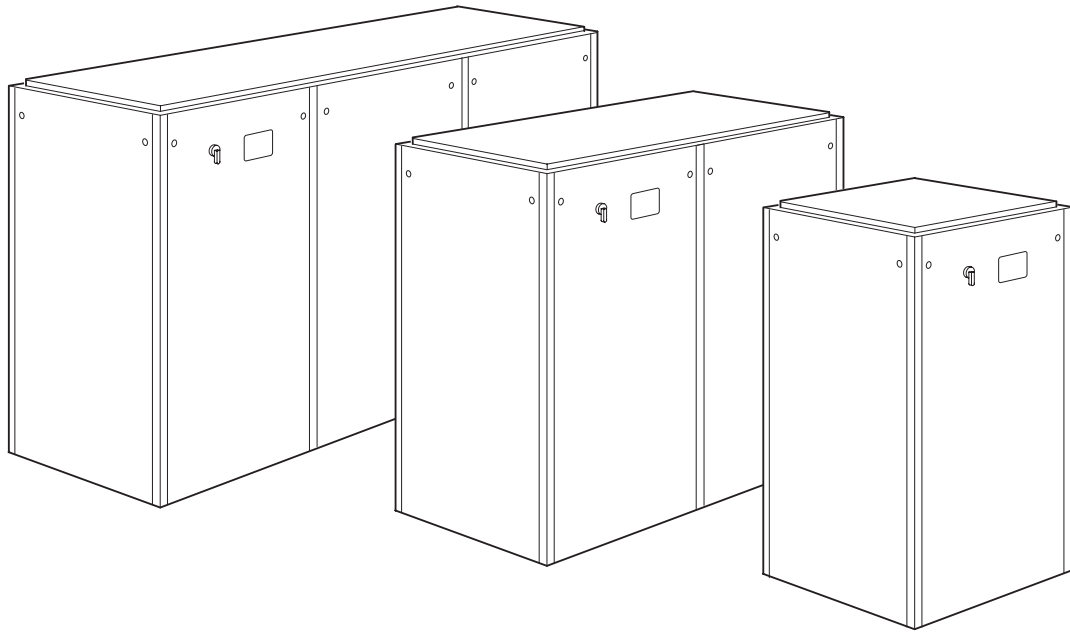




# NetworkAIR™ AFX Series

Precision Air-Conditioning Units—60 Hz



*Technical Data*

# Contents

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<b>Available Models</b> .....	<b>1</b>
Downflow	1
Upflow front-return	1
Upflow rear-return	1
Indoor rear-discharge centrifugal condenser	1
Indoor top-discharge centrifugal condenser	1
<b>Overview</b> .....	<b>3</b>
Introduction	3
Capacity	3
Air pattern	3
Control	3
Configuration	4
Front access	4
Humidity control	4
Compliance	4
<b>Model Selection</b> .....	<b>5</b>
<b>Standard Features</b> .....	<b>7</b>
Microprocessor controller	7
Overall cabinet	8
Blower assembly	9
Electrical panel	9
Humidifier	9
Electric reheat	9
Refrigeration system and compressor	9
Cooling coil	10
Condenser	10
Air filter	10
Water-regulating valves	10
Airflow sensor	10
Clogged filter alarm	10
Emergency drain pan	11
<b>Optional Features</b> .....	<b>13</b>
Emergency/environmental	13
External components	13
Control/monitoring	14
Reheat	15
System Components	15

**Performance Specifications . . . . . 17**

- Net cooling capacity—air/remote condensing 17
- Net cooling capacity—water 18
- Net cooling capacity—glycol 19

**Performance Data . . . . . 21**

- Air system 21
- Coolant requirements 21
- Pump system 21
- Water regulating valve—2-Way/3-Way, single seated 22
- Humidification—solid state electrode canister 22
- Filters 22
- Evaporator coil 22
- Compressor—scroll 22
- Electric Reheat 23
- Hot gas reheat 23
- Hot water reheat 23
- Steam reheat 23
- Drycooler 23
- Centrifugal indoor condenser 23
- Physical data 24
- Connection sizes 24

**Electrical Data . . . . . 25**

- Electric Reheat—6–14 ton 25
- Electric Reheat—18–28 ton 26
- Steam/hot water/or no-reheat—6–14 ton 27
- Steam/hot water/or no-reheat—18–28 ton 28
- Indoor centrifugal condenser units 29

**Guide Specifications . . . . . 31**

- General 31
- Product 31
- Individual systems 34
- Options 36

**Dimensional Data . . . . . 39**

- Downflow—6–8 ton 39
- Downflow—10–18 ton 40
- Downflow—20–28 ton 41
- Upflow front-return—6–8 ton 42
- Upflow front-return—10–18 ton 43
- Upflow front-return—20–28 ton 44
- Upflow rear-return—6–8 ton 45
- Upflow rear-return—10–18 ton 46

Upflow rear-return—20–28 ton	47
Indoor rear-discharge centrifugal condenser—6–8 ton	48
Indoor rear-discharge centrifugal condenser—10–18 ton	49
Indoor rear-discharge centrifugal condenser—20–28 ton	50
Indoor top-discharge centrifugal condenser—6–8 ton	51
Indoor top-discharge centrifugal condenser—10–18 ton	52
Indoor top-discharge centrifugal condenser—20–28 ton	53
<b>Air-Cooled Condensers and Drycoolers</b>	<b>55</b>
Key to the model number	55
Air-cooled condenser—physical data	56
Air-cooled condenser—electrical data	57
Single-fan air-cooled condenser—6 ton	58
Dual-fan air-cooled condenser—6–14 ton	59
Triple-fan air-cooled condenser—14–20 ton	60
Dual-fan air-cooled condenser—20–26 ton	61
Triple-fan air-cooled condenser—26–28 ton	62
<b>Drycooler</b>	<b>63</b>
Glycol cooled drycooler—physical data	63
Glycol cooled drycooler—electrical data	63
Dual-fan fluid cooler—6–8 ton	64
Triple-fan fluid cooler—10–12 ton	65
Dual-fan fluid cooler—14–18 ton	66
Triple-fan fluid cooler—20–28 ton	67
<b>Pump Specifications</b>	<b>69</b>
Pump performance	69
Pump electrical data	69
<b>Guidelines for Installation</b>	<b>71</b>
Room preparation	71
Unit location	71
Service access	71
Receiving the unit	71
Rigging	72
Floorstand	72
Utility connections	72
Power unit	72
Humidifier connections	72
Condensate drain	72
Water supply to humidifier	72
Water supply	73
<b>APC Worldwide Customer Support</b>	<b>75</b>

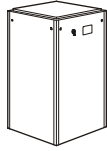


# Available Models

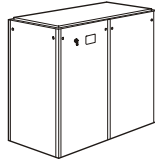
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## Downflow

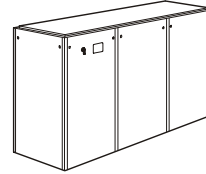
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6-8 ton



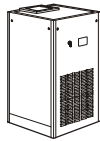
10-18 ton



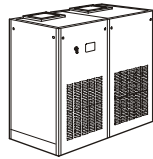
20-28 ton

## Upflow front-return

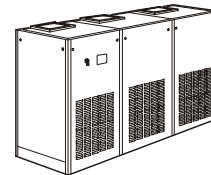
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6-8 ton



10-18 ton



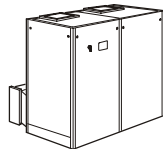
20-28 ton

## Upflow rear-return

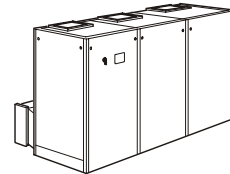
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6-8 ton



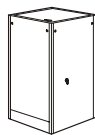
10-18 ton



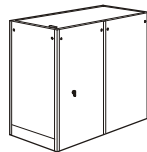
20-28 ton

## Indoor rear-discharge centrifugal condenser

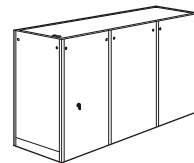
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6-8 ton



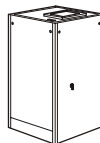
10-18 ton



20-28 ton

## Indoor top-discharge centrifugal condenser

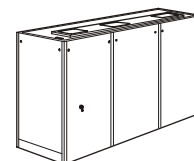
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6-8 ton



10-18 ton



20-28 ton



# Overview

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## Introduction

The APC AFX series precision air-conditioning system provides compact, quiet, efficient, and reliable system solutions in the expanding precision air-conditioning market. The AFX series is offered in a wide variety of capacities, configurations, and air patterns within an extremely compact cabinet size.

Precision environmental control requirements now reach far beyond the confines of the traditional data center or computer room to encompass a larger suite of applications, referred to as technology rooms.

Typical technology room applications included:

- Computer rooms
- Telecommunication facilities
- Clean rooms
- Power equipment
- Medical equipment rooms
- Archives
- LAN environments

A worldwide network of APC representatives is fully qualified to provide engineering, sales, installation and service for our products.

Our commitment to quality is demonstrated by the APC industry-leading two-year parts warranty.

## Capacity

Available are 6 through 28 nominal tons (20 kW–96 kW) in nine models and 3 cabinet designs.

## Air pattern

Downflow units discharge air into the raised floor plenum eliminating the need for air distributing ductwork. This enables the owner to locate the unit where space is available or relocate the unit as the room changes or expands. These units are suitable for areas with raised floors greater than 12" (305 mm) high. Air is drawn in through the top of the unit. Downflow units also include a static regain duct which increases performance and efficiency while reducing noise level.

Upflow units discharge air into either a plenum or ductwork. These units are suitable for areas with raised floors less than 12" (300 mm) high. Air is drawn in through the front on the standard design or optionally from the rear of the unit.

## Control

The microprocessor controller provides advanced integrated system operation and management ensuring simple, reliable and precise temperature and humidity control.



## Configuration

**Air-cooled.** Unit used with an air-cooled condenser. Refrigerant lines must be run between the indoor unit and the condenser. Air cooled units require low maintenance and have low operating costs.

Configurations are:

- Air-cooled with remote outdoor condenser.
- Air-cooled with indoor floor mounted condenser.

**Water-cooled.** Unit used with a cooling tower or other source of water. Field refrigeration piping is eliminated by a factory sealed and tested system. Water piping to and from the unit is required.

**Glycol-cooled.** Unit used with a drycooler. The need for field refrigeration piping is eliminated by a factory sealed and tested system. The glycol piping is sealed, eliminating costly water treatment often encountered with open cooling towers.

**Remote-condensing.** Unit used with a remote air-cooled condensing unit which includes the compressor(s). This allows key maintenance procedures to be located outside the critical environment helping eliminate access by maintenance personnel in high security areas.

## Front access

The AFX Series has full service front access for routine servicing of components. Front access also narrows the footprint of the unit making it possible for units to be placed side by side.

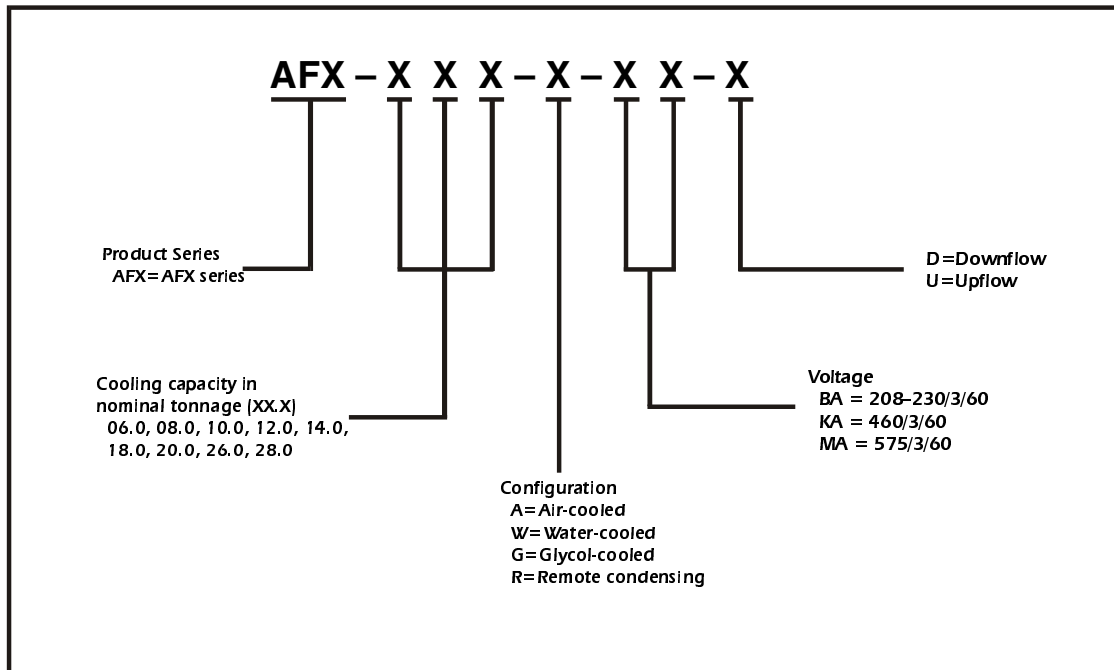
## Humidity control

Humidity is managed through a self-contained steam canister humidifier for maximum efficiency and ease of maintenance. Dehumidification control is assured with a split evaporator coil which decreases the humidity level without over-cooling the space, therefore reducing the need for electric reheat.

## Compliance

The AFX Series has received agency approvals by ETL and MEA#223-99-E. Electrical systems comply with NEC and UL 1995 standards.

# Model Selection





# Standard Features

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## Microprocessor controller

The microprocessor controller provides state of the art control for a wide variety of environmental applications including the demanding requirements of data centers, control rooms, clean rooms, switch rooms, MRI facilities, CAT scan facilities and UPS Rooms. Operator Interface is provided by the four-line, 80-character backlit LCD display. A user-friendly menu structure along with clearly defined prompts allow the operator to easily move about the program. Within the configuration menu the operator will find numerous selections allowing the AFX to be tailored to meet specific requirements.

**Status.** Complete status monitoring is provided within the status menu of the microprocessor controller.

Available information includes:

- Current temperature
- Current humidity
- Temperature setpoint
- Humidity setpoint
- Cooling status
- Heating status
- Humidification status
- Dehumidification status

**Alarms.** Quick access to any alarm condition is facilitated through the menu structure. The alarm key acts as a hot key, providing immediate access to the alarm display menu. Presence of a new alarm will sound the audible alarm. The red alarm LED on the display panel will remain illuminated until all alarms have been cleared. The temperature and humidity alarm setpoints are adjustable.

Alarm annunciations include:

- Loss of airflow
- Clogged filter
- High head pressure
- Low suction pressure
- High temperature
- Low temperature
- High humidity
- Low humidity

**Setpoints.** The microprocessor is provided with independent setpoints for:

- Heating
- Cooling
- Humidification
- Dehumidification

Automatic setpoint crossover protection will prevent the setting of the heat setpoint above the cool setpoint and the humidify setpoint above the dehumidify setpoint. Setpoint adjustment can be restricted to only operators with knowledge of the security codes set within the security menu structure.

**Configuration.** Flexibility is offered through the use of the configuration menu. Operating requirements are satisfied by changing the configuration settings. New configurations are stored in EEPROM and protected from unauthorized tampering by the four-digit security password, selected in the security menu.

Configuration options include:

- Fahrenheit or celsius display
- Alarm input polarity
- Compressor minimum on time
- Alarm enable
- Compressor minimum off time
- Temperature deadbands
- Power loss restart time delay
- Humidity deadbands
- Redundant unit grouping
- Small room delay

**Common alarm contact.** A common alarm relay is installed on every microprocessor. In the event of an alarm condition, the relay will change state. The user can select which alarms change the state of the relay. This feature allows for remote enunciation of alarm status.

**Run times.** The major components within the unit (motor, humidifier, and compressor) have independent run timers that monitor and store accumulated run hours on the components. The run timers are provided with operator adjustable run time alarms.

**Security.** Multiple security levels prevent unauthorized adjustment of important system parameters. The user may select a four-digit password for setpoint and configuration changes. Should the password be forgotten, APC can provide temporary access.

**Monitoring.** With the addition of a network communications card the microprocessor may interface with the locally installed APC remote monitoring and control system. Gateways are available for interfacing with building management systems. Please check with APC for compatibility with your building management system.

**Cool inhibit.** Prevents the unit from over-cooling during the dehumidification cycle. If the space temperature falls below a user adjustable setpoint, cooling will become inhibited until the space temperature returns to setpoint.

**Cool override.** A manual toggle switch will allow one compressor operation in the event of a microprocessor failure. The cool override can be field wired to a snap acting thermostat for cooling control.

**Remote shutdown.** Events external to the unit, such as activation of a fire suppression system may require the unit to shut down remotely. Additionally this feature may be tied into a BMS that would allow remote control of the units on/off status.

**Remote relay shutdown.** Remote shutdown of the NetworkAIR system can be done by a factory installed relay. The relay can be ordered with a 24, 120, or 240 volt coil. The relay must be powered by others to disable the NetworkAIR system.

## Overall cabinet

The frame is constructed of heavy gauge steel for maximum strength. Steel access panels are insulated for quieter operation. The unit has been designed for full service access from the front. The flush mounted panels are removable using convenient quarter-turn fasteners. The access doors for the electronic controller and electrical panel can be opened without interrupting the operation of the unit.

<b>Blower assembly</b>	The AFX series includes multiple, centrifugal blower assemblies that have been engineered for quiet, reliable operation. Lower blower speeds reduce noise and extend belt and bearing life to 200,000L <sub>10</sub> hours. Permanently lubricated bearings, a single-belt variable pitch drive, and an adjustable motor base all ensure dependable operation. In addition, the air return patterns evenly distribute air across the cooling coil.
<b>Electrical panel</b>	The electrical panel contains the contactors, starters, overload protection devices, and input power circuit breakers. Each wire (except jumpers) is numbered every 3" (80 mm), or color coded to facilitate circuit tracing when installing and servicing the unit. Each AC power circuit is individually circuit-braker protected on all three phases. All compressor and motor devices are thermally and short circuit protected. The electrical panel is easily accessible from the front of the unit, and its modular construction allows access to major components within the unit cabinet. An emergency cool override switch can be manually activated to initiate cooling and a field wired thermostat can be utilized to control cooling operation. All electrical components are UL-listed and-recognized and all wiring conforms to NFPA 70 (NEC) and UL 1995 requirements.
<b>Humidifier</b>	The humidifier utilizes a pure steam generator specifically designed for hi-tech area environmental control. The pure steam eliminates contaminating mineral deposits, potentially deadly bacteria, white dust and excessive humidity. The humidifier requires little or no scheduled maintenance. Automatic flushing combined with an indicator that signals when the canister is to be changed, ensure maintenance free operation.
<b>Electric reheat</b>	A three-phase electrical resistance heater sized to offset the sensible cooling capacity in the dehumidification mode is incorporated in each AFX series unit. The reheat elements are low watt density sheathed components. The reheat is three phase to provide even phase loading. Reheat elements are electrically and thermally protected.
<b>Refrigeration system and compressor</b>	The refrigeration system operates under an automatic microprocessor controller for greater efficiency and accuracy. The heavy-duty compressors are designed for year-round operation with a 15-year life expectancy. The performance of the refrigeration system is enhanced by use of Scroll Compressor Technology. Scroll compressors offer many advantages over older technology semi-hermetic compressors. Vibration in the system is greatly reduced by elimination of the reciprocating masses found in the semi-hermetic compressor. Risk of refrigeration leaks at compressor gaskets are eliminated with the scroll compressors fully welded hermetic shell. The design of the scroll is more tolerant to liquid flood back than the traditional reciprocating compressor. Power consumption at full load is greatly reduced with higher EER's of the scroll. In addition reliability is enhanced due to the fewer moving parts required using scroll technology. The end result is a refrigeration system that offers the user optimized performance, efficiency and reliability.

Each refrigeration system includes:

- Thermal expansion valve with equalizer
- High and low pressure switches
- Sight glass with moisture indicator
- Filter drier
- Liquid line solenoid valve

### **Cooling coil**

The AFX utilizes dual distributors on one circuit of the refrigeration system. During dehumidification the smaller distributor is turned off effectively reducing the active circuits of the evaporator coil. During this mode of operation the evaporating temperature is decreased, resulting in a lower coil surface temperature. This reduction of the coil temperature decreases the sensible heat ratio of the coil allowing a greater percentage of moisture removal. Additionally the warmer air leaving the inactive circuits of the evaporator coil blends with the near saturated air from the active circuits raising the dry bulb temperature of the blended air well above saturation.

### **Condenser**

Water-and glycol-cooled systems employ a brazed plate condenser that uses the latest heat transfer technology. Type 316L stainless plates are brazed together in a vacuum furnace and comply with ASME pressure vessel code. Pressure rating is 450 psi (3100 kPa).

### **Air filter**

The filtration of conditioned air is extremely vital to maintaining the clean, particle-free environment required by electrical equipment. The AFX Series uses 30% efficient (ASHRAE 52.1-92), 4" (102 mm) deep filters, with full depth filter pleats. In addition to high filtration properties, these filters produce a lower pressure drop than standard filters so less energy is required during normal operation. Filters are easily replaced from the top on downflow units and from the front on upflow units.

### **Water-regulating valves**

The water-and glycol-cooled systems maintain proper performance by sensing refrigerant discharge pressure and regulating the amount of water or glycol supplied to the condenser. Two-way and three-way valves are available. The standard valve pressure rating is 150 psi (1030 kPa).

### **Airflow sensor**

The air proving switch is continuously monitored by the microprocessor. Upon detection of a loss of air flow the microprocessor will deactivate: cooling, heating, humidification and dehumidification. After the air flow has been restored for a predetermined period of time the microprocessor will reactivate the functions as needed.

### **Clogged filter alarm**

An adjustable air pressure differential switch senses the pressure drop across the filters. Upon sensing an excessive pressure drop, the switch activates the alarm circuit of the microprocessor and displays a clogged filter message simultaneously with an audible signal.

## **Emergency drain pan**

Systems are provided with two drain pans. The primary stainless steel condensate drain pan lies directly under the cooling coil. A secondary emergency drain pan provides additional protection by catching any water before it reaches the subfloor and becomes a problem. An optional factory supplied water detector in the emergency drain pan functions as your early warning system in the event of any water problems. A threaded flange is factory supplied for secondary drain connections. *A secondary drain pan is not provided on bottom return or precool units.*





# Optional Features

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The following optional features are available on the AFX Series unless otherwise noted. Certain combinations of options may not be available.

