

GAV/H

Construction

Casing

Self-supporting construction, fan sections individually partitioned.

- Casing and legs from galvanized sheet steel
- Temperature- and UV-radiation resistant powder coating RAL 7032 pebble gray
- Lifting lugs standard

Heat exchanger

Standard tube arrangement lengthwise, staggered, in special copper.

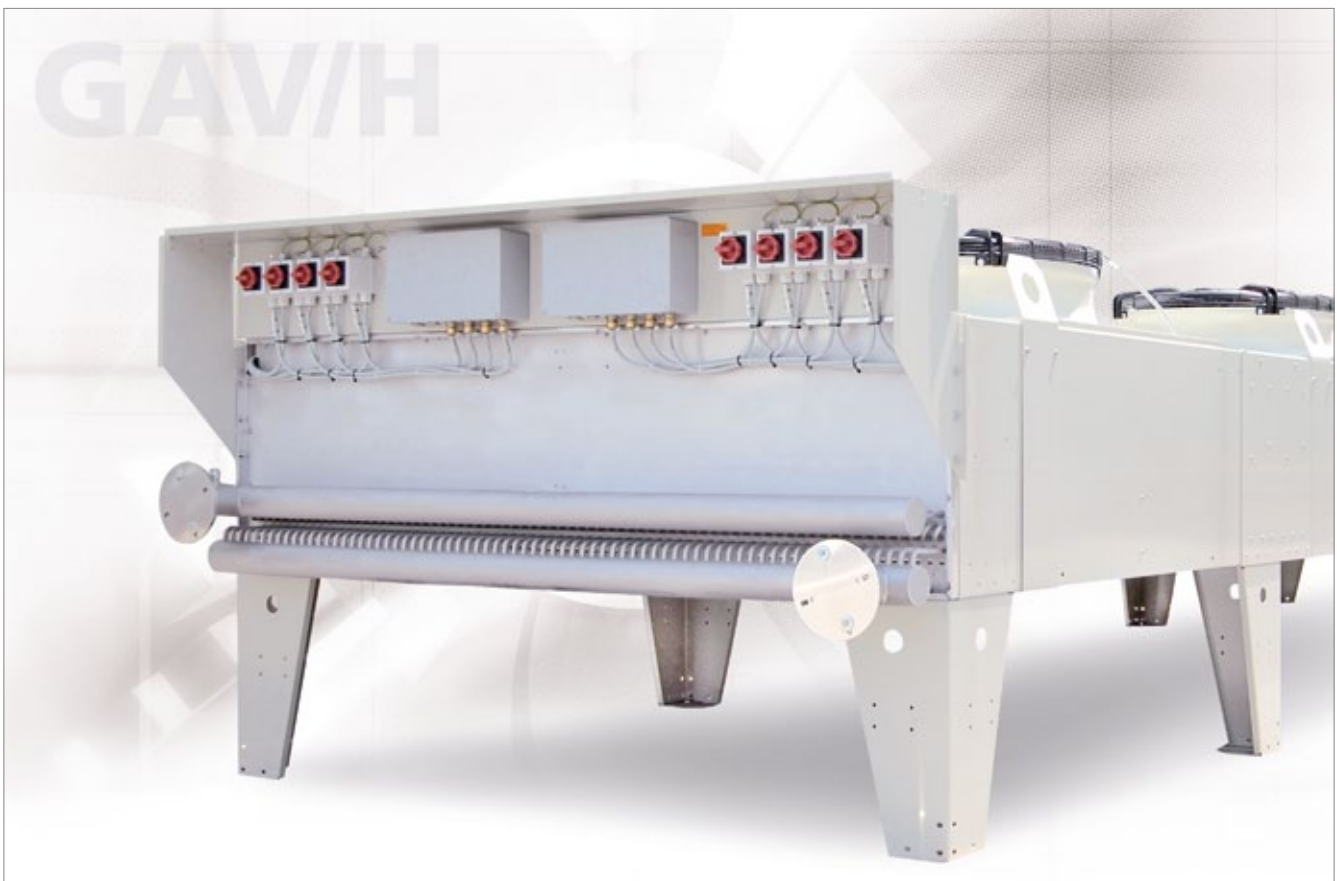
- Material:
 - Tubes: SF-Cu
 - Fins: AL with closed dimpled fins
 - Fin spacing: 2.2 mm
- Multi-circuiting possible
- Connections
 - Male thread connection of steel, vertical type (use for vertical and horizontal airflow)
- Maximum permissible pressure: 16 bar

Axial fans

Compact unit without external pressure, weather resistant: Motor with fans, Fan guard in accordance with DIN EN ISO 13857 and assembly brackets.

