Scroll Compressor

Refrigerant R290 R290

35.4kW

31.7kW

SYSAQUA BLUE

Air Cooled Water Chillers

SYSAQUA BLUE.L (Cooling Only)
SYSAQUA BLUE.H (Heat Pump)
Model 35B

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

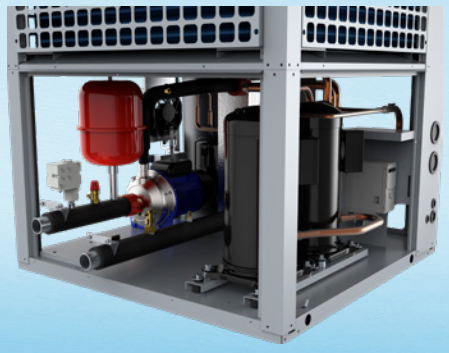
systemair

Key Points

- **R290** natural refrigerant,
- Unit is optimized for partial load operation,
- High SEER and Scop,
- 2 compressors fitted in tandem, with an immediate return on investment versus the inverter units,
- "Night Mode" for energy savings and even more reduced noise level in night operation,
- Water law is standard for energy savings,
- Possibility to combine up to 6 units with the NetTune module,
- Refrigerant circuit is completely closed in a separate compartment in order to reduce noise level,
- Great accessibility to internal components for service operations,
- Display on external panel allowing the complete control of the unit,
- Wide operating limits,
- High temperature operation up to 60 °C,
- Operation in heat pump mode down to external temperature of -20 °C,
- Fan speed control for low ambient operation in cooling mode down to -15 °C,
- ModBus interface available (reading/writing),
- Phase sequence monitor supplied as standard,
- User-friendly controller that allows to reduce the need of an external water tank in most of comfort air conditioning installations,
- Control logic on return or leaving water temperature,
- In cooling mode, 3.5 litres of buffer volume per kW are recommended,
- The **SYSAQUA BLUE.H** units ensure a constant temperature out of water even at very low temperatures
- Double water set point,
- Water filter (not fitted) and water flow switch (factory fitted) are supplied as standard,
- "Plug and play" hydraulic kit is standard,
- Automatic air vent,
- Victaulic connection on internal components ensuring a perfect sealing and facilitating service operations,
- Pressure tapping point 1/4" on water pipes for pressure measurement,
- Small footprint, allowing shipping and handling costs to be saved, units find easily a place to be installed.

SYSAQUA BLUE

SYSAQUA BLUE.L 35B
SYSAQUA BLUE.H 35B



Specifications

General

The new **SYSAQUA BLUE.L/SYSAQUA BLUE.H 35B** have been designed and optimized to operate with R290 refrigerant fluid. They are of single refrigerant circuit type.

They are available in **cooling only (SYSAQUA BLUE.L)** and **heat pump (SYSAQUA BLUE.H)** versions.

Each unit delivers a nominal cooling capacity of **31.7 kW** and a nominal heating capacity of **35.4 kW**.

All units are equipped with **two scroll compressors fitted in tandem** for adapting to partial system loads.

The general operation status of the machine is continuously under the control of an **IHM controller**.

The **SYSAQUA BLUE.L** and **SYSAQUA BLUE.H units can operate without water tank**, thanks to the IHM controller that implements an **auto-adaptative control logic** ensuring a total protection of the compressors at different load or water volume conditions.

The minimum water volume requested in cooling mode is **3.5L/kW** for application air conditioning and **10L/kW** for application process.

In heating mode, **12.5L/kW** are recommended in order to guarantee homogeneous temperatures during the defrosting cycles (comfort and energy savings).

A **fan speed controller** can be also supplied as factory-fitted option to authorize the unit to operate in cooling mode at low ambient temperature.

SYSAQUA BLUE.L and **SYSAQUA BLUE.H** units can be supplied in several versions:

- **STD (Standard) version**
- **HPF version** : Increases the static pressure.

Cabinet and structure

The cabinet and structure of the unit are of heavy duty galvanized steel. All galvanized steel components are **individually painted** by a special painting process before the assembly of the unit.

This painting system performs a homogeneous protection to the corrosion. The painting is a polyester powder based type, coloured in **RAL 7040**.

The units **SYSAQUA BLUE.L/SYSAQUA BLUE.H** are suitable for outdoor installation, directly on the building roof or at the ground level.

Compressors

Each unit is equipped with two scroll compressors fitted on a rail and assembled together to form **tandem compressors**.

The compressors are then mounted on rubber pads in order to eliminate noise and vibration transmissions.

The compressor motors have a direct start-up. Each motor is cooled by the refrigerant gas and is equipped with an overload protection.

A **phase sequence monitor** is supplied as standard.

Evaporator

The evaporator is consisting of a stainless steel plate heat exchanger insulated with closed cell synthetic foam. It is protected by an **antifreeze electric heater** to ensure a good protection against freezing at low ambient temperature when the unit is switched off and at low water temperature when the unit is running.

Maximum working pressure is 3.5 bar at water side and 27.2 bar(g) at refrigerant side.

Condenser

The condenser is a finned coil constructed with seamless copper tubes mechanically expanded into aluminium fins. The fins of **SYSAQUA BLUE.H** coils are made of aluminium with hydrophylic blue coating to facilitate water droplets drain.

The condenser is largely dimensioned in order to optimize performance and defrosting cycles.

The condenser can be equipped, as optional, a protective grille to prevent shocks.

Condenser fans and motors

The fan motor has IP54 grade and is equipped with a thermal overload protection.

A pressostatic type fan speed controller can be delivered as factory-fitted option. It allows the unit to operate in cooling mode at low ambient temperatures down to -10 °C minimum, because it regulates the fan speed in order to maintain the constant condensing temperature.

All fans are fitted with a protective grille on top.

Refrigerant circuit

All units have one refrigerant circuit consisting of : scroll tandem compressors, plate heat exchanger, electronic expansion valve, reverse cycle valve and liquid reservoir (heat pump version only), condenser coil, as well as safety and control devices such as high pressure switch and high/low pressure transducers.

Inspection on refrigerant via a sight glass can be done during service operations, by removing an access panel, without disturbing the unit operating conditions.

All refrigerant components are shown in the functional diagrams illustrated in the next pages, section "Refrigerant flow diagrams".

Hydraulic circuit

Thanks to the design flexibility on the hydraulic circuit, all the units can be configured in several ways :

- **BASIC unit** : Unit without pump, the hydraulic circuit contains the following components : supplied loose water filter, mounted water flow switch, water safety valve, automatic air vent, optional field-installed in/out 1 1/2" water valves.
  All water piping is covered with thermal insulation.
- **1P-SP** : One pump unit having the same equipment as BASIC unit + a pump with 150 kPa external static pressure. An air vent is provided for this configuration.
- "**Variable Primary Flow**" is used to modulate the power of the hydraulic pump

The different components of hydraulic kit are interconnected by Victaulic couplings in order to facilitate maintenance operations.

The hydraulic connections are of male gas threaded type; for the connection diameters, please refer to the physical data tables on the next pages.

Specifications

Control panel

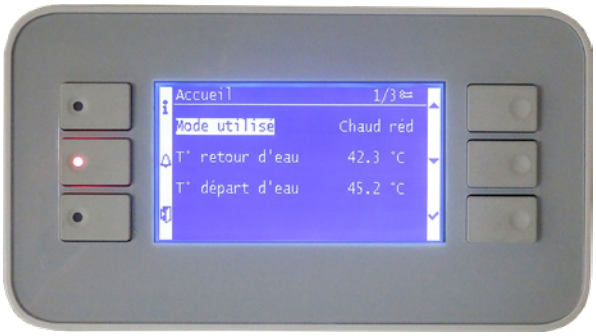
The units are fitted with an external control panel that displays the operating parameters and alarms.

The control panel is accessible from exterior without removing any parts, nor shutting down the unit, because it is placed on an external panel.

The **SYSAQUA BLUE.L/SYSAQUA BLUE.H** units are equipped with a microprocessor based control with a new **IHM** logic that implements an intelligent control **with anticipation of needs**, either on entering water temperature, or on leaving water temperature.

The main features of this control system are :

User interface



- User-friendly : with only 6 buttons and a tree logic, it is possible to control the unit easily,
- Reliable : all indications on the display are visible in every weather conditions,
- Alarm visualization with a logging of the last 150 alarms,
- Remote ON/OFF switching,
- Compressor and pump working hour counter,
- Pressure transducers to control discharge and suction temperatures,
- Maximum discharge temperature control,
- Part load operating mode,
- Remote Cooling/Heating mode switching,
- Compatibility with BMS (RS485 ModBus RTU or BacNet MSTP protocol),
- Compressor operating limits stored in a flash memory.

Control and safety devices

Each unit is complete with the following safety and control devices :

Safety :

- Fan motor overload protection.
- Compressor motor overload protection.
- Water flow switch.
- Water filter (supplied loose).
- High pressure switch.
- High and low pressure transducers.
- Evaporator antifreeze electric heater.
- Crankcase heater.
- Safety valve on 27.2 bar refrigerated side.
- Safety valve on 3.5 bar water side.
- Module de détection de gaz.

