VersaTemp
By Airstack®

VersaTemp™ Water-to-Water Heat Pump with Auxiliary Air-Cooled Coil

Product Data Catalog

ARA 020X, 030X, 060X Modules

Contents

Multistack VersaTemp™ Heat Recovery Chillers

Multistack ARA VersaTemp units provide all the benefits of a Dedicated Heat Recovery Chiller™ (DHRC) including:

- Full cooling capacity with zero need for hot water
- Full simultaneous heating and cooling capacity
- Full heating capacity with zero need for chilled water
- High effective COP ensures reduced operating expense
- Fast payback
- Reduced carbon footprint
- Can be easily combined with select Multistack ASP air-cooled modular chillers (See Pg. 11) plus pump, free cooling and accessory modules

Innovative Design for Maximum Flexibility

- Integrated source-sink/refrigerant-to-air heat exchanger—no need for a well field or backup heat sinks
- Four-pipe operation with brazed plate condenser sized for full heat rejection—NOT A DESUPERHEATER
- Provides four to six times more heat than a desuperheater
- Built-in automatic controls for full, partial (with multiple modules), or no hot water production; surplus heat is rejected via the integral air-cooled heat exchanger

Leverages the Advantages of a Modular Design

- Redundant systems up to 600 tons capacity
- EC fan motors (575 volt units require optional transformer) paired with low-sound fan blade technology for quiet operation
- Optional chilled water and/or hot water pumping packages
- Optional tanks, air separators, and accessories
- Integrated controls with multiple connectivity options

ARA VersaTemp units use scroll compressors and are available as 20-, 30- or 60-ton modules which may be assembled into an array to provide the required jobsite capacity and redundancy. Each module includes two compressors, common single-circuit evaporator, single-circuit refrigerant-to-hot water heat exchanger, single-circuit air-to-refrigerant heat exchanger, electronic expansion valves, reversing valve, and control system.

Modules are shipped wired and charged with refrigerant and are factory run-tested prior to shipment on an AHRI certified test stand. ARA modules are ETL listed according to UL Standard 1995, and CSA certified per Standard C22.2#236.

Compressors

Each module includes two hermetic scroll compressors in a tandem piping arrangement mounted to the module with rubber-in-shear isolators. Each system also includes high discharge pressure and low suction pressure safety cut-outs. Refer to unit nameplate for specific refrigerant charge.

Hot and Chilled Water Heat Exchangers

The evaporator is a brazed plate heat exchanger constructed of 316 stainless steel; designed, tested, and stamped according to UL 1995 code for 650 psig working pressure. The condenser is a brazed-plate heat exchanger also constructed of 316 stainless steel and designed, tested, and stamped in accordance with UL 1995 code for 650 psig working pressure.

Refrigerant to Air Heat Exchanger

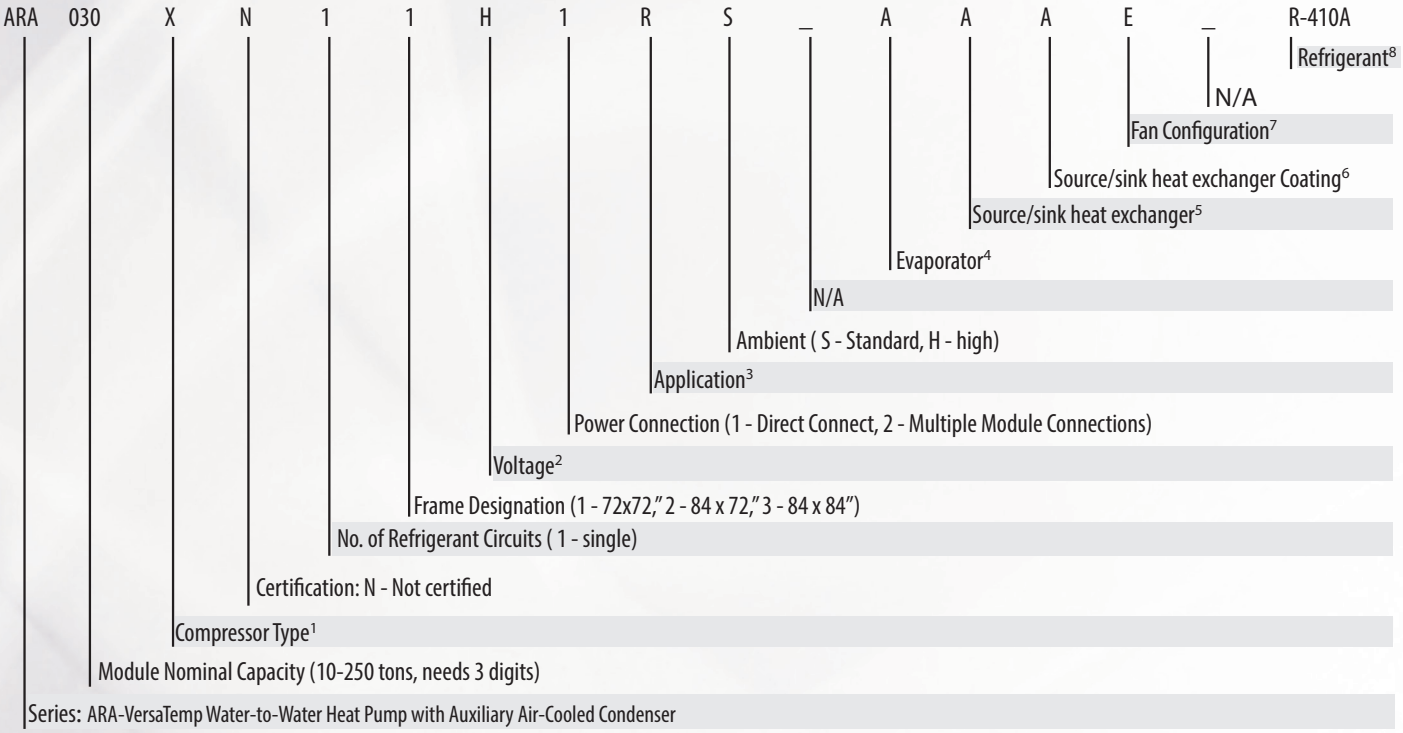
Each module contains dual (four in ARA 060X) variable speed axial fans. Fan blades are of aluminum construction using ultra-quiet owlet design. Each fan has seven blades and an integral EC motor (575 V units require optional transformer).

Control System

VersaTemp module operation is controlled by a microprocessor master controller that monitors entering and leaving chilled water and hot water temperatures to determine both the chilled water and hot water system demand. The control system uses demand to make staging mode decisions (cooling, heating, or simultaneous heat recovery) and select the needed number of compressors. Mode decisions are available from the controller as well as via remote input. Response times and set points are adjustable. The master controller provides for variable time between compressor sequencing and temperature sensing in order to optimize chiller performance and efficiency at varying building loads.

Multistack has a policy of continual improvement and reserves the right to change product design, literature and specifications without notice. For more information on this and other Multistack products, contact your nearest Multistack dealer.

Model Number Nomenclature



[1]X - Copeland Scroll (ZP),
[2] A - 208/3/60, L - 230/3/60, H - 460/3/60, C - 575/3/60, D - 200/3/50, E - 400/3/50, F - 380/3/60, V - Other
[3] R - Heat Pump
[4] A - Brazed SS, V - Other
[5] A - Cu tube Al fin, B - Cu tube Cu fin, V - Other
[6] A - None, B - Bronzeglow, H - Heresite, E - Electrofin, S - Standard, V - Other
[7] E - ECM Fans, H - High static, L -Single Fan, V -Other
[8] R-410A

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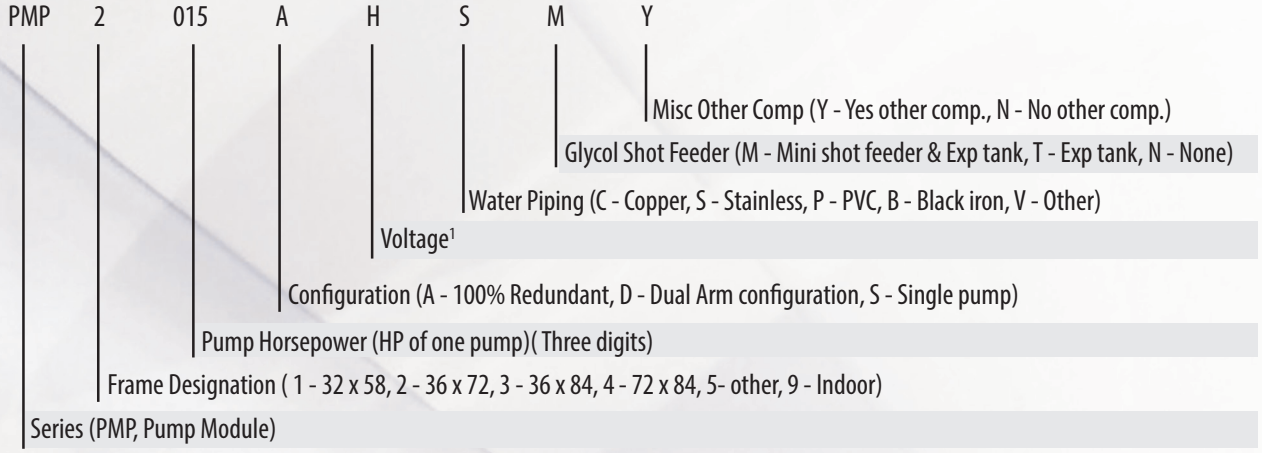
Pump Module



