Installation and service instructions

for contractors

DHW heat pump
Type TDE1-50/TDE1-60
DHW heat pump with immersion heater EHE

DHW heat pump

6020407 NZ 8/2018

Please keep safe.

Safety instructions

Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

Danger
This symbol warns against the risk of injury.

Please note
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively intended for qualified contractors.

- Work on the refrigerant circuit may only be carried out by authorised refrigeration engineers.
- Work on electrical equipment may only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations to be observed

- National installation regulations
- Statutory regulations for the prevention of accidents
- Statutory regulations for environmental protection
- Codes of practice of the relevant trade associations
- All relevant safety regulations as defined by DIN, EN, DVGW, VDE and locally applicable standards

Safety instructions for working on the system

Working on the system

- Isolate the system from the power supply, e.g. by removing the separate fuse or by means of a mains isolator, and check that it is no longer live.
  Note
  In addition to the control circuit there may be several power circuits.
  Danger
  Contact with live components can result in severe injuries. Some components on PCBs remain live even after the power supply has been switched off.
  Prior to removing covers from the appliances, wait at least 4 minutes until the voltage has completely dropped out.
- Safeguard the system against reconnection.
- Wear suitable personal protective equipment when carrying out any work.

Danger
Hot surfaces and fluids can lead to burns or scalding.
- Before maintenance and service work, switch OFF the appliance and let it cool down.
- Never touch hot surfaces on the appliance, fittings or pipework.

Please note
Electronic assemblies can be damaged by electrostatic discharge.
Prior to commencing work, touch earthed objects such as heating or water pipes to discharge static loads.

Repair work

Please note
Repairing components that fulfil a safety function can compromise the safe operation of the system.
Defective components must be replaced with original spare parts.

Auxiliary components, spare and wearing parts

Please note
Spare and wearing parts that have not been tested together with the system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty.
For replacements, use only original or approved spare parts.

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Safety instructions (cont.)

Safety instructions for operating the system

What to do if water escapes from the appliance

Danger
If water escapes from the appliance there is a risk of electrocution.
Switch OFF the heating system at the external isolator (e.g. fuse box, domestic distribution board).

Danger
If water escapes from the appliance there is a risk of scalding.
Never touch hot heating water.

Index

Disposal of packaging

Please dispose of waste packaging in line with statutory regulations.

Symbols

Symbol	Meaning
	Reference to other document containing further information
	Step in a diagram: The numbers correspond to the order in which the steps are carried out.
	Warning of material losses and environmental pollution
	Live electrical area
	Pay particular attention.
	▪ Component must audibly click into place. or ▪ Acoustic signal
	▪ Fit new component. or ▪ In conjunction with a tool: Clean the surface.
	Dispose of component correctly.
	Dispose of component at a suitable collection point. Do **not** dispose of component in domestic waste.

The sequences of steps for commissioning, inspection and maintenance are summarised in the section "Commissioning, inspection and maintenance" and are identified as follows:

Symbol	Meaning
	Steps required during commissioning
	Not required during commissioning
	Steps required during inspection
	Not required during inspection
	Steps required during maintenance
	Not required during maintenance

Intended use

The appliance is intended solely for installation and operation in sealed unvented heating systems that comply with EN 12828, with due attention paid to the associated installation, service and operating instructions.

The appliance may only be used for heating DHW.

The range of functions can be extended with additional components and accessories.

Intended use presupposes that a fixed installation in conjunction with permissible system-specific components has been carried out.

Commercial or industrial use for purposes other than domestic hot water heating shall be deemed inappropriate.

Any usage beyond this must be approved by the manufacturer in each individual case.

Intended use (cont.)

Incorrect use or operation of the appliance (e.g. the appliance being opened by the system user) is prohibited and will result in an exclusion of liability. Incorrect use also occurs if the components in the heating system are modified from their intended function.

Note
The appliance is intended exclusively for domestic use, i.e. even users who have not had any instruction are able to operate the appliance safely.

Product information

The DHW heat pumps consist of the following components:
- Air/water heat pump module
- Integral enamelled DHW cylinder with peripheral heat exchanger
- Dry immersion heater for DHW heating

Type TDE1-50 requires a mains connection with 230 V and 50 Hz. Type TDE1-60 requires a mains connection with 230 V and 60 Hz.

Operating modes

The DHW heat pump is available for **recirculation air mode**, **outdoor air mode** and **recirculation air mode with air discharge to the outside**.

Recirculation air mode

In recirculation air mode, the ambient air (indoor air) in the installation room is used for DHW heating.
When DHW is being heated, the installation room is cooled and dehumidified.

Recirculation air mode with air discharge to the outside

Ambient air from the installation room is supplied to the DHW heat pump.
The ambient air that is cooled down during DHW heating is routed outdoors by the DHW heat pump.
This creates negative pressure in the installation room.
To compensate for the negative pressure, outdoor air must flow into the installation room. This requires a separate outdoor air aperture.

Note
The flow of outdoor air can make the temperature of the room drop significantly when in this operating mode, e.g. in winter.
This operating mode is therefore only possible in unheated rooms.

Outdoor air mode

Outdoor air is supplied to the DHW heat pump via a duct.
The minimum air intake temperature is –5 °C.
The outdoor air that is cooled down during DHW heating is routed outdoors by the DHW heat pump.

Preparing for installation

Transport and installation

! **Please note**
Impacts, compression and tensile loads can cause damage to the outside panels of the appliance.
Never put weight on the top or front of the appliance or cylinder jacket.

The DHW heat pump can be transported vertically or horizontally.

Note for horizontal transport
Stand the DHW heat pump upright. Allow the DHW heat pump to stand for at least 24 hours before commissioning.
Lifting straps (accessories) are available for transport.

Installation room requirements

- The installation room must be dry and free from the risk of frost.
- The intake air must be kept free from dust, grease and contamination through halogenated hydrocarbons (e.g. as contained in sprays, paints, solvents and cleaning agents).
- To prevent the transmission of structure-borne noise, never site the appliance on ceilings with wooden joists (e.g. in the attic).
- A separately fused standard power socket must be available.
- A condensate drain pipe must be available.
- Always maintain the minimum clearances for service and maintenance work.

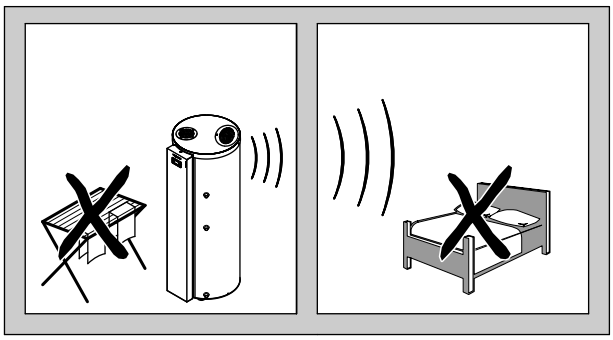

Fig. 1

Minimum clearances

Recirculation air mode

Note
If the room volume is < 20 m³, the specified appliance capacity cannot be guaranteed.

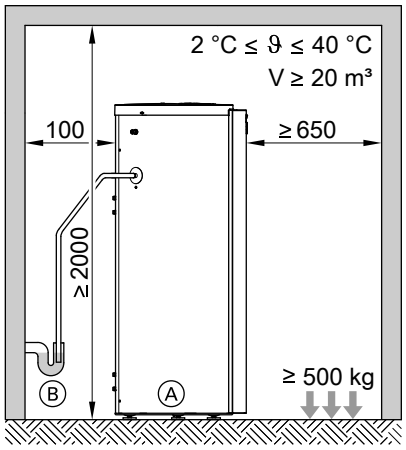

Fig. 2

Ⓐ DHW heat pump
Ⓑ Condensate drain pipe

Recirculation air mode with air discharge to the outside

Note
- *If the room volume is < 20 m³, the specified appliance capacity cannot be guaranteed.*
- *This operating mode is only permissible in unheated rooms.*

Preparing for installation (cont.)

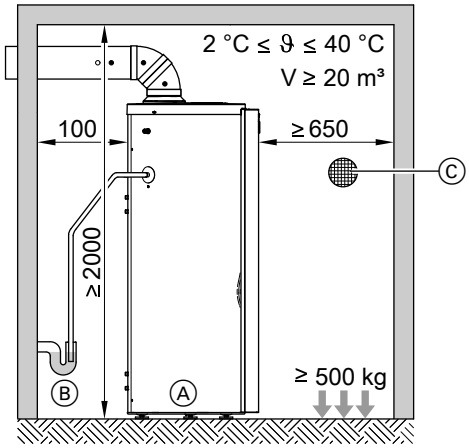

Fig. 3

Ⓐ DHW heat pump
Ⓑ Condensate drain pipe
Ⓒ Outdoor air aperture:
With outdoor air adaptor DN 160: ≥ DN 160
With outdoor air adaptor DN 180: ≥ DN 180

Minimum room height
When using ductwork made from EPP (accessories), the height of the room must be at least 2060 mm.

Outdoor air mode

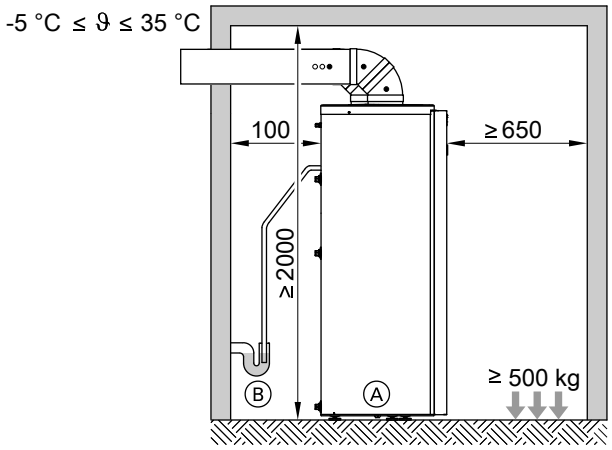

Fig. 4

Ⓐ DHW heat pump
Ⓑ Condensate drain pipe

Minimum room height
When using ductwork made from EPP (accessories), the height of the room must be at least 2060 mm.

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Preparing for installation (cont.)

