

Anti-condensation circulation unit

282 series

CALEFFI
BIO MASS



01225/14 GB

replaces dp 01225/11



Function

The anti-condensation circulation unit performs the function of connecting the solid fuel generator to the distribution manifold, controlling the return temperature to the generator, to avoid condensation by means of the built-in thermostatic sensor. The unit also enables connecting the generator to the inertial storage or directly to the user system.

Versions with centre distances of 90 and 125 mm have been specifically designed for the connection to the separator-distribution manifold 559 series. 125 mm version can also be connected to the manifold for central heating systems 550 series.



Product range

Code	28260.A2L	28261.A2L	28262.A2L	28263.A2L	28264.UPM	28265.UPM	28266.UPM	28267.UPM
Generator return on LH side	x		x		x		x	
Generator return on RH side		x		x		x		x
Centre distance 90 mm	x	x			x	x		
Centre distance 125 mm			x	x			x	x
ALPHA2 L 25-60 pump	x	x	x	x				
UPML 25-95 pump					x	x	x	x
Size DN 25 (1")	x	x	x	x	x	x	x	x

Technical specifications

Materials

Anti-condensation valve

Body: brass EN 1982 CB753S
Cap: brass EN 12164 CW614N
Obturator: PSU
Spring: stainless steel EN 10270-3 (AISI 302)
Seal: EPDM
Union seal: non-asbestos fibre
Wax thermostatic sensor

Shut-off valves

Body: brass EN 12165 CW617N
Seal: non-asbestos fibre

Other accessories

Pipe: copper
Check valve: - body: brass EN 12164 CW614N
- obturator: PPAG40

Performance

Medium: water, glycol solutions
Max. percentage of glycol: 50%
Max. working pressure: 10 bar
Working temperature range: 5–100°C
Temperature gauge scale: 0–120°C

Connections:

- system circuit: 1" F (ISO 228-1) with union
- generator circuit: 1" F (ISO 228-1)
- connections centre distance:
 - cod. 28260.A2L, 28261.A2L, 28264.UPM, 28265.UPM: 90 mm
 - cod. 28262.A2L, 28263.A2L, 28266.UPM, 28267.UPM: 125 mm

• Code completion

Setting	45°C	55°C	60°C	70°C
•	4	5	6	7

Anti-condensation valve

Setting temperature (Tset): 45°C, 55°C, 60°C, 70°C
Setting accuracy: ±2°C
By-pass complete closing temperature: $T_{mix} = T_{set} + 10^\circ\text{C} = T_r$

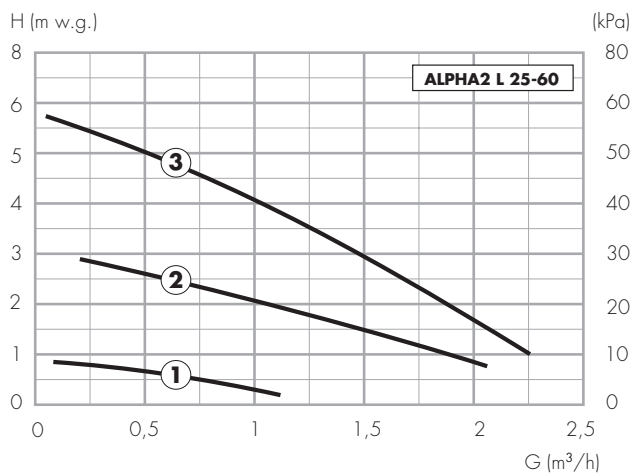
Pump

Pump: model ALPHA2 L 25-60 (or UPML 25-95)
Material: - body: cast iron GG 15/20
Electric supply: 230 V-50 Hz
Max. ambient humidity: 95%
Max. ambient temperature: 80°C
Protection class: IP 44 (IPX2D)
Pump centre distance: 130 mm
Pump connections: 1 1/2" with nut

Technical specifications of insulation

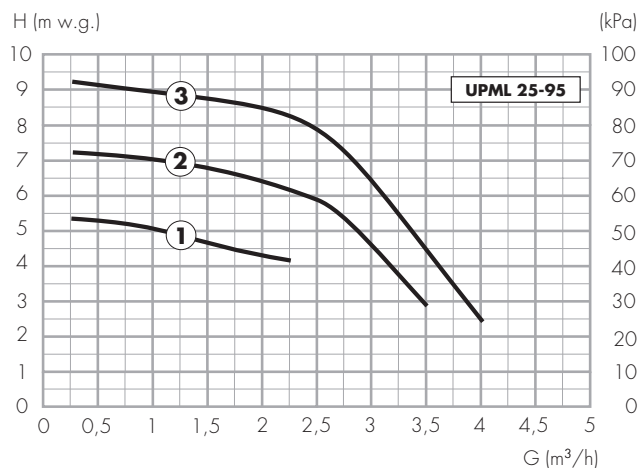
Material: closed cell expanded PE-X
Thickness: 20 mm
Density: - inner part 30 Kg/m³
- outer part 50 Kg/m³
Thermal conductivity (DIN 52612): - at 0°C 0,038 W/(m·K)
- at 40°C 0,045 W/(m·K)
Coefficient of resistance to the diffusion of water vapour (DIN 52615): > 1300
Working temperature range: 0–100°C
Reaction to fire (DIN 4102): class B2

Head available at the unit connections



Note:

