



## Air-Cooled MagLev™ Chiller Product Catalog

**MagLev™**



### For Chillers:

ASP075FC, ASP095FC, ASP100FC, ASP120FC, ASP125FC,  
ASP150FC, ASP160FC, ASP190FC, ASP200FC, ASP250FC

## Product Number Nomenclature

ASP	150	F	C/N	1	5	H	1	A	S	1	C	A	A	S	-134a
															Refrigerant <sup>8</sup>
															Fan Configuration <sup>7</sup>
															Condenser Coating <sup>6</sup>
															Condenser <sup>5</sup>
															Evaporator <sup>4</sup>
															AHRI Version
															Ambient ( L - Low, S - Standard, H - high, C - low & high)
															Application <sup>3</sup>
															Power Connection (1 - Direct Connect, 2 - Multiple Module Connections)
															Voltage <sup>2</sup>
															Frame Designation 1 - 32 x 58, 2 - 36 x 72, 3 - 36 x 84, 4 - 72 x 84, 5 - other)
															No. of Refrigerant Circuits ( 1 - single , 2 - dual , 4 - four)
															AHRI Certified (C - certified, N - Not certified)
															Compressor Type <sup>1</sup>
															Module Nominal Capacity (075-, 095-, 100-, 120-, 125-, 150-, 160-, 190-, 200-, 225-, 250-, 300-tons)
															Series

<sup>1</sup> A - Copeland Scroll (ZR), B-Bristol, C - Trane Cornerstone, F-Danfoss Turbocor Flooded, R - Bitzer Screw, S - Trane Scroll, T - Danfoss Turbocor DX, Z - Copeland scroll (old elec), X - Copeland Scroll (ZP), N-None

<sup>2</sup> 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

<sup>3</sup> A - Air Cooled, C - Remote Condenser, D - Cond Unit, H-Heat Recovery, R - Heat Pump

<sup>4</sup> A - Braze SS, B - Braze SMO, C- S&T copper, D - S&T cu-Ni, V - Other, N-None

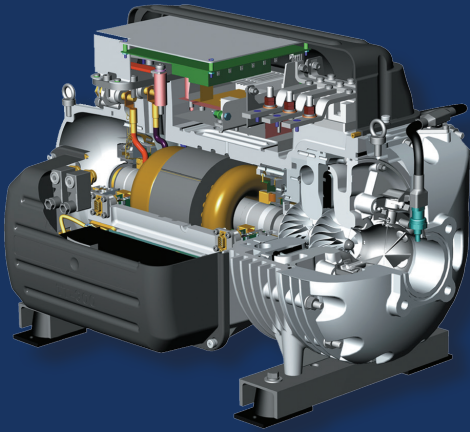
<sup>5</sup> A - Cu tube Al fin, B - Cu tube Cu fin, C- Microchannel, V - Other

<sup>6</sup> A - None, B - Bronzeglow, H - Heresite, E - Electrofin, V - Other

<sup>7</sup> S - Standard, H - High static, L -Low sound, V -Other

<sup>8</sup> R-410A or R-134a

NOTE: Not all listed options are available on the Air Cooled Flooded Chiller. Please contact your local Multistack representative with any questions.

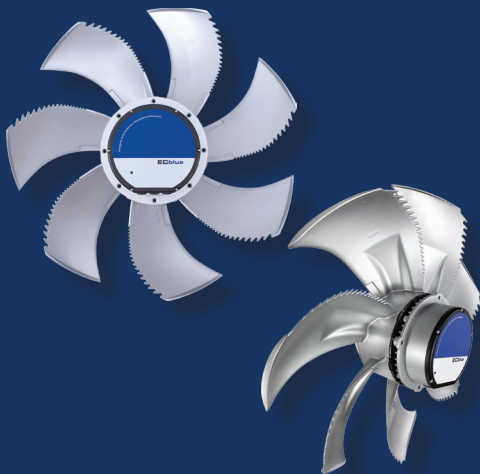


## Cutting Edge Performance

- Near water-cooled efficiencies at air cooled conditions with unprecedented part-load performance
- MagLev technology offers a near-frictionless two-stage variable speed centrifugal compressor for maximum efficiency at all load conditions
- Oil free design eliminates performance degradation and ensures sustainable, documentable performance over the life of the chiller as well as reduced maintenance
- Flooded 4-pass evaporator provides low-flow turndown at extreme efficiency levels

## FlexSys Lite Controls

- Real time chiller optimization with Natural Progression Controls™
- Robust industrial grade computing hardware
- Onboard memory allows trending of over 100 points in 5 second intervals for up to 2 years of data logging
- Standard chilled-water pump control

