

# **MULTISTACK**<sup>®</sup>

Originators. Innovators. Never the Imitators.



## **Air-Cooled Stand-Alone ASC Chillers 20 thru 195 Tons**

**ASC020X, 021X, 025X, 026X, 030X, 031X, 035X,  
036X, 040X, 041X, 050X, 060X, 065X, 075X,  
080X, 090X, 095X, 100X, 105X, 120X, 135X,  
150X, 155X, 165X, 185X, 195X**

# Multistack Air-Cooled Stand-Alone Chillers

Multistack, the inventor and world leader in modular chiller systems, introduces a full line of efficient, reliable and innovative ASC air-cooled stand-alone chillers available in 20 to 195 tons capacity.

- Dual refrigeration circuits with R-410A refrigerant and one, two or three scroll compressors provide excellent load flexibility, reliability, redundancy and serviceability.
- Compact footprint.
- Fixed speed, low sound condenser fans standard. ECM fans optional. Fan sizes tailored to specific circuit requirements.
- Coils designed for customers' specific needs with numerous coating options.
- Latest c.PCO controller technology from Carel:
  - On-board WiFi
  - USB 2.0 port for PC connection
  - Local and remote connectivity
  - Multitask operating system
- Low ambient option to -20 F.
- Sound pressure levels range from 64 to 78 total dBA at 30 feet. Low sound options to include compressor covers, discharge attenuators and louvers. Contact Multistack for more information.
- 120 VAC convenience outlet.
- Options to include (on select sizes) desuperheaters, pumps, expansion tank, glycol feeders and adiabatic media kits.
- Optional variable speed compressors (future release).
- Optional hot gas bypass.



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# Multistack ASC Controls

Multistack ASC chillers use the latest c.PCO controller technology from Carel.

Features include:

- Two built-in Ethernet interfaces for high speed local and remote connectivity.
- Local connectivity through open standard protocols.
  - Local Web interface
  - Tablet and smart phone connectivity
- Centralized data collection.
  - Chart creation for confirming system performance
  - On-board data logger
- Secure connectivity.
  - Compliant with international standards

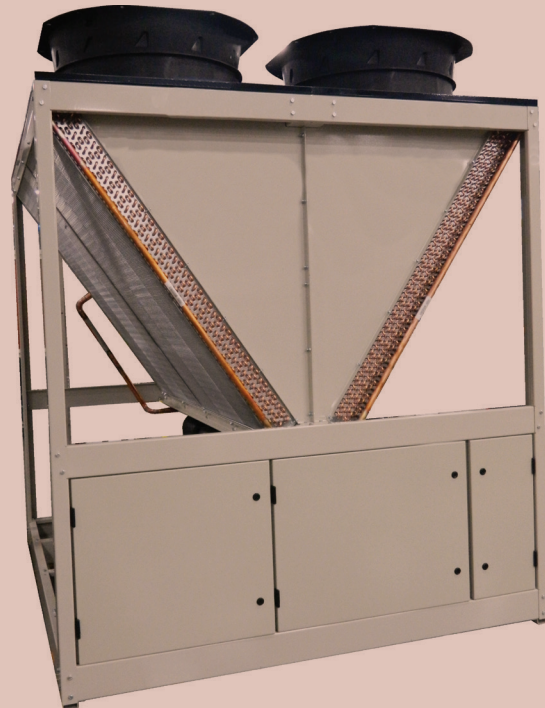


First ever Multistack controller to offer a standard WiFi interface.

- Provides tablet, smart-phone or PC connection using common Web browsers

Optional BAS control available.

- BACNet IP
- BACNet MS/TP
- LON Works



General Data

General Data *													
ASC	020X	021X	025X	026X	030X	031X	035X	036X	040X	041X	050X	060X	065X
Compressor Type: Scroll													
Compressor Quantity/Total Nominal Tons Capacity	2/20	4/19	2/25	4/26	2/29	4/33	2/33	4/36	2/37	4/39	4/48	4/57	6/64
Evaporator Type: Brazed Plate													
Evaporator Water Volume Gallons	2	2	4	4	4	4	4	4	4	4	6	8	8
Condenser Fans													
Fan Quantity Total CFM	2 19,000	2 19,000	2 21,500	3 24,000	2 24,000	4 29,000	3 28,500	4 31,500	4 33,000	4 34,000	4 38,000	4 44,000	4 50,000
Refrigerant: R-410A													
Total Operating Weight (Lbs.)	2,235	2,350	2,425	2,655	2,565	2,910	2,870	3,010	3,105	3,035	4,435	4,745	5,015
Total Shipping Weight (Lbs.)	2,215	2,330	2,395	2,625	2,535	2,880	2,835	2,975	3,070	3,000	4,380	4,680	4,950

General Data*													
ASC	075X	080X	090X	095X	100X	105X	120X	135X	150X	155X	165X	185X	195X
Compressor Type: Scroll													
Compressor Quantity/Total Nominal Tons Capacity	6/73	4/79	6/86	5/90	4/93	4/107	4/120	4/135	6/140	4/149	5/165	6/181	6/198
Evaporator Type: Brazed Plate													
Evaporator Water Volume Gallons	9	9	9	10	10	14	14	14	16	16	18	18	18
Condenser Fans													
Fan Quantity Total CFM	4 54,000	6 65,000	6 70,000	6 72,000	6 74,000	8 86,000	8 92,000	10 122,000	10 108,000	10 118,000	12 135,000	12 138,000	12 156,000
Refrigerant R-410A													
Total Operating Weight (Lbs.)	5,120	6,560	6,345	6,585	6,780	7,990	8,550	9,235	10,305	10,110	11,295	12,250	12,430
Total Shipping Weight (Lbs.)	5,045	6,485	6,270	6,500	6,695	7,870	8,430	9,115	10,170	9,975	11,145	12,100	12,280

\* Tables apply to standard ASC units with aluminum fins only. For unit weights with copper-fin coils and options such as pumps and ECM condenser fans, consult with a Multistack representative.

