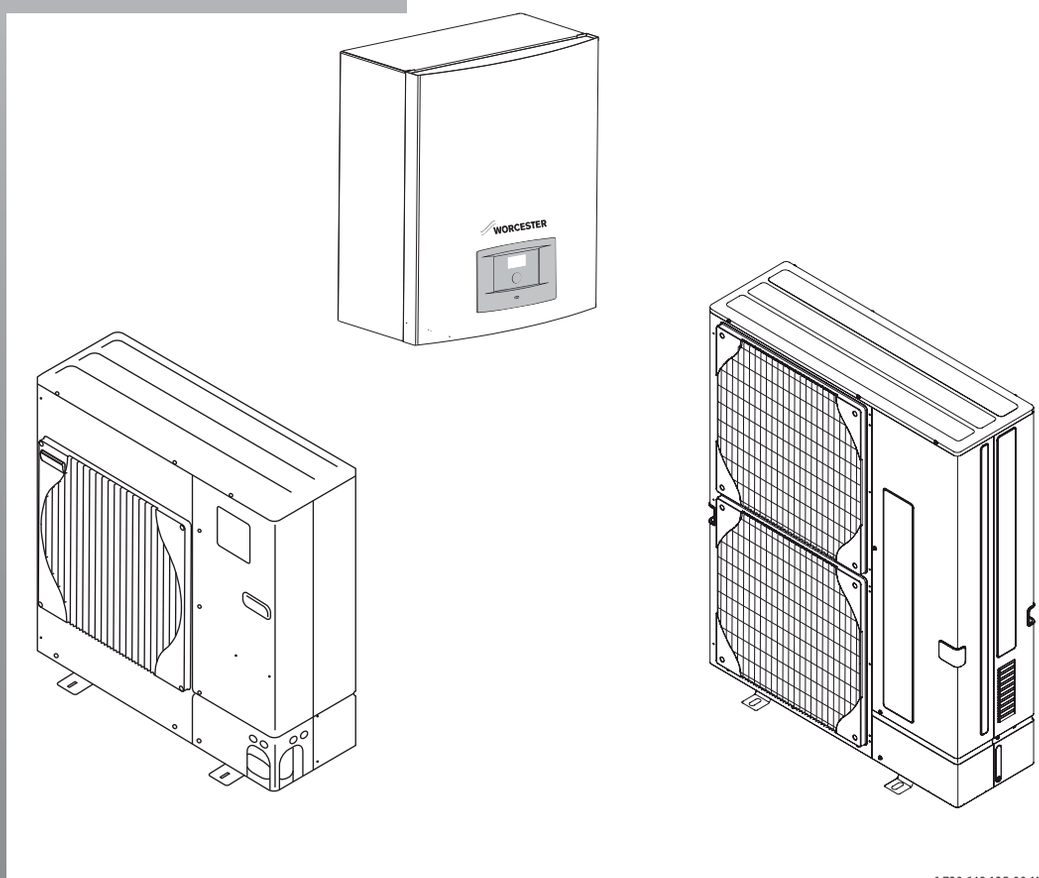
INSTALLATION, COMMISSIONING AND SERVICING INSTRUCTIONS

AIR TO WATER SPLIT HEAT PUMP

GREENSOURCE HYDROLIGHT AND HYDROCOMFORT

OUTDOOR UNIT 7.5, 10, 11 AND 12, 1 PHASE AND 3 PHASE MODELS
HYDROLIGHT 8 AND 16 1 PHASE
HYDROCOMFORT 8 AND 16 1 PHASE AND 3 PHASE



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UK/IE

benchmark
COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

WORCESTER
Bosch Group

6 720 806 629 (2013/02)

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1 KEY TO SYMBOLS AND SAFETY INSTRUCTIONS

1.1 KEY TO SYMBOLS

WARNINGS

Warnings in this document are framed and identified by a warning triangle which is printed on a grey background.

Keywords indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **NOTICE** indicates that material damage may occur.
- **CAUTION** indicates that minor to medium injury may occur.
- **WARNING** indicates that serious injury may occur.
- **DANGER** indicates possible risk to life.

IMPORTANT INFORMATION

Important information in cases where there is no risk of personal injury or material losses is identified by the symbol shown on the left. It is bordered by horizontal lines above and below the text.

ADDITIONAL SYMBOLS

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document or to other related documents
•	a list entry
–	a list entry (second level)

Table 1

1.2 SAFETY INSTRUCTIONS

GENERAL

▶ Read the guide carefully and keep it to hand for future use.

INSTALLATION AND COMMISSIONING

▶ The heat pump may be installed and put into operation only by a competent person.

SERVICE AND MAINTENANCE

▶ Only qualified personnel may carry out repairs. Incorrect repairs can lead to serious risks to the user, and a reduction in savings.
▶ Only use original spare parts.
▶ Service and maintenance must be carried out annually by a competent person.

HANDLING REFRIGERANT

The air to water heat pump is filled with R410A refrigerant.

▶ Only qualified and authorised refrigeration engineers may work on the refrigerant circuit.
▶ For all work with refrigerant, wear suitable safety gloves and goggles.

WHAT TO DO IF REFRIGERANT LEAKS

If refrigerant leaks and touches the skin, it can cause frostbite.

▶ In case of a refrigerant leak, never touch any part of the air to water heat pump.
▶ Avoid skin or eye contact with refrigerant.
▶ Seek medical attention if you get refrigerant on your skin or in your eyes.
▶ If the refrigerant leaks please contact your installer immediately.

2 BENCHMARK

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the scheme. Visit www.centralheating.co.uk for more information.

3 PRE - INSTALLATION

3.1 AIR SOURCE HEAT PUMP OPERATION

As the outside temperature gets colder, the heat demand of a house increases and the output of an air source heat pump will decrease. Eventually it becomes so cold outside that the output of the heat pump alone is not able to heat the building effectively. The Greensource Split range of air source heat pumps therefore allow for either monoenergetic (with Hydrocomfort module) or bivalent (with Hydrolight module) operation.

Monoenergetic means that in the event of very low external temperatures a 3-stage electrical heater in the indoor unit will automatically be activated to provide additional heat and keep the building warm.

In bivalent operation a second heating appliance (e.g. gas or oil boiler) is used to supplement the heat load.

3.2 SELECTION AND SIZING OF A HEAT PUMP

It is essential that heat pump systems are designed to operate efficiently in order to meet the building heating needs and the expectations of the customer. In order to achieve this, the following design activities must be completed prior to installation:-

- Pre-design assessment - Determine the suitability of a heat pump system for the building based on the customer requirements, expectations and building type.
- Detailed design - Complete building heat loss calculations and domestic hot water usage assessment.
- Specification - Select a suitable heat pump and system components based on the detailed design. Calculate and communicate the predicted energy use and running costs of the system to the customer.

A suitable design methodology for the above is detailed in MIS3005, the Microgeneration Certification Scheme (MCS) heat pump installer standard. Worcester, Bosch Group recommended that this standard is followed for heat pump systems. The standard covers the design, installation and commissioning requirements to ensure that 100% of the building heat loss can be met efficiently by the heat pump system. A heat pump system must be designed to this standard to be eligible for government financial incentives e.g Renewable Heat Incentive (RHI).

The Worcester Bosch Group design team offer a heat pump sizing service which is MCS compliant. To request this service, download and submit the form using the guidance notes from our website address:

www.worcester-bosch.co.uk/hp

3.3 HEAT LOSS

The total heat loss of the house is calculated from the addition of fabric and ventilation heat losses.Fabric heat loss is the transmission of heat by conduction through the building structure, i.e windows, walls, roof and floor. Ventilation heat loss is heated air escaping from the house and being replaced by cold air from outside.

3.3.1 CALCULATING THE HEAT LOSS OF THE HOUSE

It is essential to accurately calculate the heat loss of the house to ensure correct sizing of the heat pump system. The heat loss is dependent on the construction of the house, room sizes, external and internal design temperatures and air change rates. The heat loss calculations should satisfy the requirements of BS EN 12831.

3.3.2 ESTIMATING HEAT LOSS

Estimating the heat loss of the building is useful in determining the suitability of a heat pump system. However, assumptions based on floor area (e.g. 50 W/m^2 for new build etc.) and SAP (the governments Standard Assessment Procedure) should not be used for the detailed design and specification stage. It should be noted that the heat loss for non standard houses i.e. houses with large areas of glazing, high ceilings, log burners etc. or houses in exposed locations may deviate significantly from any rules of thumb.

In existing properties, boilers are often oversized and should therefore not be used to determine the actual heat requirements of the house. However, estimates may be made on the basis of the existing energy consumption of the space to be heated.

This installation manual does not cover all the necessary details to calculate the heat loss. The information given here is provided to remind the heating system designer and installer of the process and considerations.

4 HEAT EMITTERS

Worcester, Bosch Group heat pumps are fitted with weather compensation controls as standard. However, for a heat pump to perform to its highest energy efficiency, the central heating emitter circuit should be designed so that the flow temperature is as low as possible.

As a guide, the system should be designed using the following maximum flow temperatures;

- Underfloor heating: 35-40 °C
- Radiators: 45-50 °C

If underfloor heating has been installed, it is important to remember that the underfloor system designer should have been informed that the heat source will be from an air source heat pump. It is also important to remember that radiators should have been correctly sized to work effectively with lower flow temperatures.

A tool to aid installers and end users to understand the relevance of building heat loss and heat emitter selection on heat pump performance, has been created by the joint trade associations. The 'Heat Emitter Guide' can be downloaded from the following website: www.microgenerationcertification.org

5 REGULATIONS AND STANDARDS

Installation of this heat pump should be done in accordance with MCS/MIS 3005.

This appliance must be installed and serviced only by a competent person in accordance with the current: IEE Regulations, Building Regulation, Building Standards (Scotland) (Consolidation), Building Regulations (Northern Ireland), local water by-laws, Health & Safety Document 63S (The Electricity at Work Regulations 1989), IS 813 (Eire) and other local requirements.
The relevant Standards should be followed, including:
BS7074:1: Code of practice for domestic and hot water supply
EN:12828: Central heating for domestic premises
BS7593: Treatment of water in domestic hot water central heating systems
BS EN 14511: Requirements heat pumps for space heating
BS EN 378: Safety and environmental requirements for heat pumps
The Health and Safety at Work Act 1974
The Management of Health and Safety at Work Regulations 1999
The Construction (Health, Safety and Welfare) Regulations 1996
The Construction (Design and Management) Regulations 1994
The Lifting Operations and Lifting Equipment Regulations 1998
Where no specific instruction is given, reference should be made to the relevant codes of Practice.
Potable water: All seals, joints, compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved for use with potable water supplies.

This is to certify that the above ranges of products manufactured by Bosch Thermotechnology have been tested and found to comply with:

- the requirements of the (Water Fittings) Regulations 1999 for England and Wales, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.
- the requirements of the UK Building Regulations:

The Building Regulations 1991 (England & Wales) Requirements G3, L1 and Regulation 7.
The Building Standards (Scotland) Regulations 1990. Regulation 10 (B2), 22 (J3.3a and J3.4), 27 and 28 (P2.6 and P3).
The Building Regulations (Northern Ireland) 2000.

In accordance with current EU legislation (the F-gas regulation, EC Regulation No 842/2006 which came into effect on 4 July 2006), a heat pump that contains more than 3 kg of refrigerant R410A must be checked regularly by an accredited technician.

It is therefore a requirement that the owner of a Worcester Greensource Split Heat Pump has the refrigerant circuit checked by an accredited technician. Leak tests must be performed at installation and then repeated every 12 months.

6 STANDARD DELIVERY

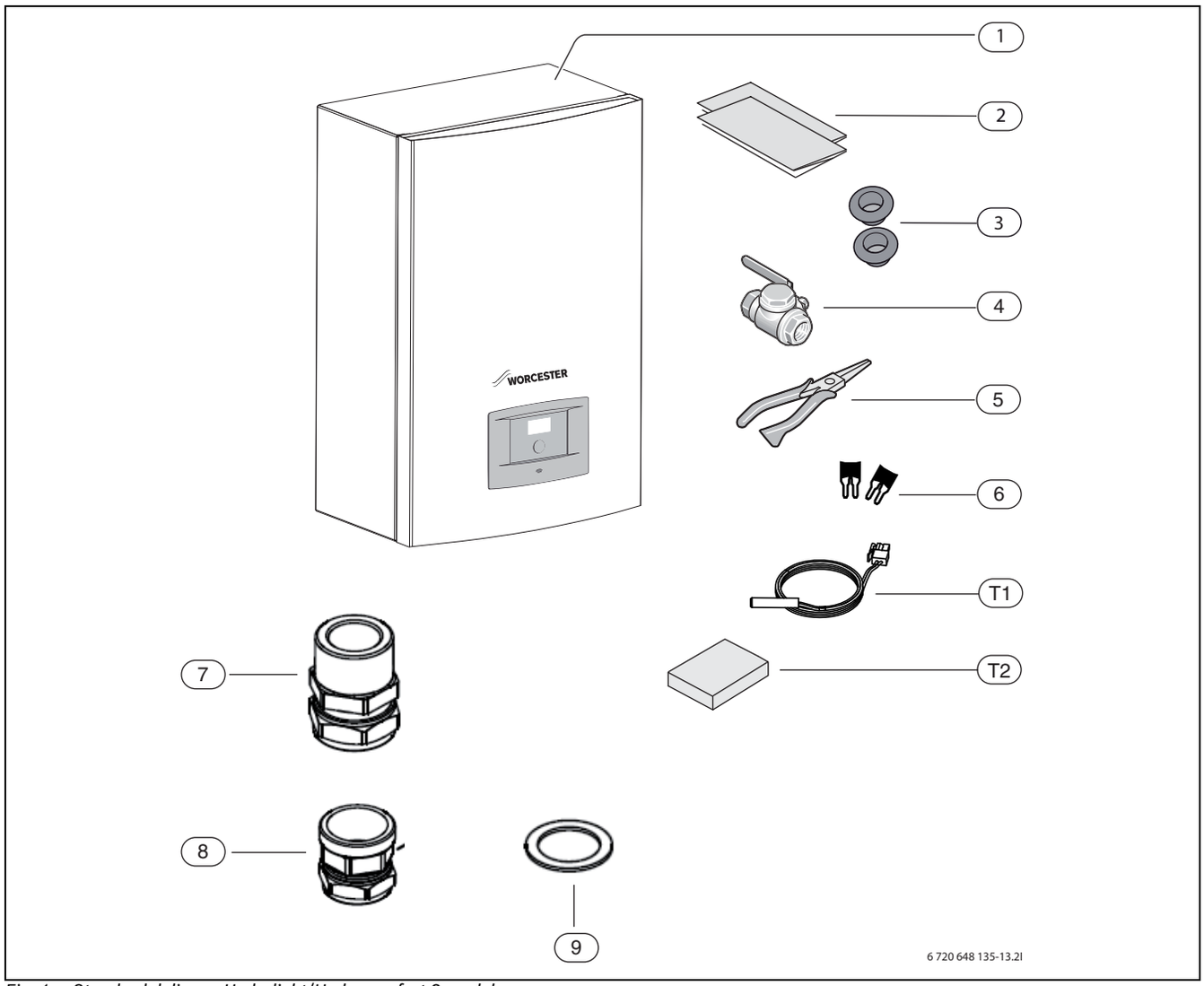

Fig. 1 Standard delivery, Hydrolight/Hydrocomfort 8 module

[1] Hydrolight/Hydrocomfort module (example)
[2] Installation instructions and operating instructions
[3] Cable gland X 2
[4] Particle filter with strainer
[5] Circlip pliers
[6] Jumpers for 1-phase installation X 2[1)]
[7] Male adapter part 22 mm (Hydrocomfort X 1, Hydrolight X 1)
[8] Female adapter part 22 mm (Hydrocomfort X 1, Hydrolight X 3)
[9] Washer 1” (Hydrocomfort X 2, Hydrolight X 4)
[T1] Flow temperature sensor
[T2] Outside temperature sensor

1) All hydrocomfort are 3 -phase on delivery, (→ Chapter 10.1.2)

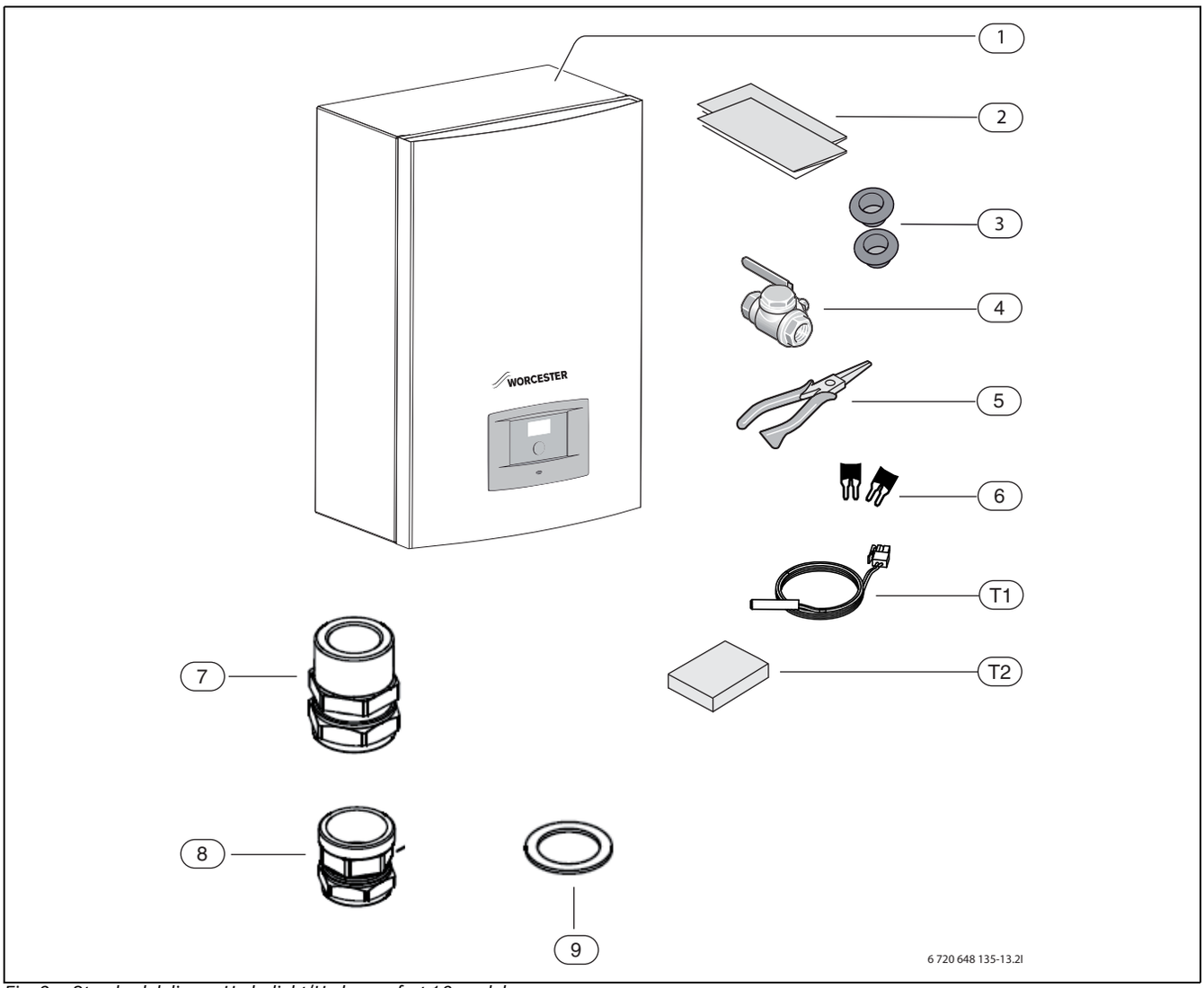

Fig. 2 Standard delivery, Hydrolight/Hydrocomfort 16 module

[1] Hydrolight/Hydrocomfort module (example)
[2] Installation instructions and operating instructions
[3] Cable gland X 2
[4] Particle filter
[5] Circlip pliers
[6] Jumpers for 1-phase installation X 2[1)]
[7] Male adapter part 28 mm (Hydrocomfort X 1, Hydrolight X 1)
[8] Female adapter part 28 mm (Hydrocomfort X 1, Hydrolight X 3)
[9] Washer 1" (Hydrocomfort X 2, Hydrolight X 4)
[T1] Flow temperature sensor
[T2] Outside temperature sensor

1) All hydrocomfort are 3 -phase on delivery, (→ Chapter 10.1.2)

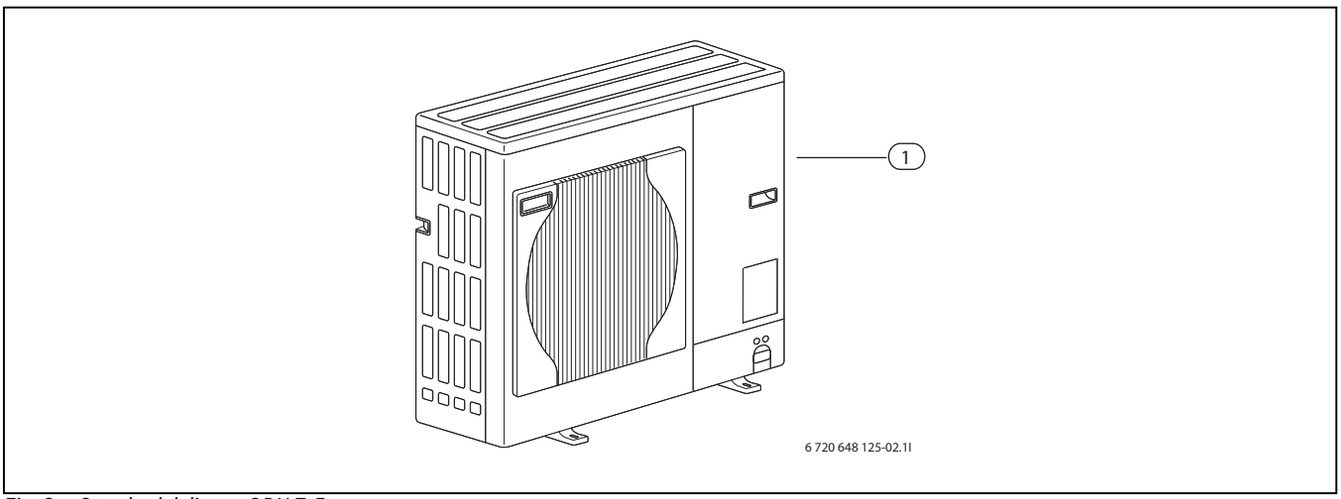

Fig. 3 Standard delivery, ODU 7.5

[1] ODU 7.5

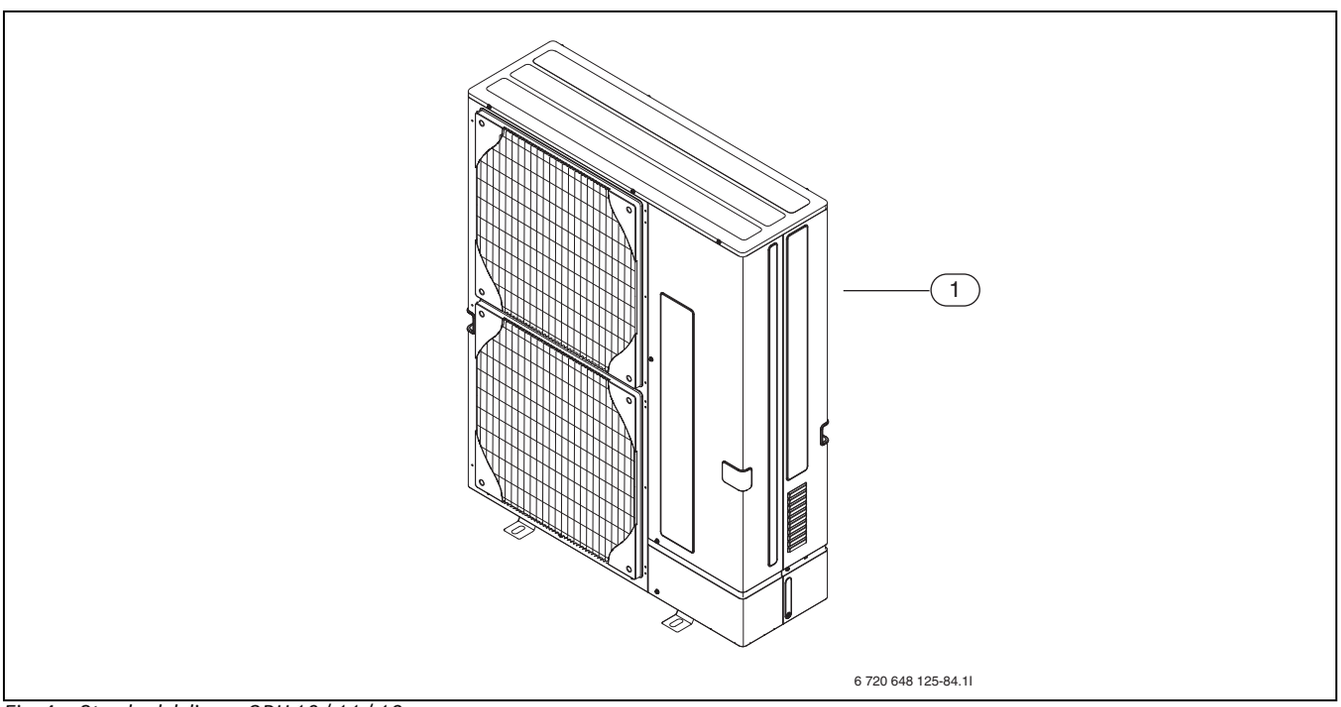

Fig. 4 Standard delivery, ODU 10 / 11 / 12

[1] ODU 10 / ODU 11 / ODU 12

7 GENERAL

Only competent persons may carry out the installation. The installer must follow applicable rules and regulations and recommendations from the manufacturer.

7.1 INFORMATION ABOUT THE HEAT PUMP

The Worcester Greensource unit consists of one of the following outdoor units ODU 7.5; 10; 11 or 12 external module and the option of either a Hydrolight/Hydrocomfort 8 or Hydrolight/Hydrocomfort 16 internal unit.

This results in the following combinations (s=single phase, t=three phase):

ODU	Hydrolight	Greensource Split HP Hydrolight
7.5	8	8kW Single-phase
10	16	11kW Single-phase
11s	16	14kW Single-phase
12s	16	16kW Single-phase
11t	16	14kW Three-phase
12t	16	16kW Three-phase

Table 2

ODU	Hydrocomfort	Greensource Split HP Hydrocomfort
7.5	8	8kW Single-phase
10	16	11kW Single-phase
11s	16	14kW Single-phase
11t	16	16kW Single-phase
12s	16	14kW Three-phase
12t	16	16kW Three-phase

Table 3

The Hydrocomfort is designed for single input operation with integrated electric heating element.

The Hydrolight is designed for dual mode operation with an oil or gas boiler.

7.2 APPLICATION AREA

The heat pump must only be used in a sealed heating system according to BS EN 12828.
Other forms of use are not permitted. Worcester, Bosch group take no responsibility for damage occurring due to non-permitted use.

The heating system to which the heat pump is connected must have a volume of at least 25L always available, otherwise a buffer tank (primary water storage) must be installed.

7.3 DATA PLATE

The data plate for the heat pump is on the service hatch. Information about the heat pump's output, part number, serial number, amount of refrigerant fluid in the pump and the date of manufacture is stated there.

The data plate for the Hydrolight/Hydrocomfort module is on the electric box of the unit.

7.4 TRANSPORT AND STORAGE

The outdoor unit and Hydrolight/Hydrocomfort unit must be transported and stored in an upright position. The outdoor unit may be tilted temporarily, but must not be laid down.

The Hydrolight/Hydrocomfort module must not be stored or transported at temperatures below − 10 °C. The outdoor unit must not be stored at temperatures below − 10 °C.

7.5 POSITIONING THE HEAT PUMP

Heat pump installations should be made in accordance to the current MIS3005 micro generation installation standards and including MCS020 planning standards. There are two options available as accessories for fixing the outdoor unit:

- ▶ Floor standing version
- ▶ Wall-mounted version (only on 8kW unit)

- The outdoor unit is placed outdoors, on a level and stable surface. Cast slabs are recommended.
- Sound propagation must be taken into consideration when positioning the outdoor unit.
- When locating of the outdoor unit consideration must be done to minimise the noise so that neighbouring properties are not adversely affected.
- The outdoor unit must be positioned so that air is not prevented from passing through the evaporator.
- The outdoor unit must not be positioned so that the recirculation of cold air can occur.
- Avoid positioning the outdoor unit so that it is exposed to wind directly from the front.
- The outdoor unit must not be positioned where there is a risk of snow and rain drops from eaves. If this is not possible, install a protective roof with a minimum distance of 1 m.
- The Hydrolight/Hydrocomfort unit is positioned indoors. Pipework between the outdoor unit and the Hydrolight/Hydrocomfort module must be as short as possible. The pipes must be insulated.
- Only connect the outdoor unit and internal unit using suitable refrigerant lines.
- Discharge water from the safety valve must be routed away from the Hydrolight/Hydrocomfort module to a frost free drain so that any discharge does not create a risk.

7.6 DEFROST METHOD

In regions where the air has a high moisture content and there is a danger of freezing (near lakes, rivers and the sea), the SW 7-6 switch can be switched to "on". This shortens the defrosting cycles.

The principle of defrosting in the outdoor unit is known as hot gas defrosting. During defrosting, the flow in the refrigerant circuit is reversed by means of an electrically-controlled four-way valve.

The compressed gas from the compressor is fed into the top of the evaporator, causing the ice on the outside to melt. During this process, the water in the heating system is cooled slightly. The time required for defrosting depends on the amount of ice and the outdoor temperature.

7.7 CHECKS BEFORE INSTALLATION

- ▶ Installation of the outdoor unit should be performed by a competent person.
- ▶ The outdoor unit installation must follow the current applicable regulations.
- ▶ Check that all pipe connections are intact and have not shaken loose during transportation.
- ▶ Before the outdoor unit is commissioned, the heating system, hot water cylinder and the heat transfer fluid system, including the outdoor unit, must be filled and vented.
- ▶ Wiring should be kept as short as possible to protect the system from downtime, for example during a thunderstorm.

7.8 CAN-BUS

CAUTION: Interference.
- ▶ The CAN-BUS cable must be screened and laid with a minimum distance of 100mm separately from the power cable.

CAUTION: Do not mix up the 12 V and CAN-BUS connections!
The processors will be damaged beyond repair if 12 V is connected to the CAN-BUS.
- ▶ Ensure that the four cables which are to be connected to the contacts on the printed circuit boards are made with their corresponding markings.

The printed circuit boards in the Hydrolight/Hydrocomfort unit, and accessories board if applicable, are connected via the CAN-BUS communication line. The CAN (Controller Area Network) is a system that facilitates communication between microprocessor-based modules/ printed circuit boards.

A room controller is available as an accessory and must be connected by a CAN-BUS cable.

Suitable cable for external laying is cable type LIYCY (TP) 2x2x0.5. The cable must be twisted pair and screened. The screen must only be earthed at one end and to the chassis.

Maximum cable length is 30 m between the internal room controller and the internal Hydro unit.

The CAN-BUS cable must **not** be routed together with the mains cable that carry 230 V or 400 V. The minimum clearance is 100 mm. Routing of these cable together with the sensor cables is not permitted.

The connection between the circuit boards is by four wires, because the 12V-supply between the circuit boards must also be connected. The circuit boards have markings for both the 12V and CAN-BUS connections.

7.9 CAN-BUS TERMINATION

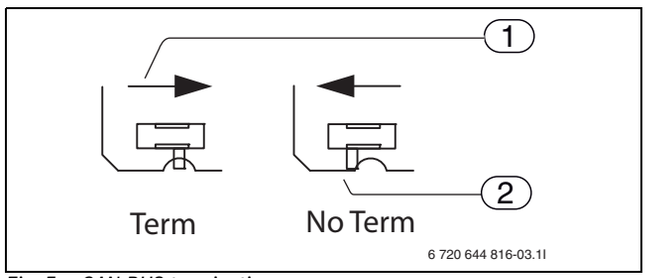

Fig. 5 CAN-BUS termination

[1] Terminated CAN-BUS
[2] Non-terminated CAN-BUS

Switch S1 marks the start and end of the CAN-BUS connection. The display card (labelled with CPU on the wiring diagram) and the accessories board (IOB-B) in the Hydrolight/Hydrocomfort module must be terminated by switch S1 (position ON).

If the CAN-BUS connected room controller is used it is terminated, and S1 on the main circuit board (IOB-A) in the Hydrolight/Hydrocomfort module must be set to **not terminated** (position OFF).

When using the Multi Box kit (which is an accessory), the board in this unit must instead be terminated in the main board of the Hydrolight/ Hydrocomfort unit.

We recommend that all printed circuit boards that are to be connected to the CAN-BUS are installed first. When this is being done, switch S1 must be in the **Term** position. (ON position).

7.9.1 SETTING OF SWITCH S1

When switch S1 is in position ON, the loop is terminated. In position ON, S1 is placed at the middle position and covers the hole in the board.

When switch S1 is in position OFF, the loop is not terminated. In position OFF, S1 is placed at one of the side positions and the hole in the board is not covered.

7.10 HANDLING CIRCUIT BOARDS

CAUTION: Always wear a a ground-connected bracelet when handling electronics.

Circuit boards with control electronics are sensitive to discharges of static electricity (ESD – ElectroStatic Discharge) when handled. To prevent damaging the components, special care is therefore required when handled.

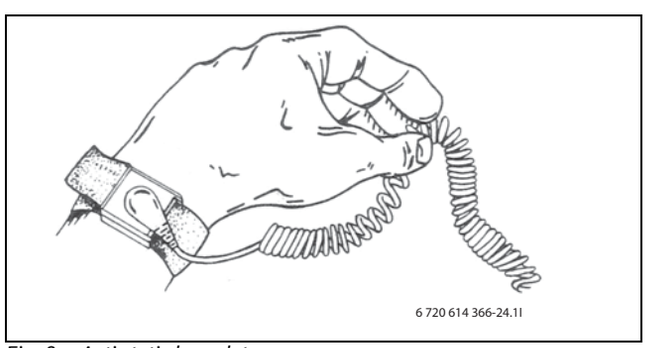

Fig. 6 Anti static bracelet

Damage is usually latent, and a circuit board can operate correctly during commissioning but show signs of problems later. Charged objects may only be problematic if they are in close proximity to the electronics. Keep a distance of at least one metre from expanded polystyrene, protective plastic and other packaging, synthetic material (e.g. fleeces) and similar before starting work.

A method for good ESD protection is a ground-connected bracelet when handling electronics. This bracelet must be put on before opening the screened metal bag/packaging or before exposing an installed board. The bracelet must be worn until the circuit board is enclosed in its screen packaging or closed electric box. Replaced, returned circuit boards must be handled in the same way.

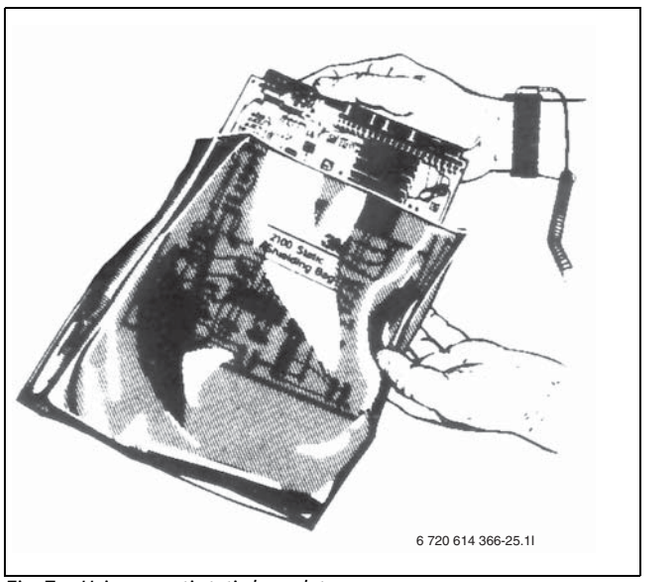

Fig. 7 Using an anti static bracelet

8 DIMENSIONS, CLEARANCE AND PIPE CONNECTIONS

8.1 OUTDOOR UNIT

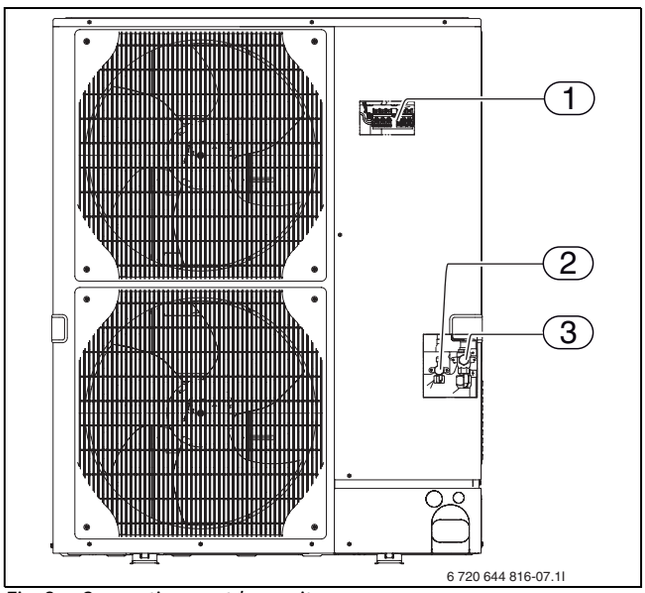

Fig. 8 Connections, outdoor unit

[1] Connections, power and signal cable
[2] Refrigerant pipe connection (flare connection) ø 9.52 (3/8")
[3] Refrigerant pipe connection (flare connection) ø 15.88 (5/8")

Connections apply for all outdoor unit sizes.

8.1.1 REQUIRED MINIMUM CLEARANCES FOR THE OUTDOOR UNIT

Minimum distance between the outdoor unit and the wall is 300 mm.

Minimum distance in front of the outdoor unit is 500 mm for ODU 7.5, 10 and 11, 1000 mm for ODU 12t.

Minimum distance at the sides of the outdoor unit is 150 mm.

Any protective roof must be installed at least 1 metre above the outdoor unit, to prevent recirculation of cold air.

