THERMATRAC
Total Hot Water System

TRT SERIES AIR SOURCE HEAT PUMP
OWNER'S GUIDE & INSTRUCTION MANUAL

Please read this manual thoroughly before undertaking installation or operation and keep in a safe place for future reference by a serviceman.

CONTENTS

1 INTRODUCTION

These Heat pumps are used for residential or commercial application for domestic hot water and hydronic heating. Heat pump water heater can produce hot water to maximum 60℃ with ambient temperature between -7℃~43℃.

2 SAFETY INFORMATION

ELECTRICAL POWER MUST BE ISOLATED BEFORE STARTING WORK ON THE EQUIPMENT.

This manual is intended to provide instructions for installation, commissioning and operation.

WARNING!

The installation, commissioning and maintenance of these units should be performed by qualified personnel having a good knowledge of standards and local regulations, as well as experience with this type of equipment.

WARNING!
Any wiring used on site must comply with local electrical regulations.

WARNING!
Ensure that the electrical supply corresponds to the specification indicated on the manufacturer requirement before proceeding with the connection in accordance with the wiring diagram supplied.

WARNING!

The unit must be permanently grounded to avoid any risks caused by insulation defects.

WARNING!
No wiring must come in contact with the heat source or the fan rotating parts.

WARNING!
When preparing for shutting down the unit for a long period if the installation does not contain glycol, the condenser and the circled water pipes need to be carefully and completely drained of water.

CAUTION!
The unit should be handled using lifting and handling equipment appropriate to the unit's size and weight.

CAUTION!
It is forbidden to start any work on the electrical components without switching off the electrical supply to the unit.

CAUTION!
It is forbidden to start any work on the electrical components if water or high humidity is present on site.

CAUTION!
When the unit is being connected, ensure that no impurities are introduced into the pipe work and the water circuits.

CAUTION!
The mesh filters must be provided on the hydraulic pump and in exchanger water inlets.

The Manufacturer’s warranty is void if the recommendations listed in this manual are not followed.

3 CHECKING PRODUCT RECEIVED

3.1 Inspection and Storage

Upon receiving the equipment, all the items should be checked with the packing list to ensure that no items are missing. All units should be carefully inspected on receipt for any visible damage. In the event of shipping damage, inform the shipping company and lodge a complaint by registered letter. The manufacturer's warranty does not cover any physical damage to the unit after acceptance.

WARNING!
The sharp edges and surfaces of the coil fins can cause injury. Avoid contact with them.

3.2 Handling the Unit

Take care to avoid any sharp movements during the unloading and moving of the unit. Do not push or pull it by its base. Place a safety wedge between the unit base and the fork lift truck to avoid damaging the unit s structure and casing. Wedge is required along the entire length of the unit.

4 TECHNICAL SPECIFICATIONS

4.1 Electrical and Physical Data
4.2 Dimension and clearance
Please refer to Spec of each model for detail information.

5. INSTALLATION INSTRUCTION

5.1 Locating Unit

The units absorb the heat from the ambient air. Because of this, they should be installed outdoors or some places with sufficient space to provide free air circulation through the evaporator coil. Any ventilation restrictions will reduce the air flow, then decrease the heating capacity.

It is prohibited to connect the outdoor axial fan to air ductwork because of pressure drops created by such ductwork. If want to use cool air, a additional booster fan must be installed.

In case the unit is located in an area exposed to high wind, it's necessary to install near a vertical wall, so the unit is not in direct wind current.

Install sound isolator pad to reduce vibration and sound.

5.2 Clearance and Access Panel

After installation, all sides of the unit must be accessible for regular maintenance and service. Please refer to Spec of each model for detail information.

Note: Before installation please open access panel to take out the controller and support bracket, etc.