Overview of connections

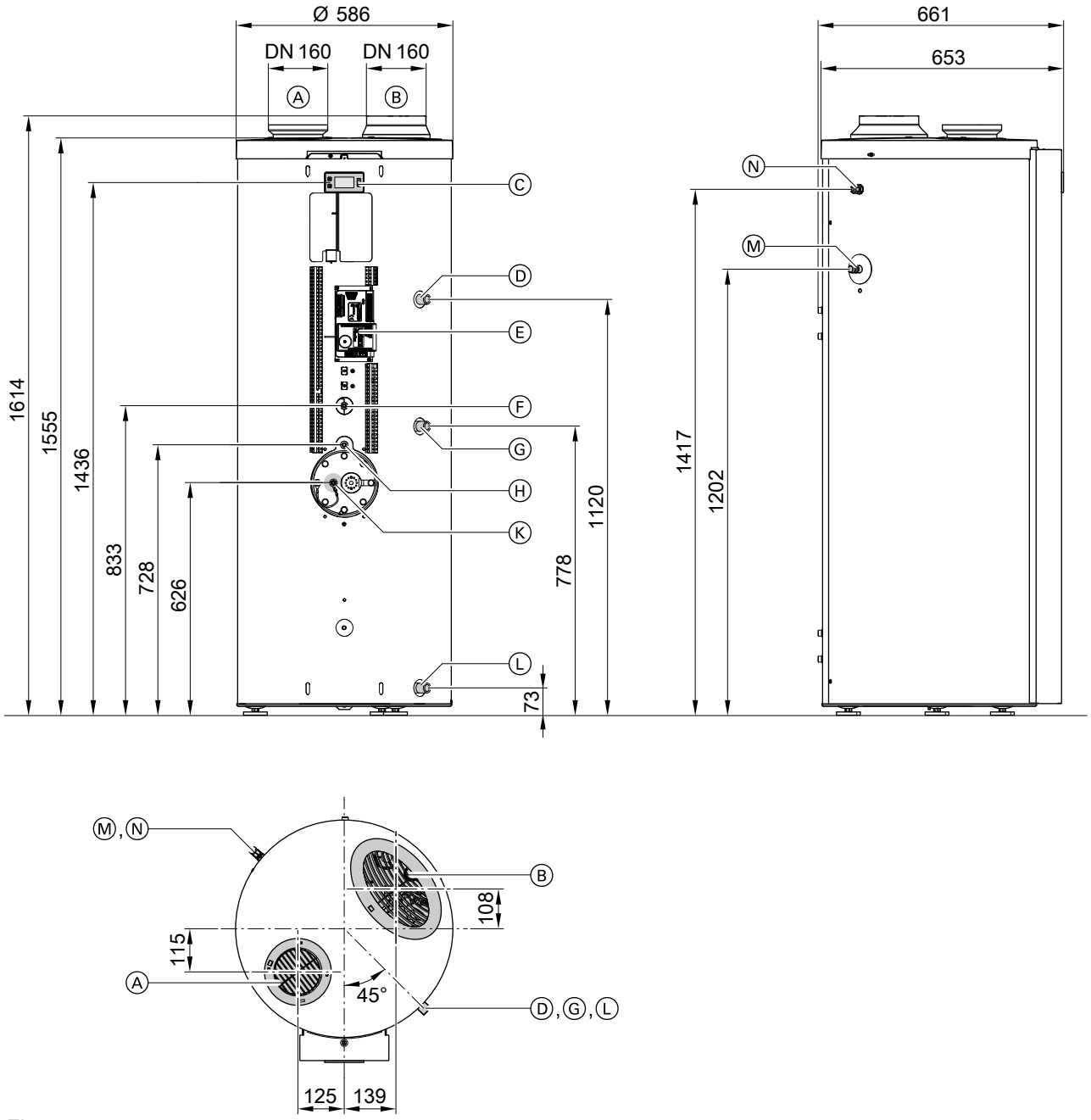

Fig. 5

Ⓐ Air discharge
Ⓑ Air intake
Ⓒ Programming unit
Ⓓ DHW R ¾
Ⓔ Heat pump control unit
Ⓕ Sensor well for draw-off profile L
Ⓖ DHW circulation R ¾
Ⓗ Sensor well for draw-off profile M

Factory-fitted temperature sensors:
- Cylinder temperature sensor
  and
- High limit safety cut-out for DHW heat pump

Ⓚ
- Inspection port
- Protective magnesium anode
- Impressed current anode (accessories)
- Immersion heater (standard delivery)

Ⓛ Cold water/drain R ¾
Ⓜ Condensate drain ∅ 20 mm
Ⓝ Power cable (3 m long)

Siting the DHW heat pump

! **Please note**
Incorrect handling can lead to irreparable damage to the DHW heat pump.
- **Never** drill into the sheet steel casing of the DHW heat pump.
- **Never** use the connectors as a transport aid.
- Carefully remove the DHW heat pump from the pallet. The EPS padding underneath can be removed for this.

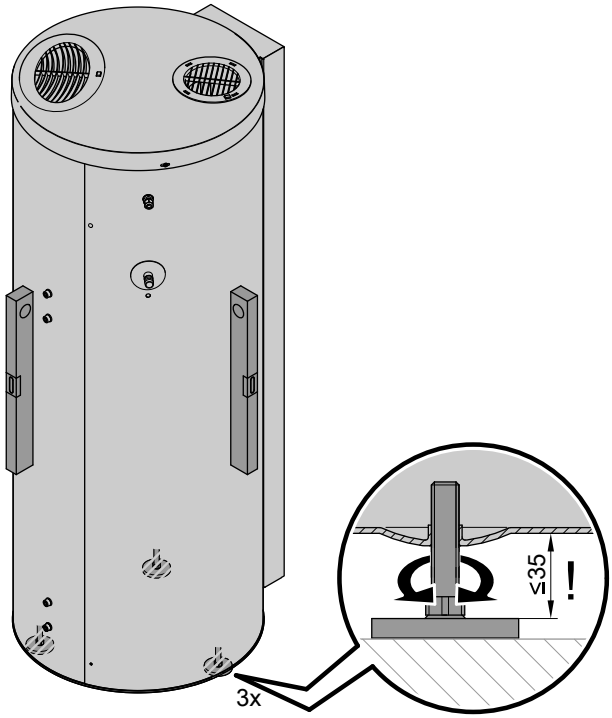

Fig. 6

Align the DHW heat pump horizontally.

Conversion to outdoor air mode

Note
*With outdoor air mode and outdoor temperatures below 6 °C, the max. DHW temperature of 62 °C is not reached in the **"ECO"** and **"SMART"** operating programs.*

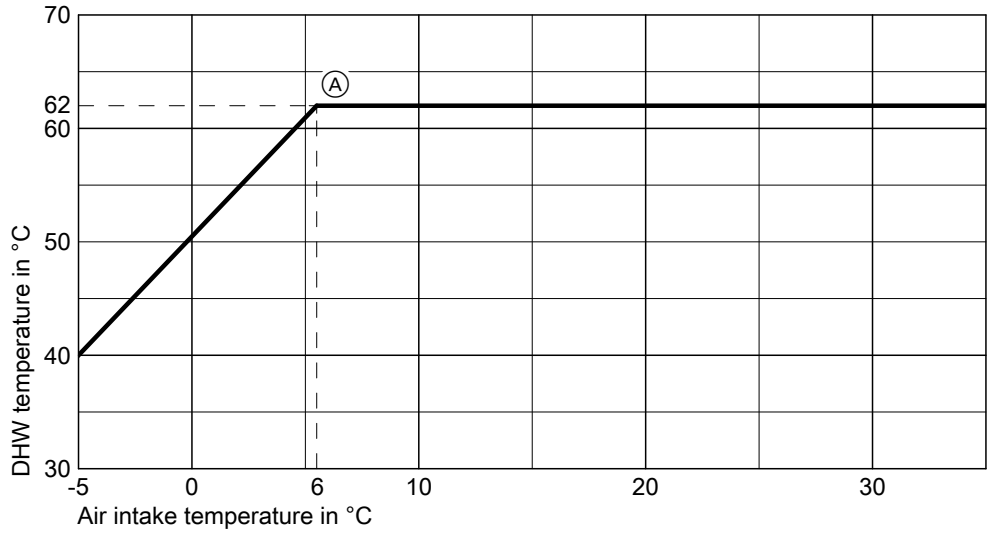

Fig. 7

Ⓐ *Max. DHW temperature that the heat pump can reach*

Mounting the outdoor air adaptor

Danger
Hot surfaces can cause burns.
- Switch OFF the appliance before maintenance and service work. Allow the appliance to cool down.
- Never touch hot surfaces on the appliance, fittings or pipework.

Danger
Fins with sharp edges can cause injury.
Wear protective clothing.

Outdoor air mode:

Outdoor air adaptors for supply and extract air apertures are fitted (steps 1 and 2 in Fig. 8)

Recirculation air mode with air discharge to the outside:

Outdoor air adaptor for the extract air aperture is fitted (step 1 in Fig. 8)

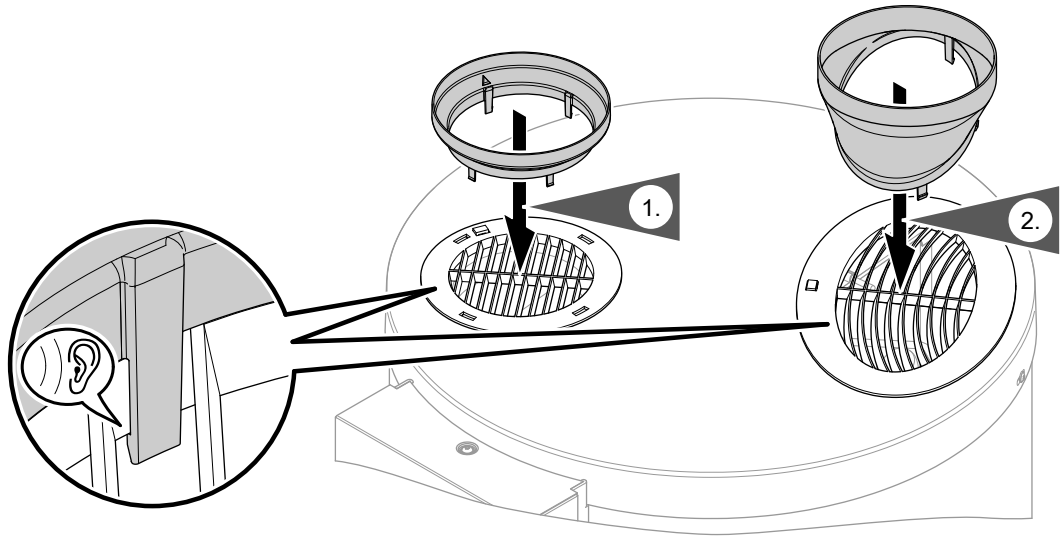

Fig. 8

Conversion to outdoor air mode (cont.)

Fitting the air intake/air discharge ductwork

System diagram

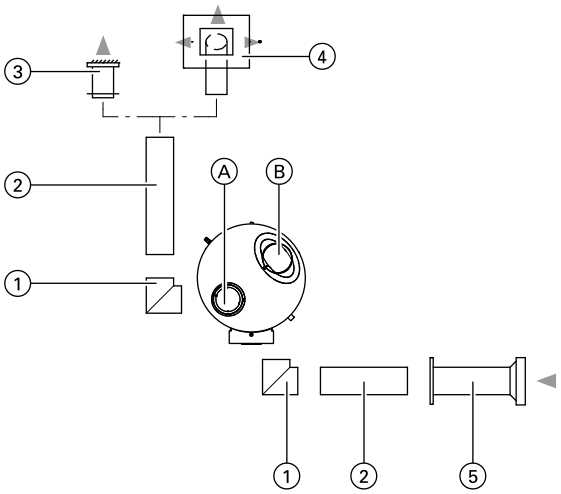

Fig. 9

Ⓐ Air discharge
Ⓑ Air intake

Ductwork			DN
①	**Bend**	90°	160
		45°	160
②	▪ **Folded spiral-seam tube** ▪ **Flexible pipe** ▪ **EPP pipe**	Length 3.0 m	160
③	**Outdoor air intake grille as air discharge duct wall outlet**		160
④	**Exhaust air roof outlet**	Round, with protective grille and insulation sleeve, for air discharge duct	160
⑤	**Supply air vent**	Wall/external connection, for air intake duct	160
	Check valve (on site)		

Conversion to outdoor air mode (cont.)

