

AIR - COOLED
WATER CHILLERS WITH AXIAL FANS
MICRO-CHANNEL CONDENSATION COILS
FINNED COILS
FROM 110,8 KW TO 684 KW
ORION R/MC
ORION R





ORION R-MC ORION R

AIR COOLED WATER CHILLER FROM 110,8 KW TO 684 KW



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General Features

Air condensing refrigerant unit for outdoor installation, with axial fan and micro-channel finned coil or finned coil in aluminum. The modular constructive approach of the V-shaped coil layout permits less room taken while leaving whole suction surface. Reduced dimensions mean reduced unit installation area, an optimization of the technical spaces and less room for the building site itself.

Designed for a quite running, reliable and efficient, they result to be extremely easy to install and require lower maintenance. Every single unit is tested in our company and supplied with oil and refrigerant agent required for functioning.

Technical Features

- Frame: Self-supporting galvanized steel modular frame protected with polyester powder painting RAL 7037PB, weather resistant. Steel screws and bolts. Compressors are situated in a sound proof vane and separated from the air box.
- Compressors: 3-phase scroll compressors, in high efficiency tandem arrangement. With reduced noiseless they achieve the heating needs efficiently.
- Fans: axial type coupled to the electric motor directly, 3phase and 6poles with internal electrical protection. They permit an optimal air flow through the finned coil with top rated energy efficiency and excellent noise.

 The electrical insulation is of 2 category, level protection IP 54.
- Air side heating exchanger: with aluminum microchannel finned coils, or aluminum finned coils. microchannel finned coils permits a plus 15% performing and a gas charge reduction of over 30%. The E-Coating Electrofin options is suitable as anti-corrosion solution for aggressive environments.
- Water side heating exchanger: plate type for units till 2 modules, optimized for modern refrigerants, designed for high performances and reliability. Shell and tube with double refrigerant circuit for units with more than 2 modules.
 Composed by: header, tube-plate, shell and refrigerant connections in stainless steel, exchanger tubes in copper SfCu DIN 1787, brass diaphragms, gasket in asbestos-free agglomerate, stainless steel screw. The exchanger is covered with insulation to avoid condensate and heat exchange with the external environment.
- Refrigerant circuit: made of pickled copper, it includes:
 liquid line shut off faucet, dehydrator filter, high and low pressure switches, sight glass and humidity indicator, service connections, solenoid valve and security valve. High and low pressure switches and pressure transducers. The thermostatic expansion valve is standard for models 110.1 and 140.1
- Electrical board: it includes an automatic main circuit breaker with door safety interlock, safe fuses for compressors, automatic control circuit breaker, compressor and fan remote controls (except for version EC or FSC), phase sequence control, terminal board for the unit-microprocessor interface. All wires and clamps are numbered.
- Microprocessor: it manages automatically the regulation of the water temperature, the compressor timings and rotations, and the alarms. It indicates on the display the operating status of the unit, the delivery and return water temperatures from the plant and the alarms code.
- Other features: water side differential pressure switch, relief valve.

AIR COOLED WATER CHILLERS

ORION VR MC

ORION VR HT

ORION R

VEGA

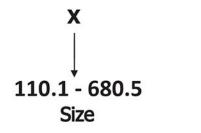
TAURUS

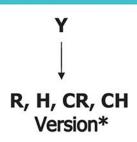
DRACO

ATMOS

SIAL

Model Number Nomenclature





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*
Only cooling
Heat nump



Main components

Compressor: scroll high efficiency 3-phase compressor. For low noise working.



Fan: axial fan type provided with nozzle and protection grill. It allows an optimal air flow through the finned coil with minimal noise level and power consumption.



Water-cooler exchanger: plates and shell & tubes type. Suitable for modern refrigerants. For high efficiency and reliability.



Air-cooler exchanger:

with aluminum micro channel finned coil, or aluminum finned coil.



Microprocessor: it controls all device functions.



Electronic expansion valve: it laminates the condensed refrigerant.



Pressure differential switch water side: it works as flow control, it operate when the flow water reach the minimum level.



Accessories

Compressors soft starters: enables the gradual start of compressors by limiting the initial starting current.