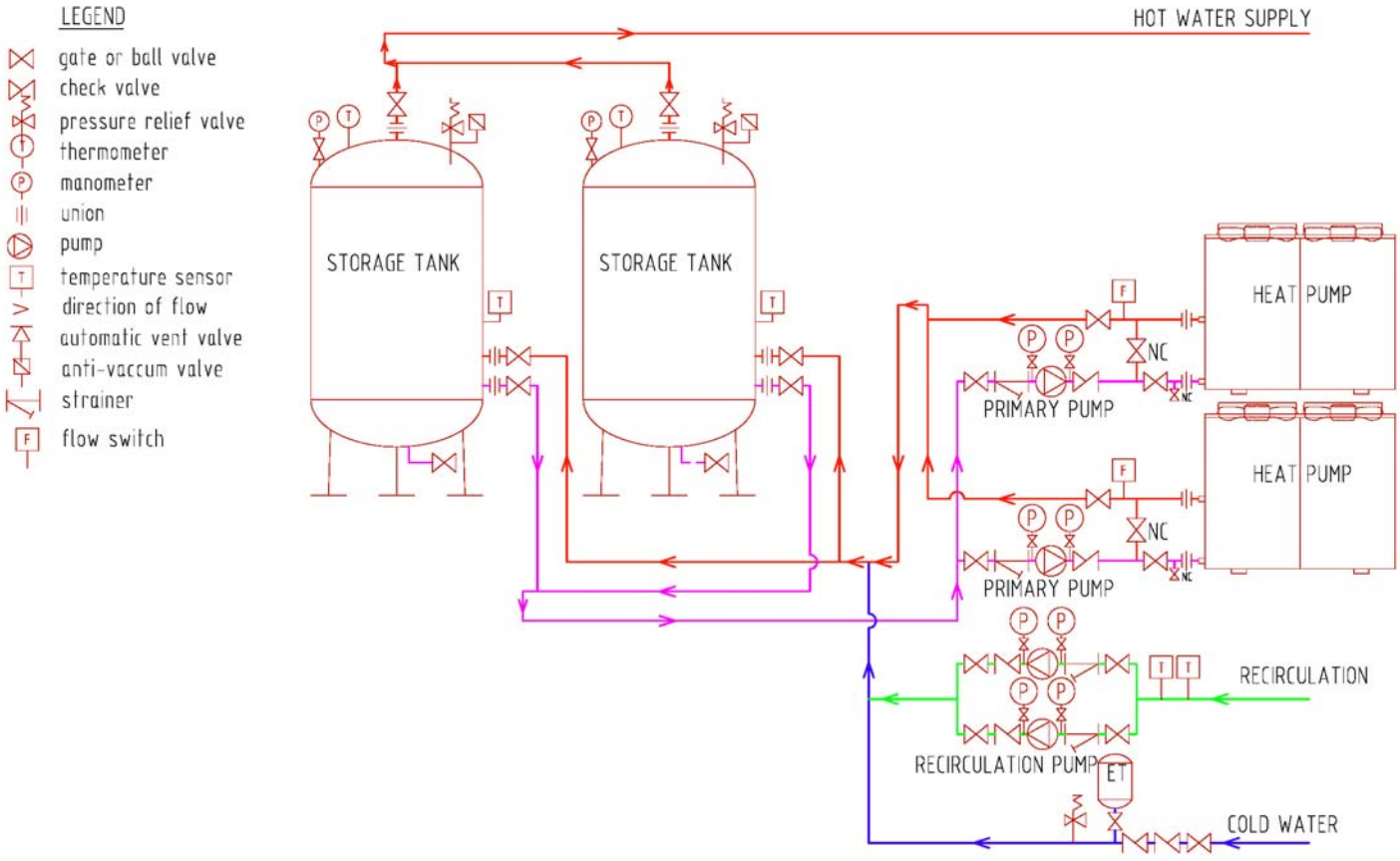
WARNING!
The grille is intended to protect operators from risks of injury from the fan blade during installation and maintenance.
However, it can cause clogging with frost or ice on heat pump machines installed in cold or mountainous regions.
To avoid such a risk, a shelter must be provided, or the protective grille can simply be removed.

5.3 Piping Diagram

Install flow switch at outlet pipe and wire it to PCB inside heat pump.

Install strainer (40~60 mesh) at inlet. Clean it regularly.

Install “NC” valves for heat exchanger back-washing and chemical washing.



HEAT PUMP WATER HEATER SYSTEM SCHEMATIC DRAWING

This diagram is a recommendation and is not intended to replace an engineered piping system by a professional engineer.

6 ELECTRICAL CONNECTION

6.1 Electrical Connection

Before starting any electrical connection, check that the electrical supply corresponds to the specification indicated on the unit's rating plate and to the unit's electrical characteristics table.

Important: It is the responsibility of the installer to provide circuit breaker protection, corresponding to the machine's capacity (refer to the Electrical specification table or the label pasted on the heat pumps).

Connection to the electrical network must comply with current electrical standards.

WARNING!

Site wiring must be carried out in accordance with the wiring diagram affixed to the unit's junction box.

The power cables for general power supply to the unit must have a copper core, with dimensions in accordance with current IEC standards and any applicable code.

The unit must be permanently grounded via a terminal block provided inside the junction box.

