

# SyScroll 20 to 35 Air **NEW**

Air Cooled Water Chillers Cooling Only and  
Condensing unit  
Engineering Data Manual



20.0 to 33.0 kW

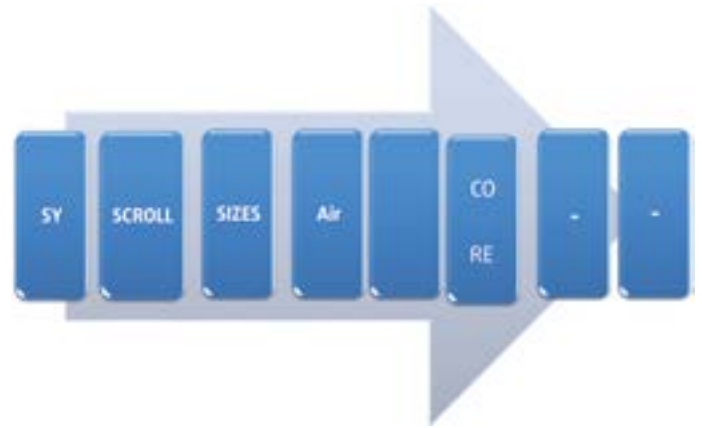




## Key points

- R410A refrigerant.
- Simpler refrigerant circuit layout with only one compressor.
- Great accessibility to internal components for service operations.
- Aeraulic independence between refrigerant circuit and condensing side.
- New display on external panel allowing the complete control of the unit.
- Wide operating limits.
- Low water temperature applications in cooling mode (down to -8 °C).
- Improved acoustic performances.
- New fan motor with integrated grill & condenser.
- Multistage centrifugal pump equipped as standard.
- Mechanical gauge kit, available both factory mounted and field mounted.
- Fan speed control, suitable for low ambient temperature operation in cooling mode.
- ModBus interface available.
- Phase sequence monitor supplied as standard.
- User-friendly microprocessor based control.
- New controller that allows to reduce the use of an external water tank.
- Return and leaving water temperature control logic.
- Dynamic set point (climatic, 4-20 mA, 0-10 V, 0-5 V, 0-1 V) as standard.
- Domestic hot water management.
- Advanced defrost management.
- Advanced pump management.
- Time scheduling.
- Remote terminal available as accessory.
- Double water set point.
- Rubber pads supplied as standard.
- Water filter supplied as standard.
- Differential pressure switch supplied as standard.

# Specifications



CO = Cooling Only; RE = Remote Evaporator;

## General

The new [SyScroll Air](#) air cooled water chillers have been designed and optimized to operate with [R410A](#) refrigerant fluid. They are available in [cooling only CO](#) and [remote evaporator \(RE\)](#) versions.

Each version consists of [4 sizes](#) and covers a nominal cooling capacity range from [20.0 to 33.0 kW](#).

All units are equipped with [one scroll compressors](#).

The general operation status of the machine is continuously under the new control of an microprocessor based controller.

The units can operate [with very low water content](#), thanks to the new microprocessor implementing an [auto-adaptive control logic](#) ensuring a total protection of the compressors at different load or water volume conditions. The minimum water volume requested is [4.0 l/kW](#). An external water tank can be supplied as accessory for field installation. All units are equipped with a [multistage centrifugal pump](#) as standard.

A [fan speed controller](#) is included in the standard equipment allowing the unit operating in cooling mode at low ambient temperature.

## Conformity with standards

The units are in conformity with the following standards:

- Machine Directive: 2006/42/EC
- Low Voltage Directive: 2006/95/EC
- Electromagnetic Compatibility Directive: 2004/108/EC
- Pressure Equipment Directive: 2014/68/EU

## Cabinet

The cabinet is made of heavy gauge 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 are suitable for outdoor installation, directly on the building roof or at the ground level.

## Compressors

Compressors are hermetic scroll type fitted with an inherent motor protection device ensuring protection against overheating. All compressors have direct-on-line starting and are mounted on rubber vibration isolators in order to minimize noise and vibration transmission.

A soft start system can be supplied as optional, whereas a [phase sequence monitor](#) is supplied as standard.

## Evaporator

Indoor heat exchangers are brazed stainless steel plate type. They are insulated with a 10 mm thick closed cell polyethylene foam material and provided with male gas threaded connections.

It is protected by a [35 W antifreeze electric heater](#) to ensure a good protection against freezing at low ambient temperature when the unit is switched off.

Maximum working pressure is 10 bar at water side and 45 bar at refrigerant side.

## Air cooled condenser coil

Outdoor heat exchangers are finned tubes coils. Coils are built with internally grooved copper tubes expanded into corrugated aluminium fins.

### Condenser fans

Units are equipped with two 500mm diameter axial fans with profiled, sickle shaped blades designed with bionical know how, optimized full bellmouth with static blades (motor suspension) and short diffusor.

They are placed directly in front of the coil in order to increase the air flow and the heat transfer between air and refrigerant.

Fan motors have IP54 protection grade, and thermostat protection placed in the bearings. Both fans are equipped with a safety grill.

### Refrigerant circuit

Refrigerant circuit is equipped with one hermetic scroll compressor, sight glass, filter-drier and mechanical expansion valve (electronic expansion valve is available as an option).

### Hydraulic circuit

All units are equipped with multi-stage centrifugal pump providing outdoor available static pressure. Pump impeller is insulated with anti-condensation shell. Water filter is supplied as standard. Safety valve and expansion tank are placed on suction side of the pump. Water connections are 1" 1/4 male GAS threaded type.

### Control panel



A new optimized control is supplied on all the units with a simple user interface (possibility to customize keys functions and to set menus visibility).

In addition to standard features as water temperature control (with possibility to choose LWT/EWT probe), the control can also manage following functions.

The main features of this control system are:

- Dynamic set point (4-20 mA, 0-1V, 0-5V, 0-10V),
- Double set point,
- OAT compensation,
- Auto adaptative function to reduce the water content of the plant,
- Advanced pump management,
- Remote keyboard (ACCESSORY) with possibility to connect (up to 100 m distance) without any serial interface.

### Electrical board

Electric equipment is built in compliance with CE standards. Easy accessible in front of the unit – through an access panel fixed with screws – the equipment is complete with:

- Door lock main isolating switch,
- Compressor contactors and automatic circuit breaker switches,
- Phase sequence control,
- Pressostatic fan speed control,
- Clamps for remote summer/winter switch,
- Clamps for external flow switch,
- Clamps for remote double set-point,
- Clamps for external interlock,
- Clamps for remote general alarm,
- Connection clamps to remote keyboard (OPTIONAL),
- Clamps for dynamic set-point compensation (4-20 mA, 0-1 V, 0-5 V, 0-10 V),
- Soft-starter,
- Power factor correction capacitors (OPTIONAL).

### Standard equipment

- Fan speed control.
- Microprocessor card with 4 red digits, 18 LED, 4 buttons.
- Digital pressure and temperature reading kit.
- High ambient pressure control.
- Sequence phase control.
- Control circuit transformer 230 V/12 V.
- Compressor/pump hour meter.
- Main switch.
- Refrigerant R410A.
- PED approval.
- Evaporator antifreeze electric heater.
- Compressor box.
- Water differential pressure switch.
- Water filter.
- Automatic circuit breaker.
- Multi stage centrifugal pump.

**Factory-installed option:**

- Coil with “E-Coating” treatment,
- Soft starter,
- Electronic Expansion Valve,
- Coil guard,
- Desuperheater.

**Field-installed accessories**

- Compressor jacket,
- Mechanical Gauge kit,
- Hydro kit (112 l water tank),
- Water flow switch,
- Water pressure switch,
- In/out valve kit,
- Remote On/Off control,
- ModBus protocol kit for BMS,
- Power factor correction capacitors,
- Sequencer for up to 4 chillers installation,
- Remote terminal.



