

# ThermoSetter™

## Recirculation thermal balancing valve

### 116A series



01325/24 NA

Replaces 01325/22 NA



#### Function

The ThermoSetter™ adjustable thermal balancing valve is used for automatic balancing of recirculation loops in domestic hot water systems, to speed hot water delivery, reduce water waste and save energy. The internal thermostatic balancing cartridge automatically modulates flow to ensure a constant temperature in the recirculation piping system. The 116A Series has an adjustment knob with 95 °F to 140 °F (35 °C to 60 °C), sizes ½", ¾"; 95 °F to 150 °F (35 °C to 65 °C), sizes 1", 1¼" temperature scale indication. An integral check valve to prevent circuit thermo-syphoning is standard on sizes 1/2" and 3/4" and is an optional accessory on 1" and 1-1/4" sizes.

The 1162xx and 1166xx Series is available with a "disinfection" by-pass cartridge, for use in systems which are designed to perform thermal disinfection for prevention of Legionella. When the disinfection cartridge senses 160 °F (70 °C) -1162xx, or 140 °F (60 °C) -1166xx, water (2 available temperature options), indicating disinfection control mode, it automatically opens a by-pass flow path to allow sufficient flow for disinfection to occur. When the temperature drops back to normal range, the disinfection by-pass cartridge closes to return flow control to the balancing cartridge.

The 1163xx Series is also available with a "disinfection" valve that is controlled by a 24V spring return thermo-electric actuator, rather than thermostatically, thus allowing thermal disinfection mode to be controlled remotely by an automation system.

The 116A series ThermoSetter is available pre-assembled with Caleffi low-lead brass full-port ball valve for isolation. Fitting sizes 1/2 and 3/4 inch are pre-assembled with the Caleffi 290030 series low lead ball valve. Fitting sizes 1 and 1-1/4 inch are pre-assembled with the Caleffi NA108 series low lead ball valve. Product codes for 116A ThermoSetters pre-assembled with isolation valves can be found on page 3 for 1/2 and 3/4 inch and found on page 5 for 1 and 1-1/4 inch.

The valve complies with standards NSF/ANSI/CAN 61 (180 °F/82 °C Commercial Hot), NSF/ANSI/CAN 372 and with codes IPC, IRC, UPC and NPC as certified by ICC-ES.

NSF/ANSI/CAN 61  
NSF/ANSI/CAN 372



#### Product range

1161 series	ThermoSetter without disinfection function
1162 series	ThermoSetter with disinfection function bypass cartridge (160 °F (70 °C))
1163 series	ThermoSetter with actuator disinfection function
1166 series*	ThermoSetter with disinfection function bypass cartridge (140 °F (60 °C))

sizes ½" & ¾" with NPT female, sweat, press, PEX crimp, PEX expansion union connections  
sizes 1" and 1¼" with integral NPT female connections

\*Maximum temperature setting must be less than 140 °F for 1" & 1 ¼" sizes when using the 140 °F disinfection temperature bypass cartridge.

## Technical specifications

### Materials:

Body: DZR\* low-lead brass  
Adjustable cartridge: stainless steel & copper  
Springs: stainless steel AISI 302 (EN 10270-3)  
Hydraulic seals: peroxide-cured EPDM  
Adjustment knob: ABS  
\* Meets the "lead free" requirement of Section 1417 of the Safe Drinking Water Act (SDWA).  
This product has a weighted average lead content of less than 0.25% for its wetted surfaces contacted with consumable water.

### Performance:

Suitable fluid: water  
Max. working pressure: 230 psi (16 bar)  
Max. differential pressure: 15 psi (1 bar)  
Max. inlet temperature: 195 °F (90 °C)  
Adjustment temperature range:

sizes ½" & ¾": 95 – 140 °F (35 – 60 °C)  
sizes 1" & 1¼": 95 – 150 °F (35 – 65 °C)

Factory setting: 130 °F (55 °C)

	½" & ¾"	1" & 1¼"
Cv (Kv) max:	2.1 (1.8)	4.4 (3.8)
Cv (Kv) dis:	1.2 (1.0)	2.3 (2.0)
Cv (Kv) min:	0.23 (0.2)	1.0 (0.9)
Cv (Kv) design:	0.52 (0.45)	1.9 (1.6)

### Disinfection performance:

Disinfection temperature: 1162xx series-160 °F (70 °C)  
1166xx series-140 °F (60 °C)

\*Maximum temperature setting must be less than 140°F for 1" & 1¼" sizes when using the 140°F disinfection temperature bypass cartridge.

Closing temperature: 1162xx series-170 °F (75 °C)  
1166xx series-150 °F (65 °C)

### Connections:

Main: ½" & ¾" with NPT female, sweat, press,  
PEX crimp and PEX expansion union connections  
1" & 1¼" integral NPT female  
Temperature gauge/sensor dry-well: Ø 10 mm metric

### Temperature gauge code 116010

Scale: 32 – 180 °F (0–80 °C)  
Diameter: 1½" (40 mm)  
Stem diameter: 0.35" (9 mm)

### Technical specifications of insulation

Materials: closed cell expanded PE-X  
Thickness: ½ inch (13 mm)

Density:

-internal part: 1.9 lb/ft³ (30 kg/m³)  
-external part: 5.0 lb/ft³ (80 kg/m³)

Thermal conductivity (DIN52612):

- at 32°F (0 °C): 0.82 BTU · in/hr · ft² · °F (0.0345 W/(m · K))  
- at 105°F (40 °C): 0.94 BTU · in/hr · ft² · °F (0.0398 W/(m · K))

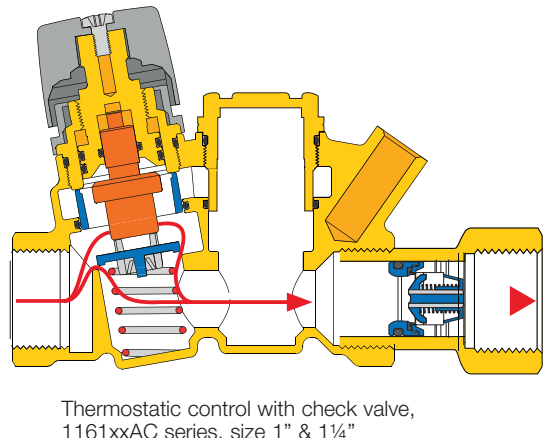
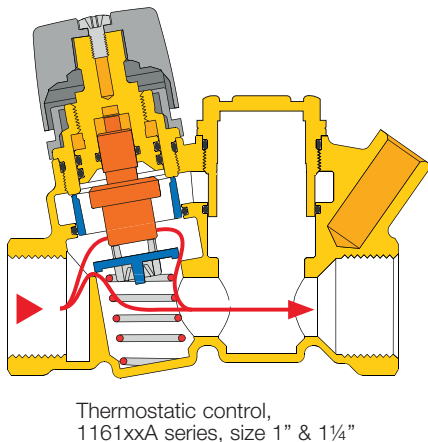
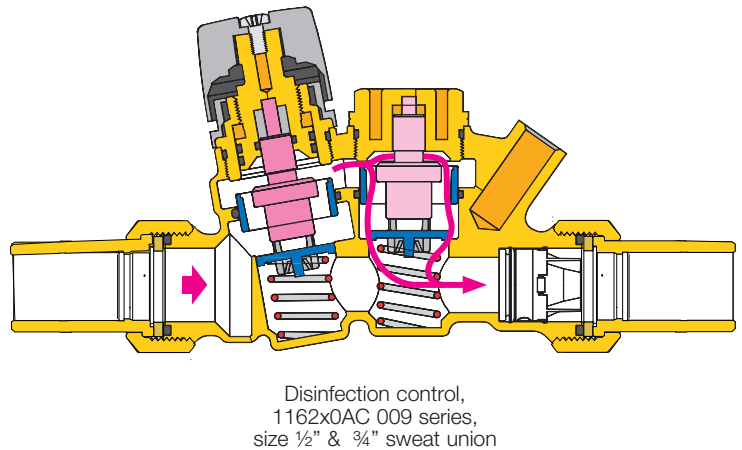
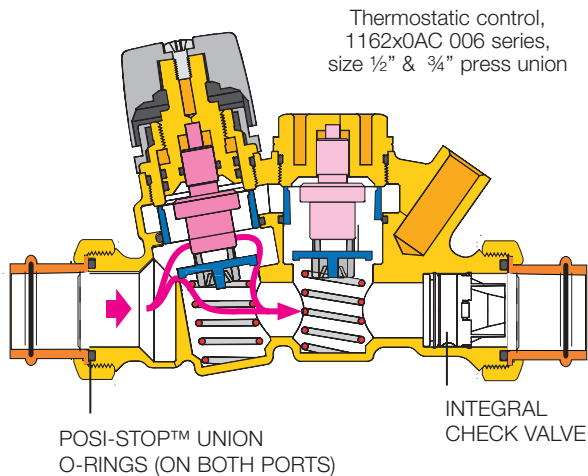
Coefficient of resistance to the diffusion of vapor: > 1,300