[1] A - 208/3/60, L - 230/3/60, H - 460/3/60, C - 575/3/60, D - 200/3/50, E - 400/3/50, F - 380/3/60, V - Other

Free Cool / Dry Cooler / Remote Condenser Module

FCP 2 H C A A S

- S — Fan Config (S - Standard, V - Other)
- A — Coil Coating (A - None, B - Bronzeglow, H - Heresite, E - Electrofin, V - Other)
- A — Coil (A - Cu tube Al fin, B - Cu tube Cu fin, C- Microchannel, V - Other)
- C — Water Piping (C - Copper, S - Stainless, P - PVC, B - Black iron, V - Other, N - None)
- H — Voltage[1]
- 2 — Frame Designation (1 - 32 x 58, 2 - 36 x 72, 3 - 36 x 84, 4 - 72 x 84, 5- other; A - 3V, B - 4V, C - 5V, D - 6V, E - 7V, F - 8V)
- FCP — Series (FCP - FreeCool Module, DCP - Dry Cooler, RCP - Remote Condenser)

[1] A - 208/3/60, L - 230/3/60, H - 460/3/60, C - 575/3/60, D - 200/3/50, E - 400/3/50, F - 380/3/60, S - 220/230/1/60, V - Other

Accessory Module

ACP 2 H C 180 M B S C

- C — Strainer construction materials[2]
- S — Basket Strainer (S - Single, D - Duplex, L - Lakos, N- None)
- B — Air Separator (Y - Yes, N - None)
- M — Glycol Shot Feeder (L-Large shot feeder & Exp tank, M - Mini shot feeder & Exp tank, T - Exp tank, N - None)
- 180 — Tank Volume (Three digits: 000=None)(Gallons)
- C — Water Piping (C - Copper, S - Stainless, P - PVC, B - Black iron, V - Other)
- H — Voltage[1]
- 2 — Frame Designation (1 - 32 x 58, 2 - 36 x 72, 3 - 36 x 84, 4 - 72 x 84, 5- other)
- ACP — Series (ACP - Accessory Component Module)

[1] A - 208/3/60, L - 230/3/60, H - 460/3/60, C - 575/3/60, D - 200/3/50, E - 400/3/50, F - 380/3/60, S - 220/230/1/60, V - Other
[2] B - Bronze, C - Copper, S - Stainless, N-None, V - Other

General Information

General Data, VersaTemp Heat Pumps			
Compressor	**ARA 020X**	**ARA 030X**	**ARA 060X**
Type	SCROLL	SCROLL	SCROLL
Nominal Capacity (per compressor)	10	15	30
Quantity	2-TANDEM	2-TANDEM	2-TANDEM
Evaporator	**ARA 020X**	**ARA 030X**	**ARA 060X**
Type	BRAZED PLATE	BRAZED PLATE	BRAZED PLATE
Weight (Lbs.)	112	128	214
Water Storage (gallons)	2.0	2.5	5.9
Quantity	1	1	1
Header Water Storage (gallons)	18.0	21.0	36.4
Source-Sink Heat Exchanger	**ARA 020X**	**ARA 030X**	**ARA 060X**
Type	BRAZED PLATE	BRAZED PLATE	BRAZED PLATE
Weight (Lbs.)	90	121	262
Water Storage (gallons)	2.4	3.5	8.2
Quantity	1	1	1
Header Water Storage	18.0	21.0	36.4
Fans	**ARA 020X**	**ARA 030X**	**ARA 060X**
Motor Type	EC	EC	EC
kW	4.1	4.1	4.1
Quantity	2	2	4
Fan Type	Axial	Axial	Axial
Fan Material	Composite	Composite	Composite
Air Flow Per Module (per module)	16,000	22,000	44,000
Air-Cooled Coil	**ARA 020X**	**ARA 030X**	**ARA 060X**
Fin Material	Aluminum	Aluminum	Aluminum
Tube Material	Copper	Copper	Copper
Tube Diameter (mm)	7	7	7
Number of Rows	4	4	4
Coil Dimensions (Ins.) (Quantity)	30x61-1/2 (2)	42x73-1/2 (2)	42x73-1/2 (4)
Module Dry Weight (Lbs.)	1,700	2,100	4,000
Refrigerant Type	R410A	R410A	R410A
Charge (Lbs./Circuit)	60	65	135
Number of Circuits	1	1	1
Operating Weight with Al/Cu coils (Lbs.)	1,820	2,290	4,350
Shipping Weight with Al/Cu coils (Lbs.)	1,700	2,100	4,000
Operating Weight with Cu/Cu coils (Lbs.)	2,300	2,920	5,610
Shipping Weight with Cu/Cu coils (Lbs.)	2,180	2,730	5,260

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Controls

Multistack ARA chillers use the latest c.PCO controller technology from Carel. This controller provides effective, efficient control with easy access to the configuration and management parameters using a menu system. The main screen provides quick access to the user function without a password and includes chiller component status information, ON-OFF and chiller operating mode, and set points via the UP-DOWN and ENTER keys.

The controller is powered by the VersaTemp™ module single point power connection and monitors and reports these system parameters:

- Chilled Water Entering and Leaving Temperature
- Discharge and Suction Refrigerant Pressure
- Proof of Chilled Water Flow
- Hot Water Entering and Leaving Temperature
- Refrigerant Suction Temperature
- Proof of Hot Water Flow

Three password levels provide three different access modes to the parameters: read-only for assistance, edit for servicing, and total access for the manufacturer.

Additional features include:

- WiFi interface for tablet, smart-phone or PC connection using common Web browsers
- Local connectivity through open standard protocols.
  - Local Web interface
  - Tablet and smart phone connectivity
- Centralized data collection.
  - Chart creation for confirming system performance
  - On-board data logger
- Secure connectivity.
  - Compliant with international standards

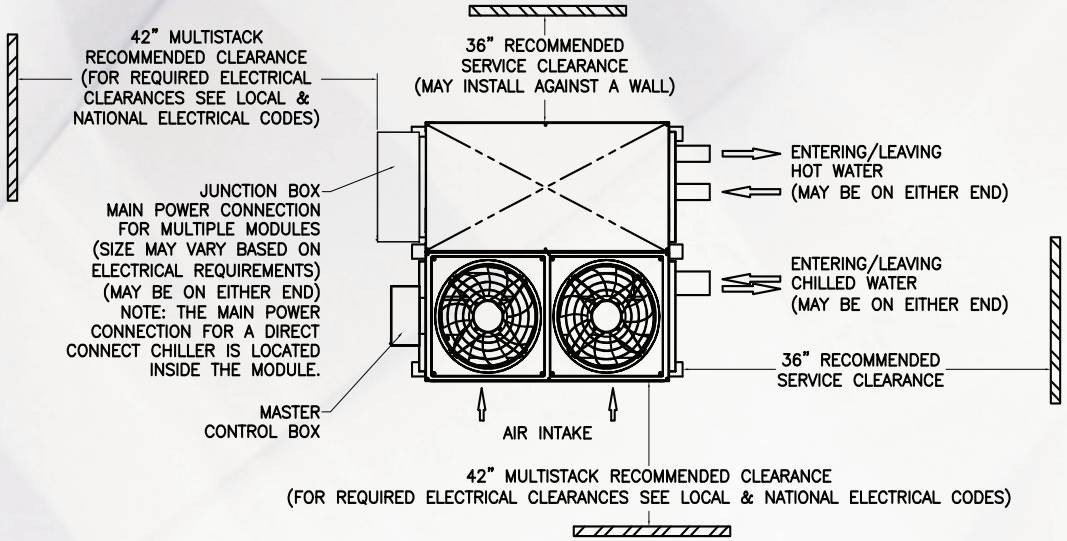
Optional BAS control available.

- BACNet IP
- BACNet MS/TP
- LON Works

Multistack invented the modular chiller. ARA modules may be easily and quickly combined with ARA or Mulstack ASP modular air-cooled chillers to provide the heating/cooling capacity required. ARA modules may also be combined with Multistack free cooling and pump modules. Owners can purchase the capacity needed now and purchase additional capacity later. Multiple modules provide flexible capacity control for best efficiency—plus reliability and redundancy.

CLEARANCES

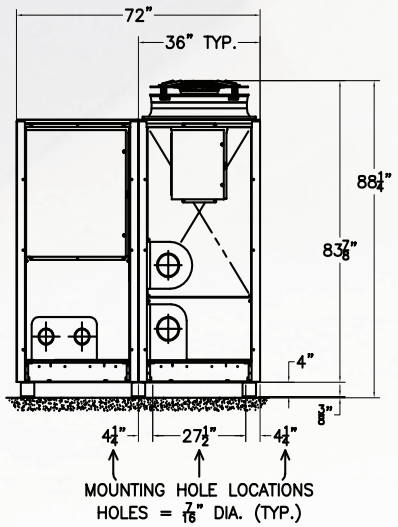
- No obstructions above fans.
- Horizontal clearances as shown on drawing.
- Multistack does not recommend pit installations.
- Consult Multistack Representative for options.

