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FITTER

INSTRUCTIONS FOR FITTER

NAME cat. no. HEWALEX: 91.10.13 **PCWU 2.5kW**

EQUIPMENT CHARACTERISTICS

Utility water heat pump - PCWU 2.5kW uses heat contained in outdoor or ventilation air for high-efficiency hot utility water production.
The temperature of outlet air from heat pump is 5-10°C lower. It may be used to cool rooms in summertime.

Heat pump PCWU 2.5kW is a complete unit, which is very easy to install. The following tools and accessories will be needed for fitting:

- Philips screwdriver PZ2
- flat-head power screwdriver 2mm
- flat wrenches 17, 27, 41
- welding machine in case of PP tubes
- drilling machine with drill fitted for building wall, in order to fasten heat pump holder in a stable way
- drill rig ND150 in case of air-ducts going outside building (option, possibility to apply other technologies)
- on-wall fixing grip with dowels fitted for building wall (option)
- 3 cut-off valves
- 2 drain valves
- water filter
- water tube, min. diameter Φ20mm inside, insulated (recommended: plastic)
- air tube (depending on an installation, additionally: ducts, choke valves, air guides)
- masking cover for ventilation ducts going outside building
- 4-wire cable 0.75mm², to extend controller if needed
- protective pipe to cover controller cable
- pipe unions and gaskets for circulating pump
- check valve (when pump has shared stub pipe for return to the tank with circulation)
- pipe unions and nipples GZ 3/4" for screwing-in in heat pump (easily removable)
- a hose to extend condensate discharge
- thread packing (e.g. hemp fibres, Teflon thread)

NOTE: The tools and equipment listed above include those most frequently used in installations. Each installation may have its individual requirements, which would make it necessary to apply other tools and extra accessories.

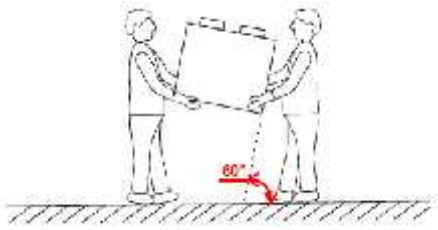
Table of Contents

Also read User's Instructions prior to fitting!

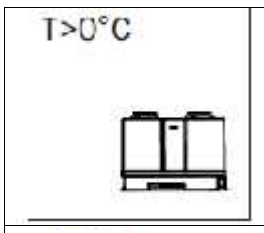
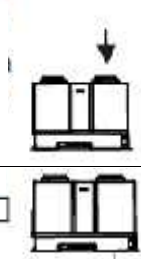
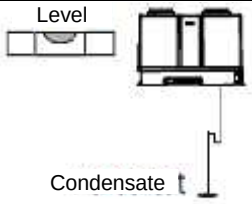
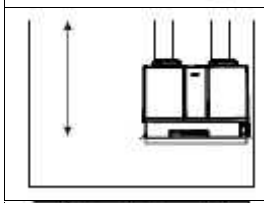
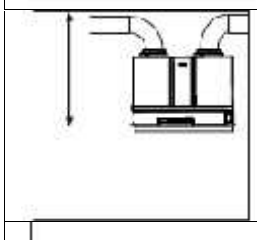
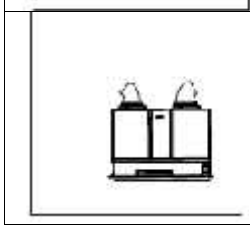
1 Storage and handling

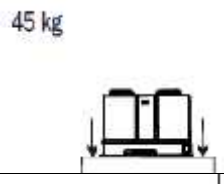
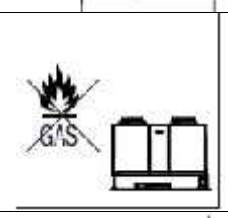
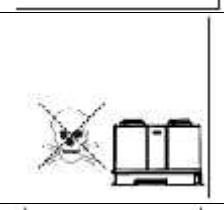
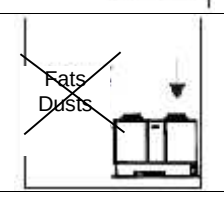
During storage heat pump should be protected by foil and original factory cardboard packaging. Equipment storage temperature should range within -10 to 45°C. The unit cannot be flooded with water during storage. Heat pump should be carried at angle up to 60°. After handling heat pump should be left in its normal position for 1 hour before it is started up.

While transporting heat pump on a cart or with a forklift, it should be set on a pallet.



2 Choosing installation location

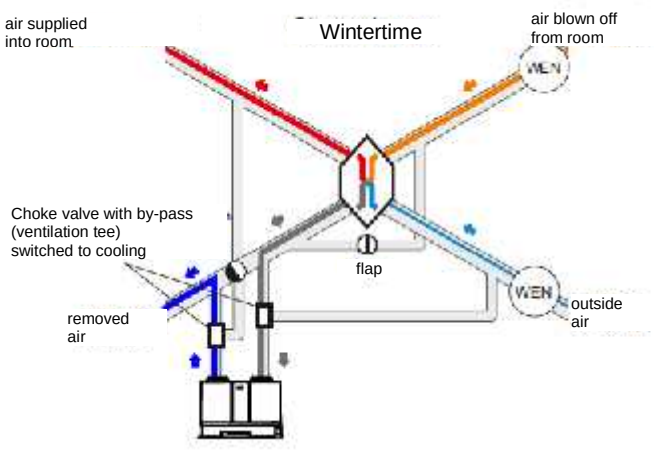
	The unit is fitted for building-in only in heated rooms.
T of air inlet 0-40°C 	Drawn air temperature should range within -5 to 43°C. Quicker heat pump wear and tear will take place in case of operation at lower or higher temperature values.
	Condensate discharge should be extended with a conduit or pipeline to floor drain. Water seal should be provided within this line in order to avoid fetid odours. One should remember that condensate discharge flow is generated by gravity only. Level the unit to make condensate flow down smoothly.
	In case of vertically connected air tubes, minimum height from heat pump base to ceiling: 650 mm. Ducts should be easily removable (that is it should be possible to lift them up to at least 100 mm).
	In case of air ducts with horizontal outlet it is necessary to use 90° elbows with tube diameter 160 mm. In that case, minimum room height is 850 mm. should be easily removable (that is it should be possible to lift them up to at least 100 mm).
	Air guides should be provided in case if air is drawn and exhausted from room, where heat pump is installed. Minimum cubic capacity of room is 80 m^3, and it should be provided with very good ventilation - in this case unit efficiency is worse due to air mixing.

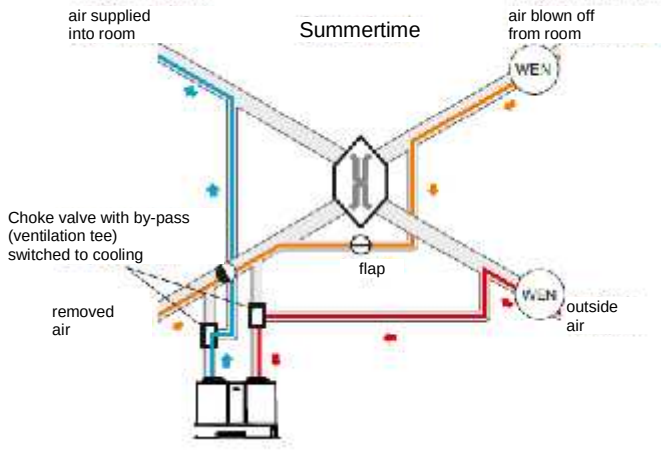
	The surface, where heat pump is installed, must carry the unit weight (64 kg).
	It is not allowed to install the unit in rooms, where flammable materials are stored, or in locations, where drawn air would contain flammable substances. Failure to follow this instruction may result in fire.
	Heat pump cannot be supplied with air or installed in places, where toxic or caustic substances are present. This also applies to air drawn from pool chlorination facilities, where high chlorine concentration may cause evaporator perforation.
	If air drawn into heat pump contains plenty of fat (e.g. excess of heat from industrial kitchens) fume hood should be provided with carbon type filters so as to reduce evaporator clogging with fats. For the same reason, drawn air should be free from dusts.

Connection to mechanical ventilation

In case of the PCWU 2.5kW heat pump, it is possible to connect the pump to mechanical ventilation.

If air handling unit has delivery reaching 350-500 m^3/h, it will be fully sufficient source of air for heat pump. Moreover, solution using ventilation allows efficient air cooling in summertime - by ca. 5-10°C relative to inlet air (cooling temperature to a large extent depends on fan delivery - at 350m^3/h air will be flowing through evaporator longer, and thus it will be cooler).





Example diagram showing connection to air handling unit - differences may appear depending on the system of air handling units from various manufacturers.

Wintertime - the pump takes exhaust heat just after air handling unit. We work with air precooled in a recuperator. However, exhaust air temperature is still high and interesting for us from point of view of heat recovery in a heat pump. Air cooled in a heat pump is exhausted outside building.

Summertime - heat pump yeses air from outside - exhausts cooled air into a room. This time, air is taken from outside because due to hygienic requirements we are not allowed to work in a closed cycle.

When connecting heat pump to air handling unit, it is possible to use control system leaving heat pump. We can use voltage signal (230 V) from the RL01 relay to switch on RL01 air handling unit.

Control may be also solved by way of modifying heat pump and ventilation system operation times. Time interval should be set in air handling unit guaranteeing that heat pump has suitable air delivery all the time. In case if air handling unit switches off earlier, heat pump fan will not be capable of overcome installation resistance, and thus air flow through evaporator will decrease considerably. Low pressure alert may be activated in boundary conditions.

