

GeoCal™ geothermal manifolds

110 Series

Installation, commissioning and servicing instructions



Function

The GeoCal™ pre-assembled manifold for ground-source geothermal loops offers an alternative method of piping parallel earth loops, bringing all circuits to a common manifold station without labor-intensive fusion welding. GeoCal manifolds provide significant installation, commissioning, and operational advantages. With optional 3/4" or 1" QuickSetter™ balancing valves with flowmeter, and shutoff ball valves, GeoCal allows easy individual circuit balancing leading to lower pumping costs and greater system efficiency. Shutoff ball valves installed on the return manifold allows for easy individual circuit purging while minimizing purge pump size. GeoGrip™ couplings are used for connecting to polyethylene piping, either directly to the manifold or to the balancing valves and shutoff valves, making the ground earthloop installation completely free of fusion joints.

GeoCal™ pre-assembled manifold comes complete with automatic air vents, dual-scale temperature gages, fill/drain valves, supply and return manifolds, brass end caps with insulation and wall brackets with mounting hardware and labels.

Product range

Series 110 GeoCal™ pre-assembled manifold.....2 to 8 earthloop circuit outlets 1-1/4" NPT female end connection

Technical specification

Materials:

Supply and return manifold body: polymer PA66G30
 End fitting with air vent, fill/drain valve: brass
 End cap: brass
 Tie rods: Stainless steel
 Wall mounting brackets: Stainless steel

Performance:

Suitable fluids: water, ethanol*, methanol*, glycol and saline solutions
 Max. percentage of solutions
 glycol: 50%
 ethanol: 30%
 methanol: 25%
 Max. working pressure: 90 psi (6 bar)
 Max. system test pressure: 150 psi (10 bar)
 Working temperature range:
 water, glycol and saline solutions: 15 - 140°F (-10 - 60°C)
 ethanol and methanol solutions: 15 - 86°F (-10 - 30°C)
 Ambient temperature range: -5 - 140°F (-20 - 60°C)
 Max. flow rate: 24 gpm (1.6 l/s) total all circuits
 Supply & Return manifold end connection: 1-1/4" NPT female
 Connection center distance: 4 inch (100mm)
 Custom threaded circuit connections with EPDM mechanical seal for connecting geothermal pipe fitting, shutoff ball valves, or QuickSetter balancing valves.

*Always verify compliance with local regulations prior to use.

| Code | Description | | | |
|----------|----------------|------------------|----------------|----------------------------|
| 1107B5LA | 1-1/4" NPT end | GeoCal™ Manifold | 2 circuits | Left side Pipe Connections |
| 1107C5LA | | | 3 circuits | |
| 1107D5LA | | | 4 circuits | |
| 1107E5LA | | | 5 circuits | |
| 1107F5LA | | | 6 circuits | |
| 1107G5LA | | | 7 circuits | |
| 1107H5LA | | | 8 circuits | |
| 1107B5RA | | | 1-1/4" NPT end | |
| 1107C5RA | 3 circuits | | | |
| 1107D5RA | 4 circuits | | | |
| 1107E5RA | 5 circuits | | | |
| 1107F5RA | 6 circuits | | | |
| 1107G5RA | 7 circuits | | | |
| 1107H5RA | 8 circuits | | | |

Characteristic Components

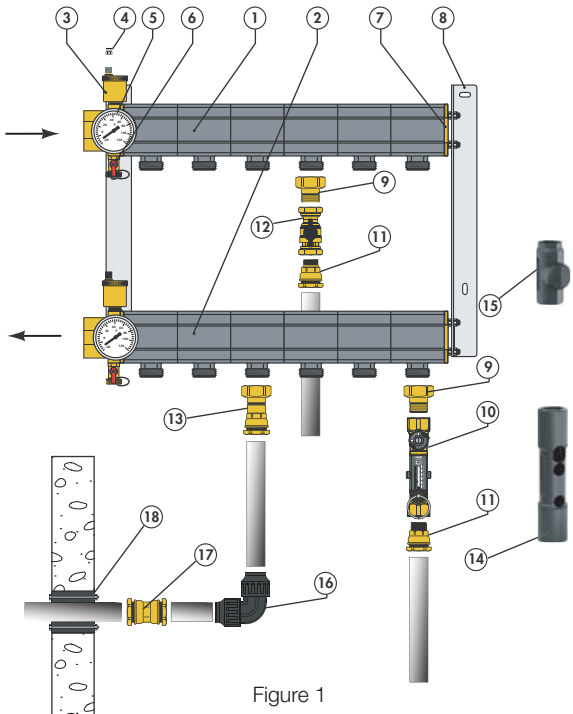


Figure 1

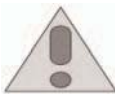
- 1. Supply manifold
- 2. Return manifold
- 3. Air vent
- 4. Vent cap adapter NA 10204 (for methanol/ethanol fluids)
- 5. Temperature gage
- 6. Drain valve
- 7. Blind end plug
- 8. Bracket
- 9. Manifold outlet fitting 110050A/60A*
- 10. QuickSetter 132552A/662A*
- 11. GeoGrip pipe coupling 861527A/634A*
- 12. Isolation valve NA39589/NA39753*
- 13. GeoGrip manifold to earthloop pipe connector NA10246/247*
- 14. Optional insulation shells for QuickSetter with inlet/outlet fittings 112001/003*
- 15. Optional insulation shells for isolation valves with inlet/outlet fittings 111001/003*
- 16. GeoGrip elbow NA866027/034*
- 17. GeoGrip sleeve coupling 863027/034*
- 18. GeoSeal Wall penetration seal NA10248/NA10249*

*Part numbers for 3/4" / 1" sizes

Flexible pipe connection choices:

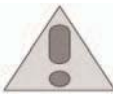
- A. Connect directly to earthloop piping using item 13.
- B. Connect using isolation valves with items 9, 11, 12.
- C. Connect using QuickSetters with items 9, 10, 11.

NOTE: Items 9 and 13 come complete with EPDM mechanical seals (gaskets), code R67032, for sealing when threading on to the manifold circuit connection.



SAFETY INSTRUCTION

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



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

If the GEOCAL geothermal manifold 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.

Make sure that all the connecting pipework is water tight.

When making the water connections, make sure that the pipework connecting the GeoCal geothermal manifold 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.

Water temperatures higher than 100°F (38°C) can be dangerous. During the installation, commissioning and maintenance of the GeoCal geothermal manifold, take the necessary precautions to ensure that such temperatures do not endanger people.

Water temperatures higher than 100°F (38°C) can be dangerous. During the installation, commissioning and maintenance of the GeoCal geothermal manifold, take the necessary precautions to ensure that such temperatures do not endanger people.