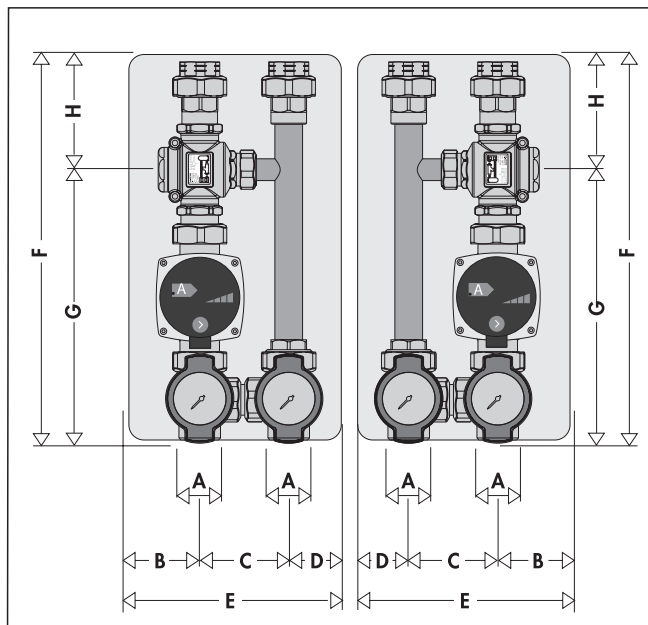
The ALPHA2 L pump can operate with constant or proportional pressure control, which adapts the performance to the system requirements. For further details, see the installation instruction sheet of the pump supplied in the package.



Note:

The UPML pump can operate with constant or proportional pressure control, which adapts the performance to the system requirements. For further details, see the installation instruction sheet of the pump supplied in the package.

Dimensions

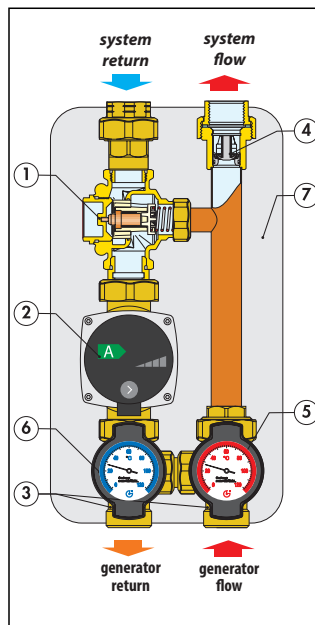


Code	A	B	C	D	E	F	G	H	Mass (kg)
28260.A2L	1"	75	90	45	218	407	290	117	6,60
28262.A2L	1"	75	125	45	245	407	290	117	6,70
28264.UPM	1"	83	90	45	218	407	290	117	8,10
28266.UPM	1"	83	125	45	253	407	290	117	8,20
28261.A2L	1"	75	90	45	210	407	290	117	6,60
28263.A2L	1"	75	125	45	245	407	290	117	6,70
28265.UPM	1"	83	90	45	210	407	290	117	8,10
28267.UPM	1"	83	125	45	253	407	290	117	8,20

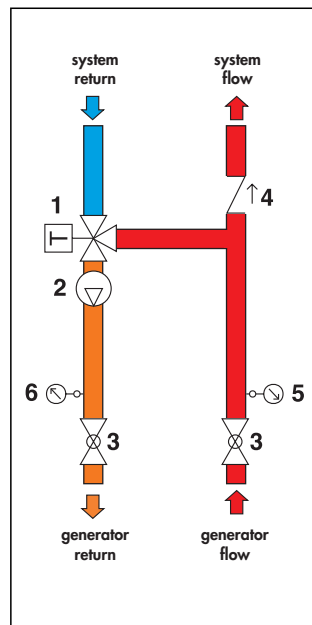
• Code completion

Setting	45°C	55°C	60°C	70°C
•	4	5	6	7

Characteristic components



Hydraulic diagram

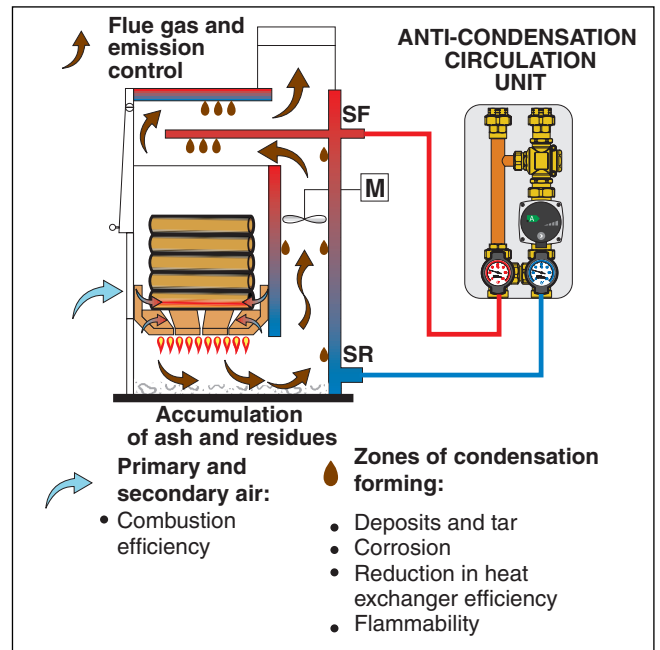


- 1) Anti-condensation valve
- 2) High-efficiency pump
- 3) Shut-off valves
- 4) Check valve
- 5) Flow temperature gauge
- 6) Return temperature gauge
- 7) Insulation

Wooden biomass and condensation build-up

Wooden solid fuel contains a variable moisture percentage depending on the type (logs, pellets, woodchips etc.) and seasoning. Water vapour is released during the solid fuel drying phase inside the combustion chamber. The presence of cold zones in the generator or flue gas chimney can lower the temperature of the flue gas down to the dew point, causing condensation to occur. Water vapour condenses on the generator surfaces, together with soot and part of the unburnt hydrocarbons contained in the flue gas, producing deposits and tar. These substances stick to the walls of the generator, covering most of the inner surfaces. In addition to being dangerous due to its flammability, tar is damaging to the integrity of the generator and limits the efficiency of the flue gas-system water exchanger.

