

SYSAER R32

Rooftop Units - Heat Pump Version

Models SR R32 105 - SR R32 120 - SR R32 140

Scroll Compressor



Refrigerant R32

R32

106 to 139 kW



106 to 142 kW



19 200 to 25 500 m³/h



Key Points

- Energy class **A**,
- Ecodesign 2021,
- **R32** refrigerant,
- High SEER and SCOP,
- 2 circuits for the entire range to optimize performances at part load, and avoid cold draught during defrost mode.
- The range **SYSAER R32** is provided with 2 compressors, 1 per circuit. This configuration gives an immediate return on investment,
- Acoustic compressor jackets to improve acoustic performances,
- Refrigerant circuit is completely closed in a separate compartment in order to reduce noise level,
- Great accessibility to internal components for service operations,
- Removable drain pan,
- Double skin as a standard with 25 mm glass wool insulation.
- Many air inlet/outlet configurations,
- EC PLUG FAN for supply air and AC FAN for extract air,
- 2 filters stage
 - G4
 - F7 / F9
- 1 energy recovery system
 - **RECO** : energy recovery on the exhaust air
- 1 additional heating system
 - Electric heater
- Leak detection according BREEAM standard,
- New display on external panel allowing the complete control of the unit,
- Phase sequence monitor supplied as standard,
- Small footprint, allowing shipping and handling costs to be saved, units find easily a place to be installed,
- R32 gas detector.

SYSAER R32



SYSAER R32
SR R32 105 - SR R32 120- SR R32 140

Specifications

General

The new **SYSAER R32** units have been designed and optimized to operate with R32 refrigerant fluid. They are of single refrigerant circuit type.

They are available in **reversible** version.

The range consists in **3 sizes (SR R32 105, SR R32 120 and SR R32 140)** and covers a nominal cooling capacity range from **106 to 139 kW** and a nominal heating capacity range from **106 to 142 kW**.

All the units consist of two refrigerant circuits equipped with **scroll mono-compressor** to constantly adapt to the partial loads of the system.

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

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 **SYSAER R32** are equipped with **double skin panels as a standard** to prevent insulation fiber entering into the building and harmful build-up of bacteria or contaminants. It also ensure better thermal insulation

Specifications of glass wool:

- Conductivity : 0.035W/(m.K) at 20°C
- Thermal resistance : 0.714 m².K/W

Control and maintenance operations are facilitated thanks to all of the doors and access panels. Opening and closing are done with a simple triangular key.

Extractable drain pan under indoor coil, to allow for hygienic cleaning.

Compressors

The compressors are 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.

Crankcase heater on each compressor to eliminate refrigerant migration and allow for safe start up in winter.

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

Outdoor coils

The outdoor coils are a finned coil constructed with seamless copper tubes mechanically expanded into aluminium fins. The fins of **SYSAER R32** coils are made of aluminium with hydrophilic blue coating to facilitate water droplets drain in the event of defrosting.

Outdoor coils are largely dimensioned in order to optimize performance and defrosting cycles.

Outdoor coils designed for low air resistance to reduce axial fan power consumption and noise level.

Outdoor coils are equipped with a protective grille to prevent shocks.

Each **SYSAER R32** has axial fan, with 2 speeds.

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

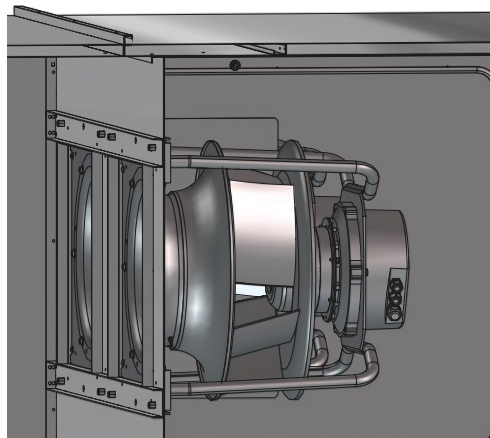
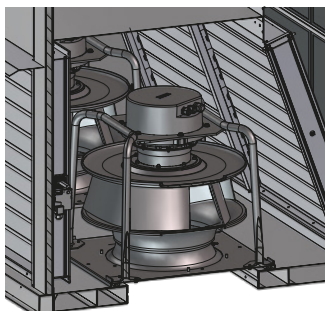
A pressostatic type fan speed controller can be delivered as factory-fitted option. It allows the unit to operate in cooling mode at low ambient temperatures down to -10 °C minimum, because it regulates the fan speed in order to maintain the constant condensing temperature.

All fans are fitted with a protective grille on top.

Specifications

Blast and return fan

The **SYSAER R32** is provided with blast and return fans, **PLUG FAN type** with an AC (Asynchronous) motor or with an EC (Electronic Switching) motor, Low Pressure or High Pressure according to the configuration selected by the customer.

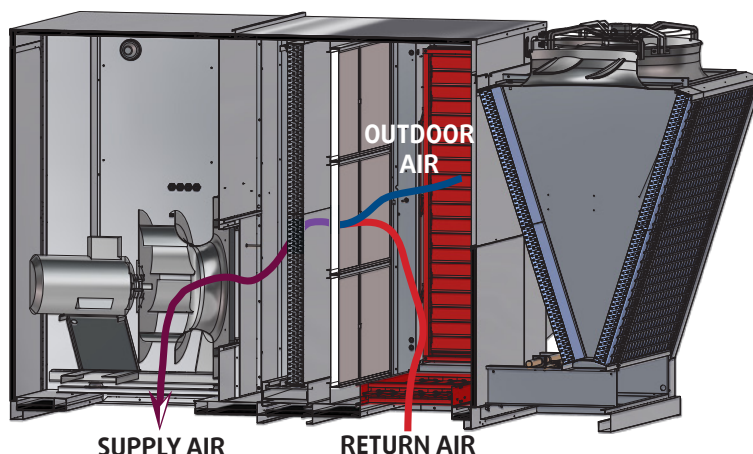


Economiser with 2 dampers

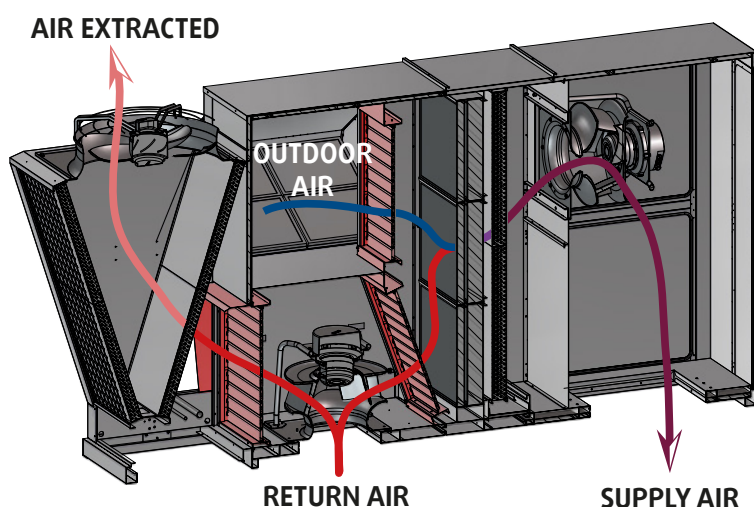
The factory-mounted economiser with 2 motorised dampers is available with the R1, R2 and R4 configurations.

The control program for the economiser is optimized to use the biggest possible amount of outdoor air, in order to save consumption of the compressors, and thus energy.

The outdoor air damper is closed during SHUTDOWN periods, in the starting, morning warming and night idling modes, in order to save energy.



Economiser with 3 dampers - RECO system



The factory-mounted economiser with 3 motorised dampers, is equipped with an **EC plug fan return fan as a standard** and is available with the R1 and R2 configurations.

The economiser increases the partial load operation of the compressors and improves the seasonal efficiency thanks to a proportional-action control function..

The economiser with 3 combined dampers, with proportional modulation of the outdoor-recycled-extracted air allows an extraction up to 100% of the total air flow (in equivalent quantity to the intake of outdoor air).

It provides real energy savings by regulating the air renewal.

Outdoor air	Pc	EER	Ph	COP
30%	+1%	+2%	+7%	+4%
60%	+2%	+4%	+14%	+8%

Specifications

Heating

The **SYSAER R32** can be equipped, according to the specifications of the customer, with an additional heating system. This equipment is installed and tested in the factory.

Electric heating

The electric heating battery is available on all of the configurations of the **SYSAER R32**. 1 power level of **48kW** is available to adapt to the entire **SYSAER R32** range.

The regulation makes it possible to control 2 power stages in order to adapt the electrical consumption to the heating needs.

An air flow rate detector associated with 2 automatic and manual reset thermostats provides the safety for the electric heating function.

Gas leak detector

The objective of the R32 leakage detector card is:

- To detect R32 leakage that could occur in the product,
- To stop the unit by controlling the energy supply of the compressors,
- To alarm that leakage is detected,
- To supply air distribution in case of leakage for discharging the unit.

The table shows the maximum refrigerant limit before considering a leakage on the units:

FLUID	% max LFL	Max set point***
[-]	[100x allowed limit* / LFL**]	[ppm]
R32	19.8	31 800

* allowed limit: corresponds to the column "Limite pratique" in the EN378 extract

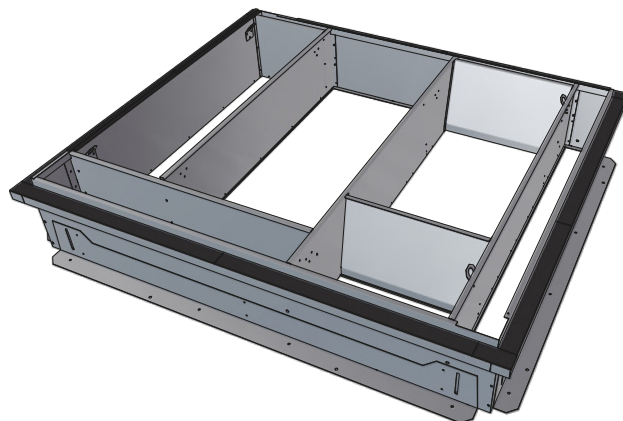
** LFL: minimum concentration of refrigerant able to propagate a flame in a homogeneous mixture of refrigerant and air

*** Maximum set point is calculated based on:

Vapour state at P _{atm} : 1.013 bar	
ρ _{R32} (-20°C)	2.564 Kg/m ³
ρ _{R32} (60°C)	1.918 Kg/m ³

Frame

The mounting frame is made from galvanized steel sheet. It is delivered with a seal to connect the edge of the frame to the unit and eliminate vibrations and thermal bridges.



CO₂ sensor (Option)

CO₂ room sensor with active/switching output, automatic calibration (can be switched off), for determining the CO₂ content in the air (0...2000 ppm / 0...5000 ppm). The transmitter converts the measured values into a standard signal of 0 -10 V or 4...20 mA (switchable).

If a CO₂ sensor is connected to the unit, the value of the minimum is calculated according to the CO₂ content. The value measured by the sensor can be read on the main display. The user could set the ppm number up to which the minimum amount of fresh air is present and read the number of ppm from when 100% fresh air is used.

Specifications

Control



All of the required controls are grouped together and wired on the **SYSMAER R32**, factory tested and shipped READY TO USE.

The controls are located in a sealed compartment that is isolated from the air flow. The cables and inside wires are marked in order to facilitate troubleshooting.

The electrical equipment is compliant with EC standards and EN60204-1.

A single main switch that can be locked can be accessed from the outside of the **SYSMAER R32** without opening the caisson. This switch is sized in the factory according to all of the options supplied.

The unit comes standard with a single electrical connection.

A factory-programmed direct digital control (the **IATC**) handles and optimizes the operation all throughout the year, emphasizing comfort and the saving of energy.

The **IATC** regulates the heating and the cooling according to the desired ambient temperature and also the humidity in cooling mode according to the setpoint, controlling the cyclical operation and the rotation of the compressors, as well as the de-icing, leak gas, high and low pressures, compliance with the requirements for minimum ventilation and the continuous fan mode.

Compensation for the summer-winter ambient temperature and cooling setpoint always above heating setpoint are provided as standard.

Maintenance parameters and operating times for the compressors/electrical heaters/unit are also available.

The **IATC** is equipped with clock card for scheduler programming. This card can be programmed on site in comfort-economy modes with a reduction in the ambient temperature and in the ambient humidity.

The user interface also contains a backlit semi-graphic liquid crystal display screen with 8 lines and 22 columns. This display shows the current values, setpoints, operating times and alarms.

