

Instructions

VX Solo II



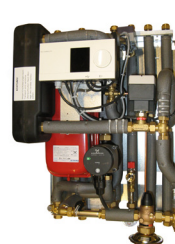
VX Solo II



VX Solo II H



VX Solo II H2



VX Solo II HWP



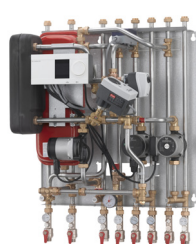
VX Solo II HWS



VX Solo II HWS



VX Solo II H2WP



VX Solo II H2WS



VX Solo OP

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2.0 Safety notes

Instructions

This operating manual should be read carefully before installation and start-up of the substation. The manufacturer accepts no liability for damage or faults that result from non-compliance with the operating manual.

Please read and follow all the instructions carefully to prevent accidents, injury and damage to property. The risk of persons being injured and equipment damaged increases considerably if the recommended permissible operating parameters are exceeded.

Installation, assembly work, first start-up and maintenance work may be carried out only by qualified and authorized personnel in compliance with the safety regulations (both heating and electrical work).

Energy source

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

Application

The substation is designed only to operate with water or a water-glycol mixture (up to 40%), and other heating media may not be used.

Connect the substation to the house installation in a frost-free room, where the temperature does not exceed 50 °C and the humidity does not exceed 80%. Do not cover or wall up the substation or in any other way block the entrance to the station.

Choice of material

Choice of materials always in compliance with local legislation.

Corrosion protection

The maximum chloride compounds of the flow medium should not be higher than 300 mg/l. The risk of equipment corrosion increases considerably if the recommended permissible chloride compounds are exceeded.

Safety valve(s)

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

Sound level.

≤ 55 dB.



Connection

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

Warning of hot surfaces

Parts of the substation may become hot and hot surfaces can cause serious burns. Please be extremely cautious in close proximity to the substation.

Warning of high pressure and high temperature

The stations work at a maximum supply temperature from the district heating network of 110°C and the stations work with a operating pressure of 16 bar, which may put the user at risk of burns from touching the surface or from the emissions of hot media (water/steam). The risk of persons being injured and equipment damaged increases considerably if the recommended permissible operating parameters are exceeded.

Emergency

In case of danger or accidents - fire, leaks or other dangerous circumstances - interrupt all energy sources to the station if possible, and seek expert help.

In case of discoloured or bad-smelling domestic hot water, close all shut-off valves on the substation, inform the operating personnel and call for expert help immediately.

Warning of transport damage

Before substation installation, please make sure that the substation has not been damaged during transport. Always transport the substation with the utmost care and caution.

IMPORTANT - Tightening of connections

Due to vibrations during transport all flange connections, screw joints and electrical clamp and screw connections must be checked and tightened before water is added to the system.

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

(Do not overstrain! - See item 7.2)

3.0 Storage and Handling

If the substation is stored before installation, make sure that the place is dry and heated.

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

Do not stack the unit higher than factory shipped. Units that are shipped in cardboard packaging are to be lifted by the carrying handles of the packaging. Transport / removals over great distances should be carried out on pallets.

During and after unpacking, the substation can be lifted by using straps, fitted around the pipes or it can be lifted by hand in the pipes. Lifting in the pipes can cause leaks. ALWAYS re-tighten.



Handling

When working on the substation suitable safety shoes must be worn.

4.0 Disposal

Dispose of packaging material in accordance with local regulations.

This product consists of materials, which must not be disposed of together with domestic waste. Switch off the complete power supply and dismantle the product and sort the components in various groups before disposal. Always observe the disposal rules of the local legislation.

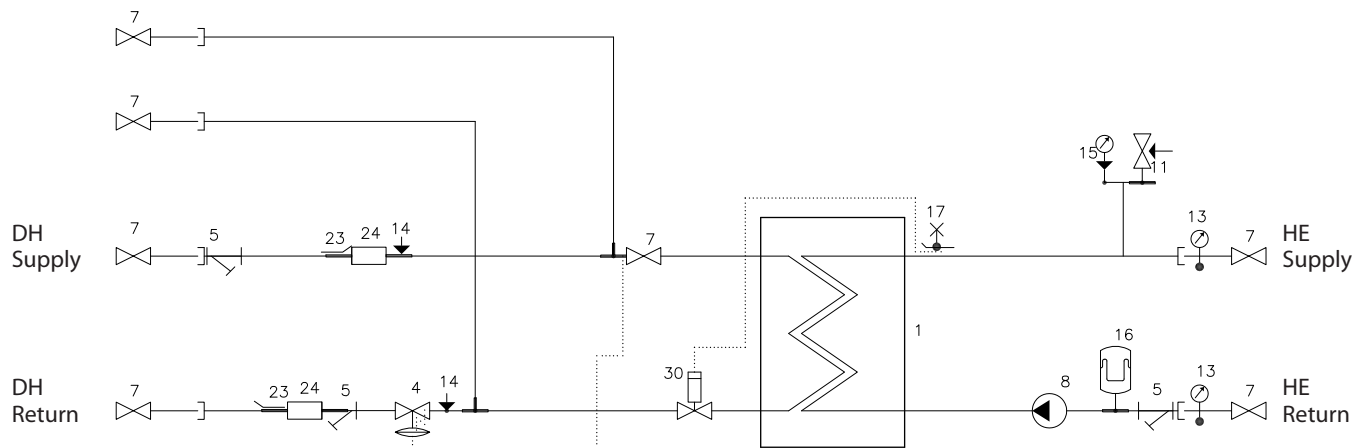


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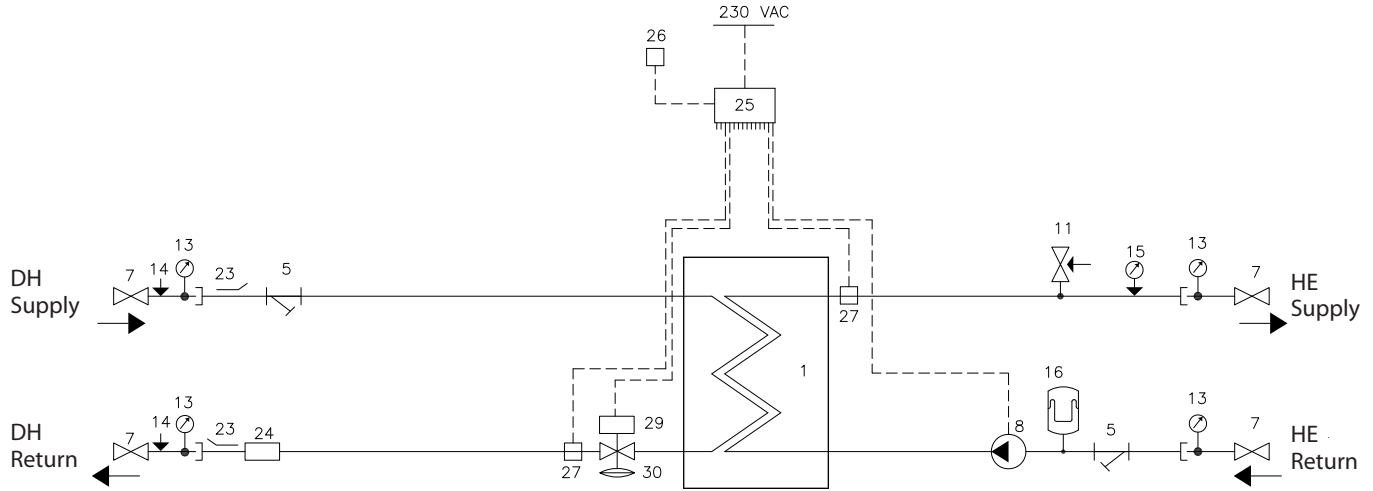
5.0 Diagrams - examples

5.1 VX Solo II (T°C 200u) - 1 HE circuit + primary connection pipes for cylinder



- 1 Plate heat exchanger, HE, with insulation
- 4 Differential pressure controller AVPL
- 5 Strainer
- 7 Ball valve
- 8 Circulation pump HE
- 11 Safety valve, HE 2.5 bar
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 17 Air vent
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 30 Self-acting thermostatic valve T°C 200/VS 2-15

5.2 VX Solo II H (ECL 210/A230.1a) - 1 HE circuit

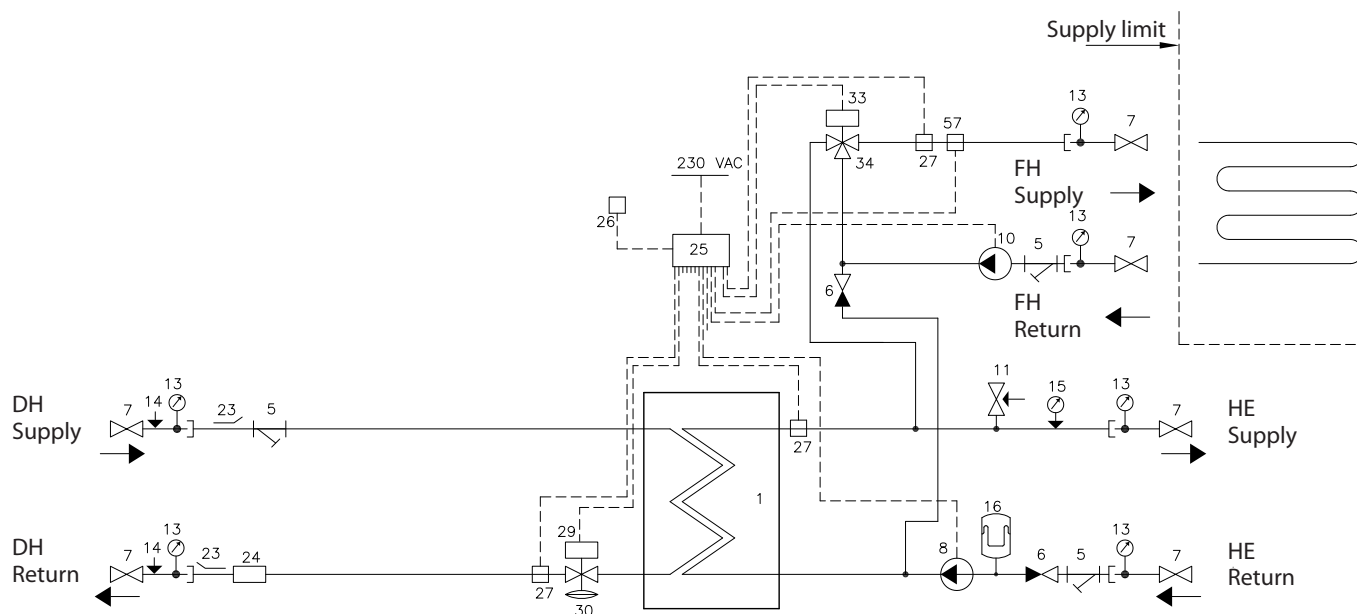


- 1 Plate heat exchanger, HE, with insulation
- 5 Strainer
- 7 Ball valve
- 8 Circulation pump HE
- 11 Safety valve, HE
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A230.1a
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 29 Danfoss actuator AMV150
- 30 Danfoss flow controller with integrated control valve AHQM

Instructions

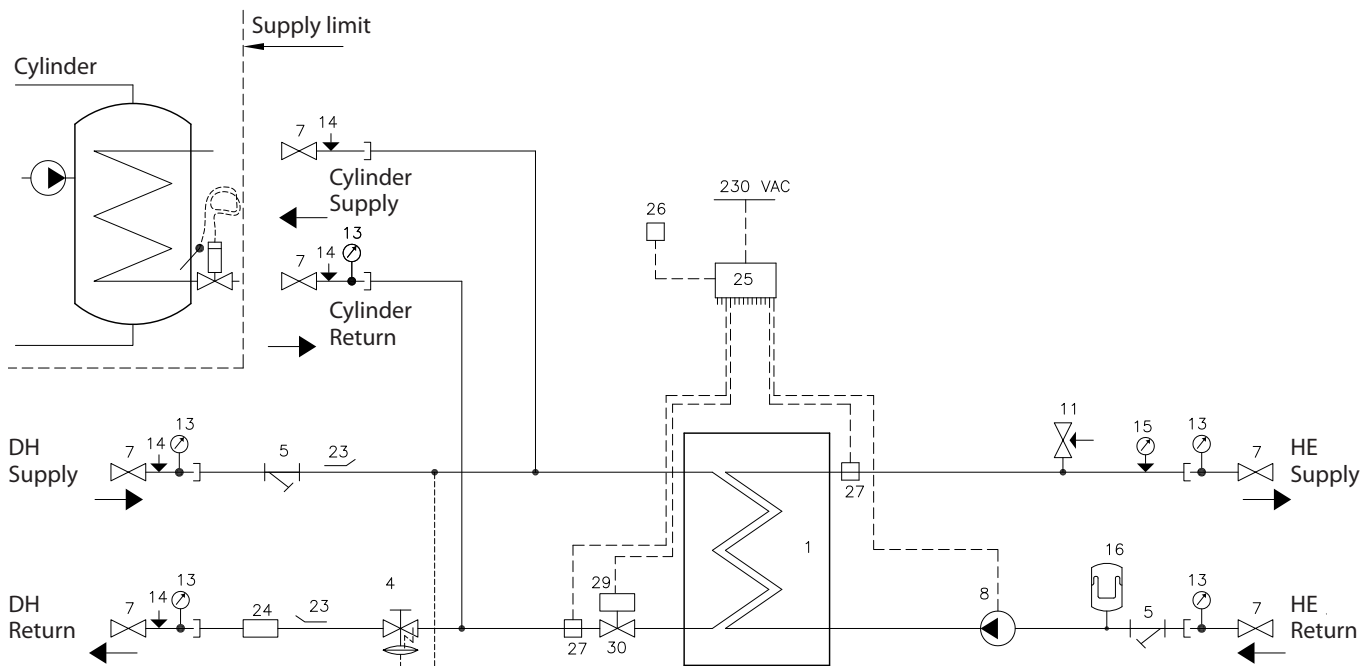
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5.3 VX Solo II H2 (ECL 210/A260.1d) - 2 HE circuits



- 1 Plate heat exchanger, HE, with insulation
- 5 Strainer
- 6 Non-return valve
- 7 Ball valve
- 8 Circulation pump HE
- 10 Circulation pump FH
- 11 Safety valve, HE
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A260.1d
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 29 Danfoss actuator AMV13
- 30 Danfoss flow controller with integrated control valve AHQM
- 33 Danfoss actuator AMV150
- 34 3-way valve VMV 30/15
- 57 Safety temperature monitor Jumo AT

