instruction manual.

Domestic hot water (DHW) temperature adjustment

Use the DHW buttons (details 1 and 2 - fig. 1) to adjust the temperature from a min. of 10°C to a max. of 65°C.



fig. 10

Sliding temperature

When the optional external probe is installed, the control panel display (detail 5 - fig. 1) shows the actual outside temperature read by the probe. The boiler control system works with "Sliding Temperature". In this mode, the heating system temperature is controlled according to the outside weather conditions in order to ensure high comfort and energy saving throughout the year. In particular, as the outside temperature increases, the system delivery temperature is decreased according to a specific "compensation curve".

With the Sliding Temperature adjustment, the temperature set with the heating buttons (details 3 and 4 - fig. 1) becomes the maximum system delivery temperature (high and low temperature zone). It is advisable to set a maximum value to allow system adjustment throughout its useful operating range.

The boiler must be adjusted at the time of installation by qualified personnel. Adjustments can in any case be made by the user to improve comfort .

Compensation curve and curve offset - High Temperature Zone

Press the button (detail 10 - fig. 1) once to display the actual compensation curve (fig. 11), which can be modified with the DHW buttons (details 1 and 2 - fig. 1).

Adjust the required curve from 1 to 10 according to the characteristic (fig. 13).

By setting the curve to 0, sliding temperature adjustment is disabled.



fig. 11 - Compensation curve

Press the heating buttons (details 3 and 4 - fig. 1) to access parallel curve offset (fig. 14), modifiable with the DHW buttons (details 1 and 2 - fig. 1).



fig. 12 - Parallel curve shift

Press the button) (detail 10 - fig. 1) again to exit parallel curve adjustment mode.

Compensation curve and curve offset - Low Temperature Zone with optional Remote Timer Control connected

Refer to the relevant instruction manual.

Compensation curve and curve offset - Low Temperature Zone without optional Remote Timer Control connected

Press the ECONOMY/COMFORT button (detail 7 - fig. 1) for 10 seconds; parameter o01 or the actual compensation curve is displayed, which can be modified with the DHW buttons (details 1 and 2 - fig. 1).

Adjust the required curve from 1 to 10 according to the characteristic (fig. 13). By setting the curve to 0, sliding temperature adjustment is disabled.

Press the heating button (detail 4 - fig. 1) to access parameter o02 or parallel curve offset (fig. 14), modifiable with the DHW buttons (details 1 and 2 - fig. 1).

Press the ECONOMY/COMFORT button (detail 7 - fig. 1) again for 10 seconds to exit parallel curve adjustment mode .

References for Compensation curve and curve offset

If the room temperature is lower than the required value, it is advisable to set a higher order curve and vice versa. Proceed by increasing or decreasing in steps of one and check the result in the room.







fig. 14 - Example of parallel compensation curve shift

Adjustments from remote timer control (for Low Temperature Zone only)

If the Remote Timer Control (optional) is connected to the boiler, the above adjustments are managed according to that given in table 1. Also, the control panel display (detail 5 - fig. 1) shows the actual room temperature read by the Remote Timer Control.

Table.	1
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DHW temperature adjustment	Adjustment can be made from the Remote Timer Control menu and the boiler control panel.	
Eco/Comfort selection	On disabling DHW from the Remote Timer Control menu, the boiler selects the Economy mode. In this condition, the ECONOMY/COMFORT button (detail 7 - fig. 1) on the boiler panel is disabled .	
	On enabling DHW from the Remote Timer Control menu, the boiler selects the Comfort mode. In this condition , one of the two modes can be selected with the ECONOMY/COMFORT button (detail 7 - fig. 1) on the boiler panel .	

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System water pressure adjustment

The filling pressure with system cold, read on the boiler water gauge, must be approx. 1.0 bar. If the system pressure falls to values below minimum, the boiler card will activate fault F37 (fig. 15).



fig. 15 - Low system pressure fault

Operate the filling cock (detail 1 - fig. 16) and bring the system pressure to a value above 1.0 bar.

At the bottom of the boiler there is a pressure gauge (detail 2 - fig. 16) to show the pressure even when there is no power supply.



fig. 16 - Filling cock



Once the system pressure is restored, the boiler will activate the 180-second air venting cycle indicated on the display by FH.

At the end of the operation always close the filling cock (detail 1 - fig. 16)

2. Installation

2.1 General Instructions

BOILER INSTALLATION MUST ONLY BE PERFORMED BY QUALIFIED PERSONNEL. IN ACCORDANCE WITH ALL THE INSTRUCTIONS GIVEN IN THIS TECHNICAL MANUAL. THE PROVISIONS OF CURRENT LAW. THE PRESCRIPTIONS OF NATIONAL STANDARDS AND LOCAL REGULATIONS AND THE RULES OF PROPER WORKMANSHIP

2.2 Place of installation

The combustion circuit is sealed with respect to the place of installation, therefore the unit can be installed in any room. However, the place of installation must be sufficiently ventilated to prevent the creation of dangerous conditions in case of even small gas leaks. This safety standard is required by EEC Directive no. 90/396 for all gas units, including those with sealed chamber.

Therefore the place of installation must be free of dust, flammable materials or objects, or corrosive gases. The room must be dry and not subject to freezing.



If the unit is enclosed in a cabinet or mounted alongside, a space must be provided for removing the casing and for normal maintenance operations

2.3 Plumbing connections

Important

The heating capacity of the unit must be previously established by calculating the building's heat requirement according to the current regulations. The system must be provided with all the components for correct and regular operation. It is advisable to install shutoff valves between the boiler and heating system allowing the boiler to be isolated from the system if necessary.



The safety valve outlet must be connected to a funnel or collection pipe to prevent water spurting onto the floor in case of overpressure in the heating circuit. Otherwise, if the discharge valve cuts in and floods the room, the boiler manufacturer cannot be held liable.

Do not use the water system pipes to earth electrical appliances.

Before installation, carefully wash all the pipes of the system to remove any residuals or impurities that could affect proper operation of the unit.



Also, a filter must be installed on the system return piping to prevent impurities or sludge from the system clogging and damaging the heat generators.

The filter must be installed when replacing generators in existing systems. The manufacturer declines any liability for damage caused to the generator by failure to install or inadequate installation of this filter.

Carry out the relevant connections according to the diagram in sec. 4.1and the symbols given on the unit.

The unit has an internal double circulation, which enables the management of two heating zones: a low temperature zone (floor system) and a high temperature zone (radiators, towel warmers, etc.).

Solar system

The unit has a specific internal circuit for connection to one or more external solar collectors. The internal circuit of ECONCEPT SOLAR ST comprises: stratified solar hot water tank with solar coil. flow limiter, filling unit, solar safety valve, variable-speed pump and solar expansion tank. Make the corresponding connections, respecting the instructions given below.

- It is best to use steel or copper pipes in the solar circuit. Given the high temperatures the heat transfer fluid can reach, the use of plastic pipes, e.g. in PE or similar materials, is not allowed. Deformation or breakage of the pipes can cause a general system failure !
- The widths of the pipes must be correctly sized . In particular, too large a size slows the system speed and reduces its efficiency. To minimise pressure loss in the solar circuit, the speed of flow in the copper pipe must not exceed 1.5 m/s. For ideal transmission of heat, for the collectors a nominal flow of 40 l/h for every m2 of gross collector area is necessary.
- All the components of the system must be sized in order to ensure an even volumetric flow rate with the required nominal flow rate .
- The pipes outside the boiler must be provided with adequate thermal protection to prevent excessive heat loss. In particular, in case if pipes laid outdoors, use insulation resistant to atmospheric agents, UV rays and bird damage.

- The solar circuit must be perfectly tight. Check all the joins between pipes and correct execution of any welds. Use pressure fittings only of the thermal resistance guaranteed by their manufacturer is equal to 200°C.
- The presence of air in the solar circuit considerably affects its efficiency. It is necessary to install venting devices in
 the highest points of the solar circuit (e.g. at the tops of the columns) and make sure the system is completely vented
 after commissioning and after every maintenance operation. The delivery and return pipes must be installed with
 adequate slopes towards the vents, avoiding the creation of air pockets. Automatic or manual devices (recommended) can be used as venting devices. The venting devices must be resistant to temperatures up to 150°C. If the system is not working and the automatic venting devices are not blocked, steam can come out. Therefore the automatic
 venting devices must be blocked while the system is working.
- The solar circuit must be filled with suitable heat transfer fluid, specific for solar systems. Recommended products: "FERSOL LT" or "FERSOL ULTRA LT" which provide adequate antifreeze protection for temperatures to -12°C and -25°C respectively. In general, choose the type of fluid according to the outside temperature in relation to the heating system in the place of installation. Add approx. 7°C to this temperature (e.g. -5°C) as a safety factor : therefore in the above example, the antifreeze protection of "FERSOL LT" fluid will suffice. FERSOL premixed solar fluid contains non-toxic propylene glycols and corrosion inhibitors thermostable to 300°C (peak temperature limit condition reachable for very short periods).
- For solar system filling and venting operations, refer to sec. 3.2. For periodical fluid and maintenance checking operations, refer tosec. 3.3.

System water charcteristics

In the presence of water harder than 25° Fr (1° F = 10ppm CaCO₃), the use of suitably treated water is advisable in order to avoid possible scaling in the boiler. The treatment must not in any case reduce the hardness to values below 15° F (Decree 236/88 for uses of water intended for human consumption). Water treatment is indispensable in the case of very large systems or with frequent replenishing of water in the system. If partial or total emptying of the system becomes necessary in these cases, it is advisable to refill it with treated water.

