



SUNPUMP™

---

## *OWNER'S MANUAL*

---

*2017 SUNPUMP 3.1*

*MULTI-FUNCTION HEAT PUMP*

## BEFORE YOU START

1. After receiving your SunPump please inspect the state of the system to ensure components are not damaged. Any damage related to transport is the responsibility of the purchaser's shipping company and should be promptly addressed.
2. It is essential to read and follow all instructions and warnings, including labels shipped with or attached to the unit before operating your new SunPump.
3. These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation. A Heating Permit is required and the responsibility of the Forced Air or Hydronic Installer to certify and stamp. This appliance must only be installed by a qualified person who is certified and trained to operate heat pump/refrigeration and/or heating systems.
4. The SunPump must be used only indoors in applications for which it was intended. Any misuse of this unit can cause personal injury and/or damage to equipment. Do not install in a Garage, Crawlspace, or other non-conditioned space outside of the fully-insulated building envelope.
5. Modifications of any electrical connections in the SunPump System may cause the warranty to become void. Homes with unstable power require protection devices to manage Brown Power or voltage spikes. Consult with your Electrician for advice.
6. It is important to keep this manual with the SunPump for reference in the future.



## WARNING


### PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in personal injury, death, or property damage.

Read and follow all instructions and warnings, including labels shipped with or attached to unit before operating your new SunPump system.

SunPump 3.1 Solar-Assisted heat pump is a special appliance. Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency or your distributor for information or assistance. The qualified installer or service agency must use factory---authorized kits or accessories when modifying this product.

Note: SunPump is not responsible for any personal injury or unit damage caused by improper installation or operation.

Any time you see this symbol  in manuals, instructions and on the unit, be aware of the potential for personal injury. There are three levels of precaution:

- **DANGER** identifies the most serious hazards which can result in severe personal injury or death.
- **WARNING** signifies hazards that could result in personal injury or death.
- **CAUTION** is used to identify unsafe practices which would result in minor personal injury or product and property damage.

**NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation. **TIP** is used to suggest field install ideas.

## Table of Contents

1	Introduction .....	5
2	Principle of heat pumps.....	6
3	Safety .....	7
4	SunPump 3.1 Solar-AssistedHeat Pump.....	9
4.1	Dimensions .....	9
4.2	Parts List .....	10
4.3	Exterior Fittings List .....	11
4.4	SunPump Solar Evaporators .....	12
4.5	System Specification .....	12
5	Operation .....	14
5.1	Operator Display.....	14
5.2	Controller Operation Mode and Buttons .....	15
5.3	Start up .....	16
5.4	System Setup .....	17
5.4.1	Setting Correct Time .....	17
5.4.2	Setting Temperature Display Units .....	17
5.4.3	Setting Timer Option .....	17
5.5	Adjusting Parameters .....	18
5.6	Parameter Settings .....	19
5.7	Measured Data Values .....	20
5.8	Error Codes .....	21
5.9	Trouble Shooting Guide .....	22
6	Installation .....	23
6.1	Typical Mechanical Room Layout .....	23
6.2	Outdoor Air & Panel Sensors .....	24
7	Wiring Diagrams .....	25
8	Warranty Registration .....	27
8.1	Service Agreement .....	27

## 1 Introduction

This document is designed to be used in conjunction with the Installer Manuals and/or technical support manuals provided to SunPump trained Installers. This Owner's Manual will provide the information on all necessary activities before and during usage of the system.

SunPump Solar encourages installers of SunPump products to always keep workmanship, best practices and safety in mind. An organized installation will benefit both installer and Owner.

While reading the manual, please pay close attention to three level of cautions described on page iii of this manual.



### CAUTION

This device is not suitable for children and must be operated by persons over the age of 18 and who are acquainted with content of the installation and operating instruction manual.

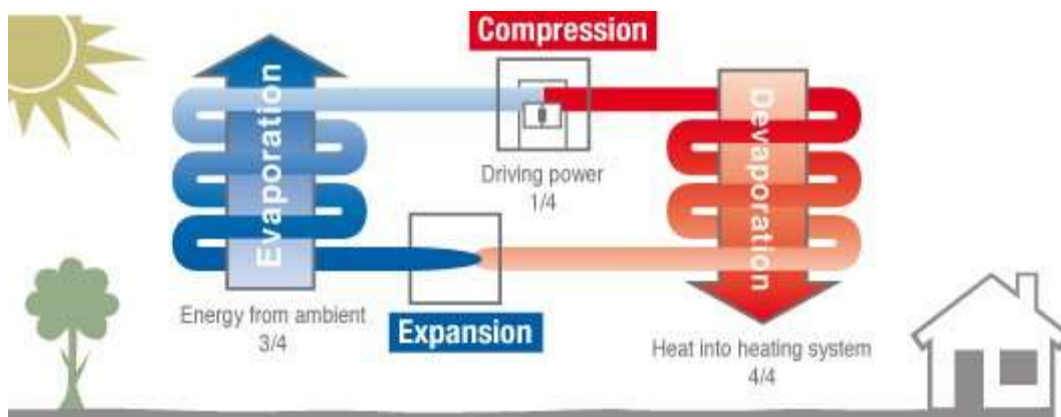


## 2 Principle of heat pumps

A heat pump is a device in which a refrigerant continuously changes phase from gas to liquid, changing temperature at the same time. In the cold liquid state, it absorbs energy from the atmosphere as it evaporates to gas. More energy is added at the compressor as the warm gas is compressed to a high pressure hot gas. The combined energy is released into your house when the hot gas condenses back to liquid. The cool liquid is expanded back to a low pressure cold liquid and the process is continuously repeated.

The advantage of a heat pump is that it moves more heat energy through the vapor-compression cycle described above than the electricity it consumes, providing very high effective efficiency. The Coefficient of Performance (COP) of a heat pump is the ratio of the total energy delivered over the amount of energy consumed by the compressor and is typically in the range of 1.5 to 4, depending mainly on the ambient air and hot water temperatures.

SunPump uses large aluminum solar panels that can directly exchange the cold refrigerant temperature with latent solar environmental temperatures day or night, and directly assisted by solar heat gains on the Panels in the day. The panels do not produce electricity.



<http://www.tepelna-cerpadla-mach.cz/en/heat-pump-for-family-houses/heat-pump-principle.php>

### 3 Safety

Do not step on the Panels or climb on the indoor unit at any time.

Do not allow children to play on or around the unit.

Do not place any items into ventilation openings on the side of the unit. Doing so could damage equipment or result in severe electrical shock.

If you detect any abnormal odor from the unit or burnt smell - turn off the power and switch off power at the breaker.

Do not pull on the power cables or place these under tension.

Do not clean the appliance with water as this can damage the insulation on the hot water tank.

Do not place any objects in front of the air vents on the side of the unit that may block airflow as this can cause internal electronics to overheat.


Avoid touching power cables or any electrical connections with wet hands as there is a risk of electric shock.

Only a certified refrigeration technician familiar with the use of R410a refrigerant should make any adjustments in the refrigerant levels, or the refrigerant recovery required for disconnecting.

Failure to turn off all power connections to the unit (system power and electric backup heater) at the disconnect or breaker before installing or servicing the system can result in severe personal injury or death, and can result in damage to the equipment.

Never make any changes to the control parameters unless you are fully aware of how these will affect the operation of the system and know that those changes will not increase the risk of injury to people or cause damage to the unit or any associated heating equipment.

# SAFETY PRECAUTIONS



**⚠ DANGER**

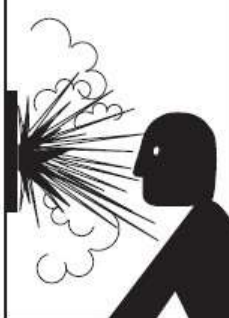
Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.