Multistack has a policy of continual improvement and reserves the right to change product design, literature and specifications without notice.

**Minimum Circuit Ampacity****Maximum Overcurrent Protection Specifications****Fuse and Wire Sizing**

Use these tables to determine MCA (Minimum Circuit Ampacity), MOP (Maximum Overcurrent Protection), wire sizing and fuse sizing for each ASC chiller.

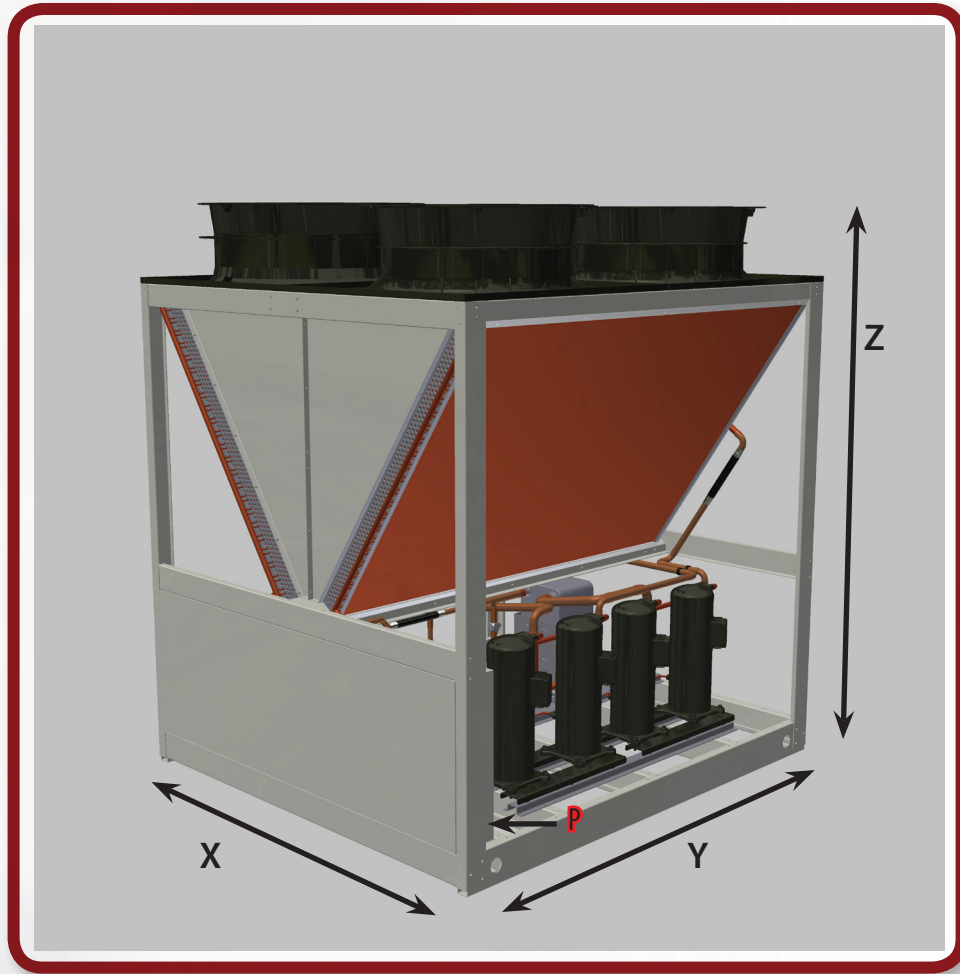
- Standard ASC units only. For units with optional pumps and ECM condenser fans, consult with a Multistack representative.
- Use Type RK5 fuses.
- Wire sizing is based on National Electric Code (NEC) rating for 75<sup>0</sup> C copper wire with three wires per conduit. Applicable codes may require different wire sizing.
- Wiring distance from branch circuit shall not exceed 100 feet.

**MCA and MOP Information**

MODEL	NO. of COMPRESSORS	MCA/MOP (AMPS)			
		208/3/60	230/3/60	460/3/60	575/3/60
ASC020X	2	83/125	73/110	41/60	31/45
ASC021X	4	82/100	73/90	37/45	30/40
ASC025X	2	113/175	100/150	53/80	43/70
ASC026X	2	113/150	100/125	53/70	41/60
ASC030X	2	138/200	122/175	63/90	52/80
ASC031X	4	142/175	125/150	68/90	52/70
ASC035X	2	158/225	140/200	70/100	57/80
ASC036X	4	157/200	137/175	76/100	58/70
ASC040X	2	169/250	150/225	74/110	59/90
ASC041X	4	171/225	149/200	83/100	65/80
ASC050X	4	213/300	188/250	100/125	80/100
ASC060X	4	263/350	232/300	120/150	98/125
ASC065X	6	278/350	245/300	119/150	100/125
ASC075X	6	310/400	274/350	137/175	120/150
ASC080X	4	345/450	304/400	152/200	122/150
ASC090X	6	387/450	341/400	176/200	144/175
ASC095X	5	387/500	342/450	176/225	142/175
ASC100X	4	382/500	337/450	172/225	138/175
ASC105X	2	451/600	396/500	204/250	163/200
ASC120X	4	495/600	436/600	224/300	180/225
ASC135X	4	575/800	506/700	259/350	209/300
ASC150X	6	572/700	504/600	258/300	207/250
ASC155X	4	629/800	555/700	282/350	228/300
ASC165X	5	692/800	609/800	312/400	251/300
ASC185X	6	730/900	643/800	330/400	265/350
ASC195X	6	900/1000	796/900	403/500	325/400