- Fan blade \varnothing 500, 650, 800, 910, 1000 mm, balanced in two levels according to a DIN EN ISO 1940 standard
- Motors, threephase current $400 \pm 10\%V$, 50 Hz, 2 speeds, Δ -Y-connections, Protection: IP 54
- Variable speed control by reduction of voltage.
- Proof to frequency changes (maximum fan pitch $dU/dt=500V/\mu s$; $U_{peak} < 1000V$, $f_{max} < 60Hz$).
- Standard protection of motor by thermocouples.
- For outdoor installation and ambient motor temperatures of $-30^{\circ}C$ up to $+60^{\circ}C$.
- Please contact Küba for special voltages.
- GA. 05 and 06: Fans 230V 1, (no surcharge)
- All fans ErP 2015 compliant

Container type (CGAV/H) and other designs available in our Küba Select selection program!



Fans

Standard construction

GA. 05 - 06

- 400V±10% 3, 50 Hz with speed reduction
Δ-Y-change-over
- Protection: IP54
- Range of application: -30°C to +60°C

GA. 08 - 10

- 400V±10% 3, 50 Hz with speed reduction
Δ-Y-change-over
- Protection: IP54
- Range of application: -30°C to +60°C

Module	Fan	Blade Ø	N°. Poles	Label data						Operating values per fan					
				n [min ⁻¹]		P [W]		I [A]		n [min ⁻¹]		P [W]		I [A]	
				Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y
05-	N	500	4	1,330	940	830	550	1.5	1.0	1,360	1,060	680	490	1.3	0.9
	L		4	1,300	1,025	770	490	1.7	0.8	1,320	1,060	660	430	1.6	0.8
	S		6	870	590	290	150	0.7	0.4	900	640	240	140	0.6	0.3
06-	N	650	4	1,380	1,160	2,000	1,450	3.9	2.5	1,400	1,190	1,850	1,390	3.8	2.3
	L		6	950	850	720	530	2.8	1.2	950	870	680	500	2.8	1.1
	S		8	710	630	350	240	1.7	0.6	710	640	340	220	1.6	0.6
08-	N	800	6	890	690	1,800	1,150	3.8	2.2	910	730	1,770	1,210	3.9	2.2
	L		6	900	690	1,400	940	2.7	1.7	890	640	1,380	830	2.8	1.6
	S		12	450	370	270	170	0.8	0.4	450	360	290	180	0.8	0.4
09-	N	900	6	840	660	2,500	1,600	5.0	2.7	850	660	2,850	1,750	5.6	3.0
	L		6	840	630	1,850	1,050	3.8	1.9	860	660	1,650	990	3.6	1.8
	S		8	660	500	900	540	2.1	1.1	670	530	840	530	2.2	1.1
10-	N	1000	6	820	620	2,700	1,600	5.3	2.8	850	650	2,520	1,550	5.1	2.7
	L		8	690	570	1,550	1,150	3.3	2.0	700	590	1,380	1,050	3.2	1.9
	S		10	560	480	940	660	2.9	1.4	570	500	860	600	2.9	1.3

- Fans are rated for continuous operation S1.
Fan motors have to be operated for at least two hours per month.
- Other motors will change performances and Sound Pressure Levels quoted.
- Operation with frequency converter only possible with sinusoidal filter on all phases.

- According to nameplate information, the motors are designed for continuous operation (S1 or S2). This defines the operating conditions and switching frequency pursuant to the DIN EN 60034-1 standard.

GEA Küba GAV/H Fans

Fans

Speed actuator and control operation

Speed control by decrease of the effective voltage

Single-phase and three-phase motors can be speed controlled via voltage reduction. During partial speed, substantial losses occur in the rotor, since slip power is transformed into heat. The voltage decrease can be accomplished by a transformer or by phase control.

When using phase control, the voltage has a greater harmonic content, resulting in additional losses and causing additional heat in the motor.

