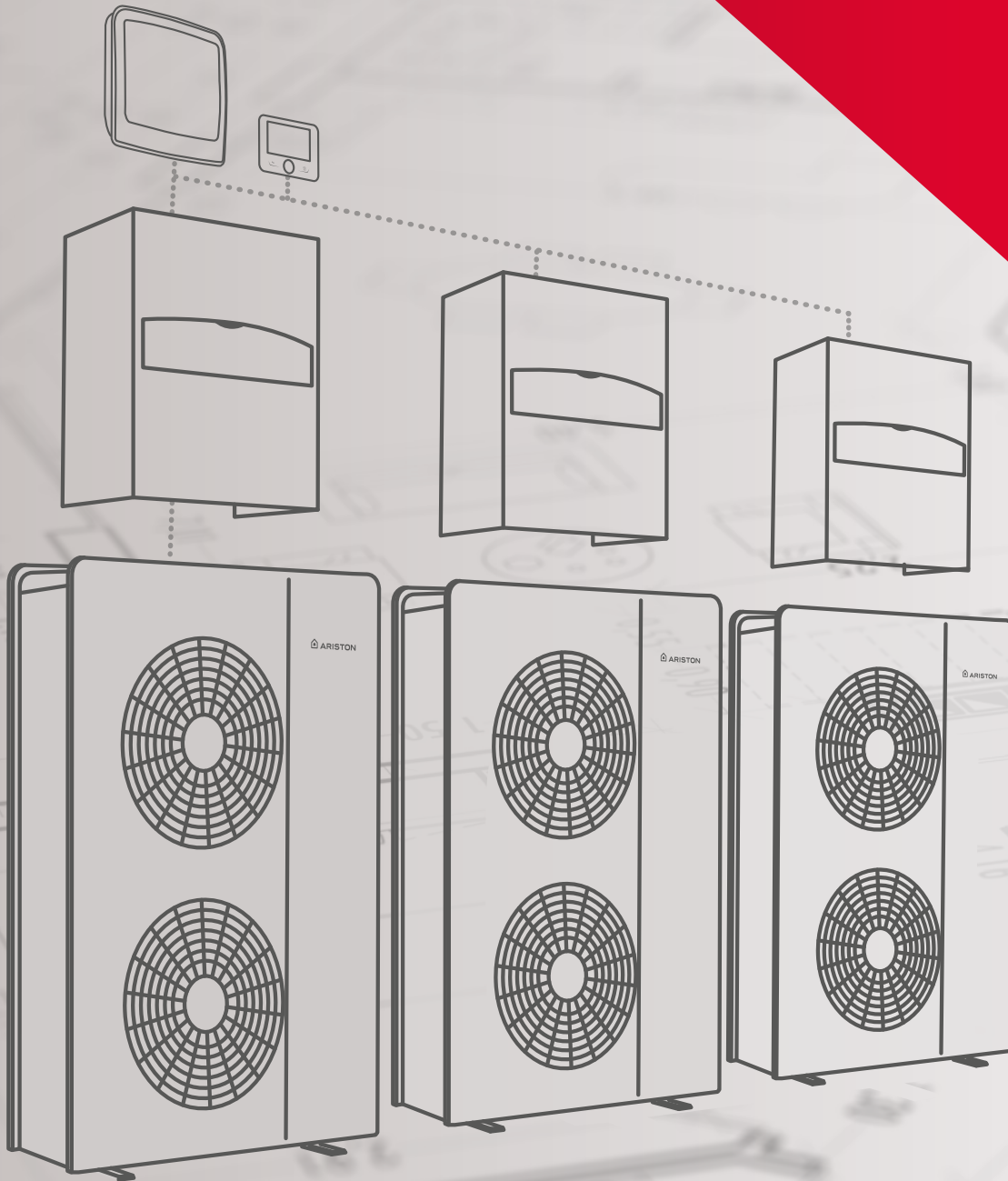




# ARISTON

The home of sustainable comfort



PROFESSIONAL MANUAL

## **Nimbus NET R32 - Cascade**

Heat pumps in cascade and high-power hybrid systems

release 09 | 2023









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# 1. MAIN COMPONENTS





			TOTAL CAPACITY HHP CASCADE (kW) <sup>(2)</sup>						
				NIMBUS 80 S EXT R32	NIMBUS 80 S-T EXT R32	NIMBUS 80 M EXT R32	NIMBUS 80 M-T EXT R32	NIMBUS 120 M-T EXT R32	NIMBUS 150 M-T EXT R32
	NIMBUS PLUS S NET R32 CASCADE <sup>(1)</sup>	80x2 1ph	16	2	-	-	-	-	-
		80x2 3ph	16	-	2	-	-	-	-
	NIMBUS PLUS M NET R32 CASCADE <sup>(1)</sup>	80x2 - 1ph	16	-	-	2	-	-	-
		80x2 - 3ph	16	-	-	-	2	-	-
		120x2 - 3ph	24	-	-	-	-	2	-
		120x3 - 3ph	36	-	-	-	-	3	-
		150x2 - 3ph	30	-	-	-	-	-	2
		150x3 - 3ph	45	-	-	-	-	-	3
		150x4 - 3ph	60	-	-	-	-	-	4
		150x5 - 3ph	75	-	-	-	-	-	5
	NIMBUS POCKET M NET R32 CASCADE <sup>(1)</sup>	80x2 - 1ph	16	-	-	2	-	-	-
		80x2 - 3ph	16	-	-	-	2	-	-
		120x2 - 3ph	24	-	-	-	-	2	-
		120x3 - 3ph	36	-	-	-	-	3	-
		150x2 - 3ph	30	-	-	-	-	-	2
		150x3 - 3ph	45	-	-	-	-	-	3
		150x4 - 3ph	60	-	-	-	-	-	4
		150x5 - 3ph	75	-	-	-	-	-	5

## NOTES

<sup>(1)</sup> Only heat pumps of the same size and type can be combined.

<sup>(2)</sup> Rated power in heating mode  $T_{air}=+7^{\circ}\text{C}$  and  $T_w=35^{\circ}\text{C}$ .

<sup>(3)</sup> UNIVERSAL SENSOR: not standard-supplied but mandatory for creating the system.

										
NIMBUS WH S	NIMBUS WH M	NIMBUS WH-L M	NIMBUS LB	CASCADE MANAGER	SENSYS HD	SYSTEM DELIVERY SENSOR T10	BUFFER TANK SENSOR (3) (mandatory - not included)	GATEWAY CONNECTIVITY LIGHT GATEWAY WI-FI	GPRS GATEWAY (optional)	OUTDOOR SENSOR
2	-	-	-	1	1	1	1	1		1
2	-	-	-	1	1	1	1	1		1
-	2	-	-	1	1	1	1	1		1
-	2	-	-	1	1	1	1	1		1
-	-	2	-	1	1	1	1	1		1
-	-	3	-	1	1	1	1	1		1
-	-	2	-	1	1	1	1	1		1
-	-	3	-	1	1	1	1	1		1
-	-	4	-	1	1	1	1	1		1
-	-	5	-	1	1	1	1	1		1
-	-	-	2	1	1	1	1	1		1
-	-	-	2	1	1	1	1	1		1
-	-	-	2	1	1	1	1	1		1
-	-	-	3	1	1	1	1	1		1
-	-	-	2	1	1	1	1	1		1
-	-	-	3	1	1	1	1	1		1
-	-	-	4	1	1	1	1	1		1
-	-	-	5	1	1	1	1	1		1

## 2. TECHNICAL DATA

### Selection table for Commercial Hybrid Systems

In a Hybrid system is fundamental to choose the correct power ratio between Heat Pump and Boiler. This parameter has a direct influence on investment expenses and energy/cost saving for the end user. In the table below is shown the power ratio between Heat Pumps in Cascade and Genus Premium Evo HP commercial boiler, and a qualitative evaluation of the impact of the different power ratios in energy consumption.

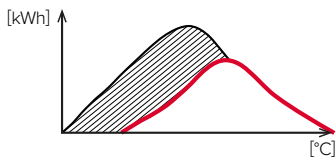
			Boiler GENUS PREMIUM EVO HP						
Ratio Heat Pump / Boiler power*			45	65	85	100	115	150	
HEAT PUMP	Size	Number	Power*	39,8 kW	57,3 kW	80,0 kW	88,0 kW	109,0 kW	140,0 kW
	8	1	8 kW	20%	14%	10%	9%	7%	6%
	12	1	12 kW	30%	21%	15%	14%	11%	9%
	15	1	15 kW	38%	26%	19%	17%	14%	11%
	8	2	16 kW	40%	28%	20%	18%	15%	11%
	12	2	24 kW	60%	42%	30%	27%	22%	17%
	8	3	24 kW	60%	42%	30%	27%	22%	17%
	15	2	30 kW	75%	52%	38%	34%	28%	21%
	8	4	32 kW	80%	56%	40%	36%	29%	23%
	12	3	36 kW	90%	63%	45%	41%	33%	26%
	8	5	40 kW	101%	70%	50%	45%	37%	29%
	15	3	45 kW	113%	79%	56%	51%	41%	32%
	12	4	48 kW	121%	84%	60%	55%	44%	34%
	15	4	60 kW	151%	105%	75%	68%	55%	43%
	12	5	60 kW	151%	105%	75%	68%	55%	43%
15	5	75 kW	188%	131%	94%	85%	69%	54%	

\*Heat pump: nominal power A7W35  
Boiler: max thermal output at 80/60°C



#### ratio < 25%

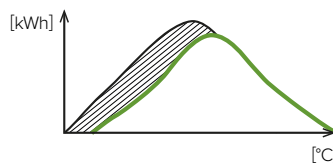
The heat pump size is small: small increase in size of the heat pump can easily lead to a significant improve in renewable energy share



Boiler operating range Heat pump operating range

#### ratio between 25% and 50%

The heat pump size is perfectly balanced with almost 70-80% of renewable energy share on the overall heat demand



#### ratio > 50%

The heat pump size is already large: the increase in renewable energy share that can be achieved by increasing even more its size is really limited



## 2. TECHNICAL DATA

The ARISTON heat pumps cascade is a system of heat pumps connected to one another hydraulically and electrically that work in a combined, smart and efficient way thanks to the coordination of the cascade manager, to supply heating, cooling and domestic hot water production functions in installations requiring high heat outputs.

The ARISTON cascade can be created with various types of heat pumps.

- / Nimbus S: split heat pumps (with indoor unit);
- / Nimbus M: hydronic monobloc heat pumps (with indoor unit);
- / Nimbus M Pocket: hydronic monobloc heat pumps (without indoor unit).

At a hydraulic level, the heat pumps are connected in parallel on common delivery and return manifolds, and supply – for space heating and cooling – a buffer tank, which also functions as a hydraulic separator, for guaranteeing optimal performances in terms of water flow rates for both the heat pumps (primary circuit) and the system (secondary circuit).

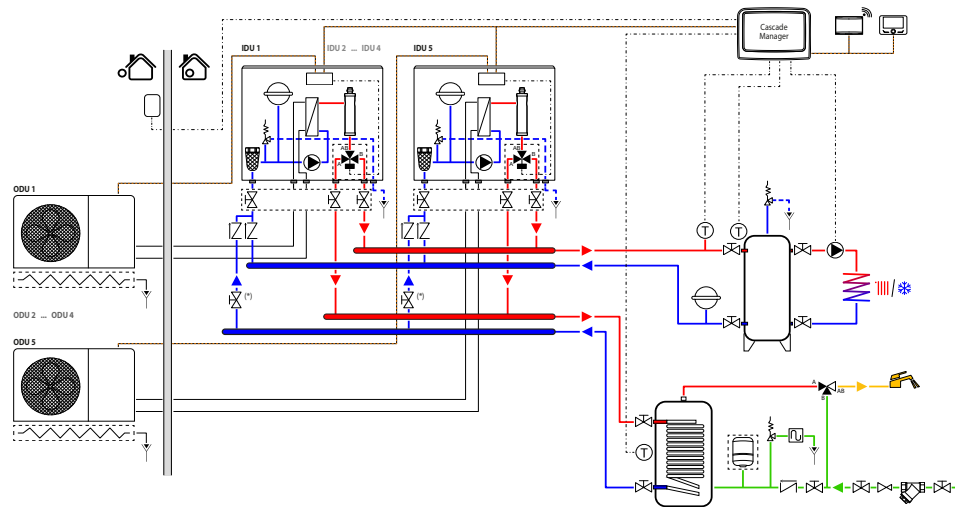
For space heating and cooling, the cascade manager, thanks to the presence of a delivery sensor and a buffer sensor, is able to constantly define the power requirements of the system by activating a suitable number of heat pumps and modulating them accordingly to optimise the system's efficiency and maximise comfort.

One or more heat pumps can also be dedicated to the production of domestic hot water, by means of a hydraulic connection in parallel to the common dedicated delivery and return manifolds, for supplying one or more domestic hot water storage tanks. The domestic hot water service is managed by the cascade manager in such a way that domestic hot water can be produced in parallel with space heating/cooling, provided there are heat pumps available in the system.

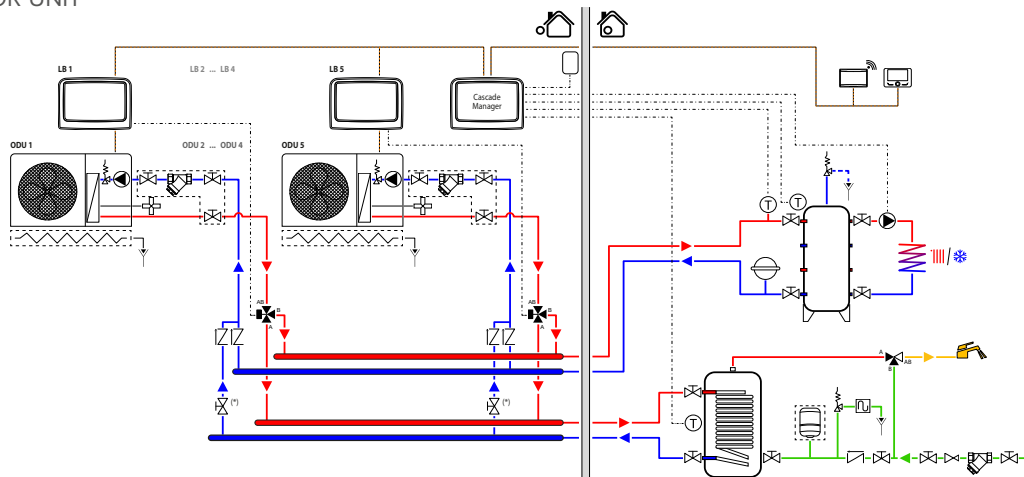
For both the space heating and domestic hot water production services, the system manager can use supplementary heat sources to aid the heat pumps or replace them if none are available, for guaranteeing, whenever required, maximum comfort and continuity of service even in emergency situations.

The supplementary heat sources can include integrated heating elements present in the heat pump models with indoor unit and a gas-fired boiler.

### CASCADE WITH INDOOR UNIT

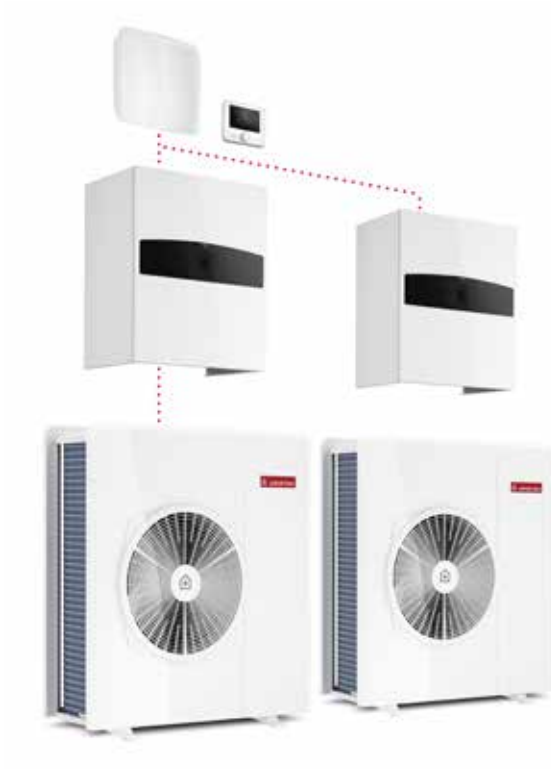


### CASCADE WITHOUT INDOOR UNIT



## 2. TECHNICAL DATA

### SPLIT HEAT PUMPS



NIMBUS S EXT R32 - CASCADE		80 S x 2	80 S-T x 2
PERFORMANCE IN SPACE HEATING MODE		<i>Min / Nom / Max</i>	
Nominal heat output (Ta +7°C, Tw 35/30°C)	kW	2.74 / 16.0 / 23.5 (11.75+11.75)	2.74 / 16.0 / 23.5 (11.75+11.75)
CoP of single heat pump at the nominal power		4.8	4.8
PERFORMANCE IN SPACE COOLING MODE		<i>Min / Nom / Max</i>	
Nominal heat output (Ta +35°C, Tw 7/12°C)	kW	2.65 / 14.0 / 17.0	2.65 / 14.0 / 17.0
EER of single heat pump at the nominal power		3.10	3.10
TECHNICAL DATA			
Type of refrigerant / GWP		R32 / 675	R32 / 675
Refrigerant charge	g	1800 x 2	1800 x 2
CO <sub>2</sub> eq.	ton	2.43	2.43
Back-up heating element	kW	4 + 4	4 + 4
Power output / maximum current draw*	kW/A	9.06 / 39.4	9.06 / 14.4
Voltage-Phase-Frequency	V-ph-Hz	230-1-50	400-3-50

\* maximum current draw in heat pump mode only



## HYDRONIC MONOBLOC HEAT PUMPS (WITH INDOOR UNIT)



NIMBUS M EXT R32 - CASCADE		80 M x 2	80 M-T x 2	120x2	150x2	120x3	150x3	150x4	150x5
<b>PERFORMANCE IN SPACE HEATING MODE</b>		<i>Min / Nom / Max</i>							
Nominal heat output (Ta +7°C, Tw 35/30°C)	kW	2.7/16.0/23.5	2.7/16.0/23.5	4.1/24.0/28.7	4.1/30.0/35.3	4.1/36.0/43.1	4.1/45.0/53.0	4.08/60/71.6	4.1/75.0/88.3
CoP of single heat pump at the nominal power		4.8	4.8	4.9	4.7	4.9	4.7	4.7	4.7
<b>PERFORMANCE IN SPACE COOLING MODE</b>		<i>Min / Nom / Max</i>							
Nominal heat output (Ta +35°C, Tw 7/12°C)	kW	2.65/14.0/17.0	2.65/14.0/17.0	3.7/18.1/20.6	3.7/22.0/23.8	3.7/27.15/30.9	3.7/33.0/35.6	3.7/44.0/47.5	3.7/55.0/59.4
EER of single heat pump at the nominal power		3.10	3.10	3.15	2.93	3.15	2.93	2.93	2.93
<b>TECHNICAL DATA</b>									
Type of refrigerant / GWP		R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675
Refrigerant charge	g	1400 x 2	1400 x 2	2100 x 2	2100 x 2	2100 x 3	2100 x 3	2100 x 4	2100 x 5
CO <sub>2</sub> eq.	ton	1.89	1.89	2.84	2.84	4.25	4.25	5.67	7.09
Back-up heating element	kW	4+4	4+4	6+6	6+6	6+6+6	6+6+6	6+6+6+6	6+6+6+6+6
Power output / maximum current draw *	kW/A	9.06 / 42.6	9.06 / 42.6	10.3 / 16.6	12.4 / 20	15.45 / 24.9	18.5 / 30	24.7 / 40	30.9 / 50
Voltage-Phase-Frequency	V-ph-Hz	230-1-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50

\* maximum current draw in heat pump mode only

## 2. TECHNICAL DATA

### HYDRONIC MONOBLOC HEAT PUMPS (WITHOUT INDOOR UNIT)



### POCKET TECHNICAL DATA

NIMBUS M EXT R32 - CASCADE		80 M x 2	80 M-T x 2	120x2	150x2	120x3	150x3	150x4	150x5
PERFORMANCE IN SPACE HEATING MODE		<i>Min / Nom / Max</i>							
Nominal heat output (Ta +7°C, Tw 35/30°C)	kW	2.7/16.0/23.5	2.7/16.0/23.5	4.1/24.0/28.7	4.1/30.0/35.3	4.1/36.0/43.1	4.1/45.0/53.0	4.08/60/71.6	4.1/75.0/88.3
CoP of single heat pump at the nominal power		4.8	4.8	4.9	4.7	4.9	4.7	4.7	4.7
PERFORMANCE IN SPACE COOLING MODE		<i>Min / Nom / Max</i>							
Nominal heat output (Ta +35°C, Tw 7/12°C)	kW	2.65/14.0/17.0	2.65/14.0/17.0	3.7/18.1/20.6	3.7/22.0/23.8	3.7/27.15/30.9	3.7/33.0/35.6	3.7/44.0/47.5	3.7/55.0/59.4
EER of single heat pump at the nominal power		3.10	3.10	3.15	2.93	3.15	2.93	2.93	2.93
TECHNICAL DATA									
Type of refrigerant / GWP		R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675	R32 / 675
Refrigerant charge	g	1400 x 2	1400 x 2	2100 x 2	2100 x 2	2100 x 3	2100 x 3	2100 x 4	2100 x 5
CO <sub>2</sub> eq.	ton	1.89	1.89	2.84	2.84	4.25	4.25	5.67	7.09
Back-up heating element	kW	4+4	4+4	6+6	6+6	6+6+6	6+6+6	6+6+6+6	6+6+6+6+6
Power output / maximum current draw *	kW/A	9.06 / 42.6	9.06 / 42.6	10.3 / 16.6	12.4 / 20	15.45 / 24.9	18.5 / 30	24.7 / 40	30.9 / 50
Voltage-Phase-Frequency	V-ph-Hz	230-1-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50	400-3-50

\* maximum current draw in heat pump mode only

## 3. OUTDOOR UNIT

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### NIMBUS EXT R32 S

Regarding the SPECIFICATION DESCRIPTION chapters of the single SPLIT OUTDOOR UNITS, consult the updated version of the specific dedicated Professional Manual of the product.

The models that can be used are:

- / NIMBUS EXT R32 80 S;
- / NIMBUS EXT R32 80 S-T;



### NIMBUS EXT R32 M (POCKET)

Regarding the SPECIFICATION DESCRIPTION chapters of the single MONOBLOC OUTDOOR UNITS, consult the updated version of the specific dedicated Professional Manual of the product.

The models that can be used are:

- / NIMBUS EXT R32 80 M;
- / NIMBUS EXT R32 80 M-T;
- / NIMBUS EXT R32 120 M-T;
- / NIMBUS EXT R32 150 M-T.



## 4. INDOOR UNIT

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### NIMBUS WH R32 S

Regarding the SPECIFICATION DESCRIPTION chapters of the single SPLIT INDOOR UNITS, consult the updated version of the specific dedicated Professional Manual of the product.

/ NIMBUS WH S



### NIMBUS WH R32 M

Regarding the SPECIFICATION DESCRIPTION chapters of the MONOBLOC INDOOR UNITS, consult the updated version of the specific dedicated Professional Manual of the product.

The models that can be used are:

/ NIMBUS WH M;  
/ NIMBUS WH-L M.



## 5. SPECIFICATION DESCRIPTION

### CASCADE MANAGER



- / A BUS device that controls several machines operating with a heat pump as a single energy generator for the space heating, cooling and domestic hot water production system;
- / Optimisation of the efficiency and operating duration of the generators;
- / Modulation of the system with control of the starting and stopping of the heat pumps;
- / Possibility of controlling up to 5 units based on heat pumps;
- / Management of the power and of the functional parameters of the units: operating duration, status and availability of each unit, of each single heat pump;
- / Management of two thermal zones with on/off input contacts;
- / 2 auxiliary input contacts;
- / Management of a supplementary generator for creating a hybrid system;
- / Management of the buffer tank and impressed-current anode;
- / Management of 2 auxiliary programmable inputs and 4 auxiliary programmable outputs;
- / Management of the circulator pump feeding the buffer tank and of the secondary relaunch device;
- / Photovoltaic function: possibility of interaction with photovoltaic systems in order to reduce consumption;
- / Dehumidification function: possibility of controlling the machine's operation on the basis of the humidity in the room of installation;
- / Management of the space heating/domestic hot water diverter valve and of the space heating/cooling diverter valve with possible different terminals;
- / 230 V - 1 ph - 50 Hz power supply;
- / 6 W rated power input;
- / Rated/maximum current 25/140 mA.

### NIMBUS LB M



#### LIGHT BOX

PCB holder with high- and low-voltage connections for Nimbus Pocket, installable also outdoors; includes the following elements:

- / Product PCB;
- / Terminal board for low-voltage connections;
- / Terminal board for high-voltage connections;
- / Terminal board for power supply;
- / Dimensions (WxHxD): 376 x 275 x 61 mm;
- / Weight: 2.5 kg;
- / Electrical protection rating IPX5.

### SENSYS HD SYSTEM INTERFACE



System manager featuring a 4.3" high-resolution modulating display for measuring the room temperature and controlling the system's operating parameters. The BUS BridgeNet® protocol allows for:

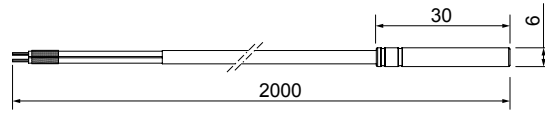
- / Switching the heat pump on and off;
- / Setting the operating modes;
- / Viewing and setting the room temperature and the domestic hot water temperature, and the system diagnostics values;
- / Performing multi-temperature, daily and weekly time scheduling of the room temperature in the heating and cooling modes;
- / Performing time scheduling of the domestic hot water production;
- / Activating/setting the AUTO function (climate temperature control);
- / Controlling all functions of the heat pump and of the indoor unit;
- / Performing guided setting/configuration of the system parameters;
- / Viewing and releasing errors;
- / Viewing the energy reports (sensitive statistics of the boiler and heat pump, SCOP, SEER, estimate of the hot water available);
- / Personalising the home screen;
- / Powering and connecting the ARISTON system via bus (ARISTON BUS BridgeNet® proprietary protocol);
- / Electrical protection rating: IP20;
- / Operating temperatures: -10°C/+50°C.

## 5. SPECIFICATION DESCRIPTION

### T10 SYSTEM DELIVERY SENSOR

Thermowell sensor;

- / NTC sensor 10 k $\Omega$ ;
- /  $\beta=3977$ ;
- / Temperature range -20/95°C;

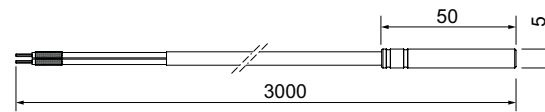


- / Isolation resistance 100 Mohm;
- / Isolation voltage 3750 V;
- / IP 67 protection rating.

### UNIVERSAL SENSOR (mandatory - not included)

Thermowell sensor to be used for buffer tanks and indirect cylinders:

- / NTC 10 k sensor;
- / Temperature range -20/95°C;
- / Isolation resistance 100 Mohm;



- / Isolation voltage 3750 V;
- / IP 67 protection rating.

### LIGHT GATEWAY WI-FI



A device for connecting the new generation ARISTON system and the home Wi-Fi network:

- / Compatible with Wi-Fi ADSL router with WEP and WPA/ WPA2 Personal encryption 2.5 GHz;
- / Powering and connection to ARISTON system via BUS (ARISTON BUS BridgeNet® proprietary protocol);

- / Configuration for housing and powering the Sensys HD modulating system manager;
- / Electrical protection rating: IP20;
- / Operating temperatures: 0°C/+50°C.

### GATEWAY GPRS (optional)



Communication interface between the Cascade Manager control unit and Sensys HD for using connectivity via GPRS.

