Refrigerant R513-A

1.8 to 2.6kW

1.7 to 2.0kW

250 to 460 m³/h

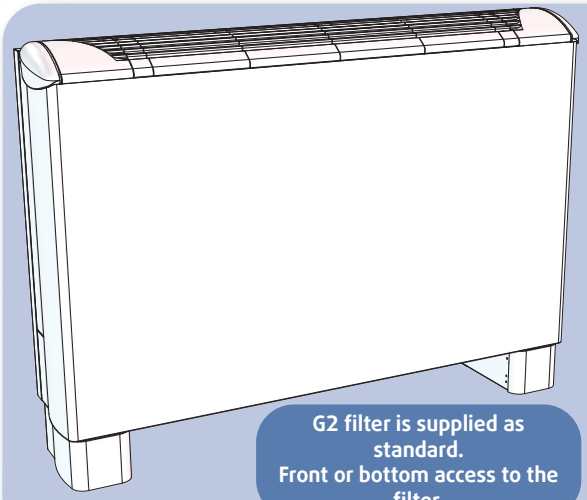
SYSCW-AR R513

Water Source Heat Pumps - Vertical console Version

Models 07R to 09R

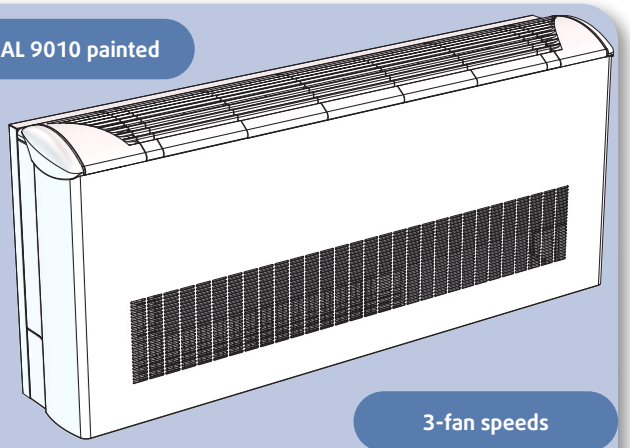
systemair

Some advantages...



G2 filter is supplied as standard.
Front or bottom access to the filter.

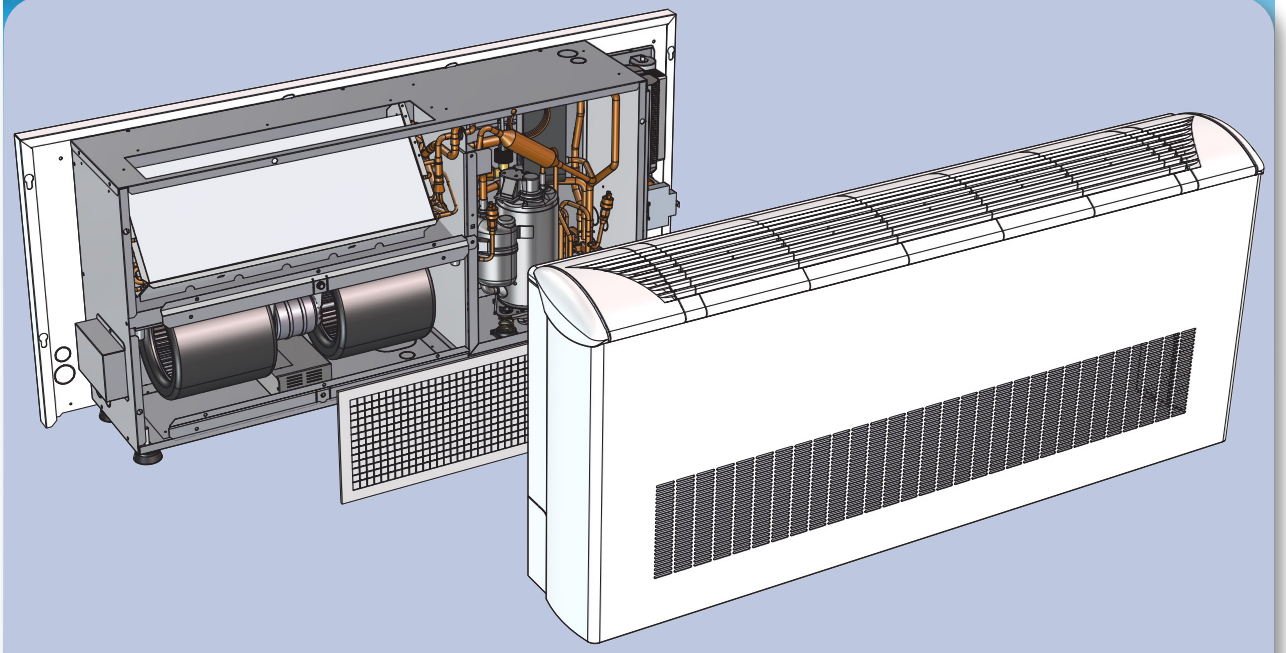
RAL 9010 painted



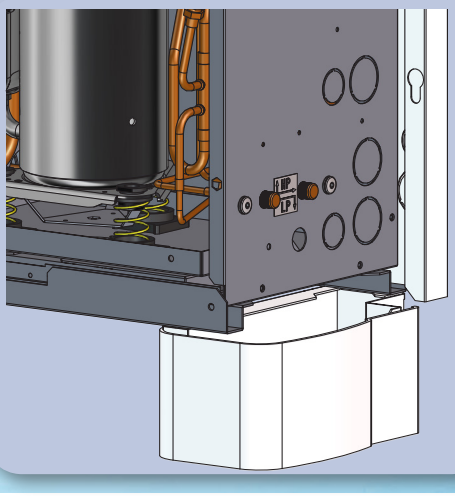
3-fan speeds

Temperature range : 15 to 45 °C

EC version is available as optional



Front panel is very easy to remove in order to facilitate access to internal components.



Direct external access Schrader valves (HP&LP) available for a pressure tap on the refrigerant circuit.

Unit Description

Generalities

- **RAL 9010** painted cabinet with optimal compactness.
- High efficiency units with **high COP** values.
- Complete access to the compressor, fan and electrical box, **through front removable panel**.
- Condensate drain pan with **anti-corrosion treatment** by oven-baked epoxy paint.
- Fan motor equipped with **3 ventilation speed**, or optional EC version.
- **Heat exchanger with brazed stainless steel plates** on the water/refrigerant side, for improved efficiency.
- Autonomous control by **Siemens controller. The RCS user remote control** includes a digital display and key control buttons.

Introduction

The new generation of **SYSCW-AR R513A water source heat pumps** is the fruit of our considerable product experience and our awareness of the market, all combined with a technology based on the energy efficiency of machines, in order to provide on the market **units with the highest performance in terms of COP**.

Operating range

To enable a much wider operating range and installation using a water source in an application with a dry cooler, the standard SYSCW-AR R513A units are designed to operate in a **water source temperature range between 15 and 45 °C**.

Cabinet

The cabinet is made of galvanised sheet steel painted RAL 9010.

To facilitate access to the main components, **front removable panel** provides access to the compressor, the fan and the electrical box.

The condensate drain pan has anti-corrosion treatment consisting of oven-baked epoxy paint.

The inside of the cabinet, on the fan compartment side, is coated with 15 mm thick closed cell polyurethane foam thermal-acoustic insulation, classified **M1**.

On the compressor compartment side, the thermal-acoustic insulation is of 20 mm thick Isofeutre type with heavy mass.

Versions

The SYSCW-AR R513A range is available in several versions :

- SYSCW-AR VC : standard version with cabinet,
- SYSCW-AR VCL : low height version with cabinet,
- SYSCW-AR VN : standard version without cabinet,
- SYSCW-AR VNL : low height version without cabinet.

Each version can be supplied, as standard, with fixed feet (BA configuration) or with adjustable feet (FA configuration).

Filtration

All units are equipped as standard with a disposable G2 filter.

Access to the filter can be realized by the front or the bottom (according to the selected configuration BA or FA).

Water connections

The water source outlet and return connectors are located on the outside of the unit in several configurable positions. They are of female gas threaded type (1/2").

The condensate drain connection is of smooth tube type with an outside diameter of 16 mm.

Water feeding sides : BACK / RIGHT / LEFT / BELOW.

A flow switch of SIKA type will be factory supplied as standard in order to avoid any damage.

Electrical box

Holes are provided in the casing for entry of electrical power supply and remote control cables.

The electrical power supply for SYSCW-AR R513A units is 230V/1Ph/50Hz. Compressor is standard equipped with an internal thermal protection with an automatic reset function.

Refrigerant circuit

The refrigerant circuit comprises a rotary type hermetic compressor, a cycle reversal valve, a water/refrigerant heat exchanger, a liquid receiver, and a finned coil. The refrigerant circuit also comprises an HP pressure switch with automatic reset function and an LP pressure switch with an automatic reset function. Two direct external access Schrader valves (HP & LP) are available for pressure tapping on the refrigerant circuit.

The water/refrigerant heat exchanger is of the brazed stainless steel plate type, for increased efficiency. The anti-freeze safety of the heat exchanger is provided by a water pipe sensor located on the water outlet of the unit monitored by the electronic board. Maximum service pressure water side (10 bar) and refrigerant side (18 bar). The heat exchangers are particularly well adapted to the operation of reversible heat pumps with high thermal transfer rates for a low water flow rate.