**⚠ WARNING**

**Explosion Hazard**

- Temperature-pressure relief valve must comply with ANSI Z21.22-CSA 4.4 and ASME code.
- Properly sized temperature-pressure relief valve must be installed in opening provided.
- Can result in overheating and excessive tank pressure.
- Can cause serious injury or death.



**⚠ WARNING**

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction manual must remain with water heater.



**⚠ WARNING**

- Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".
- Failure to do this could result in death, serious bodily injury, or property damage.

**CAUTION**

**Improper installation and use may result in property damage.**

- Do not operate water heater if flood damaged.
- Inspect and replace the anode as needed.
- Install in location with drainage.
- Fill tank with water before operation.
- Be alert for thermal expansion.

Refer to instruction manual for installation and service.

**⚠ WARNING**


**Excessive Weight Hazard**

Use two or more people to move and install water heater.


Failure to do so can result in back or other injury.

**⚠ WARNING**

**Fire Hazard / Electric Shock Hazard**



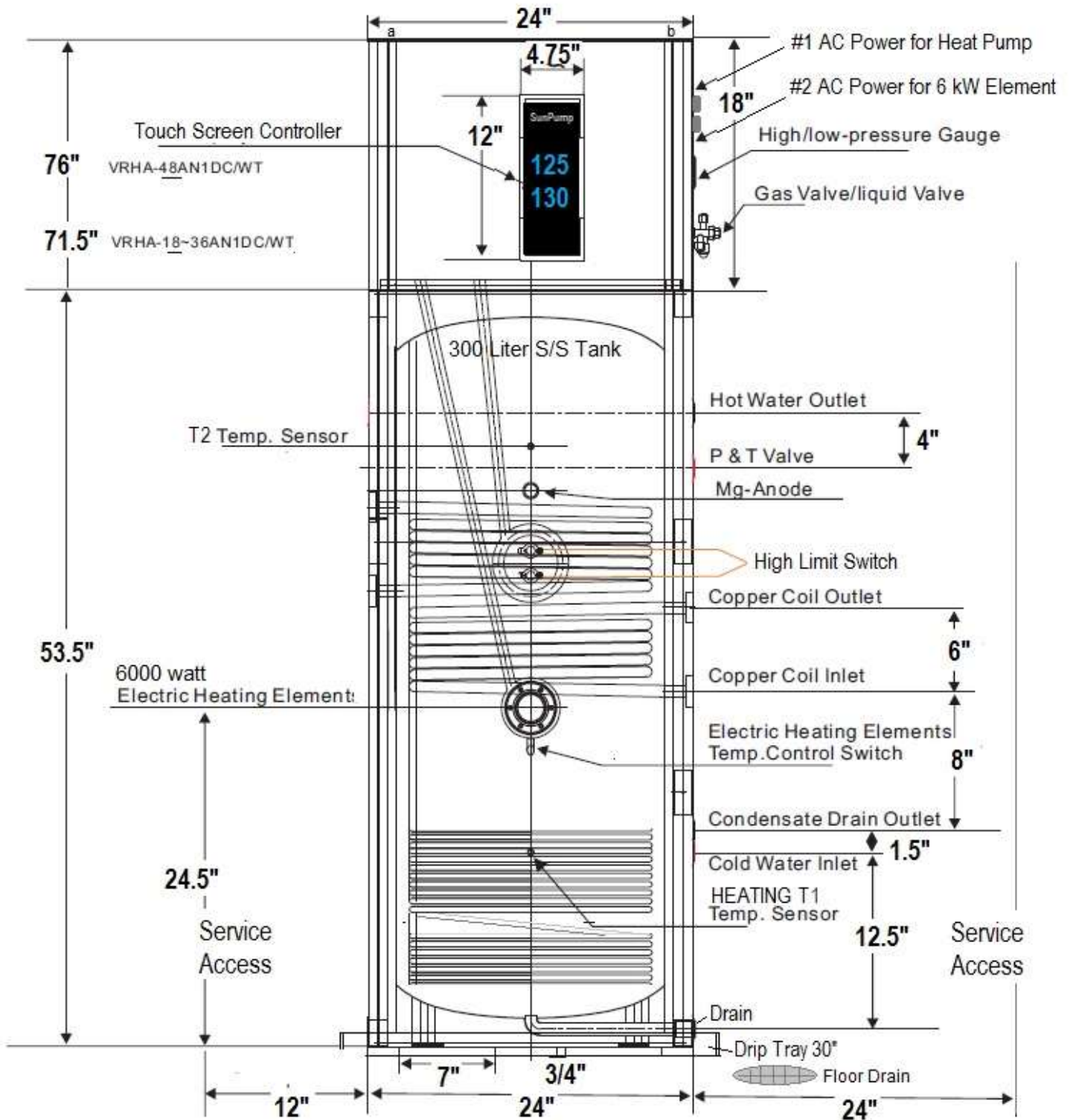
- Do not use this water heater with any voltage other than shown on the model rating plate.
- Failure to use the correct voltage shown on the model rating plate could result in death, serious bodily injury, or property damage.





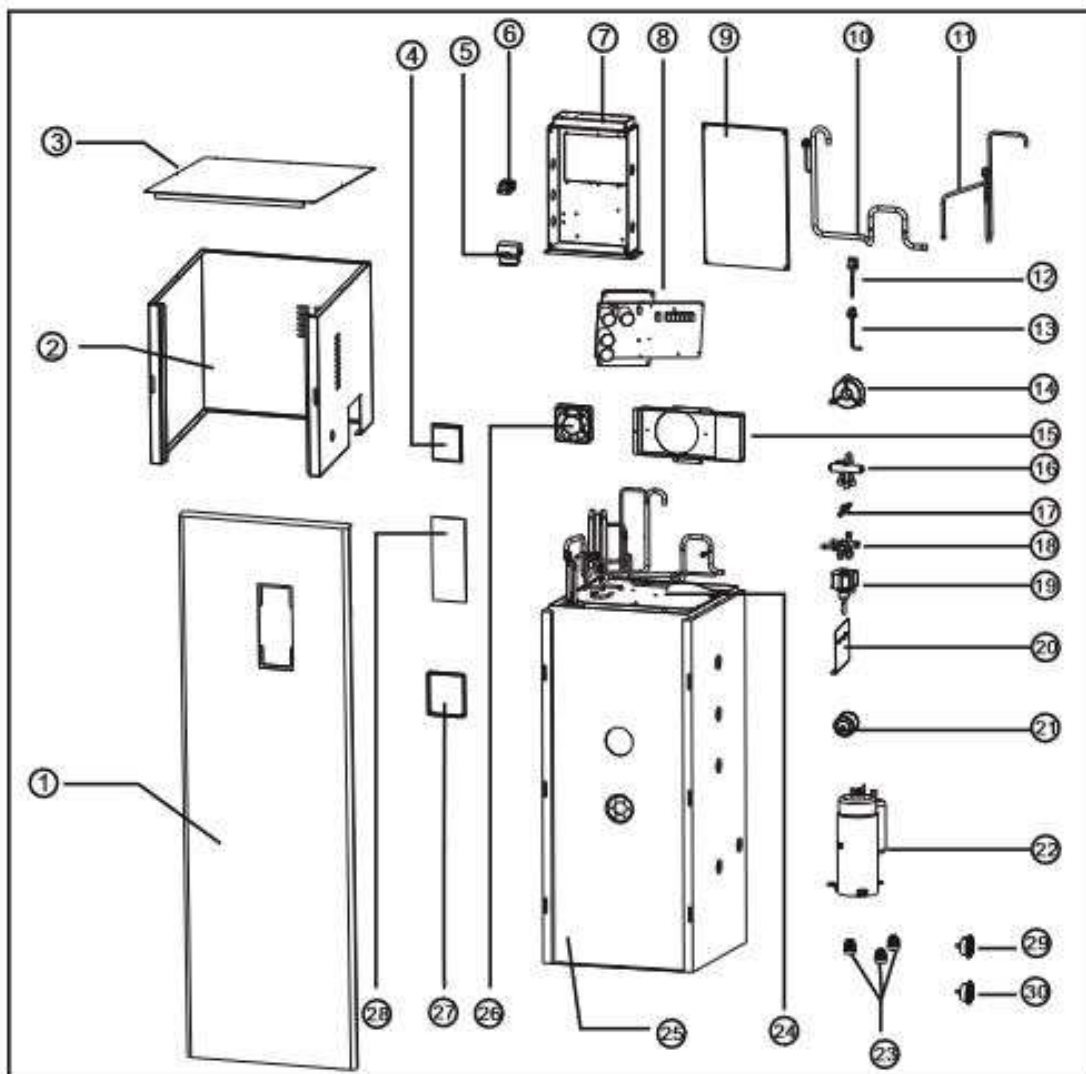
## 4 SunPump 3.1 Solar-Assisted Heat Pump