Antifreeze system, antifreeze fluids, additives and inhibitors

The boiler is equipped with an antifreeze system that turns on the boiler in heating mode when the system delivery water temperature falls under 6°C. The device will not come on if the electricity and/or gas supply to the unit are cut off. If it becomes necessary, it is permissible to use antifreeze fluid, additives and inhibitors only if the manufacturer of these fluids or additives guarantees they are suitable for this use and cause no damage to the heat exchanger or other components and/or materials of the boiler unit and system. It is prohibited to use generic antifreeze fluid, additives or inhibitors that are not expressly suited for use in heating systems and compatible with the materials of the boiler unit and system.

2.4 Gas connection



Before making the connection, ensure that the unit is arranged for operation with the type of fuel available and carefully clean all the pipes of the gas system to remove any residues that could affect good functioning of the boiler.

The gas must be connected to the relative connector (see fig. 33) in conformity with current standards, with rigid metal pipes or with continuous flexible s/steel wall tubing, placing a gas cock between the system and the boiler. Make sure that all the gas connections are tight. The capacity of the gas meter must be sufficient for the simultaneous use of all equipment connected to it. The diameter of the gas pipe leaving the boiler does not determine the diameter of the pipe between the unit and the meter; it must be chosen according to its length and loss of head, in conformity with current standards.



Do not use the gas pipes to earth electrical appliances.



2.5 Electrical connections

Connection to the electrical grid



The unit's electrical safety is only guaranteed when correctly connected to an efficient earthing system executed according to current safety standards. Have the efficiency and suitability of the earthing system checked by professionally qualified personnel. The manufacturer is not responsible for any damage caused by failure to earth the system. Also make sure that the electrical system is adequate for the maximum power absorbed by the unit, as specified on the boiler dataplate.

The boiler is prewired and provided with a Y-cable and plug for connection to the electricity line. The connections to the grid must be made with a permanent connection and equipped with a bipolar switch whose contacts have a minimum opening of at least 3 mm, interposing fuses of max. 3A between the boiler and the line. It is important to respect the polarities (LINE: brown wire / NEUTRAL: blue wire / EARTH: yellow-green wire) in making connections to the electrical line. During installation or when changing the power cable, the earth wire must be left 2 cm longer than the others.



The user must never change the unit's power cable. If the cable gets damaged, switch off the unit and have it changed solely by professionally qualified personnel. If changing the electric power cable, use solely **"HAR H05 VV-F"** 3x0.75 mm2 cable with a maximum outside diameter of 8 mm.

Solar collector temperature probe

The unit is provided with a temperature probe for positioning on the circuit at the outlet of the last collector .The probe must be connected to the controller after carrying out the solar circuit filling operations described in sec. 2.3. The controller is located on the left side on the back of the electrical box. The probe must be connected to terminals 5 and 6, removing the resistances (to be kept for future use).

Room thermostat (optional)



CAUTION: The room thermostat must have clean contacts. CONNECTING 230 V. TO THE TERMINALS OF THE ROOM THERMOSTAT WILL IRREPARABLY DAMAGE THE ELECTRONIC CARD.

When connecting a remote timer control or a timer switch, do not take the power supply for these devices from their cut-out contacts. Their power supply must be taken with a direct connection from the mains or with batteries, depending on the kind of device.

External probe (optional)

Connect the probe to its respective terminals. The maximum permissible length for the boiler - external probe connection electrical cable is 50 m. A normal 2-wire cable can be used. The external probe should preferably be installed on the North, North-West wall or that facing the largest area of living room. The probe must never be exposed to the early morning sun or, insofar as possible, direct sunlight; protect it if necessary. In any case, the probe must not be installed near windows, doors, ventilation openings, flues or heat sources that could affect the reading.











fig. 17 - External probe positioning not recommended

Accessing the electrical terminal block

Follow the instructions given in fig. 18 to access the electrical connections terminal block. The layout of the terminals for the various connections is given in the wiring diagram in fig. 36.



fig. 18 - Accessing the terminal block

2.6 Fume ducts

The unit is a "C-type" with sealed chamber and forced draught ; the air inlet and fume outlet must be connected to one of the following extraction/suction systems. The unit is approved to work with all the Cxy flue configurations specified on the dataplate (some configurations are given by way of example in this section). Some configurations may be expressly limited or not permitted by law, standards or local regulations. Before proceeding with installation, check and carefully observe the above-mentioned prescriptions. Also comply with the provisions on the positioning of wall and/or roof terminals and the minimum distances from windows, walls, ventilation openings, etc.



This C-type unit must be installed using the fume suction and exhaust ducts supplied by the manufacturer in accordance with UNI-CIG 7129/92. Failure to use them automatically invalidates every warranty and relieves the manufacturer of any liability.

For fume exhaust pipes longer than 1 metre, during installation take in account the natural expansion of the materials when the boiler is working.

To prevent deformations, leave an expansion space of approx. 2 ÷ 4 mm for every metre of pipe.



fig. 19 - Expansion

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fig. 20 - Examples of connection with coaxial pipes () = Air / = Fumes)

For coaxial connection, fit the unit with one of the following starting accessories. For the wall hole dimensions, refer to sec. 4.1. Any horizontal sections of the fume exhaust must be kept sloping slightly towards the boiler, to prevent any condensate from flowing back towards the outside and causing dripping.



fig. 21 - Starting accessory for coaxial ducts

Before proceeding with installation, check with table 2 that the maximum permissible length is not exceeded, bearing in mind that every coaxial bend gives rise to the reduction indicated in the table. For example, a \emptyset 60/100 duct comprising a 90° bend + 1 horizontal metre has a total equivalent length of 2 metres.

Table.	2 ·	- Max.	length	coaxial	ducts
--------	-----	--------	--------	---------	-------

	ECONCEPT SOLAR ST 18		ECONCEPT	SOLAR ST 25
	Coaxial 60/100 Coaxial 80/125		Coaxial 60/100	Coaxial 80/125
Max. permissible length	6 m	16 m	5 m	15 m
Reduction factor 90° bend	1 m	0.5 m	1 m	0.5 m
Reduction factor 45° bend	0.5 m	0.25 m	0.5 m	0.25 m

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fig. 22 - Examples of connection with separate pipes (

For connection of the separate ducts, fit the unit with the following starting accessory:



fig. 23 - Starting accessory (code 041039X0) for separate ducts

Before proceeding with installation, make sure the maximum permissible length has not been exceeded, by means of a simple calculation:

- 1. Establish the layout of the system of split flues, including accessories and outlet terminals.
- Consult the table 4 and identify the losses in m_{eq} (equivalent metres) of every component, according to the installation position.
- 3. Check that the sum total of losses is less than or equal to the maximum permissible length in table 3.

Table. 3 - Max. length separate ducts

	Separate ducts		
	ECONCEPT SOLAR ST 18	ECONCEPT SOLAR ST 25	
Max. permissible length	80 m _{eq}	75 m _{eq}	

Table. 4 - Accessories

				Losses in m _{eq}		
				Air	Fume e	exhaust
				inlet	Vertical	Horizontal
Ø 80	PIPE	1 m M/F	1KWMA83W	1.0	1.6	2.0
	BEND	45° M/F	1KWMA65W	1.2	1	.8
		90° M/F	1KWMA01W	1.5	2	.0
	PIPE SECTION	with test point	1KWMA70W	0.3	0.3	
	TERMINAL	air, wall	1KWMA85A	2.0	-	
		fumes, wall with antiwind	1KWMA86A	-	5	.0
	FLUE	Split air/fumes 80/80	1KWMA84U	-	12	2.0

Connection to collective flues



fig. 24 - Examples of connection to flues (=> = Air / => = Fumes)

If you are then going to connect the **ECONCEPT SOLAR ST** boiler to a collective flue or a single flue with natural draught, the flue must be expressly designed by professionally qualified technical personnel in conformity with the current standards and be suitable for airtight chamber units equipped with a fan.

In particular, flues must have the following characteristics:

- · Be sized according to the method of calculation stated in the current standards.
- Be airtight to the products of combustion, resistant to the fumes and heat and waterproof for the condensate.
- Have a circular or quadrangular cross-section, with a vertical progression and with no constrictions.
- · Have the ducts conveying the hot fumes adequately distanced or isolated from combustible materials.
- Be connected to just one unit per floor.
- · Be connected to just one type of unit (or all and only forced draught units or all and only natural draught units).
- Have no mechanical suction devices in the main ducts.
- Be at a lower pressure, all along their length, under conditions of stationary operation.
- · Have at their base a collection chamber for solid materials or condensation equipped with a metal door with an airtight closure.

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2.7 Condensate drain connection

The boiler is equipped with an internal trap to drain condensate. Fit the inspection union A and flexible tube B, pressing it in for approx. 3 cm and securing it with a clamp. Fill the trap with approx. 0.5 I. of water and connect the flexible tube to the drainage system.



fig. 25

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3. Service and maintenance

All adjustment, conversion, commissioning and maintenance operations described below must only be carried out by Qualified Personnel (meeting the professional technical requirements prescribed by current regulations) such as those of the Local After-Sales Technical Service.

FERROLI declines any liability for damage and/or injury caused by unqualified and unauthorised persons tampering with the unit.

