

HKV 1 1/4 IN. BRASS MANIFOLD

PRODUCT INSTRUCTIONS

SCOPE

This guide provides instruction regarding HKV 1 1/4 in. manifold installation and operation. Manifolds may only be installed, adjusted and maintained by an appropriately licensed installer of radiant systems.

Throughout this document, the signal word **NOTICE** is used to help you avoid property damage. We cannot warn of all hazards; you must also use your own good judgment.

ABOUT HKV 1 1/4 IN. MANIFOLDS

HKV 1 1/4 in. manifolds are used for distributing and regulating the volume of flow in geothermal and radiant systems. The HKV 1 1/4 in. manifold is equipped with supply/shutoff valves and circuit balancing isolation valves which allow individual complete circuit isolation. Note the

following:

- Must be operated using heating water, which is free of corrosive particles or other contaminants that can damage the manifold
- Maximum permissible continuous operating pressure is 87 psi (6 bar) at 176°F (80°C)
- Maximum permissible test pressure is 145 psi (10 bar) at water temperature < 86°F (30°C) and maximum ambient temperature 104°F (40°C)
- Use manifolds only as intended in order for the REHAU *PEXa Limited Warranty* to apply.

NOTICE: A damaged manifold may leak, causing system failure and property damage.

- Do not expose manifold to harmful chemicals, aggressive water conditions or any external influences that may cause damage to manifold materials.
- Use appropriate antifreeze agents when below freezing conditions exist.
- Properly insulate manifold and/or locate manifold so as to avoid condensation.
- Do not install the manifold using connectors or accessories made by other manufacturers.

Impact of System Fluid on Manifold and System Components

The installer must have an understanding of local water conditions and how the makeup of the system fluid can impact the lifetime and performance of the system components. The composition of the system fluid has a major impact on the potential for corrosion within the complete system. The likelihood of corrosion and failure of system components can be greatly reduced by using suitable water quality and ensuring proper system operation.

The local installer and design engineer must have an understanding of the potential for water-side corrosion. In certain cases, various forms of corrosion can occur which include functional impairments to the system, system leakage, clogging of system components, impairment of heat transmission and flow noise.

Field experience has shown that risk of corrosion damage is greatly reduced by the following measures:

- System must be completely sealed and operated with heating water without additives. If water treatment is necessary, the contractor should ensure that the additives to the system including antifreeze, corrosion inhibitors and system flushing chemicals do not lead to corrosion of the system components.
- Propylene glycol, ethylene-based glycols and alcohol-based glycols at maximum 50% concentration are recommended within temperature pressure ratings as shown in Fig. 2 in case freeze protection of system is necessary.
- Materials such as wax or mineral oils, threading oils or incompatible air compressor oils must not be introduced into the system.
- Installer must review the complete list of water-contact materials in the HKV 1 1/4 in. manifold (see Table 1) to ensure compatibility with the flushing fluid, system fluid and additional make-up water.
- Manifold must be installed in a non-corrosive environment.
- If there are known local conditions that could lead to corrosion of the system components, the installer must consult with a water quality expert experienced in corrosion control of piping systems. If there are no known standards for ensuring proper water quality, then the German engineering standard, VDI 2035 *Prevention of Damage in Water Heating Installations*, should be referenced. (English version of VDI 2035 available for purchase at www.beuth.de or contact REHAU for assistance.)
- System fluid should also comply with RPA guidelines for hydronic radiant heating systems.

Manifold Components

Each HKV 1 1/4 in. manifold comes complete with the following:

- Installation instructions
- 1 1/4 in. NPT supply and return manifold isolation ball valves with thermometer sockets and flat gaskets
- Two 1 1/4 in. BSPP brass end caps with gaskets
- Isolation valves on supply side
- Circuit balancing/isolation valves on return side
- Mounting brackets
- Four drywall screws
- Vent key
- Manifold circuit chart

In addition, you will need:

