Installation and operating instructions

DAIKIN Altherma R HW (Hot water heat pump indoor unit)

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DAIKIN Altherma R HW
(Hot water heat pump - indoor unit)

English

EKHHP300A*2V3
EKHHP500A*2V3

List of contents

1 General safety precautions

1.1 Particular safety instructions

WARNING

Heaters that have not been set up and installed correctly can impair the function of the heater and/or cause serious or fatal injuries to the user.

- Work on the equipment (such as set-up, servicing, connection and initial commissioning) must only be carried out by persons who are authorised and who have successfully completed **qualifying technical or vocational training** and who have taken part in advanced training sessions recognised by the relevant responsible authorities for the specific activity. These include, in particular, **certified heating engineers, qualified electricians and HVAC specialists** who, because of their professional training and **expert knowledge**, have experience in the professional installation and maintenance of heating systems, gas installations and hot water storage tanks.

WARNING

Disregarding the following safety instructions may result in serious physical injury or death.

- This equipment must only be used by **children** aged 8 and above and by persons with restricted physical, sensory or mental capabilities or with a lack of experience and knowledge if they are under supervision or if they have been instructed in the safe use of the equipment and understand the dangers arising therefrom. **Children** must not play with the equipment. Cleaning and **user maintenance** must not be carried out by **children** without supervision.
- Establish the power supply in accordance with IEC 60335-1 via a separate isolator that separates all poles with a contact opening distance and that provides full disconnection in accordance with overvoltage category III.
- All the electrical work must only be carried out by electrically qualified experts and with consideration of the local and national regulations and the instructions in this manual.
  Check that a suitable electrical circuit is being used.
  Inadequate capacity of the power circuit or improperly executed connections can cause electrocution or fire.
- The customer must install a pressure relief device with rated over-pressure less than 0.6 MPa (6 bar). The connected drain line must have a continuous gradient and a free outlet in a frost-free environment (see chap. 1.2.1, 1.2.7 and 3.4 (fig. 3-5)).
- Water may drip out of the drain line of the pressure relief device. The drain opening must be left free to atmosphere.

- The pressure relief device must be operated regularly in order to remove scale deposits and to make sure it is not blocked.
- The storage tank and hot water circuit can be drained. The instructions in chap. 5.1.1 and 5.1.2 must be observed.
- All the work on the refrigerant circuit of the heat pump must only be carried out by refrigeration qualified experts and with consideration of the local and national regulations and the instructions in this manual.
- Improperly executed work on the refrigeration circuit of the heat pump can endanger life and health of persons and can impair the function of the heat pump (see chap. 5.2).

1.1.1 Observing the manual

- The original documentation is written in German. All other languages are translations.
- Please read this manual carefully and thoroughly before proceeding with the installation or modification of the heating system.
- The precautionary measures described in this document cover very important topics. Follow them meticulously.
- The installation of the system and all activities described in this manual and the applicable documents for the installer must be carried out by an approved installer.

This manual provides all the necessary information for installation, start-up and maintenance as well as basic information on operation and settings. Please see the attached documents for a detailed description of operation and controller.

All heating parameters needed for smooth operation are already factory-set. For setting the controller, please refer to the information in chap. 6 and the applicable documents.

- Make a note of the preset values before making any changes to the unit configuration.
- Comply strictly with warning instructions.

Relevant documents

– Outdoor unit for DAIKIN EKHHP: the respective installation and operating instructions.
– When connecting a DAIKIN solar system: the respective installation and operating instructions.

The instructions are included in the scope of supply for the individual units.

1.1.2 Meaning of warnings and symbols

Warnings in this manual are classified according into their severity and probability of occurrence.

DANGER

Indicates an immediate danger.

Disregarding this warning can lead to serious injury or death.

WARNING

Indicates a potentially dangerous situation.

Disregarding this warning can result in serious physical injury or death.

CAUTION

Indicates a potentially dangerous situation.

Disregarding this warning can cause damage to property and the environment and result in minor injuries.

This symbol identifies user tips and particularly useful information, but not warnings or hazards.

Special warning signs

Some types of danger are represented by special symbols.

Electric current

Risk of burning or scalding

Risk of environmental damage

Validity

Some information in this manual has limited validity. The validity is highlighted by a symbol.

Heat pump outdoor unit

Heat pump indoor unit

Comply with the stipulated tightening torque (see chap. 3.1)

Applies only to the unpressurised solar system (Drain-Back).

Applies only to the solar pressure system.

Handling instructions

- Instructions on actions are shown as a list. Actions where the sequential order must be maintained are numbered.

  ➔ Results of actions are identified with an arrow.

1.2 Safety instructions for installation and operation

1.2.1 General

WARNING

Heaters that have not been set up and installed correctly can impair the function of the heater and/or cause serious or fatal injuries to the user.

- Work on the DAIKIN EKHHP (such as set-up, inspection, connection and initial commissioning) must only be carried out by persons who are authorised and who have successfully completed **qualifying technical or vocational training** and who have taken part in advanced training sessions recognised by the relevant authorities responsible for the specific activity. These include in particular **certified heating engineers, qualified electricians and HVAC specialists** who have experience in the professional installation and maintenance of heating, cooling and air conditioning systems,heat pumps and hot water storage tanks due to their **professional training** and their **expert knowledge**.
- Switch off the external main switch during all work on the DAIKIN EKHHP and secure it to prevent unintentional activation.
- Do not leave any tools or other objects below the hood of the unit after finishing installation or maintenance work.

Avoiding danger

The DAIKIN EKHHP conforms to the state-of-the-art and meets all recognised technical requirements. However, improper use can lead to serious injuries or death as well as causing material damage. To prevent such risks, only install and operate the devices:

- as stipulated and in perfect condition,
- with an awareness of the safety and hazards involved.

This assumes knowledge and use of the contents of this manual, the relevant accident prevention regulations and the recognised safety-related and occupational medical rules.

Before working on the heating system

- Only authorised and trained heating technicians may work on the heating system (such as installation, connection and initial commissioning).
- Switch off the main switch and secure it against unintended switch-on when carrying out any work on the heating system.
- Seals must not be damaged or removed.
- In the case of connection on the drinking water side, the safety valves and their hydraulic integration must comply with the requirements of EN 12897.

1.2.2 Intended use

The DAIKIN EKHHP may only be used for hot water preparation and may only be installed, connected and operated in accordance with the information in these instructions.

Only the use of a suitable outdoor unit approved by DAIKIN is permitted. The following combinations are permitted in this respect:

Outdoor unit	Indoor unit
ERWQ02AAV3	EKHHP300A*2V3
	EKHHP500A*2V3

Tab. 1-1 Permissible combinations of DAIKIN EKHHP indoor units and DAIKIN heat pump outdoor units

Any other use outside the intended use is considered as improper. The operating company alone shall bear responsibility for any resulting damage.

Intended use also includes compliance with the maintenance and service conditions. Spare parts must at least satisfy the technical requirements defined by the manufacturer. This is the case, for example, with original spare parts.

1.2.3 Installation room

WARNING

The plastic wall of the storage tank of the DAIKIN EKHHP can melt under the effects of external heat (> 80 °C) and, in extreme cases, can catch fire.

- Only install the DAIKIN EKHHP at a minimum distance of 1 m to other heat sources (> 80 °C) (e.g. electrical heater, gas heater, chimney) and combustible materials.

CAUTION

- Only install the DAIKIN EKHHP if the ground has a sufficient load-carrying capacity of 1050 kg/m^2 plus safety margin. The ground must be flat, horizontal and level.
- **Outdoor installation is not permissible.**
- Installation in an explosion-risk environment is not permissible.
- The electronic controller must not be exposed to weather effects (such as rain and snow) under any circumstances.
- The storage tank must not be exposed to continuous direct sunlight, as the UV radiation and the effects of the weather will damage the plastic.
- The DAIKIN EKHHP must be installed so it is protected from frost.

For safe and trouble-free operation, it is necessary that the installation site of the DAIKIN EKHHP meets the safety-related criteria described in detail in chap. 3.3.

Information on the installation site of other components can be found in the associated documentation supplied with them.

1.2.4 Electrical installation

- Electrical installation must only be carried out by specialist personnel with electrical engineering qualifications and subject to compliance with the valid electrical engineering guidelines as well as the regulations of the responsible utility company (EVU).
- Compare the mains voltage indicated on the nameplate (230 V, 50 Hz) with the supply voltage before connecting to the mains.
- Before beginning work on live parts, disconnect all of the systems circuits from the power supply (switch off main switch, disconnect fuse) and secure against unintentional restart.

- Establish the power supply in accordance with IEC 60335-1, via a separator device which exhibits contact separation in all poles with a contact opening distance that provide full disconnection in accordance with overvoltage category III.
- Equipment covers and service panels must be replaced as soon as the work is completed.

1.2.5 Working on cooling systems (heat pump)

The DAIKIN EKHHP requires fluorinated greenhouse gas for its function.

For work on stationary refrigeration systems (heat pumps) and air conditioning systems, a certificate of competence is required for the European area in accordance with the F-Gas Certification Regulation pursuant to (EU) no. 2015/2067.

– Up to 3 kg or 5 t CO_2 equivalent total refrigerant charge: Category II certificate of qualification
– From 3 kg or 5 t CO_2 equivalent total refrigerant charge: Category I certificate of qualification

- Always wear safety goggles and protective gloves.
- When working on the refrigerant circuit, ensure that the workplace is well vented.
- Never carry out work on the refrigerant circuit in closed rooms or work pits.
- Do not let refrigerant come into contact with open fire, embers or hot objects.
- Never allow refrigerant to escape into the atmosphere (high pressure at the point of the leak).
- When removing the service pipes from the filling connections, never hold the connections in the direction of your body. Residual refrigerant could escape.
- If leakage in the refrigerant circuit is suspected: Never pump the refrigerant back into the heat pump outdoor unit with the internal compressor - always extract and recycle with a suitable recycling device.
- Components and spare parts must at least satisfy the technical requirements defined by the manufacturer.

1.2.6 Requirements for the unpressurised storage water

Observe the current technological regulations to prevent corrosion products and deposits.

Minimum requirements regarding the quality of filling and supplementary water:
– Water hardness (calcium and magnesium, calculated as calcium carbonate): ≤ 3 mmol/l
– Conductivity: ≤ 1500 (ideal: ≤ 100) µS/cm
– Chloride: ≤ 250 mg/l
– Sulphate: ≤ 250 mg/l
– pH value: 6.5 - 8.5

Measures for desalination, softening or hardness stabilisation are necessary if the filling and top-up water have a high total hardness (> 3 mmol/l – total of the calcium and magnesium concentrations, calculated as calcium carbonate). For other properties deviating from the minimum requirements, suitable conditioning measures are necessary to maintain the required water quality.

Use of filling water and top-up water that does not meet the stated quality requirements can cause a considerably reduced service life of the equipment. The responsibility for this lies solely with the operating company.

If an optional external heat generator is connected via the corrugated tube heat exchanger of the EKHHP500A*2V3, these minimum requirements also apply to the filling and supplementary water of this heating circuit.

1.2.7 Sanitary connection

- Create a heating system according to the safety requirements of EN 12828.
- The plumbing connection must comply with the requirements of EN 12897. The requirements of the following must also be observed:
  – EN 1717 – Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow
  – EN 61770 – Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hosesets
  – EN 806 – Specifications for installations inside buildings conveying water for human consumption
  – and, in addition, the country-specific legislation.

A safety valve must be installed in the drinking water supply line to the DAIKIN EKHHP. There must be no shut-off valve between the safety valve and the DAIKIN EKHHP.

Any steam or water that escapes must be able to discharge frostproof, safe and observable manner via a suitable blow-off pipe with a constant downward gradient.

During operation of the DAIKIN EKHHP with auxiliary heat source, the storage tank temperature may exceed 60 °C, above all when solar energy is used.

- When installing the system, therefore, install scald protection (hot water mixing device, e.g. **VTA32**).

Make sure water quality complies with EU directive 2020/2184 and the regionally-applicable regulations.

1.2.8 Operation

The DAIKIN EKHHP

- Do not operate until all installation and connection work is complete.
- Only operate with completely filled storage tank (level indicator).
- Only connect with a pressure reducer on the external water supply (supply line).
- Only operate with the specified quantity of refrigerant and the type of refrigerant specified.
- Only operate if the protective cover is installed.

The specified servicing intervals should be adhered to and inspection work must be carried out.

1.2.9 Instructing the owner

- Before handing over the DAIKIN EKHHP, explain to the user how to operate and check the system.
- Provide the operating company with the technical documentation (this documentation and all its references) and indicate that these documents must be available in the immediate vicinity of the unit at all times.
- Document the handover.

2 Product description

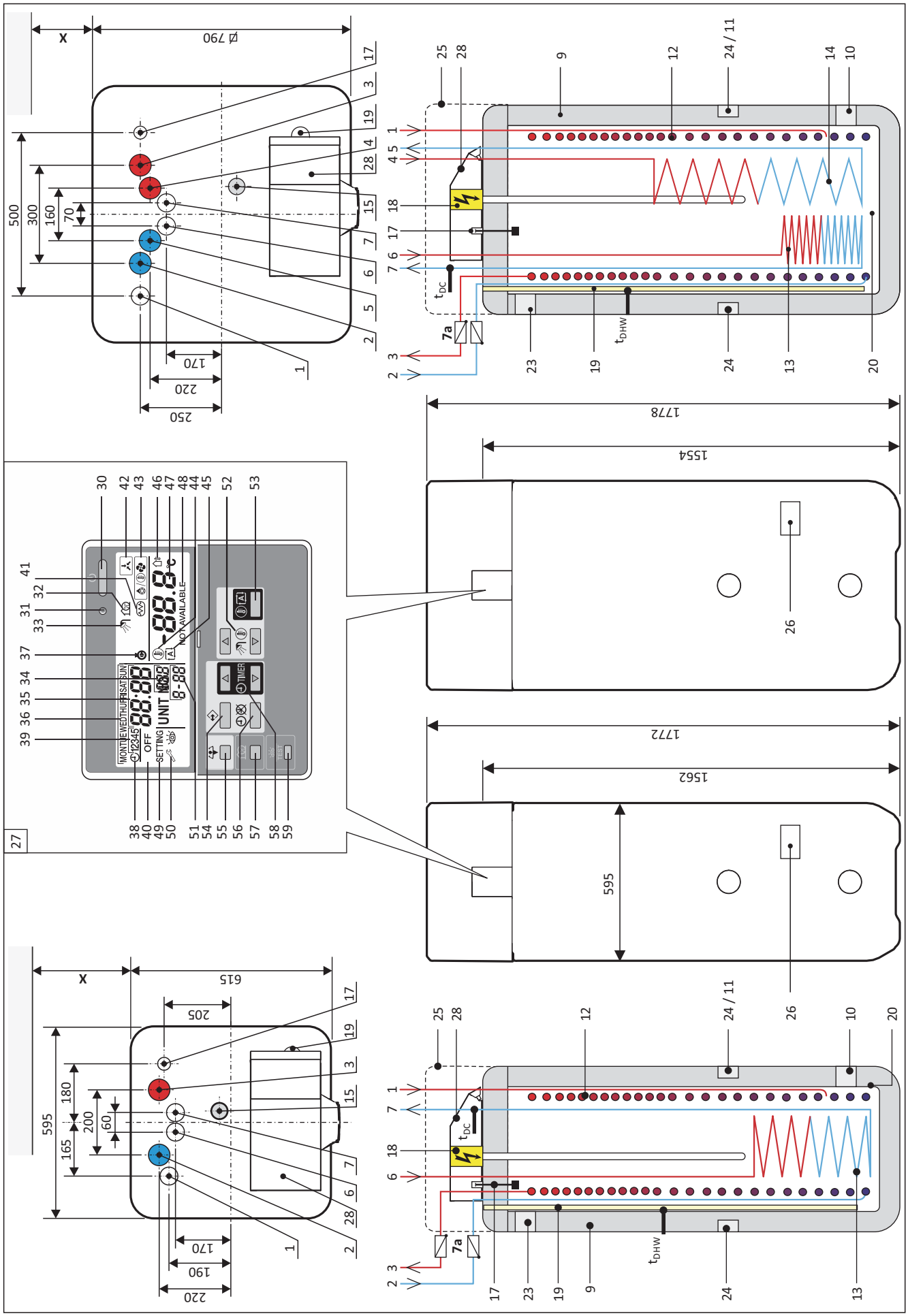


Fig. 2-1 Design of the DAIKIN EKHHP – For the legend, see tab. 2-1

Item	Name (EKHHP)
1	p=0 Solar feed or feed for additional heat source (1" IG)
2	Cold water connection (1" AG)
3	Hot water (1" AG)*
4	Feed solar or for additional heat source (3/4" IG + 1" AG) (EKHHP500A*2V3 only)
5	Return solar for additional heat source (3/4" IG + 1" AG) (EKHHP500A*2V3 only)
6	Connection for refrigerant gas line Cu Ø 3/8" (9.5 mm)
7	Connection for refrigerant liquid line Cu Ø 1/4" (6.4 mm)
7a	Recommended accessories: Circulation stop valves (2 pcs.)
9	Storage tank (polypropylene double walled jacket with PUR hard foam heat insulation)
10	Filling and draining connection or return p=0 solar or return for additional heat source
11	Mount for solar controller or handle
12	Heat exchanger (stainless steel) for domestic hot water heating
13	Heat exchanger (stainless steel) for storage tank charging by hot water heat pump (condenser)
14	Heat exchanger (stainless steel) for storage tank charging by pressurised solar or alternative heat generator (EKHHP500A*2V3 only)
15	Connection for integrated electrical Booster-Heater BSH (R 1½" IG)
17	Fill level indicator (tank water)
18	Integrated electrical Booster-Heater (BSH)
19	Sensor pocket for tank temperature sensor t_{DHW}
20	Pressure-free storage tank water
23	Safety overflow ⚠ connection
24	Mount for handle
25	Cover hood
26	Type plate
27	Hot water heat pump controller
28	Connection box with controller

AG	Male thread
IG	Female thread
t_{DHW}	Storage tank temperature sensor
⚠	Safety devices
	Observe tightening torque!

