



01223/13 NA
Replaces 01223/12 NA

ThermoMix™ boiler protection high-flow thermostatic mixing valve

280 series



Function

The ThermoMix™ boiler protection high-flow thermostatic mixing valve is used in hydronic heating systems with non-condensing boilers, including solid fuel, biomass, gas, LP or oil-fired. It can be installed with steel, cast iron and copper tube style boilers, automatically controlling the return water temperature, preventing condensation of the water vapor contained in the flue gas. The 280 series ThermoMix™ valve mixes by-pass flow from the boiler with return flow from the system, sending a fixed temperature flow to the boiler which protects against corrosion from condensation occurring when a minimum flue gas temperature is not otherwise maintained.

Exchangeable thermostatic sensor cartridge changes valve temperature setting. The thermostatic sensor cartridge can easily be removed for maintenance or to change the valve set temperature, with out removing the valve body from the piping.

Product range

280 series ThermoMix™ boiler protection valveconnections 1" and 1-1/4" NPT male or sweat union

Technical specifications

Materials

- body: brass
- lower body plug: brass
- shutter: PSU
- spring: stainless steel
- seal: EPDM
- union seals: fiber
- thermostatic sensor: wax

Performance

Suitable fluids: water, glycol solutions

Max. percentage of glycol: 50%

Max. working pressure: 150 psi (10 bar)

Working temperature range: 40–212°F (5–100°C)

Thermostatic sensor cartridge: 130°F (55°C) Tset standard

Optional cartridges Tset (field replaceable): 115°F (45°C)
140°F (60°C)
160°F (70°C)

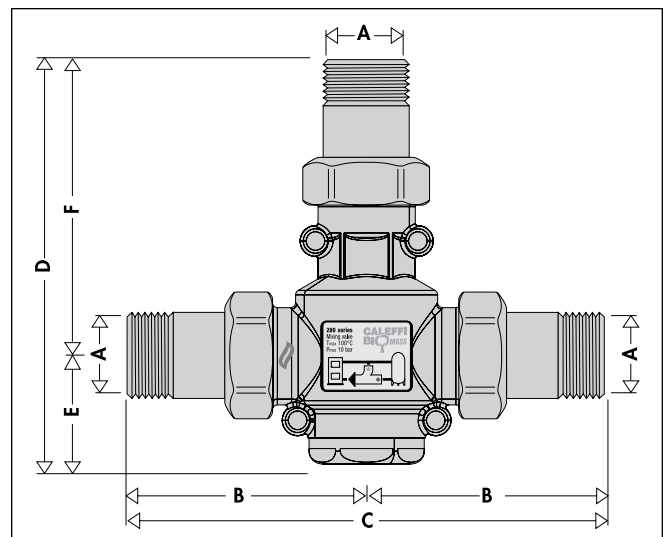
Sensor cartridge accuracy: ±4°F (±2°C)

By-pass closed temperature: Tset +18°F (+10°C)

Fully open flow characteristic: 10 Cv (size 1")
14 Cv (size 1-1/4")

Connections: - NPT male union: 1" and 1-1/4"
- sweat union: 1" and 1-1/4"

