

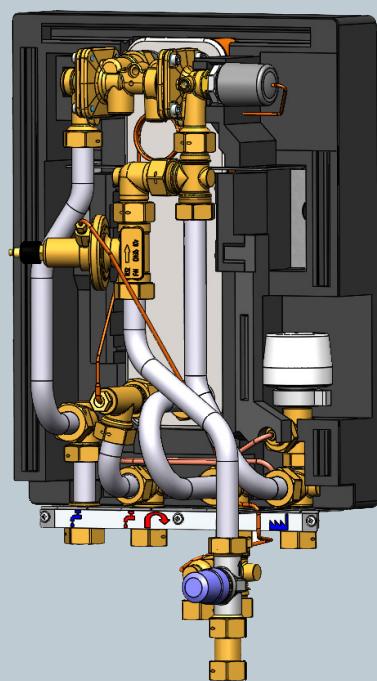
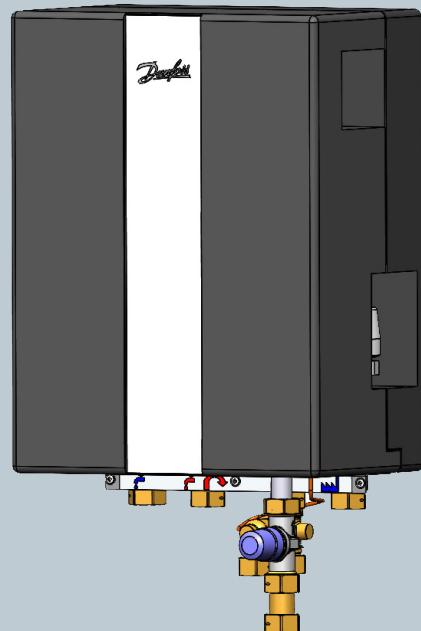
Mounting and Installation Guide

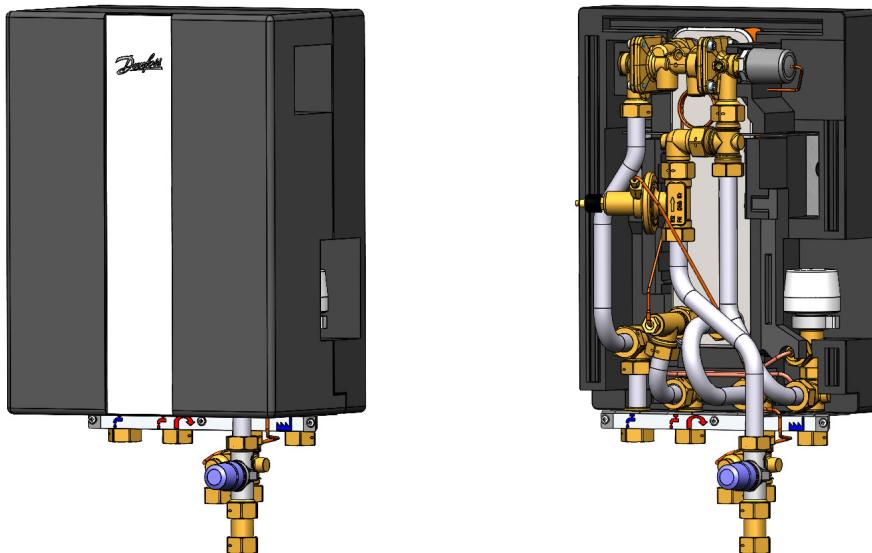
Akva Lux II TDv substation

Fully insulated district heating substation for low-temperature district heating and instantaneous domestic hot water.

Akva Lux II TDv

Fully insulated district heating substation for district heating and instantaneous DHW





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2. INSTALLATION INSTRUCTIONS, SAFETY AND HANDLING

Instructions

Please read these instructions carefully before installing and commissioning this substation. The manufacturer accepts no liability for loss or damage resulting from failure to comply with these instructions for use. Read and follow these instructions carefully to prevent the risk of physical injury and/or damage to property. Exceeding the recommended operating parameters considerably increases the risk of personal injury and/or damage to property. Installation, commissioning and maintenance must be carried out by qualified and authorized personnel in compliance with the local safety regulations.

Once the station has been installed and is operating, there is *normally* no need to alter the settings or other functions. The district heating substation is very reliable and easy to operate.

Energy source

The substation is primarily designed for connection to district heating. Alternative energy sources can be used if the operating conditions are equivalent to district heating at all times.

Application

The substation is designed only to operate with water and other heating media may not be used.

The substation is to be connected to the household piping in a frost-free room, where the temperature does not exceed 50 °C and the relative humidity is not higher than 80%. The substation must not be covered, bricked in or otherwise cut off from access.

Choice of materials

Only use materials, that comply with local regulations.

Corrosion

The maximum chloride compounds of the medium must not be higher than 300 mg/l. The risk of corrosion increases considerably if the recommended chloride content is exceeded.

Safety valve(s)

Installation of safety valve(s) must always be in compliance with local regulations.

Noise level.

≤ 55 dB.

PTC2+P controller for domestic hot water

The controller is preset from factory and sealed with a red sticker. This sealing must not be broken.

The warranty becomes void if the sealing is broken.



Storage

Before installation, the units must be stored in a dry, heated (i.e. frost-free) room.

(Relative humidity max. 80% and storage temperature 5-70 °C).

The units must not be stacked higher than the limit at the factory (max. 8 layers). Units supplied in cardboard packaging must be lifted using the handles incorporated in the packaging. Units must be placed on pallets for transport/moving across large distances.

As far as possible, do not lift the substation by the pipes. Lifting by the pipes may cause leaks. REMEMBER to retighten.



Connection

It must be possible to cut off all energy sources to the unit - including electrical connections - at all times. The unit must be connected to an electrical equalizer connection.

Warning! Hot surfaces

Parts of the substation may be very hot and can cause burn injuries. Be very careful when you are in the immediate vicinity of the substation.

Warning of high pressure and high temperature

The maximum supply temperature in the district heating network can be up to 120°C and the operating pressure can be up to 16 bar. This may result in a risk of scalding from touching the substation and from outflow of the medium (water/steam). Exceeding the substation design data and operating parameters for pressure and temperature carries an appreciable risk of personal injury and/or damage to property.

Emergencies

In the event of fire, leaks or other hazards, immediately shut off all sources of energy to the substation, if possible and call for appropriate assistance.

If the domestic hot water is discoloured or malodorous, shut off all ball valves on the substation, notify all users and call for professional assistance immediately.

Warning of damage during transport

On reception of the substation, and before installing it, check for any evidence of damage during transport.

The substation must be handled and moved with the greatest care and attention.

IMPORTANT - Tightening of connections

Before adding water to the system, ALL pipe connections MUST be retightened, as vibrations during transport may have caused leaks. Once the substation has been filled and the system has been put into operation, ALL pipe connections MUST be tightened once more.

(Do not overtighten! - See page 9, Test and Connections)



Handling

We recommend that you wear suitable safety footwear while handling and installing the substation.

NOTE: Interventions/rework on our components results in loss of warranty.

2. INSTALLATION INSTRUCTIONS, SAFETY AND HANDLING

Reach

All products of the Akva Lux II TDv series comply with the provisions of the REACH regulation.

We are therefore obliged to inform our customers about the presence of substances according to the SVHC candidate list, if they are present.

We hereby inform you: This product contains brass parts containing lead (CAS 7439-92-1) in a concentration above 1% (w/w).

Potential equalization / grounding

Equipotential bonding is understood as all measures for eliminating electrical potential differences (contact voltages), which can occur between eg two pipelines. Equipotential bonding is an important measure for protection against electric shock. Equipotential bonding reduces corrosion in the heat exchanger, instantaneous water heaters, district heating stations and plumbing installations. Equipotential bonding should be in accordance with the provisions 60364-4-41: 2007 and IEC 60364-5-54: 2011. Binding point is marked with a grounding symbol on the bottom right corner of the mounting plate and there is a hole in the mounting plate and a label with grounding symbol.