- R-20 connectors for the size of RAUPEX® you are using
- Mini thermometers (Art. 250218, sold separately)
- Brass manifold air vent ball drain combination set (Art. 250226, sold separately)
- 1 1/4 in. brass manifold adapter fittings (Art. 298986-001, sold separately)
- Adjustable wrench
- 1 1/4 in (32 mm) wrench for 3/8, 1/2 and 5/8 in. R-20 connectors
- 1 1/2 in (38 mm) wrench for 3/4 in. fittings
- 2 in (50 mm) wrench

Manifold Technical Data

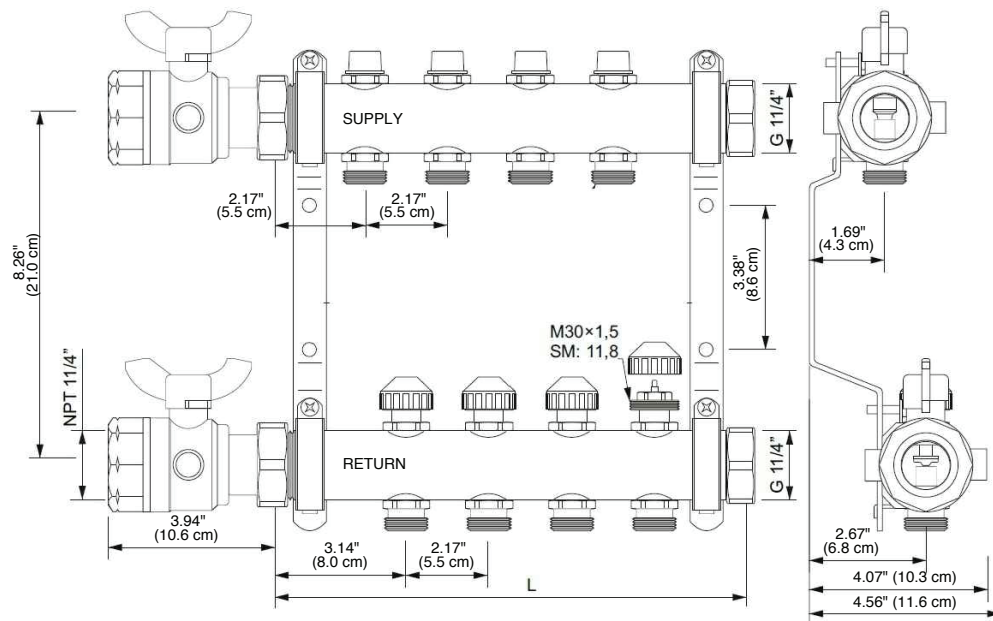


Fig. 1: Manifold dimensions

Manifold Specifications

Number of Outlets	Manifold Length (L)	
	in	cm
4	11.81	30.0
6	16.14	41.0

Table 1: Manifold Specifications

Materials

Headers	Brass (CW 508L)
Ball valve casing and end piece set	Brass (CW 617N)
Valve casing, lower valve part and flow indicator casing	Brass (CW 614)
Valve shaft	Nickel-plated brass (CW 614)
Valve spring and flow indicator spring	Stainless steel 1.430
O-ring washers	EPDM
Valve disk and valve head	EPDM
Connection ball valve/end piece	AFM 34 Synthetic fiber based material

Connections

Header ends	1 1/4 in. BSP parallel (straight) threads
Outlets	R-20 BSP parallel (straight) outside threads
Isolation valve	1 1/4 in. NPT female threads

Temperature / Pressure Capabilities

Maximum operating temperature	176°F (80°C) @ 87 psi (6 bar)
Minimum operating temperature	14°F (-10°C) @ 145 psi (10 bar)
Maximum water test pressure	145 psi (10 bar)
24 hrs. < 86°F (30°C) @ max. ambient temperature	104°F (40°C)

Flow Rates

Maximum flow rate	4.0 USGPM per circuit; 40 USGPM total (0.25 l/s per circuit; 2.52 l/s total)
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NOTICE: Exposure to some fluids may damage manifold materials. Contractor must confirm compatibilities of system fluids such as antifreeze, corrosion inhibitors and system flushing chemicals with water contact components of manifolds.

