

CRIO BS

7-1-1 PE ↔ 173-2-2 PE

R290

Refrigerant
R290 | GWP=3



Brazen plate
heat exchanger



Semi-hermetic
piston compressor



Axial fan



Cu/Al
condensing coils



SEPR

Air to water chillers for medium temperature applications

Standard efficiency



Solution

B - Base
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

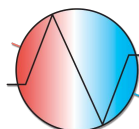
AS - Standard equipment
DS - Desuperheater
HR - Total modulating Heat Recovery

Cooling capacity 7 - 164 kW

Safety system	To ensure high-safety-level the unit is equipped with an ATEX certified gas detector and an EC centrifugal extraction fan . The sensor, with external dedicated power supply and Modbus output signal, has an alarm threshold set at 10% of the lower flammable limit (LFL). The Propane alarm causes the immediate shutdown of the machine and the centrifugal extraction fan is switched on, which allows the ventilation of the compressor compartment and the dilution of the R290 concentration to values below the lower flammability limit.
Structure	Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Basement and panels made of galvanized steel sheet, oven-painted with polyurethane powders. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. LN (Low Noise) version: the panels are internally lined with sound-absorbing material. SL (Super Low Noise) version: the panels are sandwich and insulated with rock wool.
Compressor	Reciprocating semi-hermetic type compressor equipped with: electronic control module and protection of the electric motor (installed inside the electrical panel); oil charge; oil level sight glass and oil crankcase heater; anti-vibration rubber supports; anti-vibration pipes (suction and discharge); suction and discharge valves. The compressor can be supplied with one or more RSH capacity control heads to guarantee an adaptation of the cooling capacity in case of thermal load's reduction: please see the list of accessories for further information.
EC Fan	Premium-Axial-Fans with bionic shaped blades and high-efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP54 and thermal class THCL 155. The motor efficiency class complies with IE4.
Air heat exchanger	Finned coil made with copper pipes arranged on staggered rows, mechanically expanded inside a pack of aluminium fins offering a high exchange surface area.
Water heat exchanger	Brazen plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure switch, air vent valve and thermally insulated with closed-cell neoprene anti-condensate material. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.
Electrical board	Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components: - Main isolator switch - Door interlock safety device - Contactor and protection for compressor and fans - Cabinet minimum protection rating IP54. To ensure higher level of security, the cabinet is outside the machine and positioned on one side of the unit. The propane sensor is equipped with separate power supply: this power supply must always be guaranteed in order to ensure the monitoring of any leakage.
Control	The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.
Refrigerant circuit	Filter drier, moisture-liquid sight glass, electronic expansion valve, high & low pressure gauge, high and low pressure transducers, high pressure switch, safety high pressure valve (when required by EN 378-2016 standard).
Water circuit (Integrata)	Base version: as interface to the plant, includes the water fittings of the evaporator only. Integrated version: Water storage tank, water pressure gauge, safety valve, water discharge valve, centrifugal pump(s) suitable for glycol solutions up to 40%, manual by-pass valve, manual air venting valve. The pump control equipment is fitted inside the electrical board of the unit and the microprocessor control manages the pump starting, timing and all the safety devices of the whole system.

ACCESSORI PRINCIPALI

- Anti-vibration rubber/spring mounts
- Air heat exchanger protection panel or filter
- Air heat exchanger with various coatings treatment
- Low pressure switch
- Low pressure safety valve
- Double safety valve
- Overpressure valve / automatic by-pass
- Double water pump (stand-by) - Standard/ High pressure
- Open / Closed expansion vessel with automatic filling unit
- RSH Capacity Control head / Inverter driven compressor
- Advanced control c.pCo



JNC

J. Negre C., S.L.

Soluciones desde 1991

CRIO BS

Technical data

CRIO BS R290 range		7-1-1 PE	9-1-1 PE	12-1-1 PE	17-1-1 PE	19-1-1 PE
COOLING - A BP/ST/AS/EC/*S version						
Cooling capacity ⁽¹⁾	[kW]	6,70	8,16	11,0	16,3	19,0
Total power input ⁽¹⁾	[kW]	4,05	4,50	6,52	8,37	10,0
EER - Energy Efficiency Ratio	-	1,65	1,81	1,69	1,95	1,90
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	3,4	5,4	6,0	10,2	11,3
"Ecodesign" compliance for process application (SEPR)	-	2,86	3,05	2,70	3,34	3,22

REFRIGERANT CIRCUIT						
Refrigerant	-	R290				
GWP	-	3				
Charge of refrigerant - Base unit	[kg]	0,9	1,4	1,6	2,6	2,9
Independent gas circuits	[n°]	1				
Compressors type	-	Semi-hermetic pistons				
Compressors quantity	[n°]	1				
Steps of capacity for each compressor (std)	-	1 (50%)	1 (75%); 2 (50%)			
Condensing coils type	-	Cu/Al				
Fans type	-	Axial EC				
Fans quantity	[n°]	1				
Fans power input ⁽¹⁾ (total)	[kW]	0,50	0,50	0,50	0,81	0,81
Total air flow	[m ³ /h]	4.300	6.300	6.300	12.500	12.500
Expansion valve type	-	Electronic				
Evaporator water flow ⁽¹⁾	[m ³ /h]	1,65	2,00	2,71	4,01	4,65
User circuit pressure drop ⁽¹⁾	[kPa]	28,1	20,2	20,6	27,4	26,5

DESUPERHEATER (option) - A BP/ST/DS/EC/*S						
Heating capacity ⁽²⁾	[kW]	1,79	1,99	3,07	3,53	4,35
Water flow	[m ³ /h]	0,31	0,35	0,54	0,61	0,76
User circuit pressure drop	[kPa]	2,3	2,7	2,5	2,2	2,6

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S						
Heating capacity ⁽²⁾	[kW]	10,50	12,40	17,70	24,20	28,90
Water flow	[m ³ /h]	1,82	2,16	3,06	4,18	5,00
User circuit pressure drop	[kPa]	19,5	13,9	24,3	27,2	27,1

Electrical data						
Power supply	-	400/3/50				
Emergency power supply	-	230/1/50				
Maximum power input without pump	[kW]	7,00	8,70	12,5	14,1	16,6
Locked rotor current – LRA without pump	[A]	52,9	64,1	88,3	104	119
Maximum absorbed current - FLA without pump	[A]	12,7	14,8	21,6	23,5	30,6

HYDRONIC KIT (option)						
Buffer tank capacity	[L]	30	30	30	60	60
Pump type	-	Centrifugal				

Standard pump - 150 kPa useful head						
Motor Efficiency	-	-	-	-	-	-
Pump motor nominal power	[kW]	0,37	0,37	0,37	0,55	0,55
Pump motor nominal current	[A]	1,4	1,4	1,4	1,9	1,9

Standard pump - 250 kPa useful head						
Motor Efficiency	-	-	-	IE3	IE3	IE3
Pump motor nominal power	[kW]	0,55	0,55	0,75	0,9	0,9
Pump motor nominal current	[A]	2	2	1,9	2,5	2,5

Water connections						
Dimension (nominal external diameter)	[inch/DN]	1/2" (DN15)	1/2" (DN15)	1" (DN 25)	1" (DN 25)	1" (DN 25)

Noise levels ⁽³⁾						
Total sound power (ST version)	[db(A)]	82	79	79	82	83
Total sound pressure (ST version) - at 1 m distance	[db(A)]	67	63	63	65	66
Total sound pressure (ST version) - at 10 m distance	[db(A)]	51	48	48	51	52
Total sound power (LN version)	[db(A)]	79	76	76	79	80
Total sound pressure (LN version) - at 1 m distance	[db(A)]	64	60	60	62	63
Total sound pressure (LN version) - at 10 m distance	[db(A)]	48	45	45	48	49
Total sound power (SL version)	[db(A)]	77	74	74	77	78
Total sound pressure (SL version) - at 1 m distance	[db(A)]	62	58	58	60	61
Total sound pressure (SL version) - at 10 m distance	[db(A)]	46	43	43	46	47

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO BS

Technical data

CRIO BS R290 range		23-1-1 PE	28-1-1 PE	33-1-1 PE	39-1-1 PE	48-1-1 PE
COOLING - A BP/ST/AS/EC/*S version						
Cooling capacity ⁽¹⁾	[kW]	21,1	25,7	29,7	36,7	47,2
Total power input ⁽¹⁾	[kW]	10,5	13,4	16,6	19,0	24,9
EER - Energy Efficiency Ratio	-	2,01	1,92	1,79	1,93	1,90
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	13,3	14,2	17,7	19,9	25,3
"Ecodesign" compliance for process application (SEPR)	-	3,07	3,04	2,90	3,06	3,35

REFRIGERANT CIRCUIT						
Refrigerant	-	R290				
GWP	-	3				
Charge of refrigerant - Base unit	[kg]	3,5	3,7	4,6	5,2	6,6
Independent gas circuits	[n°]	1				
Compressors type	-	Semi-hermetic pistons				
Compressors quantity	[n°]	1				
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)			1 (83%); 2 (67%); 3 (50%)	
Condensing coils type	-	Cu/Al				
Fans type	-	Axial EC				
Fans quantity	[n°]	1			2	
Fans power input ⁽¹⁾ (total)	[kW]	0,84	0,84	1,70	1,70	4,23
Total air flow	[m ³ /h]	11.800	11.800	23.500	23.500	40.400
Expansion valve type	-	Electronic				
Evaporator water flow ⁽¹⁾	[m ³ /h]	5,18	6,30	7,28	8,98	11,6
User circuit pressure drop ⁽¹⁾	[kPa]	24,6	27,6	29,4	21,8	27,0

DESUPERHEATER (option) - A BP/ST/DS/EC/*S						
Heating capacity ⁽²⁾	[kW]	4,35	5,94	6,92	7,94	8,73
Water flow	[m ³ /h]	0,75	1,03	1,20	1,39	1,51
User circuit pressure drop	[kPa]	2,5	2,4	2,8	2,7	2,5

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S						
Heating capacity ⁽²⁾	[kW]	30,7	39,3	45,7	55,2	68,3
Water flow	[m ³ /h]	5,32	6,81	7,92	9,55	11,8
User circuit pressure drop	[kPa]	23,7	30,1	33,7	41,5	29,9

Electrical data						
Power supply	-	400/3/50				
Emergency power supply	-	230/1/50				
Maximum power input without pump	[kW]	19,1	21,4	27,5	34,1	42,6
Locked rotor current – LRA without pump	[A]	138	205	228	243	282
Maximum absorbed current - FLA without pump	[A]	37,8	38,8	47,8	57,7	70,3

HYDRONIC KIT (option)						
Buffer tank capacity	[L]	60	60	160	160	290
Pump type	-	Centrifugal				

Standard pump - 150 kPa useful head						
Motor Efficiency	-	-	IE3			
Pump motor nominal power	[kW]	0,55	0,9	0,9	0,9	1,1
Pump motor nominal current	[A]	1,9	2,5	2,5	2,5	3,3

Standard pump - 250 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	1,5	1,5	1,5	1,5	2,2
Pump motor nominal current	[A]	4,1	4,1	4,1	4,1	4,7

Water connections						
Dimension (nominal external diameter)	[inch/DN]	1" (DN 25)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)

Noise levels ⁽³⁾						
Total sound power (ST version)	[db(A)]	84	84	87	88	87
Total sound pressure (ST version) - at 1 m distance	[db(A)]	67	67	70	71	69
Total sound pressure (ST version) - at 10 m distance	[db(A)]	53	53	56	57	56
Total sound power (LN version)	[db(A)]	81	81	84	85	84
Total sound pressure (LN version) - at 1 m distance	[db(A)]	64	64	67	68	66
Total sound pressure (LN version) - at 10 m distance	[db(A)]	50	50	53	54	53
Total sound power (SL version)	[db(A)]	79	79	82	83	82
Total sound pressure (SL version) - at 1 m distance	[db(A)]	62	62	65	66	64
Total sound pressure (SL version) - at 10 m distance	[db(A)]	48	48	51	52	51

