

Solar storage-to-boiler thermostatic connection kit

262 - 263 series



BS EN ISO 9001:2000
Cert. n° FM 21654



UNI EN ISO 9001:2000
Cert. n° 0003



01164/09 GB



Function

The solar storage-to-boiler connection kits automatically control and optimise the thermal energy contained in the solar water storage, ensuring that domestic hot water is distributed throughout the system at a controlled optimum temperature.

They ensure that users always receive hot water at the set temperature and switch the boiler on if the temperature of the water coming from the solar storage falls below the set point.

The kits are available in two versions, to be **coupled with various boiler kinds, with storage or instantaneous.**

Depending on the version, they are supplied complete with thermostatic diverter valve, special thermostatic control device **designed to prevent boiler hunting** and anti-scald thermostatic mixing valve.

These compact kits are designed for quick and easy installation in both new and existing systems.

They come complete with a pre-formed shell protective cover.

Patent application No. MI2008A001813.

Product range

Code **262350** SOLARINCAL-T. Solar thermostatic connection kit to boilers with storage _____ size 3/4"
Code **263350** SOLARINCAL-T PLUS. Solar thermostatic connection kit to instantaneous boilers _____ size 3/4"

Technical specifications

Materials

Thermostatic mixing valve

Body:	- 262 series:	dezincification resistant alloy CR EN 12165 CW602N, chrome plated
	- 263 series:	dezincification resistant alloy CR EN 1982 CB752S, chrome plated
Obturator:		PSU
Springs:		stainless steel
Seals:		EPDM
Knob:		ABS

Diverter valve and thermostatic control device

Body:	- 262 series:	brass EN 12165 CW617N, chrome plated
	- 263 series:	dezincification resistant alloy CR EN 1982 CB752S, chrome plated
Obturator:		PSU
Springs:		stainless steel
Seals:		EPDM
Cover:		ABS
Union seals:		non-asbestos fibre

Protective cover

262 series	Material:	PVC
	Thickness:	7 mm
	Density:	1,29 kg/dm ³
	Working temperature range:	-5-110°C
	Reaction to fire (EN 13501-1):	class B

263 series	Material:	EPP
	Thickness:	15 mm
	Thermal conductivity:	0,037 W/(m·K) at 10°C
	Density:	0,045 kg/dm ³
	Working temperature range:	-5-120°C
	Reaction to fire (UL 94):	class HBF

Connections:	- inlet and outlet:	3/4" M with union
	- boiler:	3/4" M

Performance

Thermostatic mixing valve

Medium:	drinking water
Max. working pressure:	10 bar (static); 5 bar (dynamic)
Max. inlet temperature:	100°C
Adjustment temperature range:	35-55°C
Factory set:	43°C
Accuracy:	±2°C
Max. inlet pressure ratio (H/C or C/H):	2:1
Min. temperature difference between inlet hot water and the outlet mixed water to ensure anti-scald performance:	10°C
Min. flow rate for stable operation:	4 l/min
Performance to standards:	NF 079 doc. 8, EN 15092, EN 1111, EN 1287

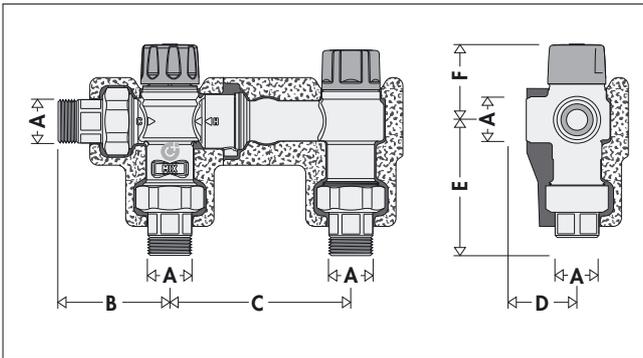
Thermostatic diverter valve

Max. working pressure:	10 bar
Max. differential pressure:	5 bar
Max. inlet temperature:	100°C
Factory set:	45°C
Accuracy:	±2°C

Thermostatic control device

Max. inlet temperature:	85°C
Factory set:	30°C
Accuracy:	±2°C

Dimensions



Code	A	B	C	D	E	F	Weight (kg)
262350	3/4"	66,5	108,5	40	81	42,5	1,75

High temperature and solar systems

In solar thermal systems with natural circulation in the primary circuit and a water storage with heating jacket, the temperature of the domestic water in the storage can vary considerably depending on the degree of solar radiation and can reach very high temperatures over long periods.

In summer, and if there is little water usage, the hot water at the storage outlet can actually reach temperatures around 98°C before the temperature and pressure safety relief valves are actuated.

At these temperatures, the hot water cannot be used directly, because of the danger of scalding for users.

Water temperatures over 50°C can cause burns very quickly. For example, at 55°C, partial burn occurs in about 30 seconds, whereas at 60°C partial burn occurs in about 5 seconds.

