MULTISTACK®

ASM Medical/Process Chillers

Product Data Catalog

3 through 30 Tons
ASM003X, ASM005X, ASM007X, ASM008X, ASM009X, ASM010X, ASM015X, ASM020X, ASM030X

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Multistack ASM Chillers

Multistack, the inventor and world leader in modular chiller systems, introduces a full line of efficient, reliable and innovative multi-purpose process chillers: the ASM. ASM chillers meet a wide range of process cooling needs including medical, plastics and general industrial applications. ASM chillers can be used as portable chillers to provide effective cooling, where needed and when needed.

- One or two scroll compressors for standard air-to-water conditions
- Variable speed scroll compressors available in some sizes for even greater part load efficiency
- Fin and tube condenser coil and corrosion-resistant stainless steel brazed-plate evaporators
- Three through 30 ton capacities in standalone non-modular configurations
- Compact, space-efficient units maximize valuable floor and/or roof space
- Native building automation protocols: Modbus IP and Modbus RTU. BACnet IP, BACnet MSTP, Metasys N2, or LonWorks optional with additional factory-installed hardware
- Integral pumps and tanks available on request
- Available in all stainless steel construction, stainless steel hardware and epoxy paints

Easy to Install

- Accessible single point electrical connection and FNPT threaded water connections
- Factory run and tested at or as close to submitted conditions as possible

Simple to Operate

- Intuitive keypad for control of unit operation
- Plain English display with easy to understand abbreviations
- 128 x 64 dot pixel STN monochrome graphics LCD with 2.8" diagonal viewing area
- Easy interface with customer-supplied computer terminal

Highly Dependable

- Meets UL 1995 standards. Carries third party certified ETL compliance
- Electronic controls for maintaining precise process temperatures
- Available with dual refrigeration circuits for redundancy
- Reliable thermal dispersion proof-of-flow switch

Simple to Service

- Automatic recording of fault conditions with sensor information at time of fault
- Industry standard components with many common manufacturer's off-the-shelf parts
- Smaller control panel components mounted on DIN rail for ease of replacement if required

Model Number Nomenclature

ASM 030 X C/N 1 1 H A L 1 A A A E S S R-410A

- R-410A — Refrigerant
- S — Tank[8]
- S — Pump[7]
- E — Fan Configuration[6]
- A — Condenser Coating[5]
- A — Condenser[4]
- A — Evaporator[3]
- 1 — AHRI Version
- L — Ambient (L-Low, S-Standard, H-High, C-Low & High)
- A — Application[2]
- H — Voltage (See Voltage Codes)
- 1 — Frame Designation 1-32x58, 2-36x72, 3-36x84, 4-72x84, 5-Other
- 1 — No. of Refrigeration Circuits (1-Single, 2-Dual)
- C/N — AHRI Certified (C - certified, N - Not certified)
- X — Compressor Type[1]
- 030 — Nominal Capacity (3 - 30 tons)
- ASM — Multistack Medical/Process Chiller

1 X- Copeland Scroll (ZP), A- Copeland Scroll (ZR), D- Copeland Digital Scroll, N- None, Q- Quasi Variable Speed Copeland, V- True Copeland Variable Speed

2 A- Air Cooled, C- Remote Condenser, D- Condensing Unit, H- Heat Recovery, R- Heat Pump (ASA and ARA are H- Heat Recovery)

3 A- Brazed SS, B- Brazed SMO, C- S&T Copper, D- S&T Cu-Ni, O- Remote by Others, R- Remote by Multistack, V- Other, N- None

4 A- Cu Tube Al Fin, B- Cu Tube Cu Fin, C- Microchannel, V- Other

5 A- None, B- Bronzeglow, H- Heresite, E- Electrofin, S- Standard, V- Other

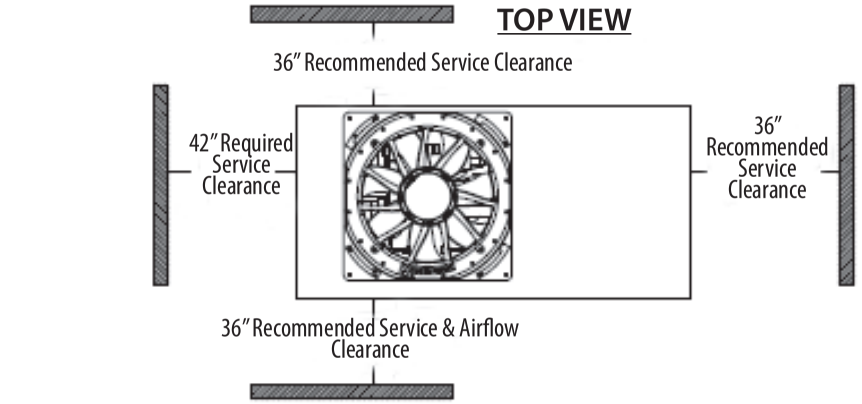
6 E-ECM Fan, H- High Static, L- Single Fan, S- Standard, V- Other