**Wire and Conduit Requirements**

MCA	3 Conductor 1 Conduit	6 Conductor 2 Conduit	9 Conductor 3 Conduit
50	#8 AWG	–	
65	#6 AWG	–	
85	#4 AWG	–	
100	#3 AWG	–	
115	#2 AWG	–	
130	#1 AWG	–	
150	#1/0 AWG	–	
175	#2/0 AWG	–	
200	#3/0 AWG	–	
230	#4/0 AWG	–	
255	250 MCM	–	
285	300 MCM		
310	–	#2/0 AWG	
335	–	#2/0 AWG	
380	–	#3/0 AWG	
460	–	#4/0 AWG	
510	–	250 MCM	
570	-	300 MCM	
620	-	350 MCM	
670	-	400 MCM	
760	-	-	250 MCM
840	-	-	300 MCM
855	-	-	300 MCM
930	-	-	350 MCM



**ASC 020 through 041 Units**

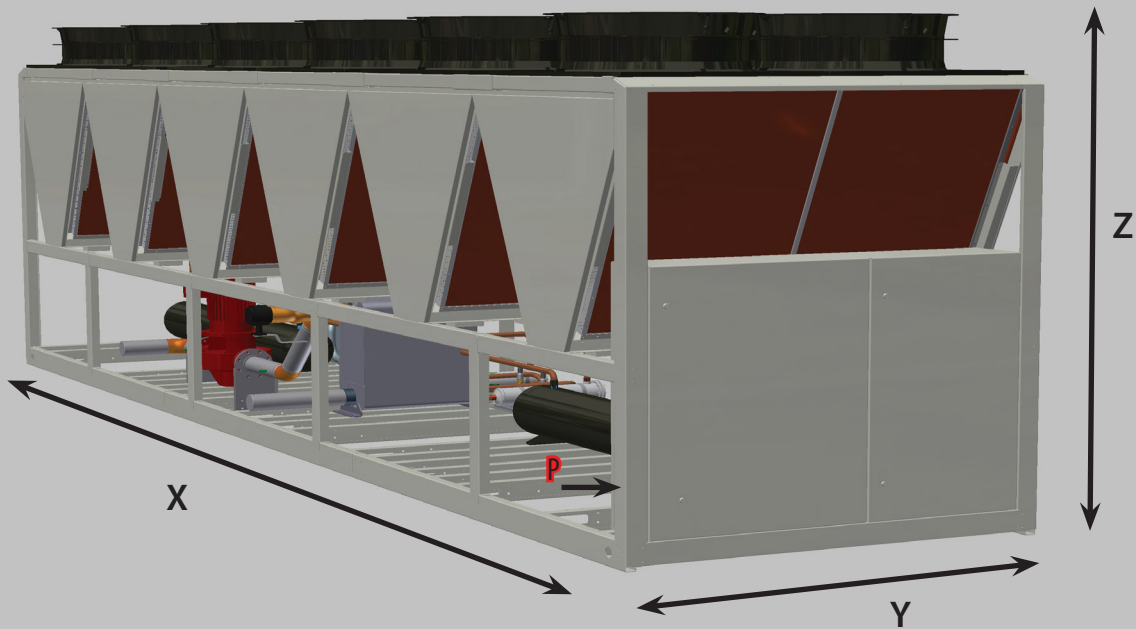
Unit	Dim X (In.)	Dim Y (In.)	Dim Z (In.)
020X	77	79	95
021X	77	79	95
025X	77	79	96
026X	77	79	96
030X	77	79	96
031X	77	79	95
035X	77	84	96
036X	77	84	96
040X	77	84	96
041X	77	84	96

**CLEARANCES**

- No obstructions above fans.
- 36-Inch perimeter required for airflow.
- 42-Inch recommended front clearance. See local and national electrical codes for electrical clearances.
- Multistack does not recommend pit installations.
- Refer to General Data Tables on Page 4 for shipping and operating weights.
- Consult Multistack Representative for options.

**POWER CONNECTION LOCATION**

Main power to the unit is through the panel as shown at **P** in drawing. Installer to drill appropriate hole for conduit at approximately 9-1/2 inches vertically and 6-1/2 inches horizontally.



### ASC 050 through 195 Units

Unit	Dim X (In.)	Dim Y (In.)	Dim Z (In.)
050X	115	79	112
060X	115	79	112
065X	115	79	112
075X	115	79	112
080X	115	79	112
090X	172	79	112
095X	172	79	112
100X	172	79	112
105X	172	79	112
120X	229	79	112
135X	229	79	112
150X	286	79	112
155X	286	79	112
165X	286	79	112
185X	343	79	112
195X	343	79	112

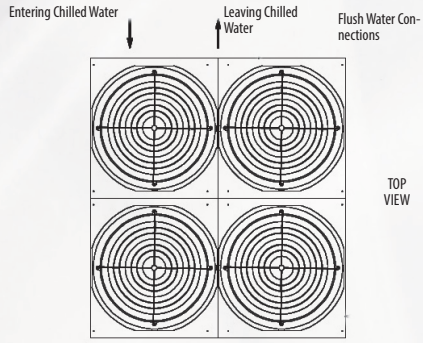
#### CLEARANCES

- No obstructions above fans.
- 60-Inch perimeter required for airflow.
- Multistack does not recommend pit installations.
- Refer to General Data Tables on Page 4 for shipping and operating weights.
- Consult Multistack Representative for options.

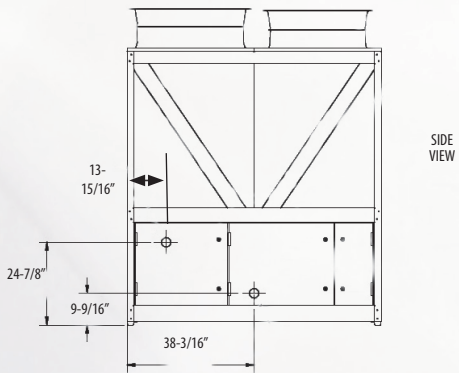
#### POWER CONNECTION LOCATION

Main power to the unit is through the panel as shown at **P** in drawing. Installer to drill appropriate hole for conduit at approximately 9-1/2 inches vertically and 6-1/2 inches horizontally.

