OWNER'S & INSTALLATION MANUAL

Unitary Mini Chiller

Thank you very much for purchasing our air conditioner,
please read this installation&owner's manual carefully before using your air conditioner.

INDEX

The following symbols are used in this publication and inside the unit:

U User

I Installer

A Assistance


Important


Prohibition


Danger voltage


Danger moving blades


Danger high temperatures

GENERAL WARNINGS

U I A

⚠ These units have been designed to chill and/or heat water and must be used in applications compatible with their performance characteristics; these appliances are designed for residential or similar applications.
Incorrect installation, regulation and maintenance or improper use absolve the manufacturer from all liability, whether contractual or otherwise, for damage to people, animals or things. Only those applications specifically indicated in this list are permitted.
Read this manual carefully. All work must be carried out by qualified personnel in conformity with legislation in force in the country concerned.

The guarantee is invalidated if the above instructions are not respected and if the unit is started up for the first time without the presence of personnel authorised by the Company (where specified in the supply contract) who should draw up a "start-up" report.

The documentation supplied with the unit must be consigned to the owner who should keep it carefully for future consultation in the event of maintenance or service.

All repair or maintenance work must be carried out by the Company's Technical Service or qualified personnel following the instructions in this manual. The air-conditioner must under no circumstances be modified or tampered with as this may create situations of risk. Failure to observe this condition absolves the manufacturer of all liability for resulting damage.

FUNDAMENTAL SAFETY RULES

U I A

When operating equipment involving the use of electricity and water, a number of fundamental safety rules must be observed, namely:

⛔ This appliance is not intended for use by persons (including children) with reduced physical,sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Do not touch the unit with bare feet or with wet or damp parts of the body
Do not carry out cleaning operations without first disconnecting the system from the electricity supply.
Do not modify safety or regulation devices without authorisation and instructions from the manufacturer.
Do not pull, detach or twist the electrical cables coming from the unit, even when disconnected from the mains electricity supply.
Do not open doors or panels providing access to the internal parts of the unit without first ensuring that the mains switch is in the off position.

Do not introduce pointed objects through the air intake and outlet grills.

Do not dispose of, abandon or leave within reach of children packaging materials (cardboard, staples, plastic bags, etc.) as they may represent a hazard.

⚠ The chiller appliances are supplied without the main switch. The power supply to the unit must be disconnected using a suitable main switch that must be supplied and installed by the installer.

⚠ Respect safety distances between the unit and other equipment or structures. Guarantee adequate space for access to the unit for maintenance and/or service operations;
Power supply: the cross section of the electrical cables must be adequate for the power of the unit and the power supply voltage must correspond with the value indicated on the respective units. All units must be earthed in conformity with legislation in force in the country concerned.

⚠ Hydraulic connections should be carried out as indicated in the instructions to guarantee correct operation of the unit. Empty the water circuit or add glycol if the unit is not used during the winter.
Handle the unit with the utmost care to avoid damage.

These air cooled reverse-cycle chillers with axial-flow fans operate with refrigerant fluid and are suitable for outdoor installation. The units conform to the essential requisites of EEC directive 98/37.
They are factory tested and on site installation is limited to water and electrical connections.

STRUCTURE
Panels and base are made from galvanised steel plate painted with epoxy powder to ensure total resistance to atmospheric agents. Condensate collection pan as standard.

COMPRESSORS
Hermetic rotary or scroll compressor with crankcase heater and thermal cut-out .

EVAPORATOR
AISI 316 stainless steel plate type evaporator complete with electric heater and differential pressure switch.
Casing lined with anti-condensate closed cell neoprene cladding.

PUMPS
The units feature a pump with the moving parts in contact with the water made from corrosion resistant materials, extra wear ring on the impeller, built-in capacitor for high starting torque and automatic venting of impeller chamber.

PUMP ASSEMBLY
Pump assembly with expansion tank, safety valve, auto-water replenishing assembly, pressure gauge and pump.

CONDENSING COILS
Made from copper tubes and high surface area aluminium fins. Condensing coil protection grills as standard.

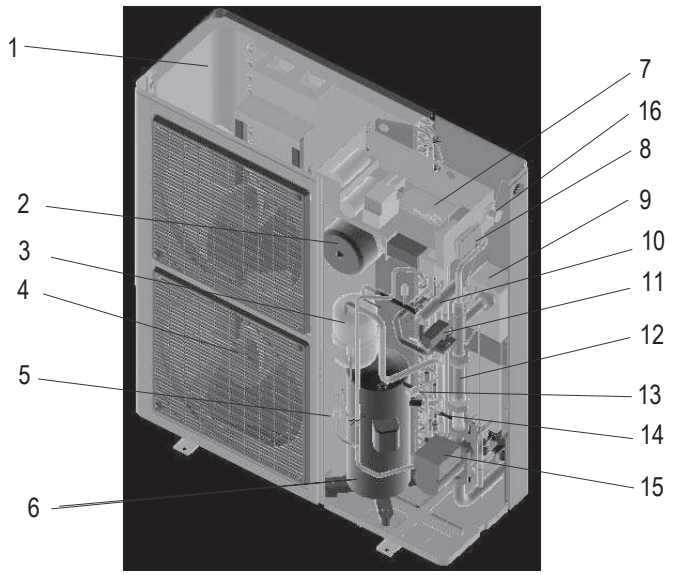
FANS
Axial-flow fans. Six-pole electric motor with built-in thermal cut-out. Housed in aerodynamic tubes with accident prevention grill. Device for operation with low outside air temperatures: continuous fan rotation speed control via condensing temperatures transducer.

POWER AND CONTROL ELECTRICAL PANEL
Power and control electrical panel constructed in accordance with IEC 204-1/EN60335-2-40, complete with compressor contactor. Control via “A2” control panel.

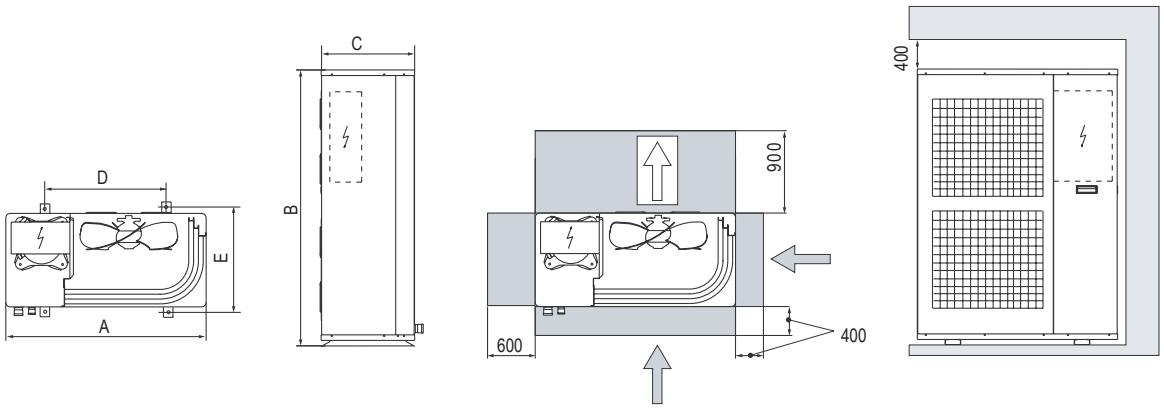
EMERGENCY STOP PUSHBUTTONS
In case system crisis is occur (e.g: Compressor out of control), press the emergency stop pushbuttons at once, and turn it clockwise, until crisis is removed

OPTIONAL ACCESSORIES
- Removable metal mesh filter.
- Remote keyboard kit.
- Additional pump.

The above accessories are optional. Consult the relative documentation for assembly instructions and technical data.



1 Condenser
2 Expansion tank
3 Accumulater
4 Axial-flow fan
5 High pressure switch
6 Compressor
7 Electrical panel
8 Control panel
9 Plate heat exchanger
10 Reversing valve (only cooling only)
11 Water differential pressure switch
12 Pump connecting pipe(model 12/14/16KW only)
13 Low pressure switch
14 Capillary
15 Pump
16 Emergency Stop Pushbuttons



1- Hydraulic connections IN : R1 (5~7) R5/4 (9~16)
2- Hydraulic connections OUT : R1 (5~7) R5/4 (9~16)

Dimension	5	7	9	10	12	14	16
A	990	990	940	940	1070	1070	1070
B	966	966	1245	1245	1249	1249	1249
C	354	354	360	360	420	420	420
D	624	624	600	600	698	698	698
E	366	366	376	376	430	430	430

CHOICE OF INSTALLATION SITE

Before installing the unit, agree with the customer the site where it will be installed, taking the following points into consideration:

- check that the fixing points are adequate to support the weight of the unit;
- pay scrupulous respect to safety distances between the unit and other equipment or structures to ensure that air entering the unit and discharged by the fans is free to circulate.

POSITIONING

Before handling the unit, check the capacity of the lifting equipment used, respecting the instructions on the packaging. To move the unit in the horizontal, make appropriate use of a lift truck or similar, bearing in mind the weight distribution of the unit. To lift the unit, insert tubes long enough to allow positioning of the lifting slings and safety pins in the feet on the unit.

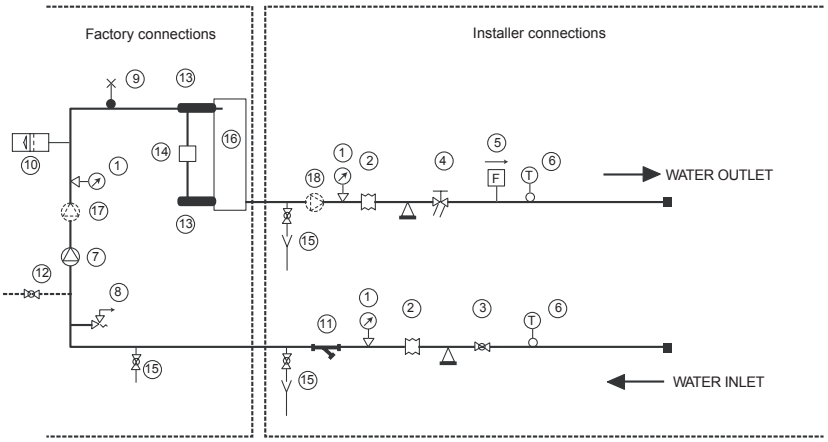
To avoid the slings damaging the unit, place protection between the slings and the unit. Position the unit in the site indicated by the customer. Place either a layer of rubber (min. thickness 10 mm) or vibration damper feet (optional) between the base and support surface. Fix the unit, making sure it is level and that there is easy access to hydraulic and electrical components. If the site of installation is exposed to strong winds, fix the unit adequately to the support surface using tie rods if necessary. If a heat pump unit is being installed, make sure the condensate is drained using the drain hose supplied as standard. Prevent leaves, branches or snow from accumulating around the unit. These could reduce the efficiency of the unit.

HYDRAULIC CONNECTIONS I A

The choice and installation of components is the responsibility of the installer who should follow good working practice and current legislation. Before connecting the pipes, make sure they do not contain stones, sand, rust, dross or other foreign bodies which might damage the unit. Construction of a bypass is recommended to enable the pipes to be washed through without having to disconnect the unit (see drain valves). The connection piping should be supported in such a way as to avoid it weighing on the unit. It is recommended that the following devices are installed in the water circuit of the evaporator.

A hydraulic safety valve shall be mounted in water system, which should open constantly.

1. Two pressure gauges with a suitable scale (inlet and outlet).
2. Two vibration damper joints (inlet and outlet).
3. Two gate valves (normal in inlet and calibrating in outlet).
4. A flow switch (inlet) or a differential pressure switch (inlet-outlet).
5. Two thermometers (inlet and outlet).
6. An inlet filter as close as possible to the evaporator and positioned to allow easy access for routine maintenance.
7. An energy-saving water tank.
8. Additional pump.
9. The connecting line of flow switch, which mounted outside the unit, should be connected in series with the pressure-difference switch, which mounted inside the unit.



1 Pressure gauge
2 Vibration damper joint
3 Gate valve
4 Calibrating valve
5 Flow switch
6 Thermometer
7 Pump
8 Safety valve
9 Air vent
10 Expansion tank
11 Mesh filter
12 Auto-water replenishing
13 Temperature sensor
14 Differential pressure switch
15 Drain/chemical washing valve
16 Plate heat exchanger
17 Additional pump
18 Additional pump

If the installation requires a useful head higher than that obtained by installing a pump assembly and storage tank, it is recommended that an additional pump is installed on the unit. Provided the additional pump installed inside of unit(only model 12/14/16KW can be installed inside of unit), the pump must connected close to plate heat exchanger. Provided the pump installed outside of unit, the pump shall be connected at water pipe's outlet.The pump can be easily installed on the unit by removing the pump connection pipe(see page 3). Connect to terminal PL,PN on the electrical panel.

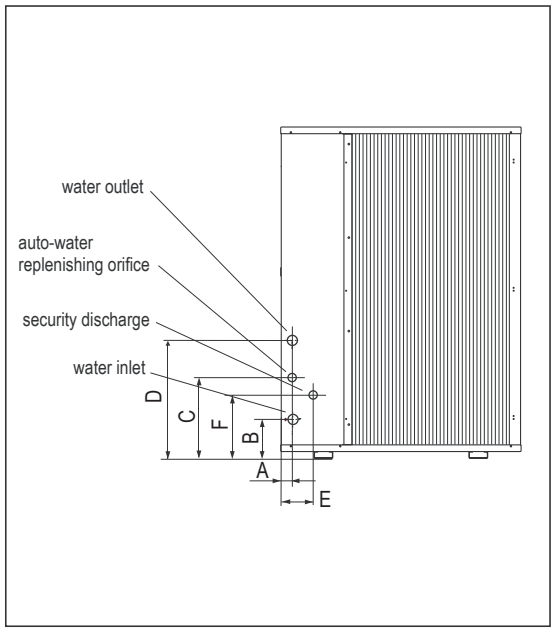
SIZE AND POSITION OF CONNECTIONS

Model	5	7	9	10	12	14	16
A (mm)	70	70	76	76	78	78	78
B (mm)	156	156	107	107	89	89	89
C (mm)	230	230	220	220	180	180	180
D (mm)	362	362	310	310	305	305	305
E (mm)	122	122	145	145	148	148	148
F (mm)	205	205	107	107	152	152	152
Water inlet/outlet (Ø)	R1	R1	R5/4	R5/4	R5/4	R5/4	R5/4
Auto-water replenishing (Ø)	G1/2	G1/2	G1/2	G1/2	G1/2	G1/2	G1/2
Security discharge (Ø)	G1/2	G1/2	G1/2	G1/2	G1/2	G1/2	G1/2

⚠ The chillers must be provided with a filling/top-up system connected to the return line and a drain cock in the lowest part of the installation. I nstallations containing anti-freeze or covered by specific legislation must be fitted with hydraulic disconnectors.

⚠ The manufacturer is not liable for obstruction, breakage or noise resulting from the failure to install filters or vibration dampers. Particular types of water used for filling or topping up must be treated with appropriate treatment systems. For reference values, see the table.

PH	6-8
Electrical conductivity	less than 200 mV/cm (25°C)
Chlorine ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
To tal iron	less than 0.3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
Ammonia ions	none
Silicon ions	less than 30 ppm



FILLING THE INSTALLATION

- Before filling, check that the installation drain cock is closed.
- Open all installation and terminal air vents.
- O pen the gate valves.
- Begin filling, slowly opening the water filling cock outside the unit
- W hen water begins to leak out of the terminal air vent valves , close them and continue filling until the pressure gauge indicates a pressure of 1.5 bars.

EMPTYING THE INSTALLATION

- Before emptying, place the mains switch in the "off" position
- Make sure the installation fill/top-up water cock is closed
- O pen the drain cock outside the unit and all the installation and terminal air vent valves.

⚠ The installation must be filled to a pressure of between 1 and 2 bars.
It is recommended that this operation be repeated after the unit has been operating for a number of hours. The pressure of the installation should be checked regularly and if it drops below 1 bar, the water content should be topped-up.
Check the hydraulic tightness of joints.

⚠ an all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device(RCD)with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule the appliance shall be installed in accordance with national wiring regulations

⚠ If the fluid in the circuit contains anti-freeze, it should not be allowed to drain freely as it is pollutant. It should be collected for possible reuse. When draining after heat pump operation, take care as the water may be hot (up to 50°).

The unitary mini chillers leave the factory already wired, and require the installation of an omnipolar thermal overload switch, a lockable mains disconnecting switch for the connection to the mains power supply, and the connection of the flow switch to the corresponding terminals. All the above operations must be carried out by qualified personnel in compliance with the legislation in force.

For all electrical work, refer to the electrical wiring diagrams in this manual. You are also recommended to check:
- that the characteristics of the mains electricity supply are adequate for the absorptions indicated in the electrical characteristics table below, also bearing in mind the possible use of other equipment at the same time.

⚠ Power to the unit must be turned on only after installation work (hydraulic and electrical) has been completed.
All electrical connections must be carried out by qualified personnel in accordance with legislation in force in the country concerned.
Respect instructions for connecting phase, neutral and earth conductors. The power line should be fitted upstream with a suitable device to protect against short-circuits and leakage to earth, isolating the installation from other equipment.

⚠ Voltage must be within a tolerance of ±10% of the rated power supply voltage for the unit (for three phase units, the unbalance between the phases must not exceed 3%). If these parameters are not respected, contact the electricity supply company
For electrical connections, use double insulation cable in conformity with current legislation in the country concerned

An omnipolar thermal overload switch and a lockable mains disconnecting switch, in compliance with the CEI-EN standards (contact opening of at least 3mm), with adequate switching and residual current protection capacity based on the electrical data table shown below, must be installed as near as possible to the appliance

⚠ The devices on the unit must be lockable.
An efficient earth connection is obligatory. Failure to earth the appliance absolves the manufacturer of all liability for damage.
In the case of three phase units, ensure the phases are connected correctly.

⛔ Do not use water pipes to earth the unit.

