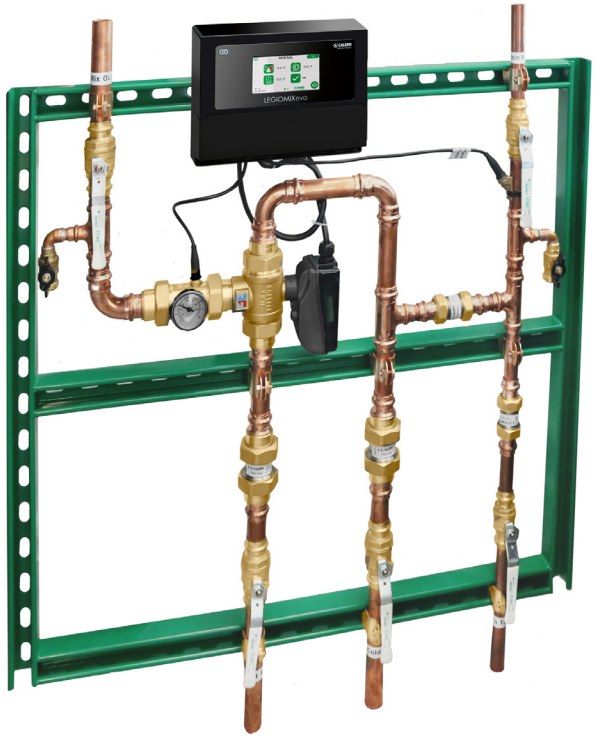
LEGIOMIX®evo
Digital mixing valve station
6003AFS series

CALEFFI

01443/26 NA



Function

The 6003 Series LEGIOMIXevo® digital mixing valve station is engineered for centralized domestic hot water systems to ensure consistent mixed water temperatures despite inlet temperature, pressure, or flow rate fluctuations. Pre-built for simpler installation and reduced commissioning time, the station performs an automatic daily self-cleaning cycle to prevent scale accumulation. Additionally, the controller features automated thermal disinfection programs to mitigate Legionella growth.

The LEGIOMIXevo controller continuously compares accessory sensor feedback to its programmed set point. Any deviation causes the controller to signal a 0–10 VDC proportional fail-safe actuator to adjust a 3-way ball valve and maintain mixed water temperature to the set point. Temperature management is driven by an LCD touchscreen interface providing real-time status indication, localized data logging, and periodic setting updates, configurable locally or remotely via computer. Integrated relays manage optional alarms and accessory devices. The assembly is available with an optional factory-installed recirculation pump.

The LEGIOMIXevo supports standalone operation or integration with Building Management Systems (BMS) via Modbus or BACnet protocols, as well as remote operation through Caleffi Cloud®. All operational parameters can be adjusted directly through the controller interface or via the Caleffi Cloud dashboard. Additionally, the LEGIOMIXevo controller is backwards-compatible with existing LEGIOMIX® installations.

The LEGIOMIXevo valve body and controller is listed and certified by ASSE to standard 1017. It is also compliant with CSA B125.3, certified by IAPMO R&T, and meets the NSF/ANSI/CAN 61 and NSF/ANSI/CAN 372 standards for low lead and lead-free materials as certified and listed by ICC-ES. Additionally, it complies with UPC, IPC, IRC, and NPC requirements for use in accordance with U.S. and Canadian plumbing codes certified by IAPMO R&T. The product also meets the CSA Z317.1 special requirements for plumbing installations in health care facilities, certified by IAPMO R&T. The controller has an IP54 rating for protection against dust and water.

For information regarding the 6003 LEGIOMIXevo, reference documents:

NA11371 6003 LEGIOMIXevo User Manual

H0013290 6003 LEGIOMIXevo Installation Sheet

1428 NA 6003 LEGIOMIXevo Technical Brochure

Certifications

Product Range

Code 6003AFS series:

Complete wall-mount assembly with pre-piped digital mixing valve:	1”, 1¼”, 1½”, 2”, 2½", 3" copper

Technical specifications

System specifications

Power supply: 24 V (AC) ± 10% 50/60 Hz (115/24 VAC transformer included in package)

Average power consumption: 5 VA
Stand-by power consumption: 3.5 VA
Max. power consumption:
- Controller: 9 VA
- Actuator: 6 VA
- Total: 15 VA

Ambient temperature:
- Operation: 32 - 120 °F (0 - 50 °C) EN 60721-3-3 Cl. 3K4, max. humidity 95%
- Transportation: -20 - 160 °F (-30 - 70 °C) EN 60721-3-2 Cl. 2K3, max. humidity 95%
- Storage: -5 - 160 °F (-20 - 70 °C) EN 60721-3-1 Cl. 1K2, max. humidity 95%

Adjustment temperature range: 70 - 185 °F (20 - 85 °C)
Disinfection temperature range: 100 - 185 °F (40 - 85 °C)
Charge reserve: 15 days in the event of electric supply failure with a rechargeable backup button battery

Battery recharging time: 12 h
Cable for connection to the power supply:
Insulated cable equivalent or greater than SJOOW, 16 - 18 AWG

Station components

Frame: epoxy painted steel uni-strut
Pipes: copper type L
Ball valves: low-lead brass
Check valves: stainless steel
Main connections: copper 1", 1¼", 1½", 2", 2½" and 3"

Mixing valve body

Materials*:
- Body: DZR low-lead brass, EN 12165 CW724R
- Ball: AISI 316 stainless steel
- Hydraulic seals: peroxide-cured EPDM
- Ball seats: PTFE

*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 by consumable water.