## Emergency/ environmental

**Smoke detector(s).** The factory installed smoke detector(s) is designed to sense smoke concentration in the return air stream. Upon detecting smoke concentration an audible and visual alarm on the microprocessor will be activated and the unit will immediately shut-down.

**Firestat.** A Firestat is available for installation in the air stream. If the return air temperature reaches 125° F (52° C), the air conditioner will be turned off and both an audible and visual alarm will be activated on the microprocessor.

**Water detector(s).** The solid-state water detector(s) activates an audible and visual alarm on the microprocessor when moisture is detected. The water detector is provided with 15' (5 m) of wire. Multiple detectors can be used in the optional secondary drain pan in the sub floor.

**Essential/non-essential lockout.** When facilities have limited backup power capacity, this lockout prevents the operation of electrical loads that are not *essential* for continued site operation.

## External components

**Floorstand.** The heavy gauge floorstand raises the unit above the subfloor to match the height of the raised floor. Heights are available from 6" to 36" (12" to 36" for downflow units) in 3" increments and are adjustable +/- 1.5". Adjustment is provided by threaded pedestals. Vibration absorbing pads are included. The floorstand, pedestal and pads ship loose. Floorstands are available for seismic applications.

**Air deflector.** An air deflector ships loose and attaches to the floorstand for changing air direction from vertical to horizontal.

**Plenum.** The discharge plenum mounts on top of the upflow unit to direct and distribute conditioned air. Manually adjustable, double deflecting grilles are provided on 3 or 4 sides. Plenum shall be painted to match the color of the unit.

**Duct flange.** A 1" (25 mm) duct flange is installed on a unit to provide convenient connection to external ductwork. The duct flange can be installed at the air outlet on upflow units, or at the air inlet on downflow units.

## Control/monitoring

**Custom alarm dry contact closures.** Each unit can be equipped with any or all of the listed dry contact closures. Upon activation of the associated alarm, a discreet Normally Open or Normally Closed contact is available for remote monitoring of that discreet alarm.

- High Temperature Alarm
- Low Temperature Alarm
- High Humidity Alarm
- Low Humidity Alarm
- Compressor High Pressure Alarm
- Fan Status Alarm
- Change Filter Alarm
- Fire Alarm (with addition of optional firestat)
- Smoke Detector Alarm (with addition of optional smoke detector)
- Humidifier Change Canister Alarm
- Water Underfloor Alarm (with addition of water detector)
- Additional Common Alarm

**Redundant group control.** Allows up to six NetworkAIR units the ability to communicate with each other to automatically switch upon alarm condition, or timed rotation. Can also allow standby units the ability to assist the running system.

**Remote display panel.** The microprocessor controller allows facility or building-maintenance personnel to evaluate and control the unit from up to 50 ft. away from the unit, without having to enter the secured space.

**Remote sensor(s).** Environmental sensors can be strategically placed, up to 50 ft. from the unit to better meet the site's cooling needs. The sensor must be positioned to permit air movement across the sensors.

**Monitoring system.** A PC-based monitoring application which provides single terminal monitoring and control for up to 120 units. The Windows-based operated program (except Windows NT) has status screens for individual unit conditions, mode of operation and alarms. The system graphically presents temperature and relative humidity over time. Temperature, relative humidity, alarm history, and other readings are stored for future use.

**Environmental monitoring unit.** A stand-alone unit which performs continuous temperature and humidity sensing through two available probes (one included) and contact monitoring. The unit is controlled by available web, control console, or SNMP interface with network connection. In the event of an environmental anomaly, notification is sent to the customer via e-mail or SNMP. The unit is 18.25" × 9" × 2.75" (464 mm × 229 mm × 70 mm) and sits in or on top of a rack. The probes extend up to 12' (3.66 m) from the unit.

## Reheat

**Hot water or steam reheat.** An on/off solenoid valve for steam reheat, or a modulating valve for hot water reheat maintains the dry bulb temperature when the system is in dehumidification and heat mode. Completely factory pre-piped, the system includes a copper tube, aluminum-fin reheat coil, solenoid valve, float, and thermostatic and steam trap for steam reheat only.

**Hot gas reheat.** The copper tube, aluminum fin hot gas reheat coil maintains the leaving dry bulb temperature when the system is in the dehumidification mode. The coil is controlled by the microprocessor through a factory-piped-and-wired three-way heat reclaim regulator and check valve (water/glycol only).

## System Components

**Premium efficiency motor(s).** High efficiency motors conserve energy over periods of continuous fan operation.

**High efficiency filter(s).** Pleated final filters with an efficiency of 40% and 60% (ASHRAE 52.2), 4" (102 mm) deep, allow the removal of a greater percentage of airborne particulate contaminants.

**Prefilter(s).** Intended to capture large airborne particulate contaminants, thereby extending the life of the high-efficiency filter. Prefilters are 1" (25 mm) deep and easily disposable.

**Condensate pump.** The factory installed and wired condensate pump will pump 36 gal/h (0.06 L/s) at 15 ft. (4.6 m) head.

**High pressure water regulating valve(s).** Water and glycol systems may utilize an optional regulating valve, which operates with a maximum pressure of 350 psi (2400 kPa), to automatically control condensing temperature.

**Flared filter-drier connection.** Flared threaded connections can be provided on either side of the filter drier to expedite replacement.

**Hot gas bypass.** An auxiliary side-port hot gas bypass circuit. The activation of the hot gas bypass circuit will maintain the evaporator coil temperature during low load conditions. This optional feature will offer longer compressor run times and minimize compressor cycling and temperature fluctuations.

**Pressure gauges.** Suction and discharge pressure gauges may be provided for the convenience of service personnel.



# Performance Specifications

## Net cooling capacity—air/remote condensing

CAPACITY IN BTU/H		MODEL								
		6T	8T	10T	12T	14T	18T	20T	26T	28T
80° F DB, 67° F WB (26.7° C DB, 19.4° C WB)	Total (BTUH)	78,100	111,000	132,800	147,200	158,000	226,900	267,300	296,800	329,600
	(kW)	(22.9)	(32.5)	(38.9)	(43.1)	(46.3)	(66.4)	(78.3)	(86.9)	(96.5)
50% RH	Sensible (BTUH)	72,500	89,000	125,200	134,200	151,700	184,600	239,800	258,100	283,300
	(kW)	(21.2)	(26.1)	(36.7)	(39.3)	(44.4)	(54.1)	(70.2)	(75.6)	(83.0)
75° F DB, 62.5° F WB (23.9° C DB, 16.9° C WB)	Total (BTUH)	72,800	103,100	123,300	136,300	148,900	210,300	248,700	279,200	305,000
	(kW)	(21.3)	(30.2)	(36.1)	(39.9)	(43.6)	(61.6)	(72.8)	(81.8)	(89.3)
50% RH	Sensible (BTUH)	70,900	88,000	122,400	131,800	148,900	181,600	237,300	256,300	277,900
	(kW)	(20.8)	(25.8)	(35.8)	(38.6)	(43.6)	(53.2)	(69.5)	(75.0)	(81.4)
75° F DB, 61° F WB (23.9° C DB, 16.1° C WB)	Total (BTUH)	73,100	101,700	124,500	137,000	149,000	205,500	251,500	281,100	308,200
	(kW)	(21.4)	(29.8)	(36.5)	(40.1)	(43.6)	(60.2)	(73.6)	(82.3)	(90.2)
45% RH	Sensible (BTUH)	73,100	95,000	124,500	137,000	149,000	195,600	251,500	281,100	308,200
	(kW)	(21.4)	(27.8)	(36.5)	(40.1)	(43.6)	(57.3)	(73.6)	(82.3)	(90.2)
72° F DB, 60° F WB (22.2° C DB, 15.5° C WB)	Total (BTUH)	69,700	98,800	119,400	130,300	143,000	201,500	238,800	269,400	292,700
	(kW)	(20.4)	(28.9)	(35.0)	(38.2)	(41.9)	(59.0)	(69.9)	(78.9)	(85.7)
50% RH	Sensible (BTUH)	68,700	86,000	119,400	127,800	143,000	177,700	231,200	251,400	272,700
	(kW)	(20.1)	(25.2)	(35.0)	(37.4)	(41.9)	(52.0)	(67.7)	(73.6)	(79.8)
72° F DB, 58.6° F WB (22.2° C DB, 14.8° C WB)	Total (BTUH)	70,200	97,600	119,500	131,700	143,000	197,500	242,200	271,900	296,500
	(kW)	(20.6)	(28.6)	(35.0)	(38.6)	(41.9)	(57.8)	(70.9)	(79.6)	(86.8)
45% RH	Sensible (BTUH)	70,200	92,500	119,500	131,700	143,000	191,100	242,200	271,900	296,500
	(kW)	(20.6)	(27.1)	(35.0)	(38.6)	(41.9)	(56.0)	(70.9)	(79.6)	(86.8)
70° F DB, 58.5° F WB (21.1° C DB, 14.8° C WB)	Total (BTUH)	67,600	96,000	116,100	126,800	139,100	196,000	232,400	262,600	284,300
	(kW)	(19.8)	(28.1)	(34.0)	(37.1)	(40.7)	(57.4)	(68.0)	(76.9)	(83.2)
50% RH	Sensible (BTUH)	66,900	84,400	116,100	125,300	139,100	174,400	226,300	246,800	266,200
	(kW)	(19.6)	(24.7)	(34.0)	(36.7)	(40.7)	(51.1)	(66.3)	(72.3)	(78.0)
70° F DB, 57.2° F WB (21.1° C DB, 14.0° C WB)	Total (BTUH)	68,100	95,000	116,000	128,100	139,100	192,200	236,000	265,700	288,400
	(kW)	(19.9)	(27.8)	(34.0)	(37.5)	(40.7)	(56.3)	(69.1)	(77.8)	(84.4)
45% RH	Sensible (BTUH)	68,100	90,400	116,000	128,100	139,100	186,700	236,000	265,700	288,400
	(kW)	(19.9)	(26.5)	(34.0)	(37.5)	(40.7)	(54.7)	(69.1)	(77.8)	(84.4)

\*Performance Specifications @ 95° F Ambient (AIR/GLYCOL/RC) or @ 105° F Condensing (WATER)

## Net cooling capacity—water

CAPACITY IN BTU/H		MODEL								
		6T	8T	10T	12T	14T	18T	20T	26T	28T
80° F DB, 67° F WB (26.7° C DB, 19.4° C WB)	Total (BTUH)	85,500	121,000	144,600	160,700	171,300	246,200	298,500	340,000	361,500
	(kW)	(25.0)	(35.4)	(42.3)	(47.1)	(50.2)	(72.1)	(87.4)	(99.6)	(105.9)
50% RH	Sensible (BTUH)	76,100	93,500	130,000	139,500	157,900	193,300	252,900	276,500	295,900
	(kW)	(22.3)	(27.4)	(38.1)	(40.8)	(46.2)	(56.6)	(74.1)	(81.0)	(86.6)
75° F DB, 62.5° F WB (26.7° C DB, 19.4° C WB)	Total (BTUH)	79,100	111,800	133,100	147,800	158,000	226,800	283,500	312,100	332,400
	(kW)	(23.2)	(32.7)	(39.0)	(43.3)	(46.3)	(66.4)	(83.0)	(91.4)	(97.3)
50% RH	Sensible (BTUH)	74,300	92,200	127,200	137,300	154,000	189,500	222,800	271,500	290,600
	(kW)	(21.8)	(27.0)	(37.2)	(40.2)	(45.1)	(55.5)	(65.2)	(79.5)	(85.1)
75° F DB, 61° F WB (23.9° C DB, 16.1° C WB)	Total (BTUH)	73,557	110,000	125,928	147,800	152,460	222,000	281,200	304,600	324,400
	(kW)	(21.5)	(32.2)	(36.9)	(43.3)	(44.6)	(65.0)	(82.3)	(89.2)	(95.0)
45% H	Sensible (BTUH)	73,557	99,600	125,928	147,800	152,460	203,800	228,700	293,100	312,400
	(kW)	(21.5)	(29.2)	(36.9)	(43.3)	(44.6)	(59.7)	(67.0)	(85.8)	(91.5)
72° F DB, 60° F WB (22.2° C DB, 15.5° C WB)	Total (BTUH)	75,500	106,900	127,000	141,100	151,100	216,700	263,000	297,900	317,100
	(kW)	(22.1)	(31.3)	(37.2)	(41.3)	(44.2)	(63.5)	(77.0)	(87.2)	(92.9)
50% RH	Sensible (BTUH)	72,300	90,100	123,600	133,900	149,800	185,300	242,800	265,900	283,400
	(kW)	(21.2)	(26.4)	(36.2)	(39.2)	(43.9)	(54.3)	(71.1)	(77.9)	(83.0)
72° F DB, 58.6° F WB (22.2° C DB, 14.8° C WB)	Total (BTUH)	71,577	105,400	122,364	132,561	148,302	212,500	264,600	291,000	310,300
	(kW)	(21.0)	(30.9)	(35.8)	(38.8)	(43.4)	(62.2)	(77.5)	(85.2)	(90.9)
45% RH	Sensible (BTUH)	71,577	97,000	122,364	132,561	148,302	198,800	264,600	284,300	304,200
	(kW)	(21.0)	(28.4)	(35.8)	(38.8)	(43.4)	(58.2)	(77.5)	(83.2)	(89.1)
70° F DB, 58.5° F WB (22.2° C DB, 14.8° C WB)	Total (BTUH)	73,300	103,800	123,200	136,700	148,800	210,300	255,300	288,700	307,400
	(kW)	(21.5)	(30.4)	(36.1)	(40.0)	(43.6)	(61.6)	(74.8)	(84.5)	(90.0)
50% RH	Sensible (BTUH)	71,300	88,400	121,000	130,800	148,800	181,700	237,500	260,000	277,700
	(kW)	(20.9)	(25.9)	(35.4)	(38.3)	(43.6)	(53.2)	(69.5)	(76.1)	(81.3)
70° F DB, 57.2° F WB (22.2° C DB, 14.8° C WB)	Total (BTUH)	70,587	102,400	119,790	129,492	148,600	206,400	257,400	282,500	301,400
	(kW)	(20.7)	(30.0)	(35.1)	(37.9)	(43.5)	(60.4)	(75.4)	(82.7)	(88.3)
45% RH	Sensible (BTUH)	70,587	94,600	119,790	129,492	148,600	193,900	257,400	277,200	296,700
	(kW)	(20.7)	(27.7)	(35.1)	(37.9)	(43.5)	(56.8)	(75.4)	(81.2)	(86.9)

\*Performance Specifications @ 95° F Ambient (AIR/GLYCOL/RC) or @ 105° F Condensing (WATER)

## Net cooling capacity—glycol

CAPACITY IN BTU/H		MODEL								
		6T	8T	10T	12T	14T	18T	20T	26T	28T
80° F DB, 67° F WB (26.7°C DB, 19.4°C WB)	Total (BTUH)	77,700	110,700	130,200	145,800	155,300	225,100	270,000	296,400	328,700
	(kW)	(22.8)	(32.4)	(38.1)	(42.7)	(45.5)	(65.9)	(79.1)	(86.8)	(96.2)
50% RH	Sensible (BTUH)	72,300	88,800	123,400	133,600	150,100	184,000	241,000	257,900	282,900
	(kW)	(21.2)	(26.0)	(36.1)	(39.1)	(44.0)	(53.9)	(70.6)	(75.5)	(82.8)
75° F DB, 62.5° F WB (23.9°C DB, 16.9°C WB)	Total (BTUH)	71,900	102,000	121,600	133,900	145,800	206,800	256,400	274,400	302,100
	(kW)	(21.1)	(29.9)	(35.6)	(39.2)	(42.7)	(60.6)	(75.1)	(80.3)	(88.5)
50% RH	Sensible (BTUH)	70,300	87,400	121,600	130,600	145,800	179,900	210,600	251,800	277,500
	(kW)	(20.6)	(25.6)	(35.6)	(38.2)	(42.7)	(52.7)	(61.7)	(73.7)	(81.3)
75° F DB, 61° F WB (23.9°C DB, 16.1°C WB)	Total (BTUH)	69,597	100,600	121,600	129,294	145,700	201,700	254,400	278,700	305,200
	(kW)	(20.4)	(29.5)	(35.6)	(37.9)	(42.7)	(59.1)	(74.5)	(81.6)	(89.4)
45% RH	Sensible (BTUH)	69,597	94,400	121,600	129,294	145,700	193,600	216,500	278,700	305,200
	(kW)	(20.4)	(27.6)	(35.6)	(37.9)	(42.7)	(56.7)	(63.4)	(81.6)	(89.4)
72° F DB, 60° F WB (22.2°C DB, 15.5°C WB)	Total (BTUH)	69,000	97,300	116,100	127,500	139,300	197,200	237,700	266,400	285,400
	(kW)	(20.2)	(28.5)	(34.0)	(37.3)	(40.8)	(57.7)	(69.6)	(78.0)	(83.6)
50% RH	Sensible (BTUH)	69,000	85,300	116,100	125,500	139,300	175,500	230,600	251,800	265,100
	(kW)	(20.2)	(25.0)	(34.0)	(36.7)	(40.8)	(51.4)	(67.5)	(73.7)	(77.6)
72° F DB, 58.6° F WB (22.2°C DB, 14.8°C WB)	Total (BTUH)	68,310	96,200	116,100	124,245	139,300	193,000	241,600	268,600	292,500
	(kW)	(20.0)	(28.2)	(34.0)	(36.4)	(40.8)	(56.5)	(70.7)	(78.6)	(85.6)
45% RH	Sensible (BTUH)	68,310	91,200	116,100	124,245	139,300	188,500	241,600	268,600	292,500
	(kW)	(20.0)	(26.7)	(34.0)	(36.4)	(40.8)	(55.2)	(70.7)	(78.6)	(85.6)
70° F DB, 58.5° F WB (22.2°C DB, 14.8°C WB)	Total (BTUH)	66,900	94,400	112,500	125,200	135,100	191,100	230,600	259,300	278,600
	(kW)	(19.6)	(27.6)	(32.9)	(36.7)	(39.6)	(56.0)	(67.5)	(75.9)	(81.6)
50% RH	Sensible (BTUH)	66,900	83,500	112,500	125,200	135,100	171,900	225,300	247,100	265,100
	(kW)	(19.6)	(24.4)	(32.9)	(36.7)	(39.6)	(50.3)	(66.0)	(72.4)	(77.6)
70° F DB, 57.2° F WB (22.2°C DB, 14.8°C WB)	Total (BTUH)	66,900	93,300	112,500	125,100	135,000	187,300	234,600	261,900	284,100
	(kW)	(19.6)	(27.3)	(32.9)	(36.6)	(39.5)	(54.8)	(68.7)	(76.7)	(83.2)
45% RH	Sensible (BTUH)	66,900	89,400	112,500	125,100	135,000	183,800	234,600	261,900	284,100
	(kW)	(19.6)	(26.2)	(32.9)	(36.6)	(39.5)	(53.8)	(68.7)	(76.7)	(83.2)

\*Performance Specifications @ 95° F Ambient (AIR/GLYCOL/RC) or @ 105° F Condensing (WATER)





# Performance Data

## Air system

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Air Volume (CFM)		4,200	4,400	7,000	7,200	8,400	8,800	12,600	13,200	14,200
(L/s)		(1,982)	(2,077)	(3,304)	(3,398)	(3,965)	(4,154)	(5,947)	(6,230)	(6,702)
Fan Motor HP (qty)		3 (1)	3 (1)	3 (2)	3 (2)	3 (2)	3 (2)	3 (3)	3 (3)	3 (3)
(kW)		(2.2) (1)	(2.2) (1)	(2.2) (2)	(2.2) (2)	(2.2) (2)	(2.2) (2)	(2.2) (3)	(2.2) (3)	(2.2) (3)
External Static Pressure (inches)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
(Pa)		(125)	(125)	(125)	(125)	(125)	(125)	(125)	(125)	(125)
Number of Fans		1	1	2	2	2	2	3	3	3

## Coolant requirements

WATER	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
65° F Water In (GPM)		6.2	8.9	10.1	11.7	11.4	17.9	20.2	23.1	23.4
(18.3° C) (L/s)		(0.4)	(0.6)	(0.6)	(0.7)	(1.7)	(1.1)	(1.3)	(1.5)	(1.5)
Pressure Drop (psig)		3.2	4.9	4.8	3.8	2.9	4.8	4.9	4.6	4.7
(kPa)		(22.1)	(33.8)	(33.1)	(26.2)	(20.0)	(33.1)	(33.8)	(31.7)	(32.9)
THR (MBH)		114,435	160,827	195,092	216,444	228,736	323,814	374,456	444,410	456,066
(kW)		(33.5)	(47.1)	(57.1)	(63.4)	(67.0)	(94.8)	(109.6)	(130.1)	(133.5)
75° F Water In (GPM)		8.3	11.8	13.4	15.6	15.2	23.9	26.9	30.8	31.2
(23.9 °C)(L/s)		(0.5)	(0.7)	(0.8)	(1.0)	(1.0)	(1.5)	(1.7)	(1.9)	(2.0)
Pressure Drop (psig)		5.7	8.7	8.6	6.7	5.2	8.6	8.7	8.1	8.3
(kPa)		(39.3)	(60.0)	(59.3)	(96.2)	(35.9)	(59.3)	(60.0)	(55.9)	(57.2)
THR (MBH)		114,435	160,827	195,092	216,444	228,736	323,814	374,456	444,410	456,066
(kW)		(33.5)	(47.1)	(57.1)	(63.4)	(67.0)	(94.8)	(109.6)	(130.1)	(133.5)
85° F Water In (GPM)		18.6	25.7	28.4	33.8	30.7	52.1	58.1	65.8	69.3
(29.4 °C) (L/s)		(1.2)	(1.6)	(1.8)	(2.1)	(1.9)	(3.3)	(3.7)	(4.2)	(4.4)
Pressure Drop (psig)		27.3	39.9	37.6	30.1	20.8	39.3	39.4	36.1	39.9
(kPa)		(188.3)	(275.1)	(259.3)	(207.6)	(143.9)	(271.0)	(271.7)	(249.0)	(275.2)
THR (MBH)		114,435	160,827	195,092	216,444	228,736	323,814	374,456	444,410	456,066
(kW)		(33.5)	(47.1)	(57.1)	(63.4)	(67.0)	(94.8)	(109.6)	(130.1)	(133.5)
<b>GLYCOL</b>										
105° F Glycol In (GPM)		17.5	25.2	31.0	31.7	34.9	50.8	61.4	66.9	67.8
(40.6 °C) (L/s)		(1.1)	(1.6)	(2.0)	(2.0)	(2.2)	(3.2)	(3.9)	(4.2)	(4.3)
Pressure Drop (psig)		12.0	21.5	26.2	26.1	9.3	11.0	11.8	10.2	10.5
(kPa)		(82.8)	(148.3)	(180.7)	(180.0)	(64.1)	(75.9)	(81.4)	(70.3)	(72.4)
THR (MBH)		110,543	156,191	188,188	208,802	220,638	313,448	361,520	432,200	442,906
(kW)		(32.4)	(45.7)	(55.1)	(61.1)	(64.6)	(91.8)	(105.9)	(126.6)	(129.7)

