Danfoss Termix VX Compact 20 Climate Solutions Design Center Installation Guide

Contents

Danfoss Termix VX Compact 20 Climate Solutions Design Center

Specifications

- **Product Name**: Termix VX Compact 20
- **Function**: District heating substation for indirect heating
- **Mounting**: Wall-mounting

Safety notes
Safety Notes – general
The following instructions refer to the standard design of a substation. Special versions of substations are available on request. This operating manual should be read carefully before the 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 is 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 discoloured or bad-smelling domestic hot water, close all shut-off valves on the substation, inform the operating personnel, and call for expert help immediately.

Storage
Any storage of the substrate, which may be necessary before installation, should be in conditions which are dry and heated.

Please observe the instructions.
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 120 °C. The maximum operating pressure of the substation is 10 bar. PN 16 versions are available on enquiry. 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 according to local regulations.

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

Mounting

Installation must be in compliance with local standards and regulations. District heating (DH) – In the following sections, DH refers to the heat source which 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:

1. District heating (DH) supply
2. District heating (DH) return
3. Heating (HE) supply

4. Heating (HE) return
5. Tank flow line (TFL)
6. Tank return line (TRL)

Connection sizes:

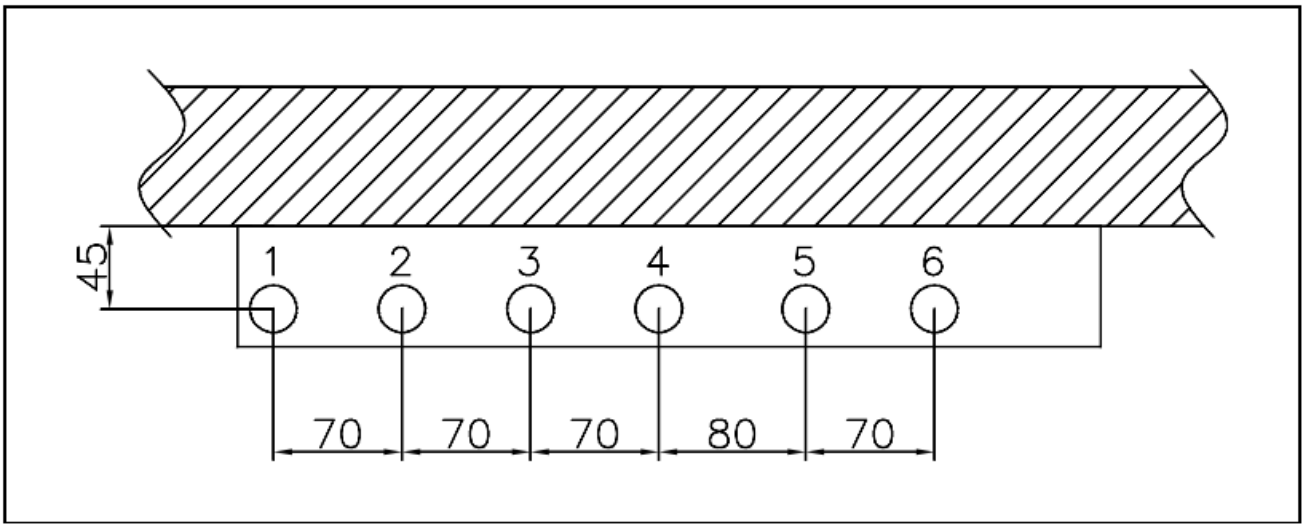
- **DH + HE**: G 1” (int. thread)
- **TFL + TRL**: G ¾” (int. thread)

Dimensions (mm):

- **Without cover**: H 835 x W 505 x D 240
- **With cover**: H 835 x W 540 x D 360

