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Air Cooled Chiller

Air Cooled Chiller for Air Conditioning Equipment in data centers and computer rooms

Technical Data

Contents

Part Number	Description/Model Name
ACCH050G-AAA-D03S	Air cooled chiller 50 kW, 208-230V/60 Hz, R22, 3HP Pump with Independent Power Feed
ACCH050G-ABA-D03S	Air cooled chiller 50 kW, 208-230V/60 Hz, R22, 3HP Pump, Single Feed
ACCH050G-ADA-D03S	Air cooled chiller 50 kW, 460-480V/60 Hz, R22, 3HP Pump with Independent Power Feed
ACCH050G-AKA-D03S	Air cooled chiller 50 kW, 460-480V/60 Hz, R22, 3HP Pump, Single Feed
ACCH084G-AAA-D03S	Air cooled chiller 84 kW, 208-230V/60 Hz, R22, 3HP Pump with Independent Power Feed
ACCH084G-ABA-D03S	Air cooled chiller 84 kW, 208-230V/60 Hz, R22, 3HP Pump, Single Feed
ACCH084G-ADA-D03S	Air cooled chiller 84 kW, 460-480V/60 Hz, R22, 3HP Pump with Independent Power Feed
ACCH084G-AKA-D03S	Air cooled chiller 84 kW, 460-480V/60 Hz, R22, 3HP Pump, Single Feed
ACCH120G-AAA-D05S	Air cooled chiller 120 kW, 208-230V/60 Hz, R22, 5HP Pump with Independent Power Feed
ACCH120G-ABA-D05S	Air cooled chiller 120 kW, 208-230V/60 Hz, R22, 5HP Pump, Single Feed
ACCH120G-ADA-D05S	Air cooled chiller 120 kW, 460-480V/60 Hz, R22, 5HP Pump with Independent Power Feed
ACCH120G-AKA-D05S	Air cooled chiller 120 kW, 460-480V/60 Hz, R22, 5HP Pump, Single Feed
ACCH167G-AAA-D05S	Air cooled chiller 167 kW, 208-230V/60 Hz, R22, 5HP Pump with Independent Power Feed
ACCH167G-ABA-D05S	Air cooled chiller 167 kW, 208-230V/60 Hz, R22, 5HP Pump, Single Feed
ACCH167G-ADA-D05S	Air cooled chiller 167 kW, 460-480V/60 Hz, R22, 5HP Pump with Independent Power Feed
ACCH167G-AKA-D05S	Air cooled chiller 167 kW, 460-480V/60 Hz, R22, 5HP Pump, Single Feed
ACCH200N-ABA-D10S	Air cooled chiller 200 kW, 460-480V/60 Hz, R410A, 10HP Pump, Single Feed
ACCH200N-AKA-D10S	Air cooled chiller 200 kW, 460-480V/60 Hz, R410A, 10HP Pump, Single Feed
ACCH220N-ABA-D10S	Air cooled chiller 220 kW, 208-230V/60 Hz, R410A, 10HP Pump, Single Feed
ACCH220N-AKA-D10S	Air cooled chiller 220 kW, 460-480V/60 Hz, R410A, 10HP Pump, Single Feed

Overview

The modular air cooled chillers for air conditioning equipment in data centers is a new generation of leading edge technology with an all-in-one integrated package simplifying time and cost of installation.

Precision environmental 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. Critical environment applications include:

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

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

APC warrants all parts for 12 months from shipment. Extended warranties are available.

Model

The air cooled modular chillers are designed for medium to large data centers and are available in six models; from 50 kW to 220 kW. Models 50-167 kW include a separate power feed to the pump for UPS connection.

Chilled Water Distribution

Chilled water is often used in data centers to provide the maximum reliability and capacity control of the cooling equipment, while maintaining the indoor environment refrigerant-free. To provide high reliability for year-round operation, a dedicated chiller is recommended for data center air conditioners.

APC's Air Cooled Modular Chiller supplies chilled water to the Computer Room Air Conditioners (CRACs). The chilled water absorbs rejected heat from the air through the CRAC units, then is routed back to the chiller through the return lines. The chiller then rejects the heat from the water completing the system cycle.

Configuration

- Air Cooled

Compliance Approval

- ETL

- ARI 550/590-2003

Standard Components

- Integrated Pump Package
- Dual Pumps
- Low Ambient Controls
- Non-Fused Disconnect
- Scroll Compressors
- Independent Power Feed for Pumps
- *Comfort*Link™ Controls
- FOIP Vibration Isolation
- Cooler Heater Protection
- Minimum Load Control

Optional Components

- Accessory Fluid Storage Tank
- Single Feed Power
- ModBus LEI Translator
- Wind Baffles

Scalable Solution for Critical Environments

Data Centers
Air conditioners for data centers are designed for close temperature and humidity control. Chilled water is often used in data centers to provide the maximum reliability and control of the equipment providing precision and predictable control and maintaining the indoor environment refrigerant-free. To provide high reliability for year-round operation, a dedicated chiller is provided for data center equipment.

High Density
As a result of expensive data center space, data centers are looking for ways to maximize return on investment by deploying as many servers as possible in the smallest possible space.

In addition, today's high density servers such as blade servers draw an increasing amount of power from each rack, up to 25kW per rack (where 4kW used to be the standard). For this application, the loss of cooling even for a few minutes, would represent a rapid increase in the equipment inlet temperatures resulting in equipment failures. An air cooled chiller with a storage tank and pumps connected to an UPS can maintain temperature for a few minutes until the chiller is back on-line.

Availability
Mission critical infrastructures require the highest possible level of availability.

By using extended run-time cooling and redundancy, a high available infrastructure is maintained.

High Rise Buildings
In some buildings the use of refrigerant based air cooled air conditioners is not practical due to the long distances to the condenser.

For these applications chilled water is used to run long distances from the outdoor equipment to the air conditioners.

Low Noise
APC chiller's AeroAcoustic™ fan is almost half as loud as standard propeller fans. The majority of the noise reduction is in the most unpleasant frequencies, which makes APC chillers ideal for sound-sensitive environments. When cooler temperatures allow part-load operation, the fans operate at lower speeds and become even quieter.

Compact Footprint
APC chiller's compact design means it won't stand out if installed on the roof. The integrated hydronics and the chilled fluid storage tank's placement under the chiller does not increase the footprint of the chiller, allowing easy installation almost anywhere.

Efficiency and Reliability
The high EER (up to 10.1) and few moving parts of scroll compressors provide efficient and reliable operation. APC chillers use ultra-quiet, high-efficiency scroll compressors, operated in tandem for greater efficiency at partial loads. The compressors are maintenance-free and protected by an auto-adaptive control that minimizes compressor wear.

Standard Features

Fan System
The fan is controlled by a variable frequency drive to provide low speed operation at part load or reduced outdoor air temperatures.

Multiblade design on the fan increases performance and reduces low frequency noise and rumble.

The fan is also mounted to an extremely rigid tower, therefore, vibrations and noise are not amplified through the unit casing.

Hydronics
The pump package includes dual pumps each sized for the total capacity in order to provide redundancy.

The chiller also includes an expansion tank, flow switch, circuit setter and strainer to provide a complete integrated system.

Heat Exchanger
The heat exchanger for the chilled water in models 50-167 kW is a brazed plate evaporator which provides high heat transfer efficiency in a compact area.

The heat exchanger for models 200-220 kW is a shell and tube type.

A heater is provided on the heat exchanger for protection in cold ambient temperatures down to -20°F (-28.9°C).

Scroll Compressors
Scroll compressors are designed for high full and part load efficient year-round operation with a 15-year life expectancy.

With only one moving part, the compressor provides high reliability and a very smooth and quiet operation.

Compressor control algorithms minimize compressor cycling and ensures compressor operation within design parameters.

Dual Redundant Pumps
In case one pump fails, the other takes over and keeps the fluid circulating.

Separate Electrical Feed for Pumps
A separate electrical feed can be provided to the pumps, for uninterruptible operation through an external UPS in case of power failure, providing chilled water from a storage tank while the generator powers the chiller.

This feature is available on 50, 84, 120 & 167 kW models only. US Patent 6,980,433.

Low Ambient Controls
Chiller is provided with low ambient controls to -20°F to ensure proper operation in cold environments.

FOIP Vibration Isolation
The field-installed ¼-in. neoprene isolator pads (24-in. x 3-in.) reduce vibration transmission from the compressor through the floor and into the conditioned space.

Cooler Heater Protection
A heater is supplied in the pump box that will protect this section from freezing in outdoor-air temperatures down to -20°F (-28.9°C), except in the case of a power failure.

Minimum Load Control
Allows additional capacity reduction for unit operation using hot gas bypass.

Non-Fused Disconnect
Provides non-fused disconnect capability for power and controls located at the unit.

Optional Features

Storage Tank (50-167 kW only)
The storage tank fits under the chiller without increasing the footprint.

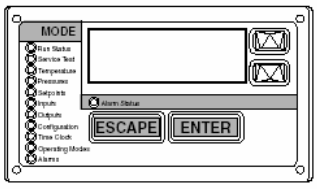
Insulated and with freeze protection to -20°F (-28.9°C).

Factory supplied and field installed with ready to install water connections.

Communications Interface
ModBus LEI translator allows integration with BMS systems.

Wind Baffles
The wind baffles are required if the wind velocity is anticipated to be greater then 5 mph (8 km/h) on units that will operate in low ambient temperatures.

Microprocessor Controller



Microprocessor Controller

The *Comfort*Link™ microprocessor controls overall unit operation. Its central executive routine controls a number of processes simultaneously. These include internal timers, reading inputs, analog to digital conversions, fan control, capacity control, and head pressure control. Some processes are updated almost continuously, other every 2 to 3 seconds, and some every 30 seconds. The microprocessor routine is started by switching the Emergency ON-OFF switch to the ON position. The pump control will energize the cooler pump to the internal (or CCN) time schedule (or input occupied signal from external system).

Control will also start one pump based on the last pump started. When the unit receives a call for cooling (based on a deviation from chilled water set point), the unit stages up in capacity to maintain the cooler fluid set point. The first compressor starts 1 to 3 minutes after the call for cooling. The *Comfort*Link microprocessor controls the capacity of the chiller by cycling compressors at a rate to satisfy actual dynamic load conditions. The control maintains leaving-fluid temperature set point shown on the Scrolling Marquee display board through intelligent cycling of compressors. Accuracy depends on loop volume, loop flow rate, load, outdoor-air-temperature, number of stages, and particular stage being cycled off. No adjustment for cooling range or cooler flow rate is required, because the control automatically compensates for cooling range by measuring both return-fluid temperature and leaving-fluid temperature. This is referred to as leaving-fluid temperature control with return-fluid temperature compensation.

The basic logic for determining when to add or remove a stage is a time band integration of deviation from set point plus rate of change of leaving-fluid temperature. When leaving-fluid temperature is close to set point and slowly moving closer, logic prevents addition of another stage.

If a 1°F per minute (0.6°C per minute) pull-down control has been selected (adjustable setting), no additional steps of capacity are added as long as difference between leaving-fluid temperature and set point is greater than 4°F (2.2°C) and rate of change in leaving-fluid temperature is less than 1°F per minute (0.6°C per minute). If it has been less than 90 seconds since the last capacity change, compressors will continue to run unless a safety device trips. This prevents rapid cycling and also helps return oil during short on periods.

Sensors

Three thermistors are used for temperature-sensing inputs to the microprocessor. Additional thermistor sensors may be used as remote temperature sensors for optional LCWT reset.

- Cooler leaving chilled fluid temperature (T1)
- Cooler entering fluid (return) temperature (T2)
- Outside air temperature (T9)

Two refrigerant pressure transducers are used in each circuit for sensing suction and discharge pressure. The microprocessor uses these inputs to control capacity and fan cycling.

- Saturated condensing temperature
- Cooler saturation temperature

The microprocessor uses these temperatures and pressures to control capacity and fan cycling.

Control Sequence

Off Cycle
If ambient temperature is below 36°F (2°C), cooler heaters are also energized.

Start-up
After control circuit switches on, the prestart process takes place, then the microprocessor checks itself, starts pump and waits for temperature to stabilize. The controlled pull-down feature limits compressor loading on start-up to reduce demand on start-up and unnecessary compressor usage. The microprocessor limits supply-fluid temperature decrease (start-up only) to 1°F (0.6°C) per minute.

Capacity Control
On the first call for cooling, the microprocessor starts the initial compressor and fans stage on the lead circuit.

As additional cooling is required, additional compressors are energized.

The speed at which capacity is added or reduced is controlled by the temperature deviation from the set point and the rate of temperature change of the chilled fluid.

The Main Base Board (MBB) responds to temperature of supply chilled water to cycle the compressor(s) and to control compressor unloading and loading to match cooling load requirements.

The minimum load control valve is energized by the MBB. The valve allows hot gas to pass directly into the cooler circuit on the final step of unloading, maintaining constant suction pressure and permitting the unit to operate at lower loads with less compressor cycling. See Physical Data table on page 11 for minimum steps of unloading.

Standard *Comfort*Link™ Controls with Scrolling Marquee Display Module
A four-digit alphanumeric display shows all of the *Comfort*Link control codes (with 60 character expandable clear language), plus set points, time of day, temperatures, pressures, and superheat.

Low-Temperature Override
Prevents LCWT (leaving chilled fluid temperature) from overshooting the set point and possibly causing a nuisance trip-out by the freeze protection.

High-Temperature Override
Allows chiller to add capacity quickly during rapid load variations.

Abnormal Conditions
All control safeties in chiller operate through compressor protection board or control relay and microprocessor.

Loss of feedback signal to the MBB will cause the compressor(s) to shut down. For other safeties, microprocessor makes appropriate decision to shut down a compressor due to a safety trip or bad sensor reading and displays appropriate failure code on the display. Chiller holds in safety mode until reset. It then reverts to normal control when unit is reset.

Low-Pressure Safety
Safety cuts out if system pressure drops below minimum.

High-Pressure Cutout
Switch shuts down compressors if compressor discharge pressure increases to 426 psig (2937 kPa).

Compressor Anti-Cycling
Limits compressor cycling.

Loss of Flow Protection
Proof of flow switches are standard and installed on all APC chillers.

Sensor Failures
Failures are detected by the microprocessor.

Dual Chiller Control
The *Comfort*Link controller allows two chillers (piped in parallel) to operate as a single chilled water plant with standard control functions coordinated through the master chiller controller. This standard *Comfort*Link feature requires a communication link between the two chillers.

Thermostatic Expansion Valve

The TXV controls refrigerant flow to the cooler for different operating conditions. An equalization line and temperature controlled sensing bulb are used to maintain a fixed setting of super-heated refrigerant leaving the cooler.

Diagnostics

The microprocessor may be put through a service test (see Controls, Startup, Operation, Service, and Troubleshooting literature). The service test confirms that the microprocessor is functional, informs observer through display the condition of each sensor and switch in chiller, and allows observer to check for proper operation of fans and compressors.

Default Settings

To facilitate quick start-ups, APC chillers with *Comfort*Link controls are pre-configured with a default setting that assumes stand-alone operation supplying 44°F (6.7°C) chilled water.

Configuration settings will be based on any options or accessories included with the unit at the time of manufacturing.

Date and time are set to U.S. Central Time zone and will need to be reconfigured based on location and local time zone. If operation based on occupancy scheduling is desired, this will also need to be set during installation.

Performance Specifications

***LCWT = 45°F (7.2°C)**

**ECWT °F(°C)	Propylene Glycol (%)	Unit Size	Minimum Flow Rate GPM (L/s)	Maximum Flow Rate GPM (L/s	Minimum Loop Volume Gal. (L)	CONDENSER ENTERING AIR TEMPERATURE °F (°C)					
						95 (35)		105 (40.6)		115 (46.1)	
						Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)
55 (12.8)	0	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.0 (49.2)	33.5 (2.1)	13.2 (46.4)	31.7 (2.0)	12.5 (43.9)	29.8 (1.9)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	24.2 (85.1)	58.0 (3.7)	22.8 (80.2)	54.6 (3.4)	21.3 (74.9)	50.9 (3.2)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	35.4 (124.5)	84.7 (5.3)	33.5 (117.8)	80.2 (5.1)	31.5 (110.8)	75.3 (4.8)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	48.2 (169.5)	115.4 (7.3)	45.4 (159.6)	108.7 (6.9)	42.3 (148.7)	101.4 (6.4)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	58.2 (204.6)	139.3 (8.8)	54.2 (190.4)	129.5 (8.2)	49.7 (174.7)	118.9 (7.5)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	67.6 (237.7)	162.0 (10.2)	62.9 (221.2)	150.8 (9.5)	57.9 (203.6)	138.9 (8.8)
	15	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	13.9 (48.9)	33.6 (2.1)	13.1 (46.1)	31.9 (2.0)	12.4 (43.6)	30.0 (1.9)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	24.0 (84.4)	58.3 (3.7)	22.6 (79.5)	55.0 (3.5)	21.1 (74.2)	51.3 (3.2)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	35.1 (123.4)	85.2 (5.4)	33.2 (116.7)	80.7 (5.1)	31.2 (109.7)	75.8 (4.8)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	47.8 (168.1)	116.1 (7.3)	45.1 (158.6)	109.4 (6.9)	42.0 (147.7)	102.0 (6.4)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	57.2 (201.1)	138.9 (8.8)	53.1 (186.7)	129.1 (8.1)	58.7 (206.4)	118.4 (7.5)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	66.6 (234.2)	161.7 (10.2)	62.0 (218.0)	150.8 (9.5)	57.1 (200.8)	138.9 (8.8)
	25	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	13.8 (48.5)	34.1 (2.2)	13.0 (45.7)	32.3 (2.0)	12.3 (43.2)	30.4 (1.9)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	23.9 (84.0)	59.2 (3.7)	22.5 (79.1)	55.8 (3.5)	21.0 (73.8)	52.0 (3.3)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	34.9 (122.7)	86.5 (5.5)	33.1 (116.4)	81.9 (5.2)	31.1 (109.3)	77 (4.9)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	47.5 (167.0)	117.8 (7.4)	44.8 (157.5)	111.0 (7.0)	41.8 (147.0)	103.5 (6.5)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	56.5 (198.7)	140.1 (8.8)	52.6 (184.9)	130.2 (8.2)	48.3 (169.8)	119.6 (7.5)
		ACCH220	84.0 (5.3)	336 (21.2)	210.0 (794.9)	65.9 (231.7)	163.3 (10.3)	61.5 (216.2)	152.4 (9.6)	56.7 (199.4)	140.5 (8.9)
	40	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	13.6 (47.8)	35.4 (2.2)	12.9 (45.4)	33.5 (2.1)	12.1 (42.5)	31.5 (2.0)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	23.6 (83.0)	61.4 (3.9)	22.3 (78.4)	57.9 (3.7)	20.8 (73.1)	54.0 (3.4)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	34.5 (121.3)	89.7 (5.7)	32.7 (115.0)	85.0 (5.4)	30.8 (108.3)	79.9 (5.0)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	47.0 (165.3)	122.1 (7.7)	44.3 (155.8)	115.1 (7.3)	41.3 (145.2)	107.3 (6.8)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	53.5 (188.1)	138.9 (8.8)	49.4 (173.7)	129.7 (8.2)	46 (161.7)	119.5 (7.5)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	64.6 (227.1)	167.9 (10.6)	60.4 (212.4)	156.8 (9.9)	55.8 (196.2)	144.9 (9.1)

*LCWT - Leaving Chilled Water Temperature
**ECWT - Entering Chilled ater Temperature