ELECTRICAL DATA

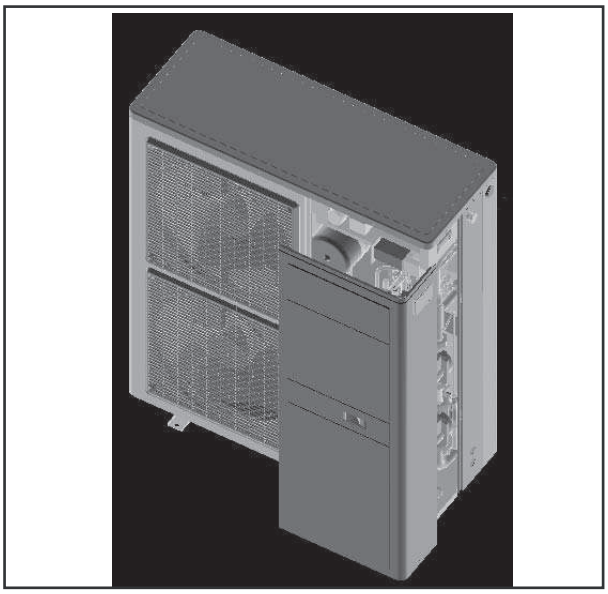
Mod.	Electrical power supply (V-Ph-Hz)	Rated values (1)									Max. values (2)		FUSES Glass 5x20mm 250V FUSE1
		Compressors			Fan/fans		Pump		Total				
		F.L.I. (kW)	F.L.A. (A)	L.R.A. (A)	F.L.I. (kW)	F.L.A. (A)	F.L.I. (kW)	F.L.A. (A)	F.L.I. (kW)	F.L.A. (A)	F.L.I. (kW)	F.L.A. (A)	
5	220-240~50	1.80	8.75	36.8	0.23	1.1	0.10	0.40	2.13	9.6	2.5	11.3	5A
7	220-240~50	2.57	12.1	50.8	0.23	1.10	0.10	0.40	2.90	13.6	3.5	16.00	5A
9	220-240~50	3.01	14.1	96	0.32	1.50	0.21	1.0	3.54	16.9	4.95	23.1	5A
10	220-240~50	3.40	15.80	136	0.32	1.50	0.21	1.0	3.93	18.3	5.0	23.7	5A
10	380-415 3N~50	3.40	5.30	50	0.32	1.50	0.21	1.0	3.93	6.10	5.0	8.60	5A
12	380-415 3N~50	4.17	6.30	67	0.32	1.50	0.21	1.0	4.70	8.80	5.5	9.9	5A
14	380-415 3N~50	4.62	5.70	67	0.32	1.50	0.21	1.0	5.15	8.20	6.55	10.50	5A
16	380-415 3N~50	6.02	10.68	67	0.32	1.50	0.21	1.0	6.55	11.5	8.0	13.5	5A

F.L.I. power input
F.L.A. current input
L.R.A. compressor start-up current
(1) Outside air temperature 35°C - Water temperature at evaporator 12/7°C.
(2) Values refer to the lower rated voltage (50 Hz). These values should be used to dimension protection switches and power cable

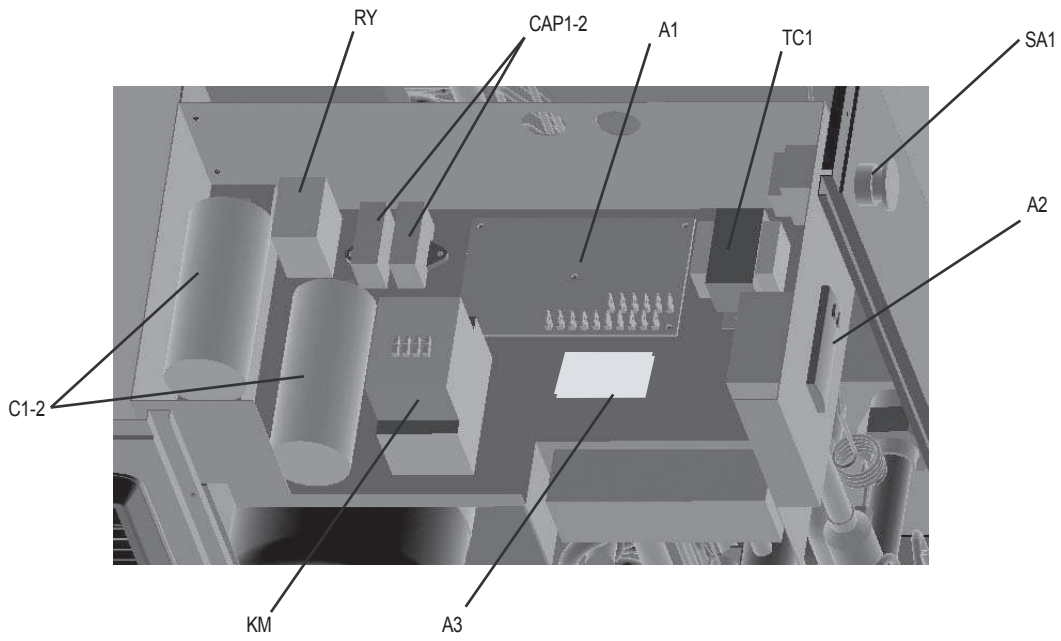
ELECTRICAL PANEL

The electrical panel is located inside the unit at the top of the technical compartment where the various components of the refrigerant circuit are also to be found.

To access the electrical panel, remove the front panel of the unit by undoing the screws.



ELECTRICAL PANEL LAYOUT



SA1 Emergency switch
A2 Electronic controller
RY Compressor start relay
A1 Power control board
C1-2 Compressor capacitor
CAP1-2 Fan capacitor
KM Compress contactor
T1 Safety transformer
A3 FILTER

ELECTRICAL POWER CONNECTIONS

For the functional connection of the unit, bring the power supply cable to the electrical panel inside the unit and connect it to terminals L-N and ⏚ respecting the (L) phase, (N) neutral and ⏚ earth in the case of single phase units (220-240V~50Hz), or L1-L2-L3 phases, N neutral and PE earth in three phase units (380-415V 3N~ 50Hz)

Dealer provides power cord.

A UXILIARY CONNECTIONS

All terminals referred to in the explanations below are to be found on the terminal board inside the electrical panel and described as "installer terminals".

REMOTE START UP AND STANDBY

To fit a remote on/standby device, the jumper must be replaced with a switch connected to terminals 4 and 5 on the installer terminal board. For timed operation, connect a daily or weekly timer between terminals 4 and 5.

REMOTE KEYBOARD KIT

The remote keyboard kit can be used to display all unit functions and access the parameters of the electronic board from a point located at some distance from the unit itself.

It consists of a remote control module.

To install the kit, proceed as follows:

- disconnect the power supply and then access the inside of the electrical panel;
- connect the remote control module with 3 wires to terminals 15, 16 and 17 on the installer terminal board:
  connect terminal 15 to terminal Black/gnd on the module;
  connect terminal 16 to terminal Blue/signal on the module;
  connect terminal 17 to terminal Red/+12v on the module;

⚠ To avoid interference due to magnetic fields, the use of shielded cable is recommended. The cable should not be more than 100m long.

The Specification of Power

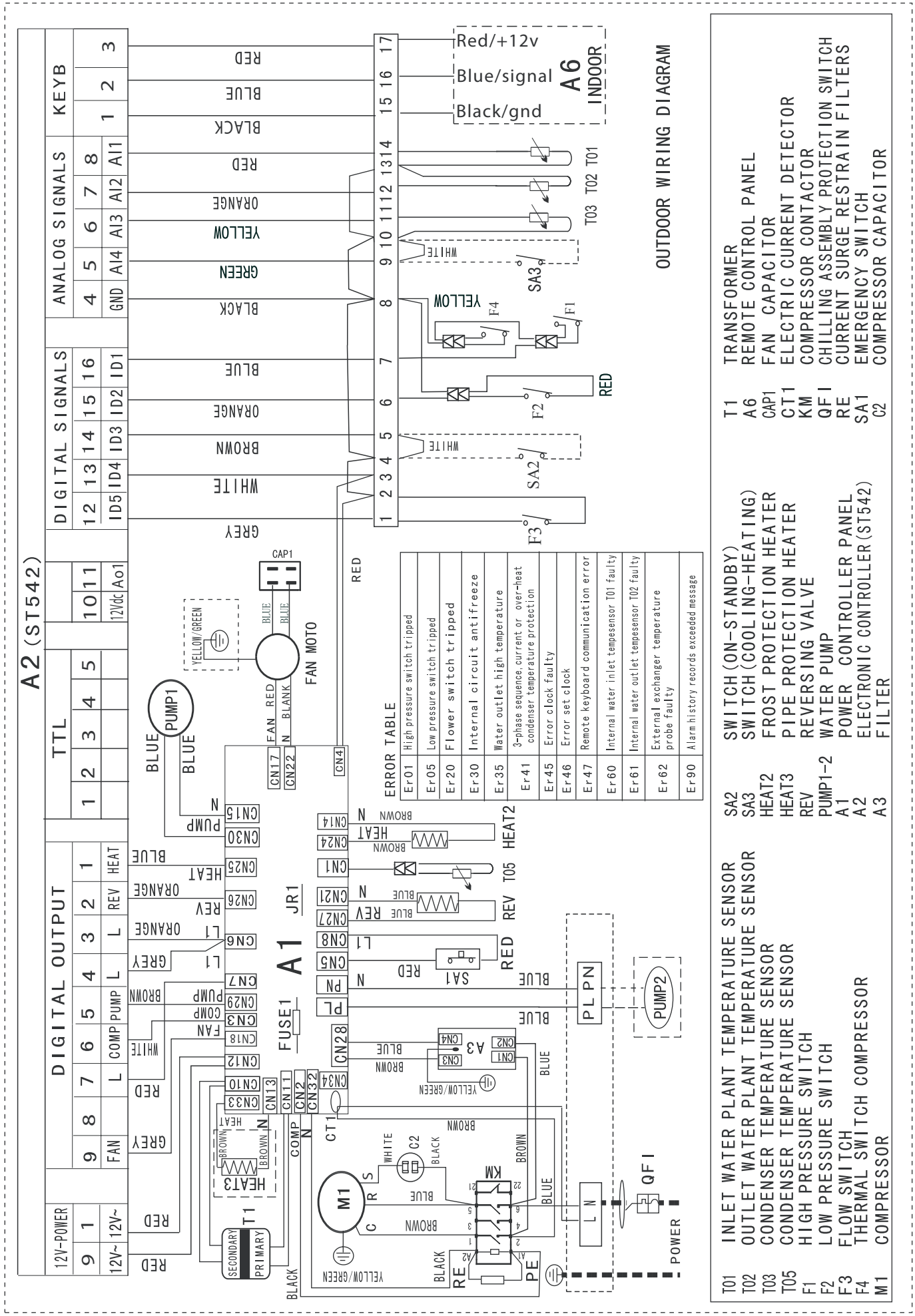
TYPE		5	7	9	10
POWER	PHASE	1-PHASE	1-PHASE	1-PHASE	1-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	220-240V~, 50Hz	220-240V~, 50Hz	220-240V~, 50Hz
CIRCUIT BREAKER/FUSE (A)		25/20	30/25	40/25	40/35
POWER WIRING (mm^2)		3x2.5	3x2.5	3x4.0	3x4.0
GROUND WIRING (mm^2)		2.5	2.5	4.0	4.0
OUTDOOR/INDOOR CONNETING WIRING(mm^2)		1.0	1.0	1.0	1.0

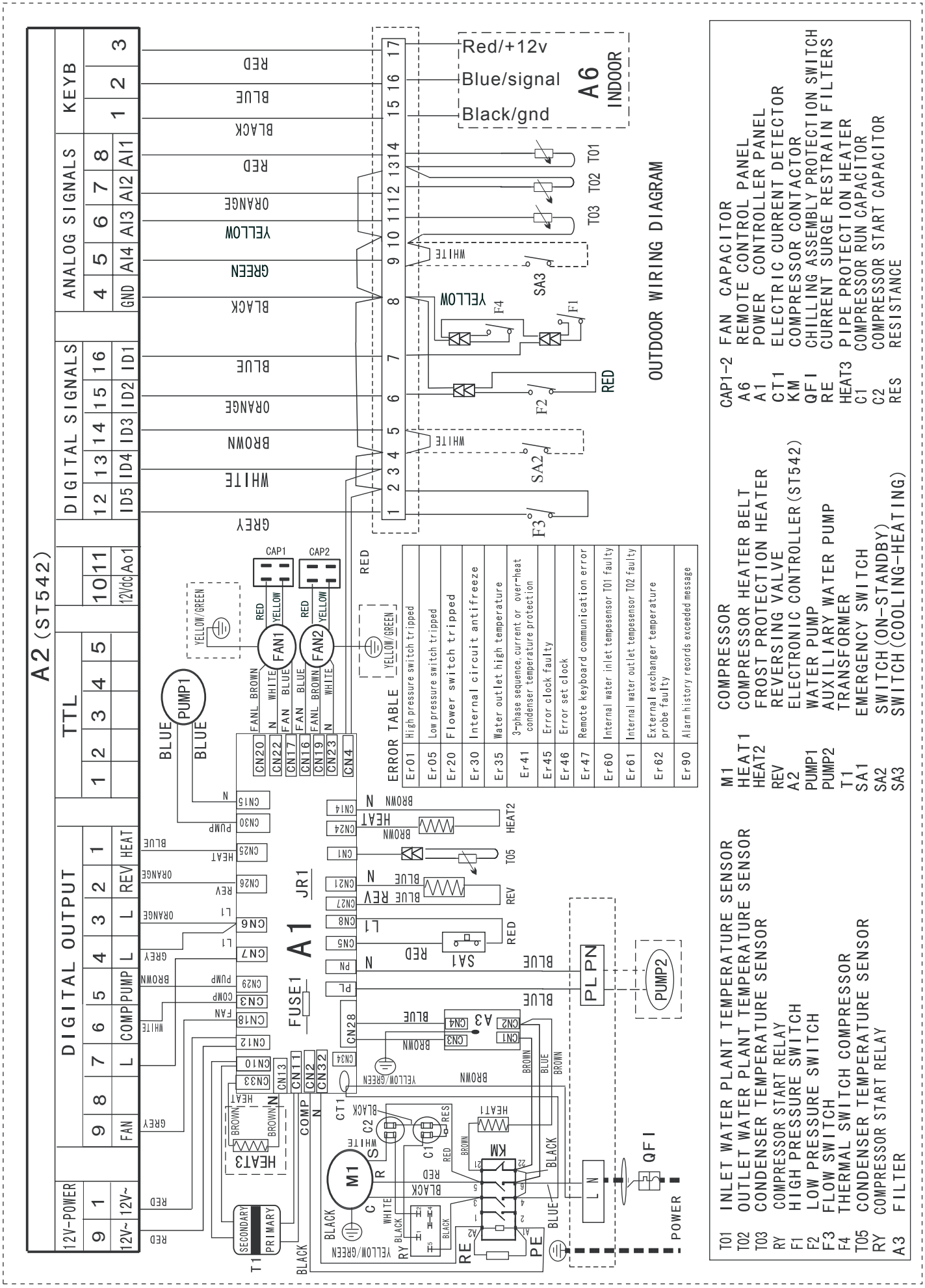
TYPE		10	12	14	16
POWER	PHASE	3-PHASE	3-PHASE	3-PHASE	3-PHASE
	FREQUENCY AND VOLT	380-415V 3N~, 50Hz	380-415V 3N~, 50Hz	380-415V 3N~, 50Hz	380-415V 3N~, 50Hz
CIRCUIT BREAKER/FUSE (A)		25/15	25/15	25/15	30/20
POWER WIRING (mm^2)		5x2.5	5x2.5	5x2.5	5x4.0
GROUND WIRING (mm^2)		2.5	2.5	2.5	4.0
OUTDOOR/INDOOR CONNETING WIRING(mm^2)		1.0	1.0	1.0	1.0

⚠ The power cord type designation is H07RN-F.

Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed flexible cord, type designation H07RN-F or heavier cord.

The means for disconnection from a power supply shall be incorporated in the fixed wiring and have an air gap contact separation of at least 3mm in each active(phase) conductors.

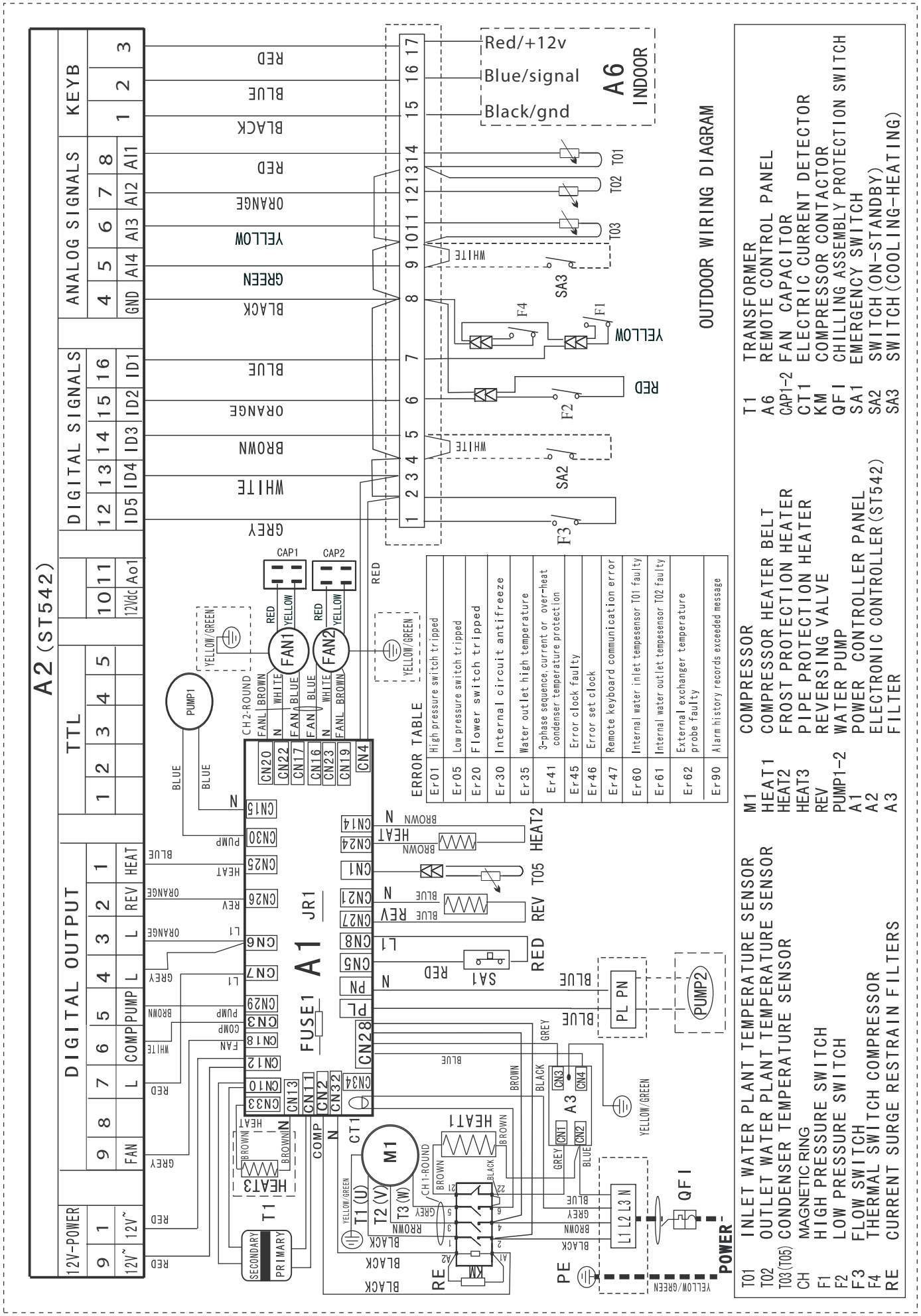

A2 (ST542)
A1
A6 INDOOR
Red/+12v
Blue/signal
Black/gnd
OUTDOOR WIRING DIAGRAM
ERROR TABLE
Er01 High pressure switch tripped
Er05 Low pressure switch tripped
Er20 Flower switch tripped
Er30 Internal circuit antifreeze
Er35 Water outlet high temperature
Er41 3-phase sequence, current or over-heat condenser temperature protection
Er45 Error clock faulty
Er46 Error set clock
Er47 Remote keyboard communication error
Er60 Internal water inlet tempesensor T01 faulty
Er61 Internal water outlet tempesensor T02 faulty
Er62 External exchanger temperature probe faulty
Er90 Alarm history records exceeded message
T01 INLET WATER PLANT TEMPERATURE SENSOR
T02 OUTLET WATER PLANT TEMPERATURE SENSOR
T03 CONDENSER TEMPERATURE SENSOR
T05 CONDENSER TEMPERATURE SENSOR
F1 HIGH PRESSURE SWITCH
F2 LOW PRESSURE SWITCH
F3 FLOW SWITCH
F4 THERMAL SWITCH COMPRESSOR
M1 COMPRESSOR
SA2 SWITCH(ON-STANDBY)
SA3 SWITCH(COOLING-HEATING)
HEAT2 FROST PROTECTION HEATER
HEAT3 PIPE PROTECTION HEATER
REV REVERSING VALVE
PUMP1-2 WATER PUMP
A1 POWER CONTROLLER PANEL
A2 ELECTRONIC CONTROLLER(ST542)
A3 FILTER
T1 TRANSFORMER
A6 REMOTE CONTROL PANEL
CAP1 FAN CAPACITOR
CT1 ELECTRIC CURRENT DETECTOR
KM COMPRESSOR CONTACTOR
QF1 CHILLING ASSEMBLY PROTECTION SWITCH
RE CURRENT SURGE RESTRAIN FILTERS
SA1 EMERGENCY SWITCH
C2 COMPRESSOR CAPACITOR
POWER
PUMP1
PUMP2
FAN MOTO
HEAT3
HEAT2
REV
SA1
SA2
SA3
F1
F2
F3
F4
M1
C2
CT1
KM
QF1
RE
PE
T1
A3
JR1
FUSE1
CAP1
DIGITAL OUTPUT
TTL
DIGITAL SIGNALS
ANALOG SIGNALS
KEYB
12V-POWER