The air/refrigerant coil is made of aluminium fins which are mechanically crimped onto copper tubes. The geometry of the coil and of the fin profile have been carefully designed to provide maximum efficiency in the operation of the units.

The cycle reversal valve is designed to be normally energised in heating mode. This logic enables the heat pump to continue to operate in cooling mode if this valve fails.

The liquid receiver enables the charge of R513A refrigerant to be optimised, in order to maintain a high COP value.

Ventilation section

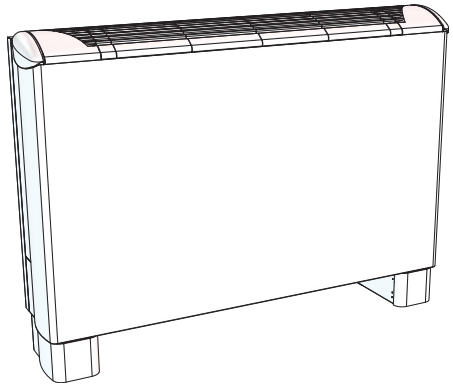
The fan compartment contains the fan-motor assembly, the air/refrigerant coil and the condensate drain pan. The ventilation section is completely isolated from compressor compartment by a thermally and acoustically insulated partition wall.

Wide removable panels provide access to the various internal components. The condensate drain pan has an anti-corrosion treatment.

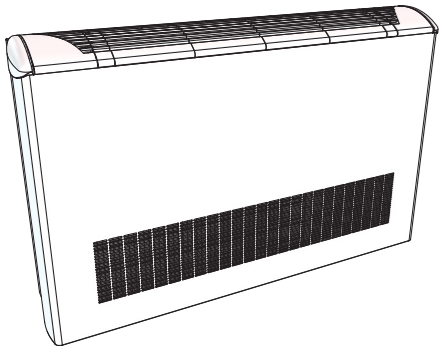
- The **standard AC motor of asynchrone direct drive type** having 3 speed direct-drive fan motor with ipsothermal protection against overheating during operation.
- The **EC1 motor** of high efficiency and low electrical consumption type for a significant energy saving. The motor is suitable for 0-10 V input, ensuring variable speed capability. The 3 fan speeds can be controlled either manually or automatically by the electronic management board of the unit

Versions

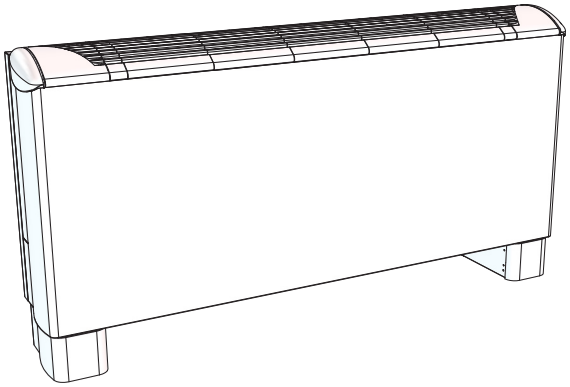
SYSCW-AR R513A VC - filter assembly below (BA)



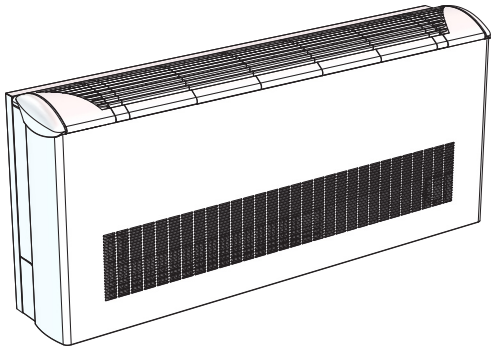
SYSCW-AR R513A VC - front filter assembly (FA)



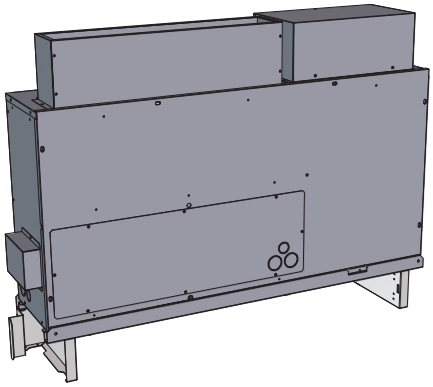
SYSCW-AR R513A VCL - filter assembly below (BA)



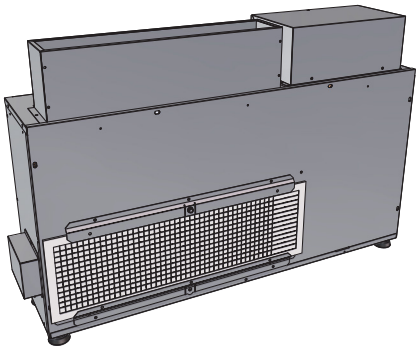
SYSCW-AR R513A VCL - front filter assembly (FA)



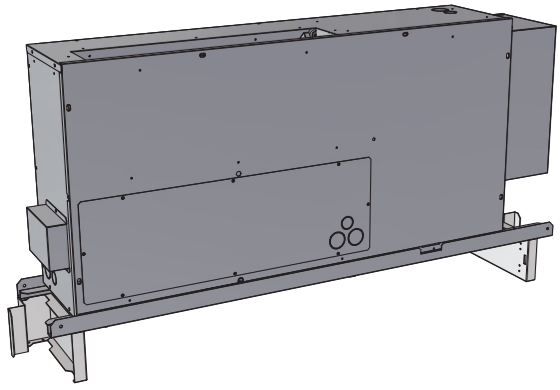
SYSCW-AR R513A VN - filter assembly below (BA)



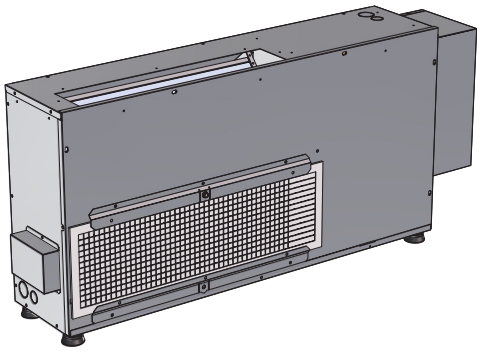
SYSCW-AR R513A VN - front filter assembly (FA)



SYSCW-AR R513A VNL - filter assembly below (BA)

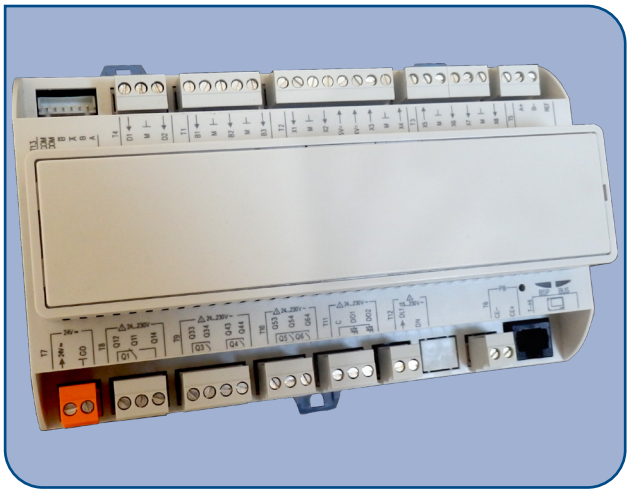


SYSCW-AR R513A VNL - front filter assembly (FA)



Control Features

All **SYSCW-AR R513A** water source heat pumps are, in their standard version, equipped with a **Siemens** electronic control system which manages their operation and their safety devices.



Anti-freeze safety function : this is provided by two temperature sensors. In cooling mode an "ICT" temperature sensor located in the finned coil protects the water source heat pump against accidental freezing.

In heating mode, the safety function is provided by an "LWT" minimum water outlet temperature sensor.

The automatic reset LP pressure switch completes the anti-freeze safety function by monitoring a minimum acceptable suction pressure to ensure correct operation of the compressor.

High temperature safety function : the "ICT & LWT" temperature sensors check that the condensation temperature at the finned coil and the water temperature at the outlet of the water/refrigerant heat exchanger do not exceed the authorised limits.

The automatic reset HP pressure switch completes the high temperature safety function.

The **Siemens** regulation exists with the following communication protocols:

- **Modbus RTU**
- **Bacnet MSTP**
- **LON**

RCS remote control

A RCS remote control is supplied **as optional** (factory fitted or wall mounted).

It enables individually controlled operation or stand-alone regulation.

The **RCS remote control** is ergonomically designed and discreet. It comprises a digital display and essential functions such as :

- On/Off,
- Selection of operating mode,
- Room temperature display,
- Fan speed selection,
- Temperature set-point adjustment
- Alarm code display

Master/slaves control : the standard version of the **Siemens** electronic control enables operation in master/slaves regulation mode for **up to 15 water source heat pumps using a single RCS remote control**.