***LCWT = 47°F (8.3°C)**

**ECWT °F(°C)	Propylene Glycol (%)	Unit Size	Minimum Flow Rate GPM (L/s)	Maximum Flow Rate GPM (L/s	Minimum Loop Volume Gal. (L)	CONDENSER ENTERING AIR TEMPERATURE °F (°C)					
						95 (35)		105 (40.6)		115 (46.1)	
						Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)
57 (13.9)	0	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.5 (51.0)	34.7 (2.2)	13.7 (48.2)	32.8 (2.1)	12.9 (45.4)	30.9 (1.9)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	25.0 (87.9)	59.9 (3.8)	23.6 (83.0)	56.5 (3.6)	22.0 (77.4)	52.7 (3.3)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	36.5 (128.3)	87.6 (5.5)	34.6 (121.7)	82.9 (5.2)	32.5 (114.3)	78.0 (4.9)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	49.8 (175.1)	119.4 (7.5)	46.9 (164.9)	112.5 (7.1)	43.8 (154.0)	104.9 (6.6)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	60.5 (212.5)	144.7 (9.1)	56.3 (197.9)	134.8 (8.5)	51.7 (181.8)	123.7 (7.8)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	70.0 (246.1)	167.9 (10.6)	65.2 (229.2)	156.4 (9.9)	60.0 (211.0)	144.0 (9.1)
	15	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.3 (50.3)	34.9 (2.2)	13.6 (47.8)	33.0 (2.1)	12.8 (45.0)	31.1 (2.0)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	24.8 (87.2)	60.3 (3.8)	23.4 (82.3)	56.8 (3.6)	21.8 (76.6)	53.0 (3.3)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	36.3 (127.6)	88.1 (5.6)	34.4 (120.9)	83.5 (5.3)	32.3 (113.6)	78.5 (5.0)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	49.4 (173.7)	120.1 (7.6)	46.6 (163.8)	113.1 (7.1)	43.4 (152.6)	105.5 (6.7)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	59.5 (209.2)	144.5 (9.1)	55.4 (194.8)	134.6 (8.5)	50.8 (178.6)	123.5 (7.8)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	69.0 (242.6)	167.7 (10.6)	64.3 (226.1)	156.4 (9.9)	59.2 (208.1)	144.4 (9.1)
	25	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.3 (50.3)	35.4 (2.2)	13.5 (47.5)	33.5 (2.1)	12.7 (44.7)	31.5 (2.0)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	24.7 (86.8)	61.2 (3.9)	23.3 (81.9)	57.7 (3.6)	21.7 (76.3)	53.8 (3.4)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	36.1 (126.9)	89.4 (5.6)	34.2 (120.2)	84.7 (5.3)	32.2 (113.2)	79.7 (5.0)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	49.1 (172.6)	121.8 (7.7)	46.3 (162.8)	114.8 (7.2)	43.2 (151.9)	107.1 (6.8)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	58.8 (206.7)	145.7 (9.2)	54.8 (192.7)	135.8 (8.6)	50.3 (176.9)	124.7 (7.9)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	68.3 (240.1)	169.2 (10.7)	63.7 (224.0)	158.0 (10.0)	58.8 (206.7)	145.7 (9.2)
	40	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.1 (49.6)	36.6 (2.3)	13.4 (47.1)	34.7 (2.2)	12.6 (44.3)	32.7 (2.1)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	24.4 (85.8)	63.5 (4.0)	23.0 (80.9)	59.8 (3.8)	21.5 (75.6)	55.8 (3.5)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	35.7 (125.5)	92.8 (5.9)	33.9 (119.2)	87.9 (5.5)	31.8 (111.8)	82.7 (5.2)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	48.6 (170.9)	126.2 (8.0)	45.8 (161.0)	119.0 (7.5)	42.7 (150.1)	111.0 (7.0)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	57.4 (201.8)	149.2 (9.4)	53.6 (188.5)	139.3 (8.8)	49.4 (173.7)	128.3 (8.1)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	67.0 (235.6)	174.0 (11.0)	62.6 (220.1)	162.9 (10.3)	57.9 (203.6)	150.3 (9.5)

*LCWT - Leaving Chilled Water Temperature
**ECWT - Entering Chilled Water Temperature

Performance Specifications

**LCWT = 49°F (9.4°C)												
**ECWT °F(°C)	Propylene Glycol (%)	Unit Size	Minimum Flow Rate GPM (L/s)	Maximum Flow Rate GPM (L/s	Minimum Loop Volume Gal. (L)	CONDENSER ENTERING AIR TEMPERATURE °F (°C)					
						95 (35)		105 (40.6)		115 (46.1)	
						Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)
59 (15)	0	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	15.0 (52.7)	35.9 (2.3)	14.2 (49.9)	34.0 (2.1)	13.4 (47.1)	32.1 (2.0)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	25.8 (90.7)	61.9 (3.9)	24.3 (85.4)	58.4 (3.7)	22.7 (79.8)	54.5 (3.4)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	37.7 (132.6)	90.5 (5.7)	35.8 (125.9)	85.8 (5.4)	33.6 (118.1)	80.7 (5.1)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	51.4 (180.7)	123.3 (7.8)	48.5 (170.5)	116.2 (7.3)	45.2 (158.9)	108.4 (6.8)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	62.7 (220.5)	150.2 (9.5)	58.5 (205.5)	139.9 (8.8)	53.8 (189.0)	128.7 (8.1)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	72.5 (254.9)	173.8 (11.0)	67.5 (237.3)	162.0 (10.2)	62.5 (219.7)	149.3 (9.4)
	15	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.9 (52.4)	36.1 (2.3)	14.1 (49.6)	34.2 (2.2)	13.3 (46.8)	32.2 (2.0)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	25.6 (90.0)	62.3 (3.9)	24.2 (85.1)	58.8 (3.7)	22.6 (79.5)	54.8 (3.5)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	37.5 (131.8)	91.1 (5.7)	35.5 (124.8)	86.4 (5.5)	33.4 (117.4)	81.2 (5.1)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	51.0 (179.3)	124.1 (7.8)	48.1 (169.1)	116.9 (7.4)	44.9 (157.9)	109.1 (6.9)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	61.8 (217.3)	150.3 (9.5)	57.6 (202.5)	148.1 (9.3)	53 (186.3)	128.9 (8.1)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	71.4 (251.0)	173.5 (10.9)	66.6 (234.2)	162.0 (10.2)	61.4 (215.9)	149.4 (9.4)
	25	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.8 (52.0)	36.6 (2.3)	14.0 (49.2)	34.7 (2.2)	13.2 (46.4)	32.7 (2.1)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	25.5 (89.7)	63.2 (4.0)	24.0 (84.4)	59.6 (3.8)	22.4 (78.8)	55.6 (3.5)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	37.3 (131.1)	92.4 (5.8)	35.4 (124.5)	87.6 (5.5)	33.3 (117.1)	82.4 (5.2)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	50.8 (178.6)	125.8 (7.9)	47.9 (168.4)	118.6 (7.5)	44.7 (157.2)	110.7 (7.0)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	61.2 (215.2)	151.6 (9.6)	57.1 (200.8)	141.5 (8.9)	52.5 (184.6)	130.2 (8.2)
		ACCH220	84.0 (5.3)	336 (21.2)	210.0 (794.9)	70.7 (248.6)	175.3 (11.1)	66 (232.1)	163.7 (10.3)	60.9 (214.1)	151.1 (9.5)
	40	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	14.6 (51.3)	37.9 (2.4)	13.8 (48.5)	36.0 (2.3)	13.0 (45.7)	33.9 (2.1)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	25.2 (88.6)	65.6 (4.1)	23.8 (83.7)	61.8 (3.9)	22.2 (78.1)	57.7 (3.6)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	36.9 (129.7)	95.9 (6.1)	35.0 (123.1)	90.9 (5.7)	32.9 (115.7)	85.5 (5.4)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	50.2 (176.5)	130.5 (8.2)	47.2 (166.0)	123.0 (7.8)	44.2 (155.4)	114.8 (7.2)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	59.8 (210.3)	155.4 (9.8)	55.9 (196.5)	145.2 (9.2)	51.5 (181.1)	133.9 (8.4)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	69.4 (244.0)	180.3 (11.4)	64.9 (228.2)	168.8 (10.7)	60.0 (211.0)	155.8 (9.8)

*LCWT - Leaving Chilled Water Temperature
**ECWT - Entering Chilled ater Temperature

**LCWT = 51°F (10.6°C)											
**ECWT °F(°C)	Propylene Glycol (%)	Unit Size	Minimum Flow Rate GPM (L/s)	Maximum Flow Rate GPM (L/s	Minimum Loop Volume Gal. (L)	CONDENSER ENTERING AIR TEMPERATURE °F (°C)					
						95 (35)		105 (40.6)		115 (46.1)	
						Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)	Nominal Cap. Tons (kW)	Nominal Flow Rate GPM (L/s)
61 (16.1)	0	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	15.5 (54.5)	37.1 (2.3)	14.7 (51.7)	35.2 (2.2)	13.9 (48.9)	333.2 (21.0)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	26.7 (93.9)	63.9 (4.0)	25.1 (88.3)	60.3 (3.8)	23.5 (82.6)	56.3 (3.6)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	39.0 (137.1)	93.5 (5.9)	37.0 (130.1)	88.6 (5.6)	34.8 (122.4)	83.4 (5.3)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	53.1 (186.7)	127.3 (8.0)	50.0 (175.8)	120.0 (7.6)	46.7 (164.2)	112.0 (7.1)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	65.0 (228.4)	155.7 (9.8)	60.6 (212.9)	145.0 (9.1)	55.8 (196.1)	134.8 (8.5)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	75.0 (263.7)	180.0 (11.4)	69.8 (245.4)	167.8 (10.6)	64.3 (226.1)	154.6 (9.8)
	15	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	15.4 (54.1)	37.4 (2.4)	14.6 (51.3)	35.4 (2.2)	13.7 (48.2)	33.4 (2.1)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	26.5 (93.2)	64.4 (4.1)	25.0 (87.9)	60.7 (3.8)	23.3 (81.9)	56.7 (3.6)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	38.7 (136.1)	94.1 (5.9)	36.7 (129.0)	89.2 (5.6)	34.5 (121.3)	84.0 (5.3)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	52.7 (185.3)	128.2 (8.1)	49.7 (174.7)	120.8 (7.6)	46.4 (163.1)	112.8 (7.1)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	64.1 (225.4)	155.8 (9.8)	54.7 (192.3)	145.4 (9.2)	55.1 (193.7)	134.0 (8.5)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	73.4 (258.1)	178.5 (11.3)	68.9 (242.3)	167.7 (10.6)	63.6 (223.6)	154.6 (9.8)
	25	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	15.3 (53.8)	37.9 (2.4)	14.5 (51.0)	35.9 (2.3)	13.7 (48.2)	33.8 (2.1)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	26.3 (92.5)	65.3 (4.1)	24.8 (87.2)	61.6 (3.9)	23.2 (81.6)	57.5 (3.6)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	38.5 (135.4)	95.5 (6.0)	36.5 (128.3)	90.6 (5.7)	34.4 (120.9)	85.2 (5.4)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	52.4 (184.2)	130.0 (8.2)	49.4 (173.7)	122.5 (7.7)	46.1 (162.1)	114.4 (7.2)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	63.5 (223.3)	157.5 (9.9)	59.3 (208.5)	147.0 (9.3)	54.7 (192.3)	135.7 (8.6)
		ACCH220	84.0 (5.3)	336 (21.2)	210.0 (794.9)	73.1 (257.0)	181.5 (11.5)	68.3 (240.1)	169.5 (10.7)	63.1 (221.9)	156.4 (9.9)
	40	ACCH050	16.0 (1.0)	66.0 (4.2)	55.0 (207.9)	15.1 (53.1)	39.3 (2.5)	14.3 (50.3)	37.2 (2.3)	13.5 (47.5)	35.1 (2.2)
		ACCH084	29.0 (1.8)	114.0 (7.2)	71.0 (268.4)	26.1 (91.8)	67.7 (4.3)	24.6 (86.5)	63.0 (4.0)	23.0 (80.9)	59.6 (3.8)
		ACCH120	42.0 (2.7)	167.0 (10.5)	104.0 (393.1)	38.1 (134.0)	99.1 (6.3)	36.2 (127.3)	94.0 (5.9)	34.0 (119.5)	88.4 (5.6)
		ACCH167	57.0 (3.6)	227.0 (14.3)	142.0 (536.8)	51.9 (182.5)	134.7 (8.5)	48.9 (171.9)	127.1 (8.0)	45.7 (160.7)	118.6 (7.5)
		ACCH200	72.0 (5.0)	288.0 (18.0)	180.0 (681)	62.3 (219.0)	161.9 (10.2)	58.3 (205.0)	151.4 (9.6)	53.8 (189.2)	139.8 (8.8)
		ACCH220	84.0 (5.3)	336.0 (21.2)	210.0 (794.9)	71.9 (252.8)	186.9 (11.8)	67.2 (236.3)	174.8 (11.0)	62.2 (218.7)	161.6 (10.2)

*LCWT - Leaving Chilled Water Temperature
**ECWT - Entering Chilled ater Temperature

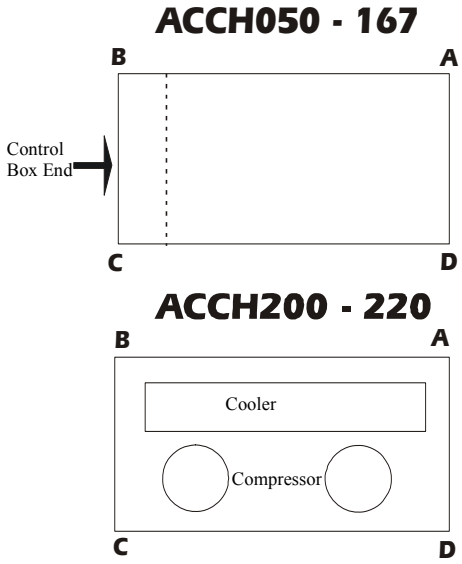
Physical Data 60 Hz (English Units)

SKU ACCH:	**050**	**084**	**120**	**167**	**200**	**220**
REFRIGERANT TYPE	R-22	R-22	R-22	R-22	R-410A	R-410A
Expansion Valve	Thermostatic	Thermostatic	Thermostatic	Thermostatic	Electronic	Electronic
Refrigerant Charge (lb) Ckt A / Ckt B	27 / -	38 / -	44 / 30	45 / 45	40.5 / 89.5	40.5 / 112
COMPRESSORS	Scroll, Hermetic					
Quantity	1	2	3	4	3	3
Speed (RPM)	3500	3500	3500	3500	3500	3500
(Qty) Ckt A	(1) SM185	(2) SM160	(1) SM115 (1) SM160	(2) SM160	(2) 20	(2) 25
(Qty) Ckt B	---	---	(1) SM185	(2) SM160	(1) 20	(1) 20
Oil Charge (Pt)						
Ckt A	11.6	14.0	13.7	14.0	26.2	26.2
Ckt B	---	---	11.6	14.0	13.1	13.1
No. Capacity Steps						
Standard	1	2	3	4	3	3
With Hot Gas Bypass	2	3	4	5	4	4
Minimum Capacity Steps (%)						
Standard	100	50	25	25	33	29
With Hot Gas Bypass	79	38	16	19	22	19
COOLER	Welded, Direct-Expansion Plate Heat Exchanger				Direct Expansion, Shell and Tube Type	
Net Fluid Volume (gal)	1.61	2.84	6.30	7.44	28.2	28.2
Maximum Refrigerant Pressure (psig)	450	450	450	450	445	445
Maximum Fluid Side Pressure (psig)	150	150	150	150	150	150
FLUID CONNECTIONS (in)						
Inlet and Outlet, FPT	2	2	2 1/2	2 1/2	4	4
Drain (NPT)	1/2	1/2	1/2	1/2	3/4	3/4
CONDENSER FANS						
Standard Low Noise Type						
Fan Speed (RPM) Standard / Low Noise	1140 / 570	--- / 850	--- / 850	--- / 850	--- / 1140	--- / 1140
No. Blades / Diameter (in)						
Ckt A	15 / 30	11 / 30	11 / 30	11 / 30	9 / 30	9 / 30
Ckt B	---	---	11 / 30	11 / 30		9 / 30
Number of Fans / Total kW						
Ckt A	1 / 1.8	2 / 2.0	2 / 2.0	2 / 2.0	3	3
Ckt B	---	---	1 / 1.8	2 / 2.0	1	1

Physical Data 60 Hz (English Units)

SKU ACCH:	050	084	120	167	200	220
Total Airflow (CFM)	10,500	13,600	21,000	27,300	49,600	49,600
CONDENSER COILS						
Quantity / Rows	1 / 3	1 / 3	2 / 3	2 / 3	4 / 3	4 / 3
Total Face Area (sq.ft.)	23	32	55	64	94	94
HYDRONIC MODULE	Pump(s), Strainer w/Blowdown Valve, Expansion Tank, Pressure Gages, Drain and Vent Plugs, Flow Switch, and Balance Valve				Pump(s) with pressure/temperature taps, NPT fittings, and triple duty valve	
Pump	Dual, Centrifugal Monocell Pump(s), 3500 RPM				Dual	Dual
Expansion Tank Volume (gal)	4.4	4.4	10.3	10.3	Field Supplied	Field Supplied
CHILLER WEIGHTS & DIMENSIONS						
Net Weight (lbs)	1298	1819	3134	3603	4705	4911
Shipping Weight (lbs)	1361	1907	3308	3777	5685	5891
Height (in)	52	52	52	52	90	90
Length (in)	82	108	108	108	95	95
Depth (in)	43	43	90	90	89	89

ACCH SIZE	Point Loading Weights (Pounds)				
	A	B	C	D	Total Weight
050	238	299	353	408	1298
084	399	533	451	436	1819
120	825	707	666	936	3134
167	953	784	837	1029	3603
200	1155	1202	1197	1150	4704
220	1177	1225	1279	1229	4910



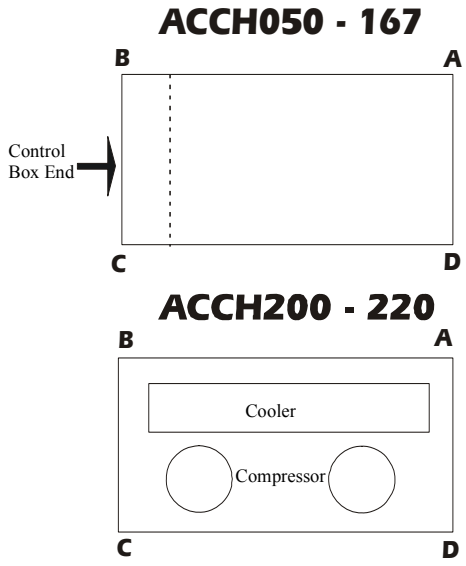
Physical Data 60 Hz (SI Units)

SKU ACCH:	**050**	**084**	**120**	**167**	**200**	**220**
REFRIGERANT TYPE	R-22	R-22	R-22	R-22	R-410A	R-410A
Expansion Valve	Thermostatic	Thermostatic	Thermostatic	Thermostatic	Electronic	Electronic
Refrigerant Charge (kg) Ckt A / Ckt B	12.2 / -	17.2 / -	20.0 / 13.6	20.4 / 20.4	18.4 / 40.6	18.4 / 50.8
COMPRESSORS	Scroll, Hermetic					
Quantity	1	2	3	4	3	3
Speed (r/s)	58.3	58.3	58.3	58.3	58.3	58.3
(Qty) Ckt A	(1) SM185	(2) SM160	(1) SM115 (1) SM160	(2) SM160	(2) 20	(2) 25
(Qty) Ckt B	---	---	(1) SM185	(2) SM160	(1) 20	(1) 20
Oil Charge (Pt)						
Ckt A	11.6	14.0	13.7	14.0	26.2	26.2
Ckt B	---	---	11.6	14.0	13.1	13.1
No. Capacity Steps						
Standard	1	2	3	4	3	3
Optional (Maximum)	2	3	4	5	4	4
Minimum Capacity Steps (%)						
Standard	100	50	25	25	33	29
Optional (Maximum)	79	38	16	19	22	19
COOLER	Welded, Direct-Expansion Plate Heat Exchanger				Direct Expansion, Shell and Tube Type	
Net Fluid Volume (L)	6.08	10.75	23.84	28.12	106	106
Maximum Refrigerant Pressure (kPa)	3103	3103	3103	3103	3068	3068
Maximum Fluid Side Pressure (kPa)	1034	1034	1034	1034	1034	1034
FLUID CONNECTIONS (mm)						
Inlet and Outlet, FPT	50.8	50.8	63.5	63.5	101.6	101.6
Drain (NPT)	12.7	12.7	12.7	12.7	19.1	19.1
CONDENSER FANS						
Standard Low Noise Type						
Fan Speed (r/s) Standard / Low Noise	19 / 9.5	--- / 14.2	--- / 14.2	--- / 14.2	--- / 19	--- / 19
No. Blades / Diameter (mm)						
Ckt A	15 / 762	11 / 762	11 / 762	11 / 762	9 / 762	9 / 762
Ckt B	---	---	11 / 762	11 / 762	9 / 762	9 / 762
Number of Fans / Total kW						
Ckt A	1 / 1.8	2 / 2.0	2 / 2.0	2 / 2.0	3	3
Ckt B	---	---	1 / 1.8	2 / 2.0	1	1

Physical Data 60 Hz (SI Units)

SKU ACCH:	**050**	**084**	**120**	**167**	**200**	**220**
Total Airflow (l/s)	4,955	6,419	9,595	12,884	23,409	23,409
CONDENSER COILS						
Quantity / Rows	1 / 3	1 / 3	2 / 3	2 / 3	4 / 3	4 / 3
Total Face Area (sq.m.)	2.14	2.97	5.11	5.95	8.73	8.73
HYDRONIC MODULE	Pump(s), Strainer w/Blowdown Valve, Expansion Tank, Pressure Gages, Drain and Vent Plugs, Flow Switch, and Balance Valve				Pump(s) with pressure/temperature taps, NPT fittings, and triple duty valve	
Pump	Dual, Centrifugal Monocell Pump(s), 58.3 r/s				Dual	Dual
Expansion Tank Volume (L)	16.5	16.5	39	39	Field Supplied	Field Supplied
CHILLER WEIGHTS & DIMENSIONS						
Net Weight (kg)	590	827	1425	1638	2134	2233
Shipping Weight (kg)	619	867	1504	1717	2579	2678
Height (mm)	1321	1321	1321	1321	2282	2282
Length (mm)	2083	2743	2743	2743	2394	2394
Depth (mm)	1092	1092	2286	2286	2237	2237