Disposal

The station consists of materials that must not be disposed of with household waste. Disconnect the entire energy supply and disassemble the product for disassembly and dispose of it in accordance with local regulations.

Disposal

Dispose of the packaging in accordance with the local regulations for disposal of used packaging materials.

The substation is made of materials that cannot be disposed of together with household waste.

Close all energy sources and disconnect all connection pipes. Disconnect and dismantle the product for disposal in accordance with the applicable local regulations for the disposal of the individual components.

3. PRODUCT INTRODUCTION

Application

Akva Lux II TDv is a fully insulated substation substation for direct heating and instantaneous domestic hot water for large singlefamily, houses. The Akva Lux II TDv is also suitable for small apartment houses with 2-4 apartments.

Construction

The Akva Lux II TDv is prefabricated with a brazed, highly efficient Danfoss plate heat exchanger type XB06H-1 26 or XB06H-1 40 for domestic hot water production, an energy-saving domestic hot water controller Danfoss PTC2+P as well as a Danfoss FJVR thermostat for control of the bypass/circulation temperature, non-return valve on the cold water connection, differential pressure controller and strainer.

The Akva Lux II TDv is also equipped with a zone valve RA-C and thereby prepared for fitting of a thermal actuator TWA-Q, which enables connection to an electronic programmable room thermostat.

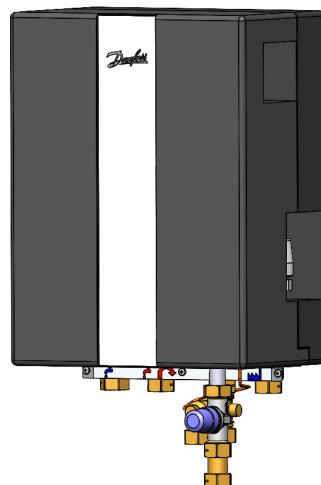
The substation is prepared for domestic hot water recirculation, if required. A circulation set and a safety set is available as optional equipment.

Design

The design emphasizes the user-friendly placement of all components.

The Akva Lux II TDv supplied with an elegant insulation cover and can be supplied with a white-lacquered cover in modern design.

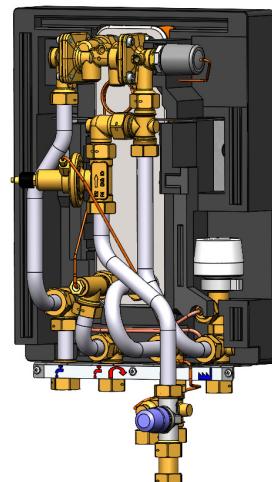
Akva Lux II TDv units are prepared for merger with Danfoss distribution systems, mounted underneath the unit, for use on DHW and heating systems with concealed pipe installations.



Heat exchanger for DHW heating

The substation is based on a brazed, highly efficient plate heat exchanger, which is controlled by a thermostatic and pressure controlled PTC2+P DHW controller.

The Danfoss PTC2+P DHW controller with integrated differential pressure controller and energy saving function ensures that the heat exchanger is cold during standby.



Bypass (thermostatic circulation)

The water heater is supplied with a thermostatically controlled bypass, which ensures that hot water is produced immediately, when tapping starts. The bypass temperature is set with due consideration of the best possible DHW comfort and economy. DHW re-circulation can be easily added to the substation when it is required.

Domestic hot water recirculation

The substation is prepared for connection to systems with DHW recirculation. DHW installations with recirculation ensures DHW at the tap site without waiting time and without water waste. Switching to DHW recirculation is possible from a constructional point of view, requiring only mounting of a separate circulation set (see options). The circulation temperature is set independently of the set DHW temperature. This ensures the best possible DHW comfort, very low standby losses and thus a very good district heating economy.

Service and maintenance

The substation is very service-friendly and easy to install. It is mounted on the wall and as all pipes are placed in pipe bracket distance, it is possible to establish a nice piping either in the top or in the bottom of the substation.

4. GETTING STARTED - QUICK GUIDE FOR EASY START-UP

Mounting

Connect the substation to the household piping in accordance with the labelling at the bottom and/or in accordance with the instructions in this manual.

If the household piping system features domestic hot water recirculation, the substation must be connected to the recirculation system. The circulation set for recirculation connection is not standard equipment. The set must be purchased as extra equipment.

We recommend establishing recirculation BEFORE mounting the substation on the wall.

For instructions about recirculation connection, see page 11.

GETTING STARTED is a quick guide and some details in connection with installation and commissioning may require additional information, which can be found elsewhere in this instruction manual.

GETTING STARTED AKVA LUX II TDv

If the household piping system features domestic hot water recirculation, the substation must be connected to the recirculation system, - according to instructions on page 11.

1. Mount the substation on a solid wall using two sturdy bolts (max. 8 mm), screws, expansion bolts or similar.

2. Close all shut-off valves, before the water heater is connected to the household piping.

3. Tighten all pipe connections, as they may have loosened during transport and handling.

4. On systems that feature a safety valve, establish a drain connection in compliance with the applicable legislation.

5. Fill the heat exchanger / the system with water by opening the ball valve for DH return and subsequently carefully opening the ball valve for DH supply, - and at the same time vent the system.

6. Check the substation and the household piping thoroughly for leaks.

7. Pressure test the entire system for leaks in accordance with the applicable regulations.

8. Heat the system and vent the radiator circuit/heating side thoroughly on the radiators and the air valve, if any.

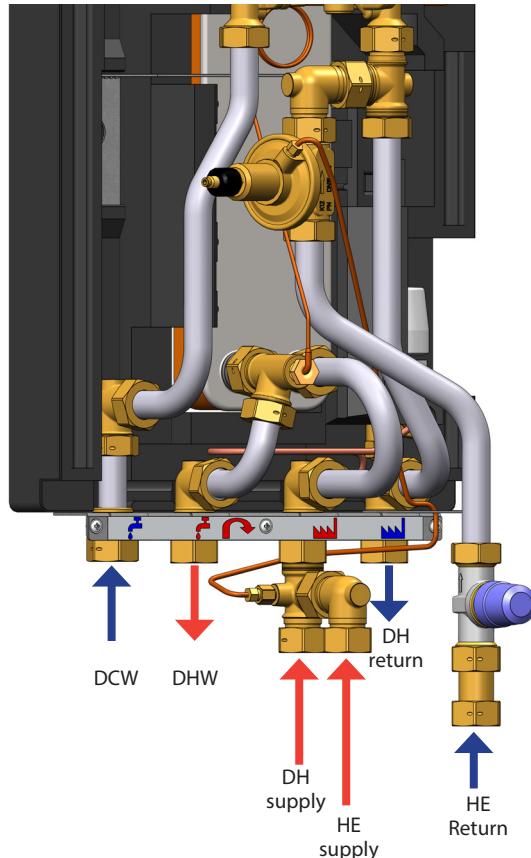
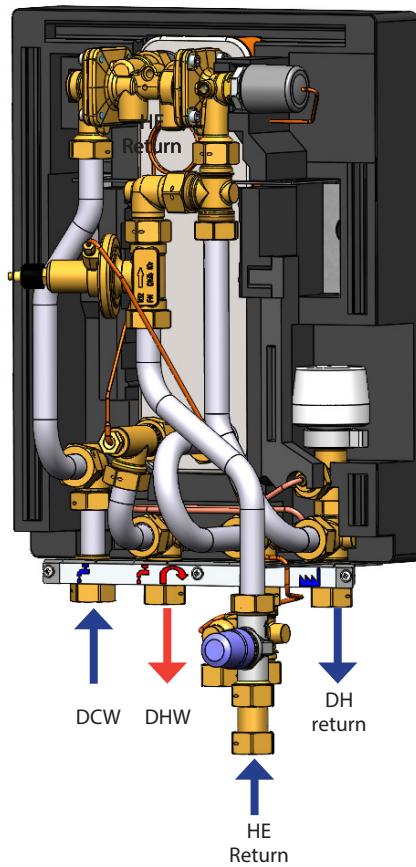
9. Finish by adjusting the substation in accordance with the instruction manuals and remember to fill out the Commissioning Certificate page 23.

