

Danfoss

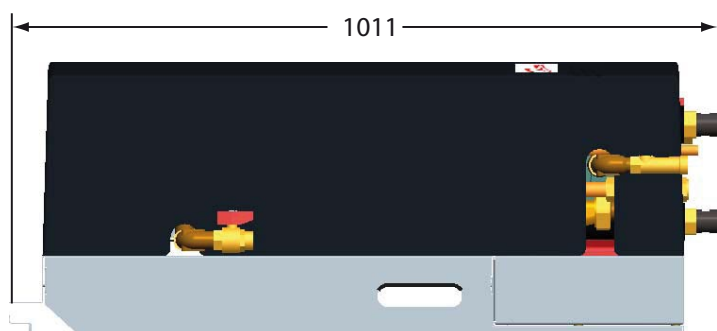
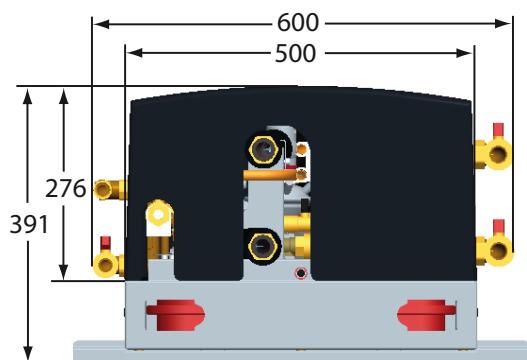
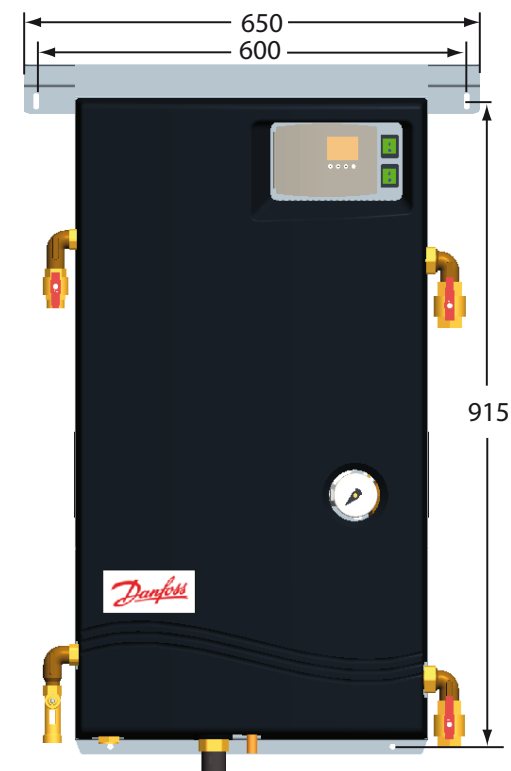


Instruction

Wall-mounted substation Hertta-100/Hertta-200

LPM

You have chosen a high-quality product to your home. We hope you will be as pleased with the substation as those customers we have served for over 30 years!



Application

Hertta-100/-200 is a substation for connecting one- and two-family houses to district heating networks. The substation is used for heating and domestic hot water.

Hertta-100/-200 is a reliable, safe and compact choice with modern design. The new energy saving district heating technology and components are used in the manufacturing. The substation includes an insulated cover which increases product safety.

Content

Application and dimensions	2
Safety notes.....	3
Delivery.....	3
Storage.....	3
For the property owner	3
Installer section:	
Installation	4
Pipe connections.....	5
Electrification and start-up	6
Controller:	
Installer and user section	
ECL Comfort 300 controller	7
Setting up temperatures	7
Appearance of the controller and button functions	7
Installer section	
1. Manual control.....	8
2. Flow temperature limits	9
3. Temp. limiting thermostatic function	9
4. Sensor displays	10
User section	
1. Setting the time and date	10
2. Setting the heat curve.....	11
3. Setting room temperature	12
4. Setting domestic hot water temperature.....	12
Installer and user section	
Basic parameters, settings	13
Standard components.....	14
Service	16
Trouble shooting	16
Dimensioning tables.....	18
Circuit diagram.....	20
Electrical circuit diagram	21
Spare-parts list	22
Options	25
Service book.....	26
General Warranty Conditions	27

Instruction

Hertta-100/Hertta-200 substation

Safety notes



Read the instructions carefully before installation and start-up of the substation. Danfoss does not bear responsibility for whichever damages of device, which have not been mounted or stored in accordance with following instructions.

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

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

Warning of high pressure and temperature

Following temperature and pressure settings have been recommended by the Finnish Energy Industries. All Danfoss substations and heat exchangers are manufactured according to European Pressure Equipment Directive PED 97/23/EC.

Maximum temperature of flow medium: +120°C.

Maximum working pressure:
 - primary side 1,6 MPa
 - domestic hot water circuit 1,0 MPa
 - heating circuit 0,25 MPa

The risk of persons getting injured and equipment being damaged increases considerably if the recommended permissible operating parameters are exceeded.

Warning of hot surface

Under the insulated cover the substation includes hot surfaces which can cause skin burns. Please be extremely cautious in close proximity of the substation.

During winter time the temperature in the primary side is +115°C or even higher. In the heating circuit temperature of flow medium can be up to +80°C.

Be aware of hot water if your heating system has leakages.

Warning of transportation damage

Prior to installing the substation, please make sure that it has not been damaged during transportation. Be extremely careful when lifting or moving the substation.

Warning of bacteria formation

Domestic hot water (DHW) always includes risk of bacteria formation. That can be avoided by setting temperature limits to DHW and circulation water.

The temperature of DHW supply has to be at least +58°C. The temperature of returning circulation water has to be at least +55°C. This prevents many warm resistant bacteria (e.g. legionella bacteria) from increasing in DHW circuit.

Electrification

Electrical connections can be done by authorized service personnel only.



Delivery

Hertta-100/-200 substation is delivered in a cardboard box. The delivery includes fittings for wall-mounting, instruction and spare part of gaskets.

Storage

If the substation is stored prior to installation in a warehouse or some other storage, make sure that the place is dry and heated.

For the property owner

The installer you've chosen will install the wall-mounted substation Hertta-100/-200 in your property and you will have a chance to enjoy warmth and domestic hot water.

The delivery includes fittings for wall-mounting. The authorized personnel will connect the substation into district heating as well as heating and domestic hot water networks. In addition you need to have a power outlet (10A/220V). An outside temperature sensor is installed with a plug-in connection.

Once you have your substation running there is usually no need to change settings or other functions. District heating substation is very reliable and easy-to-use heating equipment. If necessary, you can change the settings in the controller and make your own schedules.

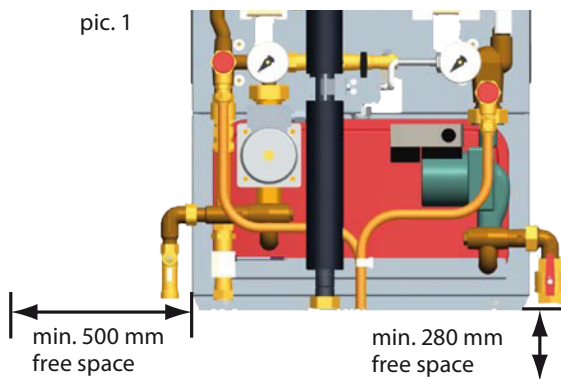
By regularly observing the function of the substation it is possible to notice failures and this way prevent bigger faults to build up. If facing possible failures in function pls check the "Troubleshooting" section page 16.

Installer section

Installation



pic. 1



Leave adequate space around the substation for mounting and maintenance purposes. It is important to leave extra space either below or the on the sides of the substation in order to change the expansion tank (pic. 1).

It is also important to pay attention to the fact that substation's operation sound can reach the rooms, depending on the location of the boiler room and the building materials.

Take the substation out of the cardboard box as shown on the picture 2.

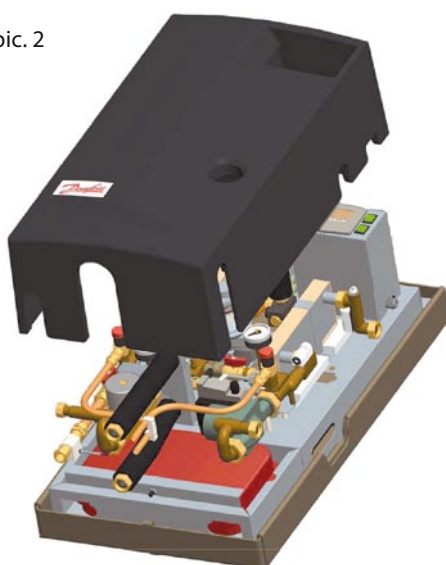
The substation is mounted on the wall on separate rail (pic. 3). Before mounting make sure that the structure of the wall is strong enough to carry the weight of the substation.

A picture of the set of district heating fittings for inlet and return connections (sold as an option) can be found on the page 25.

