SERVICE MANUAL

v1 – 24/09/2019

HPWH 2.1 200 U02; HPWH 2.1 200 U02 S; HPWH 2.1 260 U02; HPWH 2.1 260 U02 S;

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CONTENT:

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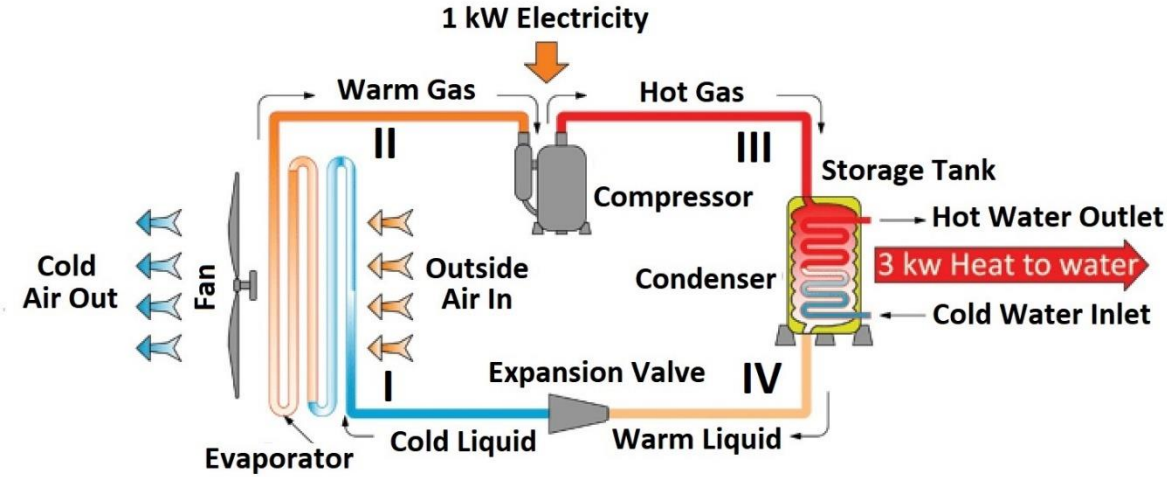
A. OPERATING PRINCIPLE

The equipment is capable of producing domestic hot water mainly by using heat pump technology. A heat pump is capable of transferring thermal energy from a low temperature source to another with a higher temperature and vice versa.

The equipment uses circuit consisting of a compressor, an evaporator, a condenser and a throttle valve; a liquid/gas coolant flows inside this circuit (see paragraph 4.6).

The compressor creates a difference in pressure inside the circuit that allows a thermodynamic cycle to be obtained: this sucks the coolant fluid in through an evaporator, where the fluid itself evaporates at a low pressure by absorbing heat; it is compressed and driven towards the condenser where the fluid condenses at a high pressure releasing the absorbed heat. After the condenser, the fluid passes through the so-called “throttle valve” and by losing pressure and the temperature starts to vaporize, it re-enters the evaporator and the cycle starts all over again.



The operating principle of the equipment is as follows (Fig. 1):

I-II: The coolant fluid sucked in by the compressor, flows inside the evaporator and while it evaporates, it absorbs the “ecological” heat given by the air. At the same time, the ambient air is sucked in by the equipment by a fan; the air loses it heat by passing over the finned-tube battery of the evaporator;

II-III: The coolant gas passes inside the compressor and it under goes an increase in pressure that causes a rise in temperature; transforming this into superheated steam;

III-IV: Inside the condenser, the coolant gas releases its heat to the water inside the tank (boiler). This exchange process makes it possible for the coolant to pass from superheated steam to a liquid state by condensing at a constant pressure and undergoing a reduction in temperature;

IV-I: The liquid coolant passes through the throttle valve; it undergoes a sudden drop in both pressure and temperature and it partially vaporizes bringing pressure and temperature back to the initial conditions. The thermodynamic cycle can begin.

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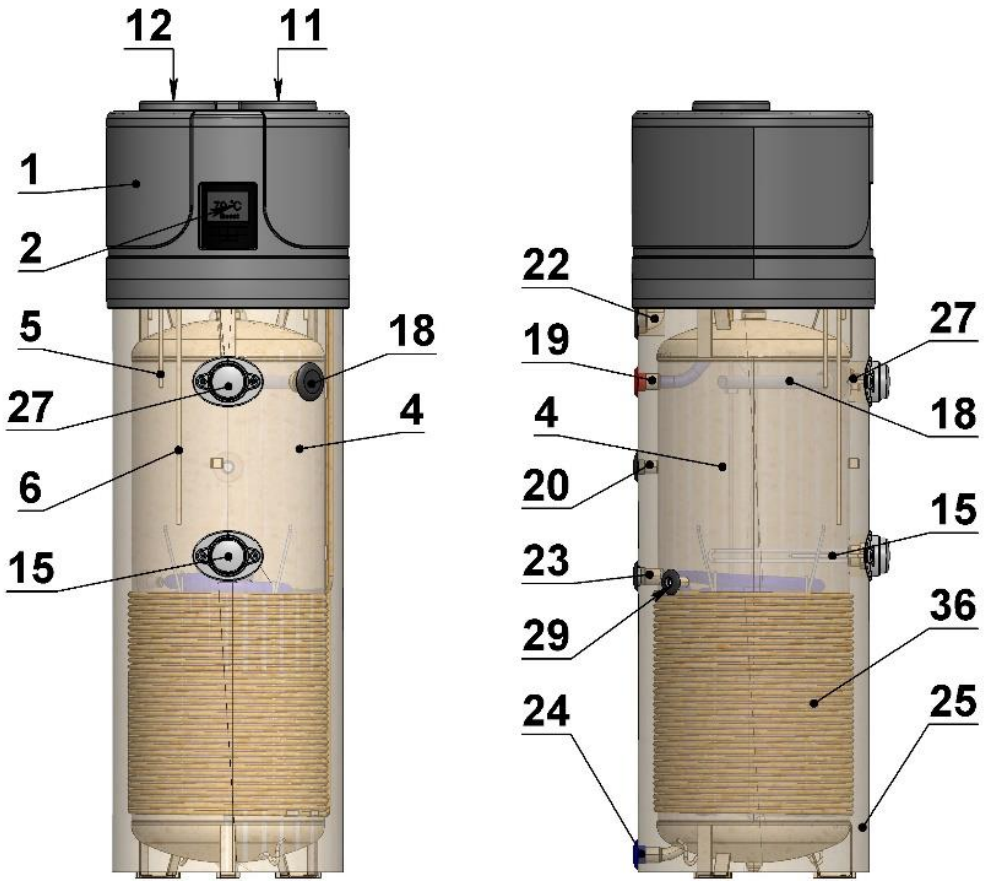
B. DESIGN OVERVIEW

1	Heat pump.
2	Control panel.
3	External PVC jacket.
4	Enameled storage tank
5	Upper storage tank probe. **“T3”**
6	Lower storage tank probe. **“T2”**
7	Refrigerant recharge needles.
8	Ambient air recirculation fan.
9	Electronically regulated expansion valve valve.
10	High-efficiency finned evaporator.
11	Air inlet (ø 160 mm).
12	Air outlet (ø 160 mm).
13	Hermetically-sealed rotary compressor.
14	Compressor’s accumulator
15	(1.5 kW – 230 W) El. heating element
16	Condenser outlet line - liquid
17	Condenser inlet line – hot gas
18	Replaceable magnesium anode.
19	Hot water outlet connection (G 1”).
20	Recirculation fitting (G ¾”).
21	Evaporator’s distributor
22	Condensates drain (G 3/4”).
23	Solar coil (G 1”; 1.2 m^2 surface).
24	Cold water inlet connection (G1”).
25	50 mm polyurethane insulation.
26	High pressure switch – automatic reset.
27	Safety thermostat, manual reset.
28	Controller box.
29	Probe for solar coil thermosensor.
30	Low pressure switch – automatic reset.
31	4-way defrosting valve
32	Upper decorative panel
33	Back decorative panel
34	Front decorative panel
35	Lower decorative panel (condense trap)
36	Condenser.
37	Protective fan grid
38	Return gas temperature **“T5”**
39	Coil temperature **“T4”**
40	Bolts M6x60
41	Ambient temperature **“T1”**



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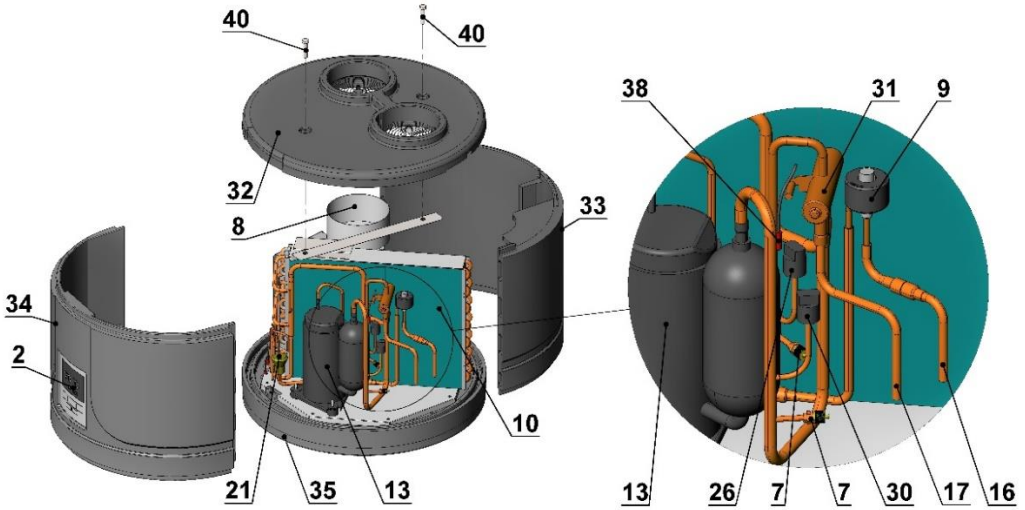

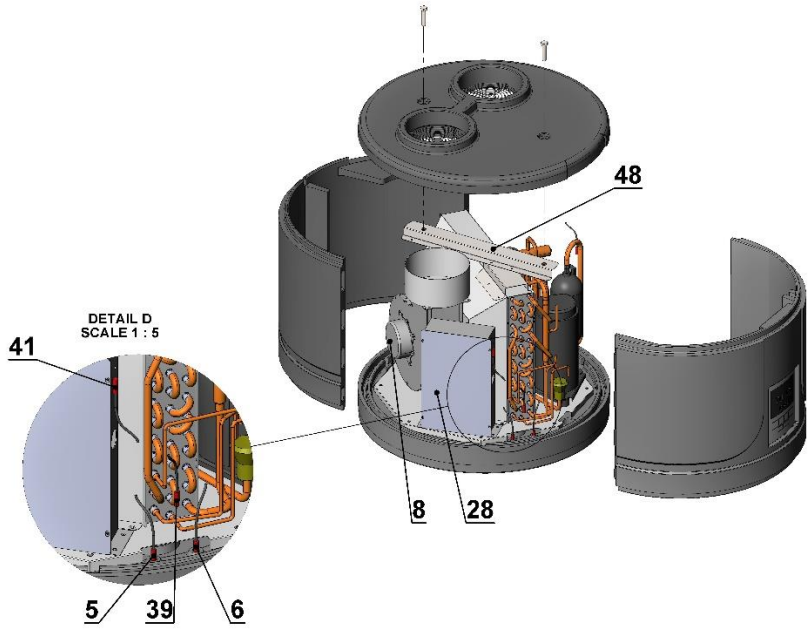

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C. PRELIMINARY CHEK AND CONTROL

1. Water flow missing?

Opening the hot water tap, it does not come out anything (no flow).

Make sure that:

1. Water supply network is in service
2. Incoming water pressure is adequate
3. Inlet water valve is open
4. Check if there is any obstruction in the circuit upstream the product (hot water outlet)

2. Hot water missing?

Opening the hot water tap, water comes out at the same temperature as the cold water.