It has a 6-key keyboard allowing for on-site programming of the setpoints, proportional and integral parameters and the hysteresis thresholds.

The semi-graphic terminal is connected to the controller using the 150-cm telephone cable provided, connecting the rear of the terminal to the J10 plug of the controller.

For other applications, you can increase the distance between the terminal and the controller:

- Up to 50 m with 6-wire shielded telephone cable.
- Up to 500 m with 6-wire shielded telephone cable and two communication cards (optional)

A system for building management provided by another supplier can communicate via ModBus on the user interface. The parameters of the **SYSMAER R32** are then transmitted and can be modified from a remote monitoring and troubleshooting station.

Models designation

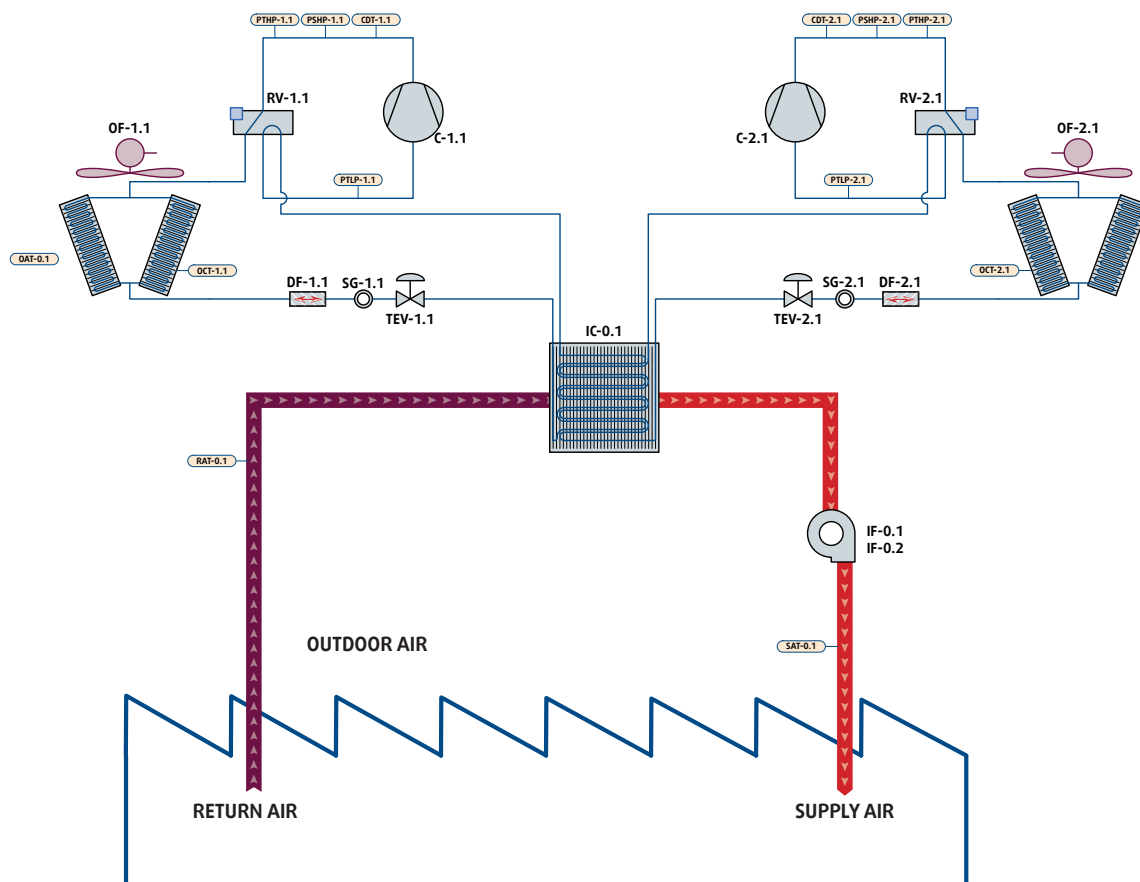
SR R32 105 . H . SYS . EH . G4 . EC HPF . S1 . R1D2 . HY . LK . + . AVM . SD

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑪

REP.	Description	
① Model	SR R32 105 : size 105 SR R32 120 : size 120 SR R32 140 : size 140	
② Version	H : Reversible	
③ Brand	SYS : Systemair	
④ Heating	Empty : Without heating EH : Electric heating	GAS C : Condensation gas burner
⑤ Filter	Empty : Without filter G4 : Filter G4	G4+F7 : Filter G4 + Filter F7 G4+F9 : Filter G4 + Filter F9
⑥ Blast fan	EC LPF : Standard EC motor fan	EC HPF : High pressure EC motor fan
⑦ Blast configuration	S1 : Low blast S2 : Left blast	S3 : Front blast S4 : Top blast
⑧ Return configuration	R1 : Low return R2 : Left return R4 : Top return R1D2 : Low return + 2 Dampers R2D2 : Left return + 2 Dampers R4D2 : Top return + 2 Dampers	R1D3 LPF RECO : Low return + 3 Dampers Standard EC motor fan R2D3 LPF RECO : Left return + 3 Dampers Standard EC motor fan R1D3 HPF RECO : Low return + 3 Dampers High pressure EC motor fan R2D3 HPF RECO : Left return + 3 Dampers High pressure EC motor fan
⑨ Sensor	Empty : Without sensor HY : Enthalpy sensor	VOC : Air quality sensor CO2 : CO ₂ sensor
⑩ Display	Empty : Without display LK : Local graphics display	RK : Offset graphics display LRK : Local and offset graphics displays
⑪ Option	AVM : Rubber absorbing pads CS : Progressive starter SD : Smoke detector CF : Clogged filter pressure switch	RT : Offset ambiance sensor MF : Anti-drip filter FAD : Fresh air ducted MODBUS : Modbus CC : Transport container

Refrigerant Flow Diagram

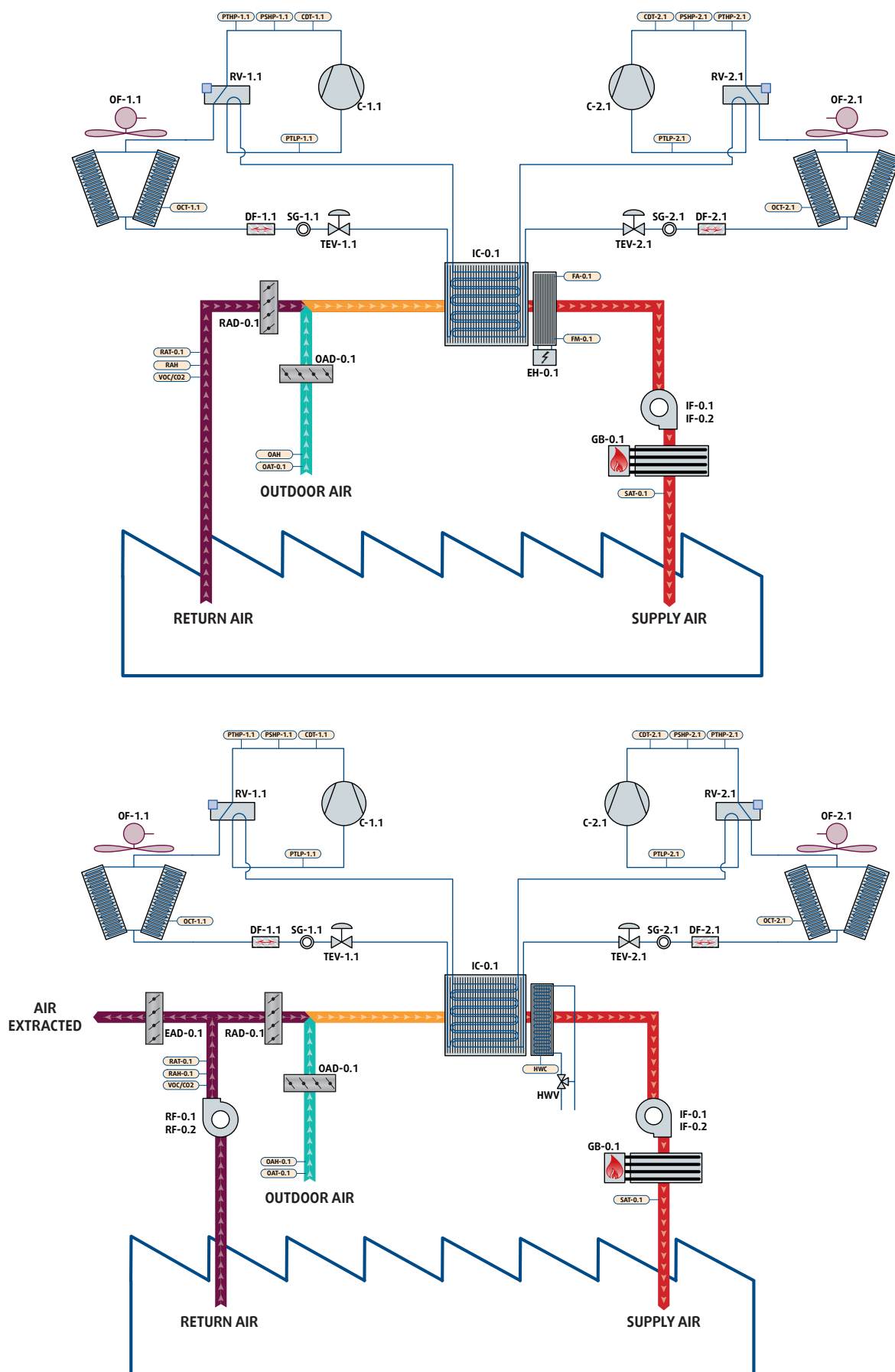
SR R32 105 - SR R32 120 - SR R32 140



REPERE	DESCRIPTION
C-1.1 C-2.1	Compressor
RV-1.1 RV-2.1	Cycle reversal valve
OF-1.1 OF-2.1	Outside fans
DF-1.1 DF-2.1	Dehydrating filter
SG-1.1 SG-2.1	Liquid light
TEV-1.1 TEV-2.1	Thermostatic pressure reducing valve (SR R32 105 to SR R32 140)
IC-0.1	Internal coil (evaporator)
CDT-1.1 CDT-2.1	Backflow temperature
PSHP-1.1 PSHP-2.1	High pressure switch
PTHP-1.1 PTHP-2.1	High pressure sensor
OCT-1.1 OCT-2.1	Condenser temperature
PTLP-1.1 PTLP-2.1	Low pressure sensor
OAT-0.1	Outside air temperature

REPERE	DESCRIPTION
IF-0.1 / IF-0.2	Blast fans
EH-0.1	Electric heating
GB-0.1	Gas burner
SAT-0.1	Blast air temperature
FA-0.1	Automatic reset heating safety thermostat
FM-0.1	Manual reset heating safety thermostat
RF-0.1 / RF-0.2	Extraction fans
RAD-0.1	Air return damper
OAD-0.1	Fresh air damper
EAD-0.1	Extracted air damper
RAT-0.1	Air return temperature
RAH-0.1	Air return hygrometry
VOC/CO2	Air return quality
OAH-0.1	Outside air hygrometry

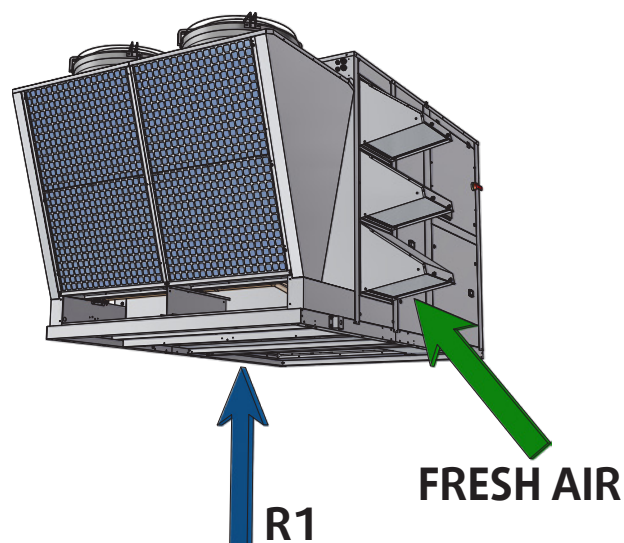
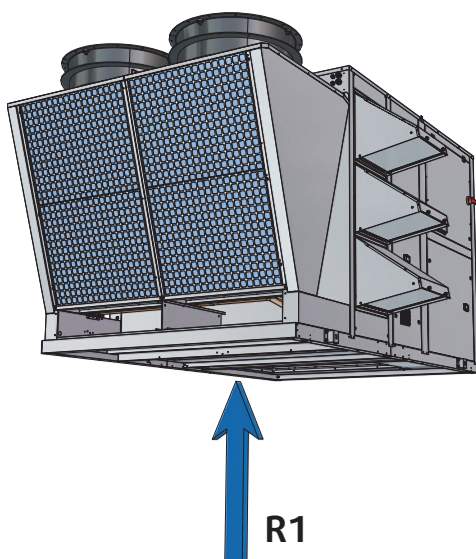
Refrigerant Flow Diagram