5.4 VX Solo II HWP (ECL 210/A237) - 1 HE circuit + primary connection pipes for DHW cylinder

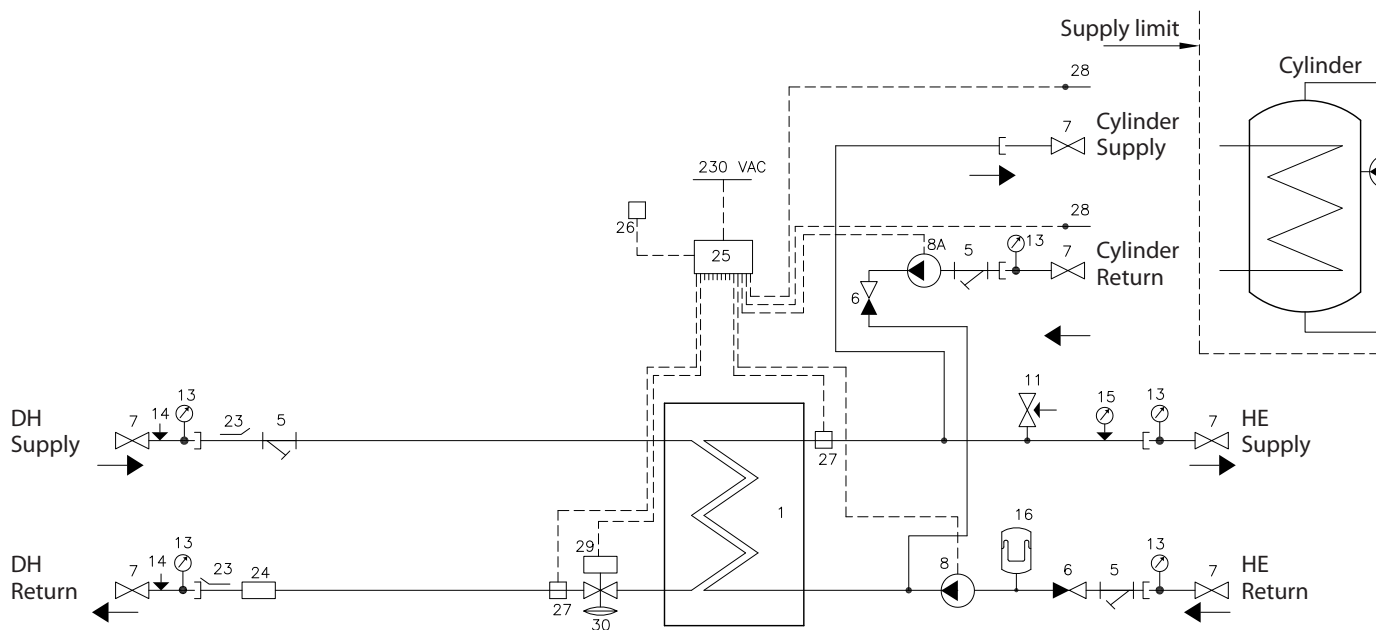


- 1 Plate heat exchanger, HE, with insulation
- 4 Differential pressure controller with flow limitation AVPB-F
- 5 Strainer
- 7 Ball valve
- 8 Circulation pump HE
- 11 Safety valve, HE
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A237
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 29 Danfoss actuator AMV150
- 30 2-way valve VS2

Instructions

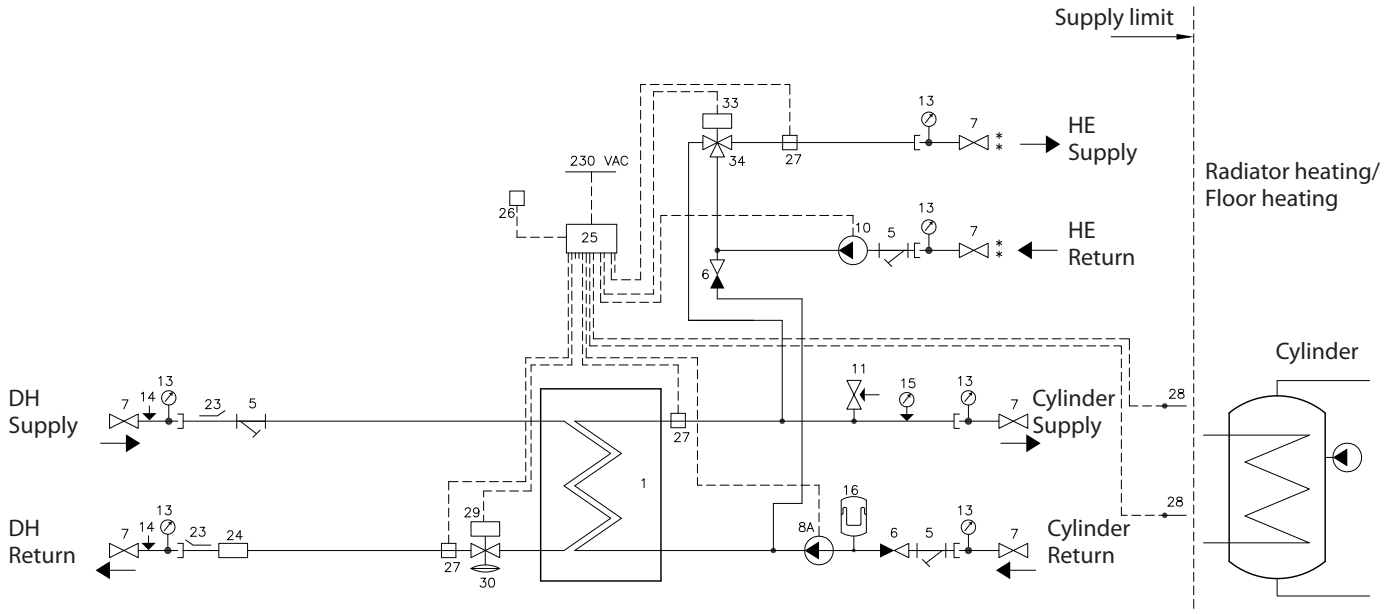
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5.5 VX Solo II HWS (ECL 210/A237.1a) - 1 HE circuit + secondary connection pipes for DHW cylinder



- 1 Plate heat exchanger, HE, with insulation
- 5 Strainer
- 6 Non-return valve
- 7 Ball valve
- 8 Circulation pump HE
- 8A Circulation pump Cylinder
- 11 Safety valve, HE
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A237.1a
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 28 Immersion sensor Danfoss ESMB
- 29 Danfoss actuator AMV13
- 30 Danfoss flow controller with integrated control valve AHQM

5.6 VX Solo II HWS (ECL 210/A247.1c) - 1 HE circuit + mixing loop + secondary connection pipes for DHW cylinder

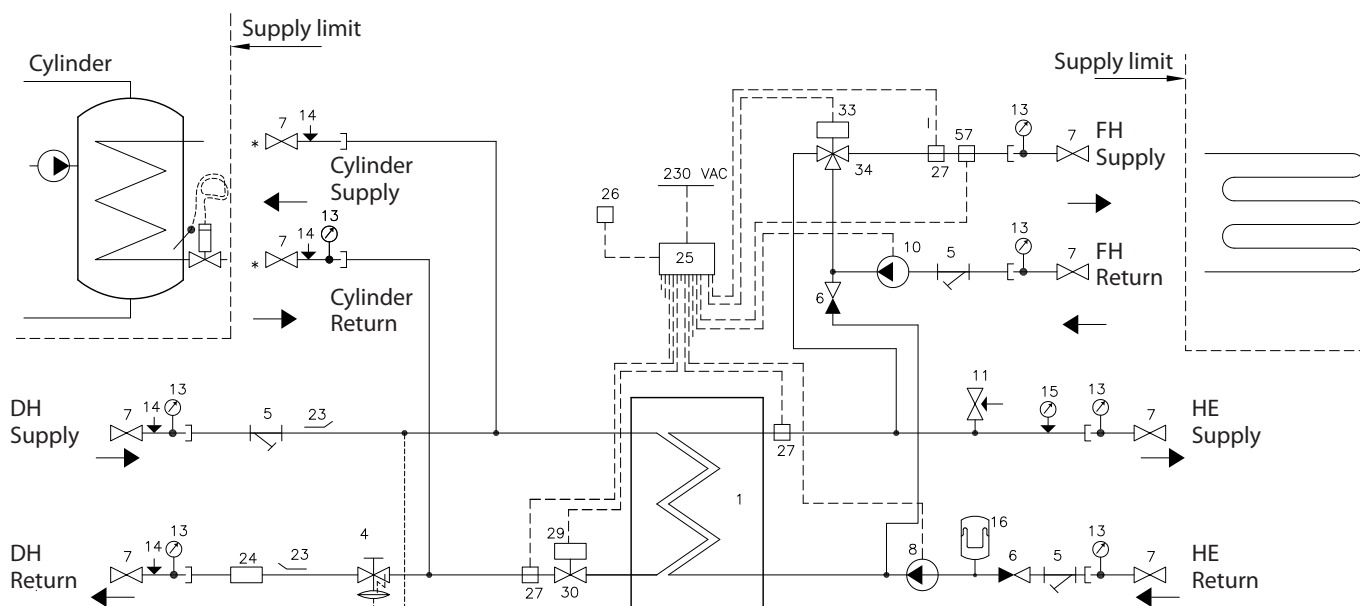


- 1 Plate heat exchanger, HE, with insulation
- 5 Strainer
- 6 Non-return valve
- 7 Ball valve
- 8A Circulation pump HE
- 10 Circulation pump Cylinder
- 11 Safety valve, HE
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A247.1c
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 28 Immersion sensor Danfoss ESMB
- 29 Danfoss actuator AMV150
- 30 Danfoss flow controller with integrated control valve AHQM
- 33 Danfoss actuator AMV150
- 34 3-way valve VMV 30/15

Instructions

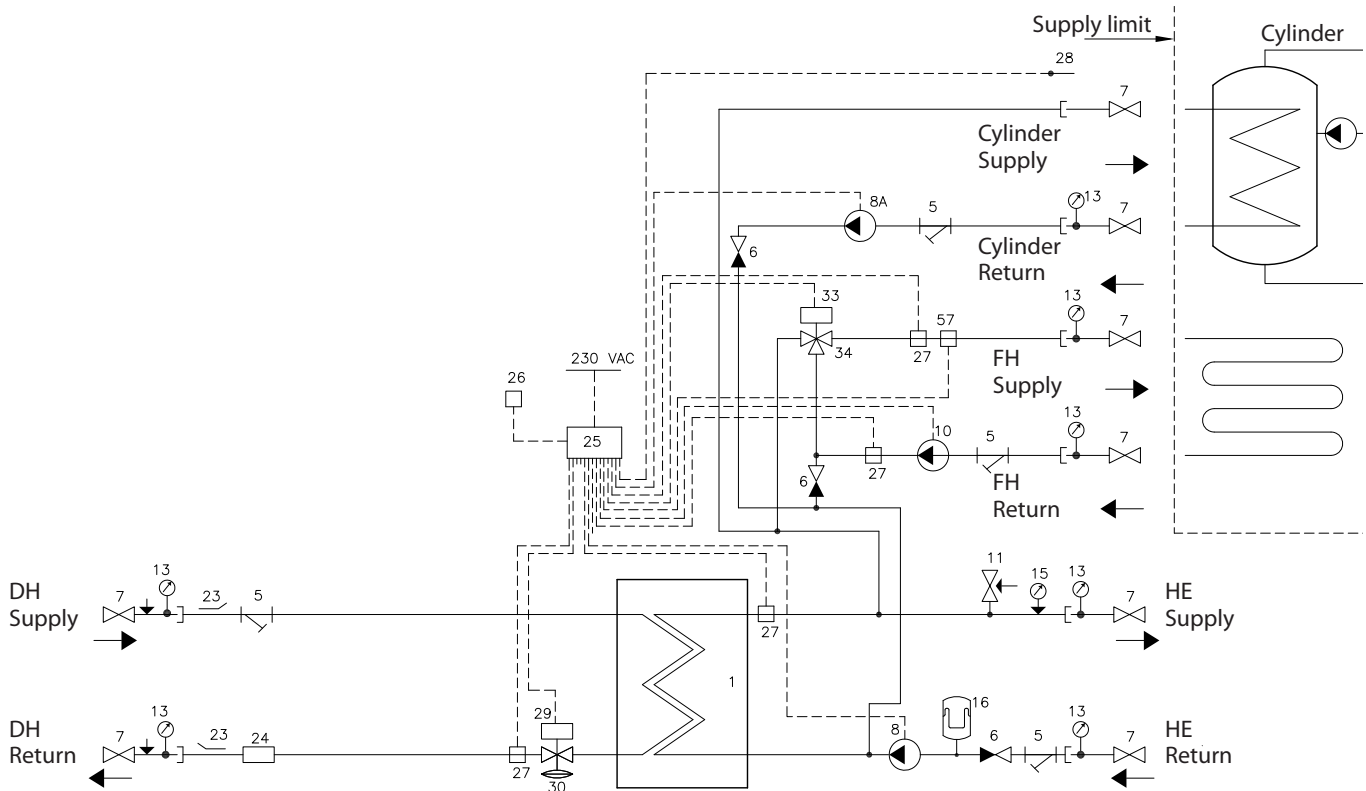
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5.7 VX Solo II H2WP (ECL 210/A260.1d) - 2 HE circuit + primary connection pipes for DHW cylinder



- 1 Plate heat exchanger, HE, with insulation
- 4 Differential pressure controller with flow limitation AVPB-F
- 5 Strainer
- 6 Non-return valve
- 7 Ball valve
- 8 Circulation pump HE
- 10 Circulation pump FH
- 11 Safety valve, HE
- 13 Thermometer
- 14 Pocket for pressure gauge
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A260.1d
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 29 Danfoss actuator AMV13
- 30 2-way valve VS2
- 33 Danfoss actuator AMV150
- 34 3-way valve VMV 30/15
- 57 Safety temperature monitor Jumo AT

5.8 VX Solo II H2WS (ECL 310/A367.1d) - 2 HE circuits + secondary connection pipes for DHW cylinder

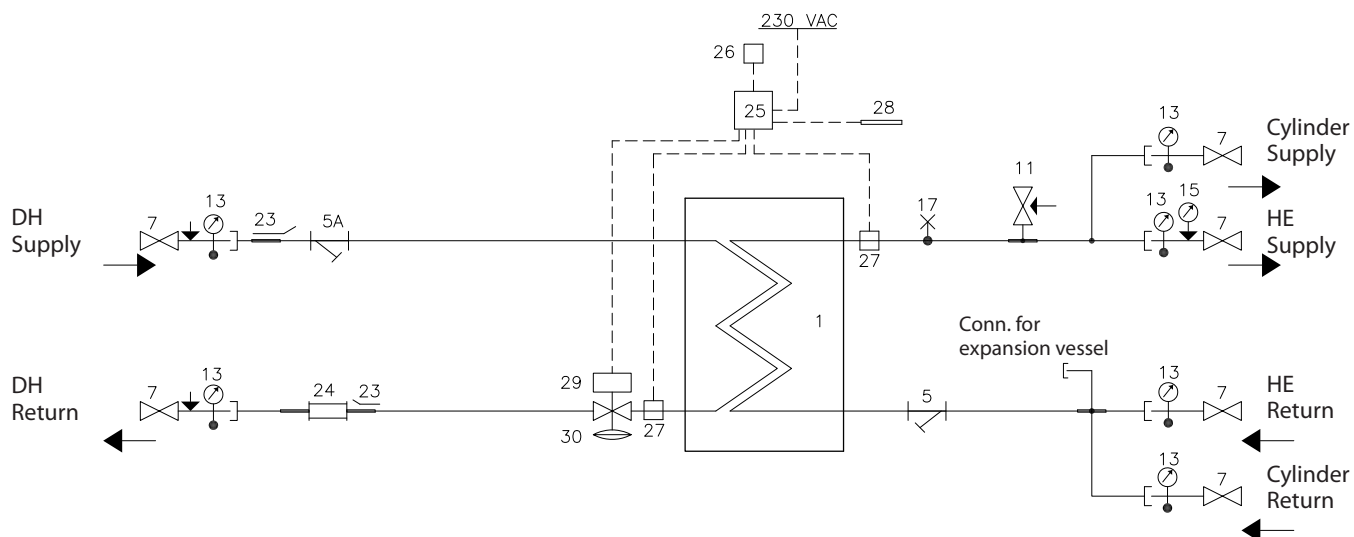


- 1 Plate heat exchanger, HE, with insulation
- 5 Strainer
- 6 Non-return valve
- 7 Ball valve
- 8 Circulation pump HE
- 8A Circulation pump Cylinder
- 10 Circulation pump FH
- 11 Safety valve, HE
- 13 Thermometer
- 15 Manometer
- 16 Expansion vessel
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 310/A367.1d
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 28 Immersion sensor Danfoss ESMB
- 29 Danfoss actuator AMV13
- 30 Danfoss flow controller with integrated control valve AHQM
- 33 Danfoss actuator AMV150
- 34 3-way valve VMV 30/15
- 57 Safety temperature monitor Jumo AT

