

TECHNICAL MANUAL

VLS

Air-water Chillers and heat pumps with low-GWP refrigerant
160 - 590 kW



PLUS

- » Refrigerant with GWP of less than 500
- » High seasonal efficiency values
- » Electronic expansion valve
- » Up to 6 compressors
- » 1 or 2 cooling circuits
- » Remote connectivity with the most common protocols
- » Possibility to configure low-noise versions



Dear Customer,

Thank you for placing your trust in one of the products of Galletti S.p.a

This product is the result of our work and our commitment to design, research, and production and has been made from the finest materials, employing state-of-the-art components and production technology.

The CE marking of the product ensures its compliance with the safety requirements of the following directives: the Machinery Directive, the Electromagnetic Compatibility Directive, the Electrical Safety Directive, and the Pressure Equipment Directive. Fulfillment of the Ecodesign requirements is fully in keeping with the environmental awareness that has always guided our company.

The company certification of the Quality and Safety management system ensures that product quality is constantly checked and improved, and that the product is manufactured in full compliance with the highest standards.

By choosing our product, you have opted for Quality, Reliability, Safety, and Sustainability.

At your disposal, once again.

Galletti S.p.a

TRANSLATION BY ORIGINAL INSTRUCTIONS

The water chillers and heat pumps comply with directive 2014/68/EC (PED).

The technical and dimensional data reported in this manual may be modified in view of any product improvement.

For any information , please contact the company: info@galletti.it

TABLE OF CONTENTS

1	SERIES	p. 4	11	INSTALLATION CLEARANCE REQUIREMENTS	p. 35
2	CONSTRUCTIVE FEATURES	p. 4	12	SITING AND DAMPERS	p. 36
2.1	STRUCTURE.....	p. 4	13	DIMENSIONS	p. 37
2.2	CUSTOMISED HYDRAULIC KIT.....	p. 4	14	WEIGHTS	p. 49
2.3	COOLING CIRCUIT	p. 4	15	ELECTRICAL DATA	p. 52
2.4	REFRIGERANT WITH LOW GWP	p. 4			
2.5	ELECTRONIC VALVE	p. 4			
2.6	ELECTRONIC MICROPROCESSOR CONTROL ...	p. 4			
2.7	ELECTRIC CONTROL BOARD	p. 5			
2.8	MICROCHANNELS FINNED COIL.....	p. 5			
3	CONFIGURATION OPTIONS	p. 6			
4	TECHNICAL FEATURES	p. 8			
4.1	WATER CHILLERS RATED TECHNICAL DATA VLS C	p. 8			
4.2	HEAT PUMPS RATED TECHNICAL DATA VLS H	p. 10			
5	PED CATEGORY	p. 12			
6	PERFORMANCES	p. 13			
6.1	CORRECTION OF THE HEATING CAPACITIES ..	p. 13			
7	SOUND LEVELS	p. 15			
7.1	ACOUSTIC INSULATION VERSIONS	p. 15			
8	OPERATING LIMITS	p. 16			
8.1	OPERATING LIMITS IN CHILLER MODE.....	p. 16			
8.2	OPERATING LIMITS IN HEAT PUMP MODE ...	p. 18			
8.3	VLS C OPERATING RANGE WITH PIPING SHELL AND TUBE HEAT EXCHANGER	p. 21			
8.4	VLS H OPERATING RANGE WITH PIPING SHELL AND TUBE HEAT EXCHANGER	p. 23			
8.5	THERMAL CARRYING FLUID	p. 26			
9	WATER PRESSURE DROP	p. 27			
9.1	Y FILTER PRESSURE DROPS	p. 27			
10	WATER CIRCUIT	p. 28			
10.1	WATER CONTENT AND CHARGING OF EXPANZION TANK SYSTEM	p. 29			
10.2	WATER CIRCUIT	p. 30			
10.3	DE-SUPERHEATER.....	p. 32			

1 SERIES

The VLS range units are designed for heating and cooling the water to be used in air-conditioning or process system, for residential, commercial or industrial. The VLS range units are intended for outdoor installation (IP24 protection degree), in a position not accessible to the public.

If protection grids are not provided (accessory) and if the machine can be reached by non-specialised personnel, access to the finned coil must be prohibited using appropriate barriers.

⚠ WARNING: Do not install the unit in environments with gas or flammable dusts.(ATEX zone)

2 CONSTRUCTIVE FEATURES

STRUCTURE

The range is designed modularly, replicating the optimized structure of V configuration condensing coils and fans. Its design ensures stability, sturdiness even during the most critical phases (such as transportation), and maximum accessibility to components in every VLS unit.

CUSTOMISED HYDRAULIC KIT

The hydronic kit is fully configurable, and as an option the pumping unit can be requested with silicon carbide/ / silicon carbide-Viton seals to handle ethylene glycol and propylene glycol concentrations of up to 35% with minimum product mixture temperatures of -10 °C.

Alternatively standard pumping group manage at most of 30% ethylene glycol.

COOLING CIRCUIT

- Scroll type compressors in a tandem or trio configuration that can be sound insulated. The adopted components' efficiency, reliability, and noise emission levels represent the state of the art for scroll compressors.
- Brazed plate heat exchangers made of stainless steel and optimised for use with R454B, alternatively piping shell and tube heat exchanger.
- Finned block condenser with 8 mm copper piping and aluminium fins, characterised by ample heat exchange surfaces VLS H.
- Microchannel condenser with low refrigerant charge (VLS C).
- Dehydrating filter.
- Flow indicator with humidity indicator.
- Thermostatic valve for expansion inside finned coil with external equalisation and integrated MOP function.
- Cycle reversing valve (only VLS H)
- Check valve (VLS H)
- Liquid receiver (VLS H)
- High and low pressure switch
- Schrader valves for checks and/or maintenance
- Electronic expansion valve: this standard feature expands the liquid refrigerant towards the plate heat exchanger during operation in chiller mode.
- Low-pressure relief valve: it limits the maximum pressure of the low-pressure circuit in order to maintain the PED category of the compressor
- Liquid separator (VLS H): this configurable accessory provides greater protection to the compressors against the return of liquids, especially during cycle reversals and defrosting. It is strongly recommended on all heat pumps operating in harsh and/or variable climates and in the areas indicated

by the operating range. (supplied in versions with trio)

- Electronic valve for liquid injection (VLS H): available on configuration with liquid separator, allows the operating limit extension in heating mode lowering the compressor discharge temperature in low air temperature and high product water temperature in zone of operating limit. (see operating range p. 16).

REFRIGERANT WITH LOW GWP

Use of R454B refrigerant with low environmental impact. R454B is a next-generation A2L refrigerant with a GWP of only 467, one of the lowest on the market. This GWP value ensures that the VLS range complies with the gradual reduction of quotas of greenhouse refrigerants in the European market required by the F-GAS regulation, down to the stricter limits foreseen for 2030

ELECTRONIC VALVE

It is standard on the entire range and offers greater responsiveness during transients. The electronics also manage the synergistic operation of the compressors and the valve, thereby making it possible to vary overheating and maximize efficiency at partial loads.

ELECTRONIC MICROPROCESSOR CONTROL

The electronic control enables the complete control of the **VLS** unit. It can be easily accessed through a polycarbonate flap with IP65 protection rating.

By reading the outdoor air temperature, it can automatically change the setpoint to adapt it to the outdoor load conditions or keep the unit running even in the harshest winter conditions. Main functions:

- Control of water returning from the system's temperature
 - With modulating pump, control of the flow temperature to the unit or the Delta T
 - Possibility of adapting the set-point to the outside load conditions or to the outside temperature
 - Control of the electronic valve
 - Complete alarm management, including history
 - An RS485 serial port is available for monitoring
 - Possibility of connecting a second remote terminal (display)
 - Management of multiple units connected to a LAN network
- Devices controlled
- Compressor
 - Reverse cycle valve (VLS H)
 - Alarm signalling relay
 - LAN networks for controlling 6 units in parallel and managing BACNET and LON communication protocols

ELECTRIC CONTROL BOARD

The electric control board is constructed and wired in accordance with EEC Directive 73/23, Directive 89/336 on electromagnetic compatibility and related standards. Made of steel sheet, it is also protected by the enclosing panels of the machine.

MICROCHANNELS FINNED COIL

The entire Chiller range has microchannel coils as a standard feature. The large heat exchange surface, the absence of a copper-aluminum interface, and the perfect flow of air make it possible to achieve the same performance while reducing the refrigerant charge by up to 40%, with obvious benefits from an ecological point of view. Galletti microchannel coils are made of Long Life Alloy, an aluminium alloy that offers maximum safety in urban and industrial environments.

For heat pumps there is a finned-coil exchanger with 8mm copper tubes and aluminium fins.

3 CONFIGURATION OPTIONS

The range VLS consists of 13 models with cooling capacities from 160 to 590 kW, available as cooling only and reversible heat pump mode, charged with R454B fluid classified like A2L (slightly flammable)

NOTE: The choice of some options can make the choice of some others forbidden or make some selection (fields) mandatory. Please contact Galletti for verification.

Available versions

Only cooling versions and plate exchanger

VLS..CS0A	Power supply 400V-3N-50Hz
VLS..CS2A	Power supply 400V-3N-50Hz + circuit breaker
VLS..CS4A	Power supply 400V-3-50Hz
VLS..CS5A	Power supply 400V-3-50Hz + circuit breaker

Only cooling versions and shell and tube heat exchanger

VLS..CT0A	Power supply 400V-3N-50Hz
VLS..CT4A	Power supply 400V-3N-50Hz + circuit breaker
VLS..CT5A	Power supply 400V-3-50Hz
VLS..CT5A	Power supply 400V-3-50Hz + circuit breaker

Reversible heat pump versions and plate heat exchanger

VLS..HS0A	Power supply 400V-3N-50Hz
VLS..HS2A	Power supply 400V-3N-50Hz + circuit breaker
VLS..HS4A	Power supply 400V-3-50Hz
VLS..HS5A	Power supply 400V-3-50Hz + circuit breaker

Reversible heat pump versions and shell and tube heat exchanger

VLS..HT0A	Power supply 400V-3N-50Hz
VLS..HT2A	Power supply 400V-3N-50Hz + circuit breaker
VLS..HT4A	Power supply 400V-3-50Hz
VLS..HT5A	Power supply 400V-3-50Hz + circuit breaker

» Configuration options

1	Expansion valve
A	Electronic
2	Water pump and accessories
0	Absent
1	LP pump
2	LP OR double pump
3	HP pump
4	HP OR double pump
5	LP pump with Viton seal
6	LP OR double pump with Viton seal
7	HP pump with Viton seal
8	HP OR double pump with Viton seal
A	LP inverter pump
B	LP OR inverter double pump
C	HP Inverter pump
D	HP OR inverter double pump
E	LP inverter pump with Viton seal
F	LP inverter double pump with Viton seal
G	HP inverter pump with Viton seal
3	Water buffer tank
0	Absent
S	Present (Hydro Smart Flow not allowed)
4	Partial heat recovery
0	Absent
D	Included with pump free contact
5	Air flow modulation
A	Condensation control with high-head EC fans
C	Condensation control by phase-cut fans
E	Condensation control with EC fans
6	Antifreezing kit
0	Absent
E	Evaporator
P	Evaporator, pump and expansion vessel

» Accessories

A	Outdoor finned coil heat exchanger protection filters
B	Hydro smart flow (water tank not allowed)
C	Pair of couplings Victaulic
D	ON/OFF status of the compressors
E	Remote control for step capacity limit (advanced controller required)
F	Configurable digital alarm board (advanced controller required)
G	Soft starter

S	Evaporator, pump, expansion vessel and tank
7	Acoustic insulation and attenuation
0	Absent
2	Compressor soundproof insulations
4	Low-noise EC fans
5	Compressor soundproof insulations + Low-noise EC fans
8	Refrigerant pipework accessories
0	Absent
1	Liquid separator at compressor intake (heat pump only). Mandatory on 243,456,546,576 models.
2	Liquid separator in compressor intake + liquid injection for operation limit extension (only for heat pumps)
9	Remote control / Serial communication
2	RS485 connection port (Modbus protocol or Carel)
B	BACNET IP/pCOWeb serial board
G	BACNET IP / pCOWeb serial board + supervision software
S	Remote simplified control panel
X	mProcess remote control panel
10	Special coils / Protective treatments
0	Copper-aluminium (heat pump only)
C	Cataphoresis
E	Microchannel in Long Life Alloy (standard for chiller)
I	Hydrophilic (heat pump only)
M	Microchannel with E-coating (standard for chiller)
P	Pre-painted fins with epoxy painting (only heat pump)
R	Copper-copper (heat pump only)
11	Anti vibration shock mounts
0	Absent
G	Made of rubber
M	With spring
12	Outdoor coil trace heater
0	Absent
1	Present (heat pump only)
13	Onboard controller
1	Advanced

H	Power factor capacitors
I	Refrigerant sensors
L	Water pipes additional insulation
M	0-10V signal for external user pump control (on-board pump excluded)
N	Compressor tandem/trio isolation valves
O	Anti-intrusion grille
P	Y-shaped filter

Q	Night-time low-noise
R	Enabling 2nd set-point / external alarm signaling via digital input
S	Hot-wire electronic flow switch
T	Energy metering kit
U	Covering panels V
V	Set-point modification with 4-20mA signal

4 TECHNICAL FEATURES

4.1 WATER CHILLERS RATED TECHNICAL DATA VLS C

» Water chillers rated technical data VLS C

VLS			162	202	234	243	254	274	314
Power supply		V-ph-Hz	400-3N-50						
Cooling capacity	(1)	kW	160	210	232	238	250	274	315
Total power input	(1)	kW	58,3	67,3	73,9	80,5	85,0	102	116
Absorbed rated current	(1)	A	95,0	111	121	132	139	166	188
EER	(1)		2,75	3,12	3,14	2,96	2,94	2,69	2,71
SEER	(2)		4,25	4,68	4,57	4,52	4,33	4,27	4,25
Air flow rate	(1)	m ³ /h	42600	85100	85100	85100	85100	85100	85100
Water flow	(1)	l/h	27516	36134	39882	40923	42982	47115	54152
Water pressure drop	(1)	kPa	26	28	45	31	50	47	52
Available pressure head - LP pumps	(1)	kPa	118	150	120	136	107	99	83
Available pressure head - HP pumps	(1)	kPa	213	205	176	192	164	200	183
Maximum available pressure head with EC fans high pressure		Pa	65	100	90	90	90	70	65
Maximum current absorption		A	123	156	176	181	192	214	244
Start up current		A	387	422	396	439	404	476	512
Startup current with soft starter		A	301	335	331	359	339	393	425
Compressors / circuits			2/1	2/1	4/2	3/1	4/2	4/2	4/2
no. of axial fans			2	4	4	4	4	4	4
Buffer tank volume		dm ³	180	350	350	350	350	350	350
Height		mm	2621	2621	2621	2621	2621	2621	2621
Depth		mm	1770	2213	2213	2213	2213	2213	2213
Length		mm	2491	3503	3503	3503	3503	3503	3503
Sound power level	(3)	dB(A)	89	91	89	92	90	91	91
Sound pressure level	(4)	dB(A)	61	63	61	64	62	63	63
Sound power level, low-noise version	(3)	dB(A)	85	85	84	85	84	84	85
Refrigerant charge - circuit 1	(5)	kg	10,5	19,5	10,5	21	10,5	11	11
Refrigerant charge - circuit 2	(6)	kg	-	-	10,5	-	10,5	11	11
Refrigerant charge with piping shell and tube heat exchanger version - circuit 1	(5)	kg	-	21	10,5	23	11	11,5	12
Refrigerant charge with piping shell and tube heat exchanger version - circuit 2	(5)	kg	-	-	10,5	-	11	11,5	12
Weight without options		kg	1047	1744	1876	1797	1783	1982	1994
Maximum transport weight		kg	1188	1915	2048	1946	1984	2125	2137
Weight without options with piping shell and tube heat exchanger version		kg	-	1871	2012	1935	1925	2108	2145

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2018)

(2) η efficiency values for heating and cooling are respectively calculated by the following formulas: $[\eta = SCOP / 2,5 - F(1) - F(2)]$ e $[\eta = SEER / 2,5 - F(1) - F(2)]$. For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.

(3) Sound power level measured according to ISO 9614

(4) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

(5) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

(6) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

VLS			344	374	414	456	546	576
Power supply		V-ph-Hz	400-3N-50					
Cooling capacity	(1)	kW	344	370	420	475	545	590
Total power input	(1)	kW	118	125	126	162	179	201
Absorbed rated current	(1)	A	194	205	208	266	294	329
EER	(1)		2,92	2,96	3,33	2,93	3,04	2,94
SEER	(2)		4,43	4,33	4,78	4,61	4,64	4,62
Air flow rate	(1)	m ³ /h	127700	127700	170200	170200	212800	212800
Water flow	(1)	l/h	59124	63602	72187	81639	93660	101397
Water pressure drop	(1)	kPa	36	39	30	35	41	46
Available pressure head - LP pumps	(1)	kPa	123	116	155	133	157	130
Available pressure head - HP pumps	(1)	kPa	228	222	213	190	199	173
Maximum available pressure head with EC fans high pressure		Pa	70	65	100	90	90	70
Maximum current absorption		A	263	278	312	362	415	460
Start up current		A	537	550	585	624	642	734
Startup current with soft starter		A	447	462	496	544	548	648
Compressors / circuits			4/2	4/2	4/2	6/2	6/2	6/2
no. of axial fans			6	6	8	8	10	10
Buffer tank volume		dm ³	550	550	700	700	850	850
Height		mm	2621	2621	2621	2621	2621	2621
Depth		mm	2585	2585	2585	2585	2569	2569
Length		mm	4622	4622	6008	6008	7483	7483
Sound power level	(3)	dB(A)	93	93	94	94	95	95
Sound pressure level	(4)	dB(A)	65	65	66	66	67	67
Sound power level, low-noise version	(3)	dB(A)	87	87	88	87	89	89
Refrigerant charge - circuit 1	(5)	kg	18	18	19,5	20,5	27	28
Refrigerant charge - circuit 2	(6)	kg	12	12	19,5	20,5	20,5	21
Refrigerant charge with piping shell and tube heat exchanger version - circuit 1	(5)	kg	18	18	19,5	20,5	27	28
Refrigerant charge with piping shell and tube heat exchanger version - circuit 2	(5)	kg	12	12	19,5	20,5	20,5	21
Weight without options		kg	2557	2563	3233	3499	4090	4144
Maximum transport weight		kg	2825	2832	3423	3689	4375	4429
Weight without options with piping shell and tube heat exchanger version		kg	2678	2684	3309	3575	4263	4317

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2018)

(2) η efficiency values for heating and cooling are respectively calculated by the following formulas: $[\eta = SCOP / 2,5 - F(1) - F(2)]$ e $[\eta = SEER / 2,5 - F(1) - F(2)]$. For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.

(3) Sound power level measured according to ISO 9614

(4) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

(5) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

(6) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

4.2 HEAT PUMPS RATED TECHNICAL DATA VLS H

» Heat pumps rated technical data VLS H

VLS			162	202	234	243	254	274	314
Power supply		V-ph-Hz	400-3N-50						
Cooling capacity	(1)	kW	160	210	232	236	250	274	310
Total power input	(1)	kW	58,5	67,7	73,9	80,5	85,0	102	116
Absorbed rated current	(1)	A	95,0	111	121	132	138	166	188
EER	(1)		2,73	3,10	3,14	2,93	2,94	2,69	2,67
SEER	(2)		4,13	4,56	4,41	4,45	4,22	4,17	4,16
Heating capacity	(3)	kW	167	224	256	249	264	290	330
Total power input	(3)	kW	56,4	68,2	77,9	83,5	82,5	99,4	112
Absorbed rated current	(3)	A	91,4	112	127	136	134	161	181
COP	(3)		2,96	3,28	3,29	2,98	3,20	2,92	2,95
SCOP	(2)		3,56	3,50	4,01	3,44	4,04	3,71	3,87
Energy efficiency			139	137	157	135	159	145	152
Heating energy efficiency class	(4)		A+	A+	A++	A+	A++	A+	A++
Maximum current absorption		A	123	156	176	181	192	214	244
Start up current		A	387	422	396	439	404	476	512
Startup current with soft starter		A	301	335	331	359	339	393	425
Compressors / circuits			2/1	2/1	4/2	3/1	4/2	4/2	4/2
no. of axial fans			2	4	4	4	4	4	4
Air flow rate	(1)	m ³ /h	47000	94100	94100	94100	94100	94100	94100
Water flow	(1)	l/h	27525	36122	39897	40581	42992	47115	53291
Water pressure drop	(1)	kPa	26	28	45	30	50	47	50
Available pressure head - LP pumps	(1)	kPa	117	151	121	137	108	99	82
Available pressure head - HP pumps	(1)	kPa	213	206	178	193	165	200	182
Maximum available pressure head with EC fans high pressure		Pa	-	-	-	-	-	-	-
Air flow rate	(3)	m ³ /h	47000	94100	94100	94100	94100	94100	94100
Water flow	(3)	l/h	28975	38872	44430	43208	45822	50334	57286
Water pressure drop	(3)	kPa	29	32	55	34	56	53	57
Available pressure head - LP pumps	(3)	kPa	98	139	108	121	91	78	54
Available pressure head - HP pumps	(3)	kPa	193	194	164	177	148	178	153
Maximum available pressure head with EC fans high pressure		Pa	65	100	90	90	90	70	65
Buffer tank volume		dm ³	180	350	350	350	350	350	350
Refrigerant charge - circuit 1	(5)	kg	24	47	23,5	48,5	23,5	24	24
Refrigerant charge - circuit 2	(6)	kg	-	-	23,5	-	23,5	24	24
Refrigerant charge with piping shell and tube heat exchanger version - circuit 1	(5)	kg	-	48,5	24	50,5	24	24,5	25
Refrigerant charge with piping shell and tube heat exchanger version - circuit 2	(5)	kg	-	-	24	-	24	24,5	25
Height		mm	2621	2621	2621	2621	2621	2621	2621
Depth		mm	1770	2213	2213	2213	2213	2213	2213
Length		mm	2491	3503	3503	3503	3503	3503	3503
Sound power level	(7)	dB(A)	89	91	89	92	90	91	91
Sound pressure level	(8)	dB(A)	61	63	61	64	62	63	63
Sound power level, low-noise version	(7)	dB(A)	85	85	84	85	84	84	85
Weight without options		kg	1155	2040	2172	2126	1969	2174	2188
Maximum transport weight		kg	1296	2241	2374	2162	2149	2345	2360
Weight without options with piping shell and tube heat exchanger version		kg	-	2167	2308	2264	2111	2300	2339

(1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2018)

(2) η efficiency values for heating and cooling are respectively calculated by the following formulas: $[\eta = SCOP / 2,5 - F(1) - F(2)]$ e $[\eta = SEER / 2,5 - F(1) - F(2)]$. For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.

