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OPTIMISER® digital regulator for heating systems with solid fuel generator

1522 series

INSTALLATION AND COMMISSIONING MANUAL

CONTENTS

Function

The OPTIMISER® digital regulator code 152200 makes it possible to combine a solid fuel generator with another type of generator already present in the heating system.
The digital regulator automatically manages the two generators, receiving the signal from the probes and activating the pumps, the motorized diverter valves in the system, according to the heating circuit needs.
Depending on the type and quantity of installed probes, the regulator supports the following system solutions:

- heating;
- production of domestic hot water by means of storage or instantaneous with plate heat exchanger;
- management of inertial water storage in parallel on the heating circuit or alternatively management of an independent solar system and direct inertial water storage.

WARNINGS

The following instructions must be read and understood before installing, commissioning and maintaining the regulator.

The safety symbol is used in this manual to draw attention to the relative safety instructions. The meaning of this symbol is as follows:
CAUTION!
YOUR SAFETY IS INVOLVED. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN INJURY.

- The digital regulator must be installed by a licensed installer in accordance with national regulations and/or relevant local requirements.
- If the digital regulator is not installed, commissioned and maintained correctly in accordance with the instructions in this manual, then it might not work properly and may endanger the user.

CAUTION: Risk of electric shock. The rear panel is live. Cut off the electric supply before carrying out any work. Failure to follow these instructions may result in personal injury or damage to property.

LEAVE THIS MANUAL AS A REFERENCE GUIDE FOR THE USER

Technical data

Regulator

Electric supply:	230 V (ac) ±10%; 50-60 Hz
Power consumption:	5,5 VA
Output signals:	10 relay contacts for heating
Contact rating:	250 V (ac), 8 (2) A (max 9 A in total)
Protection class:	II
Protection class:	IP 40
Clock data retention with no electric supply:	24 h
EEPROM data retention with no electric supply:	permanent

Ambient conditions

Ambient temperature:
Operation: 0–55°C EN 60721-3-3 Cl. 3K3, max. humidity 85%
Transportation: -10–70°C EN 60721-3-2 Cl. 2K2, max. humidity 95%
Storage: -5–50°C EN 60721-3-1 Cl. 1K2, max. humidity 95%

Temperature probe* for solid fuel generator flow, domestic water storage, domestic heat exchanger, inertial water storage in parallel on the heating system, solar water storage.

NTC type
Working range: -20–100°C
Two-wire cable

Temperature probe* for solar collector

Pt1000 type
Cable length: 3 m
Cable SIHF,
Cross section: 2 x 0,5 mm²
Max working temperature: 180°C

*The use of the probes is specified in the "Available programs" heading on page 5.

When the solid fuel generator is equipped with an anti-condensation valve, it is good practice to set the minimum working temperature of the solid fuel generator (TSG, settable in the regulator menu) to a value at least 2°C higher than the anti-condensation valve setting.

- Anti-condensation valve setting: ☐ °C

- Minimum working temperature of the solid fuel generator (TSG, working temperature range: 20–85°C): ☐ °C (factory setting: 55°C).

It is good practice to compile the two blank fields to facilitate any system checks to be performed.

NTC probes* resistance table: for solid fuel generator flow, domestic water storage, domestic heat exchanger, inertial water storage in parallel on the heating system, solar water storage.

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-20	14616	-2	6164	+16	2852	+34	1430	+52	767	+70	434	+88	260
-18	13211	±0	5634	+18	2632	+36	1331	+54	718	+72	409	+90	246
-16	11958	+2	5155	+20	2431	+38	1239	+56	673	+74	386	+92	233
-14	10839	+4	4721	+22	2247	+40	1154	+58	631	+76	364	+94	221
-12	9838	+6	4329	+24	2079	+42	1076	+60	592	+78	343	+96	210
-10	8941	+8	3974	+26	1925	+44	1004	+62	556	+80	324	+98	199
-8	8132	+10	3652	+28	1785	+46	938	+64	522	+82	306	+100	189
-6	7405	+12	3360	+30	1657	+48	876	+66	491	+84	290		
-4	6752	+14	3094	+32	1539	+50	819	+68	462	+86	274		

Pt1000 probe* resistance table: for solar collector.

°C	Ω	°C	Ω
-10	961	65	1252
-5	980	70	1271
0	1000	75	1290
5	1019	80	1309
10	1039	85	1328
15	1058	90	1347
20	1078	95	1366
25	1097	100	1385
30	1117	105	1404
35	1136	110	1423
40	1155	115	1442
45	1175	120	1461
50	1194	140	1536
55	1213	160	1611
60	1232	170	

Probe connection

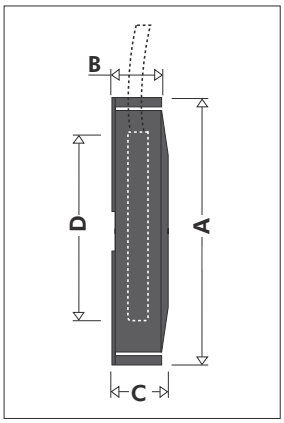
The cable connecting probes to the regulator must be installed in a dedicated raceway. If the connection cable shares the raceway with other power cables, an earthed shielded cable must be used.
Any alteration to the wiring of the regulator could result in electrical disturbance.
After performing work on the wiring, the regulator must be reset by cutting off the electric supply for a few seconds. Cable length can be increased to 100 m using a 1 mm² cross section cable.

CAUTION

Install Pt1000 probe, with red silicone sheath cable (Tmax 180°C), on the solar collector.

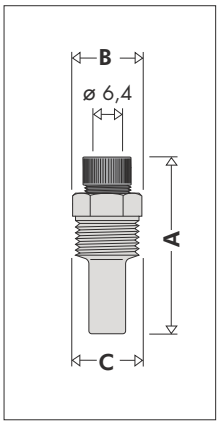
Dimensions

NTC probe and contact probe holder code 150009



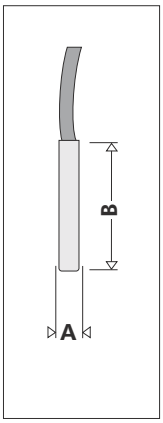
A	B	C	D	L (m)
55	9	11	30	1,5

Immersion pocket code 150029



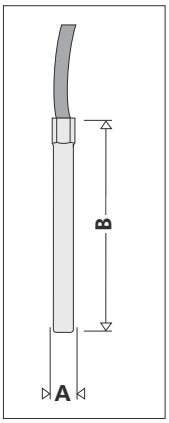
A	B	C
43	17	1/4"

NTC probe code 150006



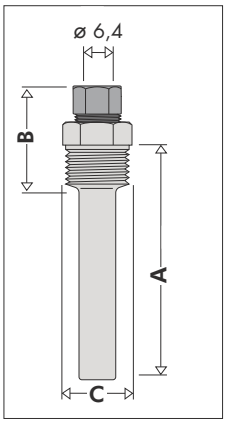
A	B	L (m)
6	28	2

Pt1000 probe code 257006



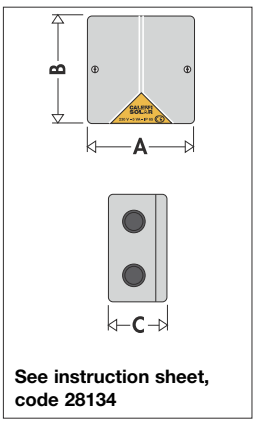
A	B	L (m)
6	50	3

Immersion pocket code 257004



A	B	C
100	23	1/2"

Relay box code F29525



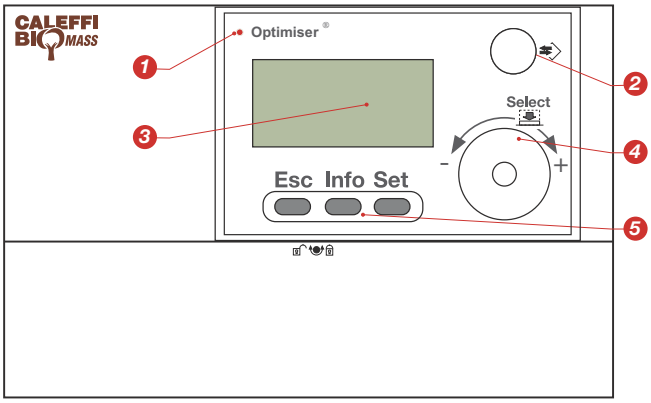
See instruction sheet, code 28134

A	B	C
90	92	54

Probe	Type	Supply	Standard application	Optional application
S1*	NTC	series	probe + contact probe holder: code 150009	immersion pocket code 150029
S2*	NTC	optional	-	probe code 150006 + pocket code 257004
S3*	NTC	optional	-	probe code 150006 + pocket code 150029
S4*	NTC	series	probe code 150006 + pocket code 257004	-
S5*	NTC	series	probe + contact probe holder: code 150009	-
Sol2*	NTC	optional	-	probe code 150006 + pocket code 257004
Sol1*	Pt1000	optional	-	immersion type: probe code 257006 + pocket code 257004

*The use of the probes is specified in the "Available programs" heading on page 5.

