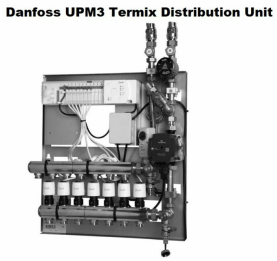

Danfoss UPM3 Termix Distribution Unit User Guide

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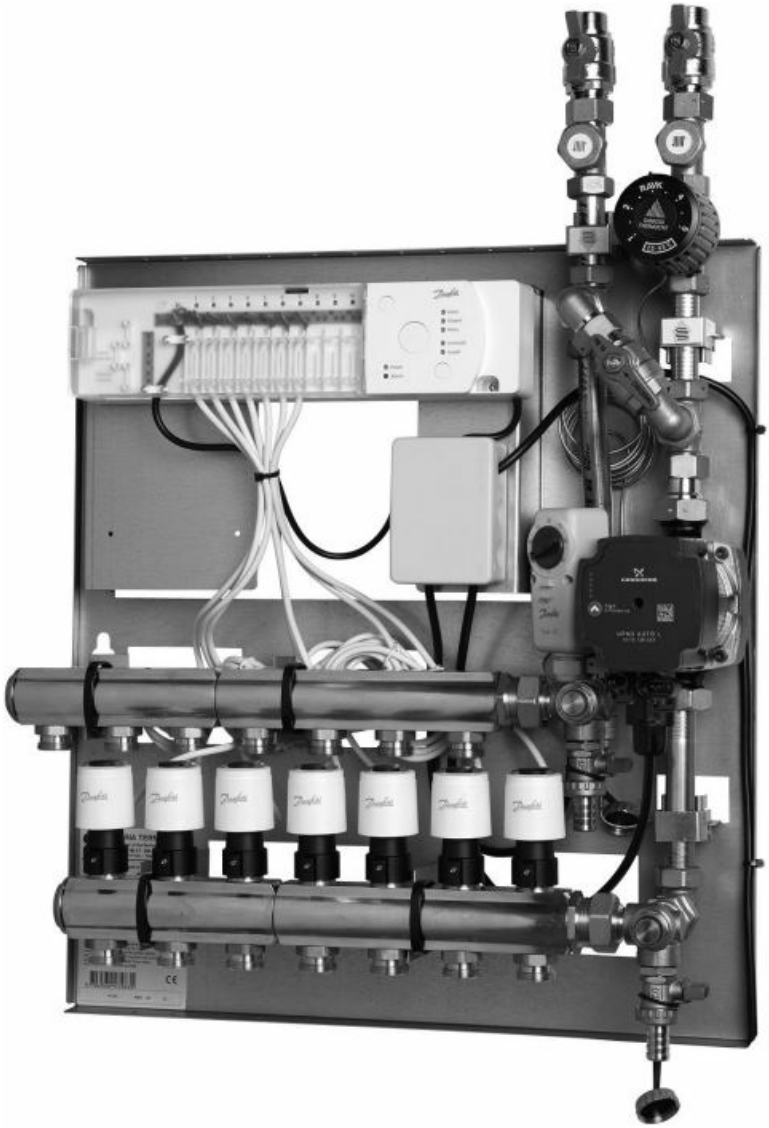
Danfoss UPM3 Termix Distribution Unit



Specifications

- **Product Name:** Termix Distribution unit
- **Function:** Manifold system for floor heating
- **Material:** Stainless steel and brass
- **Maximum Permissible Chloride Compounds:** 150 mg/l

Product Usage Instructions

Mounting

1. Securely mount the Termix Distribution unit following the provided mounting instructions in section 4.1 of the manual.
2. Ensure proper alignment and stability of the unit to avoid any issues during operation.

Start-up

1. After mounting, proceed with the start-up process outlined in section 4.2 of the manual.
2. Check all connections and components to ensure everything is properly set up before turning on the unit.

Electrical Connections

1. Refer to section 4.3 for detailed instructions on making electrical connections to the Termix Distribution unit.
2. Make sure to follow all safety guidelines and use appropriate tools when working with electrical connections.

Wiring

1. Review the wiring description provided in section 5.1 to understand the wiring requirements of the unit.
2. Use the wiring diagram in section 5.2 as a reference when connecting the Termix Distribution unit to power sources.

Design

1. Familiarize yourself with the design of the Termix Distribution unit as explained in section 6.1 of the manual.
2. Refer to the schematic diagram in section 6.2 for a visual representation of the unit's internal components.

Controls

1. Understand the functions of the circulator pump UPM3 detailed in section 7.1 for efficient control of the unit.
2. Follow the Grundfos UPM3 AUTO instructions in section 7.2 for automated control settings.

Maintenance

1. Regularly perform maintenance tasks as outlined in section 7.3 to ensure optimal performance of the Termix Distribution unit.
2. Keep the unit clean and free from debris to prevent any malfunctions.

Troubleshooting

1. Refer to section 8.1 for general troubleshooting tips in case of any operational issues with the unit.
2. Follow specific troubleshooting steps for HE-related problems in section 8.2 to address any heating element issues.

Disposal

If disposal of the Termix Distribution unit is necessary, follow the guidelines provided in section 8.3 of the manual for proper disposal methods.

FAQ

Q: What should I do if the maximum chloride compound level is exceeded?

A: If the recommended level of permissible chloride compounds (150 mg/l) is exceeded, there is a considerable risk of equipment corrosion.
It is advised to address this issue promptly by reducing the chloride compounds in the flow medium or contacting a professional for further guidance.