Control system and remote assistance: it allows the assistance and the unit control by means of web browser. Web server remote connection through corporate network. In case of alarm an alert can be sent via SMS or e-mail. For simultaneous control till 6 or 18 units.



Capacitor bank for compressor: the tools brings the consumption of the unit to $\cos\phi$ =0,95 by decreasing the absorbed reactive power

Refrigerant gauges: installed on the unit, they show the operative pressures of the cooling circuit on high and low pressure side.





Electronic expansion valve: for the condensed refrigerant rolling. In comparison with the thermostatic valve it enables fast response time according to the load variation by enhancing the unit performances.



Compressor faucet valves: they isolate the compressors from the cooling circuit by enhancing the maintenance operations.



Operating kit up to -25°C external air temperature: it allows to the chiller to operate with low external temperatures increasing the working limits.



De-superheaters: permits to recover till 25% of condensing heating for other purposes.



Total heat recovery: heat exchanger that allows the condensation heat recovery for others uses.



Liquid receiver: permits the correct refrigerant supply to the thermal expansion valve during external temperature variations.



Accessories

Pump kit: it gives to the water the pressure head necessary to pass through the hydraulic circuit and reach the terminals.



Complete Hydraulic kit

Pump: it gives to the water the pressure head necessary to pass through the hydraulic circuit and reach the terminals. **Tank:** made in high-quality carbon steel, insulated with injected rigid polyurethane with low thermal conductivity to minimize dispersions.



Expansion vessel: absorbs liquid volume variations caused by working temperature variations. In epoxy powder coated steel, long-lasting duration with steady membrane made in SBR rubber.



Inlet water filter: retains impurities of the water circuit which can damage the pumping unit and the exchanger.



Flow switch: mounted on the exit of the exchanger (user side) detects the water flow lack by an alarm to the control system.



Metallic filter coil protection: galvanized sheet steel frame - 12,5 mm

Special treatment: In case the units are to be located near the seaside or in aggressive environment we recommend to protect the exchanger with suitable anti-corrosion treatments:

- Copper finned coils cu/cu
- Treated finned coils

Fans speed control: the phase cut speed controller adjusts the air flow in order to optimize the condensation (or heat pump evaporation); the device reduces the absorbed power and the noise during partial loads.





EC fans: With BLDC brushless motor, with internal protection and fan speed control integrated. Internal electrical insolated with protection class I, IP 54, according to norm EN 61800-5-1.

The impellers are housed in aerodynamically shaped enclosures to increase the efficiency and decrease the noise level, complete with fan guards.

Noiseless version: with Flow grid tool, patented by EBMpapst. it reduces the fan noise of about 3 dB(A) depending on the type of installation.



Super Low noise version: it includes the noiseless versions tools plus an implemented condensing coil and compressors insulation with soundproofing material.





Rubber anti-vibration dampers: they reduce the vibrations transmission produced by the device.



Spring anti-vibration dampers: they are more effective than rubber dampers, reduce the vibrations transmission produced by the device.



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AIR COOLED WATER CHILLERS

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Technical Features

Model			110.1	140.1	220.2	280.2	310.2	360.3
Cooling Capacity		kW	110,8	138,8	211,2	284,0	305,0	356,8
EER	10		3,29	3,35	3,26	3,45	3,40	3,44
N° compressors / circuits	ii S	-	4/2	4/2	4/2	4/2	4/2	4/2
N° capacity steps			4	4	4	4	4	4
Compressors type					Scro	II		
Refrigerant type					R410)A		
Nominal absorbed power		kW	33,64 41,40 64,76 82,26 89,76 1				103,64	
Nominal absorbed currer	nt	Α	67,76	74,32	118,20	147,74	160,70	185,08
Maximum peak current		Α	189,82	195,74	313,65	420,81	430,53	448,81
N° fans/diameter		mm	2/800	2/800	4/800	4/800	4/800	6/800
Fans flow rate	Fans flow rate		41000	41000	82000	82000	82000	123000
Water flow		m³/h	19,05	23,87	36,32	48,84	52,45	61,36
Water pressure drop		kPa	36	29	34	49	53	32
Evaporator type					Brazed pla	ate		Shell & tube
(4)	Std	dB(A)	59	59	62	62	62	64
Sound Pressure Level (1)	LN	dB(A)	56	56	59	59	59	61
	SLN	dB(A)	52	52	55	55	55	57
Hydraulic connections			3″	3"	3"	3"	3″	DN150
Electrical supply				V/I	Hz/ Ph 400,	/50/3+N+PE		27 4
Shipping weight/micro channel finn	Shipping weight/micro channel finned coil kg		740	852	1.591	1.670	1.732	2.335
Operating weight/micro channel finn	Operating weight/micro channel finned coil kg		768	884	1.627	1.706	1.780	2.495
Shipping weight/finned coil		kg	821	934	1.754	1.834	1.896	2.580
Operating weight/finned co	il	kg	849	966	1.790	1.870	1.944	2.740

