

Chillers and Inverter Air/Water heat pumps with axial fan

Technical Bulletin

Models

i-HPV5H 0140

i-HPV5H 0250

i-HPV5H 0260

i-HPV5H 0270



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1. DESCRIPTION OF UNIT AND TECHNICAL SPECIFICATIONS

The heat pumps in this series were designed for residential and commercial applications. They are extremely versatile and are designed for heat pump operation with hot water production for space heating and sanitary use at a temperature of 60°C. The use of the brushless inverter compressor technology, combined with the electronic expansion valve, the circulator and the variable speed fan, optimise the consumption and operating efficiency of the cooling components.

1.1 FRAMEWORK

Structure suitable for outdoor installation consisting of thick profiles made of hot galvanised sheet steel and painted with polyester powder, colour RAL 7035 textured, resistant to atmospheric agents (corrosivity classification C3 according to EN ISO 12944-2:2017). The removable panels allow maintenance inside the refrigeration and hydraulic circuits.

1.2 COMPRESSORS

The DC inverter compressors are hermetic scroll compressors specially designed for operation with R32, equipped with thermal protection and mounted on rubber vibration dampers; the moving coil is driven by a BLDC electric motor cooled by the sucked-in refrigerant. All compressors are equipped with an electric heater positioned on the compressor casing that automatically switches on when the machine is running and are complete with a polyvinyl ether (PVE) oil charge. In tandem connections there is an oil equalisation line with a solenoid valve controlled by the control that ensures balancing and lubrication.

1.3 USER SIDE HEAT EXCHANGER

Brazed plate heat exchanger made of AISI 304 stainless steel, covered with black flexible closed-cell elastomeric foam; thickness 9 mm, thermal conductivity (λ) ≤ 0.036 W/mK (at air +20°C). A flow switch installed on the water side ensures the presence of water flow and, together with the protection probe, prevents the formation of ice inside.

The exchanger can be equipped with an electric antifreeze heater (optional accessory KA1).

1.4 AIR SIDE HEAT EXCHANGER

The air exchangers are made of copper tubes and aluminium fins. The pipes are mechanically expanded in the aluminium fins to increase the heat exchange factor. The geometry of these exchangers allows a low value of pressure losses on the air side and therefore the possibility of using fans with a low number of revolutions (with a consequent reduction in machine noise). On request, the coils can have surface treatments to allow greater resistance to corrosion.

1.5 FAN

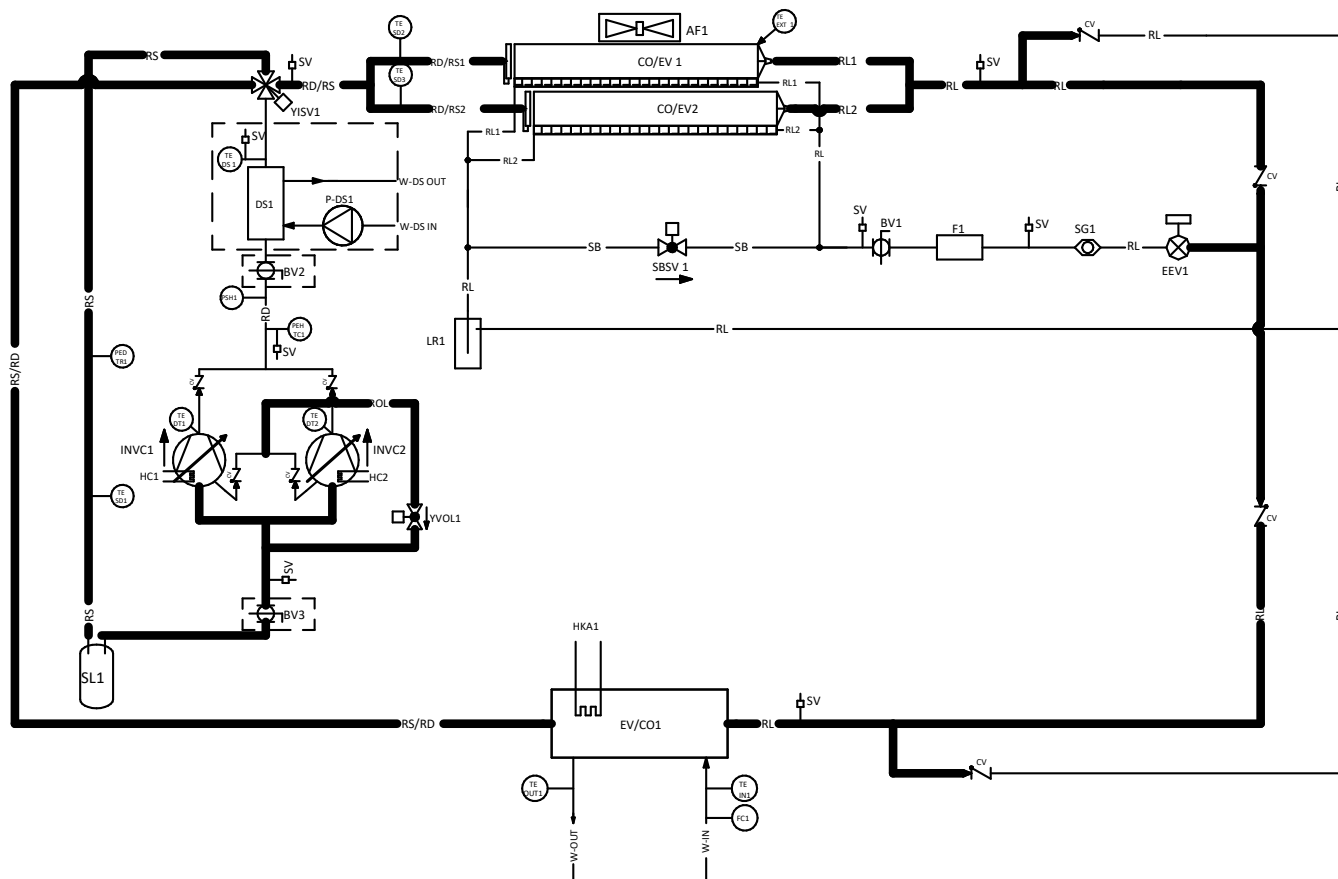
The fan is axial type with airfoil blades. It's statically and dynamically balanced and supplied complete with protection grille and air inlet and outlet with double flared profile, specially shaped to increase efficiency and reduce noise. The electric motor used is driven in modulation with brushless EC motor, directly coupled, and equipped with integrated thermal protection. The motor has an IP 54 protection rating according to CEI EN 60529.

1.6 COOLING CIRCUIT

The cooling circuit is made of copper piping, brazed and assembled in the factory in accordance with EN 13134. The components present are:

- Filter drier with 100% molecular sieve cartridge;
- Shut-off valve on the liquid line;
- Liquid flow and moisture indicator;
- Electronic expansive valve;
- Charge connections;
- High-pressure safety pressure switches;
- High and low pressure transducers;
- Reverse cycle valve;
- Receiver and liquid separator;
- Non-return valves.

Some pipes are thermally insulated with flexible, closed-cell elastomeric foam, refer to the refrigeration diagram to see which ones are insulated. Each unit is pressure tested to check for leaks and is supplied complete with a refrigerant charge optimised for operation.



Legend					
INVC	1 / 2	VARIABLE SPEED COMPRESSOR	YVOL	1	OIL LINE EQUALISATION SOLENOID
CO/EV	1 / 2	SOURCE-SIDE CONDENSER/EVAPORATOR	YISV	1	VALVE REVERSE CYCLE
EV/CO	1	USER-SIDE EVAPORATOR/CONDENSER	SBSV	1	BY-PASS LINE SOLENOID VALVE
LR	1	LIQUID RECEIVER	SG	1	LIQUID AND MOISTURE INDICATOR
SL	1	LIQUID SEPARATOR	CV		NON-RETURN VALVE
EEV	1	ELECTRONIC EXPANSION VALVE	PEH TC	1	HIGH PRESSURE TRANSDUCER
SV		CHARGING ATTACHMENT	PED TR	1	LOW PRESSURE TRANSDUCER
F	1	FILTER DRIER	PSH		HIGH-PRESSURE SWITCH
HC	1 / 2	CRANKCASE RESISTANCE	HKA	1	HEAT EXCHANGER ANTIFREEZE RESISTOR
AF	1	AXIAL FAN	TE SD	1 / 2 / 3	SUCTION TEMPERATURE PROBE
RD		DELIVERY LINE	TE DT	1 / 2	EXHAUST TEMPERATURE PROBE
RD/RS		SUPPLY/SUCTION LINE	TE DS	1	TEMPERATURE PROBE (DS)
RL		LIQUID LINE	TE EXT	1	OUTDOOR AIR PROBE
RS		SUCTION LINE	TE PD	1	DS WATER OUTLET TEMPERATURE PROBE
RS/RD		SUPPLY/DELIVERY LINE	W-DS IN		DESUPERHEATER WATER INLET
ROL		OIL EQUALISATION LINE	W-DS OUT		DESUPERHEATER WATER OUTLET
SB		BY-PASS LINE FOR SUBCOOLING	W-IN		USER RETURN
BV	1 / 2 / 3	BALL VALVE	W-OUT		USER SENDING
DS	1	DESUPERHEATER	P-DS	1	DESUPERHEATER CIRCUIT CIRCULATOR
---	ACCESSORY INSTALLED ON BOARD			INSULATED PIPES	

1.7 ELECTRICAL AND CONTROL PANEL

Completely manufactured and wired in accordance with IEC 60335-2-40.

The power section includes:

- Main switch with door lock;
- Isolation transformer for control power supply;
- Thermal protection fuses for compressor driver, EC fan and Inverter pump (where present);
- Automatic switch for compressor protection (optional);
- Driver for modulating compressor control;
- Phase sequence control relays;
- Phase sequence control relay with minimum/maximum voltage setting (optional);

- Thermostatically controlled ventilation inside the electrical panel;
- GI module - system management (optional or for versions that require it).

1.8 CONTROL SYSTEM

The control section includes:

- Interface terminal with alphanumeric display;
- Display function for set values, analogue inputs, fault codes, alarm history and parameter index;
- Key on/off and alarm reset;
- Key combinations to force defrost and force pump to maximum speed;
- Management of unit start-up from local or remote;
- ModBus connectivity (optional);
- BMS connectivity via converter (ModBus/Bacnet/Knx/Lonworks /Bacnet/Knx/Lonworks (optional)).

1.9 CONTROL AND PROTECTION DEVICES

All units are equipped as standard with the following control and protection devices: inlet water temperature probe installed on the water return pipe from the system, outlet water temperature probe that also functions as an anti-freeze probe installed on the water supply pipe to the system, high pressure transducer, low pressure transducer, compressor suction and discharge temperature probes, compressor thermal protection, fan thermal protection, flow switch on the water side to protect the evaporator, high pressure switch.

1.10 HYDRAULIC CIRCUIT

The units in the series are supplied with a built-in hydraulic circuit that includes: plate heat exchanger, protection flow switch, safety valve (6 bar) to be connected to a collection system and manual air vent valve. Further layouts for the hydronic circuit are available and described in the next chapter.

2. DESCRIPTION OF VERSIONS AND ACCESSORIES

2.1 VERSIONS

The versions available for reverse cycle heat pumps are:

- i-HPV5H - Reversible heat pump
- i-HPV5H-DS - Reversible heat pump with desuperheater. The unit with desuperheater includes the addition of a brazed plate type heat exchanger made of AISI 316 stainless steel, factory insulated using closed cell material. This version allows to recover about 20% of the condensing heat otherwise lost and to use it to feed the after-heating water coils of an AHU or for a hot water flywheel or for any other process use. This version is also equipped with an electronic circulator for the recuperator side. Check the useful head with your installation circuit.
- i-HPV5H-BT - Heat pump with cycle inversion for operation at low water temperatures. The BT version of the unit enables the operating range of the unit to be extended by cooling the water supplied to the consumer down to -8°C. In this case a mixture of water and glycol is used and the operating range is changed. Check the limits with your application.

Order code	0110321#	i-HPV5H
Configuration	09	Reversible heat pump
	55	BT version
Size	28	0140
	30	0250
	31	0260
	32	0270
Recuperator	0	-
	3	Desuperheater (DS)
-	0	-
Hydronic configuration	0	-
	5	Pump version (modulated with Inverter) (PSI)
	6	Pump version (on off) (PS)
	7	Double pump version (on off) (PD)
Specific sealing	8	Pump EC version (PSEC)
	0	-
Tank	2	Special seal for 25%<Gly<50% (TE2) *
	0	-
Antifreeze kit	2	Integrated technical storage (SI) **
	0	-
Management and connectivity module	5	Heat exchanger and pump resistance (if present) (KA1)
	6	Heat exchanger, pump and tank (KA2)
	0	-
Muffling	1	Expansion module (GI) ***
	2	Modbus connectivity (CM)
	3	Modbus connectivity (CM) and expansion module (GI) ***
Refrigerator accessories	0	-
	1	Silenced (SL)
	2	Super-silenced (SSL)
	4	Ductable (C)
Electrical accessories	0	-
	1	Compressors supply/suction ball valve (RFM)
Heat exchanger treatment	0	-
	2	Circuit breakers (IM)
Protection grids	0	-
	8	With Silverline treatment (TR2)
-	0	-
-	01	-

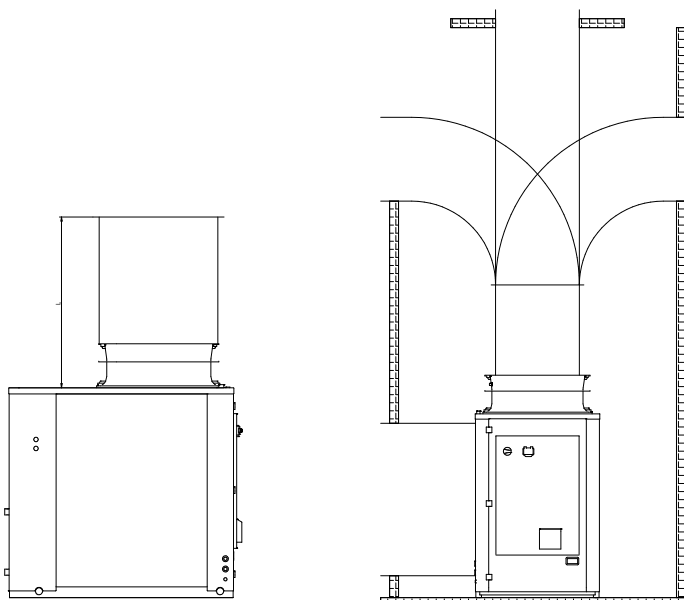
* Not valid option if the chosen hydronic configuration is PSEC

** Not valid option if no hydronic configuration is chosen (PS/PSI/PD/PSEC)

*** GI mandatory with desuperheater variant

2.2 ACOUSTIC CONFIGURATION

- It is possible to choose an acoustic configuration from the following:
- SL Silenced version. The silenced unit (with SL accessory) has an innovative thermo-acoustic insulation on the compressors. This insulation allows a noise reduction of up to 10% at certain compressor rotation frequencies.
- SSL Super-silenced version. The super-silenced unit (equipped with SSL accessory) includes, in addition to the thermo-acoustic cover on the compressors, a special fan with diffuser. This component increases the efficiency of the fan by reducing its speed, lowering the sound pressure and energy consumption. This saves substantial amounts of electricity for each fan.
- C Ductable version. With the ducted version the same diffuser used in the SSL version, is used to have a greater fan head allowing the ducting of the air expulsion. An example of a possible ducted installation is shown in the figure.



The following is a quantitative indication of the additional head obtainable with the ductable version compared to the standard version, with the same flow rate and absorbed power. Higher pressure drops do not ensure the declared performance. **In the ductable version, the declared acoustic data lose their meaning and are no longer reliable.**

Size	Useful head of the ductable version compared to the standard version	
	Pa	mmH2O
0140	40	4
0250	22	2
0260	24	2
0270	19	2

2.3 HYDRONIC KIT

It is possible to combine the heat pump with one of the following hydronic kits:

- -PS - Reversible heat pump with fixed speed pump.
- -PSI - Reversible heat pump with pump controlled by an external inverter installed in the electrical panel.
- -PSEC - Reversible heat pump with pump equipped with integrated frequency converter.
- -PD - Reversible heat pump with fixed speed pump and second standby pump.
- **-SI - Reversible heat pump with choice of hydronic kit (PS/PSI/PSEC/PD) and integrated tank. In this version the unit is extended to accommodate the storage tank and expansion vessel.

Hydronic kit characteristics		
Tank volume		400
Expansion vessel volume		24

2.4 LIST OF ACCESSORIES

Available accessories are indicated below:

Version Reversible heat pump				
Description	Accessory	Standard	Factory fitted	Supplied loose/activable after delivery
Contact for DHW management with 3-way diverter valve with consent for heating element of valve motor (for operation below 0°C)	•	•		
Remote on/off contact	•	•		
Summer/winter collection	•	•		
Dynamic set-point	•	•		
Liquid indicator	•	•		
Flow switch	•	•		
Water side safety valve	•	•		
Water side drain tap	•	•		
Enabling maximum Hz	•		•	•

Version Reversible heat pump				
Description	Accessory	Standard	Factory fitted	Supplied loose/activable after delivery
DSFR - Three-phase relays for maximum and minimum voltage monitoring + phase failure/sequence	•	•	•	
IM - Magnetothermic switches on compressors and fans	•		•	
KA1 - Antifreeze heater on: exchanger and pump (when present)	•		•	
KA2 - Antifreeze heater on: exchanger, pump and tank	•		•	
GI - Software expansion module integrating: Plant season signalling Compressor on/off signalling General alarm/machine block signalling Defrosting signalling Second set-point management	•		•	
CM - Ready for BMS connectivity via ModBus protocol	•		•	•
TR2 - Cu/Al battery with Silver Line treatment	•		•	
RFM - Compressor discharge and suction tap	•		•	
TE2 - Special mechanical seal for pumps with more than 25% and less than 50% glycol	•		•	
RP - Battery protection grid	•		•	•
SAS - Remote probe	•			•
Hi-TV415 - Remote display Touch screen	•			•
i-CR - Remote control	•			•
7touch - Display Touch screen	•			•
ISK - Serial converter USB RS485	•			•
Gateway Modbus RTU (RS485) to BACnet / Lonworks	•			•
Gateway Modbus RTU (RS485) to BACnet / Konnex	•			•
AG - Rubber vibration dampers	•			•
VDIS4 - Three-way diverter valve for DHW production	•			•
FY - Y-filter	•			•
Grooved connection joint	•			•

2.5 DESCRIPTION OF ACCESSORIES

2.5.1 Factory-fitted accessories

DSFR - Three-phase relays for maximum and minimum voltage monitoring + phase failure/sequence

Indicates the presence of all three phases in the correct sequence and if all three phase-to-phase voltages are within the set limits. The maximum and minimum voltage thresholds can be set separately.

IM - Magnetothermal switches on compressors and fans

Overcurrent circuit breakers applied to compressors and fans protect components from failures caused by current peaks.

KA1 - Antifreeze heater on: heat exchanger and pump

Electrical resistance located on the front face of the plate heat exchanger, which is activated when the temperature of the water inside the exchanger drops below +4°C. For BT units, this value must be set according to the percentage of glycol in the system and the freezing point of the fluid.

If the hydronic kit chosen includes a pump, this component will also be equipped with a resistor to protect it from freezing.

KA2 - Antifreeze heater on: heat exchanger, pump and tank

In addition to the above, the tank is also protected from ice by an electrical heating element.

GI - Software expansion module

By adding an expansion board, the resources available in the system are increased so that additional controls can be managed. These are:

- System season signalling: remote signalling of the operating mode (summer/winter).
- Compressor on/off signalling: remote signalling of compressor activation.
- General alarm/machine block signalling: remote signalling of a possible machine blockage.
- Defrost signal: remote signal of defrost in progress.
- Second set-point management: regulation allowing the set-point to be modified.

CM - Ready for BMS connectivity via ModBus protocol

Accessory allowing connection of the unit to external controllers via serial cable with RS-485 electrical standard and ModBus RTU protocol.

TR2 - Cu/Al battery with Silver line superficial treatment

Finned pack heat exchanger with copper tubes and aluminium fins, treated with a special polyurethane-based paint for corrosion protection. The treatment makes the coil flexible to resist thermal expansion and contraction, mechanically resistant, UV protected and dirt repellent. The

treatment guarantees protection of the batteries in practically all environmental conditions: from marine to rural environments, from industrial to urban areas.

For specific cleaning instructions for batteries treated in this way, please refer to the chapter in the user-installer manual entitled "Cleaning of finned batteries treated with the corrosion protection method".

The treatment resists 6000 h according to ASTM B117.

RFM - Compressor discharge and suction tap

Shut-off valve located on the compressor suction and discharge, allows for simplified maintenance by avoiding discharging refrigerant throughout the unit in the event of maintenance.

TE2 - Special mechanical seal for pumps with more than 25% and less than 50% glycol

For mixtures of water and glycol exceeding a weight percentage of 25% and up to 50%, a different mechanical seal is used to guarantee correct operation of the electropump. Below are the pairs of water temperature and glycol percentage values allowed with this accessory; for different limits, please contact the head office for an appropriate sizing with respect to the working point required.

This accessory is not necessary in the case of a pump with integrated frequency converter (PSEC) as the working percentages allowed by this option are the same as those shown below.

Water supply temperature	% glycol permitted with TE2
$-8^{\circ}\text{C} < T_w < 5^{\circ}\text{C}$	35% max.
$T_w > 5^{\circ}\text{C}$	50% max.

2.5.2 Accessories supplied separately

RP - Battery protection grid

Grids protecting the finned coils. The grids serve to protect the heat exchanger from accidental contact. They are especially recommended in places where people or animals could damage or be damaged by the finned exchanger.

SAS - Remote probe

NTC probe moulded with an IP67 thermoplastic rubber strip, 4m long, operating in the temperature range $-50^{\circ}\text{C} / + 120^{\circ}\text{C}$. The accessory is used to display the temperature inside a storage tank, this probe thermoregulates the unit only during the compressor start-up phase, the switch-off is managed by the probe on the return of the unit.

Hi-TV415 - Remote display Touch screen

Touch screen remote control for centralised management of a chiller/heat pump network, it integrates humidity and temperature sensors for thermo-hygrometric analysis of the environment and management of the double set point for underfloor radiant systems using a dehumidification system.

i-CR - Remote control

ModBus remote control with negative LCD and capacitive keys. The device is to be used as a remote machine keyboard with local temperature detection, replicating the functionality of the on-board control.

7touch - 7-Touch screen display

Is a compact system consisting of an ultra-thin touch panel, including a temperature control unit and gateway for remote control from a PC (via the "my.maxa.it" portal) or smartphone (via the app downloadable from the "My Maxa" online store). It allows winter and summer climate control.

ISK - Serial converter USB RS485

Interface device capable of reading and writing control registers via the RS485 standard and converting it to a USB port that can be connected to any supervisory system.

Gateway Modbus RTU (RS485) to BACnet / Lonworks

Device that enables conversion between Modbus RTU and BACnet/ Lonworks, allowing the unit control to be configured as a normal device in the BACnet / Lonworks network.

Gateway Modbus RTU (RS485) to BACnet / Konnex

Device that enables conversion between Modbus RTU and BACnet/ Konnex, allowing the unit control to be configured as a normal device in the BACnet/ Konnex network.

AG - Rubber antivibration

Are designed to prevent the transmission of vibrations to the structure; they are to be mounted under the unit in special holes. The optimum recommended load capacities are given, depending on the size of the machine, see section 3.1.5. The kit consists of 4 vibration dampers, screws and washers required for installation.

VDIS4 - Three-way diverter valve for DHW production

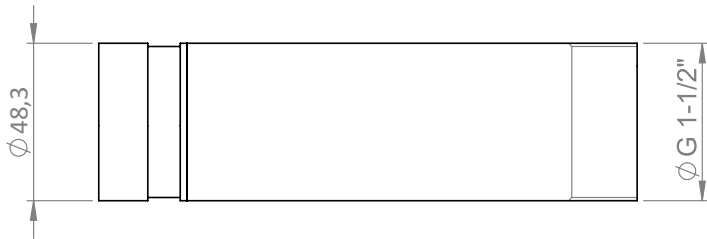
Valve that diverts the flow of water produced by the heat pump, between the system and a technical tank for the production of domestic hot water. Model with 3-way motorised ball DN (1"1/2) Kvs 28, complete with servocontrol, insulation shell and spacer to guarantee operation even with glycol water. The power cable from the servomotor is 1 metre long.

FY - Y-filter

It contains an AISI 304 stainless steel mesh sieve (500 µm filtration - PN20) that collects solids in the water. Filtration prevents clogging and/or damage to devices installed downstream of the filter. The kit consists of a 2" female threaded brass Y-filter, adapter piece between machine and grooved connector.

Grooved connection joint

In order to facilitate the installation of the system, a carbon steel piping stub is supplied with a grooved connection on one side, compatible with the one on the unit and equipped with a suitable hook for making the connection, and a G 1" 1/2 M threaded connection on the other. The kit consists of 2 nozzles and 2 grooved connections to connect the nozzles to the unit.