Functional description

Termix Distribution unit Manifold system for floor heating

- The Termix distribution unit can be directly connected to the Termix VMTD, VMTD mixer, VX, and VVX units. The unit is supplied with a meter fitting piece for domestic water, safety set, or Combiluk as required.
- The Termix distribution unit for the connection of water and heating pipes in connection with hidden pipe installations allows for a large number of connections for cold water, hot water, radiators, and floor heating with dimensions of 530 x 565 x 380 mm (h x w x d). The compact solution ensures that even though all connections are in use the unit still fits into a 60 cm cupboard. The Termix distribution unit can be mounted with a spear in the ground in the early stages of building.
- When the building is finished and protected against theft the Termix district heating unit can be mounted.
- The reliability is very high. The wireless controls comply with the newest EU standards (868 MHz) for electronic equipment. At this frequency, the risk of signal disturbances from other electronic household appliances is very low.
- The controls for the Termix distribution unit include a program for the exercise of valves and pumps and a pump stop to protect the circulation pump.

Safety notes

Safety Notes – general

- The following instructions refer to the standard design of the substation. Special versions of substations are available on request.
- This operating manual should be read carefully before installation and start-up of the substation. The manufacturer accepts no liability for damage or faults that result from non-compliance with the operating manual.
- Please read and follow all the instructions carefully to prevent accidents, injury, and property damage. Assembly, start-up, and maintenance work must be performed by qualified and authorized personnel only.
- Please comply with the instructions issued by the system manufacturer or system operator.

Corrosion protection

- All pipes and components are made of stainless steel and brass. The maximum chloride compounds of the flow medium should not be higher than 150 mg/l.
- The risk of equipment corrosion increases considerably if the recommended level of permissible chloride compounds is exceeded.

Energy source

- The substation is designed for district heating as the primary source of energy. However, also other energy sources can be used where the operating conditions allow it and always are comparable to district heating.

Application

- The substation is designed to be connected to the house installation in a frost-free room, where the temperature does not exceed 50 °C and the humidity does not exceed 60%.
- Do not cover or wall up the substation or in any other way block the entrance to the station.

Choice of material

- Choice of materials always in compliance with local legislation.

Safety valve(s)

- We recommend mounting of safety valve(s), however, always in compliance with local regulations.

Connection

- The substation must be equipped with features that ensure that the substation can be separated from all energy sources (also power supply).

Emergency

- In case of danger or accidents – fire, leaks, or other dangerous circumstances – interrupt all energy sources to the station if possible, and seek expert help.
- In case of discolored or bad-smelling domestic hot water, close all shut-off valves on the substation, inform the operating personnel and call for expert help immediately.

REACH

- All Danfoss A/S products fulfill the requirements in REACH.
- One of the obligations in REACH is to inform customers about the presence of Candidate list substances if any, we hereby inform you about one substance on the candidate list:
- The product contains brass parts that contain lead (CAS no: 7439-92-1) in a concentration above 0.1% w/w.

Storage

- Any storage of the substation that may be necessary before installation should be in conditions that are dry and heated.

Please observe instructions carefully

- To avoid injury to persons and damage to the device, it is necessary to read and observe these instructions.

Warning of high pressure and temperature

- Be aware of the installation’s permissible system pressure and temperature.
- The maximum temperature of the flow medium in the substation is 95°C.
- The maximum operating pressure of the substation is 10 bar. PN 16 versions are available on inquiry.

- The risk of persons being injured and equipment damaged increases considerably if the recommended permissible operating parameters are exceeded.
- The substation installation must be equipped with safety valves, however, always in accordance with local regulations.

Warning of hot surface

- The substation has hot surfaces, which can cause skin burns. Please be extremely cautious near the substation.
- Power failure can result in the motor valves being stuck in the open position. The surfaces of the substation can get hot, which can cause skin burns. The ball valves on the district heating supply and return should be closed.

Warning of transport damage

- Before substation installation, please make sure that the substation has not been damaged during transport.

IMPORTANT – Tightening of connections

- Due to vibrations during transport, all flange connections, screw joints, and electrical clamp and screw connections must be checked and tightened before water is added to the system.
- After the water has been added to the system and the system has been put into operation, re-tighten ALL connections.

Mounting

- Installation must comply with local standards and regulations.
- District heating (DH) – In the following sections, DH refers to the heat source that supplies the substations.
- A variety of energy sources, such as oil, gas, or solar power, could be used as the primary supply to Danfoss substations.
- For the sake of simplicity, DH can be taken to mean the primary supply.

Connections:

- **Floor heating flow line** (FHFL)
- **Floor heating return line** (FHRL)

Connection sizes:

- **FHFL + FHRL:** G ¾” (int. thread)
- **Dimensions (mm):** H 710 x W 505 x D 175
- **Weight (approx.):** 20 kg

Authorized personnel only

- Assembly, start-up, and maintenance work must be performed by qualified and authorized personnel only.

Installation

Mounting Adequate space

- Please allow adequate space around the substation for mounting and maintenance purposes.

Orientation

- The station must be mounted so that components, keyholes, and labels are placed correctly. If you wish to mount the station differently please contact your supplier.

Drillings

- Where substations are to be wall-mounted, drillings are provided in the back mounting plate. Floor-mounted units have support.

Labeling

- Each connection on the substation is labeled.

Before installation Clean and rinse

- Prior to installation, all substation pipes and connections should be cleaned and rinsed.

Tightening

- Due to vibration during transport, all substation connections must be checked and tightened before installation.

Unused connections

- Unused connections and shut-off valves must be sealed with a plug. Should the plugs require removal, this must only be done by an authorized service technician.

Installation Strainer

- If a strainer is supplied with the station it must be fitted according to the schematic diagram. Please note that the strainer may be supplied loose.

Connections

- Internal installation and district heating pipe connections must be made using threaded, flanged, or welded connections.