The GeoCal geothermal manifold must be installed in a location where fluid loss that might occur will not harm property or people.



WARNING: DO NOT use chemicals to clean the manifold or any other components within the geothermal system.

Leave this manual for the user.

Pre-assembled manifold

The pre-assembled GeoCal manifold is sold with left-side or right-side pipe connections depending on the heat pump position compared to the manifold connecting to the earthloop circuits.

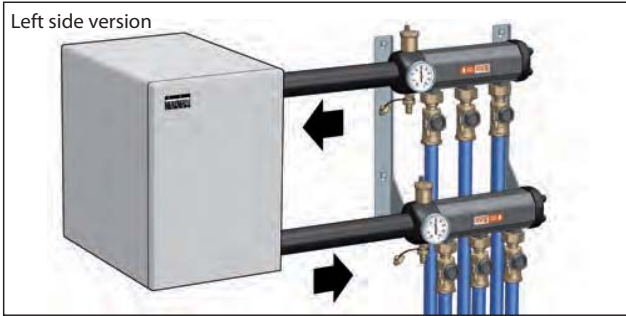


Figure 2

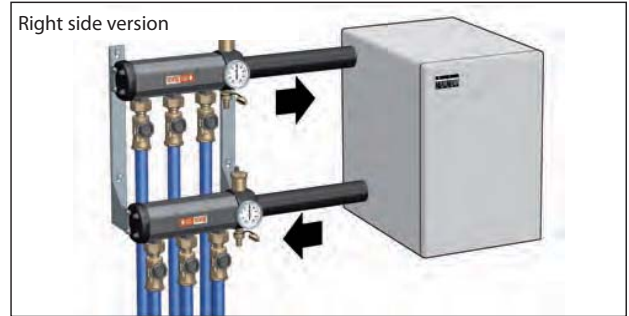


Figure 3

Mounting brackets - manifold

1. Hand thread the furnished hex head cap screws in the manifold end fitting (with air vent and fill/drain valve) backside threads (see figure 4): Do not tighten them to the end stop since they are the anchor point between the manifold and the brackets.

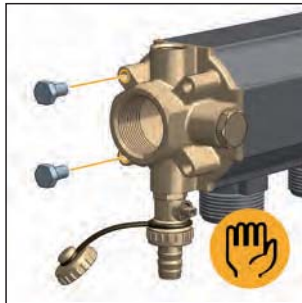


Figure 4

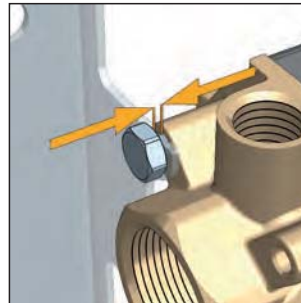


Figure 5

2. Turn the furnished hex nuts on to the exposed manifold tie rods, extending from the end cap (opposite end from the end fitting with air vent/drain valve), see figure 6. Do not tighten them to the end stop since they are used as locks to connect the manifold to the brackets, see figure 7.



Figure 6

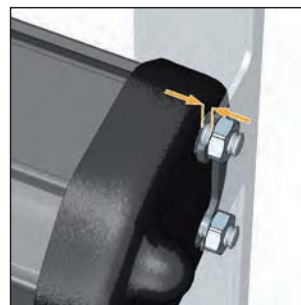


Figure 7

3. Connect the manifold to the brackets as shown in figure 8.



Figure 8

4. Position the manifold and mark the mounting screw holes on the wall. Install the mounting hardware and connect the bracket assembly to the wall. If more convenient, the brackets can be installed on the wall first, then connect the manifold to the brackets.

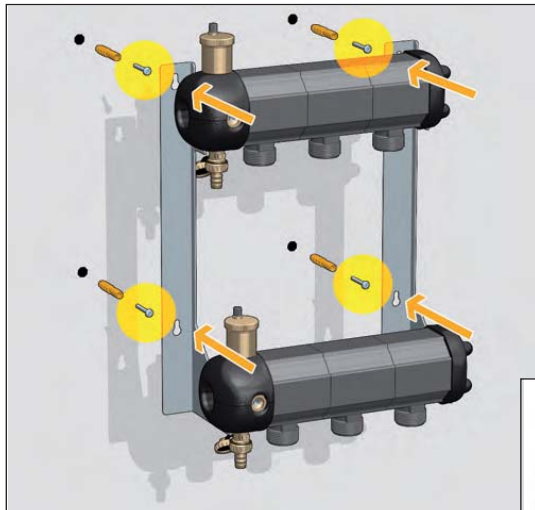


Figure 9

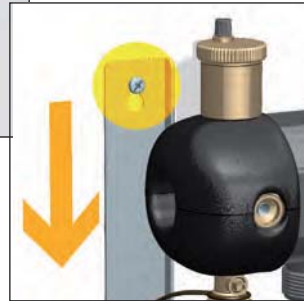


Figure 10

5. After connecting the manifold to the brackets, tighten the hex nuts on the end cap tie rods (figure 12) and the hex head cap screws on the end fitting with air vent and fill/drain valve (figure 11) using a 13 mm wrench.



Figure 11



Figure 12

6. Determine the manifolds' flow direction and apply appropriate labels furnished with the manifold. This will help with the connection of the earthloop circuits and shutoff or balancing valves, see figure 13.



Figure 13

Pipe connections

The GeoCal pre-assembled manifold with custom threaded circuit connections require EPDM mechanical seals (gaskets), code R67032, for one of four optional connections. See Figure 14:

1. GeoCal manifold outlet fitting (code 110050A or 11006A) with male NPT tailpiece to connect to female NPT connectors which comes complete with gasket, code R67032;
2. GeoGrip manifold to geothermal earthloop pipe connector (code NA10246 or NA10247), which comes complete with gasket, code R67032;
3. Isolation shutoff ball valves (code NA39589 or NA39753) with manifold outlet fitting (code 110050A or 110060A) threaded into the inlet port, and GeoGrip pipe coupling (code 861527A or 861634A) threaded into the outlet port. Disconnect the return manifold (heat transfer fluid coming from the heat pump) and connect the shut-off valve. Be sure to use black gasket, code R67032, as shown in figure 15.
4. QuickSetter balancing valves with flow meter (code 132552A or 132662A) with manifold outlet fitting (code 110050A or 110060A) threaded into the inlet port, and GeoGrip pipe coupling (code 861527A or 861634A) threaded into the outlet port. Disconnect the supply manifold (heat transfer fluid going to the heat pump) and connect the QuickSetter balancing valve with flow meter (series 132). Follow the procedure in figure 16 for mounting the manifold outlet fitting with male NPT tailpiece used with or without the Caleffi shutoff ball valves or QuickSetter balancing valves with flowmeter and the GeoGrip manifold to PE pipe connector:
Position the EPDM mechanical seal (gasket), code R67032, provided with the manifold outlet fitting and turn the union nut on the manifold custom threaded circuit connection to the end stop, covering all threads, to 22-26 ft-lb torque for proper sealing, using a 48 mm wrench. Pressure testing the earthloop system is highly recommended.