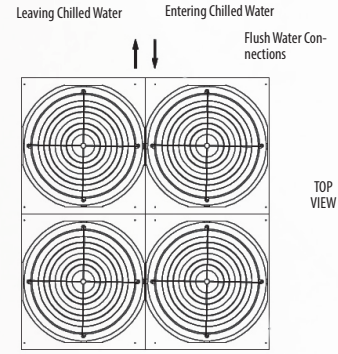
**Water Connections, ASC020X through 041X, Single Pump**



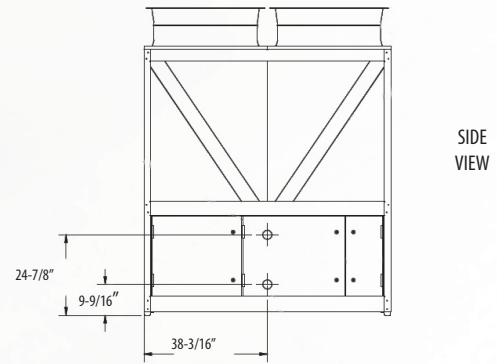
Water connections are 2-1/2" grooved on ASC 020X - 041X, on side opposite electric panels.



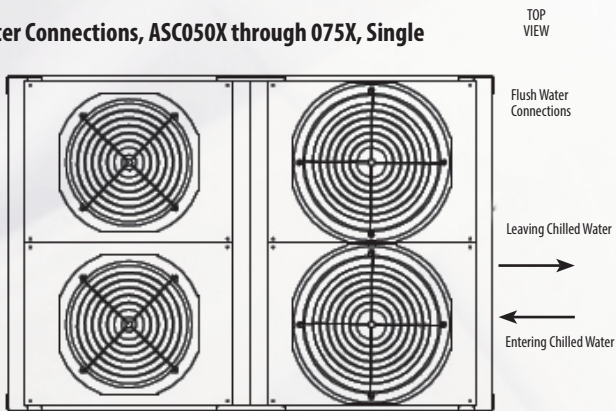
**Water Connections, ASC020X through 041X, No Pump**



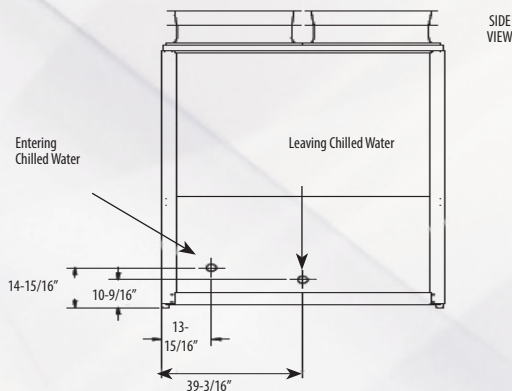
Water connections are 2-1/2" grooved on ASC 020X - 041X, on side opposite electric panels.



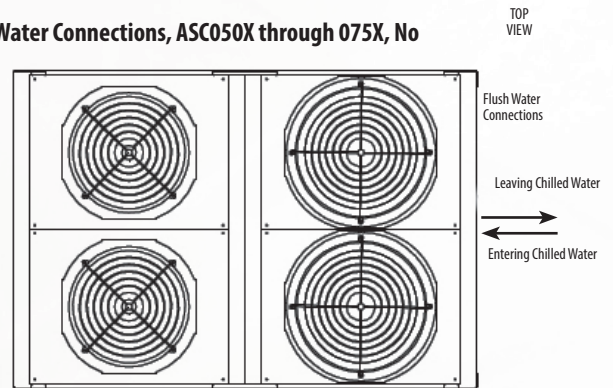
**Water Connections, ASC050X through 075X, Single**



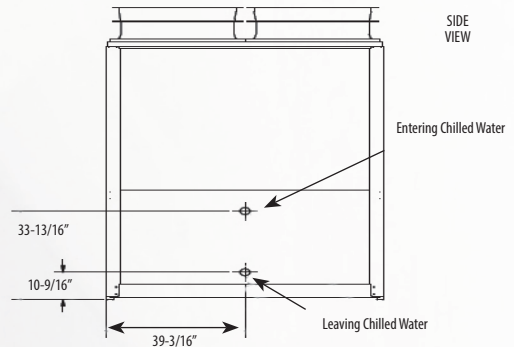
Water connections are 2-1/2" grooved on ASC 050X - 065X and 3" grooved on ASC075X, on side opposite electric panels.



**Water Connections, ASC050X through 075X, No**

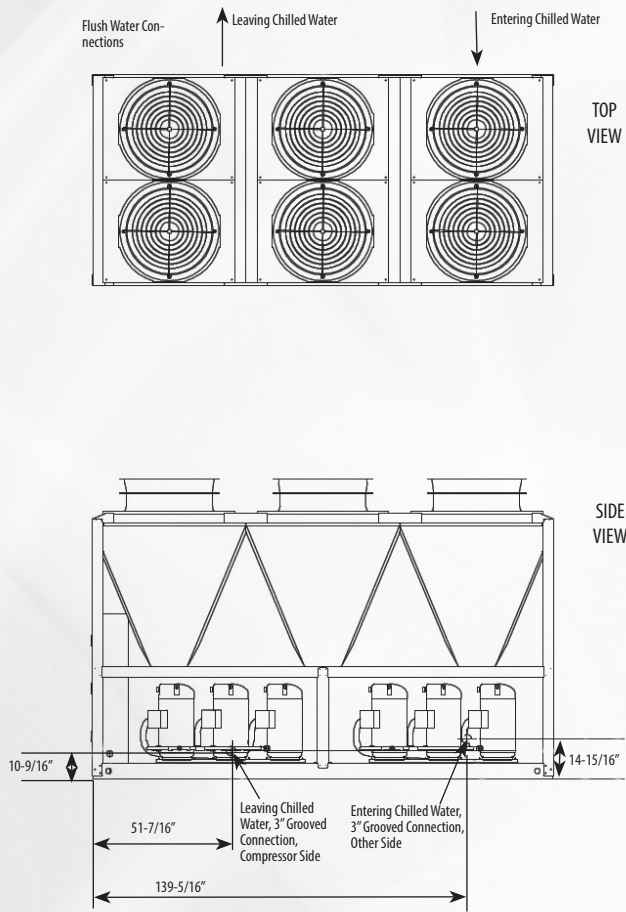


Water connections are 2-1/2" grooved on ASC 050X - 065X and 3" grooved on ASC075X, on side opposite electric panels.

