

Operating Guide

Termix AT BTD



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2.0 Functional description

District heating substation with tank for domestic hot water preparation and with thermostatic control. Designed for wall-mounting.

Application

The Termix AT BTD substation is a complete solution for hot water. The Termix AT BTD is applicable for single-family houses or apartments.

Domestic hot water (DHW)

The domestic hot water circuit consists of a hot water tank with coil and self-acting thermostatic control valve. The hot water tank and coil are enamelled and the tank contains a magnesium anode. The substation is delivered with a built in safety valve.

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3.0 Safety notes

3.1 Safety Notes – general

The following instructions refer to the standard design of 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 damage to property. 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 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.

REACH

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

Storage

Any storage of the substation which may be necessary prior to installation should be in conditions which are dry and heated.



Authorized personnel only

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



Please observe instructions carefully

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



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 in accordance with local regulations.



Warning of hot surface

The substation has got hot surfaces, which can cause skin burns. Please be extremely cautious in close proximity to the substation.

Power failure can result in the motor valves being stuck in open position. The surfaces of the substation can get hot, which can cause skin burns. The ball valves on 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.

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4.0 Mounting

4.1 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.

Connection sizes:

All connections: G 3/4" (int. thread)

Dimensions (mm):

With cover:

100L: H 1180 x W 540 x D 520

150L: H 1510 x W 540 x D 520

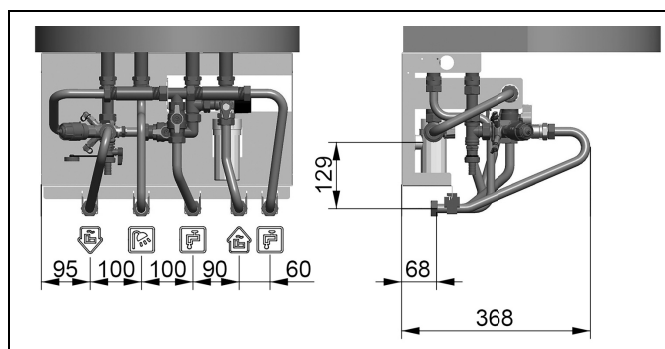
Weight (approx.): 85 – 100 kg



Authorized personnel only

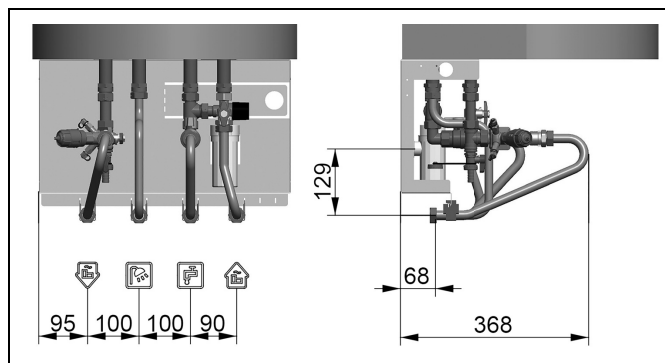
Assembly, start-up and maintenance work must be performed by qualified and authorized personnel only.

Termix AT BTB 5 pipes



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

Termix AT BTB 4 pipes



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

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4.1.1 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.

Labelling

Each connection on the substation is labelled.

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 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.

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4.2 Start-up

Start-up, Direct heating

The shut-off valves should 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 in accordance with design, it can be put to regular use.

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



Re-tighten connections

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

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5.0 Mounting instructions Termix AT BTD wall cabinet