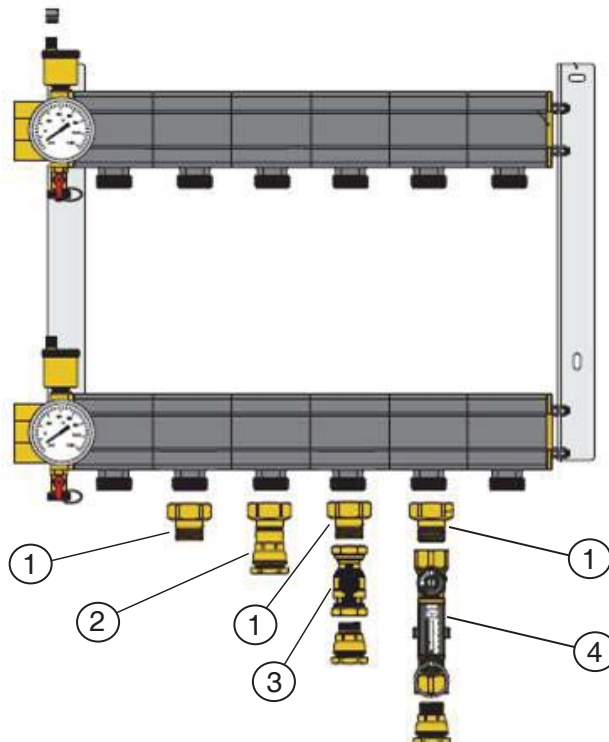


Figure 14



Figure 15



Figure 16

Circuit connections

1. With the manifold mounted on the brackets, prepare the piping for the earth loops and cut it to size for connecting it to the GeoGrip fittings, 861527A or 861634A installed in the outlets of the shutoff ball valves or QuickSetter balancing valves with flowmeter, or the GeoGrip manifold to PE pipe connectors, NA10246 or NA10247.

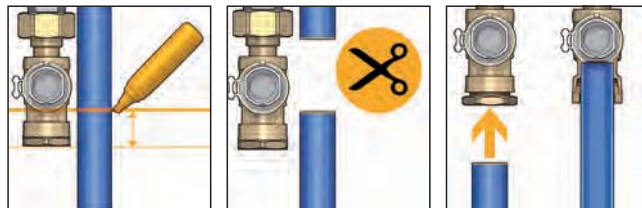


Figure 17

2. To make the pipes insertion in the GeoGrip fittings easier, unhook the shut-off valves or/ balancing valves or/PE pipe connectors from the manifold, hookup the pipe to the fitting and then reconnect the valve or connector to the manifold ensuring the black EPDM gasket, R67032, is positioned correctly, as shown above in figures 15 and 16.



Figure 18

Helpful suggestions for Installation

Pipe preparation

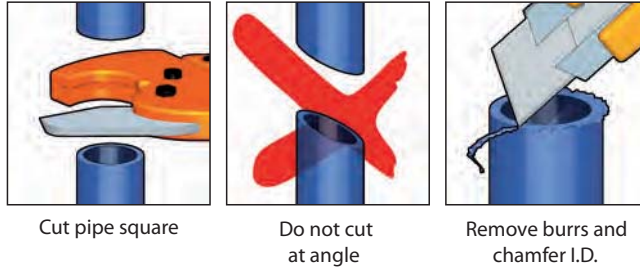


Figure 19

Pipe connection

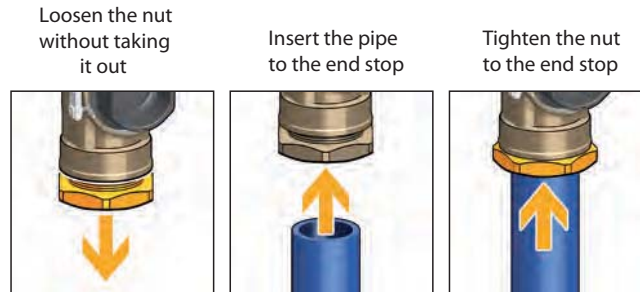


Figure 20

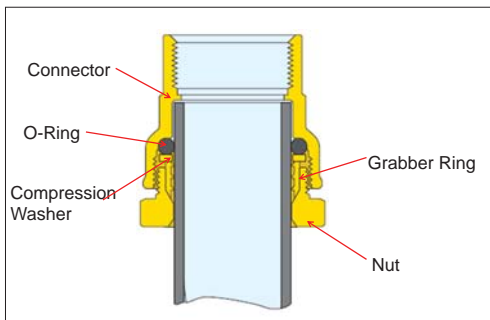


Figure 21

Do not disassemble the fitting and then put the elements on the pipe

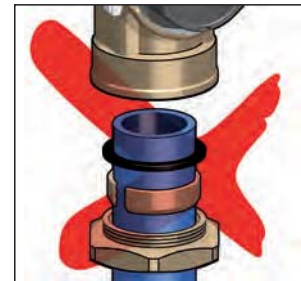


Figure 22

3. Stick the circuit label beside the appropriate branch. This can be very useful for commissioning and future service and maintenance.

