



SCREW COMPRESSORS TYPE AIR COOLED PACKAGE CHILLERS

350 RT - 500 RT



50Hz



*Smartwise Innovations...
Towards Green, Quality & Reliability Solutions*

HITASMART

RCUG SERIES



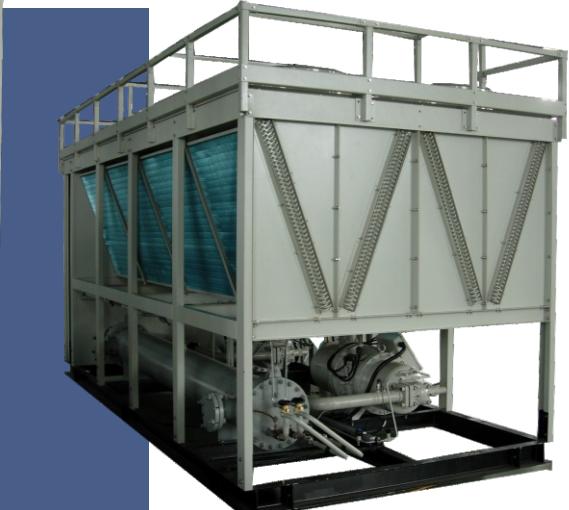
INTRODUCTION

This series of Multiple Screw Compressors Type Air Cooled Package Chillers were developed by a group of industry engineers, each of them with over 20 years of experience in the design, manufacturing, installation and service of electric chillers, packaged air-conditioners, split air-conditioners, fancoils, handling units, and related products.

- The Group is fully committed to innovative design, new and advance technology, value engineering and to provide expert personalized service to architects, consulting engineers, developers, building owners and contractors.
- The company's ability and courage to utilize and adopt latest technology, combined with fullest personalized assistance, has enabled the company to provide architects, consultants and developers various customized solutions to their various demanding application requirements.
- The company has the unique expertise and experience to custom design and fabricates equipment for installations in marine and corrosive environment, explosive and hazardous environment, low noise environment and any other special application needs!

Nomenclature

RCUG	440	-	5	A
SMARTECH Chiller Screw Compressor DX Evaporator	Nominal Cooling Tons	50Hz	Air Cooled Type	





■ SCREW COMPRESSORS AIR COOLED PACKAGE CHILLERS

GENERAL DESCRIPTION

The Air Cooled Screw Chillers are designed and manufactured to ensure efficient and reliable performance and to provide an economical system of air conditioning for residential, commercial and industrial buildings. The air-cooled scroll chillers can also be suitably piped and connected to provide chilled water or cold brine solution for process cooling purpose.

Each air-cooled screw chiller consists of an outdoor weatherproof casing constructed from heavy gauge galvanized steel coated with oven-baked epoxy polyester paint; two or multiple screw compressors with minimum two independent refrigerant circuits; a large surface area Copper tubes-Aluminium fins condenser coil for efficient heat transfer; a shell and tubes type evaporator; two or multiple axial propeller fans with direct drive inductions motors; factory packaged and prewired power and control panel; and a microprocessor based controller for capacity steps modulation and safety protections.

The air-cooled screw chillers are suitable for outdoor installation with free and unducted condenser fans air discharge.

APPLICATIONS SERVED

Industrial Process Cooling

Although the term industrial lends one to think tough & rugged, industrial process applications can actually be quite sensitive. Many of these applications need tight temperature control to maintain their quality of product. We, at Smartech understand these needs and realize that your process is your lifeblood. Accurate temperature control and 24/7 reliability are our top priorities. This list show some common process cooling applications:

- Plastics processing
- Injection mold cooling
- Extrusion cooling
- Laser cooling
- Welding machine cooling
- Metal die-casting cooling
- Metal plating / anodizing cooling
- Engine dynamometer testing cooling
- Dry cleaning cooling
- Oil cooling

Food Processing Cooling

Food processing can be some of the most critical cooling applications due to their use of meats & poultry. In dealing with food, in general, temperature control is paramount. If your chiller does not hold temperature, you lose product. We have experience in the various food processing cooling applications and can help you find a solution to yours.