3 Installation

Connection of heat pump and other equipment

Depending on selected diagram and heat pump model, we are able to connect accessory equipment defined as follows in the controller:

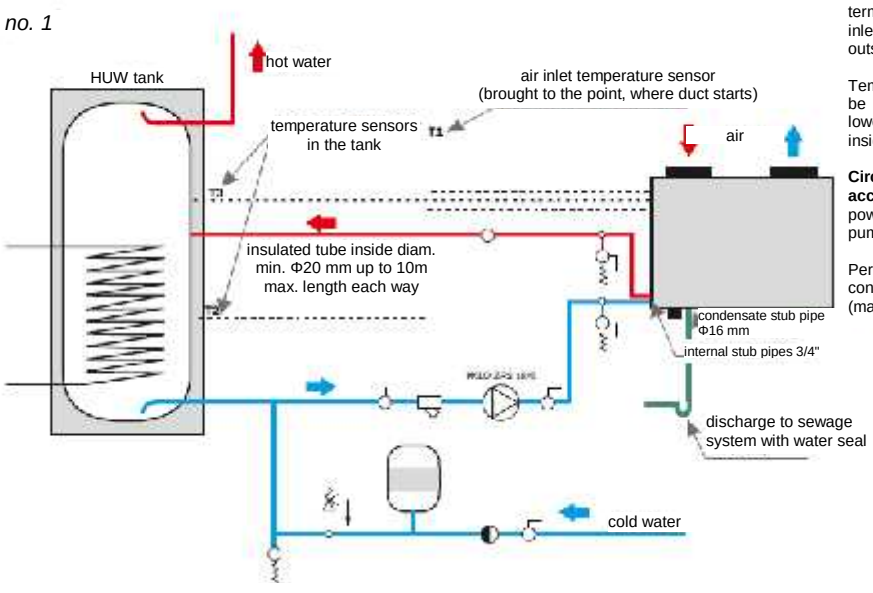
B - solid fuel fired boiler (e.g. coal boiler, fireplace with water jacket)
C - circulating pump
D - automatic boiler (e.g. gas-fired, oil-fired or electric)
E - electric heater
P - electric heater
F - pump for solid fuel fired boiler

Heat pump should be connected to the tank using tubes with the following diameters (inside diameter Ø20 and fittings 3/4", max. distance to the tank: 20 m):
- 32x5.4 (in case of PP)
- 22x1 (in case of copper)

The system should have possibly lowest resistance, so as to ensure the flow of 0.65m^3/h. In order to check if the flow is correct, we may measure heat pump water inlet and outlet temperature using an external temperature sensor. Temperature difference between inlet and outlet cannot exceed 5°C.

Equipment connection to heat pump automatics
Unscrew grey cover (7 screws, PZ2 screwdriver). Lift the cover.
After removal of heat pump grey cover it is necessary to unscrew black metal plate protecting electric box (4 screws).

diagram no. 1



The T1 sensor, marked as ambient sensor, is connected to S01 terminals. The sensor is installed in vicinity of heat pump air inlet. It should be placed outside the building (if air is drawn from outside) in provided plastic housing.

Temperature sensors T2 (tank bottom) and T3 (tank top) should be installed according to the diagram and sensor identifiers in lower and upper part of utility water tank. The sensors are fitted inside the unit.

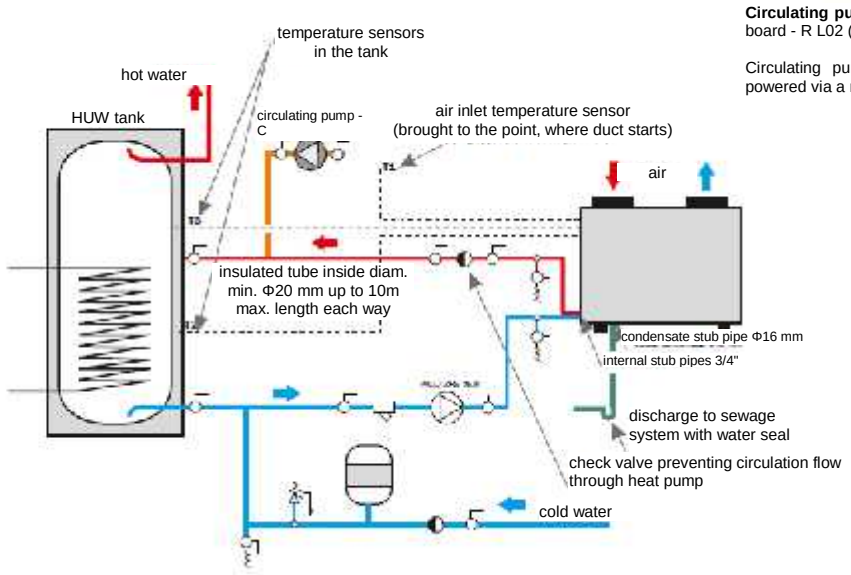
Circulating pump (WILO) also should be connected according to the diagram to OUT H in grey block (above power supply) marked with white circle in the Photo above. This pump has been fitted under grey cover of heat pump.

Peripheral equipment or other temperature sensors should be connected directly to electric board, or to an external strip (marked with white circle in the Photo above).

Symbols:
- drain valve
- cut-off valve
- expansion vessel min. 4% of tank volume
- check valve
- water filter
- safety valve, max. 7 bar

Precise control board wiring diagram is provided at the end of this Manual.

diagram no. 2



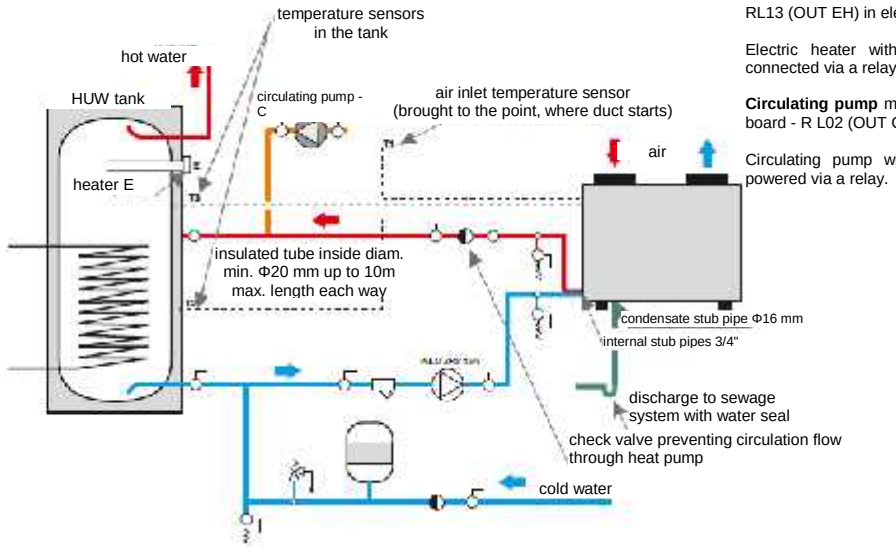
Circulating pump may be connected to terminals in electric board - R L02 (OUT C).

Circulating pump with power exceeding 100W must be powered via a relay.

Symbols:

circulating pump

diagram no. 3



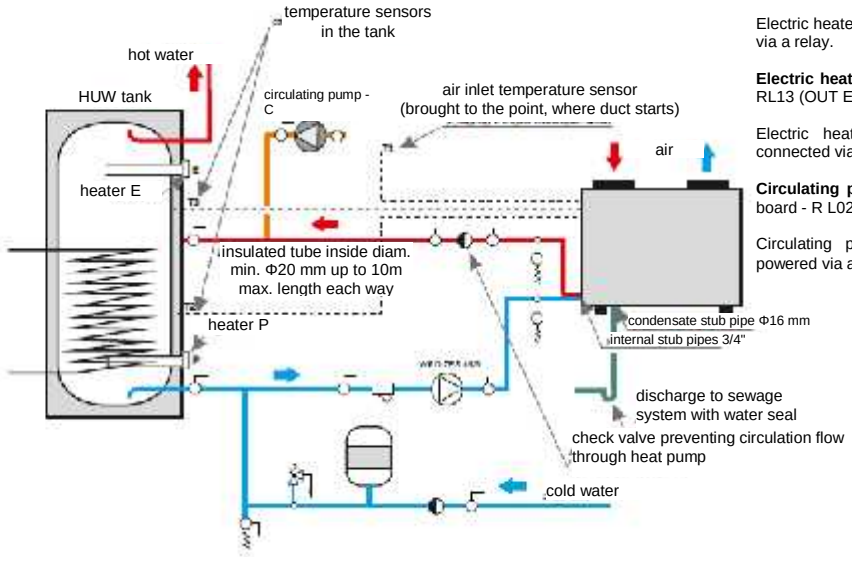
Electric heater at tank top should be connected to terminals RL13 (OUT EH) in electric board.

Electric heater with power exceeding 1500W must be connected via a relay.

Circulating pump may be connected to terminals in electric board - R L02 (OUT C).

Circulating pump with power exceeding 100W must be powered via a relay.

diagram no. 4



Electric heater at tank bottom should be connected to terminals RL08 (OUT FH) in electric board.

Electric heater with power exceeding 100W must be connected via a relay.

Electric heater at tank top should be connected to terminals RL13 (OUT EH) in electric board.

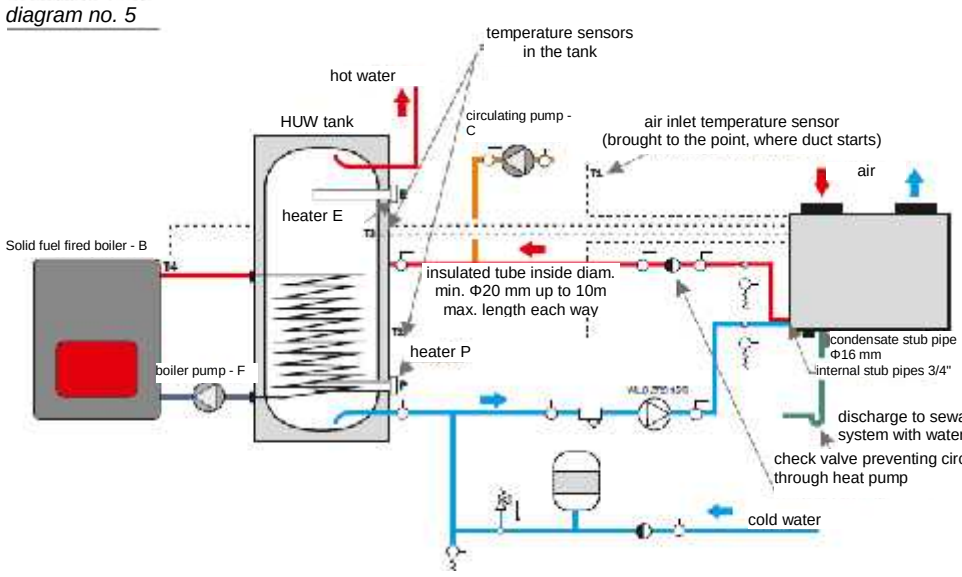
Electric heater with power exceeding 1500W must be connected via a relay.

