281 anti-condensation recirculation unit

altecnic

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Function

The Altecnic anti-condensation recirculation unit connects between a biomass burning boiler and a direct or indirect heating system or domestic hot water system.

It controls the return temperature to the boiler to avoid condensation, by means of an integral thermostatic sensor.

Keeping the boiler at a high temperature prevents condensation forming from the water vapour contained in the flue gases.

It can be used on central biomass boilers or residential biomass burners such as fireplace heating systems and solid fuel stoves and cookers

The anti-condensation recirculation unit gives the boiler a longer life and ensures greater efficiency.

The Altecnic 281 unit incorporates a circulation pump, an anti-condensation thermostatic sensor, a natural circulation swing check valve, 3 temperature gauges and is supplied with a preformed insulation shell.

Design

Multi-functional Body

The compact brass single body casting houses the pump, the thermostatic sensor, swing check valve and temperature gauge pockets enables immediate installation of the unit, either on the right or left of the biomass boiler, respecting the flow directions as shown.

The temperature gauges can be extracted from the housings and re-inserted in the same position on the other side of the unit.

The brass body prevents the formation of ferrous residues in the system, thereby helping to prolong the life of the boiler.

Anti-condensation valve

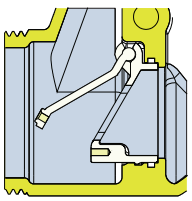
Anti-condensation valve incorporates a thermostatic sensor to control the temperature of water returning to the boiler, preventing the formation of condensation.

The sensor has been specifically designed to be removed from the valve body for maintenance or replacement if necessary.

Natural circulation swing check valve

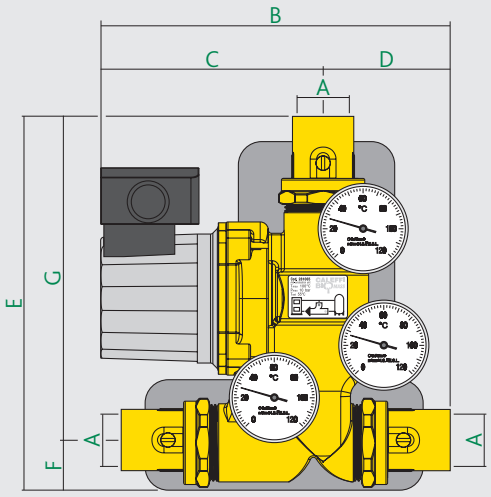
The function of this swing check non return valve is to ensure natural circulation of the medium in the event of the pump stopping due to an electric power failure.

When the pump is running, the force of the medium keeps the valve closed, forcing the water to flow through the anti-condensation thermostatic valve.



In the event of the pump stopping, when the water within the generator is at high temperature, a natural circulation of the water begins, by-passing the anti-condensation valve, thus preventing the temperature in the boiler from reaching a dangerous high levels.

Dimensions



Code	A	B	C	D	E	F	G	kg
28106•	G1	221.5	143	78.5	249.5	47	202.5	4.85
28107•	G1¼	221.5	143	78.5	249.5	47	202.5	5.15

Code 6th Digit

Setting	45°C	55°C	60°C	70°C
•	4	5	6	7

Technical Specification

Component	Material	Specification
Body:	Brass	BS EN 1982 CB753S
Obturator locking nut:	Brass	BS EN 12164 CW614N
Union:	Brass	BS EN 12165 CW617N
Ball valve in the union:	Brass	BS EN 12165 CW617N
Obturator:	PSU	Polymer
Spring:	Stainless steel	
Swing check valve:	PPS	Polymer
Sealing elements:	EPDM	

Performance

Medium:	water glycol solution
Max. glycol percentage:	50%
Max. working pressure:	10 bar
Max. operating temperature:	0°C to 100°C
Temperature gauge scale:	0°C to 120°C

Connections

Pipe connections:	1" & 1¼" female parallel BS EN 228-1

Anti-condensation valve

Setting temperature:	45°C, 55°C, 60°C & 70°C
Setting accuracy:	±2°C
Bypass complete closing temperature:	T_{set} + 10°C

Insulation

Material:	EPP
Mean thickness:	30 mm
Density:	45 kg/m3
Working temperature range:	5°C to 100°C
Thermal conductivity:	0.037 W/(m·K) at 10°C
Reaction to fire (UL94):	class HBF