Notes on the ductwork

Please note
The simultaneous operation of open flue combustion equipment (e.g. an open fireplace) and the DHW heat pump in a space with combustion air interconnection results in dangerous negative pressure inside the room. Negative pressure can result in flue gases re-entering the room.

- **Never** operate the DHW heat pump simultaneously with **open** flue combustion equipment (e.g. an open fireplace).
- Operate combustion equipment exclusively in **room sealed** mode with a separate supply of combustion air. We recommend combustion equipment with general certification as **room sealed** combustion equipment, issued by the Deutsches Institut für Bautechnik DIBt [or local equivalent].
- Doors to boiler rooms where the combustion air supply is not interconnected with the living space must be airtight and must be kept shut.

Note
In recirculation air mode with air discharge to the outside, ensure an adequate supply of fresh air to the installation room (on site), e.g. via separate vents (min. DN 160).

- Thermally insulate the ductwork with vapour diffusion-proof material.
- Always route the ducts for air intake and air discharge with a 2 to 3° fall, so that rain and condensate can drain away to the outside.
- Ensure air intake temperatures from -5 to 35 °C.
- Maximum permissible total pressure drop Δp_{total} (ductwork and appliance): 100 Pa
- Fit silencers to prevent flow noise.
- Ducts, wall outlets and connections to the DHW heat pump can be installed using anti-vibration insulation to reduce noise (see diagram).

Connections and installation options which are not permissible:

- Connection of kitchen extractor hoods to the ductwork
- Installation of a DHW heat pump with recirculation air mode in a heated room
- Connection of the air intake duct to a mechanical ventilation system
- Connection of the air intake duct to an air/geothermal heat exchanger
- Connection of the air intake duct to a tumble dryer
- Reversed connections (air intake to the outside and air discharge to the inside)
- Installation of the DHW heat pump in an attic
- Installation of the DHW heat pump in dusty rooms
- Operation of the DHW heat pump in conjunction with an open flue boiler

Anti-vibration insulation

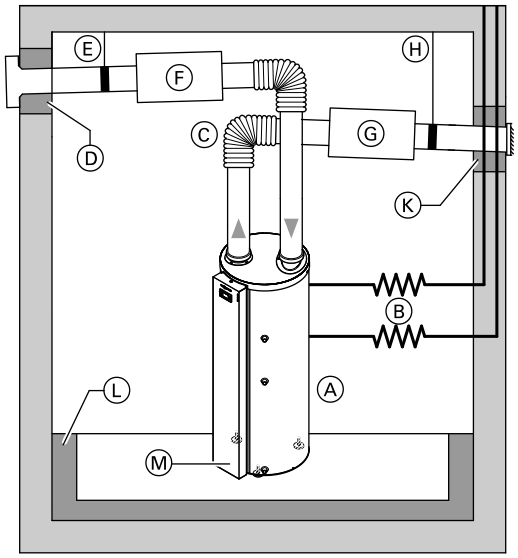

Fig. 10

Ⓐ DHW heat pump
Ⓑ Flexible hydraulic connections
Ⓒ EPP plastic pipes with thermal insulation or thermally insulated flexible pipes (min. DN 160) for air intake/air discharge ductwork
Ⓓ Anti-vibration mounts, wall outlet for air intake duct
Ⓔ Anti-vibration bracket for air intake duct
Ⓕ Air intake silencer
Ⓖ Air discharge silencer
Ⓗ Anti-vibration bracket for air discharge duct
Ⓚ Anti-vibration mounts, wall outlet for air discharge duct
Ⓛ Anti-vibration mounts for floor
Ⓜ Adjustable feet

Measures for minimising the pressure drop

- Use as few bends as possible.
- As far as possible, avoid elements that increase the pressure drop.
- Route the air intake duct above the air discharge duct if possible.

Arrangement of air intake and air discharge apertures

Please note
An "air short circuit" will result in the cooled, discharged air re-entering the appliance. This can result in reduced heat pump efficiency and defrosting problems.
Arrange and align the air intake and discharge apertures in such a way that no air short circuit occurs.

Conversion to outdoor air mode (cont.)

Air intake and air discharge duct through the wall

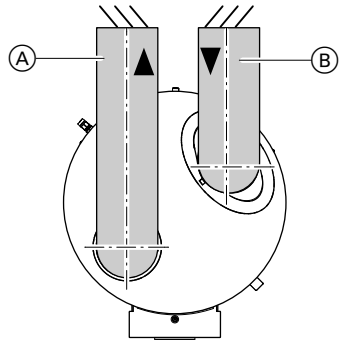

Fig. 11

Ⓐ Air discharge
Ⓑ Air intake

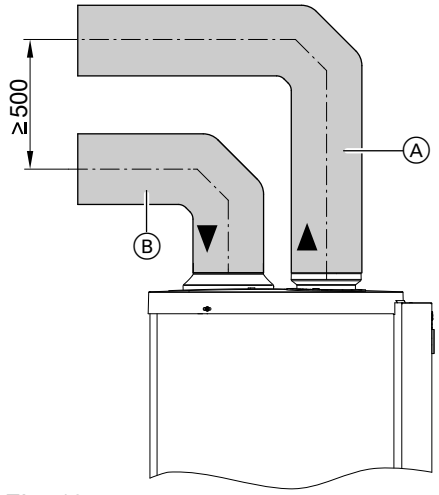

Fig. 12

Ⓐ Air discharge
Ⓑ Air intake

Air intake and air discharge duct through the roof

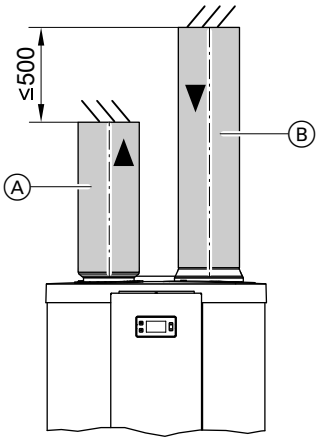

Fig. 13

Ⓐ Air discharge
Ⓑ Air intake

Installation sequence

1. Join individual duct sections together with connection pieces or coupling sleeves such that they are airtight (see system diagram on page 12).

   Please note
   Drilling swarf can cause faults in the DHW heat pump.
   Never allow drilling swarf to fall into the DHW heat pump air intake aperture or air discharge aperture.

2. Secure joints with self-tapping screws or blind rivets and make an airtight seal using cold shrink tape.

Connecting the condensate drain

When heating DHW, condensate forms on the inside of the heat pump module. This condensate needs to be routed via the condensate drain to a sewer.

1. Secure the condensate drain hose to the condensate drain connector with a hose clip.

   Please note
   Mechanical stress will damage the condensate connection and can cause leaks.
   Never twist the condensate drain connector on the appliance.

2. Route the condensate hose as a U-bend and connect with a constant fall and a pipe vent to the public sewage system or a neutralising system. If necessary, connect to an on-site trap. Ensure that the trap is connected securely.

   Note
   Connecting the condensate drain to rainwater downpipes is not permissible.

3. Check that the condensate can drain freely. Flush the condensate drain if necessary.

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Connecting the condensate drain (cont.)

4. Should the condensate drain run partially through unheated rooms, provide thermal insulation or a ribbon heater around the condensate drain on site.

> **!** **Please note**
> Freezing condensate in the heat pump leads to appliance damage.
> If necessary, provide thermal insulation or a ribbon heater around the condensate drain on site to protect against frost.

Condensate drain via trap

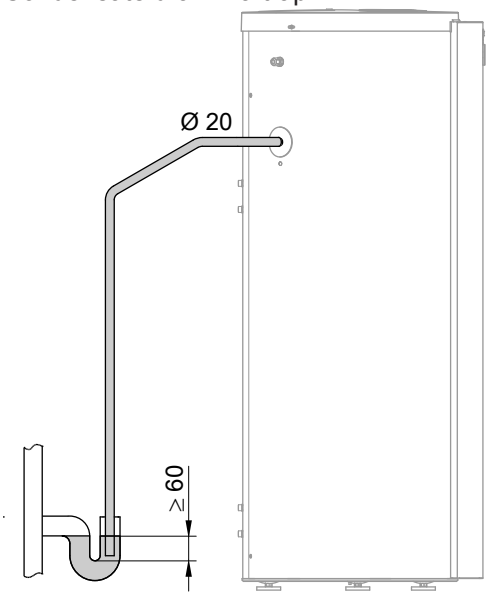


Fig. 14

Condensate drain via water seal

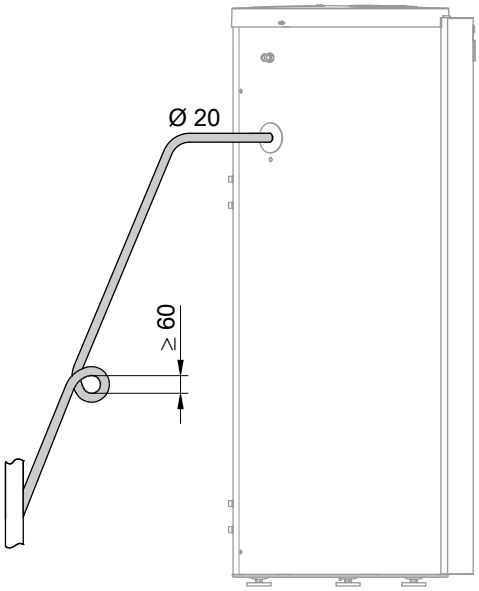


Fig. 15

Connections on the DHW side

The DHW heat pump is designed to be connected permanently to the mains water supply.
For connecting the DHW side, observe DIN 1988, DIN 4753 and EN 806.

Furthermore observe the following:
- Connect all pipework with detachable fittings.
- Equip the DHW circulation pipe with a DHW circulation pump, check valve and time switch. Gravity operation is possible only to a limited extent.

Connections on the DHW side (cont.)