Working temperature range: 32 – 212 °F (0 – 100 °C)

Flammability (ASTM D 635): Class VO

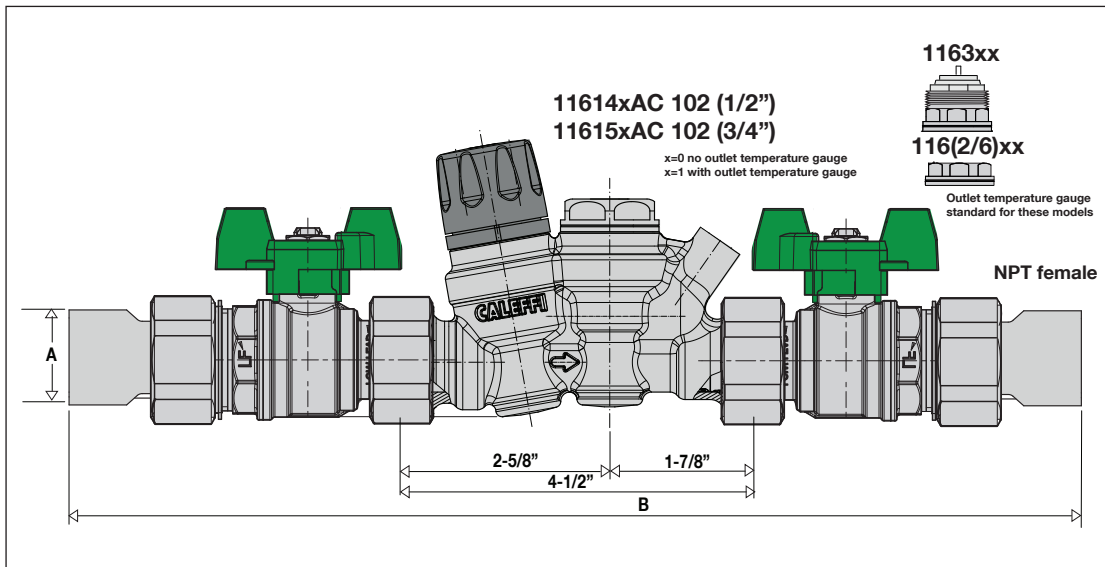
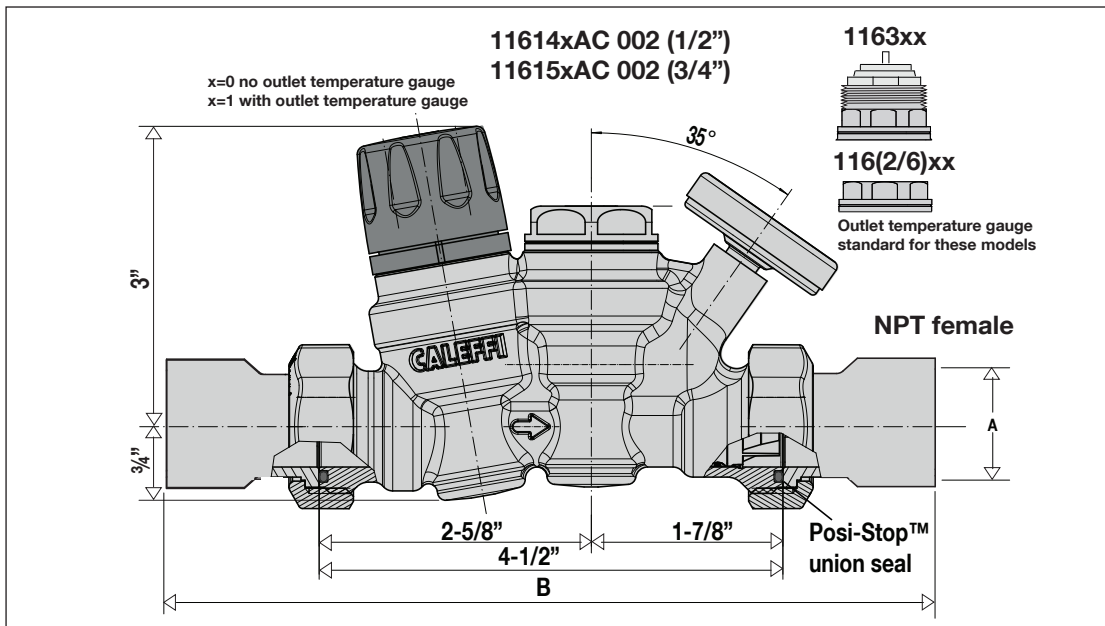
### Certifications:

1. Complies with codes IPC and UPC and standard NSF/ANSI/CAN 61 (180 °F/82 °C Commercial Hot), as certified by ICC-ES, file PMG-1512.
2. Complies with NSF/ANSI 372, low lead, as certified by ICC-ES, file PMG-1360.
3. PEX crimp fittings certified to ASTM F 1807.
4. PEX expansion fittings certified to ASTM F 1960.



## Dimensions

### ThermoSetter 116A series 1/2" & 3/4" union connections with standard outlet check



Base Code	A (pipe fitting size)	B					Weight w/o ball valves w/ ball valves (lb/kg) (NPT;Sweat;Press; PEX expansion; PEX crmp)
		Fitting Type					
		NPTF 002 102	Sweat 009 109	Press** 006 106	PEX expansion 008 108	PEX crimp 007 107	
116n40AC XXX with isolation ball valves	1/2"	6 11/16" 12 1/4"	6 1/32" 11 9/16"	6 11/16" 12 3/16"	5 15/16" 11 7/16"	5 7/8" 11 3/8"	3.0;2.6;2.4;2.4;2.4 5.0;4.6;4.4;4.4;4.4
*116n41AC XXX with isolation ball valves		6 11/16" 12 1/4"	6 1/32" 11 9/16"	6 11/16" 12 3/16"	5 15/16" 11 7/16"	5 7/8" 11 3/8"	3.0;2.6;2.4;2.4;2.4 5.0;4.6;4.4;4.4;4.4
116n50AC XXX with isolation ball valves	3/4"	7 7/32" 12 11/16"	6 1/2" 12"	6 3/4" 12 1/4"	8 7/8" 14 3/8"	7 7/8" 13 7/16"	3.0;2.8;2.4;2.4;2.4 5.0;4.8;4.4;4.4;4.4
*116n51AC XXX with isolation ball valves		7 7/32" 12 11/16"	6 1/2" 12"	6 3/4" 12 1/4"	8 7/8" 14 3/8"	7 7/8" 13 7/16"	3.0;2.8;2.4;2.4;2.4 5.0;4.8;4.4;4.4;4.4

\*with integral outlet temperature gauge (digits 5 and 6=41 and 51 only for 1161 models, and not used for A=2,6,3)

\*\*Lay Length: size 1/2": 5 inch; size 3/4": 4-3/16 inch.

n: =1 for models without disinfection function, integral outlet temperature gauge optional.

=2 for models with 160 °F (70 °C) disinfection temperature, includes integral outlet temperature gauge.

=6 for models with 140 °F (60 °C) disinfection temperature, includes integral outlet temperature gauge.