ACCH SIZE	**Point Loading Weights (Kilograms)**				
	A	**B**	**C**	**D**	**Total Weight**
050	108	135	160	185	588
084	181	241	204	198	824
120	374	320	302	425	1421
167	432	356	380	466	1634
200	524	545	543	522	2134
220	534	556	580	558	2228



Storage Tanks

APC SKU	Connections	Volume	Weight (Filled*)	Weight (Unfilled)	Nominal Dimension in (mm)			Shipping Dimensions in (mm)		
	in (mm)	Gal (L)	lb (kg)	lb (kg)	H	W	D	H	W	D
ACTA1100	2.5 (64)	110 (416)	2150 (975)	1260 (572)	23 (584)	82 (2103)	49 (1245)	29 (737)	82 (2103)	49 (1245)
ACTA1101	2.5 (64)	152 (575)	2750 (1247)	1490 (676)	23 (584)	110 (2794)	49 (1245)	29 (737)	110 (2794)	49 (1245)
ACTA1102	2.5 (64)	305 (1155)	5430 (2463)	2910 (1320)	23 (584)	110 (2794)	98 (2490)	29 (737)	110 (2794)	98 (2490)

*Weights when filled with water

Wind Baffles

APC SKU	Capacity Ranges (kW)	Nominal Dimensions						Shipping Dimensions			Nominal Weight	Shipping Weight
		Circuit Side A			Circuit Side B							
		H	W	D	H	W	D	H	W	D		
		in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	lb (kg)	lb (kg)
ACAC30001	34 - 57	48 (1220)	69 (1753)	18 (458)	-	-	-	12 (305)	96 (2439)	48 (1220)	90 (41)	190 (87)
ACAC30002	77 - 97	48 (1220)	96 (2439)	18 (458)	-	-	-	12 (305)	96 (2439)	48 (1220)	114 (52)	214 (97)
ACAC30003	120 - 134	48 (1220)	96 (2439)	18 (458)	48 (1220)	69 (1753)	18 (458)	12 (305)	96 (2439)	48 (1220)	204 (93)	304 (138)
ACAC30004	150 - 190	48 (1220)	96 (2439)	18 (458)	48 (1220)	96 (2439)	18 (458)	12 (305)	96 (2439)	48 (1220)	228 (104)	328 (149)

APC SKU	Capacity Ranges (kW)	Nominal Dimensions						Shipping Dimensions			Nominal Weight	Shipping Weight
		Control / Power End			Opposite Control / Power End							
		H	W	D	H	W	D	H	W	D		
		in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)	lb (kg)	lb (kg)
ACAC30005	200 - 1300	25 (635)	74 (1880)	12 (305)	41 (1042)	74 (1880)	12 (305)	20 (508)	96 (2439)	48 (1220)	200 (91)	300 (136)

Electrical Data

Single Power Supply

APC Model Number	Main Power Supply (includes condensers, pumps, and compressors)							
	Volts AC	PH	Hz	Max Volts	Min Volts	MCA*	MOCP**	FLA***
ACCH050G-AKA-D03S	460	3	60	506	414	37.3	60	33.3
ACCH084G-AKA-D03S	460	3	60	506	414	54.0	70	50.9
ACCH120G-AKA-D05S	460	3	60	506	414	79.5	100	75.5
ACCH167G-AKA-D05S	460	3	60	506	414	101.8	110	98.7
ACCH200N-AKA-D10S	460	3	60	506	414	143.1	175	140.8
ACCH220N-AKA-D10S	460	3	60	506	414	163.1	200	161.2
ACCH050G-ABA-D03S	208/ 230	3	60	253	187	77.5	125	69.3
ACCH084G-ABA-D03S	208/ 230	3	60	253	187	110.6	150	104.4
ACCH120G-ABA-D05S	208/ 230	3	60	253	187	167.3	200	159.1
ACCH167G-ABA-D05S	208/ 230	3	60	253	187	208.6	225	198.3
ACCH200N-ABA-D10S	208/ 230	3	60	253	187	325.1	400	313.9
ACCH220N-ABA-D10S	208/ 230	3	60	253	187	368.3	450	345.5

*MCA - Minimum Circuit Amps
**MOCP - Maximum Overcurrent Protection
***FLA - Full Load Amps

Notes:
1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is: voltage, 2%; amps 10%.
2. All units/modules have single point primary power connection. (Each unit/module requires its own power supply.) Main power must be supplied from a field-supplied disconnect.
3. Cooler heater is wired into the control circuit so it is always operable as long as the power supply disconnect is on, even if any safety device is open.
4. Maximum incoming wire size for each terminal block is 500 kcmil.
5. Power draw control circuits include both crankcase heaters and cooler heaters (where used). Each compressor has a crankcase heater which draws 180 watts of power.
6. Electrical requirements shown above does not include the power requirement for the electric heaters on the storage tanks.

Dual Power Supply for Pumps and Controls

APC Model Number	Main Power Supply (includes condensers and compressors)								Dual Power Supply for Pumps and Controls							
	Volts AC	PH	Hz	Max Volts	Min Volts	MCA*	MOCP**	FLA***	VOLTS AC	PH	HZ	Max Volts	Min Volts	MCA*	MOCP**	FLA***
ACCH050G-ADA-D03S	460	3	60	506	414	33.6	50	29.6	460	3	60	506	414	15.0	15	5.7
ACCH084G-ADA-D03S	460	3	60	506	414	50.3	70	47.2	460	3	60	506	414	15.0	15	5.7
ACCH120G-ADA-D05S	460	3	60	506	414	73.2	90	69.2	460	3	60	506	414	15.0	15	8.3
ACCH167G-ADA-D05S	460	3	60	506	414	95.5	110	92.4	460	3	60	506	414	15.0	15	8.3
ACCH050G-AAA-D03S	208/ 230	3	60	253	187	69.3	110	59.1	208/ 230	3	60	253	187	15.0	15	10.2
ACCH084G-AAA-D03S	208/ 230	3	60	253	187	102.4	125	94.2	208/ 230	3	60	253	187	15.0	15	10.2
ACCH120G-AAA-D05S	208/ 230	3	60	253	187	153.4	200	143.2	208/ 230	3	60	253	187	17.4	30	15.9
ACCH167G-AAA-D05S	208/ 230	3	60	253	187	194.6	225	186.4	208/ 230	3	60	253	187	17.4	30	15.9

*MCA - Minimum Circuit Amps
**MOCP - Maximum Overcurrent Protection
***FLA - Full Load Amps
Notes:
1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is: voltage, 2%; amps 10%.
2. All units/modules have single point primary power connection. (Each unit/module requires its own power supply.) Main power must be supplied from a field-supplied disconnect.
3. Cooler heater is wired into the control circuit so it is always operable as long as the power supply disconnect is on, even if any safety device is open.
4. Maximum incoming wire size for each terminal block is 500 kcmil.
5. Power draw control circuits include both crankcase heaters and cooler heaters (where used). Each compressor has a crankcase heater which draws 180 watts of power.
6. Electrical requirements shown above does not include the power requirement for the electric heaters on the storage tanks.

Electrical Data

CONDENSER FAN ELECTRICAL DATA

APC Unit	UNIT POWER			STANDARD CONDENSER FANS			
	Volts AC	PH	Hz	Circuit A Quantity	FLA* (each)	Circuit B Quantity	FLA* (each)
ACCH050	460	3	60	1	3.8	-	-
	208/230	3	60	1	8.4	-	-
ACCH084	460	3	60	2	2.4		
	208/230	3	60	2	5.3		
ACCH120	460	3	60	2	2.4	1	3.8
	208/230	3	60	2	5.3	1	8.4
ACCH167	460	3	60	2	2.4	2	2.4
	208/230	3	60	2	5.3	2	5.3
ACCH200	460	3	60	3	5.4	1	5.4
	208/230	3	60	3	11.9	1	11.9
ACCH220	460	3	60	3	5.4	1	5.4
	208/230	3	60	3	11.9	1	11.9

*FLA - Full Load Amperes

PUMP ELECTRICAL DATA

APC Unit	Pump Size (HP)	UNIT POWER			FLA* (each)
		Volts AC	PH	Hz	
ACCH050	3	460	3	60	3.7
		208/230	3	60	8.2
ACCH084	3	460	3	60	3.7
		208/230	3	60	8.2
ACCH120	5	460	3	60	6.3
		208/230	3	60	13.9
ACCH167	5	460	3	60	6.3
		208/230	3	60	13.9
ACCH200	10	460	3	60	15.2
		208/230	3	60	33.6

*FLA - Full Load Amperes

Notes:

1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is: voltage, 2%; amps 10%.
2. Main power must be supplied from a field-supplied disconnect.
3. The unit control circuit power transformer (24V, single-phase for all voltages) is factory supplied.
4. Cooler heater is wired into the control circuit so they are always operable as long as the power supply disconnect is on, even if any safety device is open, and the unit ON/OFF switch is in the OFF position.

PUMP ELECTRICAL DATA					
ACCH220	10	460	3	60	15.2
		208/230	3	60	33.6

*FLA - Full Load Amperes
Notes:
1. Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed minimum and maximum limits. Maximum allowable phase imbalance is: voltage, 2%; amps 10%.
2. Main power must be supplied from a field-supplied disconnect.
3. The unit control circuit power transformer (24V, single-phase for all voltages) is factory supplied.
4. Cooler heater is wired into the control circuit so they are always operable as long as the power supply disconnect is on, even if any safety device is open, and the unit ON/OFF switch is in the OFF position.

COMPRESSOR ELECTRICAL DATA

APC Unit	UNIT POWER			COMPRESSOR							
	Volts AC	PH	Hz	A1		A2		B1		B2	
				RLA*	LRA*	RLA	LRA	RLA	LRA	RLA	LRA
ACCH050	460	3	60	23.8	175	-	-	-	-	-	-
	208/230	3	60	48.7	380	-	-	-	-	-	-
ACCH084	460	3	60	20.2	135	20.2	135	-	-	-	-
	208/230	3	60	40.8	265	40.8	265	-	-	-	-
ACCH120	460	3	60	14.6	120	20.2	135	23.8	175	-	-
	208/230	3	60	32.7	265	40.8	265	48.7	380	-	-
ACCH167	460	3	60	20.2	135	20.2	135	20.2	135	20.2	136
	208/230	3	60	40.8	265	40.8	265	40.8	265	40.8	265
ACCH200	460	3	60	34.0	219	34.0	219	34.0	219	-	-
	208/230	3	60	76.9	506	76.9	506	76.9	506	-	-
ACCH220	460	3	60	44.2	270	44.2	270	34.0	219	-	-
	208/230	3	60	91.7	616	91.7	616	76.9	506	-	-

*RLA - Rated Load Amperes
**LRA - Locked Rotor Amperes

ACCESSORY TANK - ELECTRICAL DATA

APC Unit	MAIN POWER SUPPLY					POWER SUPPLY QTY. REQD.	FLA*	MCA**	MOCP***
	Volts AC	PH	Hz	Max Volts	Min Volts				
ACTA1100	230	1	50/60	253	207	1	14.1	17.6	30
ACTA1101	230	1	50/60	253	207	1	14.1	17.6	30
ACTA1102	230	1	50/60	253	207	1	28.2	35.3	60

Not available in the ACCH200 and ACCH220 size.
*FLA - Full Load Amperes
**MCA - Minimum Current Amperes
***MOCP - Maximum Overcurrent Protection

Selection Procedure

To Select an APC Chiller, use the following selection procedure.

1. Determine the Chiller unit size and operating conditions required to meet given capacity at given conditions.
   a. Capacity. . . . . 37.5 Tons (131.8 kW)
   b. Leaving Chilled Water Temp (LCWT) . . . . . 45°F (7.2°C)
   c. Cooler Water Temp Rise . . . . . 10°F (5.5°C)
   d. Condenser Entering Air Temp. . . . . 95°F (35°C)
   e. Total Flow Rate . . . . . 90 GPM (5.7 L/s)
2. From Chiller Ratings table on page 9, determine operating data for selected unit.
   a. Unit ACCH167
   b. Capacity. . . . . 48.2 Tons (169.5 kW)
   c. Cooler Water Flow . . . . . 115.4 GPM (7.3 L/s)
   d. Cooler Pressure Drop (from pressure drop curve on page 24 @90 GPM . . . . . 17 ft of water (51 kPa)
3. Determine pump selection (see Chiller Pump Selection on page page 23).
   a. Required GPM (from above) . . . . . 90 GPM (5.7 L/s)
   b. Chiller Pressure Drop (from above) . . . . . 17 ft of water (51 kPa)
   c. Storage Tank Pressure Drop (from page 25). . . . . 5.2 ft of water (15.6 kPa)
   d. Additional External System Pressure Drop (RC, CDU, and PEX Piping). . . . . 20 ft of water (60 kPa)
   e. Main Piping Pressure Drop between Chiller and CDU . . . . . Input required from customer
   f. Add Chiller Pressure and External Pressure Drop . . . . . 42.2 ft of water (126.6 kPa)
   g. Using Pump Curve on page 23, verify Pump Capacity . . . . . 50 ft of water avail. for mains

PUMP IMPELLER SIZES		
APC Chiller SKU	Pump Size (Hp)	Diameter (in)
ACCH050, 084	3	4.50
ACCH120, 167	5	4.63
ACCH200, 220	10	5.25

Chiller Pump Verification

Proper water system design is critical; cooling loads, water pressure drops and proper water line sizing must be accounted for in order to ensure proper system operation. Incorrect or incomplete analysis/ design of the water loop could lead to low water flow, loss of water temperature control, and excessive cycling of chiller compressors.

The following are the steps for verification of water pump capacity for the APC chillers (refer to Pump Curve tables).

1. Provide the total water pressure drop of the system external to the APC chiller based on the total water flow rate required.

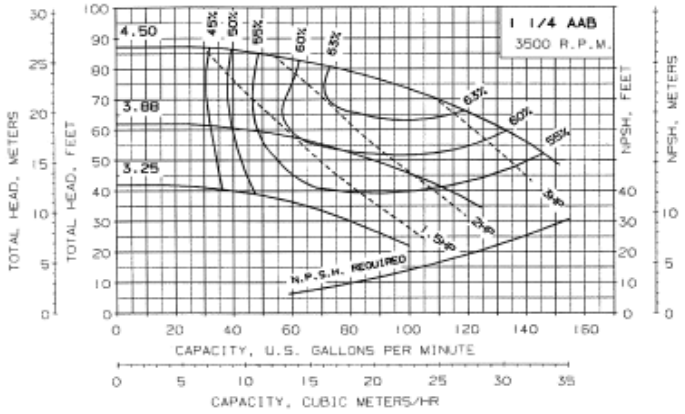
2. Determine the internal pressure drop of the chiller hydronic package based on the design flow rate (refer to internal Pressure Drop tables on page 24). Values given in these charts are based on units with clean strainers and circuit setter valves wide open.

3. If an optional storage tank is used, determine the internal pressure drop by referencing the internal Pressure Drop tables on page 25.

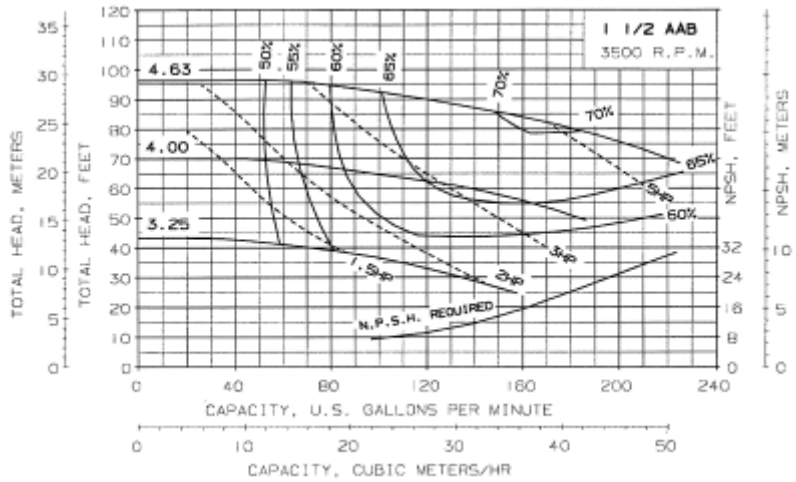
4. Add pressure drops found in Steps 1-3. This is the total pressure drop and total head required by the pump.

5. Use the pump curves table on page 23 to determine pump capacity. Plot water flow rate (Step 1) and total head (step 4) on the chart. If the point is below the pump curve, then the pumps included in the chiller have enough capacity to operate at the design conditions.

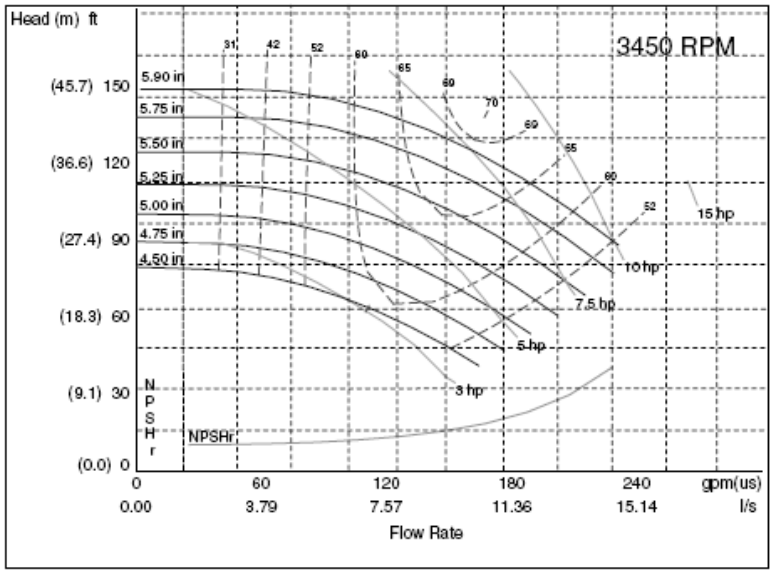
ACCH050 - 084 Pump Curve



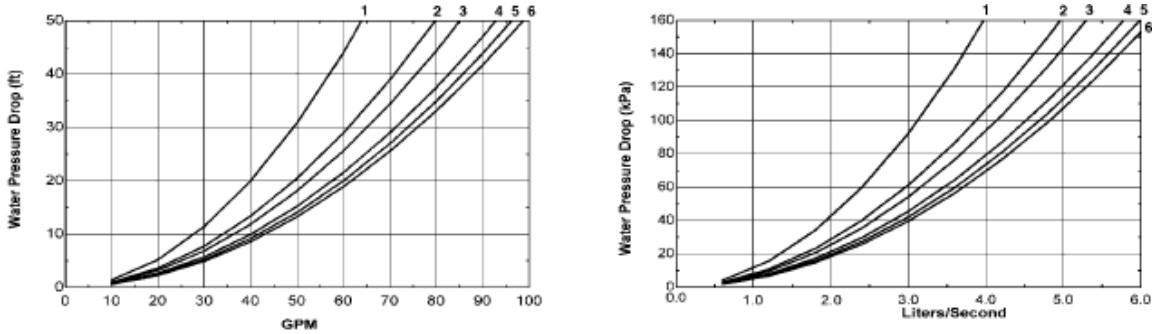
ACCH120 - 167 Pump Curve



ACCH200-220 Pump Curve

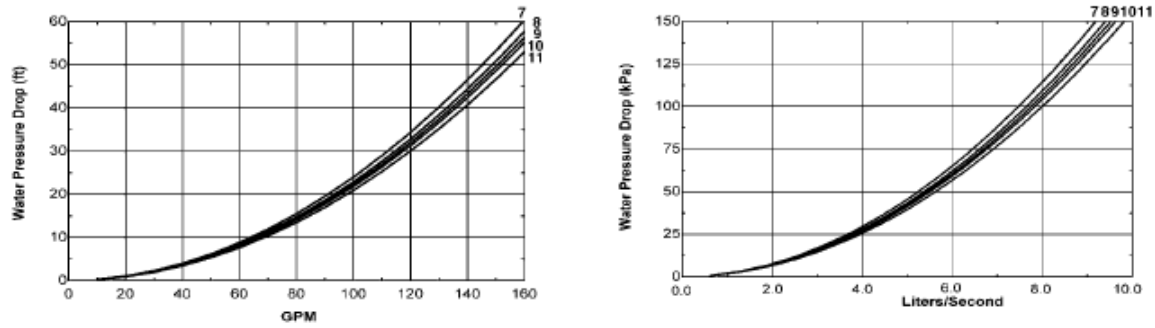


ACCH050 - 084 Chiller Pressure Drop Curves



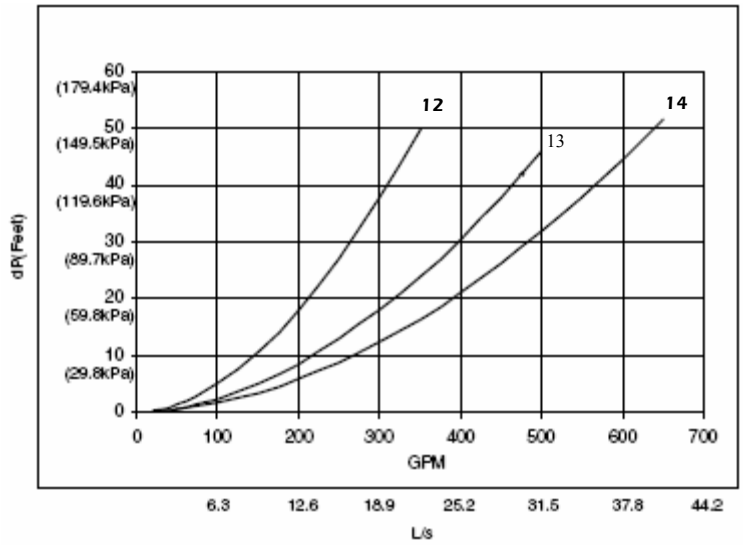
Note: Curve 2 represents ACCH050 and Curve 5 represents ACCH084.