- / Compatible with GPRS connection via a suitable integrated board;
- / Powering and connection to ARISTON system via BUS (ARISTON BUS BridgeNet® proprietary protocol);

- / Configuration for powering the Sensys HD modulating system manager;
- / Electrical protection rating: IPX4D;
- / Operating temperatures: -25/+55°C;
- / Consumption 7 W - 30 mA.

### EXTERNAL SENSOR



Sensor for reading the outdoor temperature. Connectible via cable at a maximum distance of 50 m.

## BUFFER TANK



### CKZ H 200 BUFFER TANK FOR SPACE HEATING/COOLING

- / Steel buffer tank without porcelain glass coating, installed on a base, and white-coated covering sheet;
- / Capacity: 197 litres;
- / Thermal insulation: polyurethane foam, thickness 50 mm;
- / Heat dispersion: 76 W;
- / ERP Class: C;
- / 8 x 1<sup>1</sup>/<sub>2</sub> hydraulic fittings for heat generators;
- / 1<sup>1</sup>/<sub>2</sub> hydraulic fitting for relief outlet;
- / 1/2" drainage hydraulic fitting;
- / 1/2" thermometer connection;
- / 4 thermowells diameter 1/2";
- / Maximum operating pressure: 6 bar;
- / Maximum operating temperature: 95°C;
- / Dimensions without insulation: diameter 498 mm, height 1230 mm;
- / No-load weight: 48 kg.

### CKZ H 400 BUFFER TANK FOR SPACE HEATING/COOLING

- / Steel buffer tank without porcelain glass coating, installed on a base, and white-coated covering sheet;
- / Capacity: 403 litres;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 97 W;
- / ERP Class: C;
- / 8 x 2" hydraulic fittings for heat generators;
- / 2" hydraulic fitting for relief outlet;
- / 3/4" drainage hydraulic fitting;
- / 1/2" thermometer connection;
- / 4 thermowells diameter 1/2";
- / Maximum operating pressure: 6 bar;
- / Maximum operating temperature: 95°C;
- / Dimensions without insulation: diameter 500 mm, height 1655 mm;
- / No-load weight: 76 kg.

### CKZ H 300 BUFFER TANK FOR SPACE HEATING/COOLING

- / Steel buffer tank without porcelain glass coating, installed on a base, and white-coated covering sheet;
- / 298-litre capacity;
- / Thermal insulation: polyurethane foam, thickness 50 mm;
- / Heat dispersion: 92 W;
- / ERP Class: C;
- / 8 x 1<sup>1</sup>/<sub>2</sub> hydraulic fittings for heat generators;
- / 1<sup>1</sup>/<sub>2</sub> hydraulic fitting for relief outlet;
- / 3/4" drainage hydraulic fitting;
- / 1/2" thermometer connection;
- / 4 thermowells diameter 1/2";
- / Maximum operating pressure: 6 bar;
- / Maximum operating temperature: 95°C;
- / Dimensions without insulation: diameter 500 mm, height 1760 mm;
- / No-load weight: 63 kg.

### CKZ H 500 BUFFER TANK FOR SPACE HEATING/COOLING

- / Steel buffer tank without porcelain glass coating, installed on a base, and white-coated covering sheet;
- / 473-litre capacity;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 105 W;
- / ERP Class: C;
- / 8 x 2" hydraulic fittings for heat generators;
- / 2" hydraulic fitting for relief outlet;
- / 3/4" drainage hydraulic fitting;
- / 1/2" thermometer connection;
- / 4 thermowells diameter 1/2";
- / Maximum operating pressure: 6 bar;
- / Maximum operating temperature: 95°C;
- / Dimensions without insulation: diameter 500 mm, height 1900 mm;
- / No-load weight: 106 kg.

## 5. SPECIFICATION DESCRIPTION

### INDIRECT CYLINDERS



#### CD1 200 HHP SINGLE-COIL HOT WATER INDIRECT CYLINDER FOR HEAT PUMPS

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 190-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam;
- / Heat dispersion: 1.28 kWh/day;
- / ERP Class: B;
- / High-performance coil with 2 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 22.7 kW;
- / Coil capacity: 13 litres;
- / Head losses from coil at 15 l/min: 88 mbar;
- / Magnesium anode;
- / Active anode;
- / 1" M hydraulic fittings for cold water inlet and hot water outlet;
- / 1" F hydraulic fittings for connection of the coil to the heat pump;
- / 3/4" F hydraulic fitting for domestic water recirculation;
- / 3/4" F hydraulic fitting for domestic water drainage;
- / 3 thermowells diameter 10 mm;
- / Maximum operating pressure: 7 bar;
- / Maximum operating temperature: 90°C;
- / Dimensions: diameter 66 cm, height 133 cm;
- / No-load weight: 83 kg;
- / Possibility of adding a supplementary electrical kit.

#### CD1 300 HHP SINGLE-COIL HOT WATER INDIRECT CYLINDER FOR HEAT PUMPS

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 280-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam;
- / Dispersion equal to 1.64 kWh/day;
- / ERP Class: B;
- / High-performance coil with 3.5 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 33.8 kW;
- / Coil capacity: 18 litres;
- / Head losses from coil at 15 l/min: 92 mbar;
- / Magnesium anode;
- / Active anode;
- / 1" M hydraulic fittings for cold water inlet and hot water outlet;
- / 1" F hydraulic fittings for connection of the coil to the heat pump;
- / 3/4" F hydraulic fitting for domestic water recirculation;
- / 3/4" F hydraulic fitting for domestic water drainage;
- / 3 thermowells diameter 10 mm;
- / Maximum operating pressure: 7 bar;
- / Maximum operating temperature: 90°C;

- / Dimensions: diameter 66 cm, height 185 cm;
- / No-load weight: 120 kg;
- / Possibility of adding a supplementary electrical kit.

#### CD1 450 HHP SINGLE-COIL HOT WATER INDIRECT CYLINDER FOR HEAT PUMPS

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 435-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam;
- / Dispersion equal to 1.9 kWh/day;
- / ERP Class: B;
- / High-performance coil with 4.5 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 30.8 kW;
- / Coil capacity: 18 litres;
- / Head losses from coil at 15 l/min: 90 mbar;
- / Magnesium anode;
- / Active anode;
- / 1" M hydraulic fittings for cold water inlet and hot water outlet;
- / 1" F hydraulic fittings for connection of the coil to the heat pump;
- / 3/4" F hydraulic fitting for domestic water recirculation;
- / 3/4" F hydraulic fitting for domestic water drainage;
- / 3 thermowells diameter 10 mm;
- / Maximum operating pressure: 7 bar;
- / Maximum operating temperature: 90°C;
- / Dimensions: diameter 76 cm, height 198 cm;
- / No-load weight: 160 kg;
- / Possibility of adding a supplementary electrical kit.



**CD1 600 HHP**  
**SINGLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 586-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 50 mm;
- / Heat dispersion: 2.16 kWh/day;
- / ERP Class: B;
- / High-performance coil with 5.7 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 76 kW;
- / Coil capacity: 55.9 l;
- / Head losses from coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 1" hydraulic fittings for cold water inlet and hot water 1<sup>1</sup>/<sub>4</sub> fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1/2" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 650 mm, height 1910 mm;
- / Tipping height: 2065 mm;
- / No-load weight: 167 kg;
- / Possibility of adding a supplementary electrical kit.

**CD1 800 HHP**  
**SINGLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 750-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 3.03 kWh/day;
- / ERP Class: C;
- / High-performance coil with 6 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 79 kW;
- / Coil capacity: 58.8 l;
- / Head losses from coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 1<sup>1</sup>/<sub>2</sub> hydraulic fittings for cold water inlet and 1<sup>1</sup>/<sub>2</sub> fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1/2" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 790 mm, height 1795 mm;
- / Tipping height: 1745 mm;
- / No-load weight: 215 kg;
- / Possibility of adding a supplementary electrical kit.

**CD1 1000 HHP**  
**SINGLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 931-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 3.32 kWh/day;
- / ERP Class: C;
- / High-performance coil with 6 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 79 kW;
- / Coil capacity: 58.8 l;
- / Head losses from coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 1<sup>1</sup>/<sub>2</sub> hydraulic fittings for cold water inlet and 1<sup>1</sup>/<sub>2</sub> fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 790 mm, height 2140 mm;
- / Tipping height: 2095 mm;
- / No-load weight: 251 kg;
- / Possibility of adding a supplementary electrical kit.

**CD1 1500 HHP**  
**SINGLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 1475-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 4.04 kWh/day;
- / ERP Class: C;
- / High-performance coil with 7.5 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 100 kW;
- / Coil capacity: 73.5 l;
- / Head losses from coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 2" hydraulic fittings for cold water inlet and 2" fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1<sup>1</sup>/<sub>2</sub> hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 1000 mm, height 2150 mm;
- / Tipping height: 2145 mm;
- / No-load weight: 383 kg;
- / Possibility of adding a supplementary electrical kit.

## 5. SPECIFICATION DESCRIPTION

### CD2 300 HHP DOUBLE-COIL HOT WATER INDIRECT CYLINDER FOR HEAT PUMPS

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 279-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam;
- / Dispersion equal to 1.62 kWh/day;
- / ERP Class: B;
- / High-performance upper coil with 2.5 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 27.9 kW;
- / Coil capacity: 13 litres;
- / Head losses from upper coil at 15 l/min: 80 mbar;
- / High-performance lower coil with 1 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 12.5 kW;
- / Coil capacity: 5 litres;
- / Head losses from lower coil at 15 l/min: 50 mbar;
- / Magnesium anode;
- / Active anode;
- / 1" M hydraulic fittings for cold water inlet and hot water outlet;
- / 1" F hydraulic fittings for connection of the upper coil;
- / 1" F hydraulic fittings for connection of the lower coil;
- / 3/4" F hydraulic fitting for domestic water recirculation;
- / 3/4" F hydraulic fitting for domestic water drainage;
- / 3 thermowells diameter 10 mm;
- / Maximum operating pressure: 7 bar;
- / Maximum operating temperature: 90°C;
- / Dimensions: diameter 66 cm, height 185 cm;
- / No-load weight: 122 kg;
- / Possibility of adding a supplementary electrical kit on 1 1/2" fitting.

### CD2 450 HHP DOUBLE-COIL HOT WATER INDIRECT CYLINDER FOR HEAT PUMPS

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 433-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam;
- / Dispersion equal to 1.89 kWh/day;
- / ERP Class: B;
- / High-performance upper coil with 3.5 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 27.3 kW;
- / Coil capacity: 18 litres;
- / Head losses from upper coil at 15 l/min: 83 mbar;
- / High-performance lower coil with 1 m<sup>2</sup> surface;
- / Heat exchanger power as per EN 12897: 16.5 kW;
- / Coil capacity: 5 litres;
- / Head losses from lower coil at 15 l/min: 50 mbar;
- / Magnesium anode;
- / Active anode;
- / 1" M hydraulic fittings for cold water inlet and hot water outlet:
- / 1" F hydraulic fittings for connection of the upper coil;
- / 1" F hydraulic fittings for connection of the lower coil;
- / 3/4" F hydraulic fitting for domestic water recirculation;
- / 3/4" F hydraulic fitting for domestic water drainage;
- / 3 thermowells diameter 10 mm;
- / Maximum operating pressure: 7 bar;
- / Maximum operating temperature: 90°C;
- / Dimensions: diameter 76 cm, height 198 cm;
- / No-load weight: 164 kg;
- / Possibility of adding a supplementary electrical kit on 1 1/2" fitting.

**CD2 600 HHP**  
**DOUBLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 586-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 50 mm;
- / Heat dispersion: 2.16 kWh/day;
- / ERP Class: B;
- / High-performance upper coil with 5 m<sup>2</sup> surface;
- / Upper coil heat exchanger power as per EN 12897: 69 kW;
- / Upper coil capacity: 49 l;
- / Head losses from upper coil at 15 l/min: 20 mbar;
- / High-performance lower coil with 2 m<sup>2</sup> surface;
- / Lower coil heat exchanger power as per EN 12897: 33 kW;
- / Lower coil capacity: 19.6 l;
- / Head losses from lower coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 1" hydraulic fittings for cold water inlet and hot water 1<sup>1</sup>/<sub>4</sub> fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1/2" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 650 mm, height 1910 mm;
- / Tipping height: 2065 mm;
- / No-load weight: 188 kg;
- / Possibility of adding a supplementary electrical kit.

**CD2 800 HHP**  
**DOUBLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 750-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 3.03 kWh/day;
- / ERP Class: C;
- / High-performance upper coil with 5.2 m<sup>2</sup> surface;
- / Upper coil heat exchanger power as per EN 12897: 71 kW;
- / Upper coil capacity: 51 l;
- / Head losses from upper coil at 15 l/min: 20 mbar;
- / High-performance lower coil with 2 m<sup>2</sup> surface;
- / Lower coil heat exchanger power as per EN 12897: 33 kW;
- / Lower coil capacity: 19.6 l;
- / Head losses from lower coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 1<sup>1</sup>/<sub>2</sub> hydraulic fittings for cold water inlet and 1<sup>1</sup>/<sub>2</sub> fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 790 mm, height 1795 mm;
- / Tipping height: 1745 mm;
- / No-load weight: 234 kg;
- / Possibility of adding a supplementary electrical kit.

**CD2 1000 HHP**  
**DOUBLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 931-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 3.32 kWh/day;
- / ERP Class: C;
- / High-performance upper coil with 6 m<sup>2</sup> surface;
- / Upper coil heat exchanger power as per EN 12897: 79 kW;
- / Upper coil capacity: 58.8 l;
- / Head losses from upper coil at 15 l/min: 20 mbar;
- / High-performance lower coil with 3.3 m<sup>2</sup> surface;
- / Lower coil heat exchanger power as per EN 12897: 50 kW;
- / Lower coil capacity: 32.3 l;
- / Head losses from lower coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for cold water inlet and 1<sup>1</sup>/<sub>4</sub> fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 790 mm, height 2140 mm;
- / Tipping height: 1745 mm;
- / No-load weight: 285 kg;
- / Possibility of adding a supplementary electrical kit.

**CD2 1500 HHP**  
**DOUBLE-COIL HOT WATER INDIRECT CYLINDER**  
**FOR HEAT PUMPS**

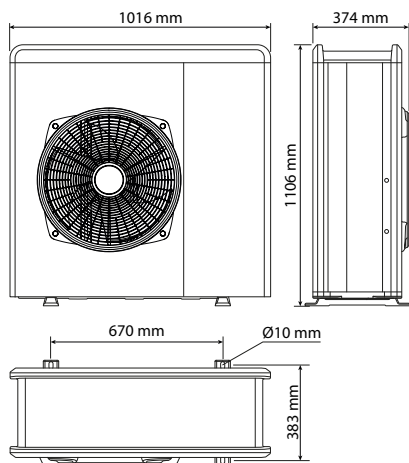
- / Titanium-enamelled hot water indirect cylinder with installation on base and white-coated covering sheet;
- / 1474-litre capacity;
- / Side inspection flange;
- / Thermal insulation: polyurethane foam, thickness 100 mm;
- / Heat dispersion: 4.04 kWh/day;
- / ERP Class: C;
- / High-performance upper coil with 7.5 m<sup>2</sup> surface;
- / Upper coil heat exchanger power as per EN 12897: 100 kW;
- / Upper coil capacity: 73.5 l;
- / Head losses from upper coil at 15 l/min: 20 mbar;
- / High-performance lower coil with 3.6 m<sup>2</sup> surface;
- / Lower coil heat exchanger power as per EN 12897: 57 kW;
- / Lower coil capacity: 35.3 l;
- / Head losses from lower coil at 15 l/min: 20 mbar;
- / Magnesium anode;
- / 2" hydraulic fittings for cold water inlet and 2" fittings for hot water outlet;
- / 1<sup>1</sup>/<sub>4</sub> hydraulic fittings for connection of the coil to the heat pump;
- / 1" hydraulic fitting for domestic water recirculation;
- / 3 thermowells diameter 1/2";
- / Maximum operating pressure: 8 bar;
- / Dimensions without insulation: diameter 1000 mm, height 2160 mm;
- / Tipping height: 2145 mm;
- / No-load weight: 417 kg;
- / Possibility of adding a supplementary electrical kit.

## 6. SINGLE OUTDOOR UNIT

### NIMBUS EXT R32 S (SPLIT)

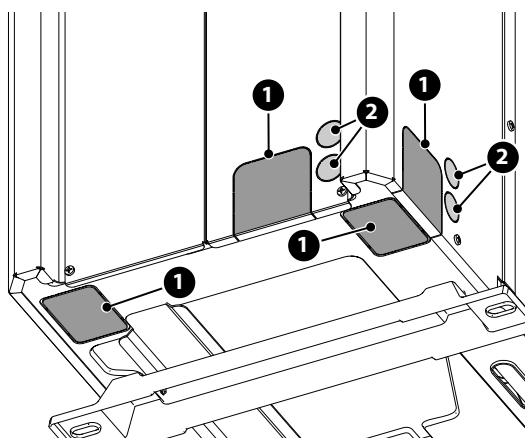
For further details and information, consult the specific dedicated Professional manual of the product.

#### DIMENSIONS AND WEIGHTS

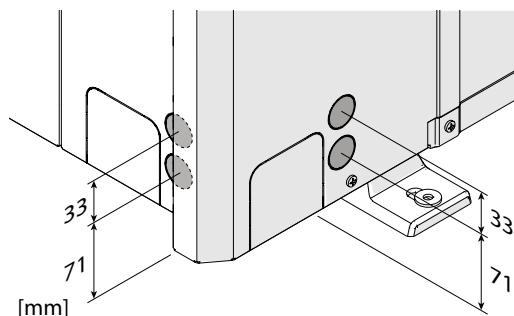


NIMBUS	kg
EXT R32 80 S	83
EXT R32 80 S - T	96

#### GAS FITTINGS



- 1 Refrigerant pipes passage
- 2 Electrical connections passage



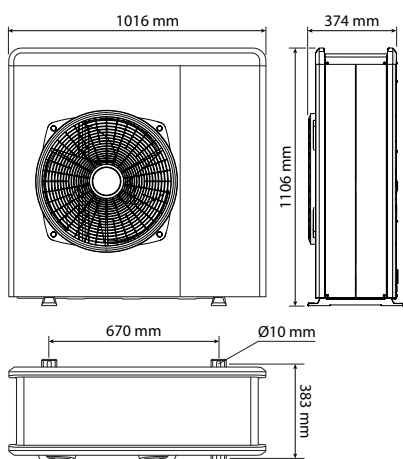
#### REFRIGERANT

		UoM
Nominal charge	1800	g
Extra gas recharge (for pipes longer than 20 m)	40	g/m
Gas pipe diameter (inlet)	5/8	inches
Liquid pipe diameter (outlet)	3/8	inches

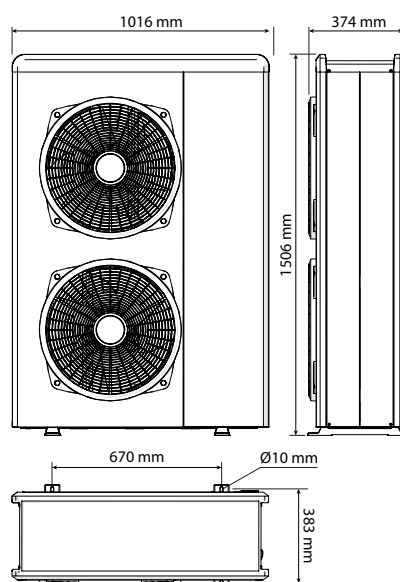
## NIMBUS EXT R32 M (MONOBLOC)

For further details and information, consult the specific dedicated Professional manual of the product.

### DIMENSIONS AND WEIGHTS

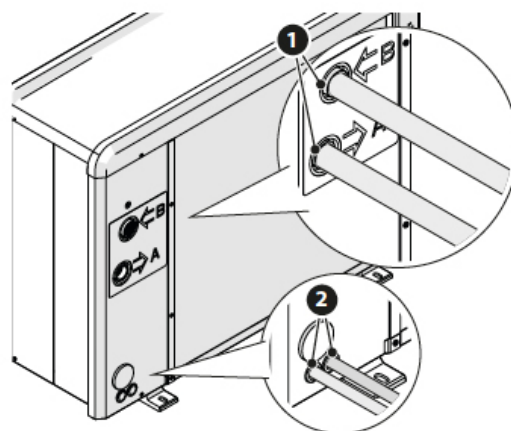
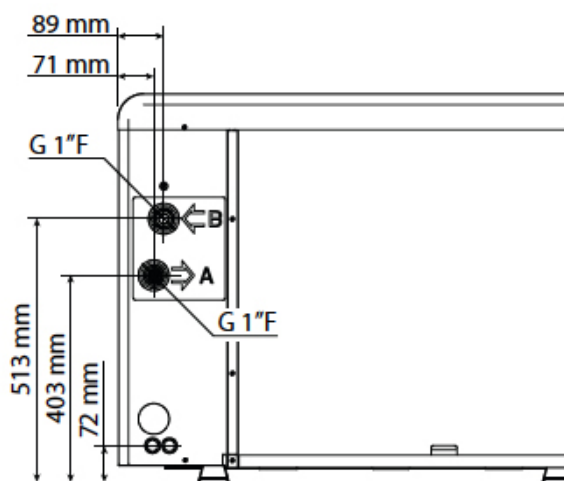


NIMBUS	kg
EXT R32 80 M	91
EXT R32 80 M - T	104



NIMBUS	kg
EXT R32 120 M - T	131
EXT R32 150 M - T	131

### HYDRAULIC FITTINGS



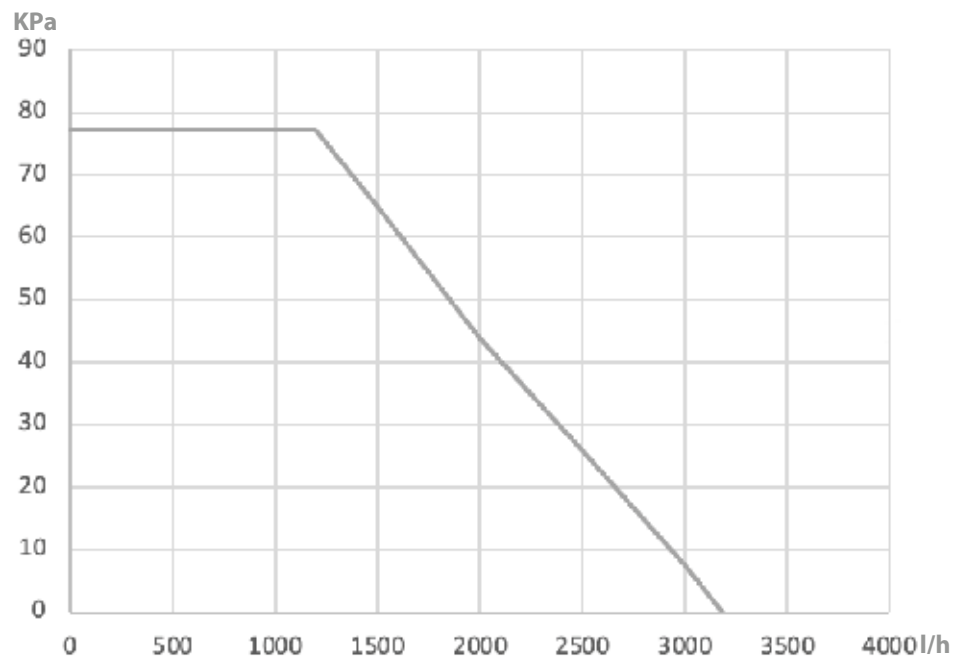
- 1 Hydraulic connections
- 2 Electrical connections passage

## 6. SINGLE OUTDOOR UNIT

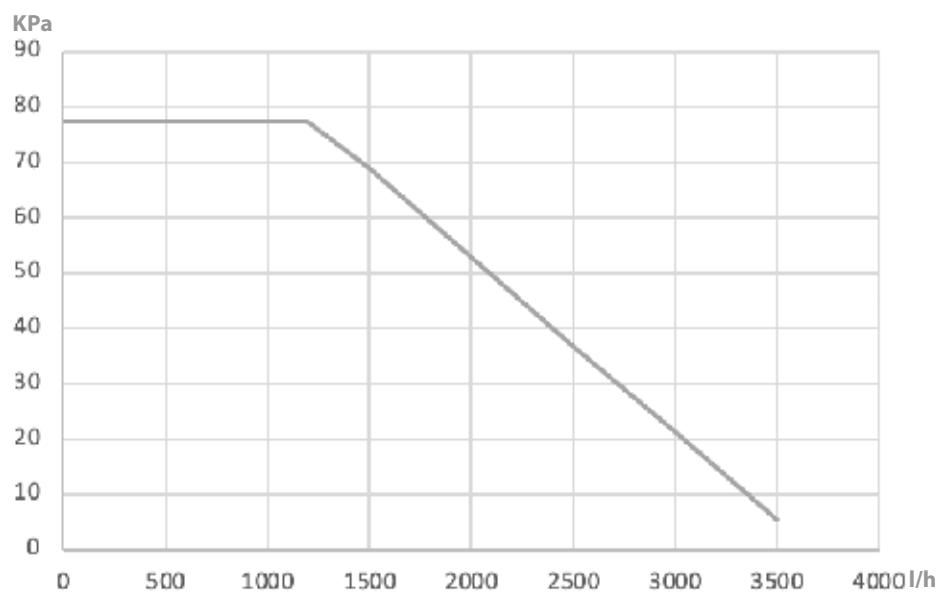
### AVAILABLE PRESSURE NIMBUS M

/ Available residual head at the outdoor unit outlet in relation to the flow rate [kPa-l/h].

NIMBUS EXT 80 M R32  
NIMBUS EXT 80 M-T R32



NIMBUS EXT 120 M-T R32  
NIMBUS EXT 150 M-T R32



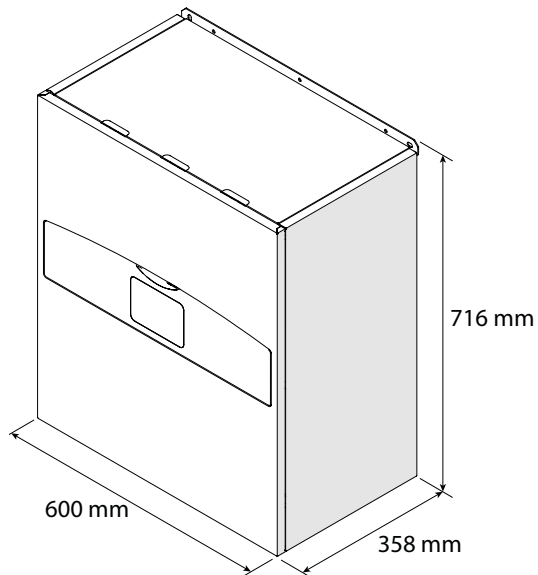
/ To calculate the residual head available for the system, it is necessary to subtract the head losses of the indoor unit from the residual head available at the outdoor unit outlet.

## 7. SINGLE INDOOR UNIT

### NIMBUS WH R32 S

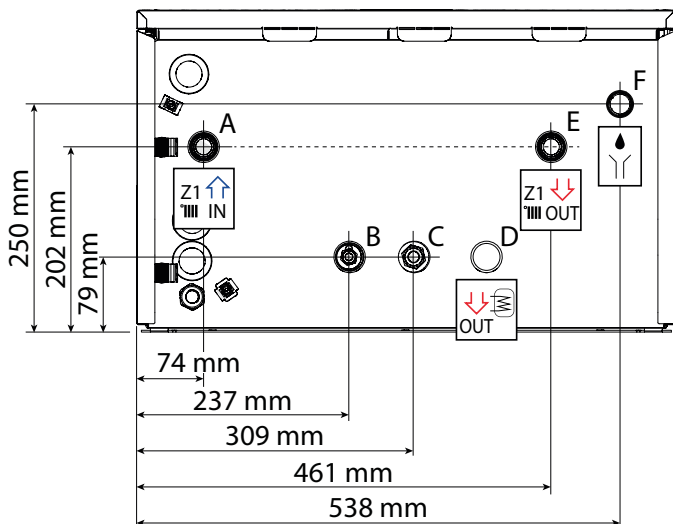
For further details and information, consult the specific dedicated Professional manual of the product.