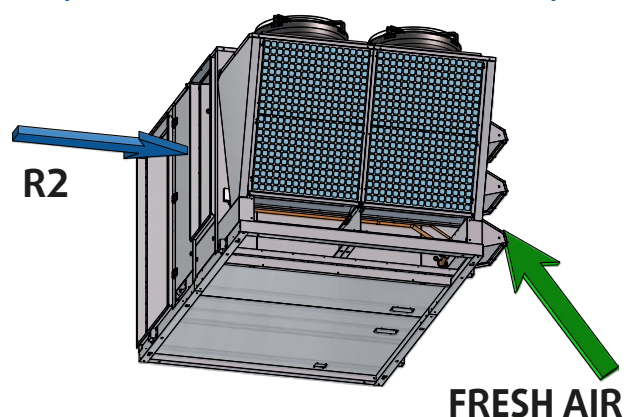
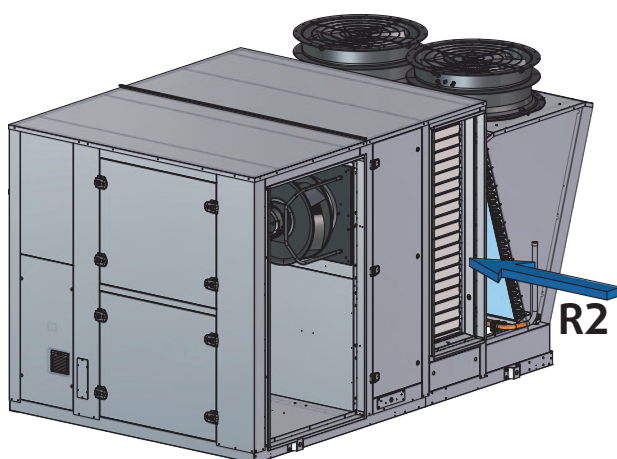
Aeraulic configuration

AIR RETURN

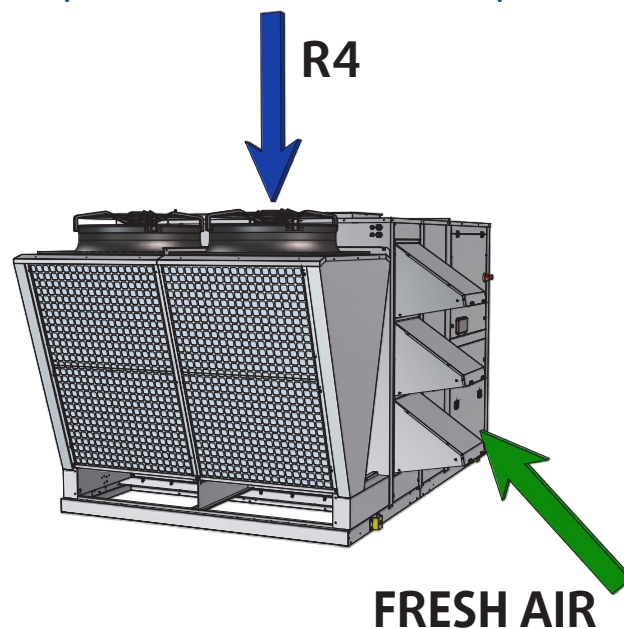
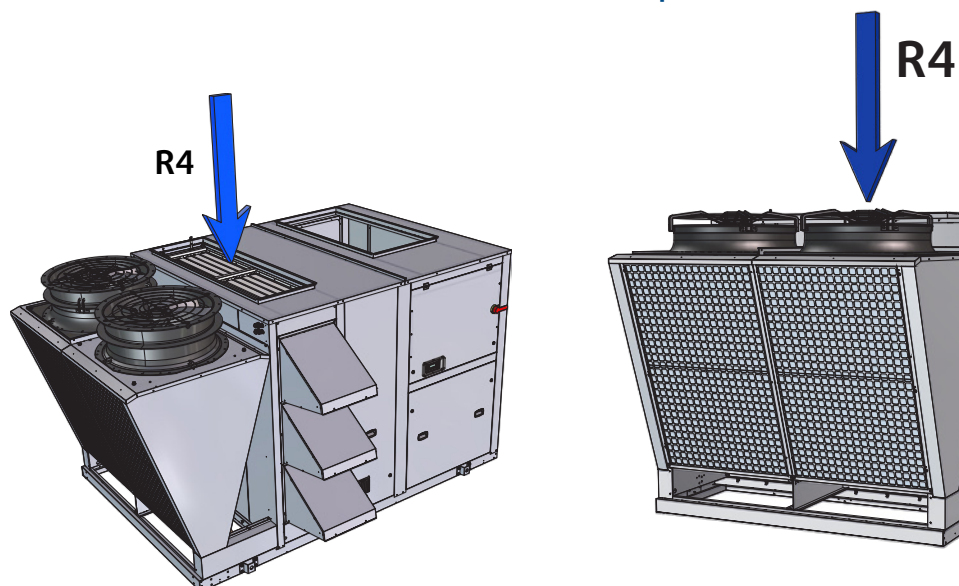
Compatible with economiser with 2 or 3 dampers



Compatible with economiser with 2 or 3 dampers



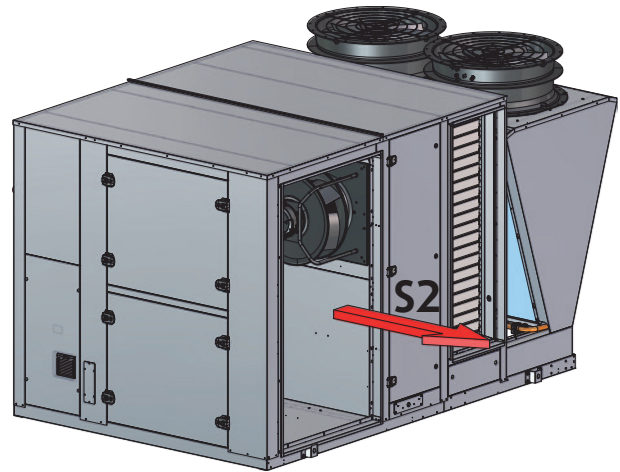
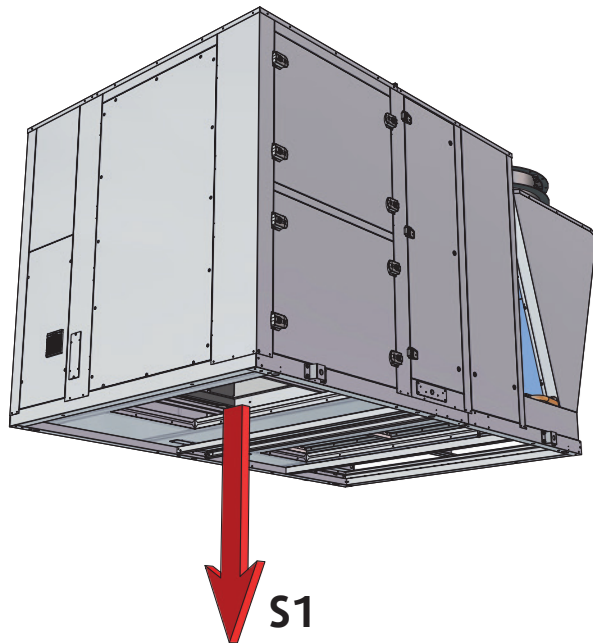
Compatible with economiser with 2 dampers



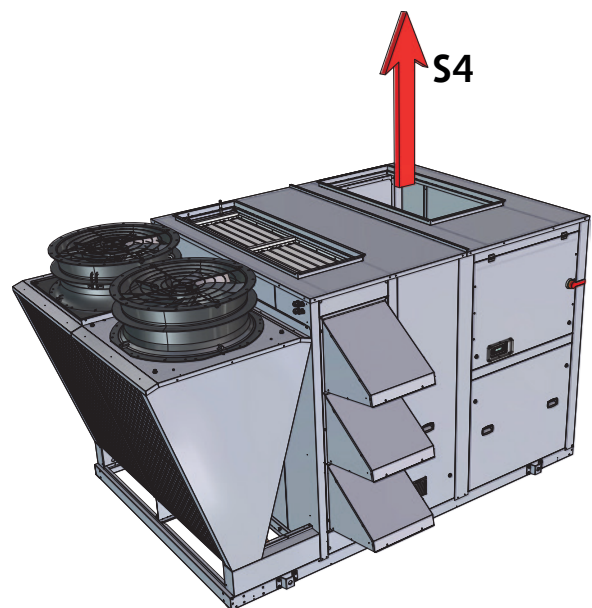
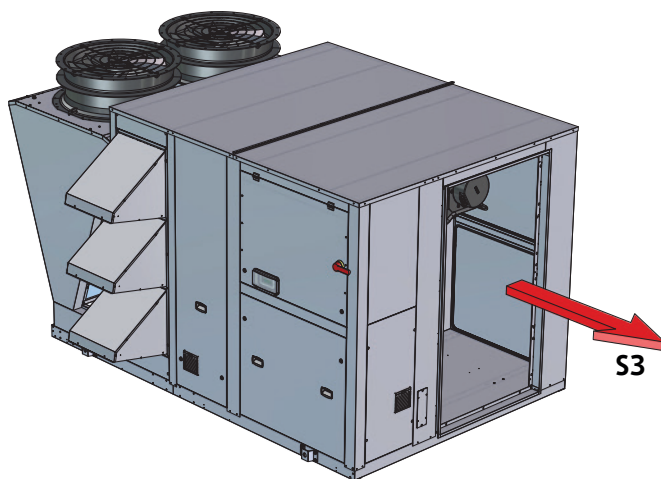
Aeraulic configuration

AIR BLAST

Compatible with gas burner

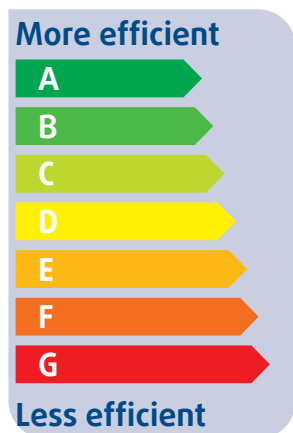


Compatible with gas burner



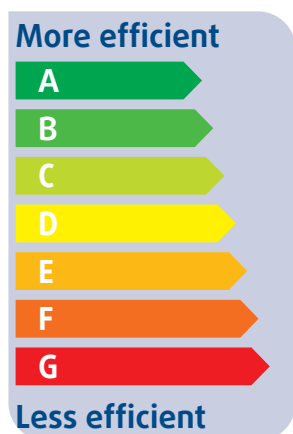
Energy performance

Energy class



SYSAER R32	SR R32 105	SR R32 120	SR R32 140
EER	3.37	3.23	3.24
Class	A	A	A

Space cooling energy efficiency class according to EN 14511 2018.