Note!

Heating and cooling the substation may cause leaks. Therefore it may be necessary to retighten the connections in the period after commissioning.

Note!

Never lift the station by its front insulation cover!

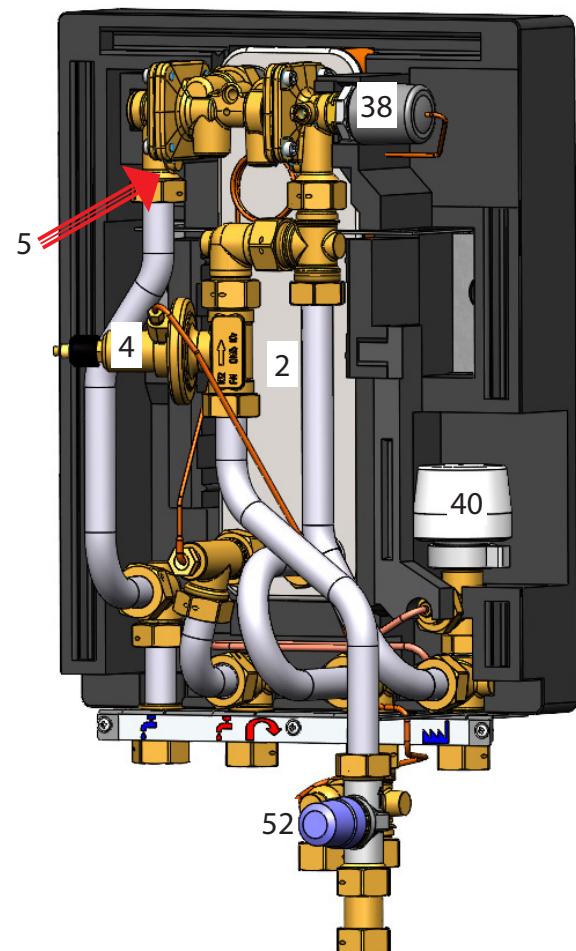


5. MAIN COMPONENTS / CONNECTIONS- AKVA LUX II TDv

- 2. Plate heat exchanger DHW
- 4. Differential pressure controller AVPL
- 5. Strainer
- 38. PTC2+P Controller
- 40. Danfoss FJVR thermostat for bypass/circulation
- 52. Zone valve RA-C



145H4156

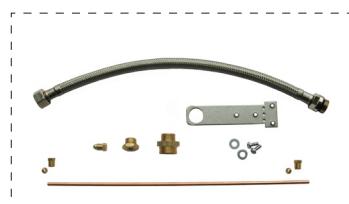


Accessories	Code No.
Cover, white painted H410 x W310 x D210	145H4156
Circulation set for mounting on site	145H4746
Ball valve set for ECO, 2 pc. DVGW, 4 pc. heating (76 mm x 3/4" ET/IT)	145H4015
Safety set for mounting underneath substation	145H3001
Actuator TWA-Q for zone valve	
Supplement for stainless steel HEX XB 06H-1 26StS (26 pl)	
Supplement for stainless steel HEX XB 06H-1 40StS (40 pl)	

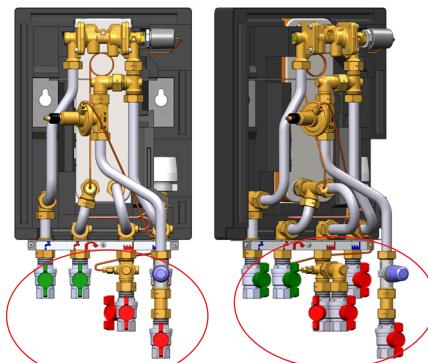
145H3001

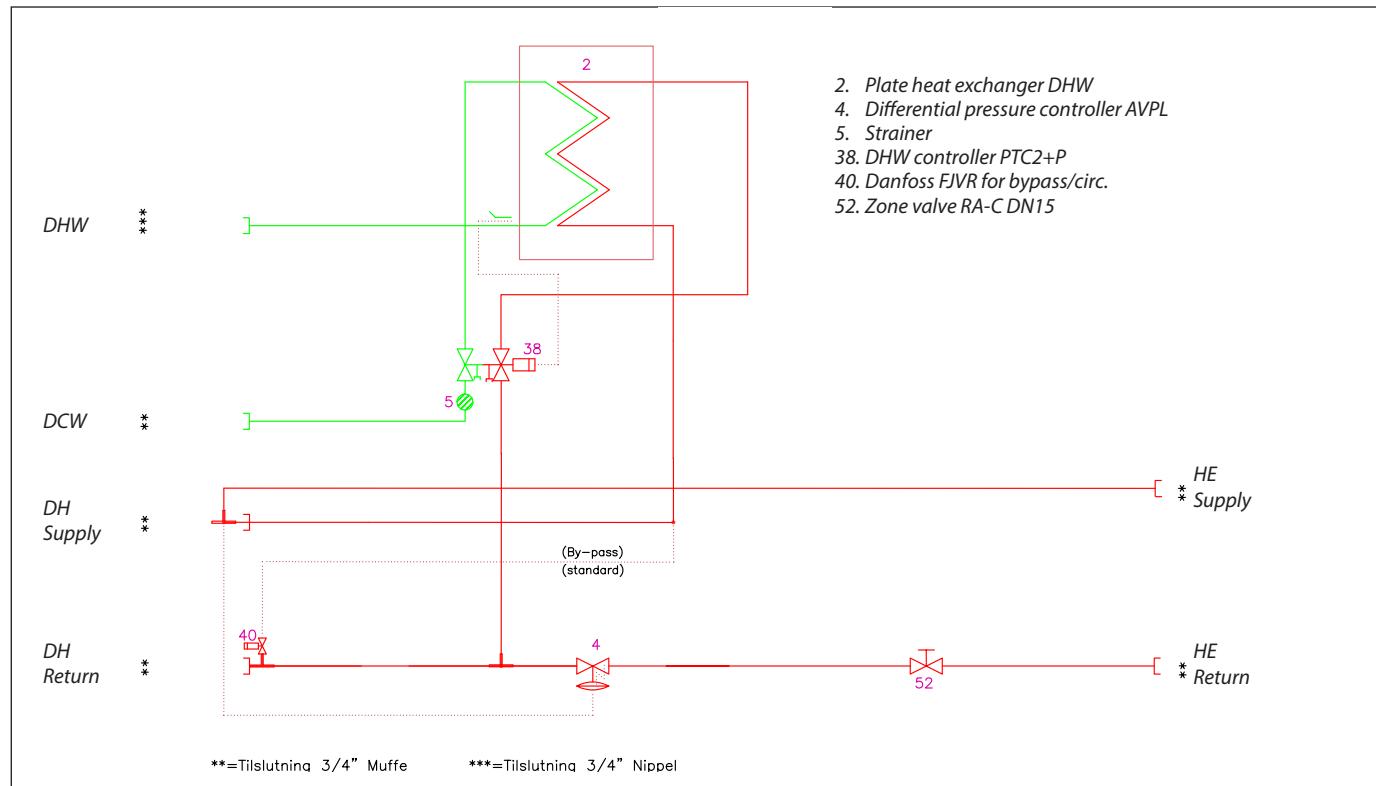


145H4746



Akva Lux II TDv with ball valve set 145H4015



6. DIAGRAM & DIMENSIONAL SKETCH, EXAMPLE - AKVA LUX II TDv


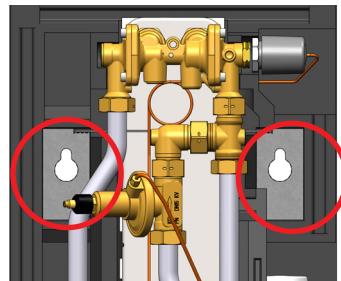
7. GENERAL

General

The installation, connection and maintenance of the substation must be performed by qualified and authorised personnel. Installation must always be performed in accordance with the applicable legislation and in compliance with these instructions. The substation must be installed so that it is freely accessible and can be maintained without unnecessary disruption. Lift the substation by its mounting plate/rear section and secure it to a solid wall using 2 sturdy bolts (max. 8 mm), screws or expansion bolts positioned in the two keyholes.

