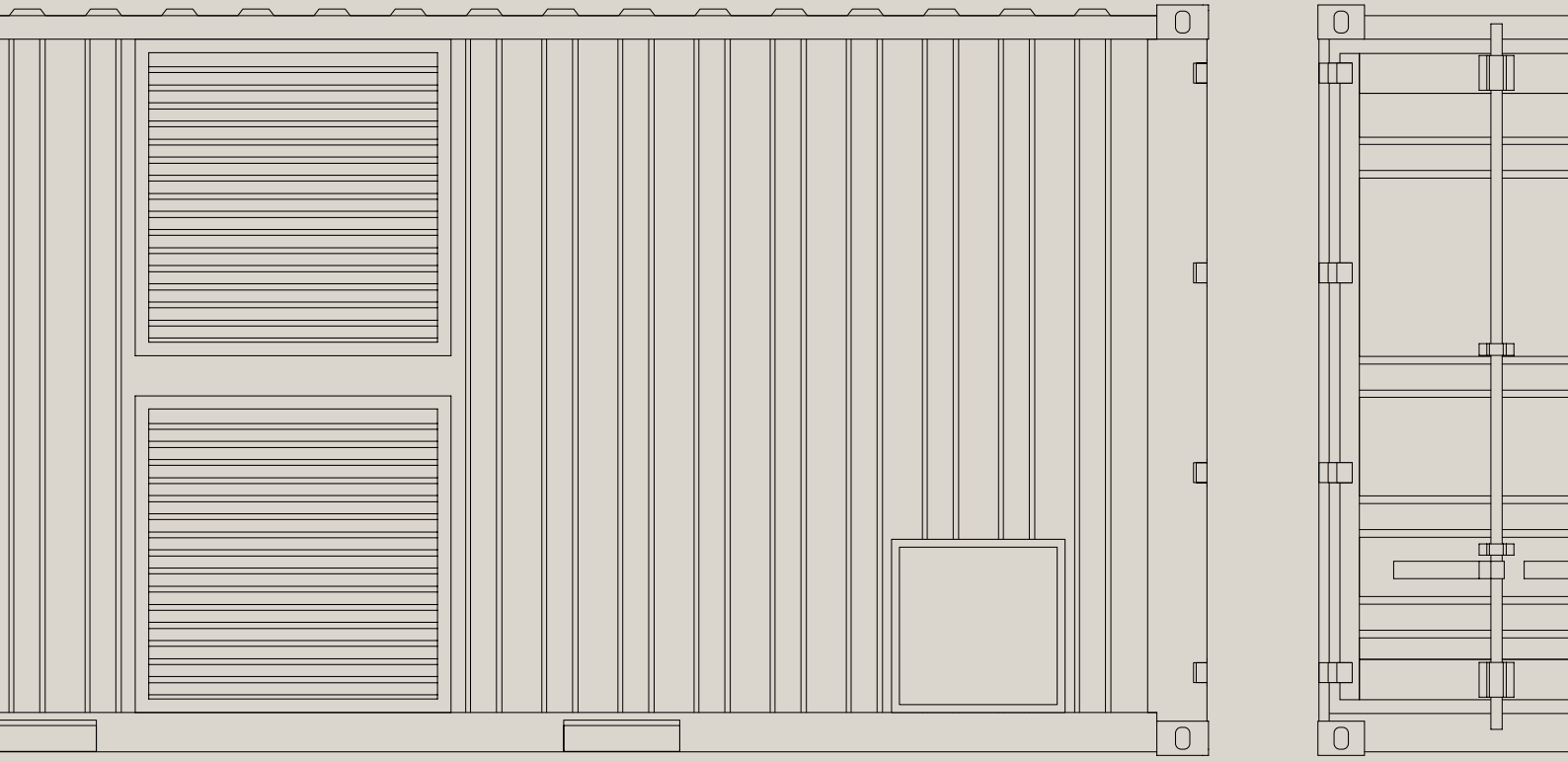
Annex **03-H/C**

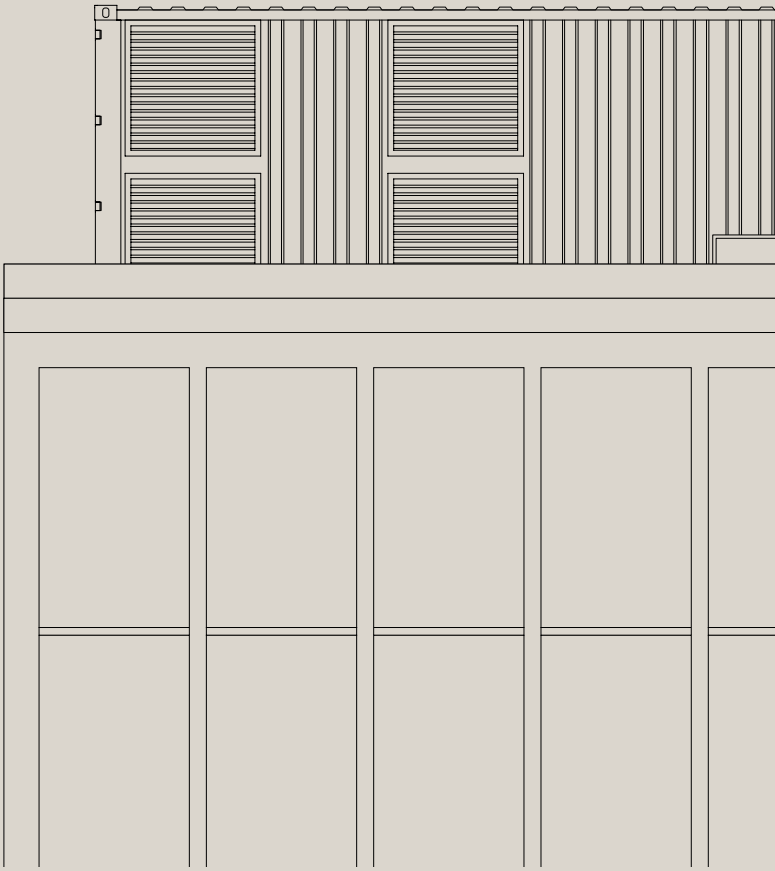
Sustainable air sourced heat pump with **PSHI**™

Here is the world's most energy-efficient
air sourced heat pump, delivered in a sustainable
"plug & play" container solution.



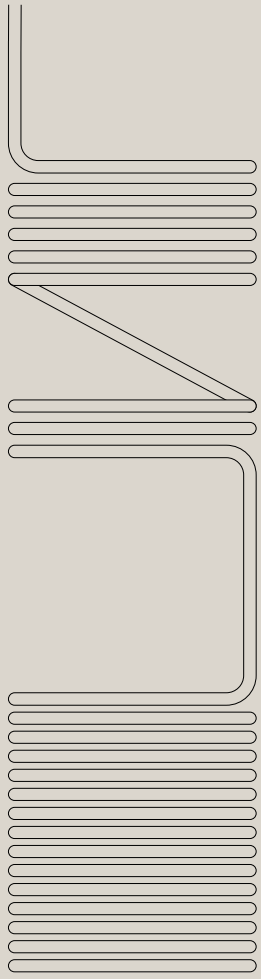
Neotemp°

Traditional technical room moved **outdoors**



By moving the technical room outdoors, preferably on the roof where possible, it offers several advantages:

+ Increased flexibility in choosing more efficient and environmentally friendly refrigerant as an energy carrier.
+ Possibility to easily connect future one's external energy sources, such as solar and wind energy.
+ Containers can be easily soundproofed in accordance with Norwegian Standard NS8175, to less than 35 dB (A)



PSHI™ - performance and efficiency

With PSHI™, Annex 03 provides at least 35% better energy efficiency than other air to water heat pump solutions. As the plate heat exchanger and the flow switch are completely eliminated, our solution provides better reliability and simplified service and maintenance. The system solution uses a liquid-filled evaporator in cooling mode, compared to traditional cooling systems this results in a 23% reduction in power consumption and 28% better cooling capacity. Correct dimensioned, the system provides an annual heating factor (SCOP) of approx. 5.0, and operating costs can be reduced by up to 80%.

