Air Cooled DX-Packaged Units Tropical

High Ambient Series – Adiabatic Evaporative Cooling Condenser

CG – PACU-A

Meet and Comply With

- ASHRAE Standard 90.1
- ARI Standard 310/380

- **Tropical Series**
- **High Performance**
- **Energy Efficient**
- **ECO Friendly Green Products**
- **Operation Flexibility**
- **Durable Products**

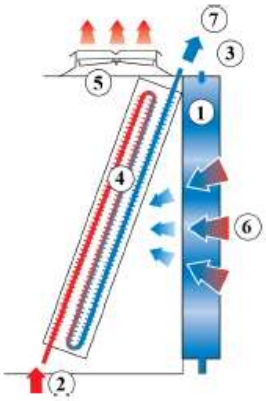
Benefits

Clima Green CG-PACU-A tropical series, ducted type air cooled dx-packaged units suit all the residential, commercial and industrial applications.

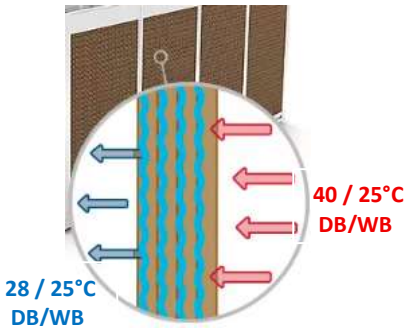
- **Tropical Series:** high temperature ambient applications continuously operation up to 52 °C.
- **High Performance**: highest cooling performance according to ARI standard ratings.
- **Energy Efficient**: Less power consumption in comparing with similar air conditioners.
- **ECO Friendly Green Products:** Zero Ozone Depletion, Low GWP refrigerant, lower Co2 emissions.
- **Operation Flexibility:** Wide operation range by High static Backward curved centrifugal fans and VSD inverters.
- **Durable Products:** unit constructions appropriately selected to guarantee high material specifications, less trouble shooting and long-life span.
- **Cost Effective:** unit cost effectively considering the energy efficient and green product.

Adiabatic Direct Evaporative Cooling DEC - Condenser

CG-PACU-A equipped with **adiabatic pre-coolers (1)** that cool the **condenser refrigerant (2)** by sensible heat transfer. **Water flows (3)** evenly over evaporative cooling pads located in front of the **dry finned coil (4)**. At the same time **axial (5) fans** draw **air (6)** through the pads where a portion of the water evaporates and cools down the saturated air. This increases the cooling capacity of the incoming air for cooling the condenser **and secure lower refrigerant pressure (7)** inside the condenser coil led to lowering the condensing temperature and maximizing the compressor capacity.



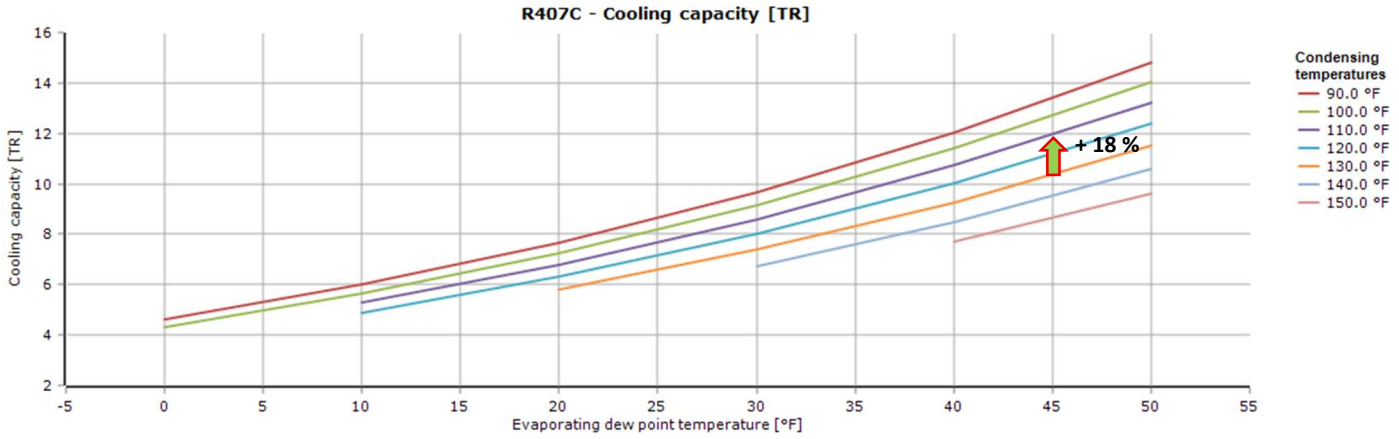
DEC - Working principle

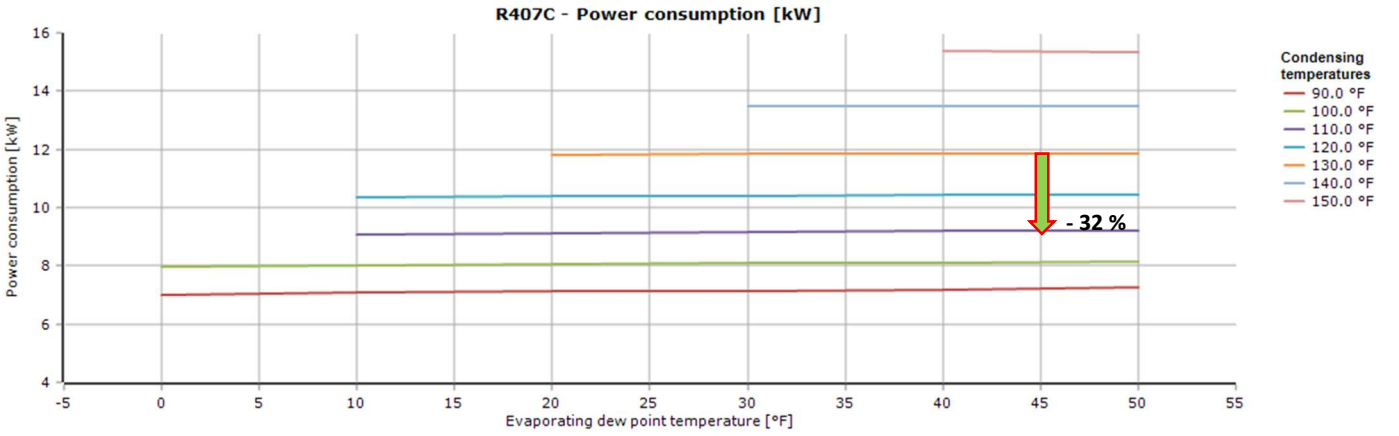


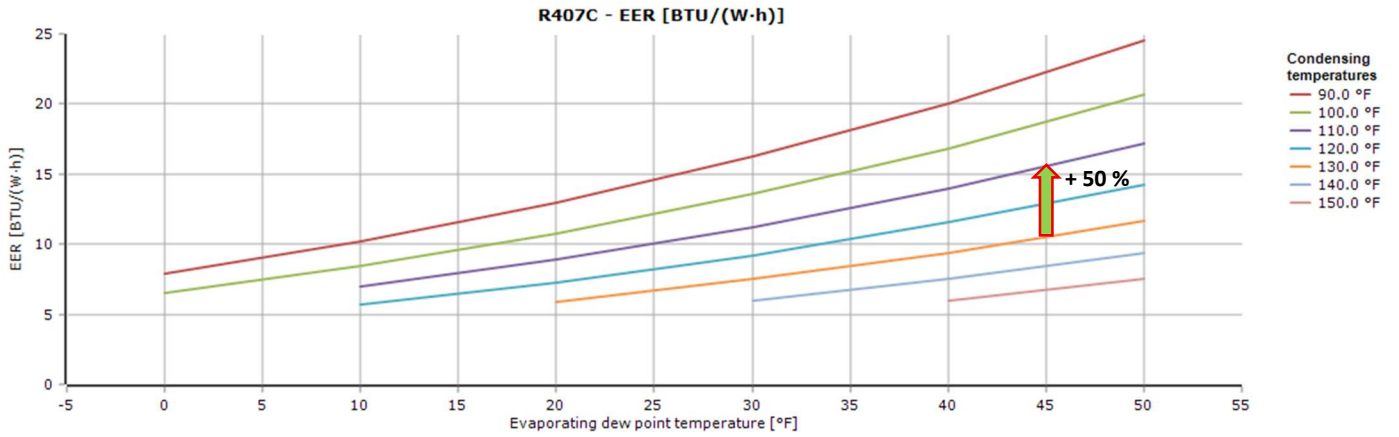
Evaporative cooling pads

Significant Improvement in Cooling Performance

The adiabatic evaporative cooling condenser could dramatically improve the cooling performance of the dx-refrigerant circuits, the below graphs show the cooling capacity ranges, power consumption as well as cooling performance of standard 10 RT hermetic scroll compressor at different condensing temperatures, For only 20° F (11°C) reduction in the condensing temperature result in increasing the cooling capacity by average 18 % and less power consumption by 32 % while secure 50 % cooling performance improvement.


R407C - Cooling capacity [TR]
Cooling capacity [TR]
Evaporating dew point temperature [°F]
+ 18 %
Condensing temperatures
90.0 °F
100.0 °F
110.0 °F
120.0 °F
130.0 °F
140.0 °F
150.0 °F


R407C - Power consumption [kW]
Power consumption [kW]
Evaporating dew point temperature [°F]
- 32 %
Condensing temperatures
90.0 °F
100.0 °F
110.0 °F
120.0 °F
130.0 °F
140.0 °F
150.0 °F


R407C - EER [BTU/(W·h)]
EER [BTU/(W·h)]
Evaporating dew point temperature [°F]
+ 50 %
Condensing temperatures
90.0 °F
100.0 °F
110.0 °F
120.0 °F
130.0 °F
140.0 °F
150.0 °F

TECHNICAL DESCRIPTION

CG-PACU unit consist of two independent air pass enclosures or air sections, the first one named as primary air section includes the Pre-filter, DX-evaporator coil, optional mist eliminator and supply air plug fans.

The second air pass named secondary air section includes, air pre filter, wet deck cellulose paper (adiabatic process) as well as sump pump, DX-condenser coil and exhaust air axial fans.

In primary air section (evaporating section): The supply air plug fan draws the Return air through intake filter passing the dx-evaporator coil as well as optional eliminator adiabatic wet deck (evaporative cooling) discharge the cooled and dehumidified supply air within the plenum box and discharge out to the space either through top or side discharge outlet Via supply air plug fans

DX-Compression Cycle

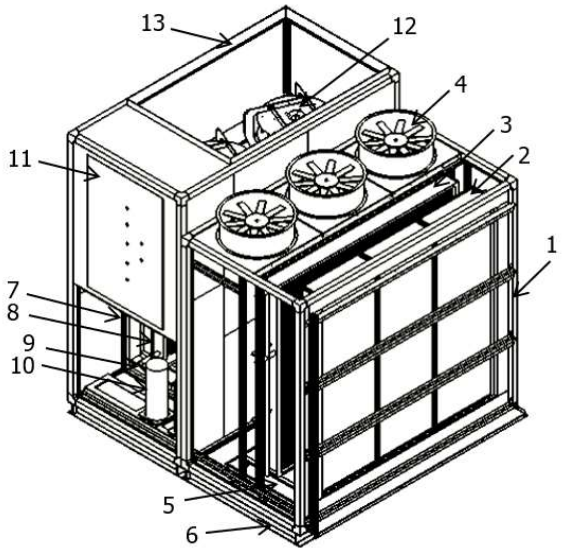
Separate depended enclosures for direct Expansion (Cooling and Dehumidification), the DX-evaporator deliver return air and cool and dehumidify the air to the set point supply air temperature ready to supply to the space via the supply air fan. Single or twin compressors shall modulate in duty according to demand load & room return air temperature set.

