

Installation Guide

Twin Kit

086L1370

Danfoss A/S is not liable or bound by warranty if these instructions are not adhered to during installation or service.

The English language is used for the original instructions.
Other languages are a translation of the original instructions.
(Directive 2006/42/EC)

© Copyright Danfoss A/S

Table of Contents

1	General	4
	1.1 Safety precautions	4
	1.2 Introduction	5
	1.3 Installation overview	5
	1.4 Positioning of Twin Kit components	6
2	Preparations	9
	2.1 Installation of heat pump with control unit and outdoor unit (Master)	9
	2.2 Installation of additional outdoor unit (Slave)	9
	2.3 Installation of Expansion card and terminal block with cable harness	10
3	Installation of Twin kit	11
4	Start up	22
5	Appendix System solution	25
	5.1 Electrical connections	26

1 General

These instructions describe the Twin Kit installation.

A Twin Kit unit means that an existing heat pump (Master), consisting of an external unit and an internal unit, can have an external unit (Slave) added. The installation includes the pipes and electrical installation, plus necessary settings in the control system.

References to menu options in the control unit are in upper case, e.g. INFORMATION ->OPERAT. -> AUTO. References to other documents and figures are marked in italics, e.g. *Installation Guide*.

1.1 Safety precautions

Danger



Hazardous electrical voltage! The connectors are live and can be highly dangerous due to the risk of electric shock. All power supplies must be isolated before electrical installation is started.

Warning



Risk of personal injury! Children are not permitted to play with the product.

Warning



Electrical installation may only be carried out by an authorised electrician and must follow applicable local and national regulations.

Warning



The electrical installation must be carried out using permanently routed cables. It must be possible to isolate the power supply using a multi-pole circuit breaker with a minimum contact gap of 3 mm.

Caution



This product is not intended for persons (including children) with reduced physical, sensory or psychological capacity, or who do not have knowledge or experience, unless supervised or they have received instructions on how the apparatus functions from a safety qualified person.

Caution



Scrapping must be carried out in accordance with applicable local rules and regulations.

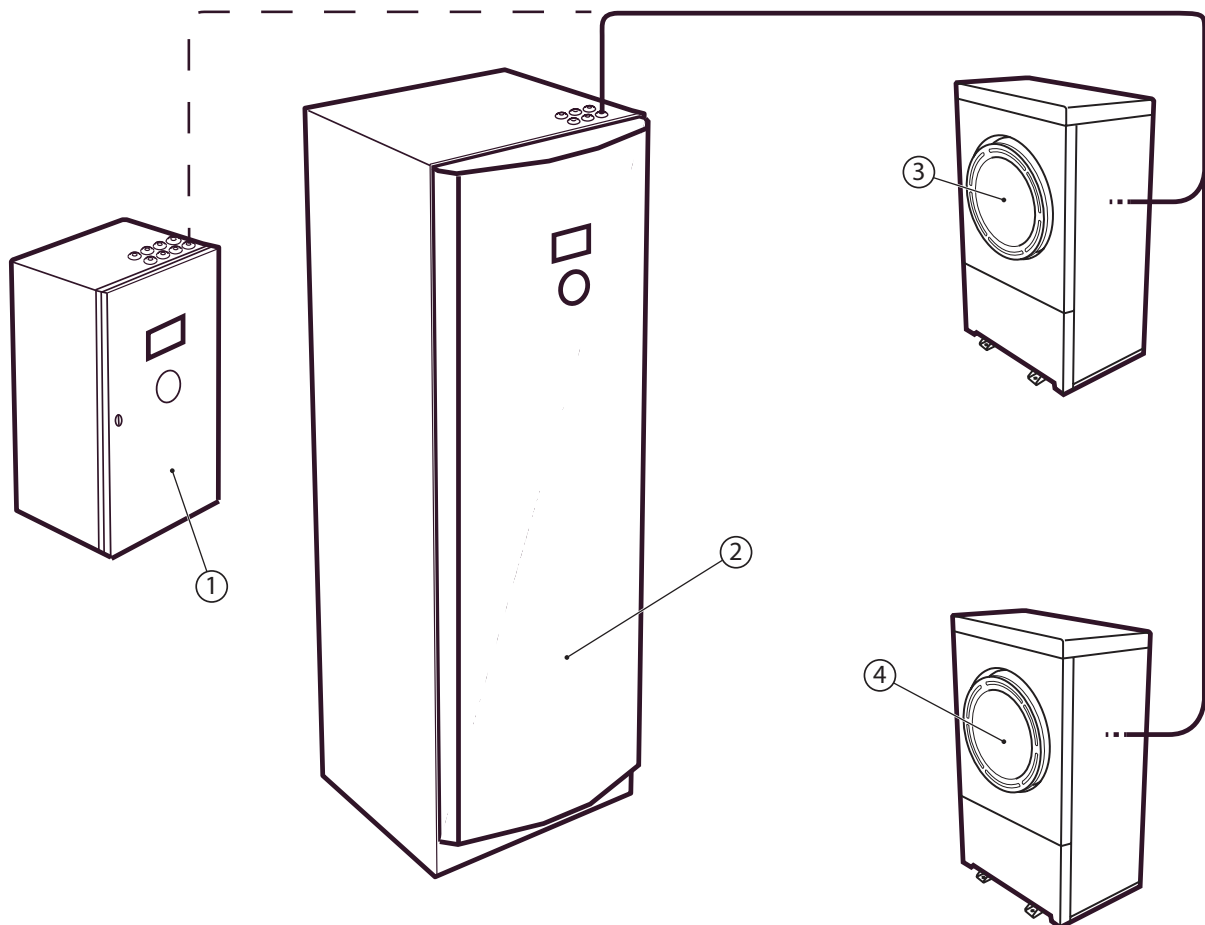
1.2 Introduction

When a Twin Kit is used in a heating system, two outdoor units (Master and Slave) are communicating with each other and sharing the same control unit (installed indoors). The software in the control unit is prepared for master/slave operation and is automatically activated during the commissioning and start up procedure.

The power supply is connected individually to each outdoor unit.

1.3 Installation overview

An overview of the installation is shown in the figure below:



Pos.	Description
1, 2	Heat pump models
3	Outdoor unit (Master)
4	Outdoor unit (Slave)

1.4 Positioning of Twin Kit components

1.4.1 Components in control unit

The positions of the Twin Kit components in the control unit are shown in the figure below:

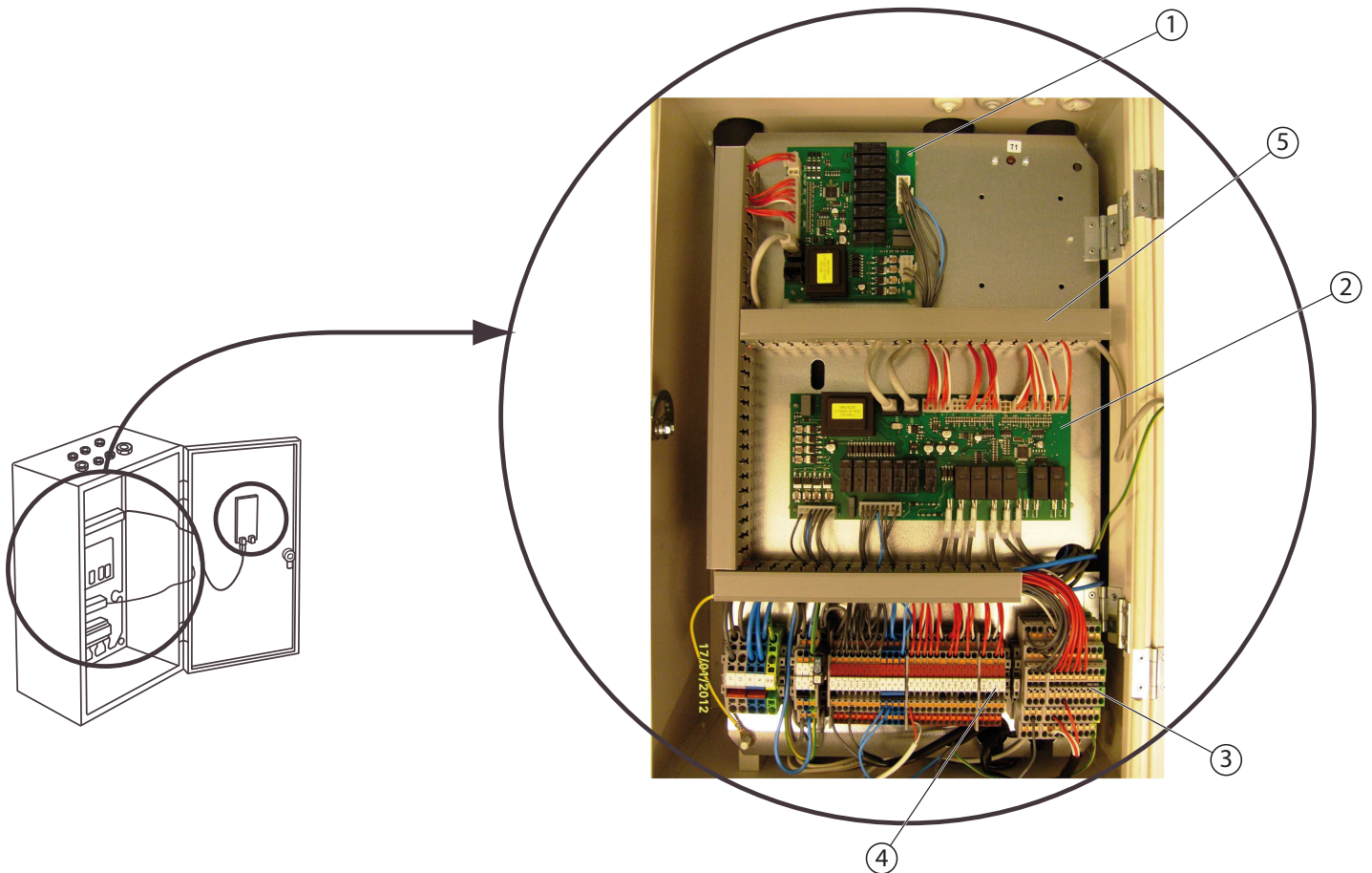


Fig. 1: Components in control unit

Pos.	Description
1	Expansion card
2	HUB card
3	Expansion block
4	X2 terminal block
5	Cover for cable duct

1.4.2 Components in electrical cabinet

The positions of the Twin Kit components in the electrical cabinet are shown in the figure below:

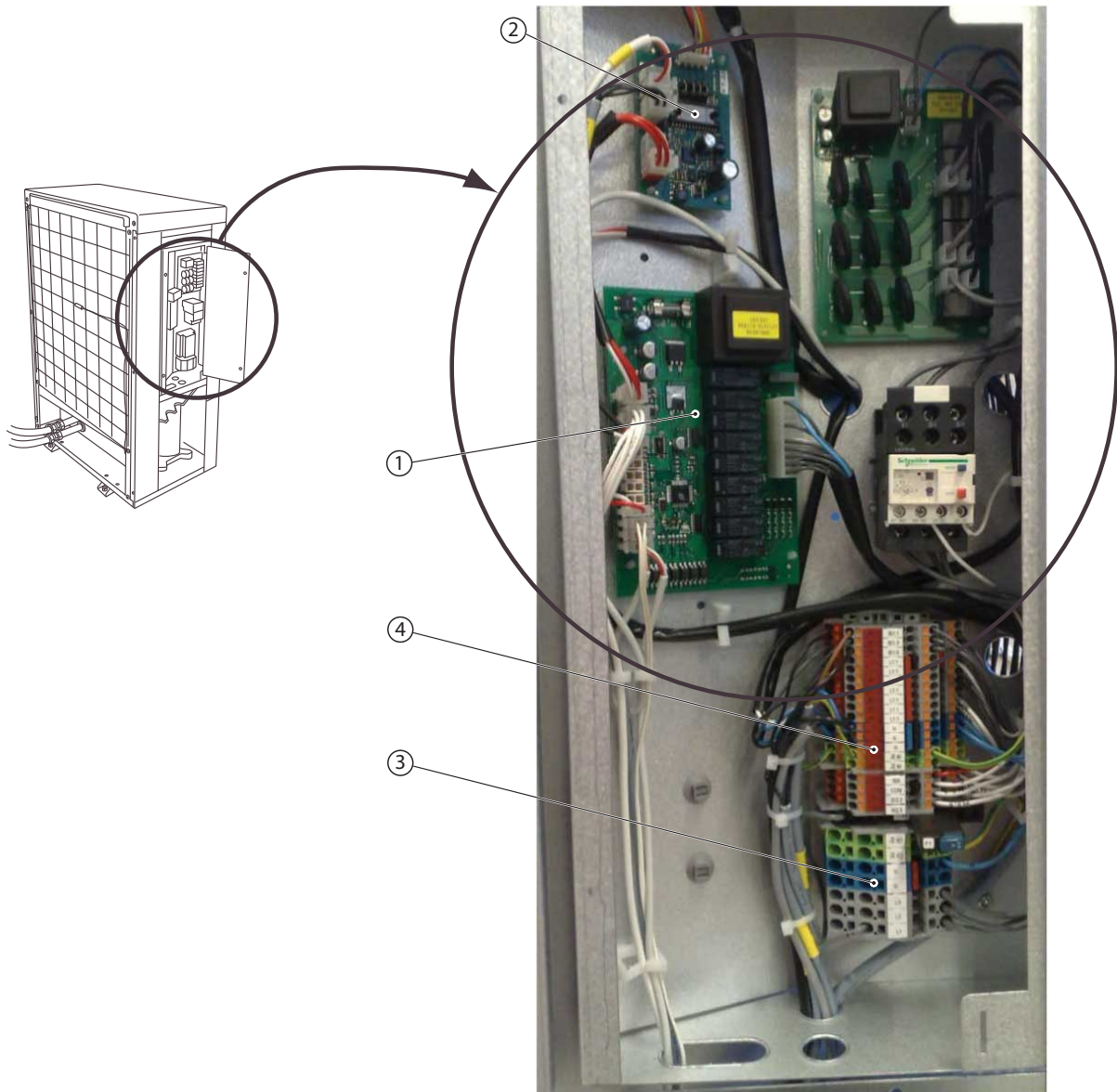
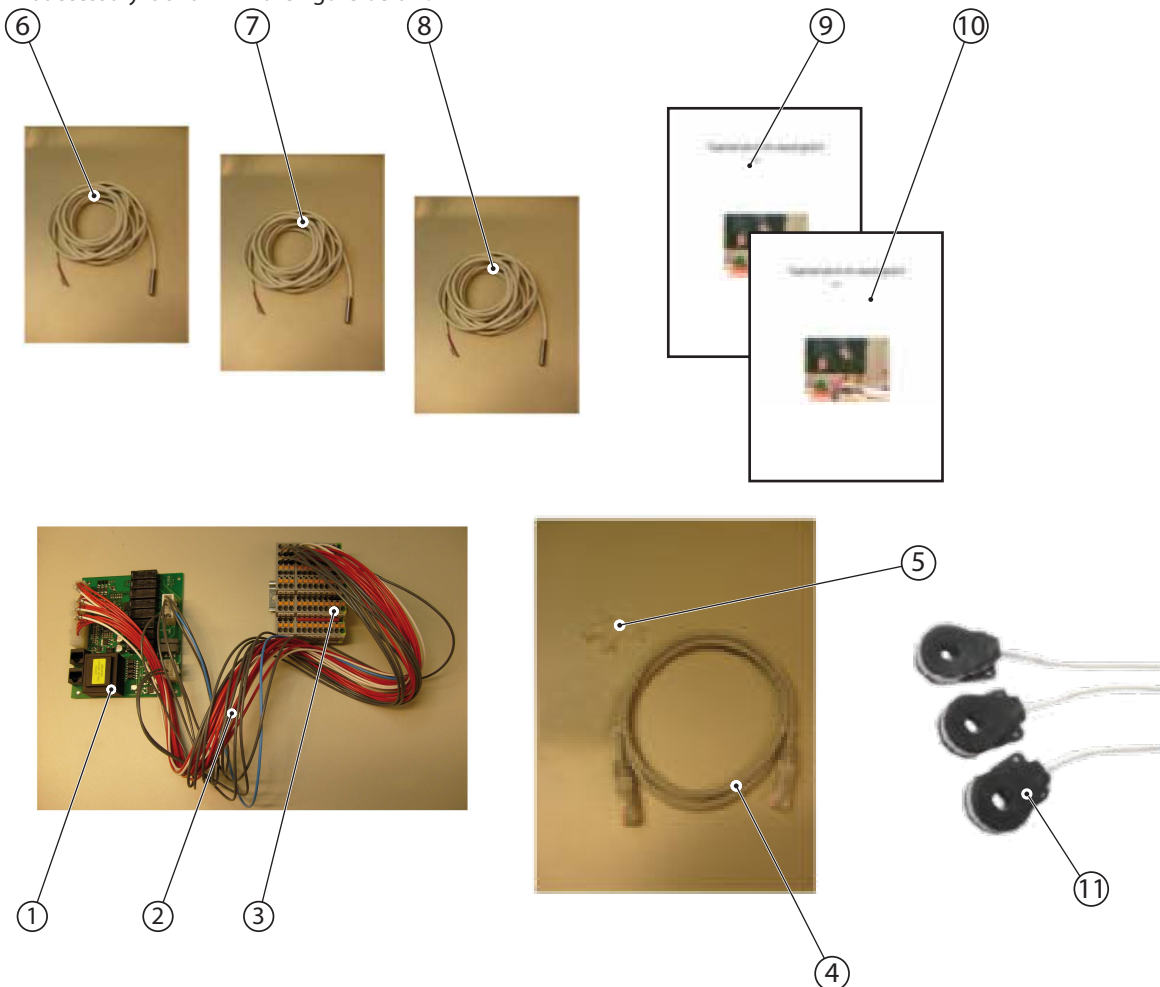