Item	Name (Controller)
30	"On/Off" key
31	Operating display LED
32	"Low noise" active display
33	"Hot Water Heating" mode active display
34	Sensor number display (see tab. 6-1)
35	Time display
36	Weekday display
37	Refrigerant compressor active display
38	Switching timer program switched on display
39	Display of active switching times
40	Display of off status in timer program
41	Display of Booster-Heater (BSH) switched on
42	Display of external signal (HT/NT/Smart Grid)
43	Display of "Start-up" operating mode, "Defrost operation" active
44	Display of external temperature or temperature in hot water storage tank
45	Display of "Automatic" mode active
46	Display of external temperature active
47	Display of hot water temperature or other temperature values (in connection with items 44/46)
48	"Function not available" display
49	Display of parameter setting mode active
50	Display of service technician required
51	Display of parameter code or error code
52	Hot water temperature setting keys
53	"Automatic" operating mode key
54	Programming key
55	"High output" operating mode key
56	Activation/deactivation of timer program key
57	"Low noise" key
58	Time setting keys
59	Error code/parameter setting key Short press: Display last error code Press for 5 s: Access parameter settings

Tab. 2-1 Legend for fig. 2-1

3 Set-up and installation

WARNING

Operating the DAIKIN EKHHP with the storage tank not filled or not completely filled may cause damage to the device.

- Do not fill the DAIKIN EKHHP until all hydraulic installation work has been completed.
- Observe the sequence during the filling process.

Commissioning only after all installation work has been completed and only after the storage tank has been completely filled.

WARNING

Cooling systems (heating pumps), climate control systems and heating devices that have been set up and installed incorrectly can both endanger human life and health and be impaired in their function.

- Work on the DAIKIN EKHHP (such as installation, repair, connection and initial commissioning, for example) must only be carried out by persons who are authorised, who have successfully completed **qualifying technical or vocational training** for the respective activity and who have taken part in advanced training sessions recognised by the relevant responsible authority. These include in particular **certified heating engineers, qualified electricians and HVAC specialists** who have experience in the professional installation and maintenance of heating, cooling and air conditioning systems, heat pumps and hot water storage tanks due to their **professional training** and their **expert knowledge**.

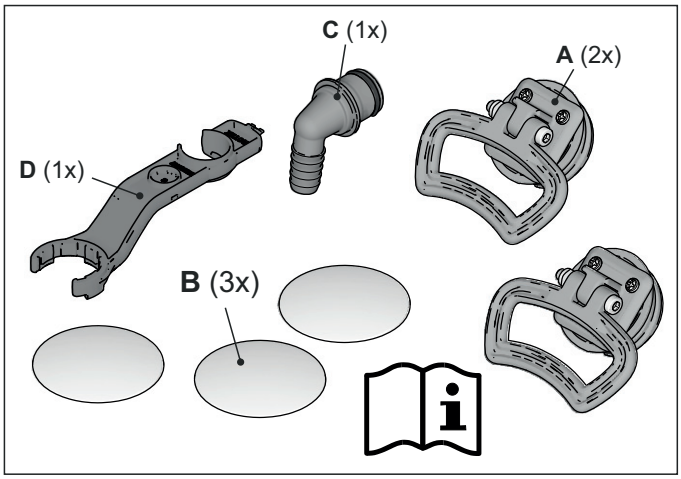
3.1 Tightening torques

Component	Thread size	Tightening torque
Hydraulic line connections (water)	1"	25 to 30 Nm
Fluid line connections (refrigerant)	1/4"	15 to 17 Nm
Gas line connections (refrigerant)	3/8"	33 to 40 Nm
Booster-Heater	1.5"	Max. 10 Nm (hand-tight)

Tab. 3-1 Tightening torques

3.2 Scope of delivery

– DAIKIN EKHHP
– Bag of accessories (see fig. 3-1)



A Handles (only required for transport)
B Cover screen
C Hose connecting piece for safety overflow
D Spanner

Fig. 3-1 Content of bag of accessories

3.3 Installation

WARNING

The plastic wall of the storage tank of the DAIKIN EKHHP can melt under the effects of external heat (> 80 °C) and, in the extreme case, can catch fire.

- Only install the DAIKIN EKHHP at a minimum distance of 1 m to other heat sources (> 80 °C) (e.g. electrical heater, gas heater, chimney) and combustible materials.

CAUTION

- Only install the DAIKIN EKHHP if the ground has sufficient load-carrying capacity of 1050 kg/m^2 plus safety margin. The ground must be flat, horizontal and level.
- **Outdoor installation is not permissible.**
- Installation in an explosion-risk environment is not permissible.
- The electronic controller must not be exposed to weather effects (such as rain and snow) under any circumstances.
- The storage tank must not be exposed to continuous direct sunlight, as the UV radiation and the effects of the weather will damage the plastic.
- The DAIKIN EKHHP must be installed protected from frost.

CAUTION

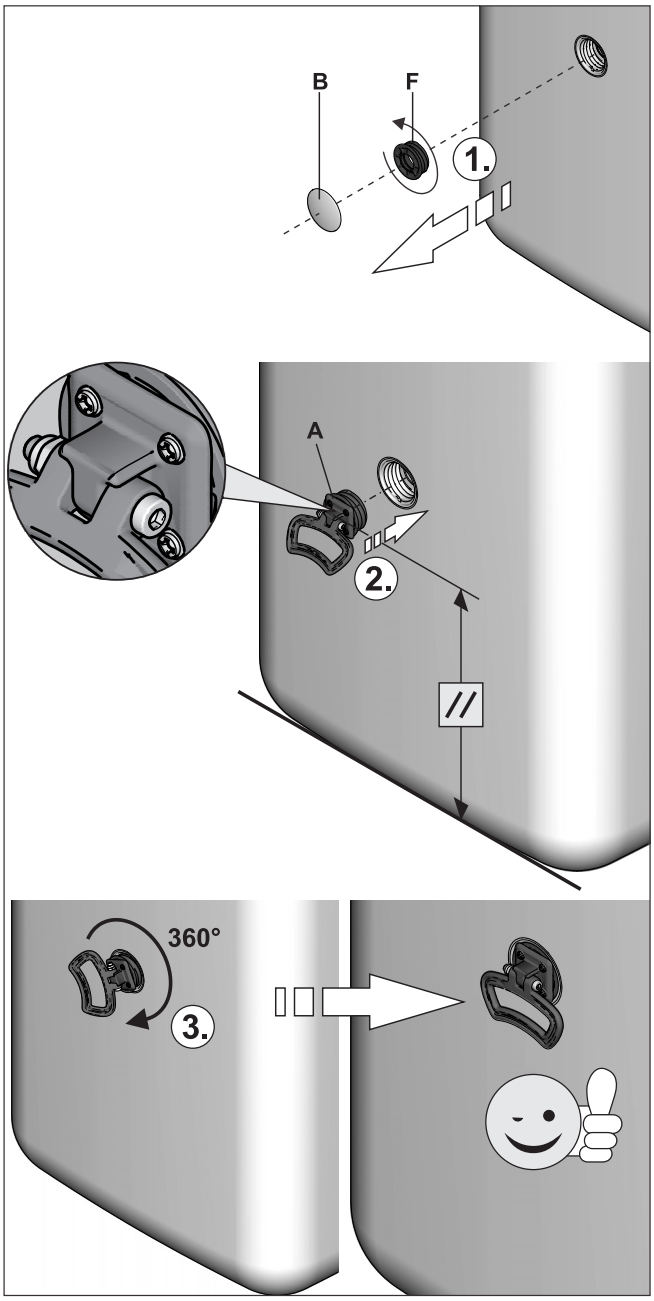
p=0 If the DAIKIN **EKHHP** is not installed a **sufficient** distance **below** the flat solar panels (the top edge of the storage tank is higher than the bottom edge of the solar panels), the unpressurised solar system in the outdoor area will not be able to drain completely.

- Install the DAIKIN EKHHP sufficiently low to the flat solar panels (observe a minimum gradient in the solar connection lines) in the case of a DrainBack solar connection.

1 Remove the packing and dispose of it in an environment-friendly manner.

2 Pull the cover screens off the storage tank (fig. 3-2, item B) and unscrew the threaded fittings (fig. 3-2, item F) from the openings at which the handles are to be fitted.

3 Screw the handles (fig. 3-2, item A) into the now uncovered threaded holes.



A Handle
B Cover screen
F Threaded piece

Fig. 3-2 Installing the handles

4 Install the DAIKIN EKHHP at the installation site.
- – Recommended distances:
  To the wall (rear): ≥ 200 mm.
  To the ceiling: ≥ 200 mm.
- – Observe the tilt dimension (see chap. 9).
- – Transport the DAIKIN EKHHP using the handles.
- – When installing the unit in a cabinet, behind panels or in other restricted conditions, sufficient ventilation (e.g., using ventilation gratings) must be ensured.
- – Install the DAIKIN EKHHP close to the withdrawal point to dispense with the need for a circulation line.

3.4 Hydraulic connection

CAUTION

If the DAIKIN EKHHP is connected to a cold water supply line in which **steel pipes** are used, swarf can enter the stainless steel corrugated tube heat exchanger and remain there. This can lead to **contact corrosion damage** and, subsequently, to leakage.

- Flush the feed pipes before filling the heat exchanger.
- Install a dirt filter in the cold water supply.
- Observe the installation instructions according to chap. 1.2.7.

ONLY DAIKIN EKHHP500A*2V3

CAUTION

If the **heat exchanger** for the **pressurised solar system** charging (see fig. 2-1, items 4+5) is connected to an **external heater** (e.g. wood-burning boiler), the DAIKIN EKHHP can be damaged or destroyed due to an excessively high leaving water temperature at these connections.

- The **leaving water temperature** of the external heating unit should be **limited to max. 95 °C**.

Prerequisite: Optional accessories (e.g. solar) are mounted on the DAIKIN EKHHP in accordance with the instructions supplied.

1 Check the cold water pressure (maximum 6 bar).
- – If a higher pressure is present in the domestic water pipe, a pressure reducer will need to be installed.
- – A pressure relief device (safety valve, max. 6 bar) must be installed in the cold water supply line. There must be no shut-off valve between the safety valve and the DAIKIN EKHHP.
- – Any water flowing out via the safety valve must be drained off in a frost-proof, safe and observable manner via a suitable, non-shut-off blow-off pipe with a constant gradient.

2 Remove the protective cover of the DAIKIN EKHHP.

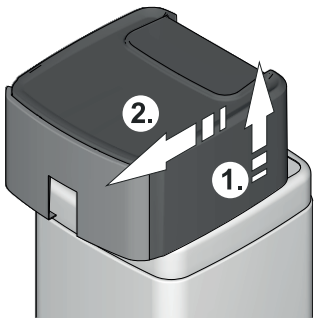


Fig. 3-3 Removing the protective cover.

3 When using **circulation stop valves**, fit them into the pipe connections on the DAIKIN EKHHP.

4 Establish hydraulic connections on the DAIKIN EKHHP (see fig. 3-5).
- – Take the position and dimension of the connections from fig. 2-1 and tab. 2-1.

If the installation conditions require the hydraulic connection directly upwards, the cover can be cut out along the broken line.

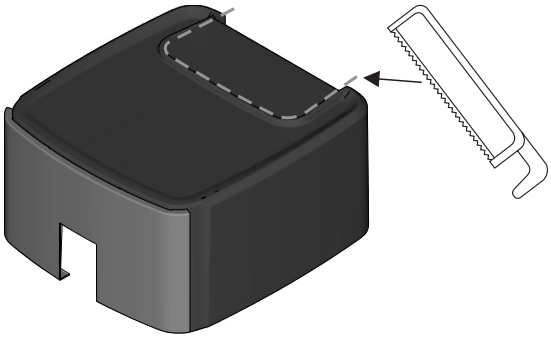


Fig. 3-4 Producing the cover cut-out

– Comply with the stipulated tightening torque (see chap. 3.1).
– Install the line so that the sound insulation hood can be positioned easily after installation.

WARNING

There is a danger of scalding at hot water temperatures of more than 60 °C. This is possible when using solar energy if an external heater is connected, the Legionella protection is activated or the target hot water temperature is set to be greater than 60 °C.

- Install scalding protection (hot water mixer device (e.g. VTA32)).

– **Water shortage protection:** The controller's temperature monitoring shuts off the DAIKIN EKHHP reliably if there is a shortage of water. No additional water shortage protection is needed in the construction. Nevertheless, regular checking of the filling level is necessary to ensure proper function.
– **Avoid damage due to deposits and corrosion:** Observe the requirements for the storage water (see chap. 1.2.6).

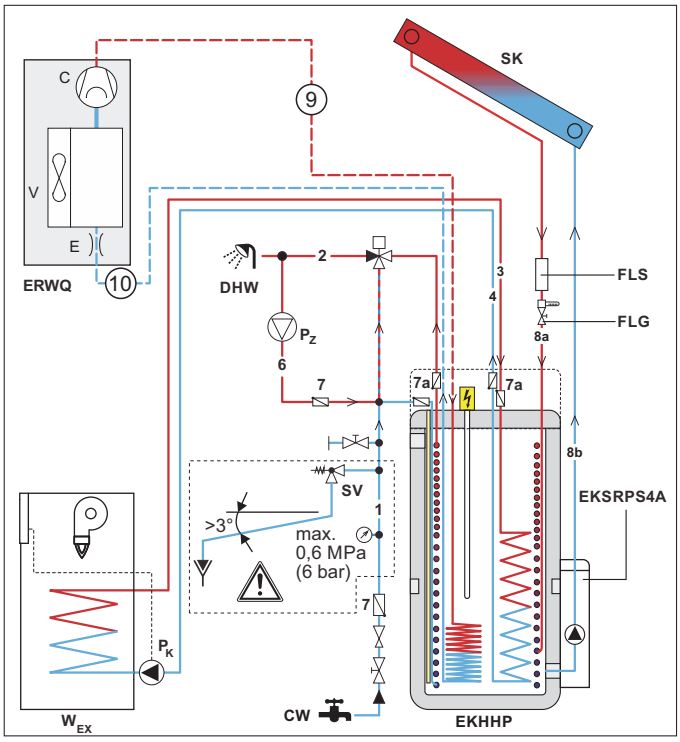


*Fig. 3-5 Hydraulic connection - for the legend, see tab. 3-2 (example EKHHP500A*2V3 with p=0 solar and optional external heat generator)*

1	*Cold water connection*
2	*Hot water distribution network*
3	*Feed Solar or for additional heat source**
4	*Return Solar or for additional heat source**
6	*Circulation (optional if permitted according to local legislation)*
7	*On-site: Check valve, non-return valve*
7a	*Circulation stop valves (2 pcs.) - recommended accessories*
8a	*Feed p=0 Solar or for additional heat source**
8b	*Return p=0 Solar or for additional heat source**
9	*Gas line (refrigerant)*
10	*Liquid line (refrigerant)*
CW	*Domestic cold water*
DHW	*Hot water*
EKHHP	*DAIKIN heat pump indoor unit*
EKSRPS4A	*p=0 DAIKIN solar control and pump unit**
FLG	*FlowGuard - solar control valve with flow indicator**
ERWQ	*DAIKIN heat pump outdoor unit*
FLS	*FlowSensor - Solar throughput and inflow temperature measurement*
P_K	*Boiler circuit pump**
P_Z	*Circulation pump (optional if permitted according to local legislation)*
SK	*Solar panel field**
SV	*On-site: Safety relief valve*
W_{EX}	*External heat generator**
*	*Optional*

Tab. 3-2 Legend for fig. 3-5

5 Carefully insulate pipework against heat loss and to avoid condensation (insulation thickness at least 20 mm).

6 Connect the drain hose to the connection piece for the safety overflow (see fig. 3-6 and fig. 2-1, item 23).
- Use transparent drain hose (draining water must be visible).
- Connect the drain hose to an adequately dimensioned waste water installation.
- Drain should not be lockable.