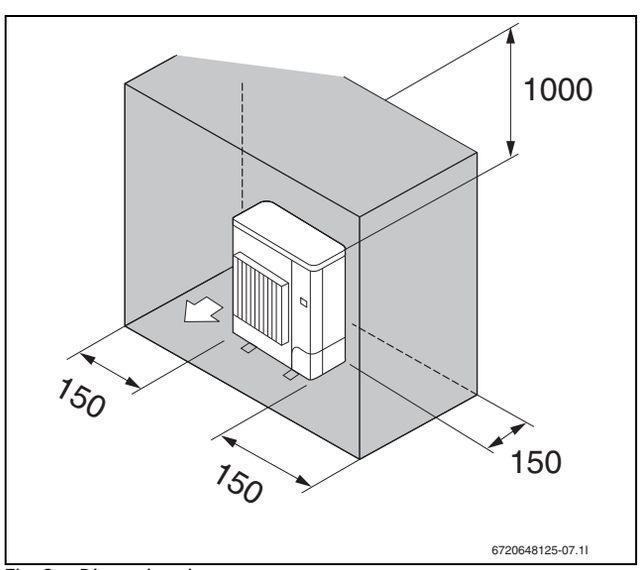

Fig. 9 Dimensions in mm

8.1.2 SIZE OF OUTDOOR UNIT

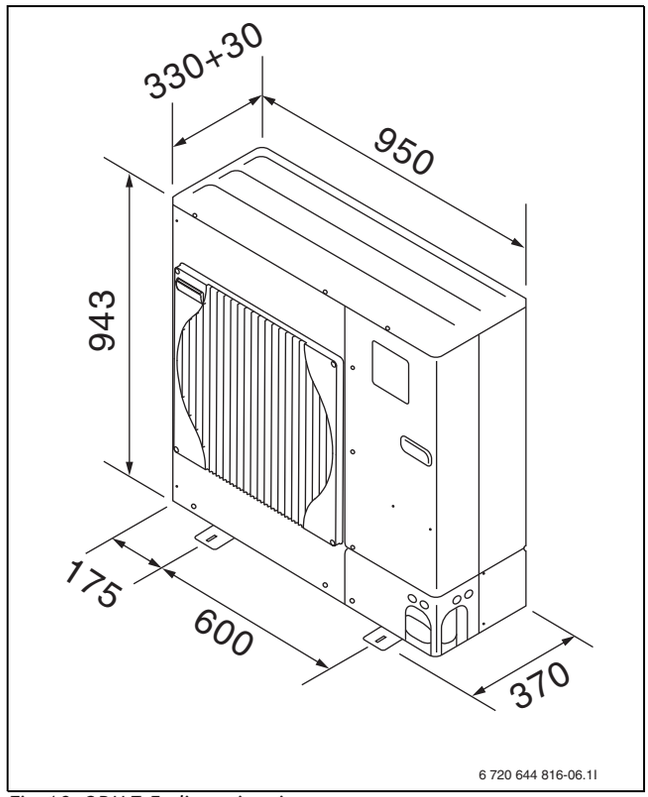

Fig. 10 ODU 7.5, dimensions in mm

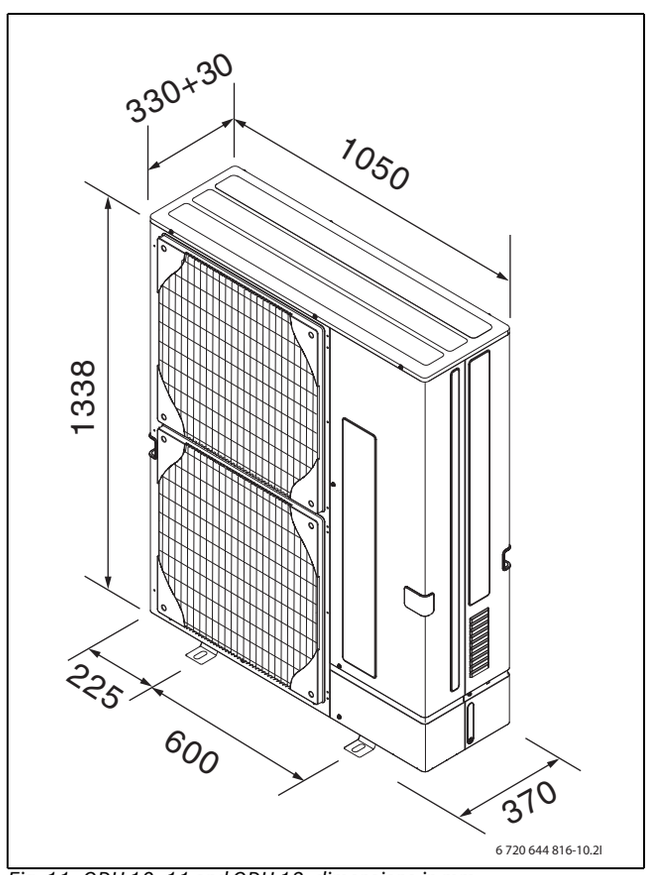

Fig. 11 ODU 10, 11 and ODU 12, dimensions in mm

8.1.3 INSTALLATION LOCATION

Heat pump installations should be made in accordance to the current MIS3005 micro generation installation standards and including MCS020 planning standards and Manufacturers instructions, suitable mounting components are available as accessories.

WARNING: Risk of damage
- The floor mounting feet with Anti vibration is designed to withstand the weight of the outdoor unit. The installer is responsible for ensuring that the installation area is appropriate for dealing with the total weight of the outdoor unit and the floor stand.
- It is advisable also to secure some form of safety wire between the upper section of the outdoor unit and the wall. This is to prevent the risk of tipping.

WARNING: Risk of damage
- The wall mounting bracket is designed to withstand the weight of the 7.5 outdoor unit only. The installer is responsible for ensuring that the wall and the selected fasteners are suitable for handling the total weight of the outdoor unit and the wall mount.
- It is advisable also to secure some form of safety wire between the upper section of the outdoor unit and the wall. This is to prevent the risk of tipping.

Make sure that the unit is installed on a stable and even surface, to prevent rattling noises during operation. Recommended installation height above ground is a minimum of 100 mm, to compensate for ice formation.

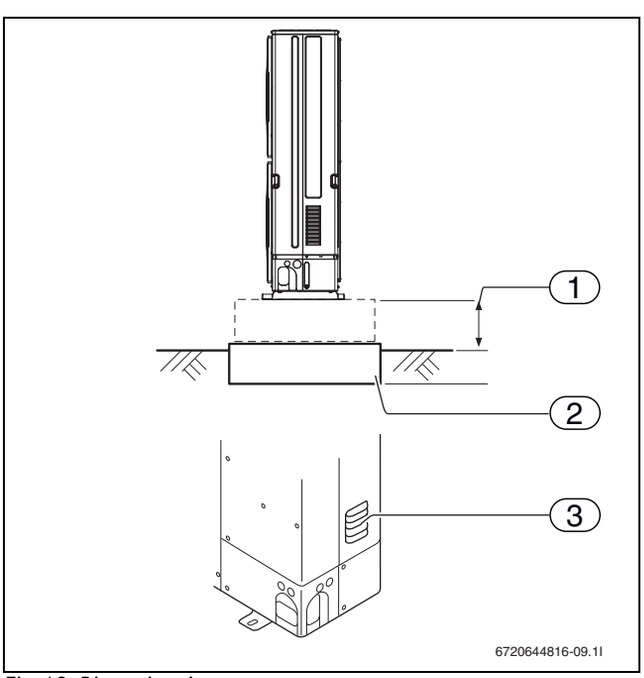

Fig. 12 Dimensions in mm

[1] > 100 mm above ground
[2] Level subsurface with sufficient load bearing capacity, e.g. cement slab cast in-situ
[3] Ventilation hole, must not be obstructed

8.1.4 APPLIANCE LAYOUT

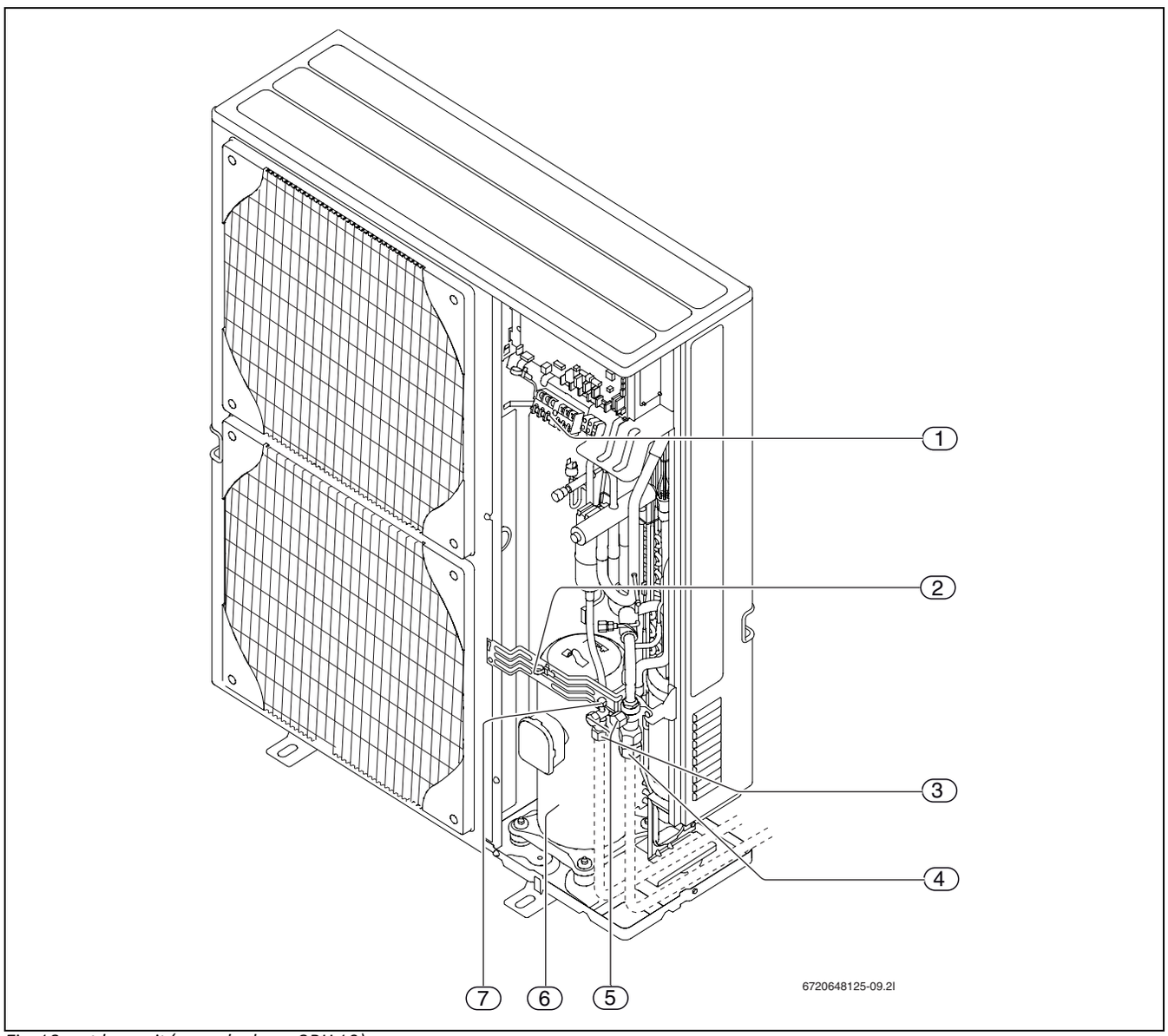

Fig. 13 outdoor unit (example shows ODU 12)

[1] Connections, electric and signal cable
[2] Cable terminals
[3] Connection, liquid (during heating mode)
[4] Connection, hot gas (during heating mode)
[5] Shut-off valves, liquid and hot gas
[6] Compressor
[7] Service outlet at shut-off valve for liquid (connection for vacuum pump)

Connections apply for all outdoor unit sizes.

8.2 HYDROLIGHT/HYDROCOMFORT UNIT

During the installation, the front panel of the Hydrolight/Hydrocomfort unit can be removed and placed on the hooks on the left or the right side of the module, or underneath the unit.

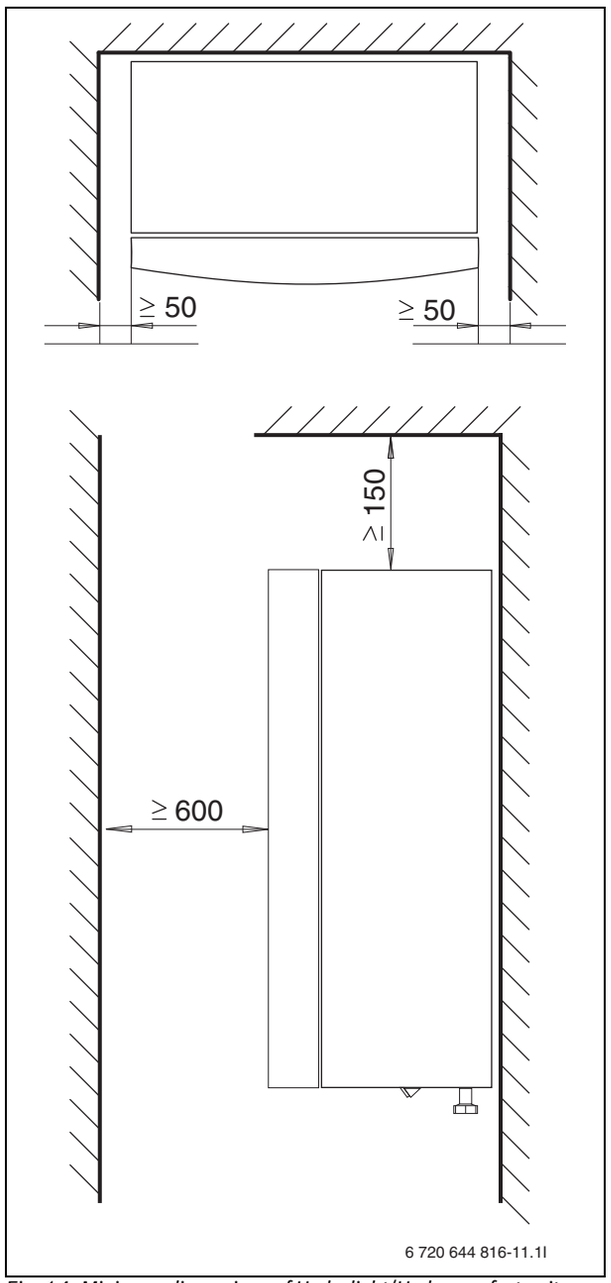

Fig. 14 Minimum dimensions of Hydrolight/Hydrocomfort unit (dimensions in mm)

An installation clearance of at least 50 mm is required between the Hydrolight/Hydrocomfort unit and the walls.

An installation clearance of at least 600 mm is required in front of the Hydrolight/Hydrocomfort unit. An installation clearance of at least 150 mm is required above the Hydrolight/Hydrocomfort unit.

8.3 PIPE CONNECTIONS

Adapter parts delivered with the appliance are only for water connections.

- ▶ Assemble male adapter part after particle filter, towards the heating system.
- ▶ Assemble female adapter part/parts at the pipe connections of the Hydrolight/Hydrocomfort unit.

The particle filter is installed in the return heating pipe to the Hydrolight/Hydrocomfort (→ [E21.V101], chapter 11.4.3).

NOTICE: Risk of leakage!

- ▶ Use washers delivered with the appliance and teflon band (not in delivery) when assembling adapter parts to appliance pipe connections.

The following connections must be made in the Hydrolight/ Hydrocomfort unit:

- ▶ Route the discharge water hose from the safety valve downwards to a frost free drain.

Pipe dimensions	
Flow/return, heating system and additional heat	R25, 1”(26x34)
Refrigerant pipe gas/liquid, to outdoor unit	5/8” and 3/8”

Table 4 Pipe dimensions

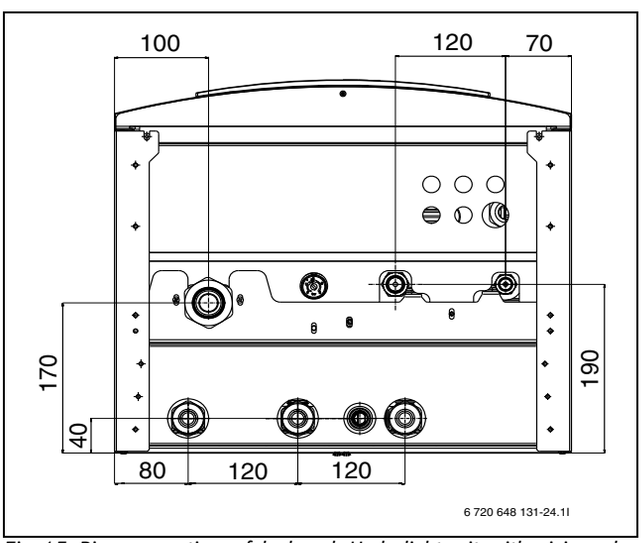

Fig. 15 Pipe connections of dual mode Hydrolight unit, with mixing valve for 2. heat appliance.

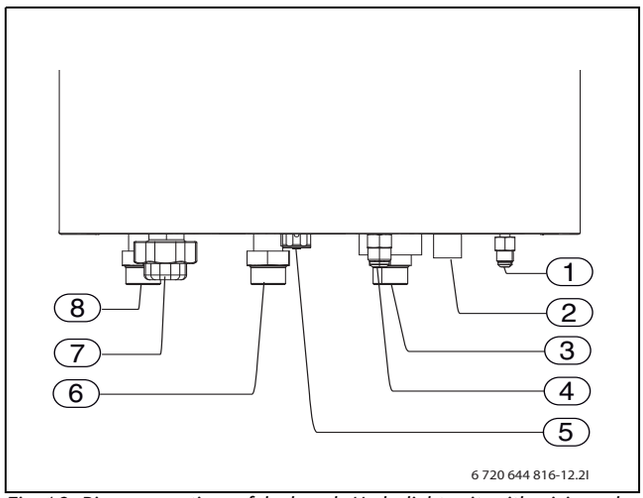

Fig. 16 Pipe connections of dual mode Hydrolight unit, with mixing valve for 2. heat appliance.

[1] Liquid line
[2] Discharge water from the safety valve
[3] Return (back to boiler)
[4] Hot gas line
[5] Pressure gauge
[6] Flow (from boiler)
[7] Heating return
[8] Heating flow

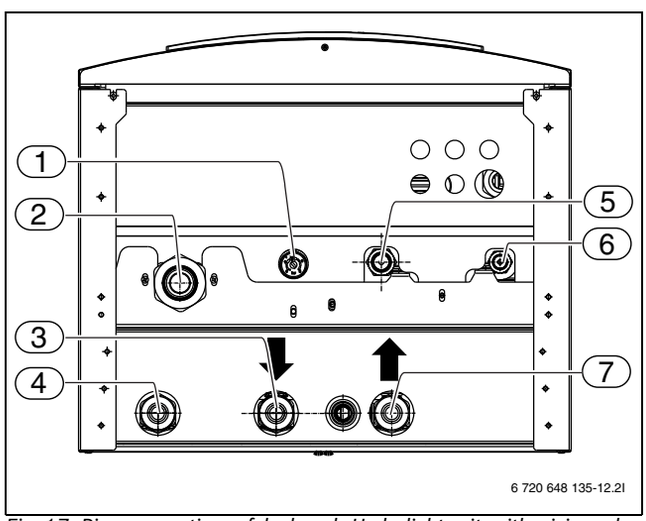

Fig. 17 Pipe connections of dual mode Hydrolight unit, with mixing valve for 2. heat appliance.

[1] Pressure gauge
[2] Heating return
[3] Flow (from boiler)
[4] Heating flow
[5] Hot gas line
[6] Liquid line
[7] Return (back to boiler)

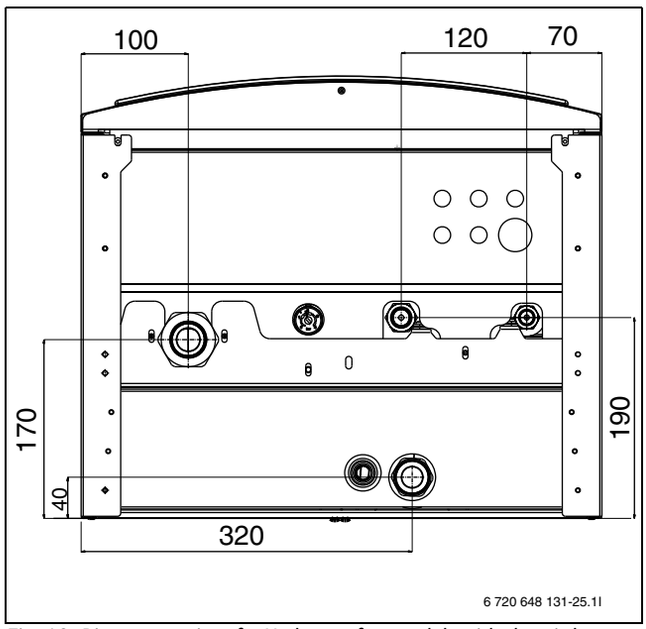

Fig. 18 Pipe connections for Hydrocomfort module with electric booster heater.

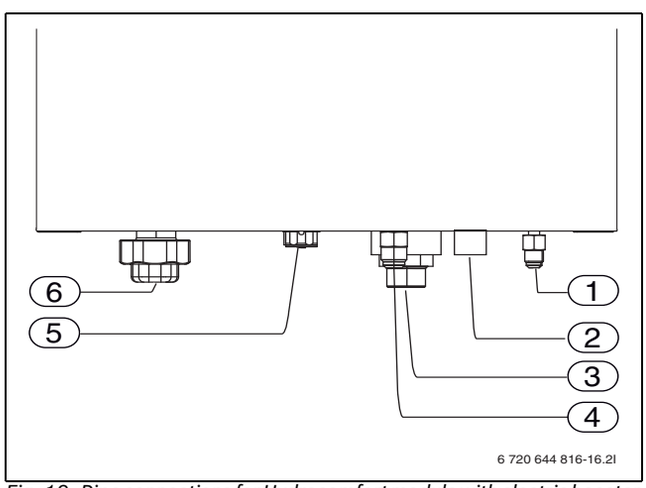

Fig. 19 Pipe connections for Hydrocomfort module with electric booster heater.

[1] Liquid line
[2] Discharge water from the safety valve
[3] Heating flow
[4] Hot gas line
[5] Pressure gauge
[6] Heating return

9 INSTALLATION

Only competent installers may carry out the installation. The installer must follow all current rules and regulations and recommendations from the manufacturer.

9.1 ACCESSORIES

If there is a danger of ice formation, a heating cable must be installed in the condensate pan and condensate drain. A heating cable is always recommended.

The diagnosis tool is required for troubleshooting at the outdoor unit available as an accessory.

The following accessories are available:

- Floor mounting feet with Anti vibration
- Wall mounting bracket for assembly of outdoor unit on the wall
- Tray for collecting and discharge of defrost water from the outdoor unit
- Room temperature controller, CAN-BUS LCD
- Buffer (primary water storage) for heating mode
- 3-way valve (for domestic hot water) plus DHW temperature sensor
- Heating cable
- Multi Box for different heating circuits
- Diagnosis tool (for Service only)

9.2 CONNECTION PRINCIPLE

The function is based on continuous condensation and booster heating of the Hydrolight/Hydrocomfort units. The control unit regulates the heat pump in accordance with the set heating curve with the actual temperatures captured by the outside temperature sensor T2 and flow temperature sensor T1.

When the heat pump can no longer meet the entire heating demand on its own due to the outside air temperature, either the Hydrolight with boiler support/Hydrocomfort with electric booster heater starts automatically and together with the heat pump, generates the temperature required inside the building.

Hot water is prioritized and controlled by the sensor T3 in the heat pump hot water cylinder. While the water is being heated in the hot water cylinder, the heating system of the heat pump is temporarily disconnected by a 3-way valve. The heating operation of the heat pump continues when the water in the hot water cylinder has reached the set temperature.

Heating and DHW mode with the heat pump in an idle state:

At outside temperatures below approx. -20 °C (adjustable value), the outdoor unit stops automatically and can no longer deliver heat. The booster heater in the Hydrocomfort module or the auxiliary heat appliance (boiler) connected to the Hydrolight module automatically takes over the heating mode and DHW production.

9.3 PREPARING THE PIPE CONNECTIONS

The drain pipe from the safety valve of the internal unit is to be frost-protected and attached from below.

▶ Route the connection pipe for the heating system and cold/hot water on site up to the installation location of the Hydrolight/Hydrocomfort unit.

9.4 POSITIONING

▶ Remove the supplied accessories.
▶ Remove the packaging according to the instructions on the packaging.

9.5 CONNECT THE HEAT PUMP TO THE HEATING SYSTEM

Heat losses can be reduced by keeping the lengths of pipework outdoors short.

▶ Insulate the outdoor pipes with a material that does not absorb moisture, such as Armaflex.
▶ Install the particle filter.

The task of the particle filter is to filter out dirt before it can enter the heat pump. Accordingly, the supplied filter valve must always be fitted on the return pipe, between the indoor unit (Hydrolight/Hydrocomfort) and the heating system. It should be fitted as close to the indoor unit as possible and be horizontal.

The particle filter is installed in the return heating pipe to the Hydrolight/Hydrocomfort (→ [E21.V101], chapter 11.4.3).

9.6 FLUSHING THE HEATING SYSTEM

FOLLOW THE GUIDANCE OF BS7593:

Treatment of water in domestic hot water central heating and also the flushing guidelines below.

NOTICE: Artificially softened water must not be used to fill the central heating system.

FLUSHING THE SYSTEM

▶ Fill the system with cold water and check for leaks.
▶ Open all drain cocks and drain the system.
▶ Close drain cocks and add a suitable flushing agent **compatible with aluminium** at the correct strength for the system conditions in accordance with the manufacturer's instructions.
The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.
▶ Circulate the flushing agent before the heat pump is connected.
▶ Run the system at normal operating temperature as directed by the manufacturer of the flushing agent.
▶ Drain and thoroughly flush the system to remove the flushing agent and debris.
▶ It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances.
▶ Close the drain cocks and refill with fresh water and a suitable inhibitor.
▶ Vent any air from the boiler and system.
▶ Clean the particle filter.

INHIBITOR

If the system is exposed to freezing conditions, add a suitable inhibitor or combined inhibitor/anti-freeze in accordance with the manufacturer's guidelines.

WARNING: Sealing agents
- ▶ Normally the addition of sealing agents to the system water is not permitted as this can cause problems with deposits left in the heat exchanger.
- ▶ In cases where all attempts to find a micro leak have failed, Worcester, Bosch Group supports the use of Fernox F4 leak sealer.

9.7 CONNECTING THE REFRIGERANT PIPE

The installation must only be carried out by certified refrigeration engineer (F Gas). The installer must comply with the applicable rules, regulations and specifications of the installation and operating instructions.

CAUTION: Do not open the shut off valves before the refrigerant pipes have been fully connected and the vacuum-drying is completely finished along with a strength and tightness test, as per BS EN378. The outdoor unit is pre-filled with refrigerant R410A which may leak if the valves are opened too soon.

Observe caution when bending pipes so that they are not kinked or damaged. A bend radius of 100 – 150 mm is sufficient.

Use a refrigerant oil with esther, ether or alkyl benzene to grease pipe flanges and flange nuts.

9.7.1 SAFETY

Use exclusively R410A refrigerant in the air to water heat pump.

Compared to previously used refrigerants, the R410A refrigerant operates at a pressure that is approx. 1.6-times higher.

- ▶ Only qualified and authorised refrigeration engineers may work on the refrigerant system.
- ▶ For the installation work, use tools and pipe components specifically made for use with R410A refrigerant.
- ▶ Check for leaks in the refrigerant system. Escaping refrigerant coming into contact with a naked flame will produce poisonous gases.
- ▶ Never release refrigerant to the atmosphere.

If refrigerant leaks and touches the skin, it can cause frostbite.

- ▶ In case of a refrigerant leak, never touch any part of the air to water heat pump.
- ▶ Avoid skin or eye contact with refrigerant.
- ▶ Seek medical attention if you get refrigerant on your skin or in your eyes.
- ▶ Contact the installer immediately.

9.7.2 PREPARING FOR INSTALLATION

TOOLS

CAUTION: Property damage from incorrect installation!
- ▶ Use only those tools that are specifically intended for handling R410A refrigerant.

Tools required to handle R410A refrigerant:

- Pressure gauge kit
- Charge hose
- Gas leak detector
- Spanners
- Flaring tool
- Flaring gauge
- Vacuum pump adapter
- Electronic refrigerant scales

PIPES AND PIPE JOINTS

WARNING: Risk of injury through escaping refrigerant! Pipes that are not permissible or that are incorrectly sized can burst.
- ▶ Only use refrigeration pipe work with the correct wall thickness.

- ▶ Ensure the insides of the pipes are clean and do not contain any harmful contaminants such as sulphuric compounds, oxidants, debris, or dust.
  - – Never store the refrigerant pipes outdoors.
  - – Do not unseal the pipe ends until immediately before they are brazed.
  - – Apply the utmost care when routing refrigerant lines.

  Dust, foreign bodies and moisture inside the refrigerant lines can be detrimental to oil quality or result in compressor failure.
- ▶ After cutting, immediately seal reusable lengths of refrigerant lines.

9.7.3 CONNECTING THE EXTERNAL AND INTERNAL UNITS

▶ Lay out the connection pipes according to how you intend to install them between the internal and external unit of the heat pump.

Start connecting the pipes at the indoor unit. Flange and connect the liquid pipe and the gas pipe as follows:

▶ Remove the flange nut from the liquid connection on the indoor unit. Discard the sealing cap.

▶ Put the flange nut on the liquid pipe (measures: → table 5).

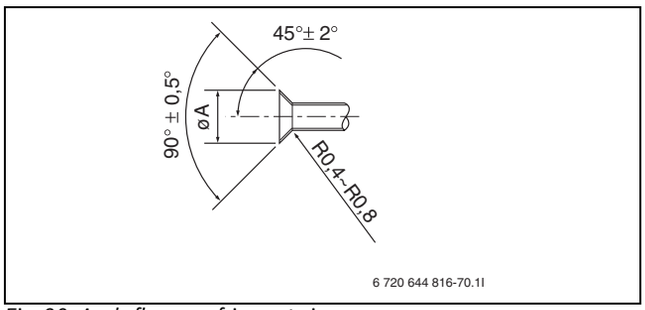

Fig. 20 Angle flange, refrigerant pipe

	Refrigerant pipe, external diameter		Flange nut, external diameter	Pipe flange (ø A in fig. 20)	Torque
Liquid side	9.52 mm	3/8”	22 mm	12.8 – 13.2 mm	34–42 Nm
Gas side	15.88 mm	5/8”	29 mm outdoor unit 27 mm indoor unit	19.3 – 19.7 mm	68–82 Nm

Table 5 Dimensions, flanges and torques for connection of the refrigerant pipe

▶ Crimp the pipe (→ fig. 20 and table 5).
▶ Grease the contact surfaces on the flange nut and the pipe flange with refrigerant oil.
▶ Fasten the flange nut on the liquid connection of the indoor unit.
▶ Tighten flange nut with spanners. For torque, refer to table 5. Use a wider wrench as the torque counteracting support (→ fig. 21).
▶ Flange the gas pipe and connect it to the gas connection of the indoor unit in the same way as the liquid pipe.

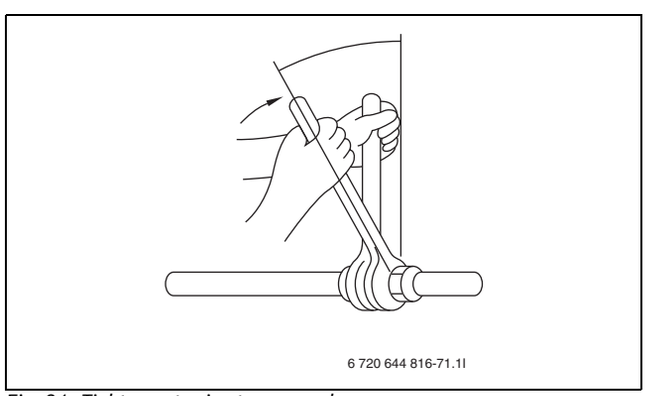

Fig. 21 Tighten nut using two wrenches

▶ Make sure that the stop valves for liquid and gas on the outdoor unit are closed (→ [5], fig. 13). Remove the flange nuts. Discard the sealing caps.
▶ Check that there is no leakage from the valves. Use an electronic leak tracer or suitable leak detector.
▶ The liquid pipe and gas pipe are flange-mounted and connected to the external unit of the heat pump in exactly the same way as the internal unit.
▶ Make sure that the pipes are not in contact with the compressor. If the pipes are in contact with the compressor this may cause unusual noise or vibrations and possible damage to the pipe work.

9.7.4 INSPECTION OF REFRIGERANT PIPING TIGHTNESS

Perform tightness test to EN 378-2. Use oxygen free nitrogen to check the leak-tightness of the refrigerant pipe.

▶ Make sure that the shut off valves for gas and liquid in the outdoor unit of the heat pump are closed (→ [5], fig. 13). Do not open them.
▶ Connect the pressure gauge and gas tank (oxygen free nitrogen) to the service outlet on the liquid shut-off valve (→[1], fig. 22).
▶ Pressurise the refrigerant piping little by little to 4.15 MPa (41.5 bar). Wait a minimum of five minutes, then check the pressure. If the pressure decreases, there is a gas leak. In which case, do a leak check.
▶ Reduce the pressure to 1.0 MPa (10.0 bar). Wait for an hour and test the pressure again.
▶ Perform bubble test (leak detecting spray) to search for leaks.

9.7.5 VACUUM EVACUATION

Evacuate the pipework using a vacuum pump, before the refrigerant flows through it.

▶ Connect the vacuum pump to the service connection on the liquid line shut off valve (→ [1], fig. 22).
▶ Start the vacuum pump and maintain vacuum for at least one hour after 1 mbar / 0,75 torr / 100 Pa / 750 micron achieved. Longer drying time may be required depending on the temperature and humidity of the surrounding air.
▶ Disconnect the vacuum pump.

9.7.6 OPENING THE SHUT-OFF VALVES

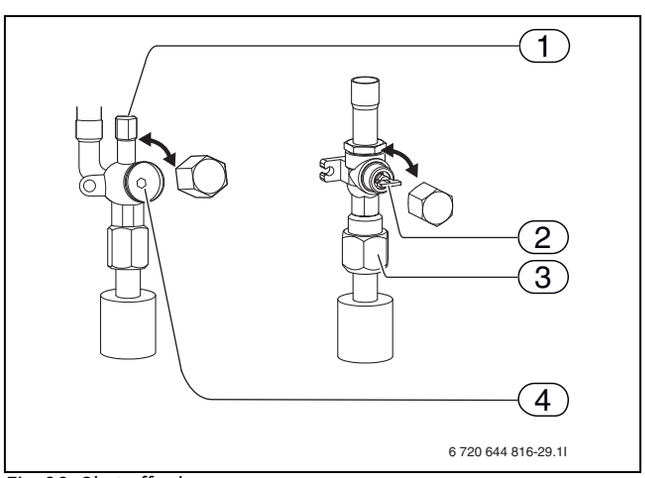

Fig. 22 Shut-off valves

[1] Service outlet, liquid pipe (connection of vacuum pump)
[2] Shut-off valve for gas
* 7.5 kW: hole for socket wrench, 5 mm
* 10 – 12 kW: handle
[3] Flange nut
[4] Shut-off valve for liquid, hole for socket wrench 4 mm

GAS SIDE

▶ Remove the cover.

- ▶ Open the shut-off valve by turning the screw (→ [2], fig. 22) as far as it will go using a 5 mm socket wrench (7.5 kW), or by turning the handle (10–12 kW).
- ▶ Put the cover back on.

LIQUID SIDE

- ▶ Remove the cover and open the shut-off valve (→ [3], fig. 22) by turning it anticlockwise as far as it will go using a 4 mm socket wrench. Stop turning as soon as you reach the stop.
- ▶ Screw the cover back on

9.7.7 FILLING WITH REFRIGERANT

- ▶ Subsequent filling of the system is not required if the length of the pipe does not exceed 30 m.
- ▶ If the pipe is longer than 30 m, additional refrigerant must be filled in accordance with table 6.
- ▶ If the ODU is running, fill liquid refrigerant at the service outlet on the suction side. Do not fill liquid refrigerant at the shut-off valve directly.
- ▶ Once you have filled refrigerant in the ODU, enter the amount you put in on the service label (on the unit).

Model	Permitted pipe length	Permitted difference vertically	Top up amount of refrigerant			
			31 – 40 m	41 – 50 m	51 – 60 m	61 – 70 m
8 kW	0 – 50 m	0 – 30 m	0,6 kg	1,2 kg	Not applicable	Not applicable
11 – 16 kW	0 – 70 m		0,6 kg	1,2 kg	1,8 kg	2,4 kg

Table 6 Topping up refrigerant

9.8 FILLING THE HEATING SYSTEM

First flush the heating system. If the water heater is connected to the system, it must be filled with clean water. The heating system is then filled.

9.8.1 FILLING THE HEATING SYSTEM WITH CLEAN WATER

Worcester Bosch recommends the fitting of an inline system filter to help ensure that the heating system can perform at its optimum level.

- ▶ Set the pre-pressure for the expansion vessel in the premises according to the heating unit's static height.
- ▶ Open the heating system's valves.
- ▶ Top up the heating water in the system and fill system to appropriate operating pressure.
- ▶ Vent the heating system by opening the shut off valve (→ [1], fig 24). This may have to be repeated a couple of times and is very important to ensure the correct operation of your heat pump.
- ▶ Also bleed via the heating system's other bleed valves (e.g. radiators).
- ▶ Refill to the correct pressure. Normal pressure is 1.0 – 2.5 bar, but depends on the expansion vessel's pre-pressure and the height of the building.
- ▶ Shut the heating water filling valve when the correct pressure is reached.