Control :

- Entering water temperature sensor.
- Leaving water temperature sensor.
- Coil temperature sensor.
- Discharge temperature sensor.
- Air temperature sensor.
- Suction and discharge pressure transducers.
- Dry contact available to the client:
  ON / OFF, SUMMER / WINTER, Day / Night.

Conformity with standards

All **SYSAQUA BLUE.L/SYSAQUA BLUE.H** units are in compliance with the following standards:

- Machine Directive : 2006/42/EC
- Low Voltage Directive : 2014/35/UE
- Electromagnetic Compatibility Directive : 2014/30/UE
- Pressure Equipment Directive : 2014/68/UE
- RoHs directive : 2011/65/EU
- Ecodesign directive : 2009/125/EC

Factory-installed options

- Condenser protective grille.
- Coil with epoxy treatment.
- Lack of water pressure switch.
- 1-pump hydraulic kit
- Variable Primary Flow
  - ✔ double speed
  - ✔ constant outlet pressure
- Fan speed control kit (for operation with low ambient temperature down to -10 °C).
- Nordic Pack including a protection of the external coils and a heating wire in condensate tray.

Field-installed accessories

- Anti-vibration rubber pads or spring damper.
- In/Out valve kit.

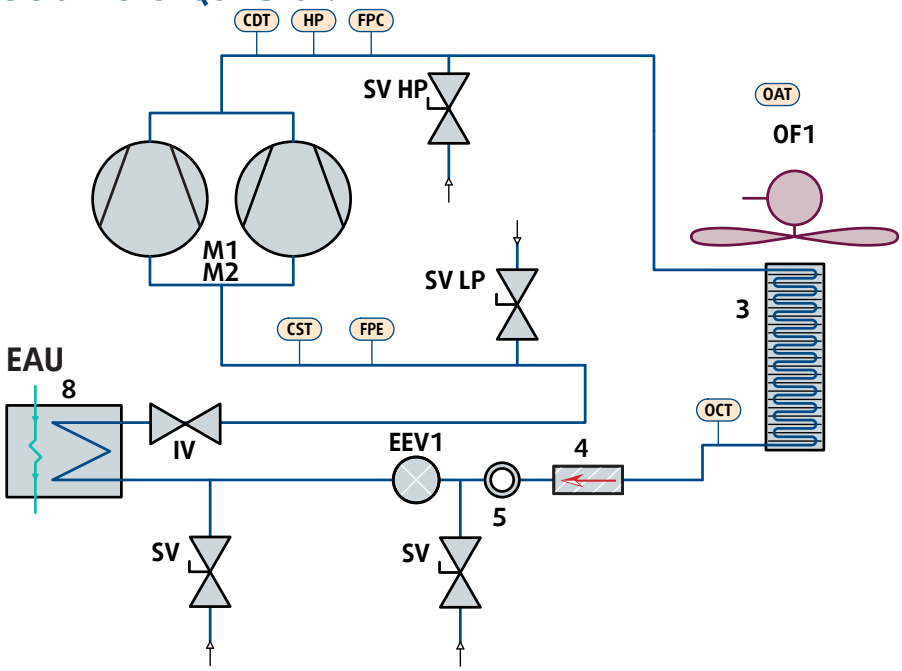
Models designation

SYSAQUA35B	.	H	.	1P-SP	.	STD	.	SYS	.	AC	.	+	.	CG	.	T
①		②		③		④		⑤		⑥				⑦		⑦

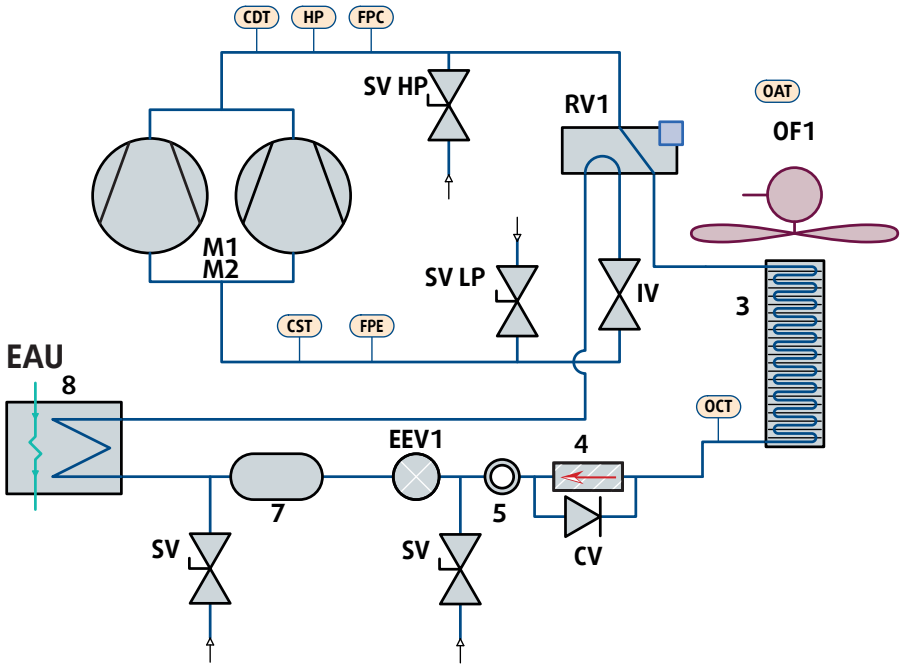
REP.		Description			
①	Size	**SYSAQUA35B** : size 35			
②	Version	**L** : Cooling only		**H** : Heat pump	
③	Hydraulic circuit	Empty : Without pump		**1P-SP** : Single pump	
④	Regulation	**STD** : Standard		**FSC** : All seasons	
⑤	Brand	**SYS** : Systemair			
⑥	Fan type	**AC** : Standard fan AC motor		**HPF** : High pressure fan	
⑦	Option	**CG** : Outdoor coil protection grid **EPO** : Finned coil treatment - epoxy **WPS** : Low water pressure sensor **AVS** : Spring damper **AVM** : rubber pads **VI** : Water isolation valves **T** : Buffer tank		**SS** : Soft Starter **NORD** : Pack nordic **V2** : Variable pump double speed **VP** : Variable pump constant outlet pressure **NET** : NetTune **4G** : 4G modem	

Refrigerant Flow Diagram

Cooling only version - SYSAQUA BLUE.L



Heat pump version - SYSAQUA BLUE.H

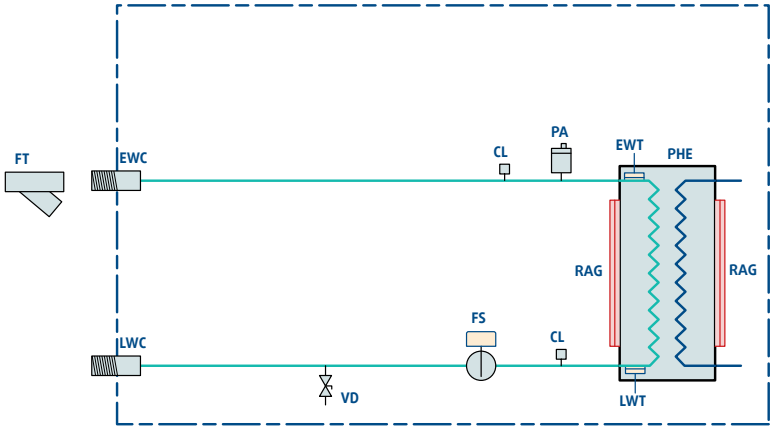


components	
M1/M2	Tandem scroll compressors
RV1	Cycle reversal valve
OF1	Outdoor fan motor
3	Air cooled condenser
4	Filter drier
CV	Check valve
5	Sight glass
EEV1	Electronic expansion valve
7	Liquid reservoir
8	Plate heat exchanger
	Pressure tapping point 1/4"

