

# Biomass Product Guide

Altecnic Renewables



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**altecnic**  
CALEFFI group

Authentic  
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As the UK's leading manufacturer and supplier of superior plumbing equipment, Altecnic is committed to significantly investing in new technology to bring innovative products to market. As part of the global Caleffi organisation, Altecnic offers a comprehensive range of internationally accredited plumbing and heating products which meet all current UK and European standards. The specialist renewables division provides professional installers with the latest solar, geothermal and biomass technology.

Supplying both domestic and commercial buildings, Altecnic's industry wide reputation for high quality manufacturing and environmental awareness is proven by ISO 45001. Trade merchants, original equipment manufacturers, plumbing and heating engineers and specifiers continue to choose Altecnic's outstanding products and services, fully supported by the national sales team and experienced technical and quality departments.



## Please note

### WRAS Approved Products

Details of the range of products approved can be found in the Water Fittings and Materials online directory:

[www.wras.co.uk](http://www.wras.co.uk)



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# Purpose-designed components for biomass systems

Developed and thoroughly proven by our parent company in Italy, Altecnic's biomass product range is purpose-designed for the high temperatures generated by wood-fuelled water or glycol based biomass heating systems. This comprehensive range offers everything an installer needs, including energy management units and safety devices, for domestic and commercial applications.

The Altecnic name guarantees purpose-designed products, eliminating any risk of installing fittings adapted from traditional applications which may not be able to cope with the ultra high temperatures and demands of a biomass system.

Our quality and environmental standards are proven by our ISO 9001:2008 and 14001:2004 certification.

If you have any questions about product choice or installation, we'd be happy to help.





# Contents

6 Biomass

7 Reference Standards

8 Safety Devices

10 Anti-condensation Valve

12 Anti-condensation Circulation Unit

14 Anti-condensation Recirculation and Distribution Unit

# Biomass

The CALEFFI BIOMASS® product series has been created specifically to be used in circuits of systems with wood solid fuel generators, operating at high temperature with water or glycol solutions as thermal medium. The materials of the components and their performance take account of the specific system needs in terms of efficiency and safety of the generators and systems.

## BIOMASS

Biomass is "the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries (including fisheries and aquaculture), as well as the biodegradable fraction of industrial and municipal waste". Biomass can be in the form of a solid, liquid or gas. This line of Caleffi products has been specifically designed for wood solid biomass (solid fuel).

Solid fuel generators can be classified in two macro-categories:

### SOLID FUEL GENERATORS

1) Boilers: generators "for solid fuels, hand and automatically stoked", to be installed in specific technical rooms. Heating takes place via a hydraulic connection to the heating system.

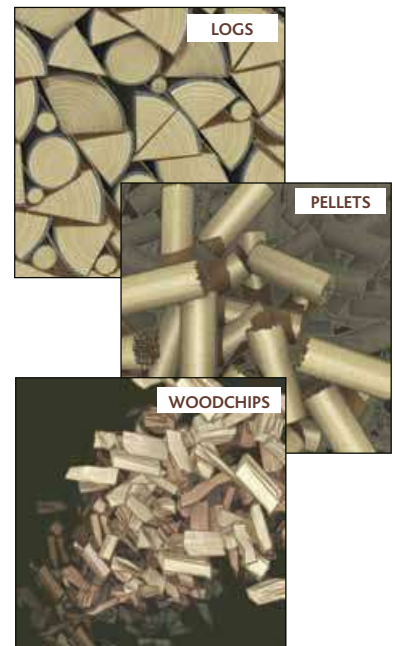
2) Residential devices: "residential solid fuels burning appliances with boiler, not exceeding a total nominal heat output of 35 kW", installed directly inside the dwelling. Hand or automatically stoked. Heating takes place via air and water circulation, with a hydraulic connection to the heating system. Residential devices can be classified in three types:

- Fireplace heating systems
- Thermostoves
- Thermocookers

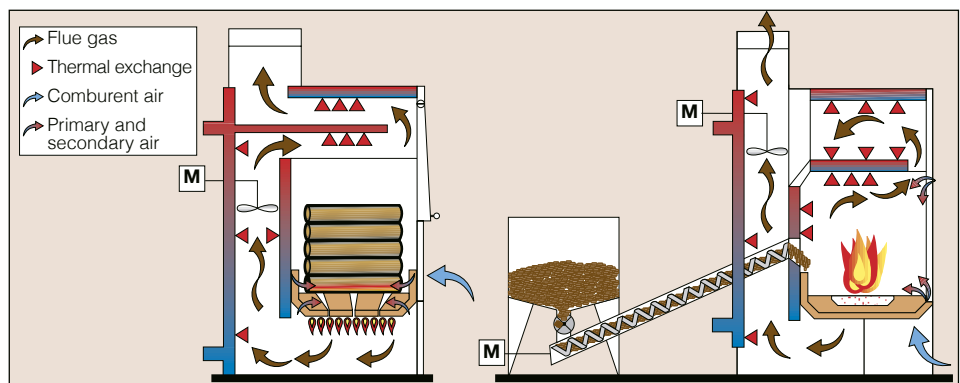
The generators are further divided according to their fuel stoking system:

Hand stoking, typically that of log-burning generators, requires an operator to put the blocks of wood into the generator stoking compartment.

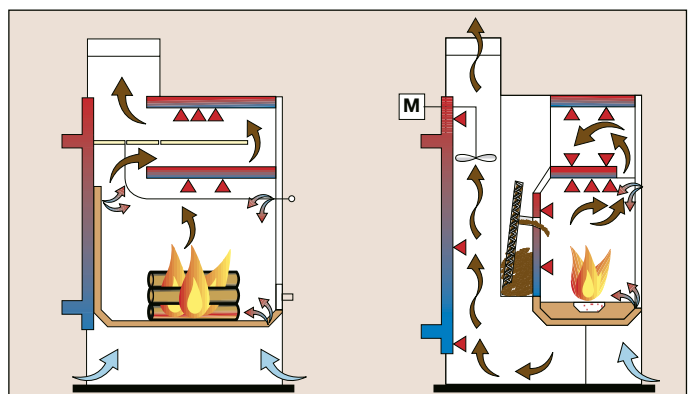
Automatic stoking refers to the last device conveying the fuel (for example pellets or woodchips) from the storage tank to the combustion chamber.



#### Hand and automatically stoked boiler



#### Hand and automatically stoked residential device

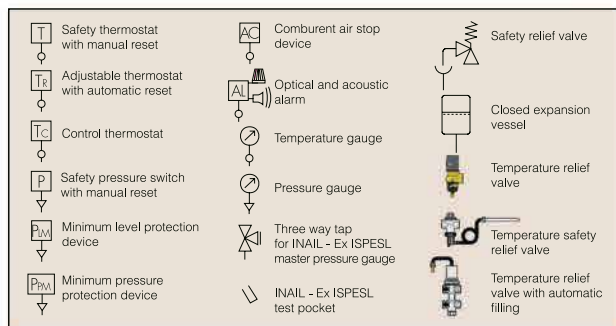


## Reference Standards

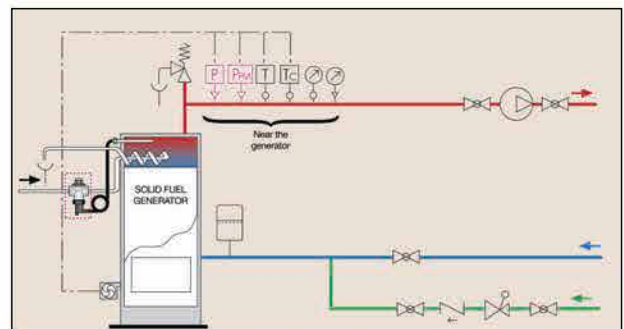
The standards classify systems according to the expansion system (open or closed vessel) and according to the system for stoking fuel into the generator, by hand (logs) or automatic (pellets, woodchips etc.).