Fig. 2: Components in the electrical cabinet

Pos.	Description
1	HP card
2	EEV card
3	Power terminal block
4	X1 Terminal block

1.4.3 Delivery check

The Twin kit accessory is shown in the figure below:



Accessories for the Twin Kit installation are supplied in an enclosed cardboard box. Check that the contents correspond to the following table:

Pos.	Part No.	Quantity	Description
1	086U9240	1	Expansion card
2	086L0766	1	Cable harness, expansion card
3	086U9977	1	Block, expansion card
4	086U8427	1	RJ-45 communication cable, 1,000 mm
5	086U0086	4	Circuit board support
6	086U9709	1	Supply line sensor 110
7	086U9710	1	Return line sensor 111
8	086U2672	1	System supply line sensor
9	086L0918	1	Installation instructions for expansion card and terminal block
10	086L2902	1	These installation instructions
11	086L2793	3	Current limiter

2 Preparations

Before starting the Twin-Kit installation, the following steps must be taken:

1. Installation of control unit (1, or 2) and outdoor unit (Master) (3).
2. Installation of additional outdoor unit (Slave) (4).
3. Installation of expansion card and terminal block, with cable harness.

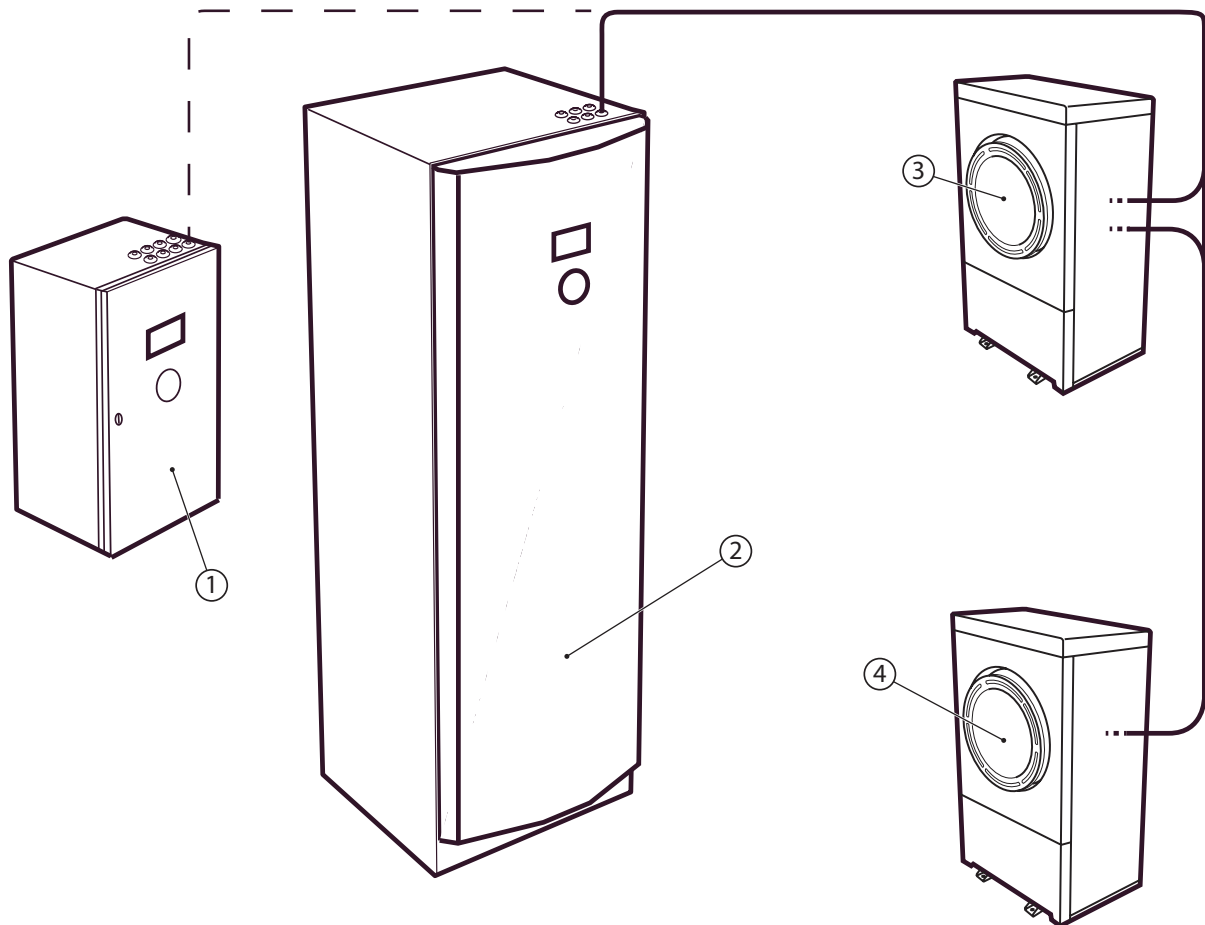


Fig. 3: Twin-Kit installation with control unit and outdoor units

2.1 Installation of heat pump with control unit and outdoor unit (Master)

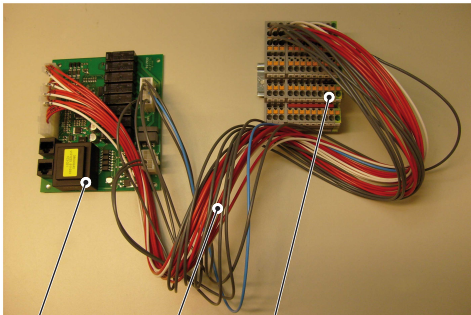
Carry out the normal installation as outlined in the heat pump *Installation guide*.

2.2 Installation of additional outdoor unit (Slave)

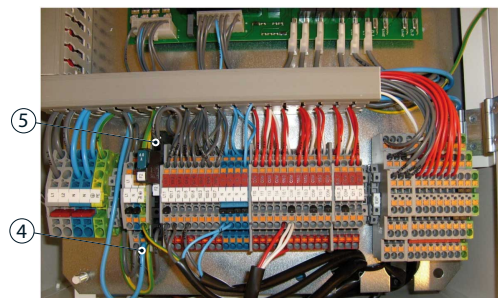
Position the additional outdoor unit in accordance with the Transport, unpacking and positioning chapter in the *Installation guide*.

Connect the supply and return lines in accordance with *System solutions appendix*.

2.3 Installation of Expansion card and terminal block with cable harness



Install the expansion card and terminal block with cable harness in accordance with the attached *Installation of expansion card and terminal block* instructions. See *position 1, 2, and 3*.



Connect the loose cable to N, see *position 4* and the loose grey cable as shown in *position 5*.

3 Installation of Twin kit

The installation consists of the following procedures:

1. Electrical Installation
2. Commissioning
3. Settings in the control system

3.1 Electrical Installation

Electrical installation is carried out in accordance with the following activities:

1. Control unit
2. Outdoor unit's electrical cabinet (Slave)
3. RJ-45 communication cable
4. Communication cable between control unit and outdoor units (Master and Slave)

Control unit

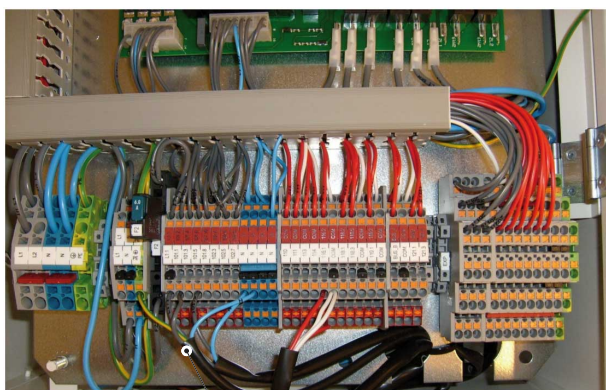
See Figure 1 on page 6 for the location of the components in the control unit.

Electrical connections in control unit

Circulation pump



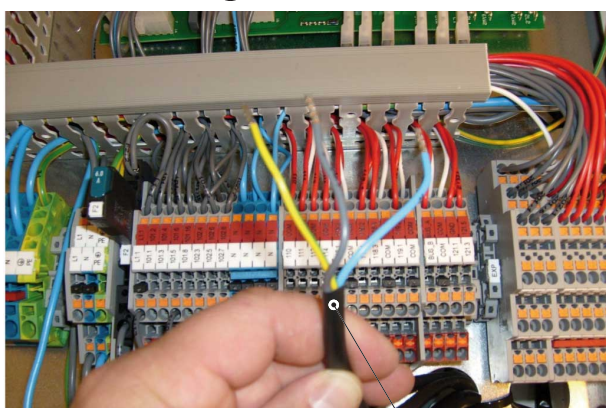
Only applicable for control units with built-in circulation pump.