### 4.1 Dimensions



NOTE: All Water, Refrigerant and Electrical connections are on the right side, allow for service room to left and right.

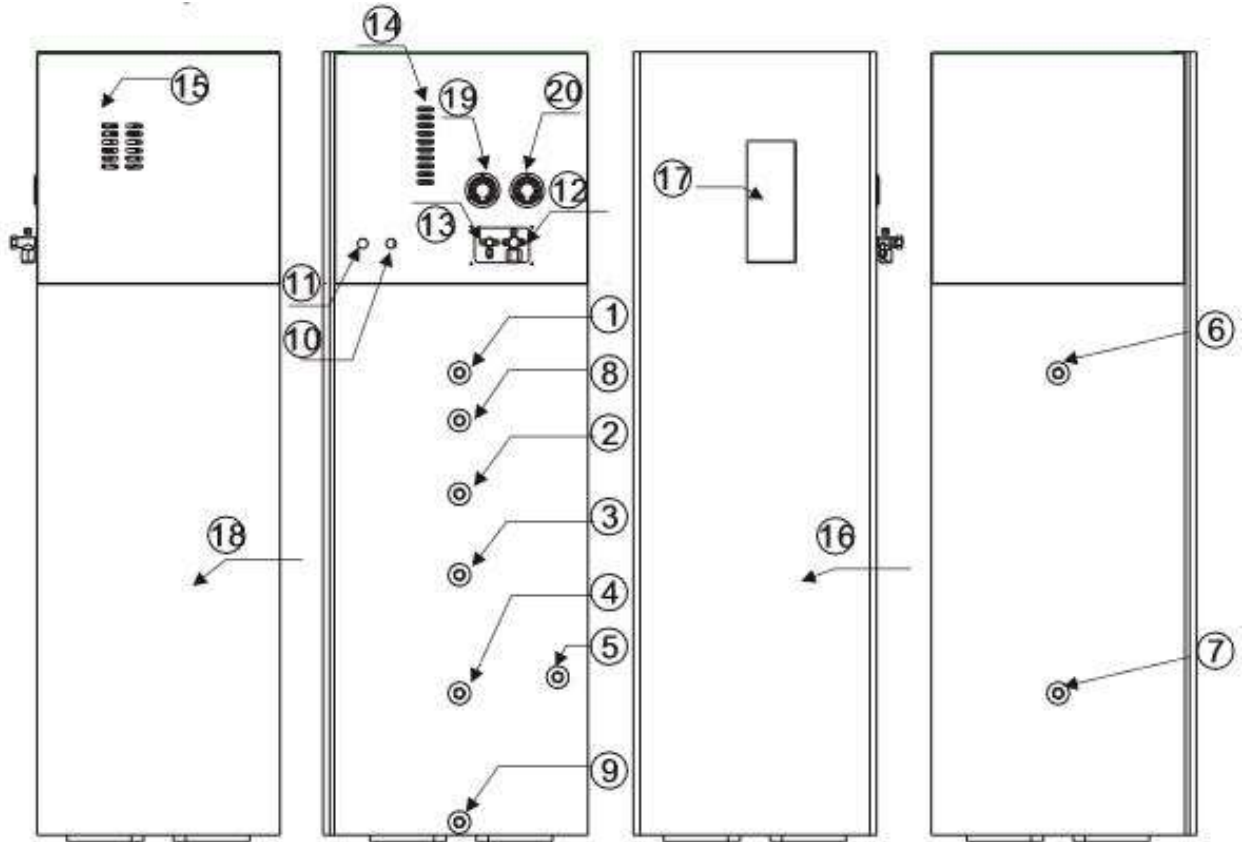
## 4.2 Parts List



NO.	NAME	Q'TY
1	Front Panel	1
2	Side Panel	1
3	Top Panel	1
4	Displayer	1
5	AC Contactor	1
6	Terminal Block	1
7	PCB Box	1
8	PCB Board	1
9	Cover	1
10	Suck Pipe	1
11	Discharge Pipe	1
12	High-Pressure Switch	1
13	Low-Pressure Switch	1
14	Inductance	1
15	Fan Motor Holder	1

NO.	NAME	Q'TY
16	Four-Way Valve	1
17	Sight Glass	1
18	Liquid/Gas Valve	1
19	Electronic Expansion Valve	1
20	Valve Plate	1
21	Dry Filter	1
22	Compressor	1
23	Rubber Cushion	3
24	Chassis	1
25	Water Tank	1
26	Fan	1
27	Displayer Box	1
28	Displayer Panel	1
29	High-pressure Gauge	1
30	Low-pressure Gauge	1