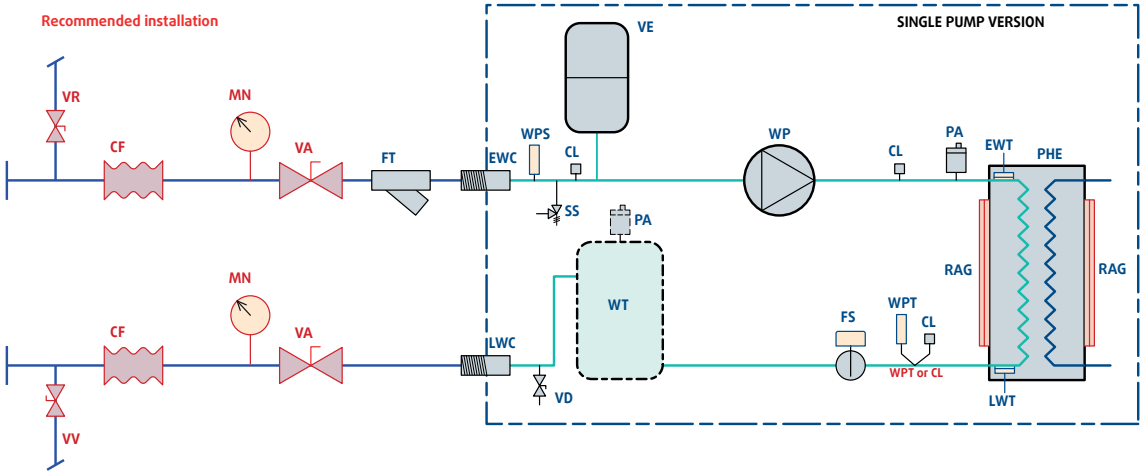
safety/control devices	
FPC	High pressure transducer
HP	High pressure switch
CDT	Discharge temperature sensor
FPE	Low pressure transducer
CST	Suction temperature sensor
OAT	Outdoor air temperature sensor
OCT	Condenser outlet temperature sensor
SV	Service valve
SV HP	Service valve HP
SV LP	Service valve BP
IV	Isolating valve

Hydraulic Circuit Diagram

Without pump version



Recommended installation - Single pump version

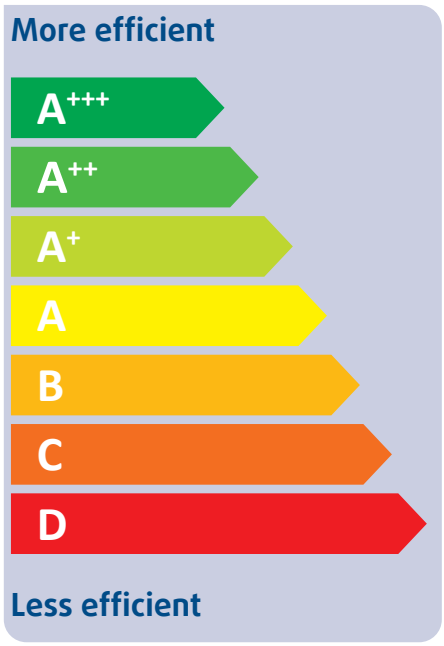


Recommended installation	
VA	Globe valve (option)
VV	Drain valve
CF	Connexion flexible
VR	Water charging valve
MN	Manometer

Hydraulic Circuit	
FT	Filter (supplied loose)
EWC/LWC	Inlet/Outlet gas male connection 1"1/2
VE	Pressure expansion tank
WPS	Lack of water pressure switch (optional)
SS	Safety valve
WP	Pump
PA	Automatic air vent
CL	Pressure tap 1/4"
EWT	Inlet water temperature sensor
LWT	Outlet water temperature sensor
PHE	Plate heat exchanger
RAG	Antifreeze heater
FS	Flow switch
VD	Drain valve
WT	Buffer tank
WPT	Pressure transducer (optional)

Energy performance

Energy class



	Exchanger outlet temperature °C	SCOP *	Class
SYSAQUA35B.H.STD.AC SYSAQUA35B.H.FSC.AC	35	3.54	A+
	55	3.08	A+
SYSAQUA35B.H.1P-SP.STD.AC SYSAQUA35B.H.1P-SP.FSC.AC	35	3.20	A+
	55	/	/
SYSAQUA35B.H.1P-SP.STD.AC+V2 SYSAQUA35B.H.1P-SP.STD.AC+VP	35	3.30	A+
	55	/	/
SYSAQUA35B.H.1P-SP.FSC.AC+V2 SYSAQUA35B.H.1P-SP.FSC.AC+VP	35	3.30	A+
	55	3.08	A+

Seasonal space heating energy efficiency class according to the Delegated Regulation No. 811/2013 of the European Commission.
* According to EN14511-2013

Operating Limits

SYSAQUA BLUE.L/SYSAQUA BLUE.H in cooling mode

SYSAQUA BLUE.L/SYSAQUA BLUE.H models			35B	
			Min.	Max.
Eau	Water outlet temperature *	°C	-15	18
	Water ΔT **	K	3	12
	Flow rate **	m^3/h	3.5	9.3
Air temperature		°C	See diagrams on next page	

* Below 5 °C, glycol is required.
** considered at nominal unit capacity

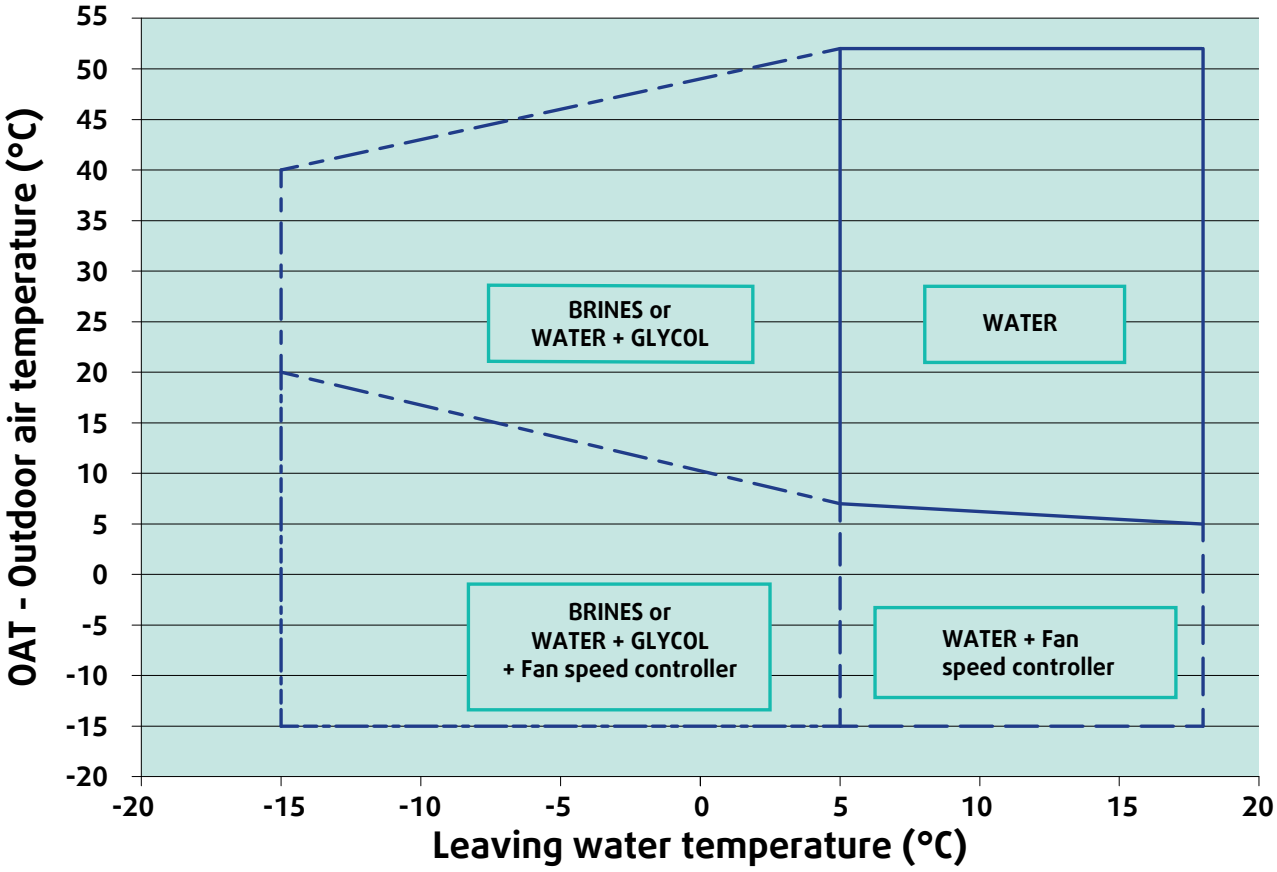
SYSAQUA BLUE.H in heating mode

SYSAQUA BLUE.H models			35B	
			Min.	Max.
Water	Water outlet temperature	°C	20	60
	Water ΔT **	K	3	12
	Flow rate **	m^3/h	3.9	10.3
Air temperature		°C	See diagrams on next page	