Weight (approx.): 30–40 kg

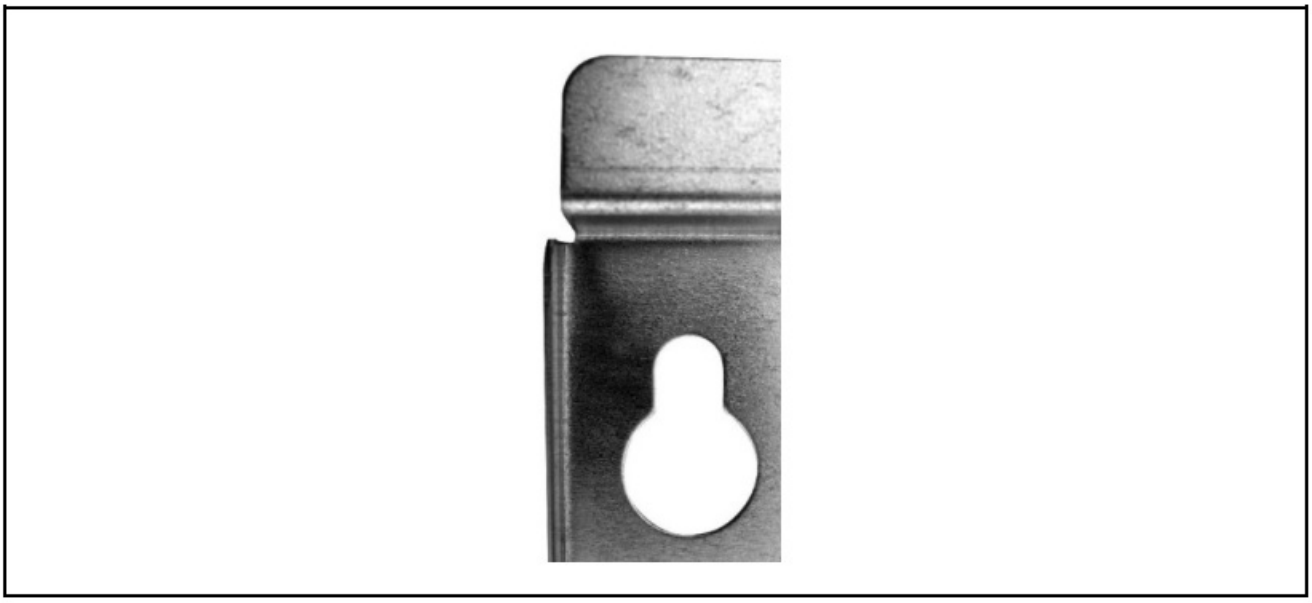
Authorized personnel only
Assembly, start-up and maintenance work must be performed by qualified and authorized personnel only



The pipe placement can deviate from the shown drawing. Please note the markings on the station.

Installation

Mounting:



Keyhole for 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.

Labelling
Each connection on the substation is labelled.

Before installation

Clean and rinse
Before installation, all substation pipes and connections should be cleaned and rinsed.

Thightening
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 pipes connections must be made using threaded, flanged, or welded connections.

Start-up
Start-up, Indirect heating

Filling

First fill
When carrying out the first fill, the heat exchanger must be slowly filled with water until it reaches working pressure.

Pressure gauge
The HE pressure gauge indicates the pressure of the HE system. This instruction must be followed strictly to avoid dangerous situations.

Supply hose
A ball valve with plug is installed in the HE return line. To fill the system, the ball valve must first be closed, the plug removed and a supply hose connected. On re-opening the ball valve, system fill can commence.

Pre-pressure
When filling the system with water, the pressure gauge should be observed closely. The expansion vessel is supplied pre-pressurised to 0.5 bar. The pre-pressure required at each substation will depend on the system head (the distance between the lowest and highest point in the system), for example:

Height (m)	Pressure (bar)
0 – 5	0,5
5 – 10	1,0
10 – 15	1,5
15 – 20	2,0

Filling stop
Filling must stop when the pressure gauge shows a pressure approximately 1-2 bar higher than the pre-pressure setting. The ball valve is then closed, the hose removed, and the plug put back in.

Start-up

Pump speed
Set the pump to the highest speed before start-up.

Start pump
Start the pump and heat through the system.

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 heat exchanger operates by design, it can be put to regular use.

Vent system
Switch off the pump and vent the installation after the radiators have been warmed up.

Adjust the 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 under floor 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.

Underfloor heating

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

Warranty
If this is not possible, then the 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 the 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).

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.

Disconnection
The substation must be electrically connected to be disconnected for repairs.

