ENGINEERING
TOMORROW

Planner handbook for Danfoss flat stations

Whether for **new buildings** or **renovations**, you can rely on **efficiency**

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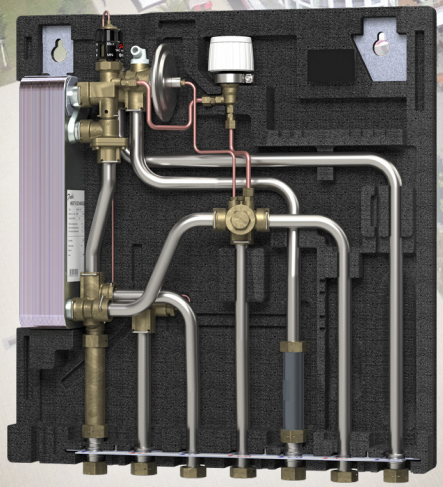


Fully
future-compatible

EvoFlat™ systems are suitable for all residential buildings – regardless of the type of energy used

Decentralized DHW heating pays off

In Germany and Austria, more than 1.5 million apartments will have to be built in the next few years and around 1 million will have to be renovated. Such an energy requirement reduction and the legally prescribed inclusion of renewable energy sources require new energy concepts – for renovations and new buildings alike.

Integration of renewable energy sources
Regardless of whether it is a new building or renovation of an existing building, alternative energy sources and the use of flat stations require a buffer storage, which collects the heat as heating water and distributes it to individual apartments. At the same time, the capacity of the heat generator can be reduced.

In decentralized heating systems, each apartment has its own hydraulic interface unit to make sure hot water with the required temperature is distributed to the different heating emitters or heating surfaces throughout the apartment. Each interface unit is also equipped with DHW heating, so that the hot water can be heated at any time, as required, in sufficient quantities and, above all, hygienically.

Benefits for all
Decentralized heating systems in new buildings and renovation projects offer many benefits for owners and tenants alike.

Building renovations in combination with decentralized systems reduce heat losses and thus heating costs. They increase comfort, convenience and domestic water hygiene. At the same time, the separate meters in each apartment also ensure more consumption transparency and better control over heating and hot water bills for tenants. This makes the building more attractive for all concerned.

* Depending on regional regulations

From traditional central heating... ... to a modern decentralized solution

Energy-efficient and individually controlled

EvoFlat™ systems consist of hydraulic interface units and horizontal pipe runs in each apartment, supplied with hot water from a central heat source.

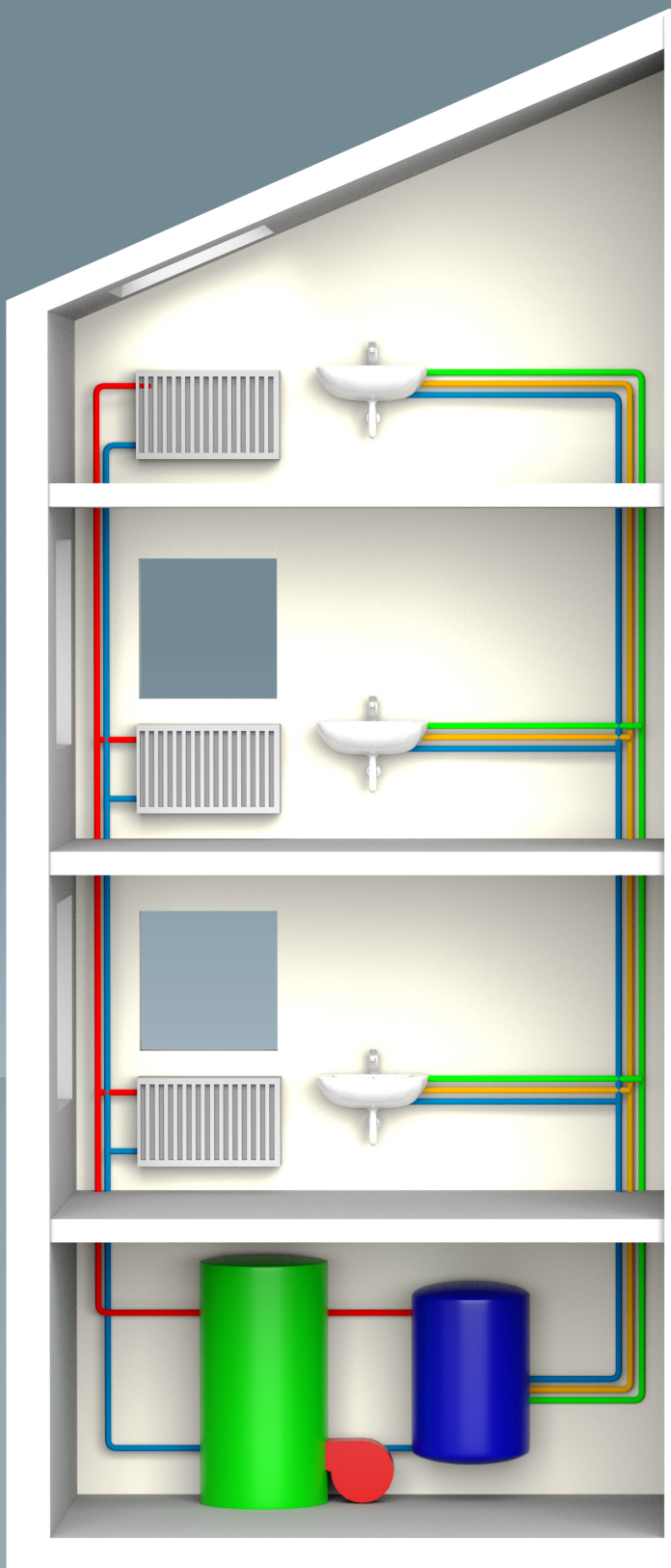
These systems can be connected via a buffer storage to any heat source. Changes and modernizations on the heat supply have no effect on the efficiency of the flat stations.

Flat stations contain a compact MicroPlate™ heat exchanger with a pressure-controlled proportional volume regulator and a differential pressure controller. The heat exchanger delivers DHW immediately if required.

The differential pressure controller prevents mutual interference from flat stations in heating mode and during DHW tapping, while also compensating for the high pressure fluctuations that come from the supply network and ensuring a constant operating pressure.

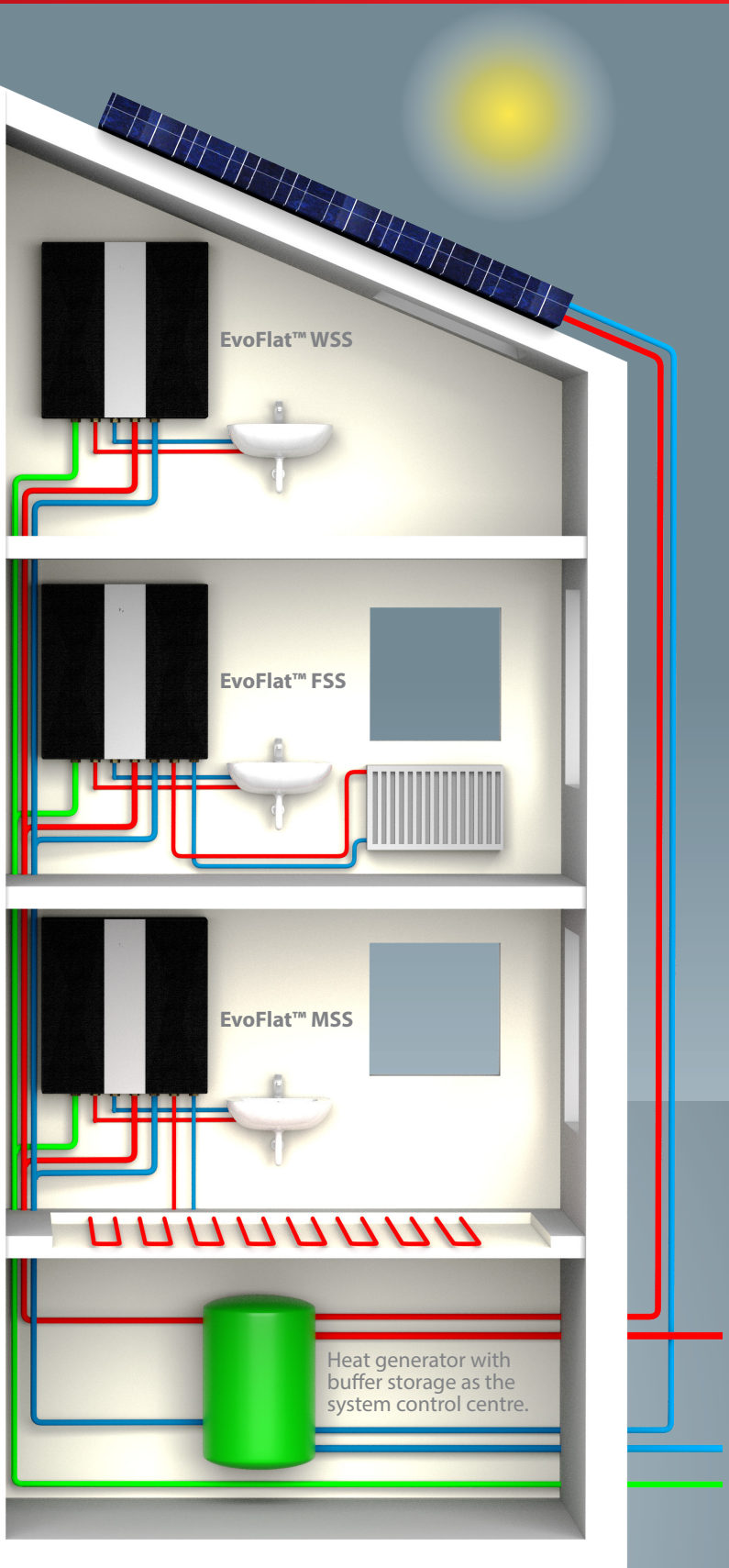
EvoFlat™ systems are the modern replacement for traditional centralized heating and DHW solutions, such as:

- Central heating systems with central domestic water heating, which are heated via district heating, oil or gas boilers.
- Gas-fired combi-heaters installed decentralized in the apartment for generating thermal heat and for heating domestic water.
- Electrical night-storage heaters, where the DHW is generated by small electrical flow heaters.



Traditional solution

Traditional arrangement of a central heating system with central domestic water heating



What makes EvoFlat™ flat stations efficient

Lowest return temperatures
Up to 28°C in the case of panel heating systems or radiators with connected underfloor temperature control

No heat loss due to circulation
In traditional systems, up to 30% energy is lost through supply and circulation lines

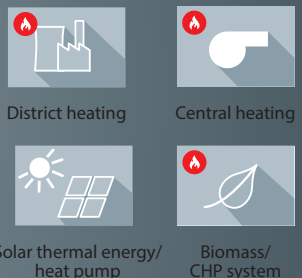
Only 3 instead of 5 supply lines
Drinking water, heating supply and heating return. DHW and circulation line are not required

Highest utilization levels in solar systems and condensing boiler technology
Thanks to the low return temperatures, condensing boilers work in economical condensation operation

Energy savings through transparency
Tenants who know their consumption level are more energy-conscious

EvoFlat solution

The EvoFlat™ system with decentralized heat distribution and DHW heating
Independent of the energy source



The most important parts of decentralized systems

The demand for and acceptance of flat stations has increased significantly in recent years. As a result of the many advantages that this system brings with it, more than half of all newly built apartment buildings are already equipped with flat stations. The use of modern materials ensures a long service life of the system.

With the help of flat stations, these systems, which are fed via a buffer tank, ensure both efficient heat distribution and safe, hygienic DHW heating as required.

Due to the low water content in the heat exchanger, the piping within the flat station and the flat itself, the hygienic aspect is fulfilled without any problems.

Stations with DHW heating performance capacities up to max. 80 kW (corresponds to approx. 30 l/min at 50°C) are provided for as-required drinking water heating.

The usual circulation line in hot water systems performs a temperature-controlled summer bypass in the flat station, which provides a hot water temperature of 40°C at all times. Hot domestic water is therefore very quickly available as soon as a tap is turned on.

This bypass remains closed in the heating season, when the station distributes heat constantly. Compared with the circulation lines of central domestic water heaters, heat loss is prevented.

All station variants also have a zone valve, which opens and closes on a time and temperature-controlled basis via a reference room thermostat. It is also possible to use stations with thermostatic fixed value control.

PWH: Capacity examples 10/50°C

Station type	Type name HEX	PWH capacity [kW]	Primary supply line/ return line [°C]	Pressure loss primary* [kPa]	Flow primary [l/h]	Tapping rate [l/min]
EvoFlat:	XB06H-1 26 Cu/StS (type 1)	43	65 / 22	40	850	15.3
	XB06H-1 40 Cu/StS (type 2)	49	65 / 21	30	950	17.5
	XB06H-1 56 StS (type 3)	51	65 / 19	28	950	18.3
	XB06H-1 56 StS (type 3)	34	55 / 24	28	950	12.5
	XB06H+ 60 Cu (type 3)	55	65 / 16	27	950	19.4
	XB06H+ 60 Cu (type 3)	38	55 / 21	27	950	13.6
Akva Lux II	XB06H-1 26 Cu/StS (type 1)	48	65 / 22	40	963	17.2
	XB06H-1 40 Cu/StS (type 2)	52	65 / 21	43	1017	18.6
	XB06H+ 60 Cu (type 3)	60	65 / 19	49	1110	21.2
	XB06H+ 60 Cu (type 3)	38	55 / 21	42	1010	14.3
Akva Lux (PTC controller)	XB37H-1 30 Cu/StS	60	65 / 14	33	996	21.5
	XB37H-1 30 Cu/StS	78	70 / 13	50	1180	28
Akva Vita (PM controller)	XB37H-1 30 Cu/StS	45	55 / 17	28	1020	16.2
	XB37H-1 30 Cu/StS	58	55 / 18	36	1270	20.8

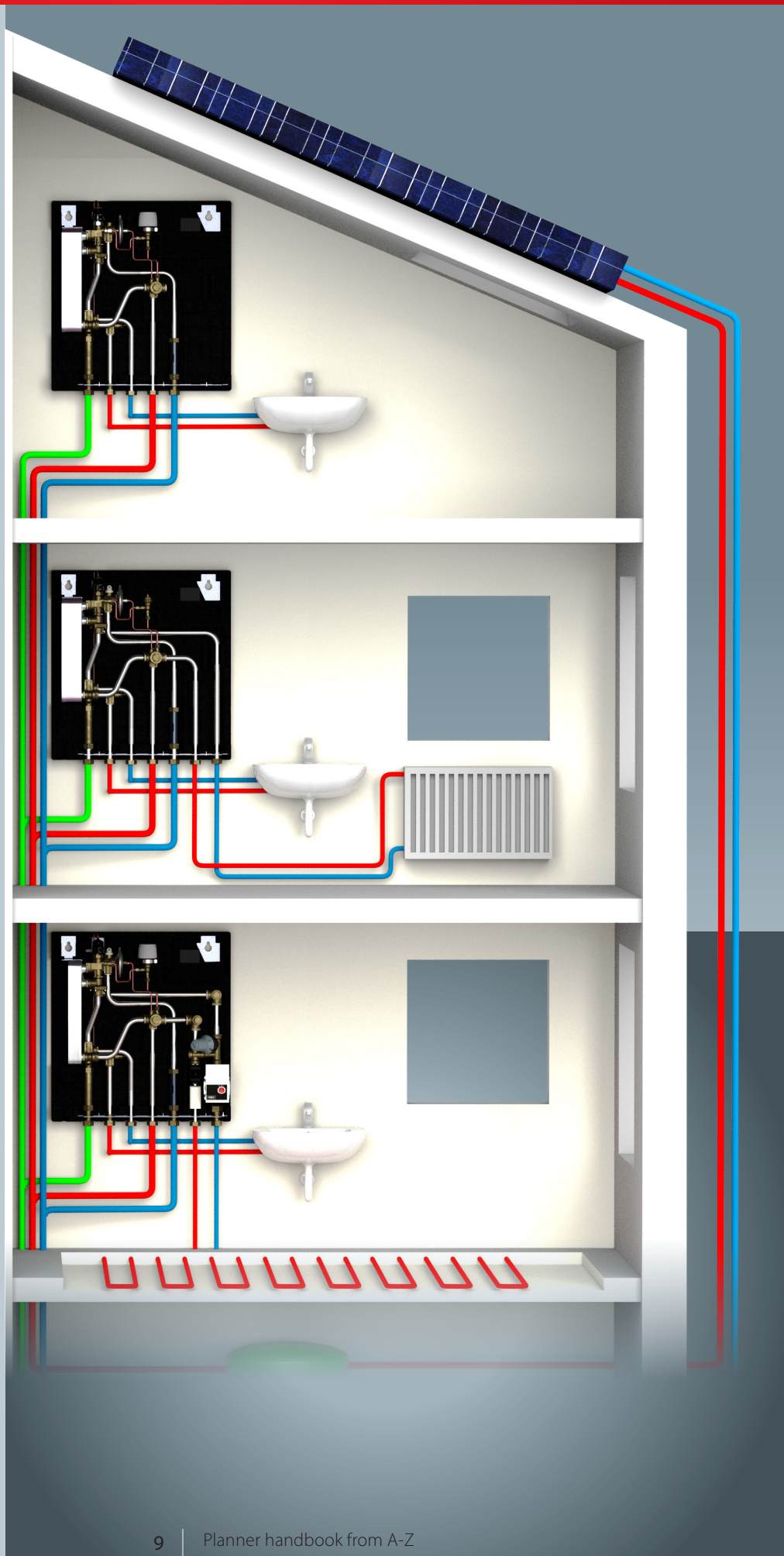
* without heat meter (HM)

Centralized heat generation and decentralized distribution

For systems with decentralized DHW heating, all available energy sources are suitable which can be integrated into the system individually or in combination via a buffer tank. This offers the opportunity to react to the development of energy prices and availability with energy-efficient technology.
By reducing the costs for so-called second rent (ancillary costs), tenants' living costs will generally also decrease, even if the basic rent increases.

Complete system

Section differential pressure controllers or section regulator valves are not required with EvoFlat™ stations.
The heat source flow rate for DHW heating is determined by the capacity of the plate heat exchanger. The heat source flow rates are determined by considering the simultaneity factors for apartment buildings. The hot water controller in the respective flat station balances pressure and temperature fluctuations on the supply side with its integrated differential pressure controller, together with the temperature controller.



SonoSelect 10 heat meters

Basic features:

- SonoSelect is available as a heat meter, cooling meter or combined heat/cooling meter
- No calming sections necessary before inlet and after outlet
- **Measuring cycle:**
  Flow: 0.5 sec.
  Temperature: 4 sec.
  Energy calculation: 0.5 sec.
- IP65 protection class
- Communication via M-bus, radio (868 MHz OMS version 4.0.2) or pulse interfaces
- Power supply, options: 3.6 V DC lithium battery or 230 V AC mains supply module (in the calculator)
- Ultrasonic sensor covers made of stainless steel (durable and vacuum-resistant design)
- Overhead installation possible, removable calculator

DN		15	15
Nominal flow rate q_p	[m³/h]	0.6	1.5
Max. flow rate q_s	[m³/h]	1.2	3
Min. flow rate (1:100) q_i*	[m³/h]	0.006	0.015
Startup flow rate q_c	[m³/h]	0.0012	0.003
Overload flow rate q_{ss}	[m³/h]	1.32	3.3

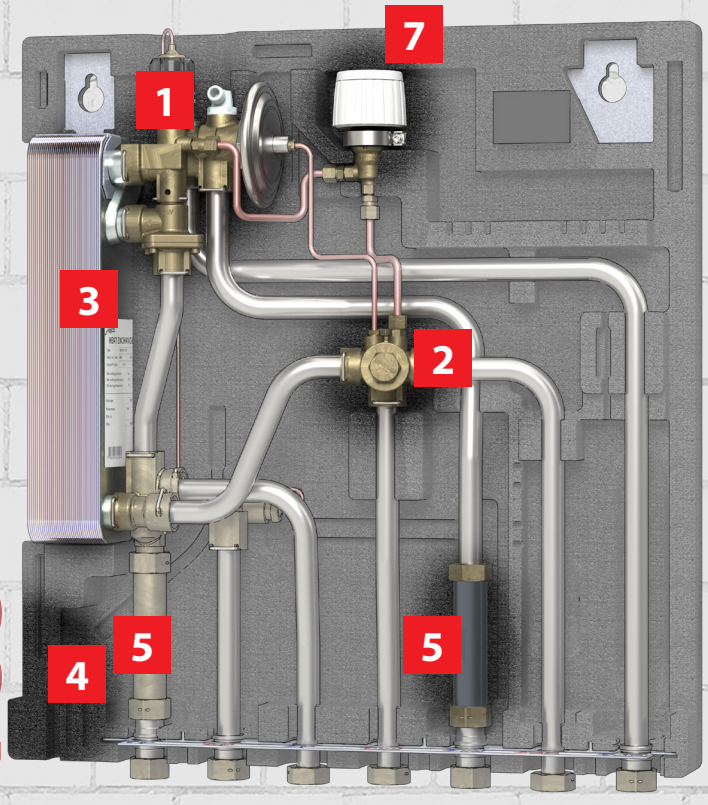
* (1:250) q_i on request

DN		15	15
Connection		G¾A", 110 mm	
Nominal pressure PN	[bar]	16	
Pressure drop (at q_p and 50°C)	[mbar]	30	150
IP protection class	[EN60529]	65	
Temperature limits	[°C]	0 to 105	

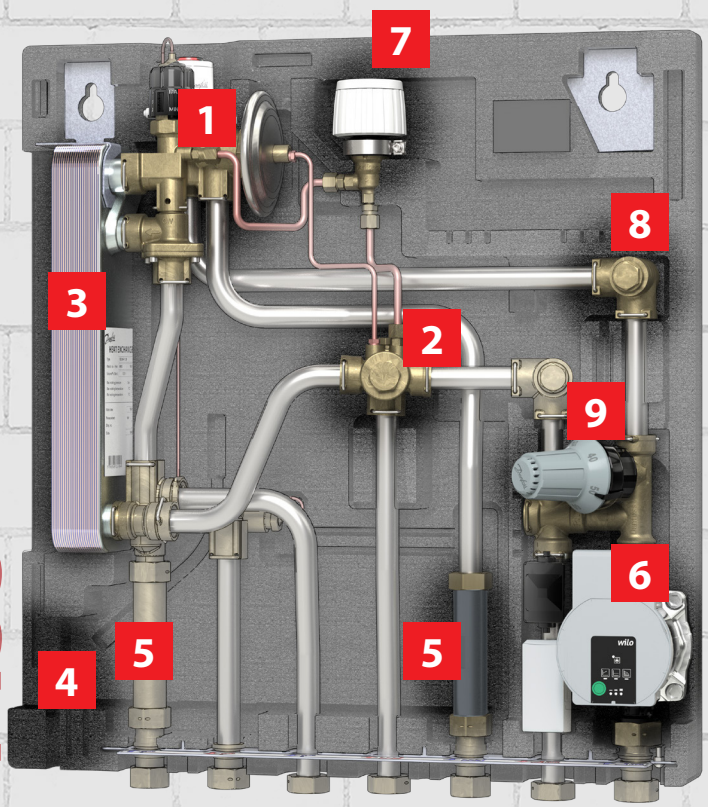
Recommendation for short measurement intervals

The heat volumes are billed via a heat meter to be installed in the primary return side of the station. This means that the energy consumption for DHW heating and heating per residential unit is recorded as required by law. For this purpose, ultrasonic heat meters with a sampling rate of max. 4 seconds can be used. Conventional devices work with a sampling rate of 15-30 seconds.

FSS



MSS



Main components of EvoFlat™ flat stations from Danfoss

1	The TPC-M controller is a differential pressure and flow controller, zone valve, thermostat and air vent, all in one unit
2	The strainer with a mesh size of 0.6 mm is installed in the centre of the crosspiece (supply flow)
3	The Micro Plate heat exchanger for energy-efficient DHW heating based on the counterflow principle
4	The thermally insulated rear wall with the insulation hood available as an option (EPP Å 0.039 W/(m*K)) for the lowest heat losses
5	Inserts (¾" × 110 mm) for hot and cold water meters
6	Mixing loop including STM 55°C and circulation pump for panel heating units
7	Summer bypass ensures rapid DHW heating outside the heating season
8	High temperature circuit connection for bathroom radiators
9	Thermostatic sensor element with FTC-type contact thermostat, regulating range 15-50°C

All in all, the built-in components make up the quality of the flat station. The standard components from Danfoss, which are tailored to the functions, guarantee safe and reliable operation.

Brazed plate heat exchanger for as-required DHW heating based on the continuous flow principle.

Type XB06-Cu brazing

Type XB06-StS brazing

MicroPlate™ plate embossing

Features:

- Energy and cost savings
- Efficient heat transfer
- Low pressure loss
- Long service life
- Patented micro plate technology
- Better CO_2 footprint
- High load safety

The lowest possible return temperature with simultaneous provision of the required tapping capacity is critical for the energy efficiency domestic water systems in flat stations.

Heat exchangers with a particularly high level of efficiency are required for this purpose. Danfoss uses the new EvoFlat™ heat exchanger for its MicroPlate™ flat stations. These are configured and dimensioned in accordance with the requested tapping capacity. The hot water temperature depends here on the available temperature of the primary side heat medium.

The heat medium and the domestic water to be heated flow by each other in opposite directions in the heat exchanger. The Danfoss heat exchanger connections and plates are produced from stainless steel 1.4404 or 1.4504 and connected to one another. They are ideal for all standard heating water and use in domestic water systems.

Water hammers can occur when a water tap is closed. Since these pressure surges can have an impact on the service life of plate heat exchangers, we recommend installing a water hammer damper on site, especially when using heat exchangers with pressure class PN16 (e.g. XB-06 with StS brazing).

10%

better heat transfer

Thanks to an innovative plate design with optimized flow properties

Guidelines for water quality for brazed plate heat exchangers with plate material EN 1.4404 ~ AISI 316L

Danfoss has created these guidelines for water quality of tap water (drinking water) and district heating water (heating water), which are used in plate heat exchangers with stainless steel plates (EN 1.4404 ~ AISI 316L) with the brazing materials copper (Cu) or stainless steel (StS). At this point it is important to emphasize that these guide values are not a guarantee against any form of corrosion, but are to be seen as an aid in achieving maximum service life of the devices and recognizing and avoiding critical operating conditions in advance.

Danfoss also provides a detailed guide to corrosion problems with additional explanations (see 'Water quality guide for copper-brazed plate heat exchangers').