Systemtank and PSHI™ heat exchanger coil in 316L stainless steel, internal and external pickling. 3 mm material thinkness secure high operation reliability and durability with an expected life cycle of +35 years. DHW heat exchanger in anti-limescale design.

In short - PSHI™ is a better solution to performance and the environment compared to other fossil mobile solutions on the market.

Turnkey and **“plug & play”**

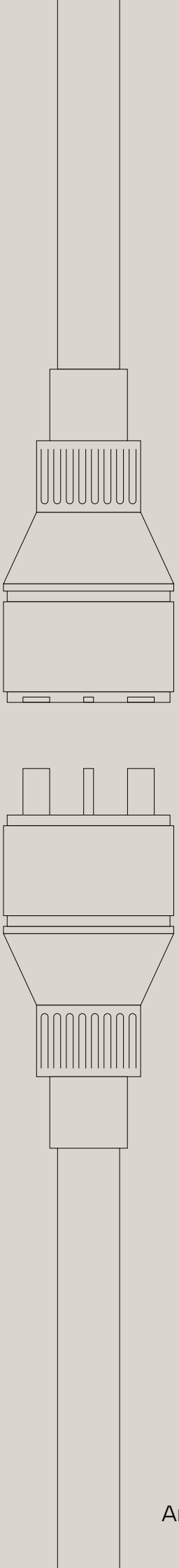
This turnkey standard 20-foot container is transported by truck, boat or train. The system is modular and can be easily adapted to any level of energy demand, with absolutely no upper limits. The container is pre-assembled, pre-testet and pre-configured with MOM documentation, ready for commissioning and regulation.
Simply plug & play.

New construction or rehabilitation

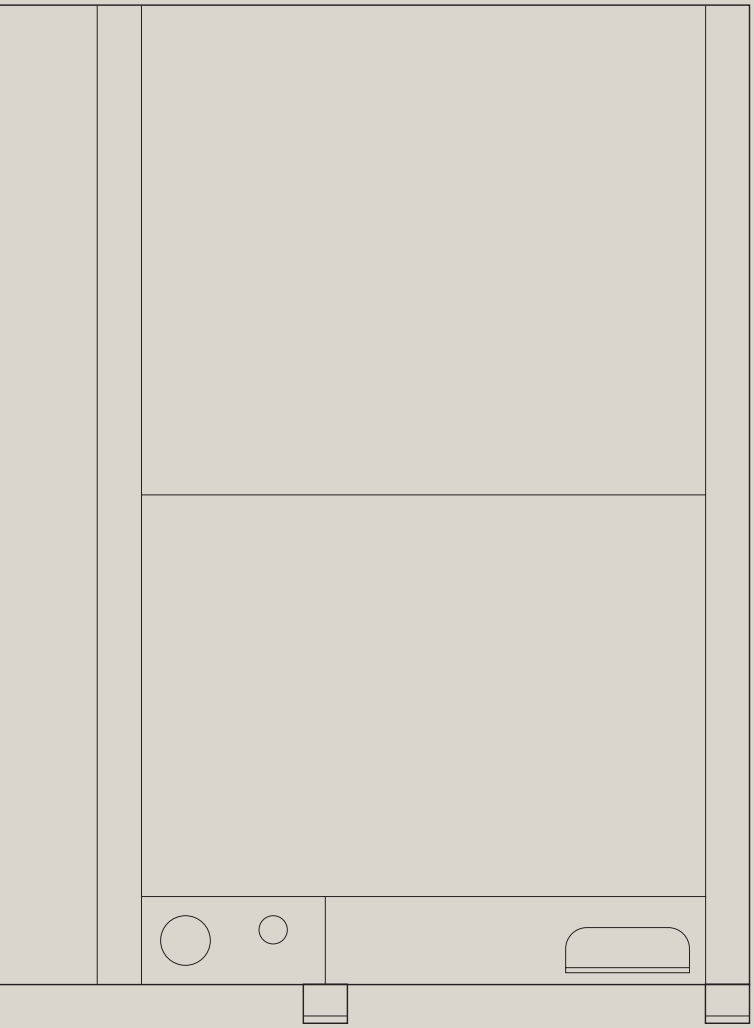
Containers can be placed on the roof or at ground level, and with less than 15m2, they are in most cases not subject to a building application. It can also have the same cladding as other building materials for a nice overall look. By placing the technical room outside the building, valuable space is freed up indoors, and it is a very profitable and quick implementation of energy saving measures. It is also a perfect temporary energy saving measure in cases where the building is planned to be demolished or re-regulated. In the case of new construction or rehabilitation, containers can advantageously be installed early in the project, as a great heating source during the building process.