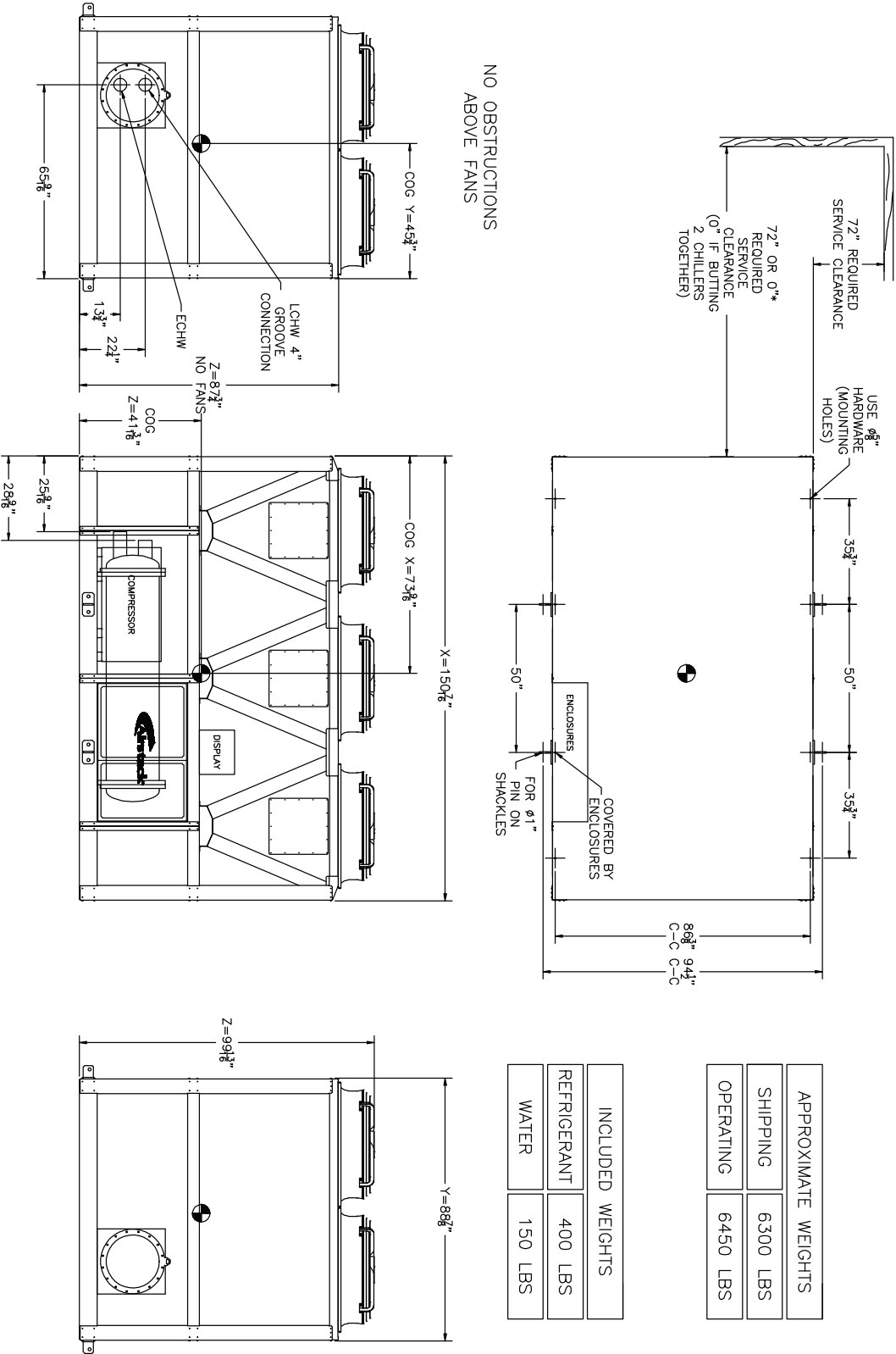


## Super Quiet Operation

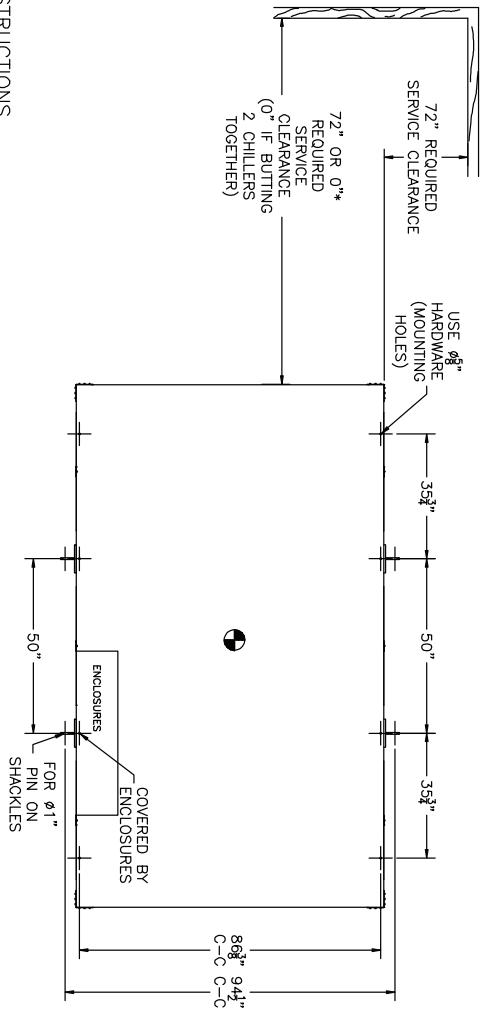
- Total sound signature of 72 dB(A) at 30 feet (ASP095F)
- MagLev compressor itself is virtually silent
- State-of-the-art ECM fans deliver quiet and ultra-efficient operation... the perfect complement to the MagLev compressor



CHILLER OPTION: ASP075F/ASP095F, LH CONNECTIONS



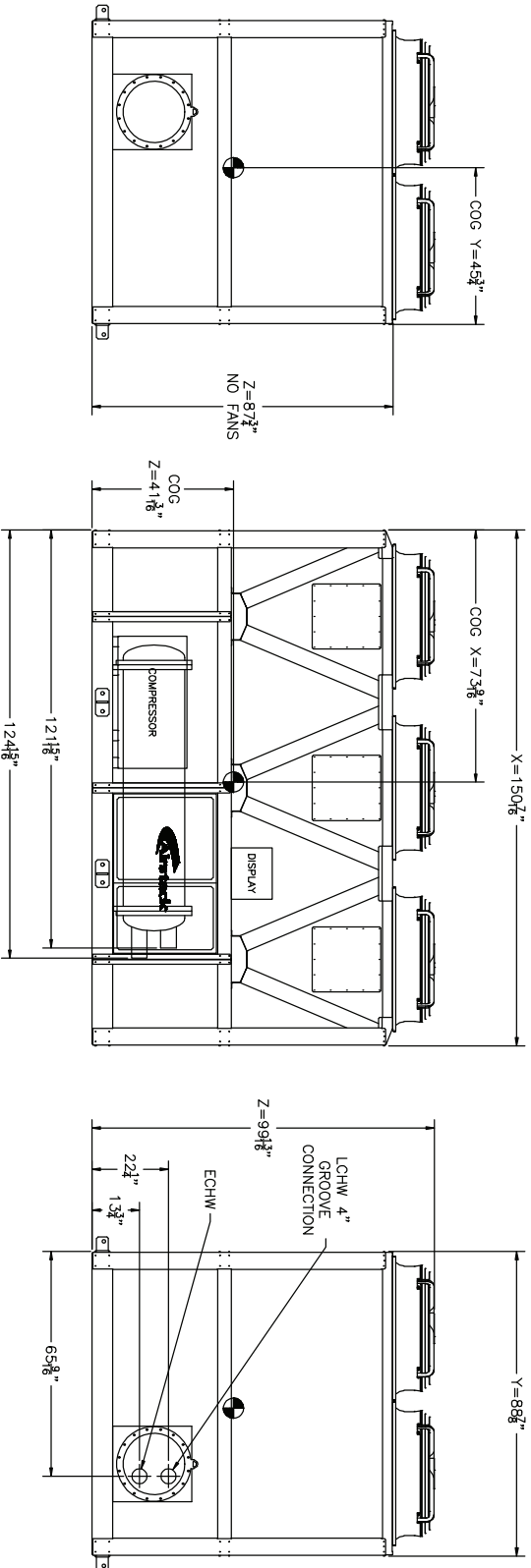
## CHILLER OPTION: ASP075F/ASP095F, RH CONNECTIONS



