



# USER MANUAL

DOMESTIC AIR SOURCE HEAT PUMP  
WATER HEATER



DOMESTIC AIR SOURCE

## HEAT PUMP

More Heat. More Savings

V-HP 150

V-HP 200

V-HP 300

V-HP 500

# **INSTRUCTION MANUAL FOR V-GUARD HEAT PUMP WATER HEATING SYSTEM**

Dear Customer,

We congratulate you for being the proud owner of a V-Guard Heat Pump Water Heating System. This product comes to you from a company committed to total quality and dedicated to customer delight, since 1977. The immense trust and support our valued customers give us has always been, and always will be, our motivation to strive harder and harder to live up to their expectations. By using this product you are not only helping the country save on raw materials (which goes into the generation of electricity) but also contributing towards a greener environment. We, the members of V-Guard, thank you and wish you many years of free hot water.

## Operating principle:

The heat pump makes use of a refrigerant for its operation. The low temperature refrigerant after absorbing free heat from the atmospheric air in the evaporator is compressed by a highly efficient electrical compressor to a high temperature and high pressure vapour refrigerant. This vapour is then passed through a heat exchanger (condensor) to transfer the heat to the water in the storage tank to produce hot water. The refrigerant then passes through an expansion valve and it goes back to the evaporator for absorbing the free heat from the atmospheric air again and the cycle is repeated.

## Product range:

Model	V-HP 150	V-HP 200	V-HP 300	V-HP 500
Tank volume (L)	160	210	320	500
Heating capacity (W)	3500	3500	3500	5800
Production capacity (LPH)	70	70	70	125
Rated power input (W)	810	810	810	1320
COP	4.32	4.32	4.32	4.38
Backup electric heater(W)	1500	1500	1500	2000
Max power input (W)	2400	2400	2400	3400
Rated current (A)	3.7	3.7	3.7	6
Max current (A)	11	11	11	15.5
Power supply	220~240V/1/50Hz	220~240V/1/50Hz	220~240V/1/50Hz	220~240V/1/50Hz
Waterproof level	IPX4	IPX4	IPX4	IPX4
Refrigerant	R410a	R410a	R410a	R410a
Max water temperature (°C)	60	60	60	60
Heat pump net dimension (mm)	682×252×448	682×252×448	682×252×448	838×300×545
Heat pump net weight (Kg)	25	25	25	36
Noise (db)	≤48	≤48	≤48	≤49
Tank net dimension (mm)	Φ440×1696	Φ500*1716	Φ620*1641	Φ750*1769
Inner tank diameter (mm)	Φ350	Φ410	Φ520	Φ650
Inner Tank Material	Enamel coated Steel with Mg Anode	Enamel coated Steel with Mg Anode	Enamel coated Steel with Mg Anode	Enamel coated Steel with Mg Anode
Water Inlet/outlet size	1.9 cm (3/4)	1.9 cm (3/4)	1.9 cm (3/4)	2.54 cm (1)
Insulation thickness(mm)	50	50	50	50
Tank net weight (Kg)	53	60	90	128
Working temperature (°C)	-15~43	-15~43	-15~43	-15~43

Condition: Heating Capacity at Air 20°C/15°C, Water Temperature from 15°C to 55°C

## Packet details

Package A	Water tank Package	Water tank 1 No, Temperature/Pressure safety valve 1 No, One-way valve 1 No, Instruction manual 1 No, Stainless Steel Bandage 1 No, bolt 2 Nos.
Package B	HEAT PUMP	Main unit Heat Pump 1 No, Connecting pipe 1 set, Installation package 1 Set

### A. Important remarks

- Before installation, it is strongly recommended to read the instructions first. This manual includes the information of installation, debugging, running and maintenance of the products.
- Every product unit has passed strict tests to ensure safety and high efficiency operation.
- The manufacturer of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, debugging, and unnecessary maintenance which is not in line with this manual.
- The installer should be an authorized technician, and installation of the system should follow the diagram on the equipment.

### Please notice the following information during installation:

1. Check whether the power supply and wire meet the standard of the unit.
2. Do not alter the power wire or socket and the metal parts should be connected to GND well. Do not change the GND connection of the system.
3. The appliance shall be installed in accordance with national wiring regulations.
4. After finishing all the wiring, check again before turning the power on.
5. Do not install the system in the warehouse where flammable gas may leak out.
6. Use voltage stabilizer in case of working voltage is beyond recommended values.