Max. body pressure rating: 230 psi (16 bar)
Max. operating pressure: 150 psi (10 bar)
Max. inlet temperature: 212 °F (100 °C)
Temperature gauge scale: 32 - 176 °F (0 - 80 °C)
Suitable fluids: water
Max. water hardness: 10 grains

Mixing valve performance

Accuracy: ± 3 ºF (± 2 ºC)
Max. operating differential pressure (dynamic): 70 psi (5 bar)
Max. ratio between inlet pressures (H/C or C/H): 2:1

Mixing valve certifications

- ASSE 1017, certified and listed by ASSE.
- NSF/ANSI/CAN 61 and NSF/ANSI/CAN 372, US and Canadian Low-Lead and Lead-Free materials contents laws for drinking water system components. Certified by ICC-ES.
- CSA B125.3, UPC, IPC, IRC and NPC compliance for use in accordance with U.S. and Canadian plumbing codes. Certified and listed by IAPMO R&T.

Mixed outlet and recirculation return temperature sensors*

Body material: stainless steel
Sensor type: NTC
Working temperature range: 14 - 255 °F (-10 - 125 °C)
Resistance: 10kΩ at 75 °F (25 °C)
Cable length: 39" (1 m)

Water storage temperature sensor*

Body material: stainless steel
Sensor type: NTC
Size: 6 mm
Working temperature range: -13 - 230 °F (-25 - 110 °C)
Resistance: 100kΩ at 75 °F (25 °C)
Cable length: 75" (1.9m)

Actuator with fail-safe** function

Power supply: 24V (AC/DC) ± 15% 50/60 Hz from controller
Control signal: 0 - 10 V
Power consumption: 6 VA
Ambient temperature:
- Operation: 32 - 130 °F (0 - 55 °C) EN 60721-3-3 Cl. 3K4, max. humidity 95%
- Transportation: -22 - 160 °F (-30 - 70 °C) EN 60721-3-2 Cl. 2K3, max. humidity 95%
- Storage: -4 - 160 °F (-20 - 70 °C) EN 60721-3-1 Cl. 1K2, max. humidity 95%

Supply cable length: 32" (0.8m)

**The fail-safe function allows the automatic closure of the hot inlet port in case of power failure.

Additional actuator specifications (EN 60730-1/-2-14)

Protection cover: self-extinguishing V0
Protection class: IP 65
Compliant with directives: FCC, IC, CE, UKCA
Control type: Type 1
Environmental pollution grade: grade 2
Activation type: multi-position
Nominal pulse voltage: 500 V peak for overvoltage category II
Dynamic torque: 11 ft-lbs (15 Nm)

Controller

Display: Touch screen, capacitive color, 4.3"
Housing: self-extinguishing A EN 60721-3-3 Cl. 3K4 BS VO, color black

Power Supply: 24 VAC ± 10% 50/60 Hz (115/24 VAC transformer included in package)

Max. power consumption: 9 VA
Average power consumption: 5 VA
Stand-by power consumption: 3.5 VA
Adjustment temperature range: 70 - 185 °F (20 - 85 °C)
Disinfection temperature range: 100 - 185 °F (40 - 85 °C)
Ambient temperature:
- Operation: 32 - 120 °F (0 - 50°C), EN 60721-3-3 Cl. 3K4, max. humidity 95%
- Transportation: -20 - 160 °F (-30 - 70 °C), EN 60721-3-2 Cl. 2K3, max. humidity 95%
- Storage: -5 - 160 °F (-20 - 70 °C), EN 60721-3-1 Cl. 1K2, max. humidity 95%

Protection class: IP 54 (Class II appliance) surface mounted, includes hardware

Contact rating:
- Mixing valve control: 0 - 10 VDC signal / 500 mA
- Relay: 10(2) A / 24 VAC
- PTC self-recovery fuse: 30 V / 3.5 A
- Conforms to directives: FCC, IC, CE, UKCA

Additional controller specification (EN 60730-1)

Control type: Type 1
Environmental pollution grade: grade 2
Nominal pulse voltage: 500 V peak for overvoltage category II