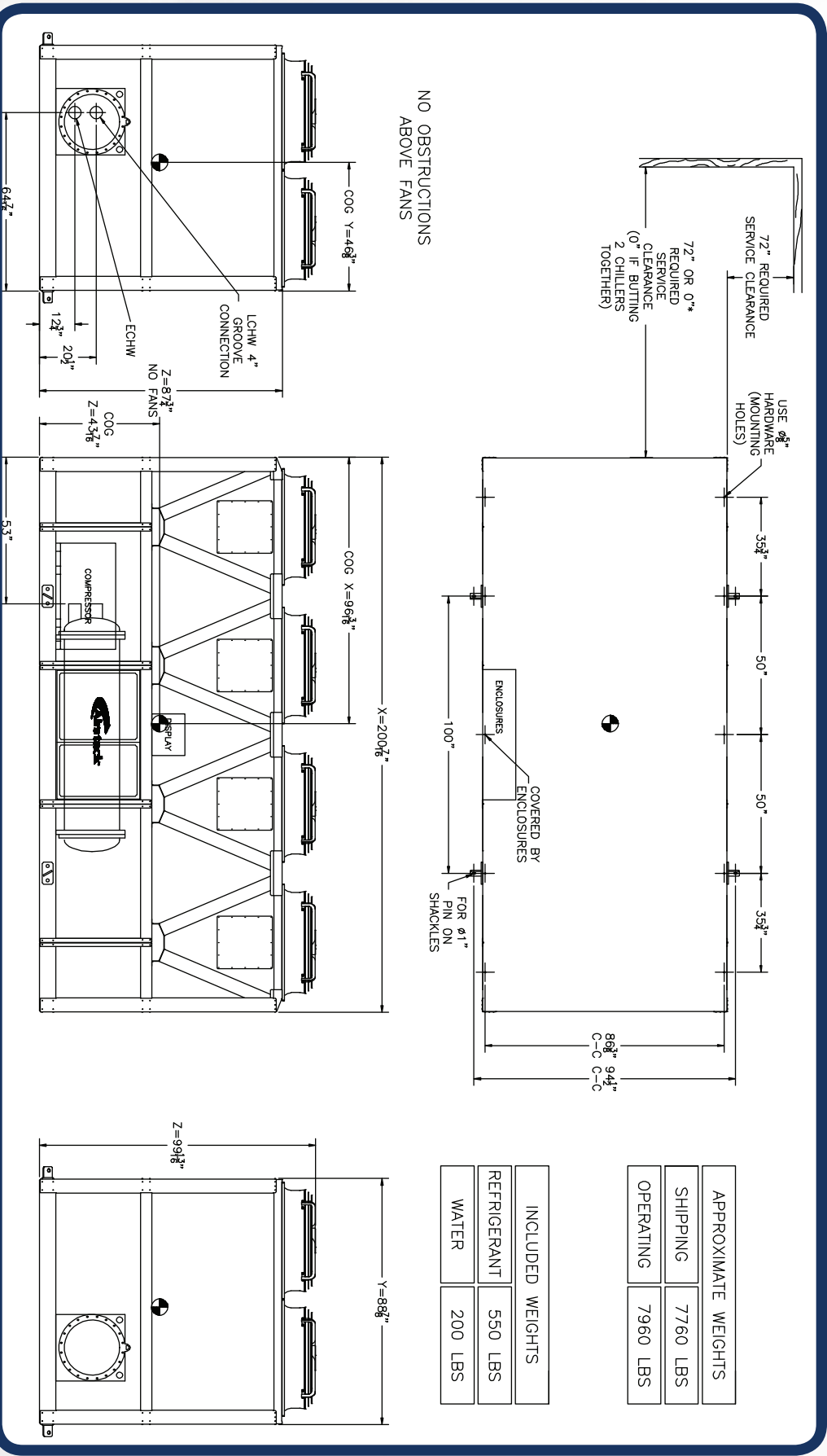
APPROXIMATE WEIGHTS	
SHIPPING	6300 LBS
OPERATING	6450 LBS

INCLUDED WEIGHTS	
REFRIGERANT	400 LBS
WATER	150 LBS

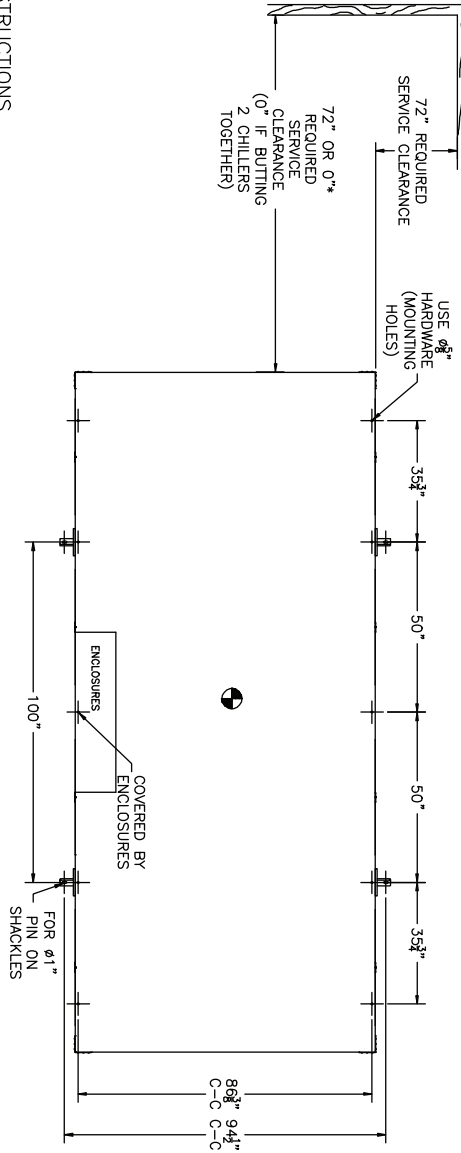
NO OBSTRUCTIONS  
ABOVE FANS



CHILLER OPTION: ASP100F/ASP120F, LH CONNECTIONS



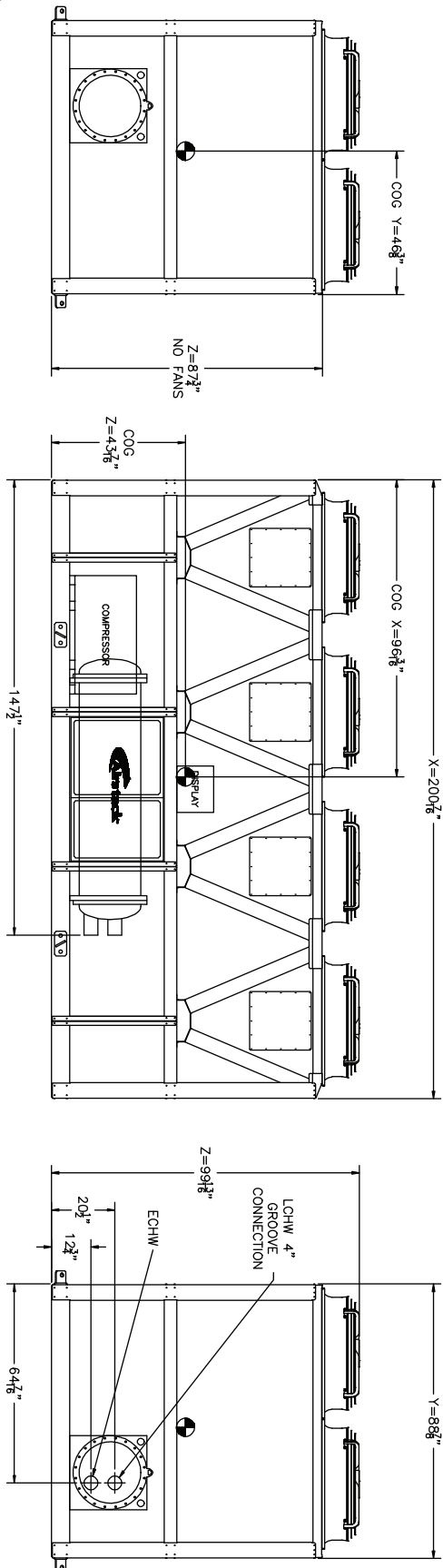
# CHILLER OPTION: ASP100F/ASP120F, RH CONNECTIONS