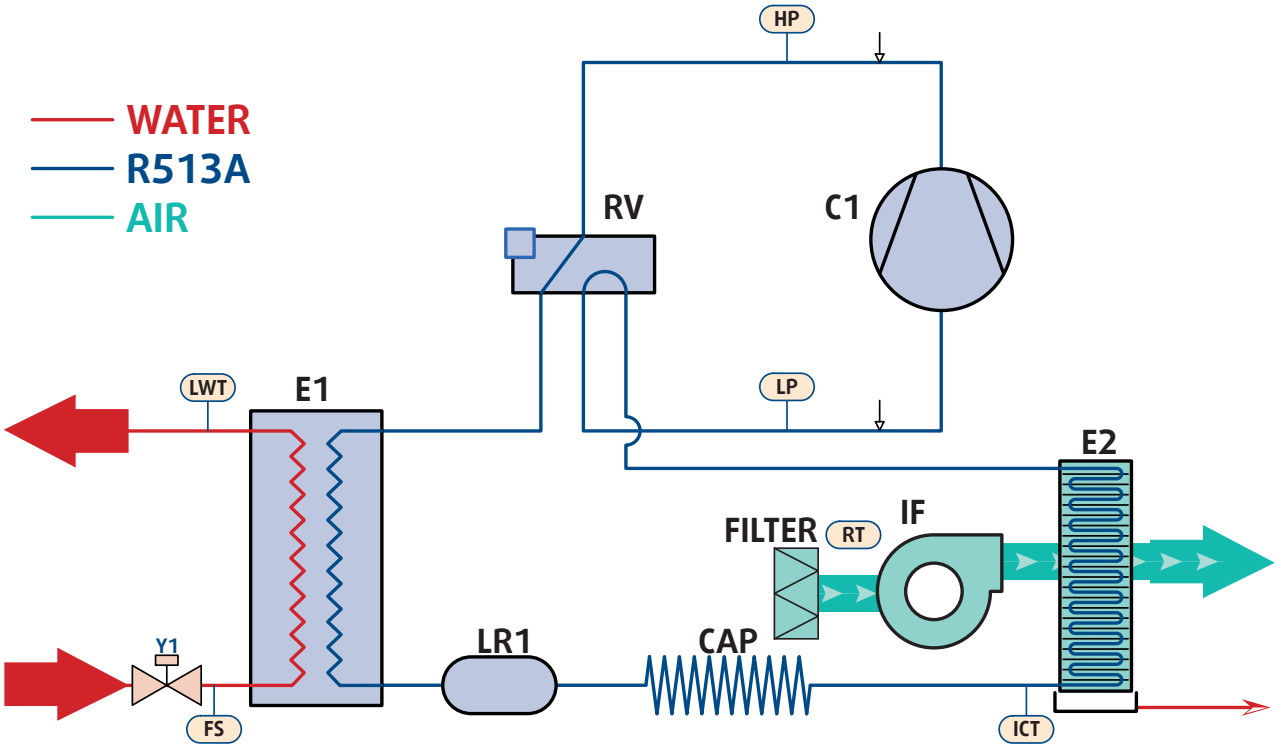
This configuration enables the installer to save on the purchase and wiring of equipment such as auxiliary relays and multi-wire cables between the various water source heat pumps. Only a bus cable with 2 twisted pairs is necessary between the master and slave units.

Models designation

CW-AR07R	.	H	.	VN	.	HB	.	ER	.	LN	.	SYS	.	EC	.	BA	.	MBRT	.	CB	.	RCSM	.	FTG
①		②		③		④		⑤		⑥		⑦		⑧		⑨		⑩		⑪		⑫		⑬

REP.		Description	
①	Size	**CW-AR07R** : SYSCW-AR R513A size 07	**CW-AR09R** : SYSCW-AR R513A size 09
②	Version	**H** : Heat pump	
③	Cabinet	**VN** : STD no cabinet **VC** : Std cabinet	**VNL** : Low No Cabinet **VCL** : Low cabinet with RF
④	Hydraulic	**HB** : Hydraulic connection bottom **HBK** : Hydraulic connection back	**HR** : Hydraulic connection right side **HL** : Hydraulic connection left side
⑤	Electrical	**ER** : Electrical connection right side	**EL** : Electrical connection left side
⑥	Acoustic	**LN** : Standard Low Noise	**XLN** : Extra low noise
⑦	Brand	**SYS** : Systemair	
⑧	Fan type	**AC** : Ventilateur moteur AC	**EC** : Ventilateur moteur EC
⑨	Air filter	**BA** : G2 filter - bottom - dessous (fixed feet)	**FA** : G2 filter - front (adjustable feet)
⑩	Communication protocol	**MBRT** : Modbus RTU **BNMS** : Bacnet MSTP	**LON** : LON
⑪	Protection	Blank : Porte fusible	**CB** : Circuit breaker
⑫	Remote control	Blank : Without remote thermostat **RCSM** : POL822 Siemens mounted	**RCS** : POL822 Siemens (wall mounting)
⑬	Cabinet option	Blank : Without grille	**FTG** : grille for cabinet (between feet - Filter BA)

Refrigerant Flow Diagram



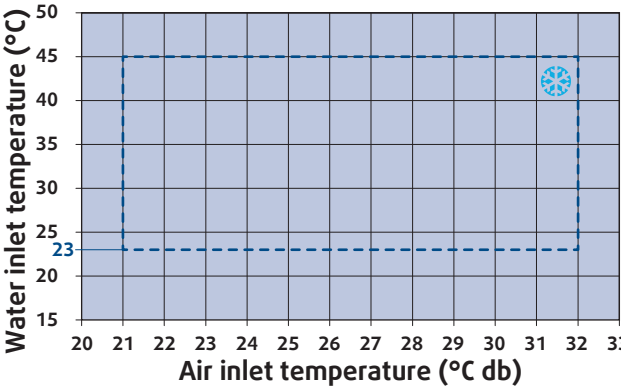
C1	Compressor	E2	Finned coil	RT	Air temperature sensor
RV	Cycle reversal valve	IF	Fan motor	ICT	Anti-freezing protection sensor
E1	Plate heat exchanger		Schrader valve	LWT	Outlet water temperature sensor
LR1	Liquid reservoir	HP	High pressure switch	FS	Flow switch
CAP	Expansion device	LP	Low pressure switch	Y1	Water circuit by-pass valve

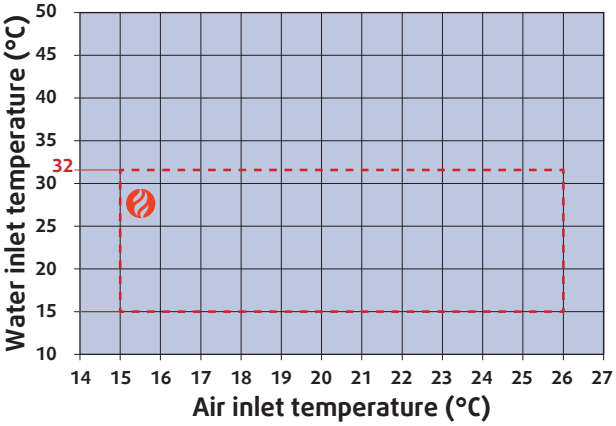
Operating Limits

Environment

This equipment is designed for an internal installation only.
In general, the sheltered locations, such as garages, attic, etc, do not provide sufficient protection against extreme temperatures and/or humidity, and the performance, the reliability and the life span of the equipment can be decreased.

Temperature limits

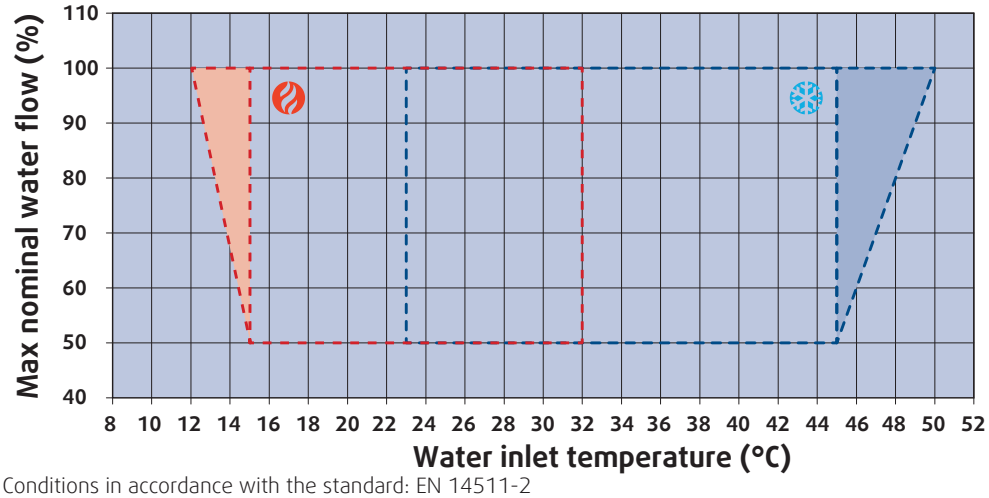




Flow limits

MODELS		07	09
PV - Minimum air flow	m³/h	250	340
MV - Nominal air flow *	m³/h	340	400
GV - Maximum air flow	m³/h	400	460

* Conditions in accordance with the standard: EN 14511-2



Conditions in accordance with the standard: EN 14511-2

MODELS		07		09	
		❄	🔥	❄	🔥
Nominal water flow	l/h	351	405	434	586
50% Nominal water flow	l/h	180*	203	217	293
Maximum hydraulic pressure	bar	10		10	