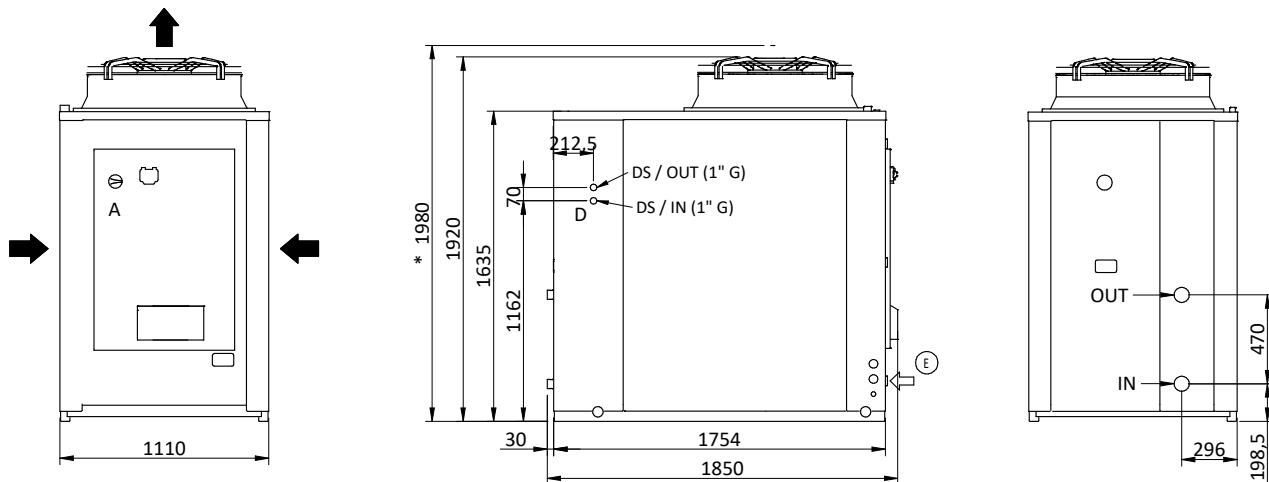


3. INSTALLATION

3.1 UNIT DIMENSIONS, HYDRAULIC CONNECTIONS, WEIGHTS AND CENTRE OF GRAVITY POSITION

3.1.1 Net dimensions and with packaging

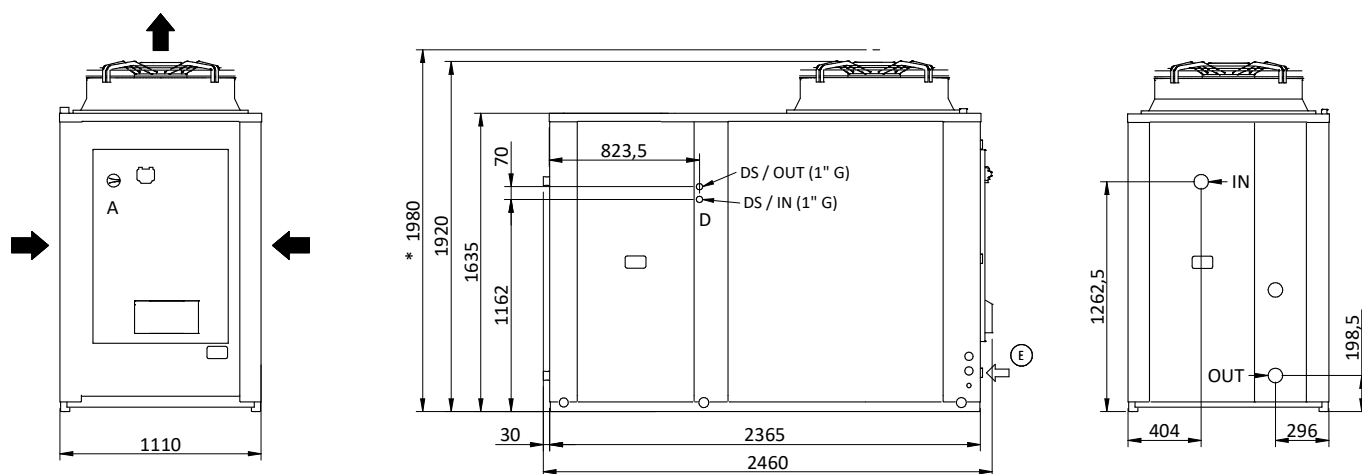
3.2.1.1 Standard version



Dimensions		
A - Length	mm	1850
B - Depth	mm	1110
C - Height	mm	1920
C - Height SL/C version	mm	1980
IN / OUT	inch	1" 1/2 Grooved
E	-	Power supply input
D IN/OUT	inch	Hydraulic connections for desuperheater kit 1" G

Dimensions with packaging		
A - Length	mm	1850
B - Depth	mm	1110
C - Height	mm	2015
C - Height SL/C version	mm	2075

3.2.2.2 Version with tank kit



Dimensions		
A - Length	mm	2460
B - Depth	mm	1110
C - Height	mm	1920

Dimensions		
C - Height SL/C version	mm	1980
IN / OUT	inch	1" 1/2 Grooved
E	-	Power supply input
D IN/OUT	inch	Hydraulic connections for desuperheater kit 1" G

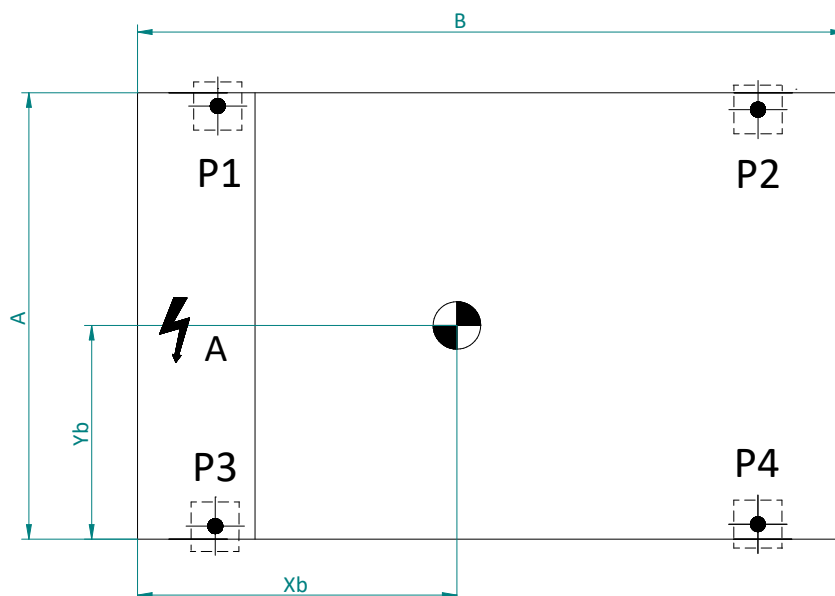
Dimensions with packaging		
A - Length	mm	2460
B - Depth	mm	1110
C - Height	mm	2015
C - Height SL/C version	mm	2075

3.1.2 Weights

Version	Models	i-HPV5H 0140	i-HPV5H 0250	i-HPV5H 0260	i-HPV5H 0270
Standard	Shipping weight [kg]	415	505	525	575
	Operating weight [kg]	410	500	520	570
With pump kit	Shipping weight [kg]	435	535	555	595
	Operating weight [kg]	440	540	560	600
With double pump kit	Shipping weight [kg]	465	565	585	625
	Operating weight [kg]	470	570	590	630
With pump and tank	Shipping weight [kg]	585	685	705	745
	Operating weight [kg]	990	1090	1110	1150
With double pump and tank	Shipping weight [kg]	615	715	735	775
	Operating weight [kg]	1000	1100	1120	1160

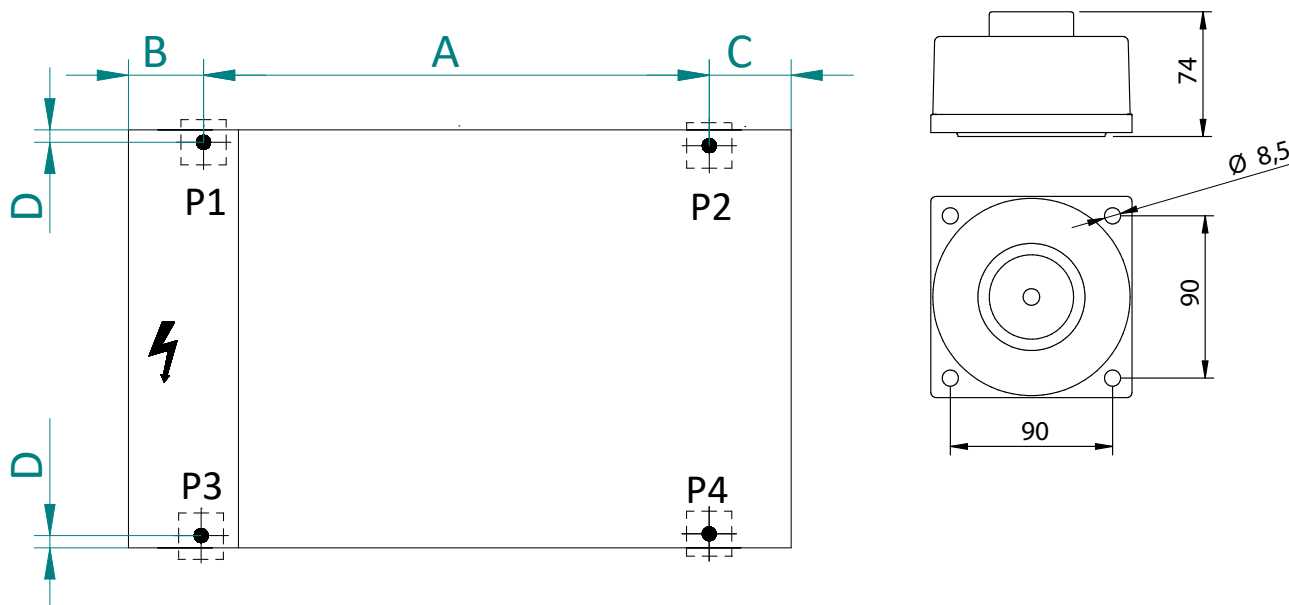
3.1.3 Location of the centre of gravity and vibrations dampers

The position of the centre of gravity of each machine is shown in the tables, with reference to the dimensions shown in the image. A distinction is made between a standard version and a machine with a tank (extended version).



Models	Version	A [mm]	B [mm]	Xb [mm]	Yb [mm]
i-HPV5H 0140	Standard	1110	1754	677	561
	With tank kit	1110	2365	1022	576
i-HPV5H 0250	Standard	1110	1754	652	517
	With tank kit	1110	2365	970	540
i-HPV5H 0260	Standard	1110	1754	665	520
	With tank kit	1110	2365	963	540
i-HPV5H 0270	Standard	1110	1754	683	511
	With tank kit	1110	2365	979	533

The positions envisaged for the installation of vibration dampers for each type of machine are shown in the images below.




Models	Version	A [mm]	B [mm]	C [mm]	D [mm]
i-HPV5H 0140 / 0250 0260 / 0270	Standard	1410	105	235	32
	Hydronic kit with tank	2180	105	80	32


3.2 TECHNICAL SERVICE AREAS


All models in the series are designed and constructed for outdoor installation.

It is good practice to create a support slab of adequate size for the unit. The units transmit a low level of vibration to the ground: it is nevertheless advisable to place anti-vibration mounts between the base frame and the support surface.

	Suspended installation is prohibited.
	The support surface must have a sufficient capacity to support the weight of the unit, which can be seen on the technical label affixed to the machine and in the specific chapter of this manual. The support surface must not be inclined to ensure correct operation of the unit and to prevent it from tipping over. The installation surface of the unit must not be smooth, to avoid the deposit of water/ice, potential sources of danger.

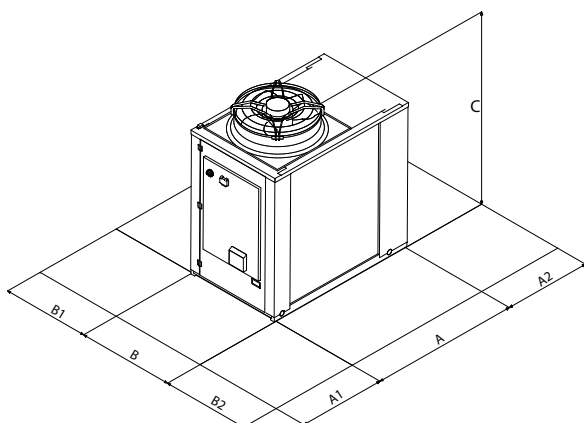
- 

The installation site of the unit must be free from foliage, dust, etc., which could block or cover the heat exchange coils. Installation should be avoided in areas subject to stagnant or falling water, for example from gutters. Also avoid locations subject to snow accumulation (such as corners of buildings with sloping roofs). When installing in areas subject to snowfall, mount the unit on a base 20 to 30 cm above the ground to prevent snow from accumulating around the unit.
- 


It is recommended to ensure sufficient air exchange to dilute the R32 gas in case of accidental leakage, thus avoiding the formation of explosive atmospheres. For this reason, a minimum distance of 1 metre must be maintained from openings or wells, where the gas could accumulate.
- 

Do not install the unit under any type of cover, such as roofs, canopies, install the unit under cover of anything type as roofs, shelters and similar.

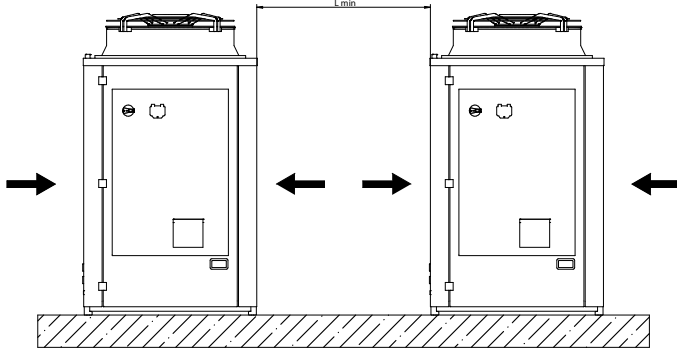
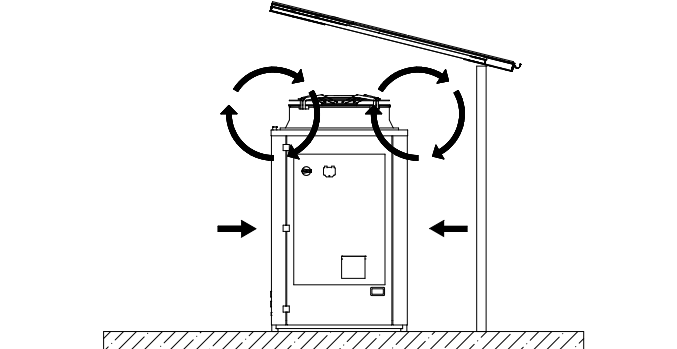
It is very important to avoid recirculation phenomena between suction and delivery, otherwise the performance of the unit will deteriorate or even interrupt normal operation. In this respect it is absolutely necessary to guarantee the minimum service spaces indicated below.



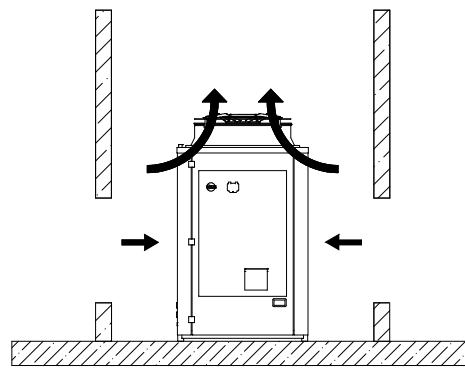
Model		A1	A2	A3	A4
i-HPV5H 0140	mm	1200	1000	1000	1500
i-HPV5H 0250 / 0260 / 0270	mm	1200	1000	1500	1500

- 

For installations in locations with strong winds refer to the area classification according to the Beaufort scale. If the value is ≥ 7 (strong wind, average wind speed = 13.9-17.1 m/s) it is strictly necessary to keep the fan powered at all times, in order to prevent its involuntary rotation.

<p>In the case of side-by-side units, the minimum distance L_{min} between them is 2200 mm.</p>	
<p>Covering with canopies or positioning near plants or walls should be avoided in order to prevent air circulation.</p>	

In the case of winds with speeds in excess of 13.9-17.1 m/s (strong winds according to the Beaufort scale), the use of windbreaks is recommended.



It is always advisable to make an environmental impact assessment based on the power and sound pressure data given in the technical data chapter and the sound emission limits based on the installation area of the unit, with reference to the DPCM of 14/11/1997. An assessment must also be made if the unit is installed in the vicinity of workers, according to D. LGS. 81/2008 Art. 189 and following.

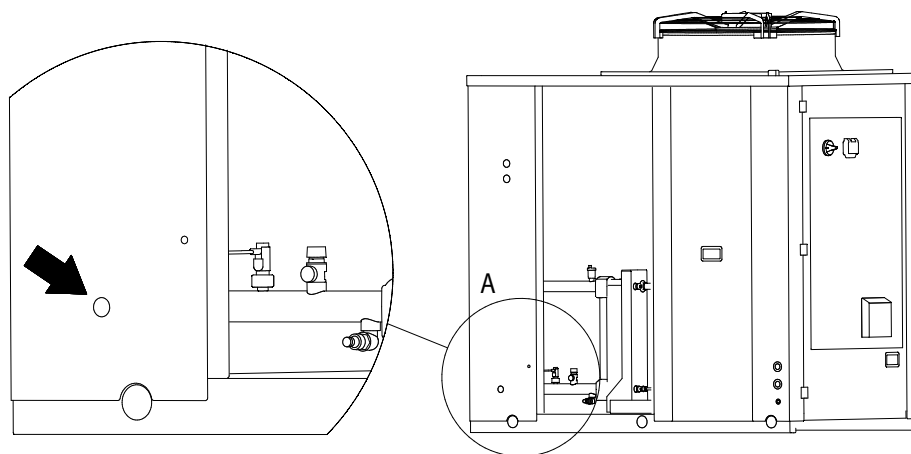
3.3 HYDRAULIC CIRCUIT

The hydraulic connections must be made in accordance with national or local regulations; the piping can be made of steel, galvanised steel or PVC. The pipes must be carefully sized according to the nominal water flow rate of the unit and the pressure drops of the hydraulic circuit. All hydraulic connections must be insulated using closed-cell material of adequate thickness. The chiller must be connected to the piping using new, non-reused flexible couplings. It is recommended to install the following components in the hydraulic circuit:

- Thermometers to measure the temperature in the circuit.
- Manual gate valves to isolate the chiller from the hydraulic circuit.
- Y-shaped metal filter and a dirt separator (installed on the return pipe from the system) with a metal mesh of no more than 1 mm (obligatory to maintain the validity of the guarantee).
- Charging unit and discharge valve where necessary.

	CAUTION: When dimensioning the pipes, make sure that the maximum system-side leakage is not exceeded as shown in the technical data table (see useful head).
	CAUTION: Connect the pipes to the connections, always using the key-to-wrench system.
	CAUTION: Create a suitable outlet for the safety valve.
	CAUTION: The expansion tank, to be provided externally, must be suitably sized according to the type and volume of fluid, the variation of temperatures and pressures in the system.
	CAUTION: The return line from the system must be at the "WATER INPUT" label, otherwise the evaporator could freeze.
	CAUTION: It is obligatory to install a metal filter (with a mesh size of no more than 1 mm) and a dirt separator on the return pipe from the installation labelled "WATER INPUT". If the flow switch is tampered with or altered, or if the metal filter and dirt separator are not present on the installation, the warranty will be immediately void. The filter and the dirt separator must be kept clean, so make sure they are still clean after the unit is installed and check them periodically.
	All units leave the factory with a flow switch (factory installed). If the flow switch is tampered with or removed, or if the water filter and deflector are not present in the unit, the guarantee will be invalid. Refer to the wiring diagram enclosed with the unit for the connection of the flow switch. Never connect the flow switch connections in the terminal block.
	The heating system and safety valves must comply with the requirements of EN 12828

The unit is pre-tensioned on the side cover plate in order to provide a suitable passage for the discharge of the safety valve (the installation of which is the responsibility of the user).



3.3.1 System water specifications

To ensure that the unit functions properly, the water must be adequately filtered (see the beginning of this section) and the quantity of dissolved substances must be minimal. The maximum permitted values are listed below.

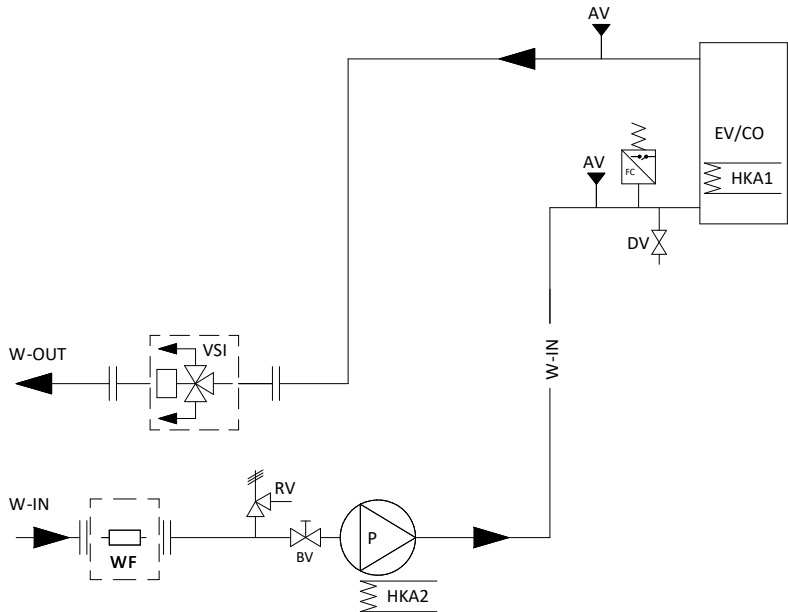
MAXIMUM PERMITTED CHEMICAL AND PHYSICAL CHARACTERISTICS OF THE SYSTEM WATER	
PH	7,5 - 9
Electrical conductivity	100 - 500 μ S/cm
Total hardness	4,5 – 8,5 dH
Temperature	< 65°C
Oxygen content	< 0,1 ppm
Max. quantity glycol	40 %
Phosphates (PO4)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,3 ppm
Alkalinity (HCO3)	70 – 300 ppm
Chlorine ions (Cl-)	< 50 ppm
Sulphate ions (SO4)	< 50 ppm
Sulphide ion (S)	No one
Ammonium ions (NH4)	No one
Silica (SiO2)	< 30 ppm

3.3.2 Typical hydraulic scheme

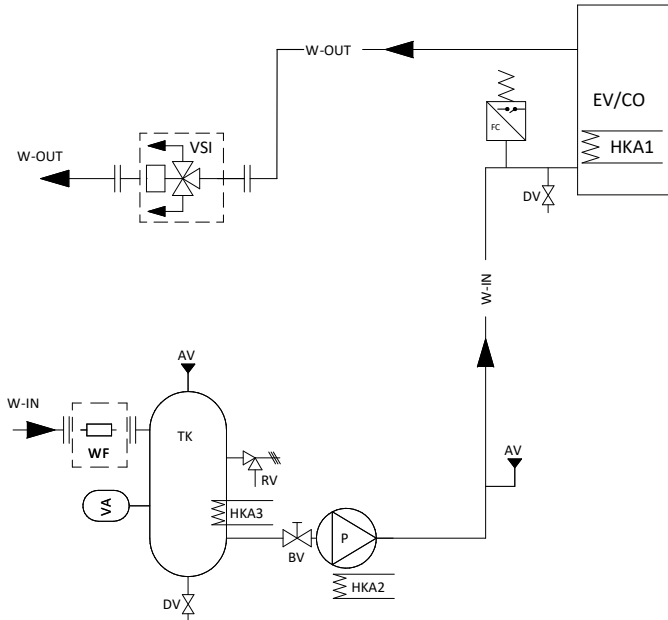
The hydraulic connection diagrams to the unit for all the available versions and the legend valid for all the diagrams are shown below. In any case, each unit always includes a safety valve with an opening pressure of 6 bar, whatever the hydronic kit with which it is equipped.

Legend			
EV/CO	Plate heat exchanger	WF	Y-filter*
DV	Discharge tap	FC	Flow switch
RV	Safety valve	W-IN	Water inlet
BV	Shut-off valve	W-OUT	Water outlet
HKA1	Heat exchanger resistance*	VSI	3-way valve*
HKA2	Pump resistance*	CV	Non-return valve
HKA3	Tank antifreeze heater*	P	Pump*
VA	Expansion vessel	AV	Automatic air vent valve
*	Optional	TK	Tank*
---	Accessory supplied separately to be installed outside the unit		

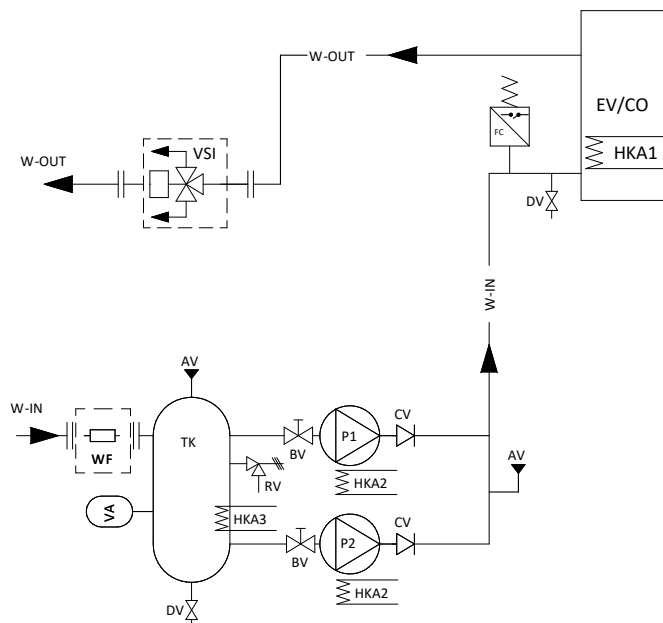
STANDARD HYDRONIC CIRCUIT WITH OPTIONAL ACCESSORIES



PS VERSION HYDRONIC CIRCUIT (WITH OPTIONAL TANK)



DP VERSION HYDRONIC CIRCUIT (WITH OPTIONAL TANK)



CAUTION: It is recommended to connect the safety valve vent to a suitable conveyor/discharge. Otherwise, the discharged water could stagnate around the machine and become a danger due to slipping/falling.

3.3.3 Minimum water content and hydraulic circuit volumes

The table shows the minimum recommended plant water content for units. The volume of the hydraulic circuit is also indicated. If this volume is less than the recommended minimum water content, it must be ensured that the pipes connecting to the unit have sufficient capacity to compensate for this difference. The additional volume required is shown in the table.

Model i-HPV5H	0140	0250	0260	0270
Minimum system water content [l]	286,0	389,0	490,0	522,0
Hydraulic circuit volume [l]	4,8	5,3	6,0	6,8
Hydraulic circuit volume with PS/PSI/PSEC [l] kit	6,5	7,0	8,0	9,0
Hydraulic circuit volume with PS/PSI/PSEC kit and -SI[l] tank	432,0	432,0	433,0	434,0
Hydraulic circuit volume with PD [l] kit	9,5	10,0	11,0	11,5
Hydraulic circuit volume with PD kit and -SI[l] tank	438,0	438,0	439,0	440,0

3.3.4 System charging / Discharging



CAUTION: Supervise all charging/reintegration operations.

CAUTION: Before charging/reintegration the system, disconnect the power supply to the units.

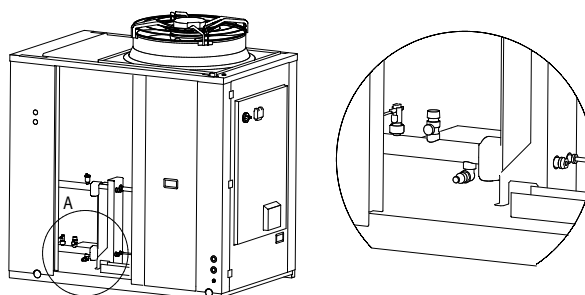
CAUTION: The charging/reintegration of the system must always take place under controlled pressure (1±3 bar). Make sure that a pressure reducer and a safety valve have been installed on the charging/reintegration line.

CAUTION: The water in the filling/reintegration line must be pre-filtered from impurities and suspended particles. Ensure that a removable cartridge filter and a dirt separator are installed.

CAUTION: periodically check and vent the air that accumulates in the system.

CAUTION: provide an automatic air release valve at the highest point of the installation.

It is advisable to use an external tap to fill the system, which is the responsibility of the installer. There is always a service tap in the unit to be used if it is necessary to top up/discharge the amount of water in the system or adjust the percentage of glycol.



