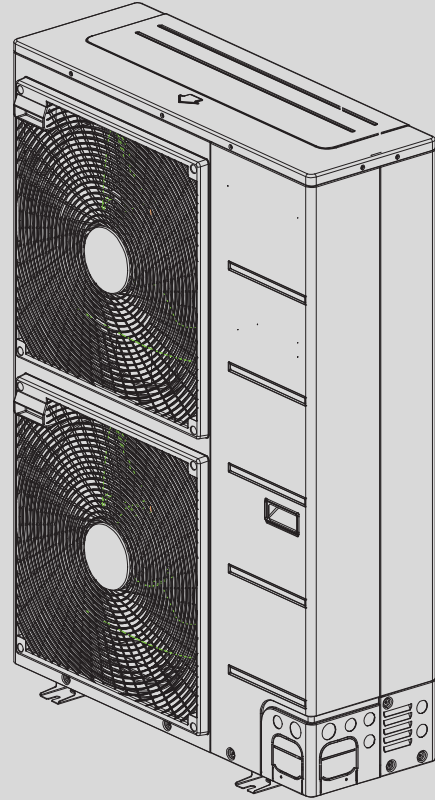
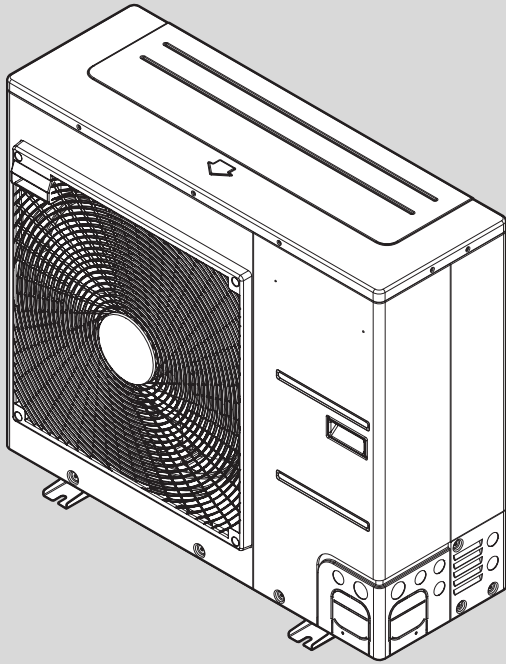


# Split Outdoor Unit

230 V 1 N~ / 400 V 3 N~



0010015329-002

**ODU Split 4...8**  
**ODU Split 11t...15t**  
**ODU Split 11s...15s**



**Table of contents**

**1 Explanation of symbols and safety instructions ..... 3**

1.1 Explanation of symbols ..... 3

1.2 General safety instructions ..... 3

---

**2 Standard delivery ..... 4**

---

**3 General information ..... 4**

3.1 Declaration of conformity ..... 4

3.2 Information about the outdoor unit ..... 4

3.3 Application area ..... 4

3.4 Heating system minimum volume and operation ..... 4

3.5 Type plate ..... 4

3.6 Transportation and storage ..... 4

3.7 Connection principle ..... 4

3.8 Defrost method ..... 5

---

**4 Technical information ..... 5**

4.1 1-phase outdoor unit ..... 6

4.2 3-phase outdoor unit ..... 7

4.3 Refrigerant Cycle ..... 8

4.4 Measurements ..... 9

---

**5 Regulations ..... 11**

---

**6 Installation ..... 11**

6.1 Lifting method ..... 11

6.2 Checklist ..... 11

6.3 Foundation for installation ..... 11

6.4 Conditions where outdoor unit is installed ..... 13

6.5 Drill a hole in the wall ..... 13

6.6 Installation at seaside ..... 14

6.6.1 Selecting the location ..... 14

6.7 Seasonal wind and cautions in winter ..... 14

---

**7 Refrigerant pipe ..... 15**

7.1 Refrigerant pipe connection ..... 15

7.1.1 Safety ..... 15

7.1.2 Preparing for installation ..... 15

7.2 Installing the refrigerant pipe ..... 15

7.2.1 Preparation for piping ..... 16

7.2.2 Connecting pipe to outdoor unit (Split 8, Split 11, Split 13, Split 15) ..... 17

7.3 Filling the heating system ..... 18

---

**8 Electrical connection ..... 18**

8.1 CAN-BUS ..... 18

8.2 Electrical wiring ..... 19

8.2.1 Wire specification ..... 19

8.2.2 Wiring procedure for power cable and connecting cable ..... 19

8.3 Circuit diagram ..... 21

8.3.1 Split 4...8 ..... 21

8.3.2 Split 11s...15s ..... 22

8.3.3 Split 11t...15t ..... 23

8.3.4 Indoor unit with mixing valve for external booster heater - Indoor unit with single phase outdoor unit ..... 24

8.3.5 Indoor unit with mixing valve for external booster heater - Indoor unit with three phase outdoor unit ..... 25

8.3.6 Indoor unit with an integrated immersion heater - 400V indoor unit with 230V outdoor unit ..... 26

8.3.7 Indoor unit with an integrated immersion heater - 400V indoor unit with 400V outdoor unit ..... 27

---

**9 Finalizing ..... 28**

9.1 Taping procedure ..... 28

9.2 Leakage test and evacuation ..... 28

9.2.1 Preparation ..... 28

9.2.2 Leakage test ..... 28

9.2.3 Evacuation ..... 29

9.2.4 Finishing the job ..... 29

---

**10 Environmental protection and disposal ..... 30**

---

**11 Maintenance ..... 30**

11.1 Evaporator ..... 30

11.2 Snow and ice ..... 31

11.3 Drawing the refrigerant back into the outdoor unit ..... 31

11.4 Information on refrigerant ..... 31

# 1 Explanation of symbols and safety instructions

## 1.1 Explanation of symbols

### Warnings



#### WARNING:

Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- **NOTICE** indicates a situation that could result in damage to property or equipment.
- **CAUTION** indicates a situation that could result in minor to medium injury.
- **WARNING** indicates a situation that could result in severe injury or death.
- **DANGER** indicates a situation that will result in severe injury or death.

### Important information



This symbol indicates important information where there is no risk to people or property.

### Additional symbols

Symbol	Explanation
▶	Step in an action sequence
→	Cross-reference to another part of the document
•	List entry
–	List entry (second level)

Table 1

## 1.2 General safety instructions

These installation instructions are intended for plumbers, heating engineers and electricians.

- ▶ Read any installation instructions (outdoor unit, heating controls, etc.) carefully before starting the installation.
- ▶ Observe the safety instructions and warnings.
- ▶ Observe national and regional regulations, technical rules and guidelines.
- ▶ Record all work carried out.

### Correct use

This outdoor unit must only be used as a heat appliance in a sealed hot water heating system for domestic purposes. Any other use is considered inappropriate. Any damage that results from such use is excluded from liability.

### Installation, commissioning and servicing

Installation, commissioning and servicing must only be carried out by an authorised contractor.

- ▶ Only use original spares.

### Electrical work

Electrical work must only be carried out by qualified electricians.

- ▶ Before starting electrical work:
  - Isolate all poles of the mains voltage and secure against reconnection.
  - Using suitable means, test that the power supply is disconnected.
- ▶ Also see connection diagrams of other system components.

### Handling refrigerant

The air to water outdoor unit 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 outdoor unit.
- ▶ 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.

### Handover to the user

When handing over the heating system, instruct the user in its operation and operating conditions.

- ▶ Explain the operation - with particular emphasis on all safety-related actions.
- ▶ Explain that conversions and repairs must only be carried out by a competent person.
- ▶ Point out the need for inspections and maintenance for safe and environmentally-compatible operation.
- ▶ The installation and operating instructions must be given to the user for safekeeping.
- ▶ Do not reach into the fan or onto the evaporator fins! Risk of injury.

## 2 Standard delivery

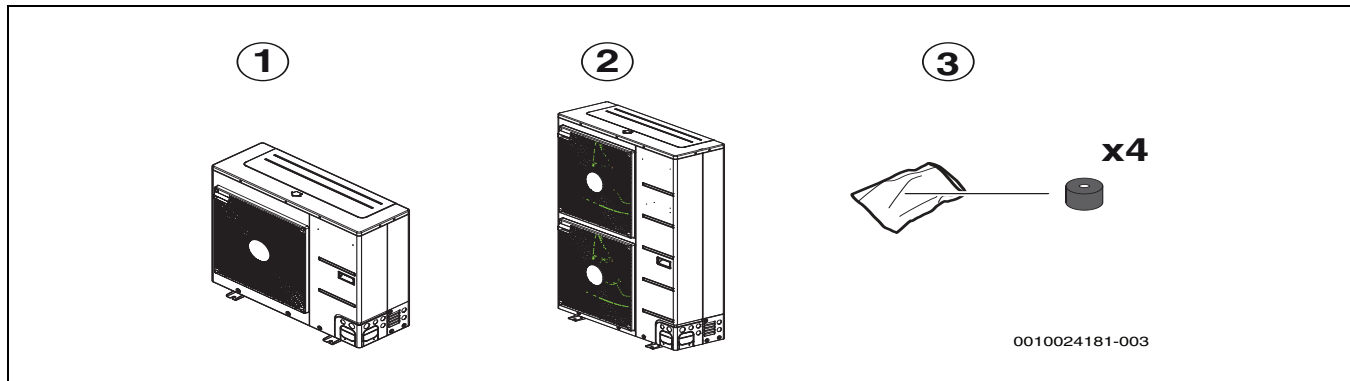


Fig. 1

- [1] Outdoor unit, Split 4...8
- [2] Outdoor unit, Split 11...15
- [3] Vibration dampers

## 3 General information

These are original instructions. Translation is not allowed without approval by the manufacturer.



Installation may only be carried out by a trained contractor. The installer must observe local provisions and regulations as well as the information in the installation and operating instructions.

### 3.1 Declaration of conformity

This product conforms to European directives and supplementary national requirements in design and operation. Conformity has been demonstrated with the CE marking.

**CE** You can request the conformity declaration of the product. Please refer to the address on the back of this manual.

### 3.2 Information about the outdoor unit

Split outdoor units are intended for outdoor use and connection with an indoor unit indoors.

### 3.3 Application area

The outdoor unit must only be used in a closed hot water heating system according to EN 12828.

Other forms of use are not permitted. We take no responsibility for damage caused through incorrect use.

### 3.4 Heating system minimum volume and operation



To avoid multiple start/stop cycles, incomplete defrosting or unnecessary alarms, a sufficient amount of energy stored in the system is required. Energy is stored in the heating system water volume, as well as in the system components (radiators and underfloor heating).

Since the requirements vary for different outdoor unit installations and heating systems, no general minimum volume is stated. Please refer to the following prerequisites for all outdoor unit sizes instead:

#### **Only one under floor heating circuit without buffer cylinders, no mixing valve:**

For the outdoor unit and the defrost function to work properly, at least 22m<sup>2</sup> heated floor area must be available. Furthermore, a room controller must be installed in the largest room (reference room). The

room temperature measured by the room controller is used to calculate the flow temperature (principle: weather-compensated control with room temperature compensation). All zone valves of the reference room must be completely open. In certain circumstances, the electric booster heater may be activated to ensure complete defrosting. That depends on the available floor space.

#### **Only one radiator circuit without a buffer cylinder or mixing valve**

For the outdoor unit and defrost function to work properly, there must be at least four radiators with an output of at least 500 W each. Make sure that the thermostats of these radiators are completely open. A room controller is recommended for this reference room so that the measured room temperature can be used to calculate the flow temperature. In certain circumstances, the electric booster heater may be activated to ensure complete defrosting. That depends on the available floor space.

#### **Heating system with 1 heating circuit without mixing valve and 1 heating circuit with mixing valve without a buffer cylinder**

For the outdoor unit and defrost function to work properly, the heating circuit without mixing valve must have at least four radiators with an output of at least 500 W each. Make sure that the thermostats of these radiators are completely open. In certain circumstances, the electric booster heater may be activated to ensure complete defrosting. That depends on the available floor space.

#### **Only heating circuits with mixing valves (also applies to heating circuits with fan convectors)**

To ensure that there is enough energy for defrosting, use a buffer cylinder with at least 50 (ODU 4-8) / 100 (ODU 11-15) liters. An additional heating circuit pump is then required.

### 3.5 Type plate

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

### 3.6 Transportation and storage

The outdoor unit must always be transported and stored upright. The outdoor unit may slightly lean temporarily (max. 45°), but cannot be laid down. The outdoor unit cannot be stored or transported in temperatures below -25 °C.

### 3.7 Connection principle

The function is based on a requirements-based control of the compressor output or by switching on the integrated/external auxiliary heater via the indoor unit. The user interface controls the heat pump according to the heating curve that has been set. If the heat pump is unable to meet the heat energy demand of the building on its own, the indoor unit automatically starts the auxiliary heater which, together with

the heat pump, generates the required temperature in the building, and in the DHW cylinder if necessary.

**Heating and DHW mode when the heat pump is deactivated**

When the temperature outside is below -20 °C the heat pump is switched off automatically and cannot produce heat for the heating water. In this case, the auxiliary heater of the indoor unit automatically takes over the heating and DHW operation.

**3.8 Defrost method**

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. The base of the casing below the evaporator of the outdoor unit serves as a drip pan in which condensate and ice accumulates. The base of the casing is heated according to requirements via an integrated heating cable. The defrosting function is activated in heating mode at inlet temperatures below 0 °C and deactivated at outside temperatures above 1 °C.



We also recommend installing heating for the drain outlet in the condensate tray (accessory for systematic removal of condensate).



Only condensate outlet heaters with max. output of 90 W should be connected to the assigned terminals (→Fig. 30[9], 31[11], 32 [14]) of the outdoor unit.