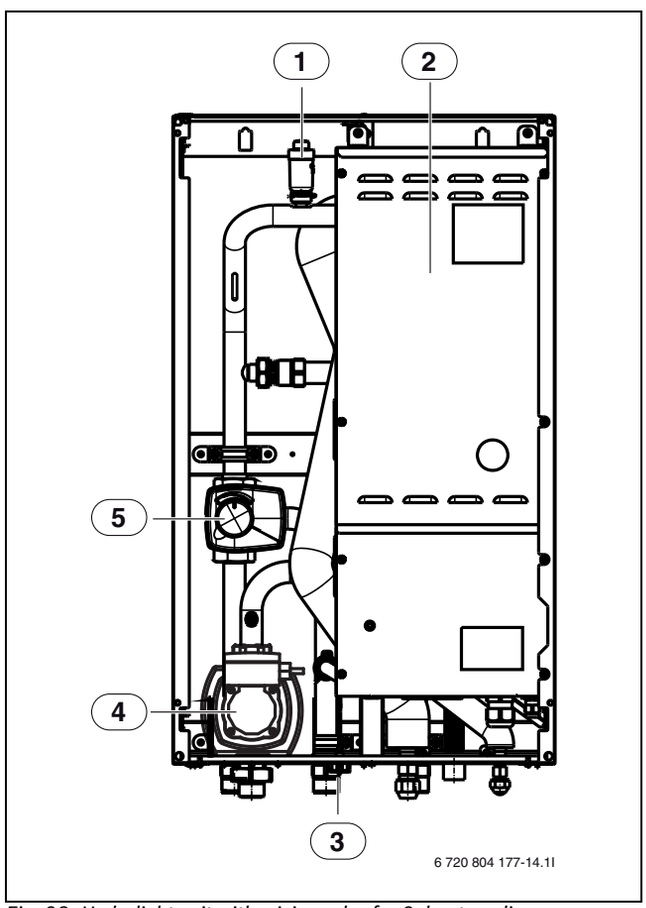

Fig. 23 Hydrolight unit with mixing valve for 2. heat appliance

[1] Air vent valve (automatic)
[2] Electrical switch box
[3] Pressure gauge
[4] Circulation pump
[5] Mixing valve

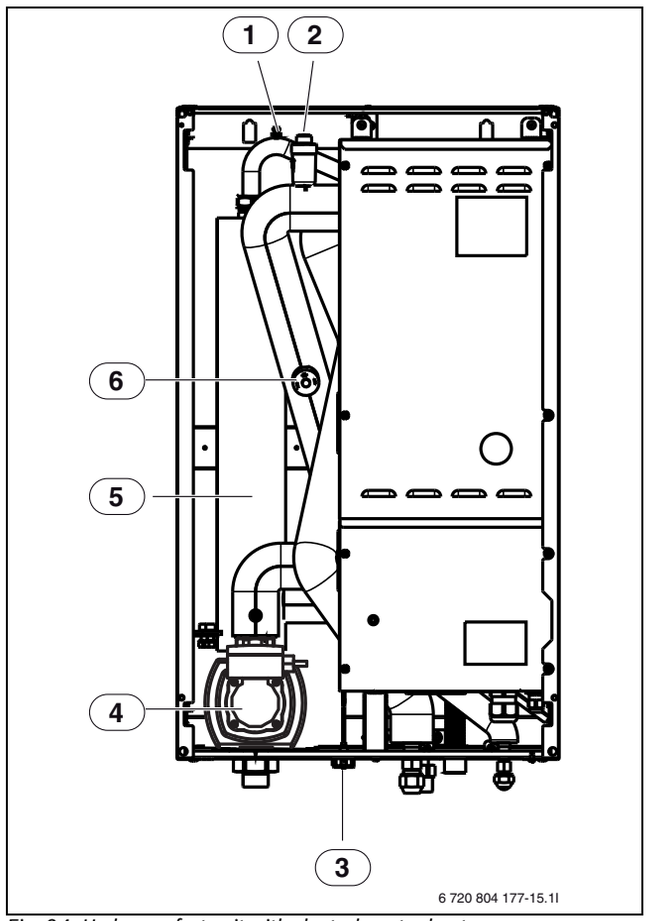

Fig. 24 Hydrocomfort unit with electr. booster heater

[1] Air vent valve (manual)
[2] Air vent valve (automatic)
[3] Pressure gauge
[4] Circulation pump
[5] Electric booster heater
[6] Pressure Switch

9.8.2 LEAK TEST

- ▶ Perform a final leak test once the system has been brought into operation and a flow temperature of between 45 and 55 °C has been reached (the quickest way to achieve this is via compressor stage 7 in manual mode) and search for fine leaks at the flare connections on the outdoor unit and Hydrolight/Hydrocomfort unit using a suitable leak detection spray or electronic tester.

9.8.3 PRESSURE SWITCH

The Hydrocomfort unit incorporates a pressure switch (→[6], fig. 24) which trips if the pressure in the heating system is too low.

If the system pressure is less than 0.5 bar, this trips the pressure switch which switches off the power supply to the electr. booster heater and triggers the alarm. **No pressure in system** To remedy the fault:

- ▶ Check that the expansion vessel and safety valve are designed to operate with the pressure in the system.
- ▶ Slowly increase the pressure in the heating system by filling water via the filling cock.
- ▶ Acknowledge the alarm by pressing the rotary selector in the user interface of the Hydrocomfort module (→[3], fig. 62).

9.9 CONNECTING A HEAT PUMP DHW CYLINDER (3RD PARTY)

It is very important that only DHW storage cylinders specifically designed for use with heat pumps are used. Cylinders of this type have a large heat exchange area, typically at least 3.0m^2, and pre-defined positions for the temperature sensors.

Using a heat pump DHW cylinder with surface areas of heat exchange less than 3m^2 or wrong positioning of sensors could result in a drop in DHW comfort and heat pump efficiency. From test work undertaken the Kingspan Albion Aerocyl series is particularly compatible with the Greensource split heat pump range.

When using an indirect internal coil in the heating system, an automatic air vent valve must be installed in the heat pump flow.

9.9.1 HEAT PUMP HOT WATER CYLINDER, SOLAR

A heat pump solar hot water cylinder can also be connected to either the Hydro light or the Hydro comfort.

9.9.2 DHW TEMPERATURE SENSOR T3 (ACCESSORY)

If the hot water cylinder is installed and T3 is connected to the system, this is automatically acknowledged upon start up of the heat pump control.

- Hot water sensor T3 is connected to terminal block T3 on circuit board IOB-A in the electric box of the indoor unit (→ fig. 40 or 46). The sensor must be properly positioned on the surface of the heat pump hot water cylinder.
- Check the installation guide of the heat pump hot water cylinder for where to position the T3 sensor (example → fig. 25). Correct positioning of the T3 sensor is critical for the hot water comfort.

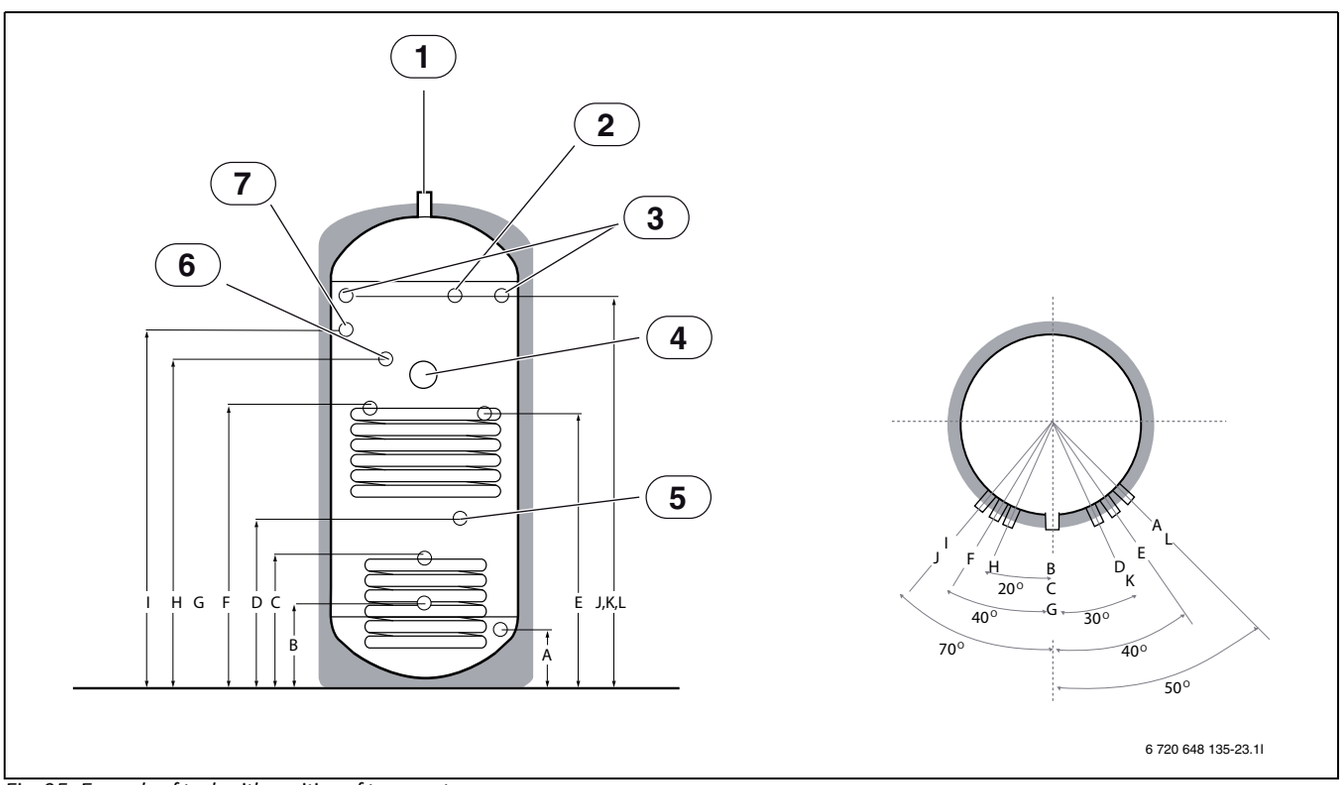

Fig. 25 Example of tank with position of temperature sensor

[1] Hot draw - off
[2] Temperature and pressure relief valve (TPRV) boss
[3] Thermostat pocket (not used)
[4] Immersion heater
[5] Thermostat pocket (not used)
[6] Thermostat pocket, preffered position of temperature sensor T3
[7] Secondary return (not always fitted, see table 7)

Capacity (L)	Height	Diameter	A	B	C	D	E	F	G	H	I	JKL	Weight (kg-empty)	Weight (kg-full)
180	1322	550	135	225	335	355	840	865	915	955	N/F	1057	65	245
210	1515	550	135	225	335	355	905	930	980	1020	1150	1250	68	278
250	1772	550	135	225	335	355	1065	1090	1140	1180	1400	1507	81	331
300	2096	550	135	225	335	355	1130	1155	1205	1245	1600	1830	97	397

Table 7 Dimensions in mm as reference to fig 25

Pay attention to the angle offset in figure 25 (H = 20°) when positioning the temperature sensor.

9.10 3-WAY VALVE (ACCESSORY)

System configuration with DHW cylinder (→ fig. 53, 55 and 57) requires a 3-way valve (E21.Q21).

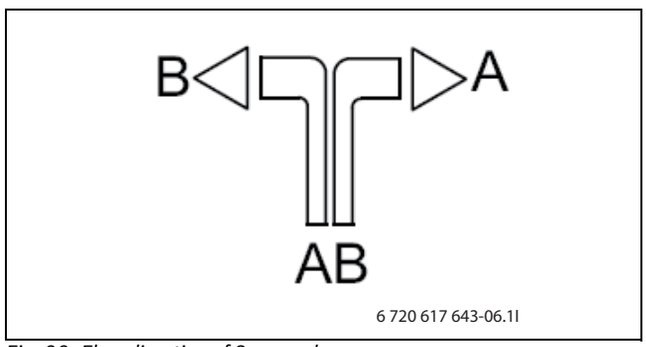

Fig. 26 Flow direction of 3-way valve

[A] to DHW cylinder
[B] to heating system (buffer cylinder)
[AB] from Hydrolight/Hydrocomfort unit

When domestic hot water is being heated the contact is closed and gate A is open (→ fig. 27)

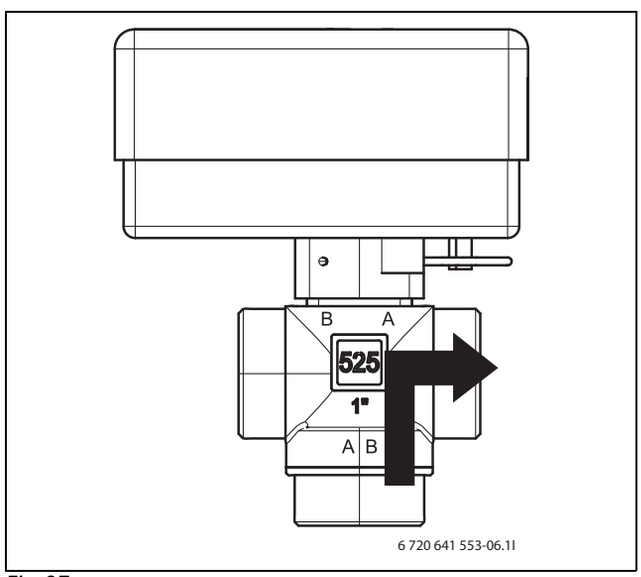

Fig. 27

When heating, the contact is open and gate B is open. (→ fig. 28)

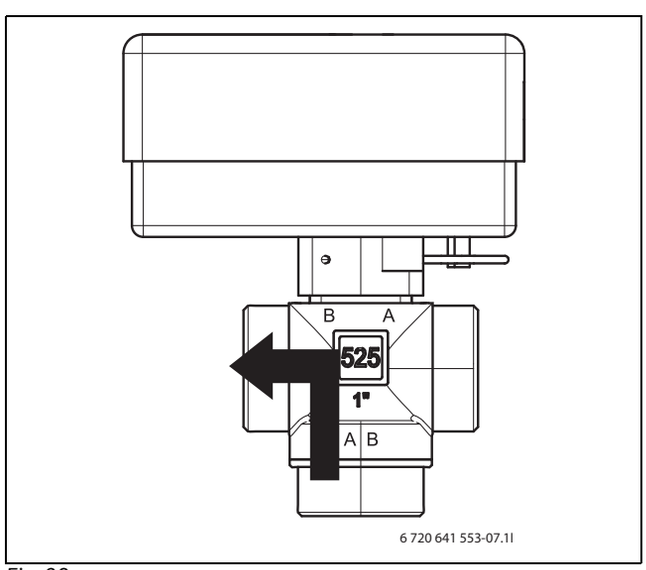

Fig. 28

The 3-way diverter valve is equipped with a Molex plug-in connector. Only terminals 2, 6 and 3 are assigned at the Molex plug. (→ fig. 29).

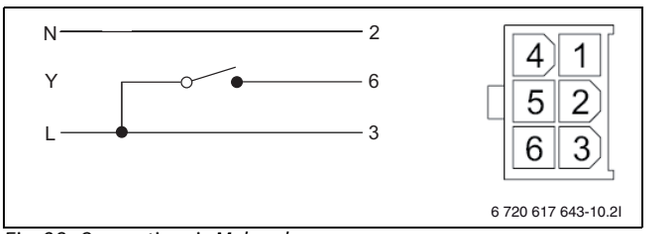

Fig. 29 Connections in Molex plug

[L] Out
[Y] 3-way valve E21.Q21

For connection to the indoor unit (→ fig. 41 or fig. 47).

9.11 INSULATION

All system heat pipe work should be insulated to current standards where applicable.

9.12 INSTALLING THE TEMPERATURE SENSORS

9.12.1 FLOW TEMPERATURE SENSOR T1

The T1 sensor is supplied together with the Hydrolight/Hydrocomfort unit.

▶ Connect the E11.T1 flow temperature sensor to terminal T1 on the IOB-A printed circuit board in the indoor unit. The temperature sensor is assigned to the buffer cylinder, if available. If no buffer cylinder is used, the sensor should be positioned on the flow pipe 1 meter after the 3-way valve (→ Chapter 11.4.3).

9.12.2 T2 OUTSIDE TEMPERATURE SENSOR

If the cable to the temperature sensor runs further than 15 m outdoors, a screened cable must be used. The screened cable must be earthed in the internal unit. The maximum length of a screened cable is 50 m.

The cable to the outdoor temperature sensor must satisfy the following minimum requirements:

Cable cross-section: 0.5 mm2
Resistance: max 50 Ω/km
Number of conductors: 2

▶ Install the sensor on the north side of the house. It must be protected from direct sunlight, ventilation air or anything that can affect the temperature measurement. The sensor must not be installed directly beneath the eaves.

9.12.3 ROOM TEMPERATURE CONTROLLER (ACCESSORY)

The room controller will only operate and control the relevant heating circuit.

When the room temperature controller is connected and integrated in the system, this is automatically acknowledged during the initial configuration.

Requirements for installation location:
- If possible, interior wall without draughts or heat radiation.
- Unimpeded circulation of room air under room controller (dotted area in fig 30 must be kept clear) this also includes a minimum of 1m from a radiator.

Do not place the room temperature controller in direct sunlight.

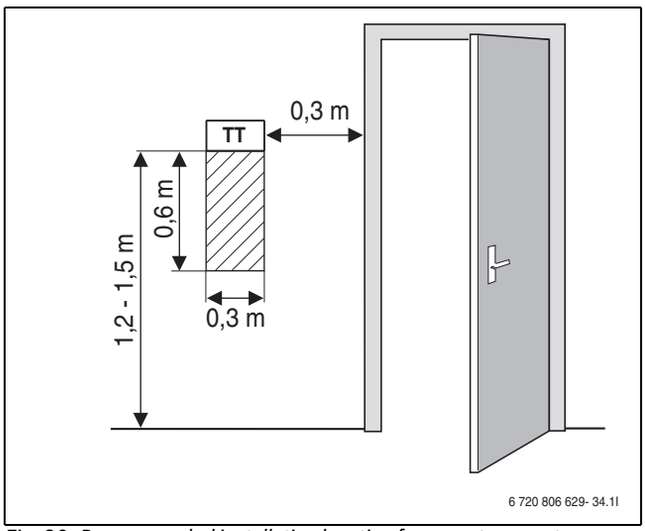

Fig. 30 Recommended installation location for room temperature controller

9.13 OTHER CONNECTIONS

9.13.1 EXTERNAL INPUTS

CAUTION: All connectors to the external inputs on the heat pump must be suited for 5 V and 1 mA.

The external inputs E21.B11 and E21.B12 can be used to remotely control certain functions in the control unit.

The functions that are activated by the external inputs are described in chapter 16.3.9.

The external input is either connected to a switch for manual activation or remote control equipment, which is activated via telephone for example.

9.14 ADDITIONAL MIXER GROUP (ACCESSORY)

The Hydrolight/Hydrocomfort unit can control a maximum of one mixed (with Multi Box accessory) and one unmixed heating circuit.

See the installation manual of the Multi Box accessory for wiring diagrams.

The standard version of the Hydrolight/Hydrocomfort is configured to control one unmixed circuit. Control of an additional mixed circuit can be achieved with the Multi Box accessory. This encompasses the control of the mixer valve and heating circuit pump. There are inputs for the flow sensor, room temperature controller and also two external inputs.

- ▶ Install the mixing valve(E12.Q11) and heating circuit pump(E12.G1) in accordance with the system solution (→ chapter 11.4).
- ▶ Connect the mixing valve and heating circuit pump as shown in the wiring diagrams (→ Installer manual for Multi Box).
- ▶ Install the flow sensor (E12.T1) at the flow of the mixer valve in accordance with the system solution (→ chapter 11.4).
- ▶ Connect the flow sensor as shown in the wiring diagram (→ Installer manual for Multi Box).
- ▶ Install the room temperature controller.
- ▶ Connect these as shown in the wiring diagram (→ Installer manual for Multi Box).

For the settings in the Hydrolight/Hydrocomfort unit, refer to chapter 16.5.

9.15 DISCONNECTING ACCESSORIES

CAUTION: Before resetting to factory values, make a note of parameters that were set when the heat pump was commissioned (heat curve, set point values, programs...)

If an accessory that has been installed is to be disconnected from the unit and no longer be used, a factory reset at service level must be performed. This does not apply when replacing defective accessories/ components.

- ▶ Select the installation and service menu (→ chapter 14).
- ▶ Select the **Advanced**.
- ▶ Select the **Return to factory settings**.
- ▶ Select **Yes** then **Save**.

Once the factory settings have been restored, the Hydrolight/ Hydrocomfort unit must be configured again.

10 ELECTRICAL CONNECTION

DANGER: Danger of electric shock!
- ▶ Switch off the main power supply before starting work on the electrical part.

DANGER: Danger due to electric shock!
The capacitor in the heat pump must be discharged once the power supply has been disconnected.
- ▶ Wait at least 5 minutes.
- ▶ Check that the green LED, LED 1, has gone out (see wiring diagram in the heat pump).

WARNING: The unit must not, under any circumstances, be switched on without water.
- ▶ Fill and pressurise the hot water heater and the heating system **before** powering on the unit.

WARNING: The compressor must be warmed up before starting for the first time.
- ▶ Switch on the power to the outdoor unit at least 2 hours prior to commissioning, up to 12 hours for extreme climate conditions (below -15 °C ambient temperature).

In order to switch off the power at the internal and external unit, always switch the power off at the same time period then wait at least 1 minute before switching the power back on. Failure to do could cause a communication error between the outdoor unit and the Hydrolight/Hydrocomfort.

The heat pump's electrical connections must be able to be isolated safely.

- ▶ Install a separate safety switch that cuts all current to the heat pump. A safety switch for each supply is required for separate power supplies. Worcester Bosch recommend the fitting of a separate electric meter on the electrical supply from the Hydrolight/ Hydrocomfort to the main electric meter.

- ▶ According to the applicable regulations for 230 V/50 Hz connection, a H05VV-U type 3-core cable must be used as a minimum. For 400V/ 50Hz use a 5-core cable of the H05VV-U type. Select the cable area and cable type that corresponds to the relevant fuse rating and routing method.
- ▶ Observe protection measures according to current wiring regulations.
- ▶ Connect the heat pump to the electric box connection strip according to BS EN 60335 part 1 and via a switch with a minimum contact distance of 3 mm (e.g. fuses, LS switch). Other loads must not be connected.
- ▶ Follow the relevant wiring diagram when connecting an earth breaker. Only connect components that are approved for the UK market.
- ▶ Observe the colour coding when replacing circuit boards.

10.1 CONNECTING THE HEAT PUMP

WARNING: SW8 at the printed circuit board of the outdoor unit must be set as follows: 3 = ON, 2 = OFF, 1 = OFF (→ fig. 32)

CAUTION: Never touch a circuit board without wearing a ground-connected bracelet (→ chapter 7.10).

A signal cable with a minimum dimension of 2 x 0,3 mm2 and a maximum length of 120 m is routed between the indoor unit and the outdoor unit.

- ▶ Remove the service flap (→[4], fig 31).
- ▶ Remove the pipe protection (→[3], fig 31).
- ▶ Route the connection cables through the strain relief in the side of the outdoor unit (→[1], fig 31).
- ▶ Connect the cables according to fig 32, post-tighten all cable mountings.
- ▶ Reinstall the service flap (→[4], fig 31).

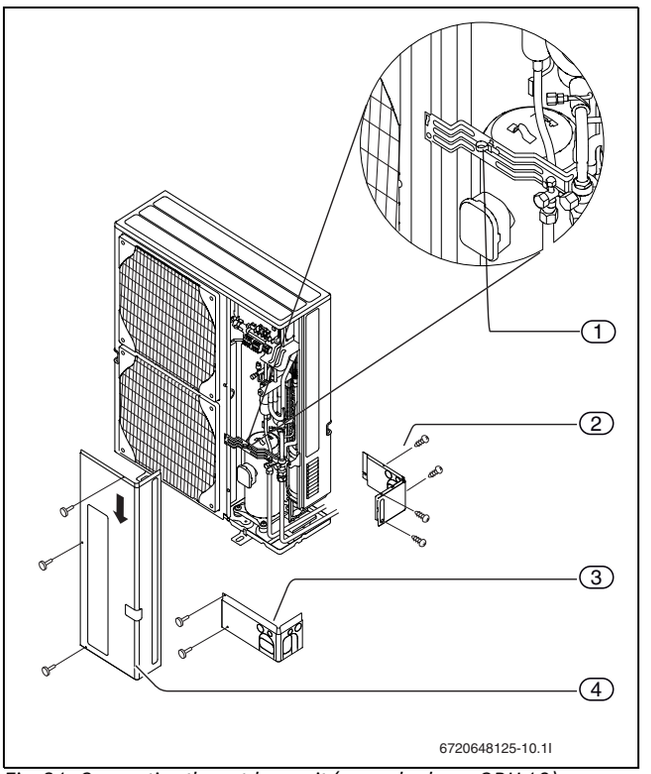

Fig. 31 Connecting the outdoor unit (example shows ODU 12)

[1] Strain relief, fasten the cables so they do not come into contact with the service flap.
[2] Pipe protection
[3] Front pipe protection
[4] Service flap

Installation applies for all sizes.

10.1.1 ADJUSTMENT OF SW8

Switch SW8-3 on the printed circuit board of the external unit must always be in the ON position because connection S1 is not used to supply power to the PAC board.

SW8-3 must be set as shown in fig. 32.

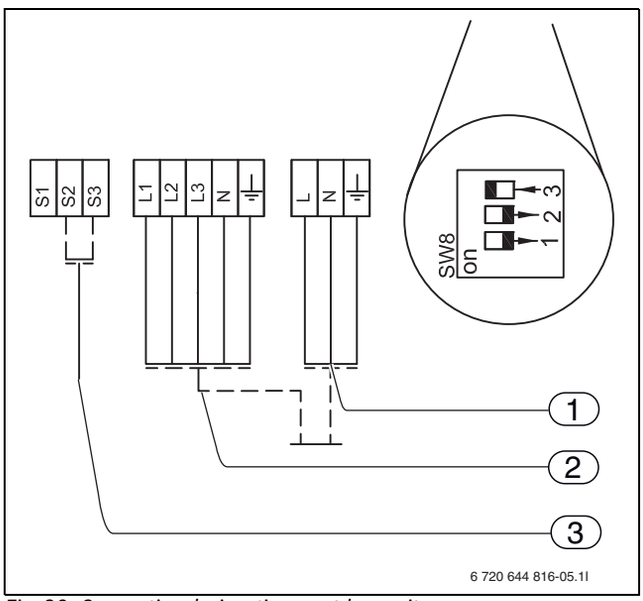

Fig. 32 Connection designations, outdoor unit

[1] 1-phase connection
[2] 3-phase connection
[3] Signal cable

10.1.2 JUMPER POSITIONING AT CONNECTION, 1-PHASE AND 3-PHASE HYDROCOMFORT

WARNING: The Hydrocomfort is delivered in 3-phase version.

▶ To change the hydrocomfort to 1-phase version, insert the jumpers in accordance with Fig. 34.

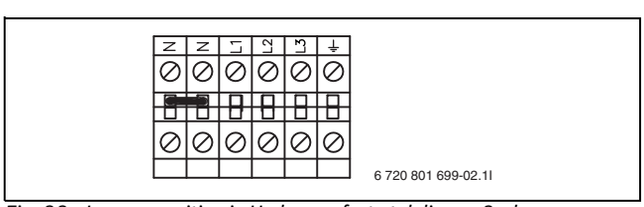

Fig. 33 Jumper position in Hydrocomfort at delivery, 3-phase

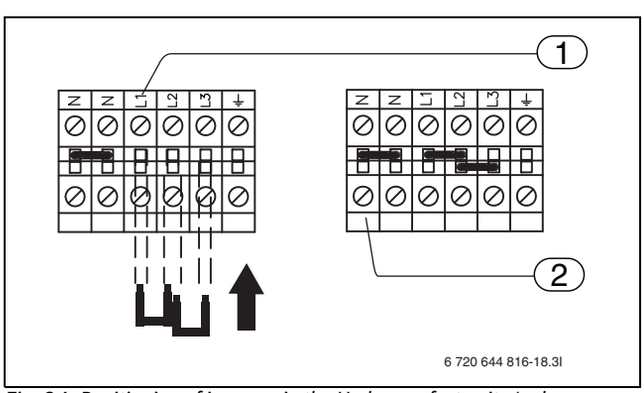

Fig. 34 Positioning of jumpers in the Hydrocomfort unit, 1-phase

[1] Location of jumper at 3-phase (delivery version)
[2] Location of jumpers at 1-phase

10.1.3 ALARM SIGNAL, MIXED ADDITIONAL HEAT

With an external 2nd heat appliance, the alarm signal to E71.E1.F21 (230 V) is connected to the terminal J4 of the main board (IOB-A) in the Hydrolight/Hydrocomfort internal unit.

If the 2nd heat appliance does not have an alarm output, E71.E1.F21 must be connected to a different signal (230 V), e.g. L.out at J3 (→ fig. 35).

If the 2nd heat appliance features a volt free or 0 V alarm, E71.E1.F21 corresponding technology (e.g. a relay) must be used to establish the connection.

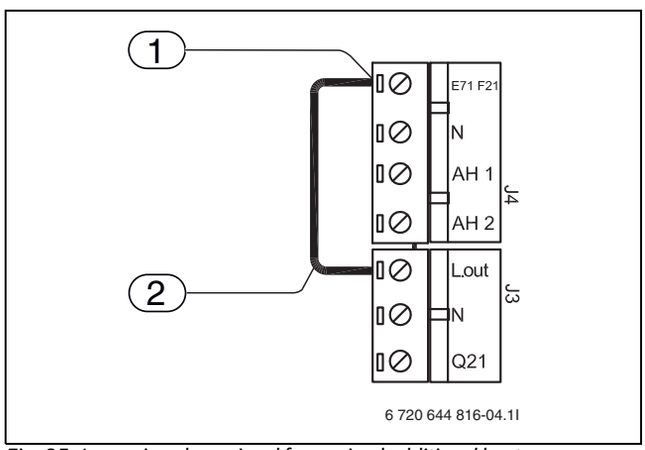

Fig. 35 In-coming alarm signal from mixed additional heat

[1] In-coming alarm signal (230V)
[2] Suggested connection for E71.E1.F21 when the mixed additional heat has no out-going alarm signal

10.1.4 START SIGNAL FOR 2ND HEAT APPLIANCE

The following points must be observed when using output E71.E1.E1:

▶ Maximum load of 230V signal output: 150W ohmic load with switch-on peaks of 5A and switch-off peaks of 3A.
▶ If the load is greater, a supplementary relay must be installed (not included).

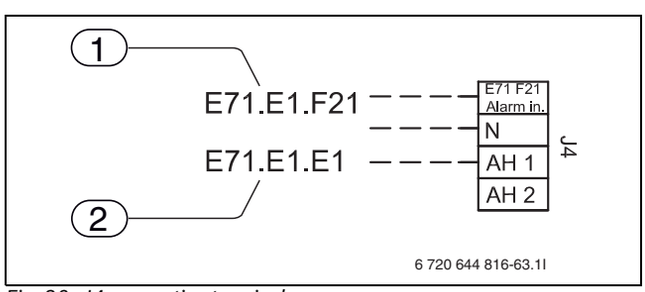

Fig. 36 J4 connecting terminal

[1] Incoming alarm signal, 2nd heat appliance
[2] Start signal, 2nd heat appliance

Be careful not to open the mixer valve immediately after the external 2nd heat appliance is activated, otherwise the heating system may cool down. The delay can be set in the installation menu (→ chapter 16.3.5).

The external heat appliance may start and stop several times. This is normal. If there are problems with the external heater because the operating times are too short, a parallel buffer tank in the flow/return of the external heater can extend the operating time. For more information, consult the manufacturer of the external heater.

10.1.5 ZONE VALVE FOR THE HYDROLIGHT UNIT WITH 2ND HEAT APPLIANCE AND FLOW RATE CONTROL

When using a Hydrolight unit with a mixer and a 2nd heat appliance equipped with flow monitoring (mainly wall-mounted boilers containing a small amount of water or modulating boilers), a zone valve must be installed between the external heater and the internal unit.

The zone valve must be installed in such a way that:

- a start of the boiler circulation pump opens the valve
- a stop of the boiler circulation pump closes the valve

Depending on the sensitivity of the flow monitoring, a fast motor valve can also be used to reduce noise.

Boilers without flow rate control (such as non modulating boilers) do not require this function.

10.1.6 CIRCULATION PUMP FOR 2ND HEAT APPLIANCE

A circulation pump is normally not required for the second heat appliance however, If the flow temperature is too high because the flow rate is too low or non-existent and the second heat appliance is not equipped with a circulation pump, a circulation pump must be installed (→ [E71.E1.G71], Fig 55).

Consult the manufacturer of the second heat appliance to find out how the circulation pump needs to be regulated.

10.2 CONNECTING THE HYDROLIGHT/HYDROCOMFORT MODULE

CAUTION: Never touch a circuit board without wearing a ground-connected bracelet (→ Chapter 7.10).

- ▶ Remove the front panel.
- ▶ Remove the electric box cover.
- ▶ Route the connection cables through the cable grommet at the bottom of the electric box.
- ▶ Connect cable as shown in the wiring diagram. Connect the contact of the signal cable to the terminal in the Hydrolight/Hydrocomfort module.
- ▶ Put the lock of the switch box and the front panel of the Hydrolight/ Hydrocomfort unit back in their respective locations.

10.3 EXTERNAL CONNECTIONS

For all external installations (→ chapter 16.3.9).

To prevent inductive interference, route all low voltage cables (measurement current) and cables carrying 230 V or 400 V separately (at least 100 mm apart).

When extending the temperature sensor cable, use the following conductor cross-sections:

- Up to 20 m long cable: 0.75 to 1,50 mm^2
- Up to 30 m long cable: 1.0 to 1,50 mm^2

10.4 PCB LAYOUT IN CONTROL PANEL, HYDROLIGHT UNIT

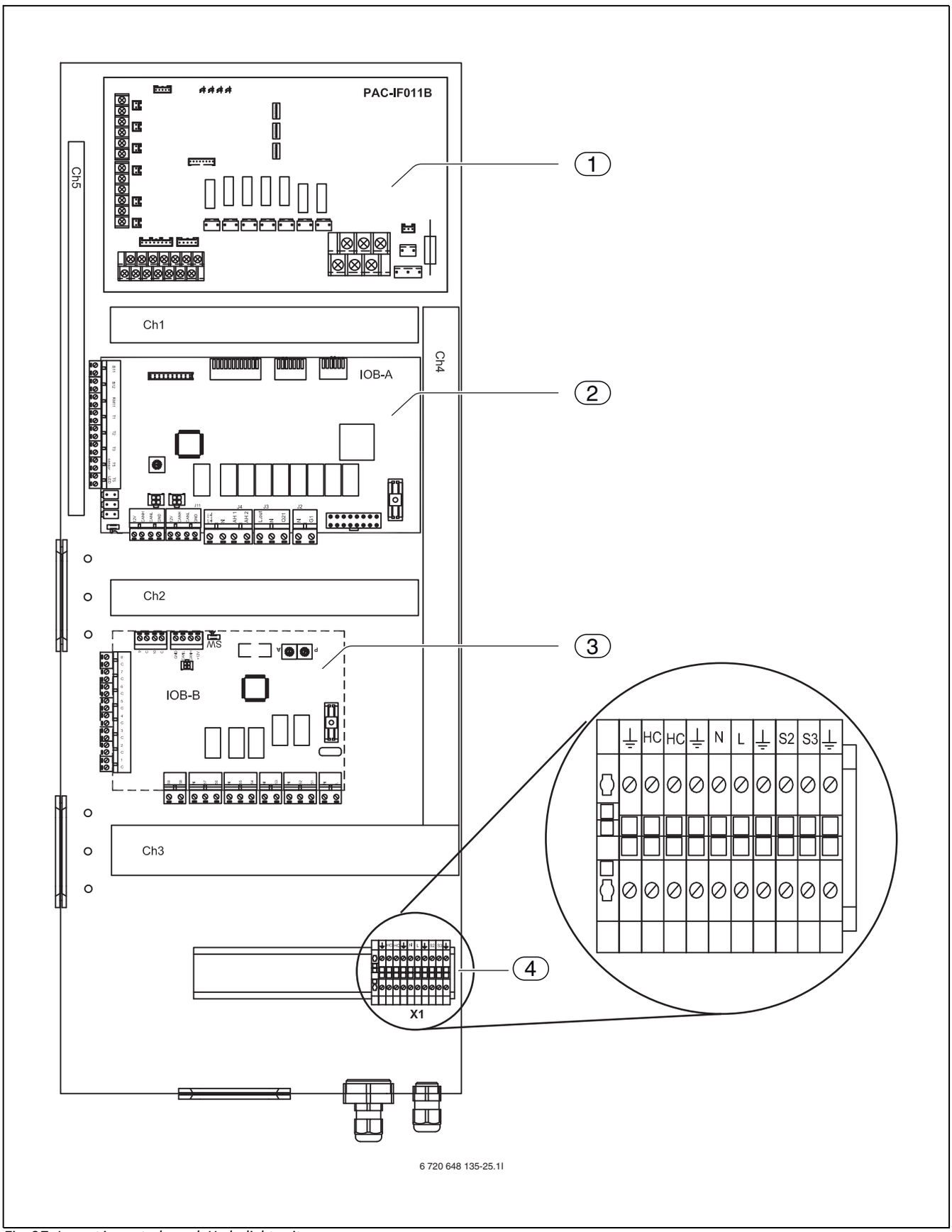

Fig. 37 Layout in control panel, Hydrolight unit

[1] Interface board (PAC)
[2] Main board (IOB-A)
[3] Accessories board (IOB-B, not included in standard delivery)
[4] Terminal (X1)

10.5 SWITCH SETTINGS, HYDROLIGHT UNIT

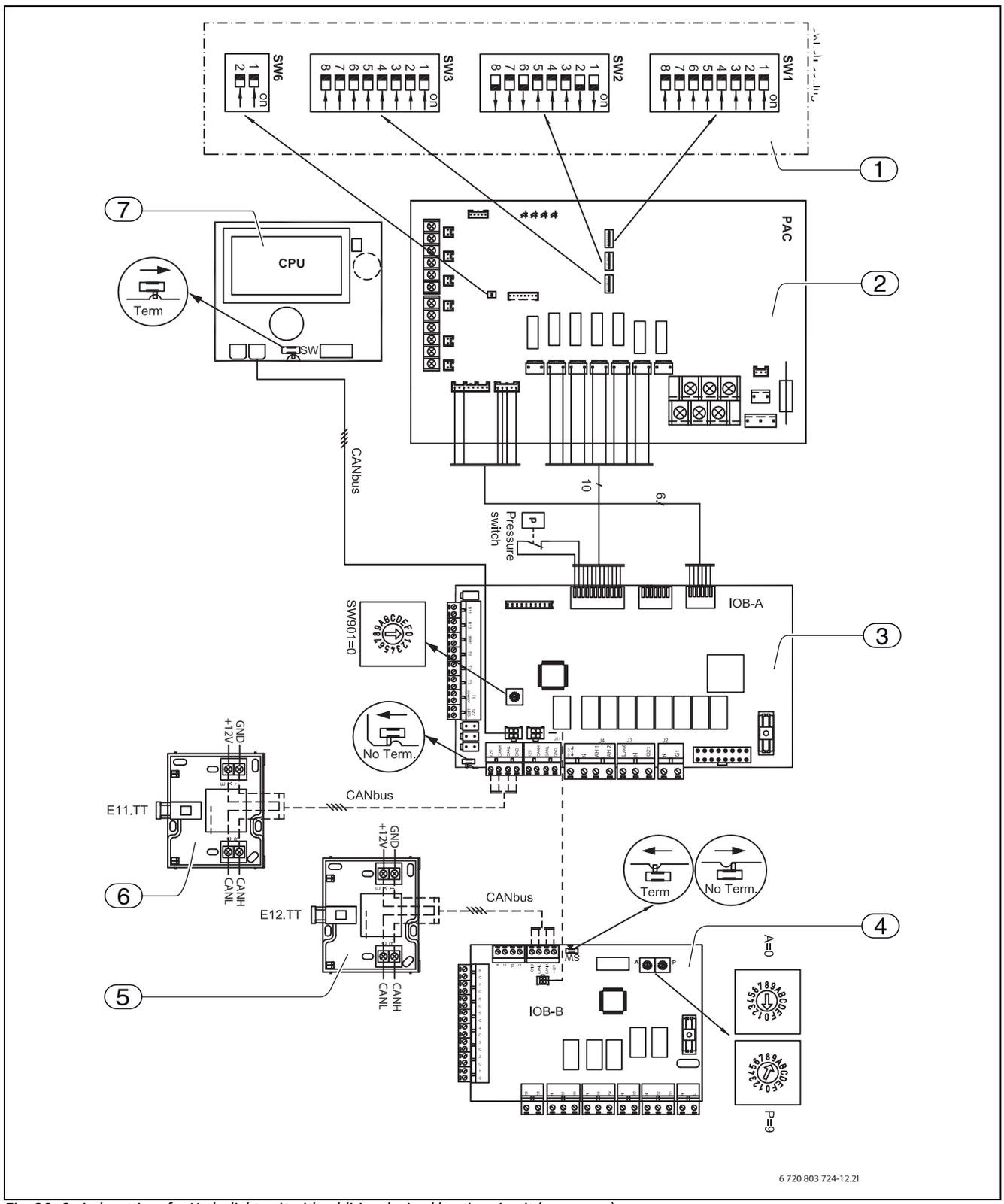

Fig. 38 Switch settings for Hydrolight unit with additional mixed heating circuit (accessory)