In secondary air section (condensing section): The extract air axial fan draws the filtered outside air passing to the wet deck direct evaporative cooling – "Adiabatic cooling process", DX-condenser coil, while air exhausted to the surrounding.

The sump pump recirculates the water to the wet deck papers for direct evaporative cooling process.

Secondary Air section

1- Air intake pre-filter
2- Wet deck-pads (adiabatic paper)
3-DX-Condenser
4- Condenser Axial Fans
5- Sump pump tank
6- Steel base frame



Primary Air Section

7- Air intake pre-filter
8- DX-Evaporator
9- Condensate drain
10- Twin scroll compressors
11- Mcc-control panel
12- Supply plug fans
13- Supply air top discharge neck (Side discharge is an option)

Unit Constructions

Panel Construction

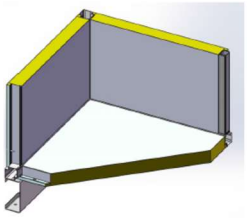
Aluminum Profile - Anodized – Double Skin Rockwall insulated sandwich panels

Drain Pans

Stainless Steel Drain pan with bottom pan drain hole sloped to side connection.

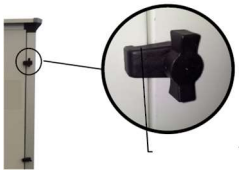
Base Frame

Epoxy Coated Heavy Duty black steel.



Profile Corners

Re-in forced Plastic / Nylon corners for



Door Lock

Door Lock in Nylon

Plug Fans

Primary / Secondary Supply air fans, High Efficiency non overloading high pressure backward Curved Centrifugal Plug Fan, Footed mounting, or Wall hanging, direct derive type, statically and dynamically balanced, Aluminum impeller complete with epoxy coated pedestal frame mounting in vibration isolators.

VFD, Variable frequency derive inverter to adjust the air flow against the actual fan static pressure, 0 to 10 v modulating speed control for part load power saving.

IEC Motors

premium efficiency - Aluminum Casing - anti corrosive coating squirl cage induction motor, three phase standard IEC motor, insulation class - F, Efficiency class IE3, Ingress protection IP 54, continuous operation class S1

Scroll Compressor

High Efficiency and cooling performance scroll compressor, dual or multi compressors per each unit.

R407C - new CFC - friendly refrigerant, low level of GWP, low power consumption, lower carbon emission.

Air Intake Filter

Aluminum filters for large dust particles with aluminum frame and filter media in multi-layered flat aluminum wire, Washable. Class: G2, mounting: on slide rails or in frames, drawn to sides though access panel.
Optional Synthetic filter G4 grade.

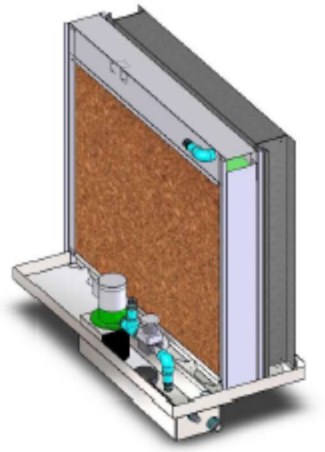
Dx- Evaporator and Condenser Coils

Copper tubes Aluminum fins air to water or refrigerant heat exchanger coil, either water, evaporator or condenser.
The collectors of the coils are equipped with nipples for vent and drain.
The water and direct expansion coils have holes at the lower cover for the drainage of the condensate in the drain pan.
The coils, in standard execution, are subjected to a pneumatic test at a pressure of 30 Bar, by injection of dry air and water immersion.

Coils Enclosures

The coils are housed in specific sections and individually mounted on "L" rails. For easy disassembly, at each coil corresponds a dedicated front panel.
Seals of passage of the collectors EPDM exclusive design to ensure a perfect air tightness and look perfectly smooth and easily washable inside the panel. The coil can be removed easily, leaving in place the gaskets.

Direct Evaporative Cooling Pads



Cellulose paper with thickness 200 mm, flute 5 for wet DEC adiabatic evaporative cooling in front of condenser coil, the DEC process equipped with circulating pump and by-pass valve for regulating the flow of water to the wet deck. The tank has a lower sump in which are housed the pump with.

stainless steel mesh filter, the make-up floating valve, the overflow with the drain plug. The lower sump in the water basin allows to reduce the amount of water present in the basin and, resulting almost emptied at each switch over of the pump, ensures the necessary bleed -off (to reduce the concentration of salts in the water and ensure a periodical replacement of the same).

Water Circulating Pump

submersible type – Rigid Plastic body house stainless steel core water circulating pump European certified, heavy-duty operation for long lifetime and minimum trouble shooting.

Electrical Components

Miniature Circuit Breakers, Motor Circuits Breakers, Contactors, relays, overload, ...

Room Thermostat (optional)

Wall bus Room Sensors and Displays, both units include a temperature sensor and can output the temperature in either °C or °F. On / OFF and three speed fan positioning

- There are versions which include humidity and/or CO2 sensors.

Physical DATA

Model Serial Number	CG-PACU-A-60	CG- PACU-A -120	CG- PACU-A -180	CG- PACU-A -260	CG- PACU-A -280	CG- PACU-A -340
Nominal air Flow (m3/h)	3,500	7,800	9,500	14,600	15,800	18,700
(CFM)	**2,100**	**4,600**	**5,600**	**8,600**	**9,300**	**11,000**
Nominal. Cooling - KW (**RT**) *	17.5 (5**)**	35 (10**)**	49 (14**)**	70 (20**)**	80 (23**)**	98 (28**)**
Voltage characteristics	380/3/5					
Refrigerant Circuits	1	2	2	2	2	2
Circuits arrange.	Interwind for 2 circuits					
Expansion Valve	TXV - Thermal Expansion Valve					
Compressor						
Type	Scroll					
Capacity (HP)	6	6	7.8	12	13.3	15.8
Quantity	1	2	2	2	2	2
Capacity MBH	72	72	94	144	160	190
Refrigerant	R407C					
Oil	Polyester Ester					
RLA (amp)-Each.	9	9	12.5	17.6	20.3	25.6
LRA (amp) -Each.	74	74	95	118	140	174
Speed (rpm)	2900					
Voltage (v/ph/HZ)	380/3/50					
DX - Evaporator Coil						
Type	CU/ALU fins					
No of rows	4 to 6					
Face Velocity (m/s)	2.5 - 3.0					
Frame Coating	Epoxy					
Refrigerant	R407C					
DX - Condenser Coil						
Type	CU/ALU fins					
No of rows	4 to 6					
Face Velocity (m/s)	3 to 3.3					
Fin Coating	Precoated Blue fins					
Refrigerant	R407C					
DEC-Sump Pump						
Type	Submersible					
Material	Plastic Body-Stainless Steel Cone					
Quantity	1	1	1	1	1	1
Capacity (watts)	50	75	100	130	130	130
Voltage (v/ph/HZ)	230/1/50					
DEC - Evaporative Cooling - Pads						
Type	Flute - 5					

Physical data continued

Material	Cellulose paper					
Face Velocity (m/s)	2.5 to 3.3					
Area (m2)	0.7	1.4	1.8	2.5	2.5	3.2
Thickness (mm)	200					
Air Pressure Drop (pa)	90					
Mini Efficiency (%)	80					
Supply Air Fans						
Type	Plug Fan					
Nominal Air Flow (m3/h)	3,500	3,900	4750	7300	7900	9350
Quantity	1	2	2	2	2	2
Size (mm)	350	350	450	500	500	560
Material	Aluminum					
Frame Coating	Epoxy					
Derive	Direct					
Speed derives	VFD					
Motor standard	IEC					
Power (Kw)	1.1	1.1	1.5	2.2	2.2	3.0
Quantity	1	2	2	2	2	2
Efficiency Class	IE3					
Insulation Class	F					
Ingress Protection	IP54					
Exhaust Air Fans						
Type	Axial-Fan					
Nominal Air Flow (m3/h)	3,600	11,250	14,850	22,400	24,450	29,200
Quantity	1	1	2	3	3	4
Size (mm)	550	550	550	550	550	550
External static presser	400	400	500	500	450	450
Material	Plastic					
Frame Coating	Epoxy					
Derive	Direct					
Speed derives	VFD					
Motor	IEC					
Power (Kw) / Each	1.1	1.1	1.1	1.1	1.1	1.1
Quantity	1	2	2	3	3	4
Efficiency Class	IE3					
Insulation Class	F					
Ingress Protection	IP54					
Filters						
Type	Pre-filter					
Material	Aluminum-Washable type					

Physical data continued

Face Velocity (m/s)	2.5 to 3.0					
Thickness (mm)	25	25	50	50	50	50
Air Pressure Drop (pa)	50	50	65	65	65	65
EU - Efficiency Grade	G2 and G4-Flat as optional					
Electrical / Control						
Electrical Panel	Panel Components by Schnieder					
Control Thermostat	Three position on/off & Auto modes					
Operation Modes	Cooling only					
Control Module	Return Air Temperature					
Dimensions / Weights						
Dimensions L X W X H (m)	1.4 x 1 x 1.45	2 x 1.6 x 1.65	2 x 1.6 x 1.65	2 x 2.1 x 2.45	2 x 2.1 x 2.45	2.2 x 2.6 x 2.45
Weights (kg) – Estimated	460	620	780	1050	1460	1580

- * Nominal cooling capacity is based on 35℃ ambient and 27/19°C DB/WB air entering evaporator in according to ARI standard.
- Units could stable in duty working as much as outdoor temperature of 52 ° C.
- S S Air Technology have all rights to change the given data without notifications.