①

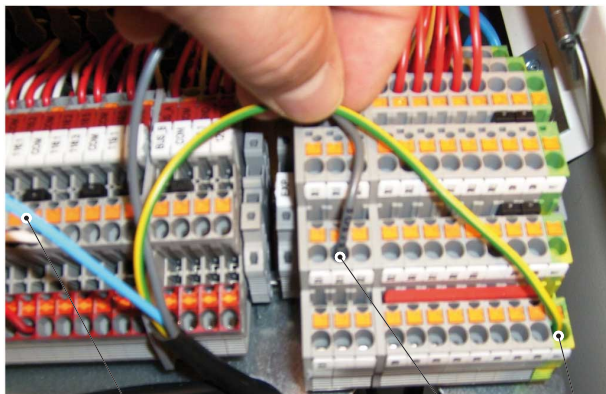
1. Disconnect the circulation pump from the terminal block by loosening the contacts from the connections marked 101.1, N and PE.

See position 1.



②

2. Peel off the cable sheath about 120 mm. See position 2.



③

④

⑤

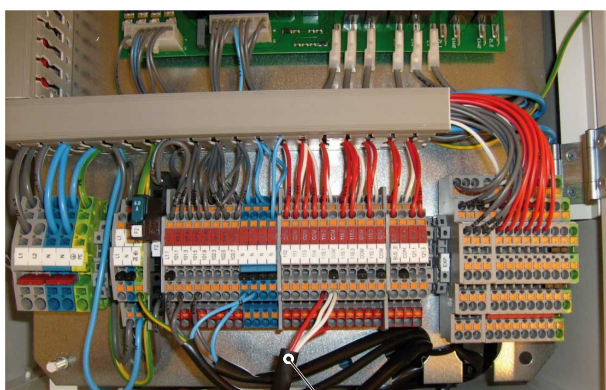
3. Reconnect the circulation pump by connecting the wires as follows:

- Wires which were connected to the X2 terminal block, marked 101.1, are connected to the expansion board, marked 201.11. See position 4.
- Wires which were connected to the X2 terminal block, marked N, are connected to the X2 terminal block, marked N, (same connection as before). See position 3.
- Wires which were connected to the X2 terminal block, marked PE, are connected to the expansion board, marked PE. See position 5.

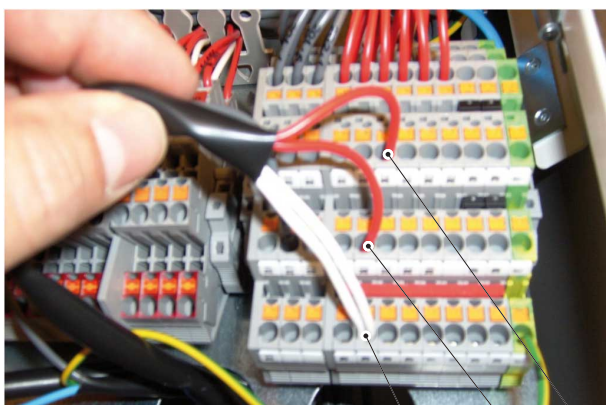
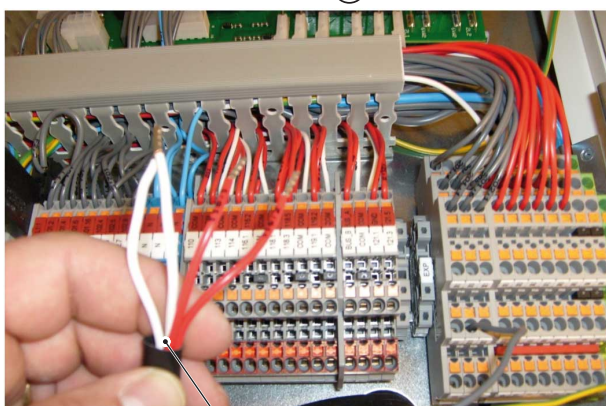
0-10V and alarm



Only applicable for control units with built-in circulation pump.



1. Disconnect the 0-10 V and alarm from the terminal block by loosening the wires from the connections marked 116.1, 116.2 and COM. See position 1.

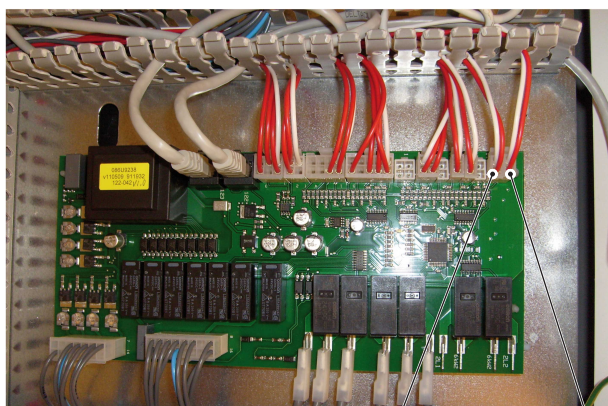


3. Reconnect the 0-10 V and alarm to the expansion board by connecting the wires as follows:
 - Wires which were connected to the X2 terminal block, marked 116.1, are connected to the expansion board, marked 206.1. See position 3.
 - Wires which were connected to the X2 terminal block, marked 116.2, are connected to the expansion board, marked 206.2. See position 4.
 - Wires which were connected to the X2 terminal block, marked COM, are connected to the expansion board, marked COM. See position 2.

Slave sensor

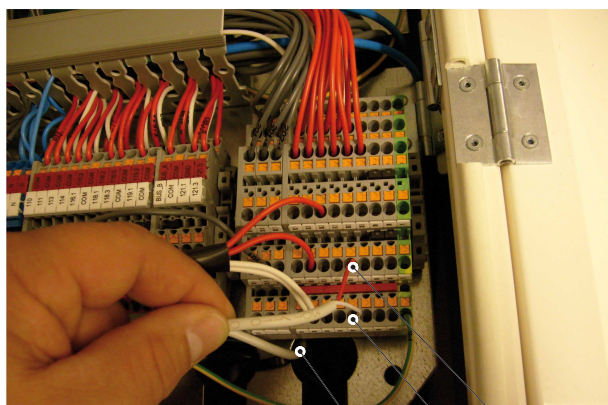


Not applicable for control units without built-in circulation pump.



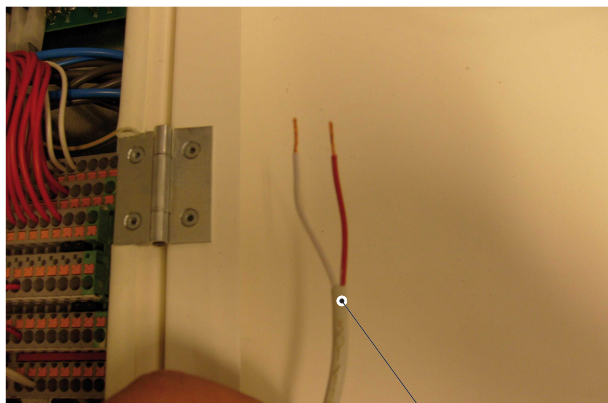
② ①

1. Disconnect the supply line sensor's Molex contact on the HUB card from the connection marked 110. *See position 1.*
2. For control units with built-in circulation pump, water heater, reversing valve hot water, and with immersion heater, the Molex contact which is connected to the connection, marked 111, must be disconnected. *See position 2.*



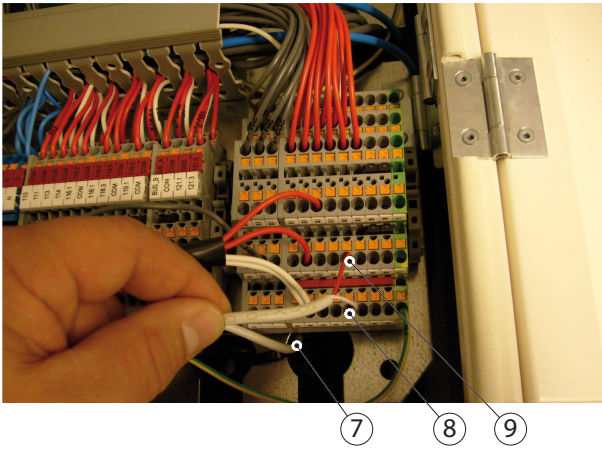
③ ④ ⑤

3. Loosen the cables by cutting away the cable tie so that the cables can be pulled back. Then run them to the lower corner of the assembly plate under the expansion board. *See position 3.*



