ENGINEERING
TOMORROW

Data sheet

ThermoDual®- FLS (welded type)

General Description / Use

Domestic hot water provision by instantaneous heater is an efficient and hygienic optimal solution. Hot water is not stored and will be produced only on request.

Habitats for bacteria,such as legionella are virtually non-existent. If the conditions for connection of these systems are given (sufficiently high capacity on heating side to cover peak load) or buffer tanks is present, these systems can be used unrestricted.

Significant advantages of the system are:

- no storage of drinking water
- efficient cooling of the primary media
- optimum use of energy
- independent choice of different energy sources
- at any time sufficiently high domestic hot water temperature, that fulfils all hygienic requirements
- low space requirement
- lime scale is largely avoided

Maximum operating parameters

Primary		
Maximum permissible supply temperature, primary	90°C / 150°C (without/with safety function)	
Maximum permissible operating pressure, primary	10 / 20 bar(g)	Pumps and 3-way valve variant / 2-way valve variant
Rated pressure, primary	PN10 / PN25	
Maximum permissible pressure differential, primary	only 2-way valve variant: 25 bar (up to 210kW) /16 bar	
Secondary		
Maximum permissible temperature, secondary	90°C	
Maximum permissible operating pressure, secondary	10 bar(g)	
Minimum required pressure (static), water supply	1.0 bar(g)	
Rated pressure, secondary	PN10	
Mains power supply / maximum power consumption	230V AC / 4.0 A	

