Freeze Protection GS4-45HPC

- System design will have the Outdoor unit & Piping filled with Water so it is important for the system to be capable to handle installations in cold weather locations and how the unit will operate to reduce this cold weather effect

- Interestingly it also gets cold in Japan (Sapporo, design temperature is 15°F). Nothing is done to the system to worry about cold weather, EVEN the tank is outside

Freeze Protection

Minimal Water Piping Outdoors

- Plan your job site and unit(s) location to penetrate into the building adjacent to the Heat Pump(s)
- Use ¾” minimum thick Closed Cell insulation on the external piping – Larger thickness of insulation can be used for colder ambient locations to provide more insulation
- Tape joints and ensure that none of the system is piping is exposed

Freeze Protection

Unit Freeze Protection Control Program

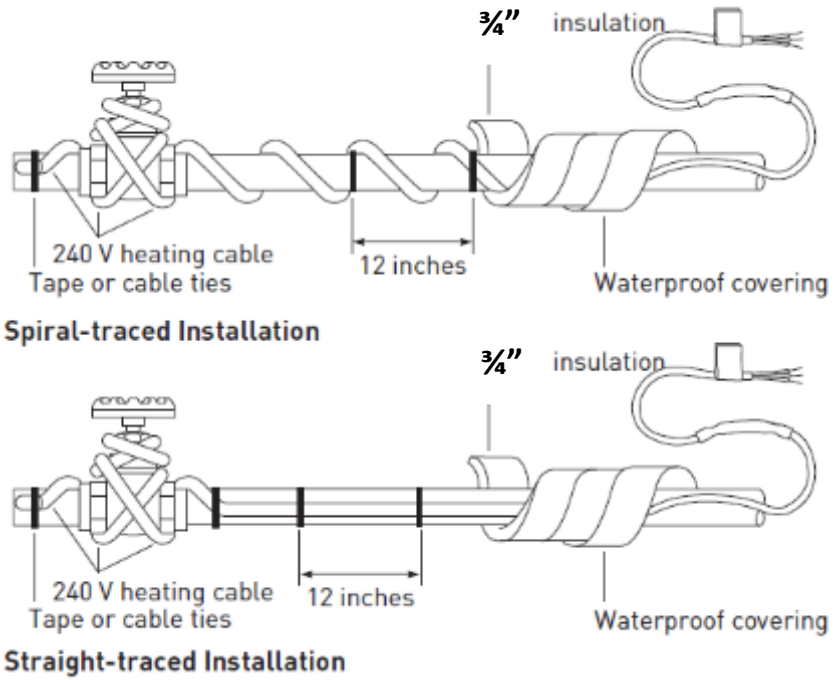
- System continually monitors Inlet & Outlet Water Temperatures plus Outdoor Ambient Temperature
- Unit will operate the unit Pump and Compressor to ensure quick heat up of the Inlet and Outlet water before cycling off

Start trigger	①	Ambient temp ≦ 37°F (3°C)	Freezing prevention operation started when ① and ②were achieved.
	②	Outlet temp. ≦ 37°F (3°C) or Inlet temp. ≦ 37°F (3°C)	
End trigger	①	Ambient temp. ≧43°F(6°C)	Freezing prevention operation ends when ① or ②is achieved
	②	Outlet temp. ≧ 43°F (6°C) [Detected for 150 seconds] and Inlet temp. ≧ 125°F (52°C) [Detected for 150 seconds]	