3.1 Adjustments

Gas conversion

The unit can operate on natural gas or LPG and is factory-set for use with one of these two gases, as clearly shown on the packing and on the dataplate. Whenever a gas different from that for which the unit is arranged has to be used, a conversion kit will be required, proceeding as follows:

- 1. Remove the casing.
- 2. Open the sealed chamber.
- 3. Replace the nozzle A inserted in the mixer, with that contained in the conversion kit.
- 4. Reassemble and check the tightness of the connection.
- 5. Apply the label, contained in the conversion kit, near the dataplate.
- 6. Refit the sealed chamber and casing.
- 7. Modify the parameter for the type of gas:
 - · put the boiler in standby mode
 - press the DHW buttons (details 1 and 2 fig. 1) for 10 seconds. the display shows "P01" flashing.
 - Press the DHW buttons fig. 1 (details 1 and 2) to set parameter 00 (for natural gas) or 01 (for LPG).
 - press the DHW buttons (details 1 and 2 fig. 1) for 10 seconds.
 - · the boiler will return to standby mode
- 8. Check the working pressure.
- Using a combustion analyser connected to the boiler fume outlet, check that the CO₂ content in the fumes, with the boiler operating at max. and min. power, matches that given in the technical data table for the corresponding type of gas.



fig. 26 - Gas nozzle replacement

TEST mode activation

Press the heating buttons (details fig. 13 and 4 -) together for 5 seconds to activate the **TEST** mode. The boiler lights at the maximum heating power set as described in the following section.

The heating symbol (detail 24 - fig. 1) and DHW symbol (detail 12 - fig. 1) flash on the display; the heating power and actual flame current value (uA x 10) will be displayed alongside.



fig. 27 - TEST mode (heating power = 100%)

Press the heating buttons (details 3 and 4 - fig. 1) to increase or decrease the power (min.=0%, max.=100%).

Press the DHW button "-" (detail 1 - fig. 1) and boiler power is immediately adjusted to min. (0%). Press the DHW button "+" (detail 2 - fig. 1) and boiler power is immediately adjusted to max. (100%).

If the TEST mode is activated and enough hot water is drawn to activate the DHW mode, the boiler remains in TEST mode but the 3-way valve goes to DHW.

To deactivate the TEST mode, repeat the activation sequence.

The TEST mode is automatically disabled in any case after 15 minutes or on stopping of hot water drawing (in case of drawing of hot water enough to activate DHW mode).

Heating power adjustment

To adjust the heating power, switch the boiler to TEST mode (see sec. 3.1). Press the heating buttons (details 3 and 4 - fig. 1) to increase or decrease the power (min. = 00 - max. = 100). Press the RESET button within 5 seconds and the max. power will remain that just set. Exit TEST mode (see sec. 3.1).

3.2 Starting

Before lighting the boiler

- Open any on-off valves between the boiler and the systems.
- Check the tightness of the gas system, proceeding with caution and using a soap and water solution to detect any leaks in connections.
- Check correct prefilling of the expansion tank (ref. sec. 4.4).
- Fill the water system and make sure all air contained in the boiler and the system has been vented, by opening the air vent valve on the boiler and any vent valves on the system.
- Fill the condensate trap and check correct connection of the condensate elimination system.
- Make sure there are no water leaks in the system, DHW circuits, connections or boiler.
- Check correct connection of the electrical system and efficiency of the earthing system
- Make sure the gas pressure value for heating is that required.
- · Make sure there are no flammable liquids or materials in the immediate vicinity of the boiler

Checks during operation

- Turn the unit on as described in sec. 1.3.
- Make sure the fuel circuit and water systems are tight.
- Check the efficiency of the flue and air-fume ducts while the boiler is working.
- Check the correct tightness and functionality of the condensate elimination system and trap.
- Make sure the water is circulating properly between the boiler and the systems.
- Make sure the gas valve modulates correctly in the heating and domestic hot water production phases.

- Check proper boiler lighting by doing several tests, turning it on and off with the room thermostat or remote control.
- Using a combustion analyser connected to the boiler fume outlet, check that the CO₂ content in the fumes, with the boiler operating at max. and min. output, corresponds to that given in the technical data table for the corresponding type of gas.
- Make sure the fuel consumption indicated on the meter matches that given in the technical data table on sec. 4.4.
 Check the correct programming of the parameters and carry out any necessary customization (compensation curve,

power, temperatures, etc.).

Solar circuit

The solar circuit is managed by the Controller DBM29 whose specifications are given in cap. 4.7 "DBM29 (ECOTRONIC tech) - Solar Controller".

To start the solar system it is necessary to use the special filling pump and carry out the following procedure, respecting the order of steps described below. Do this when the collectors are cold, i.e. in the morning or evening. If this is not possible, protect the panels with covers that opaque to the sun's rays.



fig. 28 - Solar circuit

Key

- 1 Filling cock
- 7 Pressure gauge
- 9 Filters
- 10 Container

- Drain cock
 Flow limiter
 Pump
- lot ⊢unnµ Iot Varat

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1. Solar circuit tightness test

Open the venting device in the solar collector circuit (ref. 17 - fig. 28).

Remove the boiler casing front panels. Open the solar circuit filling cock (ref. 1 - fig. 28) and drain cock (ref. 11 - fig. 28). Fit a hose from the cock (ref. 11) to the container (ref. 10 - fig. 28) and from the pump (ref. 16 - fig. 28) to the cock (ref. 1).





fig. 30 - Open

Turn the flow limiter (ref. 12 -) adjuster screw to the horizontal position (fig. 29), which closes itfig. 28. Pump the heat transfer fluid into the circuit with the filling pump (ref. 16), until it comes out the drain cock (ref. 11 - fig. 28) Maintain the circulation of the fluid, venting the system through the vent of the collectors (ref. 17 - fig. 28).

After venting, close the drain cock (11) and the venting device (ref. 17).

Bring the pressure to 4.5 bar and close the cock (ref. 1 - fig. 28).

Wait a few minutes, visually checking the unions and welds and recheck the pressure, which must remain stable on the pressure gauge (ref. 7 - fig. 28).

Eliminate any leaks detected and, if necessary, do another tightness check with solar heat transfer fluid.

2. Flushing the solar circuit

Keeping the system filled and the flow limiter screw (12) in the horizontal position (closed), connect a filter (9) on the drain pipe connected to the cock (11)

Open the cock (11) and cock (1), depressurising the solar circuit

Check the closing of the system venting device (17)

Using the pump (16), pump the solar heat transfer fluid from the container (10) in the solar circuit, for about 10-15 minutes (depending on the length of the system pipes)

Check the filter (9) and clean it if necessary.

3. Filling the solar circuit

Check the solar expansion tank prefilling pressure (ref. 308 - fig. 34), which should be approx. 0.3-0.5 bar below the filling pressure (final) so that, even cold, the tank membrane is under some tension (recommended value: 1.5 bar).

Close the cock(11) and fill the solar circuit, pressurising it .

If a pressure of 2 bar (recommended value cold for systems with a height difference of up to 15 metres between the highest point of the solar collector and the expansion tank) is reached, also close the cock (1) and turn the flow limiter screw (12) to the upright position (open).

Disconnect the hoses and the filling pump from the cocks ref. 1 and ref. 11 of fig. 28.

4. Solar circuit venting

- Activate mode FH (see specifications in cap. 4.7 "DBM29 (ECOTRONIC tech) Solar Controller").
- The solar pump will start operating in continuous mode.
- Open the system vent and ensure complete venting .
- Deactivate mode FH (see specifications in cap. 4.7 "DBM29 (ECOTRONIC tech) Solar Controller").
- The pressure gauge should indicate 1.5 2 bar in the circuit. If necessary, pressurise again by repeating the above steps.

5. Adjusting the flow limiter

ECONCEPT SOLAR ST is equipped with a variable-speed solar pump controlled by an advanced control system, which optimises the flow rate in the solar circuit according to working conditions and heat demands.

For correct operation, the flow rate in the solar circuit must be preset during commissioning, by means of the flow limiter, (fig. 31) to a value of **2** l/min per panel.



fig. 31 - Flow limiter

Activate the "Flow limiter adjustment" mode (see specifications in cap. 4.7 "DBM29 (ECOTRONIC tech) - Solar Controller"). Using an adjusting wrench (9 mm), operate on the control of the limiter (4 - fig. 31) and adjust the flow rate. Deactivate the "Flow limiter adjustment" mode (see specifications in cap. 4.7 "DBM29 (ECOTRONIC tech) - Solar Controller").

6. Solar collector temperature sensor

To connect the solar collector sensor it is necessary to disconnect the resistance "A" from the terminals on the cable "PT1000". Then connect the solar collector probe "311" to the same terminals.



fig. 32 - Solar collector sensor connection

3.3 Maintenance

Periodical check

To ensure proper operation of the unit over time, have qualified personnel carry out a yearly check, providing for the following:

- The control and safety devices (gas valve, flowmeter, thermostats, etc.) must function correctly.
- The fume exhaust circuit must be perfectly efficient.
 (Sealed chamber boiler: fan, pressure switch, etc. The sealed chamber must be tight: seals, cable glands, etc.)
 (Open chamber boiler: anti-backflow device, fume thermostat, etc.)
- · The air/fume terminal and ducts must be free of obstructions and leaks
- The burner and exchanger must be clean and free of deposits. For cleaning do not use chemical products or wire brushes.
- The electrode must be free of scale and properly positioned.
- The gas and water systems must be tight.
- The water pressure in the cold water system must be approx. 1 bar; otherwise bring it to that value.
- The circulating pump must not be blocked.
- The expansion tank must be filled.
- · The gas flowrate and pressure must match that given in the respective tables.



The boiler casing, control panel and aesthetic parts can be cleaned with a soft damp cloth, if necessary soaked in soapy water. Do not use any abrasive detergents and solvents.

Solar circuit

Make sure to periodically check the condition and pressure of the fluid in the system when cold, at least once every 2-3 years, if possible at the end of the most critical period in relation to the risk of prolonged stagnation of the fluid in the collectors (overheating of the fluid due to maximum insolation with system idle/not used: e.g. the check should be carried out immediately after the summer holidays).