## Accessories & Options

SyScroll Air	Delivery	Abbreviation	Description & Benefit
Sequence phases control	Std	PHC	It allows to check the correct sense R-S-T of electric supply phases for 400/3/50 units.
Control circuit transformer 230V/12V	Std	TRF	Voltage transformer to provide correctly the separated voltage to the auxiliary line.
Main switch	Std		Front operated switch-disconnector with direct mounted handle to cut the power Supply Line according CE standards.
Differential pressure switch	Std		Prevents the operation of the unit if the circulating chilled fluid is insufficient. Checking water differential pressure.
Antifreeze electric heater kit	Std	EEH	Electrical Heater protects the plate exchanger.
Low ambient kit (pressostatic stepless fan speed control)	Std	FSC	Electronic speed controllers are designed to control the speed of fan motors in Air Cooled Chiller. Fan Speed controlled by Condensing Pressure in cool mode. Using variable fan speed controllers offers following benefits in commercial refrigeration or air-conditioning applications High Efficiency, Low Noise level, Low air temperature in cool mode.
Double set point	Std	DSP	Can manage two different applications (set point) selected by remote dry contact.
Automatic circuit breaker	Std	ACB	ACB is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Providing Magnetic and Thermal protection to Compressor motors.
Electronic expansion valves	Std	EEV	It is the device able to control the refrigerant flow on suction line trough a stepper motor in order to keep the superheat as constant as possible.
Compressor Jacket	Option	CJ	Jacket for each compressors in order to reduce the sound of its.
Modbus protocol kit for BMS	Option	MBS	It permits the integration of the unit with BMS with Modbus protocol trough RS485 port.
Softstarter for compressor	Option	SS	An electronic device that automatically starts up the compressors gradually. The starting current can be reduced by up to 40% of the direct on line value.
Power factor corrector capacitors	Option	PFC	The purpose of the power factor corrector capacitor is to minimize the input current distortion and make the current in phase with the voltage. Target is to keep Power Factor about 0.90 in any running condition.
Mechanical gauges kit (HP and LP manometers)	Option	KM	Pressure gauges that display the operating pressure in the high and low pressure sections of the refrigerant circuit.
e-coating AL/CU	Option		It is a treatment fo AL/CU coil for medium level of pollution and for marine atmosphere.
Coil Guards	Option	CG	Grilles to protect the coils.
Desuperheater	Option	D	Additional exchanger in order to recover 20% of capacity for Domestic Hot Water application.
Remote On/Off control	Accessory		It enables the operator to power on the unit when it is in standby mode to display alarms. Maximum length: 50mt.
Remote keyboard panel	Accessory		Makes it possible to control the unit through the remote terminal, up to a maximum distance of 100mt of telephone cable.
Sequencer for up to 4 chillers installation	Accessory	SEQ	It can easily pilot up to 4 units belonging to the same family, fitted in parallel, 50 metres apart maximum.
Flow switch	Accessory	FS	Prevents the operation of the unit if the circulating chilled fluid is insufficient. It is recommended to install a flow switch to ensure the correct operation of the unit.
Water pressure switch	Accessory		Mechanical water pressure switch to be mounted on the field installation on installation water piping to prevent very low Water Pressure.
Water filter	Accessory		Filter to remove impurities from the water supply.
Valve in out	Accessory		Ball valves makes it possible to insulate unit hydraulic circuit from the rest of the installation.

Accessories are loosed and to install in the field. Options are mounted in factory.

## EN 14511-2011

Starting 2012 Campaign Eurovent Certification Company took decision to start certify only performances declared in according severe European Standard EN14511.

### BEFORE 2012: GROSS PERFORMANCES

Before this date all capacity performances are declared, measured and certified by Eurovent, as GROSS performances. COOLING or HEATING CAPACITY was rated without taking in account the negative contribution of the heat exchanger Pressure Drop or the positive contribution of the Head Available prevalence in example.

POWER INPUT was rated as pure sum of all power input contribution from all motors fitted on the unit. Without taking in account the correction due to power spent to win the exchanger Pressure Drop in example.

### AFTER 2012: NET PERFORMANCES

After this date all data are certified according EN14511. Mainly consequences in example on Water chiller or heatpump are: COOLING or HEATING CAPACITY is now rated taking in account the negative contribution of the heat exchanger Pressure Drop or the positive contribution of the Head Available prevalence in example. In case of Water to Water unit, in example, both exchanger Pressure Drop values are taken in account in the formula.

POWER INPUT is now rated as all power input contribution from all motors fitted on the unit taking in account also the correction due to power spent to win the exchanger Pressure Drop in example.

As an important consequence of these new rules setted by Eurovent is that EER, COP and ESEER are also affected by these correction. All efficiency index are now calculated, measured and certified according new rules setted by Eurovent according EN14511.

Air to water unit (non ducted outdoor):

	Indoor pump is an integral part		Indoor pump is not an integral part	
	ECC 2011 (gross)	EN14511:2011	ECC 2011 (gross)	EN14511:2011
Ph	$Ph_m^{(1)}$	$Ph_m - \frac{q_{wi} \Delta p_{e,wi}}{\eta_{pi}}$	$Ph_m$	$Ph_m - \frac{q_{wi} (-\Delta p_{i,w})}{\eta_{pi}}$
Pc	$Pc_m^{(1)}$	$Pc_m - \frac{q_w \Delta p_{e,wi}}{\eta_{pi}}$	$Pc_m$	$Pc_m - \frac{q_{wi} (-\Delta p_{i,w})}{\eta_{pi}}$
Pe	$Pe_m^{(1)}$	$Pe_m - \frac{q_{wi} \Delta p_{e,wi}}{\eta_{pi}}$	$Pe_m$	$Pe_m - \frac{q_{wi} (-\Delta p_{i,w})}{\eta_{pi}}$

(1) Measured with the indoor pump not running.

Where:

Ph = NET heating capacity.

Pc = NET cooling capacity.

Pe = electrical power input.

$Ph_m$  = is the gross heat capacity, expressed in Watts.

$Pc_m$  = is the gross cool capacity, expressed in Watts.

$q_{wi}$  = is the nominal liquid flow rate.

$\Delta p_{pe,wi}$  = is the measured available external static pressure.

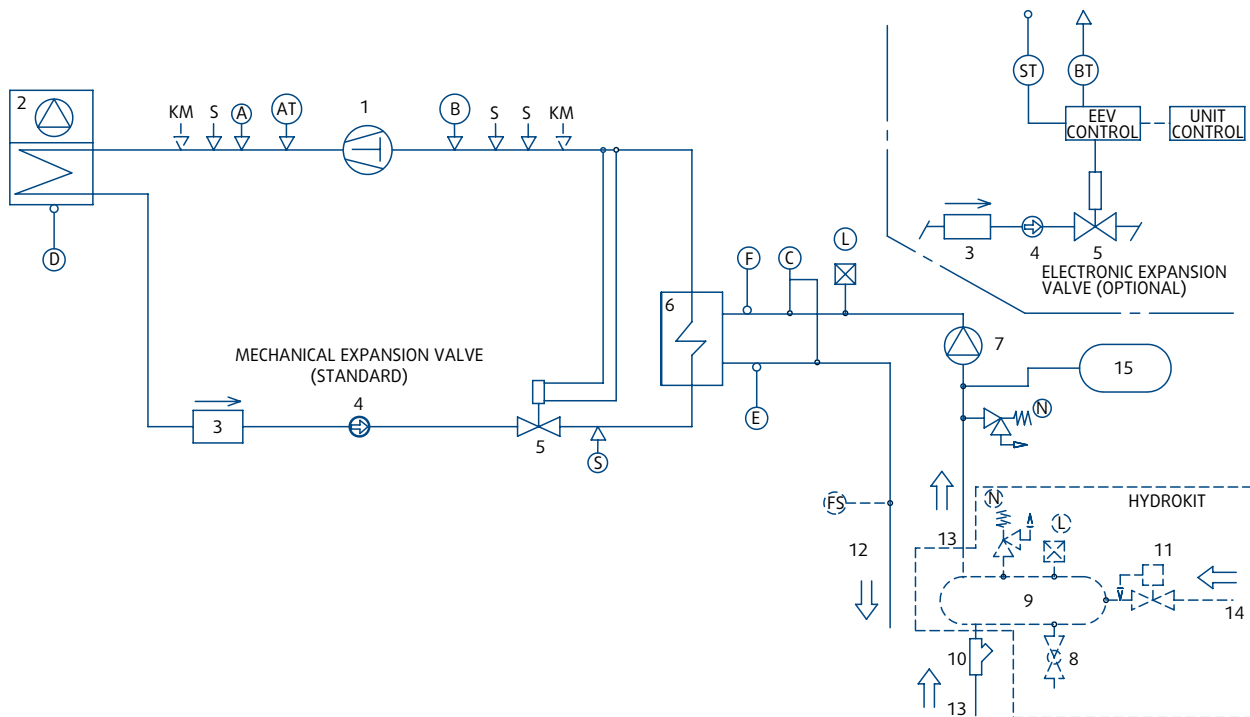
$\Delta p_{pi,wi}$  = is the measured internal static pressure difference.