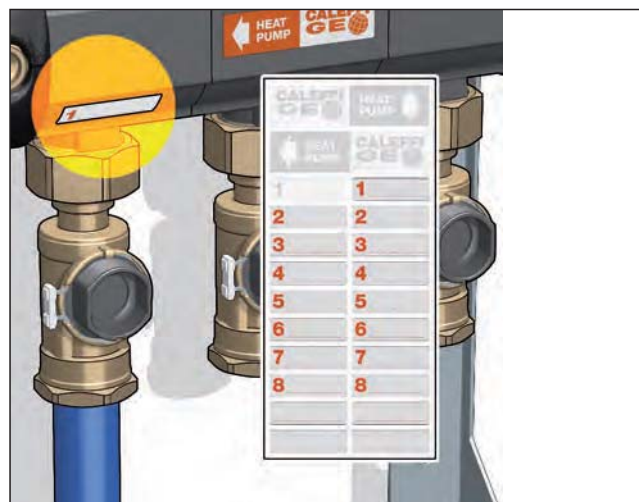


Figure 23

4. Repeat steps 1-3 for each additional circuit.

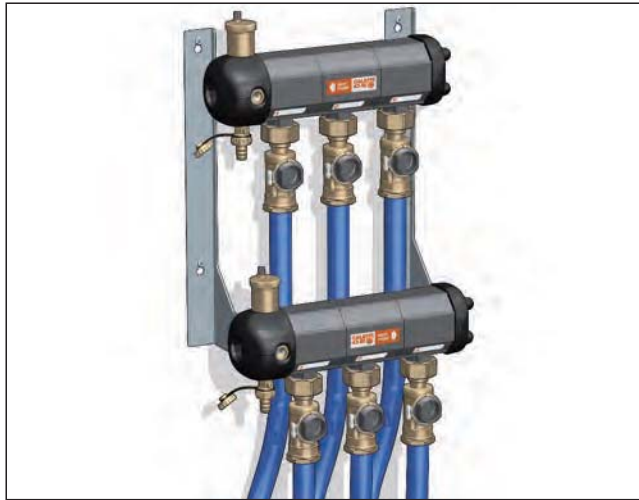


Figure 24

5. Connect the heat pump circuit main supply and return pipes.

Install a 1-1/4" ball valve Caleffi code NA39588 between the manifold and the main pipe to isolate the earth loop circuits.

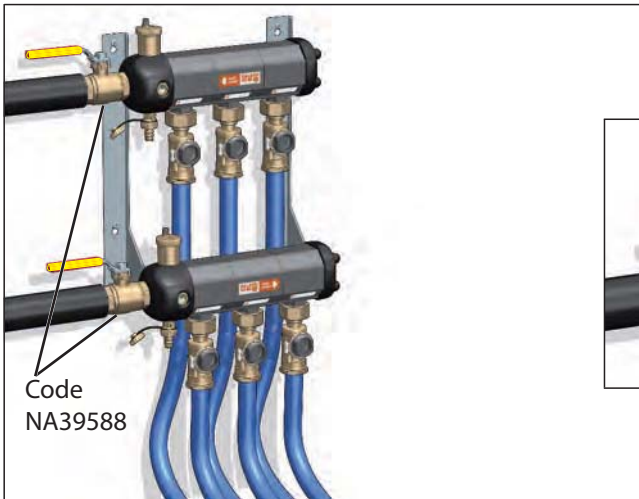


Figure 26

Figure 25

6. When the manifold is fully installed, ensure the insulation shell is closed. If the factory-installed temperature gages (code 687000) have been removed during installation, reinstall them in the pocket wells on the front of the manifold as shown.

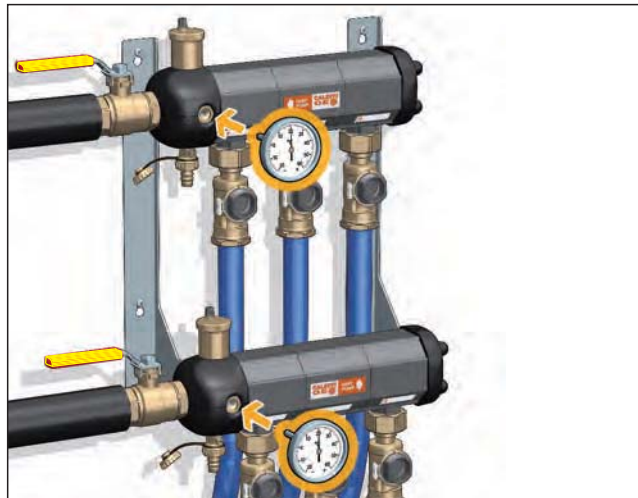


Figure 27

Air pressure testing

The GeoCal pre-assembled manifold comes complete with a separately packaged black plastic pressure vent cap, code R56214. When testing for system leakage, remove the hygroscopic safety cap, code R59681, from the factory-installed air vent, on both supply and return manifolds, and replace it with this pressure vent cap and tighten for proper sealing. Conduct the air pressure test. Reinstall the hygroscopic safety cap before filling and purging the system with heat transfer fluid. Replacement hygroscopic safety caps, code R59681, are available separately from Caleffi. All earth loops should be pressure tested with compressed air to at least 75 psi for at least 24 hours to ensure there are absolutely no leaks.



Figure 28

Circuit filling/purging procedure

1. Close all branches at the earth loop circuits using the shut-off valve and the QuickSetter balancing valve. If an outside venting system is being used due to the use of Ethanol or Methanol heat transfer fluids, the vent line and cap must be removed and a plastic pressure vent cap, code R56214, must be installed while purging and filling, allowing the air and debris to drain into fill bucket, not through the air vent. Ensure that the hygroscopic safety cap, code R59681 is re-installed after circuit filling and purging is complete.

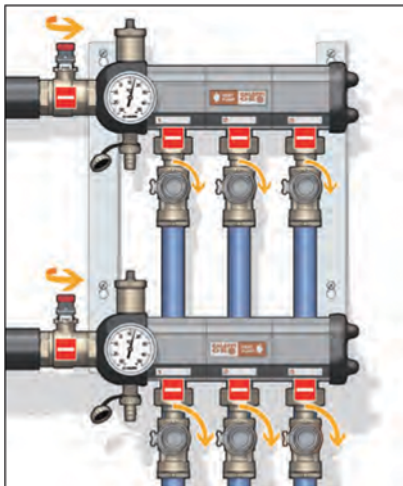


Figure 29

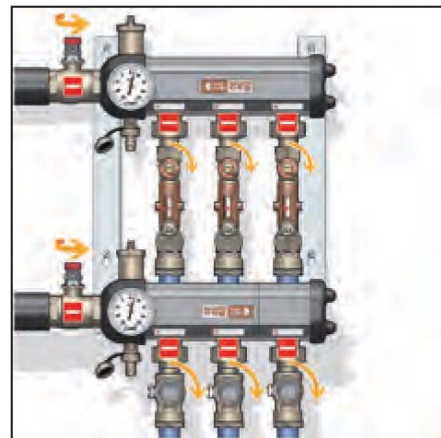


Figure 30

2. Open the fill and drain valves and make sure the main manifold inlet and outlet 1-1/4" shut-off valves are closed. This allows flow from the fill pump to enter one manifold, circulate through the earthloop piping and return to the opposite manifold to allow air and debris to expel.



Figure 31

3. Connect the system fill pump to the garden hose connections on the fill valve on the supply manifold and a drain pipe to the garden hose connection on the drain valve on the return manifold.