## Pump system

GLYCOL	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Horsepower		3/4	3/4	1	1	1	1-1/2	2	3	3
Total Head (feet) (@ design GPM)		62	59	69	68	65	65	80	92	92
(m)		(18.9)	(18.0)	(21.0)	(20.7)	(19.8)	(19.8)	(24.4)	(28.0)	(28.0)
Available Ext. Head (feet)		28	33	27	26	37	37	51	62	61
(m)		(8.5)	(10.1)	(8.2)	(7.9)	(11.3)	(11.3)	(15.5)	(18.9)	(18.6)

## Water regulating valve—2-Way/3-Way, single seated

WATER/ GLYCOL	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Size (inches - NPT)		1-1/4	1-1/4	3/4 (2)	3/4 (2)	1 (2)	1-1/4 (2)	1-1/4 (2)	1-1/2 (2)	1-1/2 (2)
Cv		14	14	20	20	28	28	40	40	40

\*2-Way/3-Way Single Seated, 150 psig W.W.P. max

## Humidification—solid state electrode canister

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Flush Cycle		automatic	automatic	automatic	automatic	automatic	automatic	automatic	automatic	automatic
Lbs/hr.		10	10	10	10	10	10	20	20	20
(Kg/hr.)		(4.5)	(4.5)	(4.5)	(4.5)	(4.5)	(4.5)	(9.0)	(9.0)	(9.0)
kW		3.4	3.4	3.4	3.4	3.4	3.4	6.8	6.8	6.8

## Filters

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Quantity		1	1	2	2	2	2	3	3	3
Size (inches) Downflow (mm)		30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 74.7)	30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 774.7)	30.5 x 30.5 (774.7 x 774.7)
Size (inches) Upflow (mm)		27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)	27.0 x 35.5 (685.8 x 901.7)
Depth (inches) (mm)		4 (101.6)	4 (101.6)	4 (101.6)	4 (101.6)	4 (101.6)	4 (101.6)	4 (101.6)	4 (101.6)	4 (101.6)

\*30% efficient, ASHRAE Standard 52.1-92, UL Class 2

## Evaporator coil

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Face Area (ft <sup>2</sup> ) (m <sup>2</sup> )		9.5 (0.88)	9.5 (0.88)	21.3 (1.98)	21.3 (1.98)	21.3 (1.98)	21.3 (1.98)	33.0 (3.07)	33.0 (3.07)	33.0 (3.07)
Rows Deep		4	4	4	4	4	4	4	4	4
Face Velocity (FPM) (m/s)		442 (2.25)	463 (2.35)	329 (1.67)	338 (1.72)	394 (2.00)	413 (2.10)	382 (1.94)	400 (2.03)	430 (2.18)

## Compressor—scroll

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
EER—Air		13.6	13.0	13.5	13.3	13.6	13.0	13.1	13.2	13.1
EER—Water		17.3	16.3	17.6	16.8	17.3	16.3	16.5	16.6	16.7
EER—Glycol		12.5	12.11	12.3	12.2	12.5	12.1	12.1	12.2	12.13
Quantity		1	1	2	2	2	2	2	2	2

## Electric Reheat

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
MBH total (includes motor heat)		28.4	28.4	56.8	56.8	56.8	56.8	85.1	85.1	85.1
(kW)		(8.3)	(8.3)	(16.6)	(16.6)	(16.6)	(16.6)	(24.9)	(24.9)	(24.9)
Stages		1	1	2	2	2	2	2	2	2

\*With equal loading on each phase, rated at 240V/3Ø and 480V/3Ø

## Hot gas reheat

WATER/GLYCOL	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
MBH (includes motor heat)		26.3	32.8	83.0	91.2	92.8	92.8	146.8	146.8	146.8
(kW)		(7.71)	(9.62)	(24.30)	(26.70)	(27.20)	(27.20)	(43.05)	(43.05)	(43.05)

## Hot water reheat

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
MBH (includes motor heat)		81.6	89.5	138.2	151.7	163.0	193.1	250.7	272.1	303.4
(kW)		(23.93)	(26.24)	(40.52)	(44.48)	(47.80)	(56.63)	(73.52)	(79.79)	(88.97)
GPM		3.0	4.6	2.5	3.0	3.5	5.5	5.0	6.0	8.0
(L/s)		(0.19)	(0.29)	(0.16)	(0.19)	(0.22)	(0.34)	(0.31)	(0.37)	(0.50)
Pressure Drop (psig)		2.7	3.4	3.0	3.5	3.9	6.2	7.4	9.5	14.4
(kPa)		(18.0)	(22.6)	(20.0)	(23.3)	(26.0)	(41.3)	(49.3)	(63.3)	(96.0)
Control Valve		solenoid	solenoid	solenoid	solenoid	solenoid	solenoid	solenoid	solenoid	solenoid

\*Entering water temperature – 180° F (82.2° C)

## Steam reheat

AIR/WATER/ GLYCOL/RC	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
MBH (includes motor heat)		79.3	86.9	133.7	143.3	163.5	188.4	242.8	272.6	297.5
(kW)		(23.25)	(25.48)	(39.21)	(42.02)	(47.94)	(55.25)	(71.20)	(79.94)	(87.24)
Control Valve		solenoid	solenoid	solenoid	solenoid	solenoid	solenoid	solenoid	solenoid	solenoid

\*5 psig (34.5 KP2) saturated supply

## Drycooler

GLYCOL	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
GPM		18	25	31	32	35	51	61	67	68
(L/S)		(1.1)	(1.6)	(2.0)	(2.0)	(2.2)	(3.2)	(3.8)	(4.2)	(4.3)
Pressure Drop (psig)		9.1	6.1	6.5	6.9	8.2	7.4	7.4	8.7	8.7
(kPa)		(62.7)	(42.1)	(44.8)	(47.6)	(56.6)	(51.0)	(51.0)	(60.0)	(60.0)

## Centrifugal indoor condenser

AIR	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Air Quantity - CFM		5,000	5,500	7,000	8,000	9,000	11,000	13,000	14,000	15,000
(L/s)		(2380)	(2619)	(3333)	(3809)	(4286)	(5238)	(6191)	(6666)	(7143)
Fan Motor HP (qty)		3 (1)	3 (1)	3 (2)	3 (2)	3 (2)	3 (2)	3 (3)	3 (3)	3 (3)
(kW)		(2.2) (1)	(2.2) (1)	(2.2) (2)	(2.2) (2)	(2.2) (2)	(2.2) (2)	(2.2) (3)	(2.2) (3)	(2.2) (3)
Blower and Motor Quantity		1	1	2	2	2	2	3	3	3
External Static Pressure (inches)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
(Pa)		(125)	(125)	(125)	(125)	(125)	(125)	(125)	(125)	(125)

## Physical data

AIR	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Height (inches)		76	76	76	76	76	76	76	76	76
(mm)		(1930)	(1930)	(1930)	(1930)	(1930)	(1930)	(1930)	(1930)	(1930)
Length (inches)		34.38	34.38	66.35	66.35	66.35	66.35	98.32	98.32	98.32
(mm)		(873.25)	(873.25)	(1685.29)	(1685.29)	(1685.29)	(1685.29)	(2997.33)	(2997.33)	(2997.33)
Depth (inches)		34.38	34.38	34.38	34.38	34.38	34.38	34.38	34.38	34.38
(mm)		(873.25)	(873.25)	(873.25)	(873.25)	(873.25)	(873.25)	(873.25)	(873.25)	(873.25)
Weight (lbs)		850	975	1,175	1,250	1,400	1,550	1,750	1,900	2,100
(Approx. kg)		(386)	(442)	(533)	(567)	(635)	(703)	(794)	(862)	(953)

### WATER/GLYCOL

Weight (Lbs)		1,000	1,050	1,800	1,850	1,900	1,950	2,650	2,700	2,750
(Approx. kg)		(454)	(477)	(818)	(841)	(863)	(886)	(1204)	(1227)	(1250)
Unit Volume (gallons)		1	1	2	2	2	2	3	3	3
(Liters)		(3.78)	(3.78)	(7.56)	(7.56)	(7.56)	(7.56)	(11.34)	(11.34)	(11.34)

### REMOTE CONDENSING – INDOOR UNITS

Weight (lbs)		870	920	1,550	1,600	1,650	1,700	2,250	2,300	2,350
(Approx. kg)		(395)	(418)	(704)	(727)	(750)	(773)	(1023)	(1045)	(1068)

## Connection sizes

AIR/REMOTE CONDENSING	MODEL	6T	8T	10T	12T	14T	18T	20T	26T	28T
Liquid Line (inches)	ODS	1/2	5/8	1/2	1/2	5/8	5/8	5/8	5/8	5/8

### AIR

Discharge Line (inches)	ODS	5/8	1-1/8	5/8	5/8	7/8	1-1/8	1-1/8	1-1/8	1-1/8
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### REMOTE CONDENSING

Suction Line (inches)	ODS	7/8	1-1/8	7/8	7/8	7/8	1-1/8	1-3/8	1-3/8	1-3/8
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### WATER/GLYCOL

Water/Glycol In/Out (inches)	ODS	1-3/8	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	1-5/8	2-1/8	2-1/8
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### AIR/WATER/GLYCOL/RC

Condensate Drain (inches)	IDS	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8
Humidifier Line (inches)	ODF	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Hot Water In/Out (inches)	ODS	5/8	5/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8
Steam Reheat In/Out (inches)	ODS	5/8	5/8	5/8	5/8	5/8	5/8	7/8	7/8	7/8

# Electrical Data

## Electric Reheat—6–14 ton

HUMIDIFIER			Electric				Steam or None			
VOLTAGE			208	230	460	575	208	230	460	575
6T	FLA	Air	42.4	42.4	21.1	17.5	41.6	42.4	21.1	17.5
		Water	40.1	40.1	20.0	16.5	39.3	40.1	20.0	16.5
		Glycol	43.9	43.9	21.9	18.1	43.1	43.9	21.9	18.1
		Remote Condensing	40.8	40.0	20.0	16.7	24.4	25.2	12.6	10.7
	WSA	Air	55.2	55.4	27.3	22.8	54.2	55.4	27.3	22.8
		Water	55.2	55.4	27.3	22.8	54.2	55.4	27.3	22.8
		Glycol	55.2	55.4	27.3	22.8	54.2	55.4	27.3	22.8
		Remote Condensing	51.0	50.0	25.0	20.9	30.5	31.5	15.8	13.4
	MOP	Air	70.0	70.0	35.0	30.0	70.0	70.0	35.0	25.0
		Water	70.0	70.0	35.0	30.0	70.0	70.0	35.0	25.0
		Glycol	70.0	70.0	35.0	30.0	70.0	70.0	35.0	25.0
		Remote Condensing	50.0	50.0	25.0	25.0	35.0	35.0	15.0	15.0
8T	FLA	Air	51.1	51.1	25.5	21.0	50.3	51.1	25.5	21.0
		Water	47.9	47.9	23.9	19.7	47.1	47.9	23.9	19.7
		Glycol	53.2	53.2	27.0	21.8	52.4	53.2	27.0	21.8
		Remote Condensing	40.8	40.0	20.0	16.7	24.4	25.2	12.6	10.7
	WSA	Air	71.3	71.5	36.4	29.5	70.3	71.5	36.4	29.5
		Water	71.3	71.5	36.4	29.5	70.3	71.5	36.4	29.5
		Glycol	71.3	71.5	36.4	29.5	70.3	71.5	36.4	29.5
		Remote Condensing	51.0	50.0	25.0	20.9	30.5	31.5	15.8	13.4
	MOP	Air	100.0	100.0	50.0	45.0	100.0	100.0	50.0	40.0
		Water	100.0	100.0	50.0	45.0	100.0	100.0	50.0	40.0
		Glycol	100.0	100.0	50.0	45.0	100.0	100.0	50.0	40.0
		Remote Condensing	50.0	50.0	25.0	20.0	30.0	35.0	15.0	15.0
10T	FLA	Air	64.5	64.5	31.9	26.7	62.0	63.6	31.5	26.3
		Water	64.5	64.5	31.9	26.7	59.7	61.3	30.3	25.4
		Glycol	64.5	65.1	32.2	26.9	63.5	65.1	32.2	26.9
		Remote Condensing	65.2	65.2	32.6	27.4	48.8	50.4	25.2	21.4
	WSA	Air	81.5	83.1	42.0	35.0	80.7	83.1	42.0	35.0
		Water	81.5	83.1	42.0	35.0	80.7	83.1	42.0	35.0
		Glycol	81.5	83.1	42.0	35.0	80.7	83.1	42.0	35.0
		Remote Condensing	81.5	81.5	40.8	34.3	61.0	63.0	31.5	26.8
	MOP	Air	90.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Water	90.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Glycol	90.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Remote Condensing	70.0	70.0	35.0	30.0	50.0	60.0	30.0	25.0
12T	FLA	Air	66.9	66.5	32.3	26.7	64.9	66.5	32.3	26.6
		Water	64.5	64.5	31.9	26.7	62.8	64.4	31.1	25.7
		Glycol	69.7	67.9	33.1	27.2	66.3	67.9	33.1	27.2
		Remote Condensing	65.2	65.2	32.6	27.4	48.8	50.4	25.2	21.4
	WSA	Air	84.7	84.9	42.0	35.4	82.5	84.9	42.0	35.4
		Water	84.7	84.9	42.0	35.4	82.5	84.9	42.0	35.4
		Glycol	84.7	84.9	42.0	35.4	82.5	84.9	42.0	35.4
		Remote Condensing	81.5	81.5	40.8	34.3	61.0	63.0	31.5	26.8
	MOP	Air	100.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Water	100.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Glycol	100.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Remote Condensing	70.0	70.0	35.0	30.0	50.0	60.0	30.0	25.0
14T	FLA	Air	68.4	67.4	33.5	28.0	65.8	67.4	33.5	28.0
		Water	64.8	65.1	32.4	27.0	63.5	65.1	32.4	27.0
		Glycol	71.4	68.9	34.3	28.6	67.3	68.9	34.3	28.6
		Remote Condensing	65.2	65.2	32.6	27.4	48.8	50.4	25.2	21.4
	WSA	Air	84.7	84.9	42.0	35.4	82.5	84.9	42.0	35.4
		Water	84.7	84.9	42.0	35.4	82.5	84.9	42.0	35.4
		Glycol	84.7	84.9	42.0	35.4	82.5	84.9	42.0	35.4
		Remote Condensing	81.5	81.5	40.8	34.3	61.0	63.0	31.5	26.8
	MOP	Air	100.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Water	100.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Glycol	100.0	90.0	45.0	35.0	90.0	90.0	45.0	35.0
		Remote Condensing	70.0	70.0	35.0	45.0	50.0	60.0	30.0	25.0

FLA= Full Load Amperes      MOP=Maximum Overcurrent Protection      WSA=Wire Size Ampere

\*Values are calculated based on 3- phase power

## Electric Reheat—18–28 ton

HUMIDIFIER			Electric				Steam or None			
VOLTAGE			208	230	460	575	208	230	460	575
18T	FLA	Air	85.7	82.5	41.1	32.9	74.5	76.1	37.9	31.5
		Water	79.3	76.1	37.9	30.3	71.3	72.9	36.3	30.2
		Glycol	89.9	86.7	44.1	34.5	76.6	78.2	39.4	32.3
		Remote Condensing	65.2	65.2	32.6	27.4	48.8	50.4	25.2	21.4
	WSA	Air	113.7	110.1	56.2	44.3	98.6	101.0	51.1	42.0
		Water	113.7	110.1	56.2	44.3	98.6	101.0	51.1	42.0
		Glycol	113.7	110.1	56.2	44.3	98.6	101.0	51.1	42.0
		Remote Condensing	81.5	81.5	40.8	34.3	61.5	63.0	31.5	26.8
	MOP	Air	125.0	125.0	70.0	50.0	125.0	125.0	60.0	50.0
		Water	125.0	125.0	70.0	50.0	125.0	125.0	60.0	50.0
		Glycol	125.0	125.0	70.0	50.0	125.0	125.0	60.0	50.0
		Remote Condensing	70.0	70.0	35.0	30.0	50.0	60.0	30.0	25.0
20T	FLA	Air	104.8	105.0	52.2	43.5	102.6	105	52.2	43.5
		Water	98.6	101.0	50.2	41.9	98.6	101.0	50.2	41.9
		Glycol	110.0	107.6	53.5	44.5	105.2	107.6	53.5	44.5
		Remote Condensing	92.2	92.6	46.3	39.0	73.2	75.6	37.8	32.1
	WSA	Air	144.7	141.0	68.3	55.0	137.4	141.0	68.3	55.0
		Water	144.7	141.0	68.3	55.0	137.4	141.0	68.3	55.0
		Glycol	144.7	141.0	68.3	55.0	137.4	141.0	68.3	55.0
		Remote Condensing	115.3	115.8	57.9	48.8	91.5	94.5	47.3	40.1
	MOP	Air	175.0	175.0	80.0	60.0	150.0	150.0	80.0	60.0
		Water	175.0	175.0	80.0	60.0	150.0	150.0	80.0	60.0
		Glycol	175.0	175.0	80.0	60.0	150.0	150.0	80.0	60.0
		Remote Condensing	100.0	100.0	50.0	40.0	80.0	80.0	40.0	35.0
26T	FLA	Air	118.9	108.6	54.2	45.1	109.7	108.6	54.2	45.1
		Water	110.5	104.8	52.3	43.6	105.5	104.8	52.3	43.6
		Glycol	122.4	110.6	55.2	45.7	111.5	110.2	55.0	45.7
		Remote Condensing	92.2	92.6	46.3	39.0	73.2	75.6	37.8	32.1
	WSA	Air	156.1	151.2	68.8	57.5	143.8	147.4	68.8	57.5
		Water	156.1	151.2	68.8	57.5	143.8	147.4	68.8	57.5
		Glycol	156.1	151.2	68.8	57.5	143.8	147.4	68.8	57.5
		Remote Condensing	115.3	115.8	57.9	48.8	91.5	94.5	47.3	40.1
	MOP	Air	175.0	175.0	80.0	60.0	175.0	175.0	80.0	60.0
		Water	175.0	175.0	80.0	60.0	175.0	175.0	80.0	60.0
		Glycol	175.0	175.0	80.0	60.0	175.0	175.0	80.0	60.0
		Remote Condensing	100.0	100.0	50.0	40.0	80.0	80.0	40.0	35.0
28T	FLA	Air	115.2	107.1	53.5	44.7	108.1	107.1	53.5	44.7
		Water	107.7	103.7	51.8	43.3	104.3	103.7	51.8	43.3
		Glycol	117.9	108.3	54.1	45.1	109.4	108.3	54.1	45.1
		Remote Condensing	92.2	92.6	46.3	39.0	73.2	75.6	37.8	32.1
	WSA	Air	156.1	151.2	78.9	63.0	143.8	147.4	75.5	62.6
		Water	156.1	151.2	78.9	63.0	143.8	147.4	75.5	62.6
		Glycol	156.1	151.2	78.9	63.0	143.8	147.4	75.5	62.6
		Remote Condensing	115.3	115.8	57.9	48.8	91.5	94.5	47.3	40.1
	MOP	Air	175.0	175.0	100.0	80.0	175.0	175.0	90.0	70.0
		Water	175.0	175.0	100.0	80.0	175.0	175.0	90.0	70.0
		Glycol	175.0	175.0	100.0	80.0	175.0	175.0	90.0	70.0
		Remote Condensing	100.0	100.0	50.0	40.0	80.0	80.0	40.0	35.0

FLA= Full Load Amperes    MOP=Maximum Overcurrent Protection    WSA=Wire Size Amperes