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO BS

Technical data

CRIO BS R290 range		55-1-1 PE	38-2-2 PE	49-2-2 PE	58-2-2 PE
COOLING - A BP/ST/AS/EC/*S version					
Cooling capacity ⁽¹⁾	[kW]	53,9	35,5	47,4	52,7
Total power input ⁽¹⁾	[kW]	29,7	20,4	24,8	29,2
EER - Energy Efficiency Ratio	-	1,81	1,74	1,91	1,80
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	26,1	20,4	26,3	28,3
"Ecodesign" compliance for process application (SEPR)	-	3,19	3,00	3,49	3,16

REFRIGERANT CIRCUIT					
Refrigerant	-	R290			
GWP	-	3			
Charge of refrigerant - Base unit	[kg]	6,8	5,3	6,8	7,4
Independent gas circuits	[n°]	1	2		
Compressors type	-	Semi-hermetic pistons			
Compressors quantity	[n°]	1	2		
Steps of capacity for each compressor (std)	-	1 (83%); 2 (67%); 3 (50%)	1 (75%); 2 (50%)		
Condensing coils type	-	Cu/Al			
Fans type	-	Axial Ec			
Fans quantity	[n°]	2			
Fans power input ⁽³⁾ (total)	[kW]	2,97	1,67	4,26	4,25
Total air flow	[m ³ /h]	40.400	24.100	39.900	39.900
Expansion valve type	-	Electronic			
Evaporator water flow ⁽¹⁾	[m ³ /h]	13,2	8,69	11,6	12,9
User circuit pressure drop ⁽¹⁾	[kPa]	28,0	26,8	28,3	23,6

DESUPERHEATER (option) - A BP/ST/DS/EC/*S					
Heating capacity ⁽²⁾	[kW]	11,6	9,53	8,62	11,3
Water flow	[m ³ /h]	2,02	1,64	1,50	1,97
User circuit pressure drop	[kPa]	2,7	4,0	4,2	4,9

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S					
Heating capacity ⁽²⁾	[kW]	80,5	56,8	68,4	79,0
Water flow	[m ³ /h]	14,0	9,84	11,8	13,7
User circuit pressure drop	[kPa]	31	22,9	30,5	37,9

Electrical data					
Power supply	-	400/3/50			
Emergency power supply	-	230/1/50			
Maximum power input without pump	[kW]	50,2	33,1	38,6	46,4
Locked rotor current – LRA without pump	[A]	331	150	220	249
Maximum absorbed current - FLA without pump	[A]	83,9	61,2	69,7	83,1

HYDRONIC KIT (option)					
Buffer tank capacity	[L]	290	160	160	160
Pump type	-	Centrifugal			

Standard pump - 150 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	1,1	0,9	1,1	1,1
Pump motor nominal current	[A]	3,3	2,5	3,3	3,3

Standard pump - 250 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	2,2	1,5	2,2	2,2
Pump motor nominal current	[A]	4,7	4,1	4,7	4,7

Water connections					
Dimension (nominal external diameter)	[inch/DN]	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	2" (DN 50)

Noise levels ⁽³⁾					
Total sound power (ST version)	[db(A)]	87	87	86	86
Total sound pressure (ST version) - at 1 m distance	[db(A)]	69	70	69	69
Total sound pressure (ST version) - at 10 m distance	[db(A)]	56	56	56	56
Total sound power (LN version)	[db(A)]	84	84	83	83
Total sound pressure (LN version) - at 1 m distance	[db(A)]	66	67	66	66
Total sound pressure (LN version) - at 10 m distance	[db(A)]	53	53	53	53
Total sound power (SL version)	[db(A)]	82	82	81	81
Total sound pressure (SL version) - at 1 m distance	[db(A)]	64	65	64	64
Total sound pressure (SL version) - at 10 m distance	[db(A)]	51	51	51	51

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROKLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO BS

Technical data

CRIO BS R290 range		68-2-2 PE	79-2-2 PE	95-2-2 PE	108-2-2 PE
COOLING - A BP/ST/AS/EC/*S version					
Cooling capacity ⁽¹⁾	[kW]	61,8	74,6	93,1	106
Total power input ⁽¹⁾	[kW]	34,1	41,1	48,7	58,8
EER - Energy Efficiency Ratio	-	1,81	1,82	1,91	1,80
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	36,3	38,1	47,8	49,6
"Ecodesign" compliance for process application (SEPR)	-	2,92	3,12	3,21	3,03

REFRIGERANT CIRCUIT					
Refrigerant	-	R290			
GWP	-	3			
Charge of refrigerant - Base unit	[kg]	9,4	9,9	12,4	12,9
Independent gas circuits	[n°]	2			
Compressors type	-	Semi-hermetic pistons			
Compressors quantity	[n°]	2			
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)	1 (83%); 2 (67%); 3 (50%)		
Condensing coils type	-	Cu/Al			
Fans type	-	Axial Ec			
Fans quantity	[n°]	2	3		
Fans power input ⁽³⁾ (total)	[kW]	4,38	6,41	6,62	6,59
Total air flow	[m ³ /h]	37.400	59.400	55.300	55.300
Expansion valve type	-	Electronic			
Evaporator water flow ⁽¹⁾	[m ³ /h]	15,1	18,3	22,8	25,9
User circuit pressure drop ⁽¹⁾	[kPa]	24,5	32,7	38,5	40,0

DESUPERHEATER (option) - A BP/ST/DS/EC/*S					
Heating capacity ⁽²⁾	[kW]	13,6	15,5	18,6	24,8
Water flow	[m ³ /h]	2,36	2,68	3,20	4,31
User circuit pressure drop	[kPa]	5,7	4,6	4,7	4,9

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S					
Heating capacity ⁽²⁾	[kW]	92,7	111	137	161
Water flow	[m ³ /h]	16,1	19,2	23,7	27,9
User circuit pressure drop	[kPa]	32,8	31,3	36,5	39,7

Electrical data					
Power supply	-	400/3/50			
Emergency power supply	-	230/1/50			
Maximum power input without pump	[kW]	56,4	72,6	82,2	97,4
Locked rotor current – LRA without pump	[A]	278	307	348	410
Maximum absorbed current - FLA without pump	[A]	97,3	122	136	163

HYDRONIC KIT (option)					
Buffer tank capacity	[L]	160	290	290	290
Pump type	-	Centrifugal			

Standard pump - 150 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	2,2	2,2	2,2	2,2
Pump motor nominal current	[A]	4,7	4,7	4,7	4,7

Standard pump - 250 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	2,2	3	3	4
Pump motor nominal current	[A]	4,7	6,4	6,4	8,7

Water connections					
Dimension (nominal external diameter)	[inch/DN]	2" (DN 50)	2" (DN 50)	2"1/2 (DN 65)	2"1/2 (DN 65)

Noise levels ⁽³⁾					
Total sound power (ST version)	[db(A)]	88	89	91	91
Total sound pressure (ST version) - at 1 m distance	[db(A)]	70	71	73	73
Total sound pressure (ST version) - at 10 m distance	[db(A)]	57	57	59	59
Total sound power (LN version)	[db(A)]	85	86	88	88
Total sound pressure (LN version) - at 1 m distance	[db(A)]	67	68	70	70
Total sound pressure (LN version) - at 10 m distance	[db(A)]	54	54	56	56
Total sound power (SL version)	[db(A)]	83	84	86	86
Total sound pressure (SL version) - at 1 m distance	[db(A)]	65	66	68	68
Total sound pressure (SL version) - at 10 m distance	[db(A)]	52	52	54	54

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROKLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO BS

Technical data

CRIO BS R290 range		126-2-2 PE	137-2-2 PE	157-2-2 PE	173-2-2 PE
COOLING - A BP/ST/AS/EC/*S version					
Cooling capacity ⁽¹⁾	[kW]	119	127	153	164
Total power input ⁽¹⁾	[kW]	62,30	68,00	77,10	82,10
EER - Energy Efficiency Ratio	-	1,91	1,87	1,98	2,00
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	70,8	73,5	98,2	102
"Ecodesign" compliance for process application (SEPR)	-	3,17	3,07	3,19	3,26

REFRIGERANT CIRCUIT					
Refrigerant	-	R290			
GWP	-	3			
Charge of refrigerant - Base unit	[kg]	18,4	19,1	25,5	26,5
Independent gas circuits	[n°]	2			
Compressors type	-	Semi-hermetic pistons			
Compressors quantity	[n°]	2			
Steps of capacity for each compressor (std)	-	2 (75%); 3 (62,5%); 4 (50%)			
Condensing coils type	-	Cu/Al			
Fans type	-	Axial EC			
Fans quantity	[n°]	3			4
Fans power input ⁽³⁾ (total)	[kW]	5,8	5,79	7,91	7,9
Total air flow	[m ³ /h]	68.300	68.300	88.600	88.600
Expansion valve type	-	Electronic			
Evaporator water flow ⁽¹⁾	[m ³ /h]	29,1	31,2	37,5	40,2
User circuit pressure drop ⁽¹⁾	[kPa]	41,8	41,7	42,6	37,2

DESUPERHEATER (option) - A BP/ST/DS/EC/*S					
Heating capacity ⁽²⁾	[kW]	26,7	29,7	31,6	34,2
Water flow	[m ³ /h]	4,58	5,16	5,52	5,99
User circuit pressure drop	[kPa]	4,2	4,4	12,4	12,7

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S					
Heating capacity ⁽²⁾	[kW]	177	193	220	237
Water flow	[m ³ /h]	30,7	33,5	38,1	41,0
User circuit pressure drop	[kPa]	40,0	46,0	50,7	52,1

Electrical data					
Power supply	-	400/3/50			
Emergency power supply	-	230/1/50			
Maximum power input without pump	[kW]	92,0	111	114	119
Locked rotor current – LRA without pump	[A]	386	468	559	661
Maximum absorbed current - FLA without pump	[A]	161	189	189	207

HYDRONIC KIT (option)					
Buffer tank capacity	[L]	500	500	470	470
Pump type	-	Centrifugal			

Standard pump - 150 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	3	3	3	3
Pump motor nominal current	[A]	6,4	6,4	6,4	6,4

Standard pump - 250 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	4	4	5,5	5,5
Pump motor nominal current	[A]	8,7	8,7	10,6	10,6

Water connections					
Dimension (nominal external diameter)	[inch/DN]	3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)

Noise levels ⁽³⁾					
Total sound power (ST version)	[dB(A)]	90	94	95	95
Total sound pressure (ST version) - at 1 m distance	[dB(A)]	71	75	76	76
Total sound pressure (ST version) - at 10 m distance	[dB(A)]	58	62	63	63
Total sound power (LN version)	[dB(A)]	87	91	92	92
Total sound pressure (LN version) - at 1 m distance	[dB(A)]	68	72	73	73
Total sound pressure (LN version) - at 10 m distance	[dB(A)]	55	59	60	60
Total sound power (SL version)	[dB(A)]	85	89	90	90
Total sound pressure (SL version) - at 1 m distance	[dB(A)]	66	70	71	71
Total sound pressure (SL version) - at 10 m distance	[dB(A)]	53	57	58	58

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROKLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO BS

158-2-2 PV ↔ 182-2-2 PV



Refrigerant
R290 | GWP=3



Brazen plate
heat exchanger



Semi-hermetic
piston compressor



Axial fan



Microchannel
condensing coils



Air to water chillers for medium temperature applications
Standard efficiency



Solution

B - Base
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

AS - Standard equipment
DS - Desuperheater
HR - Total modulating Heat Recovery

Cooling capacity 156 - 174 kW

Safety system

To ensure high-safety-level the unit is equipped with an **ATEX certified gas detector** and an **EC centrifugal extraction fan**. The sensor, with external dedicated power supply and Modbus output signal, has an alarm threshold set at 10% of the lower flammable limit (LFL). The Propane alarm causes the immediate shutdown of the machine and the centrifugal extraction fan is switched on, which allows the ventilation of the compressor compartment and the dilution of the R290 concentration to values below the lower flammability limit.

