

Several of the pages of the Rinnai boiler installation manuals have been revised. These revisions are incorporated into the following manuals:

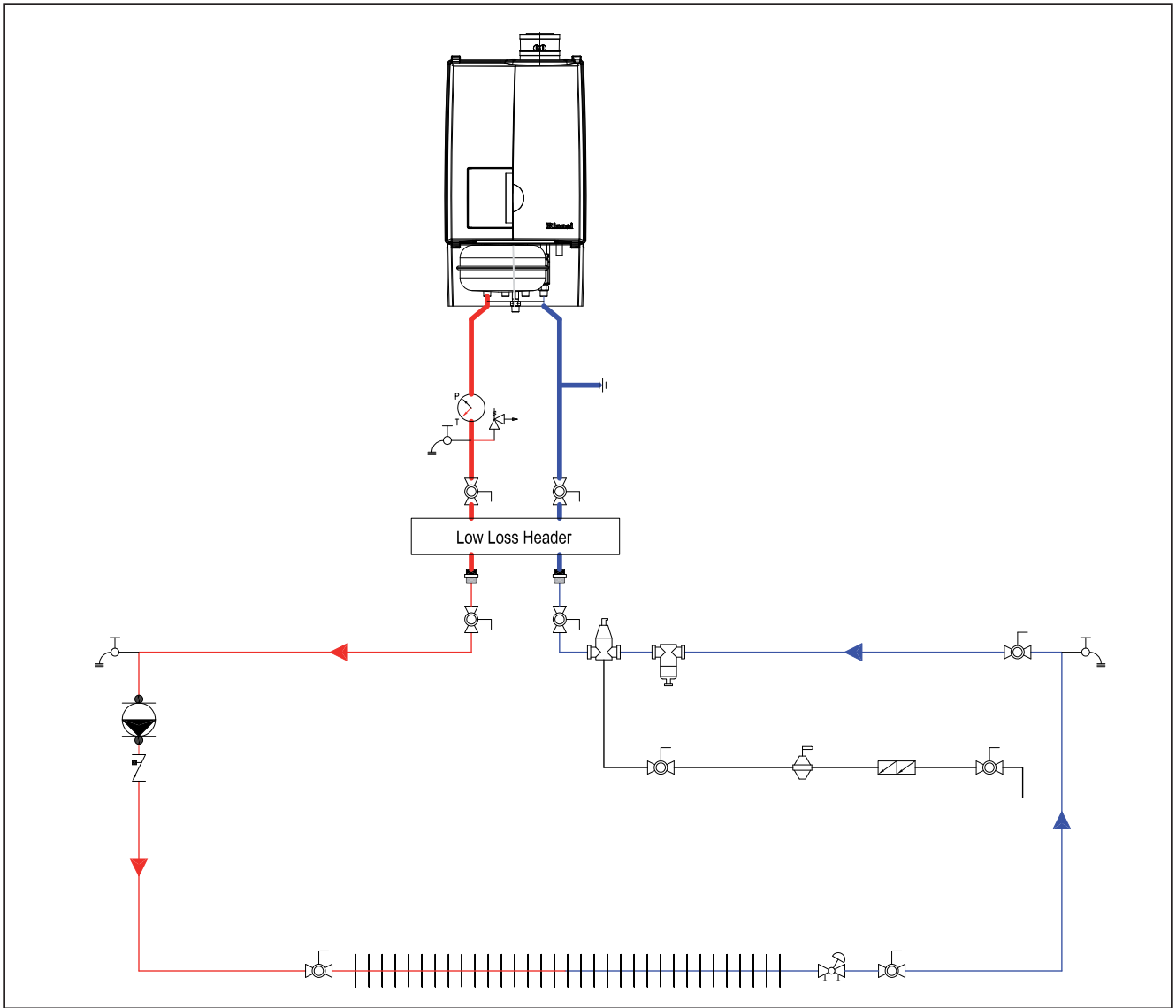
8U514002 Installation & Servicing Manual Q Series V1109

8U516002 Installation & Servicing Manual E Series V1109

The following pages supersede those pages in the previous version of the manual.

Change	Manual	Page
E boiler basic piping	E	18
E boiler plumbing kit new connections name.	E	19
E boiler system flushing	E	20, 21
E boiler domestic water quality	E	27
E boiler thermostatic mixing valve and pressure relief valve	E	28, 29
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E boiler maintenance cleaning the brazed plate heat exchanger	E	65
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## 6.1 Boiler Piping Diagram



Boiler basic piping

fig. 5

## 6.1.1 Plumbing Kit installation

### **i** NOTICE

Rinnai supplies specific Plumbing Kits with each boiler type, which must be fitted directly underneath the boiler on the supply and return pipe. Use of the Rinnai boiler without the plumbing kit will result in the void of warranty.

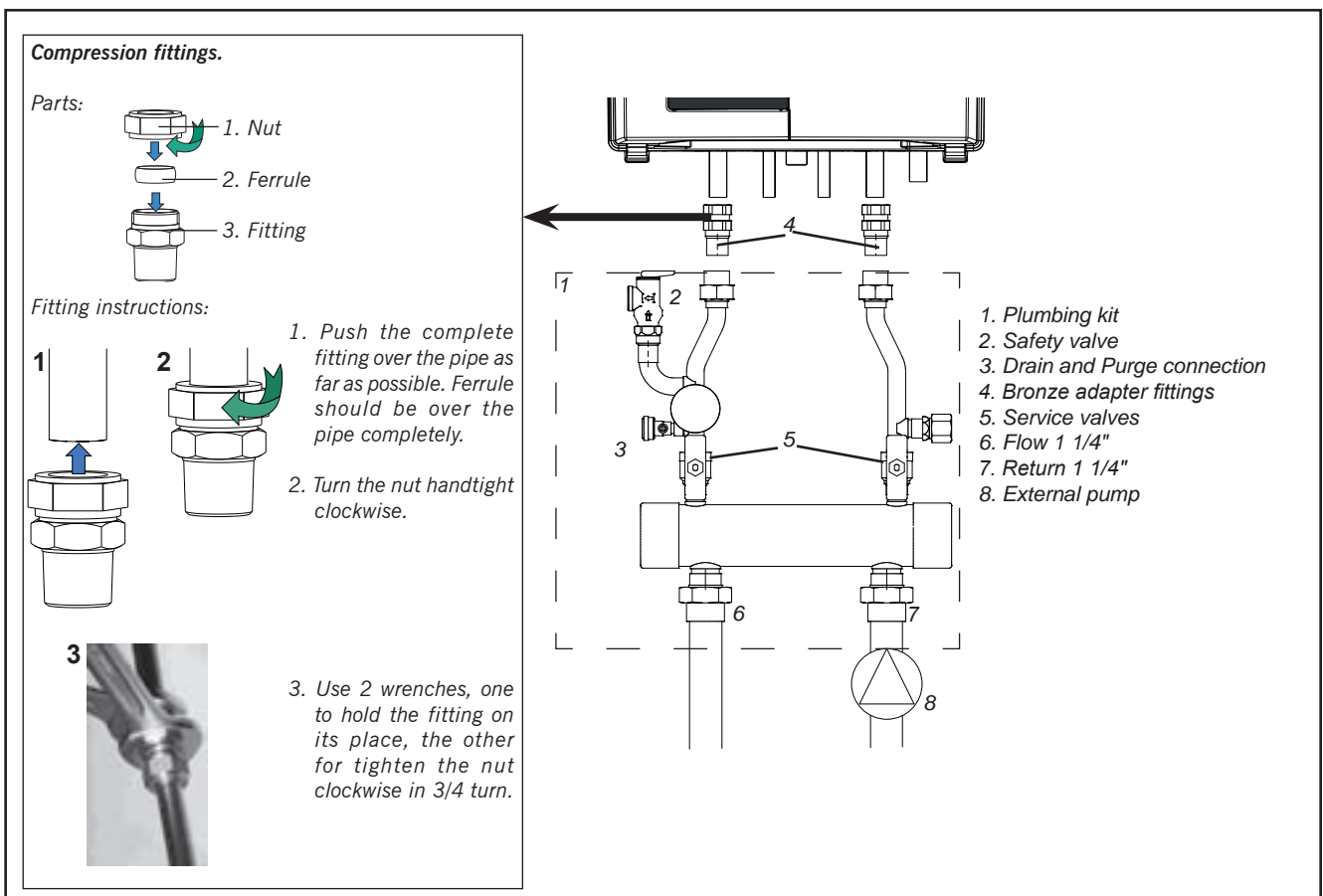
**To protect the entire heating system we recommend installing a dirt particle trap in the return circuit. When the boiler is installed to an existing heating system this trap is required. Use of a Y strainer is not permitted as substitute for a dirt trap.**