5.1 Mounting

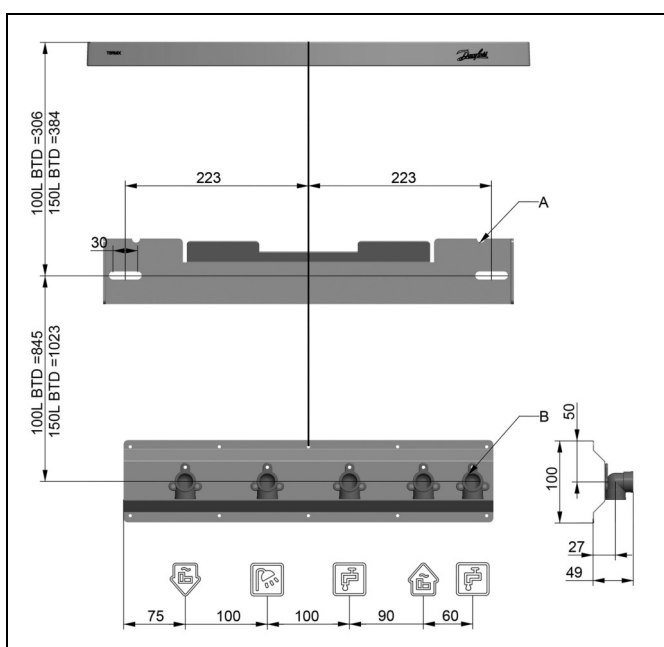


Wall bracket

Mount the Wall bracket according to the Drawing.
Use A to center the tank on the bracket.

B - All pipe threads are ISO 1/2".

Mount the container unit in the wall bracket.



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Side plates

Fasten the right and left side plates by placing the key holes over the screws on the sides of the wall bracket.



1 Bottom panel

Slide the slots in the bottom panel onto the 2 bushes in the side plates, and fasten the panel with the 2 screws in the front.

2 Top plate

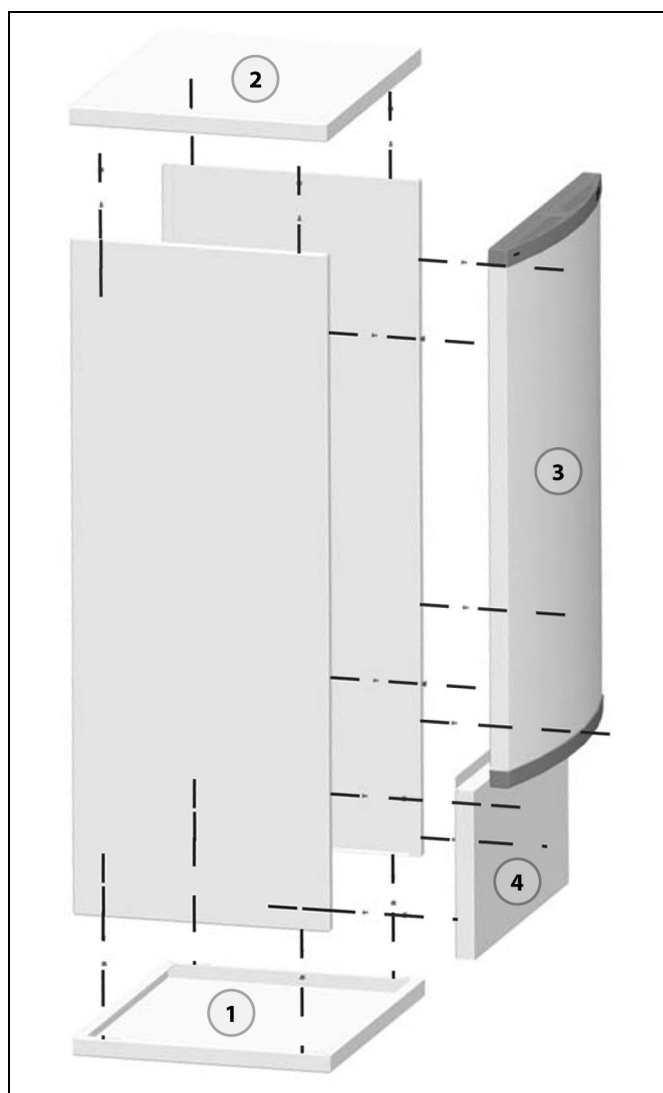
Mount the top plate.

3 Front cover

Mount the front cover by lowering the key holes onto the screws in the side plates.