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5.9 VX Solo OP (ECL 210/A237.1a) - 1 HE circuit + secondary connection pipes for DHW cylinder



- 1 Plate heat exchanger, HE, with insulation
- 5 Strainer
- 6 Non-return valve
- 7 Ball valve
- 11 Safety valve, HE
- 13 Thermometer
- 15 Manometer
- 17 Air valve
- 23 Sensor pocket for heat meter 1/2"
- 24 Fitting piece for heat meter, 3/4" x 110 mm
- 25 Controller Danfoss ECL 210/A237.1a
- 26 Outdoor sensor Danfoss ESMT
- 27 Sensor Danfoss ESMC
- 28 Immersion sensor Danfoss ESMB
- 29 Danfoss actuator AMV10
- 30 Danfoss flow controller with integrated control valve AVQM

6.0 Main components

6.1 VX Solo II (T°C) - 1 HE circuit + prim. connection for DHW cylinder

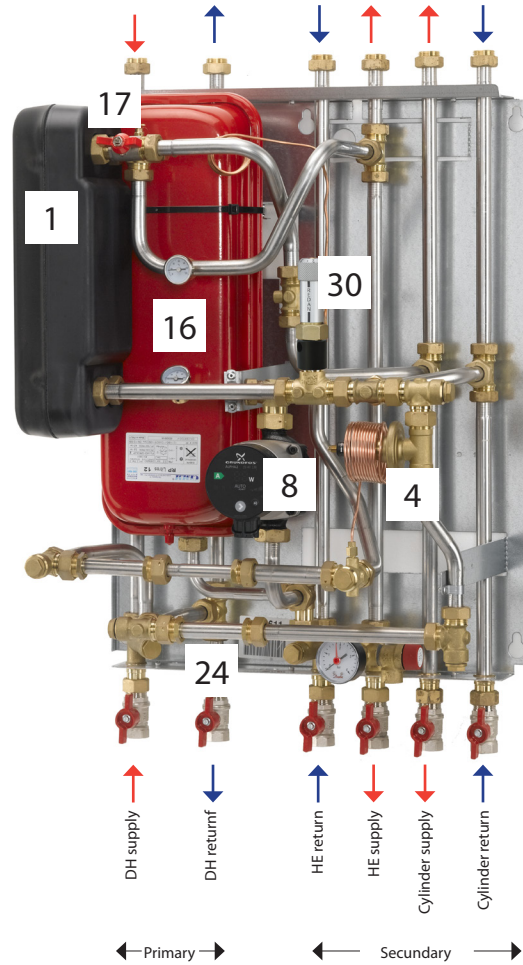
- 1 Plate heat exchanger
- 4 Differential pressure controller
- 8 Circulation pump, HE
- 16 Expansion vessel
- 17 Air valve
- 24 Fitting piece for heat meter
- 30 Thermostat T°C 200

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. The control function, however, is basically as stated in this instruction manual.

Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W510 x D345 mm

Dimensions with cover
H860 x W550 x D380 mm

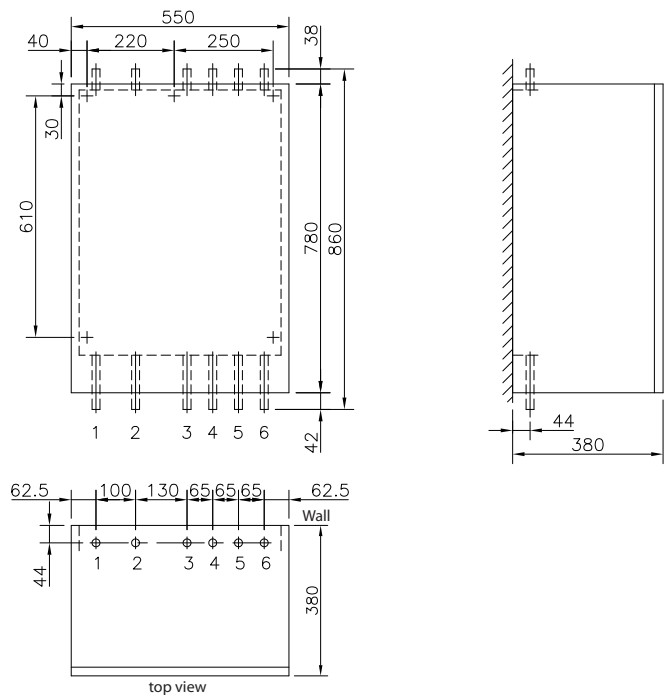
Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Heating (HE) return
- 4 Heating (HE) supply
- 5 Cylinder supply
- 6 Cylinder return

Connection sizes (example):

- DH: G $\frac{3}{4}$ (ET)
- HE: G $\frac{3}{4}$ (IT)



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6.2 VX Solo II H (ECL 210/A230.1a) - 1 HE circuit

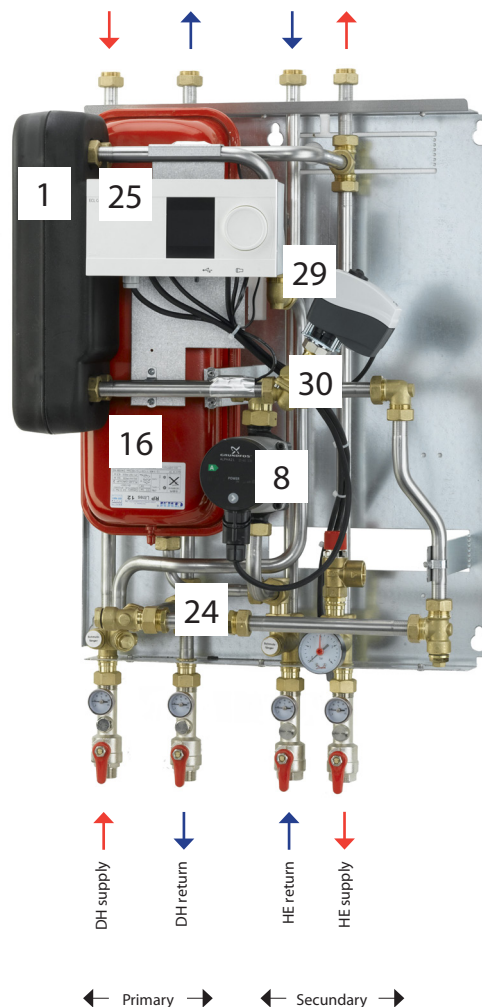
- 1 Plate heat exchanger
- 8 Circulation pump, HE
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 13
- 30 Flow controller with integrated control valve AHQM

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

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Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W530 x D365 mm

Dimensions with cover
H860 x W550 x D380 mm

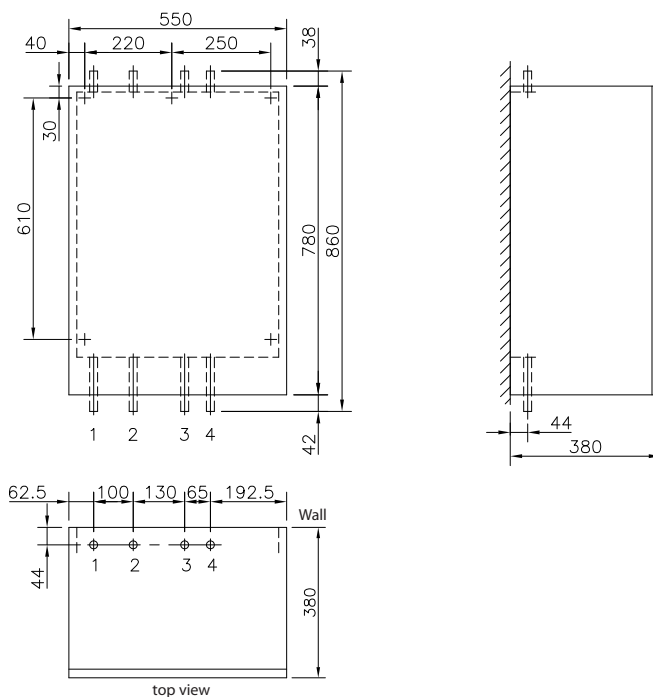
Connections:

Order:

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

Connection sizes (example):

- DH: G $\frac{3}{4}$ (ET)
- HE + FH: G $\frac{3}{4}$ (IT)



6.3 VX Solo II H2 (ECL 210/A260.1d) - 2 HE circuits

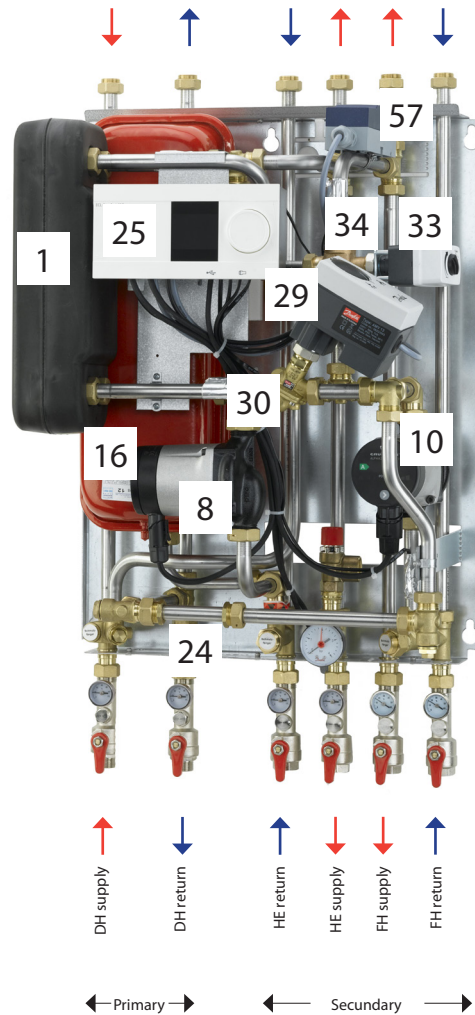
- 1 Plate heat exchanger
- 8 Circulation pump, HE
- 10 Circulation pump, FH
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 13)
- 30 Flow controller with integrated control valve AHQM
- 33 Actuator AMV150
- 34 3-way valve VMV 30/15
- 57 Safety temperature monitor

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

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Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W530 x D365 mm

Dimensions with cover
H860 x W550 x D380 mm

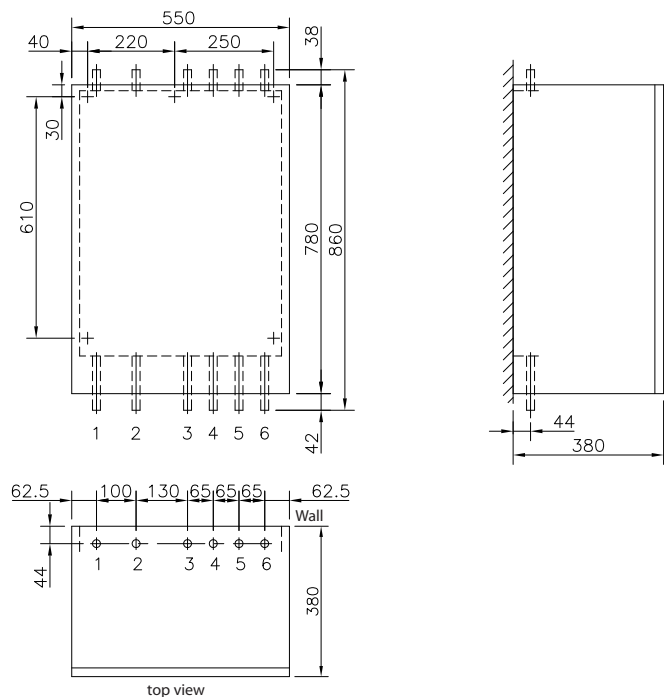
Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Heating (HE) return
- 4 Heating (HE) supply
- 5 Floor heating (FH) supply
- 6 Floor heating (FH) return

Connection sizes (example:

- DH: G $\frac{3}{4}$ (ET)
- HE + FH: G $\frac{3}{4}$ (IT)



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6.4 VX Solo II HWP (ECL 210/A237) - 1 HE circuit + prim. connection for DHW cylinder

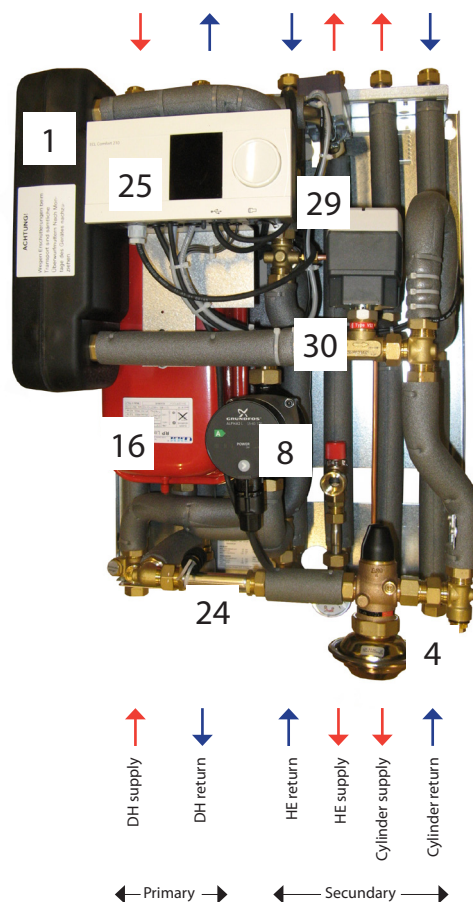
- 1 Plate heat exchanger
- 4 Differential pressure controller
- 8 Circulation pump, HE
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 150
- 30 2-way valve VS2

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

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Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W530 x D365 mm

Dimensions with cover
H860 x W550 x D380 mm

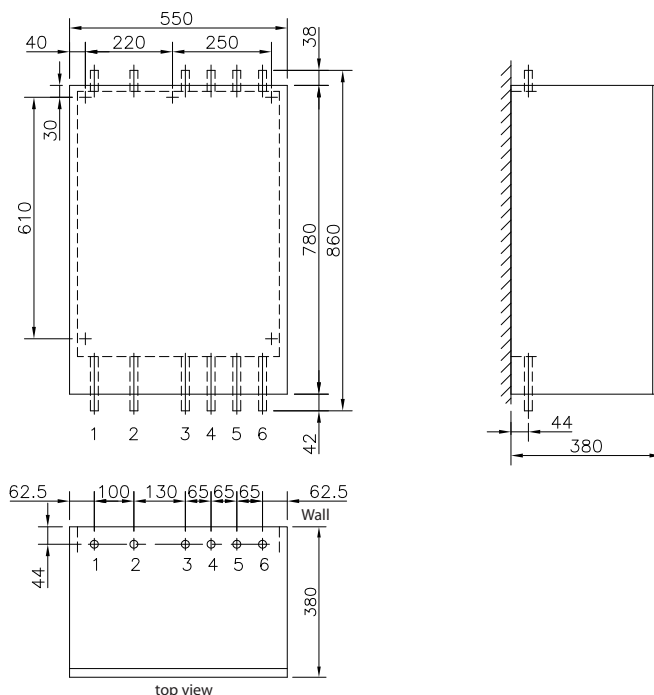
Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Heating (HE) return
- 4 Heating (HE) supply
- 5 Cylinder (FH) supply
- 6 Cylinder (FH) return

Connection sizes (example):

- DH: G $\frac{3}{4}$ (ET)
- HE + FH: G $\frac{3}{4}$ (IT)