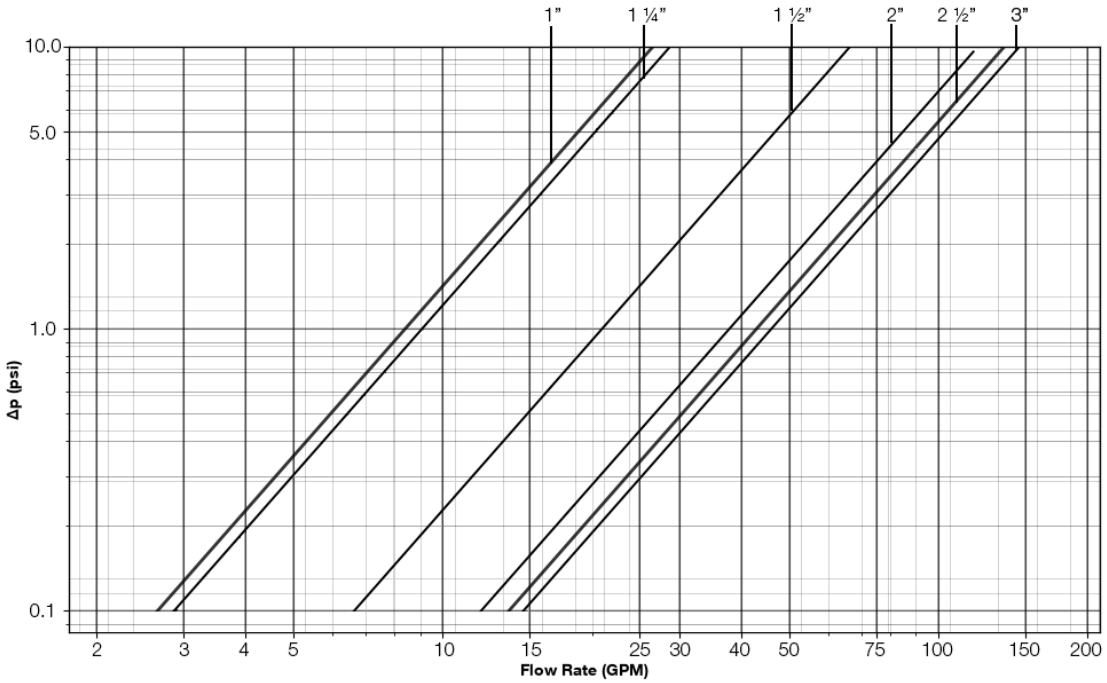
Recirculation pump 1" Station

Max. flow rate: 26 gpm (98 lpm)
Max. head height: 42' (12.8 m)
Max. working pressure: 232 psi (16 bar)
Temperature range: 14 - 230 °F (-10 - 110 °C)
Max. power consumption: 125 W

Recirculation pump 1¼" - 3" Station

Max. flow rate: 50 gpm (189 lpm)
Max head height: 59' (18m)
Max. working pressure 232 psi (16 bar)
Temperature range: 14 - 230 °F (-10 - 110 °C)
Max. power consumption: 171 W

Hydraulic Characteristics



LEGIOMIXevo Station sizing and selection procedure

Station Size	[1]Max. GPM (@ 5 fps pipe velocity)	Station Cv	Min. GPM for stable operation
1"	14	8.4	2.2
1¼"	20	9.1	
1½"	29	21	4.4
2"	50	38	8.8
2½"	76	43	
3"	106	46	

	Pressure drop across station (PSID)					
	1	1.5	2	3	5	7.5
Station size	[2]Flow rates (GPM) @ above pressure drop					
1"	8.4	10.3	11.9	14.5	18.8	23
1¼"	9.1	11.1	12.9	15.8	20.3	24.9
1½"	21	25.7	29.7	36.4	47	57.5
2"	38	46.5	53.7	65.8	85	104.1
2½"	43	52.7	60.8	74.5	96.2	117.8
3"	46	56.3	65.1	79.7	102.9	126

A. Obtain the maximum GPM (demand) of domestic hot water from project documentation.

B. Select station size which has a Max GPM value equal to or greater than the project maximum GPM demand.

1. The maximum GPM rating for the LEGIOMIX station is based on 5 feet per second pipe velocity in the station's copper tubing. This velocity recommendation is for water temperatures up to 140°F and is from the UPC (Uniform Plumbing Code) and the CDA (Copper Development Assocation) "Copper Tube Handbook". To minimize the potential of erosion-corrosion in the station piping, do not exceed 5 fps velocity.

2. The PSI/GPM table is for reference only, showing various GPM values at various pressure drops across the station.

Dimensions

Figure 1: 6003 LEGIOMIXevo Station without Pump

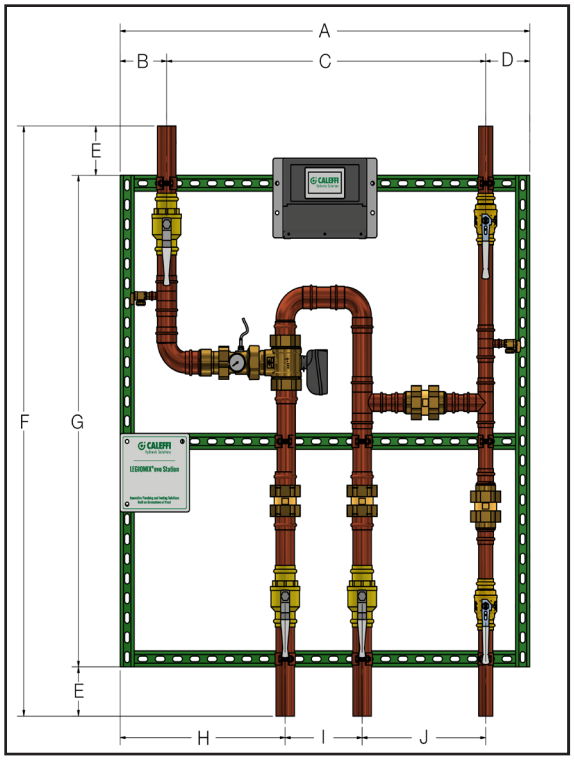
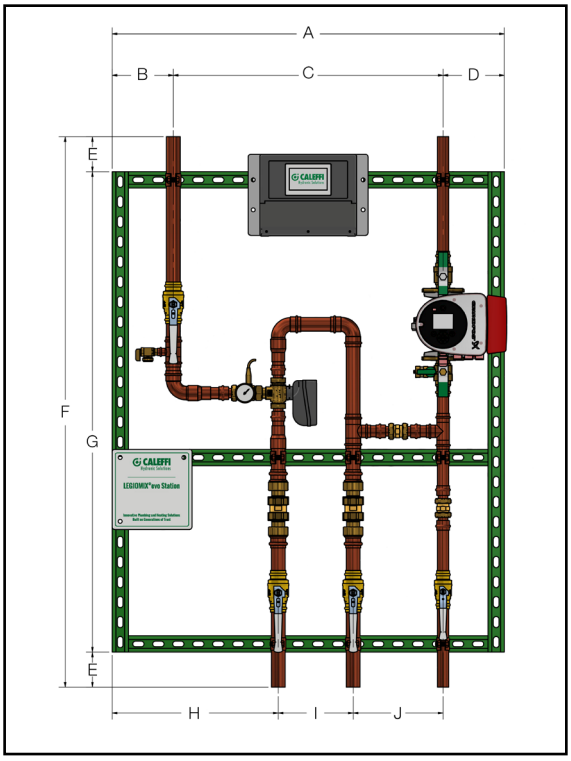