Circulating pump may be connected to terminals in electric board - R L02 (OUT C).

Circulating pump with power exceeding 100W must be powered via a relay.

Precise control board wiring diagram is provided at the end of this Manual.

diagram no. 5



Pump for solid fuel fired boiler should be connected to R L 09 (OUT P) in electric board.

Circulating pump with power exceeding 100W must be powered via a relay.

Temp. sensor T4 should be installed at boiler output.

Electric heater at tank bottom should be connected to terminals RL08 (OUT FH) in electric board.

Electric heater with power exceeding 100W must be connected via a relay.

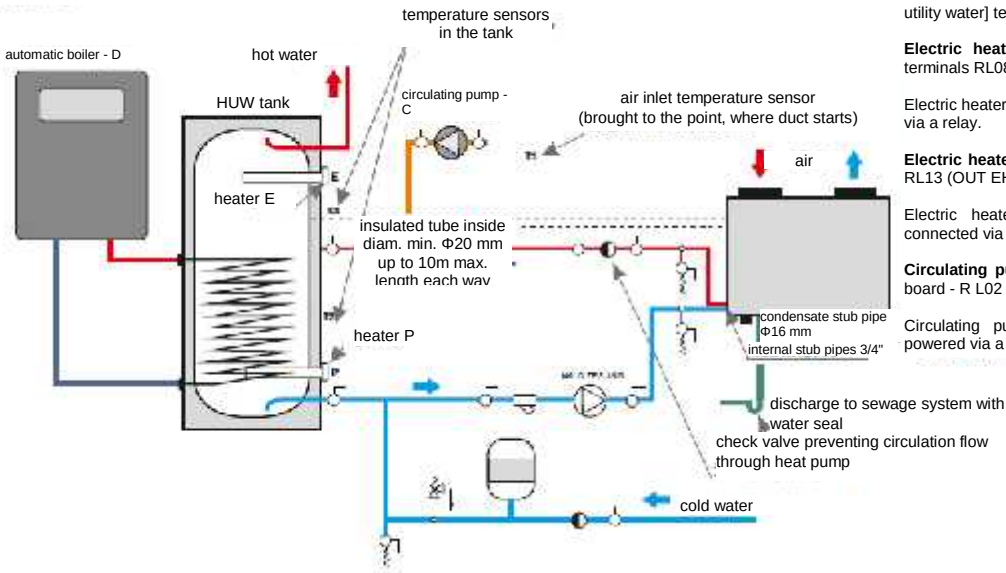
Electric heater at tank top should be connected to terminals RL13 (OUT EH) in electric board.

Electric heater with power exceeding 1500W must be connected via a relay.

Circulating pump may be connected to terminals in electric board - R L02 (OUT C).

Circulating pump with power exceeding 100W must be powered via a relay.

diagram no. 6



Automatic boiler (e.g. gas-fired) should be connected to RL 10 (OUT D) in electric board. **It is a voltage contact.**

1. Operation of an external boiler control unit (normally open bridge) only through a relay.
2. Control with properly selected resistors instead of HUW [hot utility water] temperature sensor in the boiler.

Electric heater at tank bottom should be connected to terminals RL08 (OUT FH) in electric board.

Electric heater with power exceeding 100W must be connected via a relay.

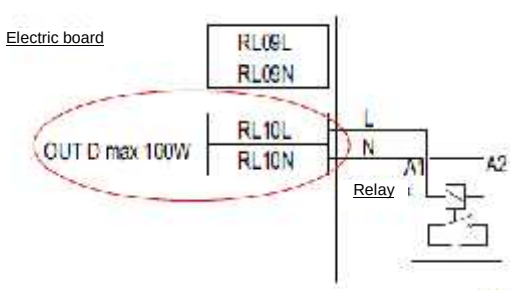
Electric heater at tank top should be connected to terminals RL13 (OUT EH) in electric board.

Electric heater with power exceeding 1500W must be connected via a relay.

Circulating pump may be connected to terminals in electric board - R L02 (OUT C).

Circulating pump with power exceeding 100W must be powered via a relay.

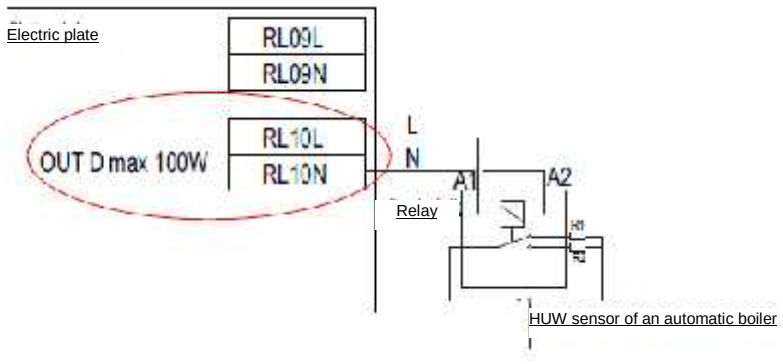
1. Operation of an external boiler control unit (normally open bridge) only through a relay.



External control unit in an automatic boiler

Precise control board wiring diagram is provided at the end of this Manual.

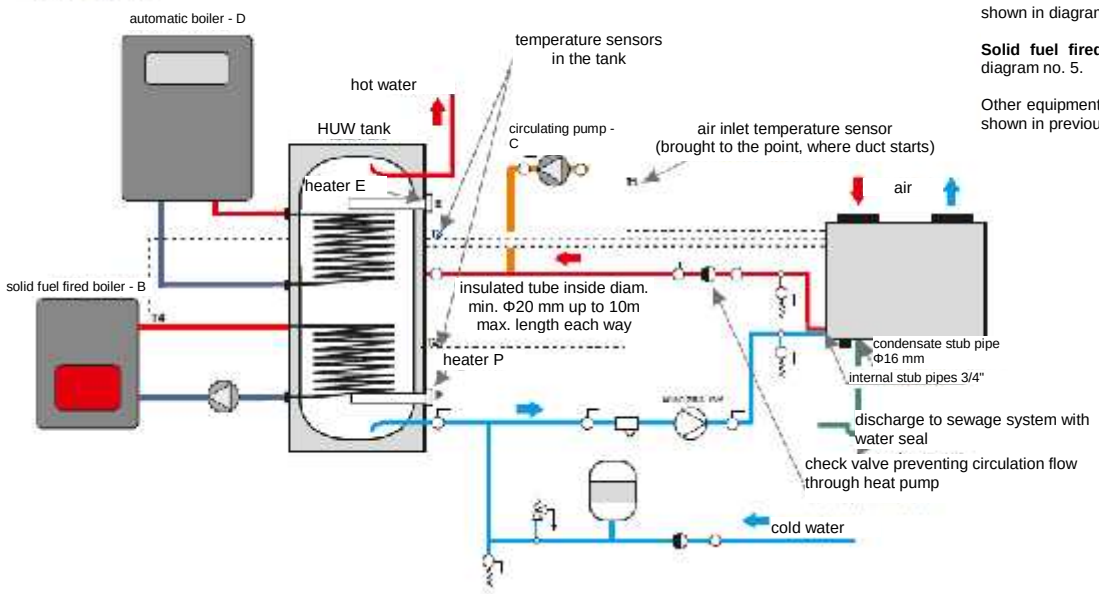
2. Control with properly selected resistors instead of HUW [hot utility water] temperature sensor in the boiler.



Exemplary chart of temperature sensor resistances for various boiler manufacturers.

Boiler manufacturer (example)	R1 resistor [kΩ] Temp.: 20 ÷ 30°C	R2 resistor [kΩ] Temp.: 70 ÷ 80°C	Boiler manufacturer (example)	R1 resistor [kΩ] Temp.: 20 ÷ 30°C	R2 resistor [kΩ] Temp.: 70 ÷ 80°C
Acv	12.0 ÷ 15.0	1.5 ÷ 2.0	**Brotje Heizung**	8.0 ÷ 12.5	1.2 ÷ 1.7
Ariston	8.0 ÷ 12.0	1.5 ÷ 2.0	**Buderus**	8.0 ÷ 12.5	1.2 ÷ 1.7
Beretta	9.0 ÷ 14.0	1.8 ÷ 2.0	**De-Dietrich**	10.0 ÷ 15.0	1.8 ÷ 2.3
Ferolli	8.0 ÷ 12.5	1.2 ÷ 1.7	**Vaillant**	3.5 ÷ 3.3	0.4 ÷ 0.6
Junkers	10.0 ÷ 14.8	1.9 ÷ 2.4	**Viessmann (new boilers)**	9.0 ÷ 15.0	1.5 ÷ 1.8
Stiebel Eltron	10.0 ÷ 15.0	1.0 ÷ 1.5	**Viessmann (old boilers)**	0.54 ÷ 0.56	0.64 ÷ 0.66
Termet	10.0 ÷ 11.0	1.4 ÷ 1.8	**Wolf**	5.0 ÷ 7.0	1.8 ÷ 2.6

diagram no. 7



Automatic boiler (e.g. gas fired) should be connected as shown in diagram no. 6.

Solid fuel fired boiler should be connected as shown in diagram no. 5.

Other equipment (if it is to be connected, it should be done as shown in previous diagrams).

Precise control board wiring diagram is provided at the end of this Manual.

diagram no. 8

Solar thermal collectors are operated via solar controller.
It is possible to connect heat pump controller to solar controller and operate it as a master controller (depending on solar controller version).

Other equipment, if it is to be added to the system, it should be connected as shown in previous diagrams.