### 4.3 Exterior Fittings List

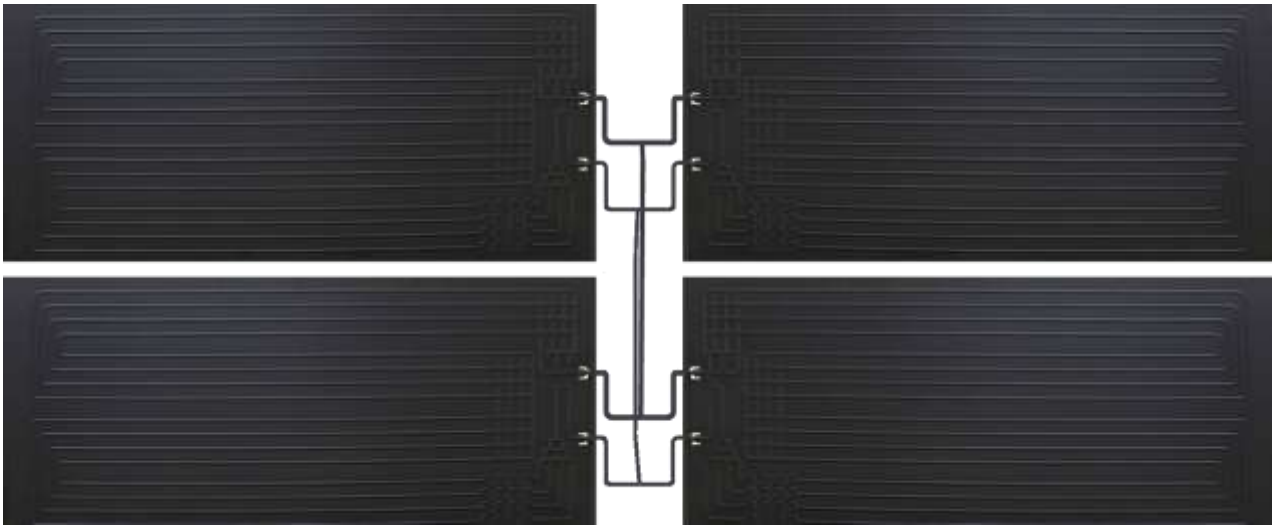


<b>1</b>	<b>Hot Water Outlet</b>	<b>12</b>	<b>Gas valve</b>
<b>2</b>	<b>Copper Coil Inlet</b>	<b>13</b>	<b>Liquid valve</b>
<b>3</b>	<b>Copper Coil Outlet</b>	<b>14</b>	<b>Air Outlet</b>
<b>4</b>	<b>Cold Water Inlet</b>	<b>15</b>	<b>Air Inlet</b>
<b>5</b>	<b>Condensate Drain Outlet</b>	<b>16</b>	<b>Front Panel</b>
<b>6</b>	<b>Hot Water Outlet</b>	<b>17</b>	<b>Displayer Panel</b>
<b>7</b>	<b>Cold Water Inlet</b>	<b>18</b>	<b>Water Tank</b>
<b>8</b>	<b>P &amp; T Valve</b>	<b>19</b>	<b>High-pressure gauge</b>
<b>9</b>	<b>Drain Outlet</b>	<b>20</b>	<b>Low-pressure gauge</b>
<b>10</b>	<b>Heat pump power cord</b>		
<b>11</b>	<b>Electric heating Elements power cord</b>		

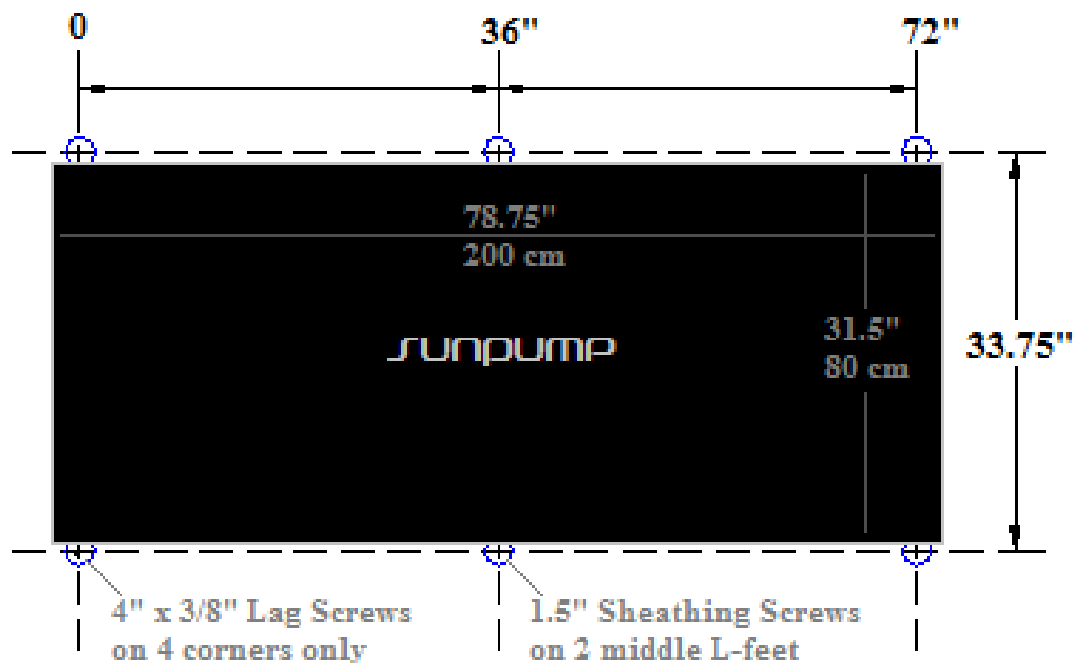
#### 4.4 SunPump Solar Evaporators

### DANGER

All person working on roofs must have successfully completed a Fall Arrest Safety course and be properly equipped with appropriate safety equipment and a safety plan.



This is a 4-panel array sample configuration which may vary depending on installation parameters. A South exposure and 30 to 90-degree angle is needed. Alternatively, an East/West split of panels works well. In high snow locations consider wall mounting under the roof overhang, or very steep angles to avoid snow and ice accumulation.



## 4.5 SP 3.1 System Specifications

Model Number	VRHA-	12DC80GT	18DC80GT	24DC80GT	36DC80GT	48DC80GT
Nominal Capacity <sup>b</sup> (Tons)		1 Ton	1.5 Tons	2 Tons	3 Tons	4 Tons
Heating <sup>b</sup> (BTU/hr)		12,000 BTU	18,000 BTU	24,000 BTU	36,000 BTU	48,000 BTU
Heating <sup>b</sup> (kW)		3.5 kW	5 kW	7 kW	10 kW	14 kW
Heating Area <sup>A</sup> @15/12BTU/ft2		~ 800-1000 ft2	~ 1200-1500 ft2	~ 1600-2000 ft2	~ 2400-3000 ft2	~ 3200-4000 ft2
Performance		Radiant heating design temperature is 85-105 F.				
Max. water temp.		140 F./60°C.	140 F./60°C.	140 F./60°C.	140 F./60°C.	140 F./60°C.
Heating input power		0.79 kW	1.57 kW	2.12 kW	3.03 kW	4.24 kW
COP <sup>1</sup> including Solar/no solar		3.7/2.6	3.6/2.5	3.6/2.5	3.6/2.5	3.6/2.5
Indoor Noise Level		42 dB(A)	44 dB(A)	45 dB(A)	47 dB(A)	48 dB(A)
Outdoor Noise level		9 dB(A) 3 M. from panels (less sound than breathing)				
Mechanical		Refer to local plumbing and building codes for system and installation requirements				
Dimensions (in.)		23.6*25.7*72.0	23.6*25.7*72.0	23.6*25.7*72.0	23.6*25.7*72.0	23.6*25.7*76.7
Shipping weight		175 lbs.	175 lbs.	181 lbs.	185 lbs.	189 lbs.
Number of panels/L-feet		2/12	3 (or 4)/18/24	4/24	6/36	8/48
R410a Charge Weight		41 oz. (1160 g)	49.5 oz. (1400 g)	63.6 oz. (1800g)	81 oz. (2300 g)	102 oz. (2900 g)
Max. operating pressure		Heating 305 PSIG low side / 610 PSIG high side   Pressure Test Panels 150-200 PSIG. MAX.				
Line set charge/max length		25 ft./35 ft.	27 ft./37 ft.	30 ft./40ft.	30 ft./45ft.	30 ft./50 ft.
Add per additional foot		0.22	0.28 oz.	0.30 oz.	0.33 oz.	0.33 oz.
Liquid line OD		1/4 in.	1/4 in	3/8 in	3/8 in	1/2 in
Gas line OD		3/8 in.	1/2 in	5/8 in	5/8 in	3/4 in
Domestic Hot Water Tank		80 Gal./300 L.	80 Gal./300 L.	80 Gal./300 L.	80 Gal./300 L.	80 Gal./300 L.
First Hour Hot Water		68 gal./hr.	74 gal./hr.	80 gal./hr.	92 gal./hr.	104 gal./hr.
Water fittings/HX Coil ft.		3/4” NPT/33 ft	3/4” NPT/33 ft	3/4” NPT/33 ft	3/4” NPT/50 ft	3/4” NPT/50 ft
Water Flow Rate at 3 FPS		1.2 GPM	1.8 GPM	2.5 GPM	3.6 GPM	5 GPM
Suggested Expansion tank		3 gal.	3 gal.	3 gal.	4 gal.	5 gal.
Heater coil dimension		Immersion: 7/8 in OD x 33/50 ft. Pressure Drop .95/1.45psi.   Double Wall Wrap-around: 2/ 3/8”x60 ft.				
Electrical		Refer to local electrical and building codes for wiring and installation requirements				
Compressor		DC Inverter 230V single phase. 2 wire (L1, L2, G) AWG12-AWG10				
Rated Running current		4.6 A	6.8 A	9.2 A	13.2 A	18.4 A
Max. current		8 A	11 A	15 A	19 A	26 A
Heat Pump Breaker/voltage		15 A / 240 V	15 A / 240 V	20 A / 240 V	30 A / 240 V	40 A / 240 V
Elec. Backup Heater		6 kW	6 kW	6 kW	6 kW	6 kW
Elect. Backup Max./Breaker		26 A./40 A	26 A./40 A.	26 A./40 A.	26 A./40 A.	26 A./40 A.