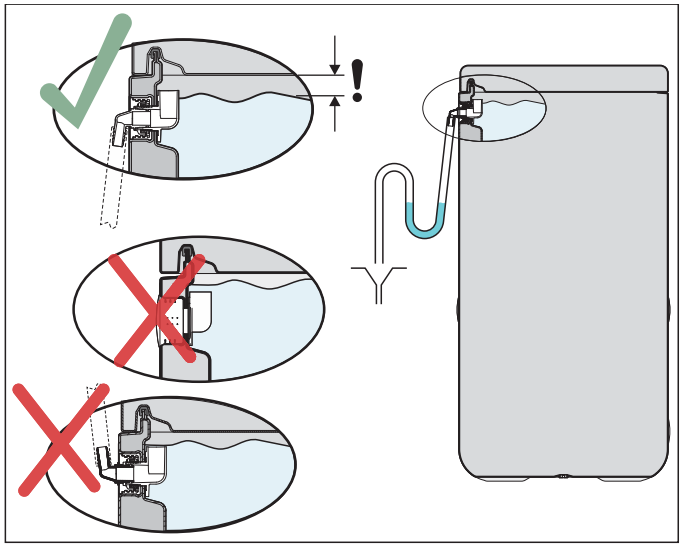


Fig. 3-6 Installation of drain hose at safety overflow

3.4.1 Optional: Connecting an external heat generator

For support or as an alternative to heating by the heat pump, external heat generators (e.g. solar, gas or oil boilers) can be connected to the DAIKIN EKHHP.

The heat supplied by the external heat generator must be fed to the unpressurised storage water in the hot water tank of the DAIKIN EKHHP.

1 Implement the hydraulic connection according to one of the two following options:
   a) DAIKIN EKHHP: p=0 unpressurised via the connections (solar feed and solar return) of the hot water storage tank or
   b) EKHHP500A*2V3 only: +p Via the integrated pressure solar heat exchanger.
- Take the position and dimension of the connections from fig. 2-1 and tab. 2-1.
- Implement the hydraulic system integration according to fig. 3-5.
- Comply with the stipulated tightening torque (see chap. 3.1).
- Install the line so that the sound insulation hood can be positioned easily after installation.

3.5 Laying refrigerant piping

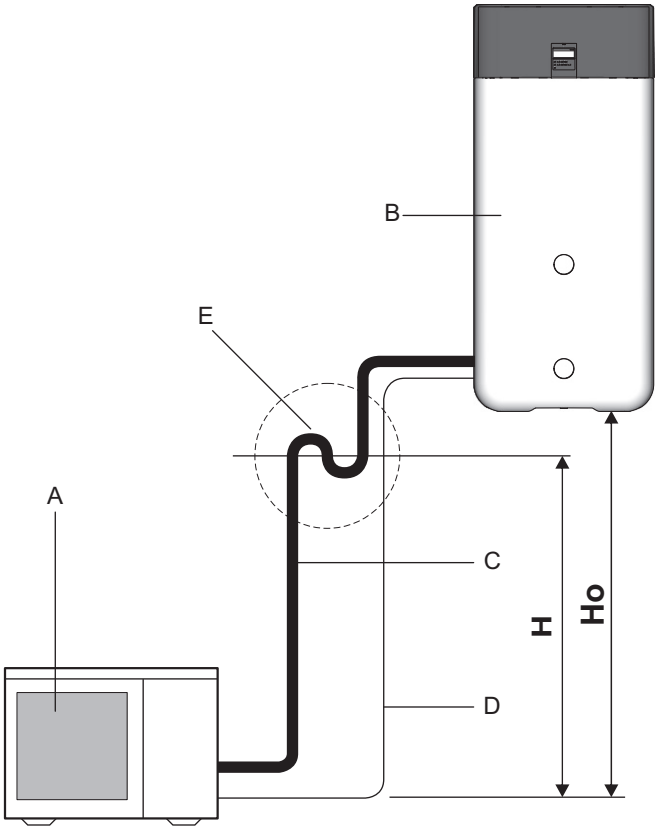
1 Check if oil trap bend is necessary.
- Required if DAIKIN EKHHP is not installed at ground level to the external heat pump unit (fig. 3-7, $H_O \geq 10$ m).
- At least one oil trap bend must be installed for every 10 m of height difference (fig. 3-7, H = distance from oil trap bend to oil trap bend).
- An oil trap bend is only required in the gas line.

2 Install lines with bending unit and an adequate clearance to electrical lines.

3 Only solder with light nitrogen flow (hard soldering only).

4 Do not apply thermal insulation to connection points until after commissioning (for purposes of leakage search).

5 Make the flare connections and connect them to the devices (Observe the tightening torque, see chap. 3.1).



A DAIKIN ERWQ
B DAIKIN EKHHP
C Gas line
D Liquid line
E Oil trap bend
H Height to 1st oil trap (max. 10 m)
H_O Height difference between heat pump outdoor unit and heat pump indoor unit.

Fig. 3-7 Oil trap bend for refrigerant piping

3.6 Pressure test and filling the refrigerant circuit

RISK OF ENVIRONMENTAL DAMAGE

Important information regarding the refrigerant used.

The overall heat pump system contains refrigerants with fluorinated greenhouse gases that are harmful to the environment when released.

Coolant type: R410A
GWP* value: 2087.5

** GWP = Global Warming Potential*

- Persons who hold a certificate of qualification for work on stationary refrigeration systems (heat pumps) and air conditioning systems for the European area in accordance with the F-Gas Certification Regulation pursuant to (EU) no. 2015/2067 are certified.
- Enter the total filling quantity of refrigerant on the label supplied on the external heat pump unit (for notes, see Installation instructions for the heat pump outdoor unit).
- Never allow refrigerant to escape into the atmosphere – always extract and recycle with a suitable recycling device.

No additional refrigerant is required for the basic filling. This is independent of the line length between the indoor unit and outdoor unit.

1 Perform pressure test with nitrogen.
   – Use nitrogen 4.0 or higher.
   – Maximum 40 bar.
2 After the leak search is complete, completely drain.
3 Vacuum seal the pipes (see installation instructions of the heat pump outdoor unit).
4 Open the stop valves on the outdoor unit completely until the stop and slightly tighten.
5 Reinstall the valve caps.

3.7 Filling the system on the water side

WARNING

Operating the DAIKIN EKHHP with the storage tank not filled or not completely filled may cause damage to the device.

- Do not fill the DAIKIN EKHHP until all hydraulic installation work has been completed.
- Observe the sequence during the filling process.
- Commissioning only after all installation work has been completed and only after the storage tank has been completely filled.

The corrugated tube heat exchangers must be filled before the storage tank.

The heat exchanger for connecting an optional heat generator (fig. 2-1, item 14, only EKHHP500A*2V3) must be filled even if no optional heat generator is connected to it. This heat exchanger or the heating circuit of the external heat generator connected to it should be filled first.

Observe the notes on the water connection and water quality according to chap. 1.2.7 and 3.4.

3.7.1 Filling the hot water heat exchanger

1 Open the shut-off valve for the cold water supply pipe.
2 Open the hot water tap connections so that the draw-off volume can be set as high as possible.
3 Once water has been discharged from the tap connections, do not interrupt the cold water flow; this will ensure that the heat exchanger is fully vented and that any impurities or residue are discharged.

3.7.2 Filling the storage tank

See chap. 8.3.

3.8 Electrical connection

WARNING

Touching live parts can result in **electric shock** and lead to potentially fatal injuries and burns.

- Before beginning work on live parts, **disconnect all of the systems circuits from the power supply** (switch off external main switch, disconnect fuse) and secure against unintentional restart.
- Establishment of the electrical connection and work on electrical components should only be performed by **electrical technicians** in compliance with valid standards and guidelines as well as the specifications of the energy supply company and the instructions in this manual.
- Never make constructional changes to connectors or other electrical equipment components.
- **Equipment covers and service panels** must be **replaced** as soon as the work is completed.

CAUTION

Increased temperatures may occur in the DAIKIN **EKHHP control housing** during operation. This can result in **currently-carrying wires** from reaching higher temperatures during operation due to self-heating. For this reason, these **lines need to** have a **continuous use temperature of 90 °C**.

- For the following connections, use only cables with a long-term use temperature ≥ 90 °C:
  – Heat pump outdoor unit
  – Voltage supply Booster-Heater
  – Contacts (HT/NT/Smart Grid connection)

– Mains connections must be designed as independent circuits.
– Ensure that mains, thermistor and data bus lines are routed separately.
– Use only cable ducts with separators or separate cable ducts spaced at least 2 cm apart.
– Line crossings are not permitted.
– For all cables connected to DAIKIN EKHHP, effective strain relief must be ensured in the switch box by means of cable ties (see fig. 3-8 to 3-10).

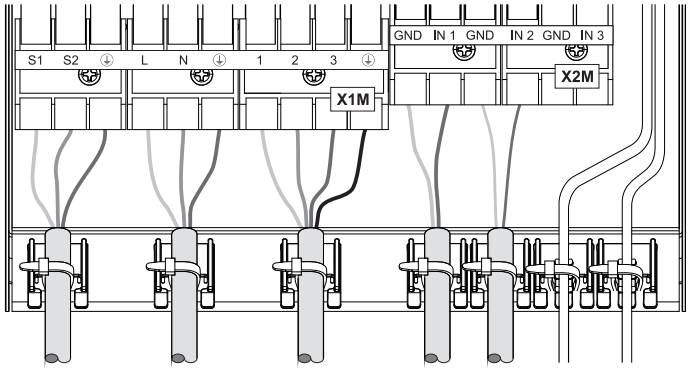


Fig. 3-8 Strain relief by cable ties

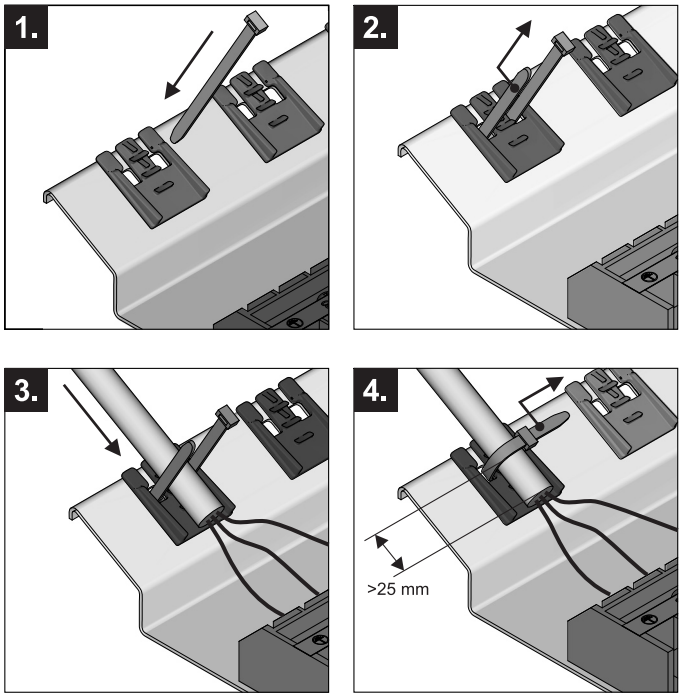


Bild 3-9 Engage retaining clip and lash cable with cable tie

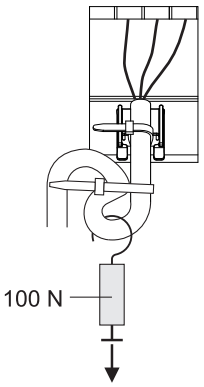


Fig. 3-10 Checking the holding force of the strain relief

3.8.1 Connection of EKHHP to heat pump outdoor unit, Booster-Heater (BSH) mains connection

1 Check the supply voltage (~230 V, 50 Hz).

2 Disconnect the junction box of the domestic installation.

3 Install the heat pump outdoor unit.

4 Lay the mains and communication cables (4-core, min. 0.75 mm²) between the heat pump outdoor unit and DAIKIN EKHHP.

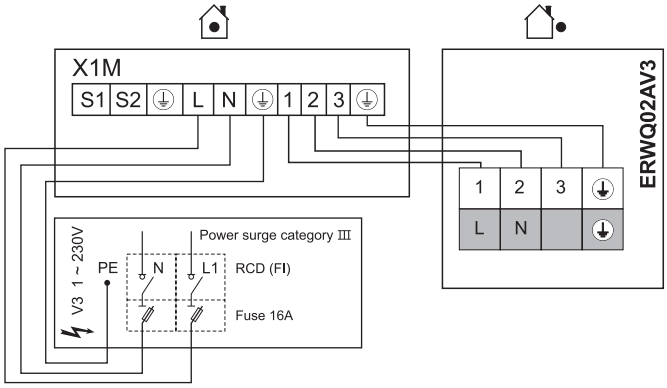
5 Connect the mains and communication cables to the heat pump outdoor unit (see associated installation instructions).

6 Connect the DAIKIN EKHHP to the heat pump outdoor unit (see fig. 3-11).

7 Lay the cable (3-core, > 1.5 mm²) for the power supply of the booster heater between the distribution box of the house installation and DAIKIN EKHHP.

8 Connect the power supply cable for the booster heater to DAIKIN EKHHP (see fig. 3-11).

9 Connect the cable for the power supply of the booster heater to the distribution box of the house installation (see fig. 3-11).



ERWQ02AAV3 Heat pump outdoor unit
X1M Terminal strip on EKHHP

Fig. 3-11 DAIKIN EKHHP mains connection

If the heat pump outdoor unit is switched off via a circuit specified by the power supply company (EVU), the DAIKIN EKHHP is also switched off.

This complete shutdown of the heat pump outdoor unit is an optional installation and must only be carried out by specialists.

3.8.2 High/low tariff mains connection (HT/NT)

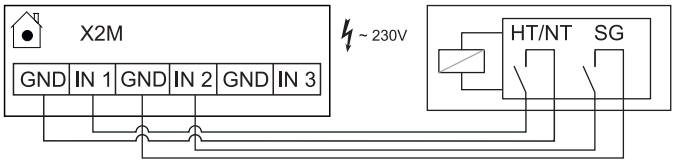
If the outdoor unit is connected to a high/low tariff mains connection, the **potential-free switching contact HT/NT** of the receiver, which evaluates the HT/NT signal issued by the electricity supply company (EVU), must be connected to the **GND/IN1 connections of** the DAIKIN EKHHP (see fig. 3-12).

If **parameter [7-00] > 0** is set, certain system components are switched off during high tariff periods (see chap. 6.5).

The potential-free switching contact **IN1** can be implemented as a **normally closed or normally open switching contact**.

a) For **design as a normally open switching contact**, **parameter [7-00] = 1** must be set.
When the EVU sends the HT/NT signal, the HT/NT switching contact is closed. The system switches to "reduced operation". If the signal is sent again, the HT/NT potential-free switching contact opens and the system resumes operation.

b) For **design as a normally open switching contact**, **parameter [7-00] = 2** must be set.
When the EVU sends the HT/NT signal, the HT/NT switching contact is closed. The system switches to "reduced operation". If the signal is sent again, the HT/NT potential-free switching contact opens and the system resumes operation.