(3) Outdoor air temperature dry bulb 7°C / wet bulb 6°C, water temperature 40°C / 45°C (EN14511:2018)

(4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]

(5) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

(6) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

(7) Sound power level measured according to ISO 9614

(8) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

VLS			344	374	414	456	546	576
Power supply		V-ph-Hz	400-3N-50					
Cooling capacity	(1)	kW	343	366	418	472	543	585
Total power input	(1)	kW	118	126	128	162	179	205
Absorbed rated current	(1)	A	193	206	211	265	294	335
EER	(1)		2,91	2,90	3,26	2,91	3,03	2,85
SEER	(2)		4,35	4,23	4,69	4,60	4,61	4,60
Heating capacity	(3)	kW	370	391	443	505	572	627
Total power input	(3)	kW	115	125	129	164	178	196
Absorbed rated current	(3)	A	188	204	213	268	292	320
COP	(3)		3,21	3,13	3,42	3,08	3,21	3,20
SCOP	(2)		3,68	3,72	3,65	3,42	3,65	3,80
Energy efficiency			144	146	143	134	143	149
Heating energy efficiency class	(4)		A+					
Maximum current absorption		A	263	278	312	362	415	460
Start up current		A	537	550	585	624	642	734
Startup current with soft starter		A	447	462	496	544	548	648
Compressors / circuits			4/2	4/2	4/2	6/2	6/2	6/2
no. of axial fans			6	6	8	8	10	10
Air flow rate	(1)	m ³ /h	141100	141100	188100	188100	235200	235200
Water flow	(1)	l/h	58960	62911	71831	81112	93327	100545
Water pressure drop	(1)	kPa	36	38	30	35	41	45
Available pressure head - LP pumps	(1)	kPa	124	117	157	134	159	132
Available pressure head - HP pumps	(1)	kPa	229	223	214	191	201	175
Maximum available pressure head with EC fans high pressure		Pa	-	-	-	-	-	-
Air flow rate	(3)	m ³ /h	141100	141100	188100	188100	235200	235200
Water flow	(3)	l/h	64235	67894	76926	87689	99325	108888
Water pressure drop	(3)	kPa	42	44	34	40	46	52
Available pressure head - LP pumps	(3)	kPa	109	102	143	113	130	95
Available pressure head - HP pumps	(3)	kPa	214	207	200	168	172	138
Maximum available pressure head with EC fans high pressure		Pa	70	65	100	90	90	70
Buffer tank volume		dm ³	550	550	700	700	850	850
Refrigerant charge - circuit 1	(5)	kg	44	44	45	46,5	66	66
Refrigerant charge - circuit 2	(6)	kg	25	25	45	46,5	46	47
Refrigerant charge with piping shell and tube heat exchanger version - circuit 1	(5)	kg	44	44	45	46,5	66	66
Refrigerant charge with piping shell and tube heat exchanger version - circuit 2	(5)	kg	25	25	45	46,5	46	47
Height		mm	2621	2621	2621	2621	2621	2621
Depth		mm	2585	2585	2585	2585	2569	2569
Length		mm	4622	4622	6008	6008	7483	7483
Sound power level	(7)	dB(A)	93	93	94	94	95	95
Sound pressure level	(8)	dB(A)	65	65	66	66	67	67
Sound power level, low-noise version	(7)	dB(A)	87	87	88	87	89	89
Weight without options		kg	2869	2876	3623	3889	4641	4697
Maximum transport weight		kg	2909	2930	3813	4079	4926	4982
Weight without options with piping shell and tube heat exchanger version		kg	2990	2997	3699	3965	4814	4870

- (1) Outdoor air temperature 35°C, water temperature 12°C / 7°C (EN14511:2018)
- (2) η efficiency values for heating and cooling are respectively calculated by the following formulas: $[\eta = SCOP / 2,5 - F(1) - F(2)]$ e $[\eta = SEER / 2,5 - F(1) - F(2)]$. For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.
- (3) Outdoor air temperature dry bulb 7°C / wet bulb 6°C, water temperature 40°C / 45°C (EN14511:2018)
- (4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]
- (5) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.
- (6) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.
- (7) Sound power level measured according to ISO 9614
- (8) Sound pressure measured at a distance of 10 m in a free field with a directivity factor of 2

5 PED CATEGORY

The water chillers and heat pumps comply with directive 2014/68/EC (PED).

Series	Size	Notified body	PED Category	Marking
VLS	F1	0476	III	CE + PED
	F2	0476	III	CE + PED
	F3	0476	III	CE + PED
	F4	0476	III	CE + PED
	F5	0476	III	CE + PED

6 PERFORMANCES

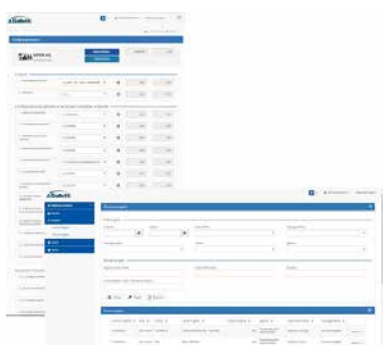
Galletti has developed on its www.galletti.com web-area the new ON-LINE integrated platform for product selection, configuration and the making of the economic offer.

The software, whose use is easy and intuitive, allows the identification of the desired products by calculating their performances based on real working conditions and their configuration helping the user in choosing options and accessories. It also allows to obtain a detailed report which includes performances, dimensional drawings, tender specifications and the economic offer.



Product selection:

- Filters to make the identification of the requested product easier
- Performance calculation and saving of results
- Performance comparison between products belonging to different series



Configuration and project history

- Wizard configuration of accessories and options for chillers, heat pumps and hydronic units
- Creation of a project which collects all products of interest
- Complete management of the stored history projects

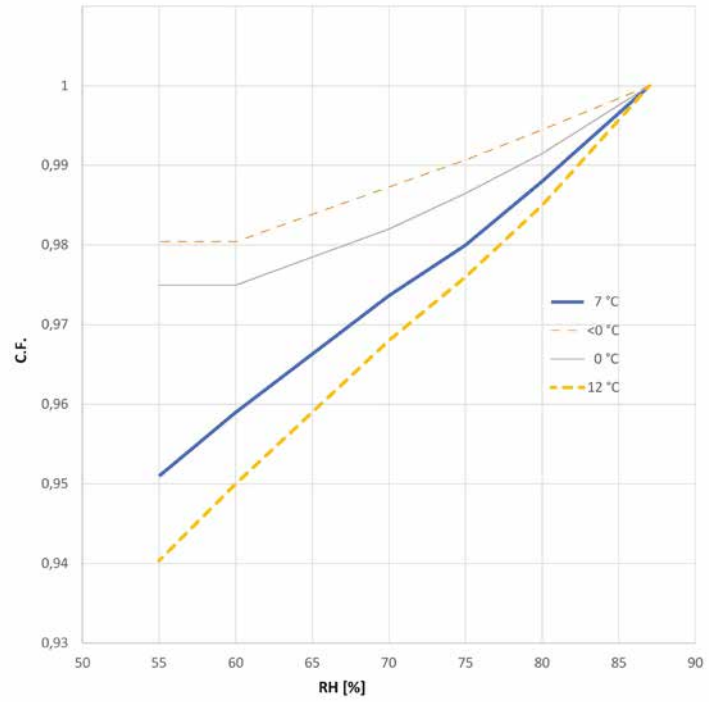


Report:

- Generation of a detailed list report in pdf format
- Choice of the sections to be included in the print:
 - Products performances
 - Dimensional drawings
 - Tender specifications

6.1 CORRECTION OF THE HEATING CAPACITIES

In the heat pump operation (heating mode), the actual heating capacities of units may be lower than the values shown in the technical data table, due to the different values of the relative humidity of the external air. To obtain the actual heating capacity, multiply the capacity values by the corrective coefficients given in graphic.



C.F. Correction coefficient
RH Relative Humidity

7 SOUND LEVELS

» Standard

Mod.	LwA (1)	125 Hz (2)	250 Hz (2)	500 Hz (2)	1000 Hz (2)	2000 Hz (2)	4000 Hz (2)	8000 Hz (2)
	dB(A)	dB	dB	dB	dB	dB	dB	dB
VLS162C	89	83,0	81,0	83,0	79,0	75,0	68,0	61,0
VLS202C	91	85,0	83,0	85,0	81,0	77,0	70,0	63,0
VLS243C	92	86,0	84,0	86,0	82,0	78,0	71,0	64,0
VLS254C	90	84,0	82,0	84,0	80,0	76,0	69,0	62,0
VLS274C	91	85,0	83,0	85,0	81,0	77,0	70,0	63,0
VLS314C	91	85,0	83,0	85,0	81,0	77,0	70,0	63,0
VLS344C	93	87,0	85,0	87,0	83,0	79,0	72,0	65,0
VLS374C	93	87,0	85,0	87,0	83,0	79,0	72,0	65,0
VLS414C	94	88,0	86,0	88,0	84,0	80,0	73,0	66,0
VLS456C	94	88,0	86,0	88,0	84,0	80,0	73,0	66,0
VLS46C	95	89,0	87,0	89,0	85,0	81,0	74,0	67,0
VLS576C	95	89,0	87,0	89,0	85,0	81,0	74,0	67,0
VLS234C	89	83,0	81,0	83,0	79,0	75,0	68,0	61,0

1. Total sound power level, weighted A
2. Sound power level by octave band, not weighted

» Low noise

Mod.	LwA (1)	125 Hz (2)	250 Hz (2)	500 Hz (2)	1000 Hz (2)	2000 Hz (2)	4000 Hz (2)	8000 Hz (2)
	dB(A)	dB	dB	dB	dB	dB	dB	dB
VLS162C	82	65,0	72,0	72,0	69,0	62,0	54,0	56,0
VLS202C	85	63,0	68,0	75,0	75,0	72,0	65,0	57,0
VLS243C	85	63,0	68,0	75,0	75,0	72,0	65,0	57,0
VLS254C	84	62,0	67,0	74,0	74,0	71,0	64,0	56,0
VLS274C	84	62,0	67,0	74,0	74,0	71,0	64,0	56,0
VLS314C	85	63,0	68,0	75,0	75,0	72,0	65,0	57,0
VLS344C	87	65,0	70,0	77,0	77,0	74,0	67,0	59,0
VLS374C	87	65,0	70,0	77,0	77,0	74,0	67,0	59,0
VLS414C	88	66,0	71,0	78,0	78,0	75,0	68,0	60,0
VLS456C	87	65,0	70,0	77,0	77,0	74,0	67,0	59,0
VLS46C	89	67,0	72,0	79,0	79,0	76,0	69,0	61,0
VLS576C	89	67,0	72,0	79,0	79,0	76,0	69,0	61,0
VLS234C	84	62,0	67,0	74,0	74,0	71,0	64,0	56,0

1. Total sound power level, weighted A
2. Sound power level by octave band, not weighted

7.1 ACOUSTIC INSULATION VERSIONS

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
Sound power level	(1) dB(A)	89	91	89	92	90	91	91	93	93	94	94	95	95
Sound power level, low-noise version	(1) dB(A)	85	85	84	85	84	84	85	87	87	88	87	89	89

(1) Sound power level measured according to ISO 9614

NOTE: Low noise sound power level = standard + compressor silencing housings; Super low noise sound power level = standard + compressor silencing housings + low noise EC fan.

8 OPERATING LIMITS

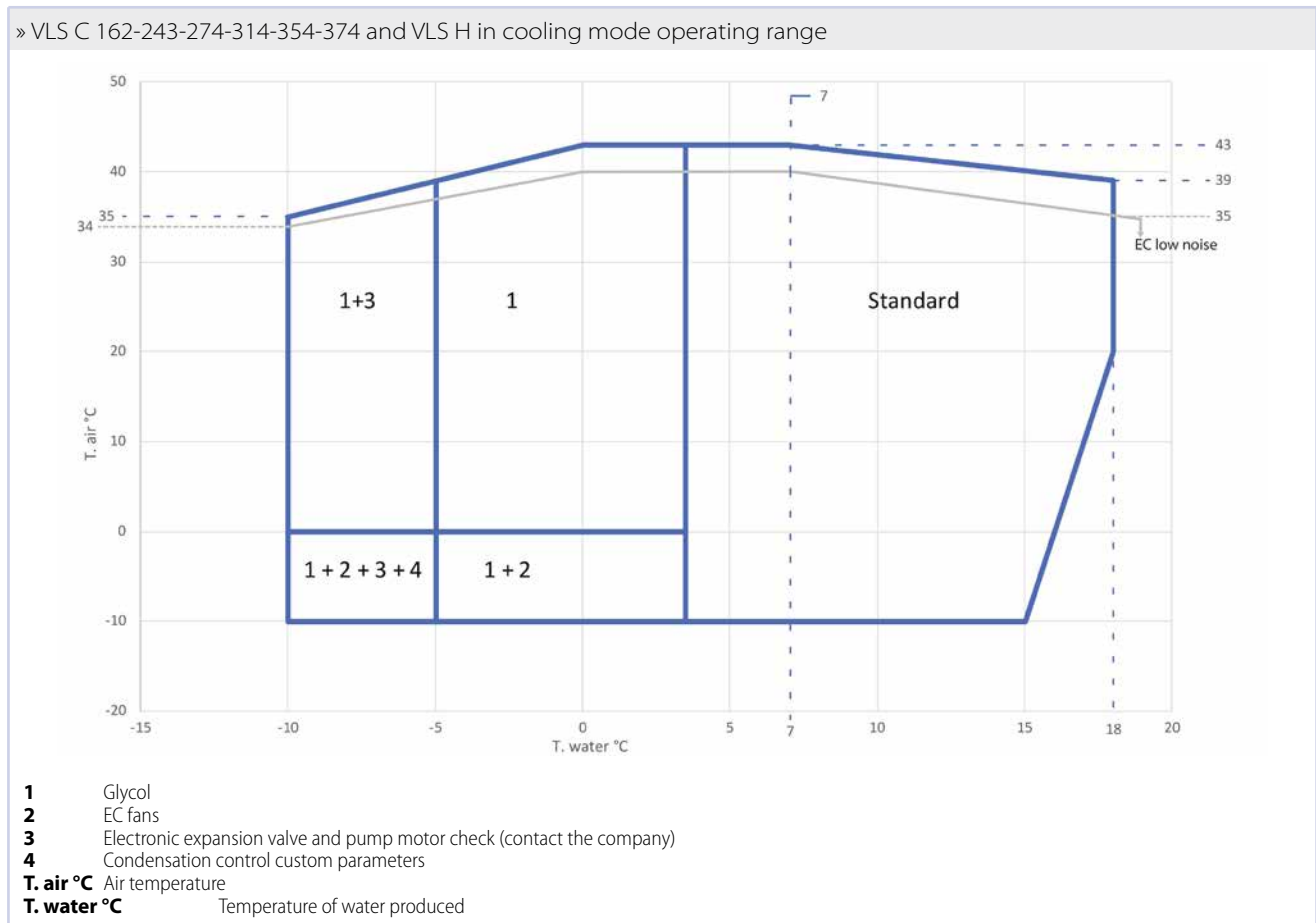
The graphs below illustrate the operating limits of VLS units (in the case of continuous operation) in relation to the outlet water temperature and outdoor air temperature. The following limits are to be considered valid for water temperature fluctuations of 5 K.

⚠ WARNING: contact the support area if you wish to operate with water temperature fluctuations other than 5 K at full load.

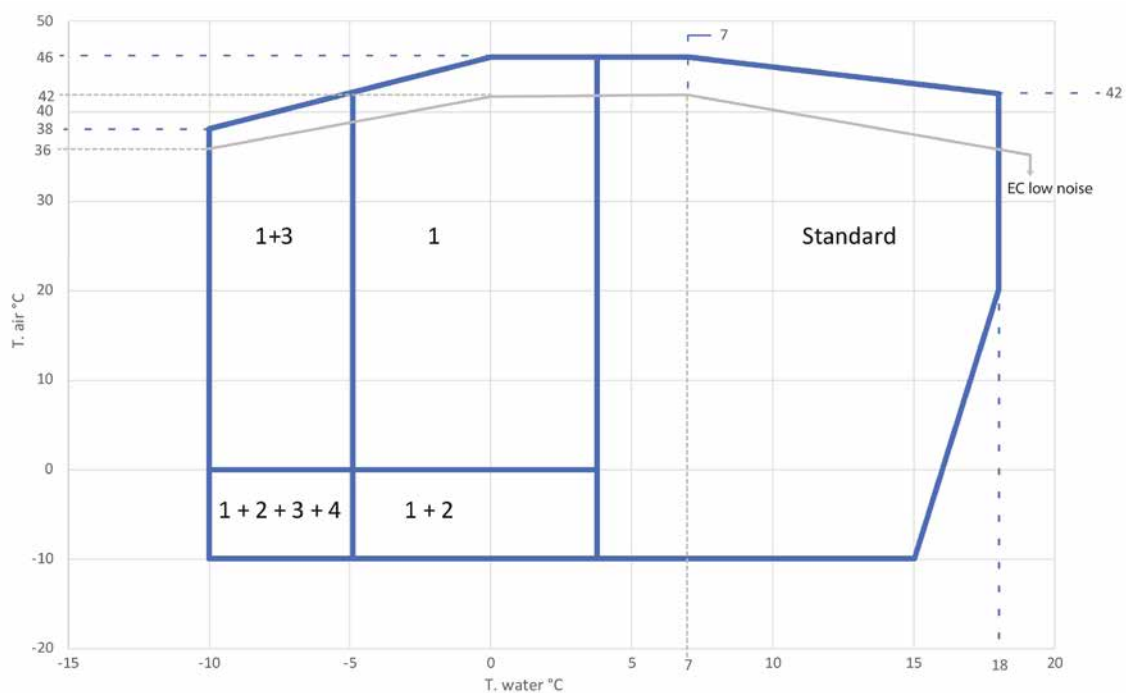
⚠ IMPORTANT: except for special requests, which can be managed on request, the VLS series units set the number of compressors running according to the temperature of the water entering the unit (temperature returning from the system) and not according to the outlet temperature. Therefore, the settable set point always refers to the temperature of the water entering the unit. The outlet water temperature, to which the following operating limits refer, therefore depends on the set point/differential combination set on the return line, on the design thermal differential, and on any unit splitting conditions (refer to the controller's technical manual). Therefore, if you would like to operate continuously in the vicinity of the operating range, you should always make sure that the temperatures are in compliance with the operating limits, even under conditions of load regulation and splitting of the unit. If in doubt, contact the Galletti product support department.

⚠ WARNING: The units are designed to work with water and air temperatures falling within the range defined by the operating limits. Attempting to operate the units beyond these limits could cause irreparable damage to the units themselves.