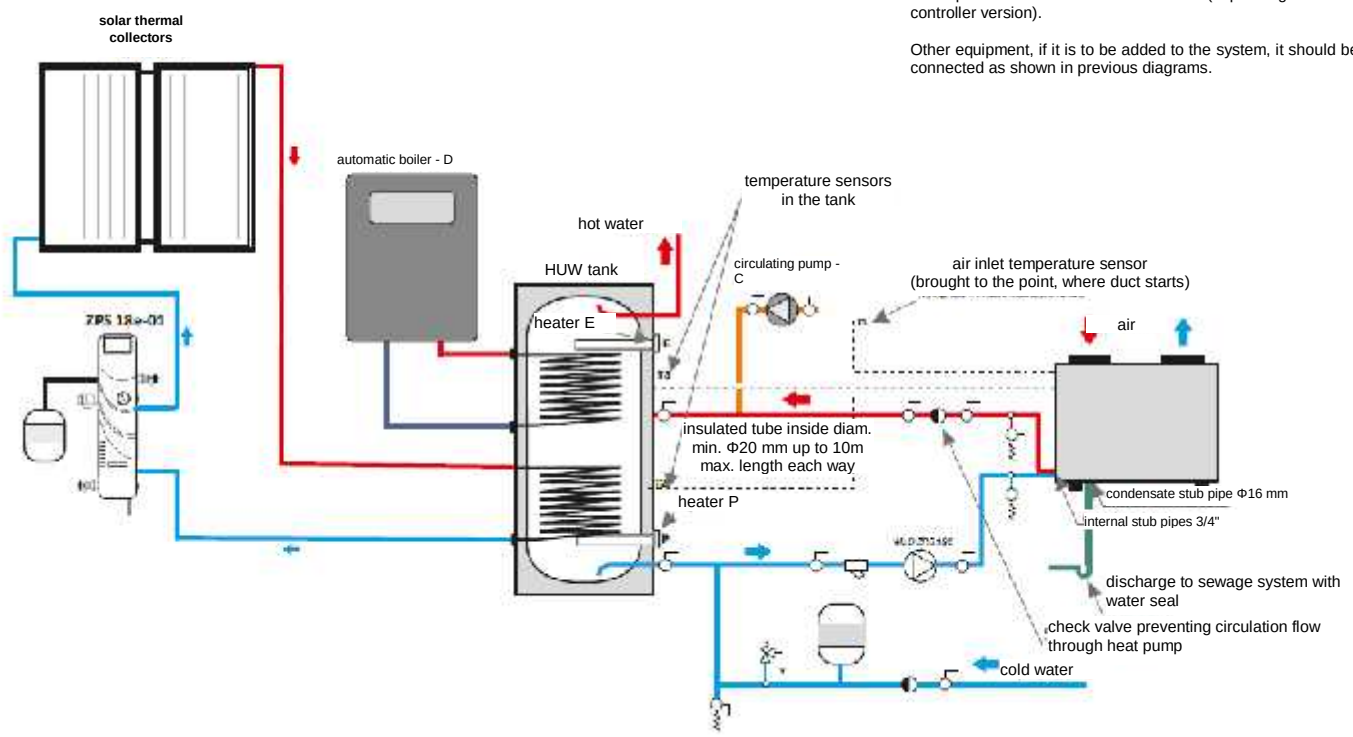
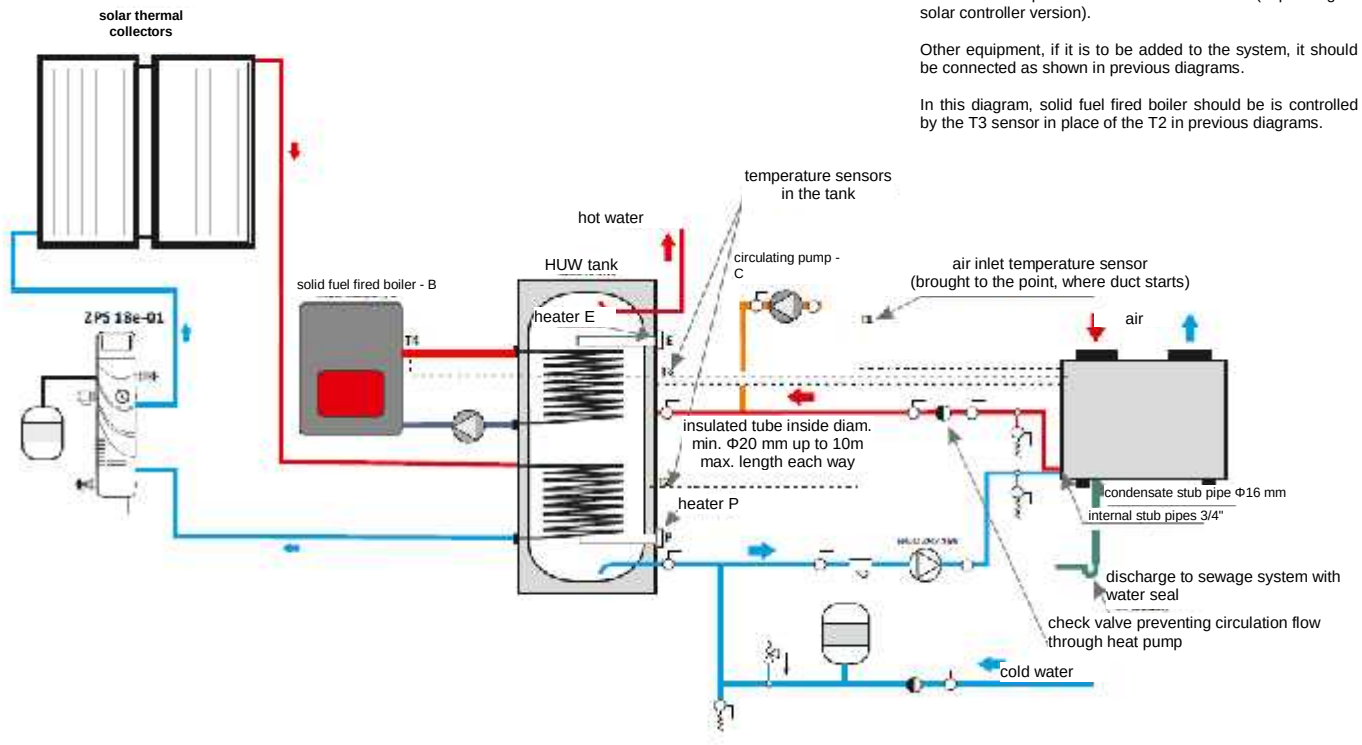


diagram no. 9

Solar thermal collectors are operated via solar controller.
It is possible to connect heat pump controller to solar controller and operate it as a master controller (depending on solar controller version).

Other equipment, if it is to be added to the system, it should be connected as shown in previous diagrams.

In this diagram, solid fuel fired boiler should be is controlled by the T3 sensor in place of the T2 in previous diagrams.



Exact control board wiring diagram is provided at the end of this Manual.

Supply air delivery

Minimum 350 m^3/h air stream must be guaranteed in order to reach optimal operating parameters. For this purpose, using air ducts of the same diameter as stub pipes in heat pump - ND150, the sum of two straight sections of air supply and exhaust duct cannot exceed 10m. Flow resistance for a 90° elbow is the same as for 2m of straight section length. In a conventional connection, when 90° elbows are provided both in intake and exhaust duct, maximum distance from building wall is 2m. When heat pump location requires longer air ducts to be connected, a supporting fan or duct of larger diameter must be installed. When we use smooth reducer, 1m of an ND150 duct may be replaced with 3m of an ND200 duct or 22m of an ND300 duct. The proposed selection of duct lengths and diameters applies to smooth pipes. Choke valve (ventilation tee) turned to side position has the same resistance as 90° elbow, therefore we have 3 running metres of duct left to use.

In case of using a duct made of spiral ventilation tube, ND150, maximum length of ducts is 5m each way.

All connections should allow easy disassembly.

Inlet air route should be provided with filter screen catching dusts and larger impurities. The filter should be regularly cleaned. Filter soiling results in restricted air flow, which in turn deteriorates heat pump efficiency.

Extended ventilation set.
HEWALEX offer includes connection accessories.

Electric power supply

Heat pump should be powered with single-phase current 230V. Connect original power cable to an electric socket (cable feeding the socket: min. 2.5mm^2) with correctly made earthing (earthing resistance should not exceed 4Q). Remember that the so-called neutralisation is not a correctly made protective zero.

The system itself should be protected with a B16 or C16 fuse.

Due to safety reasons, the installation should be protected by a 30mA residual current device.

Condensate discharge

Condensing steam from cooled air must be discharged into floor drain. Discharge line can be made using rubber hose supplied in the set, or e.g. of any rubber hose if longer conduit is needed. Condensate discharge stub pipe has a 3/4" coupler. Condensate discharge flow is generated by gravity only; therefore the system must allow free gravity flow. When condensate discharge is connected with sewage system, water seal should be used in order to avoid fetid odours. Condensate volume depends on air cooling scale and its humidity - few litres of condensate may be generated during one-time tank heating. Condensate line stub pipe outside diameter is Φ16mm, and rubber discharge hose should have the same inside diameter.

External control

The unit may be operated using an external control unit. In the strip, terminals marked ‘External control unit’ are connected by a bridge. The Ext OFF message will be displayed in right bottom corner after their disconnection. The ‘External control unit’ option of the controller allows defining, which heating devices are to be operated by the external control unit.

4 Maintenance

Supply ducts and air filter

Air filter cleaning should pose no problems. Supply air line should be provided with a filter at air inlet to the heat pump. The filter should be checked and cleaned if necessary at 2-3 month intervals. Filter soiling will result in air flow choking, which leads to drop in heat pump efficiency.

Cleaning of air ducts is very important, especially when using cooler air for room chilling. In that case it is required to clean ducts once in 2 years using antibacterial preparations for air conditioning duct cleaning. Bacteria or fungi will appear inside the ducts if water penetrates into them. Moisture may also appear inside the ducts if flowing air is warmer than environment (e.g. air drawn from outside, and the unit installed in the basement) - insulation of air ducts reduces the risk of steam condensation.

Housing removal and evaporator cleaning

Depending on evaporator soiling type:
- in case of dust and spider's web - it is possible to remove them with vacuum cleaner;
- in case of fats clinging to evaporator, apply cleaning agents (e.g. Coil-Rite or Foam-A-Coil).

Evaporator should be cleaned in order to remove bacteria and fungi at least once per 2 years, especially in case of using heat pump exhaust air for room chilling (e.g. using Coil Disinfectant).