It is therefore necessary to use a thermostatic mixing valve able to:

- reduce the temperature of the water distributed throughout the domestic water system to a value lower than that in the storage and suitable for the end user. For reasons of safety, it is recommended to set the temperature of the mixed water distributed to the users to values no higher than 50°C;
- keep mixed water temperature constant despite variations in inlet temperature and pressure;
- continue functioning over time without any loss in performance and without problems due to the continuously high temperature of the incoming water;
- enable the high temperature water in the storage to last longer, by distributing it to the user circuit at a reduced temperature;
- have an anti-scald safety function in case of failure of the cold water supply.

Integration with boiler

Solar domestic water storages are normally installed in conjunction with boilers or water heaters. In this way, boilers or water heaters can be switched on to produce domestic hot water when solar radiation is insufficient, therefore the thermal energy available within the storage is low.

The following actions are necessary to control this type of system automatically and ensure the correct distribution of domestic hot water:

- install a suitable thermostatic diverter valve between the solar circuit and the boiler or water heater, to divert hot water automatically in accordance with its temperature;
- switch the boiler or water heater on if the temperature of the solar hot water is insufficient;
- connect the solar hot water circuit to the boiler or water heater according to the functioning mode of the boiler or water heater, which can be instant modulating or equipped with its own storage.

Characteristic components

- 1) Thermostatic diverter valve
- 2) Anti-scald thermostatic mixing valve

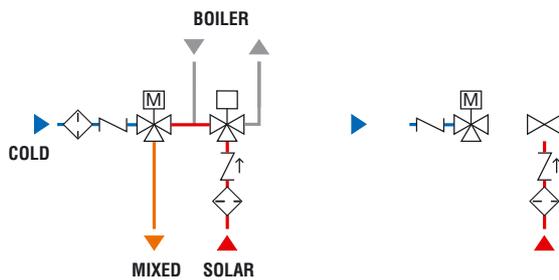
Operating principle

A thermostatic diverter valve, at the kit inlet, receives hot water coming from the solar water storage. Depending on the temperature set (factory set: 45°C), the valve diverts the water automatically and in a proportional manner towards the user circuit or the boiler with **storage circuit, with thermal integration**.

The valve modulates the flow rates to optimise the energy contained in the solar storage and reduce boiler operation times to a minimum.

A thermostatic anti-scald mixing valve, at the kit outlet, constantly controls the water temperature sent to the user.

Hydraulic diagram

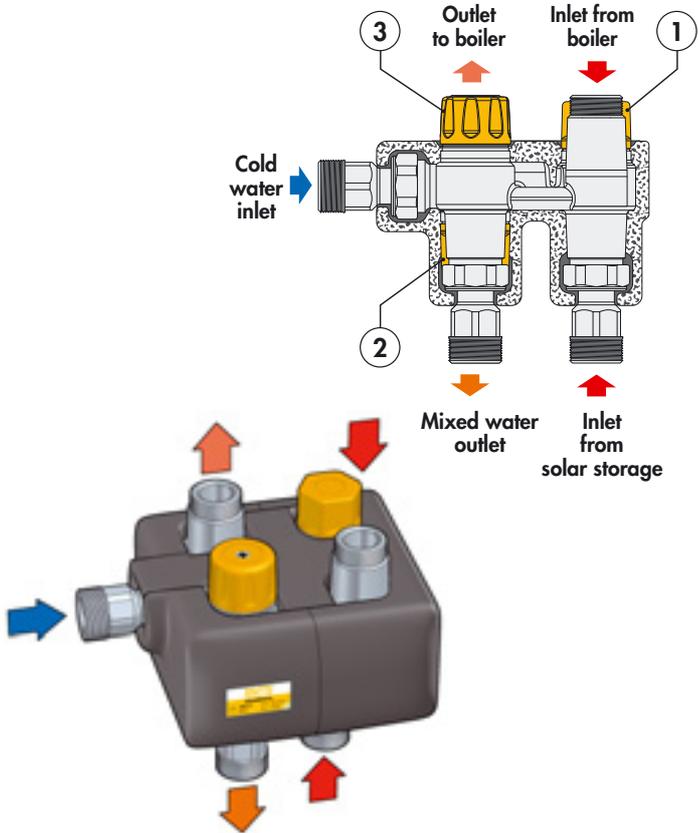


$$T_{\text{SOLAR}} > 45^{\circ}\text{C}$$

263 series SOLARINCAL-T PLUS

Characteristic components

- 1) Thermostatic diverter valve
- 2) Thermostatic control device
- 3) Anti-scald thermostatic mixing valve



Operating principle

A thermostatic diverter valve, at the kit inlet, receives hot water coming from the solar water storage.