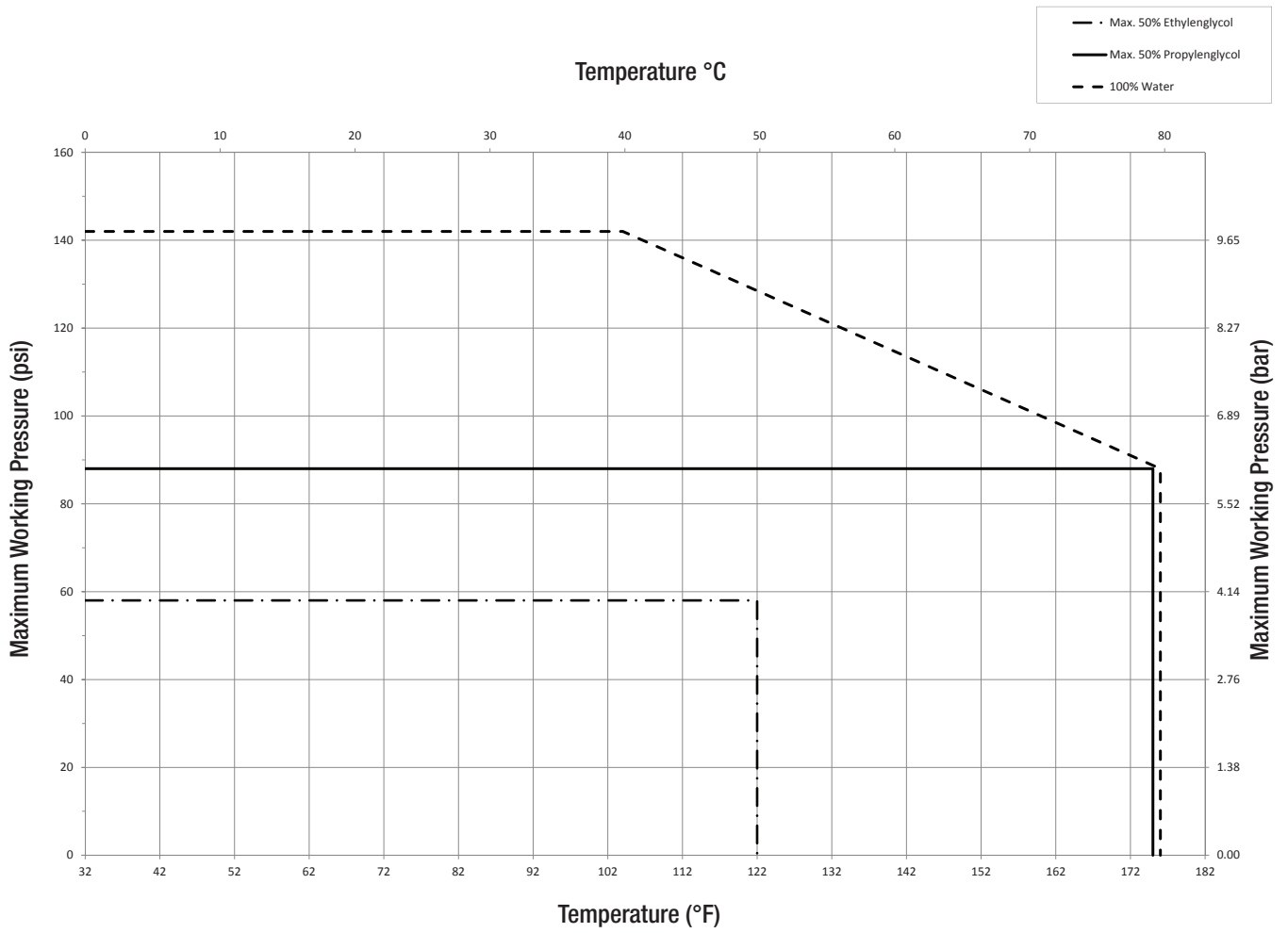


Fig. 2: Manifold temperature and pressure capabilities

Note: Operating temperature and pressure must stay below corresponding line for appropriate fluid type.