Figure 2: 6003 LEGIOMIXevo Station with Pump



Without Pump (See Figure 1)														
Code	Mixed out, hot/ cold in	Recirculation	A	B	C	D	E	F	G	H	I	J	Net Wt (lb)	Gross Wt (lb)
600366AFS	1"	3/4"	35 1/4"	5 1/4"	24 3/4"	5 1/4"	3 1/2"	39"	32"	14 1/4"	7 1/2"	8 1/4"	67	192
600376AFS	1¼"	1"	39 1/4"	6 1/8"	27"	6"	3 1/2"	55"	48"	16 5/8"	7 1/2"	9"	88	213
600386AFS	1½"	1¼"	47 1/4"	5 1/2"	35 3/4"	6 1/4"	4"	58"	50"	19 1/4"	8 1/2"	13 1/4"	105	281
600396AFS	2"	1½"	47 1/4"	10 1/2"	31 3/4"	5 1/8"	5"	60"	50"	17"	8 7/8"	14 1/4"	143	319
600360AFS	2½"	1½"	55 1/4"	7"	43 1/4"	5"	5"	70"	60"	27 1/2"	9 1/4"	13 1/2"	160	336
600380AFS	3"	2"	55 1/2"	8"	42 1/2"	4 3/4"	5"	70 1/4"	60"	29"	8 1/2"	12 1/2"	163	339

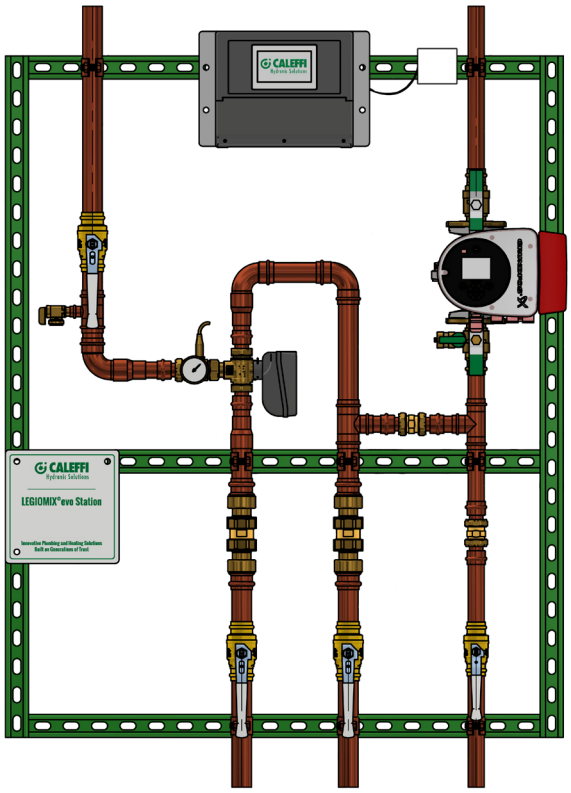
With Pump (See Figure 2)														
Code	Mixed out, hot/cold in	Recirculation	A	B	C	D	E	F	G	H	I	J	Net Wt (lb)	Gross Wt (lb)
600366AFS 001	1"	1"	39 1/4"	6"	27"	6 1/4"	3 1/2"	55"	48"	17"	7 1/2"	8 1/2"	74	199
600376AFS 001	1¼"	1"	39 1/4"	6 1/8"	27"	6 1/8"	3 1/2"	55"	48"	16 5/8"	7 1/2"	9"	102	227
600386AFS 001	1½"	1¼"	47 1/4"	5 1/4"	35 3/4"	6 1/4"	4"	58"	50"	19 1/4"	8 1/2"	13 1/4"	119	295
600396AFS 001	2"	1½"	47 1/4"	10 1/2"	34 1/4"	2 1/2"	5"	60"	50"	17"	8 7/8"	14 1/4"	157	333
600360AFS 001	2½"	1½"	55 1/4"	7"	43 1/8"	5"	5"	70"	60"	27 1/2"	9 1/4"	13 1/2"	174	350
600380AFS 001	3"	2"	55 1/4"	8"	42 1/2"	4 5/8"	5"	70"	60"	29 1/4"	8 1/2"	13 1/2"	179	355

Operating principle

The LEGIOMIXevo mixes hot water from storage or tankless water heaters with cold water from the main supply to maintain a controlled outlet temperature. The controller monitors the outlet temperature using a temperature sensor and adjusts the ball valve position to maintain the set temperature. Regardless of changes in pressure, demand, or inlet water temperature, the LEGIOMIXevo automatically regulates the outlet temperature. Pump uptime may be controlled by the schedule programmed into the controller.