Depending on installation conditions, the noise level may increase with electronic speed control by voltage reduction through phase angle control. The current may furthermore be higher than given on the nameplate.

Speed control by frequency converters

The standard AC fans are suitable for operation with frequency converters between 30% and 100% of rated motor frequency. For reduction of peak voltages and voltage increase speed and motor noise (at reduced speed) frequency converter manufacturers recommend the use of all pole sinus filters

Axial fans are suited for operation by frequency converters provided the following points are observed:

Sinus filters to ensure sinusoidal supply voltage between phases and between phase and protective earth, as offered by some converter manufacturers, must be fitted between frequency converter and motor.

du/dt filters (also called motor or damping filters) must not be used instead of sinus filters.

When using sinus filters it may be unnecessary to use screened motor supply cables, metal terminal boxes and a second earth wire connection on the motor.

If the operational leakage current of 3.5 mA is exceeded, the earthing requirements as set out in DIN VDE 0160/5.88, Section 6.5.2.1, must be complied with.

Manufacturers instructions must be observed!

Motor Protection:

A current-dependent motor protection facility (motor circuitbreaker or bimetal tripping device) is not provided and it must be noted that protection by thermo-couples TK should be wired.

Thermocouples are temperature-dependent elements which are insulated such that they are embedded in the windings of the motors. They open an electrical contact as soon as the maximum permissible permanent temperature is exceeded. They should be integrated in the control circuit of contactors in such a way, that in case of failure no automatic reactivation occurs.

Thermocouples fulfill the conditions for protecting devices with electric motor drive (IEC VDE 0730) against overloading.

Sound Data

Sound Power Levels

The A-grade total sound power level L_{WA} has been determined by way of sound measurements in accordance with DIN EN ISO 3744 for one fan.

DIN EN ISO 3744 describes the measuring method with precision class 2 with a standard deviation (acoustic power) of ≤ 2 dB.

Sound Pressure Level for several fans at nominal speed rating

Fans per dry cooler	2	3	4	5	6	8	10	12	14
Increase L_{PA} [dB(A)]	+3	+5	+6	+7	+8	+9	+10	+11	+11

Sound Power Level for one fan at nominal speed rating

Module	Fan	Blade Ø	Sound Power Level		Sound Power Level L_{WA} [dB(A)] at Octave band centre frequency f [Hz], A-rated																	
			L_{WA}		63 Hz		125 Hz		250 Hz		500 Hz		1 kHz		2 kHz		4 kHz		8 kHz		16 kHz	
			Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y	Δ	Y
05-	N	500	83	77	49	45	71	64	72	66	76	70	79	72	77	72	72	64	62	53	50	39
	L		82	76	49	44	70	63	71	66	75	69	78	72	76	69	71	64	61	53	48	39
	S		72	63	43	48	59	50	63	56	65	58	68	57	65	54	59	46	49	35	36	27
06-	N	650	94	90	54	52	74	69	85	81	86	82	89	85	89	85	86	81	75	69	63	58
	L		84	82	50	48	63	61	75	73	76	74	80	77	79	77	73	70	62	59	52	49
	S		77	74	48	46	64	62	67	64	69	66	72	70	71	68	63	59	53	50	43	40
08-	N	800	85	78	56	60	71	64	75	69	78	72	81	74	77	71	72	65	64	57	53	46
	L		86	78	56	56	70	64	75	65	78	71	81	73	80	73	77	68	68	58	57	47
	S		65	60	44	41	53	48	56	54	60	53	60	54	57	50	49	42	41	35	31	27
09-	N	900	92	85	64	59	74	71	81	74	84	77	87	81	87	80	83	75	75	65	62	53
	L		85	78	56	56	71	65	78	69	79	72	81	73	77	69	72	65	66	58	55	45
	S		79	72	59	50	66	60	71	65	71	65	74	66	70	63	66	59	59	50	46	36
10-	N	1000	87	80	62	54	75	72	80	72	82	74	82	74	79	70	74	65	67	59	55	45
	L		82	77	58	53	73	70	75	72	76	71	76	71	71	66	66	61	60	54	46	40
	S		76	72	55	60	68	64	68	64	70	66	70	66	66	62	60	56	54	48	39	34

GEA Küba GAV/H
Sound Data

Sound Pressure Correction values L_{PA} for other distances

For other distances, the change in Sound Pressure measured with the enveloping surface method depends on the dimensions of the equipment.