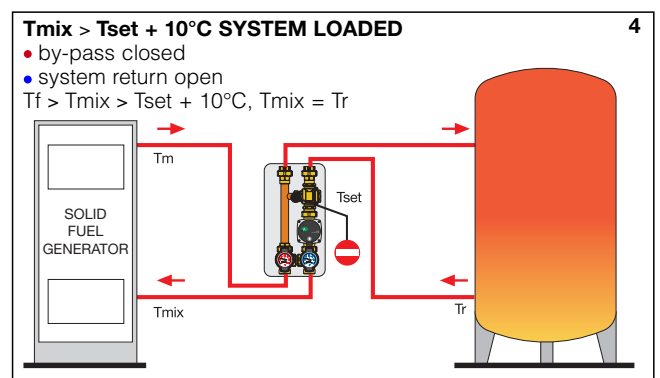
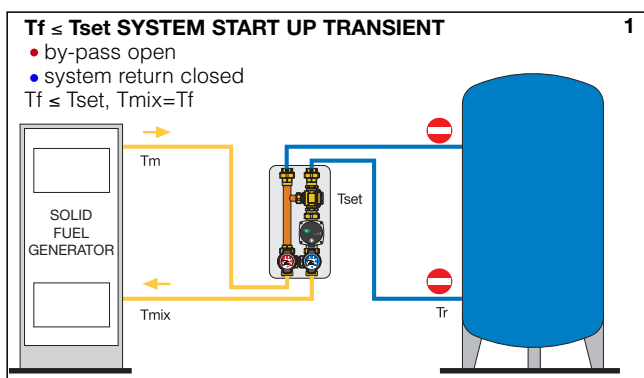
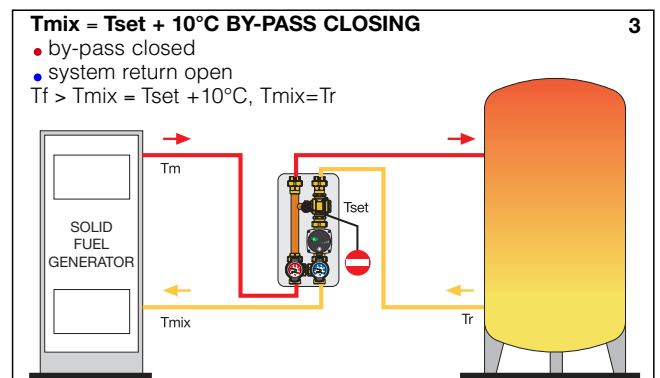
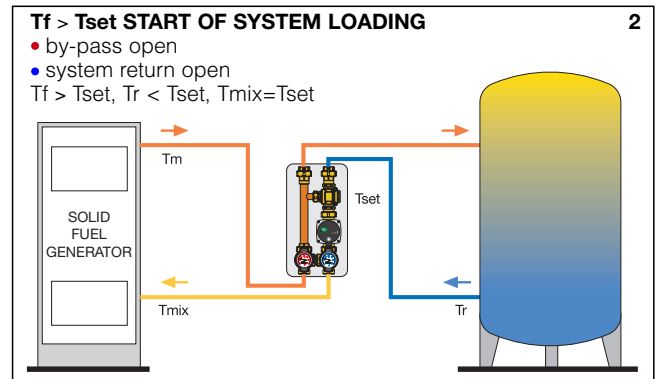
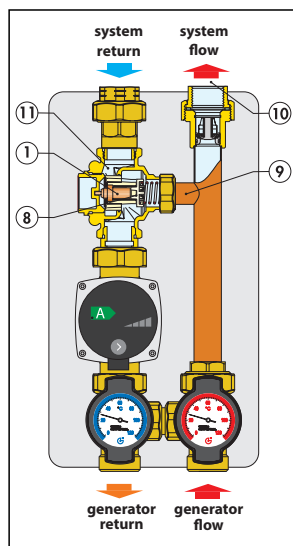
By keeping the generator walls at the highest possible temperature, the anti-condensation circulation unit limits the formation of these substances, thereby increasing the combustion efficiency, controlling the emissions into the environment and prolonging the generator life.



Operating principle

The thermostatic sensor (1), completely immersed in the medium, controls the movement of an obturator (8) that regulates the flows in by-pass (9) and toward the system (10).

At the start-up of the heat generator, the circulation unit recirculates the flow water so as to bring the generator up to temperature as quickly as possible (fig. 1). When the flow temperature T_f exceeds the setting of the anti-condensation valve T_{set} , the unit's cold port (11) starts opening to produce the water mixing T_{mix} : in this phase the system loading begins (fig. 2). When the return temperature to the generator T_{mix} is greater than the setting of the anti-condensation valve by approximately 10°C , the by-pass port (9) closes and water returns to the generator at the same temperature as the system return (fig. 3 and fig. 4).



T_f = Flow temperature
 T_{set} = Anti-condensation setting temperature

T_{mix} = Mixed water temperature of generator return
 T_r = System return temperature

Construction details

Compact construction

The unit features all the functional components assembled in a kit and ready for installation. Versions with centre distances of 90 and 125 mm have been specifically designed for the connection to the separator-distribution manifold 559 series. 125 mm version can be also applied to the manifold for central heating system 550 series.