4 Clock panel

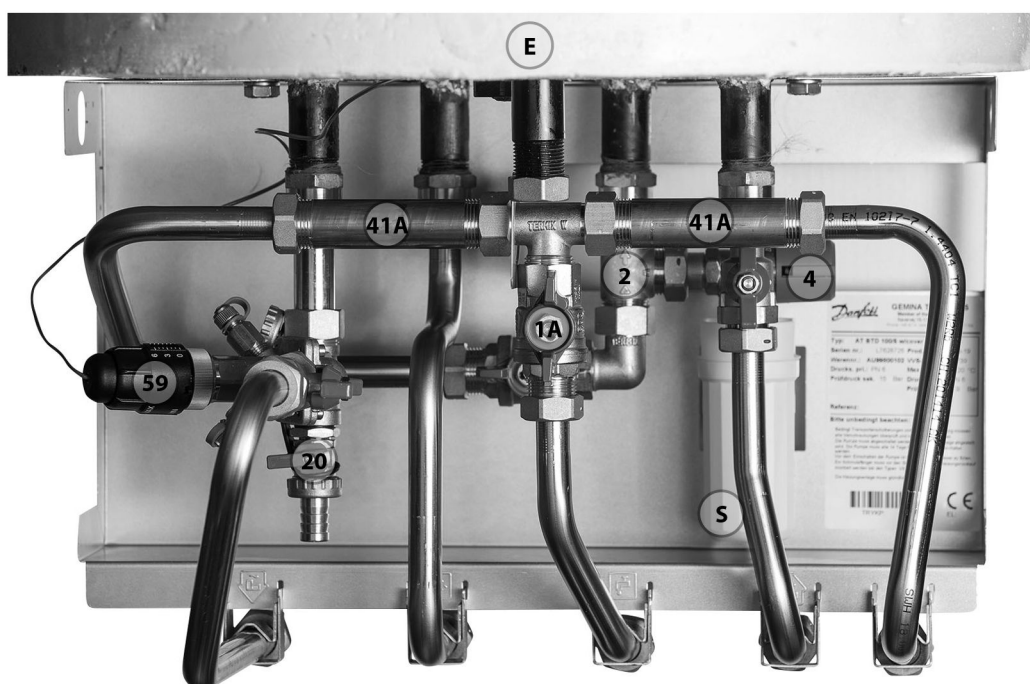
Mount the clock panel by lowering the key holes onto the screws in the side plates.



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6.0 Design

6.1 Design Termix AT BTB 5 pipes



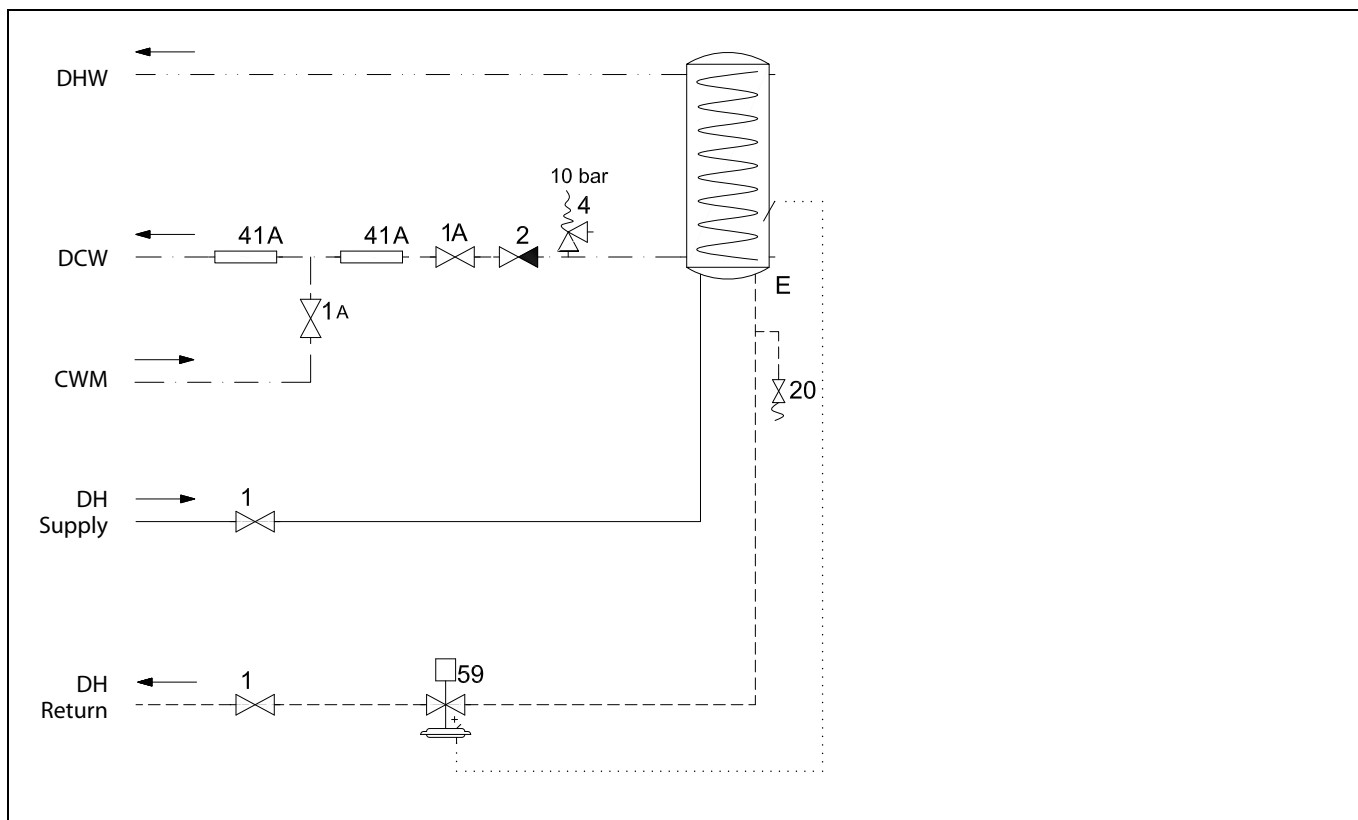
Your substation might look different than the substation shown.