The Sound Pressure Level L_{PA} can be calculated exactly using the GEA Küba Selection Software.

Ø	Number	Distance [in m]	1	2	3	4	5	7	10	15	20	30	50
500	1 to 2 motors	ΔL_{PA} [in dB (A)]	+16	+12	+9	+7	+5	+3	0	-3	-6	-9	-14
	3 to 6 motors	ΔL_{PA} [in dB (A)]	+15	+11	+9	+7	+5	+3	0	-3	-6	-9	-13
650	1 to 2 motors	ΔL_{PA} [in dB (A)]	+16	+12	+9	+7	+5	+3	0	-3	-6	-9	-13
	3 to 6 motors	ΔL_{PA} [in dB (A)]	+14	+11	+9	+7	+5	+3	0	-3	-6	-9	-13
800	1 to 2 motors	ΔL_{PA} [in dB (A)]	+15	+11	+9	+7	+5	+3	0	-3	-6	-9	-13
	3 to 10 motors	ΔL_{PA} [in dB (A)]	+13	+10	+8	+6	+5	+3	0	-3	-5	-9	-13
910	1 to 2 motors	ΔL_{PA} [in dB (A)]	+15	+11	+9	+7	+5	+3	0	-3	-6	-9	-13
	3 to 10 motors	ΔL_{PA} [in dB (A)]	+13	+10	+8	+6	+5	+3	0	-3	-5	-9	-13
1,000	1 to 2 motors	ΔL_{PA} [in dB (A)]	+14	+11	+8	+7	+5	+3	0	-3	-6	-9	-13
	3 to 10 motors	ΔL_{PA} [in dB (A)]	+13	+10	+8	+6	+5	+3	0	-3	-5	-9	-13

The stated correction values ΔL_{PA} are approximate values.

Selection table 1-range (S)

GAV/H S ..-1x ..							GA. S		
Type	Nominal capacity Q_{GLY}		Airflow		Sound pressure $L_{PA}=10\text{ m}$		Surface	Tube volume	Weight
	[kW]		[m ³ /h]		[dB(A)]				
GA.	Δ	Y	Δ	Y	Δ	Y	[m ²]	[dm ³]	[kg]
S05A-1x1F	10.5	8.0	4,160	2,880	40	30	42	7.4	86
S05A-1x1G	13.5	9.9	3,890	2,740	40	30	84	14.3	97
S05A-1x2F	20.9	16.0	8,330	5,750	43	34	84	14.7	116
S05A-1x2G	26.7	20.1	7,780	5,470	43	34	167	27.8	158
S05A-1x3F	31.5	24.0	12,490	8,630	45	36	125	21.1	172
S05A-1x3G	41.0	29.7	11,670	8,210	45	36	251	41.8	228
S06A-1x1F	17.2	15.8	7,230	6,390	45	43	55	10.7	128
S06A-1x1G	21.2	19.3	6,120	5,470	45	43	110	19.6	150
S06A-1x1H	19.9	18.1	7,650	6,650	45	43	73	13.4	142
S06A-1x1I	24.8	22.6	7,170	6,300	44	42	146	25.3	176
S06A-1x2F	34.3	31.5	14,460	12,770	49	46	110	19.6	208
S06A-1x2G	43.0	38.6	12,250	10,940	48	45	221	38.4	255
S06A-1x2H	40.0	36.2	15,300	13,300	49	46	146	26.4	242
S06A-1x2I	50.4	45.2	14,340	12,590	48	45	291	49.5	299
S06A-1x3F	49.8	45.8	21,680	19,160	51	48	166	29.7	300
S06A-1x3G	63.6	58.1	18,370	16,410	50	47	331	60.7	370
S06A-1x3H	58.4	52.9	22,950	19,950	51	48	218	37.9	357
S06A-1x3I	77.3	67.9	21,510	18,890	50	47	437	77.0	418
S08A-1x1A	25.8	20.9	8,460	6,570	33	27	118	21.3	270
S08A-1x1B	28.5	23.1	9,050	6,930	33	27	144	25.3	290
S08A-1x1C	30.8	25.3	9,450	7,270	33	27	169	29.2	320
S08A-1x2A	51.3	42.3	16,910	13,140	36	30	236	41.5	460
S08A-1x2B	57.5	46.2	18,110	13,860	36	30	287	55.0	520
S08A-1x2C	62.7	49.8	18,910	14,550	36	30	338	62.9	570
S08A-1x3A	77.0	63.1	25,370	19,710	38	32	355	65.7	680
S08A-1x3B	86.6	69.4	27,160	20,790	38	32	431	77.4	770
S08A-1x3C	94.0	75.7	28,360	21,820	38	32	507	89.2	840
S08A-1x4A	98.0	80.2	33,820	26,280	39	33	473	84.0	890
S08A-1x4B	111.1	88.9	36,210	27,720	39	33	574	99.7	1,020
S08A-1x4C	120.1	97.9	37,820	29,100	39	33	675	115.5	1,120
S08A-1x5A	125.9	103.2	42,280	32,860	40	34	591	102.4	1,090
S08A-1x5B	141.2	114.5	45,270	34,660	39	33	718	111.9	1,240
S08A-1x5C	153.8	123.1	47,270	36,370	39	33	844	131.5	1,360