$\eta_{pi}$  = is the efficiency of the pump.

Reference: Guidelines for the declaration of performances according to EN14511:2011 (available a copy upon request for Syste mair customer).



## Refrigerant Flow Diagram - SyScroll 20-35 Air CO



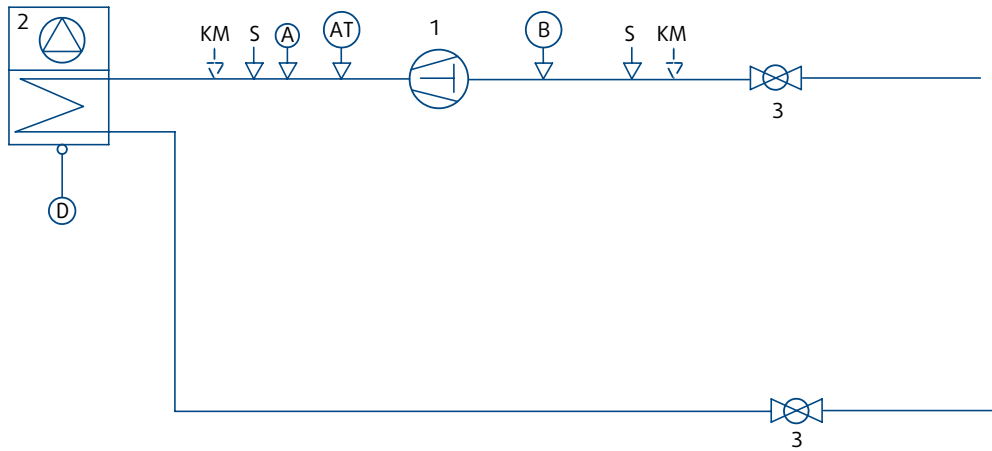
### COMPONENTS

- 1 Compressor scroll type
- 2 Air cooled condenser
- 3 Filter drier
- 4 Sight glass
- 5 Expansion valve
- 6 Plate heat exchanger
- 7 Pump
- 8 Drain valve
- 9 Water buffer tank
- 10 Water filter (loose)
- 11 Automatic water charging valve
- 12 Water outlet
- 13 Water inlet
- 14 Water charging line
- 15 Expansion vessel (lt 5)

### SAFETY/CONTROL DEVICES

- A High pressure switch (42 bar)
- AT High pressure transducer
- B Low pressure switch (1,5 bar)
- BT Low pressure transducer
- C Water differential pressure switch (105 mbar)
- D Air temperature sensor
- E Outlet water temperature sensor
- F Inlet water temperature sensor
- FS Flow switch
- L Vent valve
- N Water safety valve (3 bar)
- S Schrader valve (service/charging point)
- ST Suction temperature probe
- KM Manometer (optional)
- ↓ Pipe connection with Schrader valve 1/4" SAE
- Optional components
- ° Probes

## Refrigerant Flow Diagram - Syscroll 20-35 Air RE



### COMPONENTS

- 1 Compressor scroll type
- 2 Air cooled condenser
- 3 Global Valve

### SAFETY/CONTROL DEVICES

- A High pressure switch (42 bar)
- AT High pressure transducer
- B Low pressure switch (1,5 bar)
- D Air temperature sensor
- S Shradet valve (service/charging point)
- KM Manometer (optional)
- ↓ Pipe connection with Shradet valve 1/4" SAE
- Optional components

# Operating Limits

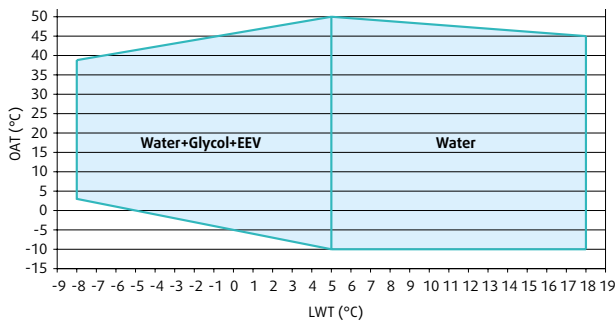
## Operating limits

Model				Syscroll 20-35 Air	
Chilled liquid	Liquid outlet temperature	Water	°C	+5 to +18	
		Brine	°C	-8 / +5 (with glycol and electronic expansion valve); +5/+18 (standard application)	
	Temperature spread		K	3 to 7	
	Maximum operating pressure		bar	3	
Heated liquid	Leaving water temperature	Water	°C	+25 to +55	
		Temperature spread	°C	3 to 15	
	Maximum operating pressure		bar	3	
Outdoor air	Outdoor air temperature (cooling)		°C	Refer to diagram "SYSCROLL 20-35 Air CO - COOLING OPERATION"	
Power supply voltage			V/ph/Hz	400 V, 3 ph + N, 50 Hz (+/- 10%)	

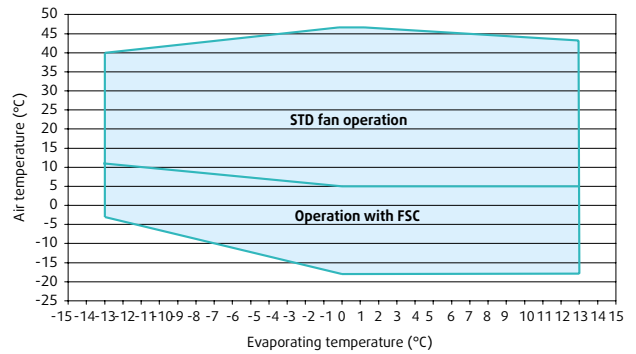
Maximum %Glycol (ethylenic or propilenic): 40%.

In case of operation with brines (water + glycol + inhibitors) it is strongly suggested the use of dedicated type of pump (contact sales dept).

### Cooling mode Syscroll 20-35 Air CO



### Cooling mode Syscroll 20-35 Air RE



## Performances corrective factors (brine)

Unit capacity, absorbed power, brine flow rate, brine pressure drop, have to be corrected according following formula:

### CORRECTED UNIT CAPACITY

$$Q_{\text{CORRECTED/GLYCOL}} = Q_{\text{NOMINAL}} \times K_c \times K_c^{E,P}$$

Where  $K_c$  : Capacity corrective factor according to LWT ( $\Delta T = 5$  [K]) → refer to [Table 1](#)

$K_c^E$  : Capacity corrective factor according to glycol percentage (ETHYLENE GLYCOL) → refer to [Table 2](#)

$K_c^P$  : Capacity corrective factor according to glycol percentage (PROPYLENE GLYCOL) → refer to [Table 4](#)

### CORRECTED UNIT ABSORBED POWER

$$P_{\text{CORRECTED/GLYCOL}} = P_{\text{NOMINAL}} \times K_i \times K_i^{E,P}$$

Where  $K_i$  : Absorbed power corrective factor according to LWT ( $\Delta T = 5$  [K]) → refer to [Table 1](#)

$K_i^E$  : Absorbed power corrective factor according to glycol percentage (ETHYLENE GLYCOL) → refer to [Table 2](#)

$K_i^P$  : Absorbed power corrective factor according to glycol percentage (PROPYLENE GLYCOL) → refer to [Table 4](#)

### CORRECTED BRINE FLOW RATE

$$G_{\text{CORRECTED/GLYCOL}} = G_{\text{RE-CALCULATED}} \times K_f^{E,P}$$

Where  $G_{\text{RE-CALCULATED}}$  : Flow rate according to  $P_{\text{CORRECTED/GLYCOL}}$  ( $P_{\text{CORRECTED/GLYCOL}} \times 860 / \Delta T / 3600$ )

$K_f^E$  : Flow rate corrective factor according to glycol percentage (ETHYLENE GLYCOL) → refer to [Table 2](#)

$K_f^P$  : Flow rate corrective factor according to glycol percentage (PROPYLENE GLYCOL) → refer to [Table 4](#)

### CORRECTED BRINE PRESSURE DROP

$$\Delta P_{\text{CORRECTED/GLYCOL}} = \Delta P_{\text{PRE-CALCULATED}} \times K_p^{E,P}$$

Where  $\Delta P_{\text{RE-CALCULATED}}$  : Pressure drop according to  $G_{\text{CORRECTED/GLYCOL}}$  ( $K_{\text{BPHE}} \times (G_{\text{CORRECTED/GLYCOL}})^2$ )