[Solid line = factory connected]
[Dotted line = connected at installation]
[1] Switch
[2] Interface board
[3] Main board
[4] Accessories board in Multi Box
[5] room temperature controller
[6] room temperature controller
[7] Display board

10.6 POWER SUPPLY, HYDROLIGHT UNIT AND ADDITIONAL MIXED HEATING CIRCUIT (ACCESSORY)

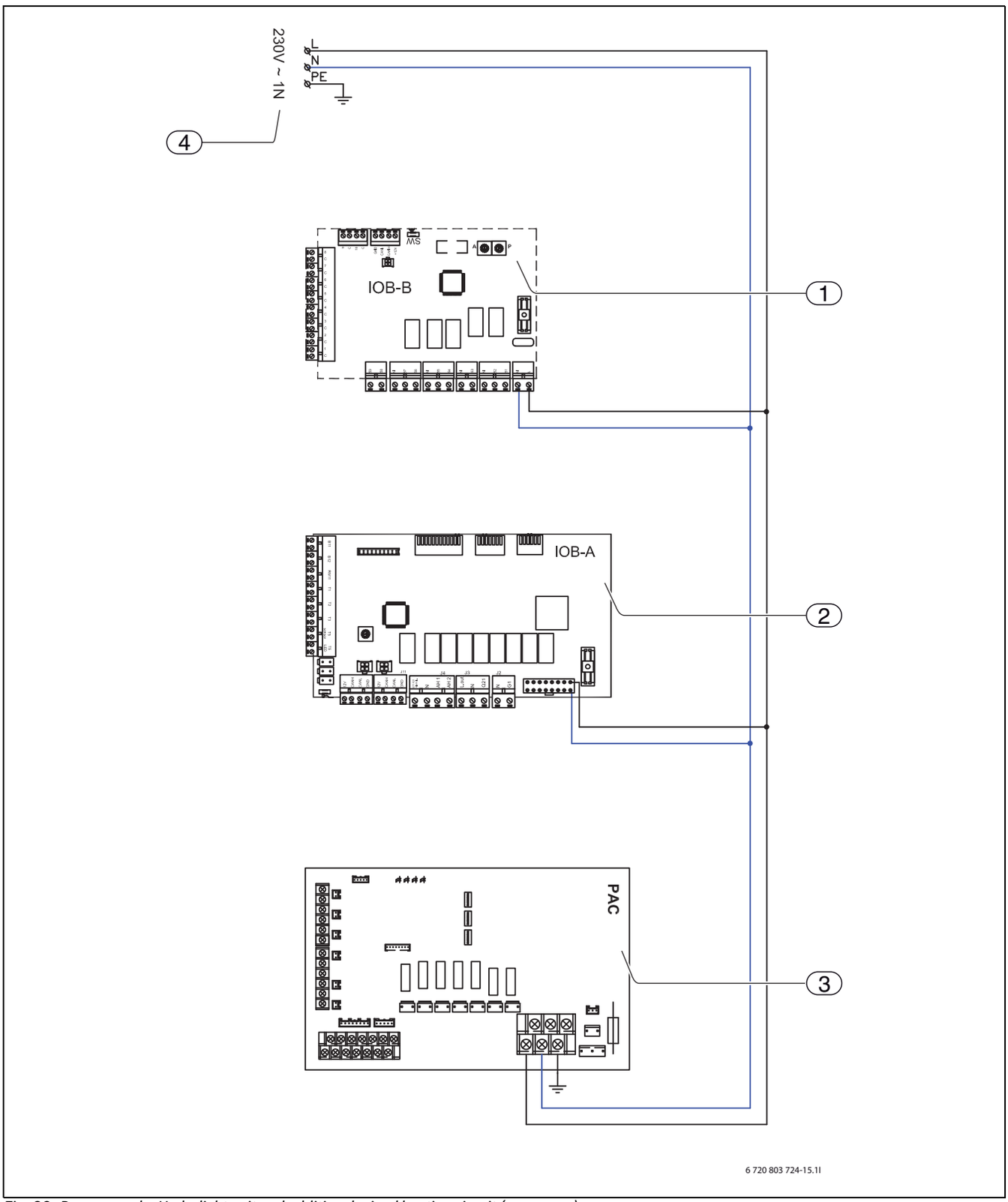

Fig. 39 Power supply, Hydrolight unit and additional mixed heating circuit (accessory)

[1] Accessories board (IOB-B, not included in standard delivery)
[2] Main board
[3] Interface board
[4] Mains power supply

10.7 TERMINAL CONNECTION DIAGRAM, HYDROLIGHT UNIT WITH 2ND HEAT APPLIANCE

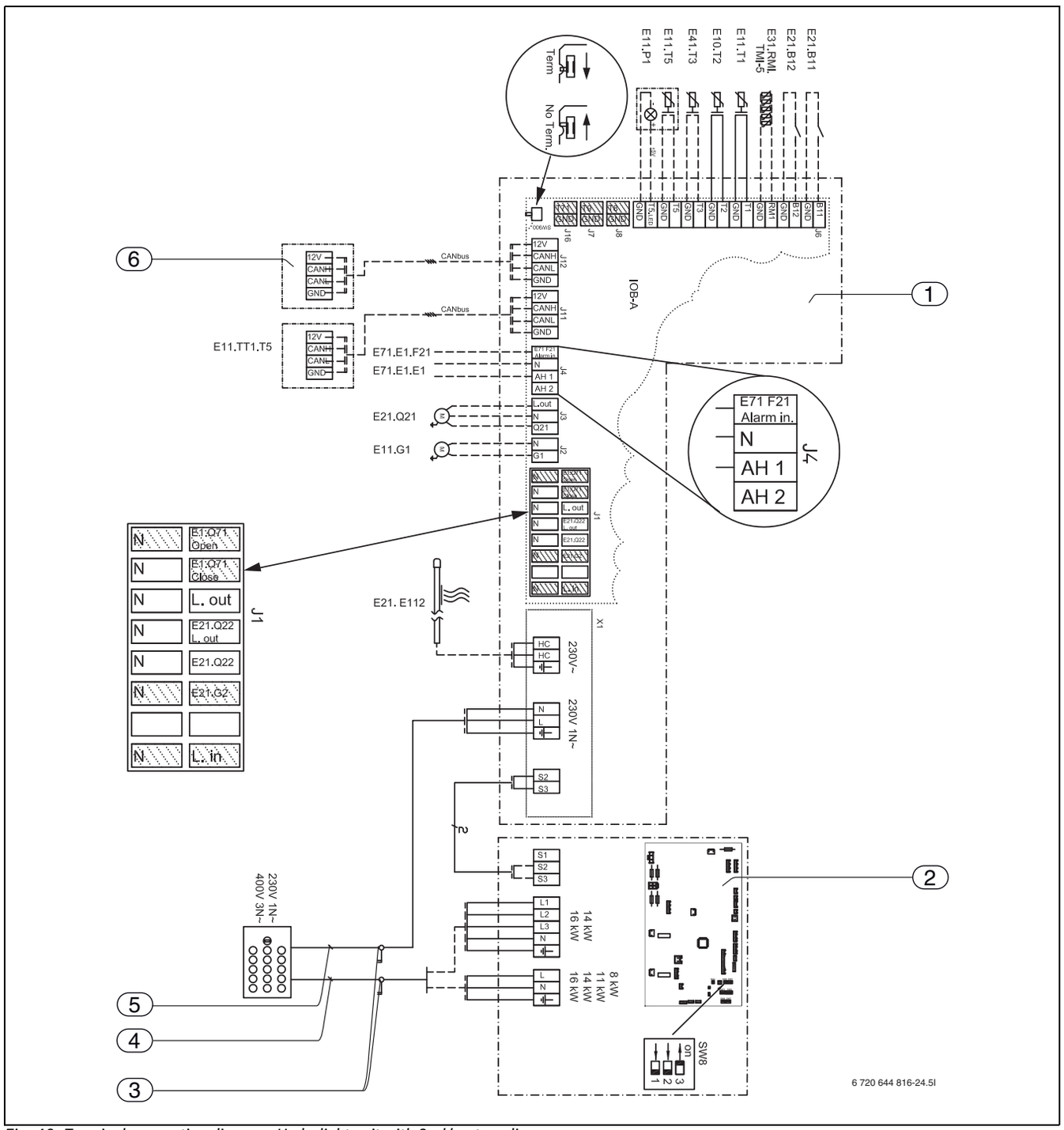

Fig. 40 Terminal connection diagram, Hydrolight unit with 2nd heat appliance

[Solid line = factory connected]
[Dotted line = connected at installation]
[1] Hydrolight unit (main board)
[2] outdoor unit
[3] Fuse (not included in standard delivery)
[4] Fuse, outdoor unit
[5] Fuse, Hydrolight unit
[6] Accessories board
[E21.B11] External input 1
[E21.B12] External input 2
[E11.T1] Flow temperature sensor
[E10.T2] Outside temperature sensor
[E41.T3] Temperature sensor, domestic hot water
[E11.TT.T5] room temperature controller, heating system
[E11.TT.P1] room temperature controller, LED
[E21.E112] Heating cable
[E71.E1.F21] Alarm signal, 2nd heat appliance (~230V)
[E71.E1.E1] Start signal, 2nd heat appliance
[E21.Q21] 3-way valve (accessory)
[E11.G1] Heating circuit pump, heating system

10.8 WIRING DIAGRAM, HYDROLIGHT UNIT WITH 2ND HEAT APPLIANCE

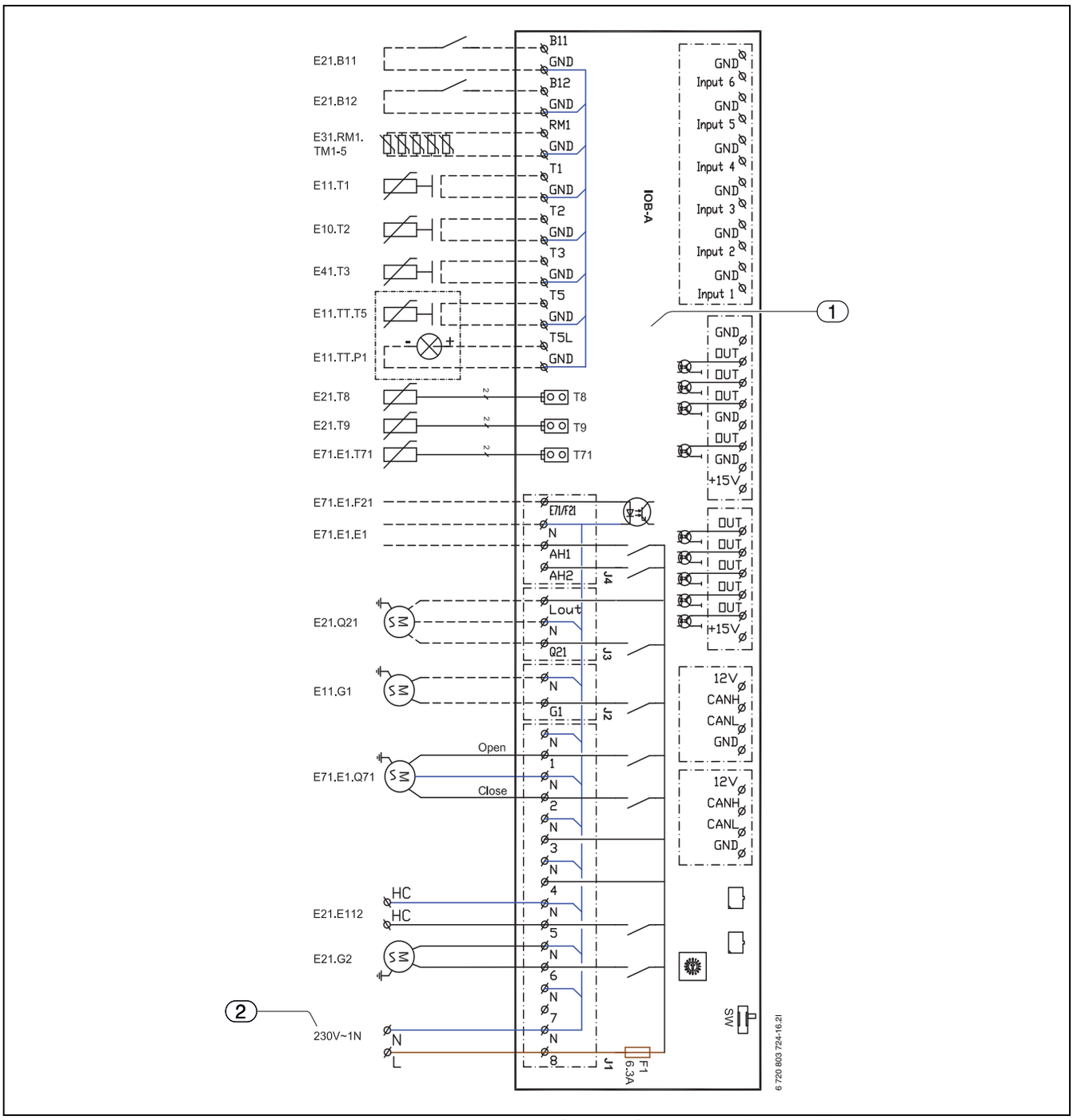

Fig. 41 Wiring diagram, Hydrolight unit with 2nd heat appliance

[Solid line = factory connected]
[Dotted line = connected at installation]
[1] Hydrolight module
[2] Mains power supply
[E21.B11] External input 1
[E21.B12] External input 2
[E11.T1] Flow temperature sensor
[E10.T2] Outside temperature sensor
[E41.T3] Temperature sensor, domestic hot water
[E11.TT.T5] room temperature controller, heating system
[E11.TT.P1] room temperature controller, LED
[E21.T8] Heating water outlet
[E21.T9] Heating water inlet
[E71.E1.T71] Flow, CH
[E71.E1.F21] Alarm signal, 2nd heat appliance
[E71.E1.E1] Start signal, 2nd heat appliance
[E21.Q21] 3-way valve (accessory)
[E11.G1] Heating circuit pump, heating system
[E21.G2] DHW circulation pump, heating water
[E21.E112] Heating cable
[E71.E1.Q71] 2nd heat appliance

10.9 SIGNAL CABLE, HYDROLIGHT UNIT WITH 2ND HEAT APPLIANCE

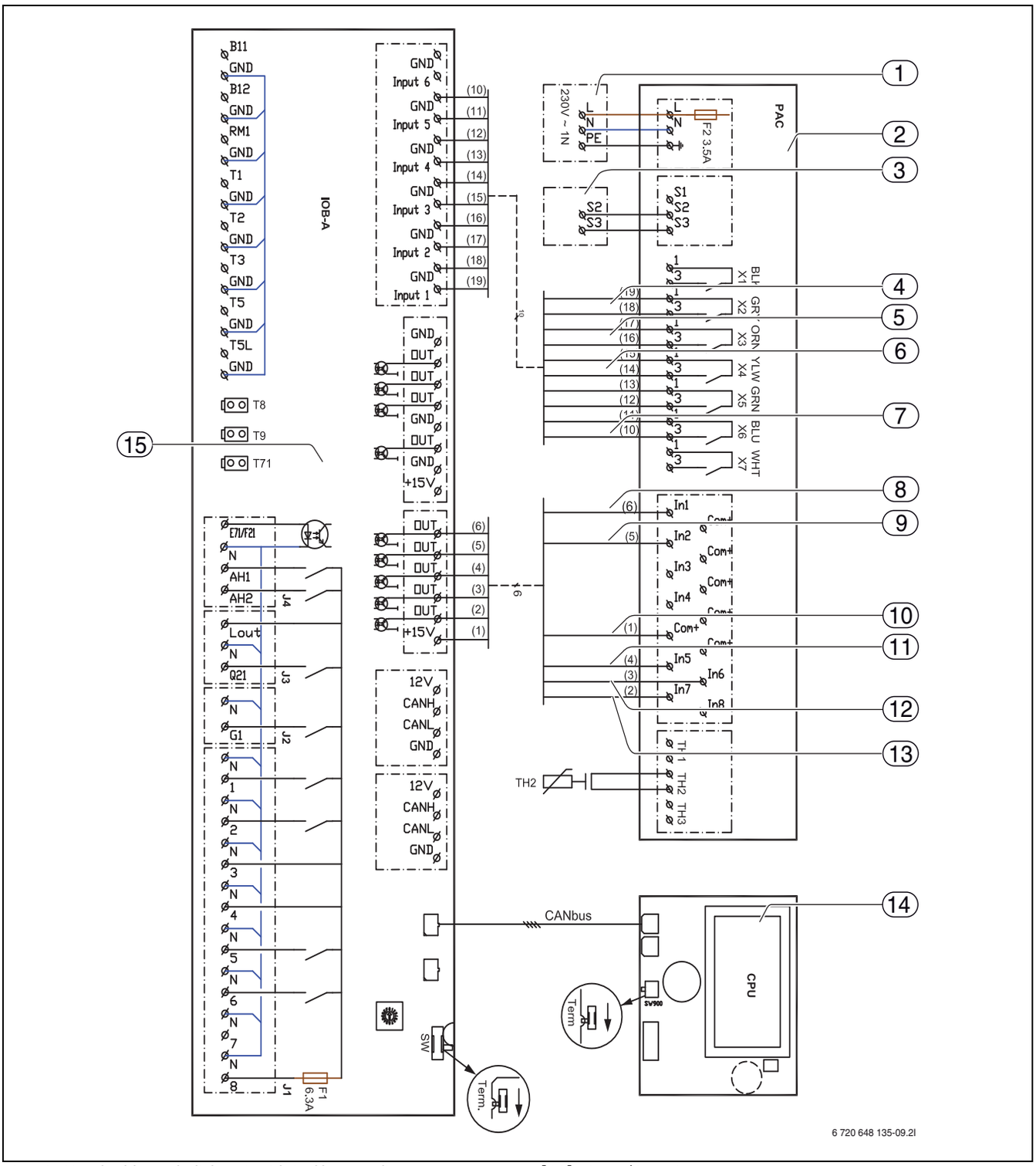

Fig. 42 Signal cable, Hydrolight unit with 2nd heat appliance

[1] Mains power supply
[2] Interface board
[3] Terminal S2, S3
[4] Malfunctions
[5] Compressor off/on
[6] defrosting
[7] Central heating
[8] Compressor, stop
[9] Central heating
[10] Com 15+V
[11] Stage/Capacitor
[12] Stage/Capacitor
[13] Stage/Capacitor
[14] Display board
[15] Main board

10.10 LAYOUT IN CONTROL PANEL, HYDROCOMFORT UNIT WITH ELECTR. HEATER

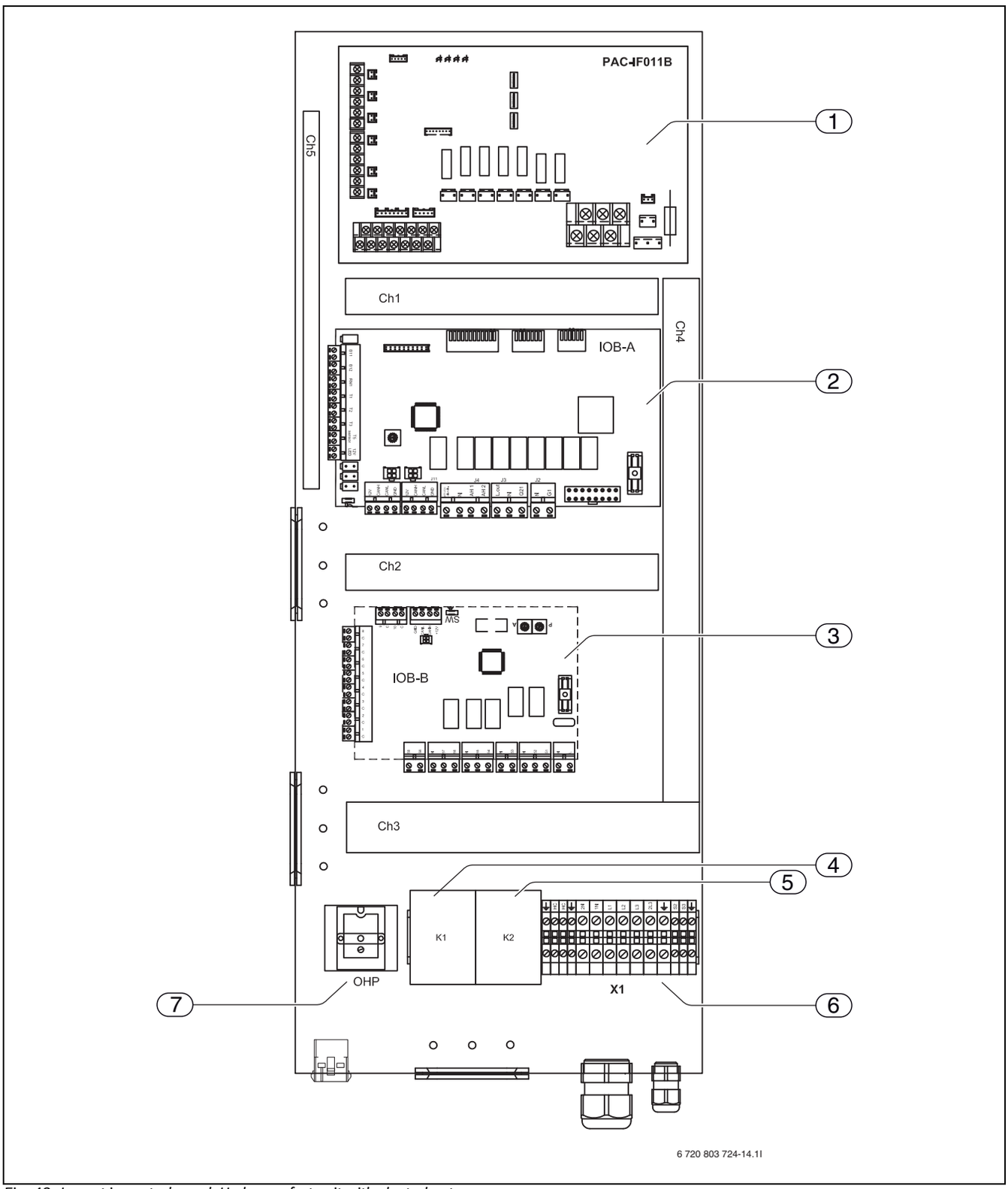

Fig. 43 Layout in control panel, Hydrocomfort unit with electr. heater

[1] Interface board (PAC)
[2] Main board (IOB-A)
[3] Accessories board (IOB-B, not included in standard delivery)
[4] Relay 1 (K1)
[5] Relay 2 (K2)
[6] Terminal (X1)
[7] Over heat protection

10.11 SWITCH SETTINGS, HYDROCOMFORT UNIT WITH ELECTR. HEATER AND ADDITIONAL MIXED HEATING CIRCUIT (ACC)

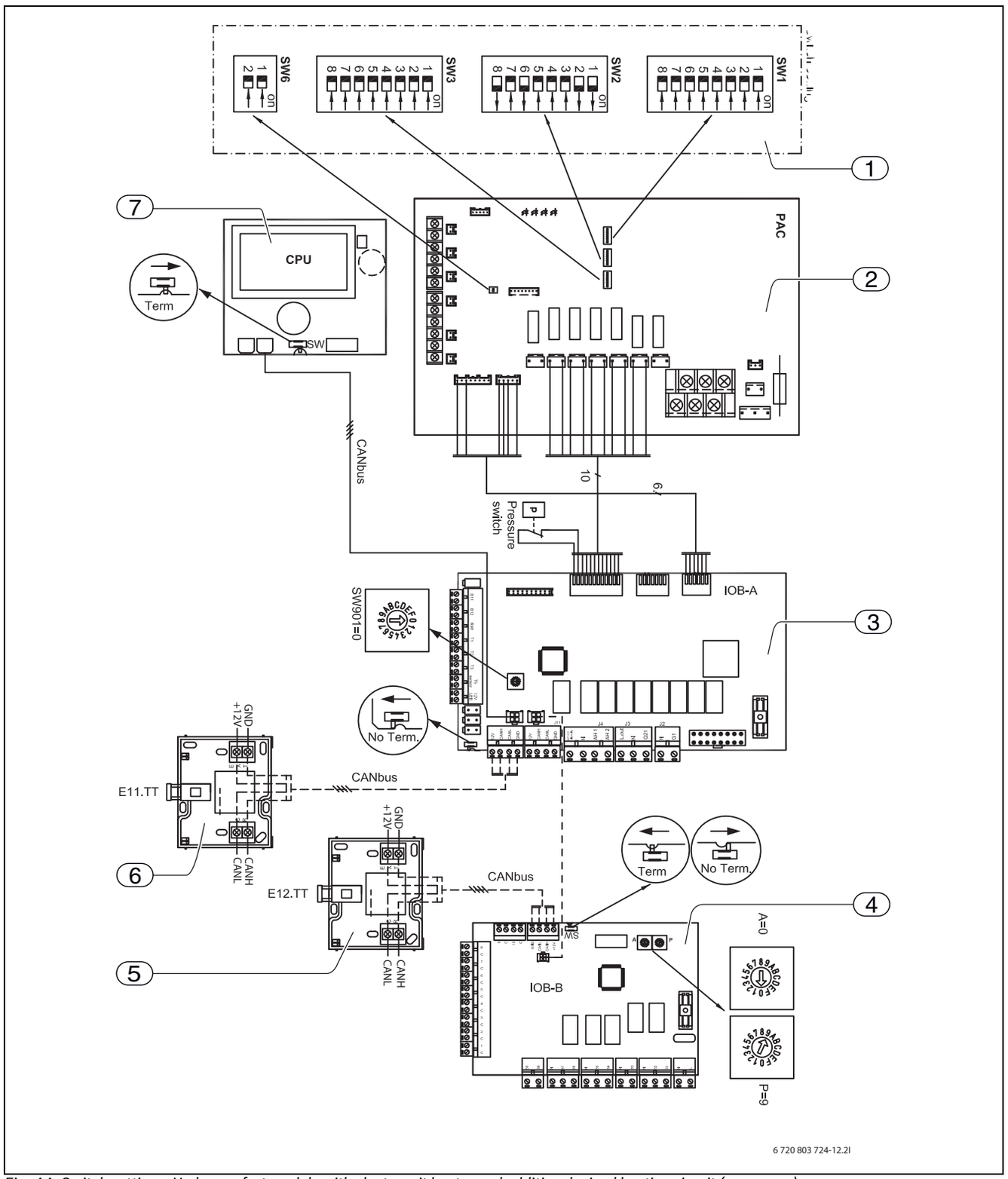

Fig. 44 Switch settings, Hydrocomfort module with electr. unit heater and additional mixed heating circuit (accessory)

[Solid line = factory connected]
[Dotted line = connected at installation]
[1] Switch
[2] Interface board
[3] Main board
[4] Accessories board (not included in standard delivery)
[5] room temperature controller
[6] room temperature controller
[7] Display board

10.12 POWER SUPPLY, HYDROCOMFORT UNIT WITH ELECTR. HEATER

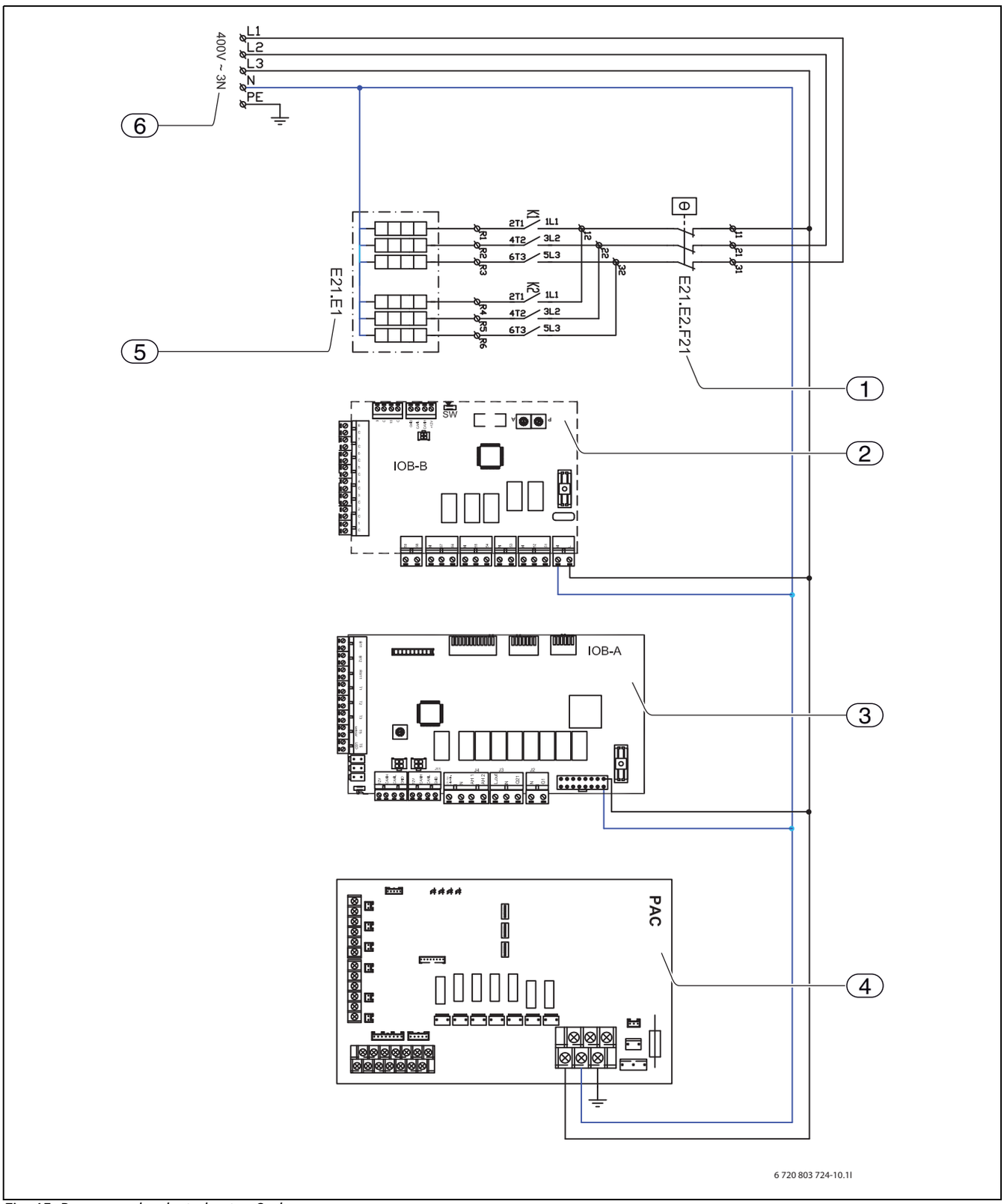

Fig. 45 Power supply, electr. heater, 3-phase

[1] Thermal Protection
[2] Accessories card (not included in standard delivery)
[3] Main board
[4] Interface board
[5] Electric booster heater
[6] Mains power supply

10.13 TERMINAL CONNECTION DIAGRAM, HYDROCOMFORT UNIT WITH ELECTR. HEATER

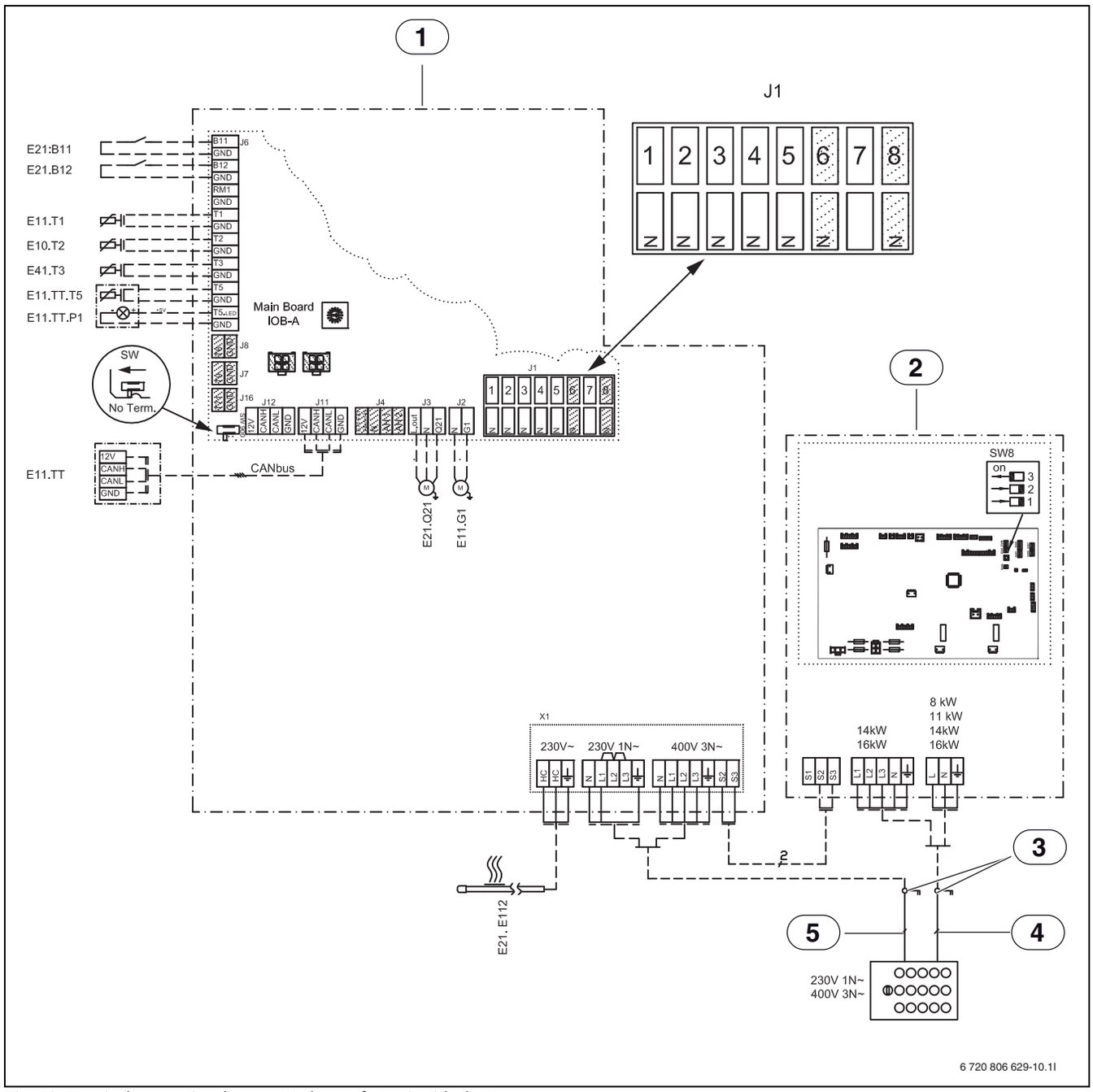

Fig. 46 Terminal connection diagram, Hydrocomfort unit with electr. heater

[Solid line = factory connected]
[Dotted line = connected at installation]
[1] Hydrocomfort module (main board)
[2] outdoor unit
[3] Safety switches (not included in standard delivery)
[4] Fuse, outdoor unit
[5] Fuse, Hydrocomfort unit
[E21.B11] External input 1
[E21.B12] External input 2
[E11.T1] Flow temperature sensor
[E10.T2] Outside temperature sensor
[E41.T3] Temperature sensor, domestic hot water
[E11.TT.T5] room temperature controller, heating system
[E11.TT.P1] room temperature controller, LED
[E21.E112] Heating cable
[E21.Q21] 3-way valve (accessory)
[E11.G1] Heating circuit pump, heating system

10.14 WIRING DIAGRAM, HYDROCOMFORT UNIT WITH ELECTR. HEATER

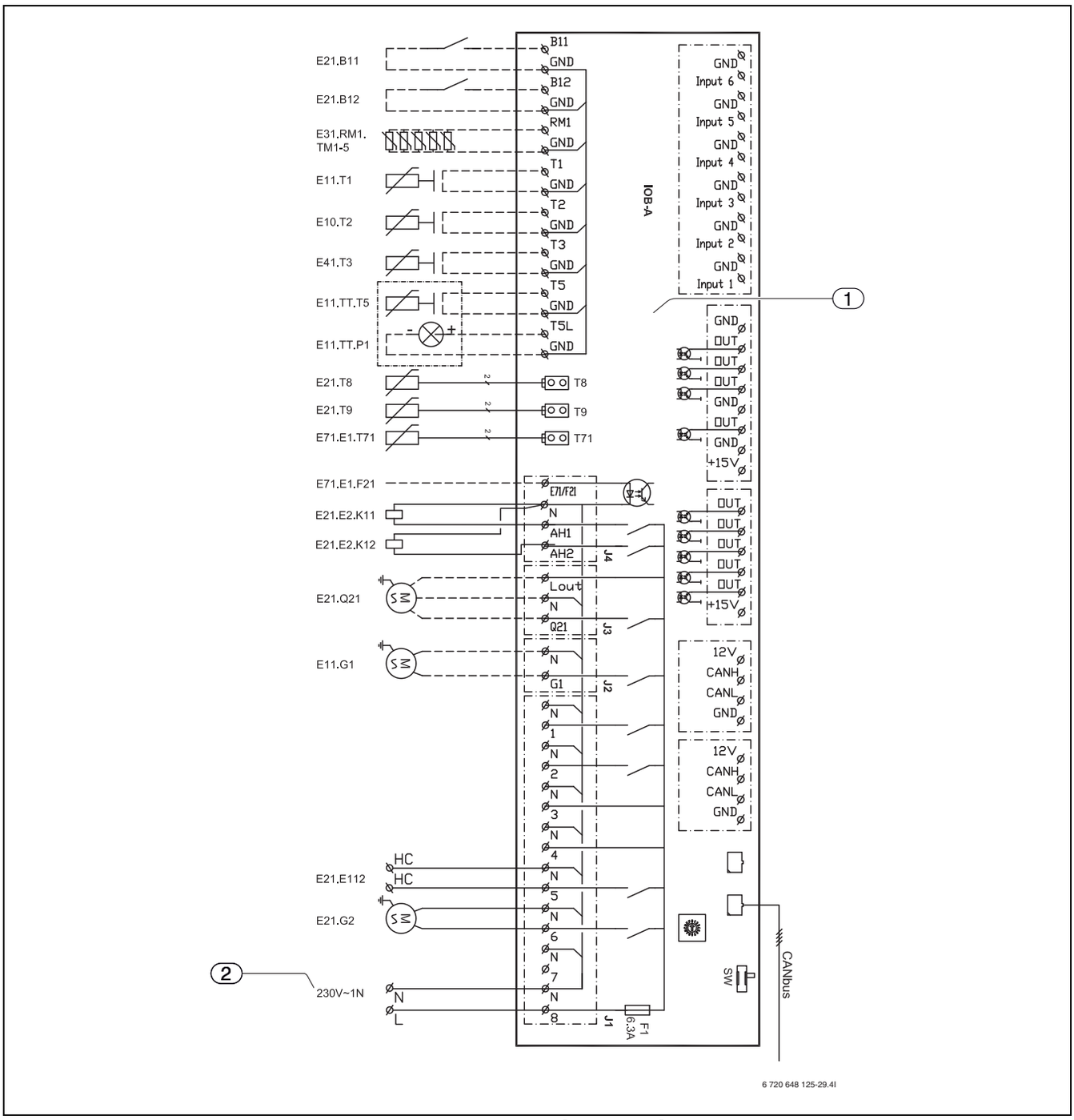

Fig. 47 Wiring diagram, Hydrocomfort unit with electr. heater

[Solid line = factory connected]
[Dotted line = connected at installation]
[1] Hydrocomfort module
[2] Mains power supply
[E21.B11] External input 1
[E21.B12] External input 2
[E31.RM1.TM1-5]Dew point alarm (max 5 pcs.)
[E11.T1] Flow temperature sensor
[E10.T2] Outside temperature sensor
[E41.T3] Temperature sensor, domestic hot water
[E11.TT.T5] room temperature controller, heating system
[E11.TT.P1] room temperature controller, LED
[E21.T8] Heating water outlet
[E21.T9] Heating water inlet
[E71.E1.T71]Flow, CH
[E71.E1.F21]Alarm signal, electric booster heater
[E21.E2.K11]Electric heater, stage 1
[E21.E2.K12]Electric heater, stage 2
[E21.Q21] 3-way valve (accessory)
[E11.G1] Heating circuit pump, heating system
[E21.G2] DHW circulation pump, heating water
[E21.E112] Heating cable