Continued on next page →

 Nominal capacity Q_{GLY} : 34% by vol. monoethylene glycol (Antifrogen N); t (in/out) = 45/40°C, $t_{11} = 32$ °C

Sound pressure: Enveloping surface method, in acc. with DIN EN ISO 13487

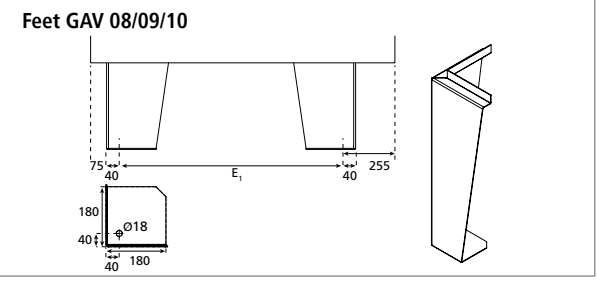
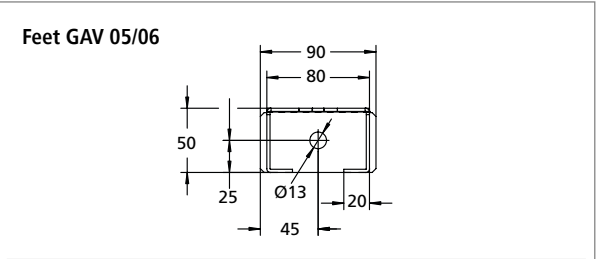
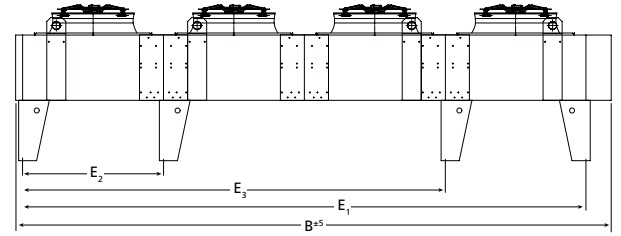
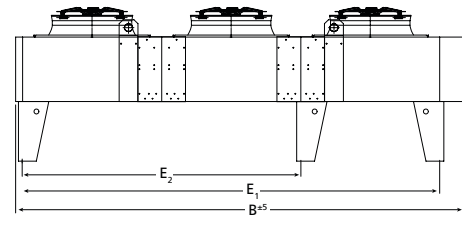
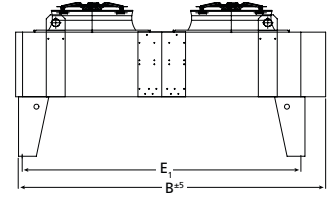
Δ: Valid at high rpm

Y: Valid at low rpm

Container type (CGAV/H) and other designs available in our GEA Küba Select selection program!