Structure

Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Basement and panels made of galvanized steel sheet, oven-painted with polyurethane powders. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. LN (Low Noise) version: the panels are internally lined with sound-absorbing material. SL (Super Low Noise) version: the panels are sandwich and insulated with rock wool.

Compressor

Reciprocating semi-hermetic type compressor equipped with: electronic control module and protection of the electric motor (installed inside the electrical panel); oil charge; oil level sight glass and oil crankcase heater; anti-vibration rubber supports; anti-vibration pipes (suction and discharge); suction and discharge valves. The compressor can be supplied with one or more RSH capacity control heads to guarantee an adaptation of the cooling capacity in case of thermal load's reduction: please see the list of accessories for further information.

EC Fan

Premium-Axial-Fans with bionic shaped blades and high-efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP54 and thermal class THCL 155. The motor efficiency class complies with IE4.

Air heat exchanger

Microchannel technology increases the primary to secondary surface area ratio and reduces the tube's air shadow to provide maximum heat exchange through our condensers.

Water heat exchanger

Brazen plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure switch, air vent valve and thermally insulated with closed-cell neoprene anti-condensate material. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.

Electrical board

Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components: - Main isolator switch - Door interlock safety device - Contactor and protection for compressor and fans - Cabinet minimum protection rating IP54.

To ensure higher level of security, the cabinet is outside the machine and positioned on one side of the unit. The propane sensor is equipped with separate power supply: this power supply must always be guaranteed in order to ensure the monitoring of any leakage.

Control

The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.

Refrigerant circuit

Filter drier, moisture-liquid sight glass, electronic expansion valve, high & low pressure gauge, high and low pressure transducers, high pressure switch, safety high pressure valve (when required by EN 378-2016 standard).

Water circuit

(Integrata)

Base version: as interface to the plant, includes the water fittings of the evaporator only.

Integrated version: Water storage tank, water pressure gauge, safety valve, water discharge valve, centrifugal pump(s) suitable for glycol solutions up to 40%, manual by-pass valve, manual air venting valve. The pump control equipment is fitted inside the electrical board of the unit and the microprocessor control manages the pump starting, timing and all the safety devices of the whole system.

ACCESSORI PRINCIPALI

- Anti-vibration rubber/spring mounts
- Air heat exchanger protection panel or filter
- Air heat exchanger with various coatings treatment
- Low pressure switch
- Low pressure safety valve
- Double safety valve
- Overpressure valve / automatic by-pass
- Double water pump (stand-by) - Standard/ High pressure
- Open / Closed expansion vessel with automatic filling unit
- RSH Capacity Control head / Inverter driven compressor
- Advanced control c.pCo

CRIO BS

Technical data

CRIO BS R290 range		158-2-2 PV	174-2-2 PV	182-2-2 PV
COOLING - A BP/ST/AS/EC/*S version				
Cooling capacity ⁽¹⁾	[kW]	156	167	174
Total power input ⁽¹⁾	[kW]	76,7	81,3	90,4
EER - Energy Efficiency Ratio	-	2,03	2,05	1,92
Saved CO2 equivalent Ton (*)	[CO2 Ton]	64,6	69,5	69,5
"Ecodesign" compliance for process application (SEPR)	-	3,19	3,26	2,97

REFRIGERANT CIRCUIT				
Refrigerant	-	R290		
GWP	-	3		
Charge of refrigerant - Base unit	[kg]	16,8	18,1	18,1
Independent gas circuits	[n°]	2		
Compressors type	-	Semi-hermetic pistons		
Compressors quantity	[n°]	2		
Steps of capacity for each compressor (std)	-	2 (75%); 3 (62,5%); 4 (50%)		
Condensing coils type	-	Microchannel		
Fans type	-	Axial EC		
Fans quantity	[n°]	4		
Fans power input ⁽¹⁾ (total)	[kW]	7,74	7,69	7,68
Total air flow	[m ³ /h]	91.100	91.600	91.600
Expansion valve type	-	Electronic		
Evaporator water flow ⁽¹⁾	[m ³ /h]	38,1	40,9	42,5
User circuit pressure drop ⁽¹⁾	[kPa]	43,6	38,3	40,5

DESUPERHEATER (option) - A BP/ST/DS/EC/*S				
Heating capacity ⁽²⁾	[kW]	31,0	33,2	39,5
Water flow	[m ³ /h]	5,37	5,78	6,87
User circuit pressure drop	[kPa]	11,9	12,1	14,9

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S				
Heating capacity ⁽²⁾	[kW]	220	236	254
Water flow	[m ³ /h]	38,1	40,9	44,1
User circuit pressure drop	[kPa]	50,7	51,9	39,8

Electrical data				
Power supply	-	400/3/50		
Emergency power supply	-	230/1/50		
Maximum power input without pump	[kW]	114	119	127
Locked rotor current - LRA without pump	[A]	559	661	704
Maximum absorbed current - FLA without pump	[A]	189	207	222

HYDRONIC KIT (option)				
Buffer tank capacity	[L]	290	290	290
Pump type	-	Centrifugal		

Standard pump - 150 kPa useful head				
Motor Efficiency	-	IE3		
Pump motor nominal power	[kW]	3	3	3
Pump motor nominal current	[A]	6,4	6,4	6,4

Standard pump - 250 kPa useful head				
Motor Efficiency	-	IE3		
Pump motor nominal power	[kW]	5,5	5,5	5,5
Pump motor nominal current	[A]	10,6	10,6	10,6

Water connections				
Dimension (nominal external diameter)	[inch/DN]	3" (DN 80)	3" (DN 80)	3" (DN 80)

Noise levels ⁽³⁾				
Total sound power (ST version)	[db(A)]	95	95	97
Total sound pressure (ST version) - at 1 m distance	[db(A)]	76	76	78
Total sound pressure (ST version) - at 10 m distance	[db(A)]	63	63	65
Total sound power (LN version)	[db(A)]	92	92	94
Total sound pressure (LN version) - at 1 m distance	[db(A)]	73	73	75
Total sound pressure (LN version) - at 10 m distance	[db(A)]	60	60	62
Total sound power (SL version)	[db(A)]	90	90	92
Total sound pressure (SL version) - at 1 m distance	[db(A)]	71	71	73
Total sound pressure (SL version) - at 10 m distance	[db(A)]	58	58	60

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO BS

Dimensions and weights

CRIO BS R290 range		7-1-1 PE	9-1-1 PE	12-1-1 PE	17-1-1 PE	19-1-1 PE	23-1-1 PE
DIMENSIONS AND WEIGHTS - Standard unit							
Lenght	[mm]	1230	1380	1380	1680	1680	1680
Width	[mm]	685	835	835	1025	1025	1025
Height (ST - LN)	[mm]	1405	1820	1820	2121	2121	2121
Height (SL)	[mm]	-	-	-	2208	2208	2208
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	190	300	300	410	420	440
Operating weight (A BP/ST/AS/EC/** version)	[kg]	195	305	305	415	425	445

DIMENSIONS - Large unit							
Lenght	[mm]	1730	1980	1980	2330	2330	2330
Width	[mm]	685	835	835	1025	1025	1025
Height (ST - LN)	[mm]	1405	1820	1820	2221	2221	2221
Height (SL)	[mm]	-	-	-	2308	2308	2308

Unit dimensions with hydronic kit							
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Large	Large	Large	Large	Large	Large
Integrata LP 1-1 OO	-	Large	Large	Large	Large	Large	Large
Integrata LP 1-1 OO and HR equipment	-	Large	Large	Large	Large	Large	Large
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Large	Large	Large	Large	Large	Large
Integrata MP 1-1 OO	-	Large	Large	Large	Large	Large	Large
Integrata MP 1-1 OO and HR equipment	-	Large	Large	Large	Large	Large	Large
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Large	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Large	Large	Large	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Large	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Large	Large	Large	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Large	Large	Large	Large	Large	Large

CRIO BS R290 range		28-1-1 PE	33-1-1 PE	39-1-1 PE	48-1-1 PE	55-1-1 PE	38-2-2 PE
DIMENSIONS AND WEIGHTS - Standard unit							
Lenght	[mm]	1680	2330	2330	2980	2980	2330
Width	[mm]	1025	1025	1025	1025	1025	1025
Height (ST - LN)	[mm]	2121	2221	2221	2300	2300	2221
Height (SL)	[mm]	2208	2308	2308	2360	2360	2308
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	510	660	630	830	840	700
Operating weight (A BP/ST/AS/EC/** version)	[kg]	515	665	635	837	847	705

DIMENSIONS - Large unit							
Lenght	[mm]	2330	2980	2980	3920	3920	2980
Width	[mm]	1025	1025	1025	1025	1025	1025
Height (ST - LN)	[mm]	2221	2221	2221	2360	2360	2221
Height (SL)	[mm]	2308	2308	2308	2420	2420	2308

Unit dimensions with hydronic kit							
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Large	Large	Large	Standard	Standard	Large
Integrata LP 1-1 OO	-	Large	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-1 OO and HR equipment	-	Large	Large	Large	Large	Large	Large
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Large	Large	Large	Standard	Standard	Large
Integrata MP 1-1 OO	-	Large	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-1 OO and HR equipment	-	Large	Large	Large	Large	Large	Large
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Large	Standard	Standard	Standard	Standard	Standard

CRIO BS

Dimensions and weights

CRIO BS R290 range		49-2-2 PE	58-2-2 PE	68-2-2 PE	79-2-2 PE	95-2-2 PE	108-2-2 PE
DIMENSIONS AND WEIGHTS - Standard unit							
Lenght	[mm]	2980	2980	2980	3920	3920	3920
Width	[mm]	1025	1025	1025	1025	1025	1025
Height (ST - LN)	[mm]	2300	2300	2300	2360	2360	2360
Height (SL)	[mm]	2360	2360	2360	2420	2420	2420
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	940	970	1000	1200	1260	1280
Operating weight (A BP/ST/AS/EC/** version)	[kg]	947	977	1007	1208	1268	1288

DIMENSIONS - Large unit							
Lenght	[mm]	3920	3920	3920	-	-	-
Width	[mm]	1025	1025	1025	-	-	-
Height (ST - LN)	[mm]	2360	2360	2360	-	-	-
Height (SL)	[mm]	2420	2420	2420	-	-	-

Unit dimensions with hydronic kit							
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-1 OO and HR equipment	-	Large	Large	Large	Standard	Standard	Standard
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-1 OO and HR equipment	-	Large	Large	Large	Standard	Standard	Standard
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard

CRIO BS R290 range		126-2-2 PE	137-2-2 PE	157-2-2 PE	173-2-2 PE	158-2-2 PV	174 & 182-2-2 PV
DIMENSIONS AND WEIGHTS - Standard unit							
Lenght	[mm]	4200	4200	5500	5500	2895	2895
Width	[mm]	1185	1185	1535	1535	2280	2280
Height (ST - LN)	[mm]	2320	2320	2350	2350	2535	2535
Height (SL)	[mm]	2380	2380	2410	2410	2560	2560
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	1630	1670	1700	1920	1925	1940
Operating weight (A BP/ST/AS/EC/** version)	[kg]	1640	1680	1710	1930	1940	1955

DIMENSIONS - Large unit							
Lenght	[mm]	5000	5000	Contact EK	Contact EK	4015	4015
Width	[mm]	1185	1185	Contact EK	Contact EK	2280	2280
Height (ST - LN)	[mm]	2320	2320	Contact EK	Contact EK	2535	2535
Height (SL)	[mm]	2380	2380	Contact EK	Contact EK	2560	2560