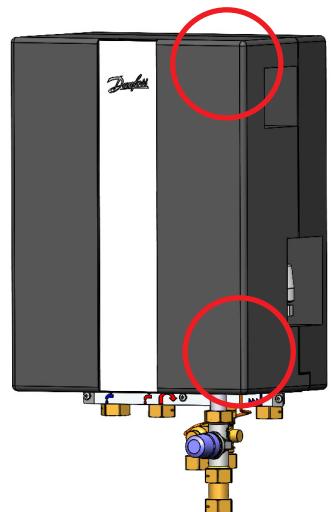
Before commissioning, rinse all the pipes in the household piping system thoroughly to remove any impurities, and check and clean the dirt strainers in the substation.

Connect the substation to the household piping in accordance with the labelling at the bottom and/or in accordance with the instructions in this manual.



Insulation front

The insulation front panel on the Akva Lux II TDv substations can be removed without using tools. Take hold of the air duct in the top and bottom of the front insulation section and pull carefully forward until the front insulation section releases from the rear section. Then pull gently until the front section is free from the components.



Test and connections

Before filling the system with water, retighten all the pipe connections because vibrations and shocks during transport and handling may have caused leaks. Once the system has been filled with water, tighten all the pipe connections once more before performing pressure test for leaks. After heating of the system, check all the connections and retighten if necessary.

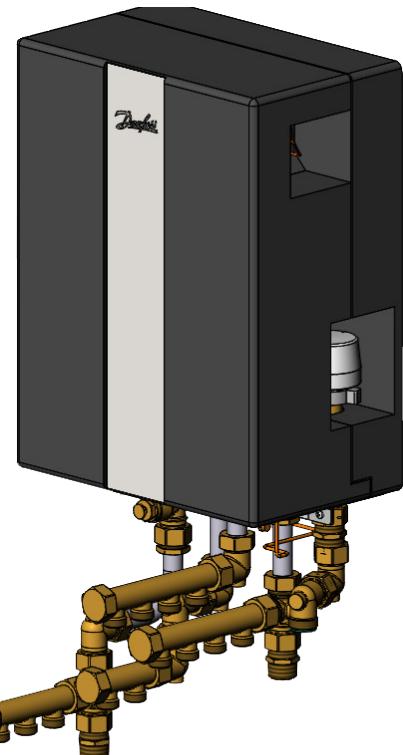
Please note that the connections may feature EPDM rubber gaskets! Therefore, it is important that you **DO NOT OVERTIGHTEN** the union nuts. Overtightening may result in leaks. Leaks caused by overtightening or failure to retighten connections are not covered by the warranty.



Danfoss Distribution Systems

Akva Lux II TDv units are prepared for assembly with Danfoss distribution systems, mounted underneath the units, for use on DHW and heating systems with concealed pipe installations.

Contact Danfoss for further information, configuration and price.



8. RECIRCULATION

If the household plumbing system includes hot water recirculation the substation must be connected to the hot water recirculation system.

Circulation set is not included in the delivery and must be ordered separately.

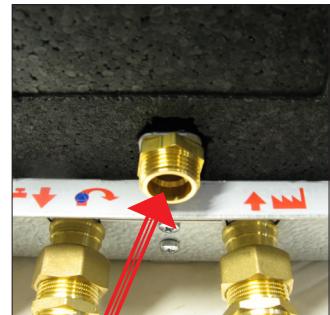
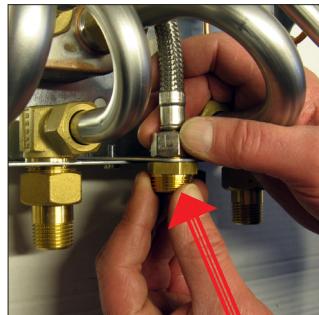
It is to be recommended to prepare the substation for recirculation before mounting it on the wall.

The recirculation pipe in your household plumbing system must be connected to a nipple, mounted on the circulation pipe of the substation. - *See pages 10 to 12 for information about preparation of substation for and connection to the DHW recirculation system.*

Remember always to mount circulation pump and non-return valve on the circulation pipe and to mount safety valve on the DCW inlet. The pump must be installed so that the pump is pumping water towards the water heater.

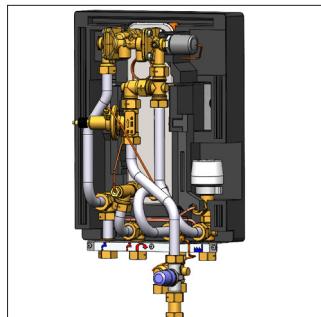
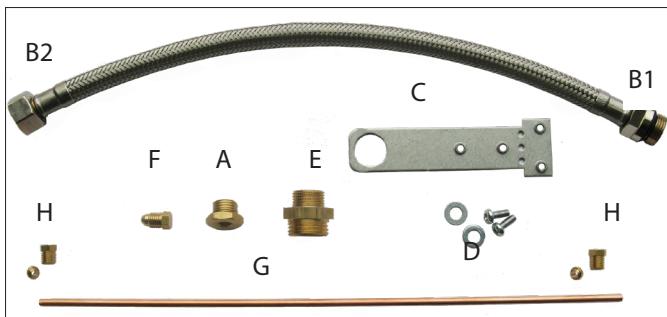
If a time-controlled pump is used, it is to be recommended that the circulation water temperature is set to approx. 35 °C.

If the circulation pump (outside the unit) is switched off for a longer period, it is to be recommended that the Danfoss FJVR thermostat is closed during the same period.



Circulation pipe connection

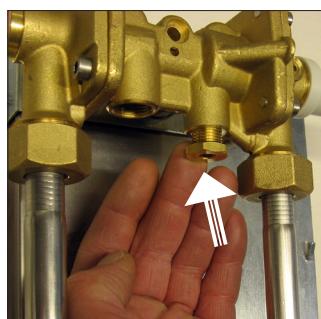
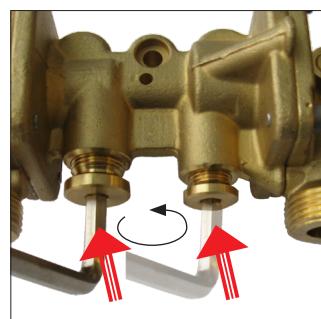
8. RECIRCULATION


Fig. 1

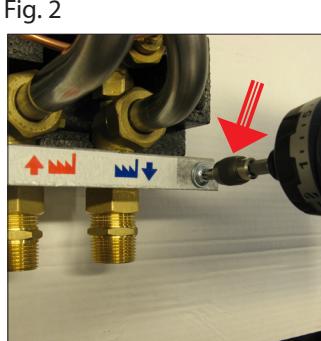
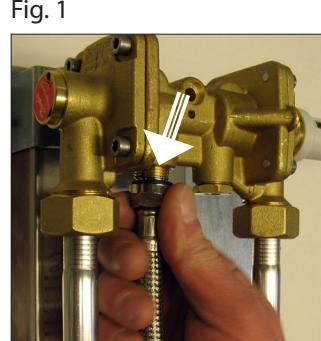
Demount plugs (6 mm Allen key) from controller.