Dimensions 1-range (GAV)

Type	GAV.-1x..: Dimensions [mm]							
GA.	H	B	E ₁	E ₂	E ₃	F	T	L
05A-1x1F	1,000	1,410	960	-	-	500	900	850
05A-1x1G	1,000	1,410	960	-	-	500	900	850
05A-1x2F	1,000	2,512	2,062	-	-	500	900	850
05A-1x2G	1,000	2,512	2,062	-	-	500	900	850
05A-1x3F	1,000	3,613	3,163	1,102	-	500	900	850
05A-1x3G	1,000	3,613	3,163	1,102	-	500	900	850
06A-1x1F	1,030	1,410	960	-	-	500	1,153	1,103
06A-1x1H	1,030	1,760	1,310	-	-	500	1,153	1,103
06A-1x1G	1,030	1,410	960	-	-	500	1,153	1,103
06A-1x1I	1,030	1,760	1,310	-	-	500	1,153	1,103
06A-1x2F	1,030	2,512	2,062	-	-	500	1,153	1,103
06A-1x2H	1,030	3,212	2,762	-	-	500	1,153	1,103
06A-1x2G	1,030	2,512	2,062	-	-	500	1,153	1,103
06A-1x2I	1,030	3,212	2,762	-	-	500	1,153	1,103
06A-1x3F	1,030	3,613	3,163	1,102	-	500	1,153	1,103
06A-1x3H	1,030	4,663	4,213	1,452	-	500	1,153	1,103
06A-1x3G	1,030	3,613	3,163	1,102	-	500	1,153	1,103
06A-1x3I	1,030	4,663	4,213	1,452	-	500	1,153	1,103
08A-1x1A	1,555	1,730	1,403	-	-	600	1,190	1,098
08A-1x1B	1,555	2,030	1,703	-	-	600	1,190	1,098
08A-1x1C	1,555	2,330	2,003	-	-	600	1,190	1,098
08A-1x2A	1,555	3,130	2,805	-	-	600	1,190	1,098
08A-1x2B	1,555	3,730	3,405	-	-	600	1,190	1,098
08A-1x2C	1,555	4,335	4,005	-	-	600	1,190	1,098
08A-1x3A	1,555	4,535	4,206	2,803	-	600	1,190	1,098
08A-1x3B	1,555	5,435	5,106	3,403	-	600	1,190	1,098
08A-1x3C	1,555	6,335	6,006	4,002	-	600	1,190	1,098
08A-1x4A	1,555	5,935	5,608	1,402	4,205	600	1,190	1,098
08A-1x4B	1,555	7,135	6,808	1,702	5,105	600	1,190	1,098
08A-1x4C	1,555	8,335	8,008	2,002	6,005	600	1,190	1,098
08A-1x5A	1,555	7,335	7,009	2,805	4,205	600	1,190	1,098
08A-1x5B	1,555	8,835	8,509	3,403	5,105	600	1,190	1,098
08A-1x5C	1,555	10,335	10,004	4,003	6,005	600	1,190	1,098
09A-1x1A	1,570	1,730	1,403	-	-	600	1,190	1,098
09A-1x1B	1,570	2,030	1,703	-	-	600	1,190	1,098
09A-1x1C	1,570	2,330	2,003	-	-	600	1,190	1,098
09A-1x1D	1,820	2,630	2,303	-	-	600	1,190	1,098
09A-1x2A	1,570	3,130	2,805	-	-	600	1,190	1,098
09A-1x2B	1,570	3,730	3,405	-	-	600	1,190	1,098
09A-1x2C	1,570	4,335	4,005	-	-	600	1,190	1,098
09A-1x2D	1,820	4,930	4,605	-	-	600	1,190	1,098
09A-1x3A	1,570	4,535	4,206	2,803	-	600	1,190	1,098
09A-1x3B	1,570	5,435	5,106	3,403	-	600	1,190	1,098
09A-1x3C	1,570	6,335	6,006	4,002	-	600	1,190	1,098
09A-1x3D	1,820	7,235	6,906	4,603	-	600	1,190	1,098
09A-1x4A	1,570	5,935	5,608	1,402	4,205	600	1,190	1,098
09A-1x4B	1,570	7,135	6,808	1,702	5,105	600	1,190	1,098
09A-1x4C	1,570	8,335	8,008	2,002	6,005	600	1,190	1,098
09A-1x4D	1,820	9,535	9,208	2,302	6,905	600	1,190	1,098
09A-1x5A	1,570	7,335	7,009	2,805	4,205	600	1,190	1,098
09A-1x5B	1,570	8,835	8,509	3,403	5,105	600	1,190	1,098
09A-1x5C	1,570	10,335	10,004	4,003	6,005	600	1,190	1,098
10A-1x1B	1,830	2,030	1,703	-	-	850	1,635	1,543
10A-1x1C	1,830	2,330	2,003	-	-	850	1,635	1,543
10A-1x1D	1,830	2,630	2,303	-	-	850	1,635	1,543
10A-1x2B	1,830	3,730	3,405	-	-	850	1,635	1,543
10A-1x2C	1,830	4,330	4,005	-	-	850	1,635	1,543
10A-1x2D	1,830	4,930	4,605	-	-	850	1,635	1,543
10A-1x3B	1,830	5,435	5,106	3,403	-	850	1,635	1,543
10A-1x3C	1,830	6,335	6,006	4,003	-	850	1,635	1,543
10A-1x3D	1,830	7,235	6,906	4,603	-	850	1,635	1,543
10A-1x4B	1,830	7,135	6,805	1,702	5,105	850	1,635	1,543
10A-1x4C	1,830	8,335	8,008	2,002	6,005	850	1,635	1,543
10A-1x4D	1,830	9,535	9,109	2,302	6,905	850	1,635	1,543
10A-1x5B	1,830	8,835	8,509	3,402	5,105	850	1,635	1,543
10A-1x5C	1,830	10,335	10,004	4,003	6,005	850	1,635	1,543