Cooling Performance

CG-PACU-A-60

2,080 CFM — Ambient DBT with Coincident WBT °C

On Coil Temp			45							50						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			18.8	18.7	18.5	17.8	17.3	16.9	17	18.8	18.5	18.3	17.3	17.1	17	16.8
Comp. Power Cons.			3.5	3.73	3.82	3.98	4.05	4.25	4.5	3.62	3.82	3.9	4.05	4.15	4.38	4.6
19	22	Sensible Cooling Capacity	9.4	9.35	9.24	8.89	8.65	8.45	8.5	9.38	9.24	9.13	8.65	8.55	8.48	8.4
	23		10.3	10.3	10.2	9.78	9.52	9.3	9.35	10.3	10.2	10	9.52	9.41	9.32	9.24
	24		11.3	11.2	11.1	10.7	10.4	10.1	10.2	11.3	11.1	11	10.4	10.3	10.2	10.1
	25		12.2	12.2	12	11.6	11.2	11	11.1	12.2	12	11.9	11.2	11.1	11	10.9
	26		13.2	13.1	12.9	12.4	12.1	11.8	11.9	13.1	12.9	12.8	12.1	12	11.9	11.8
	27		15	15	14.8	14.2	13.8	13.5	13.6	15	14.8	14.6	13.8	13.7	13.6	13.4
	28		16	15.9	15.7	15.1	14.7	14.4	14.5	15.9	15.7	15.5	14.7	14.5	14.4	14.3
	29		16.9	16.8	16.6	16	15.6	15.2	15.3	16.9	16.6	16.4	15.6	15.4	15.3	15.1
Water Evaporation			62.1	58.1	53.3	49.3	45.9	39.8	36.5	56.7	68.9	64.8	71.6	56	52	47.9

Ambient DBT with Coincident WBT °C

On Coil Temp			35							40						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			19	18.8	18.8	18.5	18.3	17.3	16.9	18.9	18.8	18.7	18.3	17.8	17.1	17
Comp. Power Cons.			3.4	3.5	3.62	3.82	3.9	4.05	4.25	3.45	3.62	3.73	3.9	3.98	4.15	4.38
19	22	Sensible Cooling Capacity	9.5	9.4	9.38	9.24	9.13	8.65	8.45	9.45	9.38	9.35	9.13	8.89	8.55	8.48
	23		10.5	10.3	10.3	10.2	10	9.52	9.3	10.4	10.3	10.3	10	9.78	9.41	9.32
	24		11.4	11.3	11.3	11.1	11	10.4	10.1	11.3	11.3	11.2	11	10.7	10.3	10.2
	25		12.4	12.2	12.2	12	11.9	11.2	11	12.3	12.2	12.2	11.9	11.6	11.1	11
	26		13.3	13.2	13.1	12.9	12.8	12.1	11.8	13.2	13.1	13.1	12.8	12.4	12	11.9
	27		15.2	15	15	14.8	14.6	13.8	13.5	15.1	15	15	14.6	14.2	13.7	13.6
	28		16.2	16	15.9	15.7	15.5	14.7	14.4	16.1	15.9	15.9	15.5	15.1	14.5	14.4
	29		17.1	16.9	16.9	16.6	16.4	15.6	15.2	17	16.9	16.8	16.4	16	15.4	15.3
Water Evaporation			39.2	54	31.1	26.3	21.6	16.9	12.8	50	45.9	41.2	37.1	33.1	28.4	24.3

Ambient DBT with Coincident WBT °C

On Coil Temp			25							30						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			18.7							19.4	18.9	18.8	18.7	18.5	17.8	17.1
Comp. Power Cons.			3.73							3.33	3.45	3.5	3.73	3.82	3.98	4.15
19	22	Sensible Cooling Capacity	9.35							9.7	9.45	9.4	9.35	9.24	8.89	8.55
	23		10.285							10.7	10.4	10.3	10.3	10.2	9.78	9.41
	24		11.22							11.6	11.3	11.3	11.2	11.1	10.7	10.3
	25		12.155							12.6	12.3	12.2	12.2	12	11.6	11.1
	26		13.09							13.6	13.2	13.2	13.1	12.9	12.4	12
	27		14.96							15.5	15.1	15	15	14.8	14.2	13.7
	28		15.895							16.5	16.1	16	15.9	15.7	15.1	14.5
	29		16.83							17.5	17	16.9	16.8	16.6	16	15.4
Water Evaporation										28.4	23.6	18.9	14.2	9.45	4.73	0

CG-PACU-A-120

4,600 CFM

Ambient DBT with Coincident WBT °C

On Coil Temp			45							50						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			37.6	37.4	37	35.6	34.6	33.8	34	37.5	37	36.5	34.6	34.2	33.9	33.6
Comp. Power Cons.			7	7.46	7.63	7.95	8.1	8.5	9	7.23	7.63	7.8	8.1	8.3	8.75	9.2
19	22	Sensible Cooling Capacity	18.8	18.7	18.5	17.8	17.3	16.9	17	18.8	18.5	18.3	17.3	17.1	17	16.8
	23		20.7	20.6	20.3	19.6	19	18.6	18.7	20.6	20.3	20.1	19	18.8	18.6	18.5
	24		22.6	22.4	22.2	21.3	20.8	20.3	20.4	22.5	22.2	21.9	20.8	20.5	20.3	20.2
	25		24.4	24.3	24	23.1	22.5	22	22.1	24.4	24	23.7	22.5	22.2	22	21.8
	26		26.3	26.2	25.9	24.9	24.2	23.7	23.8	26.3	25.9	25.6	24.2	23.9	23.7	23.5
	27		30.1	29.9	29.6	28.4	27.7	27	27.2	30	29.6	29.2	27.7	27.4	27.1	26.9
	28		32	31.8	31.4	30.2	29.4	28.7	28.9	31.9	31.4	31	29.4	29.1	28.8	28.6
	29		33.8	33.7	33.3	32	31.1	30.4	30.6	33.8	33.3	32.9	31.1	30.8	30.5	30.2
Water Evaporation			124	116	107	98.6	91.8	79.7	72.9	113	138	130	143	112	104	95.9

Ambient DBT with Coincident WBT °C

On Coil Temp			35							40						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
			21.4	*23.0*	*24.6*	*26.2*	*27.8*	*29.4*	*31.0*	*22.4*	*24.0*	*25.6*	*27.2*	*28.8*	*30.4*	*32.0*
			36.4	*38.0*	*39.6*	*41.2*	*42.8*	*44.4*	*46.0*	*37.4*	*39.0*	*40.6*	*42.2*	*43.8*	*45.4*	*47.0*
Total Cooling Cap.			38	37.6	37.5	37	36.5	34.6	33.8	37.8	37.5	37.4	36.5	35.6	34.2	33.9
Comp. Power Cons.			6.8	7	7.23	7.63	7.8	8.1	8.5	6.9	7.23	7.46	7.8	7.95	8.3	8.75
19	22	Sensible Cooling Capacity	19	18.8	18.8	18.5	18.3	17.3	16.9	18.9	18.8	18.7	18.3	17.8	17.1	17
	23		20.9	20.7	20.6	20.3	20.1	19	18.6	20.8	20.6	20.6	20.1	19.6	18.8	18.6
	24		22.8	22.6	22.5	22.2	21.9	20.8	20.3	22.7	22.5	22.4	21.9	21.3	20.5	20.3
	25		24.7	24.4	24.4	24	23.7	22.5	22	24.6	24.4	24.3	23.7	23.1	22.2	22
	26		26.6	26.3	26.3	25.9	25.6	24.2	23.7	26.5	26.3	26.2	25.6	24.9	23.9	23.7
	27		30.4	30.1	30	29.6	29.2	27.7	27	30.2	30	29.9	29.2	28.4	27.4	27.1
	28		32.3	32	31.9	31.4	31	29.4	28.7	32.1	31.9	31.8	31	30.2	29.1	28.8
	29		34.2	33.8	33.8	33.3	32.9	31.1	30.4	34	33.8	33.7	32.9	32	30.8	30.5
Water Evaporation			78.3	108	62.1	52.7	43.2	33.8	25.7	99.9	91.8	82.4	74.3	66.2	56.7	48.6

Ambient DBT with Coincident WBT °C

On Coil Temp			25							30						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
			25.0	*25.0*	*25.0*	*25.0*	*25.0*	*25.0*	*25.0*	*20.4*	*22.0*	*23.6*	*25.2*	*26.8*	*28.4*	*30.0*
			40.0	*40.0*	*40.0*	*40.0*	*40.0*	*40.0*	*40.0*	*35.4*	*37.0*	*38.6*	*40.2*	*41.8*	*43.4*	*45.0*
Total Cooling Cap.						37.4				38.8	37.8	37.6	37.4	37	35.6	34.2
Comp. Power Cons.						7.46				6.65	6.9	7	7.46	7.63	7.95	8.3
19	22	Sensible Cooling Capacity				18.7				19.4	18.9	18.8	18.7	18.5	17.8	17.1
	23					20.57				21.3	20.8	20.7	20.6	20.3	19.6	18.8
	24					22.44				23.3	22.7	22.6	22.4	22.2	21.3	20.5
	25					24.31				25.2	24.6	24.4	24.3	24	23.1	22.2
	26					26.18				27.2	26.5	26.3	26.2	25.9	24.9	23.9
	27					29.92				31	30.2	30.1	29.9	29.6	28.4	27.4
	28					31.79				33	32.1	32	31.8	31.4	30.2	29.1
	29					33.66				34.9	34	33.8	33.7	33.3	32	30.8
Water Evaporation										56.7	47.3	37.8	28.4	18.9	9.45	0

CG-PACU-A-180

5,600 CFM

Ambient DBT with Coincident WBT °C

On Coil Temp			45							50						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			51	50	49.5	48.5	48	46.8	41.8	50.5	49.5	49	48	47.4	44.3	43.1
Comp. Power Cons.			9.48	10	10.2	10.6	10.8	11.4	11.8	9.74	10.2	10.4	10.8	11.1	11.6	12.2
19	22	Sensible Cooling Capacity	25.5	25	24.8	24.3	24	23.4	20.9	25.3	24.8	24.5	24	23.7	22.2	21.6
	23		28.1	27.5	27.2	26.7	26.4	25.7	23	27.8	27.2	27	26.4	26.1	24.4	23.7
	24		30.6	30	29.7	29.1	28.8	28.1	25.1	30.3	29.7	29.4	28.8	28.4	26.6	25.9
	25		33.2	32.5	32.2	31.5	31.2	30.4	27.2	32.8	32.2	31.9	31.2	30.8	28.8	28
	26		35.7	35	34.7	34	33.6	32.8	29.3	35.4	34.7	34.3	33.6	33.2	31	30.2
	27		40.8	40	39.6	38.8	38.4	37.4	33.4	40.4	39.6	39.2	38.4	37.9	35.4	34.5
	28		43.4	42.5	42.1	41.2	40.8	39.8	35.5	42.9	42.1	41.7	40.8	40.3	37.7	36.6
	29		45.9	45	44.6	43.7	43.2	42.1	37.6	45.5	44.6	44.1	43.2	42.7	39.9	38.8
Water Evaporation			164	153	141	130	121	105	96.2	150	182	171	189	148	137	127

Ambient DBT with Coincident WBT °C

On Coil Temp			35							40						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			52	51	50.5	49.5	49	48	46.8	51.5	50.5	50	49	48.5	47.4	44.3
Comp. Power Cons.			9	9.48	9.74	10.2	10.4	10.8	11.4	9.24	9.74	10	10.4	10.6	11.1	11.6
19	22	Sensible Cooling Capacity	26	25.5	25.3	24.8	24.5	24	23.4	25.8	25.3	25	24.5	24.3	23.7	22.2
	23		28.6	28.1	27.8	27.2	27	26.4	25.7	28.3	27.8	27.5	27	26.7	26.1	24.4
	24		31.2	30.6	30.3	29.7	29.4	28.8	28.1	30.9	30.3	30	29.4	29.1	28.4	26.6
	25		33.8	33.2	32.8	32.2	31.9	31.2	30.4	33.5	32.8	32.5	31.9	31.5	30.8	28.8
	26		36.4	35.7	35.4	34.7	34.3	33.6	32.8	36.1	35.4	35	34.3	34	33.2	31
	27		41.6	40.8	40.4	39.6	39.2	38.4	37.4	41.2	40.4	40	39.2	38.8	37.9	35.4
	28		44.2	43.4	42.9	42.1	41.7	40.8	39.8	43.8	42.9	42.5	41.7	41.2	40.3	37.7
	29		46.8	45.9	45.5	44.6	44.1	43.2	42.1	46.4	45.5	45	44.1	43.7	42.7	39.9
			5.7	*8.3*	*11.0*	*14.1*	*17.5*	*21.1*	*25.0*	*3.6*	*6.2*	*9.0*	*12.0*	*15.3*	*18.9*	*22.8*
			11.5	*16.3*	*15.6*	*18.0*	*20.7*	*23.6*	*26.9*	*11.0*	*13.0*	*15.1*	*17.5*	*20.2*	*23.1*	*26.4*
Water Evaporation			103	143	82	69.5	57	44.6	33.9	132	121	109	98	87.3	74.8	64.2