Anti-condensation valve

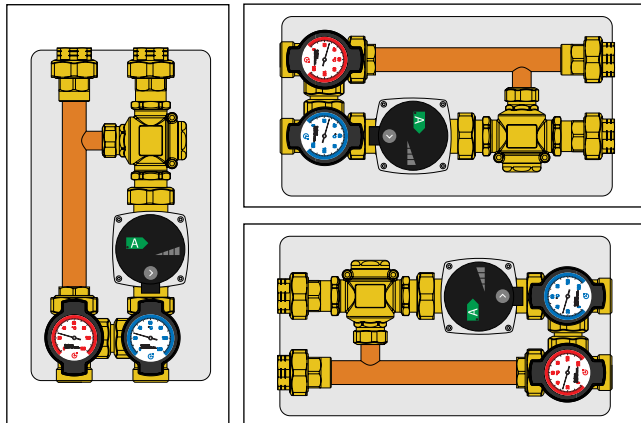
The device incorporates a thermostatic sensor to control the temperature of water returning to the solid fuel generator so as to prevent condensation. The sensor has been specifically realised to be removed from the valve body for maintenance or replacement if necessary.

Check valve

This device prevents reverse circulation of the medium. The check valve is useful when the circulation unit is used on its own for direct connection to the system or for connection to a manifold not equipped with a hydraulic separator.

Installation

The anti-condensation circulation unit can be installed on both sides of the generator respecting the flow directions indicated on the body. Installation is preferable with the pipes positioned vertically (with axis of the thermostatic sensor horizontal). Installation with the pipes positioned horizontally (with axis of the thermostatic sensor vertical) is however allowed.

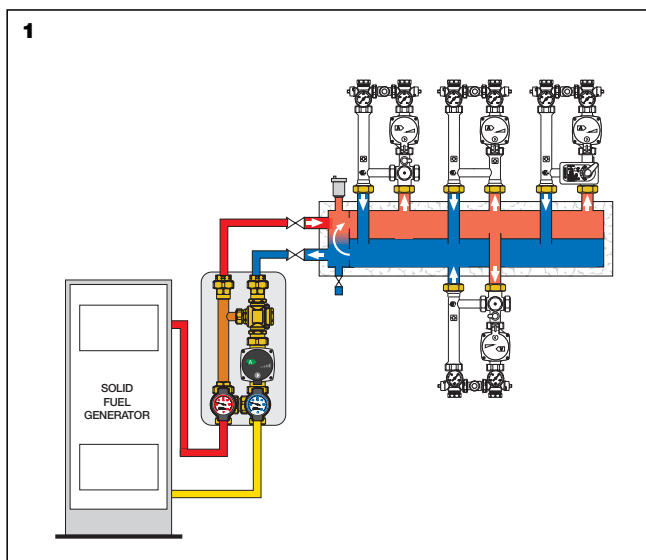


Application

The anti-condensation circulation unit is used to connect solid fuel generators to the user system according to the following system design logics:

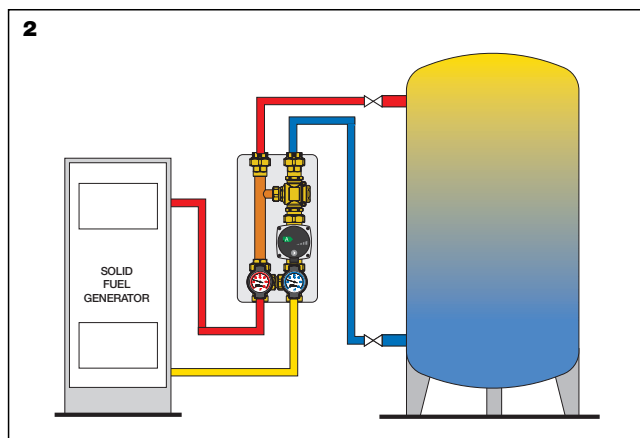
- Connection to the primary side of the 559 series SEPCOLL separator-manifold.

The solid fuel generator is used as a single energy source (primary side) and is therefore connected upstream of the hydraulic separation zone of the 559 series SEPCOLL unit (**fig. 1**).



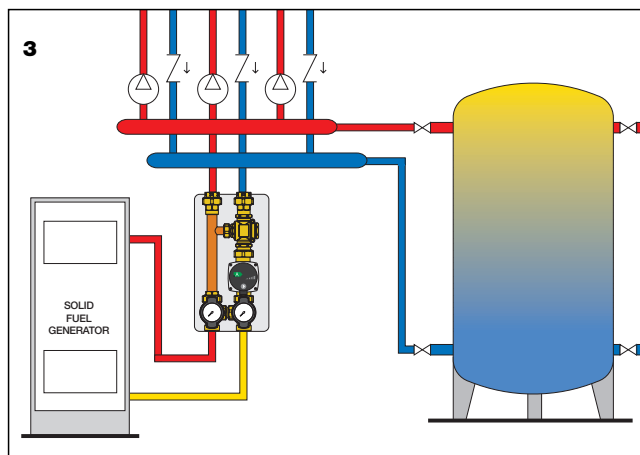
- Connection to inertial storage.

The unit performs the function of connection and hydraulic circulation between the solid fuel generator and the inertial storage, both in direct mode and with coil exchanger immersed in the storage (**fig. 2**).



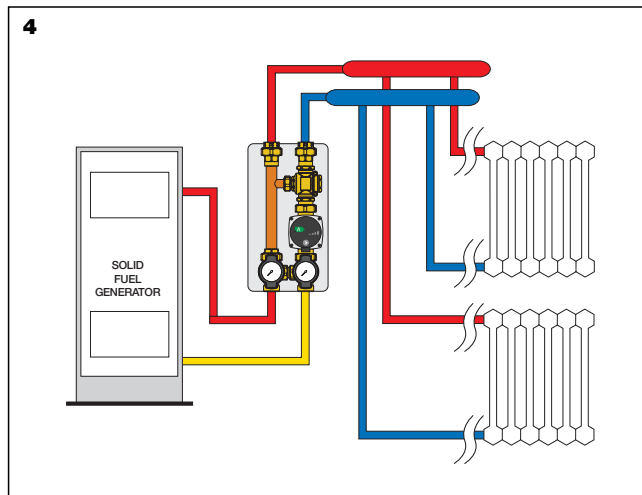
- Connection to manifold with storage in parallel

The unit connects the generator to the manifold for direct supply to the secondary circuits or in parallel to the inertial storage (**fig. 3**).