ACCH120 - 167 Chiller Pressure Drop Curves



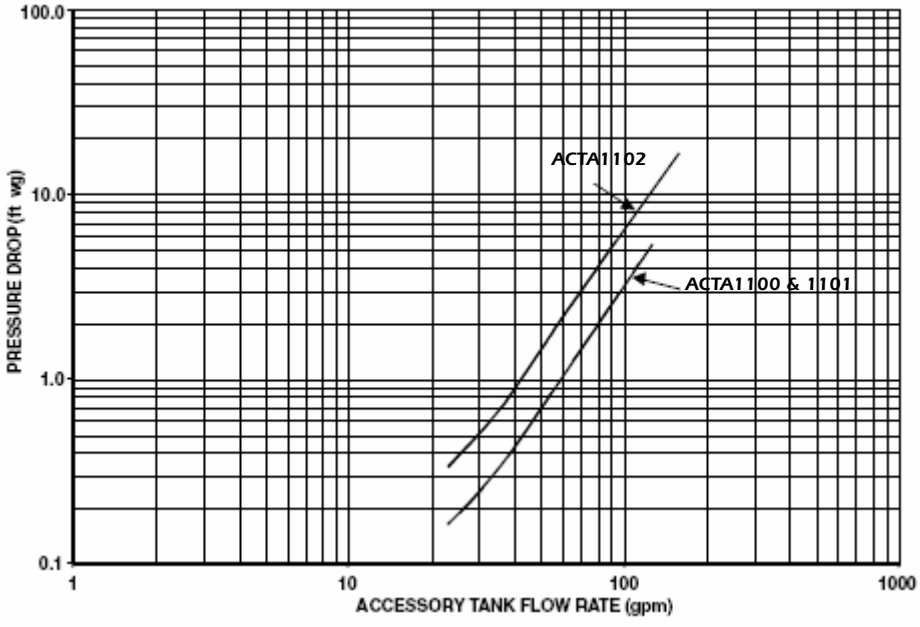
Note: Curve 7 represents AACCH120 and curve 10 represents ACCH167.

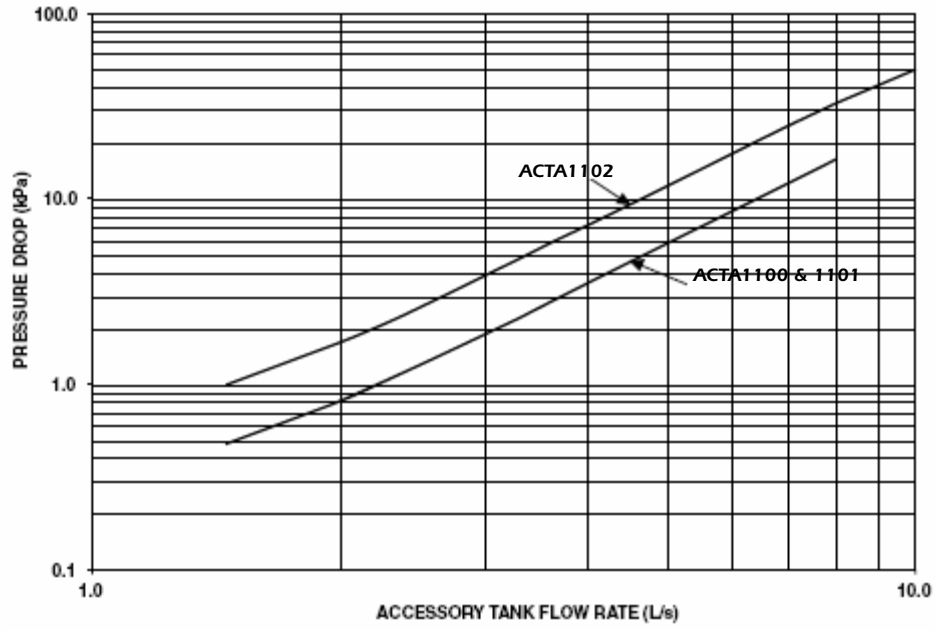
ACCH200 - 220 Chiller Pressure Drop Curves



Note: Curve 12 represents ACCH200 and ACCH220.

ACTA1100 - 1102 Tank Pressure Drop Curves





Expansion tank selection and filling

Expansion tanks are essential to the operation of any closed, pressurized, hydronic system. They perform four important functions: 1) provide for expansion of the liquid as the temperature in the system rises, 2) act as a pressure reference for the system, 3) supply sufficient pressure to prevent cavitation, 4) provide a location to charge the system.

Chiller models ACCH050 – 167 hydronic package includes a bladder-style expansion tank, pre-charged to 40 psig (277 kPa) pressure and pre-selected for loop volumes up to 6 gallons per ton. If loop volumes in excess of 6 gallons per ton are required, then a field-installed expansion tank must be provided, and the expansion tank in the chiller's hydronic package must be removed. For maximum loop volumes see page page 38.

If the top of the piping system (the highest point in the hydronic piping) is more than 80 ft (24 m) above the chiller, then the expansion tank will require additional air pressure charge. The expansion tank must be pressurized to provide at least 4 psi (28 kPa) of positive pressure at the highest point in the hydronic piping system. This will also ensure no air is drawn into the piping. The amount of charge pressure in pounds per square inch (psi) that is required in the expansion tank is equal to 4 psi (28 kPa) plus the height from the chiller to the highest point in the hydronic system divided by an X factor for setting tank pressure as shown below.

"X" Factor for Setting Tank Pressure English (ft, psi)		
% Glycol	Ethylene Glycol	Propylene Glycol
0 (pure water)	2.31	2.31
10	2.36	2.33
20	2.38	2.36
30	2.40	2.38
40	2.43	2.38
50	2.47	2.40

"X" Factor for Setting Tank Pressure SI (m, kPa)		
% Glycol	Ethylene Glycol	Propylene Glycol
0 (pure water)	0.102	0.102
10	0.104	0.103
20	0.105	0.104
30	0.106	0.105
40	0.108	0.105
50	0.109	0.106

Maximum Tank Working Pressure is 150 psig (1034 kPa).

Example: (English Units)

APC chiller elevation is 10 feet. The hydronic system is piped to a data center on the top floor with an elevation of 100 feet. Fluid is 100% water. The total pressure required in the expansion tank is:

4 psi + (100 ft – 10 ft)/2.31 = 42.96 psig

The expansion tank will require an additional 3 psi pressure.

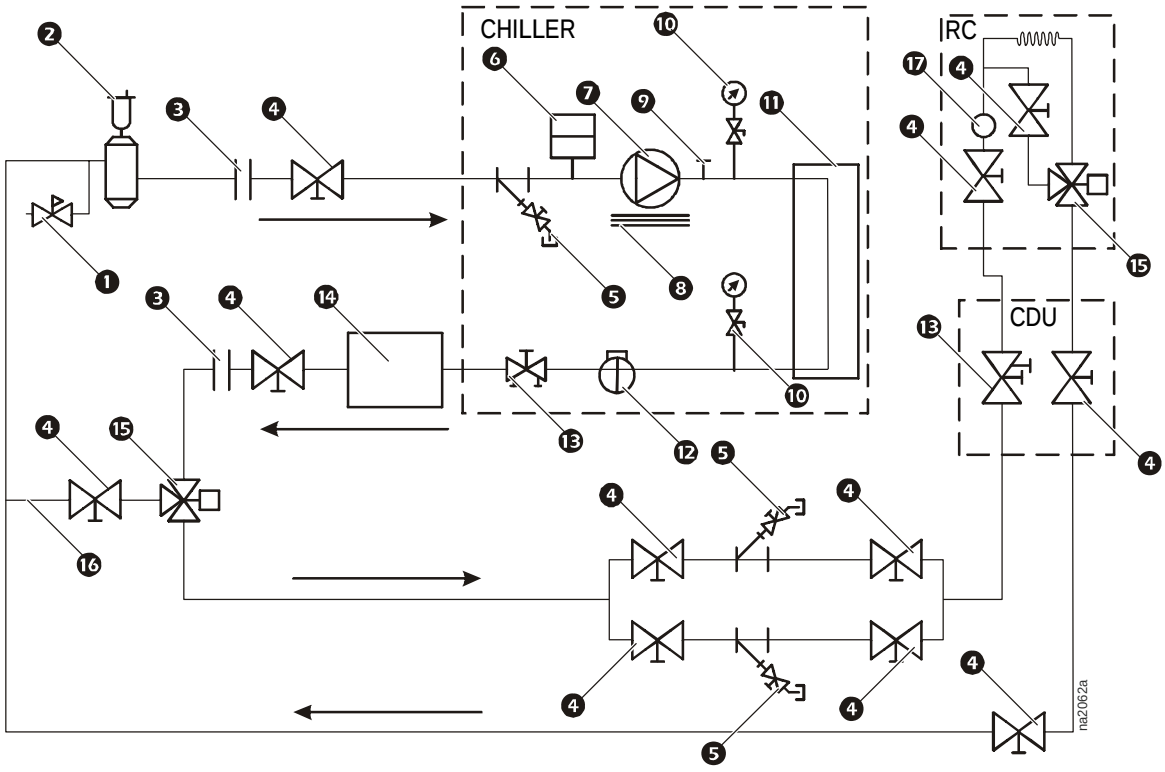
Example: (SI Units)

APC chiller elevation is 3.05 meters. The hydronic system is piped to a data center on the top floor with an elevation of 30.5 meters. Fluid is 100% water. The total pressure required in the expansion tank is:

28 kPa + (30.5 m – 3.05 m)/.102 = 297.11 kPa

The expansion tank will require an additional 21 kPa pressure.

Typical Piping — Chiller to Cooling Distribution Unit (CDU) (50-167 kw)



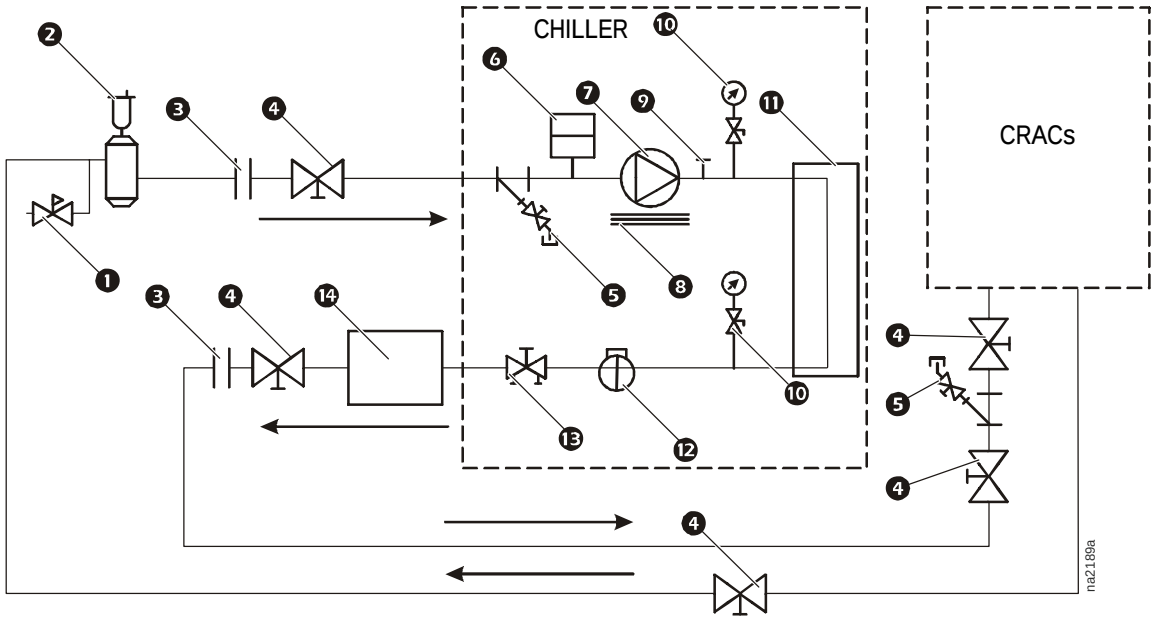
Note

Components inside dashed lines are included with the chiller, InfraStruXure InRow RC, and CDU. All other items (valves, piping, etc.) are customer-supplied.

1. Pressure reducing/fill valve
2. Air separator and vent*
3. Flex connections
4. Isolation valves
5. Strainer/blow-down valve
6. Expansion tank
7. Dual pump
8. Electric heater
9. Air vent connection port
10. Pressure gauges/petcocks
11. Heat exchanger
12. Flow switch
13. Balance valve/drain plug
14. Storage tank**
15. 3-way valve
16. Bypass line
17. Flow meter

*Install at the highest point in the system.
**To provide the coldest possible water to the load, install the optional storage tank on the leaving side of the chiller

Typical Piping — Single Chiller (50-167 kw)



Note

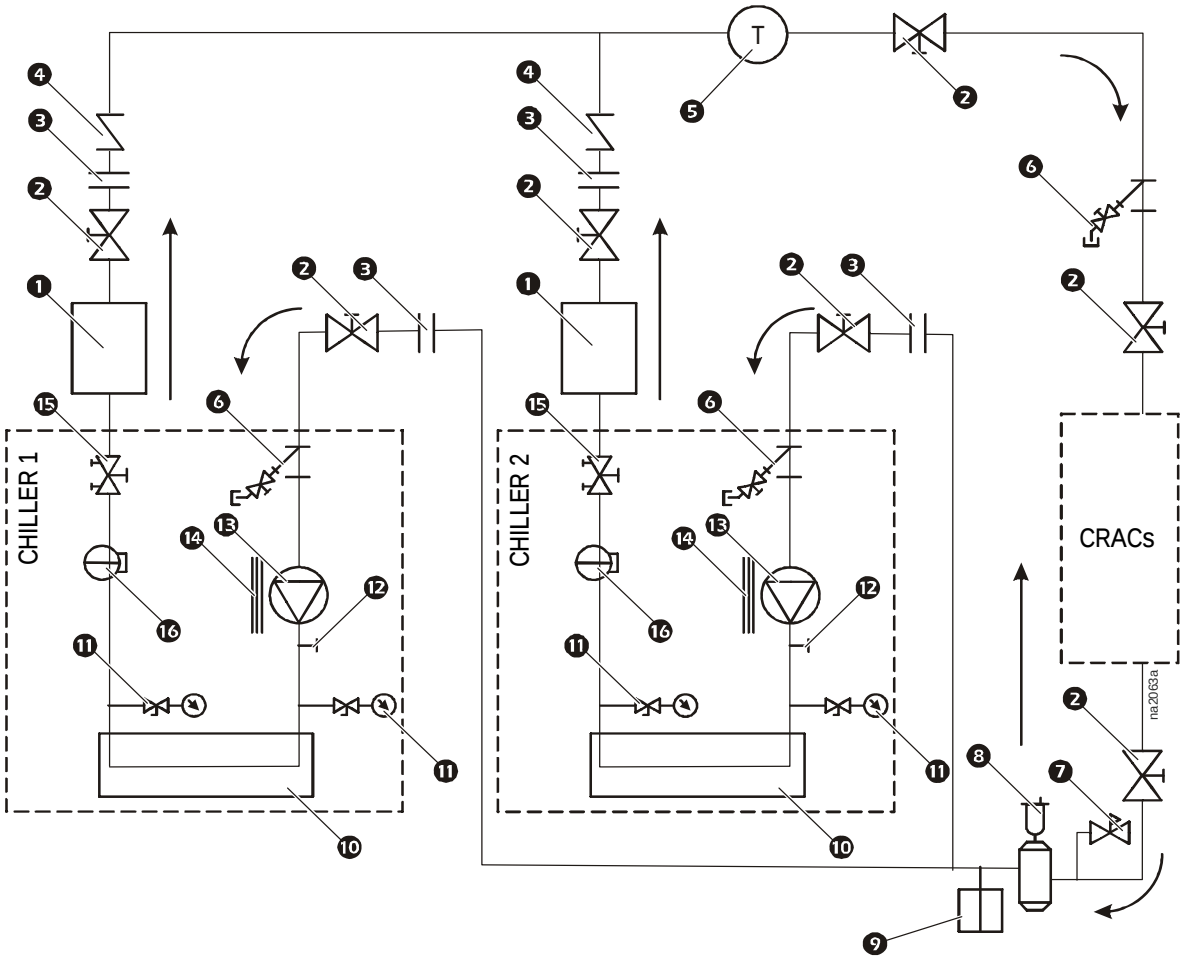
Components inside dashed lines are included with the chiller and CRACs. All other items (valves, piping, etc.) are customer-supplied.

❶	Pressure reducing/fill valve	❽	Electric heater
❷	Air separator and vent*	❾	Air vent connection port
❸	Flex connections	❿	Pressure gauges/petcocks
❹	Isolation valves	⓫	Heat exchanger
❺	Strainer/blow-down valve	⓬	Flow switch
❻	Expansion tank	⓭	Balance valve/drain plug
❼	Dual pump	⓮	Storage tank — optional**

* Install at the highest point in the system.

** To provide the coldest possible water to the load, install the optional storage tank on the leaving side of the chiller

Typical Piping — Redundant Chillers (50-167 kw)



Note

Components inside dashed lines are included with the chillers and CRACs. All other items (valves, piping, etc.) are customer-supplied.

❶	Storage tank — optional*	❾	Expansion tank****
❷	Isolation valves	❿	Heat exchanger
❸	Flex connections	⓫	Pressure gauges/petcocks
❹	Check valves	⓬	Air vent connection port
❺	Chilled water temperature sensor**	⓭	Dual pump
❻	Strainer/blow-down valve	⓮	Electric heater
❼	Pressure reducing/fill valve	⓯	Balance valve/drain plug
❽	Air separator and vent***	⓰	Flow switch

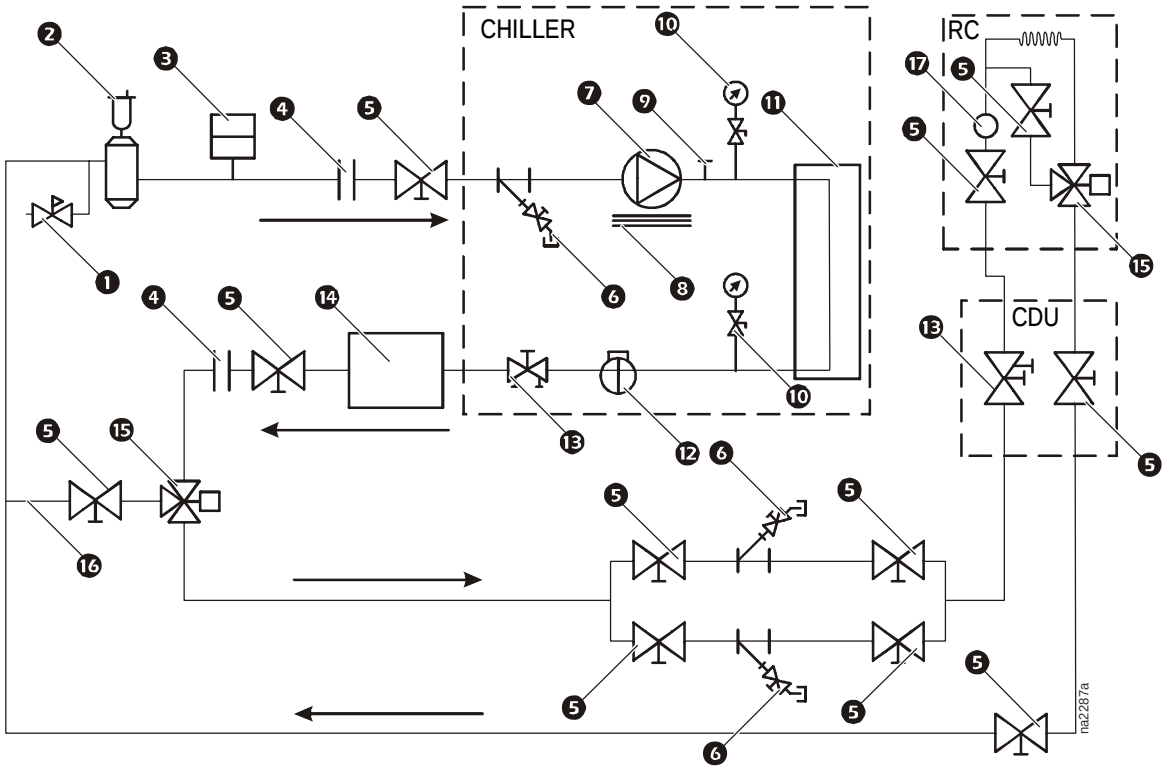
* To provide the coldest possible water to the load, install the optional storage tank on the leaving side of the chiller

** Chilled water temperature sensor should be wired to both chillers.

*** Install at the highest point in the system.

**** When applied in redundant chillers, disconnect the expansion tank and install a single expansion tank in the common header.

