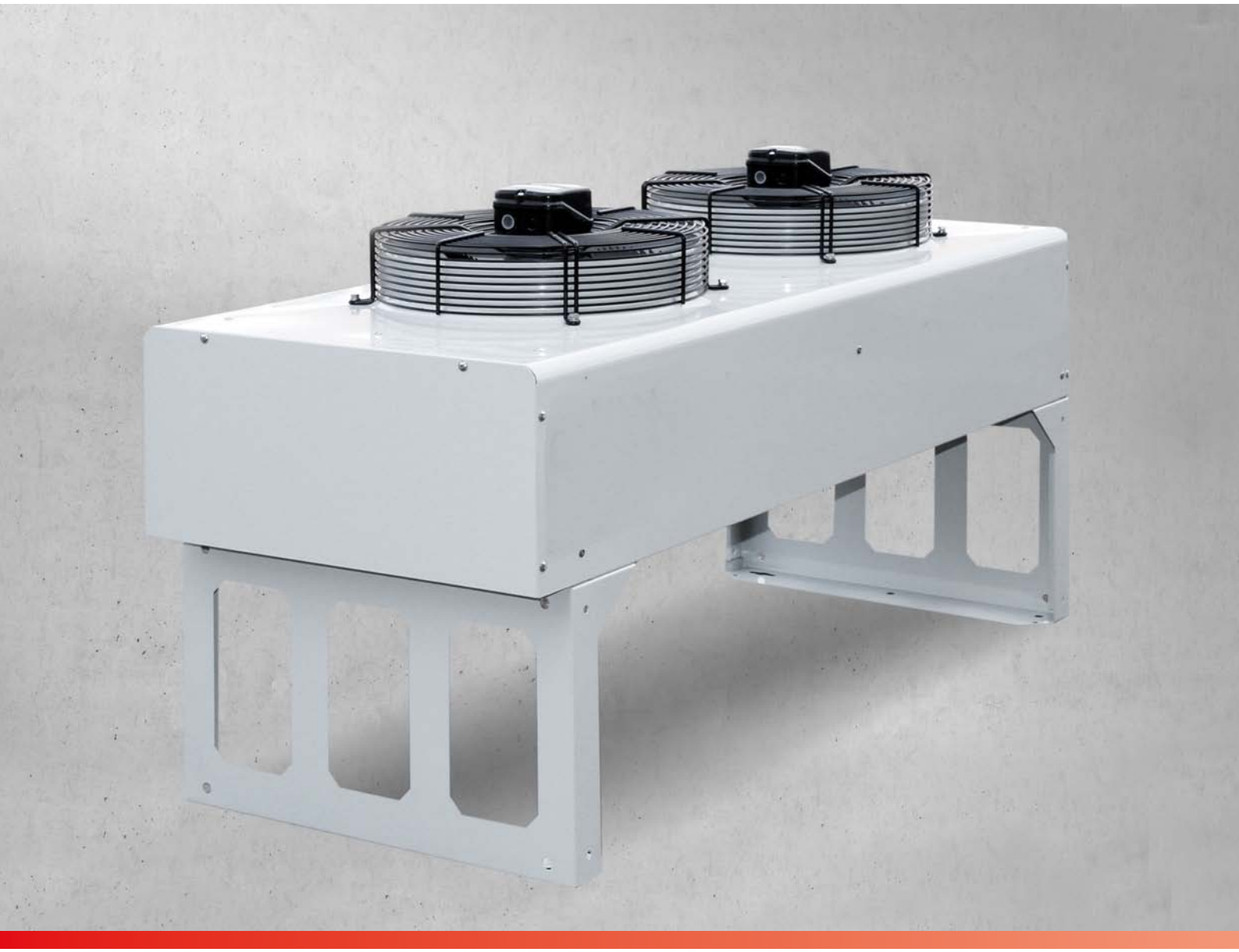
CHANGING
GEA HEAT EXCHANGERS



Küba MSM & MSA

Condenser for commercial refrigeration

Küba MSM & MSA

Condenser for commercial refrigeration

MSM

1	2	3	4		5	6
MSM	1	1	2	-	35	04

1 Series

2 Fan arrangement

3 Fans/row

4 Tube rows

5 Fan diameter

6 Motor Speed

MSA

1	2	3		4		5	6
MSA	N	03	-	1	x	3	A

1 Series

2 Fan

3 Fan diameter

4 Fan arrangement

5 Fans/row

6 Construction module







Heat Dissipation

Energy-efficient heat dissipation while considering the set-up situation and local requirements for sound emissions are important aspects when selecting condensers. Küba offers a wide range of heat exchangers with different sound and power graduations. The unit's construction design makes a space-saving set-up possible – even in tight and narrow set-up situations. Fans are available in AC technology.



Capacity range

3.9 kW — 26.5 kW

Acoustic Power Level L_{WA}

62 dB(A) — 75 dB(A)

Fans

to

Content

Basic version 4
Capacity 5
Technical data 6
Sound pressure correction L_{PA} for other distances 6
Dimensions 7
Variants 8
Tender text 9

Küba MSM & MSA Condenser

Basic version

Casing

- The casing is made of sendzimir galvanized steel plate with UV resistant powder coating
- This surface coating ensures excellent weather resistance and corrosion protection
- RAL 9018
- All mounting elements are made of stainless steel

Fan unit

- Low noise compact unit: Motor with fan blades, antitouch guard to DIN 31001/24176, of corrosion and weather-proof design.
- Fan: Ø 350 mm, with dynamic counterbalancing to quality level G 6.3 of DIN ISO 1940.
  Two different speeds are available:

  4-pole: 230 ± 10% V-1, 50 Hz, IP 44, motor protection via thermal contacts, internally wired, ambient temperature for motor from -25°C to +60°C, 1295 rpm

  6-pole: 230 ± 10% V-1, 50/60 Hz, IP 44, motor protection via thermal contacts, internally wired, ambient temperature for motor from –25°C to +60°C, 880 rpm