\*Values are calculated based on 3- phase power

## Steam/hot water/or no-reheat—6–14 ton

HUMIDIFIER			Electric				Steam or None			
VOLTAGE			208	230	460	575	208	230	460	575
6T	FLA	Air	42.4	40.0	19.9	16.0	26.0	25.2	12.5	10.0
		Water	40.1	37.7	18.8	15.0	23.7	22.9	11.4	9.0
		Glycol	43.9	41.5	20.7	16.6	27.5	26.7	13.3	10.6
		Remote Condensing	25.2	22.8	11.4	9.2	8.8	8.0	4.0	3.2
	WSA	Air	55.2	52.4	25.8	21.0	34.7	33.9	16.5	13.5
		Water	55.2	52.4	25.8	21.0	34.7	33.9	16.5	13.5
		Glycol	55.2	52.4	25.8	21.0	34.7	33.9	16.5	13.5
		Remote Condensing	31.5	28.5	14.3	11.5	11.0	10.0	5.0	4.0
	MOP	Air	70.0	60.0	30.0	25.0	50.0	50.0	25.0	20.0
		Water	70.0	60.0	30.0	25.0	50.0	50.0	25.0	20.0
		Glycol	70.0	60.0	30.0	25.0	50.0	50.0	25.0	20.0
		Remote Condensing	35.0	30.0	15.0	15.0	15.0	15.0	15.0	15.0
8T	FLA	Air	51.1	48.7	24.3	19.5	34.7	33.9	16.9	13.5
		Water	47.9	45.5	22.7	18.2	31.5	30.7	15.3	12.2
		Glycol	53.2	50.8	25.8	20.3	36.8	36.0	18.4	14.3
		Remote Condensing	25.2	22.8	11.4	9.2	8.8	8.0	4.0	3.2
	WSA	Air	71.3	68.5	34.9	27.6	50.8	50.0	25.6	20.1
		Water	71.3	68.5	34.9	27.6	50.8	50.0	25.6	20.1
		Glycol	71.3	68.5	34.9	27.6	50.8	50.0	25.6	20.1
		Remote Condensing	31.5	28.5	14.3	11.5	11.0	10.0	5.0	4.0
	MOP	Air	100.0	90.0	50.0	35.0	80.0	80.0	40.0	30.0
		Water	100.0	90.0	50.0	35.0	80.0	80.0	40.0	30.0
		Glycol	100.0	90.0	50.0	35.0	80.0	80.0	40.0	30.0
		Remote Condensing	35.0	30.0	15.0	15.0	15.0	15.0	15.0	15.0
10T	FLA	Air	61.1	57.9	28.7	22.9	44.7	43.1	21.3	16.9
		Water	56.5	53.3	26.3	21.1	40.1	38.5	18.9	15.1
		Glycol	64.1	60.9	30.1	24.1	47.7	46.1	22.7	18.1
		Remote Condensing	34.0	30.8	15.4	12.4	17.6	16.0	8.0	6.4
	WSA	Air	81.5	77.9	39.8	31.6	61.0	59.4	30.5	24.1
		Water	81.5	77.9	39.8	31.6	61.0	59.4	30.5	24.1
		Glycol	81.5	77.9	39.8	31.6	61.0	59.4	30.5	24.1
		Remote Condensing	42.5	38.5	19.3	15.5	22.0	20.0	10.0	8.0
	MOP	Air	90.0	90.0	45.0	35.0	80.0	70.0	40.0	30.0
		Water	90.0	90.0	45.0	35.0	80.0	70.0	40.0	30.0
		Glycol	90.0	90.0	45.0	35.0	80.0	70.0	40.0	30.0
		Remote Condensing	45.0	40.0	20.0	15.0	25.0	25.0	15.0	15.0
12T	FLA	Air	66.9	63.7	30.3	23.5	50.5	48.9	22.9	17.5
		Water	62.7	59.5	27.9	21.7	46.3	44.7	20.5	15.7
		Glycol	69.7	66.5	31.9	24.7	53.3	51.7	24.5	18.7
		Remote Condensing	34.0	30.8	15.8	12.4	17.6	16.0	8.0	6.4
	WSA	Air	84.7	81.1	39.8	32.4	64.2	62.6	30.5	24.9
		Water	84.7	81.1	39.8	32.4	64.2	62.6	30.5	24.9
		Glycol	84.7	81.1	39.8	32.4	64.2	62.6	30.5	24.9
		Remote Condensing	42.5	38.5	19.3	15.5	22.0	20.0	10.0	8.0
	MOP	Air	100.0	90.0	45.0	35.0	100.0	80.0	40.0	30.0
		Water	100.0	90.0	45.0	35.0	100.0	80.0	40.0	30.0
		Glycol	100.0	90.0	45.0	35.0	100.0	80.0	40.0	30.0
		Remote Condensing	45.0	40.0	20.0	15.0	25.0	25.0	15.0	15.0
14T	FLA	Air	68.4	65.2	32.4	26.0	52.0	50.4	25.0	20.0
		Water	63.8	60.6	30.2	24.0	47.4	45.8	22.8	18.0
		Glycol	71.4	68.2	34.0	27.2	55.0	53.4	26.6	21.2
		Remote Condensing	34.0	30.8	15.4	12.4	17.6	16.0	8.0	6.4
	WSA	Air	84.7	81.1	39.8	32.4	64.2	62.6	30.5	24.9
		Water	84.7	81.1	39.8	32.4	64.2	62.6	30.5	24.9
		Glycol	84.7	81.1	39.8	32.4	64.2	62.6	30.5	24.9
		Remote Condensing	42.5	38.5	19.3	15.5	22.0	20.0	10.0	8.0
	MOP	Air	100.0	90.0	45.0	35.0	80.0	80.0	40.0	30.0
		Water	100.0	90.0	45.0	35.0	80.0	80.0	40.0	30.0
		Glycol	100.0	90.0	45.0	35.0	80.0	80.0	40.0	30.0
		Remote Condensing	45.0	40.0	20.0	15.0	25.0	25.0	15.0	15.0

FLA= Full Load Amperes      MOP=Maximum Overcurrent Protection      WSA=Wire Size Amperes

\*Values are calculated based on 3-phase power



## Steam/hot water/or no-reheat—18–28 ton

HUMIDIFIER			Electric				Steam or None			
VOLTAGE			208	230	460	575	208	230	460	575
18T	FLA	Air	85.7	82.5	41.1	32.9	69.3	67.7	33.7	26.9
		Water	79.3	76.1	37.9	30.3	62.9	61.3	30.5	24.3
		Glycol	89.9	86.7	44.1	34.5	73.5	71.9	36.7	28.5
		Remote Condensing	34.0	30.8	15.4	12.4	17.6	16.0	8.0	6.4
	WSA	Air	113.7	110.1	56.2	44.3	93.2	91.6	46.9	36.8
		Water	113.7	110.1	56.2	44.3	93.2	91.6	46.9	36.8
		Glycol	113.7	110.1	56.2	44.3	93.2	91.6	46.9	36.8
		Remote Condensing	42.5	38.5	19.3	15.5	22.0	20.0	10.0	8.0
	MOP	Air	125.0	125.0	70.0	50.0	125.0	125.0	60.0	50.0
		Water	125.0	125.0	70.0	50.0	125.0	125.0	60.0	50.0
		Glycol	125.0	125.0	70.0	50.0	125.0	125.0	60.0	50.0
		Remote Condensing	45.0	40.0	20.0	15.0	25.0	25.0	15.0	15.0
20T	FLA	Air	104.8	100.4	49.9	39.9	85.8	83.4	41.4	33.0
		Water	96.8	92.4	45.9	36.7	77.8	75.4	37.4	29.8
		Glycol	110.0	105.6	52.5	41.9	91.0	88.6	44.0	35.0
		Remote Condensing	45.4	41.0	20.5	16.5	26.4	24.0	12.0	9.6
	WSA	Air	144.7	139.8	65.8	49.3	120.9	118.5	55.2	40.7
		Water	144.7	139.8	65.8	49.3	120.9	118.5	55.2	40.7
		Glycol	144.7	139.8	65.8	49.3	120.9	118.5	55.2	40.7
		Remote Condensing	56.8	51.3	25.6	20.6	33.0	30.0	15.0	12.0
	MOP	Air	175.0	175.0	80.0	80.0	150.0	150.0	70.0	50.0
		Water	175.0	175.0	80.0	80.0	150.0	150.0	70.0	50.0
		Glycol	175.0	175.0	80.0	80.0	150.0	150.0	70.0	50.0
		Remote Condensing	50.0	50.0	25.0	20.0	35.0	30.0	15.0	15.0
26T	FLA	Air	118.9	107.4	53.6	42.8	99.9	90.4	45.1	35.9
		Water	110.5	99.8	49.8	39.8	91.5	82.8	41.3	32.9
		Glycol	122.4	110.6	55.2	44.1	103.4	93.6	46.7	37.2
		Remote Condensing	45.4	41.0	20.5	16.5	26.4	24.0	12.0	9.6
	WSA	Air	156.1	151.2	66.7	53.8	132.4	130.0	56.1	45.2
		Water	156.1	151.2	66.7	53.8	132.4	130.0	56.1	45.2
		Glycol	156.1	151.2	66.7	53.8	132.4	130.0	56.1	45.2
		Remote Condensing	56.8	51.3	25.6	20.6	33.0	33.0	15.0	12.0
	MOP	Air	175.0	175.0	80.0	80.0	175.0	175.0	70.0	60.0
		Water	175.0	175.0	80.0	80.0	175.0	175.0	70.0	60.0
		Glycol	175.0	175.0	100.0	80.0	175.0	175.0	90.0	70.0
		Remote Condensing	50.0	50.0	25.0	20.0	35.0	30.0	15.0	15.0
28T	FLA	Air	115.2	104.1	52.0	41.7	96.2	87.1	43.5	34.8
		Water	107.7	97.3	48.6	39.0	88.7	80.3	40.1	32.1
		Glycol	117.9	106.5	53.2	42.7	98.9	89.5	44.7	35.8
		Remote Condensing	45.4	41.0	20.5	16.5	26.4	24.0	12.0	9.6
	WSA	Air	156.1	151.2	78.9	63.0	132.4	130.0	68.3	54.4
		Water	156.1	151.2	78.9	63.0	132.4	130.0	68.3	54.4
		Glycol	156.1	151.2	78.9	63.0	132.4	130.0	68.3	54.4
		Remote Condensing	56.8	51.3	25.6	20.6	33.0	30.0	15.0	12.0
	MOP	Air	175.0	175.0	100.0	100.0	175.0	175.0	90.0	70.0
		Water	175.0	175.0	100.0	100.0	175.0	175.0	90.0	70.0
		Glycol	175.0	175.0	100.0	100.0	175.0	175.0	90.0	70.0
		Remote Condensing	50.0	50.0	25.0	20.0	35.0	30.0	15.0	15.0

FLA= Full Load Amperes      MOP=Maximum Overcurrent Protection      WSA=Wire Size Amperes

\*Values are calculated based on 3– phase power

## Indoor centrifugal condenser units

VOLTAGE		208	230	460	575
<b>6T</b>	FLA	8.6	8.4	4.2	3.6
	WSA/MCA	10.8	10.5	5.3	4.5
	MOP	15.0	15.0	15.0	15.0
<b>8T</b>	FLA	8.6	8.4	4.2	3.6
	WSA/MCA	10.8	10.5	5.3	4.5
	MOP	15.0	15.0	15.0	15.0
<b>10T</b>	FLA	17.2	16.8	8.4	7.2
	WSA/MCA	19.4	18.9	9.5	8.1
	MOP	25.0	25.0	15.0	15.0
<b>12T</b>	FLA	17.2	16.8	8.4	7.2
	WSA/MCA	19.4	18.9	9.5	8.1
	MOP	25.0	25.0	15.0	15.0
<b>14T</b>	FLA	17.2	16.8	8.4	7.2
	WSA/MCA	19.4	18.9	9.5	8.1
	MOP	25.0	25.0	15.0	15.0
<b>18T</b>	FLA	17.2	16.8	8.4	7.2
	WSA/MCA	19.4	18.9	9.5	8.1
	MOP	25.0	25.0	15.0	15.0
<b>20T</b>	FLA	25.8	25.2	12.6	10.8
	WSA/MCA	28.0	27.3	13.6	11.7
	MOP	35.0	35.0	15.0	15.0
<b>26T</b>	FLA	25.8	25.2	12.6	10.8
	WSA/MCA	28.0	27.3	13.6	11.7
	MOP	35.0	35.0	15.0	15.0
<b>28T</b>	FLA	25.8	25.2	12.6	10.8
	WSA/MCA	28.0	27.3	13.6	11.7
	MOP	35.0	35.0	15.0	15.0

FLA= Full Load Amperes MOP= Maximum Overcurrent Protection WSA/MCA=Wire Size Amperes/Minimum Circuit Amperes

\*Values are calculated based on 3-phase power



# Guide Specifications

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## General

**Summary.** The environmental control system shall be designed specifically for precision temperature and humidity control applications. It will automatically monitor and control heating, cooling, humidifying, dehumidifying, and filtering functions for the conditioned space. The system shall be built to the highest quality engineering and manufacturing standards, and shall be subject to a functional test prior to leaving the factory. The system shall be floor mounted and configured for up/down discharge of conditioned airflow, with draw-through air pattern, to provide uniform air distribution over the entire face of the coil.

**Design requirements.** The system shall be as described in the following specification as manufactured by APC.

Model AFX \_\_\_\_\_.

Total cooling capacity: \_\_\_\_\_ MBH (kW).

Sensible cooling capacity: \_\_\_\_\_ MBH (kW).

Return air temperature: \_\_\_\_\_ ° F (° C).

Dry bulb: \_\_\_\_\_ ° F (° C).

Wet bulb: \_\_\_\_\_ % RH.

Air quantity: \_\_\_\_\_ CFM (L/s) at 0.5" (125 Pa) external static pressure.

Humidifier capacity: \_\_\_\_\_ kW.

Electrical supply: \_\_\_\_\_ V, \_\_\_\_\_ ph, 60 Hz.

**Submittals.** Submittals shall be provided with the proposal and shall include: capacity data, electrical data physical data, electrical connection drawing and piping connection drawing.

**Quality assurance.** The system shall be completely factory-tested prior to shipment. Testing shall include, but not be limited to: Completely charging the system with refrigerant to ensure pressurized integrity, "Hi-Pot" test, and controls calibration and settings. Each system shall ship with a completed test report to verify completion of factory testing procedure. The system shall be NTRL listed.

## Product

**Microprocessor.** The microprocessor controller shall provide total environmental control. The system, based on the main controller, shall offer up to eight analog inputs, two analog outputs, twelve digital inputs and thirteen digital outputs. The operator interface shall provide a 4-line, 80-character backlit LCD display. User-friendly menu structure along with

clearly defined prompts shall allow the operator to easily move about the program and monitor the following functions and alarm conditions.

- **Status:** Complete status monitoring shall be provided within the status menu of the microprocessor controller, and shall include the following information: current temperature, current humidity, temperature setpoint, humidity setpoint, cooling status, heating status, humidification status, and dehumidification status.
- **Alarms:** Quick access to any alarm condition shall be facilitated through the menu structure. Presence of a new alarm shall sound an audible alarm. A red alarm LED on the display panel shall remain illuminated until such time that all alarms have been cleared. Alarm annunciation shall include: loss of air, clogged filter, high head pressure, low suction pressure, high temperature, low temperature, high humidity, low humidity. The temperature and humidity alarm setpoints are user adjustable.
- **Setpoint:** The microprocessor controller shall provide independent setpoints for heating, cooling, humidification, and dehumidification. Automatic setpoint cross-over protection shall prevent the setting of the heat setpoint above the cool setpoint, and the humidify setpoint above the dehumidify setpoint. Setpoint adjustment shall be capable of being protected via security code.
- **Configuration:** Flexibility shall be offered through the use of the configuration menu. It shall closely match the operating requirements by changing the configuration settings. The site configuration shall be stored in the EEPROM and be protected from unauthorized tampering by the user selectable 4-digit security password in the security menu. Configuration options shall include: Fahrenheit or Celsius display, compressor minimum off-time, power-loss restart time-delay, primary-secondary transfer functions, alarm input polarity, alarm enable, temperature deadbands, humidity deadbands, and small room delay.
- **Run time:** The major components within the unit (motor, humidifier and compressor) shall have independent run-timers that monitor and store the accumulated run-hours on the components. The run timers shall be provided with operator-adjustable run-time alarms for proper component maintenance.
- **Security:** The microprocessor shall have multiple security levels to prevent unauthorized adjustment of important system parameters. A user-selectable 4-digit password shall allow setpoint and configuration changes.

**Cabinet and frame.** The cabinet and frame shall be constructed from welded structural steel. Access panels shall be flush with the frame and insulated with fiberglass 1" (25 mm) in thickness, 1.5lb/ft<sup>3</sup> (0.7kg/m<sup>3</sup>) in density.

The panels are powder coated and lift off for access to the unit. A piping and electrical access plate shall be provided in the bottom of the unit. All units require front and left side access, 24" (610 mm) minimum.

**Blower system.** The unit shall be configured for draw-through air pattern, to provide uniform air-flow over the entire face of the coil. The blower shall be

double-inlet centrifugal type, with forward-curving blades, dynamically and statically balanced. Each blower shall be independently driven by a high-efficiency motor. The drive package shall be designed for 200% of the fan motor horsepower. Minimum bearing life shall be 200,000 L<sub>10</sub> hrs. The motor and blower shall be mounted on a common frame which is isolated from the vibration of the unit frame. Each blower shall discharge conditioned air into an insulated static-regain duct located within the downflow unit.

**Electrical.** The electrical system shall conform to National Electrical Code (NEC) requirements. The control voltage shall be 24 VAC, wired in accordance with NEC Class 1 requirements. The control circuit wire shall not be smaller than 18-gauge AWG. Each wire shall end with a service loop and be securely fastened by an approved method. Control wires more than 6" (150 mm) shall be color-coded or numbered every 3" (80 mm) for ease of service tracing. All electrically-actuated components shall be easily accessible from the front of the unit. Each high-voltage unit shall be individually protected on all three phases. Main power shall be connected to a circuit breaker mounted on the electrical panel. The compressor and motor shall have overload and short-circuit protection. The electrical box shall include all components and controls required for system operation. An emergency cool-override manual switch shall be provided with provision for control using a field supplied thermostat.

- Incoming power is \_\_\_\_\_ V, \_\_\_\_\_ ph, 60 Hz.

**Humidifier.** The humidifier(s) shall be self-contained steam-generating type, factory piped and wired, with disposable cylinder and automatic solid-state control circuit.

- Capacity: \_\_\_\_\_ lb/h (g/s).

**Reheat.** The reheat elements shall be low watt density resistance type, sized to offset the sensible cooling capacity in the dehumidification mode and shall be electrically and thermally protected by Safety Agency approved safeties.

- Reheat capacity shall be \_\_\_\_\_ MBH, \_\_\_\_\_ kW, controlled in \_\_\_\_\_ (#) steps.

**Refrigeration system.** Each refrigeration system shall consist of a fully protected scroll compressor, evaporator coil mounted over an insulated stainless steel condensate pan, adjustable expansion valve, filter-drier, liquid line solenoid valve, sight glass, receiver, liquid line isolation valve, low pressure switch and manual reset high pressure switch.

**Cooling coil.** The evaporator coil shall use the latest heat-transfer technology, raised lanced-aluminum fins and rifle-bored copper tubes. Coil end-supports shall be galvanized steel. To enhance dehumidification, the coil shall be split into two circuits by a microprocessor-controlled solenoid valve. An insulated stainless steel drain pan for condensate shall be included.

**Air filters.** The air filters shall be 30% efficient per ASHRAE Standard 52.1-92, UL Class 2. The full 4" (102 mm) deep, pleated filters shall be replaceable from the top on downflow units and from the front on upflow units.

## Individual systems

**Air-cooled system.** The air cooled system shall consist of an evaporator section including evaporator coil, blower package(s), controls and electrical section and compressor(s). The condenser section shall be as follows:

- **Outdoor propeller fan condenser:** The outdoor condenser casing shall be of aluminum, and all structural supports, coil frame, motor drive supports, and mounting legs shall be made of galvanized steel. The condenser shall have copper tubes expanded into aluminum fins. Headers and connections shall be copper. The coil shall be pressure tested and sealed for shipment. The condenser motors shall have permanently lubricated sealed ball bearings, with internal overload protection, and operate on \_\_\_\_\_-V, \_\_\_\_\_-ph, 60-Hz power. Motors shall be mounted inside the condenser casing for weather protection, and shall be wired to a terminal strip in a weather-proof panel on the unit. The direct drive, aluminum fan blade and painted steel hub assembly, shall be protected by a heavy-gauge, vinyl-coated, steel-wire fan guard. On multiple units, each fan section shall be separated by full-width baffles to prevent bypass air. The condenser shall be sized for \_\_\_\_\_ ° F (° C) ambient, and condensing temperature controls shall be fan speed for –20° F (–29° C) winter ambient. Flooded controls for –40° F (–40° C) optional.
- **Indoor floor-mounted centrifugal fan condenser:** The indoor floor mounted condenser shall be a draw-through design and include quiet belt-driven double-inlet centrifugal blower(s), and a condenser coil with copper tubes expanded into aluminum fins. Belt(s) shall be sized for 200% of the system horsepower. All components shall be housed in a corrosion-resistant, heavy-gauge, steel cabinet to match the evaporator section in finish and construction, equipment with 1" (25 mm) supply and return air-duct flanges. The condenser shall be sized for \_\_\_\_\_ ° F (° C) ambient with condensing temperature controls for –40°F (–40° C). The condenser section shall be remotely mounted suitable for \_\_\_\_\_ - V, \_\_\_\_\_ -ph, 60-Hz power.
- **Models with air cooled condensing units:** The air-cooled system shall consist of an evaporator section including evaporator coil, blower package(s), controls and electrical system. The remote air-cooled condensing unit, including compressor(s), shall be housed outdoors in a weather-resistant cabinet that shall allow service access through a hinged panel. The condenser coil shall have rifled copper tubes and enhanced aluminum fins. The coil shall be pressure-tested, and sealed for shipment. The condensing unit shall be equipped with scroll compressor(s) and crankcase heater(s), service valves, high and low pressure controls, receiver with fusible plug, liquid shut-off valve and charging port, liquid line filter-drier, and sight glass. The direct drive, propeller fan, condensing unit motor(s) shall have permanently lubricated sealed ball bearing, with internal overload protection, shall operate on \_\_\_\_\_ -V, \_\_\_\_\_ -ph, 60-Hz power, and shall be mounted inside the unit casing for weather protection. The standard condensing unit shall be sized for 95° F (35° C) ambient, and controls shall be flooded suitable for –20° F (–29° C) winter ambient. Optional controls for –30° F (–34° C) shall included insulated and heated receiver. The condensing unit shall be field-wired and-piped to the evaporator section and shall be suitable for remote outdoor installation.

**Water-and glycol-cooled systems.** The water/glycol-cooled systems shall consist of an evaporator section including evaporator coil, blower package(s), controls and electrical section, compressor(s), and a water/glycol-cooled condenser section. The condenser shall be stainless steel brazed plate design and shall be controlled by 2-way (3-way optional) head pressure-regulated valve(s). Maximum water pressure is 150 psi (1030 kPa).

• **Outside heat exchanger (drycooler) for glycol cooled systems only:**

The drycooler casing shall be of aluminum, and all structural supports, coil frame, motor-drive supports, and mounting legs shall be made of galvanized steel. The drycooler coil shall have copper tubes expanded into aluminum fins. Headers and connections shall be copper. The coil shall be pressure-tested and sealed for shipment. The drycooler motors shall have permanently lubricated, sealed, ball bearings, and internal overload protection. Motors shall be mounted inside the drycooler casing for weather protection and wired to a terminal strip in a weather-proof panel on the unit. The direct-drive, aluminum fan blade and painted steel hub assembly, shall be protected by a heavy-gauge, vinyl-coated, steel-wire fan guard. On multiple fan units, each fan section shall be separated by full-width baffles to prevent bypass air. The drycooler shall be sized for 95° F (35° C) ambient, and operate on \_\_\_\_\_ -V, \_\_\_\_\_ -ph, 60-Hz power.