Ambient DBT with Coincident WBT °C

On Coil Temp			25							30						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.						50				52.4	51.5	51	50	49.5	48.5	47.4
Comp. Power Cons.						10				8.8	9.24	9.48	10	10.2	10.6	11.1
19	22	Sensible Cooling Capacity				25				26.2	25.8	25.5	25	24.8	24.3	23.7
	23					27.5				28.8	28.3	28.1	27.5	27.2	26.7	26.1
	24					30				31.4	30.9	30.6	30	29.7	29.1	28.4
	25					32.5				34.1	33.5	33.2	32.5	32.2	31.5	30.8
	26					35				36.7	36.1	35.7	35	34.7	34	33.2
	27					40				41.9	41.2	40.8	40	39.6	38.8	37.9
	28					42.5				44.5	43.8	43.4	42.5	42.1	41.2	40.3
	29					45				47.2	46.4	45.9	45	44.6	43.7	42.7
Water Evaporation										74.8	62.4	49.9	37.4	24.9	12.5	0

CG-PACU-A-280

9,300 CFM

Ambient DBT with Coincident WBT °C

On Coil Temp			45							50						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			86.2	84	82.9	80.7	79.6	77.4	75.2	85.1	82.9	81.8	79.6	78.5	76.3	74.1
Comp. Power Cons.			16	16.6	17	17.8	18.2	19	19.8	16.3	17	17.4	18.2	18.6	19.4	20.3
19	22	Sensible Cooling Capacity	43.1	42	41.5	40.4	39.8	38.7	37.6	42.6	41.5	40.9	39.8	39.3	38.2	37.1
	23		47.4	46.2	45.6	44.4	43.8	42.6	41.4	46.8	45.6	45	43.8	43.2	42	40.8
	24		51.7	50.4	49.7	48.4	47.8	46.4	45.1	51.1	49.7	49.1	47.8	47.1	45.8	44.5
	25		56	54.6	53.9	52.5	51.7	50.3	48.9	55.3	53.9	53.2	51.7	51	49.6	48.2
	26		60.3	58.8	58	56.5	55.7	54.2	52.6	59.6	58	57.3	55.7	55	53.4	51.9
	27		69	67.2	66.3	64.6	63.7	61.9	60.2	68.1	66.3	65.4	63.7	62.8	61	59.3
	28		73.3	71.4	70.5	68.6	67.7	65.8	63.9	72.3	70.5	69.5	67.7	66.7	64.9	63
	29		77.6	75.6	74.6	72.6	71.6	69.7	67.7	76.6	74.6	73.6	71.6	70.7	68.7	66.7
Water Evaporation			322	301	277	256	238	207	189	294	357	336	371	291	270	249

Ambient DBT with Coincident WBT °C

On Coil Temp			35							40						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			88	86.2	85.1	82.9	81.8	79.6	77.4	87.1	85.1	84	81.8	80.7	78.5	76.3
Comp. Power Cons.			15.4	16	16.3	17	17.4	18.2	19	15.7	16.3	16.6	17.4	17.8	18.6	19.4
19	22	Sensible Cooling Capacity	44	43.1	42.6	41.5	40.9	39.8	38.7	43.6	42.6	42	40.9	40.4	39.3	38.2
	23		48.4	47.4	46.8	45.6	45	43.8	42.6	47.9	46.8	46.2	45	44.4	43.2	42
	24		52.8	51.7	51.1	49.7	49.1	47.8	46.4	52.3	51.1	50.4	49.1	48.4	47.1	45.8
	25		57.2	56	55.3	53.9	53.2	51.7	50.3	56.6	55.3	54.6	53.2	52.5	51	49.6
	26		61.6	60.3	59.6	58	57.3	55.7	54.2	61	59.6	58.8	57.3	56.5	55	53.4
	27		70.4	69	68.1	66.3	65.4	63.7	61.9	69.7	68.1	67.2	65.4	64.6	62.8	61
	28		74.8	73.3	72.3	70.5	69.5	67.7	65.8	74	72.3	71.4	69.5	68.6	66.7	64.9
	29		79.2	77.6	76.6	74.6	73.6	71.6	69.7	78.4	76.6	75.6	73.6	72.6	70.7	68.7
Water Evaporation			203	280	161	137	112	87.6	66.6	259	238	214	193	172	147	126

Ambient DBT with Coincident WBT °C

On Coil Temp			25							30						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.						84				89	87.1	86.2	84	82.9	80.7	78.5
Comp. Power Cons.						16.6				15.1	15.7	16	16.6	17	17.8	18.6
19	22	Sensible Cooling Capacity				42				44.5	43.6	43.1	42	41.5	40.4	39.3
	23					46.2				49	47.9	47.4	46.2	45.6	44.4	43.2
	24					50.4				53.4	52.3	51.7	50.4	49.7	48.4	47.1
	25					54.6				57.9	56.6	56	54.6	53.9	52.5	51
	26					58.8				62.3	61	60.3	58.8	58	56.5	55
	27					67.2				71.2	69.7	69	67.2	66.3	64.6	62.8
	28					71.4				75.7	74	73.3	71.4	70.5	68.6	66.7
	29					75.6				80.1	78.4	77.6	75.6	74.6	72.6	70.7
Water Evaporation										147	123	98.1	73.6	49.1	24.5	0

CG-PACU-A-340

11,000 CFM

Ambient DBT with Coincident WBT °C

On Coil Temp			45							50						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			98.4	96.4	95.4	93.2	92	90	87.6	97.4	95.4	94.4	92	91	88.8	86.4
Comp. Power Cons.			19.6	20	20.4	21.3	21.8	22.6	23.6	19.8	20.4	20.8	21.8	22.2	23.1	22.2
19	22	Sensible Cooling Capacity	49.2	48.2	47.7	46.6	46	45	43.8	48.7	47.7	47.2	46	45.5	44.4	43.2
	23		54.1	53	52.5	51.3	50.6	49.5	48.2	53.6	52.5	51.9	50.6	50.1	48.8	47.5
	24		59	57.8	57.2	55.9	55.2	54	52.6	58.4	57.2	56.6	55.2	54.6	53.3	51.8
	25		64	62.7	62	60.6	59.8	58.5	56.9	63.3	62	61.4	59.8	59.2	57.7	56.2
	26		68.9	67.5	66.8	65.2	64.4	63	61.3	68.2	66.8	66.1	64.4	63.7	62.2	60.5
	27		78.7	77.1	76.3	74.6	73.6	72	70.1	77.9	76.3	75.5	73.6	72.8	71	69.1
	28		83.6	81.9	81.1	79.2	78.2	76.5	74.5	82.8	81.1	80.2	78.2	77.4	75.5	73.4
	29		88.6	86.8	85.9	83.9	82.8	81	78.8	87.7	85.9	85	82.8	81.9	79.9	77.8
Water Evaporation			322	301	277	256	238	207	189	294	357	336	371	291	270	249

Ambient DBT with Coincident WBT °C

On Coil Temp			35							40						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.			100	98.4	97.4	95.4	94.4	92	90	99.3	97.4	96.4	94.4	93.2	91	88.8
Comp. Power Cons.			18.6	19.6	19.8	20.4	20.8	21.8	22.6	19.1	19.8	20	20.8	21.3	22.2	23.1
19	22	Sensible Cooling Capacity	50.1	49.2	48.7	47.7	47.2	46	45	49.7	48.7	48.2	47.2	46.6	45.5	44.4
	23		55.1	54.1	53.6	52.5	51.9	50.6	49.5	54.6	53.6	53	51.9	51.3	50.1	48.8
	24		60.1	59	58.4	57.2	56.6	55.2	54	59.6	58.4	57.8	56.6	55.9	54.6	53.3
	25		65.1	64	63.3	62	61.4	59.8	58.5	64.5	63.3	62.7	61.4	60.6	59.2	57.7
	26		70.1	68.9	68.2	66.8	66.1	64.4	63	69.5	68.2	67.5	66.1	65.2	63.7	62.2
	27		80.2	78.7	77.9	76.3	75.5	73.6	72	79.4	77.9	77.1	75.5	74.6	72.8	71
	28		85.2	83.6	82.8	81.1	80.2	78.2	76.5	84.4	82.8	81.9	80.2	79.2	77.4	75.5
	29		90.2	88.6	87.7	85.9	85	82.8	81	89.4	87.7	86.8	85	83.9	81.9	79.9
Water Evaporation			203	280	161	137	112	87.6	66.6	259	238	214	193	172	147	126

Ambient DBT with Coincident WBT °C

On Coil Temp			25							30						
WBT DBT °C			18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.						96.4				101	99.3	98.4	96.4	95.4	93.2	91
Comp. Power Cons.						20				18.3	19.1	19.6	20	20.4	21.3	22.2
19	22	Sensible Cooling Capacity				48.2				50.6	49.7	49.2	48.2	47.7	46.6	45.5
	23					53.02				55.6	54.6	54.1	53	52.5	51.3	50.1
	24					57.84				60.7	59.6	59	57.8	57.2	55.9	54.6
	25					62.66				65.7	64.5	64	62.7	62	60.6	59.2
	26					67.48				70.8	69.5	68.9	67.5	66.8	65.2	63.7
	27					77.12				80.9	79.4	78.7	77.1	76.3	74.6	72.8
	28					81.94				85.9	84.4	83.6	81.9	81.1	79.2	77.4
	29					86.76				91	89.4	88.6	86.8	85.9	83.9	81.9
Water Evaporation										147	123	98.1	73.6	49.1	24.5	0

Quick Selection

Given: Commercial Building space with thermal design cooling as followings:

- Ambient temperatures 113/75 °F (45 / 24 °C DB/WB)
- Total Cooling Capacity: 150,850 BTUH (44 KW)
- Sensible Cooling Capacity: 116,570 BTUH (34 KW)
- Supply air Flow: 5200 CFM @ ESP 1.5 In.wg (375 pa)
- Air Entering Coil: 80.6 / 66.2 °F (27 / 19 °C DB/WB)

Selection: from cooling performance table, go to the model CG-PACU-A-180, Nominal air flow 5600 cfm

At ambient 45 / 24 °C DB/WB, fix the total and sensible cooling capacity at the on-coil air temperature as 27 / 19 °C DB/WB

- Total Cooling Capacity: 166,000 BTUH (48.45KW)
- Sensible Cooling Capacity: 133,000 BTUH (38.8 KW)
- Compressor power consumption: 10.6 KW
- Evaporative Cooling consumption: 130 l/h , Maximum Daily Consumption: 1.3 m3/day (10 working hrs.)