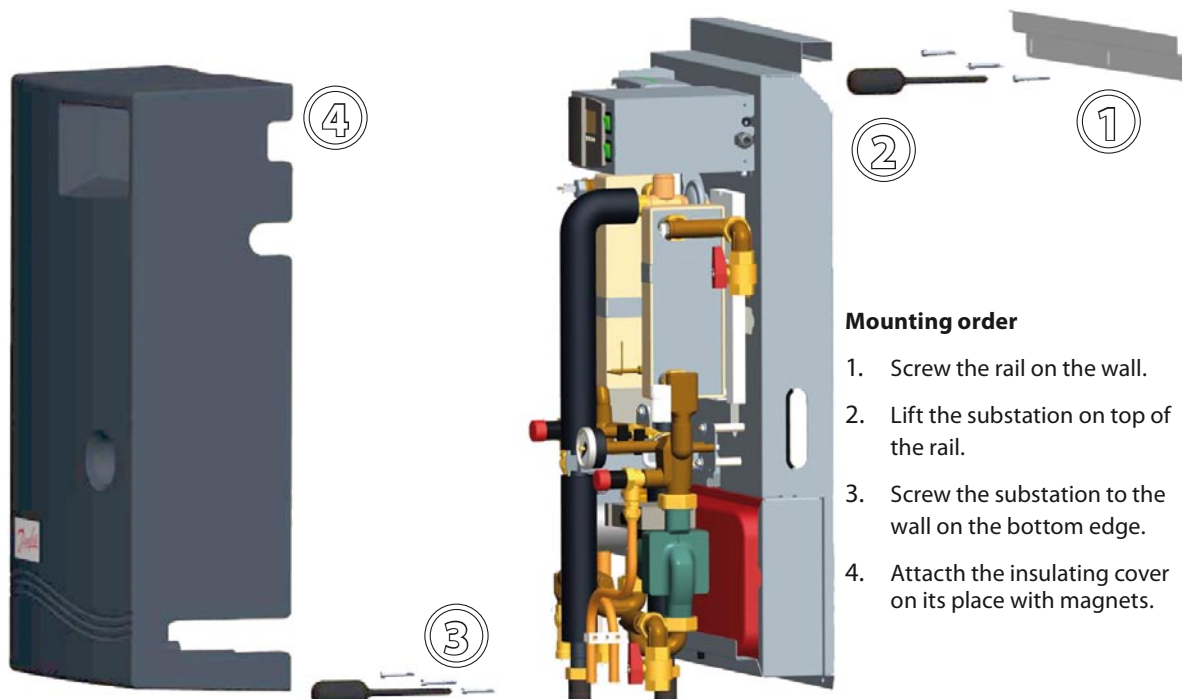


Remember proper lifting technique and do not move the substation on your own.

pic. 2



pic. 3

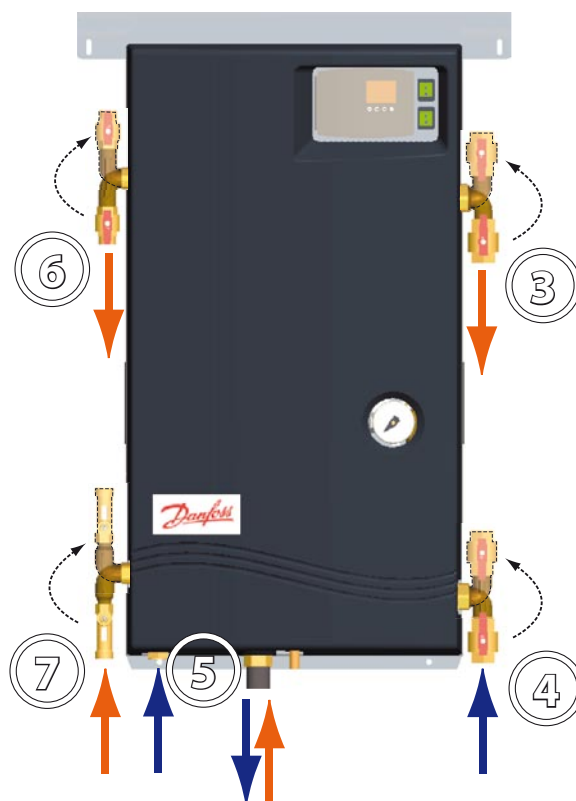


Mounting order

1. Screw the rail on the wall.
2. Lift the substation on top of the rail.
3. Screw the substation to the wall on the bottom edge.
4. Attach the insulating cover on its place with magnets.

Installer section

Pipe connections

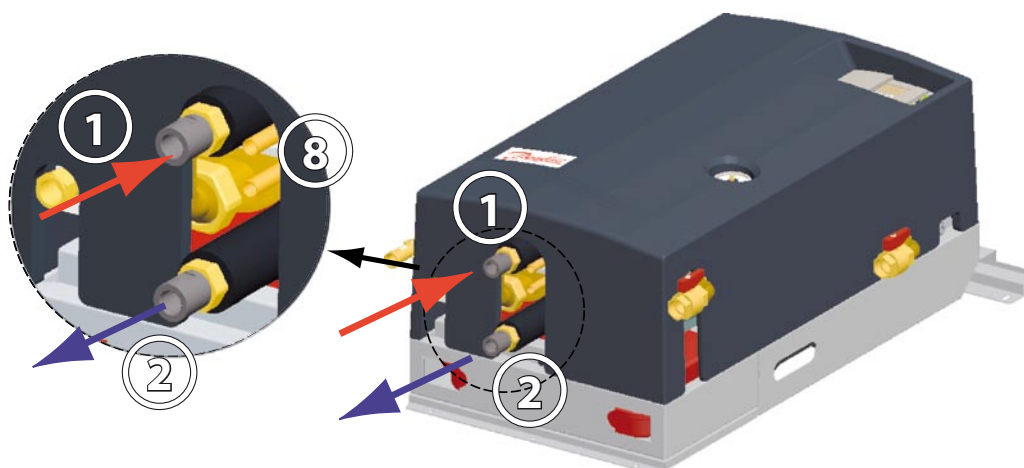


Substation has to be connected to the district heating network, heating, domestic hot water and circulation networks in the building according to the connections and flow directions in the drawing.

- 1 District heating supply, inlet G $\frac{3}{4}$ int. thread
- 2 District heating return, inlet G $\frac{3}{4}$ int. thread
- 3 Heating supply, inlet G1 int. thread, direction for connection can be chosen
- 4 Heating return, inlet G1 int. thread, direction for connection can be chosen
- 5 Domestic cold water \varnothing 22 Cu
- 6 Domestic hot water, inlet G $\frac{3}{4}$ ext. thread, direction for connection can be chosen
- 7 Domestic hot water circulation, inlet G $\frac{3}{4}$ ext. thread, direction for connection can be chosen
8. Extraction pipes for safety valves \varnothing 15 Cu



The connection to the district heating network can be done only by a qualified installer accepted by the district heating distributor.



DHW circulation

Remember to connect the DHW circulation. If your property does not have the DHW circulation, you have to take the DHW circulation as far as possible in the boiler room or build up a short (recommended min. length 3 m and pipe size DN15) loop for the DHW circulation.



The substation manufacturer takes no responsibility for failures in controls if the DHW circulation has not been connected.

Installer section

Electrification and start-up

The substation fulfills the European Directives for Electrification EMC 89/336/EC and LVD 97/23/EC. When the substation is under maintenance and when starting up the contact plug has to be pulled out.

All electrical equipment open to exterior moisture and water when starting up, should be protected prior to exposure. Components that have to be protected are the control box, the pumps and the sensors.

The substation can be electrified when all work causing moisture is finished, the moisture protections can be removed and possible moisture on the surface on the electrical equipment is to be wiped of. Take approximate glance that no wires that should be electrified are loose!

You are not required to have an electrician to start-up the substation. If you are uncertain, let the electrician take care of connections.

The contact plug is the main electrical switch in the substation.

The outdoor temperature sensor is to be installed on the north side of the property at app. 3 m height, where the outdoor temperature can be measured. There should be no ventilation window at the close proximity to the measuring point. The other end of the outdoor temperature sensor cable is to be connected into the socket on the bottom of the control box. **When connecting outdoor temperature sensor make sure to remove the substation contact plug.**

In case the length of the outdoor temperature sensor cable is not long enough for your property, it is recommendable to change the whole cable. This way extra joints are avoided.



Place for an outdoor temperature sensor plug.

The minimum area for the cable is 0,4 mm² and the maximum length is 125 m. If you choose to use extra joint inspite of recommendation, protect the jointing sleeve with the shrink cable.

Temperature limiting thermostatic function is included in the electronic controller. In case you want to use an external temperature limiting thermostat it can be ordered as an option, see p. 25, Options.

Stick the contact plug into the wall socket fitted with a 10A/220V fuse.

Wait for 10 s, turn the circulation pumps P1 (DHW) and P2 (HE) on by pressing the operating switches on the right side of the electronic controller.



Do not run the pumps without water.

Change necessary setting on the electronic controller. The complete instruction for the controller is included with the substation and the most frequently used functions can be found on this instruction p. 7-13.



All Hertta-100/-200 substations have factory settings for floor heating.

In case your property has a radiator heating system, change necessary heat curve settings (p. 11, Setting the heat curve) and the maximum flow temperature limit (p. 9, Flow temperature limit).

When all connections are finished and electrical equipment has been set up the substation can be taken into use.

✓	Check points, before start-up
	Pipes are connected according to the designs.
	Pre-pressure in the expansion tank is correct (factory setting 1 bar).
	The temperature for the domestic hot water is set to +58°C.
	The outdoor temperature sensor is installed.
	Settings on the electronic controller (in a property with a radiator heating system following settings have to be changed: heat curve, maximum flow temperature limit, temperature limiting thermostatic function).

When you have secured all check points above, you can start-up the substation by following standard procedure:

- open the shut-off valves on primary side slowly
- open the shut-off and the filling valves on internal networks and follow the filling procedure by looking at the manometers.
- take care of air venting the networks
- make sure that the pipe connections are tight

- tighten the connections if necessary
- check the rotating direction of the pumps
- check that flow directions are according to the designs
- make sure the heat curve settings are according to your heating system



Take care of giving operating instructions to the users of the substation.

Installer section

Start-up

✓	Check points, after start-up
	Check the temperatures.
	Check the pressures.
	Thermal expansion.
	Leakages.
	Operation of the pumps.
	Flow directions.
	The operation of the controller, check that the controller mode is set to "Constant comfort temperature" or when using schedules to "Scheduled operation".