7 S- Pump (S- Single, D- Dual, N- None, V- Other)

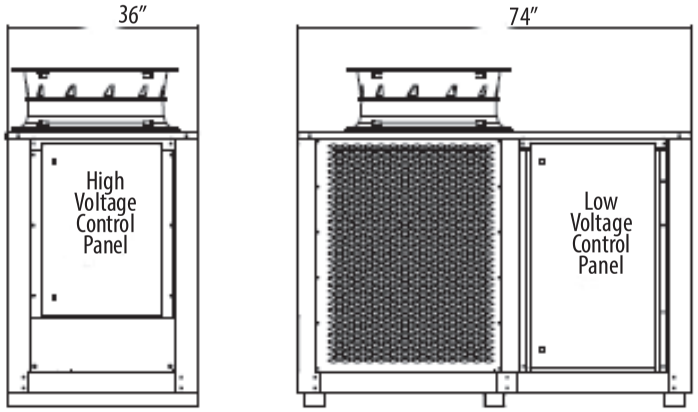
8 S- Tank (S- Standard, N- None, V- Other)

General Data *									
ASM	**003X**	**005X**	**007X**	**008X**	**009X**	**010X**	**015X**	**020X**	**030X**
Compressor	**Type: Scroll**								
Quantity/Capacity (Tons Ea.)	1/3	1/5	1/7.5	2/3.25	1/10	2/5	2/7.5	2/10	2/15
Evaporator	**Type: Brazed Plate**								
Water Storage (Gallons Ea.)	0.25	0.50	0.70	0.75	0.70	0.95	1.50	2.00	2.50
Condenser Fans									
Quantity/kW	1/0.25	1/0.75	1/2.00	1/2.00	1/3.00	1/3.00	2/2.00	2/5.00	2/6.00
CFM (Ea.)	3,000	5,000	7,500	10,000	7,500	10,000	11,000	16,500	22,000
Tank Capacity - Gallons	40	40	60	60	60	60	60	60	60
Refrigerant	**R-410A**								
No. of Circuits/ Charge (Lbs./Circuit)	1/12	1/12	1/20	2/10	1/20	2/10	2/15	2/15	2/25
Operating Weight (Lbs.)	1,650	1,650	1,650	2,200	1,650	2,200	2,725	2,725	3,303
Shipping Weight (Lbs.)	1,100	1,100	1,100	1,600	1,100	1,600	1,925	1,925	2,503

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

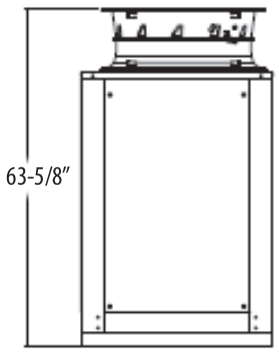


NOTES:
1. Drawing is for reference only and subject to change.
2. Estimated Weights:
   Operating - 1650 lbs.
   Shipping - 1100 lbs.



SIDE VIEW

FRONT VIEW



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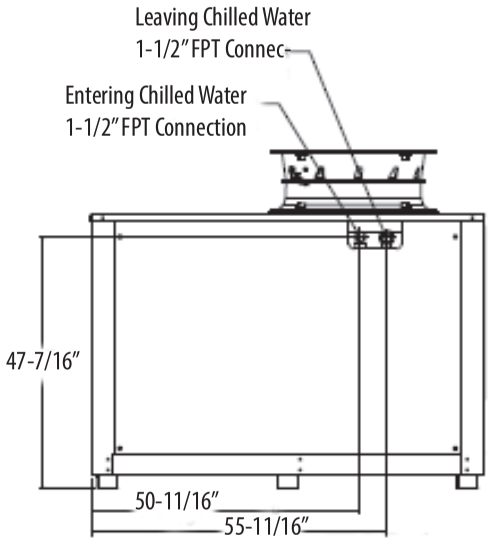

REAR VIEW

Connect main power wiring at CB1 inside high voltage panel. Installer to drill hole for conduit in bottom or left side of panel. Electrical clearances and wiring must comply with all federal, state and local regulations. Breakers, fuses, wire and wire size must be sized and installed according to the National Electrical Code (NEC).