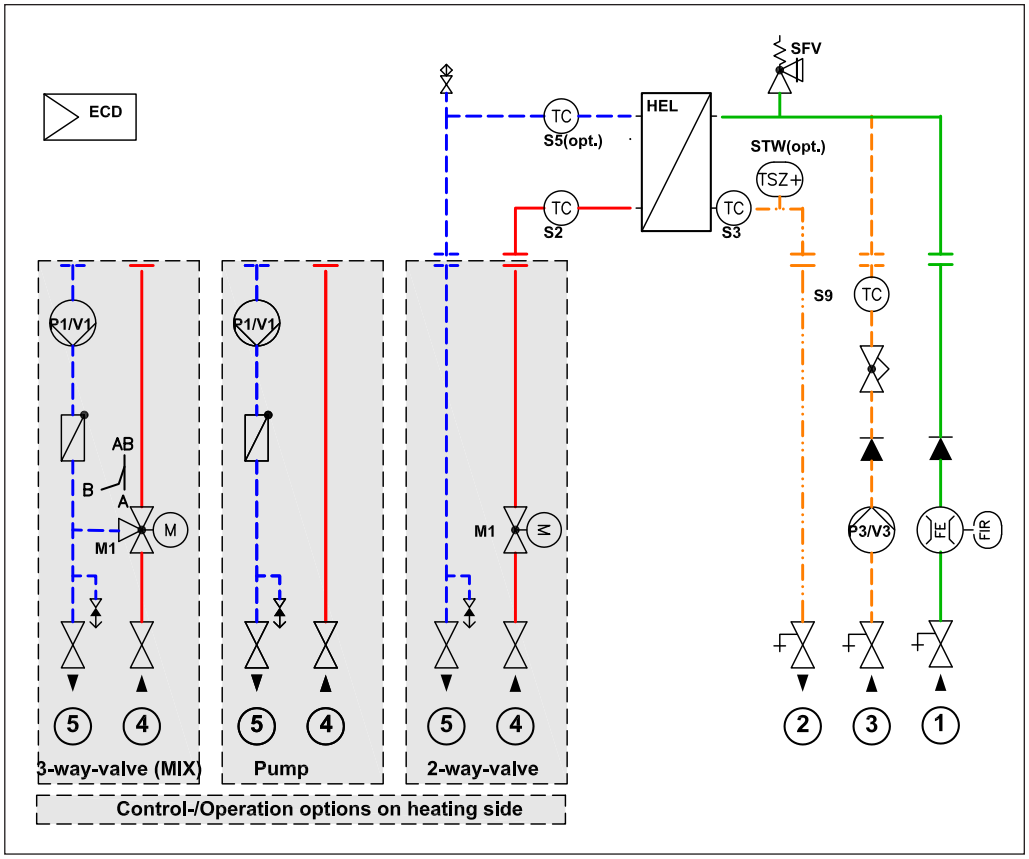
Materials

Pipes, fittings, flanges, valves (domestic side)	1.4571, bronze or brass as per DIN EN 1982, also considering DIN 50930-06 and UBA guidelines
ditto (heating side)	P235GH-TC1, CuSn5Pb5Zn5-C (RG-5), ST37.0, EN-JL 1040 (GG25)
Heat exchanger	1.4404 with Cu solder
Insulation	Hardcover PU hard foam λ=0.029 W/mK (100%ENEV)

Code numbers

Capacity [kW]	Code no.			
	Pump + 3-way mixing valve	Pump control (PWM control signal)	2-way valve (without safety function)	2-way valve (with safety function)
140	161L1091	161L1088	161L1081	161L1084
210	161L1092	161L1089	161L1082	161L1085
280	161L1093	161L1090	161L1083	161L1086
350	161L1139	161L1136	161L1130	161L1133
420	161L1140	161L1137	161L1131	161L1134
455	161L1141	161L1138	161L1132	161L1135

Circuit diagram



- Shut-off valve
- Non-return valve
- Check valve
- Balancing valve
- Air vent
- Drain
- Drain, sampling valve (optional)
- F1: Flow sensor

HEL	Heat exchanger
P1	Heating pump
P3	Circulation pump
SFV	Safety valve
M1	Motorized control valve (2/3-way)
ECD	Electronic domestic hot water controller (ECL310 / P318.10)
STW	Safety thermostat (optional)
BTA	Hot water buffer tank (installed by customer)
(1)	Domestic water (cold)
(2)	Domestic hot water (hot network)
(3)	Circulation (inlet)
(4)	Heating supply
(5)	Heating return
(TC)	Sensors (general: direct , immersion, surface) "S2": with designation as for controller

Technical data

Type ThermoDual®	Capacity [kW]	FR_P (70->25°C) [m³/h]	Pump dpr [kPa]	2-way dp [kPa]	3-way dpr [kPa]	FR_{DW} (10->60°C) [m³/h]	DW dp [kPa]	FR_C* (55->60°C) [m³/h]	C dpr** [kPa]
FLS 140	140	2,4	52	21	38	2,4	12	1,0 / 2,4	80 / 43
FLS 210	210	3,8	95	30	81	3,6	26	1,5 / 2,4	70 / 43
FLS 280	280	5,1	86	29	76	4,8	28	2,0 / 2,4	57 / 45
FLS 350	350	6,3	74	30	59	6,0	33	2,5 / 3,4	51 / 30
FLS 420	420	7,8	53	30	54	7,2	41	3,0 / 3,4	38 / 30
FLS 455	455	8,0	59	22	54	7,8	39	3,3 / 3,4	34 / 31

FR: Flow rate p: primary dpr: Remaining pump head dp: Pressure loss DW: Domestic water C: Circulation

* flow rate: standard setup / maximal possible

** remaining pump head for: standard setup / maximal possible

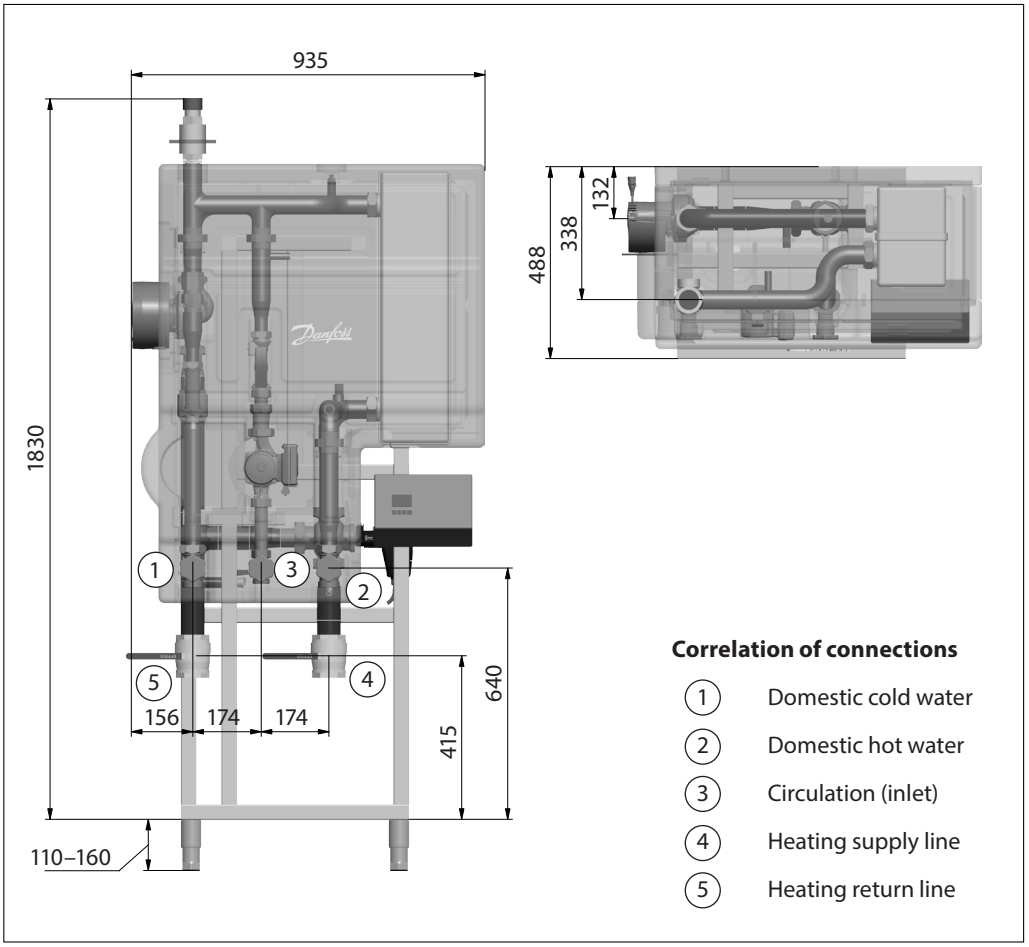
Function

Flow systems provide heated domestic water when requested. By a heat exchanger (HEL), the cold water flowing into connection (1) will be heated up to set point and provided to the consumer at the connection (2). The electronic controller (ECD) is measuring the relevant temperatures and controls the target values that are held constant in all operating conditions. This is i.e. achieved by influencing the speed of the heating pump (P1), so that the outlet temperature always matches the specified value. In case of using a control valve, the flow is directly controlled by an electrical actuator. Short-term peaks in consumption are registered at the flow sensor to intervene quickly and avoid large temperature fluctuations. The cooled- circulation water from the network (connection 3) is constantly heated in heat exchanger (HEL), even in times of draw-off , reheated and the temperature control (sensor) in the amount of the controlled circulation pump (P3) influenced so that only the necessary amount flows to maintain constant power set point.

The capacity for the peak load is to ensure either by buffering heating water in a tank (BTA) or there must be a sufficiently large connection value available. The Recharging of a buffer (e.g. from a boiler) can a requisition (sensor / switch contact) on controller (ECD) using an on-site charging pump (LPU). The operation of the system by a controlled heating pump (P1) is only possible without differential pressure between the connections (4) and (5).

Dimensions

Type ThermoDual®	Connections:				Weight [kg]		
	DW C/H	Circ.	HTG (DN) SL, RL	HTG (DN) SL, RL	Pump + 3-way v.	Pump control (PWM)	2-way v.
	1/2 G ISO	3 G ISO	4/5 PN10 Rp	4/5 PN25 WELD			
FLS 140	1 ¼"A	1 ¼"A	1 ¼"	42,4	93	90	99
FLS 210	1 ¼"A	1 ¼"A	1 ¼"	42,4	96	93	100
FLS 280	1 ½"A	1 ¼"A	1 ½"	48,3	102	98	107
FLS 350	1 ½"A	1 ¼"A	1 ½"	48,3	107	102	111
FLS 420	1 ¾"A	1 ¼"A	2"	60,3	116	106	120
FLS 455	1 ¾"A	1 ¼"A	2"	60,3	122	112	126



Correlation of connections

1. Domestic cold water
2. Domestic hot water
3. Circulation (inlet)
4. Heating supply line
5. Heating return line

Data sheet **ThermoDual®- FLS**

Accessories

Heating buffer storage tank, standing model,
Type: PSS

Charging-/Discharging Connections
as flange connection

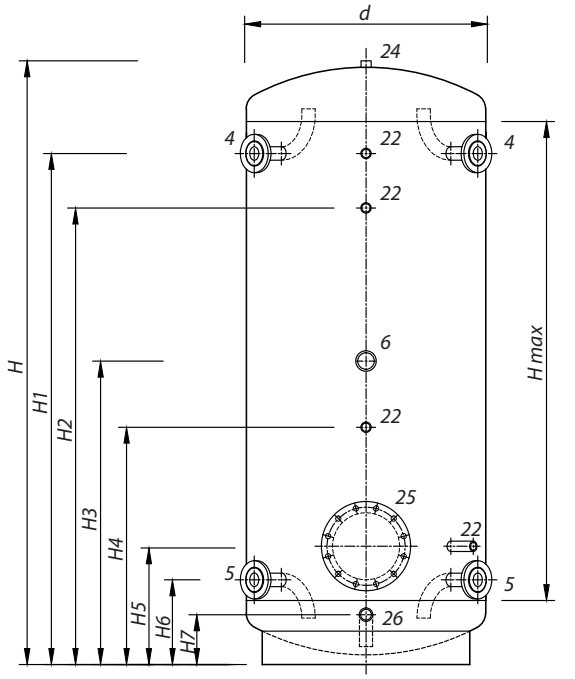
Materials

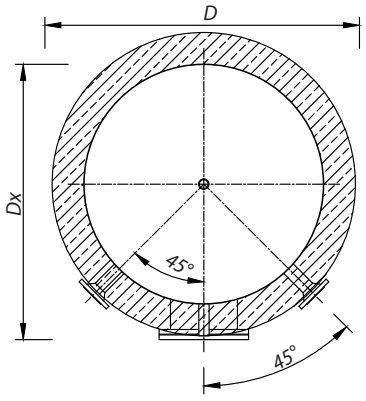
tank (shell)	Steel EN 1.0025 S235JRG2 Raw inside, outside undercoat - black
Insulation (from 1500 Liter as bypack/not mounted)	Insulation, polyester fiber fleece + EPS white, CFC-free,silver with polypropylene top layer

Maximum operating parameters

Maximum permissible operating temperature	TZ	110 °C
Maximum permissible operating pressure	PZ	6 bar

Type l	H mm	H1 mm	H2 mm	H3 mm	H4 mm	H5 mm	H6 mm	H7 mm	H_{Ma} mm	d mm	D_x mm	D mm	Tilted height mm	connections	codes	Weight kg
300	1450	1270	1070	780	620	320	215	115	1130	550	660	710	1550	DN 25 / PN 16	640U4984	85
500	1860	1665	1430	990	650	350	245	145	1550	600	710	800	2010	DN 40 / PN 16	640U4985	115
750	1870	1635	1400	1000	670	370	265	165	1500	750	860	950	1945	DN 40 / PN 16	640U4986	175
1000	1910	1655	1370	1020	690	390	285	185	1500	850	960	1050	2090	DN 50 / PN 16	640U4987	240
1500	2030	1740	1505	1070	725	445	320	220	1550	1000	1110	1200	2160	DN 50 / PN 16	640U4988 + 640U4994	325
2000	2310	1995	1750	1220	770	510	375	265	1770	1100	1210	1300	2450	DN 65 / PN 16	640U4989 + 640U4995	375





4 Charging-/Discharging conn. supply (hot)
5 Charging-/Discharging conn. return (cold)
6 Solar conn. / Reserve El. Heater Rp 2"
22 Thermostat / Thermometer Rp 1/2"
24 Air Vent Rp 3/4"
25 Inspection, diameter opening 219 mm (DN200 / PN6)
26 Drain Rp 3/4"

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