HT/NT High/low tariff mains connection (EVU receiver)
SG Smart Grid - connection (EVU receiver)
GND+IN1 Connection HT/NT switch contact on EKHHP
GND+IN2 Connection Smart Grid switch contact on EKHHP
X2M Terminal strip on EKHHP

Fig. 3-12 Electrical connection HT/NT - and Smart Grid switch contact

3.8.3 Connection of EVU receiver (intelligent control Smart Grid - SG)

As soon as the function is activated by parameter [7-00] = 3 (see chap. 6.5.2), the heat pump is set to stand-by, normal or higher temperature operation, depending on the signal from the power supply company.

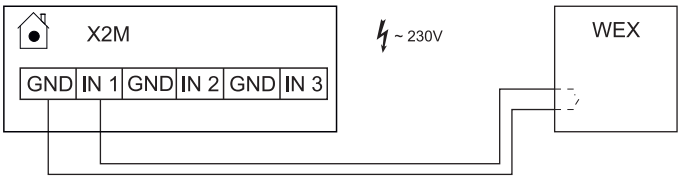
For this purpose, the **potential-free switching contacts HT/NT +SG** of the EVU receiver must be connected to the **terminal strip connections (GND+IN1)/(GND+IN2)** of the DAIKIN EKHHP (see fig. 3-12).

As soon as the Smart Grid function is active, the HT/NT function is automatically deactivated. The heat pump is operated differently depending on the value of the parameter [7-00] (see tab. 6-3).

3.8.4 Optional: Connection of the external heat generator

If an external heat generator is used, it can be connected to the DAIKIN EKHHP via a potential-free switching contact (HT/NT).

If the potential-free switching contact is closed by an external heat generator, the DAIKIN EKHHP reduces its own heat generation in order to give preference to the external heat generator (for settings, see chap. 6.5.2).



GND + IN1 Connection of potential-free switch contact on EKHHP
WEX External heat generator
X2M Terminal strip on EKHHP

Fig. 3-13 Electrical connection of external heat generators

4 Commissioning

WARNING

An improperly commissioned DAIKIN EKHHP may not operate properly and can be dangerous for the health and safety of individuals. Initial commissioning of the DAIKIN hot water heat pump by authorised and trained heating specialists only.

CAUTION

If the DAIKIN EKHHP is not properly commissioned, it could lead to material or environmental damage.

- Observe the current technological regulations to prevent corrosion products and deposits. Minimum requirements regarding the quality of filling and supplementary water:
  – Water hardness (calcium and magnesium, calculated as calcium carbonate): ≤ 3 mmol/l
  – Conductivity: ≤ 1500 (ideal: ≤ 100) µS/cm
  – Chloride: ≤ 250 mg/l
  – Sulphate: ≤ 250 mg/l
  – pH value: 6.5 - 8.5.
- If the above minimum water quality requirements cannot be guaranteed by the local water supply company, appropriate water treatment measures must be taken.
- Make sure water quality complies with EU directive 2020/2184 and the regionally-applicable regulations.

CAUTION

If the DAIKIN EKHHP is put into operation when the **storage tank is not completely full**, this can lead to a reduction in heating performance or destruction of the integrated booster heater (BSH) and possibly cause an electrical defect.

- Only operate the DAIKIN EKHHP when the storage tank is completely full.

4.1 Start-up

4.1.1 Requirements

– The DAIKIN EKHHP is set up and fully connected.
– The refrigerant system is dehumidified and filled with the specified amount of refrigerant.
– The hot water distribution network is vented and pressurised to the correct pressure (see chap. 3.7).
– The storage tank is filled up to the overflow (see chap. 8.3).
– Optional accessories have been installed and connected up.

After the DAIKIN EKHHP has been set up and fully connected, it may need to be adjusted once to the installation environment by expert personnel (configuration of optional accessories, setting parameters).

After this configuration is complete, the installation is ready for operation and the operating company can make additional individual settings on it.

The heating specialist must instruct the operating company, prepare and complete the commissioning report.

4.1.2 Starting the system

1 Check all items on the following checklist (tab. 4-1). Record the test result.

2 Switch on the power supply at the distribution box of the house installation for the DAIKIN hot water heat pump.

3 Switch on the DAIKIN EKHHP.

4 Perform a test run:
  – Display the temperatures (see chap. 6.2.3).
  – Test the hot water heating function. To do this, select a higher hot water setpoint temperature so that the heating function is activated (see chap. 6.3.1).

5 Sign the checklist together with the operating company.

Only if **all points** of the checklist can be answered with **Yes** may the DAIKIN hot water heat pump be commissioned and handed over to the operating company.

Checklist for start-up		
1.	DAIKIN EKHHP set up in accordance with the requirements and instructions in chap. 3 and without visible damage?	❑**Yes**
2.	Minimum distance of DAIKIN EKHHP to other heat sources (> 80 °C) of 1 m observed?	❑**Yes**
3.	Booster-Heater: – Does the mains connection meet the requirements and is the mains voltage 230 volts at 50 Hz? – Has the earth leakage circuit breaker been fitted in accordance with the individual country-specific regulations?	 ❑**Yes** ❑**Yes**
4.	Is the heat exchanger for DHW heating in the DAIKIN EKHHP filled and bled?	❑**Yes**
4.1	EKHHP500A*2V3 only: Is the heat exchanger filled for connection to an optional heat generator?	❑**Yes**
5.	Is the storage tank filled with water to the overflow point?	❑**Yes**
6.	Is the safety overflow connection connected to an open drain?	❑**Yes**
7.	Is the water pressure on the sanitary side < 6 bar?	❑**Yes**
8.	Are all hydraulic connections tight (no leaks)?	❑**Yes**
9.	Have the parameters been set on the controller in accordance with the structural conditions, possible connected accessories and the user specifications?	❑**Yes**
10.	Is parameter [7-02] set to 0?	❑**Yes**
11.	Does the installation operate without faults?	❑**Yes**
12.	Have the operating instructions been handed over, and has the operating company been instructed?	❑**Yes**

Location and date: _____ *Signature of installer:* _____

Signature of operating company: _____

Tab. 4-1 Checklist for start-up

5 Taking out of operation

DANGER

When opening the solar return connection and the hot water connections, there is a **danger of scalding and overflooding** from escaping hot water.

- Drain the storage tank
  - when it has cooled down sufficiently long
  - with a suitable fixture for safely draining or collecting the escaping water
  - with suitable protective clothing.

5.1 Temporary shutdown

CAUTION

A hot water heat pump that is shut down can freeze in the event of frost and may suffer damage.

- Drain the water out of the hot water heat pump if there is a danger of frost.
- If the hot water heat pump is not drained and there is a danger of frost, the power supply must be ensured and the external main switch must remain switched on.

If the DAIKIN EKHHP is not needed for a long time, it can be temporarily decommissioned.

However, DAIKIN recommends not to disconnect the system from the power supply, but simply switch it off (press the ⏻ button).

The system is then protected from frost.

If it is not possible to guarantee the power supply when there is danger of frost,

– the water side of the DAIKIN EKHHP must be completely drained.

If there is a danger of frost and the power supply cannot be guaranteed for just a few days, the unit's excellent heat insulation means that the DAIKIN EKHHP does not have to be drained on the water side, provided that the storage tank temperature is monitored regularly and does not fall below +3 °C.

However, this does not provide freeze-up protection for the connected heat distribution system.

5.1.1 Draining the storage tank

1 Disconnect the DAIKIN EKHHP from the power supply.

2 Connect a drain hose to the **KFE filling connection** (**accessory KFE BA**) (fig. 5-1, item A) and lay to a drainage point that is at least at ground level.

If no **KFE draining connection** is available, the connecting piece (fig. 5-1, item C) can be detached from the safety overflow (fig. 5-1, item B) and used.

This must be re-installed after the draining process before the hot water heat pump is put back into operation.

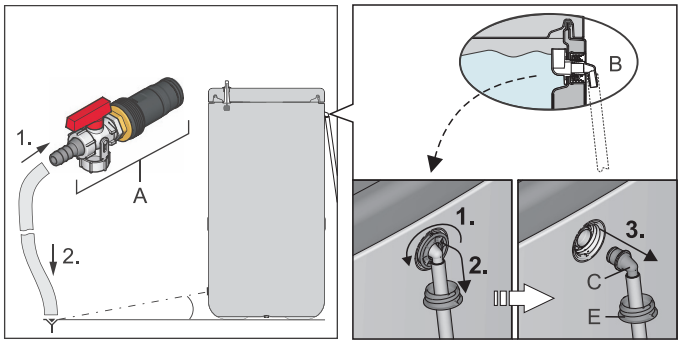


Fig. 5-1 Installing the drain hose; optional: Detaching the connecting piece from the safety overflow

A	*KFE filling connection (accessories **KFE BA**)*
B	*Safety overflow*
C	*Hose connecting piece for safety overflow*
D	*Clamping piece*
E	*Threaded piece*
F	*Sealing plug*
G	*Connection bracket*
H	*Spanner*
J	*Cover plate*
X	*Valve insert*

Tab. 5-1 Legend for fig. 5-1 to fig. 5-6

Without p=0 solar system

1 Remove the cover plate (fig. 5-2, item J) from the filling and draining connection.

2 When using KFE filling connection (accessories KFE BA):

– Remove the cover panel on the handle and unscrew the threaded piece (fig. 5-2, item E) from the storage tank.

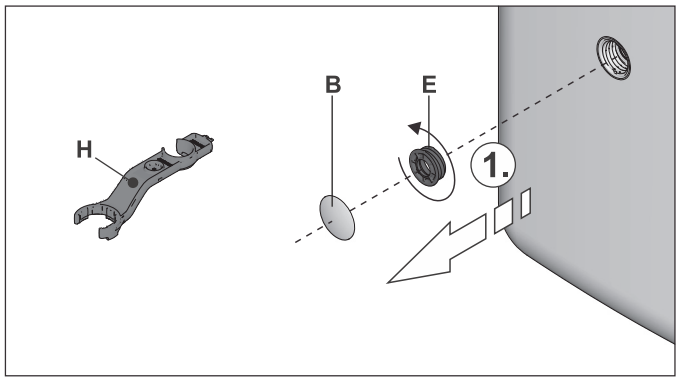


Fig. 5-2 Unscrewing the threaded piece

3 Insert the KFE filling connection in the threaded piece (fig. 5-3, item E) and secure with the clamping piece (fig. 5-3, item D).

4 Place a suitable collecting tray under the filling and draining connection.

5 Unscrew the threaded piece on the filling and draining connection (fig. 5-4, item E), remove the sealing plug (fig. 5-4, item F) and **immediately screw in** the pre-installed threaded insert with **KFE filling connection** into the filling and draining connection (fig. 5-4) again.

CAUTION

After removing the sealing plug, storage tank water surges out.

There is no valve or check valve on the filling and draining connection.

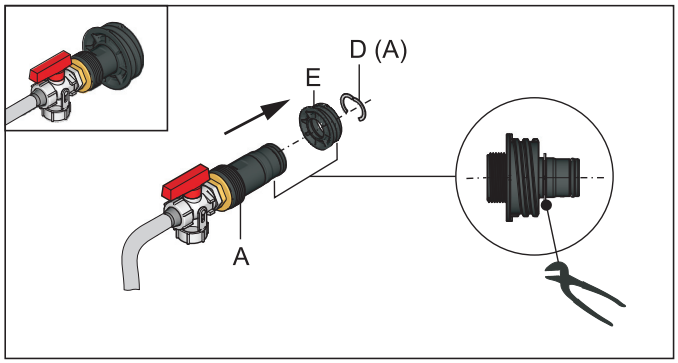


Fig. 5-3 Completing the KFE filling connection

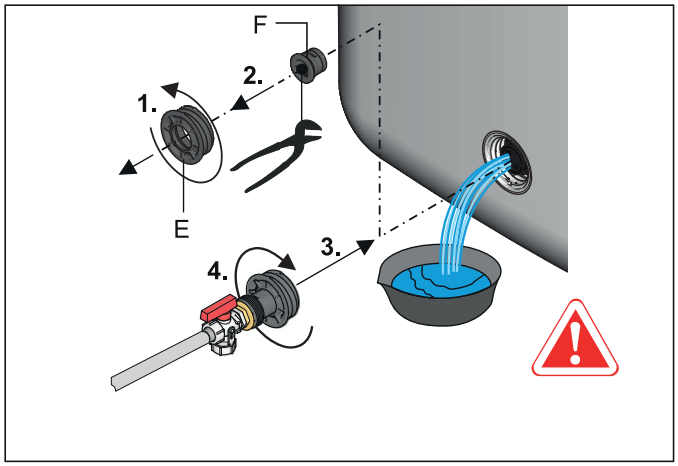


Fig. 5-4 Screwing the KFE filling connection into the filling and draining connection

6 Open the KFE tap on the **KFE filling connection** and drain the water out of the storage tank.

Only with p=0 solar system

1 Adjust the valve insert on the connection bracket so that the path to the blind plug is blocked off (fig. 5-5).

2 Place a suitable collecting tray and remove the blind plug from the connection bracket (fig. 5-5).

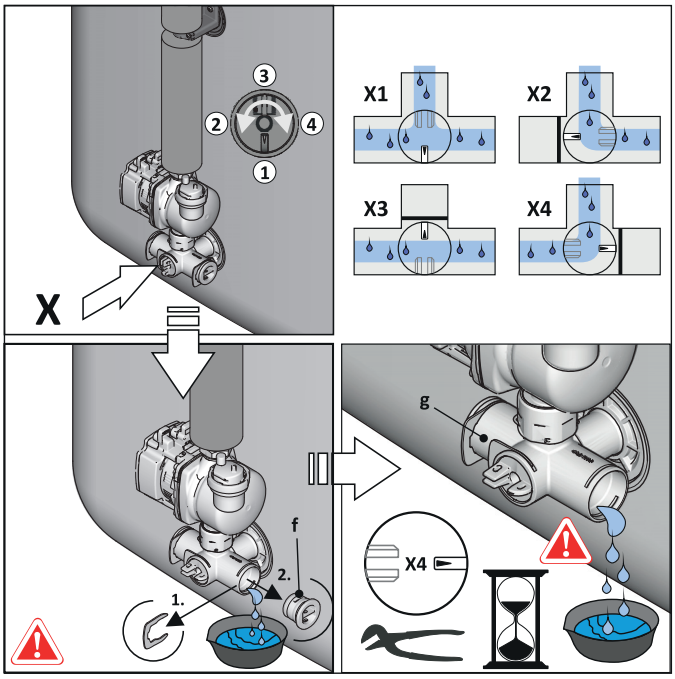


Fig. 5-5 Shut off the valve insert, remove the blind plug from the connection bracket

3 Insert the **KFE filling connection** in the connection bracket and secure with the holding clamp (fig. 5-6).

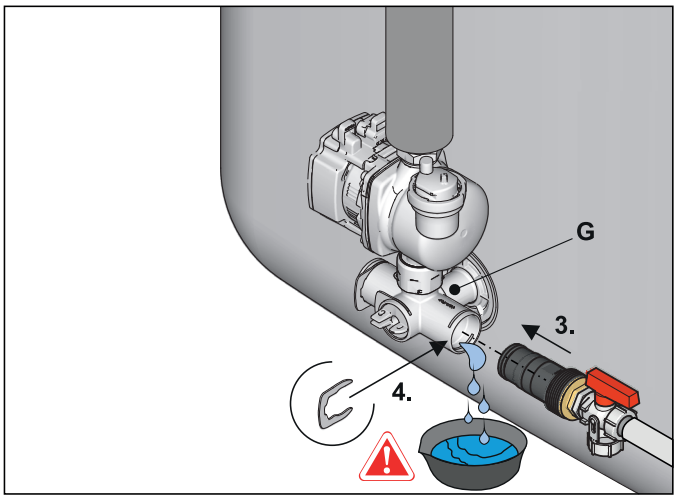


Fig. 5-6 Installing the KFE filling connection in the connection bracket

4 Open the KFE tap on the **KFE filling connection**.

5 Adjust the valve insert on the connection bracket so that the path to the drain hose is open (see also fig. 5-5) and drain the water content of the storage tank.