From physical data table at selected model

- Supply Fan power: 1.5 KW Qty:02 ------- 3.0 KW
- Exhaust Fan power: 1.1 KW Qty:02 ----- 2.2 KW
- Total Fans Power consumption: 5.2 Kw
- Overall unit Power consumption: 15.8 Kw
- System Cooling Performance EER: 10.5 BUTH/Watts COP: 3.0 KW/KW or 1.16 Kw/RT @ **45 °C ambient**

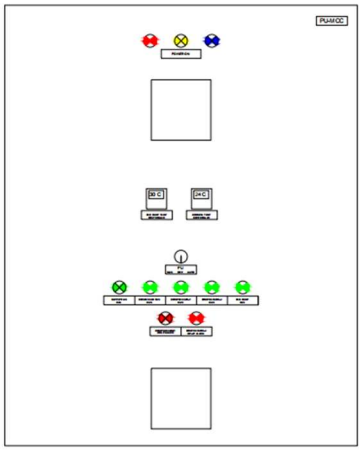
Supply air flow and static pressure:
The supply air fan external static pressure is 400 Pa, the nominal supply air flow is 5,600 cfm
The design air flow 5200 cfm could be achieved at ESP 375 pa by modulating the VSD inverter, moreover it provide more flexibility when considering the actual installed duct static pressure.

CG-PACU-A-180 ✓

5,600 CFM		Ambient DBT with Coincident WBT °C												
On Coil Temp		45							50					
WBT DBT	°C	18.0	20.0	22.0	24.0	26.0	28.0	30.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
Total Cooling Cap.		51	50	49.5	48.5	48	46.8	41.8	50.5	49.5	49	48	47.4	44.3	43.1
Comp. Power Cons.		9.48	10	10.2	10.6	10.8	11.4	11.8	9.74	10.2	10.4	10.8	11.1	11.6	12.2
Sensible Cooling Capacity	22	25.5	25	24.8	24.3	24	23.4	20.9	25.3	24.8	24.5	24	23.7	22.2	21.6
	23	28.1	27.5	27.2	26.7	26.4	25.7	23	27.8	27.2	27	26.4	26.1	24.4	23.7
	24	30.6	30	29.7	29.1	28.8	28.1	25.1	30.3	29.7	29.4	28.8	28.4	26.6	25.9
19	25	33.2	32.5	32.2	31.5	31.2	30.4	27.2	32.8	32.2	31.9	31.2	30.8	28.8	28
	26	35.7	35	34.7	34	33.6	32.8	29.3	35.4	34.7	34.3	33.6	33.2	31	30.2
	27	40.8	40	39.6	38.8	38.4	37.4	33.4	40.4	39.6	39.2	38.4	37.9	35.4	34.5
	28	43.4	42.5	42.1	41.2	40.8	39.8	35.5	42.9	42.1	41.7	40.8	40.3	37.7	36.6
	29	45.9	45	44.6	43.7	43.2	42.1	37.6	45.5	44.6	44.1	43.2	42.7	39.9	38.8
Water Evaporation		164	153	141	130	121	105	96.2	150	182	171	189	148	137	127

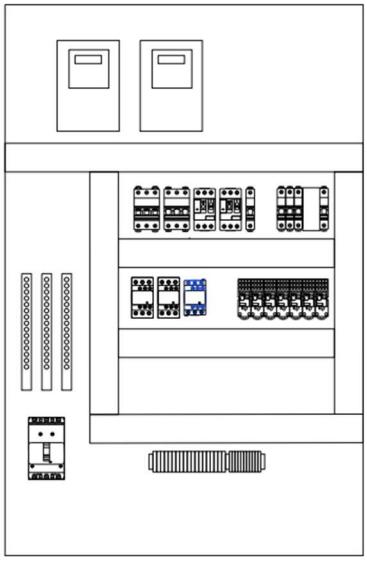
Electrical wiring and Control

A) Standard Electrical Wiring diagram for two circuits (sample for model CG-PACU-A- 280)



FRONT VIEW

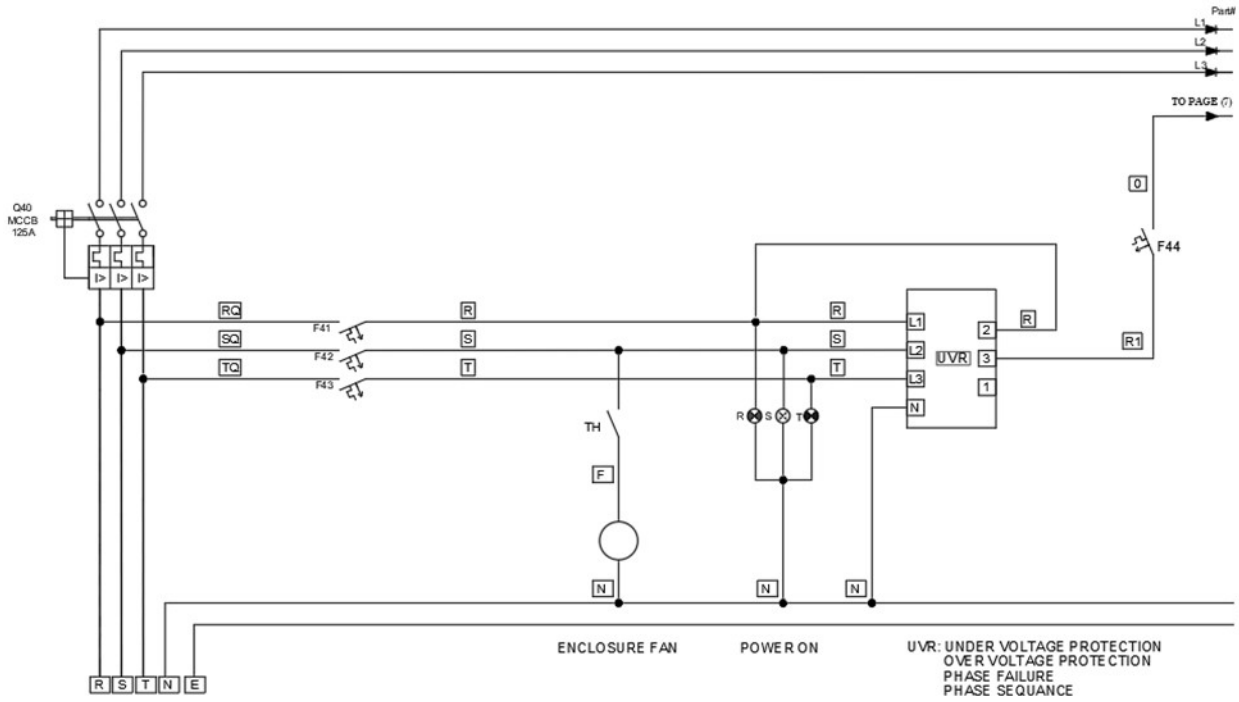
- ENCLOSURE TYPE KSA - IP66
- SIZE HXWXD (120x800x300)MM
- INCOMING CABLE FROM LOWER SIDE
- OUTGOING CABLES FROM LOWER SIDE