$K_p^E$  : Pressure drop corrective factor according to glycol percentage (ETHYLENE GLYCOL) → refer to [Table 2](#)

$K_p^P$  : Pressure drop corrective factor according to glycol percentage (PROPYLENE GLYCOL) → refer to [Table 5](#)

**Table 1**

		$K_c$	$K_i$
Leaving water temperature [LWT] (°C) ( $\Delta T=5$ [K])	7	1,000	1,000
	4	0,887	0,940
	2	0,816	0,900
	0	0,748	0,865
	-2	0,685	0,826
	-4	0,624	0,788
	-6	0,568	0,753
	-8	0,513	0,718
	-10	0,461	0,683

**Table 2**

Ethylene Glycol Percentage		0%	10%	20%	30%	35%	40%
Freezing point (*)	°C	0	-4	-10	-10	-21	-21
Minimum leaving water temperature allowed	°C	6	2	-2	-2	-8	-8
Capacity corrective factor (**)	$K_c^E$	1	0,995	0,985	0,985	0,963	0,963
Absorbed power corrective factor (**)	$K_a^E$	1	0,998	0,995	0,995	0,983	0,983
Flow rate corrective factor	$K_f^E$	1	1,015	1,050	1,050	1,123	1,123
Pressure drop corrective factor (***)	$K_p^E$	1	1,070	1,160	1,160	1,283	1,283

(\*) ASHRAE Handbook Fundamentals.

 (\*\*) Valid for LWT=7 [°C]. If LWT<7 [°C] consider  $K_c \times K_c^E$  and  $K_f \times K_f^E$ 

(\*\*\*) Valid for LWT &gt; 5 [°C]. If LWT&lt;5°C → refer to Table 3

**Table 3**

Ethylene Glycol Percentage	LWT [°C]	Corrective factor $K_f^E$	Corrective factor $K_p^E$
10%	5	1,0154	1,0710
	4	1,0154	1,0760
	3	1,0154	1,0810
	2	1,0154	1,0850
20%	1	1,0417	1,1930
	0	1,0423	1,2000
	-1	1,0428	1,2080
	-2	1,0434	1,2150
30%	-3	1,0927	1,2990
	-4	1,0936	1,3060
	-5	1,0945	1,3200
	-6	1,0954	1,3330

**Table 4**

Propylene Glycol Percentage		0%	10%	20%	30%	40%
Freezing point (*)	°C	0	-3	-7	-13	-22
Capacity corrective factor (**)	$K_c^P$	1	0,991	0,977	0,945	0,911
Absorbed power corrective factor (**)	$K_a^P$	1	0,994	0,991	0,975	0,966
Flow rate corrective factor	$K_f^P$	1	1,005	1,030	1,067	1,130

(\*) ASHRAE Handbook Fundamentals.

 (\*\*) Valid for LWT=7 [°C]. If LWT<7 [°C] consider  $K_c \times K_c^P$  and  $K_f \times K_f^P$ 
**Table 5**

Ethylene Glycol Percentage	LWT [°C]	Corrective factor $K_p^P$
10%	5	1,112
	4	1,134
20%	5	1,175
	4	1,196
	3	1,206
30%	5	1,290
	4	1,300
	3	1,310
	0	1,362
	-2	1,393
40%	-4	1,414
	5	1,433
	4	1,435
	3	1,456
	0	1,497
	-2	1,549
	-4	1,580
	-6	1,612
-8	1,653	

## Technical data - SyScroll 20-35 Air CO

Data @ Eurovent LCP/W/P/C AC conditions (1)		20	25	30	35
Cooling Capacity (2)	kW	20,4	23,9	27,7	33,2
Cooling Capacity (3)	kW	20,8	24,4	28,2	33,7
Input Power (2)	kW	7,12	7,88	9,47	12,0
Input Power (3)	kW	6,67	7,41	8,97	11,5
EER 100% (2)	kW/kW	2,87	3,03	2,93	2,77
EER 100% (3)	kW/kW	3,12	3,29	3,14	2,93
EUROVENT CLASS		A	A	A	B
EER 75% (3)	kW/kW	3,48	3,67	3,59	3,32
EER 50% (3)	kW/kW	3,70	3,92	3,85	3,61
EER 25% (3)	kW/kW	3,46	3,71	3,64	3,37
ESEER (3)	kW/kW	3,56	3,77	3,70	3,44
Number of Refrigerant Circuits		1			
Part Load Steps	%	0-100			
Power Supply		400V/3+N/50Hz			
Startup Type		Direct (softstarter as option)			
Maximum Absorbed Power	kW	10	12	13	16
Maximum Corrent (FLA)	A	20	25	26	35
Startup Corrent (LRA)	A	105	115	122	144
<b>Refrigerant</b>					
Type		R410A			
Charge	kg	4,1	4,6	6,0	6,6
<b>Compressor</b>					
Number		1			
Type		Scroll			
Crankcase Heater	W	70	90	90	90
<b>Internal heat exchanger</b>					
Number		1			
Type		Plate			
Water Flow Rate	l/s	0,97	1,14	1,32	1,59
Available Static Pressure	kPa	169	152	144	114
Hydraulic Power	W	165	173	191	181
$\eta$		0,366	0,372	0,383	0,377
<b>Fans</b>					
Number		2			
Type		Axial			
Air Flow Rate	mc/h	10.957	10.425	10.425	9.919
Total Input Power	kW	0,54	0,54	0,54	0,55
<b>Pump</b>					
Number		1			
Type		Centrifugal			
Input Power	kW	0,57	0,60	0,63	0,65
<b>Water Connections</b>					
Type		Male Gas Threaded			
Inlet Diameter	inch	1"1/4			
Outlet Diameter	inch	1"1/4			
<b>Weight</b>					
Shipping	kg	254	285	289	304
Operating	kg	248	279	283	298
<b>Dimensions</b>					
Length	mm	1.477	1.477	1.477	1.477
Width	mm	539	539	539	539
Height	mm	1.615	1.615	1.615	1.615
<b>Acoustic Data</b>					
Sound Power Level	dB(A)	73	74	74	75
Sound Pressure Level*	dB(A)	41	42	42	43

(1) Standard Eurovent LCP/W/P/R AC conditions in cooling mode: EWT/LWT 12°C/7°C, OAT 35°C.

(2) GROSS value.

(3) NET value - According EN 14511 Standard.

(\*) Sound pressure level at 10 m.- Values refers to ISO Standard 3744 with parallepiped shape.

## Technical data - SyScroll 20-35 Air RE

Data conditions (1)		20	25	30	35
Cooling Capacity (1)	kW	22,1	26,4	29,9	36,2
Input Power (1)	kW	7,23	7,96	9,56	12,3
EER 100%	kW/kW	3,06	3,32	3,13	2,94
Number of Refrigerant Circuits		1			
Part Load Steps	%	0-100			
Power Supply		400V/3+N/50Hz			
Startup Type		Direct (softstarter as option)			
Maximum Absorbed Power	kW	10	12	13	16
Maximum Corrent (FLA)	A	20	25	26	35
Startup Corrent (LRA)	A	105	115	122	144
<b>Refrigerant</b>					
Type		R410A			
<b>Compressor</b>					
Number		1			
Type		Scroll			
Crankcase Heater	W	70	90	90	90
<b>Fans</b>					
Number		2			
Type		Axial			
Air Flow Rate	mc/h	10.957	10.425	10.425	9.919
Total Input Power	kW	0,54	0,54	0,54	0,55
<b>Refrigerant Connections</b>					
Type		To be brazed			
Liquid line Diameter	inch	1/2"			
Outlet Diameter	inch	7/8"	1 1/8"	1 1/8"	1 1/8"
<b>Weight</b>					
Operating	kg	228	259	263	278
<b>Dimensions</b>					
Length	mm	1.477	1.477	1.477	1.477
Width	mm	539	539	539	539
Height	mm	1.615	1.615	1.615	1.615
<b>Acoustic Data</b>					
Sound Power Level	dB(A)	73	74	74	75
Sound Pressure Level*	dB(A)	41	42	42	43

(1) Data refers to 7°C evaporating temperature and 35°C condenser inlet air temperature

(\*) Sound pressure level at 10 m.- Values refers to ISO Standard 3744 with parallepiped shape.