8.1 OPERATING LIMITS IN CHILLER MODE



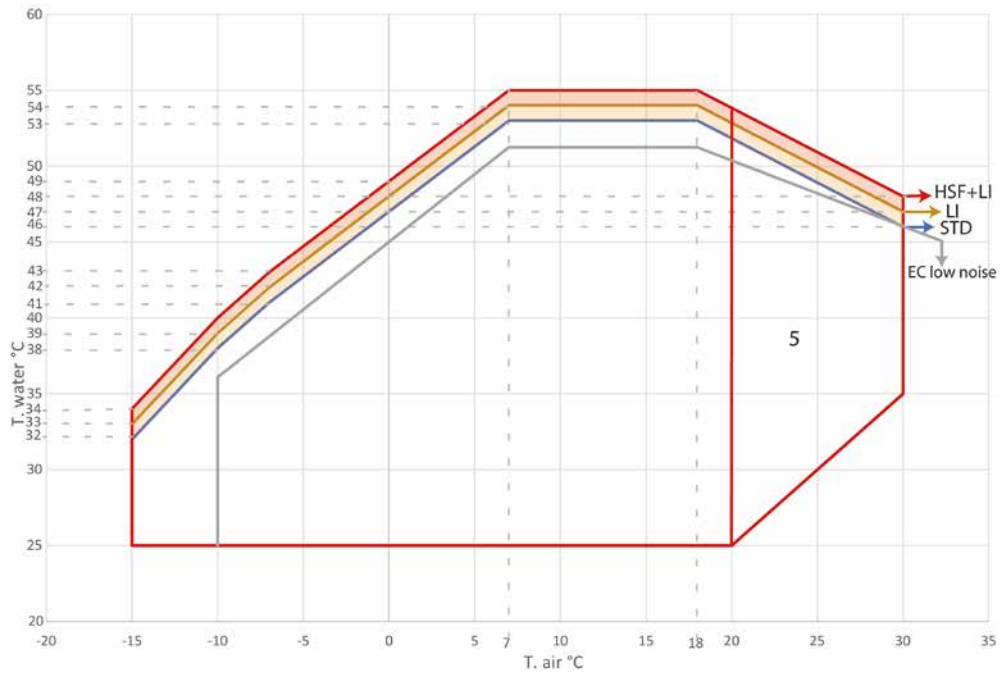
» VLS C 202-234-254-414-456-546-576 and VLS H in cooling mode operating range



- 1** Glycol
- 2** EC fans
- 3** Electronic expansion valve and pump motor check (contact the company)
- 4** Condensation control custom parameters
- T. air °C** Air temperature
- T. water °C** Temperature of water produced

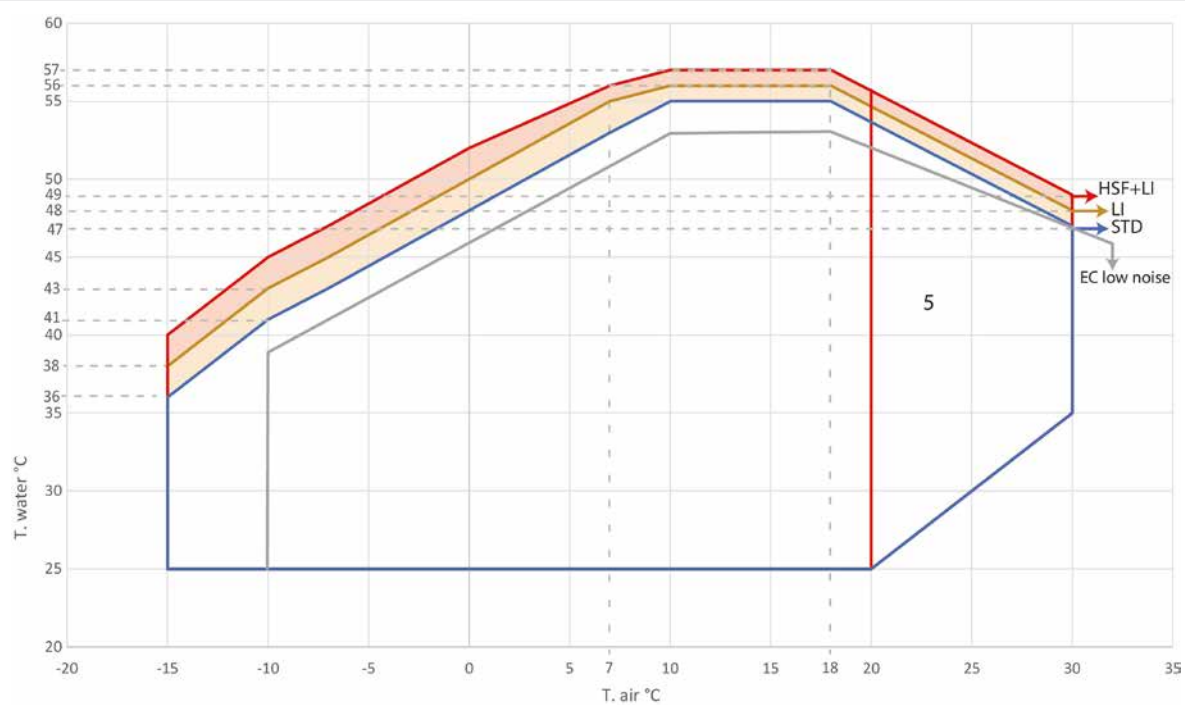
8.2 OPERATING LIMITS IN HEAT PUMP MODE

» VLS H 162-274-314-344-374 operating range



- 5** Check winter thermostatic valves (contact the company)
- T. water °C** Temperature of water produced
- T. air °C** Air temperature
- STD** Standard
- HSF** Hydro Smart Flow
- LI** Liquid injection

» VLS H 202-234-254-414-456 operating range



5 Check winter thermostatic valves (contact the company)

T. water °C Temperature of water produced

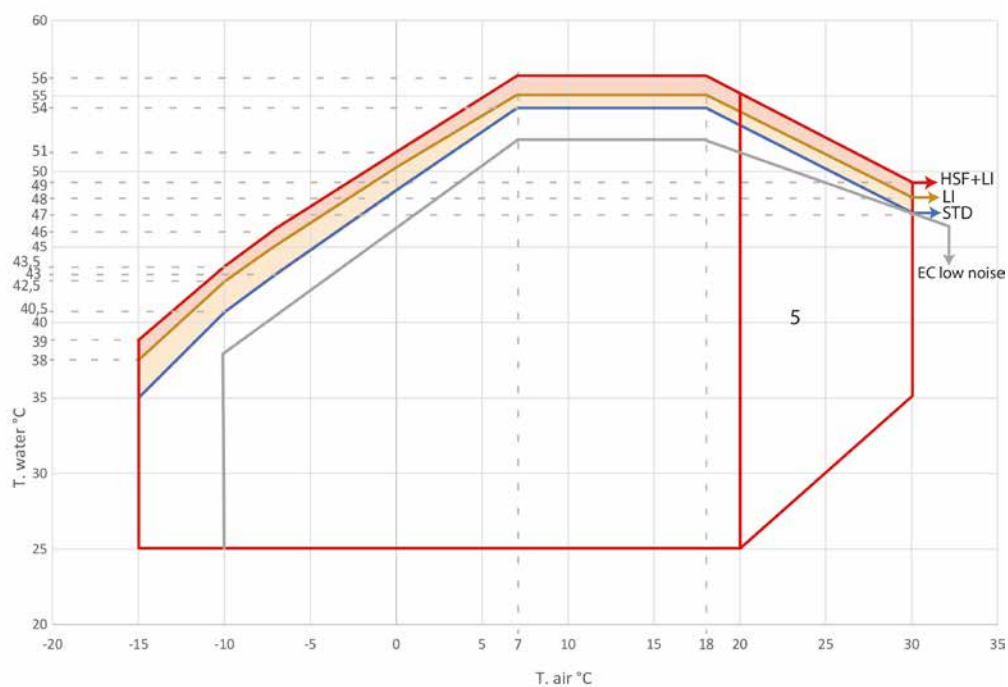
T. air °C Air temperature

STD Standard

HSF Hydro Smart Flow

LI Liquid injection

» VLS H 243-546-576 operating range



5 Check winter thermostatic valves (contact the company)

T. water °C Temperature of water produced

T. air °C Air temperature

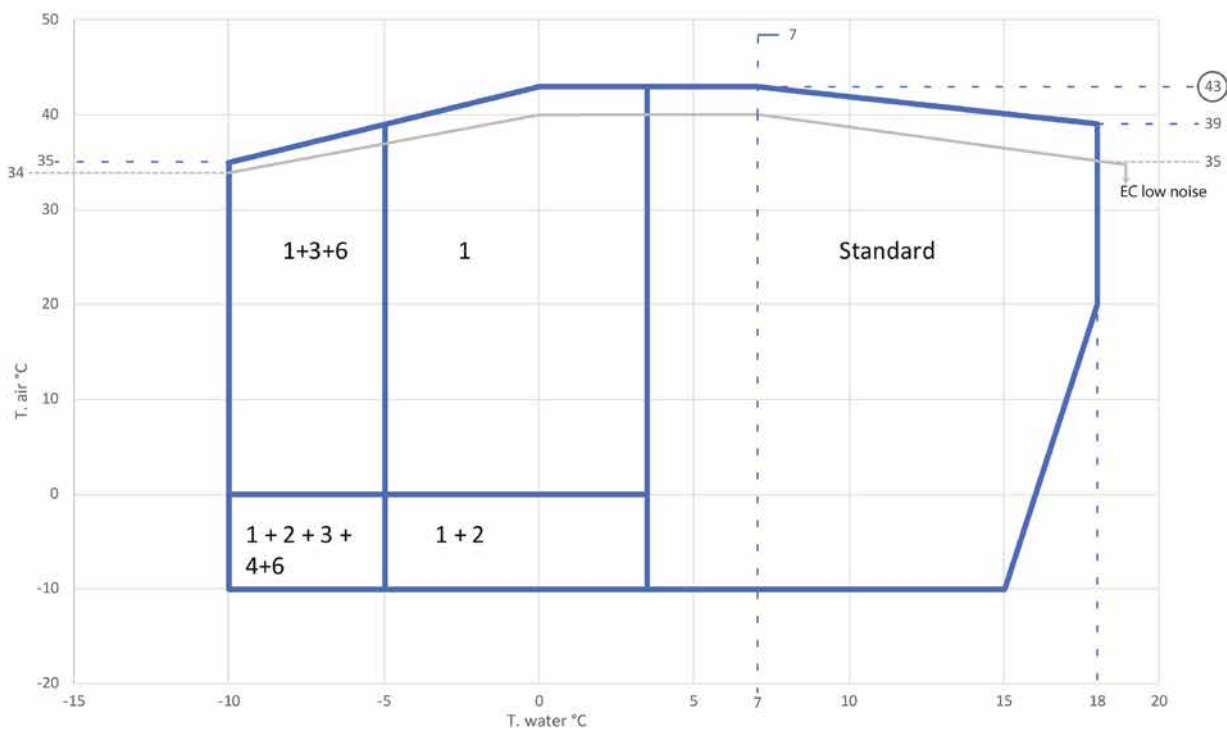
STD Standard

HSF Hydro Smart Flow

LI Liquid injection

8.3 VLS C OPERATING RANGE WITH PIPING SHELL AND TUBE HEAT EXCHANGER

» VLS C 162-243-274-314-354-374 and VLS H in cooling mode operating range with piping shell and tube heat exchanger

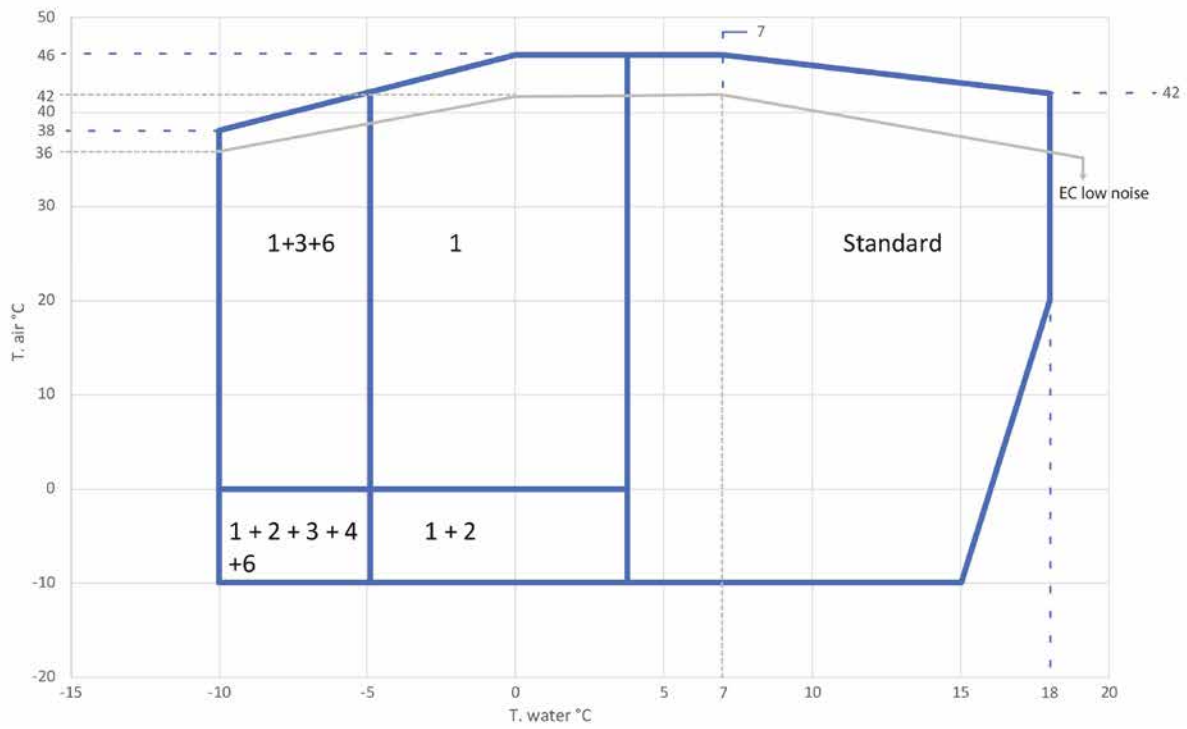


- 1** Glycol
- 2** EC fans
- 3** Electronic expansion valve and pump motor check (contact the company)
- 4** Condensation control custom parameters
- 6** Custom selection with piping shell and tube heat exchanger (contact the company)

T. air °C Air temperature

T. water °C Temperature of water produced

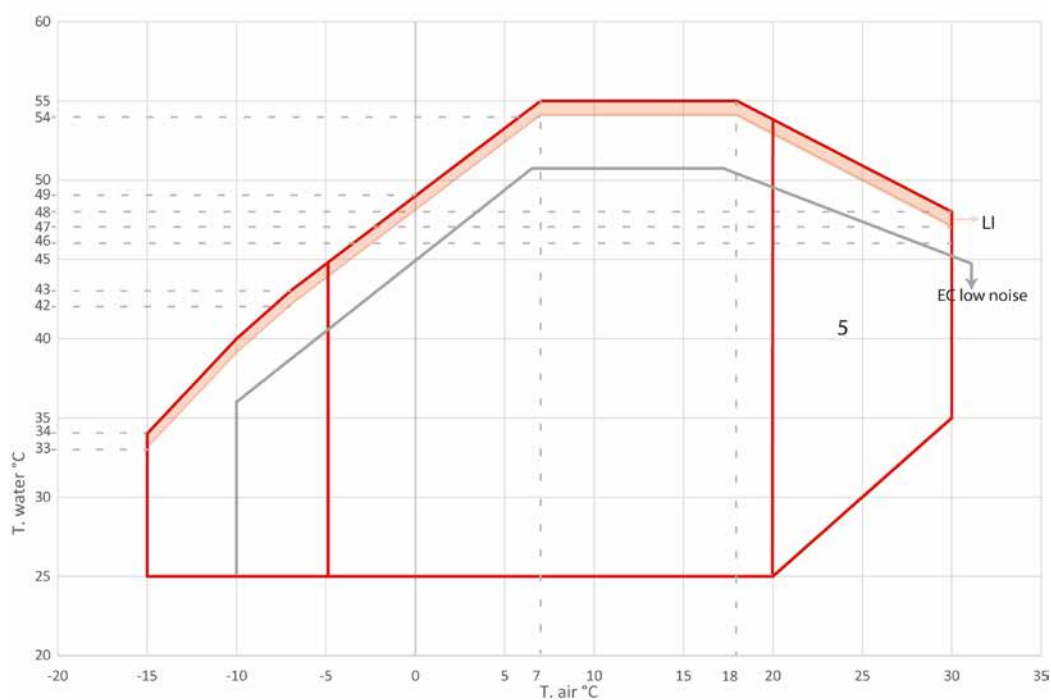
» VLS C 202-234-254-414-456-546-576 and VLS H in cooling mode operating range with piping shell and tube heat exchanger



- 1** Glycol
- 2** EC fans
- 3** Electronic expansion valve and pump motor check (contact the company)
- 4** Condensation control custom parameters
- 6** Custom selection with piping shell and tube heat exchanger (contact the company)
- T. air °C** Air temperature
- T. water °C** Temperature of water produced

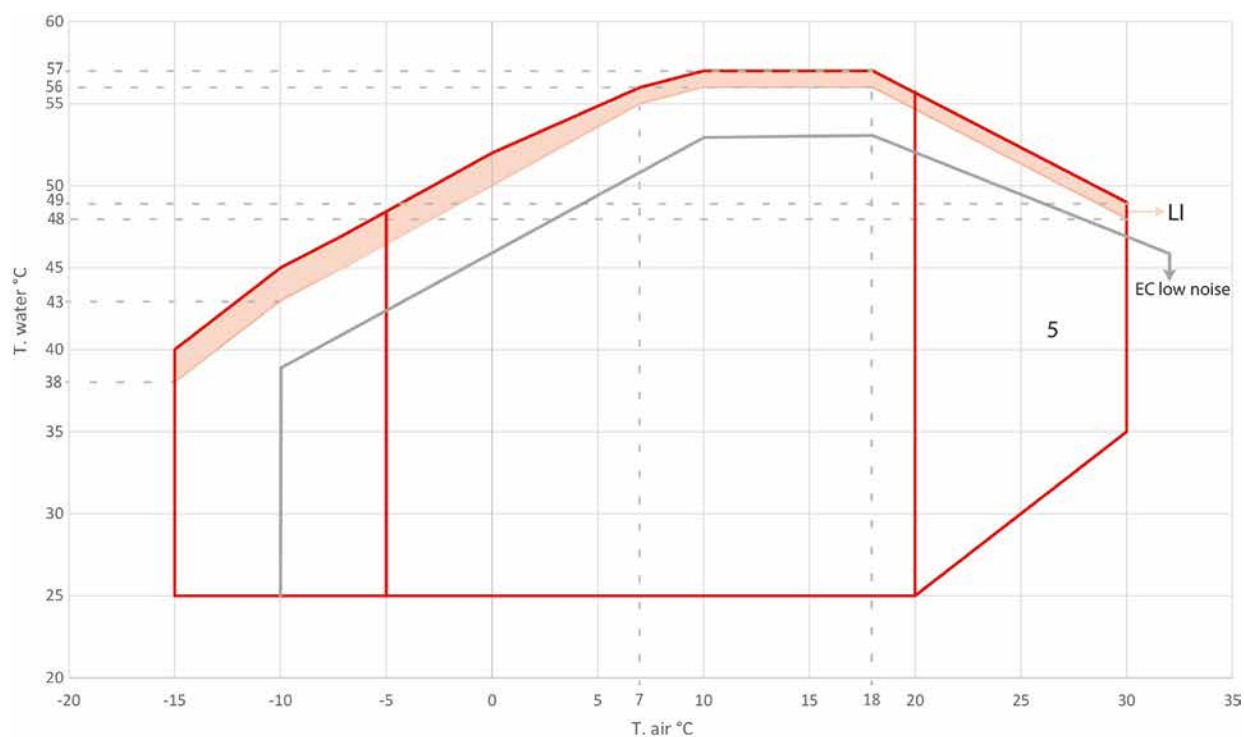
8.4 VLS H OPERATING RANGE WITH PIPING SHELL AND TUBE HEAT EXCHANGER

» VLS H 162-243-274-314-354-374 operating range with piping shell and tube heat exchanger



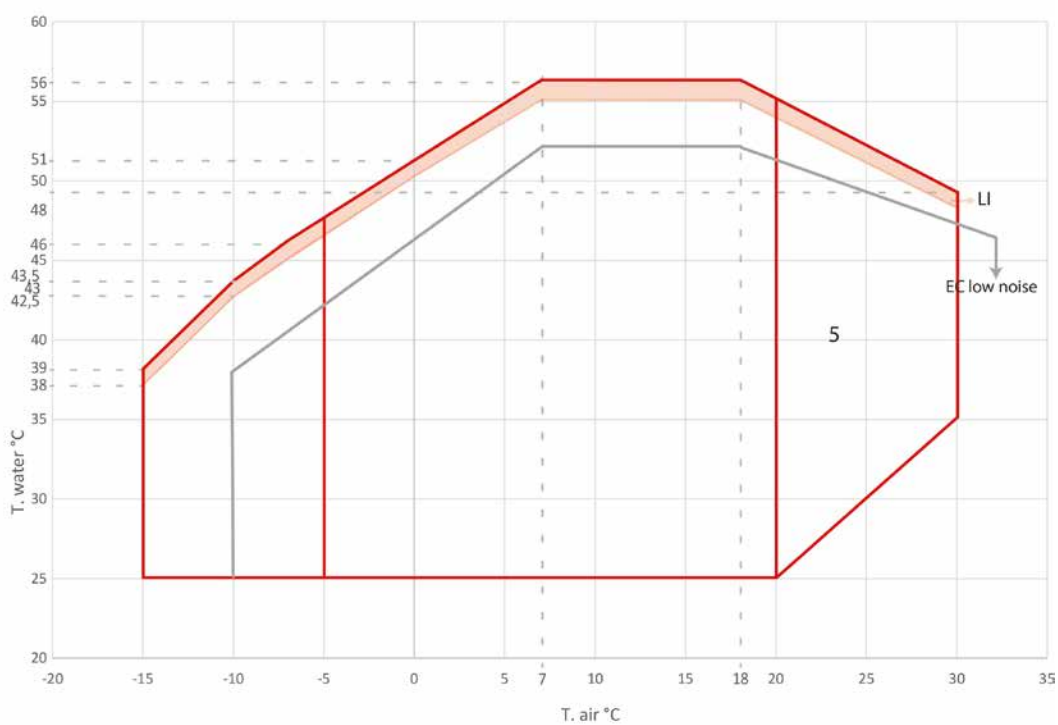
- 5** Check winter thermostatic valves (contact the company)
- 6** Custom selection with piping shell and tube heat exchanger (contact the company)
- T. water °C** Temperature of water produced
- T. air °C** Air temperature
- LI** Liquid injection

» VLS H 202-234-254-414-456 operating range with piping shell and tube heat exchanger



- 5** Check winter thermostatic valves (contact the company)
- 6** Custom selection with piping shell and tube heat exchanger (contact the company)
- T. water °C** Temperature of water produced
- T. air °C** Air temperature
- LI** Liquid injection

» VLS H 243-546-576 operating range with piping shell and tube heat exchanger



- 5** Check winter thermostatic valves (contact the company)
- 6** Custom selection with piping shell and tube heat exchanger (contact the company)
- T. water °C** Temperature of water produced
- T. air °C** Air temperature
- LI** Liquid injection

8.5 THERMAL CARRYING FLUID

The hydraulic pumps belonging to the VLS series can operate with mixtures of water and up to 30% ethylene glycol. On request it is possible to configure the units with pumping units fitted with special silicon carbide / silicon carbide-Viton seals. In these cases both ethylene glycol and propylene glycol can be tolerated at concentrations of up to 35%.