Make sure that:

1. Disconnect the product from the mains power supply (at least for one minute) and connect it again properly
2. Verify the presence of power supply voltage
3. Switch on the product
4. Wait for the established time for the water warming up.
5. Verify alarm warnings on the display

3. Water not sufficiently hot?

Opening the hot water tap, water isn't hot enough.
Day after day, the performance of heat pump became worst.

1. Make sure that:
   - The established warming up time had passed
   - The required temperature has been set up
   - There is a correct ventilation.
2. Check if the fan is working
3. Check if the compressor is working.
4. Check alarm notification on the display
5. Check if there is enough refrigerant quantity!

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4. Water loss?

The product is dripping.

Make sure that:

1. Verify if the dripping originates:
   - From one of the hydraulic connections (not intact)
   - From the overpressure protection device (safety valve).
   - Check if it is working properly.
   - From inside the product
2. Check if the condensate drain is connected properly and/or if it is obstructed.
3. Check the condition of the filter, which could generate an excessive quantity of condensate.

5. The product is working properly but there are warnings on the display?

The product supplies hot water and the display signals irregular conditions.

Refer to the section “F”

6. **Irregular operation but display does not indicate any anomaly?**

The product supplies hot water but there are noises, vibrations or other anomalies (included too hot water temperature).

1. If the water temperature is higher than the setpoint:
   - Anti-Legionella cycle is running/has just finished.
   - The system is connected to a solar thermal/PV.
2. Vibrations and irregular noises:
   - Check the installation surface (straightness and point of support)
   - Open the cover and proceed with a visual inspection checking possible contacts among the components.

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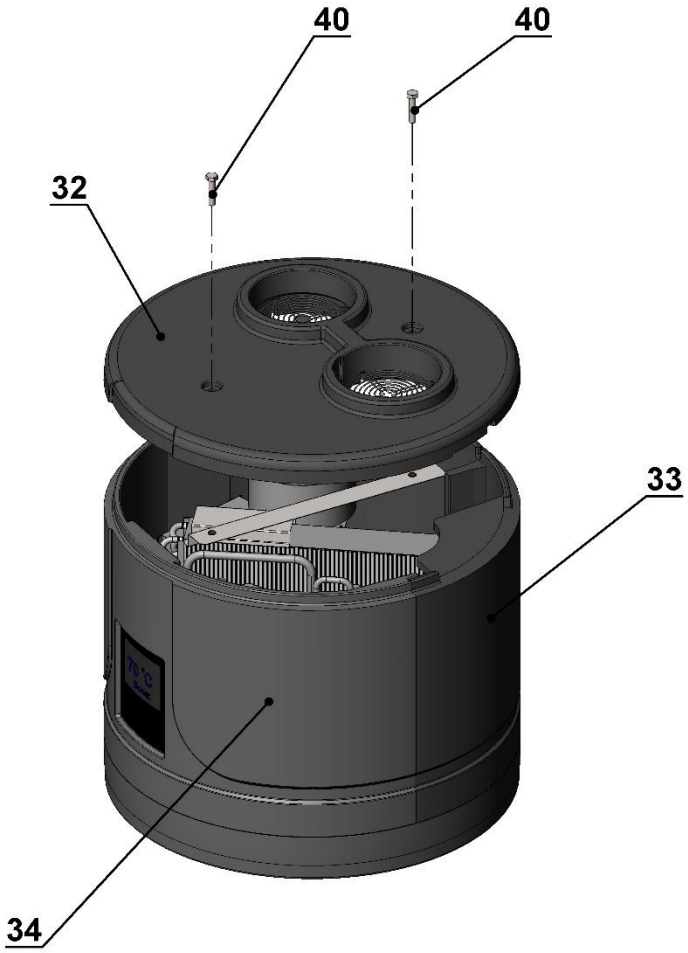
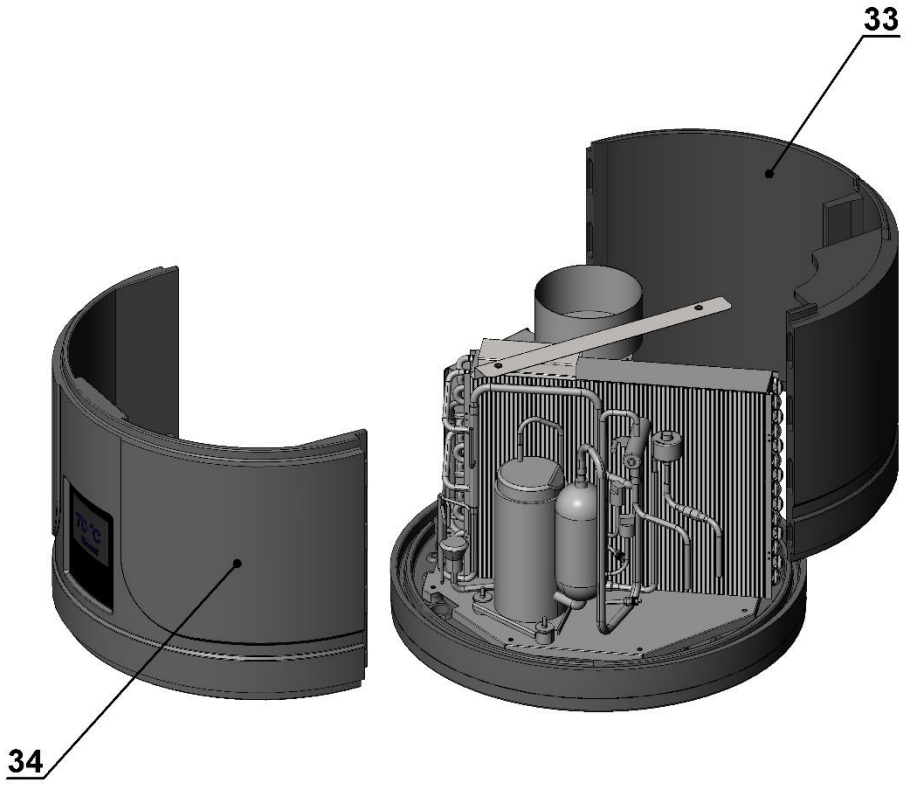
D. ACCSES TO THE HEAT PUMP – OPENING OF THE EXTERNAL CASE.

1. Unwind the screws No40 (M6x60; DIN564)
2. Pull the upper panel No32 in upper direction
3. Pull the Front 34 and Back 33 panels in upper direction (~3cm) and then in front direction





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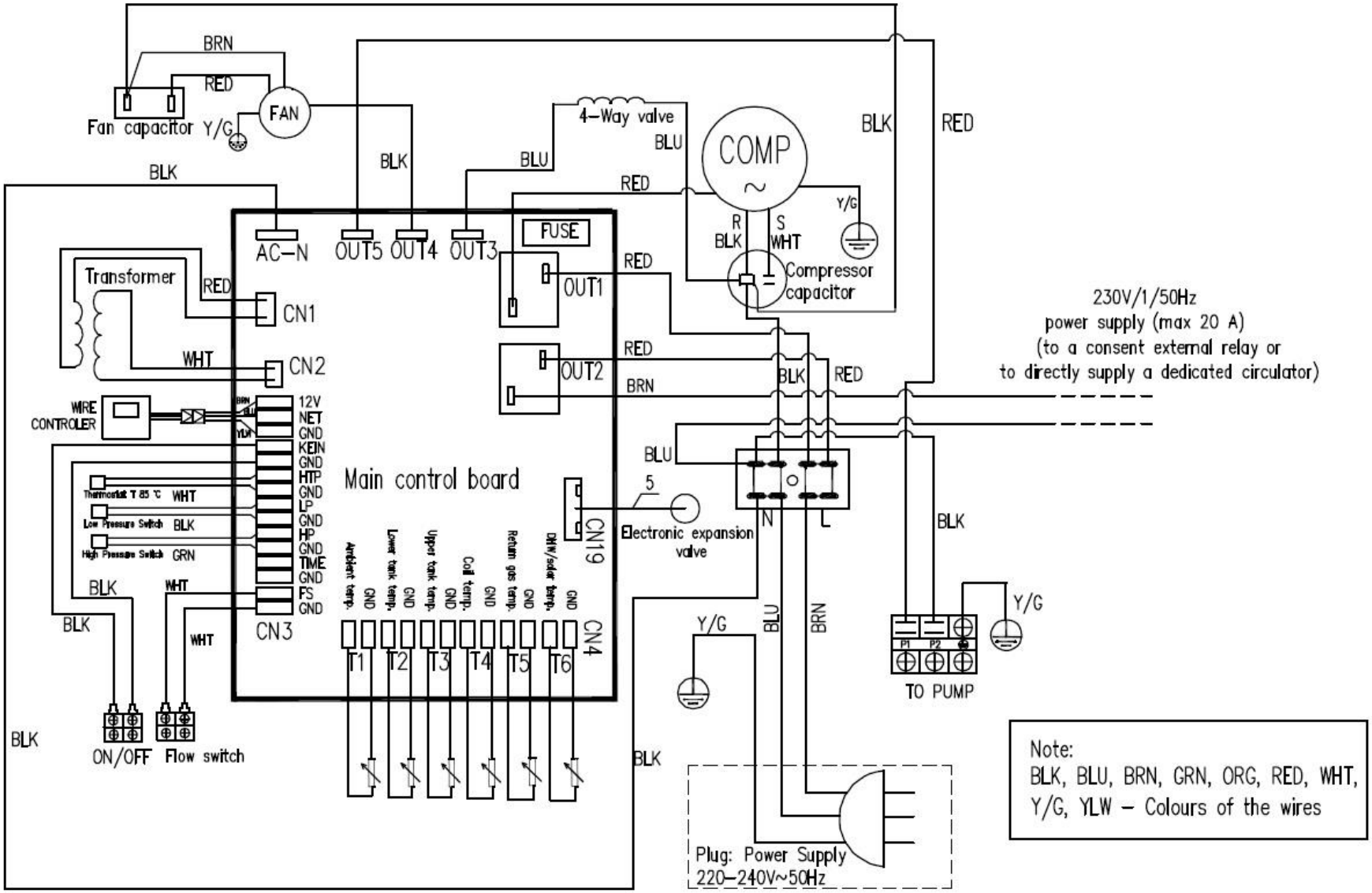
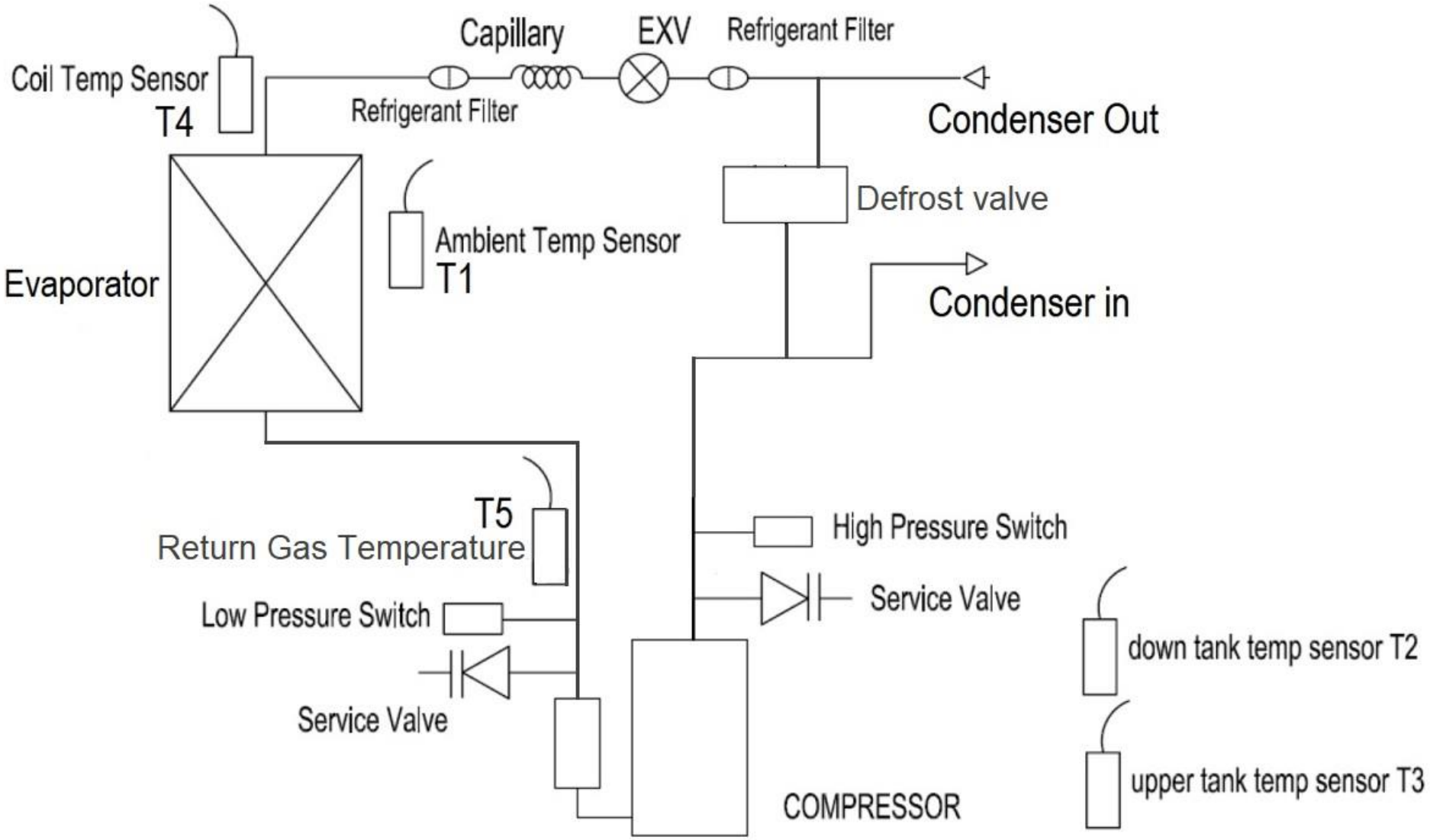
E. ELECTRIC WIRING DIAGRAM AND HEAT PUMP REFRIGERANT SCHEME.





