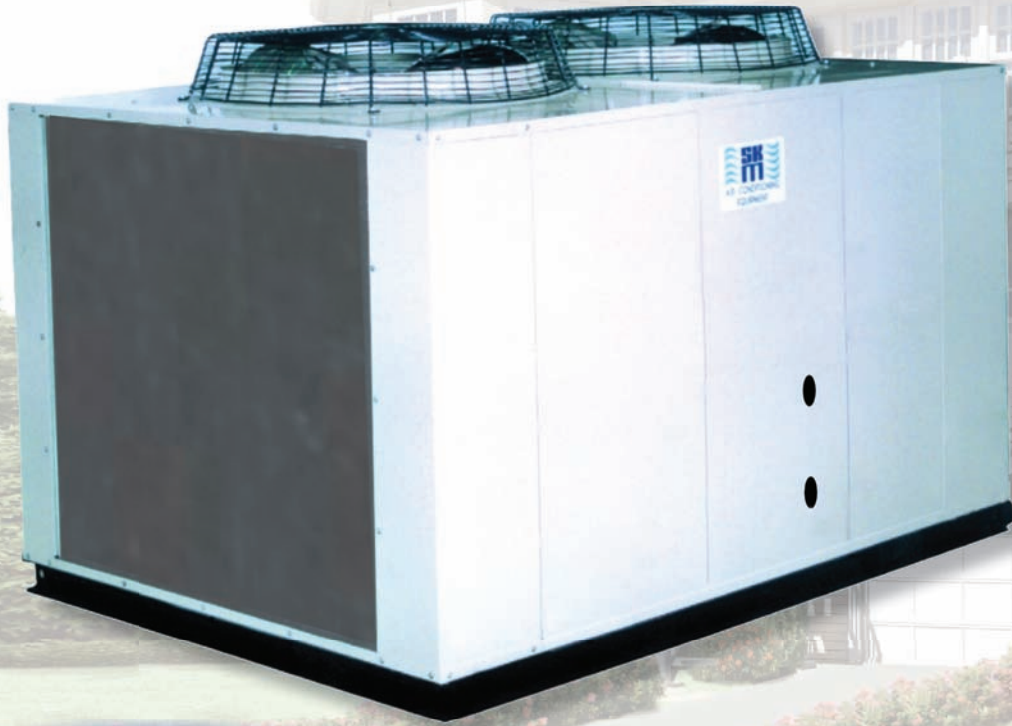


APCX(S) Series Scroll Chillers

Range 5 TR to 70 TR
(18 kW to 246 kW)



Bulletin # 089/2011 (NEW)



R-134a



SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

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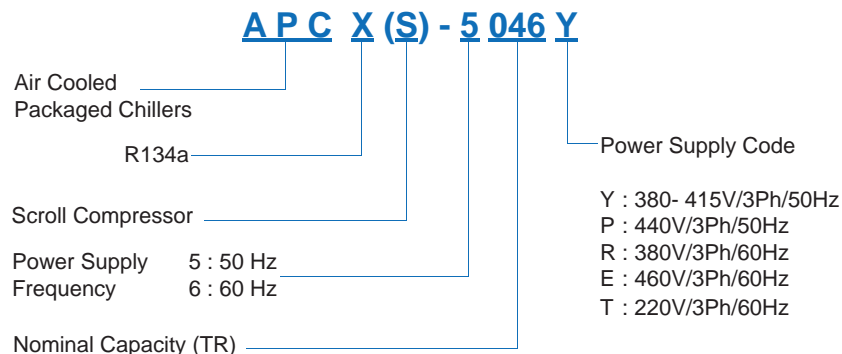
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Legend

The following legends are used throughout this manual:

cfm..... Cubic feet per minute	ft.wg..... feet of water gauge
EER..... Energy Efficiency Ratio	Ph..... Phase
Hz..... Hertz	Pi..... Power Input of Compressor
kW..... Kilowatts	TR..... Tons of Refrigeration
kg..... Kilogram	WPD..... Water Pressure Drop
lbs..... Pounds	WFR..... Water Flow Rate
l/s..... Liters per second	V..... Volts

Nomenclature



Introduction

Featuring Scroll Compressors and R134a refrigerant, SKM **APCX(S)** Air-Cooled Package Chiller is designed to meet customer's demand for environment friendly chiller with minimal noise & vibration and in compact construction. The **APCX (S)** Series is intended for extensive applications such as free standing retail outlets, shopping centers, warehouses and villas. Traditional to all SKM chillers, **APCX(S)** chillers are designed and manufactured to meet requirements of the severe climatic condition of the Gulf.

APCX(S), The new generation of SKM Chillers, units are assembled, leak tested, evacuated, internally wired and fully charged with R134a refrigerant. Every unit is fully tested and is ready for installation

APCX(S) Series are designed and manufactured in accordance with SKM Quality Management System, approved to ISO-9001:2000 & 14001:2004 and rated in accordance with AHRI-550/590.

APCX(S) Series Air-Cooled Package Chiller are available in 28 models covering nominal capacity ranges from 5TR – 62TR (18kW – 218kW) in 50Hz and 6TR – 70TR (21kW – 246kW) in 60Hz.

SKM Airconditioning Equipment,



You name it....We cool it

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

General Features

To meet the challenges of today's residential and commercial air conditioning, SKM developed **APCX(S)** Series that are more compact, lighter in weight, with lesser sound and vibration, to minimize space requirement and structural load on buildings.

APCX(S) Chillers are comprised of models with single compressor for small capacity units and multiple compressors system for higher capacity units. These multiple compressors system offer efficient capacity control, fewer start/stop than larger compressor, reduced starting load and part load capacity if one compressor fails.

APCX(S) Chillers are designed as standard to operate at a wide range of ambient temperature from 50°F (10°C), or lower, if optional low ambient operation kit is included, to 125°F (52°C).

Main Component Features

Compressors

APCX(S) Series Chillers use high efficiency, hermetically sealed scroll compressors that have fewer moving parts compared to equivalent size of reciprocating which results to unmatched reliability and quiet operation. Scroll compressors of **APCX(S)** Series have superior liquid and debris handling, ability of self-compensating for wear and generate very low gas pulsation.

APCX(S) compressors include the following features:

- Discharge Temperature Protection.
- Motor Protection.
- Disc check valve.
- Crankcase heater.
- Suction gas cooled.

Condensers

Condenser coils are manufactured from seamless Hi-X copper tubes mechanically bonded to aluminium fins to ensure optimum heat transfer. All coils are tested against leakage by air pressure of 450 psig (3100 kPa) under water. All standard coils are 3 or 4 rows, 14 FPI (1.8mm) fin spacing, 3/8" (9.5mm) O.D. tubes. An integral subcooling circuit is provided to increase the chiller cooling capacity, without additional operating costs.

For different application requirements, other optional condenser fin materials are available:

- Copper fins
 - Copper fins only electrotinned
 - Copper finned coil electro-tinned after manufacturing
 - Precoated Aluminum fins
- The pre-coated is hydrophobic polyurethane resin. This option provides substantial corrosion protection beyond standard coil construction.

- Aeris Guard Coil Coating

The Aeris Guard Coil coat is a self etching high performance modified epoxy finish that is specifically designed to coat and protect Aluminum and Copper surfaces. In addition, the coating is ideal for the protection of ferrous and non ferrous materials.

Condenser Fans & Motors

The condenser fans are propeller type, aluminium alloy blades, directly driven by electric motors. Motors are Totally Enclosed Air Over (TEAO) six pole with class 'F' insulation and IP55 protection. The TEAO and class 'F' insulation features ensure long life and are unique to SKM. The motors are factory wired to chiller unit control panel where the motor starters are located to control the operation of these motors.

The condenser fans are individually statically and dynamically balanced at the factory. Complete fan assembly is provided with suitable acrylic coated fan guard.

Evaporator

APCX(S) evaporators are Braze Plate Heat Exchangers (BPHE). Channel plates, refrigerant and water connections are constructed from stainless steel with pure copper as brazing material. BPHE design and assembly process are in compliance with Europe, Pressure Equipment Directive (PED 97/23/EC), America, Underwriters Laboratories Inc (UL) & Japan, Kouatsu-Gas Hoan Kyoukai (KHK). Maximum working pressure of water side is 363 psig (2500 kPa) and refrigerant side is 392 psig (2700 kPa).

All evaporators are insulated with 1" (25mm) thick flexible closed cell insulation, having K factor of 0.28 Btu.in/ft².hr.°F (0.040 W/m.°K).

Casing/Structure Frame

The unit casing in **APCX(S)** series chillers are made of zinc coated galvanized steel sheets conforming to JIS-G 3302 and ASTM A653 which is phosphatized and baked after an electrostatic powder coat of approximately 60 microns. This finish and coating can pass a 1000 hour in 5% salt spray testing at 95°F (35°C) and 95% RH as per ASTM B117. Unit casing is provided with access doors for easy servicing/maintenance and lifting holes for rigging.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Refrigerant Piping

The refrigeration circuit piping is fabricated from ACR grade copper piping. Each refrigeration circuit includes filter drier, liquid line solenoid valve, thermostatic expansion valve, sight glass and shut off valve. The refrigeration circuit suction line is insulated with ½" (13mm) wall thickness closed cell pipe insulation.

Control Panel

The unit mounted chiller control panel enclosure is fabricated out of heavy gauge sheet steel in phosphatized powder coated baked finish. The enclosure conforms to IP54 as per guidelines in IEC 529. A hinged access door and key-fastener is provided for easy access and security. The panel is factory wired in accordance with NEC 430 & 440, labelled, tagged and features 220V / 240V controls.

- All compressors are with DOL starting.
- Individual compressor and condenser fan motor contactors.
- Circuit breakers for compressors and condenser fan motors.
- MCB for Control Circuit.
- Remote/Local Selector Switch.
- Microprocessor control boards.
- Control Relays.
- Power and control terminal blocks.

Microprocessor Controller



All APCX(S) Series Chillers are equipped with a full function microprocessor based controller as a standard feature. The controller is factory programmed for the control of compressors and condenser fans. The controller comes with a built in keypad and display for simple but meaningful man machine interface. This controller provides complete operational control for the chiller and has built-in auto diagnostic capability that can signal normal operation or alarm conditions as well as shutting down the chiller or system if necessary.

The Main Features of the controller are as follows:

- Built in LCD display with back light.
- Roll & push knob and 3 function buttons.
- Battery backed up built in real time clock.
- Multiple authorization level to provide tight security for the control system.

- Run hours for the compressors.
- Automatic Lead/Lag of the compressors.
- Capacity control based on leaving water temperature.
- Alarm history.
- Remote Start/Stop facility from an external control system.
- Common fault, run and auto mode indication through volt free contact.

Display Information

SKM APCX(S) Chillers offer LCD display which allows the operator to access different parameters of the chiller. Operator can view and change the chiller parameters. The display information includes:

- Status
- Outputs
- Inputs
- Alarms
- Set points
- Password

System Control Philosophy

The unit may be enabled or disabled manually or through the use of an external signal from a building automation system.

Control is based upon Leaving chilled water temperature. Compressors will be staged based on the set point and actual leaving water temperature. On an increase in leaving water temperature, cooling stages will be added and on a decrease in leaving water temperature, cooling stages will be removed from the system. Water flow should be maintained as sensed by the water flow switch, for the chiller to operate..

System Protection

The intelligent microprocessor based controller monitors all the safeties related to the chiller and makes the necessary protections, by shutting down the entire chiller or the effected circuit. The protection includes:

- Low suction pressure.
- High discharge pressure.
- High compressor motor temperature.
- Freeze.
- Chilled water flow loss.
- Sensor faults.
- Compressor short cycling.

BMS Connectivity (Optional)

APCX(S) microprocessor can support the major BMS protocols such as BACnet, Modbus & LON. Extra hardware may be required depending on the protocol. The details of the parameters to be controlled, number of chillers in the building, exact protocol, etc. are required before the order as costing of the BMS interface depends on these parameters.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Factory Installed Options

Low Ambient Operation Kit (LAO)

For operation down to 25°F (-4°C) ambient. Specify minimum design ambient temperature on order.

Alternative Condenser Material

Made of copper tubes and alternative fin material and/or protective coats.

- For Copper Fins, specify (FC).
- For Copper Fins only electrotinned, specify (CFT).
- For Copper Finned Coils with electrotinned after manufacturing, specify (FCT).
- For Pre Coated aluminum fins, specify (FAP).
- For Aluminum Fins with Aeris Coat Protection, specify (FAA).
- For Copper Fins with Aeris Coat Protection, specify (FCA).

Galvanized Frame (GFB)

Hot dip galvanized after manufacture, steel frame and base.

IP55 Control Panel Enclosure (ICP)

Control Panel for special applications to meet IP55 requirements.

Condenser Coil Guard (CGP)

Coil wire mesh guard, in galvanized and painted finish for condensers. Recommended on ground level installations where coil needs to be protected against vandalism.

Electronic Expansion Valve (EEV)

To provide energy saving benefits over mechanical thermostatic expansion valve (TXV).

Control Transformer (CXT)

This option is necessary and available for APCX(S) models rated for 440V/3PH/50Hz or 460V/3PH/60Hz or power supplies without neutral. When ordering for these voltages, this option must be ordered.

Main Isolator (without door interlock) (ISO)

For main power isolation. (consult SKM)

Voltage Monitoring Module (VMM)

To prevent APCX(S) unit operation in the event of Phase loss Phase reversal, and Under / Over voltage on the incoming line voltage.

Voltage Monitoring Module as per DEWA (DVM)

Under voltage relay as per DEWA regulations. This option is available for Dubai, UAE only.

Evaporator Freeze Up Protection (EFP)

Heating cable with thermostat to prevent evaporator freeze-up where low ambient temperatures below 32°F (0°C) are anticipated with/out chiller operation.

Ammeter & Phase Selector Switch (AMPS)

To indicate running AMPS of each compressor.

Ammeter & Phase Selector switch (AMPI)

To indicate running AMPS on main incomer of a chiller.

Voltmeter & Selector Switch (VSS)

For incoming line voltage.

Soft Starter (SSS)

To reduce the starting current of compressors using reduced voltage starting method. Compressors will be started using electronic solid state soft starters that will ramp up the speed of the compressors to rated speed within few seconds thus reducing the mechanical & electrical stresses .

Suction Pressure read out Capability (SPC)

Additional transducer in suction line to display suction pressure in microprocessor.

Pressure Gauges (SDG)

Suction and discharge indication of each refrigerant circuit.

Marine Paint (MP)

To provide increased corrosion resistant in coastal environments and off-shore locations.

Hydronic Kit (HK)

Refer to hydronic catalogue Bulletin No. 081/2010 for selection.

