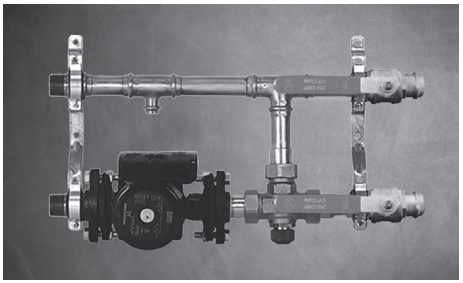
User Guide

Viega Enhanced Mixing Station



Installation

Mounting the Enhanced Mixing Station

The mixing station comes factory tested and mounted on brackets making it ready to hang. Simply install four pan head screws, or wood screws with washers, into the pre-drilled holes in the mounting brackets. See Dimensions on Page 2 for mounting holes and spacing. The station brackets have the same offset as the manifolds, making direct connecting simple. The station can also be used as a centrally located control center for remote manifolds instead of direct connecting to manifolds. Use the 1" M NPT adapters at the end of the station to connect to Viega PEX Press fittings and Viega Barrier PEX tubing to remote manifolds in different areas of the job.

Connecting Enhanced Mixing Stations to Primary Loop (Boiler Loop)

The enhanced mixing station is available in three boiler side connections:

- Copper (male) part number 12151: Copper (male) when soldering stations to boiler loop (primary loop).
- ProPress part number 12152: ProPress connections when connecting station to boiler loop (primary loop).
- PEX Press part number 12153: Viega Barrier PEX when connecting the station to boiler loop (primary loop).

When using Copper (male) stations be aware that the isolation ball valve is a ProPress connection and needs to be protected when soldering. The Copper (male) length is in accordance with ProPress distance requirements for soldering, but take additional steps to be sure press connection is protected to prevent the sealing element from being damaged. A damp rag wrapped around the ProPress ball valve will protect the sealing element from overheating.

Connecting the Base Mixing Stations to Stainless Manifolds

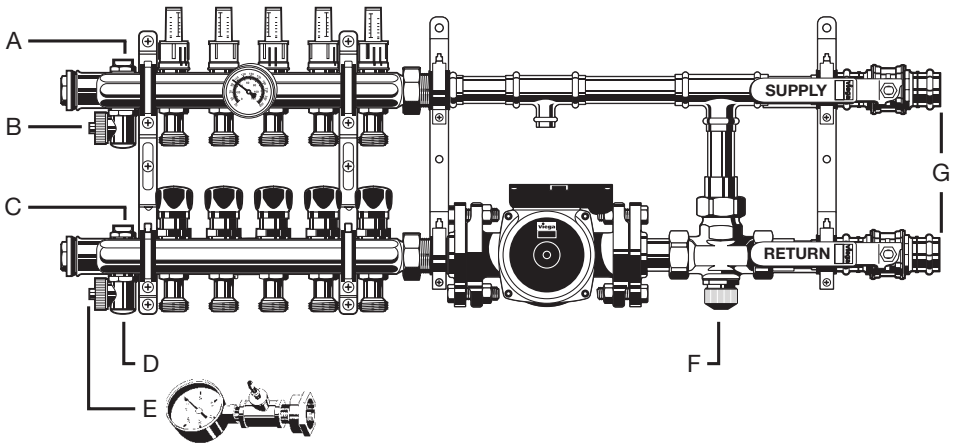
Use Teflon tape to wrap the 1" M NPT mixing station adapter. Wrap tape in the same direction as tightening the adapter. Once taped, apply a small amount of pipe dope on top of the tape for first few threads. Connect the supplied 1¼" x 1" brass bushing to the 1" M NPT adapter. Use the 1¼" threads to connect the 1¼" union connection to the base mixing station. Do this for both supply and return manifolds. Supply and return manifolds are identified by the red (supply) and blue (return) caps. The mixing station is identified with supply and return stickers on the ball valve handles to make piping identification easy.

Sensor Well

The sensor well is designed to house the supply temperature sensor for the basic heating control. Align the flat side of the sensor perpendicular with the set screw. Tighten screw with flathead screwdriver (thermostat screwdriver) to secure the sensor in the well.

This document is subject to updates. For the most current Viega technical literature please visit www.viega.us.

Viega products are designed to be installed by licensed and trained plumbing, mechanical, and electrical professionals who are familiar with Viega products and their installation.
Installation by non-professionals may void Viega LLC's warranty.