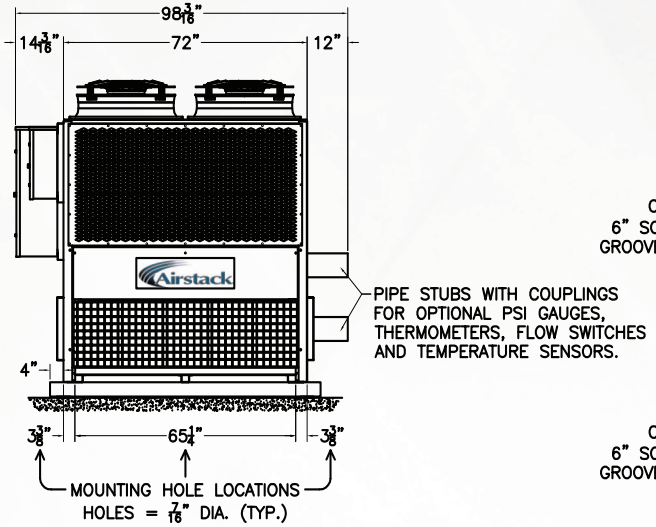


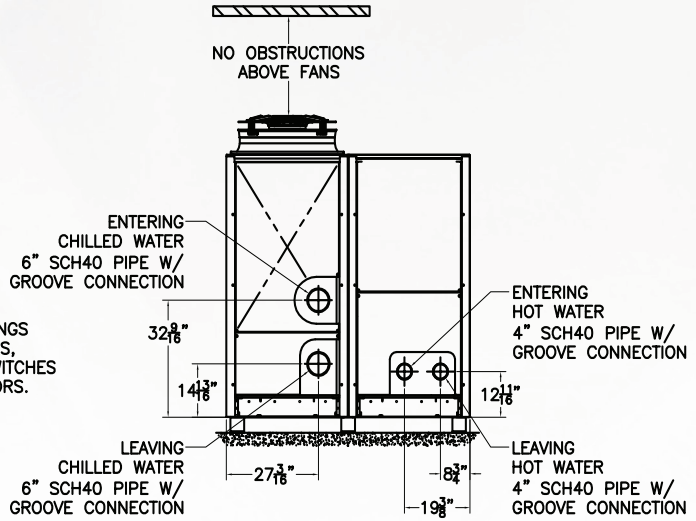
NOTES:
1) 36" RECOMMENDED CLEARANCE ONE SIDE FOR FILTER REMOVAL.
2) IF CHILLER IS GOING TO BE INSTALLED IN A PIT CONTACT FACTORY.

ESTIMATED WEIGHTS (EACH MODULE)

	WET(LBS)	DRY(LBS)
ARA020X	2,800	2,500

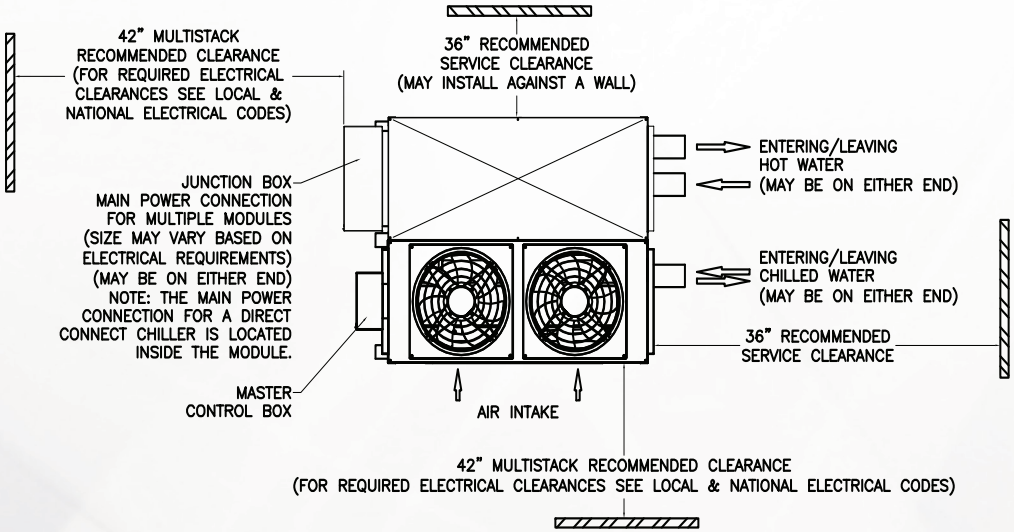






Typical Unit Dimensions, ARA 020X
Single Module

Typical Unit Dimensions, ARA 030X Single Module



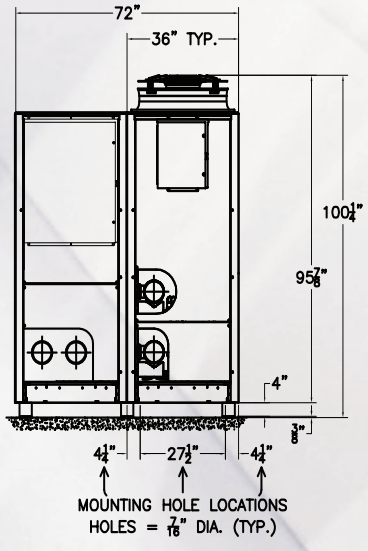
CLEARANCES

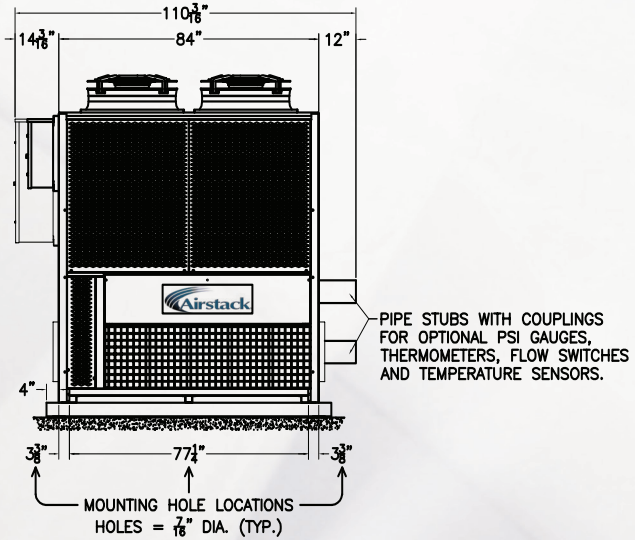
- No obstructions above fans.
- Horizontal clearances as shown on drawing.
- Multistack does not recommend pit installations.
- Consult Multistack Representative for options.

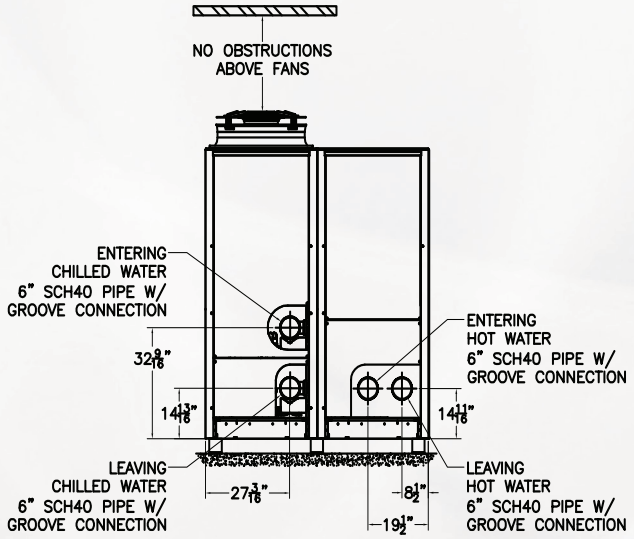
NOTES:
1) 42" RECOMMENDED CLEARANCE ONE SIDE FOR FILTER REMOVAL.
2) IF CHILLER IS GOING TO BE INSTALLED IN A PIT CONTACT FACTORY.

ESTIMATED WEIGHTS (EACH MODULE)