## Electrical Data - SyScroll 20-35 Air

### Compressor Data

400V/3/50Hz	NOMINAL		MAXIMUM			PFC (NOM)	PFC*
	P <sub>NOM-CPS</sub> kW	I <sub>NOM-CPS</sub> A	P <sub>MAX-CPS</sub> kW	I <sub>MAX-CPS</sub> A	I <sub>STARTUP-CPS</sub> LRA		
Size							
20	6,3	12	8,6	16	101	0,78	> 0,90
25	7,1	13	10,2	21	111	0,80	> 0,90
30	8,7	15	11,9	22	118	0,83	> 0,90
35	11,3	19	14,8	31	140	0,85	> 0,90

### Fans Data

230V/1/50Hz	P <sub>MAX-FANS</sub> kW	I <sub>MAX-FANS</sub> FLA
Size		
20	0,60	2,60
25	0,60	2,60
30	0,60	2,60
35	0,60	2,60

### Pumps Data

400V/3/50Hz	P <sub>MAX-PUMP</sub> kW	I <sub>MAX-PUMP</sub> FLA
Size		
20	0,72	1,30
25	0,72	1,30
30	0,72	1,30
35	0,72	1,30

400V/3+N/50Hz		STD unit with pump			
		20	25	30	35
Power input (kW)	Nominal	8	8	10	13
	Maximum	10	12	13	16
Current input (A)	Nominal	16	17	19	23
	Maximum	20	25	26	35
Start-up current (A)		105	115	122	144
Start-up current (A)**		75	82	87	102

\* Power factor correction capacitor option installed.

\*\* Soft-starter option installed.

## Acoustic Data - SyScroll 20-35 Air

Size	Octave Band (Hz)								Sound Power Level dB(A)	Sound Pressure Level* dB(A)
	63	125	250	500	1000	2000	4000	8000		
	Sound Power Level (dB)									
20	73	71	75	71	68	63	55	48	73	41
25	74	72	76	72	69	64	56	48	74	42
30	74	72	76	72	69	64	56	48	74	42
35	75	73	77	73	70	65	57	49	75	43

\* Sound pressure level at 10 m.- Values refers to ISO Standard 3744 with parallepiped shape.



## Cooling Capacities - SyScroll 20-35 Air CO

Model	LWT °C	OAT (°C)																			
		25		30		32		35		38		40		42		45		48		50	
		P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
SYSCROLL 20 CO	5	22,1	4,87	20,8	5,34	20,2	5,56	19,3	5,90	18,3	6,25	17,6	6,50	16,9	6,78	15,7	7,21	14,5	7,64	13,8	7,92
	7	<b>23,3</b>	<b>4,98</b>	<b>22,0</b>	<b>5,45</b>	<b>21,3</b>	<b>5,67</b>	<b>20,4</b>	<b>6,01</b>	<b>19,3</b>	<b>6,38</b>	<b>18,6</b>	<b>6,64</b>	<b>17,8</b>	<b>6,92</b>	<b>16,6</b>	<b>7,36</b>	<b>15,3</b>	<b>7,80</b>		
	9	24,6	5,09	23,1	5,57	22,5	5,79	21,5	6,14	20,4	6,51	19,6	6,78	18,8	7,06	17,6	7,52	16,3	7,97		
	11	<b>25,9</b>	<b>5,21</b>	<b>24,3</b>	<b>5,70</b>	<b>23,7</b>	<b>5,91</b>	<b>22,6</b>	<b>6,27</b>	<b>21,5</b>	<b>6,64</b>	<b>20,7</b>	<b>6,91</b>	<b>19,9</b>	<b>7,20</b>	<b>18,5</b>	<b>7,66</b>				
	13	27,2	5,33	25,6	5,82	24,9	6,04	23,8	6,40	22,5	6,82	21,7	7,11	20,8	7,39	19,6	7,80				
	15	<b>28,6</b>	<b>5,46</b>	<b>27,0</b>	<b>5,96</b>	<b>26,2</b>	<b>6,21</b>	<b>24,8</b>	<b>6,61</b>	<b>23,7</b>	<b>6,99</b>	<b>22,9</b>	<b>7,24</b>	<b>22,1</b>	<b>7,50</b>	<b>20,8</b>	<b>7,92</b>				
SYSCROLL 25 CO	5	26,0	5,45	24,4	5,98	23,8	6,22	22,7	6,60	21,5	7,00	20,7	7,28	19,8	7,59	18,4	8,07	17,0	8,56	16,2	8,87
	7	<b>27,4</b>	<b>5,58</b>	<b>25,8</b>	<b>6,11</b>	<b>25,1</b>	<b>6,35</b>	<b>23,9</b>	<b>6,74</b>	<b>22,7</b>	<b>7,14</b>	<b>21,9</b>	<b>7,43</b>	<b>20,9</b>	<b>7,75</b>	<b>19,4</b>	<b>8,24</b>	<b>18,0</b>	<b>8,73</b>		
	9	28,9	5,70	27,2	6,24	26,4	6,49	25,2	6,88	23,9	7,29	23,1	7,59	22,1	7,91	20,6	8,42	19,1	8,92		
	11	<b>30,4</b>	<b>5,83</b>	<b>28,6</b>	<b>6,38</b>	<b>27,8</b>	<b>6,62</b>	<b>26,5</b>	<b>7,02</b>	<b>25,3</b>	<b>7,44</b>	<b>24,3</b>	<b>7,74</b>	<b>23,3</b>	<b>8,06</b>	<b>21,8</b>	<b>8,58</b>				
	13	32,0	5,97	30,1	6,52	29,3	6,76	27,9	7,16	26,5	7,64	25,5	7,96	24,5	8,28	23,0	8,74				
	15	<b>33,6</b>	<b>6,12</b>	<b>31,8</b>	<b>6,67</b>	<b>30,7</b>	<b>6,95</b>	<b>29,2</b>	<b>7,40</b>	<b>27,8</b>	<b>7,82</b>	<b>26,9</b>	<b>8,11</b>	<b>26,0</b>	<b>8,40</b>	<b>24,4</b>	<b>8,86</b>				
SYSCROLL 30 CO	5	30,1	6,72	28,3	7,38	27,5	7,67	26,2	8,14	24,9	8,63	23,9	8,98	22,9	9,35	21,3	9,95	19,7	10,5	18,7	10,9
	7	<b>31,7</b>	<b>6,87</b>	<b>29,8</b>	<b>7,53</b>	<b>29,0</b>	<b>7,82</b>	<b>27,7</b>	<b>8,30</b>	<b>26,3</b>	<b>8,80</b>	<b>25,3</b>	<b>9,16</b>	<b>24,2</b>	<b>9,55</b>	<b>22,5</b>	<b>10,2</b>	<b>20,8</b>	<b>10,8</b>		
	9	33,4	7,03	31,4	7,69	30,6	7,99	29,2	8,48	27,7	8,99	26,7	9,35	25,6	9,75	23,9	10,4	22,2	11,0		
	11	<b>35,2</b>	<b>7,19</b>	<b>33,1</b>	<b>7,86</b>	<b>32,2</b>	<b>8,16</b>	<b>30,7</b>	<b>8,65</b>	<b>29,2</b>	<b>9,16</b>	<b>28,2</b>	<b>9,53</b>	<b>27,0</b>	<b>9,94</b>	<b>25,2</b>	<b>10,6</b>				
	13	37,0	7,36	34,8	8,04	33,9	8,33	32,4	8,83	30,6	9,41	29,5	9,82	28,3	10,2	26,7	10,8				
	15	<b>38,9</b>	<b>7,54</b>	<b>36,8</b>	<b>8,22</b>	<b>35,6</b>	<b>8,57</b>	<b>33,8</b>	<b>9,12</b>	<b>32,2</b>	<b>9,64</b>	<b>31,2</b>	<b>10,0</b>	<b>30,1</b>	<b>10,4</b>	<b>28,2</b>	<b>10,9</b>				
SYSCROLL 35 CO	5	36,1	8,77	33,9	9,62	33,0	10,0	31,5	10,6	29,9	11,3	28,7	11,7	27,5	12,2	25,6	13,0	23,7	13,8	22,5	14,3
	7	<b>38,1</b>	<b>8,97</b>	<b>35,8</b>	<b>9,8</b>	<b>34,8</b>	<b>10,2</b>	<b>33,2</b>	<b>10,8</b>	<b>31,6</b>	<b>11,5</b>	<b>30,4</b>	<b>12,0</b>	<b>29,1</b>	<b>12,5</b>	<b>27,0</b>	<b>13,2</b>	<b>24,9</b>	<b>14,0</b>		
	9	40,1	9,16	37,7	10,0	36,7	10,4	35,0	11,1	33,3	11,7	32,0	12,2	30,7	12,7	28,7	13,5	26,6	14,3		
	11	<b>42,2</b>	<b>9,38</b>	<b>39,7</b>	<b>10,3</b>	<b>38,6</b>	<b>10,6</b>	<b>36,9</b>	<b>11,3</b>	<b>35,1</b>	<b>12,0</b>	<b>33,8</b>	<b>12,4</b>	<b>32,4</b>	<b>13,0</b>	<b>30,3</b>	<b>13,8</b>				
	13	44,4	9,60	41,8	10,5	40,7	10,9	38,8	11,5	36,8	12,3	35,4	12,8	34,0	13,3	32,0	14,0				
	15	<b>46,6</b>	<b>9,84</b>	<b>44,1</b>	<b>10,7</b>	<b>42,7</b>	<b>11,2</b>	<b>40,5</b>	<b>11,9</b>	<b>38,6</b>	<b>12,6</b>	<b>37,4</b>	<b>13,0</b>	<b>36,1</b>	<b>13,5</b>	<b>33,9</b>	<b>14,3</b>				
	18	50,4	10,2	47,5	11,0	46,1	11,5	43,8	12,2	41,7	12,8	40,5	13,2	39,3	13,6	37,7	14,0				