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F. ACTIONS TO BE TAKEN WHEN ERROR CODE APPEARS ON DISPLAY

Protection/ Malfunction	Error code	LED indicator	Possible reasons	Corrective actions	Procedure
Standby		Dark			
Normal running		Bright			
Lower tank water temp. sensor failure	P1	☆● (1flash 1 dark)	1) The sensor open circuit 2) The sensor short circuit 3) PCB board failure	1) Check the sensor connection 2) Replace the sensor 3) Change the PCB board	1) Procedure 2 3) Procedure 1
Upper tank water temp. sensor failure	P2	☆☆● (2 flashes 1 dark)	1) The sensor open circuit 2) The sensor short circuit 3) PCB board failure	1) Check the sensor connection 2) Replace the sensor 3) change the PCB board	1) Procedure 3 3) Procedure 1
Evaporator coil temp. sensor failure	P3	☆☆☆● (3 flashes 1 dark)	1) The sensor open circuit 2) The sensor short circuit 3) PCB board failure	1) Check the sensor connection 2) Replace the sensor 3) change the PCB board	1) Procedure 4 3) Procedure 1
Return gas temp sensor failure	P4	☆☆☆☆● (4 flashes 1 dark)	1) The sensor open circuit 2) The sensor short circuit 3) PCB board failure	1) Check the sensor connection 2) Replace the sensor 3) change the PCB board	1) Procedure 5 3) Procedure 1
Ambient temp. sensor failure	P5	☆☆☆☆☆● (5 flashes 1 dark)	1) The sensor open circuit 2) The sensor short circuit 3) PCB board failure	1) Check the sensor connection 2) Replace the sensor 3) change the PCB board	1) Procedure 6 3) Procedure 1
Solar temp. sensor failure	P6	☆☆☆☆☆☆☆☆☆☆● (10 flash1dark)	1) The sensor open circuit 2) The sensor short circuit 3) PCB board failure	1) Check and change the solar sensor 2) Replace the sensor 3) change the PCB board	1) Procedure 7 3) Procedure 1
T6 Solar temperature too high temp. protection	P8	Dark	1) T6 too high temp. 2) T6 sensor has problem	1) P8 appears at 125°C and disappears at 120°C 2) Check and if it's necessary replace the sensor	2) Procedure 7
Emergency switch off	EC	only show the protection code	1) Connecting wire off 2) PCB board failure	1) According to the physical truth judging whether is normal or not 2) change the PCB board	2) Procedure 1
High pressure protection (HP Switch)	E1	☆☆☆☆☆● (6 flashes 1 dark)	1) Too high air inlet temp 2) Less water in the tank	1) Check if the air inlet temp is over the working limited 2) Check if the tank is full of water. If not, charge water	

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			3) The electronic expansion valve assembly blocked 4) Too much refrigerant 5) The switch damaged 6) The uncompressed gas is in refrigerant system 7) PCB board failure	3) Check and replace the electronic expansion valve assembly 4) Discharge some refrigerant 5) Replace a high-pressure switch 6) Discharge and then recharge the refrigerant 7) change the PCB board	3) Procedure 8 4) Procedure 9 5) Procedure 10 6) Procedure 9 7) Procedure 1
Low pressure protection (LP Switch)	E2	☆☆☆☆☆☆☆● (7 flashes 1 dark)	1) Too low air inlet temp 2) The electronic expansion valve assembly blocked 3) Too less refrigerant 4) The switch damaged 5) The fan assembly cannot work 6 PCB board failure	1) Check if the air inlet temp is over the working limited 2) Replace the electronic expansion valve assembly 3) Charge some refrigerant 4) Replace a new low-pressure switch 5) Check if the fan working when the compressor working. If not, some problems with the fan assembly 6) change the PCB board	 3) Procedure 9 4) Procedure 10 5) Procedure 11 6) Procedure 1
Over heat protection (HTP Switch)	E3	☆☆☆☆☆☆☆☆● (8 flashes 1 dark)	1) Too high tank water temp 2) The switch damaged 3) PCB board failure	1) If the tank water temp is over 85C, the switch will open and the unit will stop for protection. After the water comes to normal temp, 2) Replace a new thermal safety switch 3) Change the PCB board	 2) Procedure 12 3) Procedure 1
Solar thermal collector high temperature protection	E4	☆☆☆☆☆☆☆☆☆☆☆● (11flash1 dark)	1) solar water circuit water flow very little or without water flow 2) Related connecting wires off 3) Water pump failure 4) PCB board failure	1) Solar water circuit fluid infusion and exhaust 2) Related connecting wires being reconnected 3) Change the water pump 4) change the PCB board	 4) Procedure 1
Water flow failure	E5	☆☆☆☆☆☆☆☆☆● (9 flash 1dark)	1) solar water circuit water flow very little or without water flow 2) Related connecting wires off 3) water pump failure 4) water flow switch failure 5) PCB board failure	1) Solar water circuit fluid infusion and exhaust 2) Related connecting wires being reconnected 3) Change the water pump 4) Change the water flow switch 5) Change the PCB board	 5) Procedure 1
Defrost		☆☆☆☆☆☆☆☆…… (all long flashes)			
Communication failure	E8	Bright			

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G. INTERVENTION PROCEDURE.

Procedure 1	**1. CHANGING THE MAIN PCB**
PSB code: G0010018; **PSB model:** HY473024	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!!!

1) Switch off the HPWH
2) Disconnect the unit from main electricity supply
3) Unscrew four screws No: 1; 2; 3; 4
4) Open the front cover
5) Disconnect all cables and wirings of the PCB
6) Gently dismantle the main PCB from plastic clips No: 5; 6; 7; 8;
7) Replace the PCB with a new one with the same code
8) Make an assembly in the reverse order

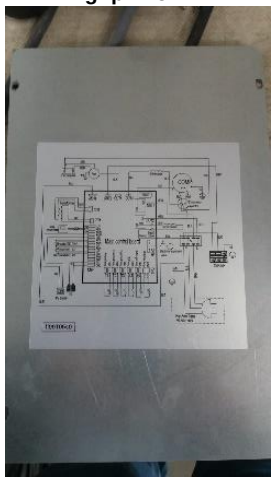
Fig: pr.1.1.

Fig: pr.1.2.

Fig: pr.1.3.

Fig: pr.1.4

Fig: pr.1.5



Procedure 2	2. CHECK AND CHANGE OF LOWER TANK TEMPERATURE SENSOR T2
NTC thermosensor code: G0030153; **NTC thermosensor model:** 5K/L1200T	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!!!

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of T2
4) On terminal CN3 (**Fig: pr.2.3)**, disconnect the cable of lower tank temperature sensor T2, designated by Number "2" on a yellow ring
5) Pull the cable out
6) Replace with a new one on reverse order.
7) When pushing a new sensor into the thermo-pocket tube (see **Fig: pr.2.1.),** assure that the sensor is dived at 420mm measured from the upper edge of thermo-pocket tube. Be sure that the position is the right one as per picture **Fig: pr.2.1.**
8) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.2.1:

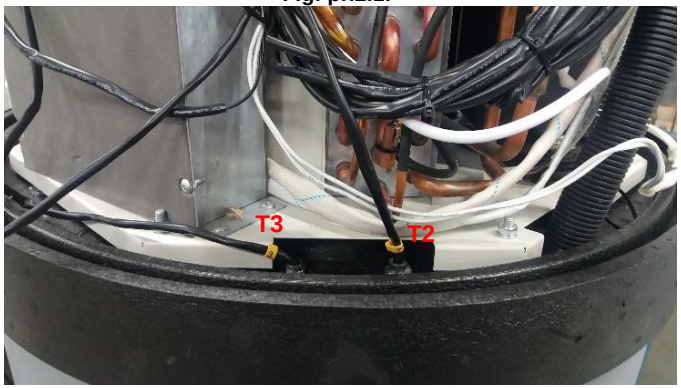


Fig: pr.2.2:

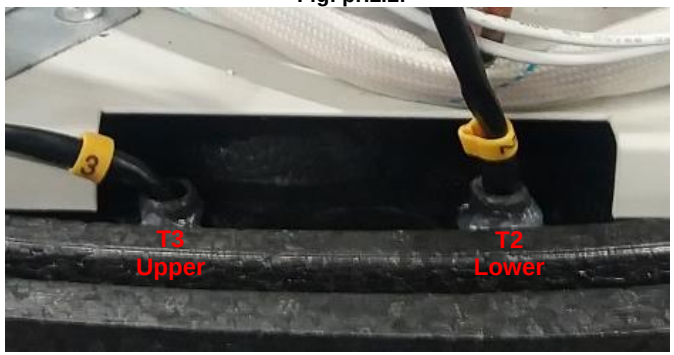


Fig: pr.2.3:

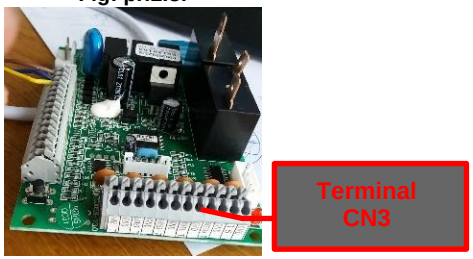
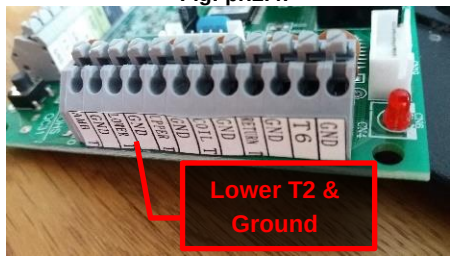


Fig: pr.2.4:



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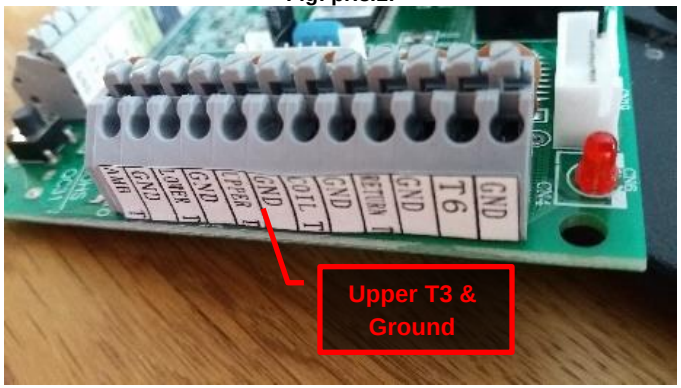
Procedure 3	3. CHECK AND CHANGE OF UPPER TANK TEMPERATURE SENSOR – T3
NTC thermosensor code: G0030153; **NTC thermosensor model:** 5K/L1200T	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!!!