Design description

E	Hot water tank with coil	4	Safety valve
S	Siphon	20	Filling/drain valve
1A	Ball valve, DVGW	41A	Fitting piece, cold water mains
2	Single check valve	59	Differential pressure/temperature regulator with flow limiting

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6.2 Schematic diagram Termix AT BTD 5 Pipes



Your substation might look different than the schematic diagram shown.

Schematic description

E	Hot water tank with coil	4	Safety valve
1	Ball valve	20	Filling/drain valve
1A	Ball valve, DVGW	41A	Fitting piece, cold water mains
2	Single check valve	59	Differential pressure/temperature regulator with flow limiting

DHW:	Domestic Hot Water
DCW:	Domestic Cold Water
CWM:	Cold water mains
DH Supply:	District Heating Supply
DH Return:	District Heating Return

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6.3 Design Termix AT BTB 4 pipes



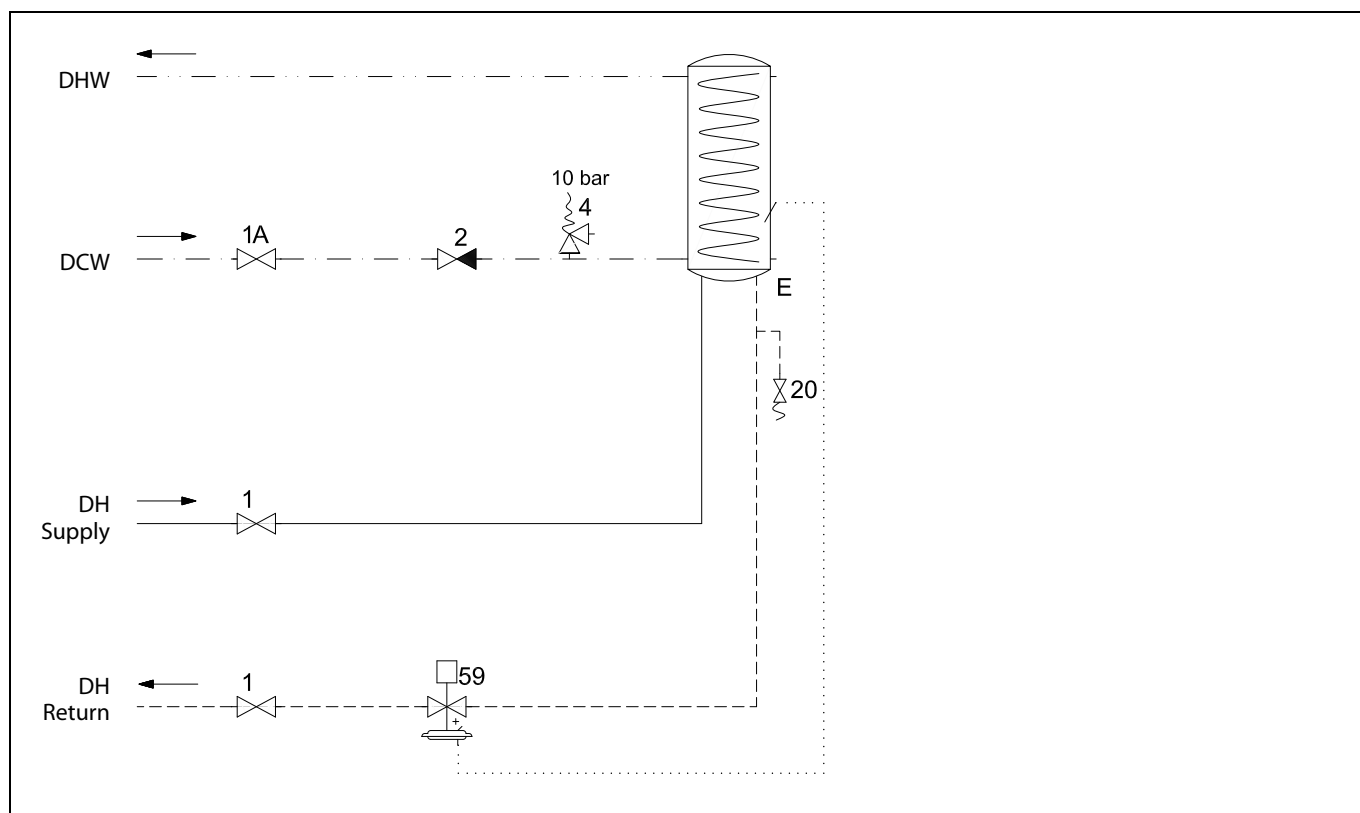
Your substation might look different than the substation shown.