Generator	Power rating	Product standard	System standard
Boiler	Up to 300 kW	EN 303-5 (2004)	EN 12828 (2003) Europe
Boiler	< 35 kW		EN 12828 (2003) Italy
Boiler	> 35 kW		Collection R ISPESL (2009) Italy
Residential	Up to 35 kW	EN 13229 (2006) EN 13240 (2006) EN 12815 (2006) EN 14785 (2006)	EN 12828 (2003) Europe UNI 10412-2 (2009) Italy

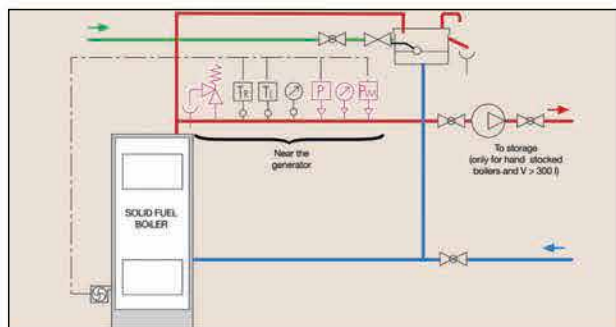
Here we give some significant examples of open and closed vessel systems made in accordance with applicable standards



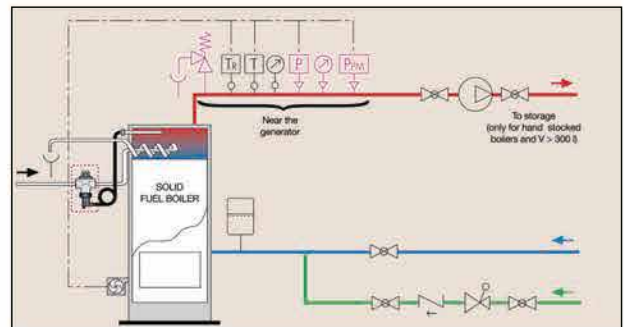
**Black devices:** mandatory according to standards  
**Magenta or "framed" devices:** optional or as an alternative according to standards



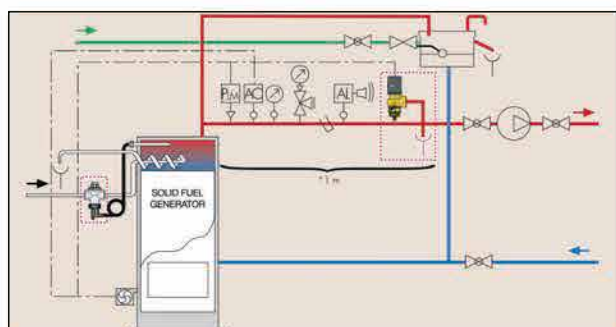
EN 12828 (2003): Heating system in buildings - Design for water-based heating systems.  
**Closed vessel.**



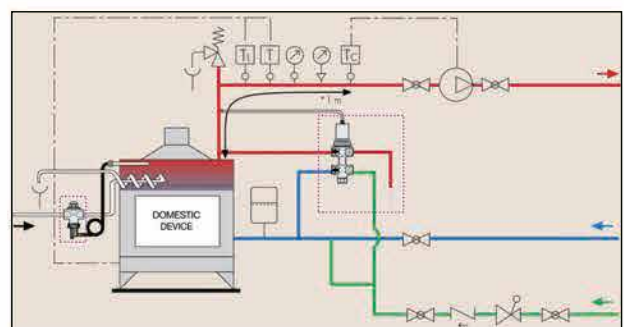
EN 303-5 (2004): Heating boilers for solid fuels, hand and automatically stoked, nominal heat output of up to 300 kW.  
**Open vessel.**



EN 303-5 (2004): Heating boilers for solid fuels, hand and automatically stoked, nominal heat output of up to 300 kW.  
**Closed vessel.**



Collection R ISPESL (2009): Applicatory technical specifications of Title II of Italian Ministerial Decree DM 1.12.75 in accordance with art. 26 of the decree. (P>35 kW for Italy).  
**Hand and automatically stoked. Open vessel.**



UNI 10412-2 (2009): Hot water heating systems - Safety requirements. Part 2: Requirements for systems with residential solid fuels burning appliances with boiler, not exceeding a total nominal heat output of 35 kW.  
**Automatically stoked. Closed vessel.**

# SAFETY DEVICES



## 542 TEMPERATURE RELIEF VALVE, WITH FAIL-SAFE ACTION. MANUAL RESET FOR BURNER SWITCH OFF OR ALARM ACTIVATION

Working pressure:  $0,3 \leq P \leq 10$  bar.  
Working temperature range: 5 to 100°C.  
Setting temperature 98°C and 99°C.  
**Qualified and calibrated  
to INAIL - Ex ISPESEL.**  
**Discharge rating:**  
1 1/2" x 1 1/4" - 136 kW.  
1 1/2" x 1 1/2" - 419 kW.



Ref no	Connections	Setting
542870	1 1/2" M x 1 1/4" F	98°C
542880	1 1/2" M x 1 1/2" F	99°C



## 543 TEMPERATURE SAFETY RELIEF, VALVE, WITH DOUBLE SAFETY SENSOR, FOR SOLID FUEL GENERATORS

Max. working pressure: 10 bar.  
Working temperature range:  
5 to 110°C.  
Setting temperature:  
95°C.

**Discharge flow rate with  $\Delta p$  of  
1 bar and  $T=110^\circ\text{C}$ : 3000 l/h**  
Length of capillary: 1300 mm.  
**Certified to EN 14597 standard.**



Ref no	Connections	Setting
543513	3/4" F	95°C

### FUNCTION

The temperature relief valve discharges the system water on reaching the setting temperature. Equipped with positive action. It can be used with non-pulverized solid fuel generators with open or closed vessel in accordance with current regulations.

#### INAIL - Ex ISPESEL reference standards

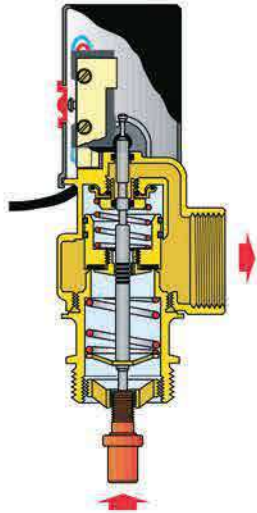
According to the provisions of Collection R Ed. 2009, concerning "central heating systems using hot water with temperatures no greater than 110°C and a maximum nominal heat output greater than 35 kW", the use of the temperature relief valve is contemplated in the following cases:

#### Open vessel systems

- Systems with generators stoked with non-pulverized solid fuel, in place of the consumption water heater or emergency exchanger (chap. R.3.C., point 2.1, letter i2).