Model			410.3	450.3	540.4	580.4	630.5	680.5		
Cooling Capacity		kW	406,4	456,0	535,2	584,8	634,4	684,0		
EER			3,49	3,53	3,49	3,52	3,47	3,49		
N° compressors / circuits	1		4/2	4/2	6/2	6/2	6/2	6/2		
N° capacity steps			4	4	6	6	6	6		
Compressors type					Scro	oll				
Refrigerant type					R410	0A				
Nominal absorbed power	•	kW	116,44	129,24	153,52	166,32	183,00	195,80		
Nominal absorbed currer	Nominal absorbed current		205,96	226,84	273,72	294,60	323,28	344,16		
Maximum peak current	1aximum peak current		562,47	578,13	538,10	653,50	677,40	694,80		
N° fans/diameter		mm	6/800	6/800	8/800	8/800	10/800	10/800		
Fans flow rate	m³/h	123000	123000	164000	164000	205000	205000			
Water flow	Water flow			78,42	92,04	100,57	109,10	117,63		
Water pressure drop		kPa	34	41	53	40	51	42		
Evaporator type					Shell &	tube				
	Std	dB(A)	64	64	65	65	67	67		
Sound Pressure Level	LN	dB(A)	61	61	62	62	64	64		
	SLN	dB(A)	57	57	58	58	60	60		
Hydraulic connections			DN150	DN150	DN150	DN150	DN150	DN150		
Electrical supply (1)				V,	/Hz/ Ph 400	/50/3+N+PE	02	10		
Shipping weight/micro channel finn	ed coil	kg	2.404	2.473	3.243	3.286	3.754 3.818			
Operating weight/micro channel finn	ed coil	kg	2.583	2.670	3.459	3.509	3.987	4.067		
Shipping weight/finned coil		kg	2.649	2.718	3.570	3.613	4.163	4.227		
Operating weight/finned co	il	kg	2.828	2.915	3.786	3.836	4.396	4.476		

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References Conditions

Nominal conditions:

Air ambient temperature T=35°C

Water temperature T=12/7°C

(1) Full sound pressure level measured at 10m from the unit in free field (ISO3744)

Operation Limits		Cod	oling
		Min	Max
*Inlet water temperature	(°C)	9	23
Outlet water temperature	(°C)	4	18
Ambient air temperature	(°C)	5	40
Ambient air temperature with kit -25℃	(°C)	-25	40
* Without ethylene glycol			

Fouling Factor Correction

Unit performances reported in the table are given for the condition of clean exchanger (fouling factor=0). For different fouling factors values, unit performances should be corrected with the correction factors shown above.

Evaporator fouling factors (m ² °C/W)	F1	F2
0 (Clean evaporator)	1	1
0.44 x 10 ⁻⁴	0,98	0,99
0.88×10^{-4}	0,96	0,99
1.76 x 10 ⁻⁴	0,93	0,98
F1 = capacity correction factors F2 = compressor power input correction factors	·	

Ethylene glycol percent by weight (%)	10	20	30	40	50
Freezing point	-3.6	-8.7	-15.3	-23.5	-35.5
Cooling capacity corr. Factor	0,986	0,980	0,973	0,966	0,960
Power input corr. Factor	1,000	0,995	0,990	0,985	0,975
Mixture flow corr. Factor	1,023	1,054	1,092	1,140	1,200
Pressure drop corr. Factor	1,061	1,114	1,190	1,244	1,310