	WET(LBS)	DRY(LBS)
ARA030X	3,570	3,150







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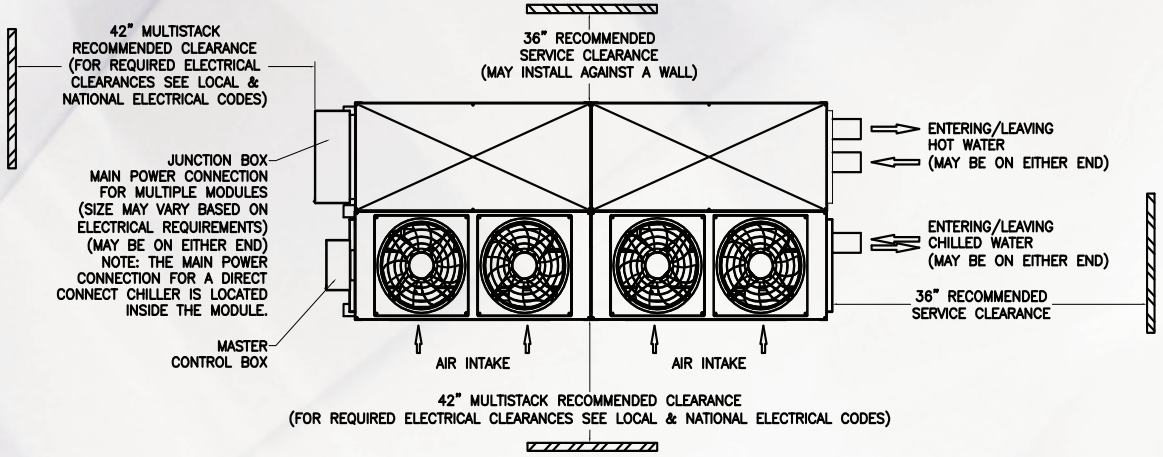
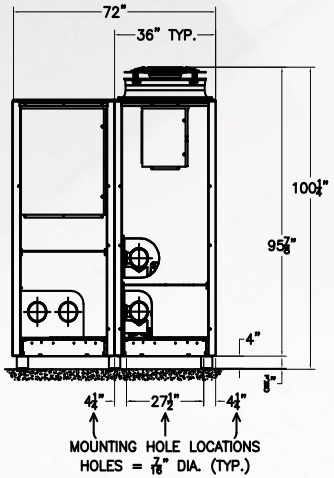
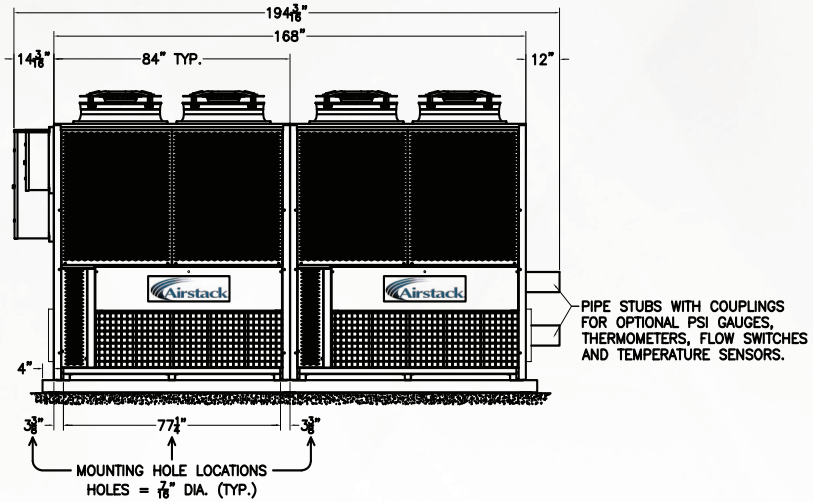
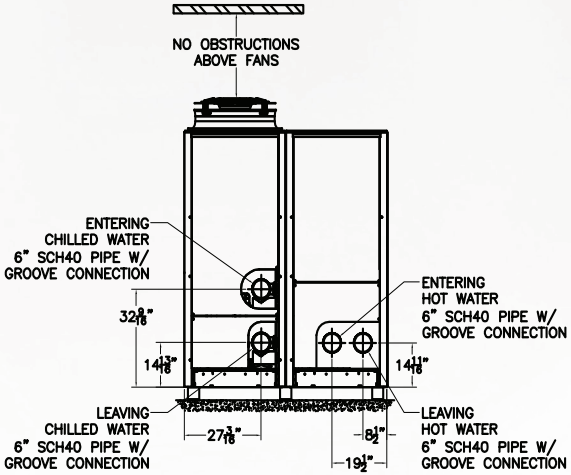