Energy demand

The modular container solution delivered in the size 20 feet with up to 111 kW heating capacity and 84 kW cooling capacity. In a 40 feet container up to 222 kW heating capacity and 168 kW cooling capacity. The modules can be combined to cover any energy demand, completely without upper limitations. Various applications such as waterborne heating, cooling, domestic hot water and 3-pipe VRF systems, tailored to any individual project.



Panasonic
ECOi Extreme

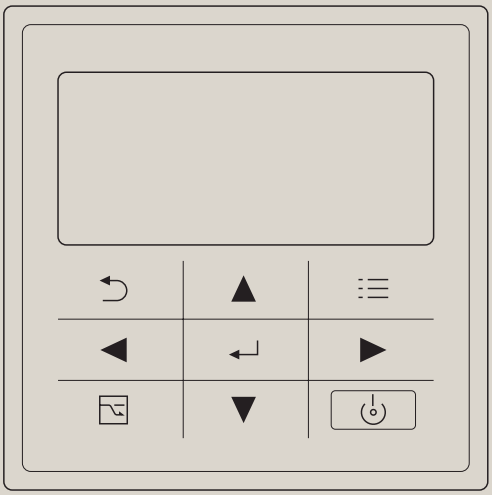


The ECOi Ex heat pump from Panasonic is developed for a very low energy consumption in combination with high energy efficiency and performance.

+ Each unit has two parallel-connected rotating inverter-controlled compressors, which give more precise and effective temperature control and high operational reliability.
+ With starting current of only 2 amps the dimensioning on the electrical system is easier, and hence it provides lower electricity peaks generating lower tariffs from the electricity provider/supplier.
+ Defrosting with minimum heat production loss (hot gas bypass) gives an unparalleled energy-efficient defrosting process.
+ Bluefin" vaporizer that improves efficiency, and silicon-coated circuit board that protects the device against moisture and dust.
+ High performance under extreme conditions. Heating operation from -35°C to 38°C and cooling operation from -10°C to +50°C.
+ Simple installation, service-friendly control and maintenance, and longer life cycle.