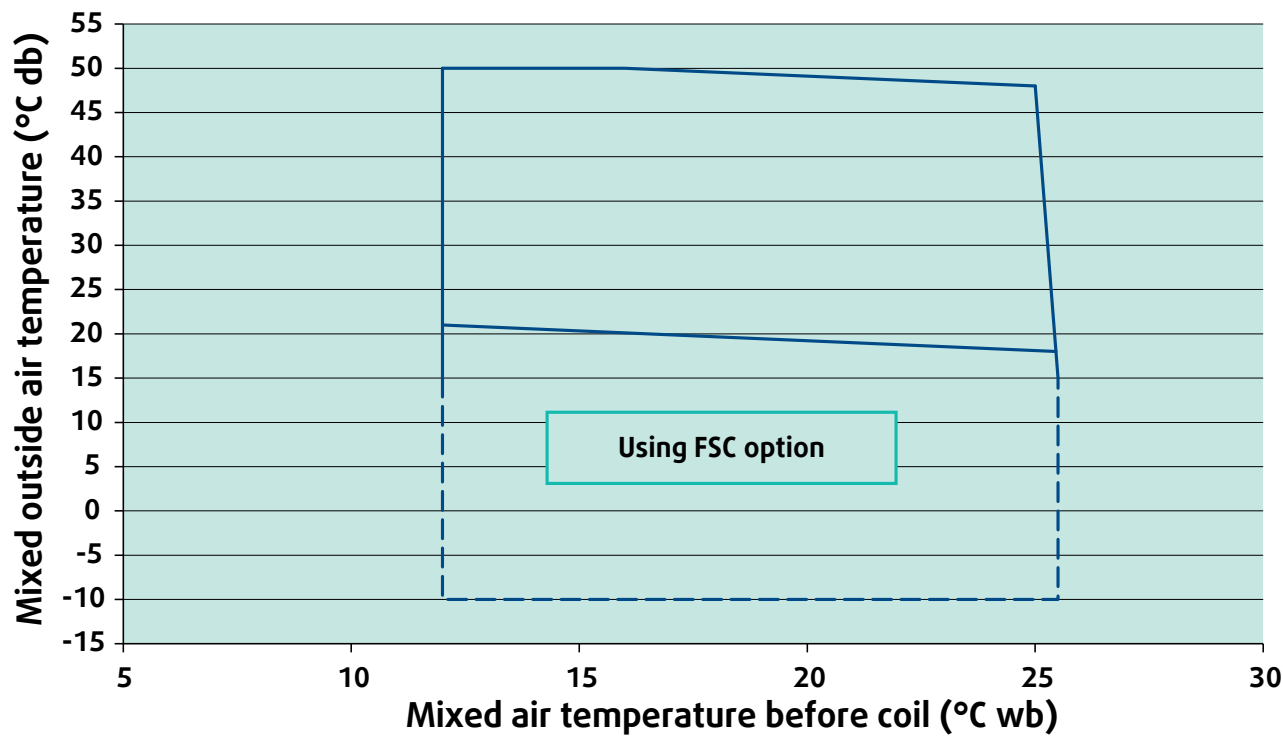


SYSAER R32	SR R32 105	SR R32 120	SR R32 140
COP	3.72	3.89	3.69
Class	A	A	A

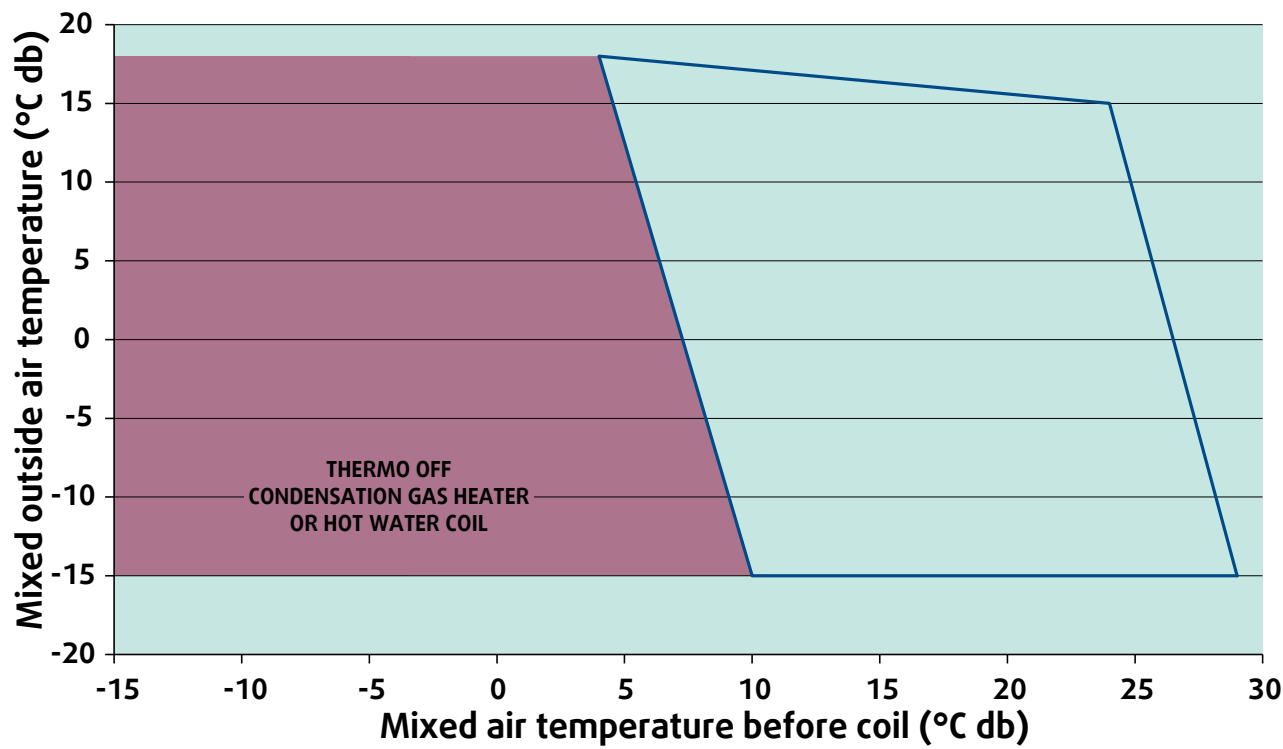
Space heating energy efficiency class according to EN 14825 2017.

Operating Limits

Cooling mode



Heating mode



Correction Factors

Fouling factors - Evaporator

Fouling factor (m ² .°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 (m ² .°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
1 200	0.973	1.020
1 800	0.958	1.030
2 400	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	-3	0.991	0.996	1.013	1.070
20	-8	0.982	0.992	1.040	1.129
30	-14	0.972	0.986	1.074	1.181

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	0.987	0.992	1.010	1.068
20	-7	0.975	0.985	1.028	1.147
30	-13	0.962	0.978	1.050	1.248

Physical Data - SYSAER R32

			SR R32 105	SR R32 120	SR R32 140
PERFORMANCE					
Nominal refrigeration power (1)		kW	106	119	139
Absorbed nominal power (1)		kW	31.5	36.8	43.0
EER total (1)			3.37	3.23	3.24
Energy efficiency class (1)			A	A	A
PdesignC (2)		kW	106	119	139
SEER (2)			3.82	3.82	3.67
ηsc (2)			150	150	144
Nominal heating power (2)		kW	106	117	142
Absorbed nominal power (2)		kW	27.0	30.3	38.0
COP (2)			3.72	3.89	3.69
Energy efficiency class (COP) (2)			A	A	A
PdesignH (2)		kW	100	118	140
SCOP (2) / Energy efficiency class (2)			3.36 / B	3.56 / B	3.32 / B
ηsh (2)			131	130	130
ELECTRICAL POWER SUPPLY					
Supply voltage			400V / 3 / 50Hz		
Maximum operating intensity		A	79.00	85.00	105.00
Start intensity		A	284.00	288.00	346.00
REFRIGERANT					
Type			R32		
Load			SEE ID PLATE		
Number of refrigeration circuits			2	2	2
COMPRESSORS					
Type			Scroll		
Nombre			2	2	2
Type de montage			Single		
Power reduction stages		%	0/50/100	0/50/100	0/50/100
Crankcase heater		W	2 x 70	2 x 70	2 x 120
INNER COIL					
Type			Copper tubes & aluminum fins		
Number of rows			4	4	4
Front surface		m²	3.24	3.24	3.24
INNER FAN					
Type			Backward curved centrifugal		
Number (3)			2	2	2
Air flow rate (3)	Minimum	m³/h	15 360	17 200	20 400
	Nominal	m³/h	19 200	21 500	25 500
	Maximum	m³/h	23 040	25 800	30 600
Motor power		kW	4.23	4.6	5.72
OUTER COIL					
Type			Copper tubes & aluminum fins		
Number of rows			3	3	3
front surface		m²	1.50	1.50	1.50
OUTER FAN					
Type			Axial		
Number			2	2	2
Diameter		mm	800	800	800
Air flow rate	Nominal	m³/h	20 000	20 000	20 000
Motor power		kW	1.51	1.51	1.51
FILTRATION					
Number of filters			9		
Efficiency / Ranking			G4 - Am < 90% / F7 - 80% < Em < 90% / F9 - Em < 95%		
Type			Cellules universelles		
DIMENSIONS & WEIGHT					
Length	Total	mm	3 740	3 740	3 740
	Floor	mm	3 295	3 295	3 295
Width		mm	2 285	2 285	2 285
Height		mm	2 150	2 150	2 150
Weight (without option)		kg	1 685	1 805	1 855

(1) According to EN 14511 2018

(3) EC standard fan

(2) According to EN 14825 2017

Weight

		SR R32 105	SR R32 120	SR R32 140
basic	kg	1 685	1 805	1 855
Filter	G4	Kg 45	45	45
	G4+F7	kg 65	65	65
	G4+F9	kg 65	65	65
2 dampers	Kg	115	115	115
3 dampers RECO	Kg	430	450	450
Electric heating	Kg	30	30	30
Warm water coil	Kg	30	30	30

Electrical Data

The maximum intensity absorbed by the **SYSAER R32** as well as the total start-up intensity are calculated by adding the basic values provided for the **SYSAER R32** with the additional options.

SYSAER R32 BASIC

		SR R32 105	SR R32 120	SR R32 140
Supply voltage		400V / 3 / 50Hz		
Maximum intensity	A	79.0	85.0	105
Total start intensity (without soft starter)	A	284.0	288.0	346.0

RFAN - RETURN FAN

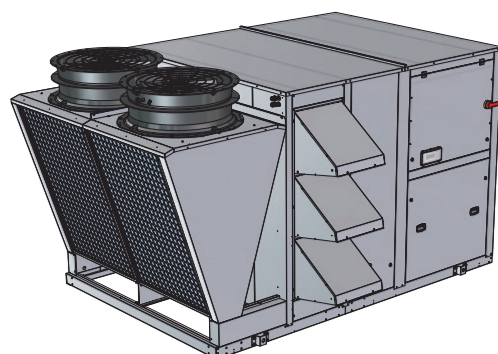
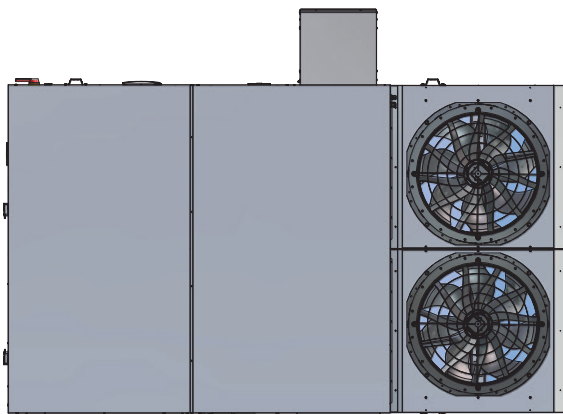
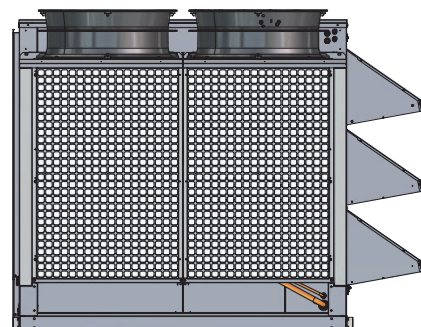
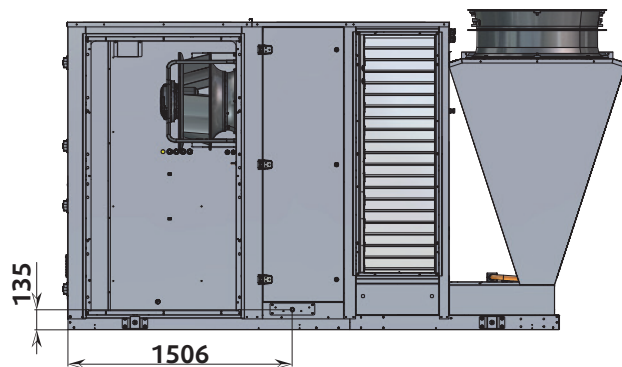
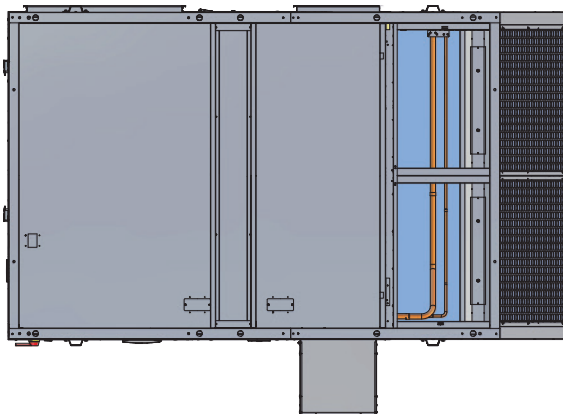
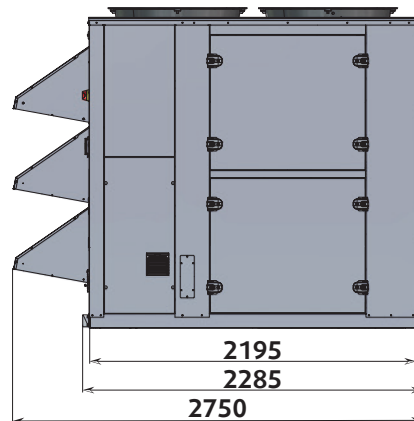
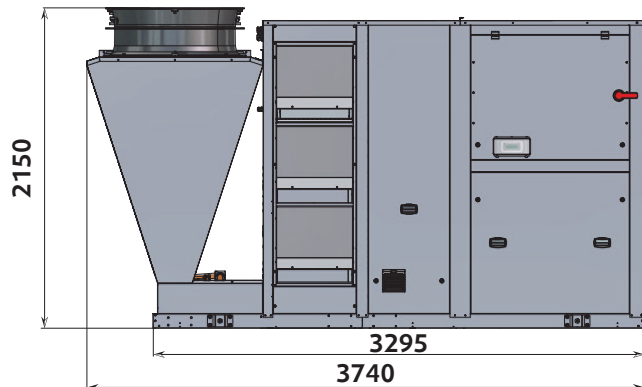
		SR R32 105	SR R32 120	SR R32 140
Maximum intensity				
EC Motor	HPF A	13.0	13.0	13.0