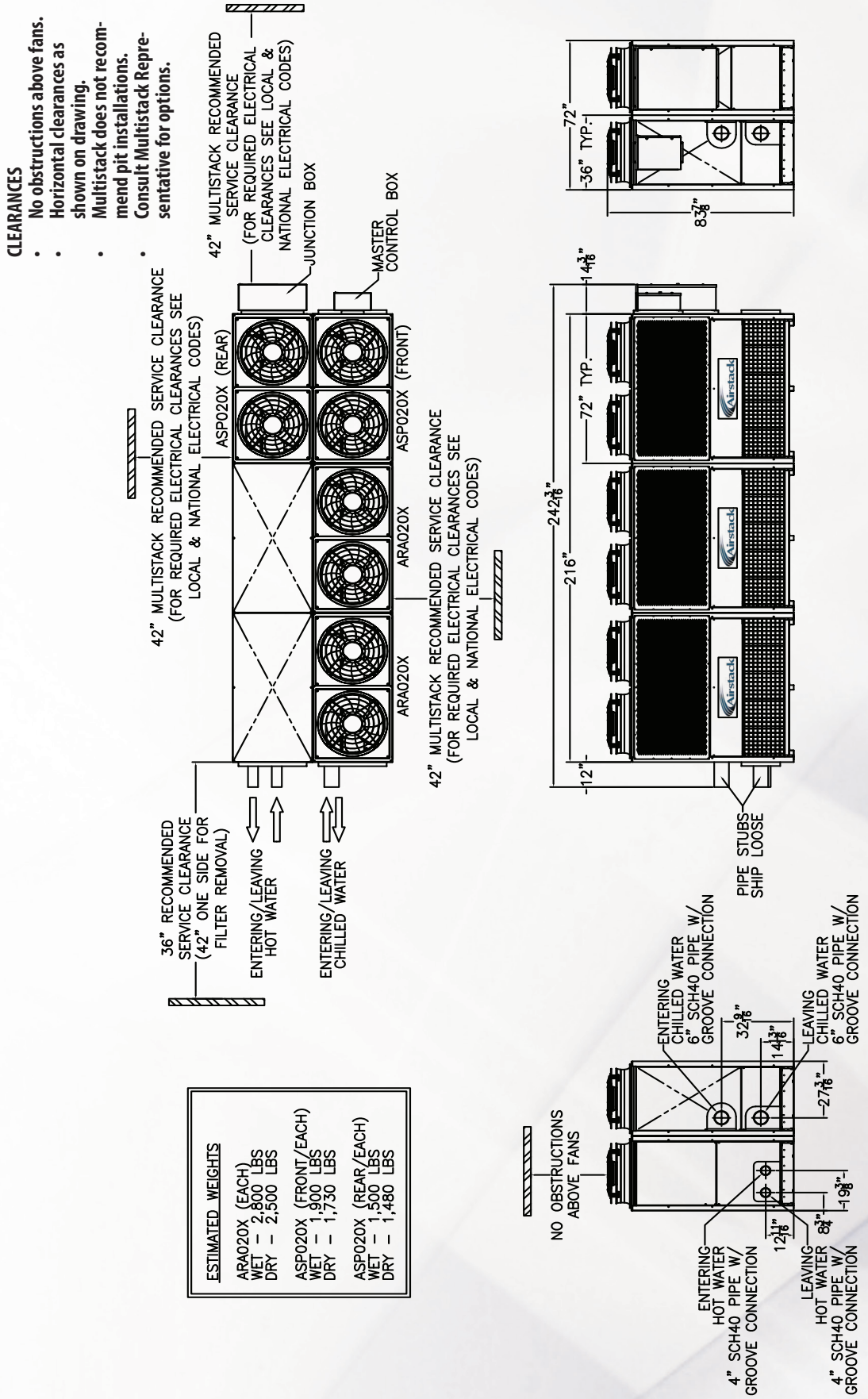


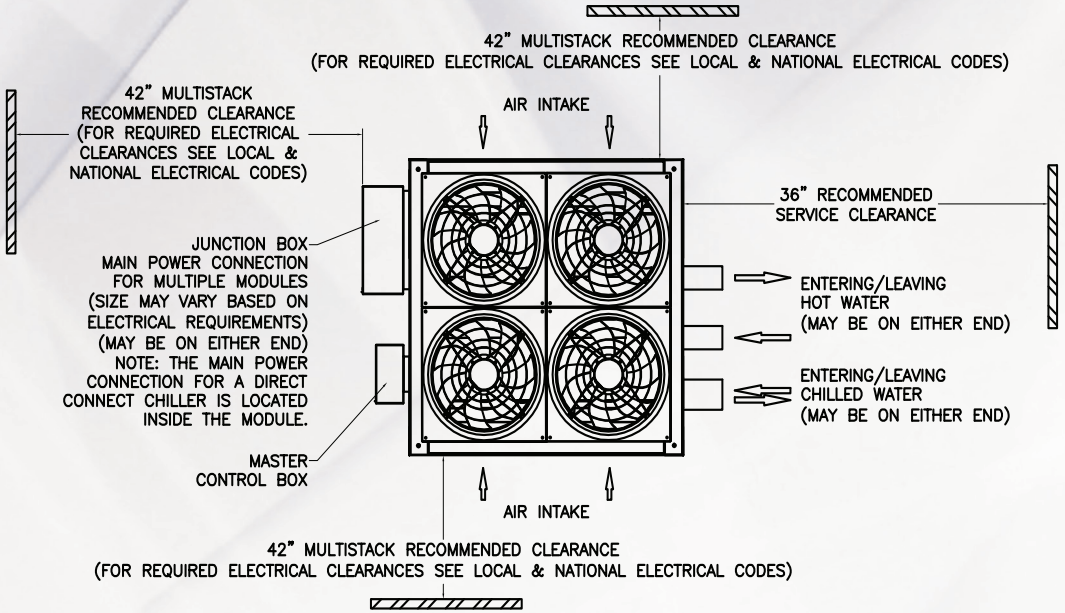




Typical Unit Dimensions, ARA 030X Two Modules

Typical Unit Dimensions
ARA 020X with ASP 020X Units





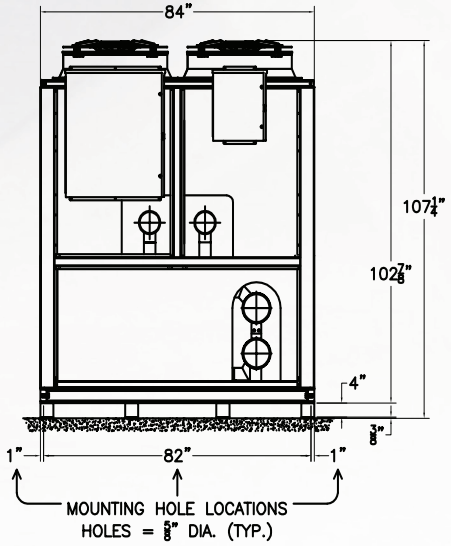
CLEARANCES

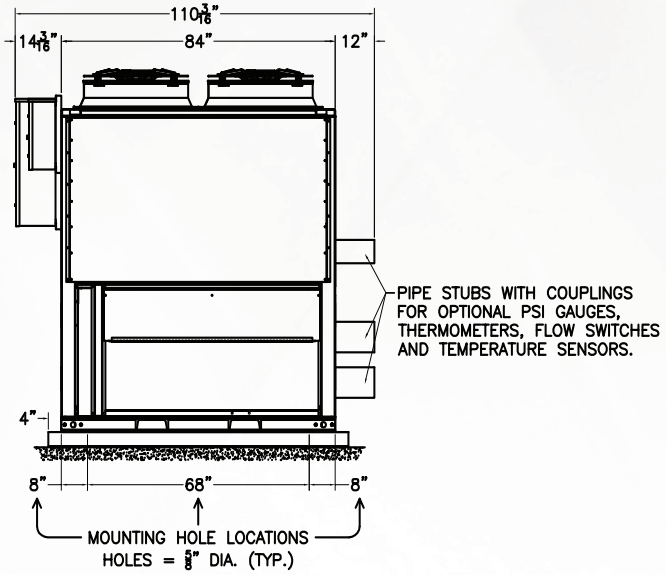
- No obstructions above fans.
- Horizontal clearances as shown on drawing.
- Multistack does not recommend pit installations.
- Consult Multistack Representative for options.

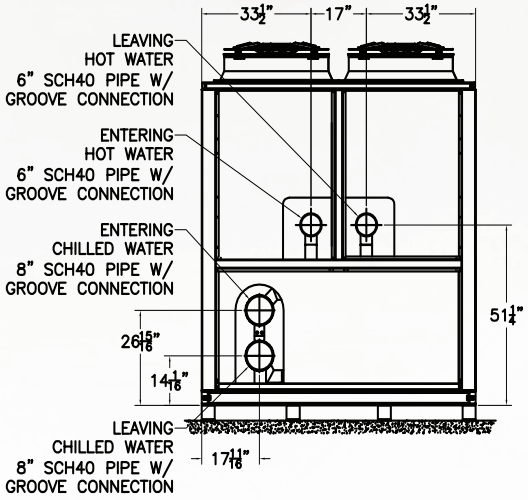
NOTES:
1) 42" RECOMMENDED CLEARANCE ONE SIDE FOR FILTER REMOVAL.
2) IF CHILLER IS GOING TO BE INSTALLED IN A PIT CONTACT FACTORY.

ESTIMATED WEIGHTS (EACH MODULE)

	WET(LBS)	DRY(LBS)
ARA060X	7,180	6,570

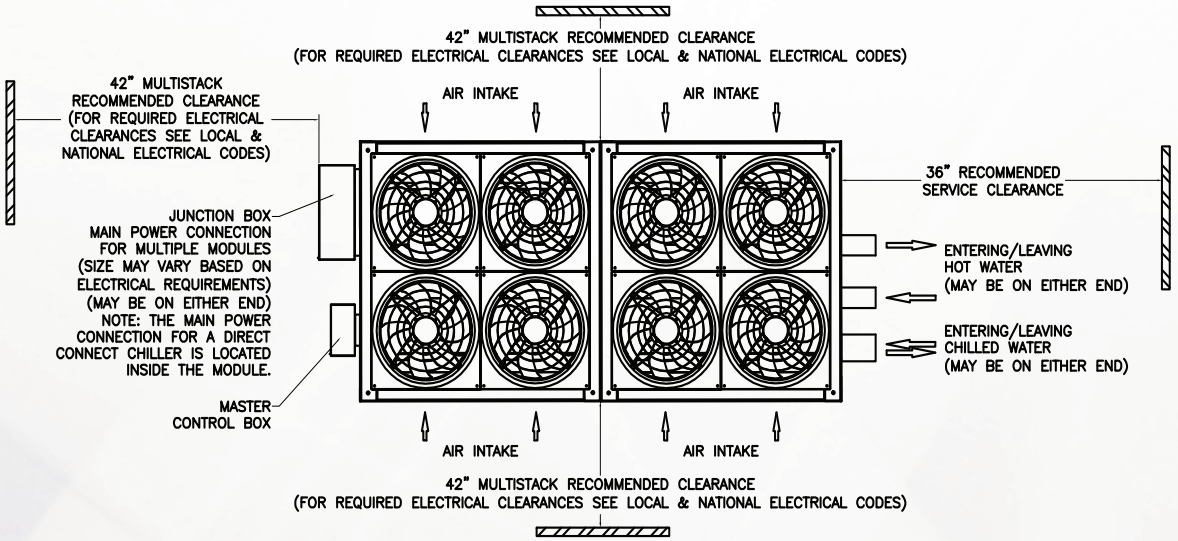






Typical Unit Dimensions, ARA 060X
Single Module

Typical Unit Dimensions, ARA 060X Two Modules



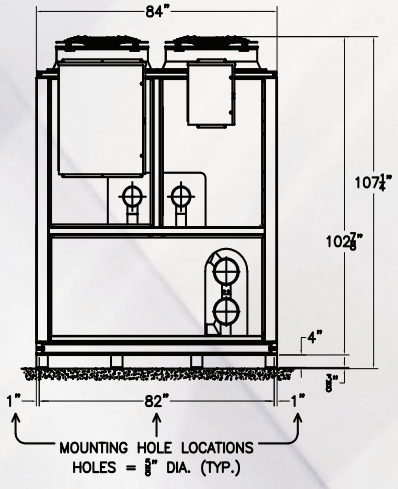
CLEARANCES

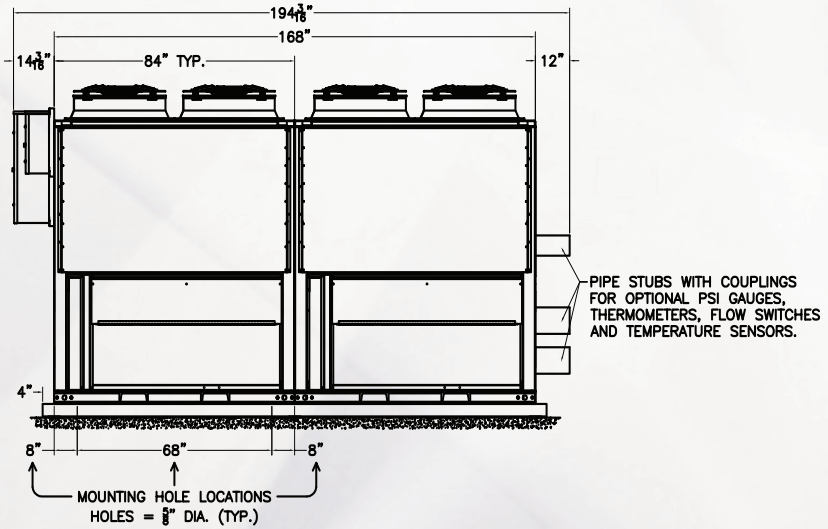
- No obstructions above fans.
- Horizontal clearances as shown on drawing.
- Multistack does not recommend pit installations.
- Consult Multistack Representative for options.

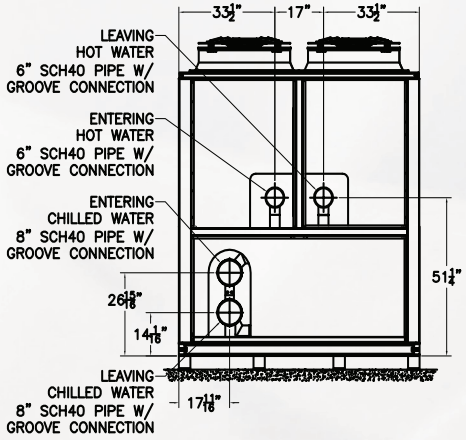
NOTES:
1) 42" RECOMMENDED CLEARANCE ONE SIDE FOR FILTER REMOVAL.
2) IF CHILLER IS GOING TO BE INSTALLED IN A PIT CONTACT FACTORY.