#### Closed vessel systems

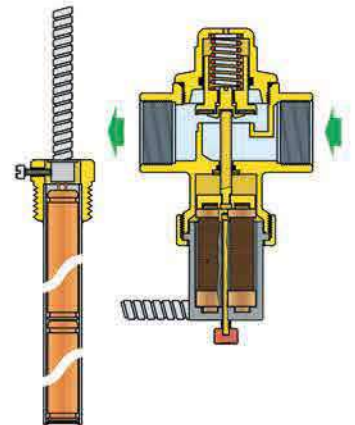
- Thermal systems with generators stoked with non-pulverized solid fuels up to a nominal heat output of 100 kW with partial cut-off in place of the residual power dissipation device (chap. R.3.C., point 3.2).



### FUNCTION

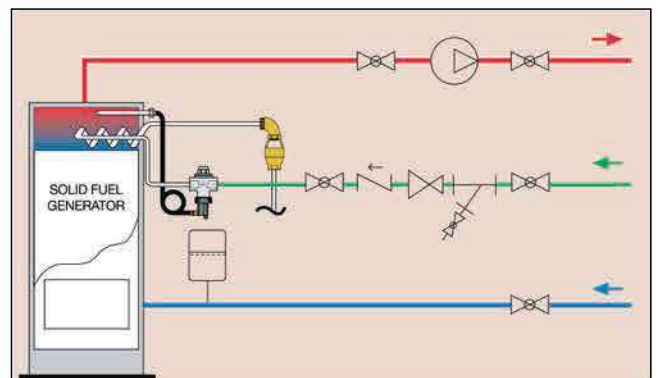
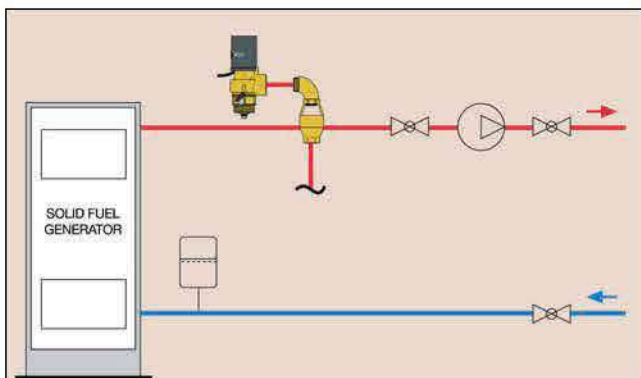
The temperature safety relief valve limits the water temperature in solid fuel generators equipped with a built-in storage or emergency exchanger (for immediate cooling).

On reaching the setting temperature, the valve opens the flow of mains water through the emergency exchanger or built-in storage unit, so as to draw off the excess heat and thereby lower the temperature of the system water contained in the boiler jacket.



#### Reference standards

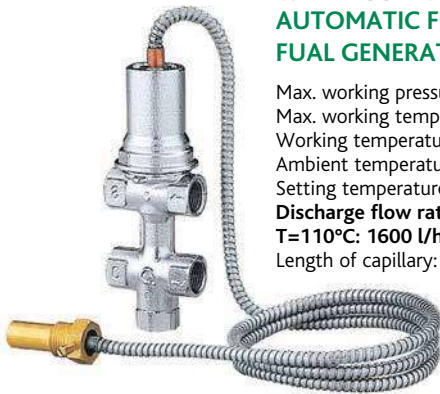
Its use is contemplated in the INAIL - Ex ISPESEL standards, Collection R - ed. 2009, chapter R.3.C., point 2.1, letter i2; point 3.1, letter i; point 3.3. The valve complies with EN 14597, it can be combined with solid fuel generators with a heat output of less than 100 kW, used according to the system provisions of the standards EN 12828, UNI 10412-2 and EN 303-5.





# SAFETY DEVICES

## 544 TEMPERATURE RELIEF VALVE, WITH POSITIVE ACTION, WITH AUTOMATIC FILLING. FOR SOLID FUEL GENERATORS



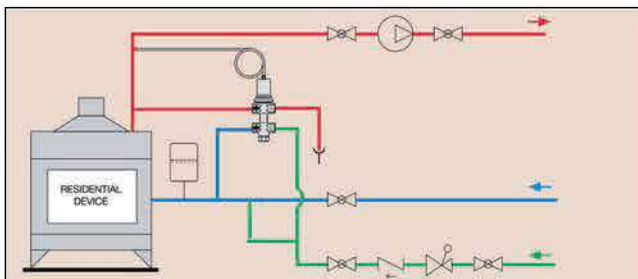
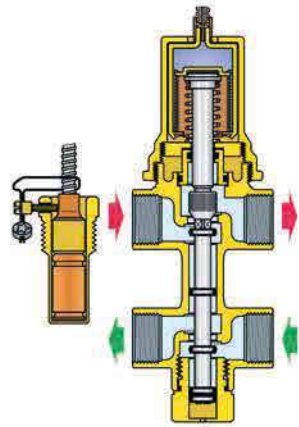
Max. working pressure: 6 bar.  
 Max. working temperature: 110°C.  
 Working temperature range: 5 to 110°C.  
 Ambient temperature range: 1 to 50°C.  
 Setting temperature: 100°C (+0/-5°C).  
**Discharge flow rate with  $\Delta p$  of 1 bar and T=110°C: 1600 l/h.**  
 Length of capillary: 1300 mm.

Ref no	Connection	Setting
544400	1/2" F	100°C

### FUNCTION

On reaching the setting temperature, the temperature relief valve discharges the water of the system with a solid fuel generator. The device integrates in a single group a temperature relief valve with a positive safety remote sensor and a filling valve. The discharge of water enables limiting the system water temperature, while the filling inlet enables the replacement of the discharged flow rate.

**Reference standards**  
 Used when there is no emergency exchanger and for heat outputs < 35 kW.



## 544 TEMPERATURE RELIEF VALVE WITH AUTOMATIC FILLING FOR SOLID FUEL GENERATORS, WITH KNOB FOR MANUAL DISCHARGE AND DIRT REMOVAL



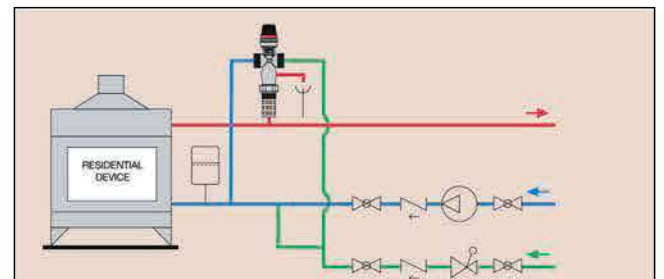
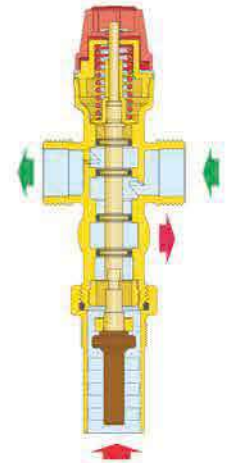
Max. working pressure: 6 bar.  
 Max. working temperature: 120°C.  
 Setting temperature: 100°C (+0/-5°C).  
**Discharge flow rate with  $\Delta p$  of 1 bar and T=110°C: 1800 l/h.**

Ref no	Connection	Setting
544501	3/4"	100°C

### FUNCTION

The device integrates in a single group a temperature relief valve and a filling valve that operate simultaneously by means of a sensor integrated in the valve body. On reaching the setting value, the valve opens the discharge outlet to eliminate the excess heat and, at the same time, the filling inlet to replace the discharged flow rate of the system water.