7. To make the system more efficient, please install the main unit at a place with good ventilation.
8. Before turning on the system for the first time, ensure the water tank is full filled with water.
9. The inlet of the water tank should be equipped with a filter(detachable), clean it according to the water quality and running condition of the system (the period should be 2~3months)
10. The highest temperature of outing water is 60°C, when using, tune up to a suitable temperature (the most suitable temperature for human is 38~45°C, if the temperature is higher than 55°C, it may cause the danger of scald). Normally, the setting temperature should not exceed 60°C.
11. Main unit can be maximum 30-degree angle from tank. Do not drop down or upend the unit.
12. Maintain the system by an authorized technician. And disconnect all power when servicing.
13. Please provide the warranty card and S/N No. enclosed with the product for after sales service.

## **B. Installation instruction**

### **Main unit installation (outdoor unit)**

1. The outdoor unit installation is similar to air-conditioner outdoor unit. It can be installed at veranda, housetop, ground or another place where is easy to install and stable.
2. Use the screw or bracket to fix the unit, use a shockproof gasket when fixing on housetop or ground. Ensure the unit has been installed vertically.
3. For the domestic model, the distance between the outdoor unit and the water tank should be less than the connecting pipe equipped (factory setting is 3M, customer can order other size according to practical use).
4. For the outdoor unit with side-vent, it should be installed at a place of ventilation and without heat radiation and other heat source. Keep a certain distance from the wall or other obstacle.
5. There should be outlet drain around the system for drainage.
6. There should be enough space for the system maintenance.

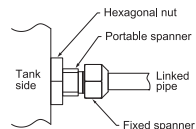
### **Water tank installation (household)**

1. The tank should be installed in a certain range around the main unit.
2. For the normal tank, put it upright. The installation place must be stable enough to support a weight of 500Kgs. Do not hang it on the wall.
3. Equip inlet water supply and outlet hot water connection with a ball valve, near the installation place, inlet pipe should be equipped with a filter for easy clean.
4. Water tank working pressure is 0-0.7MPa. Connect the safety valve to the water inlet of tank and seal up. The operation pressure of safety valve is 0.7MPa.
5. The safety valve should be connected by a small water drain pipe.
6. After water-way installation, open the water supply valve first, then switch on any tap of hot water pipe, and start to infuse water until the water flows out the hot water tap.
7. Fill tank full of water before starting plumbing connections - Switch on the water supply valve, then switch on any tap of hot-water pipe and start to infuse water until the water flows out the hot tap. Switch off the tap of water supply, and check whether there is leakage.

### **Outdoor unit and Water tank connection**

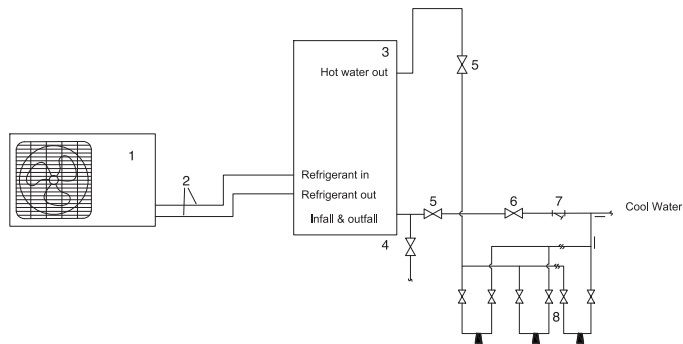
1. The outdoor unit is filled with refrigerant. Before connecting the pipes and vacuuming, do not open the inner hexagonal valve of the 2-port valve and 3-port valve of outdoor unit.
2. Before connecting the tank, open the screw cap of Refrigerant IN&OUT, to discharge all the retaining air in the coil of tank.