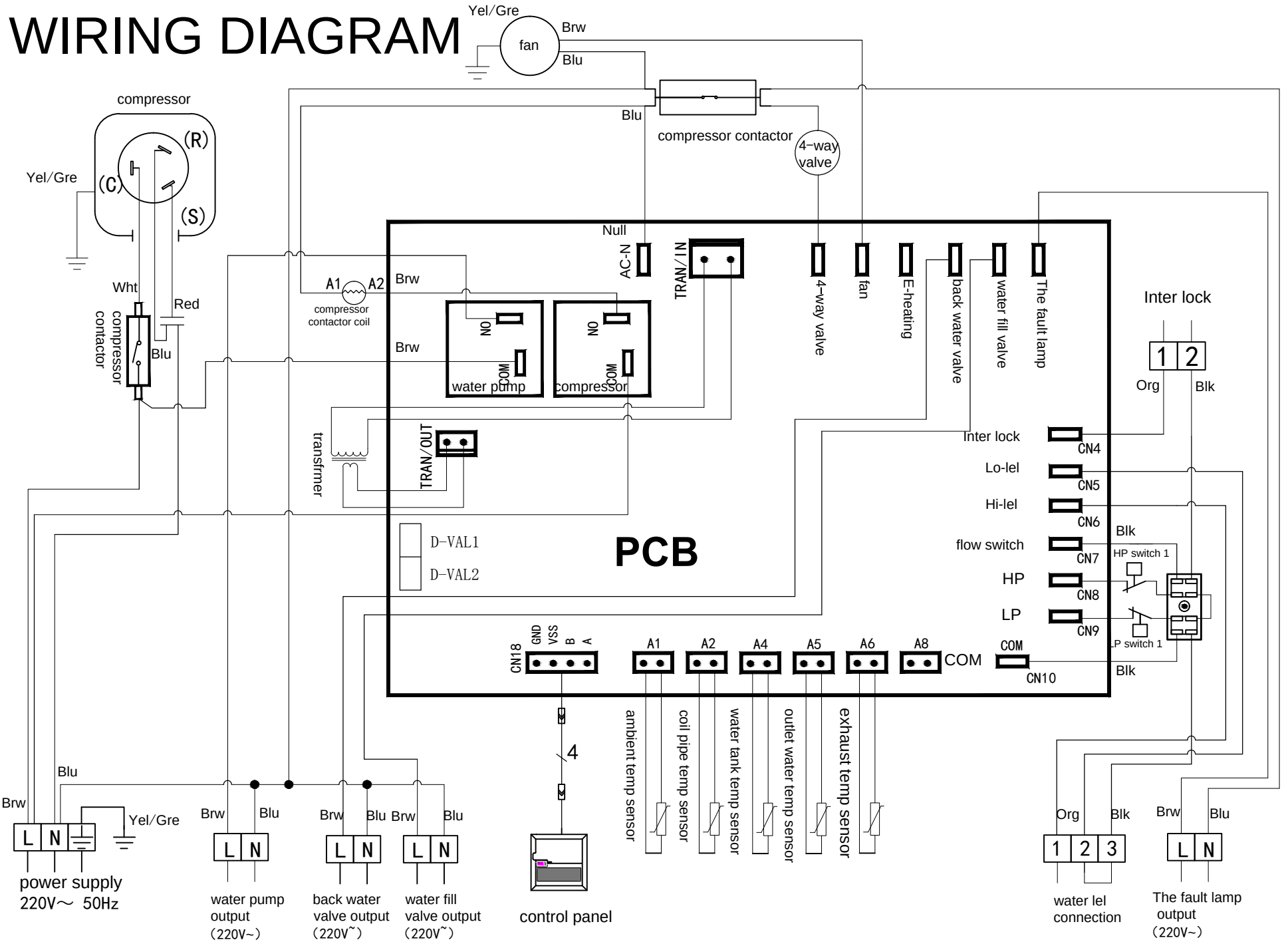
The supply voltage must not vary by more than 10%. Imbalance between the phases must not be more than 3%.

All the connections are made on screw terminals.