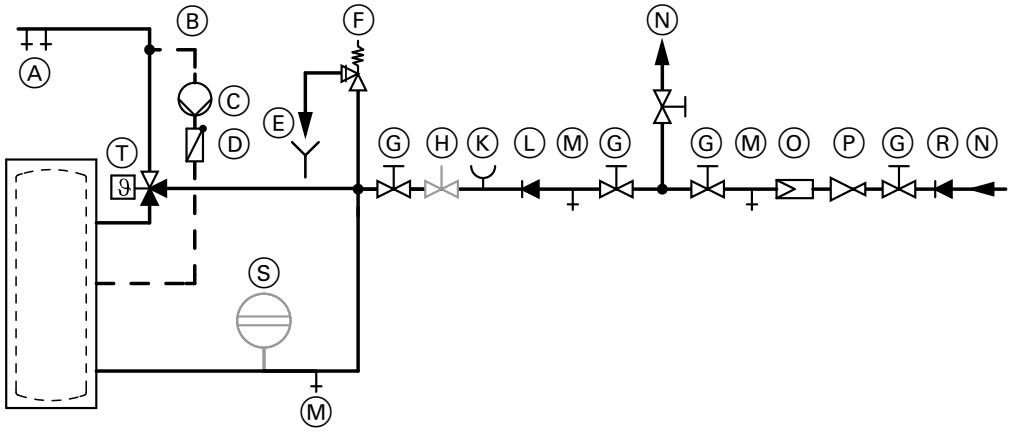


Fig. 16

Ⓐ DHW
Ⓑ DHW circulation pipe
If no DHW circulation pipe is connected, seal the connection provided for this purpose.
Ⓒ DHW circulation pump
Ⓓ Spring-loaded check valve
Ⓔ Visible discharge pipe outlet point (tundish)
Ⓕ Safety valve
Ⓖ Shut-off valve
Ⓗ Flow regulating valve
Ⓚ Pressure gauge connection
Ⓛ Non-return valve
Ⓜ Drain valve
Ⓝ Cold water
Ⓞ Drinking water filter
Ⓟ Pressure reducer
Ⓡ Non-return valve/pipe separator
Ⓢ Expansion vessel, suitable for potable water (no CH)
Ⓣ Automatic thermostatic mixing valve (on site, for DHW temperatures > 60 °C)

The safety assembly to DIN 1988 is available as an accessory. The safety assembly contains the following components:
- Shut-off valve
- Diaphragm safety valve
- Non-return valve and test connector
- Pressure gauge connector

Information on drinking water filter

According to DIN 1988-2, a drinking water filter must be installed in systems with metal pipework. We also recommend the installation of a drinking water filter when using plastic pipes, according to DIN 1988, to prevent contaminants entering the DHW system.

Information on the automatic thermostatic mixing valve

The DHW heat pump can heat drinking water to above 60 °C. Therefore, as a protection against scalding, an automatic thermostatic mixing valve must be fitted in the DHW pipe.

Information on the safety valve

A safety assembly to DIN 1988 (DN 15 (R ¾)/1 MPa) must be installed at the cold water connection.

If no safety assembly to DIN 1988 is installed, equip the system with a type-tested diaphragm safety valve as protection against excess pressure.

Installation information:
- Install the safety valve in the cold water line. Ensure it cannot be shut off from the DHW cylinder.
- There must be no constrictions in the pipework between the safety valve and the DHW cylinder.
- Never seal off the safety valve discharge pipe. Ensure that any expelled water is safely and visibly drained into a drainage system. Position a sign close to the safety valve discharge pipe, or ideally on the safety valve itself, with the following inscription: "For safety reasons, water may be discharged from the discharge pipe during heating. Never seal off."
- Install the safety valve above the top edge of the DHW heat pump.
- The safety valve must be installed with frost protection and connected to a discharge pipe with a continuous fall.

Technical requirements:
- Permissible temperature: 3 to 65 °C
- Permissible operating pressure: 1 to 10 bar (0.1 to 1 MPa)

Adjusting the draw-off rate

If there is high demand for DHW, it is possible to change the draw-off profile from M to L. To do this, remove the cylinder temperature sensor fitted at the factory and the high limit safety cut-out from sensor well Ⓐ and refit them in sensor well Ⓑ.

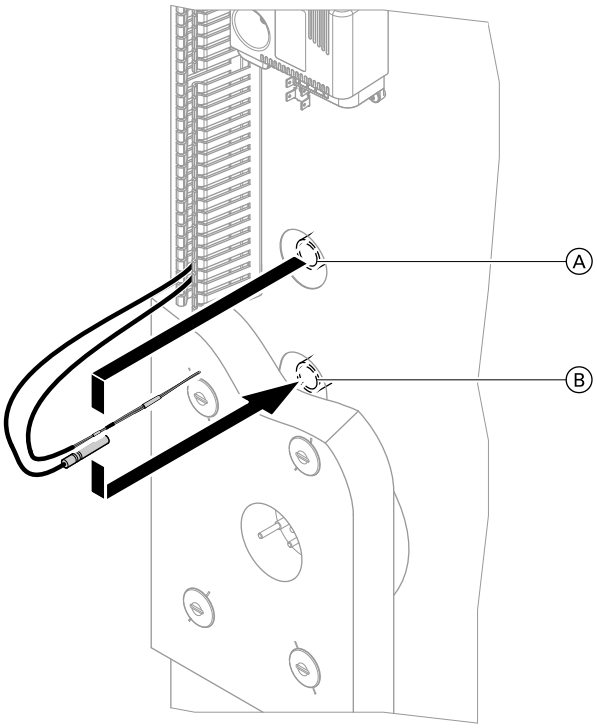


Fig. 17

Ⓐ Sensor well for draw-off profile M
Ⓑ Sensor well for draw-off profile L

Connecting to the power supply

Isolators for non-earthed conductors

- Install an isolator in the power cable to provide omnipolar separation from the mains for all active conductors, corresponding to overvoltage category III (3 mm) for full isolation. This isolator must be fitted in the permanent electrical installation in line with installation requirements, e.g. mains isolator or upstream circuit breaker.
- We additionally recommend installing an AC/DC-sensitive RCD (RCD class B ⏦⎓) for DC (fault) currents that can occur with energy efficient equipment.
- Residual current devices to DIN VDE 0100-530 selecting and sizing.
  RCD with a differential current not exceeding 30 mA.

⚠ **Danger**
Incorrectly executed electrical installations can result in injuries from electrical current and damage to the appliance.

Connect the power supply and implement all safety measures (e.g. RCD circuit) in accordance with the following regulations:

- IEC 60364-4-41
- VDE regulations
- Technical connection requirements specified by the local power supply utility
- Protect the power cable to the heat pump control unit with a fuse of max. 16 A.

⚠ **Danger**
The absence of system component earthing can lead to serious injury from electric current if an electrical fault occurs.
The appliance and pipework must be connected to the equipotential bonding of the building.

Connecting to the power supply (cont.)

Power cable

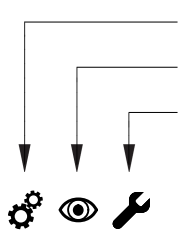
The DHW heat pump is fully wired with a 3-core power cable:
- H05VV-F 3G 1.5
- Colour: White
- Cores:
  - L1: Brown
  - N: Blue
  - PE: Green/yellow

A separately fused **standard socket** is required for the power supply:
- 230 V/50 Hz
- Max. fuse rating 16 A

Damaged connecting cables

If connecting cables to the appliance or accessories are damaged, replace them with special connecting cables. Use only suitable cables as replacements.

Steps - commissioning, inspection and maintenance



Page

Shutting down the DHW heat pump

Danger
Contact with live components can lead to serious injury from electric current.
Isolate the power supply prior to starting work on the appliance.
Be aware that the fan may run on.

Opening the DHW heat pump

Danger
Hot surfaces can cause burns.
- Switch OFF the appliance before maintenance and service work. Allow the appliance to cool down.
- Never touch hot surfaces on the appliance, fittings or pipework.

Opening the DHW heat pump (cont.)

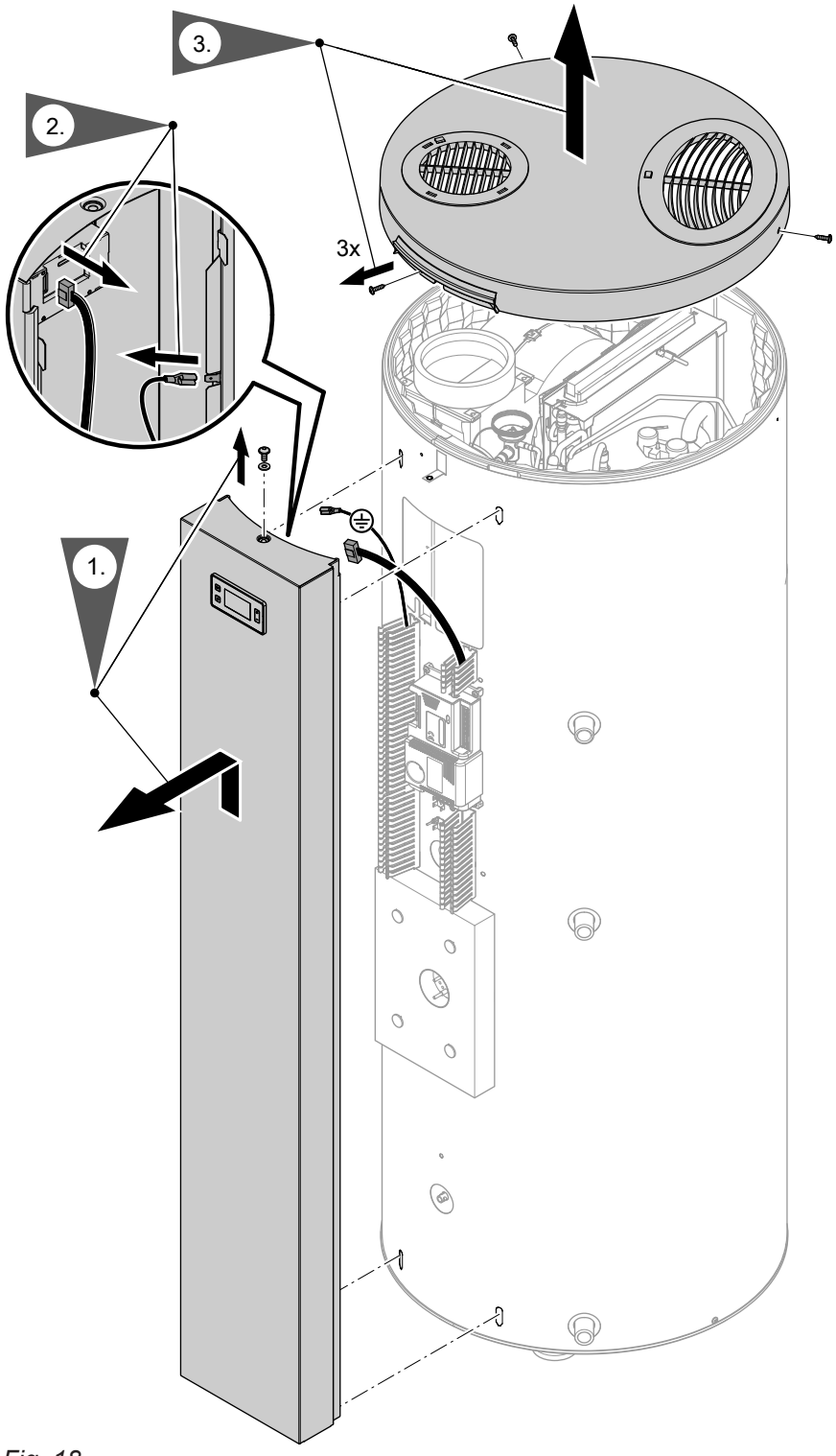


Fig. 18

Filling the DHW cylinder on the DHW side

1. **Completely** fill the DHW cylinder.
   Open the highest hot water draw-off point. Leave it open (under supervision) until only water is flowing out.
2. Check the fittings for leaks and tighten if necessary.