WARNING: Severe injury or death may result due to electric shock hazard. Only qualified, licensed electricians should wire Multistack chillers.

When installed, chiller must be level to within 1/8-inch over the length and width of the chiller.

Consult a qualified seismic expert for seismic restraint information.

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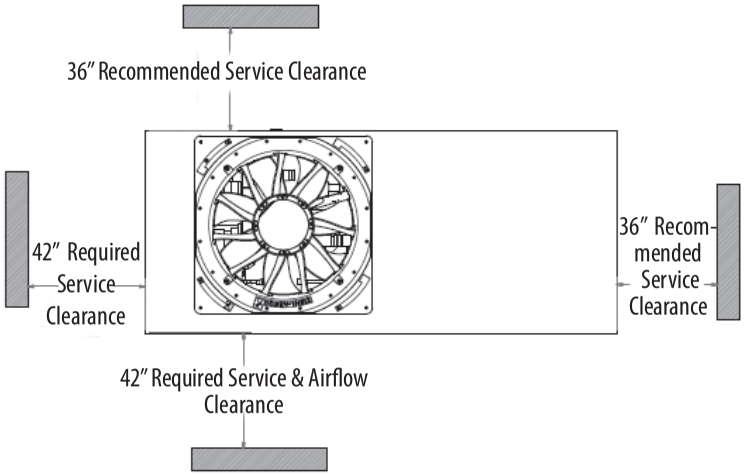

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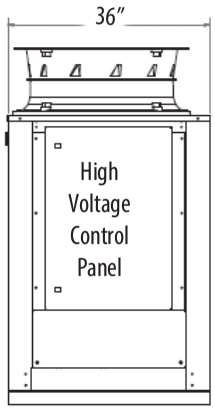

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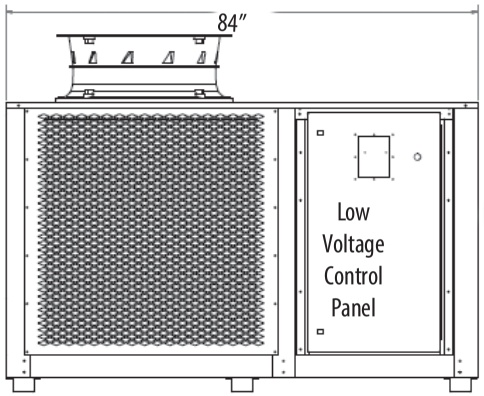
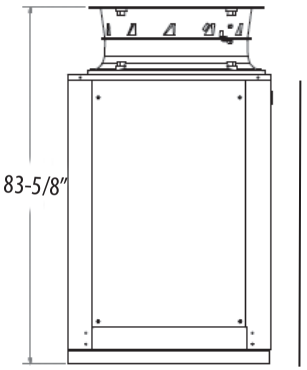


FRONT VIEW



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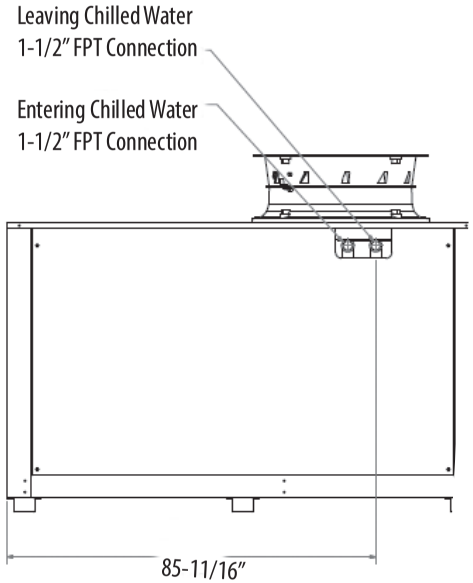

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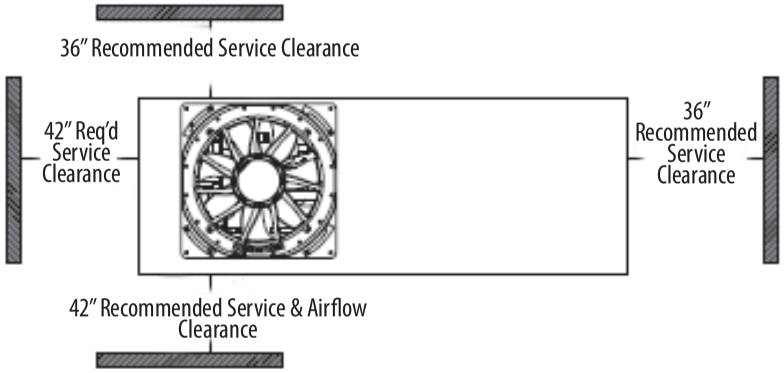