Fig. 2

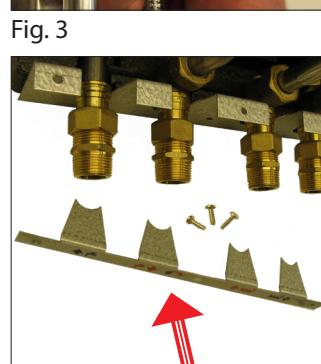
Mount nipple A in controller.


Fig. 3

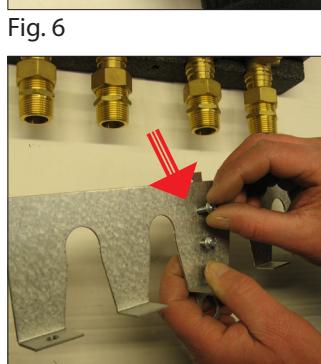
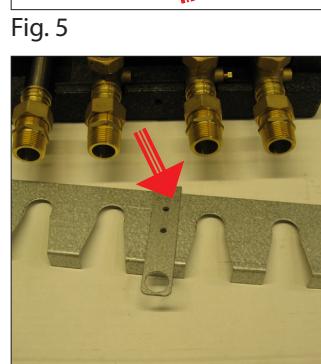
Mount circulation hose end B1 in controller.


Fig. 4

Unscrew the 3 screws on locking rail.


Fig. 5

Demount locking rail.


Fig. 6

Demount support rail, as shown.

Fig. 7

GB: Place bracket C on support rail, as shown.

Fig. 8

Fix bracket C on support rail, by fastening the screws D lightly.

Fig. 9
Demount capillary tube from T-piece.

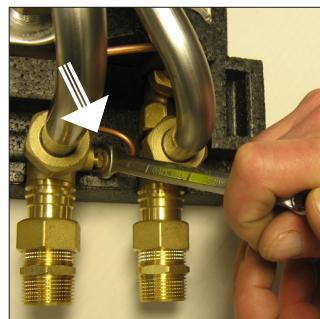


Fig. 9

Fig. 10
Mount m8 x 1 screw plug F in T-piece.

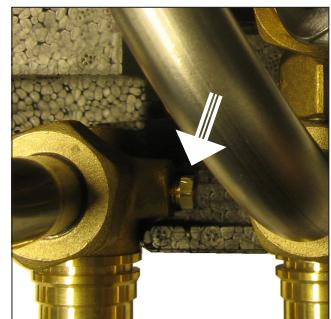


Fig. 10

Fig. 11
Demount capillary tube from T-piece as shown.

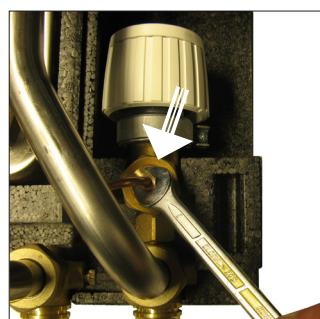


Fig. 11

Fig. 12
Mount support rail and tighten screws D with your screwdriver, as shown.

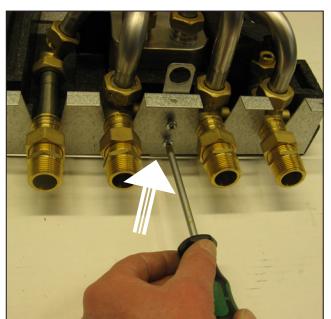


Fig. 12

Fig. 13
Fix locking rail to support rail.

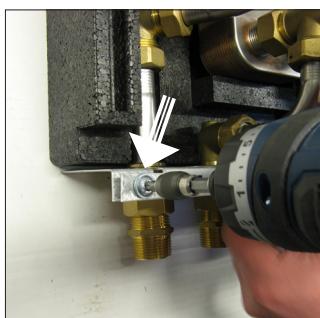


Fig. 13

Fig. 14
Fit new capillary tube G on nipple B by means of union nut and cutting ring H. - Tighten with single end wrench.

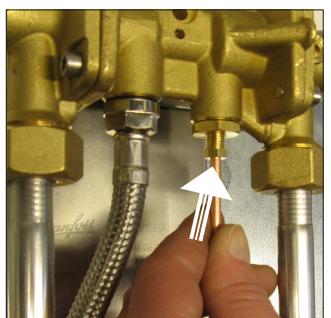


Fig. 14

Fig. 15
Fit the other end of the capillary tube G on T-piece by means of union nut and cutting ring H. - Tighten with single end wrench.

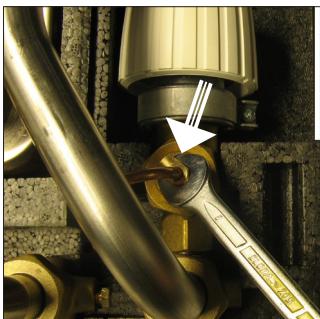


Fig. 15

Fig. 17 + 18
Cut out a section of the front insulation as shown, in order to be able to fix the front insulation cover after mounting of circulation pipe.

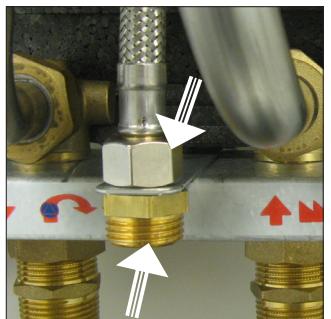


Fig. 16

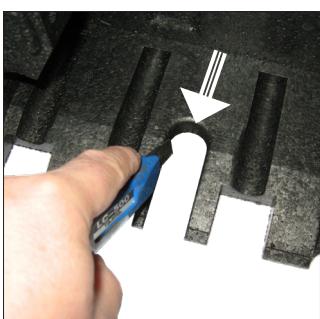


Fig. 17 + 18

9. SAFETY SET

Safety set 145H3001

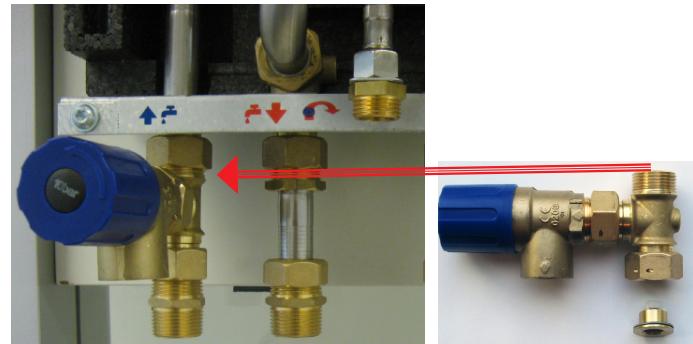
A safety set is available as optional equipment for use on systems with recirculation.

For mounting underneath unit.

Please note that the safety kit shown can be used on different unit types, and that there may therefore be components/pipe pieces that should not be used on the Akva Lux II TDv.



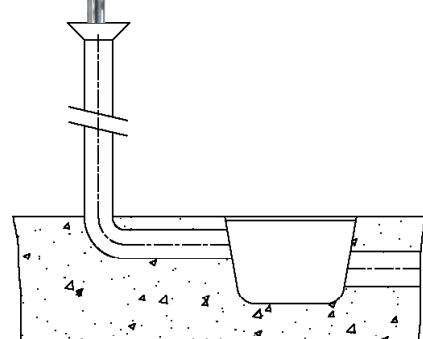
Not to be used on Akva Lux II TDv



The safety kit is mounted on the cold water inlet, as shown in the photo on the right.



A blow-off pipe is established, led to the drain.



10. ADJUSTMENT AND COMMISSIONING

General information

PLEASE NOTE! Some models may have a slightly different appearance, but the control function is in principle the same as described below.

During inspection and adjustment

The insulation front panel on the Akva Lux II TDv substations can be removed without using tools. Take hold of the air duct in the top and bottom of the front insulation section and pull carefully forward until the front insulation section releases from the rear section. Then pull gently until the front section is free from the components.