6.5 VX Solo II HWS (ECL 210/A237.1a) - 1 HE circuit + sec. connection for DHW cylinder

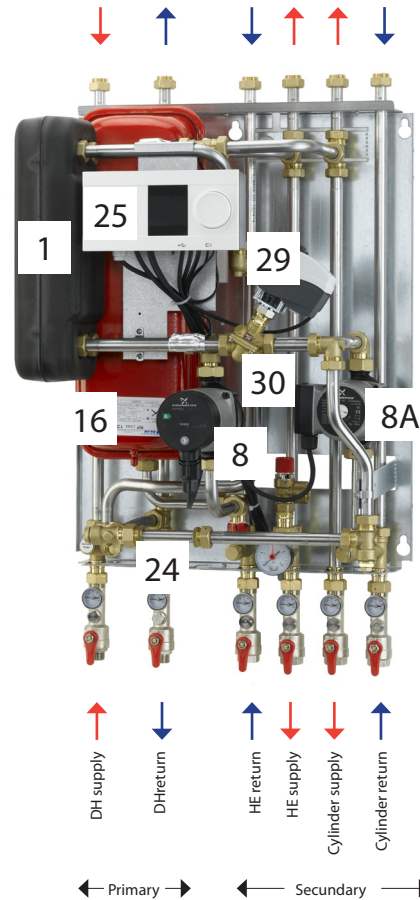
- 1 Plate heat exchanger
- 8 Circulation pump, HE
- 8A Circulation pump, Cylinder
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 150
- 30 Flow controller with integrated control valve AHQM

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

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Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W530 x D365 mm

Dimensions with cover
H860 x W550 x D380 mm

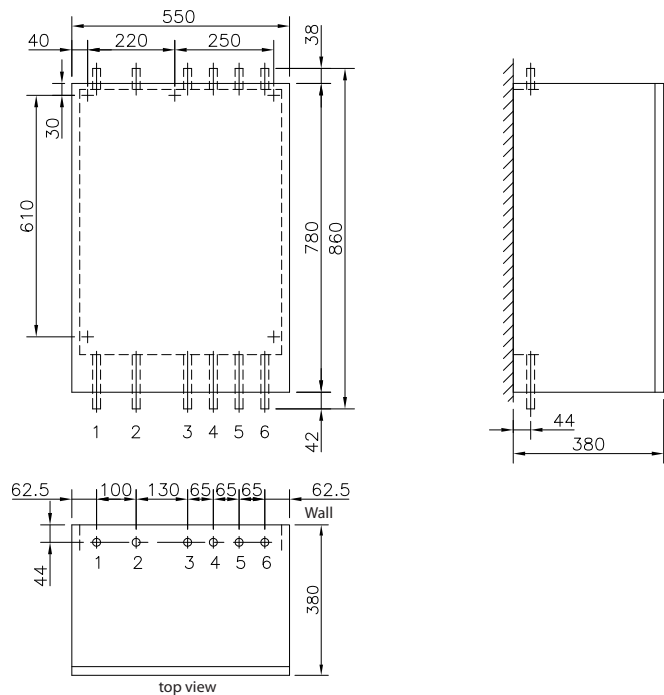
Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Heating (HE) return
- 4 Heating (HE) supply
- 5 Cylinder (FH) supply
- 6 Cylinder (FH) return

Connection sizes (example):

- DH: G $\frac{3}{4}$ (ET)
- HE + FH: G $\frac{3}{4}$ (IT)



6.6 VX Solo II HWS (ECL 210/A247.1c) - 1 HE circuit + mixing loop + sec. connection for DHW cylinder

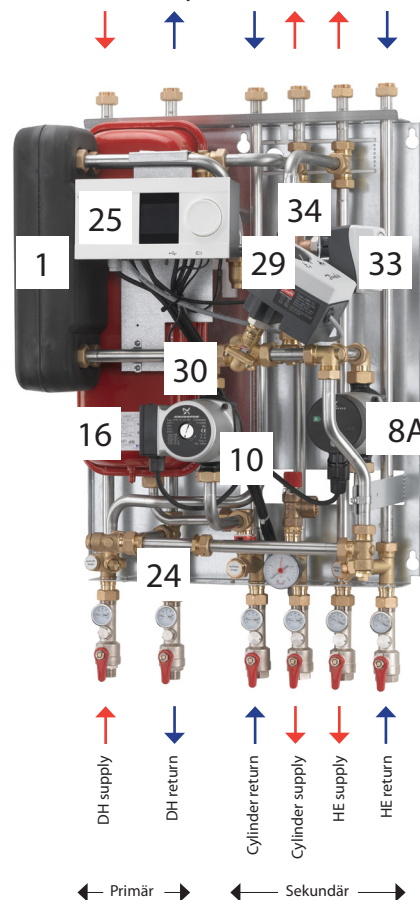
- 1 Plate heat exchanger
- 8A Circulation pump, Cylinder
- 10 Circulation pump, HE
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 150
- 30 Flow controller with integrated control valve AHQM
- 33 Actuator AMV150
- 34 3-way valve VMV 30/15

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. The control function, however, is basically as stated in this instruction manual.

Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W530 x D365 mm

Dimensions with cover
H860 x W550 x D380 mm

Connections:

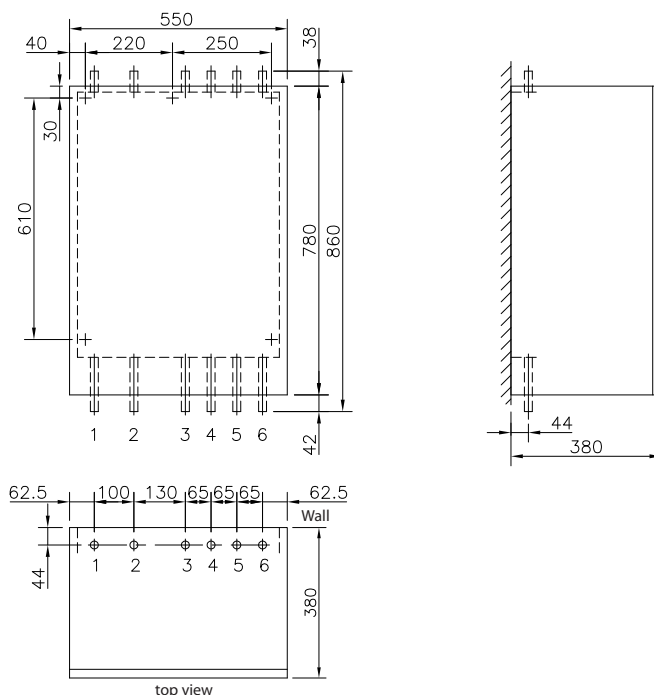
Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Cylinder (FH) return
- 4 Cylinder (FH) supply
- 5 Heating (HE) supply
- 6 Heating (HE) return

Connection sizes (example):

DH: G $\frac{3}{4}$ (ET)

HE + FH: G $\frac{3}{4}$ (IT)



6.7 VX Solo II H2WP (ECL 210/A260.1d) - 2 HE circuit + prim. connection for DHW cylinder

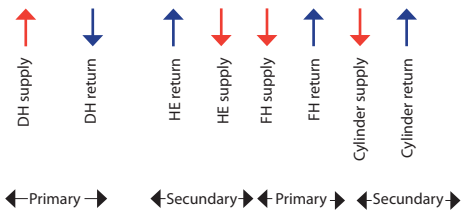
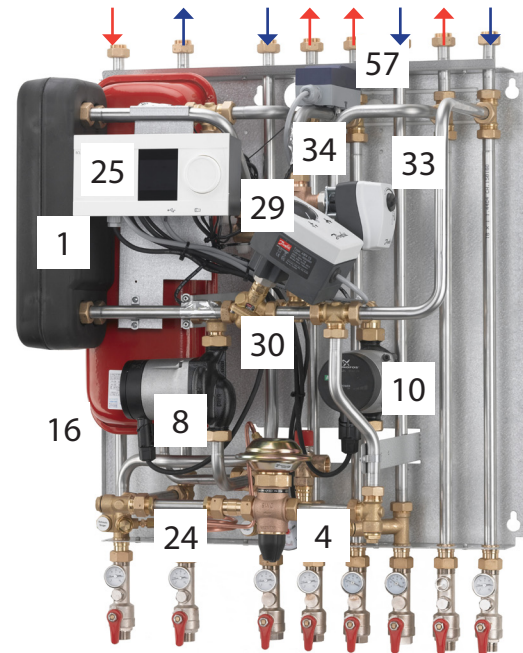
- 1 Plate heat exchanger
- 4 Differential pressure controller
- 8 Circulation pump, HE
- 10 Circulation pump, FH
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 13
- 30 Flow controller with integrated control valve AHQM
- 33 Actuator AMV 150
- 34 3-way valve VMV 30/15
- 57 Safety temperature monitor

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. The control function, however, is basically as stated in this instruction manual.

Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W650 x D365 mm

Dimensions with cover
H860 x W700 x D380 mm

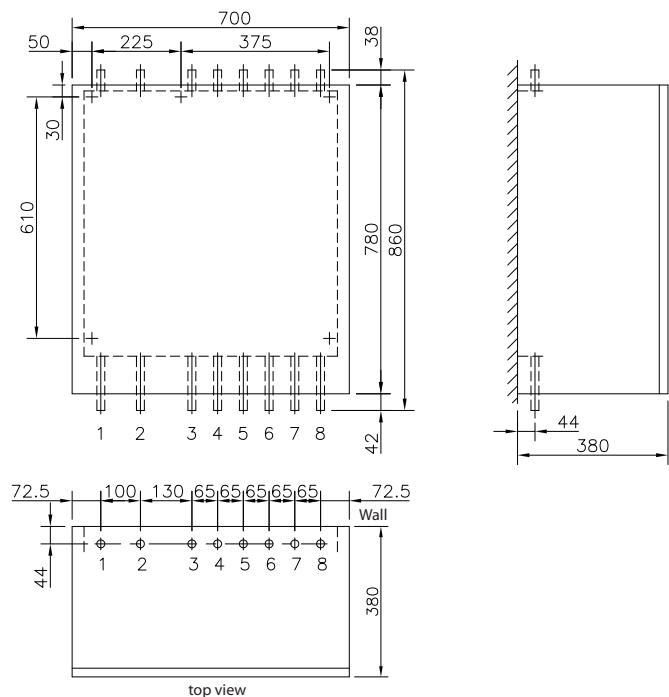
Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Heating (HE) return
- 4 Heating (HE) supply
- 5 Floor heating (FH) supply
- 6 Floor heating (FH) return
- 7 Cylinder supply
- 8 Cylinder return

Connection sizes:

DH + Cylinder: G $\frac{3}{4}$ (ET)
HE + FH: G $\frac{3}{4}$ (IT)



Instructions

VX Solo II

6.8 VX Solo II H2WS (ECL 310/A367.1d) - 2 HE circuits + sec. connection for DHW cylinder

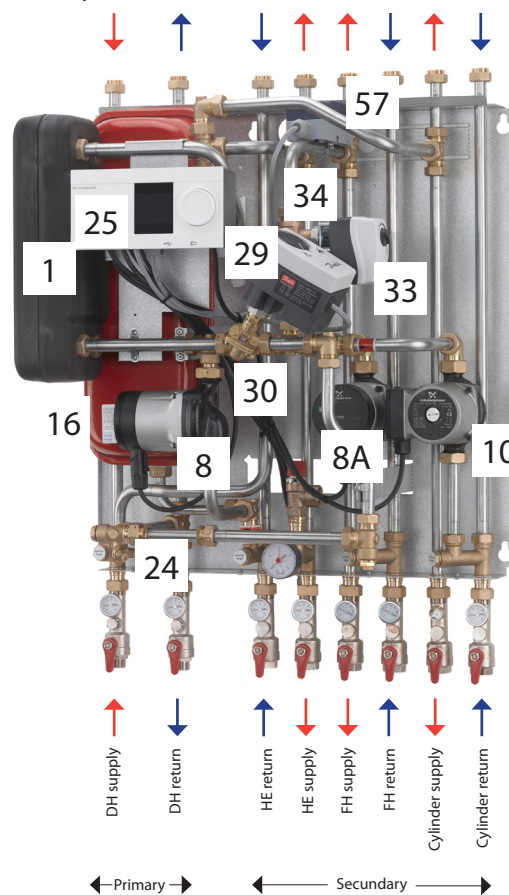
- 1 Plate heat exchanger
- 8 Circulation pump, HE
- 8A Circulation pump, Cylinder
- 10 Circulation pump, FH
- 16 Expansion vessel
- 24 Fitting piece for heat meter
- 25 Electronic controller
- 29 Actuator AMV 13
- 30 Flow controller with integrated control valve AHQM
- 33 Actuator AMV 150
- 34 3-way valve VMV 30/15
- 57 Safety temperature monitor

The substations offer variable connection possibilities, as connection of pipes can be established both in the top or in the bottom of the substation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. The control function, however, is basically as stated in this instruction manual.

Instructions for the fitted components will be supplied together with the substation.



Measurements:

Dimensions without cover
H860 x W650 x D365 mm

Dimensions with cover
H860 x W700 x D380 mm

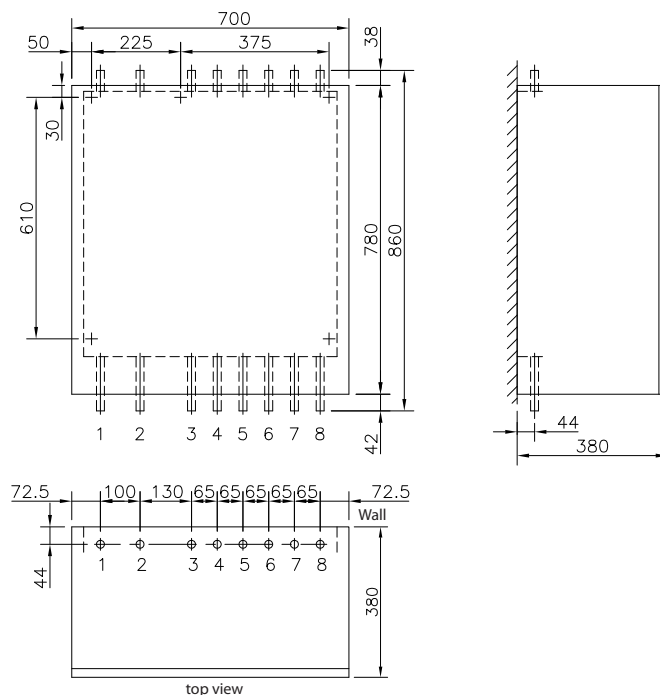
Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Heating (HE) return
- 4 Heating (HE) supply
- 5 Floor heating (FH) supply
- 6 Floor heating (FH) return
- 7 Cylinder supply
- 8 Cylinder return

Connection sizes:

DH + Cylinder: G $\frac{3}{4}$ (ET)
HE + FH: G $\frac{3}{4}$ (IT)



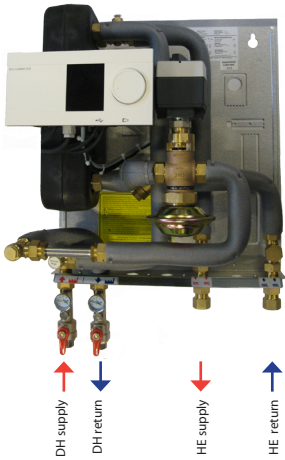
6.9 VX Solo OP (ECL 210/A237)

- 1 Plate heat exchanger
- 25 Electronic controller
- 29 Actuator AMV 10
- 30 Flow controller with integrated control valve AVQM

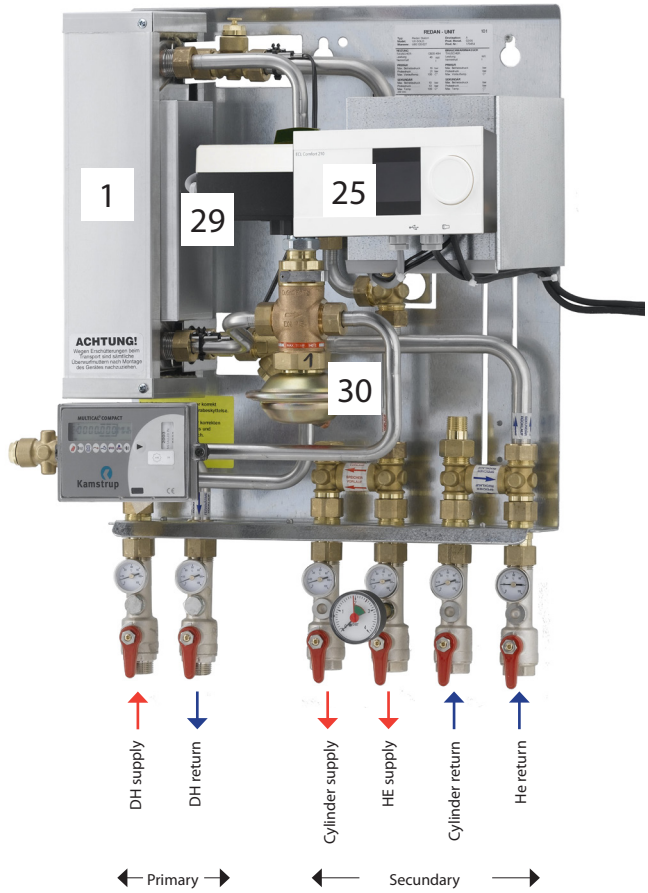
Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. The control function, however, is basically as stated in this instruction manual.