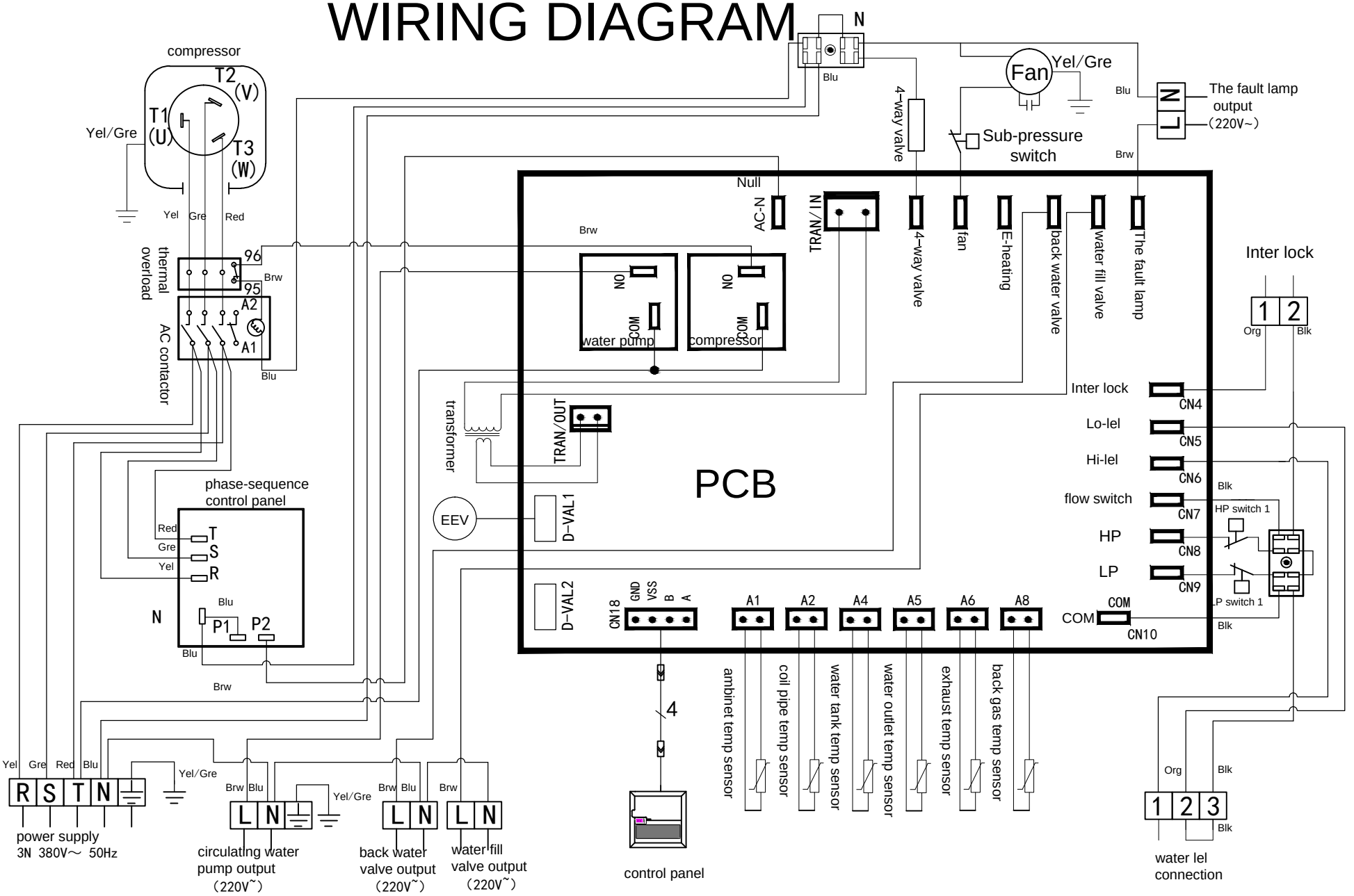
6.2 Wiring Diagram

These wiring diagrams are just for reference. Please refer to the wiring diagram label on the machine.

WIRING DIAGRAM



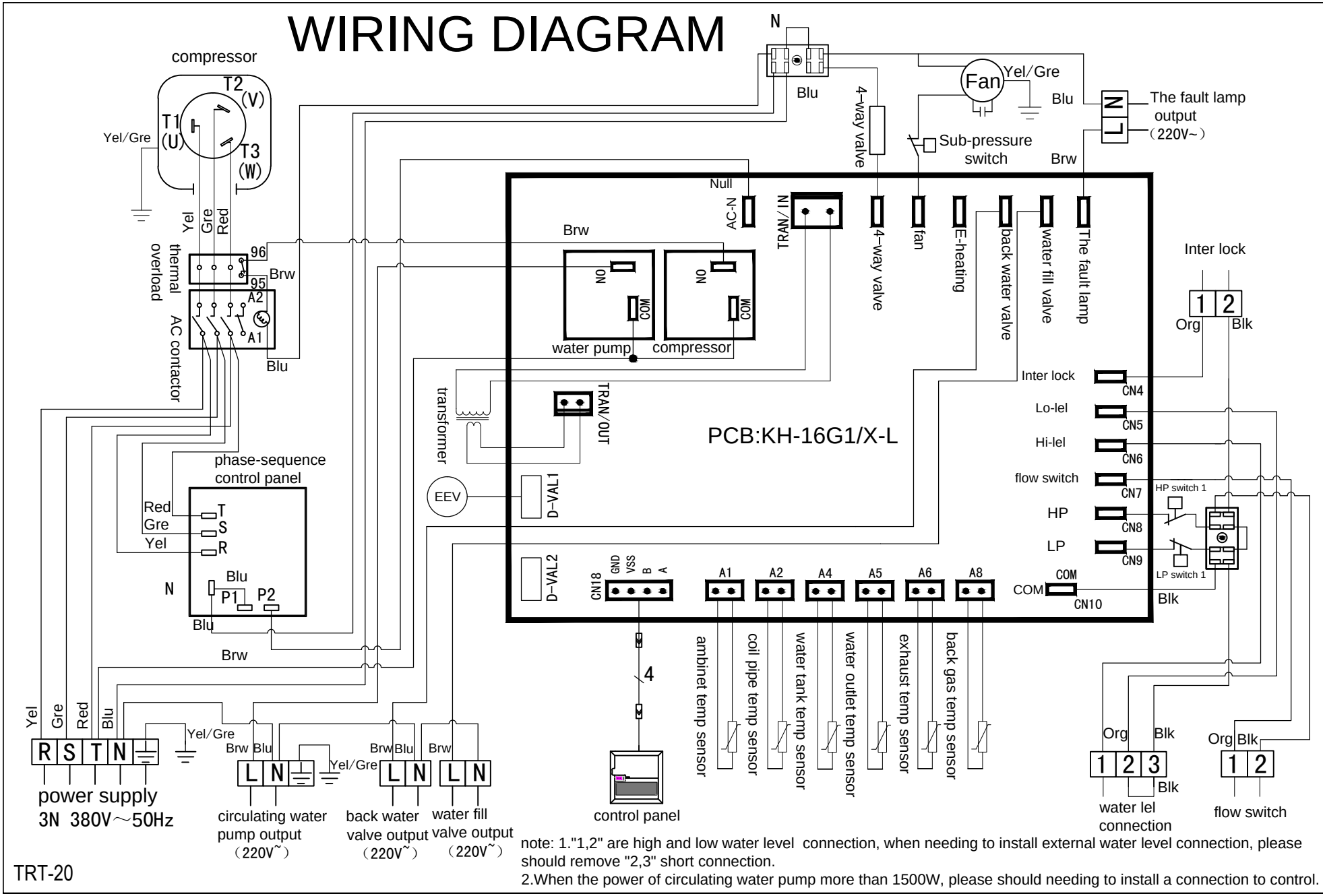
WIRING DIAGRAM



TRT-10 / TRT-18

note: 1."1,2" are high and low water level connection, when needing to install external water level connection, please should remove "2,3" short connection.
2.When the power of circulating water pump more than 1500W, please should needing to install a connection to control.

