



# SCREW COMPRESSORS TYPE AIR COOLED PACKAGE CHILLERS



60Hz



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

 **Smartech**

SSCD\_A SERIES



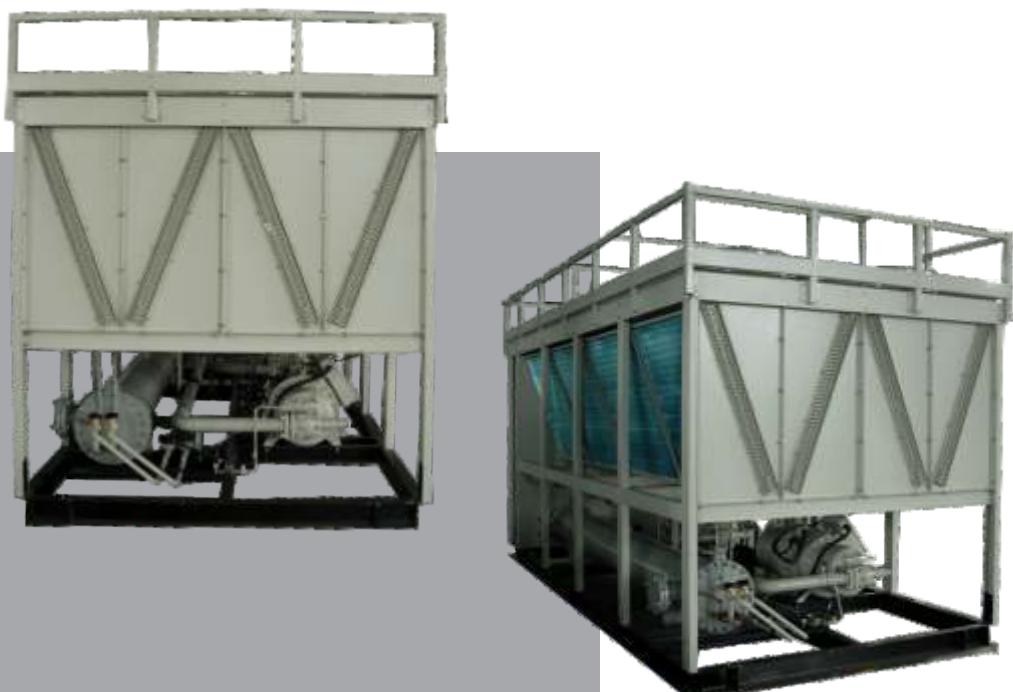
## INTRODUCTION

This series of Multiple Scroll 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!
- All units meet or exceed ASHRAE 90.1 minimum energy efficiency requirements.
- Units meet UL electrical requirements and ETL listed.
- Only used with ECO-FRIENDLY HFC type refrigerants.

## Nomenclature

<b>SSCD</b>	<b>150</b>	<b>-</b>	<b>6</b>	<b>A</b>	<b>R7</b>
SMARTech Chiller Screw Compressor DX Evaporator	Nominal Cooling Tons	60Hz	Air Cooled Type	R7 - R407C	





## 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

## ■ SCREW COMPRESSORS AIR COOLED PACKAGE CHILLERS *cont'd*

### APPLICATIONS SERVED

#### 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 or flow meters
- 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 10 cooling capacity sizes from 30 to 300 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 60Hz electrical supply from a remote mounted isolator.

The power panel is furnished with factory pre-wired and mounted DOL starters 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 SA600 microprocessor based controller with advance compressor management logic for scroll compressors in response to required chilled water inlet set-point temperature.

The Smart-Advance SA600 controller provides the following safety-protection controls and features:-

- A 4-digits LED display with 18 icons offers a clear readability with dedicated units of measures for each value displayed
- Monitors in/out temperature, high/low refrigerant
- High discharge pressure cut-out protection
- Low suction pressure cut-out protection
- Chilled water anti-freeze protection
- 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
- Large historical alarms memory
- Equipped with TTL serial connection which enables easy integration with plant supervision, monitoring and management systems through MODBUS communication protocol
- Can be furnished with optional RS485 to form LAN with suitable adaptor for local/remote plant management



### ■ Smart Advance 2

The SMART Advance 2 is a rugged microprocessor based controller designed specifically for the hostile environment of the HVAC/R industry. It is designed with the most critical process and has customers in mind. The SMART Advance 2 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 SMART Advance 2 consists of a master micro controller along with a keypad and display. Complementing the SMART Advance 2 micro controller are a variety of expansion boards that allow for system expansion to a maximum of 48 inputs and 48 outputs. Communication to these units occur at 38,400 baud over the I/O port which is dedicated for this purpose.

Two other communication ports (RS-485 and Ethernet) are available on the SMART Advance 2. The RS-485 port allows the user to interactively communicate with the SMART Advance 2 via a Windows based connection software or, for monitoring purposes only, to a BMS (Building Management System) running Modbus RTU or Johnson N2. The Ethernet port allows the user to interactively communicate with the SMART Advance 2 via a Windows based connection software or, for monitoring purposes only, to a BMS running BACnet IP or Modbus IP. For LonTalk or BACnet MSTP communication, an external adapter is required.



## ■ OPTIONAL ACCESSORIES

### UNDER VOLTAGE AND PHASE PROTECTION RELAY

It protects against low incoming voltage conditions as well as single phase unbalance by opening the control circuit.