**4 Technical information**

Range for air and water outdoor unit without booster heater

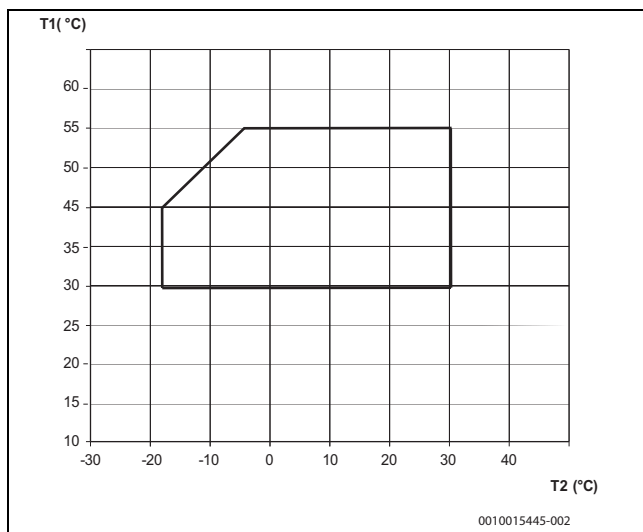


Fig. 2 Split 2-15 s/t

- [T1] Flow temperature
- [T2] Outdoor temperature

4.1 1-phase outdoor unit

	Unit	Split 4	Split 6	Split 8	Split 11s	Split 13s	Split 15s
<b>Operation, air/water</b>							
Rated output with A2 <sup>1)</sup> /W35 heating <sup>2)</sup>	kW	3.47	3.47	4.72	7.14	7.14	7.14
Elec. power consumption with A2/W35	kW	0.94	0.94	1.16	1.72	1.72	1.72
COP with A2/W35 <sup>1)</sup> Heizung <sup>4)</sup>		3.69	3.69	4.06	4.14	4.14	4.14
Rated output with A7/W35 <sup>1)</sup> Heating <sup>2)</sup>	kW	3.25	3.25	3.22	6.47	6.47	6.47
Elec. power consumption with A7/W35	kW	0.68	0.68	0.71	1.31	1.31	1.31
COP with A7/W35 <sup>1)</sup> Heating <sup>3)</sup>		4.77	4.77	4.53	4.92	4.92	4.92
Rated output with A-7 <sup>1)</sup> /W35 heating <sup>2)</sup>	kW	5.93	6.06	7.82	11.44	11.83	11.83
Elec. power consumption with A7/W35		2.19	2.5	2.98	4.24	4.82	4.82
COP with A-7 <sup>1)</sup> /W35 heating <sup>4)</sup>	kW	2.71	2.42	2.63	2.70	2.46	2.46
Cooling capacity with A35/W18	kW	8.1	8.9	9.5	15.3	15.9	16.0
EER with A35/W18		3.4	3.0	3.1	3.3	3.1	2.9
Max. power input for A7/W35	kW	1.9	2.24	2.31	3.74	4.13	4.49
<b>Electr. Data</b>							
Power supply		230V, 1N AC 50Hz					
Recommended automatic circuit breaker <sup>5)</sup>	A	16	16	16	32	32	32
Maximum current	A	13	14	15	28	28	28
Startup current	A	<3					
cos φ		0.98..0.99					
<b>Data for cooling circuit</b>							
Connection type		Flare connection 3/8" & 5/8"					
Refrigerant type <sup>6)</sup>		R410A					
Refrigerant charge	kg	1.6	1.6	1.6	2.3	2.3	2.3
<b>Air and noise data</b>							
Fan motor (DC inverter)	W	124	124	124	2x124	2x124	2x124
Nominal air flow rate <sup>7)</sup>	m <sup>3</sup> /h	3600	3600	3600	2x3600	2x3600	2x3600
Sound pressure level at a distance of 1 m	dB(A)	58	58	57	59	59	59
Sound power level <sup>8)</sup>	dB(A)	66	66	65	67	67	67
Max. sound power level	dB(A)	67	67	66	67	68	68
Silent mode (setback mode)	dB(A)	-8	-8	-4	-6	-7	-7
<b>General information</b>							
Compressor oil		FVC68D					
Quantity of compressor oil	ml	900	900	900	1300	1300	1300
Maximum heating water flow temperature, outdoor unit only	°C	57					
Maximum heating water flow temperature, booster heating only	°C	80					
Protection class		X4					
Installation altitude		Up to 2000 m over NN					
Dimensions (WxDxH)	mm	950x330x834	950x330x834	950x330x834	950x330x1380	950x330x1380	950x330x1380
Weight	kg	60	60	60	94	94	94

- 1) Rating according to EN 14511-2013
- 2) The stated heating output is a nominal value
- 3) Optimum COP according to EHPA measurement (40% inverter capacity)
- 4) 60% inverter capacity (A2/W35), 100% inverter capacity (A7/W35)
- 5) No specific fuse rating or type is required. The starting current is low and will not exceed the operating current.
- 6) GWP<sub>100</sub> = 2088
- 7) Per fan
- 8) Sound power level in accordance with EN 12102 (nominal output with A7/W55)

Table 2 Outdoor unit

## 4.2 3-phase outdoor unit

	Unit	Split 11t	Split 13t	Split 15t
<b>Operation, air/water</b>				
Rated output with A2 <sup>1)</sup> /W35 heating <sup>2)</sup>	kW	6.79	7.55	7.55
Elec. power consumption with A2/W35	kW	1.64	1.98	1.98
COP with A2/W35 <sup>1)</sup> Heating <sup>4)</sup>		4.15	3.81	3.81
Rated output with A7/W35 <sup>1)</sup> Heating <sup>2)</sup>	kW	6.41	6.41	6.41
Elec. power consumption with A7/W35	kW	1.32	1.32	1.32
COP with A7/W35 <sup>1)</sup> Heating <sup>3)</sup>		4.87	4.87	4.87
Rated output with A-7 <sup>1)</sup> /W35 heating <sup>2)</sup>	kW	11.15	12.44	12.44
Elec. power consumption with A-7/W35	kW	4.09	4.86	4.86
COP with A-7 <sup>1)</sup> /W35 heating <sup>4)</sup>		2.72	2.56	2.56
Cooling capacity with A35/W18	kW	14.5	15.0	15.5
EER with A35/W18	kW	3.3	3.1	2.8
Max. power input for A7/W35	kW	3.6	3.9	4.24
<b>Electr. data</b>				
Power supply		400V, 3N AC 50Hz		
Recommended automatic circuit breaker <sup>5)</sup>	O	3 x 13	3 x 13	3 x 13
Maximum current	O	11	11	11
Startup current	O	<3		
cos φ		0.98..0.99		
<b>Data for cooling circuit</b>				
Connection type		Flare connection 3/8" & 5/8"		
Refrigerant type <sup>6)</sup>		R410A		
Refrigerant charge	kg	2.3	2.3	2.3
<b>Air and noise data</b>				
Fan motor (DC inverter)	W	2x124	2x124	2x124
Nominal air flow rate <sup>7)</sup>	m <sup>3</sup> /h	2x3600	2x3600	2x3600
Sound pressure level at a distance of 1 m	dB(A)	59	59	59
Sound power level <sup>8)</sup>	dB(A)	67	67	67
Max. sound power level	dB(A)	68	68	68
Silent mode (setback mode)	dB(A)	-5		
<b>General information</b>				
Compressor oil		FVC68D		
Quantity of compressor oil	ml	1300	1300	1300
Maximum heating water flow temperature, outdoor unit only	°C	57		
Maximum heating water flow temperature, booster heating only	°C	80		
Protection class		X4		
Installation altitude		Up to 2000 m over NN		
Dimensions (WxDxH)	mm	950x330x1380	950x330x1380	950x330x1380
Weight	kg	96	96	96

1) Rating according to EN 14511-2013

2) The stated heating output is a nominal value

3) Optimum COP according to EHPA measurement (40% inverter capacity)

4) 60% inverter capacity (A2/W35), 100% inverter capacity (A7/W35)

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

 6) GWP<sub>100</sub> - 2088

7) Per fan

8) Sound power level in accordance with EN 12102 (nominal output with A7/W55)

Table 3 Outdoor unit

4.3 Refrigerant Cycle

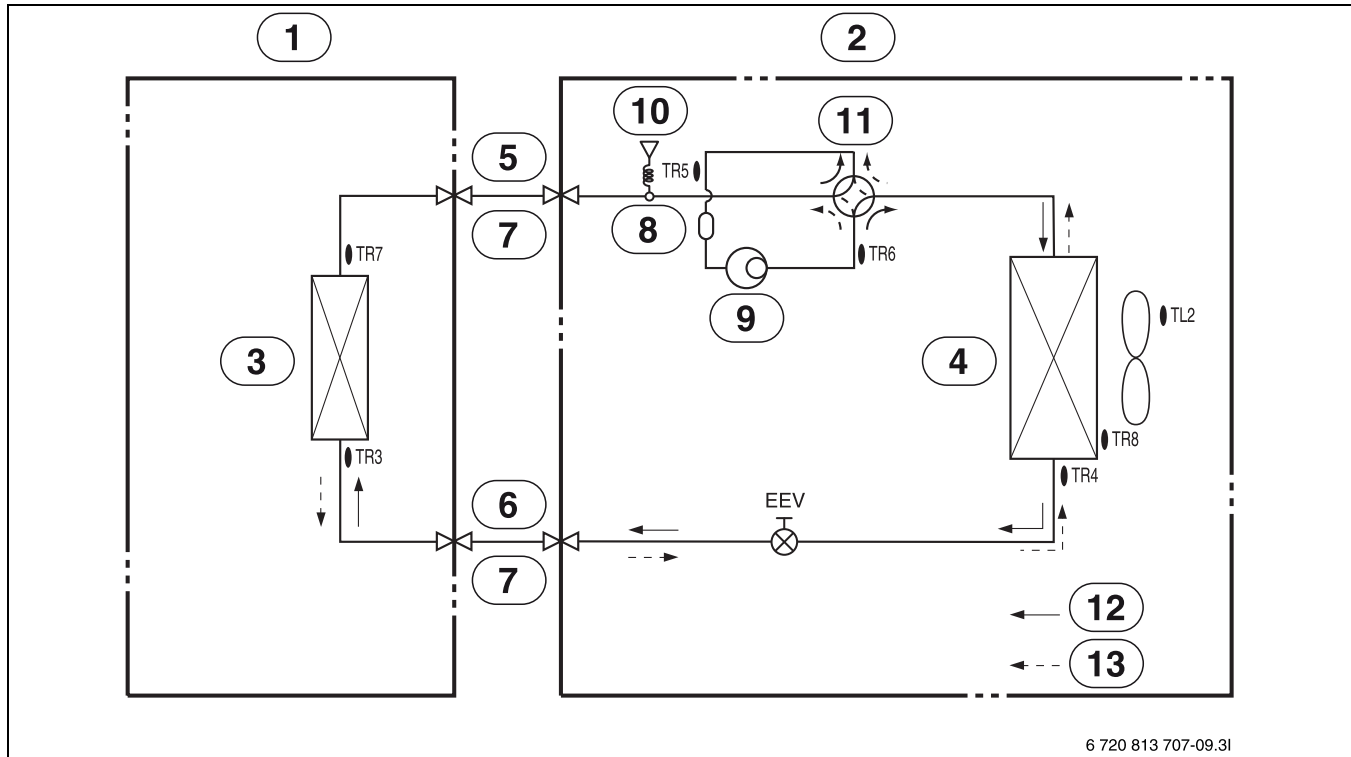


Fig. 3 Refrigerant Cycle

- [1] Indoor unit
- [2] Outdoor unit
- [3] Indoor unit plate heat exchanger
- [4] Outdoor unit heat exchanger
- [5] Gas side
- [6] Liquid side
- [7] 3-way service valve (outdoor unit)
- [8] Refrigerant collector
- [9] Compressor
- [10] Pressure sensor
- [11] 4-way valve
- [12] Cooling
- [13] Heating

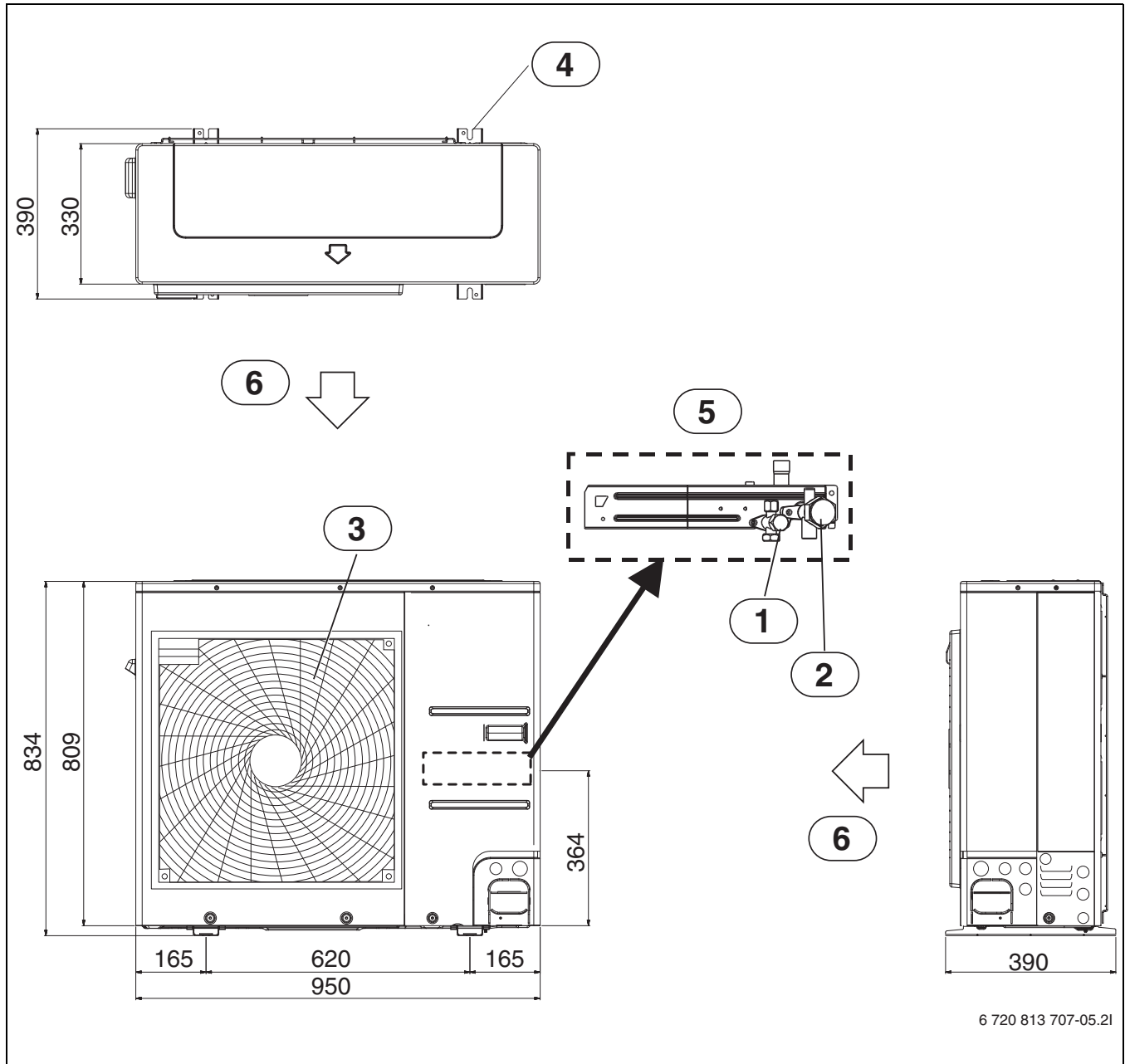
Category	Symbol	Meaning	Remarks
Indoor unit	TR7	Temperature sensor refrigerant (Gas)	See manual for indoor unit
	TR3	Temperature sensor refrigerant (liquid)	

Table 4

Category	Symbol	Meaning	Type	PCB Connector			
				Split 2	Split 4...8	Split 11...15s	Split 11t...15t
Outdoor unit	TR5	Compressor-suction pipe temperature sensor	NTC-5k Ω	CN-SUCTION (GN)	CN_TH3	CN_TH3	CN_TH2
	TR6	Compressor-discharge pipe temperature sensor	NTC-200k Ω	CN-DISCHARGE (BK)			
	TR4	Condenser temperature sensor	NTC-5k Ω	CN-C_PIPE (VI)	CN_TH2	CN_TH2	CN_TH1
	TL2	Outdoor air temperature sensor	NTC-10k Ω	CN-AIR (YL)			
	TR8	Condenser middle temperature sensor	NTC-5k Ω	CN-MID (BR)	CN_TH4	CN_TH4	CN_TH3
	EEV	Electronic expansion valve		CN-EEV_A(WH)	CN_EEV1	CN_EEV1	CN_LEV1

Table 5

4.4 Measurements



6 720 813 707-05.2I

Fig. 4 Outdoor unit dimensions Split 4...8

- [1] Liquid-side service valve
- [2] Gas-side service valve
- [3] Air discharge grill
- [4] Four holes for anchor bolts (M10)
- [5] Supporter
- [6] Air direction