ELEVATION CORRECTION FACTOR CHILLER AIR TO WATER

ELEVATION [m]	COOLING CAPACITY CORRECTION FACTOR	ELECTRIC POWER CORRECTION FACTOR
0	1	1
600	0,987	1,010
1.200	0,973	1,020
1.800	0,958	1,030
2.400	0,943	1,040

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COMPLETE HYDRAULIC KIT

All the units can be provided with hydraulic kit with various configurations:

- -pump kit
- -double pump kit
- -UP modul complete of pump kit and storage
- -UP modul complete of double pump kit and storage

Kit pump: supplied with pump mounted inside the unit, with pump delivery connected to the evaporator inlet. (till size 170.1 the pump is supplied not mounted), circuit breaker and contactor.

The pump managing is provided by the microprocessor directly.

Kit double pump: supplied with n. 2 pumps mounted inside the unit, with pump delivery connected to the evaporator inlet. (not available till size 170.1). Supplied with check (non-return) valve on pump delivery, gate valves before and after every pump, circuit breaker and contactor on every pump.

The pump managing is determined by the microprocessor with time commutation (to balances operating hours).

or mounted on the UP unit

UP Pumping stations with water storage tank

Possibility of personalization for capacity and power, they are completed with water pump, storage tank, all hydraulic and electrical components.

Frame: Self-supporting galvanized steel sheet frame protected with polyester powder painting, to resist to the external agents. Steel screws and bolts.

Hydraulic components: centrifugal pump with stainless steel structure and single-phase electric motor or 2-pole three-phase, vertical water storage tank, safety valve, air vent valve and discharge faucet.

Electrical panel: composed of a general circuit breaker with door lock, automatic circuit breaker, remote control switch pump.

All wires and terminals are identified according to norm EN60204.

Pump: single-phase / three-phase centrifugal type available in 10 different models,

with mechanical seal for either pure water or mixtures with glycol greater than 30%.

Storage tank: vertical water storage with rigid polyurethane insulation with external aluminum covering.

VOLUME 300-500-800-1000-1500 litres.

Relief valve: it eliminates the air in the hydraulic circuit.

Security valve: it intervenes when the pressure in the hydraulic circuit reach an excessive value.

Discharge faucet

PUMP MODEL

		E	F	G	Н	1	L
ORION R-MC	Size	110	140	220-280	310-410	450	540-680
STORAGE TANK (liter)	min max	300 800	300 750	500 1500	500 1500	800 1500	1000 1500
Absorbed power	kW	1,50	2,20	3,00	4,00	7,50	11,00
Absorbed current	А	3,17	4,56	6,33	7,62	14,10	20,20
Electrical supply	V/Hz/ Ph			2	400- 50-	3+N+PE	
Hydraulic connections	⊗/DN	2"	2"1/2	80	100	150	150