Here are just a few applications we have handled previously:

- Bakery cooling
- Batch cooling
- Brine / Marinade cooling
- Vacuum meat tumbler / massager cooling
- Winery cooling
- Brewery cooling
- Ice cream / Slushy machine cooling

APPLICATIONS SERVED *cont'd*

Medical & Laboratory Cooling

Medical equipment is a high dollar investment. It deserves to be cooled by a dependable, specially designed chiller. Our chillers provide proven reliability to sustain operation and prevent damage from overheating. Several applications are listed below:

- M.R.I cooling
- Clean room air conditioning
- C.A.T. Scan cooling
- P.E.T Scan cooling
- Lab testing

Specialty applications

Have a special or custom application? No problem. Custom chiller applications are where we thrive. We are here to help. Some previous custom projects are:

- Ice Rink cooling
- Explosion proof chillers for all electrical area classifications
- Stainless steel frame, cabinet and control panel construction
- Ultra Low Sound requirement.

Standard options available to meet any customer requirement:

- Installed insulated stainless steel tanks from 50 - 2000 gallons
- Hydronic pump packages with process pumping and recirculating pump options
- Nema 4 flow switch
- Alarm beacon with audible horn
- Waterside pressure relief bypass valve
- Process fluid inline separator
- Process fluid inline filter
- Extended compressor warranty
- Custom color paint to match any international color code
- High and low ambient operations options
- Low temperature options available



MECHANICAL SPECIFICATIONS AND FEATURES

RANGE

The Chiller has 4 cooling capacity sizes from 350 to 500 tons and available with HFC-407C refrigerant.

SCREW COMPRESSOR

- Separate refrigerant circuit for each compressor
- Semi-hermetic, horizontal screw type
- Two-pole hermetic motor
- Suction gas cooled motor
- Integral lubrication system using pressure differential
- Cast iron housing
- Infinite variable slide valve unloading
- Integral oil separator
- Compressor oil sump heaters



SHELL & TUBE EVAPORATOR

The adoption of a dedicate, high efficiency exchange tube allowed to exalt performances increasing the cooling capacities by values close to 10%. This performance improvement can be alternatively translated into a raising of the evaporation temperature and then in an optimisation of the COP of the cooling system, not only in combination with R407C but also with the other refrigerants.

- Header tube sheet, shell, refrigerant and water connections are made of carbon steel
- High efficiency exchange tubes are in copper, internally finned.
- Baffles are made of brass or other suitable material (carbon steel)
- The bolt system is made of steel alloys or stainless steel depending on working conditions and temperatures, while gaskets are made of an asbestos free compound.



■ MECHANICAL SPECIFICATIONS AND FEATURES *cont'd*

CONDENSER COIL

- Constructed from staggered rows of inner ridged copper tubes mechanically expanded into die-formed aluminium fins for positive bonding and efficient Heat rejection
- The pre-coated Aluminium fins improve corrosion resistance and maintain the fins surface for efficient Heat rejection
- The condenser coil is pressure tested up to 450psig with dry nitrogen under water for leaks
- Optional copper fins condenser coil



AXIAL PROPELLER FANS

- The patented and unique designed axial propellers are selected to deliver high condenser air flow rates, with noise level and low motor power consumption
- The 3-phase, high starting torque, direct drive condenser fan motor run at maximum speed of 1140 rpm for low noise operation
- All condenser fan motors are provided with either internal line break motor protection or external mounted overload protector; and suitable for outdoor installations with minimum IP54 protection
- Optional variable fan speed control or fan cycling in response to condensing head pressure, during low ambient condition

REFRIGERATION SPECIALTIES

- Thermal expansion valve(s)
- Sight glass with moisture indicator(s)
- Liquid line solenoid valve(s)
- Liquid line shut off valve(s)
- Removable core filter/drier(s)
- Charging and gauge connections
- Compressor discharge check valve(s) and stop valve(s)
- Compressor suction stop valve(s)
- High pressure relief valve(s)
- Refrigerant charge
- Oil charge



POWER AND CONTROL PANEL

Each chiller is packaged with a power and control panel which is ready to accept rated 3 phase 50Hz electrical supply from a remote mounted isolator.