Installer and user section

ECL Comfort 300 controller

The ECL Comfort 300 controller is designed for the automatic temperature control of heating and domestic hot water. By using the controller you are given full control over the functions and settings.

The operating switches for the pumps are located on the right side of the electronic controller.



Setting up temperatures

Domestic hot water temperature is set to +58°C. The temperature of the domestic hot water circulation returning to the heat exchanger has to be over +55°C.

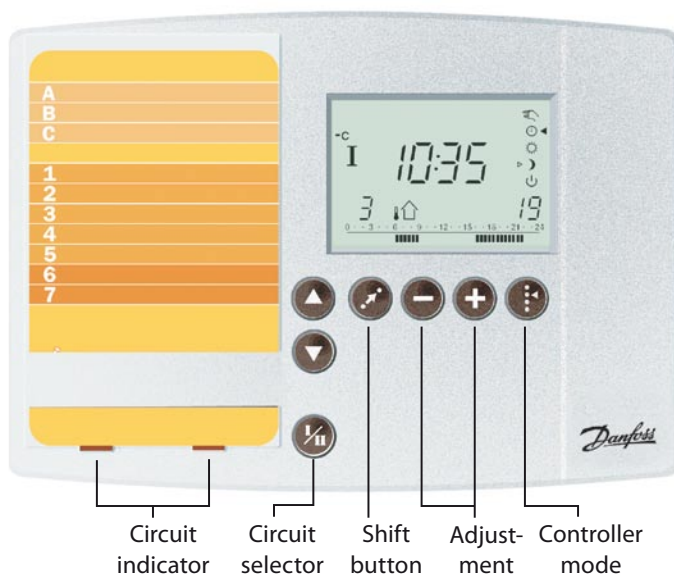
Indoor temperatures due to purpose of use have following recommendations:

- apartments and offices +20°C ... +22°C
- stores, industrial buildings +18°C
- warm stock +12°C
- garage +5°C

The district heating supply temperature is dependable on the outdoor temperature and it is between +70°C ... +120°C. Return temperature has to always be 25°C below supply temperature.

If you want to check the temperatures, see p. 10, chapter 4. Sensor displays.

Appearance of the controller and button functions



Controller mode



Manual operation (used only at maintenance and service)



Scheduled operation (normal mode if the schedules are used, temperature changes automatically following outdoor temperature)



Constant comfort temperature (normal mode, temperature changes automatically following outdoor temperature)



Constant setback temperature



Standby mode



Arrow buttons. Switch between the lines of the ECL Card.



Shift button. Switch between temperatures, changeover points etc.



Adjust temperatures and values etc.



Circuit selector for switching between the circuits.

Installer and user section

Save energy - save money - improve your comfort temperature

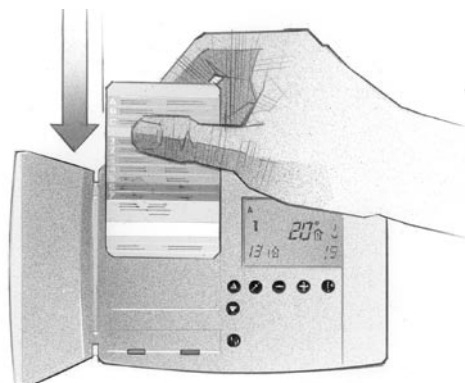
Some of the advantages of the ECL Comfort controller system:

- Secure control and the optimum use of energy resources.
- Control of system temperatures according to seasonal changes and variations in outdoor temperatures.
- Setback temperature periods and low energy consumption while you are out or asleep save heating costs.

The most common energy saving programmes are as factory settings in the controller. You can change schedules to meet your individual needs.

The ECL card inserted in the ECL Comfort controller includes all control data. ECL Comfort controller included in Hertta-100/-200 substation is equipped with a F11 card. The controller allows you to change different control functions depending on which colour is visible, grey or yellow.

- **Yellow side for the user settings;** on this side the property owner can make necessary settings
- **Grey side for the installer settings;** On this side you can change the basic settings in the controller. The property owner can alter certain basic settings on the grey side but it is absolutely necessary to know which kind of effects the alterations have.



The ECL Card can be taken out of the controller any time and either yellow or grey side can be facing you. The controller is not disturbed by this because all settings stay active in the controller memory.

It is recommendable to let the ECL Card to stay in the controller with the yellow side facing you.

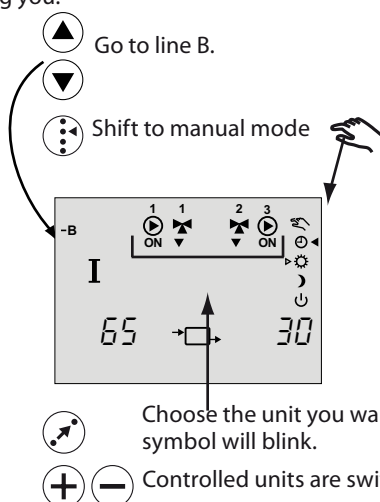


The buttons in the controller are locked in 23 minutes after the ECL card has been removed from its place. In order to reactivate the buttons insert the ECL Card into its place with the yellow side facing you.

Installer section

1. Manual control

The setting is done on the grey side of the ECL Card, place the card into the controller with the grey side facing you.



Do not leave the controller in the "Manual control" mode after finishing maintenance or service work. The normal mode is "Constant comfort temperature" or when using schedules "Scheduled operation".

Installer section

2. Flow temperature limits

The setting is done on the grey side of the ECL Card, place the card into the controller with the grey side facing you.

Go to line 2.

Min. flow temp.

Setting range

Adjust the min. limit of your system temperature. The left end of the setting range blinks.

Max. flow temp.

Setting range

Choose the max. limit. The right end of the setting range blinks.

Adjust the max. limit.

Radiator heating system

The factory settings in the controller are suitable for the floor heating systems. If your premises have a radiator heating system change the flow temperature max. limit according to the table beside.

Flow temperature max. limits		
Setting range	Radiator heating	Floor heating
10 ... 110°C	85°C	45°C

3. Temperature limiting thermostatic function

The setting is done on the grey side of the ECL Card, place the card into the controller with the grey side facing you.

Thermostatic function stops the heating circulation pump when the flow temperature exceeds set temperature (line 78) and does not drop during ΔT_{ALARM} (line 81).

a) Flow temperature max. limitation during heating, thermostatic function (T_{ALARM})

b) Reaction time (ΔT_{ALARM})

Go to line 78.

Set the desired limitation of the flow temperature.

Go to line 81.

Set the reaction time, setting range 5...250 s

Radiator heating system

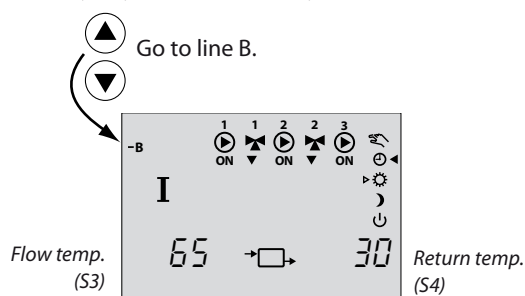
The factory settings in the controller are suitable for the floor heating systems. If your premises have a radiator heating system change the temperature limiting function settings according to the table beside.

Temperature limiting function settings		
Setting range	Radiator heating	Floor heating
10 ... 110°C	90°C	50°C

Installer section

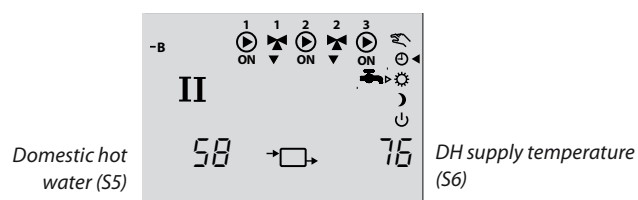
4. Sensor displays

The sensor displays are visible on the grey or yellow side of the ECL Card, place the card into the controller with the grey or yellow side facing you.



Push and hold the shift button to see the calculated flow temperatures and the desired return temperature limitations.

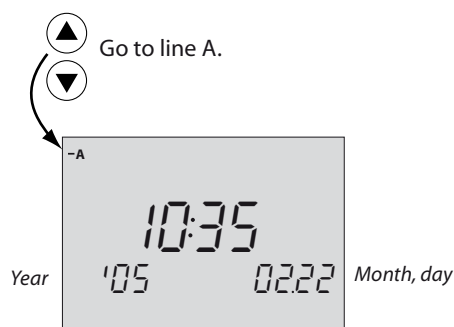
Change the circuit to see circuit II (DHW) sensor temperatures.



User section

1. Setting the time and date

The setting is done on the grey side of the ECL Card, place the card into the controller with the grey side facing you.



Use the shift button to switch between minutes, hours, years, months and days.

Set the correct time and date.

If a power failure lasts over 12 hours, you have to reset the time and date. All other settings stay in the memory.

User section

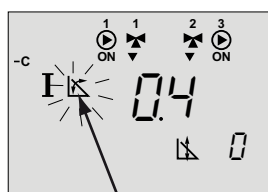
2. Setting the heat curve

The setting is done on the grey side of the ECL Card, place the card into the controller with the grey side facing you.



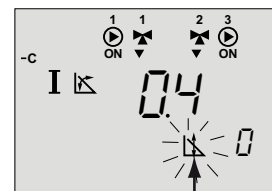
Go to line C.

Heat curve



The symbol for the slope of the heat curve blinks. Adjust the slope.