- Fully adjustable speed control by means of phase control or voltage reduction.

Noise level specifications

The given acoustic pressure L_{PA} is calculated based on the mean acoustic power level L_{WA} measured on a 10 m cuboid enveloping surface enclosing the apparatus (reference cuboid) and terminating on the reflecting plane.

The specified acoustic pressures L_{PA} are valid for a free-field setup over a reflecting plane. Any additional reflecting surfaces other than those of the reflecting setup will increase the acoustic pressure level. Acoustic power is measured using the enveloping surface method in accordance with EN 13487 and/or DIN EN ISO 3741 or DIN EN ISO 3744. The total acoustic power level is calculated by adding up the total acoustic pressure levels on the sectional measuring surfaces (DIN EN 13487)

Start-up, switching and control noise is ignored. Beat frequencies of up to 3 dB (A) may occur in apparatus with several fans.

Heat Exchanger

- The heat exchanger consists of 8 mm copper tubing, with internal ribbing, and high-performance aluminium fins with a fin spacing of 2.1 mm
- The formed fin collar ensures a permanent and effective connection between flared tubes and fins. This ensures highly effective heat transfer.

Application

- The MS condenser series consists of a total of 12 basic models (3 x MSM & 9 x MSA)
- The additional option of a 4-pole or 6-pole fan unit results in a total of 18 possible combinations, covering a condenser capacity range of 3.9 to 26.2 kW
- The frame legs supplied with the MS condenser allow it to be installed either horizontally or vertically – wall mounting is also possible. The radial fans, which are of German manufacture, meet the highest quality and performance requirements and have been optimised for use in the MS condenser. As a result the MS condensers have very low noise levels.

  Heat Exchanger and fan are supplied separately.