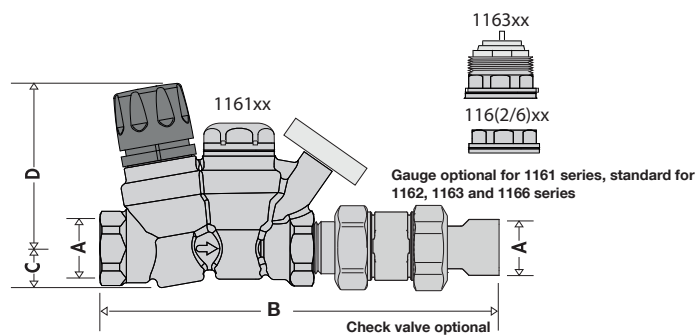
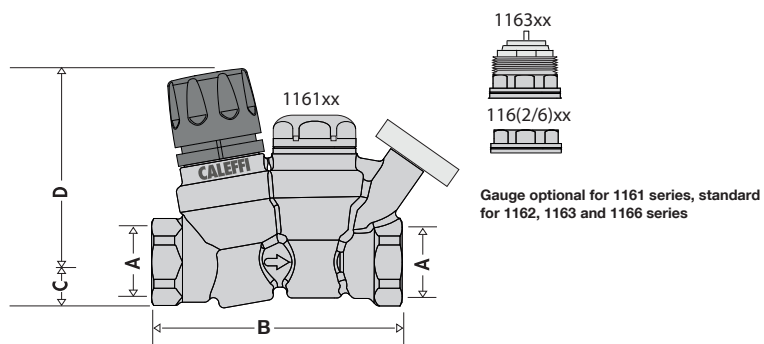
=3 for models with actuator disinfection function, includes integral outlet temperature gauge.

XXX: suffix identifies end connection style with and without isolation ball valves on inlet and outlet.

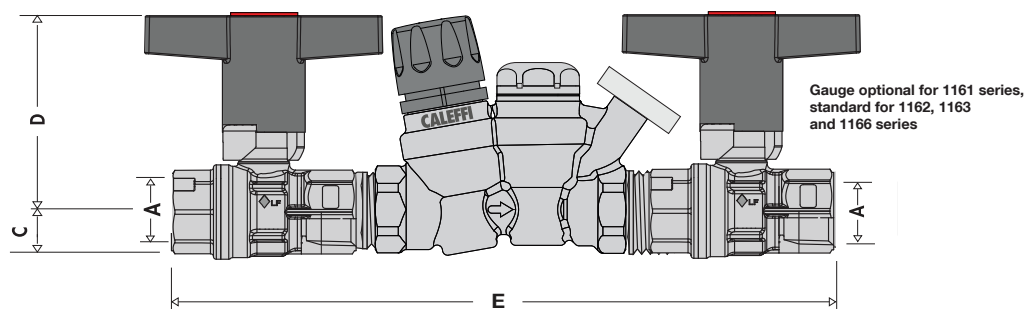
All 1/2" and 3/4" models have outlet check valve pressed into outlet before installing tailpiece and union nut, standard.

Example: 3/4" with press tailpiece, using 140 °F disinfection cartridge, isolation ball valves and gauge:  
**116651AC 106.**

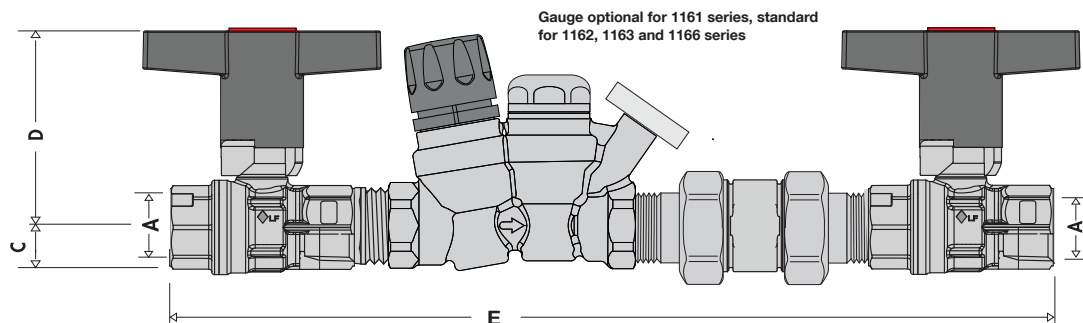
ThermoSetter 116A series 1" & 1¼" with & without outlet check



Isolation valves, no check valve



Isolation valves with check valve



**ThermoSetter 116A series 1" & 1¼" without outlet check**

Code (see note 1)	Code (see note 2)	A	B	C	D	E	Wt w/o ball valves (lb/kg)	Wt with ball valves (lb/kg)
<b>116</b> 160A	<b>116</b> D60A	1" NPT F	4½"	1"	4 ⅜"	--	2.1 / (0.95)	--
<b>116</b> 160A 001	<b>116</b> D60A 001	1" NPT F	--	1"	4 ⅜"	12"	--	4.1 (1.8)
<b>116</b> 161A*	--	1" NPT F	4½"	1"	4 ⅜"	--	2.2 / (1.00)	--
<b>116</b> 161A 001*	--	1" NPT F	--	1"	4 ⅜"	12"	--	4.2 (1.9)
<b>116</b> 170A	<b>116</b> D70A	1¼" NPT F	4½"	1"	4 ⅜"	--	2.1 / (0.95)	--
<b>116</b> 170A 001	<b>116</b> D70A 001	1¼" NPT F	--	1"	4 ⅜"	13 ⅞"	--	5.6 (2.5)
<b>116</b> 171A*	--	1¼" NPT F	4½"	1"	4 ⅜"	--	2.2 / (1.00)	--
<b>116</b> 171A 001*	--	1¼" NPT F	--	1"	4 ⅜"	13 ⅞"	--	5.7 (2.6)

**ThermoSetter 116A series 1" & 1¼" with outlet check**

Code (see note 1)	Code (see note 2)	A	B	C	D	E	Wt w/o ball valves (lb/kg)	Wt with ball valves (lb/kg)
<b>116</b> 160AC	<b>116</b> D60AC	1" NPT F	9 ½"	1"	4 ⅜"	--	2.3 / (1.0)	--
<b>116</b> 160AC 001	<b>116</b> D60AC 001	1" NPT F	--	1"	4 ⅜"	15 ¾"	--	4.3 (1.9)
<b>116</b> 161AC*	--	1" NPT F	9 ½"	1"	4 ⅜"	--	2.4 / (1.1)	--
<b>116</b> 161AC 001*	--	1" NPT F	--	1"	4 ⅜"	15 ¾"	--	4.4 (2.0)
<b>116</b> 170AC	<b>116</b> D70AC	1¼" NPT F	9 ¾"	1"	4 ⅜"	--	2.3 / (1.0)	--
<b>116</b> 170AC 001	<b>116</b> D70AC 001	1¼" NPT F	--	1"	4 ⅜"	17 ⅜"	--	4.1 (1.8)
<b>116</b> 171AC*	--	1¼" NPT F	9 ¾"	1"	4 ⅜"	--	2.4 / (1.1)	--
<b>116</b> 171AC 001*	--	1¼" NPT F	--	1"	4 ⅜"	17 ⅜"	--	4.2 (1.9)

Codes with suffix '001' come assembled with NA108 ball valves on the inlet and outlet.

(1) Models without disinfection function

\* with integral outlet temperature gauge.

(2) Models with disinfection function

D=2 for models with 160 °F (70 °C) disinfection temperature.

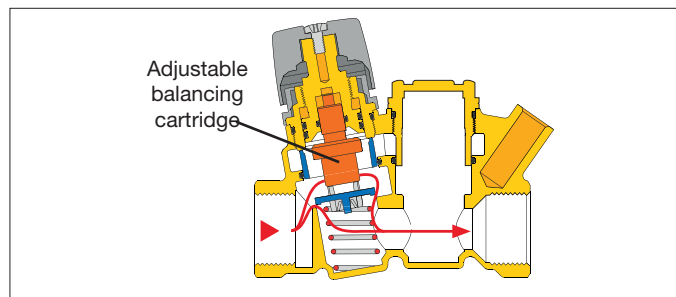
D=6 for models with 140 °F (60 °C) disinfection temperature.

D=3 for models with actuator disinfection function.