Dimensions

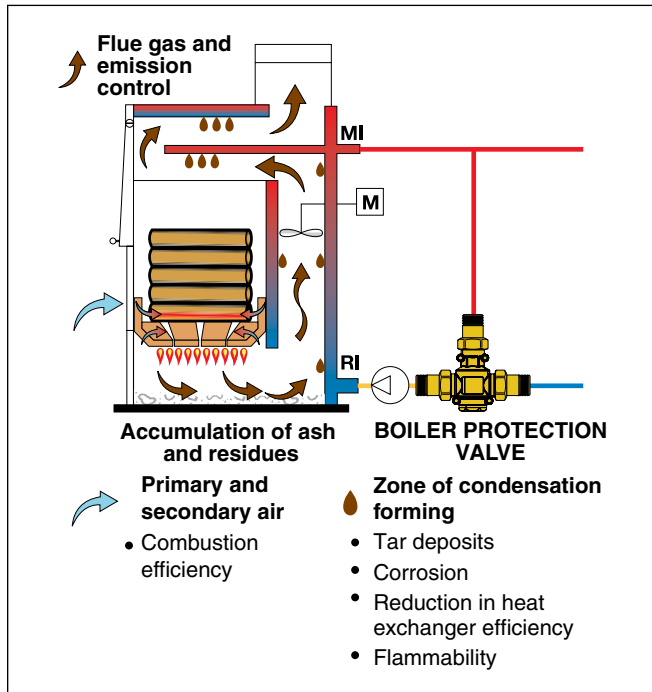


| Code | A | B | C | D | E | F |
|---------|------------|----------|--------|----------|---------|--------|
| 280165A | 1" NPT | 3 1/2" | 7" | 6" | 1 5/8" | 4 3/8" |
| 280965A | 1" SWT | 3 1/2" | 7" | 6" | 1 5/8" | 4 3/8" |
| 280175A | 1 1/4" NPT | 3 13/16" | 7 5/8" | 6 13/16" | 1 9/16" | 4 3/8" |
| 280975A | 1 1/4" SWT | 3 13/16" | 7 5/8" | 6 13/16" | 1 9/16" | 4 3/8" |

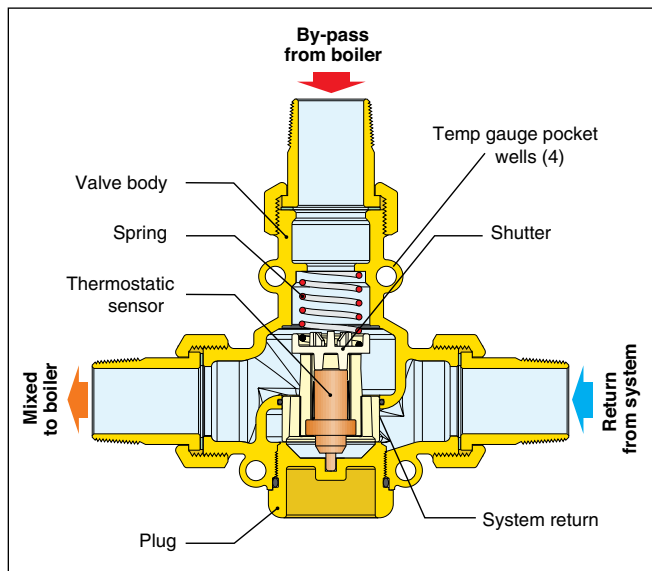
Wood biomass and condensation build-up

Wood contains a variable moisture content depending on the type (logs, pellets, woodchips, etc.). Water vapor is released during the solid fuel drying phase inside the combustion chamber. The presence of cold surfaces in the boiler or flue gas chimney can lower the temperature of the flue gas down to the dew point, causing condensation. Water vapor condenses on the boiler surfaces, together with soot and part of the unburnt hydrocarbons contained in the flue gas, producing tar deposits. 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 boiler protection valve limits the formation of these substances thereby increasing combustion efficiency, controlling emissions into the environment and prolonging boiler life.