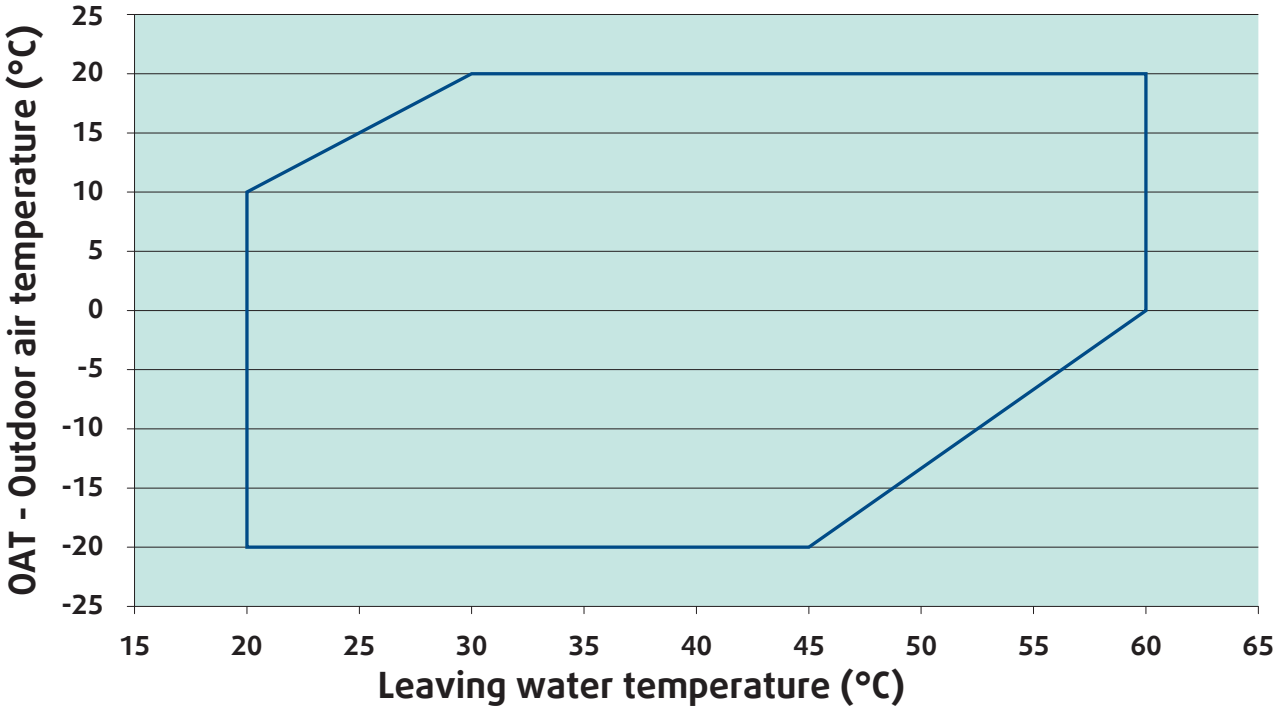
** considered at nominal unit capacity

Operating Limits

SYSAQUA BLUE.L/SYSAQUA BLUE.H in cooling mode



SYSAQUA BLUE.H in heating mode



Correction Factors

Fouling factors - Evaporator

Fouling factor (m².°C/kW)	Capacity	Power input
0.044	1.000	1.000
0.088	0.987	0.995
0.176	0.964	0.985
0.352	0.915	0.962

Fouling factors - Condenser

Fouling factor (m².°C/kW)	Capacity	Power input
0.044	1.000	1.000
0.088	0.987	1.023
0.176	0.955	1.068
0.352	0.910	1.135

Altitude factors

Altitude (m)	Capacity	Power input
0	1.000	1.000
600	0.987	1.010
1200	0.973	1.020
1800	0.958	1.030
2400	0.943	1.040

Correction factors - Ethylene glycol

% glycol	Freezing point (°C)	Capacity	Power input	Water flow	Pressure drop
0	0	1.00	1.00	1.00	1.00
10	-4	0.995	0.998	1.015	1.070
20	-10	0.985	0.995	1.050	1.160
30	-17	0.970	0.985	1.085	1.235

Warning !

Ethylene glycol is toxic to the environment. Moreover, it is not suitable for heating with domestic hot water production by simple exchange.

Correction factors - Propylene glycol

% glycol	Freezing point (°C)	Capacity	Power input	Water flow	Pressure drop
0	0	1.00	1.00	1.00	1.00
10	-3	0.991	0.994	1.005	1.112
20	-7	0.977	0.991	1.030	1.175
30	-13	0.945	0.975	1.067	1.290

Physical Data - SYSAQUA BLUE.L STD

SYSAQUA BLUE - Cooling only version			35B
Cooling capacity		kW	31.7
Power input		kW	10.2
Total EER 100% (1)			3.10
Energy class EER			A
SEER (2)			4.33
ηsc (2)			170.0
Energy class SEER			C
Power supply			400V/3~+N/50Hz
Startup type			Direct
Maximum operating current		A	34.3
Startup current (without Soft Starter)		A	120.4
Startup current (with Soft Starter)		A	55.0
REFRIGERANT			
Type			R290
Number of refrigerant circuit			1
Charge		kg	2.77
COMPRESSORS			
Number			2
Type			Scroll
Part load steps		%	0/50/100
Crankcase heater		W	2 X 53
EVAPORATOR			
Number			1
Type			Plate
Water flow		m^3/h	5.55
Water pressure drop		kPa	19
Water volume		l	3.32
Antifreeze heater		W	30
COIL			
Number			1
Frontal surface		m^2	2.79
Number of rows			2
FAN			
Number			1
STD	Air flow	m^3/h	15 840
	Rotational speed	tr/mn	675
	Power input each fan	W	695
HPF	Air flow	m^3/h	15 840
	Rotational speed	tr/mn	874
	Power input each fan	W	1 922
	Static pressure	Pa	170
WATER CONNECTIONS			
Type			Male gas threaded
Inlet diameter		pouces	1"1/2
Outlet diameter		pouces	1"1/2
BUFFER TANK (OPTION)			
Volume		L	100
DIMENSIONS			
Length		mm	1 000
Width		mm	1 000
Height	STD	mm	1 983
	HPF	mm	2 025
WEIGHT			
Operating weight		kg	312
ACOUSTICAL DATA			
Sound power level		dB(A)	83
Sound pressure level (*)		dB(A)	55

(*) Sound pressure levels calculated at 10 meters. Sound pressure levels refer to NF EN ISO 3744 - 2012 with parallepiped shape.

(1) According to EN14511-2013

(2) According to Eurovent

Physical Data - SYSAQUA BLUE.H STD

SYSAQUA BLUE - Heat pump version			35B
Cooling capacity		kW	31.7
Power input		kW	10.2
Total EER 100% (1)			3.10
Energy class EER (2)			A
SEER (2)			4.33
ηsc (2)			170.0
Energy class SEER			C
Heating capacity		kW	35.4
Power input		kW	10.3
Total COP 100% (1)			3.45
SCOP (2)			3.54
ηsh (2)			139.0
Energy class SCOP (2)			A+
Power supply			400V/3ph+N/50Hz
Startup type			Direct
Maximum operating current		A	34.3
Startup current (without Soft Starter)		A	120.4
Startup current (with Soft Starter)		A	55.0
REFRIGERANT			
Type			R290
Number of refrigerant circuit			1
Charge		kg	2.77
COMPRESSORSS			
Number			2
Type			Scroll
Part load steps		%	0/50/100
Crankcase heater		W	2 X 53
EVAPORATOR			
Number			1
Type			Plate
Cooling mode	Water flow	m^3/h	5.55
	Water pressure drop	kPa	19.00
Heating mode	Water flow	m^3/h	6.16
	Water pressure drop	kPa	22.50
Water volume		l	3.32
Antifreeze heater		W	30
COIL			
Number			1
Frontal surface		m^2	2.79
Number of rows			2
FAN			
Number			1
STD	Air flow	m^3/h	15 840
	Rotational speed	tr/mn	675
	Power input each fan	W	695
HPF	Air flow	m^3/h	15 840
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WATER CONNECTIONS			
Type			Male gas threaded
Inlet diameter		pouces	1"1/2
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BUFFER TANK (OPTION)			
Volume		L	100
DIMENSIONS			
Length		mm	1 000
Width		mm	1 000
Height	STD	mm	1 983
	HPF	mm	2 025
WEIGHT			
Operating weight		kg	312
ACOUSTICAL DATA			
Sound power level		dB(A)	83
Sound pressure level (*)		dB(A)	55

(*) Sound pressure levels calculated at 10 meters. Sound pressure levels refer to NF EN ISO 3744 - 2012 with parallepiped shape.