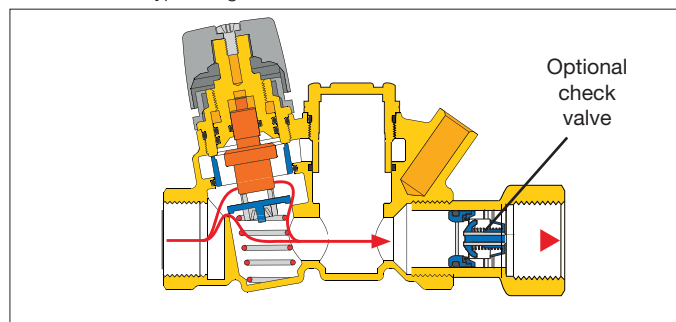
NOTE: All models, in this column come complete with integral outlet temperature gauge.

## Operating principle

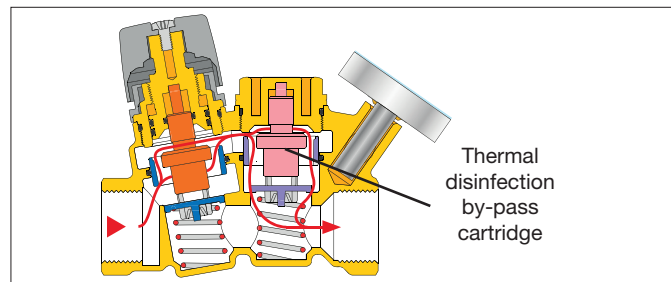
The ThermoSetter adjustable thermal balancing valve, 116A series models, installed at the end of each branch of the domestic hot water recirculation system, automatically maintains the set temperature. It controls the water flow rate according to the inlet temperature with the internal adjustable thermostatic cartridge. The thermostatic cartridge modulates the valve opening in response to changing water temperature, and when reaching the temperature setting, closes the valve to minimum flow position. A recirculation pump distributes flow to all the branches resulting in effective automatic thermal balancing. The automatic response allows each hot water branch to deliver hot water to each fixture. The ThermoSetter works perfectly with variable speed recirculation pumps for optimal energy usage.



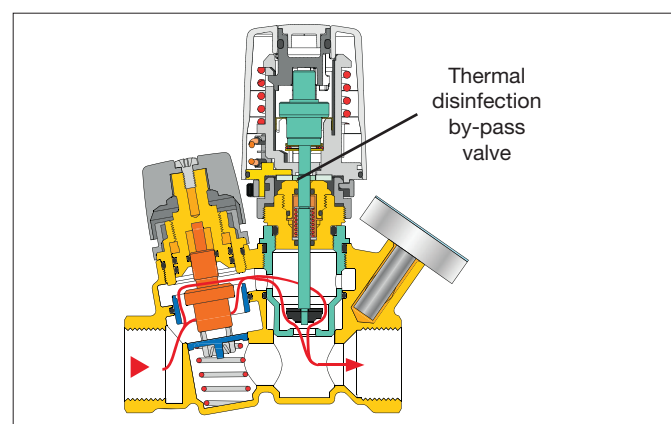
Optional check valve are available for all models, which protect against circuit thermo-syphoning.



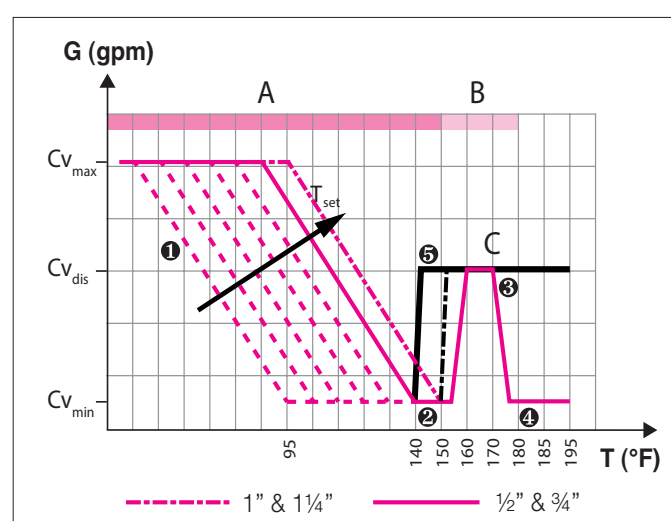
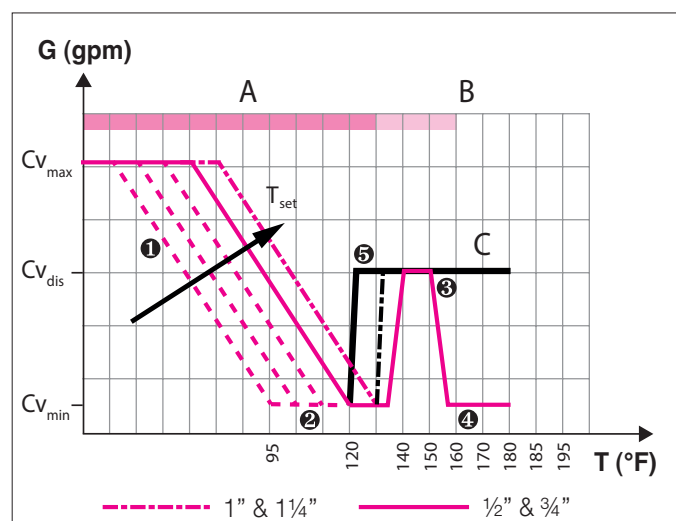
For systems using thermal disinfection for Legionella growth protection, the 1162xx series models incorporate a second thermostatic by-pass cartridge that activates at 160°F. The 1166xx series models activates at 140°F. A second flow path opens providing flow for the disinfection process which is independent of the primary balancing cartridge.



Alternately, the 1163xx series models incorporate a by-pass valve for thermal disinfection which is activated by a optional field mounted thermo-electric actuator, code 656 series, controlled by a automation system.



## Operating mode



	1/2" & 3/4"	1" & 1 1/4"
	Cv (Kv)	Cv (Kv)
Cv (Kv) max:	2.1 (1.8)	4.4 (3.8)
Cv (Kv) dis:	1.2 (1.0)	2.3 (2.0)
Cv (Kv) min:	0.23 (0.2)	1.0 (0.9)

The graph shows the variation of the Cv value depending on the valve operating mode (A, B, C) and on the inlet temperature of the domestic hot water.

#### Operating mode A - Temperature control

Cv max: = 2.1 maximum flow state when operating in temperature control mode (cartridge fully open).

Cv min: = 0.23 minimum flow state when operating at set point in temperature control mode (cartridge nearly closed).

#### Operating mode B - Automatic thermostatic disinfection

Cv dis: = 1.2 maximum flow state when operating in thermostatic controlled thermal disinfection mode with a temperature of 160 °F (70 °C).

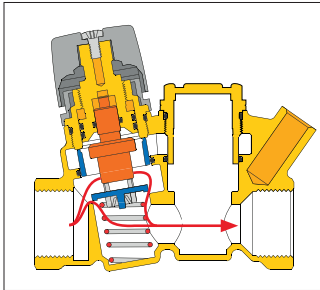
#### Operating mode C - Actuator-controlled disinfection

Cv dis: = 1.2 maximum flow state when operating in actuator-controlled thermal disinfection mode using a thermo-electric actuator, code 656 series.

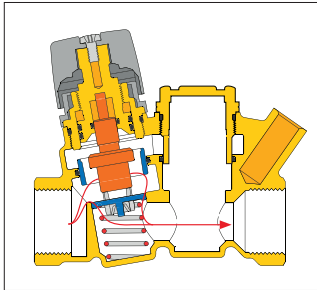
#### Operating mode A - Temperature control

At the set temperature, the valve plug, controlled by the thermostatic balancing cartridge, gradually closes the outlet to the minimum. The outlet never fully closes to always allow a minimum flow for temperature sensing and to prevent recirculation pump dead-heading. If the temperature decreases, the outlet increases, causing flow and thus temperature to increase back to the set temperature as shown in curve 1. If temperature exceeds the set-point, the plug stays in the minimum closed position as shown in curve 2. The balancing cartridge has a throttling range of 60 °F, from full open to minimum position.

