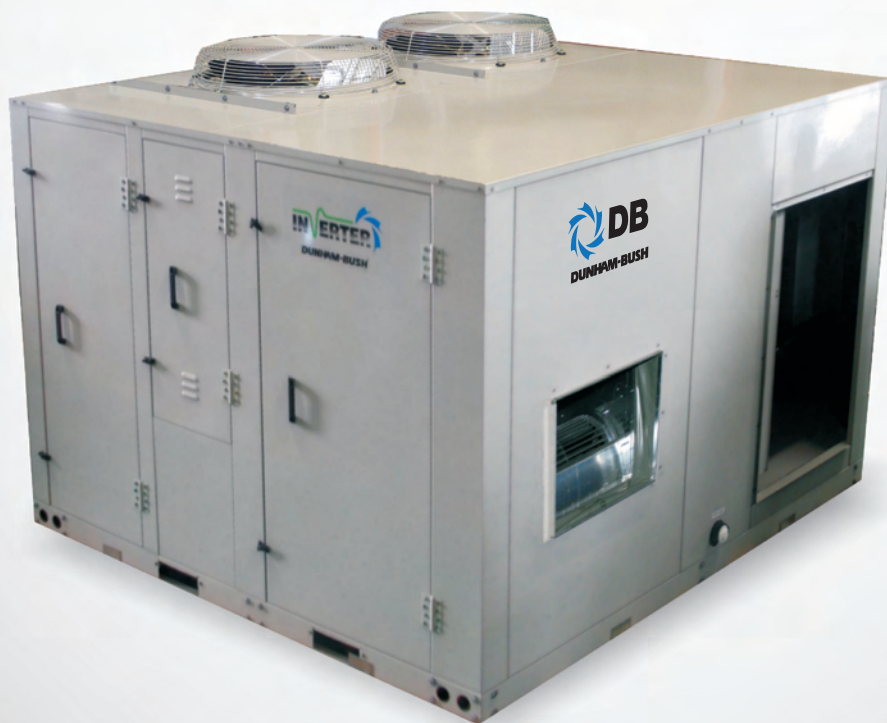




## FALCON

Inverter Rooftop Units  
ACPSG 50Hz

Cooling Capacity : 169 to 921 MBH (50 to 270 kW)  
Heating Capacity : 180 to 962 MBH (53 to 282 kW)



# DUNHAM-BUSH®

Products that perform...By people who care

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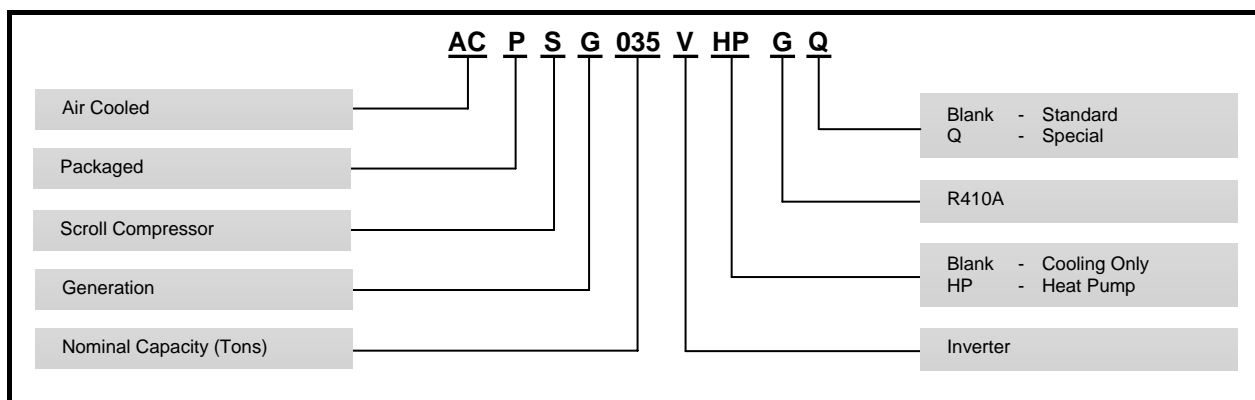
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## INTRODUCTION

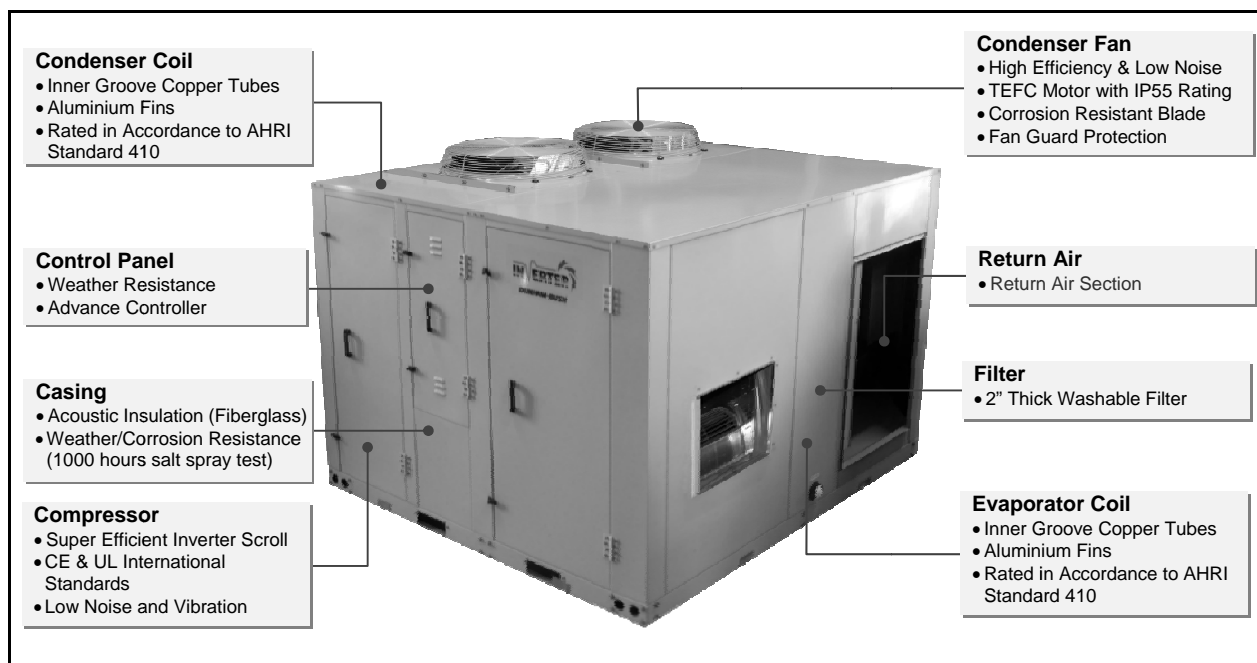
The ACPSG series are specially design and manufactured to makes Dunham-Bush inverter rooftop package unit to perform at the highest efficiency possible and operate in a wide ambient temperature range between 66°F [18.9°C] to 115°F [46.0°C] it is built specifically for outdoor installation. This series is using R410A refrigerant with cooling capacity range of 169 to 921 MBH [50 to 270 kW] and heating capacity range of 180 to 962 MBH [53 to 282 kW). The units are rated in accordance with AHRI standards 210/240 and 340/360.

The ACPSG series with new features is suitable for hotel, office, hospital, school, factory and supermarket applications where the heat load variation is inconsistent most of the time. The low noise and compact series are completely leak tested, evacuated, dehydrated and charged with refrigerant prior to shipment. All that is required on site is connecting the ducting and power supply. This greatly reduces installation work and costs.

## NOMENCLATURE



# COMPONENTS



# STANDARD FEATURES

## GENERAL

- ✦ 6 models from 169 to 921 MBH (Cooling) and 180 to 962 MBH (Heating), with nominal air flow up to 24000 CFM.
- ✦ Air volume and static pressure required can be adjusted according to the requirement because of the belt driven fan.
- ✦ ACPSPG Series is factory charged with environmental friendly R410A refrigerant in each system.
- ✦ R410A refrigerant has zero ozone depletion potential (ODP).

## HIGH EFFICIENCY DC INVERTER COMPRESSOR

### Reliability

- ✦ DC inverter compressor utilizes the permanent magnet motor technology which significantly enhances its overall performance and efficiency. At complete stop of the compressor, the magnets will positions the rotor into the optimum position for a low torque start.
- ✦ Suction gas cooled motor.



### Low Power Consumption:

- ✦ High EER.
- ✦ Crankcase heater is provided as standard to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

### Class F Insulation Condenser Fan Motor

- ✦ Extra safety margin and longer motor life even in extreme operating conditions.
- ✦ IP 55 construction ensures extra motor protection.
- ✦ Low motor speed at 950 rpm ensures quiet condenser fan operation.

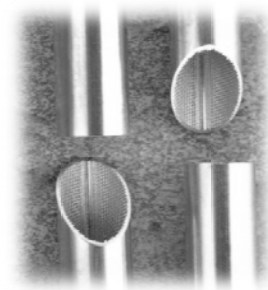
### Multiple Compressors

- ✦ By cycling off compressor operation to match building load, no energy is being wasted when room load requires lesser cooling capacity.
- ✦ No total shut down when servicing or repairing a faulty compressor.

# STANDARD FEATURES

## EFFICIENT CONDENSER COIL

- ✿ Staggered row of 3/8"OD inner groove tubes with 25 to 30% more surface area offers better heat transfer.
- ✿ Mechanically expanded into die-formed corrugated aluminum fins.
- ✿ Integral subcooling circuit to maximize efficiency.
- ✿ One or multiple thermal expansion valve promotes efficient cooling and superheat during reverse cycle.
- ✿ Leak and pressure tested to 650 psig.



## ADVANCE CONTROLLER



Advance programmable microprocessor controller design specifically for the application and precise control of the ACPSG series.