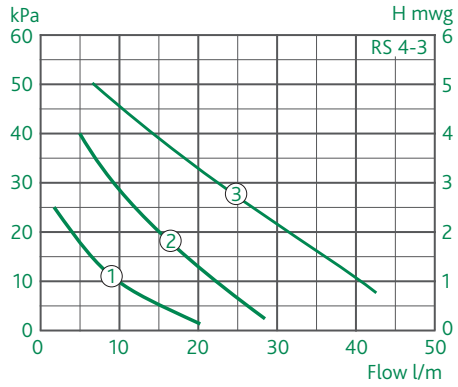
281 anti-condensation recirculation unit

Technical Specification Continued

Pump

3 speed:	model RS 4-3
Electrical Supply:	230 V - 50 Hz
Max. ambient humidity:	95%
Max. ambient temperature:	80˚C
Protection class:	IP 44

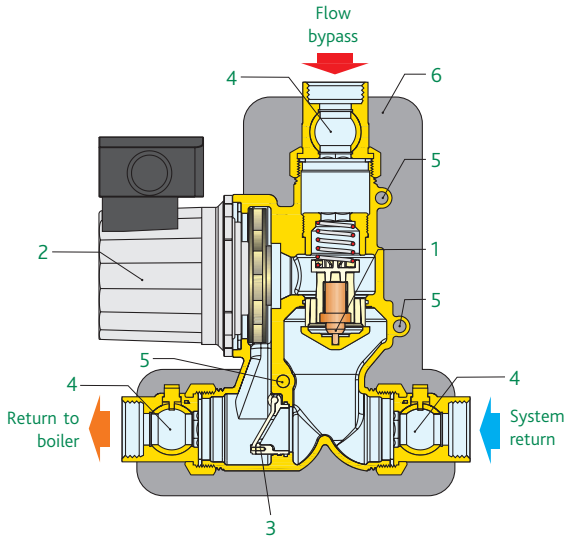
Pump Characteristic Chart



Power Consumption

Speed	n rpm	P W	I A
3	2,050	65	0.28
2	1,650	45	0.20
1	1,300	30	0.13

Components



1 Anti- condensation thermostatic sensor
2 Three speed pump
3 Natural circulation swing check valve
4 Union connector with integral ball valve
5 Temperature gauge pocket
6 Pre-formed insulation

The 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.

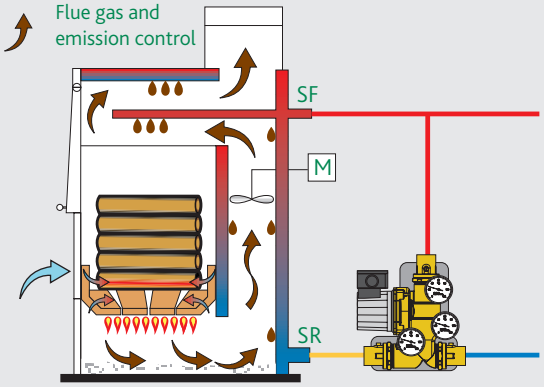
The presence of cold zones in the boiler or flue gas chimney can lower the temperature of the flue gas down to the dew point, causing condensation to occur.

Water vapour condenses onto the boiler 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 boiler, covering most of the inner surfaces.

In addition to being dangerous due to its flammability, tar is damaging to the integrity of the boiler and limits the efficiency of the flue gas-system water exchanger.

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



Primary and secondary air:
- Combustion efficiency

Zone of condensation forming:
- Deposits and tar
- Corrosion
- Reduction in heat exchanger efficiency
- Flammability

Operating Principle

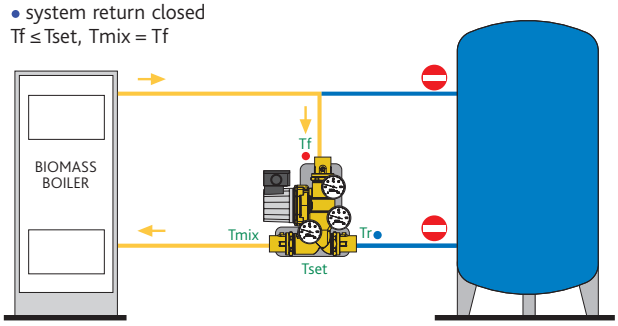
The thermostat (1), which is completely immersed in the medium, controls the obturator (2) that regulates the flow through the bypass port (3) and back towards boiler.