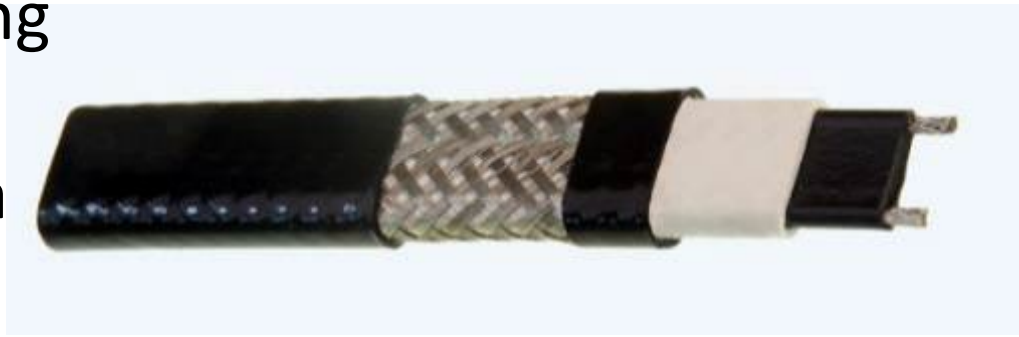
Freeze Protection

Heat tape on the pipe work

- Self regulating 5 to 8W Heat Trace used to heat both Cold & Hot Piping



- FG2-6L is a 6ft long Heat Trace with a 3ft lead cord on it to allow the FG2-6L to be directly connected to the 208/230V L1 & L2 Incoming power terminals directly without needing any extra wiring

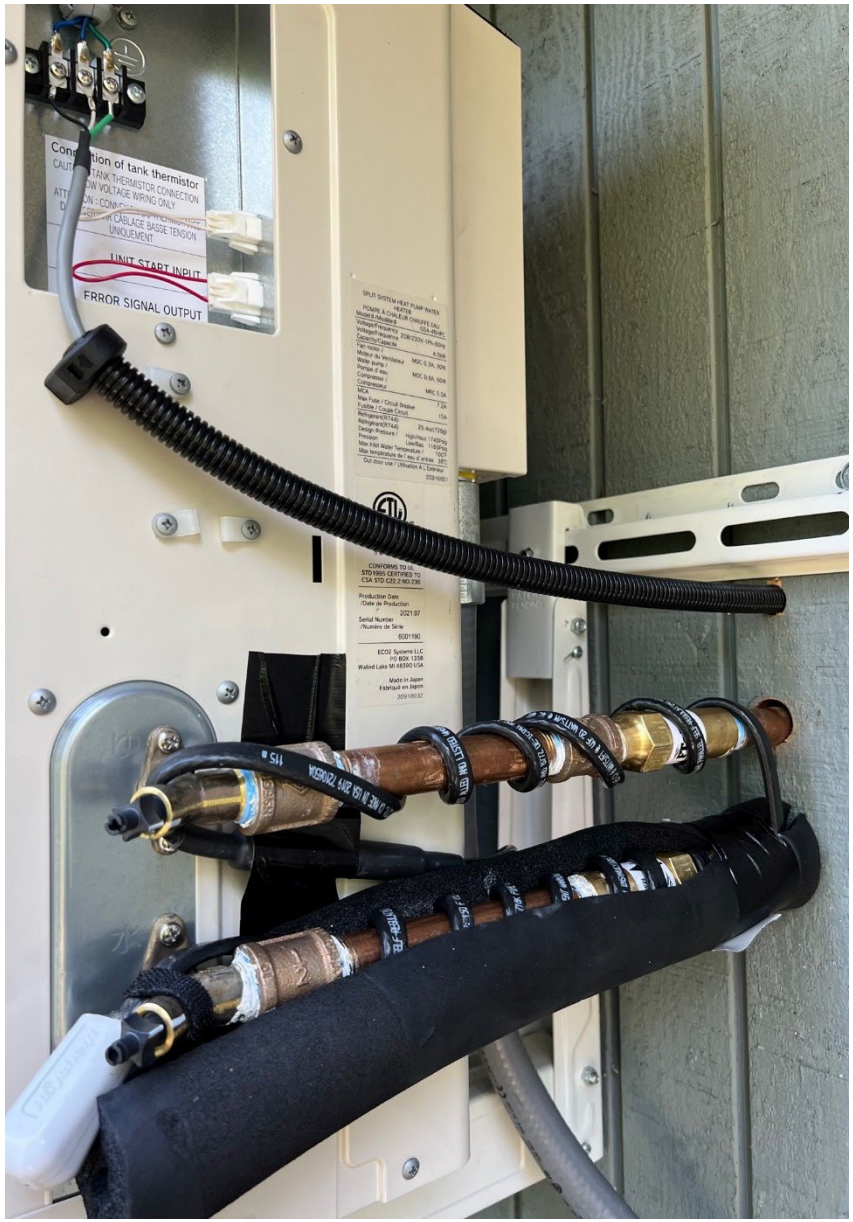


Freeze Protection

Heat tape on the pipe work

- Install the FG2-6L by wrapping tightly under the insulation on both Hot & Cold Piping to unit – The 6ft length should provide both pipes with Heat