Unit dimensions with hydronic kit							
Integrata LP 1-0 OO	-	Large	Large	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Large	Large	Contact EK	Contact EK	Large	Large
Integrata LP 1-1 OO	-	Large	Large	Standard	Standard	Large	Large
Integrata LP 1-1 OO and HR equipment	-	Large	Large	Contact EK	Contact EK	Large	Large
Integrata MP 1-0 OO	-	Large	Large	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Large	Large	Contact EK	Contact EK	Large	Large
Integrata MP 1-1 OO	-	Large	Large	Standard	Standard	Large	Large
Integrata MP 1-1 OO and HR equipment	-	Large	Large	Contact EK	Contact EK	Large	Large
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Large	Large	Contact EK	Contact EK	Large	Large

CRIO HE

10-1-1 PE ↔ 116-2-2 PE



Refrigerant
R290 | GWP=3



Brazed plate
heat exchanger



Semi-hermetic
piston compressor



Axial fan



Cu/Al
condensing coils



SEPR

Air to water chillers for medium temperature applications

High efficiency



Solution

B - Base
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

AS - Standard equipment
DS - Desuperheater
HR - Total modulating Heat Recovery

Cooling capacity 9 - 112 kW

Safety system	To ensure high-safety-level the unit is equipped with an ATEX certified gas detector and an EC centrifugal extraction fan . The sensor, with external dedicated power supply and Modbus output signal, has an alarm threshold set at 10% of the lower flammable limit (LFL). The Propane alarm causes the immediate shutdown of the machine and the centrifugal extraction fan is switched on, which allows the ventilation of the compressor compartment and the dilution of the R290 concentration to values below the lower flammability limit.
Structure	Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Basement and panels made of galvanized steel sheet, oven-painted with polyurethane powders. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. LN (Low Noise) version: the panels are internally lined with sound-absorbing material. SL (Super Low Noise) version: the panels are sandwich and insulated with rock wool.
Compressor	Reciprocating semi-hermetic type compressor equipped with: electronic control module and protection of the electric motor (installed inside the electrical panel); oil charge; oil level sight glass and oil crankcase heater; anti-vibration rubber supports; anti-vibration pipes (suction and discharge); suction and discharge valves. The compressor can be supplied with one or more RSH capacity control heads to guarantee an adaptation of the cooling capacity in case of thermal load's reduction: please see the list of accessories for further information.
EC Fan	Premium-Axial-Fans with bionic shaped blades and high-efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP54 and thermal class THCL 155. The motor efficiency class complies with IE4.
Air heat exchanger	Finned coil made with copper pipes arranged on staggered rows, mechanically expanded inside a pack of aluminium fins offering a high exchange surface area.
Water heat exchanger	Brazed plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure switch, air vent valve and thermally insulated with closed-cell neoprene anti-condensate material. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.
Electrical board	Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components: - Main isolator switch - Door interlock safety device - Contactor and protection for compressor and fans - Cabinet minimum protection rating IP54. To ensure higher level of security, the cabinet is outside the machine and positioned on one side of the unit. The propane sensor is equipped with separate power supply: this power supply must always be guaranteed in order to ensure the monitoring of any leakage.
Control	The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.
Refrigerant circuit	Filter drier, moisture-liquid sight glass, electronic expansion valve, high & low pressure gauge, high and low pressure transducers, high pressure switch, safety high pressure valve (when required by EN 378-2016 standard).
Water circuit (Integrata)	Base version: as interface to the plant, includes the water fittings of the evaporator only. Integrated version: Water storage tank, water pressure gauge, safety valve, water discharge valve, centrifugal pump(s) suitable for glycol solutions up to 40%, manual by-pass valve, manual air venting valve. The pump control equipment is fitted inside the electrical board of the unit and the microprocessor control manages the pump starting, timing and all the safety devices of the whole system.

ACCESSORI PRINCIPALI

- Anti-vibration rubber/spring mounts
- Air heat exchanger protection panel or filter
- Air heat exchanger with various coatings treatment
- Low pressure switch
- Low pressure safety valve
- Double safety valve
- Overpressure valve / automatic by-pass
- Double water pump (stand-by) - Standard/ High pressure
- Open / Closed expansion vessel with automatic filling unit
- RSH Capacity Control head / Inverter driven compressor
- Advanced control c.pCo

CRIO HE

Technical data

CRIO HE R290 range		10-1-1 PE	14-1-1 PE	17-1-1 PE	20-1-1 PE	24-1-1 PE	30-1-1 PE
COOLING - A BP/ST/AS/EC/*S version							
Cooling capacity ⁽¹⁾	[kW]	8,46	11,7	16,7	19,9	21,3	27,2
Total power input ⁽¹⁾	[kW]	3,98	5,94	7,88	9,81	10,0	12,6
EER - Energy Efficiency Ratio	-	2,13	1,97	2,12	2,03	2,13	2,16
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	8,3	10,7	11,5	15,5	15,5	20,4
"Ecodesign" compliance for process application (SEPR)	-	3,58	3,25	3,79	3,82	3,47	3,70

REFRIGERANT CIRCUIT								
Refrigerant	-	R290						
GWP	-	3						
Charge of refrigerant - Base unit	[kg]	2,2	2,8	3,0	4,0	4,0	5,3	
Independent gas circuits	[n°]	1						
Compressors type	-	Semi-hermetic pistons						
Compressors quantity	[n°]	1						
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)						
Condensing coils type	-	Cu/Al						
Fans type	-	Axial EC						
Fans quantity	[n°]	1			2			
Fans power input ⁽¹⁾ (total)	[kW]	0,07	0,14	0,59	1,08	0,51	0,58	
Total air flow	[m ³ /h]	5.100	6.100	10.300	19.700	15.000	18.400	
Expansion valve type	-	Electronic						
Evaporator water flow ⁽¹⁾	[m ³ /h]	2,08	2,88	4,09	4,89	5,23	6,67	
User circuit pressure drop ⁽¹⁾	[kPa]	21,1	22,5	28,4	28,7	24,8	30,2	

DESUPERHEATER (option) - A BP/ST/DS/EC/*S							
Heating capacity ⁽²⁾	[kW]	1,84	2,73	3,21	3,75	4,13	5,03
Water flow	[m ³ /h]	0,32	0,47	0,56	0,65	0,72	0,87
User circuit pressure drop	[kPa]	2,3	2,9	2,6	2,5	2,3	2,6

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S							
Heating capacity ⁽²⁾	[kW]	12,3	17,5	23,9	28,5	30,3	38,9
Water flow	[m ³ /h]	2,13	3,02	4,13	4,94	5,26	6,73
User circuit pressure drop	[kPa]	13,7	24	26,7	26,6	23,2	29,5

Electrical data							
Power supply	-	400/3/50					
Emergency power supply	-	230/1/50					
Maximum power input without pump	[kW]	9,30	13,1	14,1	17,7	20,2	22,5
Locked rotor current - LRA without pump	[A]	65,0	89,2	104	121	140	207
Maximum absorbed current - FLA without pump	[A]	15,7	22,5	23,5	32,5	39,7	40,7

HYDRONIC KIT (option)							
Buffer tank capacity	[L]	60	60	60	160	160	290
Pump type	-	Centrifugal					

Standard pump - 150 kPa useful head							
Motor Efficiency	-	-	-	-	-	-	IE3
Pump motor nominal power	[kW]	0,37	0,37	0,55	0,55	0,55	0,9
Pump motor nominal current	[A]	1,4	1,4	1,9	1,9	1,9	2,5

Standard pump - 250 kPa useful head							
Motor Efficiency	-	-	IE3	IE3	IE3	IE3	IE3
Pump motor nominal power	[kW]	0,55	0,75	0,9	0,9	1,5	1,5
Pump motor nominal current	[A]	2	1,9	2,5	2,5	4,1	4,1

Water connections							
Dimension (nominal external diameter)	[inch/DN]	1/2" (DN15)	1" (DN 25)	1" (DN 25)	1" (DN 25)	1" (DN 25)	1" 1/2 (DN 40)

Noise levels ⁽³⁾							
Total sound power (ST version)	[db(A)]	73	76	79	82	82	81
Total sound pressure (ST version) - at 1 m distance	[db(A)]	56	59	62	65	65	63
Total sound pressure (ST version) - at 10 m distance	[db(A)]	43	45	48	51	51	50
Total sound power (LN version)	[db(A)]	70	73	76	79	79	78
Total sound pressure (LN version) - at 1 m distance	[db(A)]	53	56	59	62	62	60
Total sound pressure (LN version) - at 10 m distance	[db(A)]	40	42	45	48	48	47
Total sound power (SL version)	[db(A)]	68	71	74	77	77	76
Total sound pressure (SL version) - at 1 m distance	[db(A)]	51	54	57	60	60	58
Total sound pressure (SL version) - at 10 m distance	[db(A)]	38	40	43	46	46	45

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE

Technical data

CRIO HE R290 range		35-1-1 PE	41-1-1 PE	48-1-1 PE	56-1-1 PE	41-2-2 PE	48-2-2 PE
COOLING - A BP/ST/AS/EC/*S version							
Cooling capacity ⁽¹⁾	[kW]	31,8	39,2	47,1	55,0	40,0	42,5
Total power input ⁽¹⁾	[kW]	15,8	19,7	23,6	26,5	18,5	19,6
EER - Energy Efficiency Ratio	-	2,01	1,99	2,00	2,08	2,16	2,17
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	23,5	24,5	29,4	39,0	32,9	39,4
"Ecodesign" compliance for process application (SEPR)	-	3,25	3,26	3,61	3,75	3,93	3,49

REFRIGERANT CIRCUIT							
Refrigerant	-	R290					
GWP	-	3					
Charge of refrigerant - Base unit	[kg]	6,1	6,3	7,6	10,1	8,5	10,2
Independent gas circuits	[n°]	1			2		
Compressors type	-	Semi-hermetic pistons					
Compressors quantity	[n°]	1			2		
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)	1 (83%); 2 (67%); 3 (50%)			1 (75%); 2 (50%)	
Condensing coils type	-	Cu/Al					
Fans type	-	Axial EC					
Fans quantity	[n°]	2			3		
Fans power input ⁽¹⁾ (total)	[kW]	1,23	2,83	3,35	2,06	1,11	0,65
Total air flow	[m ³ /h]	24.000	35.000	34.200	34.400	29.400	22.600
Expansion valve type	-	Electronic					
Evaporator water flow ⁽¹⁾	[m ³ /h]	7,78	9,59	11,5	13,5	9,80	10,4
User circuit pressure drop ⁽¹⁾	[kPa]	17,4	20,0	26,8	29,0	22,3	23,4

DESUPERHEATER (option) - A BP/ST/DS/EC/*S							
Heating capacity ⁽²⁾	[kW]	6,24	7,01	8,31	10,4	7,50	8,26
Water flow	[m ³ /h]	1,08	1,22	1,44	1,80	1,30	1,43
User circuit pressure drop	[kPa]	3,1	2,7	2,5	2,8	4,2	5,0

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S							
Heating capacity ⁽²⁾	[kW]	45,6	55,1	67,4	79,4	57,3	60,4
Water flow	[m ³ /h]	7,90	9,54	11,7	13,8	9,93	10,5
User circuit pressure drop	[kPa]	33,6	41,4	29,2	30,3	23,3	24,8

Electrical data							
Power supply	-	400/3/50					
Emergency power supply	-	230/1/50					
Maximum power input without pump	[kW]	27,5	37,8	42,6	47,7	34,3	39,3
Locked rotor current - LRA without pump	[A]	228	249	282	327	152	178
Maximum absorbed current - FLA without pump	[A]	47,8	63,2	70,3	80,3	63,1	77,5

