> CMA² - CMA² HE

CONDENSING UNITS
FOR OUTDOOR INSTALLATION

Available range

Unit type
SR Condensing unit
SP Reversible condensing unit (reversible on the refrigerant side)

Versions
VB Base Version

Acoustic setting up
AB Base setting up
AS Low noise setting up

Unit description

This series of condensing units satisfies the cooling and heating requirements of residential plants of small and medium size.
All the units are suitable for outdoor installation and can be connected to a remote heat exchanger properly designed in order to transfer to the plant all the cooling (and heating for reversible units) power generated.
It is possible for example to connect direct expansion coils placed inside air handling units or remote plate heat exchangers placed inside technical rooms. In both cases the lack of outdoor hydraulic pipes eliminates the freezing problems and avoids brine solutions to be used.
The refrigerant circuit, contained in a compartment protected from the air flow to simplify the maintenance operations, is equipped with scroll compressor mounted on damper supports, axial fans with safety protection grilles, finned coil made of copper pipes and aluminium louvered fins and shut off valves on the liquid line and on the gas line. The reversible units are moreover supplied with reverse cycle valve, thermostatic expansion valve (working in heating mode) and liquid receiver.
The circuit is protected by high and low pressure switches.
All the units can be equipped with variable speed fans control that allows the units to operate with low outdoor temperatures in cooling and high outdoor temperature in heating and permits to reduce noise emissions in such operating conditions.
The low noise acoustic setting up (AS) is obtained, starting from the base setting up (AB), reducing the rotational speed of the fans and mounting sound jackets on the compressors.
All the units are supplied with an outdoor temperature sensor, already installed on the unit, in order to realize the climatic control.
All the units are provided with a phase presence and correct sequence controller device.
All the units are accurately built and individually tested in the factory.
All the units are supplied with refrigerant charge inside.
Only electric and refrigerant connections (between condensing unit and remote heat exchanger) are required for installation.

Options

Compressor starting
- standard (contactors)
- soft starter

Fans control
- on-off control
- modulating control (condensation / evaporation control)

Electrical loads protection
- fuses
- thermal magnetic circuit breakers

Compressor power factor correction

Accessories

Rubber vibration dampers
Coil protection grille
Remote control
Modbus serial interface on RS485
Programmer clock
Phase sequence and voltage controller
Remote plate heat exchanger
Liquid line

NET NOMINAL performances - CMA²

SR	Base setting up (AB)	19.1	22.1	26.1	30.1	35.1	40.1	
A35E5	Cooling capacity	21,4	24,2	28,0	32,9	37,7	43,8	kW
	Power input	6,75	7,53	8,67	10,66	11,99	13,85	kW
	EER	**3,17**	**3,21**	**3,23**	**3,08**	**3,14**	**3,17**	**W/W**
SR	**Low noise setting up (AS)**	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
A35E5	Cooling capacity	20,5	23,2	26,9	31,6	36,2	42,1	kW
	Power input	7,26	8,14	9,34	11,45	12,97	14,92	kW
	EER	**2,83**	**2,85**	**2,88**	**2,76**	**2,79**	**2,82**	**W/W**
SP	**Base setting up (AB)**	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
A35E5	Cooling capacity	20,9	23,5	27,2	32,0	36,7	42,8	kW
	Power input	6,82	7,65	8,76	10,78	12,12	14,00	kW
	EER	**3,06**	**3,07**	**3,11**	**2,97**	**3,02**	**3,06**	**W/W**
A7C50	Heating capacity	20,0	22,5	26,1	30,9	35,5	40,1	kW
	Power input	6,87	7,71	8,95	11,07	12,42	13,97	kW
	COP	**2,91**	**2,92**	**2,92**	**2,79**	**2,86**	**2,87**	**W/W**
A7C45	Heating capacity	22,0	24,8	28,8	34,1	39,1	44,2	kW
	Power input	6,05	6,79	7,88	9,76	10,88	12,25	kW
	COP	**3,64**	**3,66**	**3,66**	**3,50**	**3,60**	**3,61**	**W/W**
SP	**Low noise setting up (AS)**	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
A35E5	Cooling capacity	20,0	22,6	26,2	30,7	35,2	41,0	kW
	Power input	7,32	8,23	9,41	11,54	13,09	15,05	kW
	EER	**2,73**	**2,74**	**2,79**	**2,66**	**2,69**	**2,72**	**W/W**
A7C50	Heating capacity	18,9	21,4	24,9	29,6	33,8	38,2	kW
	Power input	6,63	7,41	8,61	10,66	12,02	13,40	kW
	COP	**2,85**	**2,89**	**2,89**	**2,77**	**2,81**	**2,85**	**W/W**
A7C45	Heating capacity	20,9	23,6	27,5	32,6	37,3	42,2	kW
	Power input	5,84	6,52	7,59	9,39	10,58	11,88	kW
	COP	**3,58**	**3,62**	**3,62**	**3,47**	**3,52**	**3,55**	**W/W**

