



“**MORE**

- *More efficient*
- *More flexible*
- *More intelligent*

for **LESS**

- *Less energy*
- *Less time*
- *Less noise*

Capacity: up to 1100 kW



Free cooling



Water misting



USE

The **OPERA** range, available in drycooler or air-cooled condenser versions, is particularly suited to service sector, industrial and healthcare applications.

Drycoolers in the OPERA range are mainly designed for cooling water or glycol/water mix for:

- Condensers for water chillers,
- Generators,
- Free cooling,
- Processes and machines (presses, compressors, etc.).

Air-cooled condensers in the OPERA range are mainly designed for the condensation of refrigerants for water chillers, as a "split system".

These devices are designed to be installed outdoors.

RANGE

OPERA is a large modular range, which offers:

- 3 casing lengths (S, M or L module), allowing either the dimensions, the capacity or the power consumption to be optimised.
- A range of sizes, from 1 to 14 fans.
- 2 impeller diameters, 800 or 910 mm.
- Several rotation speeds, from 330 to 1 000 rpm.
- Several configurations: horizontal or vertical unit with forced or induced draught for high temperatures.

Various combinations of these elements, as well as the choice of a number of options, allow us to provide devices that are adapted to a large range of applications and environments.

DESCRIPTION

Excellent resistance to corrosion

The casing boasts category C3 protection against corrosion, in line with ISO standard 12944-2 – colour RAL 7035 (light grey)



- 1 **Coil**
Copper tubing and manifolds, high-performance aluminium fins, resistant to fouling.
Anti-shear system for tube bundles.
Pipings for drycooler: ISO PN16 type 02A rotating flanges in line with NFEN1092 in 304L stainless steel (1 or 2 input(s)/ outputs(s) depending on the flow rate) – The tubes are sealed with plastic caps to protect the bundle.
Tubes for condenser: copper (1 input/output per refrigerating circuit for units with 1 fan line, 2 inputs/outputs for units with 2 fan lines). Delivered pressurised with nitrogen.
- 2 **Fan motor assemblies**
Profiles collars with galvanised steel with polyester powder coating on the internal and external surfaces.
Aluminium and polypropylene impellers.
Class F motor - IP54 - 3PH400V +/-10% 50Hz+/-2% - Standard connection to the motor terminal boxes
Black protective grille compliant with standard BS ISO 12499.
Individual partitioning.
The motors are also available in a 60 Hz version or in other voltages.
- 3 **Casing**
Galvanised steel with polyester powder coating on the internal and external surfaces. Assembly using stainless rivets and LANTHANUM nuts and bolts for the feet.
- 4 **Feet**
Galvanised steel with polyester powder coating on the internal and external surfaces.
- 5 **Protective enclosures on the elbows and manifolds**

Each device is tested:

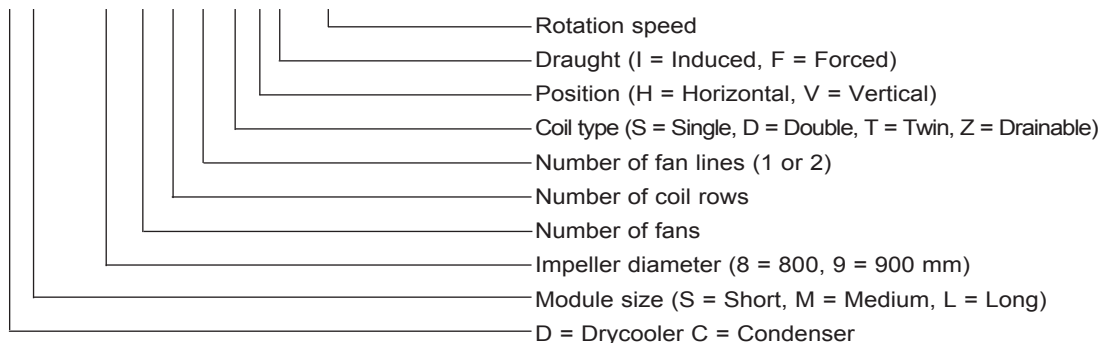
- The coil sealing is subjected to an underwater airtightness test.
- For devices with the terminal box or electrical cabinet option: rotation tests, dielectric tests, current measurement.

