PivotMixer™ water heater tank and heat pump mixing valve

520 Series

ASSE 1017
NSF/ANSI/CAN 372

Function

The Caleffi PivotMixer™ combines the AngleMix™ three-way point-of-distribution thermostatic mixing valve with a cold water cross and pivoting brass connectors for easy installation directly on typical electric water heaters and heat pump water heaters. It has unique ¾" pivot connectors that adapt to heater nipples spaced from 3" to 8" on-center. The cross for the cold water supply contains an integral check valve for the flow to the mixing valve and ½" NPT female threaded recirculation tap. The PivotMixer maintains the desired output temperature of the mixed water supplied at a constant set value compensating for both temperature and pressure fluctuations of the incoming hot and cold water. The mixing valve also features a thermal shut-off function that operates in the event of a cold water supply failure at the inlet. The angle style body design offers improved fluid dynamics for better performance and reduces installation labor and materials. The mixing valve has been certified to ASSE 1017 and Low Lead Plumbing Law by ICC-ES. It complies with codes IPC, IRC, NPC and UPC for use in accordance with US and Canadian plumbing codes, and standard NSF/ANSI/CAN 372, governing low lead material content.

Product range

52051_AP series kit:

Adjustable three-way thermostatic mixing valve, angle body with cold water cross and pivot connectors, connections ¾" NPT female to water heater; ¾" sweat, press, and NPT male union system connections.

Technical specification

Materials

Valve, cold water cross body and pivot connectors: DZR low-lead* brass
Shutter, seats and slide guides: PSU
Springs: stainless steel
Seals: peroxide-cured EPDM
Adjustment knob: ABS
Flexible pipe: stainless steel
Recirc. port plug: low-lead* brass

Performance

Suitable fluids: water
Setting range: 95 – 150 °F (35 – 65 °C)
Tolerance: ±3 °F (±2 °C)

Max. working pressure (static): 150 psi (10 bar)
Max. working pressure (dynamic): 75 psi (5 bar)
Max. hot water inlet temperature:195 °F (90 °C)
Max. inlet pressure ratio (H/C or C/H) for optimal performance: 2:1

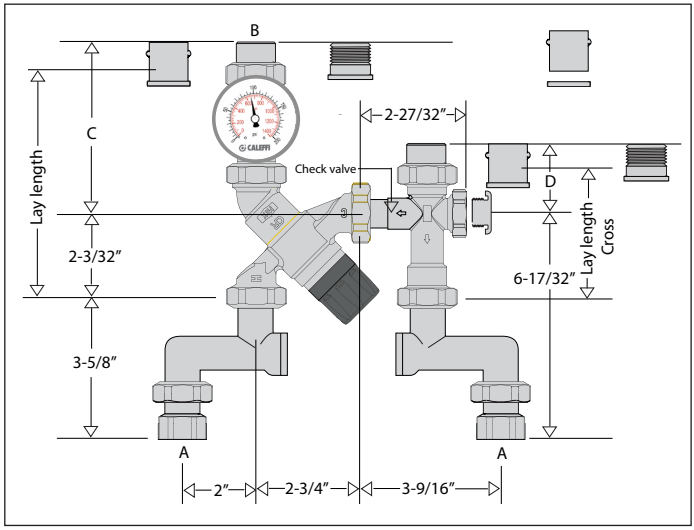
* Meets the "lead free" requirement of Section 1417 of the Safe Drinking Water Act (SDWA). This product has a weighted average lead content of less than 0.25% for its wetted surfaces contacted with consumable water.

Minimum temperature difference between hot water inlet and mixed water outlet for stable operation with balanced supply pressure conditions: 9 °F (5 °C)
Recommended minimum temperature difference between hot water inlet and mixed water outlet for optimal performance: 18 °F (10 °C)
Required minimum temperature difference between hot water inlet and mixed water outlet for thermal shut-off function: 18 °F (10 °C)
Min. flow rate for stable operation with balanced supply pressure conditions: 0.5 gpm (2 l/min)

Certifications:

1. ASSE 1017, CSA B125.3, UPC, IPC, IRC and NPC for use in accordance with U.S. and Canadian plumbing codes. Certified and listed by ICC-ES, File PMG 1357.
2. NSF/ANSI /CAN 372, Drinking Water System Components-Lead Content Reduction of Lead in Drinking Water Act, California Health and Safety Code 116875 S.3874, Reduction of Lead in Drinking Water Act, certified by ICC-ES, file PMG-1360.