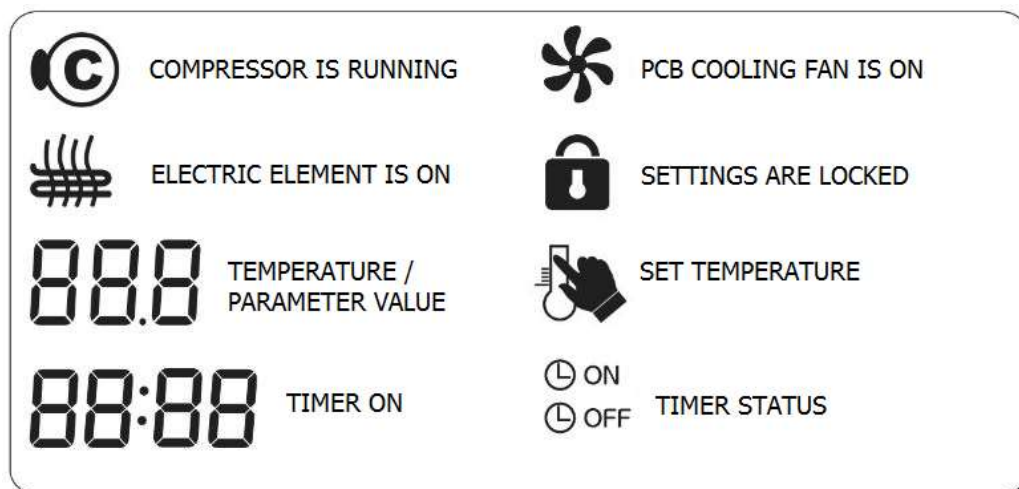
- A. Area space heating assumes new construction above code at <12 BTU/ft2; and to Code at 15 BTU/ft2.  
 B. It is the purchaser's responsibility to calculate Heat Loss/Gain, size for 100%, and size for 100% backup.  
 1. Momentary COP Measured at ambient 50 F. and water in/60 F. out/120 F. with Sun 50%, wind 15 km/hr.



## 5 Touch Screen Controller Operations – 2017 SP3.1

















The SunPump 3.1 uses the following indicators to display system status.





## 5.1 Controller Operation Modes and Buttons


	The Power button is used to activate the Controller from being asleep. It also serves as the way to save a change in Settings and exit.
	Timer allows the setting for up to two blocks of time per day, over a week. You could set the SunPump to operate from 9:30 am to 5:00 pm to capture the day time Sun, and be off at night as an example.
	The following 5 Modes can be set directly by touching one of the five round Mode icons. To reveal the measured Data Values, a01, hold for 6 seconds and scroll through 7 measured values.
	Heat Pump Mode – gives the best economy by relying on the Compressor for best energy efficiency during most of the year. This is the default Mode, also called “Eco Mode”.
	Electric Heater Mode – uses only the 6000-watt electric immersion element to heat the tank. The same as a standard electric hot water heater operation, useful during extreme cold snaps or service.
	Hybrid Mode – delivers a blend of Compressor priority plus the boost from the electric element during cold snaps. Recommended Mode during mid-Winter to achieve a recovery / economy balance
	Power Mode – allows both Compressor and Electric to heat at the same time for combined recovery. Power should be used sparingly, like when company is staying and everyone wants close showers.
	Vacation Mode - gives you a minimum heating to reduce stand by heat loss from the hot water storage tank. It should be used when you will be away for a week or longer to reduce consumption.
	Lock button is used to prevent others from changing Settings. Press the button to unlock when changes are meant to be kept.
	Arrow Up and Down are used to scroll through the 10 Parameters list, or the 7 Data values list. Also used for making changes to Parameter Values when the lower number is flashing. Changes only remain if Unlocked, and when the Power button is used to save and exit.
	Settings button is multi-purpose. It is used to reveal the Parameters with a short touch. It is also used to change from scrolling through Parameters when both top and bottom numbers are flashing, to switch the focus to only the bottom number flashing then making it possible to use the Arrows to change the Setting. To change temperature scale from Fahrenheit to Celsius, hold for 6 seconds.
	Fan icon indicates the Printed Circuit Board fan is cooling.
	Compressor icon shows it is running in heating or defrost operations.
	Electric element icon shows when the 6000-watt booster heater is on in E, HY, or P Modes.





## CAUTION

Before applying power to the SunPump ensure that all plumbing and sensor connections are hooked up, that the tank is full of water, and the refrigeration lines have been properly installed and tested.





When power is first applied to the SunPump the display will come on showing the current water temperature and the time display. **Installer is to set the correct time and Mode, plus show the Owner how to operate the basic controller functions.**

To turn the SunPump on press and release the Power button . The display will now show both the current water temperature and the set point temperature (default is 55°C). At this point the system will be operational and, assuming the water temperature is at least 5°C below the set point, will start the compressor to begin heating the water.

When the heating cycle begins, the controller fan will start first to cool the internal electronics. This will be indicated by the fan symbol on the display panel. The compressor will start shortly after, indicated by the compressor symbol on the display panel.


The arrow buttons   can be used to adjust the set point temperature up or down as desired. The recommended temperature is between 45°C and 55°C.

### 5.3.1 Setting Correct Time

- Press and hold clock button  for 5 seconds until day starts to blink.
- Use arrow buttons   to select current day.
- Press clock button a second time to switch to hour digits and use arrow keys to set correct hour (Note, SunPump uses a 24-hour format for time).
- Press clock button a third time to switch to minute digits and use arrow keys to set correct minute.
- Press clock button a fourth time to stop making changes, nothing is flashing.
- Press Power button  to save time settings and exit setup.

### 5.3.2 Setting Temperature Display Units

SunPump 3.1 can display temperatures in either Celsius or Fahrenheit. You can change between units using the Settings function setup option using the following procedure.

- Press and hold the Settings button  for 5 seconds. The default F will change to C temperature scale. To switch back just repeat holding the Settings button for 5-seconds
- Press the Power button to confirm the selection and exit function setup.





### 5.3.3 Setting Timer Option

SunPump 3.1 can be set to operate only during certain times on any day if desired. You are able to set up to two time periods per day that the heating system will operate, or you can turn the timer off to operate any time if preferred.

#### 5.3.3.1 Turn Timer Option On or Off

Use the following procedure to toggle the timer option between On and Off.

- Press and hold the clock button  and the On/Off button  at the same time for 5 seconds.
- When the time display changes to show only the days of the week release the buttons and wait a few seconds for the screen to refresh.
- When the timer option is Off the screen will appear similar to the image below:



- When the timer option is On the screen will appear similar to the image below, with the number of the corresponding period for the day shown (1 or 2), and whether the current time is within an operating period or not (ON or OFF).







#### 5.3.3.2 Setting Operating Times

The default settings for the timer option are as follows.