Checking the safety valve function

Check the function of the safety valve according to the manufacturer's instructions.

Note
The safety valve must be started up regularly for the following purposes:
- *To remove deposits.*
- *To check it is not blocked.*

Please note
A blocked safety valve can lead to leaks.
Never seal off the safety valve discharge pipe.
Ensure that any expelled water is safely and visibly drained into a drainage system.
Attach a label with the following inscription to the safety valve or, if necessary, near the discharge pipe: "For safety reasons, water may be discharged from the discharge pipe during heating. Never seal off."

Checking the condensate drain

1. Check the drain hose is seated correctly on the condensate drain.

   Note
   To prevent leaks, never twist the condensate drain connector on the appliance.

2. If necessary, clean the condensate pan (plastic base with integral drip tray).
3. Check that the condensate can drain freely. Flush the condensate drain if necessary.
4. Check for leaks.

Checking the refrigerant circuit for leaks

Danger
The refrigerant is a non-poisonous gas that displaces air. Unregulated escape of refrigerant in enclosed spaces can lead to breathing difficulties and suffocation.
- Ensure adequate ventilation in enclosed spaces.
- Always observe regulations and guidelines on handling this type of refrigerant.

Danger
Direct contact with refrigerant can be harmful to the skin.
Wear safety goggles and protective gloves when working on the refrigerant circuit.

Please note
Refrigerant can escape when working on the refrigerant circuit.
Work on the refrigerant circuit must **only** be carried out by a certified contractor (in accordance with EC 842/2006 and 303/2008).

1. Check the valves and visible solder joints for traces of oil.

   Note
   Traces of oil indicate a leak in the refrigerant circuit. Have the DHW heat pump checked by a refrigeration engineer.

2. Check the DHW heat pump interior for refrigerant leaks with a refrigerant leak detector or leak detection spray.

Cleaning the interior of the DHW cylinder

1. Empty the DHW cylinder via the drain outlet (see page 33).
2. Disconnect the DHW cylinder from the pipework to prevent cleaning agents and contaminants from entering the pipework.

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Cleaning the interior of the DHW cylinder (cont.)

3. Open the DHW heat pump (see page 21).

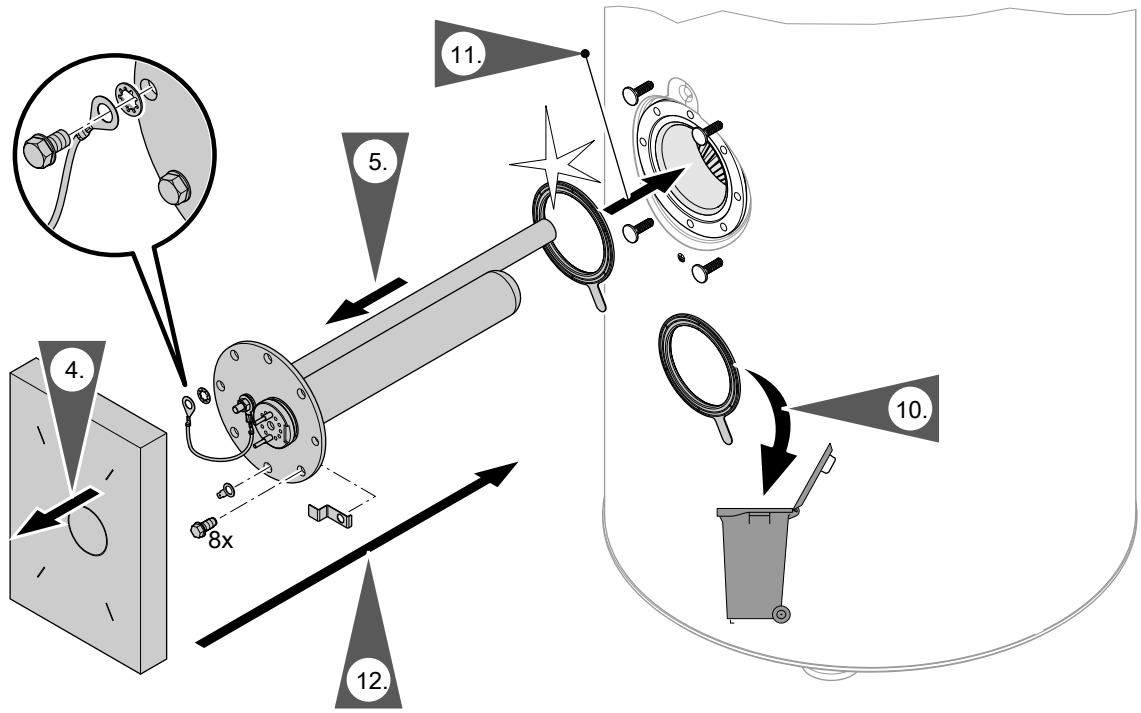

Fig. 19

6. Remove loose deposits manually or use a high pressure cleaner.

> **!** **Please note**
> Pointed, sharp and hard objects can damage the interior.
> Only use plastic cleaning tools for manual cleaning.

7. Use a chemical cleaning agent to remove hard deposits that cannot be removed with a high pressure cleaner.

> ⚠ **Danger**
> Cleaning agent residues can lead to **poisoning**.
> Observe the cleaning agent manufacturer's instructions.

> **!** **Please note**
> Cleaning agents containing hydrochloric acid can cause material damage.
> Never use cleaning agents containing hydrochloric acid.

8. **Fully** drain all cleaning agent.

9. Flush the DHW cylinder **thoroughly** after cleaning.

13. Connect the DHW cylinder to the pipework and fill (see page 21).

Checking and replacing the protective magnesium anode

- We recommend checking the function of the protective magnesium anode annually. This check can be carried out without interrupting operation. The earth current is tested with an anode tester.
- A maintenance-free impressed current anode is available as an accessory.

Testing the anode earth current with an anode tester

Open the DHW heat pump (see page 21).

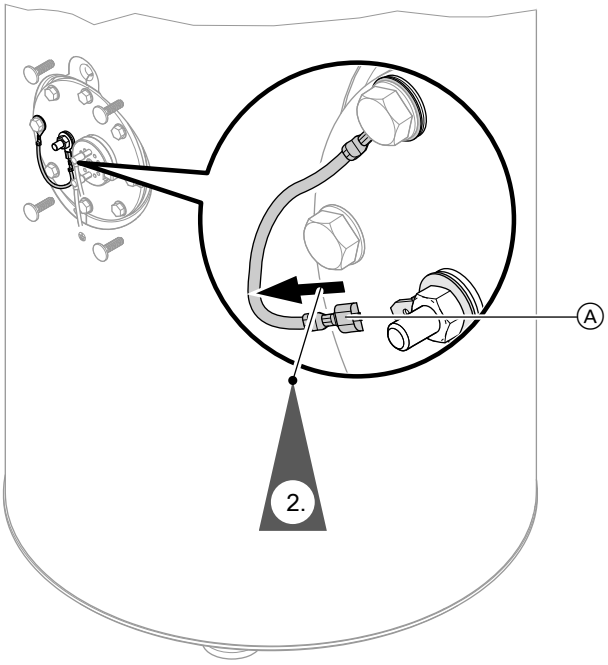

Fig. 20

3. Connect the tester in series between the tab and earth cable Ⓐ, and measure the current:
   - > 0.3 mA:
     Protective magnesium anode is functional.
   - < 0.3 mA:
     Visually inspect the protective magnesium anode.

4. If a visual inspection is necessary, drain the DHW cylinder down to the installed height of the protective magnesium anode via the drain outlet (see page 33).

   Note
   Replace the protective magnesium anode if the visual inspection indicates that it has been reduced to a diameter of 10 to 15 mm.
   A new protective magnesium anode has a length of 500 mm and a diameter of 26 mm.

Checking the fan for free rotation

⚠ **Danger**
Contact with the fans while they are operating can result in serious cutting injuries.
- Disconnect the appliance from the power supply and check that it is no longer live. Safeguard against unauthorised reconnection.
- Do not open the appliance until the fan has come to a stop.

Cleaning the fan

Clean the fan with a brush or bottle brush, for example.

! **Please note**
Removing counterweights from the impeller causes imbalance, a higher level of noise and wear on the fan.
Never remove counterweights from the impeller.

! **Please note**
Opening the volute casing leads to leaks.
Do **not** open the volute casing.

Cleaning the evaporator

Danger
Contact with live components can cause serious injury from electric current.
Disconnect the appliance from the power supply before starting work and check that it is no longer live. Safeguard against unauthorised reconnection.

Danger
Hot surfaces can cause burns.
- Switch OFF the appliance before maintenance and service work. Allow the appliance to cool down.
- Never touch hot surfaces on the appliance, fittings or pipework.

Check that the evaporator fins are clean.

Danger
Fins with sharp edges can cause injury.
If necessary, clean the fins carefully.

Please note
The fins can be damaged if they are cleaned incorrectly.
Never clean the fins with compressed air.

Closing the DHW heat pump

See page 20 (reverse order).

Starting the DHW heat pump

Please note
Starting the DHW heat pump when the DHW cylinder has not been completely filled may damage the appliance.
Completely fill the DHW cylinder **before** starting the DHW heat pump (commissioning).

1. Insert the mains plug into a standard socket (230 V/50 Hz) with separate fuse protection.
2. Switch ON the separate fuse or mains isolator (if used).

Commissioning the DHW heat pump

Setting parameters

See the following chapter.

Installation menu

Programming unit

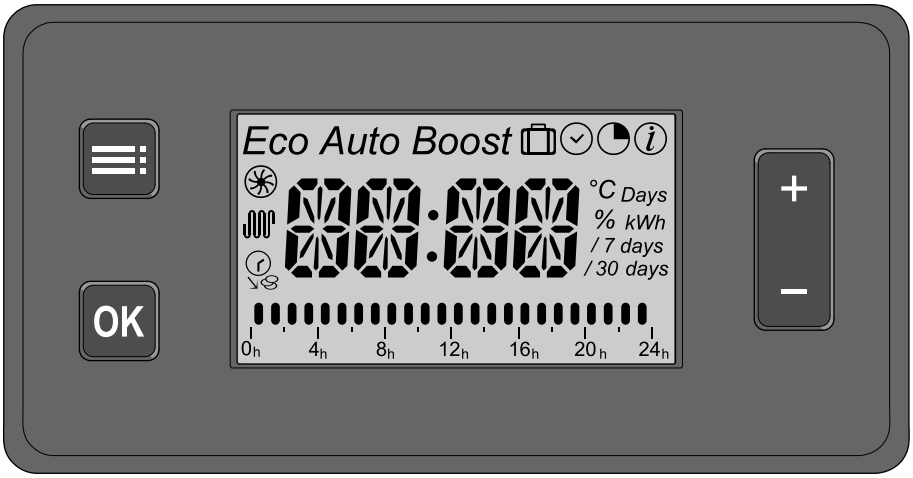

Fig. 21

Setting parameters in the "INST" installation menu

1. ☰ and **–**: Press and hold simultaneously for 3 s.
   "INST" appears on the display.
2. Use ☰ to select the following:
   - Parameters **"I1"** to **"I6"**
   - Test functions **"T1"** to **"T5"**
   - Actual temperature values **"t1'"** to **"t4'"**
3. Use **+/–** to select the parameter, function or temperature.
4. Confirm with **OK**.
5. Change the values with **+/–**.
6. Confirm with **OK**.