Display and commands



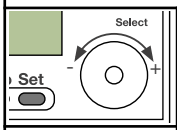
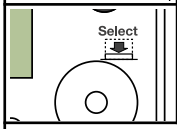
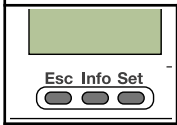
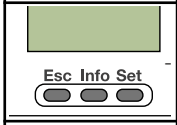
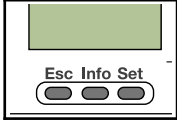
Control description

1- Operating status indicator LED.
2- Mini DIN connector on front of panel for PC connection.
3- Menu display.
4- Select knob: selection of functions menu and parameter editing.
5- Function keys

Display

The display (3) shows the text with the main operating information. In the absence of control signals, after four minutes the display reverts to the initial page.

Select knob and function keys

Select knob (4)**:** can be rotated or pressed	
	**Turn** the Select knob clockwise or anticlockwise to select the options of the function menu or to modify the values of the various user-settable parameters.
	**Press** the Select knob to open the submenu relative to the selected option.
Function keys (5)**:** can be pressed	
	**Esc:** change the display of the selected menu point and return to the previous menu level
	**Info:** displays brief information on the current menu point
	**Set:** executes the change, confirming the selected parameter value

LED

The LED (1) gives status information by means of a multicoloured diode:
- **flashing green:** regulator initialisation
- **steady green:** regulator operating
- **flashing green/red:** regulator operating with probe error or alarm
- **flashing red:** regulator checking loop
- **steady red:** regulator error.

General functions

Display

The regulator is equipped with a display to read and program the control parameters, such as cut-in temperatures, function activation delay times, thermal disinfection programs, solar system control, etc. All the system's functional parameters can be configured to match individual requirements by means of the "Select" knob and the three function keys.

Block protection function "Block Protect."

When it is powered on, the regulator performs an initial check, activating the valves and pumps to which it is connected. The message "Block Protect." appears on the display.

Pump and diverter valve anti-clog function

To prevent clogging of the pumps and diverter valves due to prolonged stoppages, the regulator activates them for 60 seconds after each period of 24 consecutive hours of disuse.

Frost protection

When the solid fuel generator flow temperature reaches a minimum user-settable value, the regulator activates the primary side pump to prevent the circuit from freezing.

Anti-legionella function (programs 5 and 8 only)

The regulator keeps the domestic water storage at the minimum set temperature and raises the temperature in order to perform thermal disinfection in accordance with customizable times.

Instantaneous domestic hot water production (programs 6 and 9 only)

The regulator manages the instantaneous domestic hot water production by means of a second heat exchanger and, if necessary, it sends the water to the boiler for thermal integration by means of the (optional) SOLARINCAL kit (code 265359).

Overtemperature safety function

The regulator is equipped with a solid fuel generator overtemperature monitoring function.
When the user-settable emergency temperature is reached on the solid fuel generator, the regulator generates an alarm signal and starts the pumps to dissipate the excess heat to the system or to an emergency user service. This latter function can be activated by means of a specific menu item. In this case, it is necessary to install a diverter valve, driven by the regulator, to transfer the flow to the emergency user service.

Probe control

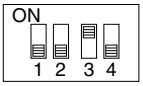
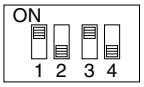
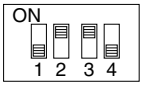
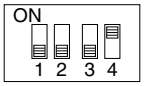
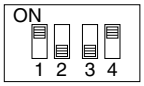
Solid fuel generator flow temperature sensor error

When the working temperature range detected is below 0°C or above 110°C, the following status is activated automatically: pumps OFF, while the display shows the message "probe error" and the LED flashes green and red alternately.

To set parameters use the document "MENU LIST" code 28180 supplied in the pack

Available programs

OPTIMISER® digital regulator code 152200 can be used in accordance with 6 different system configurations (programs), comprising a basic factory-set configuration and 5 optional configurations selectable by means of the table shown below and activatable by means of the dipswitches on the regulator. To access the dipswitches open the cover under the display. The regulator is supplied with the factory settings and probes required to perform basic program 4.

Program configuration	Description	Probes utilised					Position of program selectors (dipswitches)	Software code	Hydraulic diagram on page
4 (basic factory set program)	Heating + management of inertial water storage in parallel on the heating system*	S1	-	-	S4	S5		PR83	7
5	Heating and domestic hot water with storage + management of inertial water storage in parallel on the heating system*	S1	S2	-	S4	S5		PR84	8
6	Heating and instantaneous domestic hot water + management of inertial water storage in parallel on the heating system*	S1	S3	-	S4	S5		PR85	9
7	Heating with direct inertial water storage with tank-in-tank domestic hot water production, solar system	S1	-	Sol 1	Sol 2	-		PR86	10
8	Heating with direct inertial water storage, domestic hot water storage integrated with solar system	S1	S2	Sol 1	Sol 2	-		PR87	11
9	Heating with direct inertial water storage integrated with solar system, instantaneous domestic hot water production	S1	S3	Sol 1	Sol 2	-		PR88	12

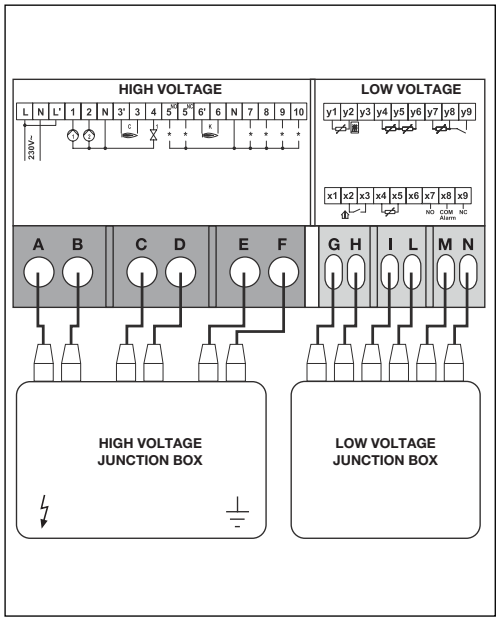
Programs 1,2 and 3 (not listed in the table but however available) are functionally equivalent to programs 7,8 and 9 respectively but without thermal solar components. For specific setting (dipswitches and probes to be used) please see instruction sheet 28169 (www.caleffi.com).

NOTE The probes are all of the NTC type (grey cable) except for probe Sol1 utilised by solar programs 7, 8 and 9, which is type Pt1000 with red cable.

*** refer to operating logic of program "management of inertial water storage in parallel on the heating system" on the next page.**

Location of cable glands

When making the electrical connections, observe the following sequence for wiring the terminal board.
- If the regulator is to be wall mounted with the consequent use of the supplied cable glands and downward cable outlet, regulations require that just one cable can transit through each hole of the cable gland, therefore a maximum of 6 high voltage cables and 6 low voltage cables can be utilised. It is therefore recommended to comply with the following table of connections and use two additional junction boxes complete with suitable inlet and outlet cable glands, in accordance with the diagram given. The earth connection must be made in the junction box.
- If the regulator is installed in an electrical cabinet, the cable outlet must be via the openings at the rear of the unit, always keeping high and low voltage cables separated. The earth connection must be made in the electrical cabinet.