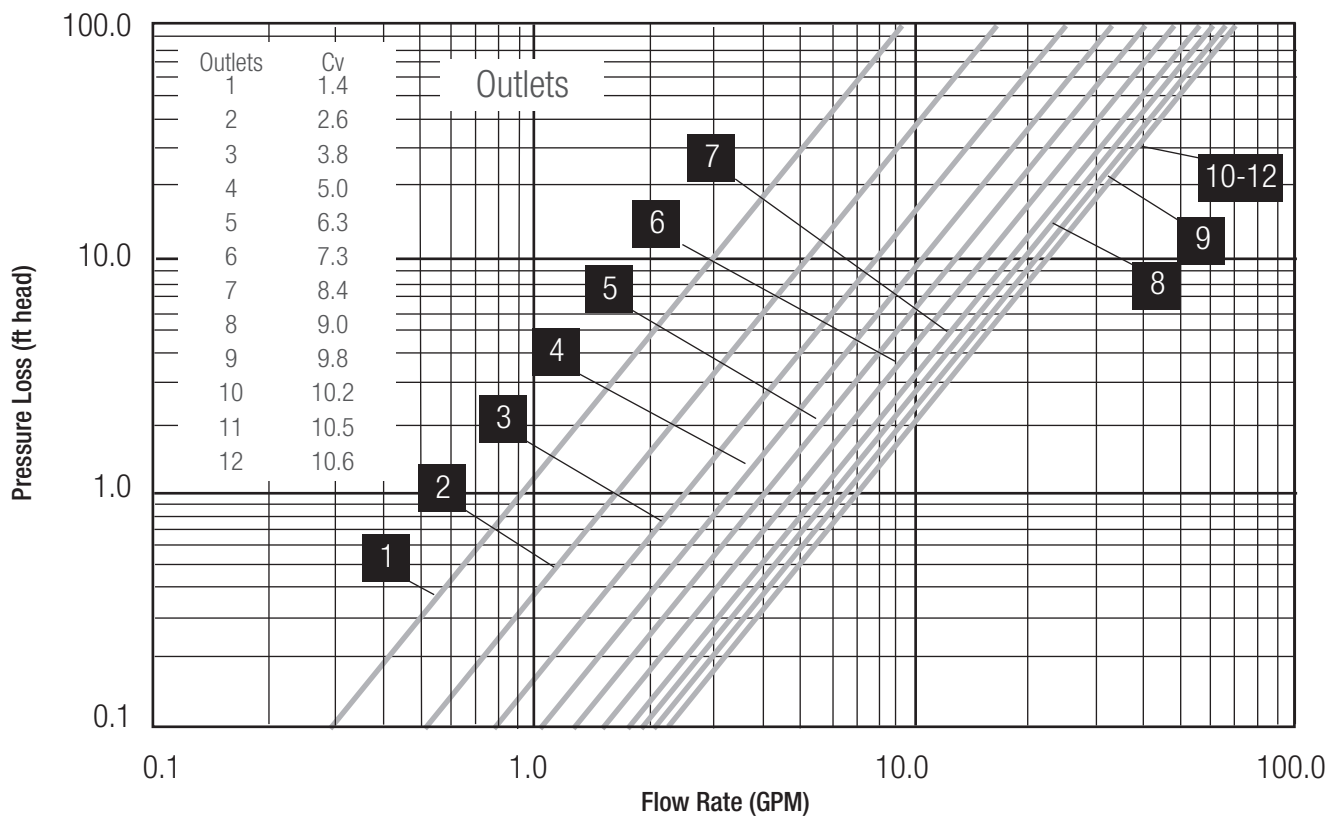


Fig. 3: Pressure loss through manifold

To use the diagram in Fig. 3, choose the flow rate that is the total flow rate for the entire HKV 1/4 in. manifold – the total of all circuits (e.g., 10 GPM). Plot a vertical line upwards to intersect with the line for the size of the manifold (e.g., 6 outlets). From that point, move to left to find pressure loss in feet of head (e.g., 10 GPM, 6 outlets = 4.0 ft. head). This is the total pressure (head) loss through the manifold’s header pipes, the 1/4 in. isolation valves and the circuit balancing valves (when fully open).

MOUNTING THE MANIFOLD

NOTICE: An improperly installed manifold can leak, causing system failure and property damage. To minimize risk of leaks:

- Must use included steel mounting brackets, which provide a secure mount, proper alignment and isolation of vibration and noise.
- Do not use thread sealant tape or pipe dope on the manifold outlets.
- Do not over tighten connections.