⚠ IMPORTANT: observe the minimum water temperature indicated in the operating ranges.

⚠ IMPORTANT: Never go below the water flow rates indicated in the following table so as to prevent the unit from stopping due to a flow alarm.

» Minimum and maximum water flow admitted

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
Water flow MIN	l/h	16512	21672	23943	24355	25800	28277	31992	35398	37772	43138	48711	56038	60373
Water flow MAX	l/h	58000	61000	65000	55000	55000	65000	71500	83000	84000	102000	115000	123000	132000
Maximum percentage of ethylene glycol	%	30	30	30	30	30	30	30	30	30	30	30	30	30

👁 NOTE: The maximum allowed glycol percentage refers to standard pumps. In case of configured unit with viton seal pumps, the maximum percentage is 35%. If works in indicated zone with number 3 on the operating limits is always necessary to request a check of pump motor dimensions.

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
ΔT min	(1)	3	3	4	4	4	4	4	4	4	4	4	4	4
ΔT max	(1)	7	7	7	7	7	7	7	7	7	7	7	7	7

(1) Return temperature 12°C for chiller mode and 40°C for heat pump mode. Tair=35°C chiller mode and 7(6)°C heat pump mode

NB: in partial load conditions, or low charge of the unit (example, frozen water produced in low temperature), the minimum ΔT could decrease. Make sure that the water flow is between maximum and minimum value indicated.

⚠ WARNING: working beyond the maximum water flow rate, over time could cause erosion problems of the heat exchanger with consequent deterioration of the unit's performance.

⚠ WARNING: working under the minimum flow rate instead causes the presence of the flow alarm with consequent stopping of the unit

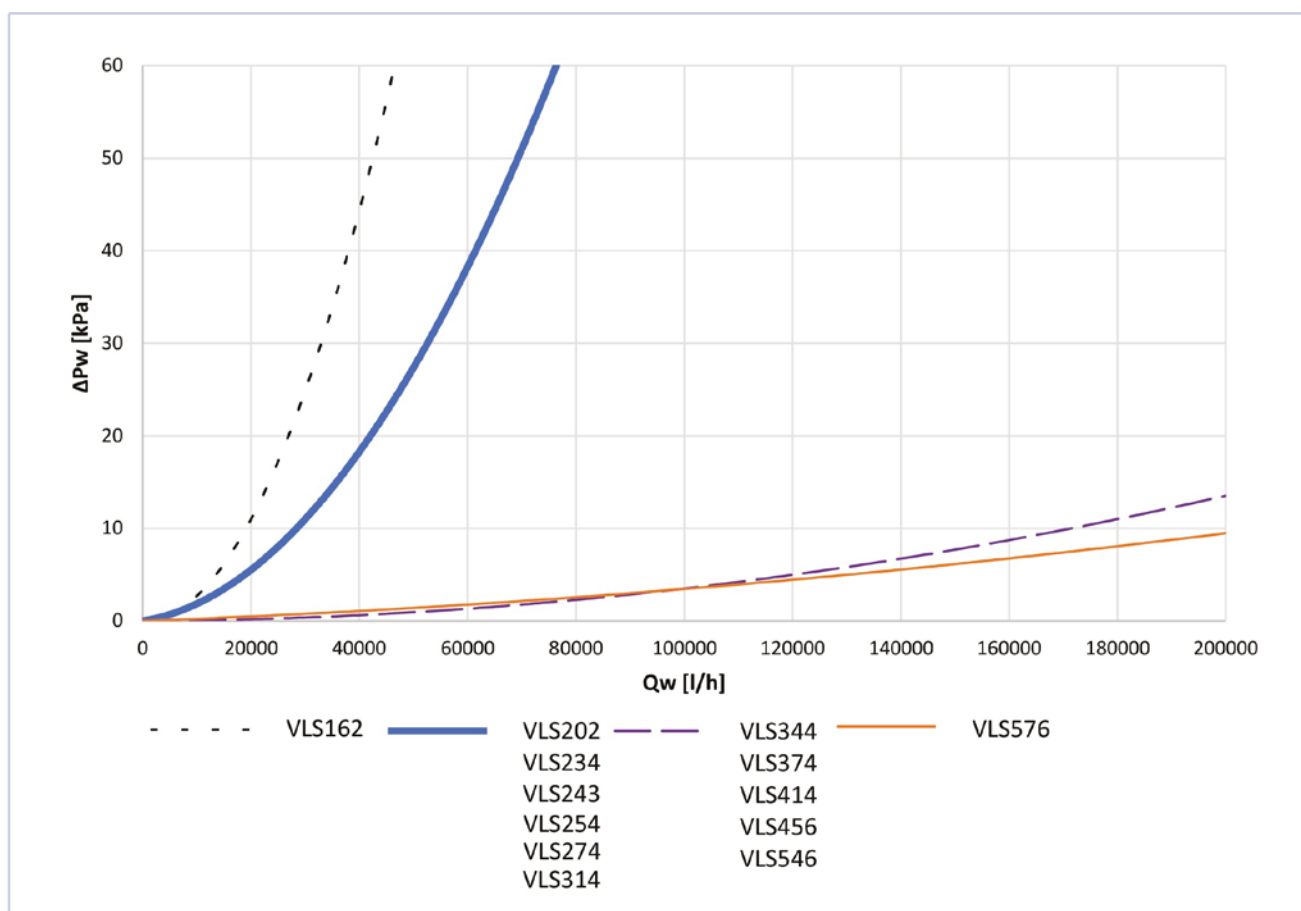
9 WATER PRESSURE DROP

9.1 Y FILTER PRESSURE DROPS

The table below shows the pressure drops of the Y filter (Δp) as a function of the water flow rate (Q_w), assuming an average water temperature of 10 °C,

VLS	162	202	243	254	274	314	344
Unit connections							
Unit connections type		VICTAULIC	VICTAULIC	VICTAULIC	VICTAULIC	VICTAULIC	VICTAULIC
Filter connections							
Filter connections type		Threaded	Threaded	Threaded	Threaded	Threaded	Flanged
Filter connections diameter	"	2 1/2"	4	4	4	4	5
Kvs		60	100	100	100	100	100
Filter name		F21NOR65	F21NOR100F	F21NOR100F	F21NOR100F	F21NOR100F	F21N DN5"-125

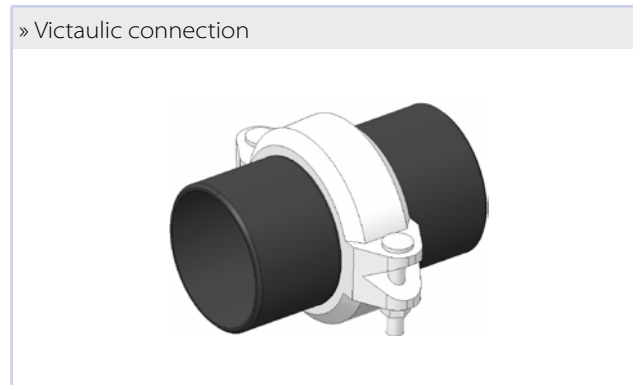
VLS	234	374	414	456	546	576
Unit connections						
Unit connections type		VICTAULIC	VICTAULIC	VICTAULIC	VICTAULIC	VICTAULIC
Filter connections						
Filter connections type		Threaded	Flanged	Flanged	Flanged	Flanged
Filter connections diameter	"	4	5	5	5	6
Kvs		100	567	567	567	788
Filter name		F21NOR100F	F21N DN5"-125	F21N DN5"-125	F21N DN5"-125	F21N DN6"-150



10 WATER CIRCUIT

All units in the VLS series are equipped with water flow switch (supplied with the unit), relief valve, water pressure gauge, automatic vent valve, and drainage valve.

Depending on the configuration they can then be equipped with a pumping unit (single or double pump managed in OR logic, standard or with inverter), buffer tank, expansion tank, and water-side cycle-reversing valve to have reverse-flow exchange in each operating mode. A gate valve is also available as an accessory for cutting off pump suction, so that the pump can be replaced without needing to empty the unit's entire tank.



When you are getting ready to set up the water circuit for the evaporator you should follow the directions below and in any case make sure you comply with national or local regulations (use the diagrams included in this manual as your reference).

1. Connect the pipes to the chiller using flexible couplings to prevent the transmission of vibrations and to compensate for thermal expansions. These units are all configured for installation of the water inlet-outlet pipes outside the unit (on the rear) and these pipes are supplied as standard accessories at no extra cost for the customer.
2. Install the following components on the piping:
 - Pair of quick-connection couplings with pipe section to be welded (optional item that may be selected from the price list). They facilitate the connecting operations to the plumbing system, greatly speeding up installation
 - temperature and pressure indicators for routine maintenance and monitoring of the unit. Pressure control on the water side allows to assess the correct functioning of the expansion tank and to detect water leakage in advance.
 - sumps on inlet and outlet piping for temperature detection, for a direct view of operating temperatures. They can also be consulted on the microprocessor on board the unit.
 - cut-off valves (gate valves) to isolate the unit from the hydraulic circuit.
 - metal net filter compulsory (inlet piping) with mesh no large than 1 mm, to protect the heat exchanger from slag or impurities inside the piping. If the machine is combined with process cycles, it is recommended to install a readily serviceable uncoupling exchanger to prevent possible operation blockages and/or breakage of the plate evaporator.
 - air vent valve placed on the higher parts of the hydraulic circuit to bleed the air. The internal pipes of the unit are fitted with small air vent valves for bleeding the unit itself: this operation should be conducted when the unit is disconnected from the power supply - make sure that the circuit is completely full of water and check again to make sure there is no air before starting the pump for the first time.
 - discharge cock and, where needed, drain tank in order to empty the system for maintenance or seasonal stops. Drainage valve is provided on the optional water buffer tank: this operation may only be carried out when the unit is disconnected from the power supply.

⚠ WARNING Failure to use anti-freezing solutions may cause serious damage to the hydraulic/cooling circuit in general.

Requirements for the heat transfer fluid and maintenance of the system

In order to avoid problems of reliability and/or operation of the hydronic system, it is necessary to take into consideration the characteristics of the heat transfer fluid (water or mixtures of water and glycol) and the hydraulic circuit.

The use of an unsuitable fluid can cause sludge deposits, algae growth, scale build-up, or corrosion and in some cases even erosion.

⚠ IMPORTANT: Never cut off the pumping unit while the unit is turned on. This could cause irreparable damage to the pump and the unit.

The Manufacturer does not accept any responsibility for damage caused by the use of untreated water, water containing particles or debris in suspension, water that has been incorrectly treated or admixed, or salt water.

By way of example, some (non-exhaustive) advice is given below (contact a specialist and consult specific standards such as UNI 8065)

- Ammonium ions (NH₄⁺) dissolved in water should be eliminated due to their high reactivity with copper.
- Chlorine ions (Cl⁻) pose a risk of holes developing due to corrosion.
- Sulfate ions (SO₄⁻) must be eliminated because they may present a risk of corrosion.
- Limit for fluoride ions: 0.1 mg/l.
- Silicon may pose a risk of corrosion. Limit: < 1 mg/l.
- Electrical conductivity: the higher the specific resistivity, the lower the tendency of corrosion. Therefore, the following limit must be observed: Electrical conductivity: < 3,500 μS/cm

- pH: neutral pH at 20 °C ($7 < \text{pH} < 8$)
- Fixed residue (at 180 °C): $< 2\,000 \text{ mg/kg}$
- Conditioners Present within the concentrations prescribed by the supplier

The water must be analysed: it is advisable to contact a qualified water treatment specialist to determine the most suitable type of treatment according to the materials used in the hydraulic system.

The installed hydraulic circuit must include all the necessary devices for water treatment: mesh filter (immediately at the inlet to the unit), additive dosing systems if necessary, any intermediate heat exchangers, vent valves at all points of possible air accumulation, air intakes, isolation valves, etc., and anything else necessary according to best practice.

⚠ CAUTION: in case of regular shut-down, if it is necessary to empty the hydraulic circuit, the system must be flushed internally with nitrogen, making sure to leave it pressurized (at a pressure approximately equal to half the maximum pressure of the hydraulic circuit) in order to avoid the entry of oxygen and to protect the parts of the system from the risk of corrosion.

10.1 WATER CONTENT AND CHARGING OF EXPANZION TANK SYSTEM

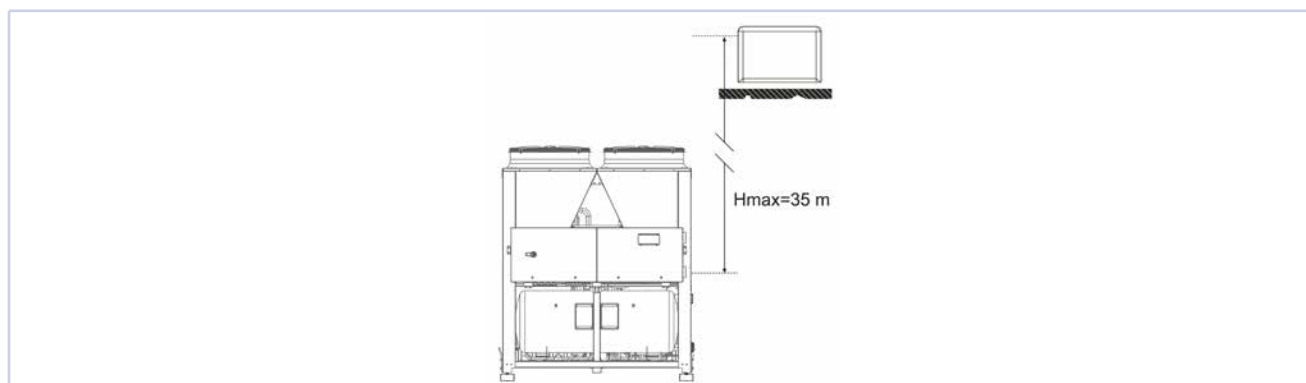
In models without a water storage reservoir it is necessary to assure that the content of water within the system does not fall below 8 litres/kW in the case of cooling-only models and 10 litres/kW in the case of heat pump models. This level is necessary to prevent the water temperature from falling below the indoor unit enabling threshold during defrost cycles.

N.B. kW in reference to rated capacity

The expansion tank is pre-charged to a pressure of 1.5 bars, sufficient for systems with a maximum height difference (H in the figure at the side) of 13 metres.

For greater height differences, refer to the table below in order to adjust the charging pressure of the expansion tank accordingly.

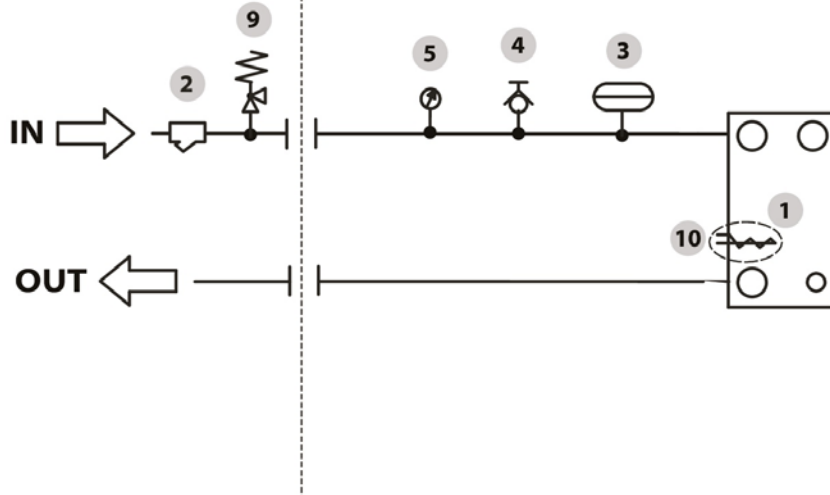
In no case should you exceed the maximum height difference $H_{\text{max}} = 35 \text{ m}$.