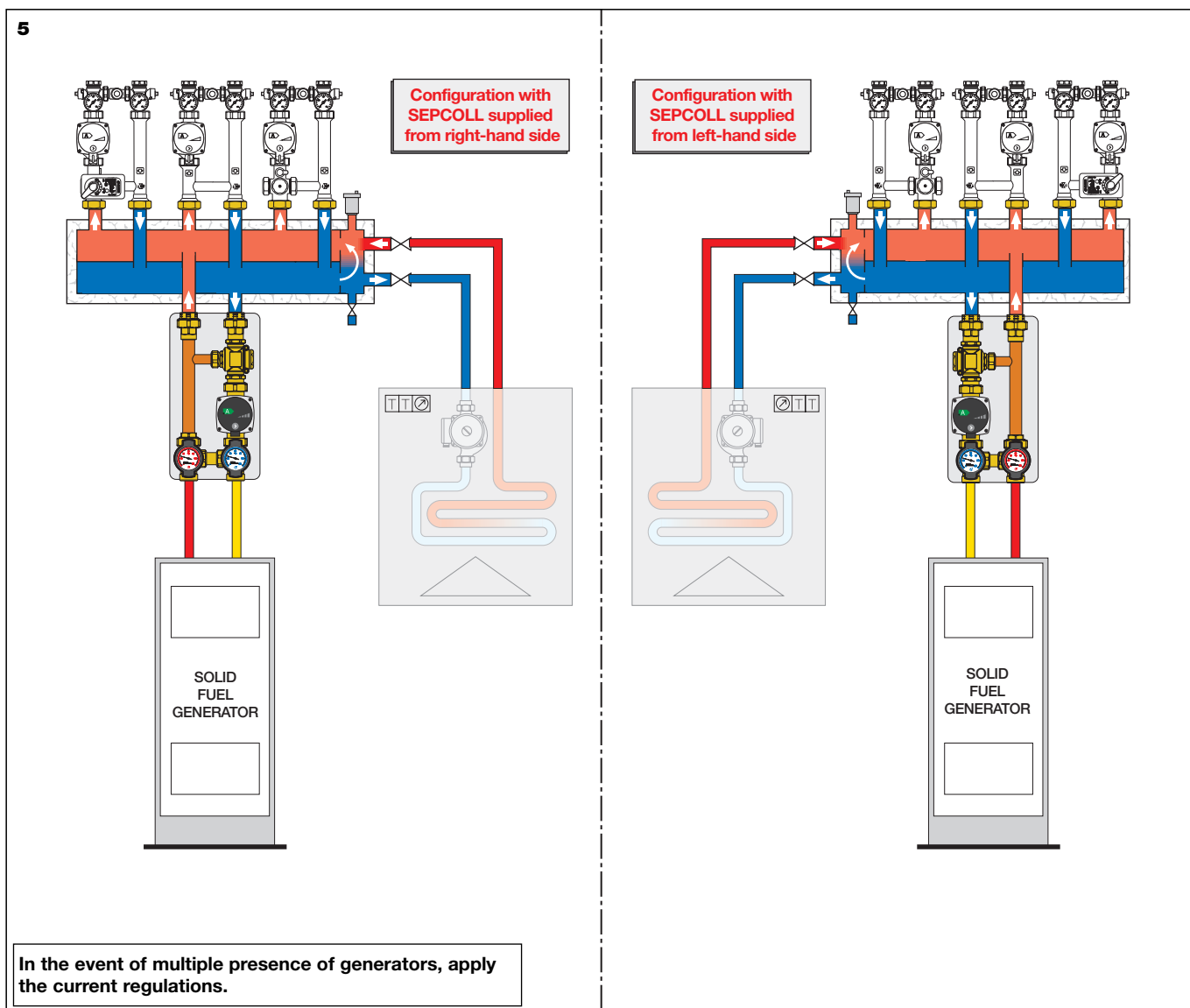
- **Direct connection to the system.**

The unit can be directly connected to the system, using the pump as a circulator for the entire system (**fig. 4**).



- **Connection to the secondary side of the 559 series SEPCOLL separator-manifold.**

When the solid fuel generator is coupled to another generator, which may already exist in the system, one of the secondary side outlets of the SEPCOLL unit can be used as the inlet of the solid fuel generator. The solid fuel generator flow is connected to the manifold which receives the flow of the primary side generator. The function of the hydraulic separation zone, with reduced head losses, remains the same even with this connection logic. The regulating unit of the secondary circuits control the temperatures in the respective circuits (**fig. 5**).



Maintenance and setting modification

The sensor can easily be removed for maintenance or setting change, according to the following procedure:

- shut off the pipes to isolate the anti-condensation circulation unit from the system;
- if the unit is installed with the pipes positioned vertically (with axis of the thermostatic sensor horizontal), remove the anti-condensation valve from the unit;
- unscrew the cap of the anti-condensation valve;
- take out the unit consisting of the spring, obturator and thermostatic sensor, noting the position of each component;
- perform maintenance or replace the sensor with a spare part, fitting it in the same position;
- re-fit the unit consisting of the spring, obturator and thermostatic sensor inside the valve body;
- screw the cap back onto the valve body;

