

GPE POLYVALENT UNITS

This kind of units have been studied and designed for all those applications where a simultaneous cold water and warm water production is required, for example: Hospitals, Hotels, sporting centers, Industrial Plants and so on.

The peculiarity of this series, called Polyvalent Groups, is to suit all passing plant's needs, automatically and apart from atmospheric conditions. The goal is to fulfill the warm water and cold-water demand moving automatically from a running mode to the other.

It's basically a 4-pipes heat pump with 2 independent and not interchangeable circuits aimed to the cold and warm water production. Each cooling circuit is therefore supplied with an additional condenser/recovery able to produce warm water, when needed.

The unit's control system is totally automatic and is carried out through an electronic microprocessor installed on board.

The units series GPE (with scroll compressors) is delivered with refrigerant and oil charge and factory-tested. The units are suitable for operation with refrigerant R 407 C and R-22.

Running Modes:

As mentioned above, the units can run in 4 different modes according to the plant's needs:

Mode No. 1 Only Cooling Mode

This running mode is the proper one when only a cold-water production is needed. The unit runs as a standard water chiller. The cooling fluid evaporates in the evaporator, removes heat from the water, is compressed into the compressor and finally in the finned coil the condensing process takes place. With such a running mode the condenser/recovery is automatically excluded from the cooling circuit.

Mode No.2 Cooling Mode with Heat Recovery

This running mode is the proper one when a simultaneous warm water and cold water production is needed. The unit runs as a standard water chiller with heat recovery. The cooling fluid evaporates in the evaporator, removes heat from the water, is compressed into the compressor and finally in the condenser/recovery the condensing process takes place with consequent warm water production according

to requirement. When the warm water demand is not enough to absorb all the heat and complete the condensing process, the same will be concluded in the coil.

Mode No. 3 Heat Pump Mode

This running mode is the proper one when only warm water is needed. The unit runs as an heat pump and therefore produces only warm water. The cooling fluid evaporates in the finned coil absorbing heat from the external air, is compressed into the compressor and finally in the condenser/recovery the condensing process takes place with consequent warm water production.

Mode No. 4 Simultaneous Cooling and heat pump running mode

This running mode is the proper one when the warm water demand is superior to the cold water demand. This running mode is available only on units with at least 2 circuits. The two circuits operate simultaneously in 2 different modes. Namely one, or more, of the cooling circuits can run in Model 1 or 2 and therefore produce cooled water and warm water. The circuits leftover can run simultaneously as heat pump and produce only warm water. Mode No. 4 is usually a middle course between Mode No. 2 and Mode No. 3.

COMPONENTS

FRAME AND PANELS

GPE – 2 Circuits

The frame and the panels are manufactured in galvanized steel and painted with thermosetting and thermoplastic powders. The painting process consists of a 12 stages working schedule able to create on the galvanized surface a myriad of activated centers (phosphatization with zinc salts) where the powder fixes itself in the complete and lasting Colour RAL 7032.

The Electr. Room and the compressor room are located inside the unit. The compressor room, even through being apart from the air flow and therefore protected against atmospheric agents is, thanks to its peculiar construction, ventilated enough to allow the components normal working conditions.

COMPRESSORS

GPE: Last generation scroll hermetic compressors, suitable for heat pump version. Great reliability, lack of mechanical vibration, reduced noisy, high efficiency are the main features of these compressors. The average COP is 3.37 Kw/Kw. On some models tandem scroll compressors are used, allowing an inrush current reduction and capacity steps execution.

COIL-AIR REFRIGERANT EXCHANGER

In the standard version, the coil is made of copper pipes and bearing frame in Peralluman or stainless steel. The way the refrigerant is distributed in the pipes is the optimum one in both working conditions: condensing and evaporating.

The coil is tested at 30-bar pressure.

EVAPORATOR

GPE-1 circuit (upto the model 821)

Weld brazed plate exchangers complete with a special distribution system to optimize the refrigerant expansion.