ESTIMATED WEIGHTS (EACH MODULE)

	WET(LBS)	DRY(LBS)
ARA060X	7,180	6,570





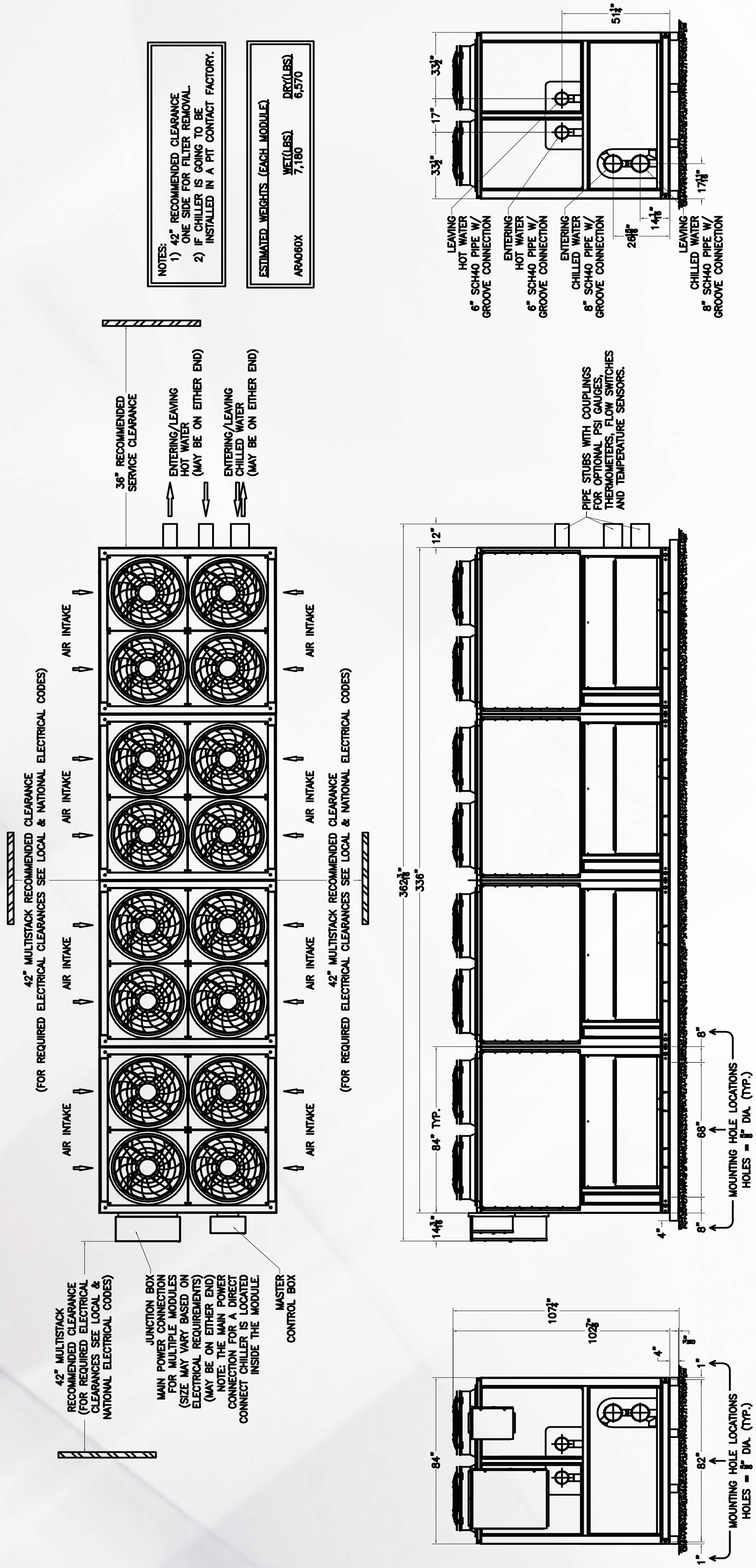


Dimensions

Typical Unit Dimensions, ARA 060X Four Modules

CLEARANCES

- No obstructions above fans.
- Horizontal clearances as shown on drawing.
- Multistack does not recommend pit installations.
- Consult Multistack Representative for options.



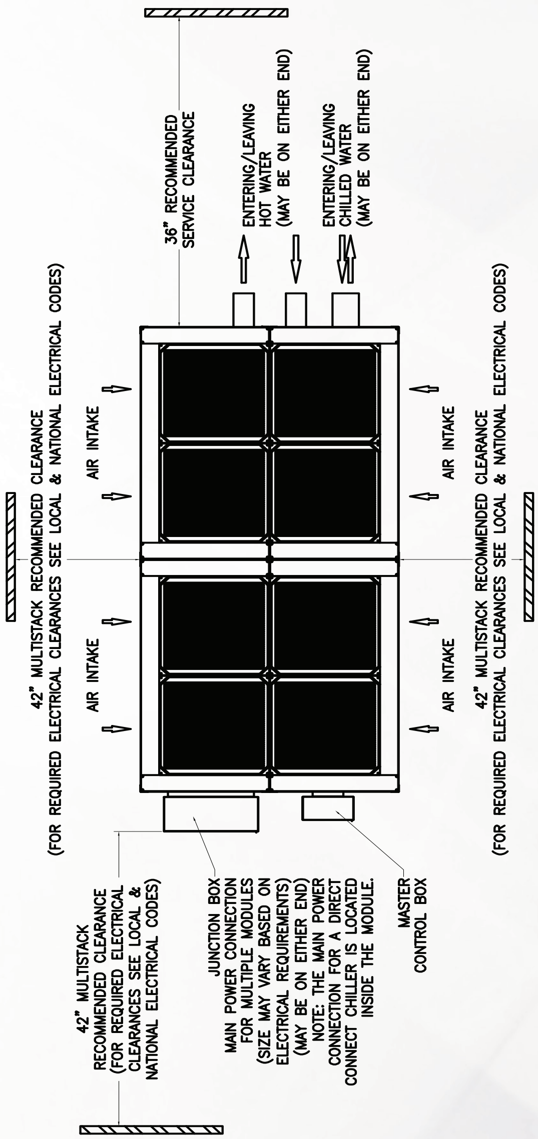
Typical Unit Dimensions, ARA 060X Multiwing Fans

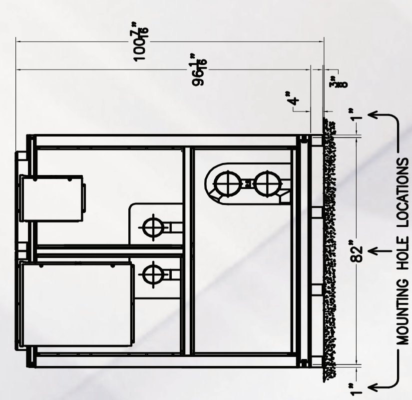
CLEARANCES

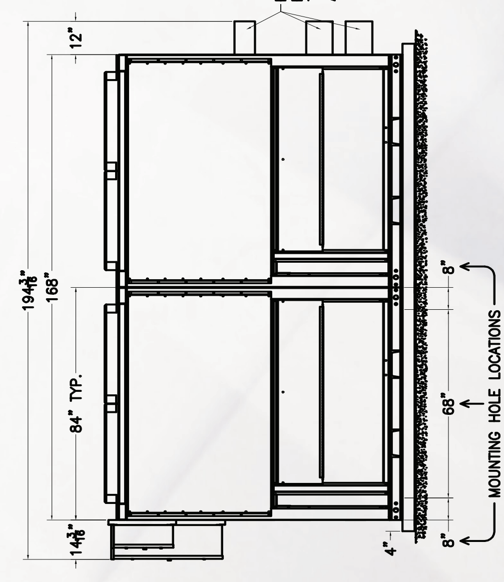
- **No obstructions above fans.**
- **Horizontal clearances as shown on drawing.**
- **Multistack does not recommend pit installations.**
- **Consult Multistack Representative for options.**

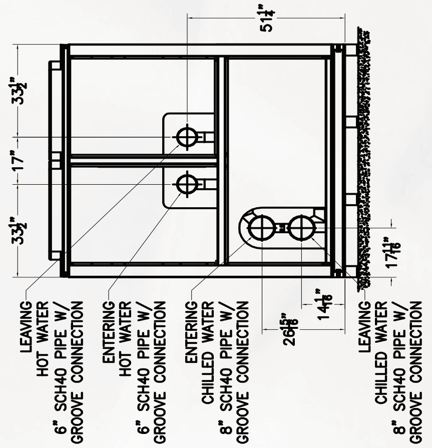
NOTES:
1) 42" RECOMMENDED CLEARANCE ONE SIDE FOR FILTER REMOVAL.
2) IF CHILLER IS GOING TO BE INSTALLED IN A PIT CONTACT FACTORY.

ESTIMATED WEIGHTS (EACH MODULE)	WET(LBS)	DRY(LBS)
ARA060X	7,180	6,570









Electrical & Piping Information

System Wire & Fuse Sizing Specifications

(Applicable codes may require different wire sizing)

Compressor Rated Load Amps (RLA) and Locked Rotor Amps (LRA)

NOTE: RLA and LRA are for each compressor.

MCA = (1.25 x RLA1*) + RLA2 + RLA3+ RLA4

Fuse Sizing: Maximum Overcurrent Protection (MOP), Type RK5 Fuse, or HACR Time Delayed Circuit Breaker

MOP= (2.25 x RLA1*) + RLA2

Where the MOP does not equal a standard size rating, the next larger size should be used. The MOP should not exceed 800 amps.

***NOTE**: RLA1 = RLA of the largest compressor in the system; RLA2 , RLA3 & RLA4 = RLA of the other compressors in the system.

The total system Minimum Circuit Ampacity (MCA) shall not exceed 760A. Wire sizing is based on the National Electric Code (NEC) rating for 75°C copper wire, three wires per conduit. Wiring distance from branch circuit shall not exceed 100 feet.