Cleaning of scaled exchanger

After few months of the system operation in highly mineralised water environment it is possible that heat pump work efficiency deteriorates (in an extreme case it will be signalled by high pressure error). Heat pump exchanger cleaning is required then.

1) Close cut-off valves at the heat pump;
2) "Short-circuit" the system using drain valves;
3) Pour into "short" system a solution of agent used for descaling of e.g. kettles (KAMIX or alike);
4) Close short cycle and switch on heat pump;
5) Heat medium in the cycle to 60°C;
6) Release the solution and wash the pipeline;
7) Connect to primary cycle.

5 Heat pump safeguards

Evaporator defrosting mode

Evaporator defrosting indicates the state, in which heat pump removes ice from the evaporator. Ice in evaporator disturbs and reduces air flow, which in turn decreases the uptake of free heat and additional working load for compressor.

Defrosting depends on the indications of temperature sensor (T8) fitted on the evaporator. When measured temperature is lower than setting of 'Temperature activating defrosting', heat pump automatics will wait according to the setting 'Defrosting cycle start-up delay'. After that time elapses, automatics will enter defrosting operation status. Defrosting will end when the temperature closing defrosting process is reached, or when maximum defrosting time passes.

Evaporator covered with ice

Evaporator during normal operation

Evaporator defrosting is executed depending on ambient temperature (T1):

1. When ambient temperature is 2°C higher than the temperature closing defrosting process, then compressor will shut down during defrosting (the pump does not heat during this). Air drawn to the heat pump will be heating up the evaporator until the condition of either temperature closing defrosting process or maximum defrosting time is satisfied.

2. When ambient temperature (T1) is lower than the temperature closing defrosting process +2°C, then defrosting will be carried out with hot vapours of the medium from the compressor. The 4-way valve will switch, sending hot medium from the compressor to the evaporator. Defrosting will end when temperature closing defrosting process is reached, or after maximum defrosting time.

At default settings defrosting from the first system will be executed only if ambient temperature exceeds 15°C. This case will occur only if air flow is too low; in extreme cases air will be almost motionless in the evaporator, and thus it will be cooled more than during normal operation.

Function protecting circulating pump against rotor seizure (ANTI-STOP)

The function protecting circulating pump against seizure works both in HEATING and STAND-BY mode.
When circulating pump stops for 72 hours, the controller will force circulating pump operation for 1 min.

This safeguard will work at the moment, when heat pump controller is connected to power supply, and the controller is in stand-by mode (operation diagram must be displayed).
If we don't want heat pump to operate, and we wish to maintain safeguards, it is required to set heat pump activation to NO in its operation parameters.

Function protecting heat pump against freezing

In case if too low temperature is displayed by sensor T6 (lowest point in heat pump, where water flows) - circulating pump will activate and will be pumping water through the exchanger until the temperature is reached, which guarantees that water does not freeze in the pipeline. Compressor will switch on in case of further temperature decrease and will heat up the vicinity of the condenser. The protection is available only if it is not deactivated at service level.

Function of the tank anti-freezing protection

If temperature in the tank (T2) drops below 4°C, electric heater will start the procedure of tank heating up to 6°C, so as to avoid water freezing. In this case the heater will switch on even if the parameter of heater activation is set to NO in the controller.

Function of automatic heat pump deactivation at low COP value

Heat pump will not activate below preset minimum temperature. This parameter is supposed to select automatically at any moment the least expensive source for utility water heating.

Depending on second heat source used to heat up water, it is necessary to select min. ambient temperature (sample values):

-5°C - electric (-5°C is the minimum temperature acceptable by the controller, however operation within 0 to -5°C results in faster wear and tear of the compressor)
0°C - heating oil
4°C - liquefied petroleum gas
8°C - natural gas

In case if solid fuel fired boiler is working, heat pump will not activate when the option of heating with solid fuel fired boiler is set.

Compressor safeguards

After switching on the heat pump, compressor will activate only one minute past fan activation. The same situation occurs at heat pump deactivation - after compressor shut down, fan in rundown will be working for one more minute.

During normal operation compressor should not start up more often than every 8-10 min. between two activation cycles - among other things this depends on the hysteresis of heat pump restart). If heat pump switches off in an emergency mode, the compressor will restart after 3 minutes. At the same time the controller will display countdown: STOP 180,179,178.

6 The unit cut-off from power system

In case if water is released from the heat pump, it should be cut off from power supply. The pump filled with water must be always connected to power source due to the protection against freezing and seizure of circulating pump. Each case of de-energising is registered by the controller, and as soon as users give up protection, they take the consequences of equipment damage in case water tube defrosting or circulating pump seizure.

7 Controller description (extended version for fitter)

Specifications of parameters c0oincident with user's part have not been repeated.

Controller map

MENU

- Login **[default 1305]**
- Parameter settings
  - Installation diagram [1-9]
  - Heat pump operation parameters
    - Heat pump activation [YES/NO, factory setting YES]
    - Temp. sensor controlling heat pump operation [T2,T3,T7, factory setting T2]
    - HUW temperature for heat pump [10-60°C, factory setting 50°C]
    - Heat pump start-up hysteresis [2-10°C, factory setting 5°C]
    - Minimum ambient temperature (T1) [-10-10°C]
    - Function protecting against freezing [YES/NO, factory setting YES]
    - Circulating pump operation mode [SYNCH./CONTINUOUS, factory setting SYNCH.]
    - Fan operation mode [MAX./ MIN./ DAY/NIGHT, factory setting MAX.]
    - Defrosting cycle start-up delay [30-90 min., factory setting 45 min.]
    - Temperature activating defrosting [-30 - 0°C, factory setting -7°C]
    - Temperature finishing defrosting [2-30°C, factory setting 13°C]
    - Maximum defrosting duration [1-12 min., factory setting 8 min.]
  - Parameters of accessory equipment
    - Heater E
      - Heater activation [YES/NO, factory setting YES]
      - HUW temperature for heater - heat pump on [30-55°C, factory setting 45°C]
      - HUW temperature for heater - heat pump off [30-60°C, factory setting 55°C]
      - Heater stoppage during heat pump operation [YES/NO, factory setting YES]
      - Heater stoppage during gas-fired boiler operation [YES/NO, factory setting YES - shown in diagrams no. 4,7,9]
    - Heater P [shown in diagrams no. 4,5,6,7,8,9]
      - Heater activation [YES/NO, factory setting YES]
      - HUW temperature for heater - heat pump on [30-60°C, factory setting 45°C]
      - HUW temperature for heater - heat pump off [30-60°C, factory setting 55°C]
      - Heater stoppage during heat pump operation [YES/NO, factory setting YES]
      - Heater stoppage during gas-fired boiler operation [YES/NO, factory setting YES - shown in diagrams no. 4,7,9]
    - Circulating pump [shown in diagrams no. 2,3,4,6,7,8,9]
      - Minimum circulating pump activation temperature [20-60°C, factory setting 35°C]
      - Circulating pump operation mode [INTERMITTENT/CONTINUOUS, factory setting INTERM.]
    - Solid fuel fired boiler B [shown in diagrams no. 3,8,9]
      - Max. boiler pump deactivation temperature [10-85°C, factory setting 65°C]
      - Min. boiler pump activation temperature [30-60°C, factory setting 45°C]
      - Temperature difference for boiler pump activation [5-15°C, factory setting 8°C]
      - Solid fuel fired boiler heating priority [YES/NO, factory setting YES]
    - Gas-fired boiler D [shown in diagrams no. 4,7,9]
      - Max. boiler shutdown temperature [10-85°C, factory setting 65°C]
      - Boiler stoppage during heat pump operation [YES/NO, factory setting YES]
  - Time programmes
    - Heat pump
    - Heater E
    - Circulating pump [shown in diagrams no. 2,3,4,6,7,8,9]
    - Gas-fired boiler D [shown in diagrams no. 4,7,9]
  - Anti-Legionella [shown in diagrams no. 3-9]
    - Anti-Legionella function activation [YES/NO, factory setting YES]
    - Protection carried out by heater E [YES/NO, factory setting YES]
    - Protection carried out by heater P [YES/NO, factory setting YES]
    - Protection carried out by gas-fired boiler [YES/NO, factory setting YES, shown in diagrams no. 4,7,9]

- External control unit
  - Heat pump deactivation [YES/NO, factory setting YES]
  - Electric heater E deactivation [YES/NO, factory setting YES]
  - Electric heater P deactivation [YES/NO, factory setting YES]
  - Gas-fired boiler shutdown [YES/NO, factory setting YES, shown in diagrams no. 4,7,9]
  - Shutdown of pump F for solid fuel fired boiler B [YES/NO, factory setting YES, shown in diagrams no. 3,8,9]
- Passwords
  - User
  - Service

- Controller settings
  - Date and time
  - Display
    - Backlight brightness [1-10, factory setting10]
    - Inactivity time until backlight switching off [1-10min., factory setting 10min.]
  - Sounds
    - Sound of keys [YES/NO, factory setting YES]
    - Sound of alarms [YES/NO, factory setting YES]
  - RS485 port
    - Transmission rate [by default 115200]
    - Actual address [by default 255]
    - Logic address [by default 65535]
  - Language
    - Polish
    - English
    - German
- Manual control
- Measured indications
- Info
- Software replacement [only for manufacturer]

Parameter settings

Installation diagram selection

Diagram supported by controller should be selected depending on the installation. Diagrams are discussed in **Installation** section (Manual: installation-service part).
After entering parameter settings, use arrows to select preferred diagram and approve with OK button.
Installation diagram selection is possible only after logging in at the service level.

Heat pump parameters

Selection of temperature sensor for heat pump control

This parameter decides about the location of control for heated up utility water temperature. Changing temperature sensor (T2 or T3) somehow allows controlling the HUW volume (T3 is installed higher, therefore water in upper part will have appropriate temperature, in case of control with the T2 the whole tank should have temperature as required by the controller). In case if the tank sensors get damaged, it is possible to switch to temperature sensor T7 (that is at heat pump outlet). In this case circulating pump will activate each time after cooling down of water tube in heat pump. The compressor will switch on after 1 min. if T7 temperature does not increase due to the heat of water from the tank.