### 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.
- Suction and discharge pressure gauges.
- 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 SSCD	Ambient Temp. °F					
		85.0		95.0		105.0	
		Ton	KWi	Ton	KWi	Ton	KWi
40	30	28.4	28.0	26.0	31.3	23.2	34.9
	50	47.0	48.5	42.5	54.2	37.5	60.3
	60	56.2	58.0	51.1	65.0	45.5	72.2
	80	74.7	76.0	68.0	85.0	60.5	94.6
	100	97.5	94.4	89.0	105.6	79.0	117.6
	120	112.6	106.0	103.1	118.4	92.0	131.8
	150	144.5	140.6	132.0	157.0	117.2	175.0
	200	199.6	203.2	180.9	227.0	158.9	252.8
	250	236.8	246.9	213.6	275.7	186.6	306.3
	300	292.2	318.0	261.7	354.9	228.3	394.5
42	30	29.6	28.2	27.2	31.5	24.3	35.2
	50	49.1	48.9	44.5	54.6	39.5	60.7
	60	58.8	58.6	53.6	65.4	47.8	72.8
	80	78.1	76.6	71.4	85.6	63.5	95.4
	100	101.8	95.2	93.2	106.4	83.1	118.4
	120	117.6	106.8	107.9	119.2	96.6	132.8
	150	151.0	141.8	138.2	158.2	123.2	176.4
	200	208.7	204.8	189.6	228.8	167.3	254.6
	250	247.9	248.7	224.1	277.5	196.6	308.7
	300	305.8	320.4	274.9	357.6	240.8	397.2
44	30	30.9	28.5	30.3	31.8	25.5	35.4
	50	51.3	49.3	50.0	55.0	41.5	61.2
	60	61.4	59.0	60.6	65.8	50.2	73.4
	80	81.5	77.2	80.0	86.2	66.7	96.0
	100	106.3	96.0	100.0	107.2	87.2	119.2
	120	122.8	107.6	120.0	120.2	101.3	133.8
	150	157.6	142.8	150.5	159.4	129.3	177.6
	200	218.2	206.4	207.0	230.4	175.9	256.4
	250	259.2	250.8	245.0	279.6	207.0	310.8
	300	319.9	322.8	309.0	360.3	253.6	400.2
46	30	32.3	28.7	29.7	32.0	26.8	35.7
	50	53.6	49.7	48.9	55.4	43.5	61.6
	60	64.1	59.6	58.8	66.4	52.7	74.0
	80	85.1	78.0	78.1	86.8	70.0	96.8
	100	111.0	96.8	101.9	108.0	91.5	120.2
	120	128.1	108.6	117.9	121.0	106.2	134.8
	150	164.5	144.0	151.1	160.6	135.6	179.0
	200	227.9	208.0	207.9	232.2	184.8	258.4
	250	270.9	252.6	246.0	281.7	217.6	313.2
	300	334.4	325.5	303.2	362.7	266.9	403.2
48	30	33.7	29.0	31.0	32.3	28.0	35.9
	50	55.9	50.1	51.2	55.8	45.7	62.1
	60	66.8	60.0	61.5	67.0	55.2	74.4
	80	88.8	78.6	81.6	87.6	73.3	97.4
	100	115.8	97.6	106.5	108.8	95.9	121.0
	120	133.6	109.6	123.2	122.0	111.2	135.8
	150	171.7	145.4	157.9	162.0	142.1	180.2
	200	238.0	209.8	217.5	234.0	194.0	260.2
	250	283.0	254.7	257.4	283.8	228.5	315.6
	300	349.4	327.9	317.5	365.4	280.5	406.2
50	30	35.1	29.2	32.4	32.6	29.3	36.2
	50	58.3	50.5	53.5	56.3	47.9	62.5
	60	69.7	60.6	64.2	67.4	57.8	75.0
	80	92.6	79.2	85.2	88.2	76.8	98.2
	100	120.8	98.6	111.3	109.6	100.4	122.0
	120	139.3	110.6	128.6	123.0	116.4	136.8
	150	179.0	146.6	164.9	163.2	148.8	181.6
	200	248.4	211.6	227.4	235.8	203.4	262.2
	250	295.4	256.8	269.2	285.9	239.7	317.7
	300	364.8	330.6	332.2	368.4	294.5	409.2

Note:

\*Kwi refers to compressor power input in KW

## PHYSICAL SPECIFICATIONS

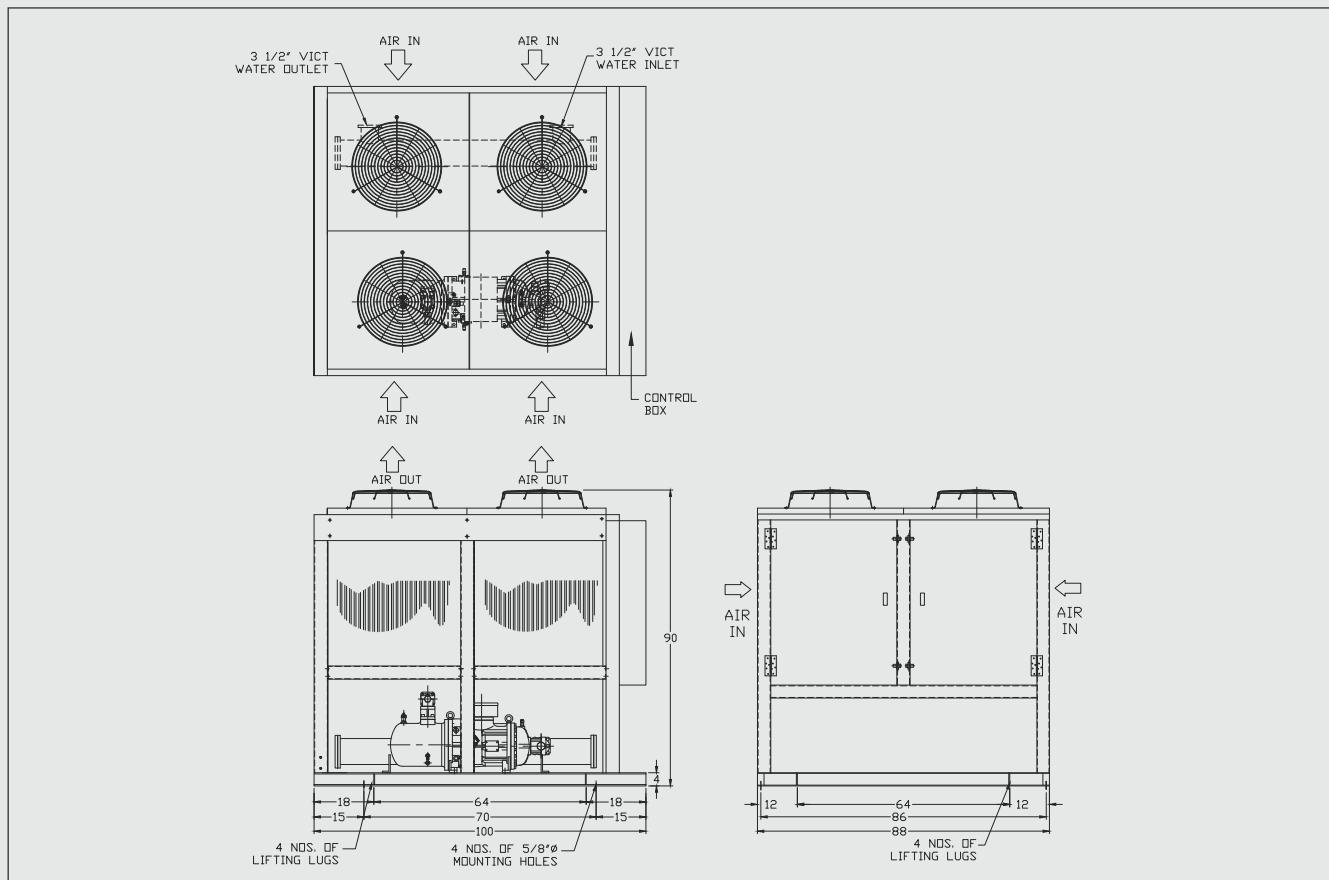


Model		SSCD 30 AR7	SSCD 50 AR7	SSCD 60 AR7	SSCD 80 AR7	SSCD 100 AR7	SSCD 120 AR7	SSCD 150 AR7	SSCD 200 AR7	SSCD 250 AR7	SSCD 300 AR7	
NOMINAL COOLING CAPACITY	RT	30.3	50.0	60.6	80.0	100.0	120.0	150.5	207.0	245.0	309.0	
COMPRESSOR	TYPE	-										
	RPM	3550	3550	3550	3550	3550	3550	3550	3550	3550	3550	
QUANTITY	-	1	1	2	2	2	2	2	2	3	3	
MIN. % UNIT CAPACITY REDUCTION	-	%	33.0				16.5			17.5	11.7	
	TYPE	-										
EVAPORATOR	WATER FLOW RATE	USGPM	73	120	145	192	240	288	361	497	588	
	WATER PRESSURE DROP	FT WG	16.1	10.1	17.9	17.0	18.5	15.2	16.4	18.0	15.5	
	WATER CONNECTION	IN [MM]	3.5 (89)		4.5 (114)	6.5 (165)					8.5 (219)	
	TYPE	-										
	COIL	FPI	-	16	16	16	14	14	14	14	14	
CONDENSER	TOTAL FACE AREA	FT <sup>2</sup>	93	107	153	160	213	267	307	391	440	
	CONDENSER FAN	-										
	INPUT	kW	6.0	6.0	9.0	9.0	12.0	15.0	18.0	24.0	27.0	
FAN MOTOR	QUANTITY	-	4	4	6	6	8	10	12	16	18	