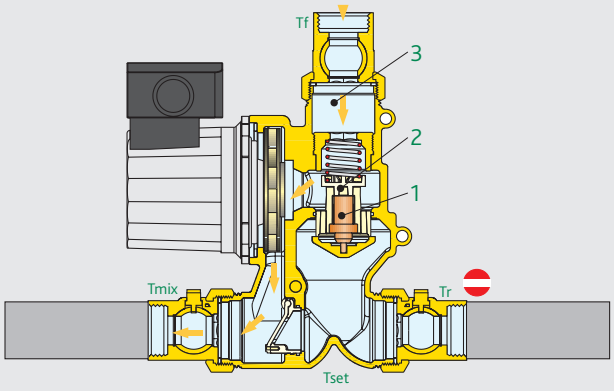
As the boiler starts up from cold the anti-condensation unit re-circulates the water so that it brings the boiler up to temperature as quickly as possible.

Tf ≤ Tset SYSTEM START UP TRANSIENT

- by-pass open
- system return closed

Tf ≤ Tset, Tmix = Tf



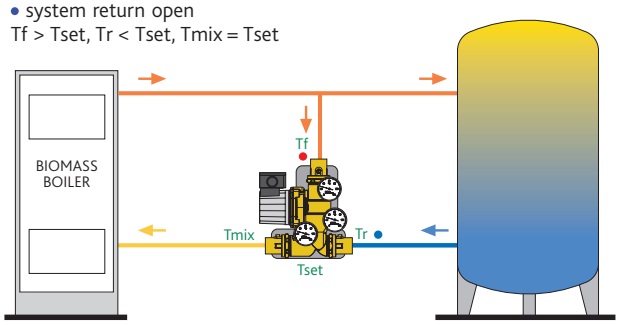


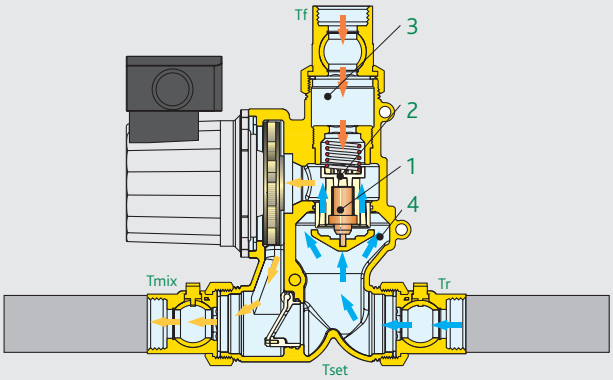
When the flow temperature Tf exceeds the set temperature of the anti-condensation valve Tset, the units cold port (4) starts to open to produce mixed water Tmix, in this phase the system loading begins.

Tf > Tset START OF SYSTEM LOADING

- by-pass open
- system return open

Tf > Tset, Tr < Tset, Tmix = Tset



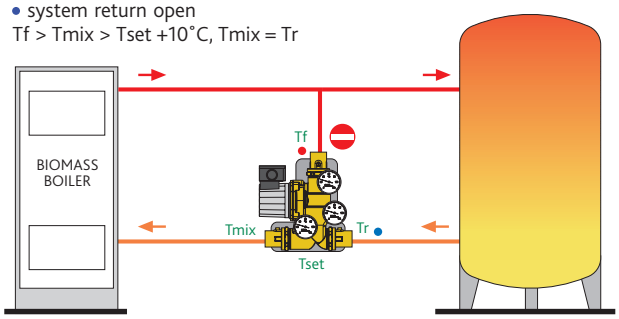


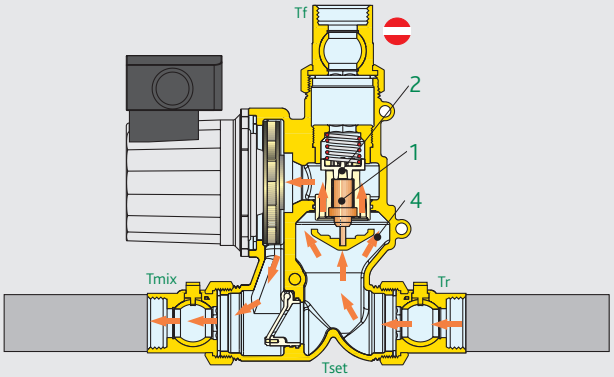
When the return temperature to the boiler Tmix is greater than the set temperature of the anti-condensation valve by 10˚C, the bypass port (3) closes and water returns to the boiler at the same temperature as the water returning from the storage cylinder.