The OPERA range complies with the following European directives:

- Machinery Directive 2006/42/EC,
- EMC Directive 2004/108/EC,
- Pressure Equipment Directive (PED) 97/23 EC.

DESIGNATION (EXAMPLE)

OPERA DLN 9124-2 SHI 690A



OPTIONS FOR EACH APPLICATION

	Options	Description/Advantages	DRYCOOLER	CONDENSER
Protection adapted for the environment	Pre-coated aluminium fins	Improves the resistance of the blades to corrosion. For low corrosion environments.	•	•
	High efficiency coating on the finned bundle: ALUCCOAT®507 or HERESITE	Improves the resistance of the blades to corrosion. For corrosive environments.	•	•
	Stainless steel tube bundle	For corrosive fluids.	•	
	Corrosiveness resistance category C5M	Casing and fan motor assemblies for corrosive environments.	•	•
	ATEX II 2G/3G	For explosive atmospheres.	•	•
Quick, simple installation	Terminal box	Connection to the terminals of each motor on the front panel of unit.	•	•
	Protection cabinet	Protected by a thermal-magnetic circuit breaker on each motor.	•	
	Control cabinet with AeroCONNECT	Protection for motors and stage regulation provided by an electronic board according to temperature or pressure.	•	•
	Control cabinet with stages on terminals	Motor protection and stages controlled by the customer control.	•	
	Maintenance switch	For stopping individual motors.	•	•
	Companion flanges	In stainless steel, with gaskets and bolts.	•	
	Raised feet	To ensure a good flow of air depending on how the units are installed: against a wall, side by side, etc.	•	•
Installation surface constraints	Blade protective screen	Protection against hail, impacts, etc. For forced draught, vertical units.	•	•
	Vertical position	For narrow terraces.	•	•
Optimised, secure transport	Stacking of 2 identical devices		•	•
	Skid for transport by container	Secure transport and easy loading/unloading.	•	•
Optimisation of electrical consumption and sound levels	EC motor (with electronic switching)	Variable speed control from 0 to 100% using a 0/10V signal. With the control cabinet via electronic board option, the device is self-regulating	•	•
High-temperature fluid application	Forced draught	Motors in the flow of fresh air.	•	
Generator application	Double circuit drycooler	Cooling of 2 water circuits (LT – HT) in series using air from just 1 unit.	•	
	Expansion vessel	Max permissible pressure: 0.5 bar eff.	•	
Application for water without glycol	Drainable coil	Device located on a slope to prevent frost - drainage by gravity	•	
Free cooling application	Free cooling valve kit	Valves with motor and sensor, controlled by the electronic board. Controlled according to the operation of the drycooler or chiller.	•	
Application with adiabatic cooling	AEROFRESH (water misting into the air flow)	Size of the unit reduced by cooling of the ambient air. Operates completely safely due to the antibacterial treatment applied to the water.	•	•

ELECTRICAL SPECIFICATIONS

I: maximum input current

P: maximum power input

The currents and power actually absorbed depend on the operation point and will be indicated in detail when the unit is selected.

Speed	Wiring	AC MOTORS								EC MOTOR	
		900		690		890		680		1000	
		Δ		Y		Δ		Y			
I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)		
9010-1		5.3	2.65	3	1.84	3.9	2.13	2.3	1.33	4.4	2.98
9020-1		10.6	5.3	6	3.68	7.8	4.26	4.6	2.66	8.8	5.96
9030-1		15.9	7.95	9	5.52	11.7	6.39	6.9	3.99	13.2	8.94
9040-1		21.2	10.6	12	7.36	15.6	8.52	9.2	5.32	17.6	11.92
9050-1		26.5	13.25	15	9.2	19.5	10.65	11.5	6.65	22	14.9
9040-2		21.2	10.6	12	7.36	15.6	8.52	9.2	5.32	17.6	11.92
9060-2		31.8	15.9	18	11.04	23.4	12.78	13.8	7.98	26.4	17.88
9080-2		42.4	21.2	24	14.72	31.2	17.04	18.4	10.64	35.2	23.84
9100-2		53	26.5	30	18.4	39	21.3	23	13.3	44	29.8
9120-2		63.6	31.8	36	22.08	46.8	25.56	27.6	15.96	52.8	35.76
9140-2		74.2	37.1	42	25.76	54.6	29.82	32.2	18.62	61.6	41.72