Parallel displacement



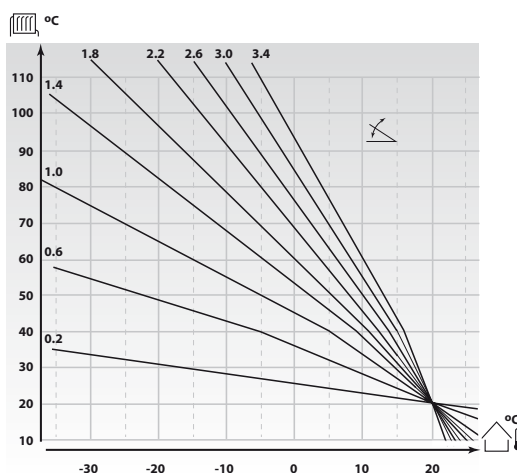
If you want to adjust the parallel displacement of the heat curve, push the shift button. The symbol for the parallel displacement blinks.

Radiator heating system

The factory settings in the controller are suitable for the floor heating systems. If your premises have a radiator heating system change the heat curve settings according to the table below.

Heat curve settings		
Setting range	Radiator heating	Floor heating
0.2 ... 3.4	1.0	0.4

More detailed information on the heat curve settings can be found in the complete ECL Comfort instruction.



Flow temperature in relation to outdoor temperature with 20°C room temperature.

The outdoor temperature changes are compensated with the heat curve. Due to different heat masses of the buildings and the various district heating network conditions it might be necessary to change the heat curve.

Tips for tuning the heat curve

In order to have as economical way of heating as possible you should pay attention to the heat curve setting. The lower the heat curve setting value is, and you still find temperature comfortable, more you save energy.

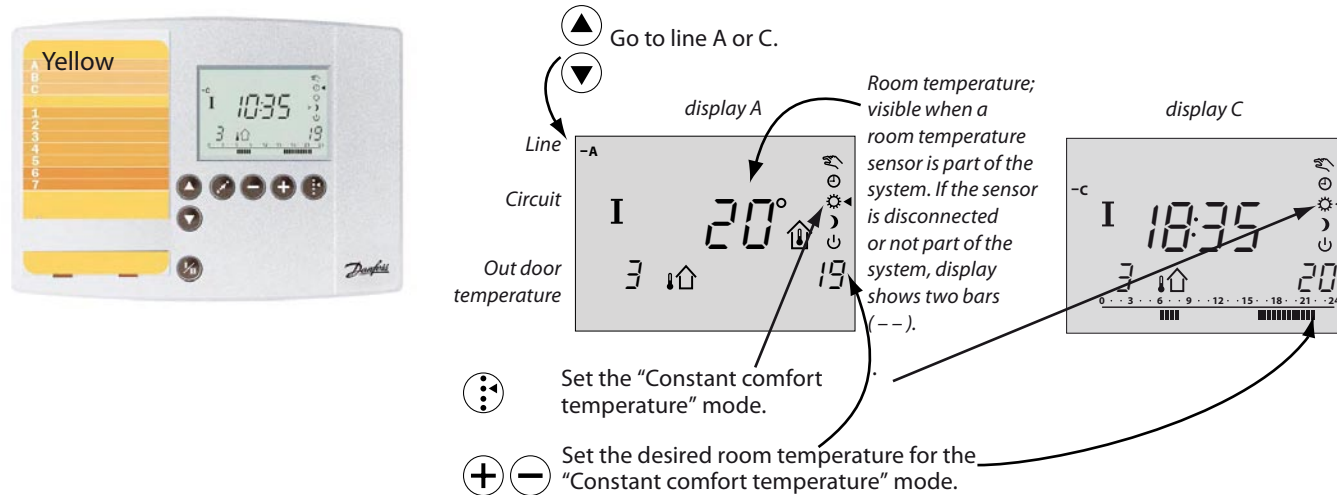
It takes about one year's follow up time to fine tune the heat curve to the optimal stage. You can start the experiment with about two decimals below the basic setting. In a household with a radiator heating system you can start with the setting 0.8 and in a floor heating household the starting curve setting could be 0.2.

If these settings cause chilly feeling raise the setting with one decimal. The best heat curve can be found by experiencing changing seasons. After finding the suitable heat curve the room temperature can be slightly adjusted with changing the room temperature settings, see page 12, chapter 3. Set up the room temperature.

User section

3. Set your room temperature

The setting is done on the yellow side of the ECL Card, place the card into the controller with the yellow side facing you.



Go to line A or C.

Line -A

Circuit I

Out door temperature 3

display A

Room temperature; visible when a room temperature sensor is part of the system. If the sensor is disconnected or not part of the system, display shows two bars (--).

display C

Set the "Constant comfort temperature" mode.

Set the desired room temperature for the "Constant comfort temperature" mode.

Is the room temperature too low?

Before changing the room temperature in the controller you should adjust the radiator thermostats. If you cannot acquire comfortable room temperature with that raise the room temperature setting. Additionally see p. 17. Troubleshooting.



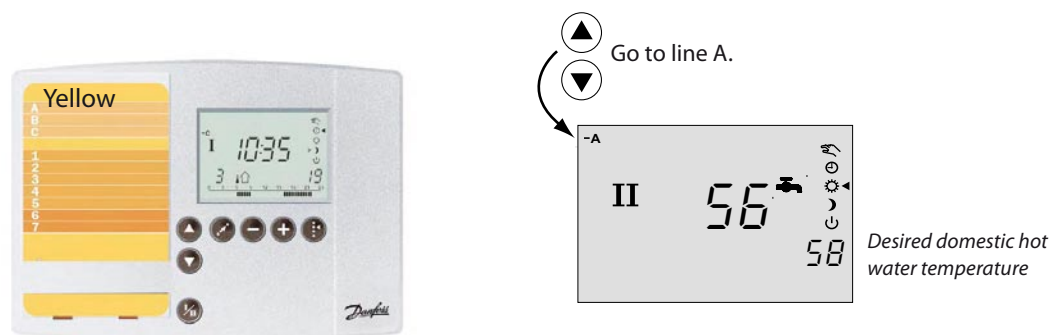
The room temperature is visible only if the room temperature sensor is connected into your equipment. It is sold as an option, see p. 25 Options. It gives more possibilities with the controls but it is not obligatory.



The setting of the desired room temperature is important even if the room temperature sensor is not connected. It has an effect on the temperature in your property.

4. Setting domestic hot water temperature

The setting is done on the yellow side of the ECL Card, place the card into the controller with the yellow side facing you.




Go to line A.


Line -A

Circuit II

display A

Desired domestic hot water temperature 56

 Push the button to choose domestic hot water circuit (II, DHW).

 Set the desired domestic hot water temperature.

Instruction

Hertta-100/Hertta-200 substation

Installer and user section

Basic parameters, settings

Below you can find a list of factory settings in the controller. You can mark the changed settings on the table.

ECL Card, yellow side, circuit I (heating)

Line		Setting range	Factory setting	Setting	Comments
A	Room temp. and the setback temp.		20/16		To change the room temperature push until points mode. Change the temperature with buttons.

ECL Card, yellow side, circuit II (domestic hot water)

Line		Setting range	Factory setting	Setting	Comments
A	DHW temperature and the set back temp.		58/58		To change the DHW temperature push until points mode. Change the temperature with buttons

ECL Card, grey side, circuit I (heating)

Line		Setting range	Factory setting	Setting	Comments
C	Heat curve	0,2 ... 3,4	0,4		Note! In a radiator heating system the typical setting is 1,0.
C	Parallel displacement	-9 ... 9 K	0 K		
1	Limit for heating cut-out	10 ... 30 °C	18 °C		
2	Flow temperature, min. and max. limits	-10 ... 110 °C -10 ... 110 °C	20 °C 45 °C		Note! In a radiator heating system change the max. temp. to 85 °C.
3	Room temperature influence min. and max	0 ... 99 -99 ... 0	0 -40		
4	Proportional band, Xp	1 ... 250 K	100 K		
5	Integration time constant, Tn	5 ... 999 s	20 s		
6	Running time of the motorized control valve	5 ... 250 s	96 s		
7	Neutral zone, Nz	0 ... 9 K	3 K		
78	Flow temperature, max. limitation during heating (thermostatic function)	10...110 °C	50 °C		Note! In a radiator heating system change the temp. to 90 °C.
81	Reaction time, ΔT_{ALARM}	5...250 s	60 s		

ECL Card, grey side, circuit II (domestic hot water)

Line		Setting range	Factory setting	Setting	Comments
4	Proportional band, Xp	1 ... 250 K	60/120 K		
5	Integration time constant, Tn	5 ... 999 s	13 s		
6	Running time of the motorized control valve	5 ... 250 s	15 s		
7	Neutral zone, Nz	0 ... 9 K	1 K		
148	Acceptable temperature deviation above the desired flow temperature	1...99 K	7 K		
149	Time interval before activation of alarm function	1...99 min	10 min		

Additional features and parameters are described more in detail in the controller's complete instruction.

Instruction

Hertta-100/Hertta-200 substation

Standard components

Pumps

Domestic hot water circulation pump (P1)

Domestic hot water circulation pump (1) circulates warm water in the network in order to guarantee warm water fast enough and to avoid unnecessary water running.

Do not stop the domestic hot water circulation pump even in the summer time because that has negative effect on the controlling functions.

The rotation speed of the pump can be adjusted either to bigger or smaller value on the operating switch on the side of the pump. The installer has to set the circulation flow to meet the designed value.

Heating circulation pump (P2)

Heating circulation pump (2) circulates water between the substation and the radiators or floor heating piping. The bearings in this type of circulation pump are oiled with water which means that it has to stay on year around.