The controller is equipped with user friendly terminal with a semi-graphic display and dedicated keys that provides easy access to the operating conditions, control set points and alarm histories with the following features:-

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>✿ The control algorithm and parameters shall be stored in flash memory and EPROM of the controller and shall retain even in the event of power failures, without requiring a backup battery</li> <li>✿ PGD Display</li> <li>✿ Built in memory for data logging</li> <li>✿ Temperature and humidity controlled</li> <li>✿ Configurable by user</li> <li>✿ Alarm status/display</li> </ul> | <ul style="list-style-type: none"> <li>✿ Analog input/output display</li> <li>✿ Digital input/output status</li> <li>✿ Remote start/stop input</li> <li>✿ Digital input for customer input alarm</li> <li>✿ General alarm output (dry contact)</li> <li>✿ Self-diagnostics</li> <li>✿ Security password access with multiple access level for advanced settings</li> <li>✿ Unit status display</li> </ul> |
|---|---|

## SAFETY CONTROL

- ✿ High-low pressure cutout to protect compressor from high discharge pressure and system leakage.

## FULLY LEAK TESTED REFRIGERANT CIRCUIT

- ✿ Compressors, condenser coil, filter drier, sight glass, thermo-expansion valve, distributor and evaporator coil is brazed in complete sealed loop.
- ✿ Leak and pressure tested at 650 psig.
- ✿ Pressure ports are provided on the discharge, liquid and suction line.
- ✿ Evacuated, dehydrated and charge with refrigerant gas prior to shipment.

## CASING

- ✿ Constructed from heavy gauge galvanized steel.
- ✿ Panels are painted with epoxy powder paint for excellent finish, weatherability and corrosion resistance.
- ✿ Evaporator section is insulated with 1 x 1 1/2 lb per.cu.ft of linacoustic fibreglass.

## EFFICIENT EVAPORATOR COIL

- ✿ Electronic expansion valve (EEV) control only on the inverter compressor system while thermal expansion valve with external equalizer for fix speed compressor(s).
- ✿ Leak and pressure tested to 650 psig.
- ✿ Evacuated, dehydrated and charged with refrigerant gas.



## DRIVE PACKAGE AND BLOWERS

- ✿ Belt driven drive package offers flexibility on various air flow rate and various static pressure applications.
- ✿ Single large diameter double inlet double width blowers (AMCA certified) reduce the noise level and eliminate the need for common transition and eliminate air unbalance.

## FILTERS

- ✿ 2" thick washable filter with average arrestance of 75% as per ASHRAE standard 52.1 (or equivalent).

# OPTIONAL ACCESSORIES

- ✿ Economizer
- ✿ Suction stop valve(s), discharge stop valve(s) and liquid stop valve(s).
- ✿ EC evaporator blower, EC condenser axial fan.
- ✿ Thermostat.
- ✿ MODBUS RS485
- ✿ Hydrophilic fins or copper fins for better corrosion resistance.
- ✿ Hot water heating coils.
- ✿ Electric heaters.

# COOLING & HEATING PORTFOLIO

## COOLING ONLY

Reference		Capacity MBH
ACPSG015VG	Cooling	169.3
ACPSG025VG	Cooling	259.7
ACPSG035VG	Cooling	391.3
ACPSG045VG	Cooling	527.9
ACPSG055VG	Cooling	660.5
ACPSG080VG	Cooling	921.1

Notes: 1) Ratings Are Gross Capacities - For Net Capacities, Deduct Evaporator Blower Motor Heat.  
2) Ratings are based on nominal airflow with on evaporator dry/wet bulb temperatures of 80/67°F (27/19.4°C) and condenser entering air temperature of 95°F(35°C)

## HEAT PUMP

Reference		Capacity MBH
ACPSG015VHPG	Cooling	169.3
	Heating	180.4
ACPSG025VHPG	Cooling	259.7
	Heating	264.1
ACPSG035VHPG	Cooling	390.9
	Heating	409.6
ACPSG045VHPG	Cooling	527.9
	Heating	535.5
ACPSG055VHPG	Cooling	660.5
	Heating	690.0
ACPSG080VHPG	Cooling	911.9
	Heating	962.2

Notes: 1) Ratings Are Gross Capacities - For Net Capacities, Add Evaporator Blower Motor Heat.  
2) Heating Mode: Ratings are based on nominal airflow with on evaporator dry bulb temperatures of 70°F (21.1°C) and condenser entering air temperature of 45°F(7.2°C).

# PHYSICAL SPECIFICATIONS

## COOLING ONLY

Model	EER	Compressor		Exp. Valve Type	Condenser Coil		Condenser Fan		Evaporator Blower				Evaporator Coil		Air Filter	R410A Charge	Approx. Unit Weight		Sound Pressure Level
		Type	Qty		Face Area	Row/ FPI	Size (Qty)	Motor hp (Qty)	Std. Size	Nominal HP	Airflow (Nominal)		Face Area	Row/ FPI	Size (Qty)	lbs / system (Qty)	kg	lbs	±2 dB(A)
					ft²						CFM	m³/hr	ft²						
ACPSG 015VG	10.2	Inverter Scroll	1	EEV	23.3	3/12	660(2)	5/8(2)	15x15	4.0	4800	8155	11.5	4/12	20x20x2(2) 20x25x2(2)	26.0(1)	816	1795	76
ACPSG 025VG	10.4	One Inverter Scroll + Fix Speed Scrolls	2	EEV on 1st System, other system(s) with TXV	28.6	4/16	660(2)	5/8(2)	18x13	5.5	7500	12743	16.7	4/12	25x25x2(4)	28.7(1) 14.1(1)	1109	2440	76
ACPSG 035VG	10.2		2		22.3	4/16	800(2)	2.0(2)	450x 450	10.0	11500	19539	25.3	4/12	16x20x2(1) 16x25x2(2) 20x20x2(2) 20x25x2(4)	37.5(1) 28.7(1)	1573	3461	80
ACPSG 045VG	10.3		3		58.3	4/16	660(4)	5/8(4)	500x 500	15.0	15000	25485	30.0	4/14	20x25x2(9)	40.1(1) 46.5(1)	1958	4308	80
ACPSG 055VG	10.0		4		89.2	3/12	800(4)	2.0(4)	560x 560	15.0	17200	29223	35.0	4/14	20x25x2(3) 25x25x2(6)	34.0(1) 22.9(1) 43.9(1)	2842	6252	81
ACPSG 080VG	10.1		6		109.5	4/16	800(4)	2.0(4)	710 x710	20.0	24000	40776	46.7	4/16	20x25x2(3) 25x25x2(9)	37.3(1) 25.8(1) 49.8(1) 50.0(1)	4060	8932	82

Notes: 1) Ratings are based on nominal airflow with on evaporator dry/wet bulb temperatures of 80/67°F (27/19.4°C) and condenser entering air temperature of 95°F(35°C).  
2) Ratings are gross capacities. For net capacity deduct evaporator blower motor heat.  
3) EER published as above is gross EER.  
4) Evaporator blower motor's nominal HP is based on 1 in WG ESP (external static pressure).  
5) Sound Pressure Level is calculated based on nominal airflow at external static pressure of 1in WG and 3m (10ft) distance away from unit at free field. Unit supply and return are assumed to be entirely insulated. The actual sound at field could be affected by the supply and return duct break out noise.

## HEAT PUMP

Model	EER	Compressor		Exp. Valve Type	Condenser Coil		Condenser Fan		Evaporator Blower				Evaporator Coil		Air Filter	R410A Charge	Approx. Unit Weight		Sound Pressure Level
		Type	Qty		Face Area	Row/ FPI	Size (Qty)	Motor hp (Qty)	Std. Size	Nominal HP	Airflow (Nominal)		Face Area	Row/ FPI	Size (Qty)	lbs / system (Qty)	kg	lbs	±2 dB(A)
					ft²						CFM	m³/hr	ft²						
ACPSG 015VHPG	10.2	Inverter Scroll	1	EEV	23.3	4/12	660(2)	5/8(2)	15x15	4.0	4800	8155	11.5	4/12	20x20x2(2) 20x25x2(2)	27.3(1)	832	1830	76
ACPSG 025VHPG	10.3	One Inverter Scroll + Fix Speed Scrolls	2	EEV on 1st System, other system(s) with TXV	28.6	5/12	660(2)	5/8(2)	18x13	5.5	7500	12743	16.7	4/12	25x25x2(4)	36.8(1) 18.3(1)	1133	2493	76
ACPSG 035VHPG	10.2		2		22.3	5/12	800(2)	2.0(2)	450x 450	10.0	11500	19539	25.3	4/12	16x20x2(1) 16x25x2(2) 20x20x2(2) 20x25x2(4)	48.5(1) 36.8(1)	1608	3538	80
ACPSG 045VHPG	10.3		3		58.3	5/12	660(4)	5/8(4)	500x 500	15.0	15000	25485	30.0	4/14	20x25x2(9)	51.8(1) 60.2(1)	2003	4407	80
ACPSG 055VHPG	10.0		4		89.2	3/12	800(4)	2.0(4)	560x 560	15.0	17200	29223	35.0	4/14	20x25x2(3) 25x25x2(6)	35.7(1) 24.0(1) 45.9(1)	2897	6373	81
ACPSG 080VHPG	10.0		6		109.5	5/12	800(4)	2.0(4)	710x 710	20.0	24000	40776	46.7	4/16	20x25x2(3) 25x25x2(9)	48.3(1) 33.1(1) 64.2(1) 64.6(1)	4152	9134	82

Notes: 1) Cooling mode ratings are based on nominal airflow with on evaporator dry/wet bulb temperatures of 80/67°F (27/19.4°C) and condenser entering air temperature of 95°F(35°C).  
2) Heating mode ratings are based on nominal airflow with on evaporator dry bulb temperatures of 70°F (21.1°C) and condenser entering air temperature of 45°F (7.2°C).  
3) Ratings are gross capacities. For net cooling capacity deduct evaporator blower motor heat, net heating capacity to add blower motor heat.  
4) EER and COP published as above are gross EER and COP. Cooling mode efficiency is rated in EER and heating mode efficiency is rated in COP.  
5) Evaporator blower motor's nominal HP is based on 1 in WG ESP (external static pressure).  
6) Sound Pressure Level is calculated based on nominal airflow at external static pressure of 1in WG and 3m (10ft) distance away from unit at free field. Unit supply and return are assumed to be entirely insulated. The actual sound at field could be affected by the supply and return duct break out noise.