Dimensions



Code	A	B	C	D	Wt. (lb.)
520510AP	¾" NPTF	¾" NPTM	4 3/16"	2"	4.5
520516AP	¾" NPTF	¾" PRESS	4 17/32"	2 13/32"	4.4
520519AP	¾" NPTF	¾" SWT	3 5/16"	1 15/16"	4.1

Lay length (hot inlet to mix oulet) for press: 5 11/16"; for sweat: 4 11/16".
Lay length (Cross) for press: 3 9/32"; for sweat: 3 17/32".

SAFETY INSTRUCTION

This safety alert symbol will be used in this manual to draw attention to safety related instructions. When used, the safety symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.**

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

CAUTION: All work must be preformed by qualified personnel trained in the proper application, installation, and maintenance of systems in accordance with all applicable codes and ordinances.

CAUTION: If the thermostatic mixing valve is not installed, commissioned and maintained properly, according to the instructions contained in this manual, it may not operate correctly and may endanger the user.

CAUTION: Make sure that all the connecting pipework is water tight.

CAUTION: If installed in an ASSE 1017 application, check valves shall be used.

CAUTION: When making the water connections, make sure that the pipwork connecting the PivotMixer thermostatic mixing valve is not mechanically overstressed. Over time this could cause breakages, with consequent water losses which, in turn, could cause harm to property and/or people.

CAUTION: Water temperatures higher than 100 ºF (38 ºC) can be dangerous. During the installation, commissioning and maintenance of the PivotMixer thermostatic mixing valve, take the necessary precautions to ensure that such temperatures do not endanger people.

CAUTION: To prevent any damage which will cause the electronic mixing valve to not operate correctly, treat highly aggressive water before entering the thermostatic mixing valve. Be sure water hardness is less than 10 grains.

WARNING: The outer surface of the device, especially in polymer type components, must not come into contact with any chemical substance, either on purpose or accidentally. The system fluid and any chemical additives used within the water piping system – whether for washing or as protection – must be compatible with the materials used to make the device and with the function it performs.

LEAVE THIS MANUAL WITH THE USER.

CONSIGNE DE SÉCURITÉ

Ce symbole d'avertissement servira dans ce manuel à attirer l'attention sur la sécurité concernant instructions. Lorsqu'il est utilisé, ce symbole signifie.
ATTENTION! DEVENEZ ALERTE ! VOTRE SÉCURITÉ EST EN JEU ! NE PAS SUIVRE CES INSTRUCTIONS PEUT PROVOQUER UN RISQUE DE SECURITE.

AVERTISSEMENT: Ce produit peut vous exposer à des produits chimiques comme le plomb, qui est connu dans l'État de Californie pour causer le cancer, dommages à la naissance ou autre. Pour plus d'informations rendez-vous www.P65Warnings.ca.gov.

ATTENTION: Tous les travaux doivent être effectués par du personnel qualifié formé à la bonne application, installation et maintenance des systèmes conformément aux codes et règlements locaux.

ATTENTION: Si le réducteur de pression, termostatico regolabile, n'est pas installé, mis en service et entretenu correctement, selon les instructions contenues dans ce manuel, il peut ne pas fonctionner correctement et peut mettre en danger l'utilisateur.

ATTENTION: S'assurer que tous les raccordements sont étanches.
ATTENTION: S'il est installé dans un pays de ASSE 1017 application, vérifiez les robinets doivent être utilisés.

ATTENTION: Lorsque vous effectuez les raccordements d'eau, assurez-vous que la tuyauterie reliant le PivotMixer termostatico regolabile n'est pas mécaniquement des overstressed. Au fil du temps, ceci pourrait causer des ruptures, avec pour consequence des pertes en eau qui, à leur tour, peuvent causer des dommages à la propriété et/ou les gens.

ATTENTION: Les températures de l'eau supérieure à 100 °F (38 °C) peut être dangereux. Au cours de l'installation, mise en service et l'entretien de le réducteur de pression, le PivotMixer termostatico regolabile, prendre les precautions nécessaires afin de s'assurer que de tells températures ne compromettent pas les gens.