(1) According to EN14511-2013

(2) According to Eurovent

Weight

Sizes		35B
without pump	kg	307
Simple pump	kg	+20
buffer tank (dry weight)	Kg	+65

Electrical Data

Unit without pump with condenser fans standard

Sizes		35B
Power supply		400V / 3~N / 50Hz
Maximum current	A	34.3
Total startup current (without Soft Starter)	A	120.4
Total startup current (with Soft Starter)	A	55.0

Unit without pump with condenser fans HPF

Sizes		35B
Power supply		400V / 3~N / 50Hz
Maximum current	A	36.0
Total startup current (without Soft Starter)	A	122.1
Total startup current (with Soft Starter)	A	56.7

Unit with standard pump and condenser fans standard

Sizes		35B
Power supply		400V / 3~N / 50Hz
Maximum current	A	36.9
Total startup current (without Soft Starter)	A	123.0
Total startup current (with Soft Starter)	A	57.6

Unit with standard pump and condenser fans HPF

Sizes		35B
Power supply		400V / 3~N / 50Hz
Maximum current	A	38.6
Total startup current (without Soft Starter)	A	124.7
Total startup current (with Soft Starter)	A	59.3

Simple pump 1P (400V / 3~N / 50Hz)

Sizes	Nominal power (kW)	Max. current (A)
35B	0.85	2.6

Acoustical Data

Sound power level Lw-dB - condenser fans standard

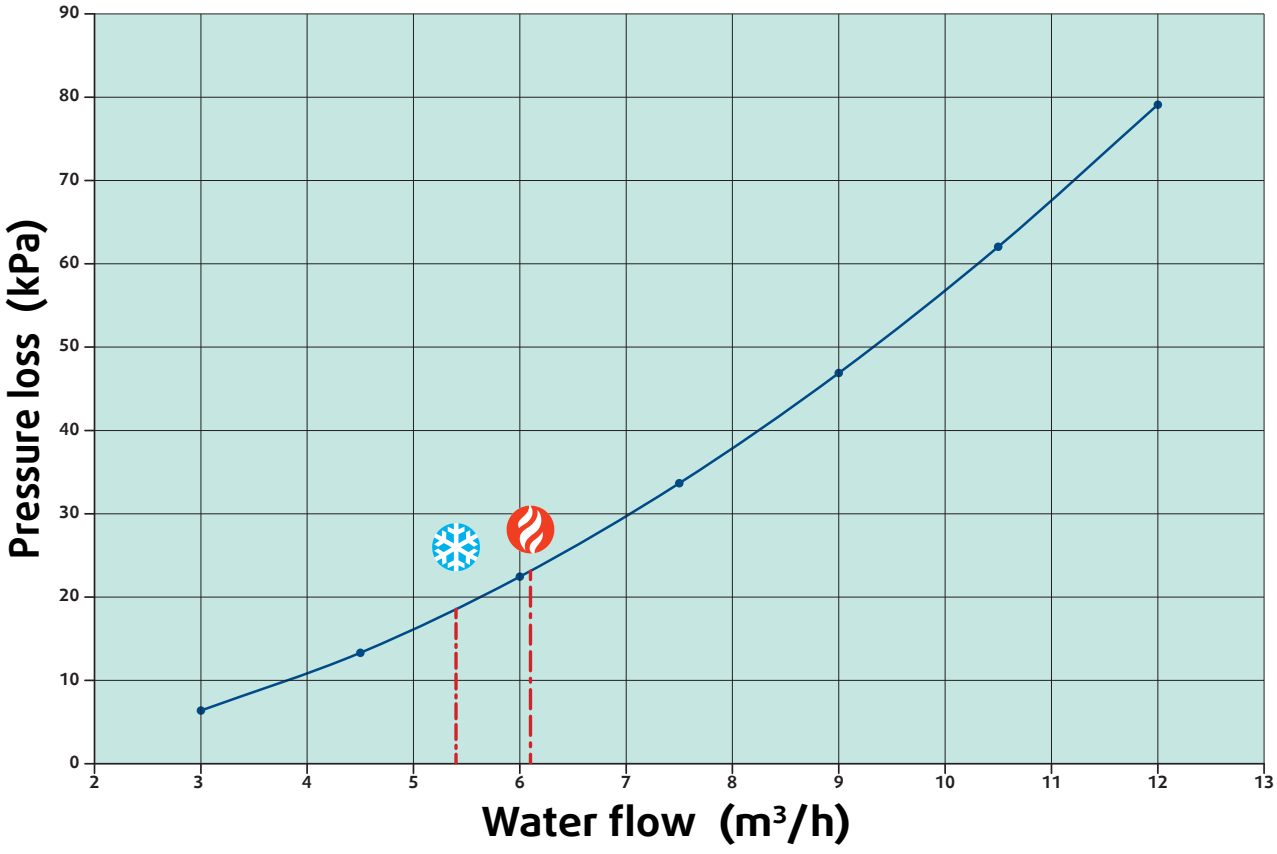
SYSAQUA BLUE.L/ SYSAQUA BLUE.H models	Frequency in octave band (Hz)						Lw global dB (A)	Sound pressure level dB(A) *
	125	250	500	1000	2000	4000		
35B	60	60	67	78	74	80	83	55

Sound power level Lw-dB - condenser fans HPF

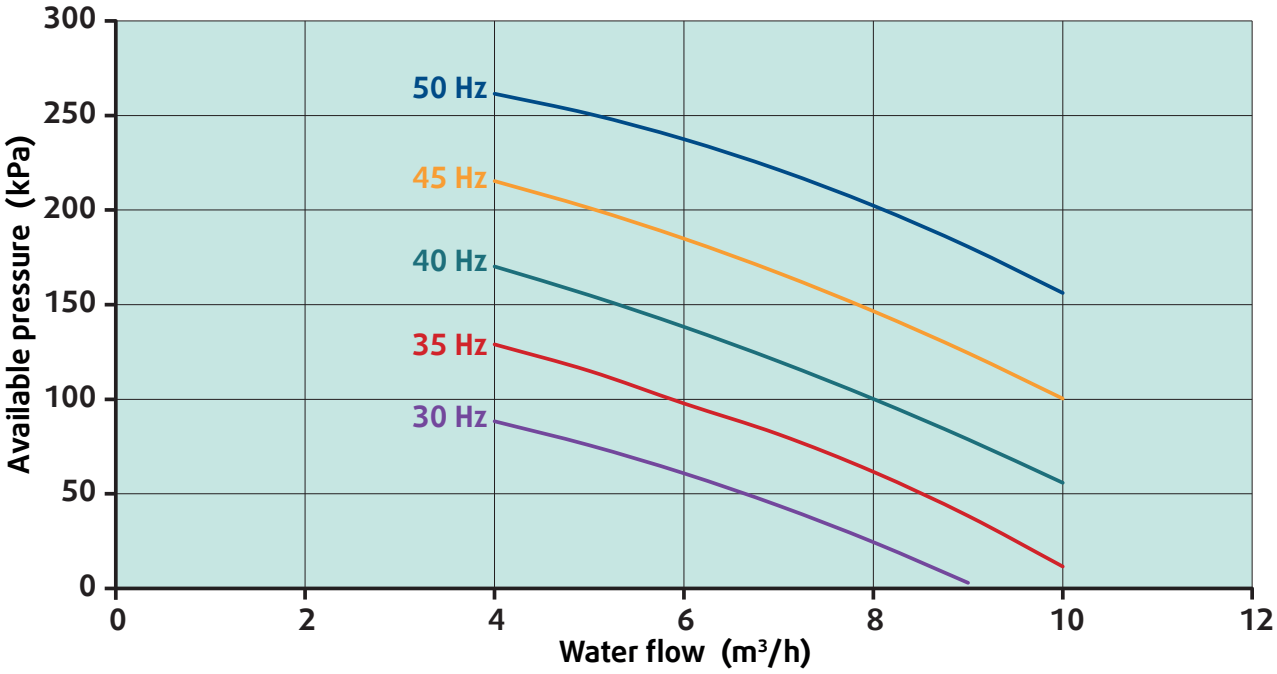
SYSAQUA BLUE.L/ SYSAQUA BLUE.H models	Frequency in octave band (Hz)						Lw global dB (A)	Sound pressure level dB(A) *
	125	250	500	1000	2000	4000		
35B	60	72	73	80	76	80	84	56

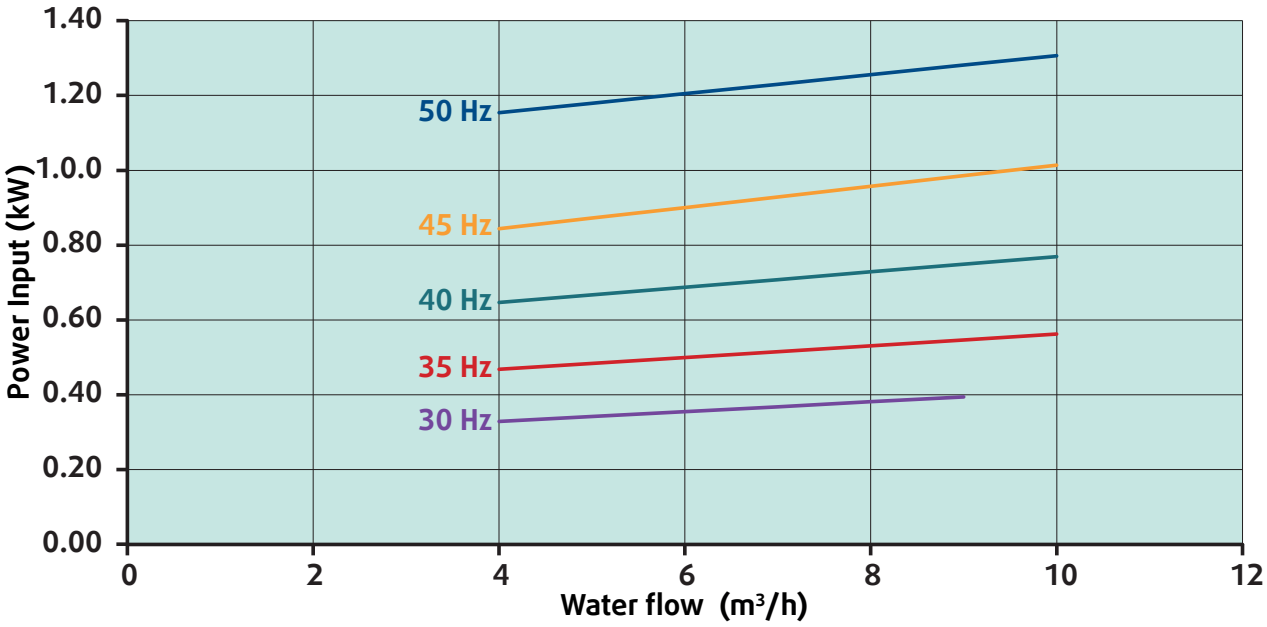
(*) Sound pressure levels calculated at 10 meters. Sound pressure levels refer to NF EN ISO 3744 - 2012 with parallepiped shape.