* Cutoff water flow: 180l/h

Physical Data

Models			07R			09R		
			PV	MV	GV	PV	MV	GV
Total cooling capacities (1)		W	1618	1690	1700	2001	2040	2051
Sensible cooling capacities (1)		W	1208	1410	1660	1440	1600	1833
Total absorbed power (3)		W	326	345	362	463	480	502
EER according to EN14511			4.96	4.9	4.7	4.32	4.25	4.09
Total Heating capacities (2)		W	1801	1790	1793	2638	2630	2632
Total absorbed power (3)		W	436	395	385	640	610	597
COP according to EN14511			4.13	4.53	4.66	4.12	4.31	4.41
VENTILATION								
Setpoint voltage		V	3.53	5.13	5.99	5.13	5.99	7.28
Air flow		m^3/h	250	340	400	340	400	460
Fan absorbed power		W	10	15	20	15	20	28
Air filter - Number / Efficiency			1/G2					
Air filter (FA) - Dimensions / Thickness		mm	660 x 205 / 6					
Air filter (BA) - Dimensions / Thickness		mm	595 x 187 / 6					
HYDRAULIC CIRCUIT								
Water exchanger		Nbr	1					
Water pressure max.		bar	10					
Cooling mode	Nominal water flow	l/h	336	351	355	425	434	439
	Water pressure drop at nominal flow	kPa	3.42	3.75	3.84	5.6	5.84	5.97
	Minimum water flow	l/h	168	180	180	213	217	220
Heating mode	Nominal water flow	l/h	395	405	410	578	586	593
	Water pressure drop at nominal flow	kPa	4.8	5.06	5.2	10.5	10.8	11.1
	Minimum water flow	l/h	198	203	205	289	293	297
Water connections Input/output		pouces	ISO G 1/2" INT					
Condensate outlet Ø		mm	15 x 20					
REFRIGERANT CIRCUIT								
Number of circuit		Nbr	1					
Refrigerant			R513A					
Compressor type			Rotary					
Load		g	500			490		
ELECTRICAL DATA								
Electrical power supply			230V / 1Ph / 50Hz ±10%					
Max. current (4)		A	4.6			5.7		
starting current (5)		A	16			16.5		
ACOUSTICAL DATA								
Sound power level (6)		dB(A)	47.2	49.8	51.5	49.8	51.5	54.3
Sound pressure level (6)		dB(A)	38.2	40.8	42.5	40.8	42.5	45.3
NR (6)		dB(A)	32	34	36	34	36	40

- (1) Nominal cooling capacities based on : entering air temperature of 27 °C dry bulb, 19 °C wet bulb with entering water temperature of 30 °C.
- (2) Nominal heating capacities based on : entering air temperature of 20 °C dry bulb, 15 °C wet bulb with entering water temperature of 20 °C.
- (3) Absorbed power (compressor + fan) at nominal conditions.
- (4) Nominal currents are given at +/- 5%.
- (5) Starting currents are given at +/- 10%.
- (6) Informative data, considering an hypothetical sound attenuation of the room and installation of 9 dB.

Physical Data (continued)

Models			07R			09R		
			PV	MV	GV	PV	MV	GV
Total cooling capacities (1)		W	1618	1690	1700	2001	2040	2051
Sensible cooling capacities (1)		W	1208	1410	1660	1440	1600	1833
Total absorbed power (3)		W	329	355	396	462	487	532
EER according to EN14511			4.92	4.75	4.29	4.33	4.19	3.86
Total Heating capacities (2)		W	1801	1790	1793	2 638	2 630	2 632
Total absorbed power (3)		W	439	405	419	639	617	627
COP according to EN14511			4.11	4.41	4.28	4.13	4.26	4.20
VENTILATION								
Air flow		m^3/h	250	340	400	340	400	460
Fan absorbed power		W	12	25	54	14	27	58
Air filter - Number / Efficiency			1/G2					
Air filter (FA) - Dimensions / Thickness		mm	660 x 205 / 6					
Air filter (BA) - Dimensions / Thickness		mm	595 x 187 / 6					
HYDRAULIC CIRCUIT								
Water exchanger		Nbr	1					
Water pressure max.		bar	10					
Cooling mode	Nominal water flow	l/h	336	351	355	425	434	439
	Water pressure drop at nominal flow	kPa	3.42	3.75	3.84	5.6	5.84	5.97
	Minimum water flow	l/h	168	180	180	213	217	220
Heating mode	Nominal water flow	l/h	395	405	410	578	586	593
	Water pressure drop at nominal flow	kPa	4.8	5.06	5.2	10.5	10.8	11.1
	Minimum water flow	l/h	198	203	205	289	293	297
Water connections Input/output		pouces	ISO G 1/2" INT					
Condensate outlet Ø		mm	15 x 20					
REFRIGERANT CIRCUIT								
Number of circuit		Nbr	1					
Refrigerant			R513A					
Compressor type			Rotary					
Load		g	500			490		
ELECTRICAL DATA								
Electrical power supply			230V / 1Ph / 50Hz ±10%					
Max. current (4)		A	4.6			5.7		
starting current (5)		A	16			16.5		
ACOUSTICAL DATA								
Sound power level (6)		dB(A)	47.2	49.7	52	49.7	52	54.4
Sound pressure level (6)		dB(A)	38.2	40.7	43	40.7	43	45.4
NR (6)		dB(A)	32	34	37	34	37	40

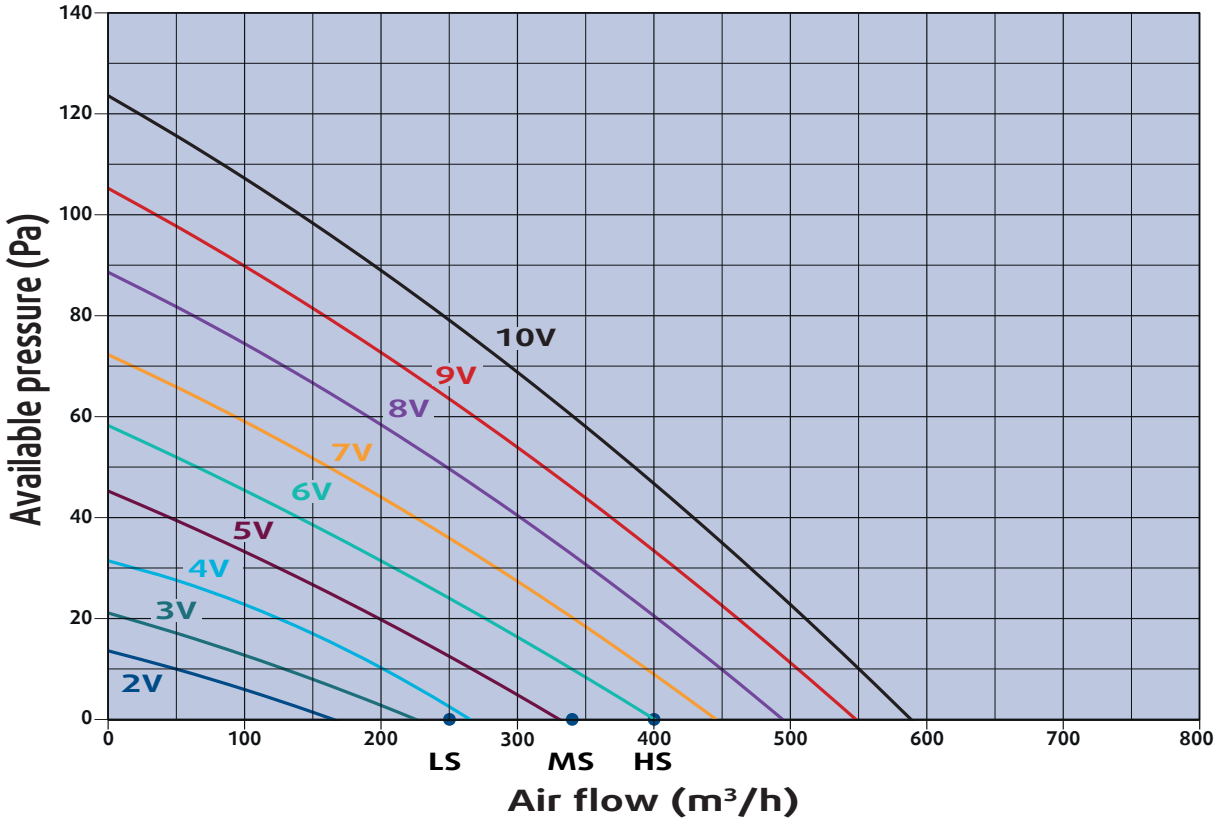
- (1) Nominal cooling capacities based on : entering air temperature of 27 °C dry bulb, 19 °C wet bulb with entering water temperature of 30 °C.
- (2) Nominal heating capacities based on : entering air temperature of 20 °C dry bulb, 15 °C wet bulb with entering water temperature of 20 °C.
- (3) Absorbed power (compressor + fan) at nominal conditions.
- (4) Nominal currents are given at +/- 5%.
- (5) Starting currents are given at +/- 10%.
- (6) Informative data, considering an hypothetical sound attenuation of the room and installation of 9 dB.