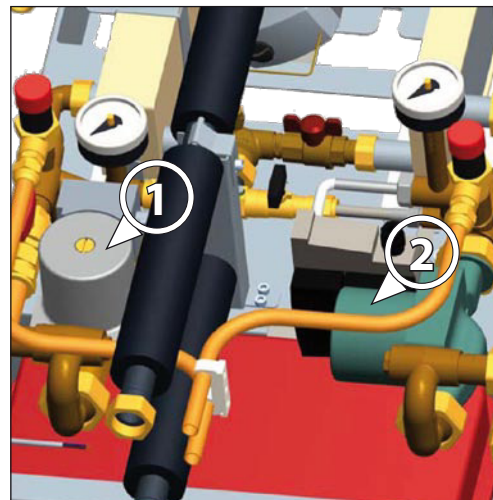
In the summer time the controller takes care of heating circulation pump operation in normal heating system by regularly rotating the pump once and a while preventing oxidation of the pump. The controller also prevents district heating valve from getting stuck by opening and closing the valve regularly.

Filling up and air venting

Usually air gets out of the motor automatically after short usage.

If the rotor space needs air venting:

- Cover all electrical components from water splashes.
- Let the pump run.
- Open the air venting screw and let the air come out. Depending on the working pressure and the temperature of flow media, it is possible that hot liquid or steam spurts out when opening the air venting screw.

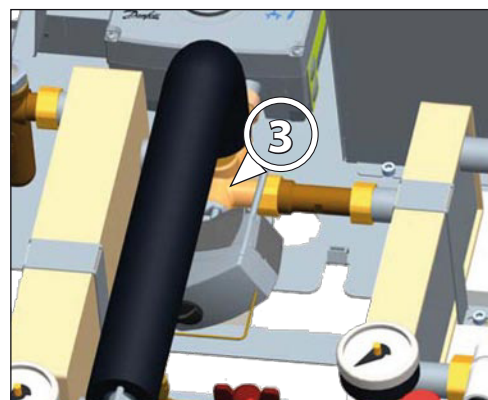


- Close the air venting screw after 15-30 seconds.
- After opening the air venting screw the pump might shut down due to high static pressure (system pressure).

Control valves

The Hertta substation includes an integrated controller (3) with two control valves and a differential pressure controller. The electronic controller controls the temperatures with the motorized control valves. The controller directs the domestic hot water temperatures by comparing controller settings with measured domestic hot water temperatures and the heating is directed by the outdoor and flow temperatures.

The controller directs the functioning of the control valves so that they do not get stuck and stay in function also during summer time. If you want for some specific reason to service the control valves manually, the water surfaces in the valves can be cleansed in the beginning of the heating season by running the valve manually open - closed a couple of times. (see page 8, chapter 1. Manual control)



Instruction

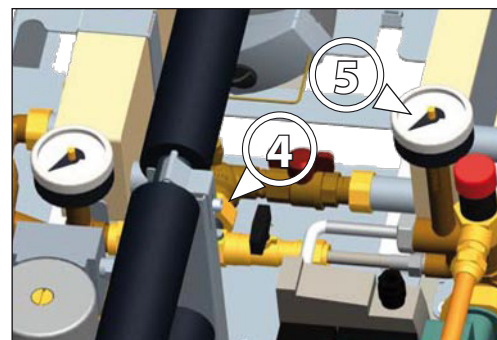
Hertta-100/Hertta-200 substation

Standard components

Filling valve for the heating circuit

The filling valve (4) is used for filling up the heating circuit. You have to open both shut-off valves which are located one after another. The circuit has to be filled until it reaches a normal setting range (0,6 - 1,2 bar). The network pressure can be read on the manometer (5).

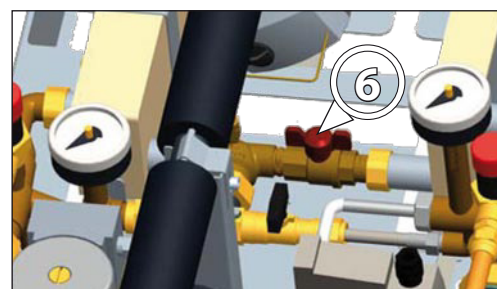
When the circuit is full (0,6 – 1,2 bar) both shut-off valves in the filling valve have to be closed. Write down the filling date. If filling needs to be done on regular basis you have a reason to suspect leakage in the network.



Summer shut-off valve

The summer shut-off function is automatically regulated by the controller reacting to the outdoor temperature changes.

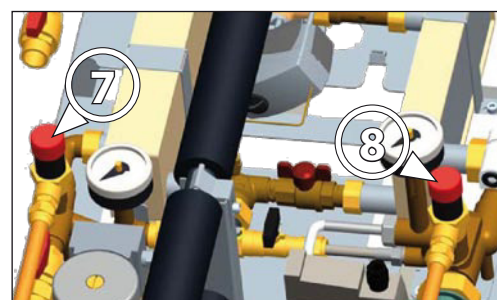
It is recommendable to let the controller take automatically care of the summer shut-off function. If needed for some reason, the place for the summer shut off valve (6) is pointed out in the drawing.



Safety valves

Safety valve is a spring loaded valve which opens under certain, predetermined pressure. It prevents excessive pressure in a closed network.

It is recommendable to test the operation of the safety valves (7, 8) once a year by turning the red knob open and close.



Instruction

Hertta-100/Hertta-200 substation

Service

It is necessary to check and maintain the substation on regular basis in order to keep it in good operating condition. It is important to notice possible leakages as early as possible.

General overview of the equipment should take place at least twice a year (before and after the heating season). More accurate service should take place once a year by authorized personnel.

Always use authorized service personnel when the equipment needs service. Concerning maintenance and warranty issues in Finland, please contact Danfoss LPM's service organisation first. If the maintenance and warranty issues concern matters in other countries, please contact your local Danfoss Sales Company. See page 27, General Warranty Conditions.

At least following points should be observed before and after the heating season:

✓	Check points, maintenance inspection
	No leakages.
	The pressure on the secondary side has to be acc. to designs (the place for the manometer p. 15, number 5.)
	Extraordinary noises.

At least following points should be inspected once a year by authorized personnel:

✓	Check points, service inspection
	Check the strainer if necessary.
	Check supply and return temperatures.
	Check the parameters of the controller.
	Check pressure drops in the heat exchangers.
	The cooling of district heating water should comply with the requirements given by the local DH company.
	Measure the pre-pressure in the expansion vessel.
	Check that the operating point of the pump stays within allowed area on the pump curve.

Trouble shooting Domestic hot water (DHW)



If your substation is not working properly check the following problem situations with their solutions to find out the possible cause for the malfunctioning.

Problem	Possible cause	Solution
DHW smells bad or is coloured. ▶	DHW heat exchanger has an internal leakage. ▶	Get in contact with local Danfoss Sales Company.
The temperature of DHW changes more than usually. ▷	The filter is clogged. ▷	Get in contact with the district heating distributor.
	The DHW controlling does not work or the control valve is broken. ▷	Get in contact with local Danfoss Sales Company.
The DHW controlling does not work. ▶	Trash in the control valve or the valve is broken. ▶	Use "Manual Control" mode to open the control valve momentarily in order to remove possible trash, see p. 8.
	The controller is broken. ▶	Get in contact with local Danfoss Sales Company.

Instruction

Hertta-100/Hertta-200 substation

Trouble shooting Heating

If your substation is not working properly check the following problem situations with their solutions to find out the possible cause for the malfunctioning.

Problem	Possible cause	Solution
The room temperature is too low.	Disruption in the district heating distribution.	▶ Get in contact with the district heating distributor.
	The filter is clogged.	▶ Get in contact with the district heating distributor.
	The heat curve in the controller is not correct.	▶ Check the heat curve setting, see p. 11
	Temperature limiting thermostatic function settings are not correct.	▶ Check thermostatic function settings, see p. 9
	▶ Failure in the heating circuit controls.	▶ Get in contact with local Danfoss Sales Company.
	Circulation pump has stopped.	▶ Turn the pump on, check e.g. heat relay.
	Pressure in the heating circuit is too low.	▶ Add water through the filling valve. Write down the filling date.
	Air in the heating circuit.	▶ Remove air from the radiators, add water if necessary.
The room temperature is too high.	Fouling in the heat exchanger.	▶ Get in contact with local Danfoss Sales Company.
	The heat curve in the controller is not correct.	▷ Check the heat curve setting, see p. 11
	The controller in the heating circuit is broken.	▷ Get in contact with local Danfoss Sales Company.
Heating control is not working.	The controller is left in "Manual control" mode.	▶ Set the controller to "Constant comfort temperature" or "Scheduled operation" mode, see p. 7.
	▶ The controller, sensor or motorized control valve is broken.	▶ Get in contact with local Danfoss Sales Company.
	The control valve is stuck or broken.	▶
Water in the heating circuit increases and excess water comes out through the safety valve for the expansion vessel.	▷ The heat exchanger has an internal leakage.	▷ Get in contact with the district heating distributor and/or local Danfoss Sales Company.
	▷ The filling valve in the heating circuit leaks into the heating circuit.	▷ Get in contact with local Danfoss Sales Company.
Pressure in the heating circuit is too low.	▶ Heating circuit has too little water or the circuit has a leakage.	▶ Add water into the circuit through the filling valve. Write down the filling date. If this happens often, get in contact with local Danfoss Sales Company.
The return temperature in the heating circuit is high.	▷ The difference between district heating and heating circuit return temperatures is big.	▷ Get in contact with local Danfoss Sales Company.