ELECTRIC HEATING COIL

		SR R32 105	SR R32 120	SR R32 140
Power	kW	48	48	48
Maximum intensity	A	76.2	76.2	76.2

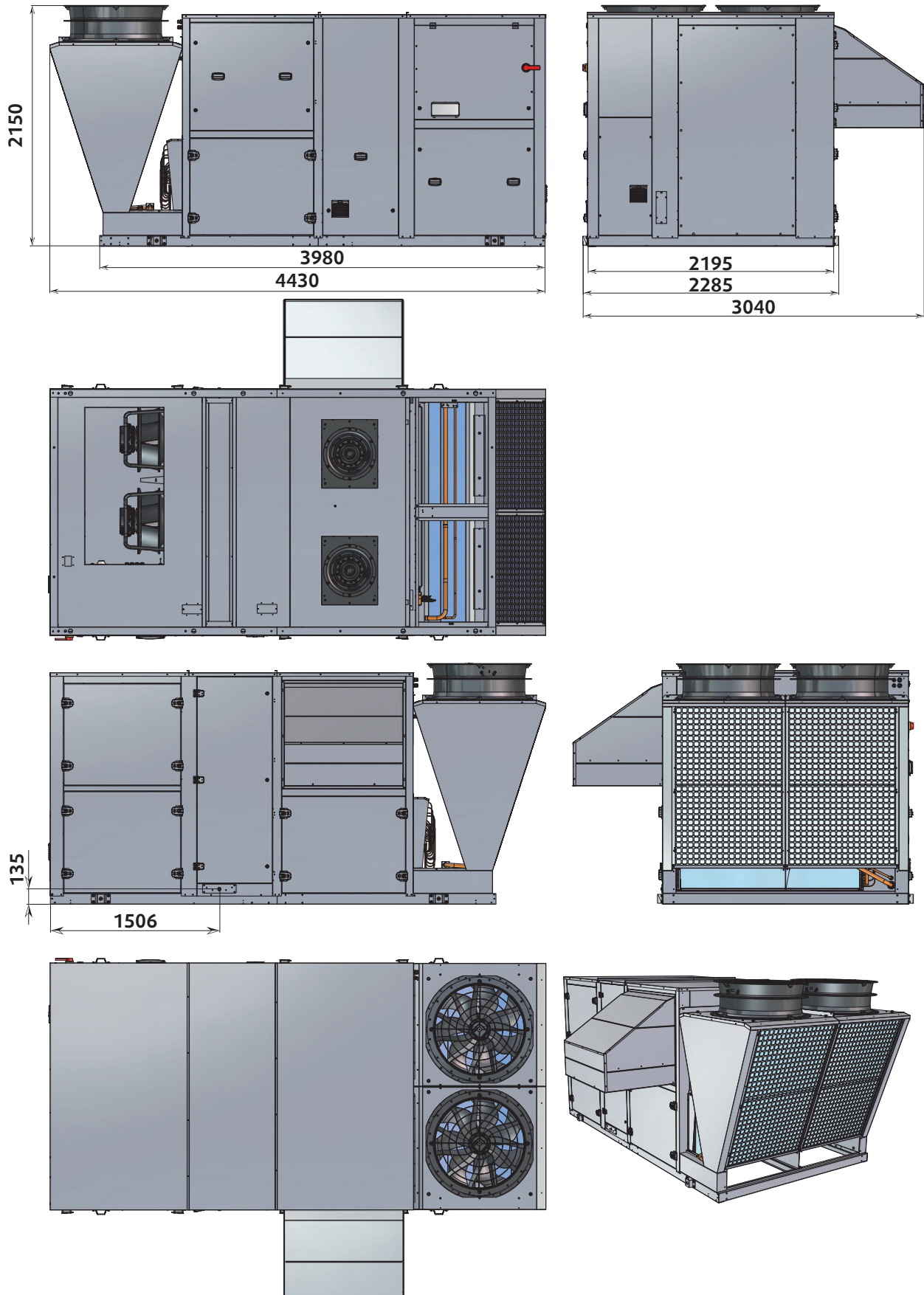
Dimensions (mm)

SYSAER SR R32 105 - 120 - 140 - BASE MODULE / BASE MODULE WITH 2 DAMPERS



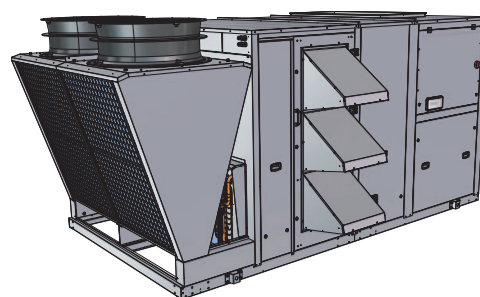
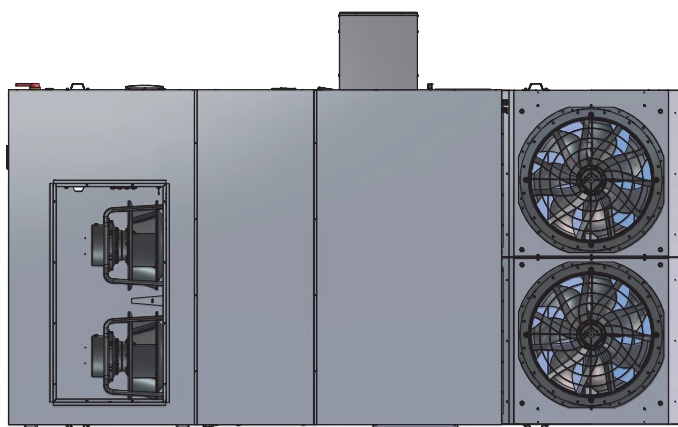
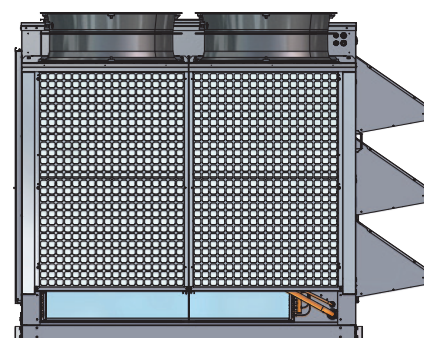
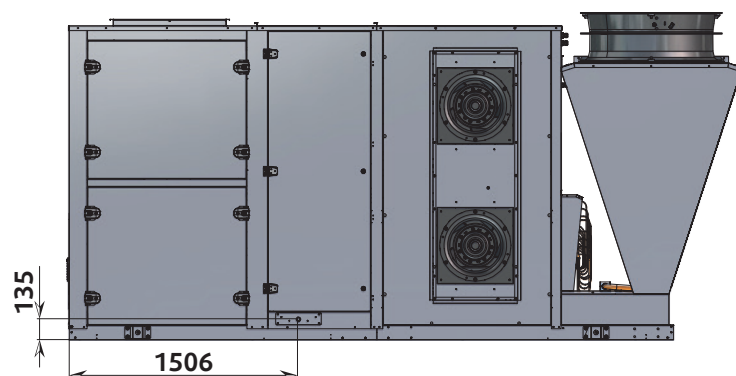
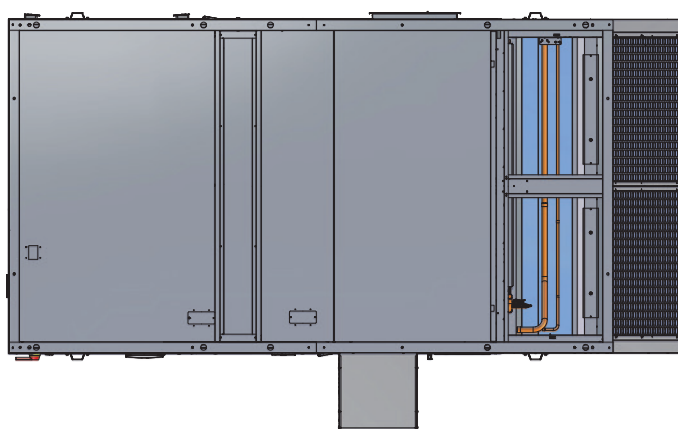
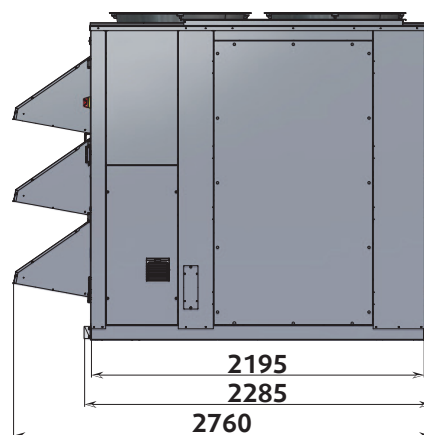
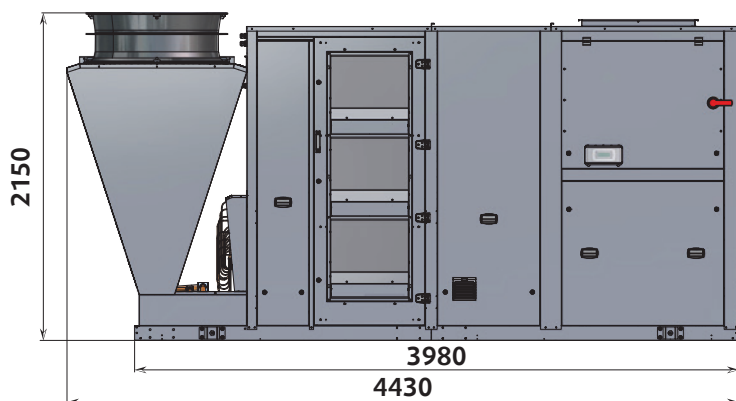
Dimensions (mm)