Outdoor temperature sensor
Outdoor sensors should be mounted so as 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 according to current regulations and local standards.

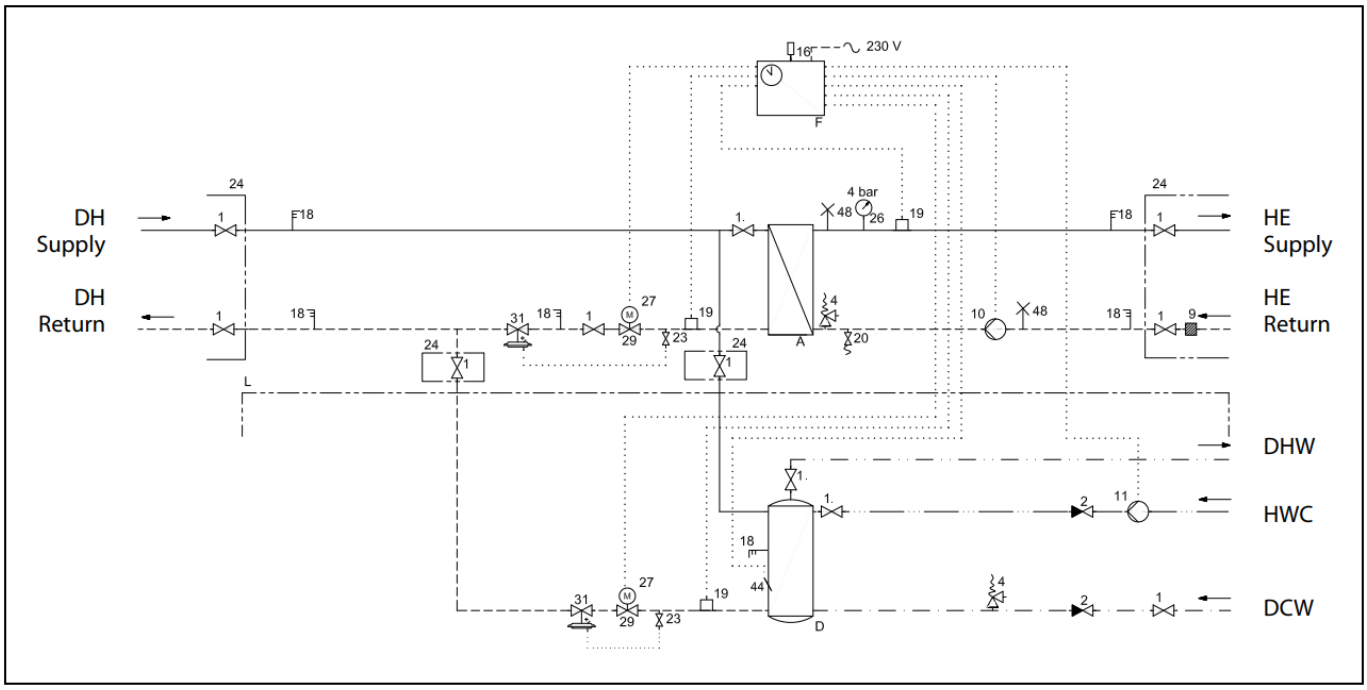
Product Design

Your substation might look different than the substation shown.

Design description

- **A** Heat exchanger, HE
- **26** Pressure gauge, HE
- **F** Electronic controller
- **27** Actuator, HE
- **4** Safety valve, HE
- **31** Differential pressure controller
- **10** Circulation pump
- **48** Air vent, manual
- **20** Filling/drain valve

Schematic diagram



Your substation might look different than the schematic diagram shown.