NET NOMINAL performances - CMA² HE

SR	Base setting up (AB)	19.1	22.1	26.1	30.1	35.1	40.1	
A35E5	Cooling capacity	22,3	24,9	29,0	34,9	39,6	46,2	kW
	Power input	6,12	6,83	7,83	9,52	10,84	12,46	kW
	EER	**3,63**	**3,65**	**3,70**	**3,66**	**3,65**	**3,71**	**W/W**
SR	**Low noise setting up (AS)**	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
A35E5	Cooling capacity	21,4	23,9	27,9	33,6	38,1	44,6	kW
	Power input	6,62	7,38	8,47	10,29	11,61	13,21	kW
	EER	**3,24**	**3,23**	**3,29**	**3,26**	**3,29**	**3,38**	**W/W**
SP	**Base setting up (AB)**	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
A35E5	Cooling capacity	21,8	23,8	27,8	33,6	39	44,1	kW
	Power input	6,07	7,03	8,16	10,1	11,7	13,2	kW
	EER	**3,60**	**3,39**	**3,4**	**3,34**	**3,33**	**3,33**	**W/W**
A7C50	Heating capacity	20,5	23,2	27,0	31,8	36,5	42,4	kW
	Power input	6,46	7,13	8,21	10,01	11,40	12,91	kW
	COP	**3,18**	**3,26**	**3,29**	**3,17**	**3,20**	**3,29**	**W/W**
A7C45	Heating capacity	22,7	25,6	29,8	35,1	40,2	46,8	kW
	Power input	5,69	6,28	7,23	8,78	10,04	11,44	kW
	COP	**3,98**	**4,08**	**4,12**	**3,99**	**4,01**	**4,09**	**W/W**
SP	**Low noise setting up (AS)**	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
A35E5	Cooling capacity	20,9	23,8	27,8	33,6	39	44,1	kW
	Power input	6,55	7,03	8,16	10,1	11,7	13,2	kW
	EER	**3,20**	**3,39**	**3,4**	**3,34**	**3,33**	**3,33**	**W/W**
A7C50	Heating capacity	19,5	22,1	25,9	30,4	34,6	40,4	kW
	Power input	6,24	6,91	7,95	9,64	10,98	12,51	kW
	COP	**3,12**	**3,19**	**3,25**	**3,15**	**3,16**	**3,23**	**W/W**
A7C45	Heating capacity	21,5	24,3	28,5	33,6	38,3	44,6	kW
	Power input	5,50	6,09	7,00	8,50	9,71	11,03	kW
	COP	**3,91**	**3,99**	**4,08**	**3,96**	**3,95**	**4,05**	**W/W**

The values are referred to units without options and accessories.

EER (Energy Efficiency Ratio) = ratio of the total cooling capacity to the effective power input of the unit
COP (Coefficient Of Performance) = ratio of the total heating capacity to the effective power input of the unit
A35E5 = source : air in 35°C d.b. / plant : evaporation temperature (dew point) 5°C - superheating 5°C
A7C50 = source : air in 7°C d.b. 6°C w.b. / plant : condensation temperature (dew point) 50°C - subcooling 5°C
A7C45 = source : air in 7°C d.b. 6°C w.b. / plant : condensation temperature (dew point) 45°C - subcooling 5°C

Acoustic performances

Base setting up (AB)	19.1	22.1	26.1	30.1	35.1	40.1	
Sound power level	77	77	78	81	82	82	dB(A)
Sound pressure level at 1 meter	61	62	62	65	66	66	dB(A)
Sound pressure level at 5 meters	51	51	52	55	55	56	dB(A)
Sound pressure level at 10 meters	46	46	47	50	50	50	dB(A)
Low noise setting up (AS)	**19.1**	**22.1**	**26.1**	**30.1**	**35.1**	**40.1**	
Sound power level	74	74	75	78	79	79	dB(A)
Sound pressure level at 1 meter	58	59	59	62	63	63	dB(A)
Sound pressure level at 5 meters	48	48	49	52	53	53	dB(A)
Sound pressure level at 10 meters	43	43	44	47	48	48	dB(A)

The acoustic performan ces are referred to units operating in cooling mode at nominal conditions A35E5.
Unit placed in free field on reflecting surface (directional factor equal to 2).
The sound power level is measured according to ISO 9614 standard.
The sound pressure level is calculated according to ISO 3744 and is referred to a distance of 1/5/10 metres from the external surface of the unit.

