CHILLERS, AIR AND WATER COOLED, FEATURING CENTRIFUGAL COMPRESSORS WITH MAGNETIC LEVITATION, FROM 200 TO 1618 KW

I-RES

FRIGOSYSTEM COREMA

RESULTING FROM FRIGOSYSTEM'S EXPERIENCE IN UTILIZING MAGNETIC LEVITATION TECHNOLOGY IN PROCESS COOLING INDUSTRIES, I-RES AIR AND WATER SOURCE CHILLERS ARE THE MOST EFFICIENT AND RELIABLE SOLUTION AVAILABLE IN THE MARKET TODAY

I-RES
THE MOST ADVANCED SOLUTION

ESEER 9.52 for I-RESW with all the advantages in terms of reliability and technical support, due to Frigosystem's unbeatable knowhow of this technology, for a truly ideal answer to the challenge of the most demanding applications:

UNBEATABLE EFFICIENCY AT PART LOAD
At partial load, I-RES units are far more efficient than traditional scroll/screw units, with ESEER values up to 60% higher. Running cost savings are evident and consistent, especially when all year round operation is required.

EXTREMELY SILENT OPERATION
Thanks to the adoption of the centrifugal compressor with magnetic levitation, and, in air source units, of fans with reduced noise emission, TECS sound power and pressure are the lowest on the market, without peaks in any of the sound frequency spectrum. Vibrations are dramatically reduced as well, with considerable advantages in terms of transmission to the building.

SIMPLIFIED LOGISTICS
Turbocor compressors feature an extremely advantageous capacity / weight ratio. The considerable weight reduction allows simplified site operations. Moreover, for water source units this goes together with reduced dimensions, thus enabling also a reduction of plantroom space.

LOW IN RUSH CURRENT
A further benefit is the very low inrush current, obtained thanks to the characteristics of the compressor and to the "inverter" starting. This is a crucial factor, as it allows a more favourable selection of the protection devices to be placed on the power supply between transformer and unit.

I-RES

AIR COOLED UNIT WITH MAGNETIC LEVITATION CENTRIFUGAL COMPRESSORS. FROM 220 TO 1.325 KW.

Units for outdoor installation characterized by an extremely compact lay-out.
The capacity range is now extended up to 1325 kW, featuring unbeatable efficiencies and noise levels.

AIR COOLED UNITS

I-RES UNITS ARE AVAILABLE IN 2 FUNCTIONS: BASE AND WITH DESUPERHEATER, FOR APPLICATIONS IN WHICH THERMAL ENERGY IS USED FOR AUXILIARY USES, AND IN 2 ACOUSTIC VERSIONS: SL-CA, SUPER LOW NOISE, CLASS A AND XL-CA, EXTRA LOW NOISE, CLASS A TO SATISFY EVEN THE MOST DEMANDING NOISE LEVEL TARGETS. HIGH EFFICIENCY VERSIONS SL-CA-E ARE AVAILABLE, FOR AN EVEN HIGHER EFFICIENCY THANKS TO THE ADOPTION OF EC FANS AND TO GENEROUS HEAT EXCHANGER SURFACES.

I-RES / SL-CA			0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE															
Cooling only (Gross Value)															
Cooling capacity	(1)	kW	233	258	346	442	509	574	650	742	848	903	977	1065	1183
Total power input	(1)	kW	70,5	81,1	110	138	161	174	208	225	269	286	310	336	374
EER	(1)		3,30	3,18	3,13	3,20	3,16	3,30	3,13	3,30	3,15	3,15	3,15	3,17	3,17
ESEER	(1)		4,77	4,87	4,72	5,07	5,17	5,09	5,04	5,16	5,12	5,13	5,09	5,06	5,14
Cooling only															
Cooling capacity	(1)	kW	232	257	345	441	507	572	648	740	846	901	975	1062	1180
EER	(1)		3,25	3,14	3,10	3,16	3,13	3,26	3,11	3,26	3,12	3,12	3,12	3,13	3,13
ESEER	(1)		4,61	4,73	4,57	4,88	4,97	4,87	4,89	4,97	4,92	4,90	4,90	4,85	4,92
Cooling energy class			A	A	A	A	A	A	A	A	A	A	A	A	A
EXCHANGERS															
Heat exchanger user side in refrigeration															
Water flow	(1)	m^3/h	40,1	44,4	59,5	76,1	87,6	98,8	112	128	146	156	168	183	204
Pressure drop	(1)	kPa	36,4	27,4	28,5	27,6	27,7	35,2	21,1	27,6	31,8	36,0	29,7	35,3	37,3
Compressors															
Compressors nr.		N°	1	1	1	2	2	2	2	2	3	3	3	4	4
No. Circuits		N°	1	1	1	1	1	1	1	1	2	2	2	2	2
Noise level															
Noise Pressure	(3)	dB(A)	56	56	58	58	58	59	59	59	60	60	60	61	61
Noise Power	(4)	dB(A)	88	88	90	90	90	91	92	92	93	93	93	94	94
Size and weight															
A	(5)	mm	3100	3100	4000	4900	4900	5800	7000	7000	8500	9700	10600	11200	11500
B	(5)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(5)	mm	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
Operating weight	(5)	kg	2320	2370	3050	4000	4240	4530	5800	6150	6940	7370	8150	8700	9020