Day of Week	1 <sup>st</sup> Operating Period		2 <sup>nd</sup> Operating Period	
	Start Time	End Time	Start Time	End Time
Monday	8:00	11:30	13:30	17:30
Tuesday	8:00	11:30	13:30	17:30
Wednesday	8:00	11:30	13:30	17:30
Thursday	8:00	11:30	13:30	17:30
Friday	8:00	11:30	13:30	17:30
Saturday	8:00	11:30	13:30	17:30
Sunday	8:00	11:30	13:30	17:30

When the timer option is turned On the SunPump will only run heating during the times indicated by these settings. For example, in the default settings above, the SunPump would not operate before 8:00 on any morning, between 11:30 and 13:30, or after 17:30 in the evening, regardless of the water temperature in the tank.

To change the timer settings, use the following procedure.

- Press and release the clock button  which will cause the time display to change to the first start time for Monday, with the day blinking.
- Use arrow buttons   to select the day you want to adjust.
- Press clock button to switch to hour digits for the 1<sup>st</sup> starting time on that day and use arrow keys to set hour you want the system to start.
- Pressing the clock button cycles through all the times which can be adjusted as needed (1<sup>st</sup> stop, 2<sup>nd</sup> start, 2<sup>nd</sup> stop, 1<sup>st</sup> start next day....).
- Once you have the times set correctly press the On/Off button  to confirm and exit.






## CAUTION



These parameters affect the operation and performance of the SunPump system and should only be adjusted by a qualified technician who fully understands their function. Changing or restoring Settings is not covered by the Parts Warranty, or Service Agreement

### 5.4 Adjusting Parameters

The table on the following page lists the parameters that a trained Technician can adjust on the SunPump as well as the default values for each. To view or change parameters, use the following procedure.

- Press the Power button once  to wake the system up and reveal the right bank of six blue square icons.
- Press the Settings button once  to show P01 flashing on the display.
- While both large numbers are flashing, P01 on top and the corresponding Value underneath, use the arrow buttons   to scroll up or down through the list of 10 values. Use our browser form on your phone to capture and share the values and measured Data with your Technician.
- To change a value, press the Settings button again so only the bottom value flashes, then use the Arrow buttons to make changes.
- Press and release the Power button  to save setting changes and exit.

See 45-second video: <https://goo.gl/photos/nB5FkpcDsR4xZYwD9>

You are invited to make a list from P01-P10 and a01-a08 and email it SunPump so we have base data.



## 5.5 Parameter Setting Codes

### 5.6

Code	Setting	Setting Data Range	Yours
P01	Water tank temperature set point when heating stops	20 to 60°C. Default: 55°C. (131 F)	
P02	Temperature below set point when heating is initiated with system in ON/OFF Mode.  NOTE: When using Fahrenheit on earlier SP3.0 models, the actual temperature difference will be the value set minus 32 degrees. (as an example, for a temperature difference of 9°F this parameter should be set to 41°F) [41 – 32 = 9]	3 to 15°C. Default: 5°C. (9 F)	
P03	ON/OFF Mode or Constant Water Temperature (CWT) Mode for variable speed compressor heating	0: ON/OFF; 1: CWT; Default: 0	
P04	Winter outdoor ambient temperature cut-off point that stops the compressor from running, so that the auxiliary heating fully takes over.	2 to -35°C. Default: -30°C. (-22 F)	
P05	Electric Heating Element low temperature activation (start of electric heater booster in Hybrid Mode)	10 to -15 C. (50 to 5 F) Default: -15 C.	
P06	Defrost Mode – Automatic by time, or Manual by temp.	0 = Auto; 1 = Manual Default: 0	
P07	Only Auto Defrost – low temperature activation	0 to -20°C. ( 32 to -4 F) Default: -15°C. (5 F)	
P08	Only Manual Mode – Defrost cycle time	15 to 300 min. Default: 40 min.	
P09	Only Manual Mode - Defrost heating time	2 to 20 min. Default: 8 min.	
P10	Both Auto and Manual - Set temperature for defrost where defrost stop warming	8 to 20 C. Default: 11 C. (53 F)	
-	Reserved parameter		
-	Reserved parameter		

## 5.6 Measured Data Values

Certain sensor outputs can be accessed from the display to help evaluate performance issues and support technical support and solve problems.

To access this data press the Power button once,  followed by the Settings button twice.  You should see the bottom large number flashing, then press and hold the Power button for 3-seconds to reveal the Data values. It will show **a01** to show the first display code. There are 8 measured values that you can scroll through with the Arrow buttons. Changes cannot be entered.

If you do not get to see a01 it is because you pressed the Power button twice or tried to skip a step. Go back to the dormant state by pressing power until the screen is just the power button and time to start over.

To exit press the Power button.



The following table lists the data codes that are available on SunPump 3.1

Data Codes	Meaning
<b>a01</b>	Tank water temperature
<b>a02</b>	Condenser coil temperature
<b>a03</b>	Compressor gas discharge temperature
<b>a04</b>	Suction temperature
<b>a05</b>	Ambient air temperature
<b>a06</b>	Electronic expansion valve opening
<b>a07</b>	Operating DC frequency of compressor (hz)
<b>a08</b>	

Use our online App in your phone or tablet to send your SunPump Parameter settings and Data values from the touch screen controller to our Support Technician.

<https://www.sunpump.solar/form-view/19>

or go to the website, and add: **/form-view/19**

## 5.7 Error Codes

Error code	Meaning
E 01	EEPROM error (IDU PCB/Remote Controller)
E 02	Water tank temperature sensor – not being read. CN
E 05	Panel defrost sensor – not being read. PCB socket CN32 bottom 2 pins
E 06	Ambient temperature sensor – not being read from CN32 middle 2 pins
E 07	Gas discharge temperature sensor failure CN32 top 2 pins
E 08	Signal communication between controller and PCB failure from CN4 socket 4-pins
E 09	Signal communication disconnect between main PCB and inverter modular board
E 10	Start failure, compressor protection disconnect, temperature protection
E 12	DC Inverter modular board or software failure.
E 13	Voltage supply is too high (power surge), or too low, (brown power)
E 14	Water temperature high limit protection trips at 158 F and auto-resets at 122 F.
E 15	Refrigerant pressure protection – too high or too low.
E 19	Return suction gas temperature sensor failure or not being read from socket CN37
E 25	Anti-freeze protection
E 30	Ambient air temperature too low for Compressor to operate. Auto-resets at warmer temp.

## 5.8 Service Call Procedure

If you see one of the Error Messages listed above, or have a part failure inside the metal cabinet follow these steps.

- Owners are required to have a Service Agreement, and to Register online within 60-days of purchase: <https://www.sunpump.solar/warranty-registration>
- Contact your local Installer or Service Agreement provider with full details of symptoms and observations for Diagnosis. SunPump will support Dealers to know the top 10 potential issues.
- 24/7 Online Support is available by Articles and Tickets here: <https://sunpump.freshdesk.com/support/login>
- Dealers often carry common parts in stock for exchange, or can obtain from SunPump if defective.