Inspection is carried out according to the service interval schedule under section "Operation and maintenance" on pages 18-21. Adjustment is made according to the instructions in this manual.

Commissioning

Commission the substation in accordance with the instruction manual.

Heating circuit, Differential Pressure Controller

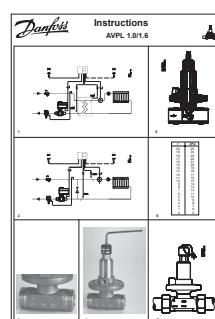
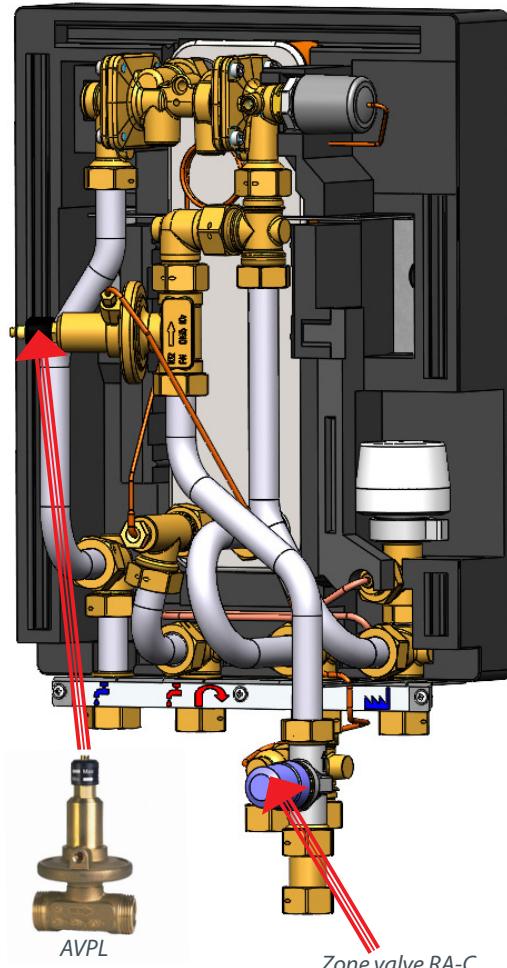
The differential pressure controller (AVPL) reduces the high, fluctuating pressure in the district heating network to a constant operating pressure.

The differential pressure controller is initially set by the plumber in connection with the commissioning of the substation.

If disruptions to the operation occur: noise in the radiator thermostats or poor regulation capacity, it may be necessary to reset the differential pressure controller to a lower or higher operating pressure.

We suggest that you contact your local plumber for assistance.

Instructions AVPL 1.0/1.6



10. ADJUSTMENT AND COMMISSIONING

It is extremely important that the flow temperature to the radiators - taking comfort requirements into account - is as low as possible. (The temperature can be read on the thermometer in HE return). The room temperature is adjusted via the thermostat heads on the radiators.

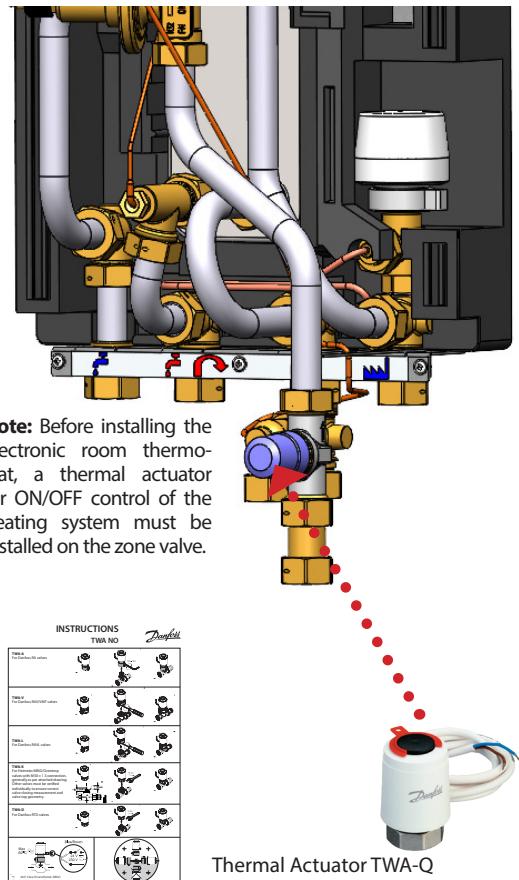
Zone valve RA-C / thermal actuator TWA-Q

The Akva Lux II TDv is equipped with zone valve RA-C, which enables connection to an electronic programmable room thermostat.

Please note that a TWA-Q thermal actuator must be mounted on the zone valve prior to connection to an electronic programmable room thermostat.

The TWA-Q thermal actuator of the zone valve is switched on by an external contact from the room thermostat, and starts to open or close the valve. The actuating movement is achieved by means of an electrically heated expansion element. When the heating current is switched off, the actuator shuts or opens the valve.

The actuator is equipped with a visual position actuator to show the open or closed position of the valve.



Electronic programmable room thermostat (option)

Electronic programmable room thermostat (option)
If the substation is connected to a room thermostat the temperature is controlled by the room thermostat and radiator thermostats.

Please note that the room thermostat keeps the temperature at a constant level in the whole apartment according to the set room parameters.

Consult additional maintenance instructions for room thermostat for further information. It is recommended to avoid fully opened thermostats on some radiators and fully shut-off on others. Higher temperature at the top and lower temperature at the bottom part of radiators means that the system operation is correct.

To keep correct temperature and friendly microclimate for human beings in the correct temperature and friendly microclimate for human beings in the apartment, it is recommended to ensure regular airing in rooms.



11. DOMESTIC HOT WATER

General information

PLEASE NOTE! Some models may have a slightly different appearance, but the control function is in principle the same as described below.

Commissioning

Commission the substation in accordance with the instructions in this manual.

Regulation of domestic hot water temperature

The domestic hot water is prepared in the heat exchanger based on the flow principle and the temperature is controlled by a combined hydraulic and thermostatic self-acting controller **PTC2+P** with integrated differential pressure controller, which blocks the flow of primary and secondary side flow through the heat exchanger immediately after completion of the tapping process.

PTC controller for DHW (Fig. 1).

Adjust the hot water temperature by moving the adjuster lever towards "+" (hotter) or "-" (colder). Start by turning the lever clockwise – until it stops/until you cannot turn it any further. Then turn the lever counter-clockwise until the temperature of the tap water is approx. 48°C during normal tapping flow (7–8 litres per min.). The temperature must never exceed 55°C to prevent limescale deposits building up in the water heater.

Bypass thermostat (default)

As a standard the substation is equipped with a bypass thermostat, Danfoss FJVR, so that when water is tapped, the water heater immediately starts to produce hot water. We recommend setting of the thermostat in pos.3. If you have to wait a long time (i.e. more than 20 sec.) for hot water, it may be necessary to set the thermostat at a higher value.

If you want to avoid waiting time altogether, you will need to set up domestic hot water recirculation to the tapping points.

Circulations thermostat / conversion to recirculation

If the household piping system features domestic hot water recirculation, the substation must be connected to the recirculation system.

Scale setting (indicative)

Pos. 2 = 30°C

3 = 40°C

4 = 45°C

Conversion to recirculation requires only an additional circulation set. (This is not part of the delivery and must be purchased as extra equipment, - see photo on page 10).

Connect the recirculation pipe from the fixed household piping system to the hexagon nipple at the bottom of the substation (please see page 10 for instructions about how to make recirculation connection).

If a time-controlled pump is used, we recommend setting the circulation water temperature to approx. 35 °C.



12. MAINTENANCE

Maintenance work

Is only to be carried out by qualified and authorised personnel.

Inspection

The substation should be checked regularly by authorised personnel. Any necessary maintenance must be performed in accordance with the instructions in this manual and other sets of instructions. During service the dirt strainers are to be cleaned – including the filter on the controller, all pipe connections must be tightened and the safety valve, if any, must be function tested by turning the lever.