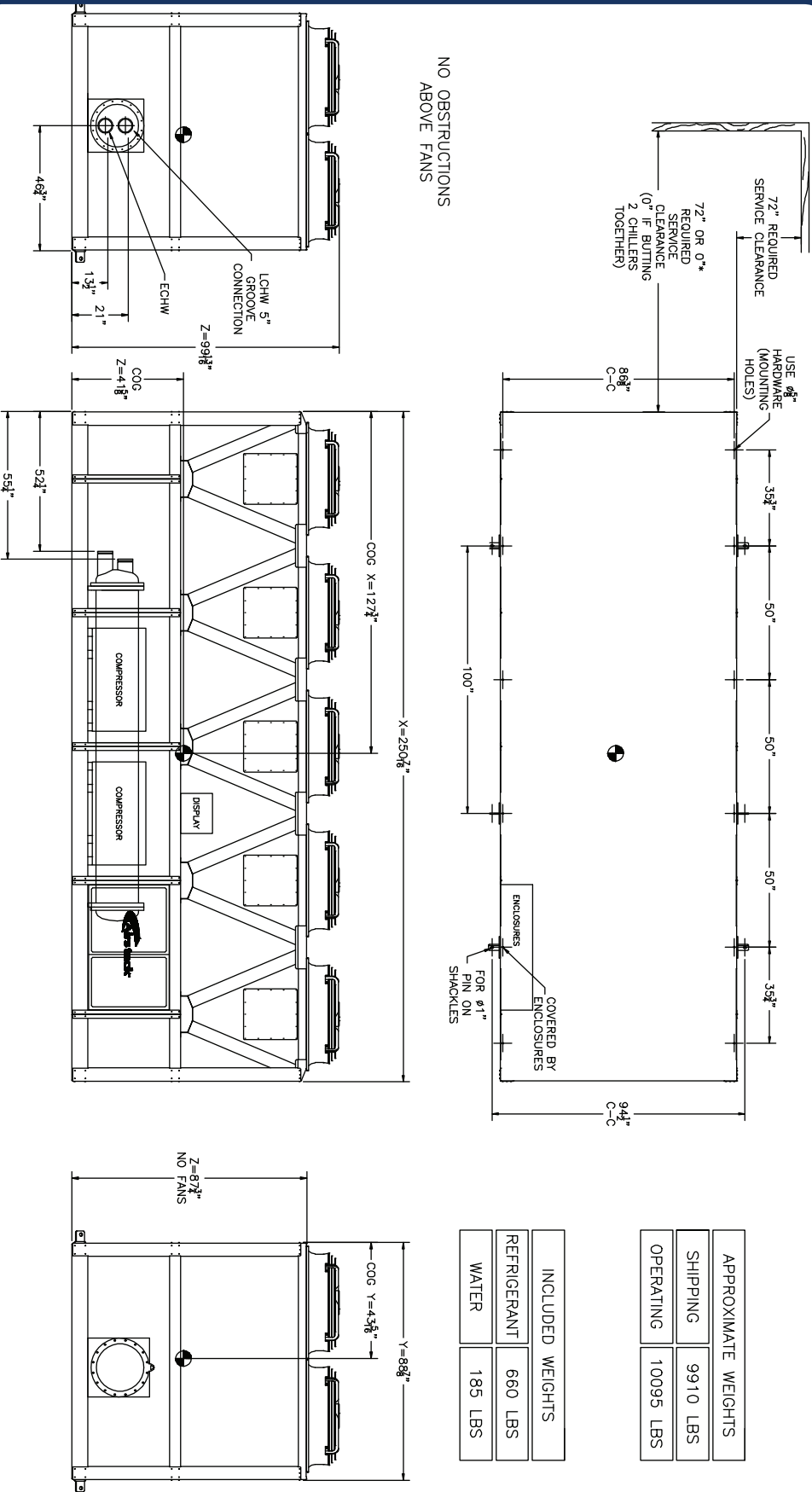
APPROXIMATE WEIGHTS	
SHIPPING	7760 LBS
OPERATING	7960 LBS

INCLUDED WEIGHTS	
REFRIGERANT	550 LBS
WATER	200 LBS

NO OBSTRUCTIONS  
ABOVE FANS

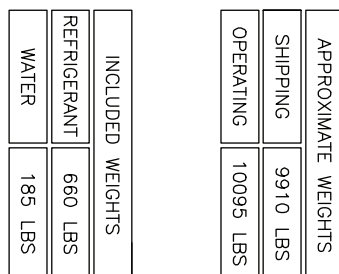


CHILLER OPTION: ASP125F/ASP160F, LH CONNECTIONS