If the unit must be completely drained, first close the manual inlet and outlet shutters (not supplied) and then disconnect the pipes on the water inlet and outlet so that the liquid in the unit can drain (to make this operation easier, it is advisable to install two external drain cocks between the unit and the manual shutters on the water inlet and outlet).

If it is necessary to top up the system or adjust the glycol content, the service tap can be used. Unscrew the cap of the service tap (A) and connect a 14 or 12 mm pipe (internal diameter measurements - check the tap model installed on your unit) to the hose connector connected to the water mains, then fill the system by unscrewing the ring nut (B). After this operation, tighten the ring nut (B) again and screw the cap (A) back on. In any case, it is advisable to use an external tap to fill the system.

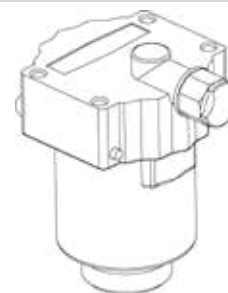


3.3.5 Air vent valve

The unit is equipped with an air vent valve that automatically eliminates the air accumulated inside the circuit, avoiding: undesirable effects such as premature corrosion and wear, lower efficiency and reduced exchange yield.

The device also has a safety function in that, in the event of a break in the exchanger, it allows the refrigerant gas to escape into the external air, preventing it from being transported to the internal terminals.

It is possible to leave the valve in the closed position by closing the cap on the outlet; by loosening the cap the valve remains in the open position and the air is discharged automatically.



If you notice a water leak, you must replace the component by unscrewing it with a spanner, as shown in the image below.



4. TECHNICAL DATA

4.1 DATA SHEET

Performance referring to the following conditions, according to standard 14511:2018:

- (1) Cooling: outdoor air temperature 35°C; in/out water temperature 12/7°C.
 - (2) Cooling: outdoor air temperature 35°C; in/out water temperature 23/18°C.
 - (3) Heating: outdoor air temperature 7°C b.s. 6°C b.u.; in/out water temperature 30/35°C.
 - (4) Heating: outdoor air temperature 7°C b.s. 6°C b.u.; in/out water temperature 40/45°C.
 - (5) Cooling: in/out water temperature 7/12°C.
 - (6) Heating: average climate conditions; T_{biv}=-7°C; low temperature.
 - (7) Indicative data subject to changes. For the correct value, always refer to the technical label on the unit.
 - (8) The volume indicated refers to the total volume required, the designer must meet it considering the quantity already present inside the unit depending on the hydronic kit chosen (please check this value in the technical data sheet).
 - (9) Sound power level: heating mode condition (3); value determined on the basis of measurements made in accordance with UNI EN ISO 9614-2, in compliance with the requirements of Eurovent certification.
 - (12) Heating: outdoor air temperature 7°C b.s. 6°C b.u.; in/out water temperature 47/55°C.
- (**) for PS/PSI/PD pump kit

N.B. The performance data given are indicative and may be subject to variation. Furthermore, the yields declared in points (1), (2), (3) and (4) refer to instantaneous power according to UNI EN 14511. The data declared in points (5) and (6) is determined according to UNI EN 14825.

TECHNICAL CHARACTERISTICS		Unit	i-HPV5H				
			0140	0250	0260	0270	
Cooling	Cooling capacity (1)	kW	29,7	36,2	48,0	52,7	
	Power input (1)	kW	9,62	11,8	15,6	17,8	
	E.E.R. (1)	W/W	3,09	3,07	3,08	2,96	
	Cooling capacity (2)	kW	37,2	55,1	65,1	65,6	
	Power input (2)	kW	9,05	13,3	15,7	16,9	
	E.E.R. (2)	W/W	4,11	4,14	4,15	3,88	
	SEER (5)	W/W	4,66	4,63	4,74	4,68	
	Water flow (1)	L/s	1,42	1,73	2,30	2,52	
Pressure drop on hydronic circuit side (1)		kPa	21	26	36	36	
Heating	Heating capacity (3)	kW	40,1	50,4	61,6	66,8	
	Power input (3)	kW	10,0	12,5	15,3	16,6	
	C.O.P. (3)	W/W	4,01	4,03	4,03	4,02	
	Heating capacity (4)	kW	40,7	49,9	59,7	66,7	
	Power input (4)	kW	12,7	15,6	18,6	20,7	
	C.O.P. (4)	W/W	3,20	3,20	3,21	3,22	
	Heating capacity (12)	kW	38,4	48,3	56,2	61,9	
	Power input (12)	kW	14,2	18,1	21,8	23,9	
	C.O.P. 12)		2,70	2,67	2,58	2,59	
	SCOP (6)	W/W	4,08	4,01	3,74	3,72	
	Water flow (4)	L/s	1,95	2,39	2,86	3,19	
	Pressure drop on hydronic circuit side (4)		kPa	37	49	58	56
	Energy efficiency - water 35°C / 55°C		Class	A++ / A+	A++ / A+	A+ / A+	A+ / A+
Compressor	Type		Scroll DC Inverter				
	Quantity		1	2	2	2	
	Refrigerant oil (type)		FW68S	FW68S	FW68S	FW68S	
	Refrigerant oil (quantity)	mL	1900	3800	3800	3800	
	Refrigerant circuits		1	1	1	1	
Refrigerant	Type		R32				
	Refrigerant quantity (7)	kg	6,5	9,5	11,7	12,0	
	Refrigerant quantity in tonnes of CO2 equivalent (7)	ton	4,4	6,4	7,9	8,1	
	Design pressure (high/low) heat pump mode	bar	46 / 27,6				
	Design pressure (high/low) chiller mode	bar	46 / 27,6				
External zone fans	Type		EC				
	Quantity		1				
	Nominal power (1)	kW	1,95	1,95	3,1	3,1	
	Maximum power input	kW	1,95	1,95	3,1	3,1	
	Maximum current input	A	4,8	4,8	4,8	4,8	
	Nominal air flow	L/s	4368	5431	6417	5547	
Internal heat exchanger	Internal heat exchanger type		Plates / BPHE				
	N° internal heat exchanger		0	1	1	1	
	Water content	L	3,05	3,54	4,27	5,12	
Hydronic circuit	Water content of the hydronic circuit	L	5	5	6	7	
	Maximum pressure hydronic kit (safety valve setting)	bar	6	6	6	6	
	Grooved water connections	inch	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	
	Minimum water volume (8)	L	286	389	490	522	
	Nominal pump power (1)	kW	-	-	-	-	
	Maximum pump power input	kW	-	-	-	-	
	Maximum pump current input	A	-	-	-	-	
Noise	Sound power level Lw (9)	dB(A)	77	83	84	84	
	Sound power level Lw SL configuration (9)	dB(A)	76	82	83	83	
	Sound power level Lw SSL configuration (9)	dB(A)	75	81	82	82	
Electrical data	Power supply		400V/3P+N+T/50Hz				
	Maximum power input	kW	22	31	37	41	
	Maximum current input	A	34	48	58	63	
	Max. power input with antifreeze kit	kW	23	31	38	41	
	Max. current input with antifreeze kit	A	36	50	60	65	

TECHNICAL CHARACTERISTICS		Unit	i-HPV5H -PS/PSI/PD				
			0140	0250	0260	0270	
Cooling	Cooling capacity (1)	kW	29,6	36,3	48,0	53,2	
	Power input (1)	kW	9,54	11,7	15,5	17,7	
	E.E.R. (1)	W/W	3,10	3,10	3,10	3,01	
	Cooling capacity (2)	kW	37,3	55,3	65,3	66,0	
	Power input (2)	kW	8,91	13,0	15,5	16,6	
	E.E.R. (2)	W/W	4,19	4,25	4,21	3,98	
	SEER (5)	W/W	4,80	4,72	4,86	4,85	
	Water flow (1)	L/s	1,42	1,74	2,30	2,55	
Heating	Heating capacity (3)	kW	40,0	50,2	61,4	66,8	
	Power input (3)	kW	9,84	12,2	15,0	16,3	
	C.O.P. (3)	W/W	4,07	4,11	4,09	4,10	
	Heating capacity (4)	kW	40,6	49,7	59,5	66,6	
	Power input (4)	kW	12,5	15,4	18,3	20,4	
	C.O.P. (4)	W/W	3,25	3,23	3,25	3,26	
	Heating capacity (12)	kW	38,4	48,3	56,5	62,0	
	Power input (12)	kW	14,2	18,0	21,7	23,8	
	C.O.P. 12)		2,70	2,68	2,60	2,61	
	SCOP (6)	W/W	4,25	4,16	3,92	3,94	
	Water flow (4)	L/s	1,94	2,38	2,85	3,19	
	Energy efficiency - water 35°C / 55°C	Class	A++ / A++	A++ / A+	A++ / A+	A++ / A+	
	Compressor	Type		Scroll DC Inverter			
		Quantity		1	2	2	2
Refrigerant oil (type)			FW68S	FW68S	FW68S	FW68S	
Refrigerant oil (quantity)		mL	1900	3800	3800	3800	
Refrigerant circuits			1	1	1	1	
Refrigerant	Type		R32				
	Refrigerant quantity (7)	kg	6,5	9,5	11,7	12,0	
	Refrigerant quantity in tonnes of CO2 equivalent (7)	ton	4,4	6,4	7,9	8,1	
	Design pressure (high/low) heat pump mode	bar	46 / 27,6				
	Design pressure (high/low) chiller mode	bar	46 / 27,6				
External zone fans	Type		EC				
	Quantity		1				
	Nominal power (1)	kW	1,95	1,95	3,1	3,1	
	Maximum power input	kW	1,95	1,95	3,1	3,1	
	Maximum current input	A	4,8	4,8	4,8	4,8	
	Nominal air flow	L/s	4368	5431	6417	5547	
Internal heat exchanger	Internal heat exchanger type		Plates / BPHE				
	N° internal heat exchanger		1	1	1	1	
	Water content	L	3,05	3,54	4,27	5,12	
Hydronic circuit	Useful head (1) (**)	kPa	146	138	155	151	
	Useful head (4) (**)	kPa	125	109	130	122	
	Water content of the hydronic circuit	L	6,5/9,5(PD)	7/10(PD)	8/11(PD)	9/11,5(PD)	
	Maximum pressure hydronic kit (safety valve setting)	bar	6	6	6	6	
	Grooved water connections	inch	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	
	Minimum water volume (8)	L	286	389	490	522	
	Nominal pump power (1)	kW	0,75	0,75	1,10	1,10	
	Maximum pump power input	kW	1,04	1,04	1,35	1,35	
	Maximum pump current input	A	1,86	1,86	2,45	2,45	
	Noise	Sound power level Lw (9)	dB(A)	77	83	84	84
Sound power level Lw SL configuration (9)		dB(A)	76	82	83	83	
Sound power level Lw SSL configuration (9)		dB(A)	75	81	82	82	
Electrical data	Power supply		400V/3P+N+T/50Hz				
	Maximum power input	kW	24	33	39	43	
	Maximum current input	A	38	52	62	68	
	Max. power input with antifreeze kit	kW	25	34	40	43	
	Max. current input with antifreeze kit	A	40	54	64	70	

TECHNICAL CHARACTERISTICS		Unit	i-HPV5H -PSEC			
			0140	0250	0260	0270
Cooling	Cooling capacity (1)	kW	29,4	35,7	47,4	53,1
	Power input (1)	kW	10,20	12,2	15,8	18,1
	E.E.R. (1)	W/W	2,88	2,93	3,00	2,93
	Cooling capacity (2)	kW	37,3	54,2	64,8	66,5
	Power input (2)	kW	9,47	13,5	15,8	17,0
	E.E.R. (2)	W/W	3,94	4,01	4,10	3,91
	SEER (5)	W/W	3,96	4,20	4,46	4,49
	Water flow (1)	L/s	1,41	1,71	2,27	2,54
Heating	Heating capacity (3)	kW	40,5	49,8	61,7	67,1
	Power input (3)	kW	10,40	12,7	15,5	16,8
	C.O.P. (3)	W/W	3,89	3,92	3,98	3,99
	Heating capacity(4)	kW	40,8	50,1	59,9	66,8
	Power input (4)	kW	13,1	15,9	18,8	20,8
	C.O.P. (4)	W/W	3,11	3,15	3,19	3,21
	Heating capacity (12)	kW	38,8	48,8	56,1	62,8
	Power input (12)	kW	14,8	18,6	22,2	24,3
	C.O.P. 12)		2,62	2,62	2,53	2,58
	SCOP (6)	W/W	3,83	3,89	3,72	3,69
	Water flow (4)	L/s	1,95	2,40	2,87	3,20
		Energy efficiency - water 35°C / 55°C	Class	A++ / A+	A++ / A+	A+ / A+
Compressor	Type		Scroll DC Inverter			
	Quantity		1	2	2	2
	Refrigerant oil (type)		FW68S	FW68S	FW68S	FW68S
	Refrigerant oil (quantity)	mL	1900	3800	3800	3800
	Refrigerant circuits		1	1	1	1
Refrigerant	Type		R32			
	Refrigerant circuits (7)	kg	6,5	9,5	11,7	12,0
	Refrigerant quantity in tonnes of CO2 equivalent (7)	ton	4,4	6,4	7,9	8,1
	Design pressure (high/low) heat pump mode	bar	46 / 27,6			
	Design pressure (high/low) chiller mode	bar	46 / 27,6			
External zone fan	Type		EC			
	Quantity		1			
	Nominal power (1)	kW	1,95	1,95	3,1	3,1
	Maximum power input	kW	1,95	1,95	3,1	3,1
	Maximum current input	A	4,8	4,8	4,8	4,8
	Nominal air flow	L/s	4368	5431	6417	5547
Internal heat exchanger	Internal heat exchanger type		Plates / BPHE			
	N° internal heat exchanger		1	1	1	1
	Water content	L	3,05	3,54	4,27	5,12
Hydronic circuit	Useful head (1) (**)	kPa	437	429	405	394
	Useful head (4) (**)	kPa	411	387	360	341
	Water content of the hydronic circuit	L	7	7	8	9
	Maximum pressure hydronic kit (safety valve setting)	bar	6	6	6	6
	Grooved water connections	inch	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)
	Minimum water volume (8)	L	286	389	490	522
	Nominal pump power (1)	kW	2,20	2,20	2,20	2,20
	Maximum pump power input	kW	2,20	2,20	2,20	2,20
	Maximum pump current input	A	4,15	4,15	4,15	4,15
Noise	Sound power level Lw (9)	dB(A)	77	83	84	84
	Sound power level Lw SL configuration (9)	dB(A)	76	82	83	83
	Sound power level Lw SSL configuration(9)	dB(A)	75	81	82	82
Electrical data	Power supply		400V/3P+N+T/50Hz			
	Maximum power input	kW	24	33	39	43
	Maximum current input	A	38	52	62	68
	Max. power input with antifreeze kit	kW	25	34	40	43
	Max. current input with antifreeze kit	A	40	54	64	70

4.2 DATA SHEET UNIT WITH DESUPERHEATER

The performance with desuperheater is shown, under conditions (1) of the technical data table, for water outlet temperatures of 45°C and 55°C from the desuperheater.

i-HPV5H	ToutDS=45°C				ToutDS=55°C			
	Cooling capacity [kW]	Power input [kW]	EER [W/W]	DS Heating capacity [kW]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	DS Heating capacity [kW]
0140	29,4	9,49	3,10	7,01	29,8	9,55	3,12	5,41
0250	36,3	11,7	3,10	8,42	36,5	11,7	3,12	6,51
0260	48,5	15,7	3,09	13,9	48,0	15,9	3,02	10,9
0270	54,1	17,6	3,07	14,1	54,0	17,7	3,05	11,0

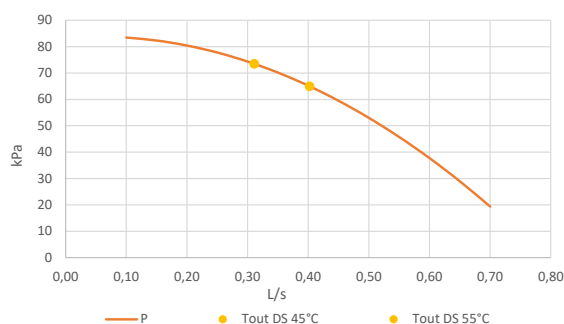
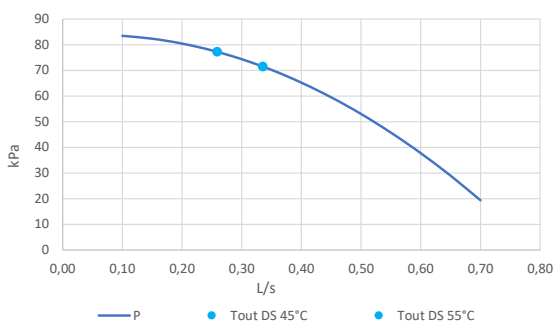
i-HPV5H -PS/PSI/PD	ToutDS=45°C				ToutDS=55°C			
	Cooling capacity [kW]	Power input [kW]	EER [W/W]	DS Heating capacity [kW]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	DS Heating capacity [kW]
0140	29,7	9,42	3,15	7,03	29,8	9,50	3,15	5,42
0250	36,5	11,5	3,17	8,46	36,3	11,6	3,13	6,55
0260	48,5	15,4	3,15	13,9	47,9	15,5	3,09	11,0
0270	53,1	17,4	3,05	13,9	53,2	17,5	3,04	10,9

i-HPV5H -PSEC	ToutDS=45°C				ToutDS=55°C			
	Cooling capacity [kW]	Power input [kW]	EER [W/W]	DS Heating capacity [kW]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	DS Heating capacity [kW]
0140	29,5	10,1	2,92	7,04	29,4	10,2	2,88	5,43
0250	35,8	12,1	2,96	8,40	35,9	12,2	2,94	6,52
0260	48,1	15,6	3,08	13,4	47,6	15,7	3,03	10,6
0270	53,6	17,9	2,99	14,0	53,5	18,0	2,97	11,0

The useful heads of the circulator associated with the desuperheater are shown below. The operating points shown in the previous table are also represented.

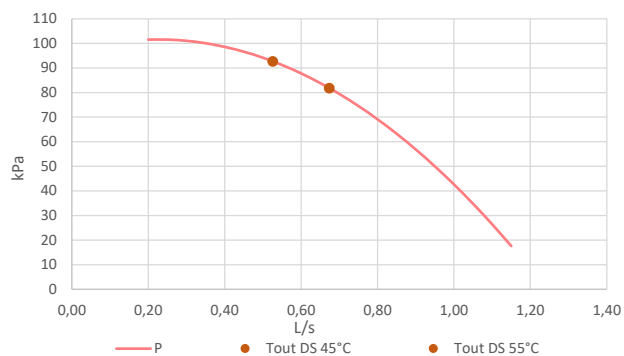
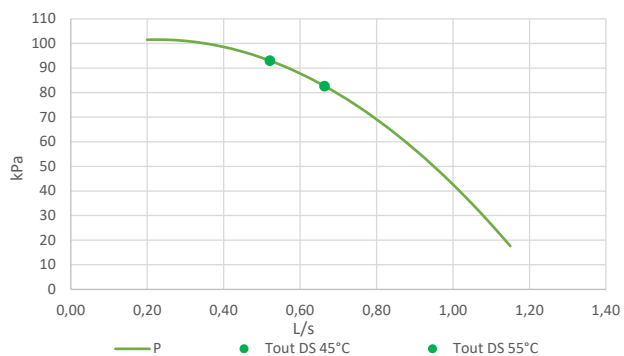
i-HPV5H 0140	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,10	83
0,15	82
0,20	80
0,25	78
0,30	74
0,35	70
0,40	65
0,45	60
0,50	53
0,55	46
0,60	38
0,65	29
0,70	19

i-HPV5H 0250	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,10	83
0,15	82
0,20	80
0,25	78
0,30	74
0,35	70
0,40	65
0,45	60
0,50	53
0,55	46
0,60	38
0,65	29
0,70	19



i-HPV5H 0260	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,20	102
0,25	102
0,30	101
0,35	100
0,40	99
0,45	97
0,50	94
0,55	91
0,60	88
0,65	84
0,70	79
0,75	75
0,80	69
0,85	63
0,90	57
0,95	50
1,00	43
1,05	35
1,10	26
1,15	18

i-HPV5H 0270	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,20	102
0,25	102
0,30	101
0,35	100
0,40	99
0,45	97
0,50	94
0,55	91
0,60	88
0,65	84
0,70	79
0,75	75
0,80	69
0,85	63
0,90	57
0,95	50
1,00	43
1,05	35
1,10	26
1,15	18



4.3 UNIT AND AUXILIARY ELECTRICAL DATA

Unit power supply	V/~ /Hz	400/3PH+PE/50
On-board control circuit	V/~ /Hz	12/1/50
Remote control circuit	V/~ /Hz	12/1/50
Fan power supply	V/~ /Hz	400/3PH+PE/50

NOTE: Electrical data is subject to change due to updating. It is therefore always necessary to refer to the technical characteristics label attached to the unit.

5. CORRECTIVE FACTORS

5.1 CORRECTION FACTORS FOR USE OF WATER-GLYCOLE MIXTURE

The correction factors for water flow rate and pressure drop must be applied to the values obtained without the use of glycol. The correction factor for water flow rate shall be calculated to maintain the same temperature difference as would be obtained without the use of glycol. The pressure drop correction factor is applied to the water flow rate value corrected by the water flow rate correction factor.

Percentage of glycol	Freezing point [°C]	Yield corrector factor	Absorbed power correction factor	Water flow correction factor	Pressure drop correction factor
10%	-3,2	0,985	1	1,02	1,08
20%	-7,8	0,98	0,99	1,05	1,12
30%	-14,1	0,97	0,98	1,10	1,22
40%	-22,3	0,965	0,97	1,14	1,25
50%	-33,8	0,955	0,965	1,2	1,33

5.2 SCALING CORRECTION FACTOR

The correction factors due to contamination of the internal gas/water exchanger are shown below.

$m^2 \text{ °C/kW}$	Power output correction factor	Power input correction factor
$0,44 \times 10^{-1}$	1,00	1,00
$0,88 \times 10^{-1}$	0,99	1,00
$1,76 \times 10^{-1}$	0,98	1,00

5.3 CALIBRATIONS AND PROTECTIONS CONTROL

Description	Value
Low pressure switch	46 bar
High pressure alarm	40 bar
Low pressure alarm	1,3 bar heating / 3,5 bar cooling
Maximum number of restarts/hour after high/low pressure (manual reset)	3
Antifreeze protection (standard version/BT version)	+3 / -10 °C
Hydronic circuit safety valve	6 bar

*Check that the antifreeze mixture concentration is suitable for the freezing temperature.

5.4 CORRECTION FACTORS DEPENDING ON ALTITUDE

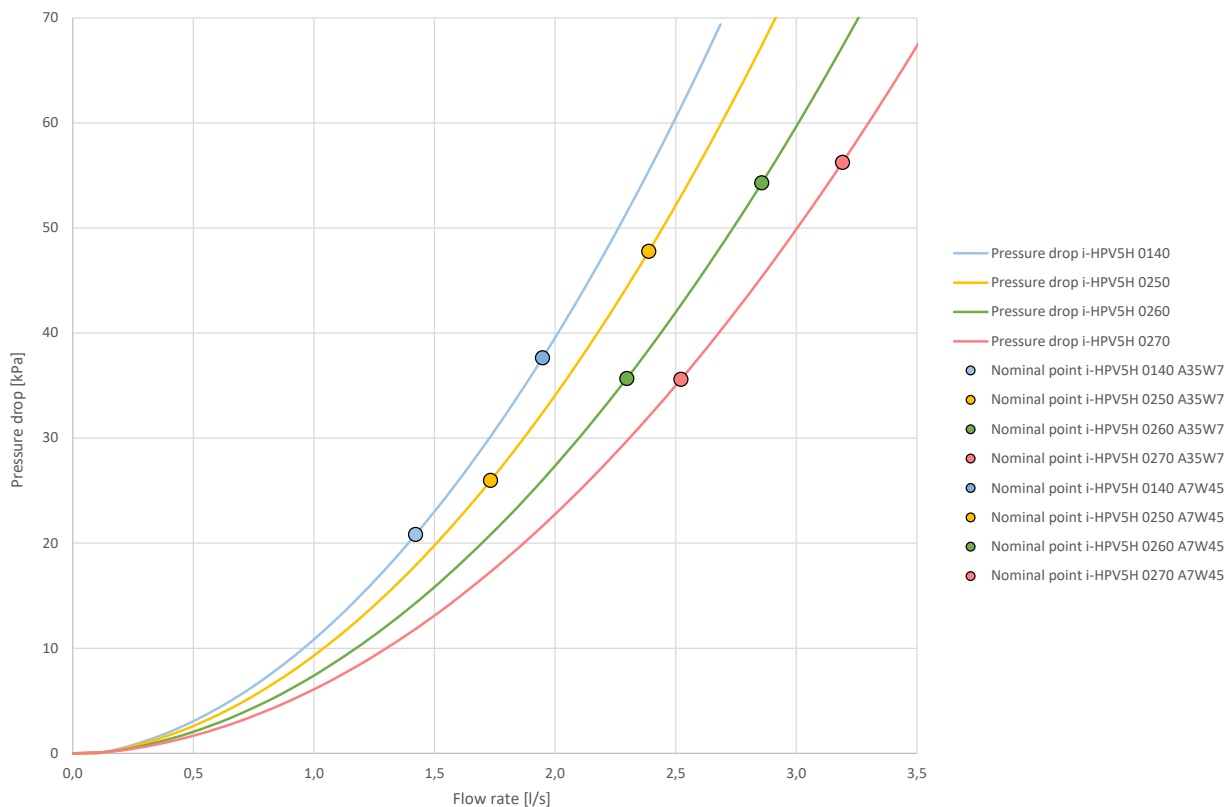
The correction factors for performance as a function of altitude are calculated for cooling under the conditions (1) and for heating under the conditions (3) in the above technical data tables and are given for altitudes of 500, 1000, 1500 and 2000 m.