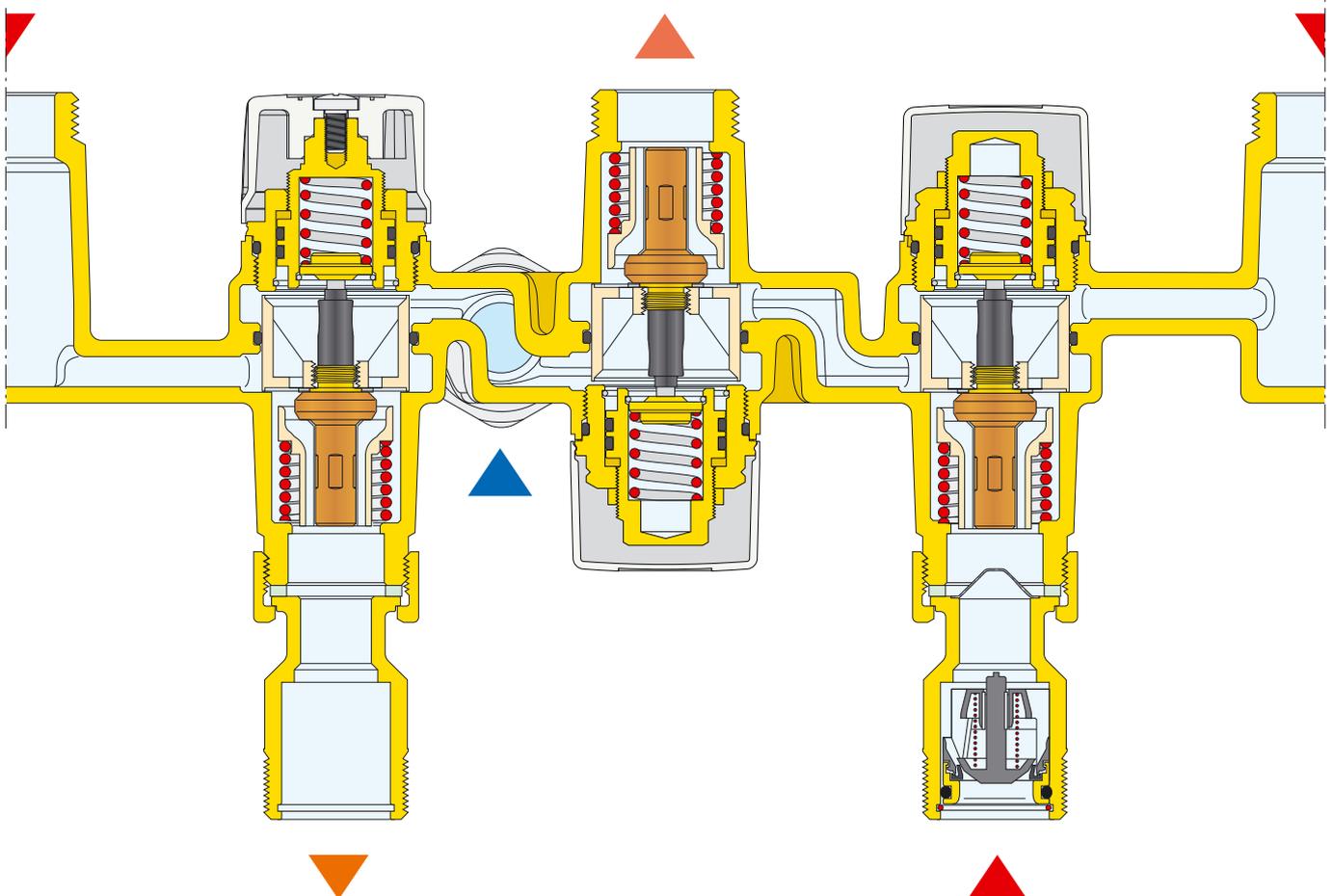
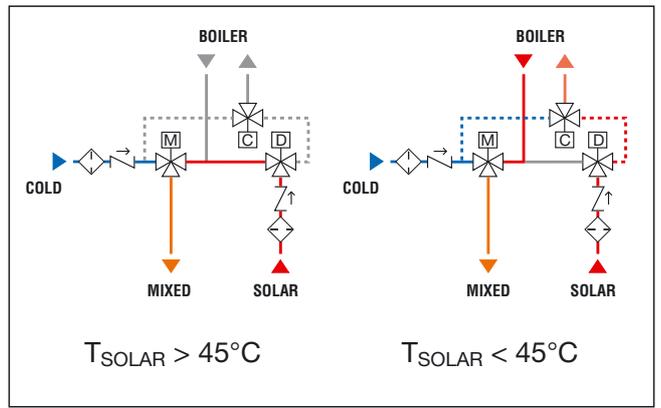
Depending on the temperature set (factory set: 45°C), the valve diverts the water automatically and proportionally towards the user circuit or the **instantaneous boiler circuit, with thermal integration.**

The valve modulates the flow rates to optimise the energy contained in the solar storage and reduce boiler operation times to a minimum.