The power panel is furnished with factory pre-wired and mounted S/D starter for compressors, DOL starters for condenser fan motors. MCBs for compressors and fan motors, external overload protectors for compressors and/or fan motors. Power, alarm and compressor run lights to indicate unit operation status.

The heart of the control panel is the highly reliable SMART-Advance **SMT³** microprocessor based controller with advance compressor management logic for screw compressors in response to required chilled water outlet set-point temperature. **SMT³** controller is designed specifically for the hostile environment of the HVAC/R industry and had customers in mind. **SMT³** controller provides flexibility with set points and control options that can be selected prior to commissioning a system or when the unit is live and functioning. Displays, alarms and other interfaces are accomplished in a clear and simple language that informs the user as to the status of the controller.

The **SMT³** controller provides the following safety protections, control functions and features:

- A user friendly back-lit 132 by 64 pixels **SMT-D¹** display panel with 6 silicon rubber buttons allows carrying out all program operations.
- Staggered starting of compressors to reduce current in-rush.
- To prevent compressors short-cycling (on and off repeatedly) which can cause overheating of compressors and premature failures or burnt-out of compressors.
- Lead-lag control of compressors operation and auto-balancing of compressors run-hours
- Retains up to 99 alarm histories complete with time of failure together with data stamping on critical sensor readings in an alarm history.
- Monitoring of the following readings and status:
 - Leaving and entering chilled water temperature
 - Compressors suction and discharge pressure
 - Compressors discharge temperature
 - Compressor operating current
 - Chilled water flow switch status
 - Compressor oil level status
 - External start/stop status
- Safety protections as below to insure system reliability:
 - Chilled water freeze protection
 - Chilled water flow loss
 - Low suction pressure/high discharge pressure
 - Low oil level
 - Low pressure differential
 - Sensor failure
 - Compressor over-current
- Various optional add-on cards are available for direct interfacing to Building Management System (BMS) through standard communication protocols such as ModBus RTU (RS485/TCPIP), BACnet (RS485/MSTP/TCPIP) and LonWorks (FTT 10).



OPTIONAL ACCESSORIES

HEAT RECOVERY / DESUPERHEATERS

This can be factory supplied and installed to get free hot water up to as high as 55°C.

OTHER OPTIONAL ACCESSORIES

- Coated or uncoated copper fins coils in lieu of pre-coated aluminium fins coils.
- Water flow switch to be shipped loose.
- Spring isolators to be shipped loose.
- Rubber-in-shear isolator to be shipped loose.



INTEGRATED PUMP TANK STATION

Process pump package can be integrated with or without a tank station. These tanks are offered in all 304SS material and fully insulated with high-quality foam insulation. Pumps are available up to 25HP and in other constructions up to 60HP with 304SS material. This section will be integral to the chiller skid and within a framed enclosure with rain shield.