Coolin	ıg Pe	erforn	nance	S							
Model	ta	2	.5	3	0	3	2	3	5	4	0
Plouei	tu	Pf	Pa	Pf	Pa	Pf	Pa	Pf	Pa	Pf	Pa
	5	117	27.7	110.9	30.5	108.3	31.6	104.7	33.4	98.2	36.5
	6	120.3	27.8	114	30.6	111.4	31.7	107.7	33.5	101.1	36.6
110.1	7	123.7	27.9	117.2	30.7	114.6	31.9	110.8	33.64	104	36.7
	9	126.7 129.8	28.1 28.3	120.1 123	30.9 31.2	117.5 120.3	32.1 32.3	113.5 116.2	33.9 34.2	106.5 109	37 37.3
	10	133	28.6	126	31.4	123.2	32.6	110.2	34.4	111.5	37.6
	5	147.8	34.4	140	37.6	136.7	39	131.7	41	122.7	44.4
	6	151.8	34.6	143.8	37.8	140.4	39.2	135.2	41.2	125.9	44.7
140.1	7	155.9	34.8	147.6	38	144.1	39.4	138.8	41.4	129.2	44.9
	9	159.6 163.4	35.1 35.5	150.9 154.4	38.4 38.7	147.3 150.6	39.7 40.1	141.8 144.8	41.8 42.2	131.9 134.6	45.3 45.7
	10	167.2	35.8	157.8	39.1	153.9	40.1	147.9	42.5	137.3	46.1
	5	220.2	54.3	209.6	59	205.5	61	199.6	64.1	189.5	69.6
	6	226.5	54.6	215.7	59.3	211.4	61.3	205.3	64.4	195	69.9
220.2	7	233	54.9	221.8	59.6	217.4	61.6	211.2	64.7	200.5	70.3
	9	238.9 244.9	55.3 55.8	227.3 232.9	60.1 60.7	222.9 228.4	62.2 62.7	216.4	65.4 66	205.4 210.3	70.9 71.6
	10	250.9	56.3	238.6	61.2	234	63.3	227.1	66.6	215.4	72.2
	5	296	68.8	282.3	74.9	276.8	77.5	268.8	81.5	254.9	88.3
	6	304.4	69.1	290.3	75.3	284.5	77.9	276.3	81.9	261.8	88.7
280.2	7	313	69.5	298.4	75.7	292.5	78.3	284	82.26	269	89.2
	9	320.9 328.9	70.1	305.7 313.1	76.4 77	299.6 306.9	79 79.7	290.8 297.6	83 83.7	275.2 281.5	89.9 90.8
	10	337	71.4	320.6	77.7	314.2	80.4	304.6	84.5	287.8	91.6
	5	317.9	74.9	303.2	81.7	297.3	84.5	292.7	89.1	273.7	96.4
	6	326.9	75.3	311.7	82.1	305.6	84.9	296.8	89.3	281.2	96.9
310.2	7	336.1	75.7	320.4	82.5	314.1	85.4	305	89.76	288.9	97.3
310.2	9	344.6 353.2	76.4 77.1	328.3 336.2	83.3 84	321.8 329.6	86.1 86.9	312.3 319.6	90.6	295.5 302.3	98.2 99.1
	10	361.9	77.8	344.3	84.8	337.5	87.7	327.1	92.2	309.1	100
	5	371.8	86.9	354.7	94.6	347.7	97.8	337.7	102.7	320.2	111.1
	6	382.4	87.4	364.7	95	357.5	98.2	347.2	103.1	329	111.6
360.3	7	393.2	87.8	374.8	95.5	367.4	98.7	356.8	103.64	337.9	112.2
	9	403.1 413.2	88.6 89.4	384 393.3	96.3 97.2	376.4 385.5	99.6 100.4	365.3 373.9	104.5 105.5	345.7 349.7	113.2 113.7
	10	423.3	90.1	402.7	98	394.8	101.3	382.6	106.4	361.6	115.2
-	5	425.2	97.3	405.5	105.3	397.5	108.8	385.3	114.3	365.4	124.3
	7	436.5	97.7	416.1	105.7	407.9	109.3	396	114.9	374.9	125
410.3	8	448 458.5	98.1 98.8	427 436.8	106.2 107.1	418.6 428.2	109.8 110.7	406.4 415.5	116.44 116.5	384.6 393	125.6 126.8
6043393000	9	469.1	99.5	446.7	108	437.9	111.7	424.7	117.5	401.6	128.1
	10	479.9	100.3	456.8	108.9	447.8	112.6	434.1	118.6	410.2	129.3
	5	477.1	108.7	455	117.7	446	121.7	432.9	128	410	139.3
	6	489.7	109.1	466.9	118.3	457.7	122.3	444.3	128.6	420.7	140
450.3	7 8	502.6 514.4	109.6 110.4	479.2 490.1	118.8 119.8	469.7 480.5	122.8 123.9	456 466.2	129.24 130.4	431.6 441	140.8 142.1
	9	526.4	111.2	501.3	120.8	491.4	125	476.6	131.6	450.6	143.5
	10	538.5	112.1	512.5	121.8	502.5	126.1	487.1	132.8	460.3	145
	5	557.8	128.5	532	139.9	521.6	144.7	506.6	152.1	480.3	164.7
F40 4	7	573.6 589.8	129.1 129.8	547 562.3	140.6 141.3	536.2 551.2	145.4 146.1	520.8 535.2	152.8 153.52	493.5 506.9	165.5 166.3
540.4	8	604.7	131	576	142.6	564.6	147.4	547.9	154.9	518.6	167.8
	9	619.7	132.1	590	143.8	578.3	148.7	560.8	156.3	530.4	169.3
	10	635	133.3	604.1	145.1	592.2	150.1	573.9	157.7	542.4	170.8
	5	609.5	139	581.3	151.5	569.9	156.7	553.5	164.7	524.8	178.6
F00 5	7	626.8 644.5	139.7 140.4	597.7 614.4	152.2 153	585.9 602.2	157.5 158.2	569 584.8	165.5 166.32	539.2 553.9	179.4 180.3
580.4	8	660.7	141.7	629.4	154.4	617	159.7	598.7	167.8	566.7	181.9
	9	677.2	143	644.6	155.7	631.9	161.1	612.8	169.3	579.6	183.5
	10	693.9	144.2	660.1	157.2	647	162.5	627.1	170.9	592.7	185.2
	5	663.7	154.3 155	632.9	166.9	620.4 636.7	172.5 173.3	602.3 618.2	181.2 182.1	570.3 585.2	197 198
coo -	7	681.3 699.3	155.6	649.6 666.6	167.7 168.4	653.4	173.3	634.4	182.1	600.4	198
630.5	8	715.7	156.7	681.9	169.8	668.4	175.6	648.6	184.6	613.6	201
	9	732.3	157.9	697.4	171.2	683.6	177.1	663	186.3	626.8	202.9
	10	749.2	159.1	713.1	172.7	699.1	178.6	677.6	188	640.3	204.9
	6	715.6	164.9	682.4 700.4	178.5 179.3	668.9 686.5	184.4 185.3	649.4 666.5	193.9	614.9	210.9
	7	734.6 753.9	165.6 166.3	718.7	180.1	704.5	186.2	684	194.8 195.8	631 647.4	212 213.1
680.5	8	771.6	167.5	735.2	181.6	720.7	187.8	699.3	197.6	661.5	215.2
	9	789.5	168.8	751.9	183.1	737.1	189.4	714.8	199.4	675.9	217.3