1. Install the manifold in its final position prior to connecting the RAUPEX pipes.
 - Manifold may be installed in a REHAU steel heating manifold cabinet, on a wall or on a temporary support frame.
 - Manifold may be mounted in any orientation (i.e., inverted, horizontal, sideways).
 - Manifold must be level and have adequate clearance on the sides for pipe connections.
 - Minimum clearance is 16 in. (40 cm) between the bottom of the manifold and the top of the finished floor.
 - Steel mounting bracket and screws are provided.

2. Attach the 1 1/4 in. isolation ball valves and the air vent drain valves by sliding the flange nut over the large tab on the flange, then over the small tab. Hand tighten the nut onto the end of the header.
 - Red-handle valve goes on the supply header.
 - Blue-handle valve goes on the return header.
 - Use the slip flanges and flat gaskets provided.
 - Align valves with the thermometer housings facing the front.

Note: If you will be using an air test, slightly wet the flat gaskets with water before attaching each valve.

3. Gently tighten the nuts with a 2 in (50 mm) wrench, without crushing the flat gaskets (1/4 to 1/2 turn).
4. Close the 1 1/4 in. isolation valves for pressure testing and to keep out foreign objects.

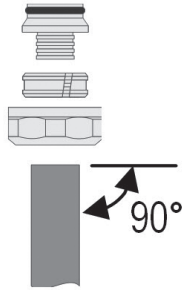
INSTALLING RAUPEX PIPES

RAUPEX pipes are connected to the manifold using REHAU R-20 manifold compression fittings (sold separately).

- For 3/8, 1/2, 5/8 and 3/4 in. fittings, the R-20 connector includes insert with O-ring, split brass ring and compression nut
- For 3/4 in. fittings, the R-20 connector also includes an R-20 x 1 in. bushing

It is easiest to connect each pipe to the manifold working left to right and starting with the upper (supply) header first.

Note: If using PVC bend guides, make sure guides are slid over pipe and adjusted to the proper height before attaching the R-20 connector.

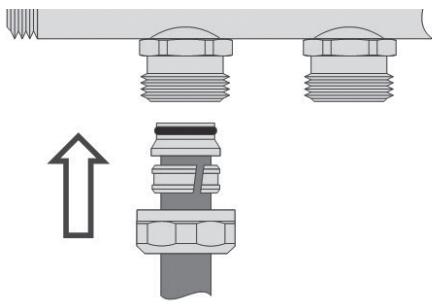


1. Cut pipe squarely using a pipe cutter.

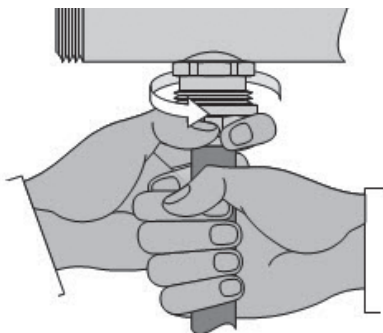


2. Slide the R-20 compression nut and split ring over the pipe.
Then push in the insert fitting all the way to the top of the pipe.

NOTICE: Do not use any damaged R-20 connectors or rubber O-rings. Damaged parts may cause leakage.

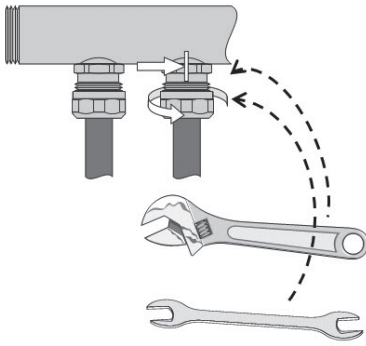


3. Push the conical end of the R-20 connector all the way into the appropriate outlet of the manifold. For 3/4 in. fittings, first attach the R-20 x 1 in. bushing to the manifold outlet with the hex end of the bushing closest to the header. This should be done hand tight.



4. Hand tighten the compression nut, making sure the pipe and fitting are pushed all the way in.

NOTICE: Do not use thread sealant tape or pipe dope on the manifold outlets. These materials may prevent a proper seal, causing leaks.