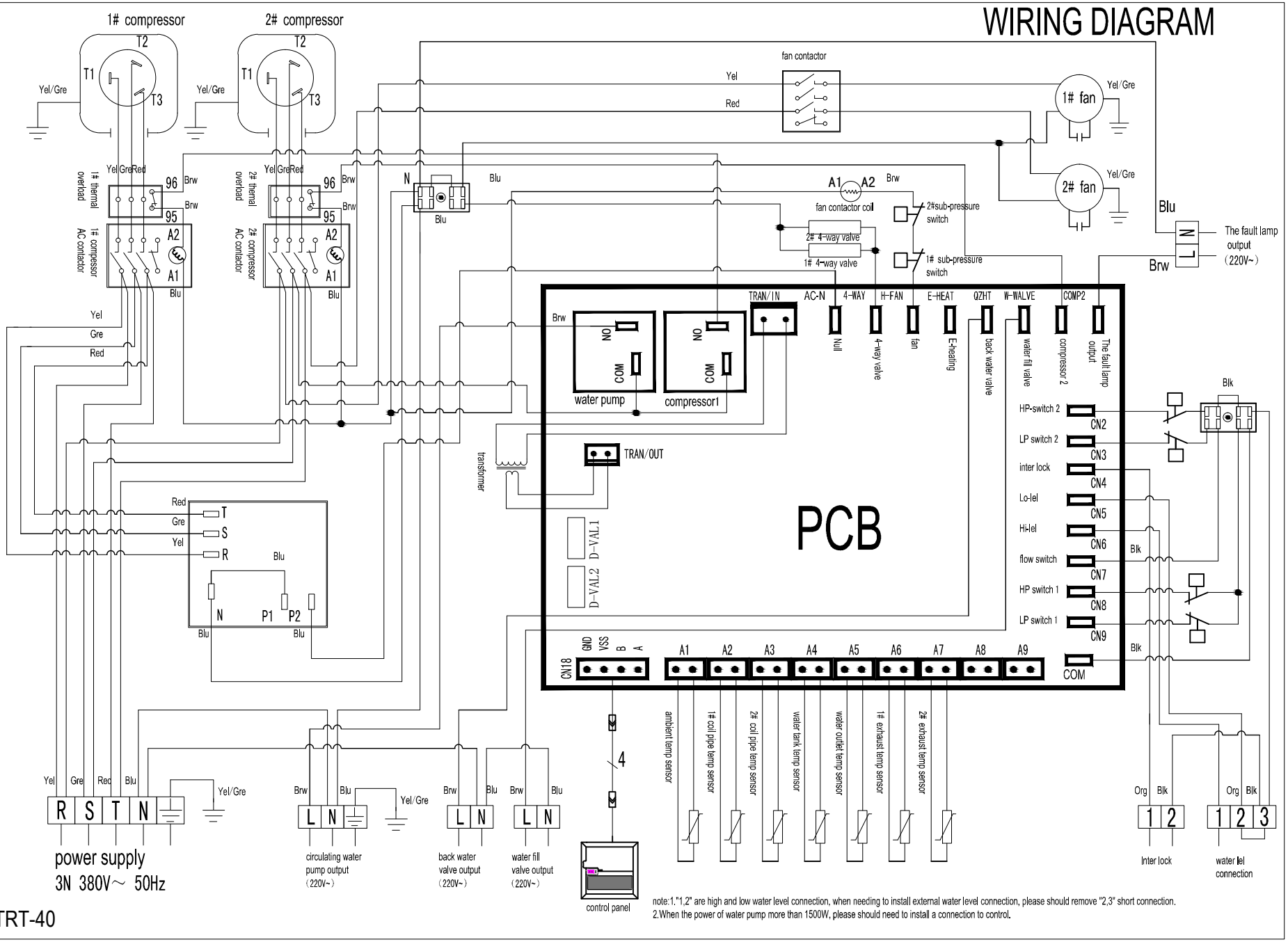
WIRING DIAGRAM



TRT-20

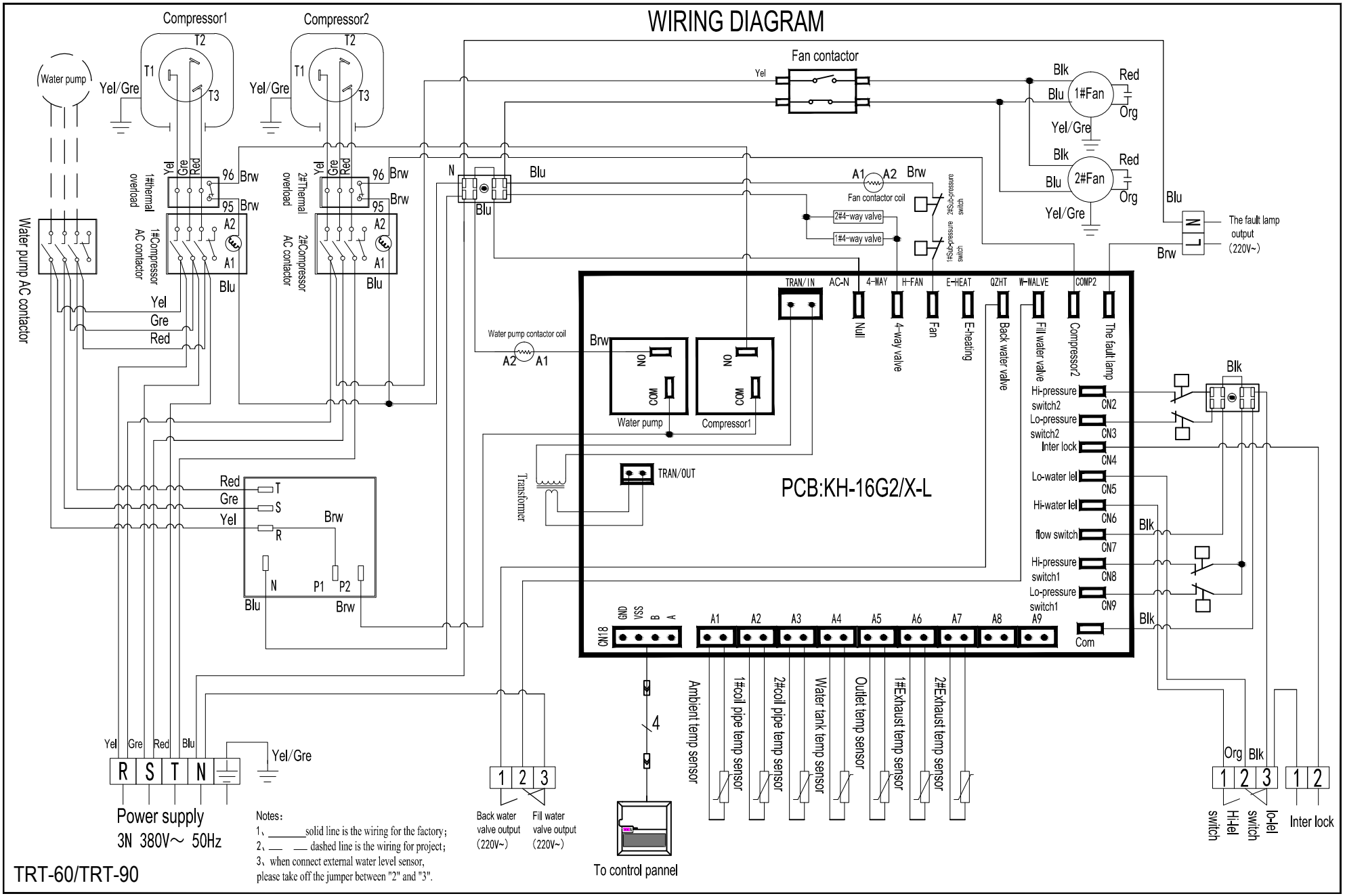
note: 1."1,2" are high and low water level connection, when needing to install external water level connection, please should remove "2,3" short connection.
2.When the power of circulating water pump more than 1500W, please should needing to install a connection to control.