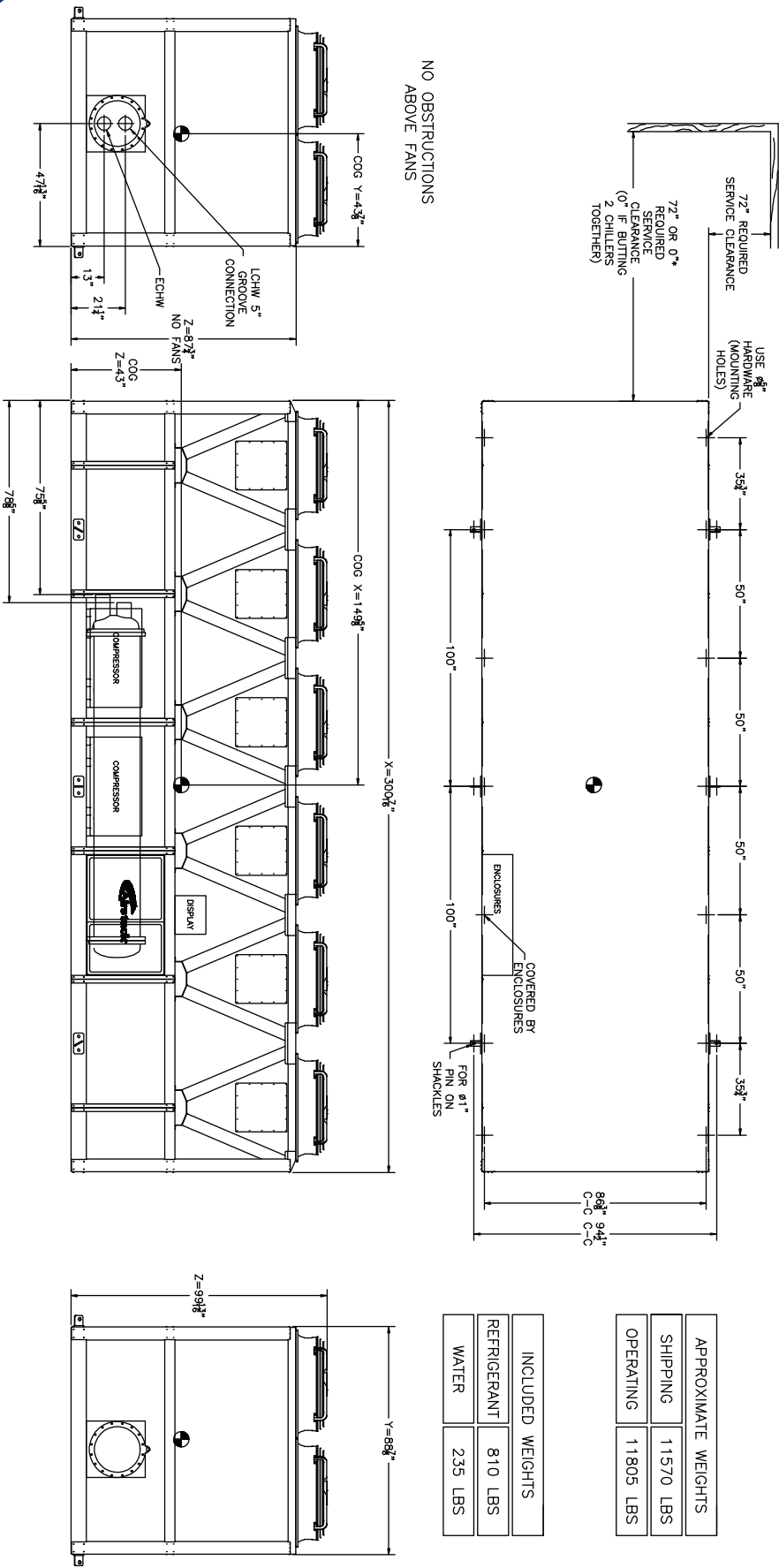




NO OBSTRUCTIONS  
ABOVE FANS



CHILLER OPTION: ASP150F/ASP190F, LH CONNECTIONS

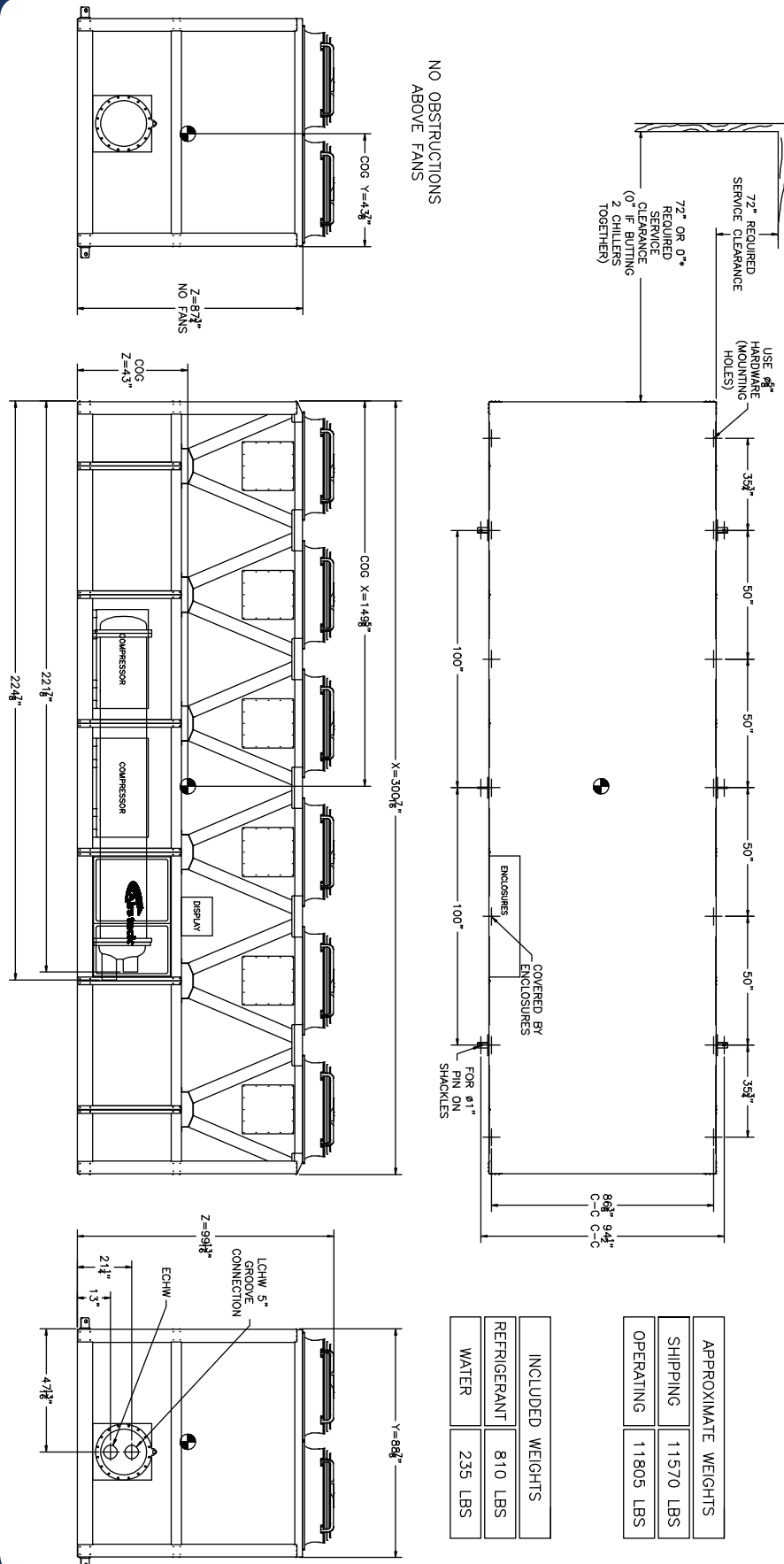


NO OBSTRUCTIONS ABOVE FANS

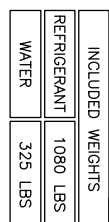
INCLUDED WEIGHTS	
REFRIGERANT	810 LBS
WATER	235 LBS