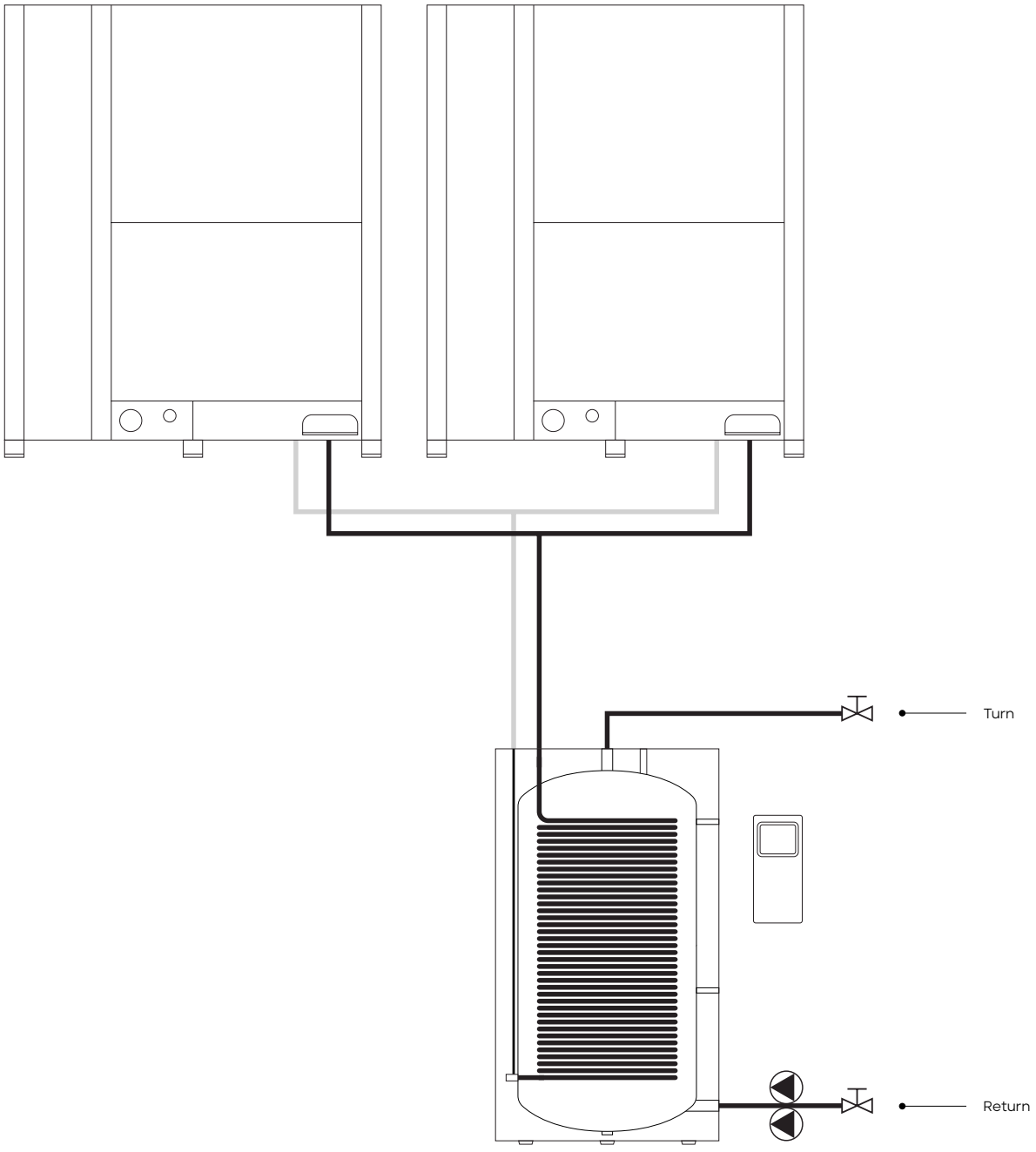
Full **control**

We offer many management options, from limited user management to a fully remote-controlled system via wireless applications. Touch panel, web server, monitoring of energy consumption, and tablets are some of many possibilities that exist.



System solution

– simple overview



Measurements and dimensional data

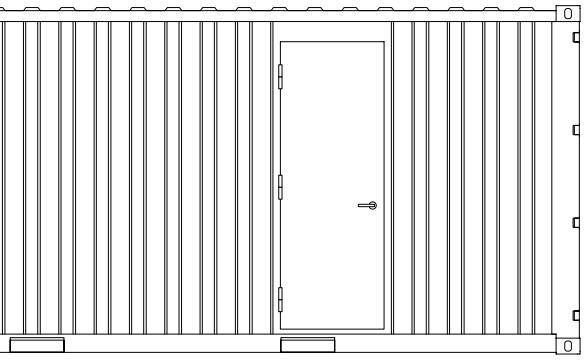
Dimensions:
6.06m x 2.44m x 2.59m (L x W x H)