NOTES:
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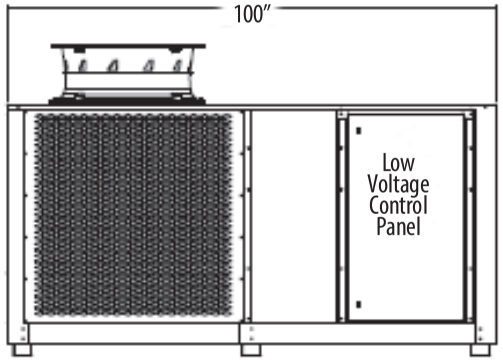
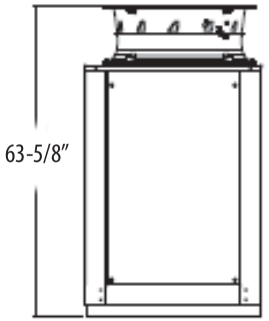
2. Estimated Weights:
   Operating - 2200 lbs.
   Shipping - 1650 lbs.

SIDE VIEW



FRONT VIEW



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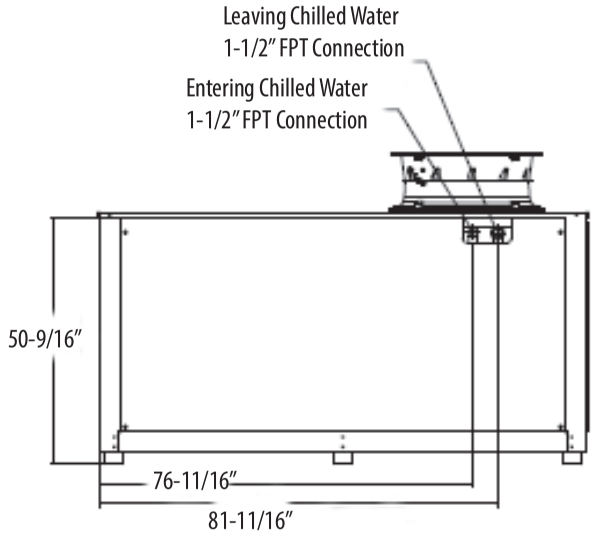

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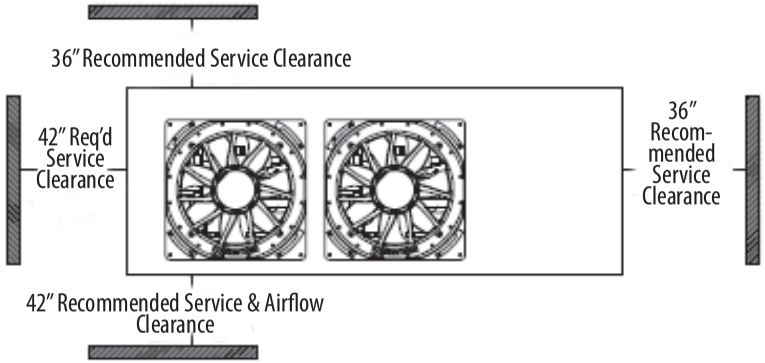
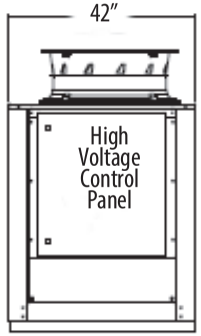


NOTES:
1. Drawing is for reference only and subject to change.
2. Estimated Weights:
   Operating - 2725 lbs.
   Shipping - 1925 lbs.



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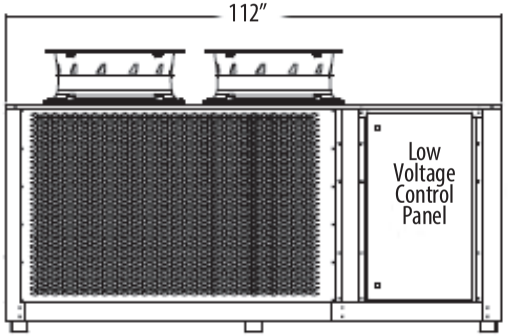

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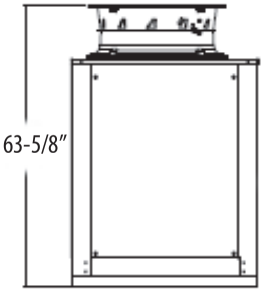