Figure 32

4. Open one loop valve on the manifold at a time to assure all the fluid goes through that loop. Fill the first circuit, opening the appropriate valves and make sure that the air has been fully removed from the circuit. When the air and debris is flushed out, close that loop valve and move to the next loop and open it fully. Repeat this procedure until all loops have been filled and purged.

Continually monitor the fluid level in the bucket as each system loop is filled and purged. Fill bucket with fluid as needed.

Remember, the loop isolation valves must be on either supply or return manifold, or both, to allow the loops to be purged individually. This is the advantage of using a manifold for geothermal earthloop installations, allowing for easy individual circuit purging while minimizing purge pump size.

If you do not have manifold valves you will need a pump of sufficient flow to purge all loops simultaneously. The heat pump may not have large enough connections to facilitate a high GPM flow rate.

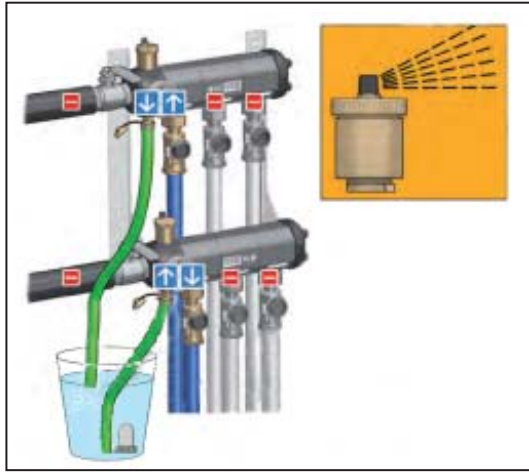


Figure 33

5. When filling and purging is completed on the first circuit, close the primary circuit valves and repeat the operation for the remaining circuits.

**Recommended minimum flow rates
for tubing purging
(fluid speed 2 ft/sec)**

| Tubing size | Minimum purge flow rate (gpm) |
|--------------------------|-------------------------------|
| 3/4" DR-11 HDPE tubing | 3.6 |
| 1" DR-11 HDPE tubing | 5.7 |
| 1-1/4" DR-11 HDPE tubing | 9 |

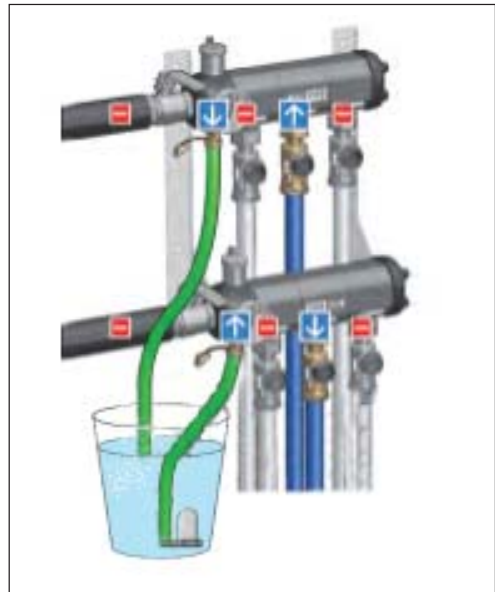


Figure 34

Hydronic testing procedure

1. After filling all circuits, conduct a system pressure test to ensure there are no leaks.
2. Close the drain valves. Connect the system pressure testing pump.

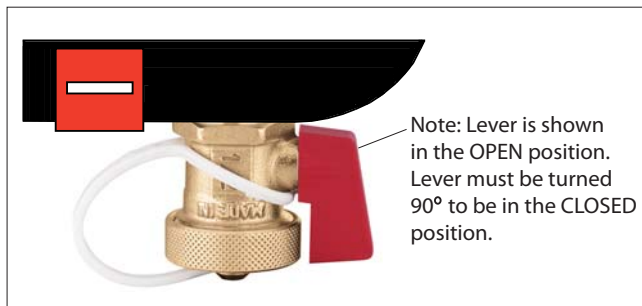


Figure 35

3. Open all circuit shut-off valves.

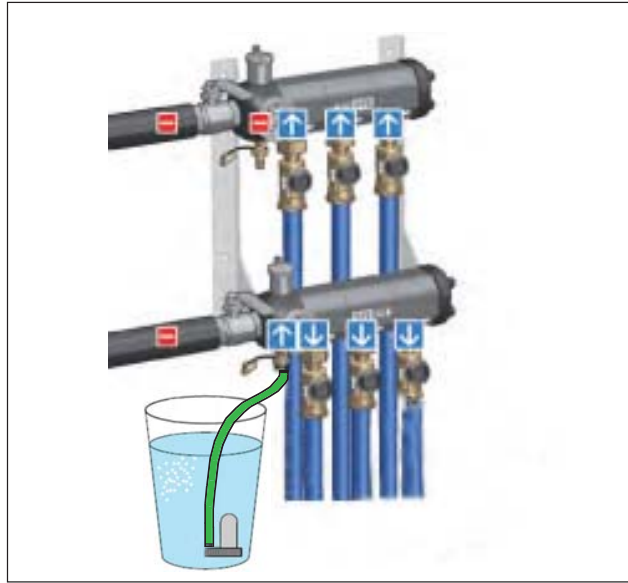


Figure 36

4. Pressurize the circuit to a maximum of 150 psi (10 bar) and check for leaks.

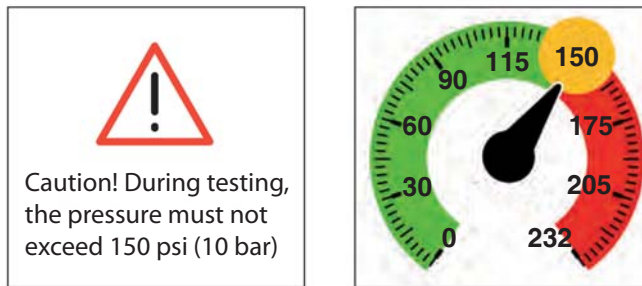


Figure 37

Commissioning and circuit balancing

1. Open the individual loop circuit shut-off valves (which includes the QuickSetter balancing valve with flowmeter if installed) and heat pump circuit main supply and return line isolation shutoff ball valves.