#### DIMENSIONS AND WEIGHTS



NIMBUS	kg
WH 80 S R32	40

#### HYDRAULIC AND REFRIGERANT FITTINGS



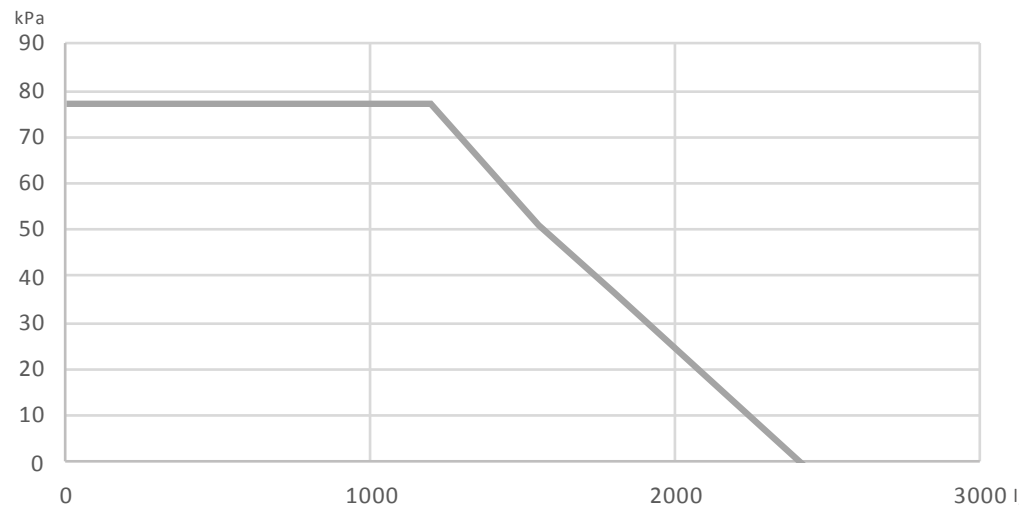
Label	Description	Ø of fittings [inches]
A	 System return	1
B	-- Refrigerant fitting (liquid side)	3/8
C	-- Refrigerant fitting (gas side)	5/8
D	 Domestic hot water delivery (accessory)	1
E	 System flow	1
F	 Safety valve drain	1

## 7. SINGLE INDOOR UNIT

### AVAILABLE PRESSURE NIMBUS S

/ Net residual head available for the system in relation to the flow rate [kPa-l/h]

NIMBUS WH 80 S R32



It is possible to install a supplementary circulator pump if the one supplied is not powerful enough.



If thermostatic or zones valves are installed on all terminals, mount a by-pass to guarantee the minimum operating flow rate.

### NOMINAL AND MINIMUM FLOW RATES

/ The minimum flow rate must always be guaranteed in all operating conditions.

Model	Nominal flow rate [l/h]	Minimum flow rate [l/h]	Flow meter ON threshold [l/h]
NIMBUS EXT R32 80 S NIMBUS EXT R32 80 S-T	1200	600	540

### MINIMUM WATER CONTENT

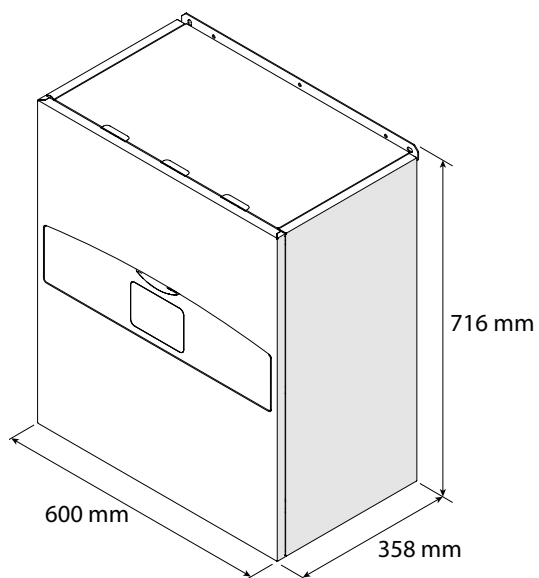
/ The system must be sized for a minimum water content of at least 5 litres for every kW of rated power. If the minimum water content is not observed, the appliance is not guaranteed to function.



## NIMBUS WH R32 M

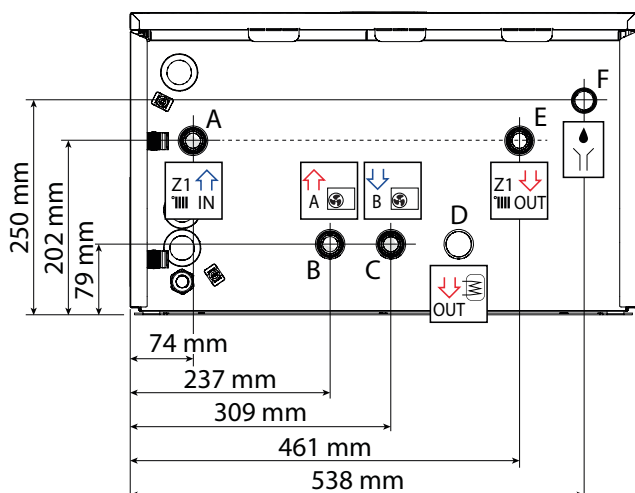
For further details and information, consult the specific dedicated Professional manual of the product.

### DIMENSIONS AND WEIGHTS



NIMBUS	kg
WH R32 M	31
WH-L R3 M	39

### HYDRAULIC FITTINGS

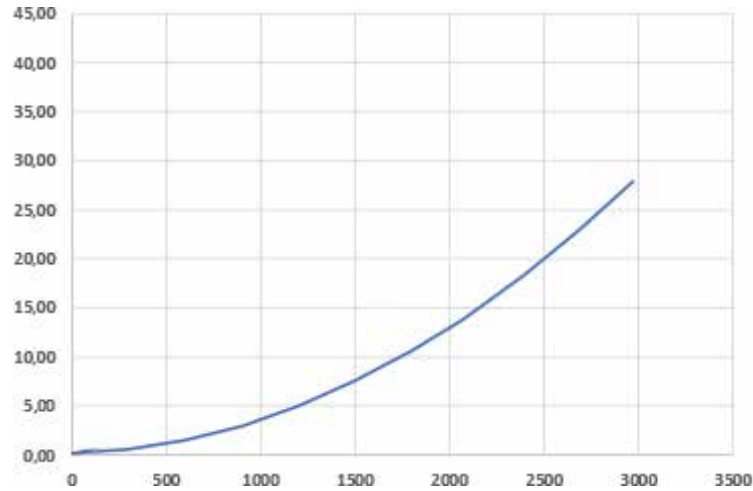


Label	Description	Ø of fittings [inches]
A	System return	1
B	Delivery from heat pump	1
C	Return to heat pump	1
D	Domestic hot water delivery (accessory)	1
E	System flow	1
F	Safety valve drain	1

## 7. SINGLE INDOOR UNIT

### HEAD LOSSES

/ Head losses of the indoor unit in relation to the flow rate [kPa-l/h]



/ To calculate the residual head available for the system, it is necessary to subtract the head losses of the indoor unit from the residual head available at the outdoor unit outlet.

### NOMINAL AND MINIMUM FLOW RATES

/ The minimum flow rate must always be guaranteed in all operating conditions.

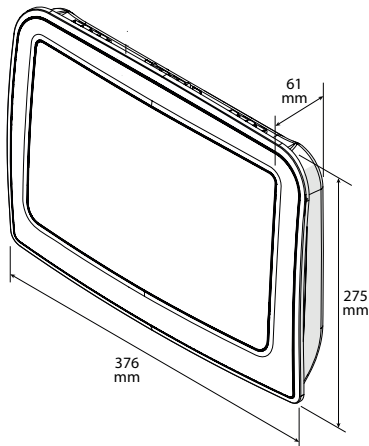
Model	Nominal flow rate [l/h]	Minimum flow rate [l/h]	Flow meter ON threshold [l/h]
NIMBUS EXT R32 80 M NIMBUS EXT R32 80 M-T	1200	600	540
NIMBUS EXT R32 120 M-T	1550	770	702
NIMBUS EXT R32 150 M-T	1900	940	852

### MINIMUM WATER CONTENT

/ The system must be sized for a minimum water content of at least 5 litres for every kW of rated power. If the minimum water content is not observed, the appliance is not guaranteed to function.

## NIMBUS LB

/ The NIMBUS Light Box M R32 indoor unit comprises a module that contains the terminal boards for the electrical connections and the Energy Manager.



Model	Weight
NIMBUS LB M R32	2.5

## OPERATING LIMITS

/ The indoor unit can be installed in indoor environments or outdoors.

Observe the following operating limits:

/ Minimum temperature: -20°C

/ Maximum temperature: +43°C

For installation in indoor environments:

/ Maximum relative humidity: 65% - 30°C



If the device is installed outdoors, make sure that the installation is protected against direct sunlight.

## POWER SUPPLY TECHNICAL DATA

NIMBUS LIGHT BOX M R32		
Power supply	V - ph - Hz	230 - 1 - 50
Permissible voltage fields	V	196 – 253
Max absorbed power	W	150
Maximum current	mA	140
Thermal cut-out	A	C -2 (4 A max.)
Residual-current circuit breaker (RCCB) size	mA	A-30
Power supply wiring	Reference	H07RN-F
	Cable cross-sectional size	3G0.75
	Max. diameter [mm]	7
Communication cabling	Reference	H07RN-F
	Cable cross-sectional size	2 x 0.75 mm <sup>2</sup>
EDF, AFR, PV signal cabling	mm <sup>2</sup>	H07RN-F 2 x 0.75 mm <sup>2</sup>
Electrical protection rating	IP	X5

**NOTE:** in making the connection between the communication cable from the indoor unit to the outdoor unit, use a twisted cable to prevent interference problems.

The power supplies for the indoor and outdoor units must be connected respectively to a dedicated residual-current circuit breaker (RCCB) with a minimum trip threshold of 30 mA. For the unit equipped with an inverter (outdoor unit), we suggest using type B residual current devices for 3-phase power supplies and type B or F (depending on the electrical system to which it is connected) for 1-phase supplies.

For the unit lacking an inverter (indoor unit), a type A residual current device will suffice. The type of connection must nonetheless be made in a workmanlike manner by qualified personnel in order to fulfil the applicable national regulations.

# 8. MINIMUM CLEARANCES

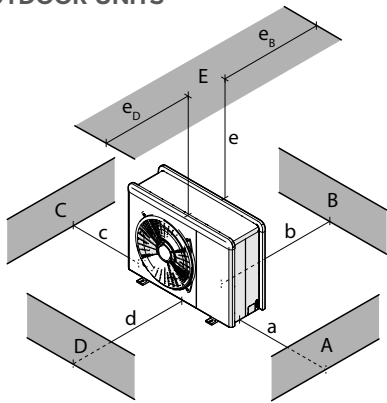
## INSTALLING THE OUTDOOR AND INDOOR UNITS

We recommend installing the indoor and outdoor units by observing the service clearances and safety requirements given in the product's technical documentation. We suggest consulting the manual of the heat pumps for further information.

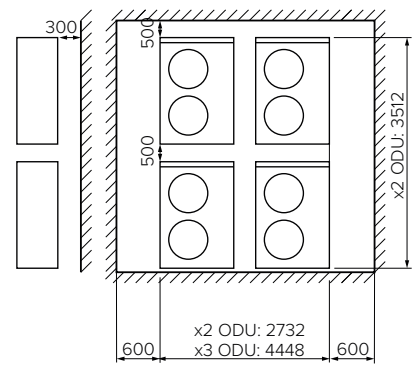
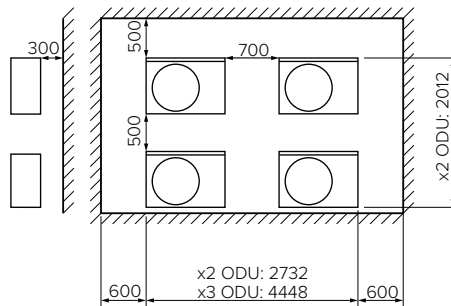
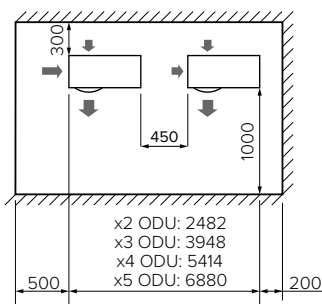
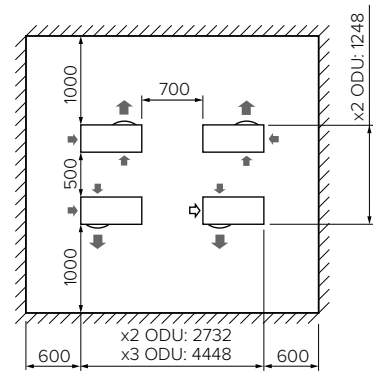
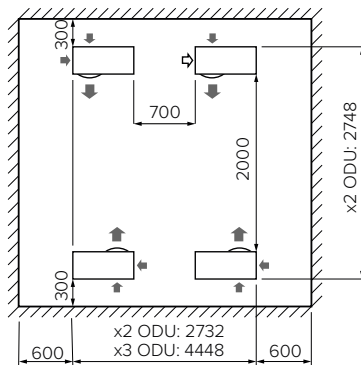
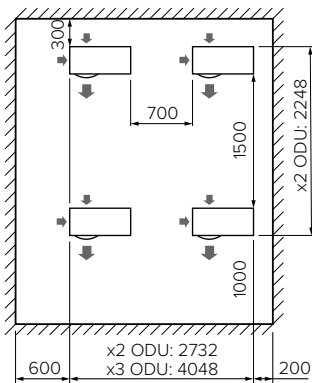
### WARNING:

When installing heat pump systems consisting of units with R32 refrigerant, we recommend observing the safety requirements as specified in the reference standard (IEC 60335-2-40:2018).

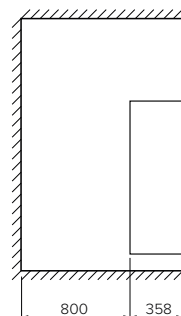
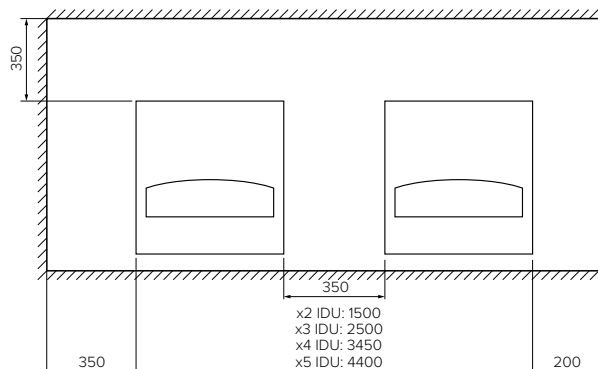
### OUTDOOR UNITS



	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	eD (mm)	eB (mm)
A-B-C	≥ 150	≥ 150	≥ 300				
B		≥ 150					
D				≥ 500			
B-E		≥ 150			≥ 500		≥ 150
B-D		≥ 150		≥ 1000			
D-E				≥ 1000	≥ 1000	≥ 1000	

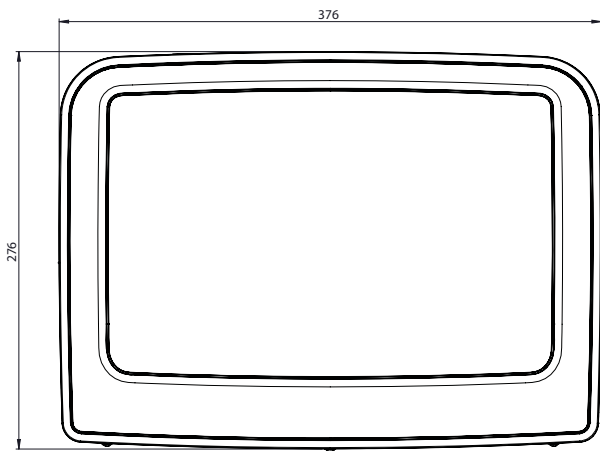
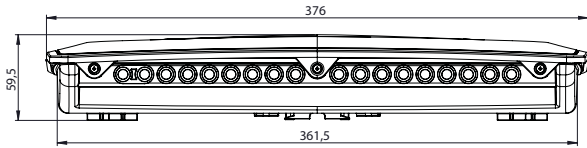


### INDOOR UNITS



## 9. CASCADE MANAGER - CHARACTERISTICS

### DIMENSIONS AND WEIGHTS



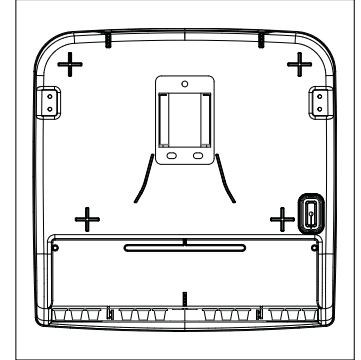
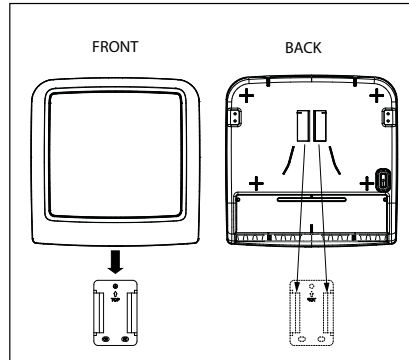
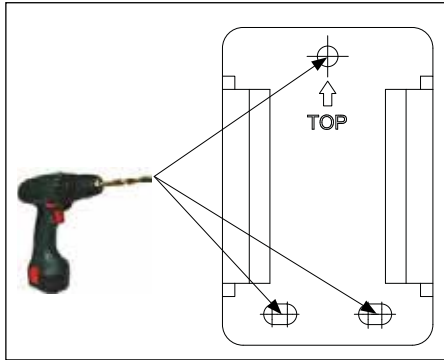
Model	Weight
CASCADE MANAGER	2.5

### TECHNICAL FEATURES

Power supply	V - ph - Hz	230 - 1 - 50
Allowed voltage range	V	196 - 253
Rated power input	W	6
Rated current / live	mA	25
Maximum current / live	mA	140
Thermal cut-out size	A	2 - C type (6 A max )
Residual-current circuit breaker (RCCB) size	mA	30 - A type
Power supply wiring	V	216-243
Cos phi	Reference	H07RN - F
	Recommended cable cross-sectional size	3G1
	Maximum diameter [mm]	10.7
Communication cabling	Reference	z H05RN - F
	Cable cross-sectional size	2 x 0.75 mm <sup>2</sup>

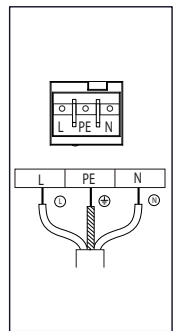
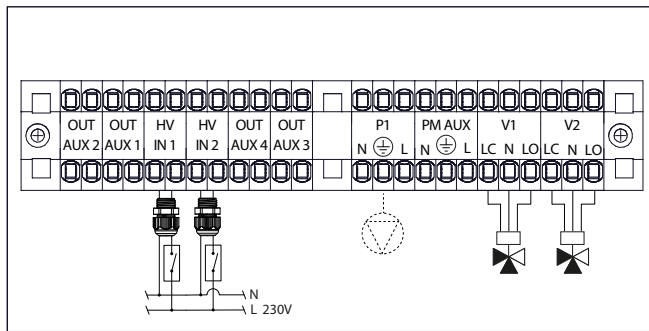
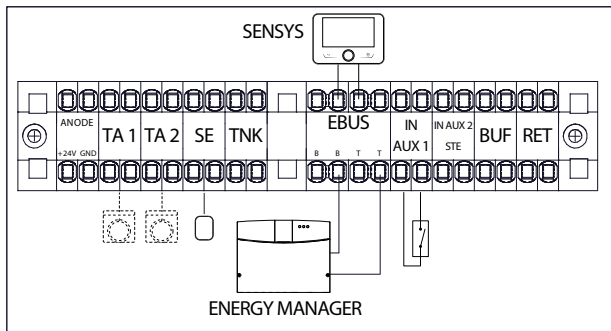
# 9. CASCADE MANAGER - CHARACTERISTICS


## INSTALLATION




## CONNECTING THE CASCADE MANAGER CONTROL UNIT TO THE ENERGY MANAGER BOARD

/ The Cascade Manager control unit communicates directly with the Energy Manager board located on each heat pump unit. Connect the two boards as explained below.




-  Connection of the pro-tech anode to (not used)


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-  Dry contacts for zone 1/zone 2 thermostat input


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-  Outdoor sensor connection


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-  Connection for hot water indirect cylinder sensor


---

-  Connection for Energy Manager of single machines and Sensys HD system manager


---

-  Auxiliary inputs connection configurable as follows:  
 0 - None  
 1 - Humidity sensor  
 2 - Heating/cooling via external control  
 3 - HC3 room thermostat  
 4 - Safety thermostat  
 5 - Photovoltaic integration (cannot be used, use logic on single machine)


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-  Connection for high buffer tank sensor


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-  Connection for low buffer tank

---

-  Connection of auxiliary outputs configurable as follows:  
 0- None  
 1- Anomaly alarm  
 2- Humidistat alarm  
 4- Cooling service  
 6- Space heating/cooling mode  
 7- CH request  
 8- Cooling request

---

-  Connection of auxiliary outputs configurable as follows:  
 0- None  
 1- Anomaly alarm  
 2- Humidistat alarm  
 4- Cooling service  
 6- Space heating/cooling mode  
 7- CH request  
 8- Cooling request

- Auxiliary input 1 connection configurable as follows:  
 0- Absent  
 1- Reduced rate  
 2- SG1  
 3- External switch-off signal  
 4- Photovoltaic integration (cannot be used, use logic on single machine)

---

- Auxiliary input 2 connection configurable as follows:  
 0- Absent  
 1- Load shedding  
 2- SG2  
 3- External switch-off signal  
 4- Photovoltaic integration (cannot be used, use logic on single machine)


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- Auxiliary output circulation pump P1 connection configurable as follows:  
 0- None  
 1- Delivery circulation pump  
 2- Auxiliary circulation pump  
 3- Cooling system circulation pump  
 4- Buffer tank circulation pump


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- Auxiliary output circulation pump P2 connection configurable as follows:  
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 1- Delivery circulation pump  
 2- Auxiliary circulation pump  
 3- Cooling system circulation pump  
 4- Buffer tank circulation pump


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-  Connection for space heating/DHW diverter valve (not used)

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-  Connection for heating/cooling diverter valve

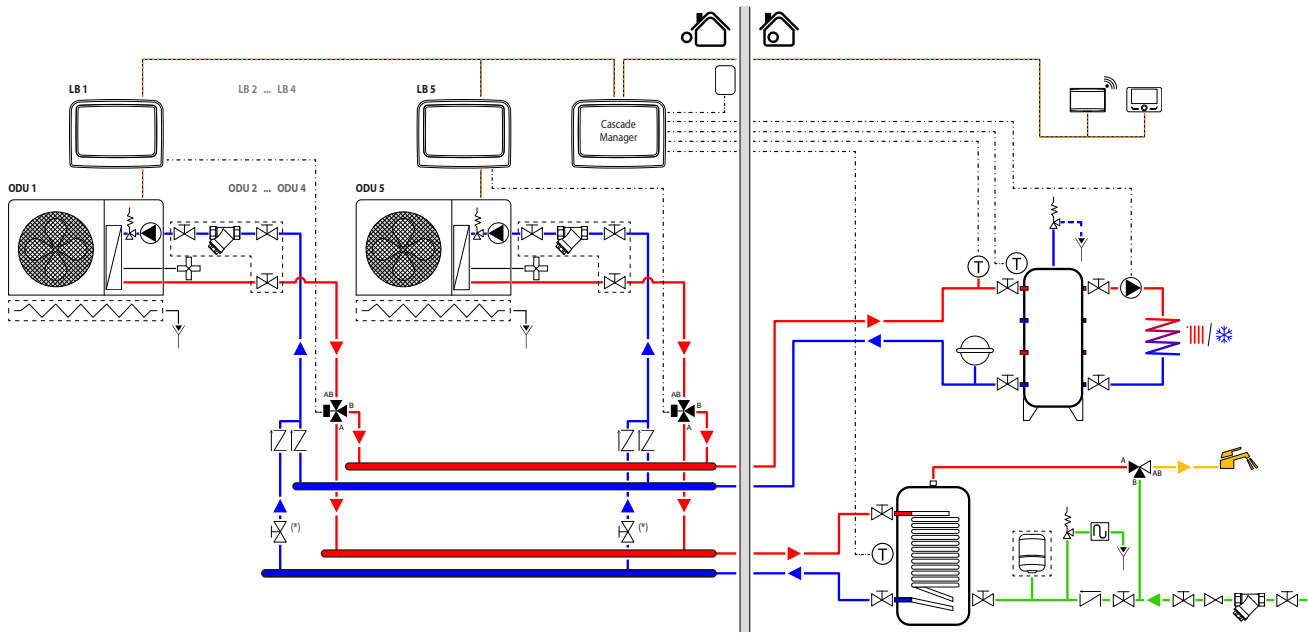
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-  Power supply

# 10. CASCADE MANAGER - OPERATING LOGICS

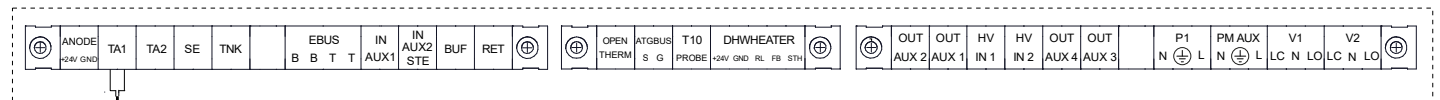
## HEATING / COOLING OPERATING LOGICS

The Cascade Manager control unit is the system's "brain": it collects heating/cooling requests from the zones, calculates the power required for satisfying the request, on the basis of the set delivery set-point temperature, and uses the heat pumps, with priority, as well as any auxiliary sources present for support, if necessary, for supplying the requested power and delivery temperature.



### HEAT REQUEST

The system's heat requests must always be connected to the cascade manager which works with smart logics to offset the delivery temperatures, with respect to the set temperatures, whenever a heat request is detected. The heat request may be generated by ON/OFF thermostats directly connected to TA1 contact on the Cascade Manager (picture below) or through E-bus2 room sensors, even connected to Zone Manager or 2-Zone Kit (more information on the related Professional Manual).

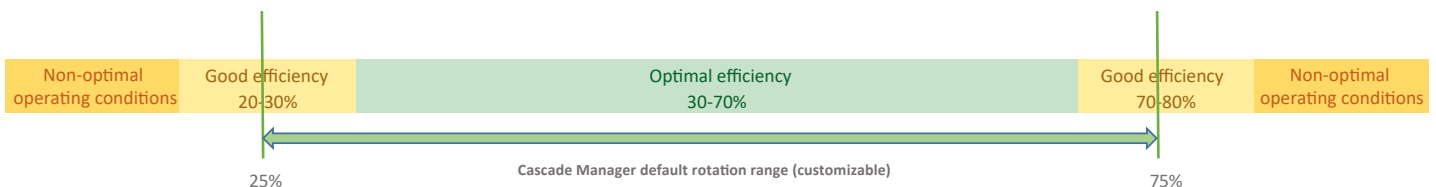


Heating/cooling request from the system

### HEAT PUMP MANAGEMENT

During an operating cycle in heating or cooling mode, the CM constantly calculates the power required for reaching the set delivery temperature for the system, on the basis of the temperatures and flow rates made available by the sensors present in the cascade.