RLA/LRA Per Compressor

	No. of Compressors	208/3/60 RLA/LRA	230/3/60 RLA/LRA	460/3/60 RLA/LRA	575/3/60 RLA/LRA
ARA020X	2	44/239	40/239	20/125	16/80
ARA030X	2	68/340	61/340	31/173	25/132
ARA060	2	N/A	N/A	60/310	48/239

MCA	WIRE SIZE (AWG) 75° (3 Conductors/1 Conduit)
50	8
65	6
85	4
100	3
115	2
130	1
150	1/0
175	2/0
200	3/0
230	4/0
255	250 MCM
285	300 MCM
310	350 MCM
335	400 MCM
380	500 MCM
420	600 MCM

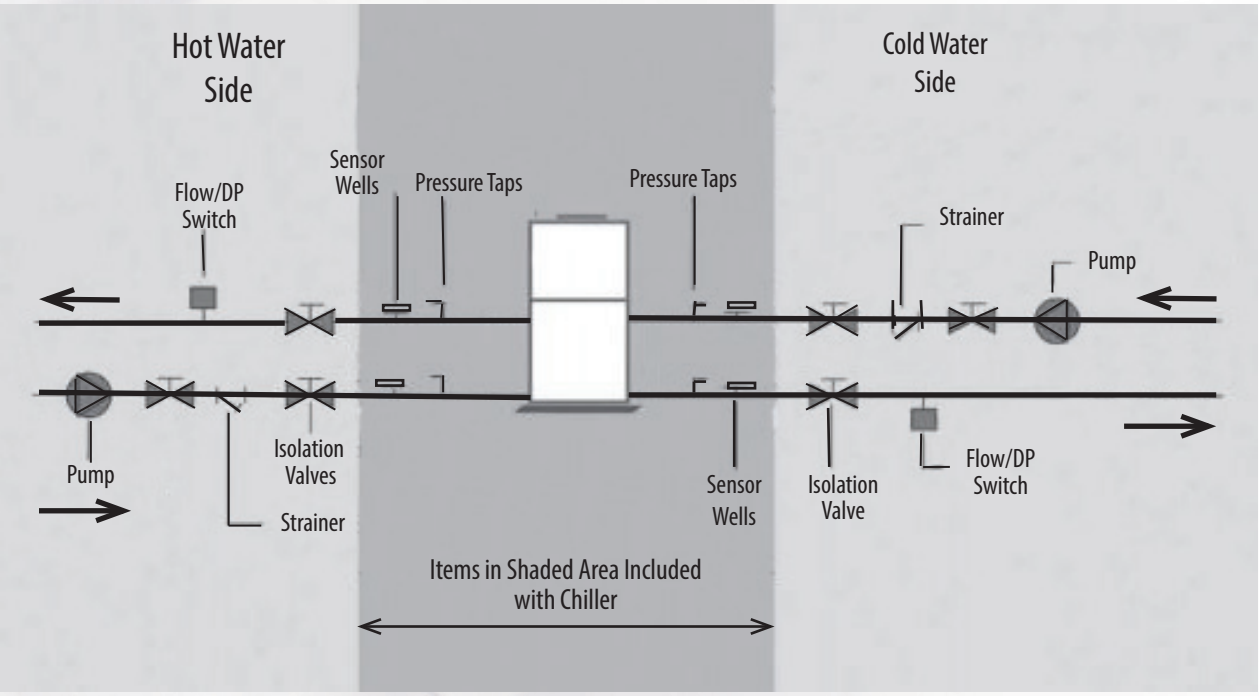
MCA	WIRE SIZE (AWG) 75° (6 Conductors/2 Conduit)
510	250 MCM
570	300 MCM
620	350 MCM
670	400 MCM
760	500 MCM
800	600 MCM

Fan Electrical Data

Consult as-ordered/as-built submittals for fan data.

Recommended Water Piping

Multistack recommends a MINIMUM two to three minute water piping loop time.



Multistack Water-to-Water Heat Pump with Heat Recovery
Models ARA 020X, 030X, 060X

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Design
   2. Performance Criteria
   3. Refrigerants
   4. Controls
   5. Installation Requirements

1.02 REFERENCES
   A. ARI 550/590-2003
   B. ANSI/ASHRAE 15
   C. ASME Section VIII
   D. NEC
   E. UL
   F. CSA
   G. OSHA as adopted by each individual State

1.03 SUBMITTALS
   A. Chiller dimensional drawings with elevation overview. Drawings to include required service clearances, location of all field installed piping and electrical connections.
   B. A summary of all auxiliary utility requirements for normal system operation required. Auxiliary utility requirements include: electrical, water, and air. Summary of auxiliary equipment shall include quantity and quality of each specific auxiliary utility required.
   C. Chiller control documentation to include: chiller control hardware layout, wiring diagrams depicting factory installed wiring, field installed wiring with points of connection, and connection points for BAS control/interface points.
   D. Sequence of operation depicting overview of control logic used.
   E. Installation and Operating Manuals.
   F. Manufacturer-certified performance data at full load in addition to either IPLV or NPLV.

1.04 QUALITY ASSURANCE
   A. Regulatory Requirements: Comply with the codes and standards as defined in Section 1.02 titled REFERENCES
   B. Chiller is required to be run tested at manufacturer's facility prior to shipment. Report available upon request.

1.05 DELIVERY and HANDLING
   A. Chiller modules shall be delivered to the job site completely assembled and charged with refrigerant.
   B. Installing contractor to comply with manufacturer's instructions for transporting, rigging, and assembly of modular chiller.

1.06 WARRANTY
   A. Manufacturer's equipment warranty shall be for a period of one (1) year from date of equipment start up or 18 months from the date of shipment, whichever occurs first.
   B. Extended warranty on parts and labor available by request. The warranty shall include parts and labor costs for the repair and or replacement of defects in components or workmanship.

1.07 MAINTENANCE
   A. Chiller maintenance shall be the sole responsibility of the owner.

PART 2 PRODUCTS

2.01 Operating Conditions
   A. Provide outdoor packaged air-cooled liquid heat pump heat recovery chiller with hot water and chilled water capacities as scheduled on drawings at job site elevation listed in Section 15050.
   B. Chiller shall be designed to operate using R-410A Refrigerant.
   C. Chiller shall be designed for parallel water flow through both the chilled water and hot water piping supplies to each module.
   D. Liquid to be chilled will be water containing corrosion inhibitors and antifreeze solution as needed.
   E. Chiller shall be designed to operate using _____volt, 3 phase, 60 (50) Hz electrical power.

2.02 Outdoor Packaged Water-to-Water Heat Pump Heat Recovery Chiller
   A. Approved manufacturer is AIRSTACK.
   B. System Description: Chiller shall incorporate scroll type compressors and can consist of multiple (20, 30, 60) – ton modules. The refrigerant circuit shall consist of a tandem compressor set, evaporator, refrigerant-to-hot water heat exchanger, air-to-refrigerant heat exchanger, electronic expansion valves, liquid line solenoid valves, filter driers, four-way reversing valve, and control system. (A multi-module chiller must be able to produce chilled water and hot water even in the event of a failure of one or more modules.) Refrigerant circuit shall not contain more than (100, 125, 220) lb. of R-410a refrigerant.

Continued on next page.

Guide Specifications

C. General
1. Chiller Modules shall be ETL listed in accordance with UL Standard 1995, CSA certified per Standard C22.2#236.
2. Modules shall ship wired and charged with refrigerant. All modules shall be factory run tested before shipment on an AHRI certified or third-party verified test stand.
3. Compressors, heat exchangers, fans, piping and controls shall be mounted on a heavy gauge, powder coated steel frame. Electrical controls, contactors, and relays for each module shall be mounted within that module. Module shall be provided within a steel enclosure suitable for outdoor use. Exposed steel surfaces shall be provided with a powder coat paint finish.

D. Piping:
1. Chilled Water Mains: Each module shall include supply and return mains for chilled water. Cut grooved end connections are provided for interconnection to six- or eight-inch standard (6.625 inch, 8.625 inch) outside diameter piping with grooved type couplings. Rolled grooved shall be unacceptable.
2. Hot Water Mains: Each module shall include supply and return mains for hot water. Cut grooved end connections are provided for interconnection to six- or eight-inch standard (6.625 inch, 8.625 inch) outside diameter piping with grooved type couplings. Rolled grooved shall be unacceptable.

E. Heat Exchangers:
1. Evaporator shall be a brazed plate heat exchanger constructed of 316 stainless steel; designed, tested, and stamped in accordance with UL 1995 code for 650 psig working pressure. The evaporator heat exchanger shall not be mounted above the compressor to eliminate liquid refrigerant migration to the evaporator and potential liquid slugging on start-up.
2. Auxiliary air-cooled coil shall have aluminum finss mechanically bonded to copper tubes and shall be factory leak-tested.
3. Hot water heat exchanger shall be a brazed plate heat exchanger constructed of 316 stainless steel; designed, tested, and stamped in accordance with UL 1995 code for 650 psig working pressure. The heat exchanger shall not be mounted above the compressor to eliminate liquid refrigerant migration to the heat exchanger with consequent liquid slugging on start-up.

F. Compressor: Each module shall contain two hermetic scroll compressors in a tandem piping arrangement mounted to the module with rubber-in-shear isolators. Each system also includes high discharge pressure and low suction pressure safety cut-outs.