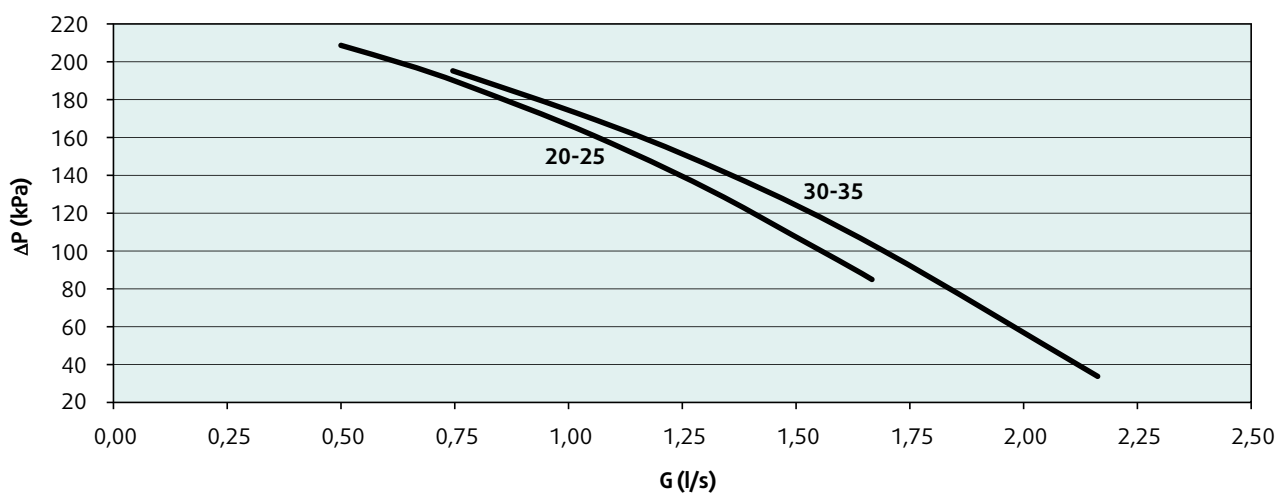
(\*) Only Compressors.