Dimensions (in mm) - All Sizes

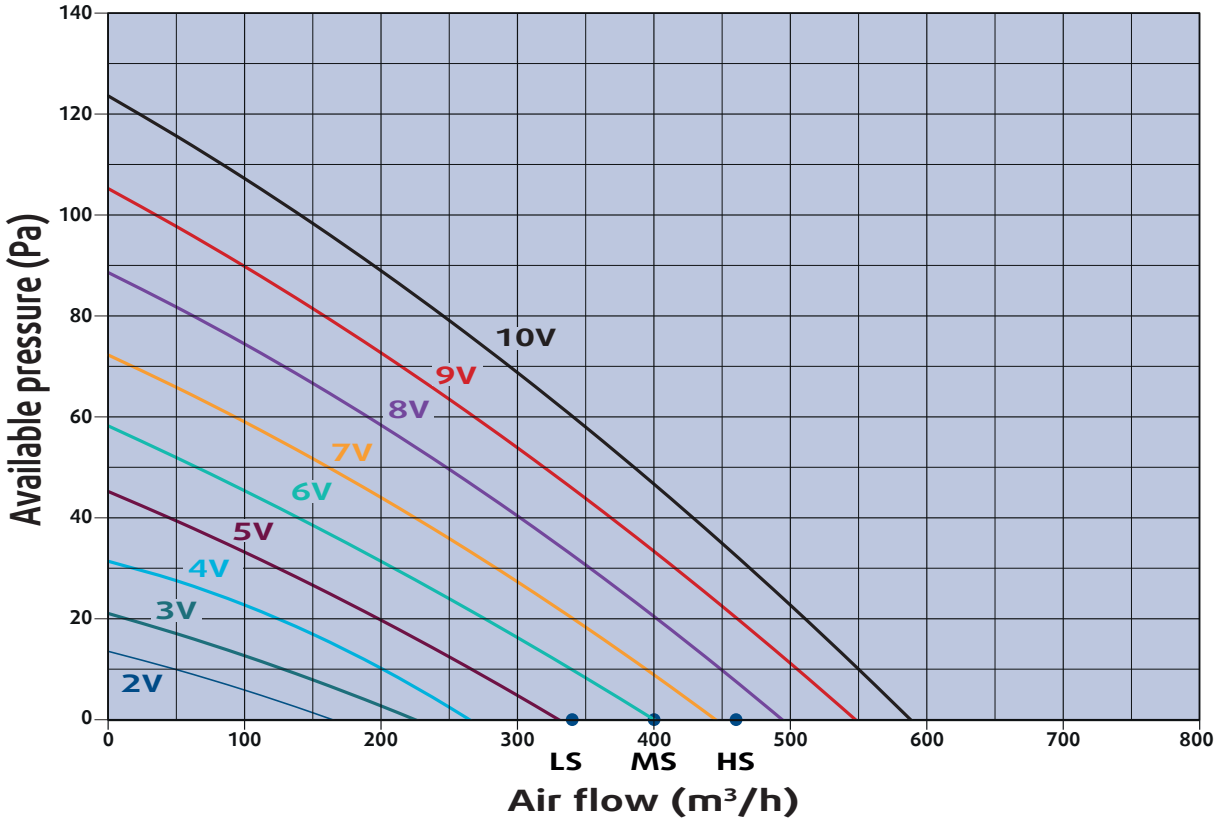
Versions			With cabinet VC	With cabinet VCL	Without cabinet VN	Without cabinet VNL
Length		mm	1138	1322	1084	1270
Width		mm	260	260	241	241
Height						
Filter configuration	BA	mm	821	683	769	626
	FA	mm	720mini - 750maxi	582mini - 612maxi	667mini - 697maxi	525mini - 555maxi

Air Flow Data

MODEL SYSCW-AR 07 - EC MOTOR



MODEL SYSCW-AR 09 - EC MOTOR



Acoustical Data

SYSCW-AR 07 R513 LN

Speeds	Power level per octave band Lw dB						Lw dB(A)	Lp global dB(A) (1)	NR (1)
	125	250	500	1 000	2 000	4 000			
LS	57.8	46.7	43.9	38.7	33.9	25.3	47.2	38.2	32
MS	58.0	51.1	47.0	42.8	38.2	28.2	49.8	40.8	34
HS	58.3	53.9	49.4	45.7	41.3	30.8	51.5	42.5	36

SYSCW-AR 07 R513 XLN

Speeds	Power level per octave band Lw dB						Lw dB(A)	Lp global dB(A) (1)	NR (1)
	125	250	500	1 000	2 000	4 000			
LS	52.4	46.6	39.2	34.2	29.0	28.0	42.5	33.5	28
MS	53.2	48.5	41.9	37.4	31.8	28.5	44.6	35.6	30
HS	53.7	50.2	44.0	40.0	34.1	30.0	46.5	37.5	32

SYSCW-AR 09 R513 LN

Speeds	Power level per octave band Lw dB						Lw dB(A)	Lp global dB(A) (1)	NR (1)
	125	250	500	1 000	2 000	4 000			
LS	58.0	51.2	47.0	42.8	38.2	28.7	49.8	40.8	34
MS	58.3	53.8	49.4	45.7	41.3	30.7	51.5	42.5	36
HS	58.7	56.3	52.0	48.6	44.3	33.5	54.3	45.3	40

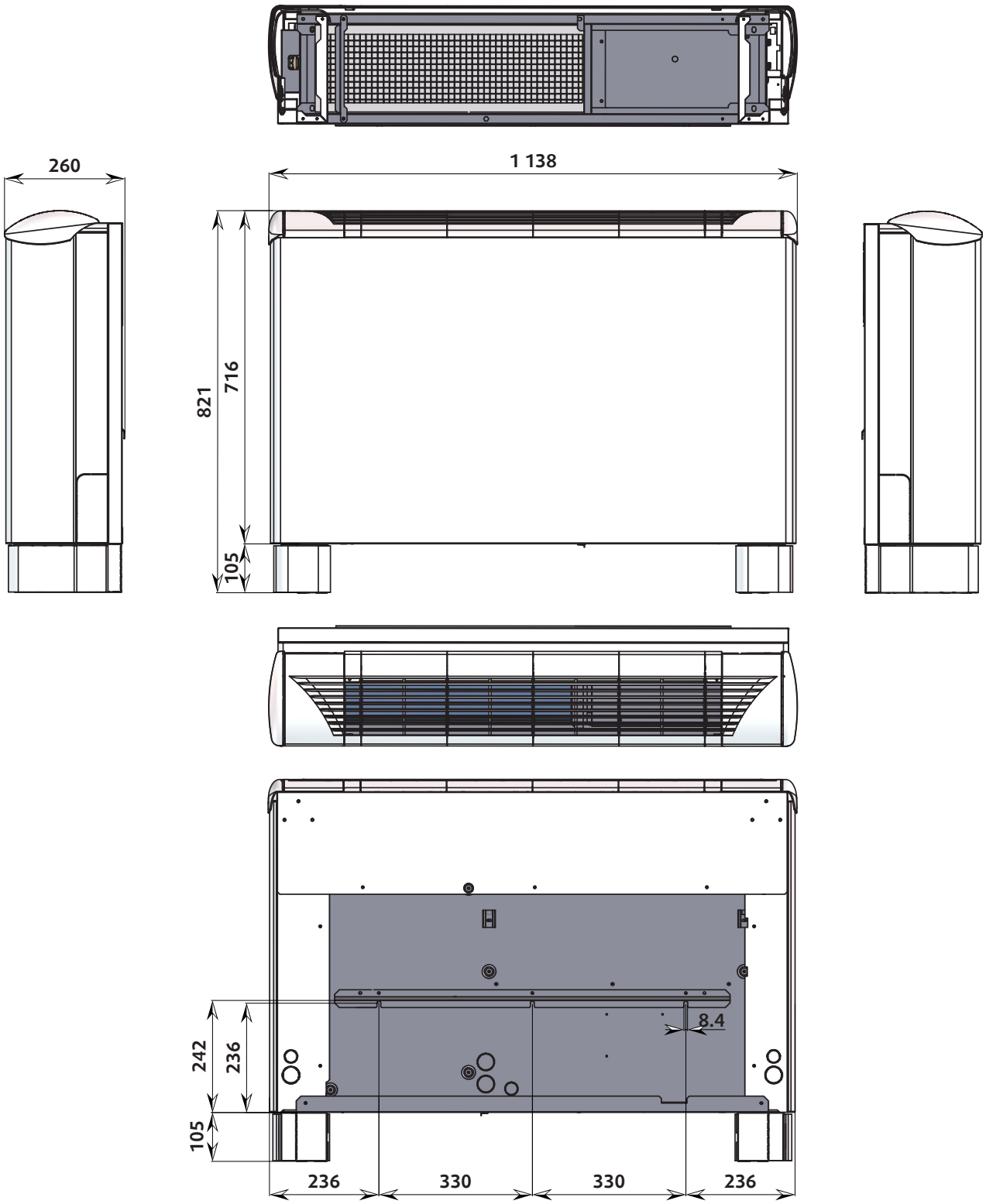
SYSCW-AR 09 R513 XLN

Speeds	Power level per octave band Lw dB						Lw dB(A)	Lp global dB(A) (1)	NR (1)
	125	250	500	1 000	2 000	4 000			
LS	53.5	48.6	41.9	37.4	31.8	29.2	44.7	35.7	30
MS	53.6	50.1	44.0	40.0	34.1	29.7	46.5	37.5	32
HS	54.0	52.1	46.5	42.7	36.7	31.7	48.6	39.6	34

(1) Informative data, considering an hypothetical sound attenuation of the room and installation of 9 dB.