Other situations

Problem	Possible cause	Solution
The pump sounds strange.	▶ Air lock in the pump.	▶ Stop the pump for a moment to remove the air lock.
	The bearing in the pump is broken.	▶ Get in contact with local Danfoss Sales Company.
The control valve has a strong, whistling sound.	The control valve is broken.	▷ Get in contact with local Danfoss Sales Company.
	▷ Pressure difference is too big in the district heating network.	▷ Get in contact with the district heating distributor.
Water leaks on the floor in the boiler room or the heat exchanger insulation is wet.	▶ The heat exchanger has an external leakage.	▶ Get in contact with the district heating distributor and/or local Danfoss Sales Company.
The pressure or the temperature of the district heating water differs significantly from normal.	▷ Disruption in the district heating distribution.	▷ Get in contact with the district heating distributor.
The controller buttons do not work.	▶ The buttons in the controller are locked.	▶ The buttons can be reactivated by inserting ECL Card into its place with the yellow side facing you, see p. 8.
The outdoor temperature is not visible on the display.	▷ The outdoor temperature sensor has been connected to the substation with the power on.	▷ Pull the substation contact plug out and reconnect it.

Instruction Hertta-100/Hertta-200 substation

Dimensioning tables

Hertta-100: Floor heating, heating for new and old properties

HEAT EXCHANGERS	Unit	DOMESTIC HOT WATER		FLOOR HEATING		HEATING new building		HEATING old building	
Manufacturer	Oy Danfoss Ab								
Type		XB06H-38		XB10-1-12		XB10-1-12		XB10-1-12	
Capacity	kW	60		17		13		14	
		Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Flow	dm³/s	0.32	0.30	0.05	0.45	0.05	0.11	0.07	0.17
Temperatures	°C-°C	70-25	10-58	115-35	30-39	115-45	40-70	115-65	60-80
Pressure drop	kPa	9	7	1	18	1	1	1	4
Dimensioningpressure	MPa	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Material		EN 1.4401							

CONTROLLERS	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Manufacturer		Danfoss			
Type		ECL 300 (F11)			

CONTROL VALVES	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Manufacturer		Danfoss			
Type		IHPMM-F			
Flow	dm ³ /s	0.32	0.05	0.05	0.07
Pressure drop	kPa	52.8	56	43.2	98.9
Size/kvs-value	DN/kvs	15/1.6	15/0.25	15/0.25	15/0.25

CIRCULATION PUMPS	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Manufacturer		Wilo			
Type		Star Z 25/6	Stratos ECO 25/1-5		
Flow	dm ³ /s	0.09	0.35	0.11	0.17
Pump head	kPa	20	46	21	24
Current / Voltage	A	0.43/230	0.46/230	0.46/230	0.46/230

EXPANSION AND SAFETY EQUIPMENT	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Volume/Pressure drop of the network	dm ³ /kPa				
Volume of the expansion tank / pre-pressure	dm ³ /kPa		12/100	12/100	12/100
Size of the safety valve / opening pressure	DN/kPa	15/1000	15/250	15/250	15/250

N:o	Quantity	Equipment	Dimensioning
	1	Differential pressure controller	DN 15/4.0
	1	Flow switch	

QUARANTEED PRESSURE DIFFERENCE IN DISTRICT HEATING NETWORK:

kPa

Instruction Hertta-100/Hertta-200 substation

Dimensioning tables

Hertta-200: Floor heating, heating for new and old properties

HEAT EXCHANGERS	Unit	DOMESTIC HOT WATER		FLOOR HEATING		HEATING new building		HEATING old building	
Manufacturer	Oy Danfoss Ab								
Type		XB06H-52		XB10-1-30		XB10-1-30		XB10-1-30	
Capacity	kW	82		42		42		36	
		Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
Flow	dm³/s	0.44	0.41	0.13	1.12	0.15	0.34	0.18	0,44
Temperatures	°C-°C	70-25	10-58	115-35	30-39	115-45	40-70	115-65	60-80
Pressure drop	kPa	9	8	1	19	1	2	2	6
Dimensioningpressure	MPa	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1,6
Material		EN 1.4401							

CONTROLLERS	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Manufacturer		Danfoss			
Type		ECL 300 (F11)			

CONTROL VALVES	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Manufacturer		Danfoss			
Type		IHPMM-F			
Flow	dm ³ /s	0.44	0.13	0.15	0.18
Pressure drop	kPa	41	53.9	71	103
Size/kvs-value	DN/kvs	15/2.5	15/0.63	15/0.63	15/0.63

CIRCULATION	Unit	DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Manufacturer		Wilo			
Type		Star Z 25/6	Stratos Para 25/1-8		
Flow	dm ³ /s	0.12	1.12	0.34	0.44
Pump head	kPa	20	49	32	36
Current / Voltage	A	0.43/230	0.93/230		

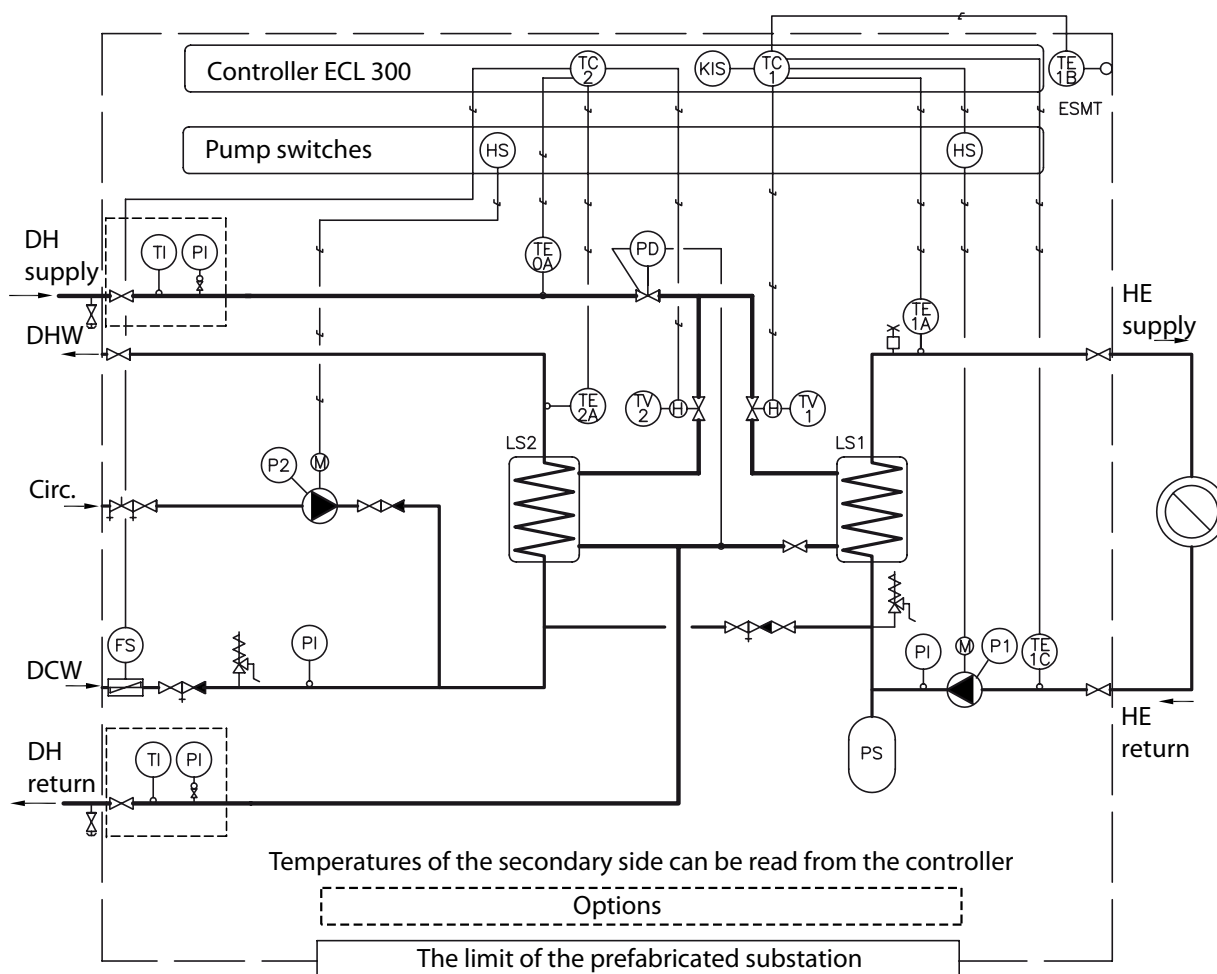
EXPANSION AND SAFETY EQUIPMENT		DOM. HOT WATER	FLOOR HEATING	HEATING	HEATING
Volume/Pressure drop of the network	dm ³ /kPa				
Volume of the expansion tank / pre-pressure	dm ³ /kPa		12/100	12/100	12/100
Size of the safety valve / opening pressure	DN/kPa	15/1000	15/250	15/250	15/250

N:o	Quantity	Equipment	Dimensioning
	1	Differential pressure controller	DN 15/4.0
	1	Flow switch	

QUARANTEED PRESSURE DIFFERENCE IN DISTRICT HEATING:

kPa

Circuit diagram, Hertta-100/-200

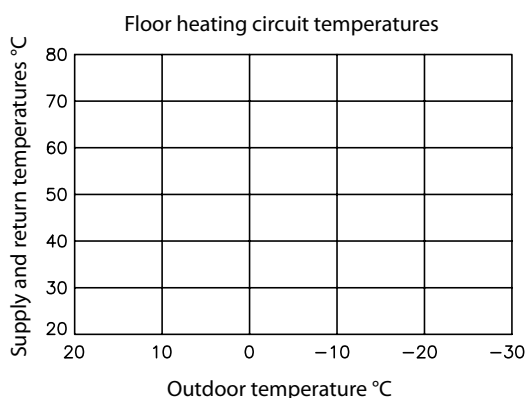


CONTROLLING DOMESTIC HOT WATER TEMPERATURE

The controller TC 2 regulates the control valve TV 2 according to the values measured by the domestic hot water sensor TE 2A. The temperature of domestic hot water is kept at the controller temperature setting. The recommended value is 58°C.