	AIR FLOW	CFM	48,320	49,960	74,440	72,880	97,640	128,160	145,040	192,880	225,600	
	NOMINAL POWER SUPPL	-					460 / 3 / 60					
ELECTRICAL	UNIT RIA	A	60.2	94.0	116.2	145.0	184.2	209.0	271.4	385.0	464.4	
	UNIT MCA	A	72	114	128	160	204	231	300	426	498	
	UNIT MFS	A	100	160	160	200	250	320	400	500	600	
UNIT DIMENSION	WIDTH	IN [MM]	88 [2235]	88 [2235]	88 [2235]	88 [2235]	88 [2235]	88 [2235]	88 [2235]	88 [2235]	88 [2235]	
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APPROX. UNIT SHIPPING WEIGHT	LBS [KG]	6042 / 2740	6283 / 2850	8874 / 4025	9111 / 4133	10582 / 4800	12170 / 5520	14043 / 6370	20018 / 9080	27822 / 12620	28175 / 12780	
APPROX. UNIT OPERATING WEIGHT	LBS [KG]	6674 / 3027	6945 / 3150	9803 / 4446	10065 / 4565	11640 / 5280	13382 / 6070	15454 / 7010	22024 / 9990	30644 / 13900	30997 / 14060	
APPROX. REFRIGERANT CHARGE, R407C	LBS [KG]	73 / 33	121 / 55	147 / 67	194 / 88	243 / 110	291 / 132	365 / 166	502 / 228	594 / 270	749 / 340	

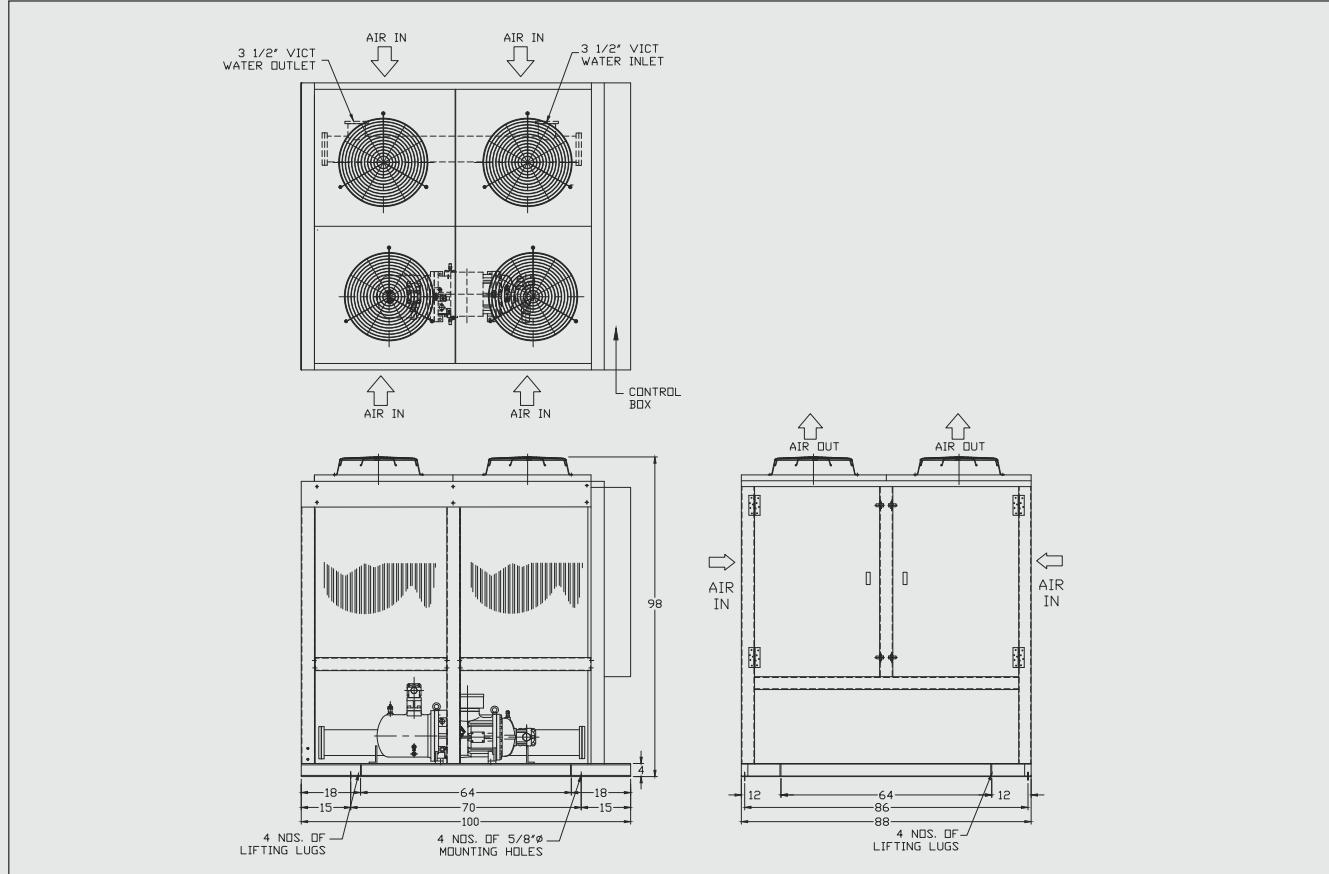
Note: All dimensions are in inches.  
All dimensions tolerance ±1/2".