WIRING DIAGRAM



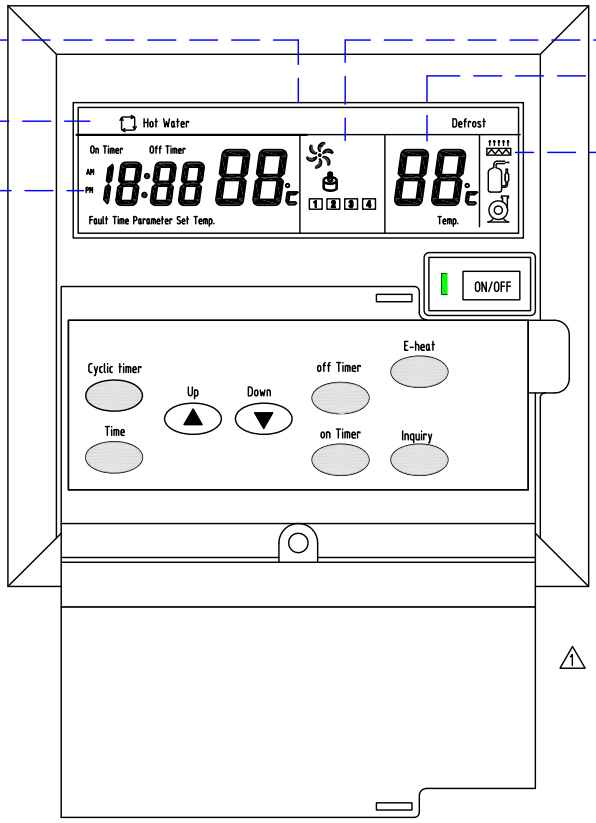
note:1."1,2" are high and low water level connection, when needing to install external water level connection, please should remove "2,3" short connection.
2.When the power of water pump more than 1500W, please should need to install a connection to control.