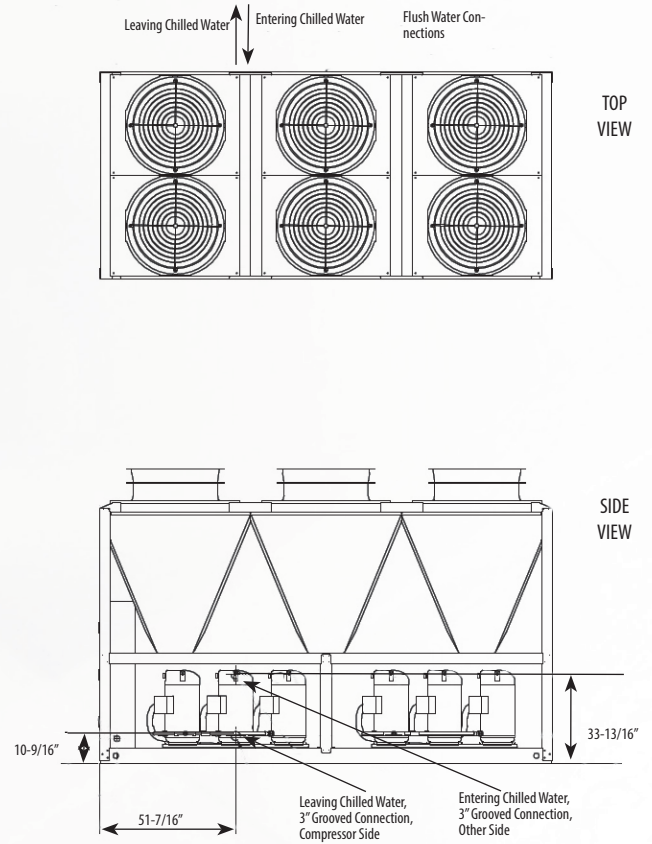




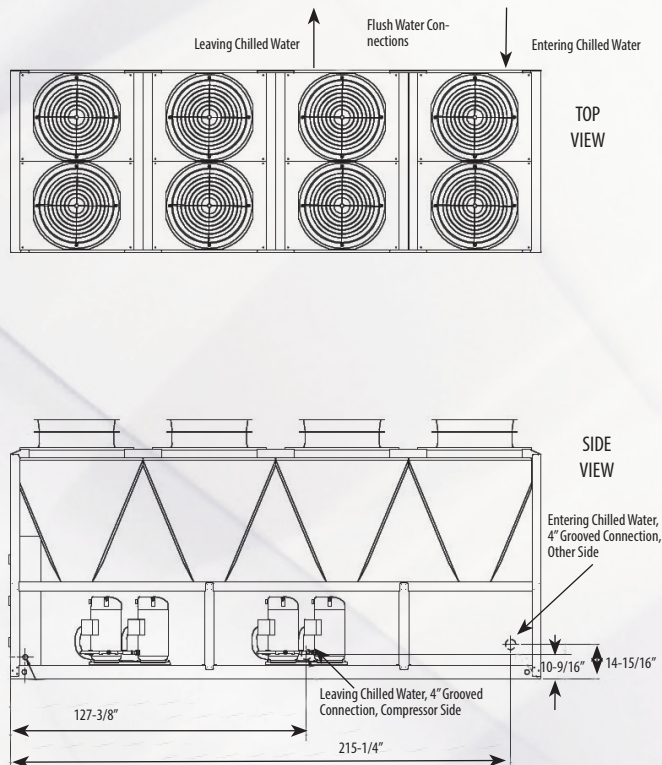
**Water Connections, ASC090X through 105X, Single**



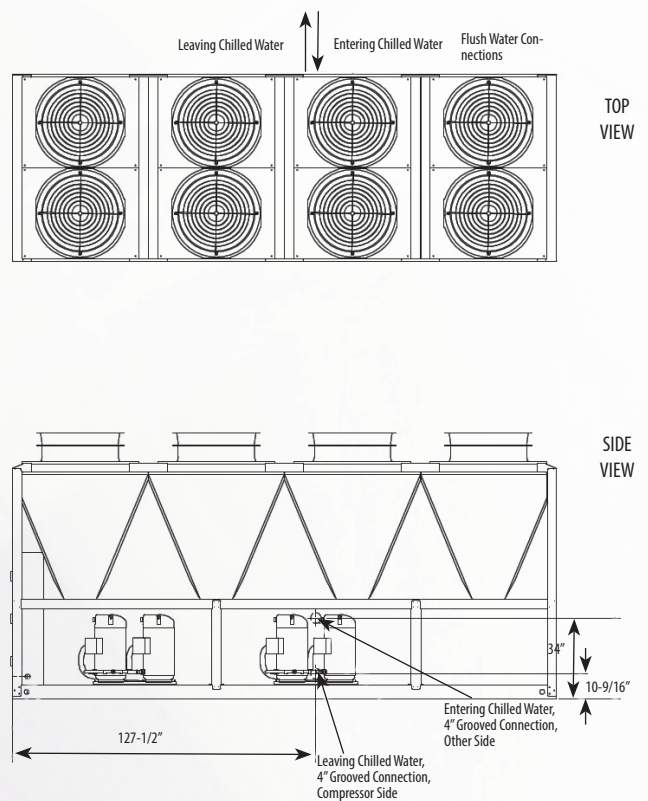
**Water Connections, ASC090X through 105X, No**