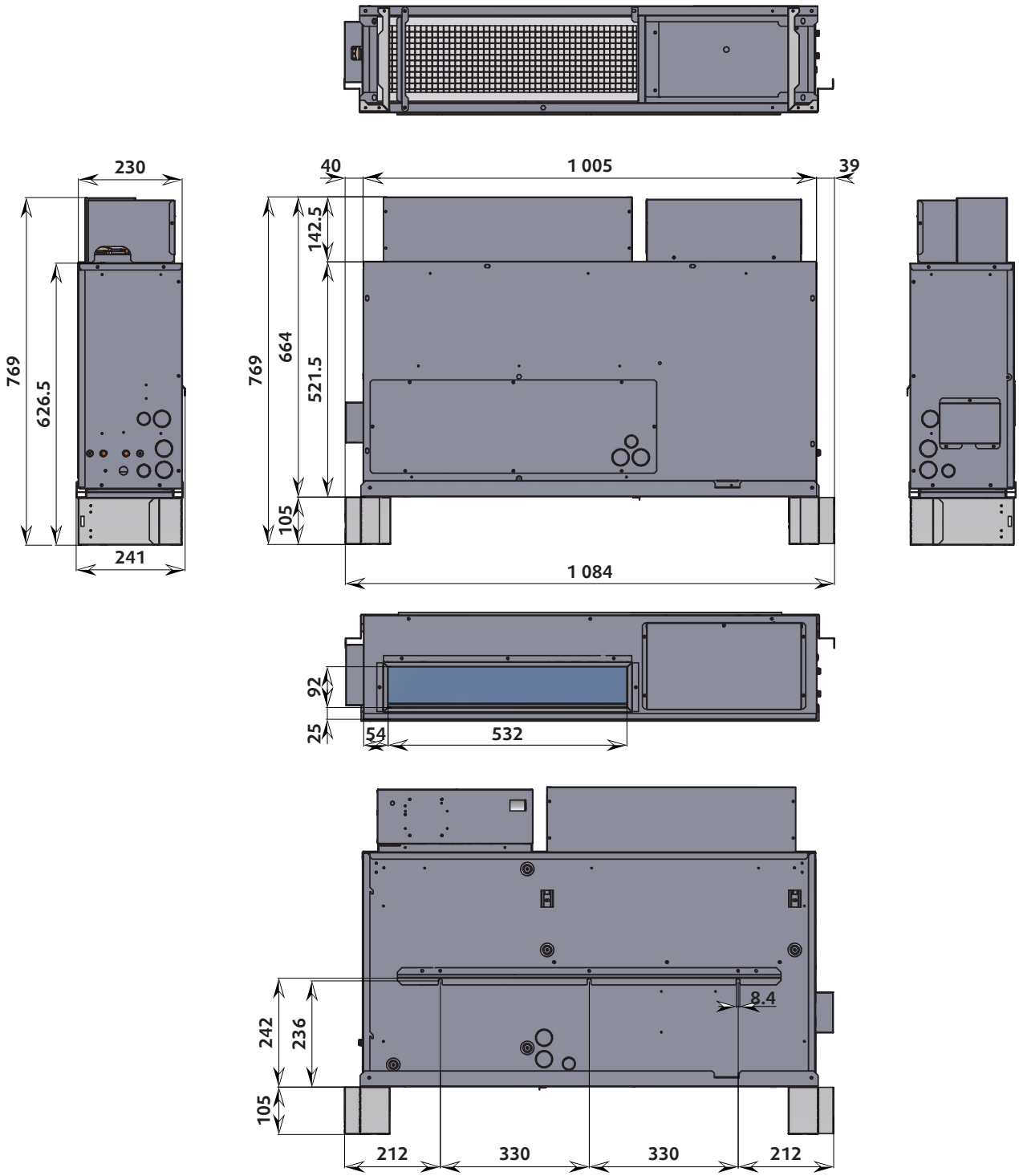
Dimensions (mm)

SYSCW-AR R513A VC BA



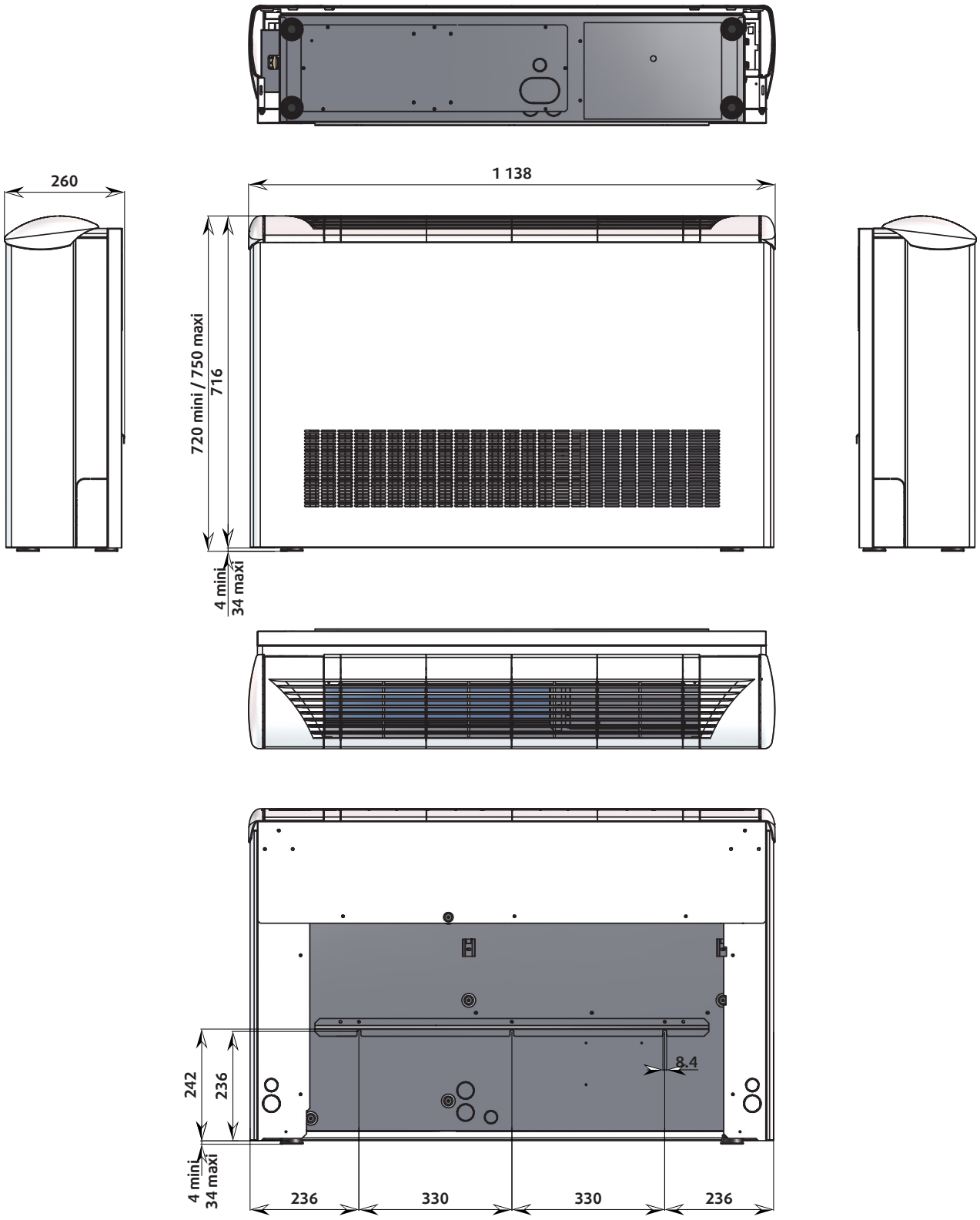
Dimensions (mm) (continued)