## 5.9 Trouble Shooting Guide

Malfunction	Reason	Solution
Unit does not turn on	<ol style="list-style-type: none"> <li>1. Power failure.</li> <li>2. Loose power wire connection.</li> <li>3. Fuse burned---out.</li> <li>4. E5 Sensor missing</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn off power and inspect power supply.</li> <li>2. Identify the cause and rectify.</li> <li>3. Identify the cause and replace with new fuse.</li> <li>4. Connect Air and Panel sensors</li> </ol>
Unit heating capacity is low or compressor working too long	<ol style="list-style-type: none"> <li>1. Shortage of refrigerant or leakage</li> <li>2. Poor thermal insulation of water system</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the system for leakage, fix leak and recharge refrigerant gas</li> <li>2. Improve thermal insulation of the system. Check for thermal migration by feeling pipes, install heat traps.</li> </ol>
Compressor discharge pressure too high	<ol style="list-style-type: none"> <li>1. Tank water level is too low</li> <li>2. Excessive refrigerant (from repair/re---gas)</li> </ol>	<ol style="list-style-type: none"> <li>1. Check / fix water supply to tank</li> <li>2. Call refrigeration mechanic to reduce refrigerant</li> </ol>
Compressor suction pressure too low	<ol style="list-style-type: none"> <li>1. Shortage of refrigerant or leakage</li> <li>2. Filter or capillary blocked</li> </ol>	<ol style="list-style-type: none"> <li>1. Call refrigeration mechanic to check the system for leakage, fix the leak and re---gas the heat pump</li> <li>2. Replace capillary tube or filter</li> </ol>
Compressor will not turn on	<ol style="list-style-type: none"> <li>1. Power failure</li> <li>2. Compressor contactor malfunction</li> <li>3. Loose connection</li> <li>4. Overload protection of compressor on</li> <li>5. Compressor capacitor is damaged</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the power supply and restore</li> <li>2. Test, then replace the contactor</li> <li>3. Check for loose wires and re-connect</li> <li>4. Check that the current / Amp draw of compressor is within specification, may require replacement of the compressor</li> <li>5. Test, then replace the capacitor if failed</li> </ol>
Loud compressor noise	<ol style="list-style-type: none"> <li>1. Liquid refrigerant getting into the compressor</li> <li>2. Compressor not working</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the cause for flooding of the compressor and solve the problem</li> <li>2. Replace the compressor</li> </ol>
The compressor is in operation but the unit does not heat	<ol style="list-style-type: none"> <li>1. Refrigerant has leaked out</li> <li>2. Compressor not working</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the system for refrigerant leakage.</li> <li>2. Repair leak and re-balance the refrigerant</li> <li>3. Replace the compressor</li> </ol>

## 6 Mechanical Room Installation

### 6.1 Typical Mechanical Room Layout



The 3D scale model show above, is typical of a radiant floor and domestic hot water installation. Your distribution system may be different, it could use an Air Handler and ducts to distribute heat as an alternative.

An Installer Manual is required reading for the trades person before the installation takes place.

## 6.2 Outdoor Air and Panel Temperature Sensors

Your SunPump system comes with two NTC 10k Ohm temperature sensors that need to be installed outdoors and connected by 2-wire AWG22 to the leads on the right side of the indoor heat pump unit shown in green as figure **S2** on page 6 parts list. Their purpose is to assist in Defrost and heating controls by measuring small changes in resistance that correspond to temperatures. In new construction, the wires can be roughed-in from Mechanical room to roof and soffit overhang areas. **Make certain S1 is installed in the lower tank thermistor well**, as shown in red on the parts page 6. If it is in the upper Well, move it to the lower for best results. Lower the temperature setting when measured near the tank bottom, because it will be very hot at the top – especially when heating is not being used.

The small black or white plastic connectors are a **JST** SM type used in low voltage Electronics and Vehicles. It is like the Molex type that also uses miniature crimped pins, but is smaller. To undue a connection pair, you must depress a catch. To avoid connector damage do not try to pull apart by tugging on the wires, grasp both halves of the plastic connector to pull apart. Remember to be patient, please do not use force.

The Ambient Air sensor (bottom right), should be installed on a shady exterior wall, or alternatively under the roof overhang shown in the picture below. Do not locate inside the Attic, on the roof, or in the Sun.

The Panel sensor (at right side), is fastened securely by a wire strand twisted tight with pliers on a Panel on the smaller ¼" liquid line that is the lower of the two on any Panel. The sensor needs to be as close to the panel as possible, right at the square cut-out is best. The goal is to measure the lower entry to the Panel, where Frost first appears. Do not install on a pipe that is inches away from the Panel because it is less accurate.

Extending the AWG22 gauge wire is simple, but needs to be done with care. Solder the twisted strands and use a shrink wrap to seal joined wires to avoid poor connection aging that will increase resistance and alter the sensor accuracy over time. Installers should consider ordering factory-made wire extensions to add 15, 35, or 50 feet quick by plugin.



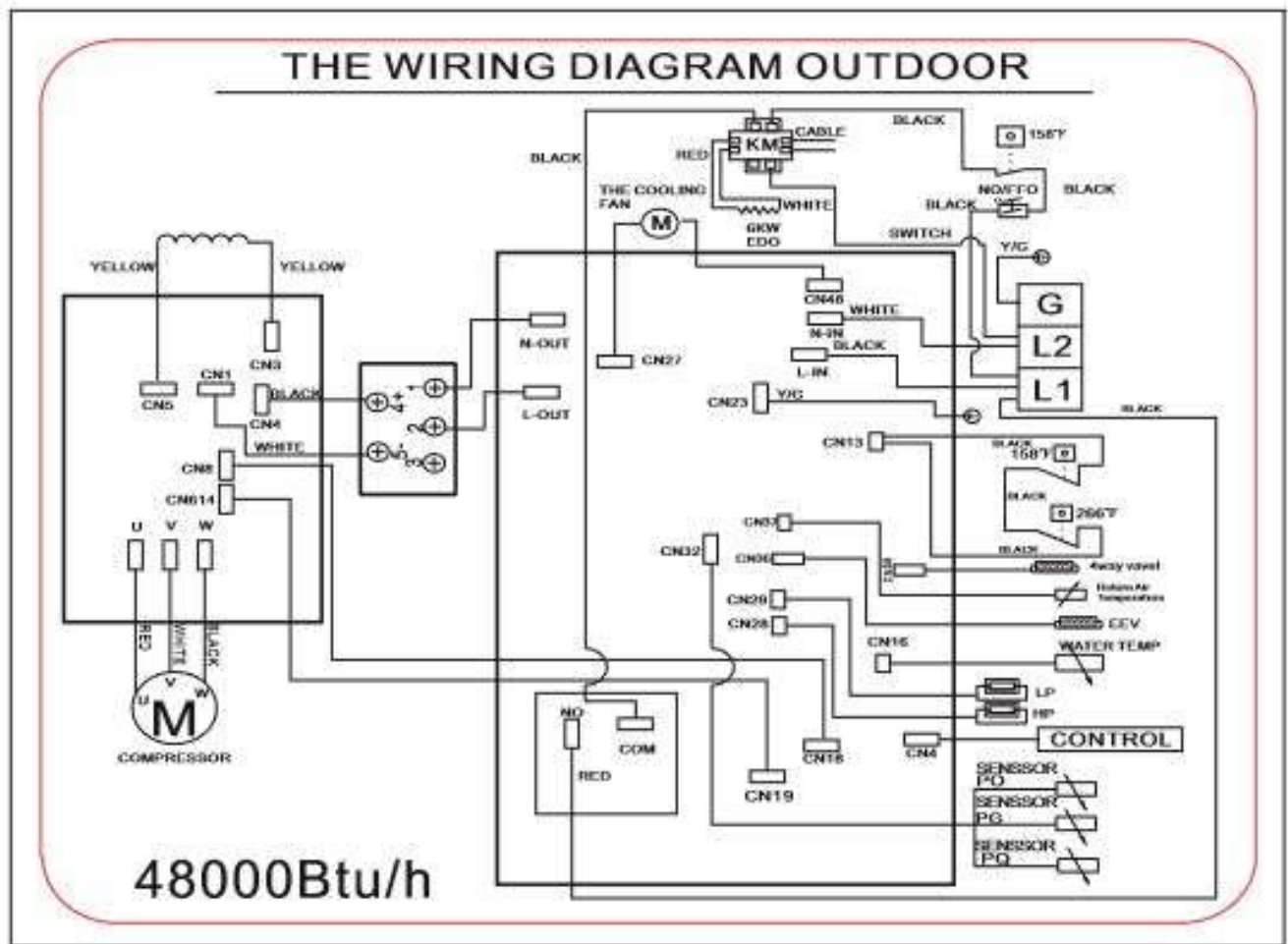


## 7 Wiring Diagrams

The SunPump is a 240V/60hz. 1-phase appliance and should only be installed and serviced by a qualified electrician who is aware of local guidelines and codes. Improper installation can result in serious injury, damage to equipment, and /or fire. It is configured for two circuits, one for the Heat Pump, plus an independent circuit for the 6-kW electric booster heating element.