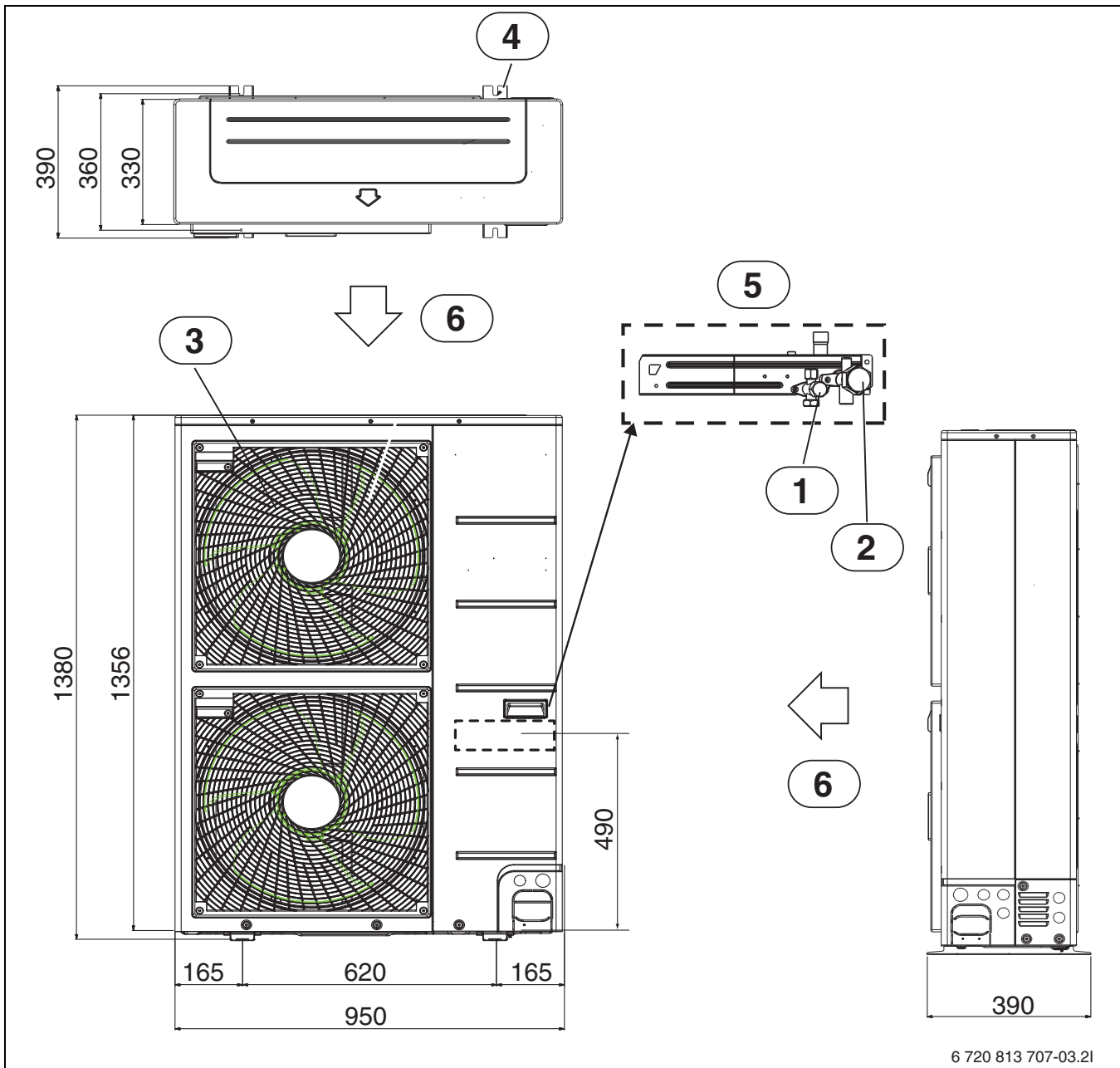


Fig. 5 Outdoor unit dimensions Split 11...15

- [1] Liquid-side service valve
- [2] Gas-side service valve
- [3] Air discharge grill
- [4] Four holes for anchor bolts (M10)
- [5] Supporter
- [6] Air direction

## 5 Regulations

Follow the directives and regulations given below:

- Local provisions and regulations of the electricity supplier and corresponding special rules
- National building regulations
- **F-Gas regulation**
- **EN 50160** (voltage properties in power grids for public distribution)
- **EN 12828** (heating systems in buildings - Design and installation of water-based heating systems)
- **EN 1717** (Protection of potable water against pollution in potable water installations)

## 6 Installation



### CAUTION:

#### Risk of injury!

During transport and installation there are a risk of crushing injury. During maintenance internal parts of the appliance can become hot.

- ▶ The installer are obliged to wear gloves during transport, installation and maintenance.

The outdoor unit is installed in the open air. Heat is exchanged with the ambient air in this unit. Therefore, it is important to secure proper space around the outdoor unit and care for specific external conditions. This chapter describes how to install the outdoor unit, route the cables to the indoor unit and then connect it up. It also contains information on installation in coastal regions.

### 6.1 Lifting method

- ▶ When carrying the suspended unit, pass the ropes between legs of base panel under the unit.
- ▶ Always lift the unit with ropes attached at four points so that impact is not applied to the unit.
- ▶ Attach the ropes to the unit at an angle of 40° or less.
- ▶ Use only accessories and parts which are of the designated specification when installing.



Be very careful while carrying the unit:

- ▶ The unit must always be carried by at least two people.
- ▶ PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.
- ▶ Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.

### 6.2 Checklist



Each installation is different. The following check list will provide a general description of the installation process.

1. Place the outdoor unit on a solid surface (→ Chapter 6.3) and anchor it.
2. Install the outdoor unit's refrigerant pipes (→ Chapter 7)
3. Install the condensate tube and condensate outlet heating (accessory) of the outdoor unit. The condensate outlet heating can be connected to the outdoor unit (defrosting controlled via thermostat) or the indoor unit (→ installation instructions for the indoor unit) (defrosting according to requirements).
4. Connect the outdoor unit and indoor unit (→ Indoor unit installation instructions).

5. Connect the CAN-BUS wire between the outdoor unit and the indoor unit (→Chapter 8.1).
6. Install electricity to the outdoor unit (→Chapter 8).

### 6.3 Foundation for installation



To avoid the possible noise problems associated with wall-mounted installation, it is advisable to install the unit on floor brackets whenever possible (accessory).

- ▶ Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- ▶ Assemble the vibration dampers on the feet of the outdoor unit with the fixation bolts.

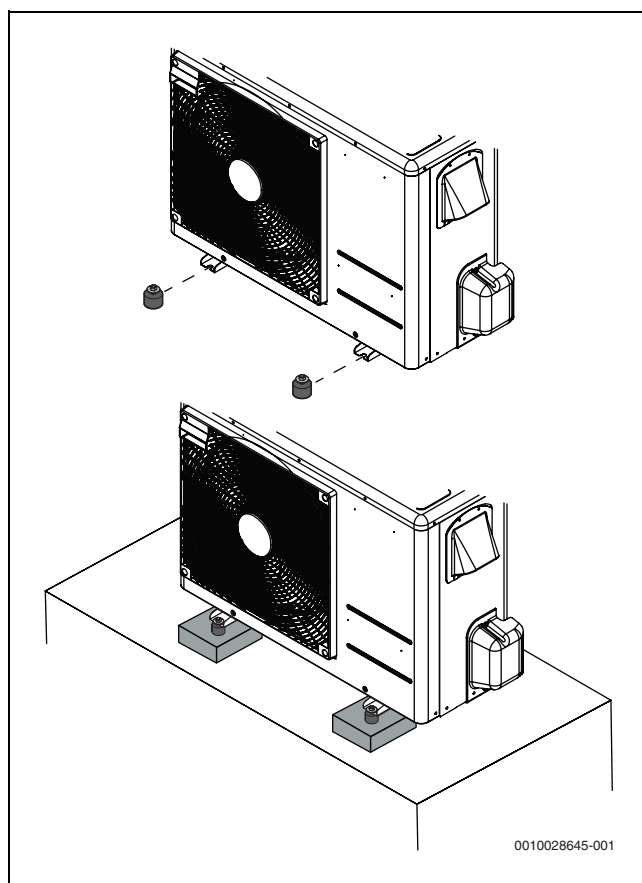


Fig. 6 Assembly of vibration dampers

- ▶ Fix the unit securely by means of the foundation bolts. (Lay out 4 sets of M10 commercially-available foundation bolts, nuts and washers. Fastening is not included in the scope of delivery.)
- ▶ Screw in the foundation bolts until their length are 20mm from the foundation surface.

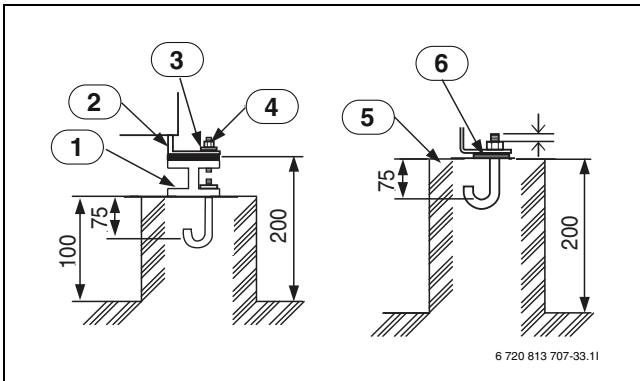


Fig. 7 Foundation bolt executing method (mm)

- [1] H-beam
- [2] Frame
- [3] Spring washer
- [4] Nut
- [5] Concrete base
- [6] Vibration-damping material (included in scope of delivery of the outdoor unit or as accessory)

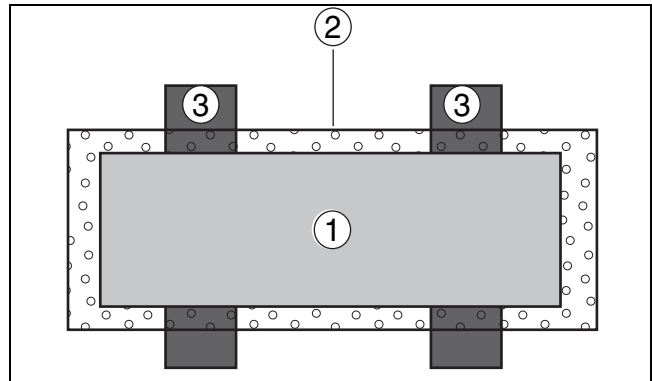


Fig. 9 Outdoor unit at the floor bracket (view from above)

- [1] Outdoor unit
- [2] Condensation drip pan (accessory)
- [3] Floor bracket (accessory)



**CAUTION:**

Risk of freezing!

- ▶ Remove the Pallet (Wood Support) (→ fig. 8) of the bottom side of the unit Base Pan before fixing the bolt. It may cause the unstable state of the unit settlement, and may cause freezing of the heat exchanger resulting in abnormal operations.



**WARNING:**

It may cause a fire.

- ▶ Remove the Pallet (Wood Support) (→ fig. 8) of the bottom side of the unit before welding. Not removing Pallet (Wood Support) causes hazard of fire during welding.

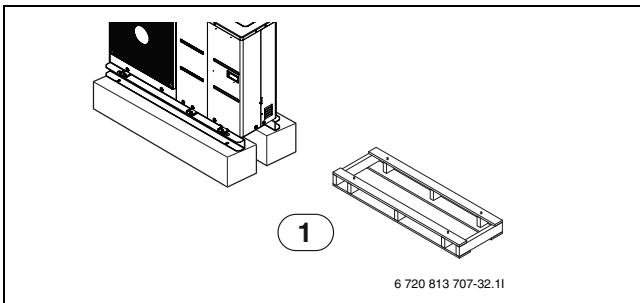


Fig. 8

- [1] Pallet (Wood Support) - remove before installation

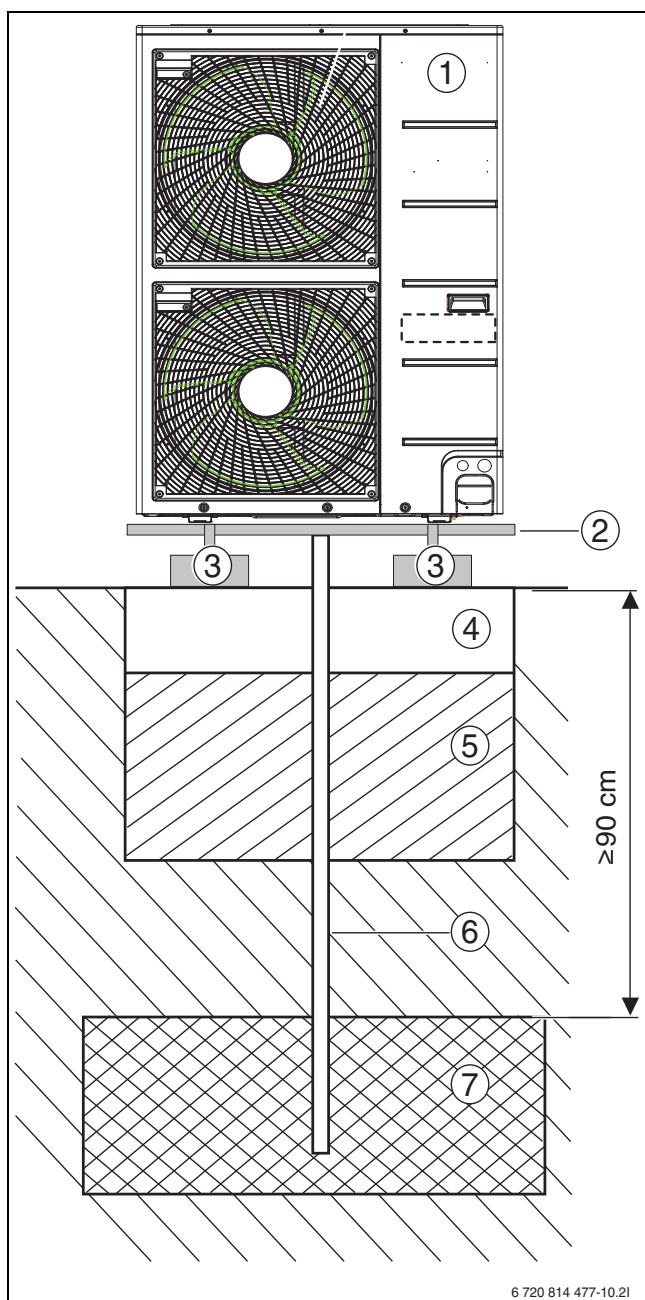


Fig. 10 Condensate drainage via gravel bed

- [1] Outdoor unit
- [2] Condensation drip pan (accessory)
- [3] Floor bracket (accessory)
- [4] Foundation 100 mm
- [5] Compacted bed of crushed stones 300 mm
- [6] Condensate pipe 40 mm
- [7] Gravel bed

The condensate can either be removed via a gravel bed or via a drain into the building. A condensation drip pan is required for the solution with the drain and is available as an accessory.

The condensation drip pan must be equipped with a heating cable that runs into the pan and into the frost-free area of the drain.

An alternative solution would be to allow the condensate to seep away naturally. This can lead to the formation of ice on the ground.



A heating cable for the drain (accessory) is required when using the condensate collection pan.

#### 6.4 Conditions where outdoor unit is installed

- ▶ Make sure that heat radiation (cooling mode) from the heat exchanger is not restricted if a sunroof is built over the unit to prevent direct sunlight or rain exposure.
- ▶ Do not place the outdoor unit at the northern side of the house. Doing this can lead to lower efficiencies in operation.
- ▶ Make sure that the clearances indicated by arrows at the front, back and side of the unit are observed.
- ▶ Do not place plants in the path of the air flow.
- ▶ Take the weight of the outdoor unit into account and select a place where noise and vibration are minimum.
- ▶ When choosing a suitable location, make sure that the maximum sound pressure level will not disturb the neighbours.
- ▶ When placing the appliance, make sure it can be accessed at all times in order to carry out maintenance work. If access is restricted, e.g. due to installation on a roof, suitable measures must be taken to ensure that maintenance work can still be carried out without additional time expenditure or costly assembly aids. If not, it may incur additional cost for the customer. Occupational health and safety regulations must always be observed.

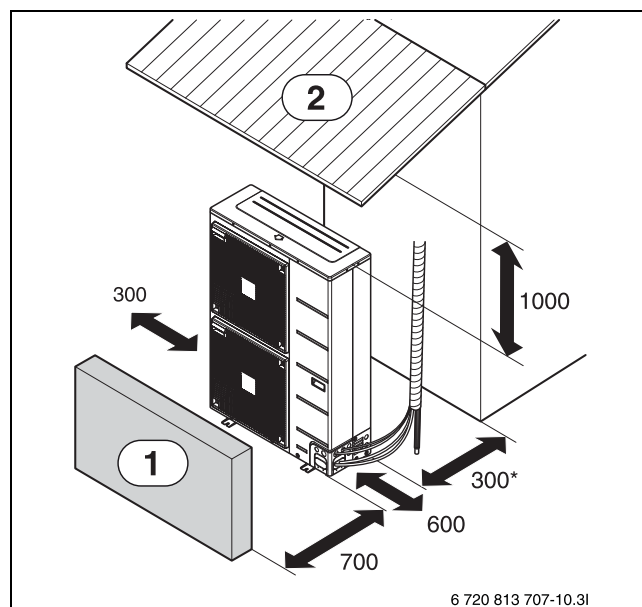


Fig. 11 Minimum service space (mm)

- [1] Fence or obstacles
- [2] Sunroof
- [\*] 150 mm if wall mounted

#### 6.5 Drill a hole in the wall

If making a hole in the wall is required to connect the pipes between the indoor unit and the outdoor unit, please follow below descriptions.