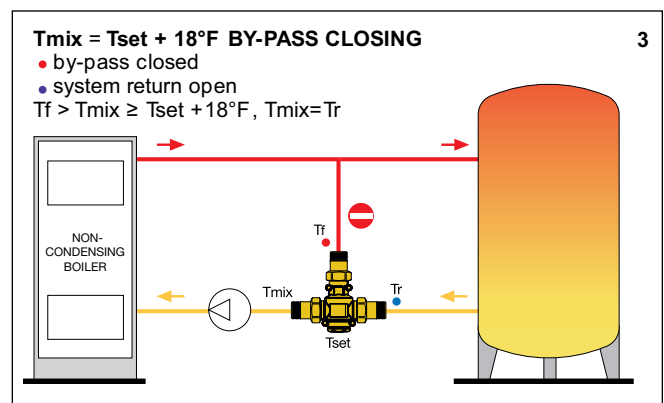
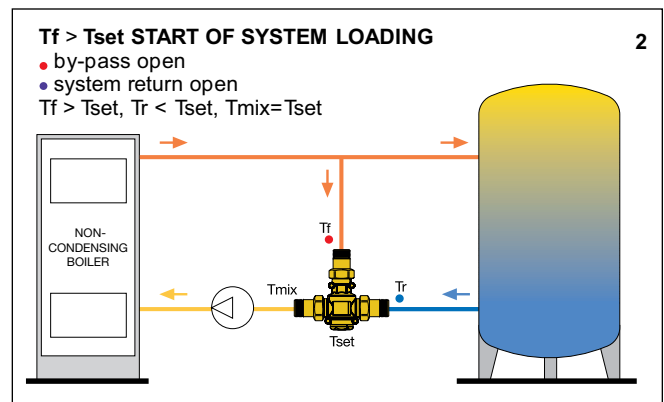
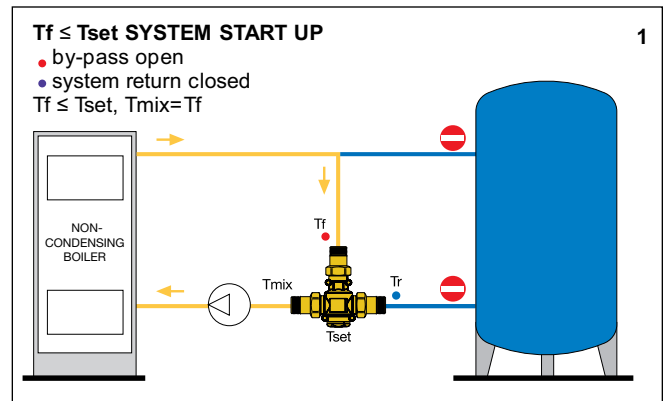


Characteristic components



Operating principle

The thermostatic sensor, completely immersed in the medium, controls the movement of a shutter that regulates the by-pass flow from the boiler and toward the system. At boiler startup, the boiler protection thermostatic mixing valve recirculates the by-pass flow from the boiler to bring the boiler up to temperature as quickly as possible (fig. 1). When the by-pass flow from the boiler T_f exceeds the setting of the boiler protection mixing valve T_{set} , the valve's return from the system port starts opening to produce the water mixing T_{mix} : in this phase the system loading begins (fig. 2). When the mixed flow to the boiler temperature T_{mix} is greater than the set point of the boiler protection mixing valve by approximately 18°F (10°C), the by-pass flow from the boiler port closes and water returns to the boiler at the same temperature as the return flow from the system (fig. 3).



Construction details

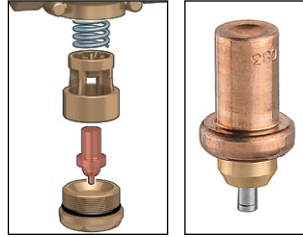
Brass body

The brass body prevents the formation of ferrous residues in the system, prolonging boiler operating life.

Thermostatic sensor replacement to modify the setting

The thermostatic sensor can be easily replaced for maintenance or set point change without removing.

| Code | Description |
|--------|-------------|
| F29633 | 115°F |
| F29634 | 130°F |
| F29635 | 140°F |
| F29636 | 160°F |

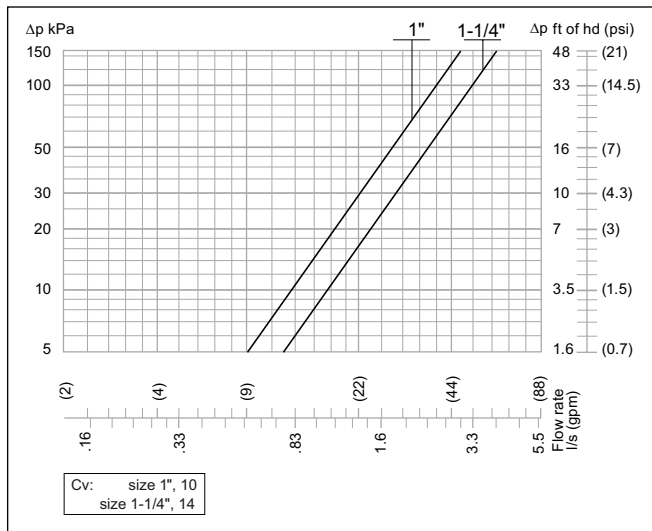


Temperature gauge pocket wells

The boiler protection mixing valve body features temperature gauge pocket wells on front and rear sides, allowing installation of a temperature gauge (code F29571) for monitoring the working temperatures: by-pass from boiler, return from system, and mixed to boiler.