A. Manual Air Bleeder
B. Purge Valve (Draw Off)
C. Manual Air Bleeder
D. Purge Valve (Draw Off)
E. Pressurization Kit
F. Diverting Valve
G. Isolation Ball Valves

Pressure Testing

Before the finish floor is installed and during a concrete pour the radiant system must be pressure tested. Air or water may be used as the medium. The following procedure is recommended by Viega:

Check with the local authority having jurisdiction for additional test requirements.

1. Double check all connections to manifold to ensure tightness.
2. Connect manifold pressurization kit to the purge valve (draw-off) on the return manifold. The purge valve on stainless manifolds are found in a similar location, but are built into the manifold header.
3. Close isolation ball valves on the mixing station.
4. Open diverting valve (turn gray cap counter clockwise to open).
5. Open all circuits on manifold.
6. Pressurize the system to 100 psi for at least 1 hour.

Air as the Medium

Use a bicycle pump or compressor. Viega's pressurization kit comes equipped with a Schrader valve for pressurizing with air.

If air test leaks more than once, test with water.

Water as the Medium

Open the isolation valves to fill and pressurize or backfill using a garden hose with a washing machine hose attached to it so there is a hose x hose connection. Attach one end of the hose to the purge valve on the station and the other end of the hose to a hose bib, wall hydrant, or sillcock. This method is limited to city or well water pressure.

The system should hold the 100 psi for a minimum of 1 hour.*
**Minor drop in pressure can be a result of change in ambient temperature.*

Maintain pressure during the installation of the finish floor to simplify leak detection. Note what the pressure is and check occasionally. If pressure drops, some investigating may be necessary. If the tubing is damaged, repair necessary section with a compression coupling.

Purging

Assuming that the heat source is already filled and purged:

Stainless Balancing Manifolds

- Supply manifold: Remove black caps to expose balancing valve. Use a 5mm allen wrench to open and close each circuit.
- Return manifold: Use each blue return cap to open and close each circuit.

Stainless Balancing and Flow Meter Manifolds

- Supply manifold: Lift locking cap and turn flow meters to open and close each circuit.
- Return manifold: Use each blue return cap to open and close each circuit.

1. Open supply isolation valve and all supply and return circuits to fill mixing station and manifold from the heat source.
2. Connect drain hose (i.e. washing machine hose) to hose thread on the return manifold purge valve (draw-off).
3. Open purge valve (draw-off).
4. Close supply isolation valve and open return isolation valve. Purge the return line.
5. Spin gray cap on diverting valve so the valve position is about 50% open.
6. Close return isolation valve.
7. Open the supply isolation valve.
8. Close supply and return balancing valves on manifold.
9. Open the supply manifold circuit and return manifold circuit that is furthest from the draw-off; push air through the entire circuit and out the draw-off eliminating air from that circuit.
10. Once the air has been purged, close the supply and return circuits.
11. Move onto the next circuit. Watch the pressure gauge on the heat source. Do this for each circuit; open, purge, close.

Purging is easier when using more than operating pressure to push air out using a fast fill component to boost pressure to 20 to 25 psi. Pressure must be kept below the safety pressure relief valve limit (commonly 30 to 50 psi).

Use a 5-gallon bucket with the hose submerged under the water level. Use the air bubbles floating to the surface as a guide. Once the air bubbles have stopped, purge a few seconds more to ensure the line is free of air. Watch the pressure in the system carefully to avoid discharging the safety relief valve.

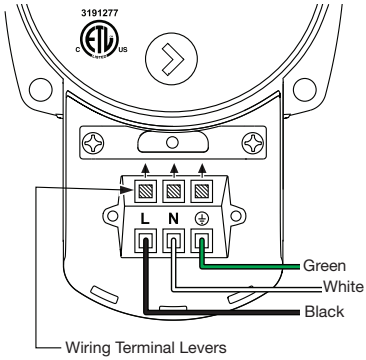
12. Once purging is complete, close draw-off and disconnect hose; open circuits and balance if necessary.
13. Open the return isolation valve.
14. Set safety high limit on diverting valve (optional).

Purging time and the amount of discharge may vary. Systems may need to be purged more than once. Air in the system may prevent flow and heat transfer. If system is purged in the future it is important to open the diverting valve fully and to power down the circulator.

Terminal Box Models

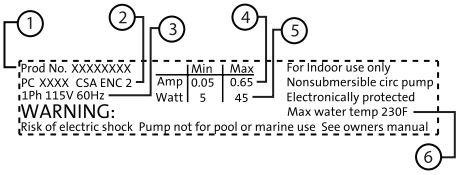
Wiring Procedure

1. Loosen terminal box screw from terminal box cover.
2. Utilize either conduit port for wiring entrance.
3. Gently push open wiring terminal levers (L-N-G) for wiring installation.
4. Slide terminal box cover over terminal box body.
5. Tighten terminal box screw Phillips #1 (5 in-lbs).
6. Apply power.
7. Lights on the control panel indicate electrical supply has been switched on.