If FERSOL solar fluid is used, the condition of the fluid, or protection stability, is visually indicated by its pink/purple colour and a change to a different colour (colourless) indicates deterioration to a minimum protection level .At this point, change all the fluid or in any case check that the pH is not below 8, in which case change the fluid so as to avoid problems.

Do not dilute the fluid with water or other fluids. When necessary, top up only with the same product.

Do not use in systems executed with materials that are not compatible with moderately alkaline liquids (PH 8 - 10).

Information regarding disposal: The fluid is not considered hazardous for the health and the environment, nevertheless it must not be disposed of or diluted in potable waters (e.g. ground waters) or water for food products.



3.4 Trouble shooting

Diagnostics

The boiler is equipped with an advanced self-diagnosis system. In case of a boiler fault, the display will flash together with the fault symbol (detail 22 - fig. 1) indicating the fault code (detail 21 - fig. 1).

There are faults that cause permanent shutdown (marked with the letter "A"): to restore operation just press the RESET button (detail 8 - fig. 1) for 1 second or RESET on the optional remote timer control if installed; if the boiler fails to start, it is necessary to first eliminate the fault.

Other faults (marked with the letter "**F**") cause temporary shutdowns that are automatically reset as soon as the value returns within the boiler's normal working range.

List of faults DBM05C boiler card

Table. 5 - List of faults

Fault code	Fault	Possible cause	Cure
		No gas	Check the regular gas flow to the boiler and that the air has been eliminated from the pipes
A01	The burner fails to light	Detection/ignition electrode fault	Check the wiring of the electrode and that it is correctly positioned and free of any deposits
		Faulty gas valve	Check the gas valve and replace it if necessary
		Insufficient gas supply pressure	Check the gas supply pressure
		Trap clogged	Check the trap and clean it if necessary
۵02	Flame present signal with	Electrode fault	Check the ionisation electrode wiring
702	burner off	Card fault	Check the card
A 0 2	Overtemperature protection	Heating sensor damaged	Check the correct positioning and operation of the heating sensor
A03	activation	No water circulation in the system	Check the circulating pump
		Air in the system	Vent the system
A04	Fume extraction duct safety device activation	Fault F07 generated 3 times in the last 24 hours	See fault F07
A05	Fan protection activation	Fault F15 generated for 1 hour (consecutive)	See fault F15
		Ionisation electrode fault	Check the position of the ionisation electrode and replace it if necessary
	No flama offen innitian stand	Flame unstable	Check the burner
A06	(6 times in 4 min.)	Gas valve Offset fault	Check the Offset adjustment at minimum power
		air/fume ducts blocked	Remove the obstruction from the flue, fume extraction and air inlet ducts and terminals
		Trap clogged	Check the trap and clean it if necessary
F07	High fume temperature	Flue partially obstructed or insufficient	Check the efficiency of the flue, fume extraction ducts and outlet terminal
		Fume sensor position	Check correct positioning and operation of the fume sensor
		Sensor damaged	
F10	Delivery sensor 1 fault	Wiring shorted	Check the wiring or replace the sensor
		Wiring disconnected	
		Sensor damaged	
F11	Return sensor fault	Wiring shorted	Check the wiring or replace the sensor
		Wiring disconnected	
		Sensor damaged	
F12	DHW sensor fault	Wiring shorted	Check the wiring or replace the sensor
		Wiring disconnected	
		Sensor damaged	
F13	Fume sensor fault	Wiring shorted	Check the wiring or replace the sensor
		Wiring disconnected	
		Sensor damaged	
F14	Delivery sensor 2 fault	Wiring shorted	Check the wiring or replace the sensor
		Wiring disconnected	
		No 230V power supply	Check the 3-pin connector wiring
F15	Fan fault	Tachometric signal interrupted	Check the 5-pin connector wiring
	1	Fan damaged	Check the fan

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	Fault code Fault		Possible cause	Cure
Γ				Check the system
	F21	Incorrect system water pressure	value	Check the safety valve
				Check the expansion tank
	A26	System protection activation	Fault F40 generated 3 times in the last hour	See fault F40
	F34	Supply voltage under 170V	Electric mains trouble	Check the electrical system
Ī	F35	Faulty mains frequency	Electric mains trouble	Check the electrical system
Ī	E27	Incorrect system water pressure	Pressure too low	Fill the system
	F3/		Sensor damaged	Check the sensor
		External probe fault	Probe damaged or wiring shorted	Check the wiring or replace the sensor
	F39		Probe disconnected after activating the sliding temperature	Reconnect the external probe or disable the sliding temperature
				Check the system
	F40	0 Incorrect system water pressure	stem water pressure Pressure too high	Check the safety valve
				Check the expansion tank
	A41	Sensor positioning	Delivery sensor disconnected from the pipe	Check correct positioning and operation of the heating sensor
	F42	F42 Heating sensor fault Sensor damaged		Replace the sensor
	F47	System water pressure sensor fault	Wiring disconnected	Check the wiring

List of faults DBM29 solar card

Fault code	Possible cause	Cure
F82	Regulator configuration fault	Only with Parameter P26=1, Stand alone
F83	Solar Collector PT1000 sensor	The sensor fault, understood as a short circuit or open circuit, causes deactivation of the Solar Pump and shutter closing. The protection is immediately deactivated on eliminating the fault. To signal this fault, the symbol S3 will be deactivated, whereas the Fault symbol and the backlight will start flashing.
F84	Solar Collector Return NTC sensor	The sensor fault, understood as a short circuit or open circuit, causes deactivation of the Solar Pump . The protection is immediately deactivated on eliminating the fault. To signal this fault, the symbol S4 will be deactivated, whereas the Fault symbol and the backlight will start flashing.
F85	Boiler card communication fault	Only with Parameter P26=0, Communicating The fault, understood as no communication with the boiler card for 60 consecutive seconds, causes deactivation of the Solar Pump and shutter closing. The protection is immediately deactivated on eliminating the fault.
F87	Protection for no circulation	Only with Parameter P25<>0, Operation without flowmeter This fault is activated when, with the Solar Pump activated, the card does not detect flow in the solar circuit for 10 consecutive minutes. The fault causes deactivation of the Solar Pump. After checking and eliminating the fault, the protection can be removed, activating and deac- tivating the OFF mode.

Low temperature zone card fault FZ4B

The controller indicates the boiler operating mode and its faults through the incorporated display: "St" means Standby (no demand in progress), "CH" means that the zone controller requests the boiler for activation of heating mode, "DH" means Domestic Hot Water production. The fault codes are given below:

Fault code	Possible cause	Cure
F70	NTC sensor fault (T1)	With circuit / contact open
F71	NTC sensor fault (T2)	With circuit / contact open
F72	NTC sensor fault (T3)	With circuit / contact open
F73	NTC sensor fault (T4)	With circuit / contact open
F74	Communication with boiler card not present	
F75	Communication with Remote Control (RT1) not present	(Only with Remote Control connected)
F76	Communication with Remote Control (RT2) not present	(Only with Remote Control connected)
F77	Communication with Remote Control (RT3) not present	(Only with Remote Control connected)

The fault codes are also displayed in the corresponding menu of the Remote Control during normal operation.

4. Technical data and characteristics

4.1 Dimensions and connections



- Gas inlet 7
- 8 Cold water inlet
- 10 System delivery
- 11 System return
- 192 Recirculation
- 320 Low temperature delivery
- 321 Low temperature return

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327	Solar system delivery
328	Solar system return

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4.3 Water circuit



fig. 35 - Water circuit

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ECONCEPT SOLAR ST

Key fig. 34-35-36

- Sealed chamber 5
- Gas inlet 7
- 8 Cold water inlet
- 10 System delivery
- 11 System return
- 14a Safety valve
- 14b Safety valve
- 14c Safety valve
- 16 Fan
- 22 Burner
- 29 Fume outlet manifold
- Heating circulating pump 32 36
- Automatic air vent 40 DHW expansion tank
- Gas valve
- 44
- 56 Expansion tank
- 72 Room thermostat (not supplied)
- 72a Low temperature zone room thermostat (not supplied)
- 74 System filling cock
- Detection electrode 82
- Diverter valve 95 97
- Magnesium anode
- 130 Hot water tank circulating pump **138** External probe (not supplied)
- 139a Low temperature zone remote timer control (not supplied)
- 145 Pressure gauge
- 154 Condensate outlet
- 155 Hot water tank temperature probe
- 161 Condensing heat exchanger
- 179 Non-return valve
- 180 Hot water tank

- 186 Return sensor
- 188 Ignition electrode
- 191 Fume temperature sensor
- 193 Trap
- 194 Exchanger
- 196 Condensate tray
- 233 Hot water tank drain cock
- 241 **Bypass**
- 246 Pressure transducer
- 256 Modulating heating circulating pump signal
- 278 Double sensor (Safety + Heating)
- 308 Solar expansion tank
- 309 Solar system filling cock
- 310 Solar system circulating pump
- Collector temperature sensor 311
- 312 Flowmeter unit
- 313 Solar system drain cock
- 314 Solar return sensor
- 315a Low temperature mixing valve
 - A = BROWN: FZ4B(9) VALVE(6)

B = BLUE: FZ4B (10) - VALVE (2)

- C = BLACK: FZ4B (11) VALVE (3)
- 316 DHW mixing valve
- 317a Low temperature safety thermostat
- 318a Low temperature circulating pump
- 319a Low temperature modulation sensor
- 320 Low temperature delivery
- 321 Low temperature return
- 322 DHW recirculation return
- 323 Mixed DHW outlet
- 326 Solar system venting cock