Height difference of system (m)	Charging pressure of expansion tank
<13	1,50
15	1,70
20	2,20
25	2,70
30	3,10

10.2 WATER CIRCUIT

» VLS (evaporator)

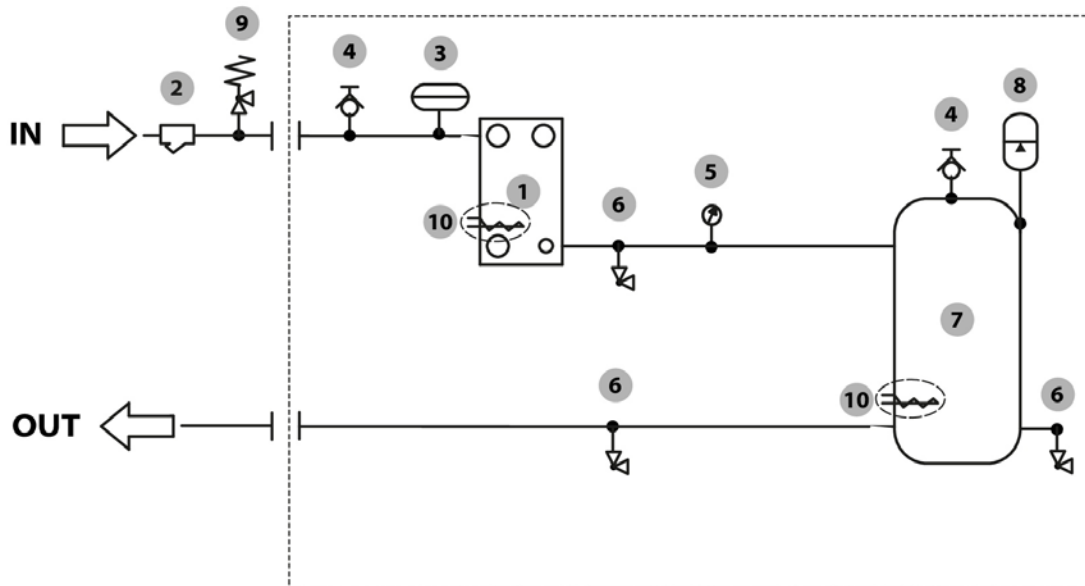


LEGEND

- 1 Evaporator
- 2 Water filter (included)
- 3 Flow switch
- 4 Air purge valve
- 5 Pressure gauge
- 6 -

- 7 -
- 8 -
- 9 -
- 10 Antifreeze electric heating
- Internal and external borderline
- OPTIONAL

» VLS (evaporator and tank)

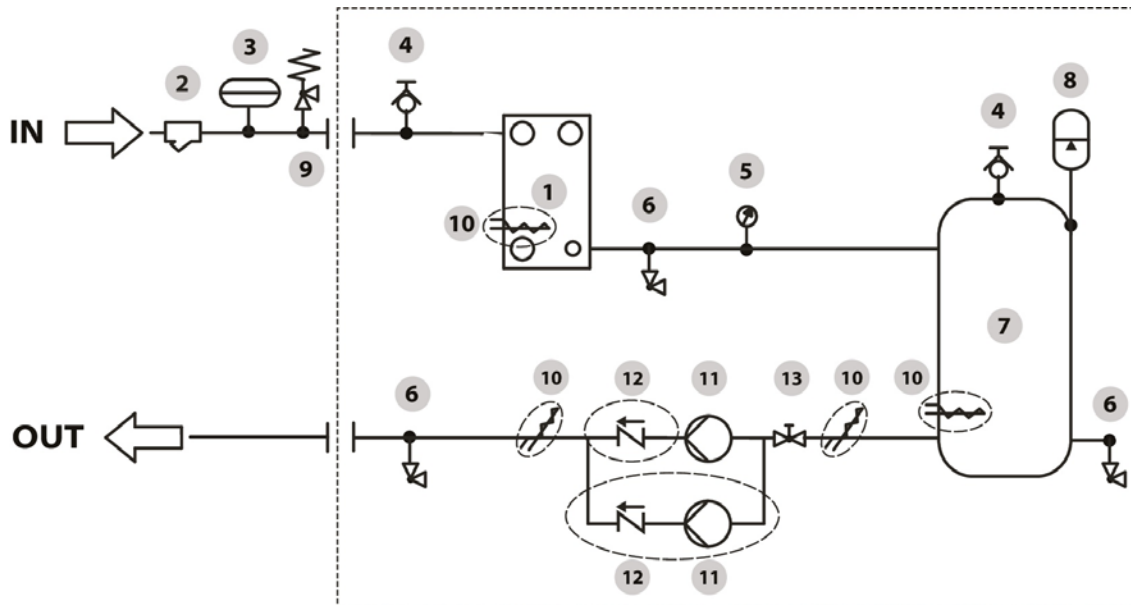


LEGEND

- 1 Evaporator
- 2 Water filter (included)
- 3 Flow switch
- 4 Air purge valve
- 5 Pressure gauge
- 6 Drain

- 7 Buffer tank
- 8 Expansion tank
- 9 Safety valve
- 10 Antifreeze electric heating
- Internal and external borderline
- OPTIONAL

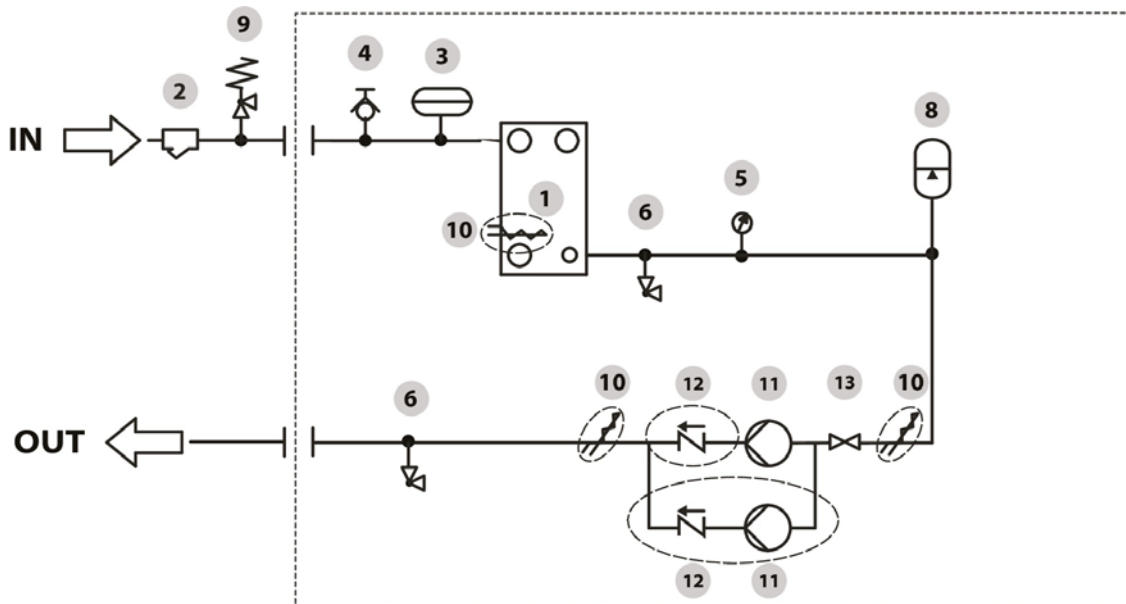
» VLS (evaporator, pump and tank)



LEGEND

- | | |
|----------------------------------|--|
| 1 Evaporator | 9 Safety valve |
| 2 Water filter (included) | 10 Antifreeze electric heating |
| 3 Flow switch | 11 Hydraulic pump |
| 4 Air purge valve | 12 Clapet valve |
| 5 Pressure gauge | 13 Pump shut-off valve |
| 6 Drain | ----- Internal and external borderline |
| 7 Buffer tank | ——— OPTIONAL |
| 8 Expansion tank | |

» VLS (evaporator and pump)



LEGEND

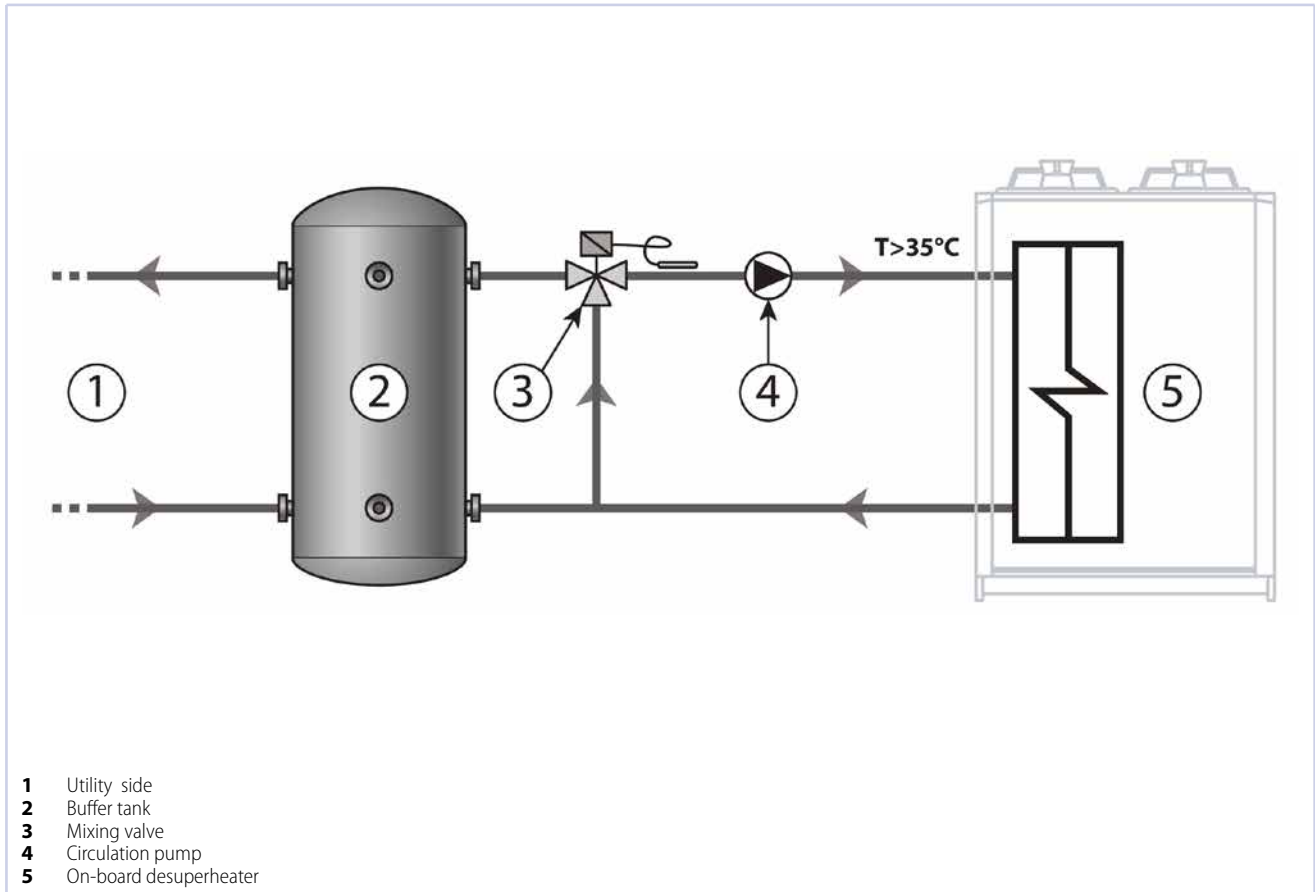
- | | |
|----------------------------------|--|
| 1 Evaporator | 9 Safety valve |
| 2 Water filter (included) | 10 Antifreeze electric heating |
| 3 Flow switch | 11 Hydraulic pump |
| 4 Air purge valve | 12 Clapet valve |
| 5 Pressure gauge | 13 Pump shut-off valve |
| 6 Drain | ----- Internal and external borderline |
| 7 - | ——— OPTIONAL |
| 8 Expansion tank | |

10.3 DE-SUPERHEATER

10.3.1 Recommended water circuit

The partial heat recovery option is provided by a braze-welded plate heat exchanger placed in series on the compressor delivery (typically in series in relation to the finned pack condenser). Its size is designed to limit pressure drops on the refrigerant side to a minimum.

All units equipped with a heat recovery kit have modulating condensation control as a standard feature. To prevent unbalances from occurring in the cooling circuit in the event of start-ups with very low water temperatures at the recuperator inlet ($<35^{\circ}\text{C}$), the recovery system water circuit should be configured as shown in the following figure. A low recuperator inlet water temperature would cause low condensation temperatures and thus an insufficient pressure differential on the expansion valve with the consequent risk of tripping the safety devices.



The bulb of the 3-way mixer valve is placed at the de-superheater exchanger inlet. By mixing the hot water produced by the recovery with colder water from the tank, it reduces the time needed for the system to reach full operating capacity to a few moments.

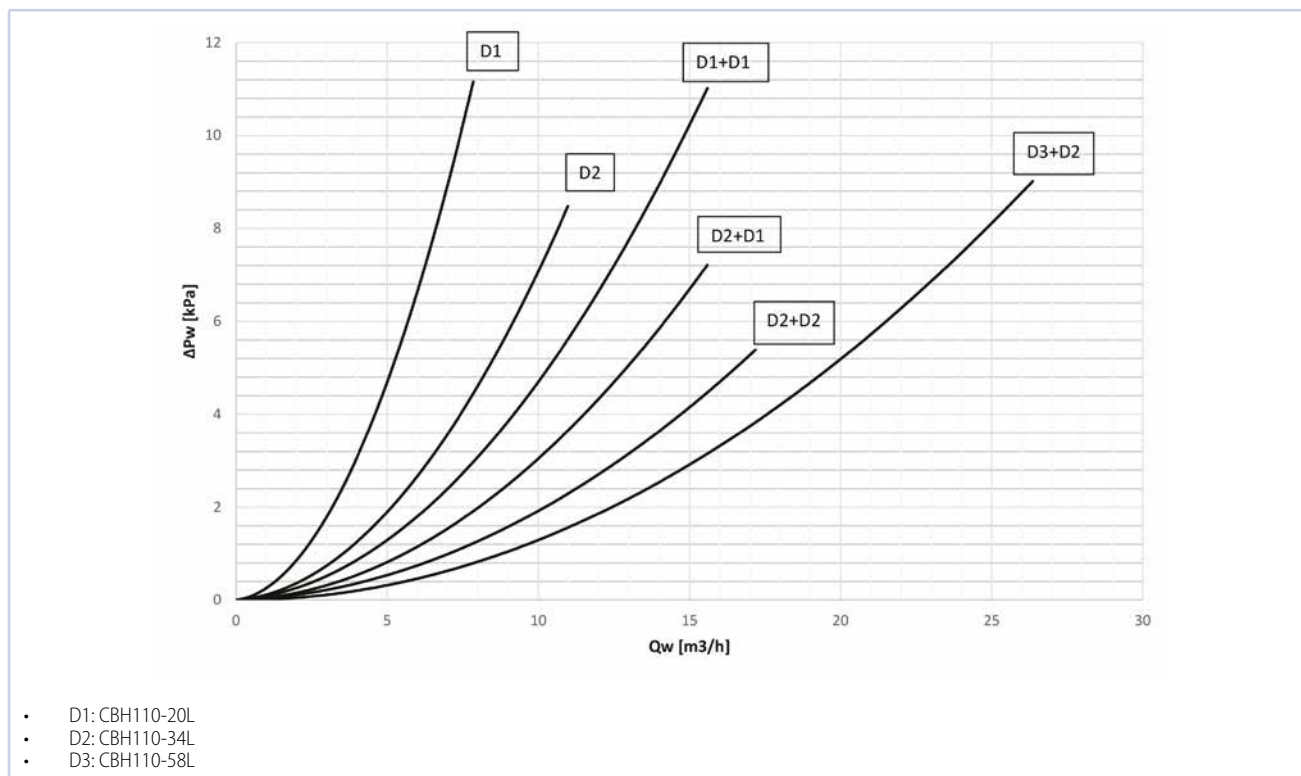
A buffer tank must be placed between the unit and the utility since the demand for hot water and its availability are not simultaneous, because it needs the compressors to be running.

Note that the heat recovery capacity is tied to the delivered cooling capacity and therefore decreases proportionately in partial load situations: this aspect should be taken into account when choosing the size of the storage tank.

The partial heat recovery option is supplied only with the de-superheater exchanger. The other components of the circuit laid out in the previous figure are not included in the supply.

10.3.2 Water pressure drop

VLS	162	202	234	243	254	274	314	344	374	414	456	546	576
no. of cooling circuits	1	1	2	1	2	2	2	2	2	2	2	2	2
no. of de-superheater (1 per circuit)	1	1	2	1	2	2	2	2	2	2	2	2	2
De-superheater type	D1	D2	D1+D1	D1	D1+D1	D1+D1	D1+D1	D2+D1	D2+D1	D2+D2	D2+D2	D3+D2	D3+D2



10.3.3 Heating capacities

» De-Superheater heating capacities

VLS	162	202	234	243	254	274	314	344	374	414	456	546	576		
Water temperature - source side 12 / 7 °C															
De-superheater heating capacity circuit 1	(1)	kW	58	59	39	81	44	51	57	57	57	73	92	101	101
De-superheater heating capacity circuit 2	(1)	kW	-	-	39	-	44	51	57	51	58	73	92	92	115
De-superheater water flow		l/h	9927	10219	6757	13943	7521	8689	9844	9870	9870	12627	15872	17318	17318
De-superheater water flow circuit 2		l/h	-	-	6757	-	7521	8689	9845	8711	10059	12627	15872	15872	19854

(1) De-superheater water temperature 40/ 45 °C, source side water temperature 12 / 7 °C

10.3.4 Heating capacities corrective factors

» De-Superheater heating capacities corrective factors

	Inlet water temperature / Outlet water temperature °C	
	50/55	50/60
f.corr Pdes	0,73	0,66
corr.f. Δp (water side)	0,53	0,44

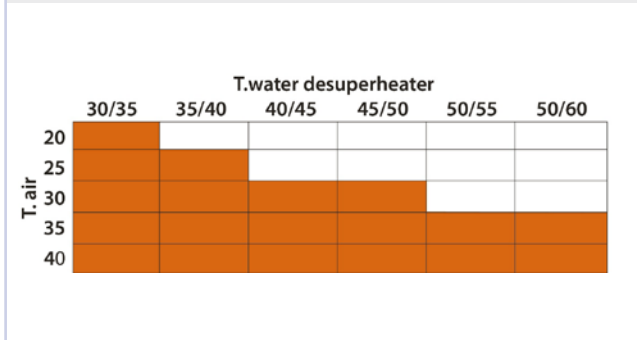
10.3.5 Production of water with desuperheater

The tables below indicate the producible water temperatures with desuperheater related to external air temperature. Are shown three operation conditions:

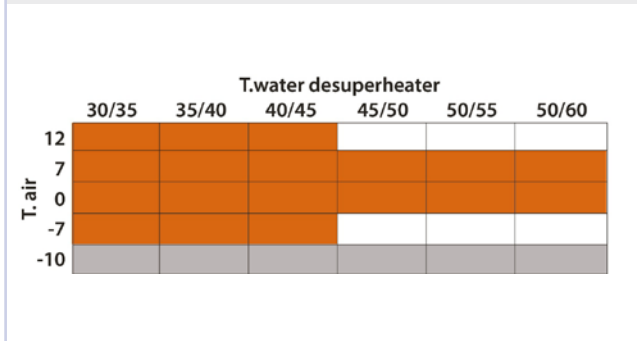
- Full load chiller mode with 7°C cold water production
- Full load heat pump mode with 45°C water production

— Full load heat pump mode with 35°C water production

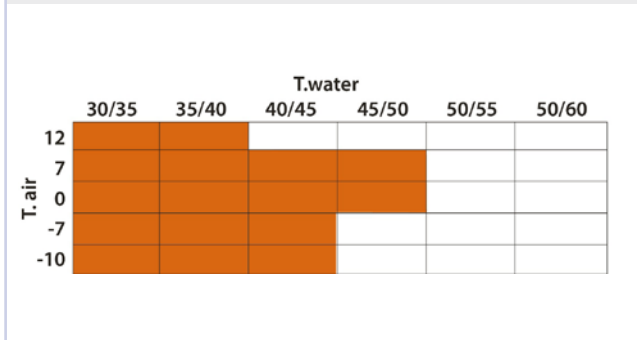
» Production of water with desuperheater - cooling mode, water produced 7°C



» Production of water with desuperheater - heating mode, water produced 45°C



» Production of water with desuperheater - heating mode, water produced 35°C



11 INSTALLATION CLEARANCE REQUIREMENTS

To guarantee the proper functioning of the unit and access for maintenance purposes, it is necessary to comply with the minimum installation clearance requirements shown in dimensional drawings.

Verify that there are no obstacles in front of the fans air outlet.

- Avoid any and all situations of backflow of hot air between air outlet and inlet of the unit.
- If even only one of the above conditions is not fulfilled, please contact the manufacturer to check for feasibility.
- In the design of the VLS series, special care has been taken to minimise noise and vibrations transmitted to the ground.
- Even greater insulation may be obtained, however, by using vibration damping base supports (available as optional accessories).
- If vibration damping base supports are adopted, it is strongly recommended also to use vibration damping couplings on the water pipes.
- Whenever the unit is to be sited on unstable ground (various types of soil, gardens, etc.) it is a good idea to provide a supporting base of adequate dimensions.

⚠ WARNING During installation adjust the vibration damping couplings in order to allow a proper slope toward the condensate drainage system, as shown on the unit.

12 SITING AND DAMPERS

It is important to bear in mind the following aspects when choosing the best site for installing the unit:

- Size and origin of water pipes;
- Location of the power supply;
- Solidity of the supporting surface;
- Avoid obstacles to the outflow of air from the fan which could cause back suction (see section on p. 35);
- Direction of prevalent winds: (position the unit so as to prevent prevalent winds from interfering with the fan air flow). Prevalent winds opposing the fan air flow will result in a maximum air temperature below the value indicated in the

operating limits;

- Avoid the possible reverberation of sound waves; do not install the unit in narrow or cramped spaces;
- Ensure adequate accessibility for maintenance or repairs (see section on p. 35).