In general, the CM splits the power requested by the system among the available heat pumps so as to keep the power of the single heat pumps within a maximum efficiency range (30%-70% of the maximum power), as illustrated in the figure, which can nonetheless be freely set. It must be considered that with an excessively narrow working power range for the single heat pumps, there is the risk of having several on/off cycles of the heat pumps as the system's thermal cycle varies, resulting in a reduction in the overall efficiency. To strike a satisfactory balance between the maximum efficiency range and the number of on/off cycles, the maximum and minimum power values of the single heat pump (referred to as the maximum and minimum turnover levels) are set by default respectively to 75% and 25%.



## 10. CASCADE MANAGER - OPERATING LOGICS

On the basis of the logics described above, when the system's thermal load increases, if in splitting the requested power among the available heat pumps the maximum defined turnover level is exceeded, the CM will activate an additional heat pump, as illustrated in Figure 1.

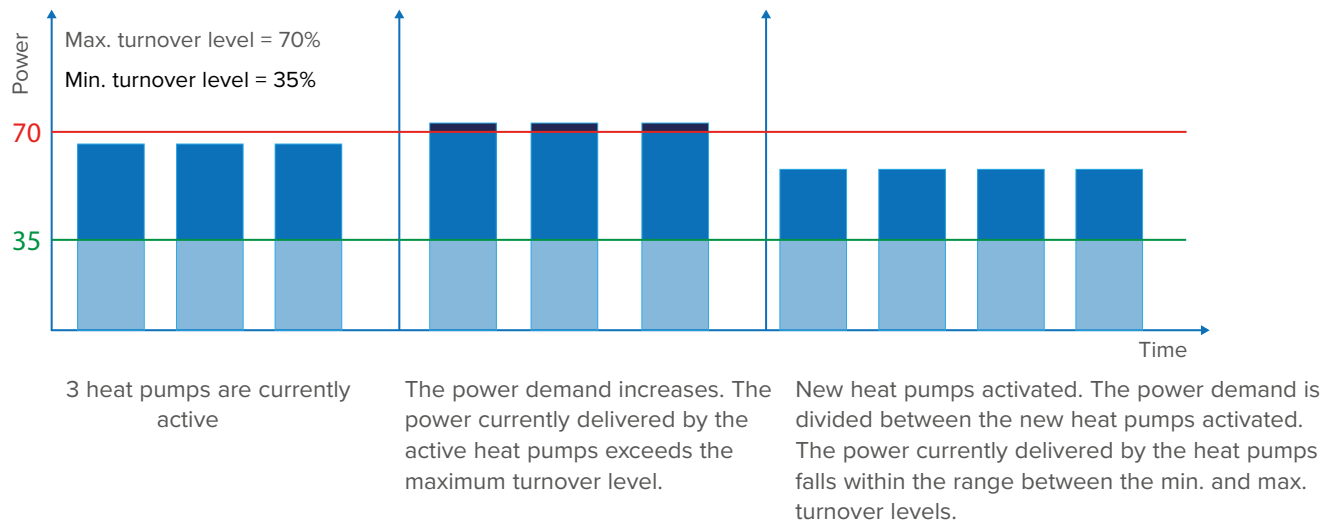


Fig. 1 Power splitting

Likewise, when the system's thermal load decreases, if in splitting the requested power among the available heat pumps the power drops below the minimum defined turnover level, the CM will switch off one of the active heat pumps, as illustrated in Figure 2.

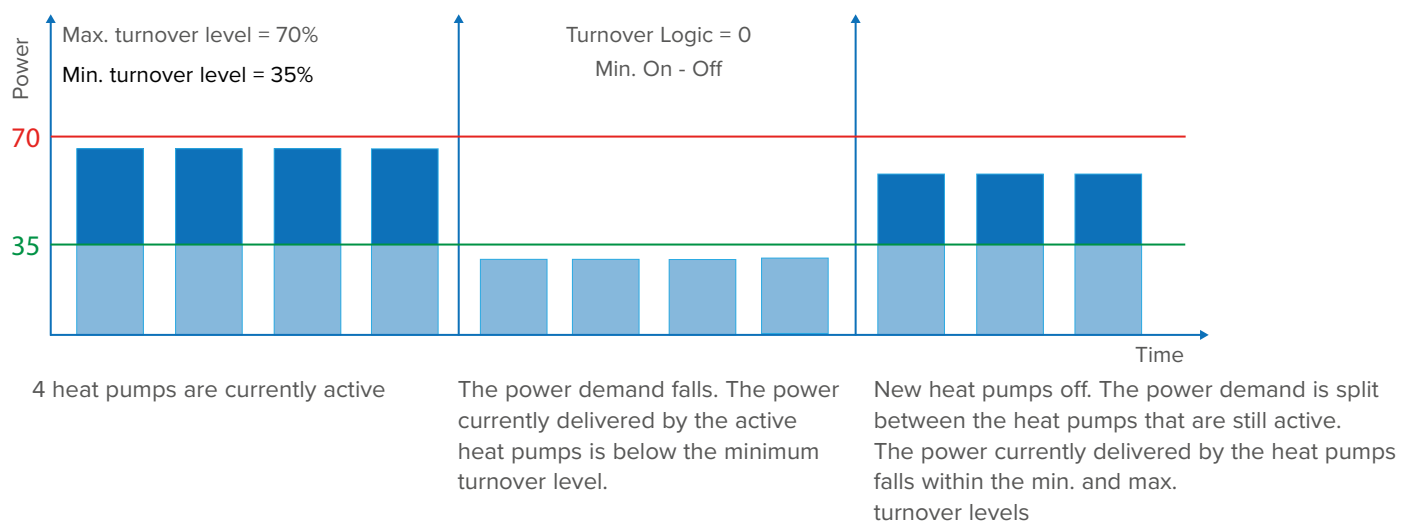


Fig. 2 Power splitting: power drop and switching off of a new heat pump with Turnover Logic = 0



If there is a reduction in the thermal load, a different logic can be selected for managing the heat pumps in which the minimum turnover level is not fixed but depends on the number of heat pumps active according to the following formula (see Figure 3):

$$\text{Minimum turnover level} = \frac{[\text{Maximum turnover level} \times (\text{No. of machines on} - 1)]}{(\text{No. of machines on})}$$

With this logic, the CM is able to better adjust to the system's thermal load variations when there is a high number of available heat pumps (4-5).

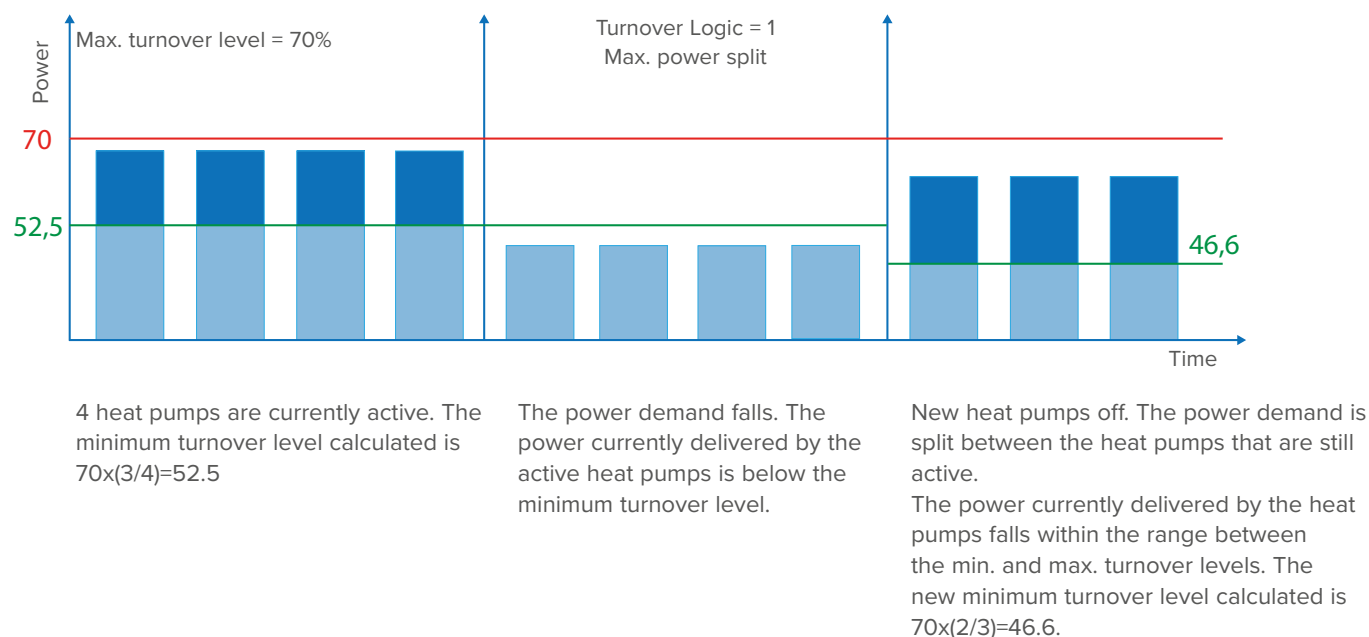


Fig. 3 Power splitting: power drop and switching off of a new heat pump with Turnover Logic = 1

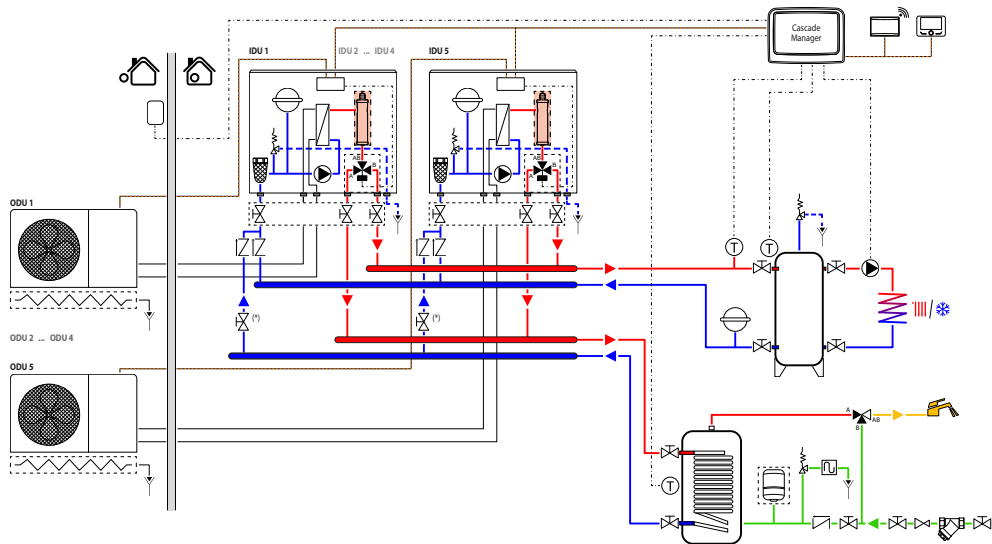
To guarantee a uniform use over time of all the heat pumps, the CM applies specific rotation logics so that the number of hours of operation in heating/cooling mode of the various heat pumps does not differ by more than 6 hours.

## 10. CASCADE MANAGER - OPERATING LOGICS

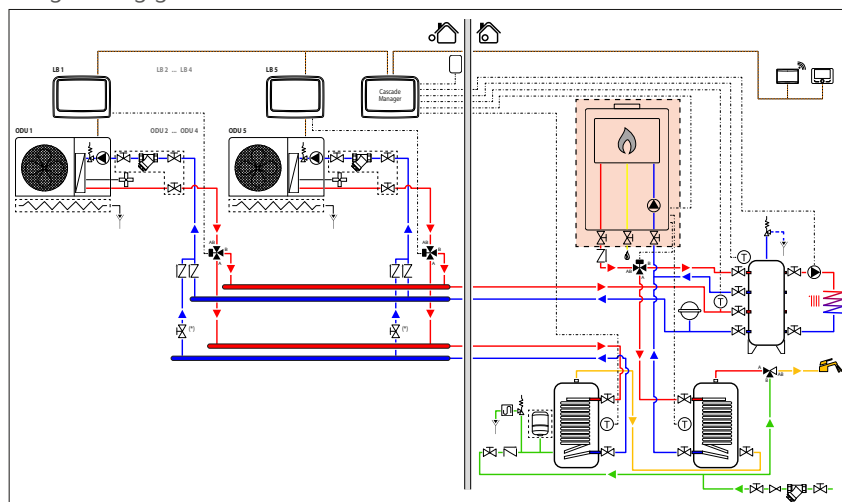
### MANAGEMENT OF AUXILIARY HEATING/COOLING SOURCES

It is possible to create cascade heat pump systems that are integrated by means of auxiliary sources that intervene in heating/cooling mode, such as, for example:

/ Supplementary heating elements, integrated in heat pump models with internal hydraulic unit;



/ External supplementary heating/cooling generators.



\* It is possible to apply to the cascade system, besides an auxiliary source to support space heating, also an auxiliary source to support space cooling.

### REFERENCE CHARACTERISTICS OF THE INTEGRATION OF AUXILIARY SOURCES

It is possible to select the intervention logic of the various auxiliary sources by choosing among the following options:

- / OFF: auxiliary source disabled;
- / INTEGRATION: the auxiliary integration source is used when the delivery of heating/cooling power is at the maximum level for all heat pumps, or when none of the heat pumps are available;
- / BACK-UP DUE TO HEAT PUMP ERROR: the auxiliary integration source is used solely when all the heat pumps are not available (back-up of the main source).

To guarantee correct management of the auxiliary sources by the CM, it is necessary to define the available heat output of the auxiliary source, in particular:

- / EXTERNAL HEATING/COOLING GENERATORS: : the power in kW of the auxiliary source;
- / INTEGRATED HEATING ELEMENTS: the maximum power of all available heating elements in the indoor units of the heat pumps that can be activated (in terms of kW).

If integrated heating elements and external heating generators are simultaneously present, the integration logics of the CM will give priority to the latter sources.

## MANAGEMENT OF AUXILIARY SOURCES

The auxiliary sources, if set for integration purposes, are used by the CM only when all the available heat pumps are active at maximum power but the delivery set-point is not reached.

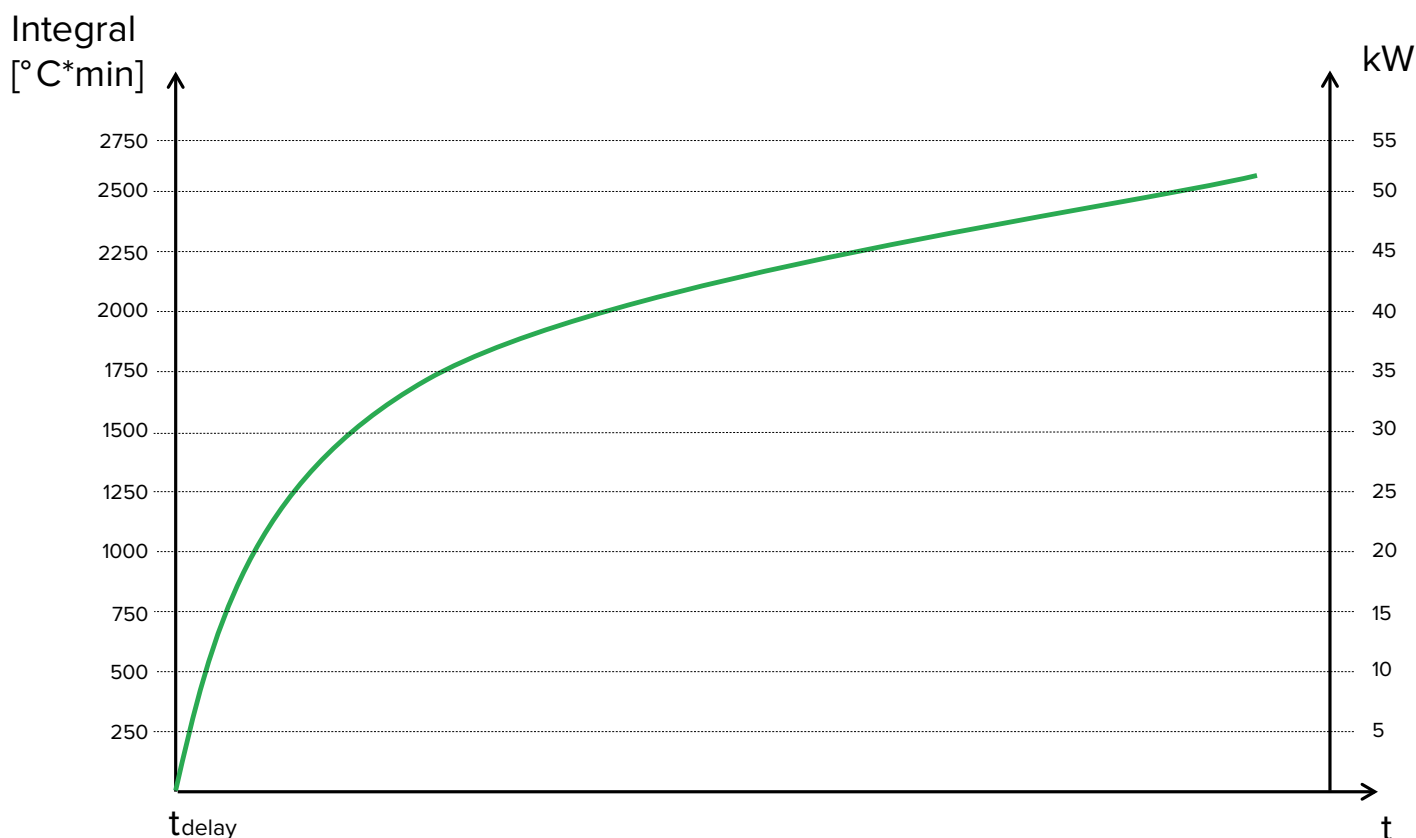
If the above-mentioned condition is maintained for a certain period of time (defined as the intervention delay time of the auxiliary sources and settable through a parameter), the CM starts calculating the power required for reaching the set temperature set-point, always on the basis of the temperatures and flow rates made available by the sensors present in the cascade. When the required auxiliary power, calculated in time with the integral method, reaches the power of the auxiliary sources, these are progressively activated.

In the case of internal heating elements, the activation steps of the single heating elements are equal to 2 kW (the power of the single heating elements), while in the case of an external auxiliary source, there is only one activation step which is equal to the power of the external source. In this case, of course, once the external source has been activated, the modulation logics (if any) of the external source will intervene.

When the delivery temperature of the cascade exceeds the set-point, the integral calculation of the auxiliary power stabilises and even reduces, determining in this case the progressive deactivation of the auxiliary sources.

The activation and deactivation speed of the auxiliary sources can be customised on the basis of the specific requirements of the system, using different parameters.

If the auxiliary sources are set as back-up sources only, they will be activated on the basis of the logics described previously, when all the heat pumps are unavailable (for example they are in error mode). In this case, of course, once the external source has been activated, the modulation logics (if any) of the external source will intervene.



In the case of integrated heating elements, to guarantee uniform use over time, the CM applies specific rotation logics so that the number of hours of operation in heating/cooling mode of the various heating elements does not differ by more than 6 hours.

## 10. CASCADE MANAGER - OPERATING LOGICS

### REACTION LEVELS OF THE HEAT PUMP CASCADE IN HEATING MODE AND IN COOLING MODE

A cascade system of heat pumps can be installed in various living scenarios (apartment blocks, detached houses, commercial facilities, etc.). To tackle the various applications needs that may arise in the field, there are a series of parameters defining the system's behaviour in terms of the speed required to for the system to become fully operational, reactivity following changes to the delivery temperature set-point and thermal load, and consumption:

/ Reaction level in heating mode

/ Reaction level in cooling mode

Each of the levels shown below determines different parameters of the algorithm controlling the activation of the heat pumps, thus changing the system's behaviour.

#### REACTION LEVELS IN HEATING MODE

VALUE	NOTES
0	Level 0, recommended for low-temperature systems*. Allows for having low consumption levels, also thanks to a mild transition to fully operational conditions and a mitigated reactivity.
1	Level 1, recommended for low-temperature systems*. Quicker transition to fully operational conditions and increased reactivity compared to Level 0.
2	Level 2, recommended for high-temperature systems. Favours the engagement of supplementary sources. Allows for having low consumption levels, also thanks to a mild transition to fully operational conditions and a mitigated reactivity.
3	Level 3, recommended for high-temperature systems. Favours the engagement of supplementary sources. Quicker transition to fully operational conditions and increased reactivity compared to Level 2.
4	Level 4, recommended for high-temperature systems*. Favours the engagement of supplementary sources. Quicker transition to fully operational conditions and increased reactivity compared to Level 3, guarantees the best performance.

#### REACTION LEVELS IN COOLING MODE

VALUE	NOTES
0	Level 0, allows for having low consumption levels, also thanks to a mild transition to fully operational conditions and a mitigated reactivity.
1	Level 1, quicker transition to fully operational conditions and increased reactivity compared to of Level 0.

Levels 3-4-5 favour the engagement of the supplementary sources and exploit more rapidly the entire potential of the heat pumps alone. These levels, therefore, are recommended whenever it is necessary to quickly activate the auxiliary sources to guarantee user comfort at the points of use, such as, for example, the hybrid schemes consisting of a heat pump cascade and a boiler. (Also for low-temperature systems, where necessary)

The various levels are arranged, as indicated, progressively in terms of speed and consumption.

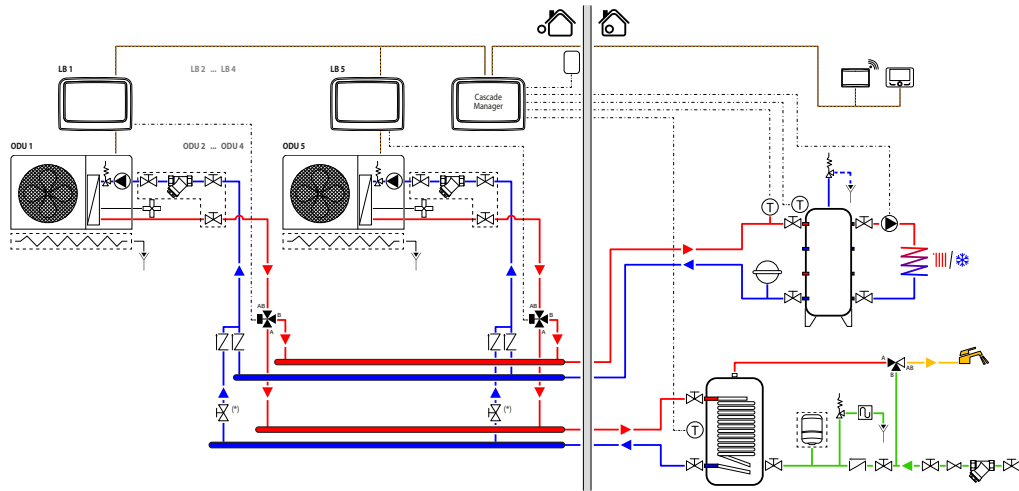
E.g.: Level 1 is characterised by a quicker transition to fully operational conditions and faster reaction times compared to Level 3.

Consequently, Level 3 will be distinguished by greater consumption compared to Level 1.

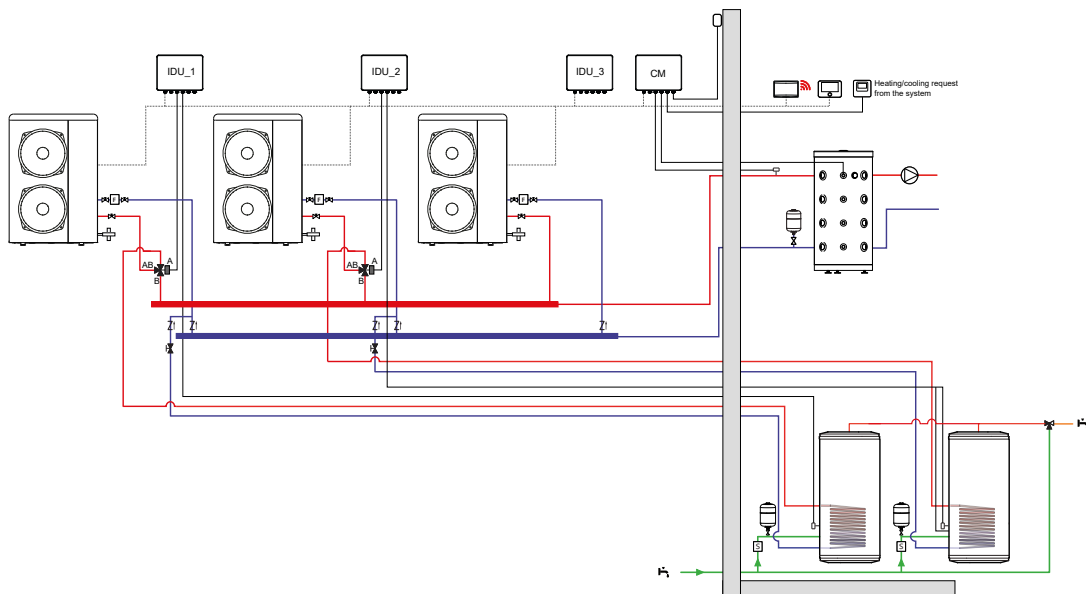
## OPERATING LOGICS FOR DOMESTIC HOT WATER PRODUCTION

In a heat pump cascade system or in a hybrid system with heat pump cascade, the production of domestic hot water can occur in four different ways:

/ PRODUCTION OF DOMESTIC HOT WATER WITH CASCADE: The domestic hot water production service is guaranteed by a single hot water indirect cylinder. Heating of the hot water indirect cylinder is guaranteed by one or more heat pumps connected hydraulically in parallel with one another, on delivery and return manifolds, by means of a three-way valve. The temperature inside the indirect cylinder is managed by the Cascade Manager through a single temperature sensor. The activation – for heating of the indirect cylinder – of the heat pumps also dedicated to the production of domestic hot water, always occurs simultaneously without the application of cascade logics. During domestic hot water production, the heat pumps dedicated to this service are unavailable for the space heating/cooling service (hot water priority).

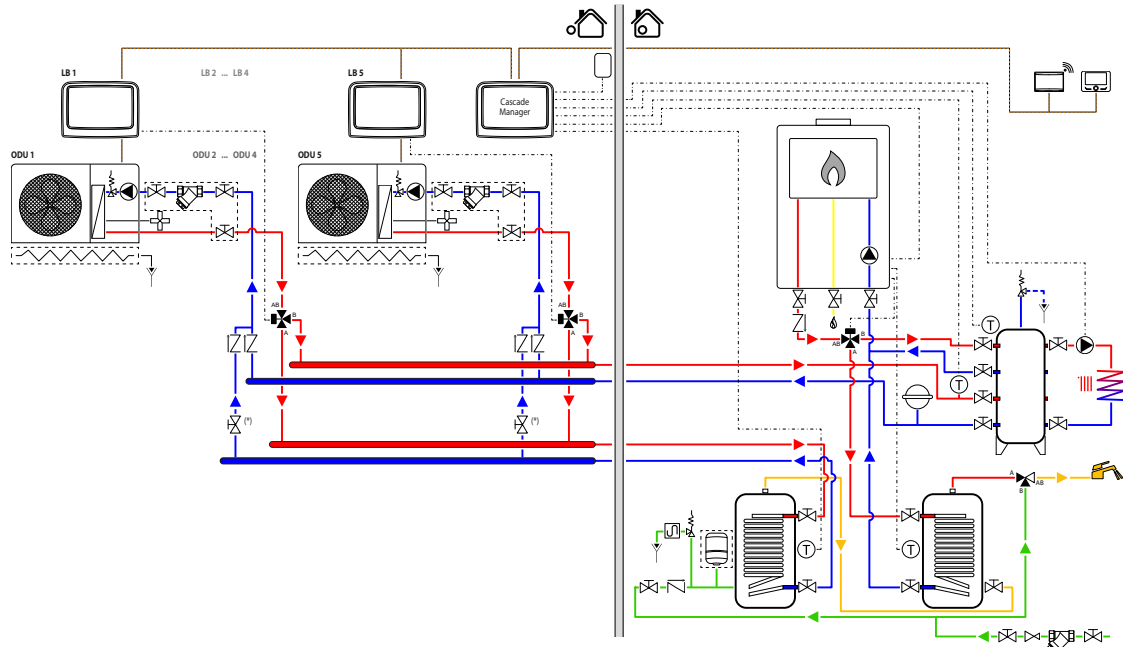


/ PRODUCTION OF DOMESTIC HOT WATER OF THE SINGLE MACHINES: The production of domestic hot water is guaranteed by several hot water indirect cylinders connected in parallel, which function both as a cold water inlet and a hot water outlet. Each indirect cylinder is heated by a single heat pump, connected hydraulically to the indirect cylinder through a dedicated three-way valve; the temperature of each indirect cylinder is managed by the relative heat pump, on the basis of its own logics, through a dedicated indirect cylinder sensor. During domestic hot water production, the heat pumps dedicated to this service are unavailable for the space heating/cooling service (hot water priority).