Technical data

Unit	19.1	22.1	26.1	30.1	35.1	40.1	
Power supply	400 - 3N - 50						V-ph-Hz
Compressor type	scroll						-
N° compressors / N° refrigerant circuits	1 / 1						n°
Source side heat exchanger type	finned coil						-
Fans type	axial						-
N° fans	1						n°
Tank volume	5/8”						-
Hydraulic fittings	1” 1/8						-

Electrical data

Standard unit	19.1	22.1	26.1	30.1	35.1	40.1	
FLA - Full load current at maximum tolerated conditions	18,8	20,8	22,9	25,9	29,9	34,0	A
FLI - Full load power input at maximum tolerated conditions	10,8	12,1	13,4	15,8	18,4	21,0	kW
MIC - Maximum instantaneous current of the unit	98	114	121	129	144	178	A
MIC SS - Maximum instantaneous current of the unit with soft starter options	55	64	68	73	82	102	A

Operating range

		Cooling		Heating		
Temperature	**Unit type**	**min**	**max**	**min**	**max**	
Outdoor air inlet temperature	SR, SP	-10*	48 (STD) 50 (HE)	-15	42	°C
Evaporating temperature (dew point)	SR, SP	0	15	-	-	°C
Condensing temperature (dew point)	SP	-	-	30	60	°C

* with fans modulating control option (condensation / evaporation control)

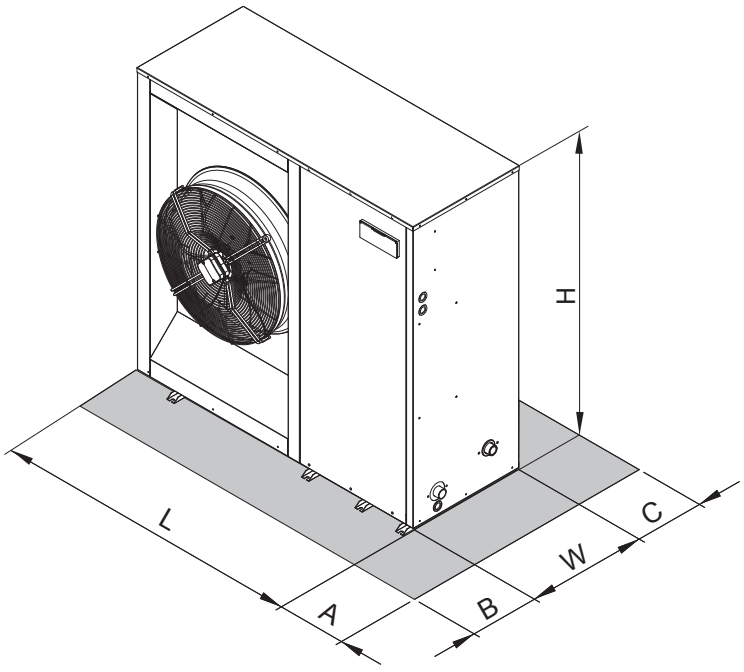
CONTROL SYSTEM

The unit is managed by a microprocessor controller to which, through a wiring board, all the electrical loads and the control devices are connected. The user interface is realized by a display and four buttons that allow to view and, if necessary, modify all the operating parameters of the unit. It's available, as an accessory, a remote control that reports all the functionalities of the user interface placed on the unit.

The main functions available are :

- water or air temperature management (through set point adjustment)
- adaptive function
- climatic control in heating and in cooling mode (automatic set point adjustment according to outdoor air temperature)
- dynamic defrost cycle management according to outdoor air temperature
- alarm memory management and diagnostic
- fans management by means of continuous rotational speed control
- pump or fan management on the plant side
- integrative electrical heaters management in heating mode (2 step logic)
- compressor and pump or fan operating hours recording
- serial communication through Modbus protocol
- remote stand by
- remote cooling-heating
- general alarm digital output

DIMENSIONS AND MINIMUM OPERATING AREA



	19.1	22.1	26.1	30.1	35.1	40.1	
L	1494	1494	1494	1704	1704	1704	mm
W	576	576	576	576	576	576	mm
H	1453	1453	1453	1453	1453	1453	mm
A	400	400	400	400	400	400	mm
B	600	600	600	600	600	600	mm
C	200	200	200	200	200	200	mm
CMA unit - maximum weight operation	221	224	239	257	277	279	kg
CMA HE unit - maximum weight operation	236	239	259	279	302	304	kg