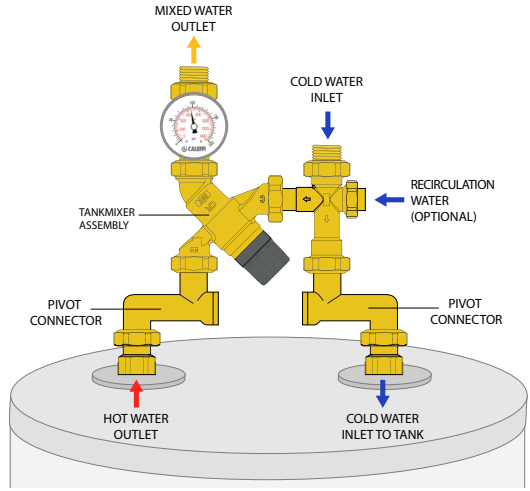
ATTENTION: Pour prévenir tout dommage qui provoque le mitigeur électronique à ne pas fonctionner correctement, le traitement de l'eau très agressive avant d'entrer dans la termostatico regolabile. Assurez-vous que la dureté de l'eau est inférieure à 10 grains.

AVERTISSEMENT: La surface extérieure de l'appareil, en particulier les composants de type polymère, ne doit pas entrer en contact avec des substances chimiques, que ce soit volontairement ou accidentellement. Le produit et les additifs chimiques utilisés dans les canalisations d'eau - que ce soit pour le lavage ou la protection - doivent être compatibles avec les matériaux utilisés pour la fabrication de l'appareil et avec la fonction qu'il remplit.

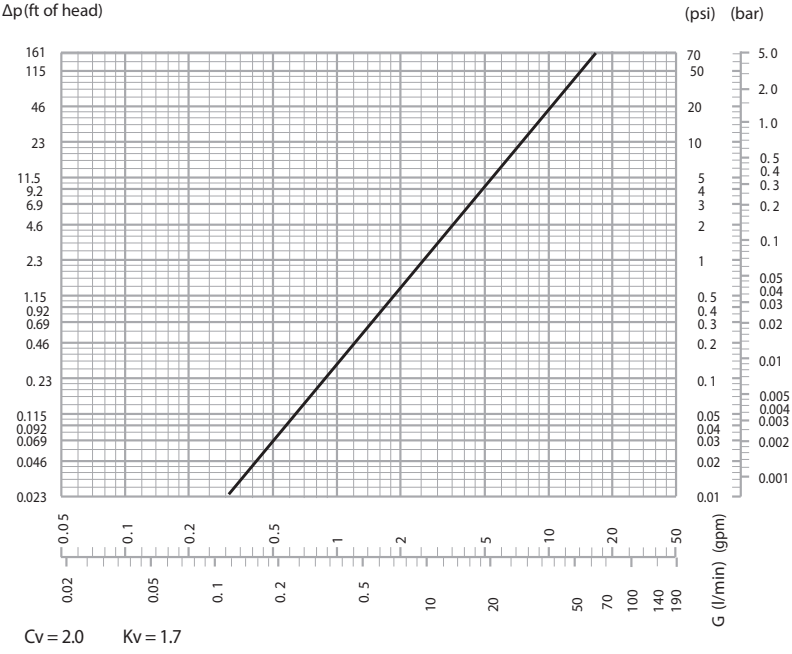
LAISSEZ CE MANUEL AVEC L'UTILISATEUR

Operating principle

The thermostatic mixing valve mixes hot and cold water to maintain a consistent temperature for the hot fixtures of the plumbing system. The PivotMixer point of distribution mixing valve assembly also includes a cold water cross, with check valve, and pivot connectors for easy installation to most electric and heat pump water heaters. It connects to the heater's 3/4" male nipples and is available with a variety of mixed water outlet and cold water inlet pipe connection types. It provides increased usable hot water capacity on existing or new high efficiency water heaters by allowing water to be stored at a higher temperature and safely delivered at lower adjustable temperatures to all fixtures. In addition, it can be used to reduce legionella growth by allowing the water heater thermostat to be set at 140 °F. The unique ¾" pivot connectors adapt to heater nipples spaced from 3" to 8" on-center. The PivotMixer has a recirculation port that can be plugged or used for connecting to a hot water recirculation loop.



Flow curve



Use

Caleffi PivotMixer thermostatic mixing valve assemblies are designed to be installed at the water heater. The PivotMixer cannot be used for tempering water temperature at fixtures as a point-of-use valve. They are not designed to provide scald protection. For safety reasons, it is advisable to limit the maximum mixed water temperature to 120 °F when anti-scald devices are not used at each fixture.