Rinsing/cleaning of plate heat exchanger

To clean the plate heat exchanger, rinse it by running clean water through the exchanger at high speed and in the opposite direction to the normal flow. This will remove any dirt deposits that may have built up in the exchanger. If rinsing with clean water is not sufficient, the exchanger can also be cleaned by circulating a cleaning agent approved by Danfoss (e.g. Kaloxi or Radiner Fl cleaning fluid) through the exchanger. Both these cleaning fluids are environmentally friendly and can be disposed off through the standard sewer system. After use of a cleaning fluid, the plate heat exchanger must be rinsed thoroughly with clean water.

Acidification of brazed plate heat exchanger

As a starting point, we do not recommend acidification of the exchanger. Deposits of limescale may build up in plate heat exchangers for domestic hot water on account of the large temperature fluctuations, and because aerated water is used on the secondary side. If it becomes necessary to clean the exchanger with acid, this can be done as shown on the drawing to the right. Brazed plate heat exchangers can withstand rinsing with a dilute acid solution - e.g. 5% formic, acetic or phosphoric acid).

Measures after maintenance work

After maintenance work and before commissioning:

- Check that all screwed connections are tight.
- Check that all safety features, covers, that were removed, have been replaced properly.
- Clean the working area and remove any spilled materials.
- Clear all tools, materials and other equipment from the working area.
- Connect to energy supply and check for leaks.
- Vent the system.
- Carry out any necessary adjustment again.
- Make sure that all safety features on the device and the system work properly.

Meter reading

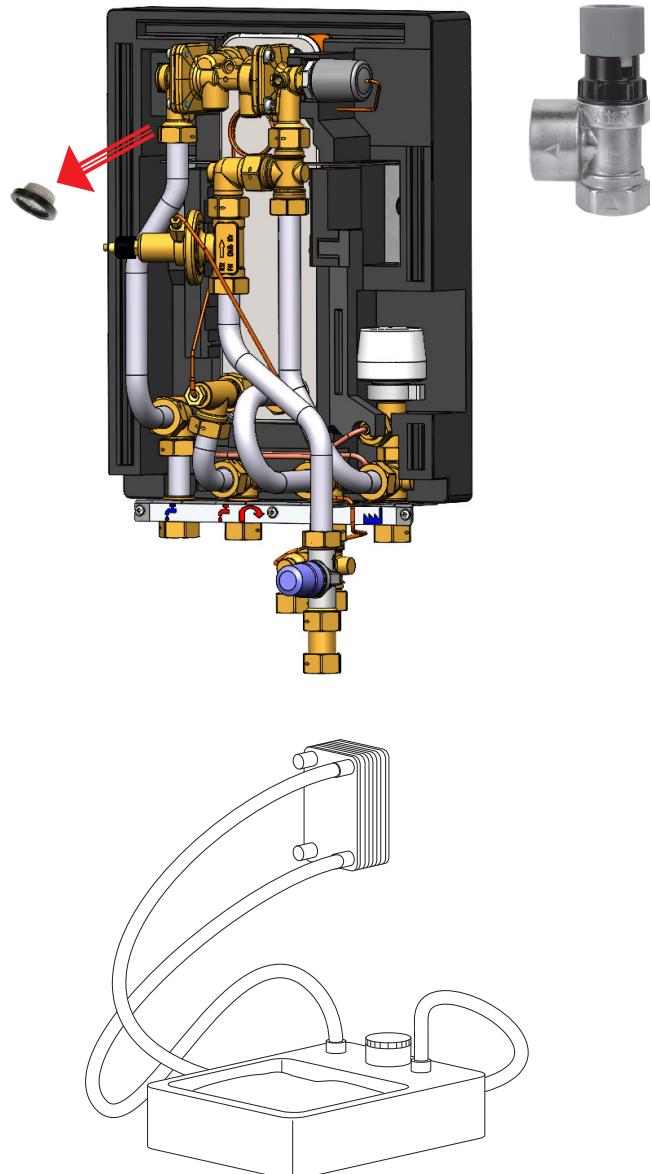
The caretaker/owner must perform visual checking and reading of the district heating meter at short, regular intervals. (The meter is not a part of the delivery from Danfoss).

Service procedures must only be performed by trained, authorised personnel.

NB! Excessive consumption for whatever reason is not covered by the Danfoss warranty.

Cooling / Return temperature reading

Cooling – i.e. the difference between the supply and return temperature of the district heating water – has a significant effect on overall energy economy. Therefore, it is important to focus on the supply and return temperature in the heating system. The difference should typically be 30–35°C. Please note that a low district heating return temperature is directly related to the return temperature from the heating circuit and the return temperature of the circulation water. It is therefore important to focus on these return temperatures.



12. MAINTENANCE SCHEDULE (recommendations)

Interval	Maintenance work	Comments
At least once a year	Check all connections for leaks	If you identify a leak, replace the gaskets and retighten the pipe connections
	Check that the safety valve on the cold water supply is functioning correctly.	Check the functionality by turning the lever on the safety valves
	Check that all components are intact and functioning as intended	In the event of irregularities, lack of functionality or visible faults and defects in a component, replace the component in question
	Clean all dirt filters/strainers in the substation	Replace any filters that are not intact
	Check that any electrical cables are in serviceable condition and that it is possible to disconnect the electrical power supply to the	Visual check. Check whether it is possible to disconnect the current to the substation.
	Check the pipes and exchanger for signs of corrosion	Visual check
	Check that the insulation cover is intact	Make sure that the insulation cover encloses the substation tightly
	Check that the temperature regulators are set in accordance	Follow the instructions in the present manual
	Check the functions of all shut-off valves	Check that the ball valves open and close as they should

*)Enduser/caretaker.

Note! After maintenance work has been carried out all gaskets HAVE to be replaced.

13. TROUBLE SHOOTING - HEATING

Fundamental

In the event of disruptions to operation, you should fundamentally - before commencing the actual troubleshooting - check whether:

- the system is correctly connected
- the district heating supply temperature is at its normal level
- the differential pressure is at its normal level. Ask your district heating supplier if necessary
- there is a power supply to the system - pump and automatics
- the dirt strainer in the district heating supply pipe is clean
- there is air in the system (if the system is vented)

Problem	Possible cause	Solution
No heat	Dirt strainer in the district heating or heating return line clogged. Filter in district heating meter clogged. Defective or incorrectly set differential pressure controller. Air pockets in the system.	Clean the filter/dirt strainer. Clean the filter (in consultation with the district heating plant). Check the functions of the differential pressure controller - if necessary, clean the valve seat. Vent the system thoroughly - see the instructions.
Uneven distribution of heat	Air pockets in the system.	Vent the system thoroughly - see the instructions.
Poor cooling	Insufficient heating surface / radiators too small compared to the total heating requirement of the building. Poor utilisation of the existing heating surface.	Increase total heating surface. Turn on all radiators and prevent the radiators in the system from becoming warm at the bottom.
No heat	Air pockets in the system.	Vent the installation thoroughly - see the instructions.