10.15 SIGNAL CABLE, HYDROCOMFORT UNIT WITH ELECTR. HEATER

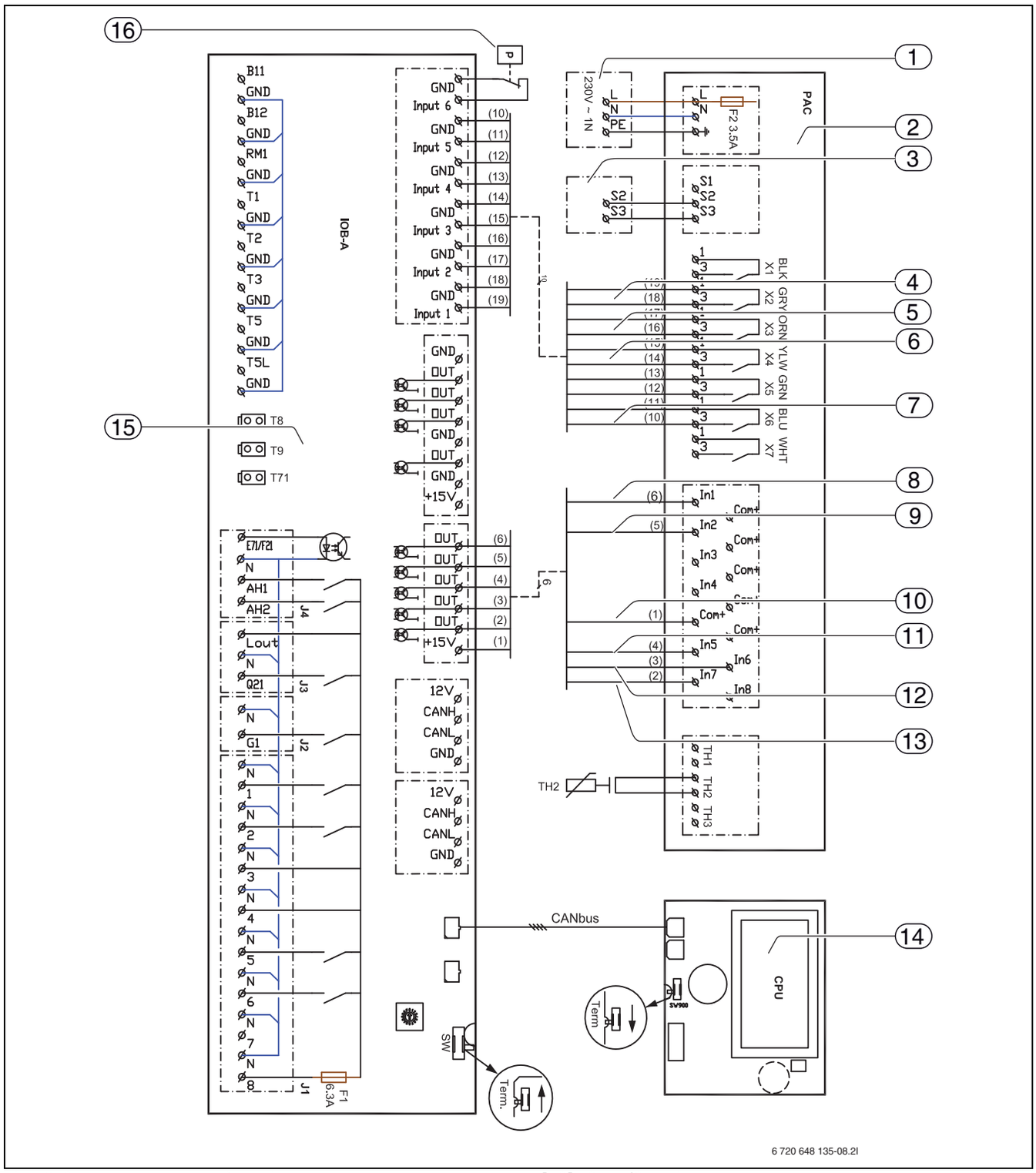

Fig. 48 Signal cable, Hydrocomfort unit with electr. heater

[1] Mains power supply
[2] Interface board
[3] Terminal S2, S3
[4] Malfunctions
[5] Compressor off/on
[6] defrosting
[7] Central heating
[8] Compressor, stop
[9] Central heating
[10] Com 15+V
[11] Stage/Capacitor
[12] Stage/Capacitor
[13] Stage/Capacitor
[14] Display board
[15] Main board
[16] Pressure Switch

11 TECHNICAL INFORMATION

11.1 SPECIFICATION - OUTDOOR UNIT

	Unit	ODU 7.5s 8 kW	ODU 10s 11 kW	ODU 11s 14 kW	ODU 12s 16 kW	ODU 11t 14 kW	ODU 12t 16 kW
Operation, air/water							
Rated output at A7/W35[1)]	kW	8.7	11.9	14.0	16.0	14.0	16.0
Input power	kW	2.0	2.7	3.25	3.9	3.25	3.9
COP at A7/W35[1)]		4.34	4.39	4.24	4.10	4.24	4.10
Rated output at A-7/W5[1)]	kW	6.0	8.3	10.5	11.2	11.5	11.2
Input power	kW	2.4	3.5	4.5	4.5	5.1	4.5
COP at A-7/W35[1)]		2.45	2.40	2.34	2.47	2.26	2.47
Electr. data							
Mains power supply		230V, 1N AC 50Hz				400V, 3N AC 50Hz	
Recommended automatic circuit breaker[2)]	A	25	32	32	32	10	16
Maximum current[3)]	A	19	26.5	26.5	28	9.5	13
Data, refrigeration connection							
Connection type		Flare connection 3/8” & 5/8”					
Refrigerant type[4)]		R410A					
Refrigerant mass	kg	3.5	5.0				
Nominal flow rate							
Heating water	m^3/h	1.008	1.404	1.764	2.016	1.764	2.016
Pressure difference, water side	ΔP(kPa)	58	50	17	14	17	14
Air and noise data							
Fan motor (DC inverter)	W	86	60 + 60 (two fans)				
Nominal air flow rate	m^3/h	3300	6600	7200			
Sound pressure level at a distance of 1 m	dB(A)	48	51	52			
Sound power level[5)]	dB(A)	66	68	68			
General information							
Compressor oil		FV 50S					
Maximum heating water flow temperature, outdoor unit only	°C	55					
Maximum heating water flow temperature, booster heating only	°C	80					
Dimensions (WxDxH)	mm	950 x 360 x 943	1050 x 360 x 1338				
Weight	kg	67	116	116	119	126	132

Table 8 outdoor unit

1) Rating according to EN 14511

2) No specific fuse rating or type is required. The starting current is low and will not exceed the operating current.

3) Starting current; depending on the type, a starting peak will not occur.

4) GWP_{100} = 1980

5) Sound power level in accordance with EN 9614-2

HEATING OPERATION RANGE FOR THE OUTDOOR UNIT

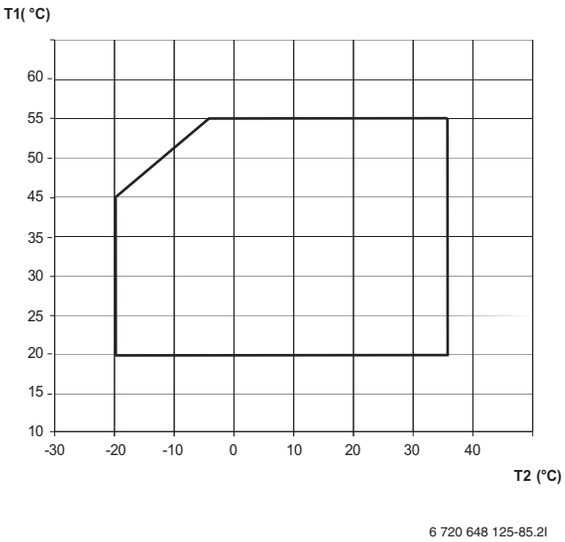

Fig. 49 ODU 7,5 - 12

[T1] Flow temperature
[T2] Outdoor temperature

11.2 SPECIFICATION, HYDROLIGHT UNIT WITH 2ND HEAT APPLIANCE

	Hydrolight 8	Hydrolight 16
Electr. data		
Recommended automatic circuit breaker	10 A	10 A
Mains power supply	230V, 1N AC 50Hz	230V, 1N AC 50Hz
Maximum power consumption	6 A	6 A
Hydraulic data		
Maximum heating output, 2nd heat appliance	25 kW	25 kW
Connection type (central heating and booster heater flow/return)	1” male thread	1” male thread
Maximum operating pressure	3 bar	3 bar
Expansion vessel	N/A	N/A
Internal pressure drop	8 kPa	17 kPa
Available external pressure	38 kPa	48 kPa
Circulation pump type	Wilo-Star RS 25/6	Wilo-Star Top-S 25/7
Refrigerant pipe data		
Connection type	Flare connection 5/8” – 3/8”	Flare connection 5/8” – 3/8”
Dimensions and weight		
Dimensions (WxDxH)	500 x 420 x 850 mm	500 x 420 x 850 mm
Weight	41 kg	48 kg

Table 9 Hydrolight unit with 2nd heat appliance

11.3 SPECIFICATION - HYDROCOMFORT UNIT WITH ELECTR. HEATER

	Hydrocomfort 8	Hydrocomfort 8	Hydrocomfort 16	Hydrocomfort 16
Electr. data				
Mains power supply	230V 1N AC 50Hz	400V 3N AC 50Hz	230V 1N AC 50Hz	400V 3N AC 50Hz
Recommended automatic circuit breaker	45 A	16 A	45 A	16 A
Maximum power consumption	45 A	16 A	45 A	16 A
Electric heater	9 kW	9 kW	9 kW	9 kW
Hydraulic data				
Connection type (central heating and electric heater flow/return)	1” male thread			
Maximum operating pressure	3 bar			
Expansion vessel	6 L			
Internal pressure drop	8 kPa	8 kPa	17 kPa	17 kPa
Available external pressure	38 kPa	38 kPa	49 kPa	49 kPa
Circulation pump type	Wilo-Star RS 25/6	Wilo-Star RS 25/6	Wilo-Star Top-S 25/7	
Refrigerant pipe data				
Connection type	Flare connection 5/8” – 3/8”			
Dimensions and weight				
Dimensions (WxDxH)	500x420x850 mm	500x420x850 mm	500x420x850 mm	500x420x850 mm
Weight	48 kg	48 kg	55 kg	55 kg

Table 10 Hydrocomfort unit with electr. heater

WARNING: The Hydrocomfort is delivered in 3-phase version.

► To change the hydrocomfort to 1-phase version, insert the jumpers in accordance with Chapter 10.1.2.

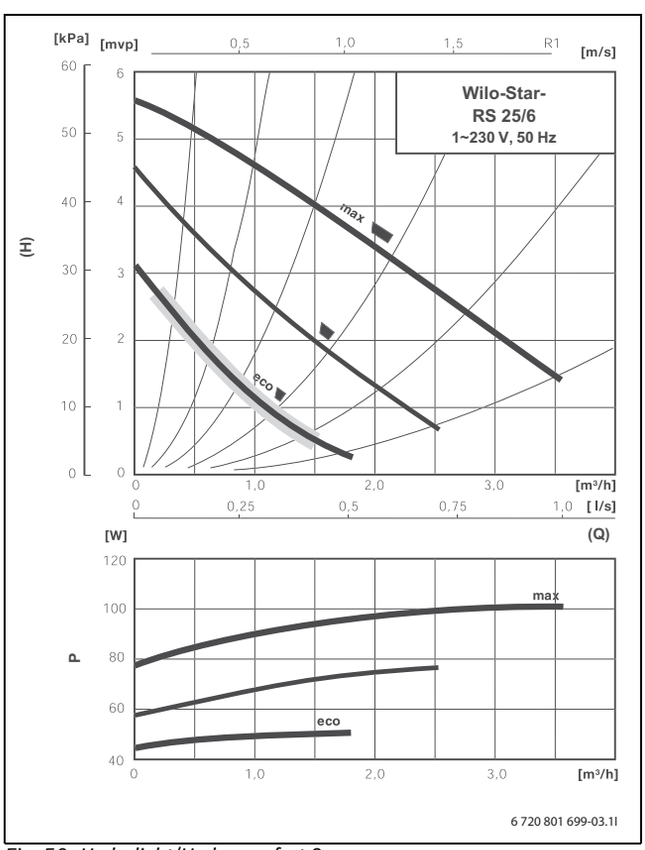

Fig. 50 Hydrolight/Hydrocomfort 8

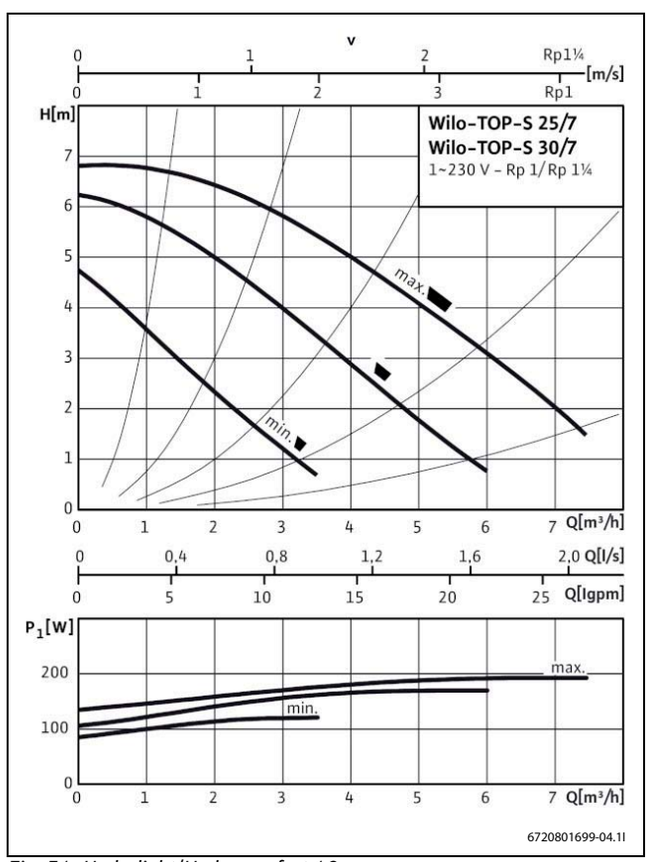

Fig. 51 Hydrolight/Hydrocomfort 16

11.4 SYSTEM CONFIGURATIONS

11.4.1 SYSTEM CONFIGURATION EXPLANATIONS

E10	
E10.T2	Outside temperature sensor

Table 11 E10

E11	**Heating circuit without mixer**
E11.G1	heating circuit pump (not in standard delivery)
E11.C111	Buffer tank (accessory)
E11. T1	Flow temperature sensor
E11.TT	room temperature controller (accessory)

Table 12 E11

E12	**Heating circuit with mixer (accessory)**
E12.G1	heating circuit pump
E12.Q11	Mixing valve
E12.T1	Flow temperature sensor
E12.TT	room temperature controller (accessory)

Table 13 E12

E21	**Internal unit**
E21.C101	Expansion vessel
E21.E2	Electric heater
E21.F101	Safety valve
E21.F111	Air vent valve (automatic)
E21.F112	Air vent valve (manual)
E21.G2	Heating water pump
E21.P101	Pressure gauge
E21.Q21	3-way valve (accessory)
E21.TH2	Temperature sensor, liquid refrigerant
E21.T8	Heating water temperature sensor, outlet
E21.T9	Heating water temperature sensor, inlet
E21.V101	Particle filter

Table 14 E21

E41	**DHW cylinder** (3rd party)
E41.F101	Safety valve
E41.F111	Air vent valve (automatic)
E41.G6	DHW circulation pump (accessory, secondary circulation)
E41.K41	Thermostatic mixing valve (mains water)
E41.Q101	isolation valve
E41.R101	Non-return valve
E41.R102	Ball check valve (spring-loaded)
E41.T3	Temperature sensor, domestic hot water (accessory)
E41.V41	Domestic hot water
E41.W41	Cold water

Table 15 E41

E71	**Electricity/oil/gas boiler (2. heat appliance)**
E71.E1.C101	Expansion vessel
E71.E1.F101	Safety valve
E71.E1.F111	Automatic air vent valve
E71.E1.G71	Circulation pump 2nd heat appliance (optional → ch. 10.1.6)
E71.E1.Q71	Mixing valve
E71.E1.R101	Non-return valve
E71.E1.T71	Flow temperature sensor
E71.E1.Q111	Zone valve (optional → ch. 10.1.5)
E71.E1.V40	Domestic hot water
E71.E1.W40	Cold water

Table 16 E71

E72	**Solar thermal system (not in standard delivery)**
E72.E1	Solar thermal collector
E72.E1.E72	Pump station, solar
E72.E1.C101	Expansion vessel
E72.E1.F101	Safety valve
E72.E1.F111	Automatic air vent valve
E72.E1.P101	Pressure gauge
E72.E1.TX1	Sensor
E72.E1.TX2	Sensor

Table 17 E72

11.4.2 ADDITIONAL MIXED HEATING CIRCUIT

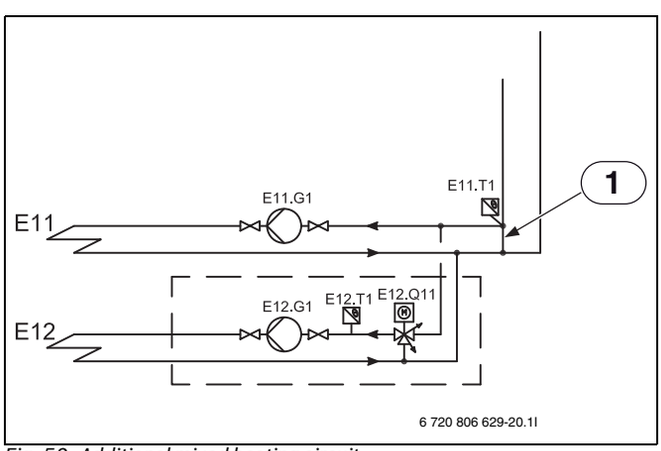

Fig. 52 Additional mixed heating circuit

[1] Bypass

When a heating circuit with mixer is installed (E12), a bypass is required if no buffer tank is installed. The bypass length must be at least ten times that of the pipes inner dimension. The E11.T1 flow temperature sensor has to be placed at the junction of the bypass.

11.4.3 SYSTEM CONFIGURATIONS

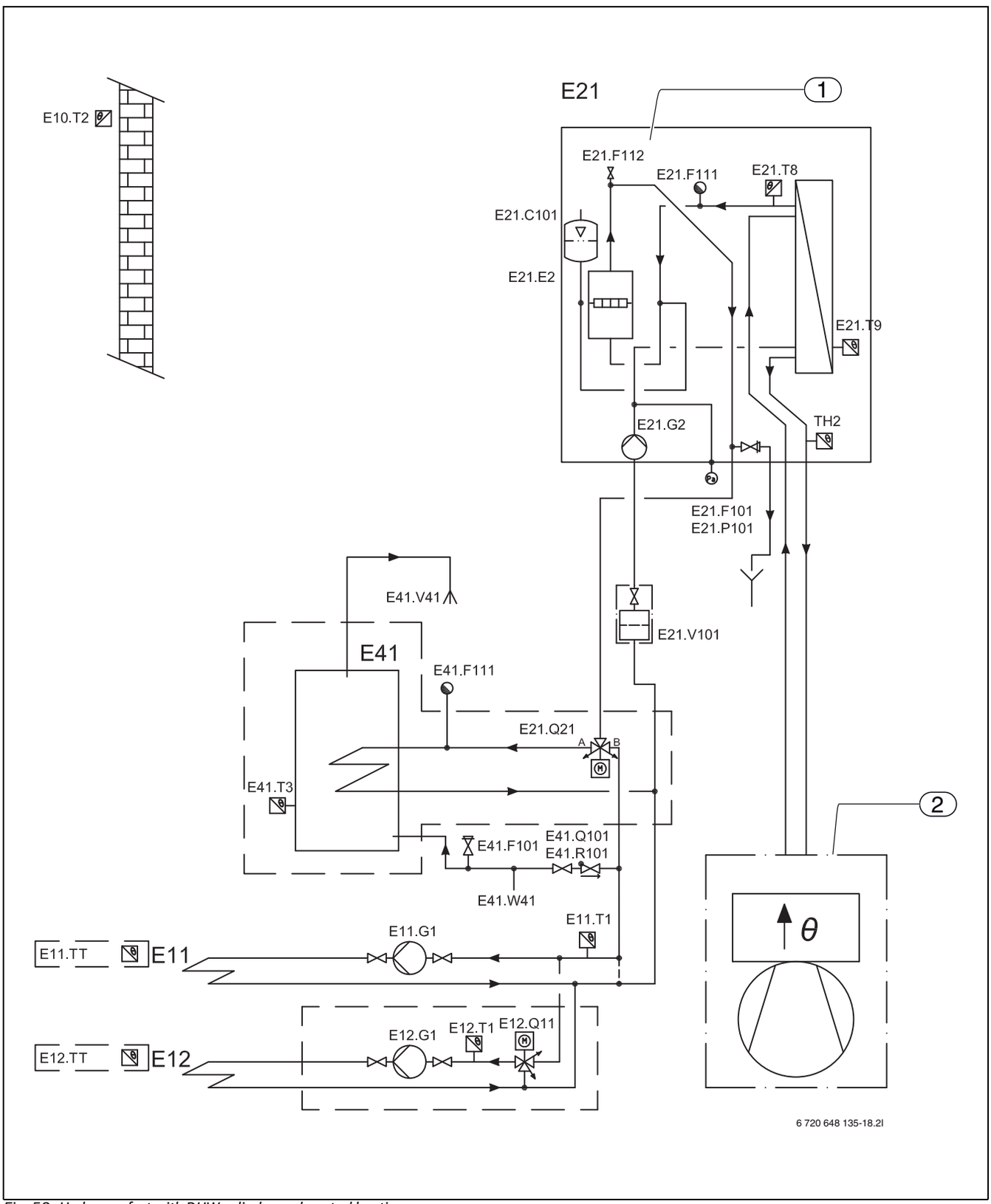

Fig. 53 Hydrocomfort with DHW cylinder and central heating

[1] Hydrocomfort
[2] Outdoor unit (ODU)

Indoor unit with internal electrical additional heat serving central heating and hot water cylinder.

The particle filter [E21.V101] is installed horizontally in the return heating pipe to the Hydrolight/Hydrocomfort ,

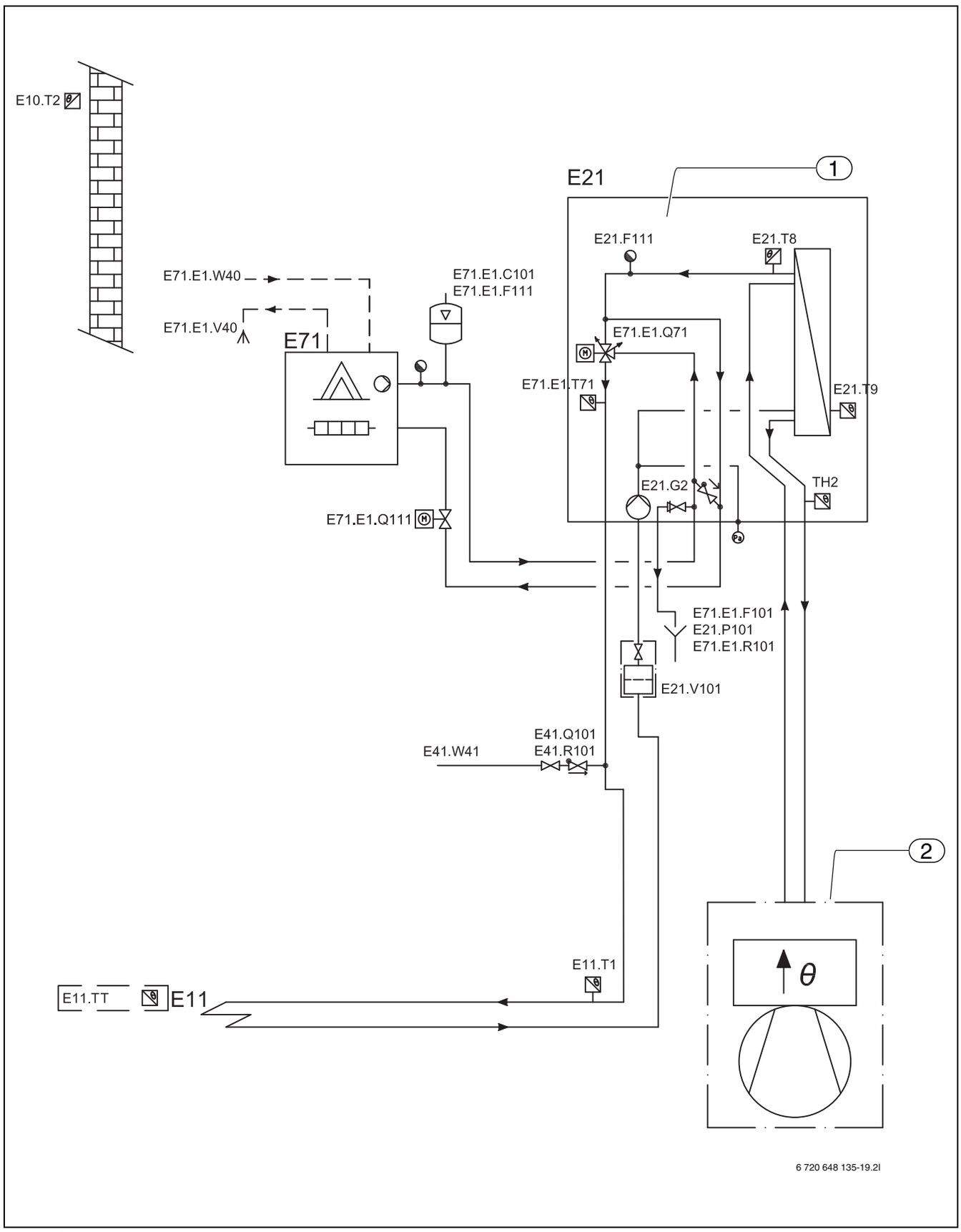

Fig. 54 Additional external heater with mixer

[1] Hydrolight
[2] Outdoor unit (ODU)

Indoor unit with external boiler additional heat serving central heating.

The particle filter [E21.V101] is installed horizontally in the return heating pipe to the Hydrolight/Hydrocomfort ,

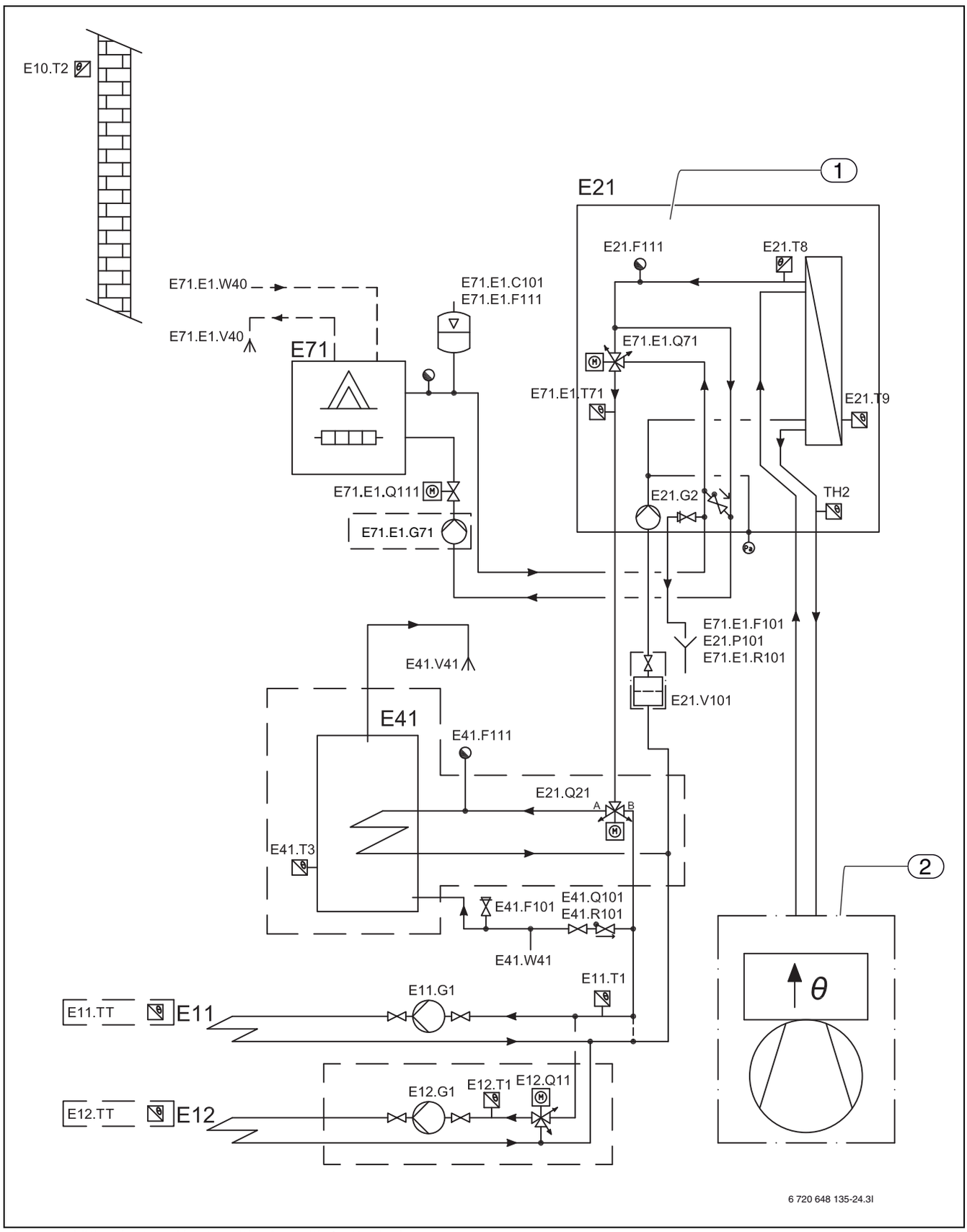

Fig. 55 Additional external heater with mixer with DHW cylinder

[1] Hydrolight
[2] Outdoor unit (ODU)
[E71.E1.G71]Circulation pump for 2nd heat appliance, regulated by the 2nd heat appliance (→ Chapter 10.1.6)

Indoor unit with additional external heater serving central heating and hot water cylinder.

The particle filter [E21.V101] is installed horizontally in the return heating pipe to the Hydrolight/Hydrocomfort ,

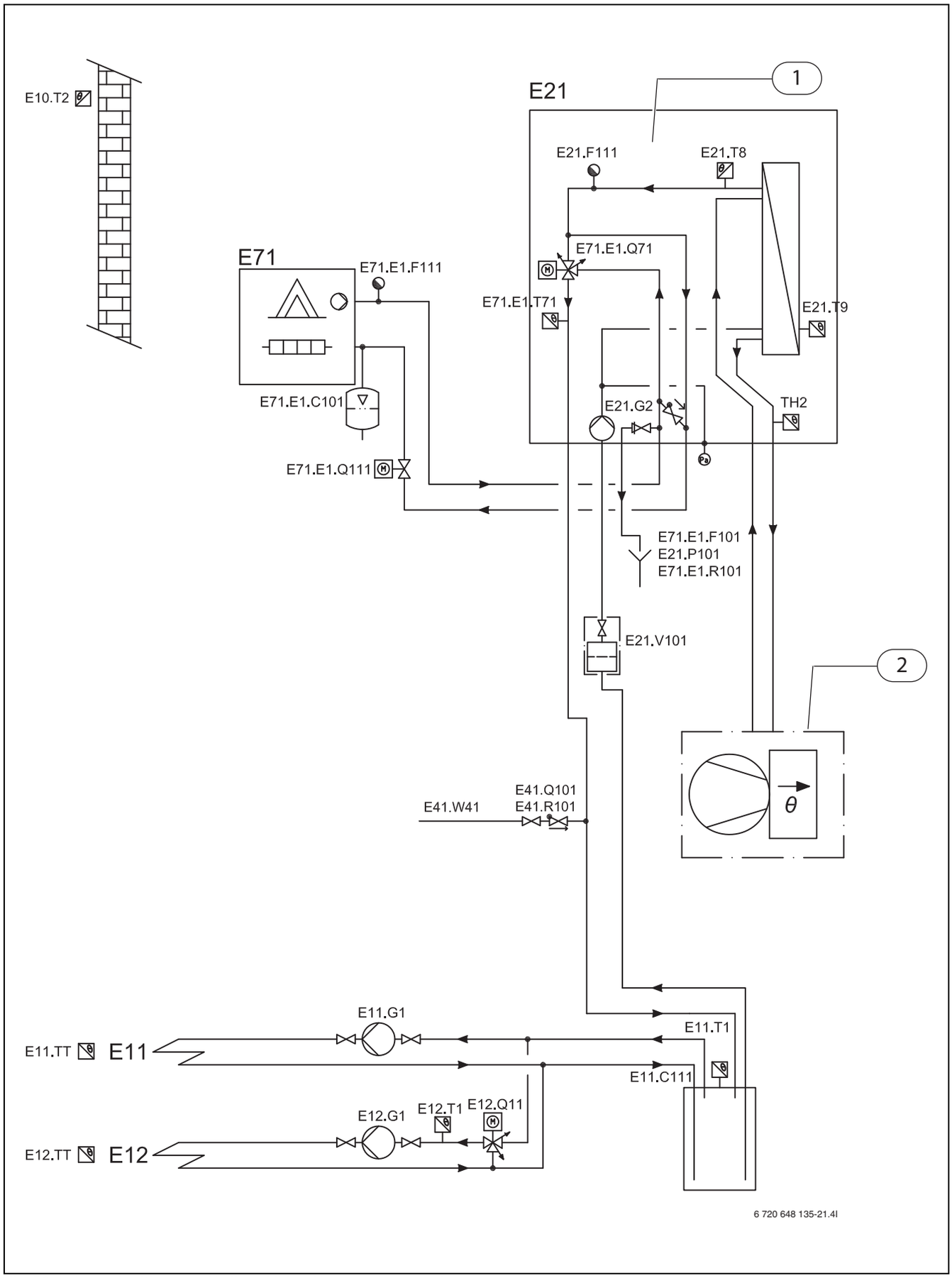

Fig. 56 Indoor unit with external boiler additional heat serving central heating through a buffer tank.

[1] Hydrolight indoor unit.
[2] Outdoor unit (ODU)

The particle filter [E21.V101] is installed horizontally in the return heating pipe to the Hydrolight/Hydrocomfort ,

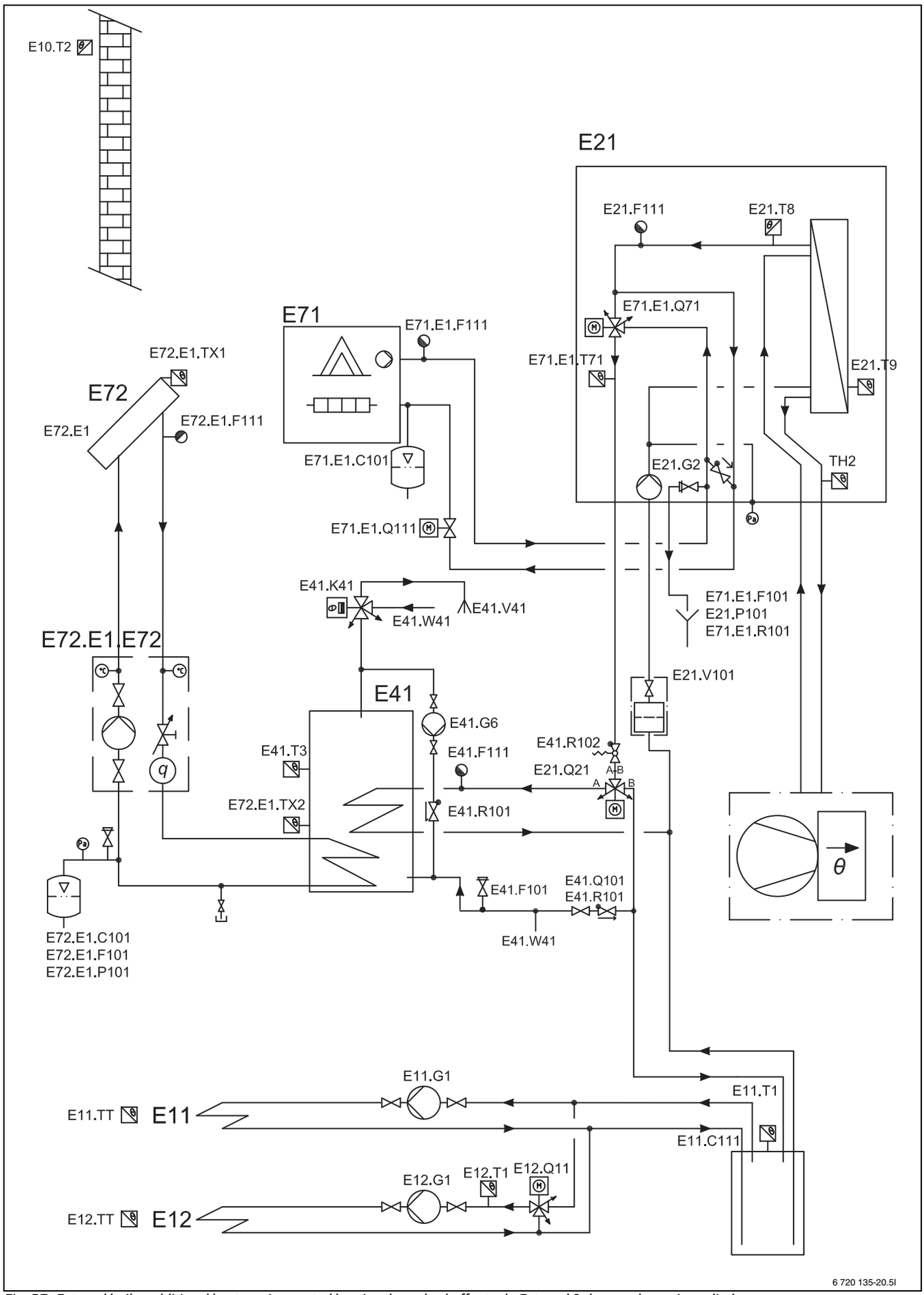

Fig. 57 External boiler additional heat serving central heating through a buffer tank. External Solar panels serving cylinder.