**Water Connections, ASC120X, 135X, Single Pump**



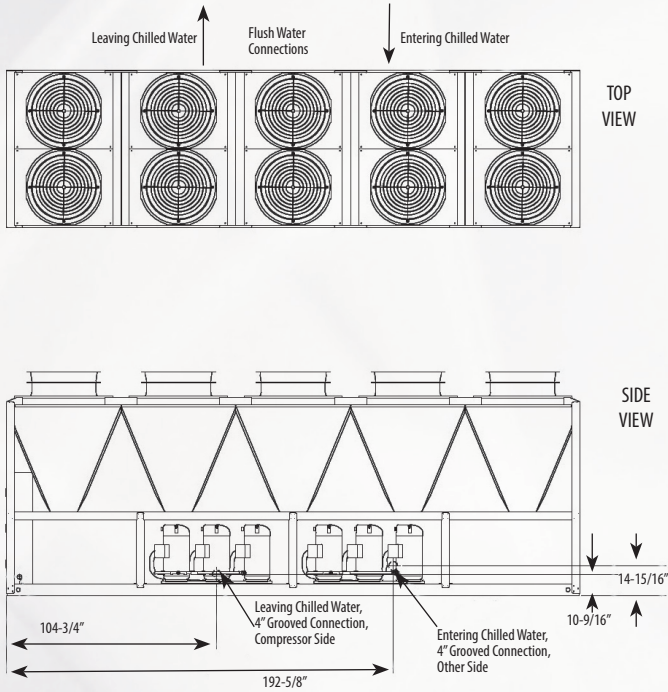
**Water Connections, ASC120X, 135X, No Pump**



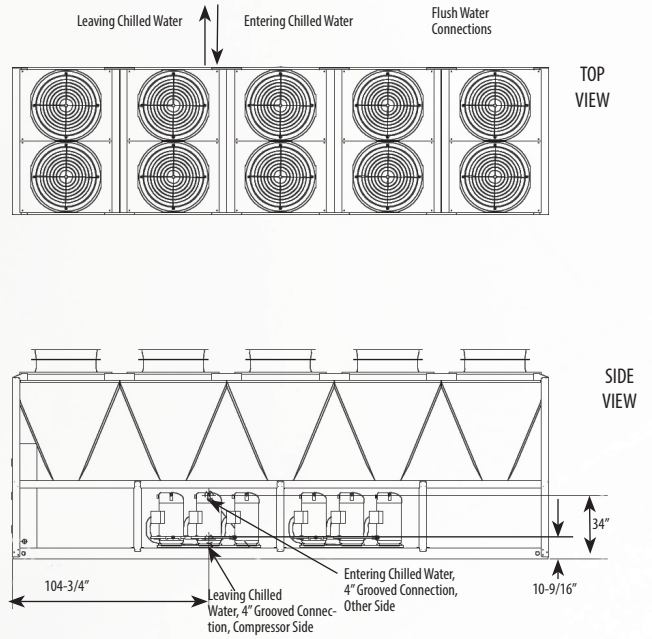
# Multistack ASC Chillers

## Water Connections

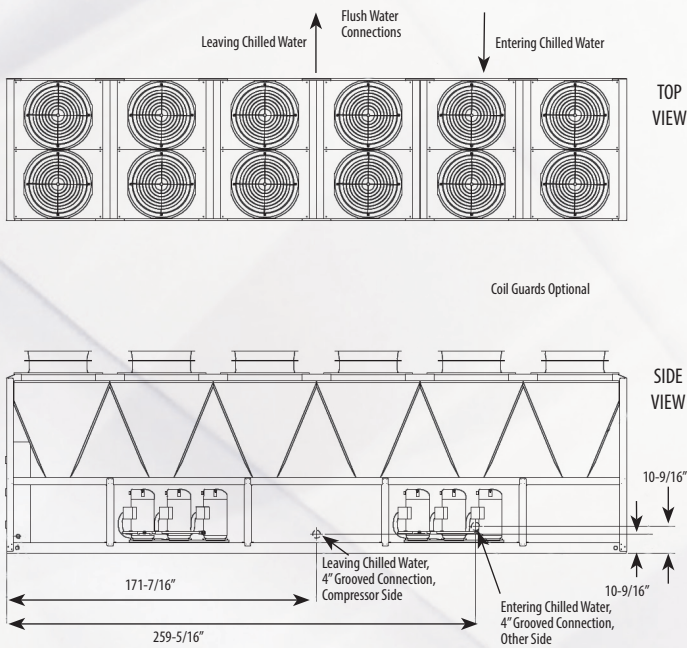
### Water Connections, ASC150X, 155X, 165X, Single



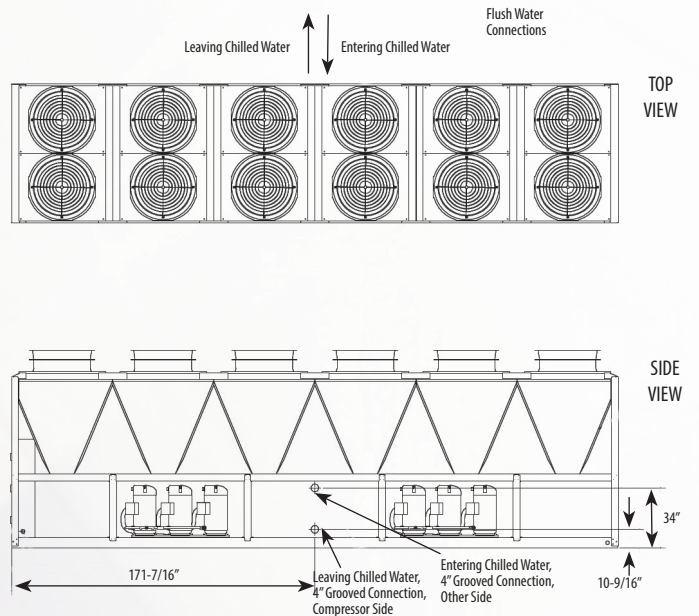
### Water Connections, ASC150X, 155X, 165X, No Pump



### Water Connections, ASC185X, 195X, Single Pump



### Water Connections, ASC185X, 195X, No Pump



**Water Quality, Treatment Specifications**

Multistack is not responsible for heat exchangers damaged due to untreated/poorly treated water.