Water Pressure Drop of Indoor Heat Exchanger



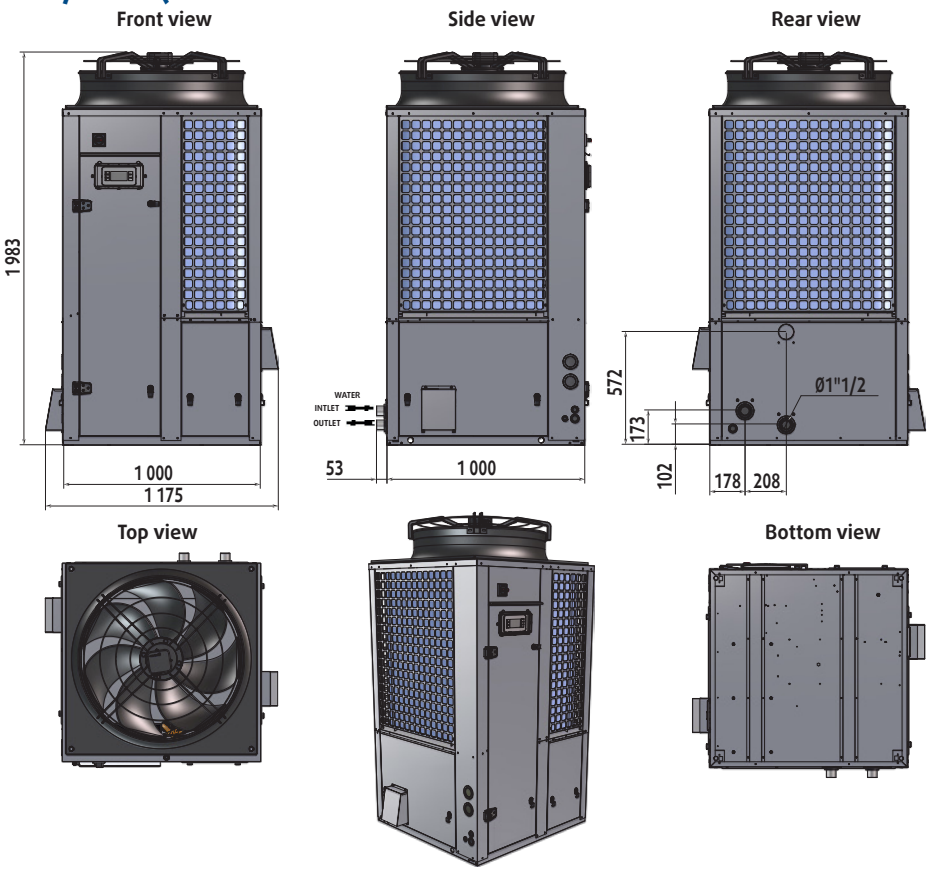
Water Pump Curves



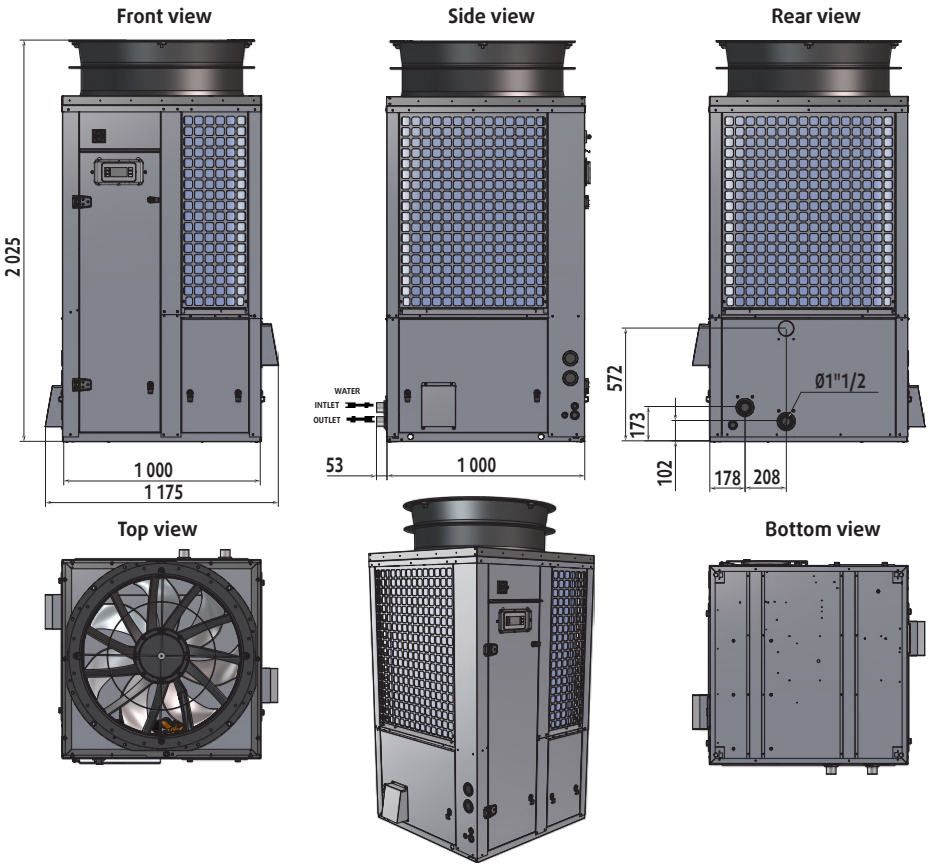


Dimensions (mm)