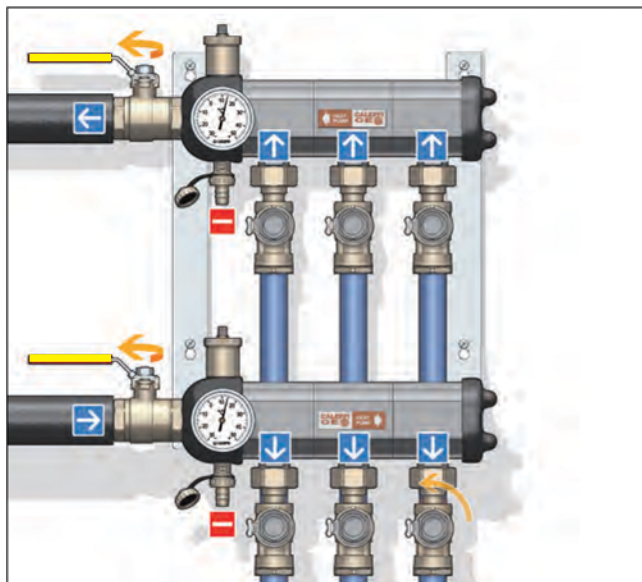


Figure 38

2. Allow the heat transfer fluid to circulate to purge air from the system.

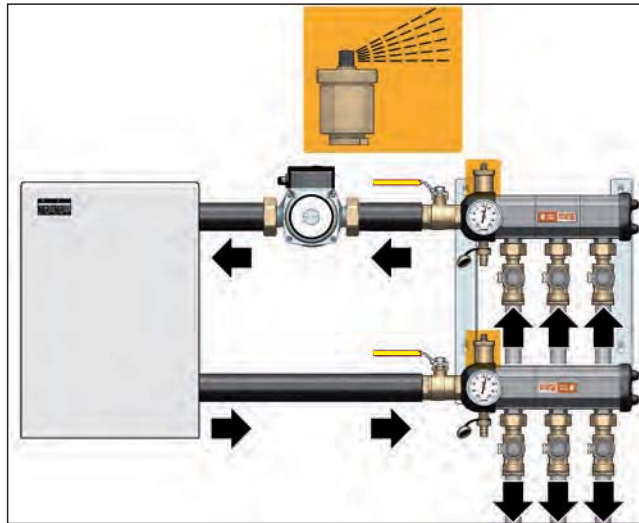


Figure 39

3. Balance the circuits now if you are using the optional QuickSetter balancing valves with flowmeters.

Maintenance

Once the GeoCal manifold is install and tested for proper operation little to no maintainance is required. If the manifold requires cleaning, DO NOT use chemicals to clean the manifold. Fresh water should be used to clean the manifold.

Quicksetter balancing valve with flow meter series 132

Function

QuickSetter balancing valves allow setting the flow rate in earthloop circuits without requiring calibration equipment. Flow adjustment is performed with the system running using a simple 3 step process: 1) pull by-pass circuit pin; 2) while viewing site gauge, turn stem to adjust flow to desired valve; 3) release by-pass circuit pin. Flow gauge is hermetically sealed from flow stream thus preventing scaling and clouding of glass. By-pass circuit prevents debris from affecting flow accuracy. To facilitate filling and purging, the QuickSetter also serves as an isolation valve when adjustment stem is fully turned clockwise. For more information and installation instructions see installation and instruction sheet 18106.



Figure 40

Product range

| | | |
|--------------|----------------|------------|
| Code 132552A | 2.0 - 7.0 GPM | 3/4" NPT |
| Code 132662A | 3.0 - 10.0 GPM | 1" NPT |
| Code 132772A | 5.0 - 19.0 GPM | 1 1/4" NPT |
| Code 132882A | 8.0 - 32.0 GPM | 1 1/2" NPT |

Technical specifications

| | |
|---|---|
| Valve & flowmeter body, and ball: | brass |
| Ball control stem & bypass valve stem: | brass, chrome-plated |
| Ball seal seat: | PTFE |
| Control stem guide & flowmeter float & indicator cover: | PSU |
| Flowmeter springs: | stainless steel |
| Seals: | EPDM |
| Suitable fluids: | water, 50% max. glycol solutions, 25% max. methanol solutions, 30% max. ethanol solutions, saline solutions |
| Max. working pressure: | 150 psi (10 bar) |
| Max. temperature: | 230°F (110° C) |
| Accuracy: | ±10% |
| Flow rate correction factor for 20%-30% glycol solutions: | 0.9 |

Quicksetter balancing valve with flowmeter insulation shell

Function

The QuickSetter balancing valve is furnished with a pre-formed insulation shell to optimize thermal performance for both hot and cold water systems. The standard insulation shell for the QuickSetter series 132 balancing valve with flow meter does not completely cover the inlet and outlet fittings needed to connect the QuickSetter to the manifold (code 110050A or 110060A) and to the earthloop HDPE piping (GeoGrip™) code 861527A or 861634A). Insulation shell (code 112001 or 112003) is designed to cover all exposed brass for the QuickSetter and connecting fittings.



Figure 41



Figure 42

Isolation shutoff ball valve

These full port ball valves with blow-out proof stem are used with the GeoCal manifold to isolate geothermal earthloop circuits for purging and filling. If a circuit becomes unusable for any reason, it can be shut off and isolated from the rest of the system.

Product range

- Code NA39589 Ball valve with T-handle, 3/4" NPT female
- Code NA39753 Ball valve with T-handle, 1" NPT female
- Code NA39588 Ball valve with lever, 1-1/4" NPT female

Technical specifications

| | |
|---------------------------------|---|
| Valve body: | brass |
| Ball: | brass, chrome-plated |
| Seats, seals and thrust washer: | PTFE |
| Suitable fluids: | water, 50% max. glycol solutions, 25% max. methanol solutions, 30% max. ethanol solutions, saline solutions |
| Max. working pressure: | 150 psi (10 bar) |
| Max. temperature: | 366°F (185°C) |



Figure 43



Figure 44

Isolation shutoff ball valve shell

Function

The isolation shutoff ball valves do not come with insulation. The insulation shells (code 111001 or 111003) are designed to cover all exposed brass for the NA39589 and NA39753 brass ball valves that use the same inlet and outlet fittings as the QuickSetter. There is no insulation shell available for the 1-1/4" Caleffi ball valve, code NA39588.



Figure 45

GeoGrip™ and GeoSeal™ fittings for HDPE pipe

Function

GeoGrip mechanical fittings with o-ring seals are high quality compression-style fittings used for connecting HDPE geothermal piping. The GeoSeal wall penetration seal forms a water-tight mechanical seal between the pipe and the hole it passes through, ideal for connecting ground earthloop systems to heat pumps through concrete walls.