❶ Thermostatic balancing control



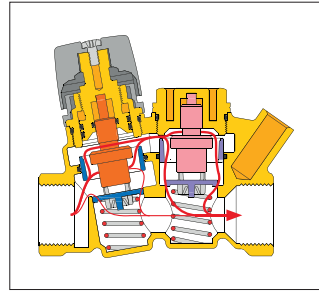
❷ Minimum flow rate



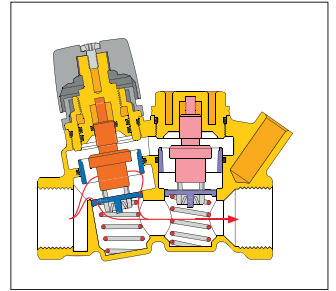
#### Operating mode B - Automatic thermostatic disinfection

The 1162xx and 1166xx series operating characteristic curves for operating mode B are curves 1, 2, 3 and 4. When a temperature higher than about 155 °F (68 °C) is reached, a by-pass passage begins to open to activate the second thermostatic cartridge which controls the thermal disinfection process, allowing flow independent of the operation of the thermostatic balancing cartridge. This allows water flow through a special by-pass port, opening the flow path up until the by-pass temperature is attained shown in curve 3. If the temperature continues rising beyond this point, the flow is reduced through the by-pass port to allow thermal balancing even during the disinfection process. When temperature reaches closing temperature, the disinfection by-pass port closes to protect the system fixtures from the effects of excessive temperatures, as shown in curve 4.

❸ Thermostatic disinfection by-pass



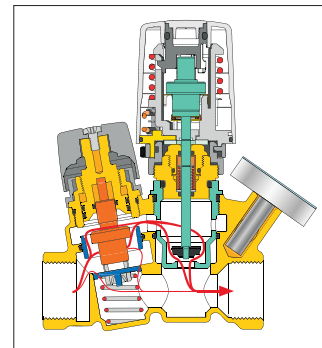
❹ Thermal shut-off



#### Operating mode C - Actuator-controlled disinfection

The 1163xx series operating characteristic curves for operating mode C are curves 1, 2 and 5. When the disinfection operating temperature setting of the electronic disinfection system is reached, the thermo-electric actuator 656 series (which is controlled by a dedicated electronic control system), is energized to operate the by-pass valve to control the disinfection process, allowing flow independent of the operation of the thermostatic balancing cartridge shown in curve 5. In this case, the minimum head loss is produced during this thermal disinfection process.

❺ Electric controlled disinfection by-pass

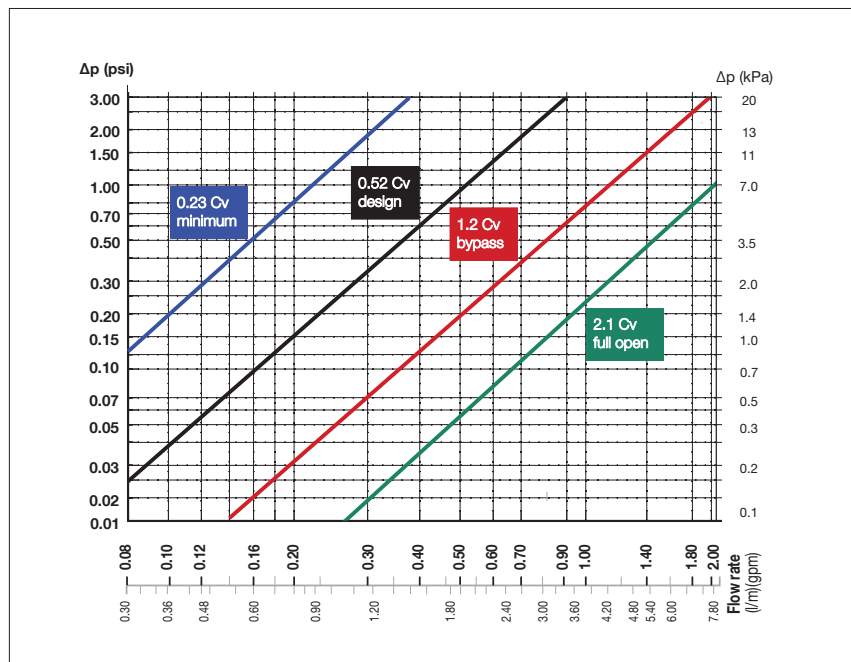




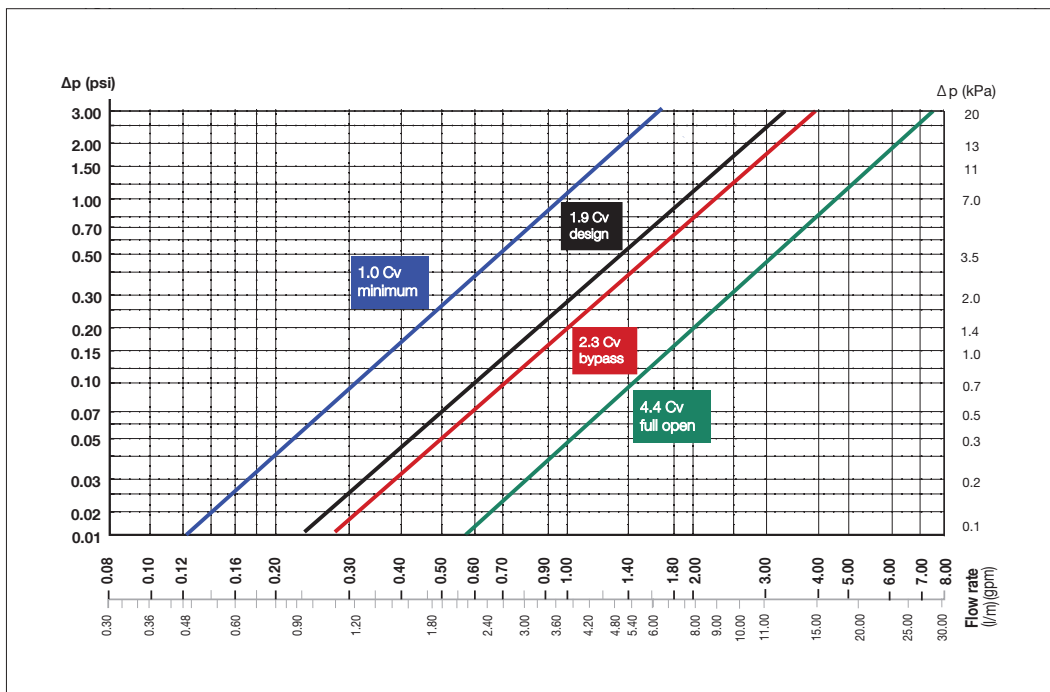
## Flow characteristics

The ThermoSetter thermostatic balancing valve is designed to balance individual branches of domestic hot water recirculation systems, based on the temperature at the valve. It automatically modulates flow to maintain hot water availability to all fixtures in the branch circuit. The valve is at minimum flow ( $C_v = 0.23$ ) when the incoming water temperature is equal to the set-point position of the adjustment dial. The valve opens as incoming water temperature drops.

For pressure loss calculations in the recirculation system, follow traditional pipe sizing and head loss practices. For pressure loss calculations across the ThermoSetter valve, use the design curve shown in the graph below. This line represents a typical valve position under normal working conditions ( $\Delta T = 10^\circ\text{F}$ ). Determine the pressure drop across the valve by selecting the branch design GPM on the graph X-axis, draw a vertical line up to the "design" curve, then go across to the Y-axis to find the design pressure drop. Include that pressure drop in your head loss calculations for the circuit.



Sizes 1/2" and 3/4"



Sizes 1" and 1 1/4"

The "by-pass mode" curve in the charts above shows the head loss of the valve when it is in by-pass thermal disinfection mode for Legionella control.



## System sizing

For flow rate calculations in the recirculation system, the pump is sized to provide sufficient flow to compensate for the total heat loss in all the supply branches to the furthest fixture in each circuit. Heat loss in return lines, downstream of the balancing valves, is irrelevant and not included in the flow rate calculations.

The flow rate calculation formula to use is:  $GPM = BTU/h / \Delta T \times 500$ .

Common design practice for recirculation lines is to use a  $\Delta T$  of 10 °F. This is the temperature difference of the recirculating water between the heat source and to the furthest fixture in each circuit. Assuming the common value of a  $\Delta T = 10$  °F, the equation simplifies to:

$$GPM = BTU/h / 5000.$$

BTU/h heat loss, will vary based on pipe type and insulation. Heat loss tables and charts are available from a variety of sources.