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of T3
4) On terminal CN3 (**Fig: pr.3.1)**, disconnect the cable of upper tank temperature sensor T3, designated by Number "3" on a yellow ring
5) Pull the cable out
6) Replace with a new one on reverse order.
7) When pushing a new sensor into the thermo-pocket tube (see **Fig: pr.2.1.),** assure that the sensor is dived to the end. Be sure that the position is the right one as per picture **Fig: pr.2.1.**
8) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.3.1:

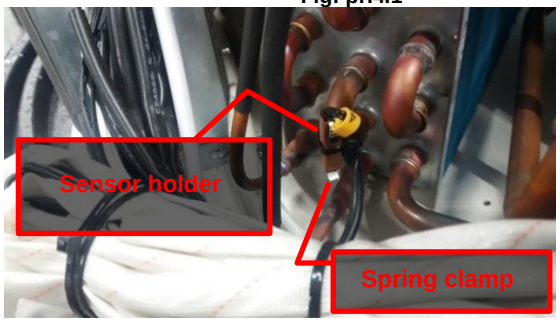


Procedure 4	4. CHECK AND CHANGE OF EVAPORATOR COIL TEMPERATURE SENSOR
NTC thermosensor code: G0030153; **NTC thermosensor model:** 5K/L1200T	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of T4
4) On terminal CN3 (**Fig: pr.4.2)**, disconnect the cable of coil tank temperature sensor T4, designated by Number "4" on a yellow ring
5) Pull the cable out
6) Replace with a new one on reverse order.
7) When mounting a new sensor into the holder (see **Fig: pr.4.1.),** assure that the sensor is well fixed by the spring clamp. Be sure that the position is the right one as per picture **Fig: pr.4.1.**
8) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.4.1



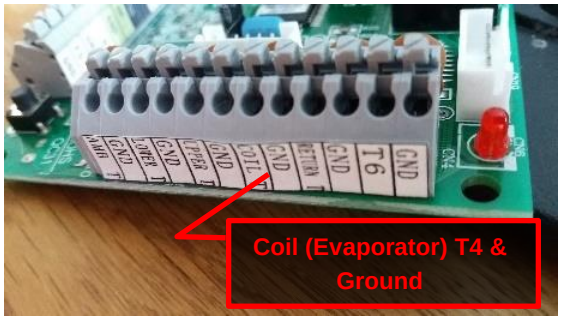


Fig: pr.4.2

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Procedure 5	5. CHECK AND CHANGE OF RETURN GAS TEMPERATURE SENSOR
NTC thermosensor code: G0030153; **NTC thermosensor model:** 5K/L1200T	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of T5
4) On terminal CN3 (**Fig: pr.5.2)**, disconnect the cable of return gas temperature sensor T5, designated by Number “5” on a yellow ring
5) Pull the cable out
6) Replace with a new one on reverse order.
7) When mounting a new sensor into the holder (see **Fig: pr.5.1.),** assure that the sensor is well fixed by the spring clamp. Be sure that the position is the right one as per picture Fig: pr.5.1.
8) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.5.1:

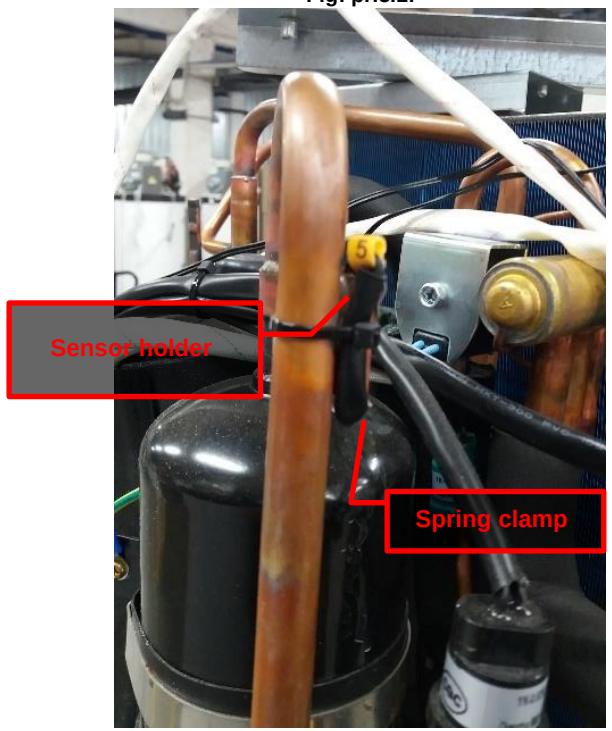
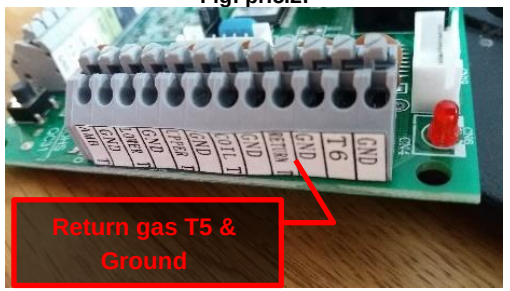


Fig: pr.5.2:



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Procedure 6	6. Check and change of ambient air temperature sensor
NTC thermosensor code: G0030152; **NTC thermosensor model:** 5K/L1200S	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of T1
4) On terminal CN3 (**Fig: pr.6.2)**, disconnect the cable of return gas temperature sensor T1, designated by Number "1" on a yellow ring
5) Pull the cable out
6) Replace with a new one on reverse order.
7) When mounting a new sensor into the holder (see **Fig: pr.6.1.),** assure that the sensor is well fixed. Be sure that the position is the right one as per picture Fig: pr.6.1.
8) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.6.1:

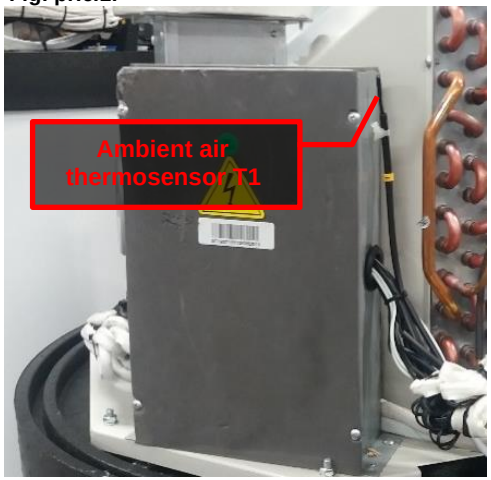
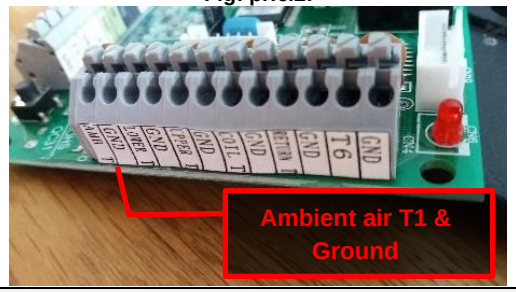


Fig: pr.6.2:



Procedure 7	7. CHECK AND CHANGE THE SOLAR SENSOR
	See procedure 6

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Procedure 8	8. CHECK AND REPLACE THE ELECTRONIC EXPANSION VALVE ASSEMBLY
Electronically regulated expansion valve ERV; Code: C0050014; **Model:** DPF(Q)1.3C-01(1-RK	
Tools:	Screw driver PH2; Pliers; spanner S10; S12; S13; Cutting tool for copper pipe; burner for brazing; brazing rods; vacuum pump; recovery unit; bottles for refrigerant; scales; leak detectors; pressure hoses; Instrument for parameters check

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!

⚠ ***Risk of injuries due to refrigerant vapors!***
Discharge refrigerant!
Use special protective gloves for refrigerant and eyeglasses!

⚠ ***Risk of burning while brazing copper pipes!***
Use special protective gloves and eyeglasses!

1) Switch off the HPWH
2) Disconnect the HPWH from the main electric supply!
3) Open the PCB box as per procedure 1.
4) Tear up the cable bundle containing the cable of ERV
5) On terminal CN19 (**Fig: pr.8.2)**, disconnect the cable of ERV
6) Discharge the refrigerant as per procedure 9
7) Dismantle ERV by unbraze its supplying copper pipes
8) Attach a new one
9) Replace both refrigerant filter/dryers too
10) Braze its copper connection
11) Vacuuming as per procedure 9
12) Charge refrigerant 880 – 890g as per procedure 9
13) Check for refrigerant leakage as per procedure 9
14) Check working parameters as per procedure 9
15) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.8.1:

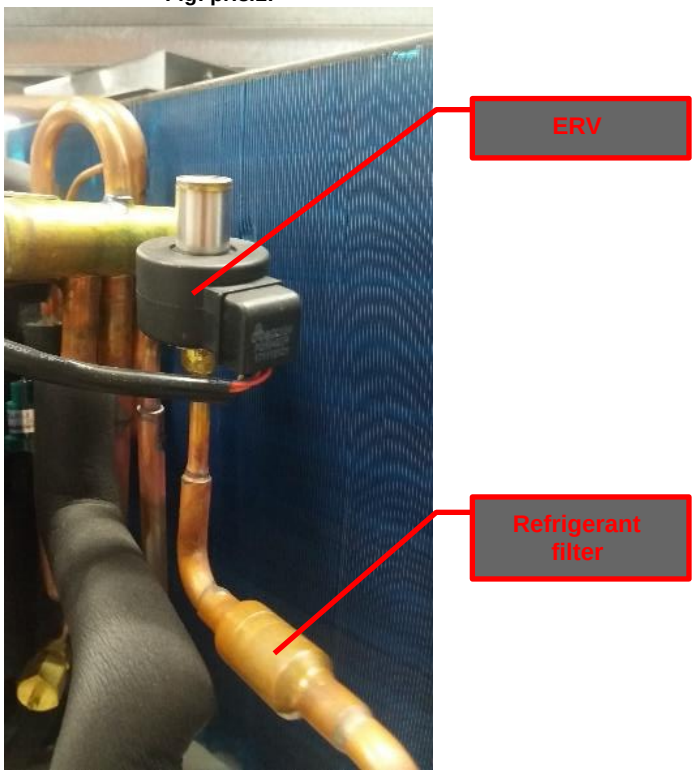

Fig: pr.8.2:

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Procedure 9	9. VACUUMING, CHARGING AND DISCHARGING REFRIGERANT
Tools:	Screw driver PH2; Pliers; spanner S10; S12; S13; Cutting tool for copper pipe; burner for brazing; brazing rods; vacuum pump; recovery unit; bottles with refrigerant; scales; leak detectors; pressure hoses; Instrument for parameters check

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!

⚠ ***Risk of injuries due to refrigerant vapors!***
Discharge refrigerant!
Use special protective gloves for refrigerant and eyeglasses!

⚠ ***Working with an equipment under high pressure!***
All activities described below must be done by qualified specialist using a quality and trouble-free equipment according to the all safety regulation!