APPROXIMATE WEIGHTS	
SHIPPING	11570 LBS
OPERATING	11805 LBS

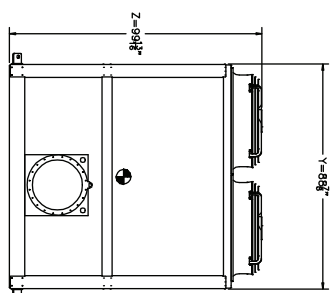
# CHILLER OPTION: ASP150F / ASP190F, RH CONNECTIONS



NO OBSTRUCTIONS  
ABOVE FANS

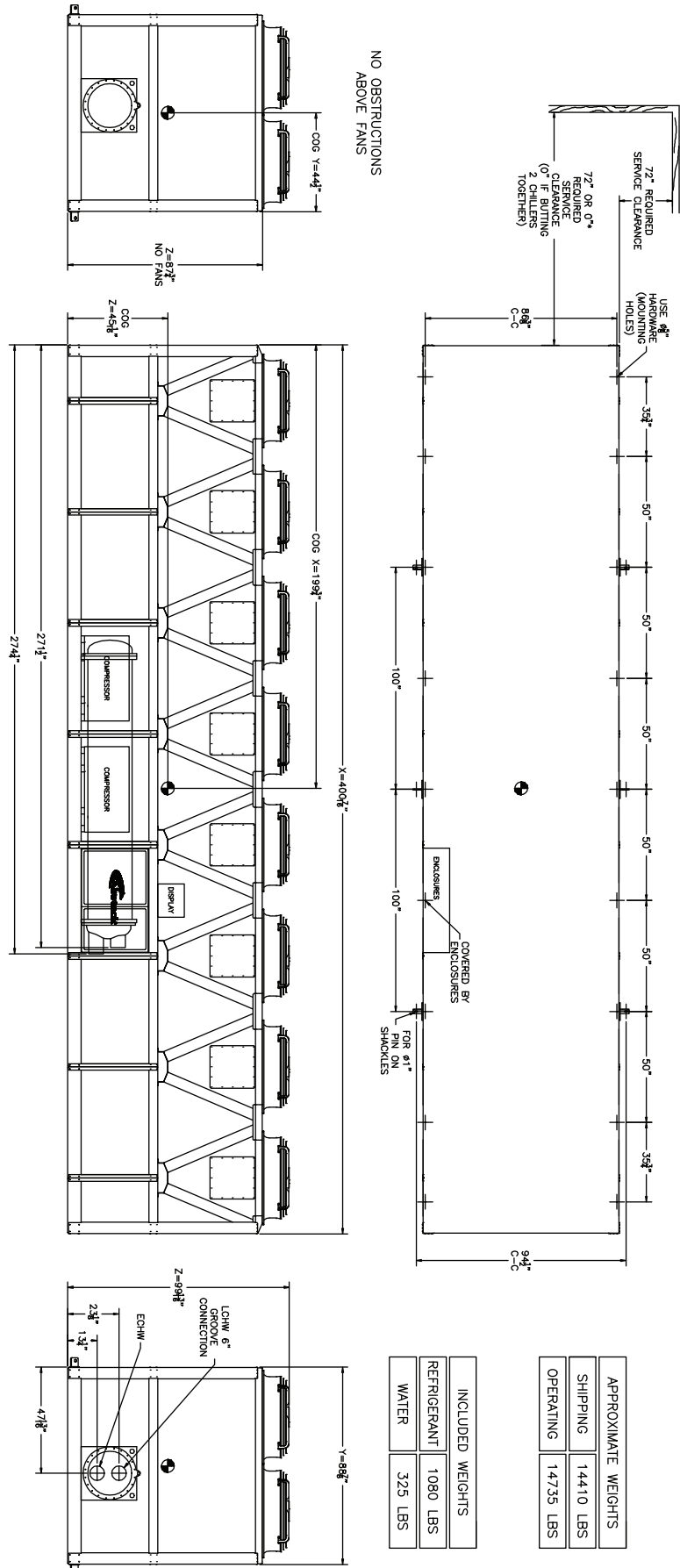


APPROXIMATE WEIGHTS	
SHIPPING	14410 LBS
OPERATING	14735 LBS





# CHILLER OPTION: ASP200F/ASP250, RH CONNECTIONS



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Electrical Data 460-60-3				
	MCA	MOP	Comp RLA	Fan FLA
ASP075F	169	225	110 (1 comp)	5.2 (6 fans)
ASP095F	202	250	136 (1 comp)	5.2 (6 fans)
ASP100F	223	300	145 (1 comp)	5.2 (8 fans)
ASP120F	257	300	172 (1 comp)	5.2 (8 fans)
ASP125F	248	300	87 (2 comp)	5.2 (10fans)
ASP150F	310	400	110 (2 comp)	5.2 (12 fans)
ASP160F	311	400	115 (2 comp)	5.2 (10fans)
ASP190F	369	500	136 (2 comp)	5.2 (12 fans)
ASP200F	410	500	145 (2 comp)	5.2 (16 fans)
ASP250F	471	600	172 (2 comp)	5.2 (16 fans)
ASP225/ 300F	536	600	136 (3 comp)	5.2 (16 fans)

Sound Pressure Levels for Air cooled MagLev Flooded Chillers					
Octave Band Center Frequency (Hz)	ASP075F/ ASP095F	ASP100F/ ASP120F	ASP125F/ ASP160F	ASP150F/ ASP190F	ASP200F/ ASP250F
Sound Pressure Level, dB at 30 ft					
63	67	68	69	70	71
125	76	77	78	79	80
250	72	73	74	75	76
500	68	69	70	71	72
1000	68	69	70	71	72
2000	63	64	65	66	67
4000	62	62	63	65	65
8000	60	60	61	63	63
Total dBA	72	73	74	75	76

## Notes:

1. Octave band sound pressure levels are linear (un-weighted), total is A-weighted.
2. 30 ft is measured from the side of the chiller.