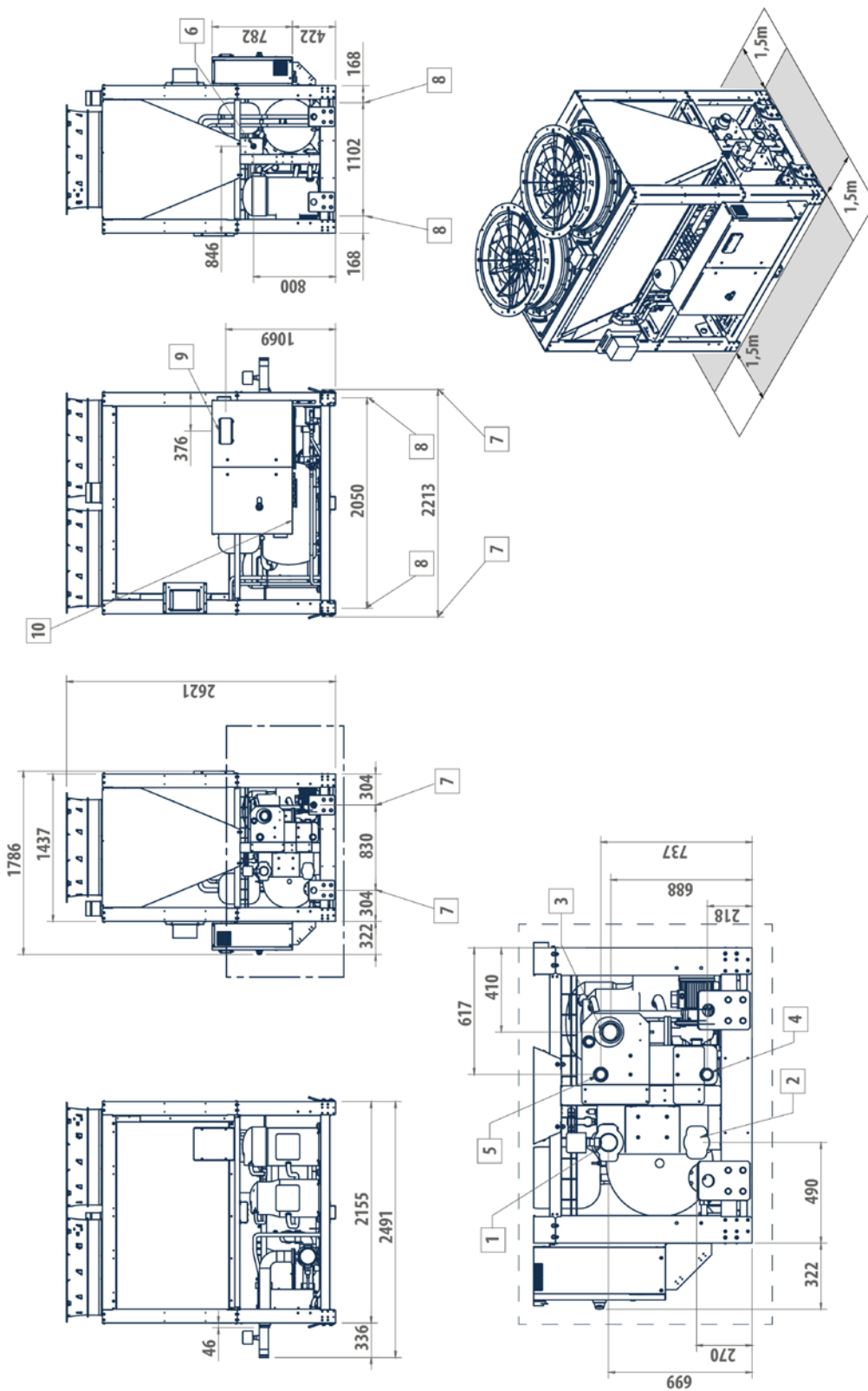
This appliance is not intended to be used by children or persons with physical, sensorial or mental problems, inexperienced or unprepared, without supervision. Be careful that children do not approach the appliance.

For the installation instructions refer to instruction manual RG66013698 supplied with unit.

VLS	DAMPERS
F1	4
F2	4
F3	8
F4	8
F5	10

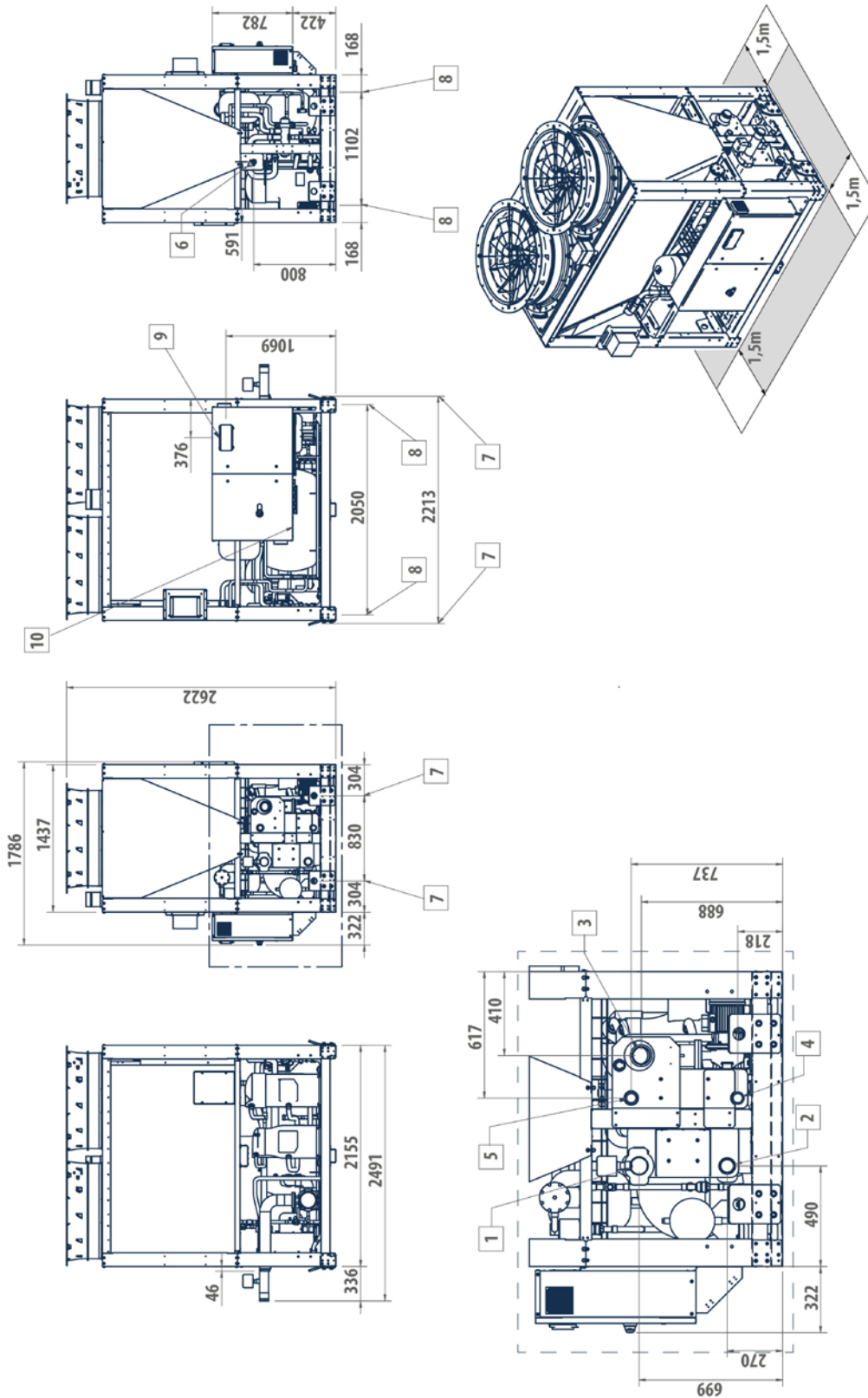
13 DIMENSIONS

» VLS C frame 1



LEGEND

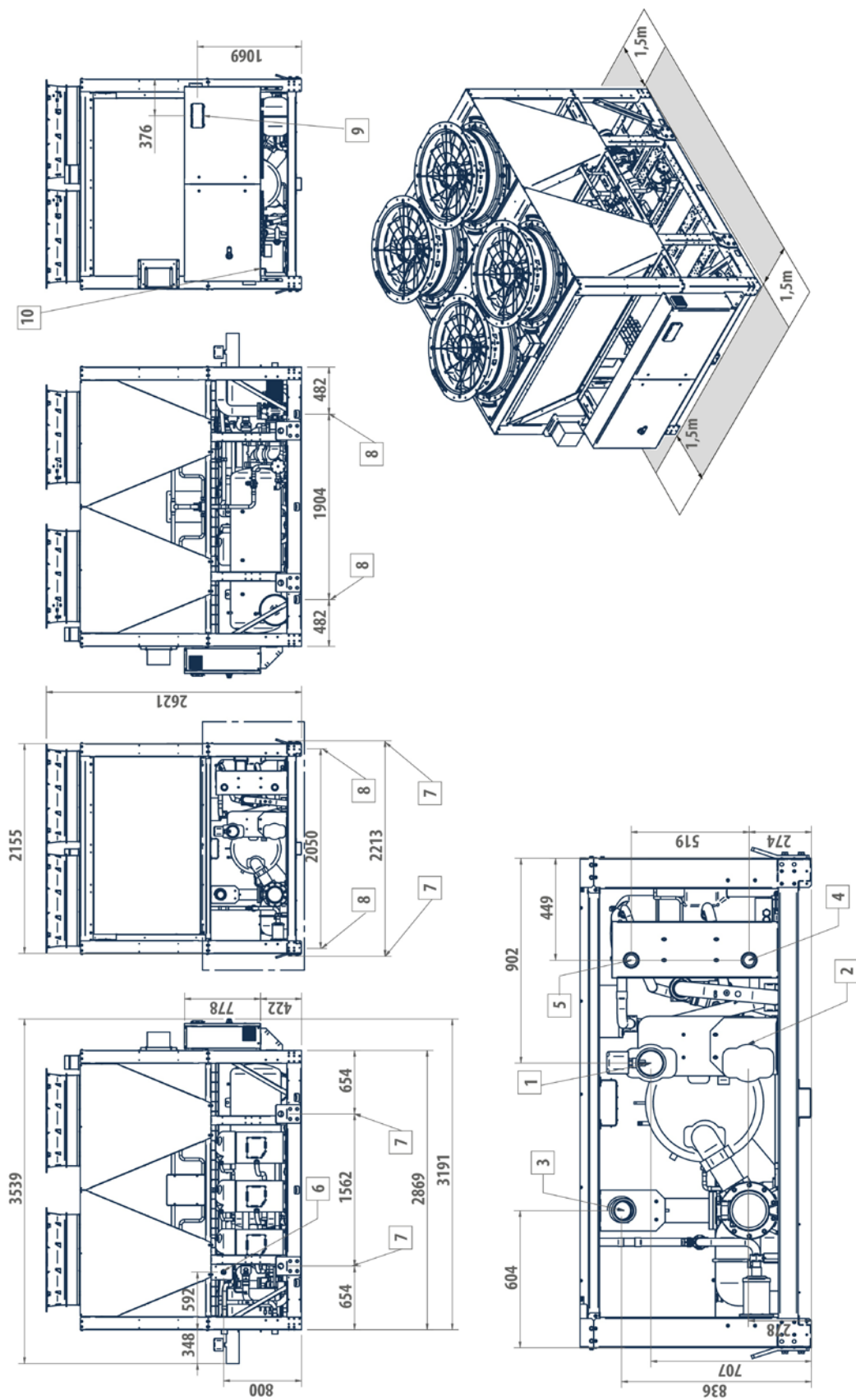
- 1 Water inlet Victaulic 3"
- 2 Water outlet, evaporator only Victaulic 3"
- 3 Water outlet pump and/or tank Victaulic 3"
- 4 Heat exchanger inlet 2" M
- 5 Heat exchanger outlet 2" M
- 6 Outlet safety valve 1" M
- 7 Lifting points
- 8 Vibration dumpers
- 9 User interface
- 10 Power supply input



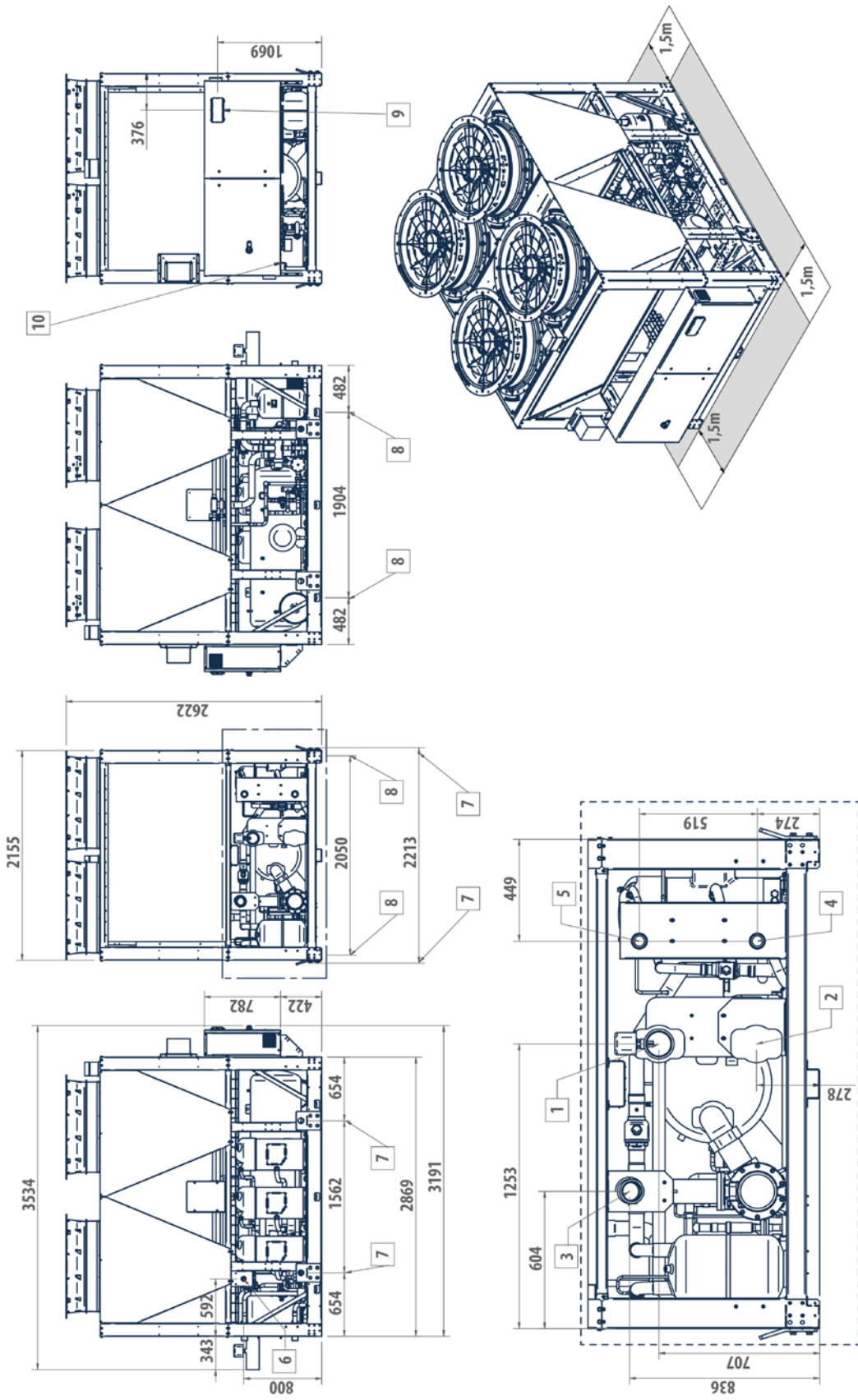
LEGEND

- 1** Water inlet Victaulic 3"
- 2** Water outlet, evaporator only Victaulic 3"
- 3** Water outlet pump and/or tank Victaulic 3"
- 4** Heat exchanger inlet 2" M
- 5** Heat exchanger outlet 2" M
- 6** Outlet safety valve 1" M
- 7** Lifting points
- 8** Vibration dumpers
- 9** User interface
- 10** Power supply input

» VLS H Frame 2 mono circuit



- LEGEND**
- 1 Water inlet Victaulic 3"
 - 2 Water outlet, evaporator only Victaulic 3"
 - 3 Water outlet pump and/or tank Victaulic 3"
 - 4 Heat exchanger inlet 2" M
 - 5 Heat exchanger outlet 2" M
 - 6 Outlet safety valve 1" M
 - 7 Lifting points
 - 8 Vibration dampers
 - 9 User interface
 - 10 Power supply input

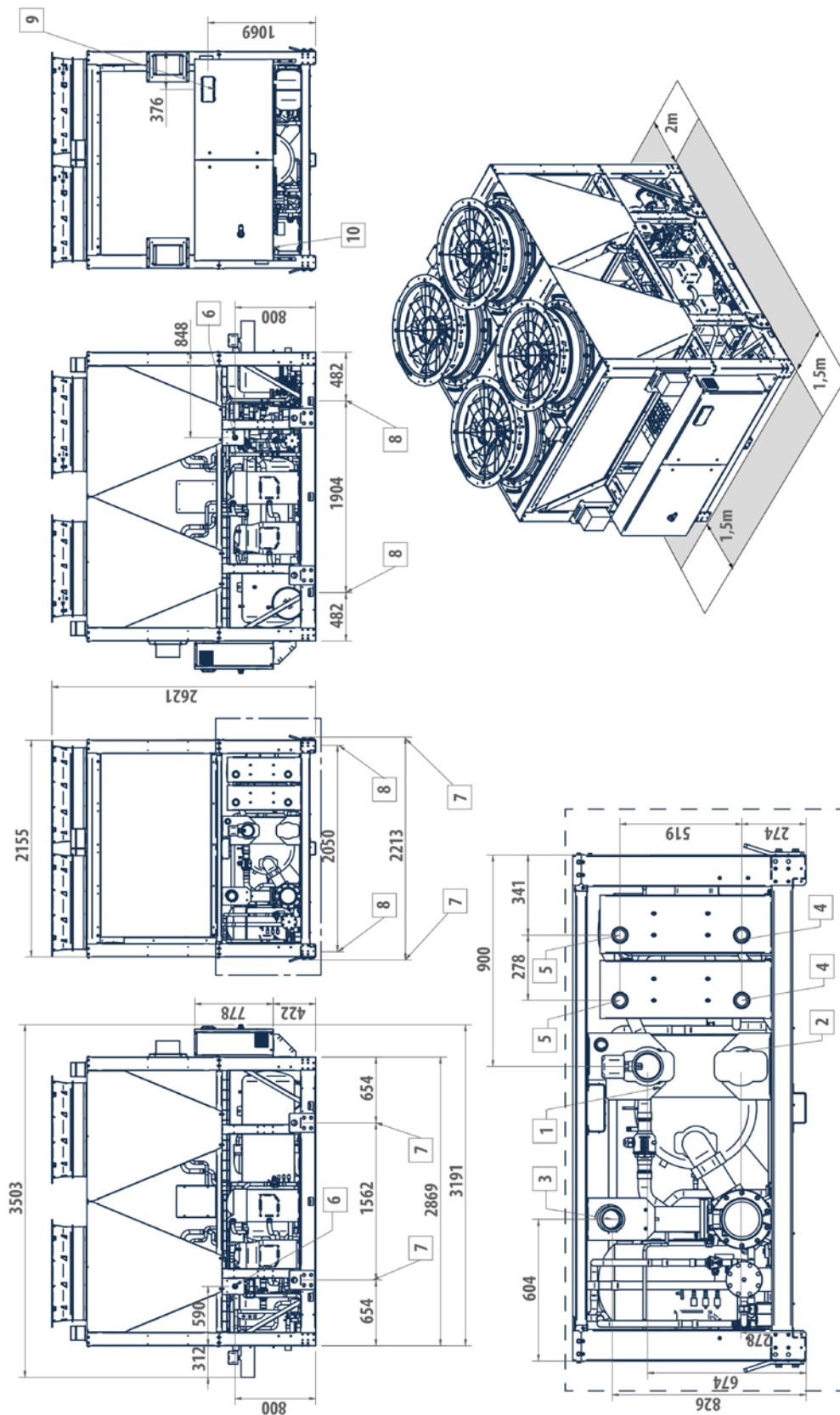


9 User interface
10 Power supply input

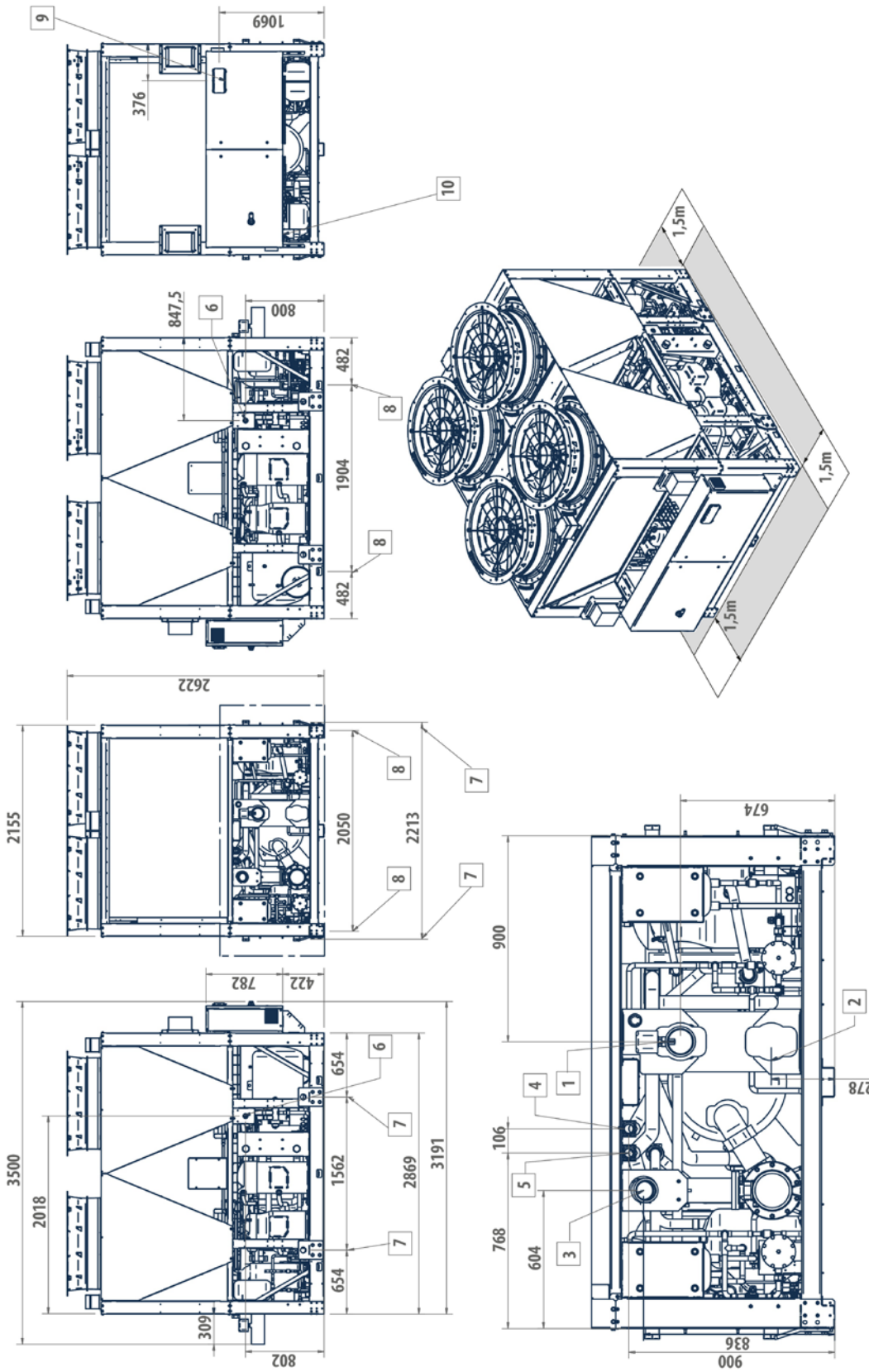
5 Heat exchanger outlet 2" M
6 Outlet safety valve 1" M
7 Lifting points
8 Vibration dumpers