### **i** NOTICE

- Install shut-off valves immediately before and after the dirt particle filter to allow the filter to be cleaned.
- Position 3 (figure 6) is a garden house thread boiler drain, that can be used to drain the boiler or add water treatment additives to the system, such as inhibitors or glycol.
- Position 4 (figure 6) is the supply connection for an indirect tank when used with the optional 3-way valve kit.
- For information on locating the expansion tank and system fill, please see the Rinnai Boiler Applications Manual.

**Thoroughly flush all pipes and radiators. We recommend the use of a Rinnai approved system cleaner. Refer to the Rinnai Boiler Applications Manual for an approved list of Rinnai system cleaners.**

- Refer to the installation template and chapter 5.3 for the pipe connection dimensions.
- Fit the bronze adapter fittings, supplied with the boiler (fig. 6, pos. 4) first to the Plumbing Kit and then to the boiler.

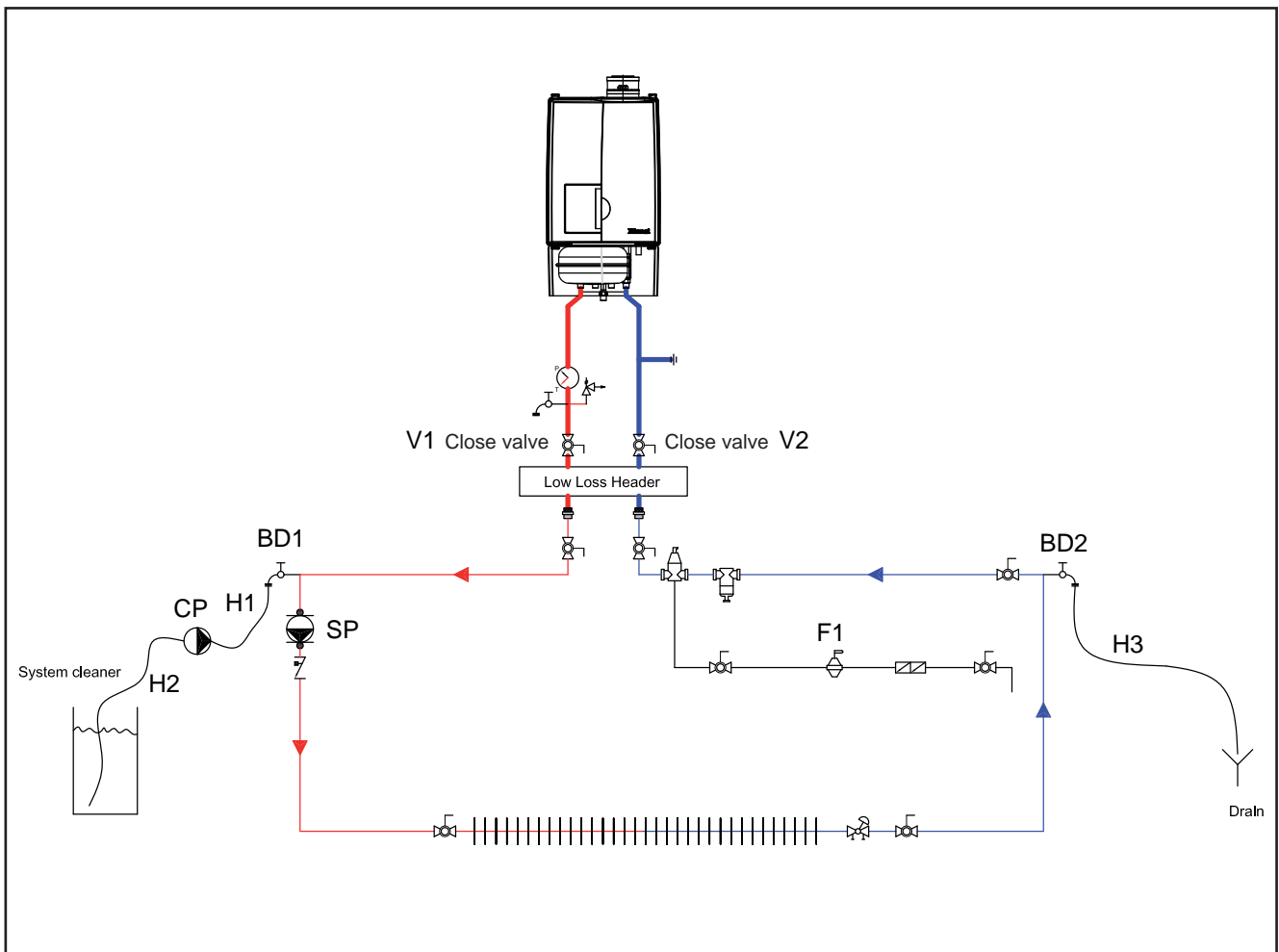


Plumbing Kit installation

fig. 6

- Boiler system flushing (Not Boiler heat exchanger)  
**The boiler must be valved off from the system, while the system is flushed.**  
**No system cleaner should ever enter the boiler heat exchanger because of its caustic nature it could damage the heat exchanger.**