Typical Piping — Chiller to Cooling Distribution Unit (CDU) (200-220 kw)



Note

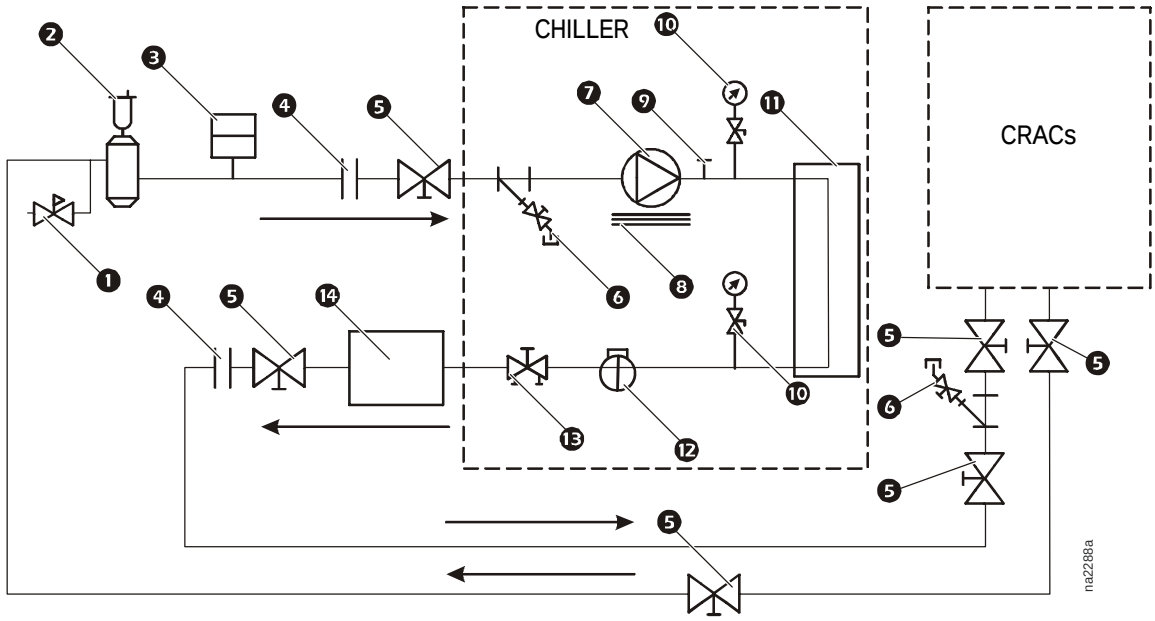
Components inside dashed lines are included with the chiller, InfraStruXure InRow RC, and CDU. All other items (valves, piping, etc.) are customer-supplied.

1. Pressure reducing/fill valve
2. Air separator and vent*
3. Expansion tank
4. Flex connections
5. Isolation valves
6. Strainer/blow-down valve
7. Dual pump
8. Electric heater
9. Air vent connection port
10. Pressure gauges/petcocks
11. Heat exchanger
12. Flow switch
13. Balance valve/drain plug
14. Storage tank**
15. 3-way valve
16. Bypass line
17. Flow meter

* Install at the warmest and lowest pressure point in the system.

** Field supplied and installed. To provide the coldest possible water to the load, install the storage tank on the leaving side of the chiller

Typical Piping — Single Chiller (200-220 kw)



Note

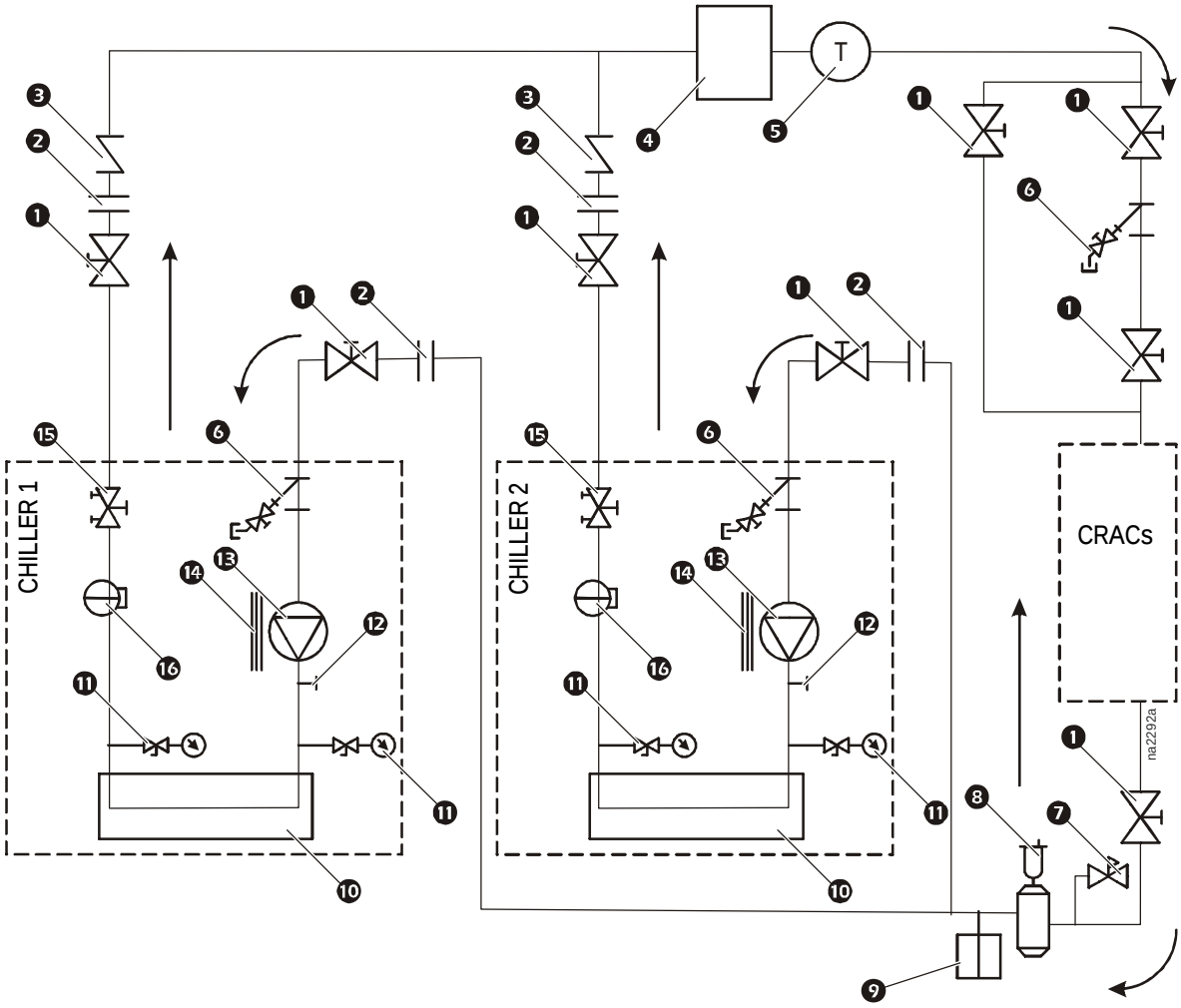
Components inside dashed lines are included with the chiller and CRACs. All other items (valves, piping, etc.) are customer-supplied.

❶	Pressure reducing/fill valve	❽	Electric heater
❷	Air separator and vent*	❾	Air vent connection port
❸	Expansion tank	❿	Pressure gauges/petcocks
❹	Flex connections	⓫	Heat exchanger
❺	Isolation valves	⓬	Flow switch
❻	Strainer/blow-down valve	⓭	Balance valve/drain plug
❼	Dual pump	⓮	Storage tank**

* Install at the warmest and lowest pressure point in the system.

** Field supplied and installed storage tank. To provide the coldest possible water to the load, install the storage tank on the leaving side of the chiller

Typical Piping — Redundant Chillers (200-220 kw)



Note

Components inside dashed lines are included with the chillers and CRACs. All other items (valves, piping, etc.) are customer-supplied.

❶	Isolation valves	❾	Expansion tank****
❷	Flex connections	❿	Heat exchanger
❸	Check valves	⓫	Pressure gauges/petcocks
❹	Storage tank*	⓬	Air vent connection port
❺	Chilled water temperature sensor**	⓭	Dual pump
❻	Strainer/blow-down valve	⓮	Electric heater
❼	Pressure reducing/fill valve	⓯	Balance valve/drain plug
❽	Air separator and vent***	⓰	Flow switch

* To provide the coldest possible water to the load, install the storage tank on the leaving side of the chiller

** Chilled water temperature sensor should be wired to both chillers.

*** Install at the warmest and lowest pressure point in the system.

**** Install the expansion tank in the common header.

Typical Piping — Redundant Chillers (200-220 kw)

Application Data

Chiller Location and Clearances

Do not locate the chiller near sound sensitive areas without proper acoustic consideration. For applications requiring mounting a chiller on a building rooftop, consideration should be given to using rubber-in-shear or spring isolators to minimize structure-borne transmission. Unit must be level when installed to ensure proper oil return to the compressors. Clearances must be provided around chillers for airflow, service and local code requirements. See dimensional drawings for specific unit clearance requirements. Ensure adequate clearance between adjacent chillers is maintained. A minimum of 10 ft (3048 mm) is recommended. Chiller fan discharge must be at least as high as adjacent solid walls. Installation in pits is not recommended.

Oversizing Chillers

Oversizing chillers by more than 15% at design conditions must be avoided as the system operating efficiency is adversely affected (resulting in greater or excessive electrical demand). When future expansion of equipment is anticipated, install a single chiller to meet present load requirements and add a second chiller to meet the additional load demand. It is also recommended that 2 smaller chillers be installed where operation at minimum load is critical. The operation of a smaller chiller loaded to a greater percentage over minimum is preferred to operating a single chiller at or near its minimum recommended value. Minimum Load Control should not be used as a means to allow oversizing chillers. Minimum Load Control should be given consideration where substantial operating time is anticipated below the minimum unloading step.

Cooler Fluid Temperature

1. Maximum leaving chilled fluid temperature (LCWT) for units ACCH050, 084, 120 & 167 is 70°F (21°C). Maximum LCWT for unit ACCH200 and ACCH220 is 85°F (29°C). Units can start and pull down with up to 95°F (35°C) entering-fluid temperature. It is recommended that entering-fluid temperature not exceed 85°F (29°C).
2. Minimum LCWT for standard unit is 40°F (4.4°C). For leaving-fluid temperatures between 34° to 39.9°F (1° to 4.39°C) a 20% anti-freeze solution, or greater is required.

NOTE: Water flowing through cooler should not exceed 100°F (38°C).

Cooler Flow / Range

Ratings and performance data in this publication are for a cooling temperature rise of 10°F (6°C). APC Chillers may be operated at a different temperature rise, providing flow limits are not exceeded and corrections to the system guidelines are made. For minimum cooler flow rates, see the Minimum and Maximum Cooler Flow Rates table. A high flow rate is generally limited by the maximum pressure drop that can be tolerated by the unit. If another temperature range is used, apply LCWT correction as given in the Selection Procedure example on page 21.

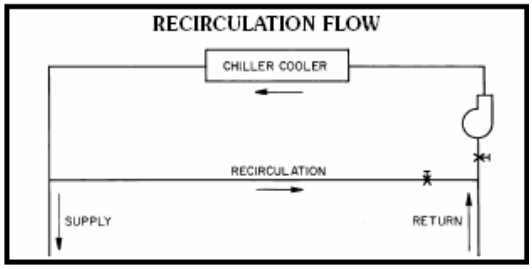
Minimum Cooler Flow (Maximum Cooler Temperature Rise)

The minimum cooler flow for standard units is shown in Minimum Cooler Flow Rates table. When system design conditions require a lower flow (or higher rise) than the minimum allowable cooler flow, follow the recommendations below.

a. Multiple smaller chillers may be applied in series, each providing a portion of the design temperature rise.

b. Cooler fluid may be recirculated to raise the flow rate to the chiller. However, the mixed temperature entering cooler must be maintained a minimum of at least 5°F (2.8°C) above the LCWT

NOTE: Recirculation flow is shown below.

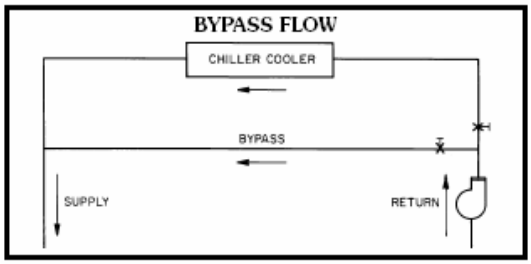


Maximum Cooler Flow

The maximum cooler flow (> 5 gpm/ton or < 5°F rise [> 0.09 L/s · kW or < 2.8°C rise]) results in practical maximum pressure drop through the cooler.

Return fluid may bypass the cooler to keep the pressure drop through the cooler within acceptable limits. This permits a higher ΔT with lower fluid flow through the cooler and mixing after the cooler.

NOTE: Bypass flow is shown below.



Variable Cooler Flow Rates

Variable rates may be applied to the standard chiller. Unit will, however, attempt to maintain a constant leaving chilled fluid temperature. In such cases, the minimum flow must be in excess of the minimum flow given in the Minimum Cooler Fluid Flow Rates and Minimum Loop Volume table, and flow rate must change in steps of less than 10% per minute. Apply 6 gal. per ton (6.5 L per kW) water loop volume if the flow rate changes more rapidly.

Tank Volume*

A properly baffled storage tank is available as an accessory. These tanks are designed to physically fit beneath the corresponding ACCH unit, taking up the same footprint.

Available volume is as follows:

ACCH050 - 110 gallons (416 liters)

ACCH084 - 150 gallons (567 liters)

ACCH120 & 167 - 305 gallons (1154 liters)

*ACCH200 and ACCH220 - Field Supplied

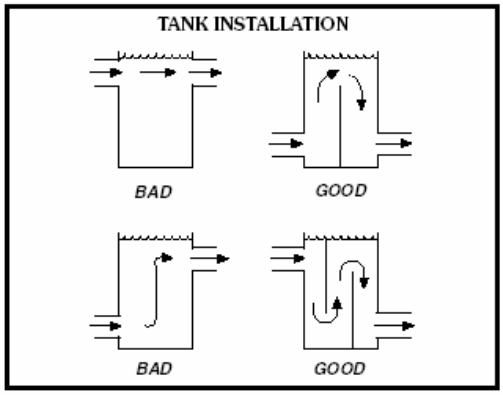
Note: All tanks must be field installed.

	Minimum and Maximum Cooler Flow Rates					
	English (60 Hz)			SI (60 Hz)		
ACCH Size	Min. Flow Rate (gpm)	Max. Flow Rate (gpm)	Min. Loop Volume (gal)	Min. Flow Rate (L/s)	Max. Flow Rate (L/s)	Min. Loop Volume (L)
050	16	66	55	1.01	4.16	207.9
084	29	114	71	1.83	7.18	268.38
120	42	167	104	2.65	10.52	393.12
167	57	227	142	3.59	14.3	536.76
220	84	336	210	5.30	21.20	794.93

Fluid Loop Volume

In process cooling applications, or for operation at ambient temperature below 32°F (0°C) with low loading conditions, there should be from 6 to 10 gal. per ton (6.5 to 10.8 L per kW). To achieve this volume, it is often necessary to install a tank in the loop.

Tank should be baffled to ensure there is no stratification and that water entering tank is adequately mixed with liquid in the tank.



Cooler Fouling Factor

The fouling factor used to calculate tabulated ratings was 0.0001 ft² · hr · °F/Btu (0.000018 m² · °C/kW). As fouling factor is increased, unit capacity decreases and compressor power increases. Corrections to published ratings can be approximated by using following multipliers:

Fouling Factors			
Fouling Factor (English) ($ft^2 \cdot hr \cdot °F/Btu$)	Fouling Factor (SI) ($m^2 \cdot C/kW$)	Capacity Multiplier	Compressor Power Multiplier
0.00025	0.000044	0.991	0.995
0.00050	0.000088	0.977	0.987
0.00075	0.000132	0.955	0.979
0.00175	0.000308	0.910	0.952

Cooler and Hydronic System Freeze Protection

Protection against low ambient freeze-up is required for unit operation in areas that experience temperatures below 32°F (0°C). Protection should be in the form of inhibited ethylene glycol or other suitable brine.

Even though the unit cooler is equipped with insulation and an electric heater that helps prevent freeze-up, it does not protect fluid piping external to cooler or if there is a power failure. Use only antifreeze solutions approved for heat exchanger duty. Use of automotive-type antifreezes is not recommended because of the fouling that can occur once their relatively short-lived inhibitor breaks down. Draining the cooler and outdoor piping is recommended if system is not to be used during freezing weather conditions. See Low Ambient Temperature Operation section.

High Ambient Temperature Operation

High outdoor ambient chiller start-up and operation (fully loaded) is possible for standard APC Chillers at ambient temperatures up to 120°F (50°C) (sizes 050, 084, 120 & 167) and 125°F (52°C) (size 200 and 220) at nominal voltage.

Low Ambient Temperature Operation

Units will start and operate down to -20°F (-29°C) as standard.

Operation at -20°F (-29°C) is achieved with the Motormaster® V condenser head pressure control as well as wind baffles (provided and installed in the field by others to all units for operation below 32°F (0°C) if wind velocity is anticipated to be greater than 5 mph (8 km/h). Inhibited propylene glycol or other suitable corrosion-resistant anti-freeze solution must be field supplied and installed in all units for unit operation below 32°F (0°C). Solution must be added to the fluid loop to protect loop down to 15°F (8°C) below minimum operating ambient temperature. Concentration should be based on expected minimum temperature and either “Burst” or “Freeze” protection levels. At least 6 gal per ton (6.5 L per kW) of fluid volume is recommended minimum for a moderate system load.

Altitude Correction Factors

Correction factors must be applied to standard ratings at altitudes above 2000 ft (610 m) using the following multipliers:

Altitude Correction Factors			
Altitude (ft)	Altitude (m)	Capacity Multiplier	Compressor Power Multiplier
2,000	610	0.99	1.01
4,000	1220	0.98	1.02
6,000	1830	0.97	1.03
8,000	2440	0.96	1.04
10,000	3050	0.95	1.05

Freeze Versus Burst Protection

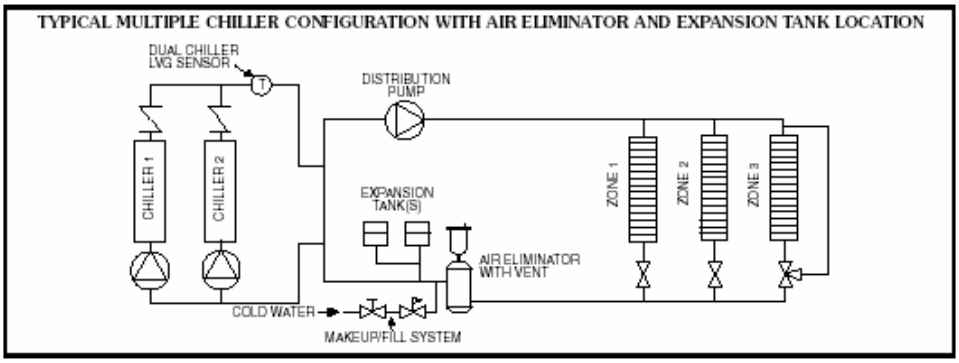
If chiller operation is not required during winter/off season, lower glycol concentrations based on “burst” protection criteria should be considered. Often the use of burst protection results in lower fluid costs and has less impact on chiller cooler capacity and flow rate. Consult glycol fluid manufacturers for burst protection recommendations and fluid specifications.

Multiple Chillers

Where multiple chillers are required, or where standby capability is desired, chillers may be installed in parallel. The flow must be balanced according to the recommendations for each chiller.

Where applied in parallel with optional hydronic package, the expansion tank must be disconnected and a single expansion tank must be installed in the common header.

Unit software is capable of controlling two units as a single plant. Refer to Controls, Start-Up, Operation, Service, and Troubleshooting guide for further details. Hydronic pump packages may not be applied in series applications.



Remote On-Off Control

Remote on-off control may be applied by hard-wired connection (see Controls and Troubleshooting literature).

Hydronic System and Expansion Tank Selection

Select pump GPM from resulting chiller selection and total pressure loss in the system plus the chiller internal pressure loss.