1) Switch off the HPWH
2) Disconnect the HPWH from the main electric supply!

DISCHARGING REFRIGERANT

3) Unscrew the protective cap of low-pressure probe (Fig pr.9.1)
4) Connect the high-pressure hose, equipped in both ends with taps to the probe and to the recovery machine. By the same way connect recovery machine to the empty bottle for R134a (Fig pr.9.6).
5) Open the tap 1&2 and all others. Then start the recovery machine in “discharging mode” and use it according to its user manual.
6) When the machine stops, the discharging process is done. Close all taps and switch off the recovery machine.
7) CLOSE THE TAP OF THE BOTTLE WITH R134a!

VACUUMING:

8) Unscrew the protective cap of high-pressure probe (Fig pr.9.1)
9) Connect the high-pressure hose, equipped in both ends with taps to the probe and to the vacuuming pump (Taps 1&2; Fig pr.9.2 and pr.9.3)
10) Open the taps and start the pump. Then the pressure gauge will look like on (Fig pr.9.4)
11) Wait ~30 min
12) If there is no leakage, after 30 min, the pressure gauge will look like on (Fig pr.9.5)
13) Close the tap of the pump and check if there is leakage (if there is a leakage the black arrow will move back)
14) If there is no leakage, the vacuuming process is done. Close the tap 1. Stop the vacuuming pump.

Fig: pr.9.1:

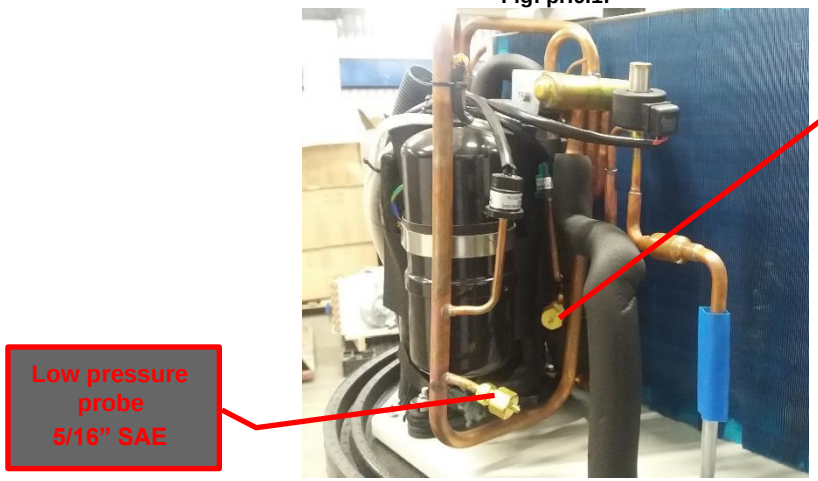

Fig: pr.9.2:

Fig: pr.9.3:

Fig: pr.9.4:

Fig: pr.9.5:

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CHARGING WITH REFRIGERANT R134a

15) Unscrew the protective cap of low-pressure probe (Fig pr.9.1)
16) Connect the high-pressure hose, equipped in both ends with taps to the probe and to the recovery machine. By the same way connect recovery machine to the filled bottle for R134a (Fig pr.9.6).
17) Put the bottle on scales with precision ±10g and tare it to "0" (Fig pr.9.7).
18) Be sure that the recovery machine and all pressure hoses are filled with refrigerant.
19) Open the tap 1&2 and all others. Then start the recovery machine in "charging mode" and use it according to its user manual.
20) The quantity of refrigerant that should be charged in heat pump is 880-890g. The gas located into the hoses and recovery machine does not count!
21) Stop the recovery machine. Close all taps.
22) When the scales read 880 – 890g refrigerant consumed, close the tap1 immediately.
23) CLOSE THE TAP OF THE BOTTLE WITH R134a!

CHECKING THE WORKING PARAMETERS OF THE HEAT PUMP

24) Unscrew the protective cap of low and high-pressure probes (Fig pr.9.1)
25) Connect the high-pressure hoses, equipped in both ends with taps to the probes and to the instrument. (Fig pr.9.8).
26) Fill the unit with water if it is not
27) Start the heat pump and the instrument.
28) Read the data and compare with the tables point F at the end of this document (±5%).

Fig: pr.9.6:

Fig: pr.9.7:

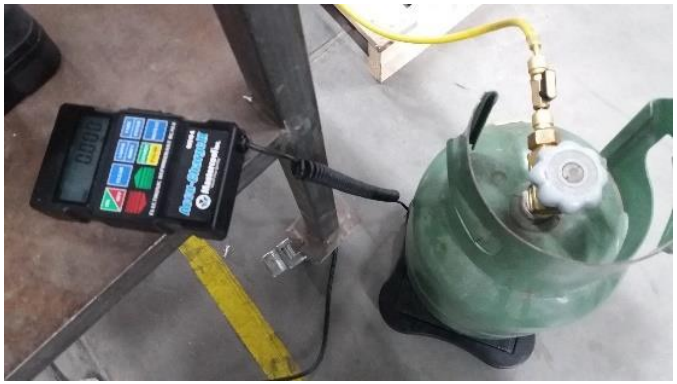

Fig pr.9.8:

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Procedure 10	10. REPLACE A HIGH/LOW-PRESSURE SWITCH
Low pressure switch: Code: C0080003; **Model:** DYKG-0.02/0.1 **High pressure switch: Code:** C0080006; **Model:** GYKG-2.5/1.8	
Tools:	Screw driver PH2; Pliers; spanner S10; S12; S13; Cutting tool for copper pipe; burner for brazing; brazing rods; vacuum pump; recovery unit; bottles for refrigerant; scales; leak detectors; pressure hoses; Instrument for parameters check

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!

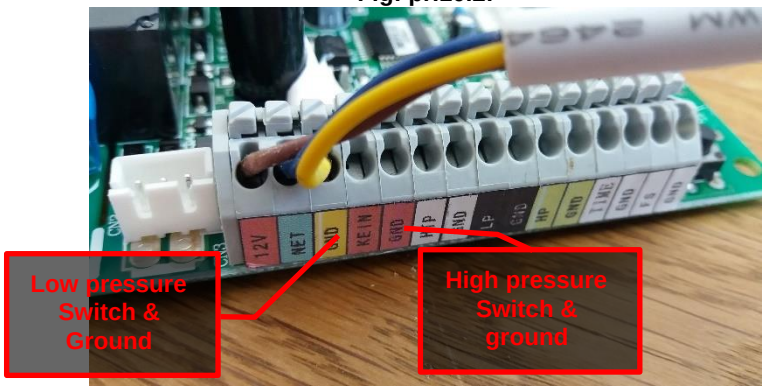
⚠ ***Risk of injuries due to refrigerant vapors!***
Discharge refrigerant!
Use special protective gloves for refrigerant and eyeglasses!

⚠ ***Risk of burning while brazing copper pipes!***
Use special protective gloves and eyeglasses!

1) Switch off the HPWH
2) Disconnect the HPWH from the main electric supply!
3) Open the PCB box as per procedure 1.
4) Tear up the cable bundle containing the cable of pressure switches
5) On terminal CN3 (Fig: pr.10.2), disconnect the cable of pressure switches (PS)
6) Discharge the refrigerant as per procedure 9
7) Dismantle PS byunsoldering its supplying copper pipes
8) Attach a new one
9) Braze its copper connections
10) Vacuuming as per procedure 9
11) Charge refrigerant 880 – 890g as per procedure 9
12) Check for refrigerant leakage as per procedure 9
13) Check working parameters as per procedure 9
14) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.10.1:

Fig: pr.10.2:



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Procedure 11	11. CHECK / REPLACE THE FAN
Fan motor: Code: D0040012; **Model:** YDK25-4D(YDK20-4F1)	
Tools:	Screw driver PH2 & PH 3; Pliers; Spanners S10; S12; S13

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

INITIAL CHEK OF VENTILATOR:

1) Clean the ducts and the filter (in some models)
2) Check if a foreign body blocks the fan rotation. In this case, remove the foreign body.
3) If the fan is blocked not because of a foreign part proceed with the FAN CAPACITOR CHEK/REPLACEMENT

FAN CAPACITOR CHEK / REPLACEMENT:

1) With multimeter measure the resistance of the fan capacitor (Ω): if the value is 0, proceed with the replacement of ventilator capacitor itself
2) If capacitor is OK, procced with a FAN REPLACEMENT

FAN REPLACEMENT:

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of the Fan
4) On PCB terminal OUT4 (Fig: pr.11.1), disconnect the cable of Fan. Do the same with cables to the fan capacitor Fig: pr.11.2
5) Pull the cables out
6) Dismantle Fan diffusor by unscrewing 4 screws No1 (Fig: pr.11.3)
7) Dismantle front panel of fan volute by unscrewing 11 screws No2 (Fig: pr.11.5)
8) Disassemble the plastic propeller by unscrewing a nut S10 (Fig: pr.11.6). Counterclockwise tighten / clockwise – unscrew!
9) Disassemble the fan motor by unscrewing screws No3, 4 pieces.
10) Fan motor is released
11) Replace it with a new one
12) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.11.1:

Fig: pr.11.2:

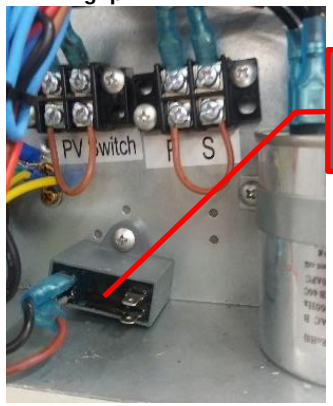

Fig: pr.11.3:

Fig: pr.11.4:

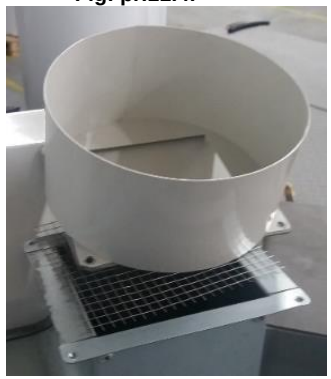

Fig: pr.11.5:

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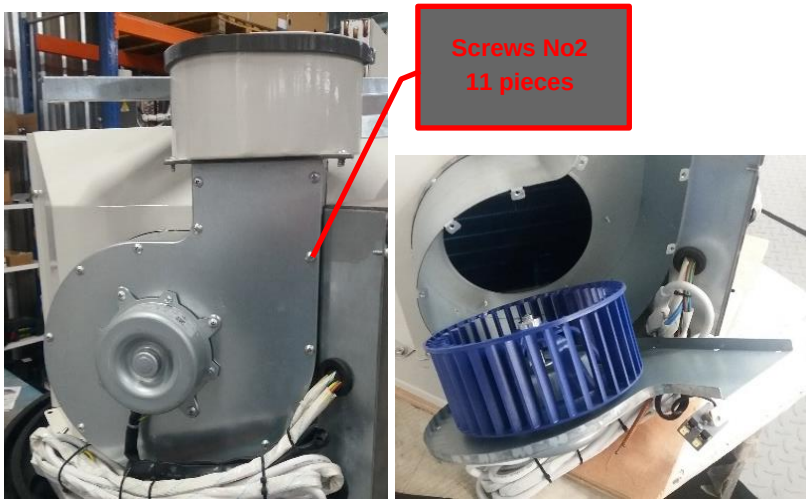

Fig: pr.11.6:

Fig: pr.11.7:

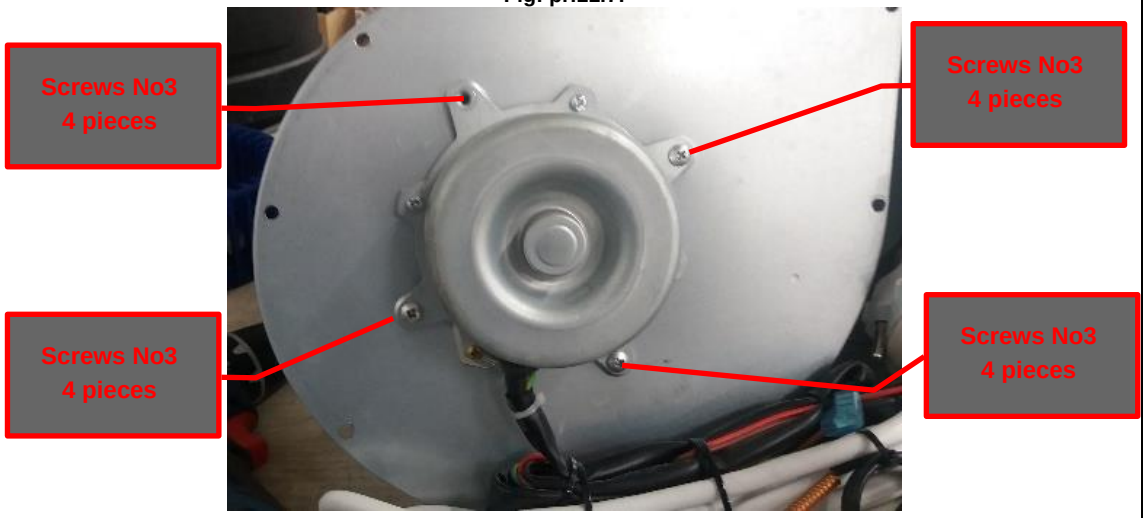

Fig: pr.11.7

Procedure 12	12. REPLACE THE THERMAL SWITCH
Thermal switch 80ºC; Code: G0030162; **Model:** BW9700 (80ºC)	
Tools:	Screw driver PH2 & PH3; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

1) Switch off the HPWH
2) Open the PCB box as per procedure 1.
3) Tear up the cable bundle containing the cable of Thermal switch
4) On terminal CN3 (Fig: pr.12.5), disconnect the cable of thermal switch
5) Unscrew the lower plastic decorative cap **Fig: pr.12.1**
6) Pull the cable of thermal switch out of the thermopocket of electric heating element. **Fig: pr.12.3**
7) Replace with a new one on reverse order.
8) When mounting a new thermo switch into the thermopocket **Fig: pr.12.3,** assure that the thermoswitch is pushed to the end.
9) When mounting back the plastic decorative cover, be sure that the triangular sign is in direction to the floor. **Fig: pr.12.4.**
10) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.12.5:

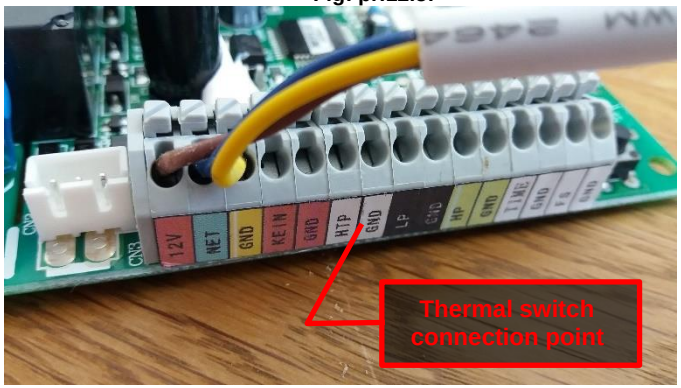

Fig: pr.12.1

Fig: pr.12.4

Fig: pr.12.2

Fig: pr.12.3

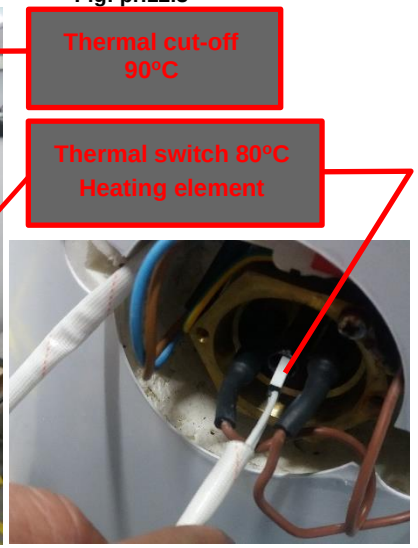

Fig: pr.12.4

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Procedure 13	13. REPLACE THE 4-WAY VALVE
4-way valve: Code: C0050001; **Model:** STF-3*127-952-R410A	
Tools:	Screw driver PH2; Pliers; spanner S6; S10; S12; S13; Cutting tool for copper pipe; burner for brazing; brazing rods; vacuum pump; recovery unit; bottles for refrigerant; scales; leak detectors; pressure hoses; Instrument for parameters check; El. Multimeter

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!

⚠ ***Risk of injuries due to refrigerant vapors!***
Discharge refrigerant!
Use special protective gloves for refrigerant and eyeglasses!

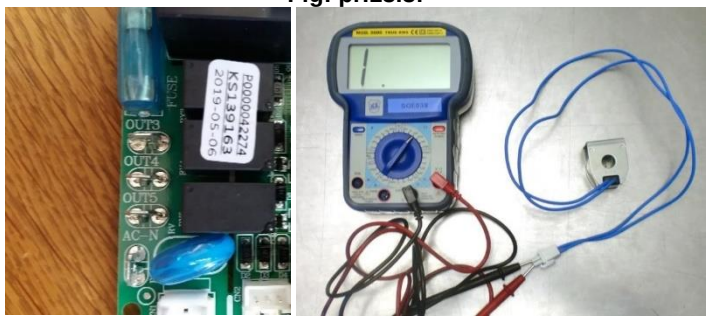
⚠ ***Risk of burning while brazing copper pipes!***
Use special protective gloves and eyeglasses!

1) Switch off the HPWH
2) Disconnect the HPWH from the main electric supply!
3) Open the PCB box as per procedure 1.
4) Tear up the cable bundle containing the cable of pressure switches
5) On terminal OUT3 (Fig: pr.13.3), disconnect the cable of 4-way valve
6) With multimeter measure the resistance of the coil (Ω): if the value is 0, proceed with the replacement of the coil only. (Fig: pr.13.3),
7) If the coil is working than proceed with replacement of the 4-way valve body at all. **Fig: pr.13.2:**
8) Discharge the refrigerant as per procedure 9
9) Dismantle body of the 4-way valve by unsoldering its supplying copper pipes
10) Attach a new one
11) Braze its copper connections
12) Vacuuming as per procedure 9
13) Charge refrigerant 880 – 890g as per procedure 9
14) Check for refrigerant leakage as per procedure 9
15) Check working parameters as per procedure
16) Assemble everything at the reverse order, do not forget to tighten again the cables into the bundle. Assure that no cables are in contact with moving parts or sharp edges.

Fig: pr.13.1:

Fig: pr.13.2:

Fig: pr.13.3:



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Procedure 14	14. ELECTRIC HEATING ELEMENT CHECK / REPLACEMENT

Limit control thermostat 90ºC: Code: 702262
El. Heat. element 1500W 230V: Code: 106400
Gascket G1½; Ø61x48.5x3: Code: 106410

Tools:	Screw driver PH2; PH3 Pliers; Socket spanner S60; El. Multimeter

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

1) Switch off the HPWH
2) Unscrew the Upper plastic decorative cap **Fig: pr.12.1 and 12.2**
3) Check if the manual reset thermal cut-off is switched on.
4) If not – push the red button on it in order to switch it on Fig**: pr.14.1**
5) If the heating element is still not working than check its resistance. If the value is 0 **(Fig: pr.14.3)**, proceed with the replacement of the heating element. The value of the normally working heating element is ~36 Ω **(Fig: pr.14.4).**
6) In order to replace the broken heating element, you need socket wrench S60.
7) Replace with a new one on reverse order.
8) When mounting a new heating element replace the gasket too.
9) Do not forget to mount ground connection **(Fig: pr.14.2).**
10) When mounting back the plastic decorative cover, be sure that the triangular sign is in direction to the floor. **Fig: pr.12.4.**
11) Assemble everything at the reverse order.

Fig: pr.14.1:

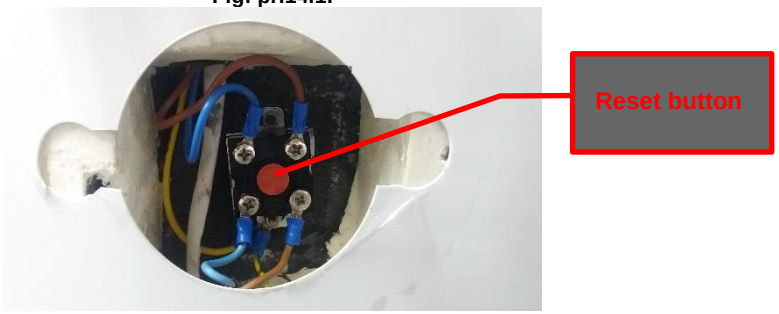

Fig: pr.14.2:

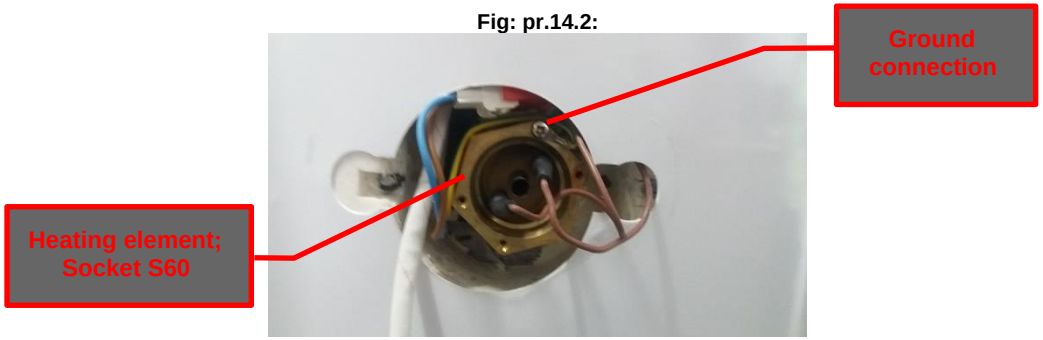

Fig: pr.14.3:

Fig: pr.14.4:

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Procedure 15	15. COMPRESSOR CHECK / REPLACE
Compressor: Code: D0020030; **Model:** WHP01900BSV-H8JU **Compressor capacitor: Code:** G0050012; **Model:** CBB65-15UF	
Tools:	Screw driver PH2 & PH3; Pliers; El= multimeter; Spanner S8; S10

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply

⚠ ***Risk of injuries due to refrigerant vapors!***
Discharge refrigerant!
Use special protective gloves for refrigerant and eyeglasses!

⚠ ***Risk of burning while brazing copper pipes!***
Use special protective gloves and eyeglasses!