Circulator must be properly grounded.

Nameplate



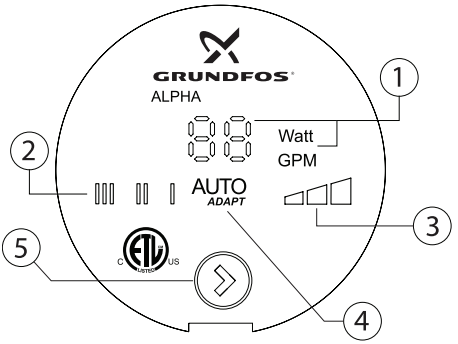
1 Product Number
2 Production Code:
- 1st and 2nd figures = year
- 3rd and 4th figures = week

3 Voltage (V):
4 Rated Current (A):
- Minimum Current (A)
- Maximum Current (A)

5 Input power (W):
- Minimum Power (W)
- Maximum Power (W)

6 Max. fluid temperature (F)

Control Display



1 LED showing Watt or flow indicator
2 LED indicating fixed speed
3 LED indicating constant pressure
4 LED AutoADAPT
5 Push-button for selection of pump setting

Lockout Condition

Identified by two horizontal dashes on the display of the circulator (--) This can be caused by:
- Air
- Locked Rotor
- Over/Under Voltage

Identify and repair the problem. To clear the lockout condition: Disconnect power to the unit for 3 minutes and then re-power the circulator.

Operating Parameters

- Supply Voltage
  - 1x115V +/-10%, 60Hz
- Motor Protection
  - The pump requires no external motor protection.
- Enclosure Class
  - Indoor use only, IP42 CSA Enclosure Type 2
- Insulation Class
  - F
- Relative Air Humidity
  - Maximum 95%
- Maximum Discharge Pressure
  - 150 psi (10.34 bar)
- Sound Pressure Level
  - 43 dB (A)
- Inlet Pressure

Inlet Pressure	
Liquid Temperature	**Min. Inlet Pressure**
167°F (75°C)	0.75 psi (0.05 bar)
194°F (90°C)	4.06 psi (0.28 bar)
230°F (110°C)	15.7 psi (1.08 bar)

- Temperature
  - To avoid condensation in the control box and stator, the liquid temperature must always be higher than the ambient temperature

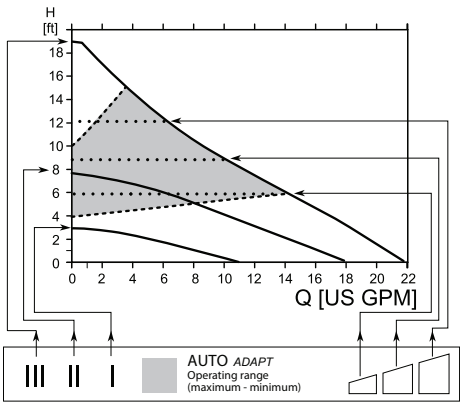
Ambient Temperature °F (°C)	Liquid Temperature	
	Min. °F (°C)	**Max. °F (°C)**
+32°F (0°C)	+36°F (+2°C)	+230°F (+110°C)
+50°F (+10°C)	+50°F (+10°C)	+230°F (+110°C)
+68°F (+20°C)	+68°F (+20°C)	+230°F (+110°C)
+86°F (+30°C)	+86°F (+30°C)	+230°F (+110°C)
+95°F (+35°C)	+95°F (+35°C)	+158°F (+70°C)
+104°F (+40°C)	+104°F (+40°C)	+158°F (+70°C)

- Maximum Glycol Concentrations
  - 50% glycol @ 36°F (2°C)
  - Hydraulic performance change can be expected.
- Watt Readings
  - Accuracy +/-1 Watt
- Flow Indicator
  - Provides a relative indication of flow, should not be used in lieu of a flow meter.