SYSAER SR R32 105 - 120 - 140 - BASE MODULE R1 WITH 3 DAMPERS



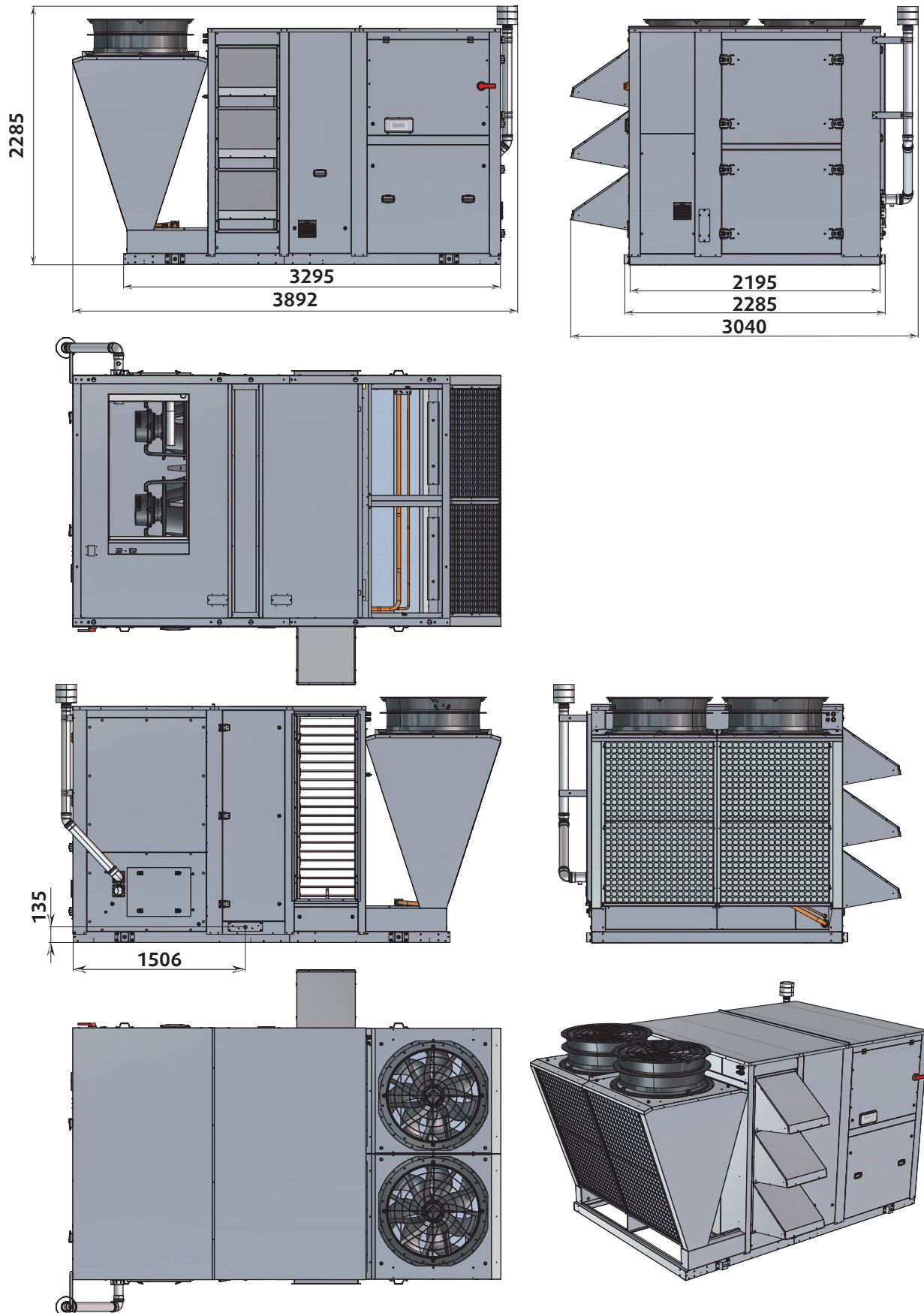
Dimensions (mm)

SYSAER SR R32 105 - 120 - 140 - BASE MODULE R2 WITH 3 DAMPERS



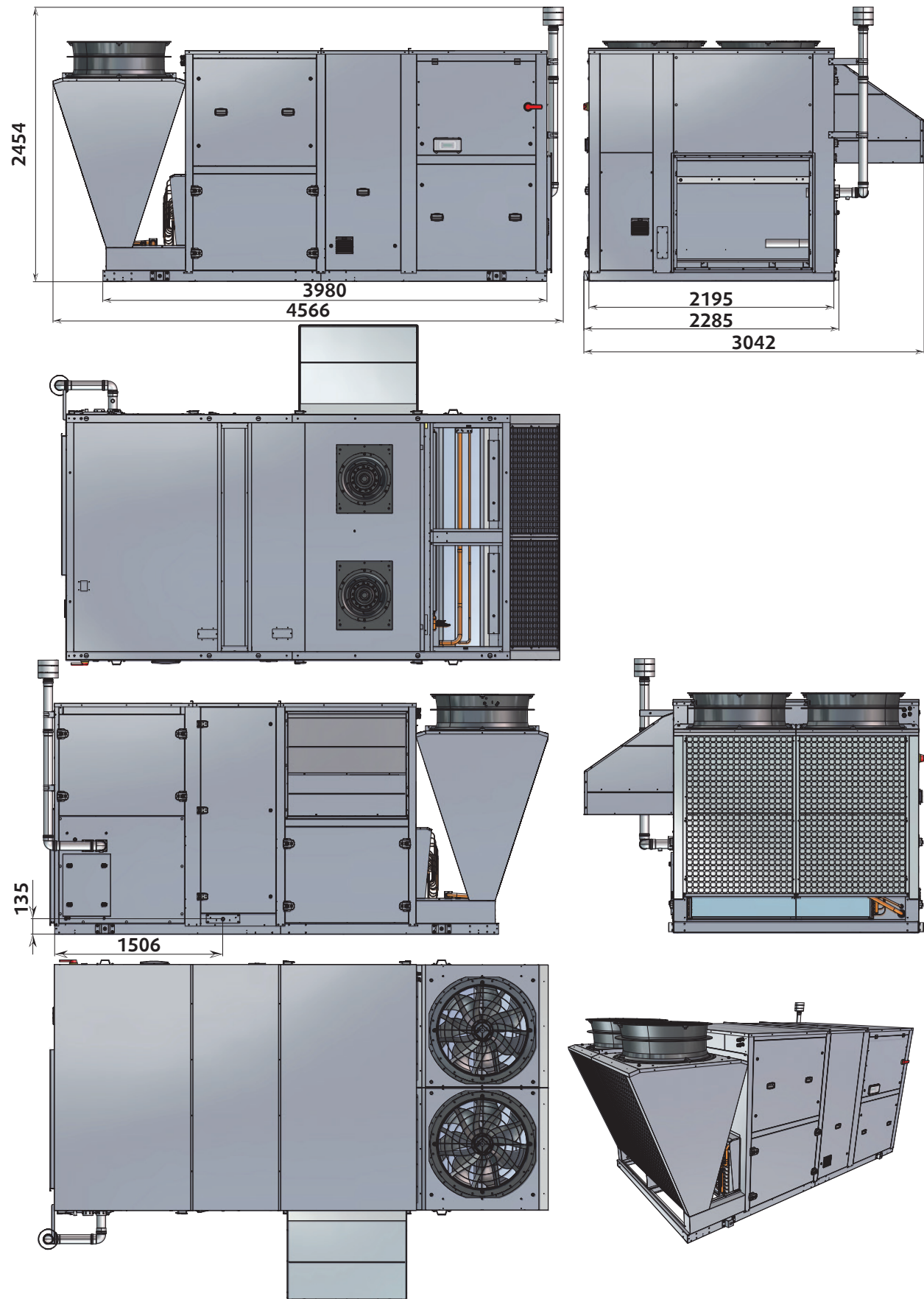
Dimensions (mm)

SYSAER SR R32 105 - 120 - 140 - BASE MODULE WITH 2 DAMPERS AND GAS BURNER



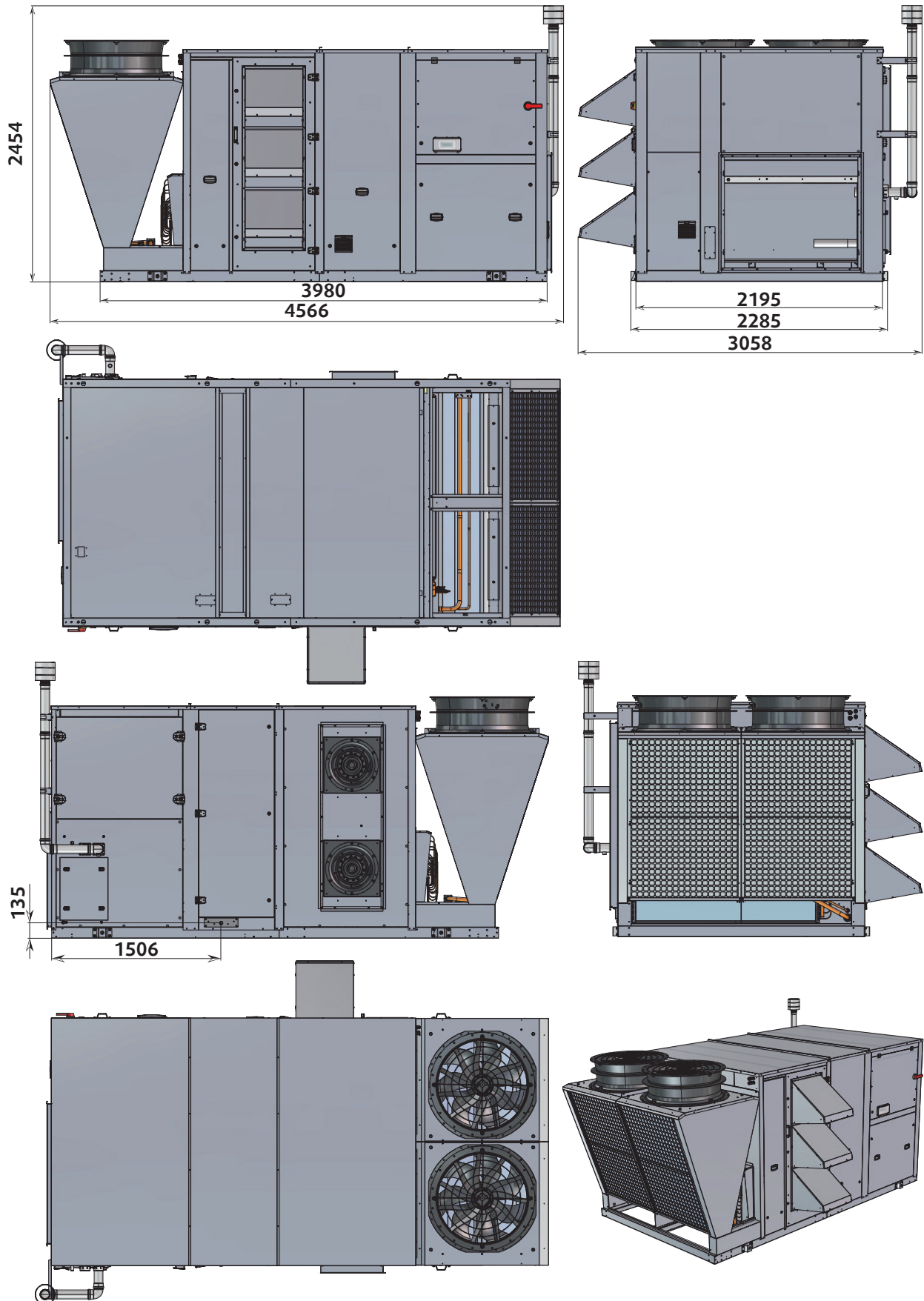
Dimensions (mm)

SYSAER SR R32 105 - 120 - 140 - BASE MODULE R1 WITH 3 DAMPERS AND GAS BURNER



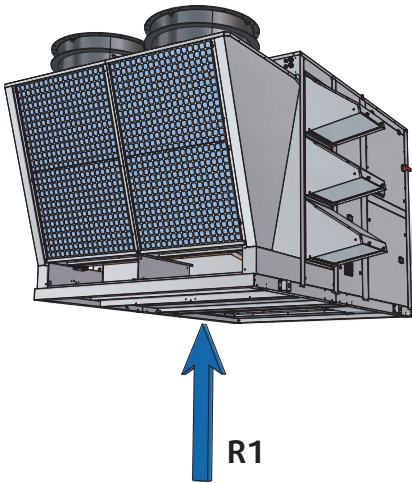
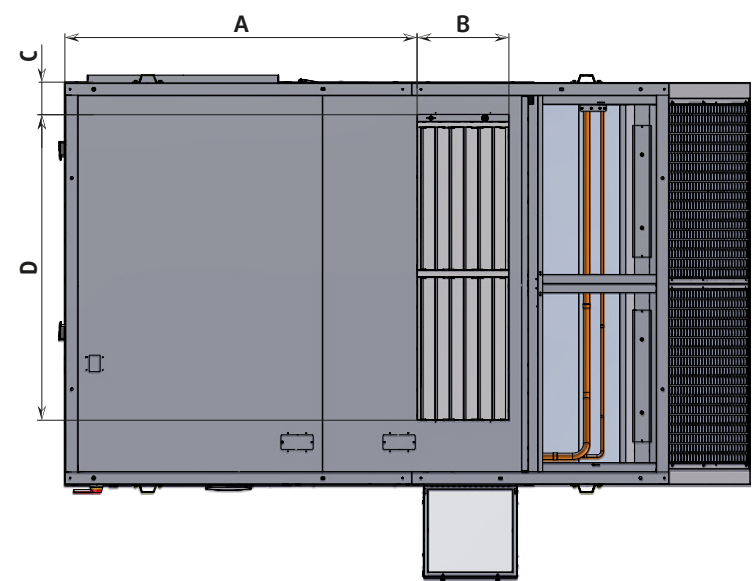
Dimensions (mm)