Water heater

As a result of the NAECA, many water heaters now have more insulation making them physically larger, for the same water capacity, than the older models. Sometimes smaller units with less capacity are installed requiring higher temperature settings to provide the capacity users were previously accustomed to, requiring mixing valves to temper the water to safe levels.

Caleffi PivotMixer thermostatic mixing valves with cold water cross assembly and pivot connectors will conveniently fit a typical electric water heater and heat pump water heater. A recirculation return can be connected at the side port of the cold water cross.

Thermal shut-off

In the event of accidental cold water supply failure, the valve will quickly close the hot inlet port to prevent the delivery of unsafe hot water. This is only guaranteed when there is a minimum temperature difference between the inlet hot water and the mixed temperature water delivery of 18 °F.

Installation

Before installing a Caleffi PivotMixer thermostatic mixing valve assembly, the system must be inspected to ensure that its operating conditions are within the range of the mixing valve, checking, for example, the supply temperature, supply pressure, etc.

Systems where the PivotMixer thermostatic mixing valve assembly will be installed must be drained and cleaned out to remove any dirt or debris which may have accumulated during installation.

The installation of appropriately sized filters at the inlet from the main water supply is always advisable.

Caleffi PivotMixer thermostatic mixing valve assemblies must be installed by qualified personnel in accordance with the diagrams in this brochure, taking into account all current applicable standards.

Caleffi PivotMixer thermostatic mixing valve assemblies can be installed in any position, either vertical, horizontal or upside down.

The following are shown on the thermostatic mixing valve body:
- Hot water inlet, color red and marked “HOT”.
- Cold water inlet, color blue and marked “COLD”.
- Mixed water outlet, marked “MIX”.

PivotMixer™

Mixed Temperature Control Knob Setting

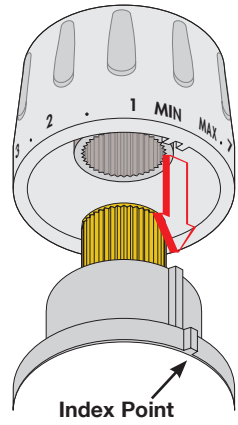
The control knob permits temperature setting between minimum and maximum in one turn (360 °). It also has a tamper-proof system to lock the temperature at application required set value. The temperature is set to the required value by means of the knob with the graduated scale, on the top of the valve.

Pos.	Min.	1	2	3	4	5	6	7	Max.
T (°F)	95	105	115	120	125	132	140	145	150
T (°C)	35	40	45	48	52	56	60	63	65

with: T_{HOT} = 158 °F (70 °C), with: T_{cold} = 59 °F (15 °C), P = 43 psi (3 bar)

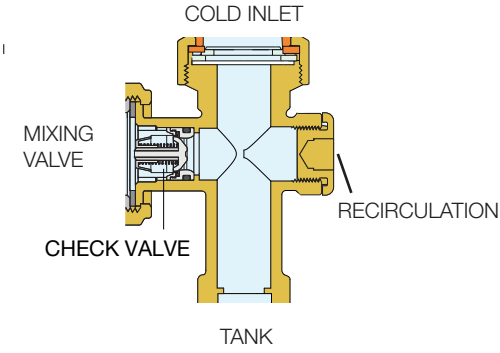
Locking the temperature setting knob

1. Align the index point to the desired temperature setting by rotating the control knob.
2. Unscrew the head screw and remove the control knob.
3. Position the knob so that the boss, indicated by red arrow in figure, fits into the internal slot of the control knob.
4. Tighten the head screw and the control knob will no longer be able to rotate to adjust the mixing setting.



Check valve

In systems with thermostatic mixing valves, check valves should be installed to prevent undesired backflow. The cold water cross of the PivotMixer assembly comes with an integral check valve on the outlet port to the mixing valve.



Commissioning

The Caleffi PivotMixer thermostatic mixing valve assembly must be commissioned in accordance with current standards by qualified personnel using temperature measuring equipment. The mixed outlet temperature gauge reduces commissioning time, saving time to approach the desired temperature efficiently. It's advisable to utilize a digital thermometer to verify the final setting of the mixed water temperature.

After installation, the valve must be tested and commisioned in accordance with instructions given below, taking into account current applicable standards.

1) Ensure that the system is clean and free from dirt or debris before commissioning the thermostatic mixing valve assembly.

2) It is recommended that the temperature is set using a suitable calibrated digital thermometer. The valve must be commissioned by measuring the temperature of the mixed water emerging at the point of use.