**Reference standards**  
 Used when there is no emergency exchanger and for heat outputs < 35 kW.



## 529 DRAUGHT REGULATING VALVE

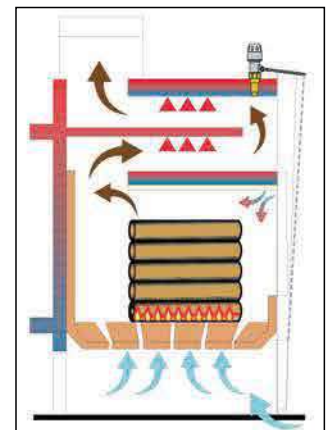


Male threaded connection.  
 Adjustment range: 30 to 90°C.

Ref no	Size	ISO 7/1
529150	3/4" M	

### FUNCTION

The draught regulating valve, installed on the boiler with the thermostatic element immersed in the medium, automatically adjusts the flow rate of the comburent air to provide a more regular and complete combustion.



# ANTI-CONDENSATION VALVE



## 280 ANTI-CONDENSATION VALVE WITH THERMOSTATIC CONTROL OF THE RETURN TEMPERATURE TO SOLID FUEL GENERATORS

Brass body.

### FUNCTION

The anti-condensation valve, used in heating systems with a solid fuel generator, automatically regulates at the set value the temperature of the water returning to the generator.

Keeping the boiler at a high temperature **prevents condensation of the water vapour contained in the flue gas.**

Condensation produces tarry deposits that, accumulating on the metal surfaces of the flue gas-system water exchanger, cause corrosion, reduce the thermal efficiency of the flue gas-system water exchanger and are a source of danger for the flue gas chimney as they are flammable.

The anti-condensation valve gives the generator a longer life and ensures greater efficiency.

Ref no	DN	Connection	Kv (m <sup>3</sup> /h)	Settings
28005.	20	¾"	3,2	45°C 55°C 60°C 70°C
28026.	20	1"	3,2	45°C 55°C 60°C 70°C
28006.	25	1"	9	45°C 55°C 60°C 70°C
28007.	32	1 ¼"	12	45°C 55°C 60°C 70°C

#### • Code completion

Setting	45°C	55°C	60°C	70°C
•	4	5	6	7

### SPECIFICATION

#### Performance

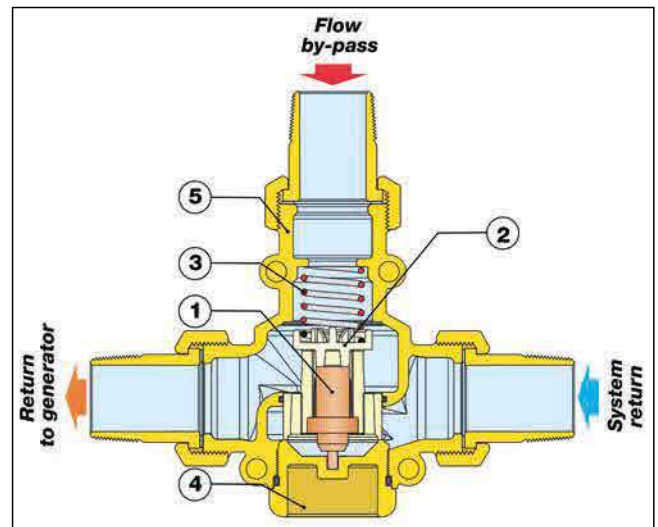
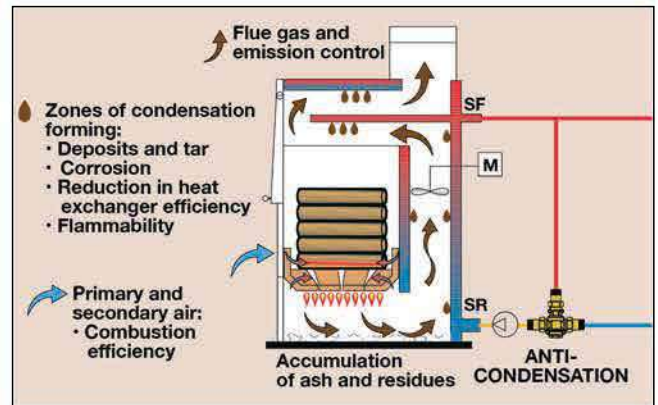
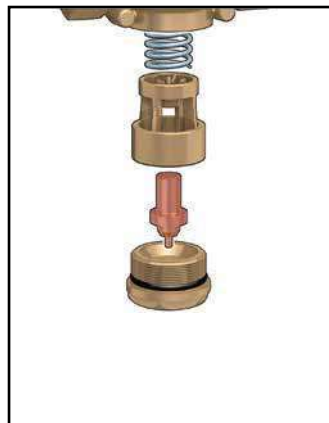
Medium:	water, glycol solutions
Maximum percentage of glycol:	50%
Max. working pressure:	10 bar
Working temperature range:	5 to 100°C
Setting temperature:	45°C, 55°C, 60°C, 70°C
Setting accuracy:	±2°C
By-pass complete closing temperature:	Tset + 10°C
Connections:	¾", 1", 1 ¼", M with union

#### Thermostat replacement to modify setting

The adjustment sensor can easily be removed for maintenance or to change the set, with no need to remove the valve body from the piping.

#### Installation

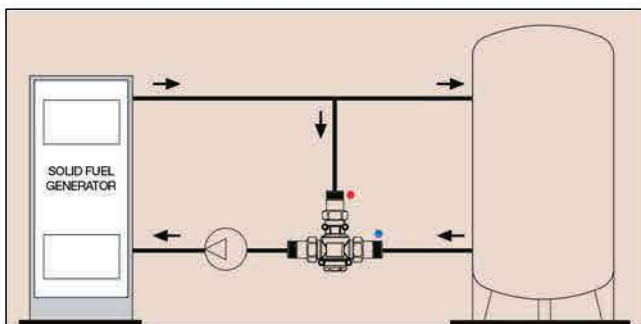
The valve can be fitted on both sides of the generator in any position, vertical or horizontal. **Installation is recommended on the return to the generator in mixing mode;** it is also allowed on the flow from the generator in diverter mode according to the needs of system control.



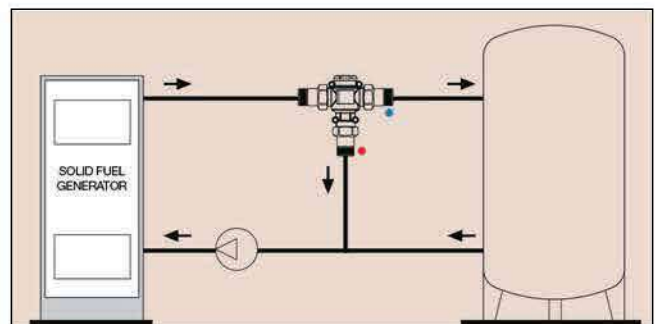
#### Characteristic components

- |                        |               |
|------------------------|---------------|
| 1) Thermostatic sensor | 4) Plug       |
| 2) Obturator           | 5) Valve body |
| 3) Spring              |               |