SYSAQUA BLUE.L/SYSAQUA BLUE.H - fan standard

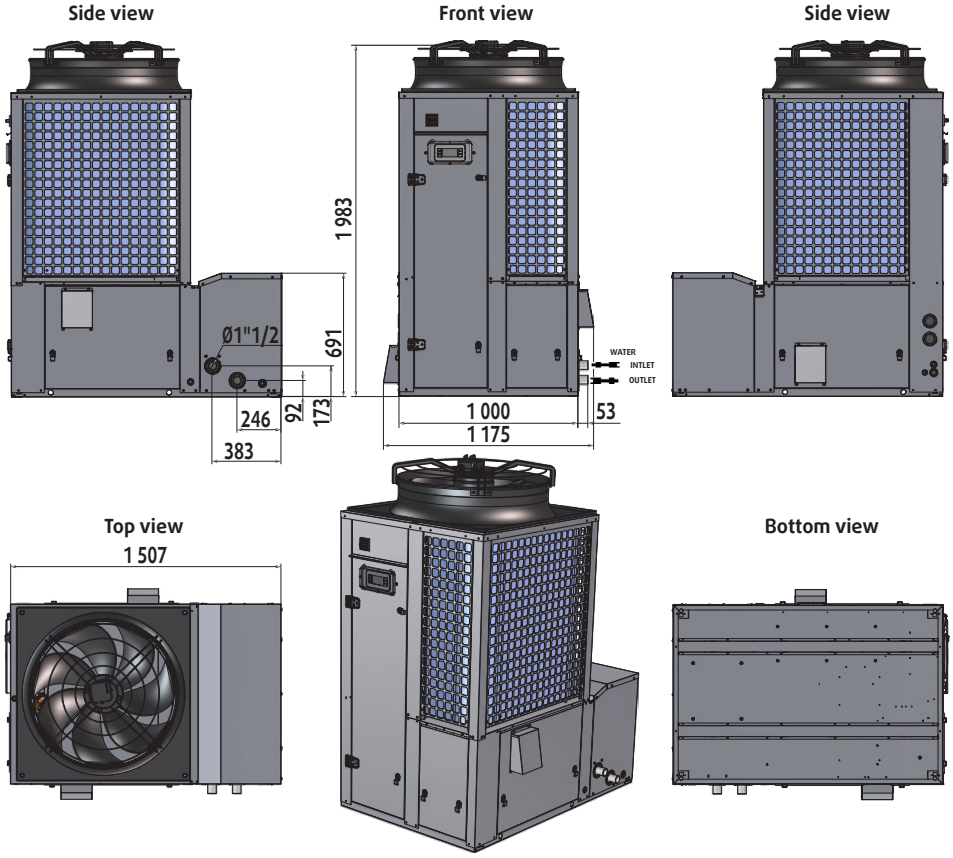


SYSAQUA BLUE.L/SYSAQUA BLUE.H - fan HPF

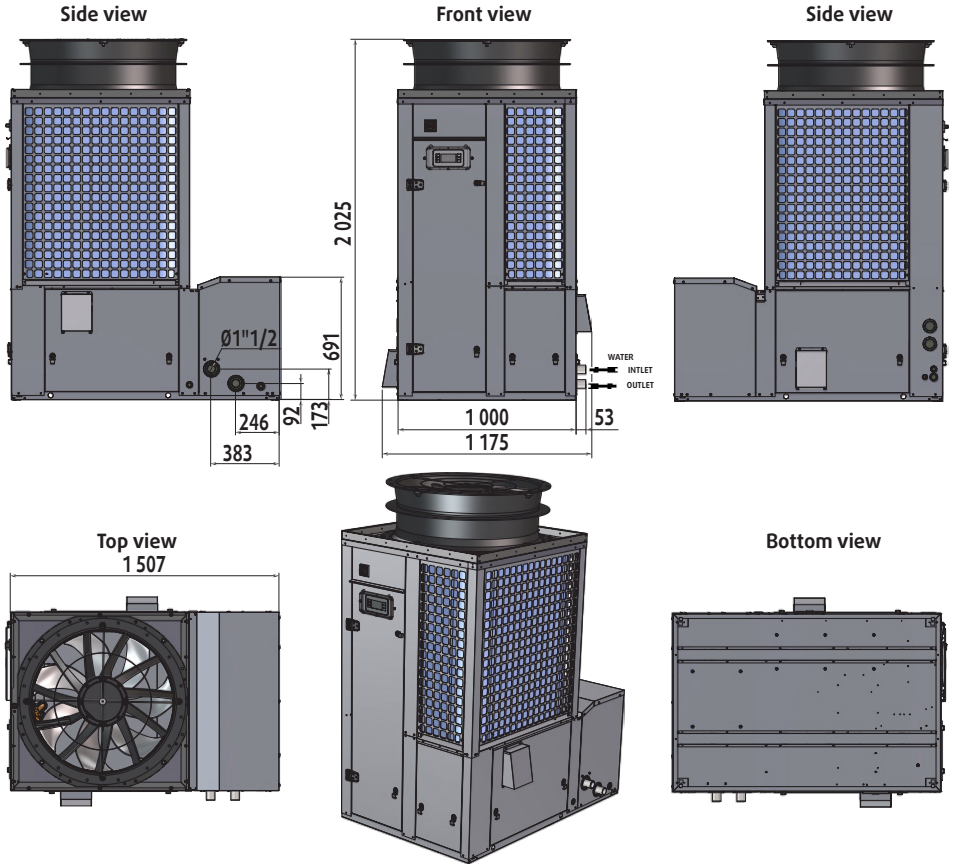


Dimensions (mm)

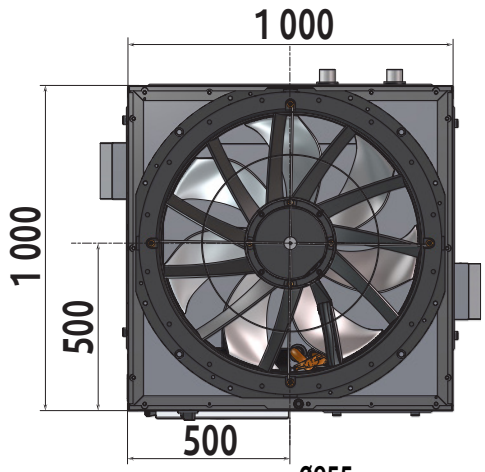
SYSAQUA BLUE.L/SYSAQUA BLUE.H with buffer tank - fan standard

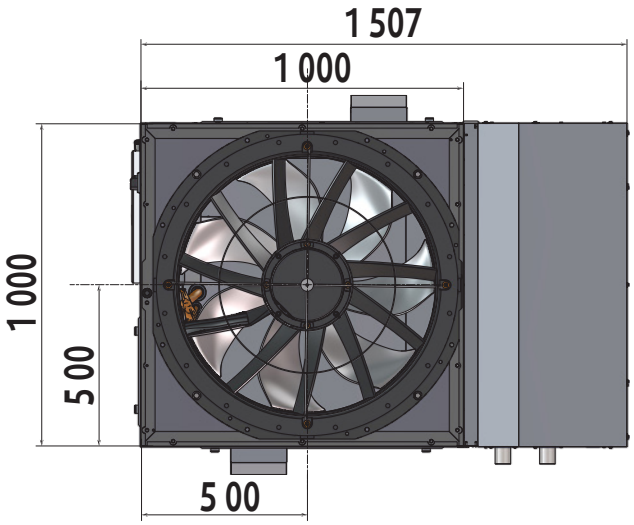


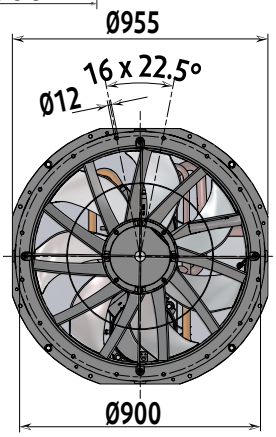
SYSAQUA BLUE.L/SYSAQUA BLUE.H with buffer tank - fan HPF

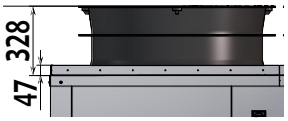


Duct outlet dimensions (mm)