Options for Field Installation

Chilled Water Flow Switch (CWFS)

Anti-vibration mounts, spring type (CAVM)

Strainer (STNR)

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

ENGINEERING SPECIFICATIONS - 50 Hz

Model	APCX (S)	5005	5008	5010	5012	5016	5020	5024
Cooling Capacity (1)	TR	5.1	7.8	9.8	12.2	15.5	20.1	24.0
	kW	18.0	27.4	34.6	43.0	54.6	70.5	84.6
Cooling Capacity (2)	TR	4.6	7.0	9.0	11.2	14.2	18.1	21.8
	kW	16.2	24.6	31.7	39.4	50.1	63.8	76.7
Compressor	-	Hermetic Scroll Compressor						
Ckt A Qty / Ckt B Qty	# / #	1	1	1	1	1	1 / 1	1 / 1
Oil Charge (Polyol Ester Oil) Ckt A Vol. / Ckt B Vol.	US Gal	0.85	0.85	1.24	1.80	1.66	1.24 / 1.24	1.80 / 1.80
	Litre	3.2	3.2	4.7	6.8	6.3	4.7 / 4.7	6.8 / 6.8
Condenser Coil	-	Air Cooled 3 or 4 rows, 12 fpi (2.1mm) fin spacing, copper tubes Aluminum fins						
Face Area (Total)	ft ²	9.7	16.7	16.7	24.4	29.3	40.0	40.0
	m ²	0.90	1.55	1.55	2.27	2.73	3.72	3.72
Condenser Fan	-	Propeller Direct Drive 960 rpm						
Code x Quantity	- x #	628 x 1	628 x 2	723 x 2	723 x 2	723 x 2	723 x 3	723 x 3
Air Flow Rate	cfm	4273	8570	10410	13246	13286	20133	19587
	l/s	2016	4044	4912	6251	6270	9501	9243
Condenser Fan Motor	-	Totally enclosed air over, Class F insulation, 6 pole, IP - 55 protected						
Size x Quantity	kW x #	0.37 x 1	0.37 x 2	0.75 x 2	0.75 x 2	0.75 x 2	0.75 x 3	0.75 x 3
Evaporator	-	Direct Expansion Brazed Plate Heat Exchangers						
Refrigerant Circuits	#	1	1	1	1	1	2	2
Water Volume	US Gal	0.50	0.74	0.85	1.21	1.90	2.57	2.57
	Litre	1.9	2.8	3.2	4.6	7.2	9.7	9.7

Model	APCX (S)	5030	5035	5040	5045	5050	5055	5060
Cooling Capacity (1)	TR	30.9	34.8	39.8	45.6	49.3	56.7	62.1
	kW	108.6	122.5	140.0	160.5	173.3	199.4	218.4
Cooling Capacity (2)	TR	28.5	31.6	36.4	41.4	44.7	51.7	56.7
	kW	100.2	111.3	128.2	145.7	157.3	181.7	199.5
Compressor	-	Hermetic Scroll Compressor						
Ckt A Qty / Ckt B Qty	# / #	1 / 1	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Oil Charge (Polyol Ester Oil) Ckt A Vol. / Ckt B Vol.	US Gal	1.66 / 1.66	2.09 / 2.09	2.48 / 2.48	3.04 / 3.04	3.60 / 3.60	3.46 / 3.46	3.32 / 3.32
	Litre	6.3 / 6.3	7.9 / 7.9	9.4 / 9.4	11.5 / 11.5	13.6 / 13.6	13.1 / 13.1	12.6 / 12.6
Condenser Coil	-	Air Cooled 3 or 4 rows, 12 or 14 fpi (2.1 or 1.8mm) fin spacing, copper tubes Aluminum fins						
Face Area (Total)	ft ²	64.0	80.0	80.0	80.0	80.0	100.0	100.0
	m ²	5.95	7.44	7.44	7.44	7.44	9.30	9.30
Condenser Fan	-	Propeller Direct Drive 960 rpm						
Code x Quantity	- x #	823 x 4	823 x 4	829 x 4	829 x 4	829 x 4	823 x 6	829 x 6
Air Flow Rate	cfm	36476	37932	43936	42224	42224	53166	59856
	l/s	17213	17900	20733	19926	19926	25089	28246
Condenser Fan Motor	-	Totally enclosed air over, Class F insulation, 6 pole, IP - 55 protected						
Size x Quantity	kW x #	1.1 x 4	1.1 x 4	1.5 x 4	1.5 x 4	1.5 x 4	1.1 x 6	1.5 x 6
Evaporator	-	Direct Expansion Brazed Plate Heat Exchangers						
Refrigerant Circuits	#	2	2	2	2	2	2	2
Water Volume	US Gal	4.20	4.65	5.63	9.20	9.20	10.55	10.55
	Litre	15.9	17.6	21.3	34.8	34.8	39.9	39.9

Table 1

Note :

- Capacity ratings are based on standard AHRI - 550 / 590 conditions of 95°F (35°C) ambient, 44°F (6.7°C) leaving chilled water temperature, 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.
- Capacity ratings are based on 115°F (46°C) ambient, 45°F (7.2°C) leaving chilled water temperature, 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

ENGINEERING SPECIFICATIONS - 60 Hz

Model	APCX (S)	6006	6009	6012	6014	6018	6024	6030
Cooling Capacity (1)	TR	6.0	9.1	12.0	14.0	18.6	23.4	28.8
	kW	21.1	31.9	42.1	49.2	65.4	82.4	101.4
Cooling Capacity (2)	TR	5.4	8.2	11.0	12.9	16.9	21.3	26.6
	kW	18.9	28.8	38.5	45.4	59.5	75.0	93.4
Compressor	-	Hermetic Scroll Compressor						
Ckt A Qty / Ckt B Qty	# / #	1	1	1	1	1	1 / 1	1 / 1
Oil Charge (Polyol Ester Oil)	US Gal	0.85	0.85	1.24	1.80	1.66	1.24 / 1.24	1.80 / 1.80
	Litre	3.2	3.2	4.7	6.8	6.3	4.7 / 4.7	6.8 / 6.8
Condenser Coil	-	Air Cooled 3 or 4 rows, 12 fpi (2.1mm) fin spacing, copper tubes Aluminum fins						
Face Area (Total)	ft ²	9.7	16.7	16.7	24.4	29.3	40.0	40.0
	m ²	0.90	1.55	1.55	2.27	2.73	3.72	3.72
Condenser Fan	-	Propeller Direct Drive 1150 rpm						
Code x Quantity	- x #	628 x 1	628 x 2	723 x 2	723 x 2	723 x 2	723 x 3	723 x 3
Air Flow Rate	cfm	5185	10398	11992	15664	15724	23874	23094
	l/s	2447	4907	5659	7392	7420	11266	10898
Condenser Fan Motor	-	Totally enclosed air over, Class F insulation, 6 pole, IP - 55 protected						
Size x Quantity	kW x #	0.55 x 1	0.55 x 2	1.1 x 2	1.1 x 2	1.1 x 2	1.1 x 3	1.1 x 3
Evaporator	-	Direct Expansion Brazed Plate Heat Exchangers						
Refrigerant Circuits	#	1	1	1	1	1	2	2
Water Volume	US Gal	0.50	0.74	1.21	1.21	2.57	2.57	4.20
	Litre	1.9	2.8	4.6	4.6	9.7	9.7	15.9

Model	APCX (S)	6035	6040	6050	6055	6060	6065	6070
Cooling Capacity (1)	TR	35.7	42.0	48.1	54.3	58.6	65.3	70.8
	kW	125.4	147.9	169.0	191.1	205.9	229.8	248.9
Cooling Capacity (2)	TR	32.9	38.4	43.7	49.5	53.4	59.9	65.1
	kW	115.6	135.0	153.8	174.2	187.7	210.7	228.8
Compressor	-	Hermetic Scroll Compressor						
Ckt A Qty / Ckt B Qty	# / #	1 / 1	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Oil Charge (Polyol Ester Oil)	US Gal	1.66 / 1.66	2.09 / 2.09	2.48 / 2.48	3.04 / 3.04	3.60 / 3.60	3.46 / 3.46	3.32 / 3.32
	Litre	6.3 / 6.3	7.9 / 7.9	9.4 / 9.4	11.5 / 11.5	13.6 / 13.6	13.1 / 13.1	12.6 / 12.6
Condenser Coil	-	Air Cooled 3 or 4 rows, 12 or 14 fpi (2.1 or 1.8mm) fin spacing, copper tubes Aluminum fins						
Face Area (Total)	ft ²	64.0	80.0	80.0	80.0	80.0	100.0	100.0
	m ²	5.95	7.44	7.44	7.44	7.44	9.30	9.30
Condenser Fan	-	Propeller Direct Drive 1150 rpm						
Code x Quantity	- x #	823 x 4	823 x 4	829 x 4	829 x 4	829 x 4	823 x 6	829 x 6
Air Flow Rate	cfm	44404	46188	52976	51032	51032	64722	72588
	l/s	20954	21796	24999	24082	24082	30542	34254
Condenser Fan Motor	-	Totally enclosed air over, Class F insulation, 6 pole, IP - 55 protected						
Size x Quantity	kW x #	1.5 x 4	1.5 x 4	2.2 x 4	2.2 x 4	2.2 x 4	1.5 x 6	2.2 x 6
Evaporator	-	Direct Expansion Brazed Plate Heat Exchangers						
Refrigerant Circuits	#	2	2	2	2	2	2	2
Water Volume	US Gal	4.65	5.63	9.20	10.55	10.55	10.55	10.55
	Litre	17.6	21.3	34.8	39.9	39.9	39.9	39.9

Table 2

Note :

- Capacity ratings are based on standard AHRI - 550 / 590 conditions of 95°F (35°C) ambient, 44°F (6.7°C) leaving chilled water temperature, 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.
- Capacity ratings are based on 115°F (46°C) ambient, 45°F (7.2°C) leaving chilled water temperature, 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.



SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

CAPACITY RATINGS - 50 Hz

Model APCX(S)	LCWT	Condenser Entering Air Temperature °F (°C)																			
		95°F (35°C)				105°F (40.6°C)				115°F (46.1°C)				120°F (48.9°C)				125°F (51.7°C)			
		Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD
EER	°F	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg
	°C	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa
5005 10.8	42	4.9	5.2	11.9	4.7	4.6	5.8	11.2	4.2	4.3	6.4	10.4	3.7	4.2	6.8	10.0	3.5	4.0	7.1	9.7	3.2
	5.6	17.4	5.2	0.7	14.0	16.3	5.8	0.7	12.5	15.3	6.4	0.7	11.1	14.7	6.8	0.6	10.3	14.1	7.1	0.6	9.6
	44	5.1	5.3	12.3	5.0	4.8	5.9	11.6	4.5	4.5	6.5	10.8	4.0	4.4	6.8	10.5	3.7	4.2	7.2	10.1	3.5
	6.7	18.0	5.3	0.8	15.0	17.0	5.9	0.7	13.4	15.9	6.5	0.7	11.9	15.3	6.8	0.7	11.1	14.7	7.2	0.6	10.4
	45	5.2	5.3	12.5	5.2	4.9	5.9	11.8	4.7	4.6	6.5	11.0	4.1	4.4	6.9	10.7	3.9	4.3	7.2	10.3	3.6
7.2	18.4	5.3	0.8	15.5	17.3	5.9	0.7	13.9	16.2	6.5	0.7	12.3	15.6	6.9	0.7	11.5	15.0	7.2	0.6	10.8	
48	5.5	5.4	13.2	5.7	5.2	5.9	12.5	5.2	4.9	6.6	11.7	4.6	4.7	6.9	11.3	4.3	4.5	7.3	10.9	4.0	
8.9	19.4	5.4	0.8	17.1	18.3	5.9	0.8	15.4	17.2	6.6	0.7	13.7	16.6	6.9	0.7	12.9	15.9	7.3	0.7	11.9	
5008 11.0	42	7.5	7.7	18.1	5.1	7.1	8.6	17.0	4.6	6.6	9.6	15.8	4.0	6.3	10.1	15.2	3.7	6.0	10.7	14.4	3.3
	5.6	26.5	7.7	1.1	15.4	25.0	8.6	1.1	13.7	23.2	9.6	1.0	11.9	22.2	10.1	1.0	10.9	21.1	10.7	0.9	9.8
	44	7.8	7.8	18.7	5.5	7.4	8.7	17.7	4.9	6.8	9.7	16.4	4.3	6.6	10.2	15.8	3.9	6.3	10.7	15.1	3.6
	6.7	27.4	7.8	1.2	16.4	25.9	8.7	1.1	14.6	24.1	9.7	1.0	12.8	23.1	10.2	1.0	11.8	22.1	10.7	1.0	10.8
	45	7.9	7.8	19.1	5.7	7.5	8.7	18.0	5.1	7.0	9.7	16.8	4.4	6.7	10.2	16.1	4.1	6.4	10.8	15.4	3.8
7.2	27.9	7.8	1.2	16.9	26.4	8.7	1.1	15.2	24.6	9.7	1.1	13.3	23.6	10.2	1.0	12.3	22.6	10.8	1.0	11.3	
48	8.1	7.8	19.5	5.9	8.0	8.8	19.3	5.8	7.5	9.9	18.1	5.1	7.3	10.4	17.5	4.8	7.0	11.0	16.8	4.5	
8.9	28.6	7.8	1.2	17.7	28.2	8.8	1.2	17.2	26.5	9.9	1.1	15.4	25.6	10.4	1.1	14.4	24.7	11.0	1.1	13.4	
5010 10.1	42	9.5	10.1	22.9	6.2	9.0	11.2	21.7	5.6	8.5	12.6	20.4	5.0	8.2	13.3	19.8	4.7	8.0	14.1	19.1	4.4
	5.6	33.5	10.1	1.4	18.5	31.7	11.2	1.4	16.7	29.9	12.6	1.3	15.0	29.0	13.3	1.2	14.1	28.0	14.1	1.2	13.2
	44	9.8	10.1	23.6	6.6	9.3	11.3	22.4	6.0	8.8	12.7	21.2	5.4	8.6	13.5	20.5	5.1	8.3	14.3	19.9	4.8
	6.7	34.6	10.1	1.5	19.6	32.9	11.3	1.4	17.8	31.0	12.7	1.3	16.0	30.1	13.5	1.3	15.1	29.1	14.3	1.3	14.2
	45	10.0	10.2	24.1	6.8	9.5	11.4	22.8	6.2	9.0	12.7	21.6	5.6	8.7	13.5	21.0	5.3	8.5	14.3	20.3	5.0
7.2	35.3	10.2	1.5	20.3	33.5	11.4	1.4	18.5	31.7	12.7	1.4	16.7	30.7	13.5	1.3	15.7	29.8	14.3	1.3	14.8	
48	10.6	10.3	25.6	7.6	10.2	11.6	24.5	7.0	9.8	13.0	23.5	6.5	9.6	13.8	23.0	6.3	9.4	14.7	22.6	6.0	
8.9	37.5	10.3	1.6	22.6	35.9	11.6	1.5	21.0	34.4	13.0	1.5	19.4	33.7	13.8	1.5	18.7	33.1	14.7	1.4	18.1	
5012 10.1	42	11.8	12.8	28.2	5.2	11.2	14.4	26.8	4.7	10.6	16.2	25.4	4.3	10.2	17.2	24.6	4.0	9.9	18.2	23.8	3.8
	5.6	41.3	12.8	1.8	15.5	39.3	14.4	1.7	14.1	37.2	16.2	1.6	12.8	36.0	17.2	1.6	12.1	34.8	18.2	1.5	11.3
	44	12.2	13.0	29.4	5.6	11.6	14.5	27.9	5.1	11.0	16.3	26.4	4.6	10.7	17.3	25.6	4.3	10.3	18.3	24.7	4.1
	6.7	43.0	13.0	1.9	16.7	40.9	14.5	1.8	15.2	38.6	16.3	1.7	13.7	37.5	17.3	1.6	12.9	36.2	18.3	1.6	12.2
	45	12.5	13.0	29.9	5.8	11.8	14.6	28.4	5.3	11.2	16.4	26.9	4.7	10.9	17.4	26.0	4.5	10.5	18.4	25.2	4.2
7.2	43.8	13.0	1.9	17.2	41.7	14.6	1.8	15.7	39.4	16.4	1.7	14.2	38.2	17.4	1.6	13.4	36.9	18.4	1.6	12.6	
48	13.2	13.2	31.7	6.4	12.6	14.8	30.2	5.9	11.9	16.7	28.6	5.3	11.6	17.7	27.8	5.0	11.2	18.7	26.9	4.8	
8.9	46.4	13.2	2.0	19.1	44.2	14.8	1.9	17.5	41.9	16.7	1.8	15.9	40.7	17.7	1.8	15.1	39.5	18.7	1.7	14.2	
5016 10.7	42	15.0	15.7	36.0	4.5	14.2	17.6	34.1	4.2	13.4	19.6	32.2	3.8	13.0	20.7	31.2	3.6	12.6	21.8	30.2	3.4
	5.6	52.7	15.7	2.3	13.5	50.0	17.6	2.2	12.4	47.2	19.6	2.0	11.3	45.8	20.7	2.0	10.8	44.3	21.8	1.9	10.3
	44	15.5	15.9	37.3	4.8	14.7	17.8	35.4	4.4	13.9	19.8	33.5	4.0	13.5	20.9	32.5	3.8	13.1	22.0	31.5	3.7
	6.7	54.6	15.9	2.4	14.3	51.9	17.8	2.2	13.2	49.1	19.8	2.1	12.0	47.6	20.9	2.0	11.5	46.1	22.0	2.0	10.9
	45	15.8	16.0	38.0	4.9	15.0	17.9	36.1	4.5	14.2	19.9	34.2	4.2	13.8	21.0	33.2	4.0	13.4	22.1	32.1	3.8
7.2	55.7	16.0	2.4	14.7	52.9	17.9	2.3	13.6	50.1	19.9	2.2	12.4	48.6	21.0	2.1	11.9	47.1	22.1	2.0	11.3	
48	16.9	16.3	40.7	5.5	16.2	18.3	38.9	5.1	15.5	20.4	37.1	4.7	15.1	21.5	36.2	4.6	14.7	22.7	35.2	4.4	
8.9	59.6	16.3	2.6	16.5	57.0	18.3	2.5	15.3	54.4	20.4	2.3	14.2	53.0	21.5	2.3	13.6	51.6	22.7	2.2	13.1	
5020 10.4	42	19.2	20.7	46.2	3.8	18.2	23.1	43.6	3.4	17.0	25.9	40.9	3.0	16.5	27.4	39.5	2.8	15.9	29.1	38.1	2.6
	5.6	67.7	20.7	2.9	11.3	63.9	23.1	2.8	10.1	59.9	25.9	2.6	9.0	57.9	27.4	2.5	8.4	55.9	29.1	2.4	7.8
	44	20.1	20.9	48.1	4.1	18.9	23.4	45.4	3.7	17.8	26.2	42.6	3.2	17.2	27.7	41.2	3.0	16.6	29.4	39.8	2.8
	6.7	70.5	20.9	3.0	12.2	66.6	23.4	2.9	11.0	62.5	26.2	2.7	9.7	60.4	27.7	2.6	9.1	58.3	29.4	2.5	8.5
	45	20.5	21.0	49.1	4.3	19.3	23.5	46.4	3.8	18.1	26.3	43.5	3.4	17.5	27.9	42.1	3.2	16.9	29.5	40.6	3.0
7.2	72.0	21.0	3.1	12.7	67.9	23.5	2.9	11.4	63.8	26.3	2.7	10.1	61.7	27.9	2.7	9.5	59.5	29.5	2.6	8.8	
48	21.7	21.4	52.1	4.8	20.5	23.9	49.2	4.3	19.3	26.8	46.2	3.8	18.6	28.3	44.7	3.6	18.0	30.0	43.2	3.3	
8.9	76.3	21.4	3.3	14.2	72.1	23.9	3.1	12.8	67.7	26.8	2.9	11.3	65.5	28.3	2.8	10.6	63.3	30.0	2.7	9.9	
5024 10.0	42	23.1	26.2	55.4	5.3	21.8	29.4	52.3	4.8	20.5	33.0	49.2	4.3	19.8	35.0	47.5	4.0	19.1	37.0	45.8	3.7
	5.6	81.1	26.2	3.5	16.0	76.7	29.4	3.3	14.3	72.0	33.0	3.1	12.7	69.6	35.0	3.0	11.9	67.2	37.0	2.9	11.1
	44	24.0	26.5	57.7	5.8	22.7	29.7	54.6	5.2	21.4	33.3	51.3	4.6	20.7	35.3	49.6	4.3	19.9	37.4	47.8	4.0
	6.7	84.6	26.5	3.6	17.3	80.0	29.7	3.4	15.5	75.1	33.3	3.2	13.8	72.6	35.3	3.1	12.9	70.1	37.4	3.0	12.1
	45	24.5	26.6	58.9	6.0	23.2	29.9	55.7	5.4	21.8	33.5	52.3	4.8	21.1	35.5	50.6	4.5	20.4	37.6	48.8	4.2
7.2	86.3	26.6	3.7	18.0	81.6	29.9	3.5	16.1	76.7	33.5	3.3	14.3	74.2	35.5	3.2	13.5	71.6	37.6	3.1	12.6	
48	26.0	27.1	62.4	6.7	24.6	30.4	59.1	6.1	23.2	34.1	55.6	5.4	22.4	36.0	53.8	5.1	21.6	38.1	51.9	4.7	
8.9	91.5	27.1	3.9	20.1	86.6	30.4	3.7	18.1	81.4	34.1	3.5	16.1	78.8	36.0	3.4	15.1	76.1	38.1	3.3	14.1	