	Electric connection	Recommended electrical cable: nr. wires for cross-section	Dedicated cable gland
HIGH VOLTAGE	Electric supply	2x1,5 mm²	A
	Pump P1	4x1 mm²	B
	Pump P2		
	Gas generator contact C	4x1 mm²	C
	Solid fuel generator contact K		
	Diverter valve V1	4x1 mm²	D
	Diverter valve V4 to optional dissipator		
	Domestic priority diverter valve V2 or domestic priority diverter valve V3	6x1 mm²	E
	SOLARINCAL type diverter valve		
	Valve V5 for loading the inertial water storage in parallel or solar circuit pump Psol	2x1 mm²	F
LOW VOLTAGE	Probe S1	2x0,75 mm²	G
	Probe S5 or solar water storage probe Sol2	2x0,75 mm²	H
	Probe S4 or solar collector probe Sol1	2x0,75 mm²	I
	Room thermostat TA or adjustment thermostat TR contact	2x1 mm²	L
	Domestic water storage probe S2 or probe S3 on domestic heat exchanger outlet	2x0,75 mm²	M
	Flow switch F	2x0,75 mm²	N

***Operating logic of program "management of inertial water storage in parallel on the heating system".**

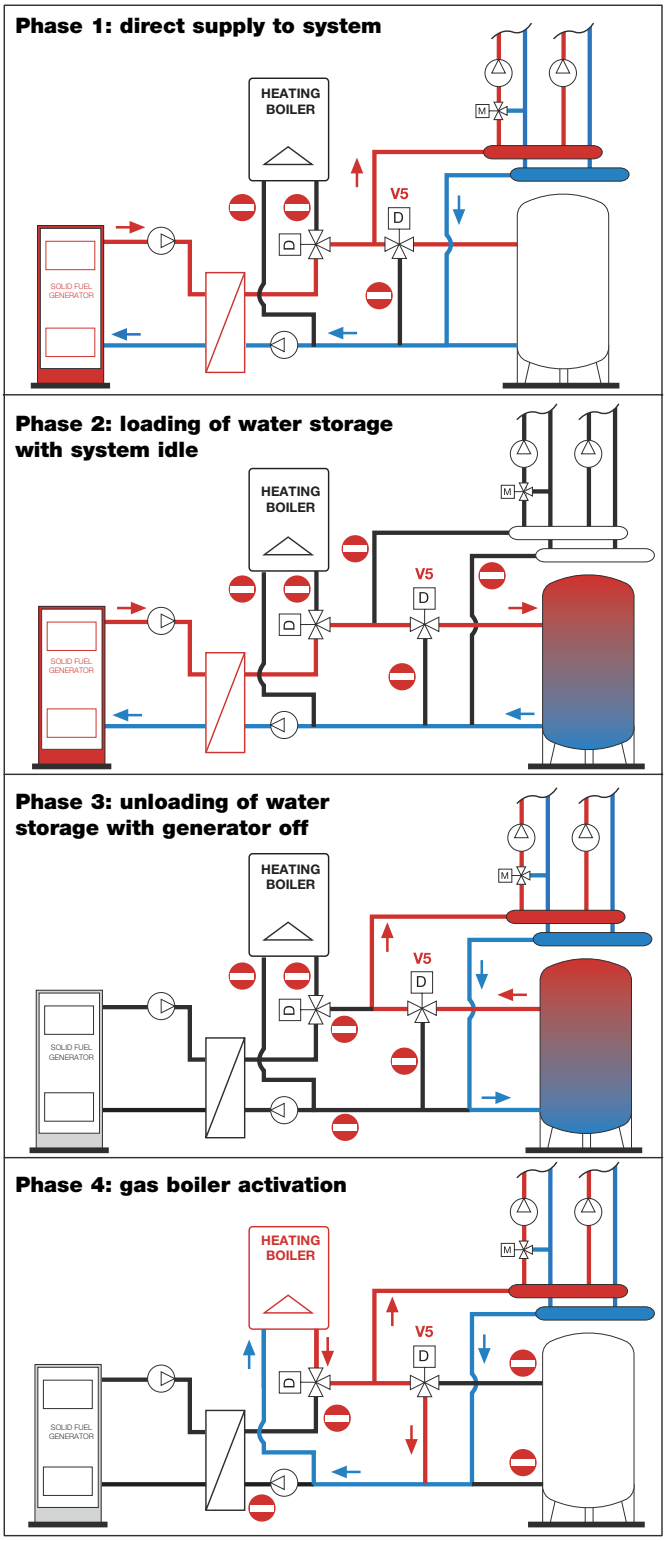
In accordance with construction and system regulations or depending on system management requirements it may be necessary to use an inertial water storage on the heating system.
The regulator is supplied as standard with the parameters and probes required to manage a heating system with inertial water storage in parallel on the heating system.
The operating logic is shown in the adjacent figures:

Phase 1: direct supply to system. With a thermal energy demand from the room thermostat, the regulator activates the solid fuel generator and connects it, once it is able to supply energy, directly to the secondary circuit bypassing the inertial water storage in parallel. Valve V5 connects the inertial water storage in parallel with the heating system so that it can receive any excess heat energy.

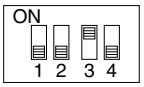
Phase 2: loading of water storage with system idle. When the room heating demand is met, with the thermostat no longer requesting heat energy but with the solid fuel generator still capable of providing it (e.g. due to an energy surplus caused by excessive fuel stoking), the regulator connects the solid fuel generator to the parallel water storage, which thus serves to store the surplus heat energy.

Phase 3: unloading of water storage with generator off. The parallel water storage is used as an energy source at the time of the next room heating demand if the solid fuel generator is not operating, not yet at working temperature or not stoked with fuel. The previously accumulated heat energy is thus drawn from the parallel water storage.

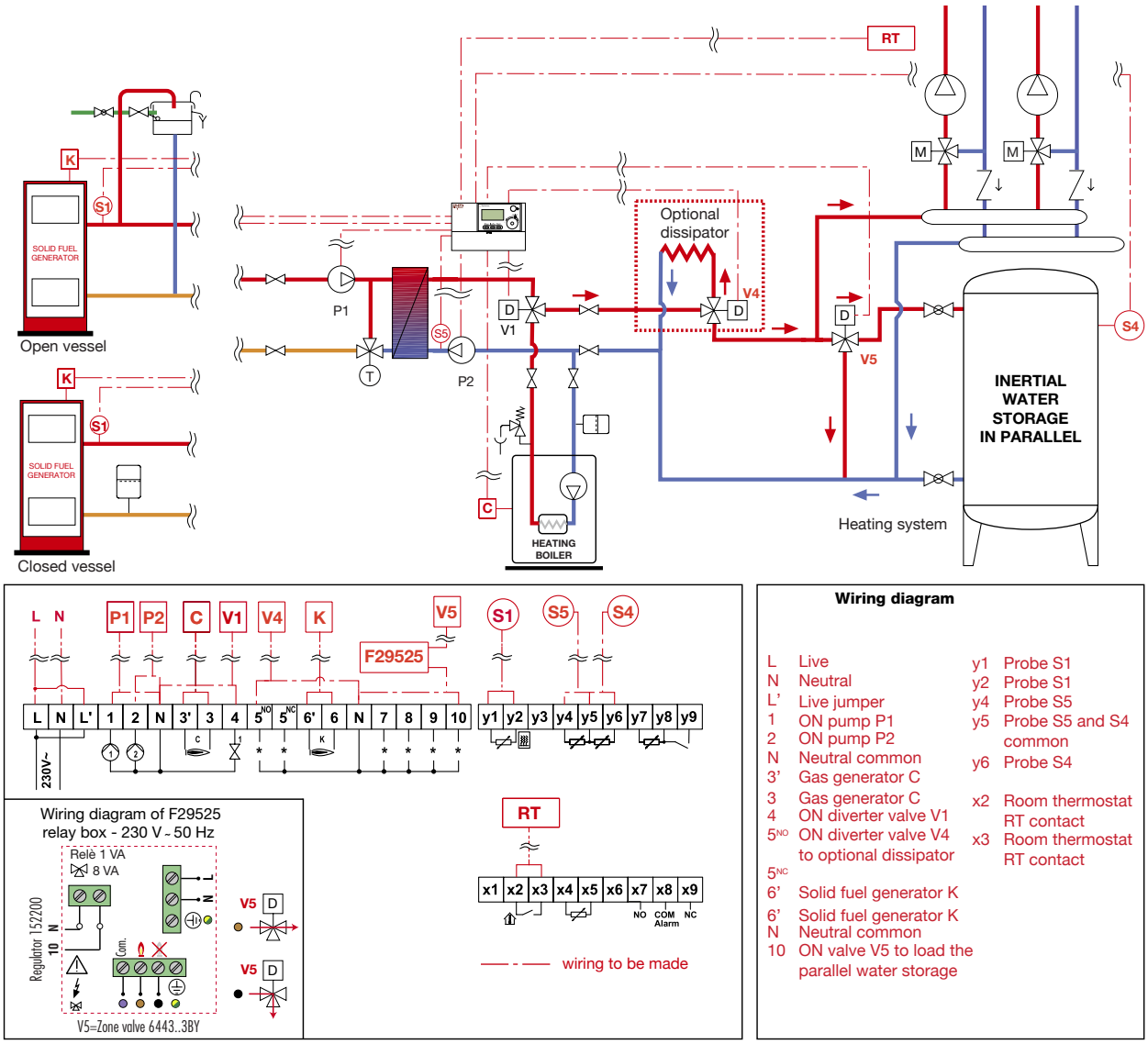
Phase 4: gas boiler activation.
Only when the solid fuel generator is not operating and the parallel water storage has no energy reserve, it is necessary to start the gas boiler, which at that point is the only device able to supply heat energy to the heating system. Valve V5 isolates the parallel water storage from the rest of the circuit to avoid loading it with heat energy delivered by the gas boiler.