3. Refrigerant IN&OUT (up-IN, down-OUT) Connect the outdoor unit and water tank by the linked pipe provided with the system. When connecting the refrigerant pipe, use a suitable fixed spanner to lock the connector on the tank to avoid rotating which may cause damage to coil pipe, then use portable spanner to fix the pipe. (Refer to figure at right corner)



Cut line instruction:

1. Outdoor unit
2. Refrigerant connecting-pipe
3. Insulated Water Tank
4. Drainage valve
5. Ball Valve
6. Safety Valve ( $\leq 0.7\text{MPa}$ )
7. Filter
8. Hot water

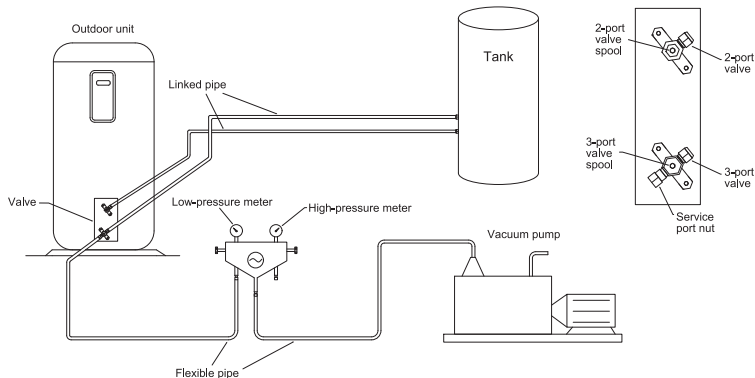


[Connection figure]

4. After connecting the outdoor unit to the tank, vacuumize the tank and connecting pipe before releasing the refrigerant in the outdoor unit, to ensure there is no impurity and moisture inside the system.

**Vacuumizing (figure 1):** Fixing the pipe connector of outdoor unit and tank when vacuumizing.

1. Screw the inspection connector screw cap of the 3-port valve on the outdoor unit; connect the compound manometer to the inspection connector of the cut-off valve.
2. Connect the vacuum pump to compound manometer and switch on both equipment to vacuumize the tank and connecting pipe. After that, the pressure should be lower than 50Pa.



3. Switch off the valve of manometer, the vacuum pump with stop vacuumizing, and keep the pressure stable for 20 minutes.

[Note: For the first installation of split heat pump, it is strongly recommended to apply vacuumizing step.]

4. After vacuumizing or exhaust, use inner hexagonal spanner (normally 5mm) to open the 2-port valve spool and 3-port valve spool and join the outdoor unit refrigerant to the whole system. (see below Fig.3)

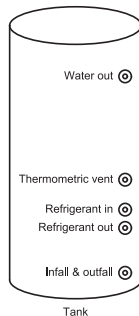
#### Leak hunting:

1. Check the pressure on manometer, static pressure is about 0.7~1.1MPa.
2. Use suds to check the leakage of all connectors.
3. After confirming no leakage, screw off the soft pipe which connect the manometer to the inspection connector and check the needle valve leakage.
4. Screw back the nut.

#### Water temperature sensor installation:

1. Find out the thermometric vent (as figure show below).
2. Insert the thermometric sensor into the bottom thermometric vent (about 10cm in deep).
3. Fix the sensor.
4. Connect the connecting wire of temperature sensor to the terminal on the wiring board.

[Note: If the thermometric sensor has been inserted to the vent and sealed, only connect the wiring when installing.]



### C. Error codes

Error code	Name
01E	water flow switch disconnected(water cycle heat pump)
02E	exhaust temperature too high
03E	high-pressure switch failure
04E	low-pressure switch failure
09E	communication failure
11E	evaporator coil temperature sensor failure
12E	ambient temperature sensor failure
13E	exhaust temperature sensor failure
14E	water inlet temperature sensor failure
15E	tank temperature sensor failure
17E	absorb temperature sensor failure
18E	water outlet temperature sensor failure
19E	return water temperature sensor failure
20E	outlet water temperature too high protection(water cycle heat pump)
21E	outlet water temperature too low protection(water cycle heat pump)