SYSAER SR R32 105 - 120 - 140 - BASE MODULE R2 WITH 3 DAMPERS AND GAS BURNER



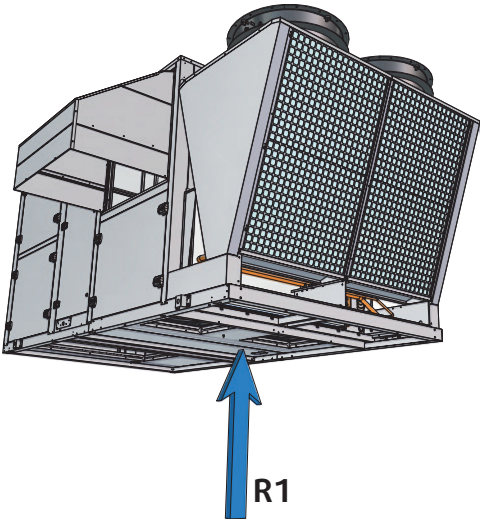
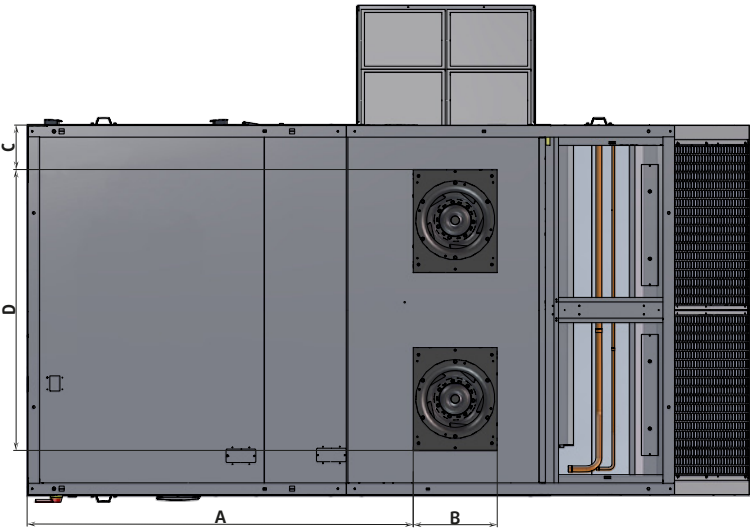
Duct outlet dimensions (mm)

AIR RETURN R1 - BASE MODULE OR 2 DAMPERS



		SR R32 105	SR R32 120	SR R32 140
A	mm	1 924	1 924	1 924
B	mm	500	500	500
C	mm	173	173	173
D	mm	1 669	1 669	1 669

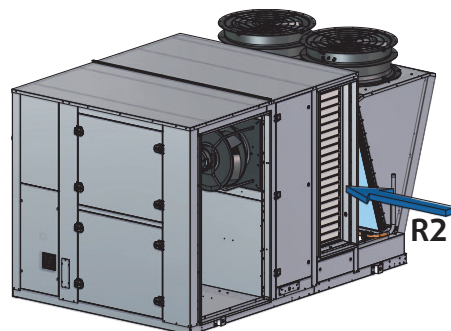
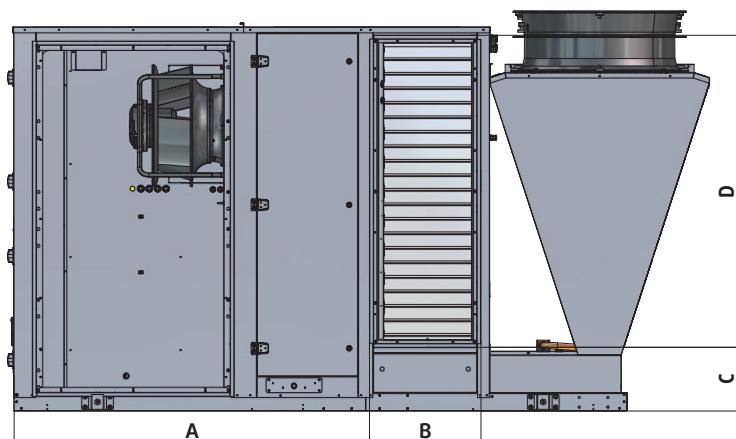
AIR RETURN R1 - 3 DAMPERS



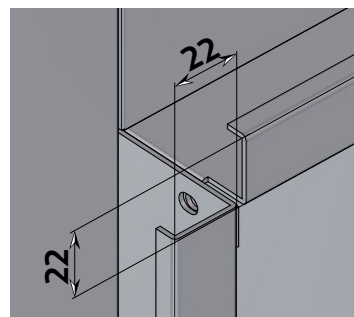
		SR R32 105	SR R32 120	SR R32 140
A	mm	2 420	2 420	2 420
B	mm	500	500	500
C	mm	271	271	271
D	mm	1 651	1 651	1 651

Duct outlet dimensions (mm)

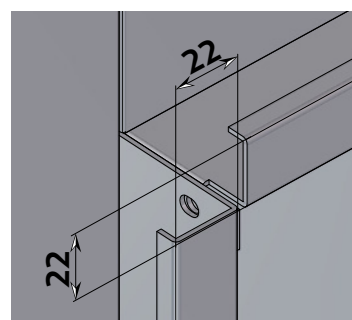
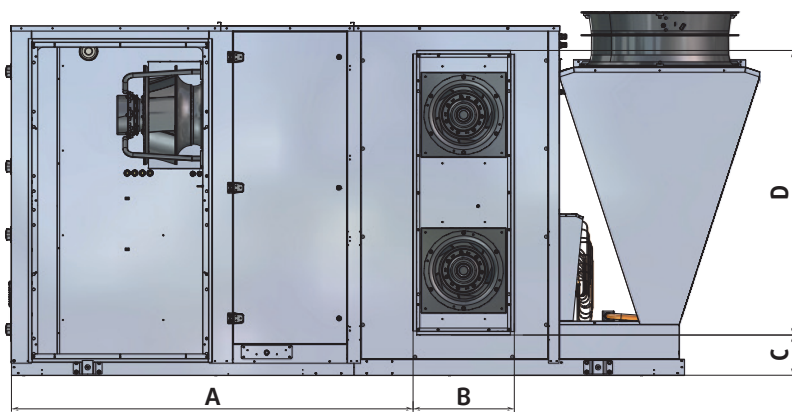
AIR RETURN R2 - BASE MODULE OR 2 DAMPERS



		SR R32 105	SR R32 120	SR R32 140
A	mm	1 915	1 915	1 915
B	mm	599	599	599
C	mm	341	341	341
D	mm	1 680	1 680	1 680



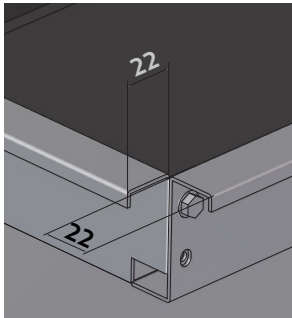
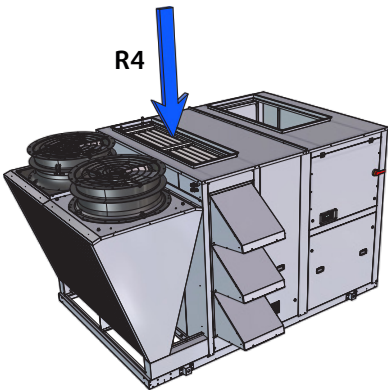
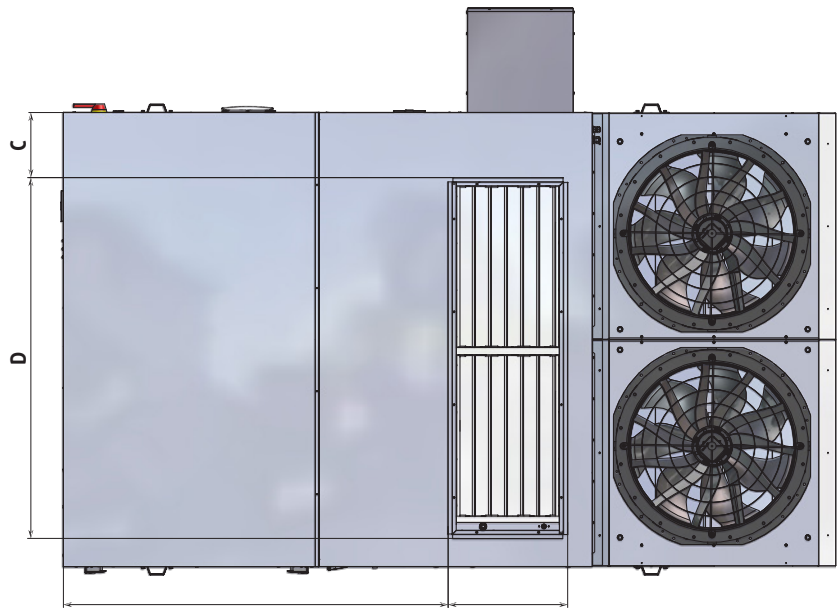
AIR RETURN R2 - 3 DAMPERS



		SR R32 105	SR R32 120	SR R32 140
A	mm	2 370	2 370	2 370
B	mm	599	599	599
C	mm	240	240	240
D	mm	1 680	1 680	1 680

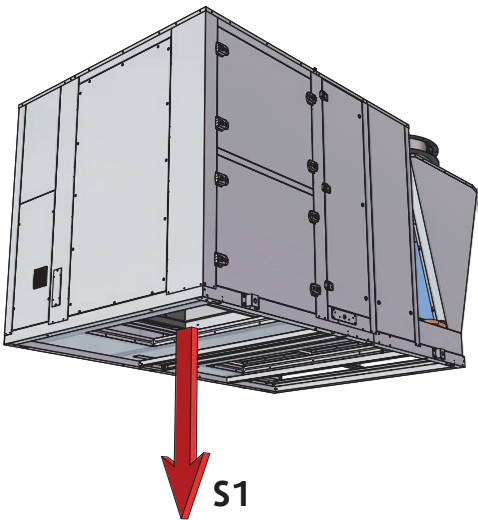
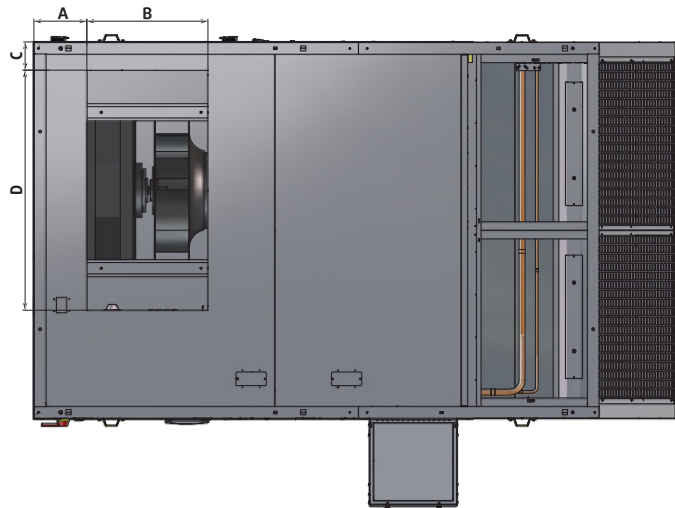
Duct outlet dimensions (mm)

AIR RETURN R4 - BASE MODULE OR 2 DAMPERS



		SR R32 105	SR R32 120	SR R32 140
A	mm	1 865	1 865	1 865
B	mm	581	581	581
C	mm	316	316	316
D	mm	1 750	1 750	1 750