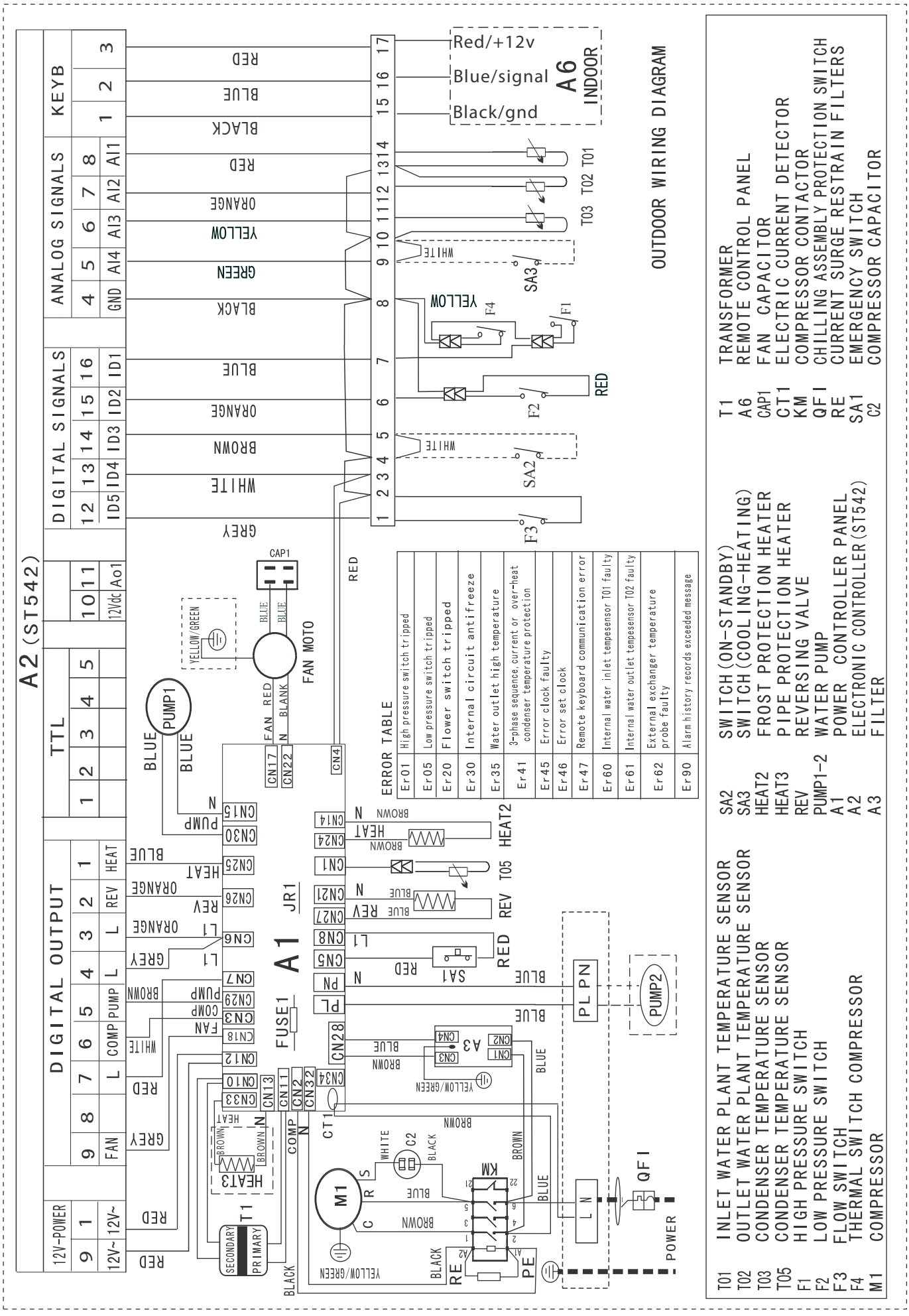


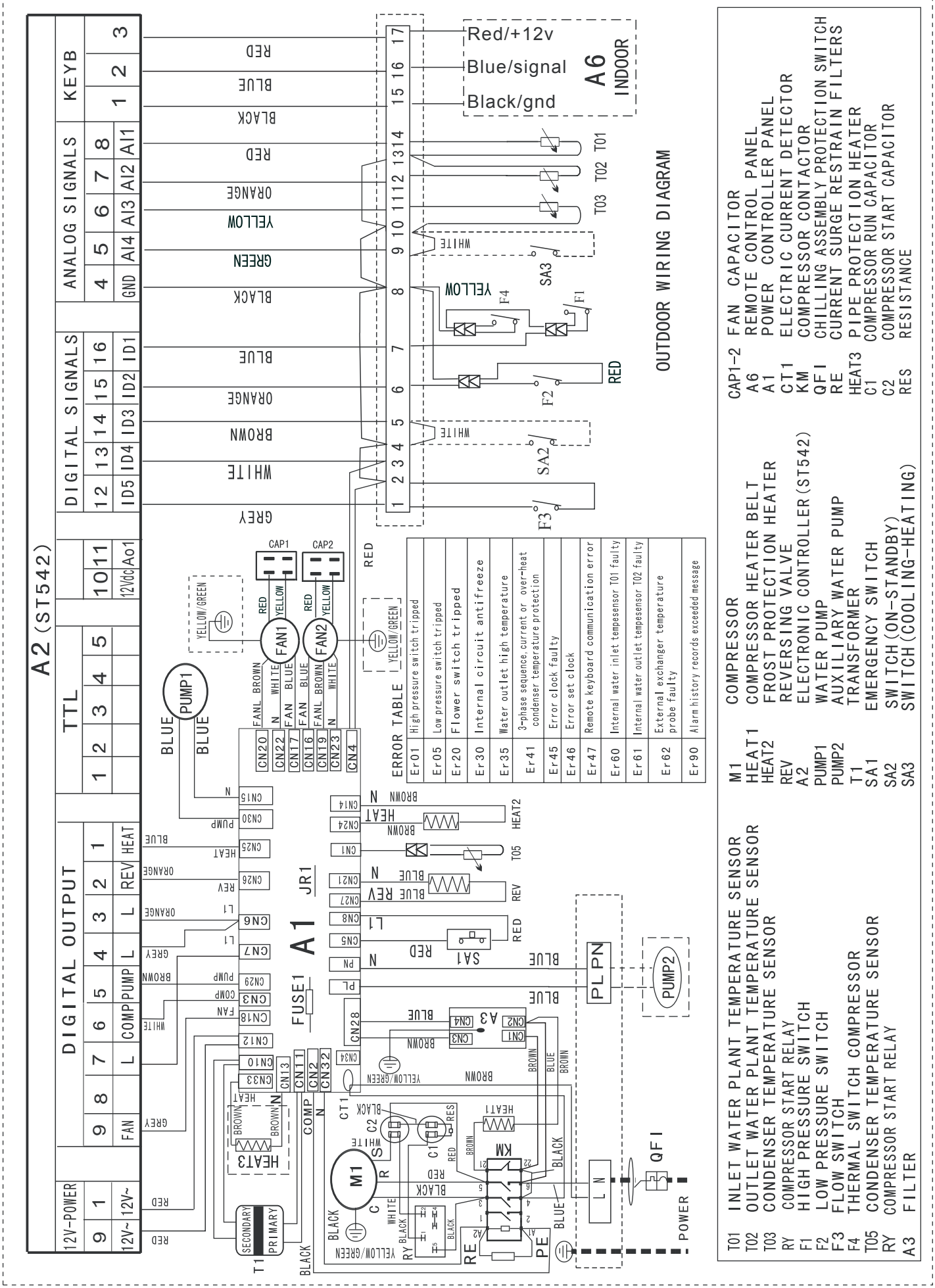
T01 INLET WATER PLANT TEMPERATURE SENSOR
T02 OUTLET WATER PLANT TEMPERATURE SENSOR
T03 CONDENSER TEMPERATURE SENSOR
RY COMPRESSOR START RELAY
F1 HIGH PRESSURE SWITCH
F2 LOW PRESSURE SWITCH
F3 FLOW SWITCH
F4 THERMAL SWITCH COMPRESSOR
T05 CONDENSER TEMPERATURE SENSOR
RY COMPRESSOR START RELAY
A3 FILTER

M1 COMPRESSOR
HEAT1 COMPRESSOR HEATER BELT
HEAT2 FROST PROTECTION HEATER
REV REVERSING VALVE
A2 ELECTRONIC CONTROLLER(ST542)
PUMP1 WATER PUMP
PUMP2 AUXILIARY WATER PUMP
T1 TRANSFORMER
SA1 EMERGENCY SWITCH
SA2 SWITCH(ON-STANDBY)
SA3 SWITCH(COOLING-HEATING)

CAP1-2 FAN CAPACITOR
A6 REMOTE CONTROL PANEL
A1 POWER CONTROLLER PANEL
CT1 ELECTRIC CURRENT DETECTOR
KM COMPRESSOR CONTACTOR
QF1 CHILLING ASSEMBLY PROTECTION SWITCH
RE CURRENT SURGE RESTRAIN FILTERS
HEAT3 PIPE PROTECTION HEATER
C1 COMPRESSOR RUN CAPACITOR
C2 COMPRESSOR START CAPACITOR
RES RESISTANCE


A2 (ST542)
12V-POWER
DIGITAL OUTPUT
TTL
DIGITAL SIGNALS
ANALOG SIGNALS
KEYB
A6 INDOOR
Red/+12v
Blue/signal
Black/gnd
OUTDOOR WIRING DIAGRAM
A1 JR1
FUSE1
HEAT1
HEAT2
HEAT3
REV
PUMP1
PUMP2
CAP1
CAP2
FAN1
FAN2
CH1-ROUND
CH2-ROUND
SA1
SA2
SA3
F1
F2
F3
F4
QF1
RE
PE
POWER
ERROR TABLE
High pressure switch tripped
Low pressure switch tripped
Flower switch tripped
Internal circuit antifreeze
Water outlet high temperature
3-phase sequence, current or over-heat condenser temperature protection
Error clock faulty
Error set clock
Remote keyboard communication error
Internal water inlet tempesensor T01 faulty
Internal water outlet tempesensor T02 faulty
External exchanger temperature probe faulty
Alarm history records exceeded message
T01 INLET WATER PLANT TEMPERATURE SENSOR
T02 OUTLET WATER PLANT TEMPERATURE SENSOR
T03(T05) CONDENSER TEMPERATURE SENSOR
CH MAGNETIC RING
F1 HIGH PRESSURE SWITCH
F2 LOW PRESSURE SWITCH
F3 THERMAL SWITCH COMPRESSOR
F4 CURRENT SURGE RESTRAIN FILTERS
M1 COMPRESSOR
HEAT1 COMPRESSOR HEATER BELT
HEAT2 FROST PROTECTION HEATER
HEAT3 PIPE PROTECTION HEATER
REV REVERSING VALVE
PUMP1-2 WATER PUMP
A1 POWER CONTROLLER PANEL
A2 ELECTRONIC CONTROLLER(ST542)
A3 FILTER
T1 TRANSFORMER
A6 REMOTE CONTROL PANEL
CAP1-2 FAN CAPACITOR
CT1 ELECTRIC CURRENT DETECTOR
KM COMPRESSOR CONTACTOR
QF1 CHILLING ASSEMBLY PROTECTION SWITCH
SA1 EMERGENCY SWITCH
SA2 SWITCH(ON-STANDBY)
SA3 SWITCH(COOLING-HEATING)


OUTDOOR WIRING DIAGRAM
A2 (ST542)
A1
A6 INDOOR
Red/+12v
Blue/signal
Black/gnd
ERROR TABLE
Er01 High pressure switch tripped
Er05 Low pressure switch tripped
Er20 Flower switch tripped
Er30 Internal circuit antifreeze
Er35 Water outlet high temperature
Er41 3-phase sequence, current or over-heat condenser temperature protection
Er45 Error clock faulty
Er46 Error set clock
Er47 Remote keyboard communication error
Er60 Internal water inlet tempesensor T01 faulty
Er61 Internal water outlet tempesensor T02 faulty
Er62 External exchanger temperature probe faulty
Er90 Alarm history records exceeded message
T01 INLET WATER PLANT TEMPERATURE SENSOR
T02 OUTLET WATER PLANT TEMPERATURE SENSOR
T03 CONDENSER TEMPERATURE SENSOR
T05 CONDENSER TEMPERATURE SENSOR
F1 HIGH PRESSURE SWITCH
F2 LOW PRESSURE SWITCH
F3 FLOW SWITCH
F4 THERMAL SWITCH COMPRESSOR
M1 COMPRESSOR
SA2 SWITCH(ON-STANDBY)
SA3 SWITCH(COOLING-HEATING)
HEAT2 FROST PROTECTION HEATER
HEAT3 PIPE PROTECTION HEATER
REV REVERSING VALVE
PUMP1-2 WATER PUMP
A1 POWER CONTROLLER PANEL
A2 ELECTRONIC CONTROLLER(ST542)
A3 FILTER
T1 TRANSFORMER
A6 REMOTE CONTROL PANEL
CAP1 FAN CAPACITOR
CT1 ELECTRIC CURRENT DETECTOR
KM COMPRESSOR CONTACTOR
QF1 CHILLING ASSEMBLY PROTECTION SWITCH
RE CURRENT SURGE RESTRAIN FILTERS
SA1 EMERGENCY SWITCH
C2 COMPRESSOR CAPACITOR

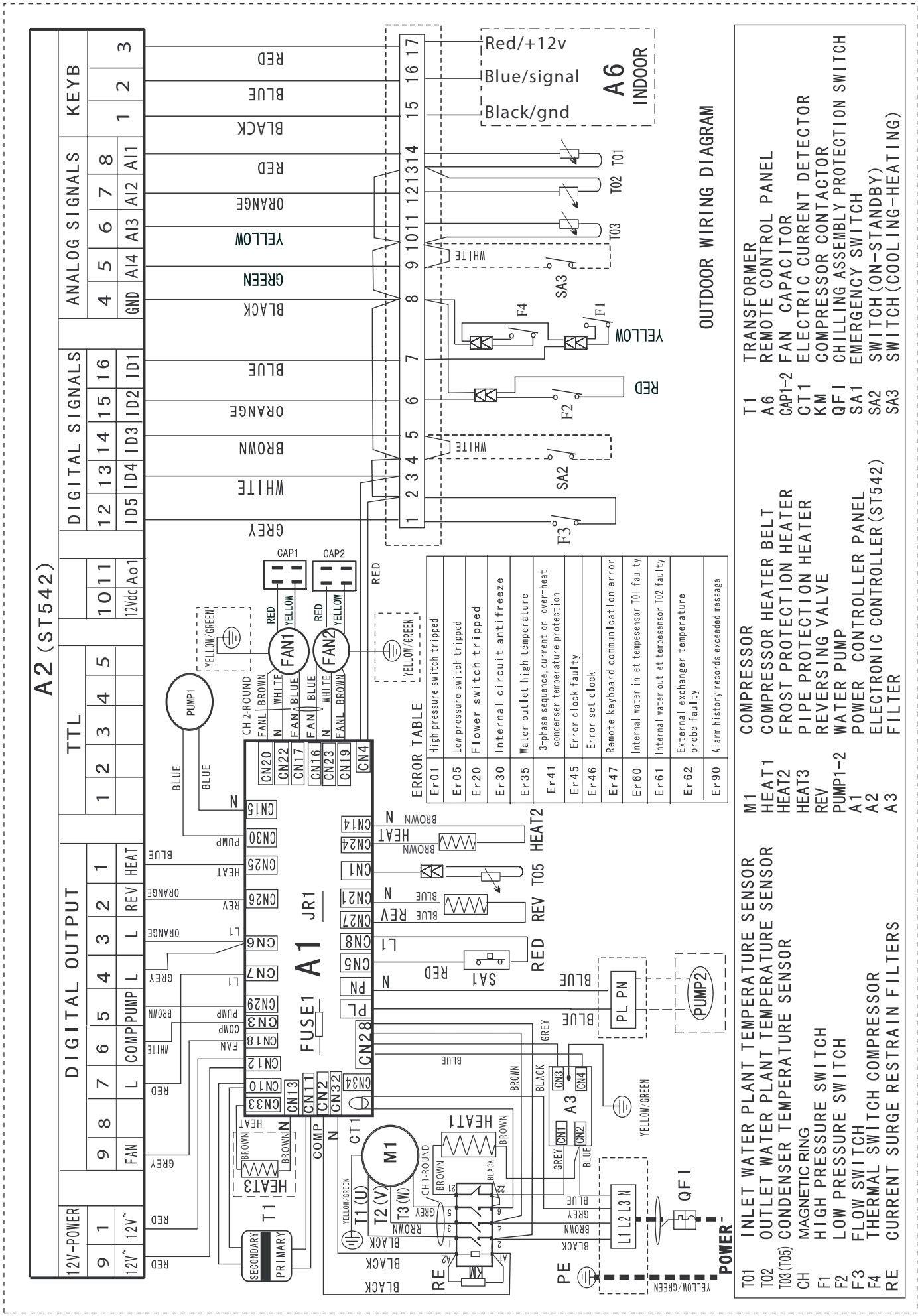


T01 INLET WATER PLANT TEMPERATURE SENSOR
T02 OUTLET WATER PLANT TEMPERATURE SENSOR
T03 CONDENSER TEMPERATURE SENSOR
RY COMPRESSOR START RELAY
F1 HIGH PRESSURE SWITCH
F2 LOW PRESSURE SWITCH
F3 FLOW SWITCH
F4 THERMAL SWITCH COMPRESSOR
T05 CONDENSER TEMPERATURE SENSOR
RY COMPRESSOR START RELAY
A3 FILTER

M1 COMPRESSOR
HEAT1 COMPRESSOR HEATER BELT
HEAT2 FROST PROTECTION HEATER
REV REVERSING VALVE
A2 ELECTRONIC CONTROLLER(ST542)
PUMP1 WATER PUMP
PUMP2 AUXILIARY WATER PUMP
T1 TRANSFORMER
SA1 EMERGENCY SWITCH
SA2 SWITCH(ON-STANDBY)
SA3 SWITCH(COOLING-HEATING)

CAP1-2 FAN CAPACITOR
A6 REMOTE CONTROL PANEL
A1 POWER CONTROLLER PANEL
CT1 ELECTRIC CURRENT DETECTOR
KM COMPRESSOR CONTACTOR
QF1 CHILLING ASSEMBLY PROTECTION SWITCH
RE CURRENT SURGE RESTRAIN FILTERS
HEAT3 PIPE PROTECTION HEATER
C1 COMPRESSOR RUN CAPACITOR
C2 COMPRESSOR START CAPACITOR
RES RESISTANCE

THREE PHASE WIRING DIAGRAM (COOLING ONLY, 10~16)



Model HEAT PUMP	Type	5	7	9	10	10	12	14	16
Minimum water flow	m^3/h	0.4	0.5	0.7	0.86	0.86	1.0	1.2	1.4
Rated water flow	m^3/h	0.86	1.24	1.54	1.74	1.72	2.0	2.4	2.8
Residual head	kPa	21	35	42	44	44	40	34	38
Max. water pressure	bar	6.0							
Max. water-in pressure	bar	5.0							
Min. water-in pressure	bar	1.5							

Model COOLING ONLY	Type	5	7	9	10	10	12	14	16
Minimum water flow	m^3/h	0.4	0.5	0.7	0.86	0.86	1.0	1.2	1.4
Rated water flow	m^3/h	0.86	1.24	1.54	1.74	1.72	2.0	2.4	2.8
Residual head	kPa	21	35	42	44	44	40	34	38
Max. water pressure	bar	6.0							
Max. water-in pressure	bar	5.0							
Min. water-in pressure	bar	1.5							

(1) condenser air in 35°C.evaporator water in/out 12/7°C

(2) Power also includes the pump power inside of it.