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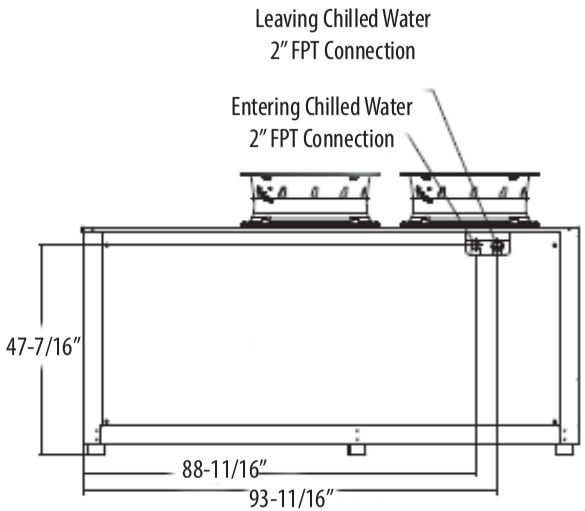

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Unit Dimensions and Clearances
ASM 030X Dual Circuit Units

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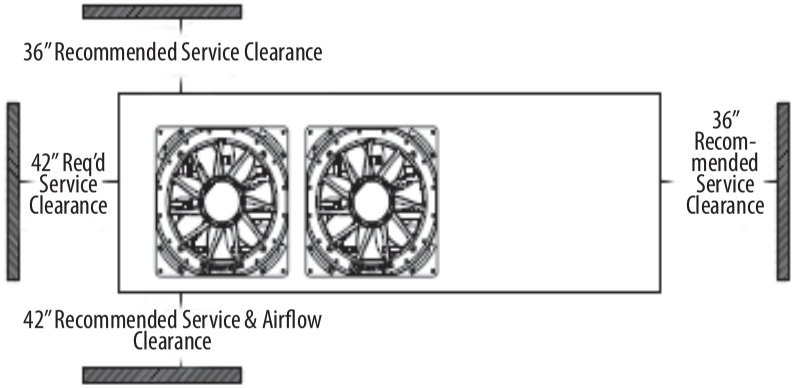

NOTES:
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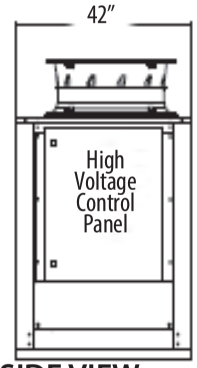
2. Estimated Weights:
   Operating - 3303 lbs.
   Shipping - 2503 lbs.



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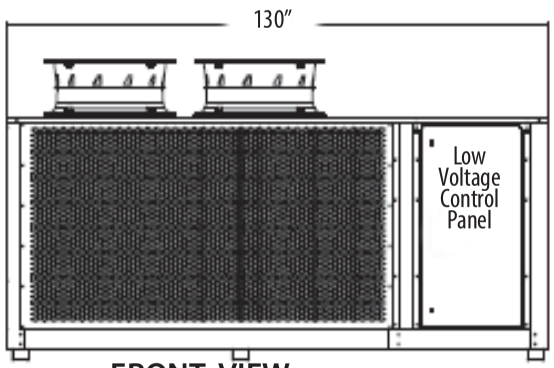

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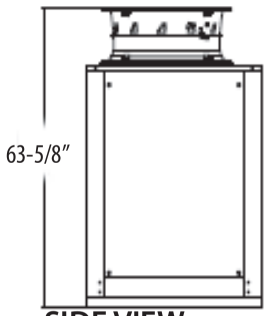

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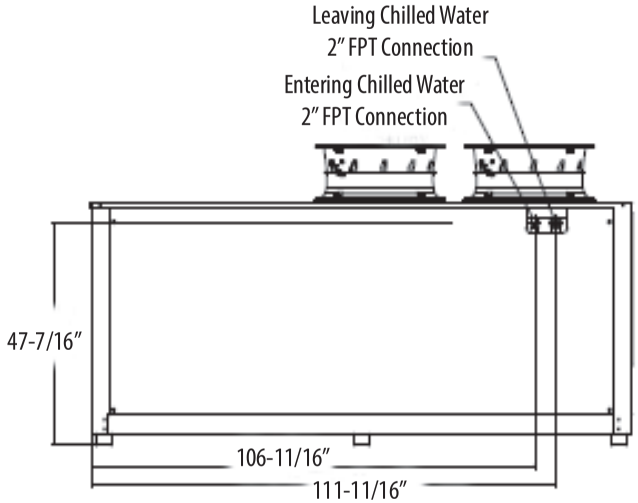