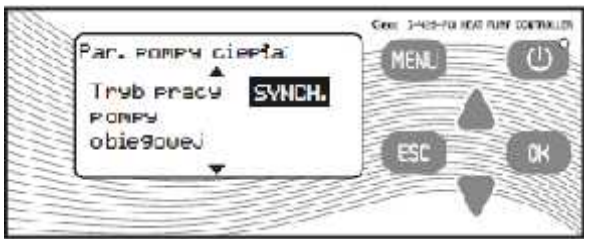
Restart hysteresis

Heat pump start-up hysteresis is one of additional parameters appearing after logging in at service level. It is temperature drop in relation to preset HUW temperature for heat pump, which restarts the unit. For example, if required water temperature is 50°C and hysteresis is 5°C, then at the moment when temperature sensor readout shows 45°C, the pump will start working until the temperature of 50°C is reached. Setting change is possible within 2 to 10°C, however it must be done with care so as to ensure comfort of use and correct unit operation.

Anti-freezing function

It is a protection against the occurrence of sub-zero temperature in room, where heat pump is installed. In case of too low temperature indicated by the T6 sensor, circulating pump will switch on and start pumping water between the tank and heat pump, so as to avoid pipeline or condenser defrosting.

Circulating pump operation mode



This parameter allows setting circulating pump operation so as to make it work in compliance with heat pump (that is only in heating mode), or continuous operation (e.g. the system venting).

Fan operation mode

This option allows changing fan rotational speed. 3 operation options are available:

1) MAX. - fan works at highest output (ca. 500 m^3/h). This allows obtaining best equipment operation results, because higher air volume is pumped through evaporator. If ambient temperature (T1) exceeds 24°C, the fan will automatically slow down (higher heat volume in the air).

2) MIN. - fan works at highest output (ca. 350 m^3/h). Heat pump operation efficiency at the same temperature of air drawn into heat pump is lower compared to fan output at MAX. If ambient temperature (T1) drops under 10°C, the fan will automatically switch to higher speed.

3) DAY/NIGHT - in this setting, between 6 a.m. and 10 p.m. the fan works at maximum speed, and at night its output is lower. The fan working at lower speed generates less noise.

Defrosting cycle start-up delay

Defrosting process functioning has been described in chapter Evaporator defrosting mode (Manual: installation-service part).

Defrosting cycle start-up delay function allows setting time within interval: 30-90min. If there is no delay, below temperature activating defrosting heat pump would be continuously in defrosting mode.

Temperature activating defrosting

The temperature initiating defrosting indicates to heat pump automatics that ice has appeared in the evaporator, which results in worse heat reception by cooling medium. Defrosting will start only when the following conditions are satisfied: evaporator temperature is lower than temperature activating defrosting process, then after delay time recheck whether the temperature in the evaporator is lower than the temperature activating defrosting.

Temperature finishing defrosting

If temperature in the evaporator increases above the setting in this parameter, defrosting will end and heat pump will return to normal operation.

Maximum defrosting duration

Defrosting duration is the second parameter. Should it be exceeded, the pump will also return to normal operation (it is enough if one of the two conditions is satisfied).

Modification of defrosting parameters by a person, who does not know the problem of heat pumps operation very well, may result in deteriorated unit operation efficiency!

External control unit

Depending on the selected diagram, we are able to define, which appliances are to be operated by the external control unit. For example, if we set heat pump deactivation to NO, even after bridge opening the heat pump will be working in compliance with the factory controller.

Manual control

Otherwise called the relays test. Depending on the selected diagram, we are able to activate successively all devices operated by the controller in order to check their correct operation. After exit to the main menu all devices return to their standard settings.

8 Alarms review

Alarm no.	Alarm designation	Possible cause	Solution	Consequences
Alarm 01	Defect of T1 temperature sensor	1) Incorrect sensor connection (no contact with board socket, e.g. inserted into connection block with insulation) 2) Broken or worn out sensor wire 3) No contact between connection block and electric board 4) Damaged electric board	1) Check sensor seating in an electric board 2) Check sensor resistance (5kQ) 3) Check connection block inserted into the electric board 4) Check the electric board	1) No indications of ambient temp. - T1 2) No 'Low COP' function 3) Faster compressor wear at ambient temperatures below -5°C
Alarm 02	Defect of T2 temperature sensor			1) No indications of tank temp. - T2 2) No 'Low Temp.' function 3) Pump operation stoppage for T2 control 4) Operation stoppage - T2-controlled equipment (depending on diagrams - solid fuel fired and gas-fired boiler)
Alarm 03	Defect of T3 temperature sensor			1) No indications of tank temp. - T3 2) Pump operation stoppage for T3 control 3) Operation stoppage - T3-controlled equipment (circulating pump depending on diagrams - solid fuel fired and gas-fired boiler)
Alarm 04	Defect of T4 temperature sensor			1) No indications of boiler temp. - T4 2) Operation stoppage - solid fuel fired boiler pump (F)
Alarm 06	Defect of T6 temperature sensor			1) No indications of water inlet temp. - T6 2) No anti-freezing protection
Alarm 07	Defect of T7 temperature sensor			1) No indications of water outlet temp. - T7 2) Operation stoppage for heat pump - T7 control
Alarm 08	Defect of T8 temperature sensor			1) No indications of ambient temp. - T8 2) Heat pump operation stoppage due to the lack of evaporator defrosting function and impossible expansion valve operation
Alarm 09	Defect of T9 temperature sensor			1) No indications of temp. before compressor - T9 2) Heat pump operation stoppage due to expansion valve inactivity
Alarm 10	Defect of T10 temperature sensor		1) Check sensor seating in an electric board 2) Check sensor resistance (50kfi) 3) Check connection block inserted into the electric board 4) Check the electric board	1) No indications of ambient temp. - T10 2) Missing 'Over Temp.' function (in critical moments the pump will be switching off through a fuse in wiring system or high/ low pressure error)
Alarm 17	Low pressure in the heat pump working system (Low Pres)	1) R410a medium leak from the system 2) Thick ice layer in evaporator (T8 sensor defect) 3) Soiled filter or evaporator (choked air flow) 4) Incorrect operation of low-pressure control 5) Damaged expansion valve 6) Damaged T8 or T9 sensor	1) Connect an external manometer to service stub pipe (pressure control opening pressure 0.15MPa, closing back pressure 0.30 MPa) 2) Clean evaporator and air filter 3) Report failure to HEWALEX service 4) Check pressure control operation	Heat pump operation stoppage until return to normal pressure state. After occurrence of boundary volume, within preset time heat pump will enter alarm no. 19 status (Heat pump stoppage). Required contact with service.
Alarm 18	High pressure in the heat pump working system (High Pres)	1) Excess of R410a medium in the system 2) Too high water temp. in the tank (incorrect temp. indications - T2 or T3), 3) T2 or T3 sensors not inserted in the tank) 4) Incorrect operation of high-pressure control 5) Damaged expansion valve	1) Read pressure value from manometer 2) Check indications of water temp. in the tank with an external temperature sensor, and compare them with values displayed in the controller 3) Check resistance and correct position of the T2 and T3 sensors 4) Report failure to HEWALEX service	Heat pump operation stoppage until return to normal pressure state. After occurrence of boundary volume, within preset time heat pump will enter alarm no. 19 status (Heat pump stoppage). Required contact with service.
Alarm 19	Heat pump stoppage. Required contact with service.	1) Alarm no. 17 persisted more than 30 min. or occurred 3 times within 30 min. 2) Alarm no. 18 persisted more than 30 min. or occurred 3 times within 30 min.	The alarm is reset through instantaneous unit cutting off from power supply. Contact with service required.	Heat pump operation stoppage until reset.
Alarm 21	Exceeded permissible temperature after compressor. (Over Temp)	1) Motor of the compressor heats up, but it does not pump the medium 2) Damaged condenser of the compressor 3) Bad resistance of T10 sensor 4) Too small volume of the R410a medium 5) Incorrect work of low- and high-pressure control 6) Damaged expansion valve	1) Check compressor supply current intensity 2) Check resistance of T10 sensor 3) Report failure to HEWALEX service	Heat pump operation stoppage until temperature drop.