## Cooling Capacities - Syscroll 20-35 Air RE

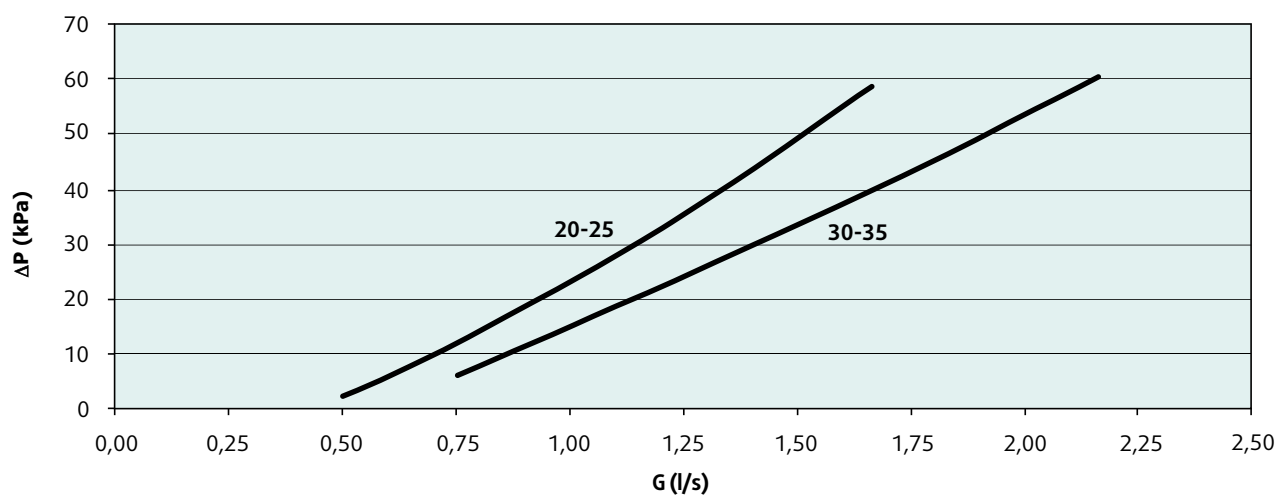
Model	Te °C	OAT (°C)																	
		25		30		32		35		38		40		42		45		48	
		P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *	P <sub>COOL</sub>	P <sub>ABS</sub> *
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
SYSCROLL 20 RE	1	23,8	4,32	22,3	4,73	21,8	4,89	20,8	5,2	19,7	5,51	18,9	5,74	18,1	5,95	17,0	6,25	16,1	6,51
	3	<b>24,3</b>	<b>4,59</b>	<b>22,8</b>	<b>5,03</b>	<b>22,2</b>	<b>5,20</b>	<b>21,2</b>	<b>5,5</b>	<b>20,1</b>	<b>5,85</b>	<b>19,3</b>	<b>6,10</b>	<b>18,5</b>	<b>6,32</b>	<b>17,4</b>	<b>6,64</b>	<b>16,4</b>	<b>6,92</b>
	5	24,7	4,86	23,2	5,33	22,6	5,52	21,6	5,8	20,4	6,20	19,6	6,47	18,8	6,71	17,6	7,04	16,6	7,34
	7	<b>25,3</b>	<b>5,14</b>	<b>23,7</b>	<b>5,63</b>	<b>23,1</b>	<b>5,82</b>	<b>22,1</b>	<b>6,15</b>	<b>20,9</b>	<b>6,55</b>	<b>20,1</b>	<b>6,82</b>	<b>19,2</b>	<b>7,08</b>	<b>18,1</b>	<b>7,44</b>		
	9	25,8	5,43	24,2	5,95	23,6	6,15	22,5	6,5	21,3	6,92	20,4	7,21	19,6	7,48	18,4	7,86		
	11	<b>26,4</b>	<b>5,73</b>	<b>24,8</b>	<b>6,28</b>	<b>24,1</b>	<b>6,49</b>	<b>23,1</b>	<b>6,9</b>	<b>21,8</b>	<b>7,30</b>	<b>20,9</b>	<b>7,61</b>	<b>20,1</b>	<b>7,90</b>	<b>18,9</b>	<b>8,29</b>		
	14	27,0	6,22	25,4	6,81	24,7	7,05	23,6	7,4	22,3	7,93	21,4	8,26	20,6	8,57	19,3	9,00		
SYSCROLL 25 RE	1	<b>28,4</b>	<b>4,83</b>	<b>26,7</b>	<b>5,29</b>	<b>26,0</b>	<b>5,48</b>	<b>24,9</b>	<b>5,8</b>	<b>23,5</b>	<b>6,16</b>	<b>22,5</b>	<b>6,42</b>	<b>21,6</b>	<b>6,66</b>	<b>20,3</b>	<b>6,99</b>	<b>19,2</b>	<b>7,28</b>
	3	29,0	5,13	27,2	5,62	26,5	5,82	25,4	6,1	24,0	6,55	23,0	6,82	22,1	7,07	20,8	7,43	19,6	7,74
	5	<b>29,5</b>	<b>5,44</b>	<b>27,7</b>	<b>5,96</b>	<b>26,9</b>	<b>6,17</b>	<b>25,8</b>	<b>6,5</b>	<b>24,3</b>	<b>6,94</b>	<b>23,4</b>	<b>7,23</b>	<b>22,4</b>	<b>7,50</b>	<b>21,1</b>	<b>7,88</b>	<b>19,9</b>	<b>8,21</b>
	7	30,2	5,74	28,4	6,30	27,6	6,51	26,4	6,88	25,0	7,33	24,0	7,63	23,0	7,92	21,6	8,32		
	9	<b>30,8</b>	<b>6,07</b>	<b>28,9</b>	<b>6,65</b>	<b>28,2</b>	<b>6,88</b>	<b>26,9</b>	<b>7,3</b>	<b>25,4</b>	<b>7,74</b>	<b>24,4</b>	<b>8,07</b>	<b>23,4</b>	<b>8,37</b>	<b>22,0</b>	<b>8,79</b>		
	11	31,5	6,41	29,6	7,02	28,8	7,26	27,6	7,7	26,1	8,17	25,0	8,51	24,0	8,83	22,6	9,28		
	14	<b>32,3</b>	<b>6,95</b>	<b>30,3</b>	<b>7,62</b>	<b>29,5</b>	<b>7,89</b>	<b>28,2</b>	<b>8,3</b>	<b>26,7</b>	<b>8,87</b>	<b>25,6</b>	<b>9,24</b>	<b>24,6</b>	<b>9,59</b>	<b>23,1</b>	<b>10,07</b>		
SYSCROLL 30 RE	1	32,2	5,95	30,2	6,52	29,4	6,75	28,1	7,1	26,6	7,59	25,5	7,91	24,5	8,21	23,0	8,62	21,7	8,98
	3	<b>32,9</b>	<b>6,33</b>	<b>30,9</b>	<b>6,93</b>	<b>30,1</b>	<b>7,17</b>	<b>28,7</b>	<b>7,6</b>	<b>27,2</b>	<b>8,07</b>	<b>26,1</b>	<b>8,41</b>	<b>25,0</b>	<b>8,72</b>	<b>23,5</b>	<b>9,16</b>	<b>22,2</b>	<b>9,54</b>
	5	33,4	6,71	31,3	7,35	30,5	7,61	29,2	8,0	27,6	8,56	26,5	8,91	25,4	9,25	23,9	9,71	22,5	10,11
	7	<b>34,2</b>	<b>7,08</b>	<b>32,1</b>	<b>7,76</b>	<b>31,3</b>	<b>8,03</b>	<b>29,9</b>	<b>8,48</b>	<b>28,3</b>	<b>9,03</b>	<b>27,1</b>	<b>9,41</b>	<b>26,0</b>	<b>9,76</b>	<b>24,5</b>	<b>10,25</b>		
	9	34,9	7,48	32,7	8,20	31,9	8,49	30,5	9,0	28,8	9,54	27,7	9,95	26,5	10,32	24,9	10,84		
	11	<b>35,7</b>	<b>7,90</b>	<b>33,5</b>	<b>8,65</b>	<b>32,6</b>	<b>8,95</b>	<b>31,2</b>	<b>9,5</b>	<b>29,5</b>	<b>10,07</b>	<b>28,3</b>	<b>10,49</b>	<b>27,2</b>	<b>10,89</b>	<b>25,5</b>	<b>11,43</b>		
	14	36,6	8,57	34,3	9,39	33,4	9,72	31,9	10,3	30,2	10,93	29,0	11,39	27,8	11,82	26,1	12,41		
SYSCROLL 35 RE	1	<b>39,0</b>	<b>7,86</b>	<b>36,6</b>	<b>8,62</b>	<b>35,6</b>	<b>8,91</b>	<b>34,1</b>	<b>9,4</b>	<b>32,2</b>	<b>10,03</b>	<b>30,9</b>	<b>10,45</b>	<b>29,7</b>	<b>10,84</b>	<b>27,9</b>	<b>11,38</b>	<b>26,3</b>	<b>11,85</b>
	3	39,8	8,35	37,4	9,15	36,4	9,47	34,8	10,0	32,9	10,66	31,6	11,10	30,3	11,52	28,5	12,10	26,8	12,60
	5	<b>40,4</b>	<b>8,86</b>	<b>37,9</b>	<b>9,71</b>	<b>36,9</b>	<b>10,05</b>	<b>35,3</b>	<b>10,6</b>	<b>33,4</b>	<b>11,30</b>	<b>32,0</b>	<b>11,77</b>	<b>30,8</b>	<b>12,21</b>	<b>28,9</b>	<b>12,83</b>	<b>27,2</b>	<b>13,36</b>
	7	41,4	9,35	38,9	10,25	37,9	10,60	36,2	11,2	34,2	11,93	32,8	12,43	31,5	12,89	29,6	13,54		
	9	<b>42,2</b>	<b>9,88</b>	<b>39,6</b>	<b>10,83</b>	<b>38,6</b>	<b>11,21</b>	<b>36,9</b>	<b>11,8</b>	<b>34,9</b>	<b>12,61</b>	<b>33,5</b>	<b>13,14</b>	<b>32,1</b>	<b>13,63</b>	<b>30,2</b>	<b>14,31</b>		
	11	43,2	10,43	40,6	11,43	39,5	11,83	37,8	12,5	35,7	13,30	34,3	13,86	32,9	14,38	30,9	15,10		
	14	<b>44,3</b>	<b>11,32</b>	<b>41,5</b>	<b>12,41</b>	<b>40,5</b>	<b>12,84</b>	<b>38,7</b>	<b>13,6</b>	<b>36,6</b>	<b>14,44</b>	<b>35,1</b>	<b>15,04</b>	<b>33,7</b>	<b>15,61</b>	<b>31,6</b>	<b>16,39</b>		

(\*) Only Compressors.

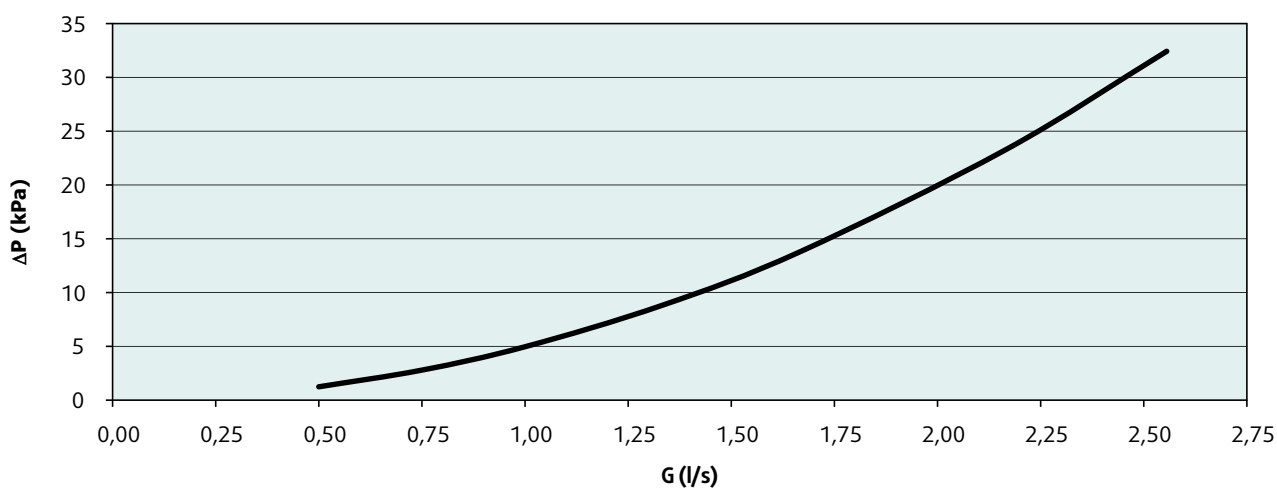
### Pump Available Static Pressure



### Water Circuit Pressure Drop



### Water Filter\* Pressure Drop



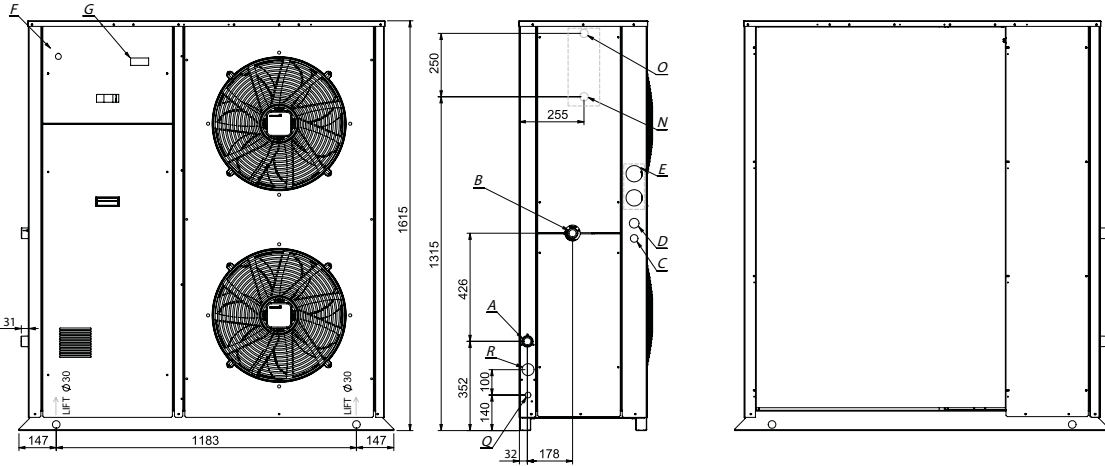
\*  $\Phi$  1 1/4 diameter, filtration capacity 500  $\mu$ m / 35 mesh.