## 10. CASCADE MANAGER - OPERATING LOGICS

/ PRODUCTION OF DOMESTIC HOT WATER WITH CASCADE AND WITH BOILER: Domestic hot water production is guaranteed by hot water indirect cylinder, managed by the heat pump cascade and by an indirect cylinder – in series – managed by the boiler. The indirect cylinder managed by the boiler is heated directly by the boiler, according to its own logics, through a dedicated hot water sensor or a thermostat.

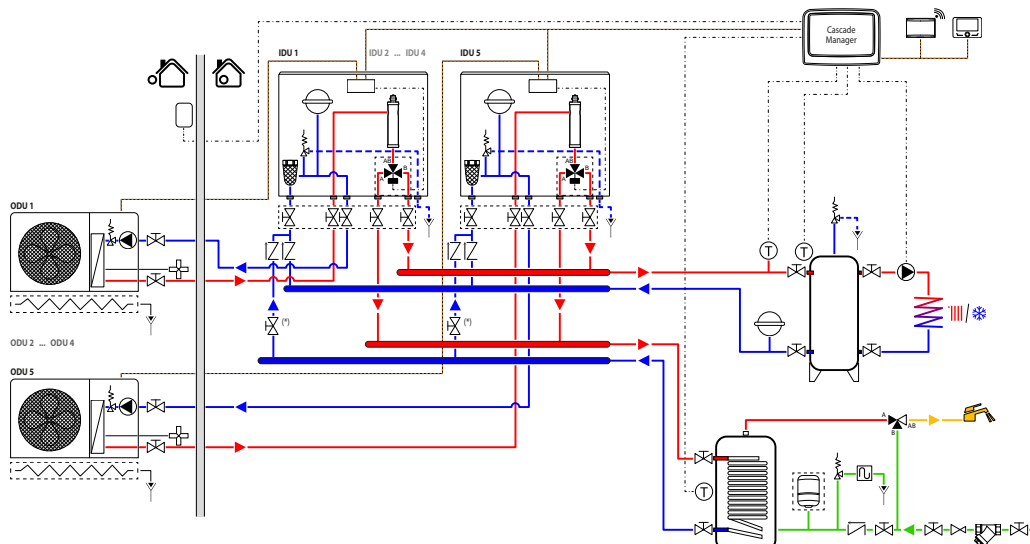


/ USE OF INTEGRATED HEATING ELEMENTS AND ANTI-LEGIIONELLA FUNCTION: If the heat pump models used in the cascade are equipped with an indoor unit with integrated heating elements, it is possible to use the heating elements to integrate the production of domestic hot water by choosing, for each heat pump, the number of heating elements that can be used and the duration of intervention. The integrated heating elements can also be configured as back-ups and will activate immediately only if all the heat pumps dedicated to domestic hot water production are unavailable.

The cascade system has an anti-Legionella function that can be configured on the basis on the specific application needs (frequency of anti-Legionella cycles, times, etc.)

If there are integration heating elements, these will be activated in parallel with the heat pumps during the anti-Legionella cycle to guarantee the minimum cycle duration.

If there are no integrated heating elements, the correct execution of the anti-Legionella cycle might not be guaranteed by the heat pumps alone.



## 10. CASCADE MANAGER - OPERATING LOGICS

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### SETTINGS AND SPECIAL FUNCTIONS

To adapt the operating logics of the CM to the specific needs of the various applications, there are a series of customisation parameters and special functions. The main parameters/functions are indicated below:

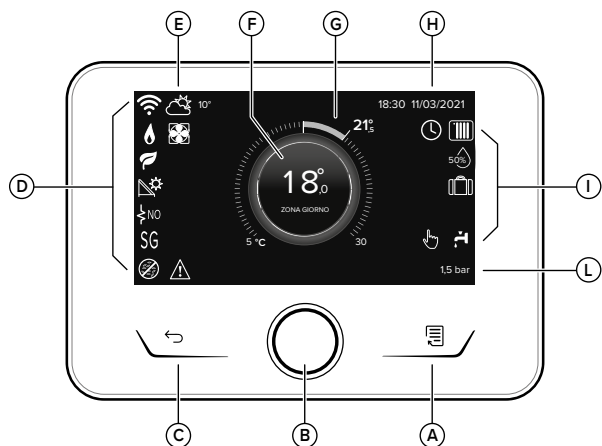
- / **AUTOMATIC COMPENSATION OF FLOW RATES AND DELIVERY TEMPERATURE:** the CM is equipped with a specific function that automatically maximises the flow rate of the heat pumps and increases, in heating mode, or decreases, in cooling mode, the delivery temperature compared to the set-point, when the temperature of the buffer tank is not aligned with the delivery temperature. This function allows for optimising the system's operation when the flow rates of the primary circuit of the cascade are lower than the flow rates of the secondary circuit of the system. In order to ensure that this function can work, the heating/cooling requests from the zones must be "communicated" to the CM.
- / **MAXIMUM POWER LEVEL OF HEAT PUMPS:** it is possible to limit, through an appropriate parameter, the maximum heat output delivered by the heat pumps, for example to limit the maximum absorbed power.
- / **DISABLING OF THE HEAT PUMPS ON THE BASIS OF THE OUTDOOR TEMPERATURE:** it is possible to set an outdoor temperature below which the heat pumps are disabled, for example to guarantee, when the auxiliary heat source is a gas-fired boiler, that the heat pumps are not running with very low outdoor temperatures and the services are nonetheless guaranteed.
- / **DISABLING OF THE HEAT PUMPS ON THE BASIS OF AN EXTERNAL SIGNAL:** through an external signal it is possible to disable the heat pumps, for example to guarantee, when the auxiliary heat source is a gas-fired boiler, that the heat pumps are not running at certain times of the day and the services are nonetheless guaranteed.
- / **CONTROL OF THE AUXILIARY HEATING/COOLING CIRCULATION PUMP:** the CM can control a relaunch circulation pump for heating/cooling as shown in the diagram. The circulation pump will be active exclusively when there is a heating/cooling request from the zones communicated to the Cascade Manager;
- / **CONTROL OF THE CIRCULATION PUMP FOR DHW RECIRCULATION:** the CM can control the circulation pump for the DHW recirculation which can be programmed with a daily or weekly schedule.

# 11. REMOTE CONTROL, MANAGEMENT AND TEMPERATURE CONTROL DEVICES

## SENSYS HD USER INTERFACE (standard)

The user interface remote control unit supplied allows for fully managing the system controlled by Cascade Manager, besides managing the system functions and the comfort functions of the zone where it is installed, and displaying any anomalies. It can also be used for room or climate control for managing a heating circuit.

Consult the dedicated manual for information on the remote control unit's operation.



### Key

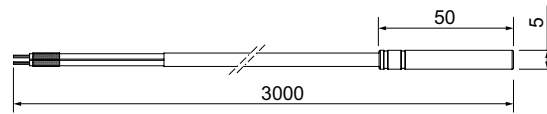
- A. Menu button
- B. OK knob / button  
(turn to select / press to confirm)
- C. Esc button (back)
- D. Function icons
- E. Weather and outdoor temperature
- F. Room temperature
- G. Desired temperature
- H. Date and time
- I. Operation icons
- L. Hydraulic pressure

	Wi-Fi module updating in progress		Cooling service enabled
<b>AP</b>	Access Point opening in progress		Cooling service active
	Wi-Fi off or not connected		Relative humidity index
	Wi-Fi connected but Internet access failed		Scheduled
	Wi-Fi active		Manual
	Outdoor temperature		TEMPERATURE REGULATION function active
	Solar heating module connected		HOLIDAY function active
<b>PV</b>	Photovoltaic contact enabled	<b>BOOST</b>	Domestic hot water BOOST function active
	Photovoltaic contact active	<b>HC HP</b>	DHW comfort function enabled with the HC-HP operating mode and electricity full rate band
<b>SG</b>	Smart Grid system enabled		DHW comfort function enabled with the HC-HP operating mode and electricity reduced rate band
	Supplementary heating elements not enabled	<b>HC 40</b>	DHW comfort function enabled with the HC 40 operating mode and electricity full rate band
	Generic heating element active		DHW comfort function enabled with the HC 40 operating mode and electricity reduced rate band
	Generic heat pump active		TEST mode active
	Power supply lockout (only for heat pumps)		Thermal SANITISATION function active
	Zone OFF		ANTI-FREEZE function active
	Room set-point extension active		DEHUMIDIFICATION function active
	Fireplace function active		Quiet mode active (heat pumps only)
	Heating		Error in progress
	Heating active		
	DHW		
	Domestic hot water active		



# 11. REMOTE CONTROL AND TEMPERATURE CONTROL DEVICES

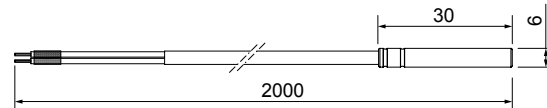
## UNIVERSAL SENSOR: BUFFER TANK AND DHW INDIRECT CYLINDER



Thermowell sensor to be used for buffer tanks and indirect cylinders:

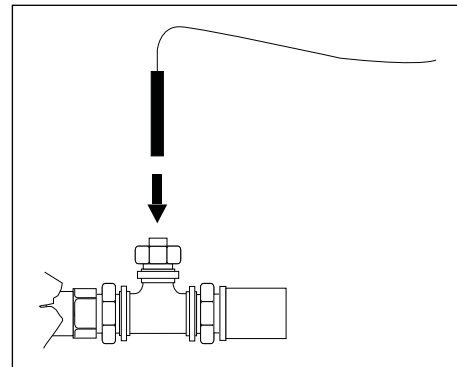
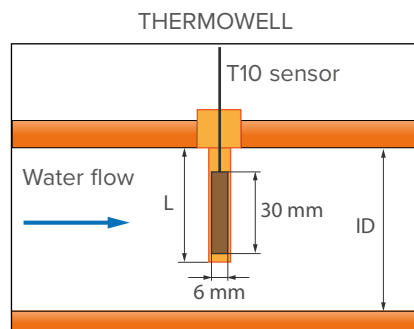
- / NTC 10 k sensor;
- / Temperature range -20/95°C;
- / Isolation resistance 100 Mohm;
- / Isolation voltage 3750 V;
- / IP 67 protection rating.

## T10 SYSTEM DELIVERY SENSOR

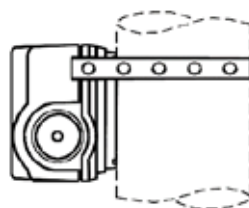


Thermowell sensor (standard):

- / NTC sensor 10 kΩ;
- /  $\beta=3977$
- / Temperature range -20/95°C;
- / Isolation resistance 100 Mohm;
- / Isolation voltage 3750 V;
- / IP 67 protection rating.



Clamp-on sensor (optional):



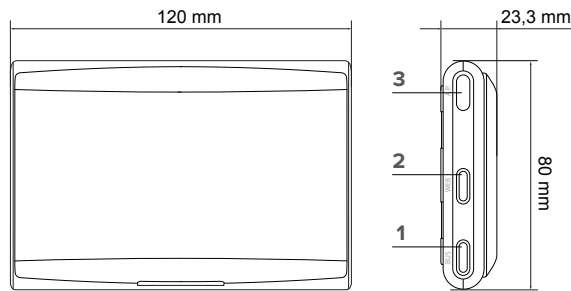
WARNING:

When installing heat pump systems consisting of units with R32 refrigerant, we recommend observing the safety requirements as specified in the reference standard (IEC 60335-2-40:2018).

## LIGHT GATEWAY

A device for connecting the new-generation Ariston heat pumps and the home Wi-Fi network.

- / Compatible with Wi-Fi ADSL router with WEP and WPA/WPA2 Personal 2.5 GHz encryption;
- / Power supply and connection con ARISTON heat pump via bus (ARISTON BUS BridgeNet proprietary protocol);
- / Configuration for housing and powering the Sensys modulating system manager;
- / IP20 electrical protection rating;
- / Operating temperatures -10°C / +60°C.



- |   |                            |
|---|----------------------------|
| 1 | BridgeNet Bus LED          |
| 2 | Internet connection LED    |
| 3 | Wi-Fi configuration button |

The LEDs on the side of the Gateway provide instant feedback on the product's operating status:

### GATEWAY OPERATING STATUS - LED CODING

#### 1 BRIDGENET BUS LED

Off	Gateway off
Steady green	BridgeNet Bus connection working
Steady red	BridgeNet Bus error or Bus cable not connected

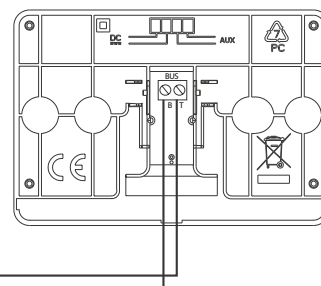
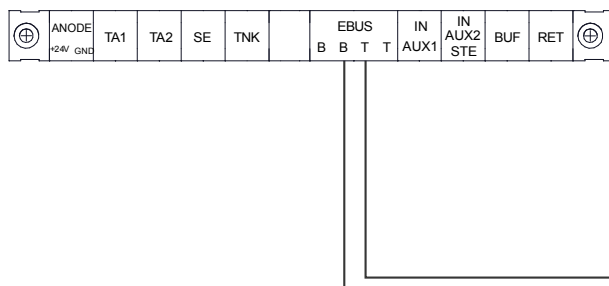
#### 2 INTERNET CONNECTION LED

Off	Gateway not powered or off
Steady green	Gateway correctly configured and connected to the Internet
Flashing green (slow)	Gateway waiting to be configured
Flashing green (fast)	Gateway connecting to the cloud
Steady red	No connection to the service or gateway is not configured

#### ALL LEDs

Off	Gateway off
Sequential flashing red	Gateway start-up
Flashing green (every 5 sec.)	Gateway in operation (it is enabled 2 minutes after configuration and disabled if there are errors, if the button is pressed or the parameters are changed)

### CONNECTION TO THE CASCADE MANAGER CONTROL UNIT



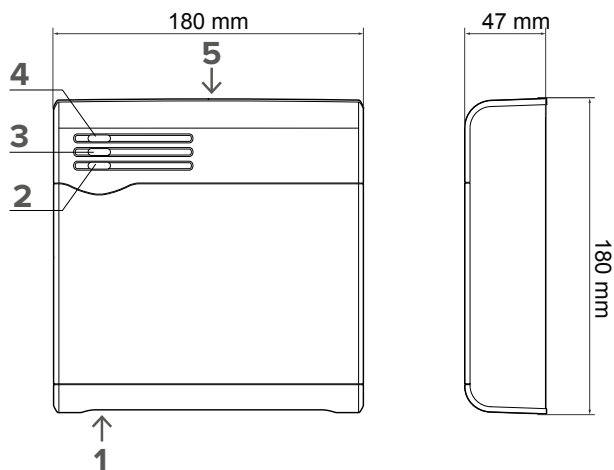
# 11. REMOTE CONTROL AND TEMPERATURE CONTROL DEVICES

## GATEWAY GPRS (optional)

Communication interface between the Cascade Manager control unit and Sensys HD for using connectivity via GPRS.

- / Compatible with GPRS connection via a suitable integrated board;
- / Powering and connection to ARISTON system via BUS (ARISTON BUS BridgeNet® proprietary protocol);
- / Configuration for powering the Sensys HD modulating system manager;
- / Electrical protection rating: IPX4D;
- / Operating temperatures: -25/+55°C;
- / Consumption 7 W - 30 mA.

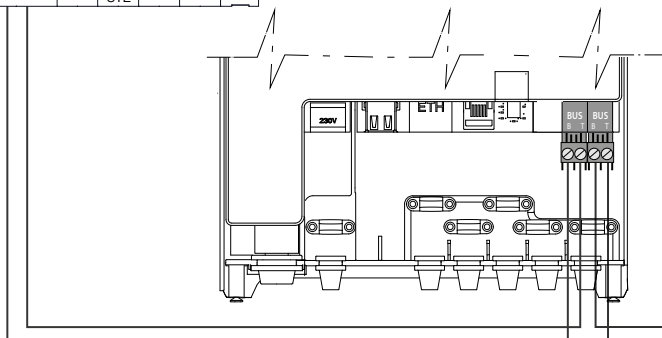
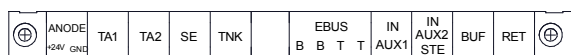
- |   |                               |
|---|-------------------------------|
| 1 | ON/OFF button                 |
| 2 | BridgeNet Bus LED             |
| 3 | Serial LED (not used)         |
| 4 | Internet connection LED       |
| 5 | Initial configuration buttons |



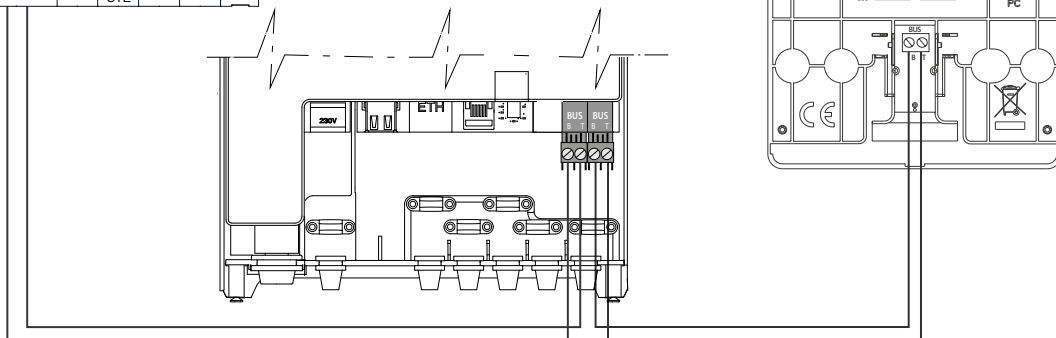
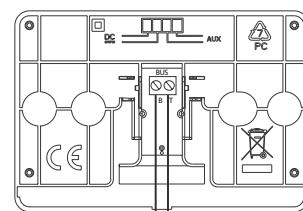
## TECHNICAL FEATURES

Conformity <b>CE</b>	2014/53/EU (RED) 2014/35/EU (LVD) 2014/30/EU (EMC)
Standard	ETSI EN 301489-17; ETSI EN 301489-52; ETSI EN 301511; ETSI EN 303417; EN60950-1; EN55032; EN61000-3-2; EN61000-3-3
Installing the product	Mounted on the wall or on any smooth surface far from metal walls
Operating temperatures	-25°C to 55°C
Storage temperatures	-40°C to 70°C
Power	220 VAC - 240 VAC; -10% / +10%
Consumption	7 W and/or 30 mA
Safety class	II
Environmental class	3
Weight	0.58 kg
Protection rating	IP X4D

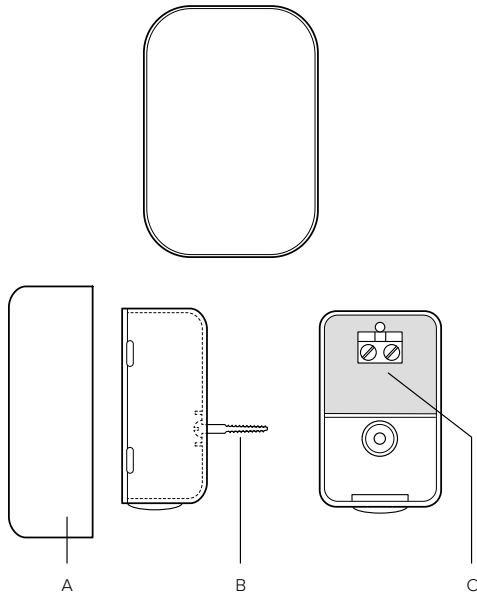
## CONNECTION TO THE CASCADE MANAGER CONTROL UNIT



## CONNECTION TO THE SENSYS HD DEVICE



## EXTERNAL SENSOR



Position the external sensor on the north wall of the building at least 2.5 m above the ground, avoiding direct exposure to sunlight. Remove the cover (Fig. A) and install the sensor using the wall plug and screw provided (Fig. B). Make the connection using a 2x0.5 mm<sup>2</sup> wire with a maximum connection length of 50 m. Connect the wire to the terminal by introducing (Fig. C) it from the lower part after creating a suitable passage. Place the sensor cover back in the correct position.

### PRODUCT DATA SHEET (valid with effect from 26 September 2015)

Supplier name	ARISTON	
Supplier identification model	Sensys HD	Outdoor sensor
Temperature control class	V	II
Energy efficiency contribution (%) for space heating	3%	2%

#### IN A SYSTEM WITH 2 ZONES AND 1 ARISTON ROOM SENSORS:

Temperature control class	VI	--
Energy efficiency contribution (%) for space heating	4%	--

#### IN A SYSTEM WITH 3 ZONES AND 2 ARISTON ROOM SENSORS:

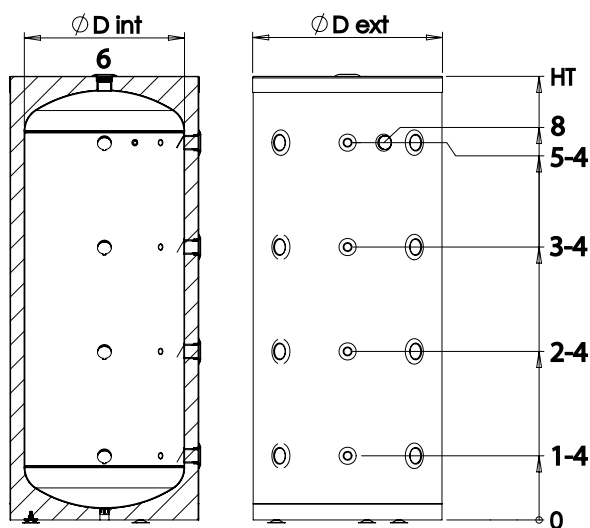
Temperature control class	VIII	--
Energy efficiency contribution (%) for space heating +5% --	5%	--

## 12. BUFFER TANK

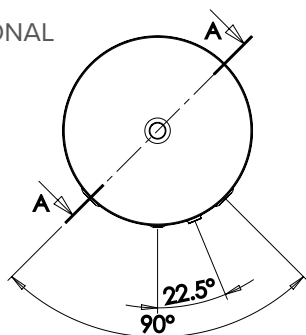
### TECHNICAL AND DIMENSIONAL CHARACTERISTICS OF THE BUFFER TANK

CKZ H BUFFER TANK	UNIT OF MEASUREMENT	200	300	400	500
ErP energy class		C	C	C	C
Indirect cylinder material		Steel without porcelain coating			
Rated capacity	l	197	298	403	473
Outer Ø	mm	600	600	700	700
Height	mm	1230	1760	1655	1900
Max. operating pressure	bar	6			
Max. operating temperature	°C	95			
Heat dispersion	W	76	92	97	105
Weight	kg	48	63	76	106

### CKZ 200 - 300 - 400 - 500 H



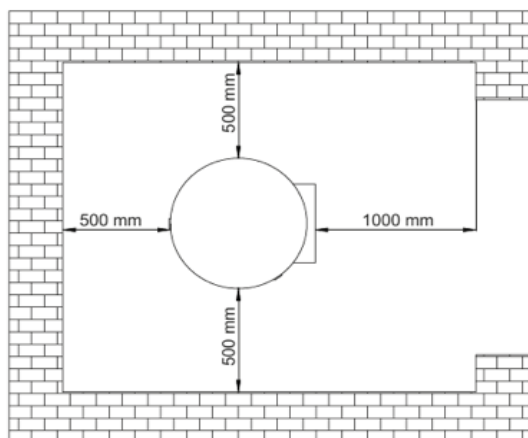
7  
CROSS-SECTIONAL  
VIEW A-A



MODEL CKZ.... H	200	300	400-500
<b>1 - 2 - 3 - 5</b> Primary/secondary network connection	1 1/2"	1 1/2"	2"
<b>4</b> Sensor	1/2"	1/2"	1/2"
<b>6</b> Relief outlet	1 1/2"	1 1/2"	2"
<b>7</b> Discharge outlet	1/2"	3/4"	3/4"
<b>8</b> Thermometer	1/2"	1/2"	1/2"

	200	300	400	500
Outer Ø [mm]	600	600	700	700
Inner Ø [mm]	500	500	500	500
Height HT (insul.) [mm]	1230	1760	1655	1900
Primary/secondary network connection [mm]	<b>1</b>	243	243	268
	<b>2</b>	489	666	638
	<b>3</b>	735	1088	1008
	<b>5</b>	981	1511	1278
Sensor [mm]	<b>1-4</b>	243	243	268
	<b>2-4</b>	489	666	638
	<b>3-4</b>	735	1088	1008
Thermometer	<b>5-4</b>	981	1511	1278
	<b>8</b>	981	1511	1278

### MINIMUM INSTALLATION CLEARANCES

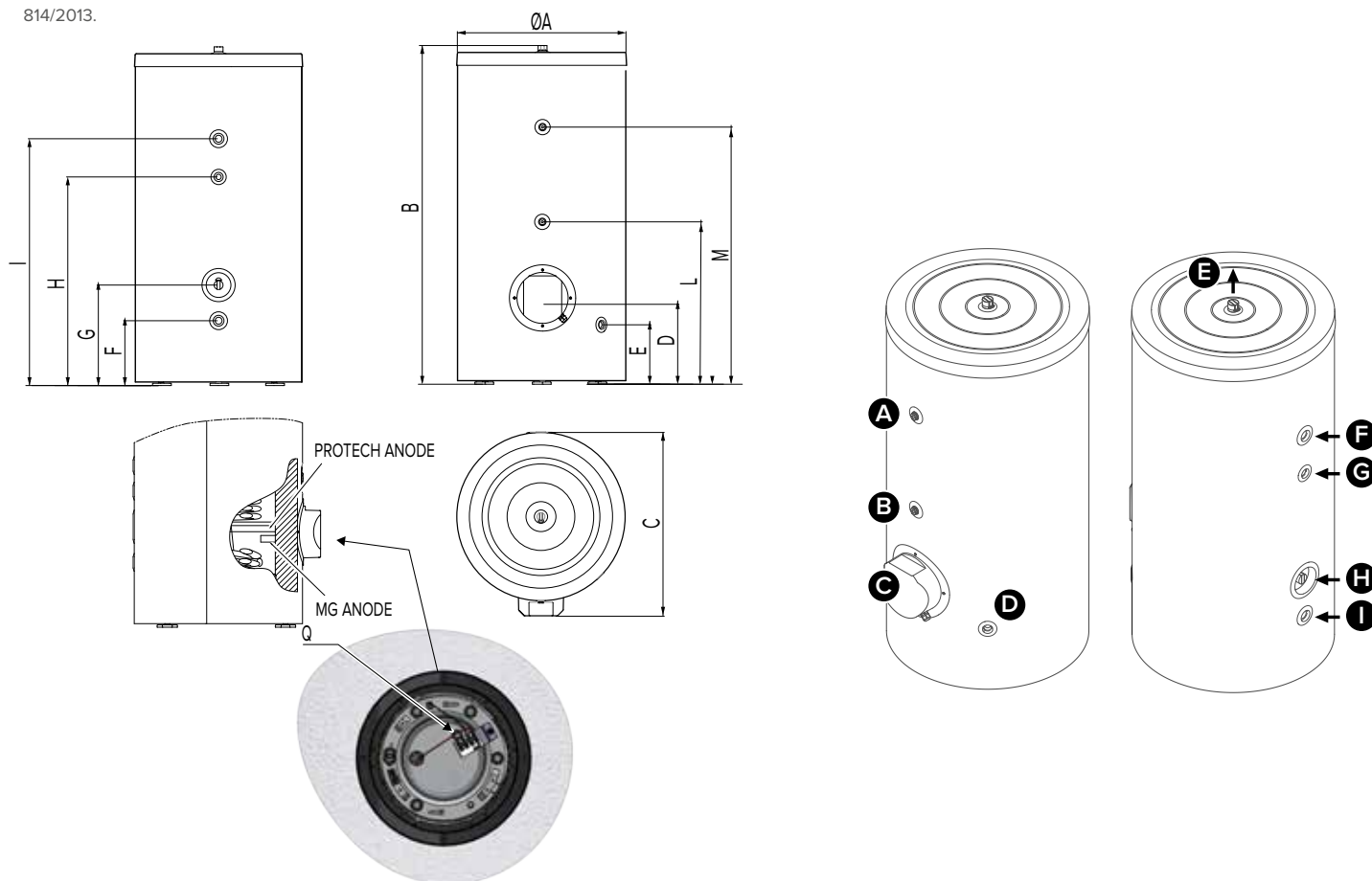


# 13. INDIRECT CYLINDERS

## TECHNICAL AND DIMENSIONAL CHARACTERISTICS OF SINGLE-COIL INDIRECT CYLINDERS

CD1 INDIRECT CYLINDER	UNIT OF MEASUREMENT	200 l	300 l	450 l
Tank capacity	l	190	280	435
Coil surface area	m <sup>2</sup>	2	3.5	4.5
Coil capacity	l	13	18	30
Heat exchanger power as per EN 12897	kW	22.7	33.8	30.8
Head losses from coil at 15 l/min	mbar	88	92	90
Max. operating pressure	bar	7	7	7
Heat dispersion EN 60379	kWh/day	1.28	1.64	1.9
Energy class		B	B	B
Weight	kg	83	120	160

**NOTE:** The energy data shown in the table and additional data appearing in the Product Sheet (Annex A to the product) are defined on the basis of Regulations (EU) 812/2013 and 814/2013.