Schematic description

- **A** Heat exchanger, HE
- **D** Hot water tank
- **F** Electronic controller
- **L** Border of delivery
- **1** Ball valve
- **2** Single check valve
- **4** Safety valve
- **9** Strainer
- **10** Circulation pump
- **11** Domestic hot water pump
- **16** Outdoor sensor
- **18** Thermometer
- **19** Surface sensor
- **20** Filling/drain valve
- **21** To be ordered separately
- **22** Test connection
- **23** Ball valve
- **24** Delivered loose with the unit
- **26** Pressure gauge
- **27** Actuator
- **29** 2-way motorized valve
- **31** Differential pressure controller
- **44** Immersion sensor
- **48** Air vent, manual
- **DCW**: Domestic Cold Water
- **DHW**: Domestic Hot Water

- **HWC**: Hot Water Circulation
- **DH Supply**: District Heating Supply
- **DH Return**: District Heating Return
- **HE Supply**: Heating Supply
- **HE Return**: Heating Return

Technical parameters

- **Nominal pressure**: PN 16
- **Max. DH supply temperature**: 120 °C
- **Min. DCW static pressure**: 0.5 bar
- **Brazing material (HEX)**: Copper
- **Heat exchangers test pressure**: 30 bar
- **Sound level**: ≤ 55 dB

Controls

Heating circuit
Differential pressure controller
The differential pressure controller smooths out the fluctuations in pressure arriving from the district heating network. The operating pressure in the substation is thus held steady.

RAVK controller

HE temperature control
The HE flow temperature in the heating circuit is controlled by the HE temperature controller.

Thermostatic control
The temperature of the HE flow line is adjusted as follows:

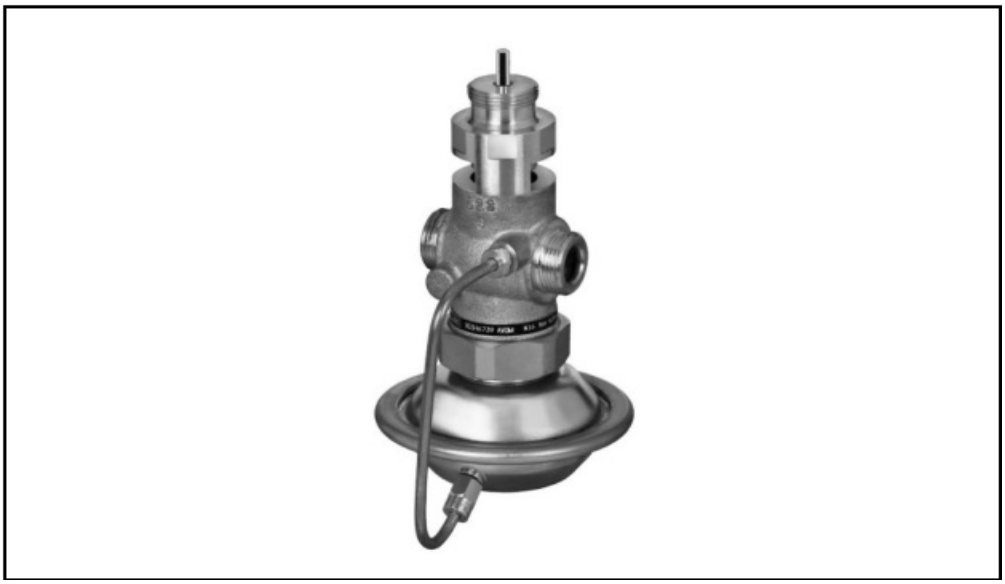
- To increase the temperature, turn the handle on the thermostatic controller to select a higher number.
- To decrease the temperature, turn the handle on the thermostatic controller to select a lower number.

RAVK controller (25-65 °C). The temperature setting is as follows:

- 1 = 25 °C
- 2 = 35 °C
- 3 = 45 °C
- 4 = 55 °C
- 5 = 65 °C

The values are intended as a guide.