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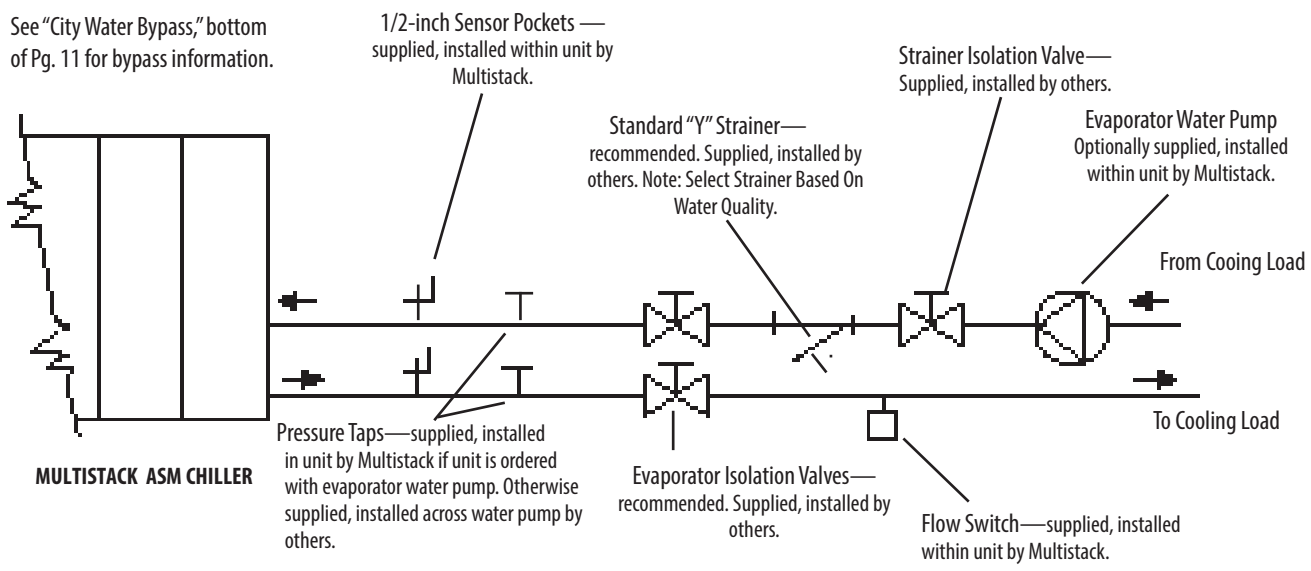


Water Quality, Treatment Specifications

Multistack cannot be responsible for heat exchangers damaged due to untreated/poorly treated water.

Water Specifications

ph:	>7 and <9
Total Dissolved Solids (TDS):	Less than 1000 ppm
Hardness as $CaCO_3$:	30 to 500 ppm
Alkalinity as $CaCO_3$:	0 to 500 ppm
Chlorides:	< 200 ppm
Sulfates:	< 200 ppm

Water Specifications with 25% Glycol

ph: >7 and <9	
Total Dissolved Solids (TDS):	1000 - 10,000 ppm
Conductivity:	1000 - 15,000 ppm
Hardness as $CaCO_3$:	30 to 500 ppm
Alkalinity as $CaCO_3$:	>500 ppm
Chlorides:	< 200 ppm
Sulfates:	< 200 ppm

City Water Bypass

To help protect customer equipment from damage in the event of a chiller or chilled water flow fault, a city water bypass arrangement can be installed. This backup cooling arrangement uses a city water bypass relay contact and a series of solenoids (Multistack or customer supplied) to switch and allow city water to cool the load instead of the Multistack chiller.

Bypass Sequence

When the chiller is running and leaving water temperature reaches the user-adjustable warning set point, the city water bypass warning relay will energize and set the corresponding BAS point. Once above the warning set point it will start the adjustable length timer; default 300 seconds. When the timer expires and leaving chilled water temperature is above the user-adjustable alarm set point, the chiller will shut off and require manual reset. If the timer expires with leaving water temperature above the warning set point the chiller will continue to run but when the temperature reaches the alarm set point the chiller will shut off and require manual reset. The alarm relay will energize and set the corresponding BAS point. When leaving water temperature is below warning set point, the timer resets and will not start timing again until warning set point is exceeded.

Controls Information

Multistack ASM chillers use the Micro Control Systems Magnum controller. This controller provides flexibility with setpoints and control options that can be selected prior to commissioning a system or when the unit is live and functioning. Displays, alarms and other interfaces are accomplished in clear language to indicate controller and chiller status. The MCS controller includes a master control board, a keypad and display. Complementing the Magnum micro controller is the MCS-SI16-A04 expansion board. Communication with these units is at 38,400 baud over the dedicated MCS-I/O port.