HYDRONIC KIT (option)							
Buffer tank capacity	[L]	290	290	290	290	290	290
Pump type	-	Centrifugal					

Standard pump - 150 kPa useful head							
Motor Efficiency	-	IE3					
Pump motor nominal power	[kW]	0,9	0,9	1,1	1,1	1,1	1,1
Pump motor nominal current	[A]	2,5	2,5	3,3	3,3	3,3	3,3

Standard pump - 250 kPa useful head							
Motor Efficiency	-	IE3					
Pump motor nominal power	[kW]	1,5	1,5	2,2	2,2	1,5	2,2
Pump motor nominal current	[A]	4,1	4,1	4,7	4,7	4,1	4,7

Water connections							
Dimension (nominal external diameter)	[inch/DN]	1" 1/2 (DN 40)	1" 1/2 (DN 40)	1" 1/2 (DN 40)	2" (DN 50)	1" 1/2 (DN 40)	1" 1/2 (DN 40)

Noise levels ⁽³⁾							
Total sound power (ST version)	[dB(A)]	84	86	87	86	83	84
Total sound pressure (ST version) - at 1 m distance	[dB(A)]	66	68	69	68	65	66
Total sound pressure (ST version) - at 10 m distance	[dB(A)]	53	55	56	54	51	52
Total sound power (LN version)	[dB(A)]	81	83	84	83	80	81
Total sound pressure (LN version) - at 1 m distance	[dB(A)]	63	65	66	65	62	63
Total sound pressure (LN version) - at 10 m distance	[dB(A)]	50	52	53	51	48	49
Total sound power (SL version)	[dB(A)]	79	81	82	81	78	79
Total sound pressure (SL version) - at 1 m distance	[dB(A)]	61	63	64	63	60	61
Total sound pressure (SL version) - at 10 m distance	[dB(A)]	48	50	51	49	46	47

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE

Technical data

CRIO HE R290 range		60-2-2 PE	70-2-2 PE	83-2-2 PE	97-2-2 PE	116-2-2 PE
COOLING - A BP/ST/AS/EC/*S version						
Cooling capacity ⁽¹⁾	[kW]	54,9	63,7	78,5	95,3	112
Total power input ⁽¹⁾	[kW]	26,1	32,5	36,4	46,9	51,9
EER - Energy Efficiency Ratio	-	2,10	1,96	2,16	2,03	2,16
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	41,6	45,2	65,5	67,5	87,6
"Ecodesign" compliance for process application (SEPR)	-	3,62	3,18	3,60	3,63	3,89

REFRIGERANT CIRCUIT						
Refrigerant	-	R290				
GWP	-	3				
Charge of refrigerant - Base unit	[kg]	10,8	11,7	17,0	17,5	22,8
Independent gas circuits	[n°]	2				
Compressors type	-	Semi-hermetic pistons				
Compressors quantity	[n°]	2				
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)		1 (83%); 2 (67%); 3 (50%)		
Condensing coils type	-	Cu/Al				
Fans type	-	Axial EC				
Fans quantity	[n°]	3			4	
Fans power input ⁽¹⁾ (total)	[kW]	2,08	3,34	2,57	5,84	2,73
Total air flow	[m ³ /h]	34.400	42.700	51.000	68.300	60.700
Expansion valve type	-	Electronic				
Evaporator water flow ⁽¹⁾	[m ³ /h]	13,5	15,6	19,2	23,4	27,3
User circuit pressure drop ⁽¹⁾	[kPa]	25,1	25,6	29,4	34,3	38,2

DESUPERHEATER (option) - A BP/ST/DS/EC/*S						
Heating capacity ⁽²⁾	[kW]	10,1	12,5	14,0	16,7	20,8
Water flow	[m ³ /h]	1,75	2,17	2,43	2,90	3,61
User circuit pressure drop	[kPa]	5,5	6,5	4,7	4,6	4,8

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S						
Heating capacity ⁽²⁾	[kW]	78,0	91,6	111	136	160
Water flow	[m ³ /h]	13,5	15,9	19,2	23,5	27,7
User circuit pressure drop	[kPa]	37,1	32,2	31,2	31,6	39,3

Electrical data						
Power supply	-	400/3/50				
Emergency power supply	-	230/1/50				
Maximum power input without pump	[kW]	43,9	59,4	72,6	82,2	101
Locked rotor current – LRA without pump	[A]	245	282	307	348	415
Maximum absorbed current - FLA without pump	[A]	79,5	102	122	136	168

HYDRONIC KIT (option)						
Buffer tank capacity	[L]	290	290	500	500	470
Pump type	-	Centrifugal				

Standard pump - 150 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	1,1	2,2	2,2	2,2	2,2
Pump motor nominal current	[A]	3,3	4,7	4,7	4,7	4,7

Standard pump - 250 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	2,2	3	3	4	4
Pump motor nominal current	[A]	4,7	6,4	6,4	8,7	8,7

Water connections						
Dimension (nominal external diameter)	[inch/DN]	2" (DN 50)	2" (DN 50)	2" (DN 50)	2"1/2 (DN 65)	2"1/2 (DN 65)

Noise levels ⁽³⁾						
Total sound power (ST version)	[db(A)]	85	88	88	90	89
Total sound pressure (ST version) - at 1 m distance	[db(A)]	67	70	69	71	70
Total sound pressure (ST version) - at 10 m distance	[db(A)]	53	56	56	58	57
Total sound power (LN version)	[db(A)]	82	85	85	87	86
Total sound pressure (LN version) - at 1 m distance	[db(A)]	64	67	66	68	67
Total sound pressure (LN version) - at 10 m distance	[db(A)]	50	53	53	55	54
Total sound power (SL version)	[db(A)]	80	83	83	85	84
Total sound pressure (SL version) - at 1 m distance	[db(A)]	62	65	64	66	65
Total sound pressure (SL version) - at 10 m distance	[db(A)]	48	51	51	53	52

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROKLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE

130-2-2 PV ↔ 185-2-2 PV



Refrigerant
R290 | GWP=3



Brazen plate
heat exchanger



Semi-hermetic
piston compressor



Axial fan



Microchannel
condensing coils



Air to water chillers for medium temperature applications
High efficiency



Solution

B - Base
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

AS - Standard equipment
DS - Desuperheater
HR - Total modulating Heat Recovery

Cooling capacity 124 - 176 kW

Safety system	To ensure high-safety-level the unit is equipped with an ATEX certified gas detector and an EC centrifugal extraction fan . The sensor, with external dedicated power supply and Modbus output signal, has an alarm threshold set at 10% of the lower flammable limit (LFL). The Propane alarm causes the immediate shutdown of the machine and the centrifugal extraction fan is switched on, which allows the ventilation of the compressor compartment and the dilution of the R290 concentration to values below the lower flammability limit.
Structure	Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Basement and panels made of galvanized steel sheet, oven-painted with polyurethane powders. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. LN (Low Noise) version: the panels are internally lined with sound-absorbing material. SL (Super Low Noise) version: the panels are sandwich and insulated with rock wool.
Compressor	Reciprocating semi-hermetic type compressor equipped with: electronic control module and protection of the electric motor (installed inside the electrical panel); oil charge; oil level sight glass and oil crankcase heater; anti-vibration rubber supports; anti-vibration pipes (suction and discharge); suction and discharge valves. The compressor can be supplied with one or more RSH capacity control heads to guarantee an adaptation of the cooling capacity in case of thermal load's reduction: please see the list of accessories for further information.
EC Fan	Premium-Axial-Fans with bionic shaped blades and high-efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP54 and thermal class THCL 155. The motor efficiency class complies with IE4.
Air heat exchanger	Microchannel technology increases the primary to secondary surface area ratio and reduces the tube's air shadow to provide maximum heat exchange through our condensers.
Water heat exchanger	Brazen plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure switch, air vent valve and thermally insulated with closed-cell neoprene anti-condensate material. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.
Electrical board	Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components: - Main isolator switch - Door interlock safety device - Contactor and protection for compressor and fans - Cabinet minimum protection rating IP54. To ensure higher level of security, the cabinet is outside the machine and positioned on one side of the unit. The propane sensor is equipped with separate power supply: this power supply must always be guaranteed in order to ensure the monitoring of any leakage.
Control	The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.
Refrigerant circuit	Filter drier, moisture-liquid sight glass, electronic expansion valve, high & low pressure gauge, high and low pressure transducers, high pressure switch, safety high pressure valve (when required by EN 378-2016 standard).
Water circuit (Integrata)	Base version: as interface to the plant, includes the water fittings of the evaporator only. Integrated version: Water storage tank, water pressure gauge, safety valve, water discharge valve, centrifugal pump(s) suitable for glycol solutions up to 40%, manual by-pass valve, manual air venting valve. The pump control equipment is fitted inside the electrical board of the unit and the microprocessor control manages the pump starting, timing and all the safety devices of the whole system.

ACCESSORI PRINCIPALI

- Anti-vibration rubber/spring mounts
- Air heat exchanger protection panel or filter
- Air heat exchanger with various coatings treatment
- Low pressure switch
- Low pressure safety valve
- Double safety valve
- Overpressure valve / automatic by-pass
- Double water pump (stand-by) - Standard/ High pressure
- Open / Closed expansion vessel with automatic filling unit
- RSH Capacity Control head / Inverter driven compressor
- Advanced control c.pCo

CRIO HE

Technical data

CRIO HE R290 range		130-2-2 PV	142-2-2 PV	161-2-2 PV	175-2-2 PV	185-2-2 PV
COOLING - A BP/ST/AS/EC/*S version						
Cooling capacity ⁽¹⁾	[kW]	124	136	155	165	176
Total power input ⁽¹⁾	[kW]	58,8	65,2	72,0	76,8	86,9
EER - Energy Efficiency Ratio	-	2,11	2,09	2,15	2,15	2,03
Saved CO2 equivalent Ton ^(*)	[CO ₂ Ton]	55,8	61,1	77,0	77,9	81,4
"Ecodesign" compliance for process application (SEPR)	-	3,68	3,58	3,66	3,78	3,44

REFRIGERANT CIRCUIT						
Refrigerant	-	R290				
GWP	-	3				
Charge of refrigerant - Base unit	[kg]	14,5	15,9	20,0	20,2	21,2
Independent gas circuits	[n°]	2				
Compressors type	-	Semi-hermetic pistons				
Compressors quantity	[n°]	2				
Steps of capacity for each compressor (std)	-	2 (75%); 3 (62,5%); 4 (50%)				
Condensing coils type	-	Microchannel				
Fans type	-	Axial EC				
Fans quantity	[n°]	4		6		
Fans power input ⁽¹⁾ (total)	[kW]	3,41	4,64	2,87	3,63	4,43
Total air flow	[m ³ /h]	66.500	75.000	79.600	87.000	94.500
Expansion valve type	-	Electronic				
Evaporator water flow ⁽¹⁾	[m ³ /h]	30,4	33,3	38,0	40,4	43,0
User circuit pressure drop ⁽¹⁾	[kPa]	40,0	35,2	34,0	37,3	33,8

DESUPERHEATER (option) - A BP/ST/DS/EC/*S						
Heating capacity ⁽²⁾	[kW]	24,0	26,3	31,4	32,8	38,7
Water flow	[m ³ /h]	4,17	4,56	5,44	5,69	6,72
User circuit pressure drop	[kPa]	4,0	4,3	12,1	11,9	14,6

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S						
Heating capacity ⁽²⁾	[kW]	176	192	219	233	253
Water flow	[m ³ /h]	30,5	33,3	38,0	40,3	43,9
User circuit pressure drop	[kPa]	39,6	45,6	50,7	50,5	39,5

Electrical data						
Power supply	-	400/3/50				
Emergency power supply	-	230/1/50				
Maximum power input without pump	[kW]	95,1	114	120	125	133
Locked rotor current – LRA without pump	[A]	390	473	568	670	714
Maximum absorbed current - FLA without pump	[A]	166	193	199	216	232