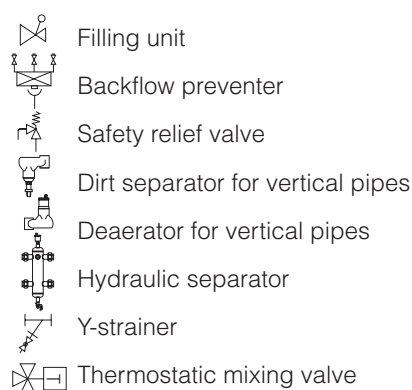
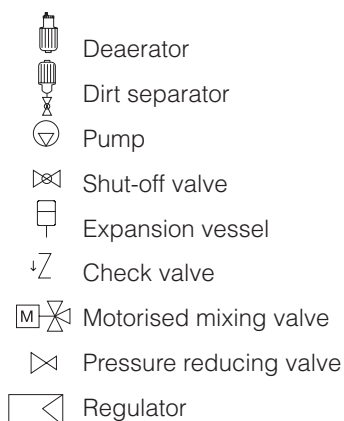
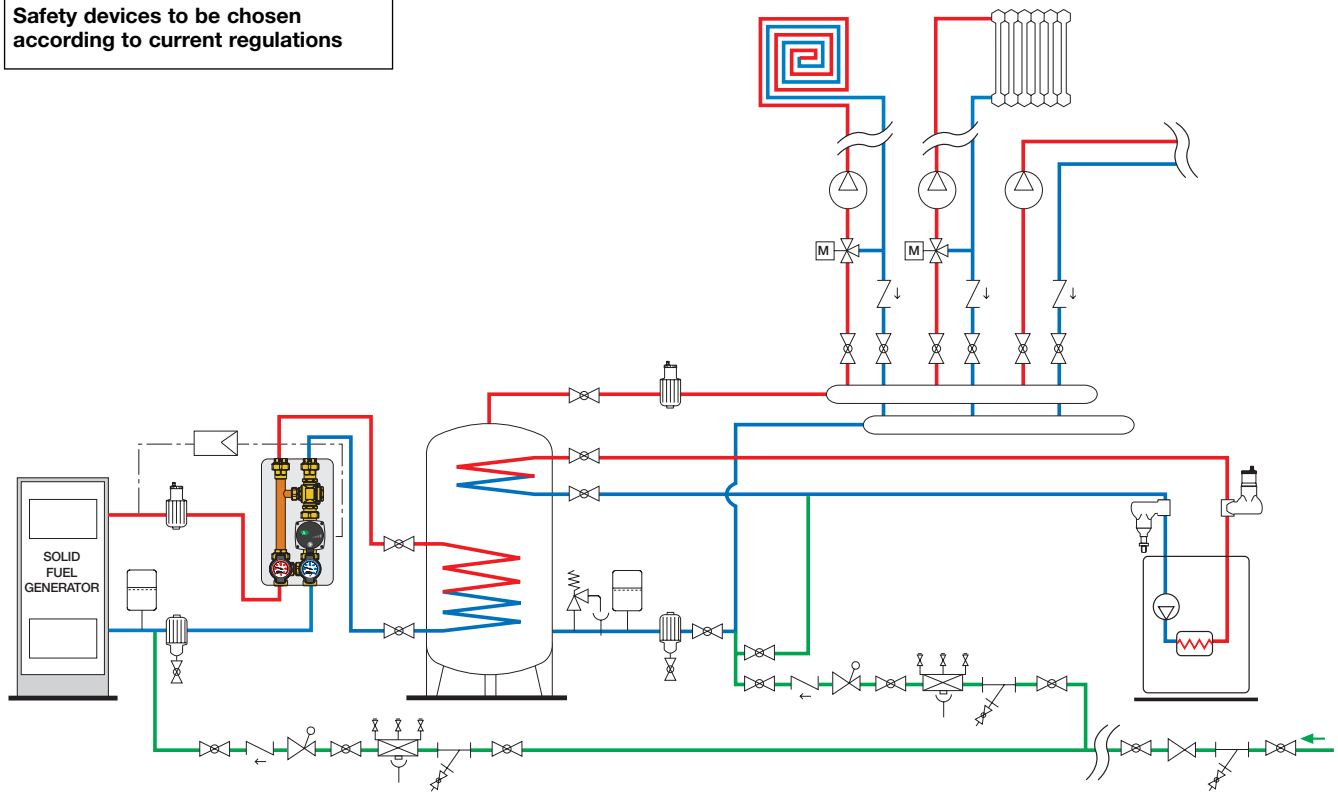
- if the unit is installed with the pipes positioned vertically (with axis of the thermostatic sensor horizontal), re-fit the anti-condensation valve onto the unit;
- if the thermostat is replaced with a spare part featuring a different setting, apply the label indicating the new setting to the cap, label supplied in the spare part packaging.