13. TROUBLE SHOOTING - DOMESTIC HOT WATER

Fundamental

In the event of disruptions to operation, you should fundamentally - before commencing the actual troubleshooting - check whether:

- the system is correctly connected
- the district heating supply temperature is at its normal level
- the differential pressure is at its normal level. Ask your district heating supplier if necessary
- there is a power supply to the system - pump and automatics
- the dirt strainer in the district heating supply pipe is clean
- there is air in the system (if the system is vented)

Problem	Possible cause	Solution
DHW*, no hot water	Non-return valve in the circulation pipe defective (leads to mixing - the circulation water pipes become cold during tapping).	Replace the non-return valve.
Temperature too low / variations in temperature	Non-return valve in thermostatic mixer in the bathroom defective - results in hot and cold water mixing. Please note that fluctuating temperatures may occur at other tapping points in the system! NB, Check all mixers in the house for faults/defects!	Replace the mixer or perhaps only the non-return valve.
Lack of hot water pressure	Clogged strainer in the cold water meter or possibly in the cold water supply in the unit. Calified heat exchanger.	Clean the strainer (cold water meter, in consultation with the water supply company). Replace the heat exchanger.
Long wait for hot water	Circulation pump out of order.	Check whether the pump is running - and whether there is a power supply to the pump. Make sure that there is no air in the pump housing.
No hot water	Dirt strainer in the district heating supply line clogged. Defective DHW controller. Defective sensor. (PTC2)	Clean the dirt strainer. Check controller settings. You may contact Danfoss Redan A/S for further information. Replace sensor.
Hot water temeprature too low	As above. Non-return valve in the circulation pipe defective (leads to mixing - the circulation water pipes become cold during).	As above. Replace non-return valve.
Hot water temperature too high	Defective domestic hot water controller.	Check the function of the DHW controller and replace if defective.
Temperature falls during tapping (lack of capacity)	Air in the capillary tube for the differential pressure controller. Calified plate heat exchanger.	Vent the capillary pipe. Replace the plate heat exchanger.

Problem	Possible cause	Solution
Poor cooling	Calified heat exchanger	Clean heat exchanger with acid solution or replace heat exchanger
	Short-circuited heat exchanger	Replace heat exchanger
Discoloured water (for a longer period)	Short-circuited heat exchanger	Replace heat exchanger
Not enough pressure on the hot water	Calified heat exchanger	Clean heat exchanger with acid solution or replace heat exchanger

14. EU DECLARATION OF CONFORMITY

ENGINEERING
TOMORROW**Danfoss A/S**6430 Nordborg
Denmark
CVR nr.: 20 16 57 15Telephone: +45 7488 2222
Fax: +45 7449 0949**MANUFACTURER'S DECLARATION****Danfoss A/S**

Danfoss Redan

declares under our sole responsibility that the

Product category:

Small Substations without electrical equipment

Type designation(s):

Akva Vita, Akva Lux, Akva Les and Akva Therm waterheater,

Akva Vita TD, Akva Vita TDP, Akva Vita II TD and Akva Vita II TDP-F

Akva Lux TD, Akva Lux TDP, Akva Lux II TD, Akva Lux II TDP, Akva Lux II TDP-F and Complete TDP-F,

Akva Les II TD, EvoFlat FSS and EvoFlat Waterheater

Distribution module SG and Metering station

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.

Pressure Equipment Directive (PED) – 2014/68/EU

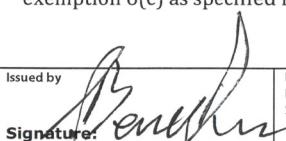
EN 13445-1:2014/A1:2014 Issue 2:2015. Unfired Pressure Vessels - Part 1: General

These products that fall under Article 4§3 shall not be CE-marked according to this directive.

RoHS Directive 2011/65/EU including amendment 2015/863.

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

Above mentioned products, do conform with the RoHS restrictions as specified in Annex II of this directive, except for the specific component containing brass, which however conforms with the exemption 6(c) as specified in Annex III of the RoHS 2 directive.

Date: 2021.04.19	Issued by	Date: 2021.04.19	Approved by
Place of issue: Silkeborg	 Signature: Name: Jan Bennetsen Title: Engineering Specialist	Place of issue: Silkeborg	 Signature: Name: Henrik Ellegaard Title: Quality & EHS Supervisor

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

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Classified as Business

15. COMMISSIONING CERTIFICATE

Commissioning certificate

The substation is the direct link between the district heating supply network and the household piping system. All supply pipes and the pipes in the household piping system must be checked and rinsed before commissioning. Once the system has been filled with water, all pipe connections must be retightened before performing pressure test for leaks. The dirt strainers must be cleaned and the substation must be adjusted in accordance with the instructions in this manual.

It is important to comply with all technical regulations and the applicable legislation in every respect.

Installation and commissioning must only be performed by trained, authorised personnel.

The substation is checked in the factory for leaks before delivery. Leaks are however possible due to vibrations caused by transport, handling and heating of the system and therefore it is important to check all connections and to retighten if necessary before commissioning. Please note that the connections may feature EPDM gaskets! **Therefore it is important that you DO NOT OVER-TIGHTEN the connections.** Over-tightening may result in leaks. Leaks caused by over-tightening or failure to retighten connections are not covered by the warranty.

To be filled-out by the installer

This substation has been retightened, adjusted and commissioned

on the:

Date/Year

by installer:

Company name (stamp)

16. GUIDELINES FOR WATER QUALITY IN DANFOSS BRAZED HEAT EXCHANGERS

ENGINEERING
TOMORROW



Danfoss A/S
Danfoss Heating Segment - DEN
BU HEX - Local Inspection Center Kamnik Slovenia

Guidelines for water quality in Danfoss brazed heat exchangers with plates of EN 1.4404 ~ AISI 316L

Danfoss has prepared this guideline for the water quality of tap water and district heating water used in plate heat exchangers of stainless steel (EN 1.4404 ~ AISI 316L) brazed with pure copper (Cu), copper -nickel (CuNi) or Stainless Steel (StS). It is important to point out that the water specification is not a guarantee against corrosion, but it must be considered as a tool to avoid the most critical water applications.

Parameter	Unit	Value or concentration	Plate			Brazing material
			AISI 316L W.Nr. 1.4404	Cu	CuNi	
pH		< 6.0	0	-	-	0
		6.0 – 7.5	+	0/-	0	+
		7.5 – 10.5	+	+	+	+
		>10.5	+	0	0	+
Conductivity	μS/cm	<10	+	+	+	+
		10 – 500	+	+	+	+
		500 – 1000	+	0	+	+
		>1000	+	-	0	+
Free Chlorine	mg/l	<0.5	+	+	+	+
		0.5 – 1	0	+	+	+
		1 – 5	-	0	0	0
		>5	-	-	-	-
Ammonia (NH ₃ , NH ₄ ⁺)	mg/l	<2	+	+	+	+
		2 – 20	+	0	0	+
		>20	+	-	-	+
Alkalinity (HCO ₃ ⁻)	mg/l	<60	+	+	+	+
		60 – 300	+	+	+	+
		>300	+	0	+	+
Sulphate (SO ₄ ²⁻)	mg/l	<100	+	+	+	+
		100 – 300	+	0/-	0	+
		>300	+	-	-	+
HCO ₃ ⁻ / SO ₄ ²⁻	mg/l	>1.5	+	+	+	+
		<1.5	+	0/-	0	+
Nitrate (NO ₃)	mg/l	<100	+	+	+	+
		>100	+	0	+	+
Manganese (Mn)	mg/l	<0.1	+	+	+	+
		>0.1	+	0	0	+
Iron (Fe)	mg/l	<0.2	+	+	+	+
		>0.2	+	0	+	+
* Hardness ratio [Ca ²⁺ , Mg ^{2+}] / [HCO₃⁻]}	/	0 – 0.3	+	-	-	+
		0.3 – 0.5	+	0/-	+	+
		>0.5	+	+	+	+

+ Good corrosion resistance

o **Corrosion could happen when more parameters are evaluated with o

o/- Risk of corrosion

- Use is not recommended

* Hardness ration limits defined per experience and internal tests in Danfoss laboratory

** In case of three or more parameters evaluated with o consultancy is needed with Consultant for Corrosion & Microbiology or BU HHE Representative

Recommended Chloride concentration to avoid Stress Corrosion Cracking (SCC) in the stainless-steel plates:

Application temperature	Chloride concentration
at T ≤ 20°C	max 1000 mg/l
at T ≤ 50°C	max 400 mg/l
at T ≤ 80°C	max 200 mg/l
at T ≥ 100°C	max 100 mg/l



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Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc., and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product.

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