SYSCW-AR R513A VN BA



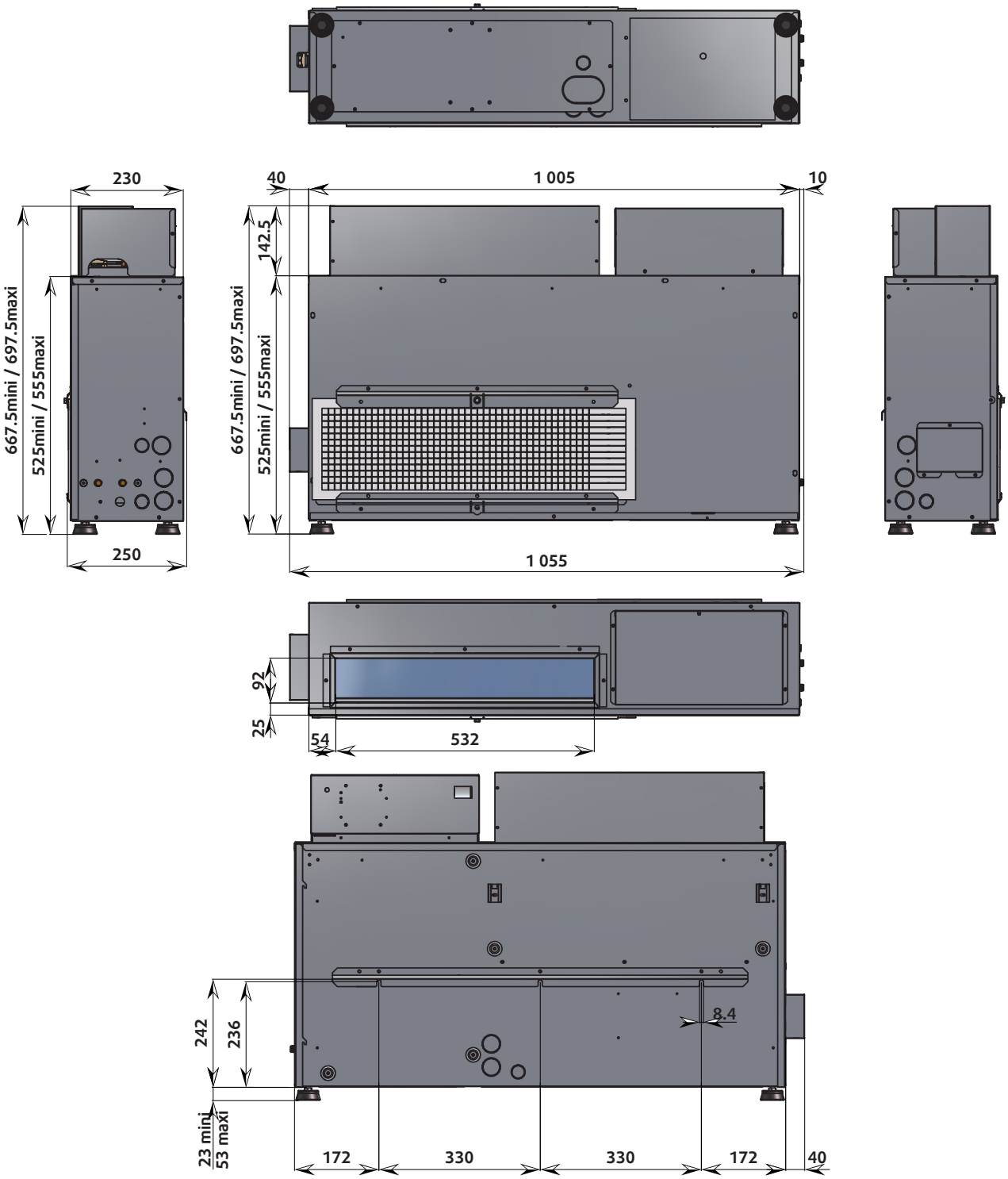
Dimensions (mm) (continued)

SYSCW-AR R513A VC FA



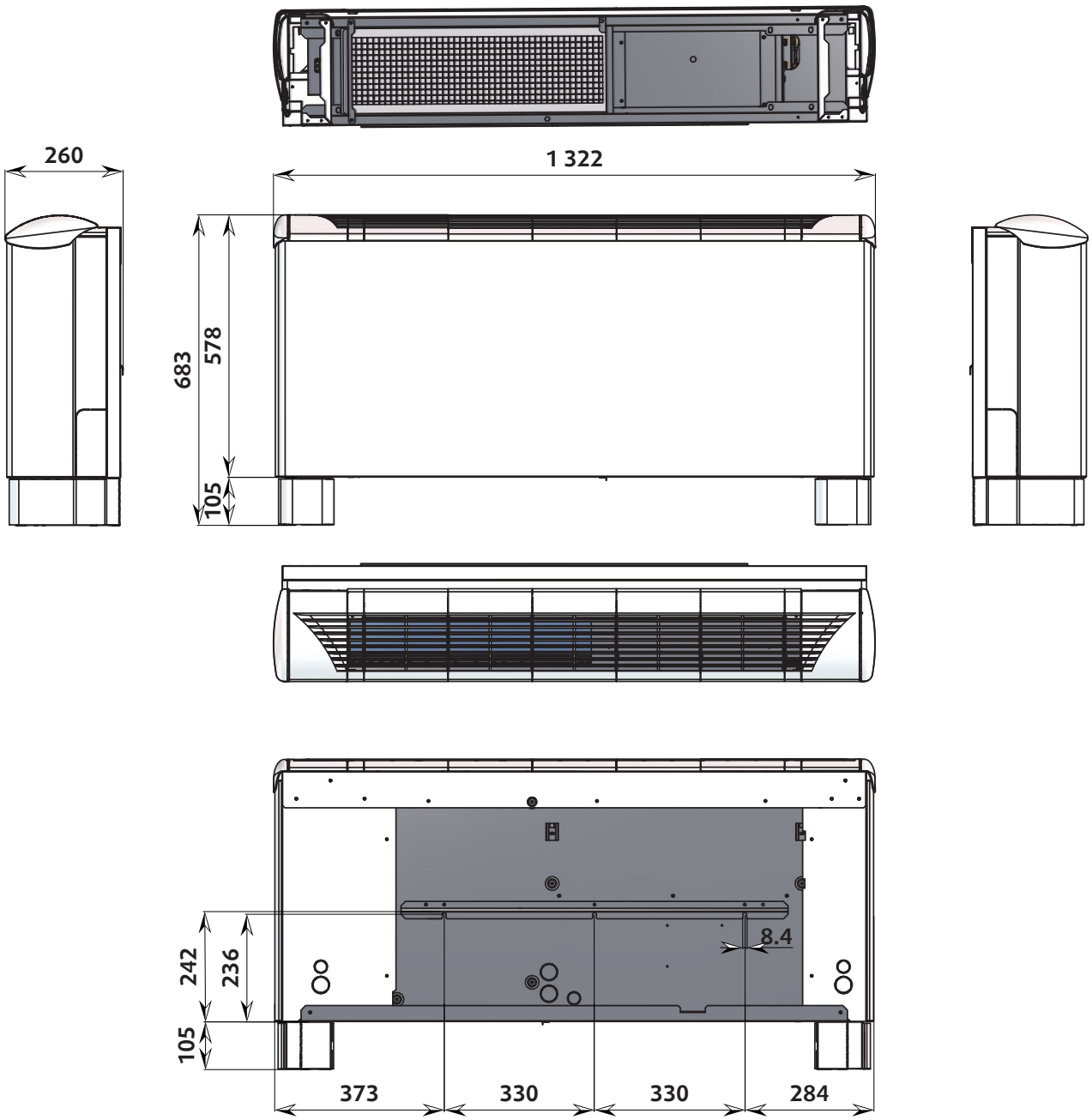
Dimensions (mm) (continued)

SYSCW-AR R513A VN FA



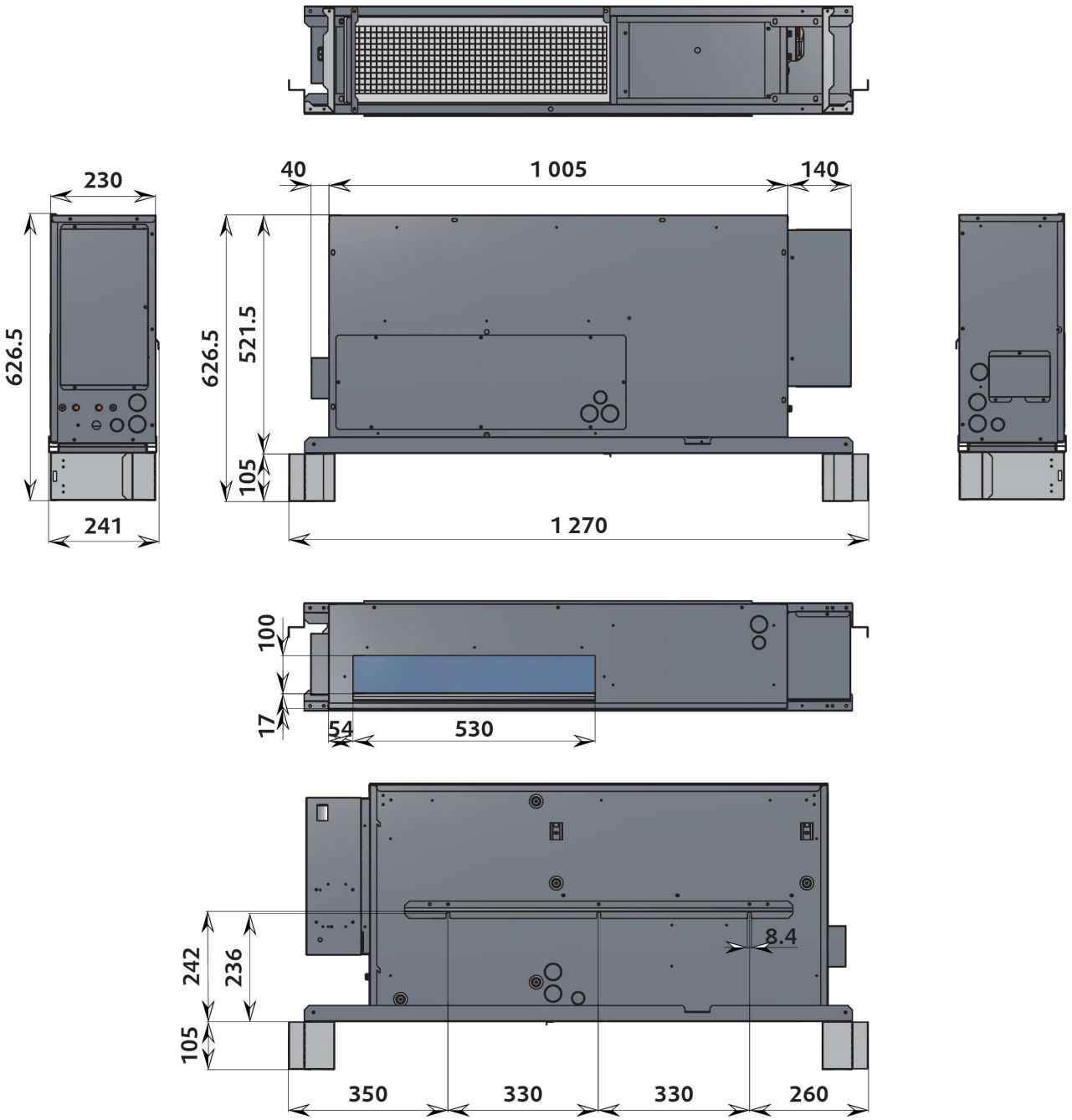
Dimensions (mm) (continued)