10 807.8

170

768.8

184.7

753.7 191.1

730.6

201.2

690.4

AIR COOLED WATER **CHILLERS**

ORION VR MC

ORION VR HT

ORION R MC

VEGA

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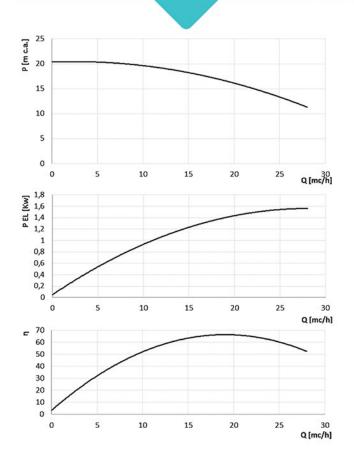
SIAL





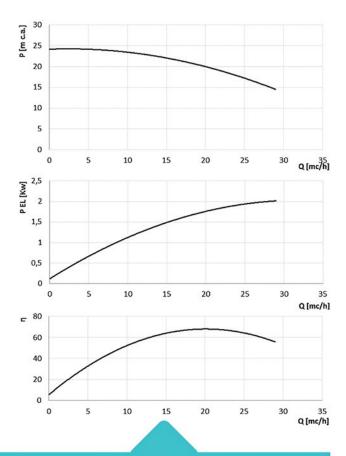
PRESSURE HEAD PUMP GRAPHIC

VERSION E



P (m c.a.)	Head (m.water column)
Q (mc/h)	Water flow
P EL (kW)	Absorbed power
η	Efficiency

P (m c.a.)	Head (m.water column)
Q (mc/h)	Water flow
P EL (kW)	Absorbed power
η	Efficiency



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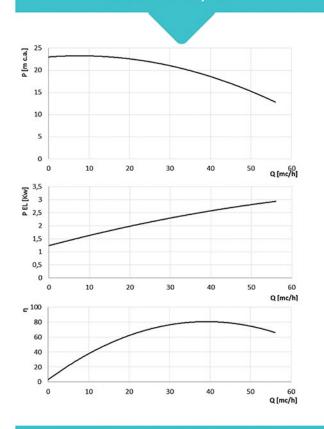
88