PERFORMANCE TABLE

Lvg Water Temp. F	Model RCUG	Ambient Temp. F					
		85.0		95.0		105.0	
		Ton	Kwi	Ton	Kwi	Ton	Kwi
40	440	355.8	314.0	316.5	363.7	278.1	399.2
	500	407.5	357.5	363.9	413.6	321.0	454.2
	550	461.5	402.9	409.8	464.2	382.4	441.9
	600	500.5	459.9	442.8	531.6	412.4	559.6
42	440	372.5	328.7	332.5	366.2	293.4	402.2
	500	426.4	374.0	381.9	416.6	338.2	457.6
	550	482.8	421.2	430.1	467.0	402.3	492.3
	600	523.9	481.4	465.2	535.4	434.2	563.7
44	440	389.7	331.2	350.0	368.9	309.1	405.2
	500	445.8	376.9	400.0	419.8	355.9	460.9
	550	504.8	423.0	450.0	470.0	422.7	494.9
	600	548.1	485.2	500.0	539.5	456.7	567.8
46	440	407.5	333.8	366.0	369.9	325.3	408.1
	500	465.8	379.9	420.8	422.8	374.2	464.3
	550	527.4	428.3	472.7	474.6	443.7	499.8
	600	573.0	489.0	512.1	543.3	479.9	572.1
48	440	425.8	336.4	384.7	374.4	342.0	411.1
	500	486.5	383.1	440.4	426.2	393.0	467.7
	550	550.8	432.0	495.0	478.6	465.3	504.3
	600	598.7	492.9	536.6	547.7	503.7	576.5
50	440	444.7	339.3	402.6	377.4	359.1	414.3
	500	507.9	386.3	460.7	429.4	412.3	471.2
	550	574.9	439.4	517.9	486.3	487.7	512.7
	600	625.2	496.9	561.9	551.7	528.3	580.8

Note:

*Kwi refers to compressor power input in KW

PHYSICAL SPECIFICATIONS



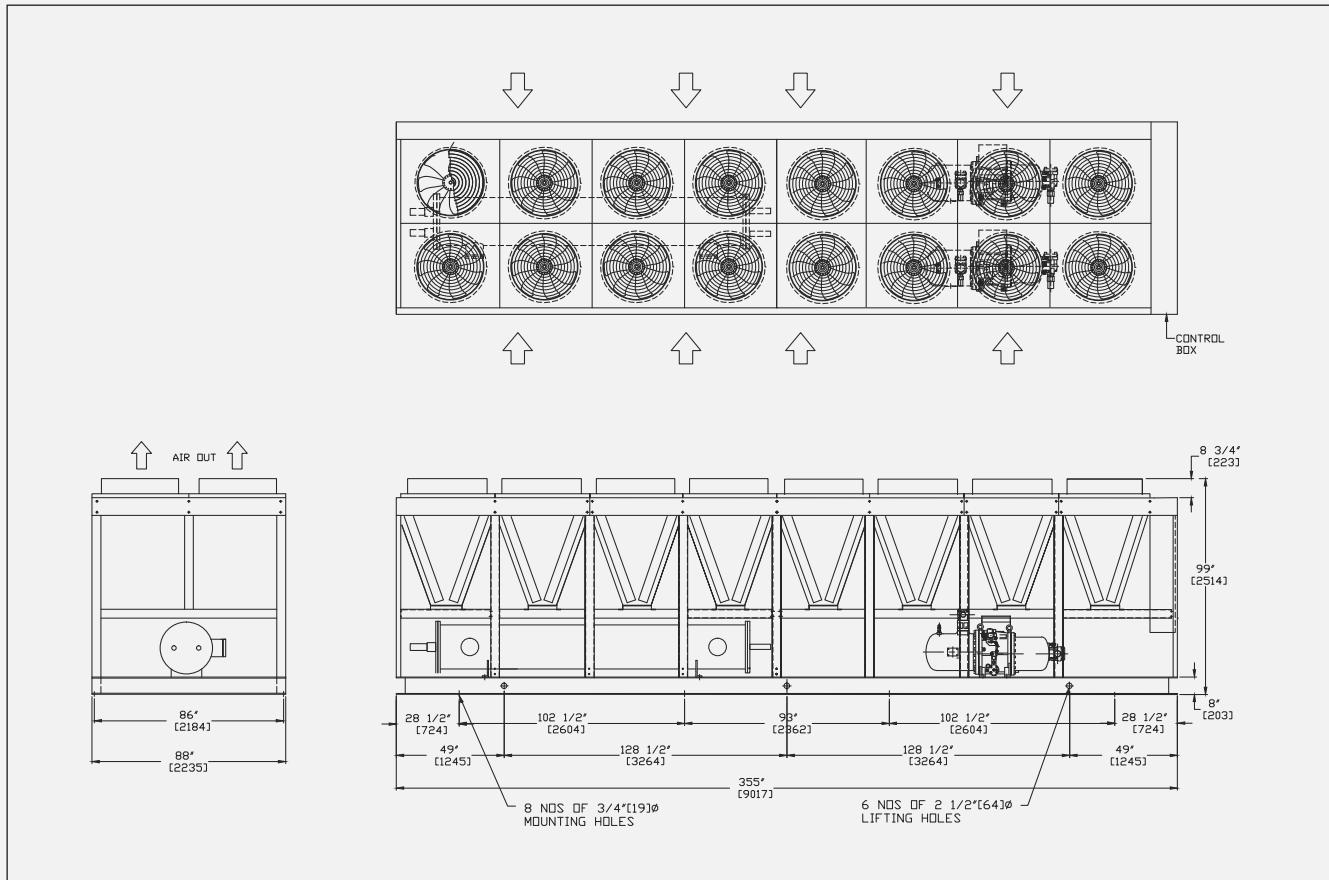
Model			RCUG 440	RCUG 500	RCUG 550	RCUG 600
NOMINAL COOLING CAPACITY		RT	350	400	450	500
COMPRESSOR	TYPE	-	SEMI-HERMETIC SCREW			
	RPM	RPM	2950	2950	2950	2950
	QUANTITY	-	2	2	2	2
MIN. % UNIT CAPACITY REDUCTION		-	CONTINUOS CAPACITY CONTROL			
		%	12.5%	12.5%	12.5%	12.5%
EVAPORATOR	TYPE	-	DIRECT EXPANSION SHELL & TUBE			
	WATER FLOW RATE	USGPM	840	960	1080	1200
	WATER PRESSURE DROP	FT WG	16.4	21.7	19.7	19.7
	WATER CONNECTION	INCH (MM)	8(203)	8(203)	8(203)	10(254)
CONDENSER FAN MOTOR	TYPE	-	HYDROPHILIC FIN TYPE			
	CONDENSER FAN	-	DIRECT DRIVE PROPELLER FAN			
	INPUT	kW	3.5	3.5	3.5	3.5
	QUANTITY	-	16	18	20	20
	AIR FLOW	CFM	246,400	277,200	308,000	308,000
ELECTRICAL	NOMINAL POWER SUPPLY	-	400 / 3 / 50			
	UNIT RLA (@Nominal ratingconditions)	A	748	870	950	1,160
	UNIT MINIMUM CIRCUIT AMPS (MCA)	A	923	1,007	1,200	1,300
	UNIT MAXIMUM FUSE SIZE (MFS)	A	1,200	1,250	1,450	1,600
UNIT DIMENSION	WIDTH	IN [MM]	88 [2235]	88 [2235]	88 [2235]	88 [2235]
	LENGTH	IN [MM]	350 [8890]	392 [9957]	434 [11024]	434 [11024]
	HEIGHT	IN [MM]	99 [2515]	99 [2515]	99 [2515]	99 [2515]
APPROX. UNIT SHIPPING WEIGHT		LBS [KG]	26268 [11940]	30998 [14090]	34760 [15800]	36832 [16742]
APPROX. UNIT OPERATING WEIGHT		LBS [KG]	27060 [12300]	31928 [14513]	35860 [16350]	37937 [17244]
APPROX. REFRIGERANT CHARGE, R407C		LBS [KG]	847 [385]	968 [440]	1089 [495]	1210 [550]

Note:

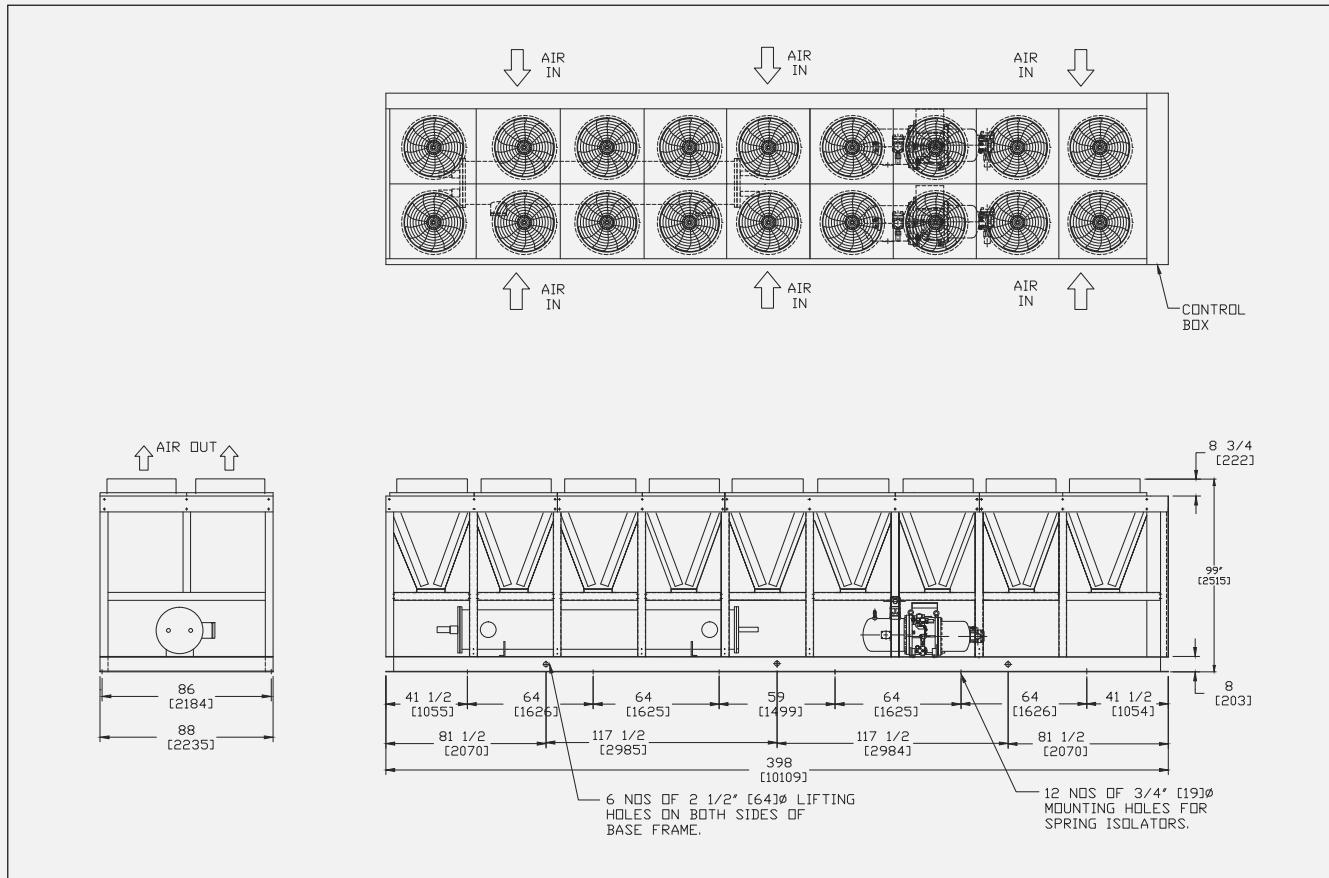
Nominal Cooling Capacity is rated at 95°F Ambient condenser air and chilled water outlet and inlet temperatures of 54°F / 44°F.