## Troubleshooting

Fault	Possible cause	Detection and elimination method
Discharge pressure is too high	<ul style="list-style-type: none"> <li>• There is air or other non-condensable gas existed in the system.</li> <li>• Water heat exchanger is scaling or fouling blockage.</li> <li>• The circulation water volume is not enough.</li> <li>• Refrigerant charging is too much.</li> </ul>	<ul style="list-style-type: none"> <li>• Vent the air from water heat exchanger.</li> <li>• Wash and clean the water heat exchanger.</li> <li>• Examine the water system pipe line and pump.</li> <li>• Drain part of the refrigerant.</li> </ul>
Discharge pressure is too low	<ul style="list-style-type: none"> <li>• Liquid refrigerant flow through evaporator to compressor, which make foam for the frozen oil.</li> <li>• Suction pressure is too low.</li> <li>• Refrigerant charging is too less, the refrigerant air goes into liquid pipe line.</li> </ul>	<ul style="list-style-type: none"> <li>• Examine and adjust the expansion valve. Make sure the expansion valve temperature sensor bulb is close connected with the air suction pipe, and absolutely insulated with the ambient environment.</li> <li>• Please refer to “fluorine filling if suction pressure is too low”</li> </ul>
Suction pressure is too high	<ul style="list-style-type: none"> <li>• Discharge pressure is too high.</li> <li>• Refrigerant charging is too much.</li> <li>• Liquid refrigerant flow through evaporator to compressor.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain part of the refrigerant.</li> <li>• Examine and adjust the expansion valve. Make sure the expansion valve temperature sensor bulb is close connected with the air suction pipe, and absolutely insulated with the ambient environment.</li> </ul>
Suction pressure is too low	<ul style="list-style-type: none"> <li>• Ambient temperature is too low.</li> <li>• The evaporator liquid inlet or compressor suction pipe is blocked, expansion valve unadjusted, or failed.</li> <li>• The refrigerant is not enough in the system.</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust suitable overheat temperature, examine whether there is fluorine leakage from the expansion valve temperature sensor bulb.</li> <li>• Examine fluorine leakage.</li> <li>• Examine the installation condition.</li> </ul>

Compressor stopped because of high pressure protection.	<ul style="list-style-type: none"> <li>• The water inlet temperature is too high, circulation water is not enough.</li> <li>• The high pressure stop setting is not correct, the air suction overheat greatly.</li> <li>• Fluorine filling is too much.</li> </ul>	<ul style="list-style-type: none"> <li>• Examine water system pipe line and water pump.</li> <li>• Examine the high pressure switch.</li> <li>• Examine the fluorine filling volume, drain part of refrigerant.</li> </ul>
Compressor stopped because of compressor overloading.	<ul style="list-style-type: none"> <li>• The voltage is too high or too low.</li> <li>• Discharge pressure is too high or too low.</li> <li>• Device loading failure.</li> <li>• Ambient temperature is too high.</li> <li>• Motor or connecting terminal is in short circuit.</li> </ul>	<ul style="list-style-type: none"> <li>• The voltage should be controlled within more or less 20V than rated voltage, and phase difference within <math>\pm 30\%</math>.</li> <li>• Examine the compressor current, compare with the full loading current indicated in the user manual.</li> <li>• Improve air ventilation.</li> </ul>
Compressor stopped because of built-in thermostat.	<ul style="list-style-type: none"> <li>• The voltage is too high or too low.</li> <li>• Discharge pressure is too high.</li> <li>• The refrigerant in the system is not enough.</li> </ul>	<ul style="list-style-type: none"> <li>• Examine the voltage to make sure it is within the specialized range.</li> <li>• Examine the discharge pressure and find out the reason.</li> <li>• Examine whether there is fluorine leakage.</li> </ul>
Compressor stopped because of low voltage production.	<ul style="list-style-type: none"> <li>• Dry filter clogging.</li> <li>• Expansion valve failure.</li> <li>• The refrigerant is not enough.</li> </ul>	<ul style="list-style-type: none"> <li>• Examine, maintain, or change dry filter.</li> <li>• Adjust or change expansion valve</li> <li>• Fill in refrigerant</li> </ul>
High noise of compressor	<ul style="list-style-type: none"> <li>• There is liquid hammer for liquid refrigerant flowing through evaporator to compressor.</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust liquid supply, examine whether normal for the expansion valve and air suction over heat degree.</li> </ul>