Tf > Tset +10˚C SYSTEM LOADING

- by-pass open
- system return open

Tf > Tmix > Tset +10˚C, Tmix = Tr

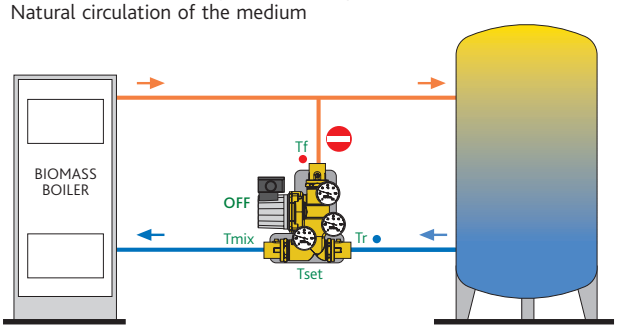


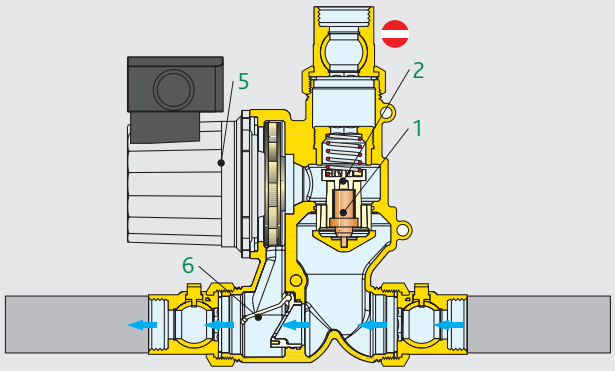


Operating Principle Continued

In the event of the pump stopping (5), the swing check valve (6), which is normally closed due to force created by the pump, opens allowing natural circulation of the medium. The flow bypasses the anti-condensation valve (1) in order to dissipate heat and prevent the temperature in the boiler from being too high which could be dangerous to system safety.

PUMP OFF
Natural circulation swing check valve open
Natural circulation of the medium





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

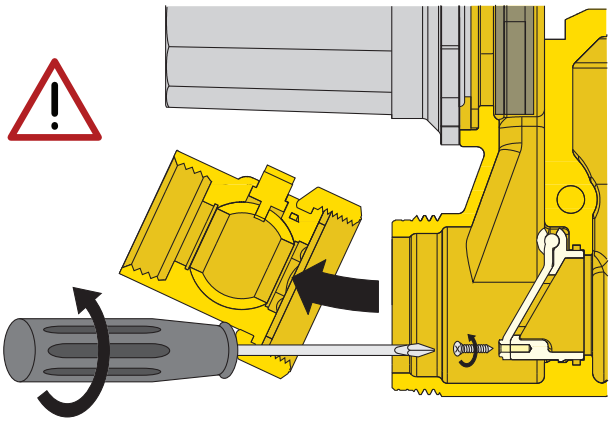
T_{mix} = Mixed water temperature returning to boiler
T_r = Return water temperature from storage cylinder

Swing Check Valve - Before Installation

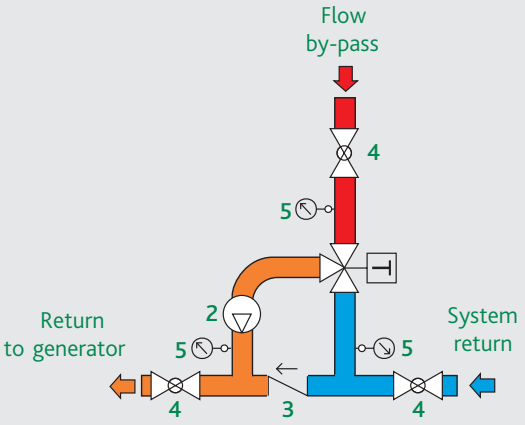
Before installation, it is necessary to remove the screw that keeps the swing check valve closed during transportation and storage.

Removing the protective screw ensures the full functionality of the swing check valve as a natural circulation device.

To do this, unscrew the union located on the mixed water outlet port of the unit and access the screw inside the valve body, unscrewing it using a cross-tip screwdriver.