Küba MSM & MSA Condenser

Capacity

Determining condenser capacity

The condenser capacity refers to the temperature difference $\Delta t = 15K$ between the air intake temperature t_{L1} at the condenser ($t_{L1} = 25^\circ C$) and the condensing temperature t_C at the condenser intake ($t_C = 40^\circ C$) for R404A. It applies only to our standard version.

$$Q_{C(N)} = \frac{Q_C}{F_1 \times F_2 \times F_3}$$

$Q_{C(N)}$ = Nominal capacity condenser (at $\Delta t = 15K$, R404A)
Q_C = Condenser capacity
F_1 = Correction factor for refrigerant
F_2 = Correction factor for temperature difference
F_3 = Correction factor for height above sea level

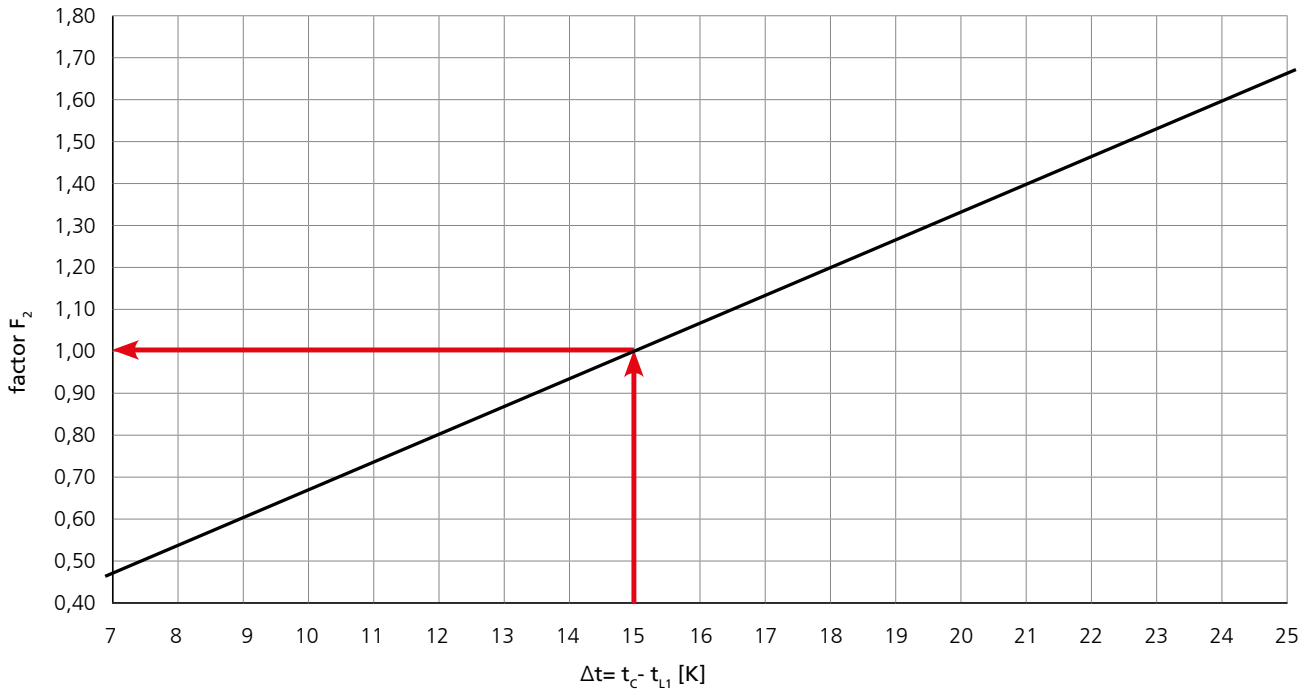
Correction factor for refrigerant (factor F_1)

R 134a	$F_1 = 0.93$	R 407A	$F_1 = 0.83$
R 22	$F_1 = 0.96$	R 407C	$F_1 = 0.87$
R 404A	$F_1 = 1.00$	R 507	$F_1 = 1.00$

Correction factor for height above sea level (factor F_3)

0 ft above sea l. $F_3 = 1.00$	4,921 ft above sea l. $F_3 = 0.87$
1,640 ft above sea l. $F_3 = 0.96$	6,562 ft above sea l. $F_3 = 0.83$
3,281 ft above sea l. $F_3 = 0.91$	8,202 ft above sea l. $F_3 = 0.80$