Altitude [m]	500	1000	1500	2000
Correction factor heat output	0,9964	0,9941	0,9888	0,9869
Correction factor power input in heating mode	0,9931	0,9841	0,9853	0,9755
Correction factor cooling capacity	0,9888	0,9762	0,9618	0,9466
Correction factor power input in cooling mode	1,0106	1,0235	1,0386	1,0560

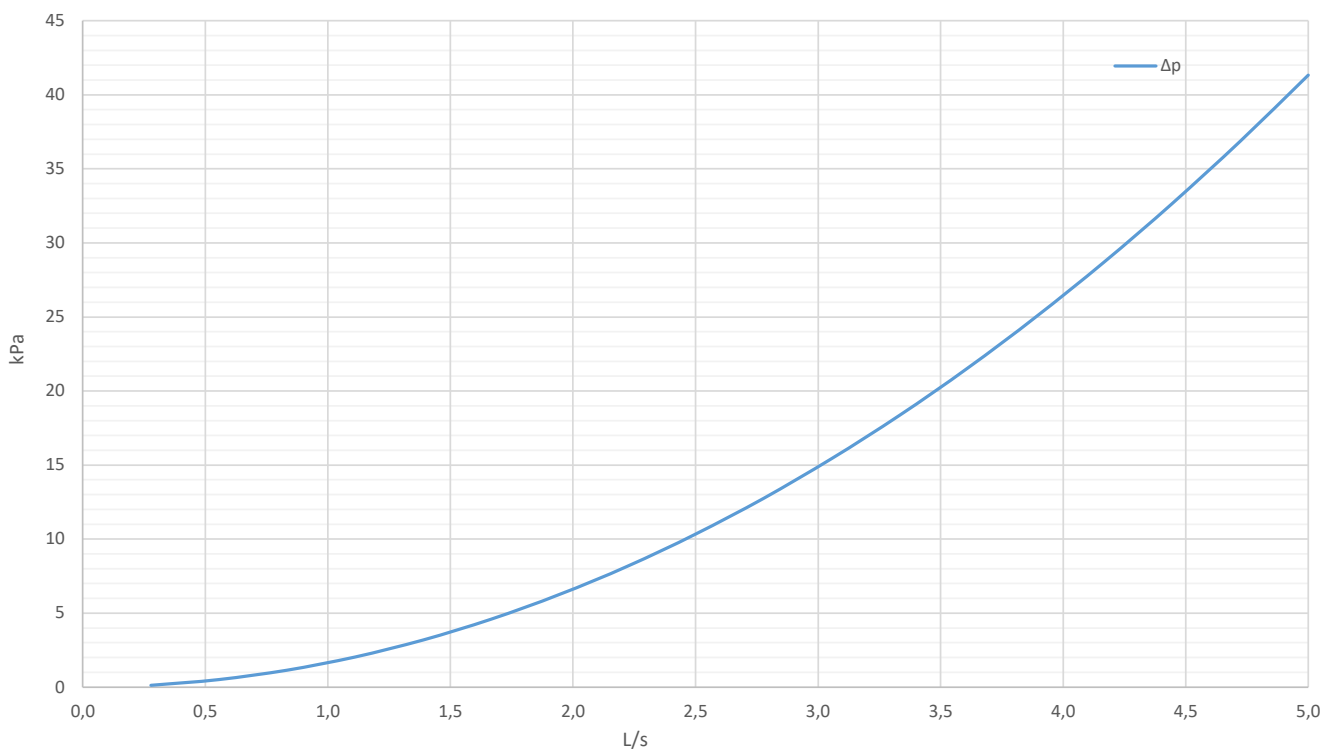
6. HYDRONIC GROUP DATA

6.1 PRESSURE DROP OF THE HYDRAULIC CIRCUIT

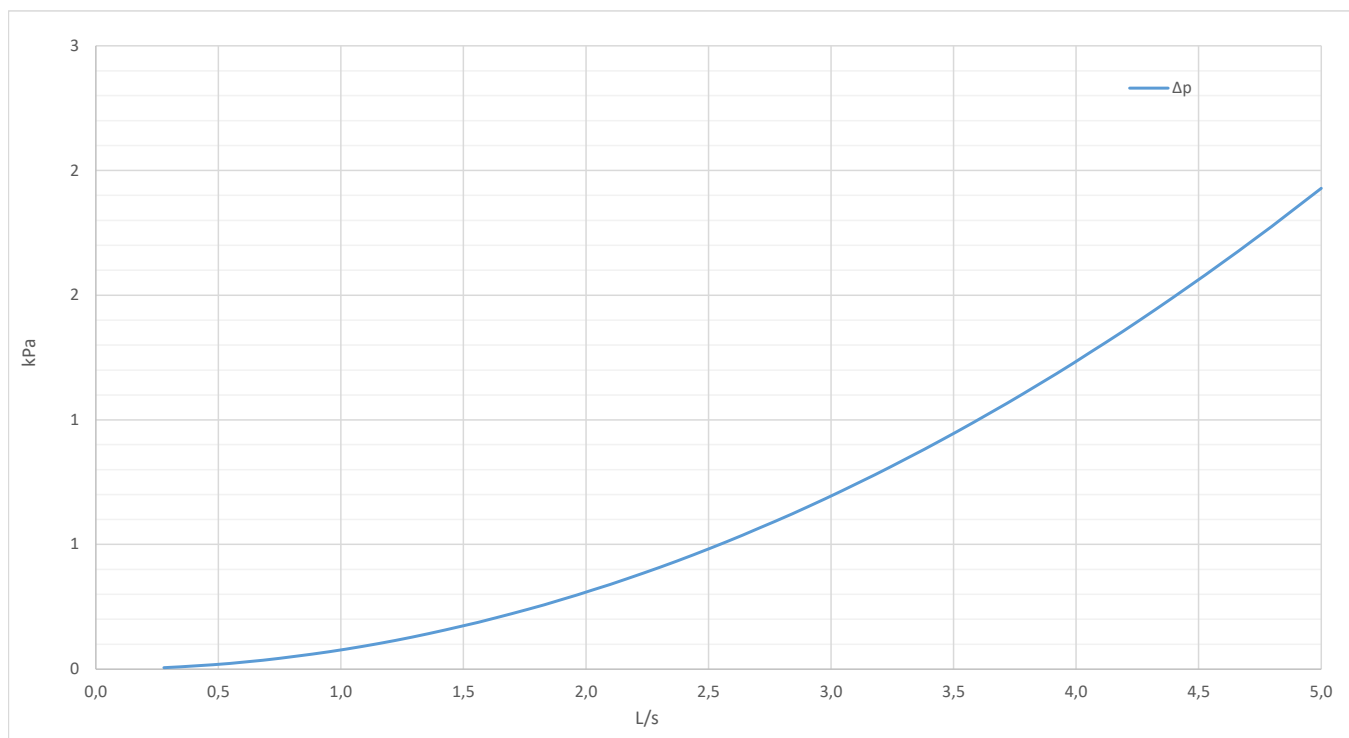
The characteristic pressure drop curves are shown below. Each curve shows the optimum operating point at the conditions specified at the apex (1) and (4) in the technical data table.



6.2 PRESSURE DROP ACCESSORY 3-WAY VALVE



6.3 PRESSURE DROP Y-FILTER ACCESSORY



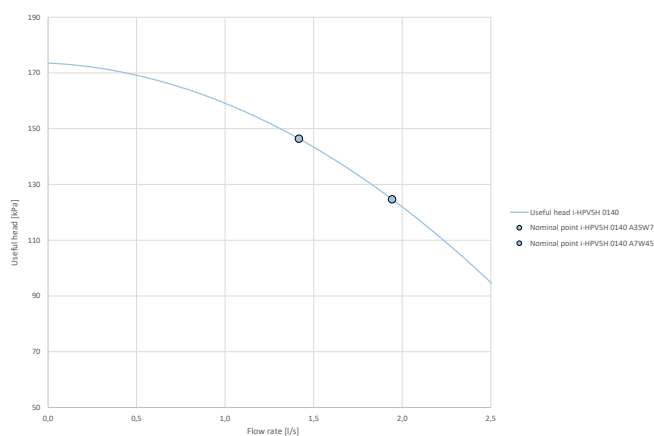
6.4 USEFUL HEAD

The characteristic head-flow curves net of pressure drops of the hydronic kit are shown below. Each curve shows the optimal working point at the conditions specified at the apex (1) and (4) in the technical data table.

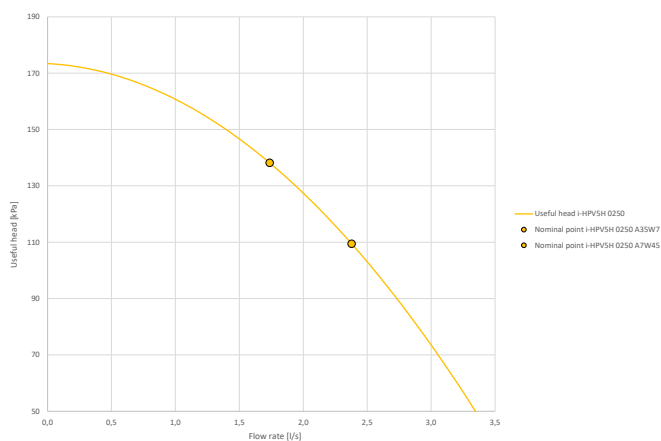
The system must be designed in such a way as to guarantee the nominal flow rate relative to the working points shown below.

6.4.1 Data for PS/PSI kit

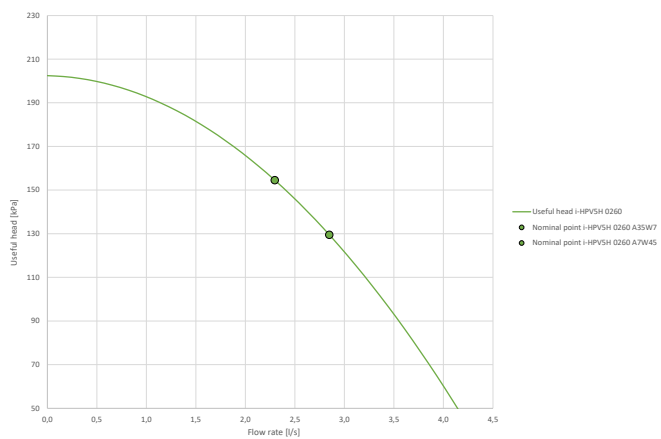
i-HPV5H 0140 -PS/PSI/PD	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	169
0,7	167
0,8	164
1,0	160
1,1	156
1,3	151
1,4	146
1,6	140
1,8	133
1,9	126
2,1	119
2,2	111
2,4	102
2,5	93
2,7	83
2,8	73



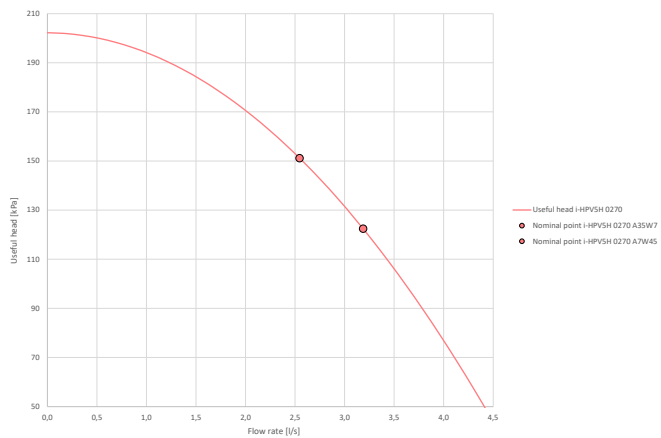
i-HPV5H 0250 -PS/PSI/PD	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	170
0,7	167
0,8	165
1,0	161
1,1	158
1,3	153
1,4	149
1,6	143
1,8	138
1,9	131
2,1	125
2,2	117
2,4	110
2,5	101
2,7	93
2,8	83



i-HPV5H 0260 -PS/PSI/PD	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	200
0,8	196
1,1	192
1,3	185
1,6	178
1,9	169
2,2	159
2,5	147
2,8	134
3,0	120
3,3	104
3,6	87
3,9	69
4,2	49
4,4	28
4,7	5

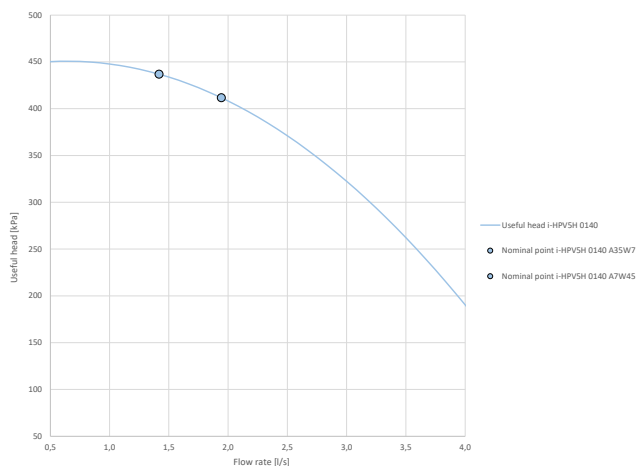


i-HPV5H 0270 -PS/PSI/PD	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	200
0,8	197
1,1	193
1,3	188
1,6	181
1,9	173
2,2	164
2,5	154
2,8	143
3,0	130
3,3	116
3,6	101
3,9	85
4,2	67
4,4	48
4,7	28

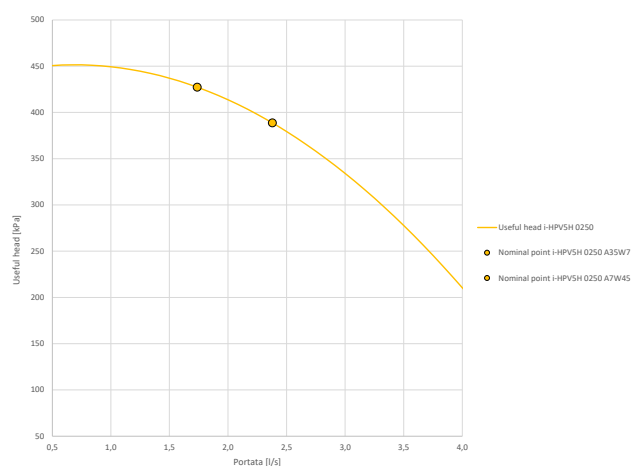


6.4.2 Data for PSEC kit

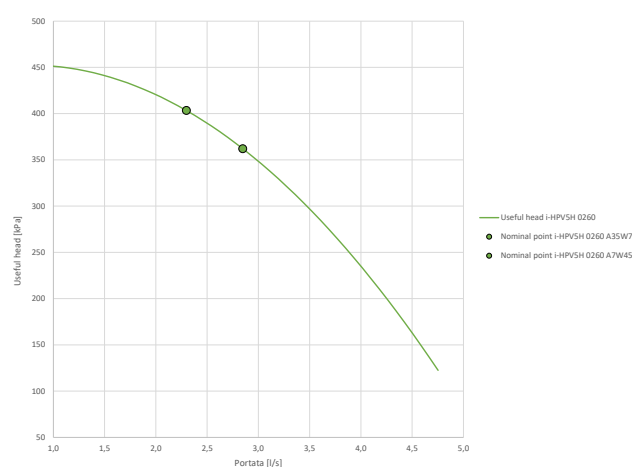
i-HPV5H 0140 -PSEC	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	450
0,7	451
1,0	448
1,2	444
1,4	437
1,7	427
1,9	415
2,1	401
2,3	384
2,6	365
2,8	343
3,0	319
3,3	293
3,5	264
3,7	232
4,0	198



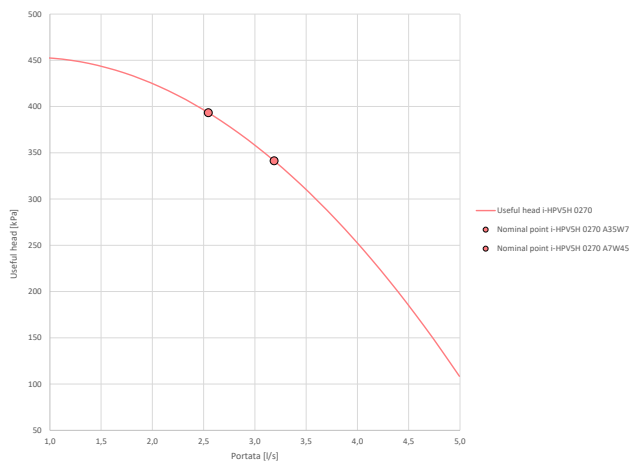
i-HPV5H 0250 -PSEC	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	451
0,7	451
1,0	450
1,2	446
1,4	440
1,7	431
1,9	420
2,1	407
2,3	392
2,6	374
2,8	354
3,0	331
3,3	306
3,5	279
3,7	250
4,0	218



i-HPV5H 0260 -PSEC	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	451
0,8	453
1,0	451
1,3	448
1,5	441
1,8	432
2,0	421
2,3	406
2,5	390
2,8	370
3,0	348
3,3	324
3,5	297
3,8	267
4,0	235
4,3	200



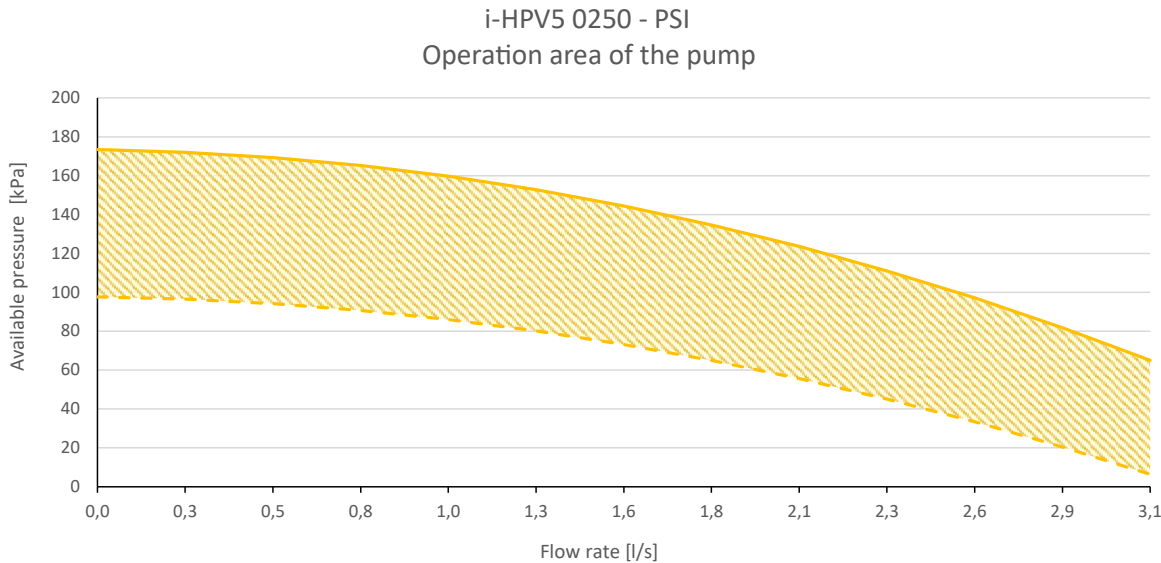
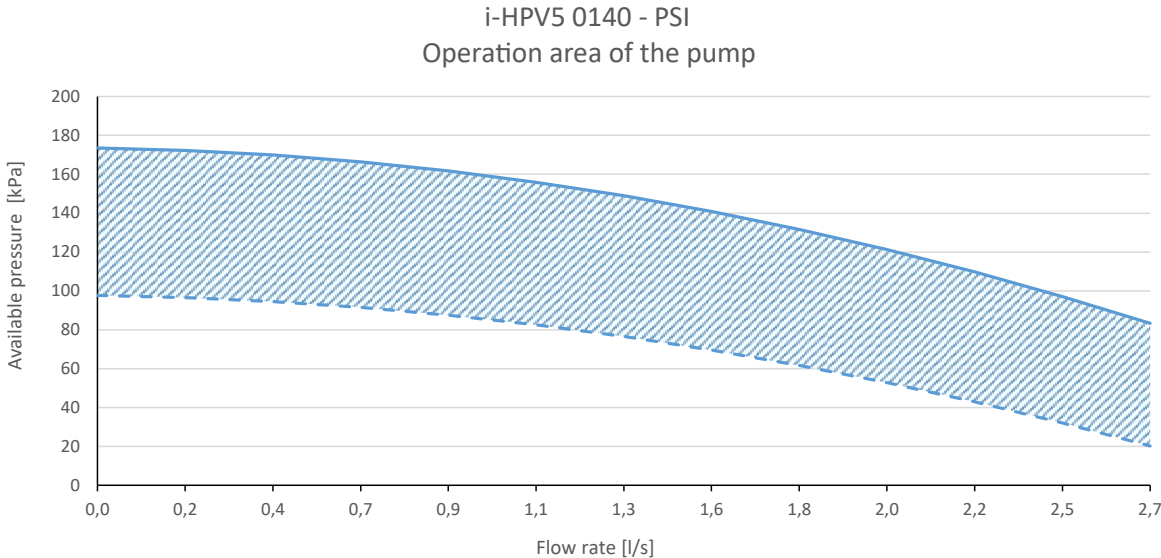
i-HPV5H 0270 -PSEC	
Flow rate [l/s]	Useful head of circulator associated to DS [kPa]
0,5	452
0,8	453
1,0	453
1,3	449
1,5	444
1,8	435
2,0	425
2,3	412
2,5	396
2,8	379
3,0	358
3,3	335
3,5	310
3,8	283
4,0	252
4,3	220



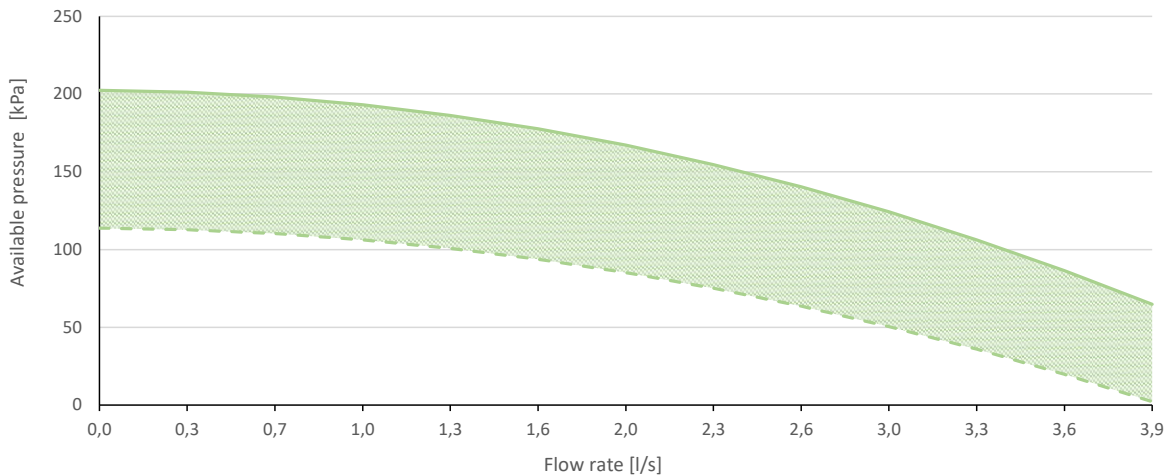
6.5 PUMP CURVES

We report the range of useful heads that the machine guarantees during pump modulation (in case of chosen accessory).

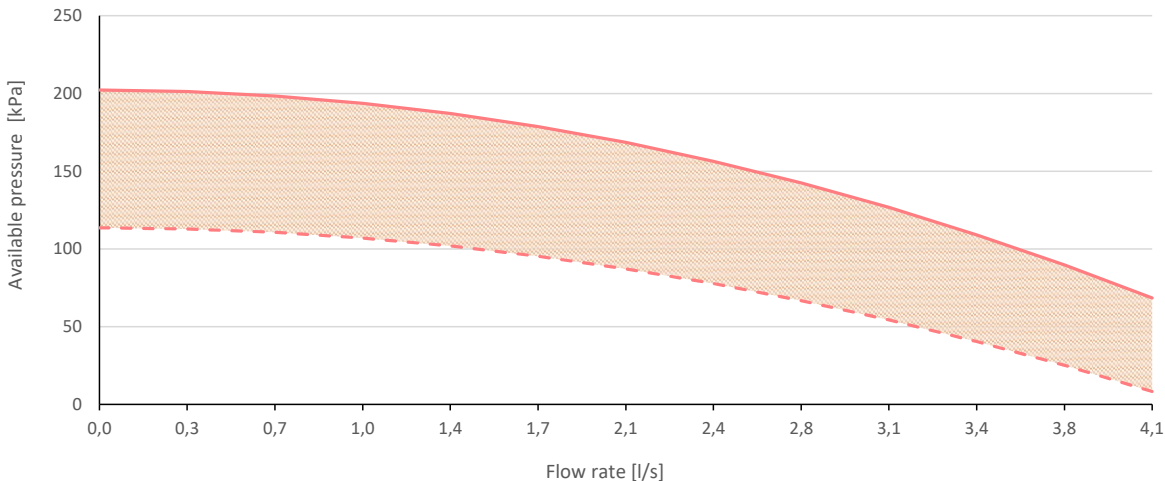
6.5.1 Area for PSI kit



i-HPV5 0260 - PSI
Operation area of the pump

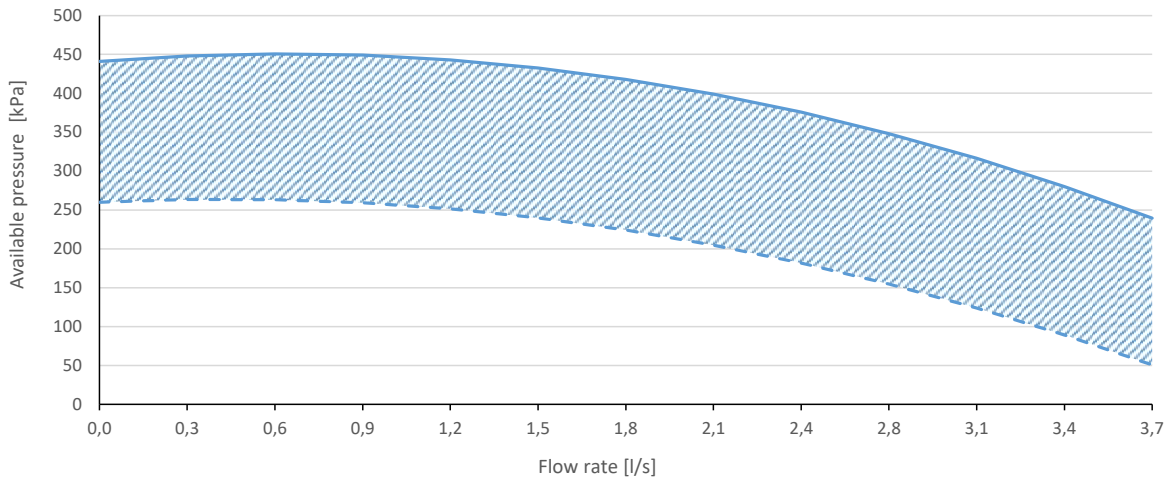


i-HPV5 0270 - PSI
Operation area of the pump

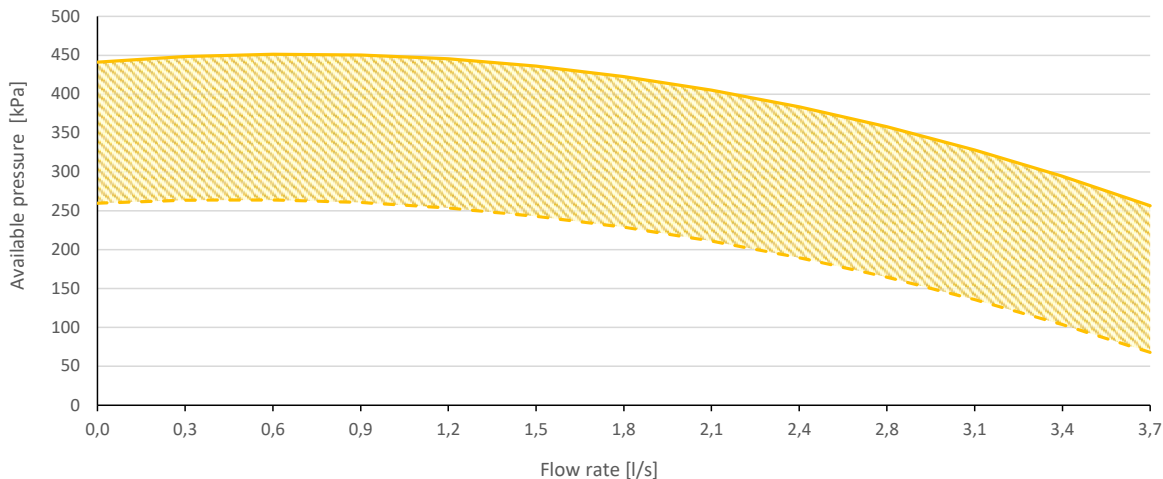


6.5.2 Area for PSEC kit

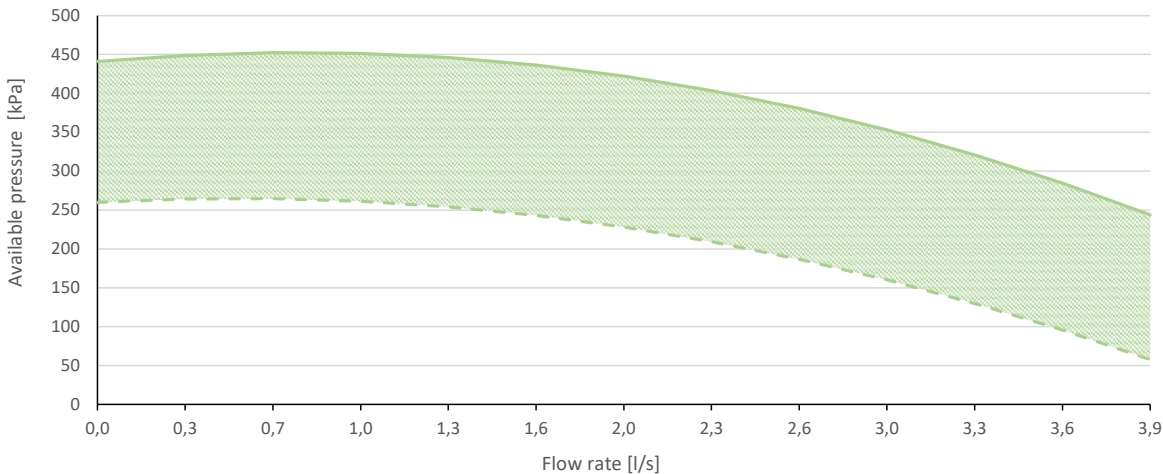
i-HPV5 0140 - PSEC
Operation area of the pump