Keyhole for mounting

Start-up

- Start-up, Heating with a mixing loop

Start-up:

1. **Pump speed**
    - Set the pump to the highest speed before start-up.
2. **Start pump**
    - Start the pump and heat through the system.
3. **Open shut-off valves**
    - The shut-off valves should then be opened and the unit observed as it enters service. Visual checking should confirm temperatures, pressures, acceptable thermal expansion, and absence of leakage.
    - If the system operates under design, it can be put to regular use.
4. **Vent system**
    - Switch off the pump and vent the installation after the radiators have been warmed up.
5. **Adjust pump speed**
    - Set the pump to the lowest speed consistent with comfort and electricity consumption.
    - Normally the change-over switch is set in the mid position (default).
    - However, for systems with underfloor heating or single pipe loop systems, it may be necessary to turn the change-over switch upwards.
    - Higher pump speeds are only used if the heating requirement increases.

Under floor heating Pump stop function

- If the substation is used in connection with underfloor heating, the circulation pump must be connected to the pump stop function in the underfloor heating controller. The pump must be stopped if all under-floor heating circuits are closed.

Warranty

- If this is not possible, then flow must be continued through the bypass. Failing this, the pump will be at risk of seizure and any remaining warranty will be withdrawn.

Summer operation Switch off the pump

- In summer the circulation pump must be switched off and the shut-off valve to the HE supply closed.

Running pump bi-weekly

- It is recommended to start up the circulation pump (for 2 minutes) once a month during summer; the shut-off valve of the HE supply must be shut.

Electronic controller

- Most electronic controllers will start up the pump automatically (please note the manufacturer´s instructions).

Re-tighten connections

- After water has been added to the system and the system has been put into operation, re-tighten ALL connections.

Pump

- The pump must be switched off during system fill.

Electrical connections

- Before making electrical connections, please note the following:

Safety notes

- Please read the relevant parts of the safety notes.

230 V

- The substation must be connected to 230 V AC and earth.

Potential bonding

- Potential bonding should be carried out according to 60364-4-41:2007 and IEC 60364-5-54:2011.
- The bonding point on the mounting plate below the right corner is marked with the earth symbol.

Disconnection

- The substation must be electrically connected so that it can be disconnected for repairs.

Outdoor temperature sensor

- Outdoor sensors should be mounted to avoid exposure to direct sunlight. They should not be placed close to doors, windows, or ventilation outlets.

- The outdoor sensor must be connected to the station on the terminal block under the electronic control.

Authorized electrician

- Electrical connections must be made by an authorized electrician only.

Local standards

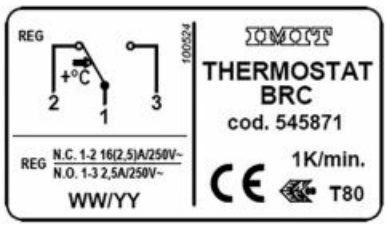
- Electrical connections must be made under current regulations and local standards.

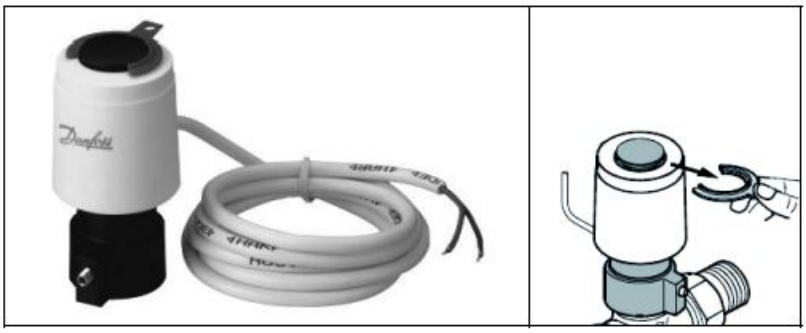
Thermoactuators Activating the thermoactuators

- The thermoactuators are supplied with a “first open” function, such that they are slightly open for frost protection until the electrical controller is installed.
- During commissioning, the “first open” function is disabled by removing the red mounting split on the term actuator.
- Please check that the thermoactuators can fully close following the disablement of the “-first open” function.
- See the installation guide included with the term actuator.

IMIT Thermostat IMIT Thermostat

- The IMIT Thermostat is used to limit the underfloor heating flow temperature. The IMIT Thermostat is preset to 60 °C, shutting off the pump and the primary on/off valve when the flow to the underfloor heating exceeds 60 °C.
- The IMIT Thermostat is (if not already factory-fitted) to be fitted on the secondary flow pipe as close to the heating interface unit as possible using the steel band provided.