The particle filter [E21.V101] is installed horizontally in the return heating pipe to the Hydrolight/Hydrocomfort ,

In this setup example the solar panel will only be able to produce domestic hot water (DHW).

The solar pump station E72.E1.E72 is controlled by its own system and not by the heat pumps control panel. For installation and settings refer to the installation instructions of the solar pump station and its control.

FUNCTIONAL DESCRIPTION OF THE SOLAR SYSTEM CONFIGURATION (FIG. 57)

- The Hydrolight unit is connected to an external additional boiler (E71). This will supply additional heat and domestic hot water when the heat pump alone is not sufficient.The domestic hot water production is carried out in the solar cylinder with twin coils (E41).
- The heat pump and the additional boiler are controlled by the control panel in the Hydrolight unit.
- The solar pump station (E72.E1.E72) is controlled by the solar controller.
- The heating water pump (E21.G2) circulates the heating water from the heat pump and/or the additional boiler to the buffer tank or the DHW cylinder.
- The heating circuit pumps (E11.G1 and E12.G1) circulates the heating water from the buffer tank to the unmixed (E11) and mixed (E12) heating circuits.
- The solar pump station (E72.E1.E72) is fitted with a circulation pump that circulates heating water from the solar thermal collectors (E72.E1) to the DHW cylinder, if the temperature in the solar thermal collectors are higher than the temperature in the cylinder.

If there is sufficient heat from the solar thermal collectors this will fully cover the DHW demand. The heat pump and the additional boiler will only provide central heating.

If the heat pump controller detects (by the E41.T3 sensor) that the temperature in the DHW cylinder falls below the set point temperature for the DHW production, the heat pump or the additional boiler will start to produce domestic hot water.

11.4.4 FLOW OVER THE SYSTEM

An absolute prerequisite for the connection is that a minimum flow of at least 70% of the nominal flow can be maintained throughout the year.

If a bypass is used and an external circulation pump is fitted, the flow over the heating system can be reduced by 40% of the nominal flow of the heat pump. The bypass length must be at least ten times that of the pipe's inner dimension. Ensure that most of the thermostat valves are fully open.

Otherwise a buffer tank must be installed.

11.4.5 TEMPERATURE SENSOR TEST VALUES

HYDROLIGHT/HYDROCOMFORT UNIT

Temperature sensor in, or connected to, the Hydrolight/Hydrocomfort unit (T1, T2, T3, T5, T8, T9) has the measured value in accordance with table 18.

°C	$\Omega_{T...}$	°C	$\Omega_{T...}$	°C	$\Omega_{T...}$
−40	154300	5	11900	50	1696
−35	111700	10	9330	55	1405
−30	81700	15	7370	60	1170
−25	60400	20	5870	65	980
−20	45100	25	4700	70	824
−15	33950	30	3790	75	696
−10	25800	35	3070	80	590
−5	19770	40	2510	85	503
0	15280	45	2055	90	430

Table 18 Sensor values

The Hydrolight/Hydrocomfort unit also contains TH2 (temperature, liquid line) which has the same characteristics as the low-temperature sensor in the outdoor unit (→table 20, →fig. 58).

ODU

The temperature sensors in the outdoor unit have measurement values and different operating ranges according to table 19.

	Normal	Abnormal
TH4	160k Ω – 410k Ω	Open-circuit or short-circuit
TH3	4.3k Ω – 9.6k Ω	
TH6		
TH7		
TH32		
TH8	39k Ω – 105k Ω	

Table 19 The sensor values outdoor unit

LOW-TEMPERATURE SENSOR ODU

The temperature sensors TH3 (tube distributor, evaporator), TH6 and TH7 (surroundings) and TH33 (between the expansion valve and evaporator) show measured values in accordance with table 20 and the diagram in fig. 58.

°C	k $\Omega_{T...}$	°C	k $\Omega_{T...}$
0	15	25	5,2
10	9,6	30	4,3
20	6,3	40	3,0

Table 20 The resistance values, low temperature sensor

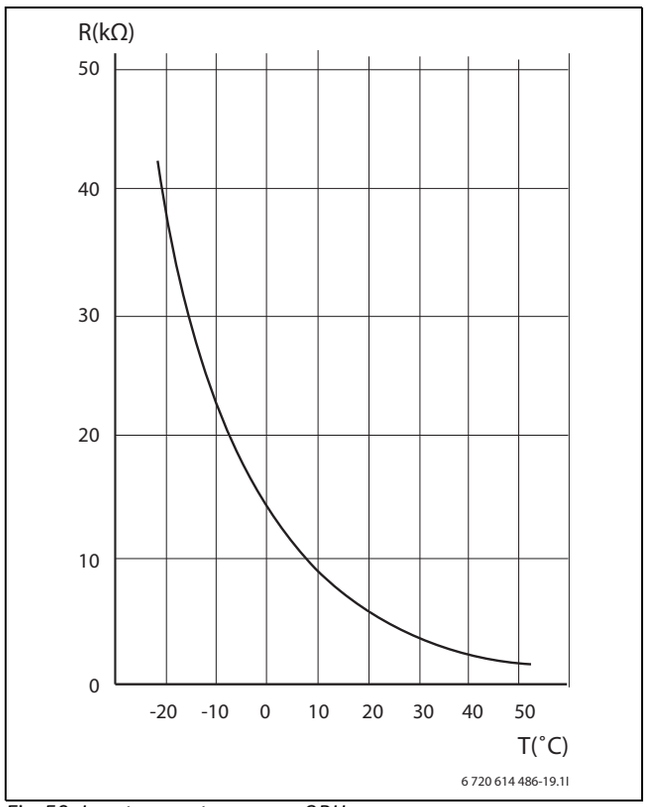

Fig. 58 Low-temperature sensor ODU

MEAN TEMPERATURE SENSOR ODU 7.5

Temperature sensor TH8 (heat sink) has measurement values according to table 21 and diagram in fig 59.

°C	k $\Omega_{T...}$	°C	k $\Omega_{T...}$
0	180	70	8
25	50	90	4
50	17		

Table 21 The resistance values, medium temperature sensor

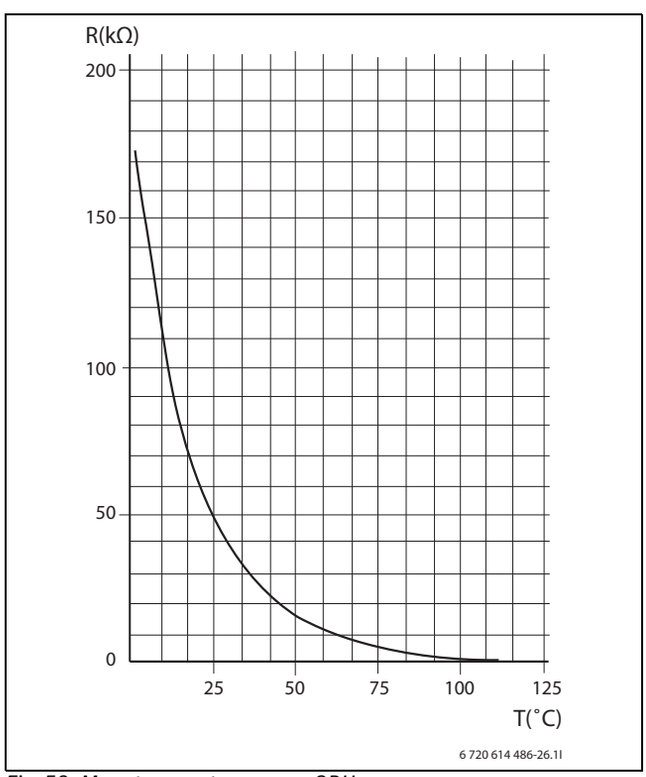

Fig. 59 Mean temperature sensor ODU

HIGH TEMPERATURE SENSOR ODU

The temperature sensors TH4 (hot gas) and TH32 (compressor temperature) show measured values in accordance with table 22 and the diagram in fig. 60.

°C	k $\Omega_{T...}$	°C	k $\Omega_{T...}$
20	250	70	34
30	160	80	24
40	104	90	17,5
50	70	100	13,0
60	48	110	9,8

Table 22 The resistance values, high temperature sensor

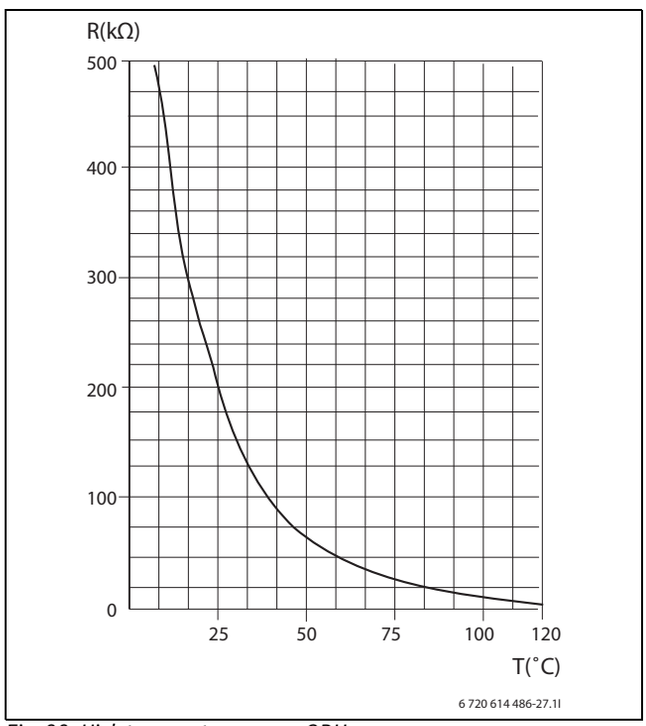

Fig. 60 High temperature sensor ODU

12 GENERAL SYSTEM INFORMATION

The heating system consists of one or two circuits. The heating system is installed according to operating mode, depending on access to and type of additional heater.

12.1 HEATING CIRCUITS

- **Circuit 1;** control of the first circuit is regulated by the installed flow sensor, in combination with installed room controller (accessory).
- **Circuit 2 (mixed), accessory:** circuit 2 is also regulated by the controller if a Multi Box (accessory) is available. In this case, an additional room temperature controller can be installed.

In heating mode, Circuit 2 cannot have a higher flow temperature than circuit 1. This means that under floor heating on circuit 1 cannot be combined with radiators on circuit 2. Room temperature reduction for circuit 1 can affect circuit 2 in some modes.

12.2 HEATING CONTROLS

It is only the room where the room controller is located that can influence regulation of the temperature.

- **Outside temperature sensor and room temperature controller** (one room temperature controller can be used for each heating circuit): if the system is to be controlled using an outside temperature sensor and a room temperature controller, the outdoor sensor must be located on the north facing external wall of the house.
  The room temperature controller is connected to the Hydrolight/ Hydrocomfort unit and signals the current room temperature to the control unit. This signal influences the flow temperature. The flow temperature is reduced if the actual room temperature is higher than the selected temperature.The room sensor must be located centrally in the house.

12.3 CONTROL METHOD FOR COMPRESSOR

The outdoor unit makes use of variable compressor speeds (inverter controlled) and adjusts to existing needs.

If the required speed is greater or less than the current speed, after a certain time the compressor will increase or decrease the speed (depending on how far it is from its set point value).

Regardless of whether the required output is great (e.g. at initial start-up) or small, the compressor will start at low speed and then increase in speed step by step.

Settings and additional information can be found in chapter 16.6.7.

12.4 TIME CONTROL OF CENTRAL HEATING

- **Time control heating:** enables you to increase or reduce the temperature on different days of the week for custom times.
- **Holiday:** the control unit has a program for holiday mode, which means that during the selected period the room temperature changes to a lower or higher level.
- **External input1** and **External input 2** in the control unit can be used for external control. A preselected function is performed when the control unit senses an input signal.

12.5 OPERATION MODES

The outdoor unit stops automatically at outside temperatures less than approx. – 20 °C. The heating and DHW production is then provided by the electr. heater or the 2nd heat appliance in the Hydrocomfort/Hydrolight unit.

The heat pump is dimensioned for less than the house peak heating load, and the additional heat sets in at the same time as the heat pump to meet the demand, when the heat pump alone is not sufficient.

Alarm mode, extra domestic hot water and thermal disinfection also activate the booster heater, even if the outdoor unit is switched off at low outside temperatures. The heating can be independent of the selected internal unit:

- 3-stage electr. heater
- 2nd heat appliance (e.g. gas or oil boiler)

12.6 OPERATION CONTROL

The outdoor unit is designed for a flow temperature of up to 55 °C.

The controller blocks the additional heater at outside temperatures higher than 10 °C (adjustable).

If at an outside temperature of more than –15 °C (adjustable) the temperature in the flow line of the heating system needs to be higher than 55 °C, the heating system switches over to CH mode exclusively following a 30-minute delay. The outdoor unit is then switched off.

EXAMPLE: THE HEAT CURVE IS SET AT 55 °C AT –5 °C (NOT FACTORY SETTING):

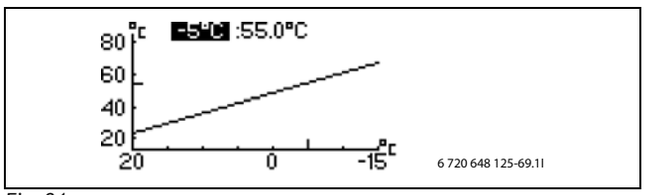

Fig. 61

- Outside temperature higher than 10 °C: heat pump operation only.
- Outside temperature below 10 °C, but higher than – 5 °C: if required, auxiliary operation together with the heat pump.
- Outside temperature below – 5 °C: auxiliary operation only.

12.7 MIXING VALVE CONTROL (MIXING VALVE FOR 2ND HEAT APPLIANCE AND HEATING CIRCUIT WITH MIXER)

The controller uses PID control to control the integrated mixing valve and can reach the flow either on the main circuit or at heating circuit 2. A signal from the controller determines how much the mixing valve opening needs to change. The signal is calculated at short intervals. In order to calibrate the mixer, this is closed completely once every 24 hrs. Depending on the mixer selected, this closing operation lasts between 3 and 5 minutes to make sure that this has been successfully carried out. No warmth or cold is transferred to the system during this time.

13 USER INTERFACE

All settings are made in the control panel and any alarms can be viewed. The control unit can be controlled via the control panel in accordance with the customer's requirements.

The user interface and controller are in the Hydrolight/Hydrocomfort unit.

13.1 OVERVIEW OF THE USER INTERFACE

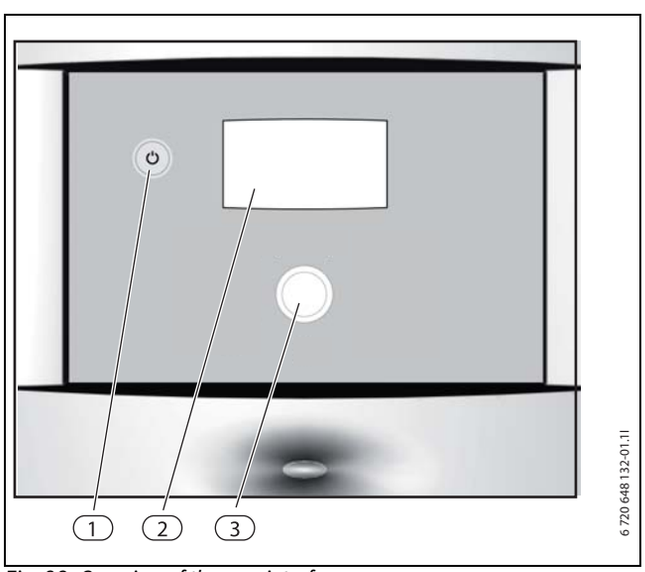

Fig. 62 Overview of the user interface

[1] ON/OFF switch
[2] Display
[3] Rotary selector

MENU DISPLAY

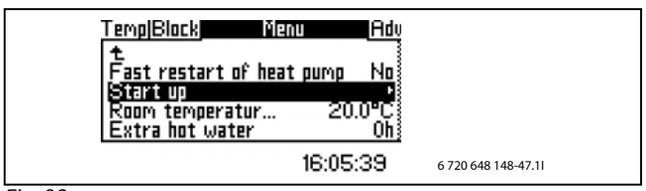

Fig. 63

MENU DIAL

The menu dial is used to navigate between the menu windows and to change the values of different settings. The menu dial is also used to confirm selections.

POWER SWITCH

The power switch button is used to start and switch off the heating installation.

13.2 CONTROL PANEL FUNCTION

The menu dial is used to navigate the menus.

- ▶ Turn the rotary selector anticlockwise to access the menus below or to the left.
- ▶ Turn the menu button clockwise to access the menus above or to the right.
- ▶ Once you have marked the required selection, press the rotary selector to confirm.

At the top of each sub menu there are back arrows to return to the previous menu.

- ▶ Press the rotary selector if the arrow is marked.

13.2.1 SYMBOL OVERVIEW

Symbols for different functions and components that are in operation are displayed in the lower part of the menu window.

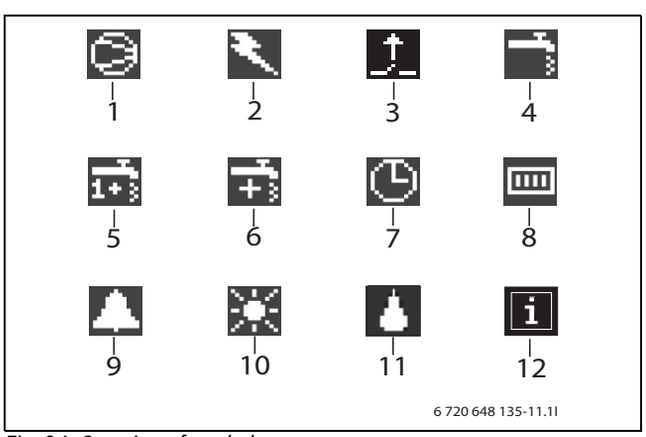

Fig. 64 Overview of symbols

[1] Compressor
[2] Additional heater (electric heater with Hydrocomfort 8-16, 2nd heat appliance with Hydrolight 8-16)
[3] External input
[4] DHW mode
[5] DHW peak
[6] Additional hot water
[7] Time control
[8] Heating Mode
[9] Malfunctions
[10] Holiday mode
[11] defrosting
[12] Info-Icon

13.3 MENU TABS

The menus are divided into four different tabs for different reasons.

- **Temperature** - overview of heating settings
- **Blocking** - blocking functions
- **Menu** - the most popular menu items
- **Advanced menu** - additional menu items.

End users only see what is available in the customer levels.

14 INSTALLATION AND SERVICE MENU (I/S)

CAUTION: The installer and service menu (I/S) is only for installers.
▶ Under no circumstances may the user access this level.

Before you can access the I/S menus, the date and time must be correctly set (→ chapter 16.1).

The backlighting in the display goes out after ten minutes if there has been no activity at the user interface.

Cooling is not an option in this unit.

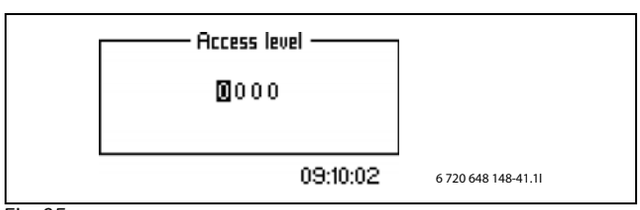

Fig. 65

A 4-digit access code is required to open the installation and service menu (I/S).

- ▶ Turn the dial to **Advanced**.
- ▶ Select **Access level**.
- ▶ Enter the four digit access code (the present date is given as two digits for the month and two digits for the date, for example 0920) using the menu dial and press the menu dial to confirm.
  "Access = Service" appears in the display
- ▶ Navigate to **Menu**. Under **Menu** are now both customer functions and I/S functions.
- ▶ Return to customer level by selecting **Access level** in **Advanced** and enter 0000 as access code.

The control unit automatically returns to customer level approximately 120 minutes after the last adjustment.

15 MENU OVERVIEW

Here you find the upper levels for all functions under **Menu** and **Advanced**. All setting functions are also in the table **Factory settings** (→Chapter 19.1). Installer level (I/S) = [1], User level = [0].

Menu			Access level
Fast restart of heat pump			1
Start up	Language		1
	Country		1
	Setting the clock	Set date Set time	1 1
	Heat pump size		1
	Operation mode		1
	Room sensor with dew point	Not used in the UK	1
	Additional heater options		1
	At additional heating option electr. heater: State total output		1
	T1 maximum set point value		1
	External input 1	Activated if change in temperature Stop hot water loading Stop heating production Additional heat only Limit electrical capacity to External blocking Safety thermostat Stop additional heat hot water Stop additional heat radiators	1 1 1 1 1 1 1 1 1 1
	External input 2	Activated if change in temperature Stop hot water loading Stop heating production Additional heat only Limit electrical capacity to External stop Safety thermostat	1 1 1 1 1 1 1 1
	External input, heating system 2	Activated if Change in temperature Block cooling External stop Safety thermostat	1 1 1 1 1
	External input 2, heating system 2	Activated if Change in temperature Block cooling External stop Safety thermostat	1 1 1 1 1
	Low energy circulation pump		1
	Minimum outdoor temperature of heat curve		1
	Accessory board function	Activate heating system 2	1
	With activated mixer group: E12.T1 maximum set point value		1
	Connected extra sensors	T3 acknowledged T5 acknowledged *With activated heating system 2*: E12.T5 acknowledged	1

Table 23 Menu

Menu			Access level
	Manual operation	Manual operation Manual operation time 3-way valve G1 heating system pump G2 Heat carrier pump G2 Speed Compressor Cooling (non Function) Electric water heater step 1 Electric water heater step 2 External additional heater Mixing valve open Mixing valve close Mixing valve open, heating system 2 Mixing valve close, heating system 2 E12.G1 pump, heating system 2 Cooling season relay (non Function) Heating cable E41.G6 Hot water circulation pump	1
	Operating option, additional heater	Additional heat only Block additional heat	1
	Correct sensor	Correct T1 Correct T71 Correct T2 Correct T3 Correct T5 Correct T8 Correct T9 Correct E12.T1 Correct E12.T5	1
	Anti-jamming mode time		1
	Alarm buzzer interval		1
	Display	Contrast Brightness	1
	Screed drying	Activate *If screed drying is activated:* Current program step Time remaining in current program step Heat source Program settings	1
	System pressure sensor connected (only in Hydrocomfort)		1
	Operation alternative G2		1
Temperature increase/decrease	Only displayed if a room temperature sensor is not installed.		0
Temperature increase/decrease, heating system 2	Only displayed if a room temperature sensor is not installed.		0
Temperature increase/decrease settings	Only displayed if a room temperature sensor is not installed.	Limit value for V or H Much colder/warmer, change Colder/warmer, change Limit value for V and H, heating system 2 Much colder/warmer, change Colder/warmer, change Change with cooling/heating, heating system 2	1 1 1 1 1
Room temperature setting	Only displayed if a room temperature sensor is installed (T5, TT).	Setting the temperature	0
Room temperature setting, heating system 2	Only displayed if a room temperature sensor is installed (E12T5, TT).	Setting the temperature	0
Extra hot water	Only displayed if DHW temperature sensor is installed (T3)	Set run time of function	0

Table 23 Menu

Blocking			Access level
Block additional heat		Select Yes/No	0
Block hot water		Select Yes/No	0
Block heating		Select Yes/No	0
Block heat, heating system 2		Select Yes/No	0

Table 24 Blocking

Advanced menu			
Heating/Cooling	Minimum outdoor temperature of heat curve		1
	Heating system temperature	Heat curve	0
		Hysteresis	1
		--Quick acceleration	1
		--Quick brake	1
		--Quick stop	1
		--integration time	1
		--Rad brake temp increase	1
		--Rad brake time	1
	Room sensor settings	Room temperature setting	0
		Outdoor temperature display in room sensor	0
		Room sensor interval	0
		Room sensor Influence	0
		--Change factor	0
		--Blocking time	
	Time limited settings	Time control heating	0
		--Day and time	0
		--Change in temperature	0
		Holiday	0
		--Date	0
		--Change in temperature	0
		External input 1	0
		--Activated if	1
		--Change in temperature	0
		--Installer settings	0
		External input 2	0
		--External in 2, active with	0
		--Temperature change	0
		--Installer settings	0
	Heating season	Heating season limit	0
		Delay	0
		Direct start limit	0
	Heating, maximum operating time at hot water demand		0
	Shut down protection, change over hot water to heating		1
	Maximum speed compressor		1
	Quick acceleration time		1
	Quick brake time		1
	Operation mode heating system 1		1

Table 25 Advanced menu

Advanced menu			
	Temperature heating system 2 (only if installed)	Heat curve Room sensor settings --Room temperature setting --Room sensor influence Time limited settings ---Time control heating ---Day and time --Change in temperature --Time control cooling day/time --Holiday ---Date ---Change in temperature --External input 1 --External input 2 Mixing valve settings --Control unit reading --P-constant --I-time --D-time --Mixing valve running time --Mixing valve limitation defrost mode	0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1
Hot water	Extra hot water	Number of hours Stop temperature	0
	Hot water peak	Interval Start time	0
	Hot Water temperature	In compressor mode --T3 Start temperature ..T9 Stop temperature Hot water, max operating time with heating demand	1 1 1 0
	Time control hot water		0
	Time control hot water circulation		0
	Slowest speed at hot water production		1
	Max speed during hot water production		1
	Quick start of addition		1
Temperatures	Display of temperatures	Readout of all sensors connected to the Hydrolight/ Hydrocomfort unit	1
	Correct sensor	Adjust all sensors connected to the Hydrolight/ Hydrocomfort unit	1
	Inputs	Readout of input signals	1
	Outputs	Readout of output signals	1
	Demand	Actual status of heat pump	1
Timers (timer programs)	Timer display		0
Operating times and consumptions	Total operating time Short-term measurements		1

Table 25 Advanced menu

Advanced menu			
Additional heat settings	Start delay		1
	Time control additional heat		1
	Operating option	Additional heat only Block additional heat	1
	Electric additional heat settings	Connection capacity --State total output --Compressor mode, output limitation --Additional heat only, output limitation Ramp time increase Ramp time decrease Locking of electricity supply when defrosting Neutral zone	1
	Mixing valve settings	Mixing valve delay Control unit reading PID heat setting --P-constant --I-time --D-time PID hot water setting --P-constant --I-time --D-time Mixing valve running time Locking of mixing valve during defrosting	1
	Max outdoor temperature for additional heat		1
	Connected electrical capacity (shows the current value)		1
Safety functions	Block heat pump at low outdoor temperature		1
	Heating cable time after defrosting		1
Setting the clock	Set date		0
	Set time		0
	Country		0
Alarm	Alarm log	Alarm log Delete alarm log?	0 0
	Alarm history	Alarm history	1
	Info log	Info log Delete info log	1 1
Access level			0
Return to factory settings			0
Deactivate alarm buzzer			0
Program version	Shows installed program version for controller		0
Connected I/O cards	Shows which I/O card is connected to the controller and its version number.		1

Table 25 Advanced menu

Temperature			Access level
Temperature		Display current temperatures	0

Table 26 Temperatures

16 COMMISSIONING

WARNING: The compressor must be warmed up before starting for the first time.

▶ Switch on the power to the outdoor unit at least 2 hours prior to commissioning, up to 12 hours for extreme climate conditions (below -15 °C ambient temperature).

In regions where the air has a high moisture content and there is a danger of freezing (near lakes, rivers and the sea), the SW 7-6 switch can be switched to "on". This shortens the defrosting cycles.

Before commissioning:

▶ Open all radiators or underfloor heating systems.
▶ Fill the heating system.
▶ Bleed the heating system.
▶ Check the heating system for leaks.

When connecting a fan coil system the fans are to be started first and any shut-off valves for the fan coils fully opened.

Cooling should not be selected on this unit. This function is not supported for the UK market.

16.1 SWITCHING ON THE HEAT PUMP

The heat pump may only be installed and started up by a competent person.

▶ Switch the power supply to the heat pump on. Start the heat pump by briefly pressing the ON/OFF switch on the user interface. The available languages are displayed.

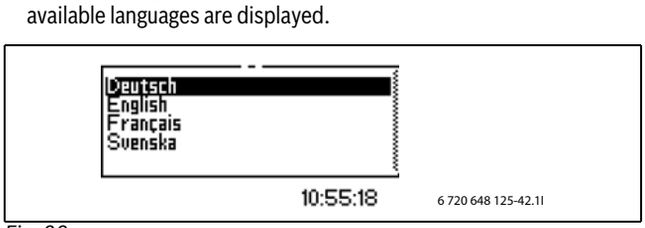

Fig. 66

▶ Select the required display language. The selected language is automatically adopted as the factory setting and will not be changed at **Return to factory settings**. To change the language, go to **Language** under **Start up**.

▶ Then select the **Country** in which the heat pump is used. Options: Germany, Great Britain, France, Sweden and Austria.

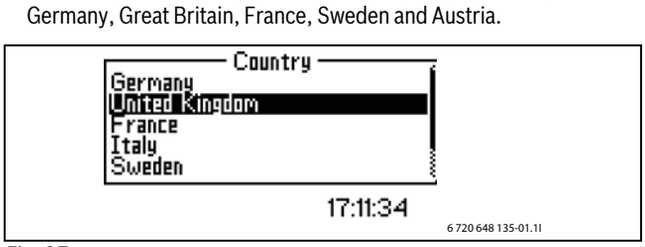

Fig. 67

▶ **Set date** in the format Year-Month-Day.

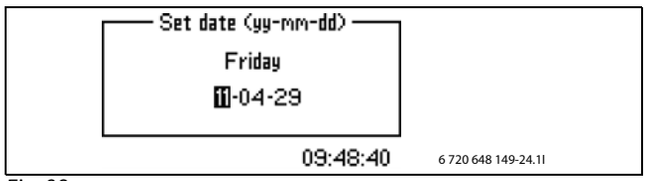

Fig. 68

▶ **Set time** in the format Hour-Minute-Second.

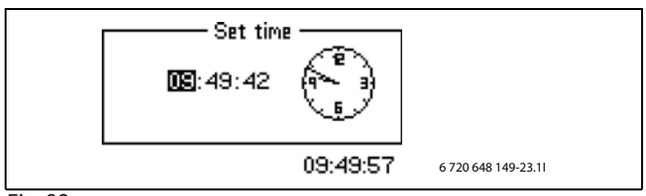

Fig. 69

There is no automatic summer / winter clock change over. This has to be done manually.

▶ Select the **Heat pump size**.

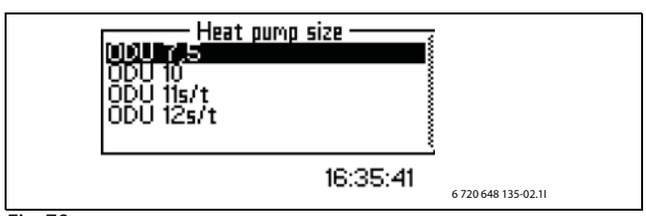

Fig. 70

▶ Select the **Operating mode** for which the heating system has been configured.

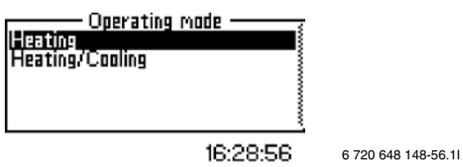

Fig. 71

Always select Heating only as cooling is not an option in this unit.

▶ Select the type of booster heating that is installed. Electric booster heater, 3-stage with Hydrocomfort, booster heater with mixer with Hydrolight.

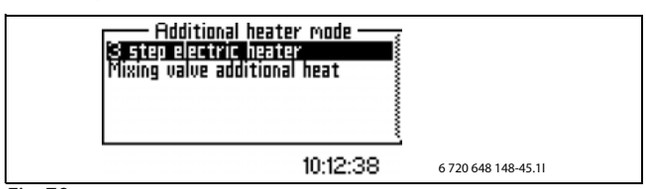

Fig. 72

▶ When selecting **3 step electric heater**: select the heating output of the booster heater.
▶ Set the current output of the incoming booster heater.

The electric additional heat built into the Hydrocomfort module is 9 kW.

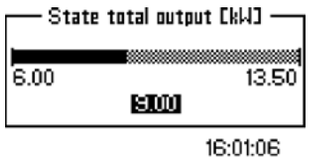

Fig. 73

▶ Select **E11.T1 Set point maximum**, i.e. the max. permitted flow temperature (H-value). The setting can be between 20°C and 80°C, the factory setting is 45°C.

The T1 max. set value must set at 80°C when operating with external auxiliary heaters.

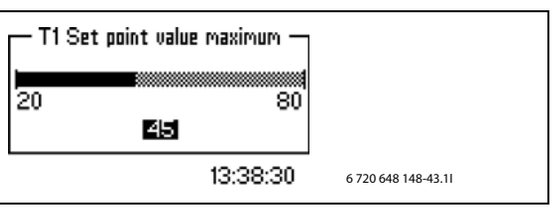

Fig. 74

▶ State whether the heat transfer medium pump G2 is a **Low energy circulation pump**.

Always select **No**.

▶ Select the **Minimum outdoor temperature of heat curve**, i.e. the outside temperature below which the flow temperature no longer increases as the outdoor temperature decreases. The value can be set to between
−35°C and 0°C. Factory setting: −10°C.
The heating curve may need to be reset if the **Minimum outdoor temperature of heat curve** is changed (→ chapter 20.3).

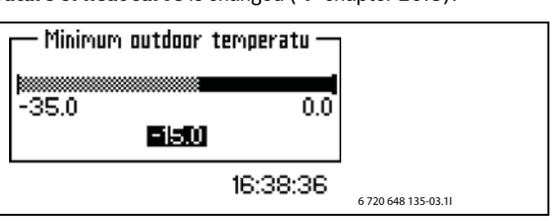

Fig. 75

If the settings have been made as specified in chapter 16.1, the heat pump will be ready for operation. To make further settings, or modify existing settings, you will need to access the installation and service menu. (→chapter 14).

Settings that have already been made in accordance with chapter 16.1 can be modified under **Menu** in the user interface of the Hydrolight/ Hydrocomfort module.

16.2 MANUAL OPERATION

Before commissioning the heating installation, all functions can be checked, by manually starting and stopping them. This can be found in the **Start up** menu section.

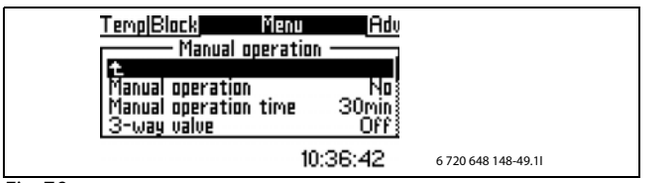

Fig. 76

▶ To activate manual mode, select **Yes** then **Save** under the **Manual operation** menu item.

Three-way valves, circulation pumps, compressor, electric elements and mixing valves can now be manually operated by selecting **On** and then **Save** for each function.

The function must be deactivated afterwards by selecting **No** on **Manual operation**.

16.3 HEATING SETTINGS

16.3.1 HEATING CURVE

The heat curve is only active in heating mode. For more information on setting of the heat curve please consult the user guide.

The heat curve constitutes the basis for the control unit's control of the temperature on the heating water to the circuit and indicates how high it needs to be in relation to the outdoor temperature. The control unit increases the temperature of the heating water when the outdoor temperature drops. The temperature of the heating water out to the circuit, i.e. the flow temperature is measured by sensor T1 for circuit 1 (full name E11.T1) and sensor T1 for circuit 2 (full name E12.T1).

Set appropriate V and H values.

▶ Go to **Advanced** on the I/S level.
▶ Select **Heating/Cooling**.
▶ Select **Heating system temperature** (or **Temperature heating system 2** to set heating system 2)
▶ Select the **Heat curve**.
▶ Adjust to the desired value.

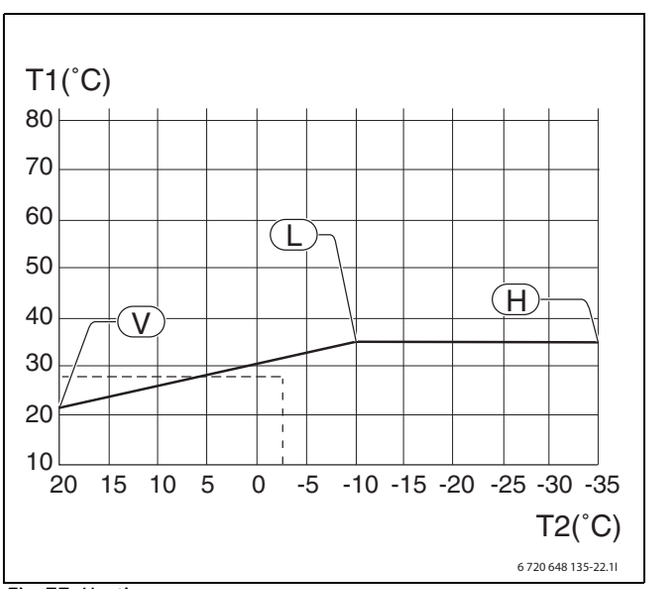

Fig. 77 Heating curve

[T1] Flow temperature
[T2] Outside temperature
[1] Lowest outside temperature of heating curve. At low temperatures the flow temperature remains unchanged.

Only the part of the heat curve with flow temperature up to the highest permitted flow temperature (the H-value) is shown in the window. Therefore, the heat curve is a straight line in the window, and the point (L) is the value at the right side of the window.

A heat curve is set for each circuit. If the room temperature is perceived to be too high or too low in the circuit, it is preferable to adjust the curve.

The heat curve can be changed in several ways. The slope of the curve can be changed by adjusting the flow temperature up or down in the left and the right end points. The curve can also be affected every 5th outdoor temperature degree.

- With the underfloor heating system, the end point on the right must be set to no higher than 40 °C. Higher temperatures can damage the pipes and floor.
- The end point on the right is normally 50 °C for radiators.
- The factory setting for the minimum outside temperature [1] is –10 °C.

  To change the value [1]:
  – In I/S select **Advanced**.
  – Select the **Heating/Cooling**.
  – Select **Minimum outdoor temperature of heat curve**.
  – Set the required value.

The outdoor unit stops at outdoor temperatures lower than approximately –20 °C. The heating installation then goes over to additional heat mode only.