# SYSTEM COOLING CAPACITY

## PERFORMANCE DATA – COOLING ONLY

Model	EER	Std. Capacity MBH	Air On Evap.		Cooling Capacity @ Ambient Air Temperature On Condenser															
			CFM	WB Temp		95°F [35°C]					105°F [41°C]					115°F [46°C]				
						Total		Sensible		kW Input	Total		Sensible		kW Input	Total		Sensible		kW Input
				°F	°C	MBH	kW	MBH	kW		MBH	kW	MBH	kW		MBH	kW	MBH	kW	
ACPSG 015VG	10.2	169.3	4800	72	22.2	186.3	54.6	91.7	26.9	14.58	177.3	52.0	90.1	26.4	15.97	159.9	46.9	83.4	24.4	15.46
				67	19.4	169.3	49.6	116.6	34.2	14.16	162.5	47.6	113.4	33.2	15.57	146.7	43.0	107.2	31.4	15.09
				62	16.7	156.0	45.7	140.6	41.2	13.94	150.0	44.0	137.7	40.4	15.33	131.3	38.5	128.9	37.8	14.97
ACPSG 025VG	10.3	259.7	7500	72	22.2	274.9	80.6	139.2	40.8	21.77	261.5	76.6	134.0	39.3	23.87	239.2	70.1	125.3	36.7	24.00
				67	19.4	259.7	76.1	178.9	52.4	21.11	249.2	73.0	174.0	51.0	23.22	219.9	64.5	164.8	48.3	23.55
				62	16.7	239.1	70.1	214.7	62.9	20.69	222.8	65.3	208.6	61.1	22.84	204.3	59.9	201.7	59.1	23.14
ACPSG 035VG	10.2	391.4	11500	72	22.2	429.5	125.9	214.9	63.0	32.30	399.3	117.0	206.2	60.4	35.51	366.7	107.5	193.6	56.7	36.20
				67	19.4	391.4	114.7	270.3	79.2	31.41	364.0	106.7	258.5	75.8	34.57	337.3	98.9	250.3	73.4	35.25
				62	16.7	362.6	106.3	327.8	96.1	30.72	340.1	99.7	316.8	92.9	33.84	304.3	89.2	300.1	88.0	35.02
ACPSG 045VG	10.3	527.9	15000	72	22.2	580.4	170.1	289.1	84.7	42.71	526.6	154.3	273.5	80.2	47.52	488.4	143.2	258.4	75.7	50.37
				67	19.4	527.9	154.7	368.2	107.9	41.63	491.6	144.1	353.0	103.5	46.15	446.1	130.8	334.5	98.0	48.97
				62	16.7	490.5	143.8	444.7	130.3	40.63	449.0	131.6	426.5	125.0	45.40	423.7	124.2	413.2	121.1	48.28
ACPSG 055VG	10.0	660.5	17200	72	22.2	694.5	203.6	343.4	100.7	54.37	667.1	195.5	334.8	98.1	60.41	607.9	178.2	314.7	92.2	64.07
				67	19.4	660.5	193.6	442.3	129.6	52.36	599.8	175.8	417.5	122.4	58.59	564.3	165.4	402.5	118.0	62.98
				62	16.7	589.8	172.9	520.9	152.7	51.63	557.1	163.3	505.7	148.2	57.86	518.3	151.9	488.2	143.1	61.99
ACPSG 080VG	10.1	921.1	24000	72	22.2	1001.1	293.4	498.0	146.0	76.97	923.2	270.6	468.4	137.3	86.01	862.0	252.7	444.5	130.3	93.55
				67	19.4	921.1	270.0	625.6	183.4	75.22	871.7	255.5	602.7	176.7	83.38	791.6	232.0	573.9	168.2	90.94
				62	16.7	843.0	247.1	747.8	219.2	73.40	793.5	232.6	728.4	213.5	81.85	729.1	213.7	699.2	204.9	89.52

Notes: 1) Ratings are based on 80°F (27°C) air on evaporator dry bulb temperature.  
2) Ratings are gross capacities. For net capacity deduct evaporator blower motor heat.  
3) kW input shown in the table is total compressor(s) power input.

## PERFORMANCE DATA – HEAT PUMP COOLING MODE

Model	EER	Std. Capacity MBH	Air On Evap.		Cooling Capacity @ Ambient Air Temperature On Condenser															
			CFM	WB Temp		95°F [35°C]					105°F [41°C]					115°F [46°C]				
						Total		Sensible		kW Input	Total		Sensible		kW Input	Total		Sensible		kW Input
				°F	°C	MBH	kW	MBH	kW		MBH	kW	MBH	kW		MBH	kW	MBH	kW	
ACPSG 015VHPG	10.2	169.3	4800	72	22.2	186.3	54.6	91.7	26.9	14.58	177.3	52.0	90.1	26.4	15.97	159.9	46.9	83.4	24.4	15.46
				67	19.4	169.3	49.6	116.6	34.2	14.16	162.5	47.6	113.4	33.2	15.57	146.7	43.0	107.2	31.4	15.09
				62	16.7	156.0	45.7	140.6	41.2	13.94	150.0	44.0	137.7	40.4	15.33	131.3	38.5	128.9	37.8	14.97
ACPSG 025VHPG	10.3	259.7	7500	72	22.2	283.2	83.0	141.0	41.3	21.82	261.5	76.6	134.0	39.3	24.04	239.1	70.1	125.3	36.7	24.16
				67	19.4	259.7	76.1	178.9	52.4	21.24	249.2	73.0	174.0	51.0	23.26	216.4	63.4	163.3	47.9	23.82
				62	16.7	239.1	70.1	214.7	62.9	20.69	222.8	65.3	208.6	61.1	22.84	198.2	58.1	196.3	57.5	23.33
ACPSG 035VHPG	10.2	390.9	11500	72	22.2	429.5	125.9	214.9	63.0	32.46	399.3	117.0	206.2	60.4	35.70	366.0	107.3	193.6	56.7	36.02
				67	19.4	390.9	114.6	270.3	79.2	31.42	375.6	110.1	262.9	77.1	34.54	337.3	98.9	250.3	73.4	35.62
				62	16.7	362.4	106.2	327.8	96.1	30.88	340.0	99.7	318.8	93.4	33.99	310.5	91.0	302.9	88.8	34.83
ACPSG 045VHPG	10.3	527.9	15000	72	22.2	580.7	170.2	289.1	84.7	43.07	540.0	158.3	278.1	81.5	47.49	488.1	143.1	258.4	75.7	50.37
				67	19.4	527.9	154.7	368.2	107.9	41.85	491.6	144.1	353.0	103.5	46.51	446.2	130.8	334.5	98.0	49.36
				62	16.7	490.6	143.8	444.7	130.3	40.89	449.1	131.6	426.5	125.0	45.72	416.1	122.0	407.3	119.4	48.38
ACPSG 055VHPG	10.0	660.5	17200	72	22.2	694.5	203.6	343.4	100.7	54.37	667.1	195.5	334.8	98.1	60.41	607.9	178.2	314.7	92.2	64.07
				67	19.4	660.5	193.6	442.3	129.6	52.36	599.8	175.8	417.5	122.4	58.59	564.3	165.4	402.5	118.0	62.98
				62	16.7	589.8	172.9	520.9	152.7	51.63	557.1	163.3	505.7	148.2	57.86	518.3	151.9	488.2	143.1	61.99
ACPSG 080VHPG	10.0	911.9	24000	72	22.2	1,001.1	293.4	498.0	146.0	77.11	923.2	270.6	468.4	137.3	86.31	862.2	252.7	444.5	130.3	94.12
				67	19.4	911.9	267.3	622.2	182.4	75.42	871.7	255.5	602.7	176.7	84.20	783.0	229.5	570.5	167.2	91.50
				62	16.7	850.8	249.4	751.0	220.1	73.94	783.8	229.7	724.3	212.3	82.50	738.3	216.4	703.3	206.1	90.05

Notes: 1) Ratings are based on 80°F (27°C) air on evaporator dry bulb temperature.  
2) Ratings are gross capacities. For net capacity deduct evaporator blower motor heat.  
3) kW input shown in the table is total compressor(s) power input.

# SYSTEM COOLING CAPACITY

## PERFORMANCE DATA – HEAT PUMP HEATING MODE

Model	COP	Std. Capacity MBH	Air On Evap.		Heating Capacity @ Ambient Air Temperature On Condenser												
			CFM	Entering Air Temp DB		23°F [-5°C]		35°F [1.7°C]			45°F [7.2°C]			55°F [12.8°C]			
						Capacity		kW Input	Capacity		kW Input	Capacity		kW Input	Capacity		kW Input
				°F	°C	MBH	kW		MBH	kW		MBH	kW		MBH	kW	
ACPSG 015VHPG	3.4	180.4	4800	60	15.6	136.5	40.0	10.46	164.1	48.1	11.44	188.0	55.1	12.34	212.0	62.1	13.29
				70	21.1	132.8	38.9	11.39	160.5	47.0	12.45	180.4	52.9	13.25	200.4	58.7	14.11
				80	26.7	125.2	36.7	12.36	148.9	43.6	13.33	172.7	50.6	14.33	196.8	57.7	15.37
ACPSG 025VHPG	3.4	264.1	7500	60	15.6	196.8	57.7	14.87	233.0	68.3	16.15	269.6	79.0	17.46	312.5	91.6	19.00
				70	21.1	191.1	56.0	16.30	233.6	68.5	17.83	264.1	77.4	19.05	307.0	90.0	20.72
				80	26.7	191.7	56.2	18.10	222.0	65.1	19.38	258.5	75.8	20.89	295.5	86.6	22.46
ACPSG035 VHPG	3.3	409.6	11500	60	15.6	297.7	87.3	22.40	352.7	103.4	24.36	408.5	119.7	26.34	473.9	138.9	28.68
				70	21.1	289.1	84.7	24.50	353.8	103.7	26.81	409.6	120.1	28.94	465.6	136.5	31.20
				80	26.7	299.4	87.8	27.50	345.5	101.3	29.41	401.1	117.6	31.71	457.4	134.1	34.16
ACPSG 045VHPG	3.4	535.5	15000	60	15.6	395.3	115.9	28.90	471.1	138.1	31.27	546.9	160.3	33.75	623.5	182.7	36.38
				70	21.1	396.1	116.1	32.24	459.3	134.6	34.45	535.5	157.0	37.12	612.1	179.4	39.96
				80	26.7	384.8	112.8	35.68	447.8	131.3	38.08	524.0	153.6	40.99	601.0	176.2	44.12
ACPSG 055VHPG	3.2	690.0	17200	60	15.6	513.1	150.4	38.40	600.1	175.9	41.54	688.3	201.7	44.73	776.7	227.7	48.22
				70	21.1	514.2	150.7	42.97	601.9	176.4	46.39	690.0	202.2	49.95	763.5	223.8	53.20
				80	26.7	501.1	146.9	47.75	573.9	168.2	50.86	661.8	194.0	54.77	750.7	220.0	58.89
ACPSG 080VHPG	3.3	962.2	24000	60	15.6	726.0	212.8	54.12	852.8	250.0	58.47	981.3	287.6	63.04	1131.8	331.7	68.67
				70	21.1	706.3	207.0	60.03	812.4	238.1	64.04	962.2	282.0	69.78	1112.6	326.1	75.99
				80	26.7	708.6	207.7	67.58	814.6	238.8	72.01	942.8	276.3	77.53	1072.2	314.3	83.46