Note :

Table 3

1. Capacity ratings are based on 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.

* Power input mentioned in this page should not be used for cable or fuse selection. MCA and MFA values given in the electrical data page (15 & 16) should be referred for the same.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

CAPACITY RATINGS - 50 Hz

Model APCX(S)	LCWT	Condenser Entering Air Temperature °F (°C)																																								
		95°F (35°C)					105°F (40.6°C)					115°F (46.1°C)					120°F (48.9°C)					125°F (51.7°C)																				
		Cap	PI	WFR	WPD		Cap	PI	WFR	WPD		Cap	PI	WFR	WPD		Cap	PI	WFR	WPD		Cap	PI	WFR	WPD																	
°F °C	TR kW	kW*	Usgpm l/s	ftwg kPa	TR kW	kW*	Usgpm l/s	ftwg kPa	TR kW	kW*	Usgpm l/s	ftwg kPa	TR kW	kW*	Usgpm l/s	ftwg kPa	TR kW	kW*	Usgpm l/s	ftwg kPa	TR kW	kW*	Usgpm l/s	ftwg kPa																		
5030 10.4	42	29.9	31.0	71.7	2.5	28.3	34.6	68.0	2.2	26.7	38.6	64.1	2.0	25.9	40.7	62.2	1.9	25.1	42.9	60.2	1.8	5.6	105.0	31.0	4.5	7.4	99.6	34.6	4.3	6.7	94.0	38.6	4.0	6.0	91.1	40.7	3.9	5.7	88.2	42.9	3.8	5.4
	44	30.9	31.3	74.1	2.6	29.4	35.0	70.4	2.4	27.8	39.0	66.7	2.2	27.0	41.2	64.7	2.0	26.1	43.4	62.7	1.9	6.7	108.6	31.3	4.7	7.8	103.2	35.0	4.4	7.1	97.7	39.0	4.2	6.5	94.8	41.2	4.1	6.1	91.9	43.4	4.0	5.8
	45	31.6	31.5	75.8	2.7	30.1	35.2	72.2	2.5	28.5	39.3	68.4	2.3	27.7	41.4	66.5	2.1	26.9	43.7	64.5	2.0	7.2	111.0	31.5	4.8	8.2	105.7	35.2	4.6	7.5	97.4	41.4	4.2	6.4	94.5	43.7	4.1	6.1	91.9	44.5	4.4	6.9
	48	33.6	32.1	80.7	3.1	32.1	35.8	77.0	2.8	30.5	40.0	73.1	2.6	29.6	42.2	71.1	2.4	28.8	44.5	69.1	2.3	8.9	118.3	32.1	5.1	9.2	112.8	35.8	4.9	8.4	107.2	40.0	4.6	7.6	104.2	42.2	4.5	7.3	101.2	44.5	4.4	6.9
	42	33.7	35.4	80.8	2.7	31.8	39.6	76.3	2.4	29.8	44.4	71.5	2.1	28.7	47.0	68.9	2.0	27.6	49.7	66.3	1.9	5.6	118.4	35.4	5.1	7.9	111.8	39.6	4.8	7.2	104.8	44.4	4.5	6.4	101.0	47.0	4.3	6.0	97.2	49.7	4.2	5.5
	44	34.8	35.7	83.6	2.8	33.0	40.0	79.2	2.6	31.0	44.8	74.4	2.3	30.0	47.4	71.9	2.1	28.9	50.1	69.3	2.0	6.7	122.5	35.7	5.3	8.5	116.1	40.0	5.0	7.7	109.1	44.8	4.7	6.8	105.4	47.4	4.5	6.4	101.5	50.1	4.4	6.0
	45	35.5	35.9	85.1	2.9	33.6	40.2	80.7	2.7	31.6	45.0	76.0	2.4	30.6	47.6	73.4	2.2	29.5	50.3	70.8	2.1	7.2	124.8	35.9	5.4	8.7	118.3	40.2	5.1	7.9	111.3	45.0	4.8	7.1	107.6	47.6	4.6	6.7	103.8	50.3	4.5	6.2
	48	37.7	36.5	90.4	3.3	35.8	40.8	86.0	3.0	33.8	45.7	81.2	2.7	32.8	48.3	78.7	2.5	31.7	51.1	76.0	2.4	8.9	132.5	36.5	5.7	9.7	126.0	40.8	5.4	8.9	119.0	45.7	5.1	8.0	115.3	48.3	5.0	7.6	111.4	51.1	4.8	7.1
5040 10.1	42	38.3	40.9	91.9	2.6	36.3	45.6	87.0	2.3	34.2	51.2	82.0	2.1	33.1	54.3	79.4	2.0	32.0	57.5	76.8	1.8	5.6	134.6	40.9	5.8	7.7	127.5	45.6	5.5	6.9	120.1	51.2	5.2	6.2	116.4	54.3	5.0	5.9	112.5	57.5	4.8	5.5
	44	39.8	41.2	95.5	2.8	37.8	46.1	90.7	2.5	35.7	51.7	85.6	2.3	34.6	54.8	83.0	2.1	33.5	58.1	80.4	2.0	6.7	140.0	41.2	6.0	8.2	132.9	46.1	5.7	7.5	125.5	51.7	5.4	6.7	121.7	54.8	5.2	6.4	117.8	58.1	5.1	6.0
	45	40.6	41.4	97.4	2.9	38.5	46.3	92.5	2.6	36.4	52.0	87.5	2.3	35.4	55.1	84.9	2.2	34.3	58.4	82.2	2.1	7.2	142.7	41.4	6.1	8.5	135.6	46.3	5.8	7.8	128.2	52.0	5.5	7.0	124.4	55.1	5.4	6.6	120.5	58.4	5.2	6.3
	48	43.2	42.2	103.8	3.2	41.2	47.2	98.8	2.9	39.0	53.0	93.6	2.7	37.9	56.1	90.9	2.5	36.8	59.4	88.2	2.4	8.9	152.1	42.2	6.5	9.6	144.8	47.2	6.2	8.7	137.2	53.0	5.9	7.9	133.3	56.1	5.7	7.5	129.3	59.4	5.6	7.1
	42	43.9	45.9	105.5	3.2	41.5	51.3	99.7	2.9	39.1	57.6	93.8	2.5	37.8	61.0	90.7	2.4	36.5	64.6	87.6	2.2	5.6	154.5	45.9	6.7	9.5	146.1	51.3	6.3	8.5	137.4	57.6	5.9	7.6	132.9	61.0	5.7	7.1	128.4	64.6	5.5	6.7
	44	45.6	46.3	109.5	3.4	43.2	51.8	103.6	3.1	40.6	58.1	97.5	2.7	39.3	61.6	94.4	2.6	38.0	65.2	91.2	2.4	6.7	160.5	46.3	6.9	10.2	151.9	51.8	6.5	9.2	142.9	58.1	6.2	8.2	138.3	61.6	6.0	7.7	133.6	65.2	5.8	7.2
	45	46.5	46.5	111.7	3.5	44.0	52.1	105.7	3.2	41.4	58.4	99.4	2.8	40.1	61.8	96.3	2.7	38.8	65.5	93.0	2.5	7.2	163.6	46.5	7.0	10.6	154.8	52.1	6.7	9.5	145.7	58.4	6.3	8.5	141.1	61.8	6.1	8.0	136.3	65.5	5.9	7.5
	48	49.4	47.4	118.5	4.0	46.8	53.0	112.3	3.6	44.1	59.4	105.8	3.2	42.7	62.8	102.5	3.0	41.3	66.5	99.1	2.8	8.9	173.7	47.4	7.5	11.8	164.5	53.0	7.1	10.7	155.0	59.4	6.7	9.6	150.2	62.8	6.5	9.0	145.2	66.5	6.3	8.4
5050 10.1	42	47.5	52.1	114.0	3.7	44.9	58.4	107.8	3.3	42.2	65.6	101.3	2.9	40.8	69.5	98.0	2.8	39.4	73.6	94.6	2.6	5.6	167.0	52.1	7.2	11.0	157.9	58.4	6.8	9.9	148.4	65.6	6.4	8.8	143.6	69.5	6.2	8.3	138.6	73.6	6.0	7.7
	44	49.3	52.6	118.3	3.9	46.6	59.0	111.9	3.6	43.9	66.2	105.3	3.2	42.5	70.1	101.9	3.0	41.0	74.2	98.4	2.8	6.7	173.3	52.6	7.5	11.8	164.0	59.0	7.1	10.6	154.3	66.2	6.6	9.5	149.3	70.1	6.4	8.9	144.2	74.2	6.2	8.3
	45	50.2	52.9	120.6	4.1	47.5	59.3	114.1	3.7	44.7	66.5	107.4	3.3	43.3	70.4	103.9	3.1	41.8	74.6	100.4	2.9	7.2	176.7	52.9	7.6	12.2	167.2	59.3	7.2	11.0	157.3	66.5	6.8	9.8	152.3	70.4	6.6	9.2	147.1	74.6	6.3	8.6
	48	53.3	53.8	127.8	4.6	50.5	60.3	121.1	4.1	47.5	67.6	114.1	3.7	46.1	71.6	110.5	3.5	44.5	75.8	106.9	3.3	8.9	187.3	53.8	8.1	13.7	177.5	60.3	7.6	12.3	167.2	67.6	7.2	11.0	162.0	71.6	7.0	10.4	156.6	75.8	6.7	9.7
	42	54.5	56.6	130.8	3.9	51.6	63.3	124.0	3.5	48.7	70.8	116.9	3.1	47.2	74.9	113.2	2.9	45.6	79.1	109.5	2.8	5.6	191.7	56.6	8.3	11.6	181.6	63.3	7.8	10.5	171.3	70.8	7.4	9.3	165.9	74.9	7.1	8.8	160.4	79.1	6.9	8.2
	44	56.7	57.2	136.1	4.2	53.7	64.0	129.0	3.8	50.7	71.6	121.6	3.4	49.1	75.6	117.9	3.2	47.5	79.9	114.0	3.0	6.7	199.4	57.2	8.6	12.5	189.0	64.0	8.1	11.3	178.2	71.6	7.7	10.1	172.7	75.6	7.4	9.5	167.0	79.9	7.2	8.9
	45	57.8	57.5	138.7	4.4	54.8	64.3	131.5	3.9	51.7	71.9	124.0	3.5	50.1	76.0	120.1	3.3	48.4	80.3	116.2	3.1	7.2	203.2	57.5	8.7	13.0	192.7	64.3	8.3	11.7	181.7	71.9	7.8	10.5	176.1	76.0	7.6	9.9	170.3	80.3	7.3	9.2
	48	61.1	58.4	146.6	4.8	57.9	65.3	139.1	4.4	54.7	73.0	131.2	3.9	53.0	77.1	127.2	3.7	51.3	81.4	123.0	3.5	8.9	214.9	58.4	9.3	14.5	203.8	65.3	8.8	13.1	192.3	73.0	8.3	11.7	186.3	77.1	8.0	11.0	180.3	81.4	7.8	10.3
5060 10.3	42	59.7	62.7	143.3	4.6	56.6	70.0	136.0	4.2	53.5	78.0	128.3	3.7	51.8	82.3	124.4	3.5	50.2	86.8	120.4	3.3	5.6	210.0	62.7	9.0	13.9	199.2	70.0	8.6	12.5	188.0	78.0	8.1	11.2	182.3	82.3	7.8	10.5	176.5	86.8	7.6	9.9
	44	62.1	63.4	149.0	5.0	58.9	70.8	141.4	4.5	55.6	78.9	133.5	4.0	54.0	83.2	129.5	3.8	52.2	87.7	125.3	3.6	6.7	218.4	63.4	9.4	15.0	207.2	70.8	8.9	13.5	195.7	78.9	8.4	12.1	189.7	83.2	8.2	11.4	183.7	87.7	7.9	10.7
	45	63.3	63.8	151.9	5.2	60.1	71.2	144.2	4.7	56.7	79.3	136.1	4.2	55.0	83.7	132.0	4.0	53.2	88.2	127.8	3.7	7.2	222.6	63.8	9.6	15.5	211.2	71.2	9.1	14.0	199.5	79.3	8.6	12.6	193.4	83.7	8.3	11.8	187.2	88.2	8.1	11.1
	48	66.9	64.8	160.6	5.8	63.5	72.4	152.5	5.2	60.0	80.6	144.0	4.7	58.2	85.0	139.7	4.4	56.3	89.5	135.2	4.1	8.9	235.3	64.8	10.1	17.3	223.4	72.4	9.6	15												