5. While holding the hex end of the manifold outlet with an adjustable wrench, turn the compression nut no more than a half turn beyond hand tight.
 - For 3/8, 1/2 and 5/8 in. connections, use a 1 1/4 in (32 mm) wrench.
 - For the 3/4 in. connections, use a 1 1/2 in (38 mm) wrench.

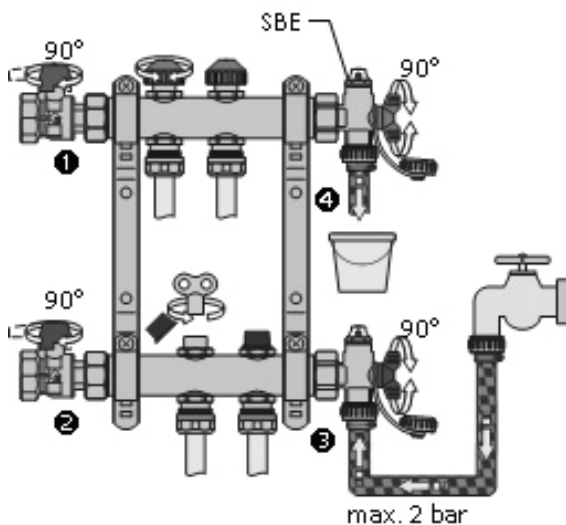
NOTICE: Do not over tighten. Use approximate force of 12 Nm or 9 lb ft. Over tightening will damage the O-ring or the manifold outlet, causing leaks.

6. If you have unused circuit outlets on the manifold, refer to section on Isolating an Individual Circuit.

FLUSHING AND FILLING RADIANT CIRCUITS

Use the brass manifold air vent ball drain combination set (Art. 250226, not included) and 1 1/4 in. brass manifold adapter fittings (Art. 298986-001, not included) to fill, purge and bleed the system. Threaded connection of boiler drain valve is for 3/4 in. garden hose threads.

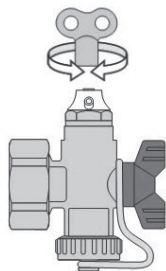
Note: System must be filled through the supply header and drained through the return header.



To fill and purge the system:

1. Close the 1 1/4 in. ball valves on the supply and return headers.
2. Make sure all flow meters are completely open by turning the vent key counter clockwise.
3. Close all balancing valves by turning the blue cap clockwise.
4. Open each drain valve by turning the handle 90° degrees to be aligned with the valve body.
5. Attach a garden hose to each valve.
6. Turn on supply of water and begin filling manifold.
7. Open the first circuit balancing valve and flow water until no more air comes out.
8. When this circuit is purged, close the valve and repeat this process for the remaining circuits.
9. When purging is complete, close the return drain valve first, then close the supply drain valve.
10. Remove hoses and install the protective caps.

The manual air vent on the top of each valve may be used to bleed trapped air from the system. These manual air vents may be replaced with the automatic air vent (sold separately) for automatic venting of trapped air.



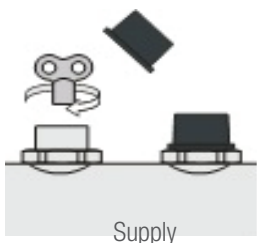
Operation of manual air vents:

1. To open the air vent, turn the square portion of the valve with the 1/4 in. vent key at least half turn.
2. Turn the white housing by hand to aim the air, mist or fluid that comes out.
3. When air is bled from the system, close the air vent by turning it clockwise.

NOTICE: Make sure air vent is completely closed after system is bled. If vent is not closed, valve will leak.

BALANCING THE MANIFOLD

The circuit shutoff and balancing valves are located on the return header.



1. Remove black protector cap of the circuit valve and close the valve by turning the vent key clockwise until it stops. This should shutoff the circuit 100%.

Note: All balancing adjustments should be made from the supply valve only.



2. Set the circuit flow (GPM) by turning the control spindle counterclockwise. Start with the circuit valve with the lowest flow requirement and set to the required flow plus approximately 50%.