Product range

| | | |
|---------------|---|---|
| Code 110050A | 3/4" NPT male to GeoCal manifold | ① |
| Code 110060A | 1" NPT male to GeoCal Manifold | ② |
| Code 861527A | GeoGrip 3/4" HDPE pipe x 3/4" NPT male | ③ |
| Code 861634A | GeoGrip 1" HDPE pipe x 1" NPT male | ④ |
| Code NA10246 | GeoGrip 3/4" HDPE pipe to GeoCal manifold | ⑤ |
| Code NA10247 | GeoGrip 1" HDPE pipe to GeoCal manifold | ⑥ |
| Code NA866027 | GeoGrip 3/4" x 3/4" HDPE pipe elbow coupling | ⑦ |
| Code NA866034 | GeoGrip 1" x 1" HDPE pipe elbow coupling | ⑧ |
| Code 863027 | GeoGrip 3/4" x 3/4" HDPE pipe sleeve coupling | ⑨ |
| Code 863034 | GeoGrip 1" x 1" HDPE pipe sleeve coupling | ⑩ |
| Code NA10248 | GeoSeal 3/4" wall penetration seal | ⑪ |
| Code NA10249 | GeoSeal 1" wall penetration seal | ⑫ |

Technical specifications

| | |
|------------------------------------|---|
| GeoGrip fittings except 90° elbow: | |
| Body and lock nut: | Brass |
| Seal: | NBR |
| NA866027 and NA866034 90° elbow: | |
| Body and lock nut: | Polypropylene |
| O-ring: | EPDM |
| Clenching ring: | Polyacetal resin |
| Suitable fluids: | water, 50% max. glycol solutions, 25% max. methanol solutions, 30% max. ethanol solutions, saline solutions |
| Max. working pressure: | 230 psi (16 bar) |
| Max. working temperature: | 140°F (60°C) |



Figure 46

GeoGrip™ and GeoSeal™ fittings for 1-1/4" pipe in heat pump circuit main supply and return lines

GeoGrip mechanical fittings for connecting HDPE geothermal piping. The GeoSeal wall penetration seal is ideal for connecting ground earthloop systems to heat pumps through concrete walls.

Product range

| | | |
|---------------|---|---|
| Code NA39588 | Ball valve with lever, 1-1/4" NPT female brass | ⑦ |
| Code NA10263 | Double nipple, 1-1/4" NPT brass | ⑧ |
| Code 132772A | QuickSetter balancing valve with flowmeter, 1-1/4" NPT female brass | ⑨ |
| Code 132882A | QuickSetter balancing valve with flowmeter, 1-1/2" NPT female brass | ⑩ |
| Code NA10268 | GeoGrip ball valve with T-handle, 1-1/4" NPT male x PE pipe compression | ⑪ |
| Code NA10269 | GeoGrip male adapter, 1-1/4" NPT x PE pipe compression | ⑫ |
| Code NA866042 | GeoGrip elbow coupling, 1-1/4" x 1-1/4" PE pipe compression | ⑬ |
| Code NA863042 | GeoGrip pipe sleeve coupling, 1-1/4" x 1-1/4" PE pipe compression | ⑭ |
| Code NA10265 | GeoSeal 1-1/4" wall penetration seal | ⑮ |

Technical specifications

| | |
|-------------------------------------|---|
| For all GeoGrip fittings items 4-7: | |
| Body and lock nut: | Polypropylene |
| O-ring: | EPDM |
| Clenching ring: | Polyacetal resin |
| Suitable fluids: | water, 50% max. glycol solutions, 25% max. methanol solutions, 30% max. ethanol solutions, saline solutions |
| Max. working pressure: | 230 psi (16 bar) |
| Max. working temperature: | 140°F (60°C) |



Figure 47

Vent cap venting instructions

Alcohol-based fluids include diluted solutions of methanol and ethanol. Although both types of alcohol based solutions have been successfully used in geothermal heat pump systems, it is imperative to verify any local ordinances or OSHA regulations that may constrain their use. It is imperative that any air-venting equipment in piping containing alcohol-based solutions be equipped with vent discharge piping that can carry any vapors outside the building and discharge them to open air away from any electrical equipment or other sources of ignition. Vent cap adapter, code NA10204, is used for outside venting, see figure below. Copper tubing and connector fitting is not included in the kit, supplied by others.

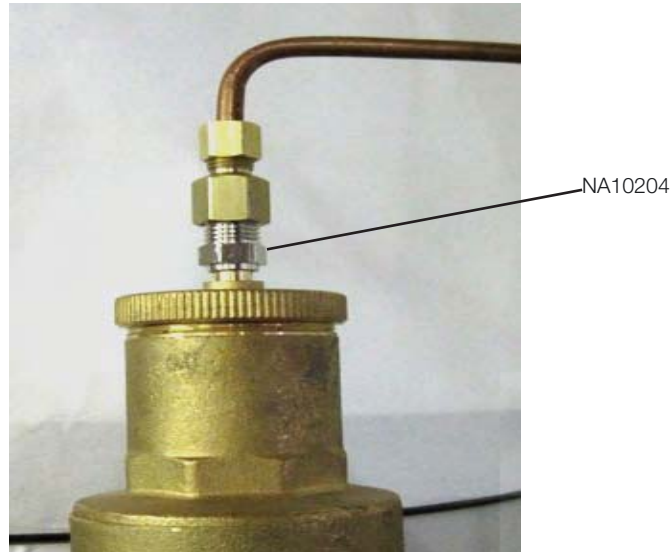


Figure 48

GeoGrip™ and GeoSeal™ fittings for pipe in main heat pump circuit supply and return lines

Inside mechanical room installation

See Figure 49. To isolate the manifold and connect directly to the heat pump with metal pipe, use ball valve (1) with double nipple (2) on both heat pump circuit supply and return ports. The QuickSetter balancing valve with flowmeter (3) can replace the ball valve on the supply line combining isolation valve and flow setting. In addition, the QuickSetter (3) provides a way to measure the total ground heat exchanger flowrate which, along with supply and return temperatures read from the manifold temperature gages, can be used to calculate the heat supplied by the earthloop system.

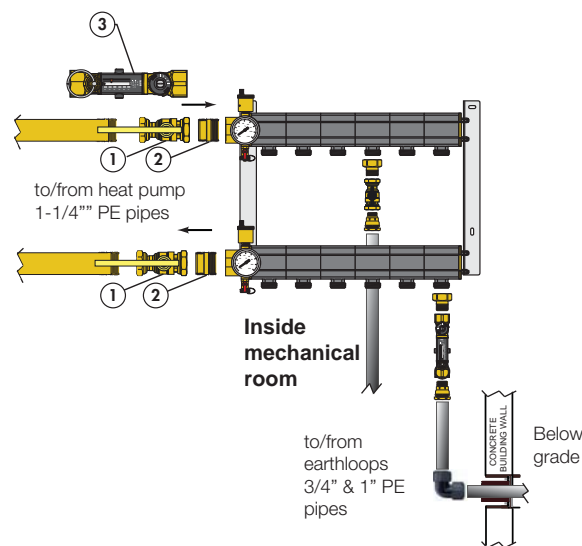


Figure 49

Outside buried vault installation

See Figure 50. To isolate the manifold and connect to the heat pump with buried PE pipe, use ball valve (4) with double nipples (2) on the heat pump circuit supply and return ports. Alternatively, brass ball valve (1) can be installed with double nipple (2) and male adapter (5) to connect to PE pipe. Additional, GeoGrip fittings are available to complete the piping layout to the heat pump in the mechanical room: elbow coupler (6), sleeve coupler (7), and GeoSeal wall penetration seal (8). See previous page for 3/4" and 1" GeoGrip and GeoSeal fittings for the earthloop circuits. The QuickSetter balancing valve with flowmeter (3) can replace the ball valve on the supply line combining isolation valve and flow setting and calculating the heat supplied by the earthloop system.