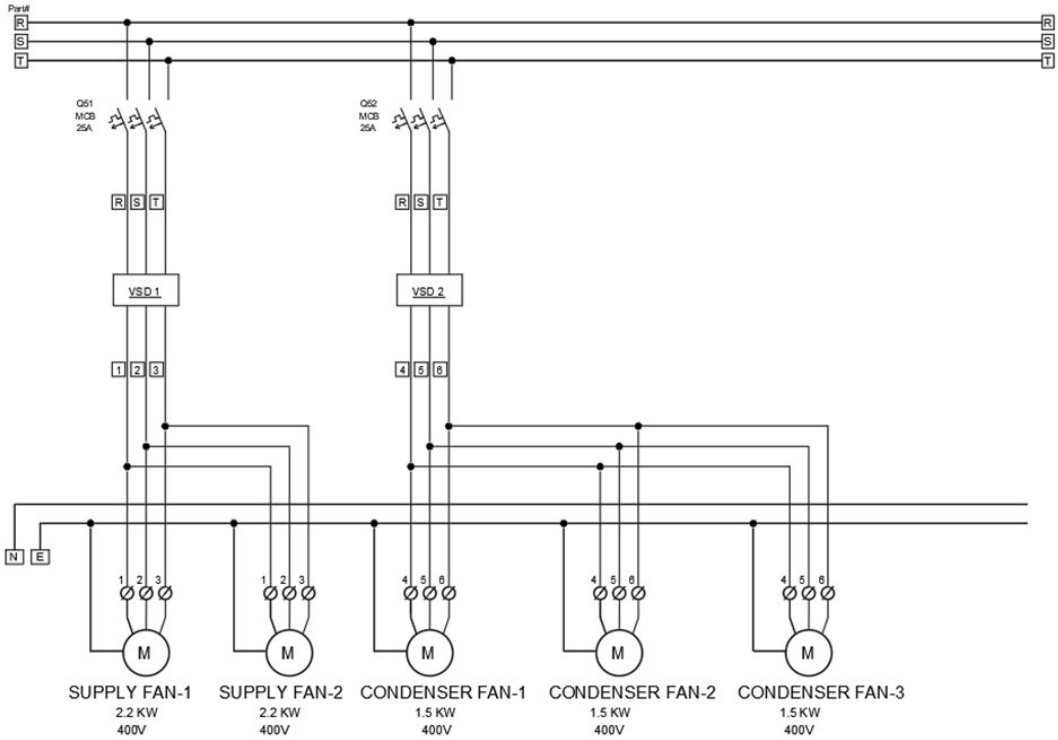


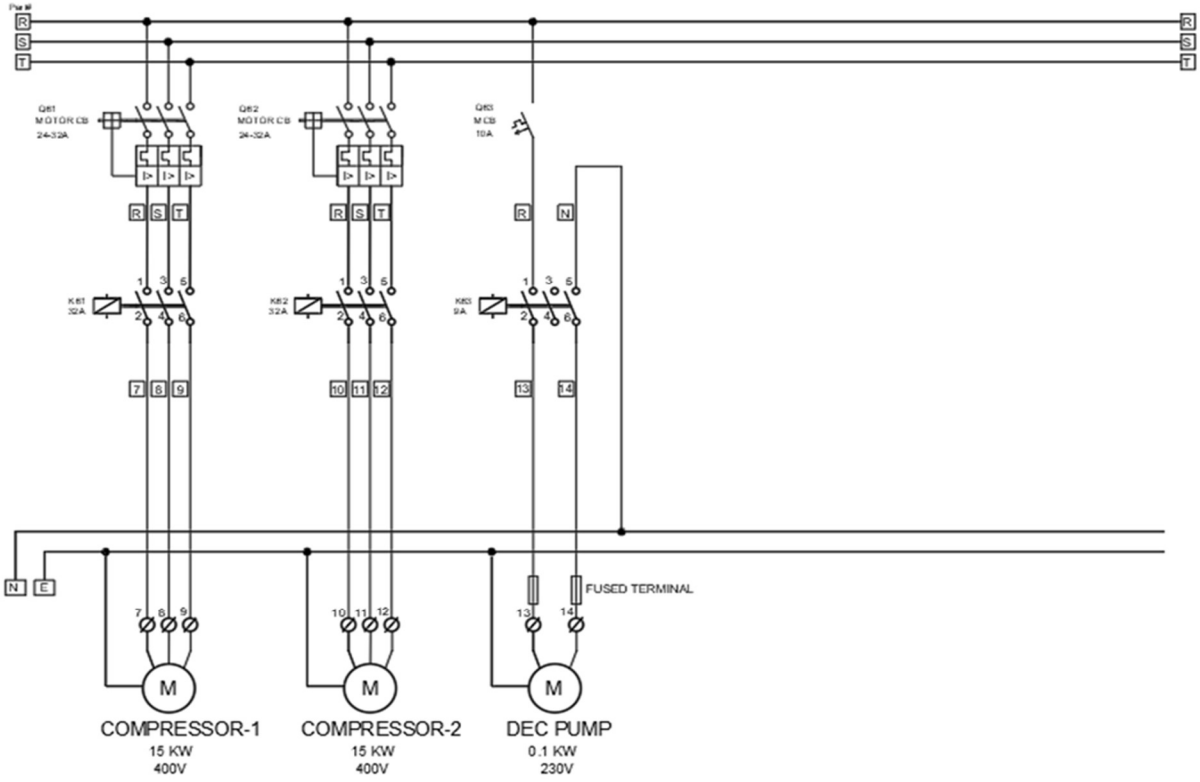
BACK PANEL VIEW

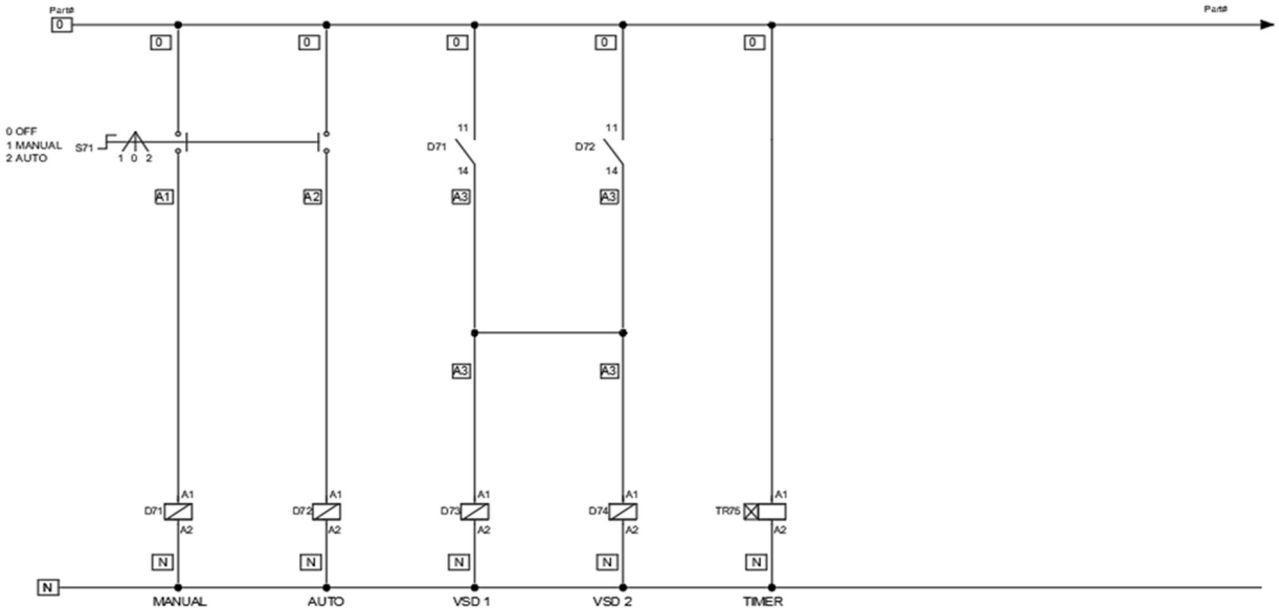
MATERIAL LIST

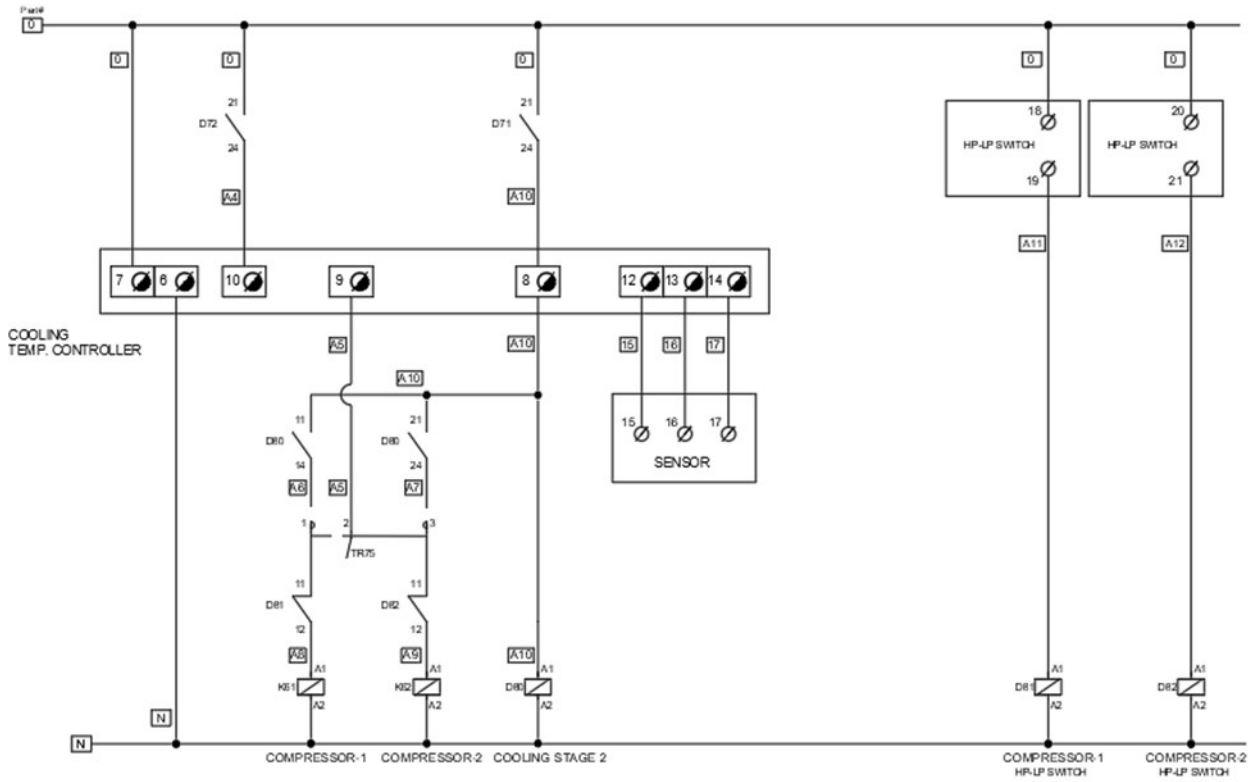
REF	SERVING	RANGE	VOLTAGE	DISCRIPTION	PART NO.	MANUFACTURE
Q40	MAIN INCOMER	125A	400V	MCCB	G12F3F125	SCHNEIDER
F41		10A	230V	MCB	IK60N	SCHNEIDER
F42		10A	230V	MCB	IK60N	SCHNEIDER
F43		10A	230V	MCB	IK60N	SCHNEIDER
UVR		5A	400V	UVR	UVR	KLEMSAN
F44		10A	230V	MCB	IK60N	SCHNEIDER
Q51	SUPPLY FAN (VSD1) 5.5KW/400V/3PH	25A	400V	MCB	A9K24320	SCHNEIDER
VSD1		17A	400V	VSD	L510	TECO
D73		6A	230V	RELAY	RXM4AB1P7	SCHNEIDER
Q52	CONDENSER FAN (VSD2) 5.5KW/400V/3PH	25A	400V	MCB	A9K24320	SCHNEIDER
VSD2		17A	400V	VSD	L510	TECO
D74		6A	230V	RELAY	RXM4AB1P7	SCHNEIDER
Q61	COMPRESSOR-1 15KW/400V/3PH	24-35A	400V	MCB	GV2ME32	SCHNEIDER
K61		32A	400V	CONTACTOR	LC1D32M7	SCHNEIDER
Q62	COMPRESSOR-2 15KW/400V/3PH	24-35A	400V	MCB	GV2ME32	SCHNEIDER
K62		32A	400V	CONTACTOR	LC1D32M7	SCHNEIDER
Q63	IEC PUMP 0.1KW/230V/1PH	10A	230V	MCB	A9K24110	SCHNEIDER
K63		9A	400V	CONTACTOR	LC1D09M7	SCHNEIDER
D71	MANUAL POS	6A	230V	RELAY	RXM4AB1P7	SCHNEIDER
D72	AUTO POS	6A	230V	RELAY	RXM4AB1P7	SCHNEIDER
TR75	MECH. TIMER	5A	230V	MECH TIMER	CCT16364	
D80	COOLING	6A	230V	RELAY	RXM4AB1P7	SCHNEIDER
D81	COMP-1 HP-LP	6A	230V	RELAY	RXM4AB1P7	SCHNEIDER
D82	COMP-2 HP-LP	6A	230V	RELAY	RXM4AB1P7	SCHNEIDER

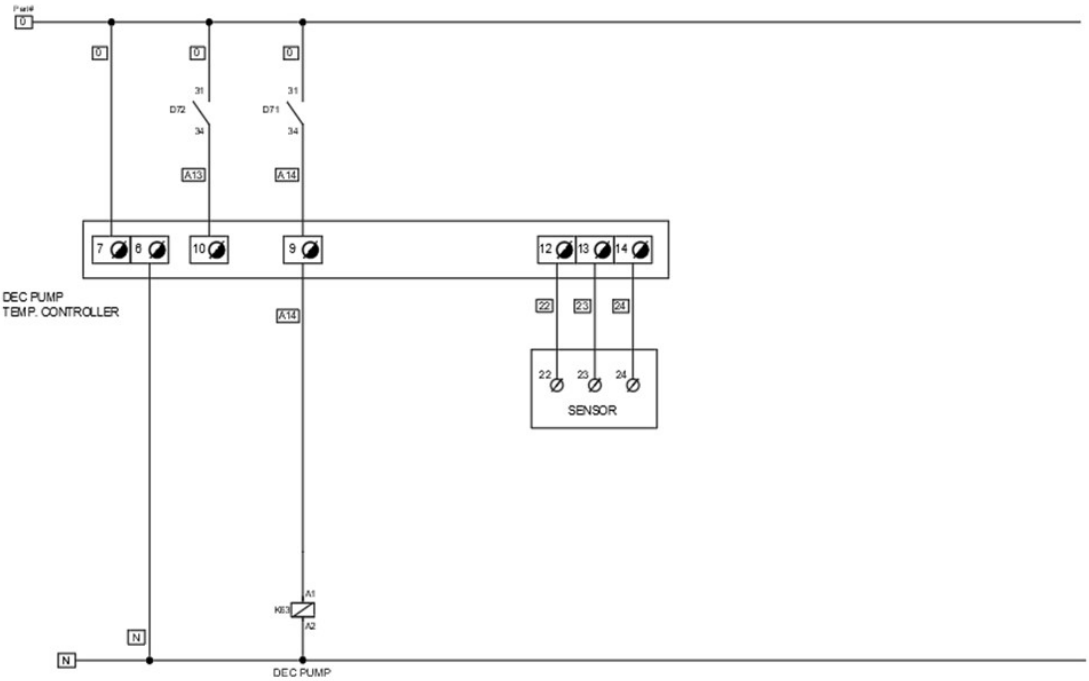

Part#
L1
L2
L3
TO PAGE (7)
Q40
MCCB
125A
0
F44
RQ
SQ
TQ
F41
F42
F43
R
S
T
L1
L2
L3
N
UVR
2
3
1
R1
TH
F
N
ENCLOSURE FAN
POWER ON
UVR: UNDER VOLTAGE PROTECTION
OVER VOLTAGE PROTECTION
PHASE FAILURE
PHASE SEQUANCE
R S T N E