Speed	Wiring	AC MOTORS												EC MOTOR			
		900		700		690		560		425		300		510		740	
		Δ		Y		Δ		Y		Δ		Y					
I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)	I (A)	P(kW)		
8010-1		3.65	1.98	2.4	1.43	2.1	0.895	1.05	0.56	0.42	0.194	0.35	0.075	0.49	0.298	1.4	0.918
8020-1		7.3	3.96	4.8	2.86	4.2	1.79	2.1	1.12	0.84	0.388	0.7	0.15	0.98	0.596	2.8	1.836
8030-1		10.95	5.94	7.2	4.29	6.3	2.685	3.15	1.68	1.26	0.582	1.05	0.225	1.47	0.894	4.2	2.754
8040-1		14.6	7.92	9.6	5.72	8.4	3.58	4.2	2.24	1.68	0.776	1.4	0.3	1.96	1.192	5.6	3.672
8050-1		18.25	9.9	12	7.15	10.5	4.475	5.25	2.8	2.1	0.97	1.75	0.375	2.45	1.49	7	4.59
8060-1		21.9	11.88	14.4	8.58	12.6	5.37	6.3	3.36	2.52	1.164	2.1	0.45	2.94	1.788	8.4	5.508
8040-2		14.6	7.92	9.6	5.72	8.4	3.58	4.2	2.24	1.68	0.776	1.4	0.3	1.96	1.192	5.6	3.672
8060-2		21.9	11.88	14.4	8.58	12.6	5.37	6.3	3.36	2.52	1.164	2.1	0.45	2.94	1.788	8.4	5.508
8080-2		29.2	15.84	19.2	11.44	16.8	7.16	8.4	4.48	3.36	1.552	2.8	0.6	3.92	2.384	11.2	7.344
8100-2		36.5	19.8	24	14.3	21	8.95	10.5	5.6	4.2	1.94	3.5	0.75	4.9	2.98	14	9.18
8120-2		43.8	23.76	28.8	17.16	25.2	10.74	12.6	6.72	5.04	2.328	4.2	0.9	5.88	3.576	16.8	11.016
8140-2		51.1	27.72	33.6	20.02	29.4	12.53	14.7	7.84	5.88	2.716	4.9	1.05	6.86	4.172	19.6	12.852



SOUND LEVELS

		SOUND PRESSURE LEVEL (Lp) * / SOUND POWER LEVEL (Lw)** - dB(A)									
		AC MOTORS								EC MOTOR	
Speed		900		690		890		680		1000	
Wiring		Δ		Y		Δ		Y			
		Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw
9010-1		51	83	45	77	49	81	41	73	56	88
9020-1		54	86	48	80	52	84	44	76	59	91
9030-1		56	88	50	82	54	86	46	78	60	92
9040-1		57	89	51	83	55	87	47	79	61	94
9050-1		58	90	52	84	56	88	48	80	62	94
9040-2		57	89	51	83	55	87	47	79	61	94
9060-2		59	91	53	85	57	89	49	81	63	95
9080-2		60	92	54	86	58	90	50	82	64	97
9100-2		61	93	55	87	59	91	51	83	65	98
9120-2		61	94	55	88	59	92	51	84	66	98
9140-2		62	94	56	88	60	92	52	84	66	99