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

CAPACITY RATINGS - 60 Hz

Model APCX(S)	LCWT	Condenser Entering Air Temperature °F (°C)																			
		95°F (35°C)				105°F (40.6°C)				115°F (46.1°C)				120°F (48.9°C)				125°F (51.7°C)			
		Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD
°F	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	TR	kW*	Usgpm	ftwg	
°C	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	
6006 10.2	42	5.8	6.4	13.9	6.3	5.5	7.2	13.1	5.6	5.1	8.0	12.2	4.9	4.9	8.4	11.8	4.6	4.7	8.9	11.3	4.3
	5.6	20.4	6.4	0.9	18.7	19.2	7.2	0.8	16.7	17.9	8.0	0.8	14.8	17.2	8.4	0.7	13.8	16.5	8.9	0.7	12.8
	44	6.0	6.5	14.4	6.7	5.6	7.2	13.6	6.0	5.3	8.1	12.7	5.3	5.1	8.5	12.2	4.9	4.7	8.9	11.2	4.3
	6.7	21.1	6.5	0.9	19.9	19.9	7.2	0.9	17.9	18.6	8.1	0.8	15.8	17.9	8.5	0.8	14.8	16.5	8.9	0.7	12.7
	45	6.1	6.5	14.6	6.9	5.7	7.3	13.8	6.2	5.4	8.1	12.9	5.5	5.2	8.6	12.4	5.1	5.0	9.0	12.0	4.8
	7.2	21.4	6.5	0.9	20.5	20.2	7.3	0.9	18.4	18.9	8.1	0.8	16.3	18.2	8.6	0.8	15.3	17.5	9.0	0.8	14.2
6009 10.1	42	8.8	9.6	21.1	6.8	8.3	10.7	19.9	6.1	7.8	11.9	18.7	5.4	7.5	12.5	18.0	5.1	7.2	13.2	17.2	4.7
	5.6	30.9	9.6	1.3	20.3	29.2	10.7	1.3	18.4	27.3	11.9	1.2	16.2	26.3	12.5	1.1	15.1	25.3	13.2	1.1	14.0
	44	9.1	9.7	21.8	7.2	8.6	10.8	20.6	6.5	8.0	12.0	19.3	5.8	7.8	12.6	18.6	5.4	7.5	13.3	17.9	5.0
	6.7	31.9	9.7	1.4	21.6	30.2	10.8	1.3	19.5	28.3	12.0	1.2	17.3	27.3	12.6	1.2	16.2	26.2	13.3	1.1	15.0
	45	9.2	9.7	22.1	7.4	8.7	10.8	21.0	6.7	8.2	12.0	19.7	6.0	7.9	12.7	19.0	5.6	7.6	13.3	18.2	5.2
	7.2	32.4	9.7	1.4	22.2	30.7	10.8	1.3	20.1	28.8	12.0	1.2	17.9	27.8	12.7	1.2	16.8	26.7	13.3	1.2	15.6
6012 9.5	42	11.5	12.8	27.6	5.0	10.9	14.3	26.3	4.5	10.4	15.9	24.8	4.1	10.0	16.8	24.1	3.9	9.7	17.7	23.4	3.7
	5.6	40.4	12.8	1.7	14.9	38.5	14.3	1.7	13.6	36.4	15.9	1.6	12.3	35.3	16.8	1.5	11.6	34.2	17.7	1.5	11.0
	44	12.0	13.0	28.7	5.4	11.4	14.4	27.3	4.9	10.8	16.1	25.8	4.4	10.4	17.0	25.1	4.2	10.1	17.9	24.3	3.9
	6.7	42.1	13.0	1.8	16.0	40.0	14.4	1.7	14.6	37.8	16.1	1.6	13.2	36.7	17.0	1.6	12.5	35.6	17.9	1.5	11.8
	45	12.2	13.0	29.2	5.5	11.6	14.5	27.8	5.0	11.0	16.2	26.3	4.6	10.6	17.0	25.5	4.3	10.3	18.0	24.7	4.1
	7.2	42.8	13.0	1.8	16.5	40.7	14.5	1.8	15.1	38.5	16.2	1.7	13.6	37.4	17.0	1.6	12.9	36.3	18.0	1.6	12.2
6014 9.1	42	13.4	16.0	32.0	6.5	12.8	17.9	30.7	6.0	12.2	20.0	29.2	5.5	11.8	21.1	28.4	5.3	11.5	22.3	27.6	5.0
	5.6	47.0	16.0	2.0	19.5	45.0	17.9	1.9	18.1	42.8	20.0	1.8	16.5	41.6	21.1	1.8	15.7	40.4	22.3	1.7	14.9
	44	14.0	16.2	33.6	7.1	13.4	18.1	32.1	6.5	12.7	20.2	30.4	6.0	12.3	21.3	29.6	5.7	12.0	22.6	28.7	5.4
	6.7	49.2	16.2	2.1	21.3	47.0	18.1	2.0	19.6	44.6	20.2	1.9	17.8	43.4	21.3	1.9	16.9	42.1	22.6	1.8	16.0
	45	14.3	16.3	34.2	7.4	13.6	18.2	32.7	6.8	12.9	20.3	31.0	6.2	12.6	21.5	30.1	5.8	12.2	22.7	29.2	5.5
	7.2	50.1	16.3	2.2	22.0	47.9	18.2	2.1	20.2	45.4	20.3	2.0	18.4	44.2	21.5	1.9	17.5	42.8	22.7	1.8	16.5
6018 10.3	42	17.9	19.2	42.9	3.3	16.9	21.3	40.6	3.0	15.9	23.6	38.3	2.6	15.4	24.8	37.1	2.5	14.9	26.0	35.8	2.3
	5.6	62.8	19.2	2.7	9.8	59.5	21.3	2.6	8.8	56.1	23.6	2.4	7.9	54.3	24.8	2.3	7.4	52.5	26.0	2.3	7.0
	44	18.6	19.5	44.6	3.5	17.6	21.6	42.3	3.2	16.6	23.9	39.8	2.9	16.1	25.0	38.6	2.7	15.5	26.3	37.3	2.5
	6.7	65.4	19.5	2.8	10.6	61.9	21.6	2.7	9.5	58.4	23.9	2.5	8.5	56.5	25.0	2.4	8.0	54.7	26.3	2.4	7.5
	45	19.0	19.6	45.5	3.7	18.0	21.7	43.1	3.3	16.9	24.0	40.6	3.0	16.4	25.2	39.4	2.8	15.9	26.4	38.1	2.6
	7.2	66.7	19.6	2.9	11.0	63.2	21.7	2.7	9.9	59.5	24.0	2.6	8.9	57.7	25.2	2.5	8.3	55.8	26.4	2.4	7.8
6024 9.4	42	22.5	26.1	54.0	5.1	21.3	29.1	51.1	4.6	20.0	32.4	48.1	4.1	19.4	34.2	46.6	3.8	18.8	36.0	45.0	3.6
	5.6	79.1	26.1	3.4	15.2	74.9	29.1	3.2	13.7	70.5	32.4	3.0	12.2	68.2	34.2	2.9	11.5	66.0	36.0	2.8	10.8
	44	23.4	26.5	56.3	5.5	22.2	29.5	53.2	5.0	20.9	32.8	50.1	4.4	20.2	34.5	48.6	4.2	19.6	36.4	46.9	3.9
	6.7	82.4	26.5	3.5	16.5	78.0	29.5	3.4	14.8	73.5	32.8	3.2	13.2	71.1	34.5	3.1	12.4	68.8	36.4	3.0	11.7
	45	23.9	26.6	57.4	5.7	22.6	29.6	54.3	5.2	21.3	32.9	51.2	4.6	20.6	34.7	49.5	4.3	20.0	36.6	47.9	4.1
	7.2	84.1	26.6	3.6	17.1	79.6	29.6	3.4	15.4	75.0	32.9	3.2	13.7	72.6	34.7	3.1	12.9	70.2	36.6	3.0	12.1
6030 9.4	42	27.8	33.1	66.8	2.2	26.4	36.9	63.2	2.0	24.8	41.1	59.6	1.8	24.1	43.4	57.7	1.7	23.3	45.8	55.8	1.6
	5.6	97.9	33.1	4.2	6.5	92.7	36.9	4.0	5.9	87.3	41.1	3.8	5.3	84.6	43.4	3.6	5.0	81.8	45.8	3.5	4.7
	44	28.8	33.5	69.2	2.3	27.4	37.3	65.7	2.1	25.8	41.6	62.0	1.9	25.1	43.9	60.2	1.8	24.3	46.4	58.2	1.7
	6.7	101.4	33.5	4.4	6.9	96.3	37.3	4.1	6.3	90.9	41.6	3.9	5.7	88.2	43.9	3.8	5.4	85.3	46.4	3.7	5.1
	45	29.5	33.7	70.9	2.4	28.1	37.6	67.4	2.2	26.6	41.9	63.7	2.0	25.8	44.3	61.8	1.9	25.0	46.8	59.9	1.8
	7.2	103.9	33.7	4.5	7.2	98.7	37.6	4.3	6.6	93.4	41.9	4.0	6.0	90.6	44.3	3.9	5.6	87.8	46.8	3.8	5.3
6030 9.4	48	31.5	34.4	75.6	2.7	30.0	38.4	71.9	2.5	28.4	42.8	68.1	2.2	27.6	45.2	66.2	2.1	26.7	47.7	64.2	2.0
	8.9	110.7	34.4	4.8	8.1	105.4	38.4	4.5	7.4	99.9	42.8	4.3	6.7	97.0	45.2	4.2	6.4	94.0	47.7	4.0	6.0

Table 4

Note :

1. Capacity ratings are based on 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.

* Power input mentioned in this page should not be used for cable or fuse selection. MCA and MFA values given in the electrical data page (15 & 16) should be referred for the same.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

CAPACITY RATINGS - 60 Hz

Model APCX(S)	LCWT	Condenser Entering Air Temperature °F (°C)																			
		95°F (35°C)				105°F (40.6°C)				115°F (46.1°C)				120°F (48.9°C)				125°F (51.7°C)			
		Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD	Cap	PI	WFR	WPD
EER	°F	TR	kW*	Usqpm	ftwg	TR	kW*	Usqpm	ftwg	TR	kW*	Usqpm	ftwg	TR	kW*	Usqpm	ftwg	TR	kW*	Usqpm	ftwg
	°C	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa
6035 9.7	42	34.4	37.5	82.6	2.8	32.8	41.7	78.6	2.5	31.0	46.3	74.5	2.3	30.1	48.8	72.3	2.2	29.2	51.3	70.2	2.1
	5.6	121.1	37.5	5.2	8.3	115.2	41.7	5.0	7.6	109.1	46.3	4.7	6.8	106.0	48.8	4.6	6.5	102.8	51.3	4.4	6.1
	44	35.7	38.0	85.6	2.9	34.0	42.2	81.6	2.7	32.2	46.8	77.4	2.5	31.3	49.2	75.2	2.3	30.4	51.7	73.1	2.2
	6.7	125.4	38.0	5.4	8.8	119.5	42.2	5.1	8.1	113.4	46.8	4.9	7.3	110.2	49.2	4.7	7.0	107.1	51.7	4.6	6.6
	45	36.3	38.2	87.1	3.0	34.6	42.5	83.1	2.8	32.9	47.1	78.9	2.5	32.0	49.5	76.8	2.4	31.1	52.0	74.6	2.3
7.2	127.7	38.2	5.5	9.1	121.8	42.5	5.2	8.4	115.6	47.1	5.0	7.6	112.5	49.5	4.8	7.2	109.2	52.0	4.7	6.9	
48	38.5	39.0	92.5	3.4	36.8	43.3	88.4	3.1	35.1	48.0	84.1	2.9	34.1	50.4	82.0	2.7	33.2	52.8	79.7	2.6	
8.9	135.5	39.0	5.8	10.2	129.5	43.3	5.6	9.4	123.3	48.0	5.3	8.5	120.1	50.4	5.2	8.1	116.8	52.8	5.0	7.7	
6040 9.8	42	40.6	44.7	97.4	2.9	38.4	49.8	92.2	2.6	36.1	55.4	86.7	2.3	34.9	58.5	83.8	2.2	33.7	61.6	80.9	2.0
	5.6	142.7	44.7	6.1	8.5	135.1	49.8	5.8	7.7	127.1	55.4	5.5	6.9	122.9	58.5	5.3	6.5	118.5	61.6	5.1	6.1
	44	42.0	45.2	100.9	3.0	39.9	50.3	95.8	2.8	37.6	56.0	90.3	2.5	36.4	59.0	87.5	2.3	35.2	62.2	84.5	2.2
	6.7	147.9	45.2	6.4	9.1	140.4	50.3	6.0	8.3	132.4	56.0	5.7	7.4	128.2	59.0	5.5	7.0	123.8	62.2	5.3	6.6
	45	42.8	45.4	102.7	3.1	40.7	50.6	97.6	2.9	38.4	56.2	92.1	2.6	37.2	59.3	89.3	2.4	36.0	62.5	86.3	2.3
7.2	150.5	45.4	6.5	9.4	143.0	50.6	6.2	8.6	135.0	56.2	5.8	7.7	130.8	59.3	5.6	7.3	126.5	62.5	5.4	6.8	
48	45.4	46.3	109.0	3.5	43.3	51.4	103.8	3.2	41.0	57.2	98.3	2.9	39.7	60.3	95.4	2.7	38.5	63.5	92.3	2.6	
8.9	159.8	46.3	6.9	10.5	152.2	51.4	6.6	9.6	144.0	57.2	6.2	8.7	139.8	60.3	6.0	8.2	135.3	63.5	5.8	7.7	
6050 9.4	42	46.3	52.0	111.2	3.5	43.8	57.9	105.2	3.2	41.3	64.4	99.1	2.8	40.0	67.9	96.0	2.7	38.7	71.6	92.9	2.5
	5.6	162.9	52.0	7.0	10.5	154.2	57.9	6.6	9.5	145.2	64.4	6.3	8.4	140.7	67.9	6.1	7.9	136.1	71.6	5.9	7.5
	44	48.1	52.6	115.4	3.8	45.5	58.5	109.3	3.4	42.9	65.1	103.0	3.0	41.6	68.6	99.8	2.9	40.2	72.3	96.6	2.7
	6.7	169.0	52.6	7.3	11.3	160.1	58.5	6.9	10.1	150.9	65.1	6.5	9.1	146.2	68.6	6.3	8.5	141.5	72.3	6.1	8.0
	45	49.0	52.9	117.6	3.9	46.4	58.9	111.4	3.5	43.7	65.4	105.0	3.1	42.4	69.0	101.7	3.0	41.0	72.6	98.4	2.8
7.2	172.3	52.9	7.4	11.7	163.2	58.9	7.0	10.5	153.8	65.4	6.6	9.4	149.1	69.0	6.4	8.9	144.3	72.6	6.2	8.3	
48	51.9	53.9	124.6	4.4	49.2	59.9	118.2	3.9	46.5	66.6	111.5	3.5	45.1	70.2	108.1	3.3	43.6	73.9	104.7	3.1	
8.9	182.6	53.9	7.9	13.0	173.2	59.9	7.5	11.8	163.4	66.6	7.0	10.6	158.5	70.2	6.8	10.0	153.4	73.9	6.6	9.4	
6055 9.7	42	52.3	57.7	125.4	3.6	49.5	64.3	118.9	3.2	46.7	71.6	112.1	2.9	45.3	75.5	108.7	2.7	43.8	79.7	105.2	2.5
	5.6	183.8	57.7	7.9	10.7	174.2	64.3	7.5	9.6	164.3	71.6	7.1	8.6	159.2	75.5	6.9	8.1	154.1	79.7	6.6	7.6
	44	54.3	58.3	130.4	3.9	51.5	64.9	123.6	3.5	48.6	72.3	116.6	3.1	47.1	76.3	113.0	2.9	45.6	80.5	109.4	2.7
	6.7	191.1	58.3	8.2	11.6	181.2	64.9	7.8	10.4	170.9	72.3	7.4	9.3	165.6	76.3	7.1	8.8	160.3	80.5	6.9	8.2
	45	55.4	58.7	132.9	4.0	52.5	65.3	126.0	3.6	49.5	72.7	118.8	3.2	48.0	76.7	115.1	3.0	46.4	80.9	111.5	2.8
7.2	194.7	58.7	8.4	12.0	184.6	65.3	7.9	10.8	174.2	72.7	7.5	9.6	168.8	76.7	7.3	9.1	163.4	80.9	7.0	8.5	
48	58.5	59.7	140.5	4.5	55.5	66.3	133.2	4.0	52.4	73.8	125.7	3.6	50.8	77.9	121.8	3.4	49.1	82.1	117.9	3.2	
8.9	205.9	59.7	8.9	13.3	195.2	66.3	8.4	12.0	184.2	73.8	7.9	10.8	178.5	77.9	7.7	10.1	172.8	82.1	7.4	9.5	
6060 9.4	42	56.3	65.3	135.2	4.1	53.4	72.8	128.1	3.7	50.4	81.1	120.9	3.3	48.8	85.6	117.1	3.1	47.2	90.4	113.3	2.9
	5.6	198.1	65.3	8.5	12.4	187.8	72.8	8.1	11.2	177.1	81.1	7.6	10.0	171.6	85.6	7.4	9.4	166.0	90.4	7.1	8.8
	44	58.6	66.1	140.5	4.5	55.5	73.6	133.2	4.0	52.4	82.0	125.7	3.6	50.7	86.6	121.8	3.4	49.1	91.4	117.8	3.2
	6.7	205.9	66.1	8.9	13.4	195.3	73.6	8.4	12.0	184.2	82.0	7.9	10.8	178.5	86.6	7.7	10.1	172.7	91.4	7.4	9.5
	45	59.7	66.4	143.2	4.6	56.6	74.0	135.8	4.2	53.4	82.5	128.1	3.7	51.7	87.1	124.1	3.5	50.0	91.9	120.0	3.3
7.2	209.9	66.4	9.0	13.8	199.0	74.0	8.6	12.5	187.7	82.5	8.1	11.2	181.8	87.1	7.8	10.5	175.9	91.9	7.6	9.8	
48	63.1	67.6	151.3	5.2	59.8	75.3	143.5	4.7	56.4	83.9	135.3	4.2	54.6	88.5	131.1	3.9	52.9	93.4	126.9	3.7	
8.9	221.8	67.6	9.5	15.4	210.3	75.3	9.1	13.9	198.3	83.9	8.5	12.4	192.2	88.5	8.3	11.7	185.9	93.4	8.0	10.9	
6065 9.9	42	62.9	69.2	150.8	5.1	59.7	77.0	143.4	4.6	56.5	85.6	135.6	4.2	54.8	90.3	131.6	3.9	53.1	95.1	127.5	3.7
	5.6	221.1	69.2	9.5	15.3	210.1	77.0	9.0	13.9	198.7	85.6	8.6	12.5	192.8	90.3	8.3	11.8	186.9	95.1	8.0	11.1
	44	65.3	70.0	156.8	5.5	62.1	77.9	149.1	5.0	58.8	86.5	141.1	4.5	57.0	91.2	136.9	4.2	55.3	96.0	132.7	4.0
	6.7	229.8	70.0	9.9	16.5	218.5	77.9	9.4	15.0	206.7	86.5	8.9	13.4	200.6	91.2	8.6	12.7	194.4	96.0	8.4	11.9
	45	66.6	70.4	159.9	5.7	63.3	78.3	152.0	5.2	59.9	87.0	143.8	4.7	58.1	91.6	139.6	4.4	56.4	96.5	135.2	4.1
7.2	234.3	70.4	10.1	17.1	222.7	78.3	9.6	15.5	210.7	87.0	9.1	14.0	204.5	91.6	8.8	13.2	198.2	96.5	8.5	12.4	
48	70.5	71.7	169.1	6.4	67.0	79.7	160.7	5.8	63.4	88.4	152.1	5.2	61.5	93.0	147.6	4.9	59.6	97.8	143.1	4.6	
8.9	247.8	71.7	10.7	19.1	235.6	79.7	10.1	17.3	222.8	88.4	9.6	15.6	216.3	93.0	9.3	14.7	209.7	97.8	9.0	13.8	
6070 9.5	42	68.1	75.4	163.5	6.0	64.8	83.8	155.5	5.4	61.4	93.1	147.3	4.9	59.6	98.1	143.0	4.6	57.8	103.2	138.7	4.4
	5.6	239.5	75.4	10.3	17.9	227.9	83.8	9.8	16.2	215.8	93.1	9.3	14.6	209.6	98.1	9.0	13.8	203.3	103.2	8.8	13.0
	44	70.8	76.4	169.9	6.4	67.4	84.9	161.7	5.9	63.8	94.2	153.2	5.3	62.0	99.0	148.8	5.0	60.1	104.0	144.3	4.7
	6.7	248.9	76.4	10.7	19.2	237.0	84.9	10.2	17.5	224.5	94.2	9.7	15.8	218.0	99.0	9.4	14.9	211.4	104.0	9.1	14.0
	45	72.2	76.9	173.2	6.7	68.7	85.5	164.8	6.1	65.1	94.7	156.2	5.5	63.2	99.5	151.7	5.2	61.3	104.5	147.1	4.9
7.2	253.8	76.9	10.9	20.0	241.6	85.5	10.4	18.2	228.8	94.7	9.9	16.4	222.2	99.5	9.6	15.5	215.5	104.5	9.3	14.6	
48	76.3	78.4	183.2	7.4	72.6	87.1	174.4	6.8	68.8	96.2	165.1	6.1	66.8	101.0	160.4	5.8	64.8	105.9	155.6	5.4	
8.9	268.4	78.4	11.6	22.2	255.5	87.1	11.0	20.2	242.0	96.2	10.4	18.2	235.1	101.0	10.1	17.2	228.0	105.9	9.8	16.3	