#### Installation in mixing mode (anti-condensation)



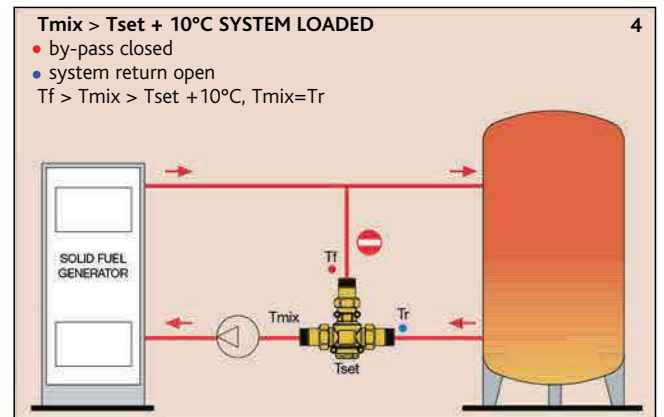
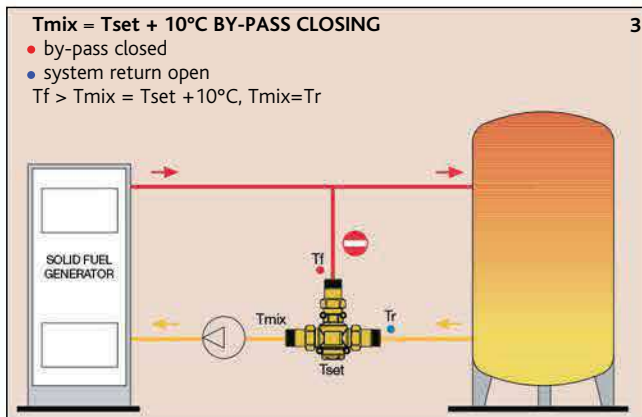
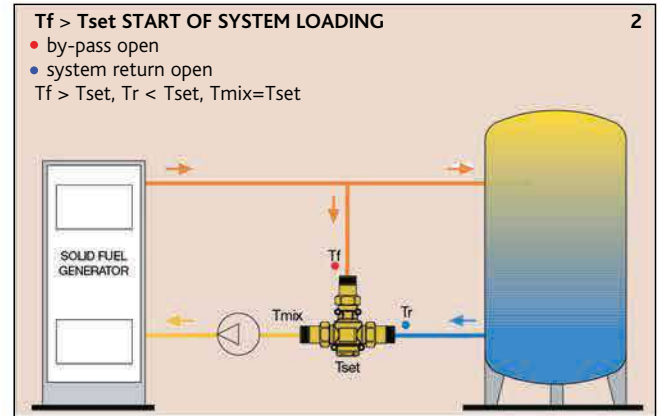
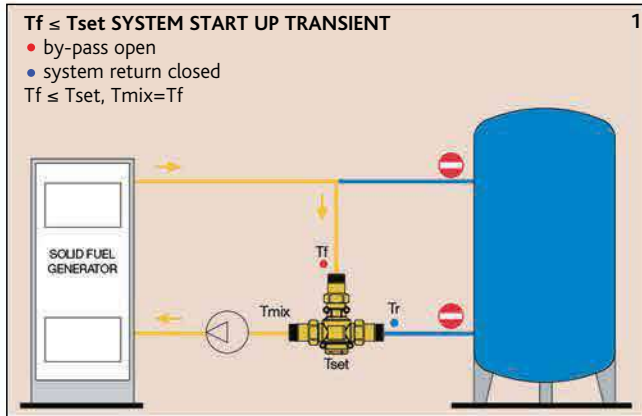
#### Installation in diverter mode (system control)



# ANTI-CONDENSATION VALVE

## OPERATING PRINCIPLE

The thermostat, completely immersed in the medium, controls the movement of an obturator that regulates the flows in by-pass and toward the system. On starting up the generator, the anti-condensation valve recirculates the flow water so as to bring the generator up to temperature as quickly as possible (1). When the flow temperature  $T_f$  exceeds the set of the anti-condensation valve  $T_{set}$ , the valve's cold port starts opening to produce the mixing  $T_{mix}$ : in this phase the system loading begins (2). When the generator return temperature  $T_{mix}$  is greater than the setting of the anti-condensation valve by approximately 10°C, the by-pass port gets closed and water returns to the generator at the same temperature of the system return (3 and 4).

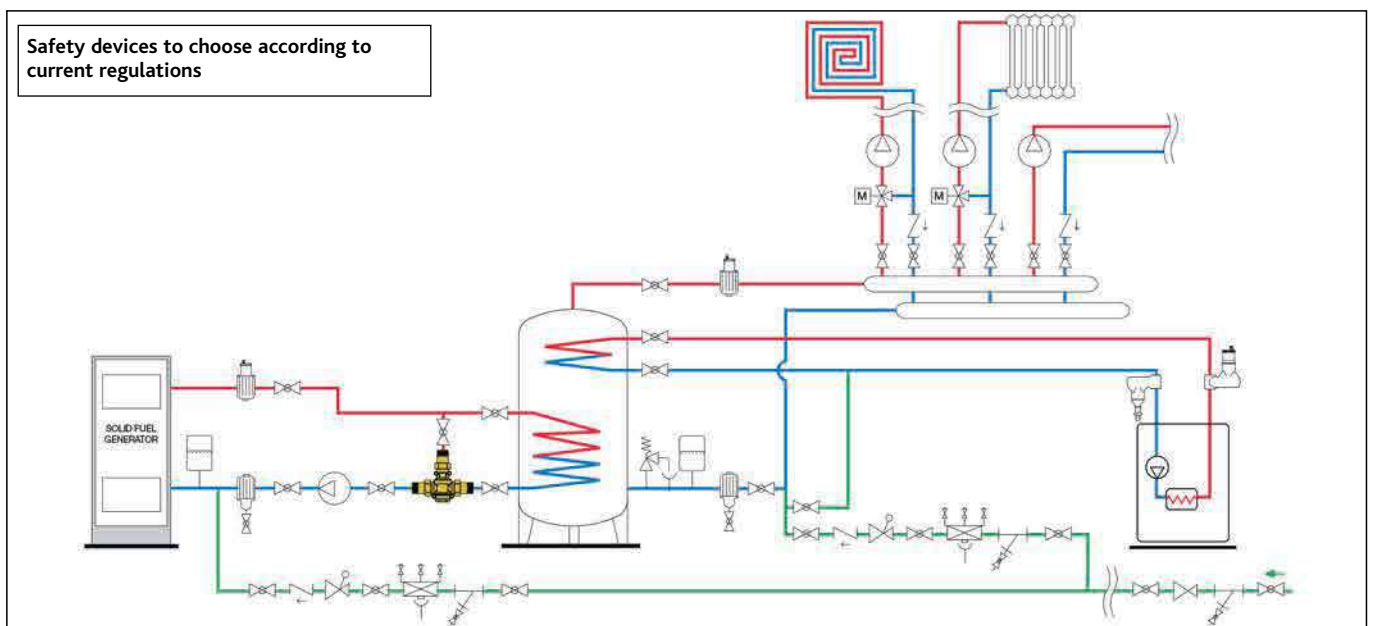


$T_f$  = Flow temperature  
 $T_{set}$  = Anti-condensation set temperature

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

### Application diagram

#### System with inertial storage



# ANTI-CONDENSATION CIRCULATION UNIT



## 282 CIRCULATION UNIT WITH ANTI-CONDENSATION VALVE, WITH THERMOSTATIC CONTROL OF THE RETURN TEMPERATURE TO SOLID FUEL GENERATORS

With insulation.