* the two types of oil are equivalents

(3) at 1m in open field fan side (sound pressure)

(4) the maximum and minimum operating pressure values refer to the activation of the pressure switches

	Model	5							Model	7							Model	9						
Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10
	Pf	4.9	5.0	5.2	5.3	5.4	5.6		Pf	6.3	6.5	6.7	6.9	7.0	7.2		Pf	8.3	8.6	8.9	9.2	9.5	9.8
	Pa	1.3	1.3	1.3	1.3	1.4	1.4		Pa	1.6	1.6	1.6	1.6	1.6	1.6		Pa	2.6	2.6	2.6	2.7	2.7	2.7
25	Pat	1.4	1.4	1.4	1.4	1.4	1.4	25	Pat	1.7	1.8	1.8	1.8	1.8	1.8	25	Pat	2.9	2.9	2.9	3.0	3.0	3.0
	Qev	0.8	0.9	0.9	0.9	0.9	1.0		Qev	1.1	1.1	1.1	1.2	1.2	1.2		Qev	1.4	1.5	1.5	1.6	1.6	1.7
	ΔPev	24.6	26.0	27.6	29.2	30.8	32.5		ΔPev	35.2	37.4	39.5	41.8	44.2	46.6		ΔPev	36	41	43	46.4	48	51
	Pf	4.6	4.8	4.9	5.1	5.2	5.3		Pf	6.0	6.2	6.4	6.6	6.7	6.9		Pf	7.9	8.2	8.5	8.8	9.1	9.4
	Pa	1.5	1.5	1.5	1.5	1.5	1.5		Pa	1.8	1.8	1.8	1.8	1.8	1.8		Pa	2.8	2.8	2.8	2.9	2.9	2.9
30	Pat	1.5	1.6	1.6	1.6	1.6	1.6	30	Pat	1.9	1.9	2.0	2.0	2.0	2.0	30	Pat	3.1	3.1	3.1	3.2	3.2	3.2
	Qev	0.8	0.8	0.8	0.9	0.9	0.9		Qev	1.0	1.1	1.1	1.1	1.2	1.2		Qev	1.3	1.4	1.4	1.5	1.5	1.6
	ΔPev	22.4	23.7	25.1	26.6	28.1	29.6		ΔPev	32.3	34.2	36.3	38.4	40.5	42.8		ΔPev	29.5	32.1	35.6	39.0	41.8	47.0
	Pf	4.8	4.9	5.0	5.1	5.2	5.3		Pf	5.9	6.1	7.2	6.4	6.6	6.8		Pf	7.5	7.8	8.0	8.2	8.5	8.8
	Pa	1.8	1.8	1.8	1.9	1.9	1.9		Pa	1.9	1.9	2.6	1.9	1.9	1.9		Pa	3.1	3.1	3.2	3.3	3.3	3.3
35	Pat	2.1	2.1	2.1	2.2	2.2	2.2	35	Pat	2.0	2.0	2.9	2.0	2.1	2.1	35	Pat	3.4	3.4	3.5	3.6	3.6	3.6
	Qev	0.8	0.8	0.8	0.9	0.9	0.9		Qev	1.0	1.0	1.2	1.1	1.1	1.2		Qev	1.3	1.3	1.4	1.4	1.5	1.5
	ΔPev	18.5	19.8	21.0	22.5	24.0	25.5		ΔPev	3.1	33.0	35.0	37.0	39.1	41.3		ΔPev	28.0	30.4	33.9	35.0	38. 0	42.0
	Pf	4.4	4.5	4.7	4.8	4.9	5.1		Pf	5.7	5.9	6.1	6.3	6.4	6.6		Pf	7.0	7.3	7.5	7.7	8.0	8.3
	Pa	1.6	1.6	1.6	1.7	1.7	1.7		Pa	2.0	2.0	2.0	2.0	2.0	2.0		Pa	3.4	3.4	3.5	3.6	3.6	3.6
40	Pat	1.7	1.7	1.8	1.8	1.8	1.8	40	Pat	2.1	2.1	2.2	2.2	2.2	2.2	40	Pat	3.7	3.7	3.8	3.9	3.9	3.9
	Qev	0.8	0.8	0.8	0.8	0.9	0.9		Qev	1.0	1.0	1.0	1.1	1.1	1.1		Qev	1.2	1.3	1.3	1.4	1.4	1.4
	ΔPev	20.1	21.3	22.6	23.9	25.3	26.7		ΔPev	29.3	31.1	33.0	34.9	36.9	39.0		ΔPev	24.0	26.0	26.8	28.0	32.1	35.3
	Pf	4.1	4.3	4.4	4.5	4.7	4.8		Pf	5.4	5.6	5.8	6.0	6.1	6.3		Pf	6.8	7.1	7.3	7.5	7.8	8.1
	Pa	1.8	1.8	1.9	1.9	1.9	1.9		Pa	2.2	2.2	2.2	2.2	2.3	2.3		Pa	3.6	3.6	3.7	3.8	3.8	3.8
43	Pat	1.9	1.9	1.9	2.0	2.0	2.0	43	Pat	2.4	2.4	2.4	2.4	2.4	2.4	43	Pat	3.9	3.9	4.0	4.1	4.1	4.1
	Qev	0.7	0.7	0.8	0.8	0.8	0.8		Qev	0.9	1.0	1.0	1.0	1.1	1.1		Qev	1.1	1.2	1.2	1.3	1.3	1.4
	ΔPev	17.8	18.9	20.1	21.3	22.5	23.8		ΔPev	26.4	28.0	29.8	31.5	33.4	35.3		ΔPev	20.0	23.5	24.6	28.0	31.0	34.0

	Model	10							Model	12							Model	14						
Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10
	Pf	10.9	11.2	11.5	11.8	12.1	12.4		Pf	12.4	12.7	13.0	13.3	13.6	13.9		Pf	14.8	15.1	15.4	15.7	16.1	16.4
	Pa	2.6	2.6	2.7	2.7	2.7	2.8		Pa	3.5	3.5	3.5	3.6	3.6	3.6		Pa	3.6	3.6	3.6	3.7	3.7	3.7
25	Pat	3.1	3.1	3.2	3.2	3.2	3.3	25	Pat	4.1	4.1	4.1	4.2	4.2	4.2	25	Pat	4.1	4.1	4.1	4.2	4.2	4.2
	Qev	1.9	1.9	2.0	2.0	2.1	2.2		Qev	2.2	2.2	2.3	2.3	2.3	2.4		Qev	2.6	2.6	2.7	2.7	2.8	2.8
	ΔPev	31.5	31.7	33.0	33.5	36.0	38.0		ΔPev	29.1	29.9	31.0	32.4	34.1	37.5		ΔPev	29.0	29.4	30.4	31.2	33.0	34.0
	Pf	10.4	10.8	11.1	11.5	11.8	12.1		Pf	11.9	12.2	12.5	12.8	13.1	13.4		Pf	14.1	14.4	14.7	15.0	15.3	15.6
	Pa	2.9	2.9	3.0	3.1	3.1	3.1		Pa	3.8	3.8	3.8	3.9	3.9	3.9		Pa	4.1	4.1	4.1	4.2	4.2	4.2
30	Pat	3.4	3.4	3.5	3.6	3.6	3.6	30	Pat	4.4	4.4	4.4	4.5	4.5	4.5	30	Pat	4.6	4.6	4.7	4.7	4.7	4.7
	Qev	1.8	1.8	1.9	2.0	2.0	2.0		Qev	2.0	2.1	2.1	2.2	2.2	2.3		Qev	2.4	2.5	2.5	2.6	2.6	2.7
	ΔPev	29.8	30.4	31.8	33.2	33.6	33.9		ΔPev	23.1	23.2	25.4	27.0	28.8	30.0		ΔPev	25.8	28.2	28.4	28.9	29.5	31.0
	Pf	9.9	10.2	10.5	10.7	11.0	11.3		Pf	11.4	11.7	12.0	12.3	12.6	12.9		Pf	13.4	13.7	14.0	14.3	14.6	14.9
	Pa	3.3	3.3	3.4	3.4	3.5	3.5		Pa	4.2	4.2	4.2	4.3	4.3	4.3		Pa	4.6	4.6	4.6	4.7	4.7	4.7
35	Pat	3.8	3.8	3.9	3.9	4.0	4.0	35	Pat	4.8	4.8	4.8	4.9	4.9	4.9	35	Pat	5.1	5.1	5.1	5.2	5.2	5.2
	Qev	1.7	1.7	1.8	1.9	1.9	2.0		Qev	2.0	2.0	2.1	2.1	2.2	2.2		Qev	2.3	2.4	2.4	2.5	2.5	2.5
	ΔPev	27.0	27.5	30.0	32.0	32.4	34.0		ΔPev	21.1	23.2	25.4	27.0	28.8	30.0		ΔPev	24.0	25.6	26.0	27.6	28.1	28.4
	Pf	9.4	9.7	10.0	10.3	10.6	11.0		Pf	10.9	11.2	11.5	11.8	12.1	12.4		Pf	12.5	12.8	13.1	13.4	13.7	14.0
	Pa	3.6	3.6	3.7	3.7	3.8	3.8		Pa	4.5	4.5	4.5	4.6	4.6	4.6		Pa	5.1	5.1	5.1	5.2	5.2	5.2
40	Pat	4.1	4.1	4.2	4.2	4.3	4.3	40	Pat	5.1	5.1	5.1	5.2	5.2	5.2	40	Pat	5.6	5.6	5.6	5.7	5.7	5.7
	Qev	1.6	1.6	1.7	1.7	1.8	1.8		Qev	1.9	2.0	2.0	2.0	2.1	2.1		Qev	2.2	2.2	2.3	2.3	2.4	2.4
	ΔPev	24.0	24.4	27.2	27.6	30.3	30.5		ΔPev	20.2	21.9	22.7	24.0	25.6	28.2		ΔPev	19.6	20.3	21.6	23.4	25.7	26.4
	Pf	9.0	9.3	9.5	9.8	10.0	10.3		Pf	10.5	10.8	11.1	11.4	11.7	12.0		Pf	12.0	12.3	12.6	12.9	13.2	13.5
	Pa	3.8	3.8	3.9	3.9	4.0	4.0		Pa	4.7	4.7	4.7	4.8	4.8	4.8		Pa	5.5	5.5	5.5	5.6	5.6	5.6
43	Pat	4.3	4.3	4.4	4.4	4.5	4.5	43	Pat	5.3	5.3	5.3	5.4	5.4	5.4	43	Pat	6.0	6.0	6.0	6.1	6.1	6.1
	Qev	1.5	1.6	1.6	1.7	1.7	1.8		Qev	1.8	1.9	1.9	2.0	2.0	2.0		Qev	2.1	2.1	2.2	2.2	2.3	2.3
	ΔPev	21.0	23.8	24.4	27.0	27.5	31.0		ΔPev	17.5	18.8	21.1	23.4	24.1	25.3		ΔPev	18.0	19.1	20.7	21.3	23.0	23.8

Ta: outside air temperature (°C)

Tw : evaporator water outlet temperature (°C)

Pf: cooling capacity (kW)

Pa: compressor power input (kW)

Pat: total power input (kW)

Qev: evaporator water flow (m^3/h)

ΔPev: evaporator pressure drop (kPa)

	Model	16					
Ta .	Tw	5	6	7	8	9	10
25	Pf	15.5	15.7	16.0	16.3	16.5	16.8
	Pa	5.0	5.0	5.0	5.1	5.1	5.1
	Pat	5.5	5.5	5.5	5.6	5.6	5.6
	Qev	2.7	2.7	2.8	2.8	2.9	2.9
	ΔPev	30.5	32.0	33.0	34.5	36.2	37.6
30	Pf	14.8	15.0	15.3	15.6	15.8	16.1
	Pa	4.5	4.5	4.5	4.6	4.6	4.6
	Pat	5.0	5.0	5.0	5.1	5.1	5.1
	Qev	2.6	2.6	2.7	2.7	2.8	2.8
	ΔPev	28.3	29.4	28.3	30.4	33.3	35.0
35	Pf	14.9	15.2	15.5	15.8	16.1	16.4
	Pa	6.0	6.0	6.0	6.1	6.1	6.1
	Pat	6.5	6.5	6.5	6.6	6.6	6.6
	Qev	2.6	2.6	2.7	2.7	2.8	2.8
	ΔPev	28.2	29.5	31.0	32.3	34.0	35.1
40	Pf	14.2	14.5	14.8	15.1	15.4	15.7
	Pa	5.5	5.5	5.5	5.6	5.6	5.6
	Pat	6.0	6.0	6.0	6.1	6.1	6.1
	Qev	2.5	2.5	2.6	2.6	2.7	2.7
	ΔPev	26.0	27.3	28.6	29.5	31.0	33.0
43	Pf	13.5	13.8	14.1	14.4	14.7	15.0
	Pa	5.0	5.0	5.0	5.1	5.1	5.1
	Pat	5.5	5.5	5.5	5.6	5.6	5.6
	Qev	2.4	2.4	2.5	2.5	2.6	2.6
	ΔPev	23.0	24.6	26.1	27.3	28.6	30.0

Ta: outside air temperature (°C)
Pa: compressor power input (kW)
ΔPev: evaporator pressure drop (kPa)
Tw : evaporator water outlet temperature (°C)
Pat: total power input (kW)
Pf: cooling capacity (kW)
Qev: evaporator water flow (m^3/h)

A COOLING PERFORMANCE (HEAT PUMP)

	Model	5							Model	7							Model	9					
Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10
25	Pf	4.9	5.0	5.2	5.3	5.4	5.6	25	Pf	6.3	6.5	6.7	6.9	7.0	7.2	25	Pf	8.3	8.6	8.9	9.2	9.5	9.8
	Pa	1.3	1.3	1.3	1.3	1.4	1.4		Pa	1.6	1.6	1.6	1.6	1.6	1.6		Pa	2.6	2.6	2.6	2.7	2.7	2.7
	Pat	1.4	1.4	1.4	1.4	1.4	1.4		Pat	1.7	1.8	1.8	1.8	1.8	1.8		Pat	2.9	2.9	2.9	3.0	3.0	3.0
	Qev	0.8	0.9	0.9	0.9	0.9	1.0		Qev	1.1	1.1	1.1	1.2	1.2	1.2		Qev	1.4	1.5	1.5	1.6	1.6	1.7
	ΔPev	24.6	26.0	27.6	29.2	30.8	32.5		ΔPev	35.2	37.4	39.5	41.8	44.2	46.6		ΔPev	36	41	43	46.4	48	51
30	Pf	4.6	4.8	4.9	5.1	5.2	5.3	30	Pf	6.0	6.2	6.4	6.6	6.7	6.9	30	Pf	7.9	8.2	8.5	8.8	9.1	9.4
	Pa	1.5	1.5	1.5	1.5	1.5	1.5		Pa	1.8	1.8	1.8	1.8	1.8	1.8		Pa	2.8	2.8	2.8	2.9	2.9	2.9
	Pat	1.5	1.6	1.6	1.6	1.6	1.6		2.00 Pat	1.9	1.9	2.0	2.0	2.0			Pat	3.1	3.1	3.1	3.2	3.2	3.2
	Qev	0.8	0.8	0.8	0.9	0.9	0.9		Qev	1.0	1.1	1.1	1.1	1.2	1.2		Qev	1.3	1.4	1.4	1.5	1.5	1.6
	ΔPev	22.4	23.7	25.1	26.6	28.1	29.6		ΔPev	32.3	34.2	36.3	38.4	40.5	42.8		ΔPev	29.5	32.1	35.6	39.0	41.8	47.0
35	Pf	4.8	4.9	5.0	5.1	5.2	5.3	35	Pf	7.0	7.1	7.2	7.3	7.4	7.5	35	Pf	7.5	7.8	8.0	8.2	8.5	8.8
	Pa	1.8	1.8	1.8	1.8	1.9	1.9		Pa	2.6	2.6	2.6	2.7	2.7	2.7		Pa	3.1	3.1	3.2	3.3	3.3	3.3
	Pat	2.1	2.1	2.1	2.2	2.2	2.2		Pat	2.9	2.9	2.9	3.0	3.0	3.0		Pat	3.4	3.4	3.5	3.6	3.6	3.6
	Qev	0.8	0.8	0.8	0.9	0.9	0.9		Qev	1.2	1.2	1.2	1.3	1.3	1.3		Qev	1.3	1.3	1.4	1.4	1.5	1.5
	ΔPev	18.5	19.8	21.0	22.5	24.0	25.5		ΔPev	32.5	33.8	35.0	36.5	38.0	39.5		ΔPev	28.0	30.4	33.9	35.0	38. 0	42.0
40	Pf	4.4	4.5	4.7	4.8	4.9	5.1	40	Pf	5.7	5.9	6.1	6.3	6.4	6.6	40	Pf	7.0	7.3	7.5	7.7	8.0	8.3
	Pa	1.6	1.6	1.6	1.7	1.7	1.7		Pa	2.0	2.0	2.0	2.0	2.0	2.0		Pa	3.4	3.4	3.5	3.6	3.6	3.6
	Pat	1.7	1.7	1.8	1.8	1.8	1.8		Pat	2.1	2.1	2.2	2.2	2.2	2.2		Pat	3.7	3.7	3.8	3.9	3.9	3.9
	Qev	0.8	0.8	0.8	0.8	0.9	0.9		Qev	1.0	1.0	1.0	1.1	1.1	1.1		Qev	1.2	1.3	1.3	1.4	1.4	1.4
	ΔPev	20.1	21.3	22.6	23.9	25.3	26.7		ΔPev	29.3	31.1	33.0	34.9	36.9	39.0		ΔPev	24.0	26.0	26.8	28.0	32.1	35.3
43	Pf	4.1	4.3	4.4	4.5	4.7	4.8	43	Pf	5.4	5.6	5.8	6.0	6.1	6.3	43	Pf	6.8	7.1	7.3	7.5	7.8	8.1
	Pa	1.8	1.8	1.9	1.9	1.9	1.9		Pa	2.2	2.2	2.2	2.2	2.3	2.3		Pa	3.6	3.6	3.7	3.8	3.8	3.8
	Pat	1.9	1.9	1.9	2.0	2.0	2.0		Pat	2.4	2.4	2.4	2.4	2.4	2.4		Pat	3.9	3.9	4.0	4.1	4.1	4.1
	Qev	0.7	0.7	0.8	0.8	0.8	0.8		Qev	0.9	1.0	1.0	1.0	1.1	1.1		Qev	1.1	1.2	1.2	1.3	1.3	1.4
	ΔPev	17.8	18.9	20.1	21.3	22.5	23.8		ΔPev	26.4	28.0	29.8	31.5	33.4	35.3		ΔPev	20.0	23.5	24.6	28.0	31.0	34.0