The controller can be programmed to meet various disinfection cycle requirements. The LEGIOMIXevo facilitates disinfection by raising the water temperature to a specific level for a set duration to control bacterial growth in a building's water system. The recirculation temperature sensor measures the temperature of water returning from the distribution system. By monitoring the recirculation return temperature, the controller adjusts the mixing valve to maintain the necessary water temperature for a specific period to disinfect the water distribution system.

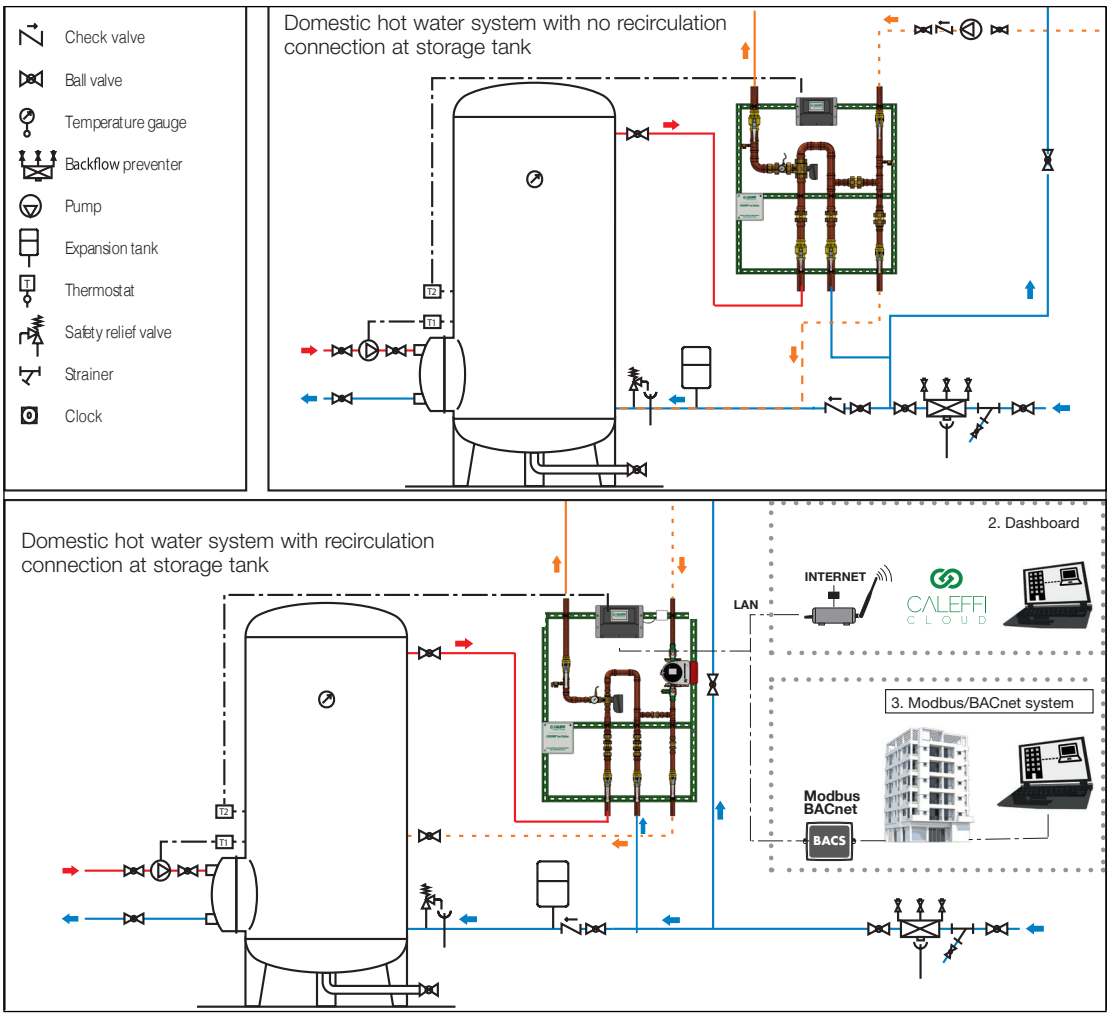
The LEGIOMIXevo controller's feedback logic and disinfection programs ensure that the correct temperature and duration for thermal disinfection are achieved before taking corrective action. Actions and system sensor readings are monitored and logged locally on the device with temperatures recorded hourly. Multiple communication options support web-based remote monitoring or local management. Optional relays support storage temperature monitoring, system alarms and emergency water shutoff in the event of a component failure.



Connectivity options

1. Controller interface
2. Web Dashboard by Caleffi Cloude via ethernet port 1 (eth 1)
3. Modbus/BACnet system (external Building Automation system management via Ethernet interface 2 (Eth2) or RS-485 interface).

Application diagrams



Operating status

- Depending on the selected operating schedule, the controller operates in one of the following modes:
- Mixing;
- Disinfection;
- Flush;
- Anti-clog;
- Shock;
- Safety valve (temperature restriction).

Mixing

In mixing mode, the controller continuously monitors In mixing mode, the controller continuously monitors the outlet temperatures using the supply sensor and automatically adjusts the mixing valve to maintain the programmed temperature set point.