⑥

4. Cut off the connector house and peel off the wire insulation. *See position 6.*

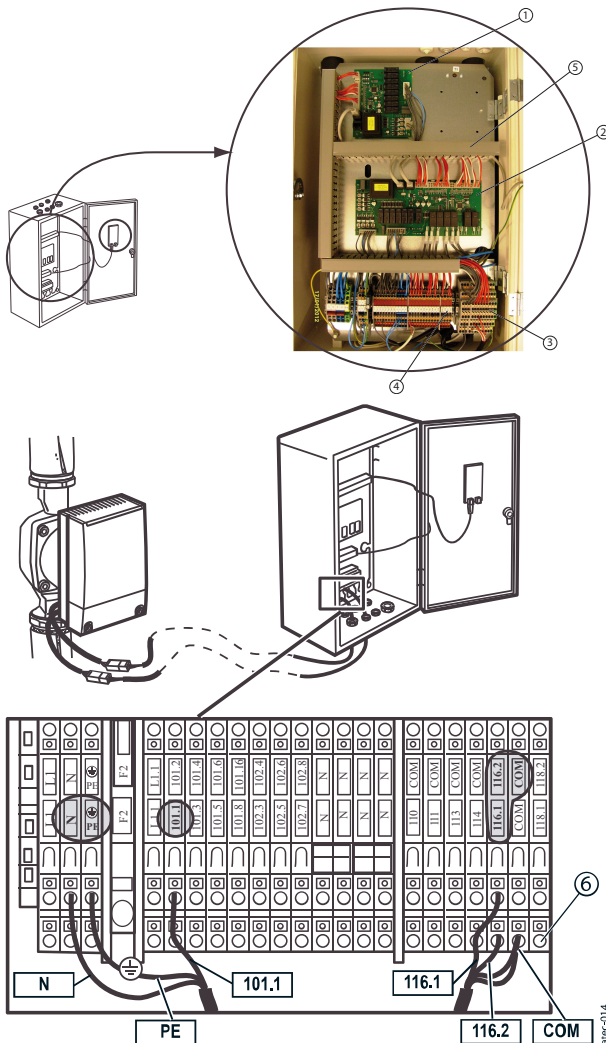


5. Connect the supply line sensor wire to the expansion card connections as follows:
 - Connect the red wire to the expansion board connection marked 208.4. *See position 9.*
 - Connect the white wire to the expansion board connection marked COM. *See position 8.*
6. For control units with built-in circulation pump, water heater, reversing valve hot water, and with immersion heater, the return line sensor wire must be connected to the expansion board connections marked 208.5 and COM.

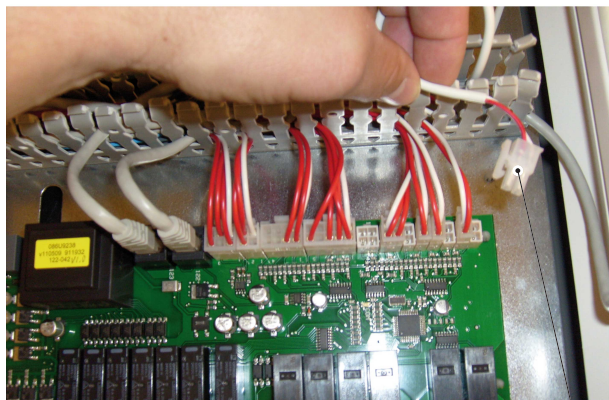
Master sensor



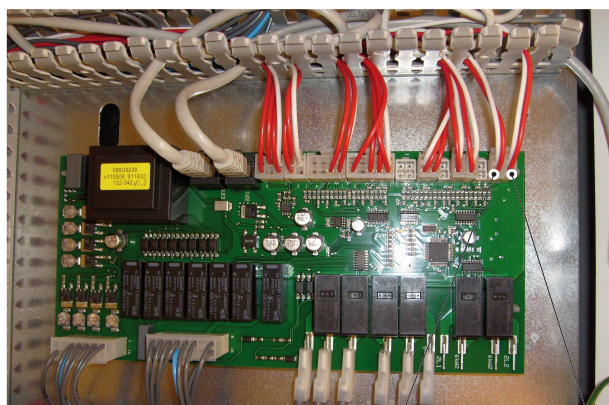
Not applicable for control units without built-in circulation pump.



1. Remove the cover on the cable duct located above the HUB card. *See position 5.*
2. Connect master circulation pump to connector marked 116.1, 116.2 and COM. *See position 6.*

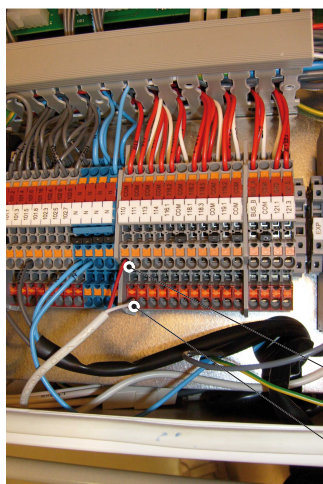


7



9

8



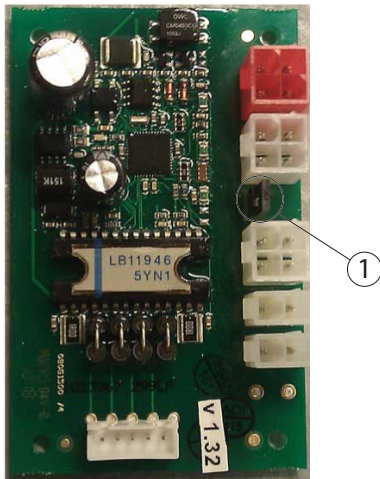
11

10

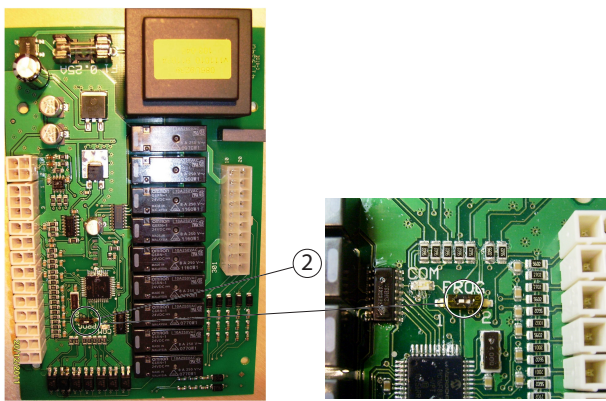
3. Take out the supply line cable (with the mounted Molex connector marked 110,1 and 110,2) from the cable duct. *See position 7.*
4. For control units with built-in circulation pump, water heater, reversing valve hot water and with immersion heater take out the return line cable (with mounted Molex connector marked 111,1 and 111,2) from cable duct.
5. Connect the supply line cables (with mounted Molex connectors) to the HUB card connection marked 110. *See position 8*
6. For control units with built-in circulation pump, water heater, reversing valve hot water and with immersion heater the return line cable (with mounted Molex connectors), must be connected to the HUB card connection marked 111
7. Pick up the enclosed supply line sensor (marked 110) from the Twin Kit
8. Connect the supplied supply line sensor as follows:
 - Connect the red wire to the X2 terminal block connection marked 110. *See position 11.*
 - Connect the white wire to the X2 terminal block X2 marked COM. *See position 10.*
9. Connect the supplied return line sensor as follows:
 - Connect the red wire to the X2 terminal block connection marked 111.
 - Connect the white wire to the X2 terminal block connection marked COM.
10. Pick up the enclosed system supply line sensor from the Twin Kit.
11. Connect the supplied system supply line sensor as follows:
 - Connect the red wire to the X2 terminal block connection marked 118.2.
 - Connect the white wire to the X2 terminal block connection marked COM.

Electrical cabinet for the outdoor unit (Slave)

See figure 2 on page 7 for the unit's position in the outdoor unit's electrical cabinet.



1. Remove the jumper from the EEV card. *See position 1.*



2. Move the dipswitch on the HP card from position 1 to position 2. *See position 1.*

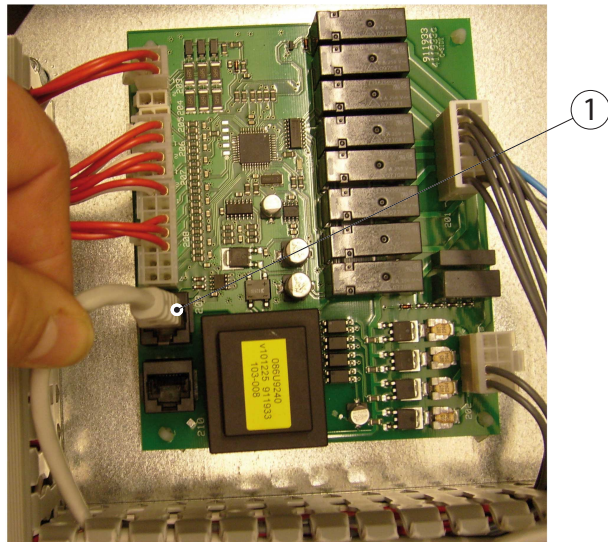
Caution



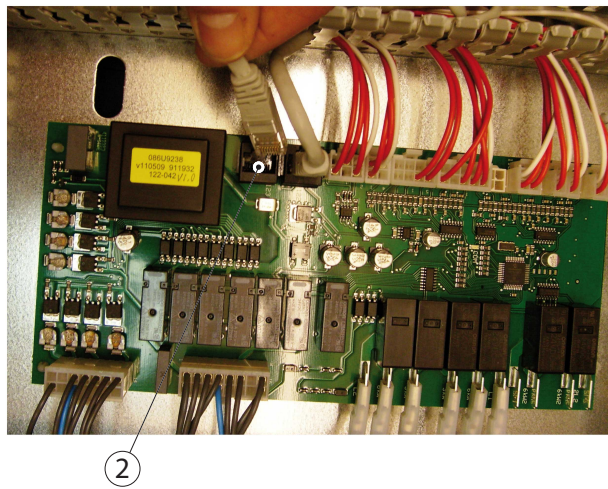
These changes should only be performed on the slave unit, otherwise it can seriously damage both devices.