Hydraulic characteristics



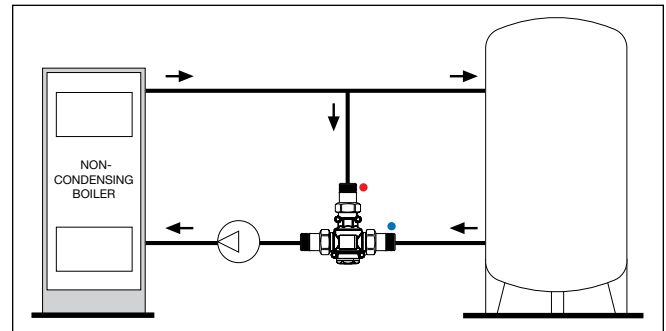
Sizing method/set point selection

Knowing the BTU output and thermal head on the boiler, the boiler flow rate can be calculated. Use the hydraulic characteristics graph to identify the pressure drop of the valve. The valve size can then be selected from the pressure drop value with the available head of the system pump. The thermostatic set point (°F) must be selected to control a mixed return to the boiler temperature that is high enough to prevent condensation, also using the information or instructions supplied by the manufacturers of solid fuel boilers.

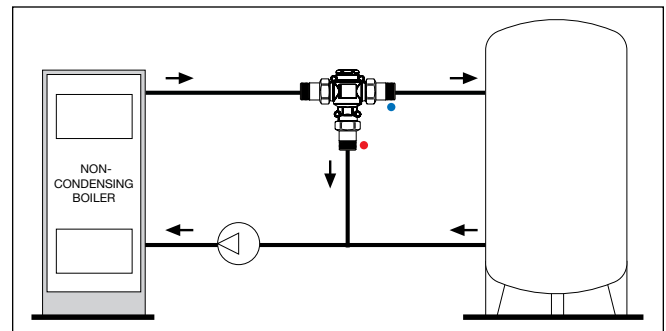
Installation

The valve can be installed on both sides of the boiler in any position, vertical or horizontal. Installation is recommended on the return to the boiler in mixing mode. It can also be installed on the flow from the boiler in diverting mode.

Installation in mixing mode (boiler protection)

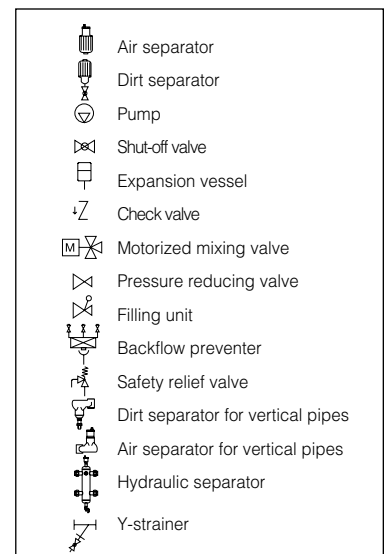
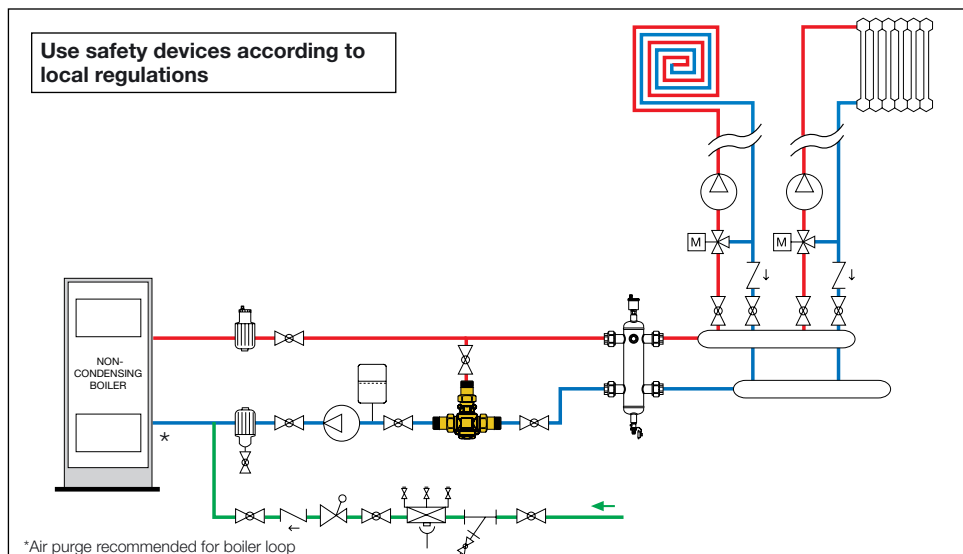