• **Indoor floor mounted drycooler:** The indoor floor-mounted drycooler shall be a draw-through design and include a quiet belt-driven, double inlet centrifugal blower(s), and a condenser coil with copper tubes expanded into aluminum fins. Belt(s) shall be sized for 200% of the system horsepower. All components shall be housed in a corrosion-resistant, heavy-gauge, steel cabinet to match the evaporator section in finish and construction, equipped with 1" (25 mm) supply and return air duct flanges. The drycooler section shall be sized \_\_\_\_\_° F (° C) ambient. The drycooler section shall be remotely mounted suitable for \_\_\_\_\_ -V, \_\_\_\_\_ -ph, 60-Hz power.

• **Single pump package for glycol cooled systems only:** The pump package shall be comprised of a centrifugal pump in a vented enclosure with pump starter, separate drycooler fan and pump circuit breakers, Aquastat, and fan cycling contractor(s) to control the fluid temperature. The controls shall be mounted in a weather-tight box. An expansion tank and Airtrol fitting shall be supplied for field installation. The pump size shall be sized for \_\_\_\_\_ GPM (L/s) at \_\_\_\_\_ ft (m) external head, and operate on \_\_\_\_\_ -V, \_\_\_\_\_ -ph, 60-Hz power.

• **Dual pump package for glycol cooled system only:** The dual pump package shall consist of two centrifugal pumps in an enclosure. Pump starters, automatic pump switch-over controls, lead-lag pump selector switch, separate drycooler fan and pump circuit breakers, aquastat, and fan cycling contractor to control the fluid temperature shall be mounted in a separate weather-tight box. An expansion tank and airtrol fitting shall be supplied for field installation. Each pump shall be sized for \_\_\_\_\_ GPM(L/s) at \_\_\_\_\_ ft (m) external head, and operate on \_\_\_\_\_ -V, \_\_\_\_\_ -ph, 60-Hz power.



## Options

**Smoke detector(s).** Smoke detector(s) shall be factory-installed in the return air to sense concentrations of smoke and send a signal to the microprocessor to shut down the unit and activate a visual and audible alarm.

**Firestat.** A firestat shall be factory-installed in the return air to sense heat and send a signal to the microprocessor shutting down the unit and activating a visual and audible alarm.

**Water detector(s).** Water detector(s) shall be factory-wired and shipped in the bottom of the unit to sense water and send a signal to the microprocessor, giving the operator possible alarm indications options for shutdown. The water detector has a 15 ft (5 m) cable for mounting in the subfloor.

**Remote sensor(s).** The temperature and humidity sensors shall be shipped loose in a 2" × 4" × 1.5" (51 mm × 102 mm × 38 mm) box and 50 ft (15 m) of cable supplied for connection to the unit mounted controller.

**Remote shutdown.** A relay shall be factory installed in the unit with a two pin terminal block to be field wired to a \_\_\_\_\_ (24, 120, or 220 VAC) signal which will shut down the unit control circuit when the signal is received.

**Essential/non-essential lockout.** An essential/non-essential lockout relay shall be factory-installed and wired to a two-pin terminal block to prevent operation of reheat or humidifier operation when a \_\_\_\_\_ (24, 120, or 220 VAC) signal is received.

**Floorstand.** An adjustable floorstand fabricated from heavy gauge steel shall be provided. The height shall be adjustable from 6" to 36" (115 mm to 915 mm) on Upflow units and 12" to 36" (230 mm to 915 mm) on Downflow units. Pedestals and vibration pads shall be included. Each pedestal shall be a 3/4" (19 mm) threaded rod, capable of a 2000-lb. (910 kg) vertical load. Zone 4 seismic floorstands shall ship loose and shall be \_\_\_\_\_ in (mm) high, up to 36" (915 mm).

**Air Deflector.** A 90° air deflector shall ship loose and shall be \_\_\_\_\_ in. (mm) high.

**Top-discharge plenum.** A top-discharge plenum shall be supplied with a gasket material for mounting to an upflow unit. Manually adjustable, double-deflecting grilles shall be provided on 3 or 4 sides. A combination of sound lining and insulation material shall be used. Plenum height shall be 20" in (508 mm) or 24" (610 mm).

**Duct flange.** A 1" (25 mm) duct flange shall be factory-installed on the top of the upflow unit at the blower outlet.

**Redundant group control.** \_\_\_\_\_ (up to 6) units shall be capable of being connected together to form a redundant group. The master microprocessor controller shall monitor the status of the slave microprocessor controllers and determine—based on run time alarm conditions and local requirements, which the units in the redundant group shall run.

**Remote display panel.** A remote microprocessor control display with keypad shall be shipped loose in a 12" × 8" × 3" (300 mm × 200 mm × 80 mm) box and 50 ft (15 m) of cable supplied for connection to the units' microprocessor logic board.

**Monitoring system.** The PC-based Supervisor System shall be shipped loose for single-terminal monitoring and control of up to 120 units. The program shall be run through Windows® and shall have status screens for individual unit conditions, mode of operation and alarms. The System shall graphically present temperature and relative humidity over time. Temperature, relative humidity, alarm history, etc. shall be recorded for future reference.

**Environmental monitoring unit.** An “EMU” shall ship loose complete with one 12' (305 mm) probe and network connection.

**Hot water reheat.** The unit shall be supplied with factory installed copper tube, aluminum fin, hot water reheat coil in place of electrical heater elements. Capacity shall be \_\_\_\_\_ MBH (kW) with \_\_\_\_\_ GPM (L/s) of \_\_\_\_\_ ° F (° C) entering hot water temperature. Hot water shall be controlled with an on/off solenoid valve.

**Steam reheat.** The unit shall be supplied with a factory-installed copper tube, aluminum-fin-reheat steam-coil in place of electrical heater elements. Capacity shall be \_\_\_\_\_ MBH (kW) with 5 psi (35 kPa) of saturated steam. Steam shall be controlled with an on/off solenoid valve.

**Hot gas reheat.** The unit shall be supplied with a factory-installed copper tube and aluminum fin hot gas reheat coil, in place of electrical heater elements. Air-cooled systems using hot gas reheat shall also include flooded condenser pressure controls. This is not available with remote-condensing units.

**Premium efficiency motor(s).** Each motor shall have a premium efficiency of no less than \_\_\_\_\_% per NEMA MG1-12.55.

**High efficiency filter(s).** Filters shall be \_\_\_\_\_% efficient per ASHRAE Standard 52.1-92, UL Class2. The full 4" (102 mm) deep, pleated filters shall be replaceable from the top on downflow units and from the front on upflow units.

**Prefilter(s).** Replaceable 1" (25 mm) thick 25–30% efficient filter(s) shall be installed upstream of the final filters to lengthen service life.

**Condensate pump, factory installed .** A factory installed and wired condensate pump shall pump 36 gal/h (0.06 L/s) at 15' (4.6 m) head.

**Condensate pump, ship loose.** A condensate pump shall ship loose for field installation and wiring. Wiring shall be 120 VAC plug-in type. A check valve is also shipped loose. It shall have a capacity of 60 gal/h (0.06 L/s) at 15 ft (4.6 m) head.

**350 PSI water regulating valves.** The condensing temperature shall be automatically controlled by 2-way (3-way) 350 psi (2400 kPa) water regulating valve(s).

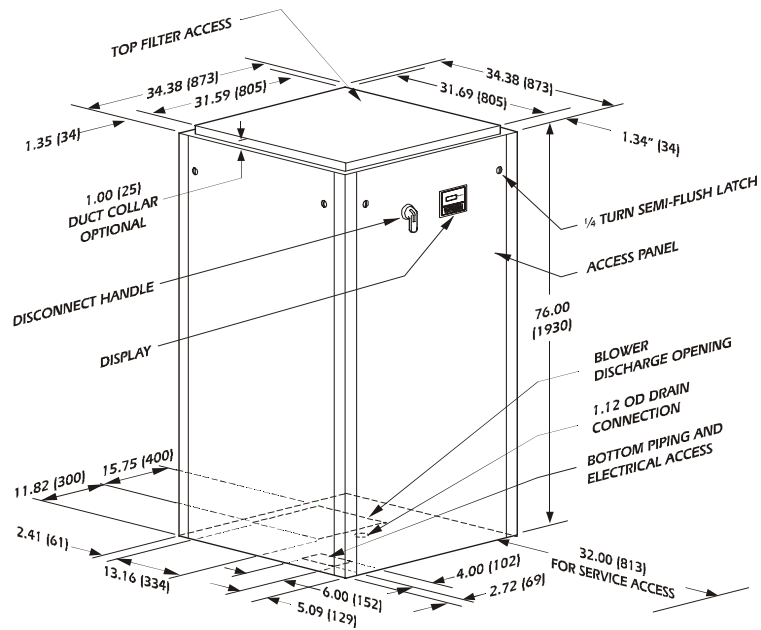
**Flared connections for filter-drier.** Flared connections shall be factory-installed on either side of the filter-drier to allow easy replacement.

**Hot gas bypass.** The unit shall be supplied with a factory installed hot gas bypass system to maintain efficient compressor operation during periods of low load. The valve shall automatically control the amount of hot gas bypassed to maintain the proper system capacity.



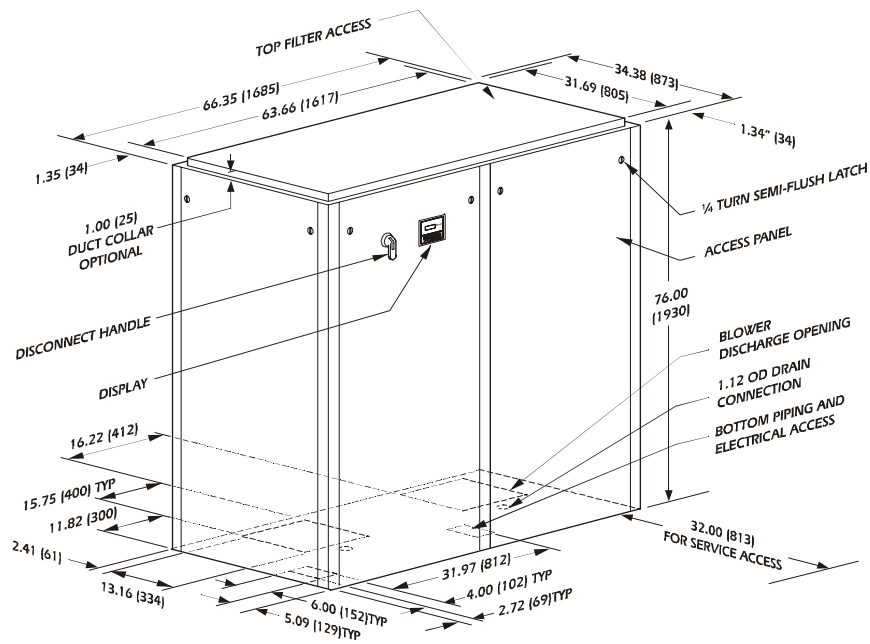
# Dimensional Data

## Downflow—6-8 ton



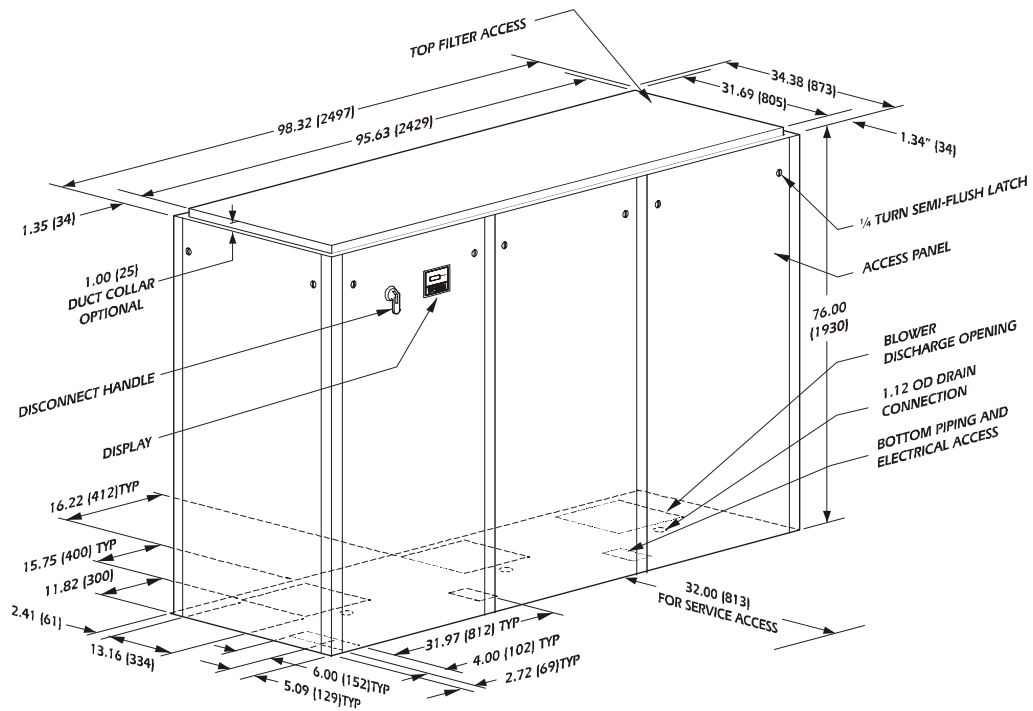
\*All dimensions in inches (mm)

## Downflow—10–18 ton



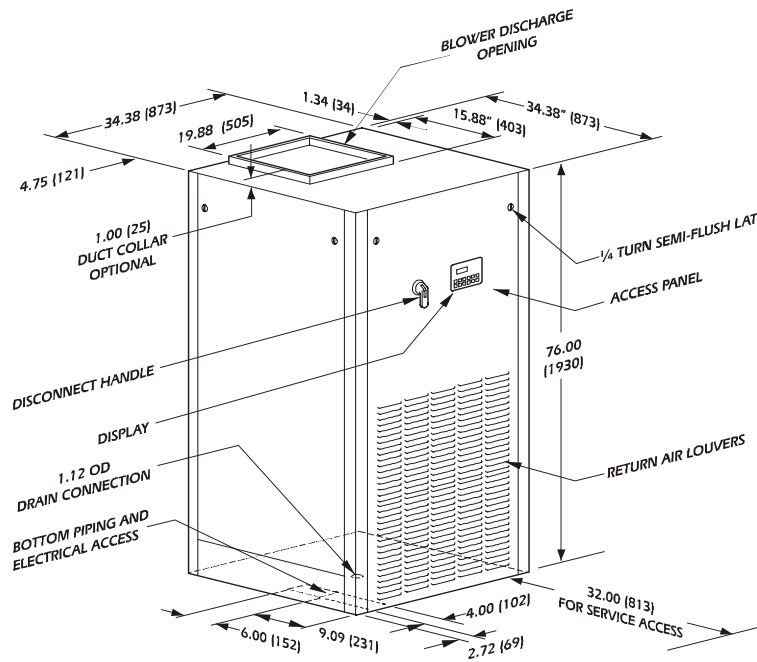
\*All dimensions in inches (mm)

## Downflow—20–28 ton



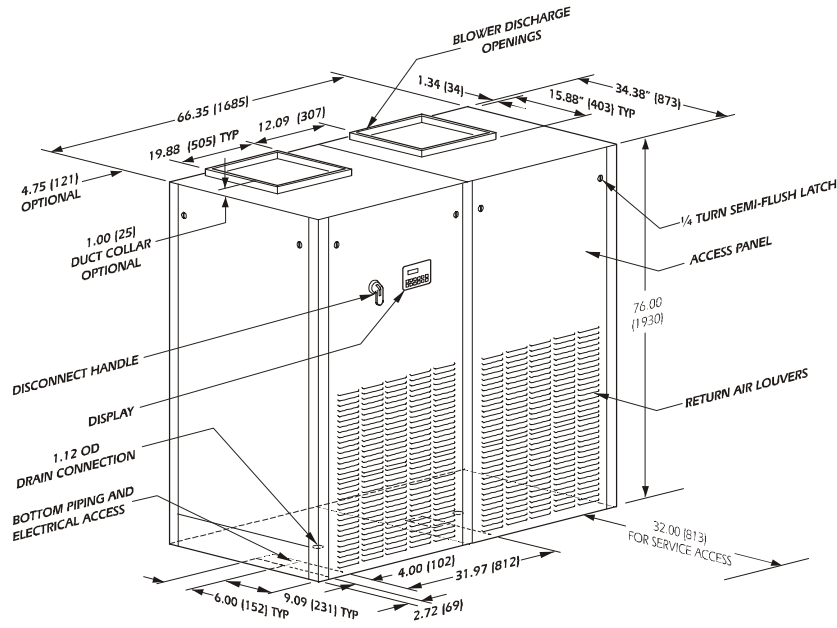
\*All dimensions in inches (mm)

## Upflow front-return—6–8 ton



\*All dimensions in inches (mm)

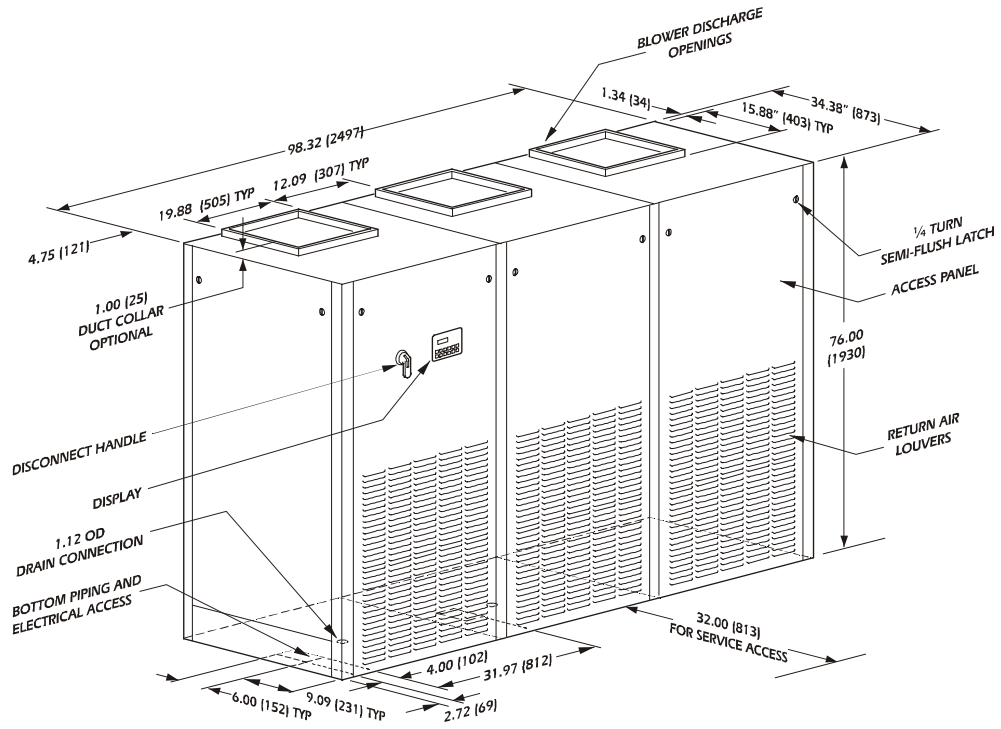
# Upflow front-return—10–18 ton



\*All dimensions in inches (mm)

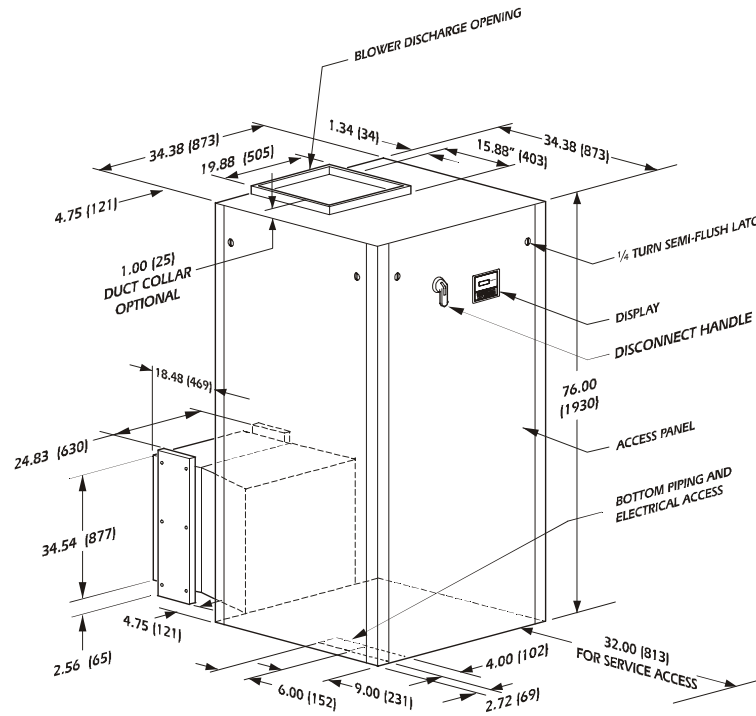


# Upflow front-return—20–28 ton



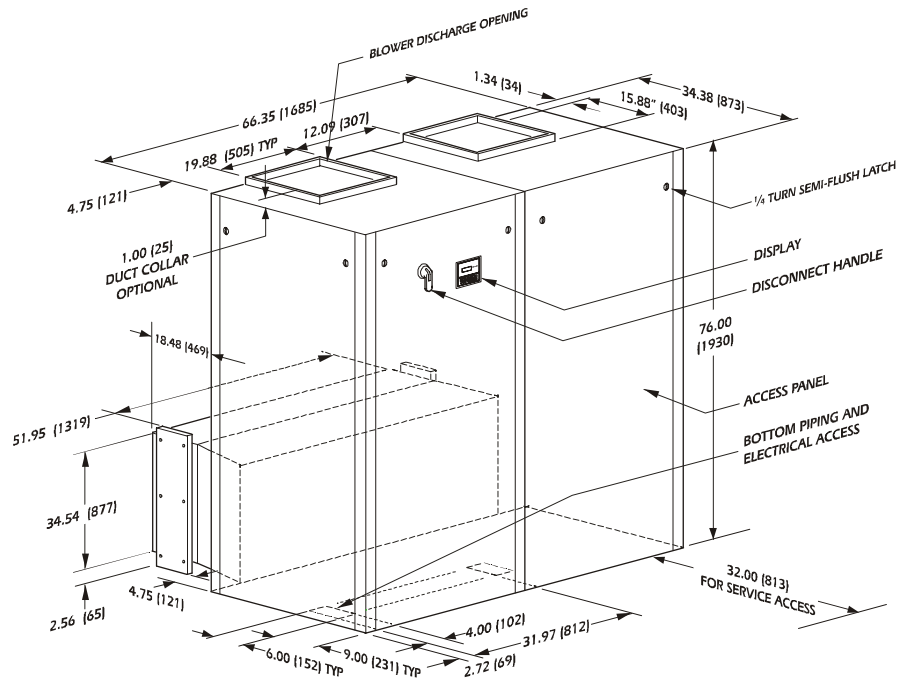
\*All dimensions in inches (mm)