Generator return on LH side

Ref no	Connection	Connection centre distance	Settings
28260.	1" F	90mm	45°C 55°C 60°C 70°C
28262.	1" F	125mm	45°C 55°C 60°C 70°C

Generator return on RH side

Ref no	Connection	Connection centre distance	Settings
28261.	1" F	90mm	45°C 55°C 60°C 70°C
28263.	1" F	125mm	45°C 55°C 60°C 70°C

### • Code completion

Setting	45°C	55°C	60°C	70°C
•	4	5	6	7

Available on request  
with UPS 25-60 ALPHA2 L and  
UPS 25-80

## SPECIFICATION

### Performance

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

Connections: - system circuit: 1" F with union  
 - generator circuit: 1" F  
 - connection centre distance: 90 mm / 125 mm

### Anti-condensation valve

Working temperature range: 5 to 100°C  
 Set temperatures: 45°C, 55°C, 60°C, 70°C  
 Setting accuracy: ±2°C  
 By-pass complete closing temperature: Tset + 10°C

### Pump

### Technical specifications of insulation

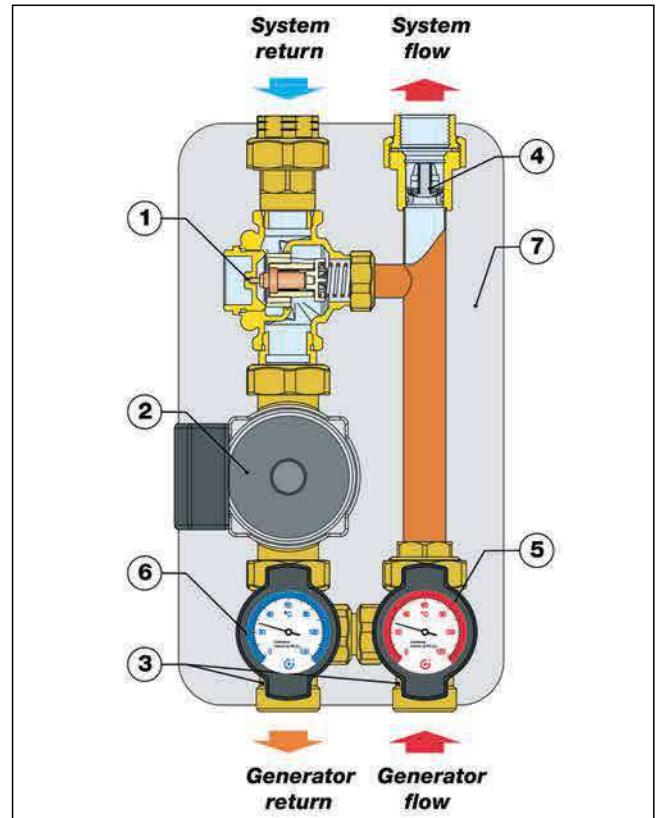
Material: closed cell expanded PE-X  
 Thickness: 20 mm  
 Density: internal part 30 kg/m<sup>3</sup>  
 external part 50 kg/m<sup>3</sup>  
 Thermal conductivity (DIN 52612): at 0°C 0,038 W/(m·K)  
 at 40°C 0,045 W/(m·K)

Coefficient of resistance to the diffusion  
 of water vapour (DIN 52615): > 1,300  
 Temperature range: 0 to 100°C  
 Reaction to fire (DIN 4102): class B2

## 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 device. The unit also enables connecting the generator to the inertial storage or directly to the user system.

Both centre distances, 90 and 125 mm, have been specifically designed for the connection to the separator/distribution manifold 559 series, both for the external use and the recess mounting versions.



### Characteristic components

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

## CONSTRUCTION DETAILS

### Compact construction

The unit features all the functional components assembled in a kit and ready for installation.

### Anti-condensation valve

This device incorporates a thermostatic sensor to control the temperature of the water returning to the 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.

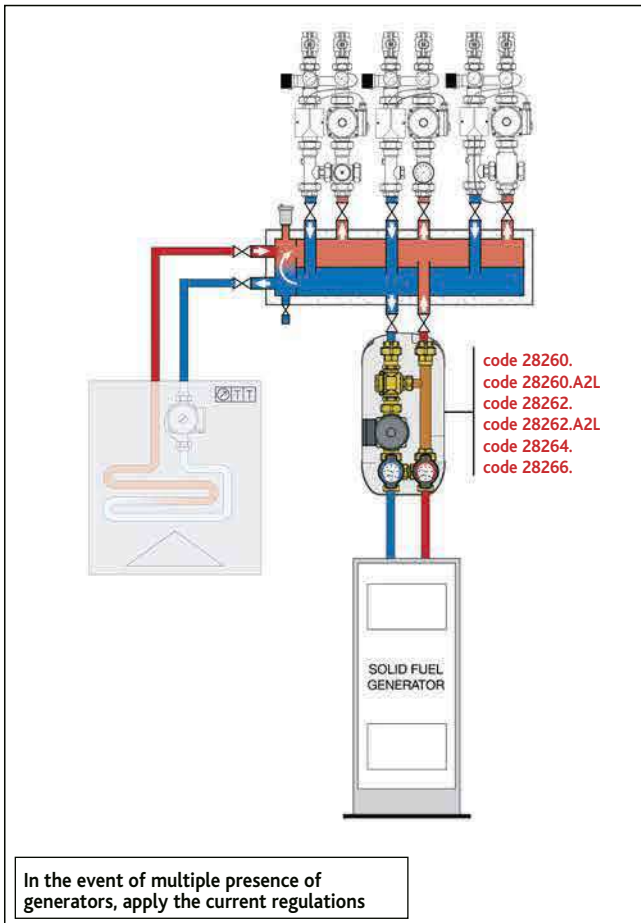
### Check valve

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

# ANTI-CONDENSATION CIRCULATION UNIT

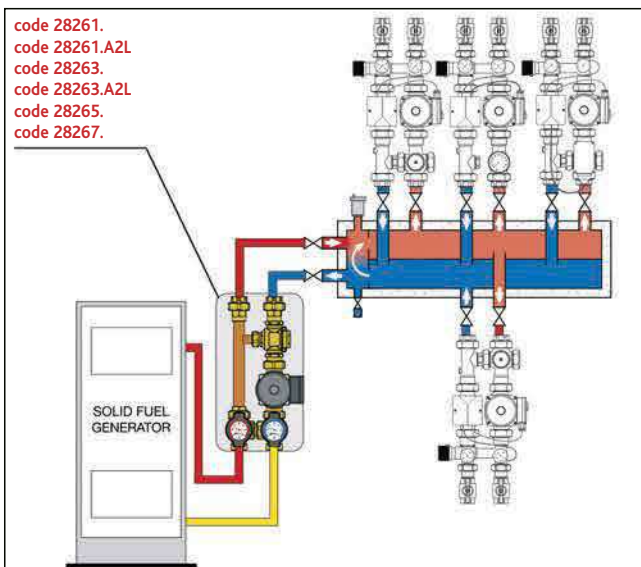
## Application diagram

System with SEPCOLL, solid fuel generator combined with gas generator



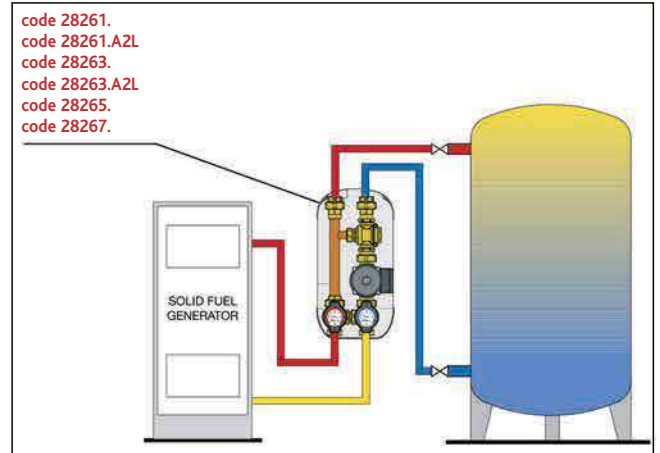
## Connection to the primary side of the 559 series SEPCOLL separator/manifold.