LEGEND
1 Water inlet Victaulic 4"
2 Water outlet, evaporator only Victaulic 4"
3 Water outlet pump and/or tank Victaulic 4"
4 Heat exchanger inlet 2" M

» VLS C Frame 2 double circuit

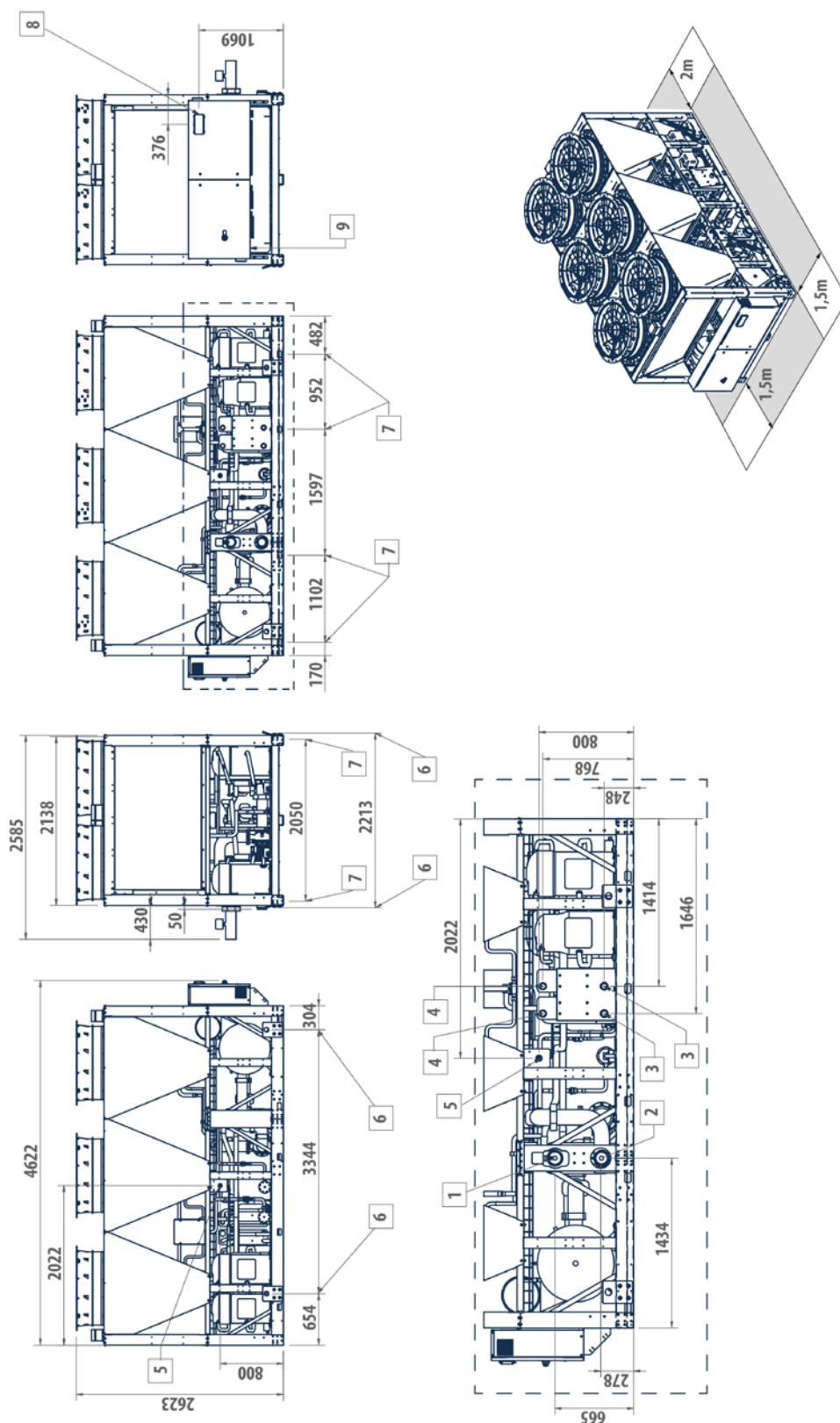


- LEGEND**
- 1 Water inlet Victaulic 4"
 - 2 Water outlet, evaporator only Victaulic 4"
 - 3 Water outlet pump and/or tank Victaulic 4"
 - 4 Heat exchanger inlet 2" M
 - 5 Heat exchanger outlet 2" M
 - 6 Outlet safety valve 1" M
 - 7 Lifting points
 - 8 Vibration dumpers
 - 9 User interface
 - 10 Power supply input

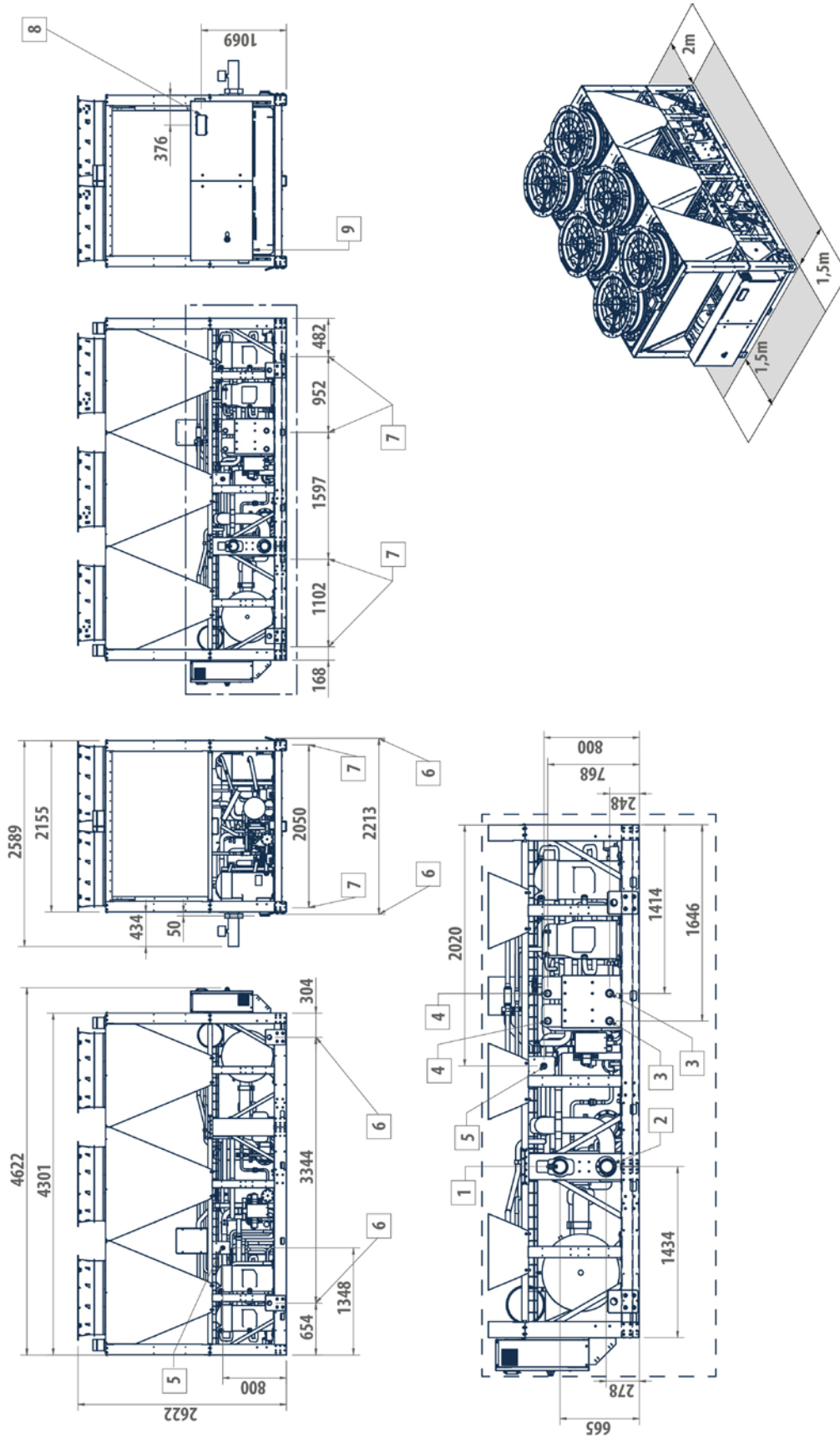


- LEGEND**
- 1 Water inlet Victaulic 4"
 - 2 Water outlet, evaporator only Victaulic 4"
 - 3 Water outlet pump and/or tank Victaulic 4"
 - 4 Heat exchanger inlet 2" M
 - 5 Heat exchanger outlet 2" M
 - 6 Outlet safety valve 1" M
 - 7 Lifting points
 - 8 Vibration dumpers
 - 9 User interface
 - 10 Power supply input

» VLS C Frame 3



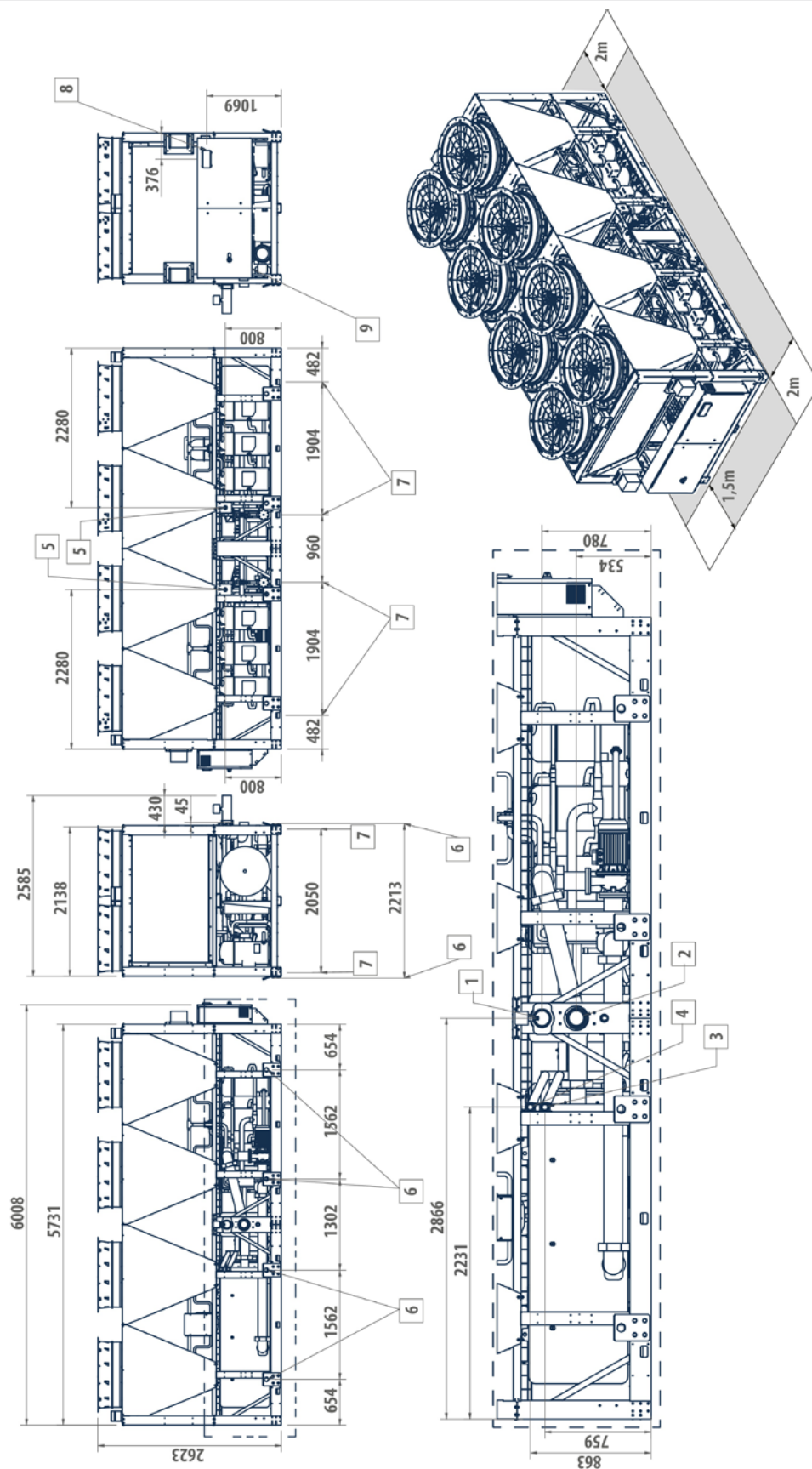
- LEGEND**
- 1 Water inlet Victaulic 4"
 - 2 Water outlet Victaulic 4"
 - 3 Heat exchanger inlet 2" M
 - 4 Heat exchanger outlet 2" M
 - 5 Outlet safety valve 1" M
 - 6 Lifting points
 - 7 Vibration dampers
 - 8 User interface
 - 9 Power supply input



LEGEND

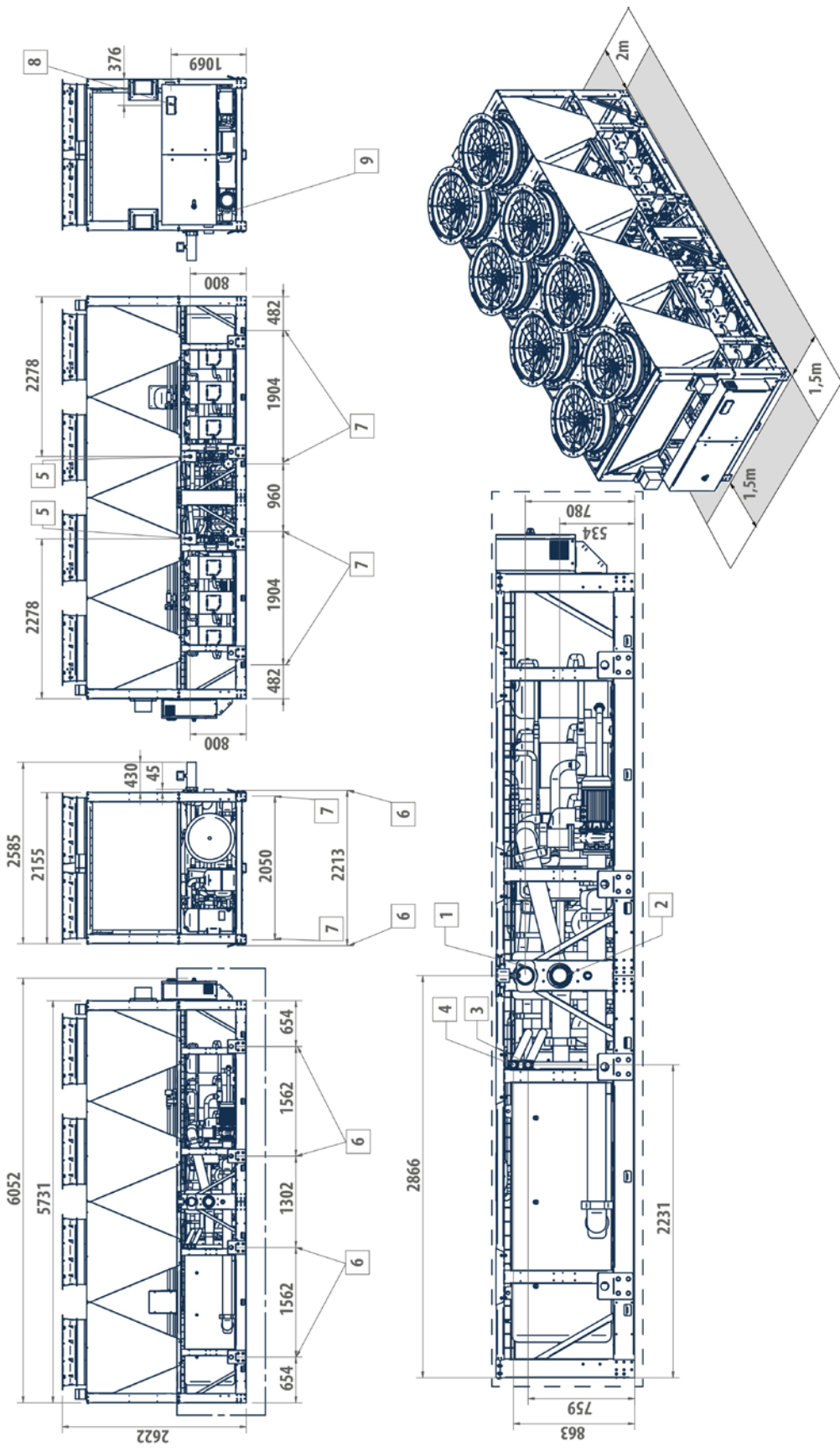
- 1 Water inlet Victaulic 4"
- 2 Water outlet Victaulic 4"
- 3 Heat exchanger inlet 2" M
- 4 Heat exchanger outlet 2" M
- 5 Outlet safety valve 1" M
- 6 Lifting points
- 7 Vibration dumpers
- 8 User interface
- 9 Power supply input