A specific thermostatic control device limits the boiler inlet temperature to prevent it being switched on and off too often, which leads to hunting and irregular operation.

An anti-scald thermostatic mixing valve, at the kit outlet, constantly controls the water temperature sent to the user.

Hydraulic diagram



Construction details

Operational flexibility

The kits are made using a single casting, so as to minimise their overall size and make installation easier. They are supplied complete with components used for control and operation, designed for direct connection to the circuit without sections of piping having to be fitted between the various devices.

High resistance to temperature

The internal control components of the diverter valve and the mixing valve are designed to maintain constant performance with inlet hot water temperatures up to 100°C, in continuous operation.

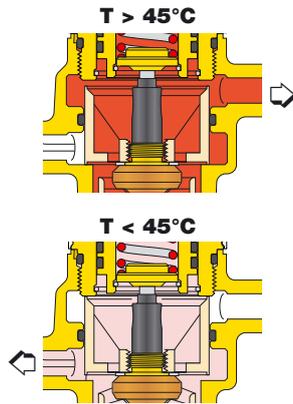
Anti-scale materials

The materials used when constructing the kit were selected to eliminate seizing due to limescale deposits. All functional parts have been made using a special anti-scale material with low friction coefficient, which ensures over time performance.

Diverter valve

The thermostatic diverter valve at the kit inlet features a built-in sensor, which is immersed directly in the flow of hot water coming from the solar storage. Through the action of the thermostat controlling obturator movement, the flow rate is adjusted proportionally and automatically, without the need for external energy sources.

This means there is no need for other temperature probes in the circuit and electrical wiring procedures.



Thermostatic control device

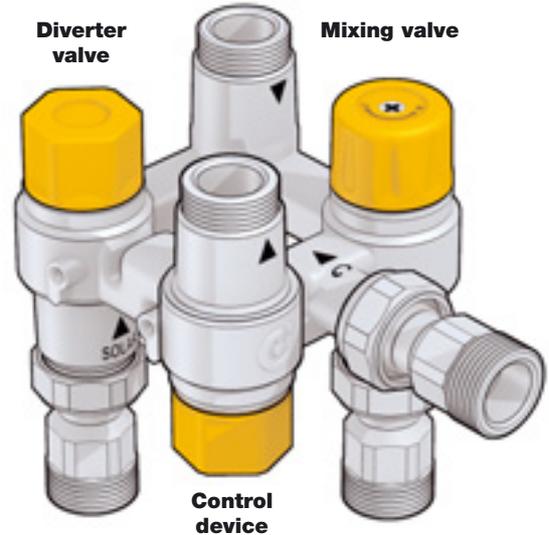
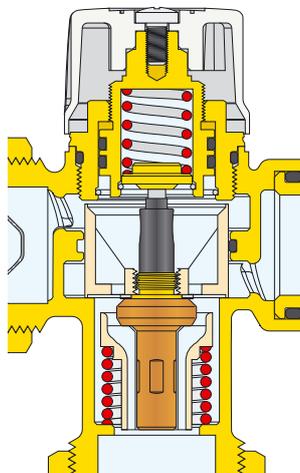
If used in conjunction with instantaneous boilers, the water temperature at the boiler inlet may reach certain values ($T > 35^\circ\text{C}$) which prevent the boiler from modulating enough the thermal power transferred to the medium. Low flow rates may lead to the boiler being switched on and off too often, with consequent hunting that prevents the boiler from operating efficiently.

The thermostatic control device in the 263 series limits the occurrence of this phenomenon, as it keeps the water temperature at the boiler inlet at a constant low value ($T = 30^\circ\text{C}$) by mixing the solar hot water coming from the diverter valve with the cold water at the inlet.

This means the boiler always operates with a suitable thermal difference between the inlet and the outlet, resulting in optimal management of the energy produced.

Thermostatic mixing valve

A special anti-scald thermostatic mixing valve offering high thermal performance is positioned at the kit outlet in order to control the temperature and protect the user. The mixing valve keeps the temperature of the hot water at the kit outlet, supplied to the user, at a constant level, even in the event of variations in temperature and pressure at the inlet or flow rate requested.