- Check Valve
  - Use of check valve may reduce pump hydraulic performance (up to -10%).
  - Use check valve in parallel pumping applications.
- Curve Conditions
  - Test Liquid: Airless water.
  - Curves apply to a density of 983.2 kg/m3 and a liquid temperature of +140°F (+60°C).
  - All curves show average values and should not be used as guarantee curves. If a specific minimum performance is required, individual measurements must be made.
  - Curves apply to a kinematic viscosity of 0.474 cSt.
- Approximate power usage

Approximate Power Usage			
Speed Setting		**Min**	**Max**
High fixed speed	III	39W	45W
Medium fixed speed	II	15W	30W
Low fixed speed	I	5W	8W
Constant pressure		8W	45W
Constant pressure		14W	45W
Constant pressure		22W	45W
AutoADAPT	AUTO ADAPT	5W	45W

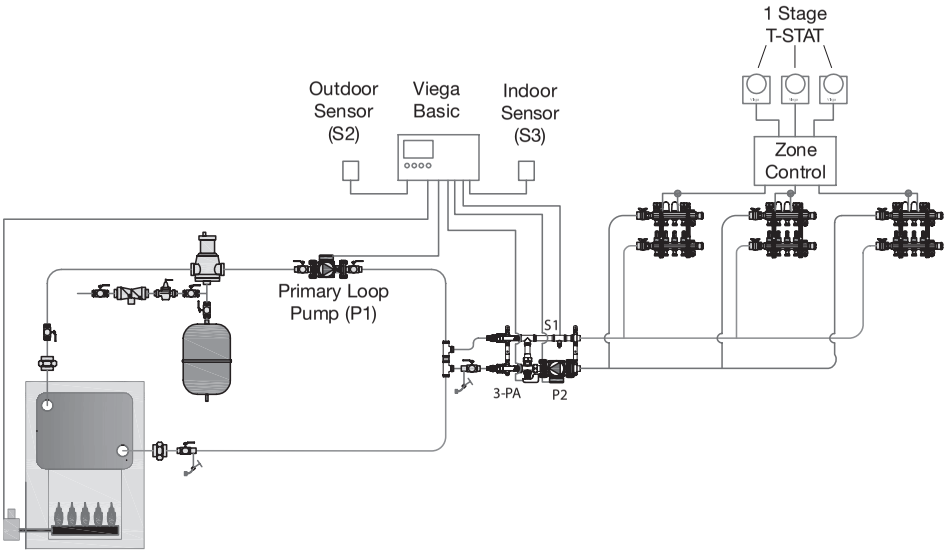
Performance* and Operation Mode Selection



**Hydraulic performance without check valve*

Pos	Description
	Push-button for selection of pump setting. Every time the push-button is pressed, the circulator setting is changed.
III	**High Fixed Speed** Runs at a constant speed and consequently on a constant curve. In Speed III, the pump is set on the maximum curve under all operating conditions. Quick Vent of the pump can be achieved by setting the pump to Speed III for a short period.
II	**Medium Fixed Speed** Runs at a constant speed and consequently on a constant curve. In Speed II, the pump is set on the medium curve under all operating conditions.
I	**Low Fixed Speed** Runs at a constant speed and consequently on a constant curve. In Speed I, the pump is set on the minimum curve under all operating conditions.
	**Constant Pressure I** The duty point of the pump will move left and right along the lowest constant-pressure curve depending on water demand in the system. The pump head (pressure) is kept constant, irrespective of the water demand.
	**Constant Pressure II** The duty point of the pump will move left and right along the middle constant-pressure curve depending on water demand in the system. The pump head (pressure) is kept constant, irrespective of the water demand.
	**Constant Pressure III** The duty point of the pump will move left and right along the highest constant-pressure curve depending on water demand in the system. The pump head (pressure) is kept constant, irrespective of the water demand.
AUTO ADAPT	**AutoADAPT (Factory Setting)** This function controls the pump performance automatically within the defined performance range (shaded area). AutoADAPT will adjust the pump performance to system demands over time.

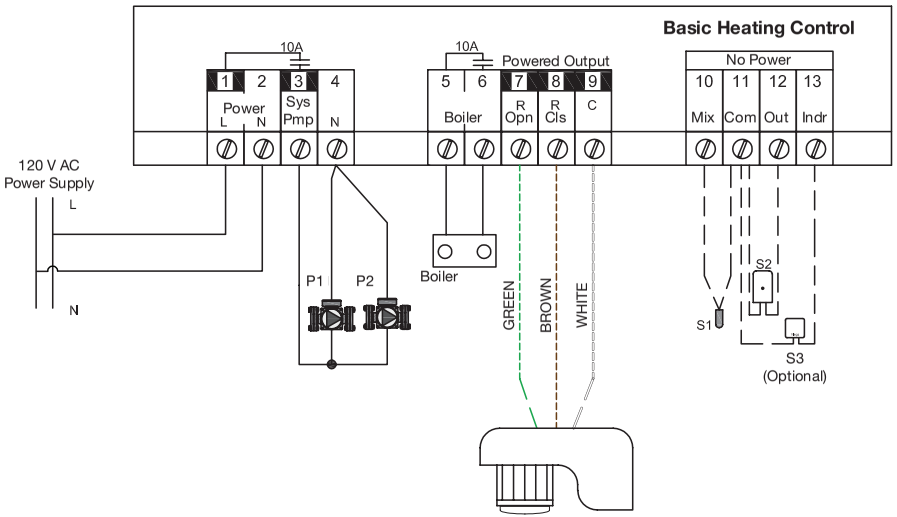
Piping Schematic for Enhanced Mixing Station with Basic Heating Control and 3 Manifolds in Parallel