Hydraulic diagrams of programs
Program 4 (software code PR83): BASIC FACTORY PROGRAM



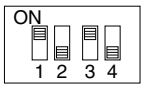
Heating + management of inertial water storage in parallel on the heating system
Number of probes utilised: 3
Probe S1 located on solid fuel generator flow
Probe S5 located on heat exchanger inlet on secondary side of circuit
Probe S4 located on the inertial water storage in parallel on the heating system



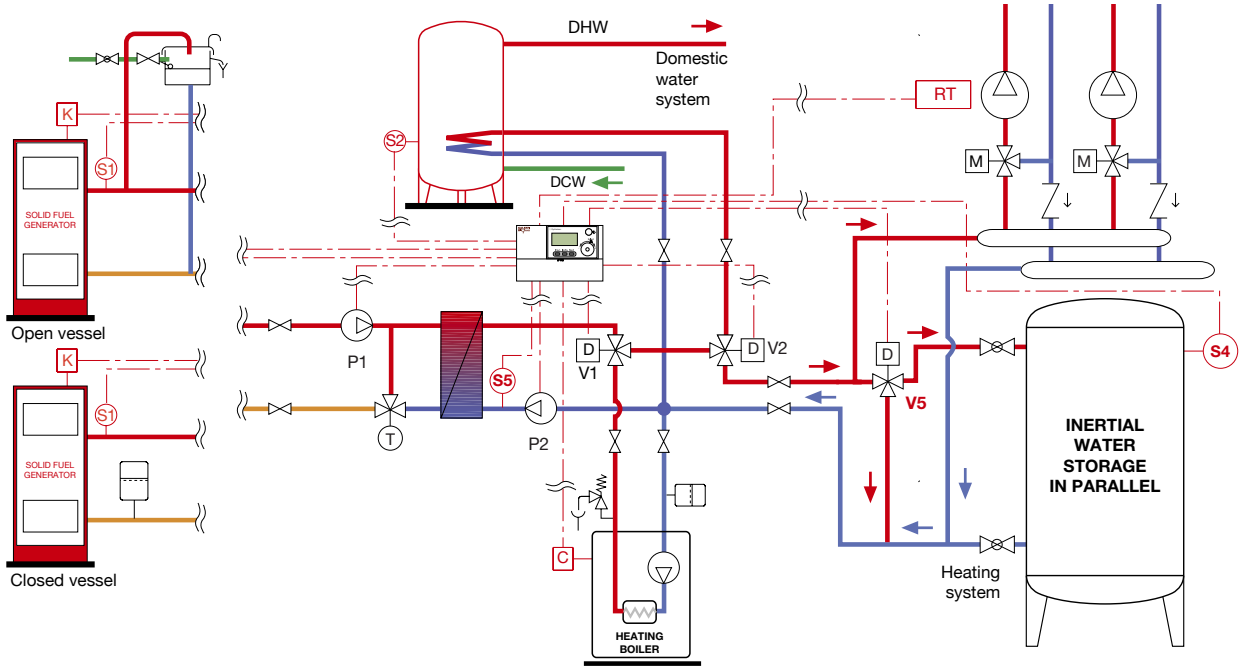
Operating principle

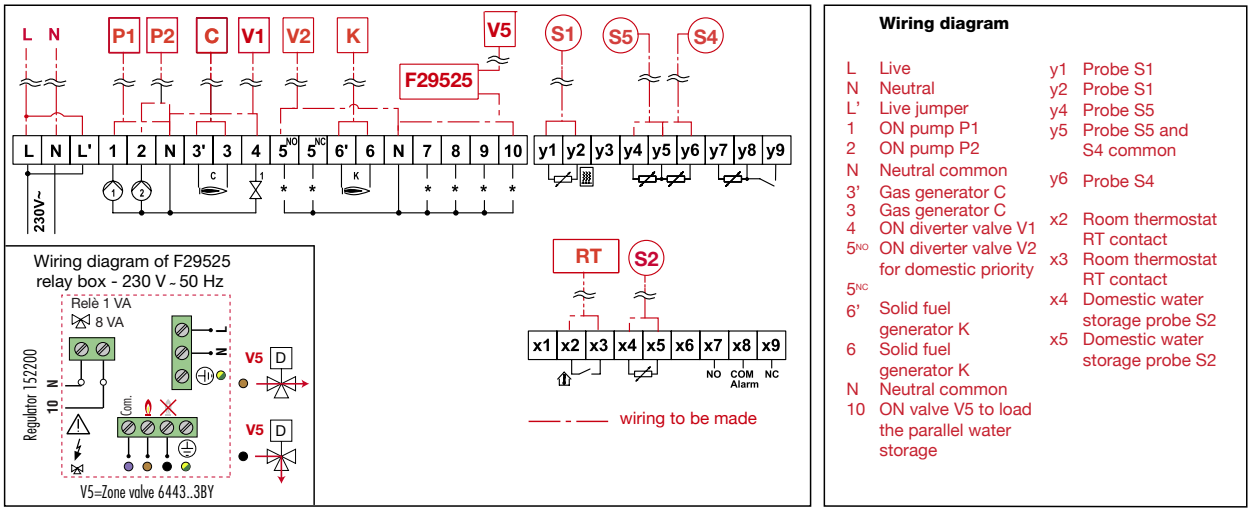
The 1522 series regulator automatically manages a system composed of a solid fuel generator, integration gas boiler and inertial water storage in parallel on the heating system.
On the request of room thermostat RT (not supplied in the pack), the regulator activates the solid fuel generator with priority using contact K (for generators that can be activated electrically). When the minimum working temperature of the solid fuel generator has been reached (as detected by probe S1), the regulator starts pump P1, diverts valve V1 to connect the heat exchanger to the system and starts pump P2. With the solid fuel generator off or not yet at working temperature, the regulator starts the integration boiler by means of contact C, stopping pumps P1 and P2 and diverting diverter valve V1 to the boiler.
In the case of solid fuel generator overtemperature, the regulator sends the flow rate of the secondary circuit either to the system (in the presence of room thermostat demand) or to an optional dissipation system, if present.
The inertial water storage in parallel is managed in accordance with the logic described on page 6. By means of diverter valve V5 (not supplied in the pack, e.g.: Caleffi 6443..3BY series + relay box code F29525) the regulator manages all phases of loading and unloading of the water storage, which is kept closed only if the gas boiler has been activated. Connection of the parallel water storage to the rest of the system is managed by the regulator by comparing the temperature readings of probes S1 (located on the solid fuel generator flow pipe), S5 (located on the heat exchanger return line) and S4 (located on the parallel water storage). For probe S5 it is advisable to use the following working set-points: 45°C for radiator systems, 30°C for radiant panel systems. The gas boiler starts when the solid fuel generator temperature is below the minimum working temperature TSG (measured by probe S1) and the heat exchanger return temperature TR (measured by probe S5) is 5°C below the value set on the regulator (TR set, fixed hysteresis value 5K).