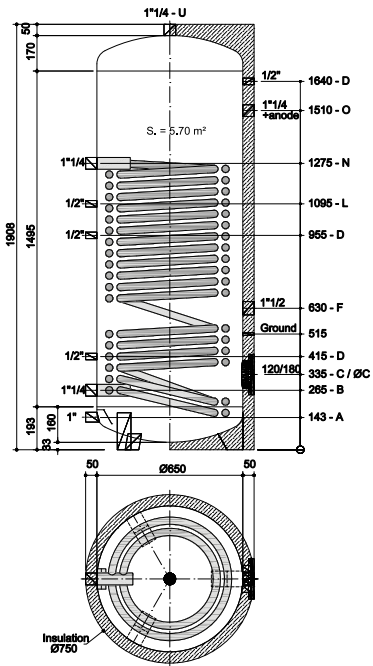
<b>A</b> Thermowell Ø 10 mm	<b>F</b> Hot water outlet Ø 1" G M
<b>B</b> Thermowell Ø 10 mm	<b>G</b> Recirculation Ø 3/4" G Female
<b>C</b> Side flange with thermowell Ø 10 mm	<b>H</b> Cold water inlet Ø 1" G M
<b>D</b> Drainage outlet Ø 3/4" G F	<b>I</b> Coil outlet Ø 1" G F
<b>E</b> Hot water outlet Ø 1" G M	

MODEL	External diameter [Ø A mm]	Height [B mm]	Max. depth [C mm]	Side flange [D mm]	Discharge outlet [E mm]	Coil outlet [F mm]	Cold water inlet [G mm]	Recirculation [H mm]	Coil inlet [I mm]	Sensor inlet [L mm]	Sensor inlet [M mm]
CD1 HHP 200	660	1332	731	374	254	254	389	789	969	659	1034
CD1 HHP 300	660	1354	731	374	254	254	389	1239	1419	714	1856
CD1 HHP 450	760	1378	827	374	254	254	389	1234	1415	834	1672

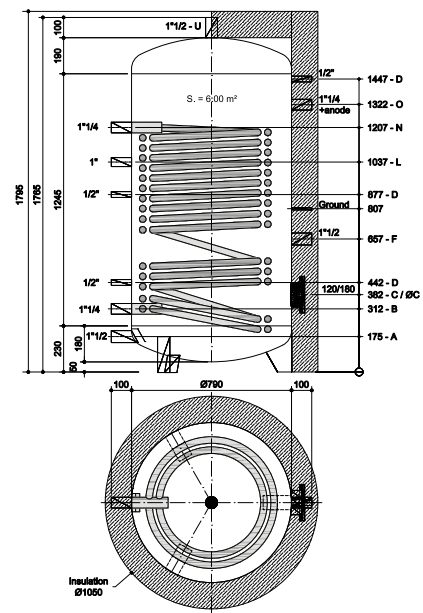
CD1 INDIRECT CYLINDER	UNIT OF MEASUREMENT	600 L	800 L
Tank capacity	l	585.7	749.8
Coil surface area	m <sup>2</sup>	5.70	6
Coil capacity	l	55.9	58.8
Heat exchanger power as per EN 12897	kW	76	79
Head losses from coil at 15 l/min	mbar	20	20
Max. operating pressure	bar	8	8
Heat dispersion	kWh/day	2.16	303
Energy class		B	C
Weight	kg	167	215

**NOTE:** The energy data shown in the table and additional data appearing in the Product Sheet (Annex A to the product) are defined on the basis of Regulations (EU) 812/2013 and 814/2013.

CD1 600 INDIRECT CYLINDER



CD1 800 INDIRECT CYLINDER



- |                                     |                           |
|-------------------------------------|---------------------------|
| <b>A</b> Cold water inlet           | <b>L</b> Recirculation    |
| <b>B</b> Coil inlet                 | <b>N</b> Coil outlet      |
| <b>C</b> Flange                     | <b>O</b> Anode            |
| <b>D</b> Thermowell                 | <b>U</b> Hot water outlet |
| <b>F</b> Heating element connection |                           |

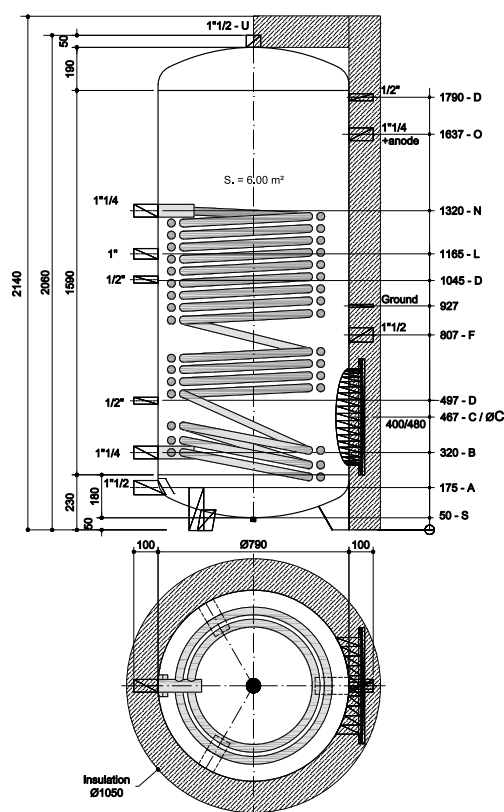
MODEL	Internal diameter [Ø mm]	Height [mm]	Insulation [Ø mm]	Tipping height	Coil surface area [m <sup>2</sup> ]	Weight [kg]
CD1 HHP 600	650	1910	750	2065	5.7	167
CD1 HHP 800	790	1795	1050	1745	6	215

# 13. INDIRECT CYLINDERS

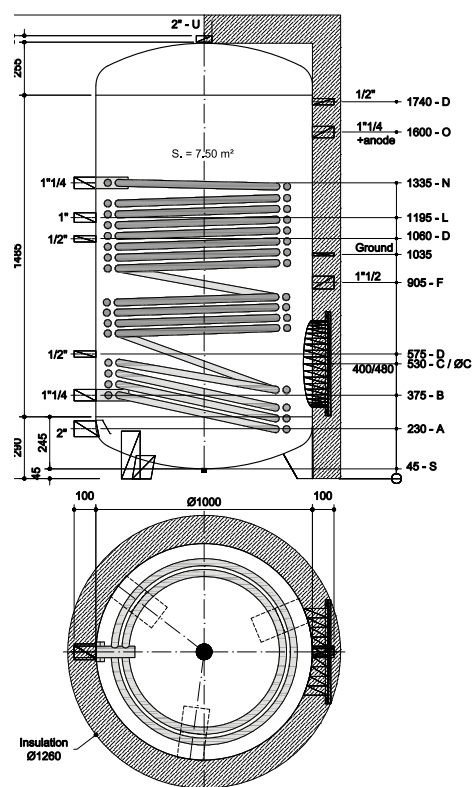
CD1 INDIRECT CYLINDER	UNIT OF MEASUREMENT	1000 L	1500 L
Tank capacity	l	931.5	1475
Coil surface area	m <sup>2</sup>	6	7.5
Coil capacity	l	58.8	73.5
Heat exchanger power as per EN 12897	kW	79	100
Head losses from coil at 15 l/min	mbar	20	20
Max. operating pressure	bar	8	8
Heat dispersion	kWh/day	3.32	4.04
Energy class		C	C
Weight	kg	251	383

**NOTE:** The energy data shown in the table and additional data appearing in the Product Sheet (Annex A to the product) are defined on the basis of Regulations (EU) 812/2013 and 814/2013.

CD1 1000 INDIRECT CYLINDER



CD1 1500 INDIRECT CYLINDER



- |                                     |                           |
|-------------------------------------|---------------------------|
| <b>A</b> Cold water inlet           | <b>L</b> Recirculation    |
| <b>B</b> Coil inlet                 | <b>N</b> Coil outlet      |
| <b>C</b> Flange                     | <b>O</b> Anode            |
| <b>D</b> Thermowell                 | <b>U</b> Hot water outlet |
| <b>F</b> Heating element connection |                           |

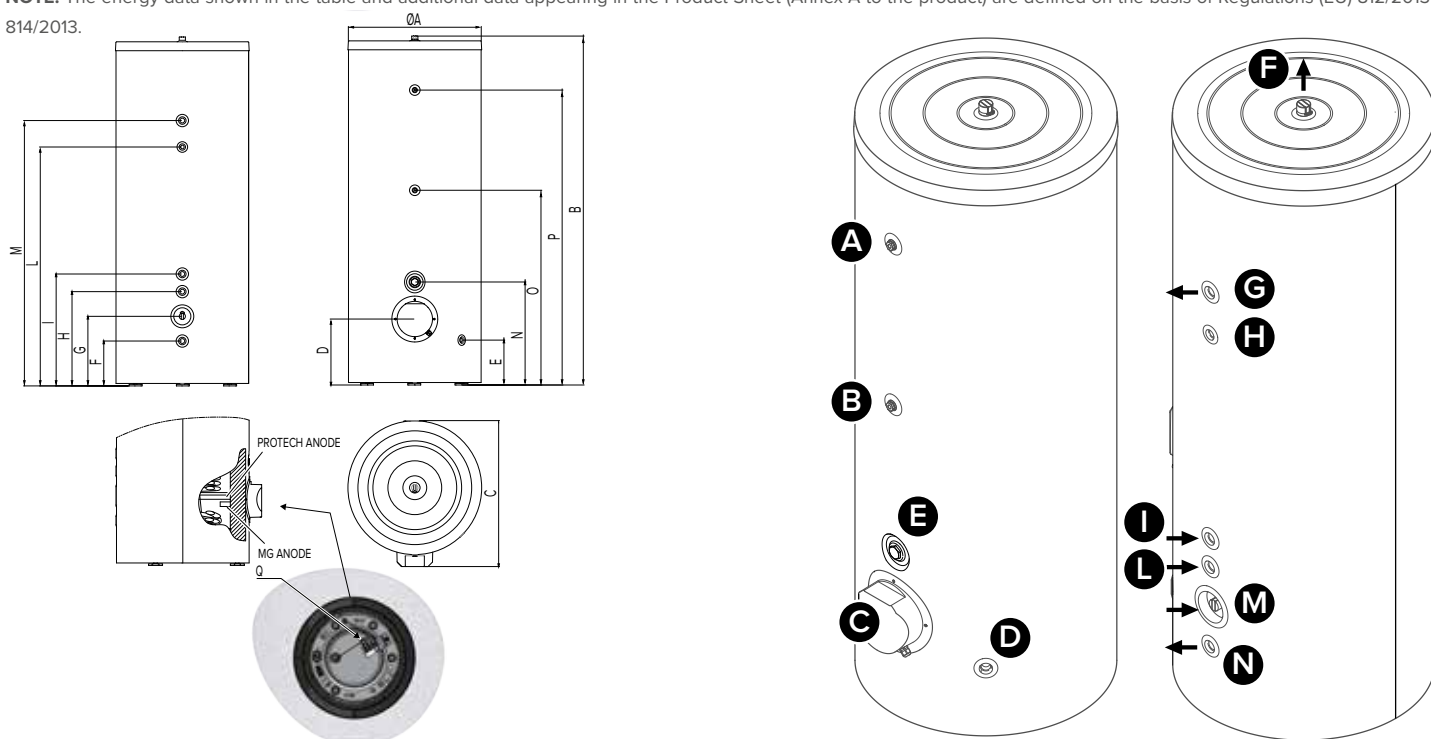
MODEL	Internal diameter [Ø mm]	Height [mm]	Insulation [Ø mm]	Tipping height	Coil surface area [m <sup>2</sup> ]	Weight [kg]
CD1 HHP 1000	790	2130	1050	2095	6	251
CD1 HHP 1500	1000	2150	1260	2145	7.5	383



## TECHNICAL AND DIMENSIONAL CHARACTERISTICS OF DOUBLE-COIL INDIRECT CYLINDERS

CD2 INDIRECT CYLINDER	UNIT OF MEASUREMENT	300 l	450 l
Tank capacity	l	279	433
<b>UPPER COIL</b>			
Coil surface area	m <sup>2</sup>	2.5	3.5
Coil capacity	l	13	18
Heat exchanger power as per EN 12897	kW	27.9	27.3
Head losses from coil at 15 l/min	mbar	80	83
<b>LOWER COIL</b>			
Coil surface area	m <sup>2</sup>	1	1
Coil capacity	l	5	5
Heat exchanger power as per EN 12897	kW	12.5	16.5
Head losses from coil at 15 l/min	mbar	50	50
Max. operating pressure	bar	7	7
Heat dispersion EN 60379	kWh/day	1.62	1.89
ErP energy class		B	B
Weight	kg	122	164

**NOTE:** The energy data shown in the table and additional data appearing in the Product Sheet (Annex A to the product) are defined on the basis of Regulations (EU) 812/2013 and 814/2013.



<b>A</b> Thermowell Ø 10 mm	<b>G</b> Heat pump heat exchanger input Ø 1" G F
<b>B</b> Thermowell Ø 10 mm	<b>H</b> Recirculation Ø 3/4" G F
<b>C</b> Side flange with thermowell Ø 10 mm	<b>I</b> Heat pump heat exchanger outlet Ø 1" G F
<b>D</b> Drainage outlet Ø 3/4" G F	<b>L</b> Solar system coil inlet Ø 1" G F
<b>E</b> Back-up heating element housing Ø 1 1/2"	<b>M</b> Cold water inlet Ø 1" G M
<b>F</b> Hot water outlet Ø 1" G M	<b>N</b> Cold water inlet Ø 1" G M

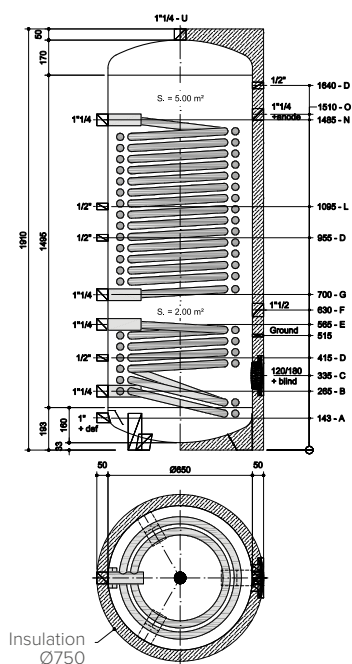
MODEL	External diameter [Ø A mm]	Height [B mm]	Max. depth [C mm]	Side flange [D mm]	Discharge outlet [E mm]	Solar coil outlet [F mm]	Cold water inlet [G mm]	Solar coil inlet [H mm]	Heat pump outlet [I mm]	Recirculation [L mm]	Heat pump inlet [M mm]	Back-up heating element [N mm]	Sensor inlet [O mm]	Sensor inlet [P mm]
CD2 HHP 300	660	1853	731	374	254	254	389	640	704	1334	1514	644	1174	1556
CD2 HHP 450	760	1978	827	374	254	254	389	534	634	1325	1505	584	1104	1672

# 13. INDIRECT CYLINDERS

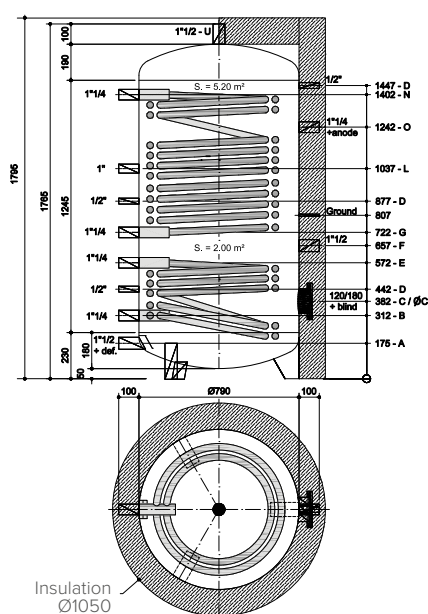
CD2 INDIRECT CYLINDER	UNIT OF MEASUREMENT	600 L	800 L
Tank capacity	l	585.7	749.8
<b>UPPER COIL</b>			
Coil surface area	m <sup>2</sup>	5	5.2
Coil capacity	l	49	51
Heat exchanger power as per EN 12897	kW	69	71
Head losses from coil at 15 l/min	mbar	20	20
<b>LOWER COIL</b>			
Coil surface area	m <sup>2</sup>	2	2
Coil capacity	l	19.6	19.6
Heat exchanger power as per EN 12897	kW	33	33
Head losses from coil at 15 l/min	mbar	20	20
Max. operating pressure	bar	8	8
Heat dispersion EN 60379	kWh/day	2.16	3.03
ErP energy class		B	C
Weight	kg	188	234

**NOTE:** The energy data shown in the table and additional data appearing in the Product Sheet (Annex A to the product) are defined on the basis of Regulations (EU) 812/2013 and 814/2013.

CD2 600 INDIRECT CYLINDER



CD2 800 INDIRECT CYLINDER



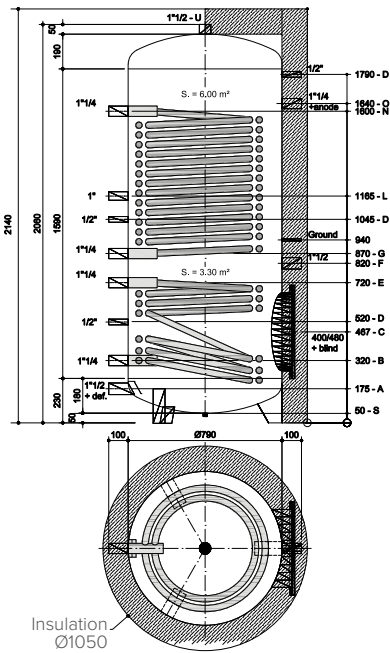
- |                            |                                     |
|----------------------------|-------------------------------------|
| <b>A</b> Cold water inlet  | <b>F</b> Heating element connection |
| <b>B</b> Lower coil inlet  | <b>L</b> Upper coil inlet           |
| <b>C</b> Flange            | <b>N</b> Upper coil outlet          |
| <b>D</b> Thermowell        | <b>O</b> Anode                      |
| <b>E</b> Lower coil outlet | <b>U</b> Hot water outlet           |

MODEL	Internal diameter [Ø mm]	Height [mm]	Insulation [Ø mm]	Tipping height	Lower coil surface area [m <sup>2</sup> ]	Upper coil surface area [m <sup>2</sup> ]	Weight [kg]
CD2 HHP 600	650	1910	750	2065	2	5	188
CD2 HHP 800	790	1795	1050	1745	2	5.2	234

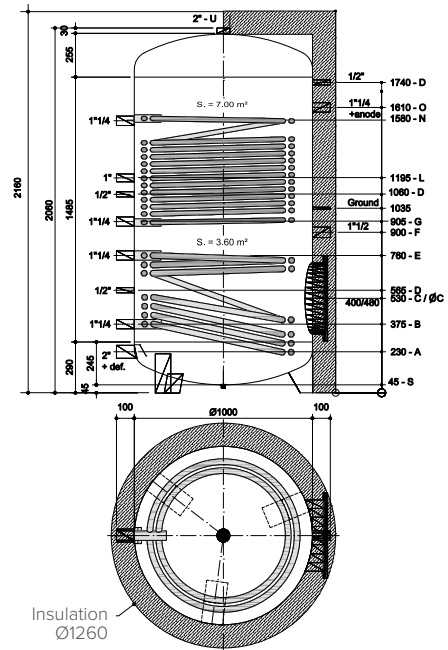
CD2 INDIRECT CYLINDER	UNIT OF MEASUREMENT	1000 L	1500 L
Tank capacity	l	931.5	1474.3
<b>UPPER COIL</b>			
Coil surface area	m <sup>2</sup>	6	7.5
Coil capacity	l	58.8	73.5
Heat exchanger power as per EN 12897	kW	79	100
Coil resistance at 15 l/min	mbar	20	20
<b>LOWER COIL</b>			
Coil surface area	m <sup>2</sup>	3.30	3.60
Coil capacity	l	32.3	35.3
Heat exchanger power as per EN 12897	kW	50	57
Coil resistance at 15 l/min	mbar	20	20
Max. operating pressure	bar	8	8
Heat dispersion EN 60379	kWh/day	3.32	4.04
ErP energy class		C	C
Weight	kg	285	417

**NOTE:** The energy data shown in the table and additional data appearing in the Product Sheet (Annex A to the product) are defined on the basis of Regulations (EU) 812/2013 and 814/2013.

CD2 1000 INDIRECT CYLINDER



CD2 1500 INDIRECT CYLINDER

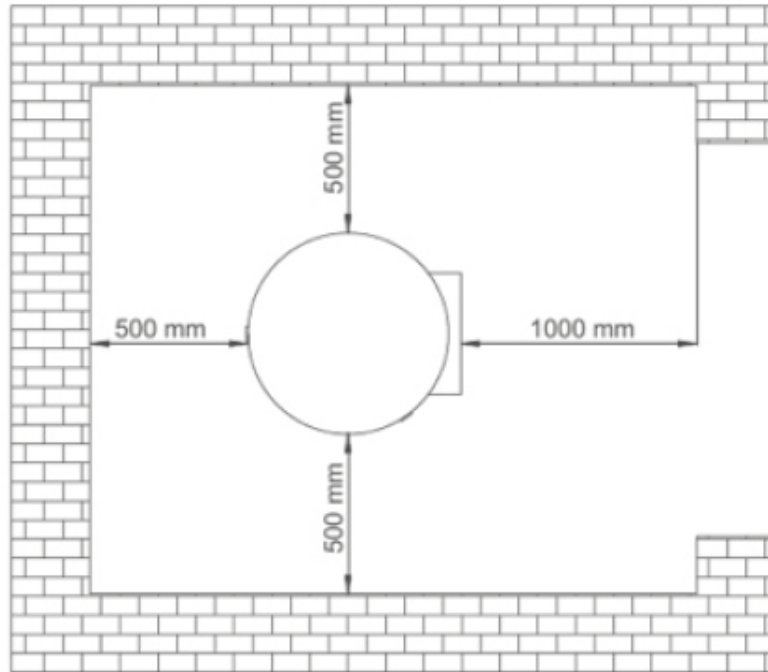


- |                            |                                     |
|----------------------------|-------------------------------------|
| <b>A</b> Cold water inlet  | <b>F</b> Heating element connection |
| <b>B</b> Lower coil inlet  | <b>L</b> Upper coil inlet           |
| <b>C</b> Flange            | <b>N</b> Upper coil outlet          |
| <b>D</b> Thermowell        | <b>O</b> anode                      |
| <b>E</b> Lower coil outlet | <b>U</b> Hot water outlet           |

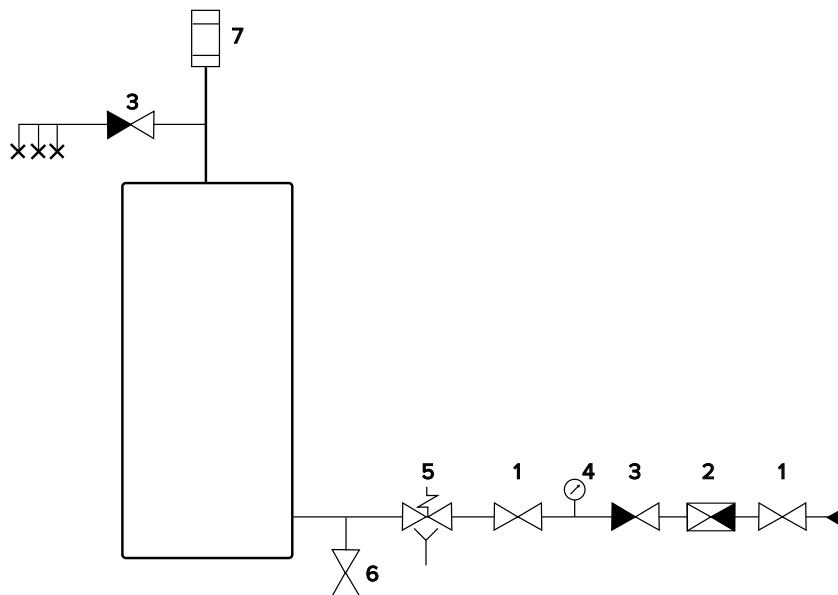
MODEL	Internal diameter [Ø mm]	Height [mm]	Insulation [Ø mm]	Tipping height	Lower coil surface area [m <sup>2</sup> ]	Upper coil surface area [m <sup>2</sup> ]	Weight [kg]
CD2 HHP 600	790	2140	1050	1745	3.3	6	285
CD2 HHP 800	1000	2160	1260	2145	3.6	7.5	417

# 13. INDIRECT CYLINDERS

## MINIMUM INSTALLATION CLEARANCES



## INSTALLATION INDICATIONS



- 1 Shut-off valve
- 2 Pressure reducer
- 3 Non-return valve
- 4 Pressure gauge fitting with pressure gauge
- 5 Safety valve
- 6 Discharge valve
- 7 Air vent valve

## 14. GENERAL INDICATIONS FOR THE SIZING OF MANIFOLDS AND BUFFER TANKS

### SIZING OF THE HEATING AND DHW CIRCUIT DELIVERY MANIFOLDS.

The pipes and delivery and return manifolds of the primary circuit must be properly sized. The circulation pumps mounted on the heat pump units work in parallel when these are in function. It is therefore advisable to use connecting pipes between the units and the manifold of adequate diameter, as specified in the technical documentation of the single units. The common manifold must be sized for the sum of all nominal flow rates of the units installed, so as to have a resulting flow speed not exceeding 1.5 m/s, as per good technical practice.