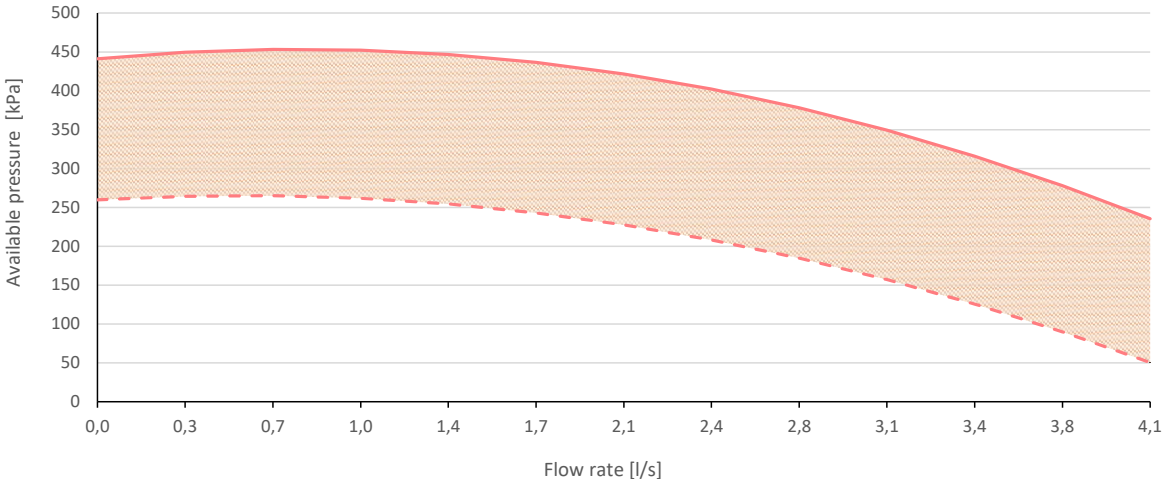
i-HPV5 0250 - PSEC
Operation area of the pump



i-HPV5 0260 - PSEC
Operation area of the pump



i-HPV5 0270 - PSEC
Operation area of the pump



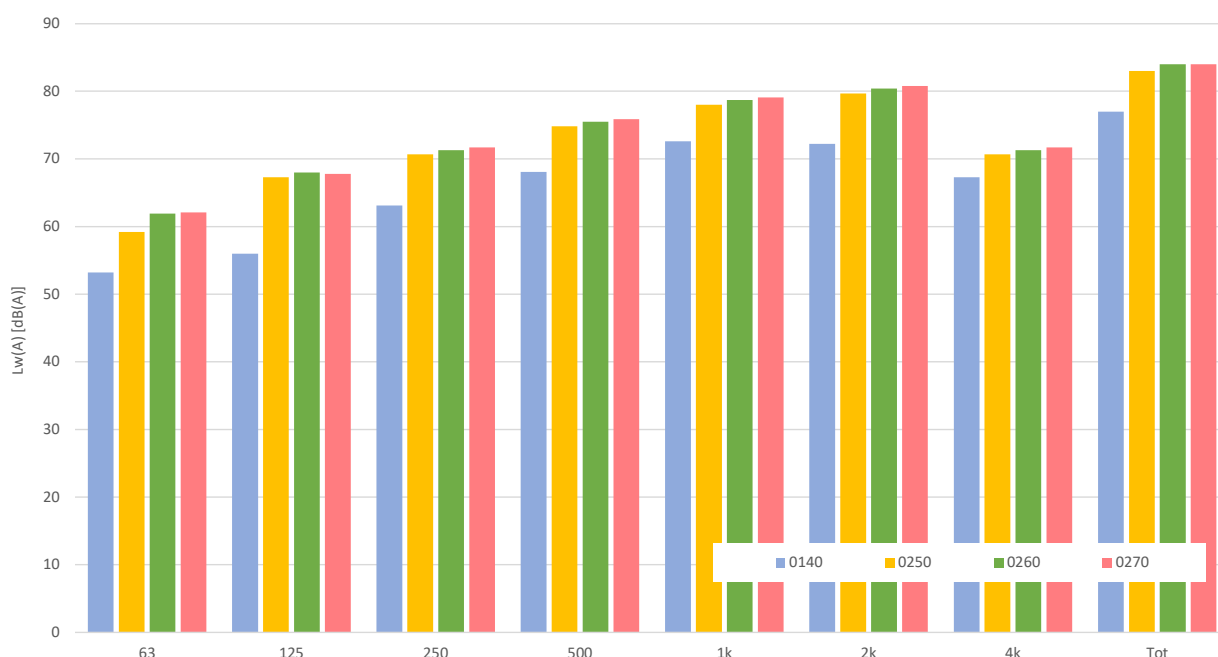
7. SOUND EMISSIONS

The sound levels refer to a fully loaded units at standard nominal conditions in accordance with EU Regulation 813/2013. The tolerance on the value of the total sound power level is 2 dB(A). The value is determined in accordance with EN 12102-1:2017, used in conjunction with UNI EN ISO 9614-2 which describes how to test with the intensimetric method.

The sound pressure values are calculated from the sound power level using ISO 3744:2010, considering units operating in the open area.

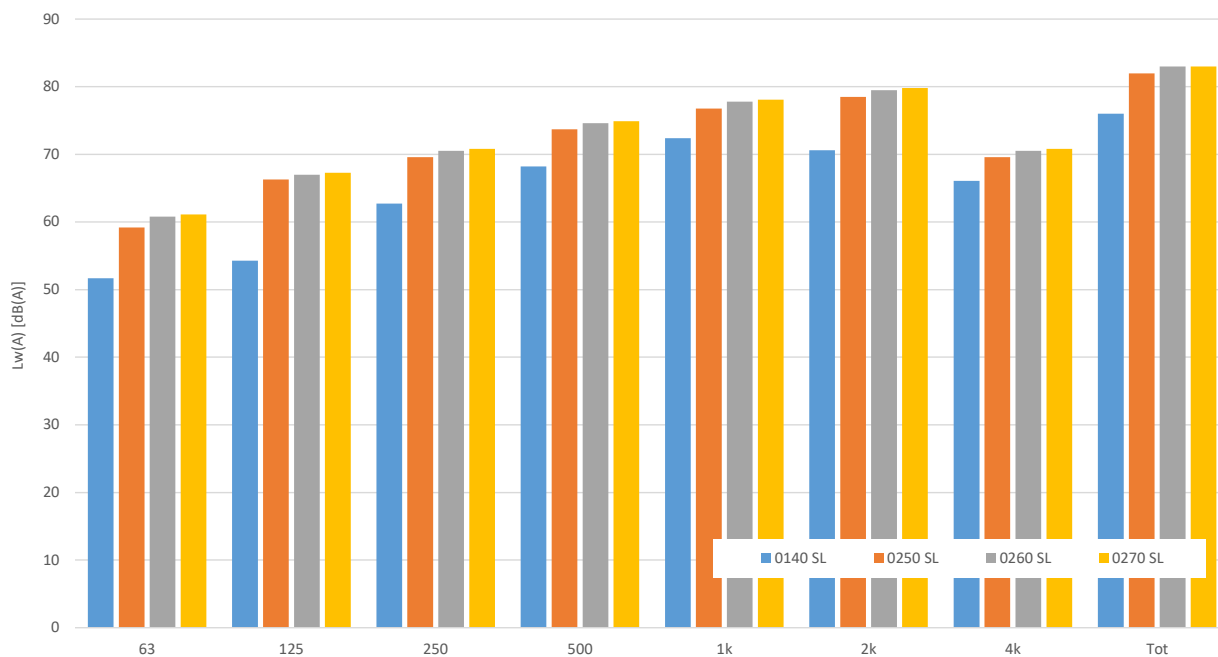
7.1 POWER AND SOUND PRESSURE STANDARD VERSION

Model i-HPV5H	Octave band sound power level							Sound power level Lw(A) [dB(A)] Tot	Sound pressure level at 1m [dB(A)] Tot	Sound pressure level at 10m [dB(A)] Tot
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz			
0140	53,2	56,0	63,1	68,1	72,6	72,2	67,3	77	59,4	45,2
0250	59,2	67,3	70,7	74,8	78,0	79,7	70,7	83	65,4	51,2
0260	61,9	68,0	71,3	75,5	78,7	80,4	71,3	84	66,4	52,2
0270	62,1	67,8	71,7	75,9	79,1	80,8	71,7	84	66,4	52,2



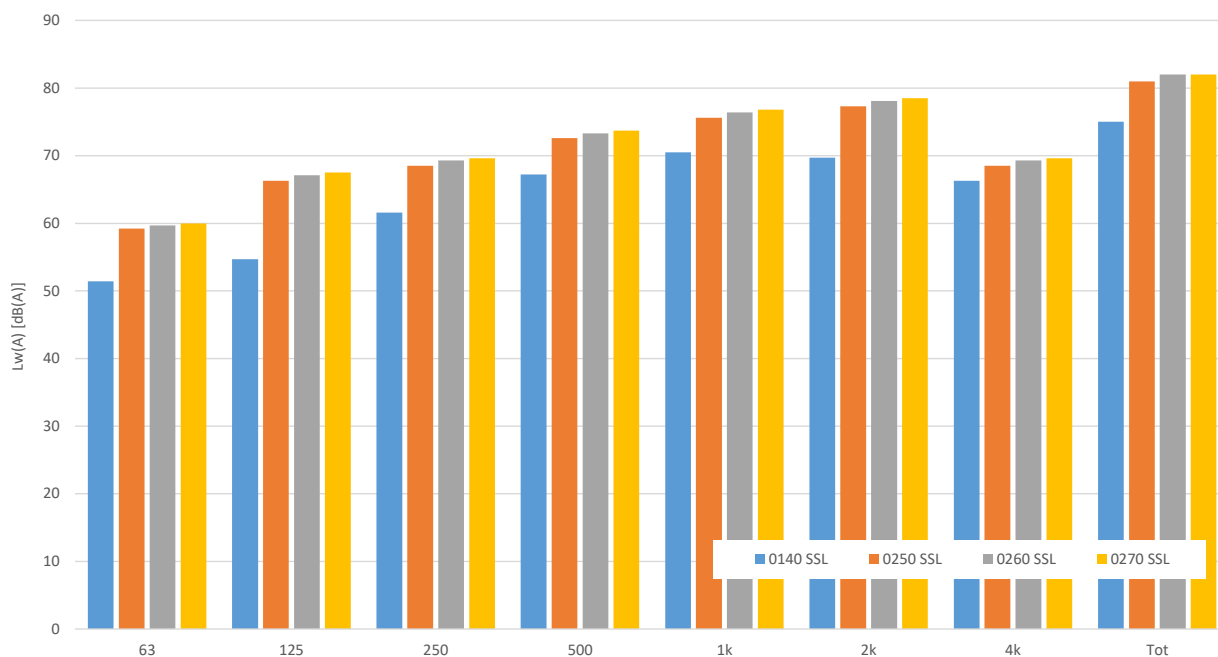
7.2 POWER AND SOUND PRESSURE SL VERSION

Model i-HPV5H	Octave band sound power level							Sound power level Lw(A) [dB(A)] Tot	Sound pressure level at 1m [dB(A)] Tot	Sound pressure level at 10m [dB(A)] Tot
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz			
0140 SL	51,7	54,3	62,7	68,2	72,4	70,6	66,1	76	58,4	44,2
0250 SL	59,2	66,3	69,6	73,7	76,8	78,5	69,6	82	64,4	50,2
0260 SL	60,8	67,0	70,5	74,6	77,8	79,5	70,5	83	65,4	51,2
0270 SL	61,1	67,3	70,8	74,9	78,1	79,8	70,8	83	65,4	51,2



7.3 POWER AND SOUND PRESSURE SSL VERSION

Model i-HPV5H	Octave band sound power level							Sound power level $L_w(A)$ [dB(A)] Tot	Sound pressure level at 1m [dB(A)] Tot	Sound pressure level at 10m [dB(A)] Tot
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz			
0140 SSL	51,4	54,7	61,6	67,2	70,5	69,7	66,3	75	57,3	43,2
0250 SSL	59,2	66,3	68,5	72,6	75,6	77,3	68,5	81	63,3	49,2
0260 SSL	59,7	67,1	69,3	73,3	76,4	78,1	69,3	82	64,3	50,2
0270 SSL	60,0	67,5	69,6	73,7	76,8	78,5	69,6	82	64,3	50,2



8. OPERATING LIMITS

8.1 WATER FLOW RATE AT THE EVAPORATOR

The nominal water flow rate refers to a temperature difference between the inlet and outlet of the evaporator of 5°C. The maximum permissible flow rate is the one with a temperature difference of 3°C and the minimum is the one with a temperature difference of 8°C at nominal conditions as indicated in the data sheet.



Insufficient water flow rate can cause evaporation temperatures too low with the intervention of the safety devices and the stopping of the unit and, in some limit cases, with the formation of ice in the evaporator and consequent serious failures of the refrigeration circuit.

For greater precision we enclose a table showing the minimum flow rates to be ensured to the plate heat exchanger in order to guarantee its correct operation (please note: the water flow switch prevent the anti-freeze probe from tripping due to lack of flow, but does not guarantee the minimum water flow rate required for correct operation of the unit).

Model	Heat pump			
	0140	0250	0260	0270
Minimum water flow rate to be guaranteed in chiller mode (condition (1) data sheet) [l/s]	0,9	1,1	1,4	1,6
Maximum water flow rate to be guaranteed in chiller mode (condition (1) data sheet) [l/s]	2,4	2,9	3,8	4,2
Intervention flow rate status – flow switch decreasing* [l/s]	0,56	0,77	0,92	0,92
Intervention flow rate status – flow switch increasing* [l/s]	0,58	0,80	0,95	0,95

* When the flow rate falls below the indicated limit (flow switch intervention flow rate - decreasing flow) the flow switch signals an alarm, which can only be reset when the flow switch intervention low rate - increasing flow - is reached.

8.2 CHILLER WATER PRODUCTION (SUMMER OPERATION)

The minimum allowed evaporator outlet temperature is 5°C for units with standard configuration. In case of units with BT configuration (low temperature) the limit drops to -8°C. In this case the use of glycol water is necessary. The maximum temperature that can be maintained at steady state at the evaporator outlet is 22°C.

8.3 HOT WATER PRODUCTION (WINTER OPERATION)

Once the system is running the water inlet temperature must not fall below 20°C: lower value not due to transient or start-up phases, can cause system faults with the possibility of compressor failure. The maximum water outlet temperature must not exceed 58°C. Temperature higher than those indicated, especially in conjunction with water flow rates, could result in malfunctioning of the unit, or in the most critical cases safety devices could be triggered.

8.4 AMBIENT AIR TEMPERATURE AND SUMMARY TABLE

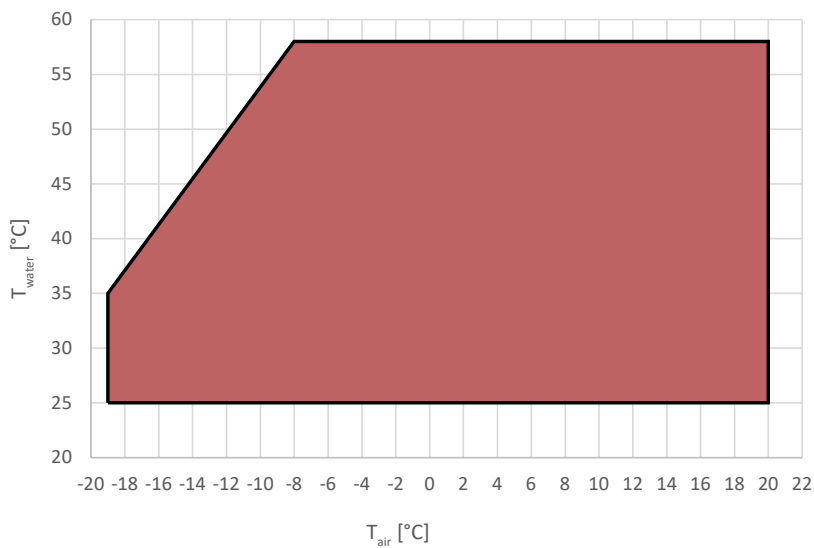
The unit are designed and built to operate in summer mode, with condensation control, with outdoor air temperature between -10°C and +46°C. In heat pump mode, the allowed range of outdoor air temperature varies from -19°C to +39°C depending on the outlet water temperature, as show in the table below.

Operating limits

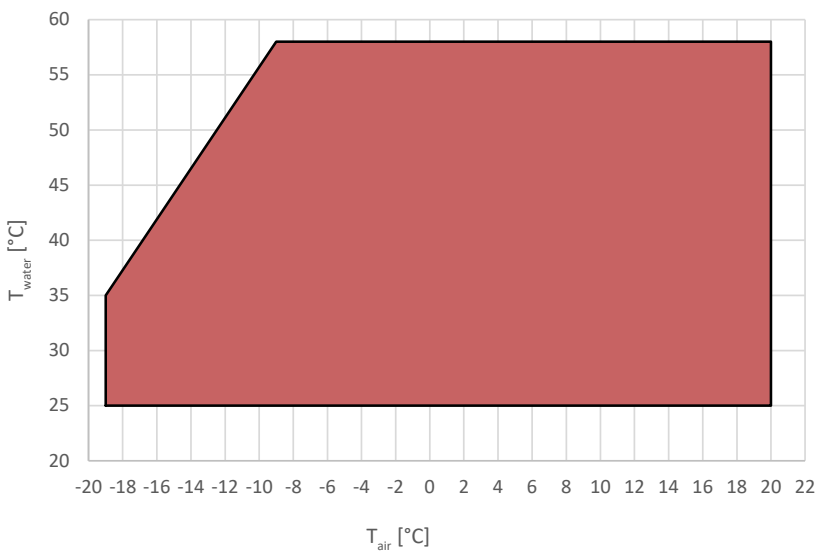
Water chiller mode		
Ambient temperature	Minimum -10 °C	Maximum +46 °C
Water outlet temperature	Minimum +5°C	Maximum +20°C
Ambient temperature BT version	Minimum -10 °C	Maximum +46 °C
Water outlet temperature BT version	Minimum -8 °C	Maximum +20°C
Heat pump mode		
Ambient temperature	Minimum -19 °C	Maximum +20°C
Water outlet temperature	Minimum +25 °C	Maximum +58 °C
Domestic hot water heat pump mode 0140 / 0270		
Ambient temperature with water at +58 °C maximum	Minimum -8 °C	Maximum +24 °C
Ambient temperature with water at +50 °C maximum	Minimum -12 °C	Maximum +39 °C
Water outlet temperature	Minimum +25 °C	Maximum +58 °C
Domestic hot water heat pump mode 0250 / 0260		
Ambient temperature with water at +58 °C maximum	Minimum -9 °C	Maximum +24 °C
Ambient temperature with water at +50 °C maximum	Minimum -12 °C	Maximum +39 °C
Water outlet temperature	Minimum +25 °C	Maximum +58 °C

Below are the graphed operating limits, in case of conditioning and sanitary production.

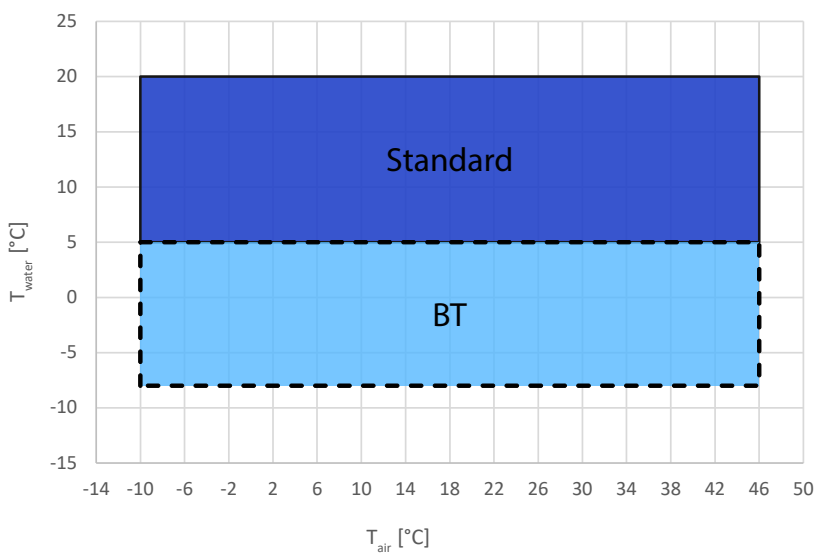
HEAT PUMP MODE i-HPV5H 0140 / 0270



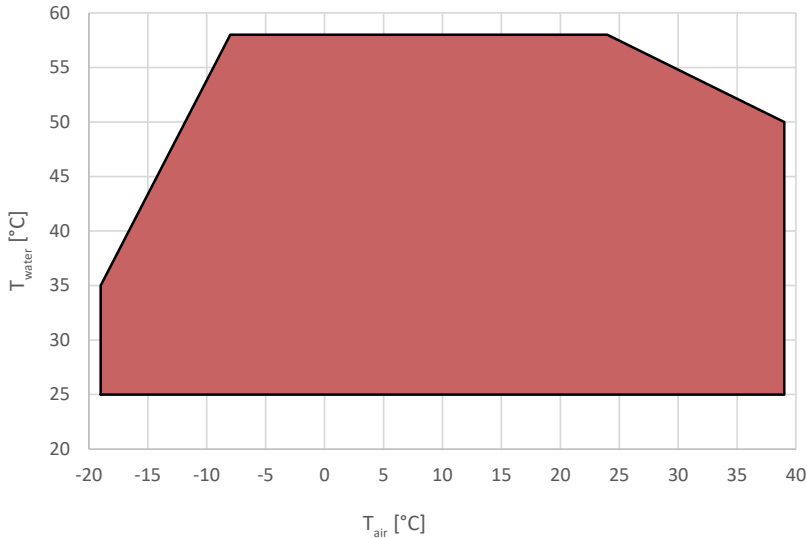
HEAT PUMP MODE i-HPV5H 0250 / 0260



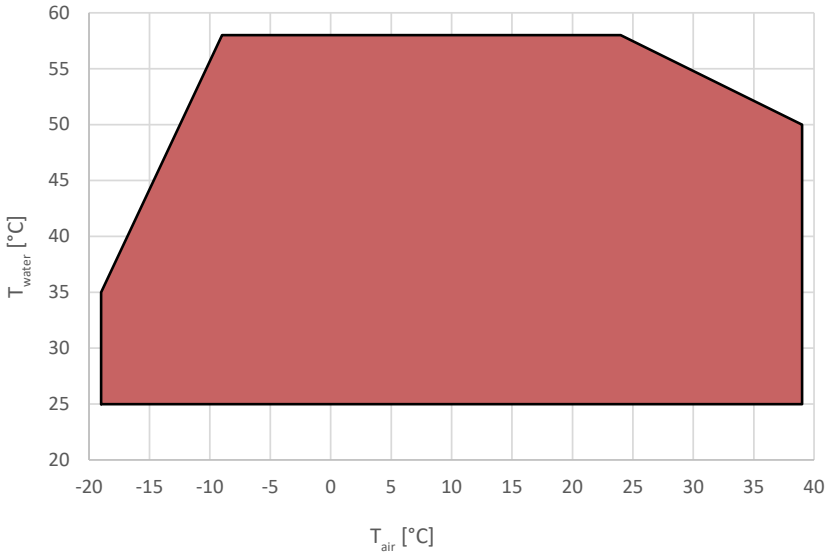
CHILLER MODE



DOMESTIC HOT WATER MODE i-HPV5H 0140 / 0270



DOMESTIC HOT WATER MODE i-HPV5H 0250 / 0260



9. PERFORMANCE TABLE

The table show power input and efficiency values for different outside air temperatures. The data shown are calculated according to EN 14511:2018. They are indicative and may be subject to change.