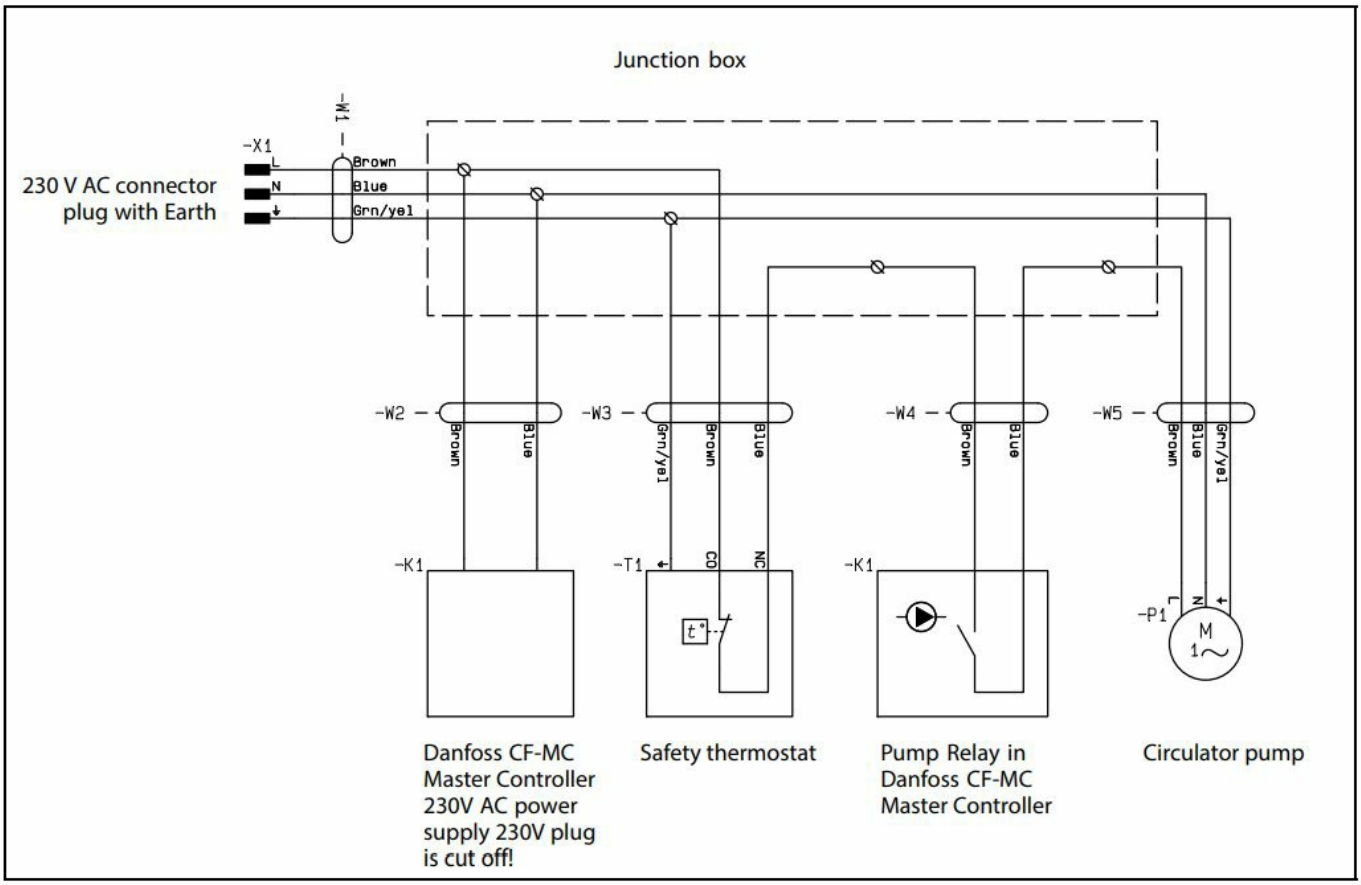


Wiring

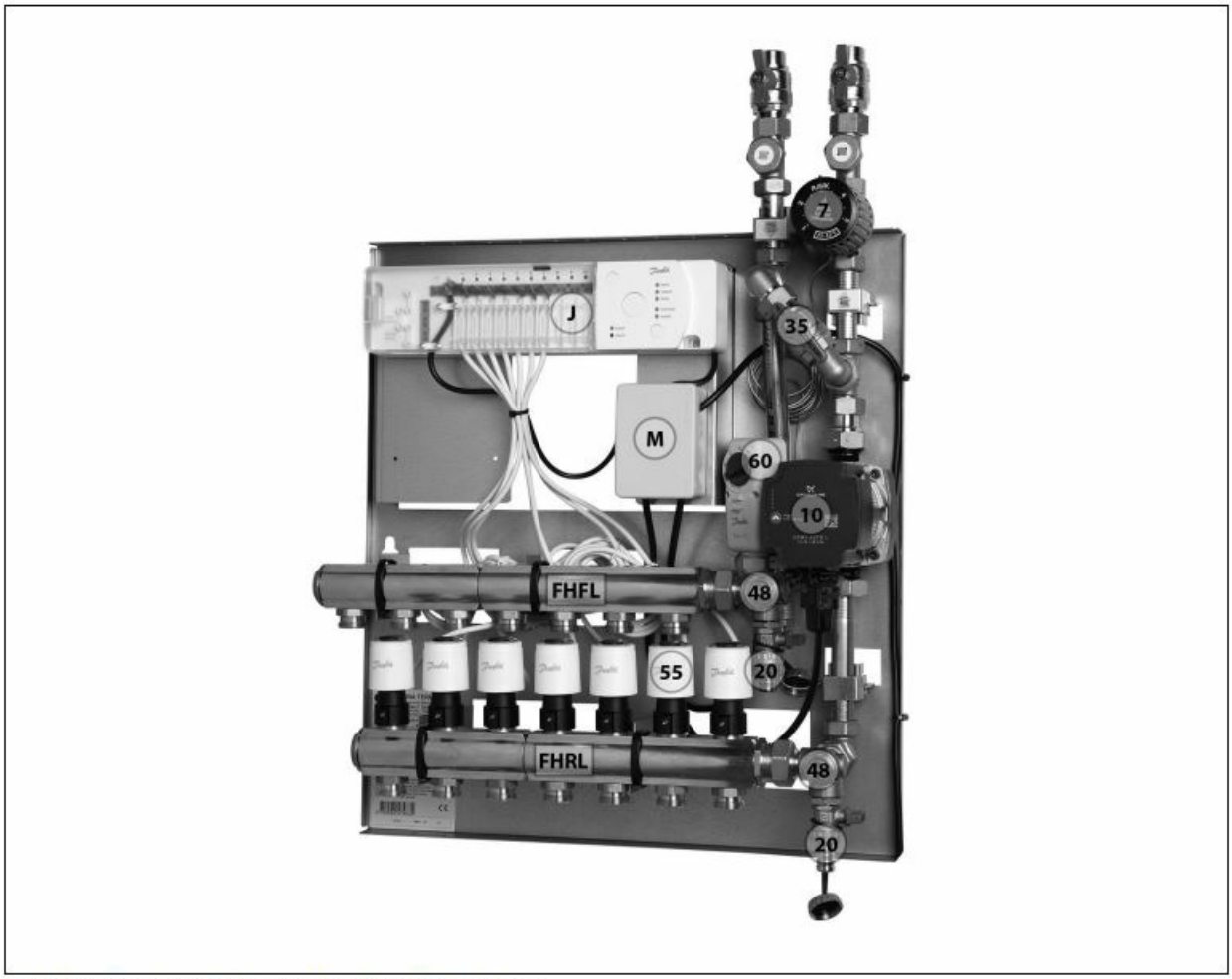
Wiring description Connecting the system’s circulation pump