	Model	10							Model	12							Model	14						
Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10	Ta .	Tw	5	6	7	8	9	10
	Pf	10.9	11.2	11.5	11.8	12.1	12.4		Pf	12.4	12.7	13.0	13.3	13.6	13.9		Pf	14.8	15.1	15.4	15.7	16.1	16.4
	Pa	2.6	2.6	2.7	2.7	2.7	2.8		Pa	3.5	3.5	3.5	3.6	3.6	3.6		Pa	3.6	3.6	3.6	3.7	3.7	3.7
25	Pat	3.1	3.1	3.2	3.2	3.2	3.3	25	Pat	4.1	4.1	4.1	4.2	4.2	4.2	25	Pat	4.1	4.1	4.1	4.2	4.2	4.2
	Qev	1.9	1.9	2.0	2.0	2.1	2.2		Qev	2.2	2.2	2.3	2.3	2.3	2.4		Qev	2.6	2.6	2.7	2.7	2.8	2.8
	ΔPev	31.5	31.7	33.0	33.5	36.0	38.0		ΔPev	29.1	29.9	31.0	32.4	34.1	37.5		ΔPev	29.0	29.4	30.4	31.2	33.0	34.0
	Pf	10.4	10.8	11.1	11.5	11.8	12.1		Pf	11.9	12.2	12.5	12.8	13.1	13.4		Pf	14.1	14.4	14.7	15.0	15.3	15.6
	Pa	2.9	2.9	3.0	3.1	3.1	3.1		Pa	3.8	3.8	3.8	3.9	3.9	3.9		Pa	4.1	4.1	4.1	4.2	4.2	4.2
30	Pat	3.4	3.4	3.5	3.6	3.6	3.6	30	Pat	4.4	4.4	4.4	4.5	4.5	4.5	30	Pat	4.6	4.6	4.7	4.7	4.7	4.7
	Qev	1.8	1.8	1.9	2.0	2.0	2.0		Qev	2.0	2.1	2.1	2.2	2.2	2.3		Qev	2.4	2.5	2.5	2.6	2.6	2.7
	ΔPev	29.8	30.4	31.8	33.2	33.6	33.9		ΔPev	23.1	23.2	25.4	27.0	28.8	30.0		ΔPev	25.8	28.2	28.4	28.9	29.5	31.0
	Pf	9.9	10.2	10.5	10.7	11.0	11.3		Pf	11.4	11.7	12.0	12.3	12.6	12.9		Pf	13.4	13.7	14.0	14.3	14.6	14.9
	Pa	3.3	3.3	3.4	3.4	3.5	3.5		Pa	4.2	4.2	4.2	4.3	4.3	4.3		Pa	4.6	4.6	4.6	4.7	4.7	4.7
35	Pat	3.8	3.8	3.9	3.9	4.0	4.0	35	Pat	4.8	4.8	4.8	4.9	4.9	4.9	35	Pat	5.1	5.1	5.1	5.2	5.2	5.2
	Qev	1.7	1.7	1.8	1.9	1.9	2.0		Qev	2.0	2.0	2.1	2.1	2.2	2.2		Qev	2.3	2.4	2.4	2.5	2.5	2.5
	ΔPev	27.0	27.5	30.0	32.0	32.4	34.0		ΔPev	21.1	23.2	25.4	27.0	28.8	30.0		ΔPev	24.0	25.6	26.0	27.6	28.1	28.4
	Pf	9.4	9.7	10.0	10.3	10.6	11.0		Pf	10.9	11.2	11.5	11.8	12.1	12.4		Pf	12.5	12.8	13.1	13.4	13.7	14.0
	Pa	3.6	3.6	3.7	3.7	3.8	3.8		Pa	4.5	4.5	4.5	4.6	4.6	4.6		Pa	5.1	5.1	5.1	5.2	5.2	5.2
40	Pat	4.1	4.1	4.2	4.2	4.3	4.3	40	Pat	5.1	5.1	5.1	5.2	5.2	5.2	40	Pat	5.6	5.6	5.6	5.7	5.7	5.7
	Qev	1.6	1.6	1.7	1.7	1.8	1.8		Qev	1.9	2.0	2.0	2.0	2.1	2.1		Qev	2.2	2.2	2.3	2.3	2.4	2.4
	ΔPev	24.0	24.4	27.2	27.6	30.3	30.5		ΔPev	20.2	21.9	22.7	24.0	25.6	28.2		ΔPev	19.6	20.3	21.6	23.4	25.7	26.4
	Pf	9.0	9.3	9.5	9.8	10.0	10.3		Pf	10.5	10.8	11.1	11.4	11.7	12.0		Pf	12.0	12.3	12.6	12.9	13.2	13.5
	Pa	3.8	3.8	3.9	3.9	4.0	4.0		Pa	4.7	4.7	4.7	4.8	4.8	4.8		Pa	5.5	5.5	5.5	5.6	5.6	5.6
43	Pat	4.3	4.3	4.4	4.4	4.5	4.5	43	Pat	5.3	5.3	5.3	5.4	5.4	5.4	43	Pat	6.0	6.0	6.0	6.1	6.1	6.1
	Qev	1.5	1.6	1.6	1.7	1.7	1.8		Qev	1.8	1.9	1.9	2.0	2.0	2.0		Qev	2.1	2.1	2.2	2.2	2.3	2.3
	ΔPev	21.0	23.8	24.4	27.0	27.5	31.0		ΔPev	17.5	18.8	21.1	23.4	24.1	25.3		ΔPev	18.0	19.1	20.7	21.3	23.0	23.8

Ta: outside air temperature (°C)

Tw : evaporator water outlet temperature (°C)

Pf: cooling capacity (kW)

Pa: compressor power input (kW)

Pat: total power input (kW)

Qev: evaporator water flow (m^3/h)

ΔPev: evaporator pressure drop (kPa)

	Model	16					
Ta .	Tw	5	6	7	8	9	10
	Pf	15.5	15.7	16.0	16.3	16.5	16.8
	Pa	5.0	5.0	5.0	5.1	5.1	5.1
25	Pat	5.5	5.5	5.5	5.6	5.6	5.6
	Qev	2.7	2.7	2.8	2.8	2.9	2.9
	ΔPev	30.5	32.0	33.0	34.5	36.2	37.6
	Pf	14.8	15.0	15.3	15.6	15.8	16.1
	Pa	4.5	4.5	4.5	4.6	4.6	4.6
30	Pat	5.0	5.0	5.0	5.1	5.1	5.1
	Qev	2.6	2.6	2.7	2.7	2.8	2.8
	ΔPev	28.3	29.4	28.3	30.4	33.3	35.0
	Pf	14.9	15.2	15.5	15.8	16.1	16.4
	Pa	6.0	6.0	6.0	6.1	6.1	6.1
35	Pat	6.5	6.5	6.5	6.6	6.6	6.6
	Qev	2.6	2.6	2.7	2.7	2.8	2.8
	ΔPev	28.2	29.5	31.0	32.3	34.0	35.1
	Pf	14.2	14.5	14.8	15.1	15.4	15.7
	Pa	5.5	5.5	5.5	5.6	5.6	5.6
40	Pat	6.0	6.0	6.0	6.1	6.1	6.1
	Qev	2.5	2.5	2.6	2.6	2.7	2.7
	ΔPev	26.0	27.3	28.6	29.5	31.0	33.0
	Pf	13.5	13.8	14.1	14.4	14.7	15.0
	Pa	5.0	5.0	5.0	5.1	5.1	5.1
43	Pat	5.5	5.5	5.5	5.6	5.6	5.6
	Qev	2.4	2.4	2.5	2.5	2.6	2.6
	ΔPev	23.0	24.6	26.1	27.3	28.6	30.0

Ta: outside air temperature (°C)

Pa: compressor power input (kW)

ΔPev: evaporator pressure drop (kPa)

Tw : evaporator water outlet temperature (°C)

Pat: total power input (kW)

Pf: cooling capacity (kW)

Qev: evaporator water flow (m^3/h)

Ta .	Model	5				Ta .	Model	7				Ta .	Model	9			
U.R.87%	Tw	35	40	45	50	U.R.87%	Tw	35	40	45	50	U.R.87%	Tw	35	40	45	50
	Pt	4.1	4.1	4.1	-		Pt	5.0	5.1	5.1	-		Pt	6.7	6.7	6.7	-
	Pa	1.3	1.5	1.6	-		Pa	1.6	1.8	2.0	-		Pa	2.8	3.0	3.3	-
-5	Pat	1.4	1.5	1.7	-	-5	Pat	1.8	2.0	2.2	-	-5	Pat	3.1	3.3	3.6	-
	Qc	0.7	0.7	0.7	-		Qc	0.9	0.9	0.9	-		Qc	1.2	1.2	1.2	-
	ΔPc	17.5	17.9	18.2	-		ΔPc	22.9	23.4	23.9	-		ΔPc	24.6	24.0	23.7	-
	Pt	4.6	4.6	4.6	4.6		Pt	5.7	5.7	5.7	5.8		Pt	7.5	7.5	7.5	7.4
	Pa	1.3	1.5	1.7	1.9		Pa	1.6	1.8	2.0	2.3		Pa	2.9	3.1	3.4	3.7
0	Pat	1.4	1.6	1.7	1.9	0	Pat	1.8	2.0	2.2	2.4	0	Pat	3.2	3.4	3.7	4.0
	Qc	0.8	0.8	0.8	0.8		Qc	1.0	1.0	1.0	1.0		Qc	1.3	1.3	1.3	1.3
	ΔPc	21.9	22.0	22.2	22.4		ΔPc	29.2	29.6	30.0	30.4		ΔPc	28.8	28.5	28.1	27.6
	Pt	5.6	5.5	5.5	5.4		Pt	7.8	7.7	7.7	7.7		Pt	8.8	8.8	8.8	8.7
	Pa	1.4	1.5	1.7	1.9		Pa	2.3	2.4	2.6	2.8		Pa	3.0	3.2	3.5	3.8
7	Pat	1.7	1.8	2.0	2.0	7	Pat	2.6	2.7	2.9	3.1	7	Pat	3.3	3.5	3.8	4.1
	Qc	0.9	0.9	0.9	0.9		Qc	1.3	1.3	1.3	1.3		Qc	1.6	1.6	1.6	1.6
	ΔPc	23.9	23.4	23.0	22.9		ΔPc	36.9	36.4	36.0	35.9		ΔPc	48.5	48.2	47.8	47.4
	Pt	5.9	5.9	5.9	5.9		Pt	7.3	7.3	7.3	7.3		Pt	9.5	9.5	9.5	9.4
	Pa	1.4	1.5	1.7	1.9		Pa	1.7	1.9	2.1	2.3		Pa	3.1	3.3	3.6	3.9
10	Pat	1.5	1.6	1.8	2.0	10	Pat	1.8	2.0	2.3	2.5	10	Pat	3.4	3.6	3.9	4.2
	Qc	1.0	1.0	1.0	1.0		Qc	1.3	1.3	1.3	1.3		Qc	1.7	1.7	1.7	1.7
	ΔPc	37.1	36.9	36.7	36.5		ΔPc	48.4	48.3	48.3	48.4		ΔPc	56.8	56.2	55.7	55.3
	Pt	6.8	6.8	6.8	6.7		Pt	8.3	8.3	8.2	8.2		Pt	10.2	10.2	10.2	10.1
	Pa	1.4	1.6	1.7	1.9		Pa	1.7	1.9	2.1	2.4		Pa	3.2	3.4	3.7	4.0
15	Pat	1.5	1.7	1.8	2.0	15	Pat	1.9	2.1	2.3	2.5	15	Pat	3.5	3.7	4.0	4.3
	Qc	1.2	1.2	1.2	1.2		Qc	1.4	1.4	1.4	1.4		Qc	1.8	1.8	1.8	1.8
	ΔPc	49.2	48.8	48.5	48.2		ΔPc	62.3	61.8	61.5	61.3		ΔPc	62.0	61.7	61.4	60.9

Ta .	Model	10				Ta .	Model	12				Ta .	Model	14			
U.R.87%	Tw	35	40	45	50	U.R.87%	Tw	35	40	45	50	U.R.87%	Tw	35	40	45	50
	Pt	8.3	8.3	8.3			Pt	9.9	9.8	9.8	-		Pt	10.4	10.5	10.6	-
	Pa	3.0	3.2	3.5			Pa	3.7	4.0	4.3	-		Pa	4.0	4.4	4.9	-
-5	Pat	3.5	3.7	4.0		-5	Pat	4.3	4.6	4.9	-	-5	Pat	4.5	4.9	5.4	-
	Qc	1.4	1.4	1.4			Qc	1.7	1.7	1.7	-		Qc	1.9	1.9	1.9	-
	ΔPc	19.6	18.9	18.0			ΔPc	26.0	25.6	25.2	-		ΔPc	15.2	15.1	15.0	-
	Pt	9.4	9.4	9.4	9.2		Pt	11.1	11.0	11.0	11.0		Pt	13.1	13.0	13.0	12.9
	Pa	3.1	3.3	3.6	3.8		Pa	3.8	4.1	4.4	4.6		Pa	4.0	4.4	4.9	5.4
0	Pat	3.6	3.8	4.1	4.3	0	Pat	4.4	4.7	5.0	5.2	0	Pat	4.5	4.9	5.4	5.9
	Qc	1.7	1.6	1.6	1.6		Qc	1.9	1.9	1.9	1.9		Qc	2.3	2.3	2.3	2.3
	ΔPc	27.5	25.6	24.8	23.2		ΔPc	33.0	32.6	32.1	31.8		ΔPc	21.1	21.1	21.0	20.9
	Pt	11.4	11.3	11.2	11.1		Pt	13.4	13.3	13.2	13.1		Pt	16.2	16.2	16.1	16.0
	Pa	3.3	3.6	3.8	4.1		Pa	3.9	4.2	4.5	4.8		Pa	4.1	4.5	5.0	5.5
7	Pat	3.8	4.1	4.3	4.6	7	Pat	4.5	4.8	5.1	5.4	7	Pat	4.6	5.0	5.5	6.0
	Qc	2.0	2.0	2.0	1.9		Qc	2.3	2.3	2.3	2.3		Qc	2.8	2.8	2.8	2.8
	ΔPc	37.2	35.8	34.5	33.1		ΔPc	44.0	43.6	43.1	42.8		ΔPc	31.2	31.1	31.0	31.0
	Pt	12.3	12.2	12.1	12.0		Pt	14.4	14.3	14.2	14.1		Pt	17.6	17.5	17.4	17.4
	Pa	3.4	3.7	3.9	4.2		Pa	4.0	4.3	4.6	4.9		Pa	4.2	4.4	5.1	5.6
10	Pat	3.9	4.2	4.4	4.7	10	Pat	4.6	4.9	5.2	5.5	10	Pat	4.7	4.9	5.6	6.1
	Qc	2.1	2.1	2.1	2.1		Qc	2.5	2.5	2.5	2.5		Qc	3.1	3.1	3.1	3.1
	ΔPc	40.5	40.0	39.2	38.8		ΔPc	38.0	37.6	37.2	37.0		ΔPc	36.4	36.2	36.0	35.9
	Pt	13.8	13.7	13.6	13.5		Pt	15.9	15.8	15.7	15.6		Pt	19.8	19.7	19.6	19.4
	Pa	3.5	3.8	4.0	4.3		Pa	4.1	4.4	4.7	5.0		Pa	4.3	4.5	5.2	5.7
15	Pat	4.0	4.3	4.5	4.8	15	Pat	4.7	5.0	5.3	5.6	15	Pat	4.8	5.0	5.7	6.2
	Qc	2.4	2.4	2.3	2.3		Qc	2.8	2.8	2.8	2.8		Qc	3.5	3.5	3.5	3.5
	ΔPc	45.8	45.1	43.6	42.9		ΔPc	45.0	44.8	44.6	44.2		ΔPc	45.4	45.2	45.0	44.9

Ta: outside air temperature (°C)
Tw: evaporator water outlet temperature (°C)
Pt: heating capacity (kW)
Pa: compressor power input (kW)
Pat: total power input (kW)
Qc: evaporator water flow (m^3/h)
ΔPc: evaporator pressure drop (kPa)
- conditions outside of operating limits