HYDRONIC KIT (option)						
Buffer tank capacity	[L]	290	290	290	290	290
Pump type	-	Centrifugal				

Standard pump - 150 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	3	3	3	3	3
Pump motor nominal current	[A]	6,4	6,4	6,4	6,4	6,4

Standard pump - 250 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	4	4	5,5	5,5	5,5
Pump motor nominal current	[A]	8,7	8,7	10,6	10,6	10,6

Water connections						
Dimension (nominal external diameter)	[inch/DN]	3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)

Noise levels ⁽³⁾						
Total sound power (ST version)	[db(A)]	90	94	95	95	97
Total sound pressure (ST version) - at 1 m distance	[db(A)]	71	75	75	75	77
Total sound pressure (ST version) - at 10 m distance	[db(A)]	58	62	63	63	65
Total sound power (LN version)	[db(A)]	87	91	92	92	94
Total sound pressure (LN version) - at 1 m distance	[db(A)]	68	72	72	72	74
Total sound pressure (LN version) - at 10 m distance	[db(A)]	55	59	60	60	62
Total sound power (SL version)	[db(A)]	85	89	90	90	92
Total sound pressure (SL version) - at 1 m distance	[db(A)]	66	70	70	70	72
Total sound pressure (SL version) - at 10 m distance	[db(A)]	53	57	58	58	60

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROKLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE

Dimensions and weights

CRIO HE R290 range		60-2-2 PE	70-2-2 PE	83-2-2 PE	97-2-2 PE	116-2-2 PE	130-2-2 PV
DIMENSIONS AND WEIGHTS - Standard unit							
Lenght	[mm]	3920	3920	4200	4200	5500	2895
Width	[mm]	1025	1025	1185	1185	1535	2280
Height (ST - LN)	[mm]	2281	2360	2320	2320	2350	2535
Height (SL)	[mm]	2368	2420	2380	2380	2410	2560
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	1080	1150	1460	1510	1710	1855
Operating weight (A BP/ST/AS/EC/** version)	[kg]	1088	1158	1470	1520	1720	1870

DIMENSIONS - Large unit							
Lenght	[mm]	-	-	5000	5000	Contact EK	4015
Width	[mm]	-	-	1185	1185	Contact EK	2280
Height (ST - LN)	[mm]	-	-	2320	2320	Contact EK	2535
Height (SL)	[mm]	-	-	2380	2380	Contact EK	2560

Unit dimensions with hydronic kit							
Integrata LP 1-0 OO	-	Standard	Standard	Large	Large	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Standard	Standard	Large	Large	Contact EK	Large
Integrata LP 1-1 OO	-	Standard	Standard	Large	Large	Standard	Large
Integrata LP 1-1 OO and HR equipment	-	Standard	Standard	Large	Large	Contact EK	Large
Integrata MP 1-0 OO	-	Standard	Standard	Large	Large	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Standard	Standard	Large	Large	Contact EK	Large
Integrata MP 1-1 OO	-	Standard	Standard	Large	Large	Standard	Large
Integrata MP 1-1 OO and HR equipment	-	Standard	Standard	Large	Large	Contact EK	Large
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Standard	Standard	Large	Large	Contact EK	Large

CRIO HE R290 range		142-2-2 PV	161-2-2 PV	175-2-2 PV	185-2-2 PV
DIMENSIONS AND WEIGHTS - Standard unit					
Lenght	[mm]	2895	4015	4015	4015
Width	[mm]	2280	2280	2280	2280
Height (ST - LN)	[mm]	2535	2535	2535	2535
Height (SL)	[mm]	2560	2560	2560	2560
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	1900	2560	2575	2590
Operating weight (A BP/ST/AS/EC/** version)	[kg]	1915	2578	2593	2608

DIMENSIONS - Large unit					
Lenght	[mm]	4015	-	-	-
Width	[mm]	2280	-	-	-
Height (ST - LN)	[mm]	2535	-	-	-
Height (SL)	[mm]	2560	-	-	-

Unit dimensions with hydronic kit					
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Large	Standard	Standard	Standard
Integrata LP 1-1 OO	-	Large	Standard	Standard	Standard
Integrata LP 1-1 OO and HR equipment	-	Large	Standard	Standard	Standard
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Large	Standard	Standard	Standard
Integrata MP 1-1 OO	-	Large	Standard	Standard	Standard
Integrata MP 1-1 OO and HR equipment	-	Large	Standard	Standard	Standard
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Large	Standard	Standard	Standard

CRIO HE+

10-1-1 PE ↔ 116-2-2 PE

R290

Refrigerant
R290 | GWP=3



Brazen plate
heat exchanger



Semi-hermetic
piston compressor



Axial fan



Cu/Al
condensing coils



EIA ready



SEPR

Air to water chillers for medium temperature applications
High efficiency plus



Solution

B - Base
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

AS - Standard equipment
DS - Desuperheater
HR - Total modulating Heat Recovery

Cooling capacity 9 - 112 kW

Safety system	To ensure high-safety-level the unit is equipped with an ATEX certified gas detector and an EC centrifugal extraction fan . The sensor, with external dedicated power supply and Modbus output signal, has an alarm threshold set at 10% of the lower flammable limit (LFL). The Propane alarm causes the immediate shutdown of the machine and the centrifugal extraction fan is switched on, which allows the ventilation of the compressor compartment and the dilution of the R290 concentration to values below the lower flammability limit.
Structure	Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Basement and panels made of galvanized steel sheet, oven-painted with polyurethane powders. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. LN (Low Noise) version: the panels are internally lined with sound-absorbing material. SL (Super Low Noise) version: the panels are sandwich and insulated with rock wool.
Compressor	Reciprocating semi-hermetic type compressor equipped with: electronic control module and protection of the electric motor (installed inside the electrical panel); oil charge; oil level sight glass and oil crankcase heater; anti-vibration rubber supports; anti-vibration pipes (suction and discharge); suction and discharge valves. The compressor can be supplied with one or more RSH capacity control heads to guarantee an adaptation of the cooling capacity in case of thermal load's reduction: please see the list of accessories for further information.
EC Fan	Premium-Axial-Fans with bionic shaped blades and high-efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP54 and thermal class THCL 155. The motor efficiency class complies with IE4.
Air heat exchanger	Finned coil made with copper pipes arranged on staggered rows, mechanically expanded inside a pack of aluminium fins offering a high exchange surface area.
Water heat exchanger	Brazen plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure switch, air vent valve and thermally insulated with closed-cell neoprene anti-condensate material. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.
Electrical board	Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components: - Main isolator switch - Door interlock safety device - Contactor and protection for compressor and fans - Cabinet minimum protection rating IP54. To ensure higher level of security, the cabinet is outside the machine and positioned on one side of the unit. The propane sensor is equipped with separate power supply: this power supply must always be guaranteed in order to ensure the monitoring of any leakage.
Control	The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.
Refrigerant circuit	Filter drier, moisture-liquid sight glass, electronic expansion valve, high & low pressure gauge, high and low pressure transducers, high pressure switch, safety high pressure valve (when required by EN 378-2016 standard).
Water circuit (Integrata)	Base version: as interface to the plant, includes the water fittings of the evaporator only. Integrated version: Water storage tank, water pressure gauge, safety valve, water discharge valve, centrifugal pump(s) suitable for glycol solutions up to 40%, manual by-pass valve, manual air venting valve. The pump control equipment is fitted inside the electrical board of the unit and the microprocessor control manages the pump starting, timing and all the safety devices of the whole system.

ACCESSORI PRINCIPALI

- Anti-vibration rubber/spring mounts
- Air heat exchanger protection panel or filter
- Air heat exchanger with various coatings treatment
- Low pressure switch
- Low pressure safety valve
- Double safety valve
- Overpressure valve / automatic by-pass
- Double water pump (stand-by) - Standard/ High pressure
- Open / Closed expansion vessel with automatic filling unit
- RSH Capacity Control head / Inverter driven compressor
- Advanced control c.pCo

CRIO HE+

Technical data

CRIO HE+ R290 range		10-1-1 PE	14-1-1 PE	17-1-1 PE	21-1-1 PE
COOLING - A BP/ST/AS/EC/*S version					
Cooling capacity ⁽¹⁾	[kW]	8,46	11,7	16,7	19,6
Total power input ⁽¹⁾	[kW]	3,98	5,94	7,88	9,03
EER - Energy Efficiency Ratio	-	2,13	1,97	2,12	2,17
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	8,3	10,7	11,5	15,1
"Ecodesign" compliance for process application (SEPR)	-	3,58	3,25	3,79	3,92

REFRIGERANT CIRCUIT					
Refrigerant	-	R290			
GWP	-	3			
Charge of refrigerant - Base unit	[kg]	2,2	2,8	3,0	3,9
Independent gas circuits	[n°]	1			
Compressors type	-	Semi-hermetic pistons			
Compressors quantity	[n°]	1			
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)			
Condensing coils type	-	Cu/Al			
Fans type	-	Axial EC			
Fans quantity	[n°]	1			2
Fans power input ⁽¹⁾ (total)	[kW]	0,07	0,14	0,59	0,36
Total air flow	[m ³ /h]	5.100	6.100	10.300	13.200
Expansion valve type	-	Electronic			
Evaporator water flow ⁽¹⁾	[m ³ /h]	2,08	2,88	4,09	4,82
User circuit pressure drop ⁽¹⁾	[kPa]	21,1	22,5	28,4	27,7

DESUPERHEATER (option) - A BP/ST/DS/EC/*S					
Heating capacity ⁽²⁾	[kW]	1,84	2,73	3,21	3,76
Water flow	[m ³ /h]	0,32	0,47	0,56	0,65
User circuit pressure drop	[kPa]	2,3	2,9	1,9	2,5

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S					
Heating capacity ⁽²⁾	[kW]	12,3	17,5	23,9	28,2
Water flow	[m ³ /h]	2,1	3,0	4,1	4,9
User circuit pressure drop	[kPa]	13,7	24	26,7	26,1

Electrical data					
Power supply	-	400/3/50			
Emergency power supply	-	230/1/50			
Maximum power input without pump	[kW]	9,3	13,1	14,1	17,7
Locked rotor current – LRA without pump	[A]	65,0	89,2	104	121
Maximum absorbed current - FLA without pump	[A]	15,7	22,5	23,5	32,5

HYDRONIC KIT (option)					
Buffer tank capacity	[L]	60	60	60	160
Pump type	-	Centrifugal			

Standard pump - 150 kPa useful head					
Motor Efficiency	-	-	-	-	-
Pump motor nominal power	[kW]	0,37	0,37	0,55	0,55
Pump motor nominal current	[A]	1,4	1,4	1,9	1,9

Standard pump - 250 kPa useful head					
Motor Efficiency	-	-	IE3	IE3	IE3
Pump motor nominal power	[kW]	0,55	0,75	0,9	0,9
Pump motor nominal current	[A]	2	1,9	2,5	2,5

Water connections					
Dimension (nominal external diameter)	[inch/DN]	1/2" (DN15)	1" (DN 25)	1" (DN 25)	1" (DN 25)

Noise levels ⁽³⁾					
Total sound power (ST version)	[db(A)]	73	76	79	80
Total sound pressure (ST version) - at 1 m distance	[db(A)]	56	59	62	63
Total sound pressure (ST version) - at 10 m distance	[db(A)]	43	45	48	49
Total sound power (LN version)	[db(A)]	70	73	76	77
Total sound pressure (LN version) - at 1 m distance	[db(A)]	53	56	59	60
Total sound pressure (LN version) - at 10 m distance	[db(A)]	40	42	45	46
Total sound power (SL version)	[db(A)]	68	71	74	75
Total sound pressure (SL version) - at 1 m distance	[db(A)]	51	54	57	58
Total sound pressure (SL version) - at 10 m distance	[db(A)]	38	40	43	44