## Upflow rear-return—6–8 ton



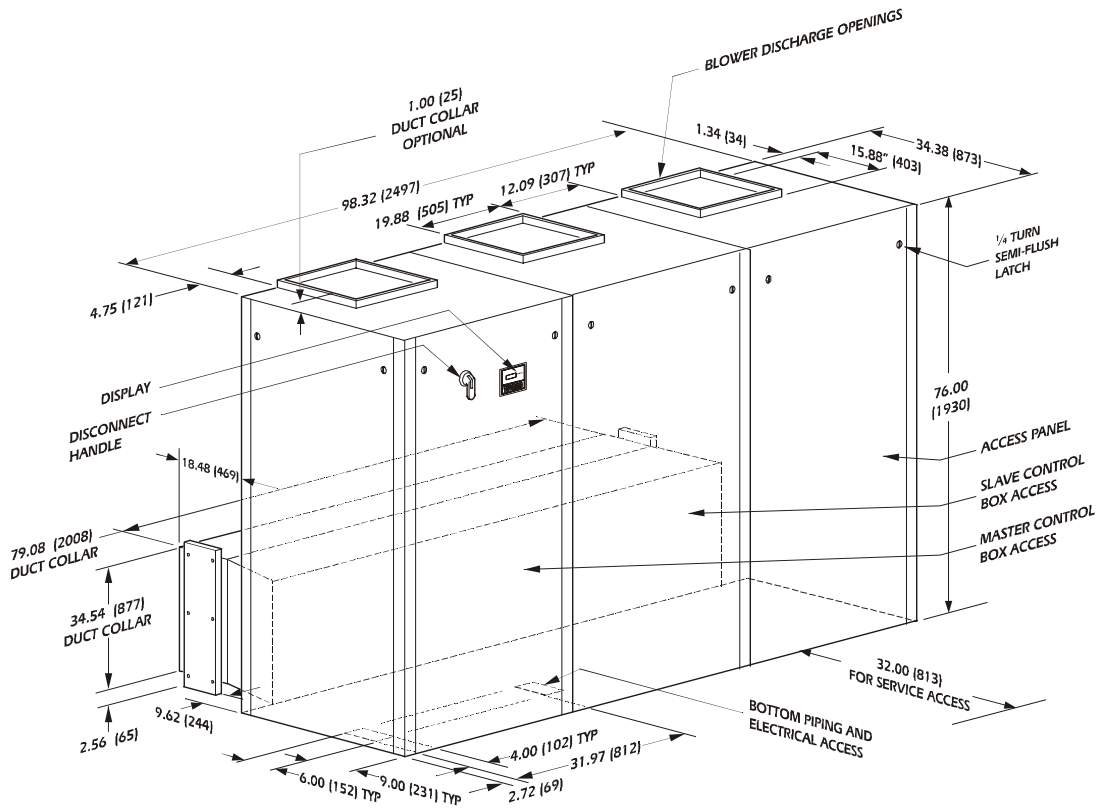
\*All dimensions in inches (mm)

# Upflow rear-return—10–18 ton



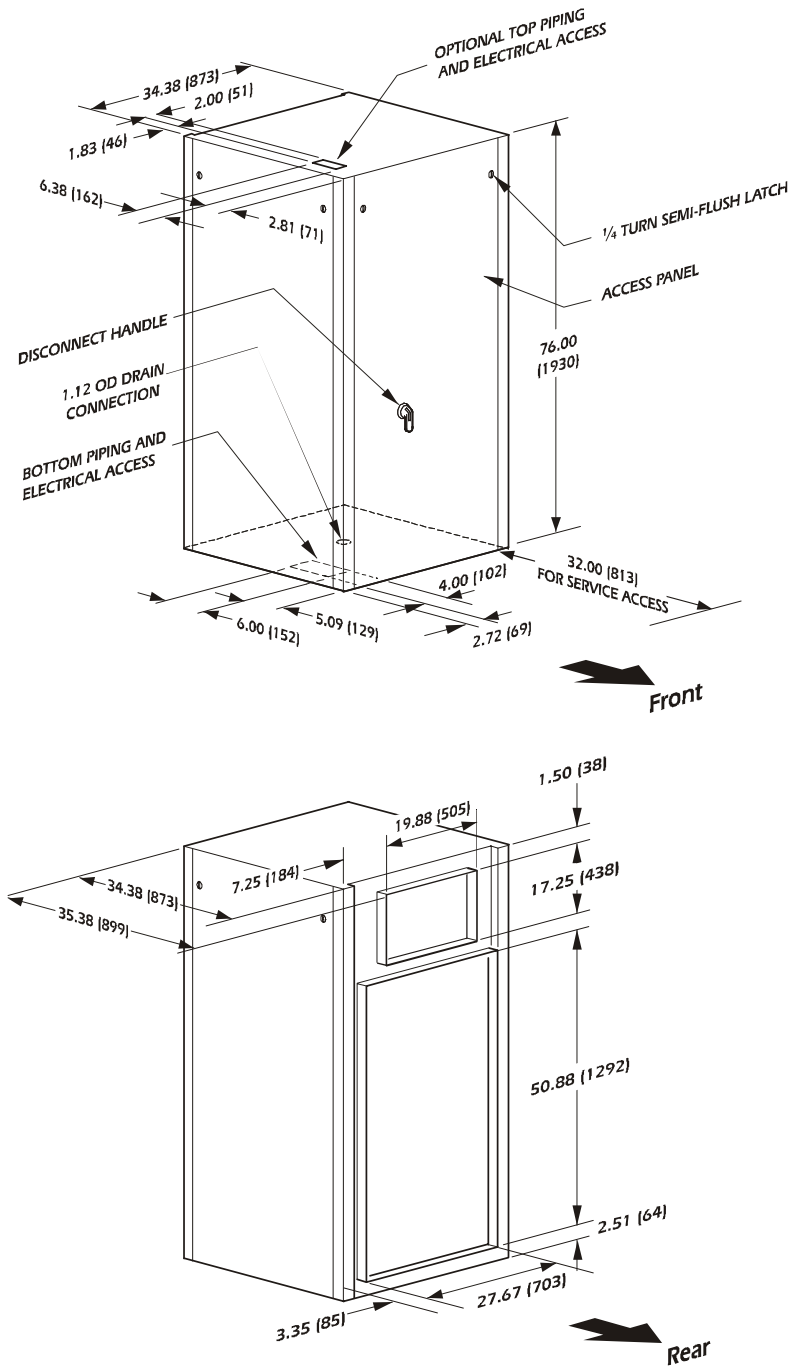
\*All dimensions in inches (mm)

# Upflow rear-return—20–28 ton



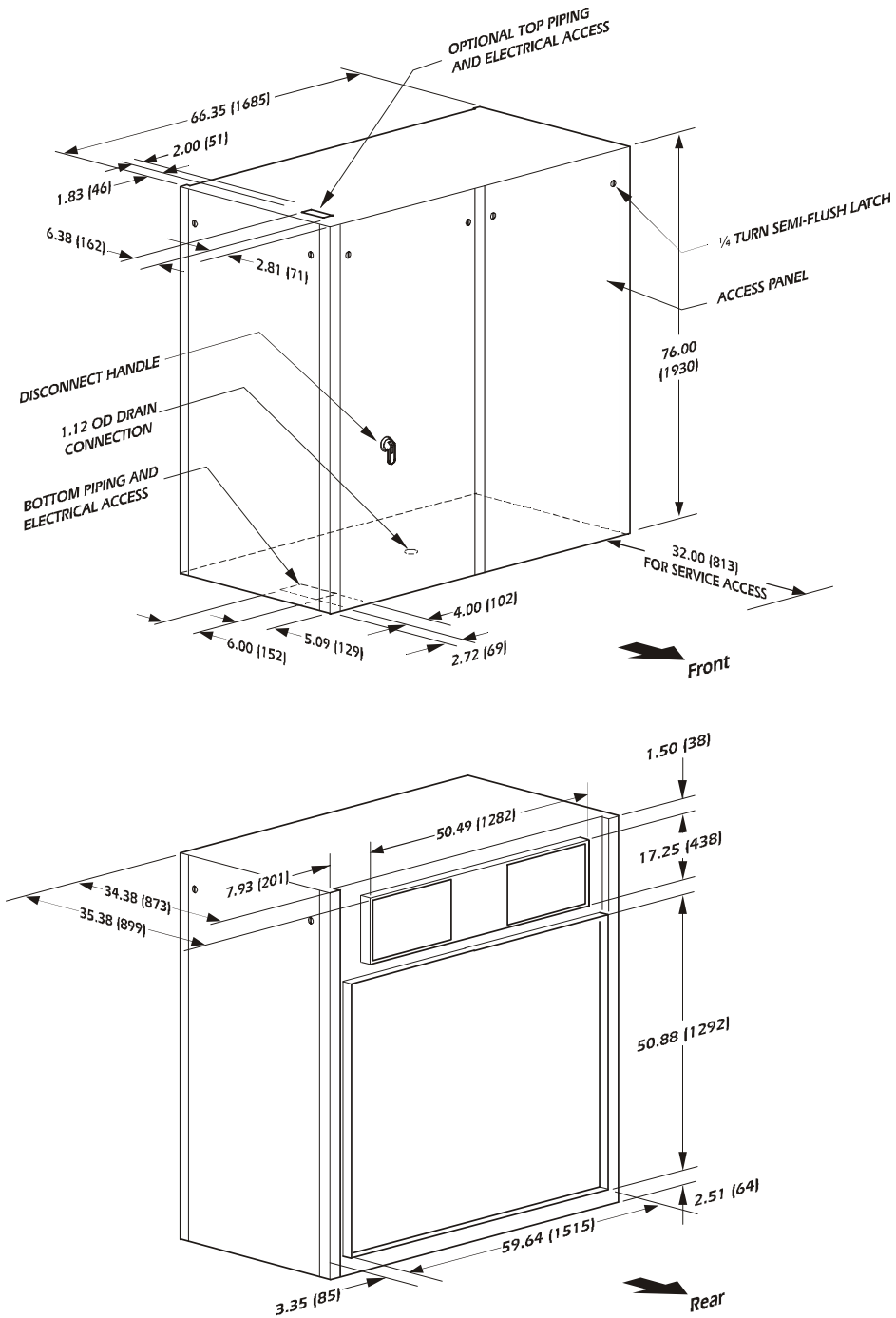
\*All dimensions in inches (mm)

# Indoor rear-discharge centrifugal condenser—6–8 ton



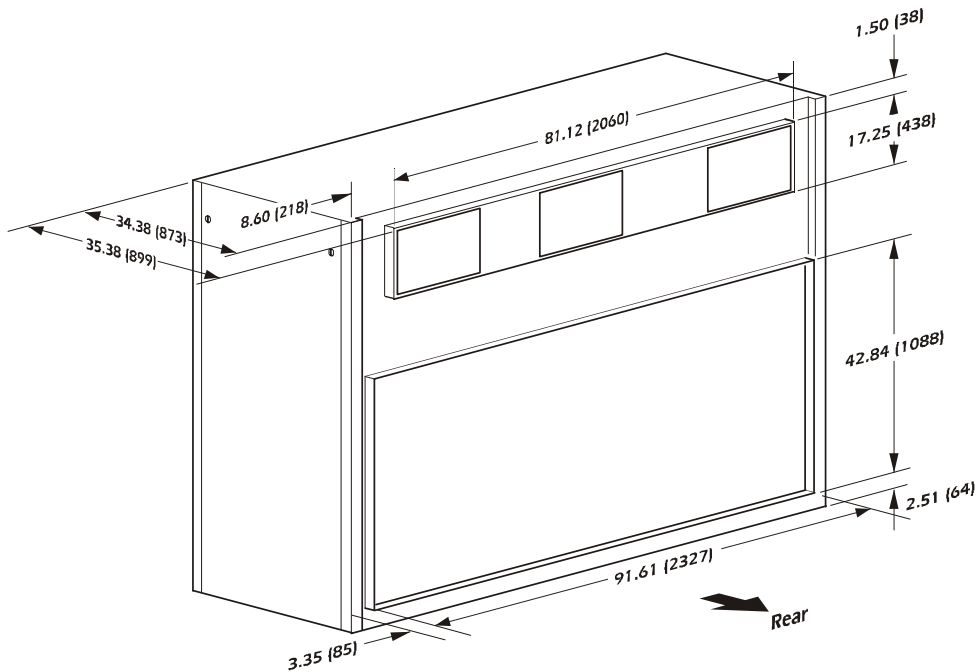
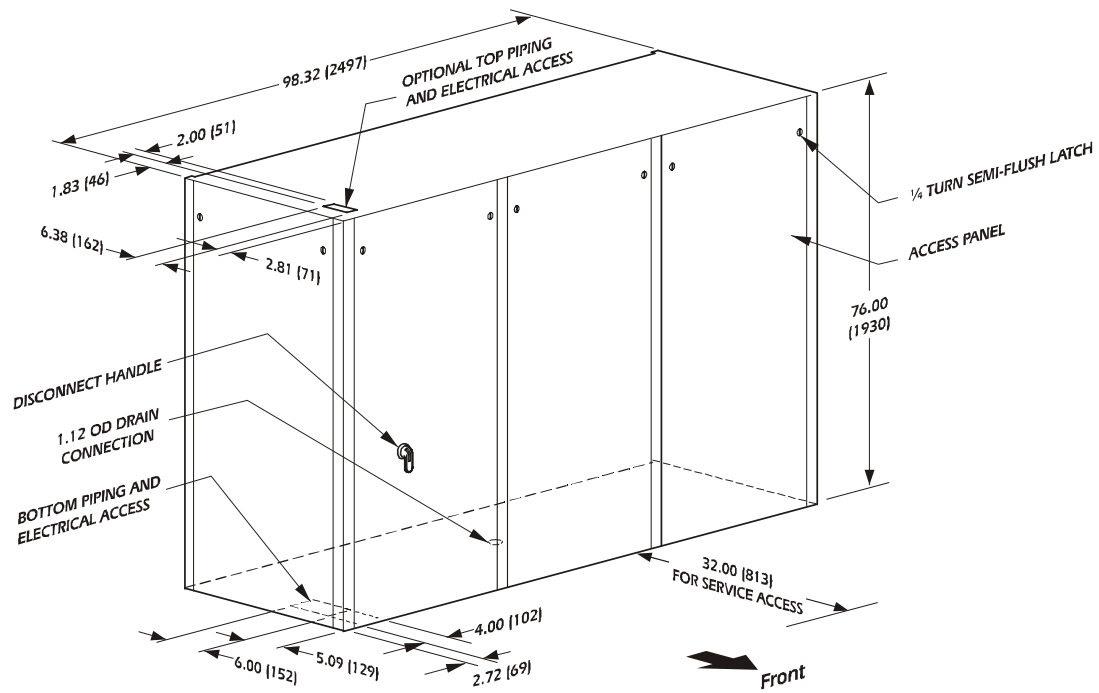
\*All dimensions in inches (mm)

# Indoor rear-discharge centrifugal condenser—10–18 ton



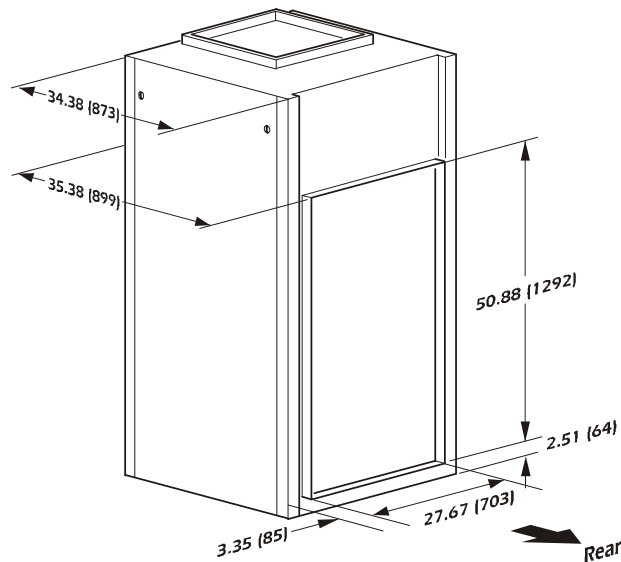
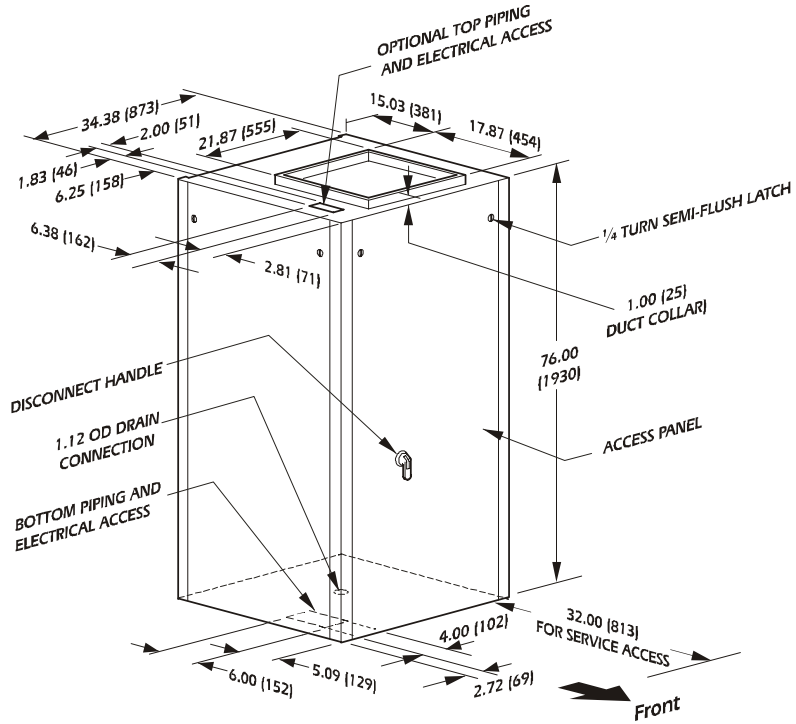
\*All dimensions in inches (mm)

# Indoor rear-discharge centrifugal condenser—20–28 ton



\*All dimensions in inches (mm)

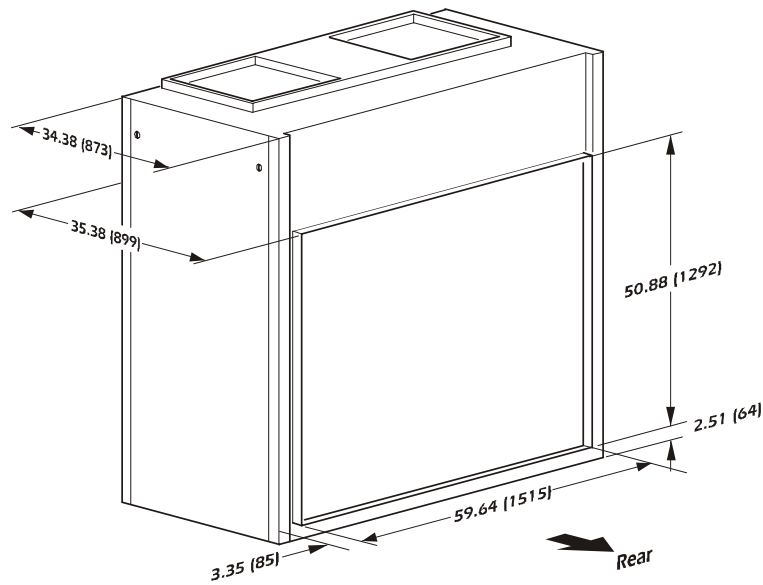
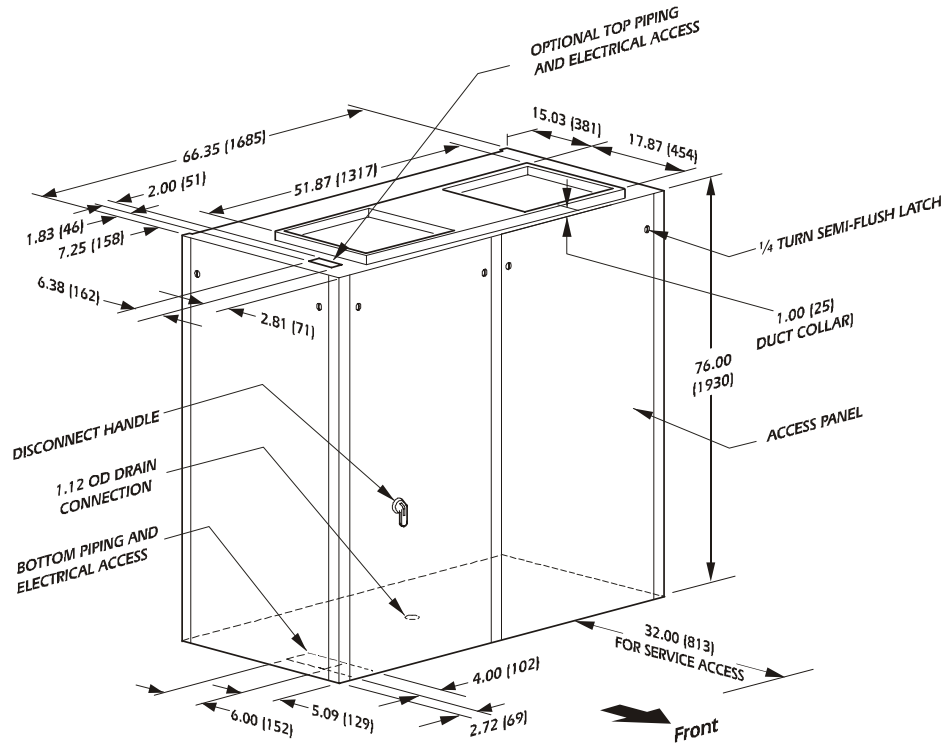
# Indoor top-discharge centrifugal condenser—6–8 ton