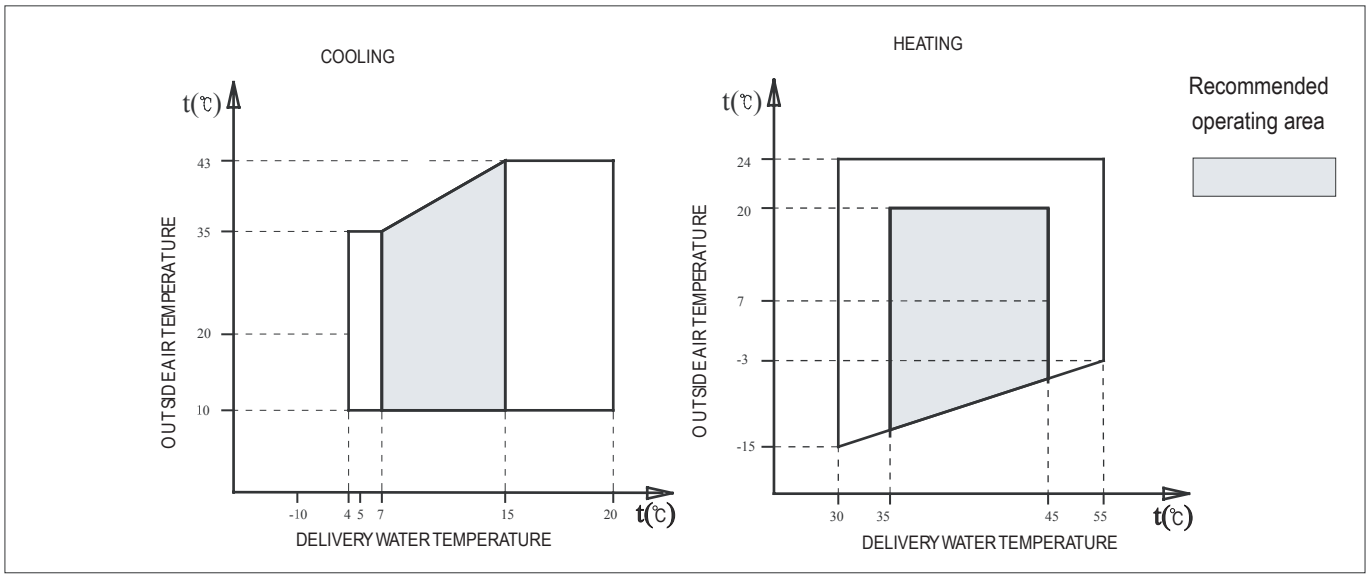
Ta .	Model	16			
U.R.87%	Tw	35	40	45	50
-5	Pt	10.5	10.4	10.3	-
	Pa	3.6	4.0	4.5	-
	Pat	3.9	4.3	4.8	-
	Qc	1.8	1.8	1.8	-
	ΔPc	13.9	13.9	13.8	-
0	Pt	12.8	12.7	12.6	12.5
	Pa	3.7	4.1	4.6	5.1
	Pat	4.0	4.4	4.9	5.4
	Qc	2.2	2.2	2.2	2.2
	ΔPc	20.2	20.1	20	19.9
7	Pt	15.6	15.5	15.5	15.4
	Pa	3.8	4.2	4.7	5.3
	Pat	4.1	4.5	5.0	5.6
	Qc	2.7	2.7	2.7	2.7
	ΔPc	30.2	30.1	30	30
10	Pt	16.9	16.8	16.7	16.6
	Pa	3.9	4.3	4.8	5.3
	Pat	4.2	4.6	5.1	5.6
	Qc	3.0	3.0	3.0	3.0
	ΔPc	35.4	35.2	35	34.8
15	Pt	19	18.9	18.8	18.7
	Pa	4.0	4.4	4.9	5.5
	Pat	4.3	4.7	5.2	5.7
	Qc	3.2	3.2	3.2	3.2
	ΔPc	46.2	45.6	45	44.4

Ta: outside air temperature (°C)
Pa: compressor power input (kW)
ΔPc: evaporator pressure drop (kPa)
Tw: evaporator water outlet temperature (°C)
Pat: total power input (kW)
- conditions outside of operating limits
Pt: heating cooling (kW)
Qc: evaporator water flow (m^3/h)

Air conditioner operating conditions
For proper performance, run the air conditoner under the following temperature conditions

Cooling operation	Outdoor temperature: 10℃~43℃
	indoor temperature: /
Heaing operation (cooling only type without)	Outdoor temperature: 4℃~24℃ (-15℃~24℃,When charge enough antifreeze)
	indoor temperature: /
Water temperature	cooling: 4℃~20℃(-15℃~20℃,When charge enough antifreeze) heating: 30℃~55℃ (30℃~55℃,When charge enough antifreeze)

If air conditioner is used beyond the above conditions, safely protection features may come into operation



Thermal head min. - max.	4-6
Water circuit pressure (bars)	1-3
Max. storage temperature	63

ETHYLENE GLYCOL SOLUTIONS

Water and ethylene glycol solutions used as a thermal vector in the place of water reduce the performance of the unit. Multiply the performance figures by the values given in the following table.

Fr eezing point (°C)						
	0	-5	-10	-15	-20	-25
Pe r centage of ethylene glycol in weight						
	0	12%	20%	28%	35%	40%
cPf	1	0.98	0.97	0.965	0.96	0.955
cQ	1	1.02	1.04	1.075	1.11	1.14
cdp	1	1.07	1.11	1.18	1.22	1.24

cPf: correction factor refrigerating capacity
cQ: correction factor flow rate
cdp: correction factor pressure drop

⚠ During winter leaving the unit unused, please drain water out completely from unit if no antifreeze were charged into pipeline, or keep power on(at standby or off status) and ensure that water is contained inside of unit.
When ambient temperature lower 5℃, running cooling mode must be charged antifreeze. Refer to upper parameters for the charged volume.

FOULING FACTORS

The performance data given refer to conditions with clean evaporator plates (fouling factor=1). For different fouling factors, multiply the figures in the performance tables by the coefficient given in the following table.

Fouling factors	Evaporator		
(m ² °C/W)	f1	fk1	fx1
4.4 x 10 -5	-	-	-
0.86 x 10 -4	0.96	0.99	0.99
1.72 x10 -4	0.93	0.98	0.98

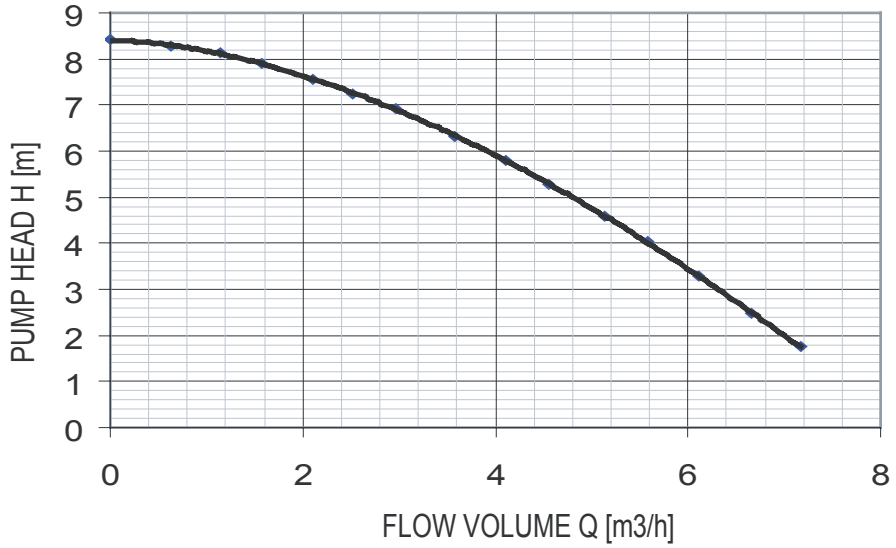
f1 capacity correction factor
fk1 compressor power input correction factor
fx1 total power input correction factor

Minimum water volume

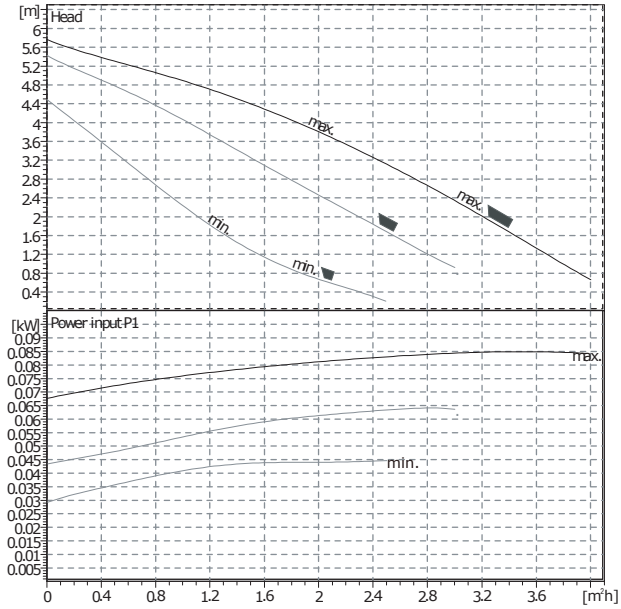
Model		5	7	9	10	12	14	16
Minimum wate volume	L	21	30	38	43	50	60	68

If the total water volume in the system is less than the value in the table above, the additional water tank is necessary in order to avoid the compressor On and Off frequently.
The minimum size of the water tank is calculated as:
Size of additional water tank(L) = Minimum water volume(L) - Actual water volume(L)

USEFUL PUMP HEAD CURVES (10/12/14/16 KW)



USEFUL PUMP HEAD CURVES (5/7/9 KW)



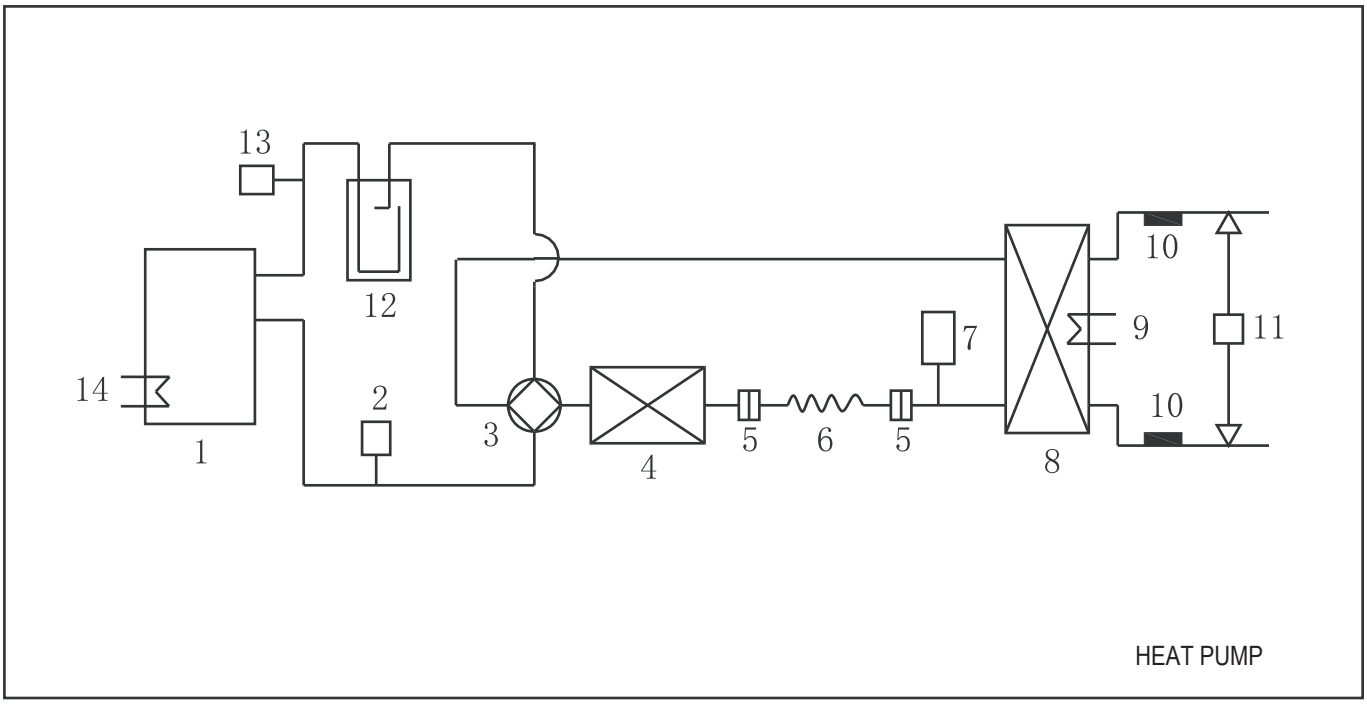
(*) To obtain the useful head of the installation, subtract the pressure drop of the plate heat exchanger.

HEAT EXCHANGER PRESSURE DROP (WATER SIDE)

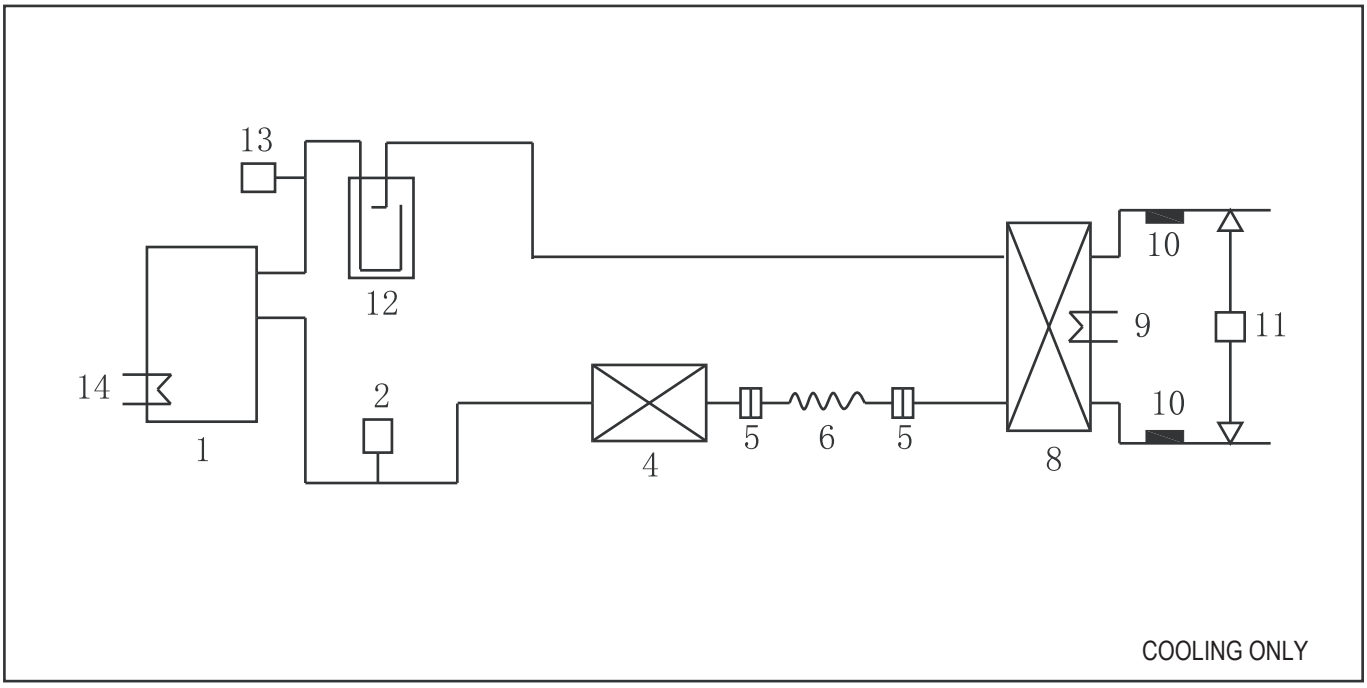
Model	Water	m³/h	0.8	1.0	1.2	1.4	1.6	1.8	2.0
	flow	l/sec	0.222	0.278	0.333	0.389	0.444	0.500	0.556
5	Pressure drop	kPa	13	23	36	52	-	-	-
7		kPa	12	21	33	47	65	-	-
9		kPa	8	15	24	35	48	62	-
10		kPa	8	11	15	19	24	30	37

Model	Water	m³/h	1.2	1.4	1.6	1.8	2.0	2.2	2.4
	flow	l/sec	0.333	0.389	0.444	0.500	0.556	0.611	0.667
12	Pressure drop	kPa	7	10	14	18	23	29	36
14		kPa	6	8	10	14	17	21	26
16		kPa	6	7	9	13	16	20	24

Note: the values highlighted refer to the rated flow



HEAT PUMP



COOLING ONLY

1 compressor	5 filter	9 frost heater	13 low pressure switch
2 high pressure switch	6 capillary	10 water temperature sensor	14 sump heater
3 reversing valve (only HEAT PUMP)	7 liquid receiver (only HEAT PUMP)	11 water differential pressure switch	
4 condenser	8 plate heat exchanger	12 accumulater	

PREPARING FOR FIRST START UP

Restarting after shutting down for long periods

The chiller must be started up for the first time by the Technical Service. Before starting up the chillers, make sure that:

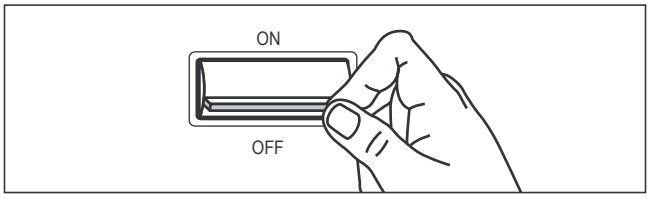
- All safety conditions have been respected
- The chiller is adequately fixed to the surface it rests on
- Functional distances have been respected;
- Hydraulic connections have been carried out as indicated in the instruction manual
- The water circuit is filled and vented. When draining after heat pump operation, take care as the water may be hot;
- The water circuit valves are open
- Electrical connections have been carried out correctly
- Voltage is within a tolerance of 10% of the rated voltage for the unit
- The unit is correctly earthed
- All electrical and hydraulic connections are tight and have been completed correctly.

⚠ The unit must be started up for the first time with standard settings. Set point values may be modified only after testing has been completed. Before starting up, power the unit for at least two hours by switching QF1 and QS1 to ON and setting the control panel "HSW7" to OFF to allow the oil in the compressor sump to heat up.