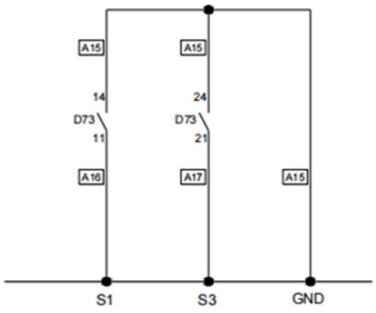

Part#
R
S
T
Q51
MCB
25A
Q52
MCB
25A
VSD 1
VSD 2
1 2 3
4 5 6
N E
M
SUPPLY FAN-1
2.2 KW
400V
SUPPLY FAN-2
2.2 KW
400V
CONDENSER FAN-1
1.5 KW
400V
CONDENSER FAN-2
1.5 KW
400V
CONDENSER FAN-3
1.5 KW
400V


R
S
T
N
E
FUSED TERMINAL
M
COMPRESSOR-1
15 KW
400V
COMPRESSOR-2
15 KW
400V
DEC PUMP
0.1 KW
230V

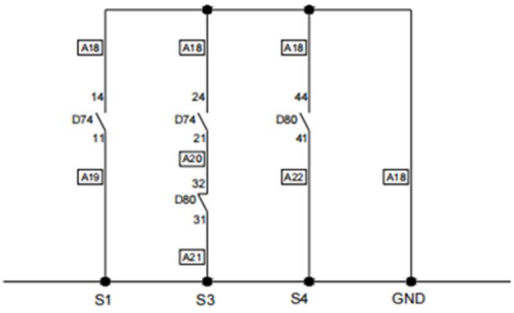

0 OFF
1 MANUAL
2 AUTO
S71
D71
D72
D73
D74
TR75
MANUAL
AUTO
VSD 1
VSD 2
TIMER


COOLING
TEMP. CONTROLLER
SENSOR
HP-LP SWITCH
HP-LP SWITCH
COMPRESSOR-1
COMPRESSOR-2
COOLING STAGE 2
COMPRESSOR-1
HP-LP SWITCH
COMPRESSOR-2
HP-LP SWITCH