NOTE: The maximum gpm (L/s), pressure and pump hp must not exceed the maximum on the pump curve.

Pump glow can be reduced using the factory-supplied balancing valve up to 10%. Beyond that, impeller trimming is recommended to reduce energy consumption. Follow local codes or ASHRAE 90.1 recommendations. Contact your APC representative for the specific amount of trim required.

The expansion tank supplied will allow loop expansion due to ambient fluctuations for loop volumes of up to the values in the Max Loop Volume table. If the loop volume exceeds this volume, a larger expansion tank must be field supplied.

ACCH050-084 4.4 total gal., 3.2 acceptable volume (16.6 total liters, 12.1 acceptable volume)

ACCH120-167 10.3 total gal., 10.3 acceptable volume (38.9 total liters, 38.9 acceptable volume)

Max Loop Volume (gal)

	ACCH050-084	ACCH120-167
Pure Water	310 (1173)	725 (2744)
10% EG	180 (681)	425 (1608)
20% EG	175 (662)	410 (1551)
30% EG	155 (586)	370 (1400)
40% EG	150 (567)	350 (1324)
10% PG	175 (662)	410 (1551)
20% PG	150 (567)	350 (1324)
30% PG	128 (484)	300 (1135)
40% PG	118 (446)	275 (1040)

EG - Ethylene Glycol
PG - Propylene Glycol

NOTE: The maximum loop volume is based on typical system of 12 psi (82.7 kPa) and 30 psi (206.85 kPa) on min/max pressures, and 100°F (37.8°C) mean temperature. If the volume in the system is greater than the limits listed below, then extra expansion tank volume must be added to the system.

The ACCH200 and ACCH220 chillers will require a field supplied expansion tank.

The expansion tank is based on fluid type, temperature range, fluid pressure and loop volume.

Parallel chillers with hydronic packages require that pump inlets be equalized to prevent pump cavitation. Pump expansion tanks must be removed and located together in the common pump suction header. All materials needed for expansion tank relocation are field supplied. Appropriate measures must be taken for freeze protection.

Air Separation

APC chillers will require a field-supplied air separation device.

Air must be controlled in a hydronic system if it is to perform properly. Air can block the flow of chilled water to its destinations and can cause cavitation in the pump, which will aerate the pump and potentially cause pump failure. The air separator is sized according to the total flow through the system. The air separator should be located inside the building. There are several types of air separators to choose from. For more information and product selection contact your local manufacturer's representative.

Guide Specifications

PART 1 — GENERAL

1.01 SYSTEM DESCRIPTION

Microprocessor controlled, air-cooled liquid chiller utilizing scroll compressors, low sound fans, hydronic pump system and optional fluid storage tank (sizes 050-167).

1.02 QUALITY ASSURANCE

A. Unit shall be rated in accordance with ARI Standard 550/590, latest revision (U.S.A.).

B. Unit construction shall comply with ASHRAE 15 Safety Code, NEC, and ASME applicable codes (U.S.A. codes).

C. Unit shall be manufactured in a facility registered to ISO 9001:2000 Manufacturing Quality Standard.

D. Unit shall be full load run tested at the factory.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Unit controls shall be capable of withstanding 150°F (66°C) storage temperatures in the control compartment.

B. Unit shall be stored and handled per unit manufacturer’s recommendations.

PART 2 — PRODUCTS

2.01 EQUIPMENT

A. General:

Factory assembled, single-piece chassis, air-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-22 sizes 050-167 and R-410A size 200 and 220), and special features required prior to field start-up.

B. Unit Cabinet:

1. Frame shall be of heavy-gage galvanized steel.
2. Cabinet shall be galvanized steel casing with a baked enamel powder or pre-painted finish.
3. Cabinet shall be capable of withstanding 500-hour salt spray test in accordance with the ASTM (U.S.A.) B-117 standard.

C. Fans:

1. Condenser fans shall be direct-driven, 11-blade (sizes 050-167) and 9-blade (size 200 and 220) airfoil cross-section, reinforced polymer construction, shrouded-axial type, and shall be statically and dynamically balanced with inherent corrosion resistance.
2. Two-speed (size 050) or single fan operation shall allow reduced sound levels during scheduled unoccupied operating periods. Manufacturers without unoccupied reduced sound capability shall submit 1/3 octave band data and sound power data as measured by ARI 370 as confirmation of unit sound characteristics.
3. Air shall be discharged vertically upward.
4. Fans shall be protected by coated steel wire safety guards.

D. Compressors:

1. Fully hermetic scroll type compressors.
2. Direct drive, 3500 rpm (60 Hz), protected by either line break device or discharge gas thermostat, depending on motor, suction gas cooled motor.
3. External vibration isolation – rubber in shear.
4. Each compressor shall be equipped with crankcase heaters to minimize oil dilution.

E. Cooler (sizes 050-167)

1. Cooler shall be rated for a refrigerant working side pressure of 450 psig (3103 kPa) and shall be tested for a maximum fluid-side pressure of 150 psig (1034 kPa) (in Canada, 250 psig (1724 kPa) per Canadian National Registry requirements).
2. Cooler shall be single-pass, ANSI type 316 stainless steel, brazed plate construction.
3. Cooler shell shall be insulated with ¾-in. (19 mm) closed-cell, polyvinyl-chloride foam with a maximum K factor of 0.28.
4. Cooler shall Incorporate 2 independent refrigerant circuits on sizes 120 & 167; sizes 050 & 084 shall have one independent refrigerant circuit.

5. Cooler shall have factory-installed heater, to protect cooler from ambient temperature freeze down to -20°F (-29°C).

F. Cooler (size 200 and 220)

1. Cooler shall be tested and stamped in accordance with ASME Code for a refrigerant working pressure of 445 psig (3068 kPa). Cooler shall have a maximum fluid-side pressure of 300 psig (2068 kPa).
2. Cooler shall be shell-and-tube type, direct expansion.
3. Tubes shall be internally enhanced seamless copper type rolled into tube sheets.
4. Cooler shall be equipped with Victaulic-type fluid connections.
5. Cooler shell shall be insulated with ¾-in. (19 mm) PVC foam (closed-cell) with a maximum K factor of 0.28.
6. Design shall incorporate a minimum of 2 independent direct-expansion refrigerant circuits.
7. Cooler shall have factory-installed heater, to protect cooler from ambient temperature freeze down to -20°F (-29°C).

G. Condenser:

1. Coil shall be air-cooled with integral subcooler, and shall be constructed of aluminum fins mechanically bonded to seamless copper tubes.
2. Tubes shall be cleaned, dehydrated, and sealed.
3. Assembled condenser coils shall be leak tested and pressure tested at 450psig (3103 kPa) on sizes 050 – 167; and 656 psig (4522 kPa) on size 200 and 220.

H. Refrigeration Components (sizes 050-167):

Refrigerant circuit components shall include filter drier, moisture indicating sight glass, thermal expansion device, and complete operating charge of both refrigerant R-22 and mineral compressor oil.

I. Refrigeration Components (size 200 and 220):

Refrigerant circuit components shall include replaceable-core filter drier, moisture indicating sight glass, electronic expansion device, discharge service valve and liquid line service valves, and complete operating charge of both refrigerant R-410A and POE compressor oil.

J. Controls, Safeties, and Diagnostics

1. Unit controls shall include the following minimum components:
   a. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
   b. Separate terminal block for power and controls.
   c. Control transformer to serve all controllers, relays, and control components.
   d. ON/OFF control switch

e. Replaceable solid-state controllers.
f. Pressure sensors installed to measure suction and discharge pressure. Thermistors installed to measure cooler entering and leaving fluid temperatures. Provision for field installed of accessory sensor to measure compressor return gas temperature.

2. Unit controls shall include the following functions:
   a. Automatic circuit lead/lag for dual circuit chillers.
   b. Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return-fluid temperature with temperature set point accuracy to 0.1°F (0.06°C).
   c. Limiting the chilled fluid temperature pull down rate at start-up to an adjustable range of 0.2°F to 2°F (0.11°C to 1.1°C) per minute to prevent excessive demand spikes at start-up.
   d. Seven-day time schedule.
   e. Leaving chilled fluid temperature reset from return fluid.
   f. Chiller water pump start/stop control and primary/standby sequencing to ensure equal pump run time.
   g. Dual chiller control for parallel chiller applications without addition of hardware modules, control panels, thermometer wells.
   h. Unoccupied low sound operation to limit condenser fan sound during scheduled periods.
   i. Timed maintenance scheduling to signal maintenance activities for pumps, condenser coil cleaning, strainer maintenance and user defined maintenance activities.
   j. Low ambient protection to energize cooler and hydronic system heaters.
   k. Periodic pump start to ensure pump seals are properly maintained during off-season periods.

3. Diagnostic
   a. The control panel shall include, as standard, a Scrolling Marquee display capable of indicating the safety lockout condition by displaying a code for which an explanation may be scrolled at the display.
   b. Information included for display shall be:
      1. Compressor Lockout
      2. Loss of Charge
      3. Low Fluid Flow
      4. Cooler Freeze Protection
      5. Thermistor Malfunction
      6. Entering and Leaving Fluid Temperature
      7. Evaporator and Condenser Pressure
      8. Time of Day:
         a. Display module, in conjunction with the microprocessor, must also be capable of displaying the output (results) of a service test. Service test shall verify operation of every switch, thermistor, fan, and compressor before chiller is started.

b. Diagnostics shall include the ability to review a list of the 20 most recent alarms with clear language descriptions of the alarm event. Display of alarm codes without the ability for clear language descriptions shall be prohibited.
c. An alarm history buffer shall allow the user to store no less than 20 alarm events with clear language descriptions, time and date stamp event entry.
d. The chiller controller shall include multiple connection ports for communicating with the local equipment network and the ability to access all chiller control functions from any point on the chiller.
e. The control system shall allow software upgrade without the need for new hardware modules.

4. Safeties
   a. Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protections:
      1. Loss of refrigerant charge
      2. Reverse rotation
      3. Low chilled fluid temperature
      4. Thermal overload
      5. High pressure
      6. Electrical overload
      7. Loss of phase
   b. Condenser fan and factory pump motors shall have external overcurrent protection.

K. Operating Characteristics

1. Unit shall be capable of starting and running at outdoor ambient temperatures from 45°F to 120°F (7°C to 50°C) for size 050 or 32°F to 125°F (0°C to 52°C) for sizes 084 – 220.
2. Unit shall be capable of starting up with 95°F (35°C) entering fluid temperature to the cooler.

L. Motors:

Condenser fan motors shall be totally enclosed single speed, 3-phase type with permanently lubricated bearings and Class F insulation.

M. Electrical Requirements:

1. Unit primary electrical power supply shall enter the unit at a single location (some units have multiple poles).
2. Primary electrical power supply shall be rated to withstand 120°F (50°C) sizes 050 – 167 and 125°F (52°C) size 200 and 220 operating ambient.
3. Unit shall operate on 3-phase power at the voltage shown in the equipment schedule.
4. Control points shall be accessed through terminal block.
5. Unit shall be shipped with factory installed control and power wiring installed.
6. Accessory storage tank cooler heater requires a separate power source.

N. Chilled Water Circuit (sizes 050-167)

1. Field pipe connections shall be copper NPT and shall be extended to the outside of the unit chassis.
2. Primary / Stand-by operation pump systems shall have pump discharge check valves.
3. Pumps shall be single stage design for installation in vertical or horizontal position and capable of being serviced without disturbing piping connections.
   a. Pump casing shall be of class 30 cast iron.
   b. The impeller shall be of cast bronze, closed type, dynamically balanced, keyed to the shaft and secured by locking cap screw.
   c. The liquid cavity shall be sealed off at the motor shaft by an internally flushed mechanical seal with ceramic seal seat and carbon seal ring.
   d. Pump shall be rated for 150 psig working pressure.
   e. The pump case shall have gauge tappings at the suction and discharge nozzles and include drain ports.
   f. Motors shall be totally enclosed 3-phase type with grease lubricated ball bearings.
   g. Each pump shall be factory tested per Hydraulic Institute Standards
4. Fluid expansion tank shall be factory installed within the chiller cabinet insulates, pre-charged and rated for a maximum working pressure of 150 psig.
5. Water pressure gages (2) shall be factory installed across the cooler and rated for 150 psi.
6. Proof-of-flow switch shall be factory installed and rated for 150 psig.
7. Balancing valve shall be factory installed to set flow gage ports shall be factory installed and rated for 300 psig.
8. Hydronic assembly shall have factory supplied electric freeze protection to -20°F (-29°C).
9. Piping shall be type-L seamless copper tubing.
10. Copper body strainer with 20 mesh screen and ball type blow down.

O. Chilled Water Circuit (size 200 and 220)

1. Chilled water circuit shall be rated for 150 psig (1034 kPa) working pressure.
2. Proof-of-flow switch shall be factory installed and wired.
3. Hydronic package:
   a. Field pipe connections shall be Victaulic type.
   b. Primary / Stand-by operation pump systems shall have a pump discharge check valve.
   c. Pumps shall be single stage design, for installation in vertical position and capable of being serviced without disturbing piping connections.
      1. Pump casing shall be of class 30 cast iron.
      2. The impeller shall be of cast bronze, closed type, dynamically balanced, keyed to the shaft and secured by locking cap screw.
      3. The liquid cavity shall be sealed off at the motor shaft by an internally flushed mechanical seal with ceramic seal seat and carbon seal ring.
      4. Pump shall be rated for 150 psig (1034 kPa) working pressure.
      5. The pump case shall have gage tappings at the suction and discharge nozzles and include drain ports.

6. Dual pumps shall allow for the servicing of one pump without draining the chilled water loop.
7. Motors shall be totally enclosed 3-phase type with grease lubricated ball bearings.
8. Each pump shall be factory tested per Hydraulic Institute Standards.

d. Pressure/temperature taps (3) shall be factory installed to measure the pressure differential across the pump and across the strainer.
e. Triple-duty valve shall be factory installed.
f. Hydronic assembly shall have factory supplied electric freeze protection to -20°F (-29°C).
g. Piping shall be type-L seamless copper tubing.
h. Cast iron body strainer with 20 mesh screen.

P. Standard Features

1. Low-Ambient Operation:

   Unit shall be capable of starting and running at outdoor ambient temperatures down to -20°F (-29°C) with the addition of antifreeze in the cooler circuit, wind baffles, and field installed or factory installed solid-state Motormaster control with condenser coil temperature sensor.
2. Unit-Mounted Non-Fused Disconnect:

   Unit shall be supplied with factory-installed, non-fused electrical disconnect for main power supply.
3. Minimum Load Control:

   Unit shall be equipped with factory installed, microprocessor-controlled, minimum load control that shall permit unit operation down to a minimum of 15% capacity (varies with unit size).
4. Coil Protection Grilles:

   Unit shall be supplied with factory (or field) installed, PVC-coated grilles to protect the condenser coil from physical damage.
5. Vibration Isolation:

   Vibration isolation pads shall be supplied for field installation at unit mounting points. Pads shall help to reduce vibration transmission into the occupied space.

Q. Optional Features

1. Wind Baffles: (factory supplied and installed)

   Required if wind velocity is anticipated to be greater than 5 mph (8 km/h) in low ambient operation.

2. Chilled Water Storage Tank (field supplied on ACCH200 and ACCH220):
   a. Fluid storage tank shall be rated for a maximum of 150 psig.
   b. Shall provide a minimum 6 gallon per ton fluid storage capacity.
   c. Shall fit under the chiller to minimize system footprint requirements. Tanks fitted outside of the chiller footprint shall not be acceptable.
   d. Tank shall be constructed with a cold rolled carbon steel shell.
   e. Tank shall be insulated with ¾-in. (19mm) closed-cell, poly vinyl-chloride foam with a maximum K factor of 0.28
   f. Tank shall be baffled to prevent temperature stratification.
   g. Tank shall have NPT threaded connections.
   h. Tank shall have vent and drain plugs accessible from outside tank enclosure.
   i. Internal heaters shall provide freeze protection to -20°F (-29°C).
3. Modbus LEI Bacnet Protocol:
   a. A Modbus communication card shall be installed at the chiller and set up to interface with a secondary controls system.

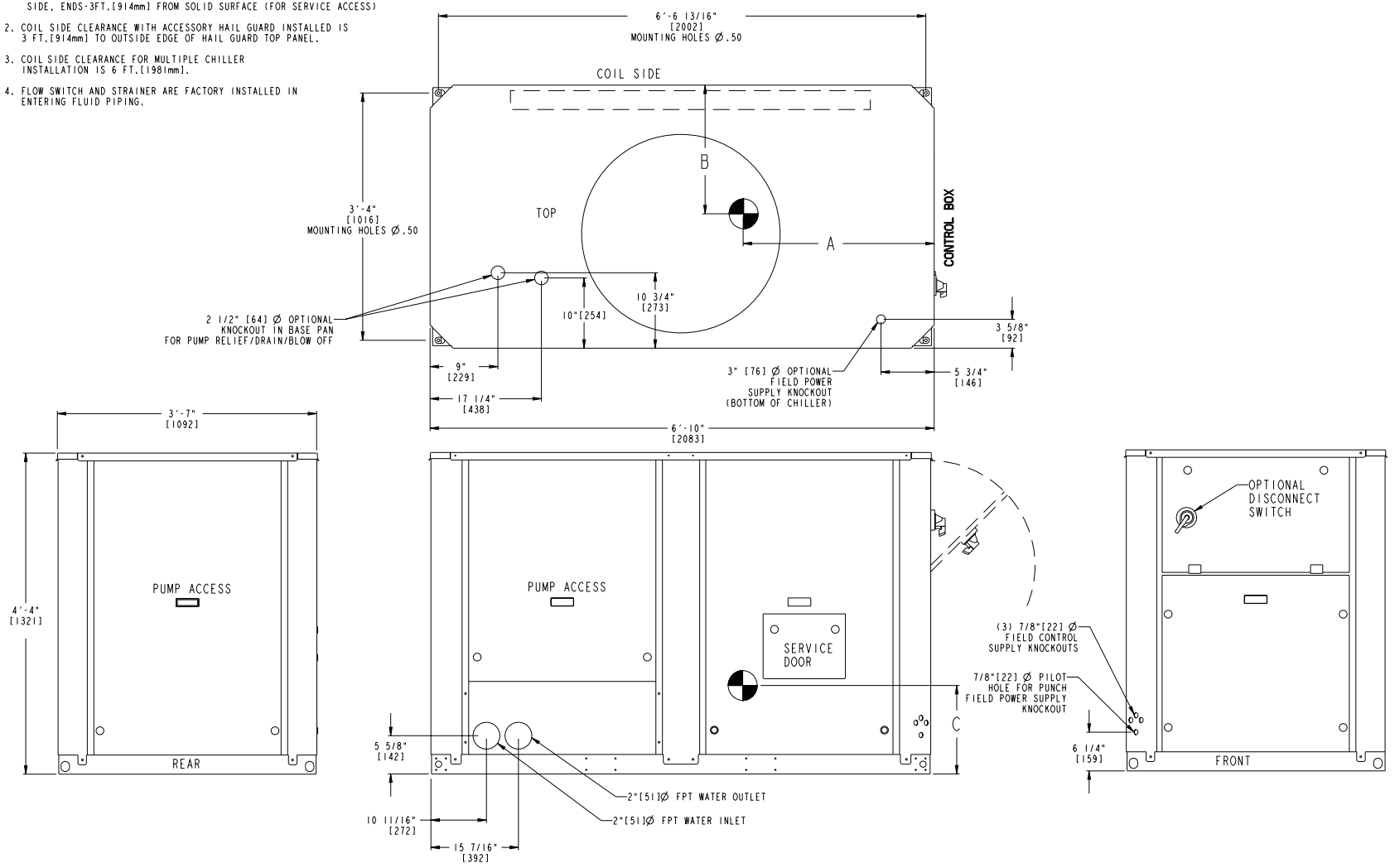
Dimensions — ACCH050

NOTES:
1. UNIT MUST HAVE CLEARANCES FOR AIRFLOW AS FOLLOWS:
   TOP-DO NOT RESTRICT IN ANY WAY
   COIL SIDE- 3 1/2 FT.[1067mm] FROM SOLID SURFACE
   SIDE, ENDS-3FT.[914mm] FROM SOLID SURFACE (FOR SERVICE ACCESS)