Notes: 1) Ratings are based on nominal airflow with on evaporator dry bulb temperatures of 70°F(21.1°C) and condenser entering air temperature of 45°F(7.2°C).  
2) Ratings are gross capacities. For net capacity add evaporator blower motor heat.  
3) kW input shown in the table is total compressor(s) power input

## BLOWER PERFORMANCE

### EVAPORATOR

Model	Airflow on Evaporator		Blower Size	Internal Static Pressure (ISP)		External Static Pressure (ESP) in WG					
			Standard			1 [249]		1.5 [374]		2 [498]	
	CFM	(m³/h)			in WG	Pa	RPM	Motor Hp	RPM	Motor Hp	RPM
ACPSG015	4,800	(8,155)	15-15	0.72	179.4	892	3.0	1,003	4.0	1,108	4.0
ACPSG025	7,500	(12,743)	18-13	0.77	191.9	843	5.5	919	7.5	991	7.5
ACPSG035	11,500	(19,539)	450x450	0.78	194.4	833	10.0	905	10.0	972	15.0
ACPSG045	15,000	(25,485)	500x500	0.96	239.2	788	15.0	849	15.0	907	20.0
ACPSG055	17,200	(29,223)	560x560	0.94	234.2	671	15.0	728	15.0	783	20.0
ACPSG080	24,000	(40,776)	710x710	1.14	284.1	531	20.0	579	20.0	626	25.0

Notes: 1) Internal static pressure (ISP) includes pressure drops through evaporator coil, standard filter and unit casing.  
2) Please consult factory for ESP exceeds the above table.

## LIMITS AND CORRECTION FACTORS

### OPERATING LIMITS

#### COOLING (AIR TEMPERATURE °F)

		DB	WB
OUTDOOR	MAX.	115	-
	MIN.	66	-

#### HEATING (AIR TEMPERATURE °F)

		DB	WB
OUTDOOR	MAX.	75	-
	MIN.	15	-

### CORRECTION FACTORS

To correct for variation in airflow, use this multiplier

Air Flow Variation	Total Capacity	Sensible Capacity
0.9	0.980	0.950
1.0	1.000	1.000
1.1	1.015	1.045

To correct for altitude, use this multiplier

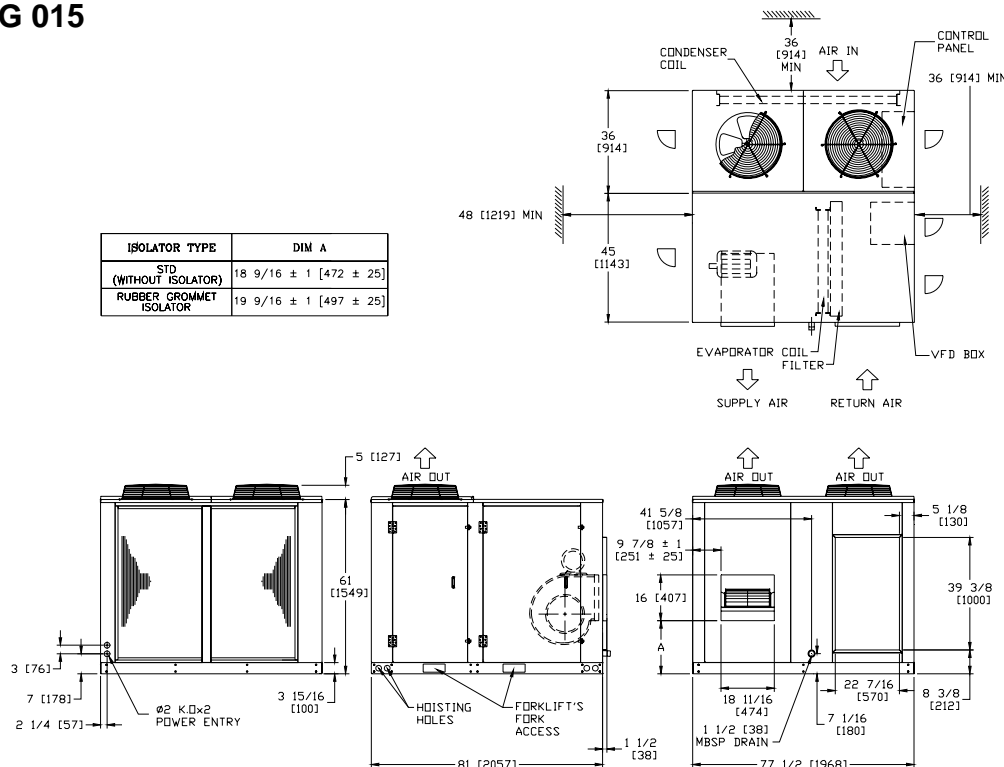
Air Above Sea Level - ft	Cooling Capacity
0	1
2000	0.98
3000	0.97
4000	0.96
5000	0.95
6000	0.93



# DIMENSIONAL DATA

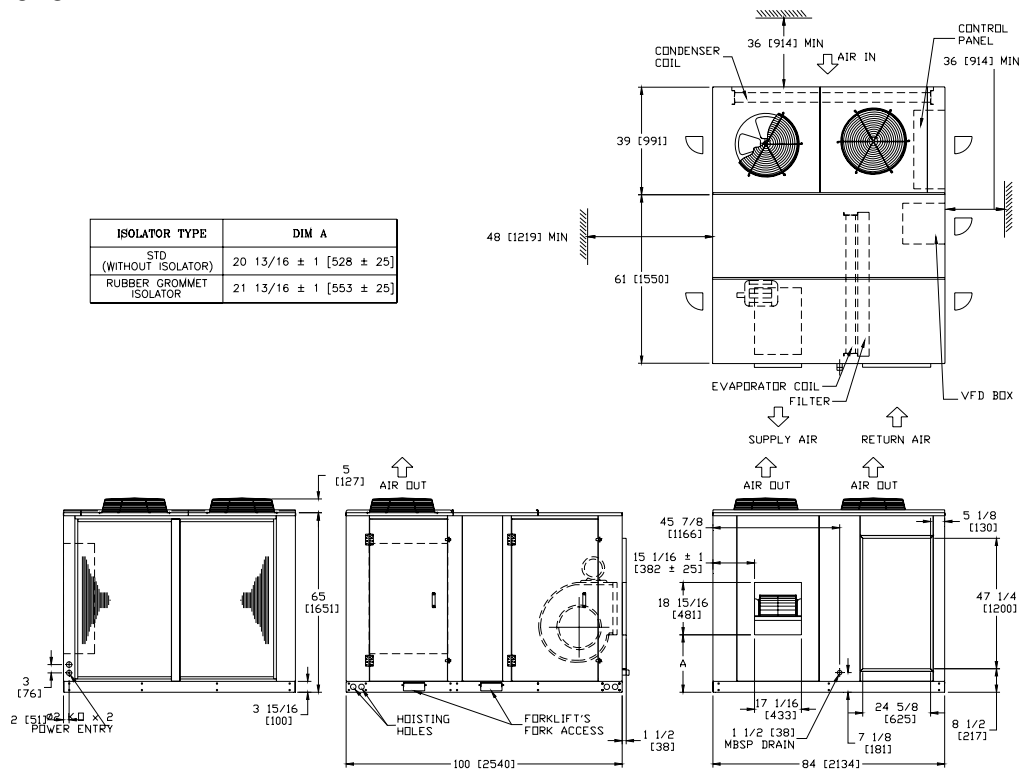
## ACPSG 015

ISOLATOR TYPE	DIM A
STD (WITHOUT ISOLATOR)	18 9/16 ± 1 [472 ± 25]
RUBBER GROMMET ISOLATOR	19 9/16 ± 1 [497 ± 25]



## ACPSG 025

ISOLATOR TYPE	DIM A
STD (WITHOUT ISOLATOR)	20 13/16 ± 1 [528 ± 25]
RUBBER GROMMET ISOLATOR	21 13/16 ± 1 [553 ± 25]