4.4 Technical data table

		ECONCEPT SOLAR ST 18	ECONCEPT SOLAR	
Data	Unit	Value	Value	
Max. heating capacity	kW	18	25.2	(Q)
Min. heating capacity	kW	3	5.3	(Q)
Max. Heat Output in heating (80/60°C)	kW	17.7	24.6	(P)
Min. Heat Output in heating (80/60°C)	kW	2.9	5.2	(P)
Max. Heat Output in heating (50/30°C)	kW	19	26.6	
Min. Heat Output in heating (50/30°C)	kW	3.2	5.7	
Max. heating capacity in hot water production	kW	18	27	
Min. heating capacity in hot water production	kW	3	5.3	
Max. Heat Output in hot water production	kW	17.7	26.5	
Min. Heat Output in hot water production	kW	2.9	5.2	
Efficiency Pmax (80-60°C)	%	98.3	98.3	
Efficiency Pmin (80-60°C)	%	97.3	97.3	
Efficiency Pmax (50-30°C)	%	105.4	105.4	
Efficiency Pmin (50-30°C)	%	107.2	107.2	
Efficiency 30%	%	109.1	109.1	
Efficiency class Directive 92/42 EEC	-	**	**	
NOx emission class	-	5	5	(NOx)
Gas supply pressure G20	mbar	20	20	
Max. gas delivery G20	m ³ /h	1.9	2.86	
Min. gas delivery G20	m ³ /h	0.32	0.56	
Gas supply pressure G31	mbar	37	37	
Max. gas delivery G31	kg/h	1.41	2.11	
Min. gas delivery G31	kg/h	0.23	0.41	
Max. working pressure in heating	bar	3	3	(PMS)
Min. working pressure in heating	bar	0.8	0.8	
Max. heating temperature	°C	95	95	(tmax)
Heating water content	litres	1	1.5	
Heating expansion tank capacity	litres	8	8	
Heating expansion tank prefilling pressure	bar	1	1	
Max. working pressure in hot water production	bar	9	9	(PMW)
Min. working pressure in hot water production	bar	0.25	0.25	
Hot water content	litres	180	180	
DHW circuit expansion tank capacity	litres	12	12	
DHW circuit expansion tank prefilling pressure	bar	3	3	
DHW flow rate $\Delta t 30^{\circ}$ C (flow rate obtained without supply of solar circuit)	l/ 10min	230	260	
DHW flow rate $\Delta t 30^{\circ}$ C (flow rate obtained without supply of solar circuit)	l/h	650	890	(D)
Solar expansion tank capacity	litres	18	18	
Protection rating	IP	X5D	X5D	
Power supply voltage	V/Hz	230V/50Hz	230V/50Hz	
Electrical power input	W	280	280	
Electrical power input in hot water production	W	180	180	
Empty weight	kg	120	125	
Type of unit		C13-C23-C33-C43-C	53-C63-C83-B23-B33	
PIN CE		0461BT0920	0063BR3161	/ -

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4.5 Diagrams











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Boiler pressure losses

1-2-3 Circulating pump speed

High Temperature zone circulating pumps Head/Pressure loss (ECONCEPT SOLAR ST 25)

Low Temperature zone circulating pumps Head/Pressure loss (ECONCEPT SOLAR ST 25)

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500





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4.6 Wiring diagram



fig. 36 - Wiring diagram

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Attention: Before connecting the collector temperature sensor, remove the resistance between terminals 5 and 6 of controller DBM29.

> Attention: Before connecting the room thermostat on the direct zone, remove the jumper on the terminal block .

Attention: The boiler is arranged for operation with room thermostat on the low temperature zone. On connecting the remote timer control it will be necessary to configure the controller FZ4B. To do this, press the AUTOCFG button (see fig. 37) until all the LEDs of the FZ4B card flash. The boiler will then be ready to operate with remote timer control on the low temperature.

To reconnect the room **thermostat** in place of the **remote timer control**, carry out the above procedure again, bringing the room thermostat to demand status (voltage-free contact).



fig. 37 - Controller FZ4B

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4.7 DBM29 (ECOTRONIC tech) - Solar Controller

User interface



- 1 Activated: solar collector temperature sufficient for exchange, normal operation
 - Flashing: solar collector cold recognition Activated: solar collector antifreeze function
- Activated: solar collector antifreeze function
 Activated: shutter closed for hot water tank max. temperature reached
 - Deactivated: shutter open, normal operation
- 4 Activated: solar collector temperature ok, normal operation
- Flashing: solar collector cooling on
- 5 Solar circulating pump on
- 6 Boiler in DHW mode
- 7 Boiler in heating mode
- 8 Solar card fault
- 9 Boiler burner on
- **11** Upper hot water tank / solar collector return temperature
- 12 Hot water tank / solar collector temperature
- **13** Activated: Solar collector temperature ok, normal operation

Deactivated: solar collector temperature sensor fault

- Flashing: solar collector limit temperature function
- 14 Activated: solar collector return temperature ok, normal operation
 - Deactivated: solar collector return temperature sensor fault
- **15** Activated: boiler hot water tank temperature correct, normal operation
- Flashing: hot water tank cooling function
- 16 Actual solar circulating pump speed (A=Min., E=Max.)
- 21 Solar collector temperature sensor info
- 22 Solar collector return temperature sensor info
- 23 Activated: excess heat elimination/supplementary heating demand
- Deactivated: no excess heat elimination/supplementary heating demand
- A ON/OFF / Enter button
- B Parameter selection button
- **C** Parameter selection button
- D Service menu access / information button



Lighting

Whenever the power to the regulator is switched on, the display activates all the symbols for 2 seconds; in the next 5 seconds, the display will show the regulator software version.

Standby mode

After the lighting stage, if there are no faults and/or higher priority demands, the regulator goes to standby mode. The following information is displayed:

- Standby: temperature of Solar Collector PT1000 sensor S3 with range 1,175°C, the symbol S3 will be lit up; temperature of Solar collector Return NTC sensor S4 with range 1,125°C, the symbol S4 will be lit up.
- Press the Info button for 1 second and the regulator returns to standby mode.

Operation

Solar Circulating Pump activation

If the temperature of the Hot Water Tank Sensor is lower than the Tank max. temperature parameter value (Installer parameter, default value equal to 60°C) and if the difference (positive) between the temperature of Solar Collector Sensor S3 and the temperature of the Hot Water Tank Sensor is higher than or equal to the Activation temperature differential parameter value (Installer parameter, default value equal to 6°C) then the ECOTRONIC tech regulator activates the Solar Circulating Pump .

To signal this mode, the Solar Circulating Pump symbol will be lit up.

Solar Circulating Pump modulation

When the Solar Circulating Pump is working and the Solar Circulating Pump Operation parameter (Installer parameter, default value equal to 0=On/Off) is set to 1, the modulation algorithm is:

- If the difference between the temperature of Solar Collector Sensor S3 and Solar Collector Return Sensor S4 is less than or equal to the Minimum - Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 10°C), the Solar Circulating Pump works at speed 1 (Min. power, 40%). To signal this mode, the symbol A will be lit up.
- If the difference between the temperature of Solar Collector Sensor S3 and the Solar Collector Return Sensor S4 is greater than the Minimum - Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 10°C), the Solar Circulating Pump works at speed 2 (55%). To signal this mode, the symbol B will be lit up
- 3. If the difference between the temperature of Solar Collector Sensor S3 and the Solar Collector Return Sensor S4 is greater than the Minimum Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 10°C) plus the Solar Circulating Pump modulation temperature differential parameter value (Installer parameter, default value equal to 5°C), the Solar Circulating Pump works at speed 3 (70%). To signal this mode, the symbol C will be lit up.
- 4. If the difference between the temperature of Solar Collector Sensor S3 and the Solar Collector Return Sensor S4 is greater than the Minimum Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 10°C) plus double the Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 5°C), the Solar Circulating Pump works at speed 4 (85%). To signal this mode, the symbol D will be lit up.
- 5. If the difference between the temperature of Solar Collector Sensor S3 and the Solar Collector Return Sensor S4 is greater than the Minimum Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 10°C) plus triple the Solar Circulating Pump Modulation temperature differential parameter value (Installer parameter, default value equal to 5°C), the Solar Circulating Pump works at speed 5 (Max. power, 100%). To signal this mode, the symbol E will be lit up.
- **N.B.:** If, at the moment of Solar Circulating Pump activation, the ECOTRONIC tech regulator does not have to set speed 5 (Max. power, 100%), the Solar Circulating Pump will work in any case at speed 5 (Max. power, 100%) in the first second of operation.

If the Solar Circulating Pump Operation parameter (Installer parameter, default value equal to 1=Modulating) is set to 0 there will be no modulation: the Solar Circulating Pump will work in on/off mode according to the normal Solar Circulating Pump activation/deactivation algorithms. To signal this mode, the symbol E will always be lit up.

Solar Circulating Pump deactivation

If the temperature of the Hot Water Tank Sensor is lower than the Tank max. temperature parameter (Installer parameter, default value equal to 60° C) and if the difference (positive) between the temperature of Solar Collector Sensor S3 and the temperature of Solar Collector Return Sensor S4 is less than or equal to the Deactivation temperature differential parameter value (Installer parameter, default value equal to 4° C) then the ECOTRONIC tech regulator deactivates the Solar Circulating Pump.

If the temperature of the Hot Water Tank Sensor is higher than or equal to the Tank max. temperature parameter value (Installer parameter , default value equal to 60°C) then the ECOTRONIC tech regulator deactivates the Solar Circulating Pump.

To signal this mode, the Solar Circulating Pump symbol will be deactivated.

Off mode

If there are no faults, it is always possible to press the ON/OFF button for 3 seconds to switch the regulator to Off mode . All demands are terminated, the shutter will be closed and the display shows the message OFF .

Only the Antifreeze protection and the Circulating Pump anti-shutdown remain active . To return the system to an operating mode, press the ON/OFF button again for 3 seconds .