2. COIL SIDE CLEARANCE WITH ACCESSORY HAIL GUARD INSTALLED IS 3 FT.[914mm] TO OUTSIDE EDGE OF HAIL GUARD TOP PANEL.

3. COIL SIDE CLEARANCE FOR MULTIPLE CHILLER INSTALLATION IS 6 FT.[1981mm].

4. FLOW SWITCH AND STRAINER ARE FACTORY INSTALLED IN ENTERING FLUID PIPING.



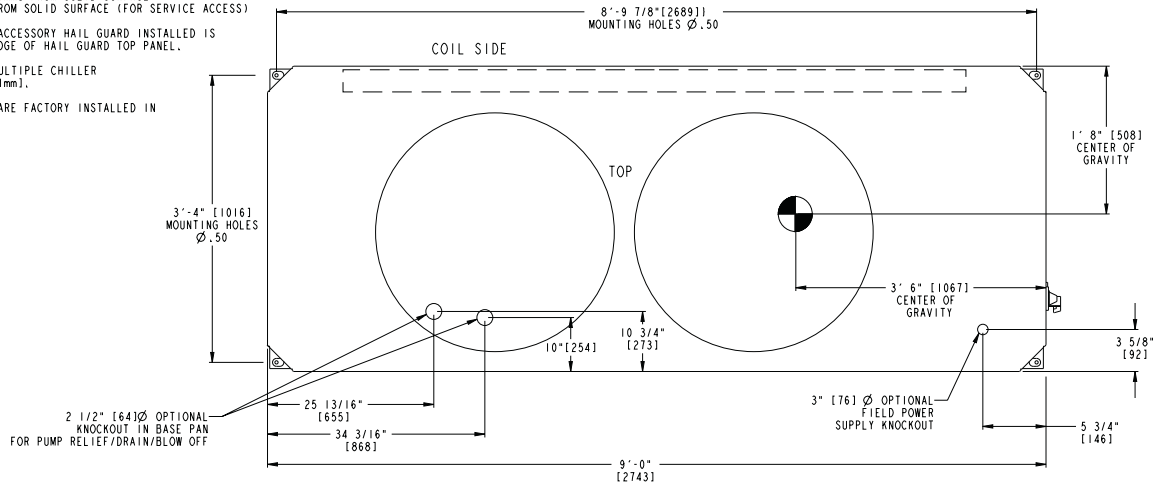
Dimensions — ACCH084

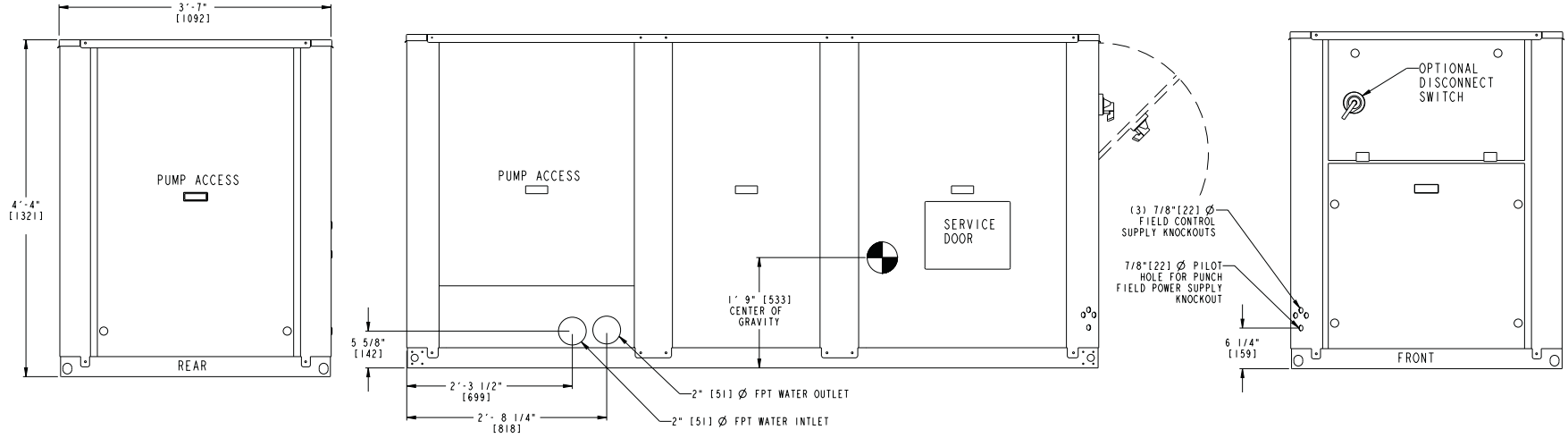
NOTES:
1. UNIT MUST HAVE CLEARANCES FOR AIRFLOW AS FOLLOWS:
   TOP-DO NOT RESTRICT IN ANY WAY
   COIL SIDE- 3 1/2 FT.[1067mm] FROM SOLID SURFACE
   SIDE, ENDS-3FT.[914mm] FROM SOLID SURFACE (FOR SERVICE ACCESS)

2. COIL SIDE CLEARANCE WITH ACCESSORY HAIL GUARD INSTALLED IS 3 FT.[914mm] TO OUTSIDE EDGE OF HAIL GUARD TOP PANEL.

3. COIL SIDE CLEARANCE FOR MULTIPLE CHILLER INSTALLATION IS 6 FT.[1981mm].

4. FLOW SWITCH AND STRAINER ARE FACTORY INSTALLED IN ENTERING FLUID PIPING.





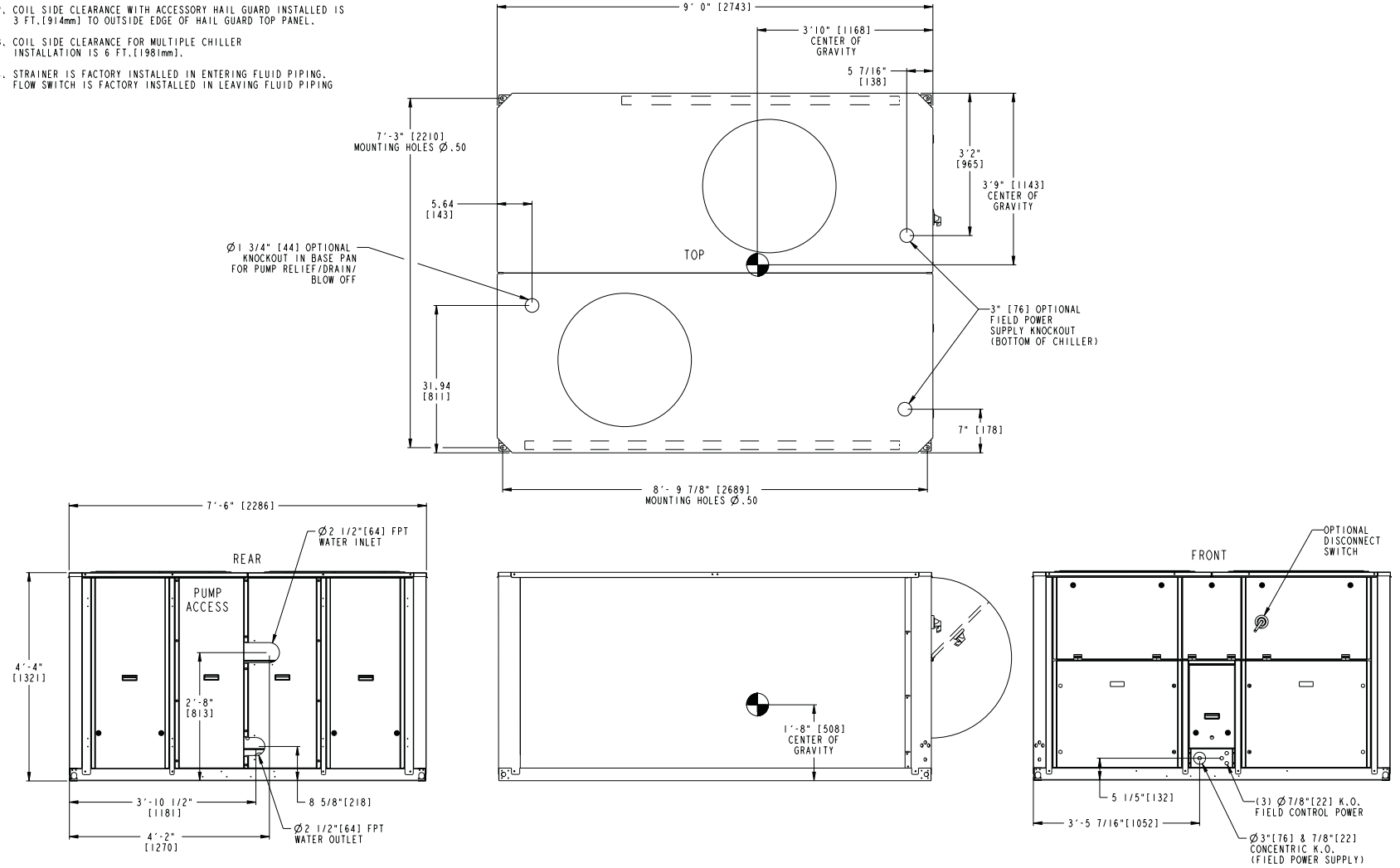
Dimensions — ACCH120

NOTES:
1. UNIT MUST HAVE CLEARANCES FOR AIRFLOW AS FOLLOWS:
   TOP-DO NOT RESTRICT IN ANY WAY
   COIL SIDE- 3 1/2 FT.[1067mm] FROM SOLID SURFACE
   SIDE, ENDS-3FT.[914mm] FROM SOLID SURFACE (FOR SERVICE ACCESS)

2. COIL SIDE CLEARANCE WITH ACCESSORY HAIL GUARD INSTALLED IS 3 FT.[914mm] TO OUTSIDE EDGE OF HAIL GUARD TOP PANEL.

3. COIL SIDE CLEARANCE FOR MULTIPLE CHILLER INSTALLATION IS 6 FT.[1981mm].

4. STRAINER IS FACTORY INSTALLED IN ENTERING FLUID PIPING. FLOW SWITCH IS FACTORY INSTALLED IN LEAVING FLUID PIPING



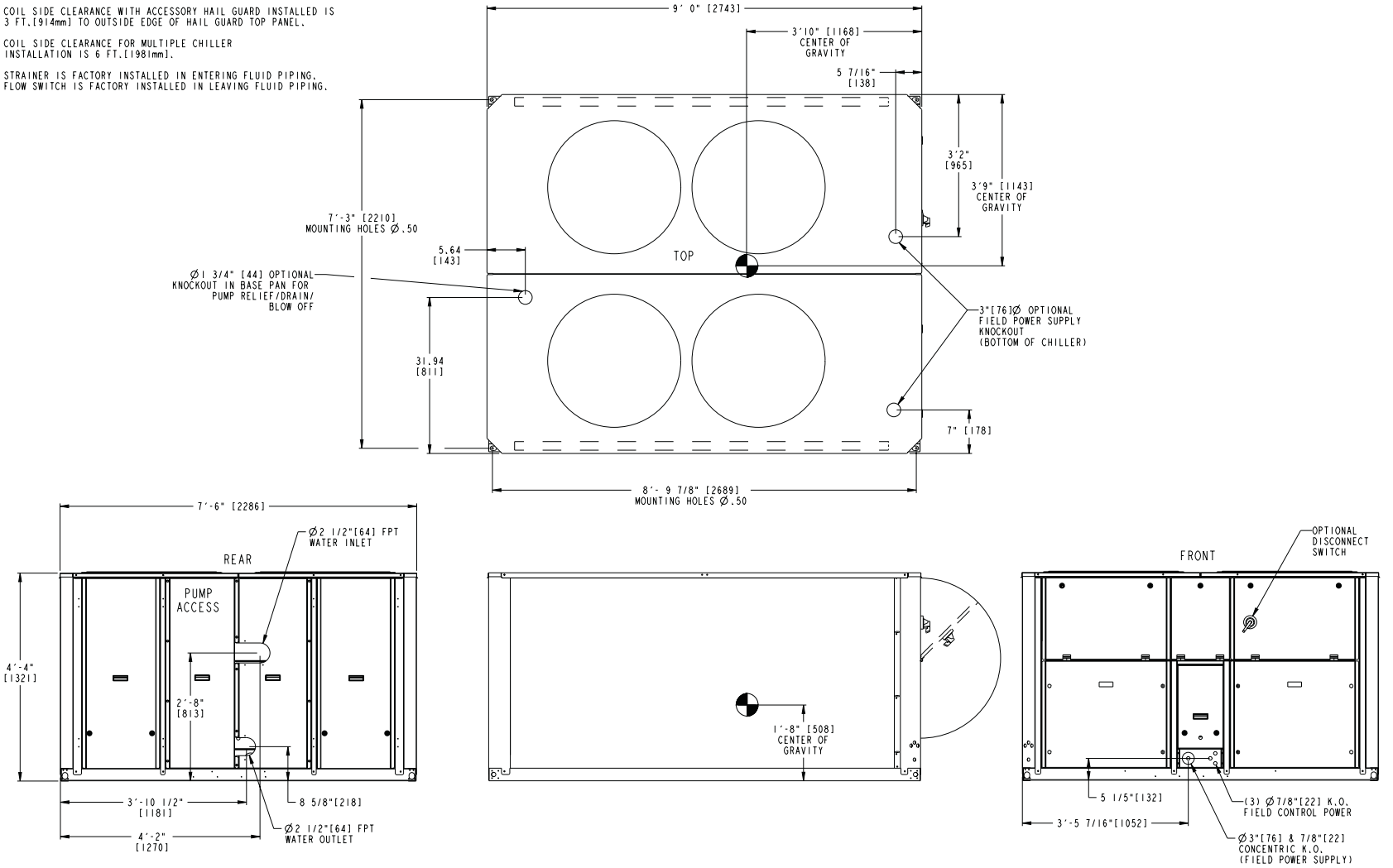
Dimensions — ACCH167

NOTES:
1. UNIT MUST HAVE CLEARANCES FOR AIRFLOW AS FOLLOWS:
   TOP-DO NOT RESTRICT IN ANY WAY
   COIL SIDE- 3 1/2 FT.[1067mm] FROM SOLID SURFACE
   SIDE, ENDS-3FT.[914mm] FROM SOLID SURFACE (FOR SERVICE ACCESS)

2. COIL SIDE CLEARANCE WITH ACCESSORY HAIL GUARD INSTALLED IS 3 FT.[914mm] TO OUTSIDE EDGE OF HAIL GUARD TOP PANEL.

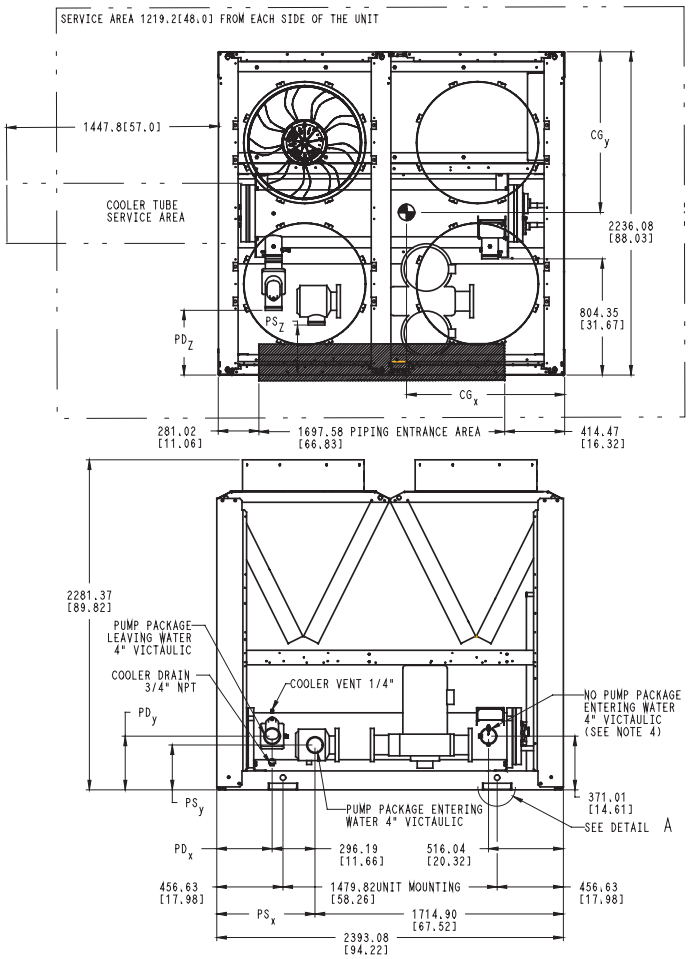
3. COIL SIDE CLEARANCE FOR MULTIPLE CHILLER INSTALLATION IS 6 FT.[1981mm].

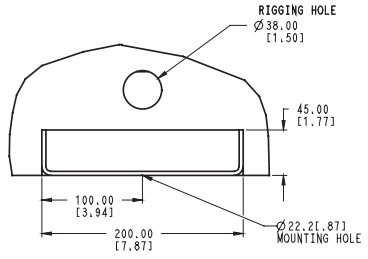
4. STRAINER IS FACTORY INSTALLED IN ENTERING FLUID PIPING. FLOW SWITCH IS FACTORY INSTALLED IN LEAVING FLUID PIPING.



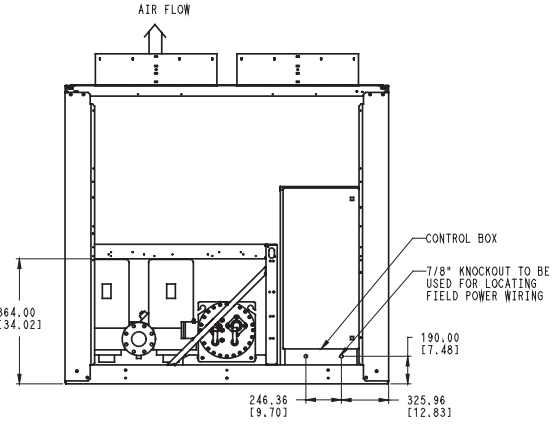
Dimensions - ACCH200 & ACCH220

NOTES: 1. UNIT MUST HAVE CLEARANCES AS FOLLOWS:
TOP- DO NOT RESTRICT
SIDES AND END- 6' FROM SOLID SURFACE
2. ALL PUMPS HAVE DRAINS LOCATED AT THE BOTTOM OF VOLUTE FOR DRAINING.
3. TEMPERATURE RELIEF DEVICES LOCATED ON SUCTION LINE,LIQUID LINE AND FILTER DRIER OF EACH CIRCUIT AND HAVE 1/4" FLARE CONNECTION.
4. NO PUMP PACKAGE LEAVING WATER CONNECTION IS SAME SIZE AND HAS SAME Y AND Z DIMENSIONS AS ENTERING WATER. ALSO HAS SAME PDx DIMENSION AS PUMP PACKAGE.