- ▶ Drill the piping hole with a  $\varnothing$  70 mm hole core drill.
- ▶ Piping hole should be slightly slant to the outdoor side to prevent raindrop into indoor side.

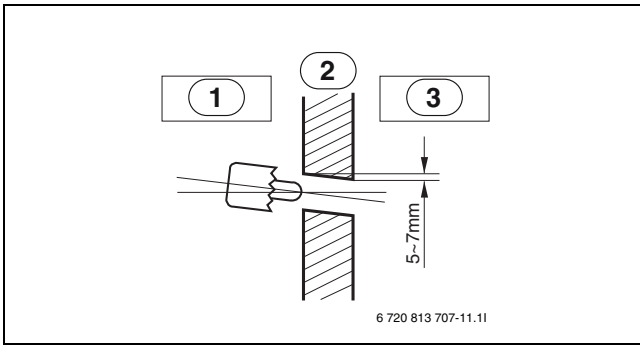


Fig. 12 Space in mm

- [1] Inside
- [2] Wall
- [3] External

### 6.6 Installation at seaside



**CAUTION:**

**Risk of corrosion!**

Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient performance.

- ▶ Do not install the outdoor unit in areas where corrosive gases, such as acid or alkaline gas, are produced.
- ▶ Do not install the product where it could be exposed to sea wind (salty wind) directly.
- ▶ Do not install the outdoor unit in the immediate vicinity of the sea, and also whenever possible avoid direct exposure to sea wind.

#### 6.6.1 Selecting the location

If the outdoor unit is to be installed close to the seaside, direct exposure to the sea wind should be avoided.

- ▶ Install the outdoor unit on the opposite side of the sea wind direction (→ fig. 13).
- ▶ In case, set up a windbreak (→ fig. 14) not to be exposed to the sea wind if you install the outdoor unit on the seaside.
  - It should be strong enough like concrete to prevent the sea wind from the sea.
  - The height and width should be more than 150% of the outdoor unit.
  - It should be keep more than 700 mm of space between outdoor unit and the windbreak for easy air flow.
- ▶ Select a well-drained place.

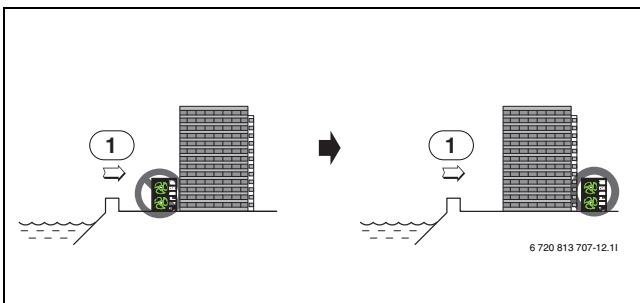


Fig. 13

- [1] Sea wind

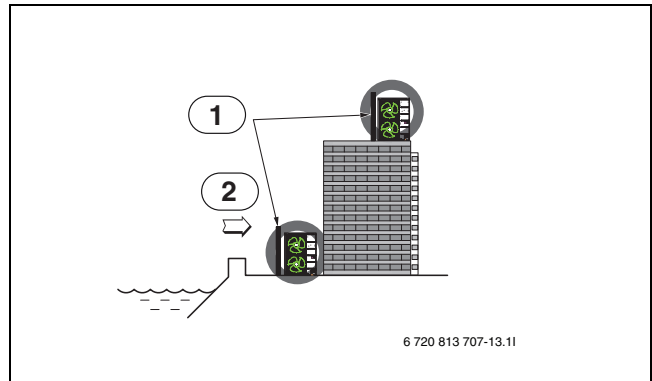


Fig. 14

- [1] Windbreak
- [2] Sea wind

### 6.7 Seasonal wind and cautions in winter

Sufficient measures are required in a snow area or severe cold area in winter so that the product can be operated well.

- ▶ Get ready for seasonal wind or snow in winter even in other areas.
- ▶ Select the intake and discharge side to prevent penetration by snow or rain.
- ▶ Position the outdoor unit where snow or rain cannot drip or slide onto it from the roof.
  - If snow piles up and freezes on the air suction hole, the system may malfunction.
  - If it is installed in a snowy area, attach a protective roof to the system.
- ▶ Install the outdoor unit 500 mm higher than the annual average snowfall if it is installed in an area with much snowfall.
- ▶ Always remove snow for operation where snow accumulates on the upper part of the outdoor unit by more than 100 mm.



If width of the console is wider than that of the product, snow may accumulate.

- ▶ The height of the console must be more than 2 times the snowfall and its width shall not exceed the width of the product.
- ▶ Don't position the intake and discharge ports of the outdoor unit so they face in the direction of the seasonal wind.

## 7 Refrigerant pipe

This chapter describes the installation of the refrigerant line at the outdoor unit.



Short connections outside reduce heat loss. Use pre-insulated refrigerant lines whenever possible. Refrigerant lines in the outdoor area must be insulated to prevent loss of heat! This insulation must be resistant to uv light, weather-proof and rodent-proof.

- ▶ Underground insulated cables must be laid in a suitable protective tube (eg KG pipe).

### 7.1 Refrigerant pipe connection



#### CAUTION:

Do not open shut-off valves before piping and vacuum extraction are complete. The outdoor unit is pre-filled with refrigerant R410A, which exits if the valves are opened too early.



Caution is required as the refrigerant lines must be bent without buckling them. A bending radius of 100 – 150 mm is sufficient.



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

#### 7.1.1 Safety

Use exclusively R410A refrigerant in the outdoor unit.

- ▶ 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 outdoor unit.
- ▶ Avoid skin or eye contact with refrigerant.
- ▶ Notify the installer immediately.

#### 7.1.2 Preparing for installation

##### Assembly 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 refrigerant pipes with the correct wall thickness.

### 7.2 Installing the refrigerant pipe

Before installing the refrigerant pipe, observe the constraints in relation to pipe lengths and gradients. After resolving all constraints, some preparations are required to proceed. Then start installing the refrigerant pipe at the outdoor unit.



#### CAUTION:

##### Risk of abnormal operation!

The rated output of the product is based on the specified standard lengths. It is important not to exceed the maximum allowable length to ensure that the product operates reliably. Improper refrigerant charge may result in abnormal operation.

- ▶ Make additional charge of the refrigerant as required according to table 6, if the single pipe length is longer than 7.5 m.

The single pipe length without necessary additional filling is 7.5m. Additional filling of refrigerant is not required up to this length.

Example: if the split unit with a single pipe length of 30m is installed, fill with an additional 900g refrigerant. The following applies:  $(30-7.5) \times 40g = 900g$



Fill in the f-gas label attached on outdoor unit about the quantity of the fluorinated greenhouse gases. (This note about f-gas label may not apply depending on your product type or market.)

Capacity	Pipe size (mm : inch) (Diameter : Ø)		Distance, single pipe length A (m)		Elevation B (m)		*Additional Refrigerant (g/m) (single pipe length)
	Gas	Liquid	Standard	Max.	Standard	Max.	
Split 4...8	15.88 (5/8")	9.52 (3/8")	7.5	30	0	30	40
Split 11	15.88 (5/8")	9.52 (3/8")	7.5	30	0	30	40
Split 13							
Split 15							

Table 6 Constraints in pipe length and elevation

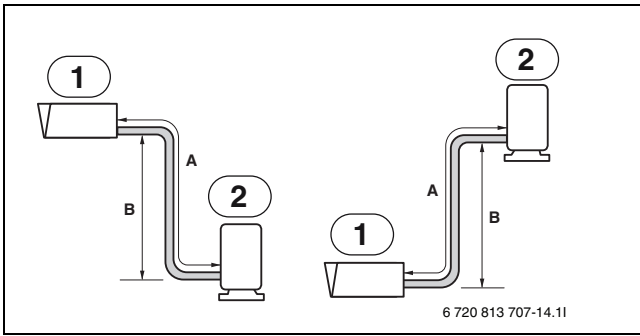


Fig. 15

- [1] Indoor unit
- [2] Outdoor unit



A trap is not necessary when the outdoor unit is installed in a higher position than the outdoor unit.

### 7.2.1 Preparation for piping

Preparation for piping is five steps. As main cause of refrigerant leakage is defects in flaring work, please carry out correct flaring work in the following steps.

1. Cut the pipes and the cable
  - Use the refrigerant lines from the range of accessories or pipes bought locally.
  - Measure the distance between the indoor unit and the outdoor unit.
  - Cut the pipes a little longer than measured distance.

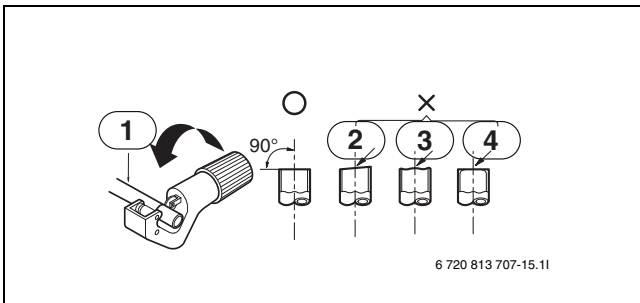


Fig. 16 Cut the pipes and the cable

- [1] Copper pipe
- [2] Slant
- [3] Uneven
- [4] Coarse

#### 2. Burrs removal

- Remove all burrs completely from cut cross section of the pipe.
- Put the end of the pipe to downward direction in order to prevent drop of burrs into the pipe.

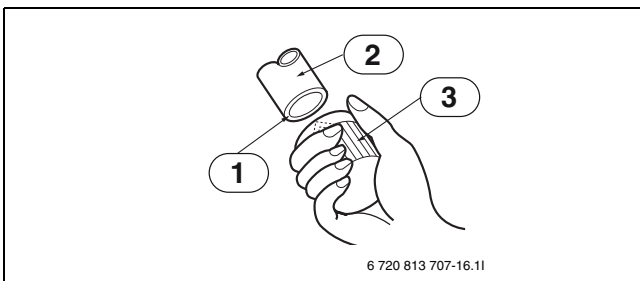


Fig. 17 Burrs removal

- [1] Point down
- [2] Pipe
- [3] Reamer

#### 3. Insert flare nut

- Take out flare nuts attached at the outdoor unit.
- Put flare nuts onto burr-removed pipe.
- If flaring work is finished, it is impossible to put nuts onto pipe.

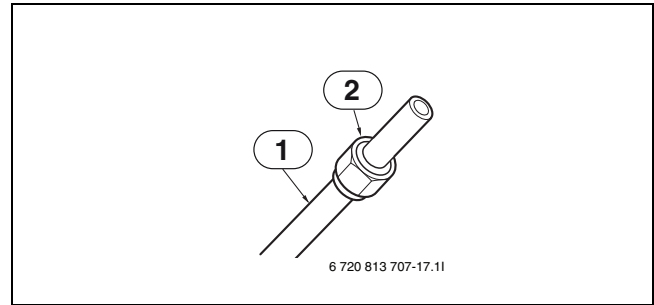


Fig. 18 Insert flare nut

- [1] Copper pipe
- [2] Flare nut

#### 4. Use for pipe connection of engineering installation

- Carry out flaring work using dedicated flaring tool for R-410A refrigerant as shown in (→Table 7).
- Firmly hold copper tube in a bar (or die) as indicated dimension in (→Table 7).

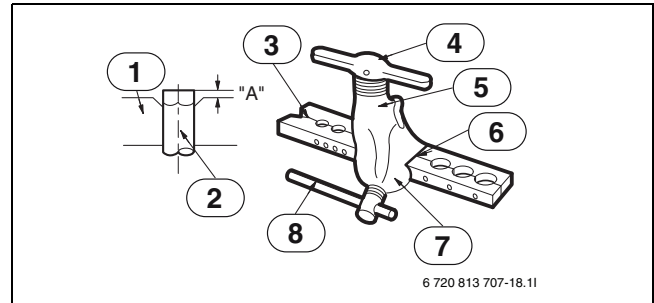


Fig. 19

- [1] Template
- [2] Copper pipe
- [3] Template
- [4] Handle
- [5] Yoke
- [6] Cone
- [7] Red arrow mark
- [8] Clamp handle

Outer diameter mm	inch	"A" (→Fig. 19)		Nm	lb*ft
		mm			
6.35	1/4	1.1~1.3		18-24	13-18
9.52	3/8	1.5~1.7		34-41	25-30
12.7	1/2	1.6~1.8		54-64	40-47
15.88	5/8	1.6~1.8		65-80	48-59
19.05	3/4	1.9~2.1		98-118	72-87

Table 7 Use for pipe connection of engineering installation

#### 5. Check

- Compare the flared work with (→Fig. 20).
- Cut off the flared section and do flaring work again, if flare is seemed to be defective,

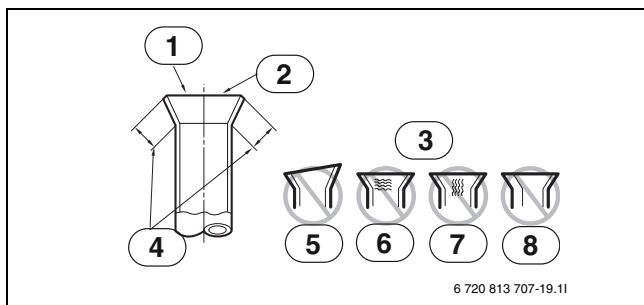


Fig. 20

- [1] Smooth all around
- [2] Inside is shiny without scratches
- [3] Improper flaring
- [4] Even length all around
- [5] Slant
- [6] Surface damaged
- [7] Cracked
- [8] Uneven thickness

**7.2.2 Connecting pipe to outdoor unit (Split 8, Split 11, Split 13, Split 15)**

Connecting pipe to the outdoor unit is five steps including PCB setting.

1. Determine direction of pipes
  - The pipes can be connectable in four directions. The directions are expressed in (→Fig. 21 & 22).