» VLS C Frame 4



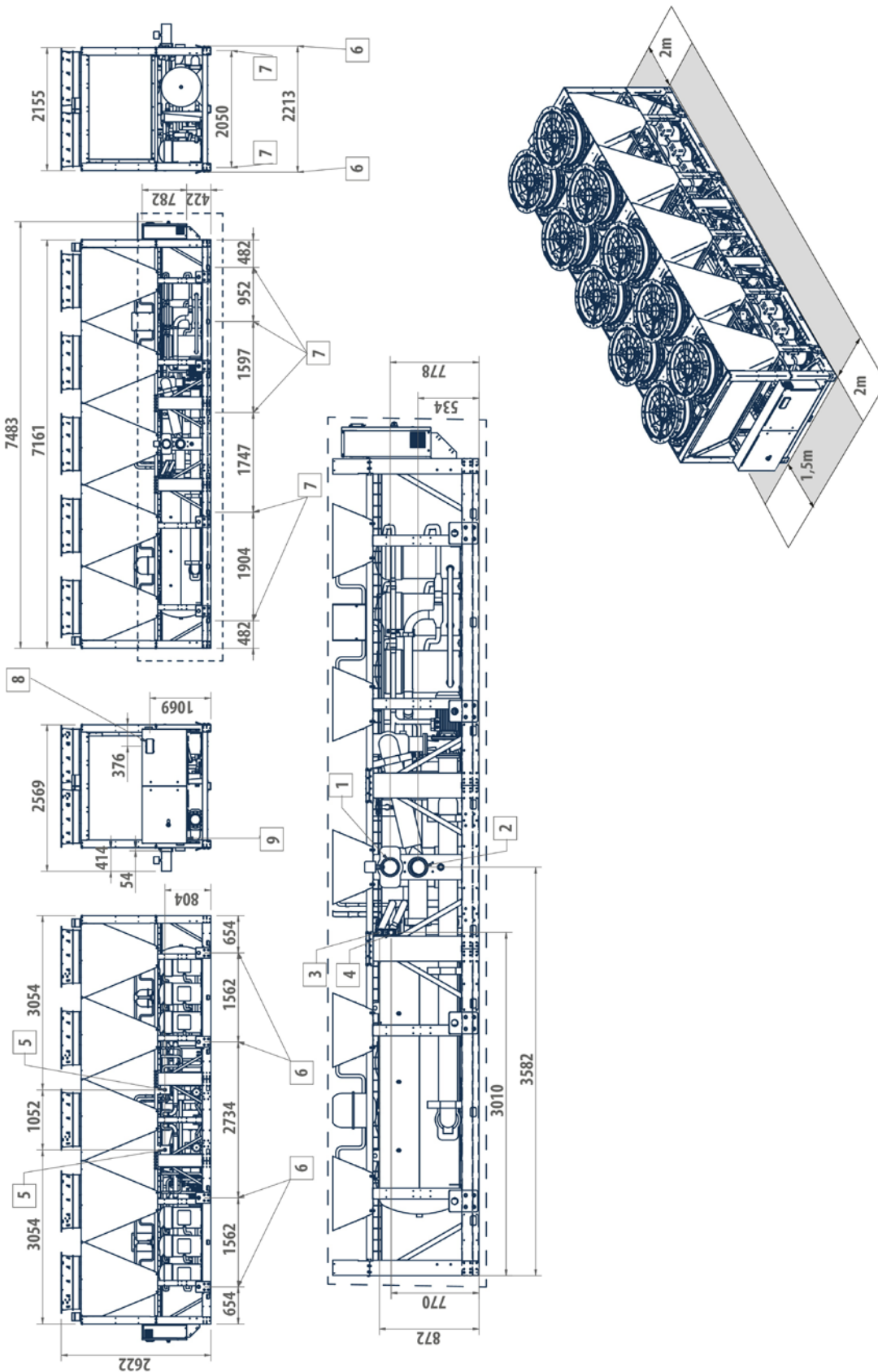
- LEGEND**
- 1 Water inlet Victaulic 4"
 - 2 Water outlet Victaulic 4"
 - 3 Heat exchanger inlet 2" M
 - 4 Heat exchanger outlet 2" M
 - 5 Outlet safety valve 1" M
 - 6 Lifting points
 - 7 Vibration dampers
 - 8 User interface
 - 9 Power supply input

» VLS H Frame 4



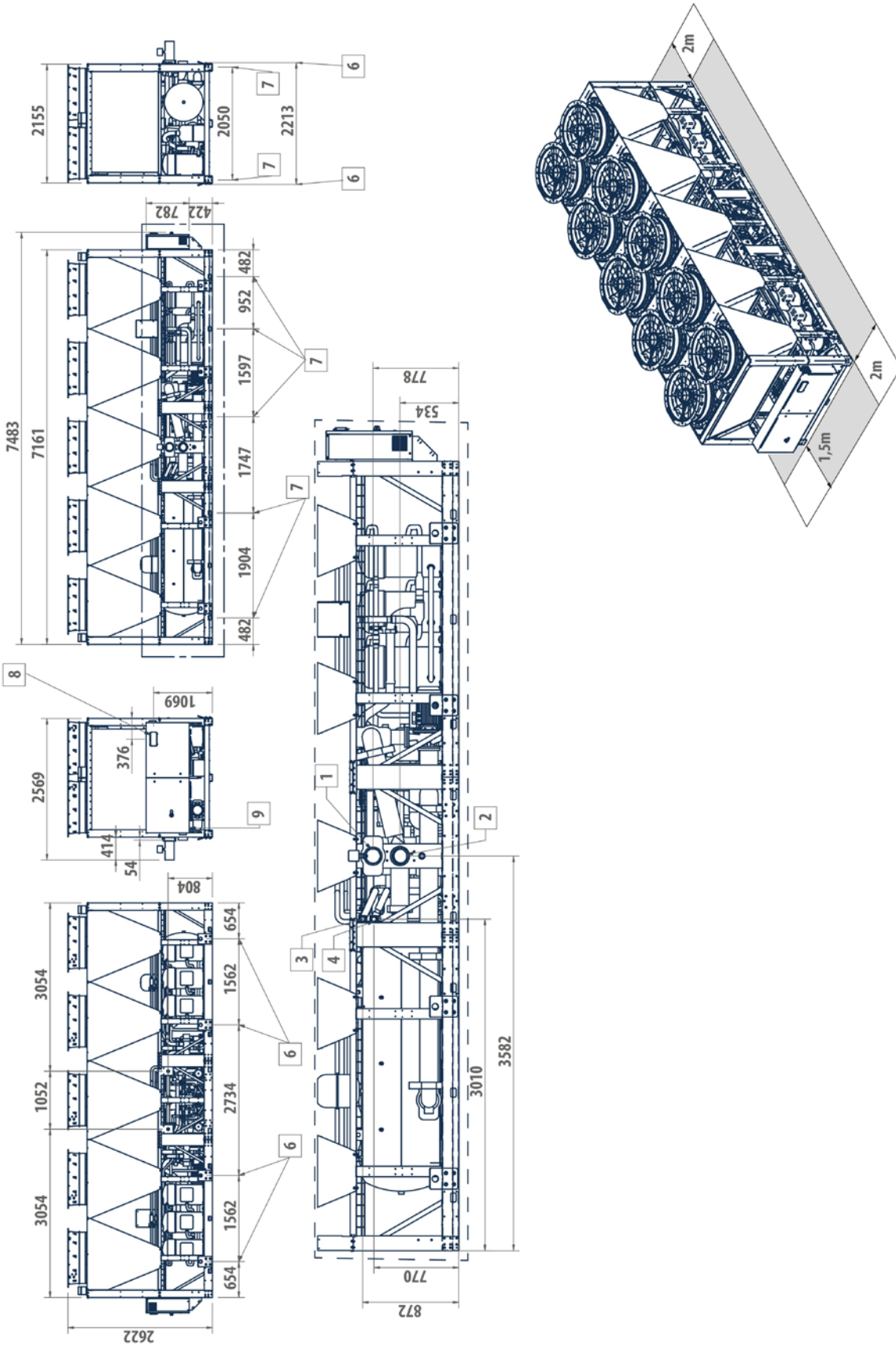
- LEGEND**
- 1 Water inlet Victaulic 4"
 - 2 Water outlet Victaulic 4"
 - 3 Heat exchanger inlet 2" M
 - 4 Heat exchanger outlet 2" M
 - 5 Outlet safety valve 1" M
 - 6 Lifting points
 - 7 Vibration dampers
 - 8 User interface
 - 9 Power supply input

» VLS C Frame 5



LEGEND

- 1 Water inlet Victaulic 5"
- 2 Water outlet Victaulic 5"
- 3 Heat exchanger inlet 2" M
- 4 Heat exchanger outlet 2" M
- 5 Outlet safety valve 1" M
- 6 Lifting points
- 7 Vibration dampers
- 8 User interface
- 9 Power supply input



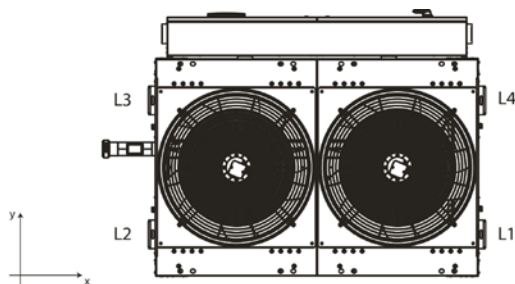
LEGEND

- 1 Water inlet Victaulic 5"
- 2 Water outlet Victaulic 5"
- 3 Heat exchanger inlet 2" M
- 4 Heat exchanger outlet 2" M
- 5 Outlet safety valve 1" M
- 6 Lifting points
- 7 Vibration dampers
- 8 User interface
- 9 Power supply input

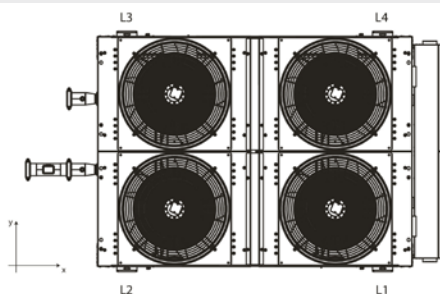
14 WEIGHTS

This drawing shows the points of the machine for which weights have been calculated, with respect to the basic chiller and heat pump model. The weights are shown in the tables below.

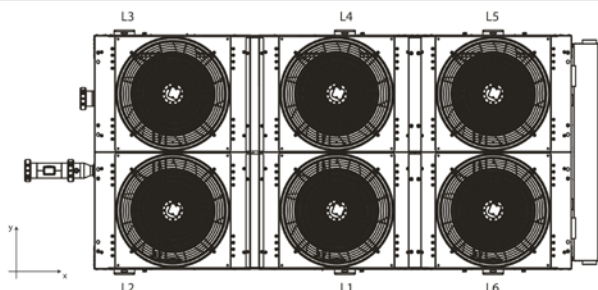
» VLS frame 1



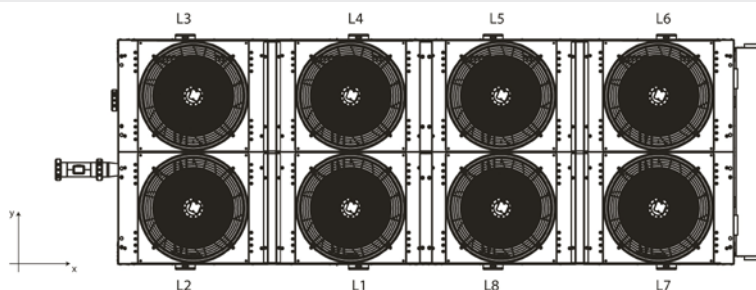
» VLS frame 2



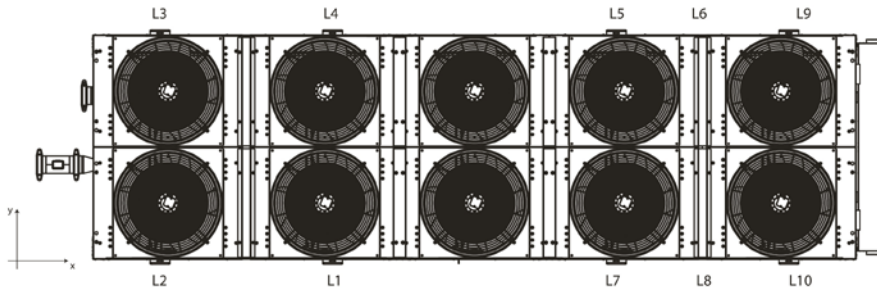
» VLS frame 3



» VLS frame 4



» VLS frame 5



» Lifting center of gravity for transporting unit C version without hydraulic options

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
Xb	mm	893	1497	1496	1447	1445	1432	1432	2128	2126	3000	3018	3914	3885
Yb	mm	684	865	811	1077	1077	1077	1077	1000	1002	1182	1212	1352	1361

» Lifting center of gravity for transporting unit H version without hydraulic options

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
Xb	mm	923	1484	1484	1446	1445	1435	1435	2156	2153	2985	3003	3888	3863
Yb	mm	688	907	858	1075	1075	1075	1075	1000	1001	1196	1221	1341	1348

» Lifting center of gravity for transporting unit C version with pump and full tank

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
Yb	mm	709	882	830	1080	1080	1079	1079	1051	1053	1126	1158	1282	1290
Xb	mm	946	1474	1475	1429	1428	1417	1417	2110	2107	2992	3011	3854	3827

» Lifting center of gravity for transporting unit H version with pump and full tank

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
Xb	mm	969	1466	1467	1432	1430	1420	1420	2137	2137	2979	2997	3836	3813
Yb	mm	710	919	872	1139	1078	1077	1077	1045	1047	1144	1172	1279	1287

Important note: the weights of the hydronic modules must be added to the standard weights of the respective basic model (cooling only and heat pump).

All weights stated below include the refrigerant charge as well as the water contained in the circuit (very important when assessing the most suitable bearing surface for the unit especially

in the presence of a tank).

To get an approximate estimate of the unit's weight when empty, subtract the weight (in kg) of the water contained in the tank (see table).

In other cases the water content is negligible for these purposes.

» Operating weight C version without hydraulic options

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
L1	kg	375	541	607	458	454	494	497	454	454	329	329	332	332
L2	kg	242	519	585	439	436	495	498	383	383	254	255	256	257
L3	kg	259	347	347	457	454	515	518	345	348	449	516	518	544
L4	kg	172	338	338	444	440	478	481	353	356	539	605	611	636
L5	kg	-	-	-	-	-	-	-	263	263	351	351	358	358
L6	kg	-	-	-	-	-	-	-	195	195	449	516	543	544
L7	kg	-	-	-	-	-	-	-	323	323	374	374	332	332
L8	kg	-	-	-	-	-	-	-	241	241	487	554	256	257
L9	kg	-	-	-	-	-	-	-	-	-	-	-	580	581
L10	kg	-	-	-	-	-	-	-	-	-	-	-	302	303
Total	kg	1047	1744	1876	1797	1783	1982	1994	2557	2563	3233	3499	4090	4144

» Operating weight H version without hydraulic options


VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
L1	kg	397	641	707	516	511	555	559	508	508	366	366	377	378
L2	kg	265	557	623	476	474	533	536	413	413	292	292	302	302
L3	kg	290	467	467	582	508	572	576	376	379	497	563	583	609
L4	kg	203	376	376	553	477	516	519	400	403	611	677	697	722
L5	kg	-	-	-	-	-	-	-	298	298	424	424	433	434
L6	kg	-	-	-	-	-	-	-	226	226	497	563	598	599
L7	kg	-	-	-	-	-	-	-	378	378	412	412	377	378
L8	kg	-	-	-	-	-	-	-	271	271	525	591	302	302
Total	kg	1155	2040	2172	2126	1969	2174	2188	2869	2876	3623	3889	4641	4697

» Operating weight C version with pump and full buffer tank

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
L1	kg	375	699	765	616	612	653	656	454	454	650	651	716	716
L2	kg	287	677	744	597	595	654	657	383	383	576	576	640	641
L3	kg	552	458	458	568	566	627	631	472	475	530	596	614	640
L4	kg	465	409	409	515	511	549	553	353	356	619	685	707	732
L5	kg	-	-	-	-	-	-	-	563	563	351	351	358	358
L6	kg	-	-	-	-	-	-	-	496	496	449	516	543	544
L7	kg	-	-	-	-	-	-	-	624	624	428	428	398	398
L8	kg	-	-	-	-	-	-	-	541	541	541	607	322	323
L9	kg	-	-	-	-	-	-	-	-	-	-	-	580	581
L10	kg	-	-	-	-	-	-	-	-	-	-	-	302	303
Total	kg	1678	2243	2376	2296	2284	2485	2497	3885	3892	4144	4410	5182	5236

» Operating weight H version with pump and full buffer tank

VLS		162	202	234	243	254	274	314	344	374	414	456	546	576
L1	kg	397	807	873	681	677	721	725	508	508	688	688	761	762
L2	kg	310	722	789	642	640	699	702	413	413	613	614	686	686
L3	kg	583	586	586	700	627	691	695	503	506	577	644	679	705
L4	kg	496	453	454	631	555	594	597	400	403	692	758	793	818
L5	kg	-	-	-	-	-	-	-	598	599	424	424	433	434
L6	kg	-	-	-	-	-	-	-	526	526	497	563	598	599
L7	kg	-	-	-	-	-	-	-	678	678	465	465	443	444
L8	kg	-	-	-	-	-	-	-	571	571	578	645	368	368
L9	kg	-	-	-	-	-	-	-	-	-	-	-	626	627
L10	kg	-	-	-	-	-	-	-	-	-	-	-	347	348
Total	kg	1786	2569	2702	2655	2499	2705	2720	4198	4204	4534	4800	5733	5789

 **WARNING:** for weight distribution of piping shell and tube heat exchanger, contact the company.

15 ELECTRICAL DATA

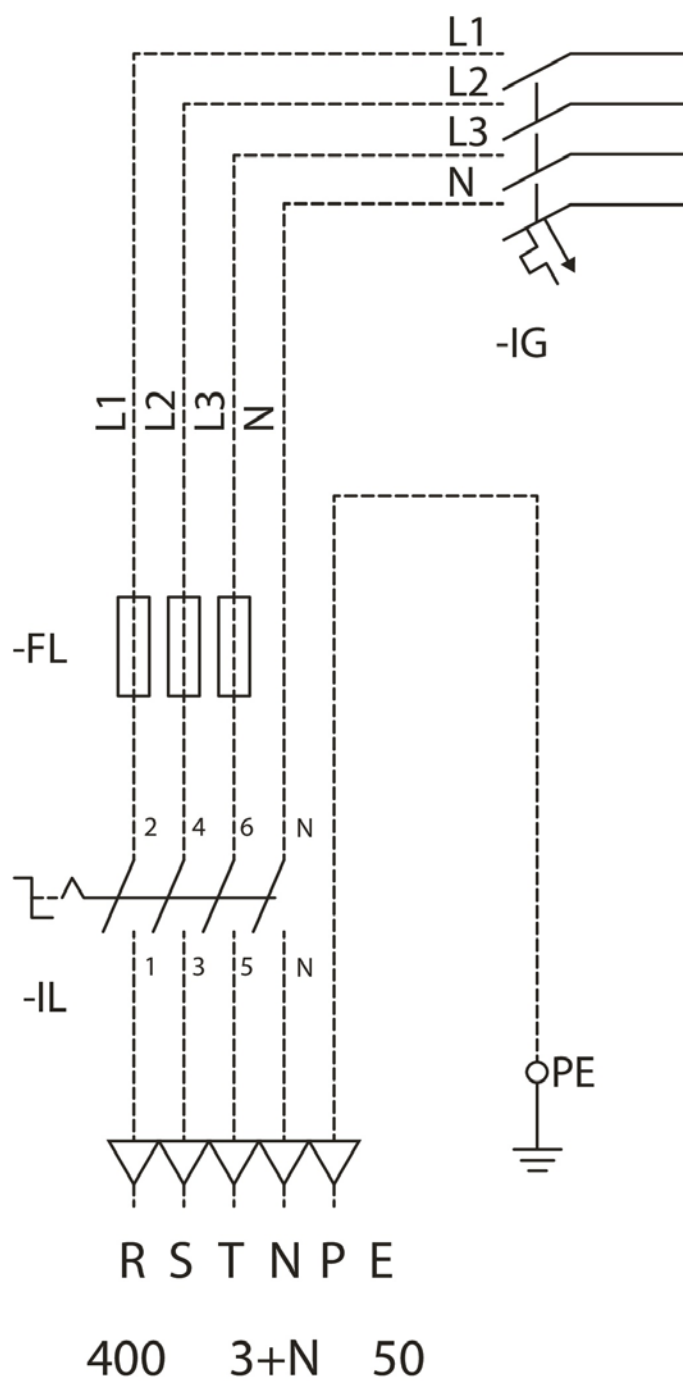
» Electrical data VLS

VLS			162	202	234	243	254	274	314	344	374	414	456	546	576
Maximum current absorption		A	123	156	176	181	192	214	244	263	278	312	362	415	460
Maximum power input		kW	86,4	109	122	124	132	147	169	182	193	215	245	284	316
Pump motor rated current - LP pumps		A	3,30	6,40	6,40	6,40	6,40	6,40	6,40	8,70	8,70	10,6	10,6	13,6	13,6
Pump motor rated current - HP pumps		A	6,40	8,70	8,70	8,70	8,70	10,6	10,6	13,6	13,6	13,6	13,6	17,2	17,2
Start up current		A	387	422	396	439	404	476	512	537	550	585	624	642	734
Startup current with soft starter		A	301	335	331	359	339	393	425	447	462	496	544	548	648
Power supply		V-ph-Hz	400-3N-50												
Auxiliary power supply		V-ph-Hz	230 - 1 - 50												
External power supply sensor			24VAC												
Cross-section area of power cables	(1)	mm ²	35,0	50,0	70,0	70,0	70,0	70,0	95,0	95,0	95,0	120	120	120	120
Safety fuse F		A	160	200	250	250	250	250	315	315	355	355	400	500	500
Circuit breaker IL		A	160	200	250	250	250	250	315	315	400	400	630	630	630

(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

- The maximum input power is the mains power that must be available in order for the unit to work.
- The maximum current absorption refers to the current that will trigger the internal safety devices of the unit. It is the maximum current allowed in the unit. This value may never be exceeded; it must be used as a reference for determining the size of the power supply line and the related safety devices (refer to the wiring diagram supplied with the units).

» Main electrical connection of units





Galletti S.p.A Organization has a Management System Certified by Kiwa Cermet Italia S.p.A, according to the UNI EN ISO 9001:2015, UNI EN ISO 14001:2015 and UNI ISO 45001:2018 standards.

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