Restoring factory settings (reset)

Note
*Does not work with active fault messages, "increased DHW hygiene" or in the **"PROGRAM"** ◔ operating program.*

1. ☰ and **OK**: Press and hold simultaneously for 3 s.
   "RST?" appears.
2. Confirm with **OK**.
   "dONE" appears.
   The factory settings are restored.

   Note
   The time and date need to be set again.
3. Exit **"RST?"** with ☰.

Overview of parameters

Parameter	Delivered condition	Setting range	Unit	Function
"I1"	1	1 or 2	—	1 Recirculation air mode 2 Outdoor air mode or recirculation air mode with air discharge to the outside
"I2"	0	0 or 1	—	0 No high/low tariff 1 Signal cable (230 V) for high/low tariff is connected (see page 36).

Installation menu (cont.)

Parameter	Delivered condition	Setting range	Unit	Function
"I3"	OFF	OFF up to 20	min	OFF No photovoltaic system 1 to 20 Signal cable for photovoltaic system (multifunctional relay) is connected (see page 36). The set temperature is raised after the multifunctional relay contact (on site) has been closed for between 1 and 20 min. ***Note*** *The minimum start-up capacity of the multifunctional relay must be set to 750 W at the inverter.*
"I4"	OFF	OFF up to 30	Days	OFF "Increased DHW hygiene" function not active 1 to 30 "Increased DHW hygiene" function active The DHW cylinder is automatically heated to 60 °C once every 1 to 30 days. ***Note*** *Only enable this function if an immersion heater or external heat generator with control relay is available.*
"I5"	OFF	OFF or 55 to 65	°C	OFF Emergency mode not active 55 to 65 Emergency mode active The set temperature is 55 to 65 °C. ***Note*** *In emergency mode, water is heated by the immersion heater only.*
"I6"	OFF	OFF or ON	—	Option for the **"PROGRAM"** operating program ◔ OFF Standard: DHW heating within the selected time program ON NIGHT mode: Optimised DHW heating between 11:00 PM and 5:00 AM DHW heating starts so that the set cylinder temperature is reached at 5:00 AM.

Checking the actuators

Parameter	Delivered condition	Setting range	Unit	Function with parameter set to "1"
"T1"	0	0 or 1	—	Compressor and fan run for 30 s.
"T2"	0	0 or 1	—	Immersion heater is in operation for 30 s.
"T3"	0	0 or 1	—	Fan runs for 30 s with speed level 1 (slow).
"T4"	0	0 or 1	—	Fan runs for 30 s with speed level 2 (fast). Only visible if **"I1"** = 2
"T5"	0	0 or 1	—	Diverter valve for defrosting opens for 30 s.

Actual temperatures

Connecting the temperature sensors: See page 36.

Parameter	Display range	Unit	Information
"t'1"	0 to 99	°C	Cylinder temperature sensor, bottom
"t'2"	–20 to 99	°C	Air intake temperature sensor

Installation menu (cont.)

Parameter	Display range	Unit	Information
"t'3"	0 to 99	°C	Cylinder temperature sensor, top
"t'4"	0 to 99	°C	Evaporator temperature sensor

Safety high pressure switch

Connecting the safety high pressure switch: See page 36.

Parameter	Display range	Unit	Information
"PR"	0 or 1	—	0 Safety high pressure switch not connected 1 Safety high pressure switch connected

Messages

Red LED on the heat pump control unit

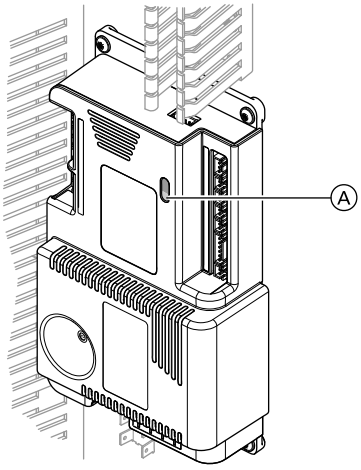

Fig. 22

Ⓐ Red LED

Red LED	Cause	Measure
Flashes briefly every 10 s.	No fault	No action required
Flashes in a different sequence.	Fault	See message on the programming unit
Constantly off	No power supply	Restore power supply.

Messages on the programming unit

Message	Cause	Measure
"ER 0"	Programming unit faulty	Replace the programming unit.
"ER 1"	Safety high pressure switch has responded. Overpressure in the refrigerant circuit.	Switch power supply OFF and ON again.
"ER 2"	High limit safety cut-out has responded. Overheating of the DHW cylinder.	Ensure DHW is being drawn. Reset high limit safety cut-out (see page 32).
"ER 3"	Short circuit/lead break in lower cylinder temperature sensor	Check resistance value and replace sensor if necessary (see page 35).
"ER 4"	Short circuit/lead break, air intake temperature sensor	
"ER 5"	Short circuit/lead break, evaporator temperature sensor	
"ER 6"	Short circuit/lead break, top cylinder temperature sensor	
"ER 8"	Communication problem between programming unit and heat pump control unit	Check connections and leads.
"ER 9"	DHW heating takes an unusually long time	Check heat pump and immersion heater; check for leaks.
"ER 10"	No changeover between high and low tariff in the last 24 h	Check inputs for high/low tariff (see page 36).

Messages (cont.)

Acknowledging messages

Press and hold ☰ and **OK** simultaneously for 3 s to clear a message and resume standard operation.

Maintenance

Removing the front cover

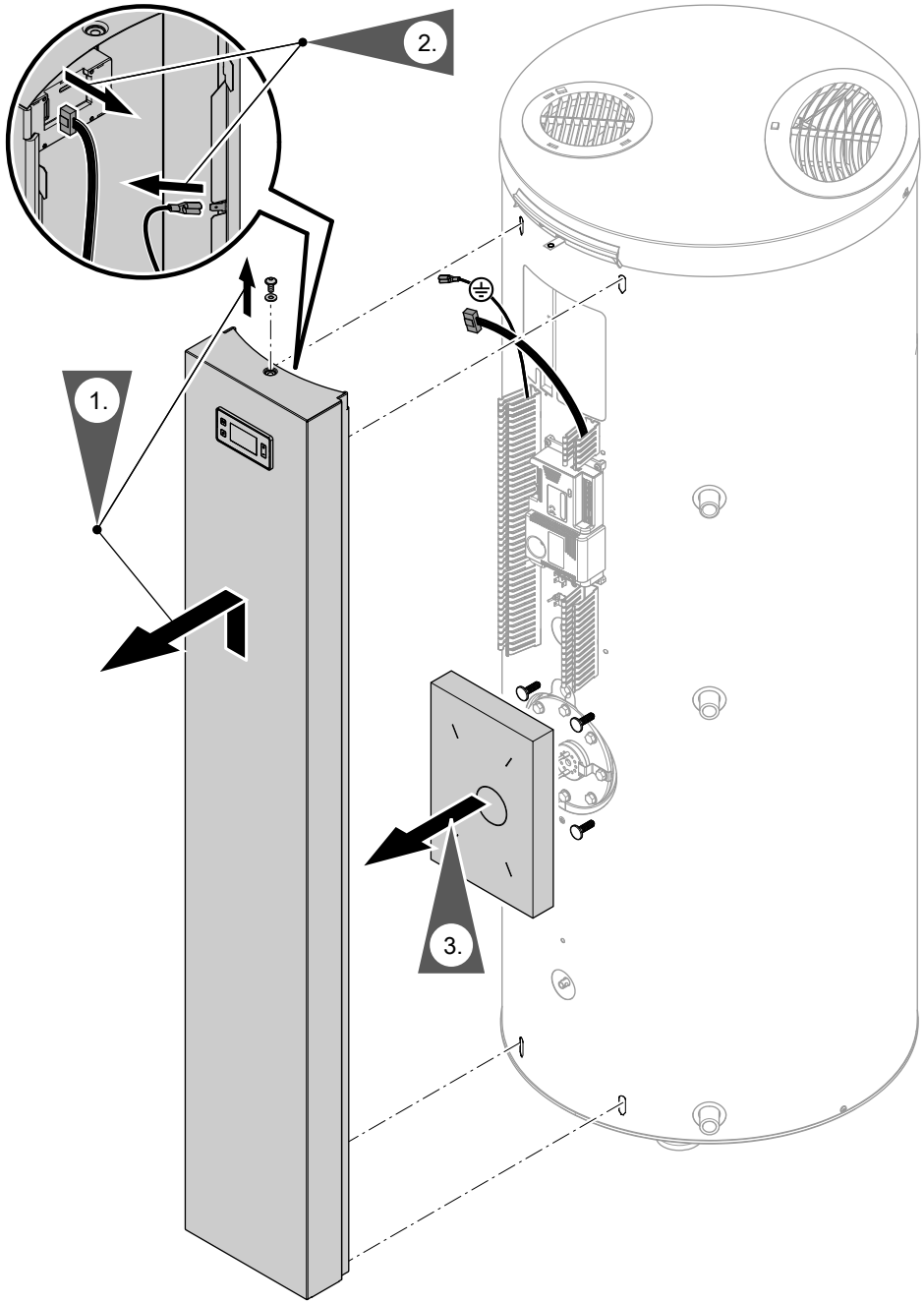

Fig. 23

Replacing the heating element in the immersion heater

1. Disconnect the system from the power supply, e.g. at a separate fuse or mains isolator.

2. Disconnect the water supply.

3. Remove the front cover, see Fig. 31.

4. Remove the thermal insulation from the immersion heater.

Maintenance (cont.)