1. Close the shutoff valves on both the supply and return connections on the plumbing kit (V1 and V2).
2. Connect pump outlet hose (H1) to the supply side purge station (BD1).
3. Connect drain hose (H3) to the return side purge station (BD2).
4. Pour the system cleaner into a pail and follow the system cleaner instructions about circulation time and volume to be added to the system.
5. Operate the charging pump (CP) and charge the system with the required volume of system cleaner.
6. Close the supply side purge station (BD1) and return side purge station (BD2).
7. Turn on the system pump(s) (SP) and circulate the cleaner through the system for required time by the cleaner manufacturer.
8. Once the time require by the system cleaner manufacturer has been met place the drain hose (H3) in a drain.
9. Turn off the system pump(s) (SP).
10. Close the main valve on the system return (V3) and open the return side purge station (BD2).
11. Open the auto feed on the system (F1) and allow water to rinse the system for whichever is greater: 10 minutes or the rinse time required by the system cleaner manufacturer.



Boiler system flushing

fig. 7

12. If the installation is a zone system be sure to purge out each zone individually.
13. Close the auto feed on the system (F1).
14. Close the return side purge station (BD2) and disconnect the hose (H3).
15. Open the main valve on the system return (V3).
16. Open shutoff valves on both the supply and return connections on the plumbing kit (V1 and V2).
17. Clean out the dirt trap.
18. Test the pH of the water that will be used for filling the system.
19. Test the water hardness of the water that will be used for filling the system.
20. Use the proper water treatment to ensure the pH and water hardness are within the Rinnai boiler water quality guidelines.
21. The boiler and system may now be filled.

The following is a list of approved system cleaners, inhibitors, and antifreeze.

**Approved antifreeze:**

- Rhomar RhoGard Mutli-Metal (AL safe)
- Noble Noburst AL

**Approved system cleaner:**

- Noble Noburst Hydronic System Cleaner
- Fernox F3 Cleaner
- Rhomar Hydro-Solv 9100



**NOTICE**

**The system cleaners from NoBurst, Rhomar, and Fernox are not to be used in the boiler. The boiler must be closed off (valved off) from the rest of the system or not connected while the cleaners are in the system. The system should then be drained and then thoroughly flushed with clean water to remove all the system cleaner.**

**Approved inhibitors:**

- Rhomar Pro-tek 922
- Noble Noburst AL inhibitor

- Connect the expansion tank to the system. See chapter 6.2.
- Connect the pipes so that they are free from strain.

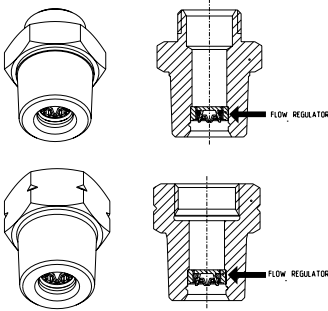
## 6.5 Hot water supply

Connection of the drinking water installation should be performed according to the national secondary drinking water regulations.



**DANGER**

**Do NOT use toxic chemicals, such as are used for boiler treatment in potable water heating systems used for space heating.**



The sanitary water pipes can be connected to the installation by use of adapter fittings. The cold water inlet on the Combi boilers must be equipped with the following components (counted in the water flow direction):

Flow regulator valve (supplied), Safety group, Expansion vessel 87 PSI / 6bar (potable water, blue).

The 3/4" NPT adapter fitting with flow reducing valve must be fitted in the cold water connection.

A flow regulator valve is supplied with the boiler in a 3/4"NPT adapter fitting. The flow regulator valve ensures that a quantity of water is supplied which has a outlet temperature of 120°F (assuming a cold water temperature of 45°F). The quantity of water is virtually unaffected by the water pressure.



**NOTICE**

**When there is a water pressure lower than 22PSI / 1.5 bar it is advisable to remove the inside mechanism of the flow reducing valve.**

### 6.5.1 Domestic Water quality

Appropriate steps must be taken to ensure the brazed plate heat exchanger does not become plugged by scale caused by hard water or sediment. If the plate heat exchanger becomes plugged by either scaling from hard water or sediment it is not the responsibility of Rinnai.

#### **1. Water hardness for DHW**

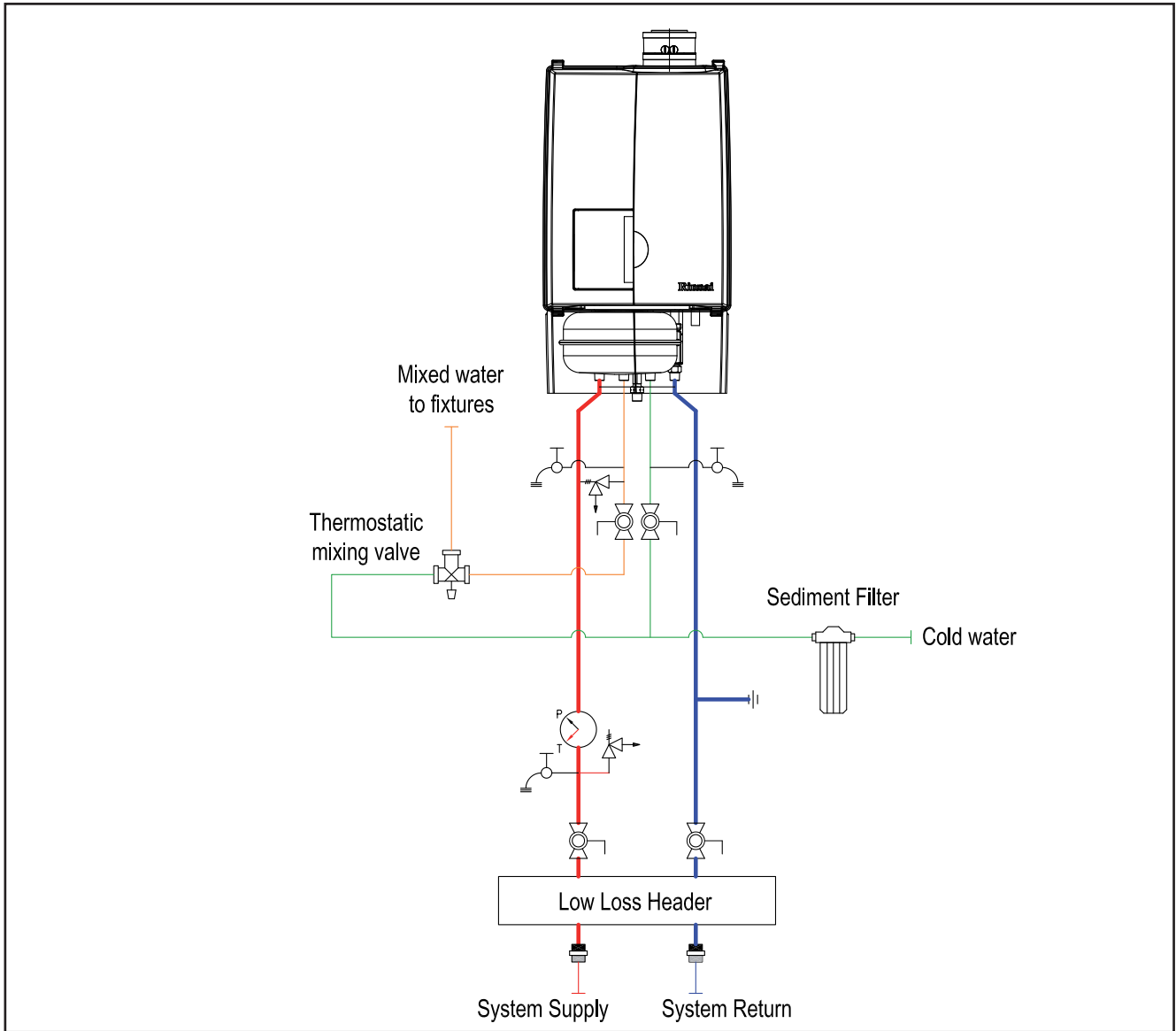
When there is a water hardness of more than 6-7 grains hardness is used for domestic water a water softener must be installed on the inlet side of the DHW connection.