Note :

Table 4 ends

1. Capacity ratings are based on 10°F (5.5°C) range and 0.0001 ft².h°F/Btu (0.018 m².°C/kW) fouling factor.

* Power input mentioned in this page should not be used for cable or fuse selection. MCA and MFA values given in the electrical data page (15 & 16) should be referred for the same.



SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Capacity Correction & Limits

Evaporator Chiller Limits of Operation

Maximum LCWT : 48°F (8.9°C)
Maximum ECWT : 76°F (24.4°C)*
Minimum LCWT : 42°F (5.6°C)

For Lower LCWT ethylene glycol solution to be used consult SKM.

(*For short periods.)

Range & Flow Limits

Range limit 8°F - 16°F (4.4°C - 8.9°C) except where limited by water flow rate limits for evaporator. For minimum & maximum water flow rate refer to page 13.

Working & Test Pressures

Evaporator Pressure		Refrigerant	Water
Maximum Working Pressure	psig	392	363
	kPa	2700	2500
Test Pressure	psig	725	725
	kPa	5000	5000

Table 5

Condenser Pressure		Refrigerant
Maximum Working Pressure	psig	300
	kPa	2068
Test Pressure	psig	450
	kPa	3102

Table 6

Cooler Fouling Factors

The units are rated at 0.0001 ft².h.°F/Btu (0.018m².°C/KW) Other than this fouling factor, apply the correction factors to get the effect on cooling capacity and power input.

Fouling Factor		Capacity Multiplier	Power Multiplier
IP	SI		
0.0001 *	0.018	1	1
0.00025	0.044	0.99	1
0.0005	0.088	0.98	0.99
0.001	0.176	0.95	0.98
0.002	0.352	0.90	0.96

*Standard fouling factor, as per AHRI standard 550/590. Table 7

Fin Material Correction Factors

The unit ratings are based on copper tube and aluminium fins condenser. For alternative condenser material the following factors apply: (**Note: Aeris Coating does not affect Capacity and Power**).

Condenser Fin Material	Capacity Multiplier	Power Multiplier
Precoated Aluminum	0.995	1.001
Copper	1.01	0.992

Table 8

Altitude Correction Factor

The units ratings are based on sea level. Above sea level apply the following correction factors:

Altitude		Capacity Multiplier	Power Multiplier
Feet	Meters		
0	0	1	1
2000	610	0.99	1.01
4000	1219	0.98	1.02
6000	1829	0.97	1.03
8000	2438	0.96	1.04
10000	3048	0.95	1.05

Table 9

Range Correction Factors

Capacity ratings based on 10°F (5.5°C) chilled water range. For other than this range please use correction factor below.

Range		Capacity Multiplier	Power Multiplier
°F	°C		
8	4.4	0.995	0.998
10	5.5	1	1
12	6.7	1.005	1.002
14	7.8	1.01	1.004
16	8.9	1.015	1.006

Table 10

Capacity Control Steps

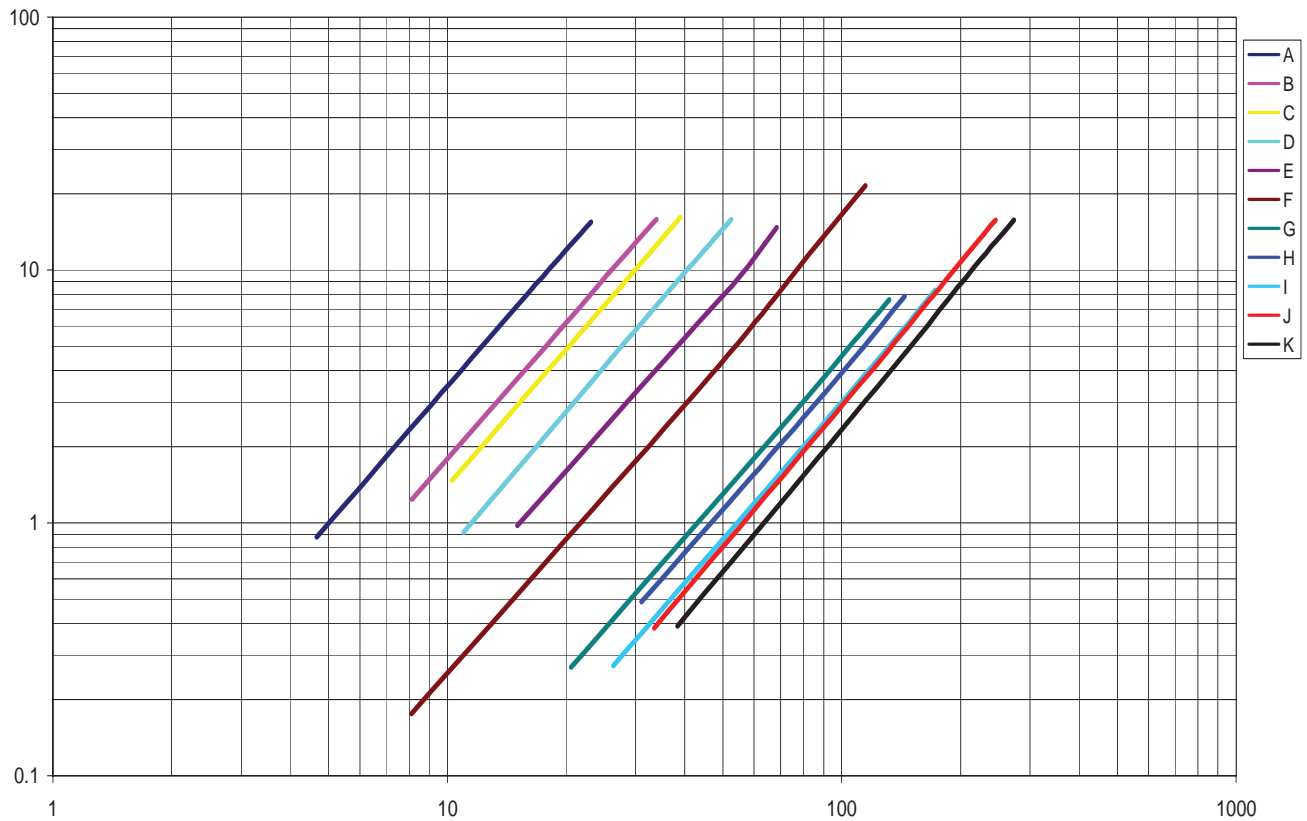
Models		Capacity Step
5005	6006	100 - 0
5008	6009	100 - 0
5010	6012	100 - 0
5012	6014	100 - 0
5016	6018	100 - 0
5020	6024	100 - 50 - 0
5024	6030	100 - 50 - 0
5030	6035	100 - 50 - 0
5035	6040	100 - 78 - 56 - 28 - 0
5040	6050	100 - 75 - 50 - 25 - 0
5045	6055	100 - 78 - 56 - 28 - 0
5050	6060	100 - 75 - 50 - 25 - 0
5055	6065	100 - 78 - 56 - 28 - 0
5060	6070	100 - 75 - 50 - 25 - 0

Table 11

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Evaporator Water Pressure Drop

ft.wg



Graph	APCX(S)Models		Water Flow Rate Range	
	50Hz	60Hz	Minimum Usqpm / L/s	Maximum Usqpm / L/s
A	5005	6006	5.8 / 0.37	21.9 / 1.38
B	5008	6009	8.8 / 0.55	32.9 / 2.08
C	5010	-	11.3 / 0.71	36.7 / 2.31
D	5012	6012, 6014	14.3 / 0.9	52.5 / 3.31
E	5016	-	17.8 / 1.12	66.2 / 4.17
F	5020, 5024	6018, 6024	22.9 / 1.44	107.7 / 6.79
G	5030	6030	34.6 / 2.18	129.3 / 8.15
H	5035	6035	39.2 / 2.48	128.2 / 8.09
I	5040	6040	45.5 / 2.87	171.8 / 10.84
J	5045, 5050	6050	57.3 / 3.62	199.9 / 12.61
K	5055, 5060	6055, 6060, 6065, 6070	64.2 / 4.05	264.7 / 16.7

Table 12



SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Selection Procedure

APCX(S) Chillers should be selected with specific Design Considerations, requirements and parameters of the intended application. Care and good engineering should lead to an efficient and cost effective selection. Sample procedures are shown below:

Example 1: (IP System)

Select an Air Cooled Package Chiller giving a capacity of 32 TR to cool water from 56°F to 44°F at 2000 ft. altitude, 0.00075 fouling factor, power supply 415V/3Ph/50Hz and 115 °F ambient Temperature.

Find compressor power input in **kW**.

Selection:

Apply the following factors to convert the required capacity to tabulated capacity ratings.

	Capacity Multiplier	Power Multiplier
Range (12 °F)	1.005	1.002
Altitude	0.99	1.01
Fouling Factor	0.965	0.985

$$\begin{aligned} \text{Tabulated rated capacity} &= \frac{32}{1.005 \times 0.99 \times 0.965} \\ &= 33.3 \text{ TR} \end{aligned}$$

Refer to capacity rating 50Hz under 115 °F condenser entering air temperature and select a chiller giving a capacity nearest larger to 33.3 TR at 44 °F LCWT. Select model **APCX(S)** 5040 giving a capacity of 35.7 TR and PI = 51.7 **kW**.

Apply correction factors to the selected unit to find actual capacity and P I.

$$\begin{aligned} \text{Capacity} &= 35.7 \times 1.005 \times 0.99 \times 0.965 \\ &= 34.3 \text{ TR} \\ \text{P I} &= 51.7 \times 1.002 \times 1.01 \times 0.985 \\ &= 51.5 \text{ kW} \end{aligned}$$

Calculation of Water Flow Rate (WFR)

To calculate the water flow rate to be circulated, use the following:

$$\begin{aligned} \text{WFR (US gpm)} &= \frac{\text{C.CAP (TR)} \times 24}{\text{Range (°F)}} \\ &= \frac{34.3 \times 24}{12} = 68.6 \text{ US gpm} \end{aligned}$$

Determine the pressure drop from chart on Page 13, using 69.0 gpm, pressure drop reading is 1.5 ft wg.

Example 2: (SI System)

Select an Air Cooled Package Chiller giving a capacity of 100 **kW** of refrigeration to cool water from 14.5°C to 6.7°C at 610M altitude, 0.132 fouling factor, power supply 380V/3Ph/60Hz and 40.6 °C ambient Temperature.

Find compressor power input in **kW**.

Selection:

Apply the following factors to convert the required capacity to tabulated capacity ratings.

	Capacity Multiplier	Power Multiplier
Range (7.8 °C)	1.010	1.004
Altitude	0.99	1.01
Fouling Factor	0.965	0.985

$$\begin{aligned} \text{Tabulated rated capacity} &= \frac{100}{1.01 \times 0.99 \times 0.965} \\ &= 103.6 \text{ kW} \end{aligned}$$

Refer to capacity rating 60Hz under 40.6 °C condenser entering air temperature and select a chiller giving a capacity nearest larger to 103.6 at 6.7 °C LCWT. Select model **APCX** 6035 giving a capacity of 119.5 **kW** and PI = 42.2 **kW**.

Apply correction factors to the selected unit to find actual capacity and P I.

$$\begin{aligned} \text{Capacity} &= 119.5 \times 1.01 \times 0.99 \times 0.965 \\ &= 115.3 \text{ kW} \\ \text{P I} &= 42.2 \times 1.004 \times 1.01 \times 0.985 \\ &= 42.2 \text{ kW} \end{aligned}$$

Calculation of Water Flow Rate (WFR)

To calculate the water flow rate to be circulated, use the following:

$$\begin{aligned} \text{WFR (L/s)} &= \frac{\text{C.CAP (kW)} \times 0.239}{\text{Range (°C)}} \\ &= \frac{115.3 \times 0.239}{7.8} = 3.5 \text{ l/s.} \end{aligned}$$

Determine the pressure drop from chart on Page 13, using 3.5 l/s, pressure drop reading is 4.1 **kPa**.