3. Proceed by adjusting the remaining supply valves by using turns outlined in Fig. 4.

Note: The valve is fully opened with 4 to 5 counterclockwise turns.

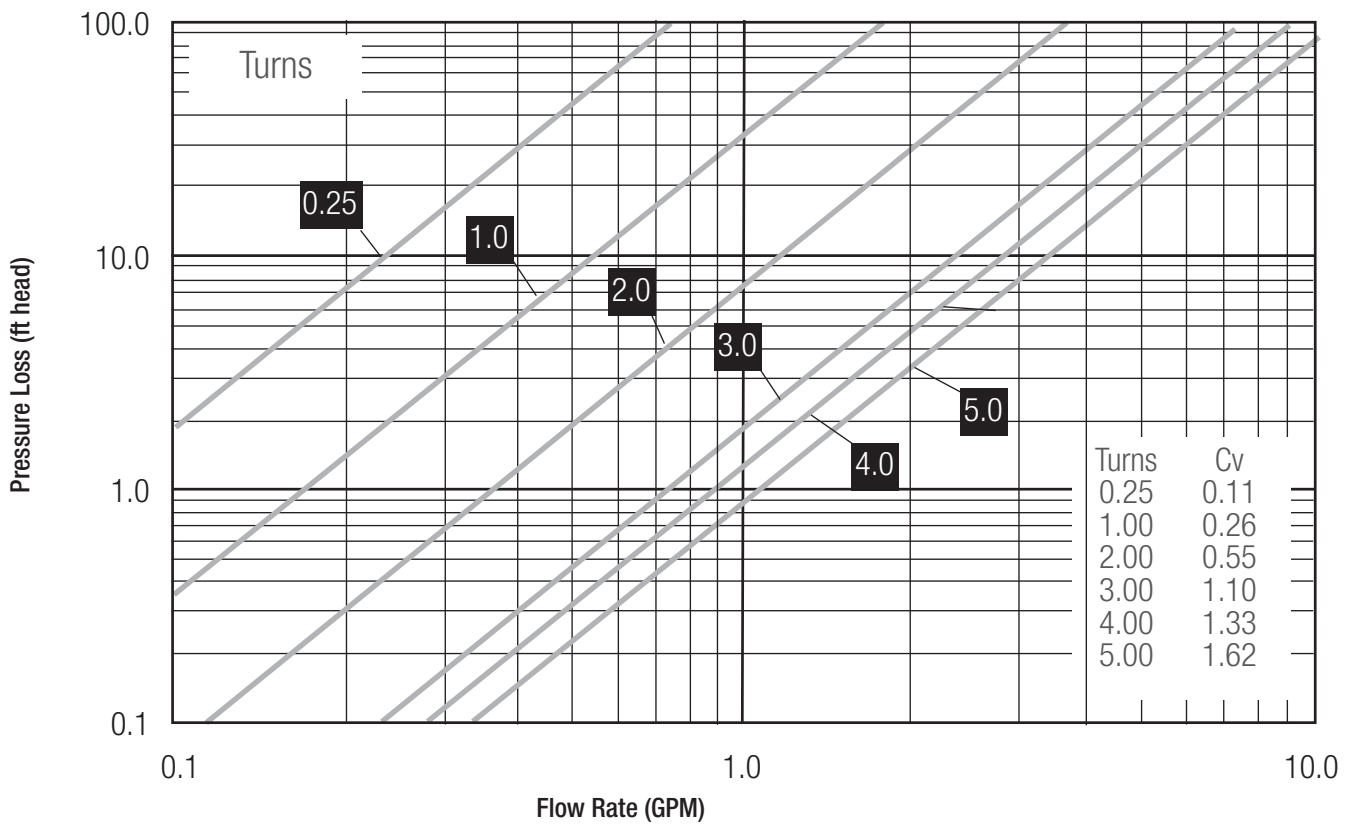
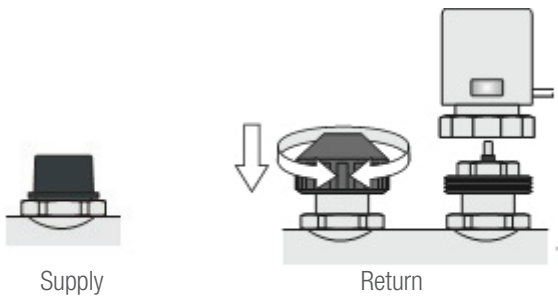