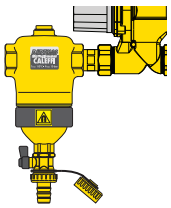
Hydraulic Diagram



Anti-condensation thermostatic sensor
Three-speed pump
Natural circulation check valve
Union with built-in ball valve
Temperature gauge

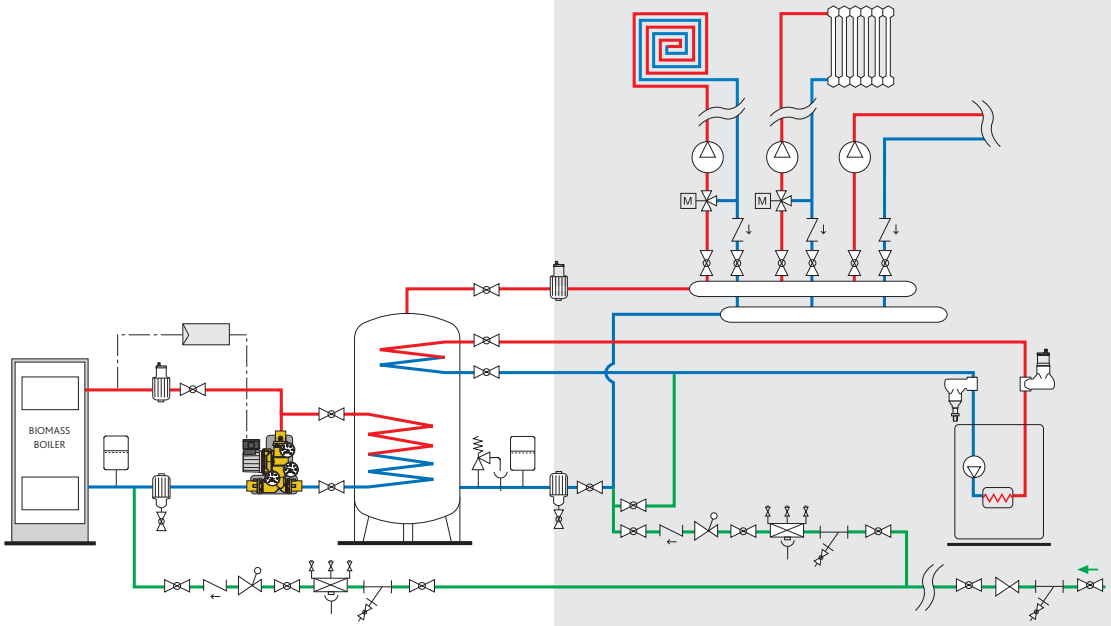
Dirt Separator

For continuous dirt separation in the system the Altecnic 46305 Dirtmag® magnetic dirt separator is available as an accessory.

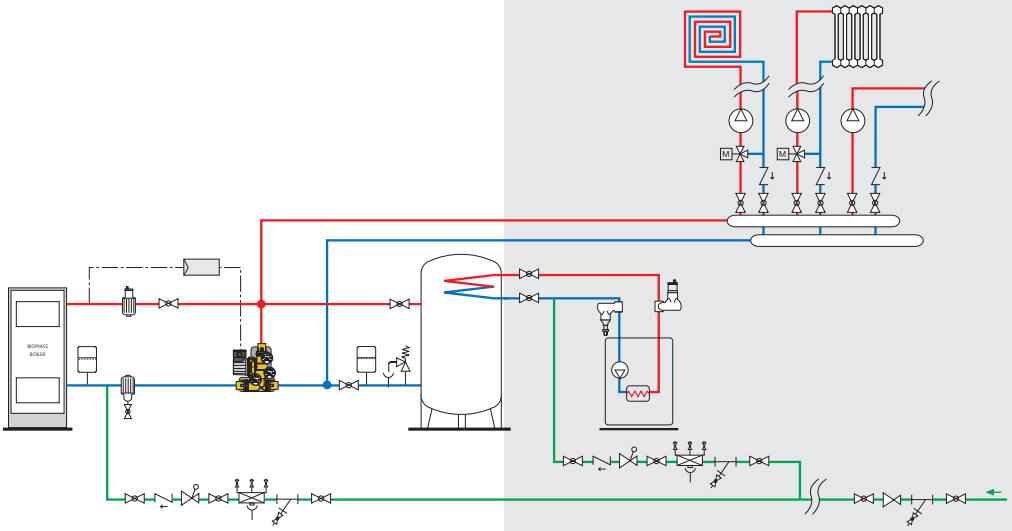


Typical Applications

Biomass Boiler with Calorifier for Indirect Heating



Biomass Boiler with Direct Heating and Calorifier



E & O.E

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