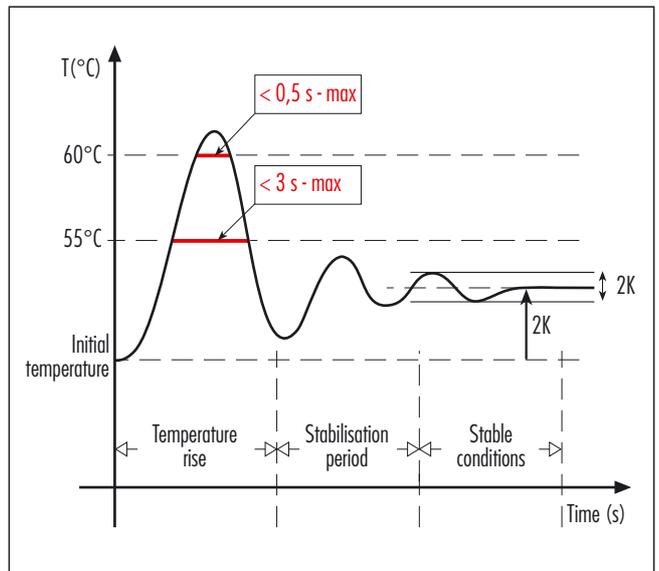


Anti-scald safety function

As a safety measure, in case of failure of the cold water supply, the valve immediately shuts off the flow of the hot water. This prevents dangerous burns. This performance is guaranteed if there is a minimum temperature difference between the inlet hot water and the outlet mixed water of 10°C. Also in case of failure of the hot water supply, the valve shuts off the cold water port and thus the outlet mixed water to prevent dangerous thermal shocks.

Thermal transient

During transient, following rapid changes in pressure, temperature or flow rate, the outlet mixed water temperature increases with respect to the initial set point and this increase must be of limited duration to guarantee safety. The anti-scald mixing valve always ensures that these conditions are respected.

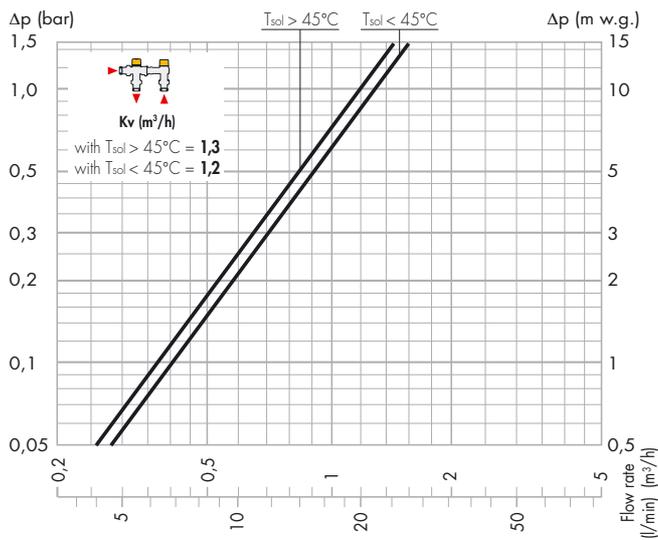


Diverter-mixing valve coupling

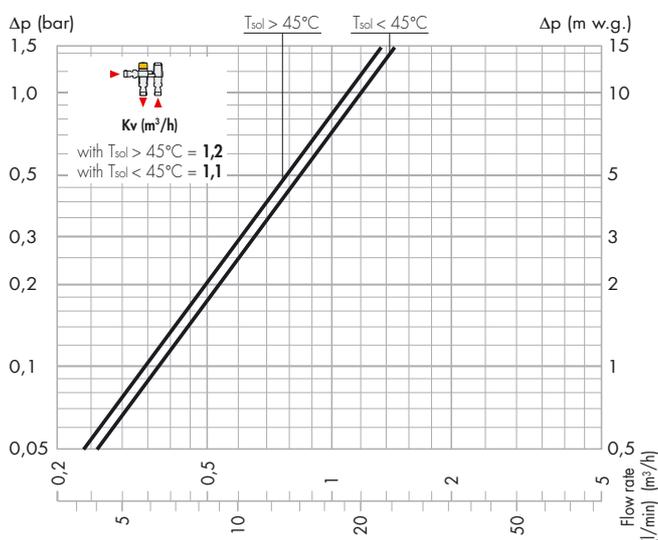
The diverter-mixing valve coupling on the Solarinca T storage-to-boiler thermostatic connection kit allows the mixing valve to rotate through 360° to satisfy all the possible installation needs. The kit comes complete with a special pre-formed protective cover.



Hydraulic characteristics of the 262 series



Hydraulic characteristics of the 263 series



Application

Solar storage-to-boiler connection kits are generally installed near the boiler, on the pipe of the hot water coming from the solar storage, to ensure a constant temperature of the mixed water supplied to the user. Given their flow rate characteristics, thermostatic kits can be installed to control water temperature both for single user points (e.g. washbasins, bidets, showers) and for multiple users. To ensure that the mixed water is supplied at the set temperature, a minimum flow rate of 4 l/min must be ensured to the kits with thermostatic mixing valves.

Checking the head loss in the kit

If the design flow rate is known and taking into account the simultaneous use of sanitary appliances, the head loss produced by the kit can be checked using the diagram.