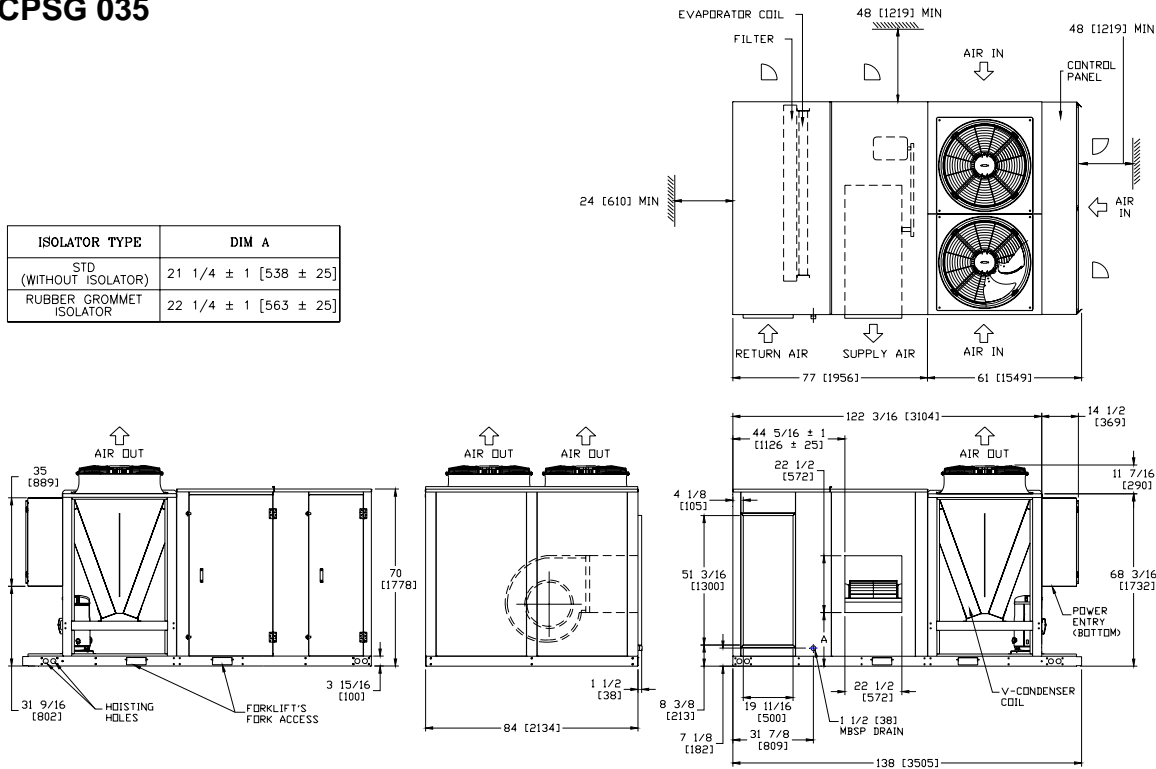


Note: All dimensions are in inches [mm].

# DIMENSIONAL DATA

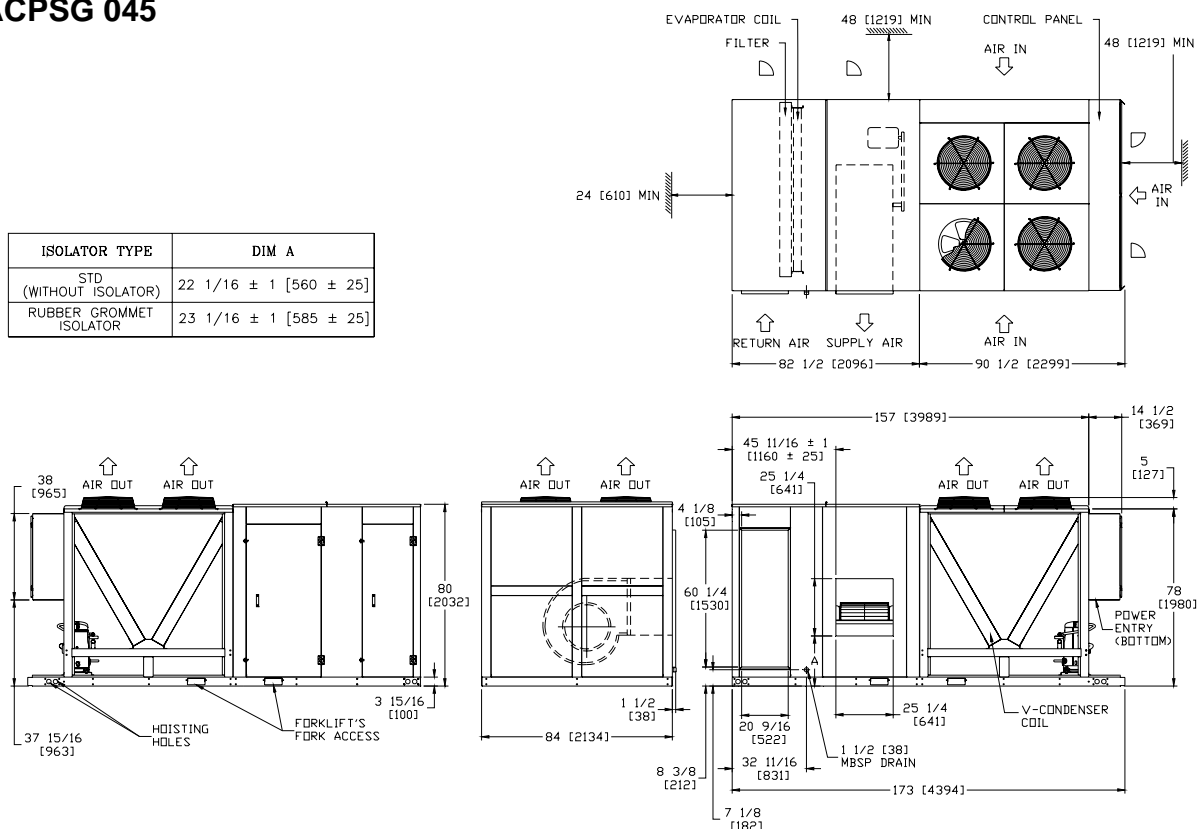
## ACPSG 035

ISOLATOR TYPE	DIM A
STD (WITHOUT ISOLATOR)	21 1/4 ± 1 [538 ± 25]
RUBBER GROMMET ISOLATOR	22 1/4 ± 1 [563 ± 25]



## ACPSG 045

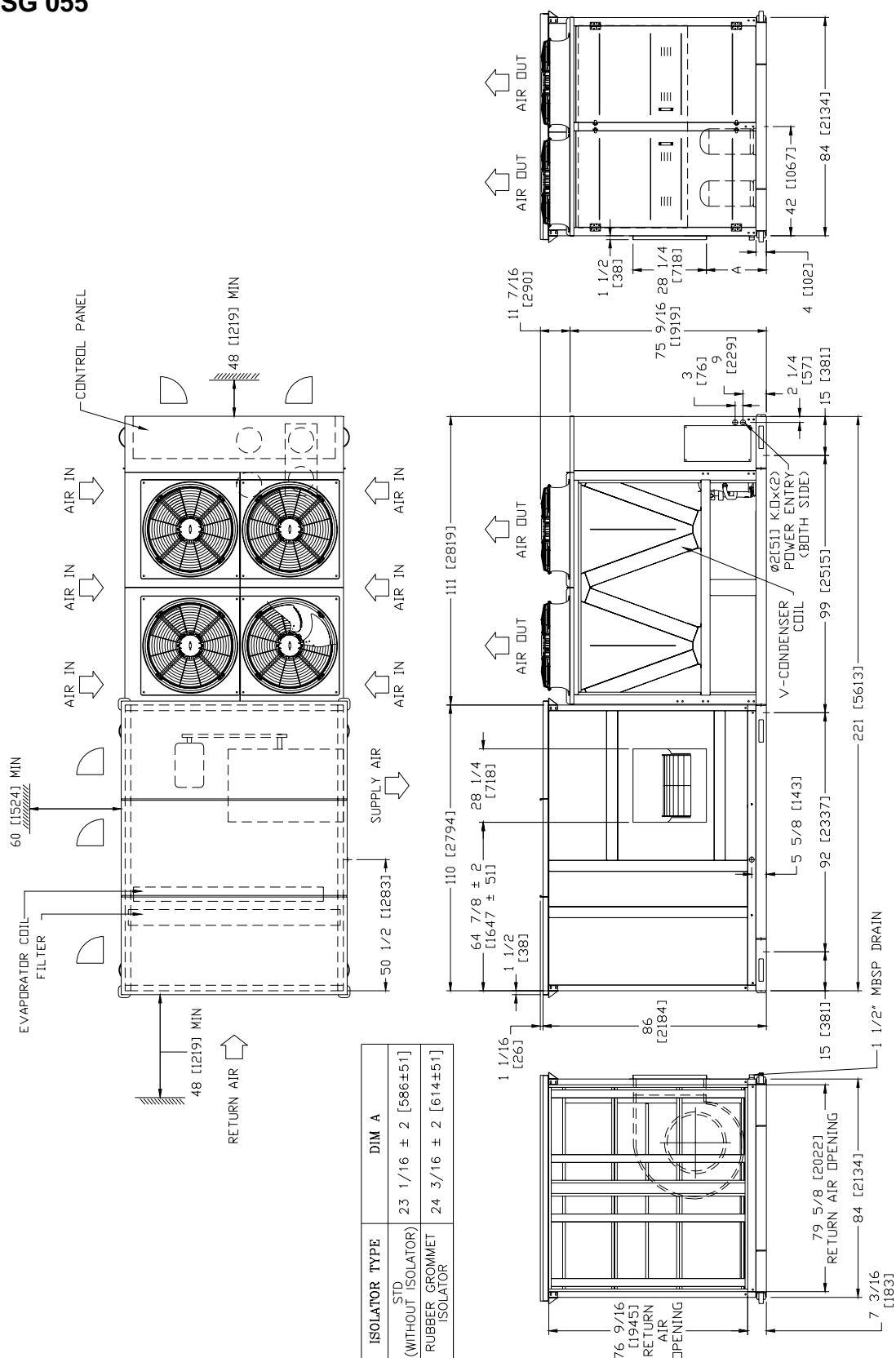
ISOLATOR TYPE	DIM A
STD (WITHOUT ISOLATOR)	22 1/16 ± 1 [560 ± 25]
RUBBER GROMMET ISOLATOR	23 1/16 ± 1 [585 ± 25]



Note: All dimensions are in inches [mm].