5.1.2 Draining the hot water circuit

1 Shut off the cold water supply to the DAIKIN EKHHP.

2 Disconnect the cold water supply to the DAIKIN EKHHP and drain the hot water distribution system.

3 Disconnect the cold water inlet and hot water outlet from the DAIKIN EKHHP.

4 Connect the drain hose to the cold water inlet and hot water outlet so that the hose opening is located just above the floor.

5 Allow the hot water heat exchanger to run idle according to siphon principle.

6 In the DAIKIN EKHHP500A*2V3, empty the connected heating circuit of the optional heat generator and the heat exchanger in the same way unless this heating circuit is filled with a frost-proof heat transfer fluid.

5.2 Final shutdown

WARNING

Cooling systems (heating pumps), climate control systems and heating devices that are incorrectly dismantled can both endanger life and health of people and be impaired in their function during start-up.

At normal atmospheric pressure and ambient temperatures, **liquid refrigerant vaporises** so suddenly that, on **contact with skin or eyes**, it can cause **the tissue to freeze** (danger of going blind).

- Work on the DAIKIN EKHHP (such as e.g. dismantling components, temporary or final shut-down of the system) must only be carried out by persons who are authorised, who have successfully completed **qualifying technical or vocational training** for the respective activity and who have taken part in advanced training sessions recognised by the relevant responsible authority. These particularly include **certified heating engineers, qualified electricians and HVAC specialists** who have experience in the professional installation and maintenance of heating, cooling and air conditioning systems and heat pumps due to their **professional training** and their **expert knowledge**.
- **Observe** the **warning and safety instructions** in the installation manual on working in the coolant system.

A final shutdown may be necessary if
– the system is defective and is being dismantled and disposed of.
– components of the system are defective, are being dismantled and replaced.
– the system or parts of the system are being dismantled and reassembled in another location.

The DAIKIN EKHHP is designed to be environmentally friendly and easy to install so that the activities described above can be carried out in an efficient and environmentally friendly manner.

When changing locations or replacing parts on the refrigerant system in the pipe network:

1 Pump the refrigerant back into the external heat pump unit (see installation and operating instructions for the particular external heat pump unit).

When disposing of the machine or replacing parts in the refrigerant system:

1 Extract refrigerant from the machine and recycle (see installation and operating instructions for the particular external heat pump unit).

CAUTION

Refrigerant leaking from the system causes long-term damage to the environment.

Mixing different kinds of refrigerant can result in hazardous toxic gases being released. Mixing with oils can lead to the soil being contaminated in case of leaking refrigerant.

- Never allow refrigerant to escape into the atmosphere - always extract and recycle with a suitable recycling device.
- Always recycle refrigerant, thus keeping it separated from oils and other additives.
- Only keep each type of refrigerant separate in suitable pressure vessels.
- Dispose of refrigerants, oils and additives properly and in accordance with the applicable national regulations of the country it is being used in.

2 Decommission the DAIKIN EKHHP (see chap. 5.1).

3 Disconnect the DAIKIN EKHHP from all electrical connections, refrigerant and water connections.

4 Dismantle the DAIKIN EKHHP or relevant components in reverse order in accordance with the installation instructions.

5 Dispose of the DAIKIN EKHHP in accordance with regulations.

Recommendations for disposal

The DAIKIN EKHHP has an environmentally friendly design. During the disposal process, the only waste created is that which can be used for material or thermal recycling. The materials used that are suitable for recycling can be sorted into individual types.

DAIKIN has complied with the standards for environmentally-friendly disposal as a result of the environmentally-friendly design of the DAIKIN EKHHP. Proper disposal in compliance with the respective national regulations of the country of use is the responsibility of the user/owner.

The designation of the product means that electrical and electronic products may not be disposed of together with unsorted domestic waste.

Proper disposal in compliance with the respective national regulations of the country of use is the responsibility of the user/owner.
– Disassembly of the system, handling of refrigerant, oil and other parts may only be carried out by a qualified fitter.
– Disposal may only be carried out by an organization that specialises in reuse, recycling and recovery.

Further information is available from the installation company or the responsible local authorities.

6 Operation, parameters

The DAIKIN EKHHP controller can be used to switch off the system and on, set the DHW heating and timer programs, make settings for the operating mode of the heat pump outdoor unit and change parameter settings.

The available parameters and their setting options are described in chap. 6.5.1 and 6.5.2.

When connected to the EKHHP, settings for a DAIKIN solar system must be made on the solar system controller.

6.1 Display indications and function of the operating elements

CAUTION

Never operate the operating elements of the controller with a hard, pointed object. This can cause damage and can cause the controller to malfunction.

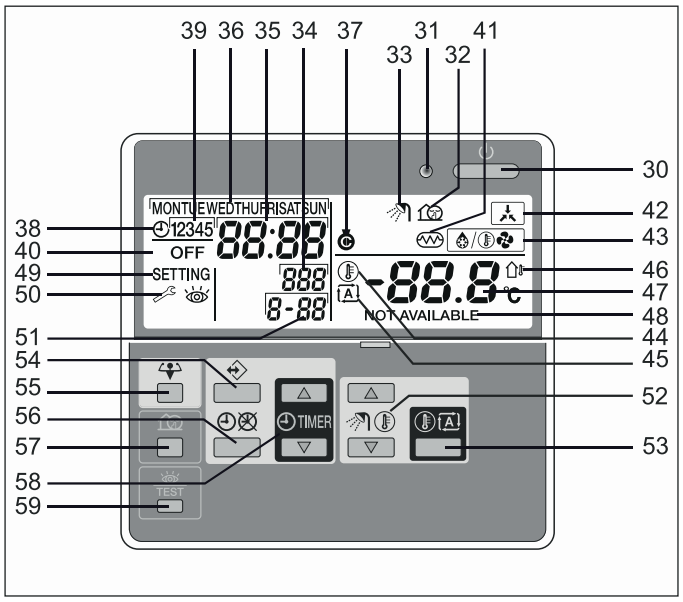


Fig. 6-1 Display and operating elements of the controller - for the legend, see tab. 2-1 and the following description

30 - "On / Off" key

Switch the DAIKIN EKHHP on and off. When the hot water heat pump is switched on, the operating display LED lights up red.

Pressing the key too often in succession can cause the system to malfunction (maximum 20x per hour).

31 - Operating Display LED

The operation indicator LED lights up during hot water heating operation. The LED flashes if there is a malfunction. When the LED is switched off, the DAIKIN EKHHP is out of service.

32 - "Low noise" operating mode display

This icon indicates that the heat pump outdoor unit is running in low noise mode.

In this operating mode the output of the system is reduced so that the operating noise of the heat pump outdoor unit is reduced.

33 - Hot water heating active display:

This icon indicates that the hot water heating mode is active.

If the hot water is provided in "high output" mode, the symbol flashes.

During thermal disinfection (legionella operation), the symbol flashes more quickly.

34 - Sensor number display 888

This code refers to the temperature displays (see chap. 6.2.3).

35 - Time display 88:88

The clock display shows the current time. In programming mode, the display shows the set switching time.

36 - Weekday display MONTUEWEDTHUFRISATSUN

This display shows the current day of the week. In programming mode, the display shows the set day.

37 - Refrigerant compressor active display

This icon shows that the refrigerant compressor is active in the heat pump outdoor unit.

38 - Switching time program switched on display

This icon shows that the switching time function is switched on.

39 - Active switching time display 12345

These icons show the active switching times of the current weekday.

40 - Off status in switching time program display OFF

This icon shows that the current switching time has switched the system off.

41 - Booster-Heater (BSH) switched on display

This icon indicates that the hot water heating assistance from the Booster-Heater (BSH) is active.

42 - External signal (HT/NT/Smart Grid) display

This icon indicates that the DAIKIN EKHHP is influenced in its mode of operation by closed switching contacts (see parameter [7-00]).

43 - "Defrost" active function display

This icon shows that the defrost or start-up operating mode is active.

44 - Storage tank temperature display

This icon appears when the hot water temperature in the integrated storage tank is displayed.

The icon is also shown if the temperature target value is set in programming mode.

45 - "Automatic" operating mode display

This icon indicates that the heat pump is running in "Automatic" mode.

46 - Outdoor temperature active display

When this icon flashes, the outside temperature is shown on the temperature display (47) (see chap. 6.2.3).

47 - Hot water temperature or other temperature values -88.8 °C display

The display shows various temperature values (see chap. 6.2.3).

48 - "Function not available" NOT AVAILABLE display

This icon is always shown if an option that has not been installed is selected or if a function is not available.

49 - Parameter setting mode active SETTING display

The display indicates that the user can view and change the parameter settings.

50 - Service technician required + display

This icon shows that the system must be checked. Contact your heating specialist or nearest DAIKIN contractual partner.

51 - Parameter code or error code 8-88 display
This display shows the code from the parameter setting (see chap. 6.5) or the error code (see chap. 7.2).

52 - Hot water temperature ▼ and setting ▲ keys
These keys are used to set the temperature setpoint for hot water preparation.

53 - "Automatic" operating mode key
This key activates or deactivates automatic mode. In this operating mode, the integrated Booster-Heater (BSH) in the storage tank of the DAIKIN EKHHP is switched on as required for the heating process.

54 - Programming key
This multifunction key is used to program the switching times.

55 - "High Output" operating mode key
This key activates or deactivates the accelerated heating mode. It is heated by means of a heat pump and an integrated Booster-Heater (BSH).

56 - Activation/deactivation of switching time program key
The main function of this multi-purpose key is to activate/deactivate the switching time program. The key is also used to program the parameters.

57 - "Low Noise" operating mode key
This key activates or deactivates the low noise mode. In this operating mode, the output of the system is reduced so that the operating noise of the heat pump outdoor unit is reduced.

58 - Time setting ▼ and ▲ keys
These keys have several functions such as:
– Setting the time.
– Switching between the display of the outdoor temperature and the storage tank temperature (see chap. 6.2.3).
– Setting the switching times for the switching time program.

59 - Error code/parameter setting TEST key
This key has several functions:
– Long key press (> 5 s): Setting of parameters
– Short key press: Display of the last error code

6.2 Basic functions

Certain menu items of the controller are only accessible to the heating expert. This security measure ensures that no undesirable malfunctions arise through incorrect configuration.

6.2.1 Switching the system on and off

1 Press the key.
➔ The operation LED lights up red.
➔ During start-up, the icon appears on the display of the controller.

After start-up, the current operating mode appears on the display of the controller.

Pressing the key again shuts down the system and the Operation LED goes out.

6.2.2 Setting the clock

Setting the time

1 Press the key for at least 5 s.
➔ The time and display of the weekday starts flashing.
2 Use the ▼ and ▲ keys to set the time.
➔ The time is increased/decreased by 1 min. Pressing and holding down the ▼ or ▲ key increases/reduces the time by 10 min.
3 Press the key to save the setting or press the key again to cancel it.

Setting the weekday

1 Press key for at least 5 s.
➔ The time and display of the weekday starts flashing.
2 Use the ▼ and ▲ keys to set the weekday.
➔ The weekday is increased/decreased by 1 min.
3 Press the key to save the setting or press the key again to cancel it.

6.2.3 Display of the current temperature

1 Press the key for 5 s.
➔ The icon and the outdoor temperature are displayed.
➔ The and icons flash on the display of the controller.
➔ The display field (fig. 6-1, item 34) shows sensor number 001.
2 Use the ▼ and ▲ keys to select the following temperatures:

Thermistor no.	Temperature sensor	Icon flashes
001	External temperature	
002	—	—
003	—	—
004	Tank temperature	
005	—	—

Tab. 6-1 Temperature displays

If no button is pressed within 30 s, the controller leaves display mode.

6.2.4 Defrost

At low outdoor temperatures and corresponding humidity, the heat pump outdoor unit may ice up. This icing impairs efficient operation. The system detects this condition and automatically goes into defrost operation .

During defrost operation, heat is extracted from the heat pump's indoor unit (EKHHP) and, if necessary, the Booster-Heater (BSH) is switched on.

After a maximum of 8 minutes, the system switches back to normal operation.

6.3 Operating modes

MAXIMUM ENERGY EXPLOITATION

The most effective use of energy is achieved by the DAIKIN hot water heat pump at the lowest possible hot water temperatures.

At temperatures above 50 °C, depending on the outside temperature, the efficiency (COP) of the DAIKIN hot water heat pump may deteriorate due to the support of the electric auxiliary heater (Booster-Heater).

6.3.1 ECO

In order to increase efficiency, an attempt is made not to use the integrated electric Booster-Heater (BSH) in this operating mode (simultaneous operation of the hot water heat pump and Booster-Heater (BSH) is not permitted, except when the low noise mode is activated).

Furthermore, most individual settings can be made to ensure convenient and efficient operation. The settings are made via the parameters as described in chap. 6.5.

When the system is switched on, it regulates the hot water preparation fully automatically on the basis of the specifications set in the controller.

➔ icon appears on the display of the controller.
➔ icon is not shown on the display of the controller.

1 Use the and keys to set the required hot water target temperature.

If possible, the hot water target temperature should be selected so that, in combination with the setting for hysteresis (parameter [6-00]), the storage water of the DAIKIN EKHHP does not cool down excessively before hot water preparation.

The hot water preparation can be influenced by additional functions:
– Low noise operation
– Switching times programming
– Automatic defrost function
– Thermal disinfection (legionella protection)
– HT/NT function
– Smart Grid function

If the user sets a value manually, this setting remains active until the user changes it or until set special functions influence it. After termination of the special functions, the adjusted setpoint is used again.

Setting the switching times for the flow temperature control is described in chap. 6.4.

If the temperature setpoint for hot water preparation is not reached by the heat pump outdoor unit, the controller switches to the integrated Booster-Heater (BSH).

The Booster-Heater (BSH) is only switched on when the hot water temperature has been set above the maximum value that can be reached by the heat pump ($T_{HP\ MAX}$) and the value measured by the temperature sensor has reached the temperature ($T_{HP\ Max}$).

6.3.2 Automatic

This operating mode is similar to the "ECO" operating mode, but after 60 minutes the integrated electric Booster-Heater (BSH) is automatically switched on for heating if required and other settings are made automatically to ensure convenient operation.

1 Press the key.
➔ The icon appears on the display of the controller.

2 Briefly press the or key.
➔ The current target temperature for hot water is displayed for 5 s on the display of the controller.

3 Within the 5 s, use the and keys to set the required hot water temperature.

Using this mode may result in higher power costs compared to other modes.

When the key is pressed again, the water heating is switched off and the icon goes out.

6.3.3 Low noise

Low noise means that the heat pump outdoor unit works at reduced output. This reduces the operating noise generated by the heat pump outdoor unit.

When Low noise mode is activated, the output in the hot water heating mode decreases in such a way that any preset hot water setpoint temperatures can no longer be reached.

1 Press the key.
➔ The icon appears on the controller display.

6.3.4 High output

It is heated up to the target hot water temperature as quickly as possible by means of a heat pump and integrated electric booster heater (BSH).

The "High output" operating mode can be activated if larger hot water tapping quantities are required for a short time.

1 Press the key.
➔ The icon flashes on the controller display.

The output support is automatically deactivated again once the specified target temperature for hot water is reached.

6.4 Setting the switching time program

The DAIKIN EKHHP can be controlled according to manual settings or according to a freely programmable switching time program.

No switching time program is stored in the factory.

The user can program up to 5 switching times for each day of the week for the controller of the water heating and the operating mode (normal, low noise).

The switching time program is switched on and off using the key. Stored switching times can be changed or deleted at any time. To have a better overview, we recommend making a record of the programmed switching times and keeping this in a safe place.

The user can also make manual setting changes when the switching time program is switched on. The controller always operates according to the last set user defaults until a new default is issued. This means that settings made manually by the switching time program may be cancelled again at the next active switching time.

The integrated Booster-Heater (BSH) is also controlled fully automatically via the controller integrated in the DAIKIN EKHHP. The switching limits and switching time periods are defined in the parameter settings. When the Booster-Heater (BSH) is switched on, the icon appears on the controller display.

> If the DAIKIN EKHHP is in an "OFF" period, the HT/NT and SG tariff contacts can no longer be evaluated and therefore have no influence on the operation of the system.

6.4.1 Displaying the switching times

1 Press the key.
➔ The current operating mode flashes.

2 Use the and keys to select the operating mode to be programmed.
➔ The selected operating mode flashes.

3 Use the key to confirm the selection.
➔ The first weekday "MON" is displayed.

4 Use the and keys to select the weekday to be programmed.

5 Use the key to confirm the selection.
➔ The first switching time programmed for the selected operating mode is displayed.

