

Data Sheet

DAF Flat Stations



DAF flat station

Rising energy costs and expectations for better comfort in your home are forcing many housing companies to renovate their building to make them relevant to tenants. Insulation of facades and roofs can reduce heating requirements by up to 83%. This means that the existing heating system is oversized and is no longer possible to operate economically. There is thus a need for a new and more up-to-date heating system, with individual heating billing for the residents.

The increasing focus on energy-optimal solutions, which is present all over the world, forms the basis for innovative solutions from Danfoss.

The DAF flat stations offer the better alternative to traditional heating systems used in flats and apartment buildings for both new build and renovation. It is a multi-functional unit that is installed in every apartment and where it heats the hot domestic water and ensure an even heating of the home either via radiators or underfloor heating, with increased flexibility, low cost efficiency, long system lifetime and less maintenance which not only lowers the carbon footprint, but also results in quicker and more sustainable return on invest.

The flat station does not produce energy, but transfers the energy from a central heating source to the apartment. It does not depend on which heat source the energy comes from, so all known heat sources can be used, such as district heating, heat pumps, solar panels, biomass or outgoing heat sources such as oil and gas.

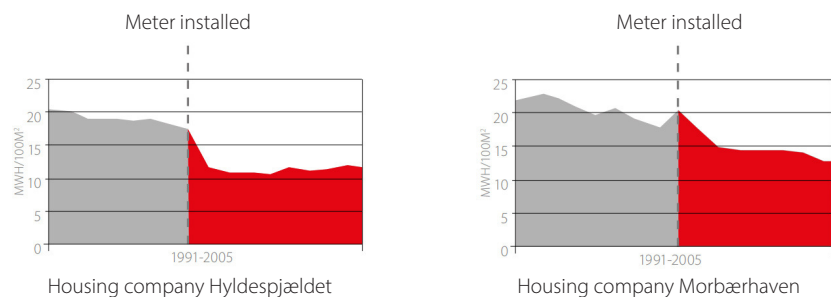
Other advantages of DAF flat stations:

- Space-saving installation that can be easily installed in narrow spaces
- Reduces assembly errors as it is supplied as a complete system that has been tested and proven from the factory
- Provides high efficiency thanks to the low return temperature in the primary circuit
- Low risk of the spread of legionella, since domestic hot water is not stored in a tank, but is produced when needed
- Individual heating calculation reduces energy consumption by up to 15-30 % compared to joint billing for apartments. Tenants who know their consumption level are more energy-conscious
- Only three supply lines compared to five for traditional distribution from central heating supply
- Can be used both for radiator heating and underfloor heating systems

With DAF flat stations we maximize these benefits and offer even greater comfort for the residents and lower overall costs for the building owner.

Who can influence his energy consumption, will lower it.

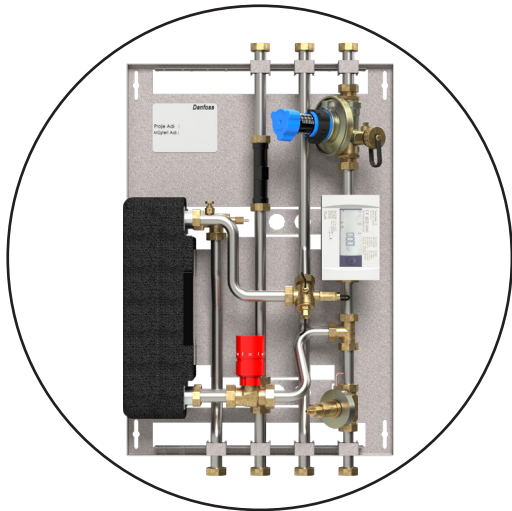
Studies was carried out in Denmark between 1991 and 2005. Energy consumption in apartments was compared before and after installing heat meters. The same residents proved to use between 15 and 30% less heating energy.



Decentralized heating systems in new buildings and renovation projects offer many benefits for building 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.



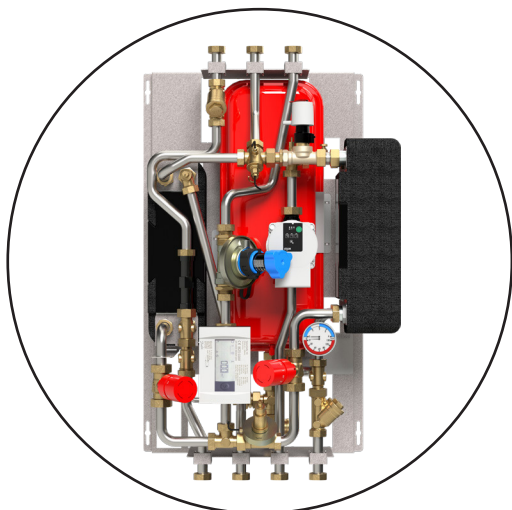
Thermostatic heating stations - Radiator

Space saving flat stations for space heating with radiator and with a high performance heat exchanger for the production of domestic hot water when needed.



Thermostatic heating stations - Floor heating

Space saving flat stations for space heating via underfloor heating with precise control of flow temperatures in the floor. Furthermore, equipped with a high performance heat exchanger for the production of domestic hot water when needed.



Indirect heating stations - Floor heating

Space saving flat stations for space heating via underfloor heating with precise control of flow temperatures in the floor. Is particularly suitable for heating units such as heat pumps, as a high-performance heat exchanger transfers the heat from the heat source to the underfloor heating. Furthermore, equipped with another high performance heat exchanger for the production of domestic hot water when needed.

Away from traditional vertical distribution..

Traditionally, apartments are heated via central heating systems with a central heat source for space heating and a central tank for hot domestic water.

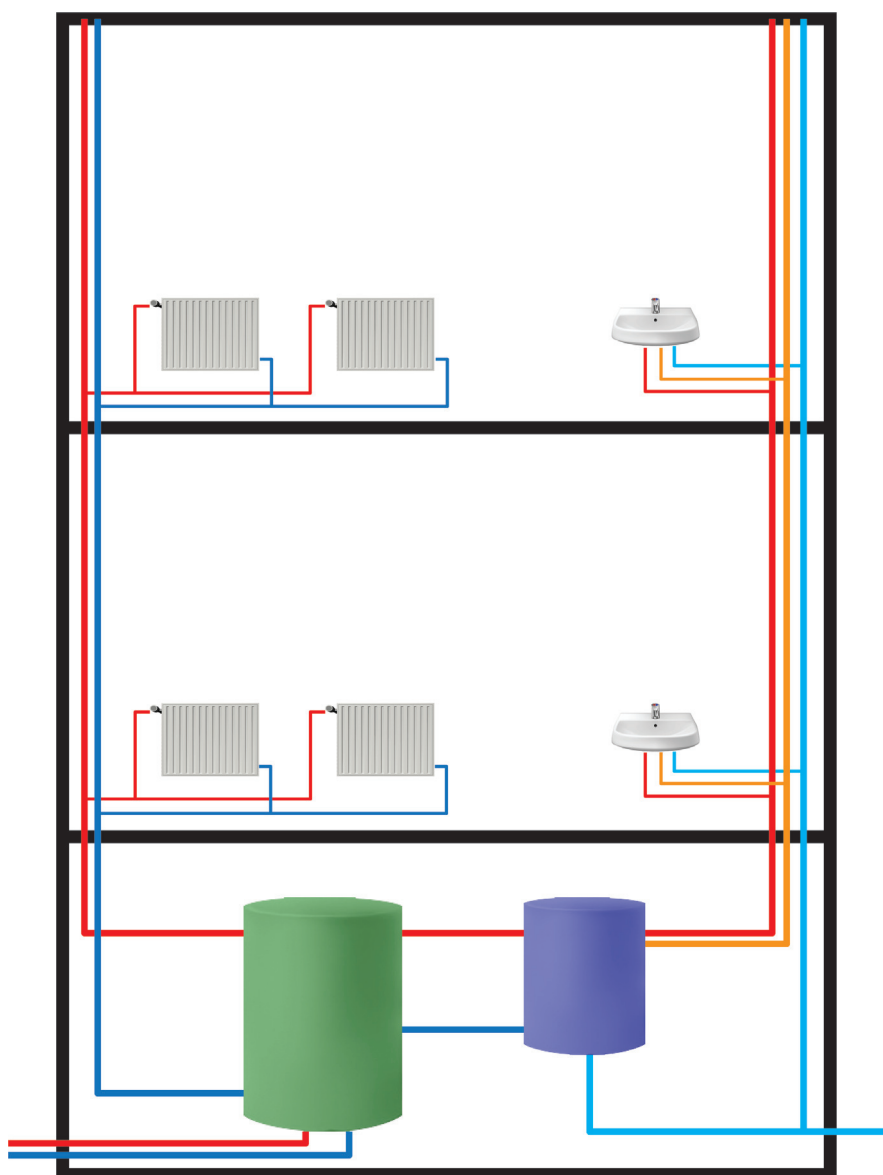
A network of pipes supplies heat to every radiator in the building and hot domestic water and cold drinking water to every tap.

The supply and return requires 5 lines that must be routed around the building.

Normally there is no individual consumption settlement, which does not motivate tenants to save on heat consumption, both space heating and domestic hot water.

There is a bigger risk of legionella spreading, as the domestic hot water is stored in a large tank, so regular legionella treatment in the central hot water tank is important.

With a standard system, you get a large heat loss as the heat is carried in two lines, at the same time with recirculation of the hot domestic water to ensure a good supply.



...to modern horizontal solutions

DAF flat station 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.

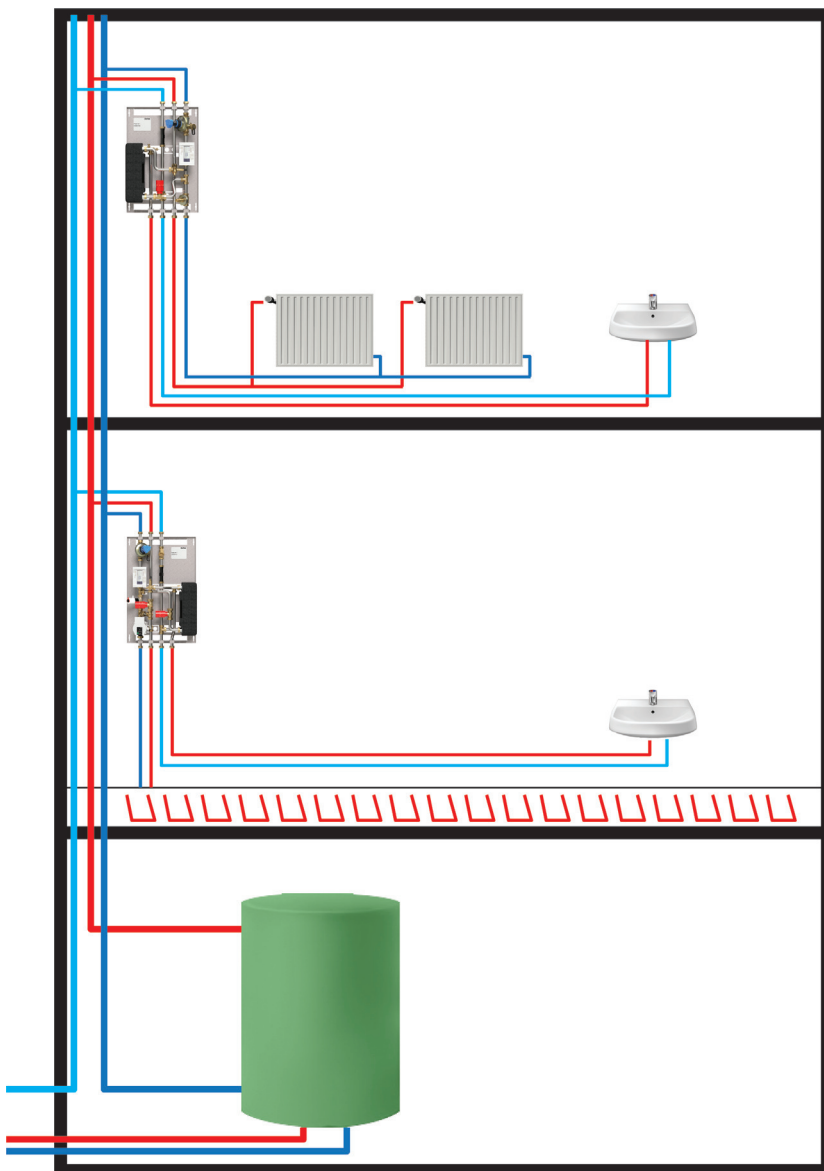
Flat stations contain a compact heat exchanger with a pressure-controlled proportional volume regulator and a differential pressure controller. The heat exchanger delivers DHW immediately if required.

DAF flat stations 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.

What are the benefits with DAF flat stations:

- Only 3 lines instead of 5 lines, leads to lower heat loss
- No heat loss due to circulation of DHW
- Lowest return temperatures, leads to better operation of central heating source
- Energy savings through transparency tenants who know their consumption level are more energy-conscious
- Low risk of legionella
- Easier and safer installation
- Less service and therefore less service costs



Direct heating stations - Radiator

- Used for heating of the domestic hot water and balancing the heating of the apartments in the houses that are heated by a central heating source
- In thermostatically controlled heating stations, the thermostat is controlled depending on the temperature. The unit works primarily for domestic hot water, and the heating is partially maintained
- Minimal operation losses thanks to the fast response times of the thermostatic valve
- Low heat loss with standard EPP heat exchanger and good pipe insulation
- Compact size that is easy and quick to install
- Low investment costs
- It has excellent strength with AISI 316 stainless steel heat exchanger and tubes, protected against corrosion

Specifications - thermostatically controlled flat stations

Max working pressure	16 bar
Max operating temperature	90 °C
Min water pressure	0.5 bar
DCW static pressure	P _{min} 1.5 bar
Pipes	Stainless steel
Valves and fittings	Brass
Connection size	3/4" G internal
Electrical connection	230V 50/60 Hz
HEX brazing material	Copper
HEX insulation	EPP λ 36 mW.m ⁻¹ .K ⁻¹

DTR

DHW		Heat center							
Heat transfer capacity (kW)	Temperature (°C)	65 °C Primary				80 °C Primary			
		Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]	Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]
35	45	14.41	65/24.1	742.80	17.85	13.58	80/19.7	475.80	8.00
	50	11.90	65/27.5	763.80	18.99	11.90	80/21.9	494.40	8.50
50	45	20.58	65/23.8	1054.20	29.31	20.58	80/19.8	722.40	14.35
	50	18.02	65/27.6	1162.20	35.52	18.02	80/22.1	750.60	15.31
65	45	26.76	65/23.2	1351.80	44.21	26.76	80/19.4	931.80	21.54
	50	-	-	-	-	23.43	80/21.5	967.20	23.10

DTR with ASV-PV

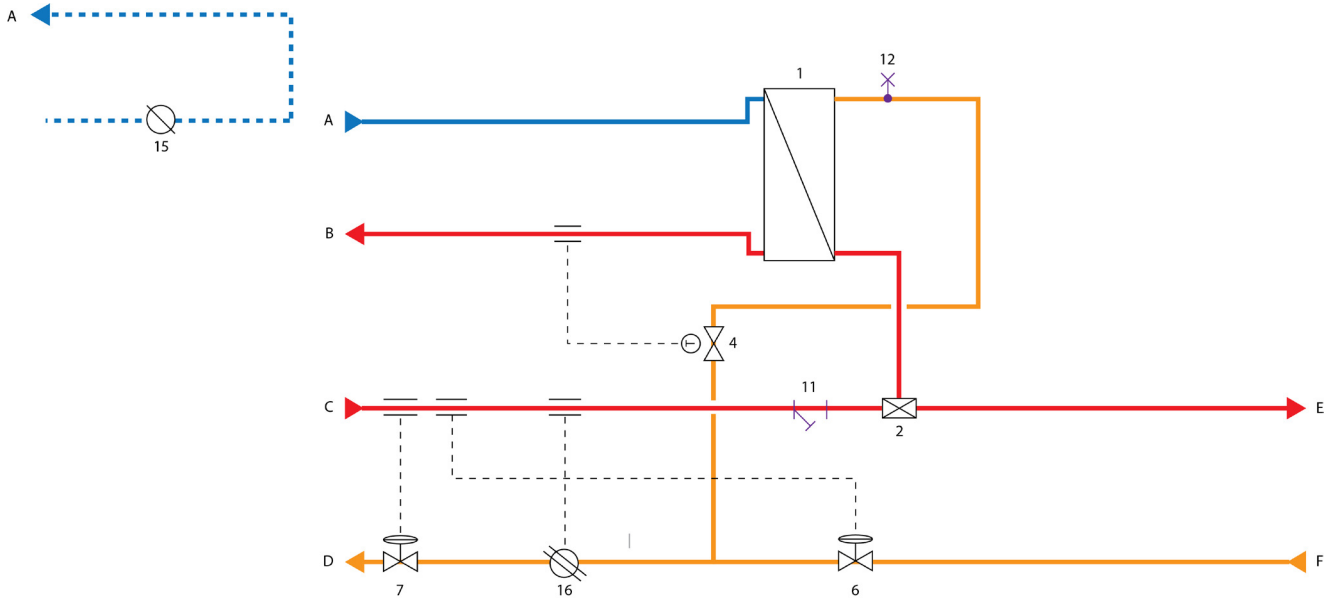
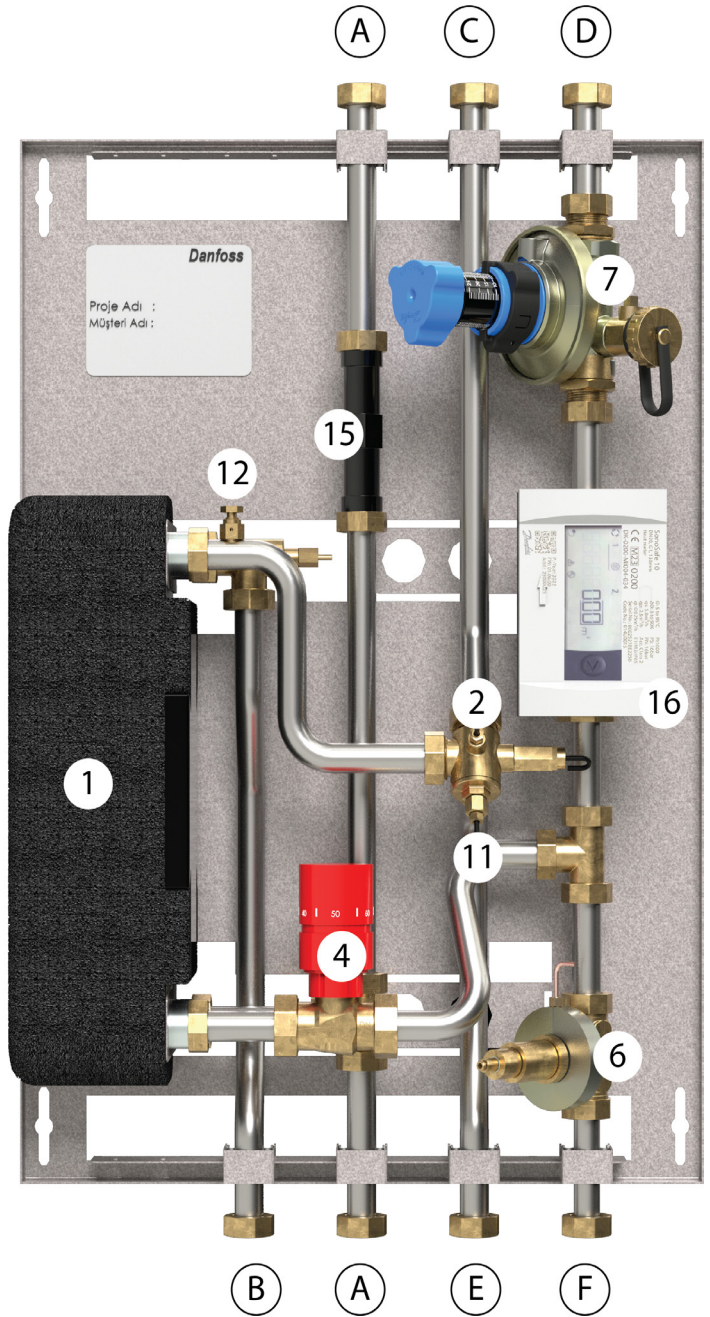
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	50	-	-	-	-	23.43	80/21.5	967.20	29.53

Calculate the size of the heat exchanger on page 32

1. Heat exchanger DHW
2. 3-way valve
4. Thermostatic controller
6. Differential pressure regulator
7. ASV-PV (Optional)
11. Strainer
12. Air vent
15. Water meter (Optional)
16. Consumption meter (Optional)

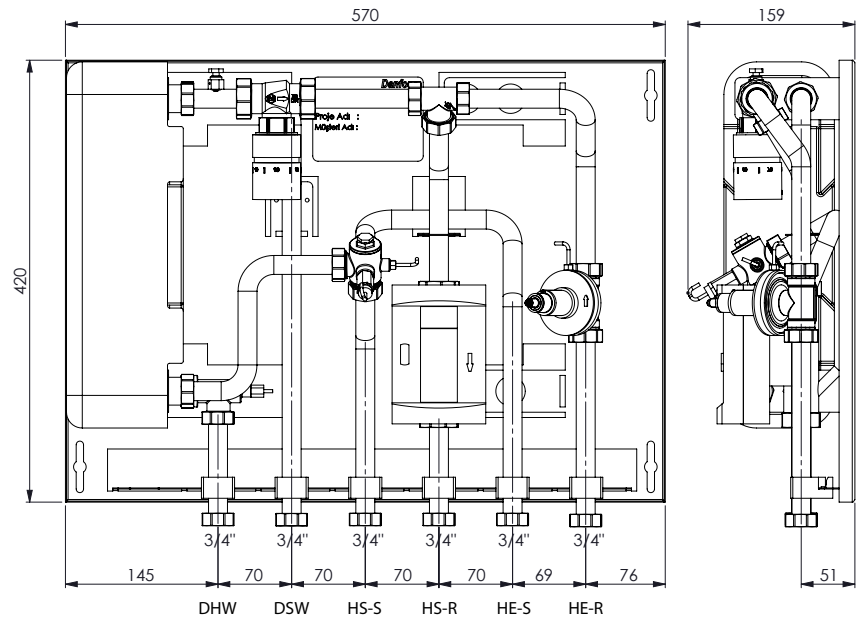
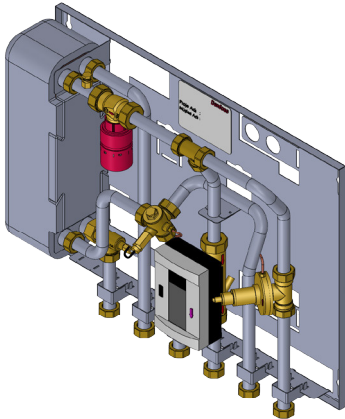
Connections:

- A. Domestic cold water (DCW)
- B. Domestic hot water (DHW)
- C. Heat source supply (HS-S)
- D. Heat source return (HS-R)
- E. Heating supply (HE-S)
- F. Heating return (HE-R)



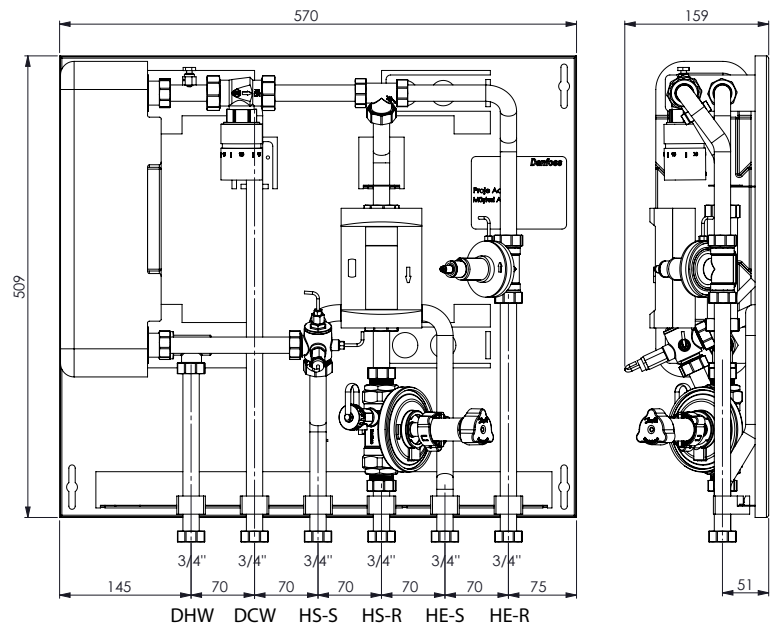
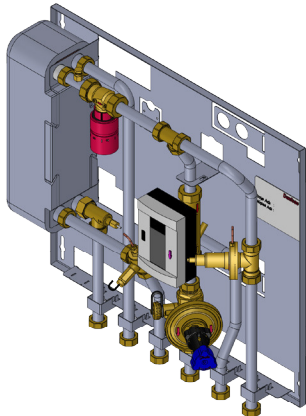
DTR-61 L

267B1129 - DTR-61 35 kW L
 267B1131 - DTR-61 50 kW L
 267B1132 - DTR-61 65 kW L
 The energy meter is optional



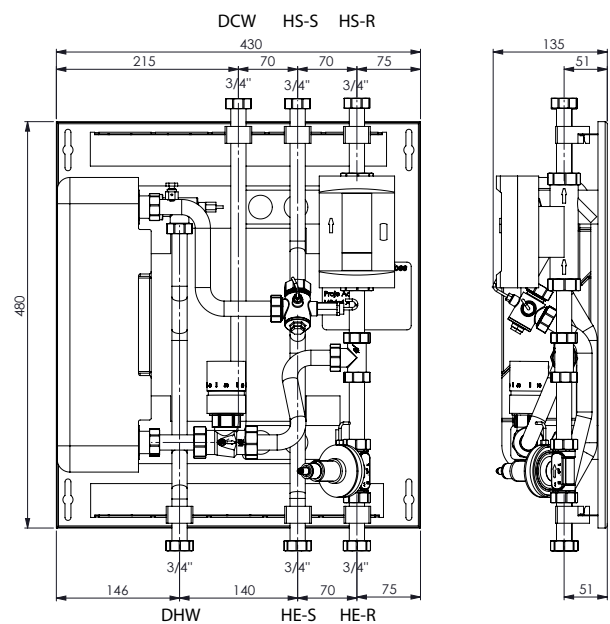
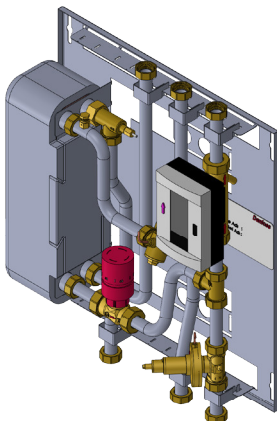
DTR-61 L ASV-PV

267B1456 - DTR-61 35 kW L ASV-PV
 267B1457 - DTR-61 50 kW L ASV-PV
 267B1458 - DTR-61 65 kW L ASV-PV
 The energy meter is optional



DTR-62 L

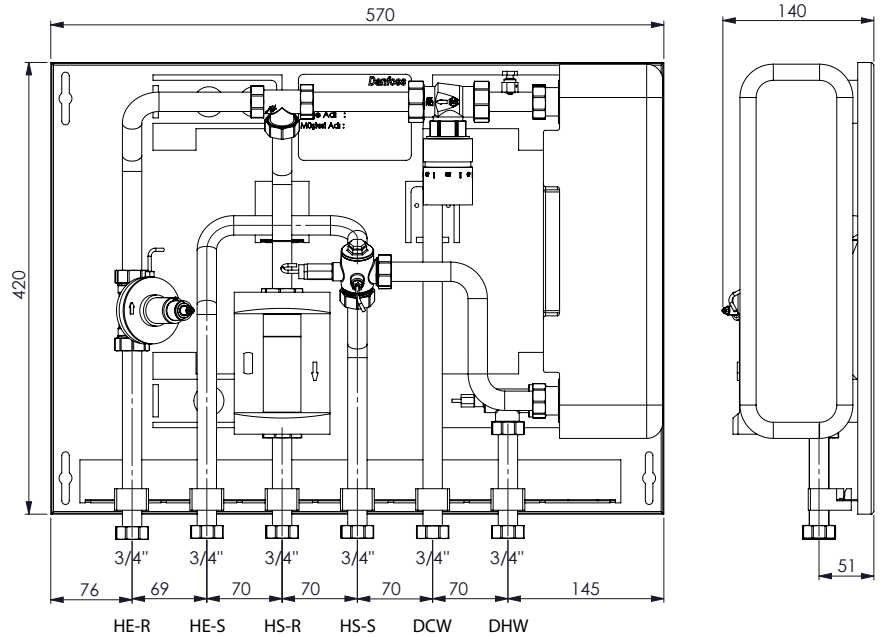
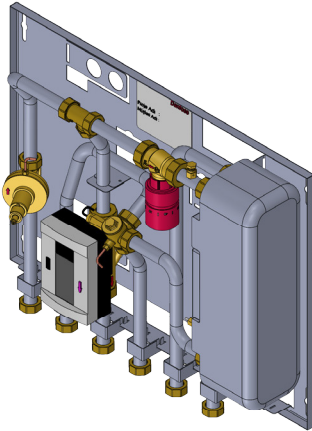
267B1134 - DTR-62 35 kW L
 267B1136 - DTR-62 50 kW L
 267B1138 - DTR-62 65 kW L
 The energy meter is optional



DTR-61 R

267B1128 - DTR-61 35 kW R
 267B1130 - DTR-61 50 kW R
 267B1133 - DTR-61 65 kW R

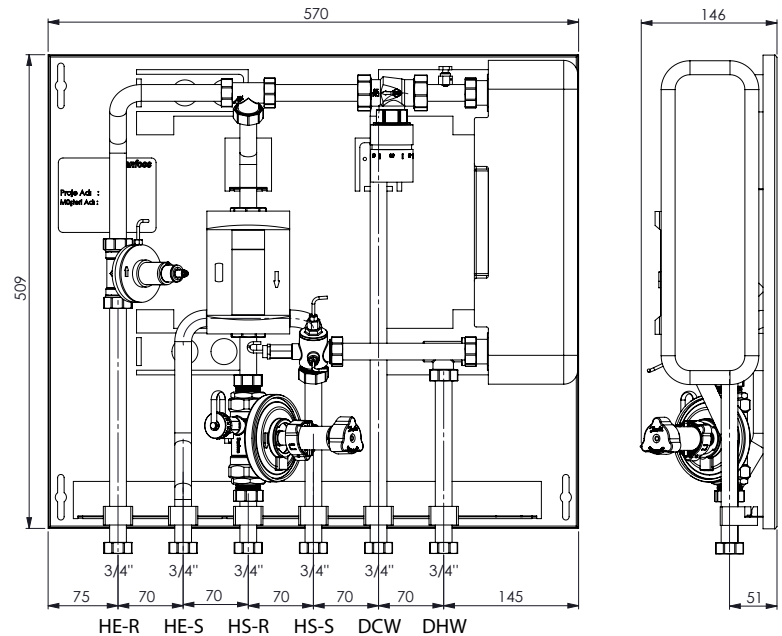
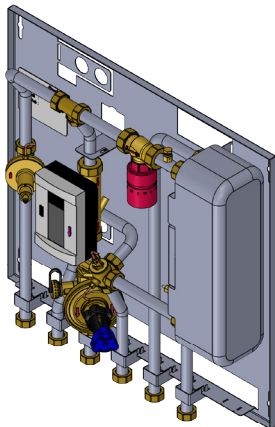
The energy meter is optional



DTR-61 R ASV-PV

267B1420 - DTR-61 35 kW R ASV-PV
 267B1421 - DTR-61 50 kW R ASV-PV
 267B1422 - DTR-61 65 kW R ASV-PV

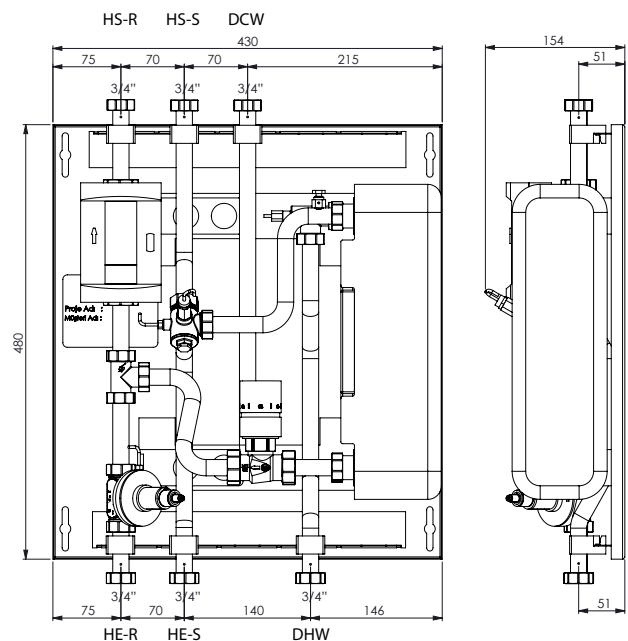
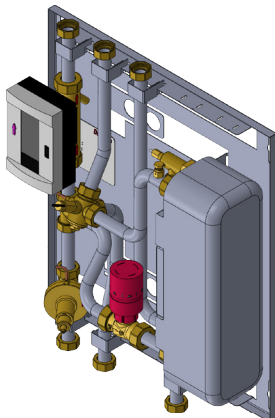
The energy meter is optional



DTR-62 R

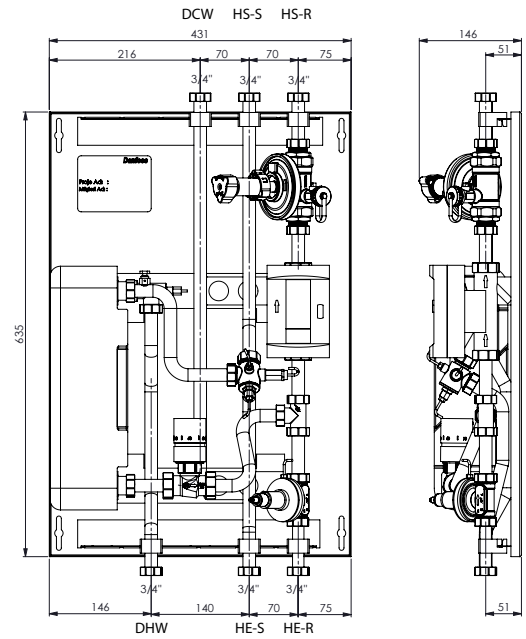
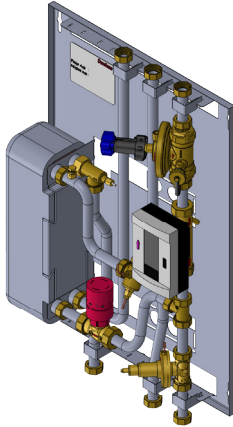
267B1135 - DTR-62 35 kW R
 267B1137 - DTR-62 50 kW R
 267B1139 - DTR-62 65 kW R

The energy meter is optional



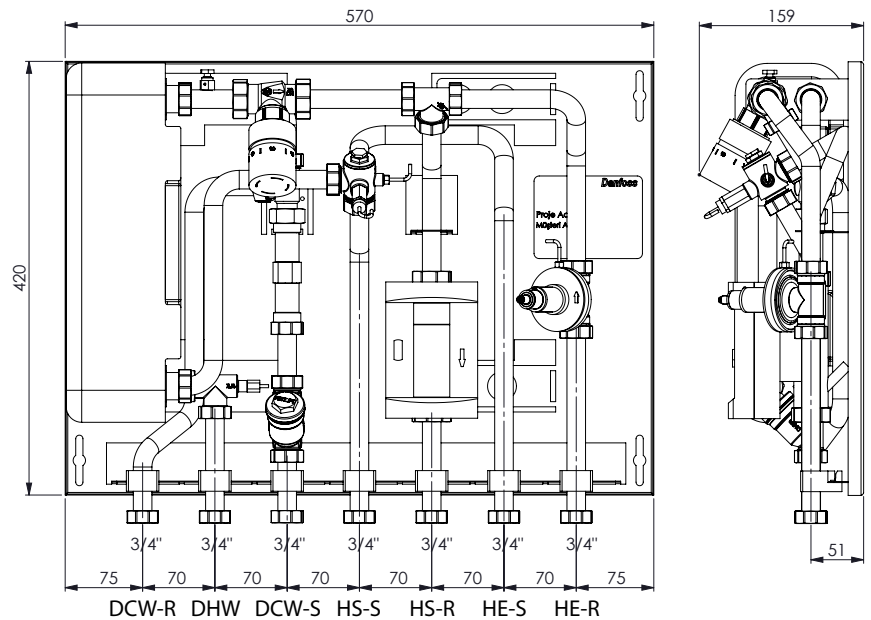
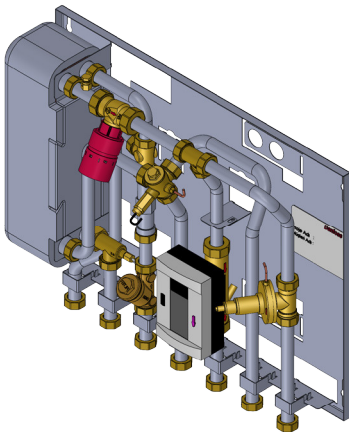
DTR-62 L ASV-PV

267B1462 - DTR-62 35 kW L ASV-PV
 267B1463 - DTR-62 50 kW L ASV-PV
 267B1464 - DTR-62 65 kW L ASV-PV
 The energy meter is optional



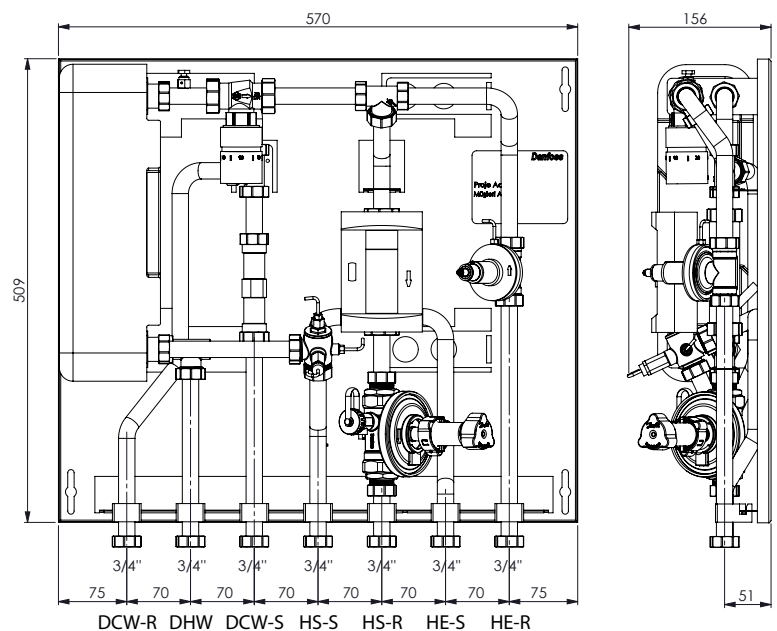
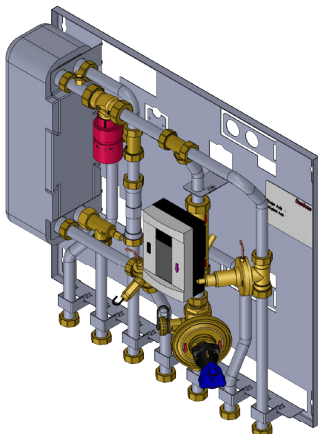
DTR-71 L

267B1140 - DTR-71 35 kW L
 267B1143 - DTR-71 50 kW L
 267B1145 - DTR-71 65 kW L
 The energy meter is optional



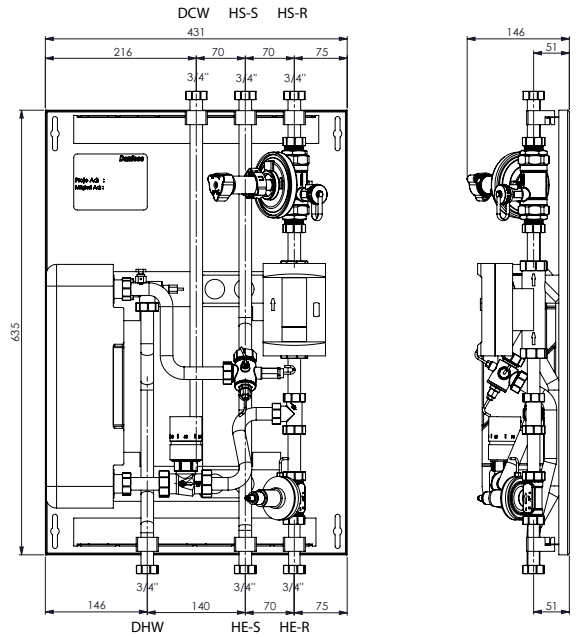
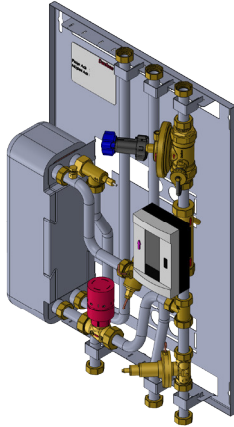
DTR-71 L ASV-PV

267B1459 - DTR-71 35 kW L ASV-PV
 267B1460 - DTR-71 50 kW L ASV-PV
 267B1461 - DTR-71 65 kW L ASV-PV
 The energy meter is optional



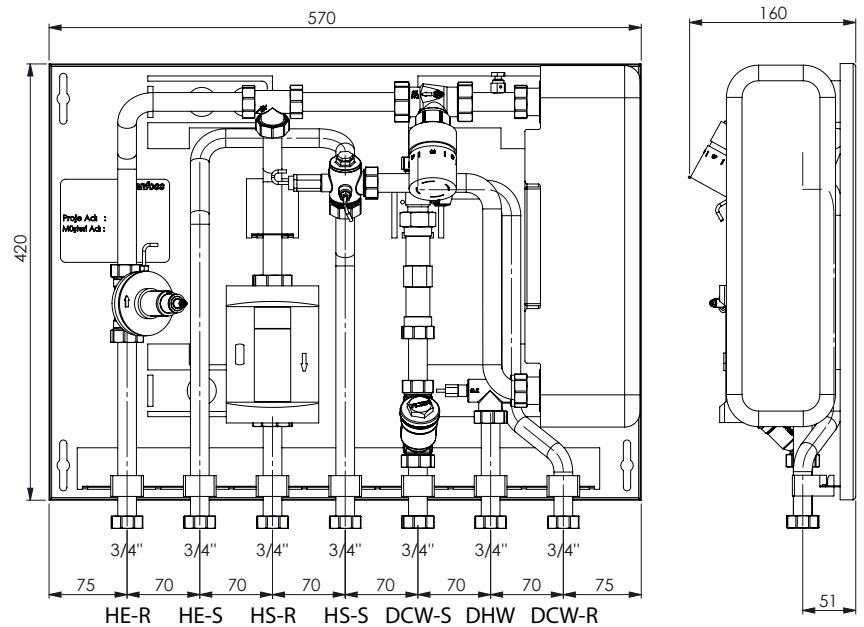
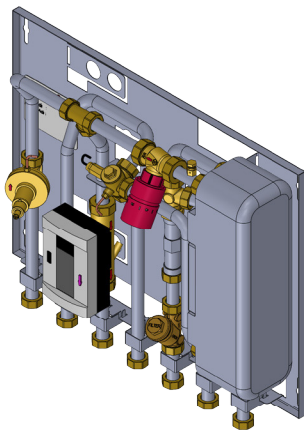
DTR-62 R ASV-PV

267B1426 - DTR-62 35 kW R ASV-PV
 267B1427 - DTR-62 50 kW R ASV-PV
 267B1428 - DTR-62 65 kW R ASV-PV
 The energy meter is optional



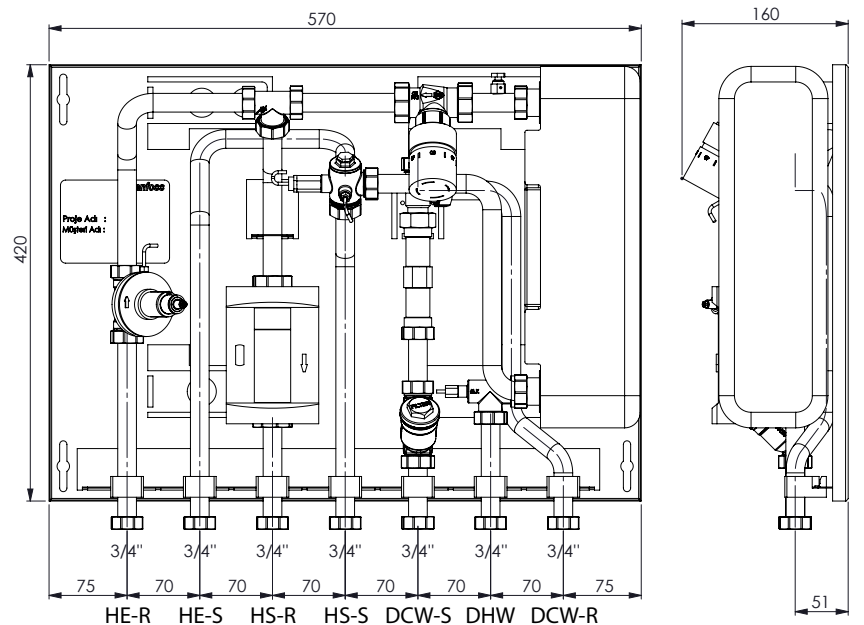
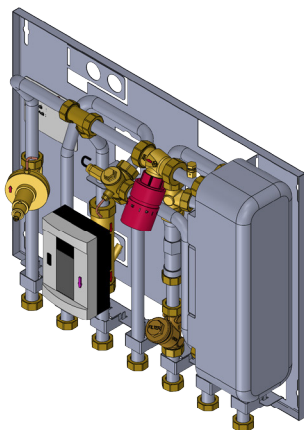
DTR-71 R

267B1141 - DTR-71 35 kW R
 267B1142 - DTR-71 50 kW R
 267B1144 - DTR-71 65 kW R
 The energy meter is optional



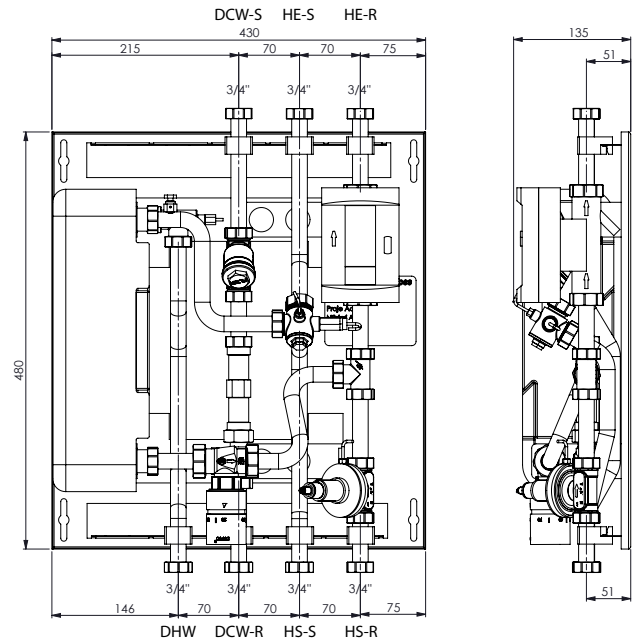
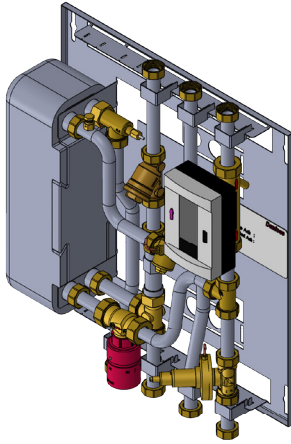
DTR-71 R ASV-PV

267B1423 - DTR-71 35 kW R ASV-PV
 267B1424 - DTR-71 50 kW R ASV-PV
 267B1425 - DTR-71 65 kW R ASV-PV
 The energy meter is optional



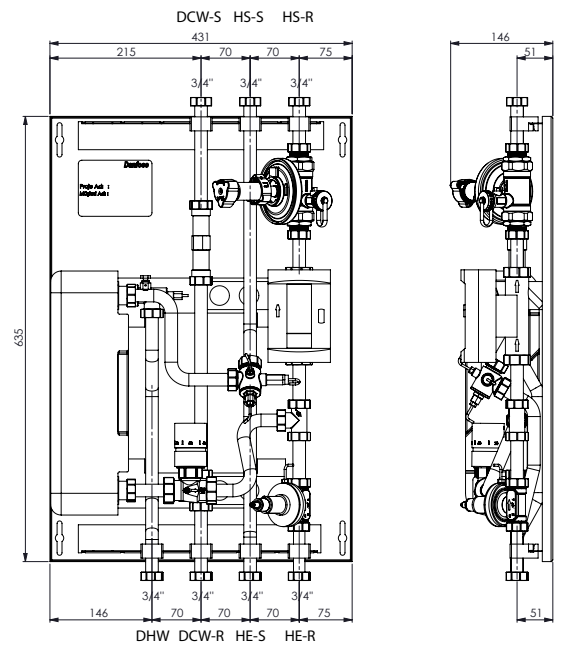
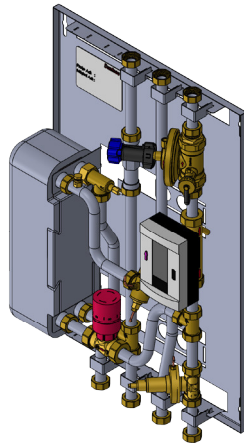
DTR-72 L

267B1146 - DTR-72 35 kW L
 267B1149 - DTR-72 50 kW L
 267B1151 - DTR-72 65 kW L
 The energy meter is optional



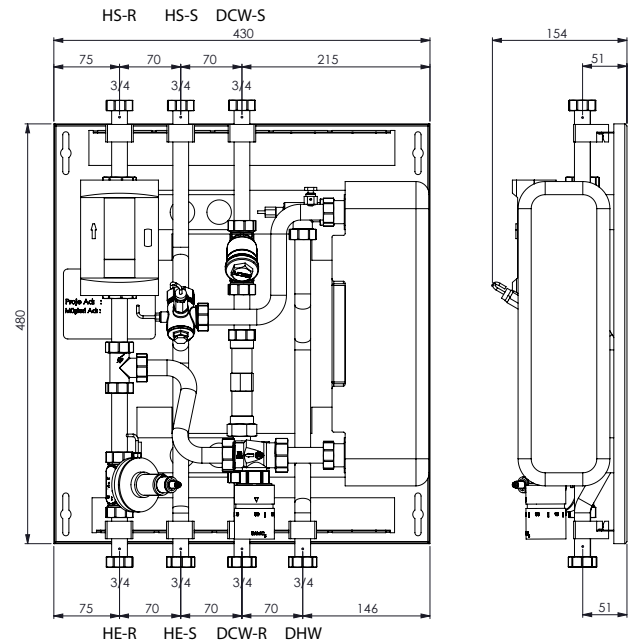
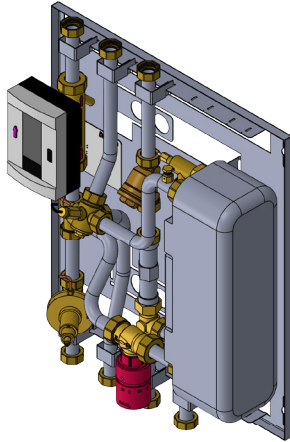
DTR-72 L ASV-PV

267B1465 - DTR-72 35 kW L ASV-PV
 267B1466 - DTR-72 50 kW L ASV-PV
 267B1467 - DTR-72 65 kW L ASV-PV
 The energy meter is optional



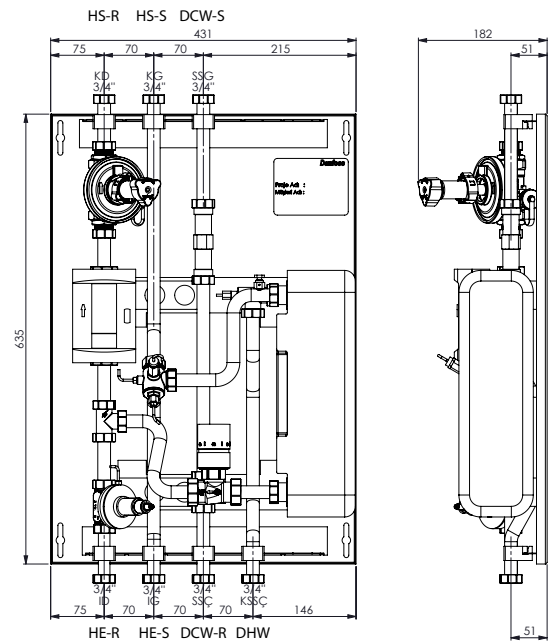
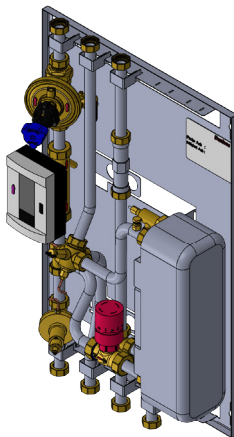
DTR-72 R

267B1147 - DTR-72 35 kW R
 267B1148 - DTR-72 50 kW R
 267B1150 - DTR-72 65 kW R
 The energy meter is optional



DTR-72 R ASV-PV

267B1429 - DTR-72 35 kW R ASV-PV
 267B1430 - DTR-72 50 kW R ASV-PV
 267B1431 - DTR-72 65 kW R ASV-PV
 The energy meter is optional



Thermostatic heating stations - Floor

- For producing domestic hot water as well as mixing and controlling underfloor heating in houses that are heated by a central heating source
- Good regulation and supply of underfloor heating systems
- Optimal solution in combination with high efficient heat pumps with low temperature operation
- The domestic hot water temperature can be precisely adjusted thank to the specially designed mixing circuit
- The mixing circuit is equipped with a two-way valve that prevents efficiency reduction at high capacities
- Is extremely practical and easy to install because of its compact size
- Low investments costs
- It has excellent resistance with AISI 316 stainless steel heat exchanger and tubes, protected against corrosion

Specifications - thermostatically controlled flat stations

Max working pressure	16 bar
Max operating temperature	90 °C
Min water pressure	0.5 bar
DCW static pressure	P _{min} 1.5 bar
Pipes	Stainless steel
Valves and fittings	Brass
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Electrical connection	230V 50/60 Hz
HEX brazing material	Copper
HEX insulation	EPP λ 36 mW.m ⁻¹ .K ⁻¹

DFH

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DFH with ASV-PV

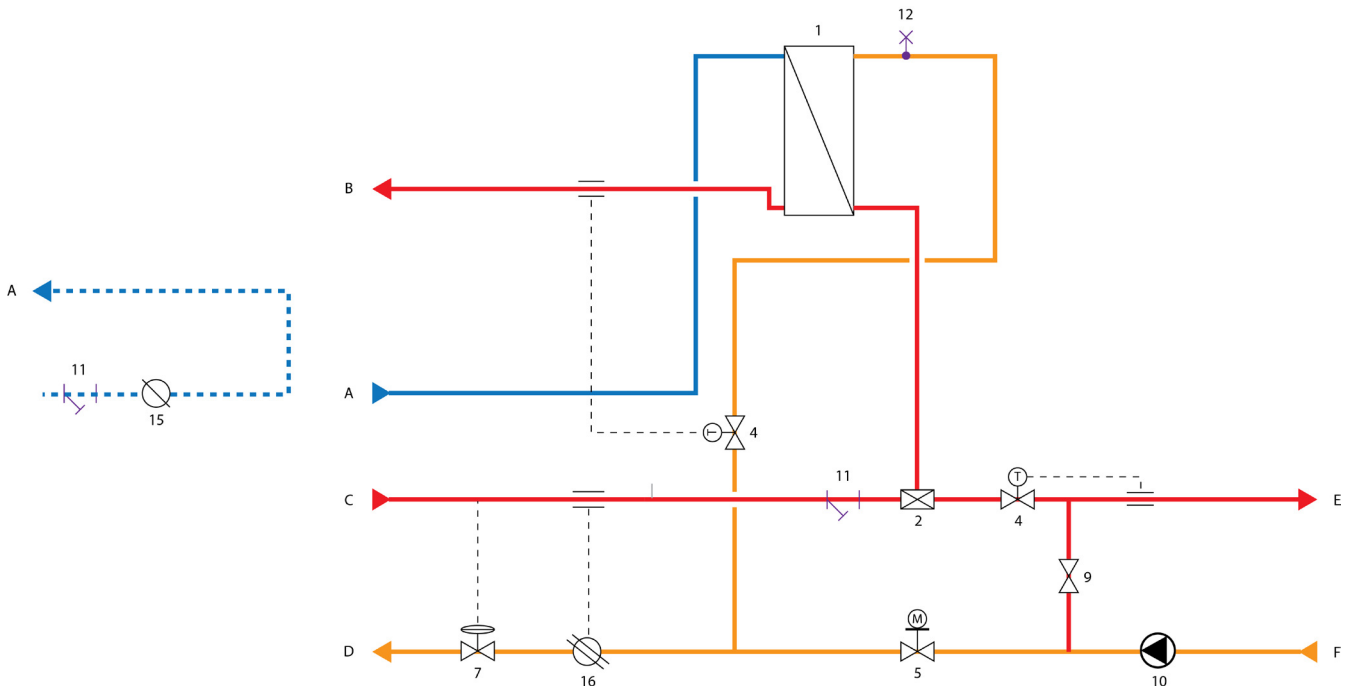
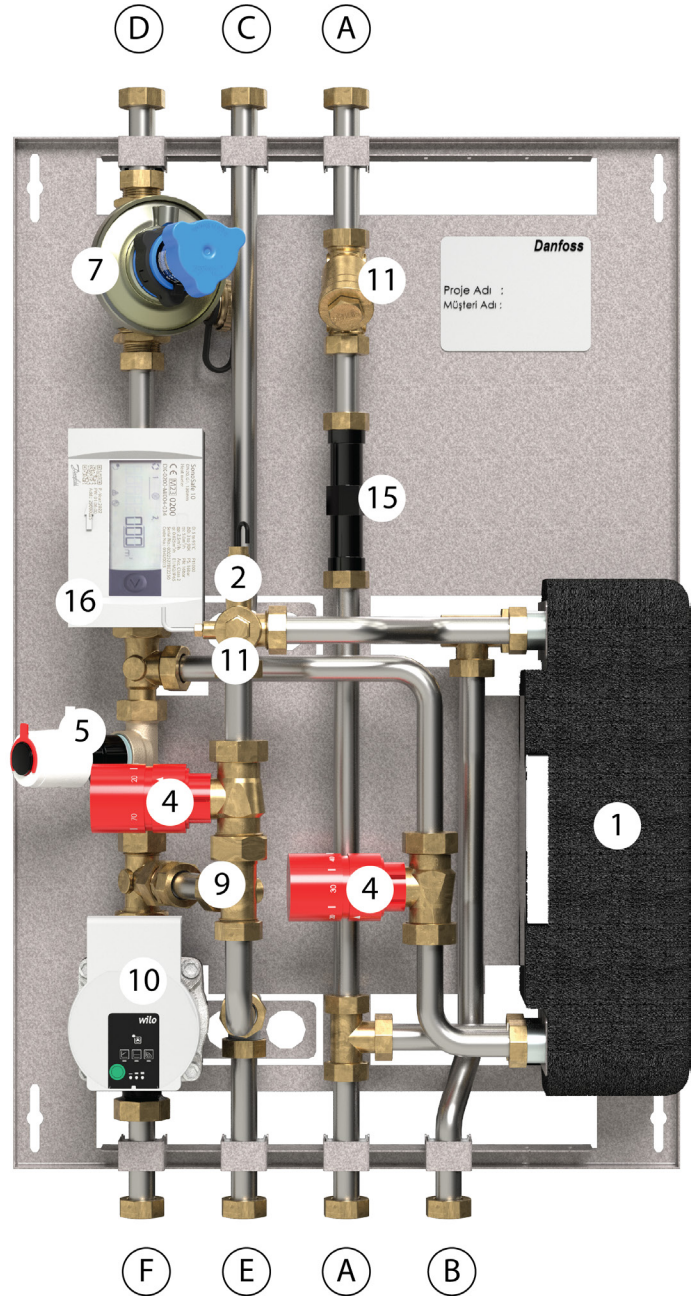
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Calculate the size of the heat exchanger on page 32

1. Heat exchanger DHW
2. 3-way valve
4. Thermostatic controller
5. Zone valve
7. ASV-PV (Optional)
9. Check valve
10. Pump
11. Strainer
12. Air vent
15. Water meter (Optional)
16. Consumption meter (Optional)

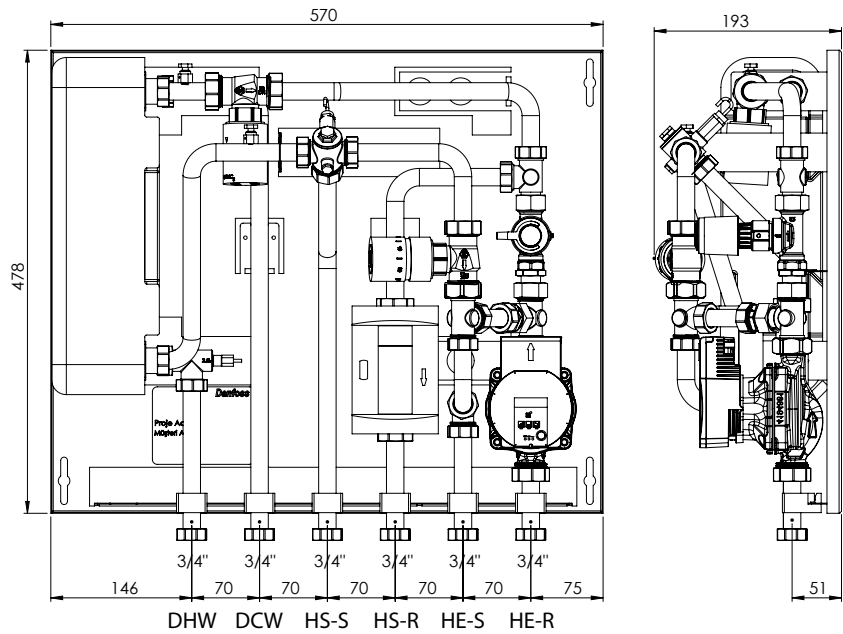
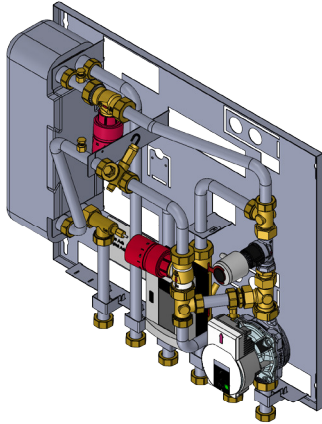
Connections:

- A. Domestic cold water (DCW)
- B. Domestic hot water (DHW)
- C. Heat source supply (HS-S)
- D. Heat source return (HS-R)
- E. Heating supply (HE-S)
- F. Heating return



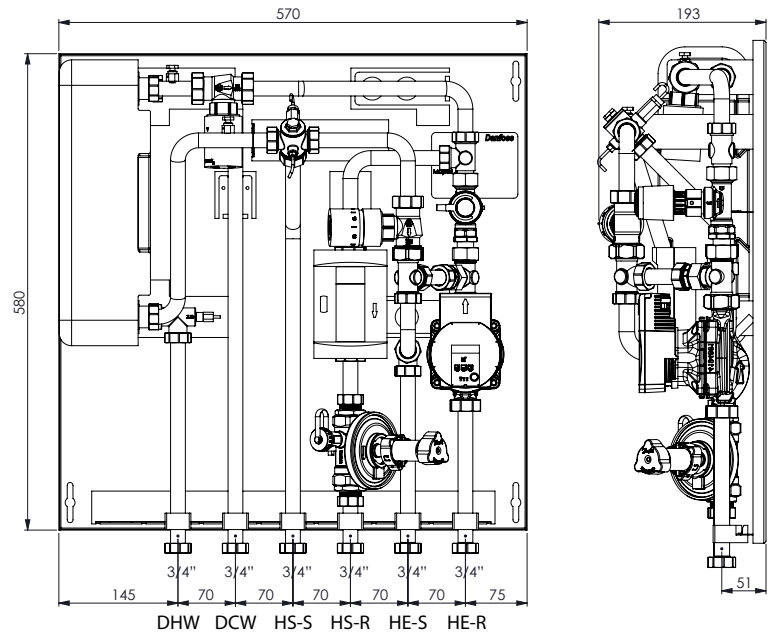
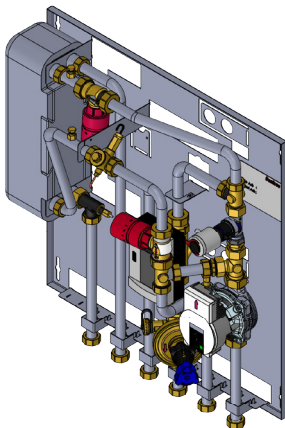
DFH-61 L

267B1152 - DFH-61 35 kW L
 267B1154 - DFH-61 50 kW L
 267B1156 - DFH-61 65 kW L
 The energy meter is optional



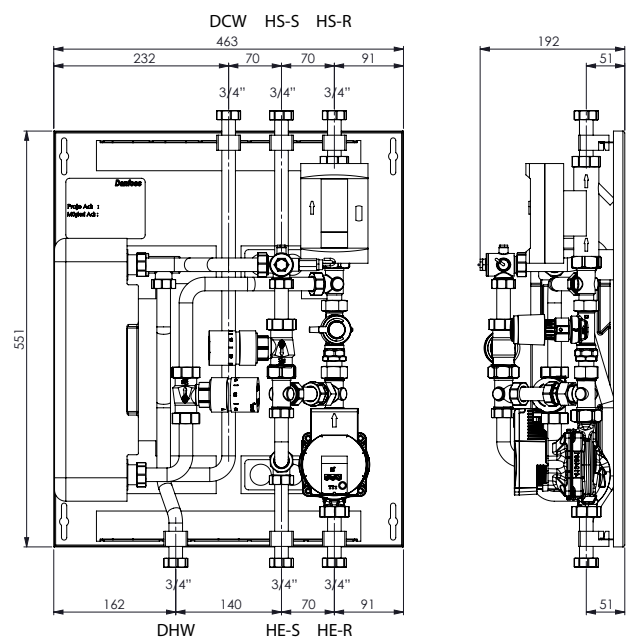
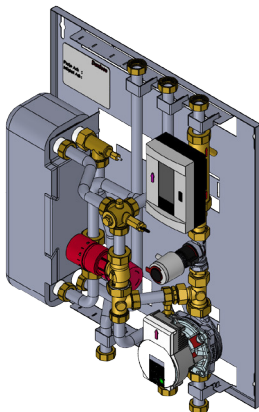
DFH-61 L ASV-PV

267B1468 - DFH-61 35 kW L ASV-PV
 267B1469 - DFH-61 50 kW L ASV-PV
 267B1470 - DFH-61 65 kW L ASV-PV
 The energy meter is optional



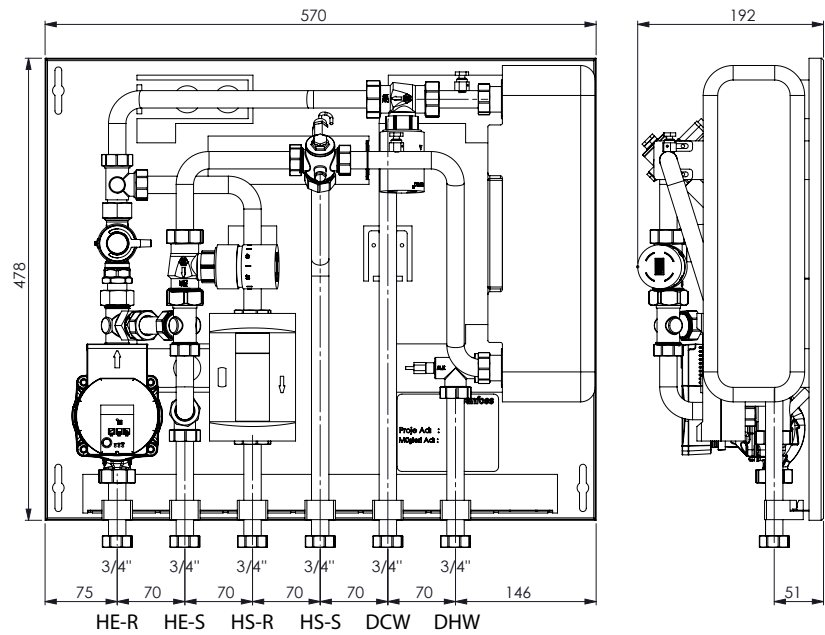
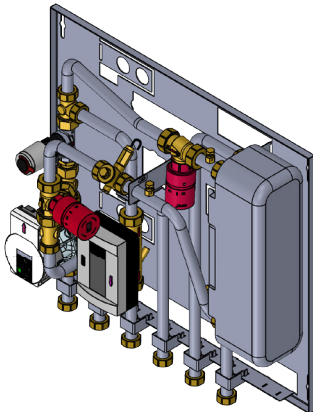
DFH-62 L

267B1158 - DFH-62 35 kW L
 267B1160 - DFH-62 50 kW L
 267B1162 - DFH-62 65 kW L
 The energy meter is optional



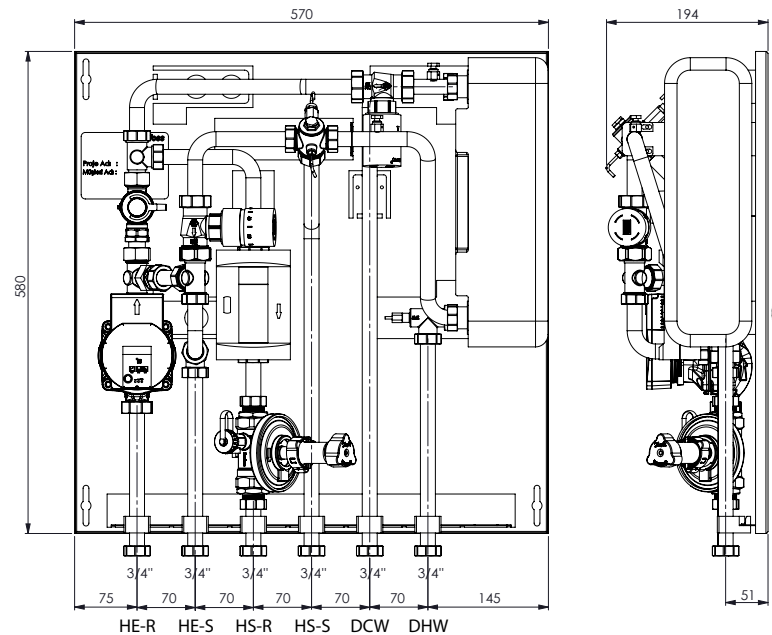
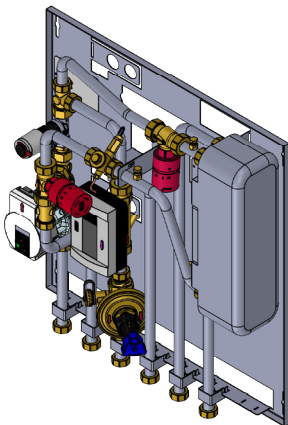
DFH-61 R

267B1153 - DFH-61 35 kW R
 267B1155 - DFH-61 50 kW R
 267B1157 - DFH-61 65 kW R
 The energy meter is optional



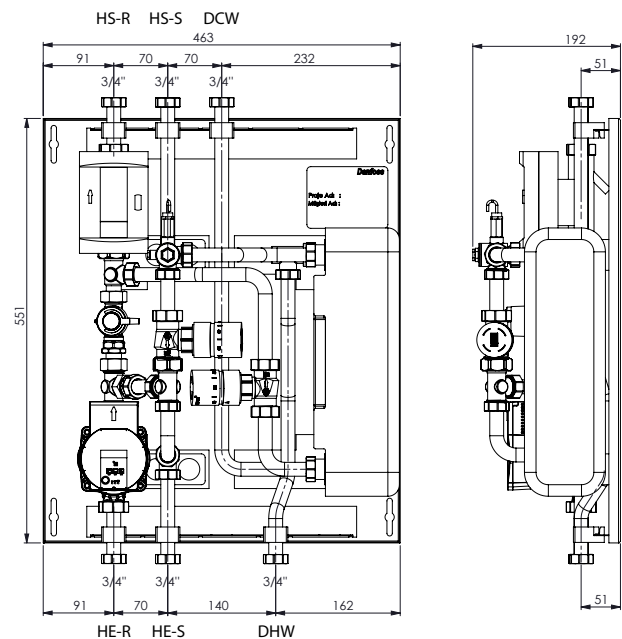
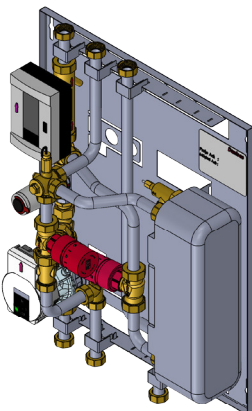
DFH-61 R ASV-PV

267B1432 - DFH-61 35 kW R ASV-PV
 267B1433 - DFH-61 50 kW R ASV-PV
 267B1434 - DFH-61 65 kW R ASV-PV
 The energy meter is optional



DFH-62 R

267B1159 - DFH-62 35 kW R
 267B1161 - DFH-62 50 kW R
 267B1163 - DFH-62 65 kW R
 The energy meter is optional



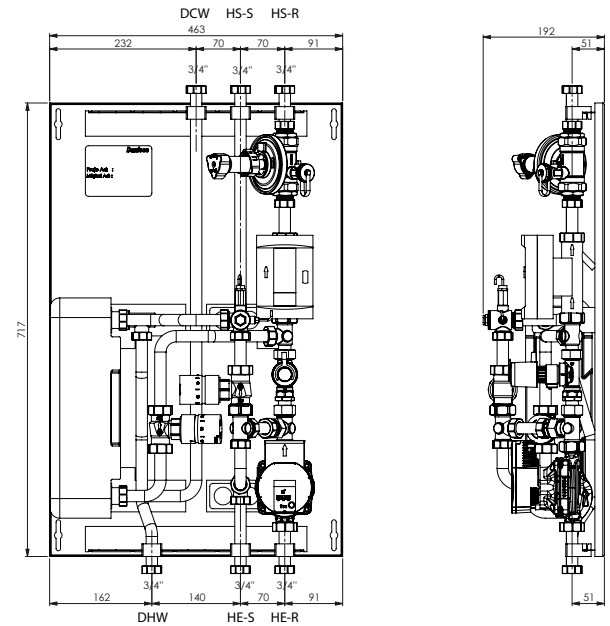
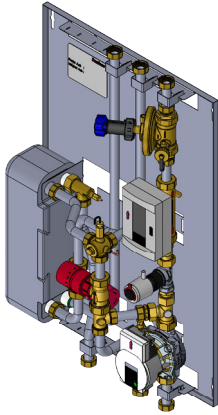
DFH-62 L ASV-PV

267B1474 - DFH-62 35 kW L ASV-PV

267B1475 - DFH-62 50 kW L ASV-PV

267B1476 - DFH-62 65 kW L ASV-PV

The energy meter is optional



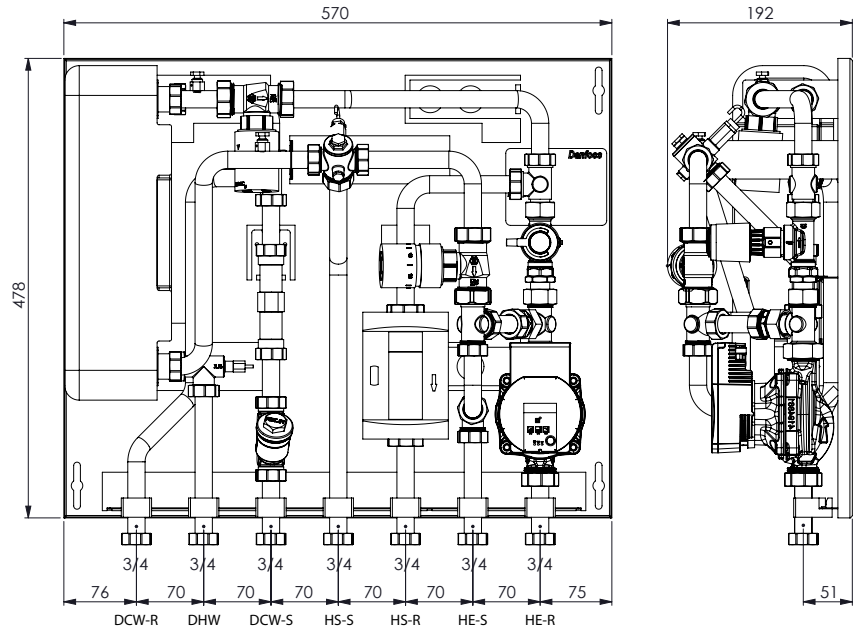
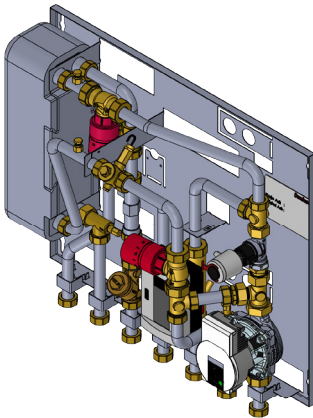
DFH-71 L

267B1164 - DFH-71 35 kW L

267B1167 - DFH-71 50 kW L

267B1169 - DFH-71 65 kW L

The energy meter is optional



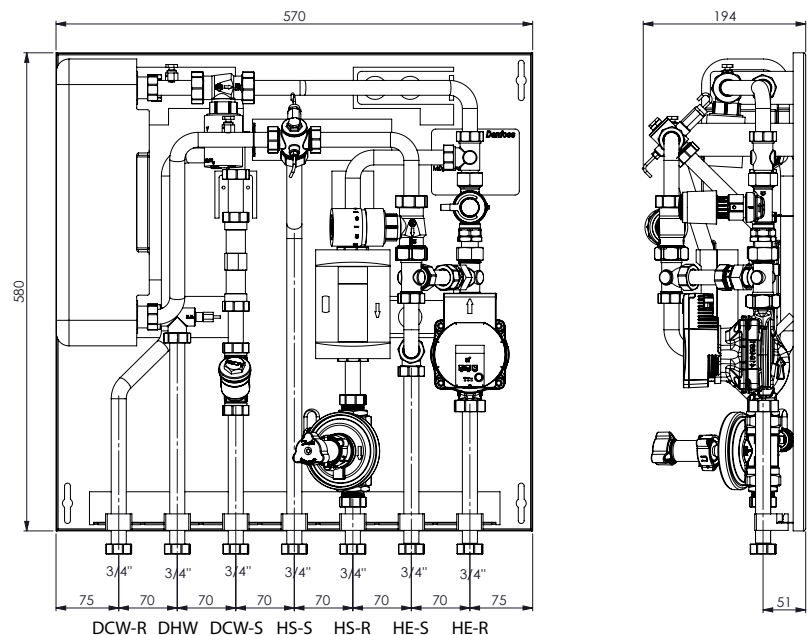
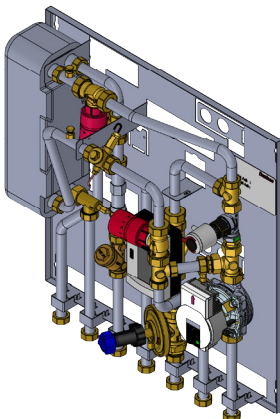
DFH-71 L ASV-PV

267B1471 - DFH-71 35 kW L ASV-PV

267B1472 - DFH-71 50 kW L ASV-PV

267B1473 - DFH-71 65 kW L ASV-PV

The energy meter is optional



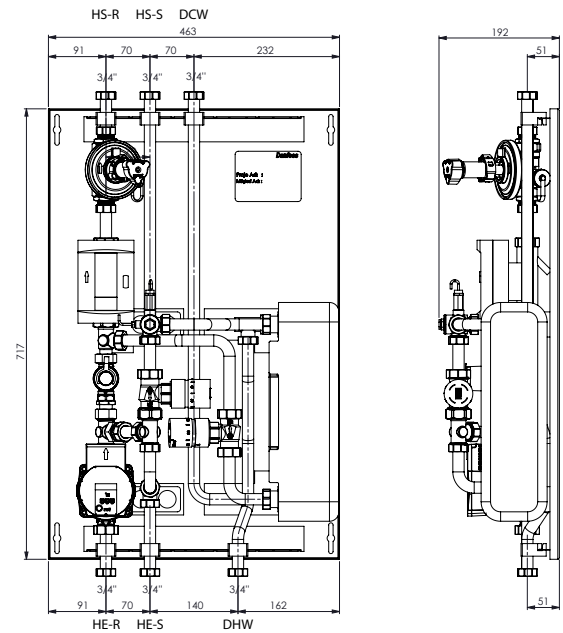
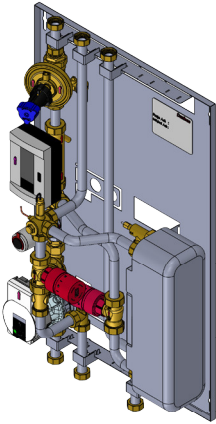
DFH-62 R ASV-PV

267B1438 - DFH-62 35 kW R ASV-PV

267B1439 - DFH-62 50 kW R ASV-PV

267B1440 - DFH-62 65 kW R ASV-PV

The energy meter is optional



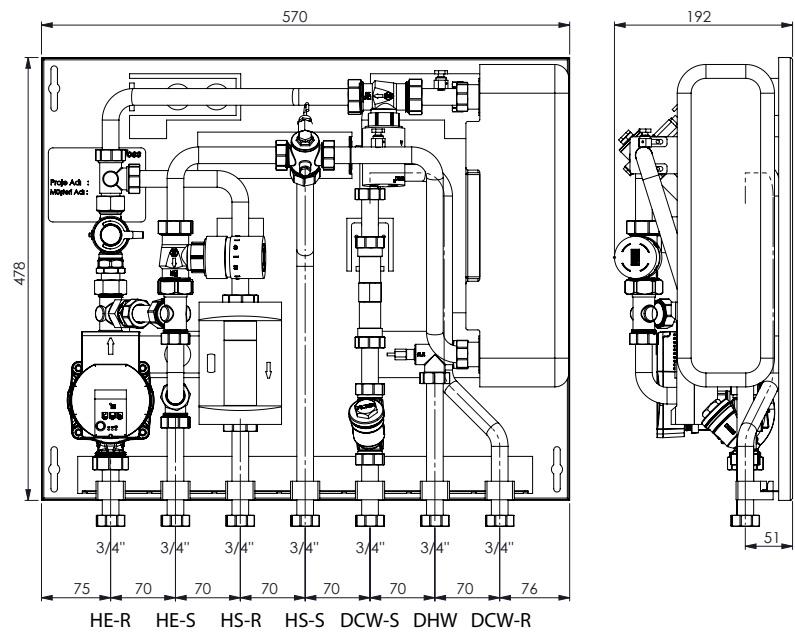
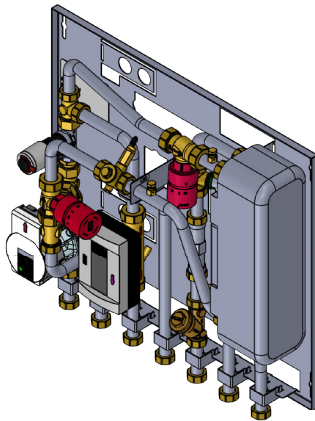
DFH-71 R

267B1165 - DFH-71 35 kW R

267B1166 - DFH-71 50 kW R

267B1168 - DFH-71 65 kW R

The energy meter is optional



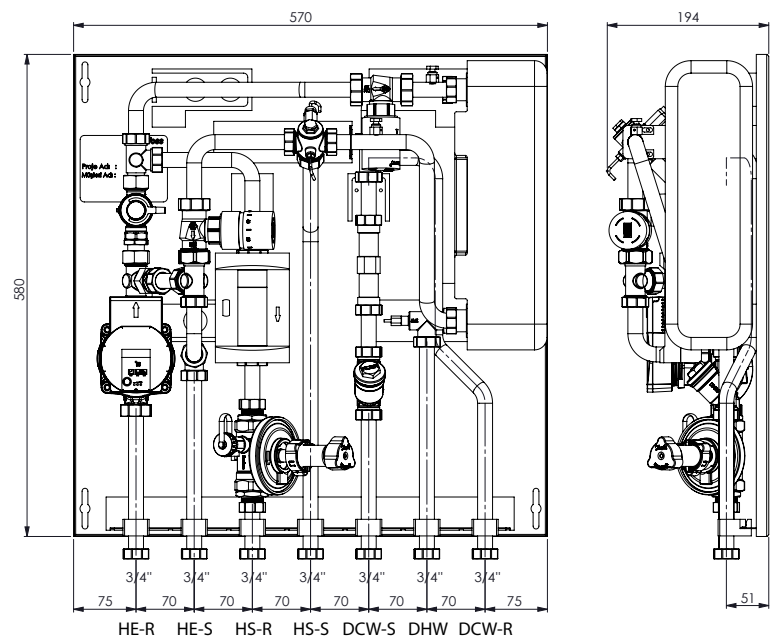
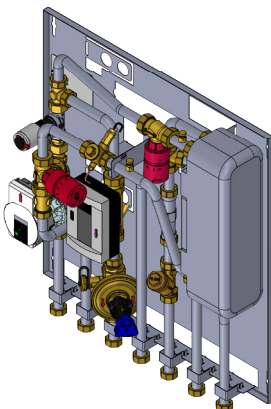
DFH-71 R ASV-PV

267B1435 - DFH-71 35 kW R ASV-PV

267B1436 - DFH-71 50 kW R ASV-PV

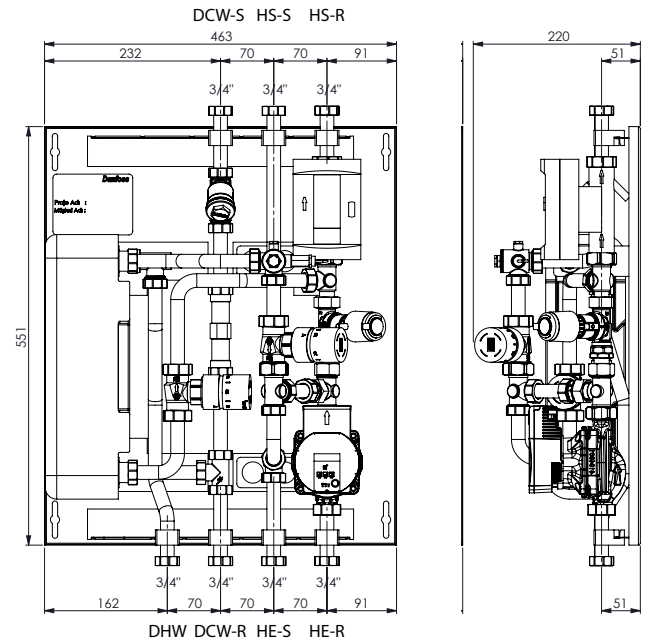
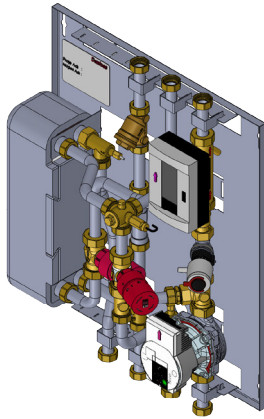
267B1437 - DFH-71 65 kW R ASV-PV

The energy meter is optional



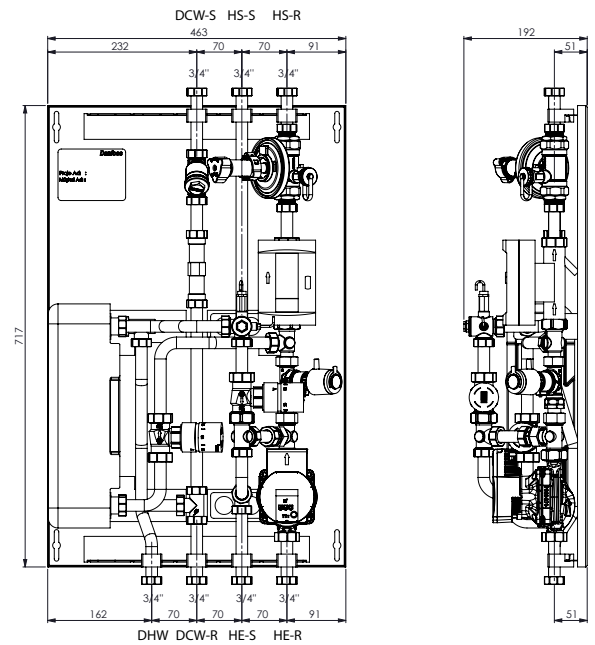
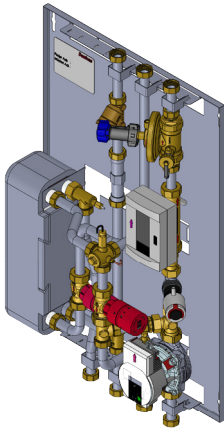
DFH-72 L

267B1170 - DFH-72 35 kW L
 267B1173 - DFH-72 50 kW L
 267B1175 - DFH-72 65 kW L
 The energy meter is optional



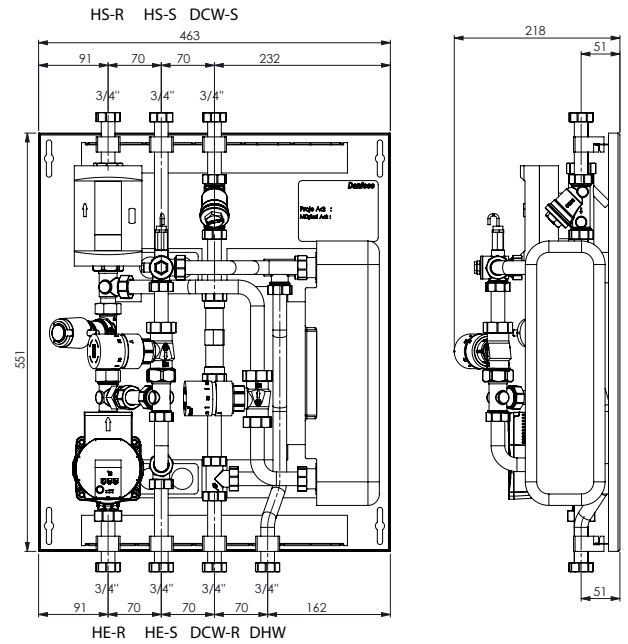
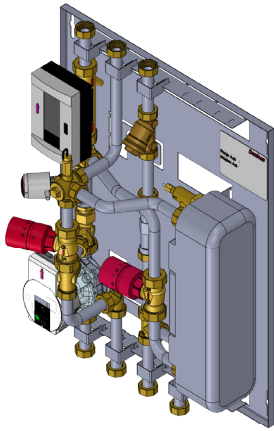
DFH-72 L ASV-PV

267B1477 - DFH-72 35 kW L ASV-PV
 267B1478 - DFH-72 50 kW L ASV-PV
 267B1479 - DFH-72 65 kW L ASV-PV
 The energy meter is optional



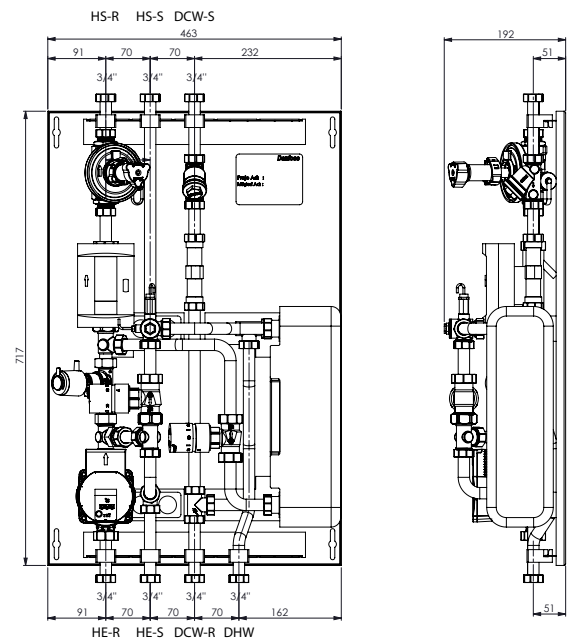
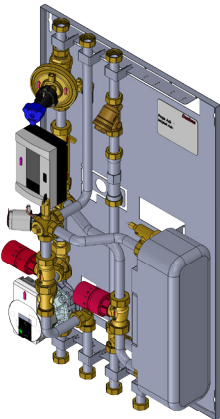
DFH-72 R

267B1171 - DFH-72 35 kW R
 267B1172 - DFH-72 50 kW R
 267B1174 - DFH-72 65 kW R
 The energy meter is optional



DFH-72 R ASV-PV

267B1441 - DFH-72 35 kW R ASV-PV
 267B1442 - DFH-72 50 kW R ASV-PV
 267B1443 - DFH-72 65 kW R ASV-PV
 The energy meter is optional



Indirect heating stations - Floor

- For producing domestic hot water and controlling underfloor heating in houses that are heated by a central heating source
- It functions as pressure relief in high-rise buildings and therefore there is no need to make zones in the heat supply system
- In addition to a heat exchanger for domestic hot water, it also has another heat exchanger for controlling space heating in a closed circuit
- External weather compensation can be made optionally
- An environmentally friendly solution with maximum energy efficiency
- Is extremely practical and easy to install because of its compact size
- Low investments costs
- It has excellent resistance with AISI 316 stainless steel heat exchanger and tubes, protected against corrosion

Specifications - thermostatically controlled flat stations

Max working pressure	16 bar
Max operating temperature	90 °C
Min water pressure	0.5 bar
DCW static pressure	P _{min} 1.5 bar
Pipes	Stainless steel
Valves and fittings	Brass
Connection size	3/4" G internal
Electrical connection	230V 50/60 Hz
HEX brazing material	Copper
HEX insulation	EPP λ 36 mW.m ⁻¹ .K ⁻¹

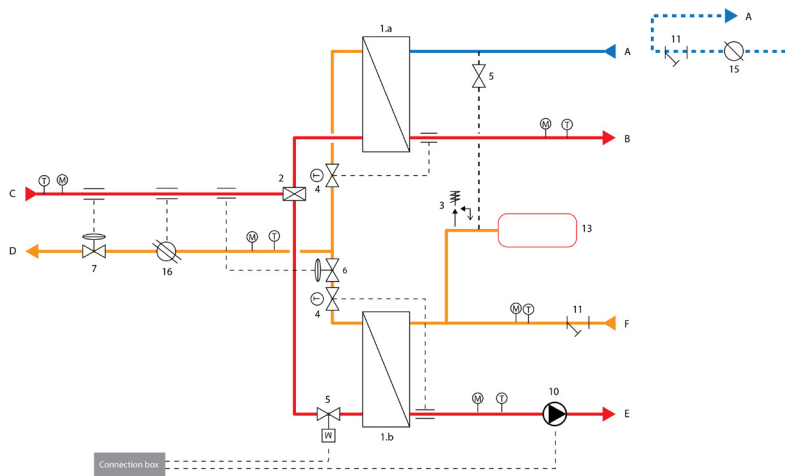
DTR - Domestic hot water

DHW		Heat center							
Heat transfer capacity (kW)	Temperature (°C)	65 °C Primary				80 °C Primary			
		Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]	Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]
35	45	14.41	65/24.1	742.80	17.85	13.58	80/19.7	475.80	8.00
	50	11.90	65/27.5	763.80	18.99	11.90	80/21.9	494.40	8.50
50	45	20.58	65/23.8	1054.20	29.31	20.58	80/19.8	722.40	14.35
	50	18.02	65/27.6	1162.20	35.52	18.02	80/22.1	750.60	15.31
65	45	26.76	65/23.2	1351.80	44.21	26.76	80/19.4	931.80	21.54
	50	-	-	-	-	23.43	80/21.5	967.20	23.10

DTR with ASV-PV - Domestic hot water

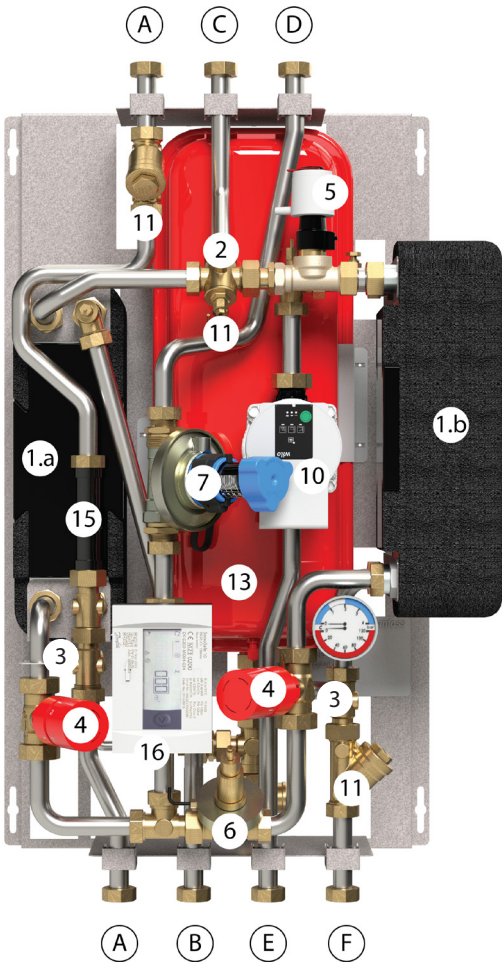
DHW		Heat center							
Heat transfer capacity (kW)	Temperature (°C)	65 °C Primary				80 °C Primary			
		Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]	Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]
35	45	14.41	65/24.1	742.80	27.56	13.58	80/19.7	475.80	11.98
	50	11.90	65/27.5	763.80	29.26	11.90	80/21.9	494.40	12.81
50	45	20.58	65/23.8	1054.20	36.95	20.58	80/19.8	722.40	17.94
	50	18.02	65/27.6	1162.20	44.81	18.02	80/22.1	750.60	19.18
65	45	26.76	65/23.2	1351.80	56.77	26.76	80/19.4	931.80	21.54
	50	-	-	-	-	23.43	80/21.5	967.20	29.53

Calculate the size of the heat exchanger on page 32



- 1.a Heat exchanger DHW
- 1.b Heat exchanger HE
- 2. 3-way valve
- 3. Safety valve
- 4. Thermostatic controller
- 5. Zone valve
- 6. Differential pressure reuglator
- 7. ASV-PV (Optional)
- 10. Pump
- 11. Strainer
- 13. Expansion tank
- 15. Water meter (Optional)
- 16. Consumption meter (Optional)

- Connections:
- A. Domestic cold water (DCW)
 - B. Domestic hot water (DHW)
 - C. Heat source supply (HS-S)
 - D. Heat source return (HS-R)
 - E. Heating supply (HE-S)
 - F. Heating return



DTR - Room heating

Heating		Heat center							
Heat transfer capacity (kW)	Temprerature (°C)	65 °C Primary				80 °C Primary			
		Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]	Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]
12	45/50	17.40	65/41.5	445.80	13.22	17.40	80/40.6	265.80	5.83
16	45/50	23.20	65/41.4	591.00	18.69	23.20	80/40.5	354.00	8.38
19	45/50	27.54	65/41.2	694.80	23.59	27.54	80/40.4	418.80	11.39

DTR with ASV-PV - Room heating

Heating		Heat center							
Heat transfer capacity (kW)	Temprerature (°C)	65 °C Primary				80 °C Primary			
		Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]	Tap load flow (l/min)	DHS/DHR °C	l/h	Pressure loss primary [kPa]
12	45/50	17.40	65/41.5	445.80	16.72	17.40	80/40.6	265.80	6.89
16	45/50	23.20	65/41.4	591.00	21.09	23.20	80/40.5	354.00	9.24
19	45/50	27.54	65/41.2	694.80	26.91	27.54	80/40.4	418.80	12.59

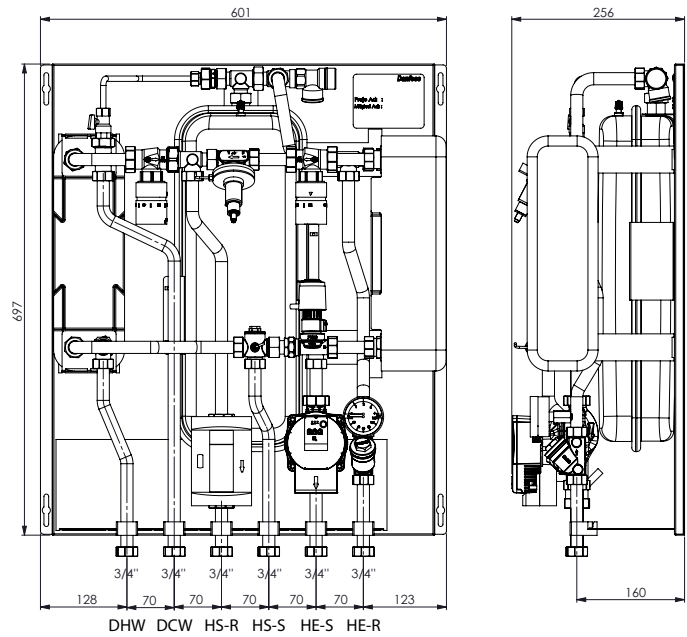
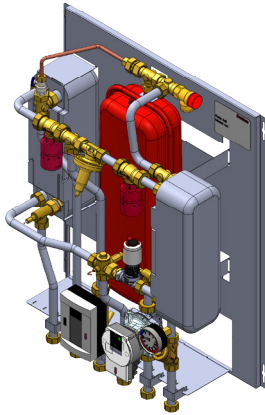
DID-61 L

267B1176 - DID-61 35 kW L

267B1179 - DID-61 50 kW L

267B1181 - DID-61 65 kW L

The energy meter is optional



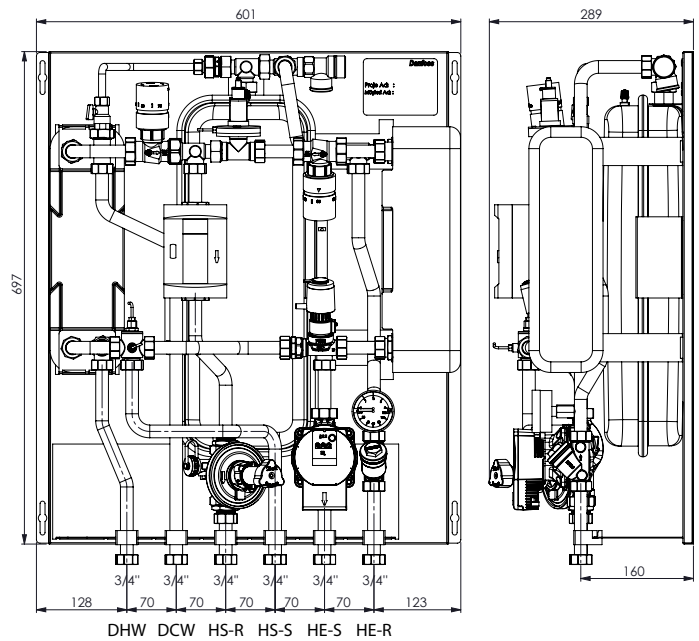
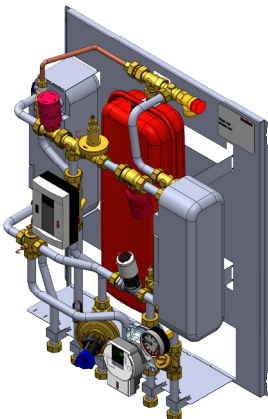
DID-61 L ASV-PV

267B1480 - DID-61 35 kW L ASV-PV

267B1481 - DID-61 50 kW L ASV-PV

267B1482 - DID-61 65 kW L ASV-PV

The energy meter is optional



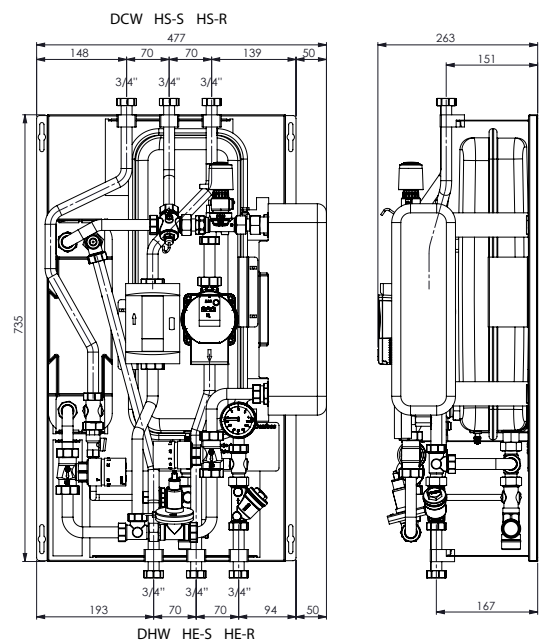
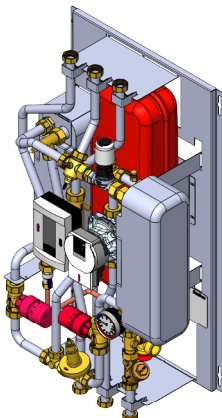
DID-62 L

267B1182 - DID-62 35 kW L

267B1185 - DID-62 50 kW L

267B1187 - DID-62 65 kW L

The energy meter is optional



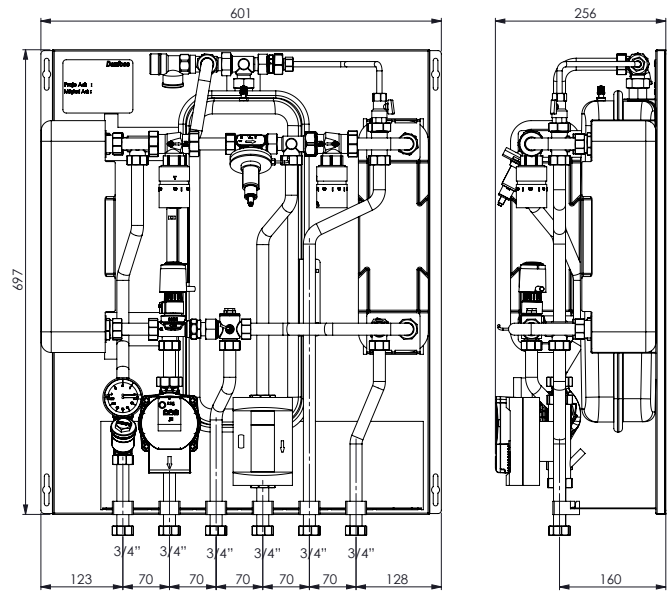
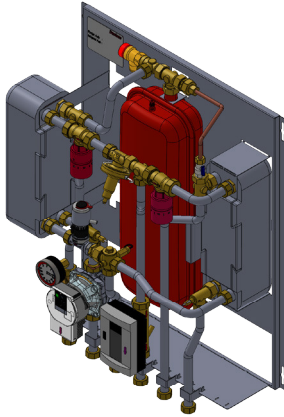
DID-61 R

267B1177 - DID-61 35 kW R

267B1178 - DID-61 50 kW R

267B1180 - DID-61 65 kW R

The energy meter is optional



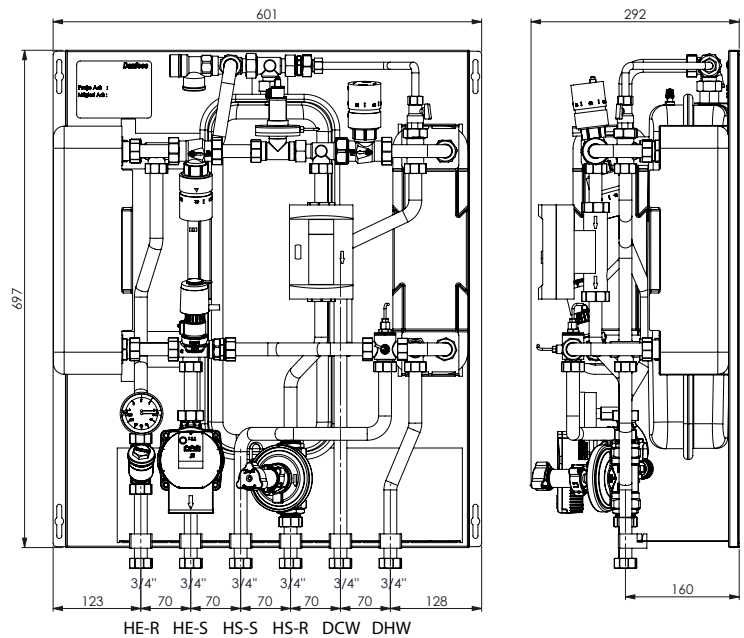
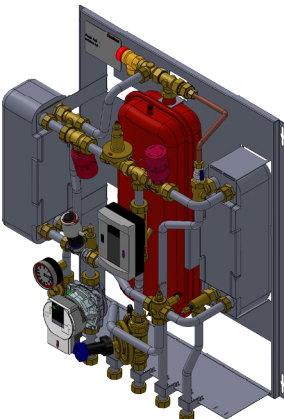
DID-61 R ASV-PV

267B1444 - DID-61 35 kW R ASV-PV

267B1445 - DID-61 50 kW R ASV-PV

267B1446 - DID-61 65 kW R ASV-PV

The energy meter is optional



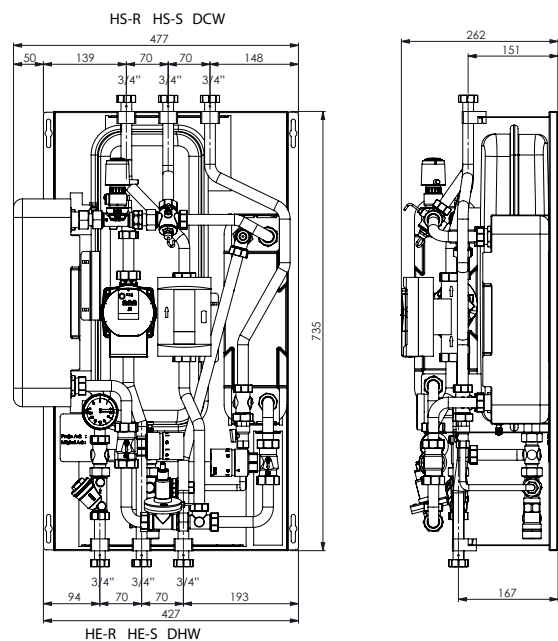
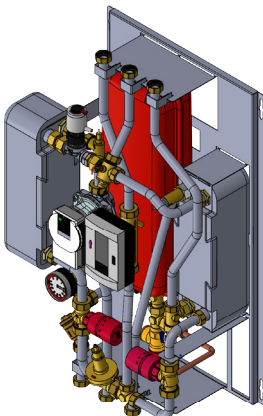
DID-62 R

267B1183 - DID-62 35 kW R

267B1184 - DID-62 50 kW R

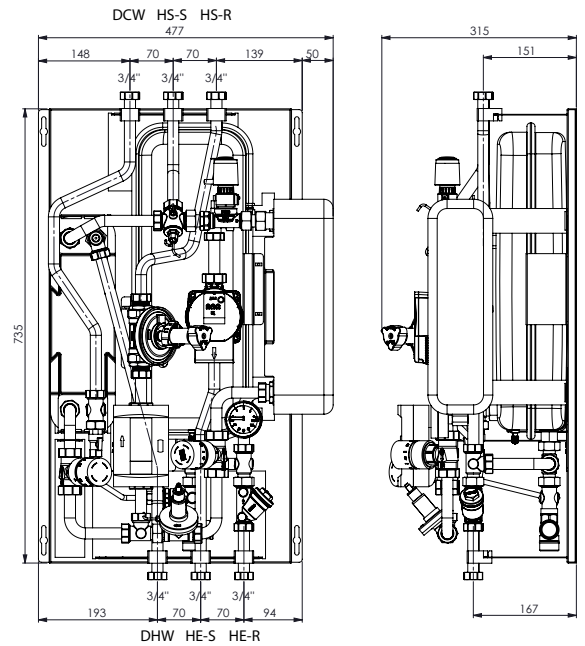
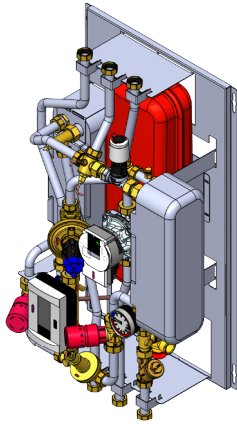
267B1186 - DID-62 65 kW R

The energy meter is optional



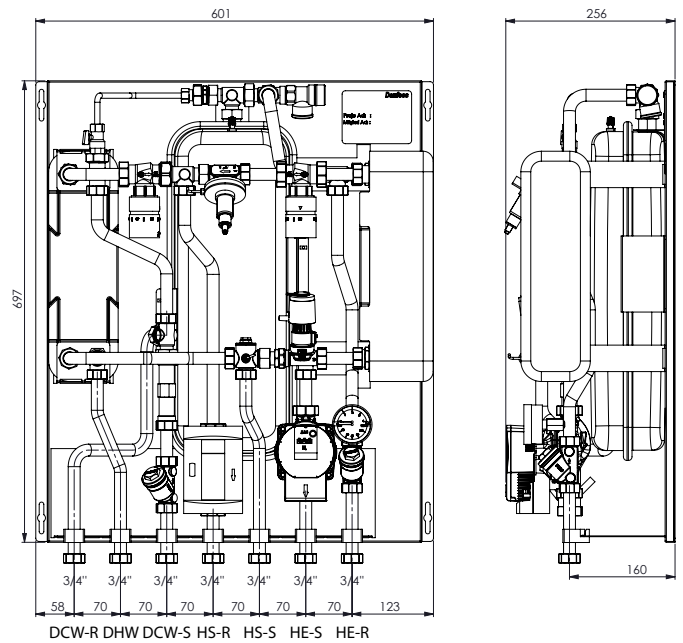
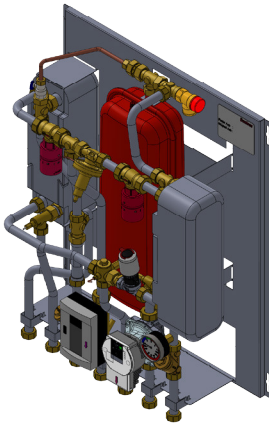
DID-62 L ASV-PV

267B1486 - DID-61 35 kW L ASV-PV
 267B1487 - DID-61 50 kW L ASV-PV
 267B1488 - DID-61 65 kW L ASV-PV
 The energy meter is optional



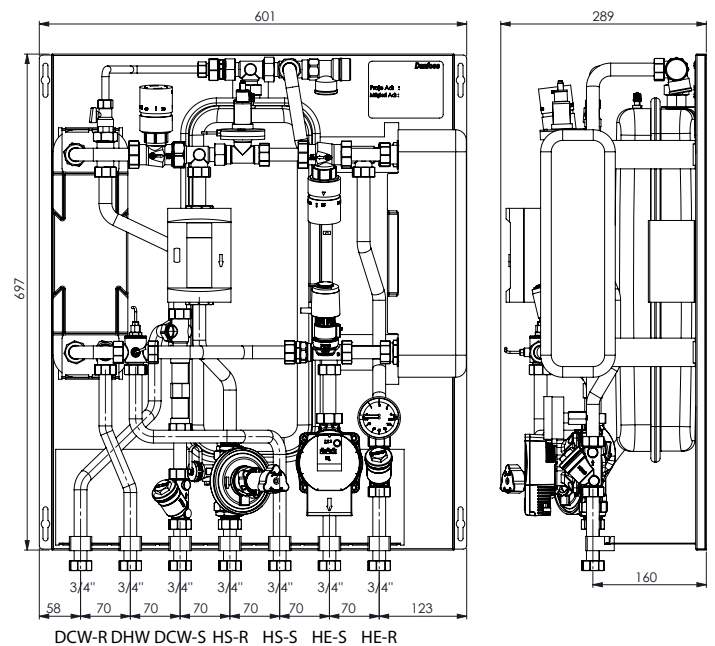
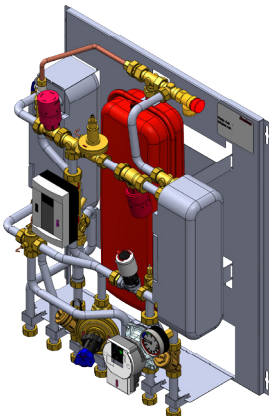
DID-71 L

267B1188 - DID-71 35 kW L
 267B1191 - DID-71 50 kW L
 267B1193 - DID-71 65 kW L
 The energy meter is optional



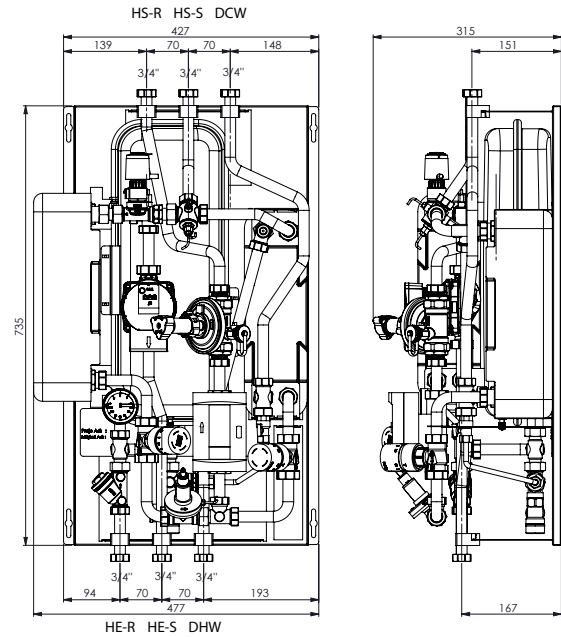
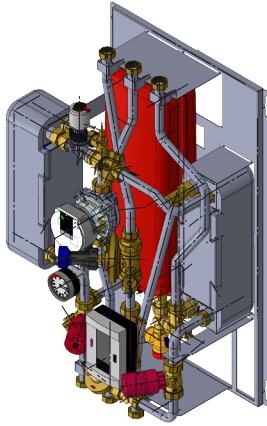
DID-71 L ASV-PV

267B1483 - DID-71 35 kW L ASV-PV
 267B1484 - DID-71 50 kW L ASV-PV
 267B1485 - DID-71 65 kW L ASV-PV
 The energy meter is optional



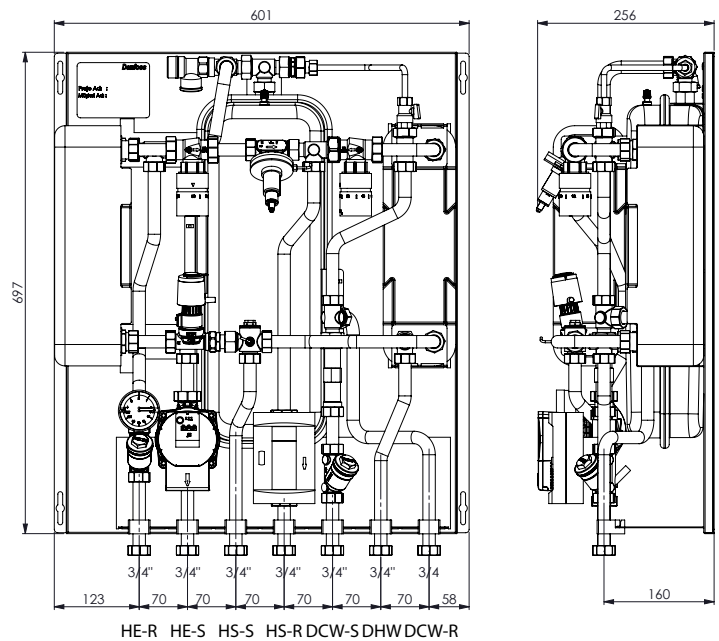
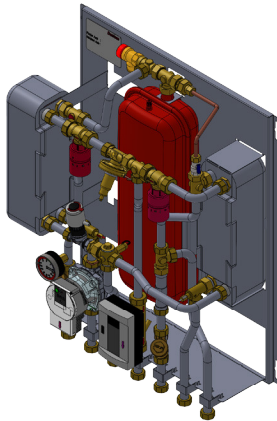
DID-62 R ASV-PV

267B1450 - DID-61 35 kW R ASV-PV
 267B1451 - DID-61 50 kW R ASV-PV
 267B1452 - DID-61 65 kW R ASV-PV
 The energy meter is optional



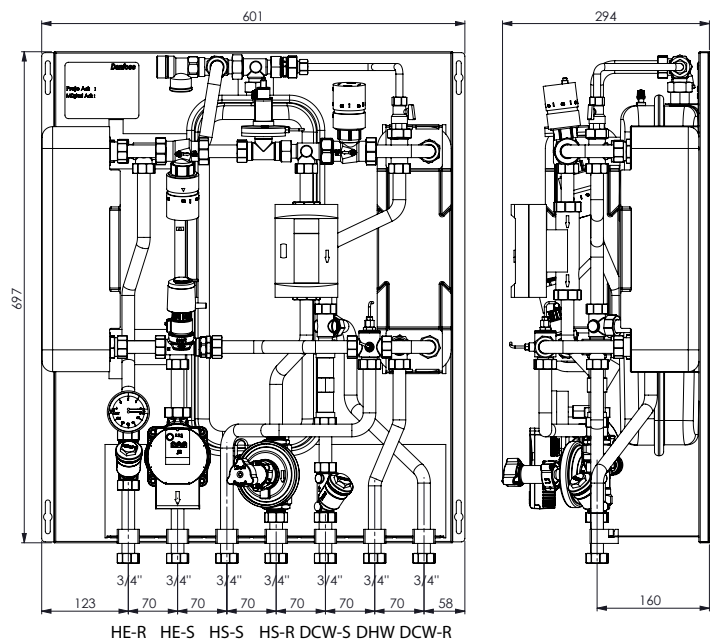
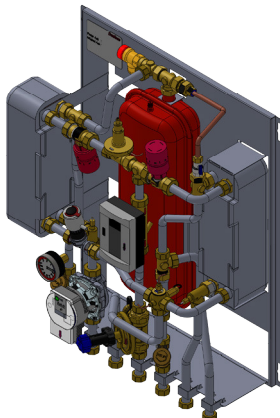
DID-71 R

267B1189 - DID-71 35 kW R
 267B1190 - DID-71 50 kW R
 267B1192 - DID-71 65 kW R
 The energy meter is optional



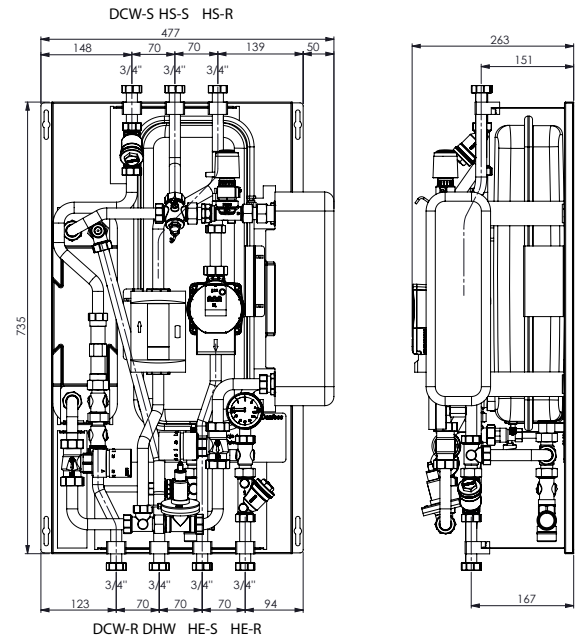
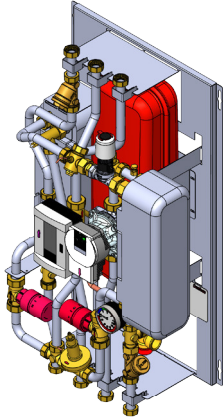
DID-71 R ASV-PV

267B1447 - DID-71 35 kW R ASV-PV
 267B1448 - DID-71 50 kW R ASV-PV
 267B1449 - DID-71 65 kW R ASV-PV
 The energy meter is optional



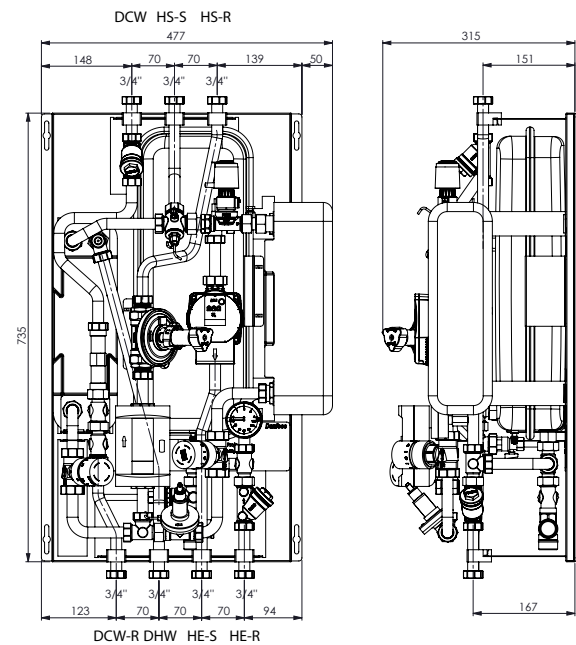
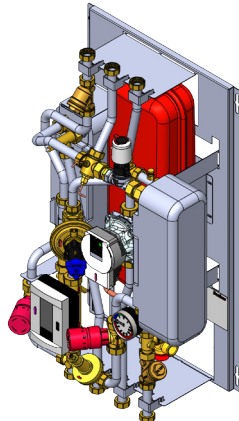
DID-72 L

267B1194 - DID-72 35 kW L
 267B1197 - DID-72 50 kW L
 267B1199 - DID-72 65 kW L
 The energy meter is optional



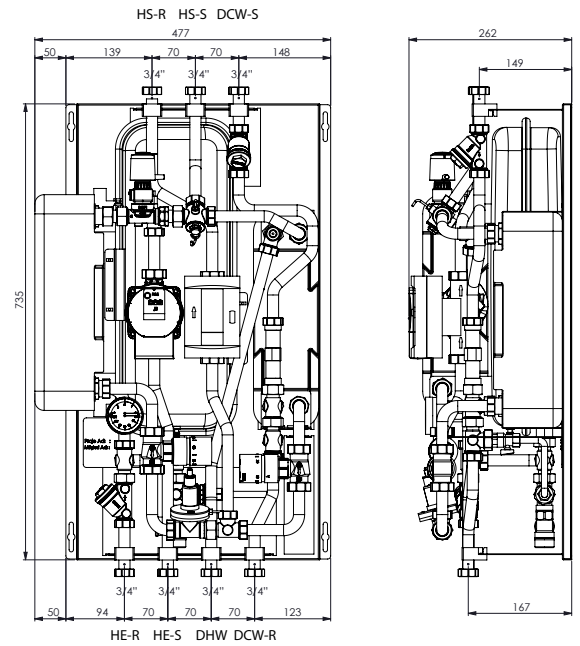
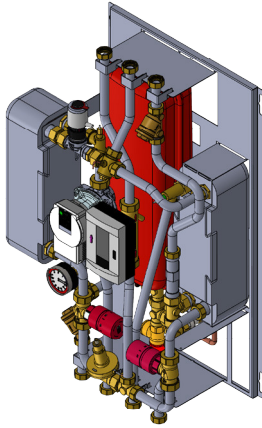
DID-72 L ASV-PV

267B1489 - DID-72 35 kW L ASV-PV
 267B1490 - DID-72 50 kW L ASV-PV
 267B1491 - DID-72 65 kW L ASV-PV
 The energy meter is optional



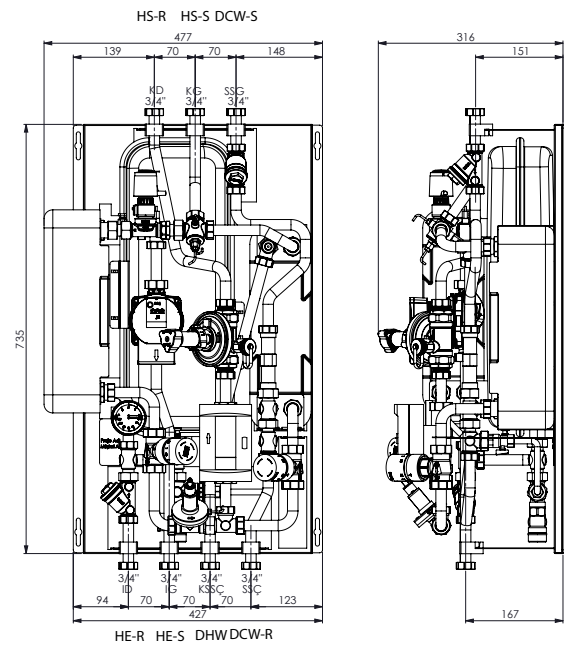
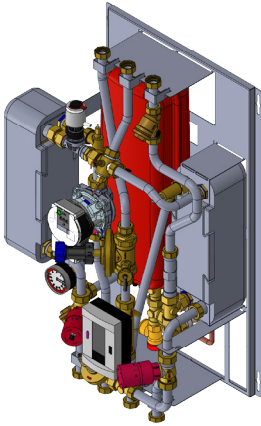
DID-72 R

267B1195 - DID-72 35 kW R
 267B1196 - DID-72 50 kW R
 267B1198 - DID-72 65 kW R
 The energy meter is optional



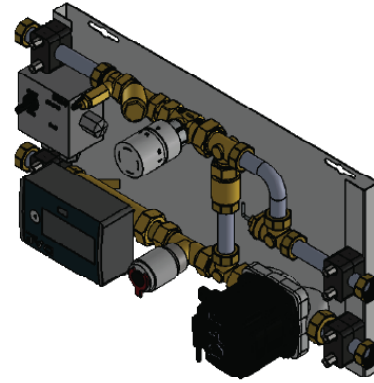
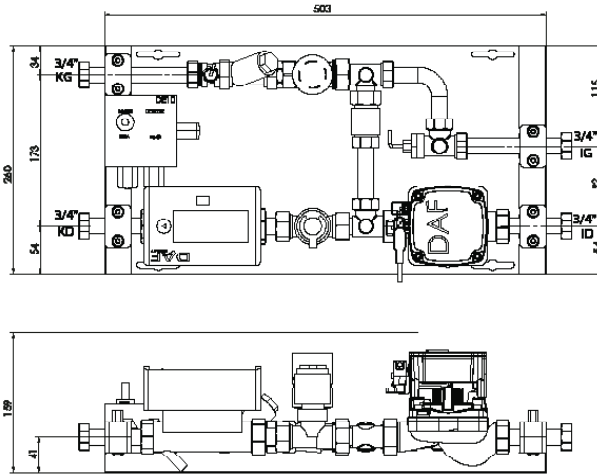
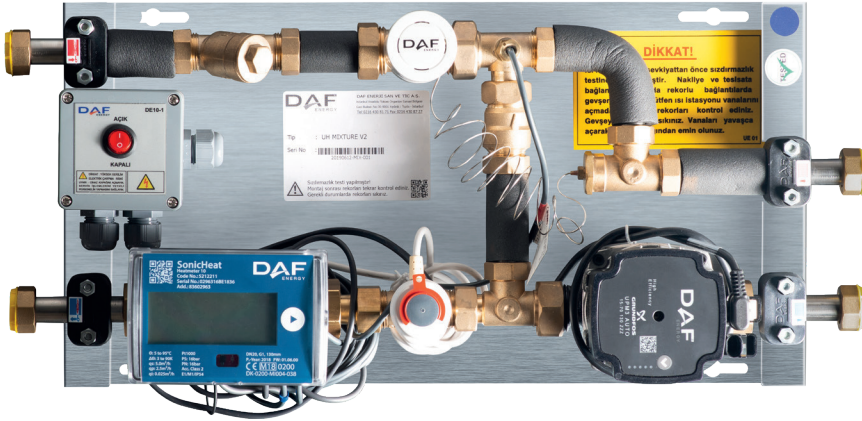
DID-72 R ASV-PV

267B1453 - DID-72 35 kW R ASV-PV
 267B1454 - DID-72 50 kW R ASV-PV
 267B1455 - DID-72 65 kW R ASV-PV
 The energy meter is optional

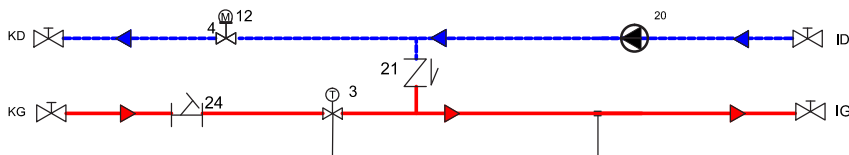


FLOOR HEATING MIX CIRCUIT

- Provides optimal operation conditions for floor heating systems.
- The “ErP Ready” high-efficiency frequency inverter pump is used.
- Thanks to the specially designed mixing circuit, the heating water temperature can be precisely regulated.
- The mixing circuit provided by the two-way valve prevents a drop in efficiency at high capacities.
- Its compact construction makes installation extremely practical and easy.
- Low initial investment costs.
- Excellent strength with AISI 316 piping.



Flow charts



- 1A. Thermostatic controller
- 4. Zone Valve
- 12. Thermal actuator
- 20. Floor Heating Pumps
- 21. Cekvalf
- 24. Dirt collector

AR-GE

As the DAF Energy R&D department, it conducts all research, improvement and engineering activities together.

All necessary technical services are provided by an office for the selection of components to suit each requirement and the creation of station designs, as well as a laboratory for the required function tests by AIT.



CERTIFIED QUALITY

EN ISO
9001

EN ISO
14001

OHSAS
18001



Calculate stop-off point

Determining the Domestic Hot Water Requirements of Apartments

1 1+1 and 2+1 Residential with Bathroom

	Flow rate (l/min)	Co-operation	l/min	Power (kW)*
Shower	9	1	9	
Washbasin	3	0	0	
To house	3	1	3	
Total**			12	33

* When the DHW outlet temperature is 50 °C.

**Use of the sink in the bathroom where the bath and the sink are used at the same time is unnecessary.

2 2+1 and 3+1 Residential with Bathroom

	Flow rate (l/min)	Co-operation	l/min	Power (kW)*
Shower	9	1	9	
Küvet	9	1	9	
Washbasin	3	0	0	
Washbasin	3	0	0	
To house	3	0	0	
Total**			18	50

* When the DHW outlet temperature is 50 °C.

** It is accepted that two baths are in use at the same time, i.e. no use of evlye and no use of lavabolanin.

3 4 and 5 Bedroom Residences with Bathroom

	Flow rate (l/min)	Co-operation	l/min	Power (kW)*
Shower	9	1	9	
Shower	9	0	0	
Küvet	9	1	9	
Washbasin	3	1	3	
Washbasin	3	0	0	
Washbasin	3	0	0	
To house	3	1	3	
Total**			24	65

* When the DHW outlet temperature is 50 °C.

** It is assumed that two bathrooms are in use at the same time for one household and one sink.

Notes

1. In cases where the number of bathrooms does not change, but the number of bedrooms or the number of residents increases, a separate value may be added depending on the stipulations.
2. For bathrooms with 4 or more phases, or if the project has special purpose wet areas such as bathrooms, saunas, etc., the capacity values must be calculated separately.
3. Since the service water outlet temperature is calculated as 50 °C, the increase in flow rate at peak duty with temperature drop is 3.5 l/min for 33 kW, 6 l/min for 50 kW, 7.5 l/min for 65 kW.

Equivalence Factors by Total Number of Housings (DAF Energy)

Number of houses	Equivalence Factor ϵf	Number of houses	Equivalence Factor ϵf	Number of houses	Equivalence Factor ϵf
1	1,00	21	0,28	130	0,09
2	1,00	22	0,27	135	0,09
3	0,65	23	0,26	140	0,09
4	0,60	24	0,25	145	0,09
5	0,55	25	0,24	150	0,09
6	0,54	30	0,20	155	0,09
7	0,52	35	0,17	160	0,09
8	0,50	40	0,17	165	0,09
9	0,48	45	0,17	170	0,09
10	0,46	50	0,16	175	0,09
11	0,44	55	0,16	180	0,09
12	0,42	60	0,15	185	0,09
13	0,40	65	0,15	190	0,09
14	0,38	70	0,14	195	0,09
15	0,36	75	0,14	200	0,09
16	0,35	80	0,13	205	0,09
17	0,34	85	0,12	210	0,09
18	0,32	90	0,11	215	0,09
19	0,31	95	0,11	220	0,09
20	0,29	100	0,10	225	0,09
21	0,28	105	0,10	230	0,09
22	0,27	110	0,09	235	0,09
23	0,26	115	0,09	240	0,09
24	0,25	120	0,09	245	0,09
25	0,24	125	0,09	250	0,09

$$Q_{boiler} = [(Z_{DS} - \epsilon) \times Q_{DY}] + Q_{SS} \times \epsilon$$

Z_{DS} : Number of apartments

ϵ : Co-use count

Q_{DY} : Apartment heating load (kW)

Q_{SS} : Power requirement for apartment base hot water production (kW)

For the sake of computational simplicity, the number of households is multiplied by the equivalence factor to obtain the “co-usage number (ϵ)”. Consequently, co-use is not a multiplier, but the number of apartments using hot water at the same time within the total number of apartments.

$$\epsilon = \epsilon f \times Z_{DS}$$

ϵ : Co-use count

ϵf : Equivalence factor

Z_{DS} : Number of apartments

Thermoregulator

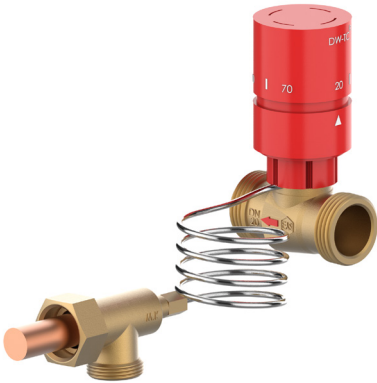
Self-acting temperature controller

TD-21 is a self-acting temperature controller used to control the water temperature in flat stations. It can be used to control domestic hot water or underfloor heating temperatures. Controller closes on rising temperature.

The controller has a control valve, thermostatic actuator and handle for temperature setting. Thermostatic actuator consists of a bellow, capillary tube and sensor.

- Features:
- Liquid filled sensing element
 - Clips used to pre-set min. and max. temperatures
 - Spindle made of stainless steel
 - Double O-ring sealing

Technical data	
Nominal size	DN20
Kvs value	2.5 m³/h
Heating or cooling fluid	Water
Operating temperature	2 - 120 °C
Maximum differential pressure	2,1 Bar
Pressure class	PN16
Setting range (DHW variant)	20 - 70 °C
Setting range (FHH variant)	20 - 55 °C
Connections (valve inlet)	R 3/4
Connections (valve outlet)	G1
Connections (head and actuator)	M30 x 1.5
Material	
Valve body	Brass
Spring and spindle	Stainless steel
Handle	Plastic
Impulse capillary tube	SUS304
Immersion sensor	Copper



Code no. (DAF)	Article	Description
41422003	EYS TRV DN20	Valve body
31421050	DHW thermoregulator	Thermostatic actuator for domestic hot water
31421051	FHH thermoregulator	Thermostatic actuator for underfloor heating

Danfoss ICON2™ hydronic floor heating

Precise and efficient control of underfloor heating with smart-home compatibility and the flexibility to fit every application.

Danfoss ICON2™ Main controller

Danfoss Icon2™ Main Controller is used for floor heating and cooling systems for individual room control. It can be configured as a wired or wireless system or as a combination, if required. The center of the system is the Danfoss Icon2™ Main Controller, which configures and ties the system together.

Installation and set-up of the Danfoss Icon2™ Main Controller is made easy by using the pre-defined application and intuitive commissioning App.

Available in basic and advanced variants.



Danfoss ICON2™ RT

Danfoss Icon2™ RT is a series of wireless thermostats in a new and updated slim design, with tool-free magnet mounting which offers the freedom to place your thermostat without the constraints of wires in the wall. The fade away feature, together with the minimalistic design, only 16 mm deep, gives it elegance and makes it blend in with the surroundings.

The Icon2™ RT is Zigbee 3.0 certified, making it compatible with smart home solutions.



Danfoss ICON2™ RT wired versions

Danfoss Icon2™ / 24V RT 24V thermostat offers a minimalistic design that makes them fade away and blend into surroundings when the display is not active. The Icon2™ / 24V RT thermostat is compatible with both Icon™ 24V Master Controller and Icon2™ Main Controller. Please be aware that FW update function is only available in combination with Icon2™ Main controller.



Danfoss ICON2™ a part of the Danfoss Ally™ family

Danfoss Icon2™ integrates seamlessly with Danfoss Ally™ solutions and can be controlled from anywhere by the Danfoss Ally™ app, so the end-users can enjoy all the benefits of a true smart-heating system. Set the temperature to 21 °C and that is exactly what it will deliver.

The Danfoss Ally™ Gateway is the only extra device needed to get cloud connected and gain all the smart heating features on top.

Because Danfoss ICON2™ is built on Zigbee 3.0 protocol, customers can also control their heating with other 3rd party Zigbee based smart home solutions.



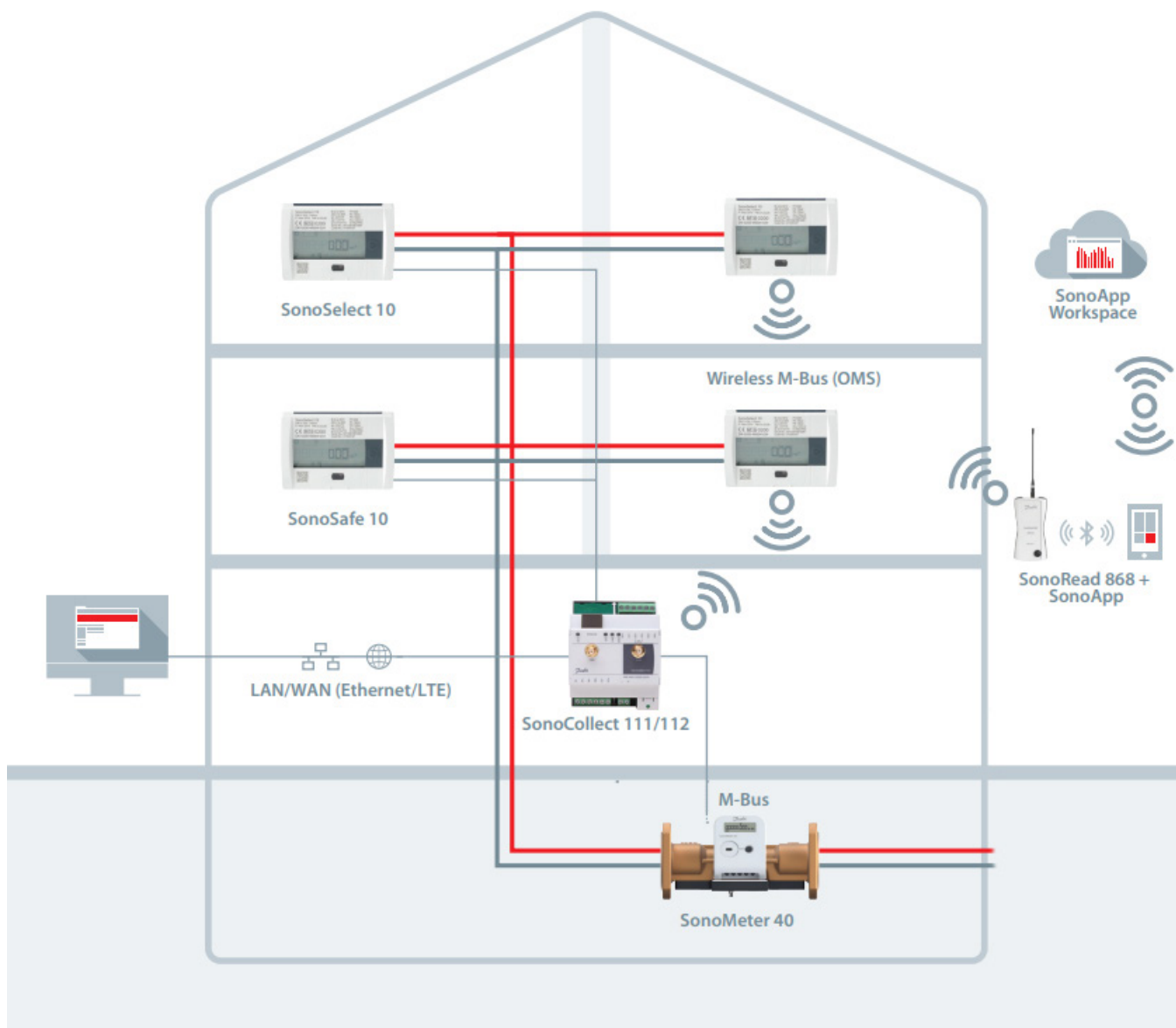
Danfoss Energy metering solutions

Danfoss Sono® compact energy meters consist of the full portfolio of the primary side and secondary side ultrasonic meters for heating as well as cooling applications. They can be used in single-family houses, apartment buildings, and commercial buildings.

Secondary side meters are typically installed after the heat exchanger and are owned by the house, apartment, or building owner. These meters cover sizes from DN15 to DN32 with flow rates from 0.6 up to 6.0 m³/h. The robust construction, long battery lifetime, and genuine diagnostics via App provide advantages to other meters available in this segment.

Primary side meters are typically installed before the heat exchanger and are owned by district energy utilities. These meters cover sizes from DN15 up to DN1200 and are available in pressure range PN16 and PN25.

We offer also easy-to-use meter and read-out solutions, either wireless walk-by solutions or fixed installation with data concentrators.



SonoSafe™ 10

The ultrasonic meter SonoSafe™ is a compact and reliable meter for residential applications. The meter offers a new level of installation and commissioning simplicity by using SonoApp. It is also manufactured in accordance with ISO/TS16949 (IATF) automotive standards ensuring highest manufacturing quality.

Main product benefits

- Open communication protocols/interfaces enable easy data access and system integration
- Best-in-class battery lifetime (up to 16 years) or 230V mains powered - lowers replacement frequency
- Configuration via SonoApp (change supply/return, energy units etc.) and modular construction (exchangeable communication modules) increases installation flexibility
- Extensive alarms (including tamper and reverse flow detection) ensure instantaneous fault detection
- Advanced diagnostics (remaining battery lifetime, transducer signal quality) allow preventive maintenance and troubleshooting

Size / Flow	DN15 - DN32 / Qp 0.6 - 6.0 m³/h
Temperature / Pressure	5 - 95 °C / PN16
Application	Heating
Approvals	MID class II B + D (heating)
Power supply	Battery AA-cell 3.6 VDC Mains unit: 230 VAC
Modular	1 slot for communication module
Communication	2 x wired M-Bus / Wireless M-Bus (OMS) / 2 x Pulse in/out
Data logging	Daily, monthly and yearly values
Tools	Configurable via SonoApp
IP protection	IP65 calculator and IP65 flow sensor



SonoSelect™ 10

SonoSelect™ is a compact ultrasonic meter for measuring energy consumption in heating, cooling and combined heating/cooling applications designed primarily for use in residential buildings. High flow measuring frequency (two timers per second), robust housing and transducer design make it an excellent choice for flat stations with instantaneous hot water preparation.

Main product benefits

- Top of class meter accuracy ensures valid billing of heating, cooling and instantaneous hot water preparation
- Versions with higher pressure (PN25) and temperature rating (130 °C) are a good match also for primary side installations and high rise buildings
- High IP rating of flow part (IP68) and calculator part (IP65) prevent condensation problems in cooling applications

Size / Flow	DN15 - DN32 / Qp 0.6 - 6.0 m³/h
Temperature / Pressure	5 - 95 °C, 5 - 130 °C / PN16
Application	Heating, cooling, combined
Approvals	MID class II B + D (heating) / TS (DK) / PTB (DE) / BEV (AT) / METAS (CH) (cooling)
Power supply	Battery AA-cell 3.6 VDC Mains unit: 230 VAC
Modular	1 slot for communication module
Communication	2 x wired M-Bus / Wireless M-Bus (OMS) / 2 x Pulse in/out
Data logging	Daily, monthly and yearly values
Tools	Configurable via SonoApp
IP protection	IP65 calculator and IP68 flow sensor



SonoMeter™ 40

SoneMeter™ 40 is a compact ultrasonic meter for measuring the flow and thermal energy in heating and/or cooling applications within district energy networks, commercial and residential buildings. The meter is MID class II B+D approved. It can be ordered for supply or return pipe installation and provides many different configuration options.

Main product benefits

- Multiple communication options available (up to 3 communication interfaces can be used in parallel)
- Exchangeable temperature sensors, batteries, and communication module
- Mains power with battery back-up secures no data loss even if power is lost
- Battery lifetime (up to 15 years) or 24V/230V mains powered - lowers replacement frequency

Size / Flow	DN15 - DN100 / Qp 0.6 - 6.0 m³/h
Temperature / Pressure	0.1 - 130 °C / PN25
Application	Heating, cooling, combined
Approvals	MID class II B + D (heating) / PTB (DE) (cooling)
Flow sensor cable length	1.2 m / 2.5 m / 5.0 m / 10.0 m
Temp. sensor cable length	1.5 m / 3.0 m / 5.0 m / 10.0 m
Configuration options	Pulse input/output values (Tariffs) Display parameters (Archive logs) M-Bus settings (Set dates)
Power supply	Battery AA-cell 3.6 VDC Mains unit: 230 VAC / 24 VAC
Modular	1 slot for communication module
Communication	2 x wired M-Bus / Wireless M-Bus (OMS) / 2 x Pulse in/ out / Modbus RS485 / BACnet / LoRa WAN
Data logging	Hourly, daily and monthly values
IP protection	IP65 calculator and IP68 flow sensor



SonoRead™ 868

SoneRead™ 868 is a portable Wireless M-Bus T1 and C1 transceiver (OMS) with bluetooth interface. It reads all OMS standardized meters. Connecting the meter readings with the SonoApp Workspace via the SonoApp creates a powerful mobile radio meter reading system will administrate known and unknown meters and encryption keys.

Main product benefits

- Plug & play startup and easy to use - lowers time spend for configuration
- Universal reading of all types of meters and measurement types - increases usability and lowers need for component replacements.

Wireless M-bus frequency	868 MHz
Wireless M-bus interface	EN13757-4, Mode T1 and C1
Antenna (changeable)	External (SMA)
Communication interface	Bluetooth 2.1 class 2 (10.0 m)
Dimensions without antenna	159 x 77 x 33 mm
Integrated battery type	Lithium ion
Operation time	20 hours (approximately)
IP protection	IP64



SonoCollect™ 111

SonoCollect™ 111 is a smart metering data concentrators for energy meter readout. It comes with a standardized wired and wireless meter readout. They both come with a standardized wired and wireless M-Bus interface. The SonoCollect™ 111 can collect the data from up to 500 energy meters. The extracted metering data can be communicated to the Cloud or other analyzing tools.

Main product benefits

- Highly flexible and suitable for most customer requirements due to product versatility and flexibility
- Easy remote configuration and updating eliminates on-site service
- Reading of up to 500 energy meters lowers the required number of concentrators

Installation	DIN rail
M-Bus interface	Up to 500 unit loads, auto-scan, compliant to EN13757
Wireless M-Bus interface	AES encryption, compliant to OMS (868 MHz), auto-scan, Mode: S, T, C
Serial interface	Modbus RS485, up to 250 kbps, two-wire
50 pulse input	3 channels, IEC 62053-31
Ethernet interface	100 MB, RJ45, support of IPv6 and IPsec (VPN)
WAN interface	LTE (4G) module, optional, slot for Mini SIM
Communication protocols	Modbus TCP, BACnet/IP, MQTT
FTP transfer (push, pull)	CSV, XML
Encryption protocols	TLS, SSH, SSL, OpenVPN
Memory for local data storage	4 GB
Firmware and configuration	Directly or remote with integrated web server



Connection to management systems

SonoCollect™ 111 supports XML and SML. Through this features, it is prepared for the connection with SonoEnergy™ or other back-end system to facilitate remote meter reading or energy data management. Updates and configurations can be done remotely by the server system. An easy way of maintenance is assured. SonoCollect™ 111 offers all essential attributes for intelligent Smart Metering.

A client website of the utility supplier offers the customer the possibility of up-to-date information about the consumption at any time. Thanks to an integrated web server, SonoCollect™ 111 provides an additional offline frontend. The customer can directly access the consumption data without internet access. A simple internet browser can be used to connect to SonoCollect™ 111. The easy to use website presents the consumption data and some statistics of all connected meters.

The integrated web server offers complete configuration. Some features are automated bus scan, easy selection of data points and generation of CSV or XML files, FTP server and FTP client, secured communication and an extensive management of user access rights.

M-Bus is short circuit protected (self-resetting fuse).

RS-232 interface for connecting an external level converter for the M-Bus.

Consumption and sensor data is transmitted to SonoEnergy™ or other energy management systems directly as CSV or XML file.

SonoCollect™ 111 is a consolidated device which fulfills all duties and responsibilities of Smart Metering. Real Plug’n Play saves time and effort.

ENGINEERING
TOMORROW



Danfoss A/S

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