- The system’s circulation pump should be connected to the contact relay in the electrical floor heating controller, so the pump can automatically start and stop, depending on whether the thermoactuators are open or closed.
- If the pump pushes against closed valves it can overheat and burn out. The electric floor heating controller is not approved to supply power to the circulation pump.
- The pump must therefore be supplied from an external connection box, such that only the 230 V phase (active) is fed through the relay contact on the electrical floor heating controller.
- The neutral and earth connections must not enter the floor heating controller.

Wiring diagram



Design

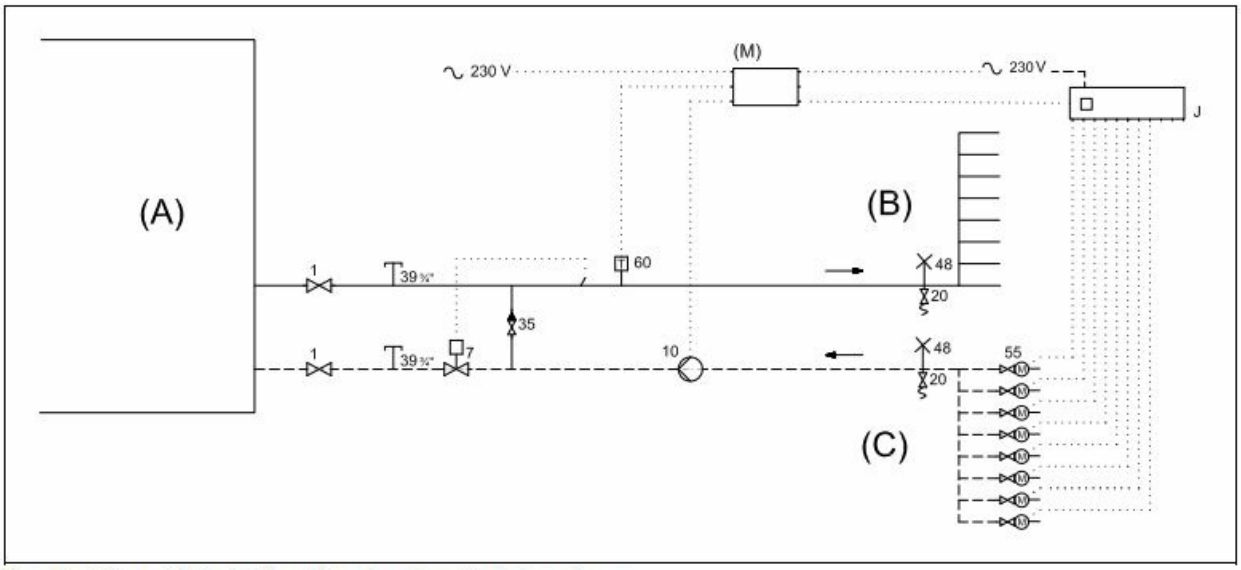


Your substation might look different than the substation shown.

Design Description

- **J** Electronic controller floor heating
- **M** Electrical wiring box
- **7** Thermostatic controller, HE
- **10** Circulation pump
- **20** Filling/drain valve
- **35** Ball valve/non-return valve
- **48** Air vent, manual
- **55** Thermoactuator
- **60** Thermostat
- **FHFL** Manifold system for floor heating flow line
- **FHRL** Manifold system for floor heating return line

Schematic diagram



Your substation might look different than the schematic diagram shown.

Schematic description

- **(A)** Termix unit
- (B) Floor heating flow line
- **(C)** Floor heating return line
- **(M)** Electrical wiring box
- **J** Electronic controller floor heating
- **1** Ball valve
- **7** Thermostatic valve
- **10** Circulator pump
- **20** Filling/drain valve
- **35** Ball valve/non-return valve
- **39** Connection closed
- **48** Air vent, manual
- **55** Thermoactuator

- **60** Thermostat

Technical parameters

Nominal pressure:

- **Nominal pressure:** PN 10 (PN 16 versions are available on enquiry)
- **Max. DH supply temperature:** 95°C
- **Min. DCW static pressure:** 0.5 bar
- **Brazing material (HEX):** Copper
- **Sound level:** S 55 dB

Controls

Circulator pump UPM3

- UPM3 Pumps can be controlled in constant pressure, proportional pressure, or constant speed mode defined using a smart user interface.
- The variable speed-modulating modes allow the pump to match its performance to the system requirements, helping to reduce noise when thermostatic valves are closing down.
- Energy labelling class A

Grundfos UPM3 AUTO instructions Control mode

- Each push on the button switches to the next program setting. The choice of operation mode depends on the type of heating system and the pressure loss in the system.