RJ-45 communication cable

See Figure 1 on page 6 for the positions in the control unit.



1. Connect the supplied RJ-45 communication cable to the expansion card output marked 209. *See position 1.*



2. Connect the other end of the RJ-45 communication cable to the HUB card's output marked 123. *See position 1.*

3.2 Communication cable between control unit and outdoor units



The communication cable is not supplied.

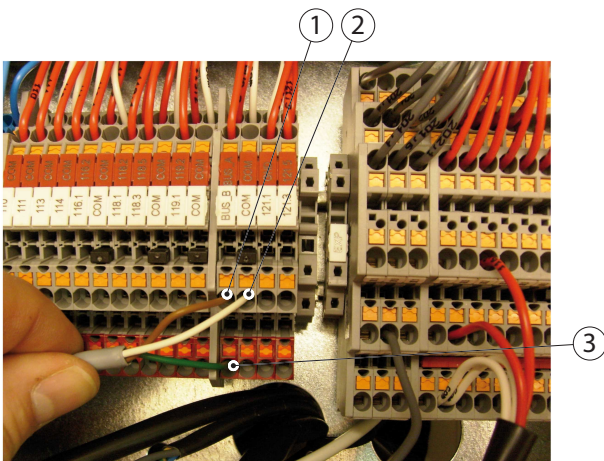
The communication cable is connected as follows:

1. Between the control unit and outdoor unit (Master)
2. Between the outdoor units (Master and Slave)

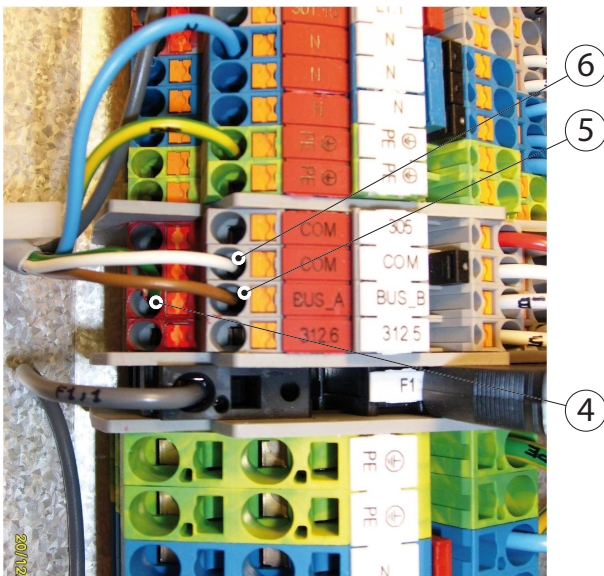
Communication cable between control unit and outdoor unit (Master)

See figure 1 on page 6 for the positioning in the control unit.

See figure 2 on page 7 for the positioning in the outdoor unit's electrical cabinet.



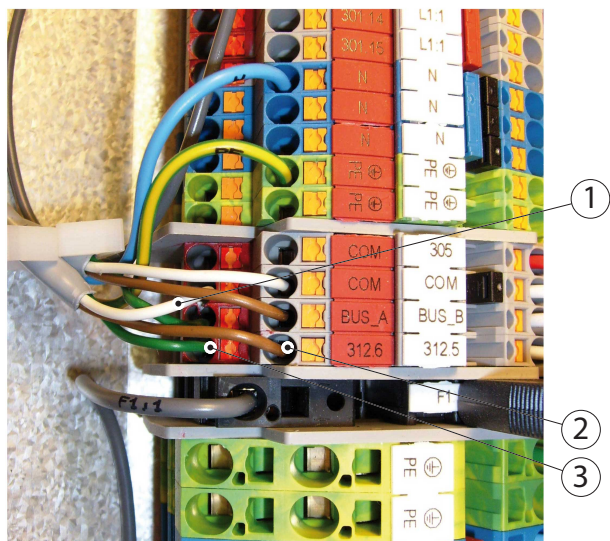
1. Connect the communication cable to the terminal block (control unit) as follows:
 - Connect a wire to the X2 terminal block connection marked BUS_A. See *position 1*.
 - Connect a conductor to the X2 terminal block connection marked BUS_B. See *position 3*.
 - Connect a conductor to the X2 terminal block connection marked COM. See *position 2*.



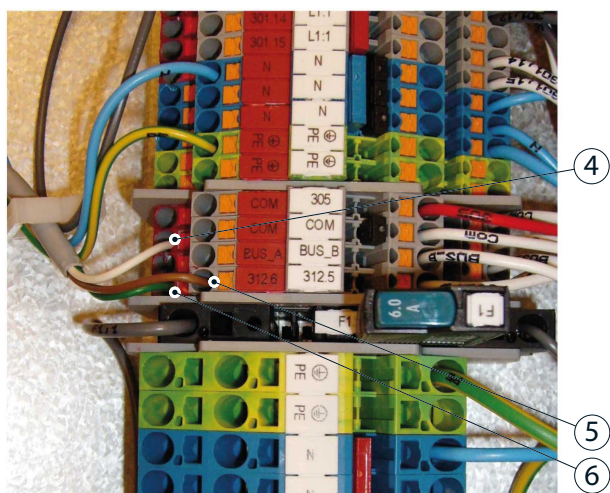
2. Connect the other end of the communication cable to the X1 block (outdoor unit's electrical cabinet) as follows:
 - Connect a wire to the X1 block connection marked BUS_A. See *position 1*.
 - Connect a wire to the X1 block connection marked BUS_B. See *position 2*.
 - Connect a conductor to the X1 block connection marked COM. See *position 3*.

Communication cable between outdoor units, Master and Slave

See figure 2 on page 7 for the positioning in the outdoor unit's electrical cabinet.



1. Connect the communication cable to the X1 block (Master) as follows:
 - Connect a wire to the X1 block (Master electrical cabinet) connection marked 312.5. *See position 2.*
 - Connect a wire to the X1 block (Master electrical cabinet) connection marked 312.6. *See position 3.*
 - Connect a conductor to the X1 block (Master electrical cabinet) connection marked COM. *See position 1.*



2. Connect the other end of the communication cable to the block X1 (Slave) as follows:
 - Connect a wire to the X1 block (Slave electrical cabinet) connection marked 312.5. *See position 2.*
 - Connect a wire to the X1 block (Slave electrical cabinet) connection marked 312.6. *See position 3.*
 - Connect a wire to the X1 block (Slave electrical cabinet) connection marked COM. *See position 1.*

3.3 Commissioning

Connect the external supply voltage.

3.4 Settings in the control system

The following symbols are used to control the menu selection in the control unit:

Symbol	Description
+	"Arrow button +" on control unit
-	"Arrow button -" on control unit

- > "Right arrow button" on control unit
- <- "Left arrow button" on control unit

Input the following settings on the control unit:

- 1 Start-up, Settings for Master
- 2 Start-up, Settings for Slave
- 3 Basic settings for heat pump units
- 4 Settings for selection, Optimum
- 5 Settings for hot water
- 6 Settings for cooling
- 7 Settings for electric auxiliary heater
- 8 Check, Manual test
- 9 Operation

4 Start up

4.1 Settings for Master

1. Press and hold <- for 5-10 seconds.
» The **SERVICE** menu is shown.
2. Press - to scroll down to **INSTALLATION**.
3. Press -> to select **INSTALLATION**.
4. Press -> to select **SYSTEM**.
5. Press - to scroll down to **MASTER/SLAV**.
6. Press -> to select **MASTER/SLAV**. The selection is selected. Then press + to activate.
» Result: **MASTER/SLAV = ON**.
7. Press <- to deselect the option.
 - If an adjustable Class A circulation pump is to be used for the master unit, go to Step 8.
 - Otherwise, continue to Step 10.
8. Press + to scroll up to **OPTIMUM**. Press -> to select **OPTIMUM**. The selection is selected. Then press + to activate.
» Result: **OPTIMUM = ON**.
9. Press <- to deselect the option.
 - Continue to Step 10.
10. Press + to scroll up to **HEAT SOURCE**. Press -> to select **HEAT SOURCE**.
11. Press -> to select **AIR**.
» **DIRECT EVAP.** is shown.
12. Press and hold -> for approx 20 seconds.
» **HEAT PUMP OUTPUT** is shown.
13. Press - to select size. Press -> when the correct size is selected.
» An asterisk (*) is shown next to the selected heat pump output.
14. Press <- repeatedly.
» The start screen is shown.