Program 5 (software code PR84)



Heating, domestic hot water with storage + management of inertial water storage in parallel on the heating system.
Number of probes utilised: 4
Probe S1 located on solid fuel generator flow
Probe S2 (not supplied in the pack) located on domestic water storage
Probe S5 located on heat exchanger inlet on secondary side of circuit
Probe S4 located on the inertial water storage in parallel on the heating system





Wiring diagram

L	Live
N	Neutral
L'	Live jumper
1	ON pump P1
2	ON pump P2
N	Neutral common
3'	Gas generator C
3	Gas generator C
4	ON diverter valve V1
5NO	ON diverter valve V2 for domestic priority
5NC	
6'	Solid fuel generator K
6	Solid fuel generator K
N	Neutral common
10	ON valve V5 to load the parallel water storage
y1	Probe S1
y2	Probe S1
y4	Probe S5
y5	Probe S5 and S4 common
y6	Probe S4
x2	Room thermostat RT contact
x3	Room thermostat RT contact
x4	Domestic water storage probe S2
x5	Domestic water storage probe S2

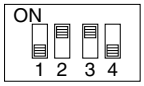
Operating principle

The 1522 series regulator automatically manages a system composed of a solid fuel generator, integration gas boiler, inertial water storage in parallel on the heating system and domestic hot water production by means of a water storage.
When the minimum working temperature of the solid fuel generator has been reached (as detected by probe S1), the regulator starts pump P1, diverts valve V1 to connect the heat exchanger to the system and starts pump P2. With the solid fuel generator off or not yet at working temperature, the regulator starts the integration boiler by means of contact C, stopping pumps P1 and P2 and diverting diverter valve V1 to the boiler.
In the case of a solid fuel generator overtemperature, the regulator sends the flow rate of the secondary circuit either to the system (in the presence of a room thermostat demand) or to the domestic water storage if it is not yet at operating temperature or lower than the limit temperature. The domestic water storage is maintained at operating temperature by probe S2 and priority diverter valve V2. The regulator performs thermal disinfection of the domestic water storage in accordance with four user-selectable preset programs, keeping it for two hours at the disinfection temperature "Legio.-Temp", settable in the range 40–75°C. The user can anyway add further disinfection periods (designated TP points in the menu).

Program	Disinfection day	Disinfection time slot
0	No disinfection	
1	Mon.	2-4
2	Sat.	10-12
3	Sun.	10-12
4	Mon. and Wed.	2-4

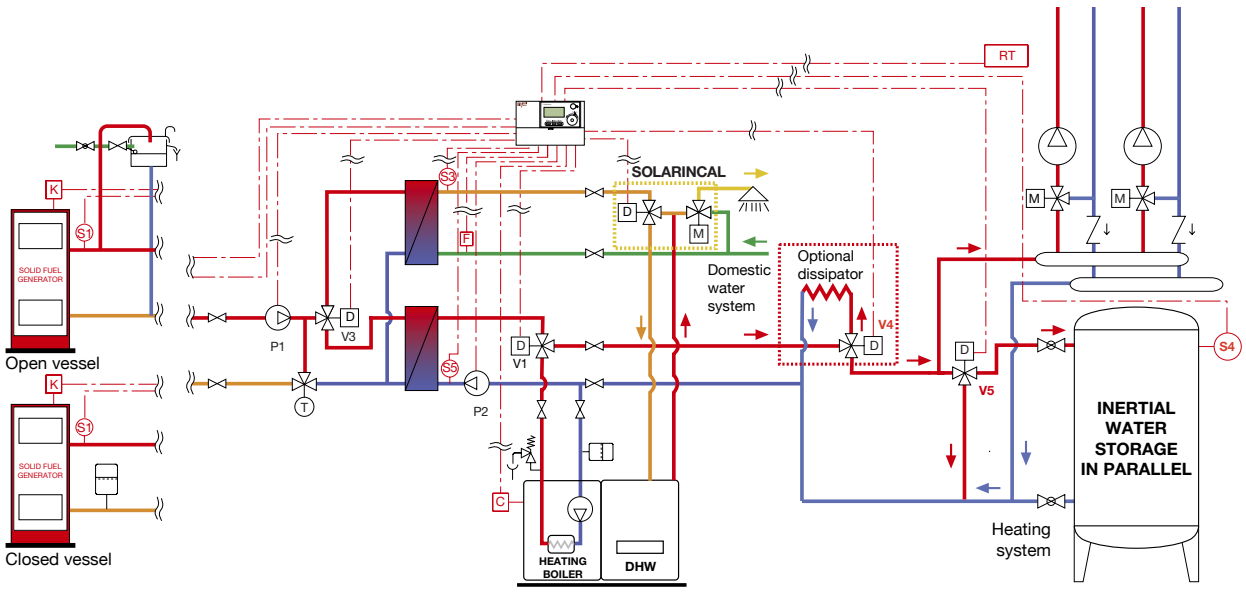
The inertial water storage in parallel is managed in accordance with the logic described on page 6. By means of diverter valve V5 (not supplied in the pack, e.g.: Caleffi 6443..3BY series + relay box code F29525) the regulator manages all phases of loading and unloading of the water storage, which is kept closed only if the gas boiler has been activated. Connection of the parallel water storage to the rest of the system is managed by the regulator by comparing the temperature readings of probes S1 (located on the solid fuel generator flow pipe), S5 (located on the heat exchanger return line) and S4 (located on the parallel water storage). For probe S5 it is advisable to use the following working set-points: 45°C for radiator systems, 30°C for radiant panel systems. The gas boiler starts when the solid fuel generator temperature is below the minimum working temperature TSG (measured by probe S1) and the heat exchanger return temperature TR (measured by probe S5) is 5°C below the value set on the regulator (TR set, fixed hysteresis value 5K).

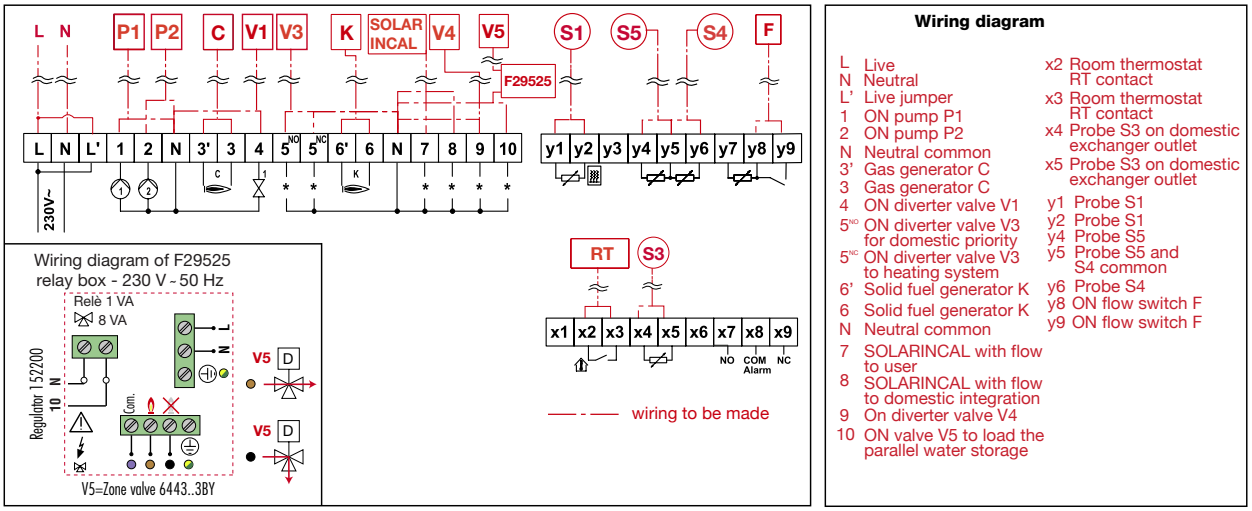
Program 6 (software code PR85)



Heating, instantaneous domestic hot water + management of inertial water storage in parallel on the heating system.