### Example:

Calculate the recirculation circuit flow rate for 100 feet of ¾" non-insulated copper pipe. Assume an average heat loss of 30 BTU/h per foot.

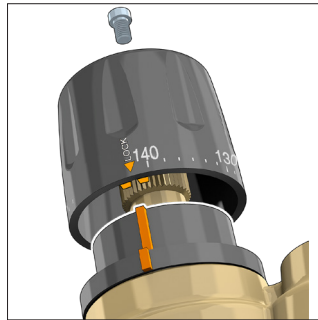
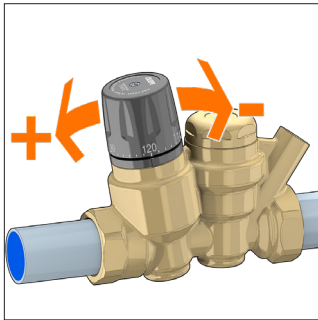
30 BTU/h per foot x 100 feet = 3000 BTU/h heat loss in the supply piping.

Flow rate =  $3000 / 5000 = 0.6$  GPM flow required in that circuit.

## Temperature adjustment and locking

Set the desired recirculation system temperature by turning the adjustment knob. The graduated scale shows the temperatures at which the adjustment knob can be set.

After adjusting the temperature, the setting can be locked at the desired value using the adjustment knob. Unscrew the locking screw at the top of the adjustment knob, remove the knob and then put it back on so that the internal groove couples with the protrusion on the knob holder nut. When this lock is used, the reference of the indication of the temperature values on the knob is lost. To restore it, completely unscrew the locking screw. Reposition the knob on MAX value. Insert and tighten the locking screw.



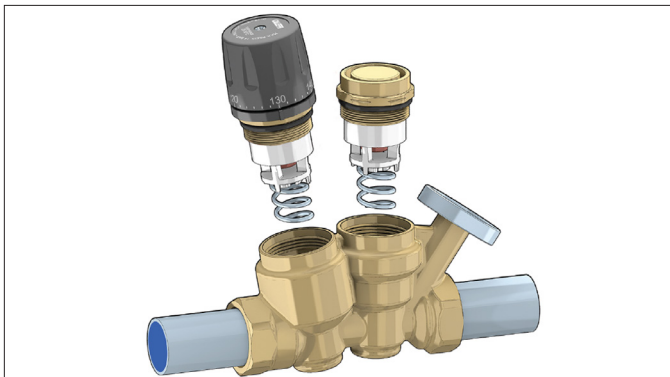
## Maintenance

Both the adjustable balancing cartridge and the disinfection control cartridge can be removed from the valve body for periodic inspection, cleaning or replacement.

Replacement disinfection by-pass cartridges:

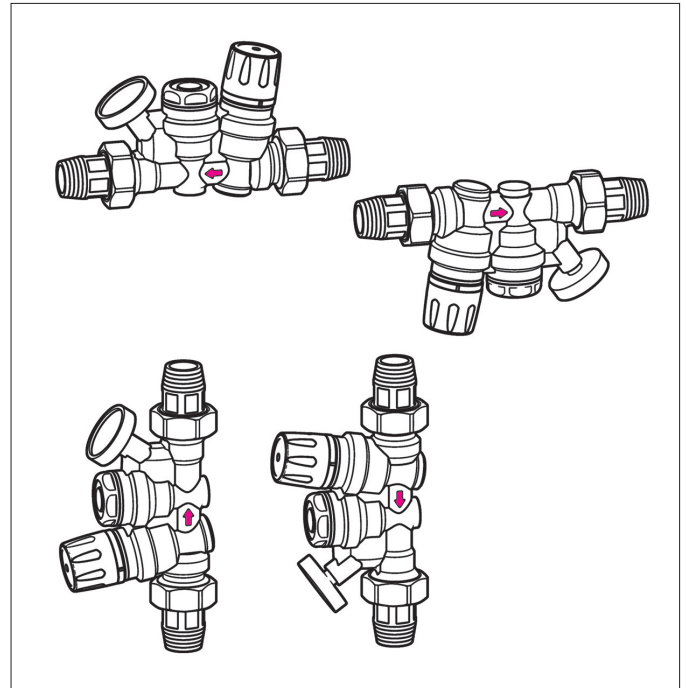
160 °F (70 °C) for 1162 series...F0000580

140 °F (60 °C) for 1166 series...F0001286



## Installation

Before installing the ThermoSetter, flush the pipes to make sure that impurities in the system will not interfere with valve performance. Strainers of sufficient capacity at the inlet from the water main are highly recommended. The ThermoSetter can be installed in any position, vertical or horizontal, following the flow direction indicated by the arrow on the valve body. The ThermoSetter must be installed according to the diagrams given herel. It must be installed to allow free access for checking on operation and maintenance procedures.



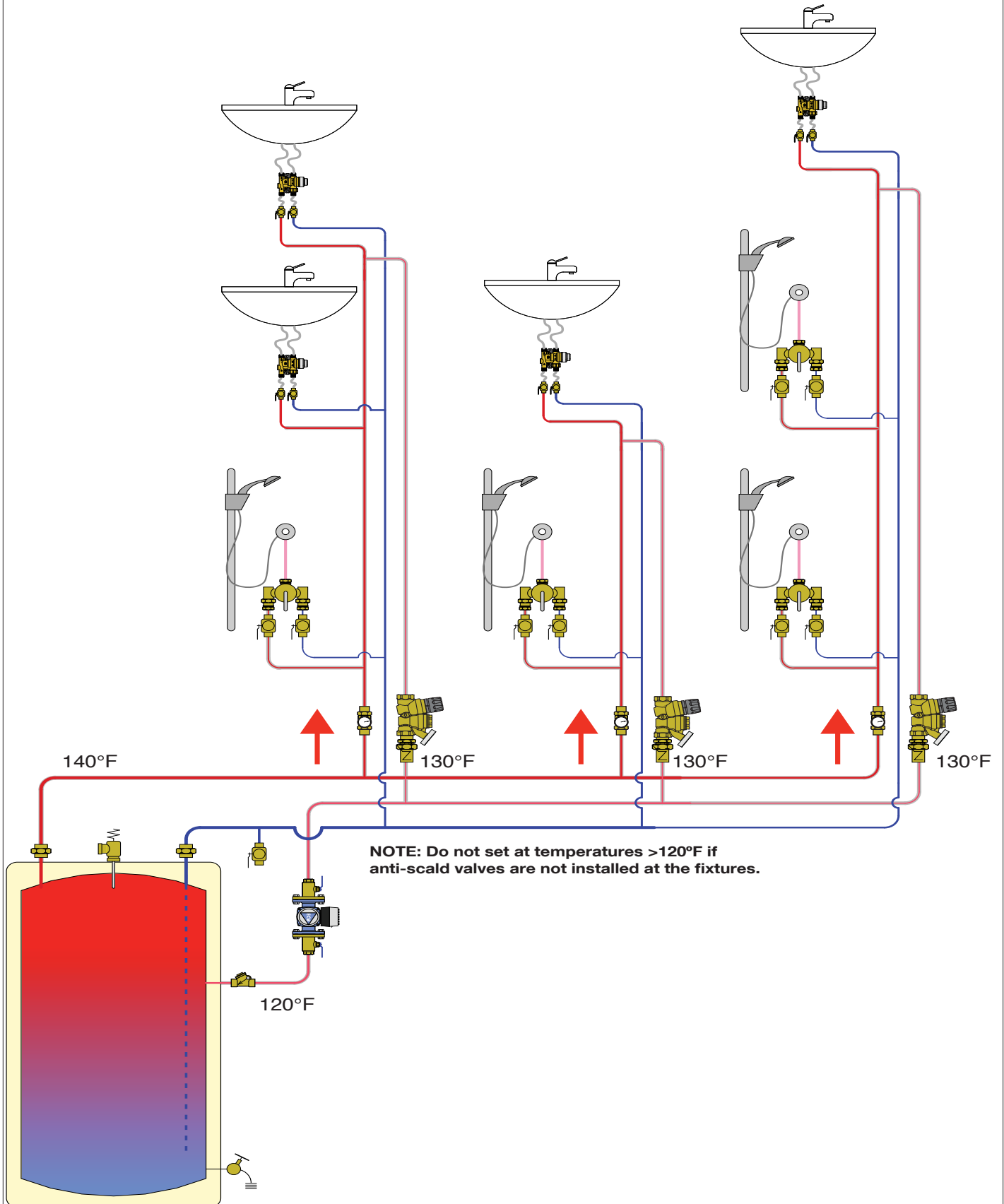
Scan to view



Installation Tip

## Typical application diagram

### Hot water recirculation with thermal balancing valves

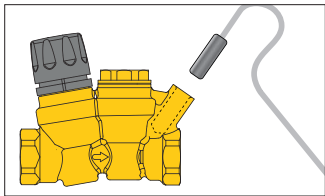


Accessories

ThermoSetter codes 116140A(C), 116150A(C), 116160A(C) and 116170A(C) come standard without temperature gauge, but temperature gauge, code 116010 can be field-installed later for confirming the temperature of the hot water in the circuit.