		SOUND PRESSURE LEVEL (Lp) * / SOUND POWER LEVEL (Lw)** - dB(A)															
		AC MOTORS										EC MOTOR					
Speed		900		700		690		560		425		300		510		740	
Wiring		Δ		Y		Δ		Y		Δ		Y					
		Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw
8010-1		48	80	41	73	37	69	32	64	27	59	18	50	32	64	42	73
8020-1		51	83	44	76	40	72	35	67	30	62	21	53	35	67	45	76
8030-1		53	85	46	78	42	74	37	69	32	64	23	55	37	69	46	78
8040-1		54	86	47	79	43	75	38	70	33	65	24	56	38	70	47	79
8050-1		55	87	48	80	44	76	39	71	34	66	25	57	39	71	48	80
8060-1		56	88	49	81	45	77	40	72	35	67	26	58	40	72	49	81
8040-2		54	86	47	79	43	75	38	70	33	65	24	56	38	70	47	79
8060-2		56	88	49	81	45	77	40	72	35	67	26	58	40	72	49	81
8080-2		57	89	50	82	46	78	41	73	36	68	27	59	41	73	50	82
8100-2		58	90	51	83	47	79	42	74	37	69	28	60	42	74	51	83
8120-2		58	91	51	84	47	80	42	75	37	70	28	61	42	75	51	84
8140-2		59	91	52	84	48	80	43	75	38	70	28	61	42	75	52	85

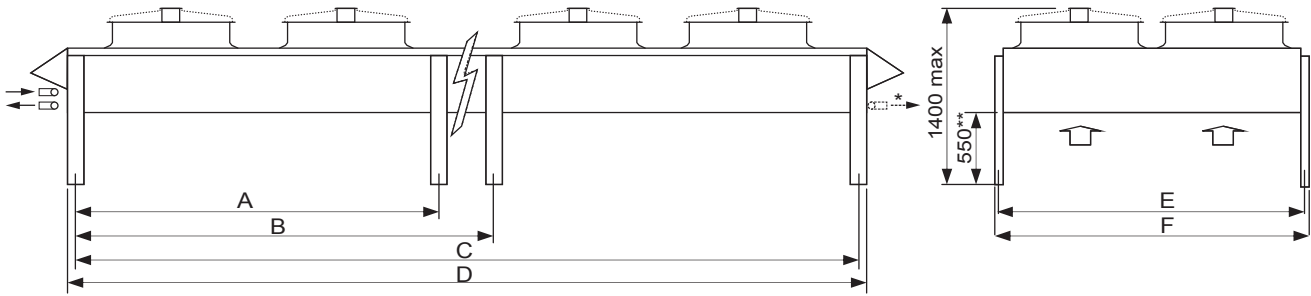
* Values measured at 10 m for horizontal units in free field, directivity 2, in line with the coil. Tolerance ±3dB.

** Only the sound power level is characteristic of the unit. These values are obtained in compliance with the ISO 3744 standard.

The difference between the sound power level and pressure level varies according to the site. To determine the unit's sound pressure level, recalculate it using the sound power level of the unit and the site conditions (you may need to consult an acoustical engineer). As the sound emitted by the unit is not uniform in all directions, for a point 10 m away in line with the fans, the recalculated pressure value must be increased by approximately 4 dB.

DIMENSIONS

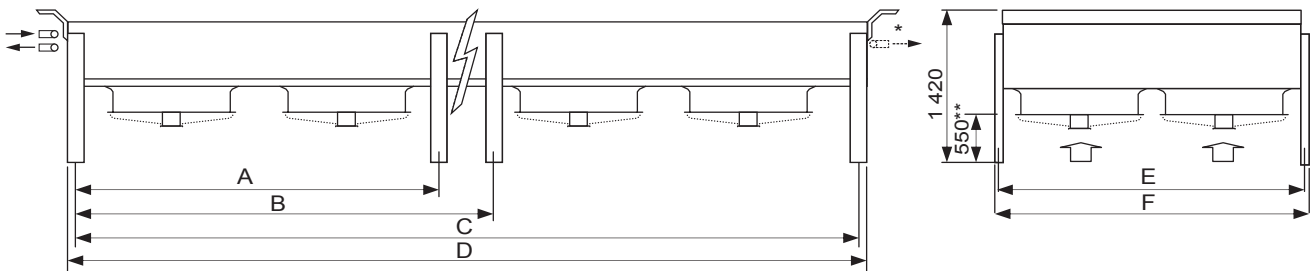
Horizontal Position - Induced Draught



Unit shown has 2 fan lines - no. of motors between the feet is not contractually binding