# DIMENSIONAL DATA

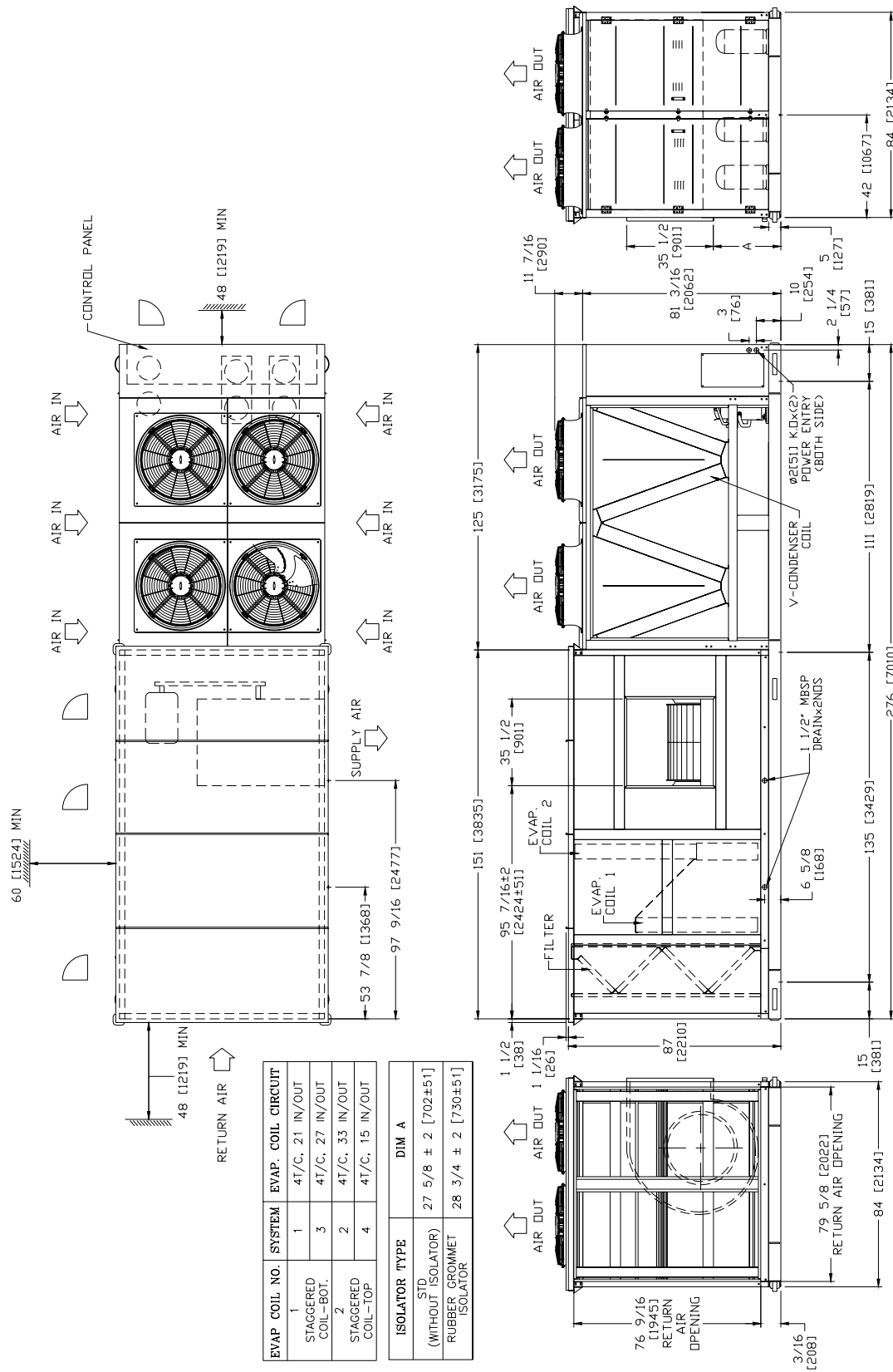
## ACPSG 055



Note: All dimensions are in inches [mm].

# DIMENSIONAL DATA

## ACPSG 080



Note: All dimensions are in inches [mm].

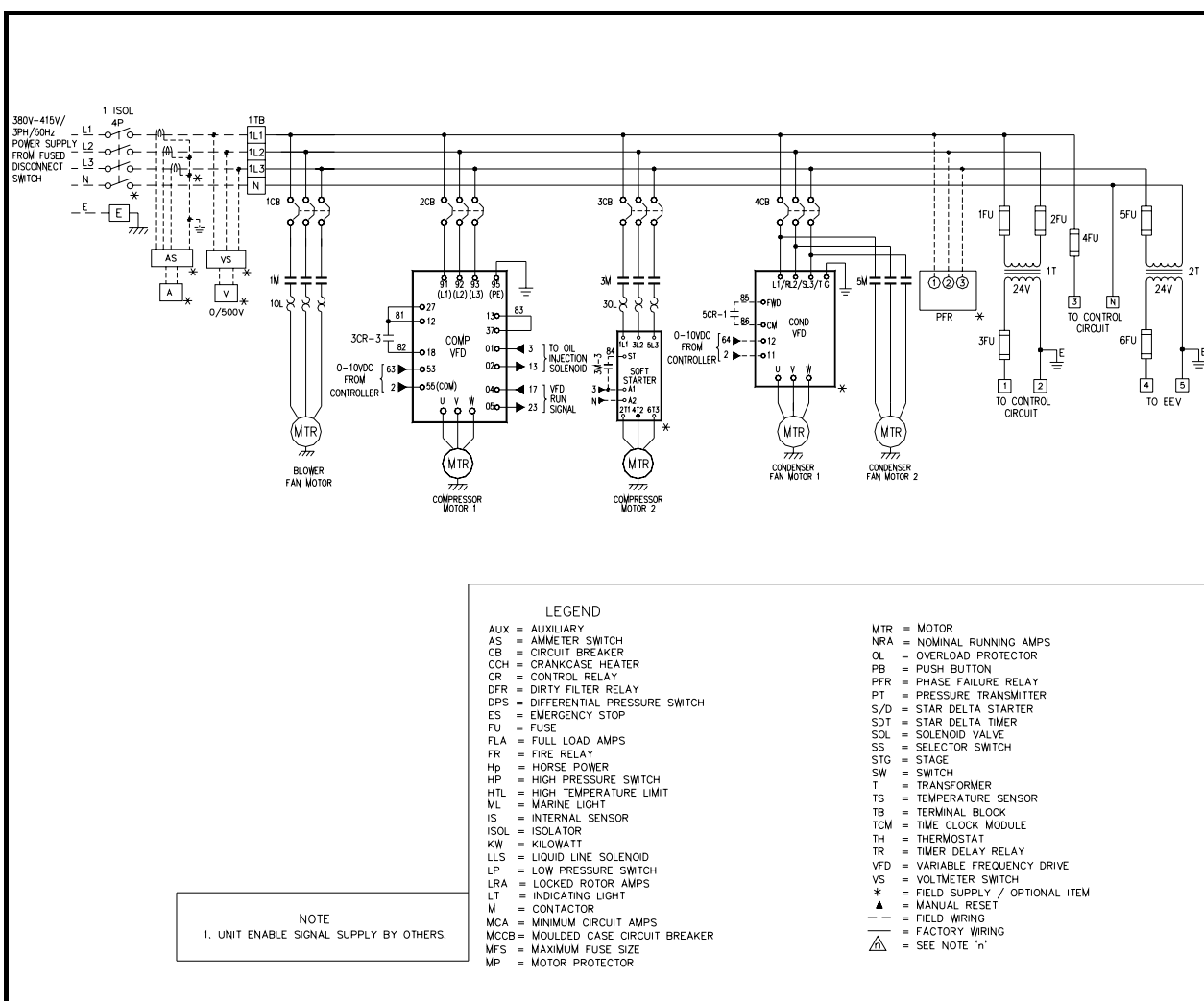
# ELECTRICAL DATA

Model	Compressor			Compressor Rating			Condenser Fan			Evaporator Blower (Std.)				Evaporator Blower (Max)				Unit Rating (Std.)			Unit Rating (Max)		
	Qty	Model	Power Supply	MRA (Each)	NRA (Each)	LRA/ MMT (Each)	Qty	Mtr. HP (Each)	FLA	Qty	Mtr. HP	FLA	LRA	Qty	Mtr. HP	FLA	LRA	FLA	MCA	MFS	FLA	MCA	MFS
ACPSG015	1	VZH088AG	380-415V/ 3PH/50Hz	1x37.5	1x24.4	1x46.9	2	5/8	2.0	1	3.0	5.1	30.6	1	4.0	6.8	41.5	33.5	39.6	60.0	35.2	41.3	60.0
ACPSG025	1	VZH088AG		1x37.5	1x24.4	1x46.9	2	5/8	2.0	1	5.5	8.8	57.2	1	7.5	11.7	79.6	50.1	56.2	80.0	53.0	59.1	80.0
	1	SH90		1x19.0	1x12.9	1x98.0																	
ACPSG035	1	VZH117AG		1x44.0	1x32.2	1x55.0	2	2.0	4.0	1	10.0	15.6	101.4	1	15.0	22.5	155.3	80.3	88.4	125.0	87.2	95.3	125.0
	1	SH184		1x36.0	1x24.5	1x197.0																	
ACPSG045	1	VZH117AG		1x44.0	1x32.2	1x55.0	4	5/8	2.0	1	15.0	22.5	155.3	1	20.0	30.3	206.0	104.0	112.1	150.0	111.8	119.9	150.0
	2	SH161		1x31.0	1x20.7	1x158.0																	
ACPSG055	1	VZH117AG		1x44.0	1x32.2	1x55.0	4	2.0	4.0	1	15.0	22.5	155.3	1	20.0	30.3	206.0	132.7	140.8	175.0	140.5	148.6	175.0
	3	SH161		1x31.0	1x20.7	1x158.0																	
ACPSG080	1	VZH117AG		1x44.0	1x32.2	1x55.0	4	2.0	4.0	1	20.0	30.3	206.0	1	25.0	36.2	231.7	181.9	189.9	225.0	187.8	195.8	225.0
	5	SH161		1x31.0	1x20.7	1x158.0																	