Instructions for the fitted components will be supplied together with the substation.



Above photo shows VX Solo OP variant for heating only.



Measurements:

Dimensions without cover
H640 x W440 x D250 mm

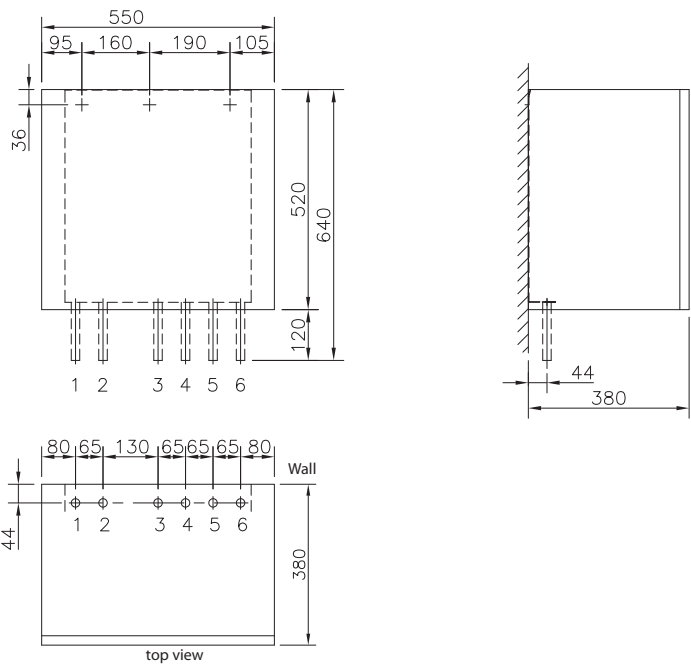
Dimensions with cover
H640 x W500 x D380 mm

Connections:

Order:

- 1 District heating (DH) supply
- 2 District heating (DH) return
- 3 Cylinder supply
- 4 Heating (HE) supply
- 5 Cylinder return
- 6 Heating (HE) return

Connection sizes (example):
DH: G $\frac{3}{4}$ (ET)
HE + Cylinder: G $\frac{3}{4}$ (IT)



Instructions

VX Solo II

7.0 Mounting

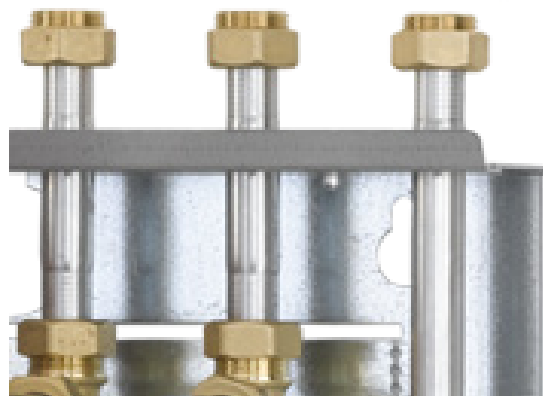
Necessary assembly, start-up and maintenance work must be performed by qualified and authorized personnel only, and always in compliance with local regulations and this instruction manual.

The substation must be easily accessible, enabling maintenance work without undue discomfort.

The substation is intended for wall mounting and the mounting sheet on the back of the substation has got holes for screw installation. Lift the substation in the back plate and fix it to a **solid wall**, which has the necessary load-bearing capacity, in a workmanlike manner with two strong bolts, screws or expansion plugs.

All pipes and connections must be cleaned and rinsed before start-up. After that the strainers should be cleaned.

A label for each of the different connections is placed on the substation. Connect the substation to the household piping according to these symbols as well as the instructions in this manual.



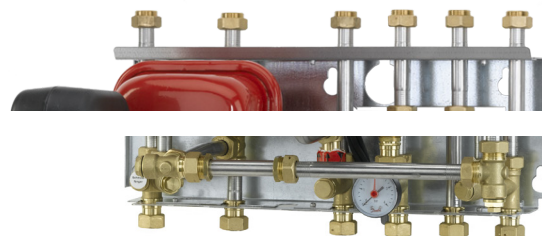
7.1 Variable connection possibilities

The substations offer variable connection possibilities (not VX Solo II HWS OP), as connection of pipes can be established in the top or in the bottom of the substation. Upon delivery the substation is prepared for connection in bottom of the substation.

For change of connection from bottom to top, demount plugs on connection pipes in top of substation and ball valves on connection pipes in bottom of substation, and mount plugs in connection pipes in bottom of substation and ball valves on connection pipes in top of substation.

Please note that the air screw, which originally is mounted on the heating supply pipe in top of substation must be relocated to the highest point of the substation. **PLEASE NOTE** that the variable connection possibilities makes it possible to establish some of the connections in the top and

others in the bottom of the substation. This may be desirable in some cases.



7.2 Tightening of connections

Check and tighten all connections before adding water to the system, as vibrations during transport may have caused leaks.

After having added water to the system, tighten all the connections before performing leak test. If the substation operates in accordance with the dimensioning basis, re-tighten the connections and take the substation into continuous use.

Please note that the connections may be supplied with EPDM rubber gaskets - in general connection sizes from 3/4" to and incl. 1 1/2" for Kompakt H stations. **Therefore take care not to overstrain the union nuts, as this may result in leaks.** The manufacturer accepts no liability for leaks that result from overstrain of union nuts.



7.3 Expansion vessel

The VX Solo II substations are equipped with an expansion vessel, which is factory set to 0,5 bar.

Please note that for type HWS OP the expansion vessel is not part of the delivery.

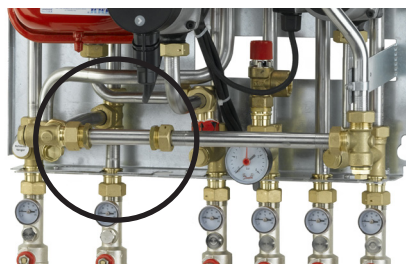


7.4 Heat meter, Fitting pieces

The substation is equipped with fitting pieces for heat meter in district heating return.

Assembly of heat meters

- Loosen nuts from fitting piece.
- Remove fitting piece and replace with heat meter.
- do not forget gaskets.
- After mounting of heat meter remember to check and tighten all threaded connections.



7.5 Mounting of outdoor temperature sensor

The outdoor temperature sensor is delivered separately and must be mounted on site according to the enclosed illustrations.

The outdoor sensor is always to be mounted on the coldest side of the property (normally the north side of the property). The sensor must not be exposed to the morning sun, and should not be mounted above windows, doors, air vents or other heat sources, and not under balconies and roof eaves.

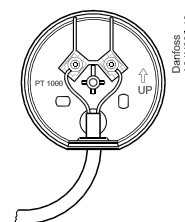
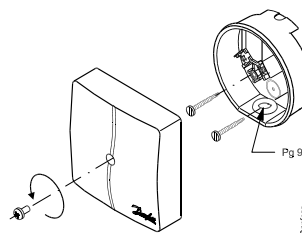
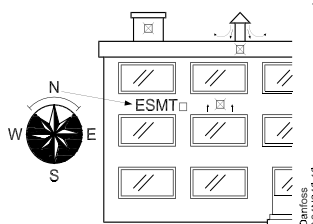
Mounting height approx. 2.5 m above ground.

Temperature range: -50 to 50° C

Electrical connections

Two wire non polarized (can be crossed)
 Sensor cable: 2 x 0.4 - 1.5 mm²

Connect the cable ends to ECL controller in clamps 29 and 30.



7.6 Mounting of immersion sensor

The immersion sensor for accurate temperature measurement and control in the cylinder is supplied separately and must be mounted and connected to the controller on site.

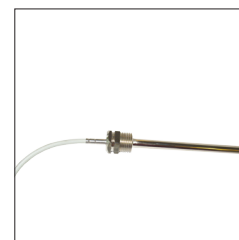
Temperature range immersion sensor: 0 to 100 °C
 Temperature range immersion pocket: 0 to 180 °C

2-wire cable (2 x 0.34 mm²) spliced is preassembled in the controller.

- 1) Mount sensor pocket (separately delivered) in top or bottom of cylinder.
- 2) Lay immersion sensor and cable from substation to cylinder and mount immersion sensor in immersion pocket.

In case the length of the sensor cable is not long enough for your property, it is recommendable to change the whole cable. The minimum area for the cable is 0,4 mm² and max. length is 125 m.

For electrical connections please refer to enclosed Danfoss instructions for the ECL controller.



Instructions

VX Solo II

8.0 Filling, Start-up

Check and tighten all connections before adding water to the system, as vibrations during transport may have caused leaks.

After having added water to the system, tighten all the connections before performing leak test. Then heat up the system and tighten the connections once again.

Before adding water to the system and first start-up, check if:

- pipes are connected according to the circuit diagram,
- expansion vessel, if any, is connected,
- heat meter is mounted,
- shut-off valves are closed,
- threaded and flanged connections are tightened.



Adding water to the system:

1. Pump must be switched off when water is added to the system.
2. Fill heat exchanger and system with water until the manometer shows a working pressure, which corresponds to the system height + 5 m (approx. 1.5 - 2.0 bar)
3. Deaerate the system completely.
4. Start the pump.

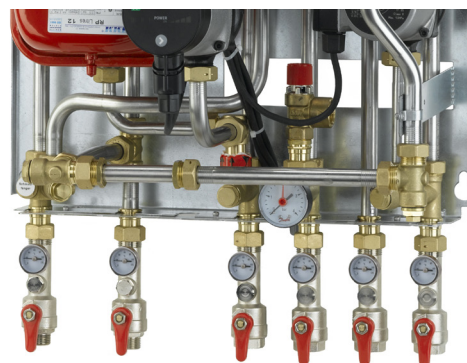
9.0 Manometer and filling

If the pressure drops below 1 bar, water must be added to the system. The operating pressure should never exceed 2.5 bar. (The safety valves open at 3 bar)

If system pressure drops dramatically within a short time, heating system should be examined for leakage, - this includes checking the factory set pressure of the expansion vessel.

Note;

Filling of water to the heating system must be done outside the substation.



10.0 Electrical connections

The station is wired and tested in the factory.

Electrical connections between the controller, pump (s), sensor and actuator (s) are made.

The electrical connection of the substation must be performed by a qualified and authorised electrician in compliance with all applicable rules and regulations.

The station should be connected to a 230 V AC power supply.

Connection of power supply must be established in accordance with current regulations and local standards.

The station must be wired and connected to an external main switch so that it can be turned off during maintenance, cleaning or repair work.

Controller ECL 210/310

Supply voltage:	230 V a.c. - 50 Hz
Voltage range:	207 bis 244 V a.c. (IEC 60038)
Power consumption	5 VA
Load on relay outputs:	4(2) A - 230 V a.c
Load on triac outputs:	0,2 A - 230 V a.c.

Actuator AMV10 / AMV13 / AMV 150

Supply voltage:	230 V a.c. - 50 Hz
Power consumption:	2 / 7 VA
For further information please refer to the enclosed instructions.	

Pump(s) (Alpha2 L)

Supply voltage:	230 V a.c. - 50 Hz
Protection class:	IP42
Power consumption:	Max. 25 Watt (UPS pump max. 45 Watt)

For further information please refer to the enclosed installation and operating instructions for the pump(s).

11.0 Description of VX Solo variants

11.1 VX Solo II (T°C 200u)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With one heating circuit for radiator or floor heating. For wall-mounting.

The temperature for the heating circuit is controlled by a self-acting thermostatic valve T°C 200u.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied.

Instructions for the fitted components will always be supplied together with the substation.



Differential pressure controller

(Standard on systems with self-acting thermostatic valve).

The differential pressure controller reduces the fluctuating pressure in the district heating network to a small and invariable operating pressure in the substation.

The required room temperature is controlled on your radiator thermostats.

Differential pressure controller AVPL

AVPL is a self-acting differential pressure controller for PN 16 with adjustable differential pressure setting and the differential pressure controller can be set at any differential pressure between 5 kPa and 25 kPa (0.05 bar and 0.25 bar).

The preset factory setting of the controller is 10 kPa (0.1 bar).

The differential pressure can be set by means of an Allen key NV 3. 1 turn corresponds with 1 kPa (0.01 bar).

The controller settings can be changed in accordance with the enclosed producer instructions:

Differential pressure controller (PN 16) AVPL
Return mounting, adjustable setting



AVPL

Alternative differential pressure controller TD200

Alternatively a differential pressure controller type TD200 can be mounted in the substation.

This type of differential pressure controller is preset from factory and should not be adjusted afterwards.



Instructions

VX Solo II (T°C 200u)

Control of heating circuit

The temperature for the heating circuit is controlled by a thermostatic valve T°C 200.

Approximate thermostat scale setting:

- Pos. 1 = 20°C
- 2 = 30°C
- 3 = 40°C
- 4 = 50°C
- 5 = 60°C
- 6 = 70°C

Please note that the values are intended as a guide and may vary according to the district heating operating conditions.

Approximate supply temperatures at:

- 10 °C outdoor temperature approx. 40°C
- 0 °C outdoor temperature approx. 55°C
- 10 °C outdoor temperature approx. 65°C

It is important to keep the supply temperature to the radiators as low as possible (the temperature is indicated by thermometer mounted in HE return). The room temperature is controlled by radiator thermostats.

Floor heating (substation with heat exchanger for floor heating)

It is important to keep the supply temperature to the floor heating system as low as possible, approx. 30-35° (the temperature is indicated by thermometer mounted in HE return),

The T°C is typically set in pos. 2-2.5 (intended as a guide). The supply temperature should not exceed 40°C (ALWAYS refer to the instructions of the floor supplier).

Circulation pump, heating circuit

See chapter 12 on page 49 for more information about circulation pump.



11.2 VX Solo II H (ECL 210/A230.1a)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With one heating circuit for radiator or floor heating. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

*Please note:
Your substation may look different than the substation shown, as variants with other components may be supplied.
Instructions for the fitted components will always be supplied together with the substation.*



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo II H is loaded with Application 1a. Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.