FH mode

If there are no faults it is always possible to press the button ⁻ for 10 seconds to switch the regulator to FH mode. The FH mode lasts 10 minutes: during this time, the Solar Circulating Pump will be activated at speed 5 (Max. power, 100%) and deactivated every 10 seconds; to signal this mode the display will indicate FH and the Solar Circulating Pump symbol and the symbol E will light up and go off every 10 seconds . The FH mode can be terminated by switching the regulator to Off mode and then to ON mode .

Flow limiter adjustment mode

If there are no faults, it is always possible to press the button - for 10 seconds to switch the regulator to Flow Limiter Adjustment mode .

To signal the Flow Limiter Adjustment mode, the Radiator and Tap symbols will start flashing together . The Solar Circulating Pump is immediately activated in continuous mode and at speed 5 (Max. power, 100%).

The Flow Limiter Adjustment mode ends automatically after 2 minutes or by pressing the button for 10 seconds.

System Cooling function (Collector and Hot Water Tank)

This function depends on the System cooling parameter value (Installer parameter, default value equal to 1=On).

During normal operation, if the temperature of the Hot Water Tank Sensor is higher than the Tank max. temperature parameter value (Installer parameter, default value equal to 60° C) and lower than the Hot water tank limit temperature parameter value (Installer parameter, default value equal to 80° C) and if the temperature of Solar Collector Sensor S3 is higher than the System Cooling function activation collector temperature parameter value (Installer parameter, default value equal to 120° C) then the ECOTRONIC tech regulator activates the Solar Circulating Pump to cool the collector.

To signal this mode, the Solar Panel symbol will start flashing .

The function ends when the temperature of Solar Collector Sensor S3 becomes lower than the System Cooling function activation collector temperature parameter value (Installer parameter, default value equal to 120°C) - 2°C.

During normal operation, if the temperature of the Hot Water Tank Sensor is higher than the Tank max. temperature parameter value (Installer parameter, default value equal to 60° C) and lower than the Hot water tank limit temperature parameter value (Installer parameter , default value equal to 80° C) and if the temperature of Solar Collector Sensor S3 is lower than the Tank max. temperature parameter value (Installer parameter value parameter value (Installer parameter) - 5°C then the ECOTRONIC tech regulator activates the Solar Circulating Pump to cool the hot water tank.

To signal this mode, the Hot Water Tank symbol will start flashing .

The function ends when the temperature of Solar Collector Sensor S3 becomes higher than the Tank max. temperature parameter value (Installer parameter, default value equal to 60° C) - 2° C.

Hot Water Tank Cooling function (solar collector overheating prevention)

This function depends on the Tank cooling parameter value (Installer parameter, default value equal to 0=Off); also, if the System Cooling function is active (Collector and Hot Water Tank), the latter has priority over the Hot Water Tank Cooling Function .

During normal operation, if the temperature of the Hot Water Tank Sensor is higher than the Tank max. temperature parameter value (Installer parameter, default value equal to 60°C) and lower than the Hot water tank limit temperature parameter value (Installer parameter , default value equal to 80°C) then the ECOTRONIC tech regulator leaves the Solar Circulating Pump on to prevent overheating of the solar collector.

If the temperature of the Hot Water Tank Sensor becomes higher than or equal to the Hot water tank limit temperature parameter value (Installer parameter , default value equal to 80° C) and if the temperature of Solar Collector Sensor S3 is lower than the Hot water tank limit temperature (Installer parameter, default value equal to 80° C) – 5° C then the ECO-TRONIC tech regulator activates the Solar Circulating Pump to cool the hot water tank.

To signal this mode, the Hot Water Tank symbol will start flashing .

Hot Water Tank Limit Temperature function

The Solar Circulating Pump will be deactivated if the temperature of the Hot Water Tank Sensor becomes higher than or equal to the Hot water tank limit temperature parameter value (Installer parameter, default value equal to 80°C); in this case, as well as shutting down the Solar Circulating Pump, the ECOTRONIC tech regulator must also close the shutter.

To signal this mode, the Solar Circulating Pump symbol will go off, and the Shutter symbol will be lit up.

The function ends when the temperature of the Hot Water Tank Sensor becomes lower than the Hot water tank limit temperature parameter value (Installer parameter, default value equal to 80° C) – 2° C.

Solar Collector Limit Temperature function

The Solar Circulating Pump will be deactivated if the temperature of Solar Collector Sensor S3 becomes higher than or equal to the Collector limit temperature parameter value (Installer parameter, default value equal to 140°C); in this case, as well as shutting down the Solar Circulating Pump, the ECOTRONIC tech regulator must also close the shutter.

To signal this mode, the Solar Circulating Pump symbol will be off, the Shutter symbol lights up and the symbol S3 above the collector will start flashing .

The function ends when the temperature of Solar Collector Sensor S3 becomes lower than the Collector limit temperature parameter value (Installer parameter, default value equal to 140° C) - 2° C.

Solar Collector Cold recognition function

This function depends on the Collector minimum limit parameter value (Installer parameter, default value equal to 0=Off).

During normal operation, if the temperature of Solar Collector Sensor S3 is lower than the Collector minimum temperature parameter value (Installer parameter, default value equal to 10°C) then the ECOTRONIC tech regulator will deactivate the Solar Circulating Pump.

To signal this mode, the Sun symbol will start flashing.

The function ends when the temperature of Solar Collector Sensor S3 becomes higher than the Collector minimum temperature parameter value (Installer parameter, default value equal to 10° C) + 2° C.

Solar Collector Antifreeze function

This function depends on the Antifreeze protection function parameter value (Installer parameter, default value equal to 0=Off).

During normal operation, if the temperature of Solar Collector Sensor S3 is lower than the Antifreeze temperature (Installer parameter , default value equal to 4° C), the Solar Circulating Pump will be activated as long as the temperature of Solar Collector Sensor S3 is higher than the Antifreeze temperature (Installer parameter , default value equal to 4° C) + 1° C.

Solar Circulating Pump Anti-shutdown function

After 24 hours of inactivity, the Solar Circulating Pump is activated for 3 seconds .

FAULTS

LCD display off

Make sure the regulator is powered: using a digital multimeter, check the presence of voltage at terminals 24 and 25. In case of no voltage, check the wiring.

In case of sufficient voltage (Range 195 – 253 Vac), check the fuse. The fuse is located inside the regulator : to access it, follow steps 1 and 2 of the section "Accessing internal terminal blocks".

LCD display on

Any operation error conditions are shown on the regulator LCD display .

Fault code Card	Description Fault
F82	Regulator configuration fault
F83	Solar Collector PT1000 Sensor S3
F84	Solar Collector Return NTC Sensor S4
F85	Boiler card communication fault
F87	Protection for no circulation

Fault 82 - Regulator configuration fault

Make sure parameter P26 is set to "0".

Fault 83 - Solar Collector PT1000 Sensor S3 faulty

The fault, understood as a short circuit or open circuit, of the sensor causes deactivation of the Solar Circulating Pump and shutter closing . On eliminating the fault, the protection is immediately deactivated .

To signal this fault, the symbol S3 will be deactivated whereas the Fault symbol, the symbol S3 and the backlight will start flashing .

Fault 84 - Solar Collector Return NTC Sensor S4 faulty

The fault, understood as a short circuit or open circuit, of the sensor does not cause deactivation of the Solar Circulating Pump . The system must simply work as though the Basic System were set . On eliminating the fault, the protection is immediately deactivated.

To signal this fault, the symbol S4 will be deactivated whereas the Fault symbol, the symbol S4 and the backlight will start flashing .

Fault 85 - Boiler card communication fault

Make sure parameter P26 is set to "0".

Fault 87 - Protection for no circulation

Only with FLOWMETER ENABLED

This fault is activated when, with the Solar Pump activated, the card does not detect flow in the solar circuit for 10 consecutive minutes. The fault causes deactivation of the Solar Pump. After checking and eliminating the fault, the protection can be removed, activating and deactivating the Off mode.

Make sure parameter P25 is correctly set.



Sensor characteristics

The temperature sensors can be checked with a digital multimeter : disconnect the sensor from regulator and check correspondence with the following tables .