An RS-485 port provides communication with Building Management Systems (BMS). Native building automation protocols are Modbus IP and Modbus RTU. BACnet IP, BACnet MSTP, Matesys N2 and LonWorks are optional with additional factory installed hardware.

Digital Inputs

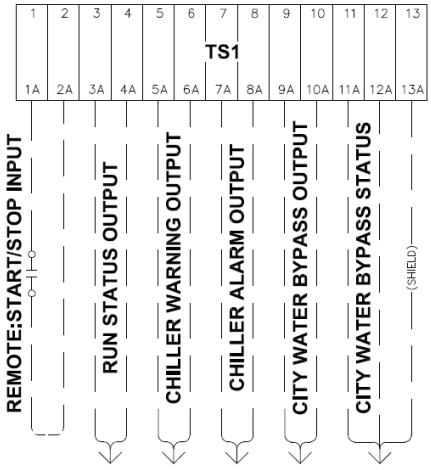
(Dry contact required; controller supplies +5V)

- Remote Start/Stop
- A closed contact indicates chiller enabled

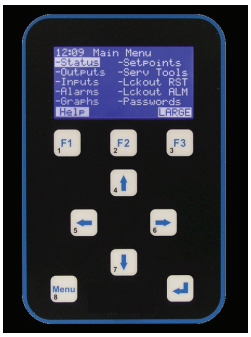
Relay Outputs

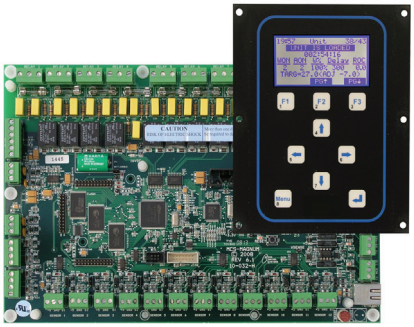
(Dry contact provided)

- Run Status
- Chiller Warning
- Chiller Alarm
- City Water Bypass Output
- City Water Bypass Status
- Customer can supply up to 6.3A @ 230VAC; protected by built-in fusing.



Customer connection points for the ASM chiller controller.





Controller circuit board and status screen.

Left, BAS interface for:

- **BACnet IP**
- **BACnet MSTP**
- **Metasys N2**
- **LonWorks**

System Wire & Fuse Sizing Specifications

(Applicable codes may require different wire sizing)

1. Compressor Rated Load Amps (RLA)/Locked Rotor Amps (LRA) per compressor.

2. Wiring Sizing: Minimum Circuit Ampacity (MCA)
MCA = (1.25 x RLA1*) + RLA2

VOLTAGE	230/1/60	208/3/60	230/3/60	460/3/60	575/3/60
ASM003X	15.3/112	11.6/88	10.5/88	5.3/44	4.2/34
ASM005X	25.9/178	17.5/136	15.8/136	7.9/66.1	6.4/55.3
ASM007X	N/A	26.2/191	23.7/191	12.1/100	9.8/78
ASM008X 2 Comps. Ea.	18.2/135	13.5/98	12.2/98	6.1/55	4.8/41
ASM009X	N/A	34.3/240	31.0/240	16.2/140	12.5/107.6
ASM010X	N/A	17.5/136	15.8/136	7.9/66.1	6.4/55.3
ASM015 2 Comps. Ea.	N/A	26.2/191	23.7/191	12.1/100	9.8/78
ASM020 2 Comps. Ea.	N/A	34.3/240	31.0/240	16.2/140	12.5/107.6
ASM030 2 Comps. Ea.	N/A	55/340	50/340	26/173	21/132

MCA	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

3. Fuse Sizing: Maximum Fuse (MF), Type RK5 Fuse

MF= (2.25 x RLA1*) + RLA2 + RLA3
Where the MF does not equal a standard size fuse, the next larger size should be used.

4. Standard modules short circuit current rating: SCCR=5kA

NOTES:

A.*RLA1 = RLA of the largest compressor in the system. RLA2 & RLA3 = RLA of the other compressors in the system.

B. Total system Minimum Circuit Ampacity (MCA) shall not exceed 500A.

C. Wire sizing is based on National Electric Code (NEC) rating for 75°C copper wire, with three wires per conduit.

D. Wiring Distance from branch circuit shall not exceed 100 feet.

PART 2 PRODUCTS

2.01 Operating Conditions

A. Provide outdoor packaged air-cooled liquid chiller with the capacity as scheduled on drawings at job site elevation listed in Section 15050.
B. Chiller shall be designed to operate using R-410A refrigerant.
C. The liquid to be chilled will be water containing corrosion inhibitors and antifreeze solution as required.
D. Chiller shall be designed to operate using _____ volt, 3 phase, 60 Hz electrical power supply.