3) The maximum outlet temperature from the valve must be set accounting for fluctuations due to simultaneous use. It is essential for these conditions to be stabilized before commissioning.

4) Adjust the temperature using the adjusting knob on the valve. For safety reasons, it is advisable to limit the maximum mixed water temperature to 120 °F in domestic hot water systems.

5) The mixed outlet temperature of the mixing valve is adjusted by using the control knob.

a) Adjust the temperature of the mixed water to the desired value.
b) Measure and record the temperature at the cold and hot water inlets.
c) Measure and record the temperature of the water delivered from the tap at the lowest and highest flow rates.
d) Run a test of the thermal shut-off function. Close the cold water inlet shut-off valve and check the mixed water delivery. The delivery flow rate should quickly drop to zero.
e) Measure and record the maximum mixed water temperature. The temperature may not exceed the values permitted in any applicable legislation or code of practice.
f) Restore the cold water inlet supply and measure the water delivery temperature after it has stabilized. The final temperature measured in this test may not exceed the permitted values as directed by the latest ASSE 1017 standard.

In case of change to temperature setting, repeat tests in accordance with points d, e, f.
All the above information should be recorded in the commissioning report and updated in the maintenance report whenever the valve undergoes maintenance or temperature setting adjustment.

Troubleshooting

Under normal operating conditions the Caleffi PivotMixer thermostatic mixing valve assembly delivers superior performance. However, in some circumstances, where the following maintenance schedule is not followed problems may arise.

Recommended maintenance schedule:

Tests should be conducted regularly to monitor the thermostatic mixing valve performance, as deterioration of performance could indicate that the valve and/or the system require maintenance. If, during these tests, the temperature of the mixed water has changed significantly in comparison with the previous test, the details given in the installation and commissioning sections should be checked and maintenance conducted.

Regularly inspect the following to uphold optimal valve performance levels. Conduct checks every 12 months at minimum or more frequently if required.

1) Check and clean the system filters.

2) Check that any check valves positioned upstream of the thermostatic mixing valve assembly are operating correctly, and without problems typically caused by debris or system impurities.

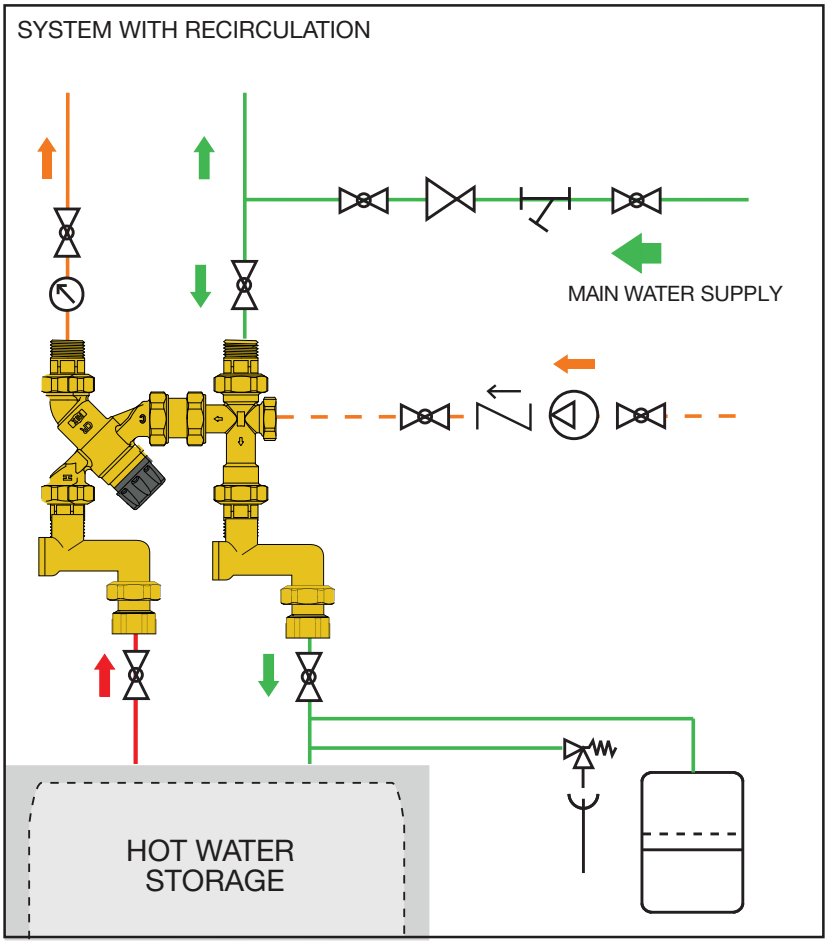
3) Limescale can be removed from internal components of the thermostatic mixing valve by immersion in a suitable de-scaling fluid.