NTC			PT	1000			1
R (Ω)		T(°C)	R (Ω)		T(°C)	R (Ω)	
54932		-10	961.5		120	1462	1
42080		-5	980.75	1	125	1481.25	
32505		0	1000	1	130	1500.5	
25308		5	1019.25	1	135	1519.75	
19854	1	10	1038.5	1 [140	1539	
15689		15	1057.75	1	145	1558.25	
12483		20	1077	1	150	1577.5	
9999	1	25	1096.25	1 [155	1596.75	1
8060		30	1115.5	1	160	1616	
6537		35	1134.75	1	165	1635.25	
5332		40	1154	1 [170	1654.5	
4374		45	1173.25	1	175	1673.75	
3608		50	1192.5	1	180	1693	
2991		55	1211.75	1 [185	1712.25	
2492		60	1231	1	190	1731.5	
2086		65	1250.25		195	1750.75	
1754		70	1269.5	1 [200	1770	7
1481		75	1288.75	1			
1257		80	1308				
1070		85	1327.25	1			1
915		90	1346.5	1 []
785		95	1365.75	1 [7
677]	100	1385] [
585		105	1404.25] [
507]	110	1423.5] [-
442		115	1442.75				
	R (Ω) 54932 42080 32505 25308 19854 15689 12483 9999 8060 6537 5332 4374 3608 2991 2492 2086 1754 1481 1257 1070 915 785 677 585 507 442	R (Ω) 54932 42080 32505 25308 19854 15689 12483 9999 8060 6537 5332 4374 3608 2991 2492 2086 1754 1481 1257 1070 915 785 677 585 507 442	R (Ω) T(°C) 54932 -10 42080 -5 32505 0 25308 5 19854 10 15689 15 12483 20 9999 25 8060 30 6537 35 5332 40 4374 45 3608 50 2991 55 2492 60 2086 65 1754 70 1481 75 1257 80 915 90 785 95 677 100 585 105 507 110 442 115	ΓC Γ(°C) R (Ω) 54932 -10 961.5 42080 -5 980.75 32505 0 1000 25308 5 1019.25 19854 10 1038.5 15 1057.75 1096.25 8060 30 1115.5 6537 35 1134.75 5332 40 1154 4374 45 1173.25 3608 50 1192.5 2991 55 1211.75 2492 60 1231 2086 65 1250.25 1754 70 1269.5 1481 75 1288.75 1257 80 1308 1070 85 1327.25 915 90 1346.5 785 95 1365.75 677 100 1385 585 105 1404.25 507 110 1423.5	TC PT 1000 R (Ω) T(°C) R (Ω) 54932 -10 961.5 42080 -5 980.75 32505 0 1000 25308 5 1019.25 19854 10 1038.5 15689 15 1057.75 12483 20 1077 9999 25 1096.25 8060 30 1115.5 6537 35 1134.75 5332 40 1154 4374 45 1173.25 3608 50 1192.5 2991 55 1211.75 2492 60 1231 2086 1308 1308 1070 1269.5 1365.75 915 90 1346.5 915 916 90 1346.5 915 190 1346.5 915 100 1385 585 105 1404.25 <	TCPT 1000R (Ω)T(°C)R (Ω)54932-10961.542080-5980.7532505010002530851019.2519854101038.51151057.75124832010779999251096.258060301115.56637351134.754374451173.253608501192.52991551211.75180130829916012311901365.751181751288.758013081070851327.25915901346.55071101423.51101423.5	TC PT 1000 R (Ω) T(°C) R (Ω) 54932 -10 961.5 42080 -5 980.75 32505 0 1000 25308 5 1019.25 13689 15 1057.75 13689 15 1057.75 12483 20 1077 9999 25 1096.25 300 1115.5 155 6637 35 1134.75 4374 45 1173.25 3608 50 1192.5 3991 55 1211.75 3608 50 1192.5 3608 155 1211.75 3608 1192.5 180 2991 55 1211.75 2086 65 1250.25 190 1731.5 1481 75 1288.75 3915 90 1346.5 915 105 1404.25 105

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SERVICE MENU

The regulator Service Menu is accessed by pressing the Info button for 10 seconds . Press the Up/Down buttons to select "tS", "In", "Hi" or "rE" . tS" means Transparent Parameters Menu, "In" Information Menu, "Hi" History Menu, and "rE" History Menu Reset. After selecting the Menu, press the Info button to access it .

"tS" - Transparent Parameters Menu

The regulator has 26 editable transparent parameters:

Sch.	Description of Transparent Parameters	Range	Default
P01	System layout setting (DO NOT MODIFY)	0-3	1
P02	Activation temperature differential (°C)	1-20°C	6°C
P03	Deactivation temperature differential (°C)	1-20°C	4°C
P04	Tank max. temperature (°C)	20-95°C	60°C
P05	Collector limit temperature (°C)	110-160°C	140°C
P06	System cooling parameter (0=Off, 1=On)	0-1	1=On
P07	System cooling function activation collector temperature (°C)	100-150°C	120°C
P08	Collector min. limitation parameter (0=Off, 1=On)	0-1	0=Off
P09	Collector min. temperature (°C)	10-90°C	10°C
P10	Antifreeze protection function parameter (0=Off, 1=On)	0-1	0=Off
P11	Antifreeze temperature (°C)	1-10°C	4°C
P12	Tank cooling parameter (0=Off, 1=On)	0-1	0=Off
P13	Thermostat activation temperature (°C)	0-95°C	40°C
P14	Thermostat deactivation temperature (°C)	0-95°C	45°C
P15	Thermal quantity balance parameter (0=Off, 1=On)	0-1	0=Off
P16	Solar circuit max. flow rate (I/min)	0-20	6 l/min
P17	Not implemented	0	0
P18	Antifreeze liquid protection rating (%)	0-50 %	25 %
P19	Solar Circulating Pump output operation mode (0=OFF continuous, 1=auto and 2=ON continuous)	0-2	1=Auto
P20	FREE CONTACT relay operation mode (0=OFF continuous, 1=auto, 2=ON continuous, 3=Boiler activation/deactivation)	0-3	1=Auto
P21	Minimum - Solar Circulating Pump modulation temperature differential (°C)	5-20°C	10°C
P22	Solar Circulating Pump modulation temperature differential (°C)	2-20°C	5°C
P23	Solar Circulating Pump operation (0=On/Off, 1=Modulating)	0-1	1
P24	Hot water tank limit temperature (°C)	70-95°C	80°C
P25	Flowmeter type selection (0=Operation without flowmeter , 1=DN8, 2=DN10, 3=DN15, 4=DN20, 5=DN25)	0-5	0
P26	Operation type selection (0=Communicating, 1=Stand alone)	0-1	0

Press the Up/Down buttons to scroll the list of parameters, in increasing or decreasing order respectively. To modify the value of a parameter just press the Enter button in relation to the parameter, then edit it with the Up/Down buttons: the change will be automatically saved.

Press the Enter button to return to the list of parameters .

Press the Info button to return to the Service Menu . Press the Info button for 10 seconds to exit the regulator Service Menu or exiting is automatic after 15 minutes .

"In" - Information Menu

The regulator can display the following information:

t01	S1: PT1000 sensor - Not used (°C)	
t02	S2: Hot water tank NTC sensor (°C) Only with parameter P26=1, Stand alone	
t03	S3: Solar collector PT1000 sensor (°C)	between 01 and 175°C
t04	S4: Solar Return Collector NTC sensor (°C)	between 01 and 125°C
F05	Solar circuit flow rate (Lt_min)Only with Flowmeter connected and activated	00-99 Lt_min
P06	Actual modulating circulating pump speed (40%=Speed 1, 100%=Speed 5)	0-100%

Press the Up/Down buttons to scroll the list of information. To display the value just press the Enter button in relation to the parameter . In case of damaged Sensor, the regulator displays hyphens .

Press the Enter button to return to the list of information .

Press the Info button to return to the Service Menu . Press the Info button for 10 seconds to exit the regulator Service Menu or exiting is automatic after 15 minutes .

"Hi" - History Menu

The microprocessor can memorise the total hours with regulator fed (Ht), the last 10 boiler faults and other information ; the History datum item H1: represents the most recent fault that occurred; the History datum item H10: represents the least recent fault that occurred.

Ht	No. hours ECOTRONIC Tech operation (Supply)	between 0 and 9999 hours
H01	Fault code	
H02	Fault code	
H03	Fault code	
H04	Fault code	
H05	Fault code	
H06	Fault code	
H07	Fault code	
H08	Fault code	
H09	Fault code	
H10	Fault code	
H11	No. hours Solar Circulating Pump operation	between 0 and 9999 hours
H12	No. hours AUX1 output relay operation	between 0 and 9999 hours
H13	No. hours AUX2 output relay operation	between 0 and 9999 hours
H14	No. hours FREE CONTACT output relay operation	between 0 and 9999 hours
H15	Max. temp. S1: PT1000 sensor Not used (°C)	
H16	Max. temp. S2: Hot water tank NTC sensor (°C) Only with parameter P26=1, Stand alone	
H17	Max. temp. S3: Solar Collector PT1000 sensor (°C)	between 01 and 175°C
H18	Max. temp. S4: Solar Return Collector NTC sensor (°C)	between 01 and 125°C
H19	No. litres solar circuit (litres)Only with Flowmeter connected and activated	between 0 and 9999 litres
H20	Average circulating pump speed (%)Cumulative calculation performed only if the circulating pump is working	0-100%
BIL	Thermal quantity balance (KWh)Cumulative calculation performed only if the circulating pump is working	between 0 and 9999 kWh

Press the Up/Down buttons to scroll the list of faults . To display the value press the Enter button in relation to the parameter . Press the Enter button to return to the list of faults .

Press the Info button to return to the Service Menu . Press the Info button for 10 seconds to exit the card Service Menu or exiting is automatic after 15 minutes .

"rE" - History Reset

Press the ON/OFF button for 3 seconds to delete all the information stored in the History Menu : the card will automatically exit the Service Menu, in order to confirm the operation.

Press the Info button for 10 seconds to exit the card Service Menu or exiting is automatic after 15 minutes .

THERMAL QUANTITY BALANCE (CALCULATION)

The Regulator performs the accumulated energy calculation only if the Solar Circulating Pump is working : the value is then displayed through the parameter BIL in the History menu, see Service Menu section.



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This function depends on the value of parameter P15 Thermal Quantity Balance (Installer parameter, default value equal to 0=Off) which must be set to 1.

NON-MODULATING CIRCULATING PUMP (WITHOUT FLOWMETER)

The value of the following parameters must be correctly set:

- P16 Solar circuit max. flow rate (I/min)
- P18 Antifreeze liquid protection rating (%)
- P23 Solar circulating pump operation (0=On/Off)

Accumulated energy (kWh) =

Value P16 * 60 x (deltaT: S3 – S4) x 1,163 x ((100-Value P18)/100) / 1000

MODULATING CIRCULATING PUMP (WITH FLOWMETER)

The value of the following parameters must be correctly set:

- **P18** Antifreeze liquid protection rating (%)
- P23 Solar Circulating Pump operation (1=Modulating)
- P25 Flowmeter type selection

Accumulated energy (kWh) =

Value measured by flowmeter *60 x (delta T:S3-S4) x 1,163 x ((100-valueP18)/100)/1000

N.B.: The regulator performs the instantaneous calculation every second and updates the value of parameter BIL every time the accumulated energy increases by 1kW.