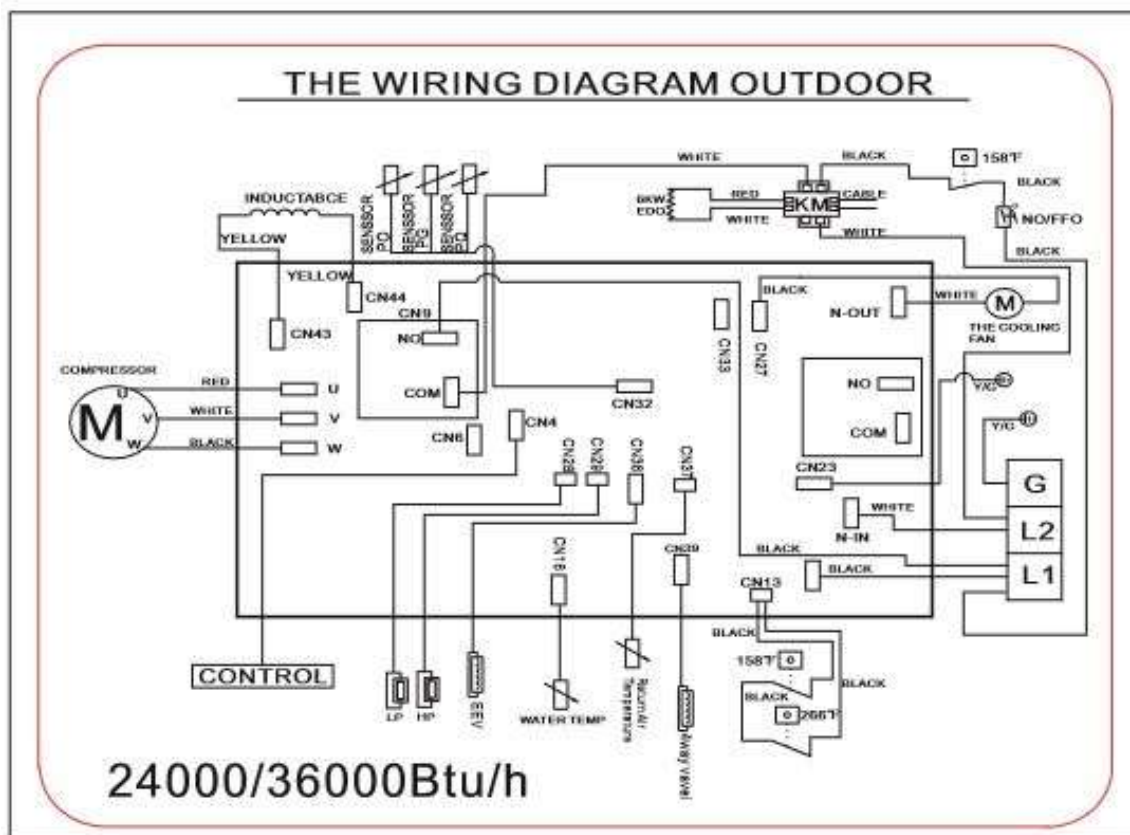
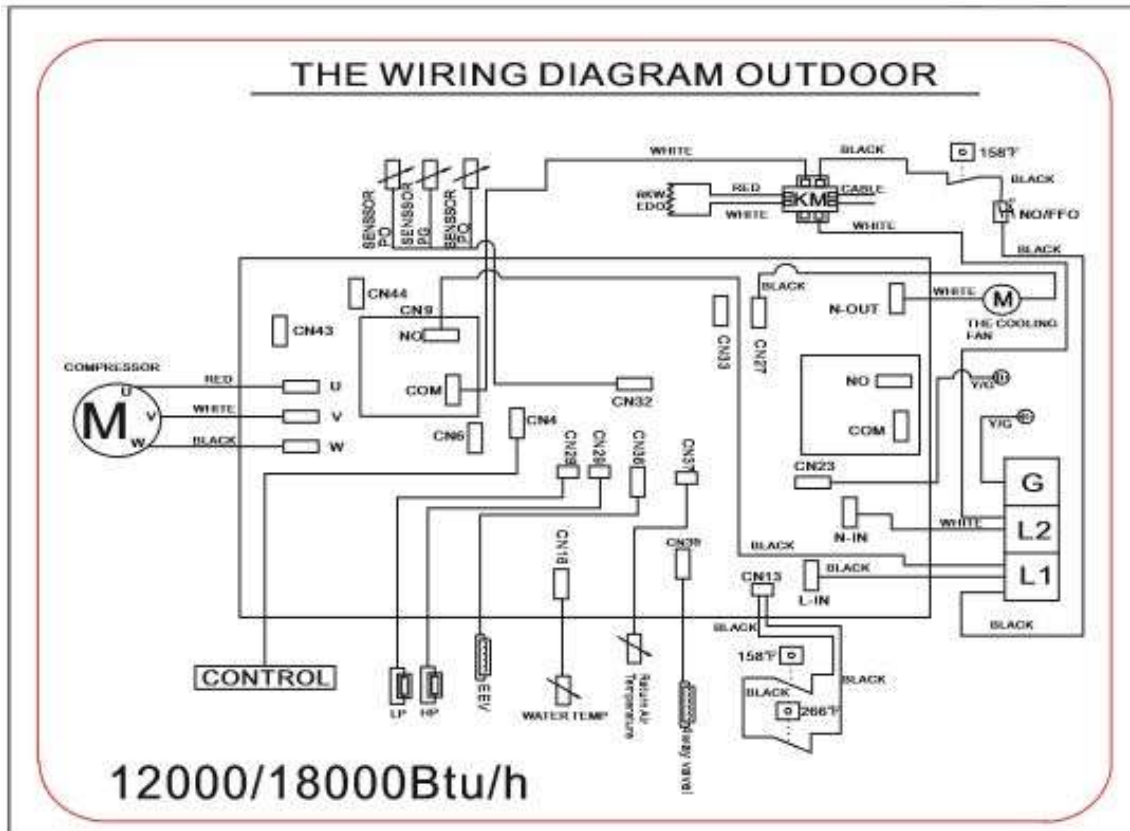
**To remove the whole front panel, take out the 2 screws located at each top front corner, then lift the panel about an inch to disengage the hook and slot connection.**

### 14 kW Electrical Wiring Diagram



These wiring diagrams are for reference. The most authoritative wiring for your model is printed on the electric compartment cover, and the Faceplate Label has the best source for specifications.

### 3.5, 5, 7, 10 kW Electrical Wiring Diagrams



## 8 Warranty Registration – First 60-days

Owners must Register using our online form within 60-days from invoice date.

<https://www.sunpump.solar/warranty-registration>

A copy of the Parts Warranty is available at the above link on the SunPump website.

## 9 Service Agreement – Required for Site Labor

Owners can buy a 2-year or 5-year Service Agreement to cover the local Installer labor for onsite diagnostics and authorized Warranty parts replacement. The annual cost for the indoor appliance insurance is less than a single site visit from a local HVAC Technician.

Installer is to provide contact details.

	Installer Contact Info	
Company		
Technician		
Phone		
Email		
Address		
Labor	Service Agreement offered: 2-year \$299 or \$15/month, 5-yr \$499	

Notes: