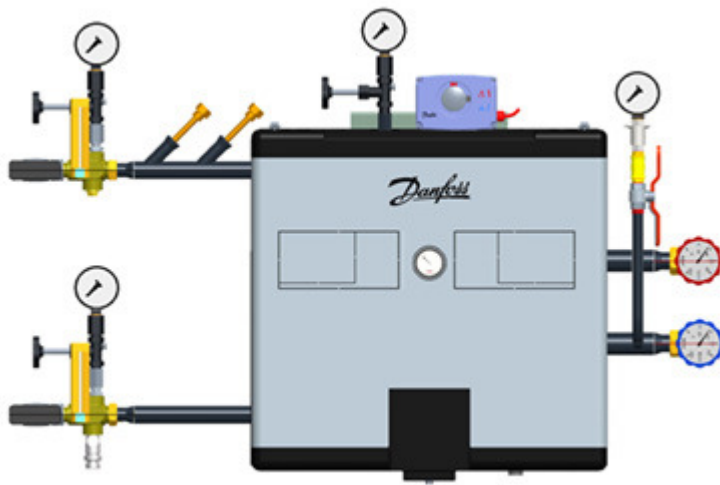


Data sheet

Welded district heating substations type DSA 1 MINI Micro Grid FR

General description / Application:



The DSA 1 MINI Micro Grid FR is a welded district heating substation. It is designed to transfer thermal energy from a local or from a district heating network to the heating or a domestic hot water system in a building.

The substation is delivered in an insulated casing, and it comprises devices as well as offers functionalities necessary to meet different district heating network connection conditions.

The DSA 1 MINI Micro Grid FR substation has been designed to secure high efficiency of the thermal energy transfer, and thus perform as the best possible heating source for a building.

The substation comprises a heat exchanger to separate the district heating network, being the primary side, from the heating or the domestic hot water systems in a building, being the secondary side. It also offers devices and equipment for controlling and monitoring the contracted flows and temperatures as well as for measuring the used in the building energy.

The DSA 1 MINI Micro Grid FR has been designed to serve existing heating systems, already equipped with pumps and control valves. The substation also suits new applications where floor heating, radiator, domestic hot water and other systems have been already designed and pumps as well as control valves shall be delivered by a third party.

The substation design follows the main standards and requirements. Consequently, it can cover a wide range of applications in different market areas.

Maximum operating parameters

Primary side		
Maximum supply temperature	TVP	120 °C
Maximum operating pressure	PZP	25 bar(g)
Nominal pressure	PN	25
Maximum differential pressure	DPP	20 bar
Maximum flow rate	VZP	3.50 m³/h at velocity ≤ 2.0 m/s
Secondary side		
Maximum supply temperature	TVS	95 °C
Maximum operating pressure	PZS	3 bar(g) (safety valve opening)
Nominal pressure	PN	6
Maximum flow rate	VZS	4.30 m³/h at w ≤ 1.5 m/s

Materials

Pipes and fittings, flanges, moulded parts, unions	P235GH EN 10216-2, CW602N (CuZn36Pb2As), CW 617 N (CuZn40Pb2), EN 12165
Heat exchanger	1.4404 Cu brazed
Fittings and valves	CC499K (CuSn5Zn5Pb2-C) EN 1982, CW602N (CuZn36Pb2As) EN 12165
insulation	37 ± 1/0 mm EPP rigid foam (λ = 0.035 W/mK) according to EN 12667; corresponds to 100% ENEC

Function

The DSA 1 MINI Micro Grid FR is an indirect type of a substation. It uses a plate heat exchanger for the thermal energy transfer purposes and to separate the network from the heating or from the domestic hot water systems in a building.

To secure a high efficiency thermal energy transfer water shall not carry air bubbles nor dirt into the heat exchanger. To ensure this the DSA 1 MINI Micro Grid FR substation comprises an air vent and a strainer on the primary side.

The heat transfer process must be controlled so that the required temperature of water on the secondary side is achieved. Water temperature is measured using sensors mounted on the primary and on the secondary sides. The readings from the sensors are processed in the integrated or delivered by a third-party controller which translates these into signals that can be used in the actuator of the pressure independent control valve (PICV) mounted on the primary side of the substation.

The PICV valve's functionality allows to limit the maximum flow regardless of pressure fluctuations and thus the contracted flow is never exceeded.

A substation can be connected to a network if it fulfills the utility company's technical conditions. These, amongst other, define the requirements concerning the measuring equipment.

Since hot water from a local or from a district heating network is delivered to DSA 1 MINI Micro Grid FR substation at different pressures and temperatures - the water temperature varies based on the outdoor conditions and depending on the season of the year - the quality of the measuring equipment is vital.

The DSA 1 MINI Micro Grid FR substation complies with the requirements by offering on the primary side thermometers and manometers designed particularly for district heating applications.

For more flexibility the substation is available with an energy meter or alternatively with an insert - a removable piece of pipe - instead of the energy meter. In the substation with the insert an energy meter (also a third-party device) can be selected and installed at a later stage. Naturally, there is a selection of Danfoss energy meters that can be installed in DSA 1 MINI Micro Grid FR as well.

The substation is always equipped with shut-off valves for service purposes.

The DSA 1 MINI Micro Grid FR offers an option of connecting an external domestic hot water (DHW) substation on the secondary side. There is a range of Danfoss DHW substations that can be sized to fit different requirements.

After transferring thermal energy from the primary to the secondary side water flows from the heat exchanger through the return lines on the primary side back to the local or the district heating network.

On the secondary side the DSA 1 MINI Micro Grid FR substation offers a selection of standard and optional items such as safety valves, safety thermostats, strainers with drain valves, connections for expansion vessels, manometers, shut off valves and thermometers.

The DSA 1 MINI Micro Grid FR has been designed to serve existing heating systems, already equipped with pumps and control valves. The substation also suits new applications where floor heating, radiator, domestic hot water and other systems have been already designed and pumps as well as control valves shall be delivered by a third party. These can be controlled from DSA 1 MINI Micro Grid FR using the integrated in the substation ECL310 controller along with different application keys. The keys are offered as accessories to best fit the particular application. The substation is also offered without the integrated controller in case a third part product should be used.

The substation is produced in two versions:

Version 1

DSA 1 MINI Micro Grid FR with the ECL 310 controller and with SonoMeter 40 heat meter,

Version 2

DSA 1 MINI Micro Grid FR without the controller and with an insert instead of the heat meter, in case third-party devices should be requested.

As a standard the integrated in the substation devices are connected to terminals of the electrical box which also comprises a safety thermostat. All other connections, power supply and the potential data transfer are arranged outside of the substation.

Design temperatures:

Primary side	°C	105 -> 75
Secondary side	°C	85 -> 65

If other temperatures are required the table "DSA 1 MINI Micro Grid FR - capacity in reference to the supply and return temperatures" should be consulted or the Danfoss customer support should be contacted.

Types / designation

DSA 1 MINI Micro Grid FR code builder		
Code	D(N) L/R YYY LXXX / SXXX FR	
D / N	Controller type	D = Danfoss ECL 310 N = no controller
L	Primary side connection direction	L = Left
R	Secondary side connection direction	R = Right
YYY	Capacity kW	20 kW: 020 / 50 kW: 050 / 75 kW: 075
LXXX	The length of the insert mounted instead of the energy meter in mm (if the insert is used the energy meter code: SXXX is skipped)	110 mm (G $\frac{3}{4}$): L110 190 mm (G 1"): L190
SXXX	The energy meter type, nominal flow in m ³ /h (if the energy meter is used the insert code: LXXX is skipped)	SonoMeter 40 QP 1,5 m ³ /h: S015 QP 2,5 m ³ /h: S025
FR	Substation's market code	French market

The DSA 1 MINI substation may be delivered in different configurations and for different operating parameters. These can be defined using the online tool: heatselector.danfoss.com

Example:

DSA 1 MINI Micro Grid FR DLR020S015FR

Substation type: DSA 1 MINI Micro Grid FR with ECL 310 controller, primary side connection on the left, secondary side connection on the right, nominal capacity 20 kW, comprising an energy meter SonoMeter 40 QP 1.5 m³/h, substation for French market.

Note:

The substation is designed to meet some particular French market requirements. However, it can be also used in other markets if the offered functionality meets the local needs.

Codes

Nominal capacity [kW]*	Substation version 1	Substation version 2	Weight approx. [kg]
	Energy meter SonoMeter 40 and ECL 310 controller	Insert instead of energy meter, no controller	
	DLRYYYXXXFR	NLRYYYLXXXFR	
	code		
20*	161L1444	161L1447	45
50*	161L1445	161L1448	50
75*	161L1446	161L1449	55

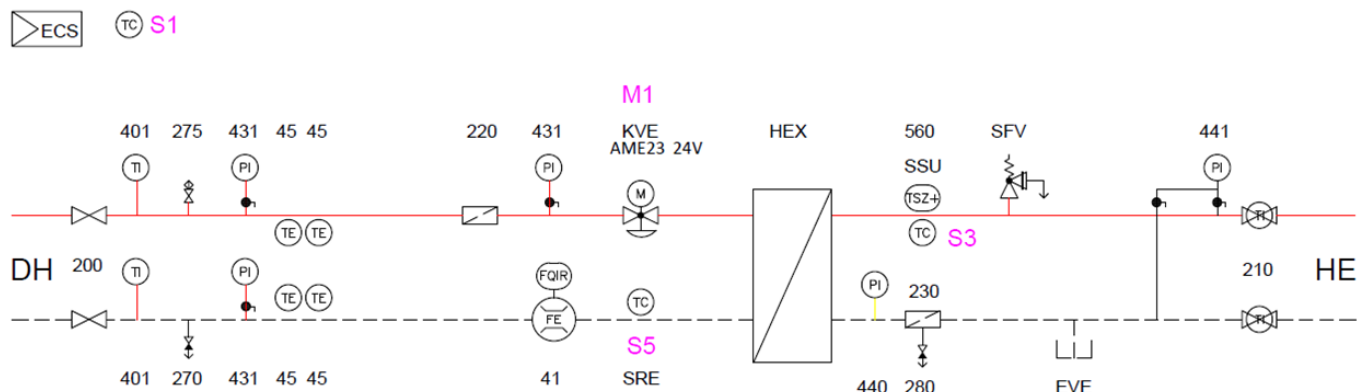
* Nominal capacity

For other capacities the table: "DSA 1 MINI Micro Grid FR - capacity in reference to the supply and return temperatures" should be consulted.

Substation version 1

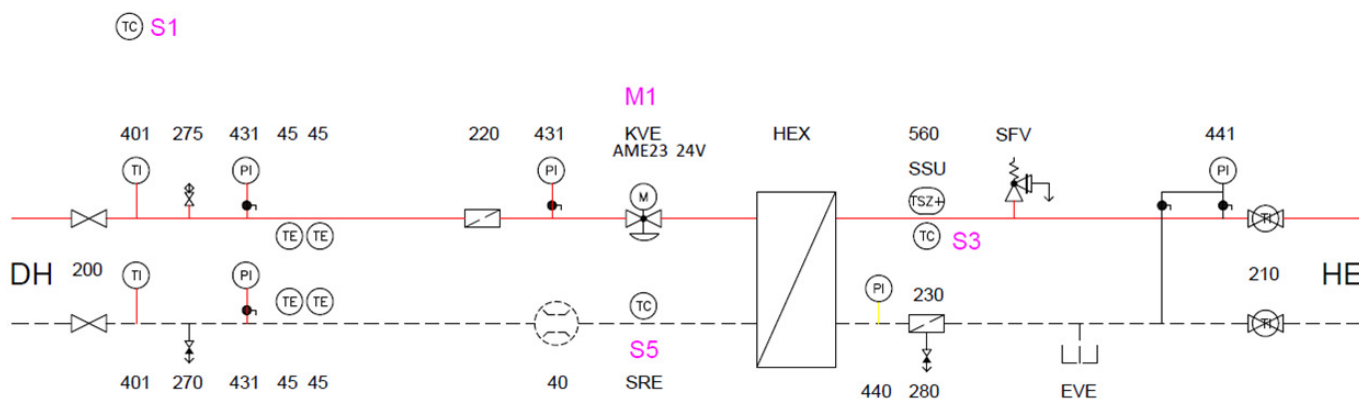
DSA 1 MINI Micro Grid FR with the ECL 310 controller and with the SonoMeter 40 heat meter

DSA 1 MINI Micro Grid FR

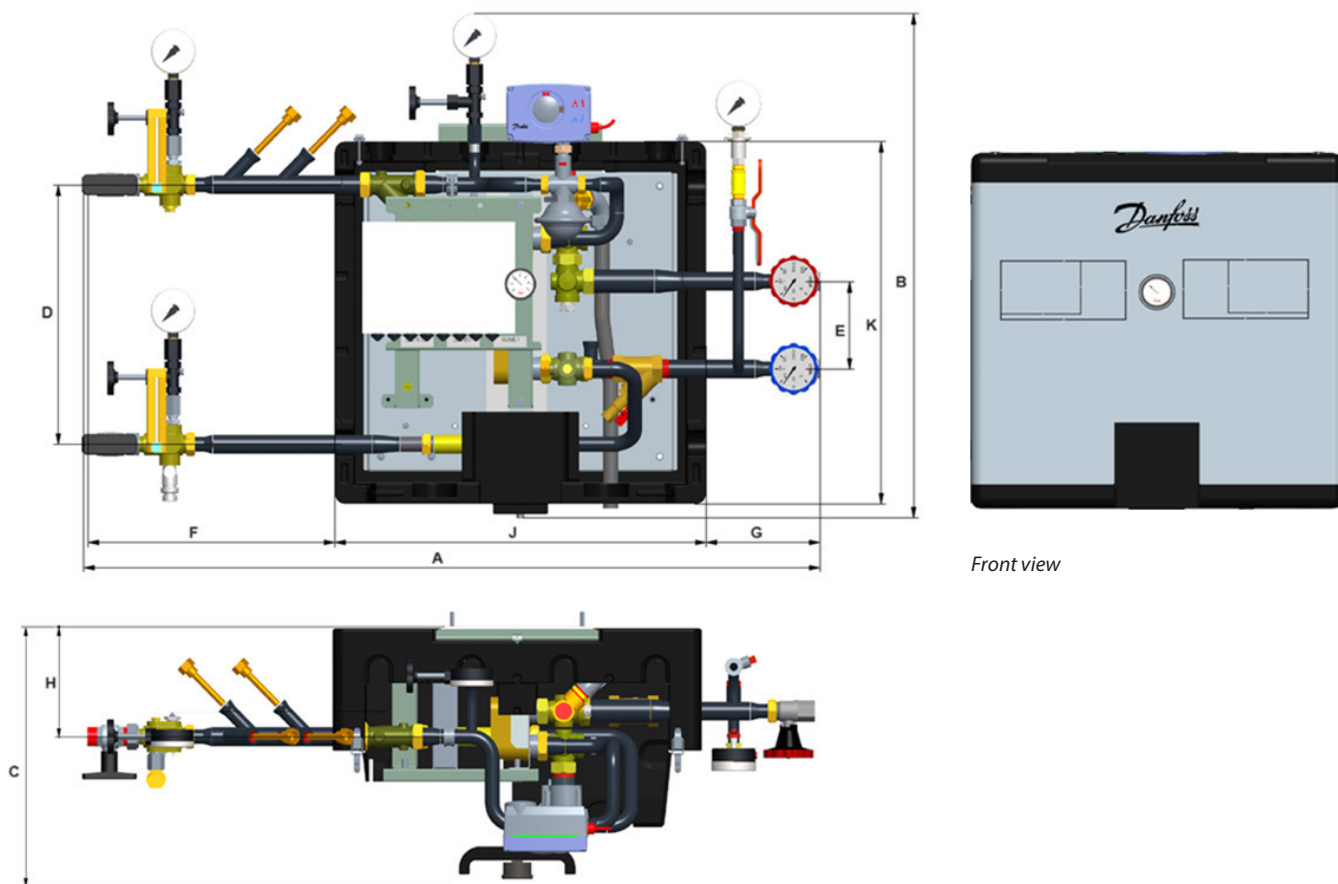


Substation version 2

DSA 1 MINI Micro Grid FR without the controller and with an insert instead of heat meter



Dimensions



Dimension [mm]	Substation version 1			Substation version 2		
	Nominal capacity [kW]			Nominal capacity [kW]		
	20	50	75	20	50	75
A	1348	1348	1356	1348	1348	1356
B	904	904	904	904	904	904
C	469	469	469	469	469	469
D	465	465	465	465	465	465
E	157	157	157	157	157	157
F	452	452	452	452	452	452
G	209	209	214	209	209	214
H	153	153	153	153	153	153
I	680	680	680	680	680	680
J	650	650	650	650	650	650

Legend / components

DSA 1 MINI Micro Grid FR main components	
HEX	Microplate heat exchanger (MPHE), brazed, type: XB12
KVE	Pressure independent control valve (PICV), PN25/max. 150°C, type AVQM
AME23	Electrical actuator, AME 23, supply voltage 24 V AC, control signal 0 (2) -10 V, 0 (4) -20 mA
40	Insert (a piece of a removable pipe) instead of a heat meter
41	Energy meter, PN25/max. 130°C, M-BUS, 230V~, type SonoMeter 40
45	Temperature sensor fitting for a heat meter - a sleeve or an adapter for a directly mounted sensor
200	Ball valve, PN25/max. 150°C, G1" ext. ISO 228/1
210	Ball valve, PN16/max. 120°C, G1" – G1½" int. ISO 228/1, with an integrated bimetal thermometer, size DA=80, class 1.0, temperature range: 0°C to 120°C
220	Strainer, PN25/max. 150°C, G1" or G1¼" ext. ISO 228/1
230	Strainer, PN16/max. 120°C, Rp 1¼"
270	High-pressure drain, PN25/max. 150°C, G¾", hose connection, with cap and chain
275	High pressure air vent, PN25/max. 150°C, G¼"
280	Drain, PN16/max. 120°C, G¾" with hose connection
401	Industrial thermometer, 0 – 160°C, 2grd, NG 150
431	Manometer, size DA = 50mm, 0-25 bar, class 1.6, G¼"
440	Manometer, size DA = 50 mm, 0 – 4 bar, class 2.5, capillary type
441	Manometer, size DA = 50 mm, 0 – 10 bar, class 2.5, capillary type
560	Safety thermostat, STW - safety temperature monitor
SRE	Return temperature limiter sensor PT1000
SFV	Safety valve, opening pressure: 3.0 bar, TÜV or INAIL
EVE	Expansion vessel connection, Rp¾" with plug
Application key	If the substation is delivered with the ECL310 controller, it can serve different purposes: • floor heating system, • radiator system, • domestic hot water system • buffer tank • other To secure the desired functionality a suitable application key must be selected and mounted in the ECL310 controller. The application key is offered as an accessory. The accessory table should be consulted to choose the required application key.

Technical data

QP [kW]	PN	Insert instead of energy meter	Energy meter SONOMETER 40	Control valve		Actuator type AME	Number of plates in HEX XB12H-1-	Primary side			Secondary side			Safety valve opening pressure bar (g)	Safety thermostat type
				type	KVS [m³/h]			DN	VP max. [m³/h]	dp max. [kPa]	DN	VP max. [m³/h]	dp max. [kPa]		
20*	25	—	QP 1.5	AVQM	1,6	23	16	G1"	0,90	85	Rp 1"	0,86	31	3.0 / TÜV	STW 20 .. 150 °C
50*	25	—	QP 2.5	AVQM	4	23	36	G1"	2,40	130	Rp 1"	2,15	36	3.0 / TÜV	STW 20 .. 150 °C
75*	25	—	QP 2.5	AVQM	6,3	23	60	G1"	2,50	95	Rp 1¼"	3,22	44	3.0 / TÜV	STW 20 .. 150 °C
20*	25	G¾" × 110	—	AVQM	1,6	23	16	G1"	0,90	85**	Rp 1"	0,86	31	3.0 / TÜV	STW 20 .. 150 °C
50*	25	G1" × 190	—	AVQM	4	23	36	G1"	2,40	130**	Rp 1"	2,15	36	3.0 / TÜV	STW 20 .. 150 °C
75*	25	G1" × 190	—	AVQM	6,3	23	60	G1"	3,50	170**	Rp 1¼"	3,22	44	3.0 / TÜV	STW 20 .. 150 °C

* Nominal capacity at the primary supply / return temperatures: 105/75°C.

For other capacities the table: "DSA 1 MINI Micro Grid FR - capacity in reference to the supply and return temperatures" should be consulted.

dp max – maximum pressure loss on the primary side or on the secondary side (for the pump selection) at Vp max

** This pressure drop value comprises the pressure loss on the heat meter that is expected to be installed at a later stage (based on the SONOMETER 40 kv value).

VP max – maximum flow on the primary or secondary sides

DSA 1 MINI Micro Grid FR - capacity in reference to the supply and return temperatures

TVP	TRP	TVS	TRS at nominal capacity 20 kW	TRS at nominal capacity 50 kW	TRS at nominal capacity 75 kW	Nominal capacity [kW]		
						20*	50*	75*
						Max flow on the primary side [m³/h]		
						0,9	2,4	3,5
						Max flow on the secondary side [m³/h]		
						1,32	2,65	4,3
[°C]						QP max [kW]		
120	80	90	63	54	58	42	112	163
120	75	85	54	44	48	47	126	184
120	70	80	46	35	39	53	140	204
120	65	75	37	25	30	58	154	225
120	60	70	29	16	21	63	168	245
120	55	65	21	6	12	68	182	265
115	80	90	66	58	61	37	98	143
115	75	85	58	49	53	42	112	163
115	70	80	49	39	43	47	126	184
115	65	75	41	30	34	53	140	204
115	60	70	32	20	25	58	154	225
115	55	65	24	11	16	63	168	245
110	80	90	69	63	65	32	84	123
110	75	85	61	53	56	37	98	143
110	70	80	53	44	48	42	112	163
110	65	75	44	34	38	47	126	184
110	60	70	36	25	29	53	140	204
110	55	65	27	15	20	58	154	225
105	80	90	73	67	70	26	70	102
105	75	85	64	58	60	32	84	123
105	70	80	56	48	51	37	98	143
105	65	75	48	39	43	42	112	163
105	60	70	39	29	33	47	126	184
105	55	65	31	20	24	53	140	204

TVP – supply temperature on the primary side

TVS – supply temperature on the secondary side

TRP – return temperature on the primary side

TRS – return temperature on the secondary side

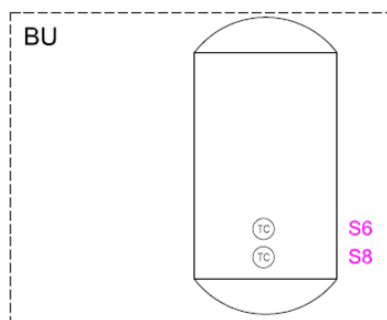
TVP	TRP at nominal capacity 20 kW	TRP at nominal capacity 50 kW	TRP at nominal capacity 75 kW	TVS	TRS	Nominal capacity [kW]		
						20*	50*	75*
						Max flow on the primary side [m³/h]		
						0,9	2,4	3,5
						Max flow on the secondary side [m³/h]		
						1,32	2,65	4,3
[°C]						QP max [kW]		
120	106	109	108	90	80	15	31	50
120	98	104	102	90	75	23	46	75
120	90	98	96	90	70	31	62	100
120	83	93	89	90	65	39	77	125
120	76	87	83	90	60	46	93	151
120	69	81	77	90	55	54	108	176
115	101	104	103	85	75	15	31	50
115	93	99	97	85	70	23	46	75
115	85	93	91	85	65	31	62	100
115	78	88	84	85	60	39	77	125
115	71	82	78	85	55	46	93	151
115	64	76	72	85	50	54	108	176
110	96	99	98	80	70	15	31	50
110	88	94	92	80	65	23	46	75
110	80	88	86	80	60	31	62	100
110	73	83	79	80	55	39	77	125
110	66	77	73	80	50	46	93	151
110	59	71	67	80	45	54	108	176
105	91	94	93	75	65	15	31	50
105	83	89	87	75	60	23	46	75
105	75	83	81	75	55	31	62	100
105	68	78	74	75	50	39	77	125
105	61	72	68	75	45	46	93	151
105	54	66	62	75	40	54	108	176

Accessories

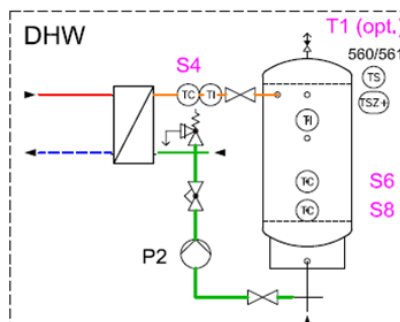
Code	Description	Marking in the drawing
168F0000	Push-in temperature sensor with connecting cable, PT1000, length 50 mm, max temperature 180°C Pocket for temperature sensor, length 100 mm, connection G½", stainless steel Cable gland, strain relief, M 12 × 1.5 mm	S4
168F0001	Push-in temperature sensor with connecting cable, PT1000, length 50 mm, max temperature 180°C Pocket for temperature sensor, length 200 mm, connection G½", stainless steel Cable gland, strain relief, M 12 × 1.5 mm	S6 or S8
168F0002	Thermostat type STW AT 20: safety temperature monitor range (STW): 40°C to 100°C, sensor connection: G½"	
168F0003	Double pocket for temperature sensor, length 200 mm	
168F0004	Temperature controller type TR and safety thermostat type STW AT 120: • TR temperature range: 0–120°C, • STW safety temperature monitor range: 70–130°C, Sensor connection G½"	
168F0005	Adapter for a direct temperature sensor L = 27,5 mm, connection: M10 × 1,0 mm / G ½", stainless steel	
168F0006	Adapter for a direct temperature sensor L = 38,0 mm, connection: M10 × 1,0 mm / G ½", stainless steel	
087H3821	A337 – application key for ECL310*	
087H3822	A347 – application key for ECL310*	
087H3825	A367 – application key for ECL310*	
087H3827	A377 – application key for ECL310*	
087H3832	A390 – application key for ECL310*	
168F0007	Insulation shell for a ball valve DN25–32, max temperature 135°C	
168F0008	Insulation shell for a ball valve DN40–50, max temperature 135°C	

*Other application keys are available on request

The accessories: 168F0000, 168F0001, 168F0002, 168F0003 and 168F0004 are used in domestic hot water substations (DHW) or in buffer tanks (BU) that can be connected to DSA 1 MINI Micro Grid FR. These accessories must be ordered separately.



Accessories - temperature sensors S6 and S8 mounted in a buffer tank (BU).



Accessories - temperature sensors S6 and S8 mounted in a domestic hot water tank (DHW) and S4 in the supply line for the charging process control; the safety thermostat T1 is an additional option.



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