* for units with input/output tubes on the opposite side
** standard feet

Horizontal Position - Forced Draught

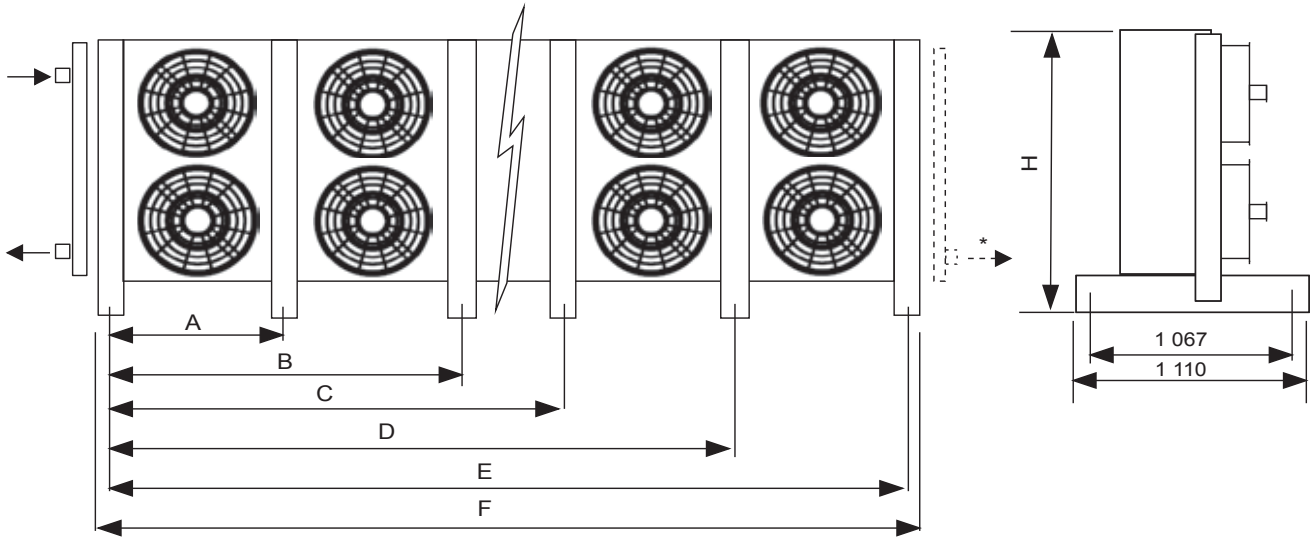


Unit shown has 2 fan lines - no. of motors between the feet is not contractually binding

* for units with input/output tubes on the opposite side
** standard feet

No. of motors		1	2	3	4	5	6	4	6	8	10	12	14
DSN or CSN S module	A	-	-	-	-	1840	1840	-	-	-	1840	1840	1840
	B	-	-	-	-	2790	3740	-	-	-	2790	3740	4690
	C	830	1780	2730	3680	4630	5580	1780	2730	3680	4630	5580	6530
	D	950	1900	2850	3800	4750	5700	1900	2850	3800	4750	5700	6650
	Max empty weight without options +/-10% (kg)	233	369	503	666	809	928	638	875	1135	1393	1617	1874
DMN or CMN M module	A	-	-	-	3140	3140	-	-	3140	3140	4740	3140	
	B	-	-	-	-	4740	-	-	-	4740	-	7940	
	C	1480	3080	4680	6280	7880	-	3080	4680	6280	7880	9480	11080
	D	1600	3200	4800	6400	8000	-	3200	4800	6400	8000	9600	11200
	Max empty weight without options +/-10% (kg)	314	523	712	958	1183	-	918	1298	1645	2029	2388	2772
DLN or CLN L module	A	-	-	-	3740	3740	-	-	3740	3740	5640		
	B	-	-	-	-	5640	-	-	-	5640	-		
	C	1780	3680	5580	7480	9380	-	3680	5580	7480	9380	11280	
	D	1900	3800	5700	7600	9500	-	3800	5700	7600	9500	11400	
	Max empty weight without options +/-10% (kg)	352	599	846	1110	1373	-	1036	1474	1929	2384	2806	
All	E	1240						2360					
	F	1280						2400					