Piping

- This drawing shows system piping concept only. Installer is responsible for all equipment and detailing required by local codes.
- Size header piping for maximum flow velocity of 2 ft./sec.
- All other piping should be sized for a maximum flow velocity of 4 ft./sec.
- Install a minimum of 12 diameters of straight pipe upstream of all circulators and check valves.
- Install isolating flanges or isolating valves on all circulators.
- Install purging valve(s) on all circuits.
- All closely spaced tees shall be within 4 pipe diameter center-to-center spacing.
- Install minimum of 6 pipe diameters of straight pipe upstream and downstream of all closely spaced tees.
- Differential pressure bypass valve prevents flow noise under partial load conditions (some zone valves closed).
- Set differential pressure bypass valve to delta P of distribution system with all zones open + 1 psi
- Not all components may be required depending on control strategy (i.e. constant circulation).

Wiring Schematic for Enhanced Mixing Station with Basic Heating Control



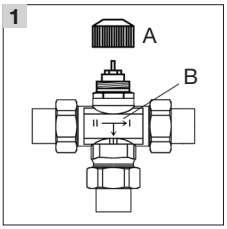
Wiring

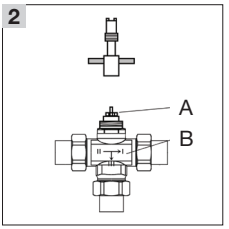
- This drawing shows system wiring concept only. Installer is responsible for all equipment and detailing required by local codes.
- All wiring shall be in conformance with the latest edition of the National Electrical Code.
- Consult with control / boiler manufacturer for limitations and installation instructions.
- Do not run the wires parallel to telephone or power cables. If wires are located in an area with strong source of electromagnetic interference (EMI), shielded cable or twisted pair should be used or the wires can be run in a grounded metal conduit.

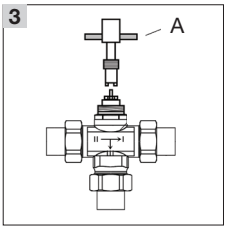
Setting Safety High Limit

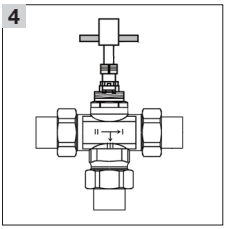
The enhanced mixing station is provided with a pre-installed temperature safety high limit feature that allows a maximum fluid temperature to be set. This feature should be used when purging is complete and system is fully operational. To use this feature follow the steps below:

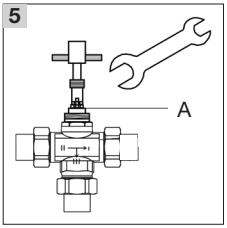
If radiant system is being serviced, the safety high limit must be turned off for purging. Reset after purging.











1. Remove (A) gray plastic cap from (B) valve body. (This cap can be used to adjust the water temperature manually.)
2. Loosen up (A) hex lock nut from the (B) valve body with brass key tool.
3. Use opposite side of (A) brass key tool and turn inner adjustment screw (slotted) clockwise until valve spring resistance is felt. To lower water temperature turn key clockwise; turn counterclockwise to raise it.
4. Turn adjustment screw further clockwise until desired supply water temperature is obtained and count quarter turns for reference. This has to be done carefully and slowly because each quarter turn of the adjustment screw will result in approximately 15°F temperature reduction. Wait until desired water temperature stays consistent.

> This calibration must be done with the boiler at its highest temperature, the circulator running and all zones open.

5. Tighten (A) hex lock nut with wrench. Do not overtighten. To secure high limit adjustment: hold slotted adjustment screw with brass key while tightening nut.

Viega LLC
585 Interlocken Blvd.
Broomfield, CO 80021

Phone (800) 976-9819
www.viega.us

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