Disinfection

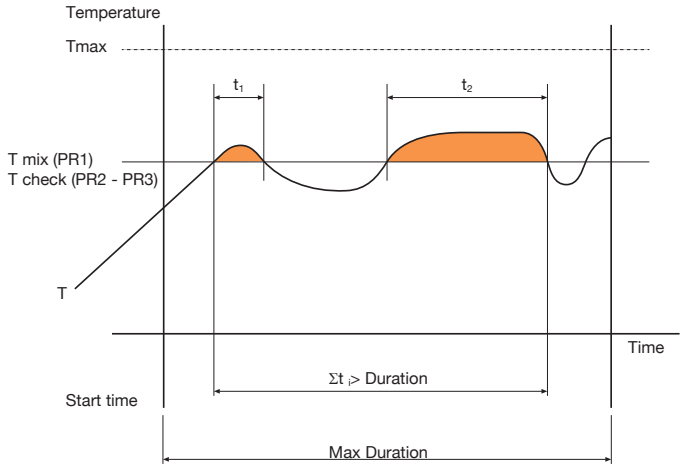
In disinfection mode, the controller raises the system water temperature by adjusting the mixing valve to achieve the programmed value for a specified duration during a thermal disinfection cycle

Disinfection cycles can be scheduled to run daily or weekly by selecting the desired days of operation.

After disinfection, the controller records the disinfection event in the system log.

The controller automatically starts and ends the disinfection cycle based on the configured Max Duration setting created by the user.

DISINFECTION CHECK



NOTE: Graph is for reference only, not shown on display or logged data.

A disinfection cycle is considered successful when the programmed temperature is maintained for the set Duration without exceeding the Max Duration.

A disinfection cycle is considered unsuccessful when the required temperature is not maintained for the set Duration within the Max Duration window and generates an alarm. The alarm is automatically cleared after the next successful disinfection cycle.

Example:

Start time: 2:00
Duration: 30 min
Max Duration: 1 hour
Program: 1
Tmix: 140 °F

If the system maintains 140 °F (60 °C) for at least 30 minutes between 2:00 and 3:00, the disinfection cycle is successful. If the required temperature is not maintained for the programmed duration before 3:00, the cycle ends with an alarm.

Programs

The controller supports 3 thermal disinfection programs. The appropriate program depends on the system configuration and the desired method of temperature verification. For more detailed information, refer to Document 1428 NA 6003 LEGIOMIXevo Technical Brochure.

- Program 1
  - › For systems without a recirculation sensor where thermal disinfection is verified by supply water temperature and cycle duration.
- Program 2
  - › For systems equipped with a recirculation sensor where thermal disinfection success is verified directly at the return line.
- Program 3
  - › For systems with a recirculation sensor where the controller must automatically boost supply temperature to compensate for system heat loss and achieve required return line disinfection levels.

Program	Use of recirculation sensor	Disinfection check	Disinfection temperature	Alarm	History
1	NO	Mixed outlet sensor	≥ T mix	YES	YES
2	YES	Recirculation sensor	≥ T check	YES	YES
3	YES	Recirculation sensor	≥ T check (+ T mix compensation)	YES	YES

Stopping disinfection

Operating parameters cannot be changed while a disinfection cycle is in progress. To stop an active cycle, open the *Advanced* menu and select *Disinfection stop*.

Flush

After a disinfection cycle, the controller automatically adjusts the flush valve to discharge high-temperature water and return the system to its normal operating setpoint.

Anti-clog

The controller automatically performs a daily mixing valve exercise to ensure proper operation and cleaning. This procedure is carried out after a disinfection cycle (if active), or in any case at 3:00 am if no disinfection cycle is active.

This function can be enabled or disabled in the Settings -> Advanced menu, via the option Anti-clog. Disabling this function increases the risk of deposits forming on moving parts of the valve.

Shock

In Shock mode, the controller raises the mixed-water temperature to the programmed shock setpoint for the specified duration.

To start a thermal shock cycle, select START. The cycle begins after the programmed countdown period. An active cycle can be paused by selecting STOP. After the cycle is complete, the controller automatically returns to mixing mode. The Shock procedure does not include a check to confirm correct completion; it will be the user's responsibility to check the temperature values.

Shock mode does not verify cycle completion. Users should confirm that the required temperature has been achieved.

Safety valve (temperature restriction)

If the water temperature exceeds the programmed safety limit, the controller can close an external two-way valve installed on the hot water inlet to the mixing valve.

Power loss

An internal battery maintains the controller's date and time settings for up to 15 days during a power outage. If power is not restored within that period, the controller launches the Setup Wizard at the next startup to restore the date and time.

Reboot

The controller can be restarted by selecting Settings->Advanced->Reboot. A reboot does not affect the configured settings.

Restoring the factory settings

To restore the controller to its factory default settings, select Settings->Advanced->Factory Reset. Factory Reset clears all user settings and stored logs.

If the controller is connected to Caleffi Cloud, the data in the cloud will be retained.

Note: if necessary, download logs before restoring the factory settings.

Commissioning

Due to the special purpose for digital mixing valves, commissioning in accordance with current regulations and by qualified personnel using suitable instruments is required. Check that the hot and cold water supply pressures are within operating limits of the mixing valve, see technical specifications. Check the temperature of the hot water coming from storage, greater than or equal to 140°F (60°C). Record all parameters settings and measurements taken in the installation log book.

Maintenance

During service, regularly monitor the performance of the LEGIOMIXevo digital mixing valve since any loss of performance may indicate maintenance is needed for the valve or the system. If the temperature of the mixed water is found to have changed significantly compared to previous recordings, refer to installation and commissioning sections. The following check points are recommended periodically, at least every 12 months or more frequently, to ensure that the valve continues to deliver optimum levels of performance:

1. Check and clean the filters installed in the system.
2. Check that any check valve installed at the inlet of the LEGIOMIXevo digital mixing valve is functioning correctly, and there are no leaks caused by dirt.
3. The internal components of the valve can be descaled by immersing in a suitable descaling fluid.
4. Follow commissioning procedure again after maintainable components have been checked.
5. Record all operations conducted on system log book.