Settings

Function:	Recommended for:	Green	Green	Yellow	Yellow	Yellow
Proportional pressure Auto ad apt		✪				
Constant pressure Auto-adapt			✪			
Proportional pressure 1		✪		✪		
Proportional pressure 2	2-pipe systems	✪		✪	✪	
Proportional pressure 3 — MA X		✪		✪	✪	✪
Constant pressure 1	1-pipe systems		✪	✪		
Constant pressure 2	Underfloor heating		✪	✪	✪	
Constant pressure 3 — MAX			✪	✪	✪	✪
Constant Curve 1				✪		
Constant Curve 2				✪	✪	
Constant Curve 3 — MAX				✪	✪	✪

Alarm status

Function:	Recommended for:	Red	Green	Yellow	Yellow	Yellow
Power Supply failure						
Blocked		✪				✪
Supply voltage low		✪			✪	
Electrical error		✪		✪		

Maintenance

- The substation requires little monitoring, apart from routine checks. It is recommended to read the energy meter at regular intervals and to write down the meter readings.
- Regular inspections of the substation according to this Instruction are recommended, which should include:

Strainers

- Cleaning of strainers.

Meters

- Checking of all operating parameters such as meter readings.

Temperatures

- Checking of all temperatures, such as DH supply temperature and DHW temperature.

Connections

- Checking all connections for leakages.

Safety valves

- The operation of the safety valves should be checked by turning the valve head in the indicated direction.

Venting

- Checking that the system is thoroughly vented.
- Inspections should be carried out a minimum of every two years. Spare parts can be ordered from Danfoss. Please ensure that any inquiry includes the substation serial number.

Authorized personnel only

- Assembly, start-up, and maintenance work must be performed by qualified and authorized personnel only.

Troubleshooting

Troubleshooting in general

- In the event of operating disturbances, the following basic features should be checked before carrying out actual troubleshooting:
- the substation is connected to electricity,
- the strainer on the DH supply pipe is clean,
- the supply temperature of the DH is at the normal level (summer, at least 60 °C – winter, at least 70 °C),
- the differential pressure is equal to or higher than the normal (local) differential pressure in the DH network – if in doubt, ask the DH plant supervisor,
- pressure on the system – check the HE pressure gauge.

Authorized personnel only

- Assembly, start-up, and maintenance work must be performed by qualified and authorized personnel only.

Troubleshooting HE

Problem	Possible cause	Solution
Too little or no heat.	Strainer clogged in DH or HE circuit (radiator circuit).	Clean gate/strainer(s).
	The filter in the energy meter on the DH circuit is clogged.	Clean the filter (after consulting the DH plant operator).
	Defective or wrongly adjusted differential pressure controller.	Check the operation of the differential pressure controller – clean the valve seat if required.
	Sensor defective – or possibly dirt in the valve housing.	Check the operation of the thermostat – clean the valve seat if required.
	Automatic controls, if any, wrongly set or defective – possibly power failure.	Check if the setting of the controller is correct – see separate instructions. Check the power supply. The temporary setting of the motor to “manual” control – see instructions on automatic controls.
	The pump is out of operation.	Check if the pump is receiving power and that it turns. Check if there is air trapped in the pump housing – see pump manual.
	The pump is set at too low a speed of rotation.	Set the pump at a higher speed of rotation.
	Pressure drop – the pressure drop on the radiator circuit shows lower than recommended operating pressure.	Fill water on the system and check the functioning of the pressure expansion vessel if required.
	Air pockets in the system.	Vent the installation thoroughly.
	Limiting of the return temperature adjusted too low.	Adjust according to instructions.
	Defective radiator valves.	Check – replace.
	Uneven heat distribution in building because of incorrectly set balancing valves, or because there are no balancing valves.	Adjust/install balancing valves.
	The diameter of the pipe to the sub station is too small or the branch pipe is too long.	Check pipe dimensions.
Uneven heat distribution.	Air pockets in the system.	Vent the installation thoroughly.
	Wrong setting of thermostat or automatic controls, if any.	Adjust automatic controls, – see instructions for automatic controls.

DH supply temperature is too high.	Defective controller. The controller does not react as it should according to the instructions.	Call the automatic controls manufacturer or replace the regulator.
	The defective sensor on the self-acting thermostat.	Replace the thermostat – or sensor only.
DH supply temperature is too low.	Wrong setting of automatic controls, if any.	Adjust automatic controls – see instructions for automatic controls.
	Defective controller. The controller does not react as it should according to the instructions.	Call in the automatic controls manufacturer or replace the controller.
	A defective sensor on the self-acting thermostat.	Replace the thermostat – or sensor only.
	Wrong placement/fitting of an outdoor temperature sensor.	Adjust the location of an outdoor temperature sensor.
	Strainer clogged.	Clean gate/strainer.