**Water Specifications**

ph:	>7 and <9
Total Dissolved Solids (TDS):	Less than 1000 ppm
Hardness as CaCO <sub>3</sub> :	30 to 500 ppm
Alkalinity as CaCO <sub>3</sub> :	0 to 500 ppm
Chlorides:	< 200 ppm
Sulfates:	< 200 ppm

**Water Specifications with 25% Glycol**

ph:	>7 and <9
Total Dissolved Solids (TDS):	1000 - 10,000 ppm
Conductivity:	1000 - 15,000 ppm
Hardness as CaCO <sub>3</sub> :	30 to 500 ppm
Alkalinity as CaCO <sub>3</sub> :	>500 ppm
Chlorides:	< 200 ppm
Sulfates:	< 200 ppm

## Multistack Air-Cooled Packaged Chiller (ASC) Guide Specification 20 through 195 Nominal Tons Capacity

### Part 1 — General

#### 1.01 SYSTEM DESCRIPTION

Approved manufacturer is AIRSTACK or approved equal.

Note: There will be no deviation to system design or material choices. All manufacturers must comply with design criteria. Substitutions are not acceptable. In the event that submitted equipment is deemed non-compliant the contractor shall provide at no additional expense to the owner/client equipment that is compliant with specification.

Air-cooled liquid chiller for outdoor installation, having a microprocessor based controller and utilizing scroll compressors, low sound fans, tube and fin condenser, and electronic expansion valve.

#### 1.02 QUALITY ASSURANCE

A. Unit shall be rated in accordance with AHRI (Air Conditioning, Heating and Refrigeration Institute) Standard 550/590, latest edition (U.S.A.) and all units shall be ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) 90.1 compliant.

B. Unit construction shall comply with ASHRAE 15 Safety Code, UL (Underwriters Laboratories) latest edition, and ASME (American Society of Mechanical Engineers) where applicable codes.

C. Unit shall be full-load run tested at the factory.

#### 1.03 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled per unit manufacturer's recommendations.

### Part 2 — Products

#### 2.01 EQUIPMENT

A. General: Factory assembled, single-piece chassis, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-410A), and special features required prior to field start-up.

B. Materials of Construction:

1. Frame shall be of heavy-gage, galvanized steel (powder coated).

C. Condenser Fans:

1. Standard condenser fans shall be direct-driven, sickle shaped with profiled blades made of aluminum. Fans shall be statically and dynamically balanced with inherent corrosion resistance.
2. Fan shrouds shall be optimized full bell mouth with guide vane, motor suspension and short diffuser made from high performance composite material in black.
3. Air shall be discharged vertically upward.
4. Fans shall be protected by coated steel wire safety guards.

D. Compressor Assembly:

1. Fully hermetic, direct-drive, scroll type compressors.
2. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.
3. Compressors shall be mounted on rubber-in-shear vibration isolators.
4. Staging of compressors shall provide unloading capability.

E. Evaporator (brazed plate):

1. Evaporator shall be rated for a refrigerant working side pressure of 650 psig and 340 psig on the water side.

*Continued on Pg. 12.*

2. Shall be single-pass, ANSI (American National Standards Institute) type 316 stainless steel, brazed plate construction.
  3. Evaporator shall be insulated with 3/4-inch (19 mm) closed-cell, PVC foam with a maximum K factor of 0.28.
  4. Shall incorporate two (2) independent refrigerant circuits.
  5. All connections shall use standard grooved-type fittings.
- E. Evaporator (shell and tube):
1. Shell-and-tube type, direct expansion.
  2. Tubes shall be internally enhanced seamless-copper type rolled into tube sheets.
  3. Shall be equipped with grooved-type water connections.
  4. Shell shall be insulated with 3/4-inch (19-mm) PVC foam (closed-cell) with a maximum K factor of 0.28.
  5. Design shall incorporate a minimum of two (2) independent direct-expansion refrigerant circuits.
  6. Evaporator shall be tested and stamped in accordance with ASME Code for a refrigerant working side pressure of 445 psig. Evaporator shall have a maximum water-side pressure of 300 psig.
- F. Condenser:
1. Coil shall be constructed of seamless copper tubes mechanically bonded to aluminum fins. Fins shall have wavy enhancements. These condenser coils are recommended with remote cooler applications. These coils are not recommended for corrosive environments.
  2. Assembled condenser coils shall be leak tested and pressure tested at 656 psig.
- G. Refrigeration Components: Refrigerant circuit components shall include filter drier, moisture indicating sight glass, electronic expansion device, discharge and complete operating charge of both refrigerant R-410A and compressor oil.
- H. Controls, Safeties, and Diagnostics:
1. Unit controls shall include the following minimum components:
    - a. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
    - b. Separate terminal block for power and controls.
    - c. Control transformer to serve all controllers, relays, and control components.
    - d. ON/OFF control switch.
    - e. Replaceable solid-state controllers.
    - f. Pressure sensors shall be installed to measure suction and discharge pressure for each circuit. Thermistors shall be installed to measure the chiller entering and leaving fluid temperatures, outdoor ambient temperature, and suction temperature. Provide for field installation of accessory sensor to measure compressor return gas temperature.
  2. Unit controls shall include the following functions:
    - a. Automatic circuit lead/lag for dual circuit chillers.
    - b. Hermetic scroll compressors are maintenance free and protected by controls that minimize compressor wear.
    - c. Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return fluid temperature.
    - d. Leaving chilled fluid temperature is reset from return fluid and outside air temperature.
    - e. Chilled water pump start/stop control and primary/standby sequencing to ensure equal pump run time.
  3. Diagnostics:
    - a. The control panel shall include, as standard, a scrolling marquee display capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display.
    - b. Information included for display shall be:
      - 1) Compressor lockout.
      - 2) Loss of charge.
      - 3) Low fluid flow.
      - 4) Cooler freeze protection.
      - 5) Cooler set point.
      - 6) Chilled water reset parameters.
      - 7) Thermistor and transducer malfunction.
      - 8) Entering and leaving-fluid temperature.
      - 9) Compressor suction temperature.
      - 10) Evaporator and condenser pressure.
      - 11) System refrigerant temperatures.
      - 12) Chiller run hours.
      - 13) Compressor run hours.
      - 14) Compressor number of starts.
      - 15) Low superheat.
  4. Safeties:
    - a. Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protections:
      - 1) Loss of refrigerant charge.
      - 2) Reverse rotation.
      - 3) Low chilled fluid temperature.
      - 4) Thermal overload.
      - 5) High pressure.
      - 6) Electrical overload.
    - b. Factory pump motors shall have external over current protection.