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.



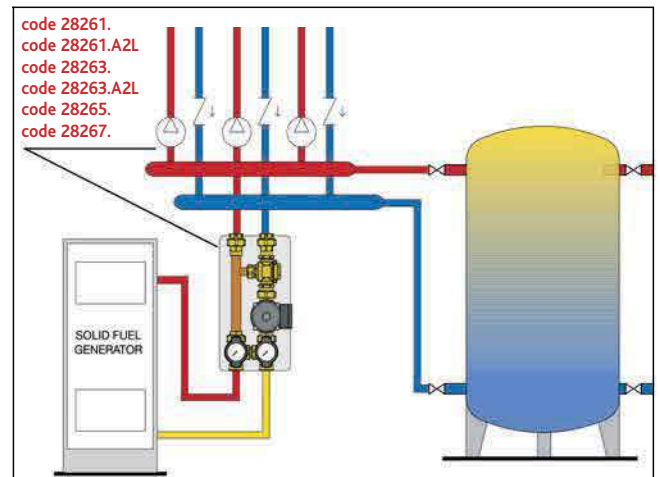
## Connection to inertial storage.

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.



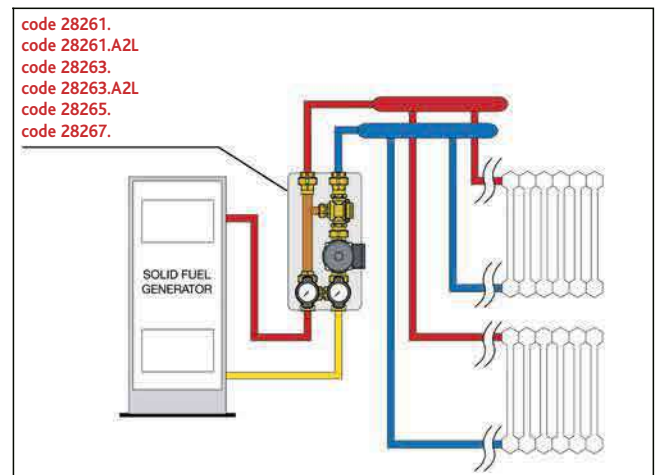
## Connection to manifold with storage in parallel

The unit connects the generator to the manifold for direct supply to the secondary circuits or in parallel to the inertial storage.



## Direct connection to the system.

The unit can be directly connected to the system, using the pump as a circulator for the entire system.



# ANTI-CONDENSATION RECIRCULATION AND DISTRIBUTION UNIT

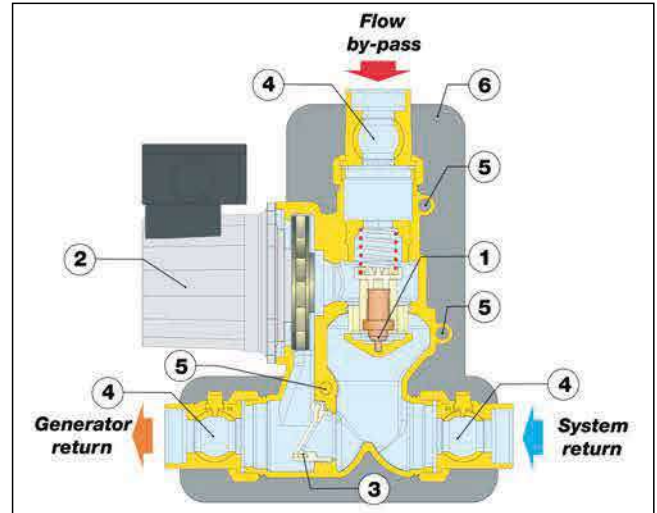


## 281 ANTI-CONDENSATION RECIRCULATION AND DISTRIBUTION UNIT, WITH THERMOSTATIC CONTROL OF THE RETURN TEMPERATURE TO SOLID FUEL GENERATORS

Brass body.  
With insulation.

### FUNCTION

The anti-condensation recirculation and distribution unit enables the connection of the solid fuel generator to the user system (direct or with inertial storage). It controls the return temperature to the generator to avoid condensation, by means of the built-in thermostatic device.



### Characteristic components

- 1) Anti-condensation thermostatic device
- 2) Pump
- 3) Natural circulation clapet valve
- 4) Union with built-in ball valve
- 5) Temperature gauge housing
- 6) Insulation

Ref no	DN	Connections	Settings
28106.	25	1" F	45°C 55°C 60°C 70°C
28107.	25	1 1/4" F	45°C 55°C 60°C 70°C

### Code completion

Setting	45°C	55°C	60°C	70°C
•	4	5	6	7

### SPECIFICATION

#### Performance

Medium: water, glycol solutions  
 Max. percentage of glycol: 50%  
 Working temperature range: 5 to 100°C  
 Max. working pressure: 10 bar  
 Maximum recommended flow rate: 2 m³/h  
 Temperature gauge scale: 0 to 120°C

Connections: 1" F and 1 1/4" F with union

#### Anti-condensation valve

Working temperature range: 5 to 100°C  
 Setting temperature: 45°C, 55°C, 60°C, 70°C  
 Setting accuracy: ±2°C  
 By-pass complete closing temperature: Tset +10°C

#### Pump

#### Technical specifications of insulation

Material: EPP  
 Mean thickness: 30 mm  
 Density: 45 kg/m³  
 Working temperature range: 5 to 100°C  
 Thermal conductivity: 0,037 W/(m·K) at 10°C  
 Reaction to fire (UL94): class HBF

### CONSTRUCTION DETAILS

#### Single casting and reversibility

The compact brass single casting, that houses the pump and functional components, enables immediate installation of the device, either on the right or left of the solid fuel generator, respecting the flow directions as shown. The temperature gauges can be extracted from the housings and re-inserted in the same position on the back side of the unit.

#### Anti-condensation valve

This device incorporates a thermostatic sensor to control the temperature of the 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.

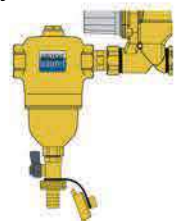
#### Natural circulation clapet valve

The function of this clapet device is to ensure natural circulation of the medium in the event of pump stop due to an electric power failure. When the pump is active, the thrust of medium keeps the valve closed, forcing the water to flow through the anti-condensation thermostatic valve. If the event of pump stop, when the water within the boiler is at high temperature, a natural circulation of the water begins, by-passing the anti-condensation valve, thus preventing the temperature in the generator from reaching dangerous high levels. The unit is provided with natural circulation valve locked. To activate its function, remove the locking screw.