The temperature gauge dry-well can also be used for inserting a special immersion probe (with Ø < 10 mm) for remote control of the disinfection temperature by a dedicated electronic control unit.



Insulation shell

The ThermoSetter insulation shell can be purchased separately to minimize heat loss.

Code	Description
<b>CBN116140</b>	Insulation shell for 1161, 1162, 1163 for ½" and ¾" sizes
<b>CBN116160</b>	Insulation shell for 1161, 1162, 1163 for 1" and 1¼" sizes



Replacement cartridges

Code	Description
<b>116000</b>	Actuator disinfection cartridge for use with 656 actuator
<b>F0001516</b>	Main balancing cartridge for ½" and ¾" sizes *
<b>F0001286</b>	Thermal disinfection bypass cartridge, 140 °F
<b>F0000580</b>	Thermal disinfection bypass cartridge, 160 °F

\*Contact Caleffi for main balancing cartridge for 1" and 1¼" sizes.



116000



F0001288  
F0000580

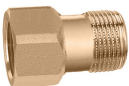


F0001516

Inline check valves

DZR low-lead brass.  
Max working pressure: 150 psi  
Max. working temperature: 250 °F (120 °C)

Code	Description
<b>NA51361</b>	1" MNPT in x 1" FNPT out
<b>NA51371</b>	1¼" MNPT in x 1¼" FNPT out



Pipe nipples

Low-lead brass.  
For connecting NA108 ball valves to inlet and outlet of 116 series ThermoSetter balancing valves.

Code	Description
<b>NA10836</b>	1" NPT nipple
<b>NA10837</b>	1¼" NPT nipple



### Isolation ball valves

The NA108 series low-lead brass full-port ball valves are designed for isolating ThermoSetter 116A series thermal balancing valves with the 1" and 1- 1/4" FNPT connections. The isolation valve easily installs in the inlet and outlet sides of the valve body using a low-lead close nipple. Some products are available pre-assembled with the NA108 series isolation valve. For example, the Caleffi 116A series ThermoSetter can be ordered complete with two of these ball valves plus low-lead close nipples by adding a suffix "001" to the order code number, see page 11.



The NA108 series have an extended stem which allows operation if the valve body gets insulated. There is no need to purchase an expensive separate stem extension which then has to be field-installed between the valve body and handle. The valve features a blowout proof stem, PTFE seats, double o-ring stem seals, lead free brass ball and stem, and polyamide thermal plastic T handle.

The following codes can be ordered separately for field installation with separately sourced low-lead close nipples.

Code	Description
<b>NA10826</b>	1" FNPT
<b>NA10827</b>	1 1/4" FNPT

### Technical specifications of NA108 ball valve

#### Materials

Body and end connection:	high tensile strength forged low-lead brass C28500
Ball and stem:	low-lead brass C28500
Stem nut:	steel (CL04)
Seats (2):	PTFE
90° stop:	hot rolled steel (DD11)
O-ring stem seals (2):	nitrile butadiene rubber (NBR) & fluoro-elastomer (FKM)
Thrust washer and packing ring:	PTFE
Black T-handle:	polyamide thermal plastic (PA6.6)
Handle top cap:	acrylonitrile butadiene styrene (ABS)

#### Performance

Suitable Fluids:	water, glycol solutions
Max. percentage of glycol:	50%
Pressure rating:	600 WOG-150WSP
Working temperature range:	-4 – 366 °F (-20 – 186 °C)
Shutoff performance:	bubble tight

#### Connections:

Main connections for 116A series:  
1", 1-1/4", NPT female inlet and outlet



Caleffi code 290030 and 290031 full-port ball valve is designed for isolating the 116A series ThermoSetter sizes 1/2" and 3/4" which have 1" metric "G" thread union connections. The isolation valve installs in between the valve body and the tailpiece fitting assembly. Male x Female configuration and bi-directional full ball valve flow capacity provides flexibility for using one, two or three isolation valves for the primary functioning valve. An optional stem extension model is also available for those projects that require pipe insulation.



Code	Description
<b>290030</b>	Isolation ball valve low lead 1" Male x 1" Female union
<b>290031</b>	Isol. ball valve with extended stem low lead 1" M x 1" F union

### Technical specifications of 290030 and 290031 ball valve

#### Materials

Body and male end cap:	DZR low-lead brass EN 12165 CW510L
Female unplated nut:	DZR low-lead brass EN CW617N EN 12165
Chrome-plated ball and unplated stem:	DZR low-lead brass EN 12164 CW510L
Seats (2):	PTFE
O-ring stem seals (2):	EPDM
Gasket:	EPDM
Green T-handle (RAL6001):	Cast Aluminum EN AC-46100 EN 1676

#### Performance

Suitable Fluids:	water, glycol solutions
Max. percentage of glycol:	50%
Max. working pressure:	230 psi (16 bar)
Working temperature range:	-40 – 300 °F (-40 – 150 °C)
Flow coefficient, fully open:	Cv 5.8 (Kvs 5.0)

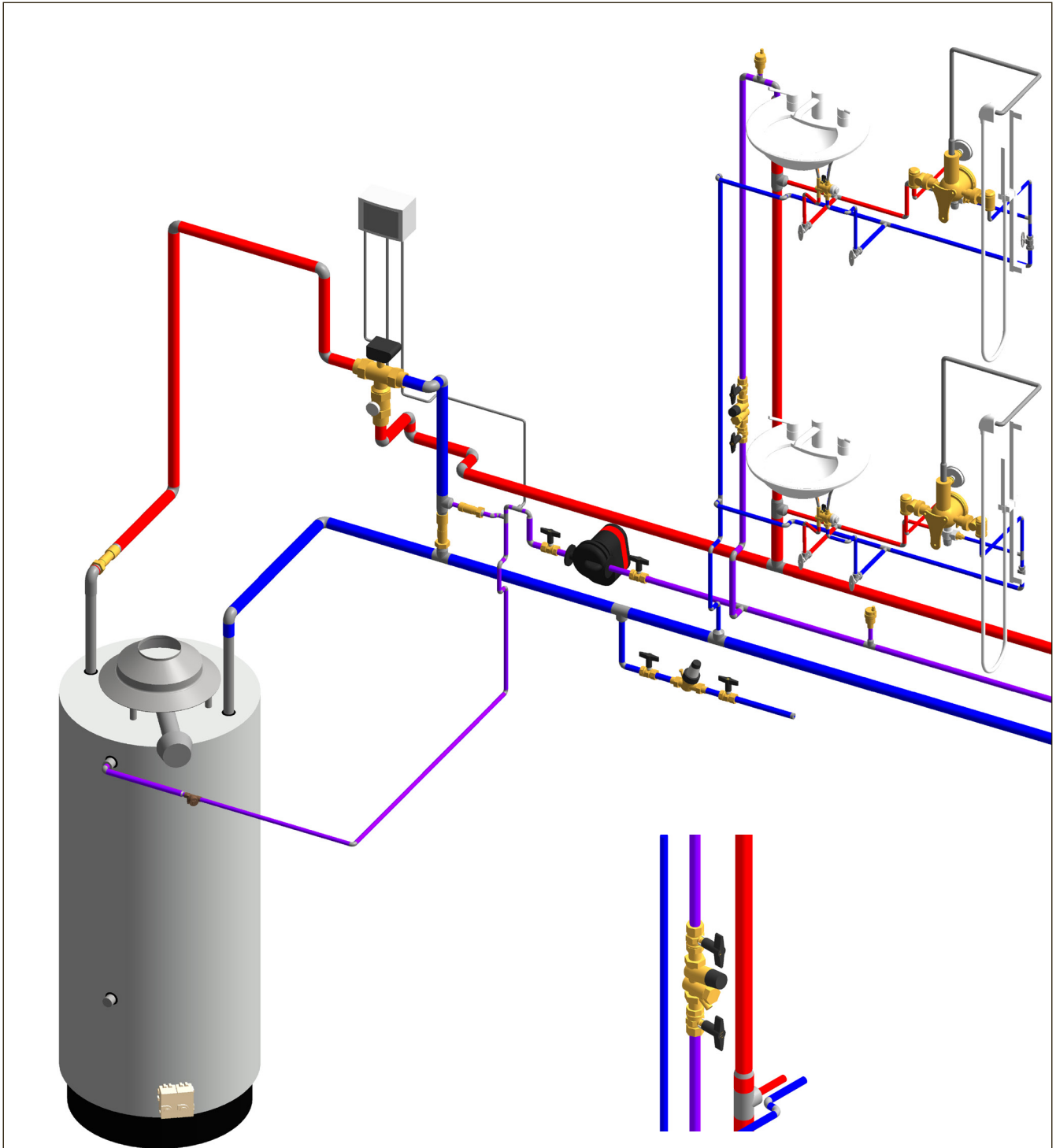
#### Connections:

Main connections: 1" Metric "G" thread Male x Female, ISO 228/1

#### Certifications:

Complies with NSF/ANSI/CAN 61 & 372.





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### **Series 1161**

Thermal balancing valve for domestic hot water recirculation circuits. Dezincification resistant low-lead brass body (<0.25% Lead content) certified to NSF/ANSI 372 by ICC-ES, file PMG-1360. Certified to NSF/ANSI 61 (180 °F/82 °C Commercial Hot), by ICC-ES, file PMG-1512. Sizes ½" and ¾": sweat, press. PEX crimp and PEX expansion union connections. PEX crimp fittings must comply with ASTM F 1807. PEX expansion fittings must comply with ASTM F 1960. Sizes 1" and 1¼" with NPT female connections. Adjustable thermostatic cartridge. Peroxide-cured EPDM hydraulic seals. Temperature gauge/probe dry-well Ø 10 mm. Maximum working pressure 230 psi (16 bar). Maximum differential pressure 15 psi (1 bar). Adjustment temperature range 95 °F to 140 °F (35 °C to 60 °C), sizes ½", ¾"; 95°F to 150°F (35 °C to 65 °C), sizes 1", 1¼". Flow rating: 2.1 Cv (1.8 Kv) maximum, 0.23 Cv (0.2 Kv) minimum, 0.52 Cv (0.45 Kv) design. Equipped with: ABS adjustment knob with temperature adjustment scale for manual setting and tamper-proof adjustment locking screw. Provide with optional outlet temperature gauge with 32 °F to 180 °F (0 °C to 80 °C) temperature scale. For sizes ½" and ¾", provided with inlet flow check valve. For sizes 1" and 1¼", provide with optional check valve. For sizes ½" and ¾", provide with optional inlet and outlet isolation low-lead ball valves, code 290030, factory-assembled; code 290030 or 290031 with extended stem, separately sourced, field installed. For sizes 1" and 1¼", provide with optional inlet and outlet low-lead brass full-port ball valves, NPT female x NPT female, for isolation, factory-assembled, or separately-sourced, Code NA108 series, with separately-sourced low-lead close nipples. Pre-formed insulation shell is available for field installation.

### **Series 1162 & 1166**

Thermal balancing valve for domestic hot water recirculation circuits with thermostatic by-pass valve for thermal disinfection function. Dezincification resistant low-lead brass body (<0.25% Lead content) certified to NSF/ANSI 372 by ICC-ES, file PMG-1360. Certified to NSF/ANSI 61 (180 °F/82 °C Commercial Hot), by ICC-ES, file PMG-1512. Sizes ½" and ¾": sweat, press. PEX crimp and PEX expansion union connections. PEX crimp fittings must comply with ASTM F 1807. PEX expansion fittings must comply with ASTM F 1960. Sizes 1" and 1¼" with NPT female connections. Adjustable thermostatic cartridge. Peroxide-cured EPDM hydraulic seals. Temperature gauge/probe dry-well Ø 10 mm. Maximum working pressure 230 psi (16 bar). Maximum differential pressure 15 psi (1 bar). Adjustment temperature range 95 °F to 140 °F (35 °C to 60 °C), sizes ½", ¾"; 95 °F to 150 °F (35 °C to 65 °C), sizes 1", 1¼". Disinfection temperature 160 °F (70 °C) for 1162 series, 140 °F (60 °C) for 1166 series. Closing temperature 170 °F (75 °C) for 1162 series, 150 °F (65 °C) for 1166 series. Flow rating: 2.1 Cv (1.8 Kv) maximum, 1.2 Cv (1.0 Kv) disinfection, 0.23 Cv (0.2 Kv) minimum, 0.52 Cv (0.45 Kv) design. Equipped with: ABS adjustment knob with temperature adjustment scale for manual setting and tamper-proof adjustment locking screw, outlet temperature gauge with 32 °F to 180°F (0 °C to 80 °C) temperature scale. For sizes ½" and ¾", provided with inlet flow check valve. For sizes 1" and 1¼", provide with optional check valve. For sizes ½" and ¾", provide with optional inlet and outlet isolation low-lead ball valves, code 290030, factory-assembled; code 290030 or 290031 with extended stem, separately sourced, field installed. For sizes 1" and 1¼", provide with optional inlet and outlet low-lead brass full-port ball valves, NPT female x NPT female, for isolation, factory-assembled, or separately-sourced, Code NA108 series, with separately-sourced low-lead close nipples. Pre-formed insulation shell is available for field installation.

### **Series 1163**

Thermal balancing valve for domestic hot water recirculation circuits with by-pass valve for thermal disinfection function with optional code 656 series thermo-electric actuator. Dezincification resistant low-lead brass body (<0.25% Lead content) certified to NSF/ANSI 372 by ICC-ES, file PMG-1360. Certified to NSF/ANSI 61 (180 °F/82 °C Commercial Hot), by ICC-ES, file PMG-1512. Sizes ½" and ¾": sweat, press. PEX crimp and PEX expansion union connections. PEX crimp fittings must comply with ASTM F 1807. PEX expansion fittings must comply with ASTM F 1960. Sizes 1" and 1¼" with NPT female connections. Adjustable thermostatic cartridge. Peroxide-cured EPDM hydraulic seals. Temperature gauge/probe dry-well Ø 10 mm. Maximum working pressure 230 psi (16 bar). Maximum differential pressure 15 psi (1 bar). Adjustment temperature range 95 °F to 140 °F (35 °C to 60 °C), sizes ½", ¾"; 95 °F to 150 °F (35 °C to 65 °C), sizes 1", 1¼". Disinfection temperature 160 °F (70 °C). Closing temperature 170 °F (75 °C). Flow rating: 2.1 Cv (1.8 Kv) maximum, 1.2 Cv (1.0 Kv) disinfection, 0.23 Cv (0.2 Kv) minimum, 0.52 Cv (0.45 Kv) design. Equipped with: ABS adjustment knob with temperature adjustment scale for manual setting and tamper-proof adjustment locking screw, outlet temperature gauge with 32 °F to 180 °F (0 °C to 80 °C) temperature scale. For sizes ½" and ¾", provided with inlet flow check valve. For sizes 1" and 1¼", provide with optional check valve. For sizes ½" and ¾", provide with optional inlet and outlet isolation low-lead ball valves, code 290030, factory-assembled; code 290030 or 290031 with extended stem, separately sourced, field installed. For sizes 1" and 1¼", provide with optional inlet and outlet low-lead brass full-port ball valves, NPT female x NPT female, for isolation, factory-assembled, or separately-sourced, Code NA108 series, with separately-sourced low-lead close nipples. Pre-formed insulation shell is available for field installation.

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