Number of probes utilised: 4
Probe S1 located on solid fuel generator flow
Probe S3 (not supplied in the pack) located on domestic heat exchanger outlet
Probe S5 located on heat exchanger inlet on secondary side of circuit
Probe S4 located on the inertial water storage in parallel on the heating system





Wiring diagram

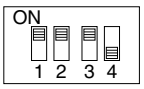
L Live
N Neutral
L' Live jumper
1 ON pump P1
2 ON pump P2
N Neutral common
3' Gas generator C
3 Gas generator C
4 ON diverter valve V1
5NO ON diverter valve V3 for domestic priority
5NC ON diverter valve V3 to heating system
6' Solid fuel generator K
6 Solid fuel generator K
N Neutral common
7 SOLARINCAL with flow to user
8 SOLARINCAL with flow to domestic integration
9 On diverter valve V4
10 ON valve V5 to load the parallel water storage

x2 Room thermostat RT contact
x3 Room thermostat RT contact
x4 Probe S3 on domestic exchanger outlet
x5 Probe S3 on domestic exchanger outlet
y1 Probe S1
y2 Probe S1
y4 Probe S5
y5 Probe S5 and S4 common
y6 Probe S4
y8 ON flow switch F
y9 ON flow switch F

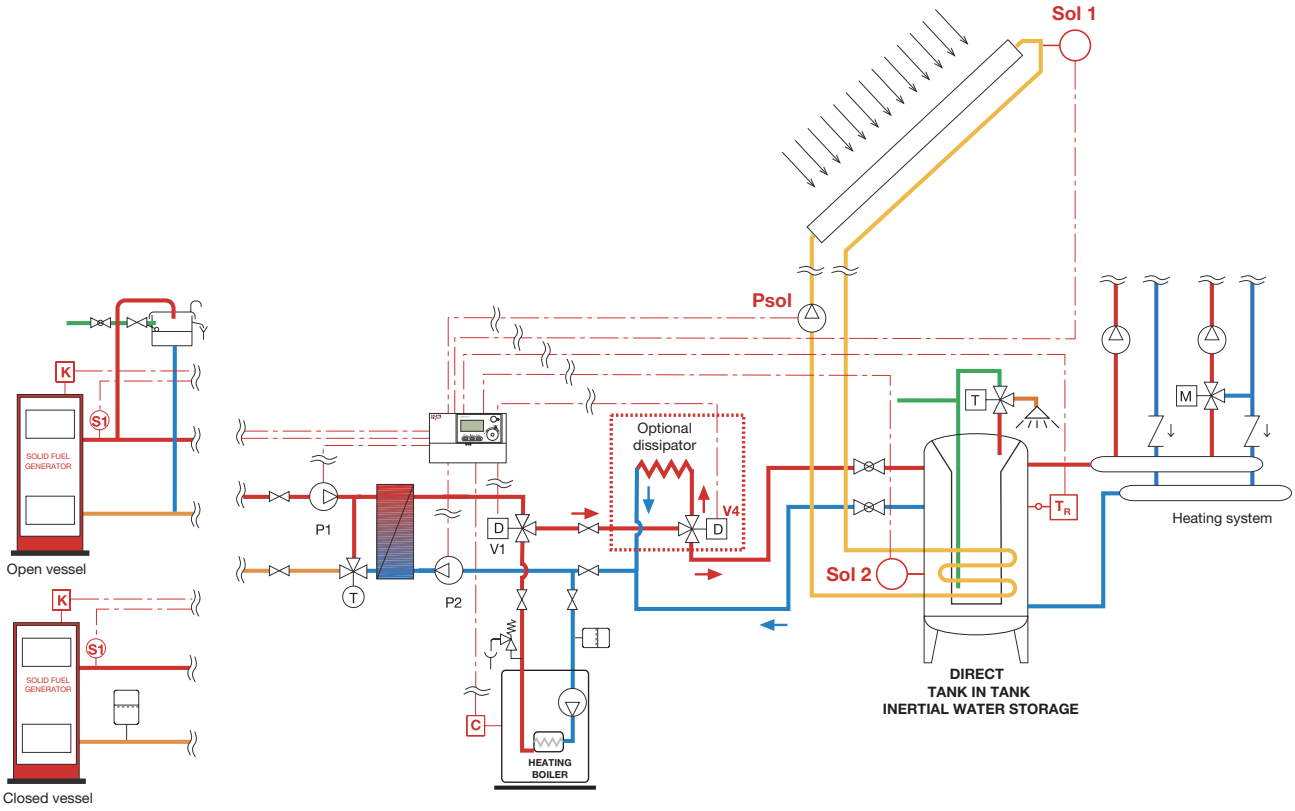
Operating principle

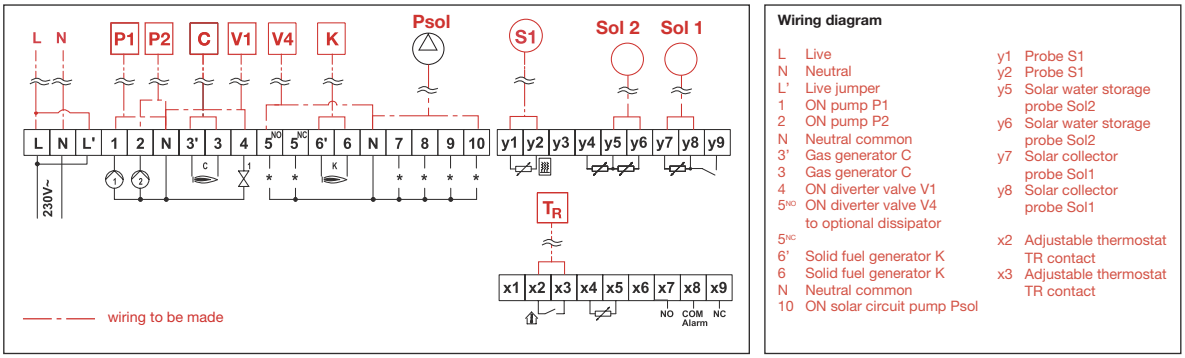
The 1522 series regulator automatically manages a system composed of a solid fuel generator, gas integration boiler (for heating and domestic hot water), inertial water storage in parallel on the heating system and instantaneous domestic hot water production by means of a plate heat exchanger.
When the minimum working temperature of the solid fuel generator has been reached (as detected by probe S1), the regulator starts pump P1, diverts valve V1 to connect the heat exchanger to the system and starts pump P2. With the solid fuel generator off or not yet at working temperature, the regulator starts the integration boiler by means of contact C, stopping pumps P1 and P2 and diverting diverter valve V1 to the boiler.
In the case of solid fuel generator overtemperature, the regulator sends the flow rate of the secondary circuit either to the system (in the presence of room thermostat demand) or to an optional dissipation system, if present.
When a domestic user tap is opened, on a signal from flow switch F, the regulator operates priority valve V3 to produce instantaneous hot water with the solid fuel generator only if the latter is already at working temperature. Probe S3 reads the water temperature at the domestic heat exchanger outlet and, if necessary, the regulator integrates the domestic hot water by supplying it to the gas boiler by means of a diverter valve (not supplied in the pack, e.g. SOLARINCAL kit code 265359).
The inertial water storage in parallel is managed in accordance with the logic described on page 6. By means of diverter valve V5 (not supplied in the pack, e.g.: Caleffi 6443..3BY series + relay box code F29525) the regulator manages all phases of loading and unloading of the water storage, which is kept closed only if the gas boiler has been activated. Connection of the parallel water storage to the rest of the system is managed by the regulator by comparing the temperature readings of probes S1 (located on the solid fuel generator flow pipe), S5 (located on the heat exchanger return line) and S4 (located on the parallel water storage). For probe S5 it is advisable to use the following working set-points: 45°C for radiator systems, 30°C for radiant panel systems. The gas boiler starts when the solid fuel generator temperature is below the minimum working temperature TSG (measured by probe S1) and the heat exchanger return temperature TR (measured by probe S5) is 5°C below the value set on the regulator (TR set, fixed hysteresis value 5K).