Parameter	Unit	Value or concentration	AISI 316L	Plate material	Brazing material
			W.Br. 1.4404	Cu	StS
pH		< 6.0	O	-	O
		6.0-7.5	+	O/-	+
		7.5-10.5	+	+	+
		> 10.5	+	O	+
Conductivity	µS/cm	< 10	+	+	+
		10-500	+	+	+
		500-1000	+	O	+
		> 1000	+	-	+
Free chlorine	mg/l	< 0.5	+	+	+
		0.5-1	O	+	+
		1-5	-	O	O
		> 5	-	-	-
Ammonia (NH_3, NH_4^+)	mg/l	< 2	+	+	+
		2-20	+	O	+
		> 20	+	-	+
Alkalinity (HCO_3)	mg/l	< 60	+	+	+
		60-300	+	+	+
		> 300	+	O	+
Sulphate (SO_4^{2-})	mg/l	< 100	+	+	+
		100-300	+	O/-	+
		> 300	+	-	+
HCO_3 / SO_4^{2-}	mg/l	> 1.5	+	+	+
		< 1.5	+	O/-	+
Nitrate (NO_3)	mg/l	< 100	+	+	+
		> 100	+	O	+
Manganese	mg/l	< 0.1	+	+	+
		> 0.1	+	O	+
Iron (Fe)	mg/l	< 0.2	+	+	+
		> 0.2	+	O	+
[Ca^{2+}, Mg^{2+}]/[HCO_3]*	/	0-0.3	+	-	+
		0.3-0.5	+	O/-	+
		> 0.5	+	+	+

\+ Good corrosion protection
O Corrosion or reduced service life if multiple parameters are evaluated as 'O' **
O/- Risk of corrosion
\- Use not recommended

* Hardness ratio limit values were determined using empirical values and internal Danfoss laboratory tests
** If 3 or more parameters were evaluated with 'O', it is recommended that Danfoss be contacted for advice

Recommended chloride concentration to avoid stress corrosion cracking (SCC) of the stainless steel plates:

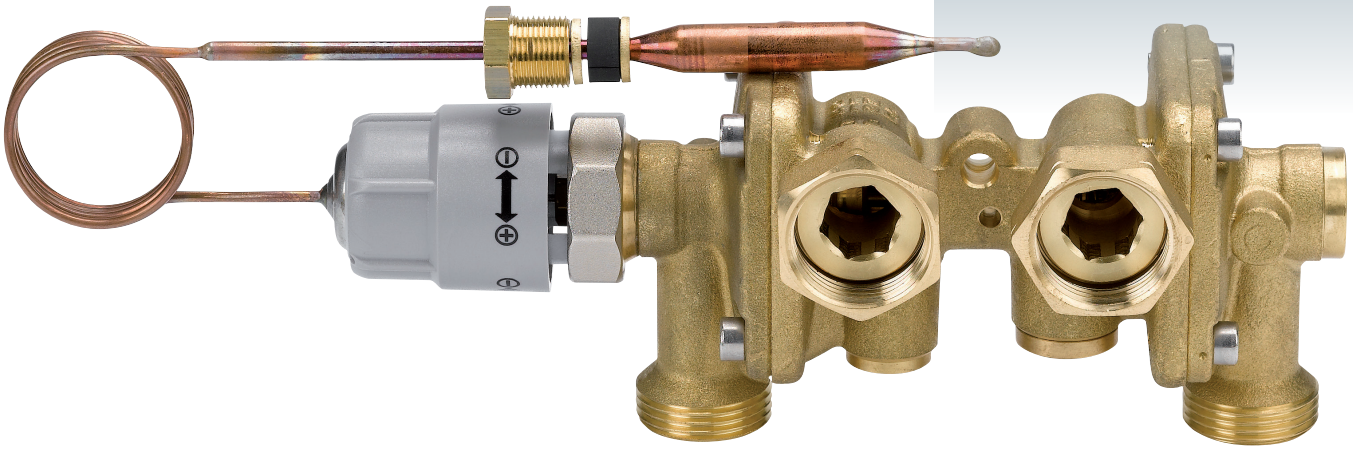
Application temperature	Chloride concentration
T ≤ 20°C	max 1000 mg/l
T ≤ 50°C	max 400 mg/l
T ≤ 80°C	max 200 mg/l
T ≥ 100°C	max 100 mg/l

Multifunctional controller for DHW heating - PTC2+P

When tapping of hot water starts, the control valve for the DHW heating opens. The water now flows through the heat exchanger and the domestic water is heated to the set temperature between 45 and 65°C.
The controller automatically balances primary side pressure and temperature fluctuations here. When the tap process is finished the controller closes the heating and domestic water supply.
As both the primary and secondary hot lines are connected at the bottom of the heat exchanger, the heat exchanger quickly cools off to the tapping end.
This largely prevents scaling on the heat exchanger and bacteria growth.

The e_{save}™ function of the domestic water systems in the Danfoss flat stations is based on the combined hydraulic and thermostatic regulation of the PTC2+P controller.

As described above, its hydraulic part ensures that the heating medium and drinking water only flow through the heat exchanger when hot water is tapped.
This means that the heat exchanger remains cold the rest of the time. There is no heat loss during the stand-by operation.



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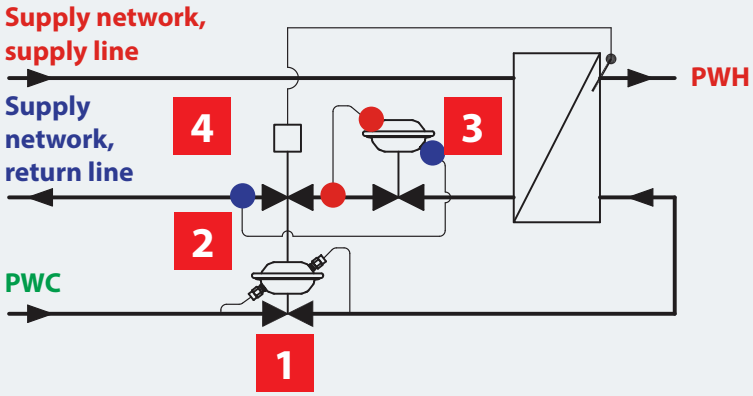


1	Proportional valve
2	Valve, temperature controller
3	Differential pressure controller
4	Temperature controller

When hot water is tapped, there is a pressure drop at the proportional valve (1) so that this valve opens. The thermostat valve (2) is also opened. The thermostat (4) controls the hot water temperature according to the target value set.
The differential pressure controller (3) compensates for the high pressure fluctuations that come from the mains and ensures a constant operating pressure. If tapping is stopped, the proportional and thermostatic valves close immediately.

The TPC-M combination controller

A key element of the flat station is the Danfoss TPC-M controller. It combines the following perfectly coordinated features in a single component:

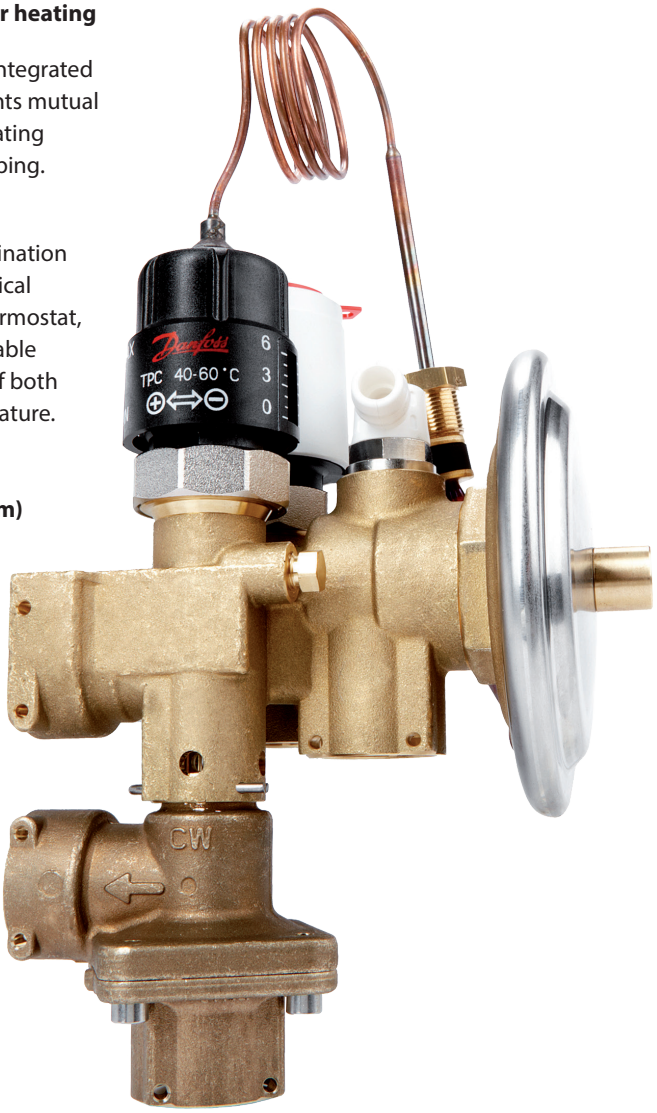
Volume regulator:
It takes in the required hot water draw through a membrane and provides the heat exchanger with the required hot water volume using a spindle and the valve.

Hot water thermostat:
A thermostatic control function for the hot water temperature installed upstream of the heat exchanger, functioning in addition to the volume regulator; it provides stable hot water temperatures even at low tapping rates by modifying the hot water volume. This feature ensures the lowest return temperatures and prevents unnecessarily high hot water volumes, thereby ensuring the energy efficiency of the entire system for DHW heating.

Differential pressure controller heating and hot water provision:
Differential pressure controller integrated into the TPC-M controller prevents mutual interference from stations in heating mode and during hot water tapping.

Zone valve, heating side:
The built-in zone valve, in combination with the optional thermal electrical actuator 'TWA-Z' and a clock thermostat, enables individualized, comfortable and energy-optimized control of both heating times and room temperature.

The requirements of the EnEV and Austrian standard (Ö-Norm) B2531 are thus met.
For all EvoFlat stations: at the 'consumer' connection, the available differential pressure is between 220-165 mbar, depending on the volume flow (40-645 l/h).



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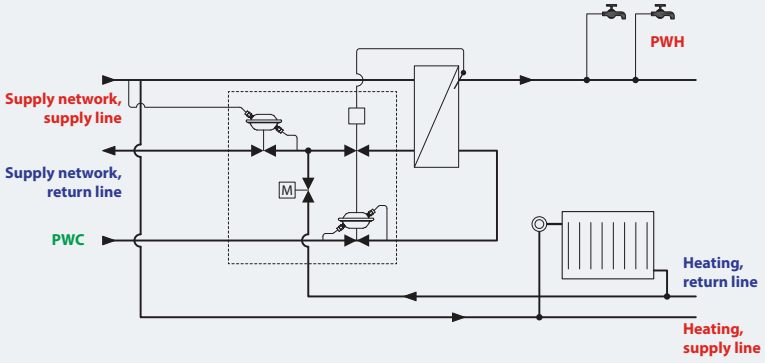
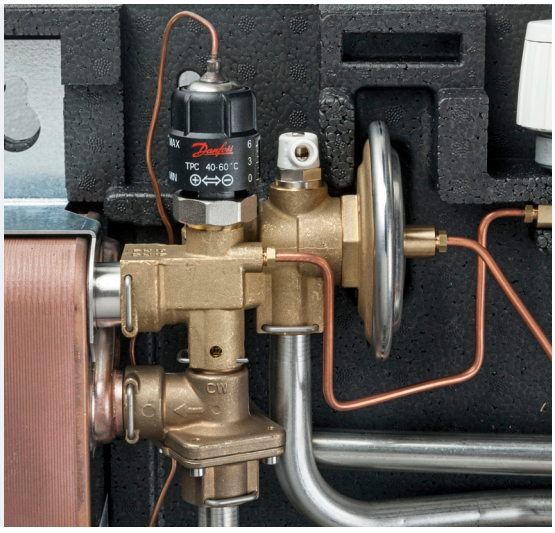




Application

The PTC controller is used to control the hot water temperature in connection with a plate heat exchanger.

The controller operates pressure- and thermostat-controlled. The pressure-controlled part ensures that both a primary (heating water) and secondary (drinking water) flow through the heat exchanger is only possible when hot water is tapped, and that the flow is closed after the tapping process has ended. The thermostat controls the hot drinking water temperature.

No-load losses are completely avoided through the functionality of the controller. After the tapping process has ended, the controller closes immediately and no longer allows flow in the heat exchanger.

Data for the PTC controller:

Dimensions, weight

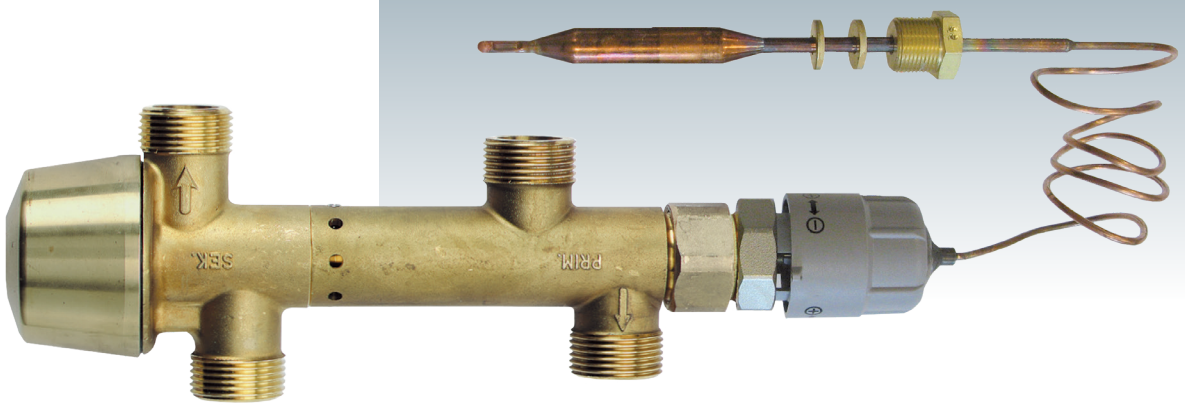
Packaging dimensions:	H 60 × W 90 × L 230 mm
Weight:	1.32 kg. (incl. packing)

Materials

Controller casting:	Brass (UBA-compliant)
Regulating element (DH):	Dezincification resistant brass
Regulating element (DCW):	Noryl
Spindle / control:	Acid-proof stainless steel / Teflon
O-rings / membrane:	EPDM
Sensors:	Acid-proof stainless steel

Pressure, temperatures, Kvs

Kvs:	3.5 m^3/h
KvR:	0.06 m^3/h
Pressure class:	PN 16
Max. Δp primary (closing):	6.0 bar
Max. Δp primary (control):	2.0 bar
Max. temperature, primary:	110°C
Min. CW pressure:	2.0 bar
Regulation range:	20-70°C



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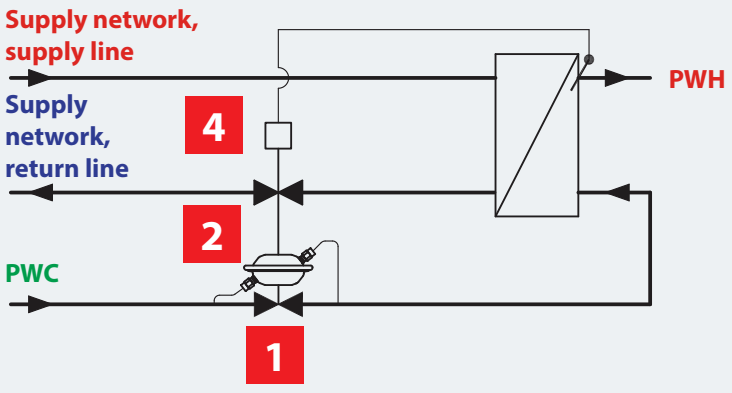


1	Proportional valve
2	Valve, temperature controller
4	Temperature controller

When hot water is tapped, there is a pressure drop at the proportional valve (1) so that this valve opens. The thermostat valve (2) is also opened. The thermostat (4) controls the hot water temperature according to the target value set. If tapping is stopped, the proportional and thermostatic valves close immediately.

Application

The PM controller is used to control the hot drinking water temperature in connection with a plate heat exchanger.

The controller is pressure-controlled, i.e. it ensures that both a primary (heating water) and secondary (drinking water) flow through the heat exchanger is only possible when hot water is tapped. There is a proportional relationship between the heating water flow and the tapping of water. The temperatures are approximately the same for both low and high tapping rates.

No-load losses are completely avoided through the functionality of the controller. After the tapping process has ended, the controller closes immediately and no longer allows flow in the heat exchanger.

Data for PM controller:

Dimensions, weight

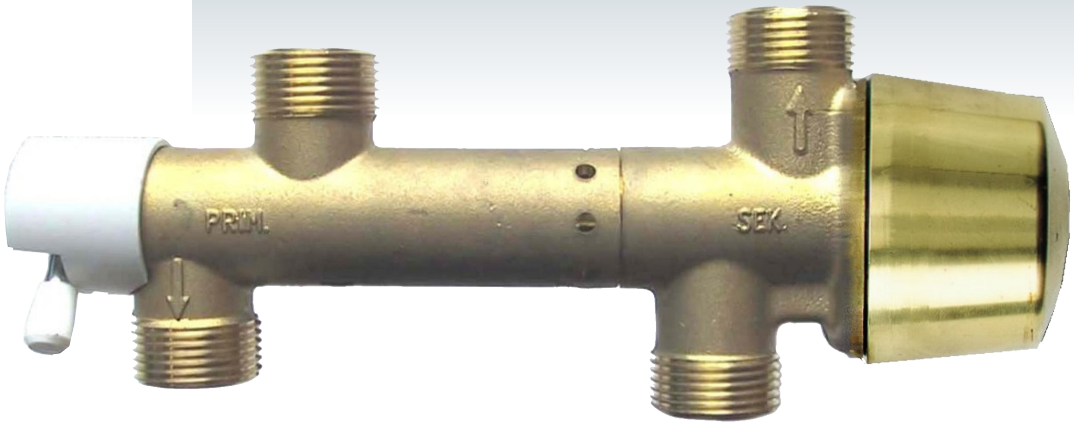
Packaging dimensions:	H 60 × W 90 × L 230 mm
Weight:	1.32 kg. (incl. packing)

Materials

Controller casting:	Brass (UBA-compliant)
Regulating element (HZ):	Dezincification resistant brass
Regulating element (DCW):	Noryl
Spindle / control:	Acid-proof stainless steel / Teflon
O-rings / membrane:	EPDM

Pressure, temperatures, Kvs

Kvs:	2.5 m^3/h
Pressure class:	PN 16
Max. differential pressure:	2.0 bar
Max. temp. (primary):	90°C
Min. CW pressure:	2.0 bar



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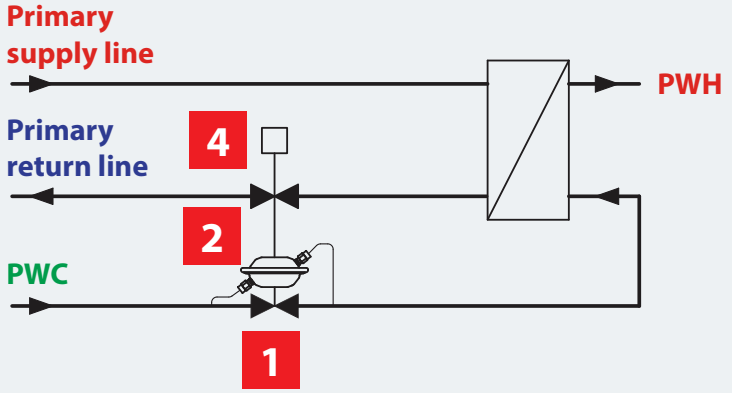
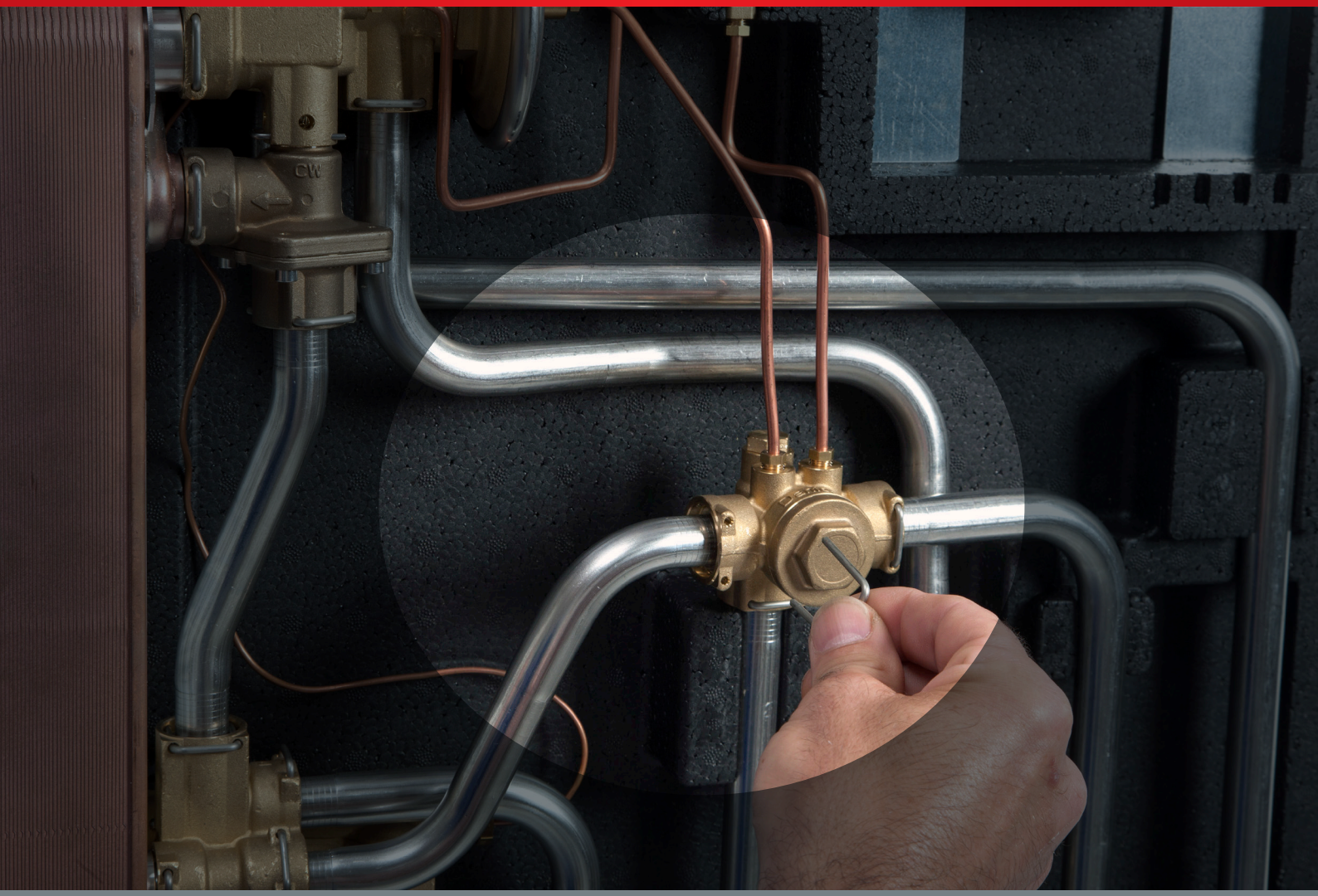


1	Proportional valve
2	Valve, temperature controller
4	Temperature controller

When hot water is tapped, there is a pressure drop at the proportional valve (1) so that this heating-side valve opens. The hot water valve (2) opens at the same time. If tapping is stopped, the proportional and hot water valves close immediately.

The ClickFit connection technology



Traditional flat stations whose internal pipes are connected with flat-sealing threaded joints face the regular occurrence of loosening during transportation and are therefore not watertight. In order to ensure that the stations are watertight for the commissioning, service technicians have to tighten every single threaded joint manually. That costs time. This is not necessary with the new EvoFlat™ stations, type FSS, WSS, FSF and MSS, because the Click-Fit-System is used for their internal connections.

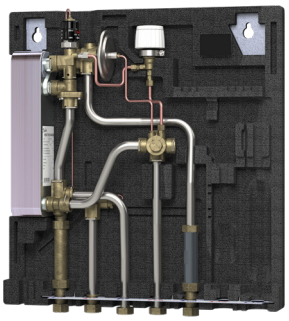
A system which has also proved itself in the car and boiler-based heating industries. The pipes are put together with fastening elements, sealed with O-rings and retained with an insert bracket. These connections can withstand pressures up to 200 bar as proved in laboratory tests, and will not loosen during transportation. Furthermore, they compensate for thermal expansion occurring during operation as well as water hammers. Leaks are therefore eliminated to the greatest possible extent.

ClickFit connection technology features

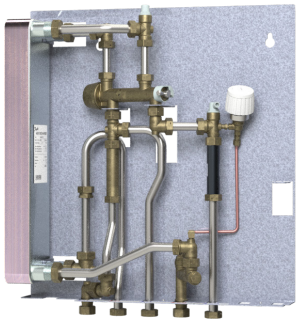
- **No compression fittings**
- **Pre-engineered moulded components**
- **O-ring seal**
- **Mounting bracket**
- **Tight even without tightening and in the event of pressure surges**

Water Heaters

Akva Lux II

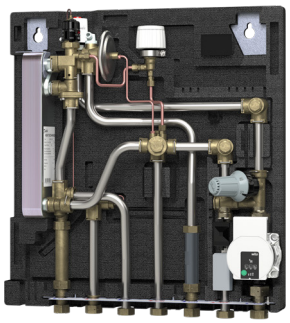


EvoFlat™ WSS



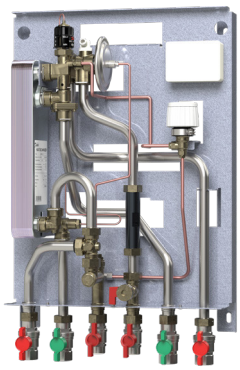
Akva Lux/Vita WSS

DHW heater and heating direct



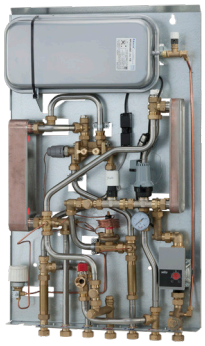
EvoFlat™ MSS

Akva Lux/Vita



EvoFlat™ Reno

DHW heater and heating indirect



VX-F

All Danfoss flat stations are available with different cover variants for on-wall and in-wall mounting. Their thermally insulated housings ensure a significant reduction in heat loss and considerable energy savings.

4. PRODUCT PORTFOLIO

EvoFlat™ flat stations are the hydraulic interfaces between heat generation and heat distribution in modern decentralized heating systems of large residential buildings. Danfoss offers an extensive product range for any application with a heating circuit and integrated DHW heating, for on-wall, shaft or in-wall mounting.

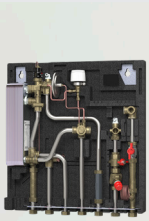
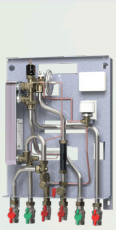
Product type/ application				
	Akva Lux / Les II	**EvoFlat™ WSS**	**Akva Lux / Vita WSS**	**EvoFlat™ FSS**
Flow water heater (PWH)	X	X	X	
Direct heating + PWH				X
Direct heating with mixing loop substations + PWH				
Indirect heating + PWH				
Indirect heating with mixing loop STM + PWH				
PWH capacity (kW)	37-60	37-55	37-80	37-55
Heating capacity (kW)	–			15
PWH control	Hydronic/ thermostatic	Thermostatic/ hydronic	Hydronic or hydronic/ thermostatic	Hydronic/ thermostatic
HE control	–			Diff. pressure
Type	Wall-mounted	Wall-mounted/ in-wall	Wall-mounted/ in-wall	Wall-mounted/ in-wall
Nominal maximal pressure PN (bar)	16	10	10	10
Max. Flow T (°C)	110	95	Akva Lux - 95 Akva Vita - 55	95
Version	Threaded	Inserted	Threaded	Inserted
Description	Page 22	Page 23	Page 24	Page 26
Performance curves	Page 42 - 44	Page 45 - 48	Page 49 - 50	Page 45 - 48

3-5%

less motive power for pumps

Thanks to the new MicroPlate™ heat exchangers with flow-optimized plate design.

Application overview – Product range

							
EvoFlat™ MSS	**EvoFlat™ FSF**	**EvoFlat™ Reno**	**Akva Lux II Reno Eco**	**Akva Lux / Vita FSS**	**Akva Lux / Vita MSS**	**VX-F FSS**	**VX-F MSS**
	X						X
		X	X	X			
X	X				X		
						X	
							X
37-55	38	37-55	37-55	Akva Lux - 80 Akva Vita - 57	Akva Lux - 80 Akva Vita - 57	52	52
15	5		15	15	15	10	10
Hydronic/ thermostatic	Hydronic/ thermostatic	Hydronic/ thermostatic	Thermostatic/ hydronic	Hydronic or hydronic/ thermostatic	Hydronic or hydronic/ thermostatic	Thermostatic/ hydronic	Thermostatic/ hydronic
Thermostatic	Central	Diff. pressure	Diff. pressure	Diff. pressure	Diff. pressure	Diff. pressure	Diff. pressure
Wall-mounted/ in-wall	Wall-mounted/ in-wall	Wall-mounted	Wall-mounted	Wall-mounted/ in-wall	Wall-mounted/ in-wall	Wall-mounted/ in-wall	Wall-mounted/ in-wall
10	10	10	10	10	10	16/10	16/10
95	PWH 95 FBHZ 45	95	95	Akva Lux - 95 Akva Vita - 55	Akva Lux - 95 Akva Vita - 55	95	95
Inserted	Inserted	Inserted	Threaded	Threaded	Threaded	Threaded	Threaded
Page 28	Page 30	Page 31	Page 32	Page 34	Page 36	Page 40	Page 40
Page 45 - 48	Page 47 - 48	Page 45 - 48	Page 42 - 44	Page 49 - 50	Page 49 - 50	Page 43	Page 43

The Akva Lux II instantaneous water heater for high performance and maximum ease of use is particularly suitable for heating drinking water in single-family houses and flats in apartment buildings. The drinking water is heated in the heat exchanger according to the continuous flow principle. The PTC2+P controller from Danfoss ensures reliable and convenient hydronic control of the hot water supply.

The Akva Lux II already achieves the standard capacity for a residential unit at a primary flow temperature of 60°C and is therefore particularly suitable for local heating and micro networks.

Capacity curves and pressure diagrams
Page 42 - 44

FEATURES AND BENEFITS:
Instantaneous water heaters substations
Capacity: up to 55 kW PWH
Compact and space-saving
Pipe connections and plate heat exchanger made of stainless steel
Lime and bacteria formation are largely avoided
Equipment:
Housing made of white-lacquered steel
Prepared for hot water circulation set
Fully insulated

Technical parameters:

Nominal pressure:	PN 16
Mains, flow temp.:	T_{max} = 110°C
Brazing (heat exchanger):	Copper

Weight incl. cover:
(incl. packing)

Type 1:	8 kg
Type 2:	9 kg

Cover: White-lacquered steel sheet version

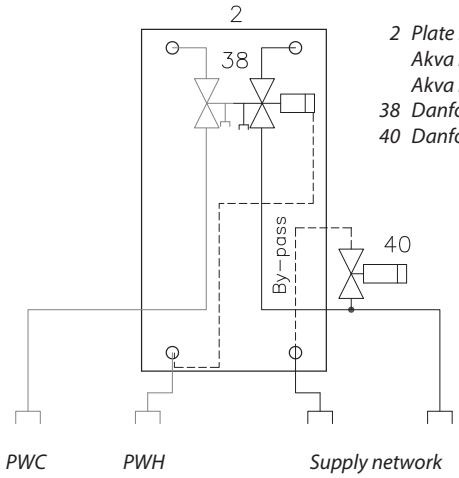
Dimensions (mm):

With insulation:	H 463 × W 306 × D 190
With insulation and cover:	H 463 × W 310 × D 210

Connection dimensions:

HZ + PWC + PWH:	R ¾" (ext. thread)
Circulation:	R ½" (ext. thread)

Circuit diagram

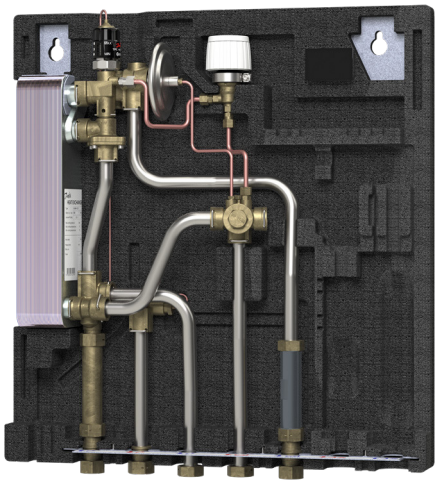


2 Plate heat exchanger
Akva Lux II = XB06H-1 26 or 40
Akva Les = XB06 + 60
38 Danfoss PTC2 controller
40 Danfoss F JVR for by-pass/circulation

Akva Lux II PWH: Capacity examples 10/50°C

Name HEX	Power PWH [kW]	Supply network, heating, flow/return [°C]	Flow, supply network* [l/h]	Pressure loss supply network* [kPa]	Tapping rate [l/min]
XB06H-1 26 Cu/StS (type 1)	43	65/22	856	37	15.4
	48	65/22	963	40	17.2
XB06H-1 40 Cu/StS (type 2)	45	65/20	867	22	16.1
	52	65/21	1017	43	18.6
XB06H+ 60 Cu/StS (type 3)	55	65/19	1025	43	19.7
	60	65/19	1110	49	21.2
	38	55/21	1008	42	14.3

* without heat meter (HM)



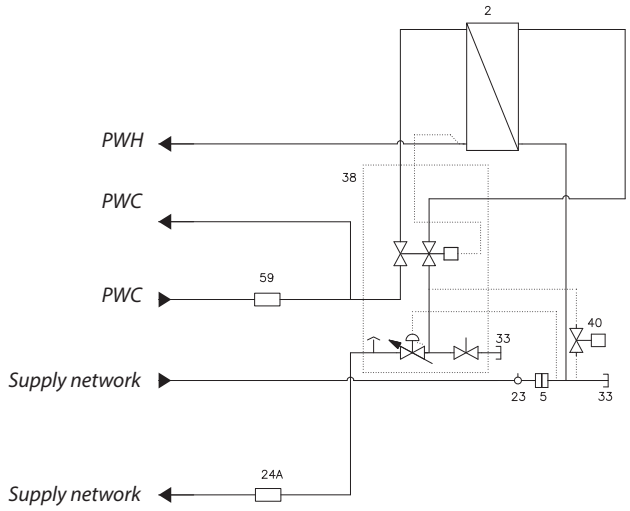
The EvoFlat™ WSS freshwater station was specially developed for buildings that are heated with district heating, boilers or CHP systems. It requires a flow temperature of at least 55°C for DHW heating.

Capacity curves and pressure loss diagrams
Page 47 - 48

FEATURES AND BENEFITS:
PWH based on the continuous flow principle
Newly developed, energy-saving TPC-M controller and high-performance heat exchanger
Only requires energy for PWH tapping - no no-load losses
Capacity: 55 kW PWH
Insulated backplate
Wall-mounted or built-in
No tightening of internal screw connections thanks to ClickFit connection technology
Pipe connections and plate heat exchanger made of stainless steel
Lime and bacteria formation are largely avoided
Differential pressure controller incl.

Equipment:
Ball valves
Mounting rail for on-wall variant
Built-in cabinet for in-wall mounting
Cover, on-wall mounted
With circulation

Circuit diagram



2 Plate heat exchanger: Danfoss XB06H -1
5 Strainer MS 0.6 mm
17 De-air function
23 Sensor pocket
24 Fitting piece for HM: ¾" × 110 mm
33 Plug
38 Multi-functional controller TPC-M
40 Summer bypass
59 Fitting piece for DCW meter: ¾" × 110 mm

Technical parameters:

Nominal pressure:	PN 10
Max. supply temperature:	95°C
Static pressure (CW):	P_{min} = 1.5 bar
Brazing (heat exchanger):	Copper / stainless steel

Weight without housing: 10 kg

Insulation: EPP λ 0.039
Power supply: 230 V AC

Dimensions (mm):
With connections: H 590 × W 550 × D 150

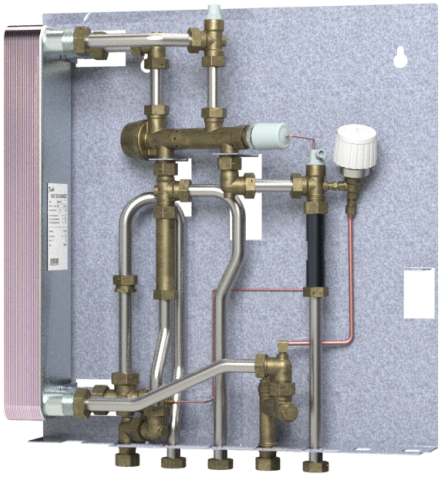
Connection dimensions: IG ¾"

PWH: Capacity examples 10/50°C

Type name HEX	DHW capacity [kW]	Supply network, flow/return [°C]	Pressure loss supply network* [kPa]	Flow, supply network [l/h]	Tapping rate [l/min]
XB06H-1 26 Cu/StS (type 1)	37	65/21	23	730	13.3
	43	65/22	40	850	15.3
XB06H-1 40 Cu/StS (type 2)	45	65/20	22	867	16.1
	49	65/21	30	950	17.5
XB06H+ 60 Cu (type 3)	55	65/16	27	950	19.4
	38	55/21	27	950	13.6
XB06H-1 56 StS (type 3)	51	65/19	28	950	18.3
	34	55/14	28	950	12.5

* without heat meter (HM)

4.3 Akva Lux + Vita WSS



The Akva Lux WSS + Akva Vita WSS are compact and easy-to-use drinking water heaters. They are especially designed for 2-pipe systems in residential buildings supplied with hot water from a central heat source (district heating station, boiler, CHP or solar system) via a central buffer accumulator. The high-performance WSS stations are available as an in-wall version with a recess box or for wall mounting with a protective hood.

Capacity curves and pressure loss diagrams
Page 49 - 50

FEATURES AND BENEFITS:
Hydronic and thermostatic control of the WW using PTC2 controller for on-demand DHW heating for Akva Lux WSS
Hydronic control of the PWH using PM controller for on-demand DHW heating for Akva Vita WSS
Minimum space required for installation
Build-in or wall-mounted variant
Pipes and plate heat exchanger made of stainless steel
Minimum risk of lime scale and bacterial growth
Capacity: up to 80 kW for PWH

Technical parameters:

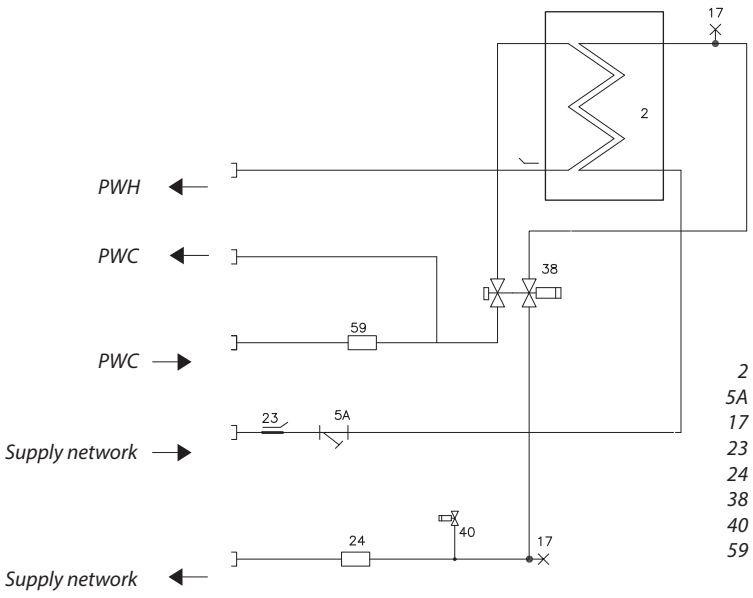
Nominal pressure:	PN 10
Max. supply temperature:	95°C*
Static pressure (CW):	P_{min} = 2.0 bar
Brazing:	Copper / stainless steel
Weight without protective hood:	12 kg
Insulation:	Pipe insulation (Akva Lux)
Power supply:	230 V AC
Dimensions (mm):	
Without cover:	H 616 × W 556 × D 145*
With cover:	H 740 × W 600 × D 200*
With recess box:	H 910 × W 610 × D 150

* Depth incl. Mounting plate

Connections sizes: IG ¾"

* for Akva Lux only. The Akva Vita can be used for systems with low flow temperatures.

Circuit diagram

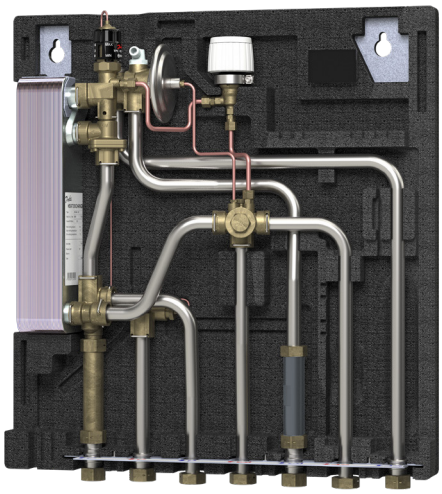


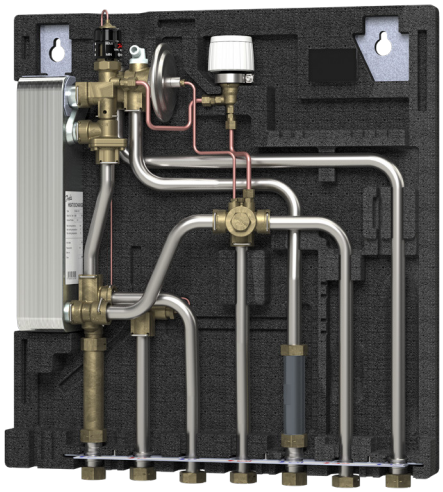
2 Plate heat exchanger
5A Strainer
17 De-air function
23 Sensor pocket for HM
24 Fitting piece for HM ¾" × 110 mm
38 Danfoss PTC2 controller
40 Summer bypass
59 Fitting piece for cold water ¾" × 110 mm

PWH: Capacity examples 10/50°C					
Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Flow, supply network* [l/h]	Pressure loss supply network* [kPa]	Tapping rate [l/min]
Akva Vita WSS XB37H-1 30	45	55/17	1020	28	16.2
	50	55/17	1140	36	18.0
	55	55/18	1270	44	19.7
	58	55/18	1350	50	20.8
Akva Lux WSS XB37H-1 30	60	65/13	996	36	21.5
	60	70/12	890	30	21.5
	70	70/13	1047	40	25.0
	75	70/13	1125	42	27.0
	78	70/13	1180	50	28.7

* without heat meter (HM)

4.4 EvoFlat™ FSS / FSS-StS





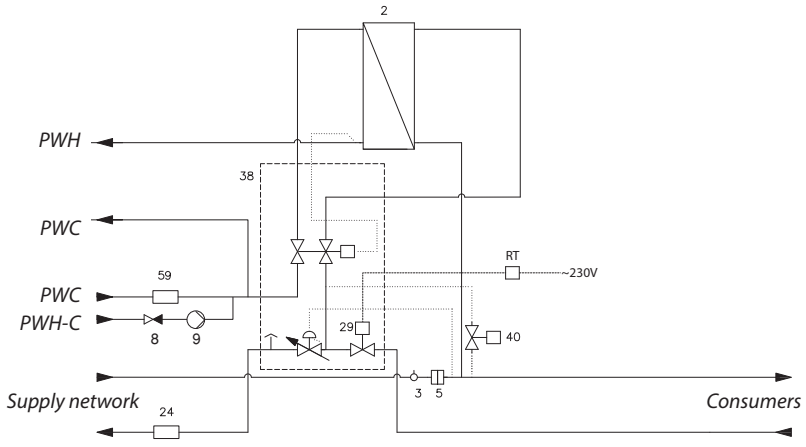
Flat station for decentralized heat distribution in apartment buildings with directly connected heating and an integrated hydronically controlled instantaneous water heater.

There are EvoFlat™ FSS flat stations ready for installation in a recess box or prepared for wall mounting for combination with Danfoss distribution systems for open heating surfaces and integrated heating surfaces.

Capacity curves and pressure loss diagrams
Page 45 - 48

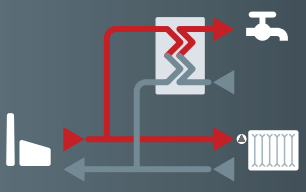
FEATURES AND BENEFITS:
Direct heating, PWH based on the continuous flow principle
Newly developed, energy-saving TPC-M controller and high-performance heat exchanger; only requires energy for PWH tapping - no no-load losses
Capacity: 15 kW HE, 55 kW PWH
Insulated backplate
Wall-mounted or built-in
No tightening of internal screw connections thanks to ClickFit connection technology
Pipe connections and plate heat exchanger made of stainless steel
Lime and bacteria formation are largely avoided
Differential pressure controller incl.
Equipment options:
Room thermostat
Actuator for the available zone valve
Ball valves
Mounting rail for on-wall variant
Built-in cabinet for in-wall mounting
Cover, on-wall mounted
With circulation

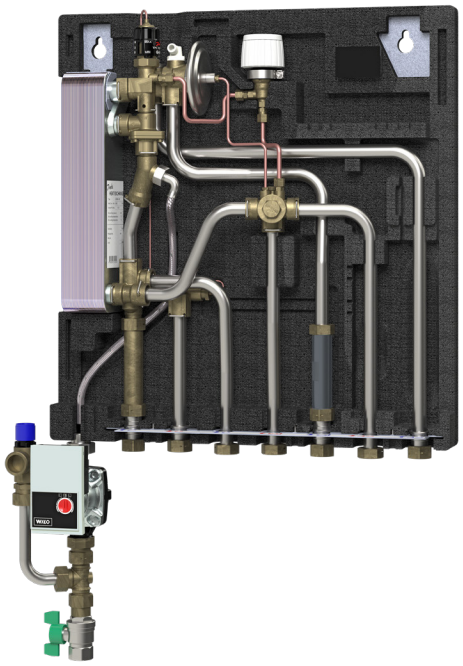
Circuit diagram



2 HEX Danfoss XB06H-1
5 Strainer
8 Check valve
9 Circulation pump
23 Sensor pocket M10x1
24 Fitting piece ¾" × 110 mm - HM
29 Actuator TWA-Z optional
38 TPC-M controller
40 Summer bypass
59 Fitting piece ¾" × 110 mm - CWM
RT room thermostat with timer (optional)

EvoFlat™ flat stations direct heating + PWH





Technical parameters:

Nominal pressure:	PN 10
Max. flow temp.:	T_{max} = 95°C
Max. differential pressure:	4 bar
Weight without housing:	max 16 kg
Insulation:	EPP λ 0.039
Power supply:	230 V AC / 24 V AC/DC
Dimensions without circulation incl. insulation (mm):	
With connections:	H 590 × W 550 × D 150
Connection dimensions:	IG ¾"

PWH: Capacity examples 10/50°C

Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Pressure loss supply network* [kPa]	Flow, supply network [l/h]	Tapping rate [l/min]
XB06H-1 26 Cu/StS (type 1)	37	65/21	23	730	13.3
	43	65/22	40	850	15.3
XB06H-1 40 Cu/StS (type 2)	45	65/20	22	867	16.1
	49	65/21	30	950	17.5
XB06H+ 60 Cu (type 3)	55	65/16	27	950	19.4
	38	55/21	27	950	13.6
XB06H-1 56 StS (type 3)	51	65/19	28	950	18.3
	34	55/14	28	950	12.5

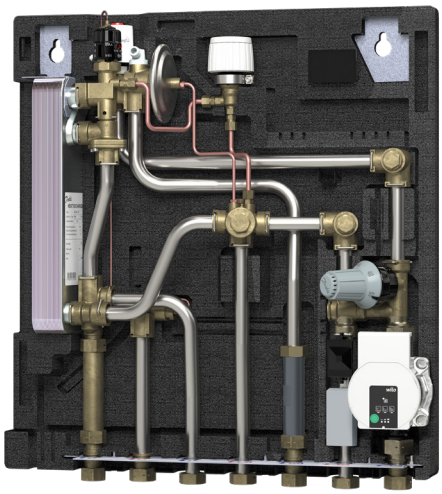
* without heat meter (HM)

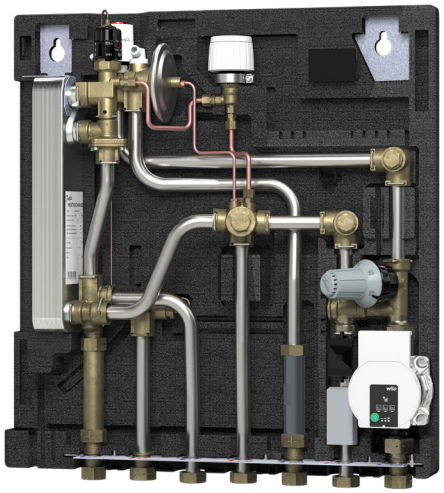
Heating: Capacity example

Heating capacity [kW]	Heating circuit Δt [°C]	Pressure loss supply network [kPa]	Flow, supply network* [l/h]
10	20	3	430
10	30	1	287
10	40	1	215
15	20	8	645
15	30	3	430
15	40	2	323

* without heat meter (HM) and drinking water

4.5 EvoFlat™ MSS / MSS-StS



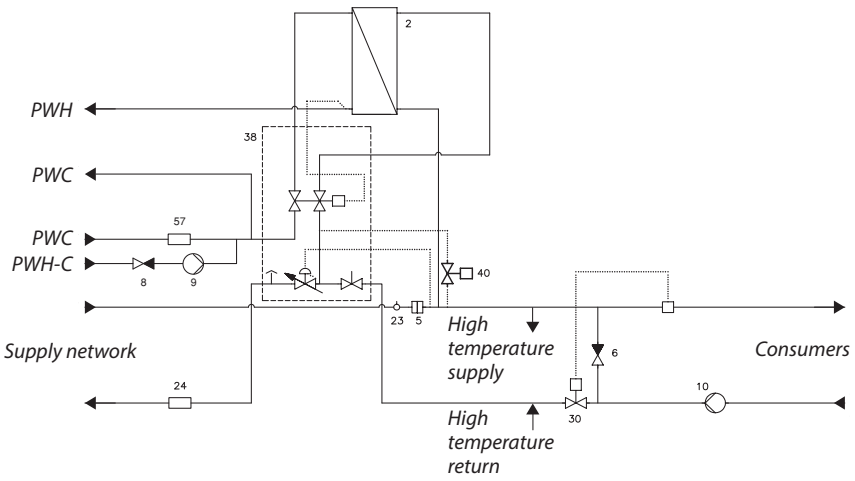


Directly heated flat station with mixing loop and an integrated instantaneous domestic hot water system for flats, single-family houses and apartment buildings with underfloor heating. Equipped with the MicroPlate™ heat exchanger and the innovative self-acting TPC-M controller for a constant hot water and DHW temperature, even with fluctuating temperatures and pressures on the primary side. The station is optionally available for on-wall or in-wall mounting.

Capacity curves and pressure loss diagrams
Page 45 - 48

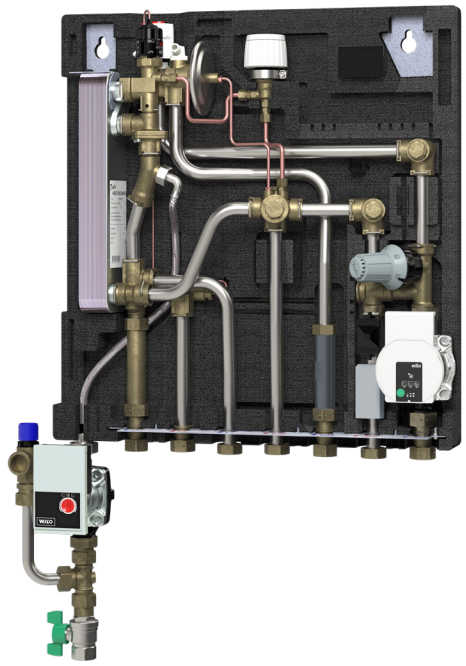
FEATURES AND BENEFITS:
Direct heating, PWH based on the continuous flow principle
Newly developed, energy-saving TPC-M controller and high-performance heat exchanger; only requires energy for PWH tapping - no no-load losses
Capacity: 15 kW HE, 55 kW PWH
Insulated backplate
Wall-mounted or built-in
No tightening of internal screw connections thanks to ClickFit connection technology
Pipe connections and plate heat exchanger made of stainless steel
Lime and bacteria formation are largely avoided
Differential pressure controller incl.
Equipment options:
Room thermostat
Actuator for the available zone valve
Ball valves
Mounting rail for on-wall variant
Cover, on-wall mounted
With circulation

Circuit diagram



2 HEX Danfoss XB06H-1
5 For strainers
6 Check valve DN 20
8 Check valve
9 Circulation pump
10 Wilo Para pump RS 15/6
23 Sensor pocket M10x1
24 Fitting piece ¾" × 110 mm - HM
30 FTC thermostat
38 TPC-M controller
40 Summer bypass
52 TWA-Z 230 V NC
57 Fitting piece ¾" × 110 mm - CWM

EvoFlat™ flat stations
direct heating + underfloor heating + PWH



Technical parameters:
Nominal pressure: PN 10
Max. flow temp.: T_{max} = 95°C
Max. differential pressure: 4 bar

Weight without housing: max. 19 kg

Insulation: EPP λ 0.039

Power supply: 230 V AC

Dimensions without circulation incl. insulation (mm):
With connections: H 590 × W 550 × D 150

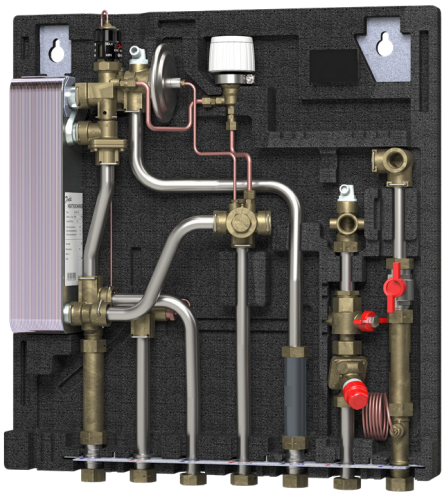
Connection dimensions: IG ¾"

PWH: Capacity examples 10/50°C					
Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Pressure loss supply network* [kPa]	Flow, supply network [l/h]	Tapping rate [l/min]
XB06H-1 26 Cu/StS (type 1)	37	65/21	23	730	13.3
	43	65/22	40	850	15.3
XB06H-1 40 Cu/StS (type 2)	45	65/20	22	867	16.1
	49	65/21	30	950	17.5
XB06H+ 60 Cu (type 3)	55	65/16	27	950	19.4
	38	55/21	27	950	13.6
XB06H-1 56 StS (type 3)	51	65/19	28	950	18.3
	34	55/14	28	950	12.5

* without heat meter (HM)

Heating: Capacity example			
Heating capacity [kW]	Heating circuit Δt [°C]	Pressure loss supply network [kPa]	Flow, supply network* [l/h]
10	20	3	430
10	30	1	287
10	40	1	215
15	20	8	645
15	30	3	430
15	40	2	323

* without heat meter (HM)

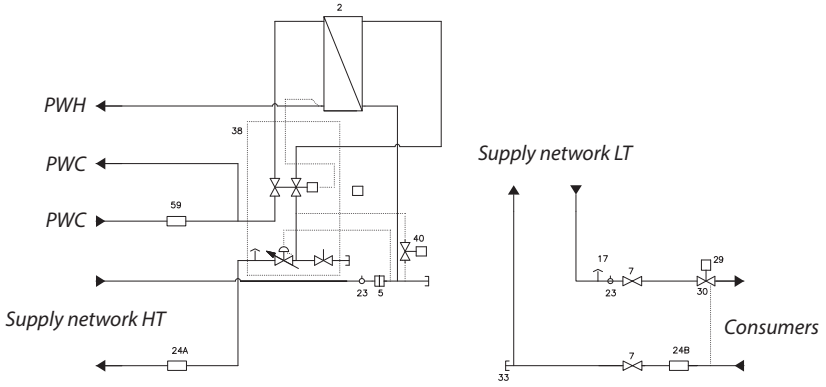


This 4-pipe flat station was developed to increase the efficiency of systems with heat pumps. The concept includes the use of two different temperature levels. A flow temperature of 55°C is required for DHW heating and a flow temperature of 35-45°C is required for the surface heating system.

Capacity curves and pressure loss diagrams
Page 47 - 48

FEATURES AND BENEFITS:
Instantaneous water heaters substations
Capacity: up to 55 kW PWH
Compact and space-saving
Pipe connections and plate heat exchanger made of stainless steel
Lime and bacteria formation are largely avoided
Equipment:
Cover, on-wall mounted
Fully insulated
Built-in cabinet for in-wall mounting

Circuit diagram



2 Plate heat exchanger: Danfoss XB06H -1
5 Strainer
7 Ball valve DN 20
17 De-air function
23 Sensor pocket
24A Fitting piece for HM: ¾" × 110 mm
24B Fitting piece for HM: ¾" × 110 mm
29 Actuator HE
30 AB-PM DN 15 HF
38 Multi-functional controller TPC-M
40 Summer bypass
59 Fitting piece for DCW meter: ¾" × 110 mm

Technical parameters:

Nominal pressure:	PN 10
Static pressure (CW):	P_{min} = 1.5 bar
Brazing (heat exchanger):	Copper / stainless steel
Weight without housing:	14 kg
Insulation:	EPP λ 0.039
Power supply:	230 V AC
Dimensions (mm):	
With connections:	H 590 × W 550 × D 150
Connection dimensions:	IG ¾"

PWH: Capacity examples 10/50°C

Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Pressure loss supply network* [kPa]	Flow, supply network [l/h]	Tapping rate [l/min]
XB06H+ 60 Cu (type 3)	55	65/16	27	950	19.4
	38	55/21	27	950	13.6
XB06H-1 56 StS (type 3)	51	65/19	28	950	18.3
	34	55/14	28	950	12.5

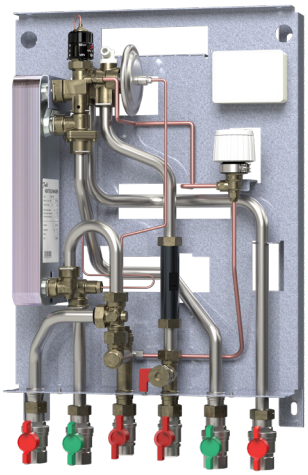
* without heat meter (HM)

Heating: Capacity example

Heating capacity [kW]	[K]	Pressure loss supply network [kPa]	Flow, supply network* [l/h]
2.5	7	20	300
3.5	10	20	300
5	15	20	300

* without heat meter (HM)

NEW

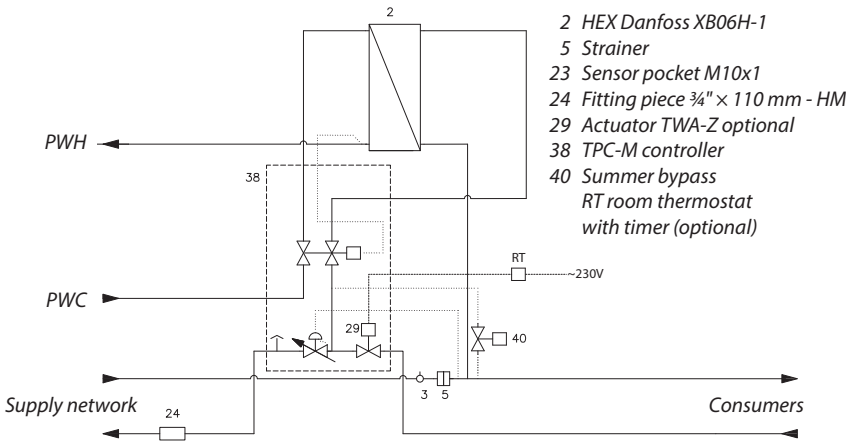


The EvoFlat™ Reno is a flat station for direct heating and a pressure and temperature controlled instantaneous domestic hot water heater for two-pipe systems, designed for decentralized heat distribution and is especially suitable for apartment buildings, where existing gas boilers should be replaced.

Capacity curves and pressure loss diagrams
Page 45 - 48

FEATURES AND BENEFITS:
Flat station for replacing existing gas boilers
Direct heating and PWH based on the continuous flow principle
Capacity: 15 kW / 55 kW PWH
Compact, space-saving design
Also suitable for LT systems with 55°C flow
Flow-compensated thermostat with integrated differential pressure controller TPC-M
Pipes and plate heat exchanger made of stainless steel
Extensive protection against limescale and bacteria formation
With pipe insulation

Circuit diagram



2 HEX Danfoss XB06H-1
5 Strainer
23 Sensor pocket M10x1
24 Fitting piece ¾" × 110 mm - HM
29 Actuator TWA-Z optional
38 TPC-M controller
40 Summer bypass
RT room thermostat with timer (optional)

Technical parameters:
Nominal pressure: PN 10
Max. flow temp.: T_{max} = 95°C
Max. differential pressure: 4 bar

Weight without housing: max. 18 kg

Power supply: 230 V AC / 24 V AC/DC

Dimensions (mm):
With connections: H 685 × W 410 × D 205
With cover: H 760 × W 455 × D 225

Connection dimensions: IG ¾"

PWH: Capacity examples 10/50°C

Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Pressure loss supply network* [kPa]	Flow, supply network [l/h]	Tapping rate [l/min]
XB06H-1 26 Cu/StS (type 1)	37	65/21	23	730	13.3
	43	65/22	40	850	15.3
XB06H-1 40 Cu/StS (type 2)	45	65/20	22	867	16.1
	49	65/21	30	950	17.5
XB06H+ 60 Cu (type 3)	55	65/16	27	950	19.4
	38	55/21	27	950	13.6
XB06H-1 56 StS (type 3)	51	65/19	28	950	18.3
	34	55/14	28	950	12.5

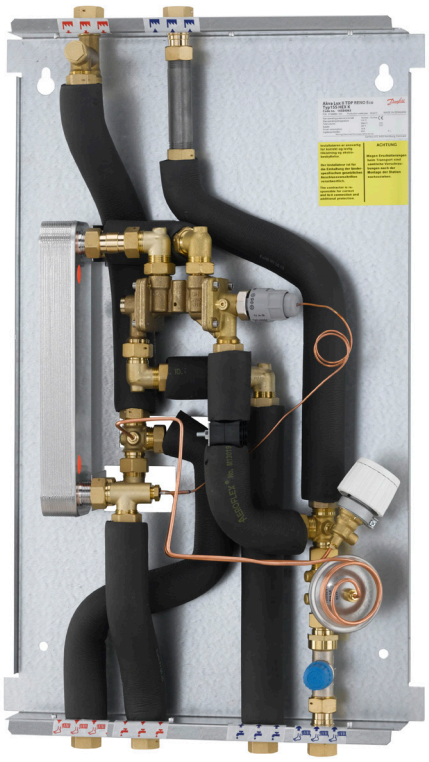
* without heat meter (HM)

Heating: Capacity example

Heating capacity [kW]	Heating circuit Δt [°C]	Pressure loss supply network [kPa]	Flow, supply network* [l/h]
10	20	3	430
10	30	1	287
10	40	1	215
15	20	8	645
15	30	3	430
15	40	2	323

* without heat meter (HM) and drinking water

4.8 Akva Lux II Reno Eco

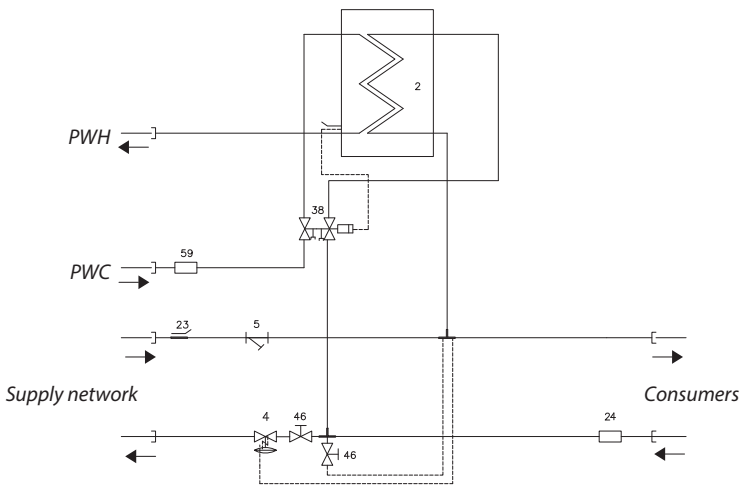


The Akva Lux II Reno Eco is a Flat station for heating and DHW heating in 2-pipe systems, which was specially developed for replacing gas boilers. While the existing connections for hot and cold water and the flow and return of the secondary heating circuits can continue to be used without major changes, it is advisable to route the connections for the primary-side heating water supply and return through the chimney. Optionally, the cold water supply can also be connected from above.

Capacity curves and pressure loss diagrams
Page 42 - 44

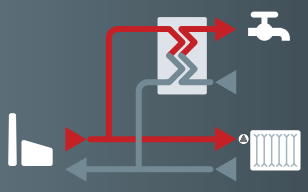
FEATURES AND BENEFITS:
Flat station for replacing existing gas boilers
Direct heating and PWH based on the continuous flow principle
With integrated freshwater system for decentralized DHW heating
Capacity: 15 kW / 56 kW PWH
Compact, space-saving design
Also suitable for LT systems with 55°C flow
Flow-compensated temperature controller with integrated differential pressure controller PTC2+P
Pipes and plate heat exchanger made of stainless steel
Extensive protection against limescale and bacteria formation
With pipe insulation

Circuit diagram



2 HEX Danfoss XB06
4 Differential Pressure Controller
5 Strainer
23 Sensor pocket M10 IG
24 Fitting piece for HM (¾" × 110 mm)
38 PTC2+P controller
46 RA-C DN 15 with sensor 20-50°C
59 Fitting piece for CWM: ¾" × 110 mm
24 Fitting piece for HM: ¾" × 110 mm (optional)

Flat stations to replace old gas boilers - direct heating + PWH



Technical parameters:
Pressure class: PN 10
DH network, flow temp.: T_{max} = 95°C
Brazing: Copper or stainless steel

Weight incl. cover: 22.0 kg

Cover: White-lacquered steel sheet version

Electrical connection: 230 V AC +/- 1%; 50 Hz

Dimensions (mm):
Without cover: H 810 × W 470 × D 147
With cover: H 1120 × W 480 × D 150

Connection dimensions: IG ¾

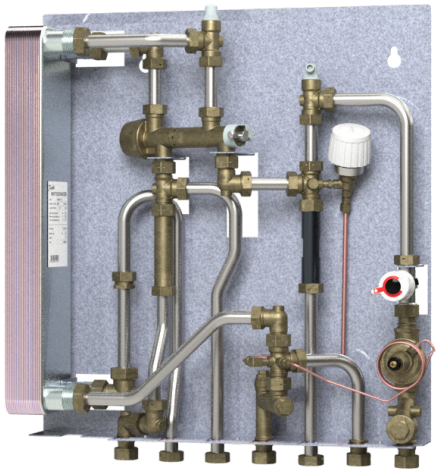
PWH: Capacity examples 10/50°C					
Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Flow, supply network* [l/h]	Pressure loss supply network* [kPa]	Tapping rate [l/min]
XB06H-1 26 Cu/StS (type 1)	43	65/22	856	37	15.4
	48	65/22	963	40	17.2
XB06H-1 40 Cu/StS (type 2)	45	65/20	867	22	16.1
	52	65/21	1017	43	18.6
XB06H+ 60 Cu/StS (type 3)	55	65/19	1025	43	19.7
	60	65/19	1110	49	21.2
	38	55/21	1008	42	14.3

* without heat meter (HM)

Heating: Capacity example			
Heating capacity [kW]	Heating circuit Δt [°C]	Pressure loss supply network [kPa]	Flow, supply network* [l/h]
10	20	22	430
10	30	10	287
10	40	6	215
15	20	49	645

* without heat meter (HM)

4.9 Akva Lux / Vita FSS

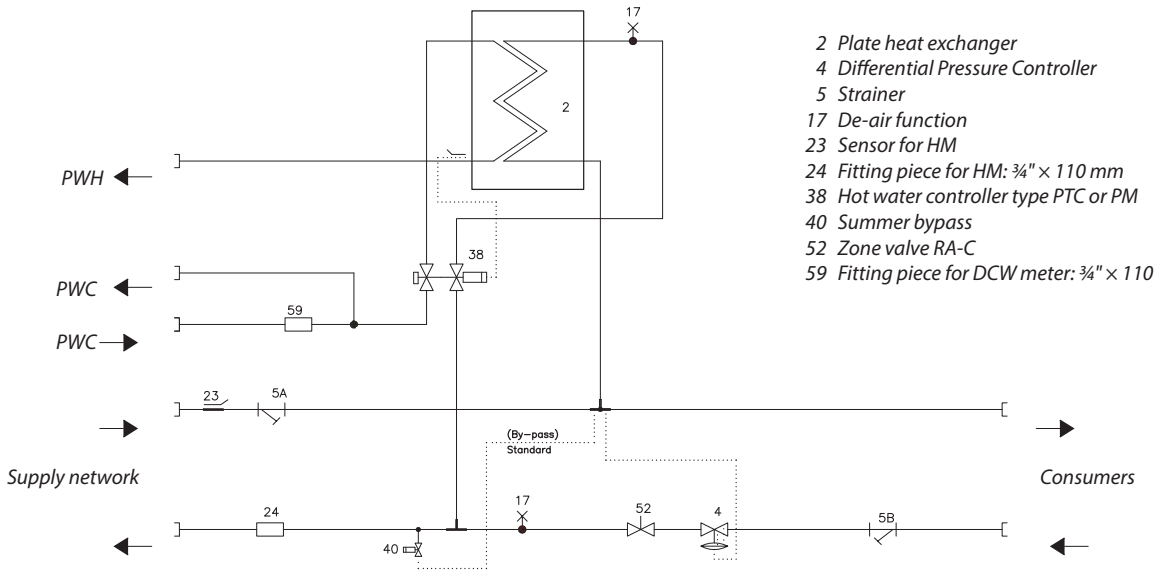


The Akva Lux FSS + Akva Vita FSS are directly heated, compact and easy-to-use flat stations for radiator heating systems with an integrated instantaneous domestic hot water system. They are especially designed for 2-pipe heating systems in residential buildings supplied with hot water from a central heat source (district heating, boiler, CHP or solar system) via a central buffer accumulator. The FSS stations are available as an in-wall version with a recess box or for wall mounting with a cover.

Capacity curves and pressure loss diagrams
Page 49 - 50

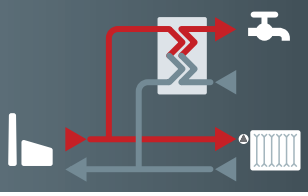
FEATURES AND BENEFITS:
Directly heated flat station for heating and PWH based on the continuous flow principle
Hydronic and thermostatic control of the WW using PT°C controller for on-demand DHW heating for Akva Lux FSS
Hydronic control of the WW using PM controller for on-demand DHW heating for Akva Lux FSS
Minimum space required for installation
Build-in or wall-mounted variant
Pipes and plate heat exchanger made of stainless steel
Heat exchanger in copper or stainless steel version
Capacity: up to 78 kW for PWH / up to 15 kW for heating
OPTIONS:
Mounting rail for wall mounted variant
Hydronic and thermostatic control of the WW using PTC controller for on-demand DHW heating for Akva Lux FSS
Built-in cabinet for in-wall mounting incl. mounting rail
Cover for on-wall mounting
Circulation kit
Room thermostat

Circuit diagram



2 Plate heat exchanger
4 Differential Pressure Controller
5 Strainer
17 De-air function
23 Sensor for HM
24 Fitting piece for HM: ¾" × 110 mm
38 Hot water controller type PTC or PM
40 Summer bypass
52 Zone valve RA-C
59 Fitting piece for DCW meter: ¾" × 110 mm

Decentralized flat stations Akva Lux / Vita FSS direct heating + DHW



Technical parameters:

Nominal pressure:	PN 10
Max. supply temperature:	95 °C**
Static pressure (CW):	P_{min} = 2.0 bar
Brazing (HEX):	Copper / stainless steel
Weight without protective hood:	20 kg
Insulation:	Pipe insulation (Akva Lux)
Power supply:	230 V AC
Dimensions (mm):	
Without cover:	H 616 × W 576.9 × D 150*
With cover:	H 740 × W 600 × D 200*
With recess box:	H 910 × W 610 × D 150
	* Depth incl. mounting plate
Connections sizes:	IG ¾"

** for Akva Lux only. The Akva Vita can be used for systems with low flow temperatures.

PWH: Capacity examples 10/50°C					
Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Flow, supply network* [l/h]	Pressure loss supply network* [kPa]	Tapping rate [l/min]
Akva Lux FSS XB37H-1 30	45	55/17	1020	28	16.2
	50	55/17	1140	36	18.0
	55	55/18	1270	44	19.7
	58	55/18	1350	50	20.8
Akva Vita FSS XB37H-1 30	60	65/13	996	36	21.5
	60	70/12	890	30	21.5
	70	70/13	1047	40	25.0
	75	70/13	1125	42	27.0
	78	70/13	1180	50	28.0

* without heat meter (HM)

Heating: Capacity example			
Heating capacity [kW]	Heating circuit Δt [°C]	Pressure loss supply network [bar]	Flow, supply network* [l/h]
2.5	15	26	143
10.0	15	36	573
2.5	20	26	108
10.0	20	29	430
15.0	20	41	645

* without heat meter (HM)

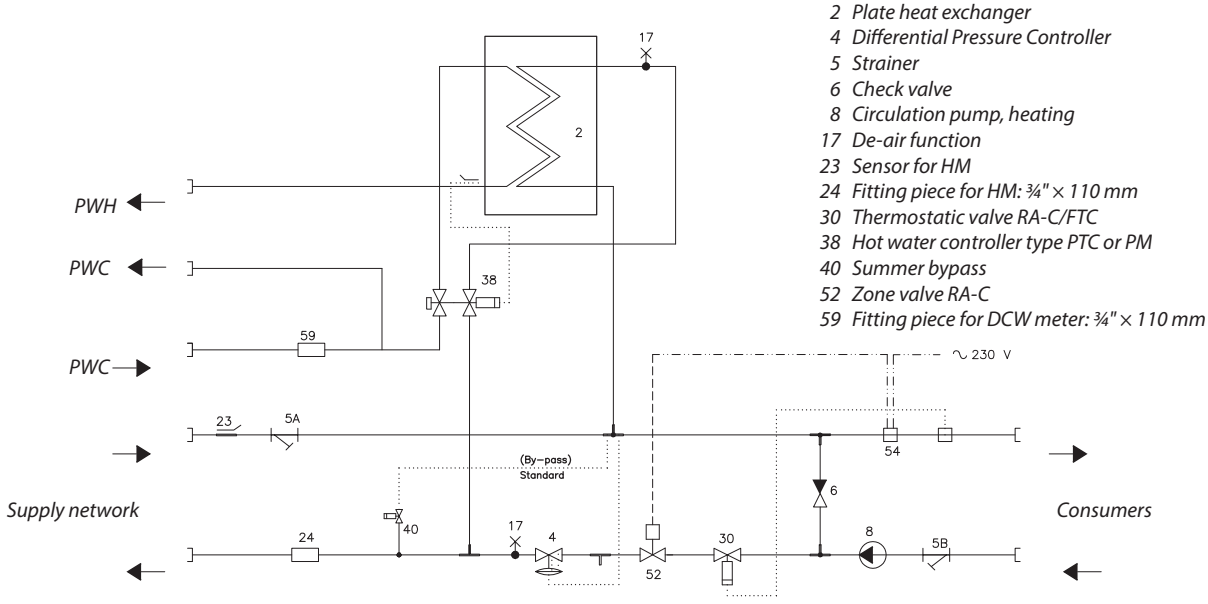
4.10 Akva Lux / Vita MSS

The Akva Lux MSS + Akva Vita MSS are directly heated, compact and easy-to-use flat stations for surface heating systems with an integrated instantaneous domestic hot water system. They are especially designed for 2-pipe heating systems in residential buildings supplied with hot water from a central heat source (district heating, boiler, CHP or solar system) via a central buffer accumulator. The MSS stations are available as an in-wall version with a recess box or for wall mounting with a protective hood.

Capacity curves and pressure loss diagrams
Page 49 - 50

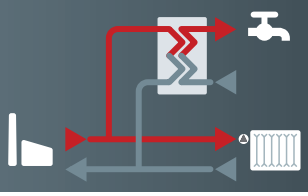
FEATURES AND BENEFITS:
Flat station for direct heating with mixing loop and PWH based on the continuous flow principle
Hydronic and thermostatic control of the WW using PT°C controller for on-demand DHW heating, Akva Lux MSS
Hydronic control of the WW using PM controller for on-demand DHW heating, Akva Lux MSS
Minimum space required for installation
Build-in or wall-mounted variant
Pipes and plate heat exchanger made of stainless steel
Heat exchanger in copper or stainless steel version
Capacity: up to 80 kW for PWH / up to 15 kW for heating
OPTIONS:
Mounting rail for wall mounted variant
Hydronic and thermostatic control of the WW using PTC controller for on-demand DHW heating for Akva Lux FSS
Built-in cabinet for in-wall mounting incl. mounting rail
Cover for on-wall mounting
Circulation kit
Room thermostat
Insulation for pipes for Akva Vita FSS

Circuit diagram



2 Plate heat exchanger
4 Differential Pressure Controller
5 Strainer
6 Check valve
8 Circulation pump, heating
17 De-air function
23 Sensor for HM
24 Fitting piece for HM: ¾" × 110 mm
30 Thermostatic valve RA-C/FTC
38 Hot water controller type PTC or PM
40 Summer bypass
52 Zone valve RA-C
59 Fitting piece for DCW meter: ¾" × 110 mm

Decentralized flat stations Akva Lux / Vita MSS direct heating + underfloor heating + PWH



Technical parameters:

Nominal pressure:	PN 10
Max. supply temperature:	95 °C**
Static pressure (CW):	P_{min} = 2.0 bar
Brazing (HEX):	Copper / stainless steel

Weight without protective hood: 20 kg

Insulation: Pipe insulation (Akva Lux)

Power supply: 230 V AC

Dimensions (mm):

Without cover:	H 616 × W 572 × D 150*
With cover:	H 740 × W 600 × D 200*
With recess box:	H 910 × W 610 × D 150

* Depth incl. mounting plate

Connections sizes: IG ¾"

** for Akva Lux only. The Akva Vita can be used for systems with low flow temperatures.

PWH: Capacity examples 10/50°C

Type name HEX	PWH capacity [kW]	Supply network, flow/return [°C]	Flow, supply network* [l/h]	Pressure loss supply network* [kPa]	Tapping rate [l/min]
Akva Vita MSS XB37H-1 30	45	55/17	1020	28	16.2
	50	55/17	1140	36	18.0
	55	55/18	1270	44	19.7
	58	55/18	1350	50	20.8
Akva Lux MSS XB37H-1 30	60	65/13	996	36	21.5
	60	70/12	890	30	21.5
	70	70/13	1047	40	25.0
	75	70/13	1125	42	27.0
	78	70/13	1180	50	28.0

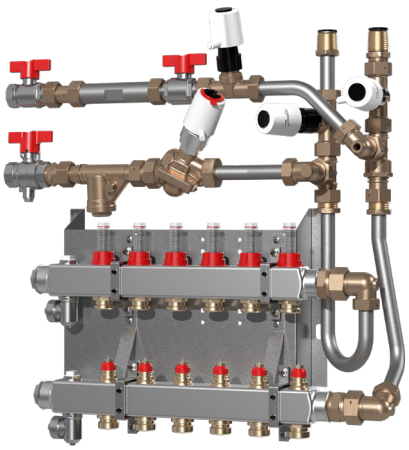
* without heat meter (HM)

Heating: Capacity example

Heating capacity [kW]	Heating circuit Δt [°C]	Pressure loss supply network [bar]	Flow, supply network* [l/h]
10.0	20	26	430
10.0	30	9	287
10.0	40	6	215
15.0	20	43	645
15.0	30	20	430

* without heat meter (HM)

4.11 CDM cooling module



Picture: CDM standard module
with optional CSG distributor, 6-way

In buildings with central heating and cooling supply, Danfoss flat stations are used in combination with a cooling module from the CD series. The station is supplied via separate risers for heating and cooling. The flat station is supplied with energy for heating and hot water on the heating side and with energy for cooling rooms in summer via the cooling supply. The operating mode is switched via zone valves. In this setup, a common distribution system for heating and cooling is used. Energy consumption can be recorded using a cooling meter.

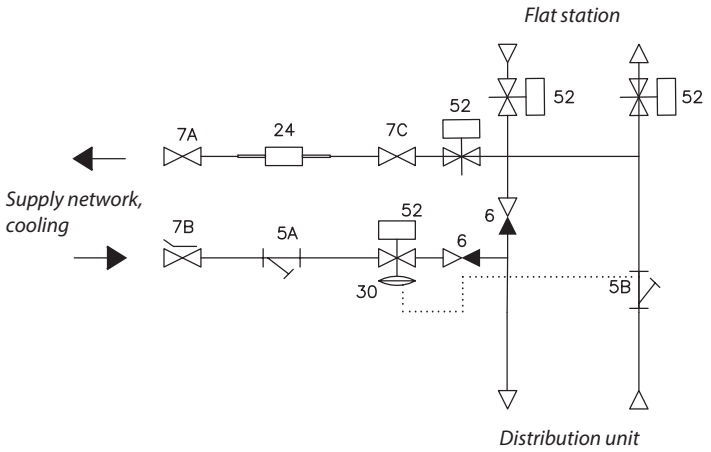
More details on page 64

FEATURES AND BENEFITS:
Direct cooling supply of a flat
Hydronic balance and flow limitation of the cooling circuit
Max. 4 kW cooling capacity (dT=6K) - Standard Max. 8 kW cooling capacity (dT=6K) - HighFlow
Minimum space required for installation
Pre-assembled module for easy connection to Danfoss flat stations
Consumption recording using a cooling meter.
OPTIONS:
Heating manifold type CSG or CSGCi

Technical parameters:

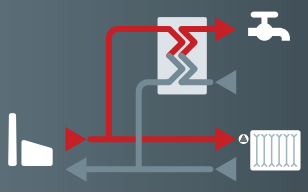
Nominal pressure CDM module:	PN 10
Nominal pressure, manifold:	PN 6
Weight:	5 kg
Dimensions (mm):	H 255 × W 500 × D 149
Connections sizes:	G ¾"

Circuit diagram



5 Strainer
6 Check valves
7A Ball valve
7B Ball valve with sensor pocket
7C Ball valve
24 Fitting piece for meter ¾" × 110mm
30 Differential pressure controller AB-PM
52 Zone valve

Cooling modules for the direct supply of flats with cooling energy



Number of circuits	Manifold for DM module type CSG	Manifold for CDM module type CSGCi with ICON™ 24V
2	145H0862	145H0882
3	145H0863	145H0883
4	145H0864	145H0884
5	145H0865	145H0885
6	145H0866	145H0886
7	145H0867	145H0887
8	145H0868	145H0888
9	145H0869	145H0889
10	145H0870	145H0890
11	145H0871	145H0891
12	145H0872	145H0892

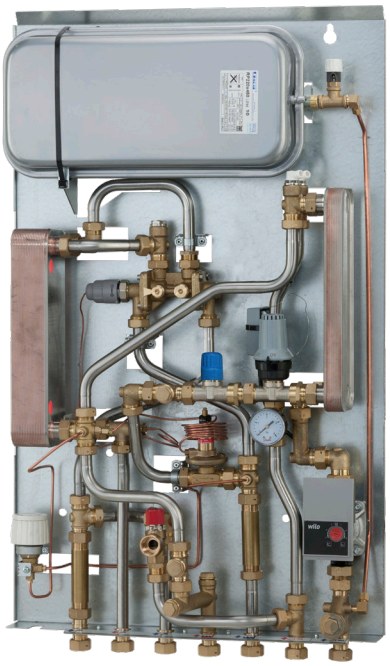
Prefabricated Danfoss stainless steel distribution systems, suitable for combined installation with Danfoss flat stations in Danfoss recess boxes.

Type CSG: Distributor system for CDM cooling module without admixture circuit, with flow meter.

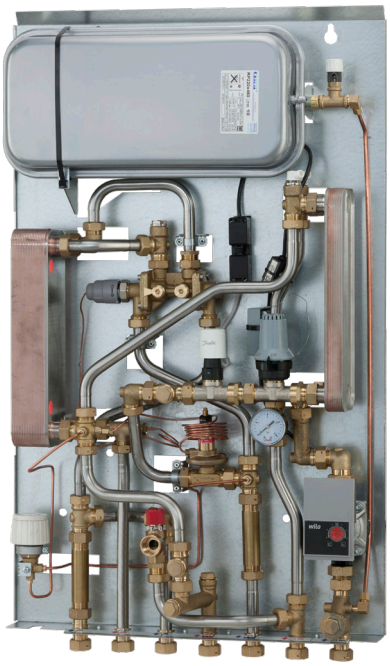
Type CSGCi: Distributor system for CDM cooling module without admixture circuit with flow meter and with hardwired heating circuit controller ICON™ 24V and actuators according to the number of circuits.

Cooling capacity [kW]	At 4 K spread flow [l/h]	At 5 K spread flow [l/h]	At 6 K spread flow [l/h]	At 7 K spread flow [l/h]	At 8 K spread flow [l/h]
CDM 'Standard'					
0.5	107				
1.0	215	172	143	123	107
1.5	322	258	215	184	161
2.0	430	344	287	246	215
2.5	537	430	358	307	269
3.0		516	430	369	322
3.5		602	502	430	376
4.0			573	491	430
4.5				553	484
5.0				614	537
5.5					591
CDM 'HighFlow'					
1.5	322	258			
2.0	430	344	287		
2.5	537	430	358	307	
3.0	645	516	430	369	322
3.5	752	602	502	430	376
4.0	860	688	573	491	430
4.5	967	774	645	553	484
5.0	1075	860	717	614	537
5.5	1182	946	788	676	591
6.0		1032	860	737	645
6.5		1118	931	798	699
7.0		1204	1003	860	752
7.5			1075	921	806
8.0			1146	983	860
8.5				1044	914
9.0				1106	967
9.5				1167	1021
10.0					1075
10.5					1129
11.0					1182

4.12 Akva Lux II VX-F



for radiator heating

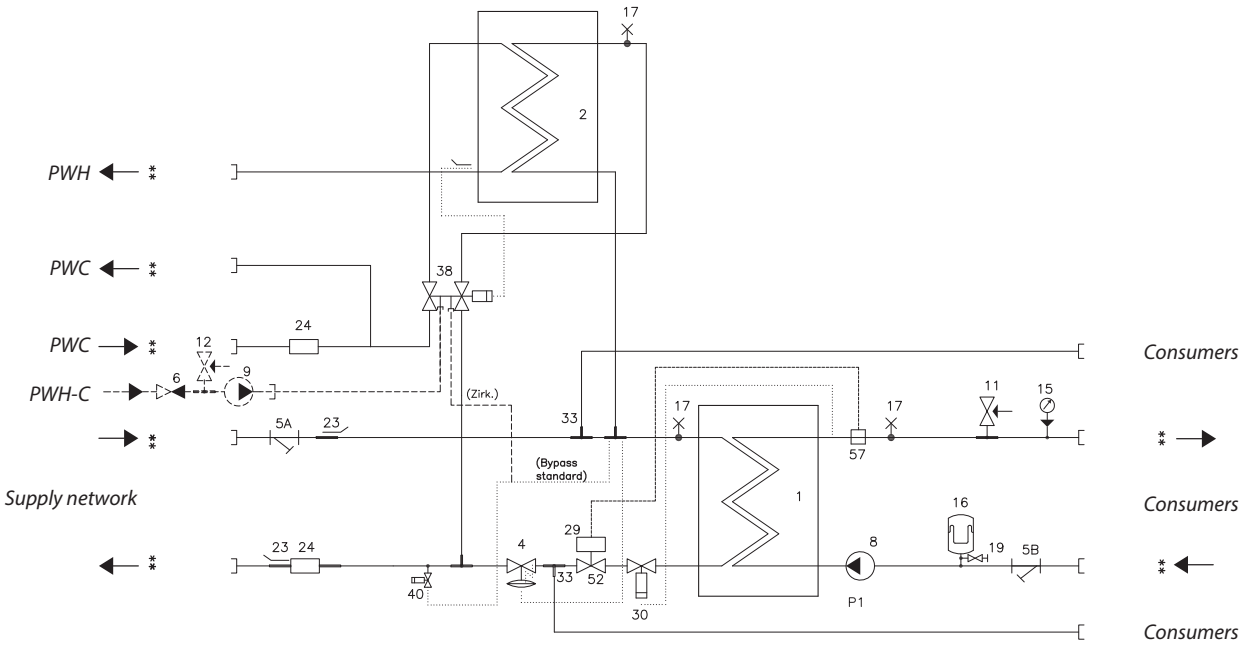


for underfloor heating

The Akva Lux II VX-F are indirectly heated flat stations with an integrated instantaneous domestic hot water system for decentralized DHW heating. There is one version for surface heating and one for radiator heating. Both stations are optionally available as an in-wall version for mounting in a flush-mounted cabinet in the sizes W 690 × H 1350 × D 150 and W 850 × H 1350 × D 150. The recess box can also accommodate an underfloor distributor.

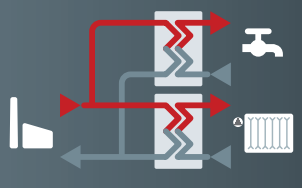
Capacity curves and pressure diagrams
Page 42

Circuit diagram



1 Plate heat exchanger, HE
2 Plate heat exchanger PWH
4 Differential Pressure Controller
5 Strainer
6 Check valve
8 Circulation pump HE 230 V
9 Circulation pump DHW
11 Safety valve HE 3 bar ½"
12 Safety valve PWH 10 bar ½"
15 Manometer
16 Expansion tank 10 L
17 De-air function
19 Filling/drain valve
23 Sensor pocket for HM ½"
24 Fitting piece for HM ¾" × 110 mm
29 TWA actuator
30 Thermostat FTC/RAC
33 Plug
38 PTC2 controller
40 Summer by-pass/circulation
52 Zone valve RA-C
57 Safety thermostat ST55

Flat stations Akva Lux II Indirect underfloor heating + PWH



FEATURES AND BENEFITS:

- Indirectly heated flat station for heating and PWH based on the continuous flow principle
- For separate installation or for assembly together with a VX-F distributor system for underfloor or radiator heating
- In recess box, directly heated flat station for heating and PWH based on the continuous flow principle

Equipment options:

- Circulation kit

Technical parameters:

Nominal pressure:	PN 16
Max. flow temp.:	95°C
Brazing (heat exchanger):	
PWH	Copper or stainless steel
Heater	Copper

Weight without housing: 30.0 kg

Electrical connection: 230 V AC / 24 V AC/DC

Dimensions (mm): H 945 × W 561 × D 150

Connection dimensions:

HZ + PWC + PWH:	G ¾" (ext. thread)
Circulation:	R ½" (int. thread)

PWH: Capacity examples, 10°C/50°C

Type	PWH capacity [kW]	Primary supply [°C]	Primary return [°C]	Pressure loss primary* [kPa]	Flow primary [l/h]	Tapping rate [l/min]
XB06H-1 40	37	60	18	27	762	13.3
	45	60	19	40	943	16.1
	55	60	20	59	1177	19.7

* without heat meter (HM)

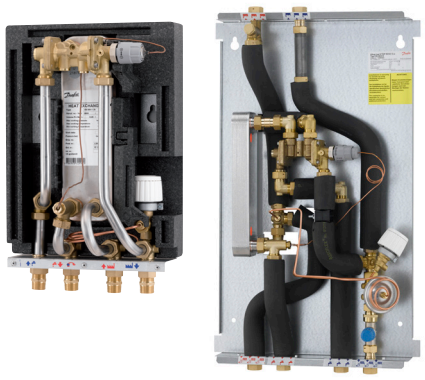
Heating: Capacity examples

Type	Heating capacity [kW]	Temp. primary [°C]	Temp. secondary [°C]	Pressure loss primary* [kPa]	Flow primary [l/h]	Flow secondary [l/h]	Pressure loss secondary [kPa]
XB06H-1 16	10	70/40	35/60	38	287	347	5
	10	60/31	30/40	62	294	865	27

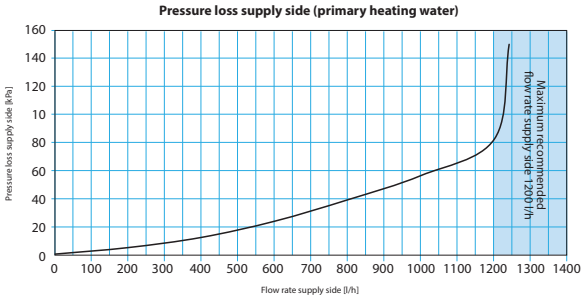
* without heat meter (HM) and drinking water capacity

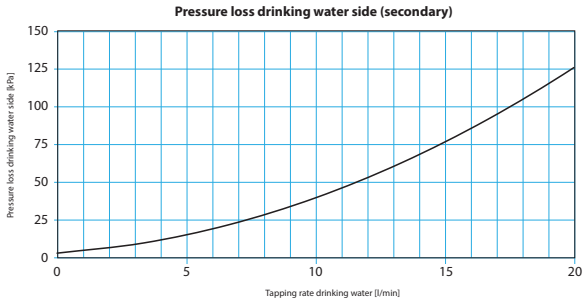
5.1 AKVA LUX II type 1 + Reno Eco

Capacity curves for capacity stage 37 kW

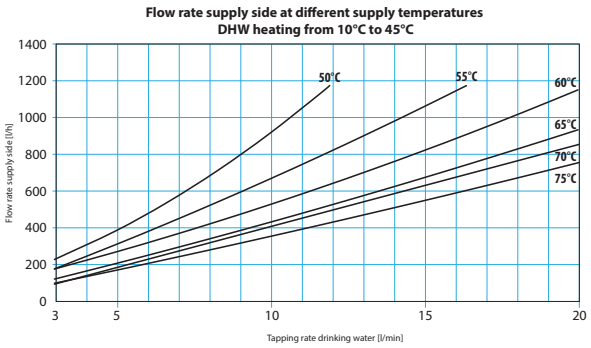


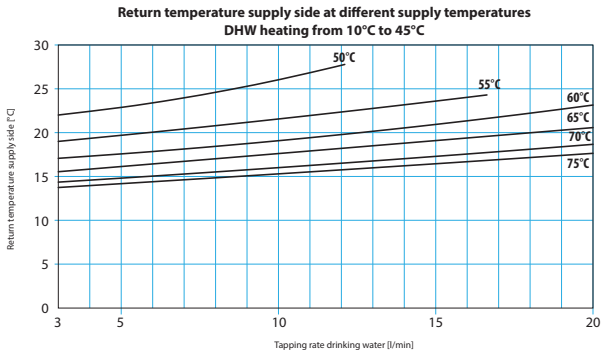
Pressure losses



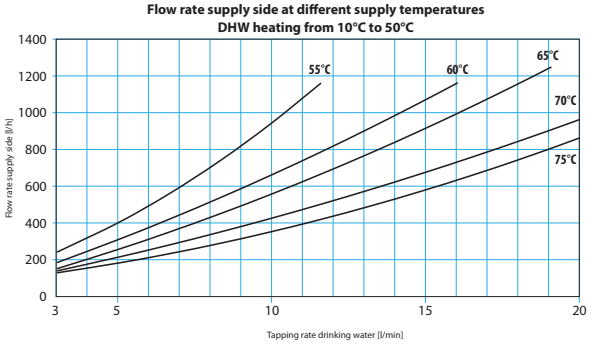


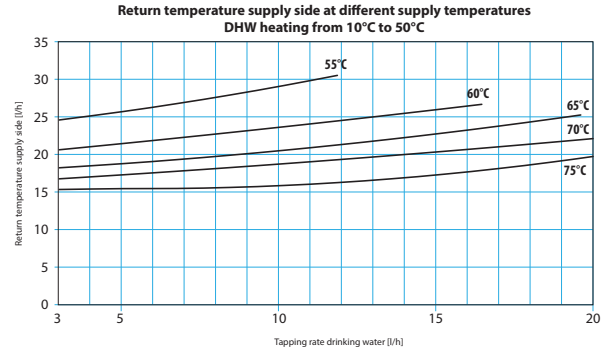
Flow volumes and tap capacity PWH - 45°C:





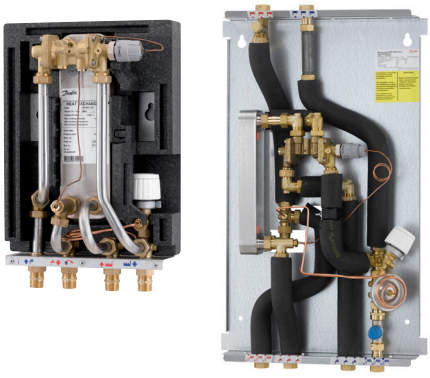
Flow volumes and tap capacity PWH - 50°C:





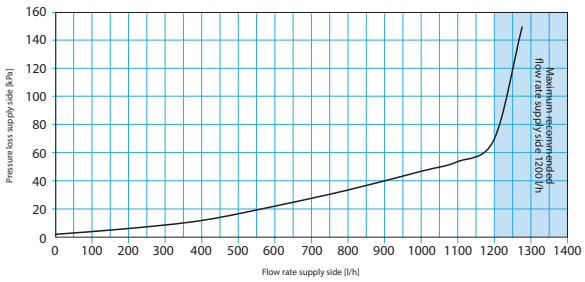
AKVA LUX II type 2 + Reno Eco

Capacity curves for capacity stage 55 kW

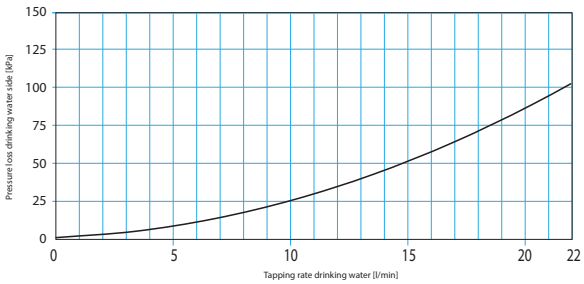


Pressure losses

Pressure loss supply side (primary heating water)

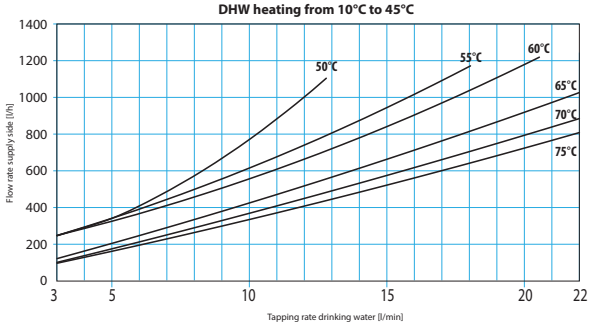


Pressure loss drinking water side (secondary)

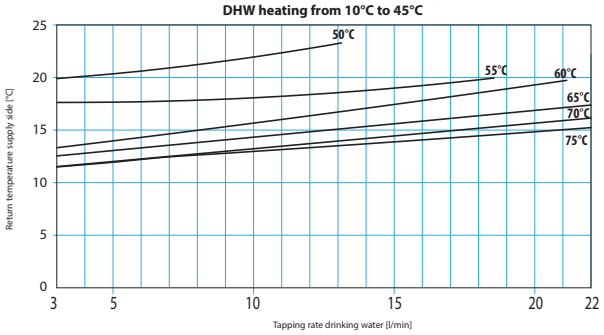


Flow volumes and tap capacity PWH - 45°C:

Flow rate supply side at different supply temperatures
DHW heating from 10°C to 45°C

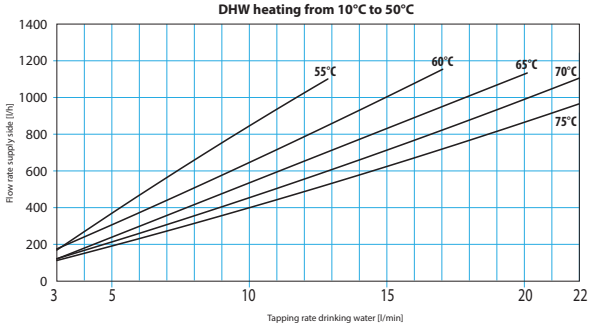


Return temperature supply side at different supply temperatures
DHW heating from 10°C to 45°C

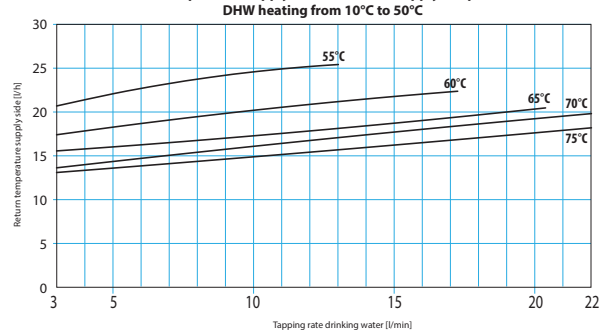


Flow volumes and tap capacity PWH - 50°C:

Flow rate supply side at different supply temperatures
DHW heating from 10°C to 50°C

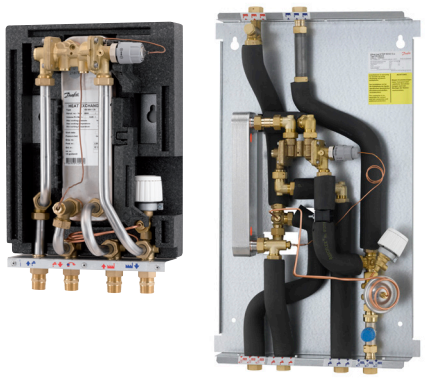


Return temperature supply side at different supply temperatures
DHW heating from 10°C to 50°C

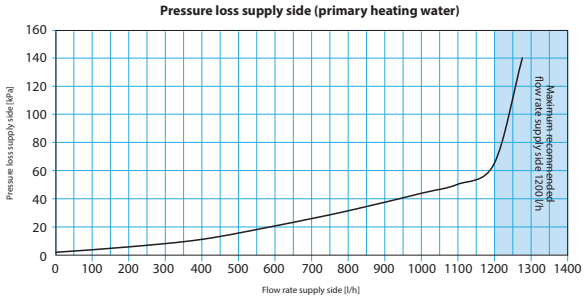


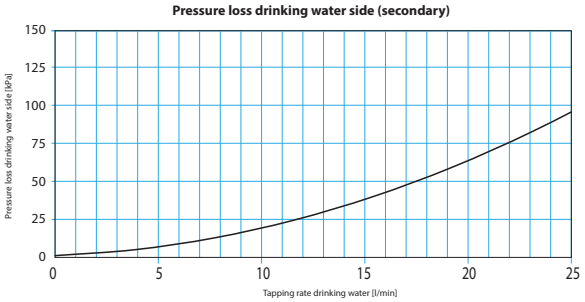
5.3 AKVA LES type 3 + Reno Eco

Capacity curves for capacity stage 60 kW

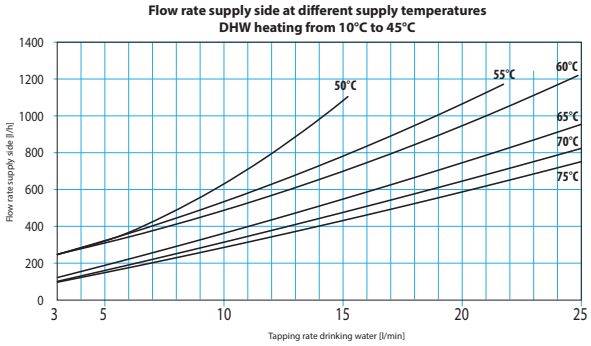


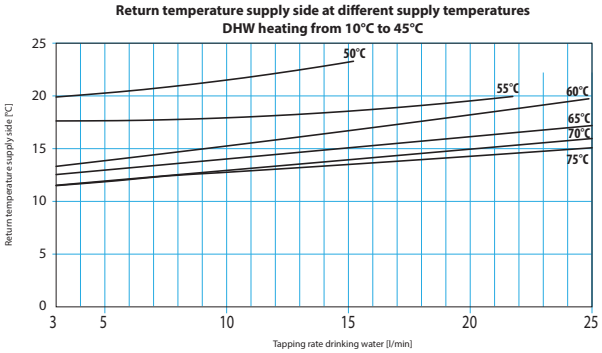
Pressure losses



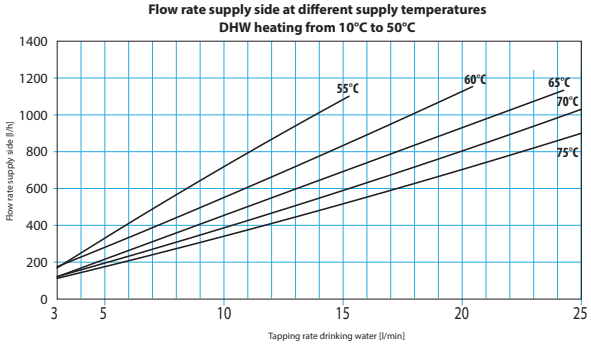


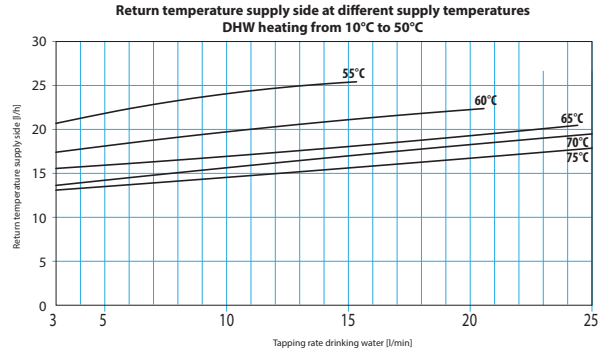
Flow volumes and tap capacity PWH - 45°C:





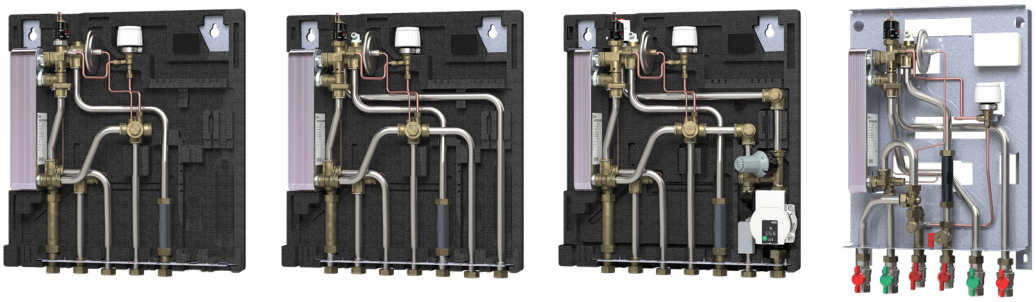
Flow volumes and tap capacity PWH - 50°C:



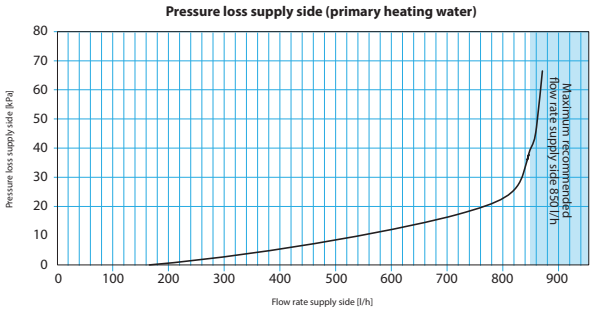


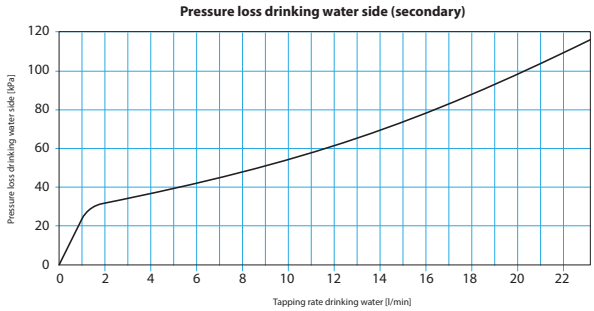
EvoFlat™ FSS/MSS/WSS/Reno type1

Capacity curves for capacity stage 37 kW

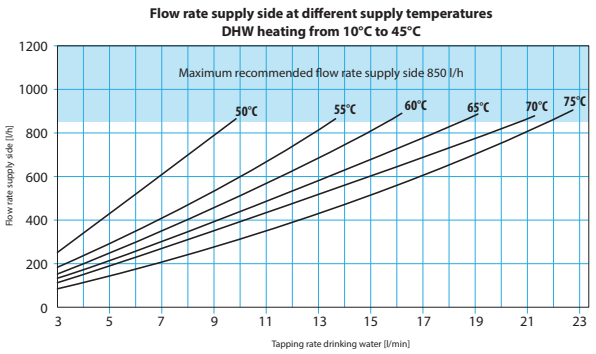


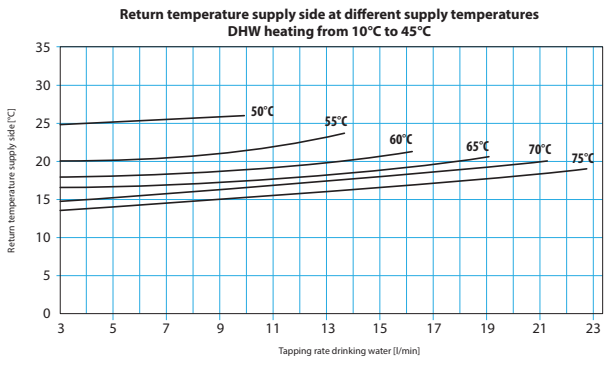
Pressure losses



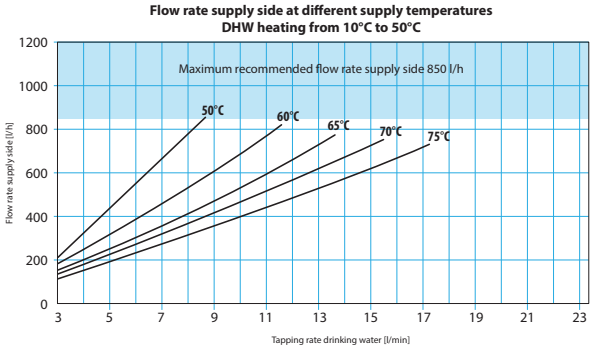


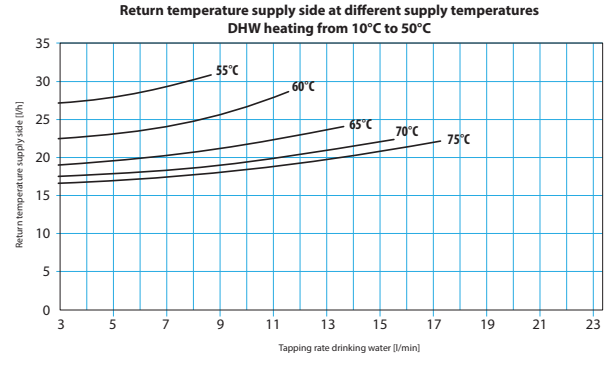
Flow volumes and tap capacity PWH - 45°C:





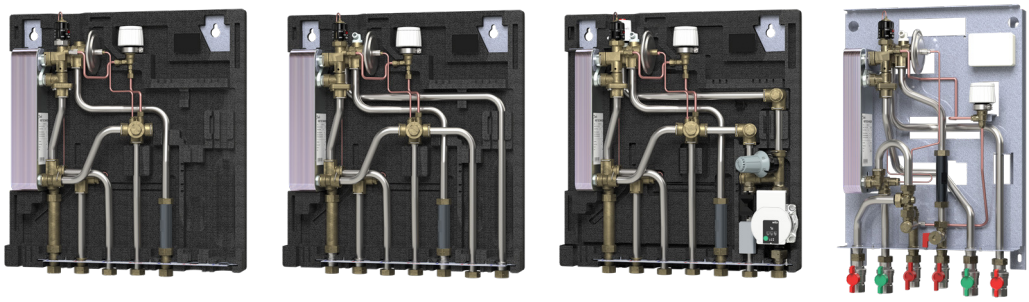
Flow volumes and tap capacity PWH - 50°C:



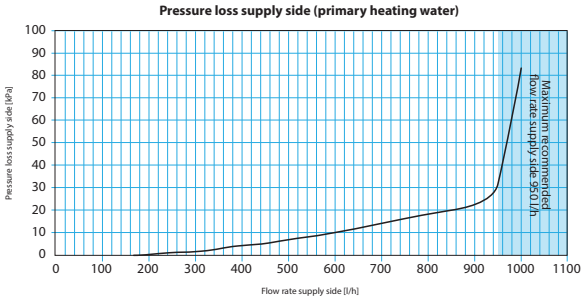


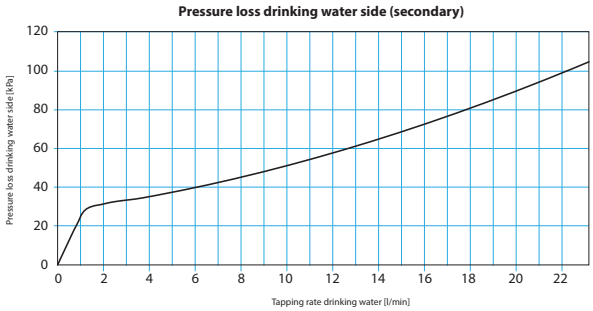
5.5 EvoFlat™ FSS/MSS/WSS/Reno type2

Capacity curves for capacity stage 45 kW

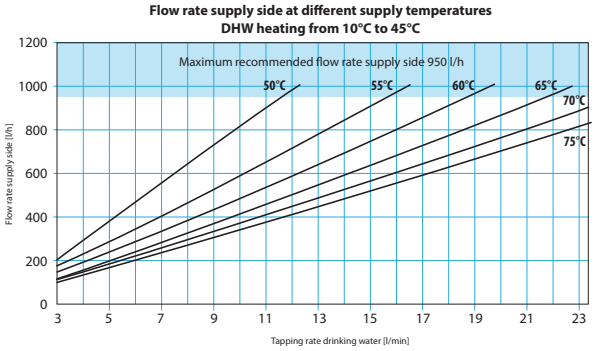


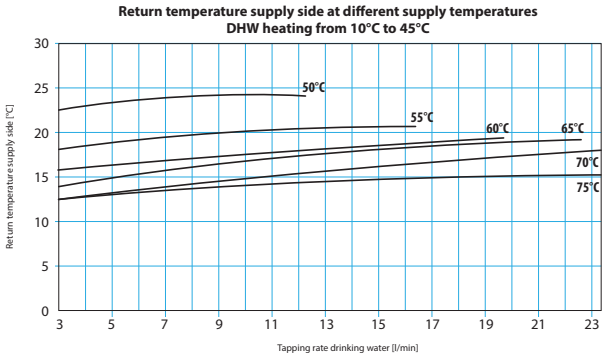
Pressure losses



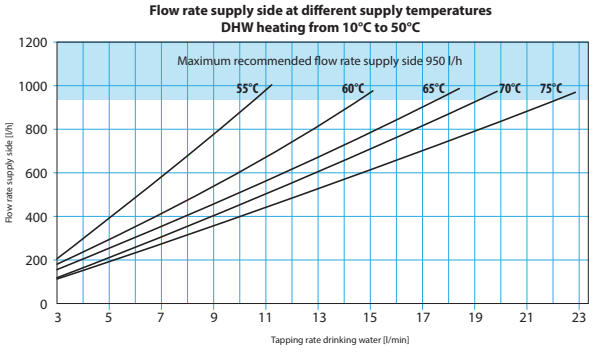


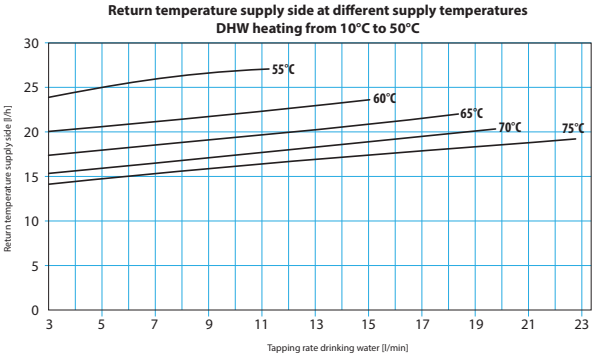
Flow volumes and tap capacity PWH - 45°C:





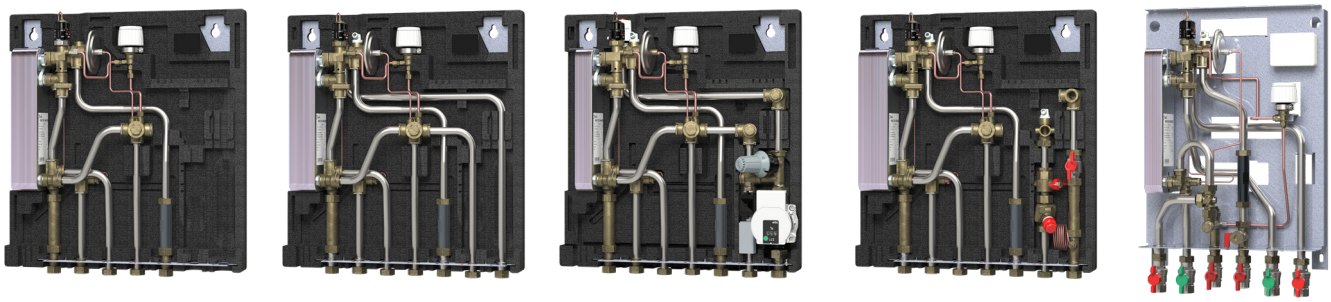
Flow volumes and tap capacity PWH - 50°C:



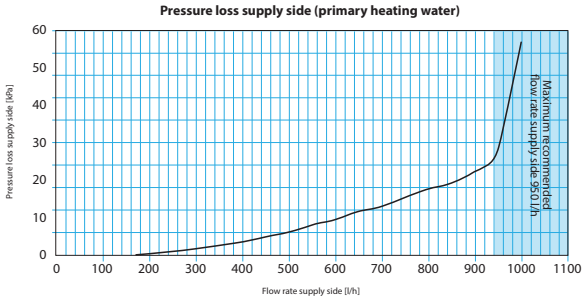


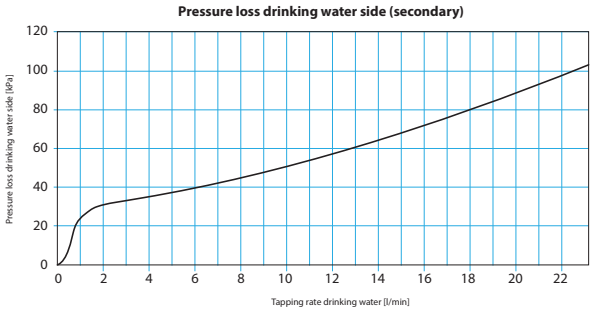
EvoFlat™ FSS/MSS/WSS/FSF/Reno type3

Capacity curves for capacity stage 55 kW

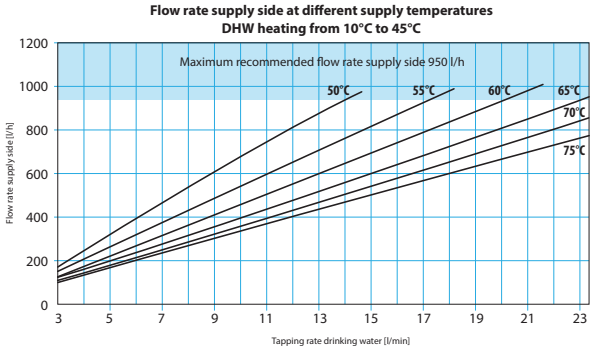


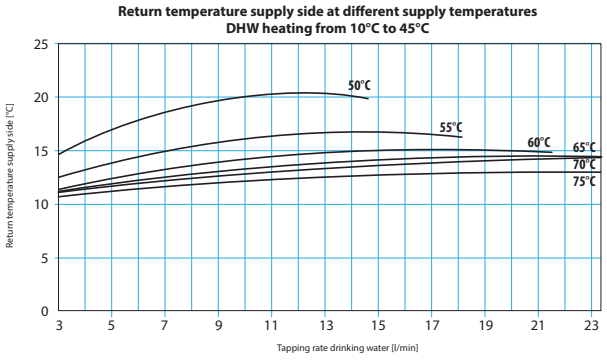
Pressure losses



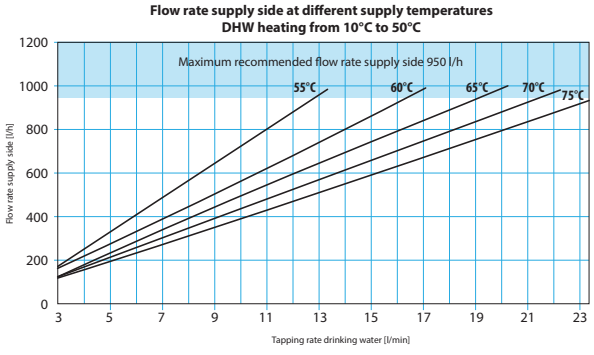


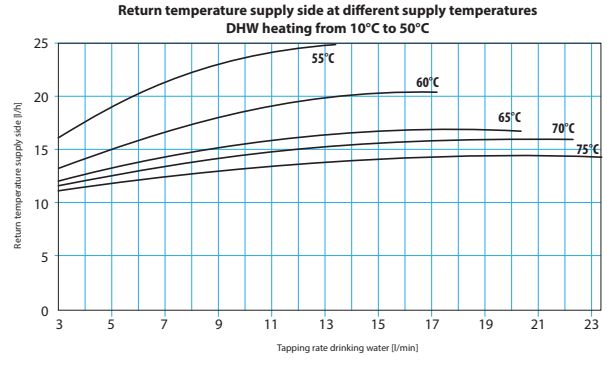
Flow volumes and tap capacity PWH - 45°C:





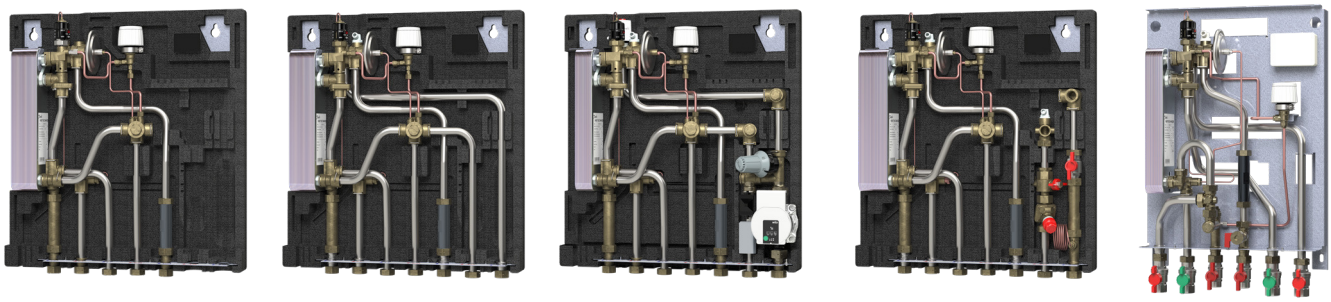
Flow volumes and tap capacity PWH - 50°C:



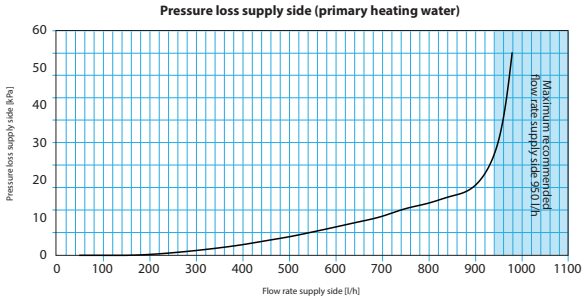


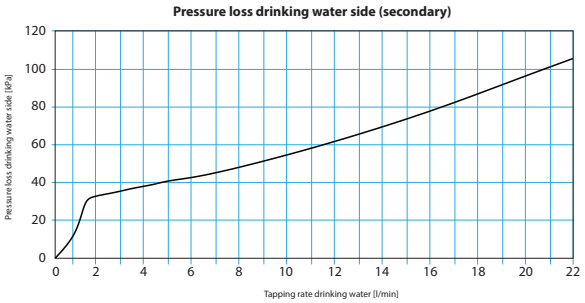
5.7 EvoFlat™ FSS/MSS/WSS/FSF/Reno type E3

Capacity curves for capacity stage 51 kW

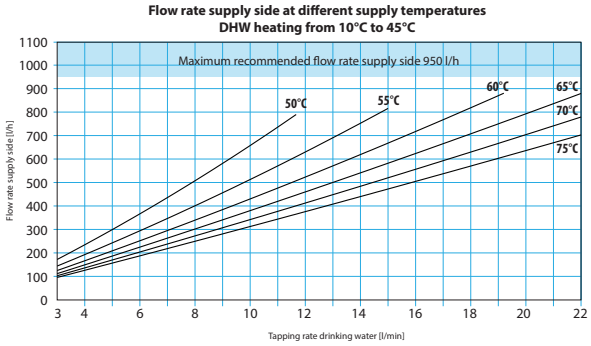


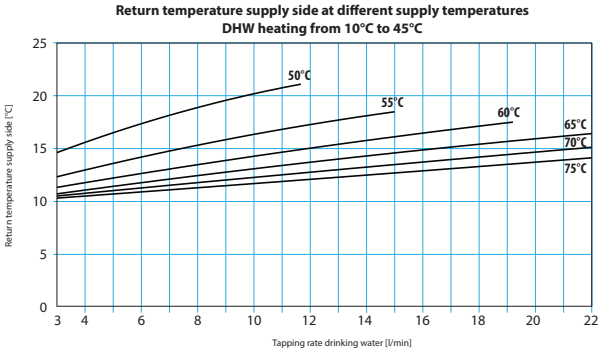
Pressure losses



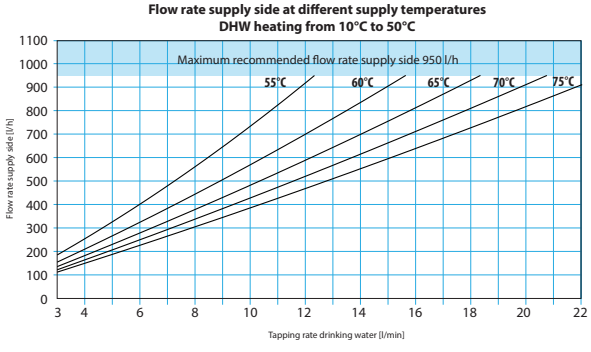


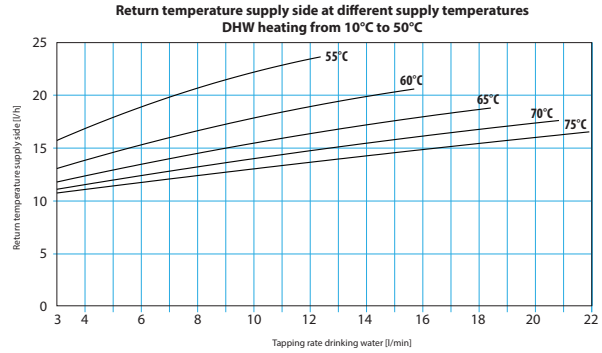
Flow volumes and tap capacity PWH - 45°C:





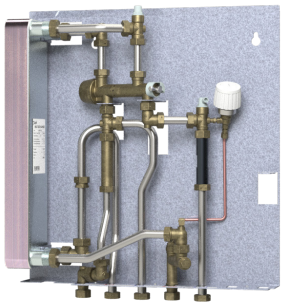
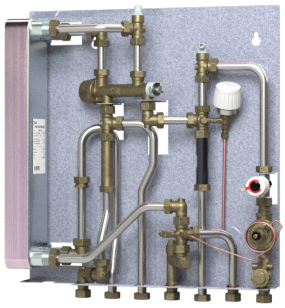
Flow volumes and tap capacity PWH - 50°C:





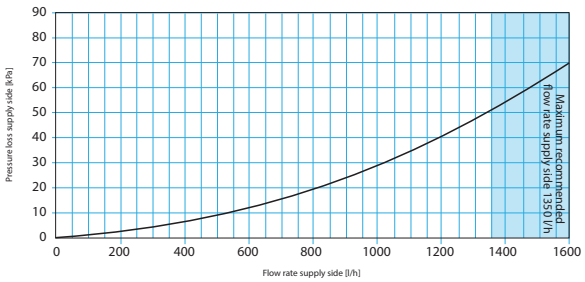
Akva Vita FSS/WSS/MSS

Capacity curves for capacity stage 58 kW

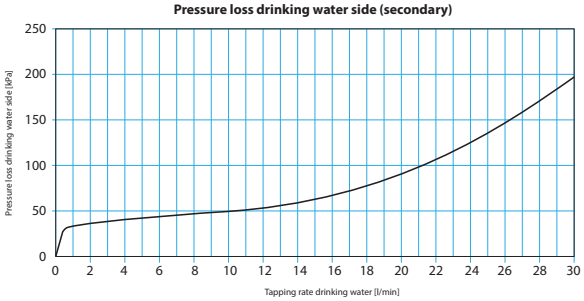




Pressure losses

Pressure loss supply side (primary heating water)

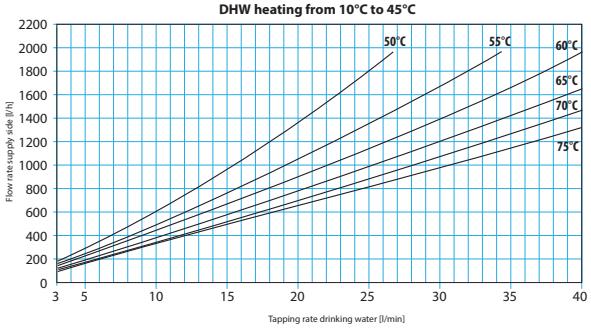


Pressure loss drinking water side (secondary)

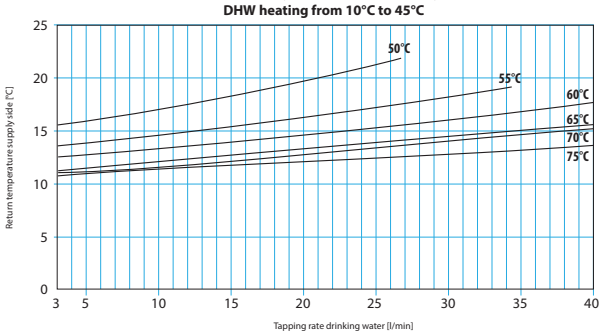


Flow volumes and tap capacity PWH - 45°C:

Flow rate supply side at different supply temperatures
DHW heating from 10°C to 45°C

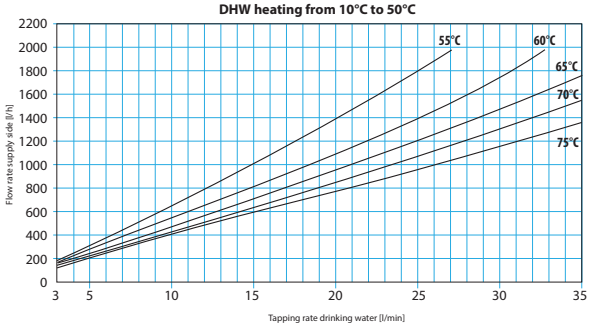


Return temperature supply side at different supply temperatures
DHW heating from 10°C to 45°C

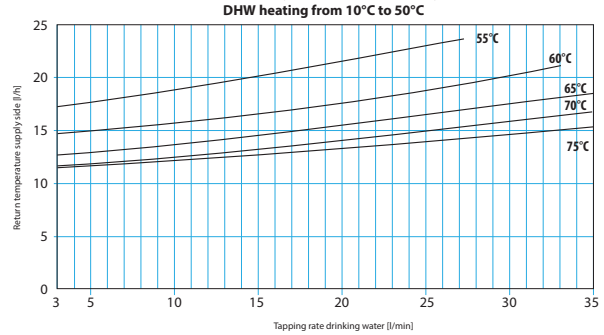


Flow volumes and tap capacity PWH - 50°C:

Flow rate supply side at different supply temperatures
DHW heating from 10°C to 50°C



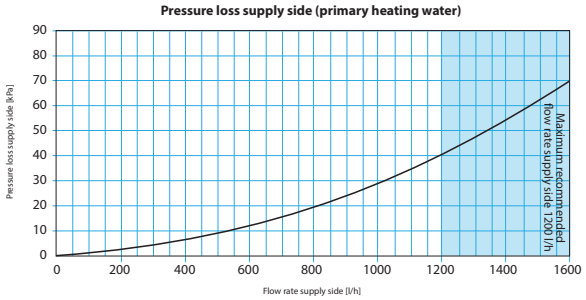
Return temperature supply side at different supply temperatures
DHW heating from 10°C to 50°C

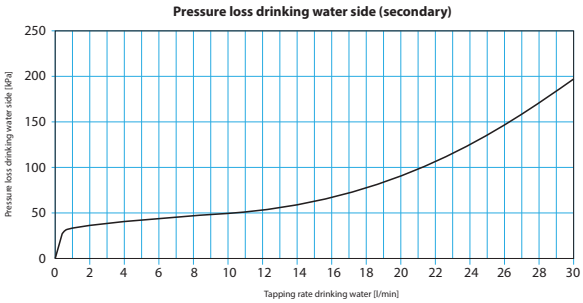


5.9 Akva Lux

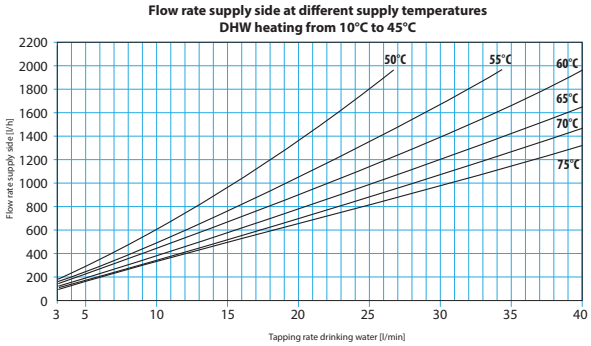
Capacity curves for capacity stage 78 kW

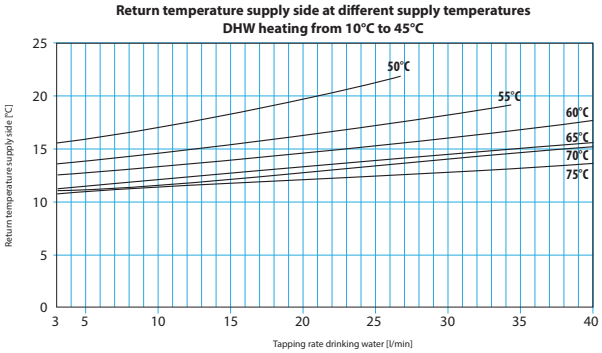
Pressure losses



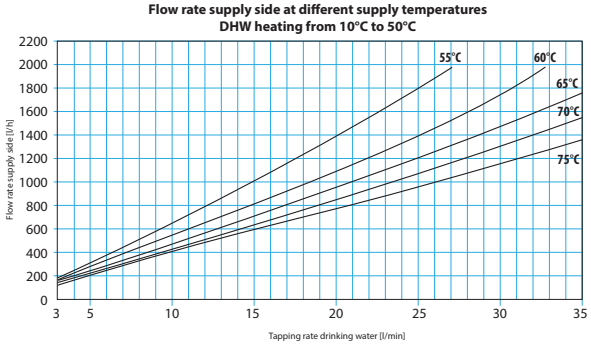


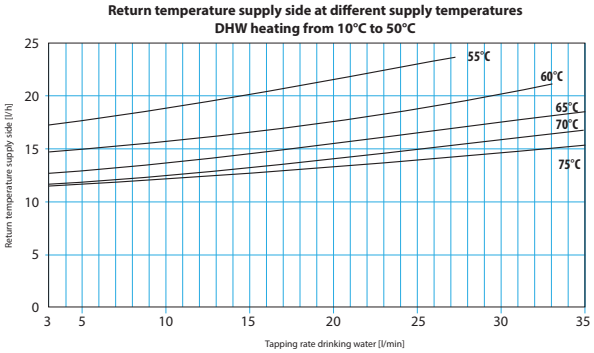
Flow volumes and tap capacity PWH - 45°C:





Flow volumes and tap capacity PWH - 50°C:



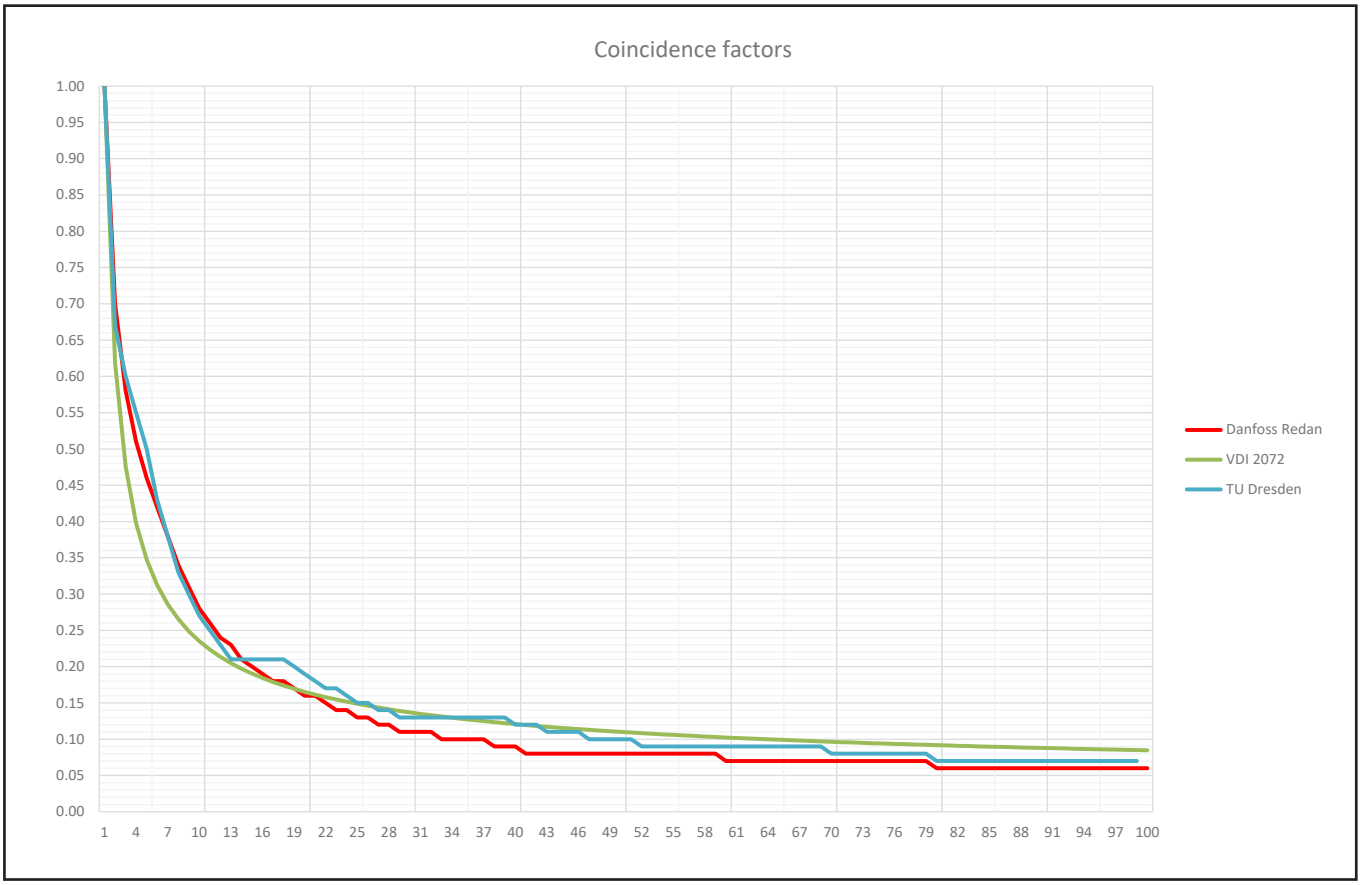


Calculation of the capacity of the PWH heat exchanger

The selection of a heat transfer station is based on the heat capacity required for DHW and space heating. The heating capacity for space heating is to be determined in accordance with the applicable national or international standards. The determination of the heat capacity for the DHW heating of the individual heat transfer station is based on the hot water demand that can occur in an apartment at any one time. Based on DIN 1988-300, it applies here that for simultaneity a maximum of the two hot water tapping points with the greatest capacity demands are open at the same time. These are, for example, the fittings on the shower and kitchen sink or the kitchen sink and bathtub. The capacity demands for DHW heating are determined using the equation below. Detailed information must be specified with the client in the room book. If no capacity requirements have been agreed, a normal capacity of 35 kW (this corresponds to requirement level II of VDI 6003) can be used for an apartment's calculation.

The simultaneity factor

Since it is impossible for all drinking water heaters to be in operation at the same time, a simultaneity factor (GLZ) is used in the calculation. There are simultaneity factors according to TU Dresden, Danfoss-Redan and more recently (for Germany) VDI 2072 (to name just three).



According to VDI 2072, the simultaneity factor is calculated as follows:

$$\varphi = 0.03 + \frac{0.5}{\sqrt{N}} + 0.45 \cdot \frac{1}{N}$$

Here:
φ = Simultaneity of DHW heating in all residential units
N = Number of residential units with the same capacity (max. 10 kW difference)

6.1 SIZING acc. to Danfoss-Redan

Determination of the capacity of a flat station depends on two factors:
1. Heat requirement for space heating
2. DWH heat capacity

The heating capacity for space heating must be calculated in accordance with EN 12831-1. The heat capacity for DHW heating can be determined as follows based on DIN 1988-300. The largest consumer within every bathroom is determined and the required capacity of the sink is added.
If no capacity is specified, we assume a capacity of 37 kW. This corresponds to requirement level II described in VDI6003.

The size of the heating water tank (buffer) and the capacity of the heat generator are now calculated using a sample calculation.
The peak load (in minutes) is required to calculate the size of the heating water tank. This peak load time depends on the heat generator. If the heat generator reaches its nominal capacity in a short time (e.g. district heating, oil or gas boiler, etc.), a peak load time of 7-10 minutes can be set. For heat generators that are heated with biomass (pellets, logs, wood chips, etc.) or for heat pumps, significantly longer peak load times should be selected. In our experience, values of 15-20 minutes are realistic here.

The following data were set as given in the calculation example:

Apartment building with 12 flats	
Hot water capacity:	37 kW
Heat load:	2.4 kW per flat
Supply:	Supply line-65°C
Consumers:	Return line-50°C
PWH:	Return line-20°C
Simultaneity factor (with 12 res. units according to TU Dresden):	0.25
Peak load:	10 min

1. Hot water tank (buffer)
To calculate the heating water tank, the heat source flow rate for DHW heating must be determined as follows:

$$V_{PWH} = \frac{Q_{PWH} \times GLZ * \text{Number of res. units}}{c * \Delta t} * 1000 = \frac{37\ kW \times 0.25 * 12\ \text{res. units}}{1.163 * (65\text{-}20)} * 1000 = 2121\ l/h$$

Since mixing occurs in the lower area of the heating water tank, based on many years of experience, we assume a real usage of 66%

$$\left(\frac{1}{0.66} = 1.5\right).$$

In this calculation, the heating water in the supply lines of the pipe network (V_{VL}) is subtracted from the calculated quantity of heating water.

$$V_{buffer} = (1.5 * V_{PWH} * \frac{10}{60}\ \text{min}) - V_{VL} = (1.5 * 2{,}121\ l/h * \frac{10}{60}) - 63\ l = 467\ l$$

Selected buffer size: 500 l

2. Capacity of the heat generator

The proportionate capacity that the heat generator must provide in addition to the space heating is calculated as follows:

$$Q_{PWHges} = Q_{PWH} * \text{Number of res. units} * GLZ * \text{Peak load} = 37\ kW * 12\ \text{res. units} * 0.25 * \frac{10}{60}\ min = 18.5\ kW$$

Space heating amounted to 2.4 kW per flat. This will give you:

Capacity of the heat generator = (2.4 kW/res. unit × 12 res. units + 18.5 kW) = 47.3 kW

3. Calculation of through-loading time

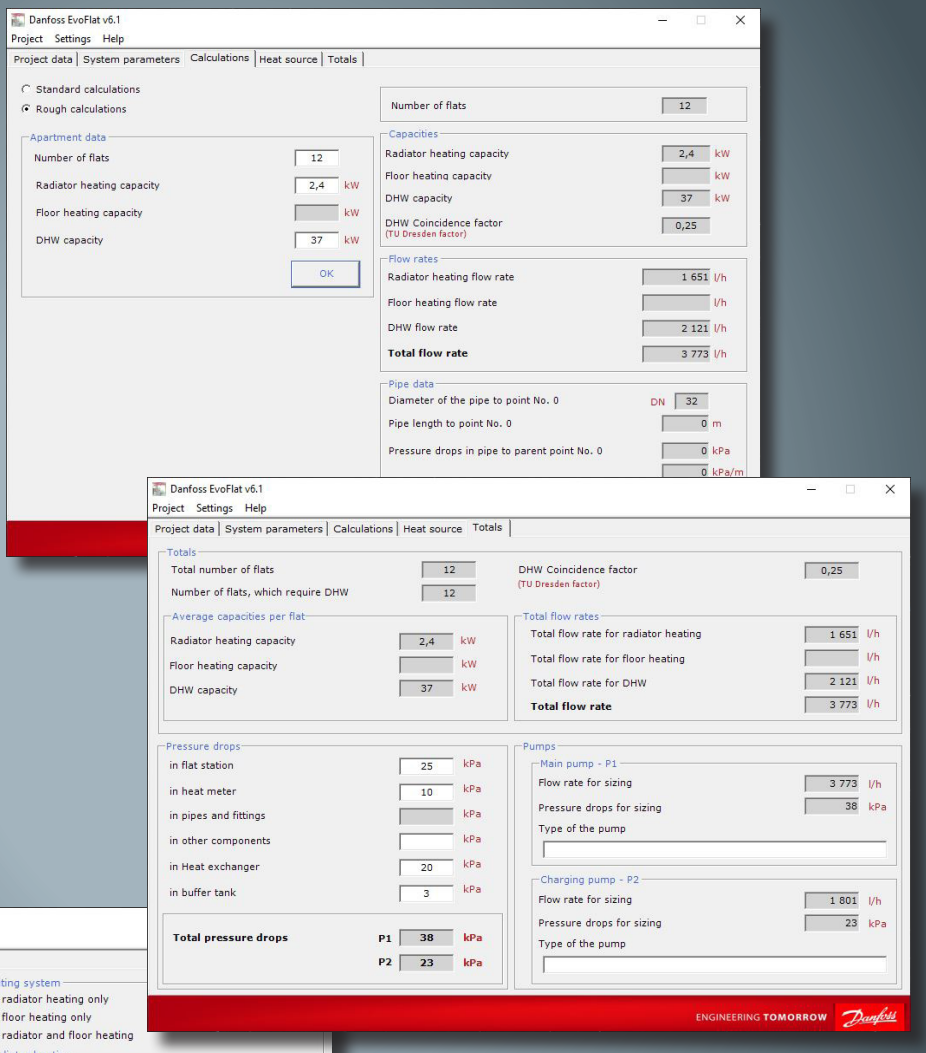
To check the through-loading time of the heating water storage tank, you can use the following calculation model:

$$T = V_{buffer} \times CP \times \rho \times \Delta T * / Q_{Heat\ generator} \times 60$$
$$= 500 \times 4.19 \times 0.9805 \times 25 / 47.3 \times 60$$
$$= 18\ min$$

Cp – specific heat capacity in kJ/kg*K
ρ – density of the water at 65°C
*ΔT – heating supply-heating return in the case of the heat generator

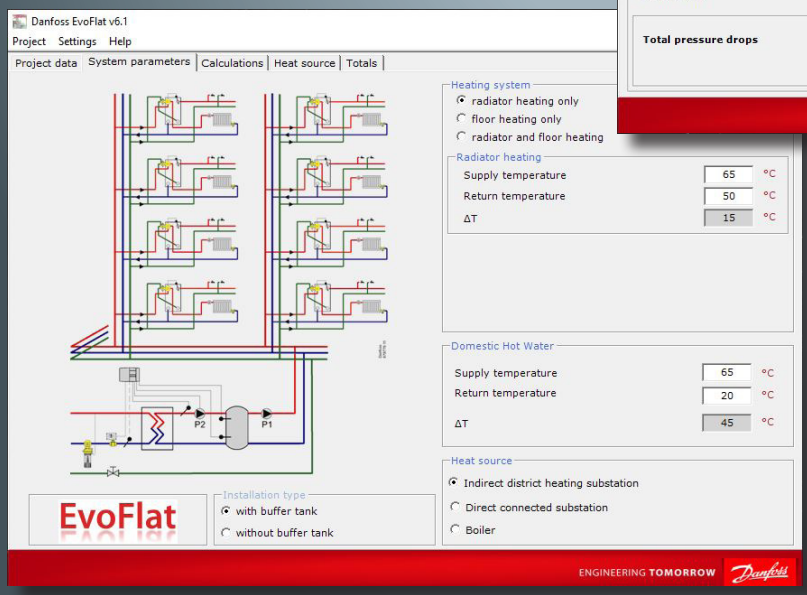
The through-loading time should not exceed 3-4 times the peak load time, depending on the number of flats.

The free Danfoss EvoFlat software offers an easier way to determine the buffer sizes, boiler capacities and even the pipe network.

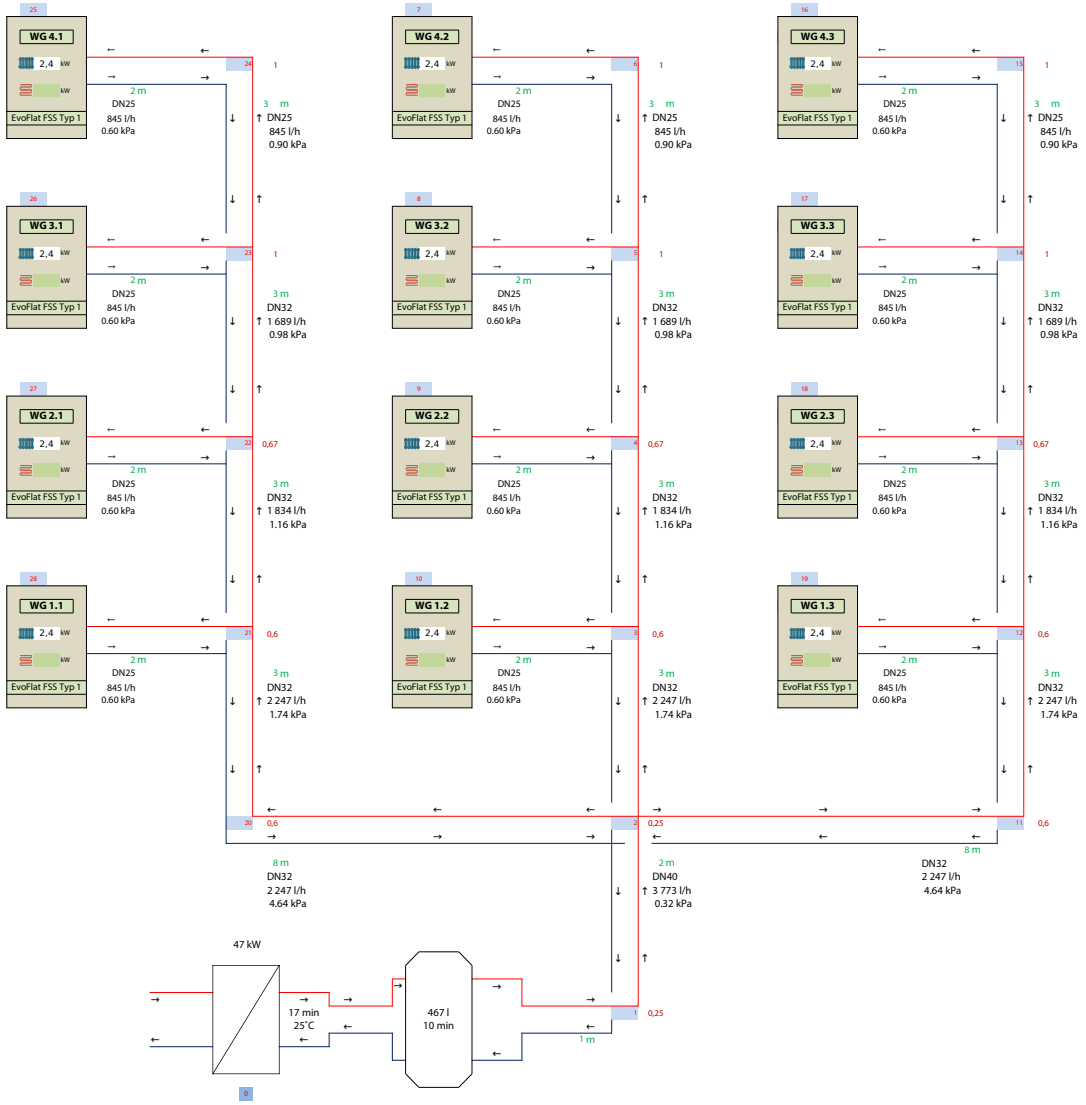


2. Recording project-specific data

1. System configuration



The simple 'copy & paste' function allows complex blocks of characters to be inserted. This allows a riser diagram to be created without CAD experience. The saved file is read in using the EvoFlat software and the finished dimensioned pipe network including information about the buffer volume and heat generator capacity is then available as a printout.



Safety-relevant components as well as pumps, safety valves, etc. are not shown in this diagram.

VDI 2072 (flow DHW heating with water/water-heat exchanger), which has been valid since 1 November 2019, includes a method for calculating the pipe network. This is not shown in the planning manual. You will find this in the dimensioning tool EvoFlat™, version 8.0, which will appear shortly.

Coincidence factors

Number of flats	Danfoss Redan	TU Dresden	VDI 2072
1	1.00	1.00	1.00
2	0.70	1.00	0.62
3	0.58	0.67	0.48
4	0.51	0.60	0.40
5	0.46	0.55	0.35
6	0.42	0.50	0.31
7	0.38	0.43	0.29
8	0.34	0.38	0.27
9	0.31	0.33	0.25
10	0.28	0.30	0.24
11	0.26	0.27	0.22
12	0.24	0.25	0.21
13	0.23	0.23	0.20
14	0.21	0.21	0.20
15	0.20	0.21	0.19
16	0.19	0.21	0.18
17	0.18	0.21	0.18
18	0.18	0.21	0.17
19	0.17	0.21	0.17
20	0.16	0.20	0.17
21	0.16	0.19	0.16
22	0.15	0.18	0.16
23	0.14	0.17	0.15
24	0.14	0.17	0.15
25	0.13	0.16	0.15
26	0.13	0.15	0.15
27	0.12	0.15	0.14
28	0.12	0.14	0.14
29	0.11	0.14	0.14
30	0.11	0.13	0.14
31	0.11	0.13	0.13
32	0.11	0.13	0.13
33	0.10	0.13	0.13
34	0.10	0.13	0.13
35	0.10	0.13	0.13
36	0.10	0.13	0.13
37	0.10	0.13	0.12
38	0.09	0.13	0.12
39	0.09	0.13	0.12
40	0.09	0.13	0.12
41	0.08	0.12	0.12
42	0.08	0.12	0.12
43	0.08	0.12	0.12
44	0.08	0.11	0.12
45	0.08	0.11	0.11
46	0.08	0.11	0.11
47	0.08	0.11	0.11
48	0.08	0.10	0.11
49	0.08	0.10	0.11
50	0.08	0.10	0.11
51	0.08	0.10	0.11
52	0.08	0.10	0.11
53	0.08	0.09	0.11
54	0.08	0.09	0.11
55	0.08	0.09	0.11
56	0.08	0.09	0.11
57	0.08	0.09	0.10
58	0.08	0.09	0.10
59	0.08	0.09	0.10
60	0.07	0.09	0.10
61	0.07	0.09	0.10
62	0.07	0.09	0.10
63	0.07	0.09	0.10
64	0.07	0.09	0.10
65	0.07	0.09	0.10
66	0.07	0.09	0.10
67	0.07	0.09	0.10
68	0.07	0.09	0.10
69	0.07	0.09	0.10
70	0.07	0.09	0.10
71	0.07	0.08	0.10
72	0.07	0.08	0.10
73	0.07	0.08	0.09
74	0.07	0.08	0.09
75	0.07	0.08	0.09
76	0.07	0.08	0.09
77	0.07	0.08	0.09
78	0.07	0.08	0.09
79	0.07	0.08	0.09
80	0.06	0.08	0.09
81	0.06	0.07	0.09
82	0.06	0.07	0.09
83	0.06	0.07	0.09
84	0.06	0.07	0.09
85	0.06	0.07	0.09
86	0.06	0.07	0.09
87	0.06	0.07	0.09
88	0.06	0.07	0.09
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90	0.06	0.07	0.09
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93	0.06	0.07	0.09
94	0.06	0.07	0.09
95	0.06	0.07	0.09
96	0.06	0.07	0.09
97	0.06	0.07	0.09
98	0.06	0.07	0.09
99	0.06	0.07	0.08
100	0.06	0.07	0.08
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111	0.06	0.06	0.08
112	0.06	0.06	0.08
113	0.06	0.06	0.08
114	0.06	0.06	0.08
115	0.06	0.06	0.08
116	0.06	0.06	0.08
117	0.06	0.06	0.08
118	0.06	0.06	0.08
119	0.06	0.06	0.08
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122	0.06	0.06	0.08
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124	0.06	0.06	0.08
125	0.06	0.06	0.08
126	0.06	0.06	0.08
127	0.06	0.06	0.08
128	0.06	0.05	0.08
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130	0.06	0.05	0.08
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132	0.06	0.05	0.08
133	0.06	0.05	0.08
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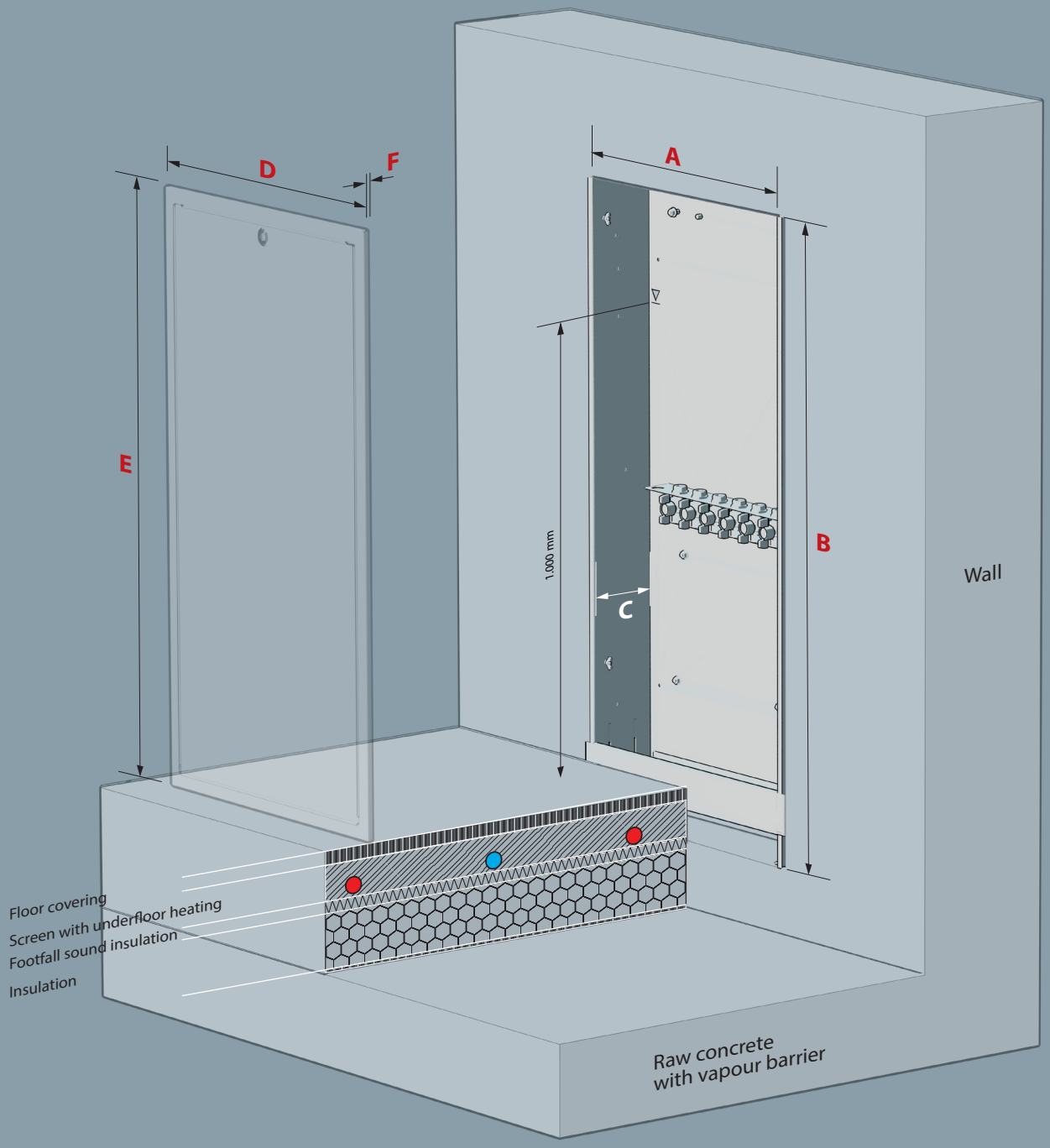

Code no.	Name	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	Mounting rail incl. mounting rail
145H4900	Recess box	610	910	150				included
145H4901	Frame with door				662	790	10	
145H4902	Recess box	690	910	150				included
145H4903	Frame with door				742	790	10	
145H4904	Recess box	610	1350	150				included
145H4905	Frame with door				662	1230	10	
145H4906	Recess box	690	1350	150				included
145H4907	Frame with door				742	1230	10	
145H4908	Recess box	850	1350	150				included
145H4909	Frame with door				920	1230	10	

Recess box made of galvanized sheet steel in a robust design. The box is closed on all sides, open at the bottom. It can be installed in masonry or in a drywall. Mounting rail incl. ball valves already integrated in the housing. Suitable for installation of Danfoss DHW heaters* and flat stations. Visible part with frame in an elegant design. Removable and made of galvanized sheet steel, powder-coated white (RAL 9016).

* except Akva Lux II / Akva Les with 190 mm installation depth

Danfoss in-wall cabinets for professional and cost-effective wall installation of flat stations and underfloor distributors.

Type	Code No.
Danfoss recess box 610×910×150, with ball valve rail	145H4900
Frame with door for in-wall box 610×910×150, RAL 9016	145H4901
Danfoss recess box 690×910×150, with ball valve rail	145H4902
Frame with door for in-wall box 690×910×150, RAL 9016	145H4903
Danfoss recess box 610×1350×150, with ball valve rail, max. 8 heating circuits	145H4904
Frame with door for in-wall box 610×1350×150, RAL 9016	145H4905
Danfoss recess box 690×1350×150, with ball valve rail, max. 9 heating circuits	145H4906
Frame with door for in-wall box 690×1350×150, RAL 9016	145H4907
Danfoss recess box 850×1350×150, with ball valve rail, max. 12 heating circuits	145H4908
Frame with door for in-wall box 850×1350×150, RAL 9016	145H4909

7.3 ACCESSORIES RANGE

Accessories selection list

Code No.	Item description, accessory	Akva Lux II & Akva Les	EvoFlat WSS
144H1461	Ball valve, DVGW ¾" × 76 mm int. thread/ext. thread	x	
145H4313	Ball valve, heating ¾" × 76 mm int. thread/ext. thread	x	
145H4537	Ball valves set incl. mounting rail incl. 5 BV (3xDVGW, 2xheating), ¾" × 76 mm int. thread/ext. thread for WSS models		x
145H4195	Ball valves set incl. mounting rail incl. 7 BV (3xDVGW, 4xheating), ¾" × 76 mm int. thread/ext. thread		
145H4015	Ball valves set for RENO (2xDVGW, 4xheating)		
144B2420	DCW connection from top - pipe set, with 110 mm fitting piece ¾"		
145H4920	Pipe set, insulated for primary connection from the top		
145H4202	Connection set for underfloor heating distributor system with base plate for third-party distributor, suitable for rail 145H4195 (BV with int. thread)		
145H4900	Recess box W=610 × H=910 × D=150 mm for EvoFlat™ incl. mounting rail		x
145H4901	Door with frame for recess box W=610 × H=910 mm		x
145H4902	Recess box W=690 × H=910 × D=150 mm for EvoFlat™ incl. mounting rail		x
145H4903	Door with frame for recess box W=690 × H=910 mm		x
145H4904	Recess box W=610 × H=1350 × D=150 mm for EvoFlat™ MSS and underfloor heating distributor (up to 8 circuits) incl. mounting rail		
145H4905	Door with frame for recess box W=610 × H=1350 mm		
145H4906	Recess box W=690 × H=1350 × D=150 mm for EvoFlat™ and underfloor heating distributor (up to 9 circuits)		
145H4907	Door with frame for recess box W=690 × H=1350 mm		
145H4908	Recess box W=850 × H=1350 × D=150 mm for EvoFlat™ and underfloor heating distributor (up to 12 circuits)		
145H4909	Door with frame for recess box W=850 × H=1350 mm		
004U8578	Cover RAL 9010 white without door W=600 × H=780 × D=200 mm		x
193B1397	Cover with door; RAL 9010 white W=630 × H=1300 × D=180 mm, open at the bottom		
193B1398	Cover with door; white RAL 9010 W=1000 × H=1300 × D=180 mm, open at the bottom		
145H4927	Cover, white-lacquered RAL 9016 without door W=455 × H=760 × D=220 mm		
145H4779	Circulation set for Akva Lux WSS, FSS and MSS (set includes Wilo Star Z Nova pump, SV, piping and seals)		
088H3112	Thermal actuator TWA-A/NC 230 V suitable for RA valves		
082F1266	Thermal actuator TWA-A/NC 230 V suitable for EvoFlat™ zone valve		
082F1262	Thermal actuator TWA-A/NC 24 V suitable for EvoFlat™ zone valve		
088U1025	Danfoss Icon™ room thermostat with display, programmable, 230 V, wall-mounted		
088U1020	Danfoss Icon™ room thermostat with display, programmable, 230 V, in-wall 80×80 mm		

*1 in conjunction with heating manifold type SG, SGC or SGCi

*2 in conjunction with heating manifold for VX-F stations

Akva Lux WSS Akva Vita WSS	EvoFlat FSS	EvoFlat MSS	EvoFlat FSF	EvoFlat Reno	Akva Lux II Reno Eco	Akva Lux FSS Akva Vita FSS	Akva Lux MSS Akva Vita MSS	VX-FSS	VX-MSS
x									
	x	x	x			x	x	x	x
					x				
					x				
				x					
		x	x				x		
x	x	x	x			x	x		
x	x	x	x			x	x		
x	x	x	x			x	x		
x	x	x	x			x	x		
		x*1	x*1				x*1		
		x*1	x*1				x*1		
		x*1	x*1				x*1	x	x*2
		x*1	x*1				x*1	x	x*2
		x*1	x*1				x*1	x	x*2
		x*1	x*1				x*1	x	x*2
x	x	x	x			x	x		
		x*1	x*1				x*1	x	x*2
		x*1	x*1				x*1	x	x*2
				x					
x						x	x		
					x			x	
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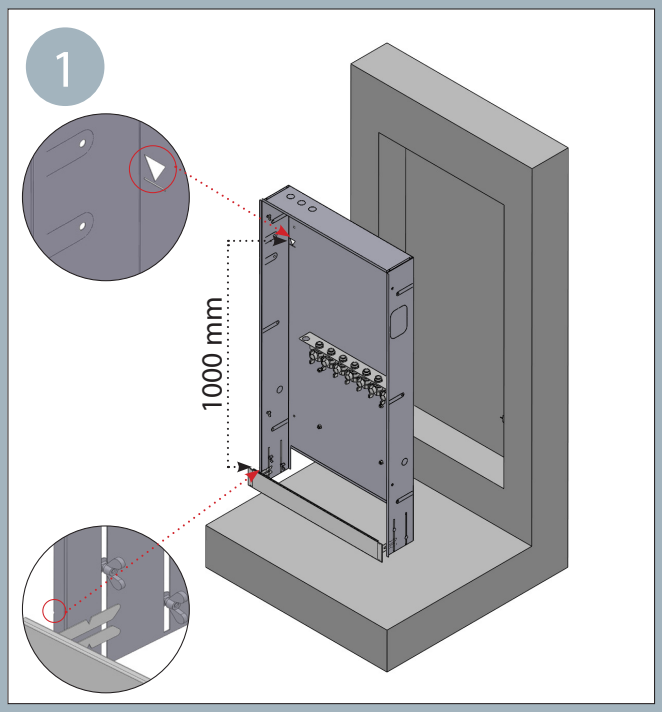
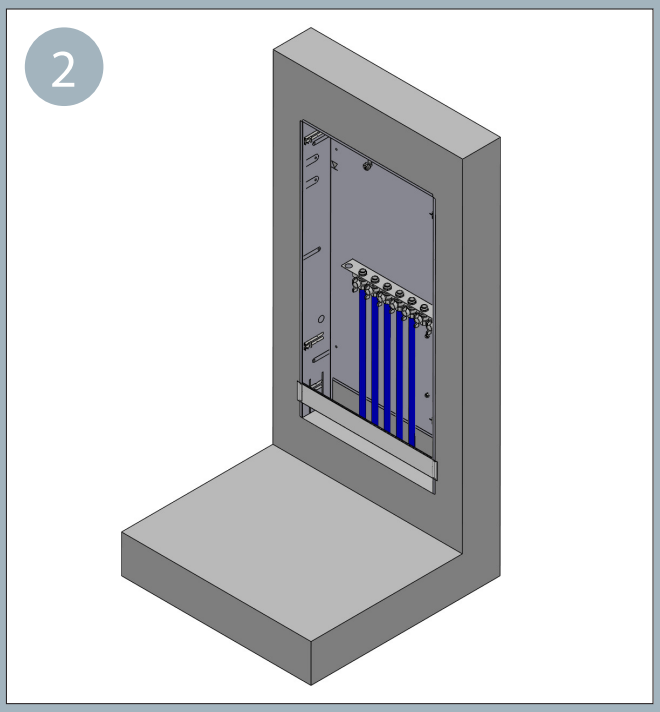
	x	x	x	x	x	x	x	x	x


1
1000 mm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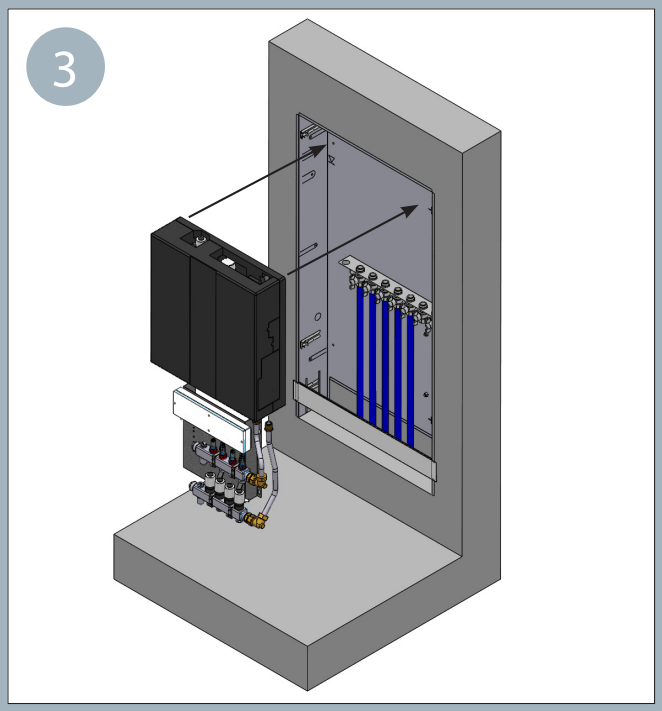
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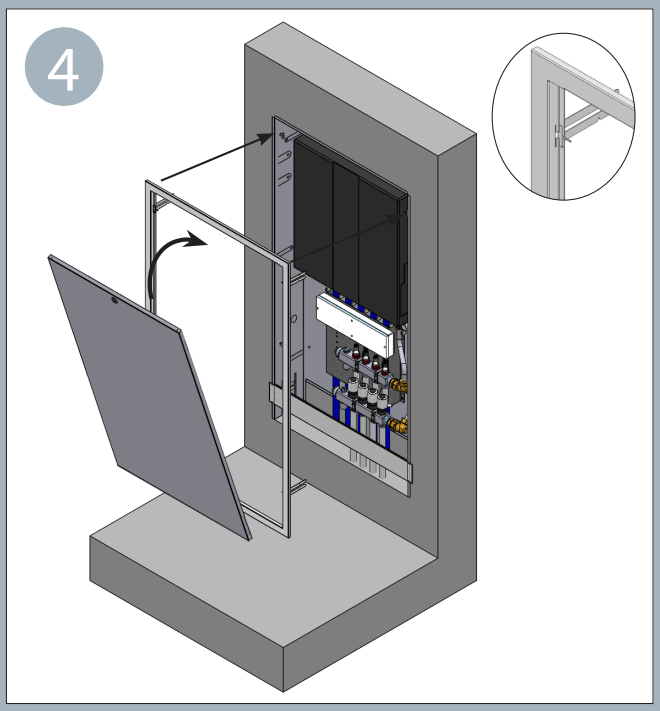
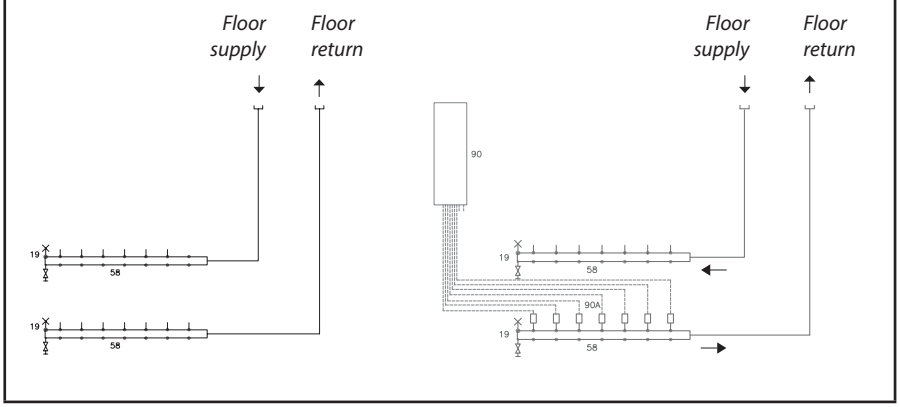

4

Distribution system SG, SGC + SGCi

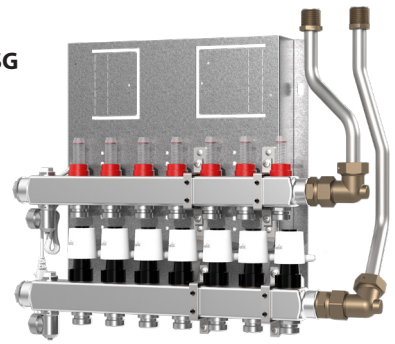
Prefabricated Danfoss stainless steel distribution systems of underfloor heating, suitable for separate or combined installation with Danfoss flat stations in Danfoss recess boxes.

Heating manifold type	Code No.
Type SG with 2 heating circuits	145H0352
Type SG with 3 heating circuits	145H0353
Type SG with 4 heating circuits	145H0354
Type SG with 5 heating circuits	145H0355
Type SG with 6 heating circuits	145H0356
Type SG with 7 heating circuits	145H0357
Type SG with 8 heating circuits	145H0358
Type SG with 9 heating circuits	145H0359
Type SG with 10 heating circuits	145H0360
Type SG with 11 heating circuits	145H0361
Type SG with 12 heating circuits	145H0362
Type SGC with 2 heating circuits and Icon™ master controller 230 V	145H0342
Type SGC with 3 heating circuits and Icon™ master controller 230 V	145H0323
Type SGC with 4 heating circuits and Icon™ master controller 230 V	145H0324
Type SGC with 5 heating circuits and Icon™ master controller 230 V	145H0325
Type SGC with 6 heating circuits and Icon™ master controller 230 V	145H0326
Type SGC with 7 heating circuits and Icon™ master controller 230 V	145H0327
Type SGC with 8 heating circuits and Icon™ master controller 230 V	145H0328
Type SGC with 9 heating circuits and Icon™ master controller 230 V	145H0329
Type SGC with 10 heating circuits and Icon™ master controller 230 V	145H0330
Type SGC with 11 heating circuits and Icon™ master controller 230 V	145H0331
Type SGC with 12 heating circuits and Icon™ master controller 230 V	145H0332
Heating manifold type SGCi with 2 heating circuits and Icon™ 24 V	145H0752
Heating manifold type SGCi with 3 heating circuits and Icon™ 24 V	145H0753
Heating manifold type SGCi with 4 heating circuits and Icon™ 24 V	145H0754
Heating manifold type SGCi with 5 heating circuits and Icon™ 24 V	145H0755
Heating manifold type SGCi with 6 heating circuits and Icon™ 24 V	145H0756
Heating manifold type SGCi with 7 heating circuits and Icon™ 24 V	145H0757
Heating manifold type SGCi with 8 heating circuits and Icon™ 24 V	145H0758
Heating manifold type SGCi with 9 heating circuits and Icon™ 24 V	145H0759
Heating manifold type SGCi with 10 heating circuits and Icon™ 24 V	145H0760
Heating manifold type SGCi with 11 heating circuits and Icon™ 24 V	145H0761
Heating manifold type SGCi with 12 heating circuits and Icon™ 24 V	145H0762

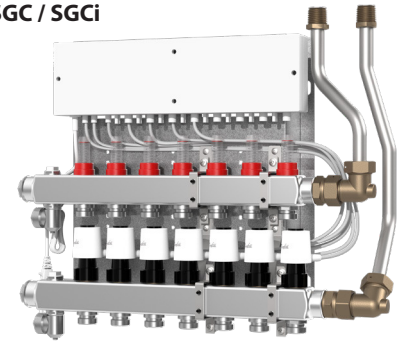
Circuit diagram



SG



SGC / SGCi



Technical parameters:
Nominal pressure: PN 6

Weight:
incl. packing: 20-30 kg

Door in front of recess box:
(optional) Steel sheet, white-lacquered RAL 9010

Electrical connection: 230 V AC / 24 AC/DC

Dimensions (mm): H 590 × W 550 × D 150

Connection dimensions: G ¾" (ext. thread)

Type SG: Distributor system for underfloor heating without admixture circuit, with flow meter.

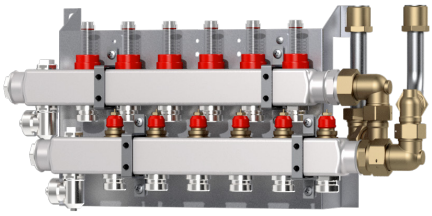
Type SGC: Distributor system for underfloor heating without admixture circuit with flow meterand with hardwired Icon™ master controller 230 V and actuators according to the number of heating circuits.

Type SGCi: Distributor system for underfloor heating without admixture circuit, with flow meter and with hardwired Icon™ heating circuit controller 24 V and actuators according to the number of heating circuits.

19 End connector with manual ventilation
58 Distributor with 7 connections, with flow meter
90 Danfoss Icon™ master controller
90A Actuator Danfoss TWA-A NC

Distributor for Akva Lux II VX-F

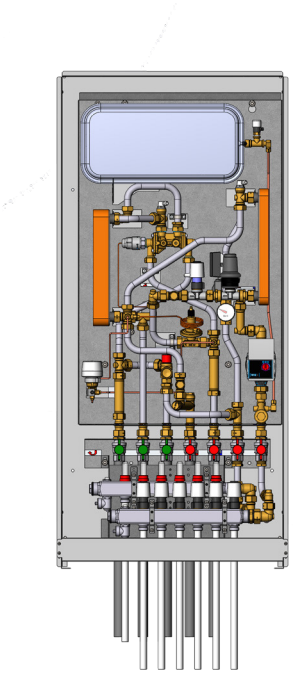
The Danfoss stainless steel distribution systems are prefabricated heating circuit distributors for underfloor heating which are prepared for separate installation or for combined installation with the well-known Danfoss flat stations type VX-F. The systems are available as standard solutions for 3 to 12 heating circuits. The systems can be installed as an in-wall version with built-in cabinet or as a wall-mounted version.



Heating manifold type	Code No.
Distribution system for Akva Lux II VX-F, with 3 heating circuits	145H0503
Distribution system for Akva Lux II VX-F, with 4 heating circuits	145H0504
Distribution system for Akva Lux II VX-F, with 5 heating circuits	145H0505
Distribution system for Akva Lux II VX-F, with 6 heating circuits	145H0506
Distribution system for Akva Lux II VX-F, with 7 heating circuits	145H0507
Distribution system for Akva Lux II VX-F, with 8 heating circuits	145H0508
Distribution system for Akva Lux II VX-F, with 9 heating circuits	145H0509
Distribution system for Akva Lux II VX-F, with 10 heating circuits	145H0510
Distribution system for Akva Lux II VX-F, with 11 heating circuits	145H0511
Distribution system for Akva Lux II VX-F, with 12 heating circuits	145H0512

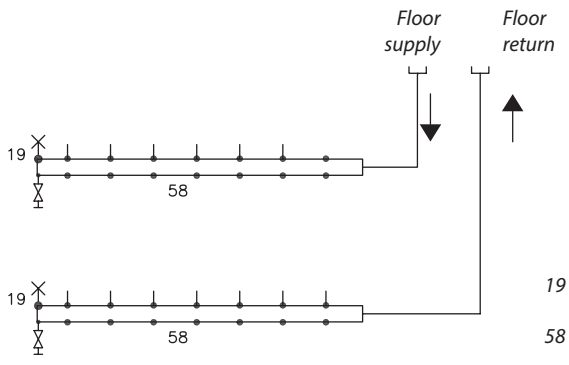
Distribution system for VX-F: Distributor system for underfloor heating without admixture circuit, with flow meter.

Recess box	Code No.
Recess box H 1350 × W 690 × D 150 mm, incl. mounting rail and ball valves (*up to 8 heating circuits)*	145H4906
Door with frame recess box 1350×690, powder-coated RAL 9016	145H4907
Recess box H 1350 × W 850 × T 150 mm, incl. mounting rail and ball valves (*up to 11 heating circuits)*	145H4908
Door with frame recess box 1350×850, powder-coated RAL 9016	145H4909
Mounting rail incl. ball valves	145H4195



VX-F station with distribution system

Circuit diagram



19 End connector with manual ventilation
58 Distributor with 7 connections, with flow meter PN 6

Technical parameters:
Nominal pressure: PN 6
Max. flow temp.: 55°C

Weight:
incl. packing: 20-30 kg

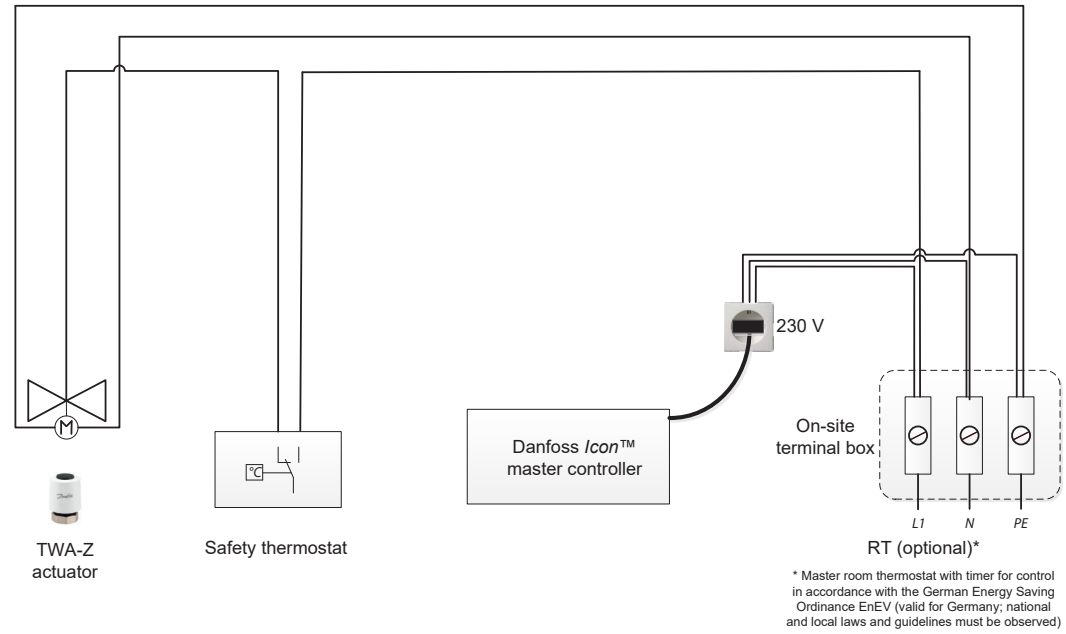
Door in front of recess box:
(optional) Steel sheet, white-lacquered RAL 9016

Electrical connection: 230 V AC / 24 V AC/DC

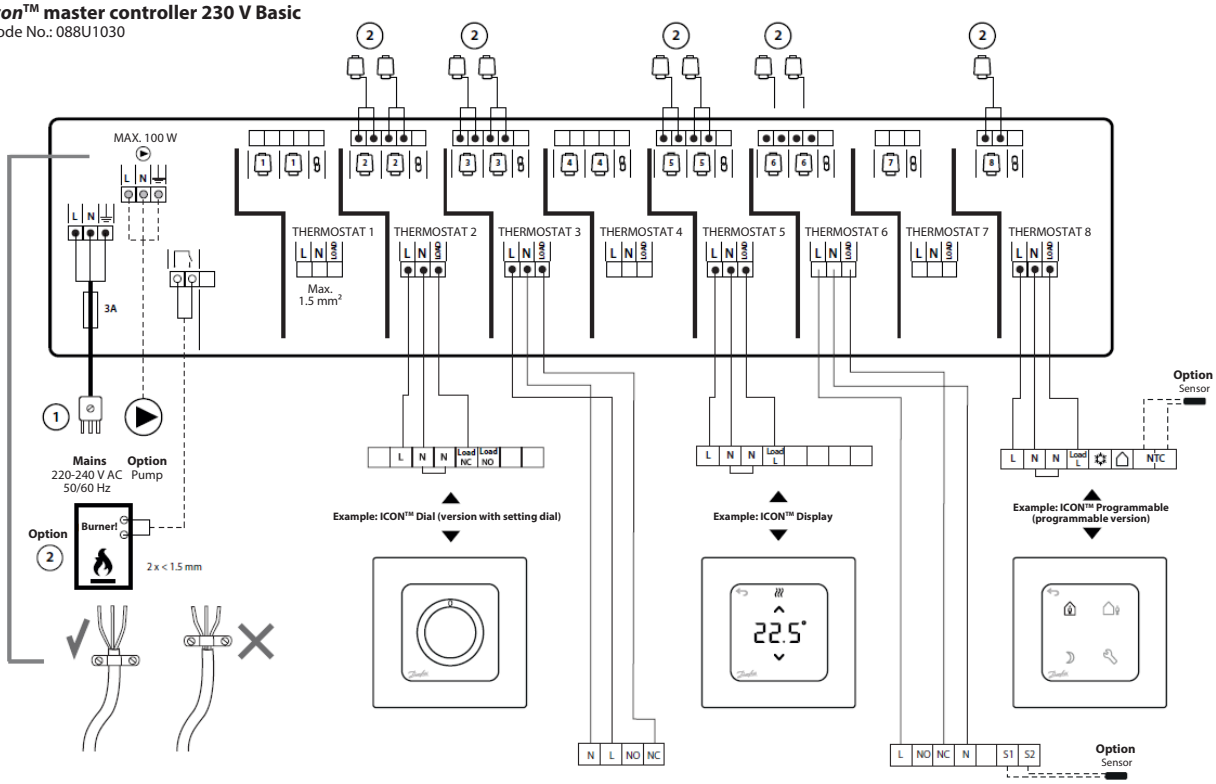
Dimensions (mm): H 227 × W 478 - 810.5 × D 153

Connection dimensions: G ¾" (ext. thread)

Wiring diagram MSS / Distributor SGC with Icon™ master controller



Icon™ master controller 230 V Basic
Code No.: 088U1030

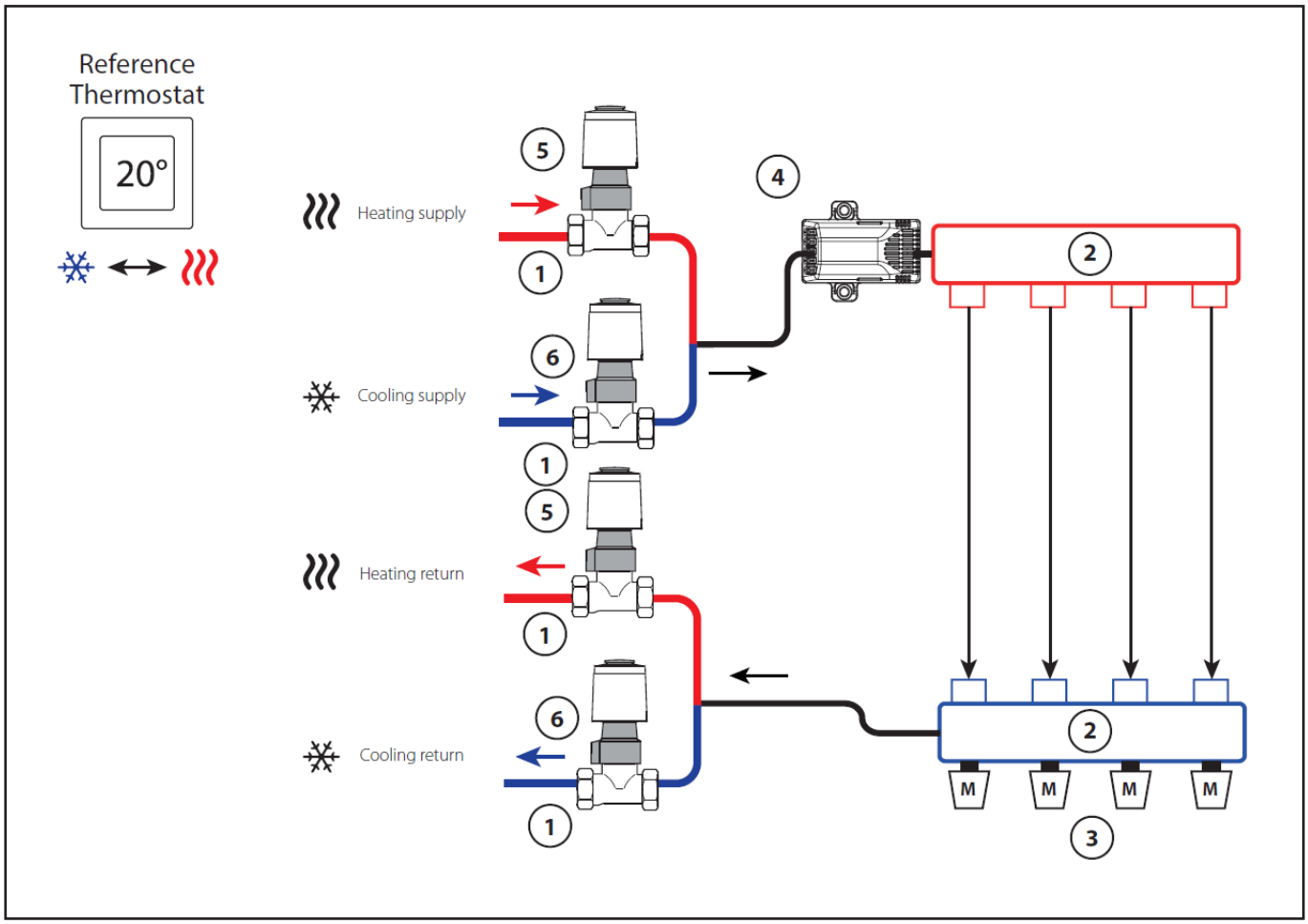


7.8 CDM cooling module

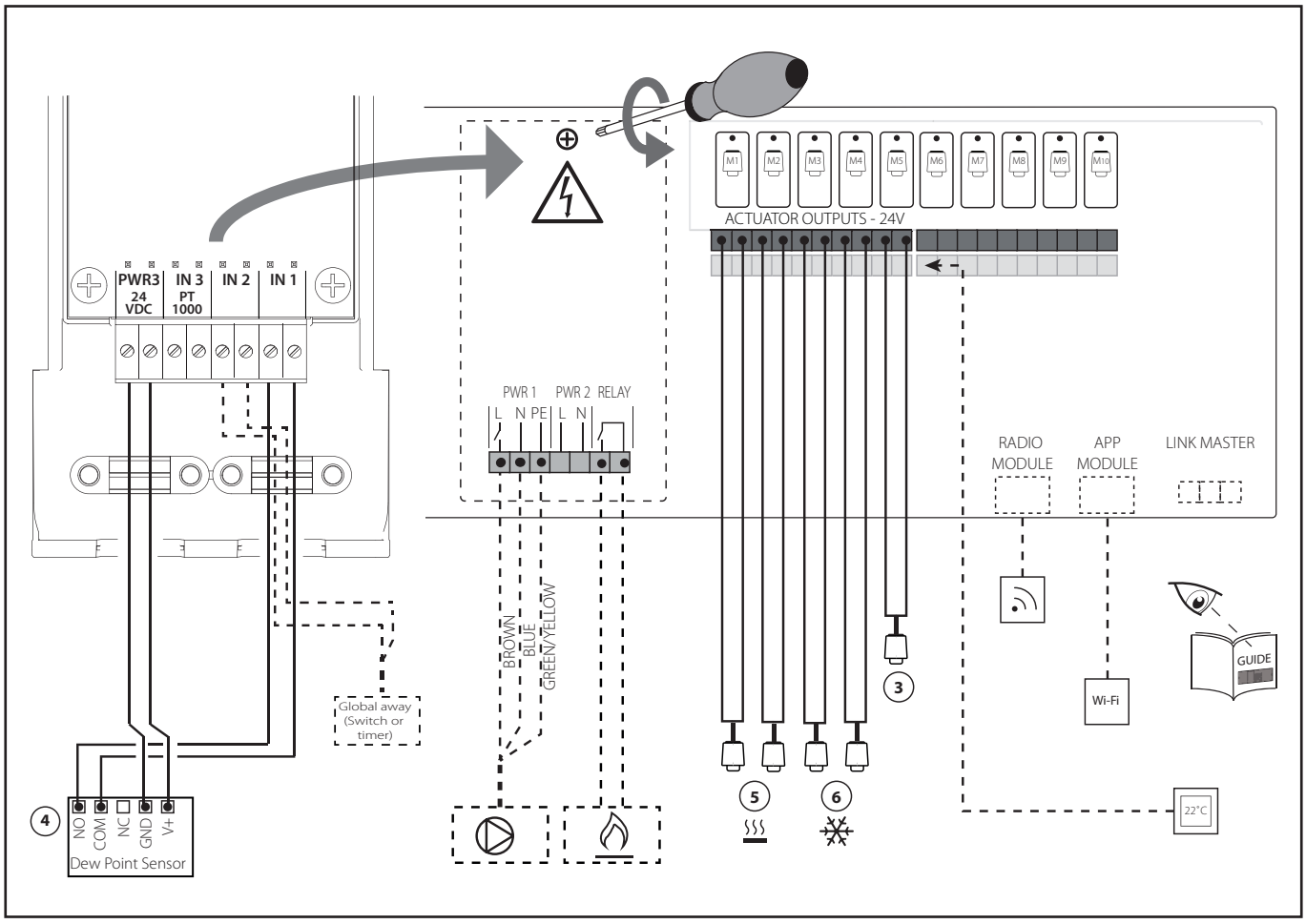
Application Description
Four-pipe system with 2-way valves on the inlets and automatic switching for cooling, controlled by reference room thermostat. The system activates the cooling mode via 2-way valves with thermal actuators on the supply and return lines by activating the corresponding outputs (**M1 - M4**). Note: In this application, outputs 1, 2, 3 and 4 on the *Danfoss Icon*™ Master are used for the application and cannot be assigned to any thermostats.
For cooling applications, it is always advisable to have a condensation switch installed in the system to prevent moisture damage to the floor and installations if the relative humidity exceeds the dew point. Four conditions must be fulfilled before cooling is permitted in a room:

- The reference room temperature must exceed the room setpoint and the cooling hysteresis.
- No room has required heating within the neutral period.
- The condensation switch must not be active/there must be no risk of condensation.
- The cooling must be activated on the room thermostat (default = activated).

Global standby is a potential-free input with which the system can be remotely switched to global presence mode, e.g. using an external GSM module from a third party provider. When the global standby input is active, all rooms receive a setpoint of 15 degrees Celsius.



Wiring diagram, CDM module with CSGCi distributor



8.1 FLAT STATIONS QUERY

Consumer

Company: _____ Post code / city: _____

Contact: _____ Street: _____

Project

Project: _____ Post code / city: _____

Number of flats: _____ Street: _____

Design data:

Use: Residential _____

Heat generator: Boiler District heating Heat Pump _____

Buffer tank: no yes (if available, capacity: _____ l)

Space heating: Radiators Floor heating Panel heating with bathroom radiator

Network or buffer temperature supply line / return line: 65°C _____°C)

Dimensioning temperatures, floor heating: _____°C/_____°C)

Dimensioning temperatures, radiators: _____°C/_____°C)

Tap load (PWH): _____ 15 l/min (37 kW at 65°C supply line) _____ 17 l/min (45 kW at 65°C supply line)

_____ 19 l/min (55 kW at 65°C supply line) _____ _____

Number of underfloor heating circuits: _____ 3 circuits _____ 4 circuits _____ 5 circuits _____ 6 circuits _____ 7 circuits

_____ 8 circuits _____ 9 circuits _____ 10 circuits _____ 11 circuits _____ 12 circuits

Number of room thermostats: _____

Circulation: no (PWH - 50°C) yes (PWH - 60°C, PWH-C - 55°C)

Brazing of plate heat exchanger: Copper Stainless steel

Installation type: Recess Wall-mounted

A riser diagram is required with details of the heating demand of the heating circuits or the flats and the DHW capacity PWH, if possible in kW. Without this information, pipe network dimensioning is not possible!

Customer requests:

Planning suggestion, pipe network Technical documents

Texts, specifications Visit from SR/BDM

Quote Gross

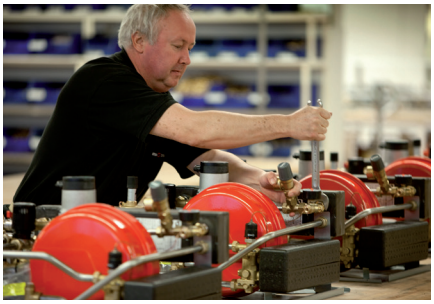
Net _____

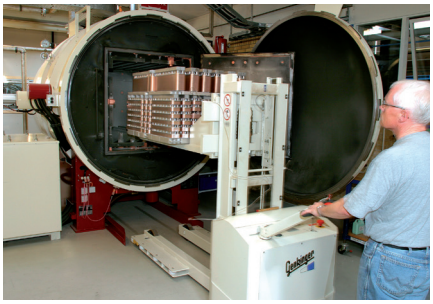
Notes

ENGINEERING
TOMORROW

Energy efficiency experience – worldwide

Danfoss is more than a household name in heating. For more than 75 years, we have been supplying customers across the world with everything from components to complete district heating system solutions. For generations, we have made it our business to help you optimize yours, and that remains our goal both now and in the future. Driven by our customers' needs, we build on years of experience to be at the forefront of innovation, continually supplying components, expertise and complete systems for climate and energy applications. Energy-efficient products from Danfoss help our customers all over the world to increase the comfort of their own customers with less energy consumption, thereby reducing their costs and the burden on our environment.





We make most of them ourselves

All important components of EvoFlat™ flat stations are developed and manufactured by Danfoss itself. This also includes the new MicroPlate™ heat exchangers, thermostatic and safety valves, thermostatic and electronic controllers.

All parts are assembled in our own factories in Denmark according to quality standards that are certified according to DIN ISO 9001. This enables us to ensure that everything harmonizes and works together during assembly and during customer operation.

This results in technically high-quality products that you and your customers can rely on.
If a fault does arise, our comprehensive service will be at your side to help fix this.

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