Note:
1) Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C - **3)** Average sound pressure level, at 10 m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level - **4)** Sound power on the basis of measurements made in compliance with ISO 9614 - **5)** Unit in standard configuration/execution, without optional accessories.

I-RESW

WATER COOLED UNIT WITH MAGNETIC LEVITATION CENTRIFUGAL COMPRESSORS. FROM 220 TO 1.618 KW.

Units for indoor installation characterized by an extremely compact lay-out. The capacity range is now extended up to 1618 kW, featuring unbeatable efficiencies and noise levels.

WATER COOLED UNITS

I-RESW UNITS ARE AVAILABLE IN 2 VERSIONS: LC, LOW CONDENSING. FOR APPLICATIONS IN WHICH THE WATER COOLED UNIT IS COUPLED WITH MEDIUM TEMPERATURE EXTERNAL SOURCE, FOR EXAMPLE ADIABATIC DRY COOLER (ACE) OR COOLING TOWERS HC, HIGH CONDENSING. FOR APPLICATION IN WHICH THE UNIT IS EXPECTED TO WORK AT HIGH CONDENSING LEVELS, AS FOR EXAMPLE IN SOME CRITICAL DRY-COOLER INSTALLATIONS.

I-RESW / HC / H			0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE															
Cooling only (Gross Value)															
Cooling capacity	(1)	kW	241	293	359	405	497	588	716	811	881	1045	1213	1405	1618
Total power input	(1)	kW	46,0	57,0	69,2	78,9	94,8	114	139	158	171	203	237	269	316
EER	(1)		5,24	5,15	5,19	5,13	5,24	5,16	5,14	5,14	5,15	5,15	5,12	5,23	5,13
ESEER	(1)		8,70	8,83	8,84	8,95	9,08	9,16	9,04	9,21	9,13	8,96	9,12	9,16	9,20
Cooling only															
Cooling capacity	(1)	kW	240	292	358	404	496	586	714	809	879	1042	1210	1402	1615
EER	(1)		5,05	4,94	4,97	4,96	5,08	4,97	4,96	4,98	5,02	5,00	5,01	5,09	5,01
ESEER	(1)		7,72	7,64	7,59	7,82	7,94	7,80	7,75	8,04	8,12	7,88	8,22	8,18	8,32
Cooling energy class			A	B	B	B	A	B	B	B	B	B	B	A	B
EXCHANGERS															
Heat exchanger user side in refrigeration															
Water flow	(1)	m^3/h	41,5	50,5	61,8	69,7	85,6	101	123	140	152	180	209	242	279
Pressure drop	(1)	kPa	35,7	38,6	36,7	28,6	38,0	42,8	32,5	28,6	36,6	33,0	27,9	35,1	27,2
Water flow	(1)	m^3/h	49,2	60,1	73,4	83,0	102	120	147	166	180	214	249	287	332
Pressure drop	(1)	kPa	25,4	38,5	46,0	37,1	24,2	38,0	45,0	39,2	21,5	34,4	23,5	24,7	24,2
Compressors															
Compressors nr.		N°	1	1	1	1	2	2	2	2	3	3	3	4	4
No. Circuits		N°	1	1	1	1	1	1	1	1	2	2	2	2	2
Noise level															
Noise Pressure	(4)	dB(A)	73	75	74	76	76	77	76	78	77	77	78	78	79
Noise Power	(5)	dB(A)	91	93	92	94	94	95	94	96	96	96	97	97	98
Size and weight															
A	(6)	mm	2990	2990	2990	2990	3490	3490	3490	3490	4990	4990	4990	5450	5450
B	(6)	mm	950	950	950	950	1300	1300	1300	1300	1300	1300	1300	1300	1300
H	(6)	mm	1900	1900	1900	1900	1800	1800	1800	1800	1800	1800	1800	1990	1990
Operating weight	(6)	kg	1485	1485	1640	1810	2715	2695	3095	3245	3815	4500	4910	5400	6130

Note:

1) Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger water (in/out) 30°C/35°C - **4)** Average sound pressure level, at 1m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level. - **5)** Sound power on the basis of measurements made in compliance with ISO 9614 - **6)** Unit in standard configuration/execution, without optional accessories.