TRT-40


WIRING DIAGRAM
Compressor1
Compressor2
Water pump
Yel/Gre
T1
T2
T3
Fan contactor
Yel
Blk
Red
Blu
Org
1#Fan
2#Fan
Yel/Gre
1#thermal overload
2#Thermal overload
96
95
Brw
A1
A2
1#Compressor AC contactor
2#Compressor AC contactor
Blu
N
Fan contactor coil
2#4-way valve
1#4-way valve
High-pressure switch
The fault lamp output (220V~)
Water pump AC contactor
Yel
Gre
Red
Water pump contactor coil
Water pump
Compressor1
TRAN/IN
AC-N
4-WAY
H-FAN
E-HEAT
QZHT
W-WALVE
COMP2
Null
4-way valve
Fan
E-heating
Back water valve
Fill water valve
Compressor2
The fault lamp
Hi-pressure switch2
Lo-pressure switch2
Inter lock
Lo-water lel
Hi-water lel
flow switch
Hi-pressure switch1
Lo-pressure switch1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
Com
TRAN/OUT
Transformer
PCB:KH-16G2/X-L
CN18
GND
VSS
B
A
A1
A2
A3
A4
A5
A6
A7
A8
A9
Ambient temp sensor
1#coil pipe temp sensor
2#coil pipe temp sensor
Water tank temp sensor
Outlet temp sensor
1#Exhaust temp sensor
2#Exhaust temp sensor
R
S
T
N
Power supply
3N 380V~ 50Hz
Back water valve output (220V~)
Fill water valve output (220V~)
To control pannel
Org
Blk
Hi-lel switch
lo-lel switch
Inter lock
Notes:
1、_____solid line is the wiring for the factory;
2、__ __ dashed line is the wiring for project;
3、when connect external water level sensor, please take off the jumper between "2" and "3".
TRT-60/TRT-90

7. HOW TO USE

7.1 The display of the remote controller KH



LCD Screen

Mode display line

Cycle Timer

[Hot Water] Hot water condition

[Defrost] Defrost condition

Run display district 1

[on Timer], [off Timer]:

If either or both appears, it shows that the machine is set on Timer /off Timer.

AM (morning), PM (afternoon)

Time display district

Setting temperature district

Error code display district

Parameter setting display district

Run display district 2

Fan motor run display icon

Making-up water condition

1 2 3 4 Show different work condition

Run diaplay district 3

[Temp.]

Water tank current temperature show district

Run display district 4

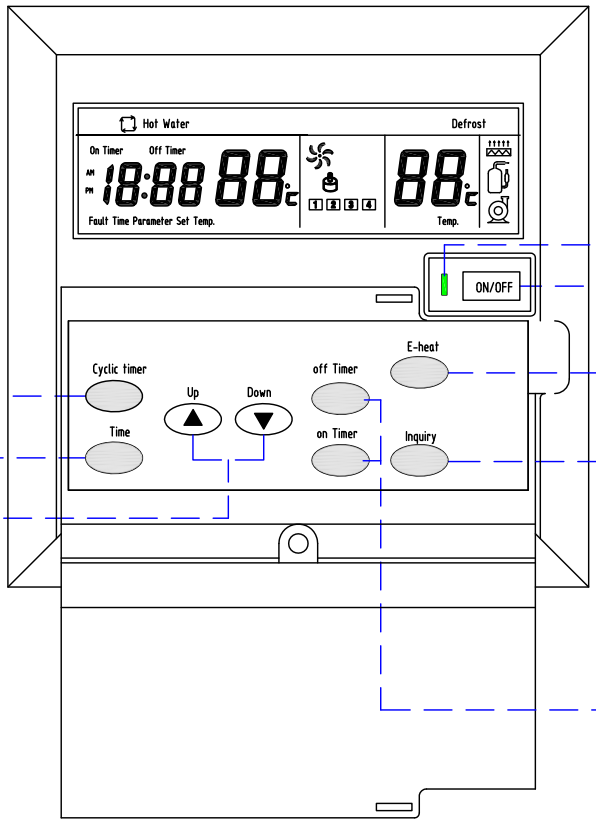
Heating element ⚠1

Compressor

Primary Pump

⚠1 (System does not equip heating element. This controller can control heating element that customer add.)

7.2 How to use remote controller



Power indicator light

Green, indicates power supply has been turned on.

Power ON/OFF

This key is used to turn on/off heat pump.

Cycle Timer

By press this key to activate or cancel the timed operation of heat pump after setting [on Timer] and [off Timer].

Time Setting

Press "Time" key and time display area will flash, then press [Up/Down] to adjust clock AM, PM, hours and minutes. Long press [Up/Down],then can set quickly.

+/-

Temperature, timer,clock and parameter adjusting key.

Electric Heating

Press this key to activate heating element regardless ambient temperature. When water temperature reaches the setting temperature, heating element will stop.

Inquiry Key

Press this key to check temperature of each temp. sensor in the unit (d). This key also is for function parameter adjustment (P).

Timer Switch

Using [Up/Down] to adjust time after pressing these [off timer] / [on timer] keys. Press [off timer] / [on timer] key again to confirm.

Long press [on Timer] key 10 seconds, then heat pump start "Defrost" mode. Press this key again to cancel "Defrost" mode.

Note:

1. Water temperature display

Water temperature display: When heat pump is "standby" or "power on" mode, there are two temperature displays on the screen. Left one is setting temperature, right one is current temperature in tank.

2. Inquiry key operation instruction

A. Press [Inquiry] key, check the temperature of each temp sensor (d01, d02...).

B. Long press this key to adjust some parameters (improper parameter setting can cause heat pump damage. So this is parameter adjustment is only for factory).