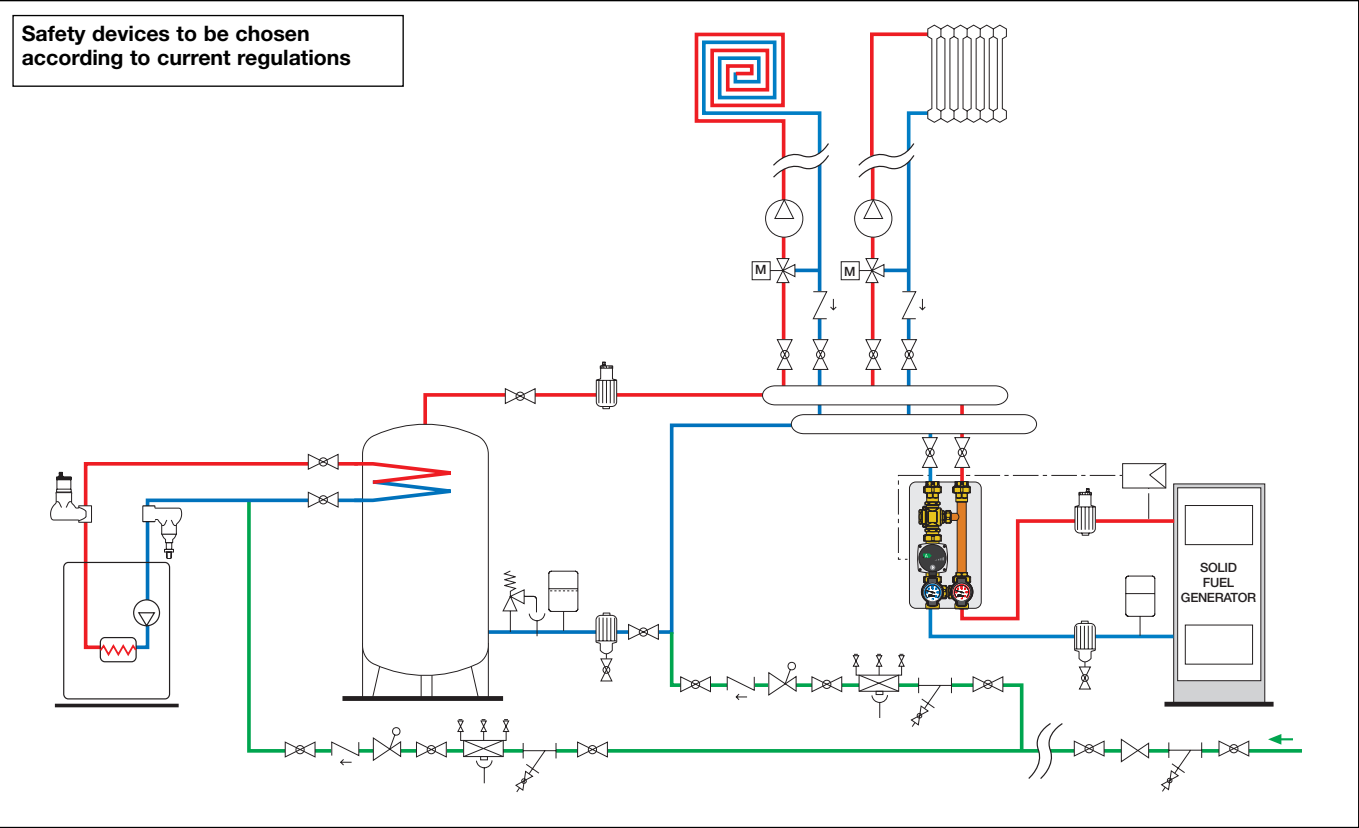
Application diagram

Solid fuel generator, system with inertial storage.

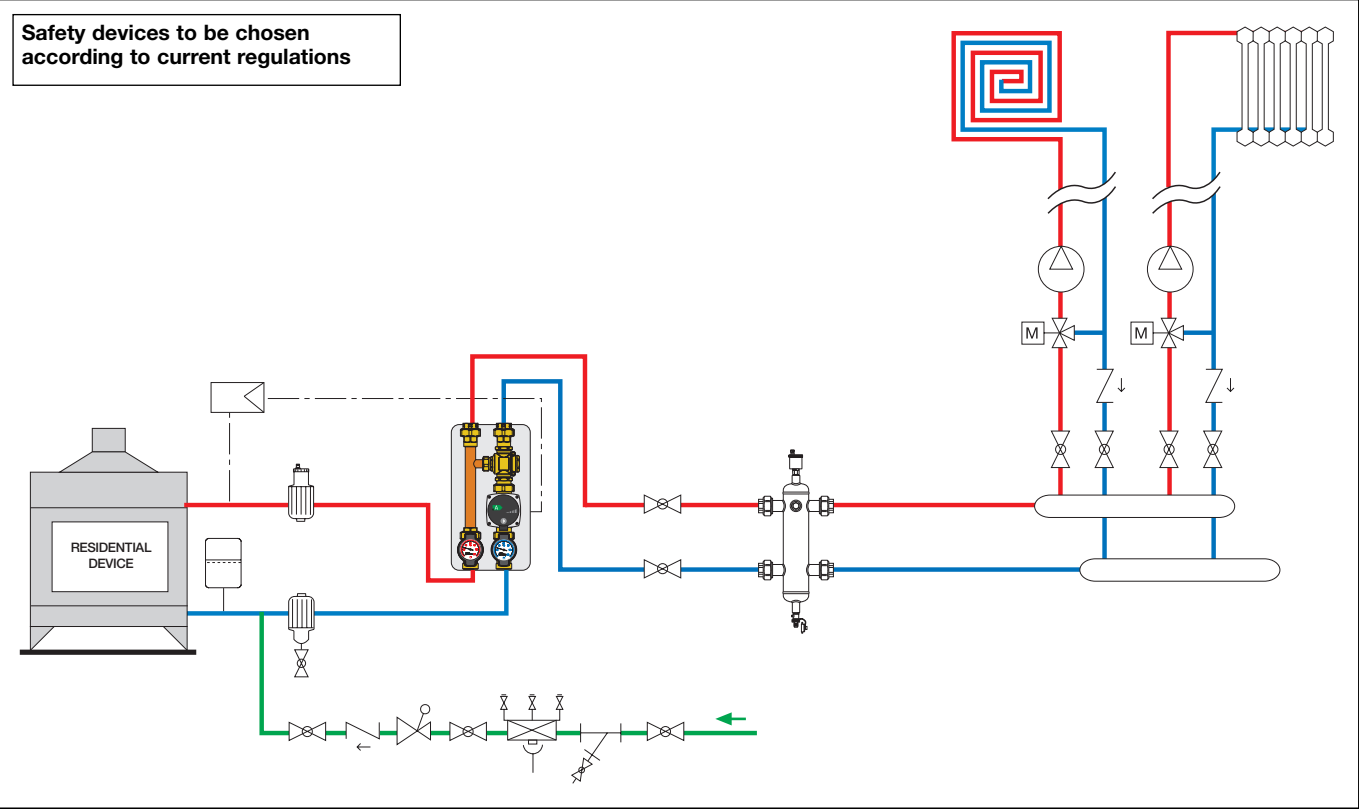
Safety devices to be chosen according to current regulations