#### **2. Sediment in DHW**

If there is sediment in your domestic water supply sediment filter or other suitable device should be used to remove it before the water enters the brazed plate heat exchanger.

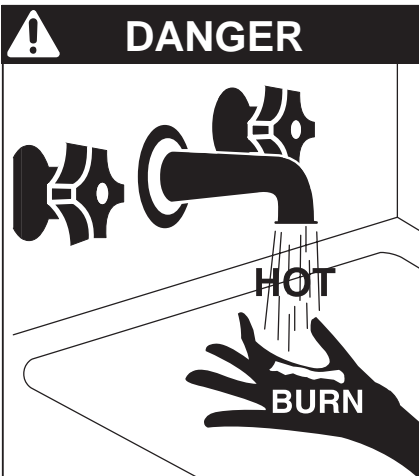
## 6.5.2 Installing a Thermostatic Mixing Valve

A thermostatic mixing valve should be installed on all E combi boilers on the domestic hot water side to prevent scalding. This valve will regulate the water temperature leaving the brazed plate heat exchanger. See the figure 10 for the suggested piping.



DHW piping with thermostatic mixing valve

fig. 10



Hot water can be dangerous, especially for infants or children, the elderly, or infirm. There is hot water scald potential if the thermostat is set too high.

Water temperatures over 125° F (51° C) can cause severe burns or scalding resulting in death.

Hot water can cause first degree burns with exposure for as little as:

3 seconds at 140° F (60° C)

20 seconds at 130° F (54° C)

8 minutes at 120° F (48° C)

Test the temperature of the water before placing a child in the bath or shower.

Do not leave a child or an infirm person in the bath unsupervised.

### 6.5.3 Installing a valve kit

A means to isolate the domestic plate heat exchanger for cleaning must be provided at installation. Refer to figure 10 for proper piping layout. A Rinnai valve kit can be used on domestic water connections for all combi boilers to allow for cleaning of the plate heat exchanger and installation of the domestic hot water pressure relief valve.

- Rinnai recommends the use of the MRIK-T (3/4" NPT thread connection) or MRIK-S kit (MRIK-S (3/4" sweat connection) when connecting the domestic water lines to the boiler
- Use of this kit will assist in flushing the flat plate heat exchanger in areas where water quality issues exist, as well as improve overall product serviceability

### 6.5.4 Pressure relief Valve

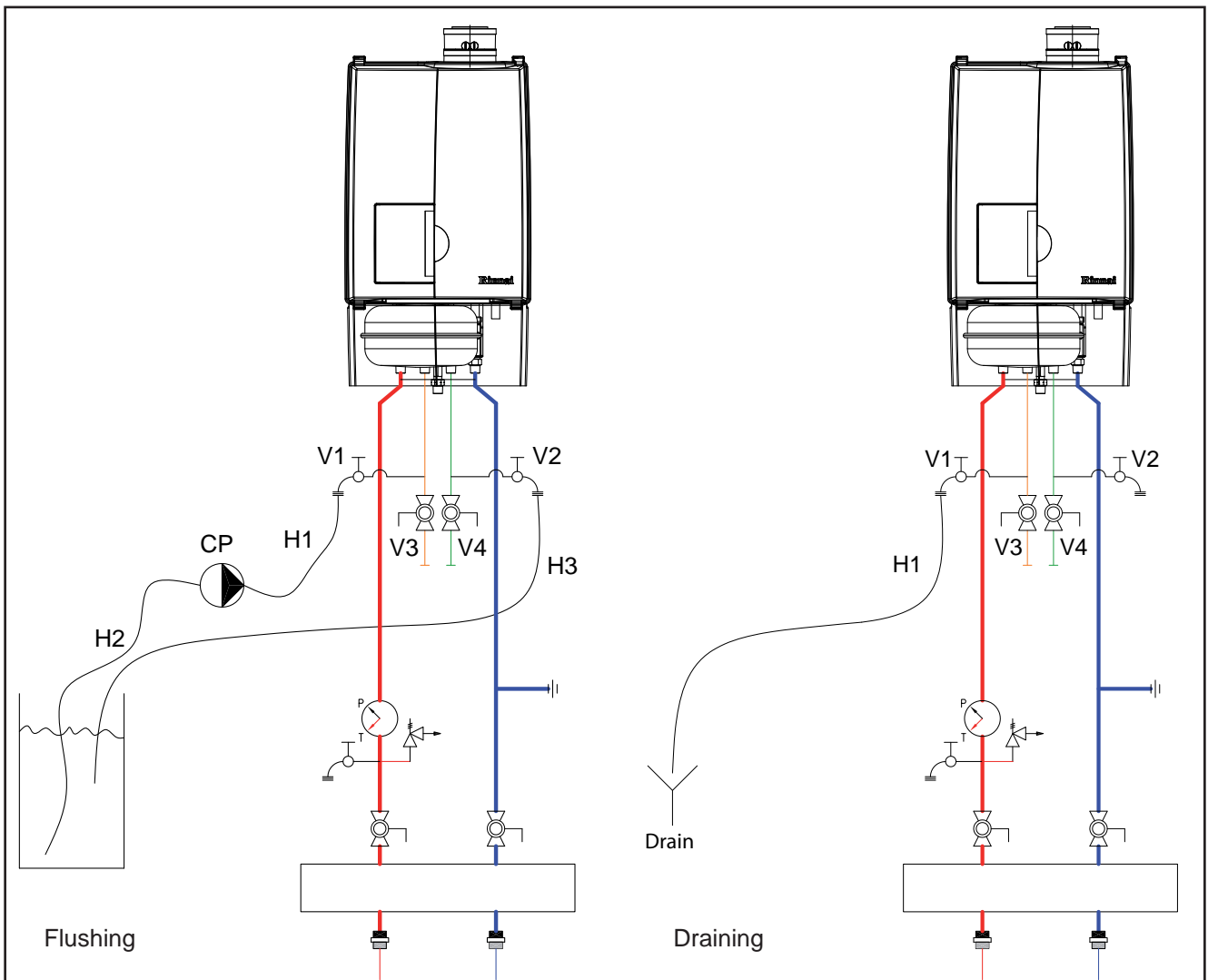
- An approved pressure relief valve is required by Rinnai for all water heating systems.
- The relief valve must comply with the standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems ANSI Z21.22 and/or the standard Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves, CAN1-4.4.
- The relief valve must be rated up to 150 psi and to at least the maximum BTU/hr of the appliance.
- The discharge from the pressure relief valve should be piped to the ground or into a drain system to prevent exposure or possible burn hazards to humans or other plant or animal life. Follow local codes. Water discharged from the relief valve could cause severe burns instantly, scalds, or death.
- The pressure relief valve must be manually operated once a year to check for correct operation.
- The relief valve should be added to the hot water outlet line according to the manufacturer instructions. DO NOT place any other type valve or shut off device between the relief valve and the water heater.
- Do not plug the relief valve and do not install any reducing fittings or other restrictions in the relief line. The relief line should allow for complete drainage of the valve and the line.
- If a relief valve discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the relief valve.
- Rinnai does not require a combination temperature and pressure relief valve for this appliance. However local codes may require a combination temperature and pressure relief valve.