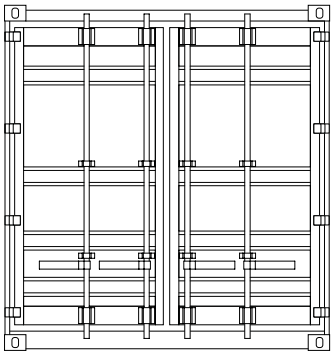
Weight:
3600 kg

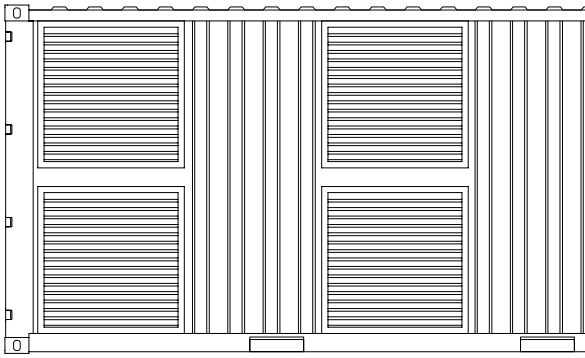
Power input:
400V 3N 54 amp

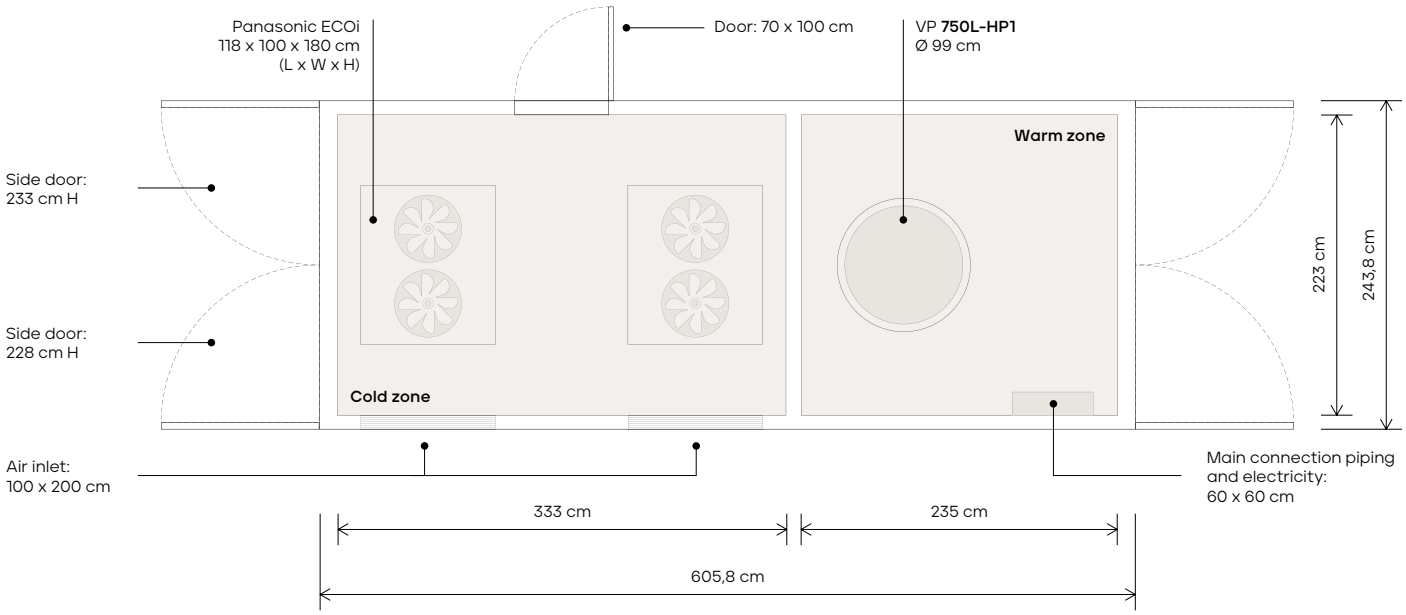
Starting current:
2 amp

Connection waterborne heating & cooling:
DN50 / Stainless Steel 316L









Specifications and performance data

Heating capacity: 111 kW
Cooling capacity: 84 kW

System/Energy tank model	**1 x Neotemp VP 750L-HP1**
Cooling capacity at 35°C, water outlet 7/12°C	84 kW
EER at 35°C, water outlet 7/12°C	4,32
Heating capacity at 7°C, water teperature at 25/35°C	111 kW
COP at 7°C, water temperature at 25/35°C	4,05
Heating capacity at 7°C, water temperature at 45/55°C	87,5 kW
COP at 7°C, water temperature at 45/55°C	3,56
Energy efficiency class at 47/55°C	A+++
ŋsh (LOT21)	156%
Dimension	1820 x 690 mm
Net Weight	198 kg
Water pipe connector	Rp 2" female thread
Heating water flow (XT=10K 45/55°C)	7,5 m3/h
Capasity electric heater	Not installed
Flow switch	Not installed
Water filter	Yes
Outdoor unit	**2 x U-16ME2E8**
Sound pressure	53 dB(A)
Dimension (HxWxD)	1842 x 1180 x 1000 mm
Net weight	2 x 315 kg
Connection liquid pipe	3/4" (18,88mm)
Connection gas pipe	1-3/8" (35,58mm)
Refridgerant	2 x 8,3 kg
Operation range outdoor temperature	minus 35°C to 38°C
Water outlet temperature range in cooling mode	5°C to 50°C
Water outlet temperature range in heating mode	10°C to 55°C
Maximum current	52 amp