STARTING UP FOR THE FIRST TIME (after two hours)

Before activating the chiller:

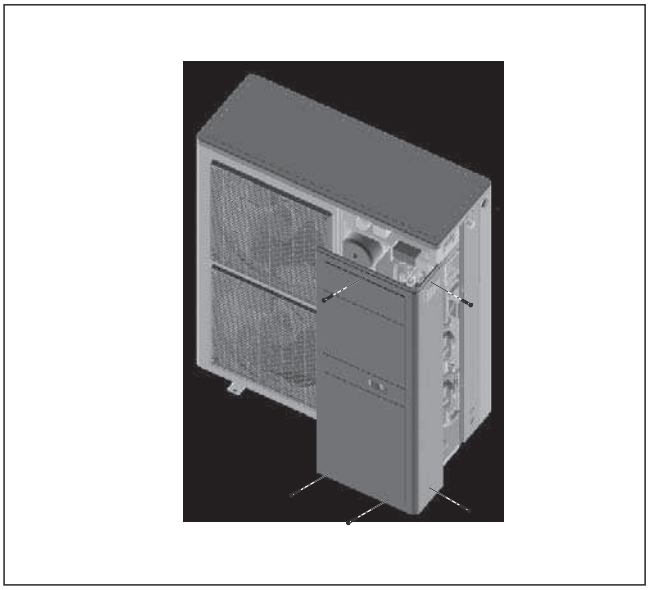
- Make sure the main remote switch QF1 is in the OFF position;



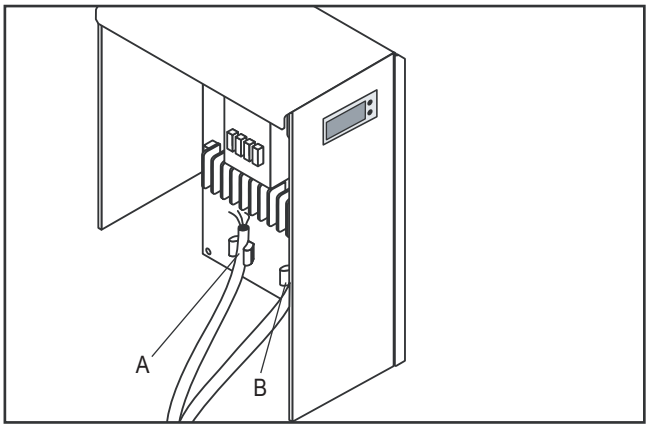
- Make sure the remote secondary switch SA2 is in the OFF or STANDBY position
- Make sure the remote keyboard A6 (if present) is set to OFF

To complete the electrical connections:

- Remove the inspection panel by unscrewing the five screws



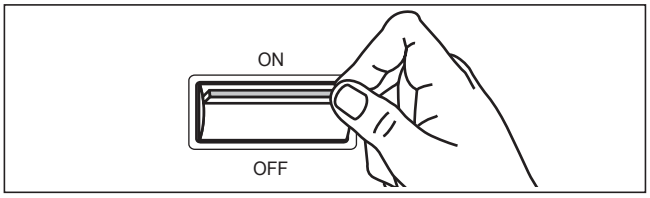
- Use grommet A for the electrical power cable and grommet B for the other external wires.



- Replace the inspection panel
- Position the main switch QF1 (outside the unit) in the "ON" position
- The "POWER" LED on the control panel "ST542" comes on to signal that voltage is present..

ACTIVATING AND DEACTIVATING THE UNIT

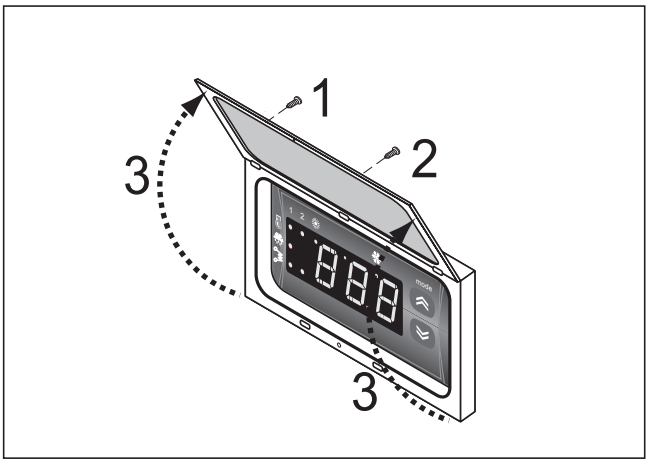
- Set the remote keyboard "A6" (if present) to ON.



- To ACTIVATE and DEACTIVATE the COOLING and HEATING functions, use the "ST542" control panel orthe remote keyboard "A6" if present.

During this phase, if the following indications appear on the display, follow the instructions:

⚠ Er20 check water flow rate and differential pressure switch.



To access the control panel, open the door:

- remove the screw 1 and screw 2;
- lift the door 3.

ACTIVATING AND DEACTIVATING THE UNIT

U I A

The front panel of the device functions as the user interface and is used to perform all operations relating to the device.

Keys

There are 4 keys on the front panel. Each key has (see the two tables below):

- o A "direct" action (indicated on the key)
- o An "associated" function (indicated on the front panel of the device beside the key). In the manual, this is shown in square brackets (e.g. [UP])
- o A "combined" action involving two keys. In the manual, this is shown in square brackets (e.g.[UP+DOWN])

Keys and associated functions

Key	Description Key	Press once (press and release)	Key [associated function]	Press and hold [press for about 3 seconds]	Menu /Comments
	UP (UP)	• Increases a value • Goes to the next label		[Manual defrost activation]	Functions menu see Functions chapter (folder FnC)
	DOWN (DOWN)	• Decreases a value • Goes to theprevious label		[Local ON/OFF]	See Local On/OFF section See also Functions menu Functions chapter (folder FnC)
	Esc(ape) Output (Without saving new settings)	• Exit without saving new settings • Go back to previous level	mode	[Change mode] See section on Changing operating mode	

set	Set Confirm (save new settings)	• Confirms value/ exit and save new settings • Move to next level (open folder, subfolder, parameter, value) • Open State Menu	disp	[Main display] --- See Main Display section	[Main Display Menu]
	ALL	Alarm acknowledgment			See Manual alarm acknowledgment and reset section

SETTING SERVICE PARAMETERS

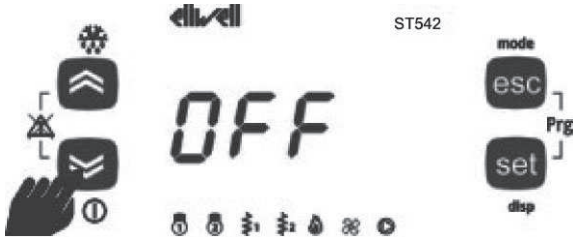
A

Local On/OFF

Device 'ON' ——> 'OFF'

	Press the [DOWN] key for about 3 seconds from the main display
	The word OFF will appear on the display. All other LEDs will be off

Device 'OFF' ——> 'ON'

	The word OFF will appear on the display. Press the [DOWN] key for about 3 seconds
	Energy ST500 will return to the "normal" screen

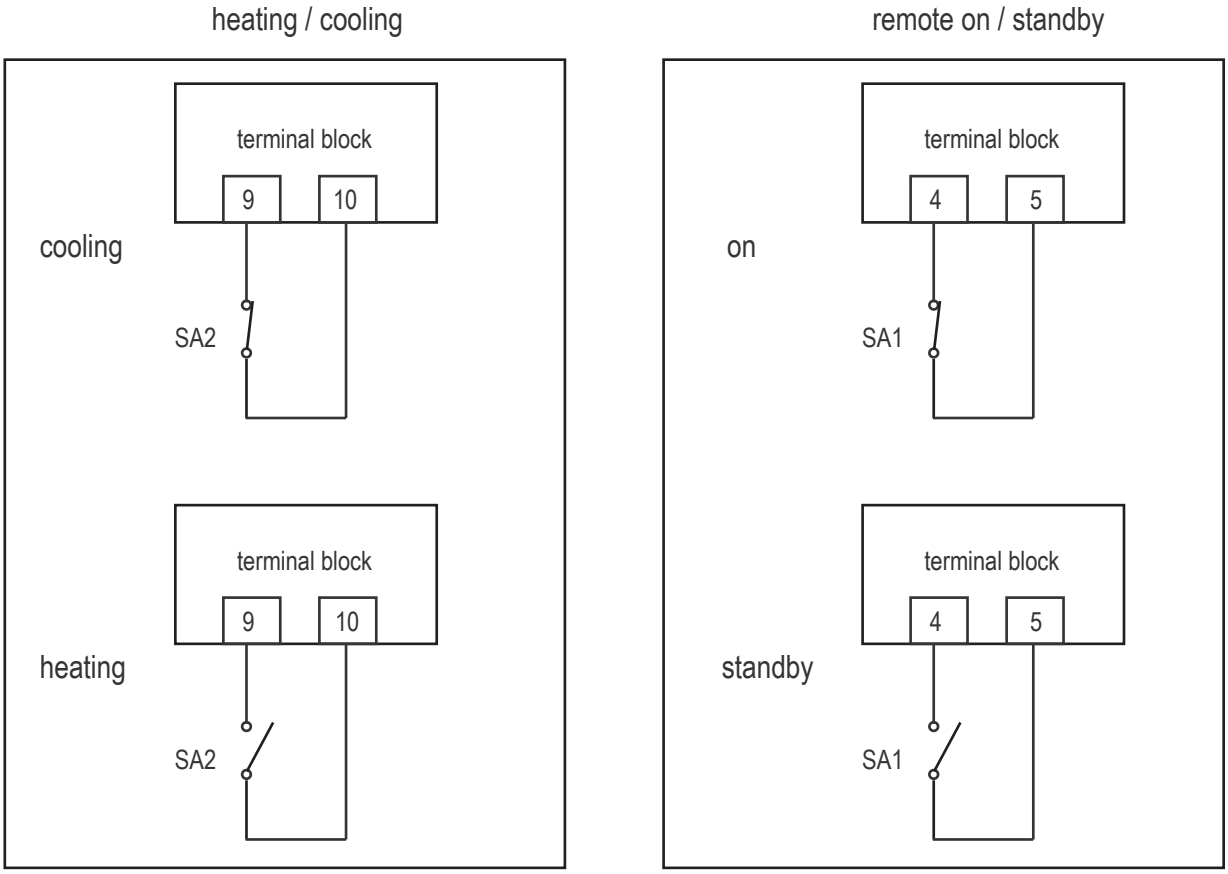
NOTE:
The local ON/OFF function is deactivated if the device has been turned OFF remotely or if a digital input is configured as a remote ON/OFF.

Remote on/standby and cooling / heating possibilities

Remote control of the unit can be done by a voltage free contact.
Depending on the setting on the digital controller ,the unit will operate in cooling or in heating mode.

Procedure

1、Connect the cable to the appropriate terminals as shown or the wiring diagram.



2、Fix the cable with cable ties to the cable tie mountings to ensure strain relief.

Note : ① The remote has priority and controls on/standby operation and change over operation.

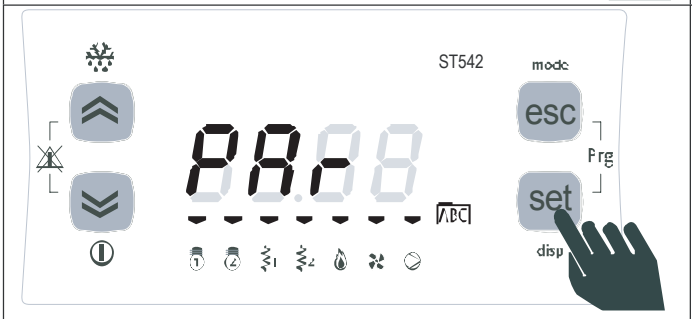
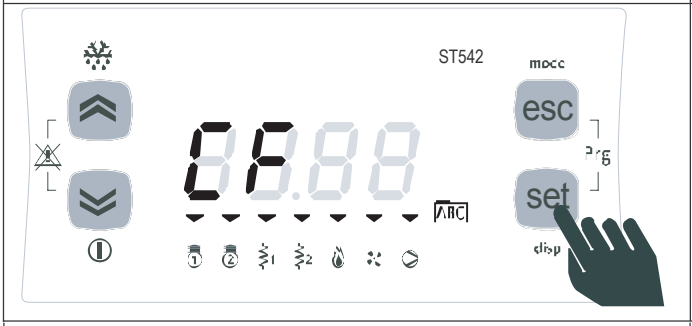
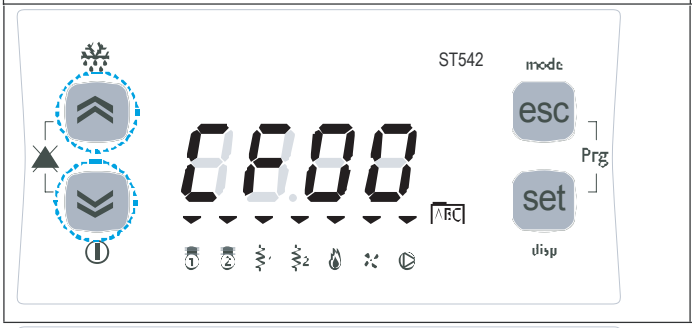
② If you want to use ST542 to control cooling/heating neither the remote,you must to set the parameter CF26 from “-14” to “0” .Please view parameter (folder PAr).

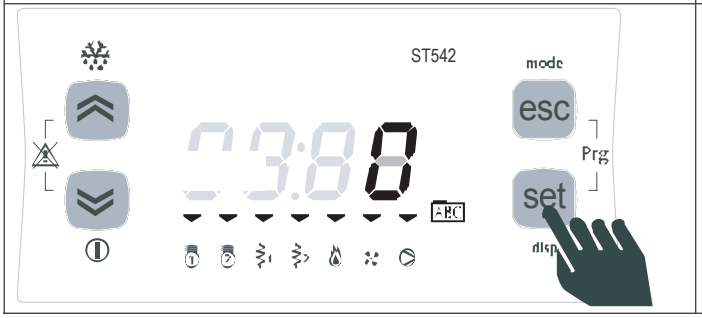
PAr	CF	Ui	St	.....	Al	Parameters		
FnC	dEF	tA	St	CC	EUr	Functions		See Functions chapter (folder FnC)
PASS						Password		
EU	Eu00	.....	.....	.....	.....			

Parameters (folder PAr)

Modifying a parameter

Instructions are provided below on how to change a machine parameter. By way of example, let's look at the CF configuration parameters folder, parameter CF26 (folder PAr/CF/CF26).

	Press the esc and set keys together to open the parameters menu. This will open the PAr menu.
	The PAr parameters menu contains all device parameters. Press the set key to view all folders.
	The first folder shown for the device is the CF configuration folder. Simply press the set key again to modify individual CF parameters.
	The CF00 parameter will be shown on the device (factory default settings). Press the "up" key to scroll the various parameters or move to the next parameter (CF01 in this case) or the ?down? key to go back to the previous parameter (CF47 in this case). CF00->CF01->CF02->.....->CF47->CF00 CF47<-CF00<-CF01->.....<-CF46<-CF47 N.B: -> UP, <-DOWN

	Press the set key to view the value of the parameter (CF26 in this case).
	For parameter CF26, the value shown will be -14. Press the “up” and “down” keys to modify this value.
	Press the set key once you have entered the required value. ** Press the esc key to exit this display and go back to the previous level. **N.B. pressing the set key will confirm the value entered. Pressing the esc key will take you back to the previous level without saving the value entered.

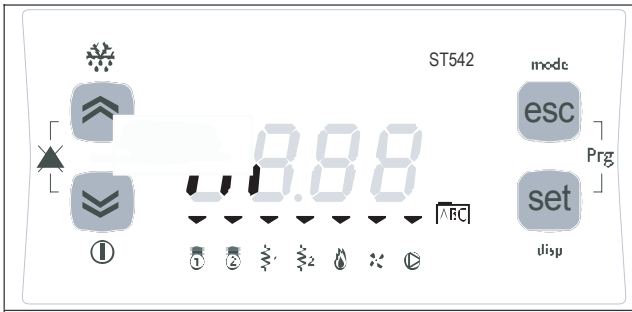
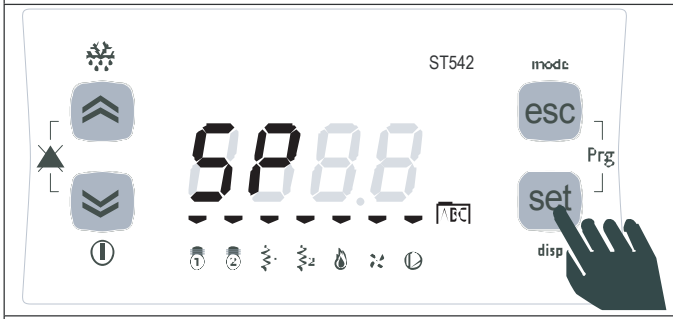
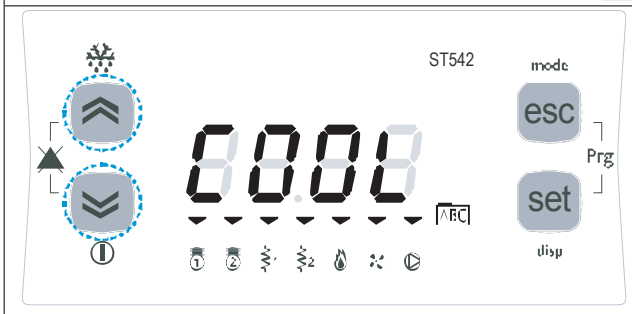
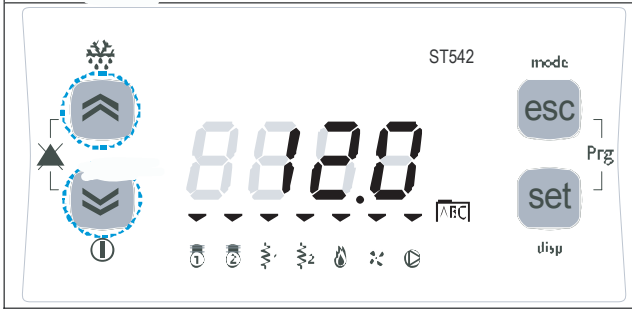
Functions (FnC folder)

See Functions chapter (folder FnC)

Example of how to set the setpoint (SP)

By way of example, we will change the setpoint value in COOL mode by 12.0 degrees centigrade to12.5 degrees centigrade.

	To change the setpoint on your machine, press the set key from the main display.

	Pressing the set key once will open a list of the various folders. Use the “UP” and “DOWN” keys to scroll the menu and find the SP folder.
	Press the set key to open the SP folder.
 	The first screen you see will be the COOL mode then the HEAT mode, using the “up” and “down” keys to scroll (shown beside each view).
	Let’s say you want to change the COOL mode setpoint. Select COOL from the menu, then press the set key.
	The device will show the current machine setpoint, which in this case is 12.0 degrees centigrade). Use the “up” and “down” keys to increase or decrease it. For example, if you want to change the setpoint to 12.5 degrees, press the "up arrow" key until you reach the required value.

	Once you have reached the required setpoint, press the set key. The device will save the value 12.5.
	To get back to the main display, press the esc key or allow a 15 second timeout to elapse for each menu.

View and Reset compressor/pump time

	Example display and reset time (hours x10) for Pump 2 Press the set key from the main display
	The label Ai will appear on the display. Use the UP and DOWN keys to scroll the other labels until you find the Hr label.
	Press the set key to view the first label - which in this case is the running time for compressor 1 (CP01)
	Scroll with the UP and DOWN keys to view (if the relative resources are present) the running time for compressor 2 (CP02) the pump running time (PU01, PU02)/Press the set key to view the pump running time PU02.

	The tens of hours of functioning are 2. (Hours expressed in tens: 2 means 20 hours of operation). To clear pump running time PU02, press and hold the [set] key. To reset the hours of functioning of pump PU02, press and hold [set]. Note: Repeat the procedure described to reset the hours of functioning of the other resources. ---------- Press the esc key to go back to the main display.

“States” menu

From the states menu you can view values for each resource.
For some resources, a "dynamic" view is possible.

- For example, when declared as not present / probe not configured (see System Configuration chapter (folder Par/CF), parameter CF01=0), analogue input AI2 will not be displayed.
- For example the hours of functioning of compressor 2 - CP02 - not available on single compressor machines.