Program 7 (software code PR86)



Heating with direct inertial water storage with tank-in-tank domestic hot water production, solar system
Number of probes utilised: 3
Probe S1 located on solid fuel generator flow
Probe Sol1 (not supplied in the pack) located on the solar collector
Probe Sol2 located on the tank-in-tank water storage

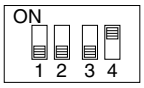




Operating principle

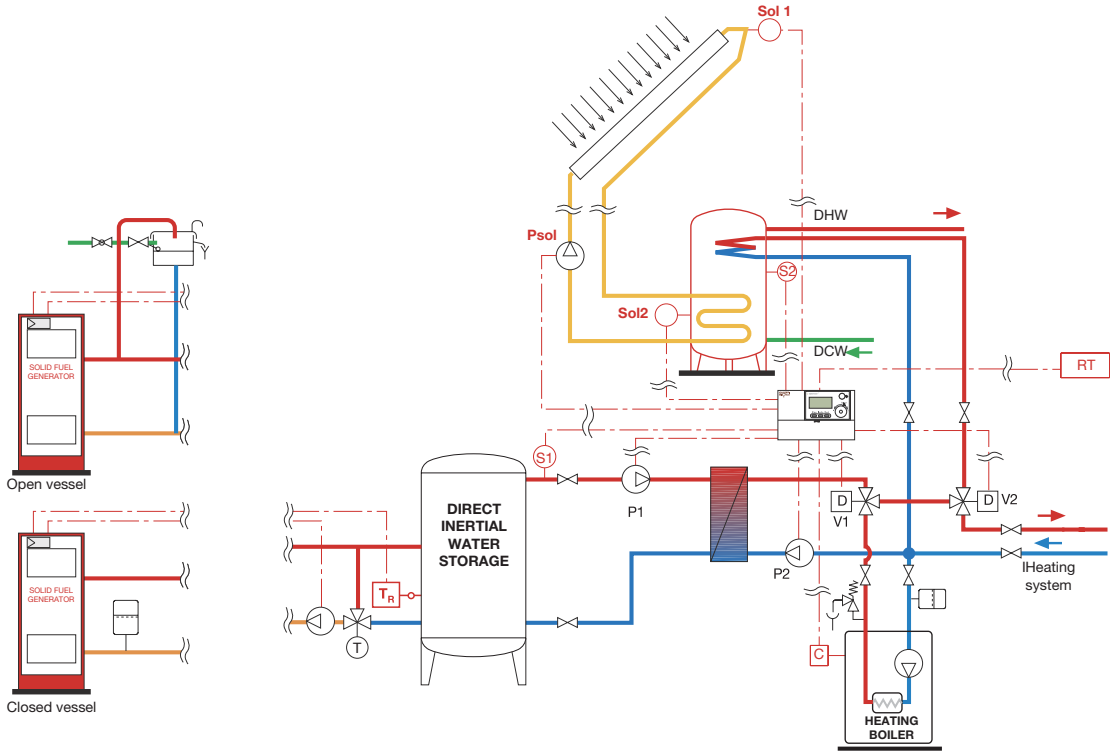
The 1522 series regulator automatically manages a system composed of a solid fuel generator, integration gas boiler and tank-in-tank direct inertial water storage combined with a solar system.
On the request of the adjustment thermostat TR (not supplied in the pack) located on the water storage, the regulator activates the solid fuel generator using contact K (for generators that can be activated electrically).
When the minimum working temperature of the solid fuel generator has been reached (as detected by probe S1), the regulator starts pump P1, diverts valve V1 to connect the heat exchanger to the system and starts pump P2. With the solid fuel generator off or not yet at working temperature, the regulator starts the integration boiler by means of contact C, stopping pumps P1 and P2 and diverting diverter valve V1 to the boiler.
In the case of solid fuel generator overtemperature, the regulator sends the flow rate of the secondary circuit either to the water storage (in the presence of a demand from adjustment thermostat TR) or to an optional dissipation system, if present.
The regulator allows to manage a simple solar thermal circuit connected to the lower coil of the tank-in-tank inertial water storage.
When the minimum working temperature of the solar collector is reached, temperature difference ΔT is checked between probe Sol1 on the solar collector and probe Sol2 on the lower section of the tank-in-tank water storage: if higher than the set value, solar circuit pump Psol is started. Pump Psol continues to run for a selectable minimum time period and it stops if ΔT falls below the set value or when the set temperature for the tank-in-tank inertial water storage is reached.
The regulator manages possible overtemperatures of the solar collector by starting pump Psol to dissipate the excess heat.

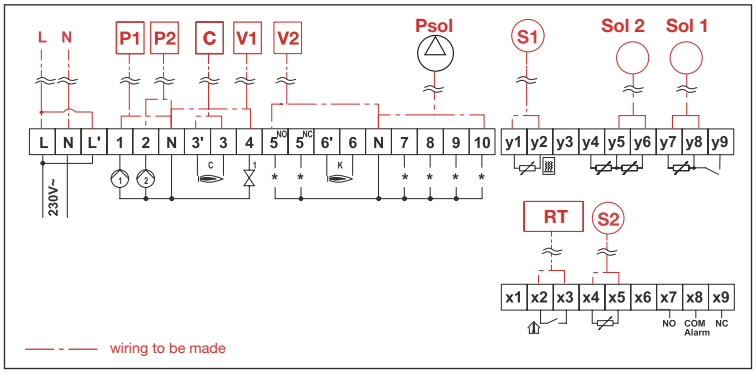
Program 8 (software code PR87)



Heating with direct inertial water storage, domestic hot water production with storage integrated with solar system

Number of probes utilised: 4
Probe S1 located on the direct inertial water storage flow pipe to the secondary circuits
Probe S2 (pocket not supplied in the pack) located on the domestic water storage
Probe Sol1 (not supplied in the pack) located on the solar collector
Probe Sol2 located on the domestic water storage





Wiring diagram

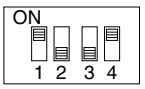
L	Live	y1	Probe S1
N	Neutral	y2	Probe S1
L'	Live jumper	y5	Solar water storage probe Sol 2
1	ON pump P1	y6	Solar water storage probe Sol 2
2	ON pump P2	y7	Solar collector probe Sol 1
N	Neutral common	y8	Solar collector probe Sol 1
3'	Gas generator C	x2	Room thermostat RT contact
3	Gas generator C	x3	Room thermostat RT contact
4	ON diverter valve V1	x4	Domestic water storage probe S2
5NO	ON diverter valve V2 for domestic priority	x5	Domestic water storage probe S2
5NC			
N	Neutral common		
10	ON solar circuit pump Psol		

Operating principle

Adjustment thermostat TR (not supplied in the pack) keeps the direct inertial water storage at working temperature by activating the solid fuel generator.
On request of the room thermostat RT (not supplied in the pack), 1522 series regulator draws energy by priority from the direct inertial water storage. When the water storage minimum working temperature has been reached (read by probe S1), the regulator starts pump P1, diverts valve V1 to connect the heat exchanger to the heating system and starts pump P2. If the water storage is not at working temperature, the regulator activates the integration boiler by means of contact C, stopping pumps P1 and P2 and diverting diverter valve V1 to the boiler.
In the case of direct inertial water storage overtemperature, the regulator sends the flow rate of the secondary circuit either to the system (in the presence of a room thermostat demand) or to the domestic water storage, if it is not yet at working temperature or below the limit temperature.
The domestic water storage is maintained at operating temperature by probe S2 and priority diverter valve V2. The regulator performs thermal disinfection of the domestic water storage in accordance with four user-selectable preset programs, keeping it for two hours at the disinfection temperature “Legio.-Temp”, settable in the range 40–75°C. The user can anyway add further disinfection periods (designated TP points in the menu).
The regulator allows to manage a simple thermal solar circuit connected to the lower coil of the domestic water storage. When the minimum working temperature of the solar collector is reached, the temperature difference ΔT is checked between probe Sol1 on the solar collector and probe Sol2 on the lower section of the domestic water storage: if higher than the set value, solar circuit pump Psol is started. Pump Psol continues to run for a selectable minimum time period and it stops if ΔT falls below the set value or when the set temperature for the domestic water storage is reached. The regulator manages possible overtemperatures of the solar collector by starting pump Psol to dissipate the excess heat.