TECHNOLOGICAL CHOICES

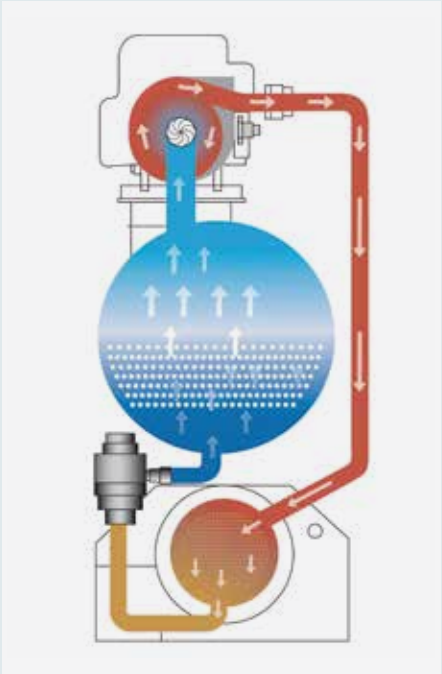
EFFICIENCY, SILENT OPERATION AND RELIABILITY. AND ALSO COMPACT DIMENSIONS AND REDUCED WEIGHT. THESE ARE THE MAIN FEATURES THAT MAKE I-RES UNITS THE BEST RESULT OF FRIGOSYSTEM'S KNOW-HOW. ADVANTAGES THAT RESULT FROM TECHNOLOGICAL CHOICES, INVOLVING EACH ASPECT OF THESE UNITS

CENTRIFUGAL COMPRESSOR WITH MAGNETIC LEVITATION

This is a miniaturized, highly innovative compressor, with magnetic levitation device and digital control of the rotor's speed. The efficiencies achieved are far superior to those with traditional volumetric compressors. Inverter controls with inlet guide vanes extend the compressor's operational limit: building requirements are precisely met, even at very low conditions. A solution that, besides the reduction of weight and dimensions with respect to traditional compressors, permits the compressor to operate completely without oil allowing an improvement of its performance, through the heat exchange process. Vibrations are virtually eliminated together with possible jolts due to inrush current in the start up phase: the unit's wear is minimized.

EC FANS

On I-RES units, the technology of EC electronic switching fans is introduced, as standard on SL-CA-E versions and optional on the other models. The superior energy efficiency of the DC brushless motor further improves the chiller's performance, that reaches the highest ESEER level in the market. More advantages are low inrush current and the ability to continuously modulate the rotational speed with an immediate gain in both silence and energy consumption.



FLOODED EVAPORATOR

The technology of flooded evaporator, further enhanced the absence of oil in the refrigerant circuits, realises a substantial increase of cooling capacity and an optimization in the compressor's operational mode. The unit's overall efficiency further increases thanks to:

- compression ratio reduction thanks to a smaller approach
- theoretic absence of refrigerant superheat at the compressor's suction stage
- minimization of refrigerant pressure drop on the evaporator's shell side
- optimization of the exchange surfaces, also at part loads, thanks to the complete control of the refrigerant level in all operating conditions.

To comply with the security requirements of the "F-gas Regulation" (CE 842//2006), factory calibrated leak detection systems are available upon request.

ELECTRONIC VALVE

The electronic valve is adopted to grant the ideal operation of the evaporator in all conditions. In the water cooled unit I-RESW, the complete flooding of tubes is granted with a sophisticated detection of the refrigerant level in the heat exchangers, while in the air cooled unit the control is made with a precise measurement of the subcooling in the condenser coil. The fast processing of the acquired data allow a quick, fluctuation-free regulation, and therefore a highly accurate adjustment to the swings of load and ambient conditions.

FRIGOSYSTEM S.r.l.
Via J.F. Kennedy, 240
21042 Caronno Pertusella - (Varese) Italy
Tel. +39 02 9658610 - Fax +39 02 9650723
info@frigosystem.it - www.frigosystem.it