Fig. 4: Number of turns to achieve pressure loss and flow rate

To use diagram in Fig. 4, use the flow rate (e.g., 1 GPM) of the circuit that needs to be balanced and plot a vertical line upward. Next, plot a horizontal line from the necessary pressure loss (e.g., 5.5 ft.head) needed to achieve the same head loss for all circuits. The intersection of the two plotted lines indicates the number of turns necessary to achieve the required pressure loss (e.g., 1 GPM, 5.5 ft.head loss equals approximately 2 turns).



4. After balancing the manifold, thread the black protective cap back on.
 - The cap prevents the valves from accidental adjustment and from getting dirty.
 - If you are using manifold actuators, mount these in place of the blue caps.



REHAU
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PRO-BALANCE® MANIFOLD
CIRCUIT CHART

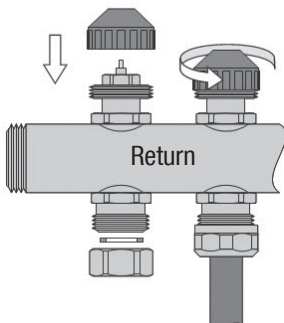
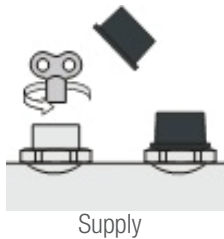
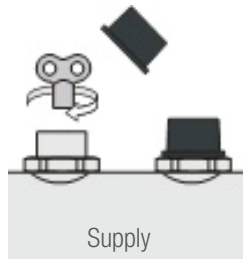
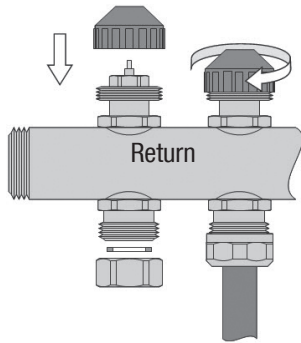
Group No.	Room Name	Pipe Size	Working Pressure	Working Temp.	Connd. Length	Design Pipe Size
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Installer: _____ Dist. Address: _____
 City/State: _____ Floor #: _____
 Client: _____ Dist. Address: _____
 Installation Date: _____ System Test Date: _____

5. Fill in the HKV Manifold Circuit Chart and post it next to the manifold.

ISOLATING AN INDIVIDUAL CIRCUIT (IF REQUIRED)

The HKV 1 1/4 in. manifold allows for complete isolation of individual circuits by using the shutoff valve integrated within the flow meter on the supply header and corresponding balancing valve on the return header.



To close a circuit:

1. On the return header, close the circuit balancing valve on the return header by turning the blue cap clockwise until it stops. If the circuit has a REHAU valve actuator installed, replace it with a blue cap.

Note: Do not use the vent key to close the circuit as this will change the balancing of the system.

2. On the corresponding supply valve, use the vent key to turn the shutoff valve clockwise until it stops.

Notes:

- Supply valves should be completely open during filling and purging the circuits.
- For permanent shut-off, attach an R-20 brass circuit outlet cap with gasket to the manifold outlet. Also, ensure balancing valve and flow meter shutoff valve are completely closed.
- When using supply valve for isolation, the installer must note the amount of turns to isolate the loop. When returning the loop to normal operation, reverse the amount of turns to keep balancing correct.

To open a closed circuit:

1. To reopen a circuit, turn the supply valve with the vent key counter-clockwise until it stops and turn blue protection cap on the return header counterclockwise to release cap from the valve.

2. If you are using a manifold actuator, completely remove the blue cap, then reinstall manifold actuator. If you are not using a manifold actuator, thread the blue protective cap back on a half turn.

TESTING AND MAINTAINING THE MANIFOLD

Once installation of manifold and pipes is complete, the system should be pressure tested with air or water to ensure there are no leaks.

The manifold should be inspected periodically during system operation to ensure none of the connections have loosened or are leaking.

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