## Dimensions SyScroll 20-35 Air

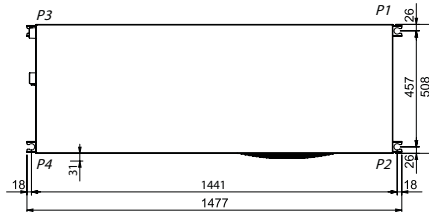
Front view

Side view

Rear view



Top view

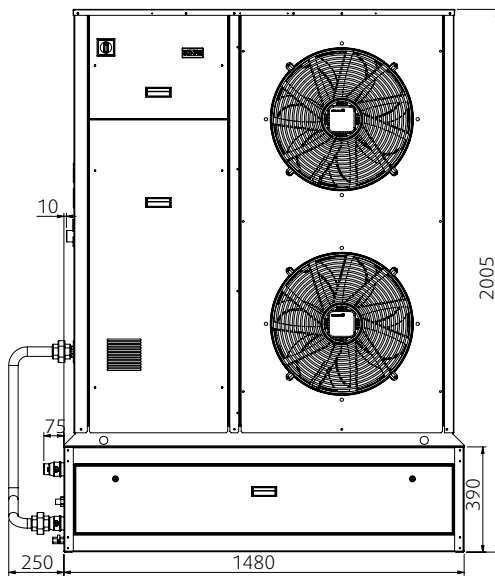


### NOTES

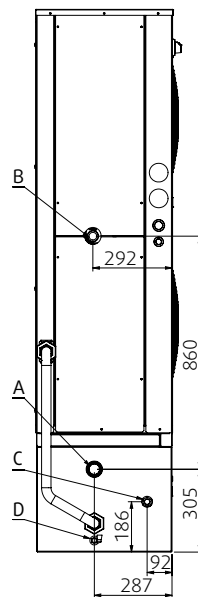
- A Water inlet  $\varnothing$  1 1/4" MGT
- B Water outlet  $\varnothing$  1 1/4" MGT
- C Auxiliary lines
- D Electrical power supply
- E Gauge kit (optional)
- F Main switch
- G Control keypad/display
- N Desuperheater water inlet 1" Gas M
- O Desuperheater water Outlet 1" Gas M
- Q Liquid Line  $\varnothing$  1/2"
- R Suction Line  $\varnothing$  1 1/8"  
 $\varnothing$  7/8" (only SYSCROLL 20)

## Dimensions Hydrokit 20-35

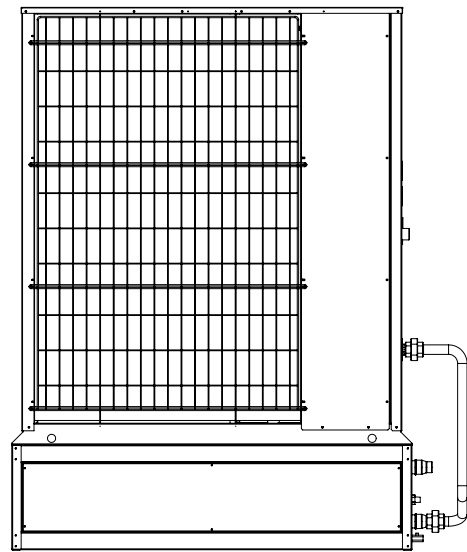
Front view



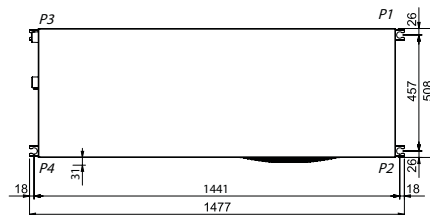
Side view



Rear view



Top view

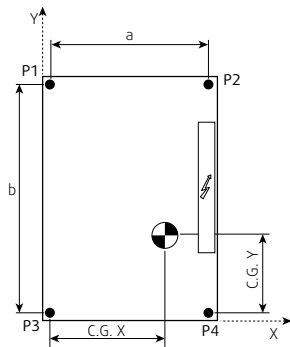


### NOTES

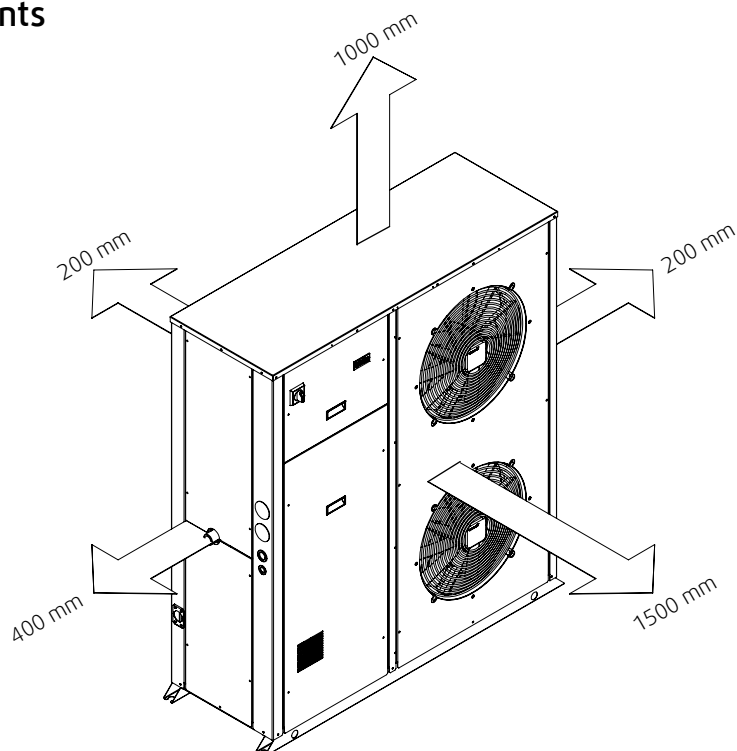
- A Water inlet  $\varnothing$  1 1/4" MGT
- B Water outlet  $\varnothing$  1 1/4" MGT
- C Tank fill  $\varnothing$  1 1/2" MGT
- D Water drain  $\varnothing$  3/8" FGT

## Weight Distribution

Model	Size	Weight distribution				Operating weight kg	Shipping weight kg	P1-P4 coordinates		CG coordinates	
		P1	P2	P3	P4			a	b	x	y
		kg	kg	kg	kg			mm	mm	mm	mm
SYSCROLL 20-35 Air CO	20	54	59	64	69	248	254	457	1.441	264	680
	25	62	65	74	77	279	285	457	1.441	260	676
	30	62	66	76	79	283	289	457	1.441	260	669
	35	68	68	81	81	298	304	457	1.441	255	677
SYSCROLL 20-35 Air CO + Hydrokit	20	99	104	109	114	427	-	457	1.441	260	705
	25	107	110	119	122	458	-	457	1.441	258	701
	30	107	110	121	124	462	-	457	1.441	258	696
	35	113	113	126	126	477	-	457	1.441	255	700
SYSCROLL 20-35 Air RE	20	49	54	59	64	228	228	457	1.441	264	680
	25	57	60	69	72	259	259	457	1.441	260	676
	30	57	61	71	74	263	263	457	1.441	260	669
	35	63	63	76	76	278	278	457	1.441	255	677



## Space requirements





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As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.