3) Switch off the HPWH
4) Open the PCB box as per procedure 1.
5) Tear up the cable bundle containing the cable of Thermal switch
6) With multimeter measure the resistance of the compressor capacitor (Ω): if the value is 0, proceed with the replacement of compressor itself **Fig: pr.15.2**
7) If capacitor is OK, procced with a compressor replacement. **Fig: pr.15.3**
8) Discharge the refrigerant as per procedure 9
9) Remove heat insulation **Fig: pr.15.3**
10) **U**nscrew the nut M8 and remove protective plastic cap as per picture **Fig: pr.15.4**
11) Disconnect cables **Fig: pr.15.4**
12) Remove three supporting nuts M10.
13) Dismantle the compressor by unsoldering its supplying copper pipes
14) Replace with a new compressor
15) Assemble everything in the reverse order. Do not forget to connect compressor ground connection **Fig: pr.15.6.**
16) Braze all copper connections. Keep cable bundle away from the burning flame!
17) Vacuuming as per procedure 9
18) Charge refrigerant 880 – 890g as per procedure 9
19) Check for refrigerant leakage as per procedure 9
20) Check working parameters as per procedure

Fig: pr.15.1:

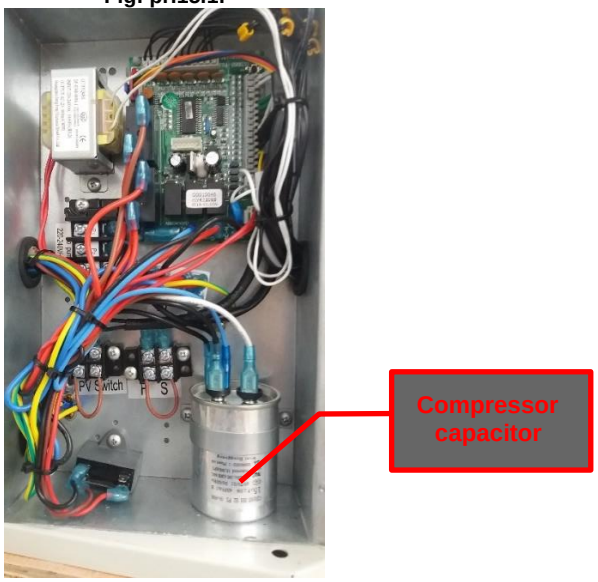


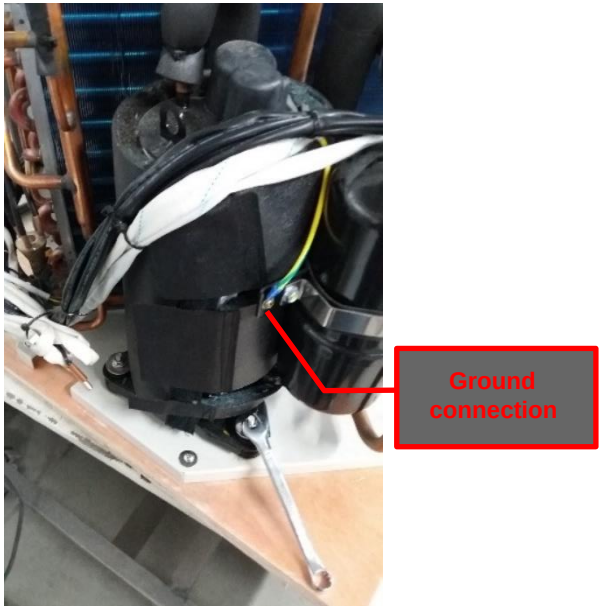
Fig: pr.15.2:

Fig: pr.15.3:

Fig: pr.15.5:

Fig: pr.15.4:

Fig: pr.15.6:



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Procedure 16	16. REPLACE THE CONTROL DISPLAY
Control display ; Code: G0020045; **Model:** HY473091	
Tools:	Screw driver PH1 & PH2;

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!!!

1) Switch off the HPWH
2) Disconnect the unit from main electricity supply
3) On the back side of the front panel, unscrew four screws No: 1; and remove the plastic cover
4) Plastic body of control display is fixed to the metal plate by four screws No2. Unwind them too. The control display is now released.
5) Replace it with a new one with the same code
6) Make an assembly in the reverse order

Fig: pr.16.1:

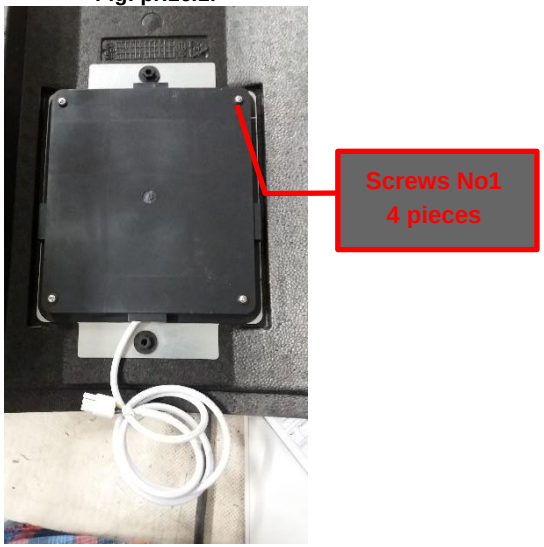
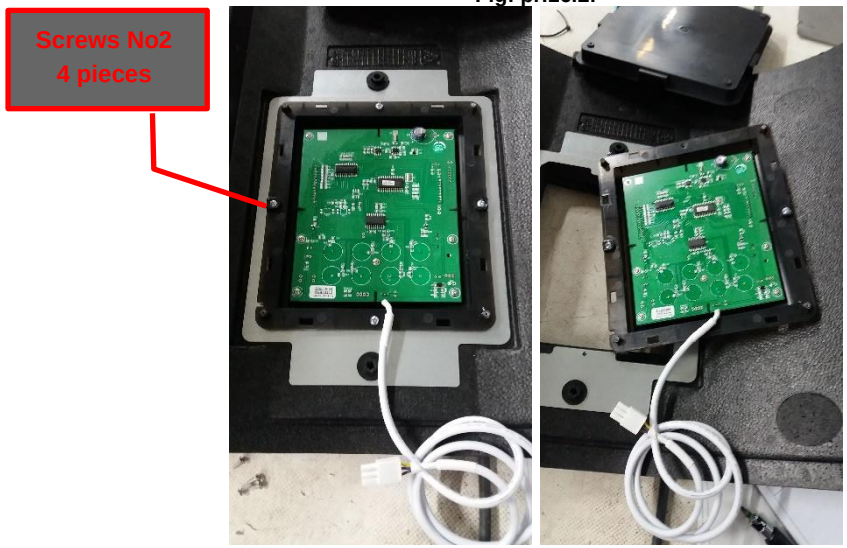


Fig: pr.16.2:



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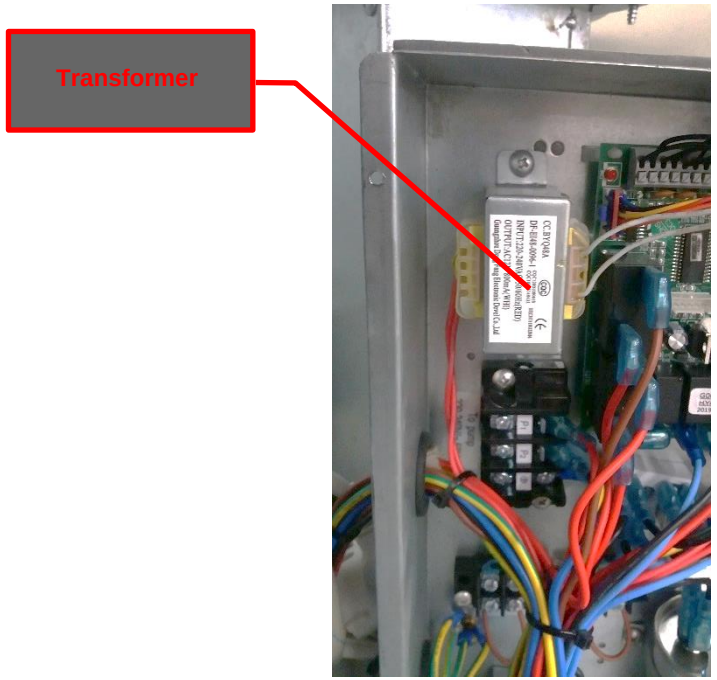
Procedure 17	**17. Replacement of transformer**
Transformer: Code: G0040001; **Model:** BYQ-800MA	
Tools:	Screw driver PH2; Pliers

⚠ ***Risk of electric shock!***
Disconnect the HPWH from the main electric supply!!!

1) Switch off the HPWH
2) Disconnect the unit from main electricity supply
3) Open the front cover of PCB box as per procedure 1
4) Disconnect all cables and wirings of the Transformer connected to the PCB.
5) Dismantle the transformer by unscrew the two screws.
6) Replace the transformer with a new one with the same code
7) Make an assembly in the reverse order



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H. FULL LIST OF CONTROLLER'S PARAMETERS.

Param. No.	Visibility: U=user I=installer=29 M=manufacturer=76	Description		Range	Default	Remarks
	Adjusting parameters:					
0	I/U	Tank water setting temp.	TS1	10 ~ 70°C	Adjust	Adjustable
1	I	Water temp difference	TS6	2 ~ 15°C	5°C	Adjustable
2	I	E-heater off tank water temp	TS2	10 ~ 90°C	65°C	Adjustable
3	I	E-heater delay time	t1	0 ~ 90min	6	t * 5 min
4	I	Week disinfection temperatur.	TS3	50 ~ 70°C	70°C	Adjustable
5	I	High temp disinfection time	t2	0 ~ 90 min	30 min	Adjustable
6	M	Defrosting period	t3	30~90 min	45 min	Adjustable
7	M	Defrosting entry coil temp.	TS4	-30 ~ 0°C	-7°C	Adjustable
8	M	Defrosting exit coil temp.	TS5	2 ~ 30°C	13°C	Adjustable
9	M	Max defrosting cycle period	t4	1 ~ 12 min	8 min	Adjustable
10	M	Electronic expansion valve adjustment		0/1	1	Adjustable (0-manual, 1-auto)
11	M	Target over-heat degree		-9 ~ 9°C	5°C	Adjustable
12	M	Steps of manually adjusting the electronic expansion valve		10 ~ 50 steps	35 steps	Adjustable
13	I	Disinfection start up time adjusting		0~23	23	Adjustable(hour)
14	I	Type of water pump		0/1/2	0	0: no water pump 1: (circulation pump) 2: (solar water pump)
15	I	Setting circulation water temperature		15～50℃	35℃	Adjustable
16	I	The temperature difference to start the circulation water pump		1-15℃	2℃	Adjustable
17	I	The temperature difference to start the solar water pump		5-20℃	5℃	Adjustable
18	I	The temperature difference to stop the solar water pump		1-4℃	2℃	Adjustable
19	I	Low outside temp. electrical heater activation		0/1	1	Adjustable 0=off, 1=on
20	I	Electrical heater activation during defrosting		0/1	1	Adjustable 0=off, 1=on

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21	I	Disinfection period		1~30 days	7 days	Adjustable
22	M	EXV open step during defrosting		10 ~ 47	30	Adjustable
23	M	EXV delay time		3 ~ 30	21; N*10 sec.	Adjustable
24	I	Low pressure switch detects temp		-10~25	-5	Adjustable
25	M	Delay detects time of low-pressure switch after compressor start		2min～20min	5min	
26	M	Temp to change 4-way change working way		-10℃～10℃	-2℃	0
27	M	The time to power on 4-way valve after compressor starts		0-15min	2min	
28	M	Electrical expansive valve action after compressor off		0-1	0	0=Invalid/1=Valid
29	M	Heat pump setting temperature		0-1	0	0: TS1=real value 1: TS1=manual
30	M	Compensation temperature		-10 ~ 10℃	0℃	Adjustable
31	M	Ambient temp sampling period		2-120min	15min	Adjustable
32	I	E-heater control after reach setting temp		0-1	1	Adjustable
33	I	Temp difference to start e-heater		1-10℃	3℃	Adjustable
34	M	Max setting temp for e-heater		65-85℃	75℃	Adjustable
35	I	ON/OFF		0-1	0	0: (remote on/off signal) 1: (PV function)
	Checking parameters: Check the real temperature and expansion valve working process.					
	Short press button to entry temp and EXV open step checking.					
A	U	Lower tank water temp.	T2	-9 ~ 99°C	Actual testing value. Error code P1 will be shown in case of a malfunction	
b	U	Upper tank water temp.	T3	-9 ~ 99°C	Actual testing value. Error code P2 will be shown in case of a malfunction	
C	U	Evaporator coil temp.	T4	-9 ~ 99°C	Actual testing value. Error code P3 will be shown in case of a malfunction	
d	U	Return gas temp.	T5	-9 ~ 99°C	Actual testing value. Error code P4 will be shown in case of a malfunction	
E	U	Ambient temp.	T1	-9 ~ 99°C	Actual testing value. Error code P5 will be shown in case of a malfunction	
F	U	Temp of solar thermal collector		~0 ~ 140℃	Measured value if failure show P6	
G	U	Electronic expansion valve step		10 ~ 47 step	N*10 step	
H	U	Tank water setting temp. real value	TS1			