Design description

E	Hot water tank with coil	4	Safety valve
S	Siphon	20	Filling/drain valve
1A	Ball valve, DVGW	59	Differential pressure/temperature regulator with flow limiting
2	Single check valve		

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6.4 Schematic diagram Termix AT BTD 4 Pipes



Your substation might look different than the schematic diagram shown.

Schematic description

E	Hot water tank with coil	4	Safety valve
1	Ball valve	20	Filling/drain valve
1A	Ball valve, DVGW	59	Differential pressure/temperature regulator with flow limiting
2	Single check valve		

DHW: Domestic Hot Water

DCW: Domestic Cold Water

DH Supply: District Heating Supply

DH Return: District Heating Return

6.4.1 Technical parameters

Technical parameters

Nominal pressure:	PN 10
Max. DH supply temperature:	T-max = 95 °C

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7.0 Controls

7.1 DHW temperature control

DHW temperature control

There are various types of DHW temperature control used in Danfoss substations.

DHW temperature should be adjusted to 45-50 °C, as this provides optimal utilisation of DH water. At DHW temperatures above 55 °C, the possibility of lime scale deposits increases significantly.

7.1.1 AB-QM controller (45–60 °)

QT is a self-acting thermostatic actuator designed to be used as return temperature control thermostat in one-pipe heating systems.

QT is dedicated to be used with AB-QM automatic balancing & control valve.

AB-QM DN 10-20 (45-60 °C)

Temperature setting		QT Sensor setting (turns)						
		0	1	2	3	4	5	6
AB-QM (flow setting)	20 %	48,0	50,5	53,0	55,5	58,0	60,5	63,0
	30 %	47,0	49,5	52,0	54,5	57,0	59,5	62,0
	40 %	46,0	48,5	51,0	53,5	56,0	58,5	61,0
	50 %	45,0	47,5	50,0	52,5	55,0	57,5	60,0
	60 %	44,0	46,5	49,0	51,5	54,0	56,5	59,0
	70 %	43,0	45,5	48,0	50,5	53,0	55,5	58,0
	80 %	42,0	44,5	47,0	49,5	52,0	54,5	57,0
	90 %	41,0	43,5	46,0	48,5	51,0	53,5	56,0
	100 %	40,0	42,5	45,0	47,5	50,0	52,5	55,0

The values are intended as a guide.



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7.2 Other

7.2.1 Cold water meter fitting piece

The substation is equipped with a fitting piece for cold water meter.