Correction factor for temperature difference (factor F_2)



t_C = Condensing temperature
t_{L1} = Air inlet temperature

For Δt between 7 K and 25 K:
Capacity at Δt = catalogue capacity * Δt / 15

Küba MSM & MSA Condenser

Technical data

Sound N					Sound L					Sound N & L		
Type	Nominal capacity	Airflow	Sound pressure *	Sound power level	Type	Nominal capacity	Airflow	Sound pressure *	Sound power level	Surface	Tube volume	Weight
	Q_c		L_{PA}	L_{WA}		Q_c		L_{PA}	L_{WA}			
	kW	m³/h	dB(A)	dB(A)		kW	m³/h	dB(A)	dB(A)	m²	dm³	kg
MSM112-3504	4.7	2,090	40	71	**MSM112-3506**	3.9	1,260	31	62	6	0.7	19
MSM113-3504	5.7	1,800	40	71	**MSM113-3506**	4.3	1,080	31	62	10	1.0	21
MSM114-3504	5.8	1,580	40	71	**MSM114-3506**	4.4	950	31	62	13	1.4	23
MSAN03-1x1A	6.7	2,610	39	70	**MSAL03-1x1A**	5.4	1,610	30	61	11	1.4	25
MSAN03-1x1B	8.3	2,390	39	70	**MSAL03-1x1B**	6.2	1,480	30	61	17	1.9	27
MSAN03-1x1C	8.9	2,250	39	70	**MSAL03-1x1C**	6.6	1,370	30	61	23	2.5	29
MSAN03-1x2A	13.4	5,220	42	73	**MSAL03-1x2A**	10.6	3,210	33	64	23	2.4	39
MSAN03-1x2B	16.6	4,780	42	73	**MSAL03-1x2B**	12.4	2,950	33	64	34	3.5	43
MSAN03-1x2C	17.7	4,510	42	73	**MSAL03-1x2C**	13.2	2,730	33	64	45	4.5	47
MSAN03-1x3A	20.1	7,840	44	75	**MSAL03-1x3A**	15.8	4,820	35	66	34	3.4	53
MSAN03-1x3B	25.0	7,160	44	75	**MSAL03-1x3B**	18.7	4,430	35	66	51	5.0	59
MSAN03-1x3C	26.5	6,760	44	75	**MSAL03-1x3C**	19.7	4,100	35	66	68	6.7	65

Subject to modification.

Nominal capacity Q_c: R404A; t=15K; t_{L1}= 25°C; t_C=40°C
Sound pressure: Enveloping surface method, in acc. with DIN EN ISO 13487

*** Sound pressure L_{PA}=10 m**

Küba MSM & MSA Condenser

Sound pressure correction L_{PA} for other distances

The sound pressure changes for other distances using the enveloping surface method depend on the dimensions of the unit.

The Küba selection software may be used for accurate calculations of the acoustic pressure level L_{PA}.

N° of fans	Distances [in m]	1	2	3	4	5	7	10	15	20	30	50
1-2 motors	ΔL_{PA} [in dB(A)]	16	12	9	7	5	3	0	-3	-6	-9	-14
3 motors	ΔL_{PA} [in dB(A)]	15	11	9	7	5	3	0	-3	-6	-9	-13

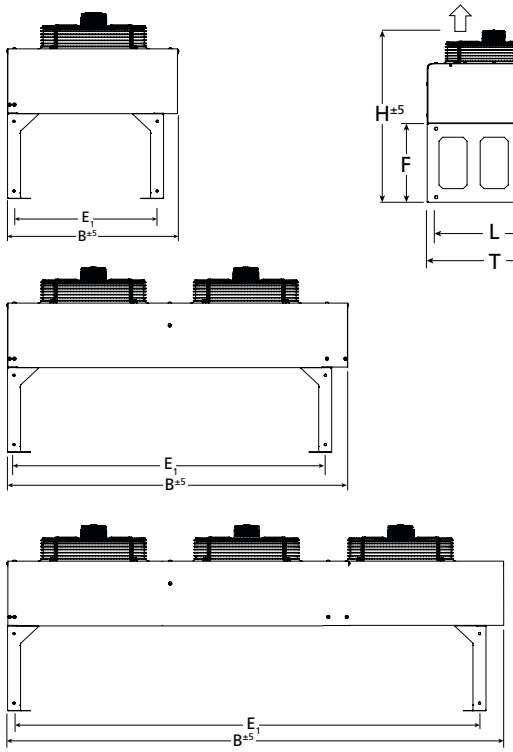
So the correction values L_{PA} are reference values.