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE+

Technical data

CRIO HE+ R290 range		30-1-1 PE	36-1-1 PE	56-1-1 PE	41-2-2 PE
COOLING - A BP/ST/AS/EC/*S version					
Cooling capacity ⁽¹⁾	[kW]	27,2	31,4	55,0	40,0
Total power input ⁽¹⁾	[kW]	12,6	15,1	26,5	18,5
EER - Energy Efficiency Ratio	-	2,16	2,08	2,08	2,16
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	20,4	27,9	39,0	32,9
"Ecodesign" compliance for process application (SEPR)	-	3,70	3,32	3,75	3,93

REFRIGERANT CIRCUIT					
Refrigerant	-	R290			
GWP	-	3			
Charge of refrigerant - Base unit	[kg]	5,3	7,2	10,1	8,5
Independent gas circuits	[n°]	1			2
Compressors type	-	Semi-hermetic pistons			
Compressors quantity	[n°]	1			2
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)		1 (83%); 2 (67%); 3 (50%)	1 (75%); 2 (50%)
Condensing coils type	-	Cu/Al			
Fans type	-	Axial EC			
Fans quantity	[n°]	2		3	
Fans power input ⁽¹⁾ (total)	[kW]	0,58	0,63	2,06	1,11
Total air flow	[m ³ /h]	18.400	17.700	34.400	29.400
Expansion valve type	-	Electronic			
Evaporator water flow ⁽¹⁾	[m ³ /h]	6,67	7,70	13,5	9,80
User circuit pressure drop ⁽¹⁾	[kPa]	30,2	16,9	29,0	22,3

DESUPERHEATER (option) - A BP/ST/DS/EC/*S					
Heating capacity ⁽²⁾	[kW]	5,03	6,25	10,4	7,50
Water flow	[m ³ /h]	0,87	1,09	1,80	1,30
User circuit pressure drop	[kPa]	2,1	3,1	2,4	3,7

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S					
Heating capacity ⁽²⁾	[kW]	38,9	45,3	79,4	57,3
Water flow	[m ³ /h]	6,73	7,84	13,8	9,93
User circuit pressure drop	[kPa]	29,5	33,2	30,3	23,3

Electrical data					
Power supply	-	400/3/50			
Emergency power supply	-	230/1/50			
Maximum power input without pump	[kW]	22,5	27,5	47,7	34,3
Locked rotor current – LRA without pump	[A]	207	228	327	152
Maximum absorbed current - FLA without pump	[A]	40,7	47,8	80,3	63,1

HYDRONIC KIT (option)					
Buffer tank capacity	[L]	290	290	290	290
Pump type	-	Centrifugal			

Standard pump - 150 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	0,9	0,9	1,1	1,1
Pump motor nominal current	[A]	2,5	2,5	3,3	3,3

Standard pump - 250 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	1,5	1,5	2,2	1,5
Pump motor nominal current	[A]	4,1	4,1	4,7	4,1

Water connections					
Dimension (nominal external diameter)	[inch/DN]	1" 1/2 (DN 40)	1" 1/2 (DN 40)	2" (DN 50)	1" 1/2 (DN 40)

Noise levels ⁽³⁾					
Total sound power (ST version)	[db(A)]	81	84	86	83
Total sound pressure (ST version) - at 1 m distance	[db(A)]	63	66	68	65
Total sound pressure (ST version) - at 10 m distance	[db(A)]	50	53	54	51
Total sound power (LN version)	[db(A)]	78	81	83	80
Total sound pressure (LN version) - at 1 m distance	[db(A)]	60	63	65	62
Total sound pressure (LN version) - at 10 m distance	[db(A)]	47	50	51	48
Total sound power (SL version)	[db(A)]	76	79	81	78
Total sound pressure (SL version) - at 1 m distance	[db(A)]	58	61	63	60
Total sound pressure (SL version) - at 10 m distance	[db(A)]	45	48	49	46

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE+

Technical data

CRIO HE+ R290 range		48-2-2 PE	83-2-2 PE	99-2-2 PE	116-2-2 PE
COOLING - A BP/ST/AS/EC/*S version					
Cooling capacity ⁽¹⁾	[kW]	42,5	78,5	96,6	112
Total power input ⁽¹⁾	[kW]	19,6	36,4	42,5	51,9
EER - Energy Efficiency Ratio	-	2,17	2,16	2,27	2,16
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	39,4	65,5	85,8	87,6
"Ecodesign" compliance for process application (SEPR)	-	3,49	3,60	4,05	3,89

REFRIGERANT CIRCUIT					
Refrigerant	-	R290			
GWP	-	3			
Charge of refrigerant - Base unit	[kg]	10,2	17,0	22,3	22,8
Independent gas circuits	[n°]	2			
Compressors type	-	Semi-hermetic pistons			
Compressors quantity	[n°]	2			
Steps of capacity for each compressor (std)	-	1 (75%); 2 (50%)	1 (83%); 2 (67%); 3 (50%)		
Condensing coils type	-	Cu/Al			
Fans type	-	Axial EC			
Fans quantity	[n°]	3		4	
Fans power input ⁽¹⁾ (total)	[kW]	0,65	2,57	1,52	2,73
Total air flow	[m ³ /h]	22.600	51.000	49.000	60.700
Expansion valve type	-	Electronic			
Evaporator water flow ⁽¹⁾	[m ³ /h]	10,4	19,2	23,7	27,3
User circuit pressure drop ⁽¹⁾	[kPa]	23,4	29,4	34,9	38,2

DESUPERHEATER (option) - A BP/ST/DS/EC/*S					
Heating capacity ⁽²⁾	[kW]	8,26	14,0	17,1	20,8
Water flow	[m ³ /h]	1,43	2,43	2,96	3,61
User circuit pressure drop	[kPa]	4,4	4,1	4,5	4,0

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S					
Heating capacity ⁽²⁾	[kW]	60,4	111	137	160
Water flow	[m ³ /h]	10,5	19,2	23,7	27,7
User circuit pressure drop	[kPa]	24,8	31,2	36,6	39,3

Electrical data					
Power supply	-	400/3/50			
Emergency power supply	-	230/1/50			
Maximum power input without pump	[kW]	39,3	72,6	85,3	101
Locked rotor current – LRA without pump	[A]	178	307	353	415
Maximum absorbed current - FLA without pump	[A]	77,5	122	141	168

HYDRONIC KIT (option)					
Buffer tank capacity	[L]	290	500	470	470
Pump type	-	Centrifugal			

Standard pump - 150 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	1,1	2,2	2,2	2,2
Pump motor nominal current	[A]	3,3	4,7	4,7	4,7

Standard pump - 250 kPa useful head					
Motor Efficiency	-	IE3			
Pump motor nominal power	[kW]	2,2	3	4	4
Pump motor nominal current	[A]	4,7	6,4	8,7	8,7

Water connections					
Dimension (nominal external diameter)	[inch/DN]	1" 1/2 (DN 40)	2" (DN 50)	2"1/2 (DN 65)	2"1/2 (DN 65)

Noise levels ⁽³⁾					
Total sound power (ST version)	[db(A)]	84	88	89	89
Total sound pressure (ST version) - at 1 m distance	[db(A)]	66	69	70	70
Total sound pressure (ST version) - at 10 m distance	[db(A)]	52	56	57	57
Total sound power (LN version)	[db(A)]	81	85	86	86
Total sound pressure (LN version) - at 1 m distance	[db(A)]	63	66	67	67
Total sound pressure (LN version) - at 10 m distance	[db(A)]	49	53	54	54
Total sound power (SL version)	[db(A)]	79	83	84	84
Total sound pressure (SL version) - at 1 m distance	[db(A)]	61	64	65	65
Total sound pressure (SL version) - at 10 m distance	[db(A)]	47	51	52	52

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE+

130-2-2 PV ↔ 185-2-2 PV



Refrigerant
R290 | GWP=3



Brazen plate
heat exchanger



Semi-hermetic
piston compressor



Axial fan



Microchannel
condensing coils



Air to water chillers for medium temperature applications
High efficiency plus



Solution

B - Base
I - Integrata

Version

ST - Standard
LN - Low Noise
SL - Super Low Noise

Equipment

AS - Standard equipment
DS - Desuperheater
HR - Total modulating Heat Recovery

Cooling capacity 124 - 176 kW

Safety system

To ensure high-safety-level the unit is equipped with an **ATEX certified gas detector** and an **EC centrifugal extraction fan**. The sensor, with external dedicated power supply and Modbus output signal, has an alarm threshold set at 10% of the lower flammable limit (LFL). The Propane alarm causes the immediate shutdown of the machine and the centrifugal extraction fan is switched on, which allows the ventilation of the compressor compartment and the dilution of the R290 concentration to values below the lower flammability limit.

Structure

Structure specifically designed and built to guarantee total resistance to atmospheric agents and corrosion. Basement and panels made of galvanized steel sheet, oven-painted with polyurethane powders. Frame made of anodized aluminium profiles, with aluminium alloy corner joints that guarantee excellent mechanical resistance and low weight. LN (Low Noise) version: the panels are internally lined with sound-absorbing material. SL (Super Low Noise) version: the panels are sandwich and insulated with rock wool.

Compressor

Reciprocating semi-hermetic type compressor equipped with: electronic control module and protection of the electric motor (installed inside the electrical panel); oil charge; oil level sight glass and oil crankcase heater; anti-vibration rubber supports; anti-vibration pipes (suction and discharge); suction and discharge valves. The compressor can be supplied with one or more RSH capacity control heads to guarantee an adaptation of the cooling capacity in case of thermal load's reduction: please see the list of accessories for further information.

EC Fan

Premium-Axial-Fans with bionic shaped blades and high-efficient EC (Electronically Commutated) external rotor motors, sealed in protection IP54 and thermal class THCL 155. The motor efficiency class complies with IE4.

Air heat exchanger

Microchannel technology increases the primary to secondary surface area ratio and reduces the tube's air shadow to provide maximum heat exchange through our condensers.

Water heat exchanger

Brazen plate-type heat exchanger, stainless steel AISI 316 made, complete with water differential pressure switch, air vent valve and thermally insulated with closed-cell neoprene anti-condensate material. The heat exchanger design provides high thermal exchange and high performance results, furthermore it guarantees small dimensions and easy installation and maintenance.

Electrical board

Each unit is equipped with electric panel, built, wired and fully tested at the factory. Wiring numeration and optimized layout facilitate troubleshooting. The installed components are identified by nameplates to better identify the application and the type of action. Switchboard is made according to standards IEC 204-1/EN60204-1 and it is complete with the following main components: - Main isolator switch - Door interlock safety device - Contactor and protection for compressor and fans - Cabinet minimum protection rating IP54.

To ensure higher level of security, the cabinet is outside the machine and positioned on one side of the unit. The propane sensor is equipped with separate power supply: this power supply must always be guaranteed in order to ensure the monitoring of any leakage.

Control

The microprocessor controls the unit capacity by timing the compressors and checks the operating alarms with the possibility to connect to BMS.

Refrigerant circuit

Filter drier, moisture-liquid sight glass, electronic expansion valve, high & low pressure gauge, high and low pressure transducers, high pressure switch, safety high pressure valve (when required by EN 378-2016 standard).

Water circuit

(Integrata)

Base version: as interface to the plant, includes the water fittings of the evaporator only.

Integrated version: Water storage tank, water pressure gauge, safety valve, water discharge valve, centrifugal pump(s) suitable for glycol solutions up to 40%, manual by-pass valve, manual air venting valve. The pump control equipment is fitted inside the electrical board of the unit and the microprocessor control manages the pump starting, timing and all the safety devices of the whole system.