\*All dimensions in inches (mm)

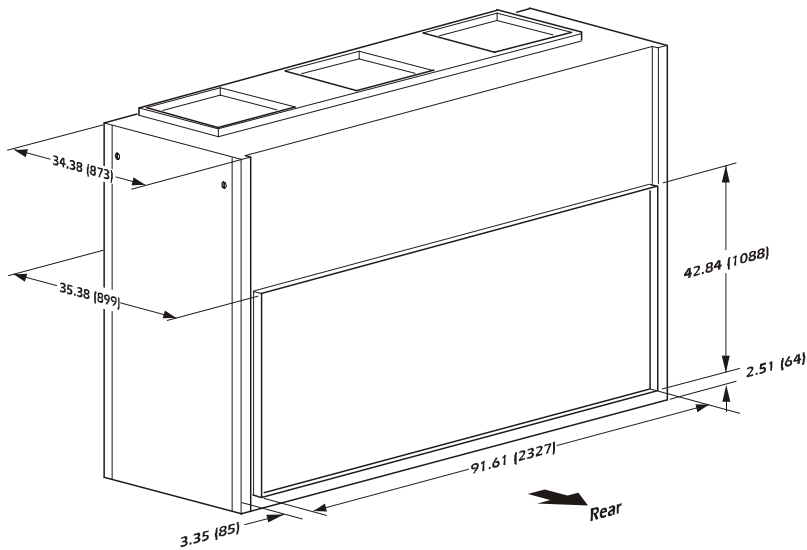
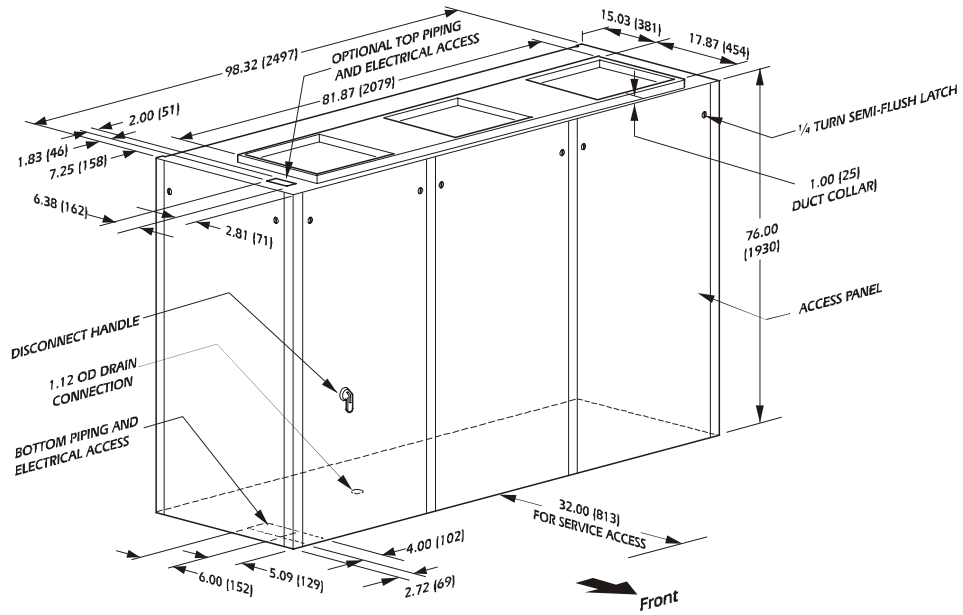


# Indoor top-discharge centrifugal condenser—10–18 ton



\*All dimensions in inches (mm)

# Indoor top-discharge centrifugal condenser—20–28 ton

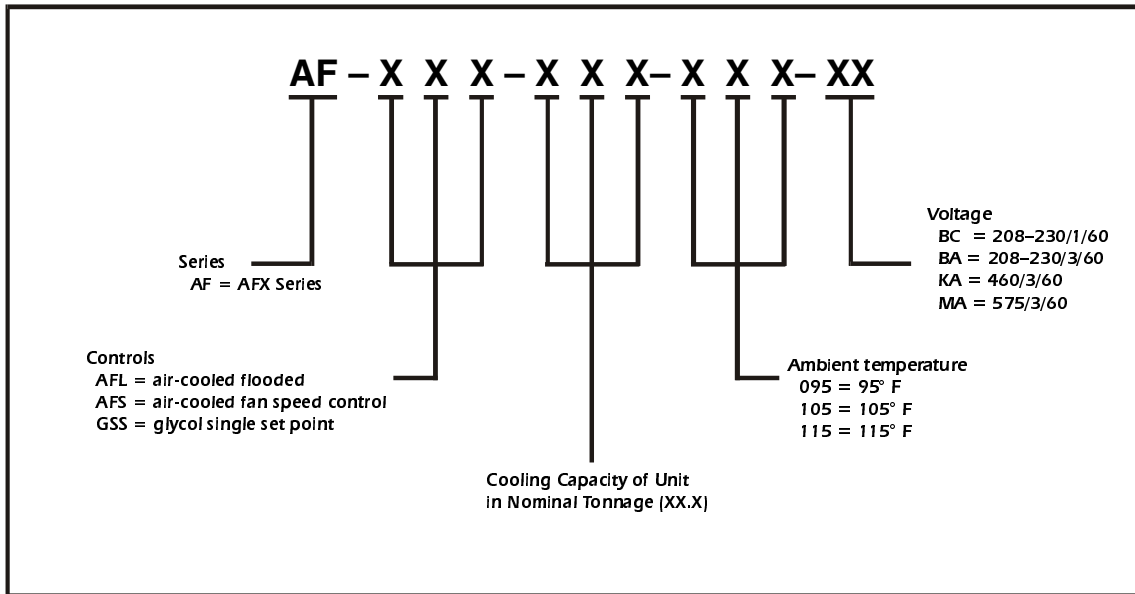


\*All dimensions in inches (mm)



# Air-Cooled Condensers and Drycoolers

## Key to the model number



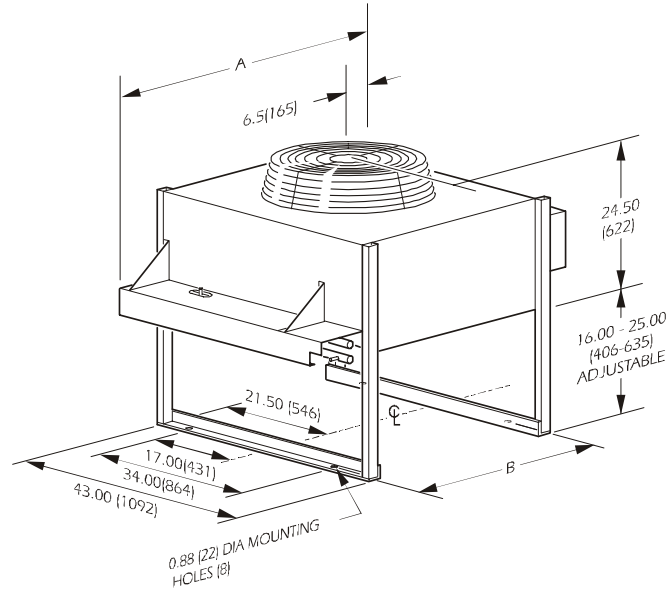
## Air-cooled condenser—physical data

MODEL TONNAGE	TEMP. AMBIENT	AIR QUANTITY		FAN QUANTITY	CONNECTION		WEIGHT	
		CFM	L/s		HOT GAS	LIQUID	Lbs	Kg
6 ton	95° F	6,450	3044	1	1-1/8"	7/8"	260	118
	105° F	6,450	3044	1	1-1/8"	7/8"	260	118
	115° F	10,100	4766	2	1-1/8"	7/8"	450	204
8 ton	95° F	10,100	4766	2	1-1/8"	7/8"	450	204
	105° F	10,100	4766	2	1-1/8"	7/8"	450	204
	115° F	12,400	5852	2	1-1/8"	7/8"	470	213
10 ton	95° F	12,400	5852	2	1-1/8"	7/8"	470	213
	105° F	12,400	5852	2	1-1/8"	7/8"	470	213
	115° F	13,700	6465	2	1-1/8"	7/8"	510	231
12 ton	95° F	13,700	6465	2	1-1/8"	7/8"	510	231
	105° F	13,700	6465	2	1-1/8"	7/8"	510	231
	115° F	12,900	6088	2	1-3/8"	1-1/8"	530	240
14 ton	95° F	12,900	6088	2	1-3/8"	1-1/8"	530	240
	105° F	12,900	6088	2	1-3/8"	1-1/8"	530	240
	115° F	20,500	9674	3	1-3/8"	1-1/8"	550	249
18 ton	95° F	20,500	9674	3	1-3/8"	1-1/8"	550	249
	105° F	20,500	9674	3	1-3/8"	1-1/8"	550	249
	115° F	19,900	9391	3	1-3/8"	1-1/8"	580	263
20 ton	95° F	19,900	9391	3	1-3/8"	1-1/8"	580	263
	105° F	19,900	9391	3	1-3/8"	1-1/8"	580	263
	115° F	20,700	9768	2	1-5/8"	1-5/8"	880	400
26 ton	95° F	20,700	9768	2	1-5/8"	1-5/8"	880	400
	105° F	20,700	9768	2	1-5/8"	1-5/8"	880	400
	115° F	34,800	16,422	3	2-1/8"	2-1/8"	1,190	540
28 ton	95° F	34,800	16,422	3	2-1/8"	2-1/8"	1,190	540
	105° F	34,800	16,422	3	2-1/8"	2-1/8"	1,190	540
	115° F	32,900	15,526	3	2-1/8"	2-1/8"	1,210	550

## Air-cooled condenser—electrical data

MODEL	TEMP.	208-230/1/60			208-230/3/60			460/3/60			575/3/60		
TONNAGE	AMBIENT	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP
6 ton	95° F	4.8	10.8	20	N/A	N/A	N/A	2.4	5.4	15	2.0	4.5	15
	105° F	4.8	10.8	20	N/A	N/A	N/A	2.4	5.4	15	2.0	4.5	15
	115° F	8.2	14.2	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
8 ton	95° F	8.2	14.2	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	105° F	8.2	14.2	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	115° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
10 ton	95° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	105° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	115° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
12 ton	95° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	105° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	115° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
14 ton	95° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	105° F	8.7	14.7	20	7.4	13.4	20	3.7	6.7	15	3.0	5.5	15
	115° F	12.6	18.6	25	10.0	16.0	20	5.0	8.0	15	3.9	6.4	15
18 ton	95° F	12.6	18.6	25	10.0	16.0	20	5.0	8.0	15	3.9	6.4	15
	105° F	12.6	18.6	25	10.0	16.0	20	5.0	8.0	15	3.9	6.4	15
	115° F	12.6	18.6	25	10.0	16.0	20	5.0	8.0	15	3.9	6.4	15
20 ton	95° F	12.6	18.6	25	10.0	16.0	20	5.0	8.0	15	3.9	6.4	15
	105° F	12.6	18.6	25	10.0	16.0	20	5.0	8.0	15	3.9	6.4	15
	115° F	N/A	N/A	N/A	11.8	17.8	25	5.9	8.9	15	4.4	6.9	15
26 ton	95° F	N/A	N/A	N/A	11.8	17.8	25	5.9	8.9	15	4.4	6.9	15
	105° F	N/A	N/A	N/A	11.8	17.8	25	5.9	8.9	15	4.4	6.9	15
	115° F	N/A	N/A	N/A	18.8	24.8	35	9.4	12.4	15	6.8	9.3	15
28 ton	95° F	N/A	N/A	N/A	18.8	24.8	35	9.4	12.4	15	6.8	9.3	15
	105° F	N/A	N/A	N/A	18.8	24.8	35	9.4	12.4	15	6.8	9.3	15
	115° F	N/A	N/A	N/A	18.8	24.8	35	9.4	12.4	15	6.8	9.3	15

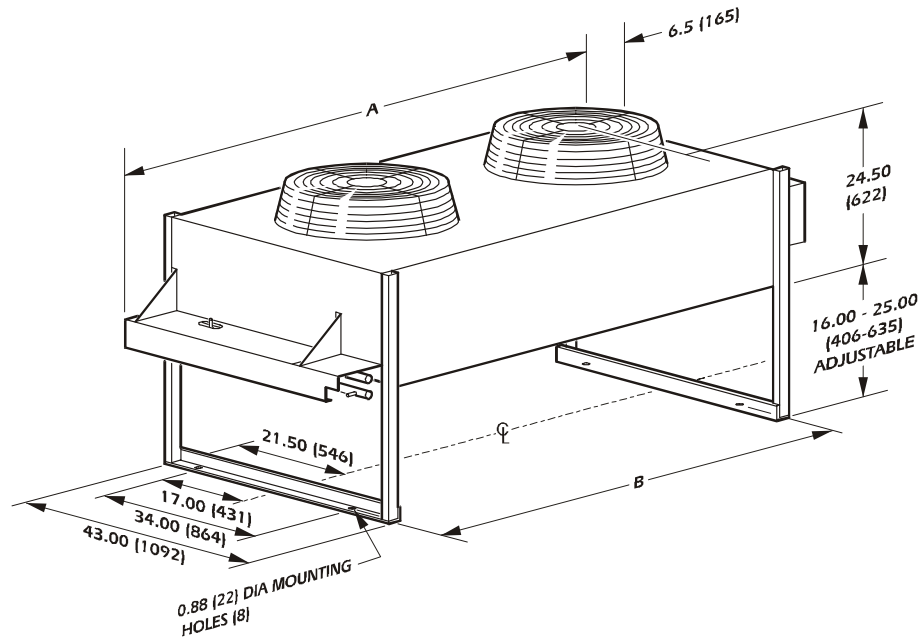
## Single-fan air-cooled condenser—6 ton



APC UNIT	TEMP	FAN QTY	A	B
6 ton	95° F (35° C)	1	49.75 (1264)	40.00 (1016)
6 ton	105° F (41° C)	1	49.75 (1264)	40.00 (1016)

\*All dimensions in inches (mm)

## Dual-fan air-cooled condenser—6–14 ton

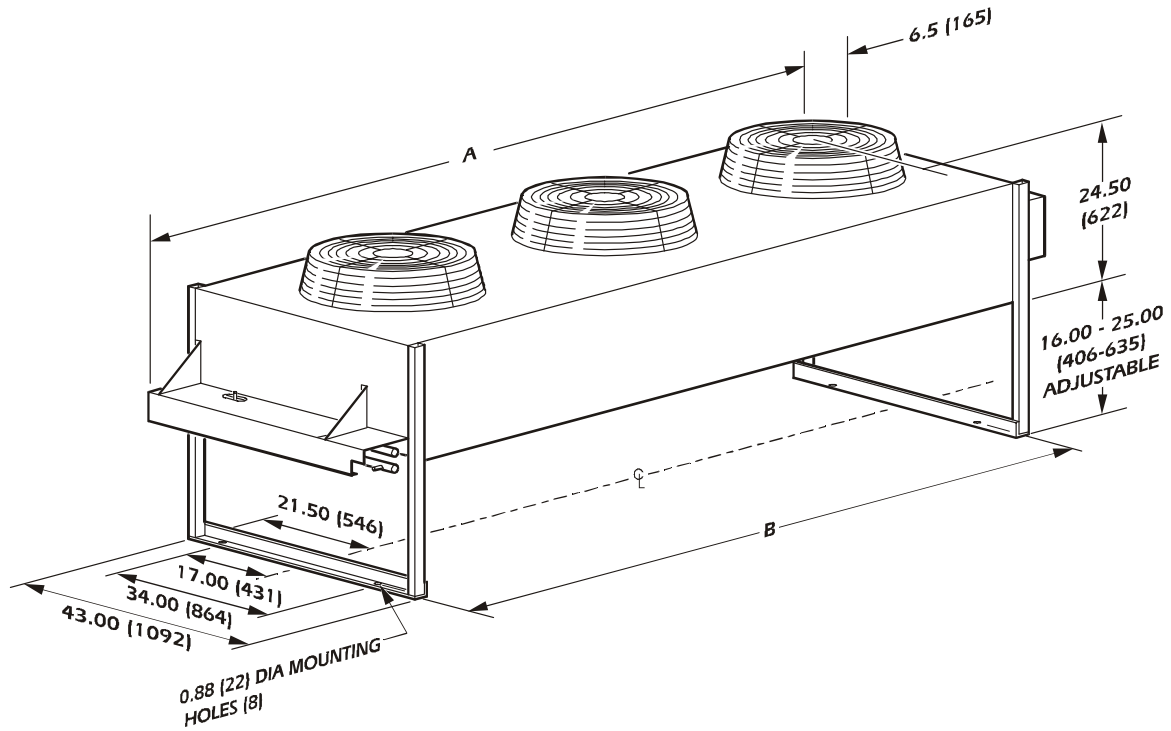


APC UNIT	TEMP	FAN QTY	A	B
6 ton	115° F (46° C)	2	69.75 (1772)	60.00 (1524)
8 ton	95° F (35° C)	2	69.75 (1772)	60.00 (1524)
8 ton	105° F (41° C)	2	69.75 (1772)	60.00 (1524)
8 ton	115° F (46° C)	2	69.75 (1772)	60.00 (1524)
10 ton	95° F (35° C)	2	69.75 (1772)	60.00 (1524)
10 ton	105° F (41° C)	2	69.75 (1772)	60.00 (1524)
10 ton	115° F (46° C)	2	89.75 (2280)	80.00 (2032)
12 ton	95° F (35° C)	2	89.75 (2280)	80.00 (2032)
12 ton	105° F (41° C)	2	89.75 (2280)	80.00 (2032)
12 ton	115° F (46° C)	2	89.75 (2280)	80.00 (2032)
14 ton	95° F (35° C)	2	89.75 (2280)	80.00 (2032)
14 ton	105° F (41° C)	2	89.75 (2280)	80.00 (2032)

\*All dimensions in inches (mm)



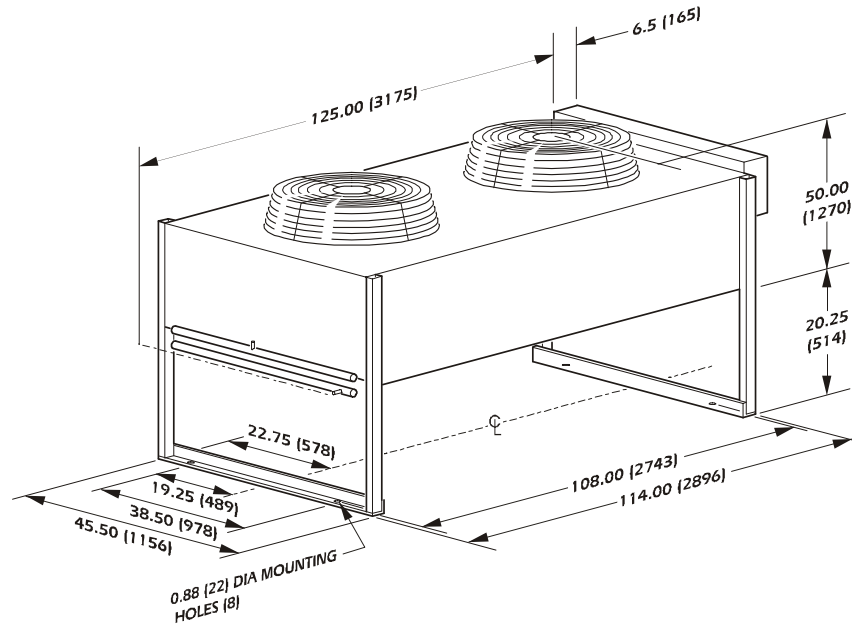
## Triple-fan air-cooled condenser—14–20 ton



APC UNIT	TEMP	FAN QTY	A	B
14 ton	115° F (46° C)	3	129.75 (3296)	120.00 (3048)
18 ton	95° F (35° C)	3	129.75 (3296)	120.00 (3048)
18 ton	105° F (41° C)	3	129.75 (3296)	120.00 (3048)
18 ton	115° F (46° C)	3	129.75 (3296)	120.00 (3048)
20 ton	95° F (35° C)	3	129.75 (3296)	120.00 (3048)
20 ton	105° F (41° C)	3	129.75 (3296)	120.00 (3048)

\*All dimensions in inches (mm)

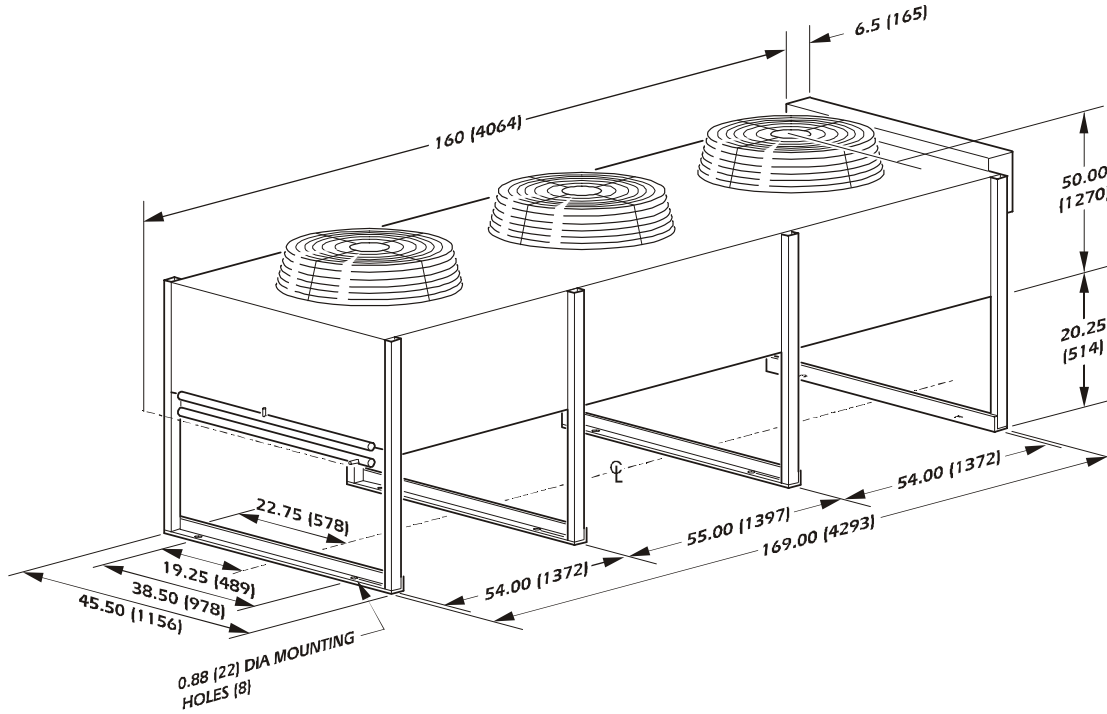
## Dual-fan air-cooled condenser—20–26 ton