SYSCW-AR R513A VCL BA



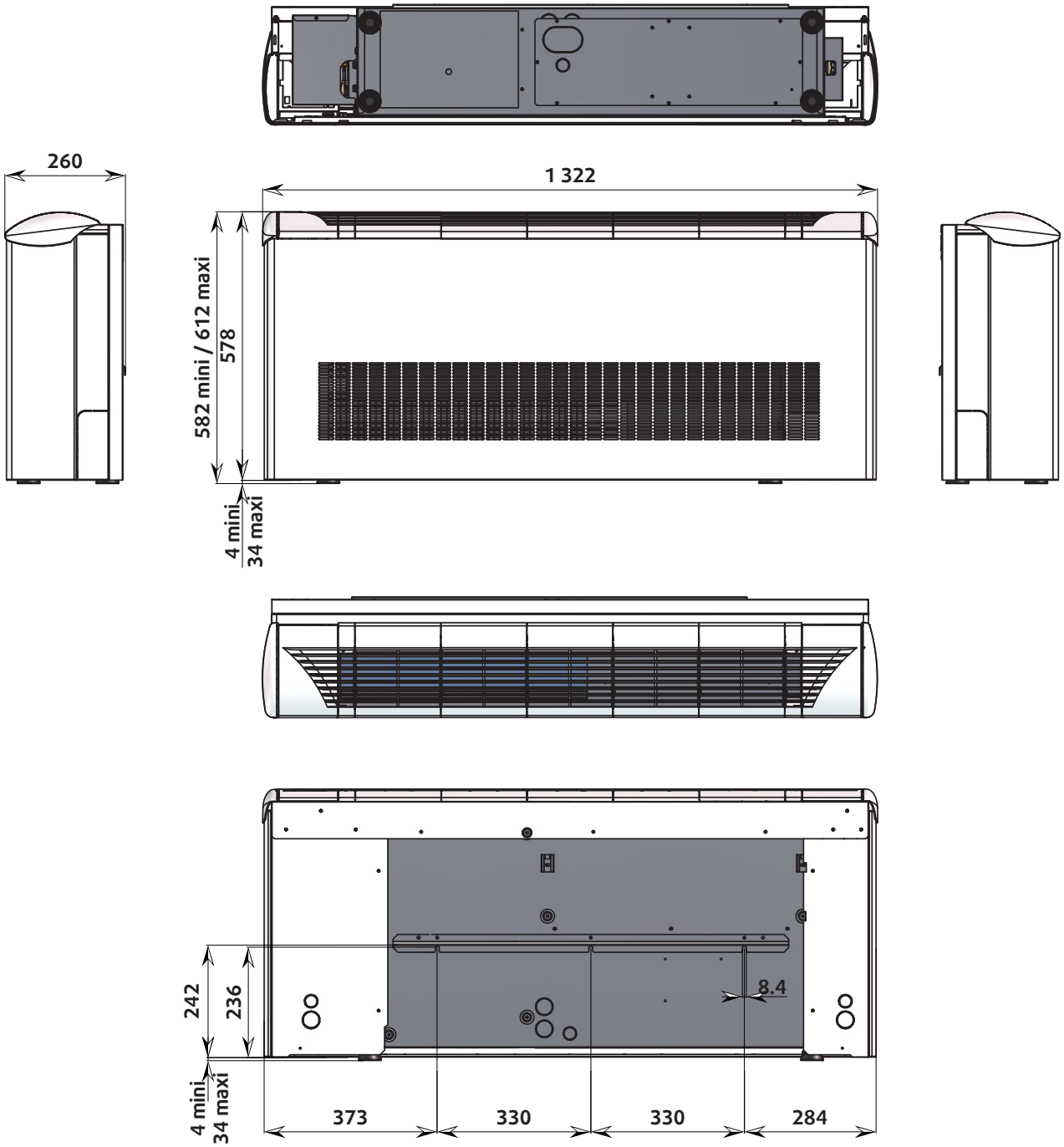
Dimensions (mm) (continued)

SYSCW-AR R513A VNL BA



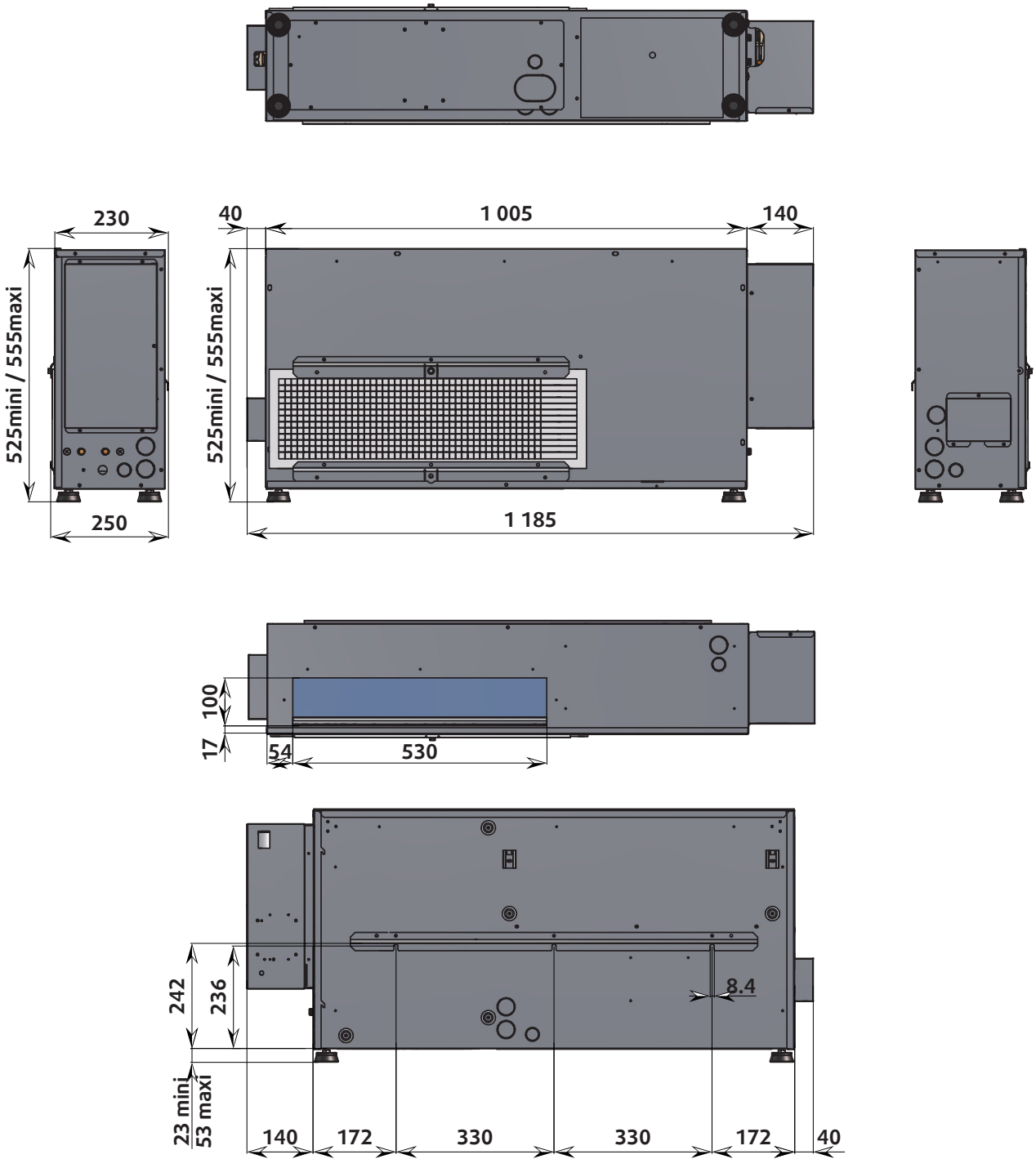
Dimensions (mm) (continued)

SYSCW-AR R513A VCL FA



Dimensions (mm) (continued)

SYSCW-AR R513A VNL FA



Notes

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december 2021