GPE-2 circuits

Dry expansion evaporator with two, three or four circuits depending on the compressor's quantity and only one water circuit. The U-bend tubes are made of ruled copper pipes having high heat exchange coefficient and grant a free expansion to the shell. The intermediate baffles are positioned so as to guarantee a uniform water distribution compatibly with the pressure drops. The exchanger is supplied complete with joints for connection with water circuit.

In the standard version the tubes are not extractable.

CONDENSER / RECOVERY

GPE-1 circuit (Up to the model 821) Each compressor work on a weld-brazed condenser/ recovery.

GPE 2 Circuits

Each Compressor work on a shell & Tube condenser / recovery.

The exchanger's tube are made of copper and externally ruled to increase the exchange coefficient. The condenser is complete with security valve with 30 bar calibration.

Axial Fans

Axial-type fans with direct-driven 6/8 poles electric motor, electronically balanced, complete with heat protection, air conveyor and protection grid.

COOLING CIRCUIT

The unit is provided with several independent cooling circuits according to the number of compressors.

Each cooling circuit, manufactured with copper or steel pipes, consists of: thermostatic expansion valves for the regulation of the refrigerant flow even in compressor capacity steps regime, solenoid valves for the automatic switching from a running mode to another, dehydrating filters, check valves, non return valves, low pressure safety valves, high and low pressure switches, high and low pressure gauges.

ELECTRICAL BOARD

The electrical board supplying the unit at 400V/3Ph consists of a proper room where a microprocessor complete with LCD display is installed.

The main switch is lock-door safety type. Inside the electrical board the controls parts the protection parts, the terminal board and the auxiliary 24 V are inserted.

CONTROL SYSTEM

EMIPLUS Microprocessor complete with IN/OUT electronic card and LCD display.

The microprocessor allows the total and automatic unit management. Its functions, besides the alarms parameters and unit status display are: -

- Control of the evaporator inlet water temperature
- Change of the working parameters
- Management of the electro-valves for the automatic switching among running modes
- Management of the protection time delays and compressors rotation
- Management of alarms
- Possibility of connection to a supervisory system

POLYVALENT UNITS - GPE SCROLL COMPRESSORS - 1 CIRCUIT						
Model		GPE 361	GPE 421	GPE 481	GPE 561	GPE 701
ONLY COOLING OPERATION (1)						
Cooling Capacity	TR	10.6	12.4	14.7	16.9	20.4
Absorbed Power of Compressor	KW	9.9	9.9	14.1	16.7	21.1
Absorbed Current of Compressor	Amps	15.7	22.5	26.5	31.0	32.8
ONLY COOLING OPERATION With RECOVERY (2)						
Cooling Capacity	TR	10.4	12.7	14.5	16.9	20.7
Heating Capacity of Desuperheater	KW	46.8	57.4	65.4	76.1	93.5
Absorbed Power of Compressor	KW	10.2	12.9	14.5	16.7	20.6
Absorbed Current of Compressor	Amps	16.0	21.9	27	31	32.2
Heat Pump Operation (3)						
Heating Capacity	KW	45.5	53.4	60.4	67.9	87.1
Absorbed Power of Compressor	KW	10.2	12.9	14.5	16.5	20.5
Absorbed Current of Compressor	Amps	16.1	21.9	27.0	30.9	32.1
Compressor SCROLL Type						
Quantity	no.	1	1	2	2	2
Cooling Circuits	no.	1	1	1	1	1
Axial Fans						
Quantity	no.	2	2	3	3	3
Air Flow Rate	Lps	4720	4720	6750	6750	6460
Absorbed power	KW	1.26	1.26	1.89	1.89	1.89
Absorbed current	Amps	6	6	9	9	9
Rotation Speed	RPM	860	860	860	860	860
EVAPORATOR (1)						
Water Flow Rate	Lps	1.78	2.09	2.47	2.84	3.43
Pressure Drop	Kpa	50	47	20	18	18
RECOVERY CONDENSER (2)						
Water Flow Rate	Lps	2.24	2.74	3.13	3.63	4.47
Pressure Drop	Kpa	50	16	20	19	22
Total maximum absorbed power	KW	15.6	16.8	21.8	23.5	30.6
Total maximum absorbed current	Amps	29	31	41	43.6	55.1
Inrush Current	Amps	148	167	140	148	184
Sound Pressure Level (4)	db(A)	67	67	68.5	68.5	68.5
Charge Of Refrigerant	Kgs	12.5	16	20	22	24.1
Dimensions						
Length	mm	2000	2000	2130	2130	2130
Width	mm	850	850	1100	1100	1100
Height	mm	1450	1450	1770	1770	1770
Weight	Kgs	520	555	745	782	834