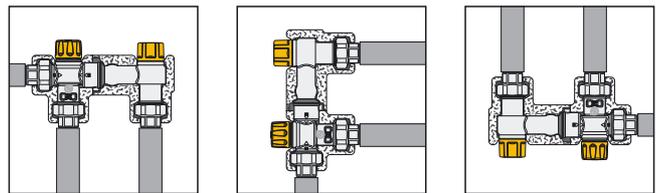
It is necessary to check the available pressure, the head loss in the system downstream of the kit and the residual pressure to be guaranteed to user devices.

Installation

Before installing the kits, the pipework must be flushed to ensure that no circulating impurities can compromise their operation. It is recommended to install always strainers of adequate performance at the water inlet from the hydraulic network.

The kits must be fitted according to the installation diagram provided in the instruction manual or in this brochure.

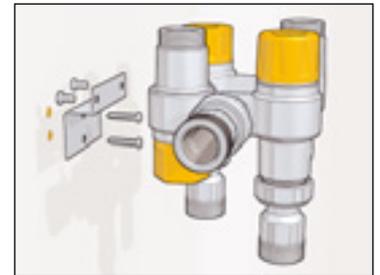
The kits can be installed in any position, vertically or horizontally.



Bracketing

The 263 series connection kit is supplied complete with a special wall-mounting bracket.

This simplifies the installation process and makes connection easier while ensuring a secure support.



Check valves

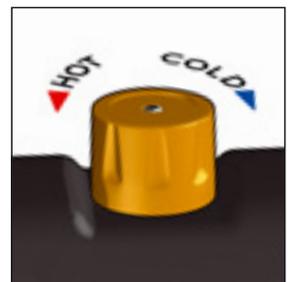
In systems with thermostatic mixing valves, check valves shall be installed to prevent undesired backflow. The kit with mixing valve incorporates check valves on the hot and cold water inlets.

Commissioning

In view of the special applications for which the thermostatic mixing valve is used, it must be commissioned according to current regulations, by qualified technicians equipped with suitable temperature measurement instruments. We recommend using a digital thermometer for measuring the mixed water temperature.

Temperature adjustment

The temperature of the mixed water is set to the desired value by means of the control knob on the thermostatic mixing valve.



Temperature setpoint adjustment

The diverter valve is factory adjusted to operate at a temperature of 45°C, diverting water to the boiler if the temperature falls below this setpoint value. The set temperature value is fixed using a locking ring.

The 263 series thermostatic control device is factory set and fixed to keep constantly at 30°C the temperature of the water at the boiler inlet.