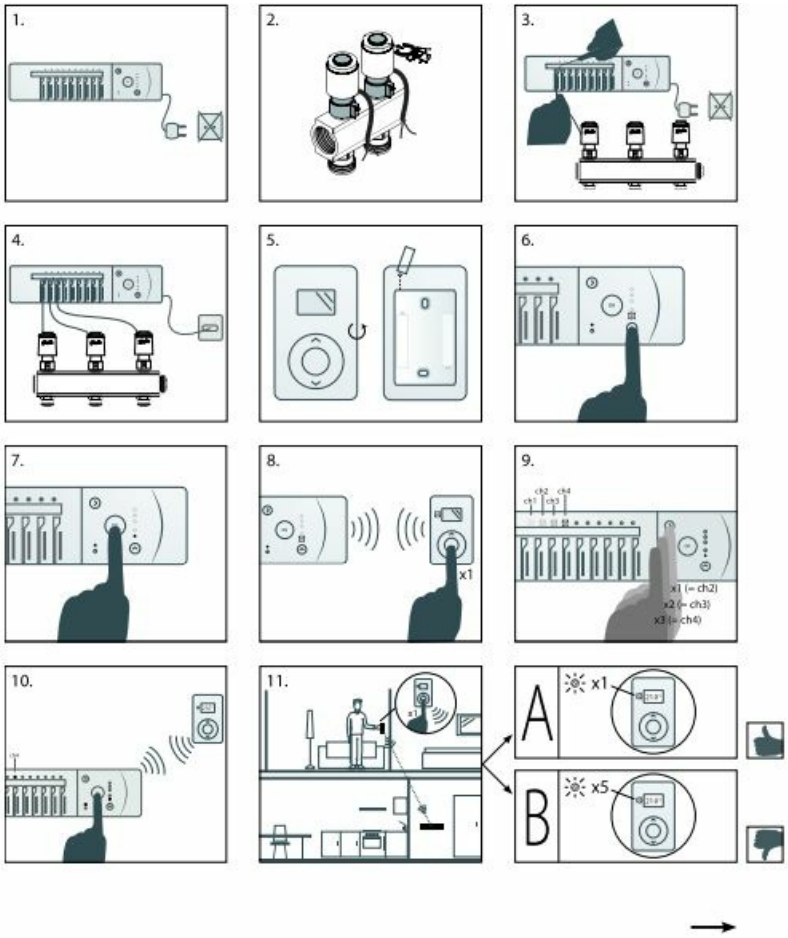
Too high DH return temperature.	Too small heating surface/too small radiators compared to the total heating requirement of the building.	Increase total heating surface.
	Poor utilization of existing heating surface. The defective sensor on the self-acting thermostat.	Make sure the heat is distributed evenly across the full heating surface – open all radiators and keep the radiators in the system from heating up at the bottom. It is extremely important to keep the supply temperature to the radiators as low as possible while maintaining a reasonable level of comfort.
	The system is a single-pipe loop.	The system should feature electronic controls as well as return sensors.
	The pump pressure is too high.	Adjust the pump to a lower level.
	Air in system.	Vent the system.
	Defective or incorrectly set radiator valve(s). Single-pipe loop systems require special one-pipe radiator valves.	Check – set/replace.
	Dirt in the motorized valve or the differential pressure controller.	Check–cleanout.
	Defective motorized valve, sensor, or automatic controller.	Check – replace.
	The electronic controller is not adjusted correctly.	Adjust according to instructions.
Noise in the system.	Pump pressure is too high.	Adjust the pump to a lower level.
The heat load is too high.	Defective motorized valve, sensor, or electronic controller.	Check – replace.

Disposal

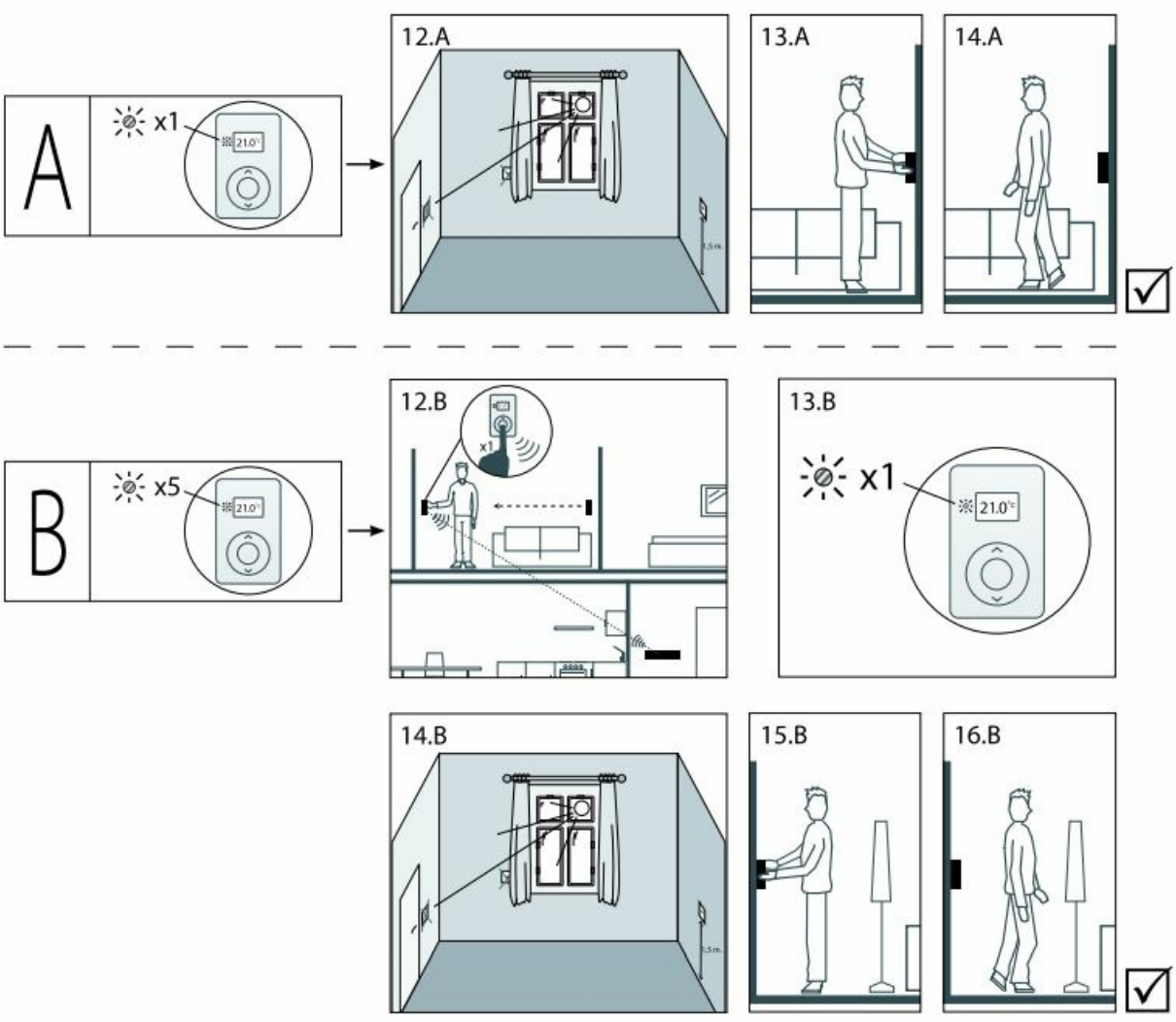
- This symbol on the product indicates that it may not be disposed of as household waste.
- It must be handed over to the applicable take-back scheme for the recycling of electrical and electronic equipment.
- Dispose of the product through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Danfoss installations guide