For more details refer to other specifications and dimensional drawings for the selected model.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

ELECTRICAL DATA

Power Supply : 380-415V/3PH/50Hz

Model APCX(S)	Unit Characteristic			Compressor			Condenser Fan Motor		
	MFA	MCA	ICF	QTY	RLA	LRA	QTY	FLA	LRA
5005	50	26	122	1	20	118	1	0.9	4
5008	80	39	179	1	30	174	2	0.9	4
5010	80	46	233	1	34	225	2	1.7	5.8
5012	80	47	280	1	35	272	2	1.7	5.8
5016	125	67	318	1	51	310	2	1.7	5.8
5020	125	82	268	2	34	225	3	1.7	5.8
5024	125	84	316	2	35	272	3	1.7	5.8
5030	200	126	380	2	51	310	4	2.8	11
5035	200	148	338	2 + 2	34 + 30	225 + 174	4	2.8	11
5040	200	159	354	4	34	225	4	3.5	16
5045	200	161	402	2 + 2	35 + 34	272 + 225	4	3.5	16
5050	200	163	404	4	35	272	4	3.5	16
5055	250	202	456	2 + 2	51 + 35	310 + 272	6	2.8	11
5060	315	238	497	4	51	310	6	3.5	16

Table 13

Power Supply : 440V/3PH/50Hz

Model APCX(S)	Unit Characteristic			Compressor			Condenser Fan Motor		
	MFA	MCA	ICF	QTY	RLA	LRA	QTY	FLA	LRA
5005	50	26	122	1	20	118	1	1.1	4.3
5008	80	40	179	1	30	174	2	1.1	4.3
5010	80	46	235	1	34	225	2	1.8	7.9
5012	80	47	282	1	35	272	2	1.8	7.9
5016	125	67	320	1	51	310	2	1.8	7.9
5020	125	82	271	2	34	225	3	1.8	7.9
5024	125	84	319	2	35	272	3	1.8	7.9
5030	200	125	382	2	51	310	4	2.6	13.1
5035	200	147	340	2 + 2	34 + 30	225 + 174	4	2.6	13.1
5040	200	159	354	4	34	225	4	3.6	16
5045	200	161	402	2 + 2	35 + 34	272 + 225	4	3.6	16
5050	200	163	404	4	35	272	4	3.6	16
5055	250	200	457	2 + 2	51 + 35	310 + 272	6	2.6	13.1
5060	315	238	497	4	51	310	6	3.6	16

Table 14

Power Supply : 460V/3PH/60Hz

Model APCX(S)	Unit Characteristic			Compressor			Condenser Fan Motor		
	MFA	MCA	ICF	QTY	RLA	LRA	QTY	FLA	LRA
6006	50	26	130	1	20	125	1	1.3	5.2
6009	80	38	186	1	28	179	2	1.3	5.2
6012	80	45	232	1	34	225	2	1.3	5.2
6014	100	50	287	1	35	272	2	3.1	11.8
6018	125	70	325	1	51	310	2	3.1	11.8
6024	125	86	277	2	34	225	3	3.1	11.8
6030	125	91	328	2	35	272	4	3.1	11.8
6035	200	127	382	2	51	310	4	3.1	11.8
6040	200	147	342	2 + 2	34 + 28	225 + 179	4	3.5	16.5
6050	200	159	354	4	34	225	4	3.5	16.5
6055	200	167	411	2 + 2	35 + 34	272 + 225	4	5	21
6060	200	170	411	4	35	272	6	3.5	16.5
6065	250	206	465	2 + 2	51 + 35	310 + 272	6	3.5	16.5
6070	315	238	497	4	51	310	6	3.5	16.5

Table 15

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

ELECTRICAL DATA

Power Supply : 380V/3PH/60Hz

Model APCX(S)	Unit Characteristic			Compressor			Condenser Fan Motor		
	MFA	MCA	ICF	QTY	RLA	LRA	QTY	FLA	LRA
6006	63	32	150	1	24	145	1	1.5	4.5
6009	100	48	202	1	36	196	2	1.5	4.5
6012	100	57	286	1	43	280	2	1.5	4.5
6014	125	62	366	1	45	353	2	3.1	9.6
6018	160	81	371	1	60	358	2	3.1	9.6
6024	160	106	339	2	43	280	3	3.1	9.6
6030	160	114	417	2	45	353	4	3.1	9.6
6035	200	147	437	2	60	358	4	3.1	9.6
6040	250	184	420	2 + 2	43 + 36	280 + 196	4	3.7	13.7
6050	250	198	434	4	43	280	4	3.7	13.7
6055	250	208	517	2 + 2	45 + 43	353 + 280	4	5.3	17.5
6060	315	213	520	4	45	353	6	3.7	13.7
6065	315	247	540	2 + 2	60 + 45	358 + 353	6	3.7	13.7
6070	400	277	570	4	60	358	6	3.7	13.7

Table 16

Power Supply : 220V/3PH/60Hz

Model APCX(S)	Unit Characteristic			Compressor			Condenser Fan Motor		
	MFA	MCA	ICF	QTY	RLA	LRA	QTY	FLA	LRA
6006	100	53	247	1	40	239	1	2.5	7.5
6009	160	79	350	1	59	340	2	2.5	7.5
6012	200	108	515	1	82	505	2	2.5	7.5
6014	200	106	627	1	76	605	2	5.4	16.7
6018	250	142	621	1	105	599	2	5.4	16.7
6024	315	201	615	2	82	505	3	5.4	16.7
6030	315	193	714	2	76	605	4	5.4	16.7
6035	400	258	737	2	105	599	4	5.4	16.7
6040	400	328	748	2 + 2	82 + 59	505 + 340	4	6.4	23.7
6050	500	374	794	4	82	505	4	6.4	23.7
6055	500	371	902	2 + 2	76 + 82	605 + 505	4	9	29.7
6060	500	361	889	4	76	605	6	6.4	23.7
6065	630	427	912	2 + 2	105 + 76	599 + 605	6	6.4	23.7
6070	630	485	970	4	105	599	6	6.4	23.7

Table 17

Legend

MFA Maximum Fuse Amps (for fuse sizing), complies with NEC Article 440-22 & 430-52.

MCA Minimum Circuit Amps.(for wire sizing), complies with NEC article 440-33.

ICF Maximum Instantaneous Current Flow

RLA Rated Load Amps. (at worst operating condition)

LRA Locked Rotor Amps

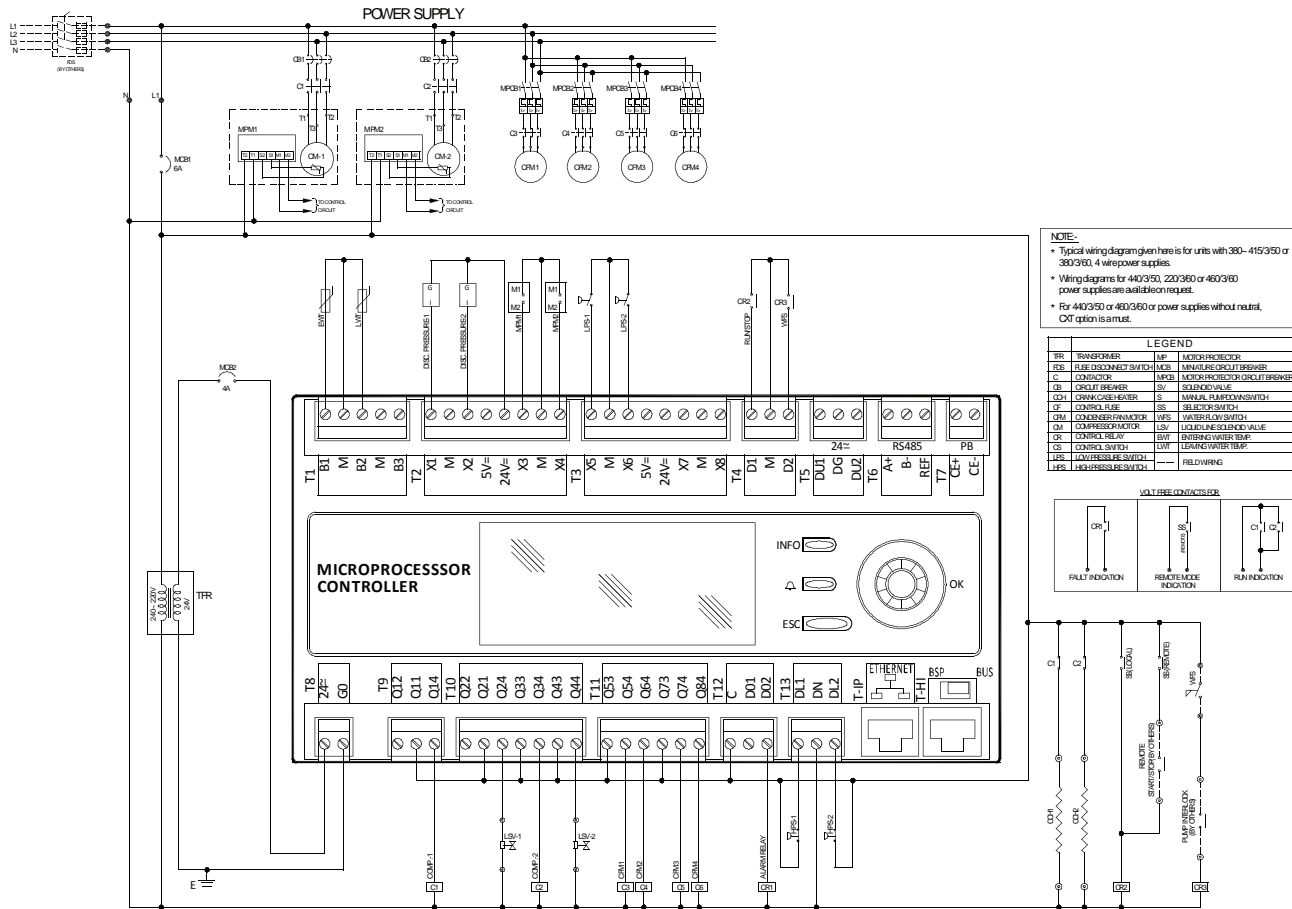
FLA Full Load Amps

Note :

Voltage imbalance not to exceed $\pm 2\%$ of the rated voltage

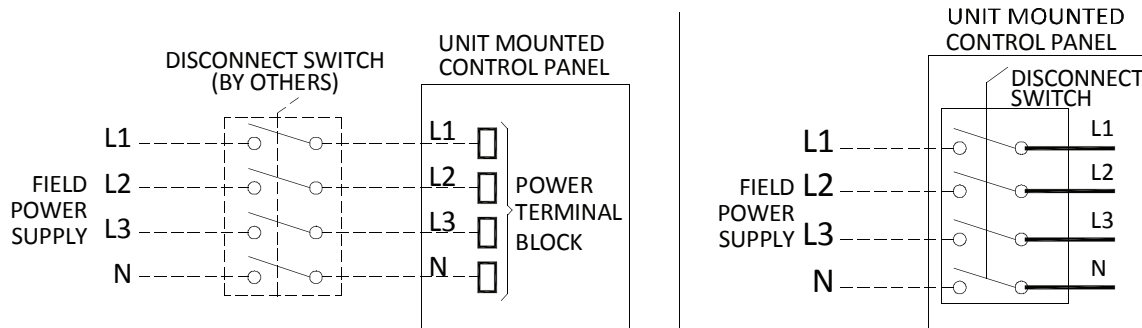
SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Typical Wiring Diagram



Power Entry Connections

All APCX(S) units are with single point power entry.