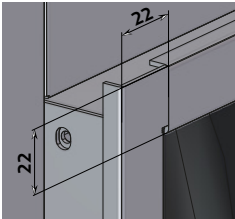
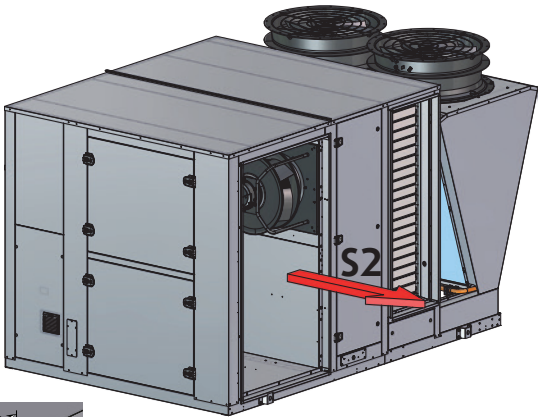
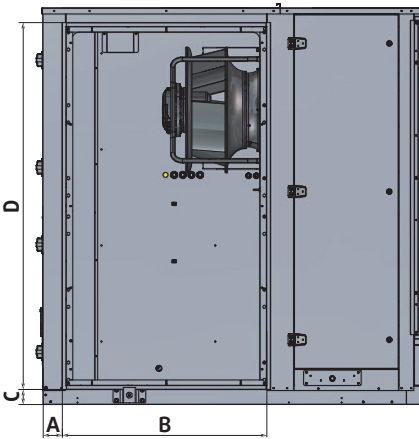
AIR BLAST S1



		SR R32 105	SR R32 120	SR R32 140
A	mm	310	310	310
B	mm	705	705	705
C	mm	164	164	164
D	mm	1 400	1 400	1 400

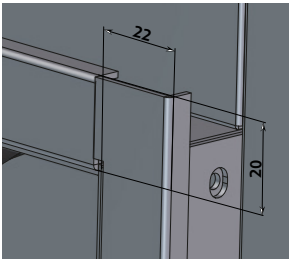
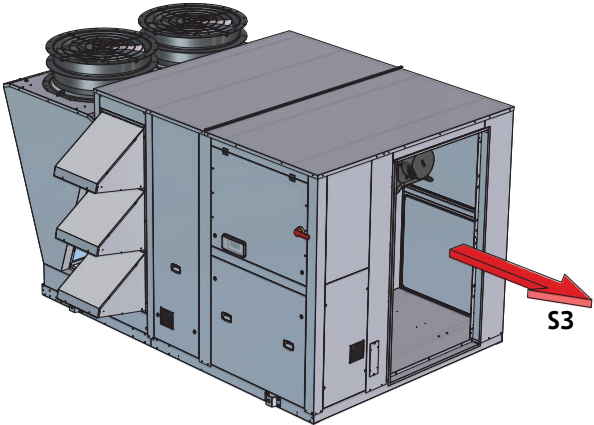
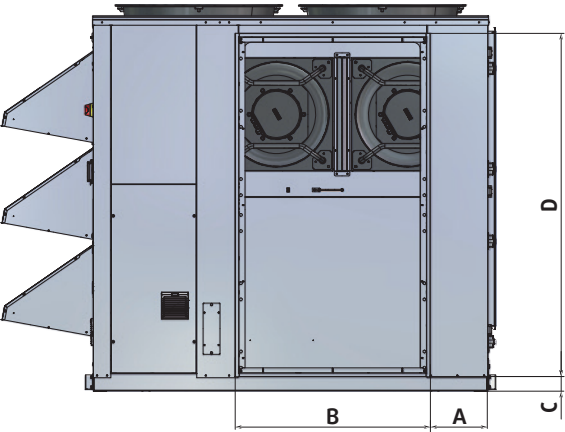
Duct outlet dimensions (mm)

AIR BLAST S2



		SR R32 105	SR R32 120	SR R32 140
A	mm	100	100	100
B	mm	1 087	1 087	1 087
C	mm	78	78	78
D	mm	1 910	1 910	1 910

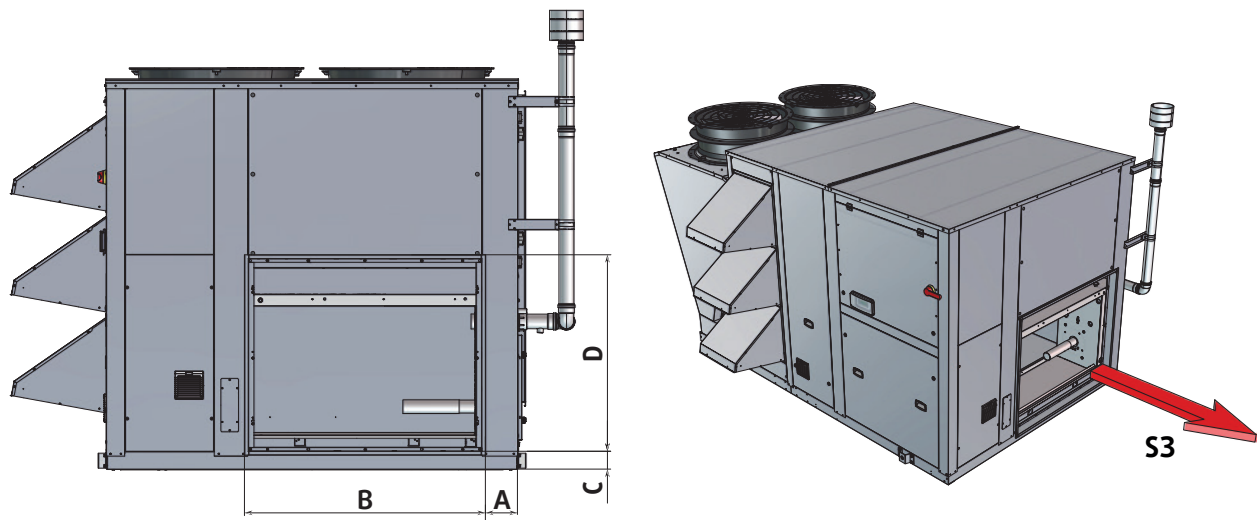
AIR BLAST S3 WITHOUT GAS BURNER



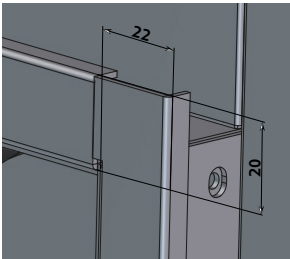
		SR R32 105	SR R32 120	SR R32 140
A	mm	320	320	320
B	mm	1 086	1 086	1 086
C	mm	77	77	77
D	mm	1 911	1 911	1 911

Duct outlet dimensions (mm)

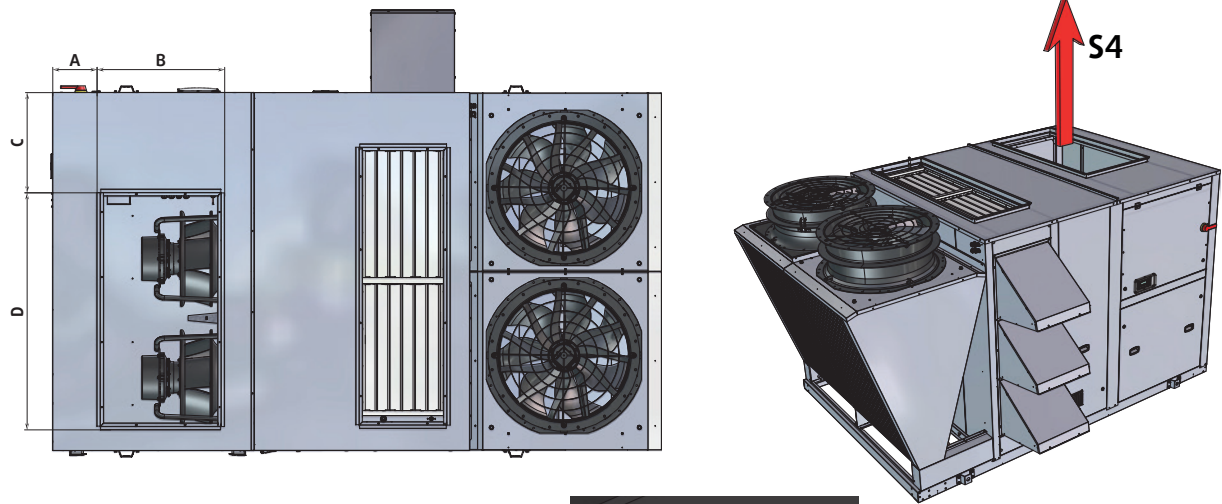
WITH GAS BURNER



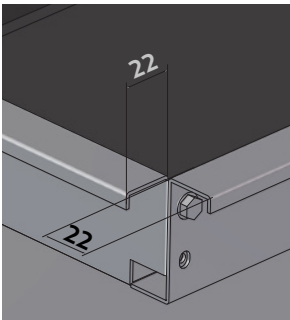
		SR R32 105	SR R32 120	SR R32 140
A	mm	172	172	172
B	mm	1 287	1 287	1 287
C	mm	77	77	77
D	mm	1 069	1 069	1 069



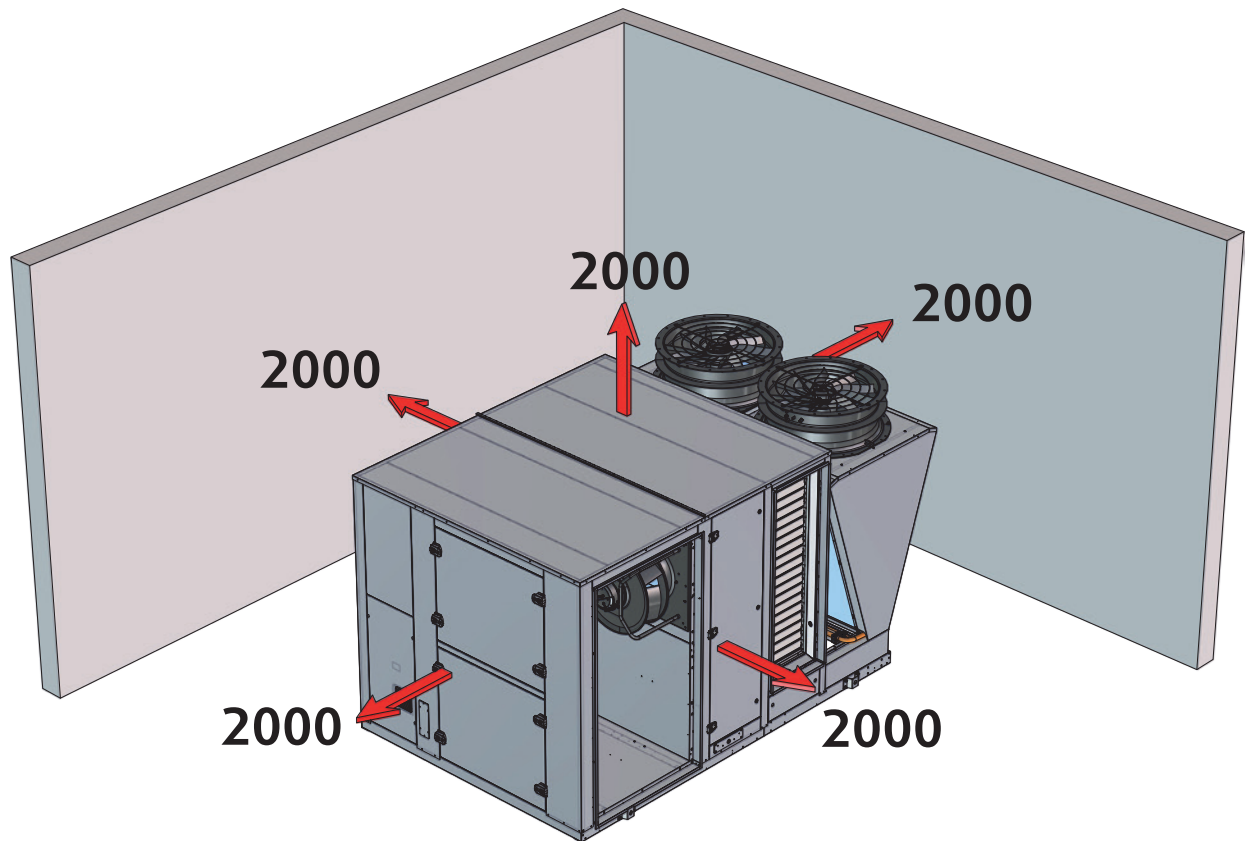
AIR BLAST S4



		SR R32 105	SR R32 120	SR R32 140
A	mm	272	272	272
B	mm	786	786	786
C	mm	595	595	595
D	mm	1 481	1 481	1 481



Space Requirements (mm)



Notes

Notes