Vertical position



Unit shown has 2 fan lines - no. of motors between the feet is not contractually binding

* for units with input/output tubes on the opposite side

No. of motors		1	2	3	4	5	6	4	6	8	10	12	14
DSN/CSN S module	A	-	-	-	1840	1840	1840	-	-	1840	1840	1840	1840
	B	-	-	-	-	2790	3740	-	-	-	2790	3740	4690
	C	-	-	-	-	-	-	-	-	-	-	-	-
	D	-	-	-	-	-	-	-	-	-	-	-	-
	E	830	1780	2730	3680	4630	5580	1780	2730	3680	4630	5580	6530
	F	950	1900	2850	3800	4750	5700	1900	2850	3800	4750	5700	6650
	Max empty weight without options +/-10% (kg)	282	419	554	705	915	1039	684	922	1181	1497	1727	1983
DMN/CMN M module	A	-	-	1540	1540	1540	-	1540	1540	1540	3140	3140	
	B	-	-	3140	4740	3140	-	3140	4740	3140	6340	4740	
	C	-	-	-	-	4740	-	-	-	4740	-	6340	
	D	-	-	-	-	6340	-	-	-	6340	-	7940	
	E	1480	3080	4680	6280	7880	-	3080	4680	6280	7880	9480	11080
	F	1600	3200	4800	6400	8000	-	3200	4800	6400	8000	9600	11200
	Max empty weight without options +/-10% (kg)	356	558	835	1046	1339	-	927	1383	1734	2187	2464	2920
DLN/CLN L module	A	-	-	1840	1840	1840	-	1840	1840	1840	3740		
	B	-	-	3740	5640	3740	-	3740	5640	3740	7540		
	C	-	-	-	-	5640	-	-	-	5640	-		
	D	-	-	-	-	7540	-	-	-	7540	-		
	E	1780	3680	5580	7480	9380	-	3680	5580	7480	9380	11280	
	F	1900	3800	5700	7600	9500	-	3800	5700	7600	9500	11400	
	Max empty weight without options +/-10% (kg)	399	639	972	1204	1537	-	1053	1572	1986	2501	2842	
All	H	1375						2495					

Dimensions (mm)

INSTALLATION RECOMMENDATIONS

- These units are designed to operate outside.
When starting up, frost and snow could adversely affect the operation of horizontal units.
As a general measure, all steps should be taken to avoid the risk of air recycling. This is especially important when the installation comprises several units.
It is not recommended to install units near the hot air extraction duct outlet or close to deciduous plants (this could cause fouling).
- **A horizontal unit** must have a surrounding free area of 1.5 m. Where the use of anti-vibration mounts is required, use a rigid frame which locks the feet together.
- **A vertical unit** should preferably be placed parallel to the direction of the wind. It is not recommended for use with low fan rotation speeds. In addition, we recommend that these units be stabilised using braces connecting their two upper ends to fixed supports (wall or framework).
- If **speed regulators** other than those recommended by the manufacturer are used, check that these are compatible with the electric motors..
- For air-cooled condensers, the **calculation of the evacuation capacity** of the air-cooled condenser must be carried out in accordance with professional best practice and particularly in accordance with:
 - the type of compressor in the installation (hermetic, semi-hermetic or open),
 - the horizontal and vertical lengths of the connection pipes and their diameter.
- **Commissioning and maintenance:** refer to the instruction manual.
- These units **comply with the European directives**. The installer is responsible for ensuring the compliance of the installation. The installer must ensure safety and protective devices (emergency stop, shut-off valves, lightning protection, etc.) are put in place and are accessible.

This document is non-contractual. As part of its policy of continual product improvement, CIAT reserves the right to make any technical modification it feels appropriate without prior notification.

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