16.3.2 CONNECTION CAPACITY FOR HYDROCOMFORT

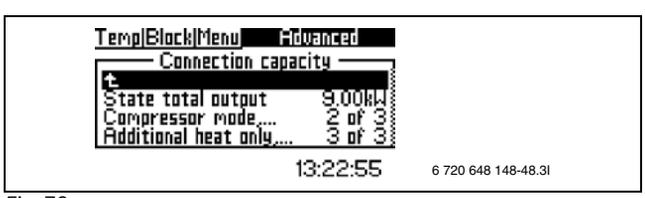

Fig. 78

- ▶ In I/S select **Advanced**
- ▶ Select **Additional heat settings**
- ▶ Select **Electric additional heat settings**
- ▶ Select **Connection capacity**

State total output: specify the connected total output of the electric heater here. For a Hydrocomfort unit with 9 kW, enter 9 kW.

Compressor mode, output limitation: specify the output restriction for the booster heater when the compressor is in operation here. The factory setting is 2/3 the value set in **State total output**.

Additional heat only, output limitation: Setting permitted output when the compressor is not in operation. The factory setting is the value in **State total output**.

16.3.3 ADDITIONAL HEAT OPTIONS

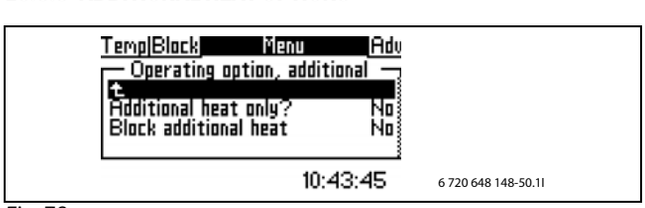

Fig. 79

Blocking of compressor and fan start:

- ▶ In I/S select **Advanced**
- ▶ Select **Additional heat settings**
- ▶ Select **Operating option**
- ▶ Select **Additional heat only**.
- ▶ Select **Yes** and then **Save**. Heating and hot water is only supplied via additional heating.

The function **Block additional heat** blocks the additional heat function, but not during alarm mode, hot water peak, extra hot water or operation with additional heat only.

Block additional heat normally this is not recommended.

16.3.4 TEMPERATURE ADJUSTMENT EXTERNAL CH

When using a 2nd heat appliance (mixer with CH), this must be configured so that the temperature it delivers is always higher than the anticipated maximum temperature in the system, irrespective of the outside temperature. The temperature set must however always be at least 65 °C in order to be able to carry out thermal disinfection of the DHW cylinder, or provide additional domestic hot water. Depending on the supplier of the external booster heater, this may need to be set with a heat curve. You can find further settings in the manual of the supplier of the external heat source.

16.3.5 MIXING VALVE DELAY

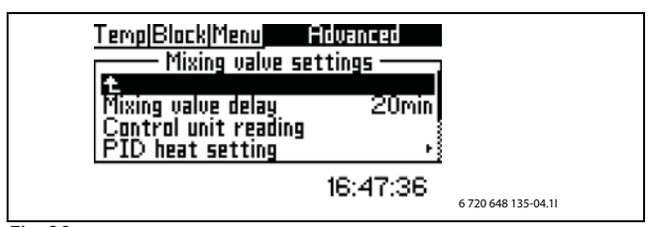

Fig. 80

To achieve the required temperature, delayed opening of the mixer is necessary.

To define the correct delay time:

- ▶ Measure the time between activation of the additional heater (in manual mode), and deactivation of the additional heater because of too high temperature in the boiler control.
- ▶ In I/S select **Advanced**
- ▶ **Additional heat settings**
- ▶ **Mixing valve settings**
- ▶ Select **Mixing valve delay**
- ▶ Enter the measured value as mixer delay
- ▶ Select Save

16.3.6 START DELAY ADDITIONAL HEATER

- ▶ Set what start delay should apply to the additional heat. When the need for additional heat arises, a timer with set time is started. When this time has passed the additional heat starts.
- ▶ In I/S select **Advanced**
- ▶ Select **Additional heat settings**
- ▶ Select **Start delay**

16.3.7 MAX OUTDOOR TEMPERATURE FOR ADDITIONAL HEAT

- ▶ Set the highest outside temperature for the CH operation. If the outside temperature exceeds the value set for more than 30 minutes, the booster heater will also be switched in above this temperature in Alarm mode, Extra domestic hot water, Thermal disinfection and during operation exclusively with additional heating.

CH mode will be activated again if the outside temperature falls below the value set.

16.3.8 BLOCK HEAT PUMP AT LOW OUTDOOR TEMPERATURE

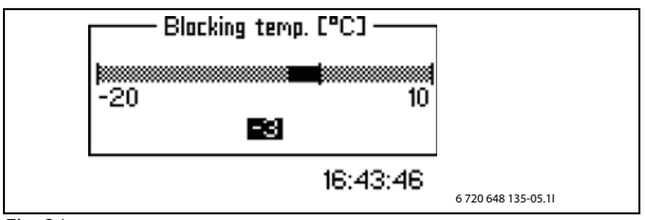

Fig. 81

- ▶ In I/S select **Advanced**
- ▶ Select **Safety functions**
- ▶ Select **Block heat pump at low outdoor temperature**
- ▶ Select **Save**

If this setting has is made, the booster heater takes over the heating and DHW production as soon as the outside temperature has been below the selected temperature for at least 30 mins.

16.3.9 EXTERNAL INPUT 1/ EXTERNAL INPUT 2

- ▶ In I/S select **Advanced**
- ▶ Select **Heating/Cooling**
- ▶ Select **Tme limited settings**

When **External input 1**/ **External input 2** is activated, the control unit performs the selected functions. When the external input is no longer active, the control unit returns to normal mode.

During pre-configuration of the heat pump, select whether **External input 1** and **External input 2** should be activated when the input is closed or open (→ chapter 16.1).

Select the menu item(s) to be executed if **External input 1**/ **External input 2** is activated:

- ▶ **Change in temperature**, set the amount of degrees that the flow line temperature is to be changed.
- ▶ **Stop heating production**, stops heat production completely, frost protection still active.
- ▶ **Stop hot water loading**, select **Yes** if hot water production with the heat pump is to be blocked.
- ▶ **Additional heat only**, select **Yes** if the heat pump operation is to be blocked.
- ▶ **Limit electrical capacity to**, select the maximum output that the additional heater may have. This selection is used during tariff control.
- ▶ **External blocking** is used if a fan convector is installed in the system and indicates the status of the fan.
- ▶ **Safety thermostat**, switches the heat pump off and sends an alarm.
- ▶ **Stop additional heat hot water**, if **Yes** is selected, the electr. booster heater is switched off.
- ▶ **Stop additional heat radiators**, if **Yes** is selected, the 2nd heat appliance is stopped, i.e. only the compressor is used.

16.3.10 ROOM SENSOR SETTINGS (ROOM CONTROLLER)

- ▶ In I/S select **Advanced**
- ▶ Select **Heating/Cooling**
- ▶ Select **Room sensor settings**

ROOM SENSOR INFLUENCE

- ▶ Set the extent to which a room temperature deviation of 1 K (°C) influences the set value for the flow temperature.

Example: with a 2 K (°C) deviation from the set room temperature, the set value of the flow temperature is changed by 4 K (°C) (2 K deviation * factor 2 = 4 K). The greater the influence, the greater the effect of the room controller, but also the potential fluctuation in temperature.

OUTDOOR TEMPERATURE DISPLAY IN ROOM SENSOR YES/NO

With Yes the room controller displays the temperature in the house and the temperature outdoors alternately.

16.4 DOMESTIC HOT WATER SETTINGS

- ▶ In I/S select **Advanced**
- ▶ Select **Hot water**

16.4.1 HOT WATER TEMPERATURE

The DHW production is checked via sensor T3 (cylinder sensor) and T9 (return sensor in internal unit).

DHW charging starts if the temperature at sensor T3 falls below the set value, and stops when the temperature exceeds the set value of T3+0.5K and the set value of T9. If a greater degree of comfort is required, the T9 stop temperature can be increased to the required temperature. However, this has a significant impact on the effectiveness of the heat pump.

Separate DHW heating by the 2nd heat appliance is only possible if the highest anticipated temperature of the 2nd heat appliance does not exceed the maximum flow temperature T1.

16.4.2 COMPRESSOR SPEED DURING DHW PRODUCTION

The compressor has been set at the factory to operate at stage 3 as minimum and stage 7 as maximum when charging the DHW cylinder.

If the compressor stage is higher than 3 in heating mode, this stage is also used for charging with domestic hot water. If a greater degree of comfort and faster charging of the DHW cylinder is required, set the value "Lowest speed when filling with domestic hot water" to the required value.

If the factory setting is changed, this restricts the efficiency of the heat pump and can lead to error messages with several DHW cylinders.

16.4.3 HOT WATER PEAK (ANTI-LEGIONNELLA FUNCTION)

When the DHW peak program is activated, the DHW cylinder is heated up to 65 °C with the assistance of the heat pump and booster heater. If the temperature is too high for the heat pump, it is stopped and the booster heater increases the temperature up to the stop temperature. **Hot water peak** is not activated as a factory setting. If this function is required, the interval in days and the time can be set under **Advanced**.

- ▶ In I/S select **Advanced**
- ▶ Select **Hot water**
- ▶ Select **Hot water peak**

If **Activate** under **Interval** is selected, **Hot water peak** is carried out once and is subsequently inactive.

16.4.4 HOT WATER CIRCULATION

The time control for the DHW circulation pump is set under **Advanced**.

- ▶ In I/S select **Advanced**
- ▶ Select **Hot water**
- ▶ Select **Time control hot water circulation**

A switch-on and shutdown can be set for each day of the week.

16.4.5 EXTRA HOT WATER

Additional amount of hot water is produced by temporarily increasing the temperature of the hot water during the set number of hours to the indicated stop temperature.

The heat pump starts the function directly and uses the compressor first and then the additional heat source to increase the temperature. When

the desired number of hours have passed, the heat pump returns to normal hot water mode.

DANGER: Risk of burn injuries.
▶ Use a mixing valve when the hot water temperature exceeds 60 °C.

▶ In I/S select **Advanced**
▶ Select **Hot water**
▶ Select **Extra hot water**
▶ **Number of hours**
▶ Set the time for which extra domestic hot water should be produced
▶ Select **Stop temperature**
▶ Set stop temperature for extra domestic hot water.

16.5 SETTINGS FOR HEATING CIRCUIT 2

16.5.1 ACTIVATE MIXER GROUP

▶ In I/S select **Menu**
▶ Select **Start up**
▶ Select **Accessory board function**

If a mixer module is installed for heating circuit 2, this must be confirmed in the menu. To do this, select **Accessory board function**.

▶ To confirm the accessories card, select **Yes** then **Save**.

16.5.2 HEATING CURVE

▶ Go to **Advanced** on the I/S level.
▶ Select **Heating/Cooling**.
▶ Select **Temperature heating system 2**
▶ Select the **Heat curve**.
▶ Adjust to the desired value.

Perform the same settings made with heating system 1 (→ chapter 16.3.1).

16.5.3 MAX LIMIT E12.T1 SET POINT VALUE

Maximum flow temperature for heating system (circuit) 2 can be adjusted here.

This value is set to 45 °C on delivery. The value may need to be increased if only radiators are used.

▶ In I/S select **Menu**
▶ Select **Start up**
▶ Select **Max limit E12.T1 set point value**
▶ Set the required value.

16.5.4 MIXER RUNTIME

If a mixed heating circuit with mixer is installed, the current runtime of the mixer valve must be set. To do this, select **Advanced**.

▶ In I/S select **Advanced**
▶ Select **Heating/Cooling**
▶ Select **Temperature heating system 2**
▶ Select **Mixing valve settings**
▶ Select **Mixing valve running time**

Setting the runtime in seconds.

16.5.5 EXTERNAL INPUT, HEATING SYSTEM 2/ EXTERNAL INPUT 2, HEATING SYSTEM 2

▶ Go to **Advanced** on the I/S level.
▶ Select **Heating/Cooling**.
▶ Select **Temperature heating system 2**
▶ Select the **External input 1 or 2**

When External input, heating system 2/ External input 2, heating system 2 is activated, the control unit performs the selected functions. When the external input is no longer active, the control unit returns to normal mode.

Select pre-configuration of the heat pump if External input, heating system 2 and External input 2, heating system 2 are to be activated when the input is closed or open (→ chapter 16.1).

Select the menu item(s) to be executed if External input, heating system 2/ External input 2, heating system 2 is activated:

▶ **Change in temperature**, set the amount of degrees that the flow line temperature is to be changed.
▶ **Block cooling**, select **Yes** if cooling is to be blocked.
▶ **External stop**, is used if a fan convector is installed in the system and indicates the status of the fan.
▶ **Safety thermostat** switches the heating circuit pump and mixer off and sends an alarm.

16.5.6 ROOM SENSOR SETTINGS (ROOM CONTROLLER)

▶ In I/S select **Advanced**
▶ Select **Heating/Cooling**
▶ Select **Temperature heating system 2**
▶ Select **Room sensor settings**

Perform the same settings made with heating system 1 (→ chapter 16.3.10).

16.6 OTHER SETTINGS

Following commissioning and pre-configuration in accordance with chapter 16.1- 16.5, all the necessary settings have been made. Furthermore, additional settings can be made if required. These are listed in this chapter.

16.6.1 SYSTEM PRESSURE SENSOR CONNECTED

A system pressure transmitter is only available for Hydrocomfort. The menu is not visible in Hydrolight.

▶ In I/S select **Menu**
▶ Select **Start up**
▶ Select **System pressure sensor connected**

Always select **Yes**.

16.6.2 OPERATION ALTERNATIVE G2

▶ Setting the operating mode of the heat transfer medium pump G2 or automatic start at compressor start.
In systems without bypass or without buffer cylinder, G2 must be continuously in operation.

Setting continuous mode:

▶ In the installation and service menu select **Menu**.
▶ Select **Start up**.
▶ Select **Operation alternative G2**.
▶ Set the required value.

16.6.3 CONNECTED EXTRA SENSORS

If the DHW sensor T3 is installed, this is automatically confirmed.

If the room controller is installed, this is automatically confirmed.

If the heating system (heating circuit) 2 is installed, the room controller will also have automatically confirmed E12.T5.

All sensors can be deactivated if required.

▶ In I/S select **Menu**
▶ Select **Start up**
▶ Select **Connected extra sensors**

16.6.4 CORRECT SENSOR

All sensors can be corrected a maximum of 5 °C up or down. The value is given directly in °C. Sensors should only be corrected in exceptional cases.

- ▶ In I/S select **Menu**
- ▶ Select **Start up**
- ▶ Select **Correct sensor**

16.6.5 ANTI-JAMMING MODE TIME

At the set time each day the circulation pump G2 and 3-way valve VXV are run for one minute each, provided that they have not been operated during the previous twenty four hours. Factory setting = 2, which means 02:00. Min = 0, max = 23.

- ▶ In I/S select **Menu**
- ▶ Select **Start up**
- ▶ Select **Anti-jamming mode time**

16.6.6 ALARM BUZZER, INTERVAL

If the alarm signal is not deactivated, it sounds at the specified interval in the event of an alarm. Factory setting = 1 minute. Maximum = 10 minutes.

- ▶ In I/S select **Menu**
- ▶ Select **Start up**
- ▶ Select **Alarm buzzer, interval**

16.6.7 HYSTERESIS, HEATING

There is normally no reason to change the factory setting. It is only in the event of large temperature changes in the heating system or if the compressor continuously changes speed between its outer positions (0 - 7 steps), that adjustment is required.

Hysteresis determines when the heat pump's compressor is to increase and reduce the heating output in relation to the heat curve's value. These values are offset in relation to the heat curve to prevent the compressor from starting and stopping continuously.

INTEGRATION TIME

The value **Integration time** is the normal regulation of hysteresis. The integration time determines how quickly the compressor's speed is to be regulated if the flow temperature (T1) deviates from the heat curve less than that stated in the menu **Quick acceleration** or **Quick brake**.

A factory setting of 60 degree minutes (°min) means that if the deviation is 1 °C it takes 60 minutes for the speed of the compressor to increase or reduce by 1 stage. With a deviation of 2 °C it takes 30 minutes for the speed of the compressor to change.

Setting the integration time:

- ▶ Go to **Advanced** on the I/S level.
- ▶ Select **Heating/Cooling**.
- ▶ Select **Heating system temperature**.
- ▶ Select **Hysteresis**.
- ▶ Select **Integration time**.
- ▶ Set the required value.

QUICK ACCELERATION AND QUICK BRAKE

The value determines how many degrees the flow temperature (T1) can deviate from the heat curve before the compressor quickly changes speed (heat output).

Factory setting is 5 °C (acceleration) 1 °C (brake), which means that if the flow temperature T1 exceeds the set point value from the heat curve by 1 °C the speed reduces by 1 step (brakes). The reduction occurs gradually as long as the deviation is 1 ° or more during the set time **Quick brake**.

The opposite applies if T1 falls below the heat curve by 5 ° instead, the speed then increases (advances).

Setting the permissible temperature deviation:

- ▶ Go to **Advanced** on the I/S level.
- ▶ Select **Heating/Cooling**.
- ▶ Select **Heating system temperature**.
- ▶ Select **Hysteresis**.
- ▶ Select **Quick acceleration** or **Quick brake**.
- ▶ Set the required value.

Select how long a deviation can last before the speed changes:

- ▶ Go to **Advanced** on the I/S level.
- ▶ Select **Heating/Cooling**.
- ▶ Select **Hysteresis**.
- ▶ Select **Rad brake temp increase** or **Rad brake time**.
- ▶ Set the required value.

QUICK STOP

The value **Quick stop** determines how many degrees the flow temperature (T1) can exceed the heat curve before the compressor stops fully.

Setting the permissible temperature deviation:

- ▶ Go to **Advanced** on the I/S level.
- ▶ Select **Heating/Cooling**.
- ▶ Select the **Heating system temperature**.
- ▶ Select the **Hysteresis**.
- ▶ Select the **Quick stop**.
- ▶ Set the required value. Factory setting: 10 °C.

16.6.8 OPERATING TIMES AND CONSUMPTIONS

The total operating times of the controller, compressor and booster heater are displayed here (active connection). Short-term measurements can also be carried out for the compressor and booster heater.

- ▶ Go to **Advanced** on the I/S level.
- ▶ Select **Operating times and consumptions**.

16.7 FAST RESTART OF HEAT PUMP

To bypass all timers when the heat pump starts:

- ▶ Select **Menu**
- ▶ Select **Fast restart of heat pump**
- ▶ Select **Yes** then **Save**.

The heat pump starts after 20 s if a central heating or domestic hot water demand exists and all internal timers of the external unit have elapsed. Internal timers cannot be influenced.

The internal timers in the outdoor unit can delay the start more than 20s.

16.8 SCREED DRYING

Screed drying requires the installation of underfloor heating coils under the floor tiles.

Screed drying must take place with a continuous electrical power supply. When screed drying is used, the electric connection should therefore be made in the standard way.

The screed drying function is used for the drying of screed in new-build homes. The screed drying program has the highest priority, which

means that all functions, apart from the safety functions and electric heating only operation, are deactivated. When drying the screed, all heating circuits are in operation.

The screed drying is carried out in three phases:

- Heating phase
- Phase with maximum temperature
- Cooling phase

Heating and cooling are performed stepwise; each step continues for at least a day. The phase with maximum temperature is considered to be one step. There are 9 steps with the factory values: Heating phase in 4 steps (25 °C, 30 °C, 35 °C, 40 °C), maximum temperature (45 °C for four days), cooling phase in 4 steps (40 °C, 35 °C, 30 °C, 25 °C).

To activate the screed drying program (→ chapter 16.8.1).

It is possible to cancel a running program. On completion of the program, the heat pump returns to normal operation.

Following a power supply interruption or failure, the screed drying program continues at the point where it was interrupted.

16.8.1 SCREED DRYING

▶ In the installation and service menu select **Menu**.
▶ Select **Start up**.
▶ Select **Screed drying**.
▶ Select **Activate**.
▶ Enter **Yes** if screed drying is to be carried out.

Current program step and **Remaining time for current step** are displayed. It is possible to change the program step.

16.8.2 HEAT SOURCE FOR SCREED DRYING

Select the heat source for the screed drying process in the user interface of the Hydrolight/Hydrocomfort module.

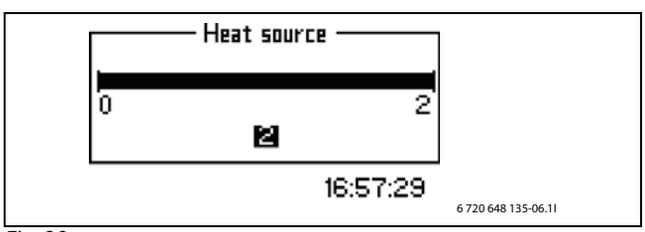

Fig. 82

Selecting the heat source for screed drying:

- Heat source 0: compressor and booster heater
- Heat source 1: compressor
- Heat source 2: booster heater

16.8.3 PROGRAM SETTINGS FOR SCREED DRYING

The following changes can be made in the program settings menu:

- Increase in flow temperature per heating stage
- Number of days per heating stage
- Maximum flow temperature
- Number of days with maximum flow temperature
- Flow temperature reduction per cooling stage
- Number of days per cooling stage

17 TIMER (TIMER PROGRAMS)

Fig. 83

There is a number of timers in the control unit. The status for each of these is shown in the menu **Timers**. Only functions that are active are shown in the menu, the others are hidden until activated.

EXTRA HOT WATER

Displays the remaining time for requested extra hot water.

ADDITIONAL HEAT START

Displays the countdown of the timer for delay of additional heat.

MIXING VALVE CONTROL DELAY

Displays the time that the mixing valve function is delayed after the additional heat timer has counted down.

ALARM MODE DELAY

Displays the remaining time until the additional heat is activated when an alarm is triggered.

COMPRESSOR START

Displays remaining time of compressor start delay

HEATING, OPERATING TIME AT HOT WATER DEMAND

Displays the remaining time before the maximum time in heating mode is reached if there is a simultaneous hot water requirement.

HOT WATER, OPERATING TIME AT HEATING SYSTEM DEMAND

Displays the remaining time before the maximum time for hot water production is reached if there is a simultaneous heating requirement.

HEATING SEASON DELAY

Displays the remaining time until the heating season is activated in the heat pump.

DELAY IN DISCONNECTION OF HEATING SEASON

Indicates the remaining time before the heating period is deactivated in the heat pump.

BLOCKING ROOM SENSOR INFLUENCE

Displays the time remaining when the room controller is blocked.

HOT WATER PEAK INTERVAL

Displays the time remaining to the next hot water peak.

HEATING CABLE

Shows the time the heating cable is active following defrosting.

18 ERROR MANAGEMENT

Alarms in the display window apply mainly to the Hydrolight/ Hydrocomfort module. Alarms that occur in the outdoor unit must be checked with the diagnostic tool (accessory) (→ chapter 18.10).

In the menu **Alarm** there is:

- **Alarm log**
- **Alarm history**
- **Info log**

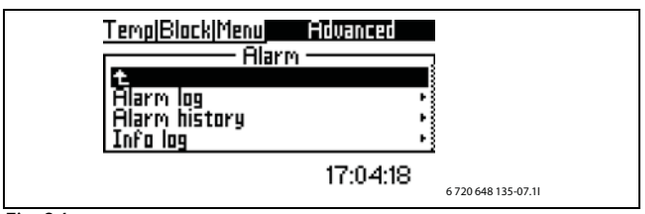

Fig. 84

The customer level (K) gives access to alarm information in the **Alarm log**.

Installer/Service level (I/S) gives access to:

- **Delete alarm log**
- Information regarding the **Alarm history**
- Information regarding the **Info log**
- **Delete info log**

18.1 ALARM HISTORY

ALARM INFORMATION

Alarms are stored in chronological order. Turn the menu dial to read off all information about the most recent alarm, continuing to turn will show the previous alarm.

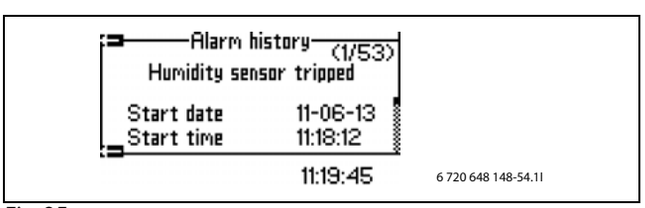

Fig. 85

Alarm information consists of a heading and then detailed information about the time, temperatures of all sensors and status for each output at the alarm point.

18.2 ALARM LOG AND INFO LOG

In the **Alarm log** and the **Info log**, all alarms and warnings that have occurred are stored in chronological order.

▶ Delete the **Alarm log** and the **Info log** after commissioning is complete.

18.3 EXAMPLE OF AN ALARM:

When an alarm is triggered, an alarm window is displayed and a warning signal sounds. The alarm window displays the alarm causes and the time and date that the alarm occurred.

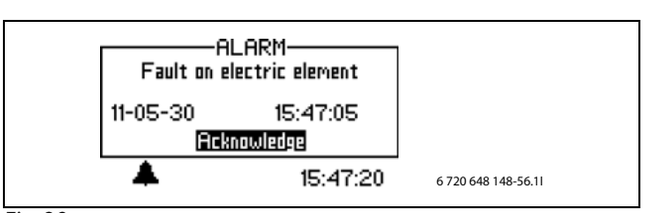

Fig. 86

If you press the rotary selector, **Acknowledge** is marked, the alarm symbol disappears and the warning signal is suppressed. The heat pump restarts if heat demand exists.

The alarm symbol (→ [10] fig. 64) continues to be displayed and the ON and fault indicators change from flashing red to constant red if the fault is not remedied. Every alarm is stored in the alarm log. Active alarms are indicated by the alarm symbol.

The alarm symbol appears for both alarms in the outdoor unit and for alarms in the Hydrolight/Hydrocomfort module, if alarms have occurred in both the units, two alarm symbols will appear.

18.4 DIMMED MENU DISPLAY

18.4.1 POSSIBLE CAUSE 1: FAULTY FUSE IN THE DOMESTIC POWER SUPPLY.

▶ Check whether all domestic fuses are OK.

▶ If required, change/reset fuse/MCB.

After the fault has been remedied, the heat pump automatically restarts.

18.4.2 PROBABLE CAUSE 2: THE MINIATURE CIRCUIT BREAKER IN THE HYDROLIGHT/HYDROCOMFORT MODULE HAS TRIPPED.

▶ Replace the fuse on the IOB A board.

18.5 ALL ALARMS, WARNINGS AND INFORMATION WINDOWS

An alarm can occur temporarily due to various reasons. However, there is never a risk involved in resetting an alarm. All the alarms that can appear in the menu display are described in this section. The descriptions give an idea about the nature of the alarm and what can be done to rectify it.

The alarm log shows alarms and warnings that have occurred.

18.6 ALARM WINDOW

18.6.1 FAILURE / SHORT CIRCUIT ON SENSOR

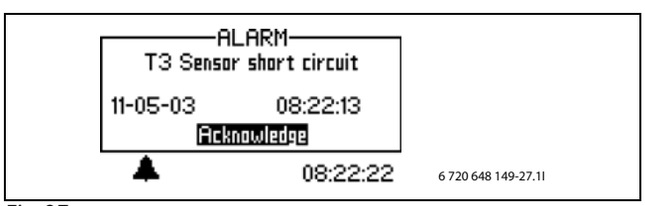

Fig. 87

All sensors connected to the heating installation can give an alarm in the event of a fault. In the example, it is sensor T3, hot water, which has given an alarm. All sensors give alarms in the same way.

Possible cause 1: occasional fault:

▶ No action required.

Possible cause 2: fault at temperature sensor or incorrect connection:

▶ Check the sensor connection.

▶ Check the sensor (→ chapter 11.4.5).

18.6.2 MAX FLOW TEMPERATURE, HEATING SYSTEMOR MAX FLOW TEMPERATURE, HEATING SYSTEM 2

An alarm is triggered if the flow temperature exceeds the set value by 6 K, i.e. **E11.T1 Set point maximum** + 6 K, in order to protect the underfloor heating system.

Possible cause 1; value in E11.T1 Set point maximum incorrectly set

▶ Check **E11.T1 Set point maximum**. Adjust if necessary.

Possible cause 2; flow rate fault

▶ Check the filter and thermostatic valve.

Possible cause 3; maximum flow temperature incorrectly set

- With separate domestic hot water heating, the anticipated temperature of the additional heater must not exceed the maximum flow temperature T1. The settings can be modified at the external booster heater or at T1.

18.6.3 T8 HIGH FLOW TEMPERATURE OR T71 HIGH FLOW TEMPERATURE

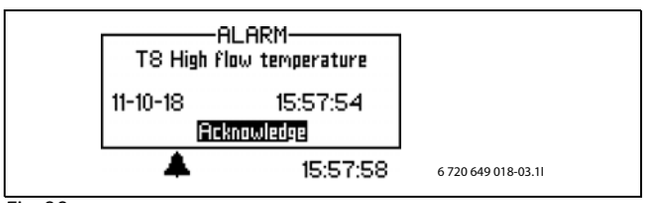

Fig. 88

There are two sensors, T8 and T71, in the Hydrolight/Hydrocomfort module, which for safety reasons stop the heat pump if the temperature of the flow rises above the set value.

Possible cause 1: insufficient flow rate in heat pump:

- Check that the heat carrier pump has not stopped.
- Check that all the valves are open. The thermostat valves in heating systems should be fully open and in floor heating systems at least half of the coils should be fully open.
- If the heat carrier pump speed (G2) is not self-adjusting: Increase the speed of the heat carrier pump. Note that the speed of the circulation pump for the heating system must also be increased, as it must be greater than the speed of the heat carrier pump.
- Select the **Acknowledge**.

Possible cause 2: filter blocked

- Check the filter.
- Clean the filter if necessary (→chapter 22.1).
- Select the **Acknowledge**.

18.6.4 ERROR IN MAIN BOARD, HEATING SYSTEM

Fault in the IOB A board in the Hydrolight/Hydrocomfort, or in communication with it.

- Check the LED on the circuit board, it should flash green.
- Check termination switch S1 (→ fig. 38). This should be in the non-terminated position.
- Check the CAN-BUS connections to the IOB-B board.
- Check the strap on the IOB-B board according to the wiring diagram (→ fig 38).
- Check the power supply on CAN-BUS. The voltage should be 12V DC.
- Replace the faulty IOB board.

18.6.5 ERROR IN ACCESSORY BOARD

Fault in the accessories board (IOB-B) in the Hydrolight/Hydrocomfort module or corresponding communication.

- Check the LED on the circuit board, it should flash green.
- Check the termination switch S1 (→ fig 38), it should be in the not terminated position.
- Check the CAN-BUS connections to the IOB-B board.
- Check the strap on the IOB-B board according to the wiring diagram (→ fig 38).
- Check the power supply on CAN-BUS. The voltage should be 12V DC.
- Replace the faulty IOB board.

18.6.6 ERROR IN ROOM SENSOR BOARD OR ERROR IN E12.T5 ROOM SENSOR BOARD

Fault in the CAN-BUS connected room controller or communication to it.

- Check the termination switches S1, they should be in the terminated position.
- Check termination settings in the room controller.
- Check the power supply on CAN-BUS. The voltage should be 12V DC.
- Replace the faulty room controller.

18.6.7 ERROR IN MULTI FUNCTION BOARD

Fault in the multi function board or corresponding communication.

- Check the LED on the circuit board, it should flash green.
- Check the termination switches S1, they should be in the terminated position.
- Check the CAN-BUS connections to the room controller.
- Check the power supply on CAN-BUS. The voltage should be 12V DC.
- Replace the faulty room controller.

18.6.8 FAULT ON ADDITIONAL HEATER

Alarm from booster heater.

- Check status in the booster heating.
- 230 V must be present at the alarm input for the 2nd heat appliance (→ chapter 10.1.3).

18.6.9 FREEZE PROTECTION EXCHANGER T9 ACTIVATED

The purpose of the alarm is to prevent the condenser from freezing at low temperatures. Possible causes:

- **With defrosting:** is there still enough water in the system?

18.6.10 ALARM HEAT PUMP

The outdoor unit has developed a fault.

- Check the signal cable connection in the outdoor unit and in the Hydrolight/Hydrocomfort module. Connection S2 of the outdoor unit must be connected to connection S2 of the Hydrolight/Hydrocomfort module. The same applies for S3.
- Check fault code using diagnostic tool (accessory).
- Check mains voltage to external unit.
- If the power supply to the Hydrolight/Hydrocomfort module or the outdoor unit was briefly interrupted, switch off the power supply to both units roughly at the same time then wait at least one minute before switching the power back on. Wait to see if the alarm disappears.

18.6.11 LOW MAINS VOLTAGE

If the mains voltage falls below 170 V, the information symbol in the display lights up. If the voltage falls below 170 V for more than one hour, the alarm is activated.

- Check mains voltage.

18.6.12 SCREED DRYING SET POINT VALUE FOR HEATING NOT REACHED

The alarm is activated if the temperature at the current stage in the screed drying program is not reached within the set time.

18.6.13 OVERLOADED TRANSFORMER

If the voltage at the secondary side of the transformer falls below 9V, and the voltage at the primary side is OK, an alarm is triggered and all outputs are enabled. The alarm must be acknowledged manually.

- Check the voltage on the secondary side.
- Fault in the transformer. Replace main board.

18.6.14 FAULT ON ELECTRIC ELEMENT

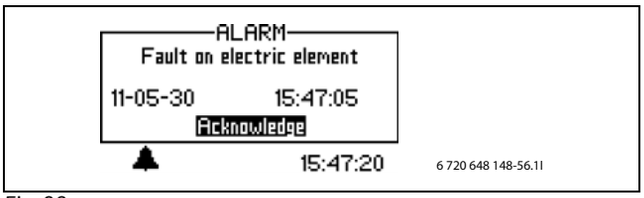

Fig. 89

Possible cause 1: overheating protection of the power supply has tripped:

- ▶ Check that the heat carrier pump has not stopped.
- ▶ Reset overheating protection of power supply. A reset button is located in the switch box of the Hydrolight/Hydrocomfort module.
- ▶ Select the **Acknowledge**.

18.6.15 NO PRESSURE IN SYSTEM

If the system pressure is less than 0.5 bar, this trips the pressure switch which switches off the power supply and triggers the alarm **No pressure in system**. To remedy the fault:

- ▶ Check that the expansion vessel and safety valve are designed to operate with the pressure in the system.
- ▶ Slowly increase the pressure in the heating system by filling water via the filling cock.
- ▶ Acknowledge the alarm manually by pressing the rotary selector in the user interface of the Hydrolight/Hydrocomfort module (→[3], fig. 62).

18.7 WARNING MESSAGE

18.7.1 IS THE HEAT PUMP FUSED FOR THIS OUTPUT?

The warning is activated to ensure that the system is designed to handle the load produced.

In the info log is stored **Check fuse**.

- ▶ Check that the outdoor unit and the Hydrolight/Hydrocomfort unit are connected to the correct fuse size.

18.7.2 MAXIMUM WORKING TEMPERATURE HEAT PUMP

In the info log is stored **Maximum working temperature heat pump**.

Fig. 90

The temperature sensor T9 located in the Hydrolight/Hydrocomfort unit stops the heat pump for safety reasons as soon as the temperature of the return water exceeds a certain limit (>56 °C).

Probable cause 1; The heat setting is set so high that the heating system's return temperature is too high:

- ▶ Reduce the heat setting.

Possible cause 2: valves at the underfloor heating system or radiators are closed:

- ▶ Open the valves.

Possible cause 3: the flow rate of the heat pump is higher than the flow rate in the heating system:

- ▶ Check the speed of the heating circuit pump and flow rate as specified in chapter 20.3.

18.7.3 HIGH TEMPERATURE DIFFERENCE HEAT TRANSFER FLUID

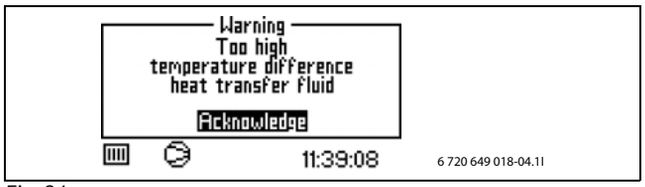

Fig. 91

This warning window is displayed when the temperature difference between sensors T8 and T9 becomes too high (> 13 K).

Possible cause 1: insufficient flow rate in heat pump:

- ▶ Check that the heat carrier pump has not stopped.
- ▶ Check that all the valves are open. The thermostat valves in heating systems should be fully open and in floor heating systems at least half of the coils should be fully open.
- ▶ If the heat carrier pump speed (G2) is not self-adjusting: Increase the speed of the heat carrier pump. Note that the speed of the circulation pump for the heating system must also be increased, as it must be greater than the speed of the heat carrier pump.
- ▶ Select **Acknowledge**.

Possible cause 2: filter blocked:

- ▶ Check the filter.
- ▶ Clean the filter if necessary (→chapter 22.1).
- ▶ Select **Acknowledge**.

18.7.4 TOO SHORT CHANGEOVER TIME FOR FLOOR HEATING

In the info log is stored **Too short changeover time for floor heating**

The warning appears if the value **Delay before** is set to a shorter time than 7hours or the value **Delay after** is set shorter than 7 hours, which is not recommended during underfloor heating.

18.8 INFORMATION WINDOW

18.8.1 LOW MAINS VOLTAGE

If the mains voltage falls below 170 V, the information symbol in the display lights up. If the mains voltage is below 170 V for one hour, an alarm is triggered.

- ▶ Check mains voltage.

18.9 INFO SYMBOL

For a number of events that occur when the heat pump is in operation an icon appears in the display without an alarm being triggered. Although these events do not require immediate action, they are saved in the information report.

Once the text in the information report has been read the icon vanishes from the display.

18.9.1 TOO HOT FOR HEAT PUMP OPERATION

If the temperature exceeds 46 °C for 30 minutes, the Info icon is activated. The booster heater takes over operation of the system. Confirmation is given if the temperature once again falls below 46 °C.

18.9.2 TOO COLD FOR HEAT PUMP OPERATION

If the outdoor temperature falls below the set value in **Block heat pump at low outdoor temperature** (factory value = – 15 °C) the heat pump stops. The warning is activated and the heating installation switches to operating with only additional heat.

18.9.3 MAXIMUM FLOW TEMPERATURE, HEAT PUMP

The temperature in the system has reached the maximum temperature for the heat pump.

Possible cause 1: heating curve set too high

- ▶ Adjust the heating curve (→ chapter 16.5.2).

Possible cause 2; bivalence point set incorrectly Block heat pump at low outdoor temperature .

▶ Adjust bivalance point (→ 16.3.8).

Possible cause 3; flow rate fault

▶ Check filters and valves

18.9.4 MAXIMUM FLOW TEMPERATURE, ADDITIONAL HEAT

The CH flow has now reached its max. temperature.

Possible cause 1: heating curve set too high

▶ Adjust the heating curve (→ chapter 16.5.2).

Possible cause 2; bivalence point set incorrectly Block heat pump at low outdoor temperature .

▶ Consult the installer if this occurs more than once.

Possible cause 3; flow rate fault

▶ Check filters and valves

18.9.5 MAXIMUM WORKING TEMPERATURE ADDITIONAL HEAT

The CH return has reached the max. permissible temperature.

Possible cause 1: heating curve set too high

▶ Adjust the heating curve (→ chapter 16.5.2).

Possible cause 2; bivalence point set incorrectly Block heat pump at low outdoor temperature .

▶ Adjust bivalance point (→ 16.3.8).