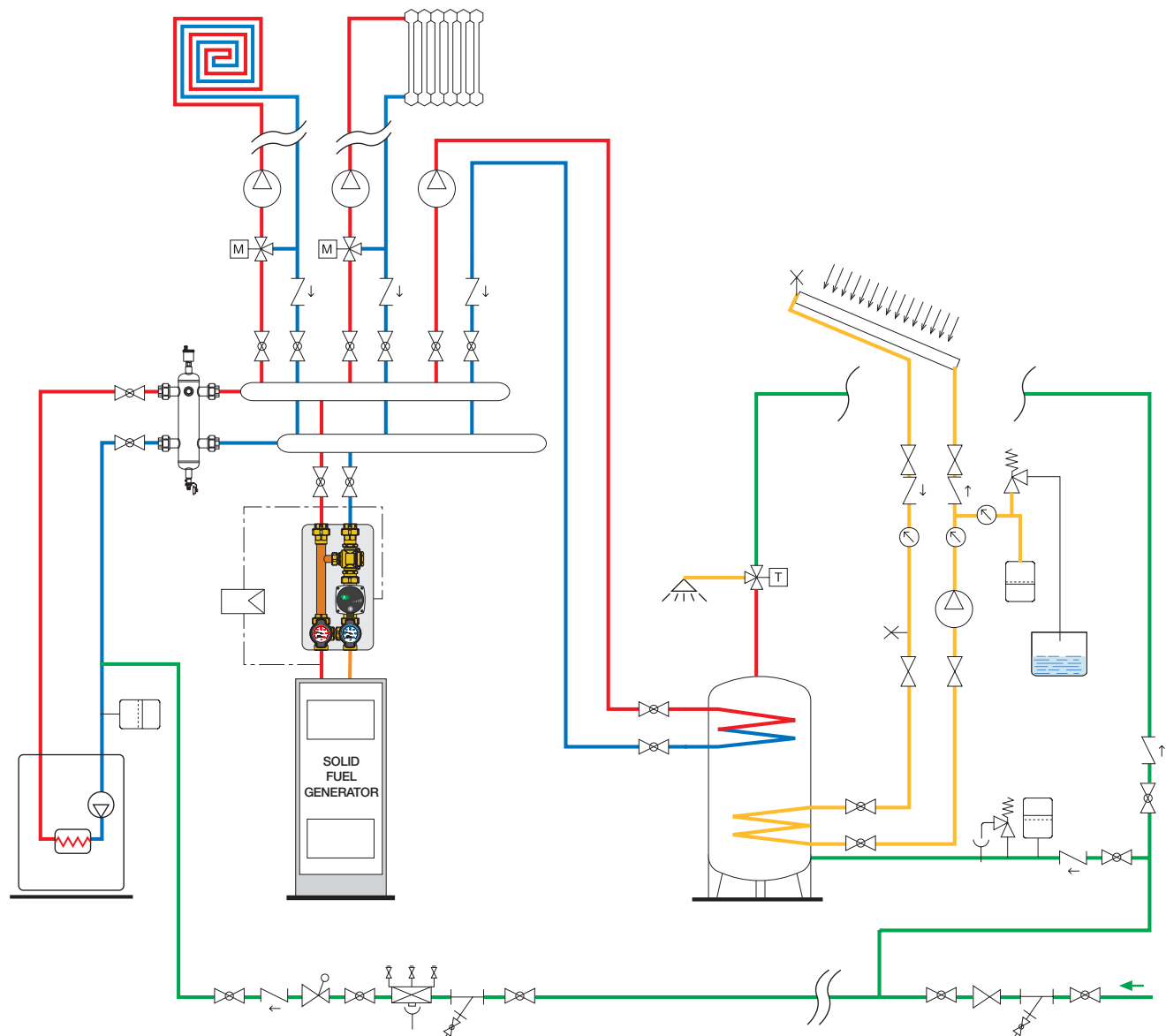
Solid fuel generator, connection to central heating system manifold and inertial storage in parallel.



Solid fuel generator, direct supply to the system.



Safety devices to be chosen according to current regulations



SPECIFICATION SUMMARY

282 series

Anti-condensation circulation unit. Configuration with generator return on right side (or left side). Connections to generator circuit 1" F (ISO 228-1), connections to system circuit 1" F (ISO 228-1) with union. Connections centre distance 90 mm (and 125 mm) fitted for 559 series SEPCOLL. 125 mm centre distance fitted for central heating system 550 series manifold. Medium water and glycol solutions; maximum percentage of glycol 50%. Maximum working pressure 10 bar. Working temperature range 5–100°C. Temperature gauge scale 0–120°C. Complete with: anti-condensation valve with brass body, brass cap, PSU obturator, stainless steel spring, EPDM seal, union seal in non-asbestos fibre, wax thermostatic sensor, setting temperatures 45°C, 55°C, 60°C, 70°C, setting accuracy $\pm 2^\circ\text{C}$, by-pass complete closing temperature $T_{\text{set}} + 10^\circ\text{C}$; shut-off valves with brass body, non-asbestos fibre seal; copper connection pipe; PPAG40 check valve; high-efficiency pump model ALPHA2 L 25-60 (and UPML 25-95), cast iron body, electric supply 230 V - 50 Hz, maximum ambient humidity 95%, maximum ambient temperature 80°C, protection class IP 44 (IPX2D), pump centre distance 130 mm, pump connections 1 1/2" with nut. With insulation.

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