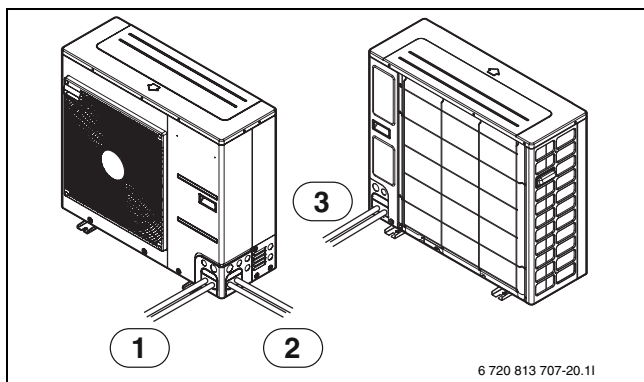


Fig. 21

- [1] Forward
- [2] Sideways
- [3] Backward

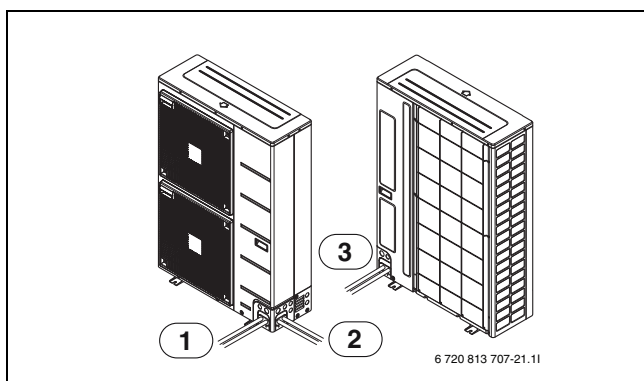


Fig. 22

- [1] Forward
- [2] Sideways
- [3] Backward

2. Determine the installation direction of the pipe: for downwards see (→fig. 15)

3. Tightening

- Align the centre of the pipes and sufficiently tighten the flare nut with fingers.
- Tighten the flare nut with a wrench until the wrench clicks.
- Tightening torque is as in (→Table 7)

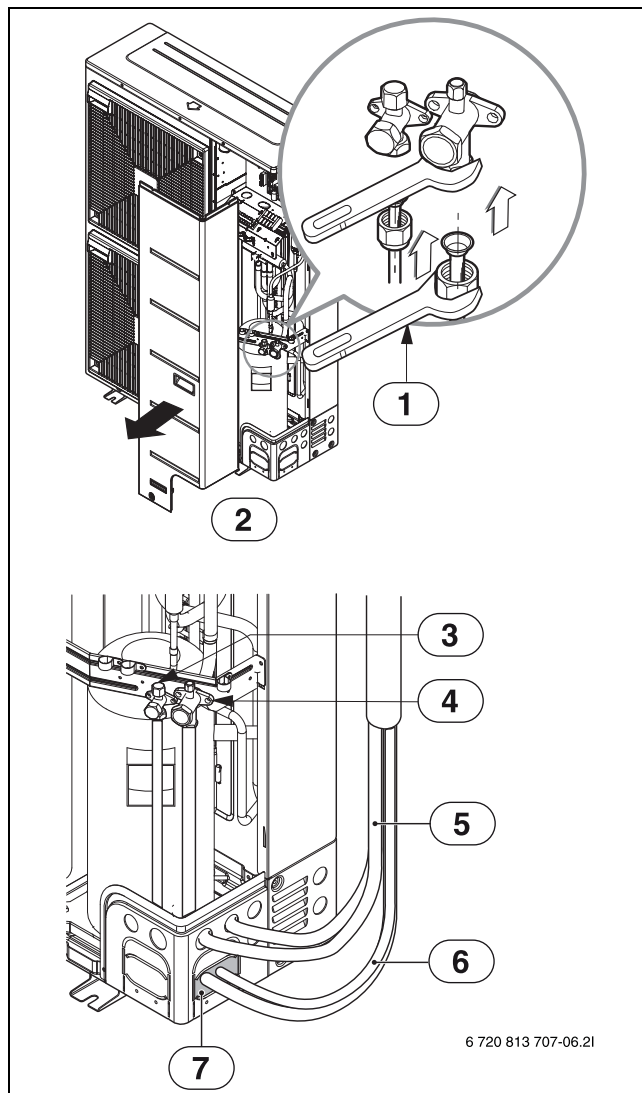


Fig. 23

- [1] Torque wrench
- [2] Outdoor unit
- [3] Liquid side piping
- [4] Gas side piping
- [5] Power supply cable
- [6] Connection pipe
- [7] Putty or insulating material

4. Preventing entering of foreign objects

- Seal the pipe knock-outs with putty or insulating material (to be provided by the customer). Seal all openings (→Fig. 23).
- If insects or small animals enter the outdoor unit, it may cause a short circuit in the electrical box.
- Finally, form the pipes by wrapping the connecting portion of the indoor unit with insulation material and secure it with two kinds of vinyl tape. Ensuring thermal insulation is very important.

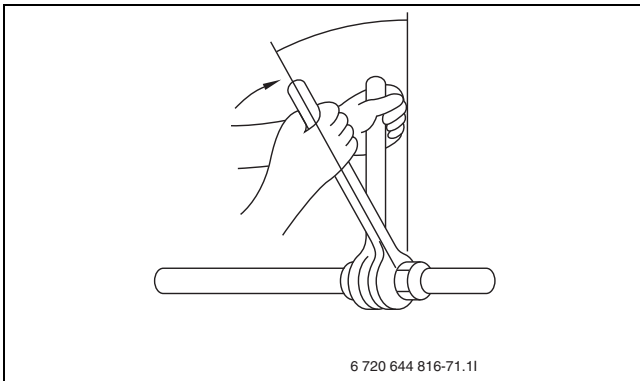


Fig. 24 Tighten nut using two wrenches



**WARNING:**

**Risk of electric shock!**

- ▶ Do not open the side panel and not set the DIP switch while the product is in operation.

**7.3 Filling the heating system**

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



For complete instructions on how to fill the heating system, please refer to the indoor unit installation instructions.

**8 Electrical connection**



**DANGER:**

**Risk of electric shock!**

The components in the outdoor unit conduct electricity. The capacitor in the outdoor unit must be discharged after disconnecting it from the power.

- ▶ Switch off the master switch.
- ▶ Wait at least five minutes before any electrical work.

**NOTICE:**

**The installation will get damaged if the power is connected without water.**

Components in the heating system can overheat if the power is connected before it has been filled up with water.

- ▶ Fill the DHW cylinder and heating system before turning on the heating system, and establish the correct pressure.



The outdoor unit electrical connection must be disconnected safely and according to applicable rules.

- ▶ Install a separate safety switch that disconnects all power to the outdoor unit if it is not supplied through the indoor unit. In case of separate power supplies you will need one safety switch for each supply.
- ▶ Choose cable area and type that represent the fuse protection and wire mode.
- ▶ Connect the outdoor unit according to the circuit diagram. Never connect any other consumers.

- ▶ If power is not supplied to the heat pump via the indoor unit, install a separate safety switch that completely de-energizes it. When the power supply is separate, a separate safety switch is needed for each supply line.
- ▶ Ensure to install a residual current device based on normative requirements in each country. We recommend to use a residual current device of type B.
- ▶ Observe the colour coding when replacing circuit boards.

**8.1 CAN-BUS**

**NOTICE:**

**Malfunction due to electrical disturbances!**

High voltage lines (230/400 V) close to a communications line can cause the indoor unit to malfunction.

- ▶ Install screened CAN-BUS wire away from a power cord. Minimum clearance: 100 mm. Routing together with bus lines is permitted.

**NOTICE:**

**System damage due to swapping of 12V and CAN-BUS connection.**

The communication circuits are not designed for 12V direct voltage.

- ▶ Check that the cables are connected to the corresponding plugs on the printed circuit board.



CAN-BUS: do not connect at "Out 12V DC" (12V direct voltage output) on the main PCB.

Max. Cable length 30 m

Minimum diameter  $\varnothing = 0.75 \text{ mm}^2$

The outdoor unit and the indoor unit are connected by a communications wire, CAN-BUS.

**A suitable cable for external cable installation is a LiYCY cable (TP) 2 x 2 x 0.75 or equivalent.** An alternative cable should have a cross section area of at least 0.75 mm<sup>2</sup>, and be a duplex cable, screened and approved for outside use. The shielding should be grounded at both ends:

- ▶ To the housing of the indoor unit.
- ▶ To the ground connector of the outdoor unit.

Maximum cable length is 30 m.

The connection between the circuit boards is by three wires. The circuit boards have markings for both the CAN-BUS connections

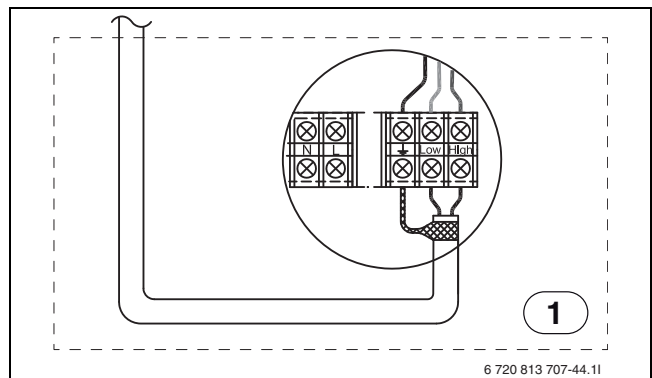


Fig. 25 CAN-BUS connection

[1] Outdoor unit

**The termination switch** marks the start and the end of the CAN-BUS loop. The outdoor unit I/O module card should be terminated.

## 8.2 Electrical wiring

- ▶ Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.

**WARNING:**

**Risk of electric shock or fire!**

If power supply circuit has a lack of capacity or electric work deficiency, it may cause an electric shock or fire.

- ▶ Be sure to have authorized electrical engineers do the electric work using special circuits in accordance with regulations and this installation manual.

- ▶ Install the Unit transmission line away from the power source wiring so that it is not affected by electric noise from the power source. (Do not run it through the same conduit.)
- ▶ Be sure to provide designated grounding work to Unit.

**CAUTION:**

**Risk of electric shock!**

If earth is incomplete, it may cause an electric shock.

- ▶ Be sure to correct the unit to earth.
- ▶ Do not connect earth line to any gas pipe, liquid pipe, lightning rod or telephone earth line.

- ▶ Give some allowance to wiring for electrical part box of Units, because the box is sometimes removed at the time of service work.
- ▶ Never connect the power source to the terminal block of the CAN-BUS data cable. If connected, electrical parts will be burnt out.

Only connect CAN-BUS cables to the designated terminals.

**CAUTION:**

**Risk of damage on equipment!**

Running the product in reversed phase may break the compressor and other parts. Introducing with a missing N-phase or with a mistaken N-phase will break the equipment.

- ▶ The heat pump and indoor unit are connected using a CAN-BUS data cable. Run the shielded CAN-BUS line separate from the power cables. Maintain a minimum distance of 100 mm. Communication lines may be run together with sensor cables.

### 8.2.1 Wire specification

**Power specification**

The power cord connected to the unit should be complied with IEC 60245 or HD 22.4 S4 (Rubber insulated cord, type 60245 IEC 66 or H07RN-F).

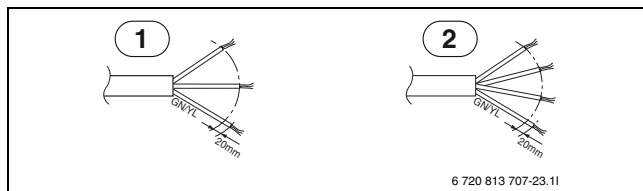


Fig. 26

- [1] 1 Phase (Ø)
- [2] 3 Phase (Ø)

**Terminal specification of power cable and related cautions:**

When the cable is connected to the terminal, it should have a normal wire end sleeve.

If the cable is connected to the PCB:

- ▶ Round pressure terminals (→Fig. 27) should be used to connect the earth to the main PCB.

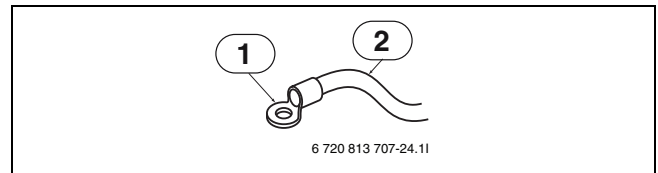


Fig. 27

- [1] Round pressure terminal
- [2] Power wiring

If no materials are used when connecting cables to terminal block, follow the instructions below.

- ▶ Do not connect wiring of different thicknesses to the power terminal block. (Slack in the power wiring may cause abnormal heat.)
- ▶ Do as shown in (→Fig. 28), when connecting wiring which is the same thickness.

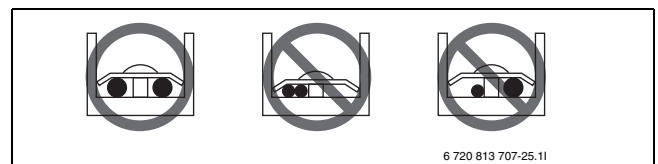


Fig. 28

### 8.2.2 Wiring procedure for power cable and connecting cable

- ▶ Disassemble the side panel from the outdoor unit by loosening screws.
- ▶ Connect Power cable to Main power terminal and Connecting cable to Control terminal, respectively. See below figure for detailed information. When connecting earth cable, the diameter of cable should be bigger than 1.5mm<sup>2</sup> to secure safety. The earth cable is connected to the terminal block where earth symbol is marked.
- ▶ Use cable clamps (or cord clamps) to prevent unintended move of Power cable and Connecting cable.
- ▶ Reassemble the side panel to the outdoor unit by fastening screws.

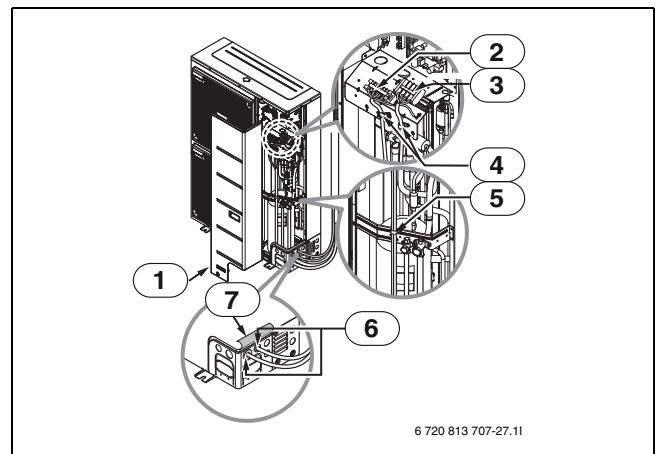


Fig. 29

- [1] Side board
- [2] Control terminal (Terminal for connecting cable)
- [3] Main power terminal (Terminal for power cable)
- [4] Cable clamp (or cord clamp)
- [5] Cable clamp (or cord clamp)
- [6] When connecting power cable, make sure the rubber bushes are properly attached in knock-out holes after removing the insulation pad.
- [7] Insulation pad



### CAUTION:

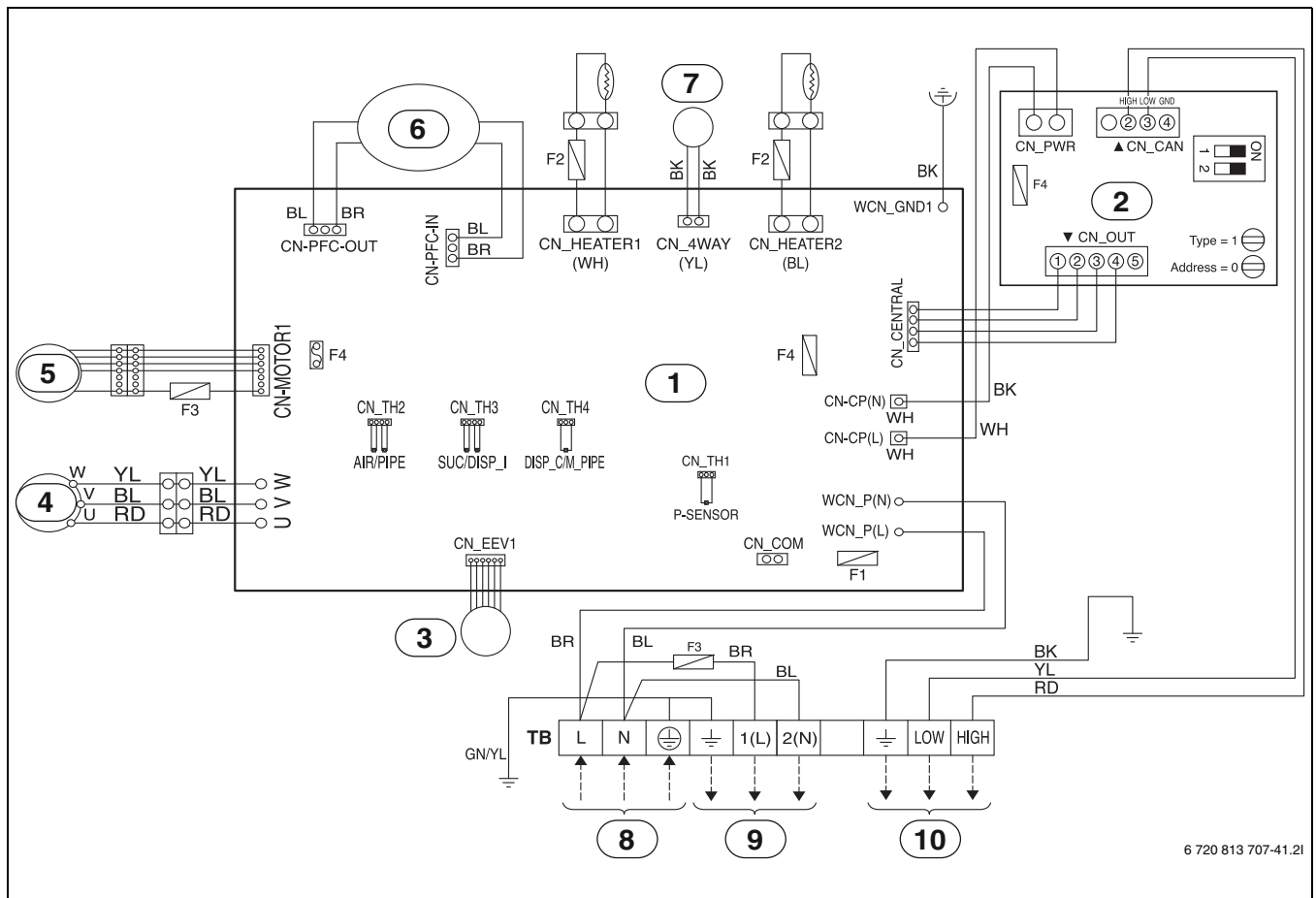
#### **Start wiring work after checking and confirming following conditions!**

The following problems could be caused by a power supply fault such as a sudden surge or drop in voltage: chattering of magnetic switches (frequent on and off operation), physical damage of parts where magnetic switch is contacted, damaged fuse, malfunction of overload protection parts or related control algorithms and failure of compressor start up.