See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



We also refer to Danfoss Installation Guide für ECL Comfort 210, application A230, which can be found on www.heating.danfoss.com

Instructions

VX Solo II H (ECL 210/A230)

Control of heating circuit

For controlling the heating circuit the VX Solo II H is supplied with a self-acting flow controller with integrated control valve Danfoss AHQM and an electrical actuator AMV 150, which in combination with the ECL controller controls the heating circuit.

The controller closes when set max. flow is exceeded.

The flow-controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

**Please see enclosed instructions,
Electrical actuator AMV 150
Flow-controller with integrated control valve AHQM**



Manual override (AMV 150)



AHQM



Press and hold the button (on the bottom side of the actuator) during manual override.

Circulation pump, heating circuit

See chapter 12 on page 48 for more information about circulation pump



11.3 VX Solo II H2 (ECL 210/A260.1d)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With two heating circuits for radiator and floor heating. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied.

Instructions for the fitted components will always be supplied together with the substation.



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo II H2 is loaded with Application 1d. Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.

See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



We also refer to Danfoss Installation Guide für ECL Comfort 210, application A260, which can be found on www.heating.danfoss.com

Instructions

VX Solo II H2 (ECL 210/A260)

Control of heating circuit

For controlling the heating circuit the VX Solo II H2 is supplied with a self-acting flow controller with integrated control valve Danfoss AHQM and an electrical actuator AMV 13, which in combination with the ECL controller controls the heating circuit.

The controller closes when set max. flow is exceeded.

The flow-controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure.

The electrical actuator has undergone a functional test from factory.

*Please see enclosed instructions,
Electrical actuator AMV 13
Flow-controller with integrated control valve AHQM*



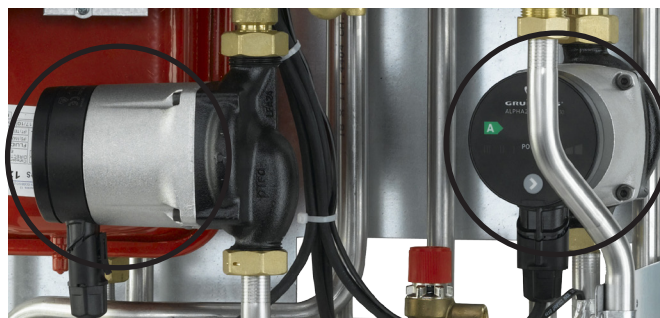
AHQM



AMV 13

Circulation pump

See chapter 12 on page 48 for more information about circulation pump.



Control of floor heating circuit

For controlling the floor heating circuit the VX Solo II H2 is supplied with a 3-way valve VMV and an electrical actuator AMV 150, which in combination with the ECL controller controls the floor heating circuit.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

*Please see enclosed instructions,
Electrical actuator AMV 150
3-way seated mixing valve VMV*



Manual override (AMV)



VMV



Press and hold the button (on the bottom side of the actuator) during manual override.

Safety temperature monitor

The floor heating circuit can be supplied with a safety thermostat for protection against overheating.

*Please see enclosed operating instructions
Jumo AT*



11.4 VX Solo II HWP (ECL 210/A237)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With one heating circuit for radiator or floor heating and with connection pipes for domestic hot water cylinder on the primary side. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied.

Instructions for the fitted components will always be supplied together with the substation.



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

Various applications can be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.

See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



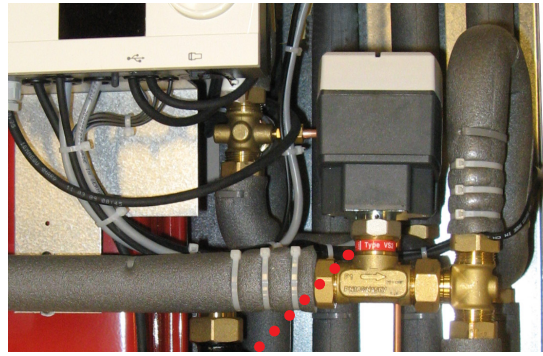
We also refer to Danfoss Installation Guide für ECL Comfort 210, application A230, which can be found on www.heating.danfoss.com

Control of heating circuit

For controlling the heating circuit the VX Solo II HWP (ECL 210), AVPB-F is supplied with a 2-way valve VS 2 and an electrical actuator AMV 150, which in combination with the ECL controller controls the heating circuit.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

Please see enclosed instructions, Electrical actuator AMV 150 2-way valve VS 2



Manual override (AMV)



VS 2



Press and hold the button (on the bottom side of the actuator) during manual override.

Differential pressure controller

The self-acting differential pressure controller AVPB-F with flow limitation reduces the fluctuating pressure in the district heating network to a small and invariable operating pressure in the substation and thereby ensures the best possible operating conditions.

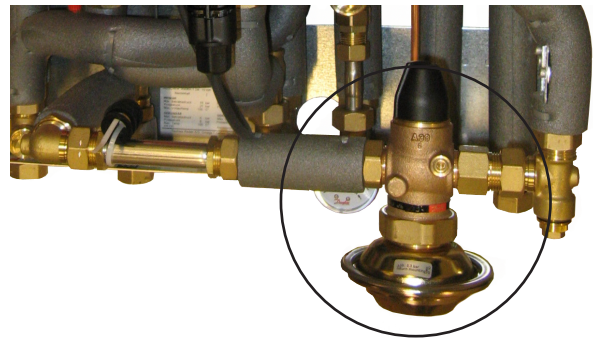
The control valve opens on falling differential pressure to maintain constant differential pressure, and closes on rising differential pressure or when set max. flow is exceeded.

The differential pressure controller is preset from factory and **should not** be adjusted afterwards.

The controller has a control valve with adjustable flow restrictor and flow setting is being done by the adjustment of the flow restrictor position.

The controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure.

Please see enclosed instructions, AVPB-F



Flow setting

Flow setting is being done by the adjustment of the flow restrictor position.

Instructions

VX Solo II HWP (ECL 210/237)

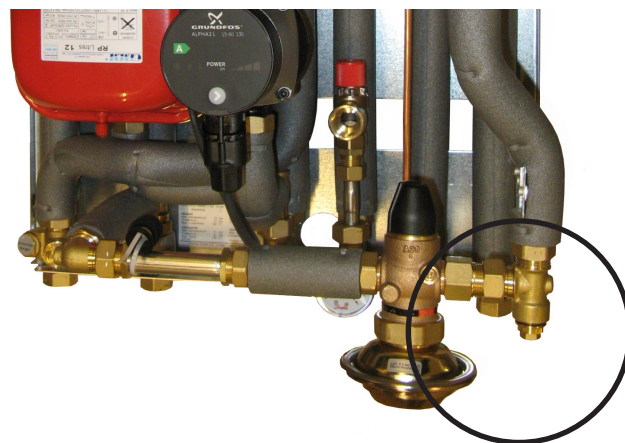
Circulation pump, heating circuit

See chapter 12 on page 48 for more information about circulation pump.



Domestic hot water

The VX Solo II HWP (ECL 210/230) substations are supplied with connection pipes for domestic hot water cylinder on the primary side. (Please note that cylinder control is not included in delivery).



11.5 VX Solo II HWS (ECL 210/A237.1a)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With one heating circuit for radiator or floor heating and with connection pipes for cylinder on the secondary side. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. Instructions for the fitted components will always be supplied together with the substation.



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo II HWS (ECL 210/A237) is loaded with Application 1a.

Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.

See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



We also refer to Danfoss Installation Guide für ECL Comfort 210, application A237, which can be found on www.heating.danfoss.com

Instructions

VX Solo II HWS (ECL 210/A237)

Control of heating circuit

For controlling the heating circuit the VX Solo II HWS (ECL 210/A237) is supplied with a self-acting flow controller with integrated control valve Danfoss AHQM and an electrical actuator AMV 150, which in combination with the ECL controller controls the heating circuit. The controller closes when set max. flow is exceeded.

The flow-controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

**Please see enclosed instructions,
Electrical actuator AMV 150
Flow-controller with integrated control valve AHQM**



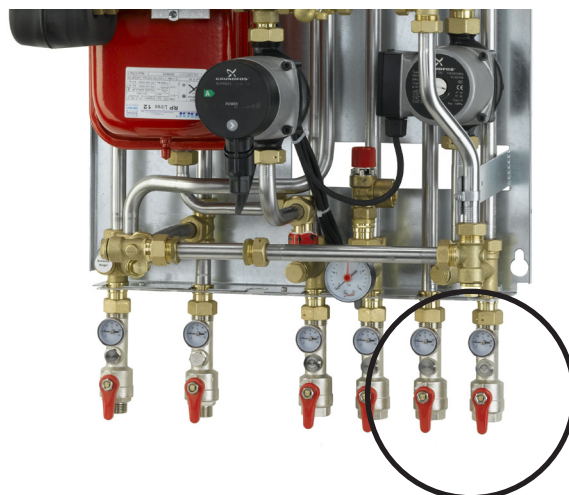
Circulation pump

See chapter 12 on page 48 for more information about circulation pump.



Domestic hot water

The VX Solo II HWS (ECL 210/A237) substations are supplied with connection pipes for domestic hot water cylinder on the secondary side, and the temperature in the cylinder is controlled by the Danfoss ECL controller.

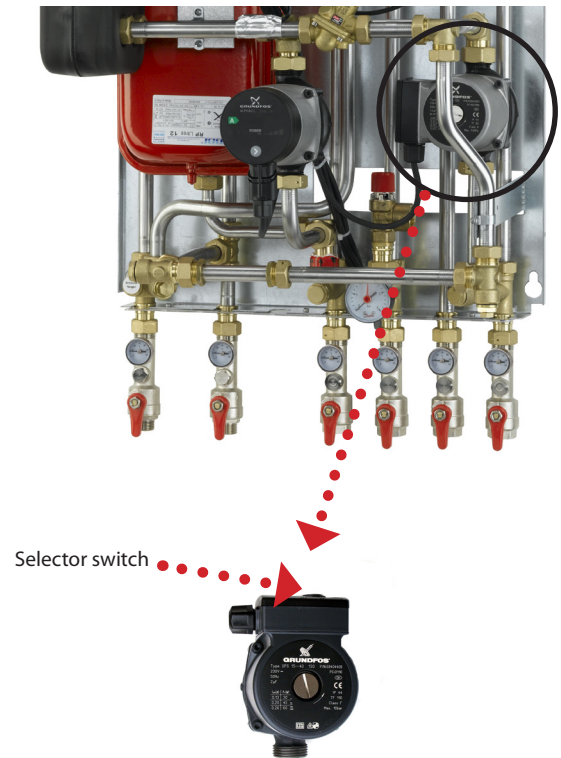


Domestic hot water circulation pump

It is recommended to set the pump at highest speed of rotation (setting 3) before start-up. Then set the pump at lowest possible speed of rotation (setting 1), in due consideration of the electricity consumption and the heating comfort. Factory setting of the selector switch is centre position (default).

Select setting 2 and 3 only if the pump setting does not meet actual system requirements.

*Please see enclosed instructions,
GRUNDFOS UPS
Installation and operating instructions*



11.6 VX Solo II HWS (ECL 210/A247.1c)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With one heating circuit for radiator or floor heating, with mixing loop and with connection pipes for cylinder on the secondary side. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied.

Instructions for the fitted components will always be supplied together with the substation.



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo II HWS (ECL 210/A247) is loaded with Application 1c.

Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.



See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



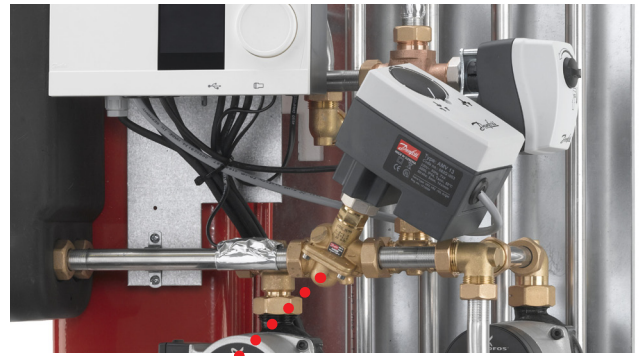
We also refer to Danfoss Installation Guide für ECL Comfort 210, application A247, which can be found on www.heating.danfoss.com

Control of heating circuit

For controlling the heating circuit the VX Solo II HWS (ECL300/C47-1) is supplied with a self-acting flow controller with integrated control valve Danfoss AHQM and an electrical actuator AMV 150, which in combination with the ECL controller controls the heating circuit. The controller closes when set max. flow is exceeded. The flow-controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

*Please see enclosed instructions,
Electrical actuator AMV 150
Flow-controller with integrated control valve AHQM*



Manual override (AMV 150)



AHQM



Press and hold the button (on the bottom side of the actuator) during manual override.

Control of heating circuit, mixing loop

The VX Solo II HWS (ECL 210/AS247) is supplied with mixing loop, which provides a suitable temperature level e.g. for floor heating. The VX Solo II HWS (ECL 300/C47-1) is supplied with a 3-way valve VMV and an electrical actuator AMV 150, which in combination with the ECL controller controls the mixing loop.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

*Please see enclosed instructions,
Electrical actuator AMV 150
3-way seated mixing valve VMV*



Manual override (AMV 150)



VMV



Press and hold the button (on the bottom side of the actuator) during manual override.

Circulation pump, heating circuit

See chapter 12 on page 48 for more information about circulation pump.

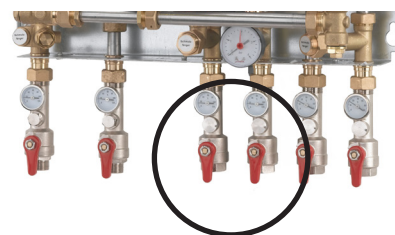


Instructions

VX Solo II HWS (ECL 210/A247)

Domestic hot water

The VX Solo II HWS substations are supplied with connection pipes for domestic hot water cylinder on the secondary side, and the temperature in the cylinder is controlled by the Danfoss ECL controller.



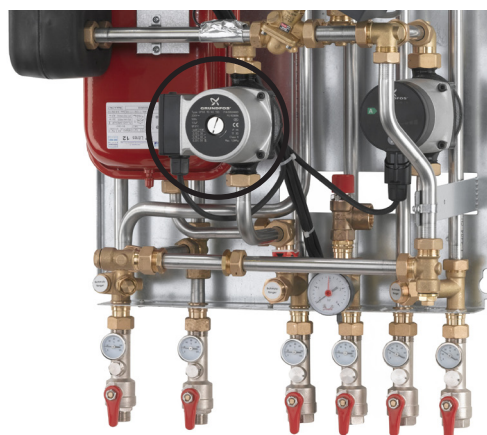
Domestic hot water circulation pump

It is recommended to set the pump at highest speed of rotation (setting 3) before start-up. Then set the pump at lowest possible speed of rotation (setting 1), in due consideration of the electricity consumption and the heating comfort. Factory setting of the selector switch is centre position (default).

Select setting 2 and 3 only if the pump setting does not meet actual system requirements.

**Please see enclosed instructions,
GRUNDFOS UPS**

Installation and operating instructions



11.7 VX Solo II H2WP (ECL 210/A260.1d)

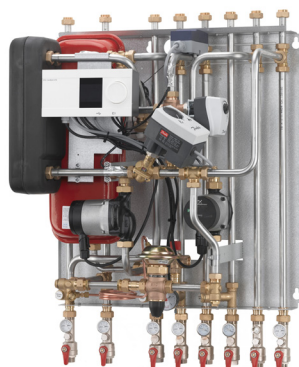
Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With two heating circuits for radiator and floor heating, and connection pipes for cylinder on the primary side. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied.