Heating
Capacity Table

Energy/system tank: 1 x VP **750L-HP1**
Outdoor unit: 2 x U-16ME2E8

Ambient temperature	At 10K Water outlet	kW Heating capacity	kW Power input	COP kW/kW
+18°C	35°C	111,1	13,6	8,14
	45°C	95,1	11,8	8,03
	55°C	87,4	10,9	8,01
+15°C	35°C	111,1	15,6	7,12
	45°C	95,1	13,5	7,05
	55°C	87,4	12,3	7,08
+10°C	35°C	111,1	20,5	5,41
	45°C	95,1	19,5	4,88
	55°C	87,4	20,6	4,24
+7°C	35°C	111,1	25,1	4,43
	45°C	95,1	22,9	4,16
	55°C	87,4	22,2	3,94
+5°C	35°C	111,1	26,2	4,24
	45°C	95,1	23,8	3,99
	55°C	87,4	23,1	3,79
+2°C	35°C	106,1	27,5	3,85
	45°C	94,2	27,0	3,49
	55°C	87,4	25,8	3,39
0°C	35°C	100,0	27,0	3,70
	45°C	88,6	25,9	3,42
	55°C	82,6	25,6	3,23
-5°C	35°C	86,3	25,1	3,44
	45°C	76,5	24,4	3,14
	55°C	71,4	24,2	2,95
-10°C	35°C	74,2	23,2	3,19
	45°C	65,7	22,8	2,89
	55°C	61,2	22,7	2,69
-15°C	35°C	63,7	21,8	2,93
	45°C	56,2	21,5	2,62
	55°C	N/A	N/A	N/A
-20°C	35°C	55,0	20,8	2,65
	45°C	N/A	N/A	N/A
	55°C	N/A	N/A	N/A
-25°C	35°C	47,0	20,1	2,34
	45°C	N/A	N/A	N/A
	55°C	N/A	N/A	N/A

Cooling
Capacity Table

Energy/system tank: 1 x VP **750L-HP1**
Outdoor unit: 2 x U-16ME2E8

Ambient temperature	At 5K Water outlet	kW Cooling capacity	kW Power input	EER kW/kW
+40	5°C	66,6	20,3	3,29
	7°C	76,4	23,9	3,20
	12°C	92,2	25,4	3,63
+35	5°C	73,2	17,2	4,26
	7°C	83,6	21,0	3,98
	12°C	101,3	22,3	4,54
+30	5°C	78,4	14,6	5,38
	7°C	89,8	18,3	4,92
	12°C	103,1	20,1	5,13
+25	5°C	81,9	12,0	6,84
	7°C	93,9	14,8	6,33
	12°C	104,0	15,8	6,58
+20	5°C	86,3	11,4	7,54
	7°C	98,9	14,1	7,03
	12°C	105,8	15,2	6,95
+15	5°C	79,4	11,2	7,08
	7°C	90,9	13,8	6,59
	12°C	105,3	15,2	6,92
+10	5°C	80,5	11,0	7,34
	7°C	92,2	13,5	6,81
	12°C	104,9	14,3	7,33
+2	5°C	81,9	10,7	7,67
	7°C	93,0	13,3	7,02
	12°C	104,0	14,1	7,40
0	5°C	81,9	10,4	7,85
	7°C	93,9	13,0	7,21
	12°C	103,5	13,8	7,51
-7	5°C	74,6	9,9	7,52
	7°C	90,8	12,5	7,27
	12°C	103,3	13,5	7,63
-10	5°C	75,0	9,7	7,77
	7°C	85,9	12,2	7,01
	12°C	103,5	13,0	7,95

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