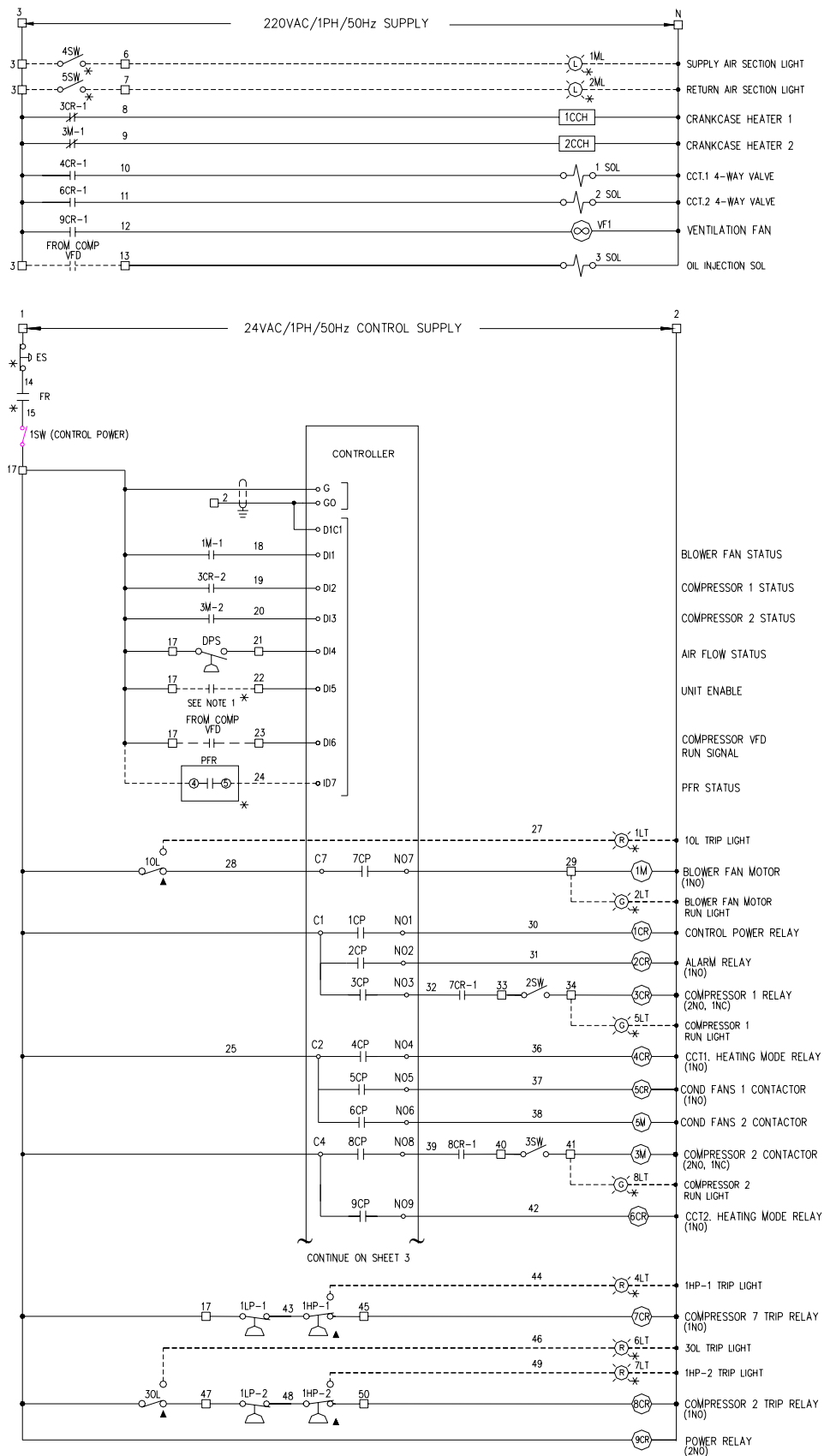
Note: Compressor NRA value is based on the following condition:

Evaporating temperature: 45°F, Condensing temperature: 130°F, Subcooling: 8.3K, Superheat: 11.1K, Ambient Temperature: 95°F

# TYPICAL WIRING SCHEMATIC



# TYPICAL WIRING SCHEMATIC





# GUIDE SPECIFICATIONS

## 1 GENERAL

Air cooled packaged unit shall include compressor(s), evaporator and condenser coils with fans, refrigeration piping, electrical components and enclosing cabinet in one piece. The units shall be factory assembled, internally wired, fully refrigerant charged with R410A and are suitable for outdoor installation on ground level with ducted system. The units shall be capable to operate up to 115°F (46°C) ambient temperature without failure.

## 2 CABINET

The unit cabinet shall be constructed from heavy gauge galvanized steel with epoxy painted for excellent finished, weatherability and corrosion resistance up to 1000 hours salt spray test according to ASTM B-117. Evaporator section shall be of 25mm (1 inch) thick single skin and lined with minimum 2lbs/ft<sup>3</sup> (32kg/m<sup>3</sup>) density having thermal conductivity of 0.0346W/m.K (0.24Btu.in/ft<sup>2</sup>.h.°F) acoustical fiberglass insulation. The insulation shall have fire resistant of Class O (BS 476 Part 6, 7). Hinged access doors shall be provided for easy service and maintenance of unit internal parts.

## 3 COMPRESSOR & REFRIGERATION PIPING

Unit's 1<sup>st</sup> system shall be equipped with the high efficiency inverter compressor whilst fixed speed compressor(s) for the rest of the system(s). All compressors shall be scroll, hermetically sealed, refrigerant gas cooled, quiet running and supported on rubber mounts to minimize vibration.

The inverter compressor motor shall be a permanent magnet type and matched with a specially designed, variable frequency drive which modulates the speed of the compressor motor and provides several compressor protection functions.

1, 2, 3 or 4 refrigeration circuits shall be piped with copper tubing and include electronic expansion valve (EEV) on the inverter compressor while thermal expansion valve with external equalizer for fixed speed compressor(s). Filter dryer, sight glass, suction accumulator (standard for heat pump models), pressure fittings as well as charging/access ports shall be included in each circuit. The compressors shall comply with the internationally recognized standards CE and UL.

## 4 CRANKCASE HEATERS

Each compressor shall have a crankcase heater installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles. These are standard on all ACPSG models.

## 5 EVAPORATOR COIL

Evaporator coil shall be of draw through air design for uniform air distribution. The evaporator coil shall be quality construction of staggered row of 3/8" OD inner

grooved seamless copper tube, mechanically bonded to aluminium fins with galvanized coil plates. The coil shall be factory leak and pressure tested to 650psig (45 bar) under water. A galvanized and painted drain pan shall be provided to cover the entire coil area. The drain pan shall be designed to incorporate sloped gutter for complete condensate removal.

## 6 EVAPORATOR BLOWER AND MOTOR

Evaporator blower shall be belt driven, double-inlet-double-width (DIDW) forward curved blades. All blowers are statically and dynamically balanced to ensure quiet operation and smooth performance. Heavy-duty V-belt fan drive with cast iron pulleys keyed and secured to the blower shaft shall be provided.

Motors shall be of totally enclosed fan cooled (TEFC) with IP55 enclosure rating, 4-poles with class F insulation. Motors shall be mounted to an adjustable motor frame. Motor pulleys shall be cast iron, keyed and secured to the motor shaft.

## 7 CONDENSER COIL

Condenser coil shall be air cooled with integral sub-cooling circuit, constructed from staggered row of 3/8"OD inner grooved seamless copper tube, mechanically bonded to aluminium fins with galvanized coil plates. The coil shall be factory leak and pressure tested to 650psig (45 bar) under water.

## 8 CONDENSER FAN AND MOTOR

Condenser fan shall be direct driven propeller type discharging air vertically upward. Condenser fans shall be constructed of corrosion resistant blades and are statically and dynamically balanced. Condenser fan motors shall be of totally enclosed fan cooled (TEFC) with IP55 enclosure rating, 6-poles with class F insulation and wired to unit control panel. The condenser fan assembly shall be provided with heavy gauge and rust resistant steel wire fan guard.

## 9 FILTERS

Units shall be provided with 2" thick washable pleated filters having average arrestance efficiency of 75% as per ASHRAE Standard 52.1 (or equivalent) with side loading.

## 10 VISION 2020i CONTROL

The unit mounted control panel enclosure shall be constructed from heavy gauge galvanized steel with epoxy painted for excellent finished, weatherability and corrosion resistance. The enclosure shall conform to IP54. Hinged and lock type access door shall be provided for easy access and security.

The control panel shall be completely factory wired and shall include standard IEC DOL (non UL) with fixed speed compressor, evaporator fan motor and condenser fan motor circuit breaker and contactors,



# GUIDE SPECIFICATIONS

compressor and evaporator fan motor thermal overload relays, anti-recycling time delay, fuse, power and control circuit terminal blocks and features 24V controls with 380-415V/3PH/50HZ power supply with neutral and earth. The units control panel is fully wired ready to accept the main power supply.

The unit shall be provided with Vision 2020i control system with the following features,

- ✱ The control algorithm and parameters shall be stored in flash memory and EPROM of the controller and shall retain even in the event of power failures, without requiring a backup battery
- ✱ PGD Display
- ✱ Built in memory for data logging
- ✱ Temperature controlled
- ✱ Configurable by user
- ✱ Alarm status/display
- ✱ Analog input/output display
- ✱ Digital input/output status
- ✱ Remote start/stop input
- ✱ Digital input for customer input alarm
- ✱ General alarm output (dry contact)
- ✱ Self-diagnostics
- ✱ Security password access with multiple access level for advanced settings
- ✱ Unit status display

The variable speed compressor shall be capable of speed modulation from 25Hz to a maximum of 100Hz. The unit minimum capacity shall be 25% of full load or less. The resident control algorithms shall make all heating, cooling, and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point, and provides better building comfort. A centralized control shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

## Defrost Controls

Adaptive demand defrost shall be provided to permit defrost wherever coil icing conditions begin to significantly reduce unit capacity

## 11 OPTIONS

### 11.1 Hot Water Heating Coil

Hot water coil shall be provided for heating purpose (hot water shall be field supplied).