In case of a power failure, the Regulator does not lose the accumulated energy calculation : the data is saved once every 10 minutes, therefore when the power is restored and the solar circulating pump restarts, the calculation can begin again without loss of data .

4.8 FZ4B low temperature zone card

Service Menu

Press the Ok button for 5 seconds to access the zone controller Service Menu.

Press the buttons and to select:

"tS" = Transparent Parameters Menu

"In" = Information Menu

"Hi" = History Menu (of the zone controller)

"rE" = History Menu Reset (of the zone controller).

After selecting the Menu, press the Ok button to access it.

"tS" - Transparent Parameters Menu

The zone controller is provided with 35 transparent parameters also modifiable from Remote Control (Service Menu):

Remote Control	Zone Card FZ4B	Boiler Card (if prearranged)	Description transparent parameters	Range	Default (for mixed zone)	Recom- mended for Direct Zone
01	P01		Zone1 Min. Temperature	10-90°C	10°C	10°C
02	P02		Zone1 Max. Temperature	10-90°C	40°C	70÷80°C
03	P03		Zone1 calculated set point offset	0-40°C	10°C	0°C
04	P04		Do not modify	10-90°C	90°C	
05	P05	o01	Zone1 External Probe Curve	0-10	0	
06	P06	o02	Zone1 External Probe Offset	20-40°C	30°C	
07	P07		Zone2 Min. Temperature	10-90°C	10°C	
08	P08		Zone2 Max. Temperature	10-90°C	80°C	
09	P09		Zone2 calculated set point offset	0-40°C	0°C	
10	P10		DO NOT MODIFY	10-90°C	90°C	
11	P11	o03	Zone2 External Probe Curve	0-10	0	
12	P12	o04	Zone2 External Probe Offset	20-40°C	30°C	
13	P13		Zone3 Min. Temperature	10-90°C	10°C	
14	P14		Zone3 Max. Temperature	10-90°C	80°C	
15	P15		Zone3 calculated set point offset	0-40°C	0°C	
16	P16		DO NOT MODIFY	10-90°C	90°C	
17	P17	o05	Zone3 External Probe Curve	0-10	0	
18	P18	006	Zone3 External Probe Offset	20-40°C	30°C	
19	P19		Mixing valve on+off time	0-15sec	15sec	
20	P20		Mixing valve boost	0-120sec	0sec	
21	P21		Mixing valve on time for °C	0-15sec/°C	1sec/°C	
22	P22		DO NOT MODIFY	0-20°C	4°C	
23	P23		DO NOT MODIFY	70-85°C	80°C	
24	P24		DO NOT MODIFY	0-60°C	0°C	
25	P25		DO NOT MODIFY	0-1	0	
26	P26		DO NOT MODIFY	10-65°	55°C	
27	P27		Post-circulation time	0-20 min	10 min	
28	P28		DO NOT MODIFY	0-1	0	
29	P29		Delay for Zone	0-255 sec.	30 sec.	
30	P30		DO NOT MODIFY	0-1	0	
31	P31		DO NOT MODIFY	0-3 min	3 min	
32	P32		DO NOT MODIFY	0-10°C	5°C	
33	P33		DO NOT MODIFY	0-10 min	2 min	
34	P34		DO NOT MODIFY	0-1	0	
35	P35		DO NOT MODIFY	0-1	0	

Press the "+" and "-" buttons to scroll the list of parameters in increasing or decreasing order respectively. To modify the value of a parameter, press the Ok button after selecting it: press the + and - buttons to modify it, and the setting will be automatically saved. Press the Ok button to return to the list of parameters. Press the Ok button for 3 seconds to return to the Service Menu. Press the Ok button for 5 seconds to exit the Service Menu.

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Description of parameters

The "Min. Zone Temperature" and "Max. Zone Temperature" parameters define the delivery temperature adjustment range for each zone; in case of Remote Control, the user delivery temperature adjustment will come within this range and be modulated by the Remote Control during operation; in case of Chronothermostat: on closing of the contact, the delivery temperature adjustment will be set to the "Max. Zone Temperature" parameter value; on closing of the contact, the demand will be eliminated. The "Zone calculated set point offset" parameter defines an offset for the required delivery temperature set point. Example: if the Remote Control demands 52°C and this parameter is set to 10°C, the zone controller will demand 62°C from the boiler; in case of Chronothermostat, this value will be added to the "Max. Zone Temperature" parameter. The "Zone External Probe Curve" and "Zone External Probe Offset" parameters are used for the sliding temperature in case of Chronothermostat.







fig. 40 - Example of parallel compensation curve shift

The "Mixing valve on+off time" and "Mixing valve on time for $^{\circ}C$ " parameters are used for adjustment of the mixing valve. Example: with the parameters set to the default value (therefore 15sec and 1sec/ $^{\circ}C$), if the delivery temperature required for the mixed zone is 32 $^{\circ}C$ and the actual delivery temperature measured by the mixed zone sensor is 28 $^{\circ}C$, the mixing valve will remain in opening 4sec (=(32 $^{\circ}C$ -28 $^{\circ}C$)*1sec/ $^{\circ}C$) every 15sec. The same rule (in absolute value) is applied for closing.

The "Mixing Valve Boost" parameter defines the mixing valve forced opening time. With every new demand, the mixing valve is opened for this time, before starting adjustment.

The "Post-circulation time" parameter defines the post-circulation time and is activated on the last zone which ends the temperature demand.

The "Delay for Zone Valves" parameter defines a waiting time between the zone controller demand and activation of the boiler circulating pump.

"In" - Information Menu

The card can display the following information:

t01	NTC sensor (T1)	between 05 and 125°C
t02	NTC sensor (T2)	between 05 and 125°C
t03	NTC sensor (T3)	between 05 and 125°C
t04	NTC sensor (T4)	between -30 and 70°C (Negative values flash)
t05	Remote Control (RT1) or On/Off Thermostat demand	On/Of
t06	Remote Control (RT2) or On/Off Thermostat demand	On/Of
t07	Remote Control (RT3) or On/Off Thermostat demand	On/Of
t08	Zone 1 Heating set point (Calculation)	between 05 and 125°C
t09	Zone 2 Heating set point (Calculation)	between 05 and 125°C
t10	Zone 3 Heating set point (Calculation)	between 05 and 125°C
t11	Zone Card Heating set point (Calculation)	between 05 and 125°C

Press the + and - buttons to scroll the list of information in increasing or decreasing order respectively. To display the value of a parameter, press the Ok button after selecting it: in case of damaged sensor, the card displays hyphens. Press the Ok button again to return to the list of parameters. Press the Ok button for 3 seconds to return to the Service Menu. Press the Ok button for 5 seconds to exit the Service Menu.

"Hi" - History Menu

The card can store the last 10 faults: the History datum item H1: represents the most recent fault that occurred; the History datum item H10: represents the least recent fault that occurred.

The codes of the faults saved are also displayed on the corresponding menu of the Remote Control.

Press the + and - buttons to scroll the list of faults. To display the value of a parameter, press the Ok button after selecting it.

Press the Ok button for 3 seconds to return to the Service Menu. Press the Ok button for 5 seconds to exit the Service Menu.

"rE" - History Reset

Press the Ok button for 3 seconds to delete all the faults stored in the History Menu: the card will automatically exit the Service Menu, in order to confirm the operation.

Press the Ok button for 3 seconds to return to the Service Menu.

Information during operation

The controller indicates the boiler operating mode and its faults through the incorporated display: "St" means Standby (no demand in progress), "CH" means that the zone controller requests the boiler for activation of heating mode, "DH" means Domestic Hot Water production. The fault codes are given below:

Fault code	Possible cause	Cure
F70	NTC sensor fault (T1)	With circuit / contact open
F71	NTC sensor fault (T2)	With circuit / contact open
F72	NTC sensor fault (T3)	With circuit / contact open
F73	NTC sensor fault (T4)	With circuit / contact open
F74	Communication with boiler card not present	
F75	Communication with Remote Control (RT1) not present	(Only with Remote Control connected)
F76	Communication with Remote Control (RT2) not present	(Only with Remote Control connected)
F77	Communication with Remote Control (RT3) not present	(Only with Remote Control connected)

The fault codes are also displayed on the corresponding menu of the Remote Control during normal operation.

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User settings

The settings for Heating, such as max. delivery temperature, external probe curve (with optional external probe connected to boiler), weekly time programming, etc., are independent for each zone; these are modified through the Remote Control of the corresponding temperature zone. In case of direct zones, make sure to set a similar max. delivery temperature for all the temperature zones. With Room Chronothermostats, on closing of the contact the delivery temperature is adjusted to the max. value set by the zone controller. The settings relevant to DHW such as Domestic Hot Water temperature, weekly time programming (with boiler prearranged: see relevant documentation), etc., are managed in parallel; these are modified through the temperature zone Remote Controls. In case of DHW weekly time programming, the zone controller overlaps programmes coming from the single Remote Controls.

Conversion of low temperature zone to high temperature zone

The low temperature zone can become a high temperature zone. Follow the instructions given below (also refer to the table of parameters FZ4B):

- 1. Parameter 2 card FZ4B 40°C to 70°C ÷ 80°C
- 2. Parameter 3 card FZ4B 10°C to 0°C
- 3. Disconnect the safety thermostat (317A) from the delivery pipe.
- 4. Do not disconnect or bypass the mixing valve (ref. 315a)



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