Legionella-distribution temperature

Systems with domestic hot water storage are typically maintained at 140 °F (60 °C) to control Legionella bacteria. Temperatures in this range can also create a scalding hazard if water is delivered directly to fixtures. For example, exposure to water at 130 °F (54 °C) can result in burn injuries in approximately 30 seconds. At 140 °F (60°C), burn injuries can occur in as little as 5 seconds.

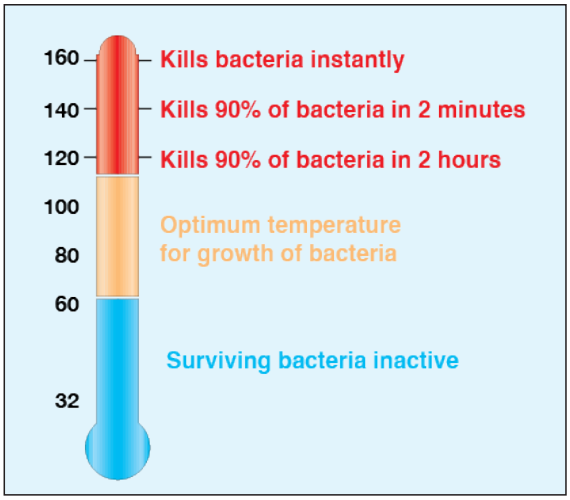
In view of the above, it is necessary to install a digital mixing valve which can:

- Support scheduled thermal disinfection cycles by temporarily allowing higher water temperatures throughout the system, typically during times of low demand (night).
- Reduce the distributed water temperature to an adjustable value below storage temperature.
- Maintain a consistent mixed-water temperature despite changes in inlet temperature, pressure, or demand.

Thermal disinfection

The image to the right illustrates the relationship between water temperature and Legionella pneumophila survival under laboratory conditions.

Thermal disinfection is commonly performed by elevating water temperatures throughout the system for a specified period. Temperatures of 140 °F (60 °C) or higher are typically used to support thermal disinfection programs and help control bacterial growth.