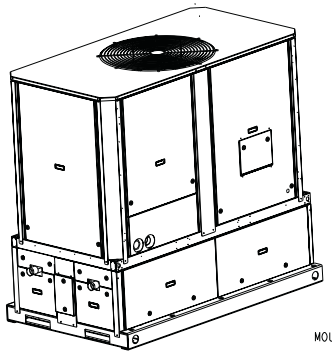




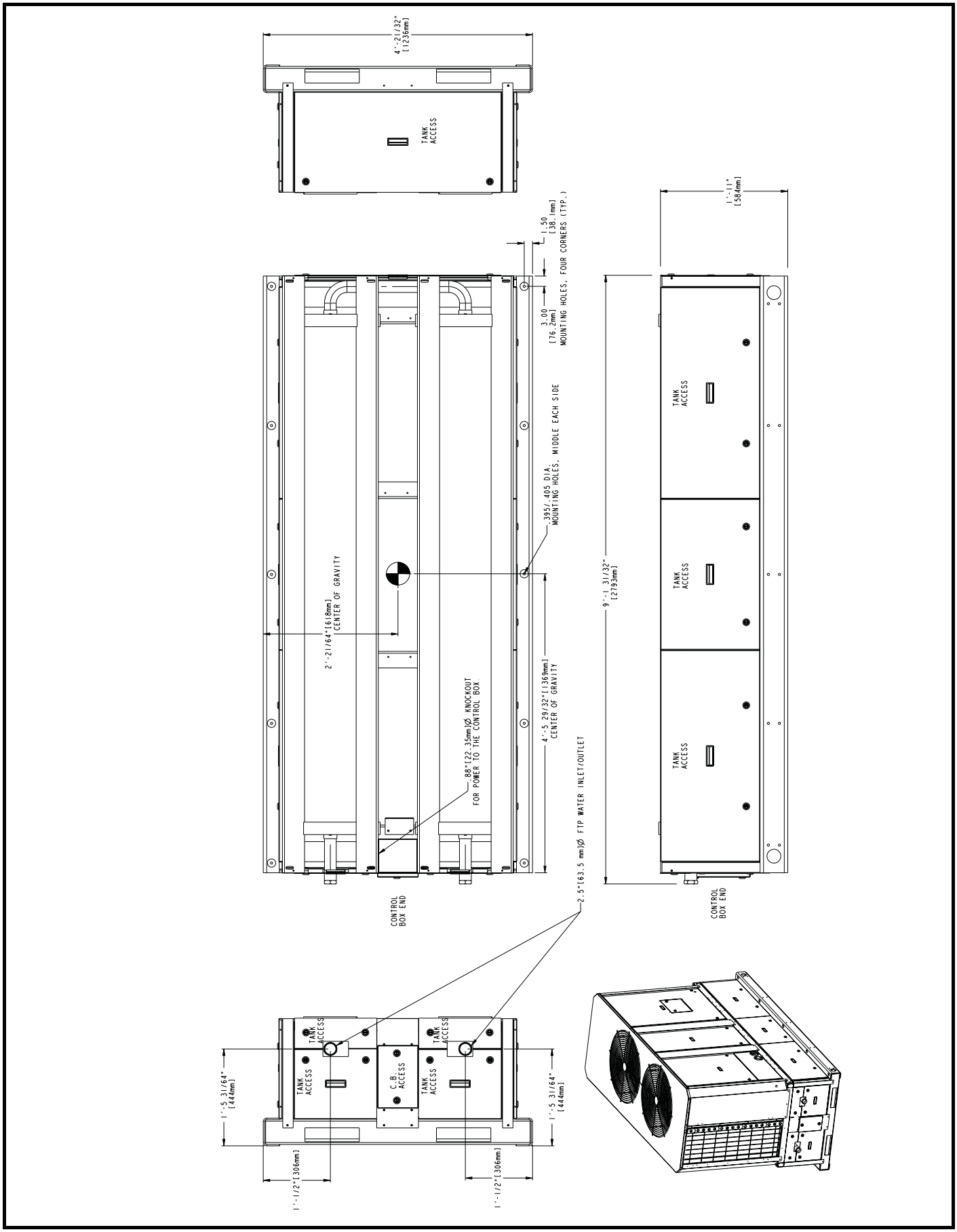
DETAIL A
SCALE 1:2



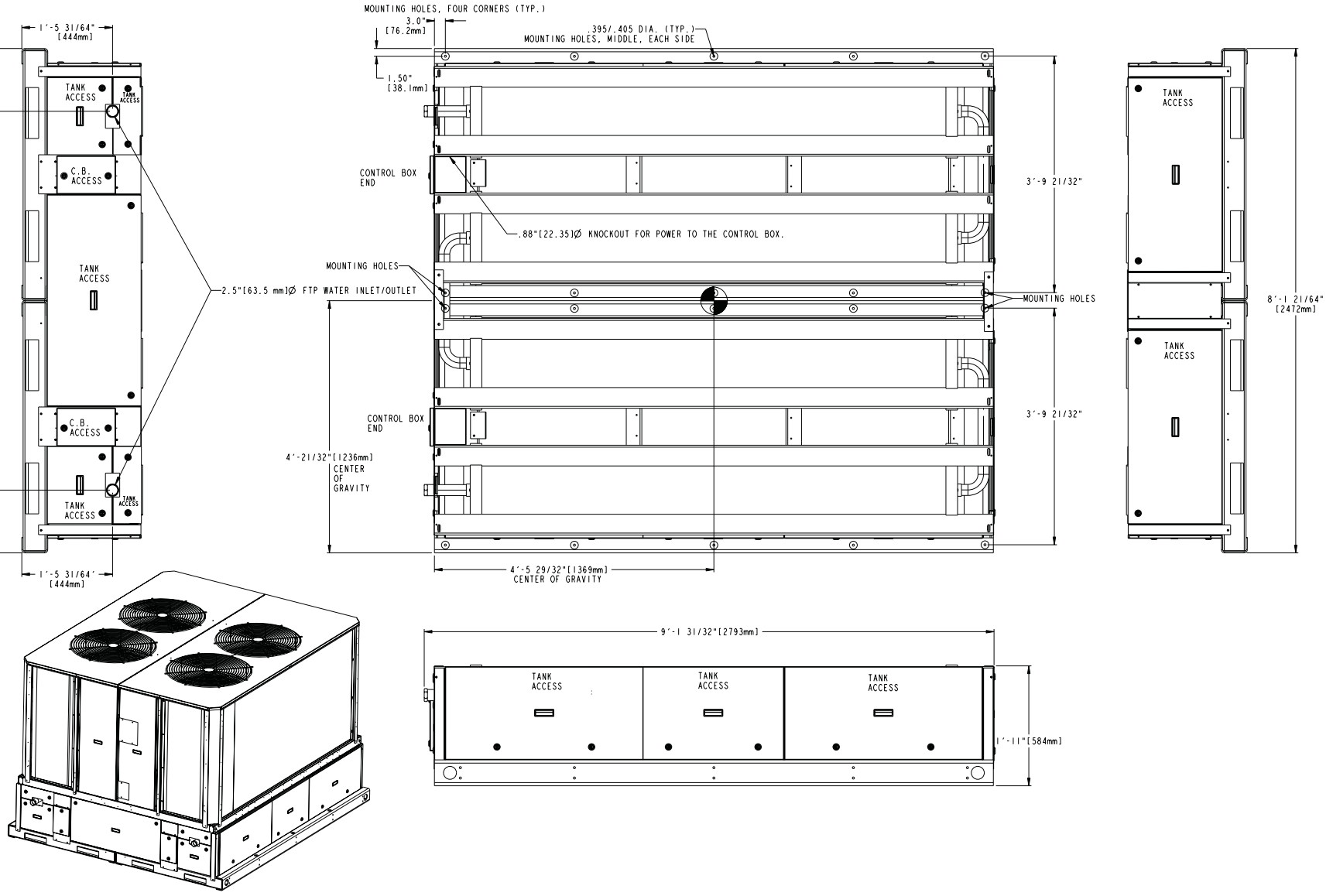
Dimensions — storage tank ACTA1100 (for ACCH050)

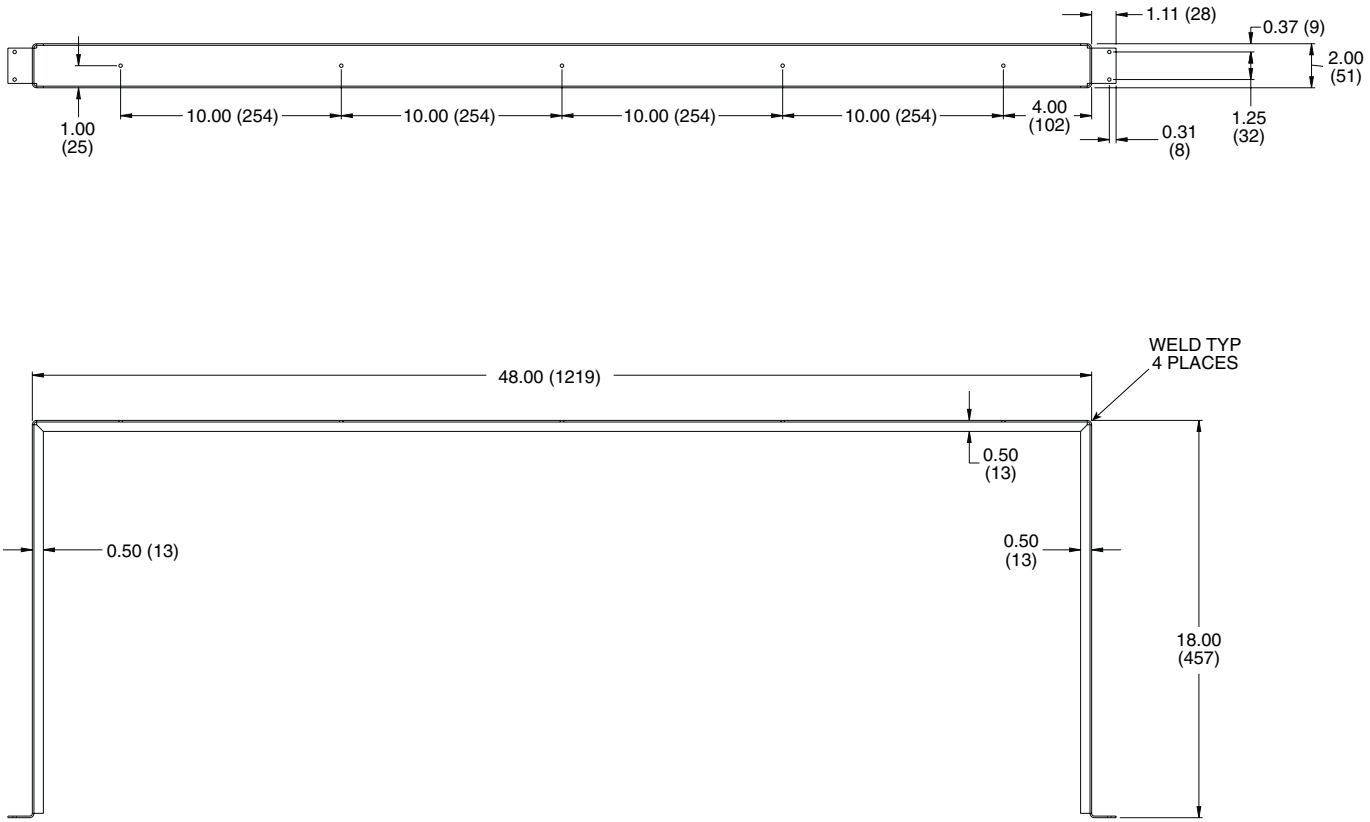


Dimensions — storage tank ACTA1101 (for ACCH084)



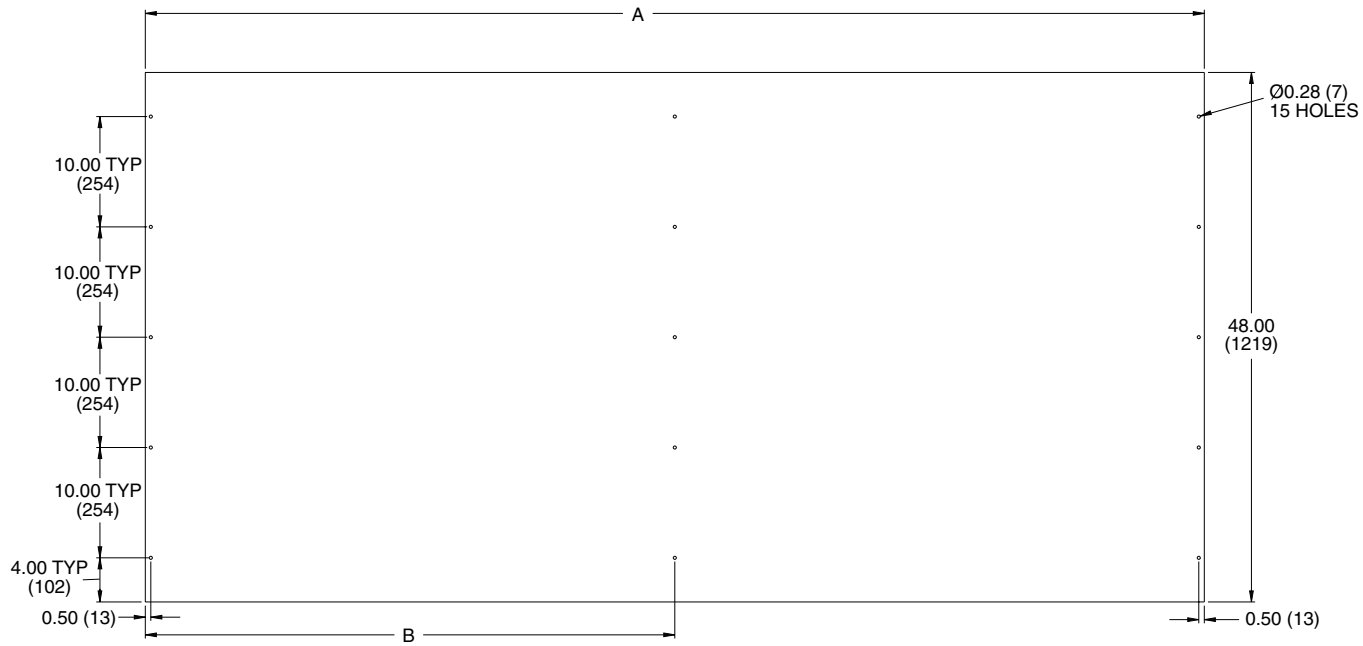
Dimensions — storage tank ACTA1102 (for ACCH120 & 167)





Dimensions given in inches (mm).

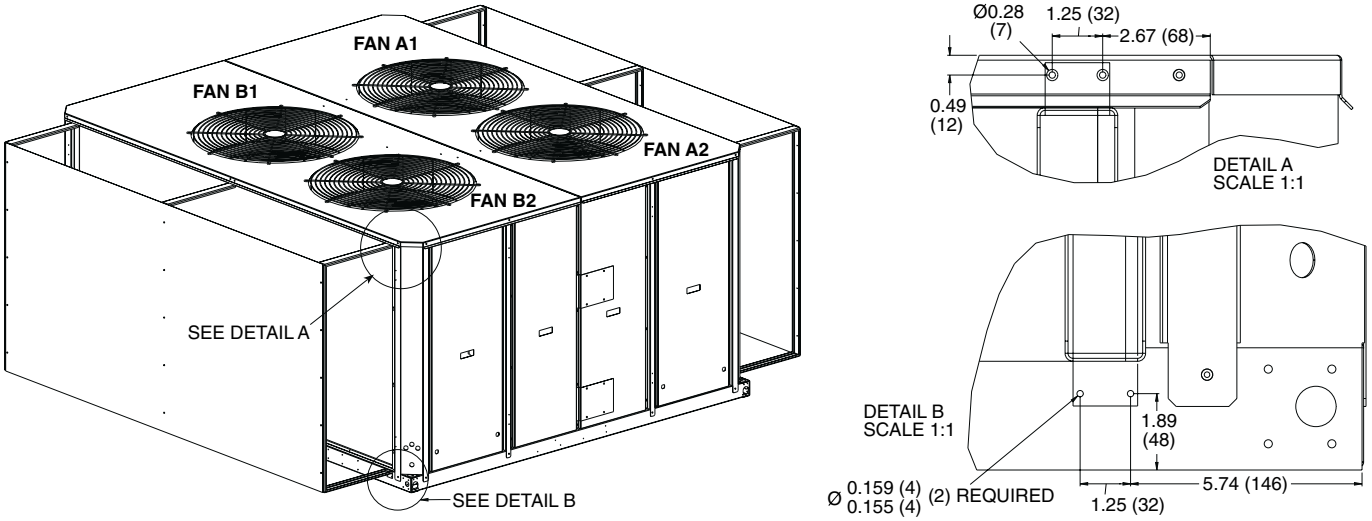
Fig. 1 — Bracket Dimensions



Dimensions given in inches (mm).

UNIT SIZE	DIM A	DIM B
ACCH050, ACCH120 (circuit B side)	68.92 (1751)	34.46 (875)
ACCH084, ACCH120 (circuit A side) ACCH167 (circuit A and B side)	96.00 (2438)	48.00 (1291)

Fig. 2 — Baffle Dimensions



NOTE: Dimensions in inches (mm).

Fig. 3 — Typical Baffle Location Sizes 120-167 (167Shown)

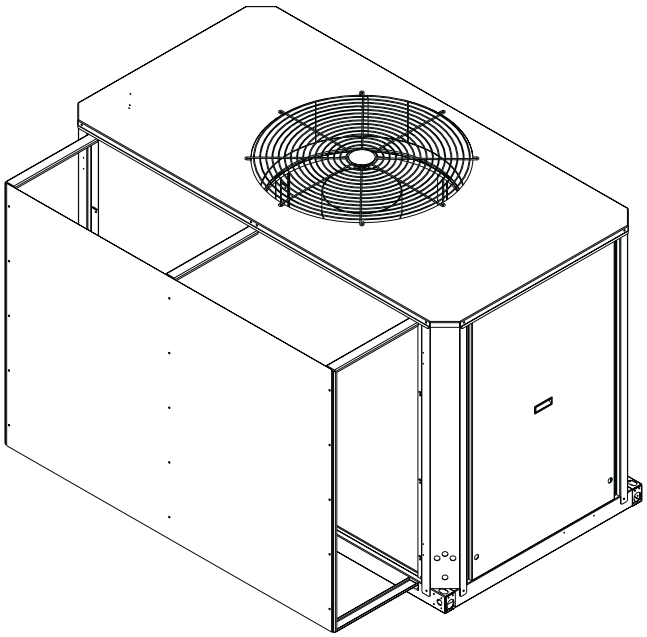
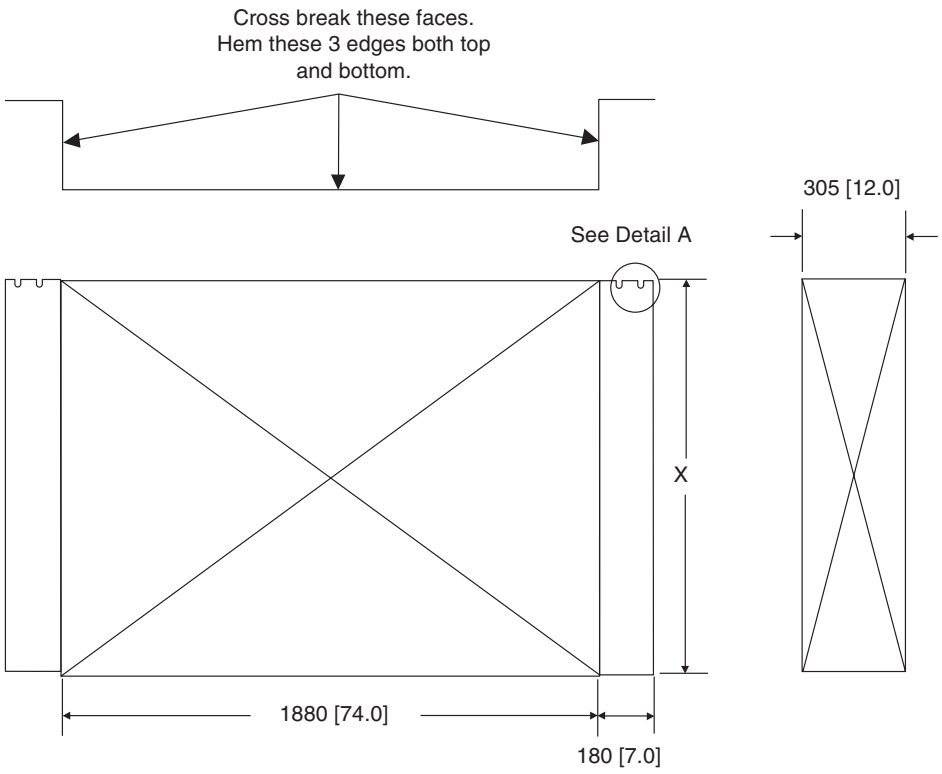


Fig. 4 — Baffle Location (Sizes 050 & 084)



ACCH UNIT SIZE	POSITION	BAFFLE HEIGHT (X)
200-220	Control/Power End	635 [25.0]
	Opposite Control Power End	1040 [41.0]

Material: 18 ga. Corrosion Resistant Sheet Metal.
Dimensions are in mm [inches].

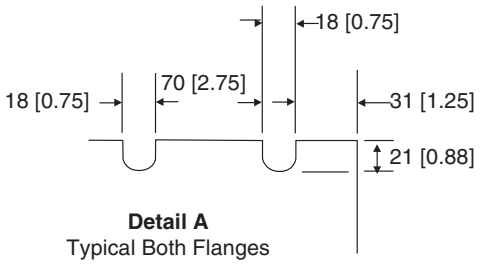


Fig. 1 — Field-Fabricated and Field-Installed Wind Baffles

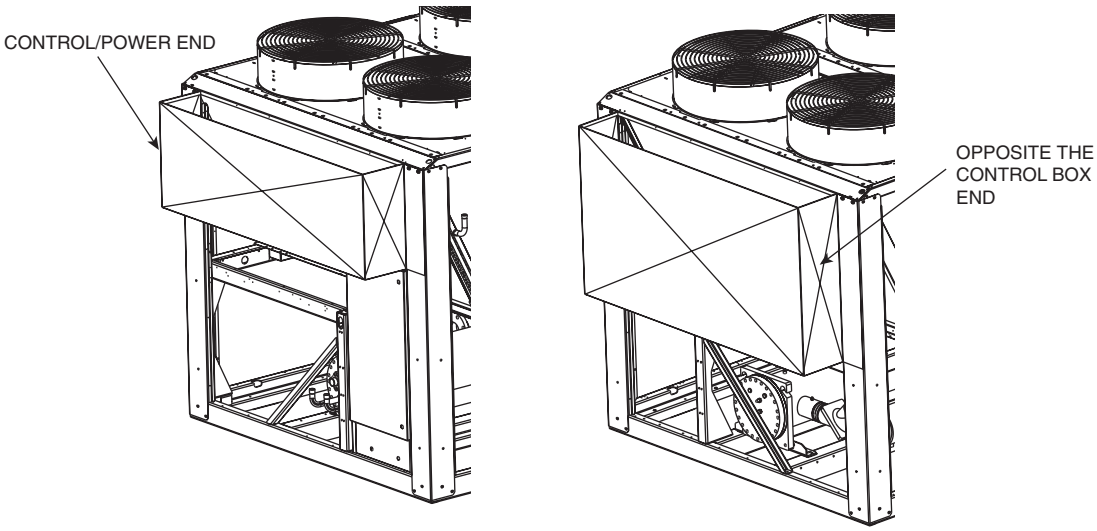


Fig. 2 — Wind Baffles Installed on Ends of ACCH200 & 220 Units

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    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**

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