9 Controller messages review

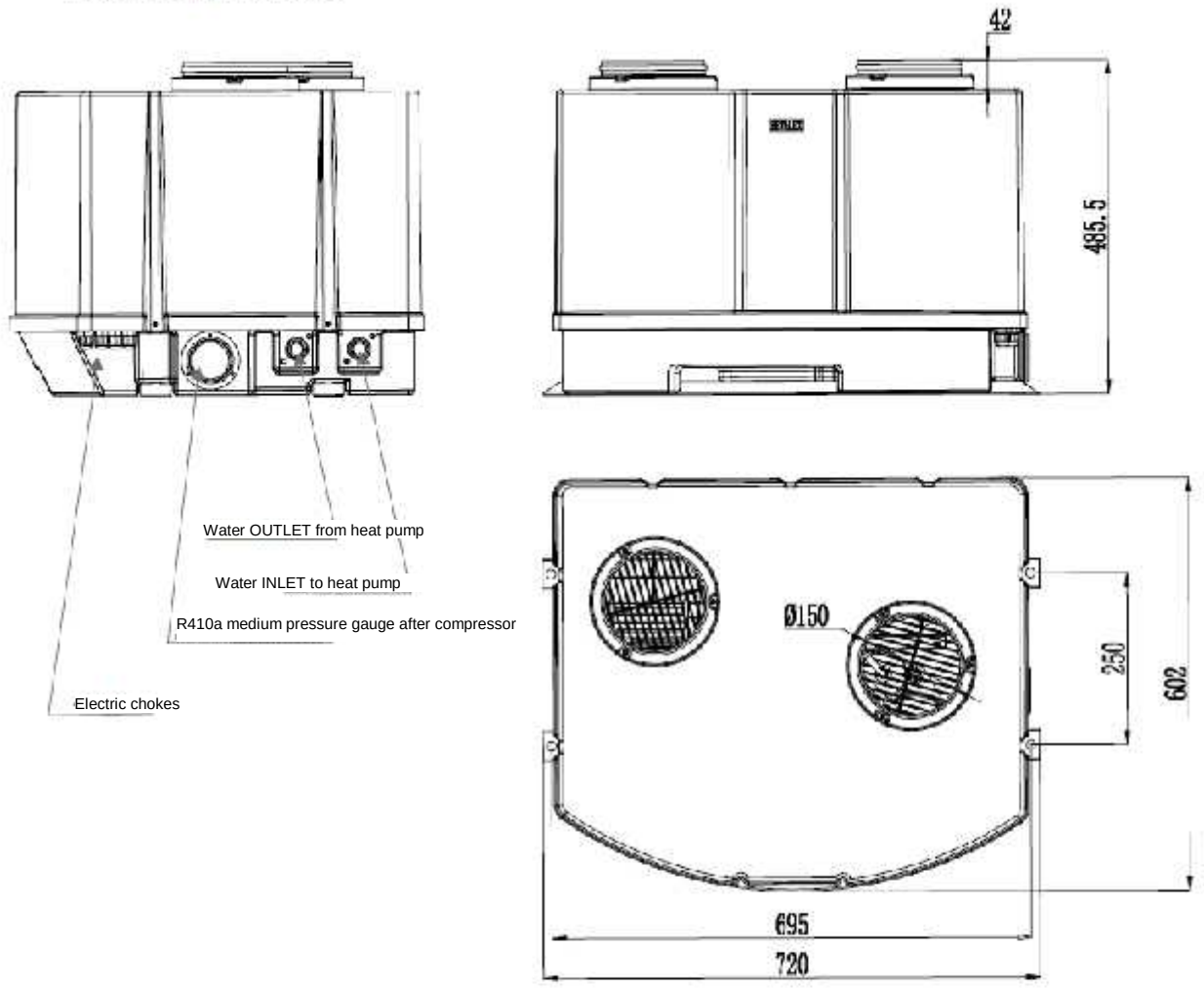
Message	Definition
ExtOFF	External bridge open
HPOFF	Heat pump switched off (manually or by time program)
LowPres	Alarm no. 17
HighPres	Alarm no. 18
Defrost	Evaporator defrosting
STOP 180 (..., STOP 1)	Countdown until compressor restart
LowCOP	The T1 temp. lower than min. start-up temp. for heat pump
LowTemp	Too low temperature in the tank - the tank protection
AntiFreez	Protection against freezing for water cycle in heat pump
PreHeat	Preheating of oils in compressor with compressor heater
OverTemp	Alarm no. 21

TECHNICAL DATA

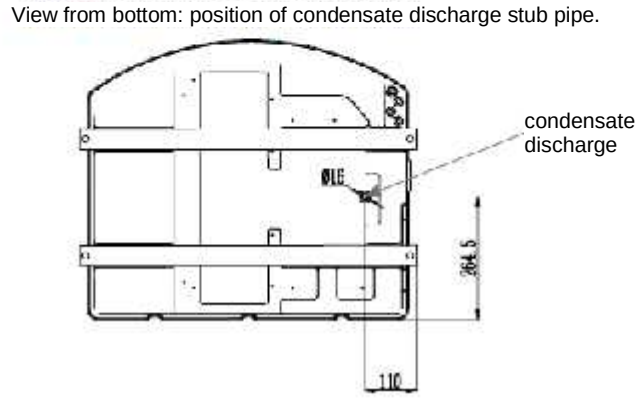
Dimensions

PCWU 2,5kW

cat. no.: HEWALEX: 91.10.13

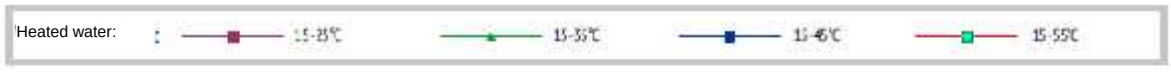


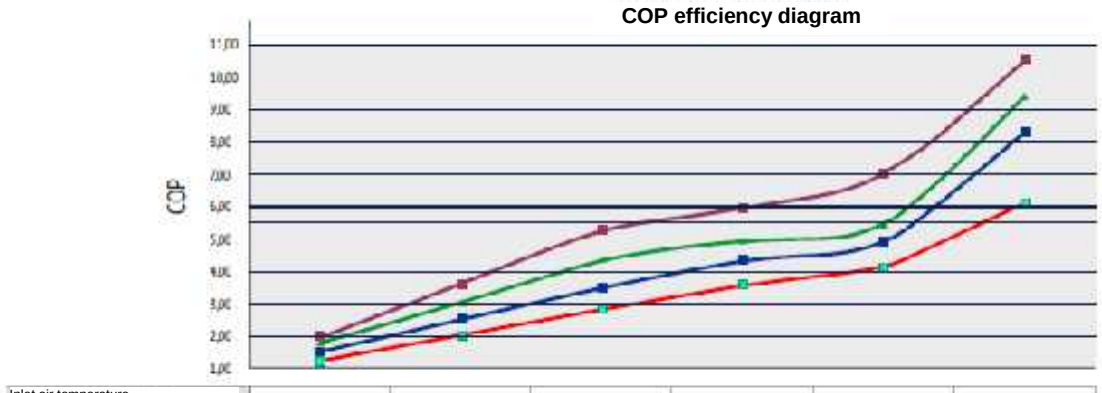
View from bottom: position of condensate discharge stub pipe.



Technical parameters list

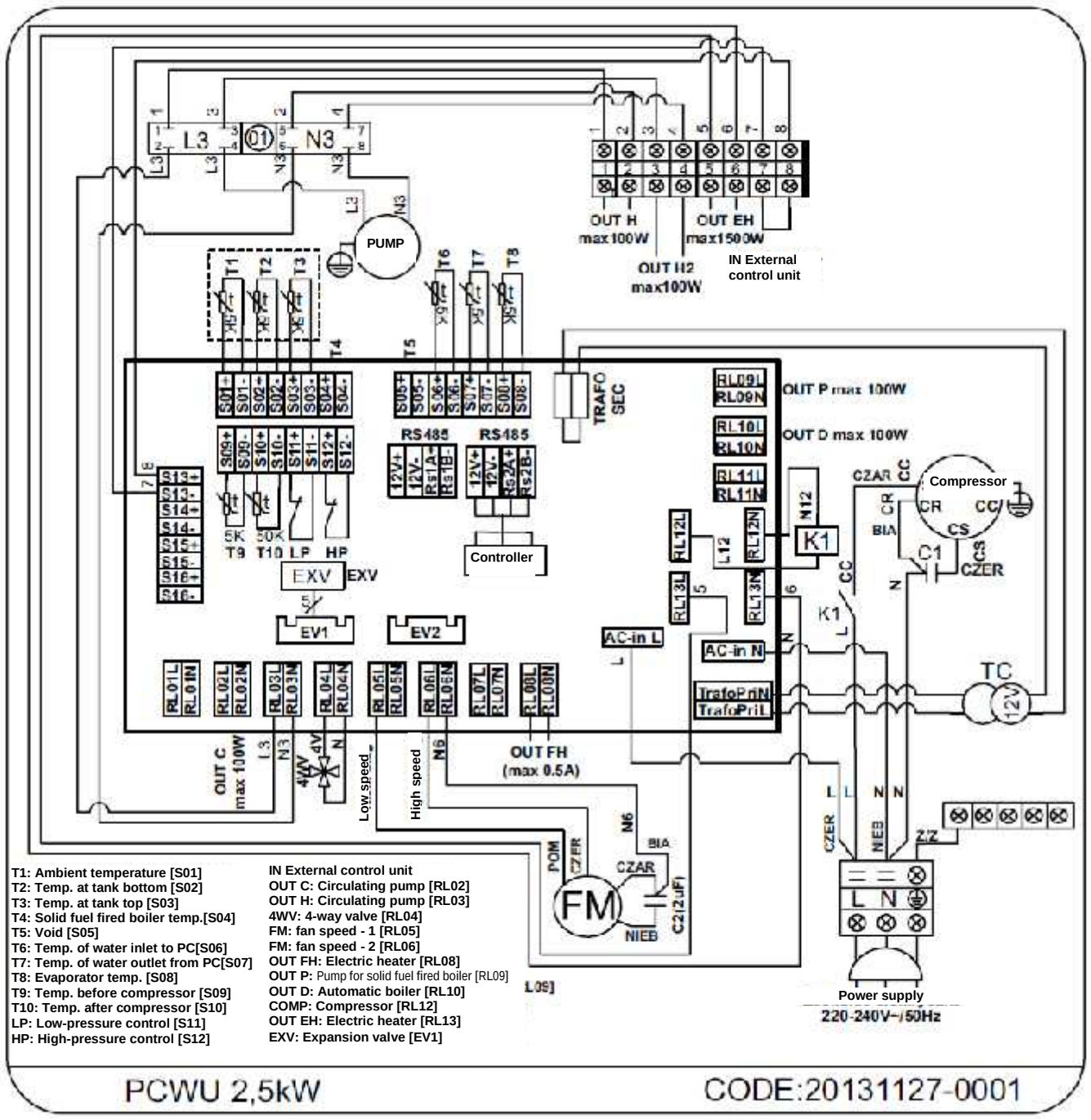
Model	PCWU	2.5kW
Heating power (A7/W30-35)	kW	2.51
To the system with the tank	L	>80
Heat pump supply power (A7/W30-35)	kW	0.67
COP efficiency coefficient (A7/W30-35)		3.8
COP efficiency coefficient (A15/W15-45)		4.35
Supply voltage/frequency	V~/Hz	1~230/50
Number of compressors		1
Compressor type		rotary
Max. temp. of water heating with heat pump	°C	60
Air flow	m^3/h	350/500
Air pumping pressure	Pa	40
Diameter of air stub pipes	mm	0150
Noise (measured at source)	dB(A)	45
Water terminals	inch	3/4
Condensate terminal	mm	16
Main source stream (AT=5°C)	l/min	11
Min. internal diameter of pipeline to the tank	mm	20
Max. length of pipeline to the tank	m	15
Working medium (weight)	-/(g)	R410a(1200)
Low-pressure control (OFF/ON)	MPa	0.02/0.15
High-pressure control (OFF/ON)	MPa	4.4/3.2
Max. required installation safety valve	MPa	0.7
Unit dimensions (L / W / H)	mm	720/600/490
Net weight	kg	45
Weight with packaging	kg	55





Inlet air temperature (dry-bulb and wet-bulb thermometer measurement)	-/(-10	A/C	/06	15/15	20/15	35/26
15°C	3,97	5,80	3,26	5,35	7,02	10,55
35°C	2,79	3,20	4,55	4,96	5,46	9,48
45°C	2,50	2,49	3,49	4,35	4,92	8,35
55°C	2,23	2,01	2,83	3,60	4,14	6,33

Wiring diagram



Guarantee Certificate

Manufacture date (Quality Control stamp).....