9.1 HEATING

Model i-HPV5H		HEATING																				
		Tout [°C]																				
		25			30			35			40			45			50			47-55		
T air outdoor [°C]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	
0140	-15	25,1	10,2	2,46	24,6	11,2	2,20	24,1	12,3	1,96	23,7	13,5	1,76									
	-10	27,0	10,0	2,70	27,1	11,1	2,44	27,0	12,3	2,20	26,9	13,6	1,98	25,4	14,7	1,73	25,7	16,3	1,58	25,5	17,2	1,48
	-7	27,5	9,13	3,01	27,3	10,1	2,70	26,9	11,1	2,42	27,0	12,2	2,21	26,2	13,2	1,98	26,3	14,6	1,80	25,7	15,4	1,67
	-2	30,5	8,45	3,61	30,8	9,36	3,29	30,0	10,3	2,91	30,2	11,5	2,63	29,3	12,5	2,34	28,9	13,6	2,13	28,9	14,6	1,98
	2	39,0	8,97	4,35	38,5	9,91	3,88	38,3	10,9	3,51	38,3	12,2	3,14	37,4	13,4	2,79	36,9	14,7	2,51	36,6	15,5	2,36
	7	41,1	8,17	5,03	40,6	9,05	4,49	40,1	10,0	4,01	40,7	11,4	3,57	40,7	12,7	3,20	40,2	13,9	2,89	38,4	14,2	2,70
	12	41,2	6,85	6,01	40,9	7,64	5,35	40,3	8,51	4,74	40,4	9,61	4,20	40,4	10,8	3,74	39,5	11,9	3,32	38,0	12,1	3,14
	15	39,9	6,19	6,45	39,4	6,95	5,67	39,0	7,78	5,01	39,5	8,93	4,42	39,5	10,1	3,91	38,8	11,1	3,50	37,1	11,4	3,25
	20	40,0	5,75	6,96	39,8	6,48	6,14	39,2	7,29	5,38	39,8	8,47	4,70	40,0	9,59	4,17	39,3	10,6	3,71	37,9	10,9	3,48
	25	38,9	4,71	8,26	38,5	5,38	7,16	38,1	6,12	6,23	38,2	7,06	5,41	37,6	7,92	4,75	37,0	8,83	4,19	35,3	9,08	3,89
30	41,5	4,55	9,12	41,4	5,23	7,92	40,3	6,00	6,72	40,7	6,96	5,85	40,1	7,83	5,12	39,3	8,75	4,49	37,6	9,01	4,17	
0250	-15	29,6	14,4	2,06	29,2	15,9	1,84	28,8	17,5	1,65	28,4	19,4	1,46									
	-10	33,8	14,3	2,36	34,5	16,1	2,14	34,4	17,8	1,93	34,6	19,8	1,75	35,0	22,1	1,58	34,9	24,4	1,43	34,5	25,7	1,34
	-7	39,5	14,7	2,69	39,6	16,4	2,41	39,4	18,2	2,16	39,5	20,2	1,96	38,9	22,2	1,75	39,1	24,5	1,60	39,2	26,1	1,50
	-2	40,9	11,7	3,50	40,0	13,0	3,08	39,7	14,4	2,76	39,6	15,9	2,49	39,4	17,7	2,23	39,1	19,4	2,02	38,8	20,6	1,88
	2	51,3	12,3	4,17	52,2	13,8	3,78	51,7	15,3	3,38	51,3	17,0	3,02	50,9	18,8	2,71	50,0	20,7	2,42	49,4	21,8	2,27
	7	52,2	10,2	5,12	51,2	11,3	4,53	50,4	12,5	4,03	50,6	14,1	3,59	49,9	15,6	3,20	48,7	17,1	2,85	48,3	18,1	2,67
	12	52,0	8,30	6,27	50,7	9,30	5,45	49,7	10,4	4,78	50,1	11,8	4,25	49,3	13,2	3,73	48,4	14,5	3,34	47,6	15,4	3,09
	15	50,7	7,67	6,61	49,9	8,60	5,80	48,9	9,63	5,08	49,0	11,0	4,45	48,3	12,3	3,93	47,5	13,7	3,47	46,9	14,5	3,23
	20	50,8	7,59	6,69	50,2	8,10	6,20	49,7	9,09	5,47	49,4	10,5	4,70	49,0	11,8	4,15	48,0	13,0	3,69	47,5	13,8	3,44
	25	49,4	7,00	7,06	49,3	7,39	6,67	48,8	7,88	6,19	48,2	8,95	5,39	47,4	10,1	4,69	46,2	11,3	4,09	45,7	12,1	3,78
30	51,6	7,20	7,17	51,4	7,70	6,68	51,5	8,19	6,29	51,4	8,80	5,84	50,7	10,0	5,07	49,6	11,2	4,43	48,9	12,0	4,08	
0260	-15	36,7	17,2	2,13	35,9	18,9	1,90	35,2	20,8	1,69	33,4	22,0	1,52									
	-10	40,0	17,3	2,31	40,0	19,2	2,08	39,8	21,2	1,88	39,2	22,7	1,73	38,0	24,2	1,57	38,0	26,6	1,43	37,7	28,2	1,34
	-7	42,2	16,0	2,64	42,0	17,7	2,37	41,9	19,6	2,14	41,7	21,7	1,92	41,4	23,7	1,75	41,2	26,0	1,58	40,8	27,6	1,48
	-2	45,6	14,3	3,19	45,3	15,8	2,87	45,0	17,4	2,59	44,7	19,2	2,33	44,4	21,1	2,10	43,3	23,0	1,88	43,5	24,6	1,77
	2	54,2	14,7	3,69	56,3	16,6	3,39	56,8	18,5	3,07	57,2	20,6	2,78	56,3	22,6	2,49	55,6	24,7	2,25	55,0	26,2	2,10
	7	63,1	12,5	5,05	62,3	13,9	4,48	61,6	15,3	4,03	60,8	16,9	3,60	59,7	18,6	3,21	59,1	20,4	2,90	56,2	21,8	2,58
	12	63,6	10,3	6,17	62,6	11,5	5,44	61,7	12,8	4,82	60,9	14,2	4,29	59,9	15,7	3,82	58,9	17,3	3,40	56,1	18,6	3,02
	15	62,8	9,64	6,51	62,0	10,8	5,74	61,0	12,0	5,08	60,1	13,4	4,49	59,3	14,8	4,01	58,1	16,4	3,54	55,9	17,6	3,18
	20	63,6	9,05	7,03	62,7	10,2	6,15	62,0	11,4	5,44	60,9	12,7	4,80	60,2	14,2	4,24	59,2	15,7	3,77	56,7	16,9	3,36
	25	64,7	7,89	8,20	63,9	8,98	7,12	62,9	10,2	6,17	61,9	11,5	5,38	61,1	12,9	4,74	60,3	14,3	4,22	57,6	15,4	3,74
30	68,8	7,63	9,02	68,0	8,74	7,78	67,1	10,0	6,72	65,9	11,3	5,83	65,0	12,7	5,12	64,2	14,2	4,52	61,4	15,3	4,01	
0270	-15	38,6	18,9	2,04	38,6	20,9	1,85	38,7	23,0	1,68	39,0	25,5	1,53									
	-10	41,1	18,6	2,21	41,1	20,6	2,00	41,6	22,8	1,82	42,3	25,2	1,68	42,9	27,9	1,54	43,9	30,8	1,43	40,2	29,8	1,35
	-7	43,0	17,3	2,49	43,4	19,1	2,27	43,2	21,1	2,05	44,7	23,4	1,91	44,8	25,9	1,73	45,4	28,5	1,59	45,0	30,4	1,48
	-2	50,3	16,0	3,14	50,3	17,8	2,83	50,4	19,6	2,57	50,1	21,4	2,34	49,9	23,3	2,14	49,4	25,5	1,94	50,0	27,1	1,85
	2	60,3	16,3	3,70	61,6	18,2	3,38	62,1	20,3	3,06	63,3	22,2	2,85	64,9	24,8	2,62	65,6	27,4	2,39	65,1	28,8	2,26
	7	68,3	13,5	5,06	67,6	15,0	4,51	66,8	16,6	4,02	67,4	18,7	3,60	66,7	20,7	3,22	66,5	22,8	2,92	61,9	23,9	2,59
	12	69,0	11,3	6,11	68,2	12,6	5,41	67,5	14,1	4,79	66,8	15,7	4,25	66,2	17,5	3,78	65,4	19,4	3,37	60,9	20,4	2,99
	15	68,2	10,6	6,43	67,6	11,9	5,68	66,6	13,4	4,97	65,9	14,9	4,42	65,3	16,6	3,93	64,6	18,4	3,51	60,1	19,4	3,10
	20	69,2	10,1	6,85	68,2	11,4	5,98	67,4	12,8	5,27	66,7	14,3	4,66	66,0	16,0	4,13	65,3	17,8	3,67	60,7	18,7	3,25
	25	68,8	8,64	7,96	68,0	9,87	6,89	67,1	11,2	5,99	66,3	12,6	5,26	65,3	14,2	4,60	64,7	15,8	4,09	60,2	16,7	3,60
30	73,8	8,43	8,75	72,7	9,70	7,49	71,6	11,0	6,51	70,2	12,5	5,62	69,6	14,0	4,97	68,5	15,7	4,36	63,8	16,6	3,84	

HEATING (with PS/PSI/PD kit)																						
Model i-HPV5H	T air outdoor [°C]	Tout [°C]																				
		25			30			35			40			45			50			47-55		
		Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]
0140	-15	25,1	10,2	2,46	24,7	11,2	2,21	24,2	12,3	1,97	23,7	13,5	1,76									
	-10	27,2	10,0	2,72	27,0	11,1	2,43	26,9	12,2	2,20	26,9	13,5	1,99	25,5	14,7	1,73	25,6	16,2	1,58	25,5	17,4	1,47
	-7	27,5	9,06	3,04	27,7	10,0	2,77	27,1	11,0	2,46	27,0	12,2	2,21	26,1	13,2	1,98	25,8	14,5	1,78	25,9	15,5	1,67
	-2	30,5	8,36	3,65	30,3	9,25	3,28	30,1	10,2	2,95	30,2	11,4	2,65	29,3	12,4	2,36	29,1	13,7	2,12	29,0	14,7	1,97
	2	38,9	8,81	4,42	38,4	9,75	3,94	38,2	10,8	3,54	38,2	12,1	3,16	37,3	13,2	2,83	36,8	14,5	2,54	36,6	15,5	2,36
	7	41,0	7,99	5,13	40,5	8,87	4,57	40,0	9,84	4,07	40,8	11,2	3,64	40,6	12,5	3,25	39,9	13,8	2,89	38,4	14,2	2,70
	12	41,1	6,67	6,16	40,8	7,47	5,46	40,2	8,35	4,81	40,2	9,44	4,26	40,3	10,6	3,80	39,3	11,7	3,36	38,1	12,1	3,15
	15	39,8	6,02	6,61	39,3	6,78	5,80	38,9	7,62	5,10	39,4	8,77	4,49	39,4	9,92	3,97	38,7	11,0	3,52	37,1	11,4	3,25
	20	39,9	5,57	7,16	39,5	6,32	6,25	39,5	7,11	5,56	39,7	8,31	4,78	39,8	9,43	4,22	39,0	10,5	3,71	37,8	10,8	3,50
	25	38,8	4,55	8,53	38,4	5,22	7,36	38,0	5,97	6,37	38,1	6,92	5,51	37,6	7,78	4,83	36,9	8,70	4,24	35,4	9,08	3,90
30	41,4	4,36	9,50	40,8	5,06	8,06	40,4	5,82	6,94	40,6	6,79	5,98	40,0	7,67	5,22	39,2	8,59	4,56	37,7	8,99	4,19	
0250	-15	29,5	14,3	2,06	29,2	15,8	1,85	28,7	17,4	1,65	28,3	19,3	1,47									
	-10	34,4	14,3	2,41	34,4	15,9	2,16	34,3	17,7	1,94	34,6	19,7	1,76	35,0	22,0	1,59	34,8	24,3	1,43	34,7	25,7	1,35
	-7	39,4	14,5	2,72	39,5	16,2	2,44	39,4	18,0	2,19	39,4	20,0	1,97	39,5	22,3	1,77	39,8	24,6	1,62	39,2	26,0	1,51
	-2	40,4	11,5	3,51	40,0	12,8	3,13	39,6	14,2	2,79	39,5	15,8	2,50	38,9	17,4	2,24	38,8	19,3	2,01	38,7	20,5	1,89
	2	51,1	12,0	4,26	52,0	13,5	3,85	51,4	15,1	3,40	51,2	16,7	3,07	50,7	18,6	2,73	49,8	20,4	2,44	49,6	21,7	2,29
	7	52,0	9,93	5,24	51,0	11,0	4,64	50,2	12,2	4,11	50,3	13,8	3,64	49,7	15,4	3,23	48,5	16,9	2,87	48,3	18,0	2,68
	12	51,8	8,05	6,43	50,6	9,04	5,60	49,4	10,1	4,89	50,0	11,6	4,31	49,1	13,0	3,78	48,3	14,3	3,38	47,6	15,3	3,11
	15	50,5	7,42	6,81	49,6	8,36	5,93	48,7	9,40	5,18	48,8	10,8	4,52	48,2	12,1	3,98	47,3	13,5	3,50	46,8	14,4	3,25
	20	50,6	7,34	6,89	50,0	7,85	6,37	49,5	8,85	5,59	49,3	10,2	4,83	48,7	11,5	4,23	47,8	12,8	3,73	47,5	13,8	3,44
	25	49,2	6,80	7,24	49,2	7,15	6,88	48,7	7,65	6,37	48,1	8,74	5,50	47,3	9,93	4,76	46,4	11,1	4,18	45,8	12,0	3,82
30	51,4	7,00	7,34	51,2	7,40	6,92	51,3	7,93	6,47	51,3	8,54	6,01	50,5	9,75	5,18	49,4	11,0	4,49	48,9	11,9	4,11	
0260	-15	36,7	17,1	2,15	35,9	18,8	1,91	35,1	20,7	1,70	33,5	21,9	1,53									
	-10	40,0	17,2	2,33	40,0	19,1	2,09	40,6	21,2	1,92	39,1	22,6	1,73	38,1	24,1	1,58	38,0	26,4	1,44	37,9	28,2	1,34
	-7	42,2	15,9	2,65	42,0	17,6	2,39	41,8	19,5	2,14	41,7	21,6	1,93	41,5	23,6	1,76	41,1	25,9	1,59	41,1	27,6	1,49
	-2	45,6	14,1	3,23	45,3	15,6	2,90	45,0	17,2	2,62	44,6	19,0	2,35	44,3	20,9	2,12	43,7	23,0	1,90	43,6	24,5	1,78
	2	54,0	14,5	3,72	56,3	16,4	3,43	56,5	18,2	3,10	56,7	20,3	2,79	56,2	22,3	2,52	55,2	24,5	2,25	55,0	26,1	2,11
	7	63,2	12,2	5,18	62,1	13,6	4,57	61,4	15,0	4,09	60,6	16,6	3,65	59,5	18,3	3,25	58,9	20,1	2,93	56,5	21,7	2,60
	12	63,3	10,0	6,34	62,4	11,2	5,57	61,6	12,5	4,93	60,6	13,9	4,36	59,7	15,4	3,88	58,3	17,0	3,43	56,2	18,4	3,05
	15	62,6	9,32	6,72	61,8	10,5	5,89	60,8	11,8	5,15	59,9	13,1	4,57	59,1	14,6	4,05	58,0	16,1	3,60	55,8	17,5	3,19
	20	63,3	8,72	7,26	62,2	9,90	6,28	61,8	11,1	5,57	61,0	12,4	4,92	60,4	13,9	4,35	59,0	15,4	3,83	57,2	16,8	3,40
	25	64,4	7,54	8,54	63,5	8,67	7,32	62,7	9,87	6,35	61,8	11,2	5,52	60,9	12,6	4,83	60,1	14,0	4,29	57,6	15,3	3,76
30	68,7	7,22	9,52	67,7	8,36	8,10	66,8	9,61	6,95	65,7	10,9	6,03	64,8	12,4	5,23	63,9	13,9	4,60	61,4	15,2	4,04	
0270	-15	38,6	18,8	2,05	38,6	20,7	1,86	38,7	22,9	1,69	39,0	25,3	1,54									
	-10	40,9	18,5	2,21	41,2	20,4	2,02	41,6	22,6	1,84	42,2	25,1	1,68	42,8	27,7	1,55	42,9	30,3	1,42	41,9	30,7	1,36
	-7	43,0	17,1	2,51	43,3	18,9	2,29	43,8	21,0	2,09	44,2	23,2	1,91	44,8	25,7	1,74	45,2	28,3	1,60	46,4	30,1	1,54
	-2	50,1	15,8	3,17	50,4	17,6	2,86	50,3	19,4	2,59	49,9	21,2	2,35	49,6	23,1	2,15	50,2	25,5	1,97	50,1	27,0	1,86
	2	60,1	16,0	3,76	61,4	17,9	3,43	61,9	20,0	3,10	63,1	21,9	2,88	64,7	24,5	2,64	65,4	27,1	2,41	65,1	28,7	2,27
	7	67,9	13,1	5,18	67,3	14,6	4,61	66,8	16,3	4,10	67,2	18,4	3,65	66,6	20,4	3,26	66,3	22,5	2,95	62,0	23,8	2,61
	12	68,9	10,9	6,32	67,9	12,3	5,52	67,2	13,8	4,87	66,5	15,4	4,32	65,9	17,2	3,83	65,2	19,1	3,41	60,7	20,3	2,99
	15	67,9	10,2	6,66	67,4	11,6	5,81	66,4	13,0	5,11	65,7	14,6	4,50	65,1	16,3	3,99	64,4	18,2	3,54	60,1	19,4	3,10
	20	68,9	9,69	7,11	68,0	11,0	6,18	67,2	12,4	5,42	66,5	14,0	4,75	65,7	15,7	4,18	65,1	17,5	3,72	60,7	18,6	3,26
	25	68,6	8,29	8,28	67,8	9,51	7,13	66,9	10,9	6,14	66,0	12,3	5,37	65,0	13,9	4,68	64,5	15,6	4,13	60,1	16,7	3,60
30	73,5	7,98	9,21	72,3	9,28	7,79	71,4	10,6	6,74	70,4	12,1	5,82	69,3	13,7	5,06	68,2	15,4	4,43	63,8	16,5	3,87	

HEATING (with PSEC kit)																						
Model i-HPV5H	T air outdoor [°C]	Tout [°C]																				
		25			30			35			40			45			50			47-55		
		Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]
0140	-15	25,5	10,8	2,36	25,0	11,8	2,12	24,5	12,9	1,90	24,0	14,1	1,70									
	-10	27,3	10,6	2,58	27,2	11,7	2,32	27,6	12,9	2,14	27,4	14,2	1,93	26,0	15,4	1,69	25,9	16,8	1,54	25,9	17,9	1,45
	-7	27,8	9,65	2,88	27,6	10,6	2,60	27,5	11,7	2,35	27,4	12,8	2,14	26,5	13,8	1,92	26,3	15,1	1,74	26,0	16,0	1,63
	-2	30,7	8,96	3,43	30,6	9,85	3,11	30,4	10,8	2,81	30,5	12,0	2,54	29,7	13,0	2,28	29,5	14,3	2,06	29,4	15,2	1,93
	2	39,3	9,40	4,18	39,0	10,40	3,75	39,1	11,4	3,43	38,5	12,7	3,03	37,7	13,8	2,73	37,1	15,1	2,46	37,0	16,1	2,30
	7	41,3	8,57	4,82	41,1	9,45	4,35	40,5	10,40	3,89	40,6	11,8	3,44	40,8	13,1	3,11	40,4	14,4	2,81	38,8	14,8	2,62
	12	41,3	7,25	5,70	41,1	8,04	5,11	40,5	8,92	4,54	40,4	10,00	4,04	40,6	11,2	3,63	40,2	12,3	3,27	38,5	12,7	3,03
	15	40,1	6,61	6,07	39,7	7,36	5,39	39,3	8,20	4,79	39,7	9,34	4,25	39,6	10,50	3,77	39,0	11,5	3,39	37,5	12,0	3,13
	20	40,3	6,15	6,55	39,9	6,89	5,79	39,5	7,70	5,13	40,2	8,87	4,53	40,3	9,99	4,03	39,6	11,0	3,60	38,2	11,4	3,35
	25	39,2	5,12	7,66	38,8	5,79	6,70	38,3	6,54	5,86	38,4	7,49	5,13	37,8	8,35	4,53	37,1	9,27	4,00	35,5	9,69	3,66
30	41,6	4,93	8,44	41,2	5,63	7,32	40,7	6,39	6,37	40,8	7,35	5,55	40,4	8,22	4,91	39,6	9,16	4,32	37,9	9,59	3,95	
0250	-15	29,9	14,8	2,02	29,4	16,3	1,80	29,0	18,0	1,61	28,6	19,8	1,44									
	-10	34,5	14,8	2,33	34,6	16,4	2,11	34,7	18,2	1,91	34,9	20,2	1,73	35,0	22,5	1,56	35,0	24,8	1,41	35,0	26,4	1,33
	-7	39,6	15,0	2,64	39,9	16,8	2,38	39,7	18,5	2,15	39,9	20,6	1,94	40,0	22,8	1,75	39,6	25,0	1,58	39,6	26,6	1,49
	-2	40,6	12,0	3,38	40,3	13,3	3,03	40,0	14,7	2,72	39,9	16,3	2,45	39,5	18,0	2,19	39,2	19,8	1,98	39,1	21,1	1,85
	2	51,9	12,6	4,12	52,8	14,1	3,74	52,1	15,6	3,34	51,5	17,2	2,99	51,1	19,1	2,68	50,3	20,9	2,41	49,7	22,2	2,24
	7	52,2	10,40	5,02	51,5	11,5	4,48	49,8	12,7	3,92	50,7	14,3	3,55	50,1	15,9	3,15	49,2	17,4	2,83	48,8	18,6	2,62
	12	52,0	8,53	6,10	51,0	9,53	5,35	50,0	10,6	4,72	50,0	12,1	4,13	49,3	13,4	3,68	48,2	14,8	3,26	48,2	15,9	3,03
	15	50,9	7,91	6,43	50,0	8,85	5,65	49,2	9,89	4,97	49,1	11,3	4,35	48,5	12,6	3,85	47,7	13,9	3,43	47,2	15,0	3,15
	20	51,3	7,41	6,92	50,6	8,33	6,07	49,4	9,37	5,27	49,0	10,8	4,54	49,3	12,0	4,11	48,2	13,3	3,62	48,3	14,3	3,38
	25	50,8	6,32	8,04	49,8	7,19	6,93	48,9	8,15	6,00	48,3	9,23	5,23	47,6	10,40	4,58	46,7	11,6	4,03	46,3	12,6	3,67
30	53,1	6,11	8,69	53,0	6,96	7,61	52,1	7,93	6,57	51,4	9,03	5,69	50,8	10,20	4,98	49,7	11,5	4,32	49,1	12,4	3,96	
0260	-15	36,9	17,6	2,10	36,1	19,4	1,86	35,4	21,2	1,67	33,6	22,5	1,49									
	-10	40,3	17,7	2,28	40,1	19,5	2,06	41,5	21,7	1,91	39,4	23,1	1,71	38,8	24,6	1,58	37,8	26,8	1,41	38,5	28,8	1,34
	-7	42,4	16,4	2,59	42,4	18,1	2,34	42,2	19,9	2,12	42,2	22,1	1,91	42,3	24,1	1,76	41,8	26,5	1,58	41,2	28,1	1,47
	-2	45,8	14,6	3,14	45,8	16,1	2,84	45,4	17,7	2,56	44,5	19,5	2,28	44,4	21,4	2,07	43,9	23,4	1,88	43,8	25,1	1,75
	2	55,1	15,0	3,67	57,3	16,9	3,39	57,4	18,8	3,05	57,2	20,8	2,75	56,5	22,8	2,48	55,8	24,9	2,24	55,3	26,7	2,07
	7	63,5	12,7	5,00	62,8	14,0	4,49	61,7	15,5	3,98	61,0	17,1	3,57	59,9	18,8	3,19	58,9	20,6	2,86	56,1	22,2	2,53
	12	63,5	10,5	6,05	62,7	11,7	5,36	61,5	13,0	4,73	60,8	14,4	4,22	60,2	15,9	3,79	58,9	17,5	3,37	56,8	18,9	3,01
	15	62,9	9,79	6,42	62,1	10,9	5,70	61,1	12,2	5,01	60,2	13,6	4,43	59,4	15,0	3,96	58,5	16,6	3,52	56,2	18,0	3,12
	20	63,5	9,21	6,89	62,8	10,30	6,10	62,0	11,6	5,34	61,1	12,9	4,74	60,3	14,4	4,19	59,6	15,9	3,75	57,2	17,3	3,31
	25	64,8	8,03	8,07	63,8	9,14	6,98	63,0	10,30	6,12	62,1	11,6	5,35	61,2	13,0	4,71	60,2	14,5	4,15	57,9	15,9	3,64
30	69,0	7,73	8,93	68,1	8,86	7,69	66,8	10,10	6,61	66,0	11,4	5,79	64,7	12,9	5,02	64,6	14,3	4,52	61,8	15,7	3,94	
0270	-15	38,7	19,2	2,02	38,7	21,2	1,83	38,9	23,4	1,66	39,1	25,7	1,52									
	-10	41,2	18,9	2,18	41,4	20,9	1,98	42,0	23,1	1,82	42,4	25,5	1,66	42,7	28,1	1,52	43,3	30,8	1,41	42,7	31,5	1,36
	-7	43,4	17,5	2,48	43,4	19,4	2,24	43,4	21,3	2,04	44,3	23,7	1,87	45,1	26,1	1,73	45,3	28,8	1,57	46,0	30,7	1,50
	-2	50,5	16,3	3,10	50,5	18,0	2,81	50,6	19,9	2,54	50,0	21,6	2,31	49,9	23,5	2,12	50,2	25,9	1,94	50,0	27,6	1,81
	2	61,3	16,6	3,69	62,3	18,5	3,37	62,7	20,5	3,06	62,6	22,3	2,81	65,4	25,0	2,62	66,0	27,6	2,39	66,6	29,4	2,27
	7	68,2	13,6	5,01	67,6	15,1	4,48	67,1	16,8	3,99	67,3	18,9	3,56	66,8	20,8	3,21	66,6	22,9	2,91	62,8	24,3	2,58
	12	68,4	11,4	6,00	67,6	12,8	5,28	66,7	14,3	4,66	66,1	15,9	4,16	65,5	17,6	3,72	64,6	19,5	3,31	61,0	20,8	2,93
	15	67,9	10,7	6,35	66,9	12,0	5,58	66,3	13,5	4,91	65,6	15,1	4,34	64,2	16,8	3,82	64,2	18,6	3,45	60,3	19,8	3,05
	20	68,5	10,20	6,72	67,7	11,5	5,89	67,0	12,9	5,19	66,3	14,5	4,57	65,6	16,1	4,07	64,8	17,9	3,62	61,1	19,1	3,20
	25	68,7	8,72	7,88	67,7	9,96	6,80	66,8	11,3	5,91	65,7	12,8	5,13	65,0	14,3	4,55	64,2	16,0	4,01	60,3	17,1	3,53
30	73,0	8,47	8,62	71,9	9,72	7,40	70,8	11,1	6,38	69,6	12,6	5,52	68,9	14,1	4,89	68,2	15,8	4,32	63,6	17,0	3,74	