 GEA Küba GAV/H
Dimensions 1-range

Description: GEA Küba GAV/H

GAV/GAH: Axial Fan dry cooler

For outdoor installation, air flow vertical (GAV ...), horizontal (GAH ...), without external pressure

Heat exchanger:

- High performance tubing system with staggered special SF copper tubes and pure aluminium fins with closed dimpling. Standard fin spacing is 2,2 mm.
- Series connection suitable for multiple subdivisions with draining and bleeding plugs on each circuit.
- Distributor and accumulator tubes of SF copper, steel connections.

Casing:

- Self-supporting construction, fan sections individually partitioned and optimised flow suction chamber.
- Casing and legs from galvanized sheet steel. The parts are individually powder coated including the edges, to achieve corrosion and scratch resistance impossible with liquid coating.
- Powder coating resistant to temperature and UV rays.
- Standard colour is RAL 7032, pebble grey.
- Mounted transport eyes are included in the standard scope of delivery.

Axial fans:

- Compact unit, motor with fans (blade-/sickle blade) and fan guard in accordance with DIN EN ISO 13857, corrosion proof and weather resistant.
- Fan blades ø 500, 650, 800, 910, 1000 mm balanced in two levels according to standard DIN EN ISO 1940.
- 400 V, 3-ph 50 Hz supply for standard motors
 - with 2 speeds (Δ -Y-connections)
 - variable speed control (30-100 %) by reduction of voltage
 - suitable for operation with frequency converter with sinus filter on all phases according to catalogue specifications
 - standard protection of motor by thermocouples, in the terminal box
- Protection: IP 54; Protected against dust and all-round splash water
 - For outdoor installation and ambient motor temperatures standard of -30°C up to +60°C
- Output data certified under Eurovent ID No. 98-08-043
- The LPA acoustic pressure refers to the cuboid surface envelope and the enveloping surface terminating on reflecting levels

Accessories:

- Circuit subdivision
- Speed controller
- Flange connections
- Switchgear cabinet
- Anti-Vibration Mounts
- Immersion sensor TFT loose/mounted
- Immersion tube TFT loose/mounted
- Repair switch mounted and wired on face
- Fins plastic coated ("Goldlack")
- Fins AlMg2.5
- Special voltage and frequencies

Technical Data:

Dry cooler capacity	Q_{GLY}	kW
Coolant/concentration		%
Air inlet temperature	t_{L1}	°C
Coolant temperatures	t_{cin} / t_{aus}	°C
Airflow	V_L	m ³ /h
Sound Power Level	L_{WA}	dB (A)
Sound Pressure	L_{PA}	dB(A) in 10m
Air direction discharge (vert./hor.)		
Number of fans	n	Number
Motor speed		min ⁻¹

Nominal motor capacity for nominal voltage.	P_{el}	W	V
Nominal current and mains frequency	I	A	Hz
Weight			kg
Length / Width / Height			mm
Connections	Inlet		mm
Connections	Outlet		mm
Colour	RAL		
Make	GEA Küba		
Type			
Price			EUR



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GEA Group is a global mechanical engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 index.

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