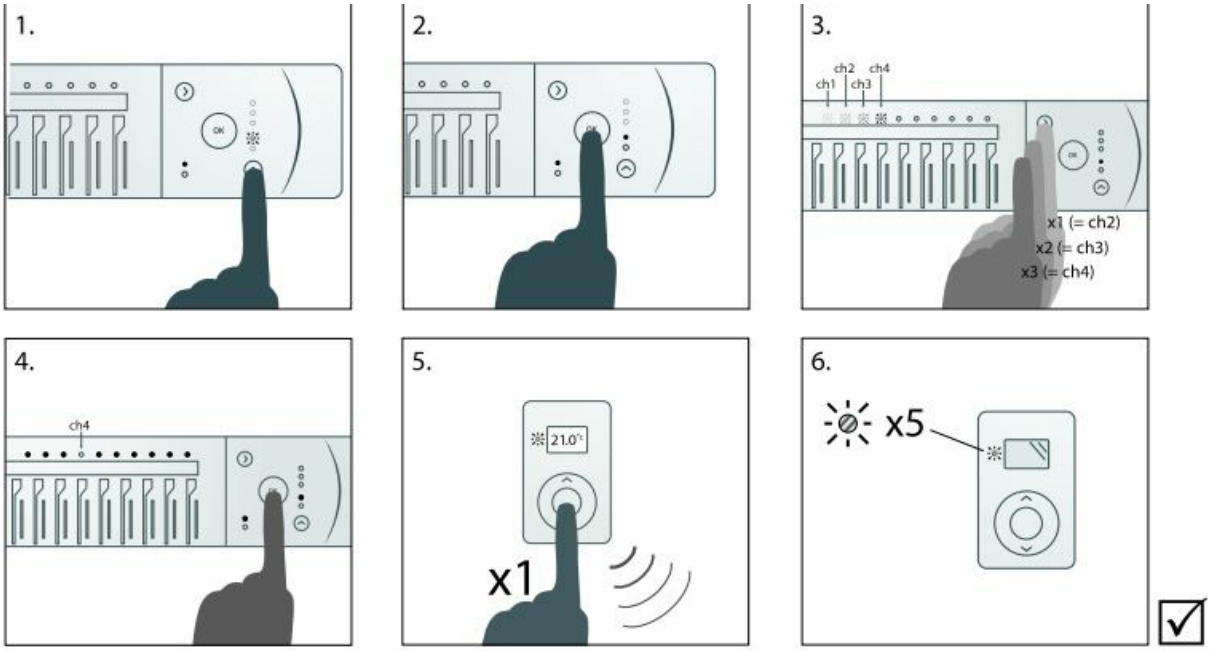
Installation – CF2



Installation – CF2



Installation – CF2



Declaration

Declaration of conformity

EU DECLARATION OF CONFORMITY Danfoss A/S Danfoss District Energy Division

Declares under our sole responsibility that the:

Product category: Small substations

Type designations: Distribution unit

Covered by this declaration is in conformity with the following directives, standards or other normative documents, provided that the product is used in accordance with our instructions.

Machinery Directive 2006/42/EC

EN ISO 12100:2011
Safety of machinery – General principles for design – Risk assessment and risk reduction

RoHS Directive 2011/65/EU
Including amendment 2015/863

EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

RED Directive 2014/53/EU

EN 60730-1:2001
Automatic electrical controls for household and similar use – Part 1: General requirements

EN 60730-1:2016
Automatic electrical controls – Part 1: General requirements

EN 60730-2-9:2011
Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls

EN 300 220-2 V3.1.1:2017
Short Range Device (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 2: Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU for non specific radio equipment

EN 301 489-1 V2.1.1:2017
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1 (b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

ETSI EN 301 489-3 V2.1.1:2019
ElectroMagnetic compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

Date: 2022.05.19 Place of issue: DK-7451 Sunds	Issued by: Signature: Name: Claus G. Mortensen Title: Quality Manager	Date: 2022.05.19 Place of issue: DK-7451 Sunds	Approved by: Signature: Name: Karina Friis Skov Title: Director, Engineering

Danfoss only vouches for the correctness of the English version of this declaration. In the event of the declaration being translated into any other language, the translator concerned shall be liable for the correctness of the translation

- **Gemina Termix A/S Member of the Danfoss Group** danfoss.com **+45 9714 1444** mail@termix.dk
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- Danfoss cannot accept any responsibility for possible errors in catalogs, brochures, videos, and other material.
- Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to the form, fit, or function of the product.
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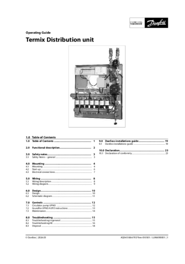
Documents / Resources



Danfoss UPM3 Termix Distribution Unit [pdf] User Guide
UPM3 Termix Distribution Unit, UPM3, Termix Distribution Unit, Distribution Unit, Unit

References

- User Manual