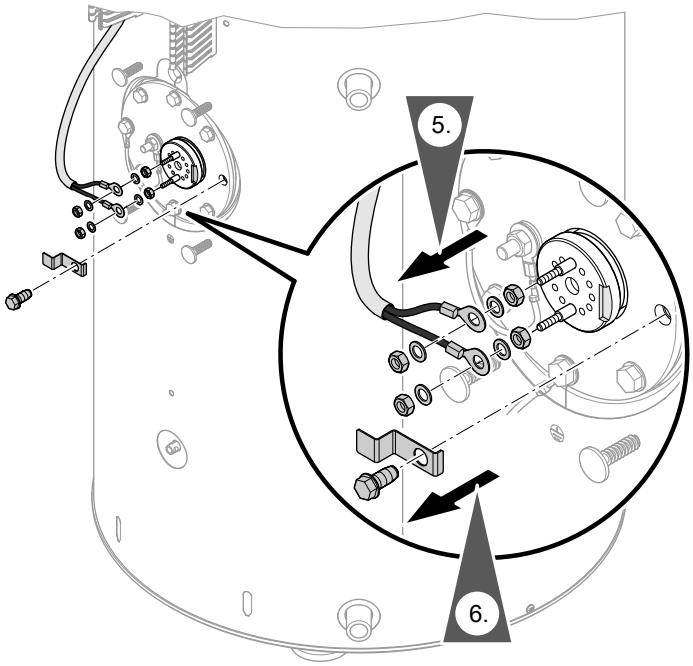

Fig. 24

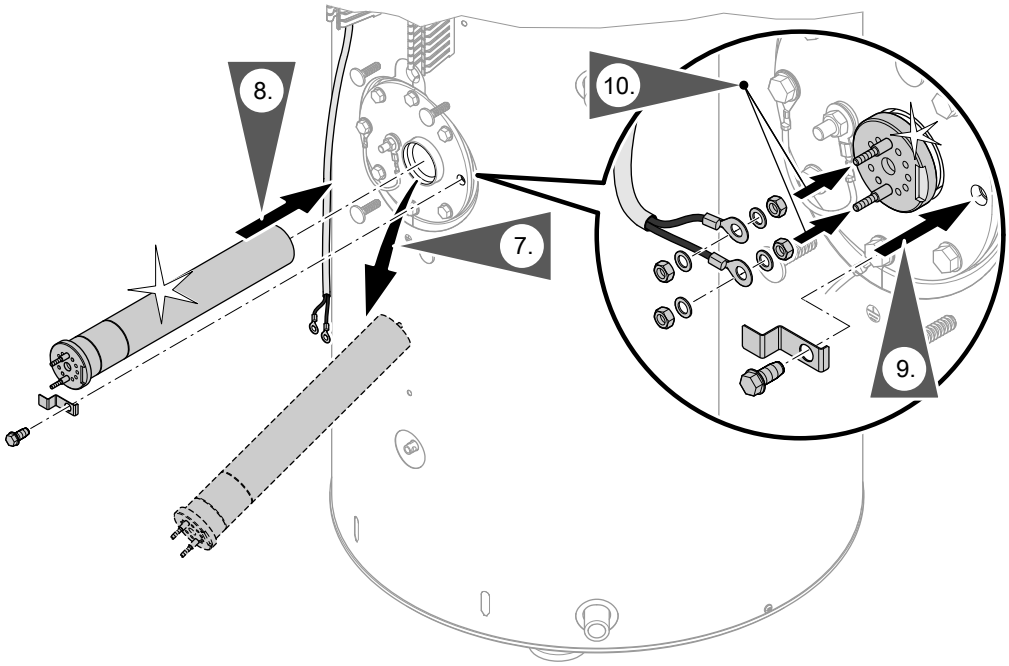

Fig. 25

8. When inserting the new heating element, ensure the recess at the head of the element is correctly positioned.

9. Torque: 25 Nm

11. Open the shut-off valve.

12. Fit the thermal insulation.

13. Fit the front cover with an earth cable, see Fig. 31.

14. Switch ON the power supply.

Resetting the DHW heat pump high limit safety cut-out

The DHW heat pump high limit safety cut-out shuts down the appliance at a temperature of $90^{+/-5}$ °C. The set temperature of the external heat generator should therefore be no higher than 85 °C.

If an immersion heater is available, it is also switched off.

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Maintenance (cont.)

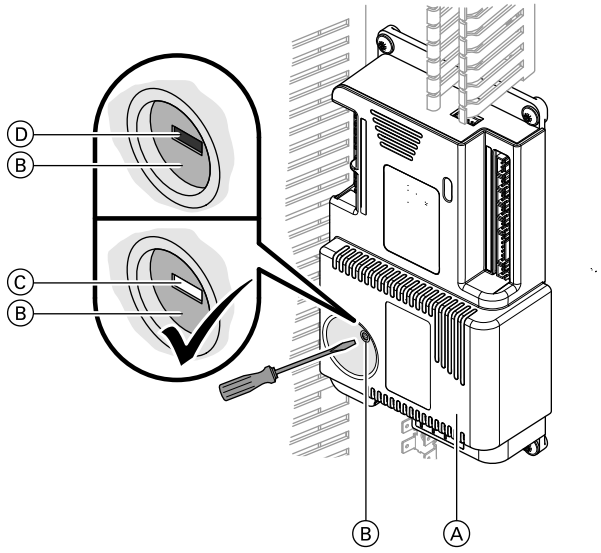

Fig. 26

Ⓐ Heat pump control unit
Ⓑ Resetting:
  Ⓒ White: Unlocked
  Ⓓ Red: Locked

1. Disconnect the system from the power supply, e.g. at a separate fuse or mains isolator.
2. Remove the front cover, see Fig. 31, page 31.
3. Use a screwdriver to press the red reset button. The reset button turns white Ⓒ.
4. Fit the front cover with an earth cable, see Fig. 31.
5. Switch ON the power supply.

Note
If the high limit safety cut-out responds several times in a row, replace heat pump control unit Ⓐ.

Replacing the heat pump control unit

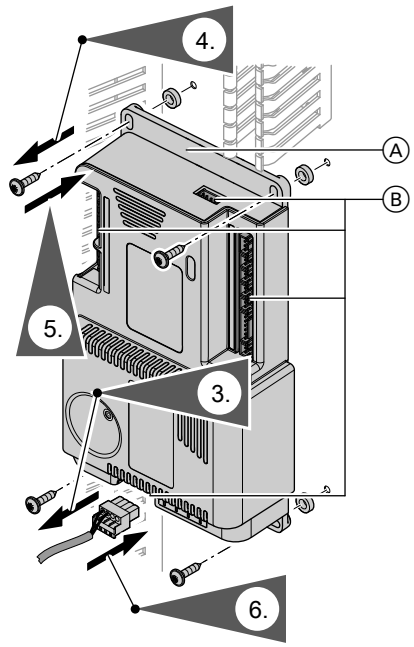

Fig. 27

1. Disconnect the system from the power supply, e.g. at a separate fuse or mains isolator.
2. Remove the front cover, see Fig. 31.
3. Disconnect cables Ⓑ from heat pump control unit Ⓐ.
4. Remove 4 screws and spacer sleeves, then the remove heat pump control unit.
5. Fit the new heat pump control unit.
6. Connect the cables to the heat pump control unit.
7. Fit the front cover with an earth cable.
8. Switch ON the power supply.
9. Reset the parameters.

Draining the DHW cylinder from the DHW side

1. Shut off the cold water supply. See page 9.
2. Open the DHW draw-off points to release pressure.

Maintenance (cont.)

3. Drain the DHW cylinder from the drain valve in the cold water supply.

Overview of internal components in the heat pump module

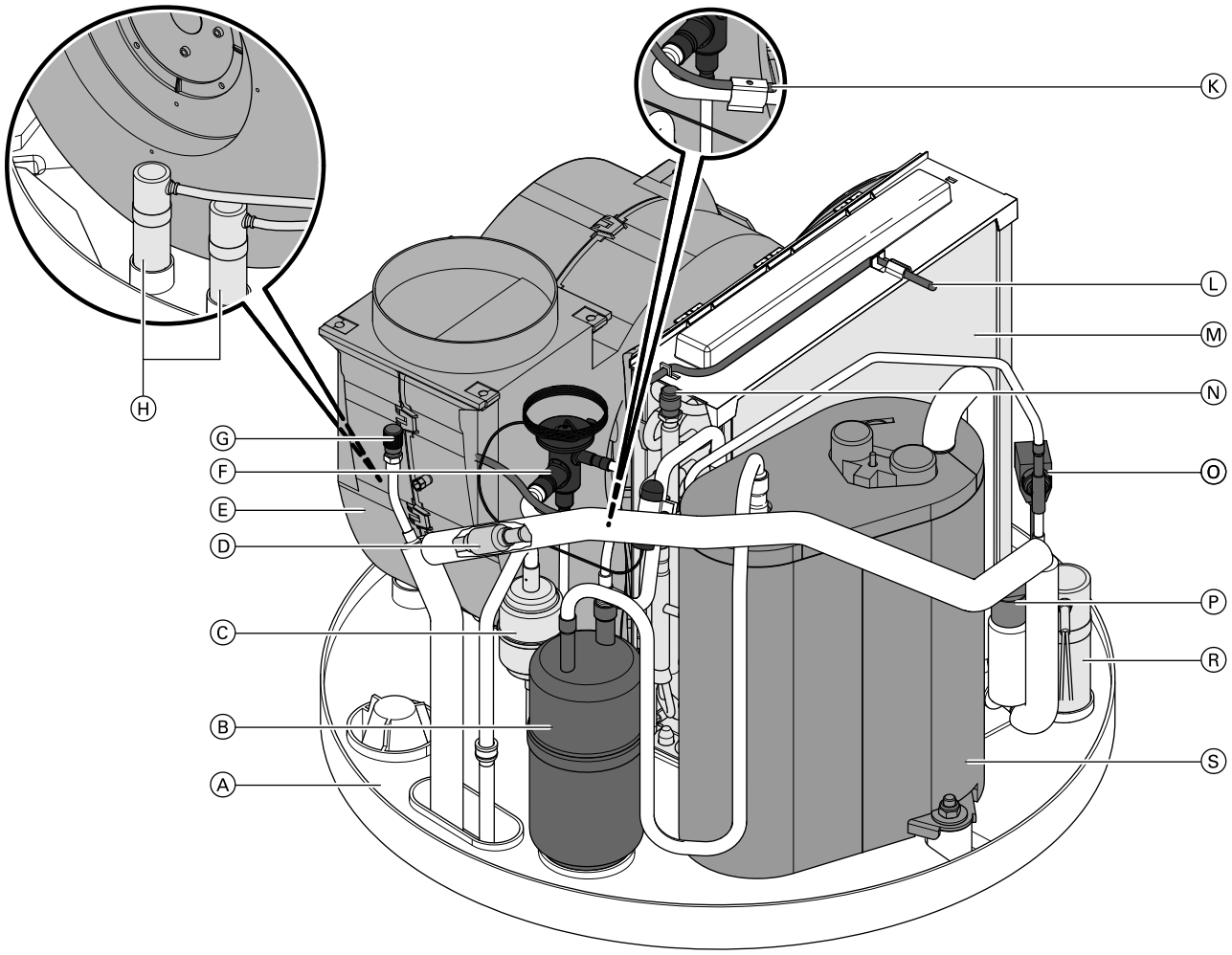

Fig. 28

Ⓐ Condensate pan (EPP base with integral drip tray)
Ⓑ Liquid separator
Ⓒ Filter dryer
Ⓓ Non-return valve
Ⓔ Fan in casing
Ⓕ Thermostatic expansion valve
Ⓖ Schrader valve, high pressure side
Ⓗ Capacitors for fan
Ⓚ Evaporator temperature sensor
Ⓛ Air intake temperature sensor
Ⓜ Evaporator
Ⓝ Schrader valve, low pressure side
Ⓞ Diverter valve, defrosting
Ⓟ Safety high pressure switch
Ⓡ Capacitor for compressor
Ⓢ Compressor

Note
For cylinder temperature sensor positioning, see "Overview of connections" on page 9.