4.2 Settings for Slave

1. Press and hold -> for 5-10 seconds.
» The **SERVICE** menu is shown.
2. Press - to scroll down to **INSTALLATION**.
3. Press -> to select **INSTALLATION**.
4. Press -> to select **SYSTEM**.
 - If an adjustable Class A circulation pump is to be used for the slave unit, go to Step 5.
 - Otherwise, continue to Step 7.
5. Press - to scroll down to **OPTIMUM**. Press -> to select **OPTIMUM**. The selection is selected. Then press + to activate.
» Result: **OPTIMUM = ON**.
6. Press <- to deselect the option. Press + to scroll up to **HEAT SOURCE**.
 - Continue to Step 7.
7. Press -> to select **HEAT SOURCE**.
8. Press -> to select **AIR**.
» **DIRECT EVAP.** is shown.
9. Press and hold -> for approx 20 seconds.
» **HEAT PUMP OUTPUT** is shown.
10. Press - to select size. Press -> when the correct size is selected.
» An asterisk (*) is shown next to the selected heat pump output.
11. Press <- repeatedly.
» The start screen is shown.

4.3 Basic settings for heat pump units

1. Press and hold <- for 5-10 seconds.
» The **SERVICE** menu is shown.
2. Press - to scroll down to **INSTALLATION**.
3. Press -> to select **INSTALLATION**.
4. Press - to scroll down to **FACTORY SET**. Press -> to select **FACTORY SET**.
5. Press - to scroll down to **RADIATOR** or **FLOOR**. Press -> to select **RADIATOR** or **FLOOR**.
» An asterisk (*) is shown next to the selected option.
6. Press <- to exit **FACTORY SET**. Wait approx 10 seconds.
» The settings is activated.
7. Press <- repeatedly.
» The start screen is shown.

4.4 Settings for options

Optimum

1. For Master: Press and hold <- for 5-10 seconds.
 - Continue to Step 3.
 - » The **SERVICE** menu is shown.
2. For Slave: Press and hold -> for 5-10 seconds.
 - Continue to Step 3.
 - » The **SERVICE** menu is shown.
3. Press - to scroll down to **OPTIMUM**. Press -> to select **OPTIMUM**.
 - » See the heat pump *Installation instructions* for the parameter meanings.
4. Press <- repeatedly.
 - » The start screen is shown.

Settings for hot water

1. Press and hold <- for 5-10 seconds.
 - » The **SERVICE** menu is shown.
2. Press -> to select **HOT WATER**.
3. Press -> to select **START**.
4. Press + to set the desired start temperature for hot water.
 - » The recommended start temperature is 40 °C.
5. Press <- repeatedly.
 - » The start screen is shown.
6. Press <- .
 - » The **INFORMATION** menu is shown.
7. Press - to scroll down to **HOT WATER**.
8. Press -> to select **HOT WATER**. Then press -> again to select **HOT WATER**. Then press + to activate **HOT WATER**.
 - » Result: **HOT WATER = ON**.
9. Press <- repeatedly.
 - » The start screen is shown.

Settings for cooling

1. For Master: Press and hold <- for 5-10 seconds.
 - » The **SERVICE** menu is shown.
2. For Slave: Press and hold -> for 5-10 seconds.
 - » The **SERVICE** menu is shown.
3. Press - to scroll down to **COOLING**. Press -> to select **COOLING**.
4. Press -> to select **COOLING**. Press -> again.
 - » The settings menu opens.
5. Press - to go to **AKTIV COOLING**. Press -> to select **AKTIV COOLING**.
6. Press -> to select **INTEGRATED IN HP**.
 - » An asterisk (*) is shown.
7. Press <- repeatedly.
 - » Until the start screen is shown.
8. Press <- .
 - » The **INFORMATION** menu is shown.
9. Press - to scroll down to **COOLING**.
10. Press -> to select **COOLING**. Press -> again to select the option **COOLING**. Press + to activate **COOLING**.
 - » Result: **COOLING = ON**.
11. Press <- repeatedly.
 - » The start screen is shown.

Settings for electrical auxiliary heater

1. Press and hold <- for 5-10 seconds.
 - » The **SERVICE** menu is shown.
2. Press - to scroll down to **AUX. HEATER**. Press -> to select **AUX. HEATER**.
3. Press -> to select **MAX STEP**. Press + to set the desired stepped setting for the electric auxiliary heater. Press <- to deselect.
 - If an external auxiliary heater is to be configured, go to Step 4.
 - Otherwise continue to Step 6.
 - »
4. Press - to scroll down to **EXTERN AUX. HEATER**
5. Press -> to select **EXTERN AUX. HEATER**. Press -> again to select the option. Press + to activate the option.
 - » Result: **EXT. AUX. HEATER = ON**.
6. Press <- repeatedly.
 - » The start screen is shown.

4.5 Check

Manual test

1. For Master: Press and hold <- for 5-10 seconds.
 - Go to Step 3.
 - » The **SERVICE** menu is shown.
2. For Slave: Press and hold -> for approx 5-10 seconds.
 - Go to Step 3.
 - » The **SERVICE** menu is shown.
3. Press - to scroll down to **MANUAL TEST**. Press -> to select **MANUAL TEST**.
4. Press -> to select **MANUAL TEST**.
5. Press + to set the system to **MANUAL TEST**.
 - » Result: **MANUAL TEST = 1**.
6. Test the various components: Scroll up and down using - and + . Select and deselect using -> and <- . Activate and deactivate components to be tested by pressing + or - respectively, when an option is selected.
7. Press + to scroll up to **MANUAL TEST**. End manual testing by pressing -> to select **MANUAL TEST**. Press - to end **MANUAL TEST**.
 - » Result: **MANUAL TEST = 0**.
8. Press <- repeatedly.
 - » The start screen is shown.

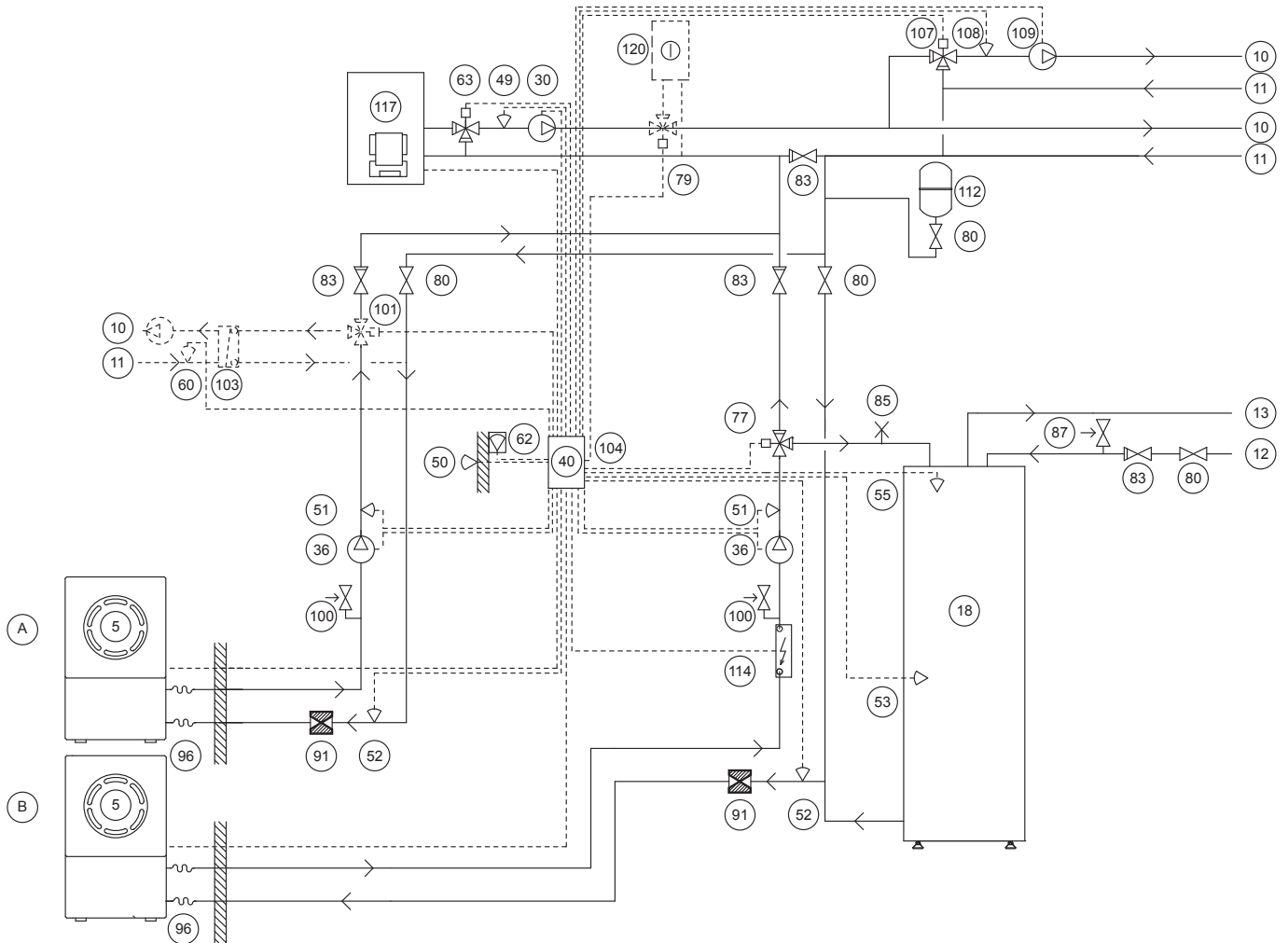
4.6 Operation

1. Press <- .
 - » The **INFORMATION** menu is shown.
2. Press -> to select **OPERAT**.
3. Press - to scroll down to **AUTO**.
4. Press -> to select **AUTO**.
 - » An asterisk (*) is shown next to the selected option.
5. Press <- repeatedly.
 - » Until the start screen is shown.