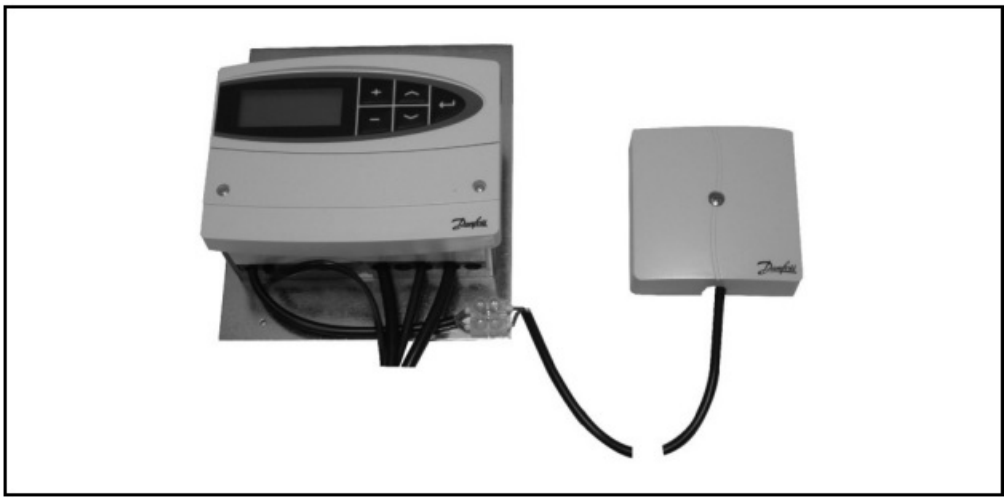
Flow controller with integrated control valve
The controller is a self-acting flow controller with integrated control valve. The controller closes when set max. flow is exceeded and can be used in combination with Danfoss electrical actuators with or with out safety function. Spring return motor can be used as safety function by power failure.



Electric 2–way motorized valve
Actuators with or without safety function are available for 3-point controls. Spring-return actuators can be used to provide safety shut-off in the event of power failure.

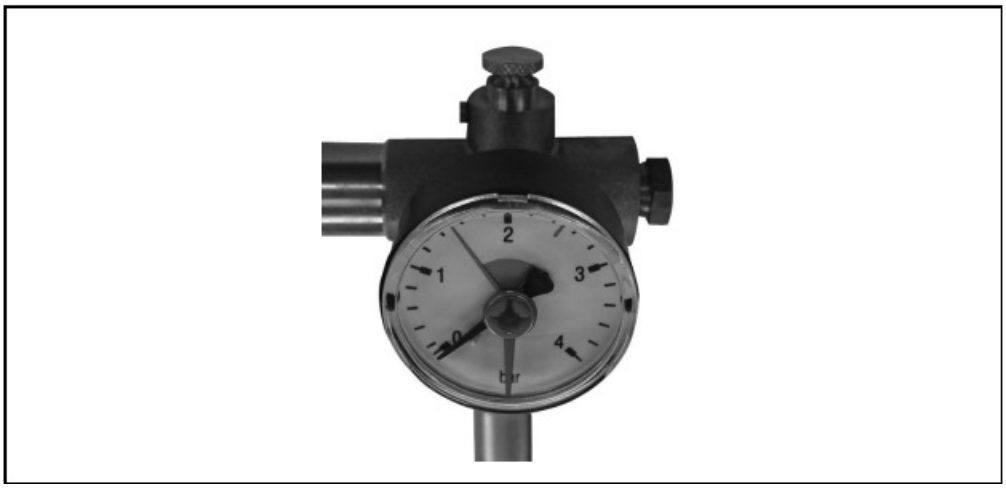
Electronic control
Substations with electronic control must be set in accordance with manufacturer´s instructions. Where the room temperature is controlled by radiator thermostats, it is recommended that thermostats be set for minimum temperature in each room.

Outdoor temperature sensor (ESMT)
Outdoor sensors should be mounted to avoid exposure to direct sunlight. They should not be placed close to doors, windows, or ventilation outlets.



Circulation pump
ALPHA2 pumps have both variable pressure-controlled operation and standard selectable three-speed operation. The unique AUTOADAPT feature allows the pump to match its performance to the system requirements, helping to reduce noise when thermostatic valves are closing down. Energy labelling class A ALPHA2 L pumps have both variable speed-pressure-controlled operation and standard selectable three-speed operation. 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 UPS pumps are a complete range of circulator pumps with 3 speeds. Energy labelling up to class B

HE pressure gauge
The HE pressure gauge indicates the pressure of the HE system.



Other

Safety valve
The purpose of the safety valve is to protect the substation from excessive pressure. The blow-off pipe from the safety valve must not be closed. The blow-off pipe outlet should be placed so that it discharges freely, and it is possible to observe any dripping from the safety valve. It is recommended to check the operation of safety valves at intervals of 6 months. This is done by turning the valve head in direction indicated.