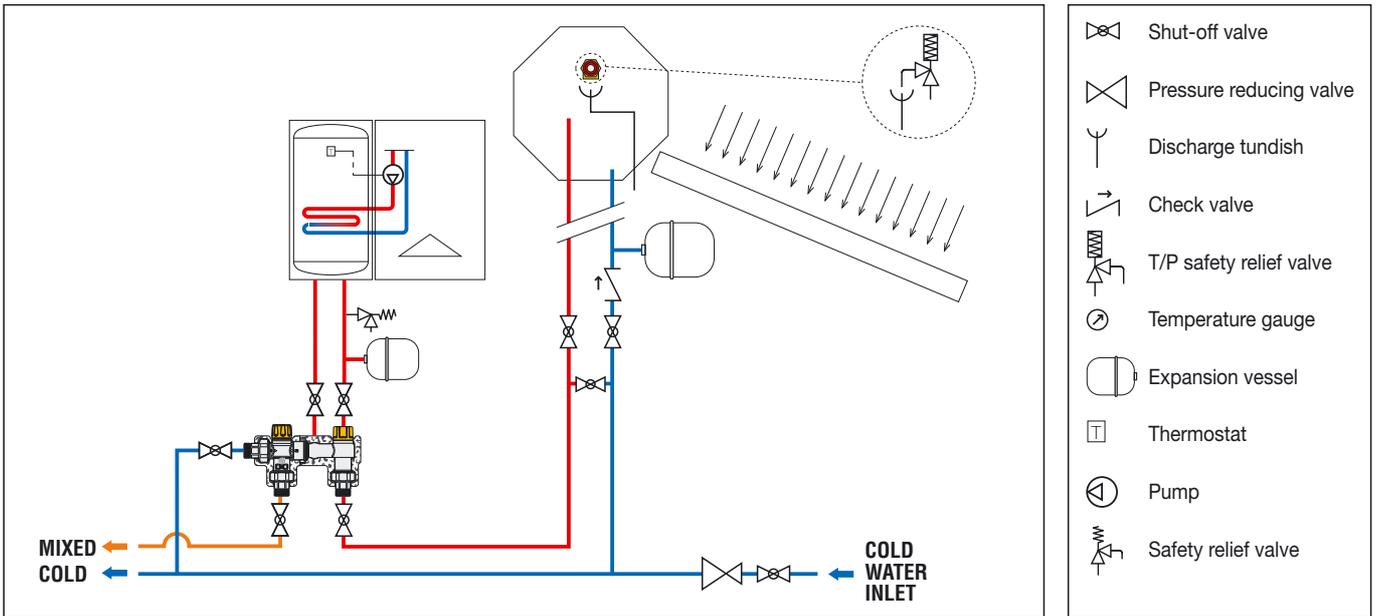
Factory configurations

Diverter valve: 45°C

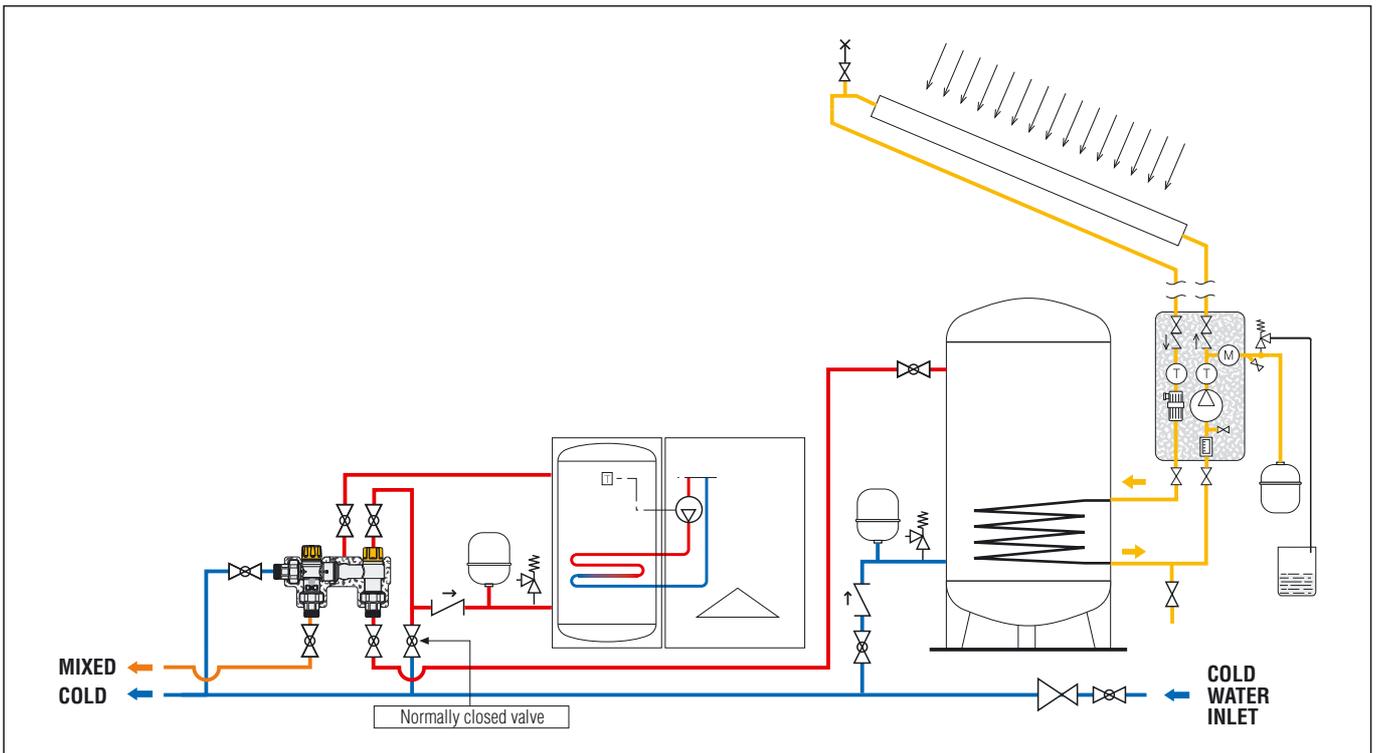
Thermostatic control device: 30°C

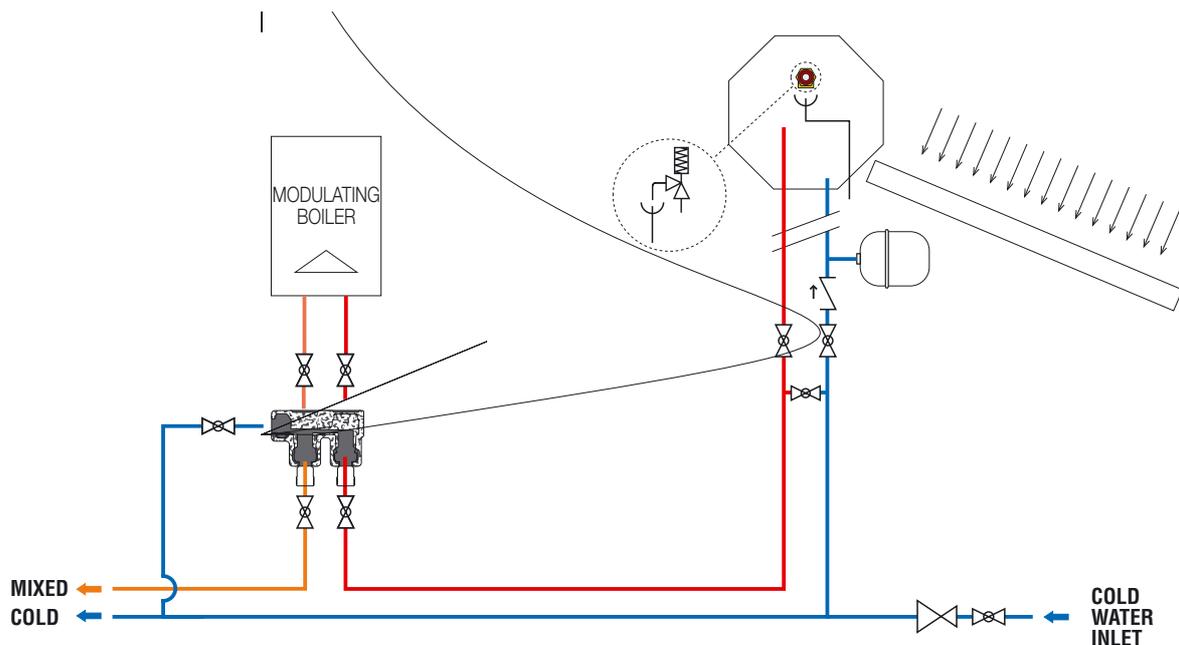
Application diagrams

262 series Thermostatic Solarincal - natural circulation solar system



262 series Thermostatic Solarincal - forced circulation solar system





SPECIFICATION SUMMARIES

262 series

Solar thermostatic connection kit to boilers with storage. Inlet and outlet connections 3/4" M with union. Boiler connections 3/4" M. Medium drinking water.

Complete with:

- Diverter valve with chrome plated brass body. PSU obturator; stainless steel springs; EPDM seals; ABS cover. Union seals in non-asbestos fibre. Maximum working pressure 10 bar; maximum differential pressure 5 bar; maximum inlet temperature 100°C; factory set 45°C; accuracy $\pm 2^\circ\text{C}$.
- Anti-scald thermostatic mixing valve with dezincification resistant alloy body, chrome plated; PSU obturator; stainless steel springs; EPDM seals; ABS control knob. Maximum working pressure (static) 10 bar, 5 bar (dynamic); temperature adjustment range 35-55°C; factory set 43°C; accuracy $\pm 2^\circ\text{C}$. Maximum inlet temperature 100°C; maximum ratio between inlet pressures (H/C or C/H) 2:1; minimum temperature differential between hot water inlet and mixed water outlet to ensure anti-scald performance 10°C; minimum flow rate for stable operation 4 l/min.

Performance to standards: NF 079 doc. 8, EN 15092, EN 1111, EN 1287. Complete with a PVC pre-formed shell protective cover.

263 series