APC UNIT	TEMP	FAN QTY
20 ton	115° F (46° C)	2
26 ton	95° F (35° C)	2
26 ton	105° F (41° C)	2

\*All dimensions in inches (mm)

## Triple-fan air-cooled condenser—26–28 ton



APC UNIT	TEMP	FAN QTY
26 ton	115° F (46° C)	3
28 ton	95° F (35° C)	3
28 ton	105° F (41° C)	3
28 ton	115° F (46° C)	3

\*All dimensions in inches (mm)

# Drycooler

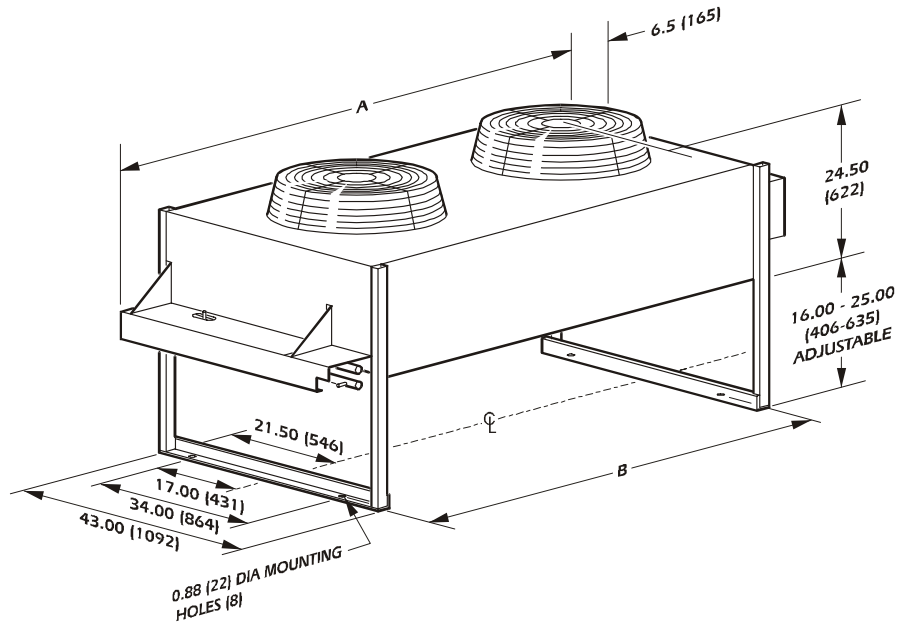
## Glycol cooled drycooler—physical data

MODEL	TEMP.	AIR QUANTITY		FAN	CONNECTION		WEIGHT		GLYCOL VOLUME	
		TONNAGE	AMBIENT		CFM	L/s	QUANTITY	HOT GAS	LIQUID	Lbs
6 ton	95° F	10,100	4766	2	1-3/8"	1-3/8"	450	204	4.9	18.1
8 ton	95° F	12,900	6088	2	1-3/8"	1-3/8"	530	240	9.1	33.7
10 ton	95° F	20,500	9674	3	1-3/8"	1-3/8"	550	250	10.2	37.7
12 ton	95° F	20,500	9674	3	1-3/8"	1-3/8"	550	250	10.2	37.7
14 ton	95° F	21,900	10,335	2	2-5/8"	2-5/8"	790	359	9.2	34.8
18 ton	95° F	20,700	9768	2	2-5/8"	2-5/8"	880	400	11.8	43.7
20 ton	95° F	34,800	16,422	3	2-5/8"	2-5/8"	1190	540	13.0	48.1
26 ton	95° F	32,900	15,526	3	2-5/8"	2-5/8"	1210	550	13.0	48.1
28 ton	95° F	32,900	15,526	3	2-5/8"	2-5/8"	1210	550	13.0	48.1

## Glycol cooled drycooler—electrical data

MODEL	TEMP.	208-230/1/60			208-230/3/60			460/3/60			575/3/60		
		TONNAGE	AMBIENT	FLA	MCA	MOP	FLA	MCA	MOP	FLA	MCA	MOP	FLA
6 ton	95° F	6.8	11.1	15	5.2	8.5	15	2.6	4.2	15	1.9	3.1	15
8 ton	95° F	7.8	12.7	20	5.2	8.5	15	2.6	4.2	15	1.9	3.1	15
10 ton	95° F	11.7	16.6	20	7.8	11.1	15	3.9	5.5	15	2.9	4.0	15
12 ton	95° F	11.7	16.6	20	7.8	11.1	15	3.9	5.5	15	2.9	4.0	15
14 ton	95° F	N/A	N/A	N/A	14.0	22.8	35	7.0	11.4	15	4.8	7.8	15
18 ton	95° F	N/A	N/A	N/A	14.0	22.8	35	7.0	11.4	15	4.8	7.8	15
20 ton	95° F	N/A	N/A	N/A	21.0	29.8	40	10.5	14.9	20	7.2	10.2	15
26 ton	95° F	N/A	N/A	N/A	21.0	29.8	40	10.5	14.9	20	7.2	10.2	15
28 ton	95° F	N/A	N/A	N/A	21.0	29.8	40	10.5	14.9	20	7.2	10.2	15

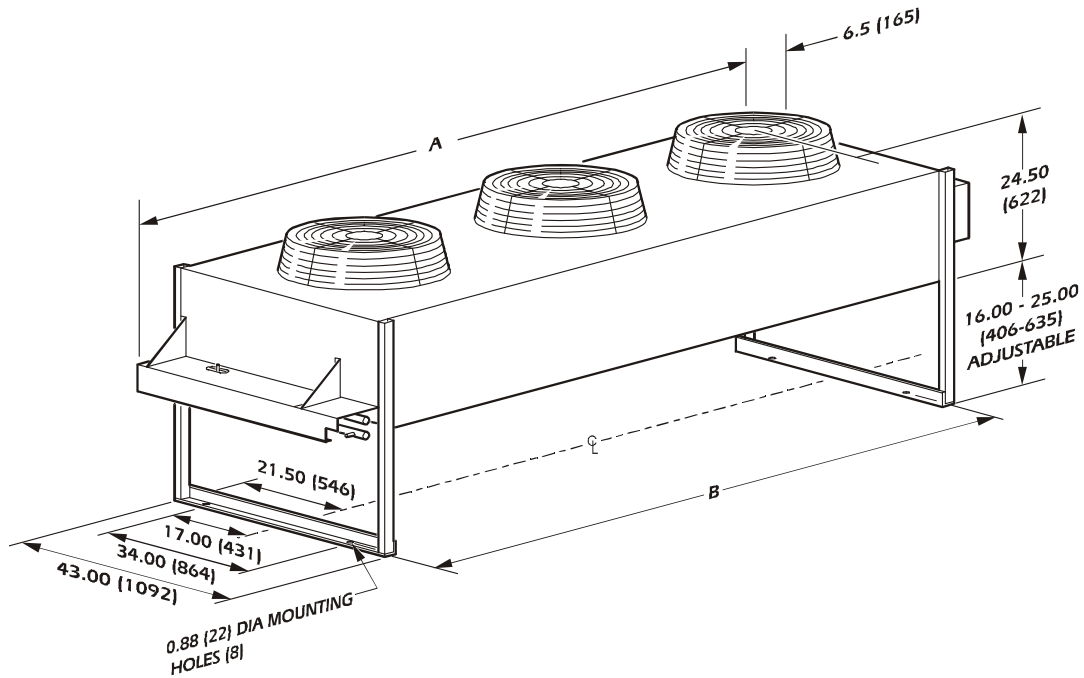
## Dual-fan fluid cooler—6–8 ton



APC UNIT	TEMP	FAN QTY	A	B
6 ton	95° F (35° C)	2	69.5 (1765)	60.00 (1524)
8 ton	95° F (35° C)	2	69.75 (1772)	80.00 (2032)

\*All dimensions in inches (mm)

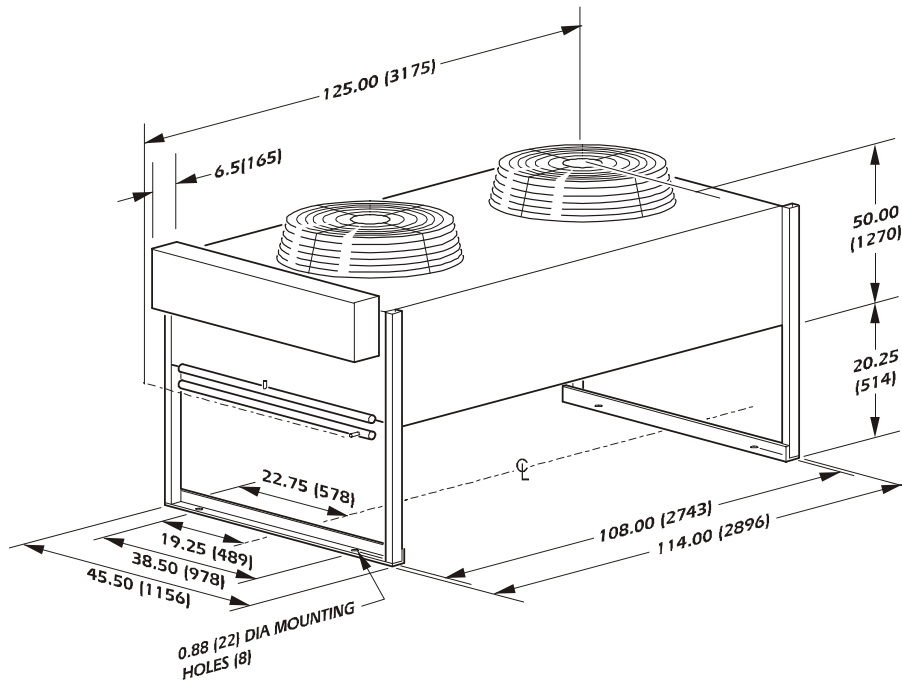
## Triple-fan fluid cooler—10–12 ton



APC UNIT	TEMP	FAN QTY	A	B
10 ton	95° F (35° C)	3	129.75 (3296)	120.00 (3048)
12 ton	95° F (35° C)	3	129.75 (3296)	120.00 (3048)

\*All dimensions in inches (mm)

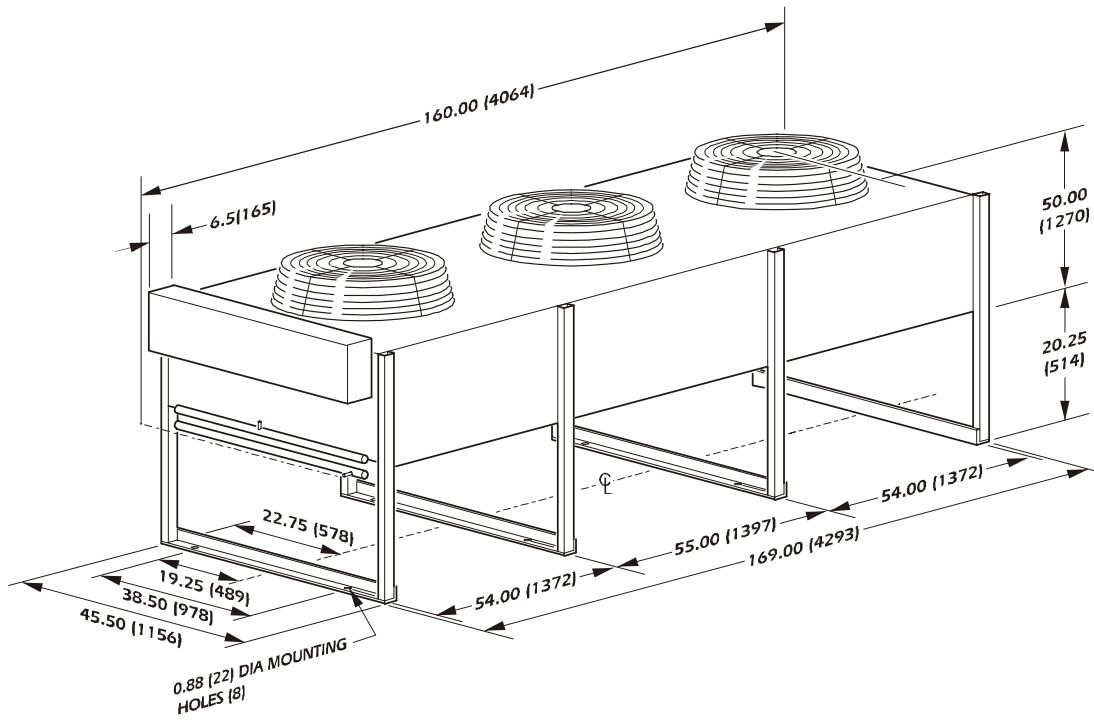
## Dual-fan fluid cooler—14–18 ton



APC UNIT	TEMP	FAN QTY
14 ton	95° F (35° C)	2
18 ton	95° F (35° C)	2

\*All dimensions in inches (mm)

## Triple-fan fluid cooler—20–28 ton



APC UNIT	TEMP	FAN QTY
20 ton	95° F (35° C)	3
26 ton	95° F (35° C)	3
28 ton	95° F (35° C)	3

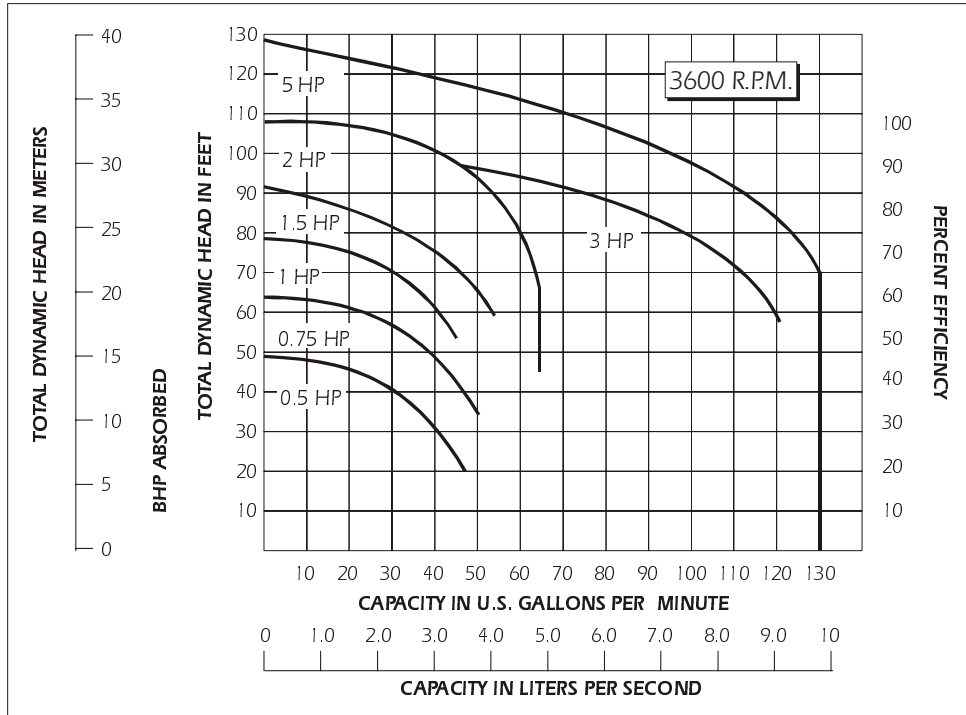
\*All dimensions in inches (mm)





# Pump Specifications

## Pump performance



## Pump electrical data

HP (kW)	1/2" (.37)		3/4" (.56)		1" (.75)		1.5" (1.1)		2" (1.5)	
VOLTAGE	FLA	MCA	FLA	MCA	FLA	MCA	FLA	MCA	FLA	MCA
208/1/60	5.4	6.8	7.6	9.5	8.8	11.0	11.0	13.8	13.2	16.5
230/1/60	4.9	6.1	6.9	8.6	8.0	10.0	10.0	12.5	12.0	15.0
208/3/60	2.4	3.0	3.5	4.4	4.6	5.8	6.6	8.3	7.5	9.4
230/3/60	2.2	2.8	3.2	4.0	4.2	5.3	6.0	7.5	6.8	8.5
460/3/60	1.1	1.4	1.6	2.0	2.1	2.6	3.0	3.8	3.4	4.3
575/3/60	0.9	1.1	1.3	1.6	1.7	2.1	2.4	3.0	2.7	3.4

FLA= Full Load Amperes

MCA=Minimum Circuit Amperes

\*Values are calculated based on 3-phase power



# Guidelines for Installation

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The AFX series provides reliable, accurate temperature and humidity control of computer rooms, laboratories, and other environments that require close tolerance control. The unit incorporates the latest system design innovations to provide you with optimum efficiency, reliability, and accuracy of control.

The AFX system will provide years of trouble-free service, if it is installed and maintained by technically qualified personnel.

## Room preparation

During the design of the room, consideration should be given to the following factors: ease of entry for the system, floor-loading factors, and accessibility of piping and wiring.

The room must be sealed with a vapor barrier to minimize migration of moisture. Polyethylene film (plastic sheeting) is a good vapor barrier for ceiling and wall applications. Rubber- or plastic-based paints should be applied to concrete floors and walls. The room should be thoroughly insulated to minimize thermal loads and make-up air (if required) should be preconditioned to reduce additional temperature, filtration, and moisture loads.

A room using a raised-floor plenum for air distribution should have at least 9" (300 mm) of clear space between the false floor and sub-floor for a finished floor height of 12" (380 mm). Pay special attention to the location of pipe chases, electrical conduits and other obstructions under the floor. These objects can block air circulation and cause loss of air pressure, thus reducing system efficiency and causing hot spots in your room.

Minimum clear space of 18" (460 mm) is to be provided for units over 15 tons (53 kW).

APC should be notified before installation if the unit is incorrect for the application.

## Unit location

The location of the unit is important for efficient and balanced environmental control in your room. The air conditioner should be located as close as possible to the largest heat load. In rooms having a high aspect ratio, mount the unit along the longest wall to ensure even air distribution. If improperly installed, erratic control or mechanical failure can and will result if the unit does not obtain proper air volume and distribution.

## Service access

At least 24" (610 mm) of clear space must be left in front of the unit for routine service (belts, filters, humidifier). We strongly recommend approximately 34" (860 mm) clearance in front of the unit.

## Receiving the unit

Your AFX unit has been completely tested and inspected prior to shipment. To ensure that you have received the unit in excellent condition, perform a careful inspection of the crating and the unit immediately upon receipt.

Verify that all parts ordered were received as specified and that the unit is the correct size and voltage necessary to fulfill your environmental control needs. Report any damage discovered to the freight carrier. If necessary, contact the APC field service department for help in repairing or replacing damaged parts. While APC is not responsible for damage incurred in transit, we want to make sure that you have no undue delays in your system start-up.

## **Rigging**

The unit is manufactured with a formed steel frame for maximum strength and unit integrity. However, as with all electrical and mechanical equipment, you must take care with proper rigging of your unit.

When using a forklift to move the unit, use the shipping skid to protect the bottom of the unit. When using chains, cables or rope to lift the unit, use spreader bars to prevent damage to the finished panel.

## **Floorstand**

Install a threaded pedestal into each leg of the floorstand. Use the washer and nut on each panel to tighten against the floorstand leg.

## **Utility connections**

All connections are made through the bottom left of the unit (the left side of upflow discharge units) for ease of service connections. Refer to the installation manual for pipe sizes and specific locations for your unit.

## **Power unit**

The AFX unit uses 3-phase power for operation. Bring the service cable through the bottom left of the unit and through the bulkhead hole into the electrical box to the circuit breaker provided on the left side of the electrical box. The ground lug is located near the 3-phase high-voltage connector. **THE UNIT MUST BE UTILITY GROUNDED OR THE WARRANTY IS VOID.**

## **Humidifier connections**

The humidifier inlet connection is in the bottom of the mechanical section. A 1/4" compression connection is supplied with the unit.

## **Condensate drain**

Condensate from the evaporator pan and discharge from the humidifier flushing system drain through a 7/8" ID drain trap in the bottom of the unit.

## **Water supply to humidifier**

1. The humidifier fill valve orifice is sized for supply water pressure from 30 PSIG (210 kPa) to 85 PSIG (590 kPa).
2. For cases above 90 PSIG (630 kPa), install a pressure-reducing valve in the water feed line to the unit.
3. With extremely dirty or muddy water sources, proper filtration is required on the units incoming water line.
4. DO NOT use softened water with the humidifier. Softened water is too conductive.
5. DO NOT use completely demineralized water with the humidifier. The minerals allow the electrode principle to work.
6. DO NOT use a hot water source. Doing so will cause deposits that will eventually block the fill valve orifices.

7. Water supplies with high conductivity (above 700  $\mu\Omega$ ) must be preconditioned for proper operation and longevity of the humidifier.

## **Water supply**

A 16- to 20-mesh strainer must be installed in the water supply to the water and glycol units to prevent clogging of brazed plate condenser. This is a field item.

**NOTE:** Because of an ongoing program dedicated to product improvement, specifications are subject to revisions without notice. APC assumes no responsibility, and disclaims all liability for damages resulting from use of this information or for any errors or omissions.





## APC Worldwide Customer Support

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Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
  - [www.apc.com](http://www.apc.com) (Corporate Headquarters)  
Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - [www.apc.com/support](http://www.apc.com/support)  
Global support with FAQs, knowledge base, and e-support.
- Contact an APC Customer Support center by telephone or e-mail.
  - Regional centers:

APC Headquarters (U.S. and Canada)	(1) (800) 800-4272 (toll free)
Latin America	(1) (401) 789-5735 (United States)
Europe, Middle East, Africa	(353) (91) 702020 (Ireland)
Japan	(03) 5434-2021 Guidance 3

- Local, country-specific centers: go to [www.apc.com/support/contact](http://www.apc.com/support/contact) for contact information.
- Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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