6 Use the and keys to move to the other switching times for this operating mode. Empty switching times are not displayed.
Pressing takes you back one step at a time.

6.4.2 Programming switching times

7 Hold the key pressed for 5 s.

8 Use the key to select the switching time number.

9 Use the and keys to set the starting time.

10 Press the key to select the type of switching time OFF for this switching time number.

11 Confirm the switching time and switching type with the key (press briefly).

12 Repeat steps 8 to 11 to program the other switching times or to change to the highest switching time of the current day (see step 6). Then continue with step 13 to complete programming.

13 Hold the key pressed for 5 s.
➔ The switching time set is displayed, saved and all switching times below that are also saved. All switching times above the current switching time are deleted.
➔ It automatically returns to step 6.

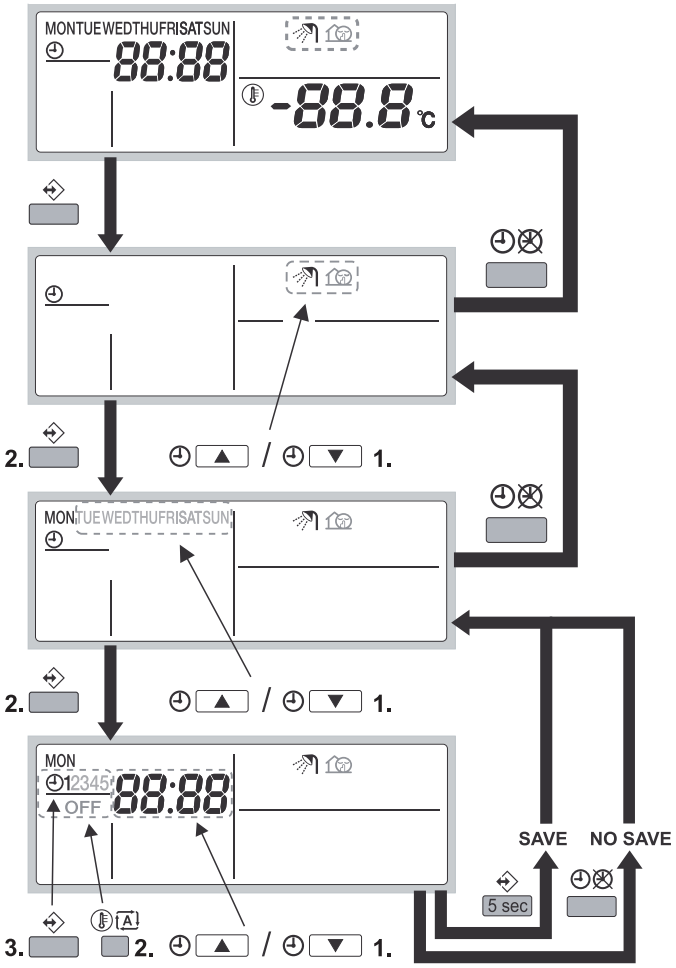


Fig. 6-2 Displaying and programming switching times

6.4.3 Deleting switching times

Deleting individual switching times

Deleting one or more programmed switching times is carried out at the same time as saving the programmed switching times. The following table explains the procedure.

For example:

– At least 4 switching times were programmed for Monday.
– Switching times 1 to 3 are set.
– After the 3rd switching time, the key (keep pressed for 5 s) confirms completion of the programming.
– The 4th switching time and 5th switching time (if available) are deleted.

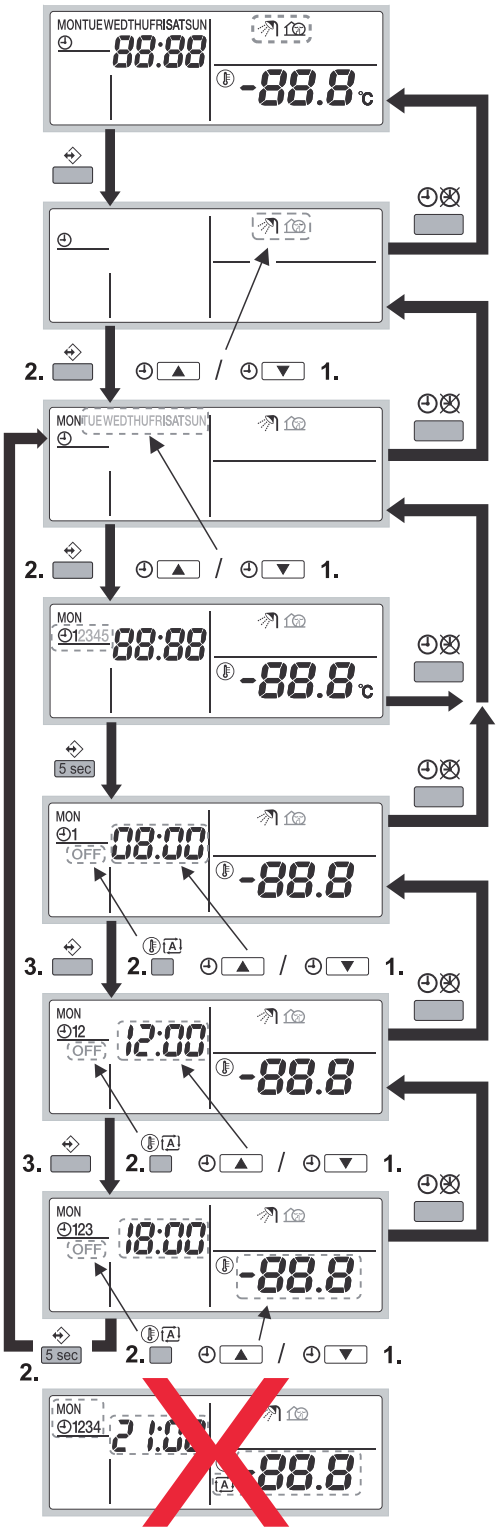


Fig. 6-3 Deleting individual switching times

Deleting all switching times of an operating mode

Only all switching times for a weekday of a certain operating mode can be deleted per deletion process.

To do this, proceed as described in section "Deleting individual switching times", but after selecting the day of the week, press and hold the ⇳ key twice in succession for 5 seconds.

6.5 Parameter settings

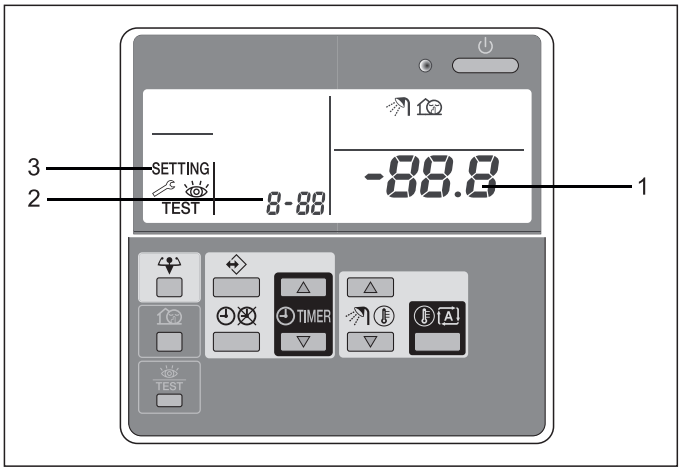
All parameters of the controller are described in detail in this section. An overview of all parameters, their factory settings and setting ranges are listed in tab. 6-4.

DAIKIN recommends that all changes to the parameters and switching times be noted in the tables in chap. 6.5.4 and 6.5.5.

6.5.1 Setting parameters

Each parameter/function is assigned a 3-digit code (e.g. [0-03]) that is shown on the controller display (fig. 6-4, item 2).

The first number [0] (Code 1 in tab. 6-4] shows the parameter group. The second and third number [03] together show the relevant parameter in this group of parameters (Code 2 in tab. 6-4).



1 Parameter value
2 Parameter code
3 Parameter setting mode active display

Fig. 6-4 Parameter setting on the controller

1 Press the TEST key for at least 5 s.
- ➔ The SETTING icon is displayed.
- ➔ The current parameter code 8-88 is displayed (fig. 6-4, item 2).
- ➔ The set parameter value -88.8 °C of the respective parameter code is displayed (fig. 6-4, item 1).

In order to set parameter groups 2 to C (grey marked area in tab. 6-4) ("Advanced Mode"), the TEST key must be pressed again for at least 10 seconds.

2 Use the ▲ key to select the parameter group.

3 Use the ▼ key to select the parameter to be set.

4 Use one of the ▼ or ▲ keys to change the setting of the parameter selected.

5 Press the ⊗ key to save the value.

6 Repeat steps 2 to 5 to set other parameters or press the TEST key to exit parameter setting mode.

Changes to parameters are only saved if the ⊗ key is pressed. Changing to a new parameter code or pressing the TEST key rejects the changes made.

6.5.2 Parameter description

[0] - Temperature settings - operating modes

The following setting options are available:

– [0-00] Hot water setpoint temperature for "High output" operating mode.
– [0-01] Hot water setpoint temperature for thermal disinfection of the hot water tank (legionella protection).

WARNING

The settings for legionella protection must always be configured according to the country-specific legislation.

If no hot water is used for several days and the storage temperature of the DAIKIN does not reach at least 60 °C, for hygiene reasons (Legionella protection) it is periodically heated up to above 60 °C once.

– [0-02] Setpoint for keep warm function. This setpoint is assumed as soon as the DAIKIN hot water heat pump is in an "OFF" period and is used to maintain a minimum storage tank temperature. The DAIKIN hot water heat pump starts as soon as the water temperature in the storage tank has fallen below the temperature hysteresis (depending on operating mode and setting).
– [0-03] Switch-off temperature of keep warm function: Temperature at which the DAIKIN hot water heat pump stops the reheating process.
– [0-04] Activation of the keep warm function: Determines whether the heating is automatically reheated when the value of parameter [0-02] is undershot.
  – 0 = Function is switched off
  – 1 = Function is switched on

[2] - Thermal disinfection (legionella protection)

An ON temperature of > 45 °C means that only the electrical Booster-Heater (BSH) is used and no heat pump. This increases the service life of the refrigerant compressor.

The following setting options are available:

– [2-00] Start day: Weekday on which the function is to be started.
– [2-01] Automatic disinfection when the hot water heat pump is switched on:
  – 0 = No disinfection
  – 1 = Automatic disinfection
– [2-02] Start time: Time at which the function is started.
– [2-03] Automatic disinfection during "stand-by" operation:
  – 0 = No disinfection
  – 1 = Automatic disinfection
– [2-04] Hold time: Duration for how long the disinfection temperature is to be maintained.

If the temperature in the storage tank drops due to a tapping operation, thermal disinfection is restarted.

If thermal disinfection is prevented, e.g. by the high tariff signal (Booster-Heater (BSH) blocked), it is carried out as soon as the DAIKIN hot water heat pump is in normal operation again (see tab. 6-3).

[3] - Other

The following setting options are available:

– [3-00] Auto restart after a power failure:
  – 0 = DAIKIN hot water heat pump starts in "Stand-by" operating mode. The switching time function is not active.
  – 1 = DAIKIN hot water heat pump restarts with the previously defined user settings.

If the DAIKIN hot water heat pump is connected to a high/low tariff mains connection where the power supply is interrupted, this parameter must be set to "1".

– [3-01] Access permission: Do not change setting value.
– [3-02] Hot water setpoint temperature > 60 °C:
  – 0 = Setting > 60 °C not possible.
  – 1 = Setting > 60 °C possible.

The maximum hot water setpoint temperature is limited to 55 °C for exclusive heat pump operation.

A hot water setpoint temperature > 55 °C is only possible when operating the electric booster heater (BSH).

[4] - Operation of the electrical Booster-Heater (BSH)

The following setting options are available:

– [4-03] Simultaneous operation of the electric booster heater (BSH) and the heat pump.
  – 0 = Not possible.
  – 1 = Is only possible during "Low noise".
  – 2 = Is only possible during the "High output" operating mode.
  – 3 = Is possible during "Low noise" and "High output" mode.

[6] - Hysteresis for water heating

The parameter settings determine the temperature limits at which heating the hot water is started and stopped by the heat pump (ON temperature and OFF temperature of the heat pump).

If the water temperature falls below the ON temperature of the heat pump ($T_{HP\ ON}$), heating the hot water with the heat pump is started.

As soon as the hot water temperature reaches the OFF temperature of the heat pump ($T_{HP\ OFF}$) or the hot water set temperature (T_U), the heating of the hot water by the heat pump is stopped.

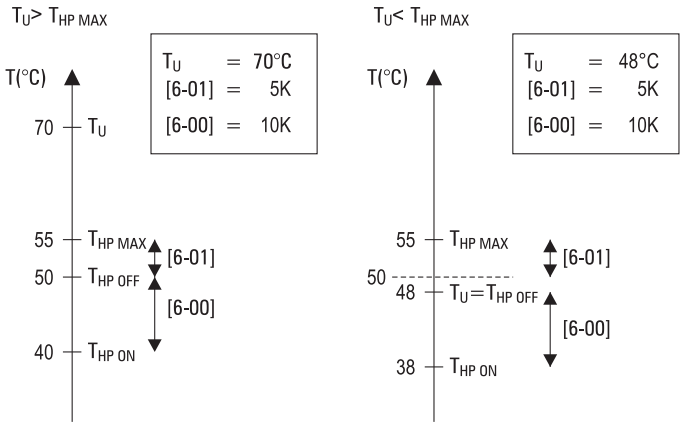
The following setting options are available:

– [6-00] Start: Temperature difference (switching hysteresis) that determines the ON temperature of the heat pump ($T_{HP\ ON}$). The set value is only evaluated in "ECO" mode.

An ON temperature of > 45 °C means that only the electrical Booster-Heater (BSH) is used and no heat pump. This increases the service life of the refrigerant compressor.

In the "ECO" and "Automatic" modes, the hot water heating operation does not start until the measured hot water temperature falls below 45 °C.

– [6-01] Stop: Temperature difference that determines the OFF temperature of the heat pump ($T_{HP\ OFF}$).



T *Hot water temperature*
$T_{HP\ MAX}$ *Maximum water temperature of the heat pump at the temperature sensor in the hot water storage tank (55 °C)*
$T_{HP\ OFF}$ *OFF temperature of the heat pump*
$T_{HP\ ON}$ *ON temperature of the heat pump*
T_U *Hot water setpoint temperature (as set on the controller)*

Fig. 6-5 Illustration of the controller for water heating with the heat pump

– [6-02] GCO (BSH): defines when the Booster-Heater (BSH) can be started after the heat pump has been switched on. This setting is only effective if simultaneous operation of the booster heater (BSH) and the heat pump is allowed ([4-03] is not set to 0).
– [6-03] High output mode priority: Sets the priority when the low noise and high output mode are active at the same time.

Settings					
	operating mode	operating mode			
[6-03]		OFF	[6-04] = 1	[6-04] = 2	[6-04] = 3
0	OFF	Normal	Low noise 1	Low noise 2	Low noise 3
	ON	High output	Normal	Low noise 1	Low noise 2
1	OFF	Normal	Low noise 1	Low noise 2	Low noise 3
	ON	High output	High output	High output	High output

Tab. 6-2 Overview of the "Low noise" and "High output" mode with simultaneous activation

If [6-03] is set to "1", "High output" mode has priority over "Low noise" mode.

– [6-04] Levels in "Low noise":
  – 1 = Lowest noise reduction.
  – 2 = Medium noise reduction.
  – 3 = Highest noise reduction.

[7-00] - High/low tariff mains connection (HT/NT) / Smart Grid connection (SG)

These parameters allow the configuration of the DAIKIN hot water heat pump with existing high/low tariff mains connection and Smart Grid connection.

As soon as the function is activated by parameter [7-00] > 0, the operation of the DAIKIN hot water heat pump is changed depending on the switching state of the connected potential-free external switching contacts.

The following setting options are available:

– [7-00]: Specifies whether the heat pump is connected to a high/low tariff mains connection/Smart Grid connection.
  – 0 = Normal mains connection (default setting).
  – 1 = HT/NT mains connection evaluation.
  – 2 = HT/NT mains connection evaluation.
  – 3 = HT/NT mains connection and Smart Grid connection evaluation.