### Cleaning the Brazed Plate Heat exchanger (Every 2 year maintenance)

The brazed plate heat exchanger should be cleaned at the service interval every 2 years. Failure to flush the brazed plate heat exchanger will cause damage to it. Follow the procedure below for cleaning the brazed plate heat exchanger.

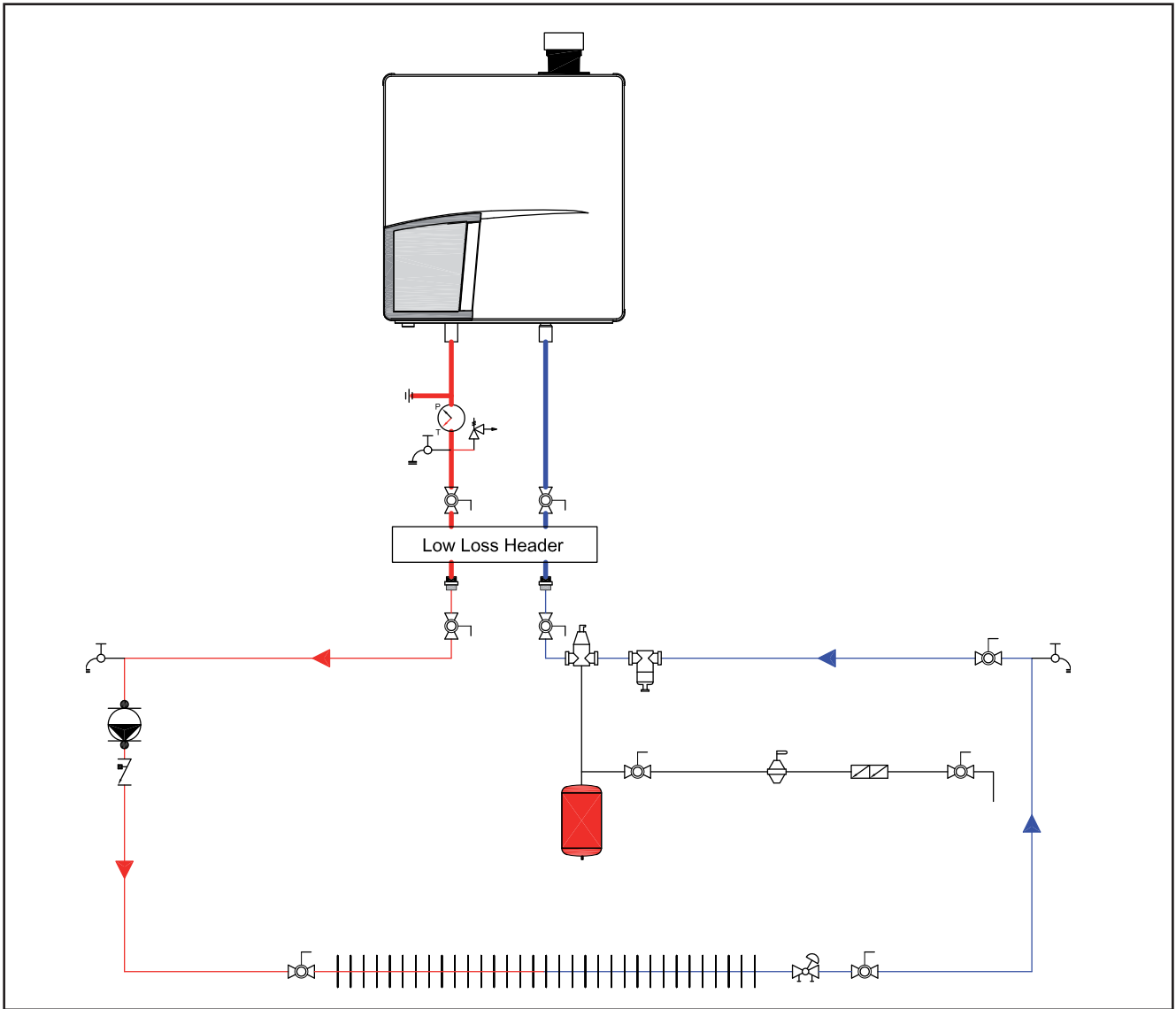
1. Turn off the DHW function on the boiler.
2. Close the shutoff valves on both the hot water and cold water lines (V3 and V4).
3. Connect pump outlet hose (H1) to the hot water line at service valve (V1).
4. Connect drain hose (H3) to service valve (V2).
5. Pour approximately 4 gallons of virgin, food grade, white vinegar or citric acid into pail.
6. Place the drain hose (H3) and the hose (H2) to the pump (CP) inlet into the cleaning solution.
7. Open both service valves (V1 and V2) on the hot water and cold water lines.
8. Operate the pump (CP) and allow the cleaning solution to circulate through the brazed plate heat exchanger for at least 45 minutes.
9. Turn off the pump (CP).
10. Rinse the cleaning solution from the brazed plate heat exchanger as follows:
  - a. Remove the free end of the drain hose (H3) from the pail
  - b. Close service valve, (V2), and open shutoff valve, (V4). Do not open shutoff valve, (V3).
  - c. Disconnect both H1 and H3 from the service valves
  - d. Connect H3 to V1 and place the end of the hose in a drain
  - e. Allow water to flow through the brazed plate heat exchanger for 5 minutes
  - f. Close service valve, (V1), and open shutoff valve, (V3).
11. Disconnect all hoses.