- ▶ Check the screws that are fasten internal wires and make sure if they are all fastened tightly.  
If these are not tightened, a contact may come loose and cause faults. (Although it is very rare case, sometimes the screws can be loosened due to the vibration while product transportation.)
  - ▶ Make sure that the electrical fuse protection is correct.
  - ▶ Make sure that the power supply corresponds to the rated voltage specified on the data plate.
-

## 8.3 Circuit diagram

### 8.3.1 Split 4...8

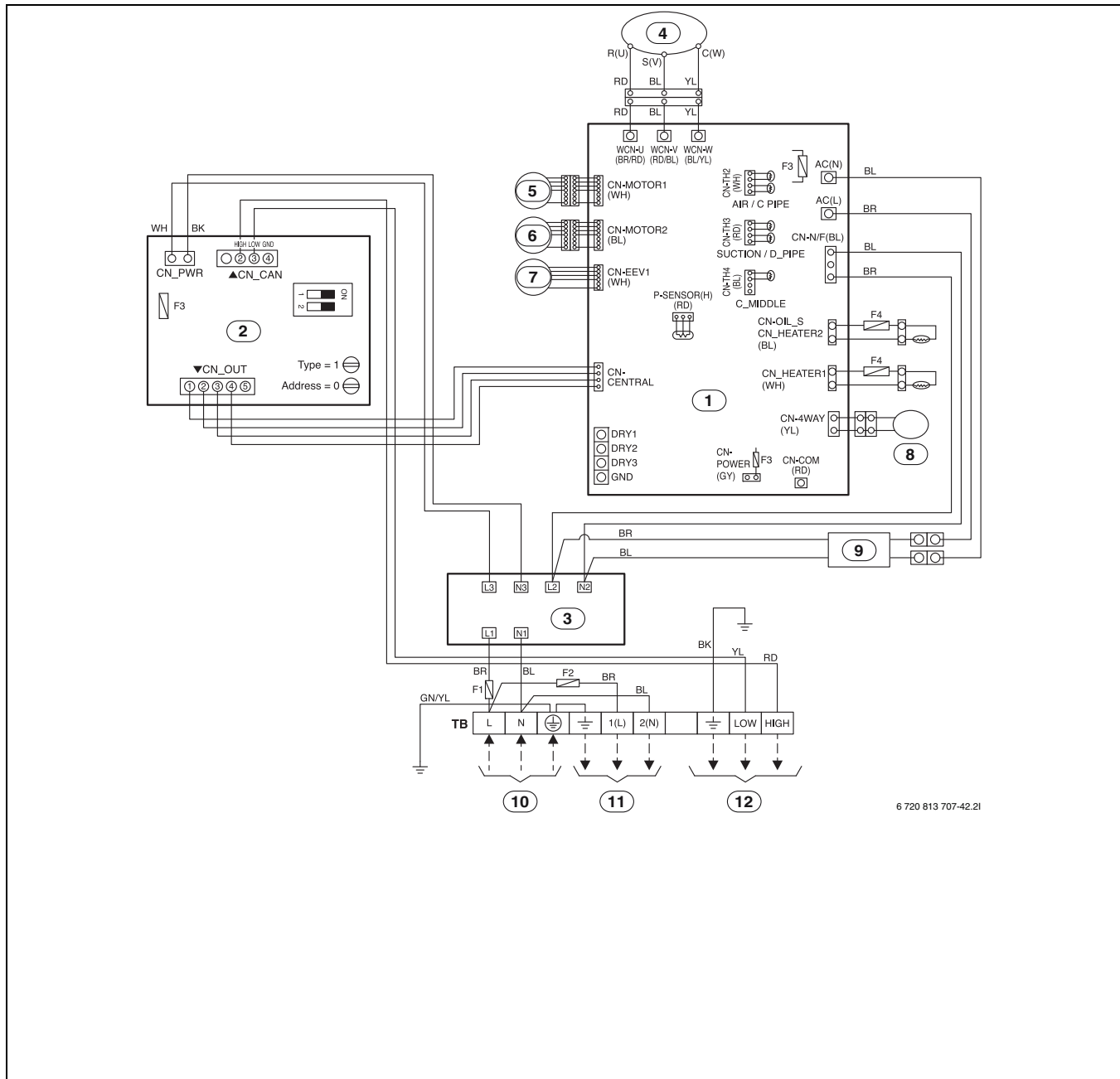


6 720 813 707-41.2I

Fig. 30

- [1] Main PCB
- [2] CAN board
- [3] Electronic expansion valve
- [4] Comp
- [5] Fan motor
- [6] PFC Reactor
- [7] 4-way valve
- [8] Power supply 220-240V ~50Hz
- [9] External condensate pan heater (230V 90W)
- [10] CAN Communication with indoor unit
- [BK] Black
- [BL] Twin Blue
- [BR] Brown
- [RD] Red
- [WH] White
- [YL] Yellow
- [GN/YL] Green/yellow
- [TB] Terminal block
- [F1] Fuse 250V 25A
- [F2] Fuse 250V 1A
- [F3] Fuse 250V 5A
- [F4] Fuse 250V 3.15A
- [AIR] Air temp, sensor
- [PIPE] Pipe temp, sensor
- [SUC] Suction pipe temperature sensor
- [DISP\_I] Discharge pipe temperature sensor
- [DISP\_C] not connected
- [M\_PIPE] Middle pipe temp. sensor
- [P-SENSOR] Pressure sensor

8.3.2 Split 11s...15s

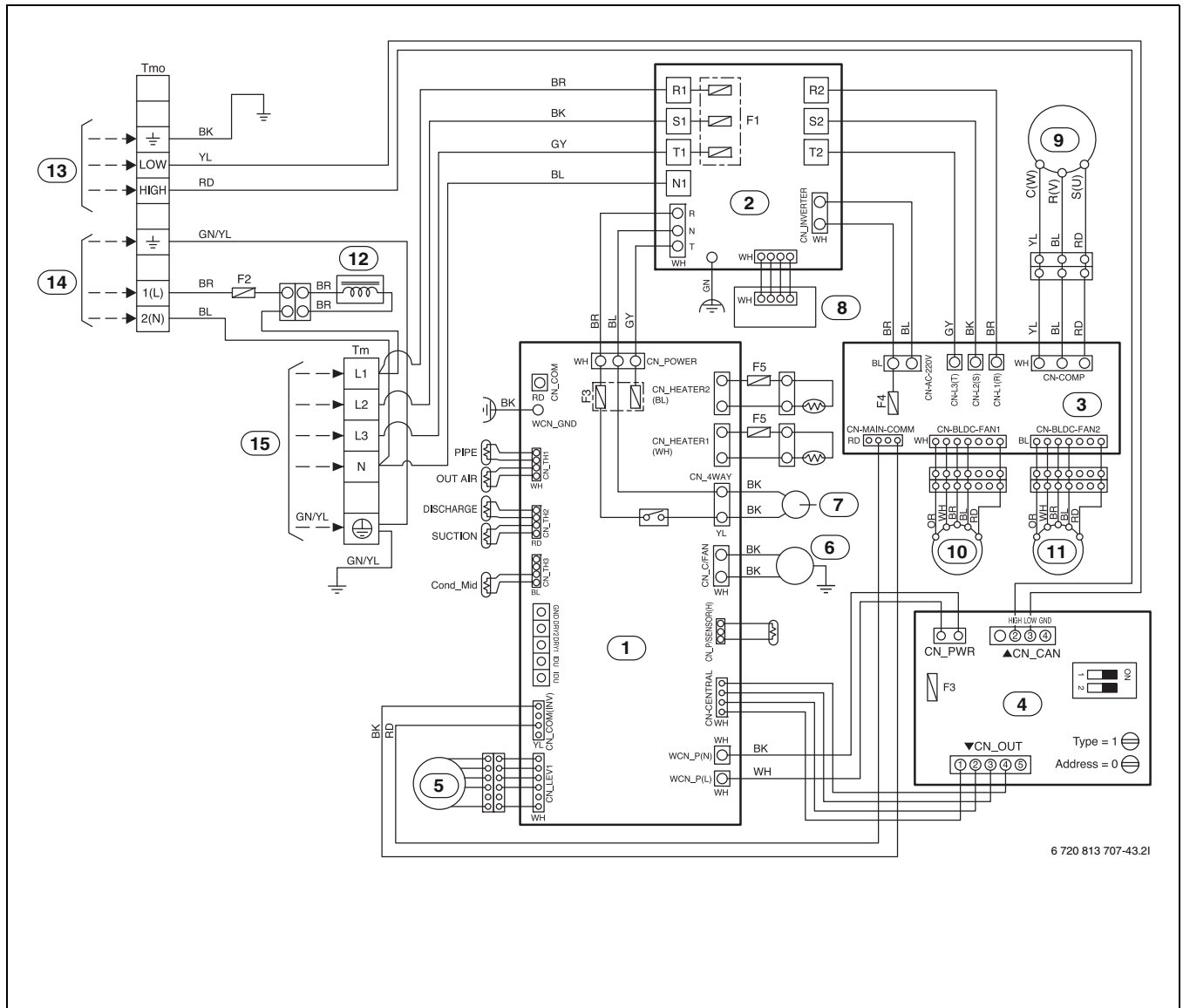


6 720 813 707-42.2i

Fig. 31 Split 11s-15s

- |                                                             |                                      |
|-------------------------------------------------------------|--------------------------------------|
| [1] Main PCB (Inverter)                                     | [GN/YL] Green/yellow                 |
| [2] CAN board                                               | [TB] Terminal block                  |
| [3] Noise filter PCB                                        | [F1] Fuse 250V 35A                   |
| [4] Comp                                                    | [F2] Fuse 250V 5A                    |
| [5] Motor 1 (Upper Fan motor)                               | [F3] Fuse 250V 3.15A                 |
| [6] Motor 2 (Lower Fan motor)                               | [F4] Fuse 250V 1A                    |
| [7] Electronic expansion valve                              | [AIR] Air temp, sensor               |
| [8] 4-way valve                                             | [C_PIPE] Pipe temp, sensor           |
| [9] Trans                                                   | [SUCTION] Suction pipe temp, sensor  |
| [10] Power supply 220-240V ~50Hz                            | [D_PIPE] Discharge pipe temp, sensor |
| [11] External consensate pipe heater (230V 90W) - accessory | [C_MIDDLE] Middle pipe temp, sensor  |
| [12] CAN Communication with indoor unit                     |                                      |
| [BK] Black                                                  |                                      |
| [BL] Twin Blue                                              |                                      |
| [BR] Brown                                                  |                                      |
| [GR] Twin Gray                                              |                                      |
| [RD] Red                                                    |                                      |
| [WH] White                                                  |                                      |
| [YL] Yellow                                                 |                                      |

## 8.3.3 Split 11t...15t

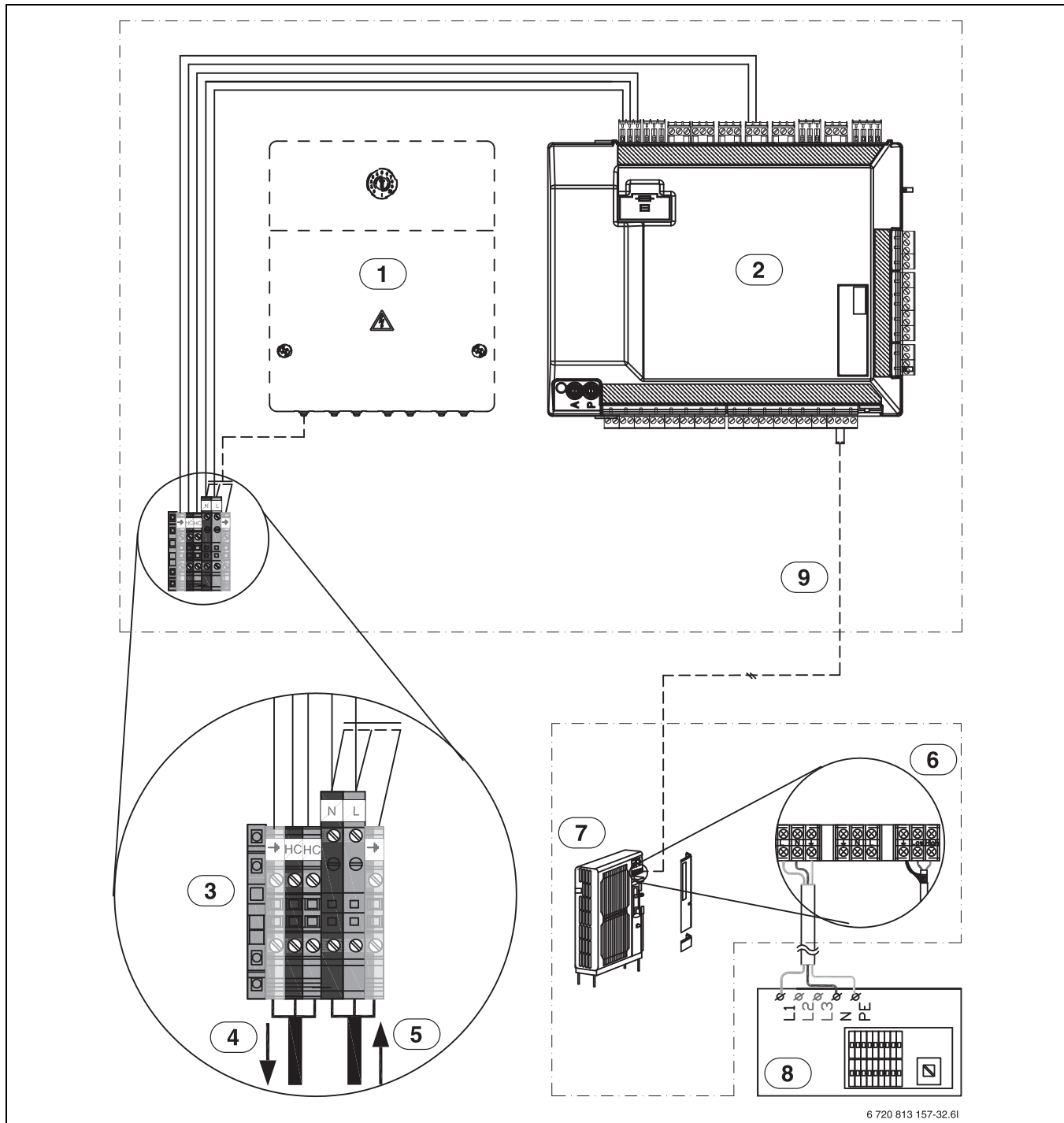


6 720 813 707-43.21

Fig. 32 Split 11t-15t

- |                                                             |                                         |
|-------------------------------------------------------------|-----------------------------------------|
| [1] Main PCB                                                | [Tm] Main terminal block                |
| [2] Noise filter PCB                                        | [Tmo] Terminal block for connecting     |
| [3] Power circuit board                                     | [F1] Fuse 500V 20A                      |
| [4] CAN board                                               | [F1] Fuse 250V 5A                       |
| [5] Electric expansion valve                                | [F2] Fuse 250 3.15A                     |
| [6] Cooling fan                                             | [F3] Fuse 250V 12A                      |
| [7] 4-way valve                                             | [F4] Fuse 250V 1A                       |
| [8] Resistor PCB                                            | [Out air] Air temp, sensor              |
| [9] Comp                                                    | [Pipe] Pipe temp, sensor                |
| [10] Motor 1 (Upper Fan motor)                              | [Suction] Suction pipe temp, sensor     |
| [11] Motor 2 (Lower Fan motor)                              | [Discharge] Discharge pipe temp, sensor |
| [12] Trans                                                  | [Cond_Mid] Middle pipe temp. sensor     |
| [13] CAN Communication with indoor unit                     |                                         |
| [14] External condensate pipe heater (230V 90W) - accessory |                                         |
| [15] Power supply 380-415 V, 3N, ~50 Hz                     |                                         |
| [BK] Black                                                  |                                         |
| [BL] Twin Blue                                              |                                         |
| [BR] Brown                                                  |                                         |
| [OR] ORANGE                                                 |                                         |
| [RD] Red                                                    |                                         |
| [WH] White                                                  |                                         |
| [GY] Twin Gray                                              |                                         |
| [YL] Yellow                                                 |                                         |
| [GN/YL] Green/yellow                                        |                                         |