Instructions for the fitted components will always be supplied together with the substation.



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo II H2WP is loaded with Application 1d. Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.

See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



We also refer to Danfoss Installation Guide für ECL Comfort 210, application A260, which can be found on www.heating.danfoss.com

Instructions

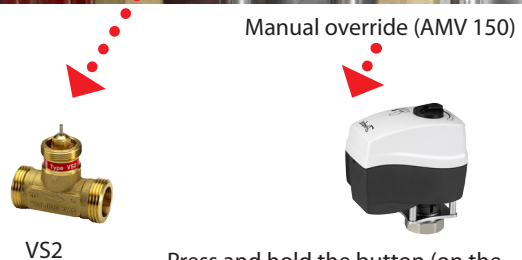
VX Solo II H2WP (ECL 210/A260)

Control of heating circuit

For controlling the heating circuit the VX Solo II H2WP (ECL 210) is supplied with a 2-way valve VS 2 and an electrical actuator AMV 150, which in combination with the ECL controller controls the heating circuit.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

Please see enclosed instructions, Electrical actuator AMV 150 2-way valve VS 2



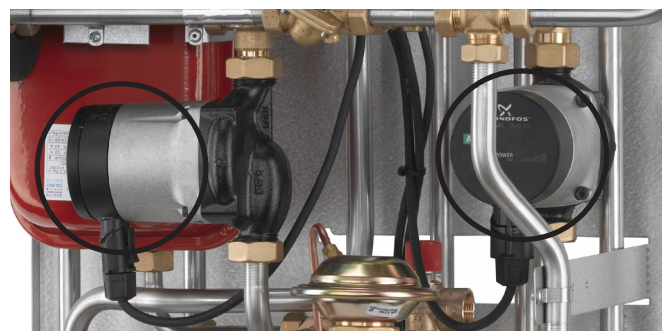
VS2

Manual override (AMV 150)

Press and hold the button (on the bottom side of the actuator) during manual override.

Circulation pump, heating circuit

See chapter 12 on page 48 for more information about circulation pumps.

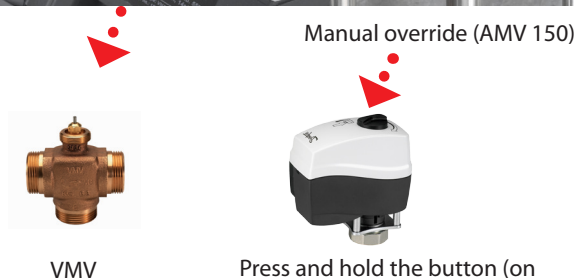


Control of floor heating circuit

For controlling the floor heating circuit the VX Solo II H2WP is supplied with a 3-way valve VMV and an electrical actuator AMV 150, which in combination with the ECL controller controls the floor heating circuit.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

Please see enclosed instructions, Electrical actuator AMV 150 3-way seated mixing valve VMV



VMV

Manual override (AMV 150)

Press and hold the button (on the bottom side of the actuator) during manual override.

Instructions

VX Solo II H2WS (ECL 310/A367)

Safety temperature monitor

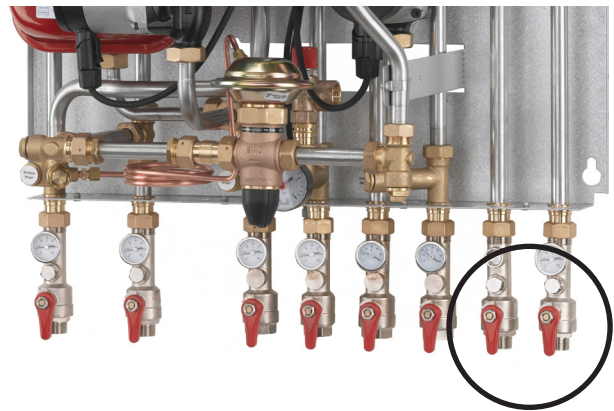
The heating circuit can be supplied with a safety thermostat for protection against overheating.

Please see enclosed operating instructions Jumo AT



Domestic hot water

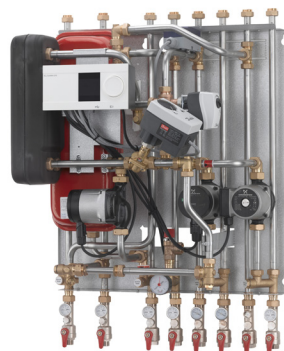
The VX Solo II H2WS (ECL 310/A367) substations are supplied with connection pipes for domestic hot water cylinder on the secondary side. (Please note that cylinder control is not included in the delivery).



11.8 VX Solo II H2WS (ECL 310/A367.1d)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With two heating circuits for radiator and floor heating, and connection pipes for cylinder on the secondary side. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 310 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.



Please note:

Your substation may look different than the substation shown, as variants with other components may be supplied. Instructions for the fitted components will always be supplied together with the substation.

Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 310 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo II H2WS is loaded with Application 1d. Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.



See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



We also refer to Danfoss Installation Guide für ECL Comfort 210, application A367, which can be found on www.heating.danfoss.com

Control of heating circuit

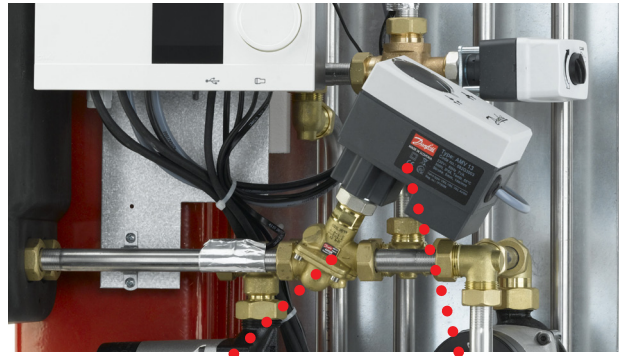
For controlling the heating circuit the VX Solo II H2WS is supplied with a self-acting flow controller with integrated control valve Danfoss AHQM and an electrical actuator AMV 13, which in combination with the ECL controller controls the heating circuit.

The controller closes when set max. flow is exceeded.

The flow-controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure.

The electrical actuator has undergone a functional test from factory.

*Please see enclosed instructions,
Electrical actuator AMV 13
Flow-controller with integrated control valve AHQM*



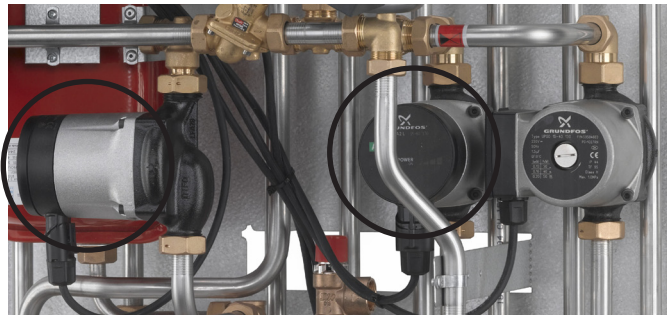
AHQM



AMV 13

Circulation pump, heating circuit

See chapter 12 on page 48 for more information about circulation pump

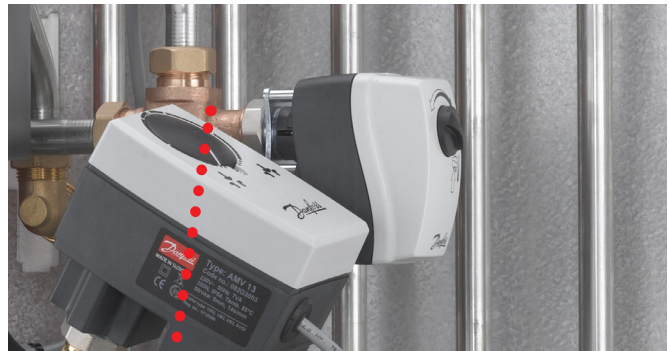


Control of floor heating circuit

For controlling the floor heating circuit the VX Solo II H2WS is supplied with a 3-way valve VMV and an electrical actuator AMV 150, which in combination with the ECL controller controls the floor heating circuit.

The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

*Please see enclosed instructions,
Electrical actuator AMV 150
3-way seated mixing valve VMV*



VMV



Manual override (AMV)

Press and hold the button (on the bottom side of the actuator) during manual override.

Instructions

VX Solo II H2WS (ECL 310/A367)

Safety temperature monitor

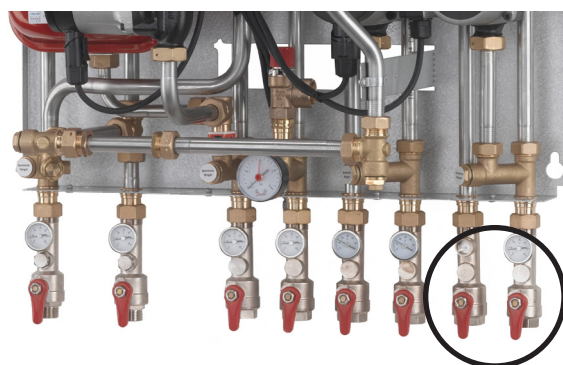
The heating circuit can be supplied with a safety thermostat for protection against overheating.

*Please see enclosed operating instructions
Jumo AT*



Domestic hot water

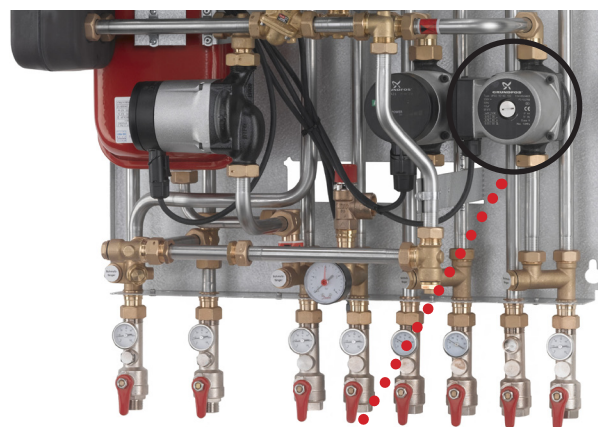
The VX Solo II H2WS substations are supplied with connection pipes for domestic hot water cylinder on the secondary side, and the temperature in the cylinder is controlled by the Danfoss ECL controller.



Domestic hot water circulation pump

It is recommended to set the pump at highest speed of rotation (setting 3) before start-up. Then set the pump at lowest possible speed of rotation (setting 1), in due consideration of the electricity consumption and the heating comfort. Factory setting of the selector switch is centre position (default). Select setting 2 and 3 only if the pump setting does not meet actual system requirements.

*Please see enclosed instructions,
GRUNDFOS UPS*



Selector switch



11.9 VX Solo OP (ECL 210/A237.1a)

Substation for indirect heating for single-family, semi-detached and terraced houses as well as flats. With one heating circuit and with connection pipes for cylinder on the secondary side. For wall-mounting.

The temperature for the heating circuit is controlled by a Danfoss ECL 210 controller in combination with an electronic actuator. The ECL controller acts as the brain of the heating system. It lets you easily control and optimise system performance and operation.

Please note:
 Your substation may look different than the substation shown, as variants with other components may be supplied.
 Instructions for the fitted components will always be supplied together with the substation.



Heating circuit

The temperature for the heating circuit is controlled electronically by the Danfoss ECL controller. The supply temperature is calculated by the controller on basis of the outdoor temperature.

The ECL Comfort 210 controller is loaded with a selected application by means of an ECL Application Key (Plug-&-Play). The Application Key contains information about application, languages and factory settings.

From factory the VX Solo OP is loaded with Application 1a. Other applications can, however, be loaded by means of the ECL Application Key, and it is possible to update the controller with new application software.

The controller is factory preset to turn off the heating automatically in the summer period.

The controller settings can be changed in accordance with the enclosed producer instructions for the mounted controller.

See ECL Application Key Box with ECL Comfort 210/310 user guide and mounting guide, for further information.



We also refer to Danfoss Installation Guide für ECL Comfort 210, application A237, which can be found on www.heating.danfoss.com

Instructions

VX Solo OP

Control of heating circuit

For controlling the heating circuit the VX Solo II HWS OP is supplied with a self-acting flow controller with integrated control valve Danfoss AHQM and an electrical actuator AMV 10, which in combination with the ECL controller controls the heating circuit. The controller closes when set max. flow is exceeded.

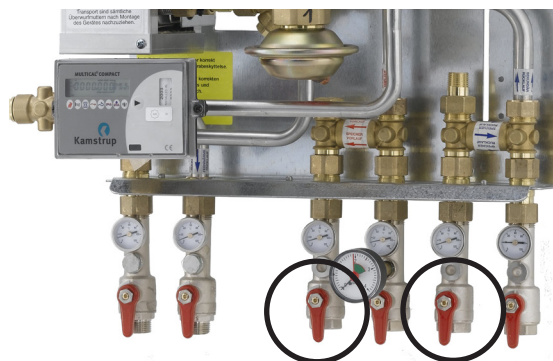
The flow-controller is equipped with excess pressure safety valve, which protects the actuator from too high differential pressure. The electrical actuator has undergone a functional test from factory. In case of operating disturbances the actuator can be closed manually turning the manual override knob on top of actuator counter-clockwise.

*Please see enclosed instructions,
Electrical actuator AMV 10
Flow-controller with integrated control valve AVQM*



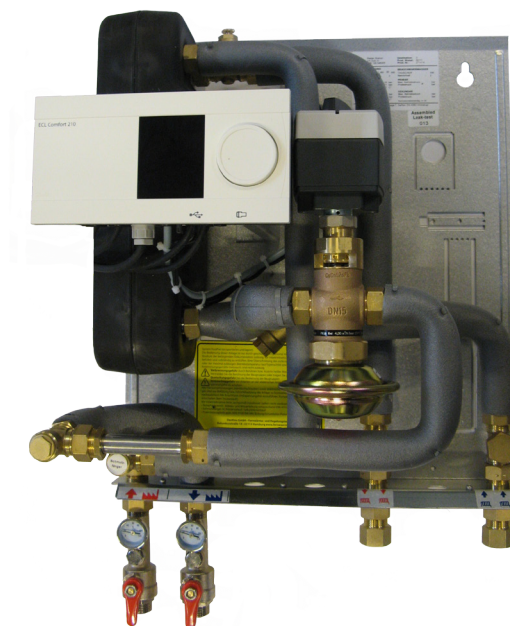
Domestic hot water

The VX Solo OP substations are supplied with connection pipes for domestic hot water cylinder on the secondary side, and the temperature in the cylinder is controlled by the Danfoss ECL controller.



VX Solo OP for heating only

The VX Solo OP is available as a variant for heating only. - See photo to the right.



Instructions

VX Solo II

12.0 Circulation pumps

Grundfos Pumpe ALPHA2 L

Substation start-up / pump

Do not start the pump until the system has been filled with liquid and vented. The required minimum inlet pressure must be available at the pump inlet. See Grundfos instructions for the pump.

The heating system can be vented via an air escape valve installed above the pump.

The pump is self-venting. It need not be vented before start-up. Air in the pump may cause noise, This noise ceases after a few minutes running.

Please note, that the system cannot be vented through the pump

Please note, that the pump must not run dry.