Flushing and draining

figure 37

### 6.1 Boiler Piping Diagram



Boiler basic piping

fig. 6

## 6.1.1 Plumbing Kit installation

Rinnai supplies specific Plumbing Kits with each boiler type, which must be fitted directly underneath the boiler on the supply and return pipe. Use of the Rinnai boiler without the plumbing kit will result in the void of warranty.

### NOTICE

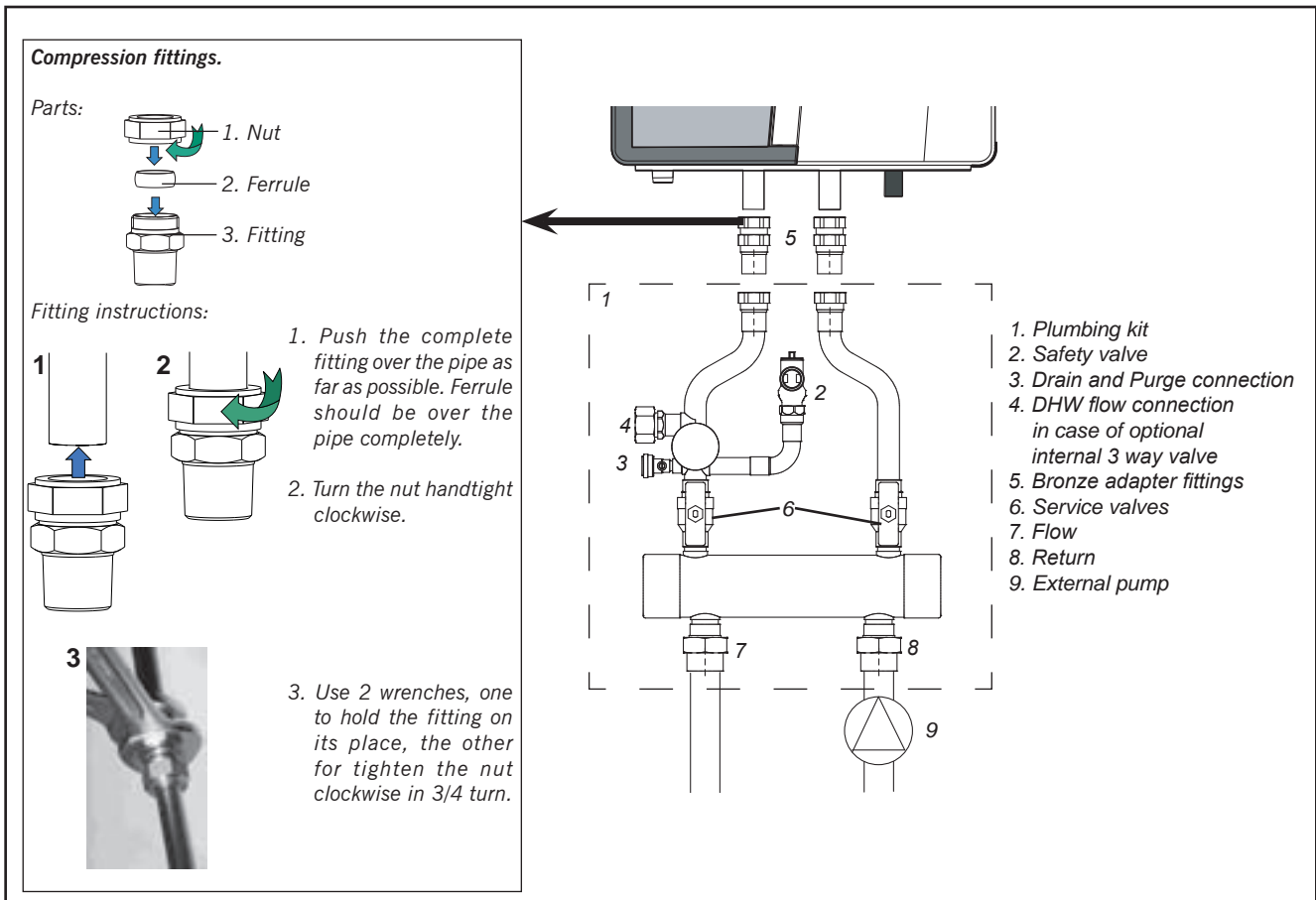
**To protect the entire heating system we recommend installing a dirt particle trap in the return circuit. When the boiler is installed to an existing heating system this trap is required. Use of a Y strainer is not permitted as a substitute for a dirt trap.**

- Install shut-off valves immediately before and after the dirt particle filter to allow the trap to be cleaned.
- Position 3 (figure 7) is a garden hose thread boiler drain that can be used to drain the boiler or add water treatment additives to the system such as inhibitors or glycol.
- Position 4 (figure 7) is the supply connection for an indirect tank when used with the optional 3-way valve kit.
- For information on locating the expansion tank and system fill, please see the Rinnai Boiler Applications Manual.