18.9.6 TOO LOW FLOW TEMPERATUREOR TOO LOW FLOW TEMPERATURE, HEATING SYSTEM 2

If the temperature of the flow falls below the set point value longer than 15 minutes, the heat pump shuts down and the warning is activated.

18.9.7 TOO HIGH RETURN TEMP

The warning appears if the return line to the heat pump (T9) becomes too hot.

▶ Check the 4-way valve in the event of repeated warnings.

18.10 CHECKING THE HEAT PUMP USING THE DIAGNOSTIC TOOL (ACCESSORY).

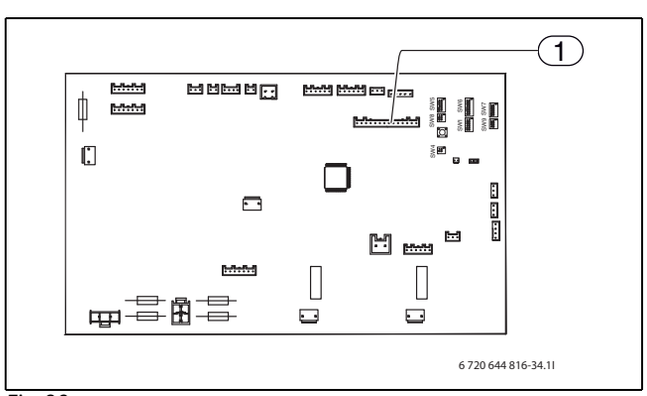

Fig. 92

[1] Connecting the diagnostic tool

18.10.1 CHECKING THE HEAT PUMP

The function of the heat pump can be checked by making adjustments in the diagnostic tool (accessory).

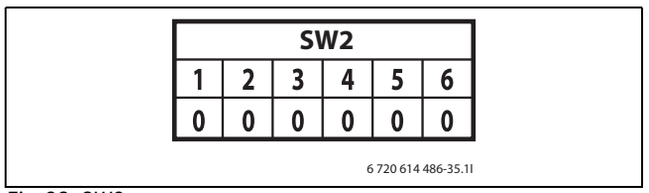

Fig. 93 SW2

[1] ON
[0] OUT

Please refer to the service manual for the heat pump for a list of codes to be used in the SW2 to check the functions of the heat pump, as well as suggestions to deal with possible faults.

The service manual is delivered with the diagnostic tool.

18.10.2 REFRIGERANT CIRCUIT DIAGRAM

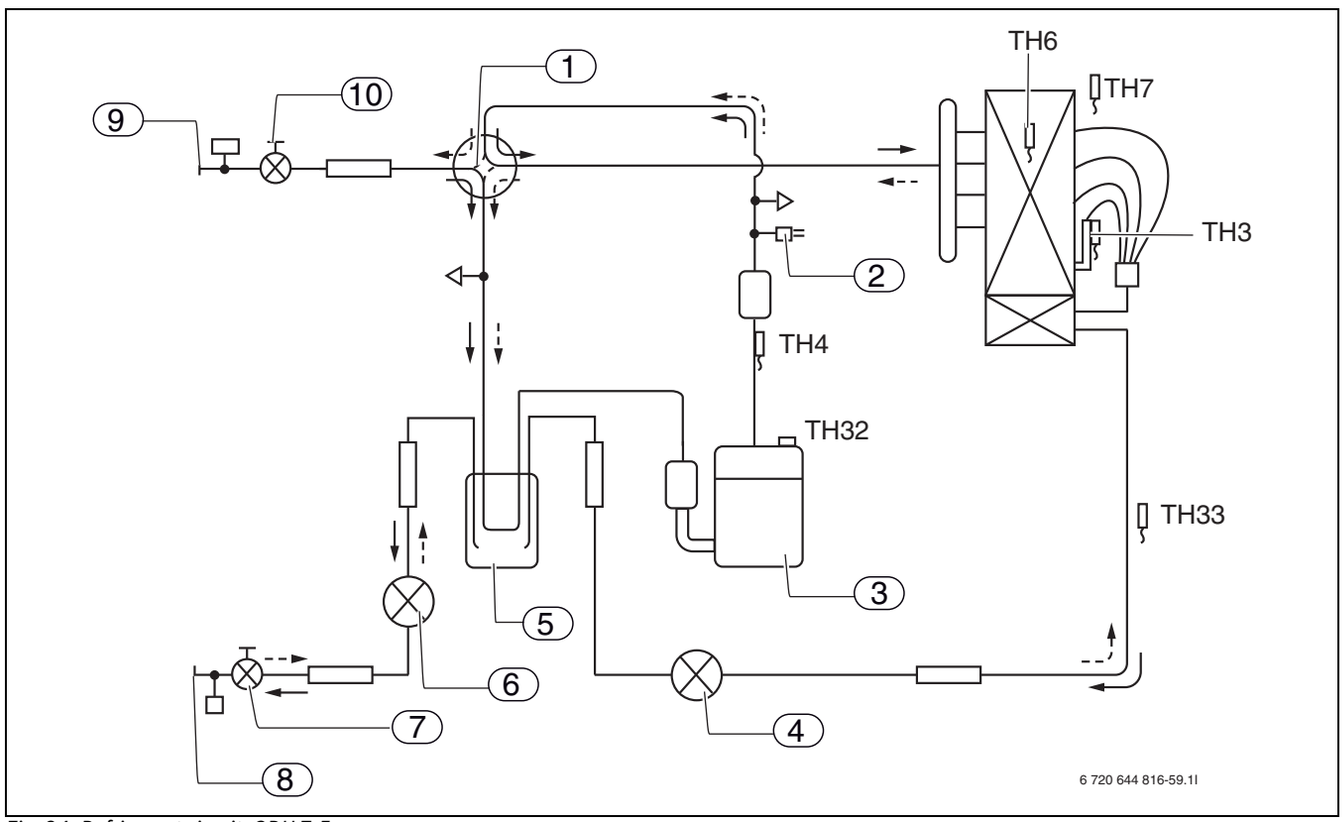

Fig. 94 Refrigerant circuit, ODU 7.5

[1] 4-way valve
[2] High pressure switch 63H
[3] Compressor
[4] Expansion valve A
[5] Liquid separator
[6] Expansion valve B
[7] Shut-off valve
[8] Refrigerant liquid pipe
[9] Refrigerant gas pipe
[10] Service output
[TH32]Temperature sensor, compressor
[TH33]Temperature sensor, surroundings
[TH3] Temperature sensor, evaporator
[TH4] Temperature sensor, hot gas
[TH6] Temperature sensor, condenser
[TH7] Temperature sensor, surroundings

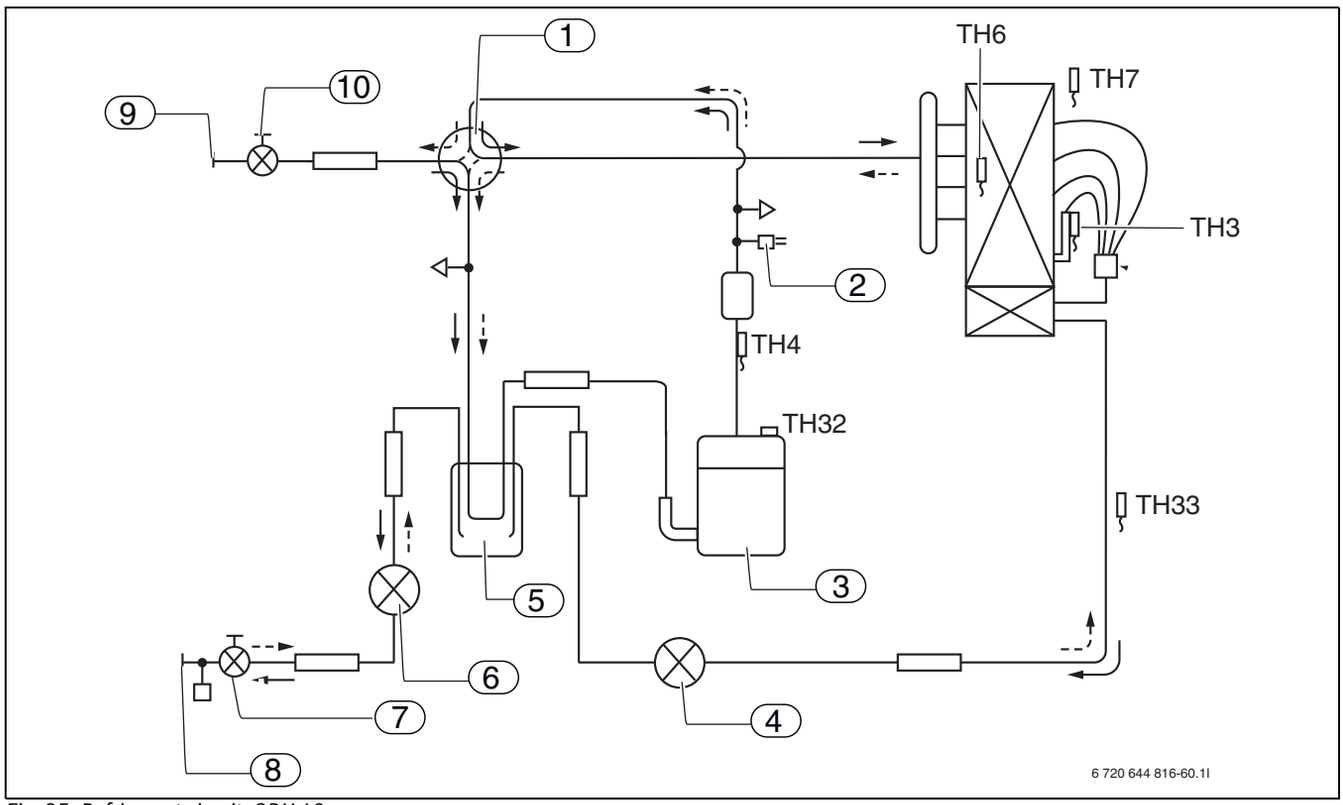

Fig. 95 Refrigerant circuit, ODU 10

[1] 4-way valve
[2] High pressure switch 63H
[3] Compressor
[4] Expansion valve A
[5] Liquid separator
[6] Expansion valve B
[7] Shut-off valve
[8] Refrigerant liquid pipe
[9] Refrigerant gas pipe
[10] Service output
[TH32]Temperature sensor, compressor
[TH33]Temperature sensor, surroundings
[TH3] Temperature sensor, evaporator
[TH4] Temperature sensor, hot gas
[TH6] Temperature sensor, condenser
[TH7] Temperature sensor, surroundings

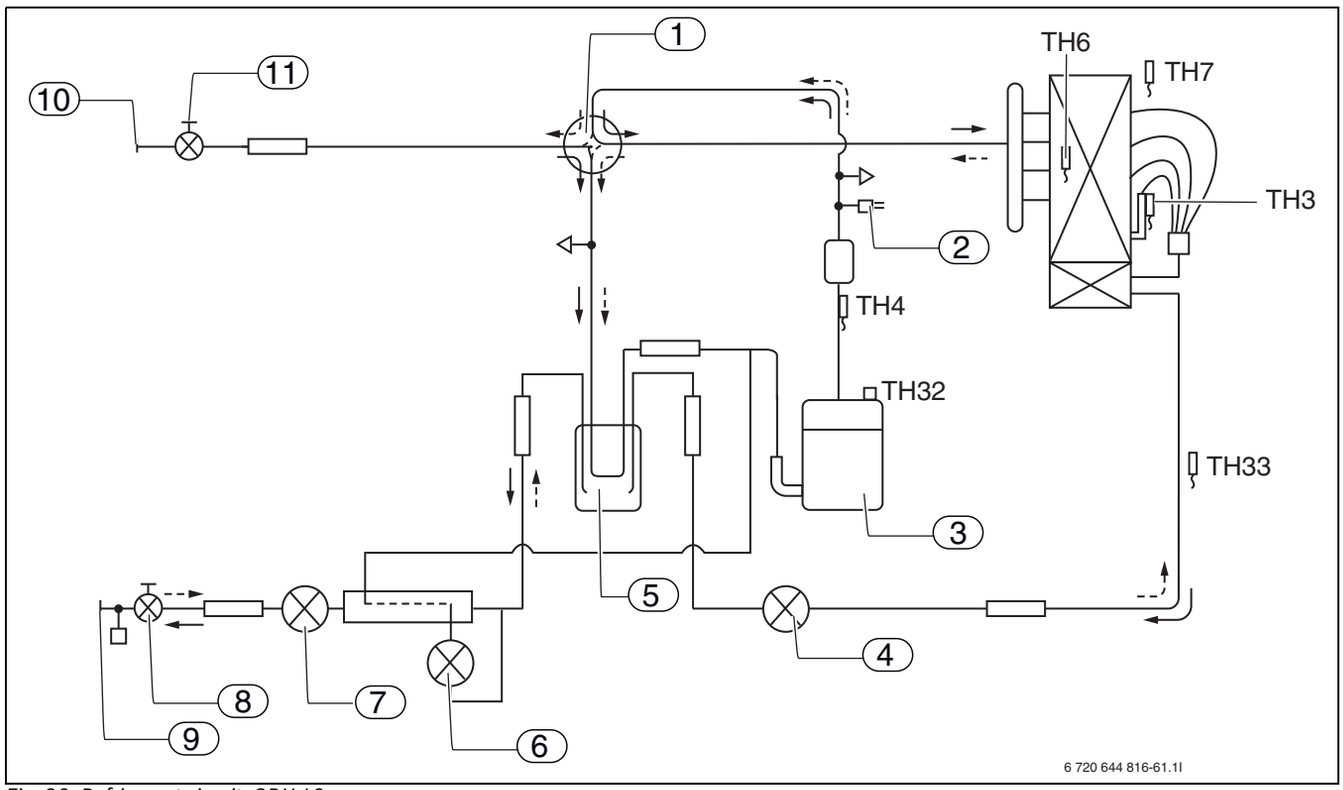

Fig. 96 Refrigerant circuit, ODU 12

[1] 4-way valve
[2] High pressure switch 63H
[3] Compressor
[4] Expansion valve A
[5] Liquid separator
[6] Expansion valve C
[7] Expansion valve B
[8] Shut-off valve
[9] Refrigerant liquid pipe
[10] Refrigerant gas pipe
[11] Service output
[TH32]Temperature sensor, compressor
[TH33]Temperature sensor, surroundings
[TH3] Temperature sensor, evaporator
[TH4] Temperature sensor, hot gas
[TH6] Temperature sensor, condenser
[TH7] Temperature sensor, surroundings

19 FACTORY SETTINGS

19.1 FACTORY SETTINGS

The tables show the values that have been preset at the factory (factory settings). These values can be modified by the user [0] via user levels **Menu** and **Advanced**.

The installer can access the items in the installation and service menu (I/S =1) listed in the following table after changing the access level under Menu or Advanced menu.

Menu	Level	F value
Fast restart of heat pump	1	No
Start up		
_”_\Setting the clock		
_”_\”_\Set date	1	yy-mm-dd
_”_\”_\Set time	1	hh:mm:ss
_”_\T1 maximum set point value	1	45 °C
_”_\External input		
_”_\”_\Activated if	1	Closed
_”_\”_\Change in temperature	1	0 °C
_”_\”_\Stop hot water loading	1	No
_”_\”_\Stop heating production	1	No
_”_\”_\Additional heat only	1	No
_”_\”_\Limit electrical capacity to	1	3/3
_”_\”_\External blocking	1	No
_”_\”_\Safety thermostat	1	No
_”_\”_\Stop additional heat hot water	1	No
_”_\”_\Stop additional heat radiators	1	No
_”_\Lowest outdoor temperature	1	-10 °C
_”_\Accessory board function	1	No
_”_\Max limit E12.T1 Set point value	1	45 °C
_”_\Connected extra sensors		
_”_\”_\ T3 acknowledged	1	Yes
_”_\”_\T5 acknowledged (T5)	1	Yes
_”_\Manual operation	1	No
_”_\Operating mode, additional heater		
_”_\”_\Additional heat only	1	No
_”_\”_\Block additional heat	1	No
_”_\Correct sensor	1	0
_”_\Anti-jamming mode time	1	02:00
_”_\Alarm buzzer interval	1	1 min
_”_\Display		
_”_\”_\Contrast	0	27
_”_\”_\Brightness	0	100
_”_\System pressure sensor connected	1	Yes
_”_\Operation alternative G2	1	Continuous
Room temperature setting (T5)	0	20°C
Room temperature setting, heating system 2	0	20°C
Extra hot water	0	0 h

Table 27 Menu

Advanced menu	Level	F value
Heating/cooling		
_”_\Minimum outdoor temperature of heat curve	1	−10 °C
_”_Heating system temperature		
_”_\”_\Heat curve	0	V=20.0 °C H=35.0 °C
_”_\”_\Hysteresis		
_”_\”_\”_\Quick acceleration	1	5.0 °C
_”_\”_\”_\Quick brake	1	1.0 °C
_”_\”_\”_\Quick stop	1	10.0 °C
_”_\”_\”_\Integration time	1	60°min
_”_\”_\”_\Rad brake temp increase	1	1.0 °C
_”_\”_\”_\Rad brake time	1	0 min
_”_\Room sensor setting		
_”_\”_\Room temperature setting	0	20 °C
_”_\”_\Room sensor interval	0	3K
_”_\”_\Room sensor influence		
_”_\”_\”_\Change factor	0	2.0
_”_\”_\Blocking time	0	4 hrs
_”_\Time limited settings		
_”_\”_\Time control heating		
_”_\”_\”_\Day and time	0	Off
_”_\”_\”_\Change in temperature	0	−10 °C
_”_\”_\Holiday		
_”_\”_\”_\Date	0	Off
_”_\”_\”_\Change in temperature	0	-10 °C
_”_\”_\External input		
_”_\”_\”_\Activated if	1	Closed
_”_\”_\”_\Change in temperature	0	0 °C
_”_\Heating season		
_”_\”_\Heating season limit	0	18 °C
_”_\”_\Delay	0	4 hrs
_”_\”_\Direct start limit	0	10 °C
_”_\Heating, maximum operating time at hot water demand	0	20 min
_”_\Shut down protection, change over hot water to heating	1	300 s
_”_\Maximum speed compressor	1	7
_”_\Quick acceleration time	1	15 min
_”_\Quick brake time	1	5 min

Table 28 Advanced menu

Advanced menu	Level	F value
_”_\Temperature heating system 2		
_”_\”_\Heat curve	0	V=20.0 °C H=35.0 °C
_”_\”_\Room sensor settings		
_”_\”_\”_\Room temperature setting	0	20 °C
_”_\”_\”_\Room sensor influence		
_”_\”_\”_\”_\Change factor	0	5,0
_”_\”_\”_\”_\Blocking time	0	4 hrs
_”_\”_\Time limited settings		
_”_\”_\”_\Time control heating		
_”_\”_\”_\”_\Day and time	0	Off
_”_\”_\”_\”_\Change in temperature	0	-10 °C

Table 29 Advanced menu

Advanced menu	Level	F value
_”__”__”_\Holiday		
_”__”__”__”_\Date	0	Off
_”__”__”__”_\Change in temperature	0	-10 °C
_”__”__“_\External input		
_”__”__”_\Active if	1	Closed
_”__”__”_\Change in temperature	0	0 °C
_”__”_\Mixing valve settings		
_”__”__”_\Control unit reading	1	
_”__”__”_\P-constant	1	1
_”__”__”_\I-time	1	300s
_”__”__”_\D-time	1	0.0s
_”__”__”_\Mixing valve running time	1	300s
_”__”__”_\Mixing valve limitation defrost mode	1	5 min

Table 29 Advanced menu

Advanced menu	Level	F value
Hot water (T3)		
_”_\Extra hot water		
_”__”_\Number of hours	0	0
_”__”_\Stop temperature	0	65 °C
_”_\Hot water peak		
_”__”_\Interval	0	0 day
_”__”_\Start time	0	03:00
_”_\Hot water temperature		
_”__”_\In compressor mode	1	
_”__”__”_\T3 Start temperature	1	46 °C
_”__”__”_\T9 Stop temperature	1	47 °C
_”__”_\Hot water, max operating time at heating demand	0	30 min
_”_\Time control hot water	0	Off
_”_\Slowest speed at hot water production	1	3
_“_\Max speed during hot water production	1	7
_“_\Quick start of addition	1	0 °C

Table 30 Advanced menu

Advanced menu	Level	F value
Temperatures		
_”_\Correct sensor	1	0,0 °C
_”_\Inputs	1	
_”_\Outputs	1	
_”_\Demand	1	
Timers		

Table 31 Advanced menu

Advanced menu	Level	F value
Additional heat settings		
_”_\Start delay	1	60 min
_”_\Time control additional heat	1	Off
_”_\Operating option		
_”__”_\Additional heat only	1	No
_”__”_\Block additional heat	1	No
_”_\Electric additional heat settings		
_”__”_\Connection capacity		
_”__”__”_\State total output	1	9.0 kW
_”__”__”_\Compressor mode, output limitation	1	2/3
_”__”__”_\Additional heat only, output limitation	1	3/3
_”__”_\Stop temperature T3	1	60 °C
_”__”_\Ramp time increase	1	20 min
_”__”_\Ramp time decrease	1	10 min
_”__”_\Locking of electricity supply when defrosting	1	5 min
_”__”_\Neutral zone	1	5 °C
_”_\Mixing valve settings		
_”__”_\Mixing valve delay	1	20 min
_”__”__”_\PID heat setting		
_”__”__”__”_\P constant	1	2.0
_”__”__”__”_\I time	1	300 s
_”__”__”__”_\D time	1	0
_”__”__”_\PID hot water setting		
_”__”__”__”_\P constant	1	4.0
_”__”__”__”_\I time	1	300 s
_”__”__”__”_\D time	1	0
Mixing valve’s run time	1	120 s
Locking of mixing valve during defrosting	1	5 min
_”__”_\Max outdoor temperature for additional heat	1	10 °C

Table 32 Advanced menu

Extended menu	Level	Fact. setting
Safety functions		
_”_\Block heat pump at low outdoor temperature	1	– 15 °C
_”_\Heating cable time	1	15 min
Setting the clock		
Setting the date	0	JJ-MM-TT
Setting the time	0	hh:mm:ss
Alarm		
_”_\Alarm log		
_”__”_\Delete alarm log	1	No
_”_\Alarm history		
_”_\Info log		
_”__”_\Delete info log	1	No
Access level	0, 1	K(0)
Return to factory settings	0, 1	B
Deactivate alarm buzzer	0	No

Table 33 Extended menu

20 FUNCTIONAL CHECK

20.1 REFRIGERANT CIRCUIT

Work on the refrigerant circuit must only be carried out by a competent person.

DANGER: Discharge of poisonous gases!
The refrigerant circuit contains materials that can form poisonous gases if released or if in the presence of a naked flame. Even low concentrations of these gases can lead to respiratory arrest.
▶ Leave the room immediately if the refrigerant circuit is leaking and ventilate thoroughly.

20.2 SETTING THE OPERATING PRESSURE OF THE HEATING SYSTEM

CAUTION: The heat pump can be damaged.
▶ Fill with water only when the heat pump is cold.

Indication on pressure gauge	
1 bar	Minimum system pressure (when cold)
2.5 bar	Maximum filling pressure at max. temperature of the heating water: may not be exceeded (safety valve opens).

Table 34 Operating pressure

▶ Fill up until required pressure is reached, depending on the height of the property.

Fill the hose with water before topping up. This prevents air being introduced into the system.

▶ If there is a pressure drop: check the expansion vessel and heating system for leaks.

20.3 OPERATING TEMPERATURES

The information in this chapter is only relevant for operation at a constant speed (G2), i.e. not self-regulating.

For the installation to perform at its best, it is important to check the flow over the condenser in the indoor unit and the heating system. Check after a 10 minute run time and at max compressor speed = step 7 (manual operation, heating).

The flow is adjusted by heat carrier pump G2 so that the temperature difference over the condenser is between 5 and 10 °C.

These are the optimum settings for heat pumps. It is important to be aware of which heating system is installed.

Checking the temperature differential:
▶ Read off sensor T8 (heat transfer fluid out) and T9 (heat transfer fluid in) in heating mode. T8 must have a temperature greater than T9.
▶ Calculate the difference by taking T8 – T9.

When commissioning is carried out at a low outdoor temperature (below 0 °C) the temperature difference should be between 5 and 7 °C.

When commissioning is carried out at outdoor temperatures above 15 °C) the temperature difference should be between 8 and 10 °C.

If the temperature differential is too low:

▶ Decrease the speed on the corresponding circulation pump (G2).

If the temperature differential is too great:
▶ Increase the speed on the corresponding circulation pump (G2) to obtain a greater flow.

21 ENVIRONMENTAL PROTECTION

Environmental protection is a fundamental corporate strategy of the Bosch Group.
The quality of our products, their economy and environmental safety are all of equal importance to us and all environmental protection legislation and regulations are strictly observed.
We use the best possible technology and materials for protecting the environment taking account of economic considerations.

PACKAGING

We are dedicated in adhering to country specific disposal standards as they relate to packaging to ensure optimum recycling.
All packaging materials are environmentally friendly and can be recycled.

OLD APPLIANCES

Old appliances contain materials that must be recycled.
The relevant assemblies are easy to separate, and all plastics are identified. In this manner the individual components are easily sorted and added into the recycling and disposal systems.

22 MAINTENANCE

DANGER: Risk of electric shock!
▶ Switch off the main power supply before starting work on the electrical part.

We recommend that a function check be performed regularly by an competent person.

▶ Only use genuine spare parts!
▶ Refer to the spare parts list when ordering spare parts.
▶ Always renew seals and O-rings removed during servicing or repair work.

During service, the activities described below should be conducted.

Show alarms

▶ Check alarm log.

FUNCTIONAL CHECK

▶ Carry out a function check (→ page 73).

ELECTRICAL CABLE ROUTING

▶ Check the electrical cable routing with regard to mechanical damage and replace defective cables.

22.1 PARTICLE FILTER

The filter prevents particles and dirt from entering the interior of the capacitor/exchanger. Over time, the filter can become blocked and must be cleaned.

The particle filter is installed in the return heating pipe to the Hydrolight/Hydrocomfort (→ [E21.V101], chapter 11.4.3).

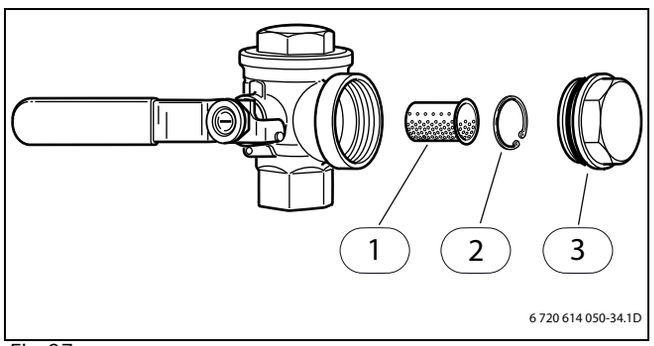

Fig. 97

[1] Filter
[2] Circlip
[3] Plug

Cleaning the filter:

- ▶ Switch off the heat pump with the ON/OFF switch.
- ▶ Close the valve and remove the plug.
- ▶ Remove the circlip that holds the filter in the valve, using the pliers provided.
- ▶ Take the filter out of the valve and rinse it with water.
- ▶ Reinstall the filter, circlip and plug.
- ▶ Open the valve and start the heat pump via the ON/OFF switch.

22.2 EVAPORATOR

If a layer of dust or dirt has accumulated on the surface of the evaporator or aluminium fins, you must remove this.

WARNING: The thin aluminium fins are fragile and can be damaged if careless. Never wipe the delicate fins with a cloth.

- ▶ Hard objects may not be used.
- ▶ Use protective gloves to protect your hands from cuts.
- ▶ Do not use a too powerful water jet.

Damage to system by cleaning agents and care products!

- ▶ Do not use cleaning agents and care products that are abrasive or contain acid or chlorine.

Clean the evaporator:

- ▶ Switch off heat pump at ON/OFF switch.
- ▶ Spray washing-up liquid onto the evaporator fins.
- ▶ Rinse off coating and washing-up liquid with water.

In some regions disposal of washing-up liquid in a gravel bed is not permitted. If the condensate pipe from the heat pump discharges into a gravel bed:

- ▶ Remove the service flap.
- ▶ Remove flexible condensate pipe from the drain pipe before carrying out the cleaning.
- ▶ Collect washing-up liquid in a suitable vessel.
- ▶ Connect the condensate pipe after cleaning.
- ▶ Fit the service flap.

23 THE GUARANTEE

The Greensource Air to Water split heat pump has a 2 year guarantee against faulty material or manufacture subject to Terms and conditions. To read the full Terms and Conditions please visit us online at www.worcester-bosch.co.uk/guarantee. The Guarantee Registration form is available on this same page and can be completed and submitted electronically. Alternatively please telephone one of our Guarantee Registration advisors on 0844 892 2552. Your statutory rights are not affected by the manufacturers guarantee.

24 COMMISSIONING REPORT

Commissioning date:	
Customer address:	Surname, first name:
	Street, house number:
	Town:
	Telephone:
Specialist contractor:	Surname, first name:
	Street:
	Town:
	Telephone:
Appliance data:	Appliance type:
	Part no.:
	Serial number:
	FD no.:
Installation test steps	
System components:	Confirmation / values
room controller CAN-BUS	☐ Yes | ☐ No
2nd heat appliance, oil/gas	☐ Yes | ☐ No
Art/Type:	
Solar integration	☐ Yes | ☐ No
Buffer tank	☐ Yes | ☐ No
Type / volume (L):	
DHW cylinder	☐ Yes | ☐ No
Type / volume (L):	
Other components	☐ Yes | ☐ No
Which?	
Minimum clearances, external unit:	
Is the external unit set up on a stable level subsurface?	☐ Yes | ☐ No
Minimum clearance to wall ? ..... mm	☐ Yes | ☐ No
Minimum clearance from sides ? ..... mm	☐ Yes | ☐ No
Minimum clearance from roofing ? ..... mm	☐ Yes | ☐ No
Minimum clearance in front of heat pump ? ..... mm	☐ Yes | ☐ No
Has the external unit been set up in such a manner that snow or water cannot slip or drip onto it?	☐ Yes | ☐ No
Condensate drain, external unit	
Is the condensate drain equipped with a heating cable ?	☐ Yes | ☐ No
Is it possible to prevent the drain from freezing by means of the condensate drain connection ?	☐ Yes | ☐ No
Connecting pipes to the external unit	
Length of connection pipe, number of elbows	
Has refrigerant been topped up because the max. length of 30m has been exceeded?	☐ Yes | ☐ No
How much?	
Who installed/supplied the connection pipe?	
Who established the connection (flanging)?	
Basic leak test performed?	☐ Yes | ☐ No
Vacuum (value at which outside temperature?)	
Fine leak test performed?	☐ Yes | ☐ No
Minimum clearances, internal unit:	
Minimum clearance from walls ? ..... mm	☐ Yes | ☐ No
Minimum clearance in front of internal unit ? ..... mm	☐ Yes | ☐ No
Central heating:	
Pre-charge pressure in expansion vessel determined ? ..... bar	☐ Yes | ☐ No
Was the heating system flushed prior to installation ?	☐ Yes | ☐ No

Table 35 Commissioning report

Heating system filled via the determined pre-charge pressure of the expansion vessel to ..... bar ?	☐ Yes | ☐ No
Internal unit sufficiently bled	☐ Yes | ☐ No
Tightness test carried out for all connections inside and outside the internal unit	☐ Yes | ☐ No
Cleanliness of filter in the heating circuit at the internal unit checked ?	☐ Yes | ☐ No
Electrical connection:	
Are the low-voltage cables installed at least 100mm away from 230 V /400 V carrying cables, or has a screened cable been used for the CAN - BUS communication ? Screening applied on one side ?	☐ Yes | ☐ No
Have the connections in the CAN-BUS been established correctly ?	☐ Yes | ☐ No
Is an output limiter connected ?	☐ Yes | ☐ No
Is the outdoor sensor T2 positioned correctly north-east ?	☐ Yes | ☐ No
Power supply:	
Phase sequence or rotational direction L1, L2, L3 , N and PE in the internal and external unit OK ?	☐ Yes | ☐ No
Power supply in accordance with installation instructions? Can external and internal unit be switched off at the same time?	☐ Yes | ☐ No
Fuse protection of heat pump and booster heater, triggering characteristic?	
Manual operation (→ Chapter 16.2):	
Function test of individual assemblies (pumps, changeover valves, fan, compressor, etc.) carried out ?	☐ Yes | ☐ No
Comments :	
Temperature values in advanced menu checked and documented?	☐ Yes | ☐ No
T1 T2 T3 T5 T8 T9	_____ °C _____ °C _____ °C _____ °C _____ °C _____ °C
CH settings (→Chapter 16.3.3):	
Start delay	
Time control additional heat	
Block CH	☐ Yes | ☐ No
Electr. booster heater settings, connected load	
Maximum temperature of booster heater	_____ °C
Power consumption (shows the current value)	
Safety functions (→Chapter 16.3.8):	
Block heat pump at low outside temperature	
Has commissioning been completed successfully ?	☐ Yes | ☐ No
Additional measures by installer necessary ?	☐ Yes | ☐ No
Comments :	
Signature of heat pump specialist :	
Signature of customer or installer :	

Table 35 Commissioning report

25 INSPECTION AND MAINTENANCE REPORTS

The inspection and maintenance reports are also designed as templates and may be photocopied.

▶ Sign and date the completed inspection work.

GENERAL INFORMATION

Maintenance report for air to water heat pumps		
Customer/system user:	Surname, first name:	
	Street, house number:	
	Postcode:	
	Telephone/fax:	
System manufacturer / Installer :		
Order number:		
Appliance type (external unit/internal unit):		Part no.:
Serial number:		FD (date of manufacture):
Program version, Rego :		Commissioning date:
System components:	room controller CAN-BUS.....☐ Temp. limiter:.....☐ Buffer cylinder :.....☐ litres Cylinder by other manufacturer yes/no :....☐ litres/type DHW cylinder :..☐ litres Cylinder by other manufacturer yes/no:.....☐ litres/type Other:	2nd heat appliance, oil/gas : ☐ Solar integration :..... ☐
Details of system user :		
Work carried out:	Read out saved alarm logs and warnings .....☐	
	Error messages logged and heat pump checked on basis of alarms.....☐	
	Log runtimes in the Operating times and consumption menu (F) (compressor and CH) : .....☐	
	Operating time for domestic hot water heating	h
	Number of compressor starts	
	Number of compressor starts in heating mode	
	Number of compressor starts in DHW mode	
	Read out sensor values in Temperatures menu and compare with table of values .....☐	
	Comments :	
	Electrical connections (230 VAC / 400 VAC) External/internal unit checked to ensure secure seating .....☐	
	Interior of external/internal unit checked using leak detector for refrigerant .....☐	
	Internal unit checked for discharge of liquid (heating water) .....☐	
	Fins on evaporator cleaned .....☐	
	remarks:	
	Filter in heating pipe cleaned : .....☐	
	Safety valve checked : .....☐	
	Function of circulation pumps , changeover valve , 3-way mixer checked : .....☐	
	Menu Service level (I / S) - Start - manual operation	
	Pre-charge pressure on heating side in diaphragm expansion vessel checked : .....bar	
	System filled on heating side to : .....bar	

Table 36 Inspection and maintenance reports

Maintenance report for air to water heat pumps		
Parameter settings changed :	Heat:.....☐ remarks:	
	DHW settings changed :.....☐ remarks:	
	CH settings changed :.....☐ remarks:	
	Safety settings changed .....☐ remarks:	
	Reset to factory settings :.....☐ remarks:	
Temperature of heat transfer medium during operation :	Off (T8) ..... °C	On (T9) ..... °C
	Temperature spread determined .....K at ..... °C Outside temperature	
Cold transfer medium during operation:	Air temperature / On ..... °C	
Other comments :		
Measures :		
Date and signature, system user		Date and signature, Service

Table 36 Inspection and maintenance reports

26 BENCHMARK LOG BOOK

AIR TO WATER HEAT PUMP COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the heat pump and associated equipment as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name

Address

Telephone Number

Heat Pump Make and Model

Heat Pump Serial Number

Commissioned by (print name) | Certified Operative Reg. No. [1]

Company Name & Address | Commissioning Date

Telephone No.

Building Regulations Notification Number (if applicable) [2]

CONTROLS - SYSTEM AND HEAT PUMP

Tick the appropriate boxes if applicable

1.	Time & Temperature Control to Heating	Room Thermostat & Programmer/Timer ☐	Programmable Roomstat ☐	Load/Weather Compensation ☐	Optimum Start Control ☐		
2.	Time & Temperature Control to Hot Water			Cylinder Thermostat & Programmer/Timer ☐	Combined with Heat pump main controls ☐		
3.	Heating Zone Valves (including underfloor loops)			Fitted ☐	Not Required ☐		
4.	Hot Water Zone Valves			Fitted ☐	Not Required ☐		
5.	Thermostatic Radiator Valves			Fitted ☐	Not Required ☐		
6.	Heat Pump Safety Interlock [3]			Built In ☐	Provided ☐		
7.	Outdoor Sensor			Fitted ☐	Not Required ☐		
8.	Automatic Bypass System			Fitted ☐	Not Required ☐		
9.	Buffer Vessel Fitted			Yes ☐ No ☐ If YES, Volume ☐ Litres			

ALL SYSTEMS

The heating system has been filled and pressure tested	Yes ☐
Expansion vessel for heating is sized, fitted & charged in accordance with manufacturer's instructions	Yes ☐
The heat pump is fitted on a solid/stable surface capable of taking its weight	Yes ☐
The system has been flushed and cleaned in accordance with BS7593 and heat pump manufacturer's instructions	Yes ☐
What system cleaner was used?	
What inhibitor was used?	Qty ☐ litres
Is the system adequately frost protected?	Yes ☐

OUTDOOR UNIT

Are all external pipeworks insulated?	Yes ☐
Is the fan free from obstacles and operational?	Yes ☐
Has suitable consideration been made for waste water discharge?	Yes ☐

CENTRAL HEATING MODE

Heating Flow Temperature ☐ °C Heating Return Temperature ☐ °C

DOMESTIC HOT WATER MODE

Measure and Record

Is the heat pump connected to a hot water cylinder? ☐ Unvented ☐ Vented ☐ Thermal Store ☐ Not Connected

Hot water has been checked at all outlets ☐ Yes Have Thermostatic Blending Valves been fitted? ☐ Yes ☐ Not required

ADDITIONAL SYSTEM INFORMATON

Additional heat sources connected: ☐ Gas Boiler ☐ Oil Boiler ☐ Electric Heater ☐ Solar Thermal Other _____

ALL INSTALLATIONS

The heating, hot water and ventilation systems complies with the appropriate Building Regulations	Yes ☐
All electrical work complies with the appropriate Regulations	Yes ☐
The heat pump and associated products have been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The operation of the heat pump and system controls have been demonstrated to the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature

Customer's Signature

(To confirm demonstration of equipment and receipt of appliance instructions)

Notes: [1] Installers should be members of an appropriate Competent Persons Scheme. [2] All installations in England and Wales must be notified to Local Area Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer. [3] May be required for systems covered by G3 Regulations

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

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Fig. 98

Service Record

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service Provider

Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

Service 1 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 2 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 3 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 4 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 5 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 6 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 7 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 8 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 9 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 10 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

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Fig. 99

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