[7-00]	Contact evaluation		Behaviour of the heat pump	Icon
	HT/NT	Smart Grid		
0 (default)	—	—	Normal operation	
1	○	—	Normal operation (low tariff)	
	●	—	Reduced operation (high tariff)	flashing
2	○	—	Reduced operation (high tariff)	flashing
	●	—	Normal operation (low tariff)	
3	○	○	Normal operation	
	●	○	Reduced operation, expensive electricity	flashing
	○	●	Switch-on recommendation, cheap electricity	(+ after 60 minutes at the earliest)
	●	●	Switch-on command, cheap electricity	+

○ *opened*
● *closed*

Tab. 6-3 Parameter configuration table [7-00]

Explanations on the behaviour of the heat pump according to tab. 6-3:

Normal operation: Heat pump operates in the set operating mode as described in chap. 6.3.

Reduced operation: Heat pump only operates in keep warm function with a fixed setpoint of 40 °C. The Booster-Heater (BSH) is never connected in parallel. This function is executed even if parameter [0-04] = 0 is set.

Switch-on recommendation: Heat pump operates with increased setpoint and reduced switching hysteresis. The Booster-Heater (BSH) is switched on at the earliest after 60 minutes according to the settings of parameter [4-03].

Switch-on command: Heat pump operates in high output mode with greatly increased setpoint. The Booster-Heater (BSH) is always switched on immediately.

[7-02] - Emergency operation

Parameter [7-02] has a factory setting of "0". In the event of a fault in the heat pump outdoor unit, parameter [7-02] = 1 can be set. In addition, the device must be set to "Automatic" mode.

Thus, when the fault is detected, the hot water heating operation is only carried out by the electric Booster-Heater (BSH).

Notify the DAIKIN service specialist.

Please only use this function in the event of a defect and be sure to reset as soon as repairs are completed, otherwise increased costs will be incurred.

The electrical Booster-Heater (BSH) is activated if a fault in the heat pump outdoor unit has occurred for longer than 1 h and has been detected.

[7-04] - Minimum ambient temperature

This parameter defines the minimum outdoor temperature at which the heat pump will still operate.

[E] - Display of device information

These parameters enable the display of various device information about the DAIKIN EKHHP heat pump indoor unit.

No settings can be made in this parameter.

6.5.3 Factory parameter settings

Code 1	Code 2	Parameter name	Factory default settings			
			Value	Range	Increment	Unit
0	00	Hot water setpoint temperature for "High output" mode.	55	40 - 60	1	°C
	01	Hot water setpoint temperature for thermal disinfection	65	50 - 75	1	°C
	02	Keep warm function switch-on temperature	37	35 - 55	1	°C
	03	Keep warm function switch-off temperature	50	35 - 55	1	°C
	04	Keep warm function activation/deactivation	0	0 - 1	1	—
2	00	Start day for thermal disinfection (legionella protection)	Fr	Every day	—	—
	01	Automatic thermal disinfection when the hot water heat pump is switched on	0	0 - 1	0	—
	02	Start time for thermal disinfection	23:00	0:00 - 23:00	1:00	h
	03	Automatic thermal disinfection in "Stand-by" mode	0	0 - 1	1	—
	04	Thermal disinfection temperature holding time [0-01]	10	5 - 60	1	Min.
3	00	Auto restart after a power failure	1	0 - 1	1	—
	01	Access authorisation	3	2, 3	1	—
	02	Hot water target temperature > 60 °C	0	0 - 1	1	—
4	03	Simultaneous operation of the electric booster heater (BSH) and the heat pump	0	0 - 3	1	—
6	00	Switching hysteresis of the heat pump	13	2 - 20	1	K
	01	Heat pump switch-off temperature difference	0	0 - 15	1	K
	02	ECO schedule timer (BSH)	120	5 - 120	1	Min.
	03	"High output" mode priority	1	0 - 1	1	—
	04	Levels in "Low noise" mode:	1	1 - 3	1	—
7	00	Behaviour in high/low tariff (HT/NT)/Smart Grid (SG) mode	0	0 - 3	1	—
	01	No application	2	—	—	—
	02	Setting for Emergency operation (use of BSH allowed or not)	0	0 - 1	1	—
	04	Lower outdoor temperature limit for heat pump operation	-15	-25 - 10	1	°C
C	00	No application	0	—	—	—
E	Display unit information					
	00	Software version	Information value, fixed.			
	01	EEPROM version	Information value, fixed.			
	02	Model ID	Information value, fixed.			

These parameters are only accessible in "Advanced Mode" (see chap. 6.5.1).

Tab. 6-4 Overview of parameter settings

6.5.4 Individual parameter settings

Parameter no.	Value		Date	Comments
	Old	New		

Tab. 6-5 Individual changes of the parameters

6.5.5 Individual switching time settings

"ECO"/"Automatic" modes

Day	Switching time no.	1	2	3	4	5
MON	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C
TUE	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C
WED	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C
THU	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C
FRI	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C
SAT	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C
SUN	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
	Temperature	°C	°C	°C	°C	°C

Tab. 6-6 Individual settings for "ECO"/"Automatic" modes

"Low noise" mode

Day	Switching time no.	1	2	3	4	5
MON - SUN	Switching time	:	:	:	:	:
	Action (on/off)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF

Tab. 6-7 Individual settings for "Low noise" mode

"High output" mode cannot be activated via switching times.

7 Malfunctions and error codes

WARNING

Touching live parts can result in an **electric shock** and lead to potentially fatal injuries and burns.

- Before beginning work on live parts, **disconnect all of the systems circuits from the power supply** (switch off external main switch, disconnect fuse) and secure against unintentional restart.
- The electrical connection and working on the electrical components should only be performed by **electrical engineers** in compliance with valid standards and guidelines as well as the specifications of the energy supply company.
- The **equipment covers and maintenance opening covers** must be **re-fitted** immediately after completion of the work.

7.1 Malfunctions

Malfunction	Possible cause	Possible solution
System not working (Operation LED off, nothing on the display)	No mains voltage	● Switch on the system's external main switch. ● Switch on the system fuse(s). ● Replace the system fuse(s).
Switching time programs are not operating or programmed switching times are carried out at the wrong time.	The weekday and time are not correctly set.	● Set the weekday. ● Set the time. ● Check the assignment of the weekday to switching times.
	Switching time function deactivated	● Activate the switching time function (⏲⊗ key).
	During a switching time, the user made a manual setting (e.g. changed the target temperature, changed the operating mode)	● Activate the switching time function again (⏲⊗ key).
The controller does not respond to inputs	The controller's operating system has crashed.	● RESET the controller. To do this, disconnect the system from the power supply for at least 10 s and then switch it on again.
Display values are not updated	The controller's operating system has crashed.	● RESET the controller. To do this, disconnect the system from the power supply for at least 10 s and then switch it on again.
Hot water does not heat up enough	Water flow too low.	● Check that all stop valves of the water circuit are completely open. ● Air in the hot water extraction circuit, bleed.
	Target value ranges too low.	● Check parameter [0-00], increase if necessary. ● Set hot water target temperature too low, increase manually. ● Check parameter [6-00], decrease if necessary.
	Draw-off rate too high.	● Reduce the draw-off rate, limit throughput. ● Check the operating mode, select another operating mode if necessary (e.g. "High output").

7 Malfunctions and error codes

Malfunction	Possible cause	Possible solution
Hot water does not heat up enough	Integrated electric Booster-Heater (BSH) not switched on.	● "ECO" operating mode selected, select another operating mode if necessary (e.g. "Automatic", "High output"). ● Check parameter [4-03], adjust if necessary. ● Check the mains supply of the booster heater (BSH). ● Thermal contactor (STB) on the booster heater (BSH) has triggered. Inspection and repair by a DAIKIN heating specialist.
	Switching time program settings	● Check the switching times, provide sufficiently long active times. ● Activate the keep warm function (parameter [0-04]) to prevent complete cooling. ● Increase the setpoint of the keep warm function (hot water heat pump starts at parameter [0-02] - hysteresis).
	The electricity supply company has sent the high tariff signal.	● Wait for another low tariff signal that will put the hot water heat pump back into normal operation.
	With external heat generator only: External heat generator has been set with priority over the heat pump, but cannot ensure sufficient heat supply.	● Check parameter [7-00], adjust if necessary. ● Check the settings of the external heat generators.
	Only with EKHHP500A*2V3 with optional external heat generator: Optional external heat generator switched on, but cannot ensure sufficient heat supply.	● Check the heat supply through the optional auxiliary heater, increase if necessary.
	Incorrect sensor values transmitted to the controller.	● Check temperature sensor t_{DHW} and replace if necessary.
Hot water does not warm up	System switched off (no display, Operation LED on)	● Switch on the system (key).
	Draw-off rate too high.	● Reduce the draw-off rate, limit throughput. ● Check operating mode, select another operating mode if necessary (e.g. "High output").
	System is in standby due to switching time programming	● Check the programmed switching times. ● Deactivate the switching time program.
	Settings for high/low tariff mains connection do not correspond to settings for electrical connections.	● HT/NT function is active and parameter [7-00] is set incorrectly. Other configurations are also possible. However, they must match the type of high/low tariff mains connection. ● Smart Grid function is active and the connections are set incorrectly. ● Have the hot water heat pump checked by a DAIKIN heating specialist.
	Defective heat pump outdoor unit	● Check the heat pump outdoor unit. ● Short-term: Activate emergency operation, [7-02] = 1, "Automatic" mode. ● Inspection and repair by a DAIKIN heating specialist.

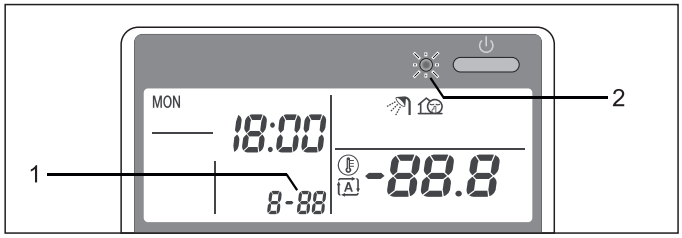
Tab. 7-1 Possible malfunctions on the EKHHP

7.2 Error codes

The electronic controller of the DAIKIN EKHHP shows error codes on the display. In addition to the error code, the LED on the controller flashes (see fig. 7-1).

To clear the error code:
- Press the ⏻ key for at least 5 s.

If the error occurs again:
- Inspection and repair by a DAIKIN heating specialist.



1 Error code
2 Flashing LED

Fig. 7-1 Error display

Error code	Component/Description
A1	EKHHP PCB fault
A5	Refrigerant temperature t_{DC} too high
AC	STB Booster-Heater (BSH) has triggered
E1	Heat pump outdoor unit PCB fault
E6	Refrigerant compressor blocked
E7	Heat pump outdoor unit fan lock
E8	Heat pump outdoor unit current too high
EC	Temperature t_{DHW} in hot water tank too high
F3	Discharge temperature on heat exchanger of the heat pump outdoor unit too high
H0	Refrigerant compressor sensor
H6	Refrigerant compressor sensor
H9	Outdoor temperature sensor
HC	Storage tank temperature sensor
J3	Refrigerant compressor outlet temperature sensor
L3	Electrical components
L4	Heat pump outdoor unit heat exchanger temperature too high
L5	Electrical components
P4	Heat pump outdoor unit heat exchanger thermistor defective
U0	Refrigerant loss
U2	Supply voltage lost
U4	Heat pump indoor unit/heat pump outdoor unit communication lost
U5	Controller communication fault
UA	Heat pump indoor unit/heat pump outdoor unit communication loss

Tab. 7-2 Possible error codes on the DAIKIN EKHHP controller

8 Service and maintenance

8.1 General

Regular inspection and maintenance of the DAIKIN EKHHP reduces energy consumption and ensures a long life and trouble-free operation.

RISK OF ENVIRONMENTAL DAMAGE!

Important information regarding the refrigerant used.

The overall heat pump system contains refrigerants with fluorinated greenhouse gases that are harmful to the environment when released.

Coolant type: R410A
GWP* value: 2087.5

** GWP = Global Warming Potential*

- Work on stationary refrigeration systems (heat pumps) and air conditioning systems only by persons who hold a certificate of competence for the European area in accordance with the F-Gas Certification Regulation pursuant to (EU) no. 2015/2067.
- Enter the total filling quantity of refrigerant on the label supplied on the external heat pump unit (for notes, see Installation instructions for the heat pump outdoor unit).
- Never allow refrigerant to escape into the atmosphere - always extract and recycle with a suitable recycling device.

Have the inspection and maintenance carried out by authorised and trained HVAC engineers once a year, ideally **before the heating period**. Malfunctions during the heating period can therefore be prevented.

DAIKIN recommends an inspection and maintenance contract to ensure regular inspection and maintenance.

Legal requirements

In terms of the F-gases regulations (EU) no. 517/2014 Articles 3 and 4, operating companies (or owners) must service their fixed-installation refrigerant units at regular intervals, check for leaks and rectify any possible leaks within as short a period as possible.

All installation, maintenance and repair work on the refrigerant circuit must be documented, e.g. in the operating manual.

For **DAIKIN heat pump systems**, the **operating company has the following obligations**:

The European statutory inspection period applies to heat pumps from a total system charge with refrigerant of 3 kg or, from 01/01/2017, from a total charge of 5 t CO_2 equivalent (for R410A from 2.4 kg).

However, DAIKIN recommends concluding a maintenance contract including documentation of the work carried out in the operating manual to safeguard warranty claims, even for systems for which there is no legal obligation to check for leakages.

- With a **total filling quantity** of the system with refrigerant of **3 kg – 30 kg** or from **6 kg** in hermetic systems and from 01/01/2017 with a total filling quantity of refrigerant of 5-50 t CO_2 equivalent or from 10 t CO_2 equivalent in hermetic systems:
  ➔ **Inspections** by certified personnel at intervals of no more than **12 months** and documentation of the work carried out in accordance with the valid regulation. This documentation must be kept for at least 5 years.

Work on stationary refrigeration systems (heat pumps) and air conditioning systems only by persons who hold a certificate of competence for the European area in accordance with the F-Gas Certification Regulation pursuant to (EU) no. 2015/2067.

- Up to 3 kg or 5 t CO_2 equivalent total refrigerant charge: Category II certificate of qualification
- From 3 kg or 5 t CO_2 equivalent total refrigerant charge: Category I certificate of qualification

Tests performed during the annual inspection

- General condition of the heating system, visual inspection of connections and pipes.
- Check of the water pressure for the cold water supply (< 6 bar), pressure reducer installation or adjustment as required.
- Visual inspection of storage tank water container fill level (see chap. 8.3).
  Top up water if required (see chap. 8.3.1) and also determine and remedy the cause for the low water level.

Maintenance work to be carried out annually

- External cleaning of the storage tank and the protective cover.
- Replacement of the wearing parts if required).
- Documentation of the maintenance work in the operating manual.
- Before restart of the DAIKIN EKHHP after maintenance work, the conditions for start-up according to chap. 4.1 must be checked and fulfilled.

8.2 Inspection and maintenance tasks

DANGER

Touching live parts can result in an electric shock and lead to potentially fatal injuries and burns.

- Before beginning work on the DAIKIN EKHHP, disconnect it from the power supply (fuse, switch off the main switch) and secure against unintentional restart.

Cleaning the protective cover and storage tank

- The low-maintenance plastic only needs to be cleaned with a soft cloth and a mild detergent.
- Do not use any cleaners with aggressive solvents (damage to the plastic surface may occur).

8.3 Periodic checks

WARNING

Improperly performed work on live components can endanger the life and health of persons and impair the function of the DAIKIN EKHHP.

- Rectification of damage to live components of the DAIKIN EKHHP must only be carried out by heating engineers authorised and recognised by the energy supply company.

Due to the design, part of the unpressurised storage water can evaporate over a certain period of time. This process does not constitute a technical fault, but is rather a physical property which requires periodic checking and correction of the water level by the operating company if necessary.

1 Remove the cover (see chap. 3.4).

2 Visual check of the water storage tank level (filling level indicator)
➔ Replenish water if required (see chap. 8.3.1 or 8.3.2) and also determine and remedy the cause for the low water level.

CAUTION

Filling the storage tank with a too high water pressure or too high flow speed can cause damage to the DAIKIN EKHHP.

- Only fill with a water pressure < 6 bar and a flow speed < 15 l/min.

3 Check the overflow hose connection and drain section for leakage, unobstructed flow and gradient.

4 Check all water and refrigerant carrying components and connections for leaks and integrity. If damaged, determine the cause and change the damaged parts.