#### Dirt separator

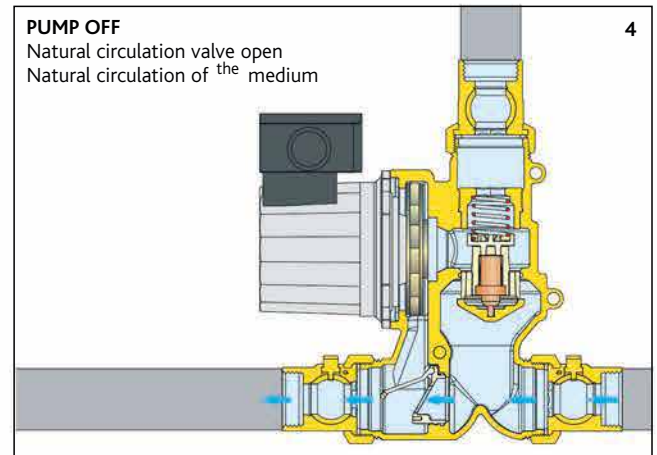
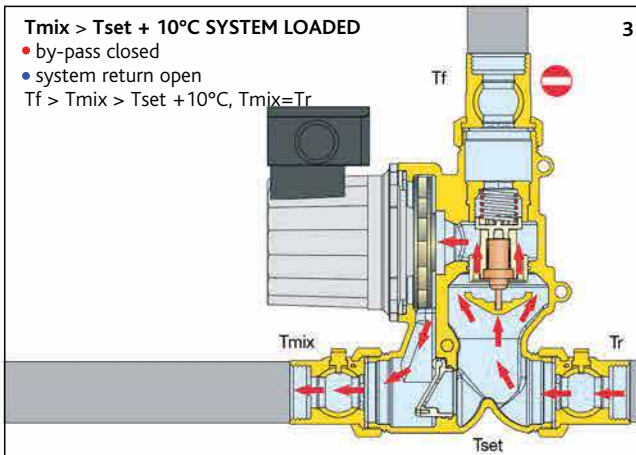
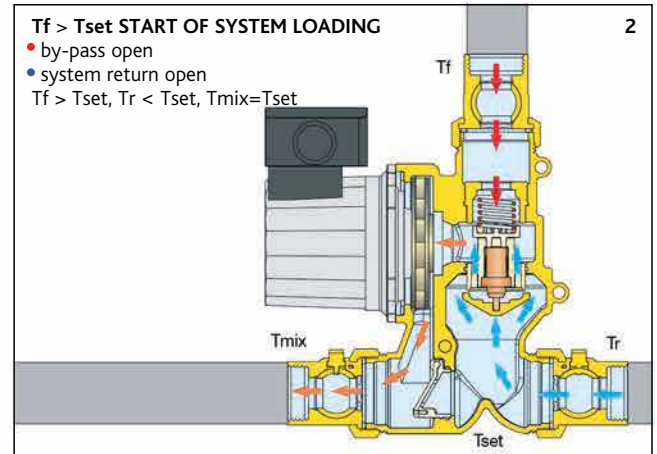
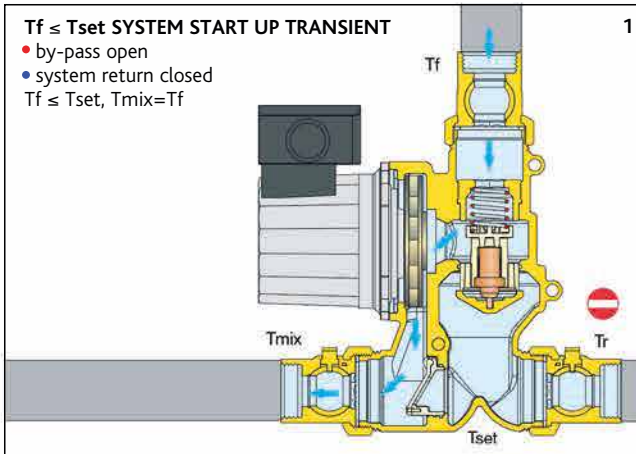
In order to carry out continuous dirt separation in the system it is available the 5462 series DIRTAL® dirt separator as accessory.



# ANTI-CONDENSATION RECIRCULATION AND DISTRIBUTION UNIT

## OPERATING PRINCIPLE

The thermostat, completely immersed in the medium, controls the movement of an obturator that regulates the flows in by-pass and toward the system. On starting up the generator, the recirculation unit recirculates the flow water so as to bring the generator up to temperature as quickly as possible (1). When the flow temperature  $T_f$  exceeds the set of the anti-condensation valve  $T_{set}$ , the unit's cold port starts opening to produce the mixing  $T_{mix}$ : in this phase the system loading begins (2). When the generator return temperature  $T_{mix}$  is greater than the set of the anti-condensation valve by approximately 10°C, the by-pass port gets closed and water returns to the generator at the same temperature of the system return (3).

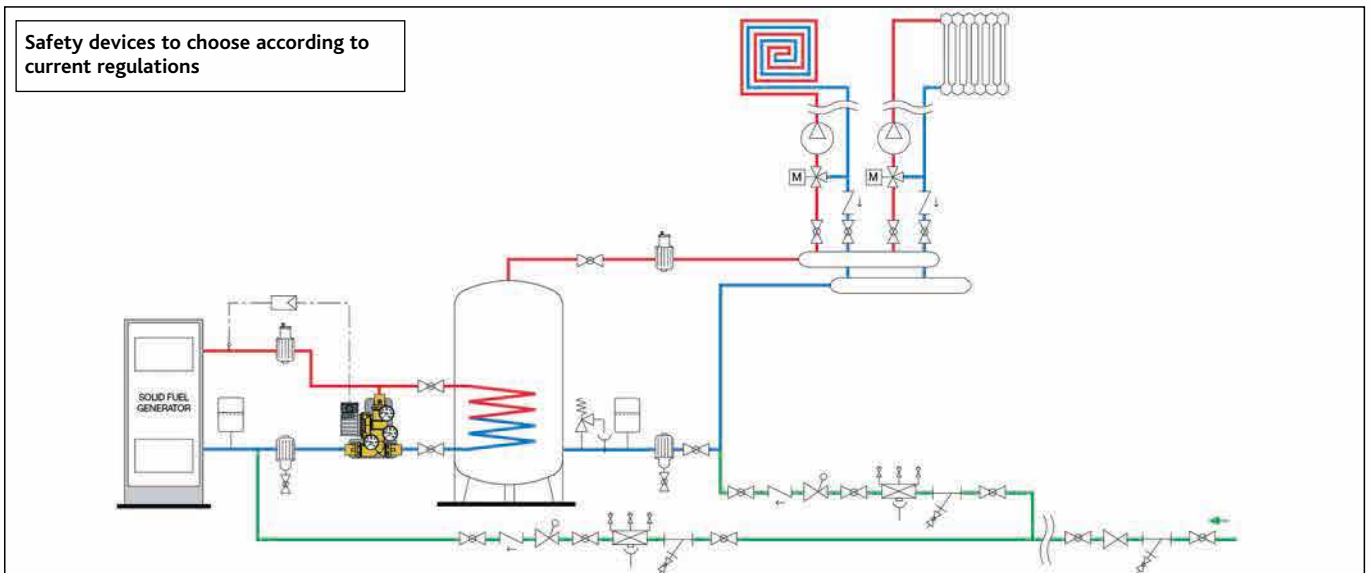


$T_f$  = Flow temperature  
 $T_{set}$  = Anti-condensation set temperature

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

### Application diagram

#### System with inertial storage



## General information

**Office hours:**

Monday to Friday 8.30am - 5.00pm.

**Terms:**

A copy of Altecnic's terms and conditions is available on request.

**Property of goods:**

Until full payment has been received, all goods supplied remain the property of Altecnic Ltd.

**Delivery:**

Carriage paid 3 day service, UK mainland only. (minimum order value of £100 applies or £7.50 small order charge applies)

## Customer care notice

Full details of Altecnic's Returns Policy are available at [www.altecnic.co.uk](http://www.altecnic.co.uk)

## Useful contacts

Accounts enquiries: 01785 218203

Customer care line: 01785 218207

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