4) When the components which can be maintained have been checked, commission the valve.

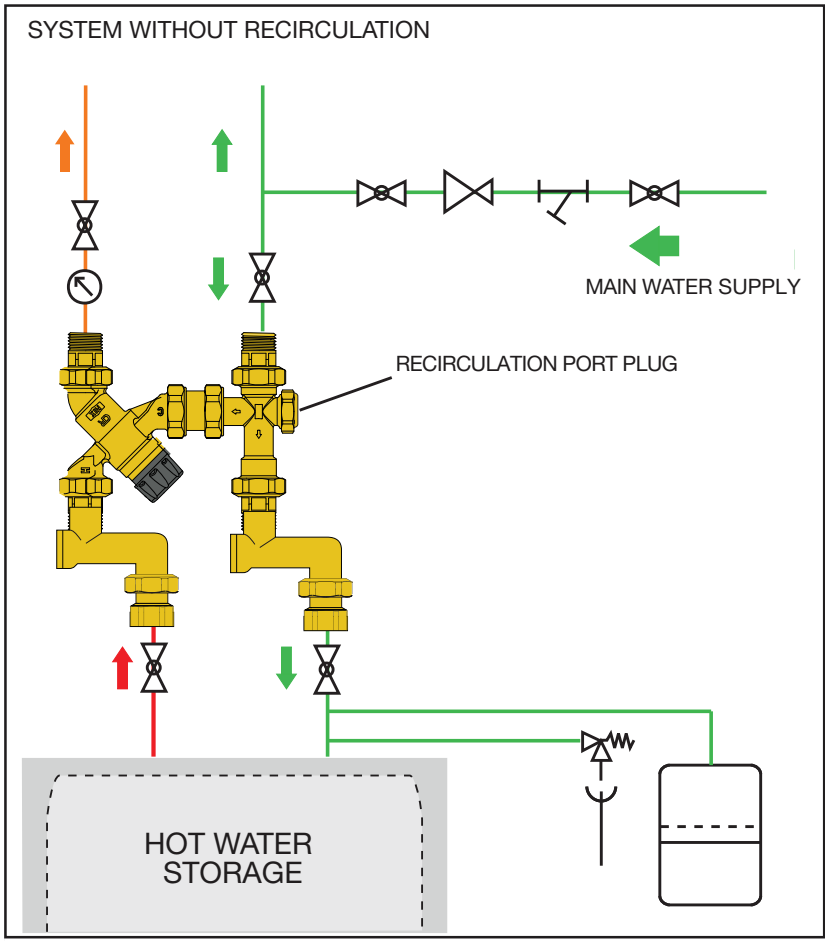
Common troubleshooting symptoms:

Symptoms	Cause	Corrective action
Hot water at the cold taps	a) Operation of check valve is hindered; Check valve is not sealing correctly. b) Check valves not installed.	- Replace faulty check valve.
Fluctuating mixed water temperature	a) Erratic supply temperatures at the inlets of the mixing valve. b) Flow through the valve is less than it's minimum flow rate. c) Incorrect commissioning of the valve.	- Restore inlet conditions within the limits of the recirculation circuit.
Erratic flow of water from the valve	a) Flow through the valve is less than it's minimum flow rate. b) Fluctuations in the supply pressures/temperatures. c) Adverse effect created by other draw off points on the system.	- Stabilize inlet supply conditions.
No flow of water from the valve	a) In-line filters or strainers blocked. b) Insufficient supply pressures. c) Debris obstructing valve operation.	- Clean filters or strainers. - Restore inlet supplies. - Clean debris or scale from the valve.
Valve shut-off function not performed when tested	a) Mixing valve not properly installed per instructions. b) Minimum temperature difference not reached. c) Valve mechanism blocked by dirt.	- Re-install per instructions. - Increase hot water temperature. - Remove dirt/limescale from the valve.

Application diagrams



Application diagrams



LEAVE THIS MANUAL WITH THE USER.

Laissez ce manuel à la disposition de l'utilisateur.

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