Standard Power Connection

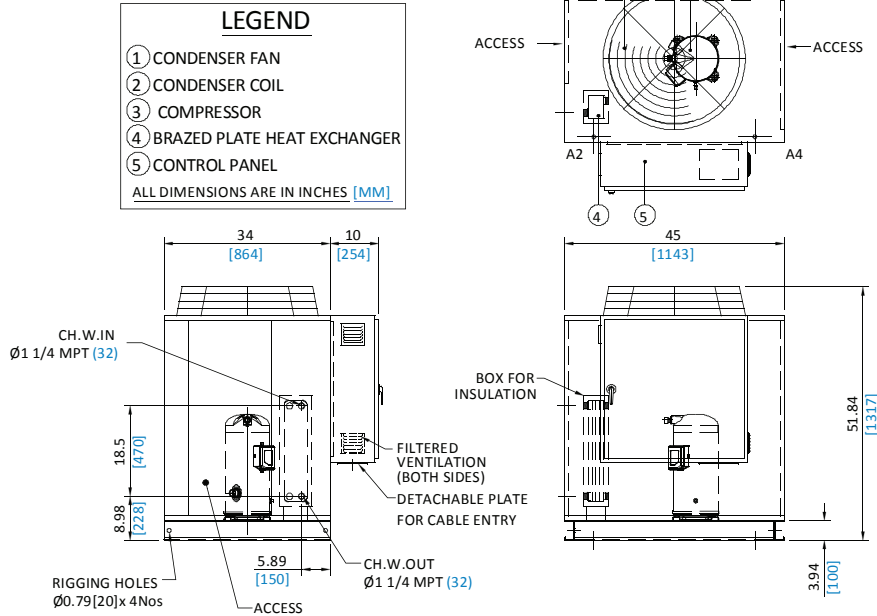
Power Connection with Optional Isolator

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

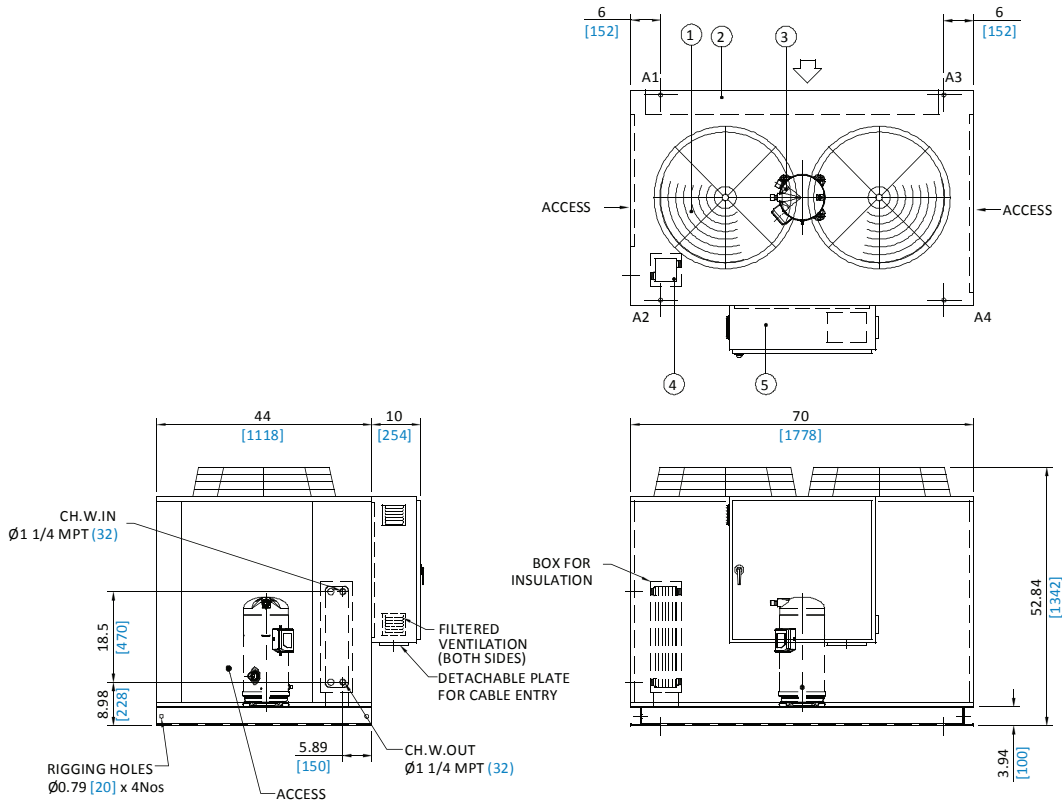
Dimensional Data

APCX(S) Models - 5005 & 6006

0.01

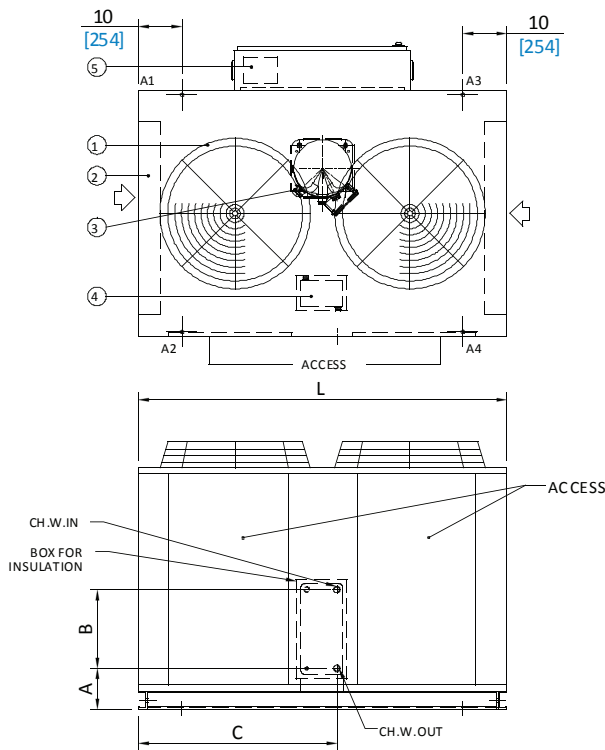


APCX(S) Models - 5008, 5010 & 6009

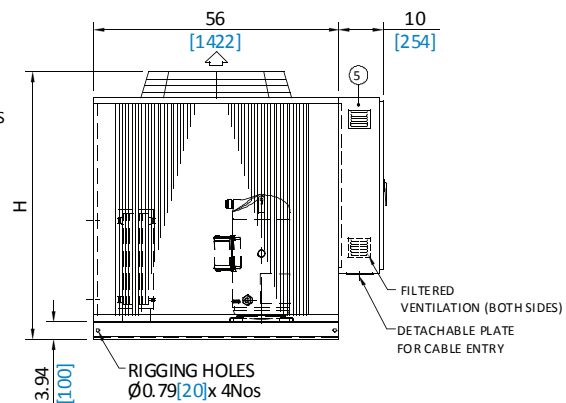


SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

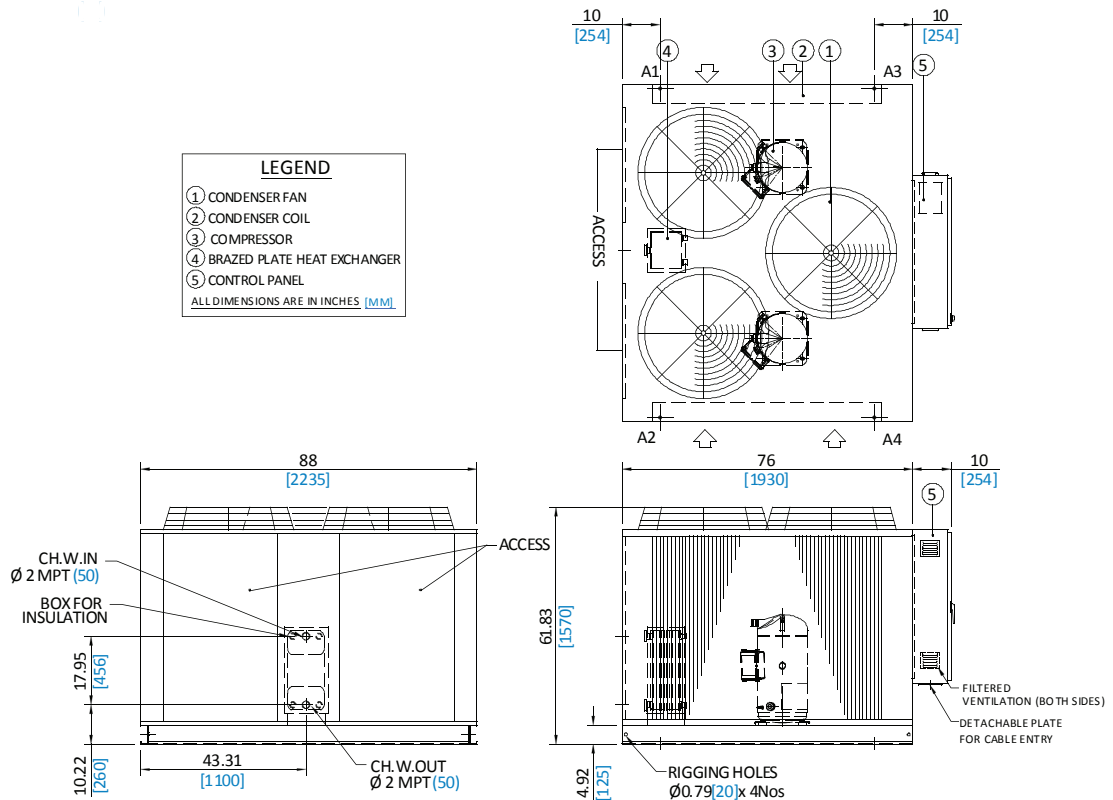
APCX(S) Models - 5012, 5016, 6012, 6014 & 6018



MODEL APCX(S)	H	L	A	B	C	CH.W. IN/OUT Ø
5012	51.84	76	8.99	18.5	39.37	Ø1 1/4 MPT
6012	1317	1930	228	470	1000	32
5016	60.84	84	9.24	17.95	45.28	Ø1 1/2 MPT
6014	1545	2134	235	456	1150	38
6018						



APCX(S) Models - 5020, 5024 & 6024



LEGEND	
①	CONDENSER FAN
②	CONDENSER COIL
③	COMPRESSOR
④	BRAZED PLATE HEAT EXCHANGER
⑤	CONTROL PANEL
ALL DIMENSIONS ARE IN INCHES [MM]	



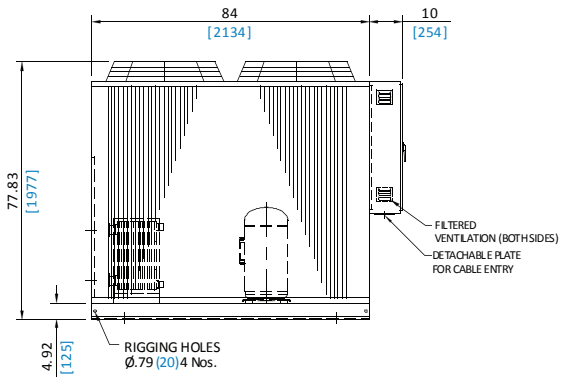
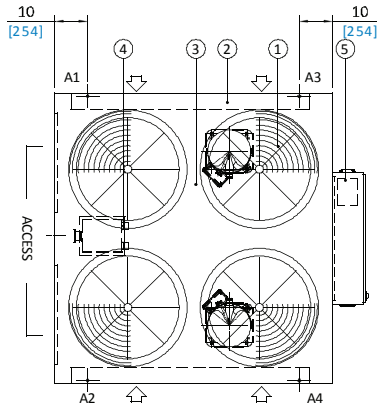
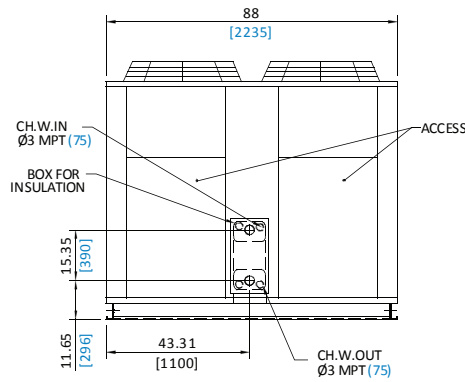
SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

APCX(S) Model - 5030 & 6035

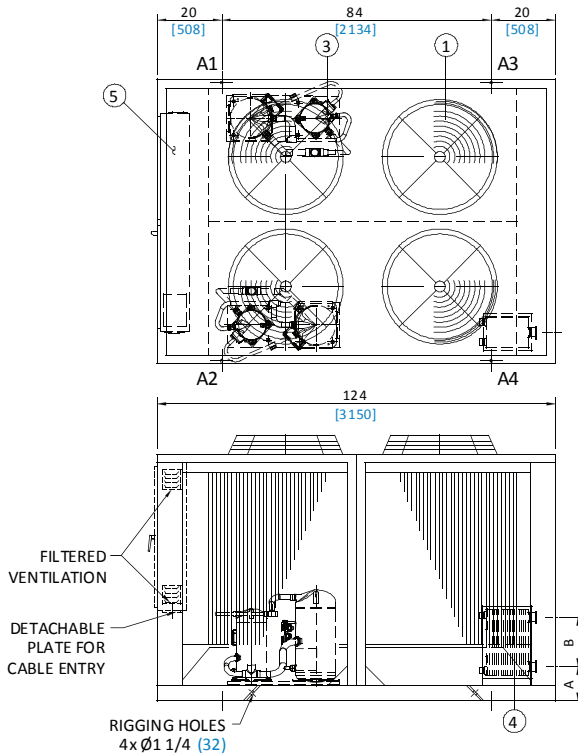
LEGEND

- ① CONDENSER FAN
- ② CONDENSER COIL
- ③ COMPRESSOR
- ④ BRAZED PLATE HEAT EXCHANGER
- ⑤ CONTROL PANEL

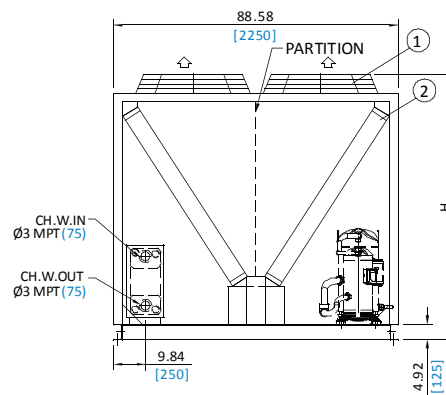
ALL DIMENSIONS ARE IN INCHES [MM]



APCX(S) Models - 5035, 5040, 5045, 5050, 6040, 6050 & 6055

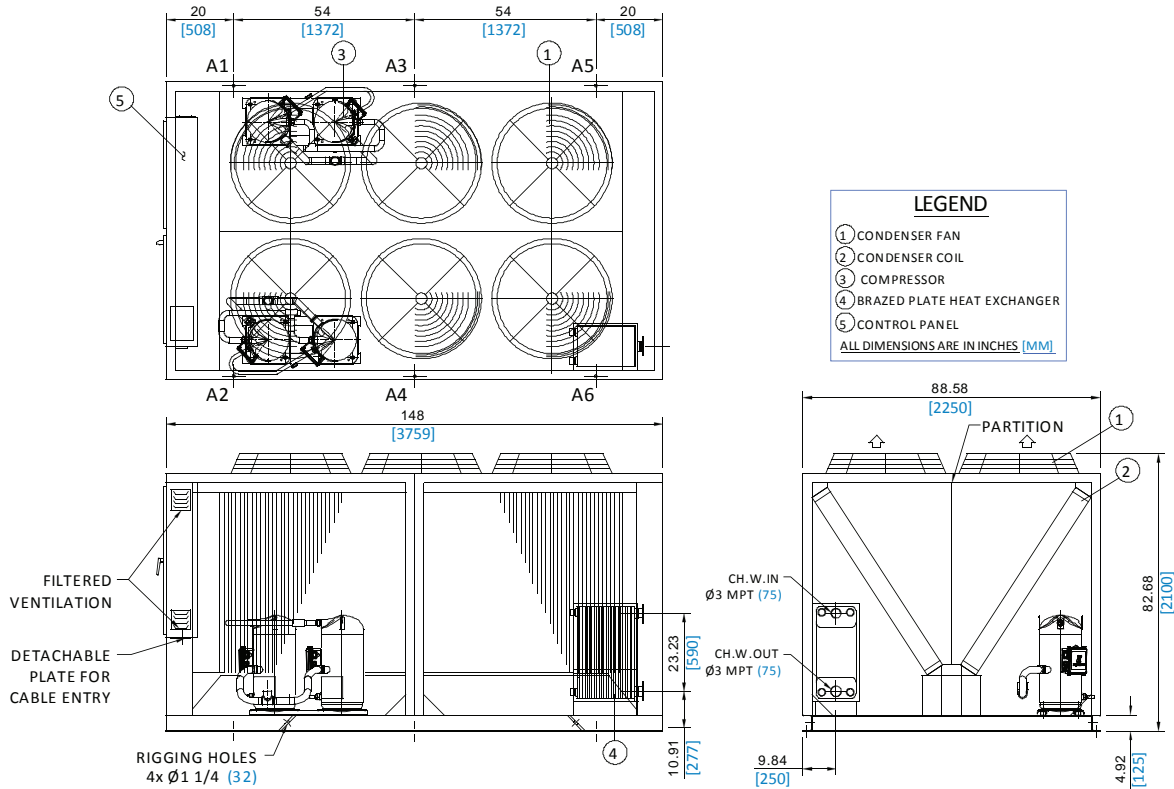


MODEL APCX(S)	A	B	H
5035			
6040	10.66 271	15.35 390	
5040			82.68 2100
5045			
6050	10.91 277	23.23 590	
5050			
6055			95.47 2425

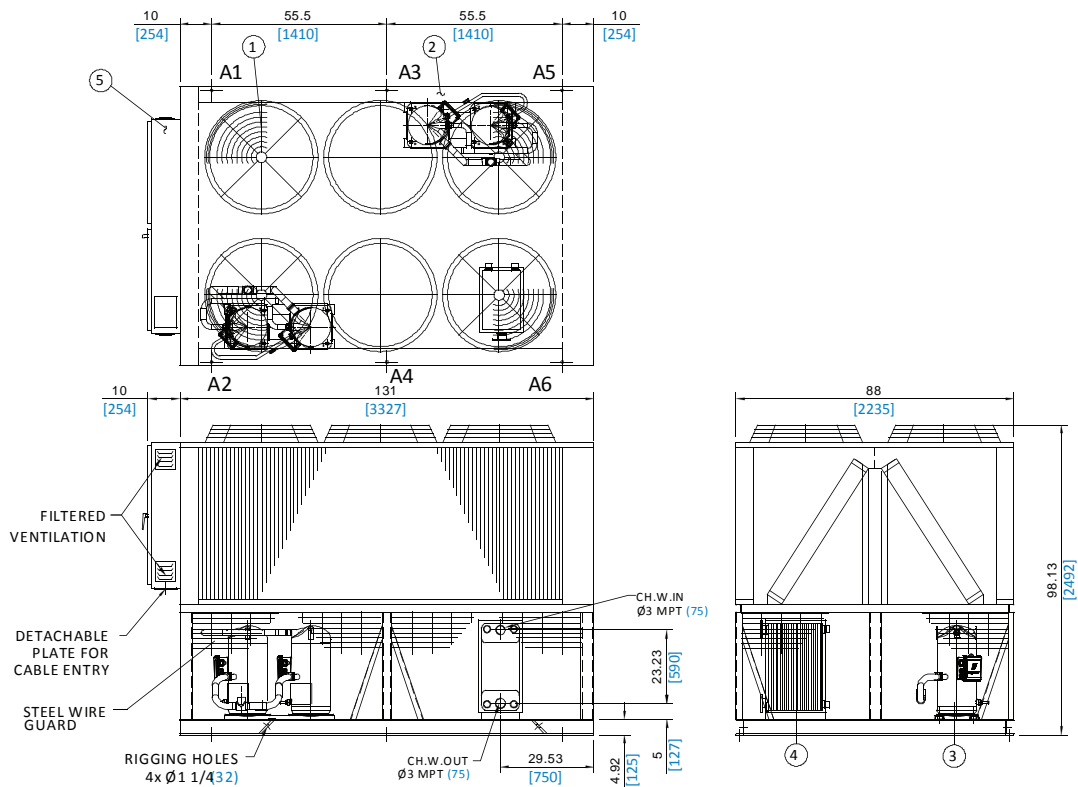


SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

APCX(S) Models - 5055, 5060 & 6060



APCX(S) Models - 6065 & 6070



SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Loading Points

50Hz

APCX(S) Models	Units	Mounting Loads						Operating Weight
		A1	A2	A3	A4	A5	A6	
5005	lbs	170	212	172	205	-	-	759
	kg	77	96	78	93	-	-	344
5008	lbs	243	281	228	246	-	-	998
	kg	110	127	103	112	-	-	452
5010	lbs	311	336	294	299	-	-	1239
	kg	141	152	133	136	-	-	562
5012	lbs	403	291	403	291	-	-	1387
	kg	183	132	183	132	-	-	629
5016	lbs	461	362	461	362	-	-	1647
	kg	209	164	209	164	-	-	747
5020	lbs	561	558	647	647	-	-	2414
	kg	254	253	294	294	-	-	1095
5024	lbs	604	602	698	698	-	-	2601
	kg	274	273	317	316	-	-	1180
5030	lbs	683	681	842	842	-	-	3049
	kg	310	309	382	382	-	-	1383
5035	lbs	1094	1094	775	920	-	-	3884
	kg	496	496	352	417	-	-	1761
5040	lbs	1217	1217	833	1002	-	-	4269
	kg	552	552	378	454	-	-	1936
5045	lbs	1292	1292	908	1167	-	-	4659
	kg	586	586	412	529	-	-	2113
5050	lbs	1325	1325	915	1189	-	-	4753
	kg	601	601	415	539	-	-	2156
5055	lbs	987	987	1036	1036	558	865	5470
	kg	447	447	470	470	253	392	2481
5060	lbs	1004	1004	1057	1057	558	865	5545
	kg	455	455	479	479	253	392	2515

Table 18

60Hz

APCX(S) Models	Units	Mounting Loads						Operating Weight
		A1	A2	A3	A4	A5	A6	
6006	lbs	170	212	172	205	-	-	759
	kg	77	96	78	93	-	-	344
6009	lbs	243	281	228	246	-	-	998
	kg	110	127	103	112	-	-	452
6012	lbs	382	279	382	279	-	-	1323
	kg	173	126	173	127	-	-	600
6014	lbs	446	354	446	353	-	-	1598
	kg	202	160	202	160	-	-	725
6018	lbs	461	362	461	362	-	-	1647
	kg	209	164	209	164	-	-	747
6024	lbs	582	579	668	668	-	-	2497
	kg	264	263	303	303	-	-	1133
6030	lbs	660	657	807	807	-	-	2932
	kg	299	298	366	366	-	-	1330
6035	lbs	711	708	869	869	-	-	3156
	kg	322	321	394	394	-	-	1431
6040	lbs	1135	1135	827	996	-	-	4091
	kg	515	515	375	451	-	-	1855
6050	lbs	1255	1255	890	1149	-	-	4549
	kg	569	569	404	521	-	-	2063
6055	lbs	1333	1333	960	1250	-	-	4875
	kg	604	604	435	567	-	-	2211
6060	lbs	965	965	1010	1010	554	861	5364
	kg	438	438	458	458	251	390	2433
6065	lbs	820	1171	1268	1231	952	851	6294
	kg	372	531	575	558	432	386	2854
6070	lbs	824	1191	1289	1246	965	854	6369
	kg	373	540	585	565	438	387	2888

Table 19

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Installation & Application Data

Location/Space Requirements

Due to the vertical air flow discharge condenser design, it is recommended that certain precautions are to be taken before installation. There should be no obstruction on the air flow.