### NOTICE

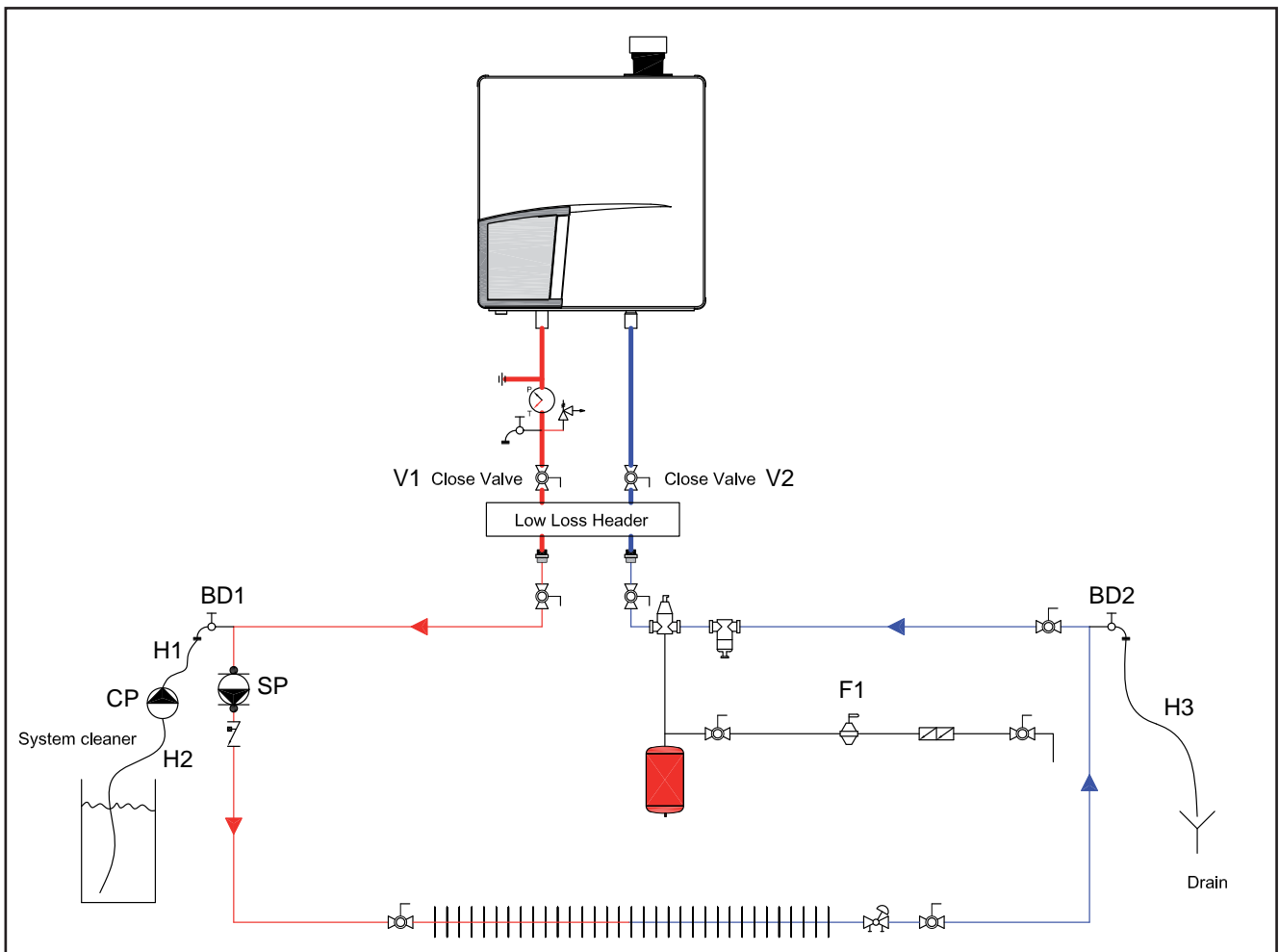
**Thoroughly flush all pipes and radiators. We recommend the use of a Rinnai approved system cleaner. Please refer to the list of approved Rinnai system cleaners in this chapter.**

- Refer to the installation template and chapter 5.3 for the pipe connection dimensions.
- Fit the bronze adapter fittings, supplied with the boiler (fig. 7, pos. 5) first to the Plumbing Kit and then to the boiler.



- Boiler system flushing (Not Boiler heat exchanger)  
**The boiler must be valved off from the system, while the system is flushed.**  
**No system cleaner should ever enter the boiler heat exchanger because of its caustic nature it could damage the heat exchanger.**

1. Close the shutoff valves on both the supply and return connections on the plumbing kit (V1 and V2).
2. Connect pump outlet hose (H1) to the supply side purge station (BD1).
3. Connect drain hose (H3) to the return side purge station (BD2).
4. Pour the system cleaner into a pail and follow the system cleaner instructions about circulation time and volume to be added to the system.
5. Operate the charging pump (CP) and charge the system with the required volume of system cleaner.
6. Close the supply side purge station (BD1) and return side purge station (BD2).
7. Turn on the system pump(s) (SP) and circulate the cleaner through the system for required time by the cleaner manufacturer.
8. Once the time require by the system cleaner manufacturer has been met place the drain hose (H3) in a drain.
9. Turn off the system pump(s) (SP).
10. Close the main valve on the system return (V3) and open the return side purge station (BD2).
11. Open the auto feed on the system (F1) and allow water to rinse the system for whichever is greater: 10 minutes or the rinse time required by the system cleaner manufacturer.



12. If the installation is a zone system be sure to purge out each zone individually.
13. Close the auto feed on the system (F1).
14. Close the return side purge station (BD2) and disconnect the hose (H3).
15. Open the main valve on the system return (V3).
16. Open shutoff valves on both the supply and return connections on the plumbing kit (V1 and V2).
17. Clean out the dirt trap.
18. Test the pH of the water that will be used for filling the system.
19. Test the water hardness of the water that will be used for filling the system.
20. Use the proper water treatment to ensure the pH and water hardness are within the Rinnai boiler water quality guidelines.
21. The boiler and system may now be filled.

The following is a list of approved system cleaners, inhibitors, and antifreeze.

**Approved antifreeze:**

- Rhomar RhoGard Mutli-Metal (AL safe)
- Noble Noburst AL

**Approved system cleaner:**

- Noble Noburst Hydronic System Cleaner
- Fernox F3 Cleaner
- Rhomar Hydro-Solv 9100



**NOTICE**

**The system cleaners from NoBurst, Rhomar, and Fernox are not to be used in the boiler. The boiler must be closed off (valved off) from the rest of the system or not connected while the cleaners are in the system. The system should then be drained and then thoroughly flushed with clean water to remove all the system cleaner.**

**Approved inhibitors:**

- Rhomar Pro-tek 922
- Noble Noburst AL inhibitor

- Connect the expansion tank to the system. See chapter 6.2.
- Connect the pipes so that they are free from strain.

**Connecting boiler with DHW tank**

- Connect the external DHW tank according to the installation instructions of the DHW tank and fittings concerned. See chapter 7 and the Rinnai Boiler Applications Manual for additional information.

- Connect the expansion tank to the system. See chapter 6.2.
- Connect the pipes so that they are free from strain.

**Connecting boiler with DHW tank**

- Connect the external DHW tank according to the installation instructions of the DHW tank and fittings concerned. See chapter 7 and the Rinnai Boiler Applications Manual for additional information.

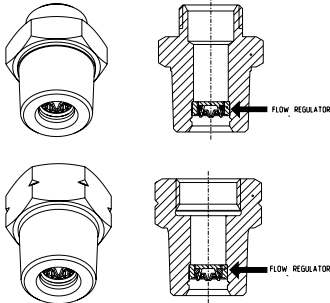
## 6.5 Hot water supply (Combi boiler Q175CN/Q175CP)

Connection of the drinking water installation should be performed according to the national secondary drinking water regulations.



**DANGER**

**Do NOT use toxic chemicals, such as are used for boiler treatment in potable water heating systems used for space heating.**



The sanitary water pipes can be connected to the installation by use of adapter fittings. The cold water inlet on the Combi boilers must be equipped with the following components (counted in the water flow direction):

Flow regulator valve (supplied), Safety group, Expansion vessel 87 PSI / 6bar (potable water, blue).