8.3.4 Indoor unit with mixing valve for external booster heater - Indoor unit with single phase outdoor unit



6 720 813 157-32.61

Fig. 33 Indoor unit with 1-phase outdoor unit

**Solid line = connected at factory**

**Dotted line = connected during installation:**

- [1] EMSmodule (accessory)
- [2] Installation panel
- [3] Indoor unit terminals
- [4] Power supply for heating cable (230 V, ~1N)
- [5] Input voltage 230 V, ~1N
- [6] ODU connecting terminals
- [7] Outdoor unit
- [8] Fuse box in outdoor unit (230V~1N)
- [9] CAN-BUS

8.3.5 Indoor unit with mixing valve for external booster heater - Indoor unit with three phase outdoor unit

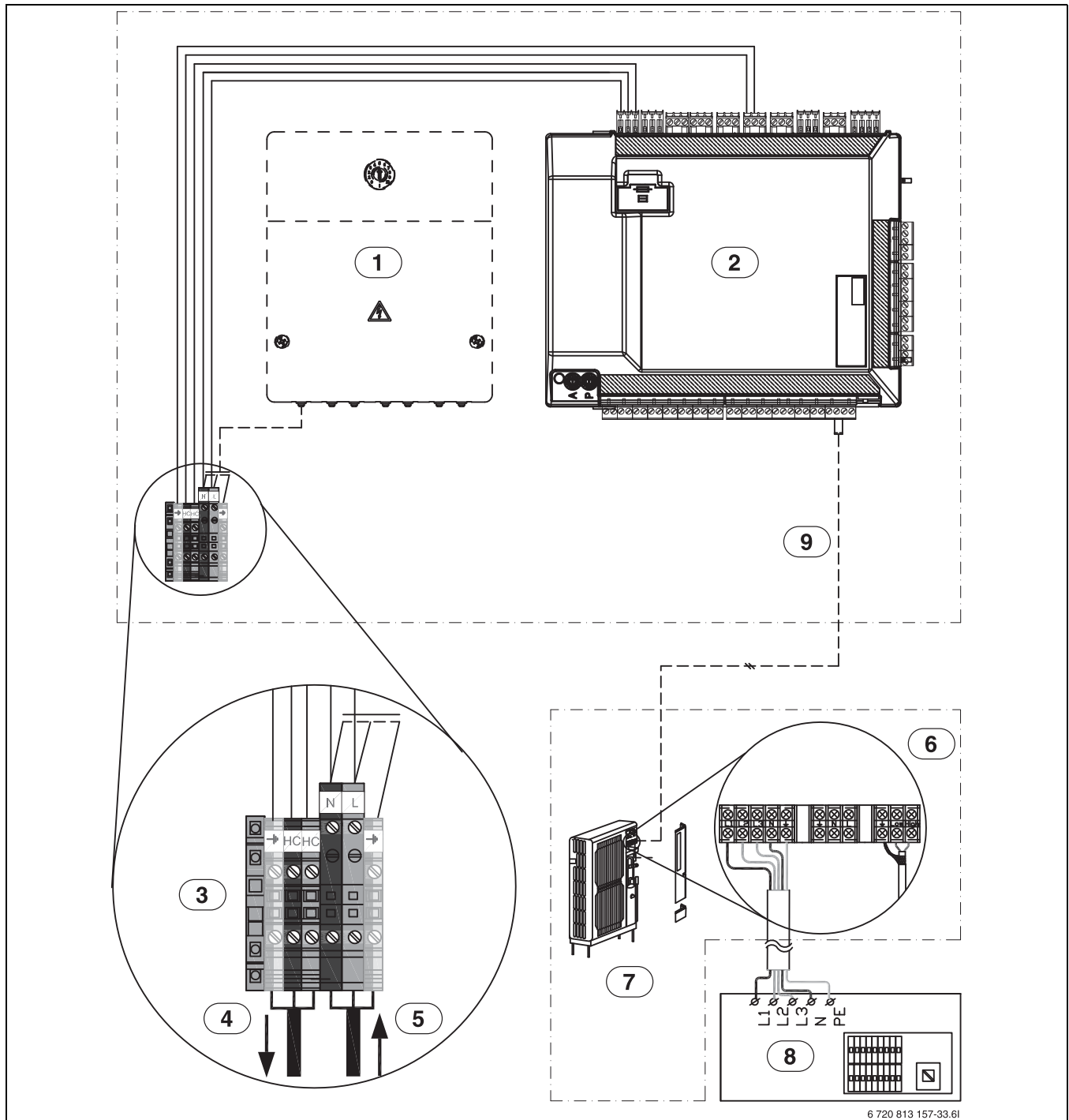


Fig. 34 Indoor unit with 3-phase outdoor unit

**Solid line = connected at factory**

**Dotted line = connected during installation:**

- [1] EMSmodule (accessory)
- [2] Installation panel
- [3] Indoor unit terminals
- [4] Power supply for heating cable (230 V, ~1 N)
- [5] Input voltage 230 V, ~1N
- [6] ODU connecting terminals
- [7] Outdoor unit
- [8] Fuse box in outdoor unit (400V~3N)
- [9] CAN-BUS

8.3.6 Indoor unit with an integrated immersion heater - 400V indoor unit with 230V outdoor unit

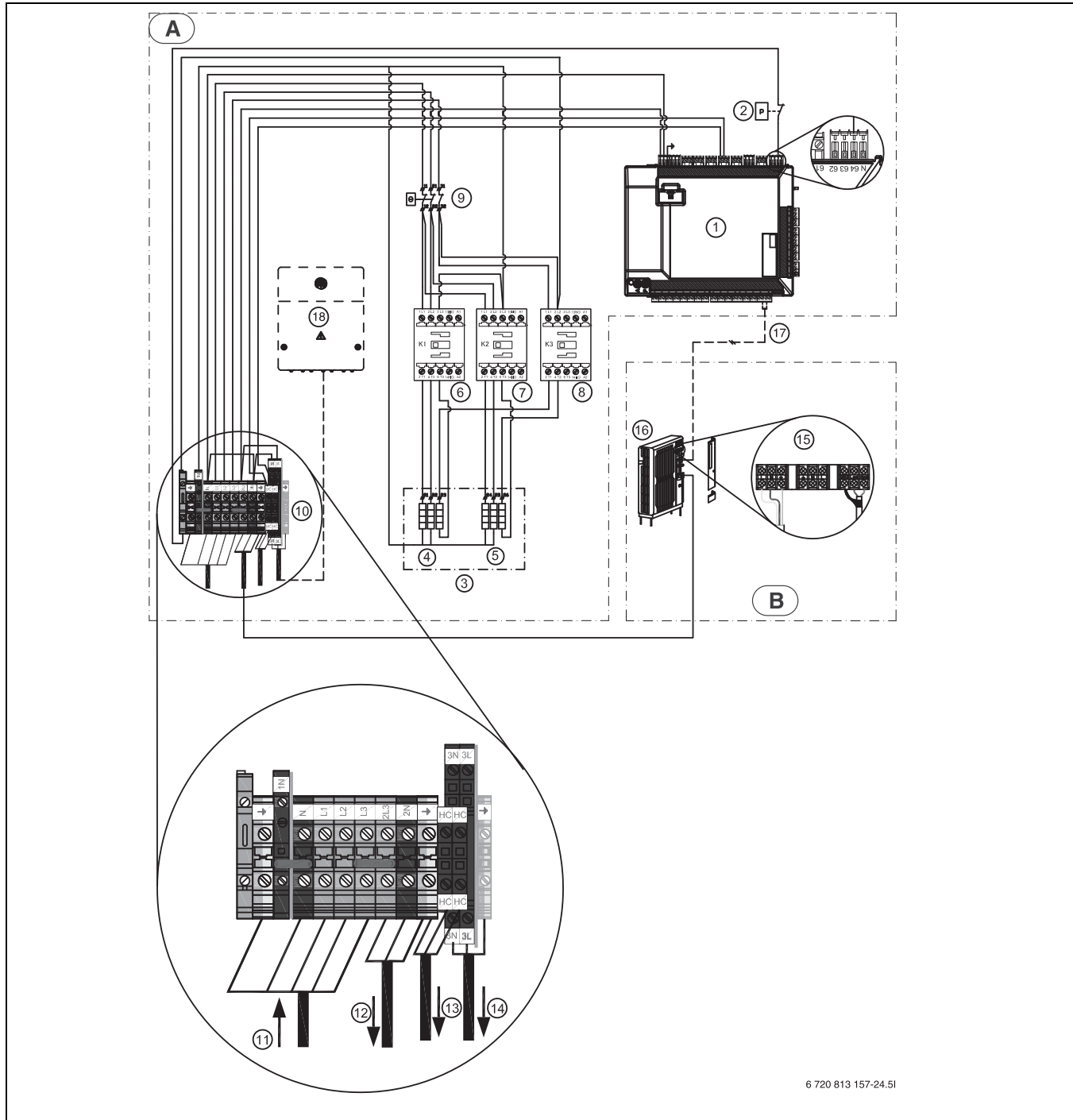


Fig. 35 400V indoor unit with 230V outdoor unit

**Solid line = connected at factory**

**Dotted line = connected during installation:**

- [A] Indoor unit
- [B] Outdoor unit
- [1] Installation panel
- [2] Pressure switch
- [3] 9kW electrical heater
- [4] 3 x 1 kW (3 x 53 Ω)
- [5] 3 x 2 kW (3 x 27 Ω)
- [6] Relay 1 (K1)
- [7] Relay 2 (K2)
- [8] Relay 3 (K3)
- [9] Overheat protection
- [10] Indoor unit terminals
- [11] Power supply, 400 V, ~3N

- [12] Outdoor unit power supply, 230 V, ~1N
- [13] Power supply for heating cable, 230 V, ~1N
- [14] Power supply for heating cable, 230 V, ~1N
- [15] ODU connecting terminals
- [16] Outdoor unit
- [17] Cable 2 x 0.75 mm<sup>2</sup> (earth conductor and CAN-BUS)
- [18] EMS module (accessory)

8.3.7 Indoor unit with an integrated immersion heater - 400V indoor unit with 400V outdoor unit

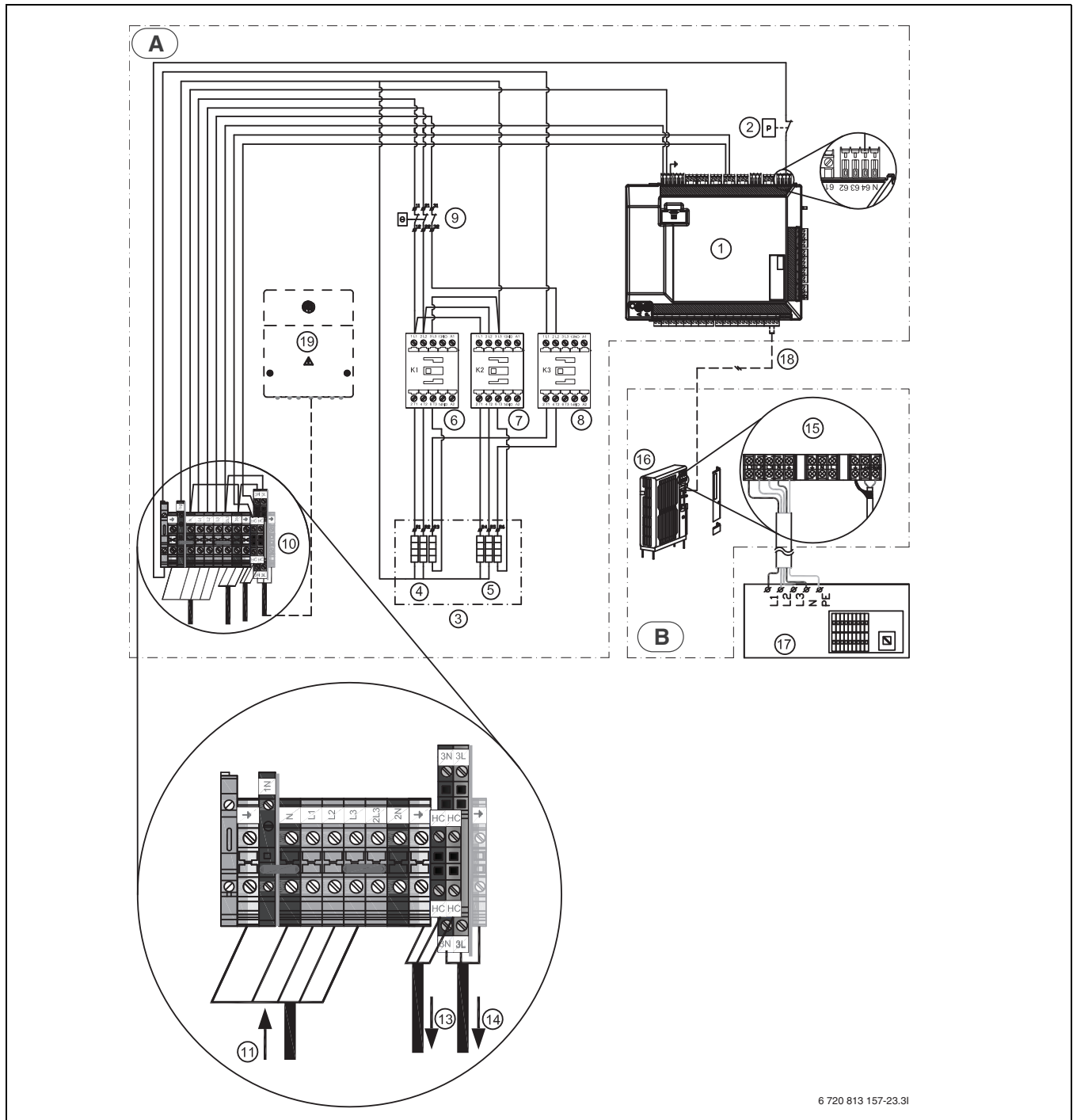


Fig. 36 400V indoor unit with 400V outdoor unit

**Solid line = connected at factory**

**Dotted line = connected during installation:**

- [A] Indoor unit
- [B] Outdoor unit
- [1] Installation panel
- [2] Pressure switch
- [3] 9kW electrical heater
- [4] 3 x 1 kW (3 x 53 Ω)
- [5] 3 x 1 kW (3 x 27 Ω)
- [6] Relay 1 (K1)
- [7] Relay 2 (K2)
- [8] Relay 3 (K3)
- [9] Overheat protection
- [10] Indoor unit terminals
- [11] Power supply, 400 V, ~3N

- [13] Power supply for heating cable, 230 V, ~1N
- [14] Power supply for EMS (accessory), 230 V, ~1N
- [15] ODU connecting terminals
- [16] Outdoor unit
- [17] Fuse box in outdoor unit (400V~3N)
- [18] Cable 2 x 0.75 mm<sup>2</sup> (earth conductor and CAN-BUS)
- [19] EMSmodule (accessory)

## 9 Finalizing

After pipes are connected and electric cables are wired, pipe forming and some tests remain. Especially, careful attention is required while performing leakage test because the leakage of the refrigerant effects degrade of performance directly. Also, it is very hard to find leaked points after all installation procedures are finished.