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Maintenance (cont.)

Checking the temperature sensors

Sensor	Test element
Top cylinder temperature sensor (M or L profile)	NTC 50 kΩ
Cylinder temperature sensor, bottom	NTC 50 kΩ
Air intake temperature sensor	NTC 50 kΩ
Evaporator temperature sensor	NTC 50 kΩ

1. Disconnect the sensor and measure its resistance.

2. Compare the test result with the actual temperature. See page 27.
In the case of severe deviation, check sensor and replace if necessary.

NTC 50 kΩ

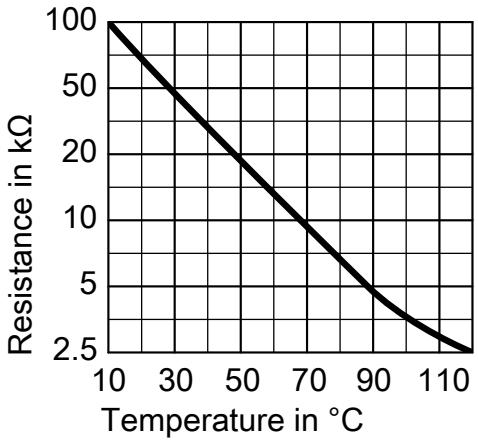

Fig. 29

Connection and wiring diagram

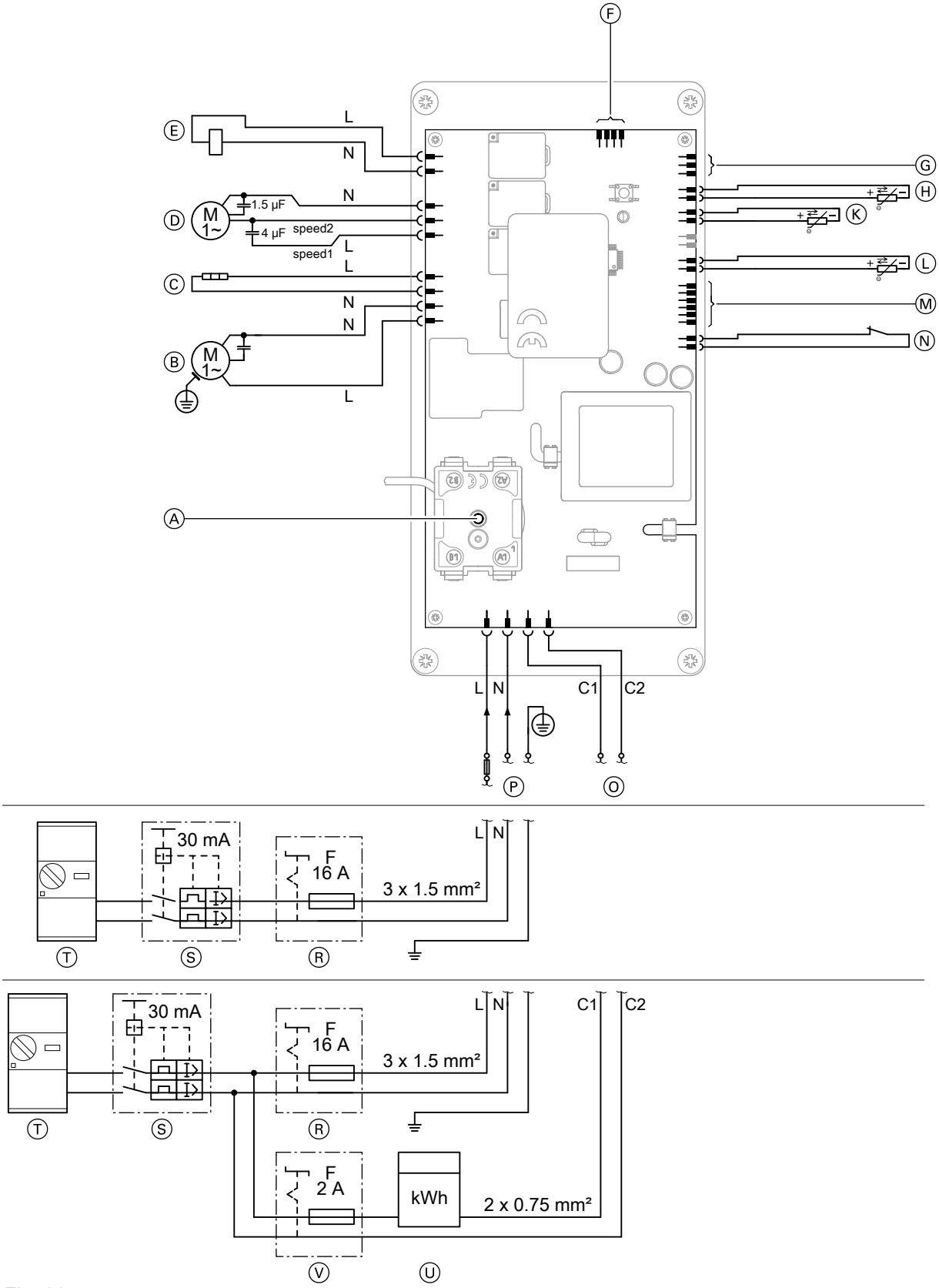

Fig. 30

Ⓐ High limit safety cut-out reset button, DHW heat pump
Ⓑ Compressor
Ⓒ Immersion heater
or
External heat generator with switching relay
Ⓓ Switching output for fan
Speed 1 Slow
Speed 2 Fast
Ⓔ Diverter valve, defrosting
Ⓕ Signal cable for the photovoltaic system (multifunctional relay)

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Connection and wiring diagram (cont.)

Ⓖ Not assigned
Ⓗ Top cylinder temperature sensor (NTC 50 kΩ), L = 1000 mm
Ⓚ Air intake temperature sensor (NTC 50 kΩ), L = 1500 mm
Ⓛ Evaporator temperature sensor (NTC 50 kΩ), L = 500 mm
Ⓜ Programming unit connection
Ⓝ Switching output for safety high pressure switch
Ⓞ High/low tariff
230 V~ Low tariff
0 V~ High tariff
Ⓟ Internal power supply
Ⓡ MCB 16 A
Ⓢ RCD
Ⓣ Mains isolator
Ⓤ Connection for tariff switching on the electricity meter
Ⓥ MCB 2 A

Reports

	Commissioning	Maintenance/service	Maintenance/service
Date:			
By:			

	Commissioning	Maintenance/service	Maintenance/service
Date:			
By:			

	Commissioning	Maintenance/service	Maintenance/service
Date:			
By:			

	Commissioning	Maintenance/service	Maintenance/service
Date:			
By:			

	Commissioning	Maintenance/service	Maintenance/service
Date:			
By:			

Specification

Heat pump type		TDE1-50/TDE1-60	
Draw-off profile		**M**	**L**[*1]
Performance data for outdoor air mode to EN 16147: 2011 at A2/W10-53 (air intake temperature 2 °C/room temperature 20 °C)			
Coefficient of performance ε (COP_{DHW})		2.0	2.3
Heat-up time	h:min	8:00 AM	8:00 AM
Standby loss (Pes)	W	30	30
Max. available amount of water (40 °C)	l	240	240
Performance data for outdoor air mode to EN 16147: 2011 at A7/W10-53 (air intake temperature 7 °C/room temperature 20 °C)			
Coefficient of performance ε (COP_{DHW})		2.5	2.8
Heat-up time	h:min	6:30 AM	6:30 AM
Standby loss (Pes)	W	27	27
Max. available amount of water (40 °C)	l	240	240
Performance data for outdoor air mode to EN 16147: 2011 at A14/W10-53 (air intake temperature 14 °C/room temperature 20 °C)			
Coefficient of performance ε (COP_{DHW})		2.9	3.2
Heat-up time	h:min	5:15 AM	5:15 AM
Standby loss (Pes)	W	25	25
Max. available amount of water (40 °C)	l	240	240
Performance data for recirculation air mode and recirculation air mode with air discharge to the outside to EN 16147: 2011 at A20/W10-53 (air intake temperature 20 °C/room temperature 20 °C)			
Coefficient of performance ε (COP_{DHW})		3.0	3.3
Heat-up time	h:min	5:00 AM	5:00 AM
Standby loss (Pes)	W	23	23
Max. available amount of water (40 °C)	l	240	240
Application limits (air intake temperature)	°C	–5 to +35	
Electrical values			
Max. power consumption	kW	2.25	2.25
Power consumption of the heat pump	kW	0.425	0.425
Power consumption of immersion heater	kW	1.5	1.5
Power supply (with and without immersion heater)			
▪ Type TDE1-50		1/N/PE 230 V/50 Hz	
▪ Type TDE1-60		1/N/PE 230 V/60 Hz	
Rated current		9.8	9.8
Fuse rating	A	16	16
Refrigerant circuit			
Refrigerant		R134a	R134a
▪ Refrigerant charge	kg	1.15	1.15
▪ Global warming potential (GWP)		1430	1430
▪ CO_2 equivalent	t	4.43	4.43
Permissible operating pressure	bar	25	25
	MPa	2.5	2.5

[*1] *Calculated values*

Specification (cont.)

Heat pump type		TDE1-50/TDE1-60	
Draw-off profile		**M**	**L**[*1]
Heating mode			
Max. air flow rate, free-blowing			
▪ Speed 1 (slow)	m^3/h	250	250
▪ Speed 2 (fast)	m^3/h	320	320
Integral DHW cylinder			
Material		Enamelled steel	Enamelled steel
Capacity	l	180	180
Max. permissible DHW temperature	°C	65	65
Max. permissible operating pressure	bar	10	10
	MPa	1	1
Minimum room volume for recirculation air mode	m^3	20	20
Max. pressure drop in the air ductwork for recirculation air mode with air discharge to the outside and outdoor air mode	mbar	1	1
	kPa	0.1	0.1
Dimensions			
▪ Length	mm	661	661
▪ Width (∅)	mm	584	584
▪ Height	mm	1555	1555
Weight	kg	95	95
Connections (male thread)			
Cold water, DHW	R	¾	¾
DHW circulation	R	¾	¾
Condensate drain (∅)	mm	20	20
Sound power level L_W (tested with reference to EN 12102/EN ISO 9614-2, accuracy category 2)			
Maximum A-weighted total sound power level inside the installation room	dB(A)	59	59
Energy efficiency class to EU Regulation no. 813/2013			
DHW heating		A+	A+

*[*1] Calculated values*

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Final decommissioning and disposal

The products can be recycled. The components and substances of the system should not be disposed of as part of ordinary household waste.
For decommissioning, isolate the system from the power supply and allow components to cool down where appropriate.
Dispose of all components correctly.

Keyword index

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Keyword index (cont.)