5 Check all electrical components, connections and pipes. Repair damaged parts.

UK only! **CAUTION**

If filling or topping up the storage tank is done by means of the boiler filling and drain valve, a temporary filling loop must be used with the appropriate backflow prevention device in accordance with clause G24.2, Guidance to the Water Supply (Water Fittings) Regulations 1999.

8.3.1 Filling, refilling the storage tank - without installed solar system

Observe the notes on the water connection and water quality according to chap. 1.2 and 3.7.

Air purge:

When filling the unpressurised storage tank, it is bled via the safety overflow that must be connected to the waste water installation in such a way that it cannot be shut off (see chap. 3.4).

1 Connect the **charge hose** with non-return valve (1") **to** the **"p=0 solar feed" connection** (see fig. 8-1, **item 1**).

2 Fill the storage tank of the DAIKIN EKHHP **until water emerges at the connection** (fig. 8-1, **item 23**) that was connected **as a safety overflow**.

3 Remove the charge hose with non-return valve (1").

8.3.2 Filling, refilling the storage tank - with optional KFE filling connection or with installed DrainBack solar system p=0

1 Without solar system: KFE fill connection (accessory KFE BA) to the fill and drain connection of the DAIKIN EKHHP (see fig. 2-1, item 10)
or
with solar system: KFE fill connection (accessory KFE BA) to the connection bracket of the p=0 control and pump unit (EKSRPS4A).

2 Connect the **charge hose** with non-return valve (1/2") **to** the previously installed **KFE cock**.

3 Fill the storage tank of the DAIKIN EKHHP **until water emerges at the connection** (fig. 8-1, **item 23**) that was connected **as a safety overflow**.

4 Remove the charge hose with non-return valve (1/2").

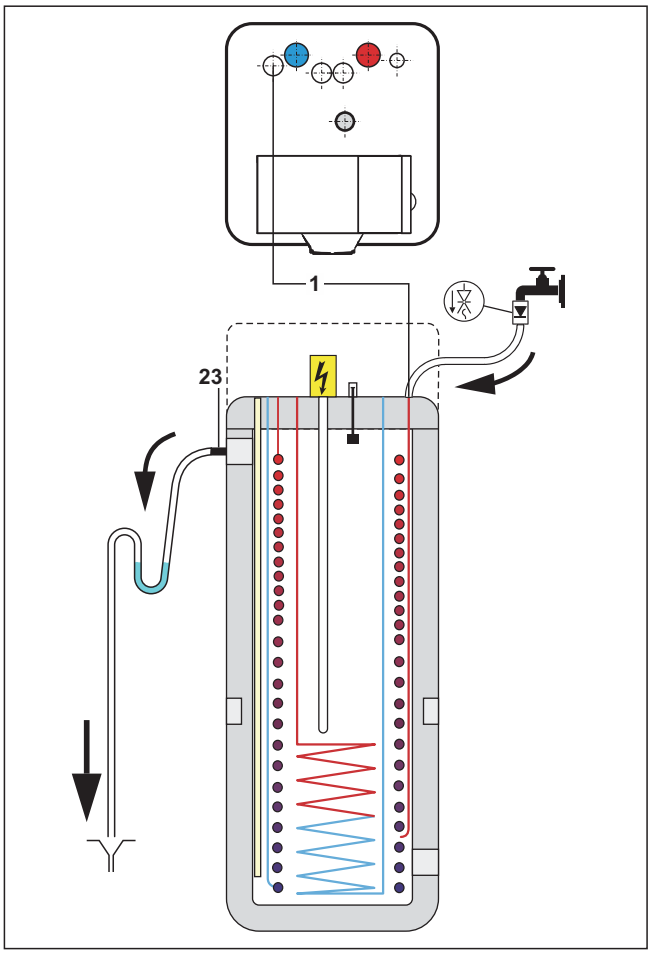


Fig. 8-1 Filling the storage tank - without solar system

9 Technical data

9.1 Basic data

Type				EKHHP300A*2V3	EKHHP500A*2V3
Can be used with heat pump outdoor unit				ERWQ02AAV3	
Dimensions and weights			**Unit**		
Dimensions (H x W x D)			mm	1,772 x 595 x 615	1,778 x 790 x 790
Tilt dimension			mm	1,900	2,050
Empty weight			kg	70	80
Storage tank					
Maximum permissible storage water temperature			°C	85	
Total storage capacity			litres	294	477
Drinking water heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger		litres	25.6	27.3
	Maximum operating pressure PMW		bar	6	
	Domestic water heat exchanger surface		m^2	5.1	5.5
Pressurised solar heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger		litres	—	10.0
	Heat exchanger surface area		m^2	—	2.0
Thermal output data [1]	Hot water quantity without reheating at a consumption rate of 10 l/min (T_S = 45 °C)		litres	98 [2]	146 [2]
	Hot water quantity without reheating at a consumption rate of 10 l/min (T_S = 50 °C)		litres	169 [2]	264 [2]
	Hot water quantity without reheating at a consumption rate of 10 l/min (T_S = 55 °C)		litres	229 [2]	367 [2]
Pipe connections [3]	Cold and hot water		inches	1" AG	
	Solar connections	p=0	inches	1" IG	
		+p	inches	—	3/4" IG + 1" AG
Refrigerant circuit					
Number of circuits			—	1	
Storage tank charging heat exchanger (stainless steel 1.4404)	Volume		litres	1.01	
	Heat exchanger surface area		m^2	2.5	
Pipe connections [3]	Number		—	2	
	Liquid line	Type	—	Flare connection	
		Outer Ø	inches	1/4" AG	
	Gas line	Type	—	Flare connection	
		Outer Ø	inches	3/8" AG	
Operating data					
Operating range	Hot water preparation without/with Booster-Heater (min/max)		°C	40 to 55/75	
Installation room ambient temperature			°C	2 - 35	
Heating output	Heat pump only (T_A = 7 °C/ T_S = 10 - 55 °C)		kW	2.2	
	Booster-Heater (BSH) only		kW	2	

Type			EKHHP300A*2V3	EKHHP500A*2V3
Electrical data				
Protection type		—	IP 21	
Voltage supply EKHHP	Phases	—	1	
	Voltage	V	230	
	Voltage range	V	Voltage ±10%	
	Frequency	Hz	50	
Mains connection [4]	Heat pump outdoor unit to EKHHP	—	4G3G (1 phase)	
	Booster-Heater (BSH)	—		
	Output BSH	kW	2.0	
	Protection type BSH	—	IPX4	

1) T_{CW} Domestic cold water inlet temperature = 10 °C
T_{DHW} Hot water draw-off temperature = 40 °C
T_S Storage tank target temperature (charging status prior to start of draw-off)

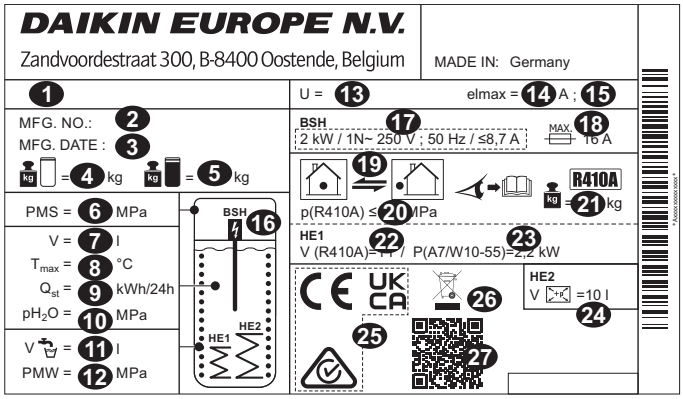
2) Charge hot water tank only with heat pump (without Booster-Heater).

3) AG Male thread
IG Female thread

4) Number of individual lines in the connector cable including protective earth conductor. The cross-section of the individual lines is dependent on the current load, the length of the connector cable and the respective legal provisions.

Tab. 9-1 Basic data DAIKIN EKHHP

9.2 Information on the type plate



1 Equipment type
2 Serial number (specify for complaints and inquiries)
3 Production date
4 Net weight
5 Total weight, filled
6 Max. permissible operating pressure PMS (heating)
7 Total storage capacity
8 Max. permissible operating temperature T_{max}
9 Standby heat expenditure in 24 hours at 60 °C (storage tank) Q_{st}
10 Operating pressure of storage water pH_2O
11 Nominal capacity of drinking water
12 Max. operating pressure PMW (plumbing)
13 Heat pump indoor unit nominal voltage U
14 Electrical power input elmax
15 Heat pump indoor unit protection type
16 Booster-Heater BSH
17 Power/voltage supply/max. power consumption Booster-Heater BSH
18 Safety device Booster-HeaterBSH
19 Refrigerant circuit
20 Max. operating pressure (refrigerant circuit)
21 Total refrigerant charge
22 Accumulator charging heat exchanger nominal capacity
23 Nominal capacity / A 7/W10-55
*24 Pressure solar heat exchanger nominal capacity (EKHHP500A*2V3 only)*
25 Conformity marking
26 Disposal marking
27 QR code (link to further product information)

Fig. 9-1 Type plate

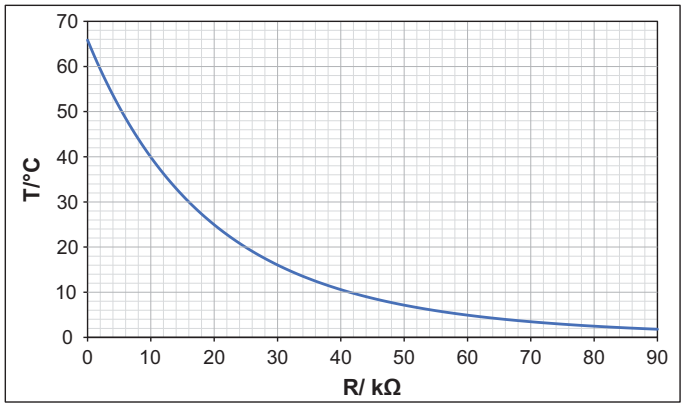
9 Technical data

9.3 Data sheets according to Ecolabel and Ecodesign regulation (EU) 812/2013 and (EU) 814/2013

DAIKIN water heater with heat pump		Outdoor unit	ERWQ02AAV3	
		Indoor unit	EKHHP300A*2V3	EKHHP500A*2V3
		Unit		
Domestic hot water preparation	Declared load profile	-	L	XL
(determined under average climatic conditions)	Class for domestic hot water preparation energy efficiency	-	A+	A+
Average climate conditions:	Water heating energy efficiency (η_{wh})	%	119	124
(design temperature = 7 °C)	Annual consumed electricity (AEC)	kWh	859	1,346
	Temperature control setting when placed on the market	°C	55	55
	Indoor sound power level (*)	dB(A)	39	39
	Exclusive operation at off-peak times possible	-	No	No
Colder climates:	Water heating energy efficiency (η_{wh})	%	108	106
(design temperature = 2 °C)	Annual consumed electricity (AEC)	kWh	951	1,580
Warmer climates:	Water heating energy efficiency (η_{wh})	%	140	149
(design temperature = 14 °C)	Annual consumed electricity (AEC)	kWh	730	1,125
Special precautions for assembly, installation and maintenance are described in the installation and maintenance instructions for the individual devices. Energy labels and product data sheets for other combinations, packages and other products can be found at "energylabel.daikin.eu". (*) Sound power level in heating operation measured according to EN 15036 for boilers and EN 12102 for heat pumps under the conditions specified in EN ISO 3746, accuracy class 3. This data is provided for the purpose of comparing energy efficiency values in accordance with Energy Labelling Regulation (EU) 2017/1369. For the correct selection of products for your application, please contact your specialist company. Depending on the application and the product selected, it may be necessary to install a supplementary auxiliary heater.				
Further data	Daily consumed electricity Qelec	kWh	4,035	6,251
	Sound power level(*) outdoors	dB(A)	61	61

Tab. 9-2 Product data sheet DAIKIN EKHHP

9.4 Temperature sensor



R *Resistance* ***T*** *Temperature*

Fig. 9-2 Resistance characteristic of the temperature sensors

T/ °C	R/ kΩ	T/ °C	R/ kΩ
0	65.85	50	7,144
5	51.06	55	5,918
10	39.91	60	4,928
15	31.44	65	4,124
20	24.95	70	3,467
25	19.94	75	2,928
30	16.04	80	2,484
35	12.99	85	2,116
40	10.58	90	1.810
45	8.67		

Tab. 9-3 Resistance values of the temperature sensor

9.5 Electrical connection diagram

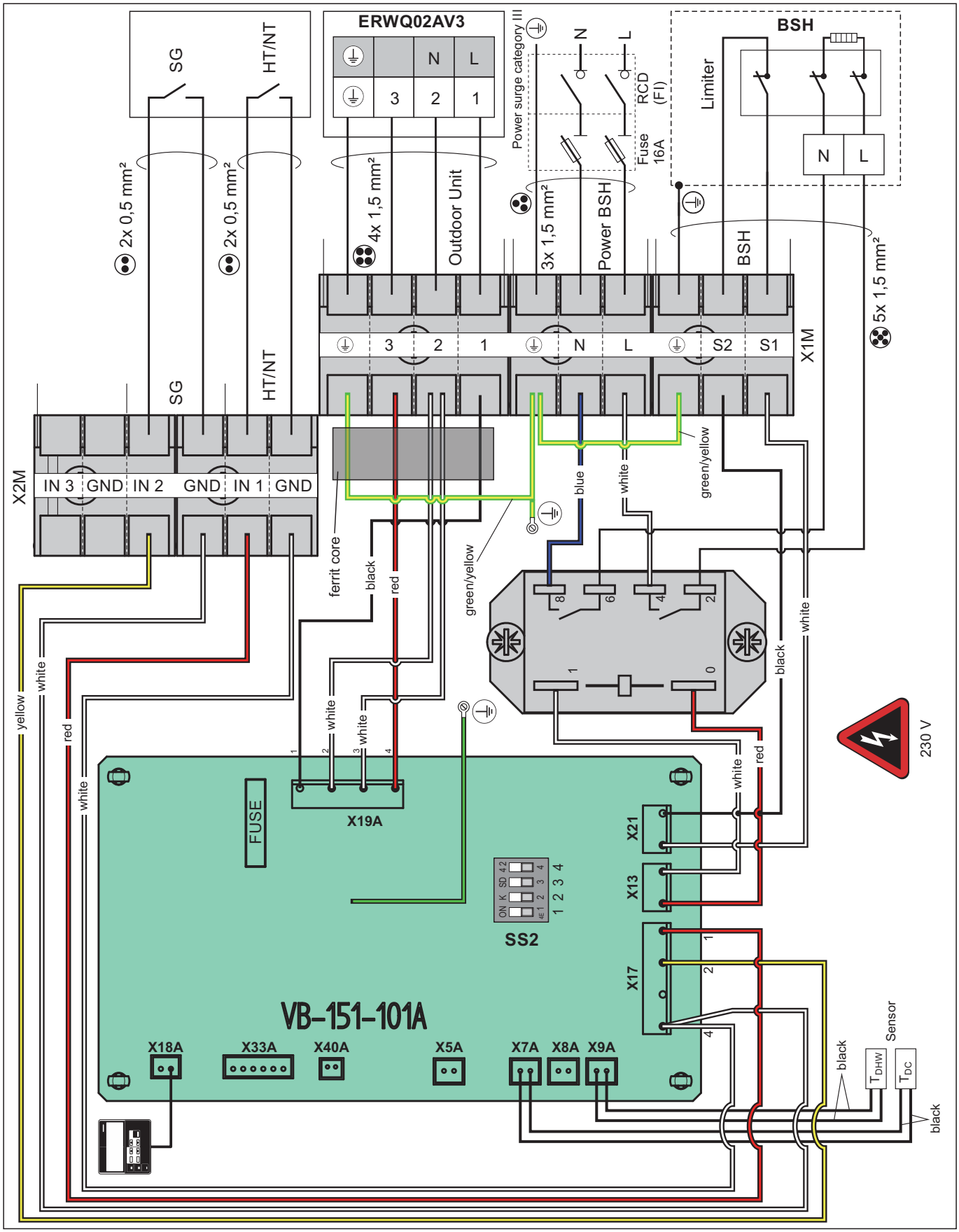


Fig. 9-3 Wiring diagram DAIKIN EKHHP

10 Notes

10 Notes

11 List of keywords

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