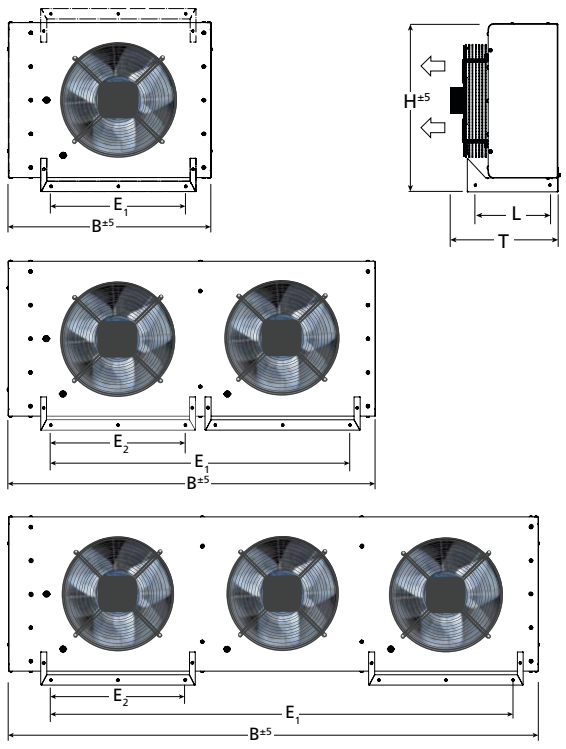
Küba MSM & MSA Condenser

Dimensions

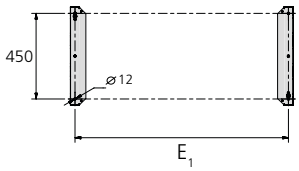
	Küba MSM & MSA Condenser					
Typ	H	B	E_1	F	T	L
	mm	mm	mm	mm	mm	mm
MSM112-3506	647	508	450	305	442	400
MSM113-3506	647	508	450	305	442	400
MSM114-3506	647	508	450	305	442	400
MSA 03-1x1A	667	677	570	305	518	450
MSA 03-1x1B	667	677	570	305	518	450
MSA 03-1x1C	667	677	570	305	518	450
MSA 03-1x2A	667	1.227	1.120	305	518	450
MSA 03-1x2B	667	1.227	1.120	305	518	450
MSA 03-1x2C	667	1.227	1.120	305	518	450
MSA 03-1x3A	667	1.777	1.670	305	518	450
MSA 03-1x3B	667	1.777	1.670	305	518	450
MSA 03-1x3C	667	1.777	1.670	305	518	450

	Air flow horizontal					
Typ	H	B	E_1	E_2	T	L
	mm	mm	mm	mm	mm	mm
MSM112-3506	646	508	360	-	343	265
MSM113-3506	646	508	360	-	343	265
MSM114-3506	646	508	360	-	343	265
MSA 03-1x1A	565	677	450	-	363	265
MSA 03-1x1B	565	677	450	-	363	265
MSA 03-1x1C	565	677	450	-	363	265
MSA 03-1x2A	565	1.227	1.000	450	363	265
MSA 03-1x2B	565	1.227	1.000	450	363	265
MSA 03-1x2C	565	1.227	1.000	450	363	265
MSA 03-1x3A	565	1.777	1.550	450	363	265
MSA 03-1x3B	565	1.777	1.550	450	363	265
MSA 03-1x3C	565	1.777	1.550	450	363	265