2.02 Outdoor Packaged Air-Cooled Chiller

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

B. System Description: Chiller shall incorporate scroll-type compressors and consist of multiple refrigerant circuits. Each refrigerant circuit shall consist of an individual compressor, condenser, evaporator circuit, thermal expansion valve, reversing valve, and control system. Each circuit shall be constructed to be independent of other circuits from a refrigeration and electrical stand-point. The multi-circuit heat pump must be able to produce chilled water even in the event of a failure of one or more refrigerant circuits.

C. General
1. Chiller modules shall be ETL listed in accordance with UL Standard 1995, CSA certified per Standard C22.2#236.
2. System shall ship wired and charged with refrigerant and shall be factory run tested prior to shipment.
3. Compressors, heat exchangers, piping and controls shall be mounted on a heavy gauge steel frame. Electrical controls, contactors, and relays for each system shall be mounted within the system cabinet.

D. Evaporator: Each evaporator shall be a brazed plate heat exchanger constructed of 316 stainless steel; designed, tested, and stamped in accordance with ASME code for 400 psig water side working pressure. Evaporator heat exchanger shall not be mounted above the compressor, to prevent the effect of migration of refrigerant to the cold evaporator with consequent liquid slugging on start-up.
E. Compressor: Chiller shall contain one (or two) hermetic scroll compressors mounted to the chiller with rubber-in-shear isolators. Each system also includes high discharge pressure and low suction pressure safety cut-outs.
F. Condenser: Chiller shall contain a single or dual condenser fan. Blades are aluminum construction owlet design seven-blade axial fan with integral EC motor. Direct drive 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. Fan motors shall be pressure controlled and suitable for outdoor use. Condenser coils shall be finned tube design. Coil shall be constructed using copper tubes and aluminum fins.

G. Central Control System
1. Chiller shall have microprocessor based controls. System shall include leaving chilled water control and head pressure control for the condenser fan.
2. Safeties shall include low leaving chilled water temperature safety for freeze protection.

H. Refrigerant circuit shall include all refrigerant specialties to provide reliable operation down to 40 degrees F ambient temperature.
OPTIONAL: Low ambient to minus 20 degrees F. (-20 F) Chiller shall incorporate appropriate refrigerant specialties including a properly sized refrigerant receiver and flooded head pressure control valve for operation to -20 F.

I. Chiller shall be provided with a single-point electrical power connection.

J. Pump - Optional
Provide an integral chilled water pump of size and capacity indicated on the drawings and schedules. Pump shall be a single centrifugal pump. Pump impeller and housing shall be stainless steel. Pump starters and controls shall be provided. In addition, in the event of a loss-of-flow failure of the shilled water system, the system shall shut down and provide a failure output.
OPTIONAL: Dual pumps shall be provided for N+1 redundancy. In the event of a pump failure the back-up pump shall automatically be enabled.

K. Tank - An integral 20- (40, 60, 100, 120) gallon stainless steel chilled water tank shall be provided integral to the system piping. Tank shall be pressure rated at 125 psi minimum.

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 enable a fault output from the integral control system.
C. The chiller shall be furnished with a 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.
D. Normal Operation
1. When the chiller is enabled, the factory supplied controller modulates chiller capacity from minimum to maximum as required by building load.
2. The chiller control system shall respond to leaving water temperature and will have an integral reset based on leaving water temperature to provide efficient operation at part-load conditions.

PART 3 INSTALLATION

3.01 PIPING SYSTEM FLUSHING PROCEDURE

A. Before connecting the chiller to the chilled water loop, the piping loop shall be flushed with a detergent and hot water (110-130° F) mixture to remove any 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. While flushing a 30-mesh (max.) Y-strainer (or acceptable equivalent) shall be in place in the system piping and examined periodically as needed to remove collected residue. The use of on-board chiller strainers is not 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 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 help ensure that all residual cleaning chemicals have been flushed out.

C. Before supplying water to the chiller consult the Water Treatment Requirements. The appropriate chiller service literature shall be available to the operator and/or service contractor and consulted for guidelines concerning preventative maintenance and off-season shutdown procedures.

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 water quality for the chiller 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 $CaCO_3$: 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. The warranty period shall commence either on the equipment start-up date or six months after shipment, whichever is earlier.

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