Assembly of cold water meter:

1: Close ball valves

Close the ball valves on cold water, if there is water on the system.

2: Loosen nuts

Loosen the nuts on the fitting piece.

3: Remove fitting piece

Remove the fitting piece and replace it with the cold water meter.
Do not forget the gaskets.

4: Tighten connections

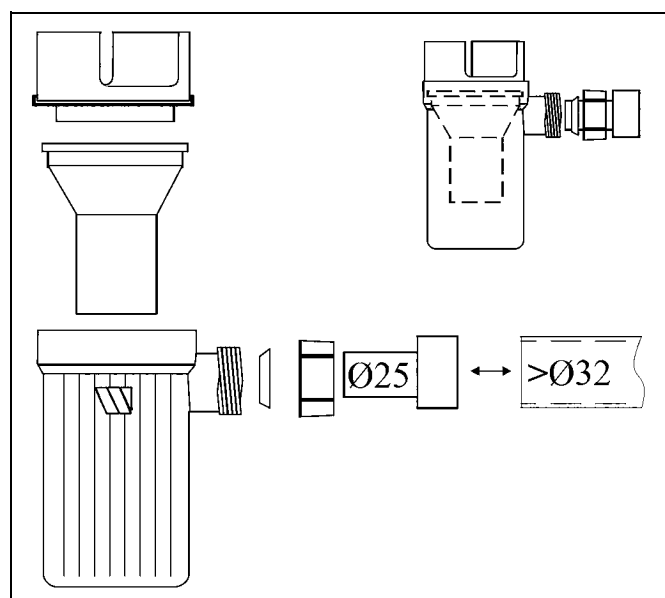
After mounting of the cold water meter remember to check and tighten all threaded connections.



7.2.2 Siphon

Placed the Siphon directly under the Safety valve.

Ensure that the drainpipe has a minimum internal diameter of 32mm.



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7.3 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.

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8.0 Troubleshooting

8.1 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.

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8.2 Troubleshooting DHW



Problem	Possible cause	Solution
Too little or no DHW.	Strainer in supply or return line clogged.	Clean strainer(s).
	DHW circulation pump out of order or with too low setting.	Check circulation pump.
	Defective or clogged non-return valve.	Replace – clean.
	No electricity.	Check.
	Wrong setting of automatic controls, if any.	To adjust an electronic controller for DHW, pls. note enclosed instructions for electronic controller.
	Scaling of the plate heat exchanger.	Replace – rinse out.
	Defective motorized valve.	Check (use manual function) – replace.
	Defective temperature sensors.	Check – replace.
	Defective controller.	Check – replace.
Hot water in some taps but not in all.	DCW is being mixed with the DHW, e.g. in a defective thermostatic mixing valve.	Check – replace.
	Defective or clogged non-return valve on circulation valve.	Replace – clean.
Tap temperature too high; DHW tap load too high.	Thermostatic valve adjusted to a too high level.	Check – set.
Temperature drop during tapping.	Scaling of the plate heat exchanger.	Replace – rinse out.
	Larger DHW flow than the substation has been designed for.	Reduce DHW flow.
Thermostatic control valve does not close	Temperature difference between DH supply and DHW set point too low.	Lower the set point temperature or increase the DH supply temperature.

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8.3 Disposal



Disposal

This product should be dismantled and its components sorted, if possible, in various groups before recycling or disposal.

Always follow the local disposal regulations.

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9.0 Declaration

9.1 Declaration of conformity

Category 0 without electrical equipment



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EU-DECLARATION OF CONFORMITY

Danfoss A/S
Danfoss District Energy Division

declares under our sole responsibility that the product(s)

Small substations - type:
Termix One, Termix Novi, Termix BTB.

Covered by this declaration is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

Machinery Directive 2006/42/EC

DS/EN 60204-1/A1:2009, Safety of machinery – Part 1 –
General Requirements.

DS/EN 12100:2011, Safety of machinery – Risk
assessment.

Date <i>3/8-2016</i>	Issued by <i>Claus G. Mortensen</i> Claus Gjøderum Mortensen	Date <i>3/8-16</i>	Approved by <i>Marina Friis Skov</i> Marina Friis Skov
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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

ID No. LUK30001

Revision No. 01

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503N0014A03 1st issue
Substations Category 0

2014-02

Printed copy for reference only

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