→

The outdoor units are now in operation.

5 Appendix System solution

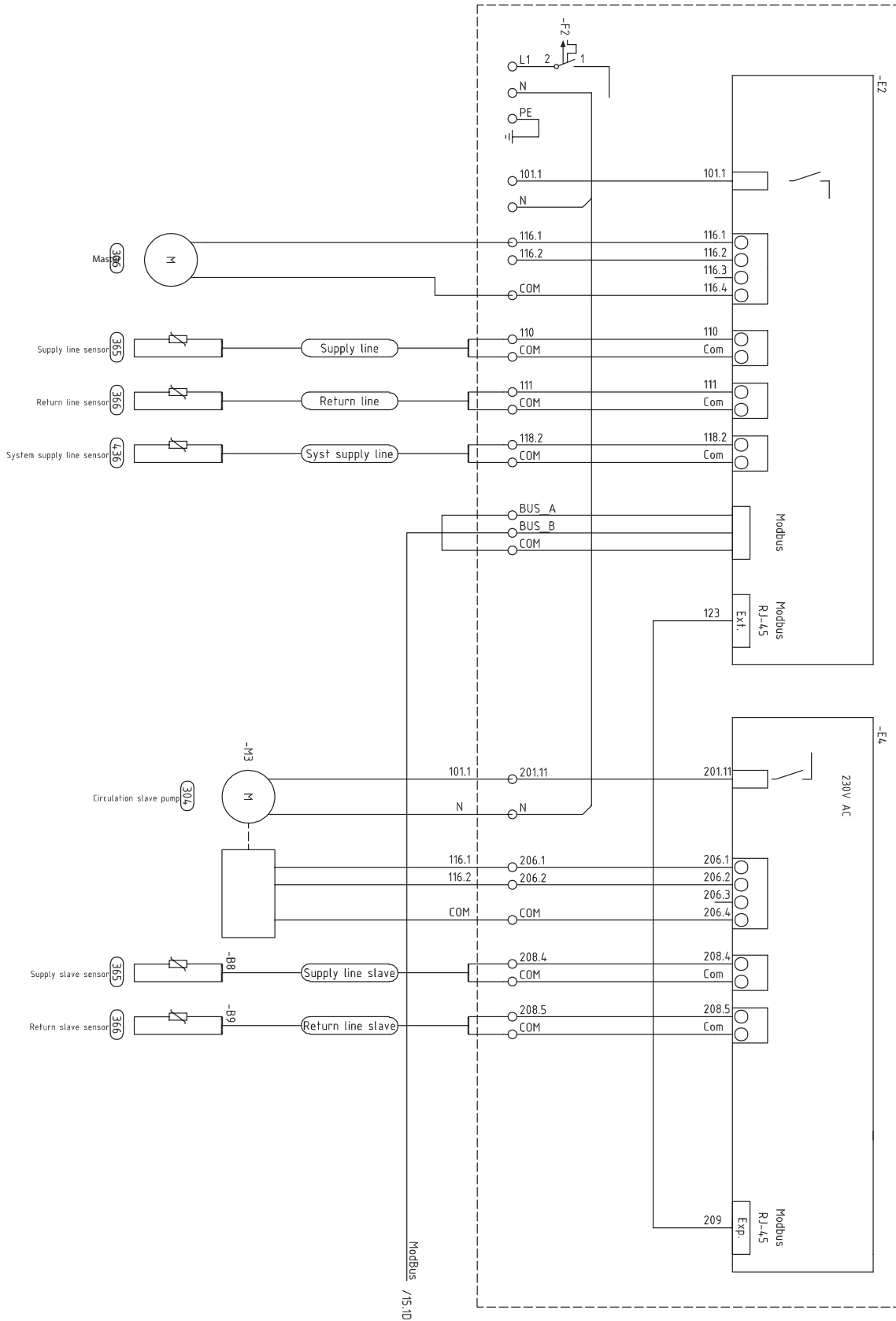


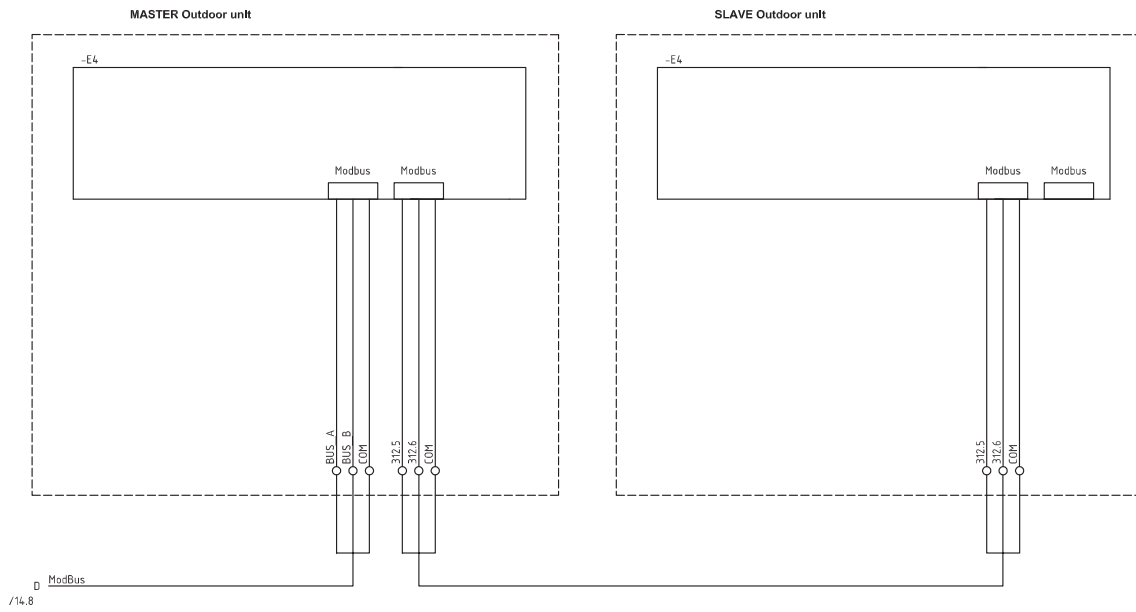
Pos. Description

- A Master
- B Slave
- 5 Heat pump unit
- 10 Supply line
- 11 Return line
- 12 Cold water
- 13 Hot water
- 18 Hot water tank
- 30 Circulation pump
- 36 Circ.pump (system)
- 40 Control unit
- 49 Supply line sensor system
- 50 Outdoor sensor
- 51 Supply line sensor (hp)
- 52 Return line sensor
- 53 Hot water sensor start (hp)
- 55 Hot water sensor top (hp)
- 60 Sensor pool
- 62 Room sensor

- 63 Shunt valve (2nd shunt)
- 77 Reversing valve
- 79 Reversing valve cooling
- 80 Shut-off valve
- 83 Non-return valve
- 85 Venting valve
- 87 Safety valve (9 bar)
- 91 Strainer filter ball
- 96 Flexible hose
- 100 Safety valve (3,0 bar)
- 101 Reversing valve pool
- 103 Heat exchanger pool
- 104 Expansion card
- 107 Shunt valve (shuntgrp 1)
- 108 Supply line sensor (shuntgrp 1)
- 109 Circ.pump (shuntgrp 1)
- 112 Expansion tank
- 114 Additional heater
- 117 Additional heater
- 120 Cooling unit (-s)

5.1 Electrical connections





Danfoss Heat Pumps
Box 950
671 29 ARVIKA
Phone +46 570 81300
E-mail: info@thermia.com
Internet: www.thermia.com
www.heating.danfoss.com

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss Heating Solutions and the Danfoss Heating Solutions logotype are trademarks of Danfoss A/S. All rights reserved.