## DIMENSION DATA

### SCSD30-6 AR7



### SSCD50-6 AR7

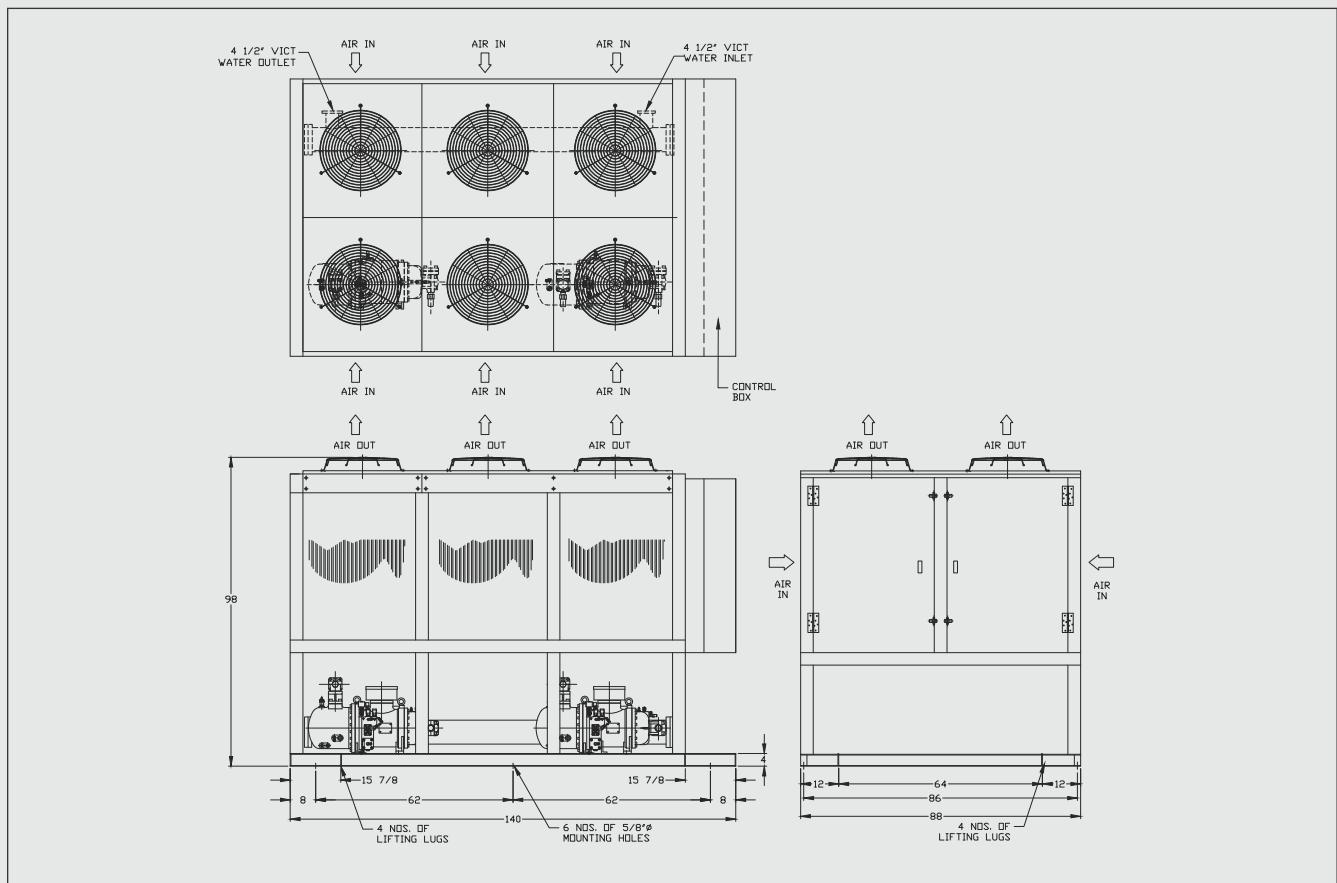


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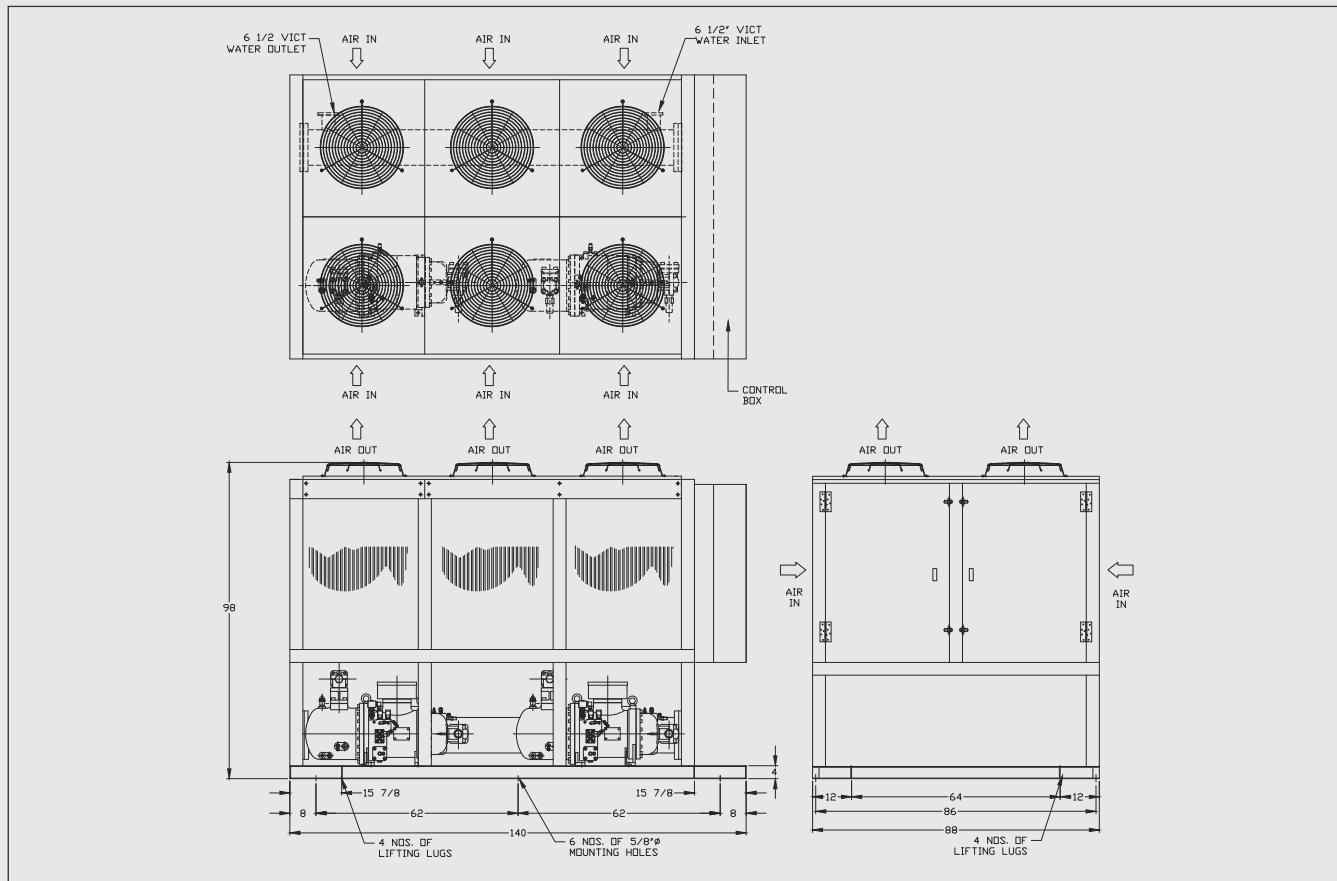
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## DIMENSION DATA