Orient the unit so that prevailing winds blow parallel to the unit length thus minimizing the effects on condensing pressure. If it is not practical to orient the unit in this manner, a wind deflecting shield should be considered.

It is also necessary to provide adequate clearance on all sides of the unit for service access and satisfactory performance. This will prevent excessive condensing temperatures and enhance system performance and operating economy.

Refer to Figure A for recommended clearance around chillers to avoid warm air recirculation or coil starvation.

Foundation

A flat concrete foundation or floor which can support the weight of the equipment must be provided as the unit must be level for proper operation and functioning of controls.

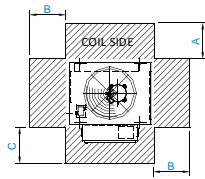
Vibration Isolation

Under certain critical conditions it is recommended that vibration isolators of rubber-in-shear or spring type be installed under the base.

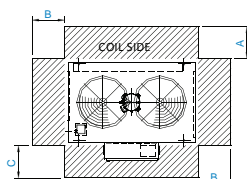
The isolators must be designed for the operating weight of the unit. For operating load points refer to the load distribution table. Correct selection of types of isolators depends upon application and structure.

To further reduce the transmission of vibration, it is recommended that flexible water connections suitable for the system pressure be installed on the water inlet and outlet connections of the chiller. For critical applications or locations, services of a noise and vibration expert is recommended.

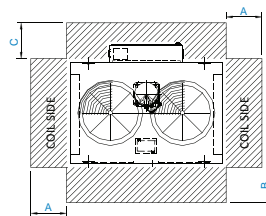
Recommended Clearances



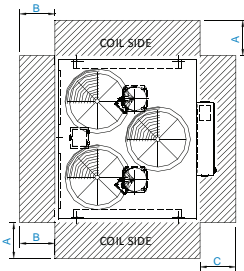
APCX (S) - 5005
APCX (S) - 6006



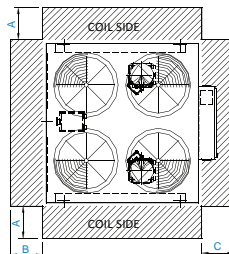
APCX (S) - 5008 & 5010
APCX (S) - 6009 & 6012



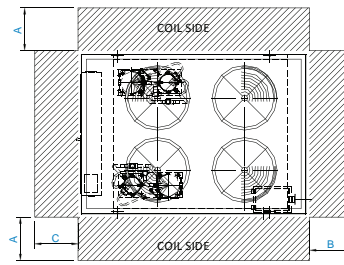
APCX (S) - 5012 & 5016
APCX (S) - 6014 & 6018



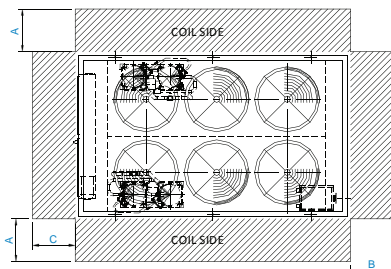
APCX (S) - 5020 & 5024
APCX (S) - 6024 & 6030



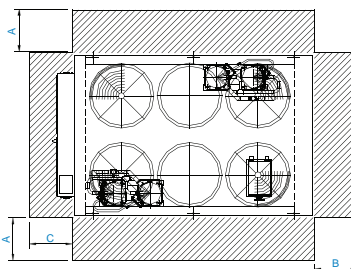
APCX (S) - 5030
APCX (S) - 6035



APCX (S) - 5035 ~ 5050
APCX (S) - 6040 ~ 6055



APCX (S) - 5055 & 5060
APCX (S) - 6060



APCX (S) - 6065 & 6070

APCX (S)		A	B	C
5005	6006		41	46
5008,5010	6009	40	66	
5012	6012		50	
5016	6014,6018	48	66	56
5020,5024	6024	64	78	
5030	6030,6035	60		40
5035,5040	6040,6050	60	102	
	6055	72		
5055,5060	6060	60	126	
	6065,6070	48	121	50

ALL DIMENSIONS ARE IN INCHES

Figure A



SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

Water Piping Practices

SKM suggests abiding by the local authorities' chilled water piping recommendations and practices as they can provide the installer the building and safety codes required for the installation.

Water piping should be designed to have a minimum number of bends and horizontal piping levels. Below are the following components it should have.

1. Temperature and pressure gauges in entering and leaving chiller water piping for unit servicing and commissioning. Pressure gauges must be installed on the same level.
2. Vibration eliminators in entering and leaving chilled water piping to lessen the sound and vibration transmitted to the building.
3. Pipe strainer in the evaporator entering piping to protect the BPHE from particles blocking the channels causing low performance, increased pressure drop and risk of freezing. If the media contain particles larger than 1 mm, a strainer with a size of 16-20 mesh (number of openings per inch) should be installed before the heat exchanger.
4. Water flow switch in the leaving chilled water piping, wired to the terminals provided in the control panel, to make sure that it has sufficient flow of water in the evaporator. This will prevent the evaporator from freezing up when the water flow is interrupted and avoid compressor slugging on start-up

5. To isolate the unit from the piping system when servicing or during maintenance, install a shut off valve on the entering and leaving chilled water piping.
6. Expansion Tank provides additional space in the chilled water piping system as temperature rises and furthermore, it maintains a positive pressure within the working limitations of the system.
7. Air Vents at high points in the chilled water system to bleed air from the system.
8. Vapor barrier on the outside of the insulation to avoid condensation in the cold surface of the pipe that may cause damage on the building structure. A thorough leak test should be made before insulating the pipe.

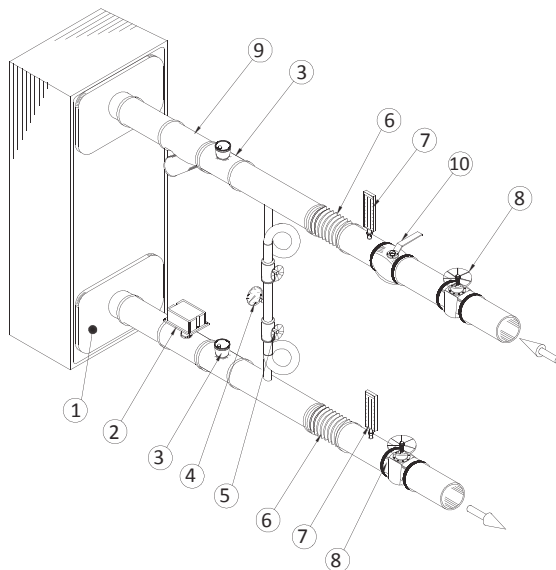
Flush all chilled water piping before making the final connection to the unit. SKM recommends hiring services of water treatment specialist to determine the type of necessary treatment. Improper or untreated chilled water leads to scaling, erosion, corrosion or algae that can cause inefficient operation and BPHE damage. SKM will not be liable for damages caused by improper or untreated chilled water.

Unit Sizing

It is strongly recommended to size the chiller for the present load. For future expansion, it is recommended to install another chiller to meet the additional load demand.

Over sizing of chillers by more than 10% at design conditions must be avoided. Over sizing causes energy inefficiency (more power consumption), erratic system operation and shortened compressor life due to excessive cycling of compressors.

TYPICAL PIPING FOR BPHE EVAPORATOR



1. HEAT EXCHANGER
2. WATER FLOW SWITCH
3. VENT
4. PRESSURE GAGE
5. SHUT OFF VALVES
6. VIBRATION ELIMINATOR
7. THERMOMETERS
8. GATE VALVE
9. STRAINER
10. BALANCING VALVE

Figure B

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

GUIDE SPECIFICATIONS

GENERAL

Unit shall be microprocessor controlled, shall have at least one refrigerant circuit consist of a hermetic scroll compressor(s), air cooled condenser, evaporator, interconnecting refrigerant piping, safety devices and accessories.

Unit shall be factory assembled, leak tested, evacuated and completely charged with refrigerant R - 134a. All factory wiring and piping shall be contained within the machine enclosure.

All electrical components shall be protected from the weather. Unit shall be rated in accordance with AHRI - 550/590. Each machine shall be capable of operating satisfactorily in a wide range of ambient air temperatures ranging from 50°F (10°C) to 125°F (52°C).

Unless indicated otherwise on electrical wiring diagram, each unit shall be factory equipped to connect to only one electrical power feeder with the necessary circuit breakers, if so specified. Unit shall be mounted on anti vibration isolators flexible enough to dampen any vibrations.

Unit shall be manufactured in ISO - 9001:2000 and 14001:2004 accredited facility.

COMPRESSOR

Compressor shall be hermetically sealed, compact high efficiency and low noise scroll type. These compressors are refrigerant gas cooled, furnished with advanced scroll temperature protection or internal motor protection.

EVAPORATOR

Evaporators shall be with Brazed Plate Heat Exchanger (BPHE). Brazed plate heat exchanger's channel plates, refrigerant and water connections shall be constructed from stainless steel with pure copper as brazing material. The design and assembly process shall comply with Europe Pressure Equipment Directive PED 97/23/EC, America, Underwriters Laboratories Inc (UL) & Japan, Kouatsu-Gas Hoan Kyoukai (KHK). and maximum working pressure of water side shall be 363 psig (2500 kPa) and refrigerant side shall be 392 psig (2700 kPa). Evaporator shall be 1 or 2 independent refrigerant circuits.

The evaporator shall be insulated with 1" (25mm) thick flexible closed cell insulation with a maximum K factor of 0.28 Btu.in/ft².hr.°F (0.040 W/m.°K)

CONDENSER COIL

Condenser coil shall be air cooled and shall be constructed of seamless Hi-x copper tubes, maximum 4 rows deep, 3/8" (9.52 mm) O.D. and mechanically bonded to the wavy type aluminum fins. Fins spacing shall be maximum 14 FPI (1.8mm). Slit fins shall not be accepted.

Precoated fins shall be used for saline and corrosive environment (if so specified). Integral sub cooling circuit in each coil shall be provided to increase the chiller cooling capacity, without additional operating cost. The coils shall be tested against leakage by air pressure of 450 psig (3100 kPa) under water.

CONDENSER FANS & MOTORS

The machine shall be furnished with direct driven propeller type discharging air upward condenser fans. Fans shall be constructed of corrosion resistant blades such as heavy gauge aluminum. The fan and drive shall be held in proper alignment. Fan assemblies shall be provided with heavy gauge, rust resistant steel. The fan assembly shall be protected with an acrylic coated steel wire fan guard. All condenser fans shall be individually statically and dynamically balanced for vibration free operation.

Condenser fan motor shall be Totally Enclosed Air Over (TEAO), 3-phase type, 6 poles with Class F insulation, Class B temperature rise and IP55 protection. Also, Motor shall be with permanently lubricated bearings and inherent corrosion resistance shaft. Condenser fan motors shall be provided with individual 3 pole contactor rated for AC3 duty operation & motor protector circuit breaker for short circuit, over current protection & isolation.

REFRIGERATION CIRCUITS

Refrigeration circuits piping shall be fabricated from ACR grade copper pipes and each refrigeration circuit shall include a removable core filter drier, liquid line solenoid valve, thermostatic expansion valve, shut off valve and sight glass.

Suction line shall be insulated with ½" (13mm) wall thickness closed cell pipe insulation with maximum k factor 0.26 Btu.in/ft².hr.°F (0.038 W/m.°K).

CASING

Machine casing shall be made of heavy gauge zinc coated galvanized steel sheets conforming to JIS-G 3302 and ASTM-A 635. To provide an extremely tough, scratch resistance, excellent anti-corrosive protection, fabricated steel shall be thoroughly de-greased and then phosphatized before application of an average 60 micron backed electrostatic polyester dry powder coating in RAL 7032 color scheme. This finish shall pass 1000-hour, 5% salt spray test at 95°F (35°C) and 95% relative humidity (ASTM B 117).

Machine casing shall be provided with access doors for easy service and maintenance and painted steel wire guard for compressors section.

The machine shall be fully assembled on welded rigid structural steel skid painted with one coat primer and minimum one coat of rust-preventing black enamel.

SKM Air Cooled Packaged Chillers APCX(S) Series - R134a

CONTROL PANEL & CONTROLS

The unit mounted chiller control panel enclosure shall be fabricated out of heavy gauge sheet steel in phosphatized, powder coated baked finish and shall conform to IP-54 protection as per guide lines in IEC-529. Control Panels shall be with hinged doors and key fasteners shall be provided for easy access and security. Panels shall be factory wired in accordance with NEC-430&440, labeled, tagged and shall feature 220/240 single phase controls and shall include the following as minimum:

- All compressors shall be with DOL Starting.
- Individual compressor & condenser fan motor contactors.
- Circuit Breakers for compressor & condenser fan motors.
- MCB for Control Circuit.
- Remote/Local selector switch.
- Microprocessor Control Boards.
- Control Relays.
- Power and Control Terminal Blocks.

MICROPROCESSOR CONTROL

Chillers shall be equipped with a full function microprocessor based controller as a standard feature. The controller shall be factory programmed for the control of compressors and condenser fans. The controller shall come with a built in keypad and display for simple but meaningful man machine interface. This controller shall provide complete operational control for the chiller and shall have built-in auto diagnostic capability that can signal normal operation or alarm conditions as well as shutting down the chiller or system if necessary.

The Main Features of the controller shall be follows:

- Built in LCD display with back light.
- Built in keypad.
- Battery backed up built in real time clock.
- Multiple authorization level to provide tight security for the control system.
- Run hours for the compressors.
- Automatic Lead/Lag of the compressors.
- Capacity control based on leaving water temperature.
- Alarm history.
- Remote Start/Stop facility from an external control system.
- Common fault, run and auto mode indication through volt free contact.

DISPLAY INFORMATION

Chiller shall be with display which allows the operator to access different parameters of the chiller. Operator shall be able to view and change the chiller parameters. The display information shall include:

- Status
- Outputs
- Inputs
- Alarms
- Set points
- Password

Controller shall monitor all the safeties related to the chiller and shall make the necessary protections, by shutting down the entire chiller or the effected circuit. The protection shall include:

- Low suction pressure.
- High discharge pressure.
- High compressor motor temperature.
- Freeze.
- Chilled water flow loss.
- Sensor faults.
- Compressor short cycling.

The controller shall monitor all the safeties related to the chiller and shall make the necessary protections, by shutting down the entire chiller or the effected circuit. The protection shall include:

- Low suction pressure.
- High discharge pressure.
- High compressor motor temperature.
- Freeze.
- Chilled water flow loss.
- Sensor faults.
- Compressor short cycling.

The controller shall support the major BMS protocols such as BACnet, Modbus & LON by adding extra hardware.