(1) : Temp water to evap. 7 / 12 Deg C - External air 35 Deg C

(2) : Temp water to evap. 7 / 12 Deg C - water to recovery 40 / 45 Deg C

(3) : Temp water to condenser 40 / 45 Deg C - temp external air 10 Deg C - 80% RH

(4) Measured at 1 Mt. in free field (ISO 3746)

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POLYVALENT UNITS - GPE							
SCROLL COMPRESSORS - 1 CIRCUIT							
Model		GPE 821	GPE 842	GPE 962	GPE 1102	GPE 1402	GPE 1602
ONLY COOLING OPERATION (1)							
Cooling Capacity	TR	24.1	25.7	28.6	32.4	41.1	48.5
Absorbed Power of Compressor	KW	27.9	25.8	29.9	35.8	41.8	55.3
Absorbed Current of Compressor	Amps	46.8	43.9	55.1	65.0	75.4	92.8
ONLY COOLING OPERATION With RECOVERY (2)							
Cooling Capacity	TR	25.1	25.7	29.1	33.8	41.8	50.5
Heating Capacity of Desuperheater	KW	114.3	116.4	131.5	152.2	187.7	229.4
Absorbed Power of Compressor	KW	25.8	25.6	29.1	33.3	40.6	51.5
Absorbed Current of Compressor	Amps	44	43.7	54.1	62	73.2	87.8
Heat Pump Operation (3)							
Heating Capacity	KW	102.5	107.1	120.7	128.2	172.4	199.2
Absorbed Power of Compressor	KW	25.6	25.5	29.0	32.9	40.1	51.1
Absorbed Current of Compressor	Amps	43.6	43.5	54.0	61.5	72.4	86.9
Compressor SCROLL Type							
Quantity	no.	2	4	4	4	4	4
Cooling Circuits	no.	1	2	2	2	2	2
Axial Fans							
Quantity	no.	3	3	3	3	4	4
Air Flow Rate	Lps	6460	9835	9835	9835	12670	12670
Absorbed power	KW	1.89	2.94	2.94	2.94	3.92	3.92
Absorbed current	Amps	9	5.25	5.25	5.25	7	7
Rotation Speed	RPM	860	900	900	900	900	900
EVAPORATOR (1)							
Water Flow Rate	Lps	4.05	4.33	4.82	5.45	6.91	8.14
Pressure Drop	Kpa	20	32	27.5	42	43	32
RECOVERY CONDENSER (2)							
Water Flow Rate	Lps	5.46	5.56	6.28	7.27	8.97	10.96
Pressure Drop	Kpa	22	66	70	64.8	41	47
Total maximum absorbed power	KW	17.5	34.1	42.8	46.0	61.4	66.3
Total maximum absorbed current	Amps	34	55.29	69.25	74.37	99.16	107
Inrush Current	Amps	217	187.65	150.25	161.95	196.8	237.3
Sound Pressure Level (4)	db(A)	68.5	71	71	71	72	72
Charge Of Refrigerant	Kgs	25.2	38	42	45.5	49.2	53
Dimensions							
Length	mm	2130	2610	2610	2610	3460	3460
Width	mm	1100	1245	1245	1245	1245	1245
Height	mm	1770	2085	2085	2085	2085	2085
Weight	Kgs	885	1185	1325	1410	1780	1850

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