### SSCD 60-6 AR7



### SSCD 80-6 AR7

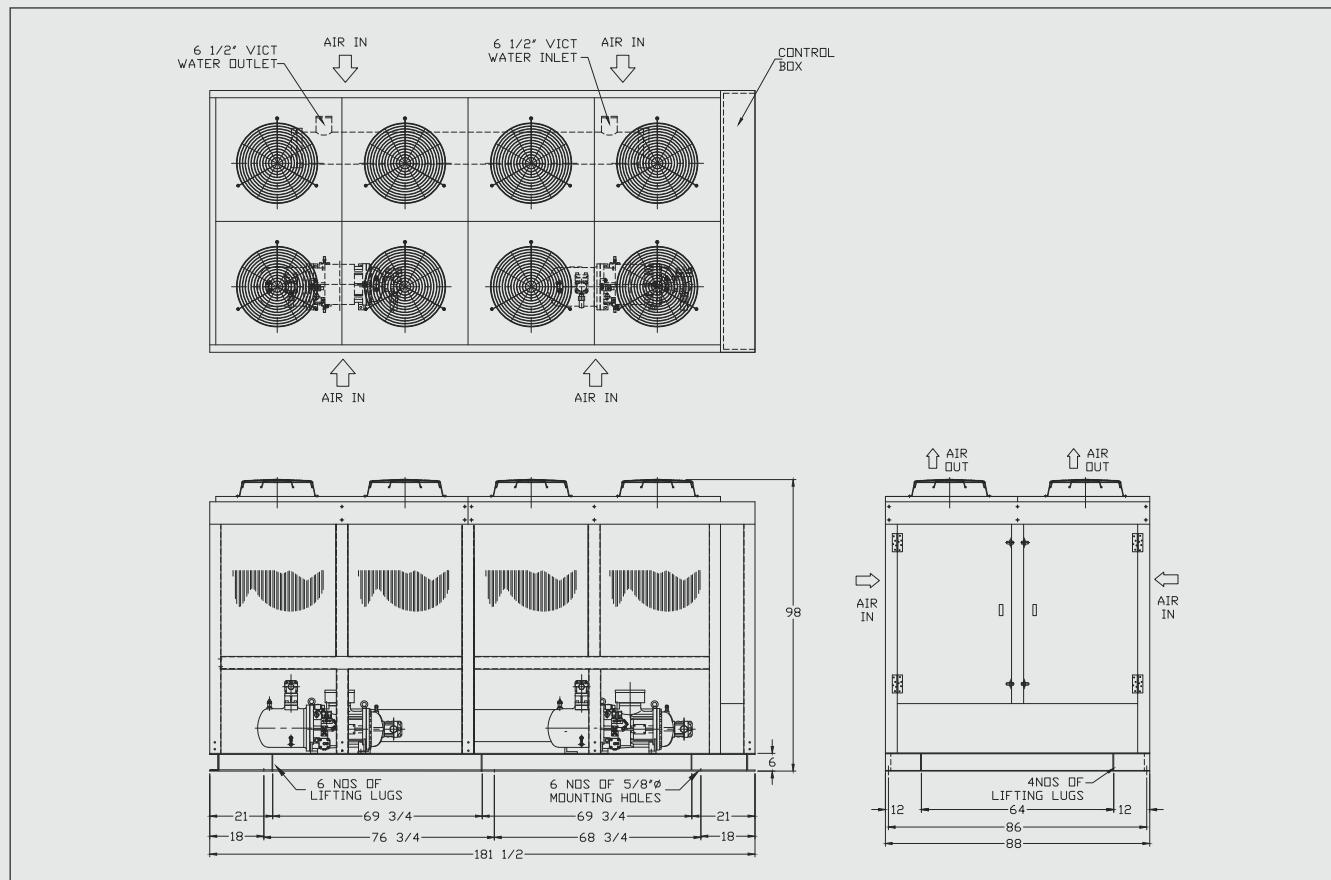


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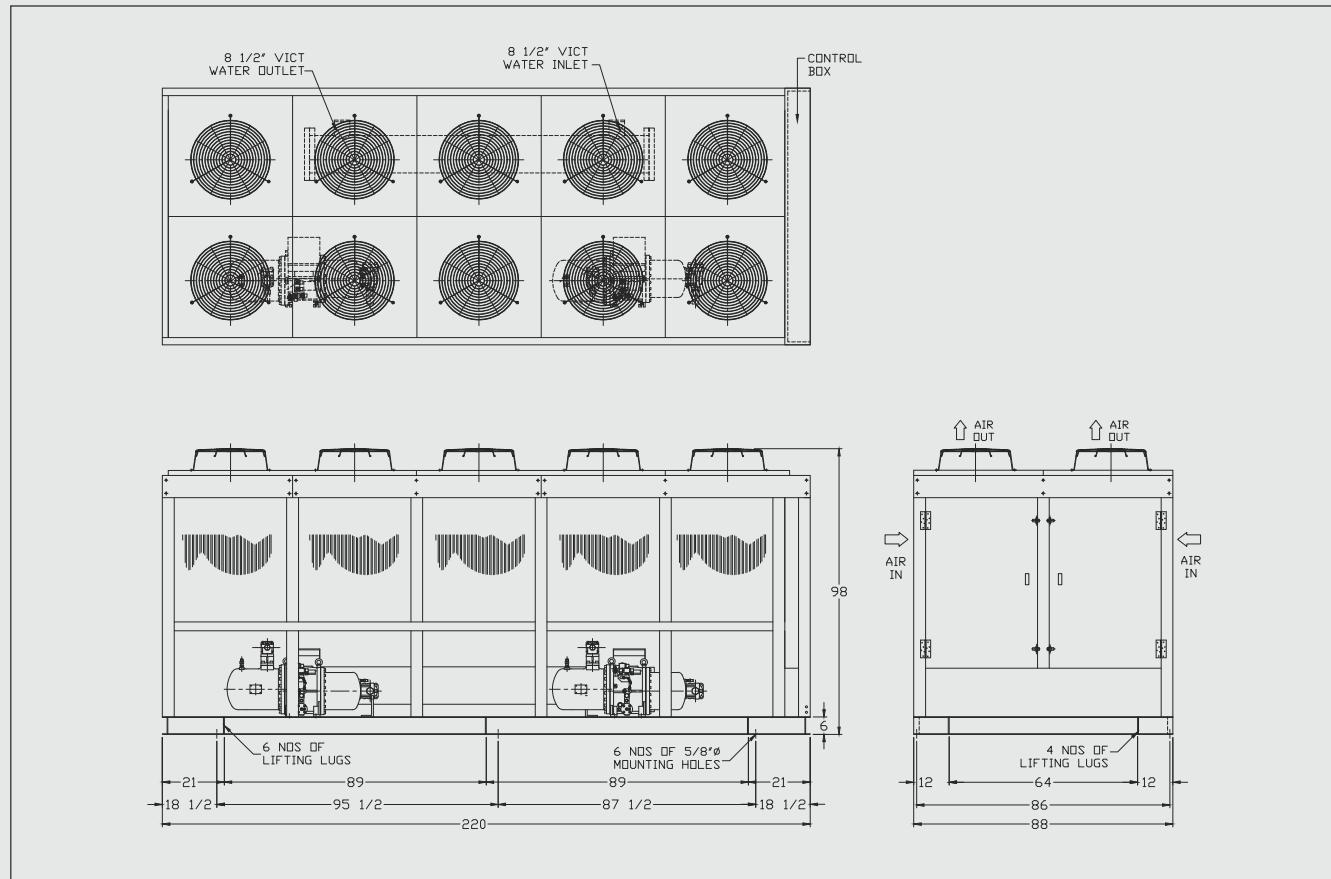
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## DIMENSION DATA