## Section 15400 Mechanical Water Chiller Air Cooled Multistack® Maglev™ Centrifugal Chiller

### **PART 1- GENERAL**

#### **1.01 SUMMARY**

Section includes design, performance criteria, refrigerants, controls, and installation requirements for Multistack air cooled centrifugal chillers.

#### **1.02 REFERENCES**

Comply with the following codes and standards: (as adopted by each individual State)

ARI 550/590

ANSI/ASHRAE 15

ASME Section VIII

NEC

ETL

CE

CSA

OSHA

#### **1.03 SUBMITTALS**

Submittals shall include the following:

- 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 points of connection 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 to job specific requirements, prior to shipment. Report available upon request.

#### **1.05 DELIVERY and HANDLING**

- A. Chiller(s) shall be delivered to the job site completely assembled and charged with complete refrigerant charge.
- B. Installing contractor to comply with the manufacturer's instructions for transporting, rigging, and assembly of chiller.

#### **1.06 WARRANTY AND START-UP**

- A. 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. After start-up a Manufacturer's Representative shall provide a minimum of 8-hours of operator training to the owner's designated representative(s).

#### **1.07 MAINTENANCE**

- A. Maintenance of the chiller shall be the sole responsibility of the owner.

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## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. Multistack LLC
- B. (Approved Equal)

### 2.02 PRODUCT DESCRIPTION

- A. Provide and install as shown on the plans a factory assembled, charged, and run tested, air cooled packaged chiller.
- B. Each unit shall include: One MagLev™, oil-free, magnetic bearing, variable speed two stage centrifugal compressor equipped with inlet guide vanes and load balance valve. Compressor to utilize its integrated variable speed drive in conjunction with the compressors inlet guide vanes and load balancing valve, to optimize the chillers part load efficiency.
- C. The chillers evaporator, condenser, and electronic expansion valves shall be common to the compressor. The chiller shall operate with (1) one refrigerant circuit.
- D. Chiller shall utilize R-134A refrigerant only.

### 2.03 DESIGN REQUIREMENTS

- A. Provide a complete factory assembled air cooled, oil free centrifugal chiller equipped with a MagLev™ compressor as specified herein. Chiller to be built in accordance to the standards defined in Section 1.02 of this specification.
- B. Chiller to utilize the following compressor arrangement for the specified nominal tonnages: 60 thru 100 tons- One MagLev compressor
- C. Each chiller shall be equipped with the following: One (1) flooded evaporator heat exchanger, one (1) air cooled condenser equipped with high efficiency ECM condenser fan motors, one (1) or more MagLev™ Compressors (refer to section 2.03 B) with integrated variable speed drive, soft start, magnetic bearings, and inlet guide vanes, one (1) or more electronic expansion valves, one (1) liquid level refrigerant sensor, one (1) load balance valve per compressor, one (1) master chiller control with necessary operating controls and system safeties, with all mechanical pressure safeties to be located at each individual compressor.
- D. Chiller Performance: Refer to performance schedule on the job specific drawings.
- E. Acoustics: Sound data shall be measured in accordance with AHRI 370 Standard. Unit sound performance data shall be measured at the highest level recorded at all load points. Unit sound performance shall not exceed a level of 100 dBA (total).
- F. Electrical: Chiller shall feature single-point power connection not utilizing adjoining power cabinets as pull boxes.
- G. Minimum Operating Conditions: Lowest evaporator saturated suction temperature shall not be below 34°F. Lowest leaving chilled water temperature shall not be below 38°F. Lowest standard ambient temperature shall not drop below 20°F without the use of optional low ambient kit.
- H. Maximum Operating Conditions: The highest leaving chilled water temperature shall not be above 60°F. Chiller shall be capable of operating at up to 110°F ambient temperature.

### 2.04 CHILLER COMPONENTS

- A. Compressor:
  - 1. Chiller to have one MagLev™, magnetic bearing, oil-free, two-stage, hermetical centrifugal compressor. Compressor to contain integrated variable speed drive with soft start and movable inlet guide vane assembly.
  - 2. Compressor to be microprocessor controlled. Compressor to be networked to master controller via Etherbus connection with a refresh rate of 50 microseconds and the micro processor of the compressor to control the variable speed drive and inlet guide vanes on the compressor to maximize unit efficiency.
  - 3. The compressor shall be capable of coming to a controlled safe stop in the event of a power outage. Unit shall be capable of auto restart in the event of a power outage, once power has been restored.
  - 4. The compressor is required to be mechanically and electrically isolated to facilitate proper maintenance, service, and or removal.
- B. Refrigerant, Evaporator and Condenser:
  - 1. All heat exchangers to be built in accordance to Section VIII of the ASME code and carry a manufacturer's name plate certifying ASME compliance.
  - 2. The evaporator is to be of shell and tube construction. Evaporator to be constructed of a single shell. Evaporator to be of flooded type with refrigerant surrounding the tubes and water passing through the tubes. Tubes to be enhanced and rifled. Internal intermediate tube supports, liquid eliminator baffle plate, pressure relief vent, water drains and vents required. Pressure relief to be spring loaded self seating type in accordance to ASHRAE 15 standard. Evaporator to be pressure tested at a test pressure of 1.1 times the operating pressure however no less than 100 PSIG. Evaporator, water boxes, suction piping, and any other component subject to condensate shall be insulated with a UL recognized ¾ inch or 1 ½" closed cell insulation. All joints and seams to be sealed so a vapor barrier is created. Factory mounted differential pressure transmitters required for flow safety. Paddle flow switches are not acceptable. Heat Exchangers to feature enhanced and rifled individual tubes. Tubes shall be individually replaceable. Tubes shall be mechanically rolled into steel tube sheets and sealed with Loctite® or equivalent sealant. Waterside to be designed to a minimum of 150 psig or 300 psig, whichever is specified. Piping connections to be either mechanical grooved connection or flange, whichever is specified. Evaporator tubes shall be serviceable without removing water connections when an even number of passes is specified.