3. Controller panel mounting

Use M4 bolt to mount the panel. Please do not over-tighten the screw. Over-tightening may jam panel key.

8 TROUBLE SHOOTING (ERROR CODE INDICATION)

The following recommendations should be taken into consideration.

code	Description	Possible cause	Remedies
E01	water temp sensor error	water temp sensor is open or shorted circuit	check and replace sensor
E02	ambient temp sensor error	ambient temp sensor is open or shorted circuit	check and replace sensor
E03	system 1 evaporator temp sensor error	evaporator temp sensor open or shorted circuit	check and replace sensor
E04	water flow switch protection error	1. defective water flow switch 2. water pump not start 3. water flow not enough 4. water pipe jammed	1.check or replace water flow switch 2.check or replace water pump 3.clean water pipe and filter
E05	system 1 high pressure protection error	1. defective high pressure protection 2. water-flow not enough	1. check or replace high pressure switch 2. clean water pipe and filter
E06	system 1 low pressure protection error	1. defective low pressure protection switch 2. lack of refrigerant	1. check or replace low pressure switch 2. recharge refrigerant
E07	outlet water temp sensor error	outlet water temp sensor is open or shorted circuit	check and replace sensor
E08	water level probe protection for low water	1. lack of water in water tank 2. water level probe open circuit	1. check or clean make-up water pipe and make-up water valve 2. check water level probe and reset
E09	temp difference protection	1. excessive difference between inlet and outlet water temp 2. Water flow not enough	1. clean water pipe and filter 2. check or replace water pump
E10	communication error	control panel wire lose connection or open circuit	1. check control panel 2.replace control panel or PCB
E11	system 2 evaporator temp sensor error	evaporator temp sensor open or shorted circuit	check and replace sensor
E12	system 2 high pressure protection error	1. defective high pressure protection 2. water-flow not enough	1. check or replace high pressure switch 2. clean water pipe and filter
E13	system 2 low pressure protection error	1. defective low pressure protection switch 2. lack of refrigerant	1. check or replace low pressure switch 2. recharge refrigerant
E14	system 1 high discharge temp protection	1. discharge temp too high 2. lack of refrigerant	1. replace compressor lubricator 2. recharge refrigerant or turn up metering valve
E15	system 2 high discharge temp protection	1. discharge temp too high 2. lack of refrigerant	1. replace compressor lubricator 2. recharge refrigerant or turn up metering valve
E16	system 1 discharge temp sensor error	discharge temp sensor is open shorted circuit	check and replace sensor
E17	system 2 discharge temp sensor error	discharge temp sensor is open shorted circuit	check and replace sensor
E18	outlet high temp protection error	direct-heating heat pump outlet temp too high	1. increase inlet water flow or replace inlet water pump 2.recharge refrigerant

9 BEFORE START-UP

Flush system before putting into operation to ensure that foreign material does not damage pump seals.

Before start-up, water should be flowing through the heater.

Check the HPWH system: fix all the screw, check the communicate indicator on the control panel, check high/low pressure. When the pressure exceed the max , turn offer the power and check the system.
Check drain pipe before start-up.

10 AFTER START-UP

After the compressor working, check the operation sound. If there is abnormal sound, turn off and check the system. If the sound is normal, check the system pressure.

Check tank water temperature. The tank water temperature can be checked on remote control panel.

The default setting is factory setting. It's no necessary for end user to adjust.

Check whether water flow meet the unit's requirement.

11 MAINTENANCE

CAUTION!
Before proceeding with any maintenance on unit, be sure that the electrical supply is switched off.

Servicing and maintaining the units must be carried out by qualified air conditioning technicians.

Repeated tripping of safety and control devices must be thoroughly investigated and corrected before any further re-occurrence.

However, it is advisable to carry out a certain number of preventive operations in order to maintain the unit in optimum working order.

These operations essentially consist of standard checks (checking operating temperature settings, checking voltages and currents, checking water flow and temperatures, etc...) and should be carried out every 6 months.

PREPARATION FOR SHUTTING DOWN THE UNIT FOR A PROLONGED PERIOD

The following recommendations should be taken into consideration: After stopping the compressor, stop the circulation pump. If installation does not contain glycol, the condenser and the hot water pipes need to be carefully and completely drained of water in areas with low temperature.

FAN BEARINGS

The fan bearings are greased for life. These bearings require no greasing. However,

check every 6 months and make sure there is no abnormal wear on these moving parts.

ELECTRICAL TERMINALS

Check the screw terminal block every 6 months.

EVAPORATOR COIL

The evaporator coils do not require any special maintenance, except when they are clogged by debris. In corrosive environment, suitable protection should be provided. Cleaning can be done by washing with suitable detergent solution, and then rinsing with clean water.

CONDENSER

The condenser is a tube in tube heat exchanger. These condensers require no specific maintenance, but a strainer should be installed in order to prevent the ingress of impurities which could clog the condenser. Regularly back wash and chemical wash heat exchanger.

EXPANSION DEVICE

The expansion device requires no specific maintenance.

PUMP (supplied by others)

The pump requires no specific maintenance.

STORAGE TANK

Storage tank should be cleaned regularly.

REFRIGERANT CHARGE

The needle valve at suction pipe nearby compressor can be used for refrigerant charge.