Moreover, it is advisable to verify that the available head at the outlet of each unit is sufficient for covering any resulting head losses on the primary circuit.

### BUFFER TANK SIZING.

The buffer tank, as shown in the diagrams at the end of this document, performs a three-fold function:

/ it is used as a hydraulic separator of the primary circuit for hot water generation and of the secondary circuit on the heating/cooling side;

/ it guarantees the minimum water quantity required for the heat pumps in order to manage the defrosting function;

/ it functions as a thermal flywheel for reducing switch-on cycles and partial loads.

The buffer tank must be sized

according to the most restrictive design condition among the three mentioned above.

In this regard, the buffer tank should be correctly sized so as to guarantee a sufficient amount of water in the primary circuit. The technical manuals of each generator specify the minimum water quantities required for each machine size.

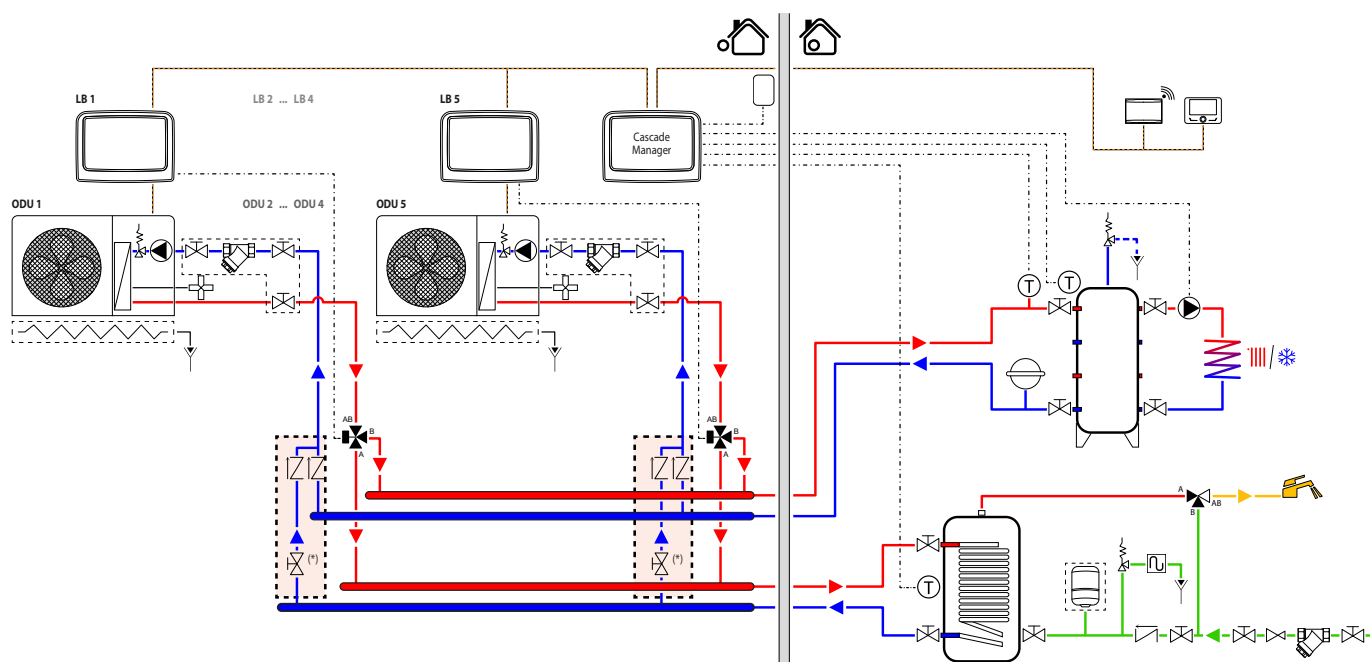
### CHECK VALVES AND MANUAL SHUT-OFF VALVES.

We suggest installing a check valve on the return pipe of each heat pump, on both the space heating/cooling side and on the DHW side. This will prevent water from flowing back into the switched-off generators.

Manual shut-off valves are mandatory if one or more heat pumps dedicated also to domestic hot water production are not activated for this service:

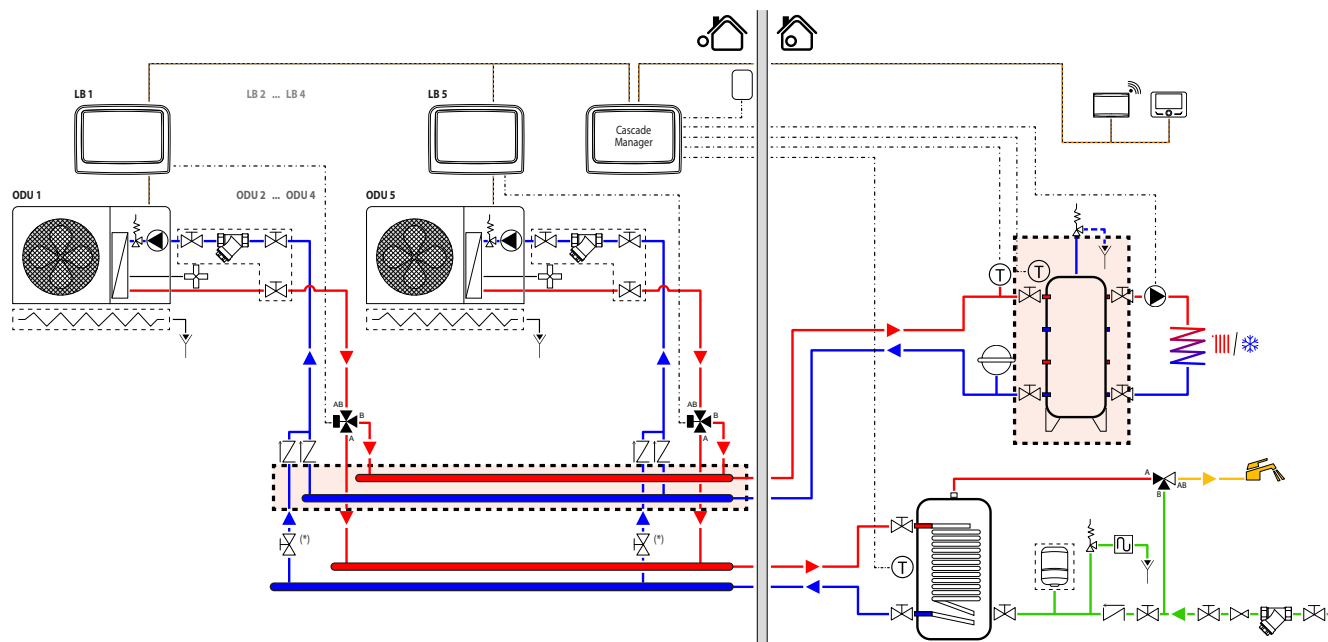
/ Valve open: heat pumps activated for the DHW service;

/ Valve closed: heat pumps NOT activated for the DHW service.



# 14. GENERAL INDICATIONS FOR THE SIZING OF MANIFOLDS AND BUFFER TANKS

## HEAT PUMP CASCADE - SIZING OF THE HYDRAULIC MANIFOLD AND OF THE BUFFER TANK



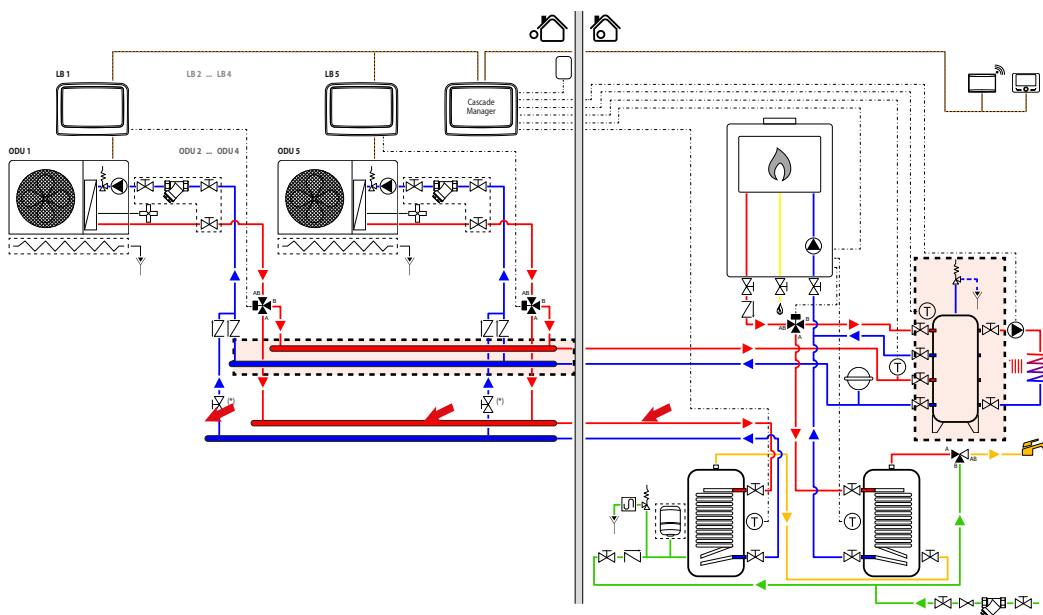
(\*) To be opened in case of DHW enabled for the related HHP.

HEAT PUMP DATA				HYDRAULIC MANIFOLD		BUFFER TANK (4 FITTINGS)
Heat pump model	Number of heat pumps	Nominal heat output in heating mode (kW, air=7°C, water=35°C)	Nominal flow rate (litres/hour)	Diameter (Steel pipe)*	Diameter (Plastic PEX pipe)	Minimum capacity** (litres)
80	2	16	2800	1" - DN25	32 mm	100
80	3	24	4200	1" 1/4 - DN32	40 mm	200
80	4	32	5600	1" 1/4 - DN32	50 mm	200
80	5	40	7000	1" 1/2 - DN40	50 mm	200
120	2	24	4200	1" 1/4 - DN32	40 mm	200
120	3	36	6300	1" 1/2 - DN40	50 mm	200
120	4	48	8400	2" - DN50	63 mm	300
120	5	60	10500	2" - DN50	63 mm	300
150	2	30	5200	1" 1/4 - DN32	50 mm	200
150	3	45	7800	2" - DN50	63 mm	300
150	4	60	10400	2" - DN50	63 mm	300
150	5	75	13000	2" 1/2 - DN65	75 mm	400

\*Considering maximum water speed of 1.5 m/s.

\*\*Considering minimum water volume of 5 l/kW.

## HEAT PUMP CASCADES WITH BOILER INTEGRATION - SIZING OF THE HYDRAULIC MANIFOLD AND OF THE BUFFER TANK



(\*) To be opened in case of DHW enabled for the related HHP.

HEAT PUMP DATA				HYDRAULIC MANIFOLD		BUFFER TANK (4 FITTINGS)
Heat pump model	Number of heat pumps	Nominal heat output in heating mode (kW, air=7°C, water=35°C)	Nominal flow rate (litres/hour)	Diameter (Steel pipe)*	Diameter (Plastic PEX pipe)	Minimum capacity** (litres)
80	2	16	2800	1" - DN25	32 mm	200
80	3	24	4200	1" 1/4 - DN32	40 mm	400
80	4	32	5600	1" 1/4 - DN32	50 mm	400
80	5	40	7000	1" 1/2 - DN40	50 mm	400
120	2	24	4200	1" 1/4 - DN32	40 mm	400
120	3	36	6300	1" 1/2 - DN40	50 mm	400
120	4	48	8400	2" - DN50	63 mm	600
120	5	60	10500	2" - DN50	63 mm	600
150	2	30	5200	1" 1/4 - DN32	50 mm	400
150	3	45	7800	2" - DN50	63 mm	600
150	4	60	10400	2" - DN50	63 mm	600
150	5	75	13000	2" 1/2 - DN65	75 mm	800

\*Considering maximum water speed of 1.5 m/s.

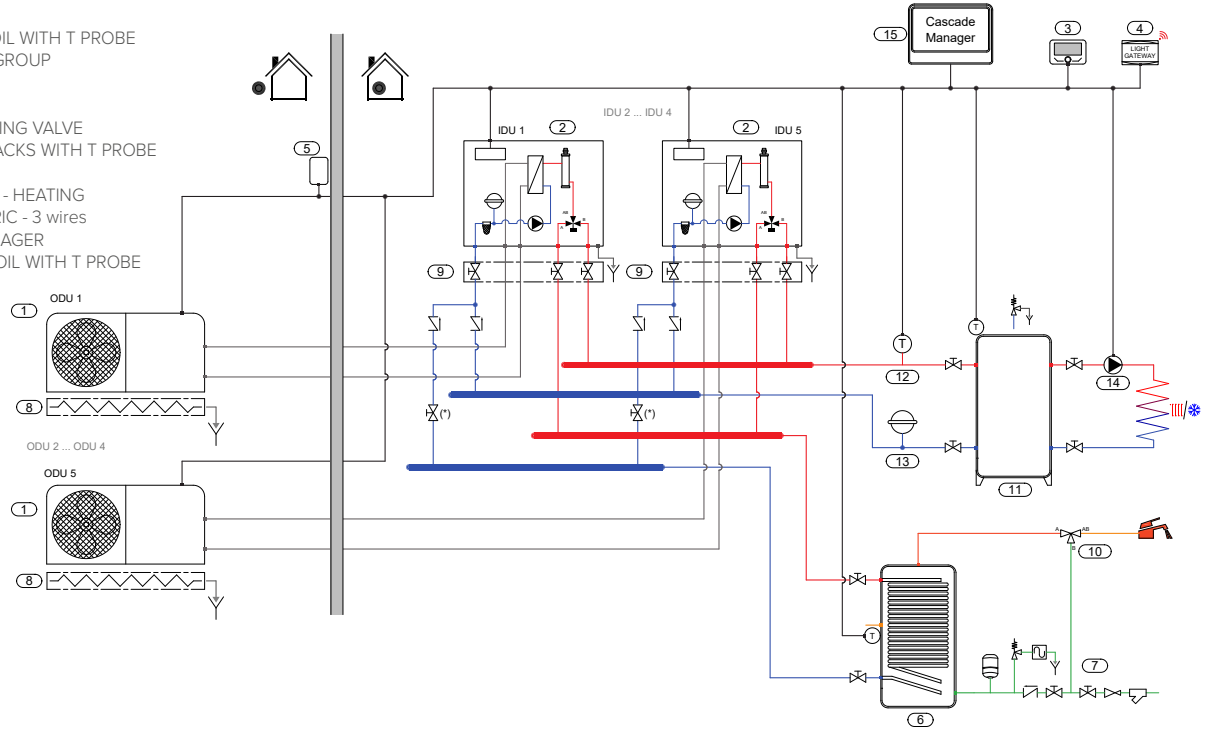
\*\*Considering minimum water volume of 5 l/kW. Moreover, due to the fact that usually buffer tanks have symmetrical fittings, in order to guarantee the right water volume to heat pumps the water volume for hybrids is double in comparison to the only heat pump solution.

# 15. SYSTEM SOLUTIONS

## SOLUTION 1 – CASCADE NIMBUS PLUS S NET R32 + CKZ H BUFFER TANK + CD1 HHP DHW INDIRECT CYLINDER

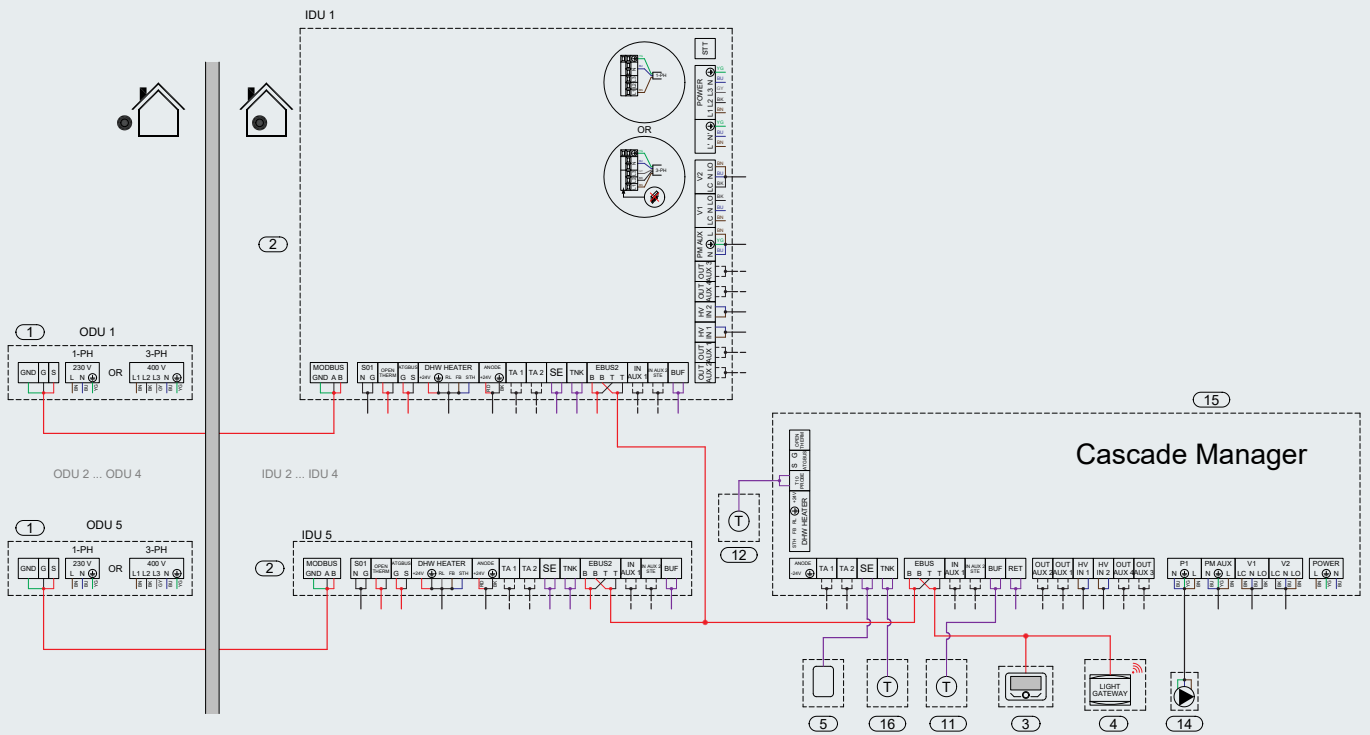
Hydraulic diagram

1. EXTERNAL UNIT HHP - SPLIT 1-PH OR 3-PH
2. IDU SPLIT WITH 3 WAY VALVE
3. SYSTEM INTERFACE
4. LIGHT GATEWAY
5. EXTERNAL PROBE
6. DHW TANK HHP 1-COIL WITH T PROBE
7. DHW INLET SAFETY GROUP
8. HE KIT BELOW ODU
9. KIT SHUT-OFF VALVE
10. THERMOSTATIC MIXING VALVE
11. BUFFER TANK 4 ATTACKS WITH T PROBE
12. T PROBE
13. EXPANSION VESSEL - HEATING
14. CIRCULATOR GENERIC - 3 wires
15. HHP CASCADE MANAGER
16. DHW TANK HHP 1-COIL WITH T PROBE



1 To be opened in case of DHW enabled for the related HHP

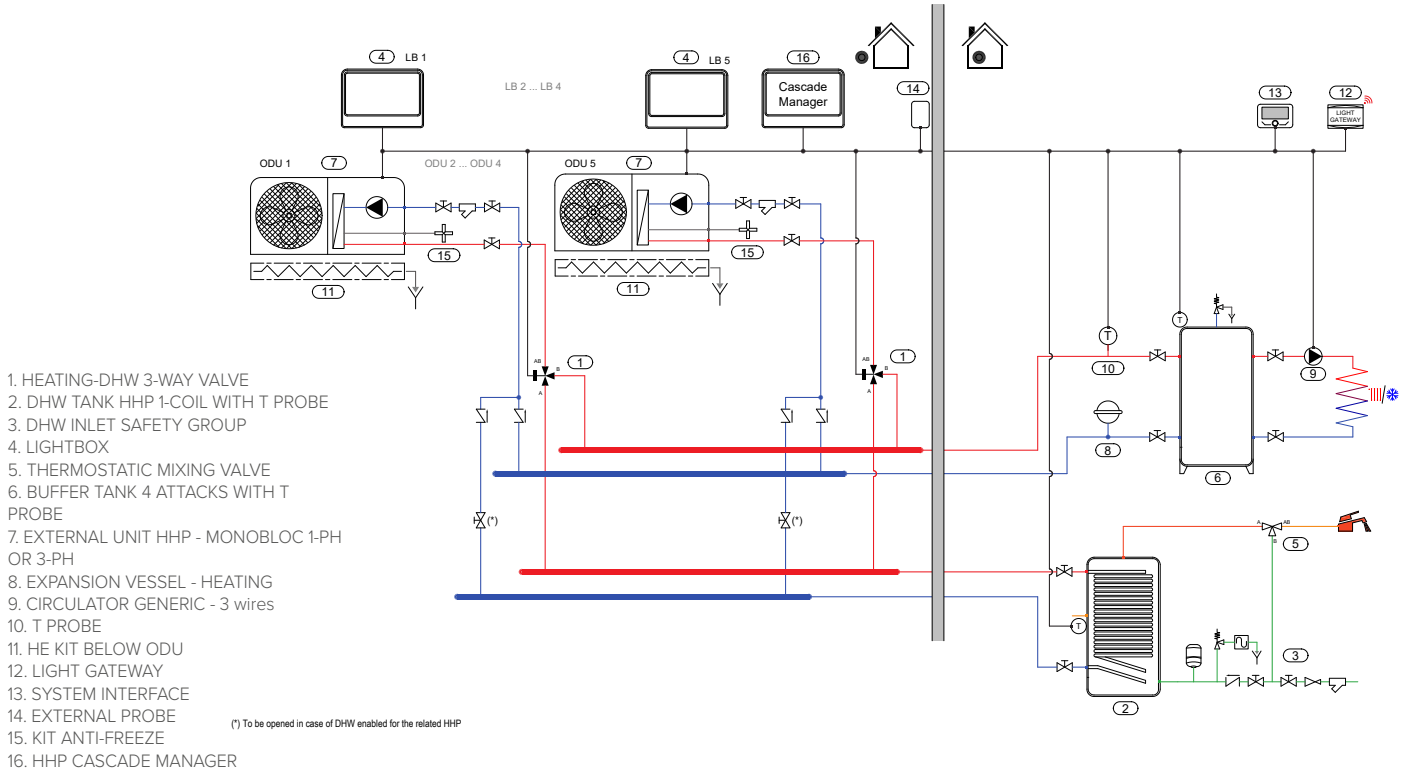
## Electrical diagram



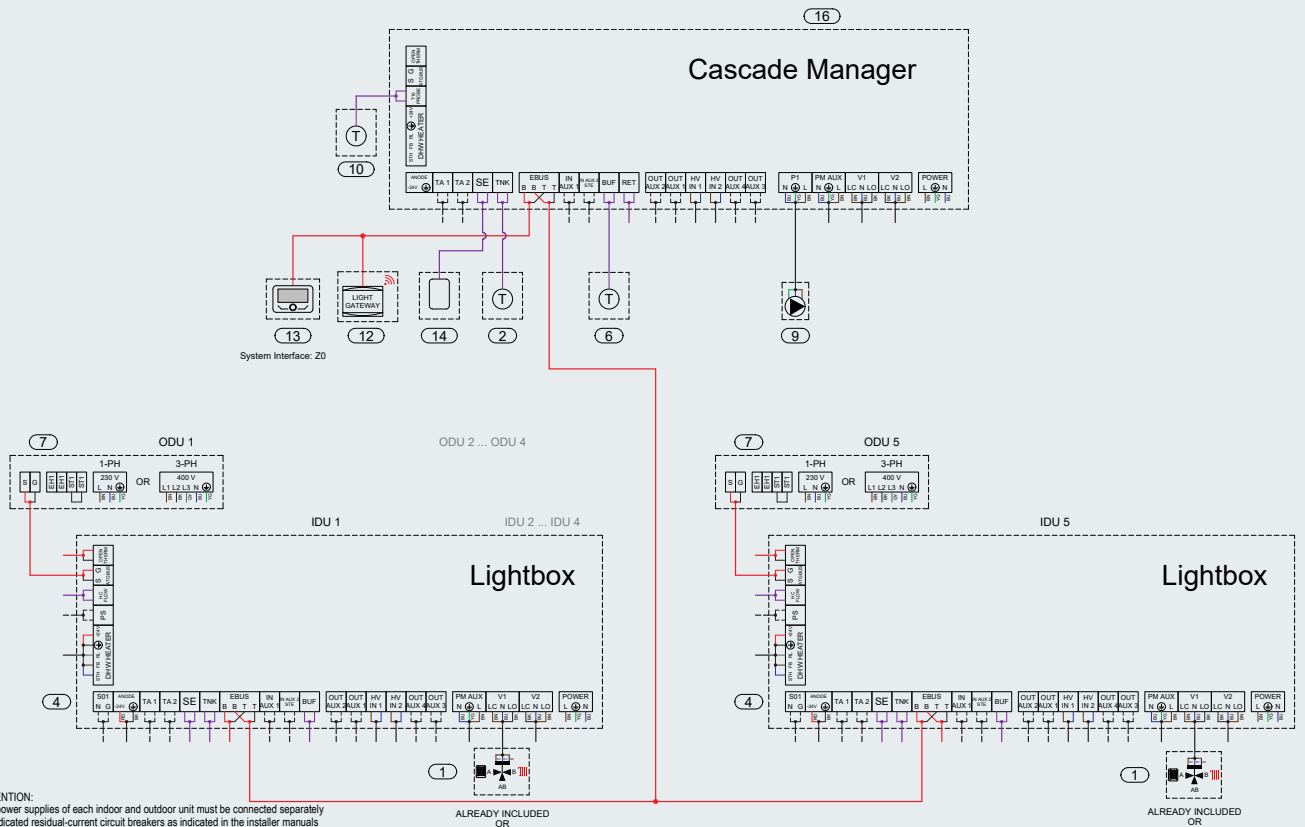
ATTENTION:  
The power supplies of each indoor and outdoor unit must be connected separately to dedicated residual-current circuit breakers as indicated in the installer manuals.