### SCSD100-6 AR7



### SSCD120-6 AR7

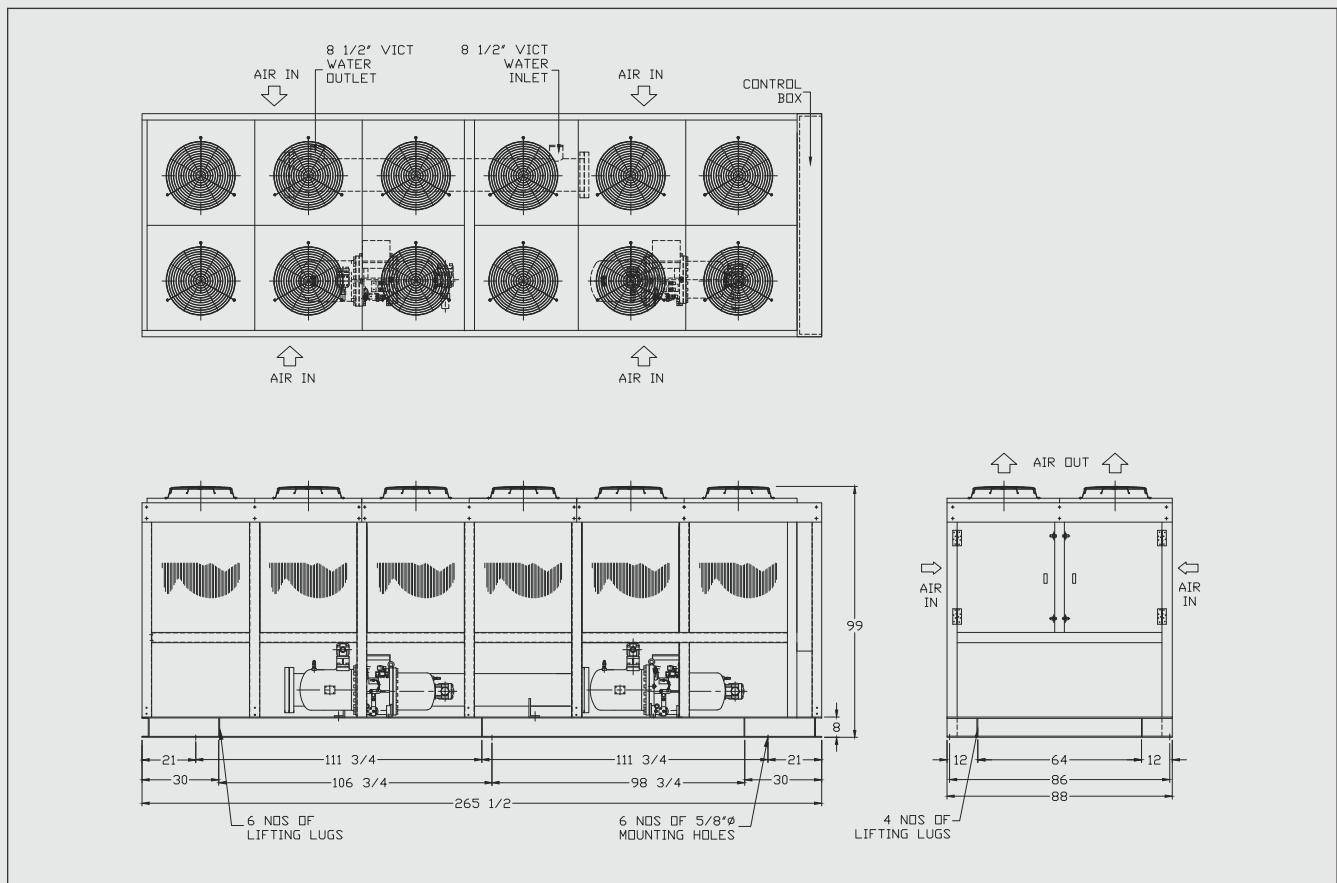


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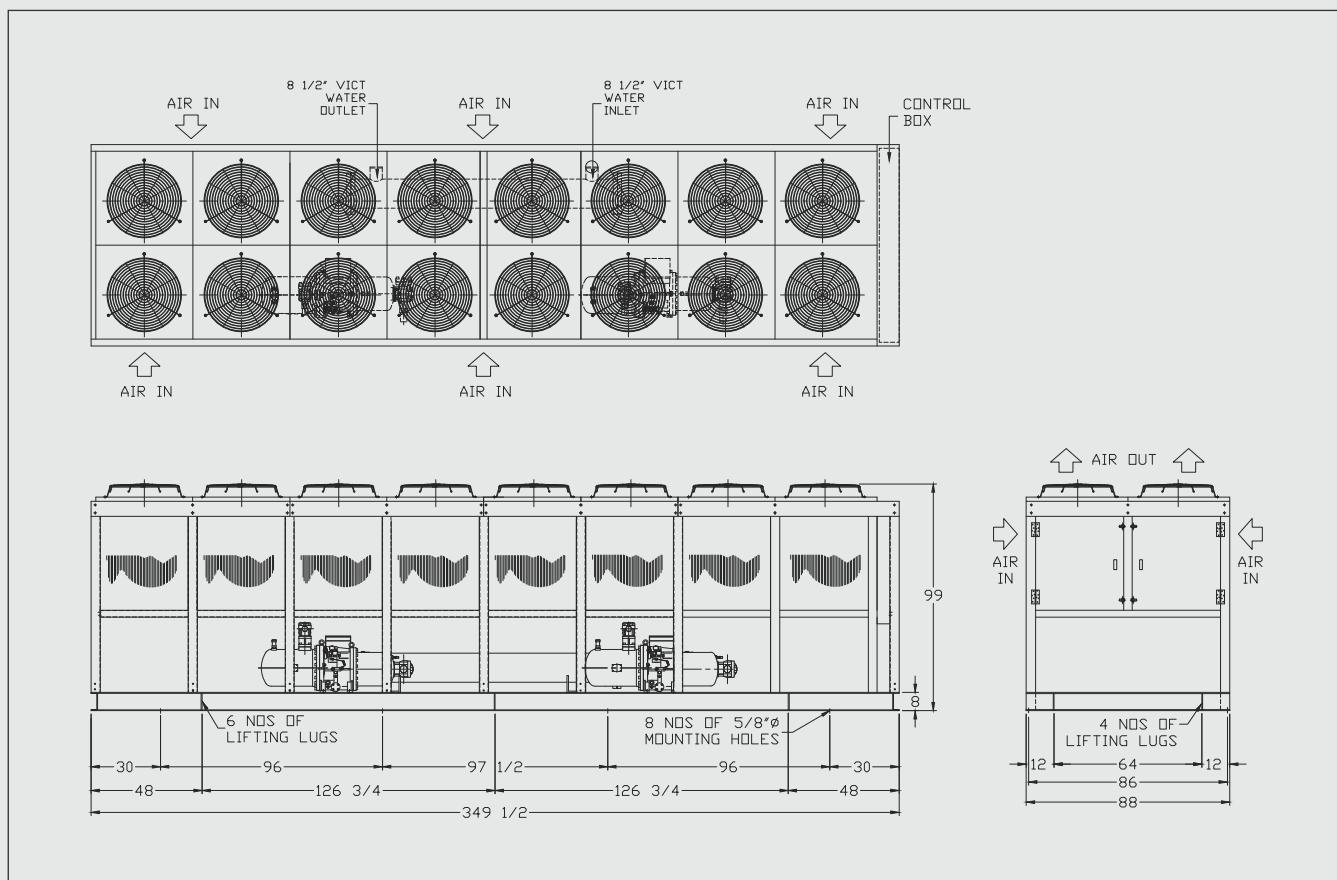
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## DIMENSION DATA