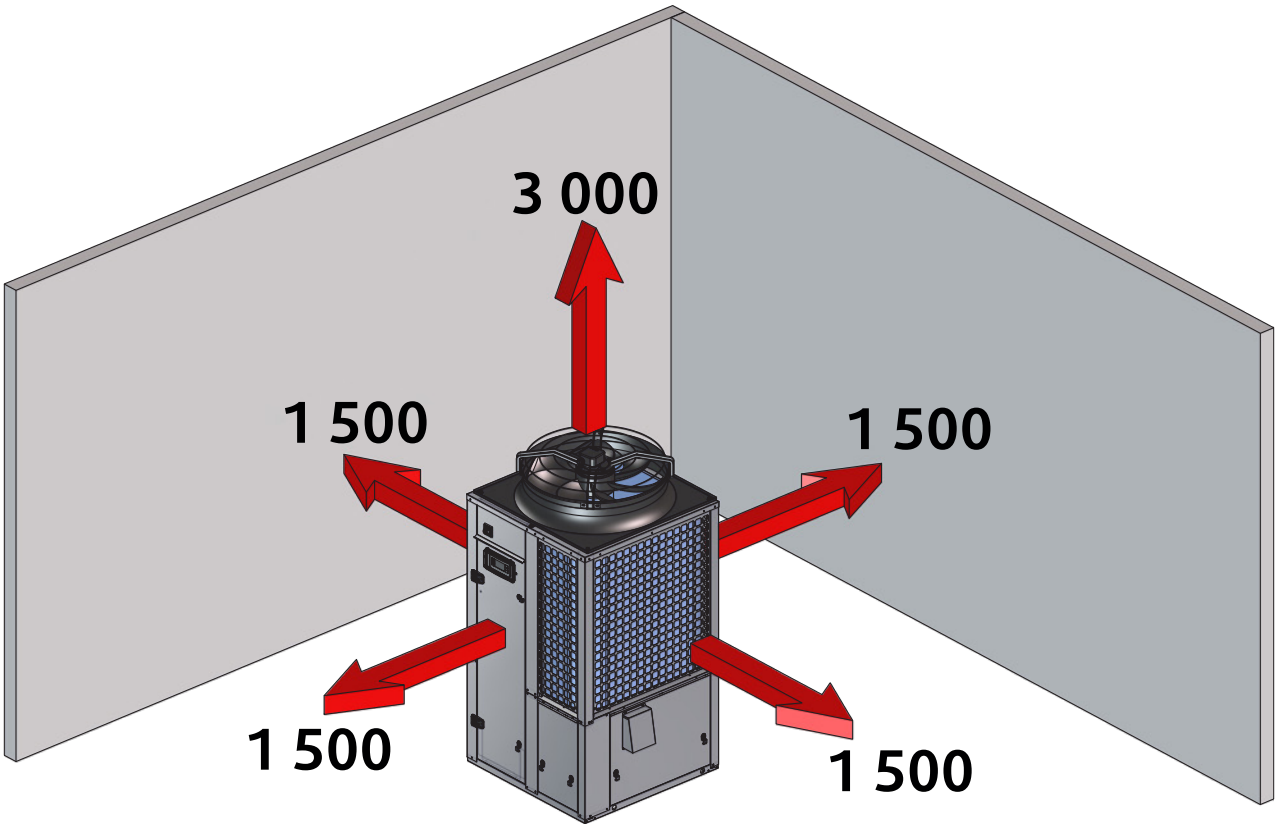


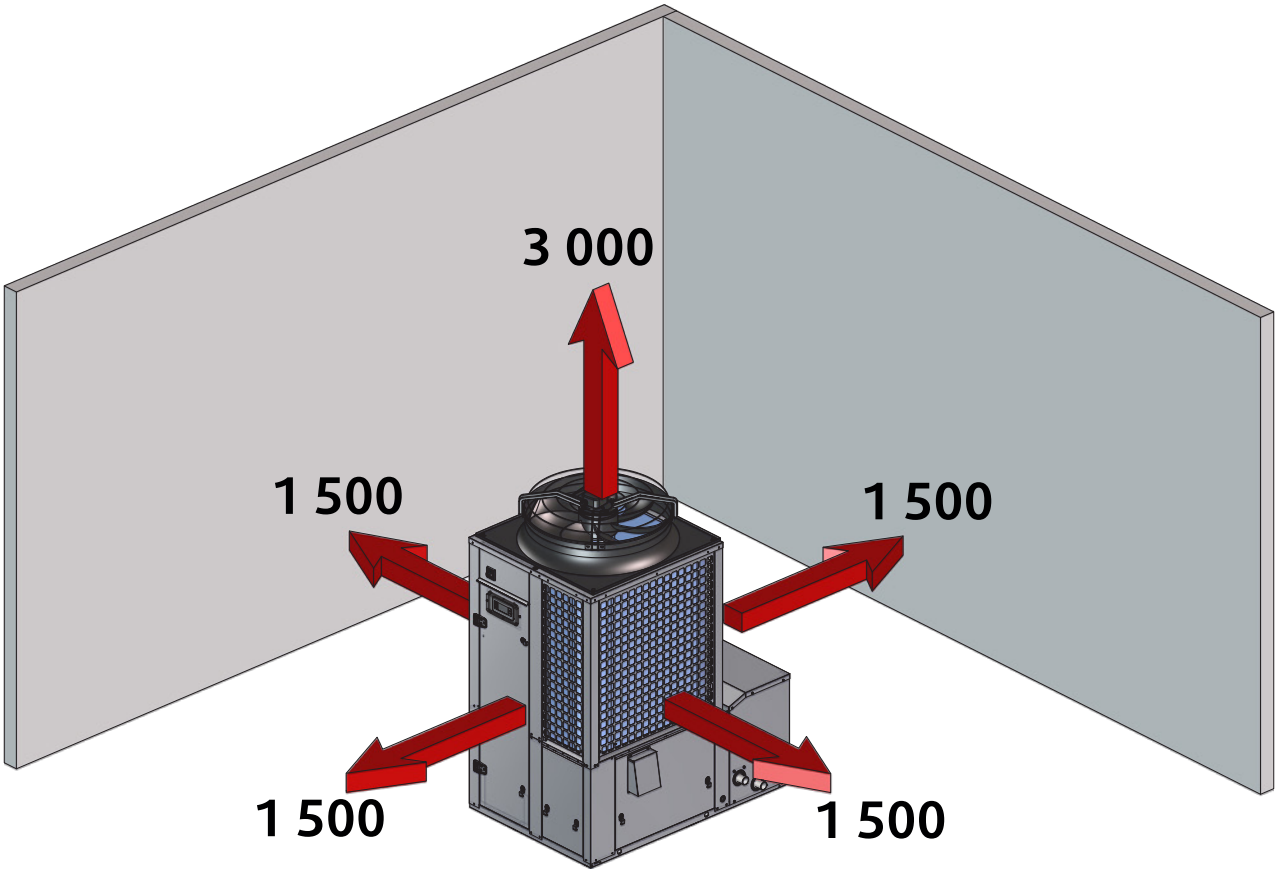




Space Requirements (mm)

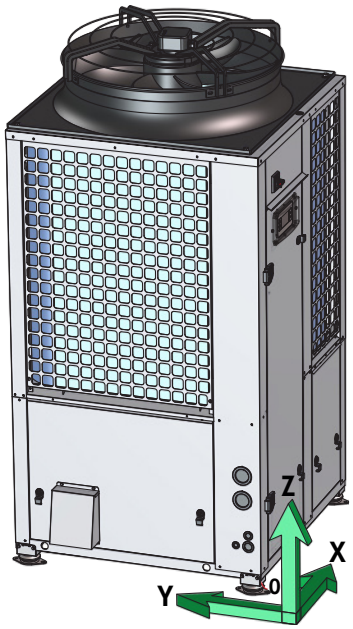
SYSAQUA BLUE.L/SYSAQUA BLUE.H

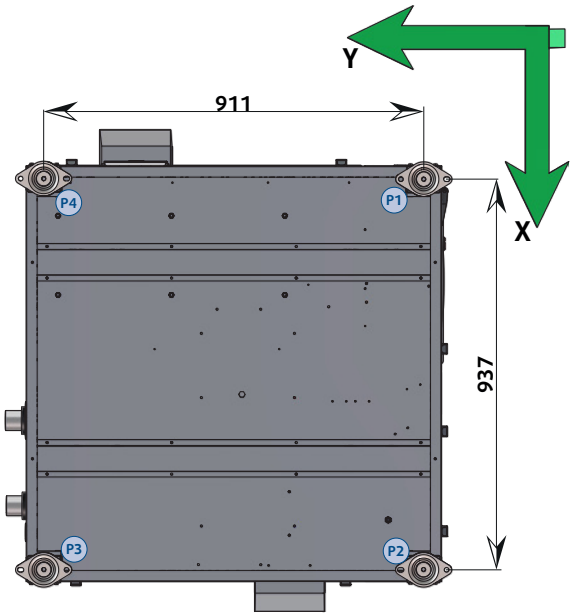




Masses distributions

SYSAQUA BLUE.L/SYSAQUA BLUE.H

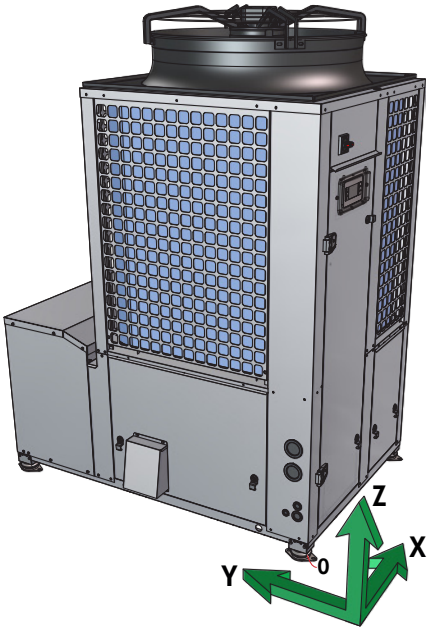


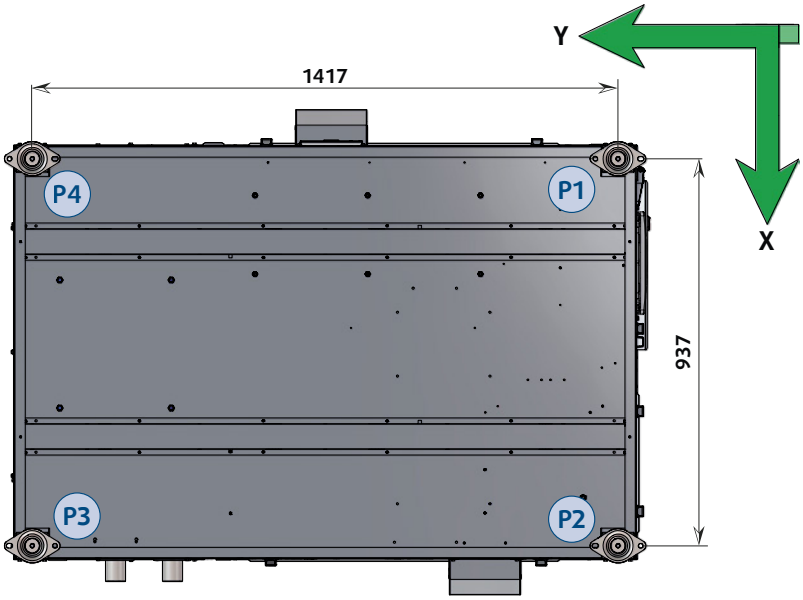


	M	XG	YG	ZG	P1	P2	P3	P4
	kg	mm	mm	mm	kg	kg	kg	kg
35B	332	496	498	695	84	83	82	83

* Operating weight

SYSAQUA BLUE.L/SYSAQUA BLUE.H with buffer tank





	M	XG	YG	ZG	P1	P2	P3	P4
	kg	mm	mm	mm	kg	kg	kg	kg
35B	497	593	681	548	110	164	134	89

* Operating weight

Notes

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systemair

september 2022

Systemair · **EDM AQA3-S-3GB/09.22** - Supersedes EDM AQA3-S-2GB/11.21