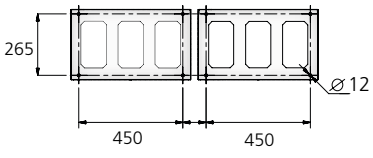




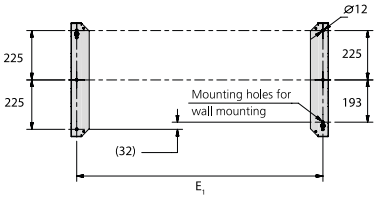
Leg dimensions for floor mounting (air flow vertical)



Leg dimensions for floor mounting (air flow horizontal)



Leg dimension for wall mounting



Küba MSM & MSA

Variants

Fans and Control

- EC Fan Control
  CBG-30AV (0-30 bar)
  CBG-50AV (0-50 bar)
  Mechanical Pressure Indicator
  Connecting cable: ca. 2 m length (UV resistant)
  Liquid compatibility: all refrigerants except NH_3
  Protection class: IP 65
  Permissable ambient temperature: -20… +60 °C

Küba MSM & MSA

Tender text

Air cooled condensers for commercial refrigeration Küba MS

without external pressure. The legs forming part of the delivery allow vertical or horizontal mounting.

Heat exchanger:

- Heat exchangers with copper tubing with internal ribbing and high performance aluminium fins spaced 2.1 mm apart
- The formed fin collar ensures a permanent and effective connection between flared tubes and fins
- This ensures highly effective heat transfer

Gehäuse:

- The casing consists of sendzimir galvanised steel plate with UV resistant powder coating (RAL 9018)
- This surface coating ensures weather resistance and corrosion protection
- All mounting components are made of stainless steel

Axialventilatoren:

- Low noise compact unit: Motor with fan blades, corrosion and weather protected fan guard grid
- Fan: Ø 350 mm, dynamically balanced with quality class G 6.3 in acc. with DIN EN ISO 1940, with two selectable speeds:
- 4-pole: 230 V ± 10% 1, 50 Hz, IP 44, thermostat relay for motor protection, internally wired, motor ambient temperature –25° C to +60°C, 1295 rpm
- 6-pole: 230 V ± 10% 1, 50/60 Hz, IP 44, thermostat relay for motor protection, internally wired, motor ambient temperature –25° C to +60°C, 880 rpm
- Continuously variable speed using phase angle control or voltage reduction
- Phase angle control may cause electromagnetic noise at some frequencies!

Technical data:

Condenser capacity	Q_C	kW
Coolant	R	
Air intake temperature	t_{L1}	°C
Condensing temperature	t_C	°C
Airflow	V_L	m^3/h
Sound power level	L_{WA}	dB(A)
Sound pressure	L_{PA}	dB(A) in 10m
Exhaust direction (vert. / hor.)		
Number of fans		Stück
Motor rpm	n	min^{-1}

Motor rated power at rated voltage.	P_{el}	W	V
Rated current and mains frequency	I	A	Hz
Weight			kg
Length / width / height			m
Connections	Inlet		mm
Connections	Outlet		mm
Colour	RAL		
Make	Küba		
Type			
Price			EUR

Küba Red Line

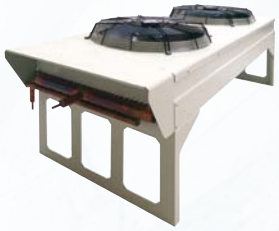
Condenser & Dry Cooler

Küba MS Condenser



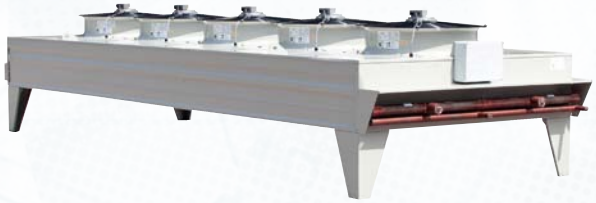
EC HFC 3.9 kW 26.5 kW

Küba RF-SJ Condenser



EC HFC 9.0 kW 154 kW

Küba RF Condenser



EC HFC 12 kW 1285 kW

Küba NF Condenser



EC NH3 12 kW 1270 kW

Küba MV Condenser



EC HFC 59 kW 1495 kW

Küba GF Gas Cooler



EC

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