Receipt or sales invoice should be enclosed with Guarantee Certificate. Warranty is null and void if the following is not filled.

WARRANTY TERMS:

1. HEWALEX grants a 3-year warranty for failure-free operation of the HEWALEX PCWU 2.5kW heat pump.
2. During warranty period the user is entitled to free of charge repairs of any damage occurring through the fault of manufacturer.
3. HEWALEX is discharged from any warranty liability for faulty unit operation, which may occur due to its use contrary to Operating Manual instructions, as well as carrying out any repairs and modifications by unauthorised persons, and due to any other damage occurring not through the fault of the manufacturer.
4. Any defects revealed during warranty period will be eliminated within 30 days from the date of reporting them by the user.
5. Warranty claims should be sent to Claims Department of Hewalex Sp. z o.o. Sp.K., ul. Słowackiego 33, 43-502, Czechowice-Dziedzice, Poland (tel.:.+48(32) 214 17 10, GSM: + 48 723 232 232, INFOLINE: 0801 000 810, hewalex.pl).
6. Buyer is entitled to equipment replacement with a new one, or return of incurred costs in case of finding manufacturing defect, which is impossible to eliminate.
7. Warranty rights may be executed only on the basis of submitted Guarantee Certificate and completed checklist procedure. Not filled or partially filled checklist is void. One checklist sheet must be sent to HEWALEX according to the terms and conditions specified in the checklist. Failure to send installation checklist is the basis to reject service application.
8. Unjustified visits of service personnel may provide grounds for the manufacturer to charge user with applicable costs.
9. In particular, technical warranty terms and conditions are applicable:

A) It is prohibited to repair the unit without contact with HEWALEX service. In case of incorrect equipment operation, report failures by phone (32) 214 17 10) or e-mail (serwis@hewalex.pl). Depending on failure type, service team will be sent to the site, or guidelines concerning repair of minor defects will be provided.

B) It is allowed to connect the heat pump to correctly working electrical system only.
Installation requirements:
- power cable to the mains socket min. 3x2.5mm^2 300/500V, complying with the 227IEC53
- current protection: B16 or C16
- differential-current protection: 30mA
- correctly made earth installation (grounding resistance should not exceed 4Ω).

All the above power supply parameters are standard and do not go beyond applicable norms.

C) Water in the system must satisfy requirements specified for potable water (O.J. (Poland) no. 203, item 1718).
Important for own water intakes:
- pH ranges between 6.5 and 9.5
- conductivity under 2500 [µS/cm at 20 °C]
- ammonia under 0.5 [mg/l]
- nitrates under 50 [mg/l]
- chlorides content under 250 [mg/l]
- copper under 2 [mg/l, permissible value provided that it does not cause any change in water colour due to its corrosive aggressiveness]
- sulphates under 250 [mg/l]
- hardness 60-500 [mg $CaCO_3$]

D) Water, air and wiring systems for the unit should be made according to the guidelines and connection diagram.

E) Select proper location for the unit installation. Any damage caused by improper selection of the equipment location will not be covered by the guarantee (that is caustic and polluted air drawn into the heat pump, unlevelled equipment, foundation tilting the unit, installing in an unheated room).

H) It is prohibited to switch off the unit during break in operation (e.g. in wintertime). Otherwise, user will be solely responsible for eliminating circulating pump protection against seizure and anti-freezing protection.

HEWALEX
Spółka z ograniczoną odpowiedzialnością Sp. k. [Ltd, Limited Partnership]
ul. Słowackiego 33
43-502 Czechowice – Dziedzice, Poland
Tel.:+48(32) 214 17 10

INSTALLATION CHECKLIST for the PCWU 2.5kW heat pump

Installation checklist has been developed as a response to ensure improved quality of systems containing HEWALEX heat pumps. We care very much about satisfying clients using our products for a long time - however, besides heat pump itself, this also requires a supporting system meeting highest quality standards.

We also believe that owing to this checklist, fitters installing our equipment will be able to demonstrate to their clients own work in a professional and reliable way.

Each item of the list must be completed. Please, mark your answer matching completed installation:

1	Is the system made according to the diagram provided in the Manual? If not, enclose drawn diagram.	**YES**	**NO**
	If YES, the diagram no. is: / If NO, enclose diagram drawing.		
2	Does the control diagram selected in the controller comply with actual installation?	**YES**	**NO**
3	Are temperature sensors located according to the conditions specified at individual diagrams in the Manual?	**YES**	**NO**
4	Is current protection of either B16 or C16 type, and power cable to the mains socket - min. 3x2.5mm^2?	**YES**	**NO**
5	Is the unit connected to correct earth installation? (see guarantee terms and conditions)	**YES**	**NO**
6	Is the system provided with differential-current protection not exceeding 30mA?	**YES**	**NO**
7	Does heat pump draw in caustic and corrosively aggressive air (e.g. from pool chlorination facilities, composting plant, sty or alike)?	**YES**	**NO**
8	Does water satisfy requirements specified for potable water? (see guarantee, according to O.J. (POLAND) no. 203, item 1718)	**YES**	**NO**
9	Is water filter installed at the inlet to heat pump?	**YES**	**NO**
10	If it is not planned to remove water from the unit in wintertime - is the equipment located in a room, where ambient temperature does not drop below 0°C?	**YES**	**NO**
11	Is the system provided with tested safety valve, max. 7 bar per HUW tank, and does water flow after depressing the valve handle?	**YES**	**NO**
12	Are suitable valves installed, which would, according to the Manual, allow possible cyclic exchanger washing?	**YES**	**NO**
13	Is the unit properly levelled and does condensate flow down to sewage system, and at the same time does not spill beyond heat pump housing? (It is acceptable to lower slightly the side, from which condensate flows down in order to ensure faster water discharge.)	**YES**	**NO**
14	Is the unit fixed in a stable way to the wall, or set on a flat ground so as to make its moving impossible?	**YES**	**NO**
15	Is the user informed that as a result of controller switching off, the function protecting against freezing and protection against circulating pump rotor seizure are lost? (Set activation to NO in the controller in heat pump parameters, if the pump is not to work and the system safeguards are to be active.)	**YES**	**NO**
16	Is the user informed that in case of polluted heat pump inlet air it may be necessary to clean evaporator once every year or more often?	**YES**	**NO**
17	Is the user trained in basic controller operation and informed that the equipment efficiency depends on air temperature and humidity, as well as temperature, to which water is heated up?	**YES**	**NO**

18	What is the diameter of air ducts? Specify the lengths of inlet and exhaust ducts, including number of elbows and extra components. Please, enclose proper drawing in case of more complex installations.			
Diameter of air ducts (intake): Diameter of air ducts (exhaust):	Air duct length: Air duct length:	Number of elbows, 90°: Number of elbows,90°:	Other resistance values for air (e.g. grates, filters): Other resistance values for air:	
19	Specify parameters of water pipeline between the pump and the tank. Specify water temp. (T6 and T7) after 10 min. of heat pump work (stabilised operation).	Pipeline making material: Pipeline length (one way):	Pipe size: Temp. readout (T6) °C	Pipe insulation: Temp. readout (T7) °C

INSTALLATION CHECKLIST for the PCWU 2.5kW heat pump

Investor's notes

Fitter's notes

Investor's name and surname:	Fitter's name and surname:
Address:	Company name:
Contact phone no.:	Company address:
E-mail address:	NIP [Taxpayer Identification No.]:
	*If the unit is mounted by a physical person, the system with heat pump can be made by Investor only.
Model:	Purchase date:
Heat pump serial number:	Fitting date:
	*Purchase date must be confirmed by a copy of proof of purchase. Equipment prices may be covered.

Personal data will be used only for warranty-related purposes for the purchased equipment, and will be handled by authorised persons employed at HEWALEX Sp. z o.o. [Ltd.] Sp. komandytowa [Limited Partnership], seated in Czechowice-Dziedzice, ul.Słowackiego 33, Poland. The whole personal information acquired is protected and used according to the terms specified in the following acts: of August 29, 1997, on personal data protection (O.J. (Poland) of 2002 No. 101, item 926 with amendments), of July 18, 2002 on provision of electronic services (O.J. (Poland) No. 144, item 1204 with amendments), and in Regulation issued by the Minister of Internal Affairs and Administration on April 29, 2004 on the documentation of personal data processing, and technical and organisational conditions, which should be met by computer equipment and systems used for personal data processing (O.J. (Poland) No. 100, item 1024). Your personal information is kept in adequately secured data base, not accessible for unauthorised persons.

I have read guarantee terms and conditions and checklist and I consent to my personal data processing only for warranty-related purposes:

HEWALEX

HEWALEX Sp. z o.o. Sp. k.
tel.: +48 74 64 17 10
infolinia: 0801 000 810

I assume responsibility for actual state of the installation according to the checklist, and consent to my personal data processing only for the purposes related to installed equipment warranty:

Investor's signature:	Fitter's signature:

The checklist should be prepared in 3 sheets when the Investor takes over the system. Its copies should be sent to:

1. Investor
2. Fitter
3. HEWALEX with a copy of equipment proof of purchase (the list to be sent by the installation Investor)

We also urge to sending photos of the installation.

False information given in the checklist will result in immediate rejection of any complaint.

NOTE:

Guarantee is valid since equipment purchase date. Guarantee requires sending the checklist not later than 30 days after fitting date (however not later than 90 days from purchase date) to the following address: HEWALEX Sp. z o.o. Sp. komandytowa, ul.Słowackiego 33, 43-502 Czechowice-Dziedzice, Poland, with a note: GWARANCJA PCWU [PCWU GUARANTEE] 2.5kW, or after registering at **hewalex.pl/gwarancja** and filling the form.