ACCESSORI PRINCIPALI

- Anti-vibration rubber/spring mounts
- Air heat exchanger protection panel or filter
- Air heat exchanger with various coatings treatment
- Low pressure switch
- Low pressure safety valve
- Double safety valve
- Overpressure valve / automatic by-pass
- Double water pump (stand-by) - Standard/ High pressure
- Open / Closed expansion vessel with automatic filling unit
- RSH Capacity Control head / Inverter driven compressor
- Advanced control c.pCo

CRIO HE+

Technical data

CRIO HE+ R290 range		130-2-2 PV	142-2-2 PV	161-2-2 PV	175-2-2 PV	185-2-2 PV
COOLING - A BP/ST/AS/EC/*S version						
Cooling capacity ⁽¹⁾	[kW]	124	136	155	165	176
Total power input ⁽¹⁾	[kW]	58,8	65,2	72,0	76,8	86,9
EER - Energy Efficiency Ratio	-	2,11	2,09	2,15	2,15	2,03
Saved CO2 equivalent Ton (*)	[CO ₂ Ton]	55,8	61,1	77	77,9	81,4
"Ecodesign" compliance for process application (SEPR)	-	3,68	3,58	3,66	3,78	3,44

REFRIGERANT CIRCUIT						
Refrigerant	-	R290				
GWP	-	3				
Charge of refrigerant - Base unit	[kg]	14,5	15,9	20,0	20,2	21,2
Independent gas circuits	[n°]	2				
Compressors type	-	Semi-hermetic pistons				
Compressors quantity	[n°]	2				
Steps of capacity for each compressor (std)	-	2 (75%); 3 (62,5%); 4 (50%)				
Condensing coils type	-	Microchannel				
Fans type	-	Axial EC				
Fans quantity	[n°]	4		6		
Fans power input ⁽¹⁾ (total)	[kW]	3,41	4,64	2,87	3,63	4,43
Total air flow	[m ³ /h]	66.500	75.000	79.600	87.000	94.500
Expansion valve type	-	Electronic				
Evaporator water flow ⁽¹⁾	[m ³ /h]	30,4	33,3	38,0	40,4	43,0
User circuit pressure drop ⁽¹⁾	[kPa]	40,0	35,2	34,0	37,3	33,8

DESUPERHEATER (option) - A BP/ST/DS/EC/*S						
Heating capacity ⁽²⁾	[kW]	24,0	26,3	31,4	32,8	38,7
Water flow	[m ³ /h]	4,17	4,56	5,44	5,69	6,72
User circuit pressure drop	[kPa]	3,5	3,8	11,6	11,4	14,0

HEAT RECOVERY (option) - A BP/ST/HR/EC/*S						
Heating capacity ⁽²⁾	[kW]	176	192	219	233	253
Water flow	[m ³ /h]	30,5	33,3	38,0	40,3	43,9
User circuit pressure drop	[kPa]	39,6	45,6	50,7	50,5	39,5

Electrical data						
Power supply	-	400/3/50				
Emergency power supply	-	230/1/50				
Maximum power input without pump	[kW]	95,1	114	120	125	133
Locked rotor current – LRA without pump	[A]	390	473	568	670	714
Maximum absorbed current - FLA without pump	[A]	166	193	199	216	232

HYDRONIC KIT (option)						
Buffer tank capacity	[L]	290	290	290	290	290
Pump type	-	Centrifugal				

Standard pump - 150 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	3	3	3	3	3
Pump motor nominal current	[A]	6,4	6,4	6,4	6,4	6,4

Standard pump - 250 kPa useful head						
Motor Efficiency	-	IE3				
Pump motor nominal power	[kW]	4	4	5,5	5,5	5,5
Pump motor nominal current	[A]	8,7	8,7	10,6	10,6	10,6

Water connections						
Dimension (nominal external diameter)	[inch/DN]	3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)

Noise levels ⁽³⁾						
Total sound power (ST version)	[db(A)]	90	94	95	95	97
Total sound pressure (ST version) - at 1 m distance	[db(A)]	71	75	75	75	77
Total sound pressure (ST version) - at 10 m distance	[db(A)]	58	62	63	63	65
Total sound power (LN version)	[db(A)]	87	91	92	92	94
Total sound pressure (LN version) - at 1 m distance	[db(A)]	68	72	72	72	74
Total sound pressure (LN version) - at 10 m distance	[db(A)]	55	59	60	60	62
Total sound power (SL version)	[db(A)]	85	89	90	90	92
Total sound pressure (SL version) - at 1 m distance	[db(A)]	66	70	70	70	72
Total sound pressure (SL version) - at 10 m distance	[db(A)]	53	57	58	58	60

Reference conditions:

(1) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Condensing coil: Cu/Al or microchannel according to models. Results according to UNI EN 14511-2022.

(2) Condenser air intake temperature = 35 °C - Evaporator fluid temperature IN/OUT = -4/-8 °C; Fluid: MEG 35% - Recovery user temp. IN/OUT = 40/45 °C; Fluid: water - Condensing coil: Cu/Al or microchannel according to models. Result: according to UNI EN 14511-2022.

(3) Sound power level in compliance with ISO 3744 - Sound pressure level (average) at 10 meter distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

(*) CO2 equivalent tons saved to the Environment compared to the choice of an EUROKLIMAT unit with similar cooling capacity and HFC refrigerant

CRIO HE+

Dimensions and weights

CRIO HE+ R290 range		10-1-1 PE	14-1-1 PE	17-1-1 PE	21-1-1 PE	30-1-1 PE
DIMENSIONS AND WEIGHTS - Standard unit						
Lenght	[mm]	1680	1680	1680	2330	2980
Width	[mm]	1025	1025	1025	1025	1025
Height (ST - LN)	[mm]	2121	2121	2121	2221	2221
Height (SL)	[mm]	2208	2208	2208	2308	2308
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	350	360	410	560	720
Operating weight (A BP/ST/AS/EC/** version)	[kg]	355	365	415	565	727

DIMENSIONS - Large unit						
Lenght	[mm]	2330	2330	2330	2980	3920
Width	[mm]	1025	1025	1025	1025	1025
Height (ST - LN)	[mm]	2221	2221	2221	2221	2281
Height (SL)	[mm]	2308	2308	2308	2308	2368

Unit dimensions with hydronic kit						
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Large	Large	Large	Large	Standard
Integrata LP 1-1 OO	-	Large	Large	Large	Standard	Standard
Integrata LP 1-1 OO and HR equipment	-	Large	Large	Large	Large	Large
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Large	Large	Large	Large	Standard
Integrata MP 1-1 OO	-	Large	Large	Large	Standard	Standard
Integrata MP 1-1 OO and HR equipment	-	Large	Large	Large	Large	Large
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Large	Large	Large	Standard	Standard

CRIO HE+ R290 range		36-1-1 PE	56-1-1 PE	41-2-2 PE	48-2-2 PE	83-2-2 PE
DIMENSIONS AND WEIGHTS - Standard unit						
Lenght	[mm]	2980	3920	3920	3920	4200
Width	[mm]	1025	1025	1025	1025	1185
Height (ST - LN)	[mm]	2221	2281	2281	2281	2320
Height (SL)	[mm]	2308	2368	2368	2368	2380
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	760	960	940	970	1460
Operating weight (A BP/ST/AS/EC/** version)	[kg]	767	968	948	978	1470

DIMENSIONS - Large unit						
Lenght	[mm]	3920	-	-	-	5000
Width	[mm]	1025	-	-	-	1185
Height (ST - LN)	[mm]	2281	-	-	-	2320
Height (SL)	[mm]	2368	-	-	-	2380

Unit dimensions with hydronic kit						
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard	Large
Integrata LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Large
Integrata LP 1-1 OO	-	Standard	Standard	Standard	Standard	Large
Integrata LP 1-1 OO and HR equipment	-	Large	Standard	Standard	Standard	Large
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard	Large
Integrata MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Large
Integrata MP 1-1 OO	-	Standard	Standard	Standard	Standard	Large
Integrata MP 1-1 OO and HR equipment	-	Large	Standard	Standard	Standard	Large
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Standard	Standard	Standard	Standard	Large

CRIO HE+

Dimensions and weights

CRIO HE+ R290 range		99-2-2 PE	116-2-2 PE	130-2-2 PV	142-2-2 PV	161-2-2 PV
DIMENSIONS AND WEIGHTS - Standard unit						
Lenght	[mm]	5500	5500	2895	2895	4015
Width	[mm]	1535	1535	2280	2280	2280
Height (ST - LN)	[mm]	2350	2350	2535	2535	2535
Height (SL)	[mm]	2410	2410	2560	2560	2560
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	1690	1710	1855	1900	2560
Operating weight (A BP/ST/AS/EC/** version)	[kg]	1700	1720	1870	1915	2578

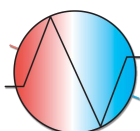
DIMENSIONS - Large unit						
Lenght	[mm]	Contact EK	Contact EK	4015	4015	-
Width	[mm]	Contact EK	Contact EK	2280	2280	-
Height (ST - LN)	[mm]	Contact EK	Contact EK	2535	2535	-
Height (SL)	[mm]	Contact EK	Contact EK	2560	2560	-

Unit dimensions with hydronic kit						
Integrata LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Contact EK	Contact EK	Large	Large	Standard
Integrata LP 1-1 OO	-	Standard	Standard	Large	Large	Standard
Integrata LP 1-1 OO and HR equipment	-	Contact EK	Contact EK	Large	Large	Standard
Integrata MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Contact EK	Contact EK	Large	Large	Standard
Integrata MP 1-1 OO	-	Standard	Standard	Large	Large	Standard
Integrata MP 1-1 OO and HR equipment	-	Contact EK	Contact EK	Large	Large	Standard
Base-P LP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard	Standard	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard	Standard	Standard	Standard
Base-T	-	Standard	Standard	Standard	Standard	Standard
Base-T and HR equipment	-	Contact EK	Contact EK	Large	Large	Standard

CRIO HE+ R290 range		142-2-2 PV	175-2-2 PV
DIMENSIONS AND WEIGHTS - Standard unit			
Lenght	[mm]	4015	4015
Width	[mm]	2280	2280
Height (ST - LN)	[mm]	2535	2535
Height (SL)	[mm]	2560	2560
Shipping weight (A BP/ST/AS/EC/** version)	[kg]	2575	2590
Operating weight (A BP/ST/AS/EC/** version)	[kg]	2593	2608

DIMENSIONS - Large unit			
Lenght	[mm]	-	-
Width	[mm]	-	-
Height (ST - LN)	[mm]	-	-
Height (SL)	[mm]	-	-

Unit dimensions with hydronic kit			
Integrata LP 1-0 OO	-	Standard	Standard
Integrata LP 1-0 OO and HR equipment	-	Standard	Standard
Integrata LP 1-1 OO	-	Standard	Standard
Integrata LP 1-1 OO and HR equipment	-	Standard	Standard
Integrata MP 1-0 OO	-	Standard	Standard
Integrata MP 1-0 OO and HR equipment	-	Standard	Standard
Integrata MP 1-1 OO	-	Standard	Standard
Integrata MP 1-1 OO and HR equipment	-	Standard	Standard
Base-P LP 1-0 OO	-	Standard	Standard
Base-P LP 1-0 OO and HR equipment	-	Standard	Standard
Base-P LP 1-1 OO	-	Standard	Standard
Base-P LP 1-1 OO and HR equipment	-	Standard	Standard
Base-P MP 1-0 OO	-	Standard	Standard
Base-P MP 1-0 OO and HR equipment	-	Standard	Standard
Base-P MP 1-1 OO	-	Standard	Standard
Base-P MP 1-1 OO and HR equipment	-	Standard	Standard
Base-T	-	Standard	Standard
Base-T and HR equipment	-	Standard	Standard



JNC

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Soluciones desde 1991