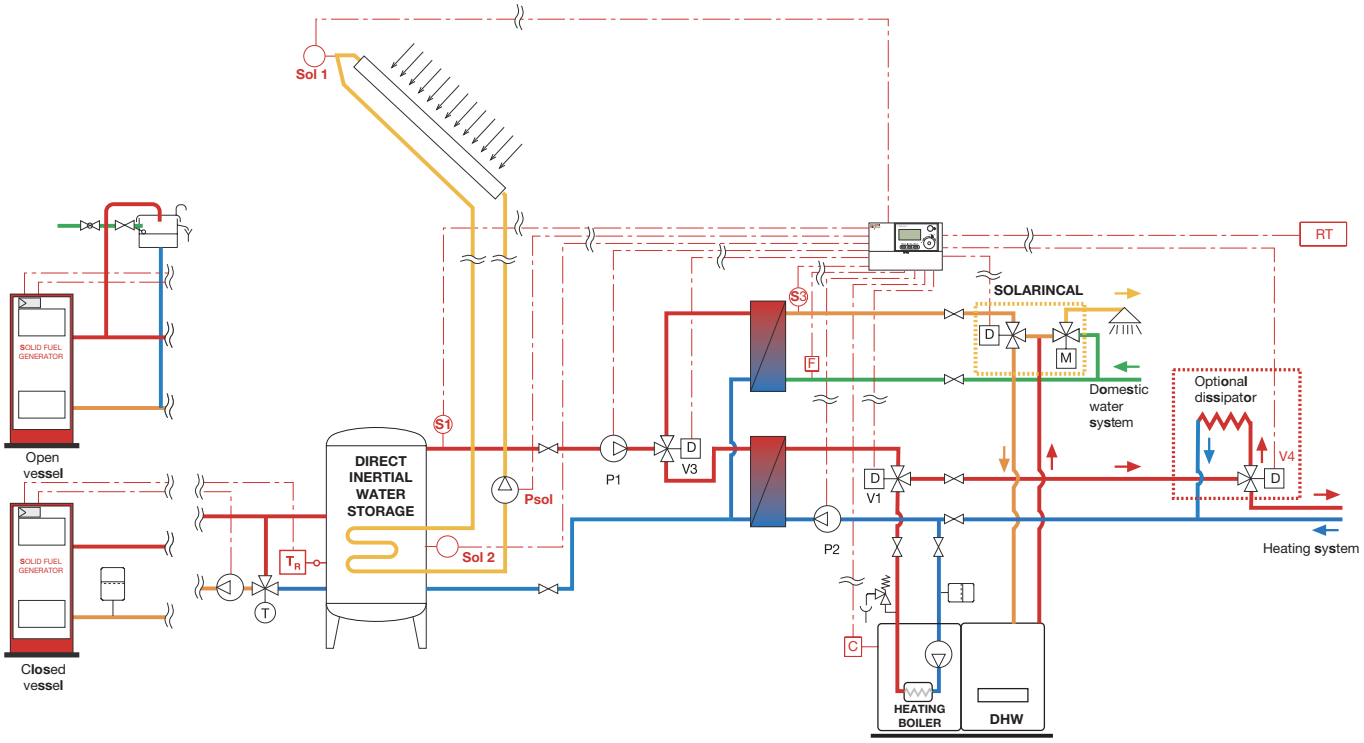
Program	Disinfection day	Disinfection time slot
0	No disinfection	
1	Mon.	2-4
2	Sat.	10-12
3	Sun.	10-12
4	Mon. and Wed.	2-4

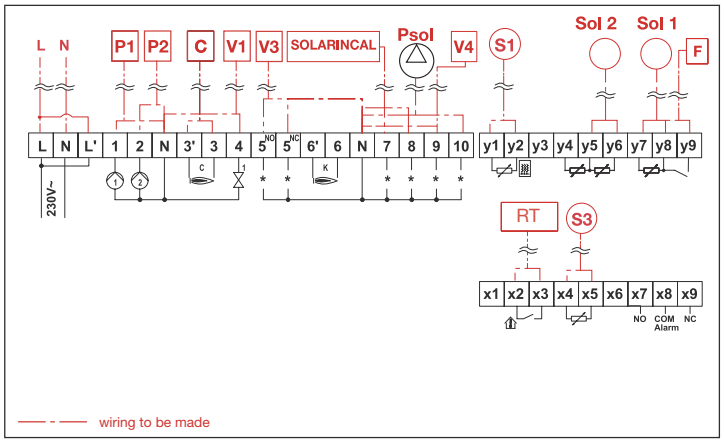
Program 9 (software code PR88)



Heating with direct inertial water storage integrated with solar system, instantaneous domestic hot water production

Number of probes utilised: 4
Probe S1 located on the direct inertial water storage flow pipe to the secondary circuits
Probe S3 located on domestic heat exchanger outlet
Probe Sol1 (not supplied in the pack) located on the solar collector
Probe Sol2 located on the direct inertial water storage





Wiring diagram

L	Live	y1	Probe S1
N	Neutral	y2	Probe S1
L'	Live jumper	y5	Solar water storage probe Sol 2
1	ON pump P1	y6	Solar water storage probe Sol 2
2	ON pump P2	y7	Solar collector probe Sol 1
N	Neutral common	y8	Solar collector probe Sol 1, ON flow switch
3'	Gas generator C	y9	ON flow switch
3	Gas generator C	x2	Room thermostat RT contact
4	ON diverter valve V1	x3	Room thermostat RT contact
5NO	ON diverter valve V3 for domestic priority	x4	Probe S3 on domestic exchanger outlet
5NC	ON diverter valve V3 to heating system	x5	Probe S3 on domestic exchanger outlet
7	SOLARINCAL with flow to user		
8	SOLARINCAL with flow to domestic integration		
9	On diverter valve V4		
10	ON solar circuit pump Psol		

Operating principle

Adjustment thermostat TR (not supplied in the pack) keeps the direct inertial water storage at working temperature by activating the solid fuel generator.
On request of the room thermostat RT (not supplied in the pack), 1522 series regulator draws energy by priority from the direct inertial water storage. When the water storage minimum working temperature has been reached (read by probe S1), the regulator starts pump P1, diverts valve V1 to connect the heat exchanger to the heating system and starts pump P2. If the water storage is not at working temperature, the regulator activates the integration boiler by means of contact C, stopping pumps P1 and P2 and diverting diverter valve V1 to the boiler.
In the case of direct inertial storage overtemperature, the regulator sends the flow rate of the secondary circuit either to the system (in the presence of a room thermostat demand) or to an optional dissipator, if present.
When a domestic user tap is opened, on a signal from flow switch F, the regulator operates priority valve V3 to produce instantaneous hot water with the direct inertial storage only if the latter is at working temperature. Probe S3 reads the water temperature at the domestic heat exchanger outlet and, if necessary, the regulator integrates the domestic hot water by supplying it to the gas boiler by means of a diverter valve (not supplied in the pack, e.g. SOLARINCAL kit code 265359).
The regulator allows to manage a simple thermal solar circuit connected to the lower coil of the direct inertial water storage. When the solar collector minimum working temperature is reached, temperature difference ΔT is checked between probe Sol1 on the solar collector and probe Sol2 on the lower section of the direct inertial water storage: if higher than the set value solar circuit pump Psol is started. Pump Psol continues to run for a selectable minimum time period and it stops if ΔT falls below the set value or when the set temperature for the direct inertial water storage unit is reached. The regulator manages possible overtemperatures of the solar collector by starting pump Psol to dissipate the excess heat.