A flow regulator valve is supplied with the boiler. The flow regulator valve ensures that a quantity of water is supplied which has a outlet temperature of 120°F (assuming a cold water temperature of 45°F). The quantity of water is virtually unaffected by the water pressure. The 3/4" NPT adapter fitting with the flow reducing valve must be fitted in the cold water connection (see Dimensions 5.3, cold water pipe -k).



**NOTICE**

**When there is a water pressure lower than 22PSI / 1.5 bar it is advisable to remove the inside mechanism of the flow reducing valve. Contact Rinnai for removal instructions.**

### 6.5.1 Domestic Water quality

Appropriate steps must be taken to ensure the indirect tank water heater does not become plugged by scale caused by hard water or sediment. If the indirect tank water heater becomes plugged by either scaling from hard water or sediment it is not the responsibility of Rinnai.

#### **1. Water hardness for DHW**

When there is a water hardness of more than 6-7 grains hardness is used for domestic water a water softener must be installed on the inlet side of the DHW connection.

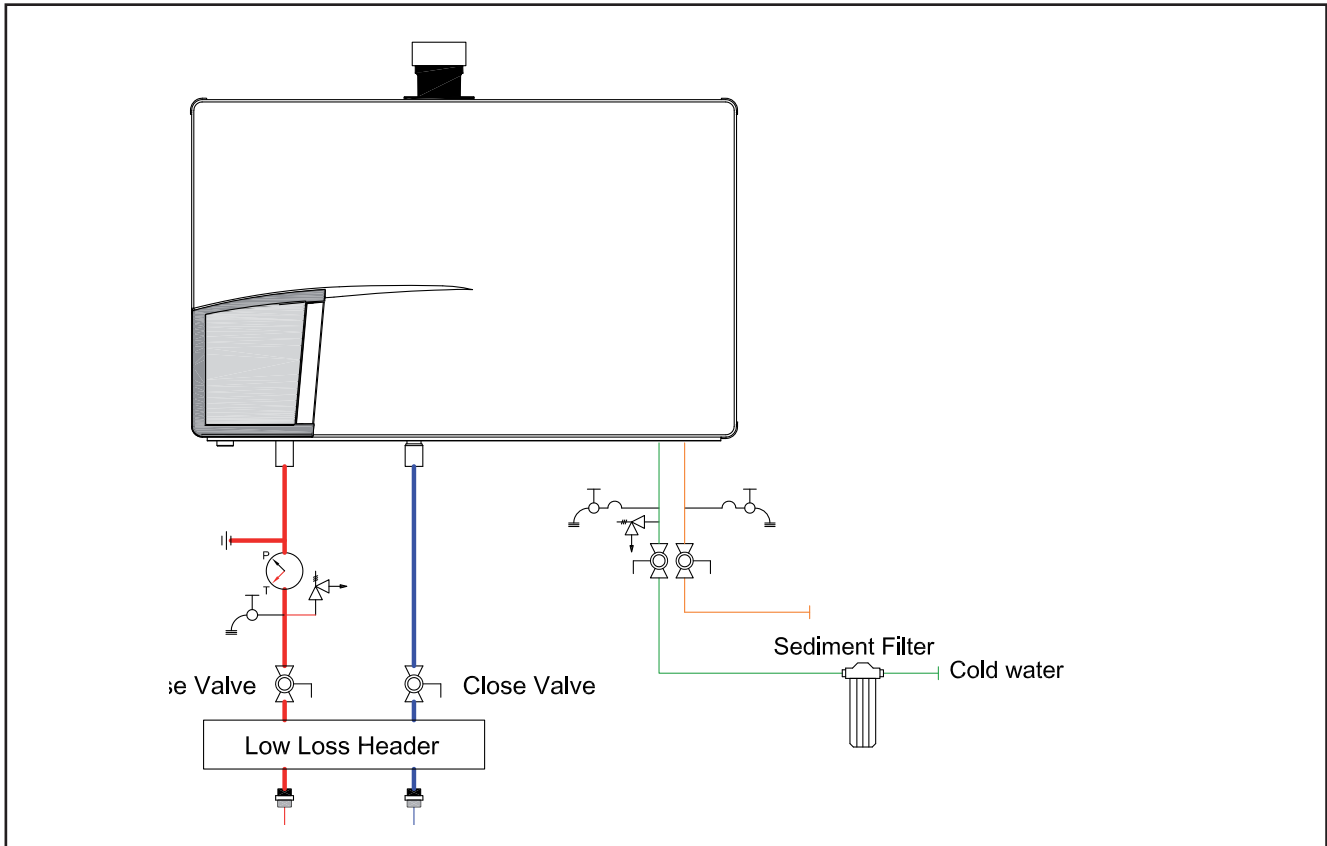
#### **2. Sediment in DHW**

If there is sediment in your domestic water supply sediment filter or other suitable device should be used to remove it before the water enters the indirect tank water heater.

### 6.5.2 Installing a valve kit

A means to isolate the domestic indirect tank water heater for cleaning must be provide at installation. Refer to figure 11 for proper piping layout. A Rinnai valve kit can be used on domestic water connections for all combi boilers to allow for cleaning of indirect tank water heater and installation the domestic hot water pressure relief valve.

- Rinnai recommends the use of the MARIK-T (3/4" NPT thread connection) or MARIK-S kit (MARIK-S (3/4" sweat connection) when connecting the domestic water lines to the boiler.
- Use of this kit will assist in flushing the indirect tank water heater in areas where water quality issues exist, as well as improve overall product serviceability.



Boiler DHW piping

fig. 11

### 6.5.3 Pressure relief Valve for Combi boilers

- An approved pressure relief valve is required by Rinnai for all water heating systems.
- The relief valve must comply with the standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems ANSI Z21.22 and/or the standard Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves, CAN1-4.4.
- The relief valve must be rated up to 150 psi and to at least the maximum BTU/hr of the appliance.
- The discharge from the pressure relief valve should be piped to the ground or into a drain system to prevent exposure or possible burn hazards to humans or other plant or animal life. Follow local codes. Water discharged from the relief valve could cause severe burns instantly, scalds, or death.
- The pressure relief valve must be manually operated once a year to check for correct operation.
- The relief valve should be added to the hot water outlet line according to the manufacturer instructions. DO NOT place any other type valve or shut off device between the relief valve and the water heater.
- Do not plug the relief valve and do not install any reducing fittings or other restrictions in the relief line. The relief line should allow for complete drainage of the valve and the line.
- If a relief valve discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the relief valve.
- Rinnai does not require a combination temperature and pressure relief valve for this appliance. However local codes may require a combination temperature and pressure relief valve.