Installation in diverting mode (system control)

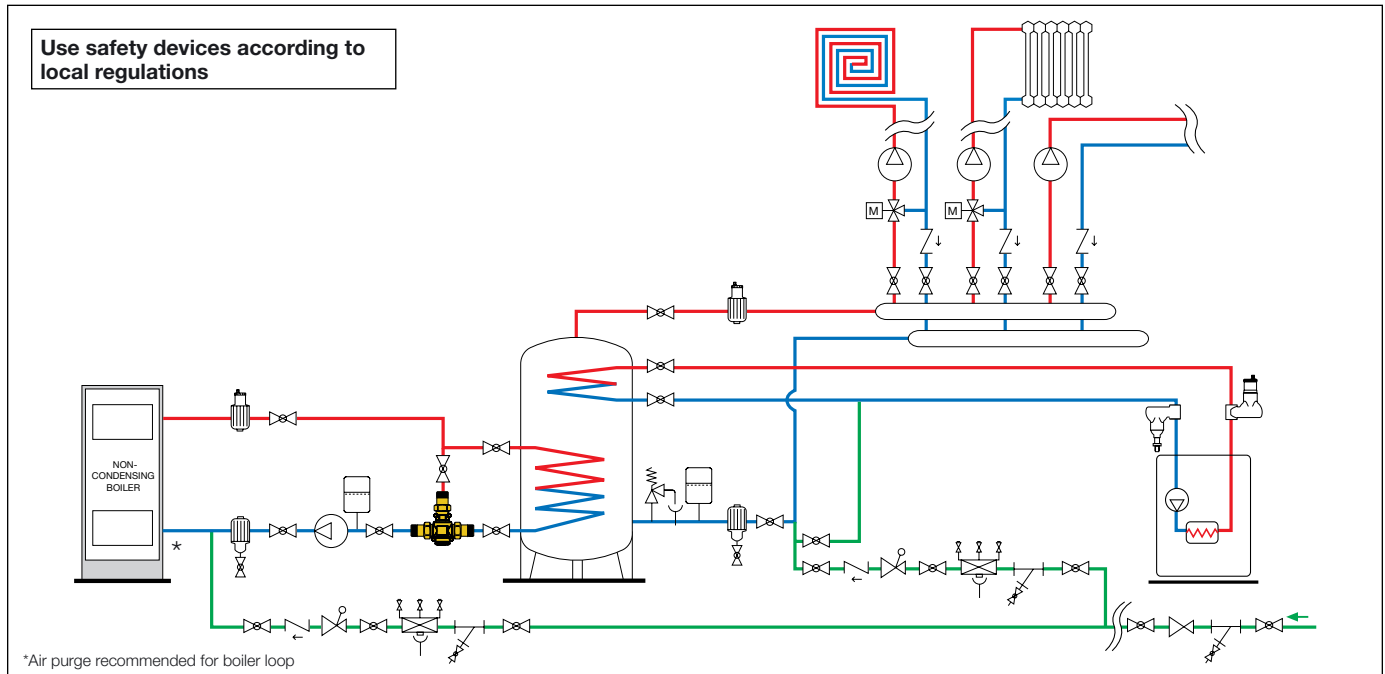


Application diagrams

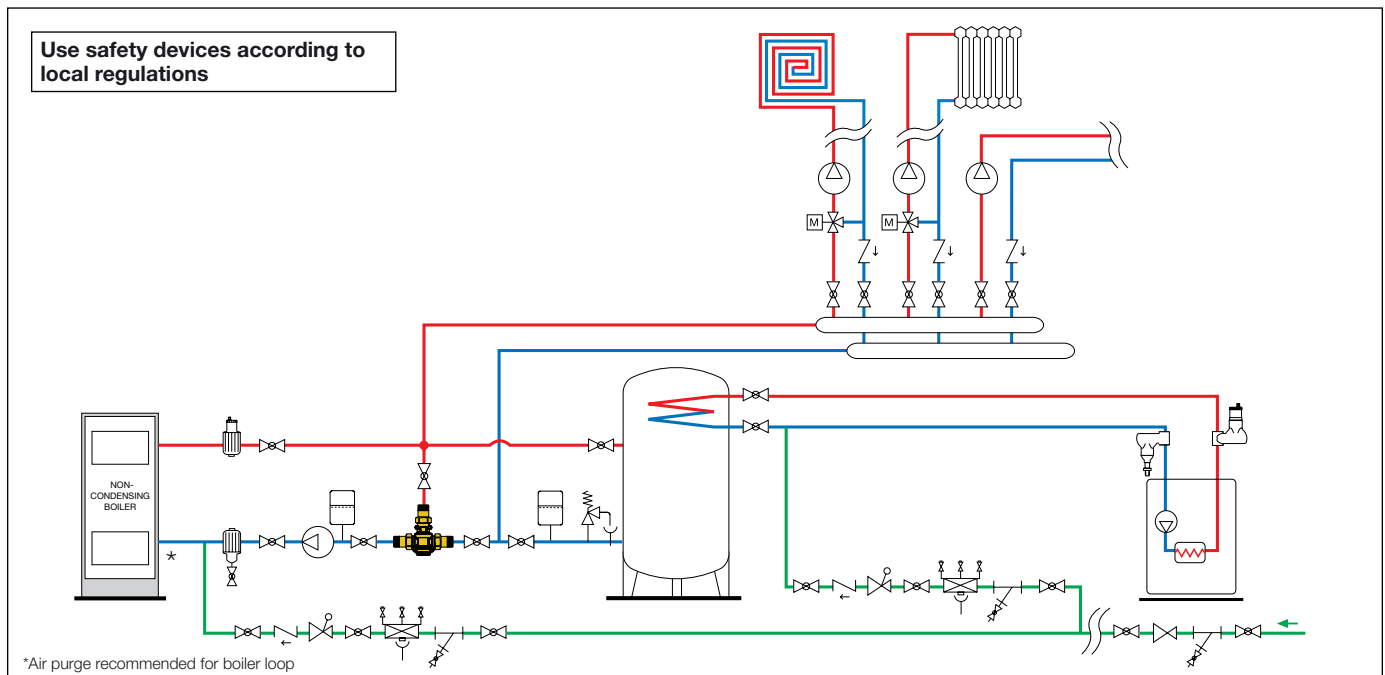
Non-condensing boiler, direct supply to the system



System with buffer tank storage



Non-condensing boiler, connection to buffer tank storage in parallel



SPECIFICATION SUMMARIES

ThermoMix™ 280 series

Boiler protection thermostatic mixing valve. Connections 1" to 1-1/4" NPT male or sweat with union. Brass body. Brass lower body plug. PSU shutter. Stainless steel spring. EPDM seal. Wax thermostatic sensor. Suitable for water and glycol solutions. Maximum percentage of glycol 50%. Maximum working pressure 150 psi (10 bar). Working temperature range 40–212°F (5–100°C). Set point temperature 130°F (55°C) standard; 115°F (45°C); 140°F (60°C); and 160°F (70°C) optional. Sensor cartridge accuracy $\pm 4^\circ\text{F}$ ($\pm 2^\circ\text{C}$). Hot inlet from boiler complete closed temperature $T_{set} + 18^\circ\text{F}$ (10°C).

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.



Caleffi North America, Inc.
 3883 W. Milwaukee Road
 Milwaukee, WI 53208
 Tel: 414-238-2360 · Fax: 414-238-2366
 sales@caleffi.com · www.caleffi.us
 © Copyright 2013 Caleffi North America, Inc.