### 11.2 Discharge / Suction / Liquid Line Service Valves

Service valves shall be provided at each refrigerant lines for service convenience.

### 11.3 Evaporator Coil Fin Materials

In lieu of standard aluminium fin, alternative fin material and/or protective coating include,

- ✱ Hydrophilic coated aluminium fin

- ✱ Copper Fin
- ✱ Aluminium fin with DB-Coat™

### 11.4 Condenser Coil Fin Materials

In lieu of standard aluminium fin, alternative fin material and/or protective coating include,

- ✱ Hydrophilic coated aluminium fin
- ✱ Copper Fin
- ✱ Aluminium fin with DB-Coat™

### 11.5 Stainless Steel Drain Pan

A stainless steel condensate drain pan shall be provided for the evaporator section in lieu of standard galvanized and painted drain pan.

### 11.6 Replaceable Core Filter Drier

Replaceable filter core drier shall be provided in lieu of standard filter drier for the convenience of filter drier's core replacement.

### 11.7 Closed Cell Elastomer Insulation

1" thick closed cell elastomer insulation (Insulflex®) shall be provided in lieu of standard fiberglass insulation. Closed cell elastomer insulation shall comply Class O (BS476 Part 6) and Class 1 (BS476 Part 7) fire resistant standard.

### 11.8 1" Double Wall Fiberglass Casing (Evaporator Section)

1" double wall fiberglass casing shall be provided in lieu of single skin fiberglass casing.

### 11.9 1" Double Wall Polyurethane Casing (Evaporator Section)

1" double wall polyurethane casing shall be provided in lieu of single skin fiberglass casing for superior thermal insulation.

### 11.10 Liquid Line Solenoid Valve (LLSV)

Factory fitted liquid line solenoid valve shall be provided for each refrigeration circuit.

### 11.11 Condenser Coil Guard

Powder coated wire mesh guard shall be provided for better condenser coil protection.

### 11.12 Suction accumulator

Suction accumulator shall be provided to prevent liquid refrigerant migration to compressor.

### 11.13 High and Low Pressure Gauges

Each compressor is provided with unit mounted pressure gauges to monitor high and low side operating pressure.

### 11.14 Stainless Steel Fasteners

Stainless steel fasteners shall be provided in lieu of standard fasteners for corrosion resistance application.

# GUIDE SPECIFICATIONS

## 11.15 C-Channel Structural Steel Base (model ACPSG015-045VG)

C-channel structural steel base shall be provided as an added unit base. C-channel base shall undergo hot-dipped galvanization process for better corrosion resistance.

## 11.16 Belt Guard

Belt guard shall be provided for belt and pulley's non- contact exposure.

## 11.17 Evaporator Blower Isolator

Rubber isolator shall be provided to dampen vibration caused by motor and blower.

## 11.18 Lockable Access Door

Lockable latch shall be provided on standard hinged type access doors.

## 11.19 Economizer

The economizer brings in cold fresh air for ventilation and provides "free" cooling to the building. It substantially reduces the need for mechanical cooling (cooling by running system's compressor) thus saving tremendous amount of energy.

The economizer option shall include an aluminum louver with bird screen at rear (for protection against rain and external elements), low leak opposed blade type fresh air damper, 0 to 100% fully modulating damper actuator (spring return type) and dry bulb sensors.

The fresh air damper (controlled via actuator) will start to operate when the dry-bulb sensor senses that the ambient/outside air temperature drop beyond a certain setpoint. The fresh air damper will modulate open from 0% to 100% based on the room temperature setpoint +/- deadband.

Fresh air damper will be fully closed when heat pump reverse cycle is triggered.

## 11.20 10% or 30% Fresh Air Intake

Either 10% or 30% (fix) fresh air intake shall be provided to meet building's indoor air quality requirement.

The fresh air intake option shall include a low leak opposed blade type fresh air damper (manual/hand operated) and an aluminum louver with bird screen at rear (for protection against rain and external elements).

Table below shows Fresh Air Intake option availability,

Model	10% Fresh Air Alone	30% Fresh Air Alone	50% Eco. + 10% Fresh Air	50% Eco. + 30% Fresh Air
ACPSG015	YES	YES	NO	NO
ACPSG025	YES	YES	NO	NO
ACPSG035	YES	YES	YES	YES
ACPSG045	YES	YES	YES	YES
ACPSG055	YES	YES	YES	NO
ACPSG080	YES	YES	YES	NO

## 11.21 Electronic Expansion Valve (EEV)

In lieu of standard thermal expansion valve equipped on fixed speed compressor's system, electronic expansion valve (EEV) shall be provided for precise superheat control (energy saving).

## 11.22 EC Evaporator Blower

In lieu of standard belt driven evaporator centrifugal blower and motor, high efficiency direct driven backward curved plug fan shall be provided. The backward curved plug fan shall be driven with electronically commutated (EC) motor. Fan speed can be stepped to requirements or continuously variable using a 0–10V DC control signal. The EC backward curved plug fan is best applicable for precise air flow control, building pressure control and energy saving purpose.

## 11.23 EC Condenser Axial Fan

In lieu of standard direct driven axial condenser fan with AC motor, a direct driven axial condenser fan with electronically commutated (EC) motor shall be provided. Fan speed can be stepped to requirements or continuously variable using a 0–10V DC control signal. The EC axial fan is best applicable for precise head pressure / low ambient control and energy saving purpose. The fan also featured a low noise behaviour.

## 11.24 Door Interlock Main Incoming Isolator

Incoming Isolator is provided to isolate the main incoming power supply to the unit.

## 11.25 Indicating Lights

Indication provided for high pressure, overload trip and compressor run.

## 11.26 UVR/Phase Failure Protect

Phase Failure Relay is provided for over voltage, under voltage and phase loss protection.

## 11.27 IP55 Control Panel

In lieu of standard control panel, IP55 Control Panel with double layer access door shall be design in according to IP55 standard is provided.

## 11.28 BMS Communication

Modbus RS485 can be added to the controller for remote monitoring.

## 11.29 Lock Out Stop

Emergency stop switch provided for Blower Fan.

## 11.30 Differential Pressure Switch for Evaporator Blower

Differential pressure switch provided to interlock with the control circuit. It is used to sense air flow and feedback to the controller.

# GUIDE SPECIFICATIONS

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## 11.31 Voltmeter

Voltmeter and selector switch provided for voltage display

## 11.32 Ammeter

Ammeter and selector switch provided for current display.

## 11.33 Electric Heater

Electric heater shall be provided for heating purpose.

## 11.34 Electric Heater Starter

Contactors and circuit breaker provided for electric heater.

## 11.35 Compressor Soft Start

Soft-Starter for fixed speed compressors to reduce the starting current.

## 11.36 Star Delta Starter Evaporator Motor

Star Delta starting method available for Evaporator motor.

## 11.37 Nominal Evaporator Motor Soft Starter

Soft-Starter available to reduce the starting current for Nominal Evaporator motor.

## 11.38 Max Evaporator Motor Soft Starter

Soft-Starter available to reduce the starting current for Maximum sized Evaporator motor.

## 11.39 VFD for Condenser Motor

Variable Frequency Drive (VFD) on base condenser fan motor(s) with pressure transducer added for more accurate control at ambient down to 40°F

## 11.40 VFD for Evaporator Motor Nominal HP

Variable Frequency Drive (VFD) on Nominal Evaporator motor hp.

## 11.41 VFD for Evaporator Motor Max HP

Variable Frequency Drive (VFD) on Maximum Evaporator motor hp.

## 11.42 CO<sub>2</sub> Sensor

The CO<sub>2</sub> sensor shall have the ability to monitor the concentration (parts per million, ppm) of CO<sub>2</sub> (Carbon Dioxide) in the air. As the CO<sub>2</sub> concentration changes, the outside air damper modulates. The sensor shall be duct mounted and field wired back to the unit.

## 11.43 24VAC Fire Relay with Transformer

Fire relay can be activated externally to shut down the unit in the event of the fire/smoke detected shall be provided.



#### **Malaysia**

Lot 5755-6, Kidamai Industrial Park,  
Bukit Angkat,  
43000 Kajang,  
Selangor Darul Ehsan,  
Malaysia

Tel: +603-8924 9000  
Fax: +603-8739 5020

#### **China**

No. 1 Dunham-Bush Road,  
Laishan District,  
Yantai,  
Shandong Province,  
China 264003

Tel: +86-535-658 8999  
Fax: +86-535-658 1999

#### **United Kingdom**

8 Downley Road,  
Havant,  
Hampshire,  
England PO9 2JD

Tel : +44-23-9247 7700  
Fax: +44-23-9245 0396

#### **United Arab Emirates**

Office # 2606,  
Fortune Executive Towers,  
Cluster T1, Jumeirah Lake Tower  
Dubai, UAE

Tel: +971-4-443 9207  
Fax: +971-4-443 9208

#### **South Africa**

No. 57 Sovereign Drive  
Route 21 Corporate Park  
Irene, Pretoria  
South Africa

Tel: +27-12-345 4202  
Fax: +27-12-345 4203

#### **Singapore**

2 Kallang Pudding Road  
#07-07 Mactech Building  
Singapore 349307

Tel: +65-6842 2012  
Fax: +65-6842 2013

#### **Indonesia**

The Vida Building 7<sup>th</sup> Floor  
Jl. Raya Perjuangan No. 8 Kebon Jeruk  
Jakarta 11530, Indonesia

Tel: +62-21-2977 8100  
Fax: +62-21-2977 8001

#### **Thailand**

1 QHouse Lumpini,  
27<sup>th</sup> Floor, South Sathorn Road,  
Tungmahamek, Sathorn,  
Bangkok Thailand 10120

Tel: +66-0-2610 3749  
Fax: +66-0-2610 3601

#### **Vietnam**

10th Floor, Nam A Bank Tower,  
201-203 Cach Mang Thang 8 Street,  
District 3, Ho Chi Minh City,  
Vietnam

Tel: +84-8-6290 3108  
Fax: +84-8-6290 3109



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