G. Source/Sink Fans: Each module shall contain dual (four in ARA 060X) fans for each refrigerant circuit. Module shall use ECM Fans (575-volt units require an additional transformer). Blades are aluminum construction owlet design seven-blade axial fan with integral ECM motor (direct drives with external VFD driven motors are not acceptable). Efficiency exceeds criteria set out in the ErP 2015 directive. Individual fans are factory tested. Encapsulation required. Encapsulation is a process of filling a complete electronic assembly with a solid compound for resistance to shock and vibration, and for exclusion of moisture and corrosive agents. Sound pressure reductions at 30 feet, as compared to standard fan option, ranges from 3-6 dBA.

H. Central Control System
1. Scheduling of the various compressors shall be performed by a microprocessor based control system (Master Controller). A new lead compressor is selected every 24 hours to assure even distribution of compressor run time.
2. The master controller shall monitor and report the following on each refrigeration system:
   a. Discharge Pressure Fault
   b. Suction Pressure Fault
   c. Compressor Winding Temperature
   d. Suction Temperature
   e. Evaporator Leaving Chilled Water Temp.
   f. Condenser Leaving Hot Water Temp
3. The master controller shall be powered by the chillers single point power connection and shall monitor and report the following system parameters:
   a. Chilled Water Entering and Leaving Temperature
   b. Discharge Refrigerant Temperature
   c. Proof of Chilled Water Flow
   d. Hot Water Entering and Leaving Temperature
   e. Discharge Refrigerant Temperature
   f. Proof of Hot Water Flow
4. An out of tolerance indication from these controls or sensors shall cause a "fault" indication at the master controller and shutdown of that compressor with the transfer of load requirements to the next available compressor. In the case of a system fFault the entire chiller will be shut down. When a fault occurs, the master controller shall record conditions at the time of the fault and store the data for recall. This information shall be capable of being recalled through the keypad of the master controller and displayed on the master controller's two- line, 40-character back-lit LCD. A history of faults shall be maintained including date and time of day of each fault (up to the last 20 occurrences).
5. Individual monitoring of leaving chilled water temperatures from each refrigeration system shall be programmed to protect against freeze-up. Individual monitoring of leaving hot water temperatures from each refrigeration system shall be programmed to protect against hi head pressure conditions.
6. Operation:
   a. The control system shall monitor entering and leaving chilled water and hot water temperatures to determine both the chilled water and hot water system demand. The control system will use the demand to make staging mode (cooling, heating, or simultaneous heat recovery) decisions and select the number of compressors required to operate. Mode decisions shall be available from the controller as well as via remote input. Response times and set points shall be adjustable. The system shall provide for variable time between compressor sequencing and temperature sensing to optimize chiller performance at varying loads.
   b. Modules shall be able to provide the following capabilities:
      1. Full cooling capacity with zero need for hot water.
      2. Full cooling capacity with ability to modulate the amount of hot water output between a minimum and maximum value by varying amount of refrigerant routed to the air-to-refrigerant condenser coil.
      3. Full heating capacity with zero need for chilled water.

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7. OPTIONAL: Interoperability
The chiller shall be capable of interfacing to a building automation system. Interface shall be accomplished using an Interoperability Web portal and shall be capable of communication over BACNet, Modbus or LON.

I. Chiller shall have external inputs and outputs to be compatible with the building management system to include remote start/stop capability and cooling alarm output.

J. Each refrigerant circuit shall include all refrigerant specialties including a properly sized dynamic receiver to provide reliable operation down to 40 F ambient.

K. OPTIONAL: Single Point Power Connection
Chiller shall be provided with a single point power connection at a 5,000 amp SCCR. This will include pre-engineered wiring for field installation and connection to a factory mounted chiller junction box. Junction box shall include branch circuit protection for each module and provide a single connection point to building power.
a. OPTIONAL—SCCR greater than 5,000 amps: Contact factory. Depending on voltage and module size SCCR up to 85,000 may be available. Some higher SCCR will require fused protection as opposed to the standard isolation circuit breakers.

L. **OPTIONAL:** Variable Flow Operation – Chilled Water
Butterfly type isolation valves shall incorporate appropriate accessories and controls to allow the chiller to operate efficiently in a variable primary flow system. Motorized valve per module shall operate for variable flow.

M. **OPTIONAL:** Pump Module
Provide a pump module of size and capacity indicated on the drawings and schedules. The pump module shall be interconnected though the common chiller header system and require no additional water connections. Pump module will become an integral part of the chiller system. The pump module shall incorporate dual in-line centrifugal pumps in a primary/standby pumping arrangement. Pump starters and controls shall be provided to enable manual selection of lead pump. In addition, in the event of a loss-of-flow failure of the chilled water system, the pump module controls shall disable the lead pump and automatically start the standby pump. The module shall be completely factory assembled and tested prior to shipment.

N. **OPTIONAL:** Lifting Frame
Optional six-inch I-beam painted steel frame will be provided with all modules mounted upon it. Typically, all water and wiring connections will be made between the modules at the factory. Depending on chiller length or customer requests, larger I-beams can be furnished.

2.03 SAFETIES, CONTROLS AND OPERATION

A. The chiller safety controls shall be provided (minimum) as follows:
1. Low evaporator refrigerant pressure
2. Loss of water flow through the evaporator
3. High condenser refrigerant pressure
4. High compressor motor temperature
5. Low suction gas temperature
6. Low leaving evaporator water temperature

B. Failure of chiller to start or chiller shutdown due to any of the above safety cutouts shall be annunciated by display of the appropriate diagnostic description at the unit control panel. This annunciation will be in plain English. Alphanumeric codes shall be unacceptable.

C. The chiller shall be furnished with a master controller as an integral portion of the chiller control circuitry to provide the following functions:
1. Provide automatic chiller shutdown during periods when the load level decreases below the normal operating requirements of the chiller. Upon an increase in load, the chiller shall automatically restart.
2. Provisions for connection to automatically enable the chiller from a remote energy management system.
3. The control panel shall provide alphanumeric display showing all system parameters in the English language with numeric data in English units.

D. Normal Chiller Operation
1. When chiller is enabled, the factory supplied master controller modulates the chiller capacity from minimum to maximum as required by building load.
2. The chiller control system shall respond to entering water temperature and will have an integral reset based on entering water temperature to provide for efficient operation at part-load conditions.

PART 3 INSTALLATION

3.01 PIPING SYSTEM FLUSHING PROCEDURE

A. Prior to connecting the chiller to the building chilled water loop, the piping shall be flushed with a detergent and hot water (110-130° F) mixture to remove previously accumulated dirt and other organic residue. In old piping systems with heavy encrustation of inorganic materials consult a water treatment specialist for proper passivation and/or removal of these contaminants.

B. During the flushing a 30 mesh (max.) Y-strainers (or acceptable equivalent) shall be in place in the system piping and examined periodically as necessary to remove collected residue. The use of on board chiller strainers shall not be acceptable. The flushing process shall take no less than six hours or until the strainers, when examined after each flushing, are clean. Old systems with heavy encrustation shall be flushed for a minimum of 24 hours and may take as long as 48 hours before the filters run clean. Detergent and acid concentrations shall be used in strict accordance with the respective chemical manufacturers instructions. After flushing with the detergent and/or dilute acid concentrations the system loop shall be purged with clean water for at least one hour to ensure that all residual cleaning chemicals have been flushed out.

C. Before supplying water to the chiller the Water Treatment Specification shall be consulted for requirements regarding the water quality during chiller operation. The appropriate chiller manufacturer's service literature shall be available to the operator and/or service contractor and consulted for guidelines concerning preventative maintenance and off-season shutdown procedures.

Continued on next page.

3.02 Water Treatment Requirements

A. Supply water for the chilled water circuit shall be analyzed and treated by a professional water treatment specialist who is familiar with the operating conditions and materials of construction specified for the chiller's heat exchangers, headers and associated piping. Cycles of concentration shall be controlled such that recirculated water quality for modular chillers using 316 stainless steel brazed plate heat exchangers and carbon steel headers is maintained within these parameters:

1. pH	Greater than 7 and less than 9
2. Total Dissolved Solids (TDS)	Less than 1000 ppm
3. Hardness as $CaCO_3$	30 to 500 ppm
4. Alkalinity as Ca CO_3	30 to 500 ppm
5. Chlorides	Less than 200 ppm
6. Sulfates	Less than 200 ppm

3.03 Warranty and Start-Up

A. Manufacturer's Warranty: Manufacturer shall provide full parts-only warranty coverage for entire chiller for a period of one year. All parts shall be warranted against defects in material and workmanship. Similar parts-only coverage shall be provided for the chillers compressors for a period of five years. The warranty period shall commence either on the equipment start-up date or six months after shipment, whichever is earlier.

B. Manufacturer shall provide the services of a factory authorized service engineer to provide complete start-up supervision. The factory authorized service engineer shall also be responsible for assembly of the chillers cabinetry package and electrical bus bar system. After start-up a manufacturer's representative shall provide a minimum of eight hours of operator training to the owner's designated representative(s).

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Originators. Innovators. Never the Imitators.℠

Originators…

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

Innovators…

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

Never the Imitators…

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

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1065 Maple Avenue P.O. Box 510 Sparta, WI 54656

Phone 608-366-2400 • info@multistack.com

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