Solar thermostatic connection kit to instantaneous boilers. Inlet and outlet connections 3/4" M with union. Boiler connections 3/4" M. Medium drinking water.

Complete with:

- Diverter valve with dezincification resistant alloy body, chrome plated. PSU obturator; stainless steel springs; EPDM seals; ABS cover. Union seals in non-asbestos fibre. Maximum working pressure 10 bar; maximum differential pressure 5 bar; maximum inlet temperature 100°C; factory set 45°C. Accuracy $\pm 2\%$.
- Thermostatic control device with dezincification resistant alloy body, chrome plated. PSU obturator; stainless steel springs; EPDM seals; ABS cover. Union seals in non-asbestos fibre. Maximum inlet temperature 85°C; factory set 30°C; accuracy $\pm 2^\circ\text{C}$.
- Anti-scald thermostatic mixing valve with dezincification-resistant alloy body, chrome plated; PSU obturator; stainless steel springs; EPDM seals; ABS control knob. Maximum working pressure (static) 10 bar, 5 bar (dynamic); temperature adjustment range 35-55°C; factory set 43°C; accuracy $\pm 2^\circ\text{C}$. Maximum inlet temperature 100°C; maximum ratio between inlet pressures (H/C or C/H) 2:1; minimum temperature differential between hot water inlet and mixed water outlet to ensure anti-scald performance 10°C; minimum flow rate for stable operation 4 l/min.

Performance to standards: NF 079 doc. 8, EN 15092, EN 1111, EN 1287. Complete with a EPP pre-formed shell protective cover.

We reserve the right to make changes and improvements to the products and related data in this publication, at any time and without prior notice.



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