**I. Electrical Requirements:**

1. Unit/module primary electrical power supply shall enter the unit at a single electrical box.
2. Unit shall operate on three-phase power at the voltage shown in the equipment schedule.
3. Control points shall be accessed through terminal block.
4. Unit shall be shipped with factory control and power wiring installed.

**J. Special Optional Features:**

1. Low-Ambient Operation: Unit shall be capable of starting and operating down to –20 F (–29 C) with the addition of the optional factory-installed low ambient kit. Also, adequate field-supplied antifreeze with suitable corrosion inhibitor protection shall be field-installed in evaporator circuit.
2. Unit-Mounted Non-Fused Disconnect: Unit shall be supplied with factory-installed, non-fused electrical disconnect for main power supply.
3. Optional Condenser Coil Materials:
  - a. Coil shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets. Galvanized steel tube sheets shall not be acceptable. A polymer strip shall prevent coil assembly from contacting sheet metal coil pan to minimize potential for galvanic corrosion between the coil and pan. All-copper construction shall provide protection in moderate coastal applications.
    - 1) Finned tube coils shall be protected with a pure phenolic thermosetting resinous coating. Metal preparation to provide a surface profile shall include degreasing and phosphatizing by immersion. The coating shall be applied in multiple coats by immersion. After each immersion, the coating shall be partially cured in an oven. Following the final immersion and the application of one (1) spray coat, the coating shall be totally cured in an oven. The total D.F.T. of the coating shall be approximately 2 mils, thereby providing good protection without adversely affecting heat transfer. D.F.T. varies depending upon fin spacing and the number of tube rows in depth. The coating shall withstand dry heat up to 205°C. (400°F.), and show no sign of attack after 5,000 hours of salt spray test to A.S.T.M. Specification B117. The coating shall be Heresite P-413C baking phenolic with plasticizer or approved equal.
4. Hot Gas Bypass: Unit shall be equipped with factory installed, microprocessor-controlled, hot gas bypass that shall permit unit operation below the minimum standard step of capacity.
5. Security Grilles/Hail Guards: Unit shall be supplied with factory- or field-installed louvered, sheet metal panels securely fastened to the chiller to provide condenser coil protection against hail or other physical damage.
6. BACnet Communication Option: Shall provide pre-programmed factory-installed communication capability with a BACnet MS/TP network. No field programming shall be required.
7. BACnet/Modbus Translator Control: Unit shall be supplied with field-installed interface between chiller and a BACnet Local Area Network (LAN, i.e., MS/TP EIA-485). Field programming shall be required.
8. LON Translator control: Unit shall be supplied with field-installed interface between the chiller and a Local Operating Network (LON, i.e., LonWorks FT-10A ANSI/ EIA-709.1). Field programming shall be required.
9. Evaporator Heaters: Evaporator heaters shall provide protection from chiller freeze-up to –20 F (–29 C) 60 Hz and –15 F (–26 C) 50 Hz.
10. Ultra-Low Sound: Shall provide sound blankets around each compressor in conjunction with low-sound fans to provide significant chiller sound reduction.
11. ECM fan option. All fans on unit shall have ECM (Electronically Commutated Motor) fan motors with integral variable speed drives to provide greater part load efficiency and reduced acoustic levels.
12. High SCCR (Short Circuit Current Rating): Optional high SCCR (Short Circuit Current Rating) device shall allow the chiller to clear a fault from 10kA (all voltages) up to 65 kA (208 thru 460 Volts, 3-phase, 50-60 Hz) or up to 25 kA (575 Volts, 3-phse/60Hz) without extensive damage to electrical components in the circuit. The high SCCR option shall provide a greater level of protection than the standard unit and shall be compliant with SCCR-related code.
13. Low Sound Compressor Blankets: Accessory low sound compressor blankets shall reduce unit sound levels by providing an acoustic blanket on each compressor.
14. Flow switch: Unit to be supplied with a factory or field installed thermal dispersion flow switch.

**Multistack has a policy of continual improvement and reserves the right to change product design, literature and specifications without notice. Contact your Multistack representative for more information on this and other Multistack products. [info@multistack.com](mailto:info@multistack.com)**



## Originators...

Multistack invented the modular water chiller. It started with a radically simple idea: chiller modules that could be brought into the equipment room one at a time, through standard doorways and down elevators, to form a fully integrated chiller system. The idea launched a revolution and transformed Multistack into a leader in the commercial water-chiller industry.

## Innovators...

Multistack perfected the modular chiller and leads the industry in innovative and environmentally friendly modular solutions. Since founding in the late 1980s, Multistack has engineered, manufactured, and distributed an impressive array of modular air conditioning firsts: the first on-board strainer, the first modular automatic blow-down device, the first modular chiller for variable flow, the first modular chiller-heater (heat pump), the first modular heat-recovery chiller, the first modular air-to-water heat pump, the first modular chiller to utilize MagLev™ compressor technology, and the first modular chiller to utilize R-410A.

## Never the Imitators...

Multistack sets the standard in the industry for superior customer service, fast and on time shipment, superior product quality, and new product development. Our pioneering leadership in environmental issues is well documented. If you want the best, be sure to specify the original – Multistack®.



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