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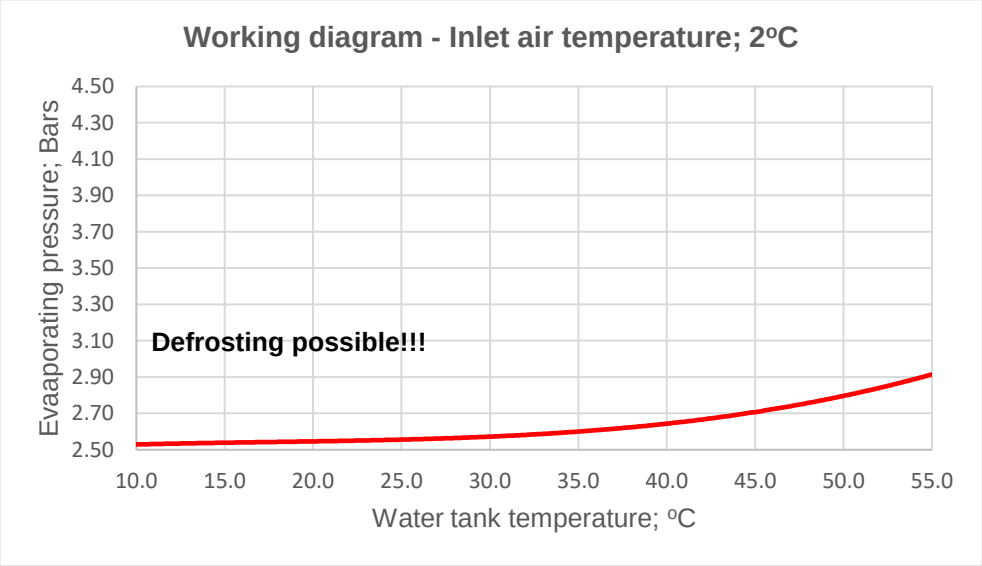
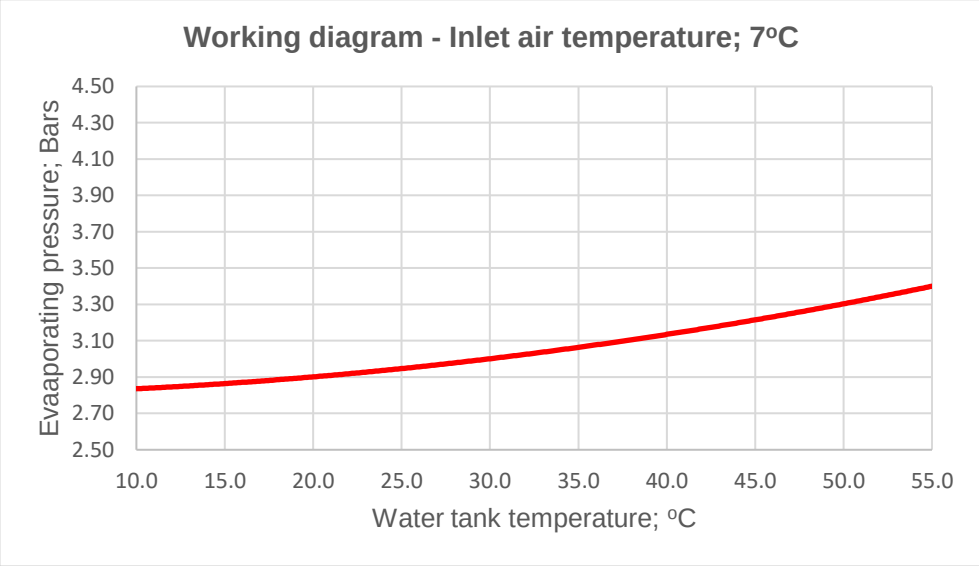
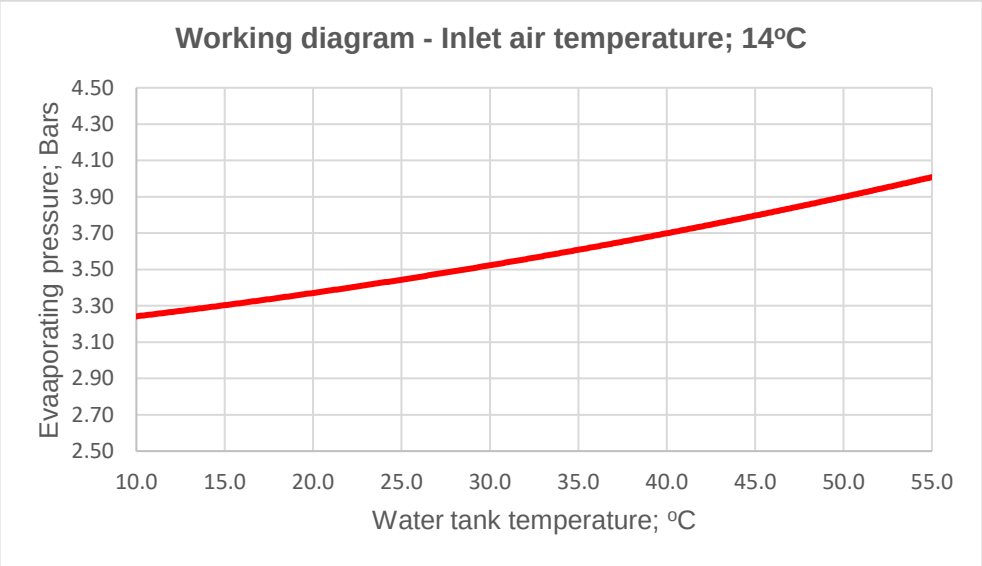
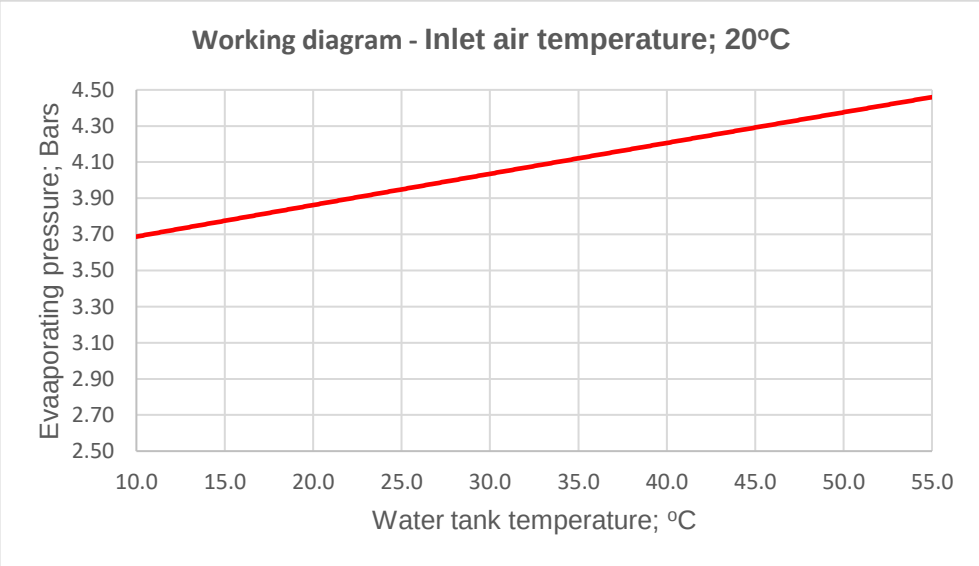
I. EVAPORATING PRESSURE









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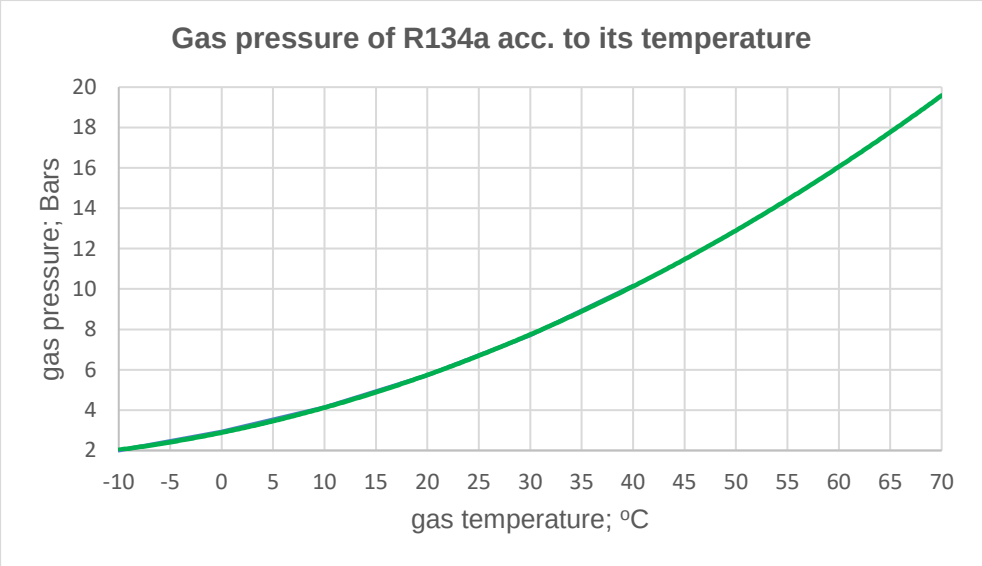

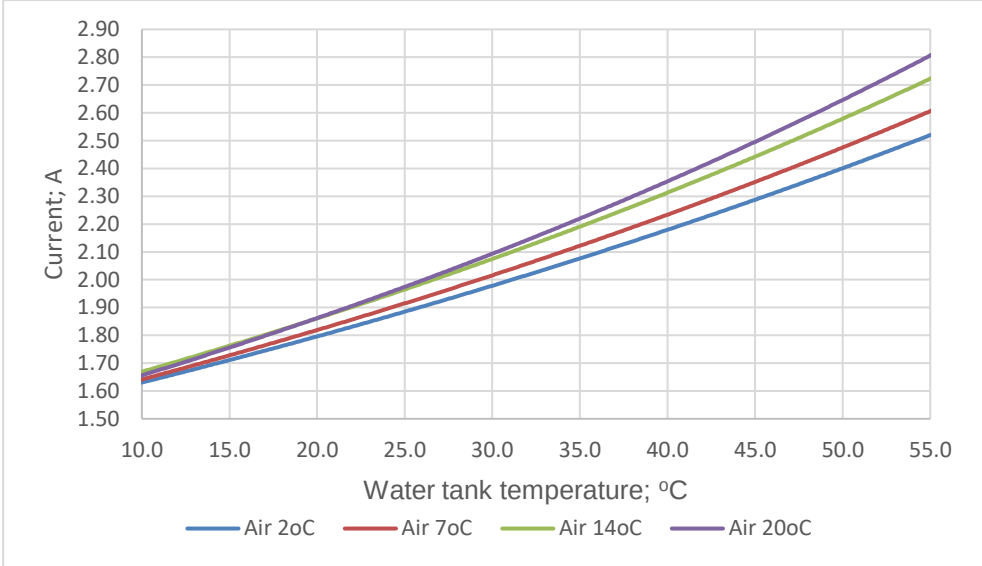

J. TOOLS AND EQUIPMENT.

TOOLS		
Handy tools:	• Screw drivers PH1, 2, 3 • Spanner: S6; 8; 10; 12; 13 • Socket wrench: S60 • Pliers • Copper tube cutter	
	• Burner for brazing copper tubes • Brazing consummative	

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Vacuuming	• Vacuum pump	
Charging / Discharging refrigerant	• Recovery machine • Scales • High pressure hoses for refrigerant • Refrigerant bottles full/empty	   
Special measuring instruments	• Multifunctioning tool for heat pump and air conditioning measurements • El. Multimeter • Manometers	  

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