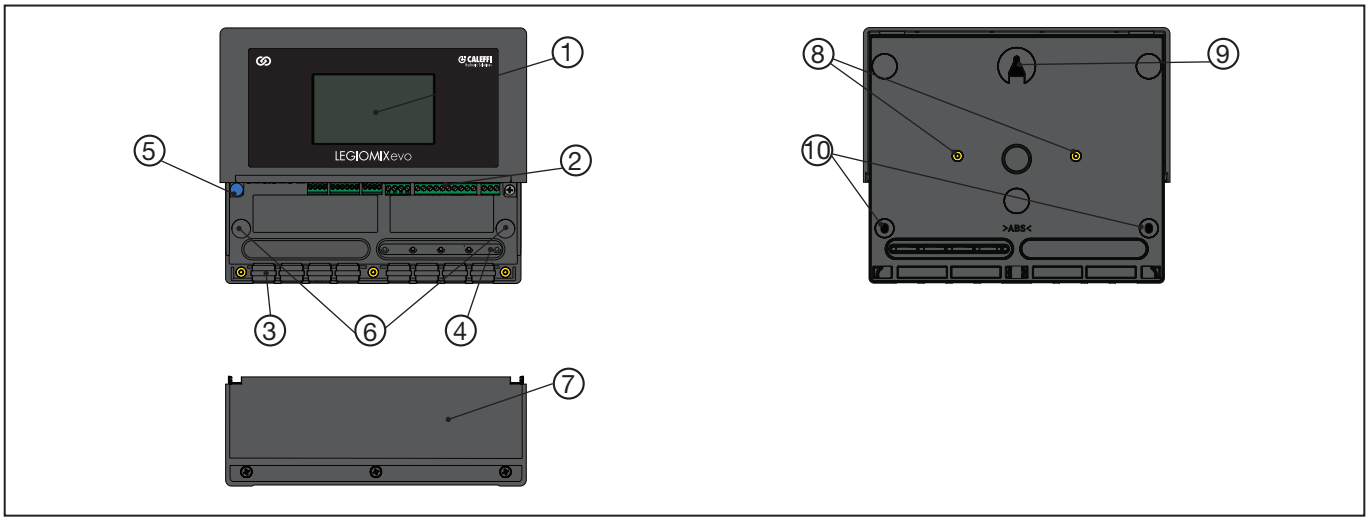


Thermal Disinfection Legionella

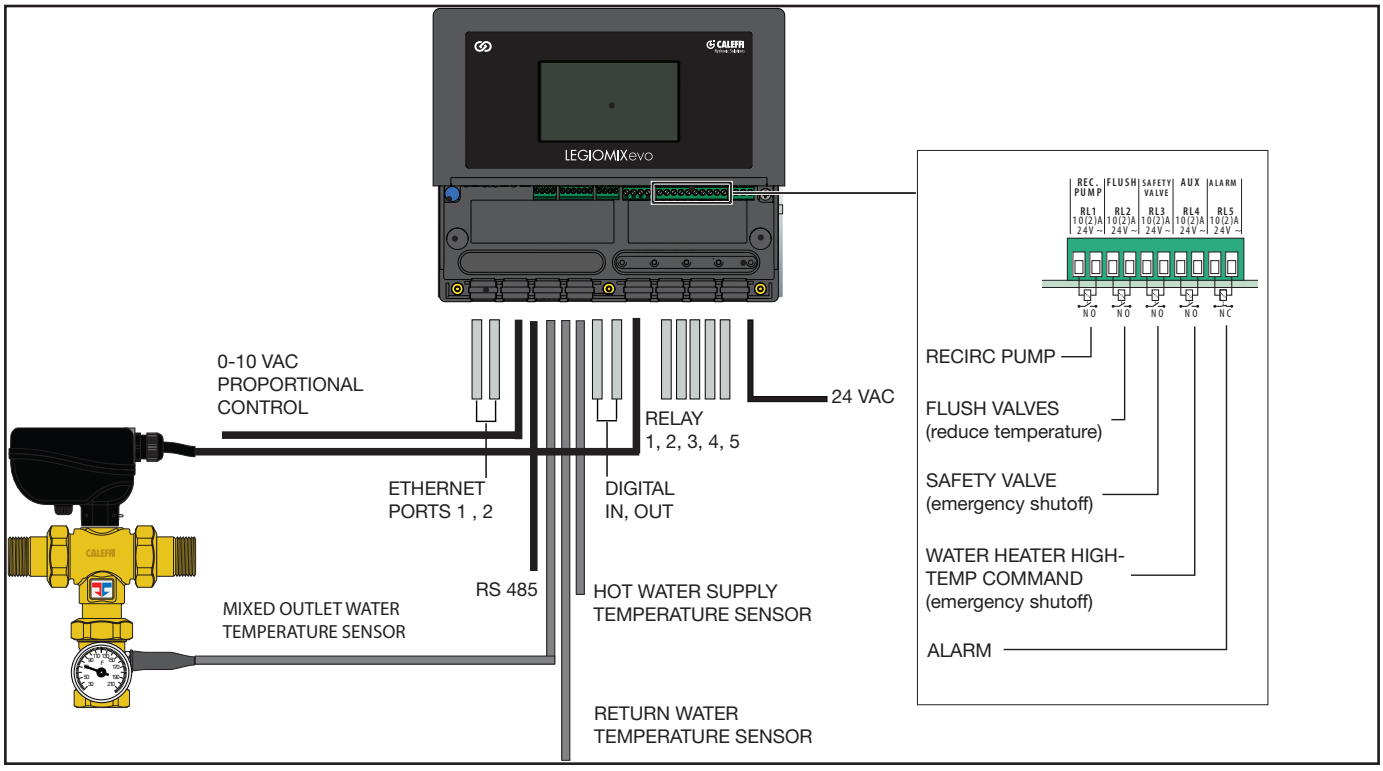
Reference documents

For best practices on Legionella risk management, refer to ASHRAE standard 188 and ASHRAE guideline 12 as well as local plumbing, mechanical and public health regulations.

Digital Controller



1. Touch display
2. Terminal board
3. Sealed cable gland
4. Cable gland
5. Anti-tampering seal
6. Knock-outs for bracketing
7. Removable cover
8. Holes for DIN rail mounting
9. Support point
10. Mounting holes



NOTES

SPECIFICATION SUMMARY

6003 LEGIOMIXevo®

Packaged electronic mixing valve station designed for domestic hot water temperature control, thermal disinfection, and continuous recirculation. System shall consist of an epoxy-painted steel strut frame, Type L copper piping, low-lead brass ball isolation valves, and stainless steel inline check valves with copper connections available in 1", 1¼", 1½", 2", 2½", or 3" sizes. The mixing valve body shall be constructed of dezincification-resistant (DZR) low-lead brass conforming to EN 12165 CW724R, featuring a 316 stainless steel ball, PTFE ball seats, and peroxide-cured EPDM hydraulic seals, meeting NSF/ANSI/CAN 372 lead-free criteria (<0.25% wetted lead content). Dynamic performance shall maintain ±3°F (±2°C) outlet temperature accuracy with up to a 2:1 inlet pressure differential, a maximum body pressure of 230 psi (16 bar), a maximum operating pressure of 150 psi (10 bar), and a maximum differential dynamic pressure of 70 psi (5 bar). Valve positioning is driven by an IP65-rated, multi-position motorized actuator delivering 11 ft-lbs (15 Nm) dynamic torque with an internal fail-safe feature that automatically closes the hot water inlet port during power loss. The station shall be managed by an IP54-rated electronic controller with a 4.3" capacitive color touchscreen interface operating on 24 VAC power (115/24 VAC transformer included; 15 VA total max system draw) with a 15-day backup battery reserve. System control includes programmable temperature settings from 70°F to 185°F (20°C to 85°C), thermal disinfection cycles from 100°F to 185°F (40°C to 85°C), and stainless steel NTC temperature sensors for mixed outlet, recirculation return, and storage tank monitoring. Integrated inline recirculation pumps shall be rated for 26 gpm at 42 ft head (1" stations) or 50 gpm at 59 ft head (1¼" through 3" stations). Complete assembly shall be certified to ASSE 1017, CSA B125.3, NSF/ANSI/CAN 61, and listed by IAPMO R&T for compliance with UPC, IPC, IRC, and NPC plumbing codes.

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

The website www.caleffi.com always has the most up-to-date version of the document, which should be used for technical verifications.

CALEFFI Hydronic Solutions

Innovative Plumbing and Heating Solutions, Built on Generations of Trust

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