9.2 COOLING

COOLING																			
Model i-HPV5H	T air outdoor [°C]	Tout [°C]																	
		5			7			10			12			15			18		
		Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]
0140	20	27,9	6,55	4,26	29,6	6,58	4,50	32,7	6,70	4,88	34,4	6,34	5,43	35,8	5,78	6,19	38,9	5,88	6,62
	25	28,3	7,49	3,78	30,4	7,60	4,00	32,9	7,72	4,26	33,8	7,24	4,67	34,8	6,59	5,28	38,8	6,75	5,75
	30	27,6	8,24	3,35	29,6	8,38	3,53	32,5	8,53	3,81	33,5	8,09	4,14	35,0	7,58	4,62	37,8	7,73	4,89
	35	27,7	9,46	2,93	29,7	9,62	3,09	32,5	9,82	3,31	33,4	9,34	3,58	34,5	8,88	3,89	37,2	9,05	4,11
	40	25,0	10,6	2,36	27,1	10,8	2,51	29,6	10,9	2,72	30,7	10,6	2,90	32,5	10,2	3,19	35,8	10,4	3,44
	45	23,0	11,9	1,93	24,4	12,0	2,03	26,9	12,2	2,20	28,1	11,9	2,36	30,6	11,6	2,64	33,9	11,8	2,87
0250	20	34,2	7,17	4,77	35,1	7,22	4,86	39,8	7,33	5,43	44,1	7,66	5,76	50,1	7,85	6,38	55,1	7,97	6,91
	25	34,8	8,56	4,07	37,0	8,62	4,29	40,7	8,80	4,63	44,9	9,20	4,88	50,8	9,46	5,37	55,2	9,58	5,76
	30	34,0	9,75	3,49	35,8	9,84	3,64	39,7	10,00	3,97	44,3	10,5	4,22	50,0	10,9	4,59	54,3	11,1	4,89
	35	33,4	11,6	2,88	36,2	11,8	3,07	39,4	12,0	3,28	44,4	12,7	3,50	50,1	13,0	3,85	55,1	13,3	4,14
	40	32,0	13,1	2,44	34,5	13,3	2,59	37,2	13,5	2,76	41,6	14,1	2,95	48,5	14,6	3,32	52,8	14,9	3,54
	45	30,3	14,7	2,06	32,4	14,9	2,17	35,5	15,1	2,35	40,2	15,8	2,54	45,9	16,4	2,80	50,1	16,6	3,02
0260	20	43,3	9,42	4,60	46,8	9,60	4,88	51,2	9,75	5,25	54,0	9,68	5,58	59,3	9,43	6,29	64,4	9,58	6,72
	25	45,4	11,5	3,95	48,7	11,6	4,20	52,8	11,9	4,44	56,1	11,7	4,79	59,5	11,2	5,31	65,0	11,5	5,65
	30	44,4	12,9	3,44	47,5	13,1	3,63	51,7	13,4	3,86	54,7	13,3	4,11	59,1	12,8	4,62	64,0	13,1	4,89
	35	44,6	15,3	2,92	48,0	15,6	3,08	51,8	15,9	3,26	55,9	15,8	3,54	60,2	15,3	3,93	65,1	15,7	4,15
	40	43,0	17,2	2,50	45,3	17,4	2,60	50,3	17,9	2,81	53,6	17,9	2,99	57,8	17,3	3,34	62,7	17,8	3,52
	45	40,7	19,4	2,10	43,4	19,6	2,21	47,5	20,0	2,38	50,4	19,9	2,53	54,7	19,3	2,83	60,0	19,7	3,05
0270	20	49,1	10,8	4,55	51,8	10,9	4,75	57,3	11,1	5,16	58,7	10,8	5,44	60,7	10,20	5,95	65,8	10,4	6,33
	25	50,7	13,3	3,81	54,8	13,7	4,00	59,5	14,0	4,25	60,0	13,1	4,58	62,4	12,3	5,07	67,9	12,6	5,39
	30	50,4	15,2	3,32	53,7	15,5	3,46	58,0	15,7	3,69	58,9	14,9	3,95	61,1	14,1	4,33	66,3	14,4	4,60
	35	50,2	17,6	2,85	52,7	17,8	2,96	58,5	18,3	3,20	58,2	17,4	3,34	61,2	16,5	3,71	65,6	16,9	3,88
	40	48,4	19,8	2,44	50,9	20,0	2,55	56,4	20,6	2,74	56,5	19,7	2,87	57,7	18,5	3,12	63,3	19,0	3,33
	45	45,7	22,0	2,08	47,6	22,1	2,15	53,7	22,7	2,37	53,7	21,6	2,49	55,8	20,7	2,70	60,9	21,0	2,90

COOLING (with PS/PSI/PD kit)																			
Model i-HPV5H	T air outdoor [°C]	Tout [°C]																	
		5			7			10			12			15			18		
		Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]
0140	20	27,9	6,49	4,30	29,2	6,49	4,50	32,7	6,59	4,96	33,9	6,21	5,46	36,0	5,66	6,36	39,2	5,74	6,83
	25	28,1	7,42	3,79	30,2	7,50	4,03	32,9	7,61	4,32	34,4	7,11	4,84	35,1	6,48	5,42	38,6	6,59	5,86
	30	27,5	8,20	3,35	29,2	8,28	3,53	32,6	8,45	3,86	34,2	8,01	4,27	35,0	7,46	4,69	37,8	7,58	4,99
	35	27,5	9,42	2,92	29,6	9,54	3,10	32,7	9,72	3,36	33,3	9,20	3,62	33,9	8,73	3,88	37,3	8,91	4,19
	40	25,3	10,6	2,39	27,0	10,7	2,52	29,5	10,9	2,71	31,0	10,5	2,95	32,9	10,1	3,26	35,7	10,3	3,47
	45	22,6	11,9	1,90	24,2	12,0	2,02	26,6	12,1	2,20	28,6	11,9	2,40	31,1	11,5	2,70	33,3	11,7	2,85
0250	20	34,2	7,07	4,84	36,5	7,12	5,13	39,4	7,16	5,50	44,2	7,50	5,89	50,6	7,64	6,62	54,3	7,71	7,04
	25	35,0	8,46	4,14	37,0	8,50	4,35	40,7	8,61	4,73	45,3	9,04	5,01	51,2	9,31	5,50	55,7	9,40	5,93
	30	33,9	9,64	3,52	35,8	9,73	3,68	40,0	9,91	4,04	43,9	10,3	4,26	50,2	10,7	4,69	54,3	10,8	5,03
	35	33,4	11,5	2,90	36,3	11,7	3,10	39,4	11,9	3,31	44,5	12,4	3,59	50,0	12,8	3,91	55,3	13,0	4,25
	40	31,9	13,0	2,45	34,5	13,2	2,61	38,1	13,4	2,84	41,7	14,0	2,98	48,4	14,5	3,34	53,0	14,7	3,61
	45	30,3	14,7	2,06	32,2	14,8	2,18	36,2	15,1	2,40	40,1	15,7	2,55	44,5	16,0	2,78	50,2	16,4	3,06
0260	20	44,1	9,34	4,72	46,8	9,44	4,96	51,2	9,58	5,34	54,0	9,49	5,69	58,6	9,19	6,38	64,4	9,30	6,92
	25	45,4	11,3	4,02	48,4	11,5	4,21	53,5	11,7	4,57	56,5	11,5	4,91	60,2	11,0	5,47	65,7	11,2	5,87
	30	44,4	12,8	3,47	47,5	13,0	3,65	51,8	13,3	3,89	54,5	13,1	4,16	59,2	12,6	4,70	64,4	12,9	4,99
	35	45,0	15,2	2,96	48,0	15,5	3,10	52,8	15,7	3,36	56,1	15,6	3,60	59,6	15,0	3,97	65,3	15,5	4,21
	40	42,6	17,0	2,51	45,5	17,3	2,63	50,5	17,8	2,84	52,8	17,6	3,00	57,9	17,1	3,39	63,1	17,5	3,61
	45	40,4	19,2	2,10	43,2	19,5	2,22	47,4	19,8	2,39	50,6	19,8	2,56	55,3	19,1	2,90	60,1	19,5	3,08
0270	20	48,9	10,6	4,61	52,3	10,7	4,89	56,7	10,9	5,20	59,2	10,7	5,53	60,8	9,88	6,15	66,2	10,0	6,62
	25	51,1	13,3	3,84	54,7	13,5	4,05	59,7	13,7	4,36	60,6	12,9	4,70	61,7	12,0	5,14	68,0	12,3	5,53
	30	50,8	15,1	3,36	52,8	15,3	3,45	59,2	15,6	3,79	58,9	14,6	4,03	61,6	13,9	4,43	66,6	14,1	4,72
	35	50,4	17,5	2,88	53,2	17,7	3,01	58,3	18,1	3,22	59,4	17,1	3,47	60,6	16,3	3,72	66,0	16,6	3,98
	40	47,5	19,5	2,44	51,0	19,8	2,58	56,6	20,3	2,79	57,0	19,4	2,94	59,0	18,5	3,19	63,5	18,7	3,40
	45	45,8	21,9	2,09	48,9	22,2	2,20	54,0	22,6	2,39	53,5	21,5	2,49	56,0	20,5	2,73	60,5	20,7	2,92

COOLING (with PSEC kit)																			
Model i-HPV5H	T air outdoor [°C]	Tout [°C]																	
		5			7			10			12			15			18		
		Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]
0140	20	27,4	7,20	3,81	28,9	7,23	4,00	32,0	7,27	4,40	33,6	6,84	4,91	35,1	6,22	5,64	38,9	6,28	6,19
	25	27,9	8,11	3,44	30,0	8,19	3,66	31,8	8,25	3,85	34,0	7,76	4,38	34,6	7,01	4,94	38,6	7,11	5,43
	30	27,1	8,86	3,06	29,1	8,94	3,26	32,1	9,07	3,54	32,7	8,63	3,79	33,9	8,00	4,24	37,5	8,07	4,65
	35	27,0	10,00	2,70	29,4	10,20	2,88	31,5	10,30	3,06	33,1	9,81	3,37	34,4	9,34	3,68	37,3	9,47	3,94
	40	24,9	11,2	2,22	26,6	11,3	2,35	28,7	11,5	2,50	30,5	11,1	2,75	31,9	10,6	3,01	35,4	10,8	3,28
	45	22,5	12,5	1,80	23,7	12,6	1,88	26,3	12,7	2,07	28,3	12,5	2,26	30,8	12,1	2,55	33,4	12,3	2,72
0250	20	33,6	7,63	4,40	35,5	7,66	4,63	39,4	7,71	5,11	44,1	8,01	5,51	50,0	8,18	6,11	54,5	8,20	6,65
	25	34,4	9,01	3,82	36,6	9,08	4,03	39,9	9,15	4,36	44,9	9,53	4,71	51,6	9,81	5,26	55,0	9,87	5,57
	30	33,7	10,20	3,30	35,0	10,30	3,40	39,3	10,40	3,78	44,2	10,8	4,09	50,5	11,2	4,51	53,7	11,2	4,79
	35	33,1	12,1	2,74	35,7	12,2	2,93	39,1	12,4	3,15	43,2	12,9	3,35	49,6	13,3	3,73	54,2	13,5	4,01
	40	31,7	13,6	2,33	34,1	13,7	2,49	37,1	13,9	2,67	42,3	14,5	2,92	48,0	14,9	3,22	51,6	15,1	3,42
	45	29,5	15,2	1,94	31,6	15,4	2,05	35,5	15,6	2,28	39,3	16,1	2,44	45,2	16,7	2,71	50,1	16,9	2,96
0260	20	43,9	9,79	4,48	46,8	9,86	4,75	49,5	10,00	4,95	54,0	9,88	5,47	58,9	9,62	6,12	64,2	9,71	6,61
	25	45,4	11,8	3,85	48,3	11,9	4,06	52,0	12,1	4,30	55,7	12,0	4,64	60,0	11,4	5,26	65,2	11,6	5,62
	30	44,7	13,2	3,39	47,5	13,5	3,52	51,3	13,7	3,74	55,3	13,6	4,07	58,3	13,0	4,48	64,0	13,2	4,85
	35	44,6	15,7	2,84	47,4	15,8	3,00	52,4	16,1	3,25	55,2	16,0	3,45	59,0	15,4	3,83	64,8	15,8	4,10
	40	42,7	17,5	2,44	44,6	17,7	2,52	50,4	18,1	2,78	53,0	18,0	2,94	57,4	17,5	3,28	63,2	17,9	3,53
	45	40,5	19,7	2,06	43,3	20,0	2,17	46,9	20,3	2,31	50,8	20,2	2,51	54,8	19,5	2,81	60,2	19,8	3,04
0270	20	49,0	11,0	4,45	51,8	11,1	4,67	56,5	11,3	5,00	59,0	11,0	5,36	60,8	10,30	5,90	66,0	10,4	6,35
	25	50,3	13,6	3,70	55,1	13,9	3,96	59,1	14,1	4,19	60,6	13,2	4,59	59,5	11,8	5,04	65,6	12,0	5,47
	30	50,7	15,5	3,27	53,1	15,8	3,36	57,6	15,9	3,62	59,4	15,0	3,96	60,1	13,8	4,36	65,4	14,1	4,64
	35	49,5	17,8	2,78	53,1	18,1	2,93	57,7	18,4	3,14	58,4	17,5	3,34	60,4	16,6	3,64	66,5	17,0	3,91
	40	47,4	20,0	2,37	51,1	20,3	2,52	56,3	20,8	2,71	56,8	19,7	2,88	58,5	18,8	3,11	64,2	19,2	3,34
	45	46,1	22,3	2,07	48,7	22,5	2,16	53,3	22,9	2,33	53,3	21,8	2,44	54,9	20,8	2,64	61,2	21,2	2,89

9.3 COOLING BT VERSION

Performance tables are about water with ethylene glycol in a fix percentage of 35% by volume.

		COOLING														
Model i-HPV5H BT	T air outdoor [°C]	Tout [°C]														
		4			1			-2			-5			-8		
		Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]
0140	20	26,4	6,53	4,04	24,5	6,43	3,81	22,2	6,34	3,50	19,6	6,19	3,17	17,5	6,06	2,89
	25	27,4	7,49	3,66	24,9	7,35	3,39	22,3	7,19	3,10	19,8	7,04	2,81	17,7	6,91	2,56
	30	26,0	8,18	3,18	24,3	8,07	3,01	21,7	7,90	2,75	19,4	7,74	2,51	17,5	7,60	2,30
	35	26,1	9,38	2,78	23,9	9,22	2,59	21,3	9,03	2,36	19,5	8,86	2,20	17,2	8,66	1,99
	40	24,4	10,6	2,30	21,8	10,3	2,12	19,6	10,1	1,94	17,2	9,91	1,74	15,5	9,73	1,59
	45	21,6	11,8	1,83	19,4	11,6	1,67	17,1	11,3	1,51	15,3	11,1	1,38	13,7	10,9	1,26
0250	20	31,5	7,09	4,44	29,3	6,99	4,19	26,7	6,88	3,88	24,0	6,73	3,57	21,6	6,58	3,28
	25	32,5	8,52	3,81	29,7	8,36	3,55	27,0	8,20	3,29	23,7	7,97	2,97	22,0	7,84	2,81
	30	32,2	9,70	3,32	28,9	9,49	3,05	26,0	9,28	2,80	23,3	9,08	2,57	21,0	8,89	2,36
	35	32,2	11,6	2,78	29,0	11,3	2,57	26,5	11,1	2,39	23,4	10,8	2,17	20,6	10,6	1,94
	40	30,9	13,1	2,36	27,6	12,8	2,16	24,1	12,5	1,93	21,8	12,2	1,79	18,9	11,9	1,59
	45	29,0	14,7	1,97	25,3	14,3	1,77	22,6	14,1	1,60	19,1	13,7	1,39	17,3	13,4	1,29
0260	20	42,2	9,44	4,47	38,3	9,20	4,16	34,9	9,02	3,87	31,5	8,79	3,58	27,7	8,57	3,23
	25	43,7	11,4	3,83	39,8	11,1	3,59	35,9	10,9	3,29	32,5	10,6	3,07	28,7	10,3	2,79
	30	42,5	12,9	3,29	38,4	12,5	3,07	34,6	12,2	2,84	30,9	11,9	2,60	27,9	11,6	2,41
	35	42,3	15,2	2,78	38,3	14,8	2,59	35,0	14,5	2,41	30,7	14,0	2,19	27,3	13,7	1,99
	40	39,5	16,8	2,35	35,6	16,5	2,16	33,0	16,2	2,04	29,4	15,8	1,86	25,9	15,4	1,68
	45	38,3	19,2	1,99	35,0	18,8	1,86	30,3	18,2	1,66	27,3	17,8	1,53	24,0	17,4	1,38
0270	20	46,6	10,7	4,36	42,3	10,5	4,03	38,9	10,3	3,78	34,7	10,1	3,44	31,2	9,88	3,16
	25	49,9	13,4	3,72	44,2	13,1	3,37	40,9	12,8	3,20	36,0	12,4	2,90	33,3	12,2	2,73
	30	48,3	15,2	3,18	44,3	14,8	2,99	39,9	14,5	2,75	36,2	14,2	2,55	32,5	13,8	2,36
	35	47,4	17,3	2,74	43,1	17,1	2,52	40,0	16,8	2,38	35,9	16,4	2,19	32,3	16,0	2,02
	40	46,4	19,7	2,36	41,7	19,2	2,17	38,2	18,9	2,02	34,2	18,4	1,86	30,9	18,1	1,71
	45	44,0	21,9	2,01	40,2	21,6	1,86	36,6	21,3	1,72	32,4	20,8	1,56	29,4	20,4	1,44

COOLING (with PS/PSI/PD kit)																
Model i-HPV5H BT	T air outdoor [°C]	Tout [°C]														
		4			1			-2			-5			-8		
		Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]
0140	20	25,7	7,67	3,35	23,7	7,59	3,12	21,2	7,50	2,83	18,5	7,37	2,51	17,0	7,28	2,34
	25	25,7	8,54	3,01	23,7	8,44	2,81	21,6	8,33	2,59	19,4	8,21	2,36	17,0	8,08	2,10
	30	25,8	9,29	2,78	22,8	9,12	2,50	20,8	9,00	2,31	18,4	8,84	2,08	16,5	8,71	1,89
	35	25,0	10,4	2,40	23,3	10,3	2,26	21,0	10,1	2,08	18,7	9,94	1,88	16,4	9,76	1,68
	40	22,5	11,5	1,96	21,0	11,4	1,84	19,1	11,2	1,71	16,5	11,0	1,50	14,7	10,8	1,36
	45	21,0	12,9	1,63	18,9	12,6	1,50	16,9	12,4	1,36	15,0	12,2	1,23	13,1	12,0	1,09
0250	20	30,8	8,05	3,83	28,8	7,98	3,61	25,8	7,87	3,28	23,0	7,73	2,98	20,9	7,60	2,75
	25	32,5	9,49	3,42	29,1	9,34	3,12	26,0	9,17	2,84	24,0	9,05	2,65	20,6	8,81	2,34
	30	31,5	10,7	2,94	28,2	10,5	2,69	25,7	10,3	2,50	22,9	10,1	2,27	20,4	9,94	2,05
	35	31,7	12,5	2,54	28,3	12,3	2,30	25,4	12,1	2,10	22,2	11,8	1,88	19,6	11,6	1,69
	40	29,8	13,9	2,14	27,0	13,8	1,96	23,7	13,5	1,76	21,2	13,2	1,61	18,6	13,0	1,43
	45	28,1	15,6	1,80	25,0	15,3	1,63	22,0	15,1	1,46	19,7	14,9	1,32	17,0	14,5	1,17
0260	20	41,3	10,3	4,01	38,3	10,1	3,79	33,5	9,95	3,37	30,4	9,78	3,11	27,5	9,63	2,86
	25	43,0	12,4	3,47	38,6	12,0	3,22	34,9	11,8	2,96	31,7	11,6	2,73	28,4	11,3	2,51
	30	41,9	13,8	3,04	38,0	13,4	2,84	33,4	13,1	2,55	30,6	12,9	2,37	27,3	12,6	2,17
	35	41,7	16,1	2,59	38,5	15,8	2,44	33,5	15,4	2,18	30,4	15,1	2,01	27,2	14,7	1,85
	40	39,9	17,9	2,23	35,9	17,5	2,05	31,8	17,2	1,85	28,9	16,9	1,71	25,1	16,4	1,53
	45	38,1	20,2	1,89	34,1	19,6	1,74	30,2	19,3	1,56	26,6	18,8	1,41	23,5	18,5	1,27
0270	20	46,0	11,6	3,97	42,2	11,4	3,70	37,9	11,3	3,35	34,2	11,1	3,08	30,9	10,9	2,83
	25	49,0	14,3	3,43	43,5	13,9	3,13	40,3	13,7	2,94	35,7	13,4	2,66	32,0	13,2	2,42
	30	47,3	16,0	2,96	43,6	15,7	2,78	39,4	15,4	2,56	35,4	15,1	2,34	30,8	14,8	2,08
	35	47,5	18,4	2,58	41,4	17,9	2,31	38,9	17,7	2,20	34,9	17,4	2,01	31,3	17,0	1,84
	40	45,5	20,6	2,21	40,7	20,1	2,02	37,6	19,8	1,90	33,8	19,5	1,73	30,3	19,1	1,59
	45	43,7	22,8	1,92	38,4	22,4	1,71	34,8	22,1	1,57	32,2	21,8	1,48	28,8	21,5	1,34

COOLING (with PSEC kit)																
Model i-HPV5H BT	T air outdoor [°C]	T _{out} [°C]														
		4			1			-2			-5			-8		
		Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]	Cooling capacity [kW]	Power input [kW]	EER [W/W]
0140	20	25,5	7,23	3,53	23,7	7,22	3,28	21,4	7,20	2,97	19,4	7,13	2,72	17,4	7,06	2,46
	25	25,6	8,11	3,16	23,6	8,07	2,92	22,0	8,04	2,74	19,4	7,93	2,45	17,2	7,85	2,19
	30	25,9	8,88	2,92	23,5	8,80	2,67	21,4	8,74	2,45	19,1	8,61	2,22	16,6	8,48	1,96
	35	26,4	10,1	2,61	23,4	9,93	2,36	20,8	9,80	2,12	19,1	9,70	1,97	16,6	9,54	1,74
	40	23,6	11,2	2,11	21,4	11,1	1,93	19,0	10,9	1,74	16,9	10,7	1,58	14,9	10,6	1,41
	45	21,2	12,5	1,70	19,2	12,3	1,56	17,1	12,2	1,40	15,1	12,0	1,26	13,0	11,8	1,10
0250	20	31,7	7,68	4,13	28,9	7,62	3,79	26,1	7,57	3,45	23,3	7,54	3,09	20,6	7,41	2,78
	25	32,4	9,04	3,58	29,3	8,96	3,27	26,2	8,86	2,96	23,3	8,74	2,67	21,2	8,67	2,45
	30	32,0	10,2	3,14	28,6	10,1	2,83	25,4	10,0	2,55	22,8	9,85	2,31	20,0	9,68	2,07
	35	31,5	12,1	2,60	28,5	11,9	2,39	25,1	11,7	2,15	22,9	11,6	1,97	19,9	11,4	1,75
	40	30,4	13,6	2,24	27,3	13,4	2,04	23,6	13,1	1,80	20,8	13,0	1,60	17,8	12,7	1,40
	45	28,3	15,2	1,86	25,1	15,0	1,67	22,3	14,8	1,51	19,4	14,5	1,34	16,8	14,3	1,17
0260	20	41,6	9,86	4,22	38,5	9,76	3,94	34,1	9,61	3,55	30,5	9,52	3,20	27,2	9,38	2,90
	25	43,4	11,8	3,68	39,9	11,7	3,41	35,4	11,5	3,08	31,0	11,2	2,77	28,5	11,1	2,57
	30	42,5	13,3	3,20	38,3	13,0	2,95	34,2	12,8	2,67	31,0	12,6	2,46	27,4	12,4	2,21
	35	42,2	15,7	2,69	38,0	15,3	2,48	33,8	15,0	2,25	30,9	14,8	2,09	27,1	14,5	1,87
	40	40,4	17,4	2,32	36,7	17,1	2,15	32,6	16,8	1,94	29,1	16,6	1,75	25,6	16,2	1,58
	45	38,1	19,6	1,94	34,6	19,3	1,79	30,4	18,9	1,61	27,0	18,6	1,45	23,0	18,2	1,26
0270	20	46,7	11,1	4,21	42,0	11,0	3,82	37,4	10,8	3,46	34,2	10,7	3,20	30,6	10,6	2,89
	25	49,1	13,6	3,61	44,1	13,4	3,29	40,6	13,3	3,05	36,1	13,1	2,76	32,8	12,9	2,54
	30	47,5	15,4	3,08	43,8	15,2	2,88	38,9	15,0	2,59	35,1	14,7	2,39	31,4	14,5	2,17
	35	48,1	17,9	2,69	43,6	17,5	2,49	39,4	17,3	2,28	35,4	17,0	2,08	30,7	16,7	1,84
	40	46,1	20,0	2,31	42,0	19,7	2,13	37,6	19,4	1,94	34,1	19,1	1,79	30,1	18,8	1,60
	45	42,9	22,2	1,93	38,4	22,0	1,75	36,1	21,8	1,66	32,4	21,5	1,51	28,8	21,2	1,36

9.4 SANITARY

Tables show the values of heating capacity, power input and COP for different outdoor air temperature during the summer season for technical water at 45/50°C for the production of domestic hot water. The data shown are indicated and may subject to change.