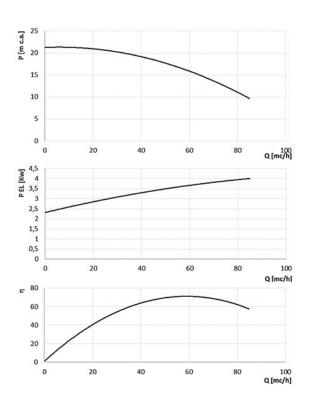
VERSION F



PRESSURE HEAD PUMP GRAPHIC

VERSION G / H





AIR COOLED WATER CHILLERS

ORION VR MC

ORION VR HT

ORION R

VEGA

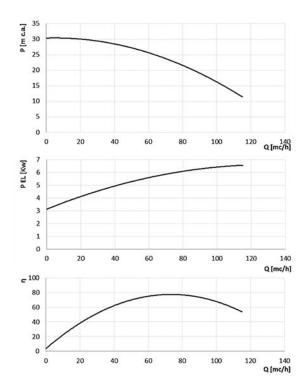
TAURUS

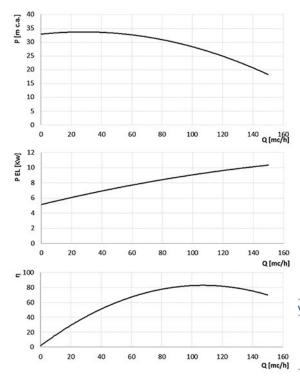
DRACO

ATMOS

SIAL

VERSION I / L

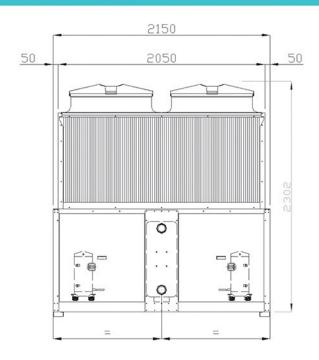


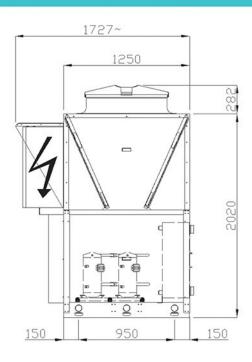




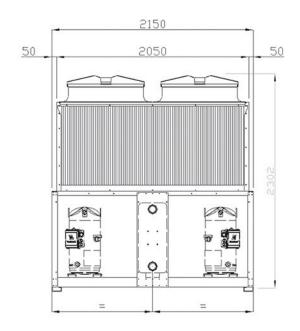
DIMENSIONAL DRAWING

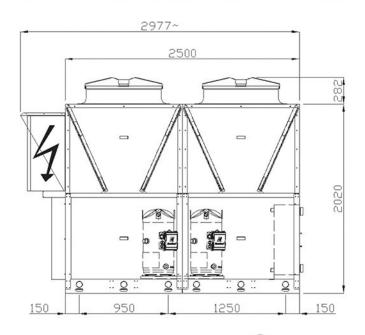
MODUL 1





MODUL 2

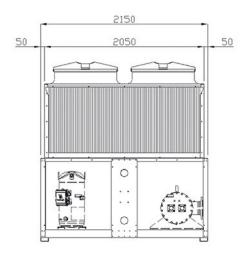


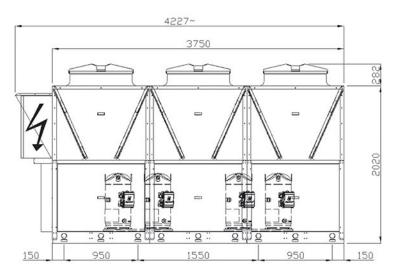




DIMENSIONAL DRAWING

MODUL 3





AIR COOLED WATER CHILLERS

ORION VR MC

ORION VR HT

ORION R

VEGA

TAURUS

DRACO

ATMOS

SIAL

MODUL 4