CONTROLLING FLOW TEMPERATURE IN THE FLOOR HEATING CIRCUIT

The controller TC 1 regulates the control valve TV 1 according to the values measured by the flow temperature sensor TE 1A and the outdoor temperature sensor TE 1B. With the sensor information, the flow temperature stays at the value set in the controller.



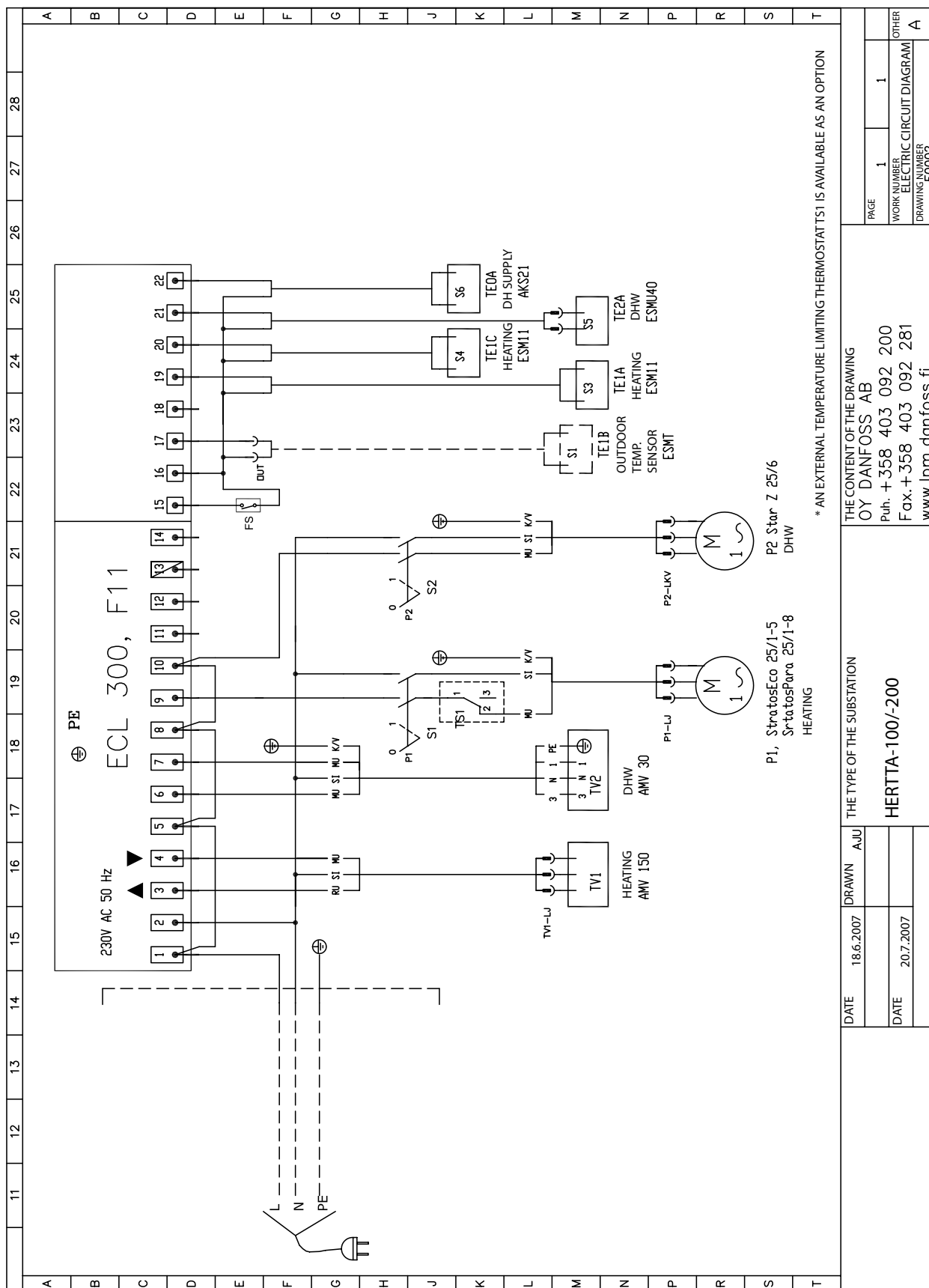
TEMPERATURE LIMITING FUNCTION IN THE FLOOR HEATING CIRCUIT

Temperature limiting thermostatic function for the flow temperature directs the pump shut down and the control valve closing functions. When the flow temperature rises over the maximum limit and exceeds the reaction time, the controller shuts down the pump P1 and closes the control valve TV1. The pump restarts immediately after the flow temperature has sunk below the set maximum temperature. If the temperature does not drop below the limit, the controller starts the pump after 26 minutes for the delay time. After that the pump shuts down again if the temperature has not sunk.