HEATING										
Model i-HPV5H	T air outdoor [°C]	Tout [°C]								
		45			50			55		
		Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]
0140	20	36,7	8,53	4,30	36,3	9,46	3,84	35,6	10,4	3,42
	25	33,2	6,74	4,93	32,2	7,55	4,26	32,3	8,38	3,85
	30	35,2	6,64	5,30	34,6	7,46	4,64	33,9	8,31	4,08
	35	37,1	6,55	5,66	36,5	7,39	4,94			
0250	20	48,9	11,8	4,14	48,1	13,0	3,70	47,6	14,4	3,31
	25	47,5	10,1	4,70	46,6	11,3	4,12	45,3	12,6	3,60
	30	50,7	10,0	5,07	49,6	11,2	4,43	48,5	12,5	3,88
	35	53,3	9,89	5,39	52,3	11,1	4,71			
0260	20	58,2	13,6	4,28	57,7	15,0	3,85	56,7	16,6	3,42
	25	59,2	12,3	4,81	58,2	13,7	4,25	57,2	15,2	3,76
	30	63,6	12,1	5,26	62,3	13,6	4,58	61,1	15,1	4,05
	35	67,0	12,0	5,58	65,8	13,5	4,87			
0270	20	62,4	15,0	4,16	61,6	16,7	3,69	57,8	18,4	3,14
	25	61,3	13,2	4,64	60,6	14,8	4,09	56,5	16,4	3,45
	30	65,4	13,0	5,03	65,2	14,6	4,47	58,3	16,3	3,58
	35	68,8	12,9	5,33	67,8	14,5	4,68			

HEATING (with PS/PSI/PD kit)										
Model i-HPV5H	T air outdoor [°C]	Tout [°C]								
		45			50			55		
		Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]
0140	20	36,5	8,40	4,35	36,5	9,33	3,91	35,5	10,3	3,45
	25	33,1	6,63	4,99	32,4	7,45	4,35	32,2	8,29	3,88
	30	35,1	6,52	5,38	34,5	7,34	4,70	33,8	8,21	4,12
	35	37,1	6,42	5,78	36,4	7,26	5,01			
0250	20	48,9	11,5	4,25	47,9	12,8	3,74	47,4	14,2	3,34
	25	47,4	9,93	4,77	46,4	11,1	4,18	45,2	12,4	3,65
	30	50,5	9,76	5,17	49,4	11,0	4,49	48,3	12,3	3,93
	35	53,1	9,61	5,53	52,1	10,9	4,78			
0260	20	58,0	13,3	4,36	57,8	14,8	3,91	56,6	16,4	3,45
	25	59,0	12,0	4,92	58,1	13,4	4,34	57,1	15,0	3,81
	30	62,9	11,8	5,33	61,9	13,3	4,65	60,8	14,8	4,11
	35	66,7	11,7	5,70	65,5	13,1	5,00			
0270	20	62,2	14,7	4,23	61,4	16,4	3,74	57,8	18,1	3,19
	25	61,4	12,9	4,76	60,4	14,5	4,17	56,3	16,2	3,48
	30	65,5	12,7	5,16	64,9	14,3	4,54	60,4	16,0	3,78
	35	68,5	12,5	5,48	67,5	14,2	4,75			

HEATING (with PSEC kit)										
Model i-HPV5H	T air outdoor [°C]	Tout [°C]								
		45			50			55		
		Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]	Heating capacity [kW]	Power input [kW]	COP [W/W]
0140	20	37,0	8,97	4,12	36,6	9,90	3,70	35,9	10,9	3,29
	25	33,5	7,22	4,64	32,7	8,05	4,06	32,6	8,88	3,67
	30	35,5	7,10	5,00	34,9	7,92	4,41	34,2	8,79	3,89
	35	37,4	6,99	5,35	36,8	7,83	4,70			
0250	20	49,3	12,0	4,11	48,2	13,3	3,62	47,7	14,7	3,24
	25	47,6	10,40	4,58	46,7	11,6	4,03	45,6	12,9	3,53
	30	50,8	10,20	4,98	49,7	11,5	4,32	48,7	12,8	3,80
	35	53,4	10,10	5,29	52,4	11,3	4,64			
0260	20	58,2	13,8	4,22	58,2	15,2	3,83	57,2	16,8	3,40
	25	59,3	12,5	4,74	58,4	13,9	4,20	57,3	15,4	3,72
	30	62,7	12,3	5,10	62,3	13,7	4,55	61,1	15,3	3,99
	35	67,1	12,2	5,50	65,8	13,6	4,84			
0270	20	62,4	15,1	4,13	61,7	16,8	3,67	58,0	18,6	3,12
	25	61,3	13,4	4,57	60,7	15,0	4,05	56,6	16,6	3,41
	30	66,0	13,2	5,00	65,0	14,8	4,39	60,5	16,4	3,69
	35	68,8	13,0	5,29	67,8	14,6	4,64			

9.5 DATAFORENERGYCERTIFICATIONOFBUILDINGSACCORDINGTOUNI/TS11300-4FORHEAT PUMPS

The supplementary data of heat pumps for the calculation of the energy performance of buildings according to UNI/TS 11300 part 4 are given below. The characteristics quantities that will be provided for each model are explained below, according to statement 31 of the standard.

		A T _{bival}	B	C	D
Reference temperature	-10°C	-7°C	2°C	7°C	12°C
PLR (T _{des} = -10°C)	100%	88%	54%	35%	15%
Power DC at full load		DC _A = DC _{bival}	DCB	DCC	DCD
COP at partial load		COPA	COPB	COPc	COPD
COP at full load		COP'A	COP'B	COP'c	COP'D
CR	>1	1	(0,54 x P _{des}) / DCB	(0,35 x P _{des}) / DCC	(0,15 x P _{des}) / DCD
Correction factor Fp	1	1	COPB/COP'B	COPc/COP'c	COPD/COP'D
PLR	part load ratio - climatic load factor				
CR	heat pump load factor				
DC	full load power at indicated temperature				
DC _{bival}	full load power at -7/35°C				
P _{design}	full load with climate A				
COP	COP with CR load at the same temperature conditions as COP'				
COP'	COP at full load under the same temperature conditions as COP				

9.5.1 Model i-HPV5H 0140

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)	min	-19 °C	
	max	20 °C	

HOT source:		WATER	
Operating temperature (cut-off)	min	20 °C	
	max	58 °C	

Performance data measured under partial load conditions according to UNI EN 14825

Operating conditions		A T _{bival}	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T _{des} = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	26,9	16,5	17,6	19,4
COP at partial load		2,38	3,54	4,29	4,80
COP at full load		2,38	3,54	4,31	4,87
CR		1,00	0,99	0,60	0,24
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.2 Model i-HPV5H 0140 PS/PSI/PD

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)	min	-19 °C	
	max	20 °C	

HOT source:		WATER	
Operating temperature (cut-off)	min	20 °C	
	max	58 °C	

Performance data measured under partial load conditions according to UNI EN 14825

Operating conditions		A T _{bival}	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T _{des} = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	27,0	16,4	17,6	19,4
COP at partial load		2,39	3,56	4,34	4,88
COP at full load		2,39	3,56	4,36	4,95
CR		1,00	1,00	0,60	0,24
Corrective factor F _p		1,00	1,00	1,00	0,99

9.5.3 Model i-HPV5H 0140 PSEC
Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)	min	-19 °C	
	max	20 °C	

HOT source:		WATER	
Operating temperature (cut-off)	min	20 °C	
	max	58 °C	

Performance data measured under partial load conditions according to UNI EN 14825

Operating conditions		A T _{bival}	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T _{des} = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	27,1	16,5	17,9	19,7
COP at partial load		2,34	3,30	3,98	4,42
COP at full load		2,34	3,30	3,99	4,48
CR		1,00	1,00	0,59	0,24
Corrective factor F _p		1,00	1,00	1,00	0,99

9.5.4 Model i-HPV5H 0250
Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)	min	-19 °C	
	max	20 °C	

HOT source:		WATER	
Operating temperature (cut-off)	min	20 °C	
	max	58 °C	

Performance data measured under partial load conditions, according to UNI EN 14825

Operating conditions		A T _{bival}	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T _{des} = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	39,8	24,3	24,0	27,2
COP at partial load		2,16	3,61	4,30	4,90
COP at full load		2,16	3,61	4,31	4,95
CR		1,00	1,00	0,65	0,25
Corrective factor F _p		1,00	1,00	1,00	0,99

9.5.5 Model i-HPV5H 0250 PS/PSI/PD

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performance data measured under partial load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	39,7	24,2	23,9	26,9
COP at partial load		2,17	3,68	4,38	4,97
COP at full load		2,17	3,68	4,39	5,02
CR		1,00	1,00	0,65	0,26
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.6 Model i-HPV5H 0250 PSEC

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performance data measured under partial load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	39,9	24,4	24,1	27,1
COP at partial load		2,15	3,51	4,14	4,67
COP at full load		2,15	3,51	4,15	4,71
CR		1,00	1,00	0,65	0,26
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.7 Model i-HPV5H 0260

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performace data measured uner load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	42,1	25,8	29,9	34,4
COP at partial load		2,10	3,22	4,22	5,15
COP at full load		2,10	3,22	4,23	5,20
CR		1,00	0,99	0,55	0,21
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.8 Model i-HPV5H 0260 PS/PSI/PD

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performace data measured uner load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	42,1	25,6	30,0	34,3
COP at partial load		2,15	3,36	4,44	5,37
COP at full load		2,15	3,36	4,45	5,43
CR		1,00	1,00	0,55	0,21
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.9 Model i-HPV5H 0260 PSEC

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performace data measured uner load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	42,1	25,7	30,2	34,4
COP at partial load		2,09	3,16	4,19	5,01
COP at full load		2,09	3,16	4,20	5,06
CR		1,00	1,00	0,55	0,21
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.10 Model i-HPV5H 0270

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performance data measured under partial load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	43,9	27,1	32,6	35,9
COP at partial load		2,01	3,10	4,29	4,78
COP at full load		2,01	3,10	4,29	4,83
CR		1,00	0,99	0,53	0,21
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.11 Model i-HPV5H 0270 PS/PSI/PD

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performance data measured under partial load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	43,8	27,0	32,4	35,7
COP at partial load		2,07	3,29	4,51	5,05
COP at full load		2,07	3,29	4,52	5,10
CR		1,00	0,99	0,53	0,21
Corrective factor Fp		1,00	1,00	1,00	0,99

9.5.12 Model i-HPV5H 0270 PSEC

Operating limits

COLD source:		OUTDOOR AIR	
Operating temperature (cut-off)		min	-19 °C
		max	20 °C

HOT source:		WATER	
Operating temperature (cut-off)		min	20 °C
		max	58 °C

Performance data measured under partial load conditions, according to UNI EN 14825

Operating conditions		A Tbival	B	C	D
Reference temperature	[°C]	-7	2	7	12
PLR (T des = -10°C)	[%]	88	54	35	15
Power DC at full load	[kW]	43,9	27,1	32,6	35,9
COP at partial load		2,00	3,07	4,20	4,69
COP at full load		2,00	3,07	4,21	4,73
CR		1,00	0,99	0,53	0,21
Corrective factor Fp		1,00	1,00	1,00	0,99

9.6 EER VALUES FOR CALCULATING THE ENERGY PERFORMANCE OF BUILDINGS ACCORDING TO UNI/TS 11300-3

The cooling capacity values and EER coefficients under partial load conditions are shown below. The reference conditions at partial load specified by UNI/TS 11300-3 are illustrated below. EER are also provided for load factors below 25%.

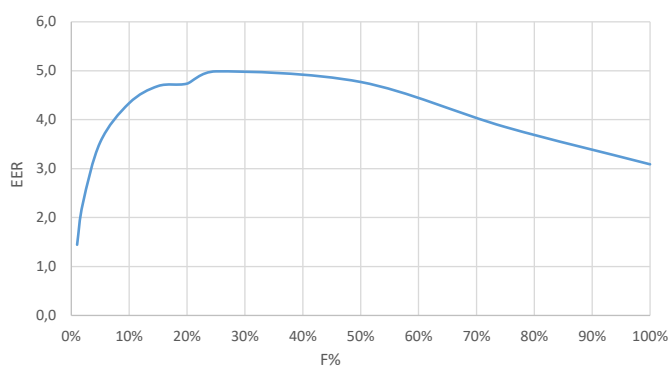
Test	Charge factor F%	Outside air dry bulb temperature [°C]	Chilled water temperature at fan inlet/outlet [°C]
1	100%	35	12/7
2	75%	30	*)/7
3	50%	25	*)/7
4	25%	20	*)/7

*) Temperature determined by water flow rate at full load.

9.6.1 Model i-HPV5H 0140

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,09	29,7
30	75%	3,85	22,2
25	50%	4,77	15,3
20	25%	4,99	16,1

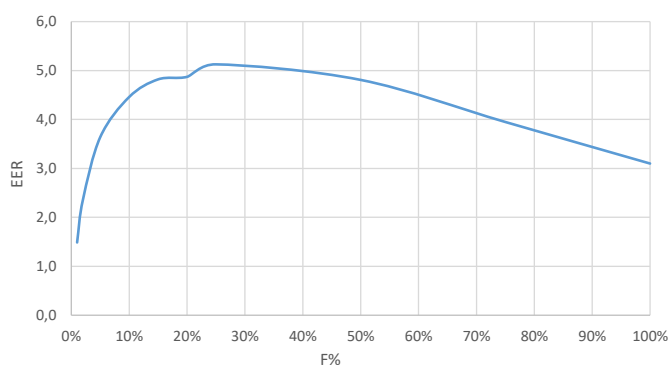
C	Load factor F%	EER @20°C x C
0,95	20%	4,74
0,94	15%	4,69
0,87	10%	4,34
0,71	5%	3,54
0,46	2%	2,29
0,29	1%	1,45



9.6.2 Model i-HPV5H 0140 PS/PSI/PD

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,10	29,6
30	75%	3,95	22,1
25	50%	4,81	15,2
20	25%	5,13	16,1

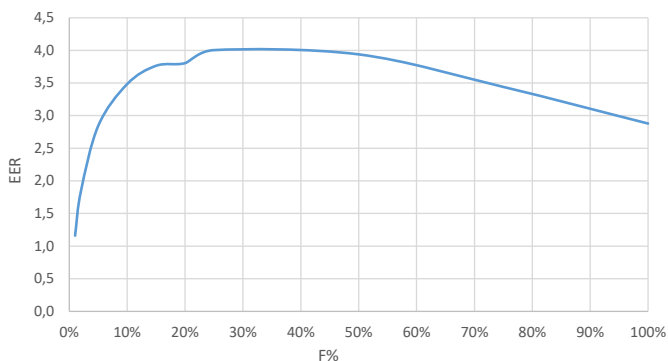
C	Load factor F%	EER @20°C x C
0,95	20%	4,87
0,94	15%	4,82
0,87	10%	4,46
0,71	5%	3,64
0,46	2%	2,36
0,29	1%	1,49



9.6.3 Model i-HPV5H 0140 PSEC

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	2,88	29,4
30	75%	3,44	22,1
25	50%	3,94	15,1
20	25%	4,01	15,7

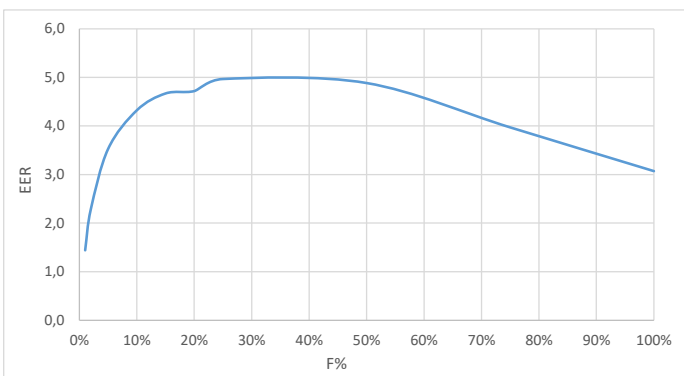
C	Load factor F%	EER @20°C x C
0,95	20%	3,80
0,94	15%	3,76
0,87	10%	3,48
0,71	5%	2,84
0,46	2%	1,84
0,29	1%	1,16



9.6.4 Model i-HPV5H 0250

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,07	36,2
30	75%	3,97	27,1
25	50%	4,89	22,6
20	25%	4,97	23,5

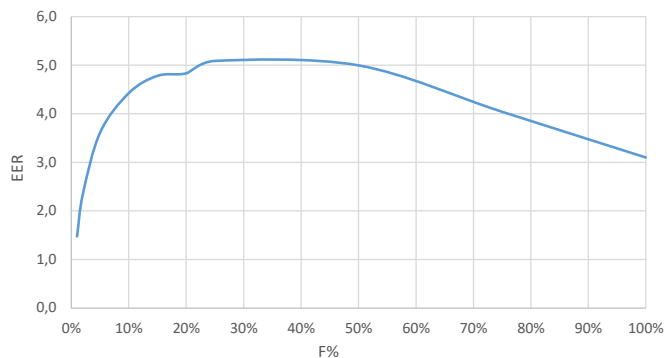
C	Load factor F%	EER @20°C x C
0,95	20%	4,72
0,94	15%	4,67
0,87	10%	4,32
0,71	5%	3,53
0,46	2%	2,28
0,29	1%	1,44



9.6.5 Model i-HPV5H 0250 PS/PSI/PD

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,10	36,3
30	75%	4,04	27,2
25	50%	4,99	22,5
20	25%	5,09	23,4

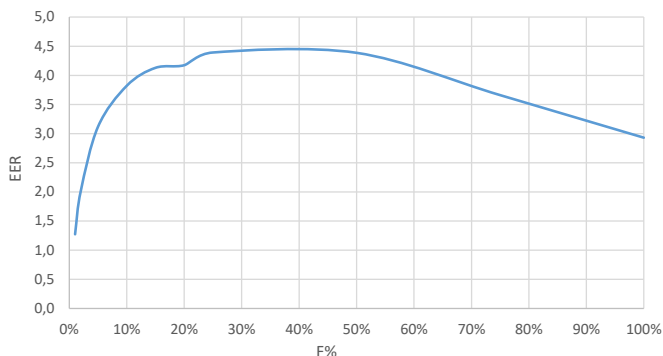
C	Load factor F%	EER @20°C x C
0,95	20%	4,83
0,94	15%	4,78
0,87	10%	4,43
0,71	5%	3,61
0,46	2%	2,34
0,29	1%	1,48



9.6.6 Model i-HPV5H 0250 PSEC

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	2,93	35,7
30	75%	3,66	26,8
25	50%	4,39	22,3
20	25%	4,39	23,1

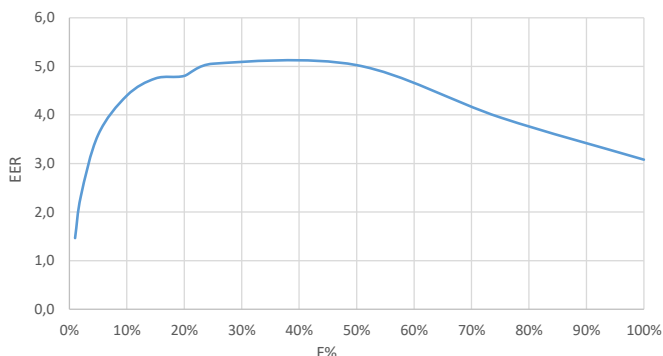
C	Load factor F%	EER @20°C x C
0,95	20%	4,17
0,94	15%	4,13
0,87	10%	3,82
0,71	5%	3,12
0,46	2%	2,02
0,29	1%	1,27



9.6.7 Model i-HPV5H 0260

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,08	48,0
30	75%	3,95	35,9
25	50%	5,03	27,8
20	25%	5,06	28,7

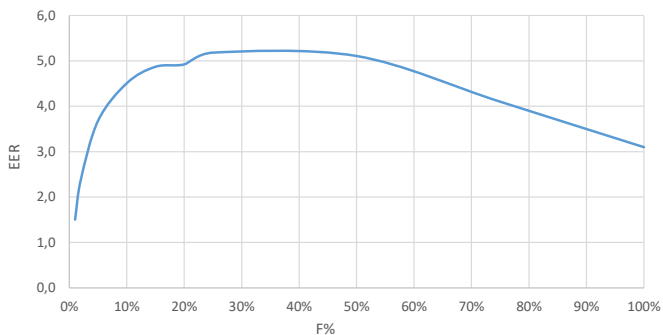
C	Load factor F%	EER @20°C x C
0,95	20%	4,80
0,94	15%	4,75
0,87	10%	4,40
0,71	5%	3,59
0,46	2%	2,33
0,29	1%	1,47



9.6.8 Model i-HPV5H 0260 PS/PSI/PD

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,10	48,0
30	75%	4,10	36,0
25	50%	5,11	27,5
20	25%	5,18	28,4

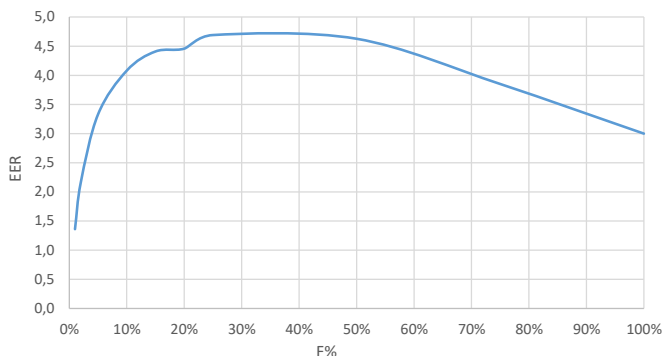
C	Load factor F%	EER @20°C x C
0,95	20%	4,92
0,94	15%	4,87
0,87	10%	4,51
0,71	5%	3,68
0,46	2%	2,38
0,29	1%	1,50



9.6.9 Model i-HPV5H 0260 PSEC

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,00	47,4
30	75%	3,85	35,3
25	50%	4,63	27,3
20	25%	4,69	28,5

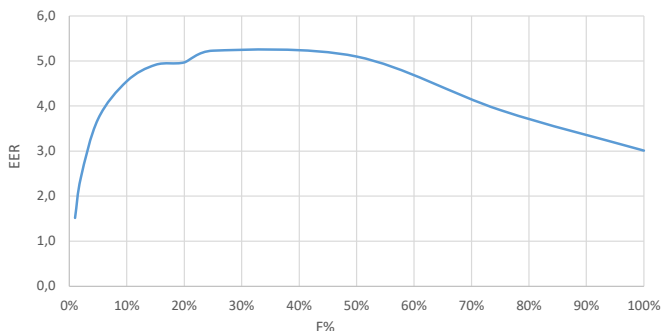
C	Load factor F%	EER @20°C x C
0,95	20%	4,46
0,94	15%	4,41
0,87	10%	4,08
0,71	5%	3,33
0,46	2%	2,16
0,29	1%	1,36



9.6.10 Model i-HPV5H 0270

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	2,96	52,7
30	75%	3,90	39,4
25	50%	4,92	29,9
20	25%	4,97	30,0

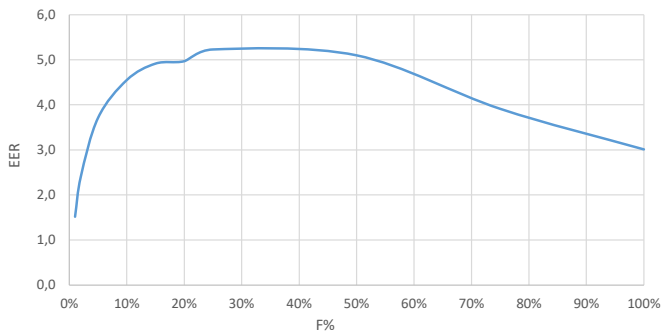
C	Load factor F%	EER @20°C x C
0,95	20%	4,73
0,94	15%	4,68
0,87	10%	4,33
0,71	5%	3,53
0,46	2%	2,29
0,29	1%	1,44



9.6.11 Model i-HPV5H 0270 PS/PSI/PD

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	3,01	53,2
30	75%	3,91	39,9
25	50%	5,10	30,1
20	25%	5,23	30,6

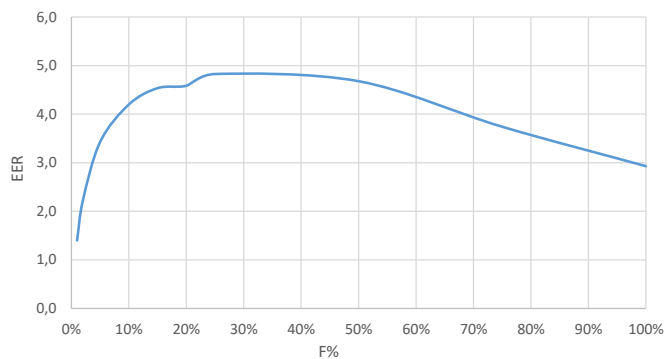
C	Load factor F%	EER @20°C x C
0,95	20%	4,97
0,94	15%	4,92
0,87	10%	4,55
0,71	5%	3,71
0,46	2%	2,41
0,29	1%	1,52



9.6.12 Model i-HPV5H 0270 PSEC

Outdoor air dry bulb temperature [°C]	Load factor F%	EER	Cooling capacity [kW]
35	100%	2,93	53,1
30	75%	3,74	39,6
25	50%	4,68	29,7
20	25%	4,83	30,7

C	Load factor F%	EER @20°C x C
0,95	20%	4,59
0,94	15%	4,54
0,87	10%	4,20
0,71	5%	3,43
0,46	2%	2,22
0,29	1%	1,40



10. REFRIGERANT SAFETY DATA SHEET

Name:	R32
HAZARDS IDENTIFICATION	
Main hazards:	Asphyxiation.
Specific hazards:	Quick evaporation could cause it to freeze.
FIRST AID MEASURES	
General information:	Do not administer to people who are unconscious.
Inhalation:	Immediately remove to fresh air. Use oxygen or artificial respiration as required. The use of adrenaline or similar drugs should be avoided.
Eye contact:	Carefully rinse with plenty of water for at least 15 minutes and get medical attention.
Skin contact:	Wash immediately with plenty of water for at least 15 minutes. Apply a sterile gauze. Immediately remove contaminated clothing.
FIRE FIGHTING MEASURES	
Extinguishing media:	Water spray, dry powder.
Specific hazards:	Breakage or explosion of vessel.
Specific methods:	Cool down the containers with a water spray from a safe position. Stop the product leakage if possible. Use water spray, if possible, to abate the fumes. Move the vessels away from the area of the fire if this can be done without posing any risks.
ACCIDENTAL RELEASE MEASURES	
Personal precautions:	Try to stop the leak. Evacuate personnel to safety areas. Ventilate appropriately. Eliminate the ignition sources. Use personal protective equipment.
Environmental precautions:	Try to stop the leak.
Cleaning methods:	Ventilate the area
HANDLING AND STORAGE	
Handling: technical measures/precautions:	Allow efficient air exchange and/or suction the work environments.
Advice for safe use:	Do not breath in fumes or aerosol.
Storage:	Close carefully and store in a cool, dry and well ventilated area. Keep in original containers. Incompatible products: explosive, flammable materials, organic peroxide
EXPOSURE CONTROLS/PERSONAL PROTECTION	
Control parameters:	OEL – data not available. DNEL: Derived no effect level (workers) long-term – systemic effects, inhalation = 7035 mg/m ³ . PNEC: Predicted no-effect concentration water (fresh water) = 0,142 mg/l aquatic, intermittent releases = 1,42 mg/l sediment, fresh water = 0,534 mg/kg dry weight
Respiratory protection:	Not required.
Eye protection:	Safety goggles.
Hand protection:	Latex gloves
Hygienic measures:	No smoking
PHYSICAL AND CHIMICAL PROPERTIES	
Colour:	Colourless.
Odour:	Ethereal. Hard to perceive at low concentrations.
Boiling point:	-51,7 °C at atm press
Flash point:	648 °C
Relative gas density (air=1)	1,8
Relative liquid density (water=1)	1,1
Solubility in water:	280000 mg/l.
STABILITY AND REACTIVITY	
Stability:	Stable under normal conditions.
Materials to avoid: Decomposition products hazardous:	Air, oxidizing agents, humidity. Under normal storage and use conditions, hazardous decomposition products should not be generated..
TOXICOLOGICAL INFORMATION	
Acute toxicity: Local effects: Long term toxicity:	LD/LC50/inHALATION/4 hours/on rat = 1107000 mg/m ³ . No known effect. No kown effect.
ENVIRONMENTAL INFORMATION	
Global warming potential GWP (R744=1):	675
Ozone Depletion Potential ODP (R11=1):	0
Disposal consideration:	Refer to the supplier's gas retrieval program. Avoid direct release into the atmosphere.

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