Strainer
Strainers should be cleaned regularly by authorized personnel. The frequency of cleaning would depend on operating conditions and the manufacturer’s instructions.

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 minimum every two years. Spare parts can be ordered from Danfoss. Please ensure that any enquiry 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
	Strainer clogged in DH or HE circuit (radiator circuit).	Clean gate/strainer(s).
	The filter in the energy meter on the DH circuit 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, are wrongly set or defective, possibly a power failure.	Check if the setting of the controller is correct – see separate instructions. Check the power supply. Temporary setting of motor to “manual” control – see instructions on automatic controls.

Too little or no heat.	The pump is out of order.	Check if the pump is receiving pow er and that it turns on. Check if ther e is air trapped in the pump housing – see the pump manual.
	The pump is set at too low a speed of rotation.	Set the pump at a higher speed of r otation.
	Pressure drop – The pressure drop on the radiator circuit is lower than t he recommended operating pressur e.	Fill water in the system and check t he functioning of the pressure expa nsion vessel, if required.
	Air pockets in the system.	Vent the installation thoroughly.
	Limiting of the return temperature is adjusted too low.	Adjust according to instructions.
	Defective radiator valves.	Check – replace.
	Uneven heat distribution in the 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 pi pe is too long.	Check pipe dimensions.
Uneven heat distribution.	Air pockets in the system.	Vent the installation thoroughly.
DH supply temperature is too high.	Wrong setting of thermostat or auto matic controls, if any.	Adjust automatic controls – see inst ructions for automatic controls.
	Defective controller. The controller does not react as it should accordin g to the instructions.	Call the automatic controls manufacturer or replace the regulat or.
	Defective sensor on self-acting ther mostat.	Replace the thermostat or sensor o nly.
DH supply temperature is too low.	Wrong setting of automatic controls , if any.	Adjust automatic controls – see inst ructions for automatic controls.
	Defective controller. The controller does not react as it should accordin g to the instructions.	Call in the automatic controls manufacturer or replace the controll er.
	Defective sensor on self-acting ther mostat.	Replace the thermostat or sensor o nly.
	Wrong placement/fitting of the outd oor temperature sensor.	Adjust the location of the outdoor te mperature sensor.
	Strainer clogged.	Clean the gate/strainer.
	Too small heating surface/too small radiators compared to the total heat ing requirement of the building.	Increase total heating surface.

Too high DH return temperature.	Poor utilization of existing heating surface. Defective sensor on 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.
	Pump pressure is too high.	Adjust the pump to a lower level.
	Air in the 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 – clean out.
	Defective motorized valve, sensor, or automatic controller.	Check – replace.
	The electronic controller was not adjusted correctly.	Adjust according to instructions.
Noise in the system.	Pump pressure is too high.	Adjust the pump to a lower level.
Heat load is too high.	Defective motorized valve, sensor, or electronic controller.	Check – replace.

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FAQs

Q: What is the ideal application for the Termix VX Compact 20?
A: The Termix VX Compact 20 is ideal for spaces where a high level of security against burst pipes and water damage in the heating system is required. It is suitable for use in district heating systems with a need for a heat exchanger.

Q: How can I control the heating temperature?
A: The heating temperature can be controlled either thermostatically or by using an electronic controller with an outdoor temperature sensor. Refer to the controls section (6.0) of the manual for detailed instructions on

temperature control.

Q: What maintenance tasks should be performed regularly?
A: Regularly inspect and clean components such as the plate heat exchanger, safety valve, and circulation pump. Ensure all valves are functioning correctly and check for any leaks in the system. Detailed maintenance instructions can be found in section 6.3 of the manual.

Documents / Resources

	Danfoss Termix VX Compact 20 Climate Solutions Design Center [pdf] Installation Guide VI.CW.P2.02, LUK41300, Termix VX Compact 20 Climate Solutions Design Center, Termix VX Compact 20, Climate Solutions Design Center, Solutions Design Center, Design Center, Center

References

- User Manual