Label							Visibility	Description	Change
Ai	Ai1	Ai2	Ai3	Ai4	//	//	Dynamic	Analogue inputs	//
di	di1	di2	di3	di4	di5	//	Dynamic	Digital inputs	//
AO	AO1	AO2	AO3	//	//	//	Dynamic	Analogue outputs	//
dO	dO1	dO2	dO3	dO4	dO5	dO6	Dynamic	Digital outputs	//
CL	HOUr	dAtE	YEAr					Clock	YES
AL	Er00	.....	.....	.....	.....	Er99	Dynamic	Alarms	//
SP	Value	//	//	//	//	//		Setpoint (set)	YES
Sr	Value	//	//	//	//	//		Real setpoint	//
Hr	CP01	CP02	PU01	PU02	//	//	Dynamic	Running time (hoursx10) compressor/pumps	YES

Reset alarm log (folder EUr)

See 1-4	Press [esc + set] in the main screen. The label ‘PAr’ will appear. Scroll with ‘UP’ and ‘DOWN’ to find the ‘FnC’ label. Press ‘set’. The label ‘dEF’ will appear. Scroll with ‘UP’ and ‘DOWN’ to find the ‘EUr’ label.
	Press the “set” key for 3 seconds [set]
	The ‘YES’= label appears to indicate that the alarm log has been deleted.

Keys-combined action

Symbol [function associated to the combined pressing of the keys]	Combination Keys	Combined pressing of keys Press once (press and release	[associated function]	[Menu] / Comments
		[UP (UP) + DOWN (DOWN)]	[Manual reset]	See Manual alarm acknowledgment and reset section
		[Esc+SETPOINT]	[Open programming menu]	[Programming menu]
				

Manual alarm acknowledgment and reset

Alarm messages blink. How to acknowledge an alarm is explained below.
All error messages are shown in the AL folder (see state Menu)

An error message will be shown, alternating with the error alert and the main display.
The ALARM LED will be permanently on.

	ALARM/ERROR ACKNOWLEDGMENT
	An error can be acknowledged by pressing any key once. After pressing any key, the alarm LED will start to blink.
	MANUAL RESET
	To manually reset an alarm, press the “up” and “down” keys together [UP+DOWN] - - - - - - - - - N.B: resetting an active alarm* will save the alarm in the AL folder (see state Menu). * i.e. manual reset (alarm)
	The device will return to the main display.

LEDs and Display

The display has 18 icons (LEDs) split into 3 categories (+ decimal point):

- Decimal point
- States and Operating Modes
- Values and Units of Measure
- Loads

Display

Values of up to 4 figures or 3 figures plus a sign can be displayed.

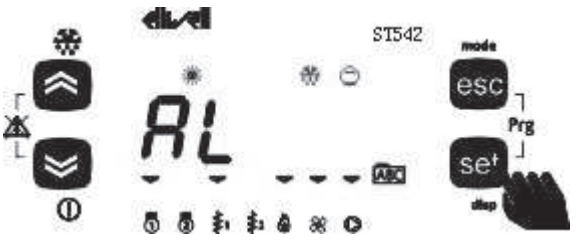
LED: decimal point

Values are always shown in tenths of a degree/bar.

⚠ At every change of season, make sure the operating conditions fall within the limits specified on page 18. Check that the compressor current input is less than the maximum indicated in the table of technical data.In three-phase models,check that the noise levels of the compressor are not abnormal. If this is the case, reverse one phase.

Make sure the voltage is within the established limits and that, for three phase units, the unbalance its and that, for three phase units, the unbalance between the phases is less than 3%. Check that the cover is closed again following the setting procedure.Heating and cooling are activated and deactivated via the control panel.To activate and deactivate the unit, see page 17.

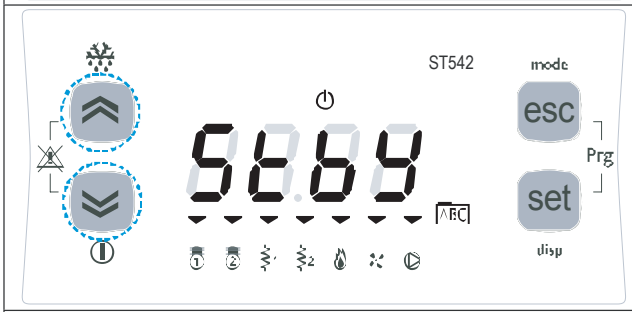
Alarm Display (AL)

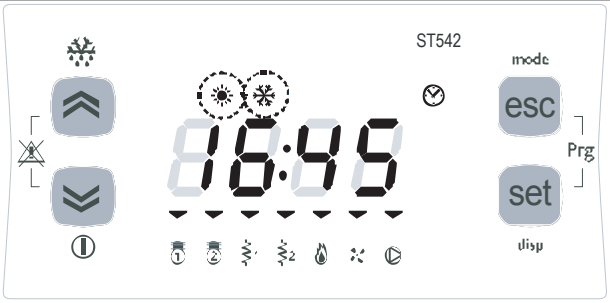
	Press the set key from the main display
	The label Ai will appear on the display. Use the UP and DOWN keys to scroll the other labels until you find the AL label
	Press the set key to view the label of the first active alarm (if it exists)
	In this case, the first alarm is Er01. Use the UP and DOWN keys to scroll any other alarms. N.B: the menu is not cyclical. For example, if the active alarms are ER01, Er02 and Er03, the display will show: Er01 ->Er02->Er03 <-Er02<-Er01 N.B: -> UP, <-DOWN Press the esc key to go back to the main display.

“Operating Mode” menu

Instructions are provided below on how to change the operating mode.
There are three different operating modes:

- Standby mode (StbY)
- Heat mode
- Cooling mode

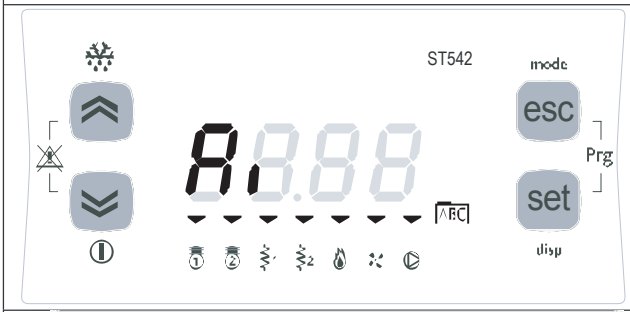
<table>
<tr>
<td> 
</td>
<td>For example, let’s say you want to change from StbY to COOL mode
To change operating mode, press and hold the mode key for at least 2 seconds
PS The main display is set as rtc (current time)</td>
</tr>
<tr>
<td> 
</td>
<td>A blinking menu will open containing the values StbY (standby), HEAt (heat) and COOL (cool).</td>
</tr>
<tr>
<td> 


</td>
<td>Select your required operating mode and press the set key.</td>
</tr>
<tr>
<td> 
</td>
<td>You will be automatically returned to the main display and you will see that the Stby LED that was previously on has gone off and the COOL LED has come on.</td>
</tr>
</table>

Setting the clock (CL)

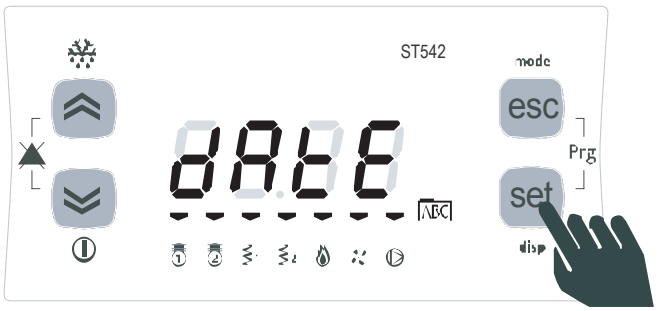
Energy ST500 has a clock (RTC) to run the alarm log and time bands, just like a programmable chronothermostat.
Instructions are provided below on how to set the time: the same procedure applies to change the date and year.

To change the clock on your machine, press the set key from the main display.



Pressing the set key once will open a list of the various folders.
Use the “UP” and “DOWN” keys to find the CL folder.

Press the set key to open the CL menu.



On entering this menu, you will see HOUr. Use the “UP” and “DOWN” keys to select the time, date or year.
Once you have decided what you want to set, press the [set]** key to open the modification menu for the variable selected.
**press and hold for about 3 seconds

LIST OF ACCESSIBLE PARAMETERS		
Parameter	Description	Unit of measure
CnF*	Machine configuration parameters	value
CP	Compressor parameters	value
FAn	Fan parameters	value
ALL	Alarm parameters	value
PUP	Pump parameters	value
Fro	Frost parameters	value
dFr	Defrost parameters	value

Note: when setting the parameters the COMPRESSOR and HEATER LEDs will flash alternating with the DEFROST LED.

*To enable the remote heating-cooling switch set parameter H27 to 2.

DISPLAYING ALARMS

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FA ULT	CAUSE	REMEDY
Values display indication STY	Remote switch in Standby position (automatic reset)	Position the remote switch to Standby Reset the switch Reset the jumper between terminals 4-5
Values display indication Er01	High pressure switch tripped manual reset	Check fault (see high discharge pressure page 30) Reset manually
Values display indication Er05	Low pressure switch tripped automatic reset for the first three trips in an hour	Check fault
Values display indication Er41	3-phase sequence,current and over-heat condenser temperature protection manual reset	Check power supply (A1)
Values display indication Er30	Frost prevention alarm (manual reset)	Check water outlet temperature Check water flow Check set point temperature or reset heating model
Values display indication Er61	Water delivery sensor BT2 malfunction (automatic reset)	Check electrical connections Replace component
Values display indication Er62	Coil sensor BT3 malfunction (automatic reset)	Check electrical connections Replace component
Values display indication Er60	Water return sensor BT1 malfunction (automatic reset)	Check electrical connections Replace component
Values display indication Er20	Differential pressure switch or flow switch tripped automatic reset for the first three trips in an hour	Check for inadequate water flow Check presence of air in water circuit
Values display indication Er47	Remote keyboard communication error	Reconnect to A6 controller
Values display indication Er45/Er46	Error clock faulty / Error set clock	Reset the clock
Values display indication Er90	Alarm history records exceeded message (manual reset)	Manual reset

Set point in cooling
(factory set) = 10°C, Hysteresis = 3°C.
The compressor starts with water temperatures above 13°C.
The compressor shuts down with water temperatures of less than 10°C.

Set point in heating
(factory set) = 45°C, hysteresis = 3°C.
The compressor starts with water temperatures below 42°C.
The compressor shuts down with water temperatures above 45°C.

In the event of a temporary power failure, when power returns, the mode set previously will be retained in the memory.

COMPRESSOR START UP DELAY
Two functions prevent the compressor from starting up too frequently
- Minimum time since last shut-down 180 seconds.
- Minimum time since last start-up 360 seconds.

PUMP
The electronic board includes a pump control output. The pump starts when the assembly is powered up and at least 120 seconds before the compressor starts up and stops 120 seconds after the assembly shuts down.
After the first 120 seconds of pump operation when the water flow is at full speed, the water flow alarm functions are activated (differential pressure switch and flow switch).
With a pump connected to terminals PL and PN on the installer terminal board.

FAN SPEED CONTROL
For correct operation of the unit with different outside temperatures, the microprocessor controls the fan speed based on the pressure reading from the pressure probe, thus enabling heat exchange to be increased and/or decreased, maintaining the condensing or evaporation temperature practically constant.

The fan functions independently of the compressor.

FROST PREVENTION ALARM
To prevent the water freezing and damaging the plate heat exchanger, the microprocessor shuts down the compressor if the temperature measured by the heat exchanger outlet temperature sensor is less than 3°C.
The frost prevention temperature set point can be modified by an authorised service centre only and only after verifying that the water circuit contains antifreeze.
Tripping of this alarm shuts down the compressor but not the pump, which remains active.
To reset normal functions, the outlet water temperature must rise to more than +15°C. Reset is manual.

WATER FLOW ALARM
The microprocessor provides for management of a water flow alarm controlled by a differential pressure switch fitted as standard on the appliance and a flow switch to be installed on the water delivery piping.
This safety device may trip after the first 120 seconds of pump operation when the water flow is up to speed.
Tripping of this alarm shuts down the compressor but not the pump, which remains active.
To reset normal functions, the alarm contact must be deactivated for at least five seconds.

When electrical current current exceeds to setting value and condenser temperature over than 65° C, system will shut down, but not returns to normal operation until the condenser temperature decreased less than 52°C. If phase sequence were detected error, please re-input power, and then the system will turn normal.

A SHUTTING DOWN FOR LONG PERIODS

If it is previewed not to use the machine for long periods
After deactivating the chiller:
- Make sure the remote switch SA2 is in the "Standby" position, or alternatively disconnect the unit from the power supply.
- Make sure the remote keyboard (if present) or the ST542 is set to “OFF”.
- Position QF and QS on OFF
- Deactivate the indoor terminal units by placing the switch of each unit in the “OFF” position.
- Close the water valves.

⚠ If there is a possibility that the outside temperature may drop below zero, there is the risk of freezing. The water circuit MUST BE EMPTIED AND SHUT OFF POWER (when draining after heat pump operation take care as the water may be hot) or antifreeze must be added in the proportion recommended by the manufacturer.

ROUTINE MAINTENANCE

A

Never perform any cleaning operations before having disconnected the unit from the mains power supply.
If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard

Regular maintenance is fundamental to maintain the efficiency of the unit both in terms of operation and energy consumption. The Technical Assistance Service maintenance plan must be observed, with an annual service which includes the following operations and checks:

- Filling of the water circuit
- Presence of air bubbles in the water circuit
- Efficiency of safety devices
- Power supply voltage
- Power input
- Tightness of electrical and hydraulic connections
- Condition of the compressor contactor
- Efficiency of the plate heat exchanger heater
- Checking of operating pressure, superheating and subcooling
- Efficiency of compressor heater
- Cleaning of finned coil (*)
- Cleaning of fan grills
- Cleaning of condensate drain pan (if installed).

(*) for “Heat pump” appliances, the checks are to be performed quarterly.

For units installed near the sea, the intervals between maintenance should be halved.

EXTRAORDINARY MAINTENANCE

A

Never perform any cleaning operations before having disconnected the unit from the mains power supply.

CHEMICAL WASHING

You are recommended to chemically wash the plate heat exchanger after every 3 years of operation. For instructions on how to carry out this operation, contact De’ Longhi Spa.

REFRIGERANT GAS CONTENT

The chillers are filled R410a refrigerant gas and tested in the factory. In normal conditions, there should be no need for the Technical Assistance Service to intervene to check the refrigerant gas. However, over time, small leaks may develop at the joints leading to loss of refrigerant and draining of the circuit, causing the unit to function poorly. In this case, the leaks of refrigerant must be identified and repaired and the refrigerant circuit refilled. Proceed as follows:

- Empty and dry the entire refrigerant circuit using a vacuum pump connected to the low and high pressure tap until the vacuometer reads about 10 Pa. Wait a couple of minutes and check that this value does not rise to more than 200 Pa
- Connect the refrigerant gas cylinder or a filling cylinder to the low pressure line pressure gauge connection.
- Fill with the quantity of refrigerant gas indicated on the rating plate of the unit..
- Always check the superheating and subcooling values. In the nominal operating conditions for the appliance, these should be between 5 and 10°C and between 4 and 8°C respectively.
- After a couple of hours of operation, check that the liquid indicator indicates circuit dry (dry-green)

⚠ In the event of partial leaks, the circuit must be completely emptied before being refilled
The R410a efrigerant must only be filled in the liquid state.
Operating conditions other than nominal conditions may produce considerably different values.
Seal testing or identification of leaks must only be carried out using R410a refrigerant gas, checking with a suitable leak detector.

⛔ The refrigerant circuit must not be filled with a refrigerant other than that indicated on page 14. The use of a different refrigerant may cause serious damage to the compressor.
Oxygen, acetylene or other inflammable or poisonous gases must never be used in the refrigerant circuit as they may cause explosion or poisoning.
Oils other than those indicated on pages 14 must not be used. The use of different oils may cause serious damage to the compressor.

DISPOSAL

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Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.
Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
Contact you local government for information regarding the collection systems available.
If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

FAULT	CAUSE	REMEDY
The chiller does not start up	No voltage	- Check presence of voltage - Check safety systems upstream of the appliance
	Mains switch in OFF position Remote switch (if present) in OFF position Control panel set to OFF Main unit switch in OFF position Compressor thermal solenoid switch OFF	Switch ON
	Supply voltage too low	Check power line
	Contactor coil faulty Electronic board faulty Start-up capacitor faulty (if present) Compressor faulty	Replace the component
Insufficient output	Insufficient refrigerant Sizing of unit Operation outside recommended limits	Check
Compressor noisy	Liquid returning to compressor Inadequate fixing	Check
	Reversed phase (three phase units only)	Reverse one phase
Noise and vibrations	Contact between metal bodies	Check
	Weak foundations	Repair
	Loose screws	Tighten screws
The compressor stops due to the activation of the protection devices	Excessive delivery pressure Low suction pressure Low voltage Electrical connections not sufficiently tight Operation outside permitted limits	Check
	Faulty operation of pressure switches	Thermal cut-out tripped
	Replace the component	Check supply voltage Check electrical insulation of windings

FAULT	CAUSE	REMEDY
The chiller does not start up	No voltage	- Check presence of voltage - Check safety systems upstream of the appliance
	Mains switch in OFF position Remote switch (if present) in OFF position Control panel set to OFF Main unit switch in OFF position Compressor thermal solenoid switch OFF	Switch ON
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Insufficient output	Insufficient refrigerant Sizing of unit Operation outside recommended limits	Check
Compressor noisy	Liquid returning to compressor Inadequate fixing	Check
	Reversed phase (three phase units only)	Reverse one phase
Noise and vibrations	Contact between metal bodies	Check
	Weak foundations	Repair
	Loose screws	Tighten screws
The compressor stops due to the activation of the protection devices	Excessive delivery pressure Low suction pressure Low voltage Electrical connections not sufficiently tight Operation outside permitted limits	Check
	Faulty operation of pressure switches	Thermal cut-out tripped
	Replace the component	Check supply voltage Check electrical insulation of windings

FAULT	CAUSE	REMEDY
High discharge pressure (greater than 36 bars)	High external water temperature High water inlet temperature	Check
	Insufficient air flow Insufficient water flow	Check fan operation Check pump operation
	Faulty fan regulation	Check
	Air in water circuit	Vent air
	Excessive refrigerant charge	Check
Low discharge pressure (less than 25 bars)	Low outside air temperature Low water inlet temperature	Check
	Moisture in the refrigerant circuit (liquid indicator - moisture yellow)	Faulty fan control
	Faulty fan control	Check
	Air in water circuit	Vent air
	Insufficient gas content	Check
High suction pressure (greater than 10 bars)	High outside air temperature High inflow water temperature	Check
Low suction pressure (less than 5.0 bars)	Low utility water inlet temperature Low external water inlet temperature Clogged water filter Blocked plate heat exchanger	Check

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更改说明：

H到I版本，修改第34页不清楚的字体。