**SOLUTION 2 – CASCADE NIMBUS POCKET M NET R32 + CKZ H BUFFER TANK + CD1 HHP DHW INDIRECT CYLINDER**  
Hydraulic diagram



Electrical diagram

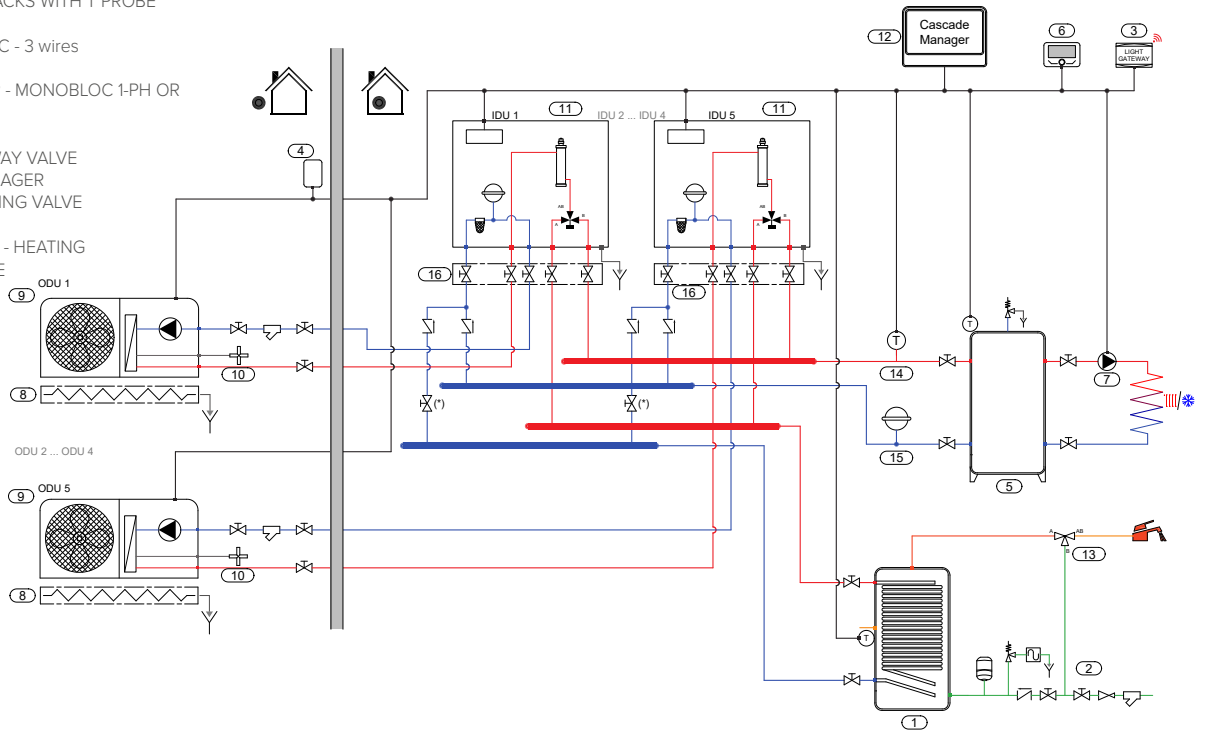


# 15. SYSTEM SOLUTIONS

## SOLUTION 3 – CASCADE NIMBUS PLUS M NET R32 + CKZ H BUFFER TANK + CD1 HHP DHW INDIRECT CYLINDER

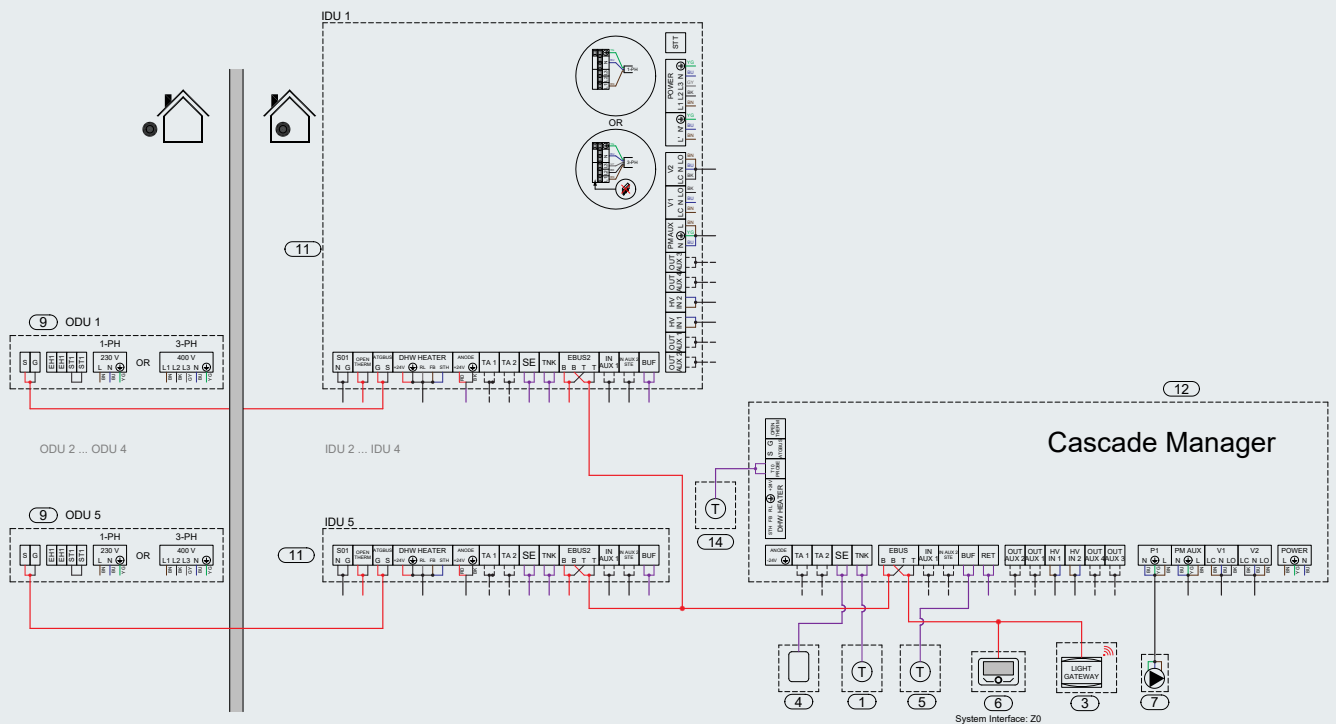
Hydraulic diagram

1. DHW TANK HHP 1-COIL WITH T PROBE
2. DHW INLET SAFETY GROUP
3. LIGHT GATEWAY
4. EXTERNAL PROBE
5. BUFFER TANK 4 ATTACKS WITH T PROBE
6. SYSTEM INTERFACE
7. CIRCULATOR GENERIC - 3 wires
8. HE KIT BELOW ODU
9. EXTERNAL UNIT HHP - MONOBLOC 1-PH OR 3-PH
10. KIT ANTI-FREEZE
11. IDU MONO WITH 3 WAY VALVE
12. HHP CASCADE MANAGER
13. THERMOSTATIC MIXING VALVE
14. T PROBE
15. EXPANSION VESSEL - HEATING
16. KIT SHUT-OFF VALVE



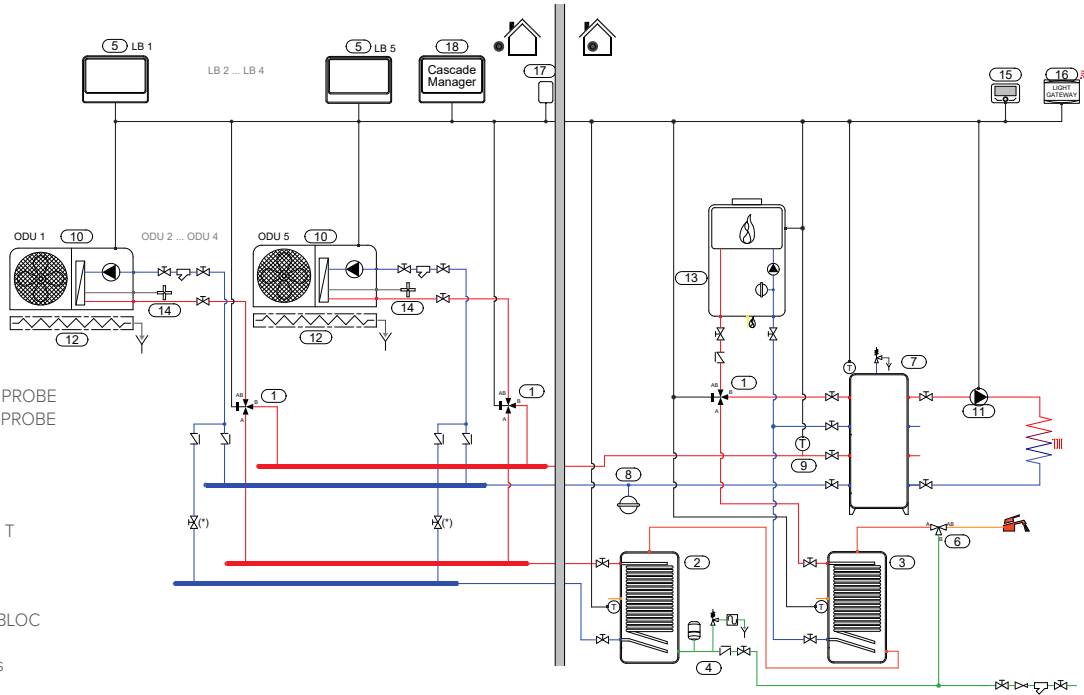
\*) To be opened in case of DHW enabled for the related HHP

Electrical diagram



ATTENTION:  
The power supplies of each indoor and outdoor unit must be connected separately to dedicated residual-current circuit breakers as indicated in the installer manuals.

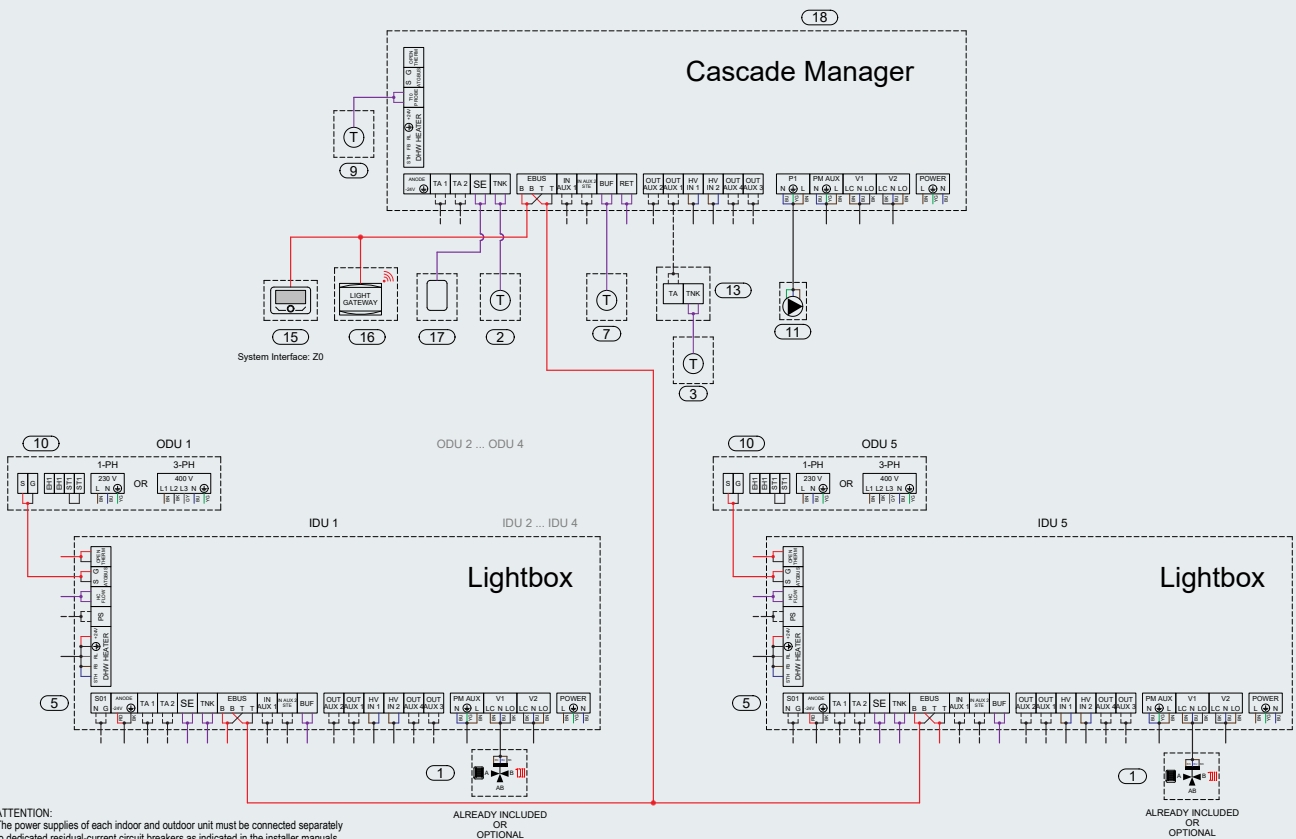
**SOLUTION 4 – HYBRID CASCADE NIMBUS POCKET M NET R32 + CKZ H BUFFER TANK + CD1 HHP DHW INDIRECT CYLINDER**  
Hydraulic diagram



1. HEATING-DHW 3-WAY VALVE
2. DHW TANK HHP 1-COIL WITH T PROBE
3. DHW TANK HHP 1-COIL WITH T PROBE - BOILER
4. DHW INLET SAFETY GROUP
5. LIGHTBOX
6. THERMOSTATIC MIXING VALVE
7. BUFFER TANK 8 ATTACKS WITH T PROBE
8. EXPANSION VESSEL - HEATING
9. T PROBE
10. EXTERNAL UNIT HHP - MONOBLOC 1-PH OR 3-PH
11. CIRCULATOR GENERIC - 3 wires
12. HE KIT BELOW ODU
13. GENERIC BOILER
14. KIT ANTI-FREEZE
15. SYSTEM INTERFACE
16. LIGHT GATEWAY
17. EXTERNAL PROBE
18. HHP CASCADE MANAGER

(\*) To be opened in case of DHW enabled for the related HHP

Electrical diagram



**ATTENTION:**  
The power supplies of each indoor and outdoor unit must be connected separately to dedicated residual-current circuit breakers as indicated in the installer manuals

ALREADY INCLUDED  
OR  
OPTIONAL

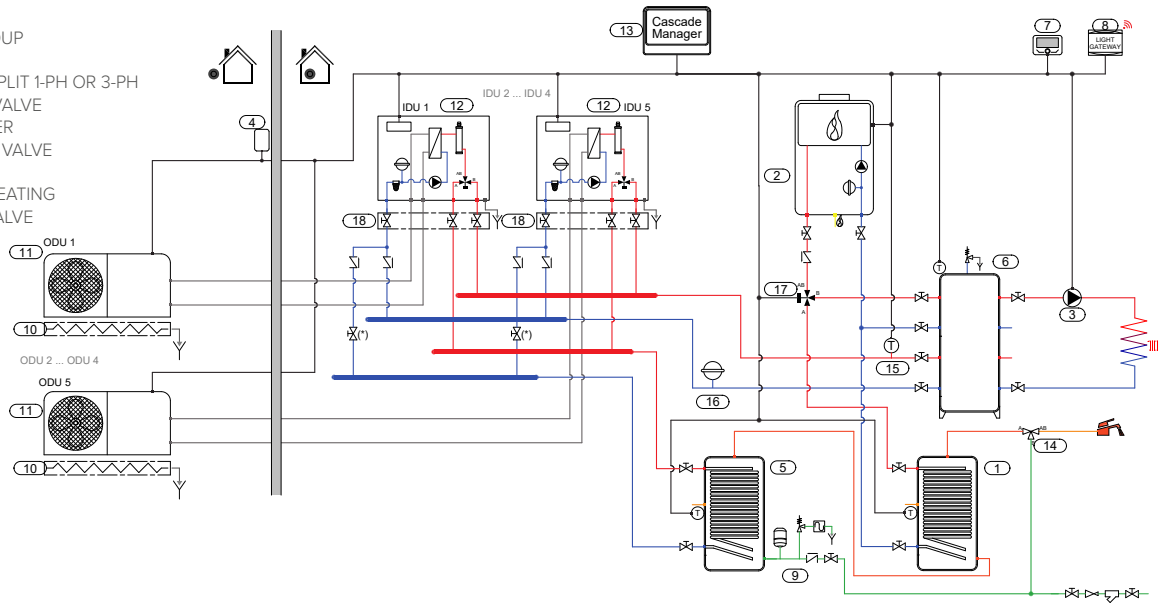
ALREADY INCLUDED  
OR  
OPTIONAL

# 15. SYSTEM SOLUTIONS

## SOLUTION 5 – HYBRID CASCADE NIMBUS PLUS S NET R32 + CKZ H BUFFER TANK + CD1 HHP DHW INDIRECT CYLINDER

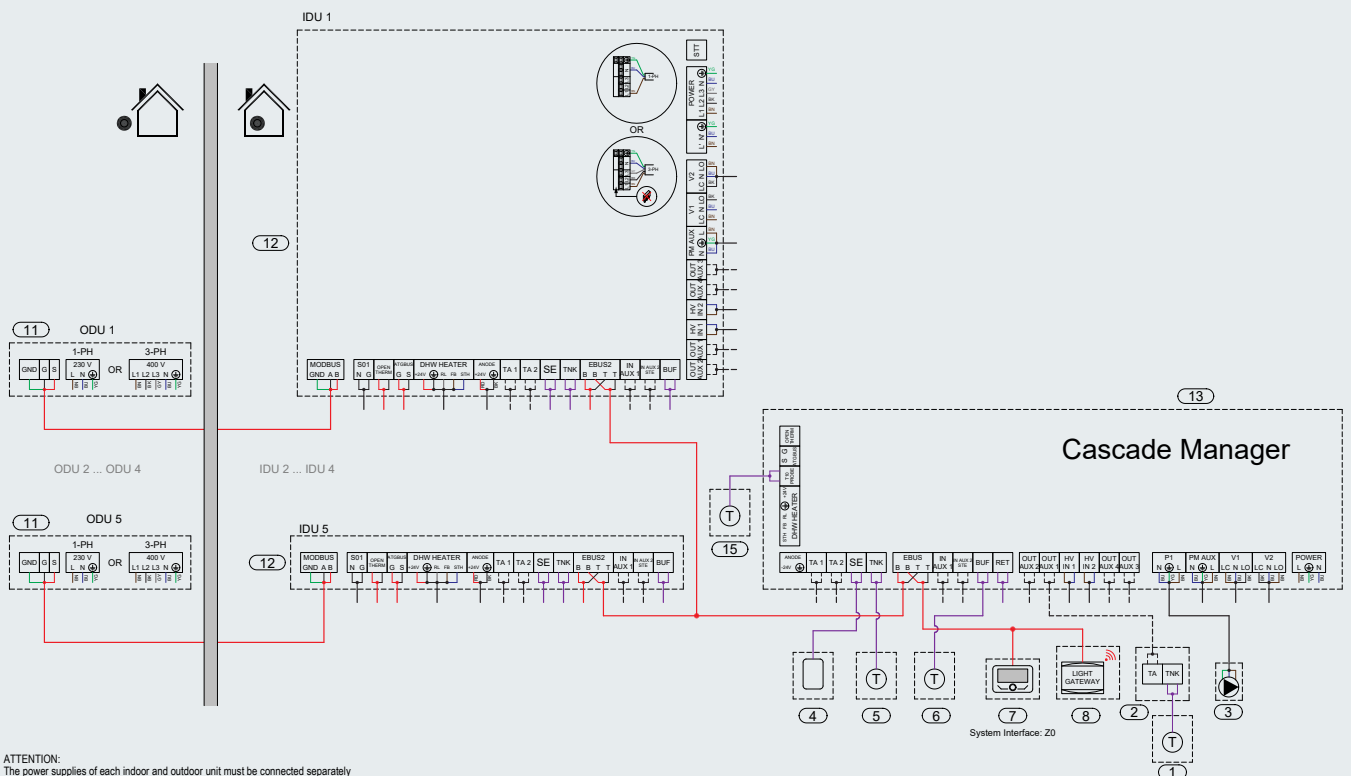
Hydraulic diagram

1. DHW TANK HHP 1-COIL WITH T PROBE - BOILER
2. GENERIC BOILER
3. CIRCULATOR GENERIC - 3 wires
4. EXTERNAL PROBE
5. DHW TANK HHP 1-COIL WITH T PROBE
6. BUFFER TANK 8 ATTACKS WITH T PROBE
7. SYSTEM INTERFACE
8. LIGHT GATEWAY
9. DHW INLET SAFETY GROUP
10. HE KIT BELOW ODU
11. EXTERNAL UNIT HHP - SPLIT 1-PH OR 3-PH
12. IDU SPLIT WITH 3 WAY VALVE
13. HHP CASCADE MANAGER
14. THERMOSTATIC MIXING VALVE
15. T PROBE
16. EXPANSION VESSEL - HEATING
17. HEATING-DHW 3-WAY VALVE
18. KIT SHUT-OFF VALVE



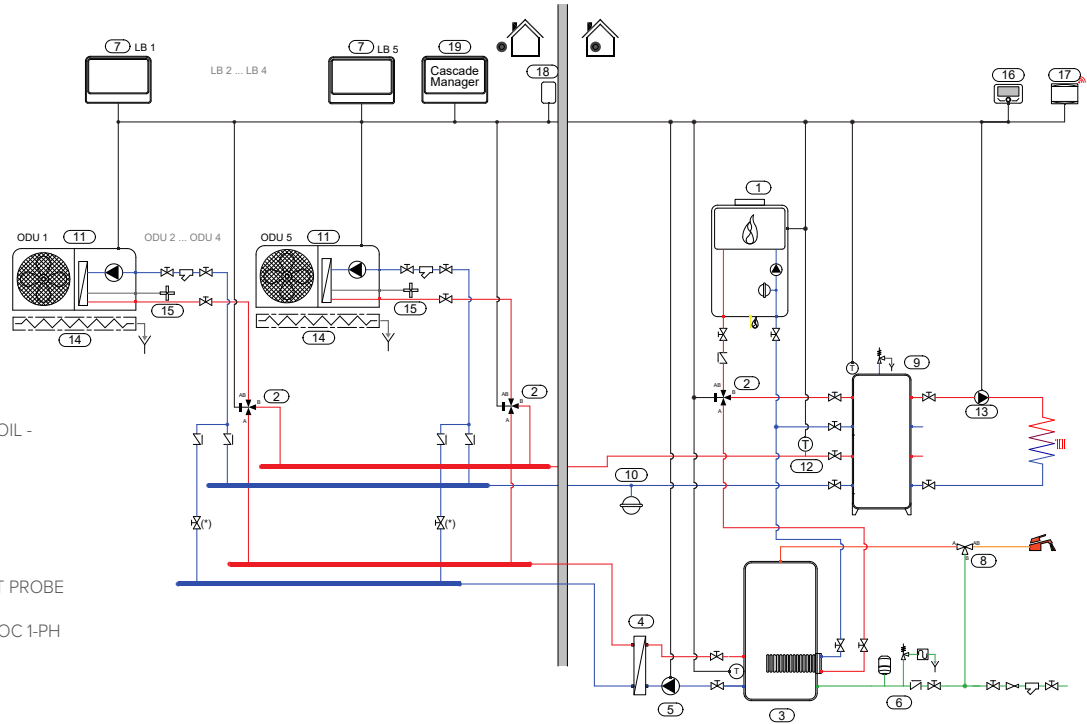
1) To be opened in case of DHW enabled for the related HHP

## Electrical diagram



**ATTENTION:**  
The power supplies of each indoor and outdoor unit must be connected separately to dedicated residual-current circuit breakers as indicated in the installer manuals.

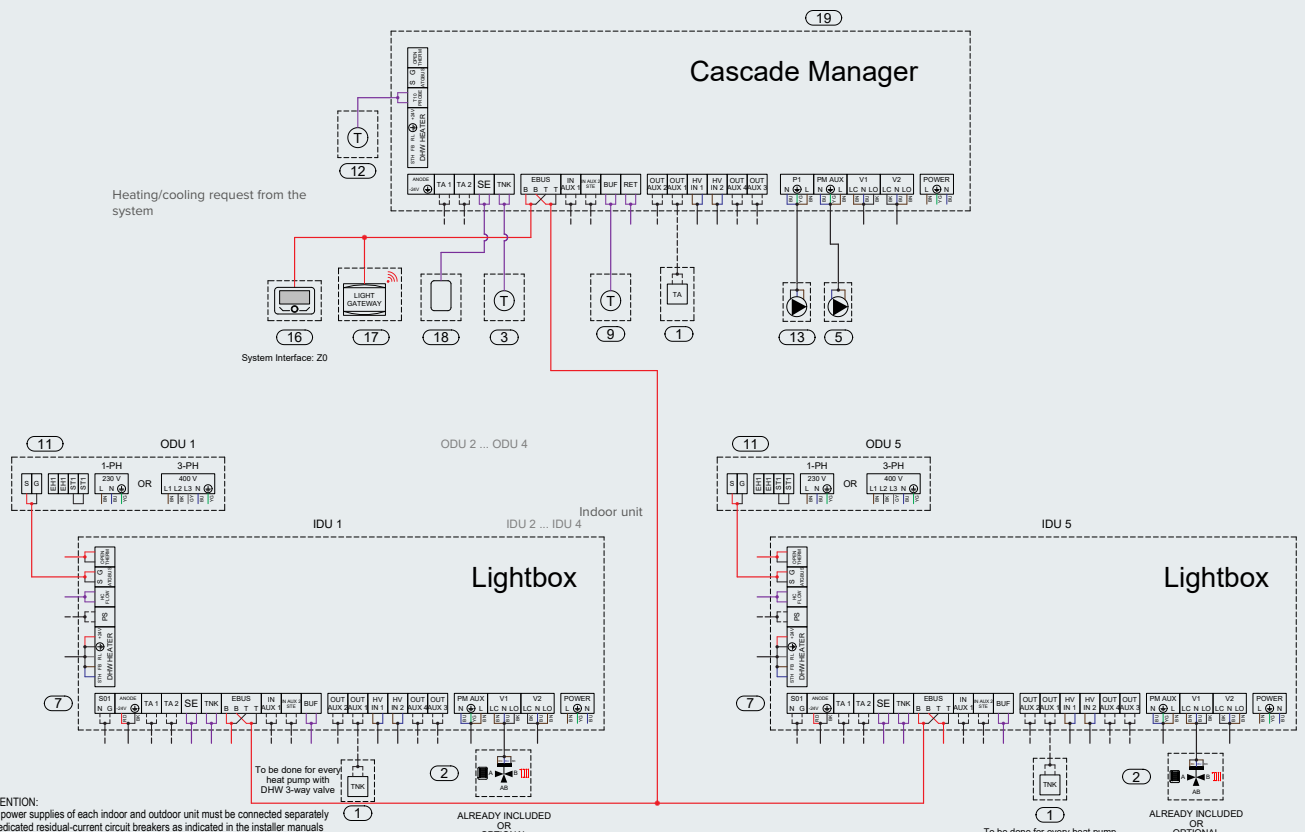
**SOLUTION 6 – HYBRID CASCADE NIMBUS POCKET M NET R32 + CKZ H BUFFER TANK + CD1 HHP DHW INDIRECT CYLINDER + PHE**  
Hydraulic diagram



1. GENERIC BOILER
2. HEATING-DHW 3-WAY VALVE
3. DHW TANK WITH REMOVABLE COIL - WITH T PROBE
4. PLATE HEAT EXCHANGER
5. DHW CHARGE CIRCULATOR
6. DHW INLET SAFETY GROUP
7. LIGHTBOX
8. THERMOSTATIC MIXING VALVE
9. BUFFER TANK 8 ATTACKS WITH T PROBE
10. EXPANSION VESSEL - HEATING
11. EXTERNAL UNIT HHP - MONOBLOC 1-PH OR 3-PH
12. T PROBE
13. SYSTEM CIRCULATOR
14. HE KIT BELOW ODU
15. KIT ANTI-FREEZE
16. SYSTEM INTERFACE
17. LIGHT GATEWAY
18. EXTERNAL PROBE
19. HHP CASCADE MANAGER

(\*) To be opened in case of DHW enabled for the related HHP

Electrical diagram



**ATTENTION:**  
The power supplies of each indoor and outdoor unit must be connected separately to dedicated residual-current circuit breakers as indicated in the installer manuals

ALREADY INCLUDED  
OR

To be done for every heat pump

ALREADY INCLUDED  
OR