### SSCD 150-6 AR7



### SSCD 200-6 AR7

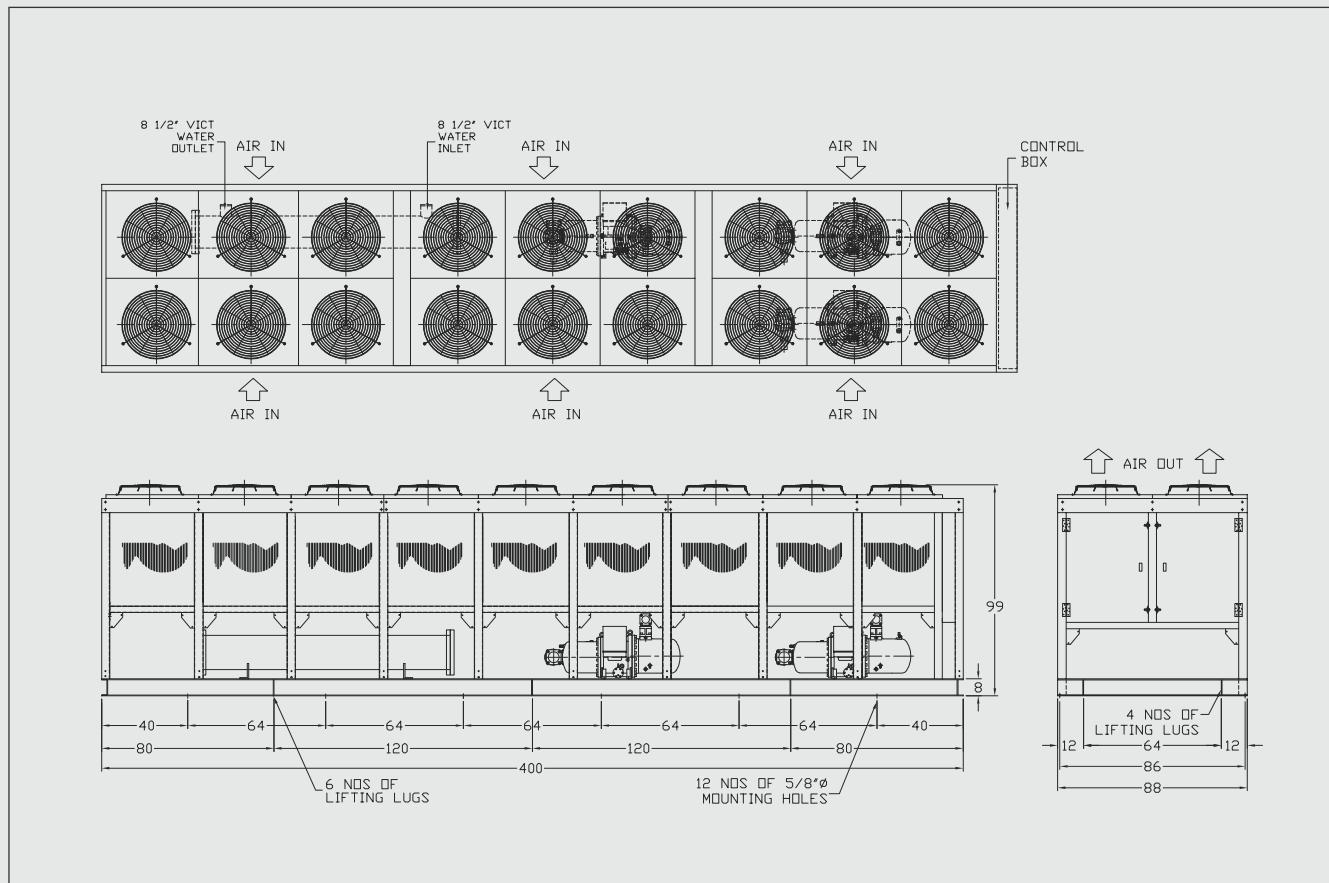


Note: All dimensions are in inches.

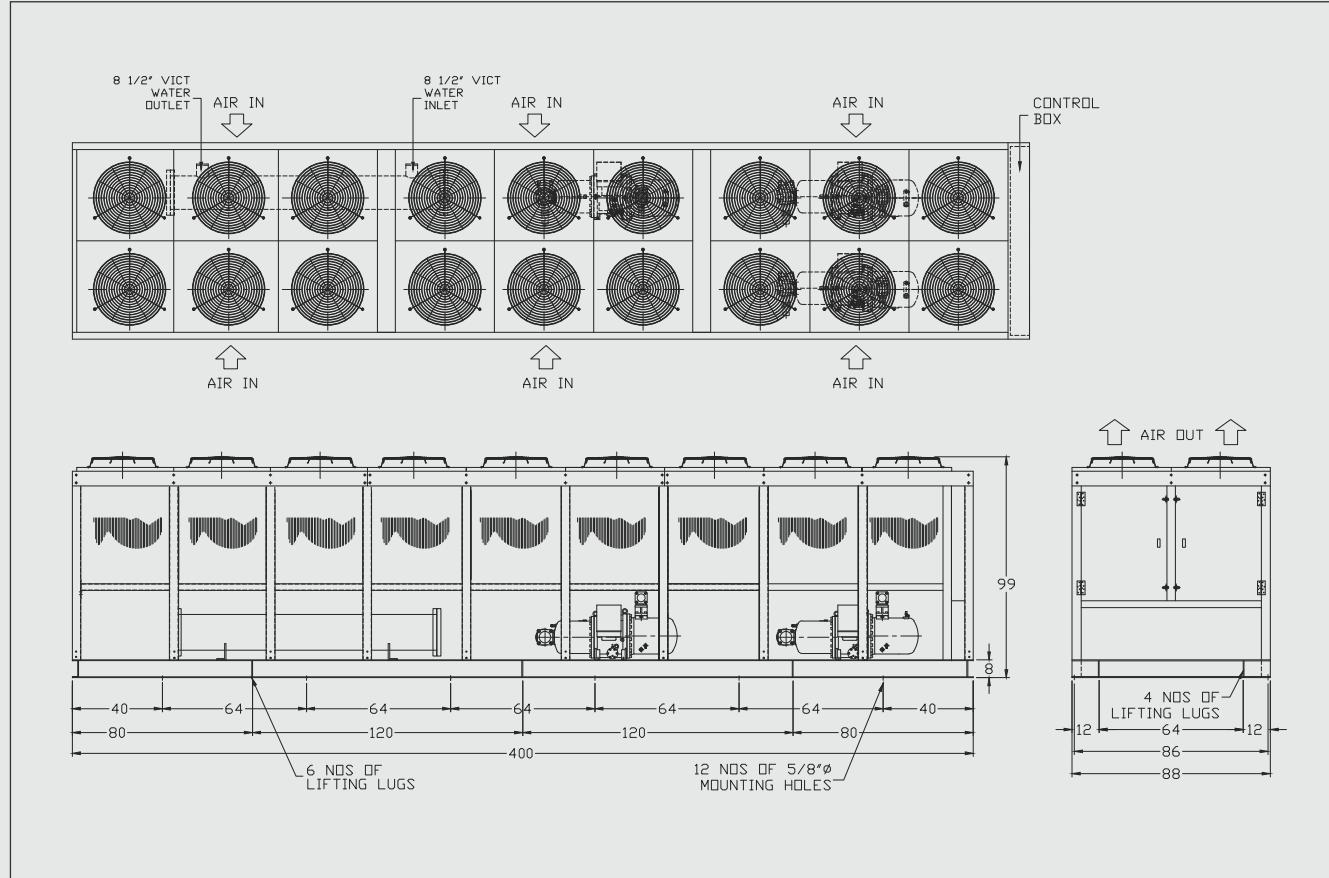
All dimensions tolerance  $\pm 1/2"$ .

## DIMENSION DATA

### SSCD 250-6 AR7



### SSCD 300-6 AR7



Note: All dimensions are in inches.

All dimensions tolerance  $\pm 1/2"$ .





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

No.15D, Jalan PJS 1/27, (Jalan Petaling Utama 6), Petaling Utama, Batu 7,  
Off Jalan Klang Lama, 46000 Petaling Jaya, Selangor.  
T: 603-7781 9818 / 7781 8181 F: 603-7783 9181  
W: [www.smart-hvac.com.my](http://www.smart-hvac.com.my)

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