Pump setting

The pump is factory-set to start on the highest proportional-pressure curve PP2. This setting is suitable for a large majority of all single-family houses

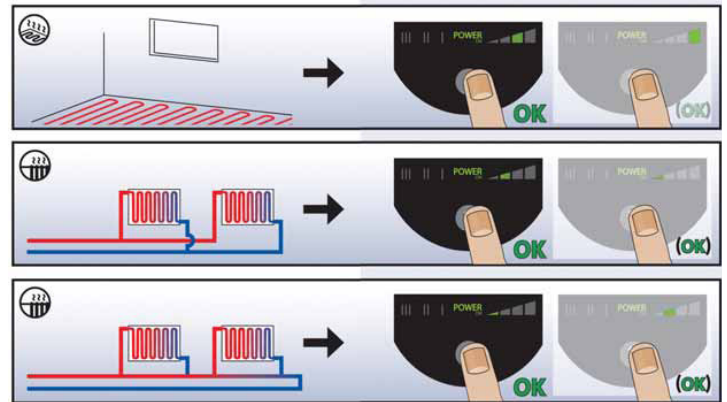
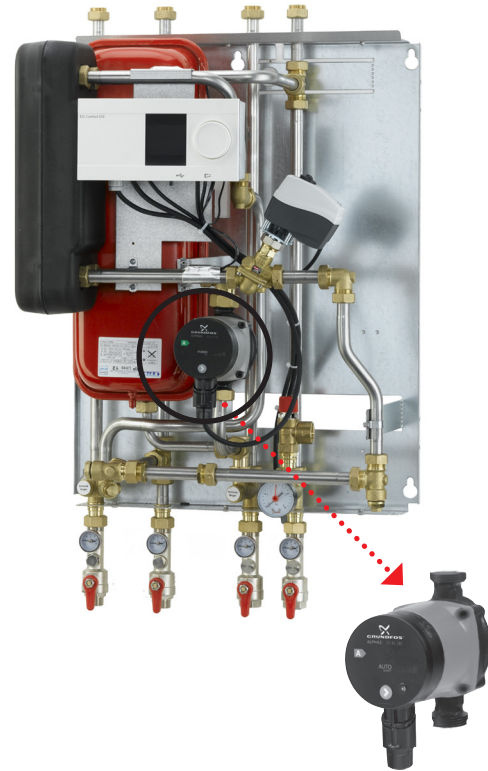
In this pump setting the pump performance and consequently the power consumption is adjusted according to the heat demand in the system.

Grundfos Alpha2 L has seven optional settings, which can be selected with the push-button.

Enclosed photo shows the recommended and alternative pump settings for system types.

For further information about pump settings please refer to the enclosed Grundfos Instructions.

ALPHA2 L,
Installation and operating instructions



Recommended and alternative pump settings for system type.

Pos.	System type	Pump setting	
		Recommended	Alternative
A.	Floor heating	Lowest constant-pressure curve (CP1)	Highest constant-pressure curve (CP2)
B.	Two-pipe systems	Highest constant-pressure curve (PP2)	Lowest constant-pressure curve (PP1)
C.	One-pipe systems	Lowest constant-pressure curve (PP1)	Highest constant-pressure curve (PP2)

Summer operation

The circulation pump for heating is automatically switched off in periods without heat demand. To prevent the pump from blocking in periods without heat demand, the controller automatically switches on the pump for some minutes every third day. In this period the circulation pump should be set at the highest speed of rotation.

If the heating requirement increases the pump setting can be changed by means of the selector switch.

For more information about venting of pump etc. please refer to enclosed installation and operating instructions.

Grundfos Pumpe ALPHA2

Substation start-up / pump

Do not start up the pump until the system has been filled with the flow media and vented. It is recommended to set the pump at highest speed of rotation before start-up. Then set the pump at lowest possible speed of rotation, in due consideration of the electricity consumption and the heating comfort.

Factory-setting of the pump is AUTOADAPT. AUTOADAPT is suitable for most systems. In this pump setting the pump performance will continuously be adjusted to the actual system requirements. For floor heating AUTOADAPT is recommended.

Pump settings:

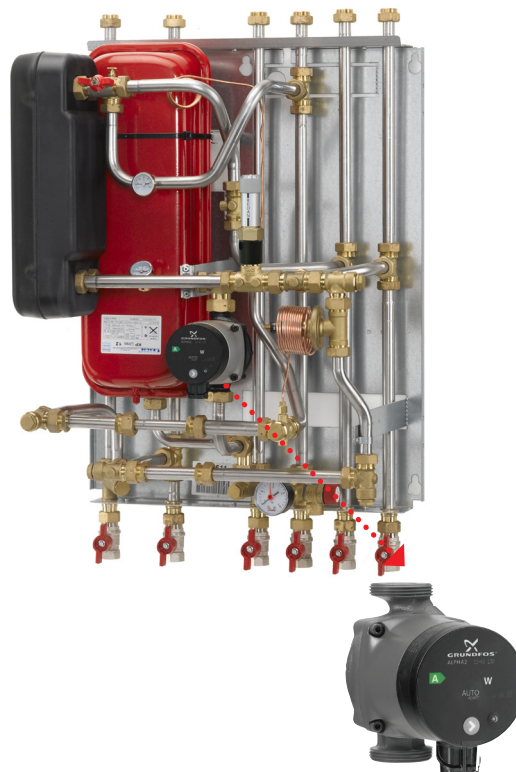
Floor heating and two-pipe systems:

Choose AUTOADAPT-function (adjusts the pump performance to the actual system requirements).

One-pipe systems:

Setting of pump according to the enclosed instructions.

ALPHA2 GRUNDFOS INSTRUCTIONS



Summer operation

Substation with T°C thermostat:

In periods without heating demand the pump can be switched of on the switch and the shut-off valve/"summer valve" **S** in top of the station can be closed during this period. Switch on the pump (for a short period) at least once per month.

For start-up follow the above start-up instructions. It is recommendable to vent the system after the summer period again.

Substation with Danfoss ECL:

The circulation pump for heating is automatically switched off in periods without heat demand. To prevent the pump from blocking in periods without heat demand, the controller automatically switch-on the pump for some minutes every third day. In this period the circulation pump should be set at the highest speed of rotation.

If the heating requirement increases the pump setting can be changed by means of the selector switch.

For more information about venting of pumps ect. please refer to the enclosed Grundfos instructions.



13.0 Maintenance

Maintenance work

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

Inspection

The operator or other authorised personnel is obliged to perform inspections at regular intervals and if necessary carry out maintenance work according to these and other instructions. Within the scope of the above maintenance work all strainers should be cleaned, all connections should be tightened and the operation of the safety valves should be checked by turning the valve head in the indicated direction.

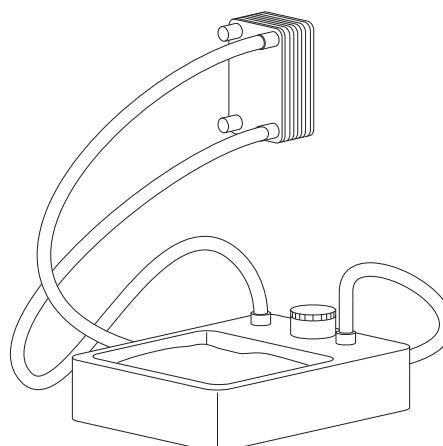


Rinsing/cleaning of plate heat exchanger

Brazed heat exchangers can be rinsed. For optimum cleaning the flow rate should be a min. of 1.5 times normal flow rate, preferably in back-flush mode. This will remove any deposits formed on the inside of the plate heat exchanger. In case of more serious deposits, a cleaning liquid, approved by Danfoss (f.ex. Kaloxi or Radiner FI) can be pumped through the heat exchanger. Both are environmentally friendly cleaning fluids and can be disposed of through the usual domestic sewerage system. Afterwards rinse thoroughly with large amounts of water.

Deacidification of plate heat exchanger

After long operation, because of the relatively high temperatures in the plates or tubes, the heat exchangers are especially subject to calcification. Any deacidification of the plate heat exchanger is done as shown on the drawing to the right. For brazed plate heat exchangers weak inhibited acid solutions (e.g. 5% formic, acetic or phosphoric acid) may be used.



Measures after maintenance work

After maintenance work and before switching the system on again:

- 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.
- Make sure that all tools, materials and other equipment that were used, have been removed from the working area.
- Connect to energy supply and check for leaks.
- Vent the system.
- If necessary adjust the system again.
- Make sure that all safety features on the device and the system work properly.

For the janitor or other supervisors

Meter reading

It is recommended to read the heat meter at regular intervals, and to write down the meter readings.

Cooling / Return temperature reading

The cooling, i.e. the temperature difference between district heating supply and district heating return is of great importance for the total heat economy. It is therefore very important to observe the supply and return temperatures. Normal temperature difference is 30-35 °C.

Please note, that the lowest district heating return temperature is directly dependent on the return temperature from the heating circuit and the cylinder circuit. Therefore, please observe these return temperatures.

Tightening of connections

When reading the heat meter, all fittings and connections should be checked for leaks. If leaks are detected, contact qualified and authorized personnel immediately.

Please note that the connections may be supplied with EPDM rubber gaskets - in general connection sizes from 3/4" to and incl. 1 1/2" for Kompakt H stations. **Therefore take care not to overstrain the union nuts, as this may result in leaks.** The manufacturer accepts no liability for leaks that result from overstrain of union nuts.

14.0 Troubleshooting

If operating disturbances occur, the following basic features should be checked before carrying out actual troubleshooting:

- the substation is connected to electricity,
- the strainer on the district heating supply is clean,
- the district heating flow temperature is at normal level (summer at least 60 °C, winter at least 70 °C),
- the differential pressure is higher than or equal to the normal (local) differential pressure in the district heating network. - If in doubt, ask the district heating plant,
- there is pressure on the system.

14.1 Troubleshooting - Heating

Problem	Possible cause	Solution
No heat	Strainer clogged on DH og HE side (radiator circuit).	Clean strainer.
	Filter in district heating meter clogged.	Clean the filter (after consulting the district heating plant).
	Defective differential pressure controller.	Check the functions of the differential pressure controller - clean valve seat if required.
	Defective sensor	Replace sensor
	Defektive actuator.	Check the functioning of the actuator.
	Defective motor valve - or possibly dirt in the valve housing.	Check the functions of the motor valve - clean valve housing if required.
	Automatic controls wrongly set or defective - possibly power failure.	Check if the setting of the controller is correct - see separate instructions. Check the power supply. Temporary setting of actuator to "manual" control - see instruction on heating circuit, manual control.
	Pump out of operation.	Check that the pump is receiving power and that it runs. Control that there is no air in the pump housing - see pump manual.
Uneven heat distribution	The pump is set at too low speed of rotation.	Set the pump at higher speed of rotation - see instructions on heating circuit.
	Air pockets in the system.	Vent the installation thoroughly.
Supply temperature too high	Air pockets in the system.	Vent the installation thoroughly.
	Wrong setting of automatic controls.	Adjust automatic controls, see instructions for automatic controls.
	Defective sensor.	Replace sensor.
	Defective controller. The controller does not react as it should in accordance with the instructions.	Call in automatic controls manufacturer or replace controller.

Problem	Possible cause	Solution
Supply temperature too low	Wrong setting of automatic controls.	Adjust automatic controls, see instructions for automatic controls.
	Defective controller. The controller does not react as it should in accordance with the instructions.	Call in automatic controls manufacturer or replace controller.
Poor cooling	Outdoor sensor mounted or placed incorrectly.	Mount/place outdoor sensor correctly.
	Strainer clogged.	Clean strainer.
	Too small heating surface/ too small radiators compared to the total heating requirement of the building.	Increase total heating surface.
	Poor utilization of existing heating surface.	Make sure that the heat is distributed evenly across the full heating surface - open all radiators and keep the radiator in the system from heating up at the bottom. Higher temperature at the top and lower temperature at the bottom part of the radiators means that the system operation is correct.
	The system is single-pipe.	It is extremely important to keep the supply temperature to the radiators as low as ever possible, while maintaining a reasonable level of comfort.

14.2 Troubleshooting - Domestic hot water

Problem	Possible cause	Solution
No domestic hot water	Defective or wrongly set differential pressure controller.	Check the functions of the differential pressure controller - clean valve seat and capillary tubes if required, - air and rinse capillary tubes.
	Strainer on DH supply clogged.	Clean strainer.
	Defective actuator - or possibly dirt in the valve housing.	Check the functions of the actuator - clean valve seat if required.
	Automatic controls wrongly set or defective - possibly power failure.	Check if the setting of the controller is correct, - see separate instructions. Check the power supply; Temporary setting of actuator to "manual" control - see instructions on heating circuit, manual control.
	Calified heating element.	Clean DHW cylinder with acid solution or replace heating element.
	Inadequate cylinder capacity.	Wait for heating / loading of the cylinder. You may check the specifications of the manufacturer conc. cylinder capacity.
Not enough pressure on the hot water	Strainer in cold water meter clogged.	Clean strainer - possibly in consultation with the water supply company.
Long waiting time	Circulation pump out of operation.	Check whether the pump is running - whether the pump is receiving power. control that there is no air in the pump housing - see pump manual.
Temperature too low	See "No domestic hot water".	See "No domestic hot water".
	Non-return valve on the circulation line defective (leads to mixing - and the circulation water pipes become cold during tapping).	Replace non-return valve.
Temperature too high	Defective actuator - possibly dirt in the valve housing.	Check the functions of the actuator - clean valve seat if required.
	Automatic controls wrongly set or defective.	Check if the setting of the controller is correct, - see separate instructions.
	Defective immersion sensor.	Replace immersion sensor.
Variations in temperature	Non-return valve on the circulation line defective (leads to mixing - and the circulation water pipes become cold during tapping).	Replace non-return valve.

Problem	Possible cause	Solution
Declining temperature during tapping	<p>Defective or wrongly set differential pressure controller (set too low).</p> <p>Automatic controls wrongly set.</p> <p>Immersion sensor placed incorrectly.</p> <p>Calified heating element.</p>	<p>Check the functions of the differential pressure controller - clean valve seat and capillary tubes if required, - air and rinse capillary tubes.</p> <p>Check that the controller has been correctly set - see separate instructions.</p> <p>Place immersion sensor correctly in accordance with the manufacturer instructions for the cylinder. You may contact Danfoss Redan A/S for further information.</p> <p>Clean DHW cylinder with acid solution or replace heating element.</p>
Poor cooling	Calified heating element.	<p>Clean DHW cylinder with acid solution or replace heating element.</p> <p>You may check the specifications of the manufacturer conc. cylinder capacity.</p>

15.0 EC-Declaration of Conformity

Danfoss Redan A/S
District Energy
Omega 7, Soften
DK-8382 Hinnerup
Telephone +45 87 43 89 43

EC-DECLARATION OF CONFORMITY

For CE marking in EU (European Union)

Danfoss Redan A/S District Energy

DK-8382 Hinnerup

Declares under our sole responsibility that below products including all available power and control options:

VX Solo II

Main components: See Instruction Manual

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

EU Directives:EMC Directive 2004/108/EEC

EN 61000-6-1 2007 Electromagnetic compatibility- Generic standard: Immunity for residential, commercial and light industry.

EN 61000-6-2 2007 Electromagnetic compatibility- Generic standard: Immunity industry.

EN 61000-6-3 2007 Electromagnetic compatibility- Generic standard: Emission for residential, commercial and light industry.

EN 61000-6-4 2007 Electromagnetic compatibility- Generic standard: Emission industry.

Machinery Directive 2006/42/EEC

EN ISO 14121-1 Safety of machinery -- Risk assessment

EN 60204-1-Safety of machinery - Electrical equipment of machines — Part 1: General requirements

PED Directive 97/23/EEC

Conformity assessment procedure followed: Module A - Internal control of production

All substations that falls under Article 3 §3 and category 1 shall not be CE-marked according to this directive

CE marked affixed year 2010

Approved by:



Danfoss Redan A/S · Omega 7, Søften · DK-8382 Hinnerup
Phone: +45 87 43 89 43 · Fax: +45 87 43 89 44 · redan@danfoss.com · www.redan.danfoss.dk

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