- Start the wrap around process at the Hot Water Outlet connection then around the external piping and cross over to the Cold Water piping in the building and complete all of the FG2-6L wrap process at the Cold Water Inlet Connection at the GS4



Freeze Protection

Power Outage

- Use the FPVKT-SMTW Valve kit to allow water to drain from the Cold & Hot piping to the unit
- 2 x FPV Valves & 2 x Tees for easy installation are provided with the Kit
- FPV Valves are installed o both Cold & Hot Piping to the GS4

Freeze Protection

Power Outage

- FPVKT will open on **BOTH** or **EITHER** of the Cold & Hot piping to start the drain process if the Water temp falls **below 34°F**
- As Valve(s) open the Water Pressure in the piping will allow 34°F Water to be drained out of piping drawing warmer water from inside the Tank or building into the piping to replace the Cold Water being drained
- Valves will close when the Water drained from the system rises **above 39°F** in the piping and GS4 unit

Notes:
Isolation Valves/Unions at Heat Pump. PRV on Tank plus Mixing Valve are not shown for clarity

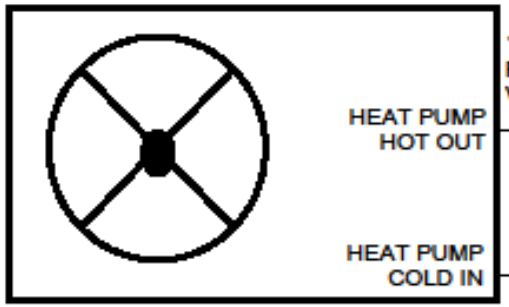
FPVKT Valves will open when the water temperature falls below 34° F
Water in the Tank and/or Heat Pump will start draining from the Cold & Hot piping with the Valve(s) attached as the Water is at this temperature

The Water being drained by each Valve will flow from either being inside the Heat Pump or through the Piping that is connected to the Tank

As the Valves are opened for draining as this process in flowing water to the Valves from the Tank or Heat Pump at a warmer temperature to prevent possible freezing of the system. Both FPVKT valves can be connected to separate drain piping

FPVKT Valves will be fully closed when the water temperature sensed is above 39ºF

FPVKT Valves should be installed external to building



GS*-45HP*

1/2" FPVKT-SMTW Freeze Protection Valve

1/2" FPVKT-SMTW Freeze Protection Valve

Anti Scald (Mixing) Valve on DHW outlet is not shown for clarity

1/2" Full Port Tank Isolation Valve installed at both Tank connections Not Shown

Drain Flow in piping when FPVKT valves open will occur due to water pressure and thermosiphon effect

FPVKT Valves should be installed vertically or at an up to 45° Angle to allow drain flow from the Valve using a Tee to connect to the 1/2" Hot & Cold Piping
FPVKT Valves should be installed at a min of 6" and a max of 24" from the GS4 Cold & Hot Water piping connections

HOT IN FROM HP

DHW HOT OUT

SANCO2 DHW STORAGE TANK

COLD OUT TO HP

DHW COLD IN

Cold Water Inlet from House supply

Route both FPVKT Valves discharge to a Drain or location where discharge of water will not create a slip/fall hazard

ECO2	Title : SANCO2 Heat Pump unit & FPVKT Kit Freeze Protection Valves			
	Drg # :ECO2-GSHP-026	Drawn : JLM	11/19/2019	Rev : 04 Reissue 07/2022

Manual Drain

Unit and piping can also be drained manually

- Close Isolation Valves installed on the piping to the GS4 unit from the Storage tank
- Open the Air bleed screws on the GS4 Cold Water Inlet Connector and Hot Water Outlet Connector to manually drain down the System
- Also drain water using the Air Bleed on the Water Pump underneath the unit
- After power outage open closed Isolation valves, fill and bleed the system then restart the GS4