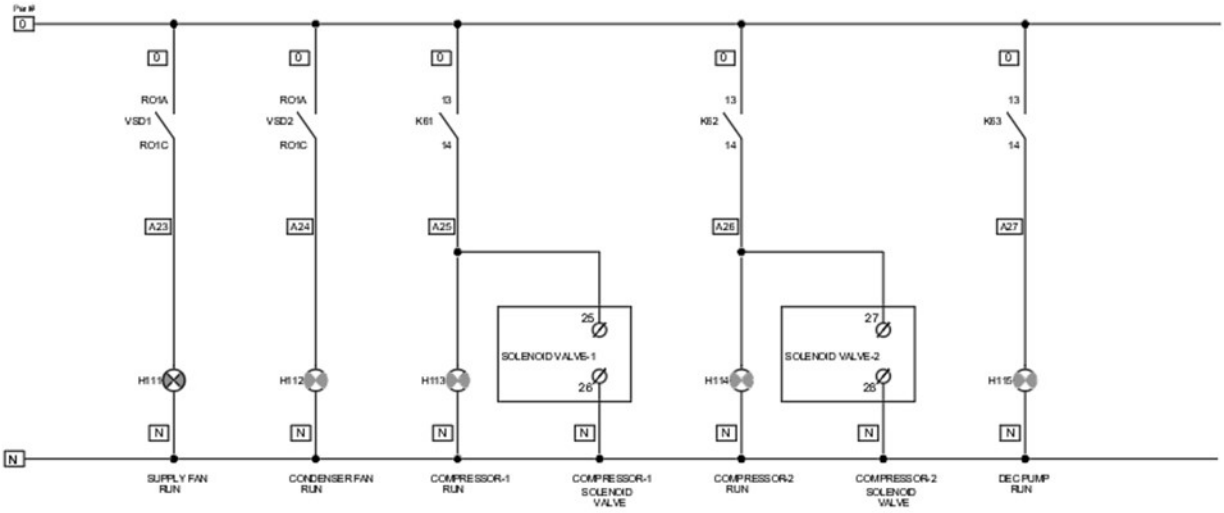

DEC PUMP
TEMP. CONTROLLER
SENSOR
DEC PUMP

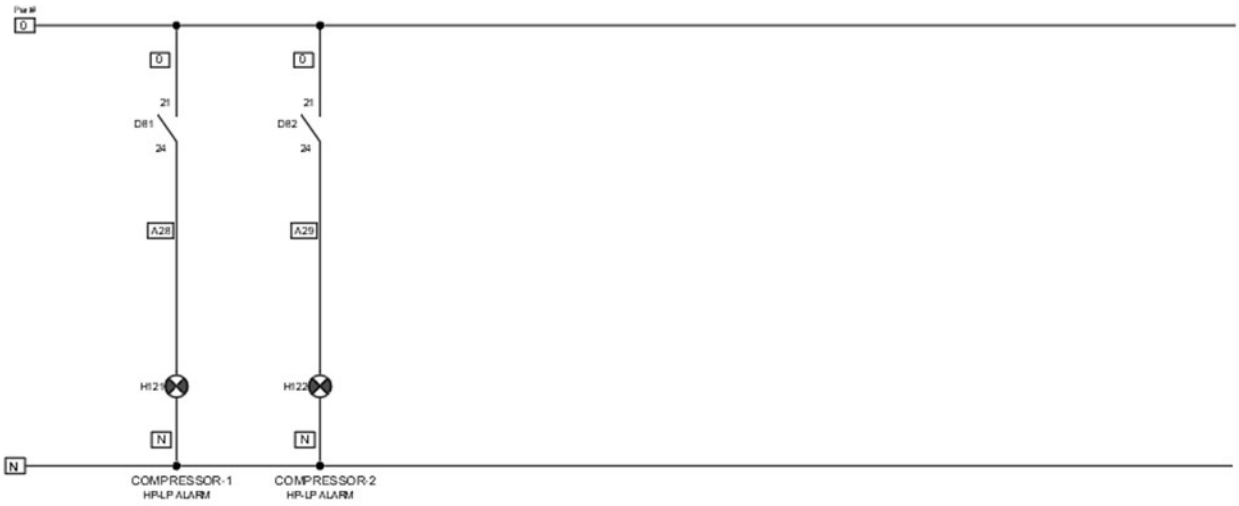


SUPPLY FAN VSD-1 TERMINALS



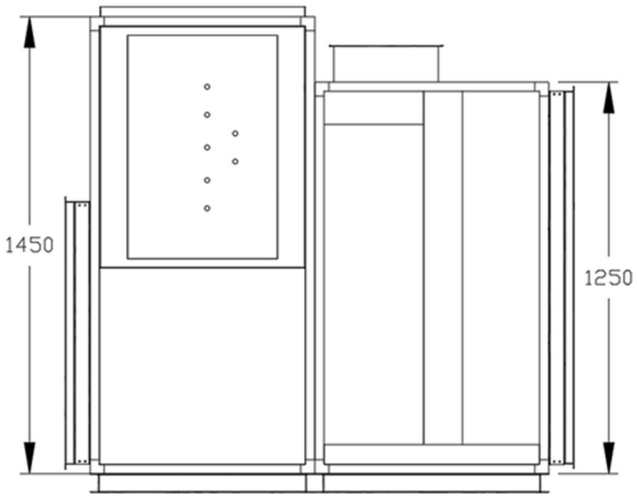
CONDENSER FAN VSD-2 TERMINALS



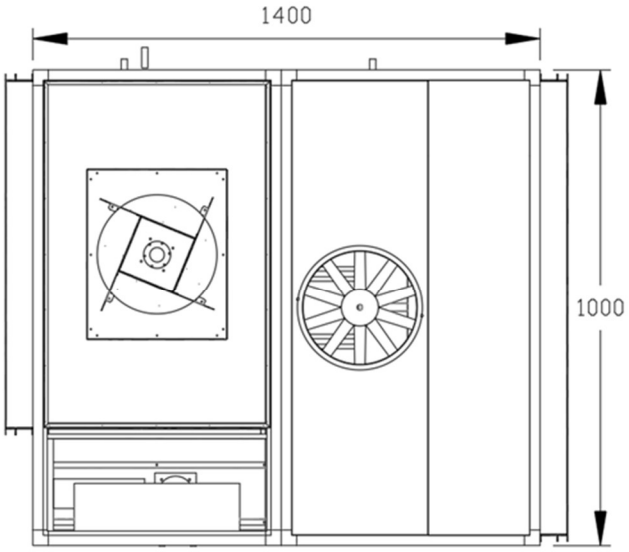


Dimensional Data

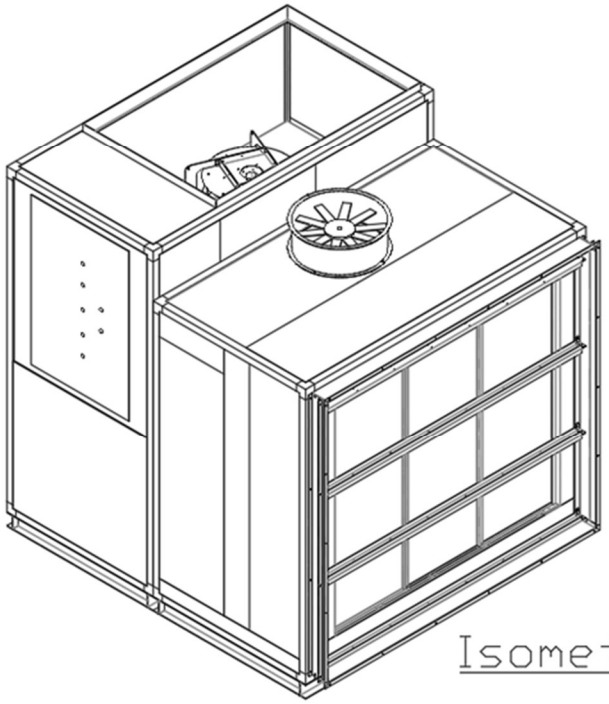
CG-PACU- A - 60



Elevation View

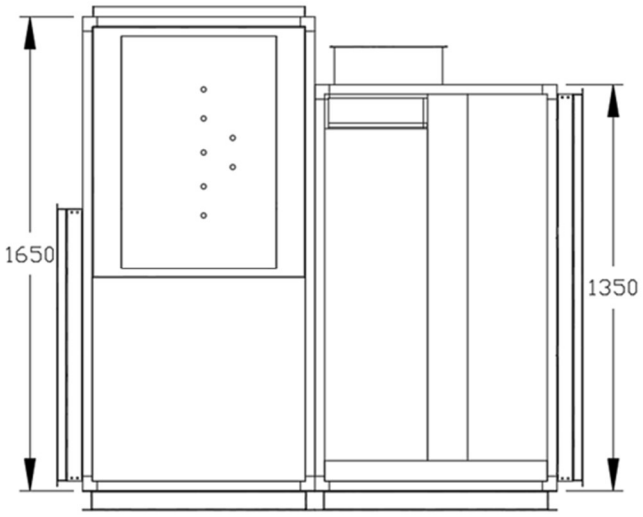


Top View

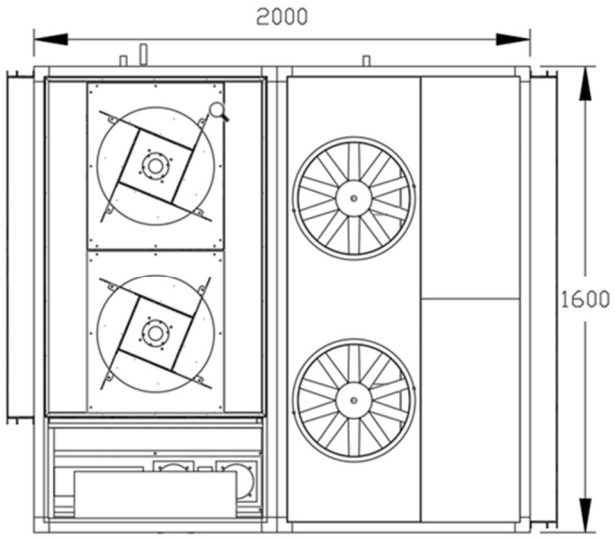


Isometric

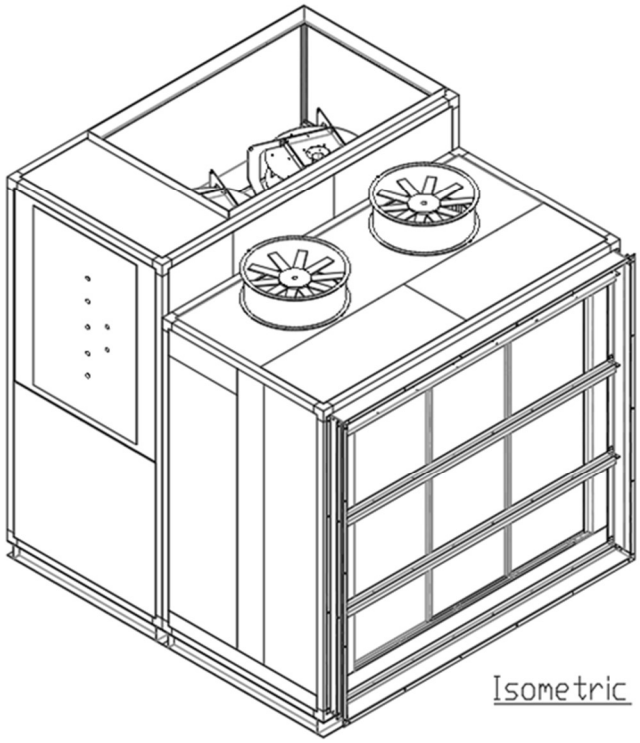
CG-PACU- A-120 and 180



Elevation View

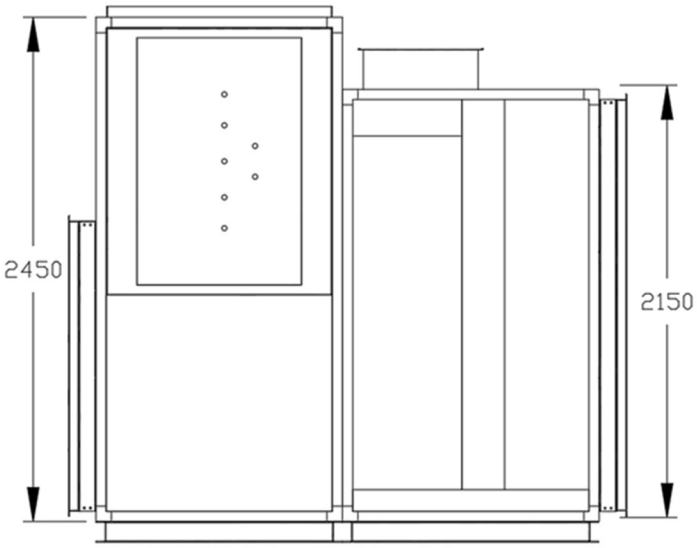


Top View

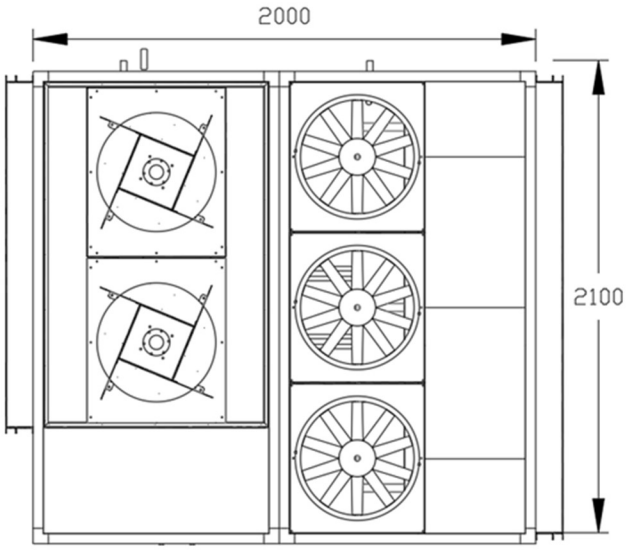


Isometric

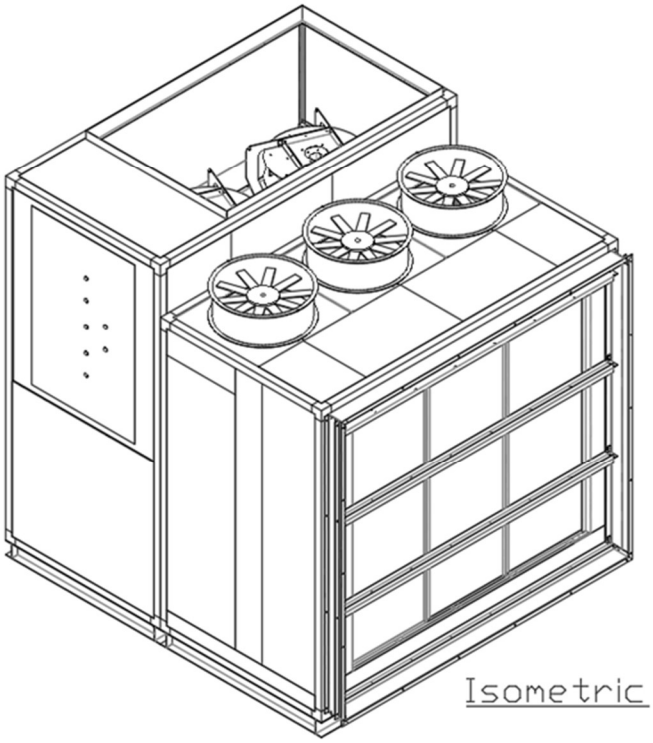
CG-PACU- A-220 and 280



Elevation View

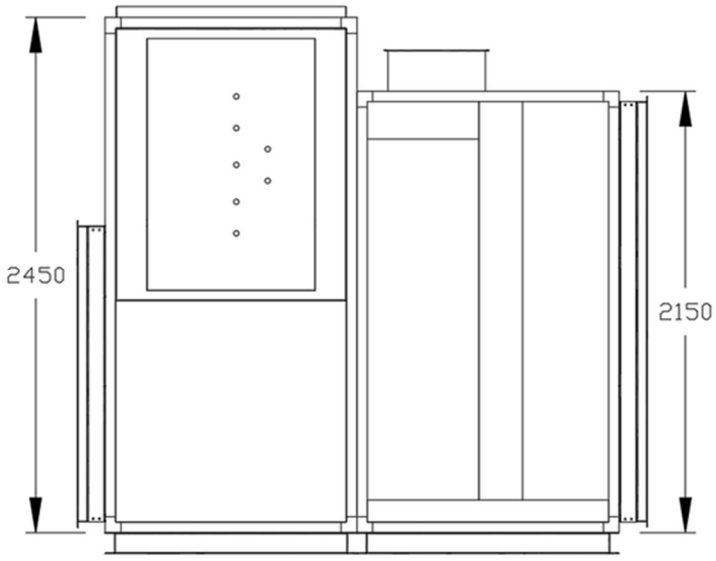


Top View

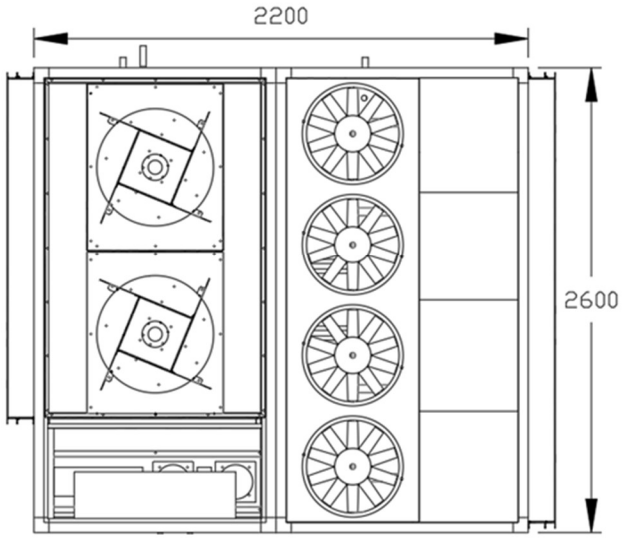


Isometric

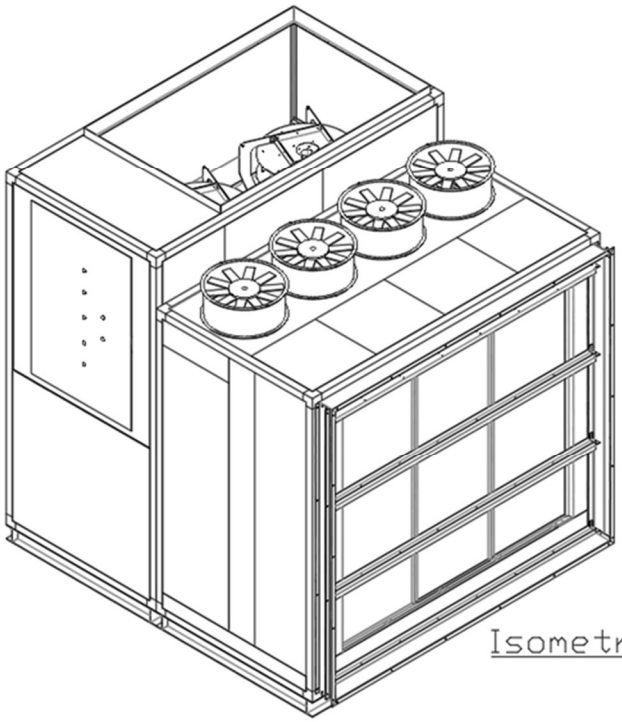
CG-PACU- A- 340



Elevation View



Top View



Isometric

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