### 9.1 Taping procedure

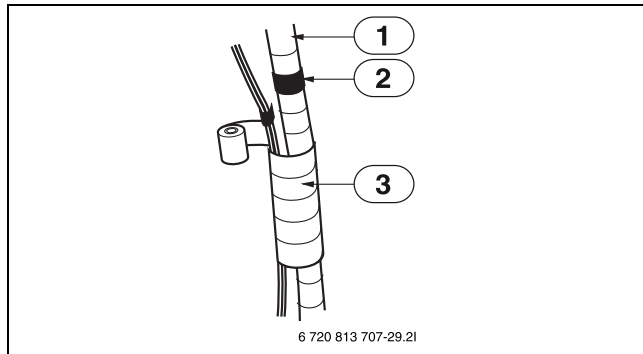


Fig. 37

- [1] Pipe
- [2] Vinyl-tape (narrow)
- [3] With Vinyl-tape (wide) wrap around

- ▶ Tape the pipes, connecting cable and power cable from down to up
  - If taping direction is up to down, rain drop may be sinking into the pipes or cables.
- ▶ Secure the taped pipe along the exterior wall using saddle or equivalent.

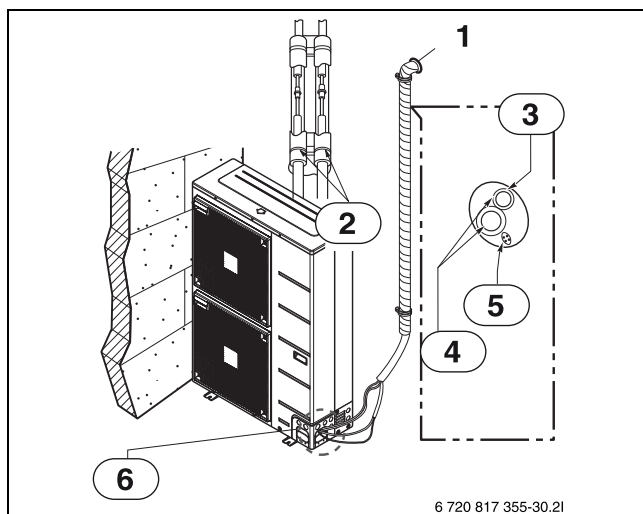


Fig. 38

- [1] Seal a small opening around the pipes with gum type sealant.
- [2] Plastic band
- [3] Tube bundle
- [4] Refrigerant pipes
- [5] Power cable
- [6] Power cable

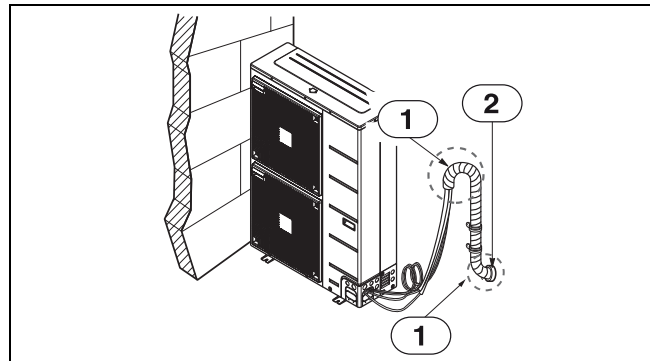


Fig. 39

- [1] Trap
- [2] Seal a small opening around the pipes with gum type sealant.

### 9.2 Leakage test and evacuation

Air and moisture remaining in the refrigerant system have undesirable effects as indicated below

1. Pressure in the system rises.
2. Operating current rises.
3. Cooling (or heating) efficiency drops.
4. Moisture in the refrigerant circuit may freeze and block capillary tubing.
5. Water may lead to corrosion of parts in the refrigeration system. Therefore, the indoor/outdoor unit and connecting tube must be checked for leak tight, and vacuumed to remove non-condensing gas and moisture in the system.

#### 9.2.1 Preparation

- ▶ Check that each tube (both liquid and gas side tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed.
- ▶ Remove the service valve caps from both the gas and the liquid side on the outdoor unit.
- ▶ Check that both the liquid and the gas side service valves on the outdoor unit are kept closed at this stage.

#### 9.2.2 Leakage test

- ▶ Connect the manifold valve (with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.

#### ⚠ CAUTION:

- ▶ Be sure to use a manifold valve for leakage test.
- ▶ Use a stop valve for this purpose if a manifold valve is not available. The "Hi" knob of the manifold valve must always be kept close.
- ▶ Charge the system using dry nitrogen with a maximum pressure of 3.0 MPa. Close the cylinder valve as soon as 3.0 MPa has been reached. Then search for leaks using liquid soap.

#### ⚠ CAUTION:

- ▶ Make sure when performing the tightness test that the top of the cylinder is higher than its bottom to avoid nitrogen entering the refrigerant system in a liquid state. Usually, the cylinder is used in a vertical standing position.
- ▶ Do a leakage test of all joints of the tubing (both indoor and outdoor) and both gas and liquid side service valves. Bubbles indicate a leak. Be sure to wipe off the soap with a clean cloth.
- ▶ Relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder after the system is found to be free of leaks. When the system pressure is reduced to normal, disconnect the hose from the cylinder.

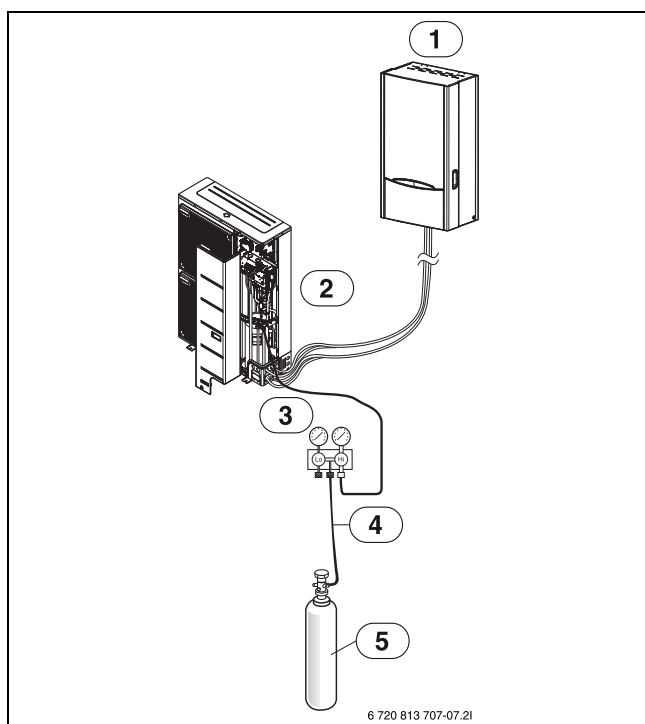


Fig. 40

- [1] Indoor unit
- [2] Outdoor unit
- [3] Manifold valve
- [4] Charge hose
- [5] Nitrogen gas cylinder (in vertical standing position)

### 9.2.3 Evacuation

- ▶ Connect the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit.
  - Confirm that the “Lo and Hi” knob of the manifold valve is open. Then, run the vacuum pump.
  - The operation time for evacuation varies with tubing length and capacity of the pump. Operate the pump until you have reached 0.5 torr/67 pascals or less.
- ▶ Close the “Lo and Hi” knob of the manifold valve and stop the vacuum pump when the desired vacuum is reached.

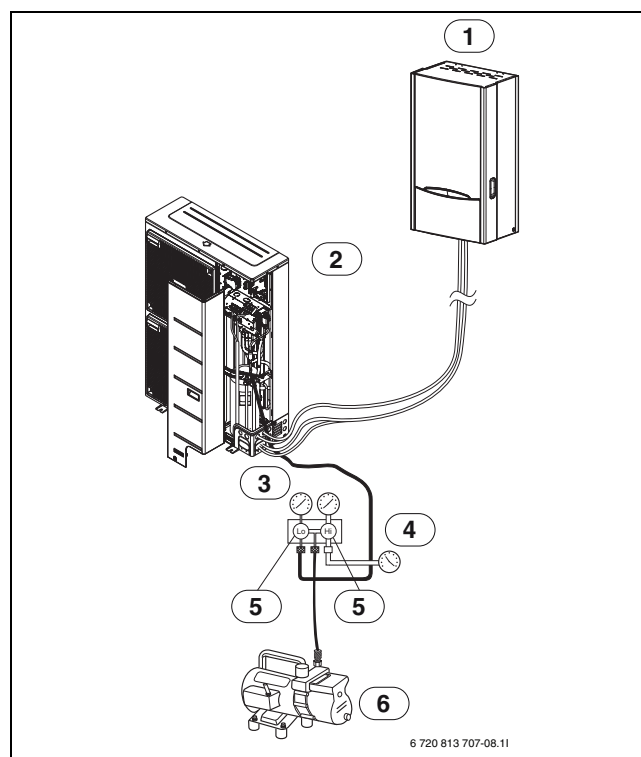


Fig. 41

- [1] Indoor unit
- [2] Outdoor unit
- [3] Manifold valve
- [4] Manometer
- [5] Open
- [6] Vacuum

### 9.2.4 Finishing the job

- ▶ Turn the valve stem of liquid side valve counter-clockwise to fully open the valve with a service valve wrench.
- ▶ Turn the valve stem of gas side valve counter-clockwise to fully open the valve.
- ▶ Loosen the charge hose connected to the gas side service port slightly to release the pressure. Then remove the hose.
- ▶ Replace the flare nut and its bonnet on the gas side service port and fasten the flare nut securely with an adjustable wrench. This process is very important to prevent leakage from the system.
- ▶ Replace the valve caps at both gas and liquid side service valves and fasten them tight. This completes air purging with a vacuum pump. The heat pump is now ready for test run.

## 10 Environmental protection and disposal

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

Where packaging is concerned, we participate in country-specific recycling processes that ensure optimum recycling.

All of our packaging materials are environmentally compatible and can be recycled.

### Used appliances

Used appliances contain valuable materials that can be recycled.

The various assemblies can be easily dismantled. Synthetic materials are marked accordingly. Assemblies can therefore be sorted by composition and passed on for recycling or disposal.

### Old electrical and electronic appliances



This symbol means that the product must not be disposed of with other waste, and instead must be taken to the waste collection points for treatment, collection, recycling and disposal.

The symbol is valid in countries where waste electrical and electronic equipment regulations apply, e.g. "European Directive 2012/19/EC on old electronic and electrical appliances". These regulations define the framework for the return and recycling of old electronic appliances that apply in each country.

As electronic devices may contain hazardous substances, it needs to be recycled responsibly in order to minimize any potential harm to the environment and human health. Furthermore, recycling of electronic scrap helps preserve natural resources.

For additional information on the environmentally compatible disposal of old electrical and electronic appliances, please contact the relevant local authorities, your household waste disposal service or the retailer where you purchased the product.

You can find more information here:  
[www.weee.bosch-thermotechnology.com/](http://www.weee.bosch-thermotechnology.com/)

## 11 Maintenance



### DANGER:

#### Risk of electric shock!

The components in the outdoor unit conduct electricity. The capacitor in the outdoor unit must be discharged after disconnecting it from the power.

- ▶ Switch off the master switch.
- ▶ Wait at least five minutes before any electrical work.



### DANGER:

#### Risk of poisonous gas leakage!

The refrigerant circuit contains substances that can be transformed into poisonous gas if they come into contact with air or open fire. Even small concentrations of these gases can cause respiratory arrest.

- ▶ The room must immediately be evacuated and carefully aired out in case of refrigerant circuit leakage.

### NOTICE:

#### Risk of deformation due to heat!

The outdoor unit insulation material (EPP) will deform if it is exposed to high temperatures

- ▶ Remove as much of the insulation (EPP) as possible prior to any soldering work.
- ▶ Use flame retardant cloth or wet cloth to protect the insulation material while performing soldering work on the indoor unit.



Only a refrigerant expert can perform work on the refrigerant circuit.

- ▶ 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.

#### Function check

- ▶ Function check (→ indoor unit installation instructions).

#### Electric cabling

- ▶ Check the cable for mechanical damage. Exchange any damage cable.

#### Temperature sensor measured values



Please make sure that the right sensor (→ indoor unit installation instructions) is used. Usage of sensors with other characteristics will lead to problems as the controls will get the wrong temperature. Example of problems could be personal injuries like scalding, damage of property due to high or low temperature, low comfort is also a possible problem.

### 11.1 Evaporator

If there is dirt or dust on the outside of the evaporator or the aluminium fins, it must be removed.

**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.



Using the wrong cleaning product may damage the installation!

- ▶ Do not use acid or chlorine based products since they contain abrasives.
- ▶ Do not use corrosive alkaline cleaning products, e.g. sodium hydroxide.

To clean the evaporator:

- ▶ Turn off the outdoor unit using the main switch (ON/OFF).
- ▶ Spray the fins with a liquid dish soap solution.
- ▶ Rinse away the soap with water.



In some regions, it is prohibited to let dish soap drain into the ground. Of the condensation water pipe drains into a gravel bed:

- ▶ Remove the flexible condensation water pipe from the drain before cleaning.
- ▶ Drain the dish soap into a container.
- ▶ Reconnect the condensation water pipe after cleaning.

## 11.2 Snow and ice

In some geographical regions or during periods of heavy snow, snow can get stuck on the back and the roof of the outdoor unit. Since it leads to icing, the snow should be removed.

- ▶ Carefully brush the snow off the fins.
- ▶ Protecting the outdoor unit from snow.

## 11.3 Drawing the refrigerant back into the outdoor unit

The refrigerant can be drawn from the indoor unit and the refrigerant pipes back into the outdoor unit:

- ▶ Remove the front right-hand cover of the outdoor unit to obtain unrestricted access to the valves for the gaseous refrigerant and liquid pipe.
- ▶ Ensure that the circulation pump in the indoor unit is running with full speed during that time (so that the plate heat exchanger does not freeze). This can be done by unplugging the PWM control from the heating pump in the indoor unit (when the power supply is switched on). It then runs at 100 percent output.
- ▶ The outdoor unit needs to be switched to cooling mode (by setting it to Always cooling in the service menu, and increasing the lower limit temperature for cooling, the restarting).
- ▶ The outdoor unit is in cooling mode.
- ▶ Close the liquid line valve (3/8") on the outdoor unit and the compressor will now draw the refrigerant back to the outdoor unit!
- ▶ Keep the suitable (hexagon socket screw) key ready in order to close the valve of the gaseous refrigerant line (5/8") at the outdoor unit.
- ▶ As soon as the compressor switches off (approx. 2-3 minutes after the liquid valve closes) - close the valve of the gaseous refrigerant line IMMEDIATELY!
- ▶ The refrigerant is now in the outdoor unit.



A pump-down is not permitted if the refrigerant has been topped up due to a refrigerant pipe length of > 7.5m.

## 11.4 Information on refrigerant

This device **contains fluorinated greenhouse gases** as a refrigerant. The refrigerant indication which corresponds to EU regulation no. 517/2014 for fluorinated greenhouse gases is found in the operating manual for the device.



Notice to installer: In the event that the filter dryer accessory is installed, use the total volume specified in the heat pump's type plate.