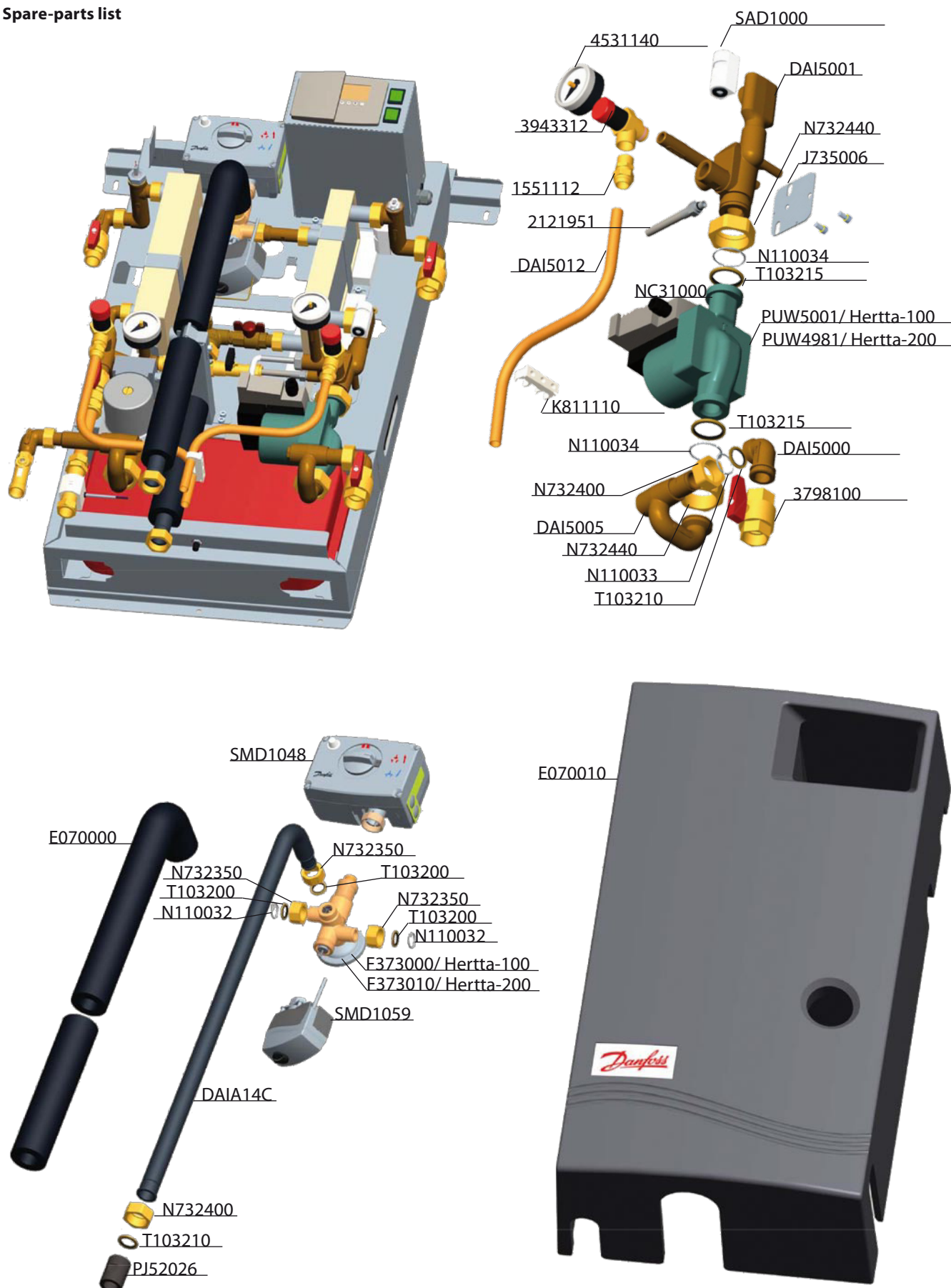
Instruction

Hertta-100/Hertta-200 substation

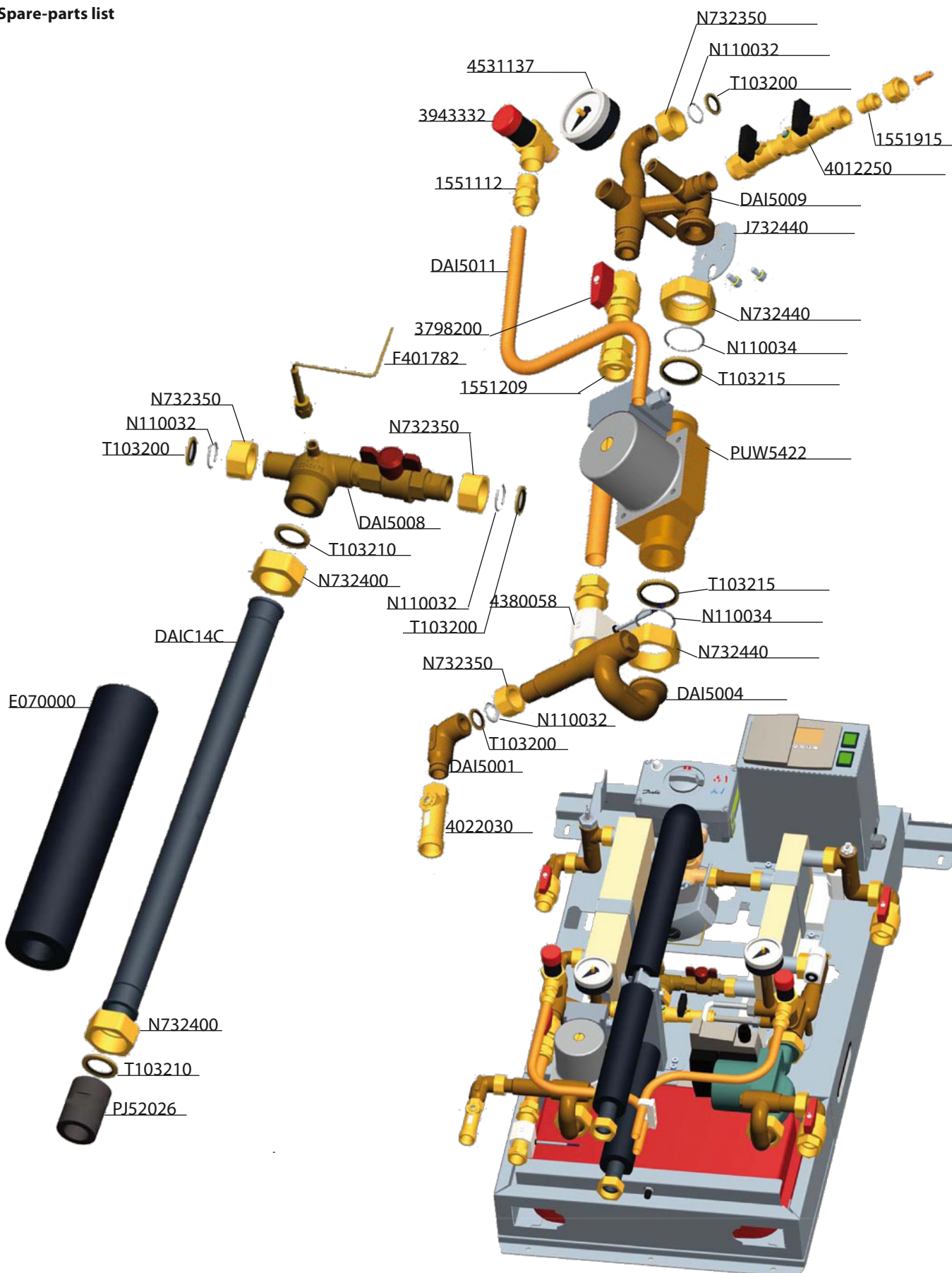
Electrical circuit diagram, Hertta-100/-200



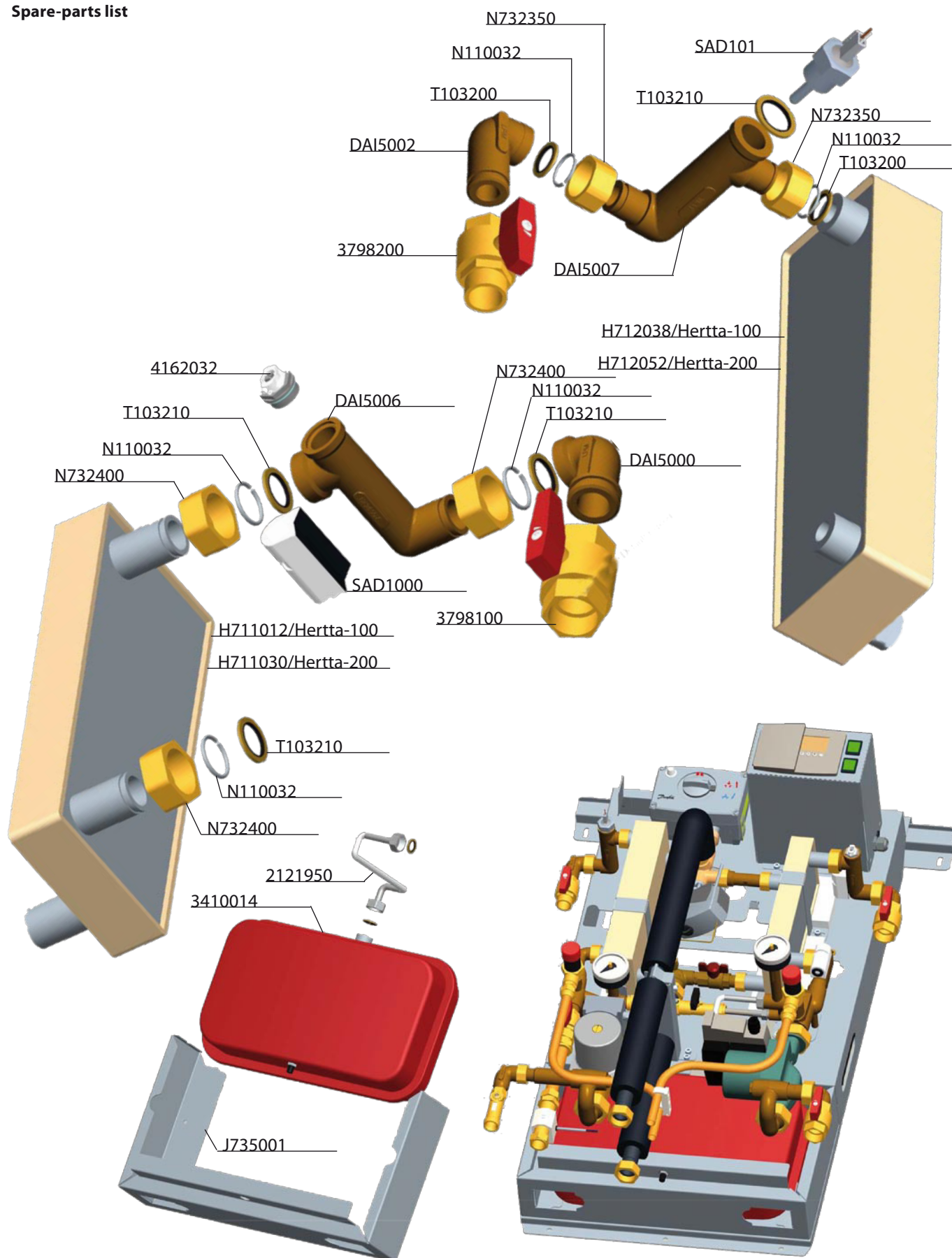
Spare-parts list



Spare-parts list



Spare-parts list



Spare-parts list



Option:
Set of district heating fittings for
inlet and return connections

Options:

- Set of district heating fittings for inlet and return connections (shut-off valve, thermometer and manometer)
- External temperature limiting thermostat
- Room temperature sensor Danfos ESM-10, 087B1164

Instruction Hertta-100/Hertta-200 substation

Service book

The substation has been taken into use acc. to given instructions and the users of the substation have been given operating instructions (see p. 3-7).

Place and date _____

Installer information:

Company: _____

Name of the installer: _____

Signature of the installer: _____

The regular maintenance has been done following manufacturer recommendation (see p. 16).

Date	Installer's company, name and signature	Service work

With warranty matters get in contact with your local Danfoss Sales Company.

Oy Danfoss Ab • Danfoss LPM

General Warranty Conditions

1) Scope of application and warranty provider

This warranty shall apply to Danfoss LPM heating substations and heat exchangers that are supplied by Oy Danfoss Ab, for district heating use.

2) Warranty period

This warranty shall be in force, as follows:

- Heating substation components 12 months from the initialization or 18 months from the delivery date, whichever period concludes earlier
- Pipework parts and connectors 12 months from the initialization or 18 months from the delivery date, whichever period concludes earlier
- Heat exchangers 12 months from the initialization or 18 months from the delivery date, whichever period concludes earlier

A change of ownership causing transfer of goods for continued use will not terminate this warranty. Product which has been repaired or replaced is not granted the new or extended warranty.

3) Scope of warranty

The guarantee covers the new component but not the costs for the assembly of the component.

Oy Danfoss Ab shall not be responsible for faults in cases where, as can be proven, the good's deteriorated quality or non-conforming applicability is obviously due to:

- Careless or faulty installation or repair work (such as insufficient pipe work supports, the wrong operating environment)
- Exceeding the maximum pressure level (pressure shocks)
- External stress (temperature, mechanical stress, etc.)
- Poor circulation water quality (does not fill the national requirements)

4) Reporting faults

The buyer shall report any faults to Oy Danfoss Ab within 14 days from the date on which they had, or should have, detected the fault in question.

5) Correcting faults

In cases where the fault in question is covered by the warranty defined in these conditions, Oy Danfoss Ab shall be obliged to correct the fault by delivering flawless goods within a reasonable period of time once a fault report has been received. The liability of Oy Danfoss Ab is limited and does not cover the indirect costs and damages.

6) Settling disputes

The Buyer shall be entitled to submit a warranty condition dispute to the Finnish Arbitral Tribunal for settlement. All disputes will be handled in English.

**Disposal instruction:**

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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