DIMENSION DATA

RCUG 440



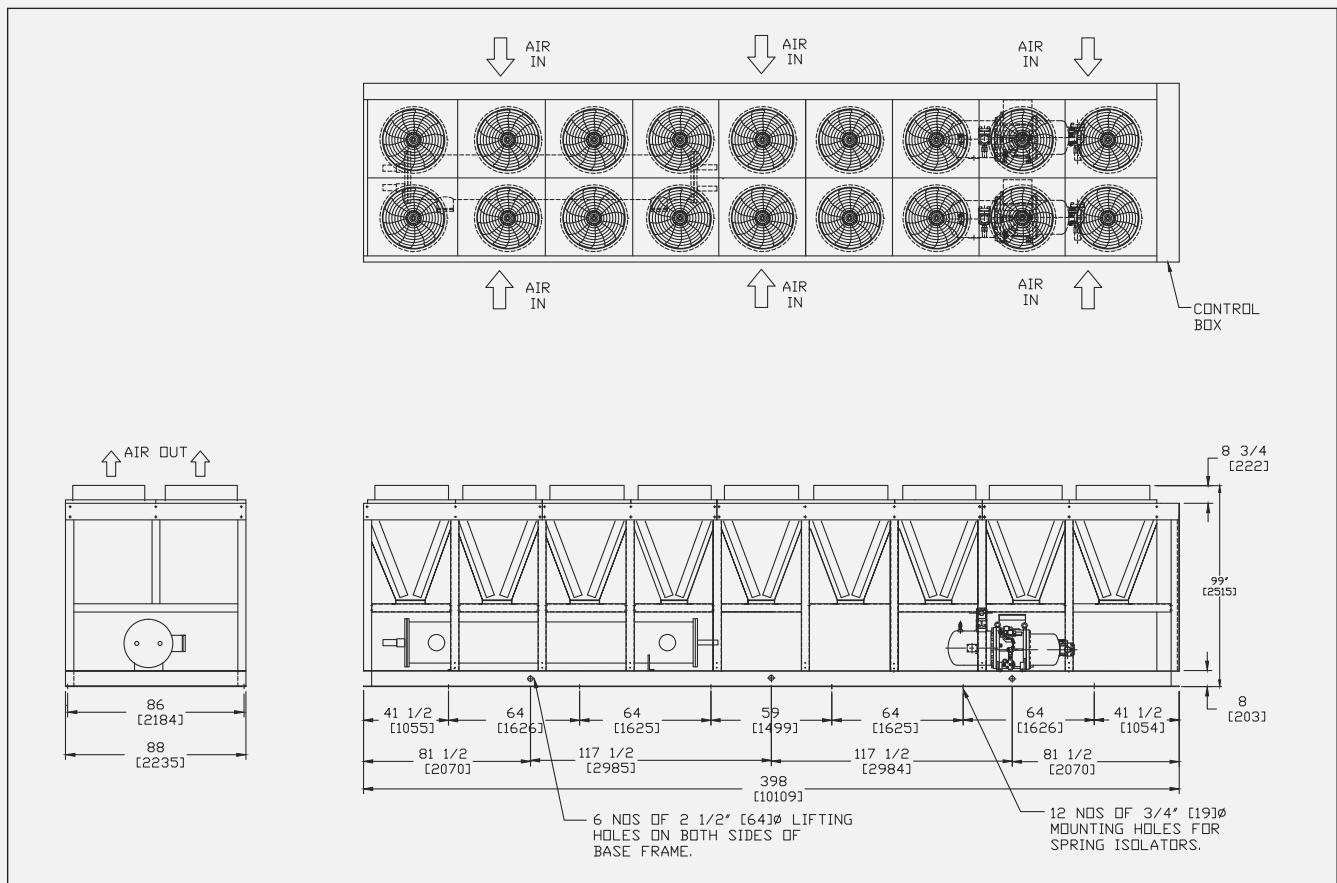
RCUG 500



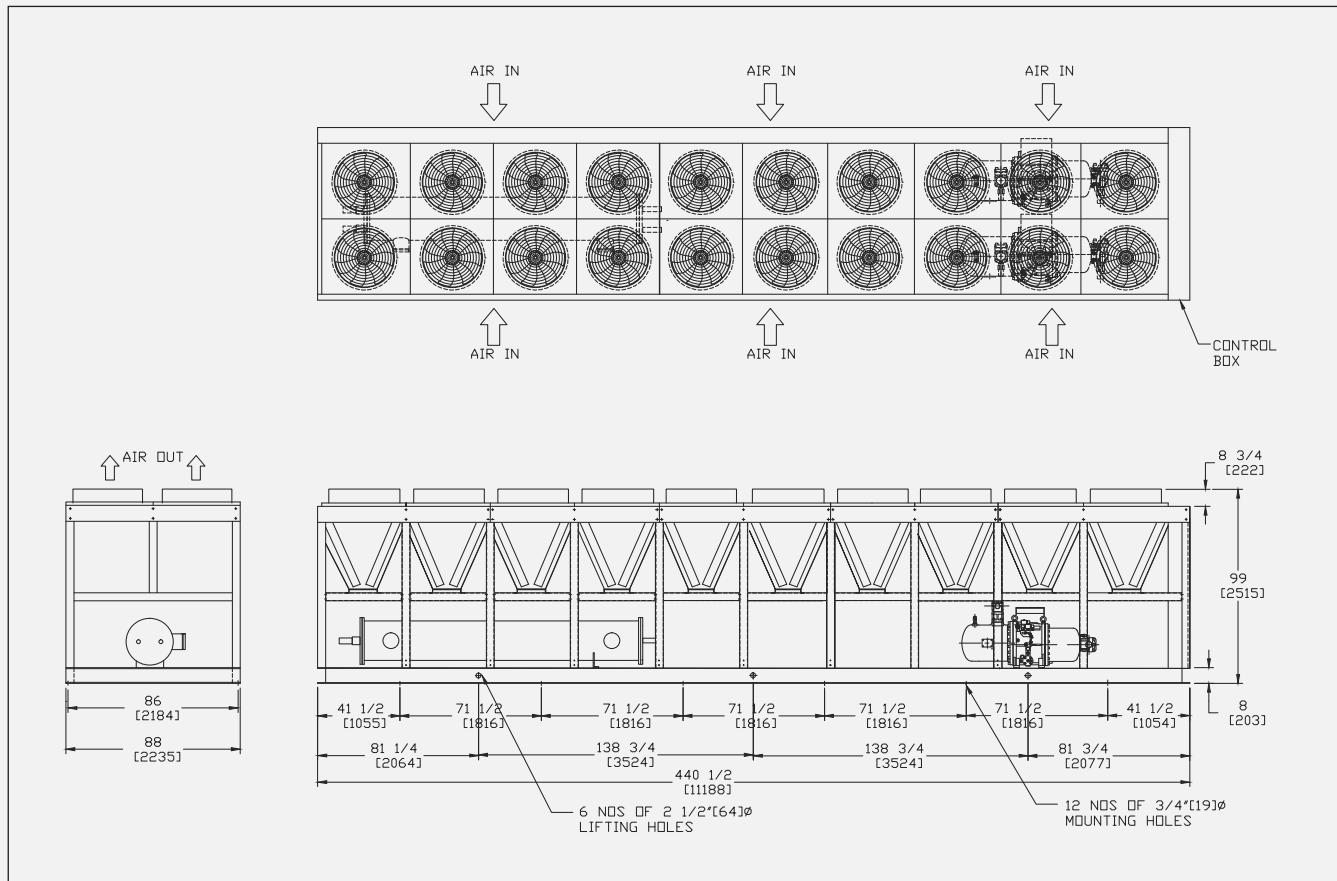
Note: All dimensions are in inches.

DIMENSION DATA

RCUG 550



RCUG 600



Note: All dimensions are in inches.



Smartech Sales & Services Sdn. Bhd.
(829707-K)

No.15, Jalan PJS 1/27, (Jalan Petaling Utama 6), Petaling Utama, Batu 7,
Off Jalan Klang Lama, 46000 Petaling Jaya, Selangor.
T: 603-7783 7288 / 7782 2788 F: 603-7782 3788
W: www.smart-hvac.com.my

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