See Figure 51. In addition, the Caleffi manifold system can be mounted horizontally within the vault. If this configuration is used, the manifold air vent (1) must be moved from its factory installed position to the position currently used by the temperature gauge (2). The temperature gauge will be installed in the original position used by the air vent. If this is the configuration that will be used, the following procedure is required for the correct component installation.

1. Both the temperature gauge and air vent are factory installed using a liquid locking product to ensure a leak-free connection. In order to remove both devices without causing damage to the device or manifold, a small amount of heat may be required to safely remove the components.
2. After removing the temperature gauge and air vent, clean threaded area and apply the appropriate liquid locking product to the threads and install the air vent and temperature gauge in the new positions. Repeat for all manifolds.

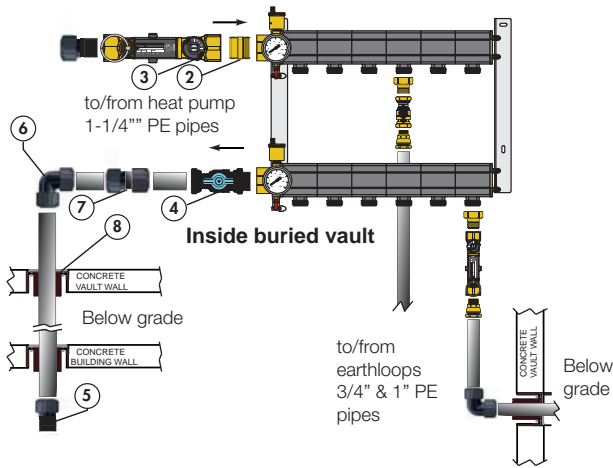


Figure 50

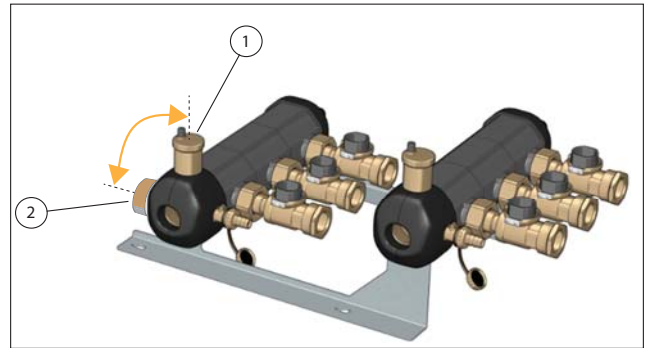


Figure 51

14. Measuring BTU's

After the closed-loop system is installed and operating, BTU output should be calculated to ensure that the system is operating at top performance. This can be accomplished by measuring the inlet and outlet temperature with a digital thermometer. The following graphic shows the correct placement of the digital thermometer. The flow rate can be measured using a QuickSetter balancing valve with flowmeter as shown. The QuickSetter is available in sizes 1-1/4" for 5 - 19 GPM, 1-1/2" for 8 - 32 GPM, or 2" for 12 - 50 GPM.

Once the inlet and outlet temperature and the flow rate in gpm has been determined insert numbers into the following formula:

$$\text{BTU/hr} = \text{Flow rate (gpm)} \times (T1-T2) \times 500$$

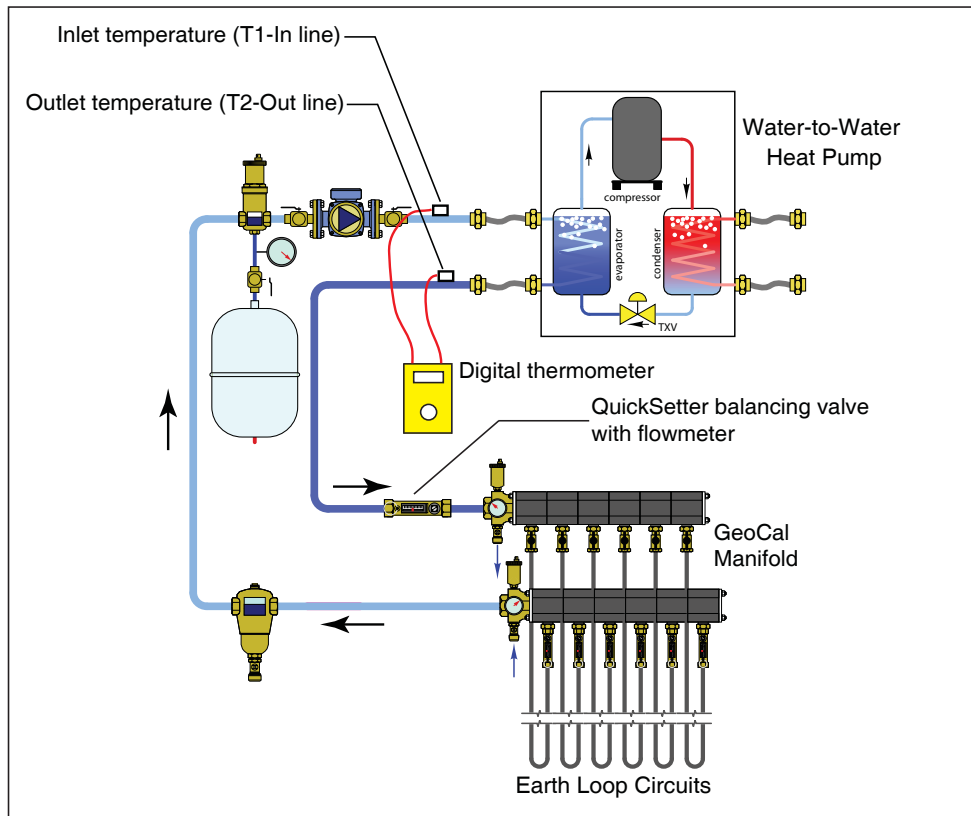


Figure 52