<p>Compressor can not start.</p>	<ul style="list-style-type: none"> <li>● Over current relay is tripped, insurance is burn.</li> <li>● The control circuit is not connected.</li> <li>● No current.</li> <li>● The pressure is too low, which can not conduct the pressure switch.</li> <li>● The contactor coil is burn out.</li> <li>● Water system failure, relay is tripped.</li> </ul>	<ul style="list-style-type: none"> <li>● Set the control circuit in manual mode, restart the compressor after maintenance.</li> <li>● Examine controlling system.</li> <li>● Examine power supply.</li> <li>● Examine whether the refrigerant is too less.</li> <li>● Reconnect, adjust two of the wiring.</li> </ul>
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**Points to be checked before & after starting system: -**

1. Check all the valves are in open condition.
2. Check the power supply, voltage and wiring are proper.
3. Fix all the screws, check the indicator lights on the controlling panel, check the pressure on the pressure gauge, when the pressure exceeds the maximum, turn off the power and check the system.
4. Check the drainpipe before running. If it is jammed, clear it to ensure the drain water can be released.
5. After starting the system, listen to the compressor sound, If there is any abnormal sound, turn off the system and check the system at once. If the sound is normal, check the system pressure.

## Normal inlet water quality standards

Sl.No	Description	Desirable Limit
1	pH	6.5 - 8.5
2	Total Hardness	1000 ppm (max.)
3	Alkalinity	500 ppm (max.)
4	Total Dissolved Solids	1200 ppm (max.)
5	Chloride	750 mg/l (max.)

### Maintenance instructions:

Though the maintenance required for this product is minimal, the customer is advised that a little bit of care (a few easy-to-do jobs) is required to maintain the high level of performance and life of the system. This is so, especially since this product is destined to be left unattended in the open air, through out it's life.

Item	Maintenance procedure	Maintenance schedule
Heat Pump	Follow Clean in Place Procedure	Once every 6 months
Electric wiring	Check earthing and continuity	Once every 3 months
Plumbing	Check for leakages	Once every 6 months
Valves	Check for smooth functioning	Once every 3 months

## Terms and conditions

### The warranty does not cover

1. Damages / defect(s) of any nature resulting from repairs effected by unauthorized persons, improper selection of model / capacity or misuse of any kind.
  2. Any parts of the system which are replaced / repaired.
  3. In case of failed component or Heat pump water heater, which is replaced under warranty: the balance of the original warranty period will remain in effect. The repaired/replaced part or Heat pump water heater does not carry a new Warranty.
  4. Accessories external to the original equipment.
  5. Damage(s) due to improper selection of accessories external to the original equipment.
  6. Damage(s) due to improper plumbing, civil and electrical work.
  7. Damage(s) resulting from exceeding the maximum permissible water pressure as specified by V-Guard.
  8. Heat loss resulting from not insulating the outlet plumbing properly and / or not providing a horizontal NRV at the inlet.
  9. In order to prevent electrical shock in case of leakage from unit, install the heat pump according to electrical standard.
  10. Do not interrupt the voltage supply to the heat pump frequently as this may result a shorter life expectancy of the heat pump.
  11. When installing over current protection, ensure that the correct current rating is met for this specific installation.
  12. Damage(s) resulting from natural calamities such as storm, heavy rain, hail stone falling, earth quake, fire etc.
  13. Corrosion of the pipes inside the Heat Pump due to hard water
- \*\* Refer normal inlet water quality standards on page no 14.

### The warranty is void

1. If the installation of the system is not in accordance with the installation / plumbing instructions specified by V-Guard.
2. If the installation / repairs / replacements are carried out by unauthorised persons.
3. If the system is shifted to a new location from the location at which the system was originally installed by authorised direct marketing associates / dealer of the company.
4. If modifications/alterations are made by unauthorised persons.
5. Warranty does not cover if the system is connected to the water supply which does not meet the inlet water quality standards mentioned in page no 14 of this Instruction manual.

Due to continuous improvement and development of the product, specifications mentioned in this manual is subjected to change without notice

## PRODUCT DISPOSAL INSTRUCTION

Material categories	Instruction
Metals (Stainless steel, Aluminium, Galvanized iron, Mild steel, Brass, copper)	The materials shall be disposed through authorized recycler in order to protect environment at the time of product final disposal.
Paper (Carton box, Corrugated buffer, Instruction Manual, sticker)	
PUF	
Rockwool	
Rubber	
Thermocol	
Plastics	
Glass	

Plastic Waste EPR Reg. No.: BO-13-000-07-AAACV5492Q-22



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SCAN TO AVAIL THE  
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