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3. The condenser shall be of aluminum fin with copper tubes. Condenser to be constructed in a "V" configuration. Condensers to be equipped with no fewer than six (6) and no greater than eight (8) ECM type condenser fan motor assemblies. Motors shall incorporate integrated active temperature management to ensure motor protection. Blades shall be of aluminum construction. Fans must be designed to ensure proper acoustical and energy performance.
  4. Refrigerant Control: Chiller to feature one (1) electronic expansion valve. Fixed orifice and float controls are not acceptable. The electronic expansion valve shall operate from minimum chiller capacity to the full load of the chiller's capacity. A low side refrigerant level sensor, constructed out of stainless steel, with a stainless steel canister with sight glass is to be used to provide feedback to the expansion valves for proper control. This ensures that a proper liquid seal is always present on the compressors power electronics. A refrigerant sight glass is required on the main liquid line feeding the electronic expansion valves. Isolation valves before and after the EXV required for proper service without removing the entire refrigerant charge.
- C. Compressor:
1. The prime mover shall be of sufficient size to effectively meet the compressor horsepower requirements. Prime mover shall be one liquid refrigerant cooled, hermetically sealed, permanent magnet synchronous motor. Motor shall be controlled by variable speed drive. Motor shall utilize soft start capabilities with an inrush current no greater than two (2) amps. Motor shall have internal thermal overload protection devices embedded in the winding of each phase of the motor.
- D. Variable Speed Drive:
1. The chiller shall be equipped with a variable speed drive. Please refer to section 2.03 B for compressor requirements. The variable speed drive to utilize Insulated Gate Bi-Polar Transistors. Variable speed drive to create it's own simulated AC voltage for the motor connected to it. Acceptable applied voltages are: 400 Volt 50 hertz, 460 Volt 60 hertz.
  2. Variable Speed drive in conjunction with the compressors inlet guide vanes will be controlled via compressor microprocessor to optimally match the lift and load requirements.
  3. The compressor circuit is required to have a line reactor and circuit breaker.

E. Chiller Controls:

The unit shall feature an industrial grade CPU with an Intel-based processor. Processor must compute at a processing speed of 1 Ghz or faster with a minimum of 1 GB of Ram, 2 GB solid state drive capacity with internal battery backup/UPS. All chiller and compressor I/O to be controlled via Etherbus with an update rate of 50 microseconds. Controller to have a minimum of 5.7 inch touch screen interface that can be disconnected and chillers still runs properly. Controller to use proprietary control logic to optimize loading, unloading, and control of multiple MagLev compressors. User shall operate chiller via HMI located on touch screen or remote web connection. All system parameters, compressor status, alarms, and faults, trend graphing, fault logging, BAS communication window, manuals, wiring diagrams, log book, and control set points shall be viewable. Shall be able to fully commission and adjust all components on the chiller, including the compressors without an auxiliary computer or software.

The chiller controller shall include the following features:

Hardware

Two EXV Outputs  
 Twelve Digital Inputs  
 Twelve Digital Outputs  
 Four Analog Inputs  
 Four Analog Outputs (0-10 VDC)  
 Four Temperature Inputs

- Windows-based industrial PC featuring Intel Processor for maximum reliability and performance. 1 Ghz minimum processor speed with 1 GB of RAM minimum. Built in battery back-up and UPS are standard.
- Solid State drives for maximum reliability and redundancy. Hard drives feature no moving parts to ensure nothing mechanically fails. With dual-hard drives there is no need to partition a single drive. One drive handles the operating system while the other handles all data acquisition to ensure no data is corrupted.
- DC Powered to ensure maximum resistance to EMI and RFI noise.
- Built in 2-port Ethernet Switch for easy integration to BAS interface and web control feature.
- Features industrial-style battery back-up in the event of a power outage.
- On board USB drives to support external peripheral devices including, keyboard, mouse, and printer.
- 5.7" TFT Display featuring 640X 480 Resolution.
- All hardware, including I/O is CE and UL Certified.
- I/O features modular design to simplify troubleshooting and or replacement if required.
- I/O has LED Indicators for all inputs and outputs to ease the troubleshooting process.
- I/O can be directly connected to without the use of terminal blocks.
- All wiring utilizes spring capture technology to prevent loose connections or wires from falling out.
- Dedicated Ethernet communication at a communication rate of 50 microseconds to all compressors and I/O.
- MagLev hubs feature dedicated inputs for high pressure switch, low pressure switch, dedicated compressor interlocks, and dedicated compressor communications. This allows for each compressor to be handled independently by itself without affecting the rest of the system.

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Software

- Controller shall control one (1) refrigerant circuit.
- HMI interface is user definable including: points list, tag names, and functions without special software. With this feature, end user can scale on all inputs and outputs, change what controls it, change the functionality, the name of it etc.
- Control system can be field reconfigured through HMI to remap I/O to change functionality on the fly. This allows for customized integration into the end users system.
- Control system can trend graph up to two (2) years of data, without overwriting or decreasing data acquisition time.
- Control System features easy to use web interface. This allows the user to do anything remotely that could be done on site.
- Advanced trend graphing available on the market. Over 100 data points are recorded in five (5) second intervals. Data can be analyzed with zoom feature. Data stored on separate 32 GB drive. Trend graph images can be exported. Trend graphs can be exported to CSV files as well.
- Advanced Fault Logging featuring calendar capability for ease of use. Data can be recalled up to two (2) years. Data can be sorted by alarm type, time stamp, or compressor.
- Color coded data: Green data means good, yellow means alarm, red means fault or off.
- Controller logs when user makes any type of change.
- Controller has onboard maintenance log to store system information.
- Controller offers real time capacity and efficiency data.

Native BAS Interfaces included with controller are:

- Modbus RTU
- Modbus TCP/IP

Optional BAS Interfaces thru interface module include:

- BAC Net IP
- BACNET MSTP
- Lonworks
- BAS interface dashboard shown on HMI. This allows the user to view what data is being written to the BAS system. Also shows if there is an error, last com, and how many times the data was sent or received.
- Control system uses proprietary optimization logic to perform accurate energy balance on all systems for maximum system performance.
- Control System features an optimum start function to ensure initial lift is always made. This prevents nuisance check valve flutter and compressor faults.

**E. Chiller Power**

1. Chiller shall have a unit mounted through the door disconnect. Chiller shall also include a master breaker.
2. Unit shall also have through the door disconnects for the compressor and for the fans. This will allow power to be separately shut off to either or both components without the need to open the access door.
3. All enclosures shall be built to NEMA 3R specifications, ETL listed, fully vented, louvered and feature cooling fans controlled by FlexSys Lite for maximum energy efficiency.

**2.05 OPTIONS**

The following items are optional and available upon request:

Heat Exchangers:

- Heat exchanger designed for 300 PSI
- Epoxy Coating
  - Tube Sheets
  - Heads
- Insulation
  - 1 ½ Closed Cell Foam
  - Metal Jacketed Insulation
- Multiple pass configurations to meet water side design criteria

Electrical:

- Dual point of electrical connection
- EMI noise filtration to meet IEE 519 standards

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Controls:

- LONWORKS

Warranties:

- Compressor warranties available by request.
- Chiller extended and labor warranties available by request.

Other:

- Lifting Frame
- Vibration Isolation
- Seismic Isolation

## PART 3- EXECUTION

### 3.01 INSTALLATION

- Chiller must be installed per all of the manufacturer's documentation. This includes: IOM Manual, Submittal documentation, CAD Drawings, other.
- All local structural codes must be observed. Chiller to be mounted and aligned on chiller pad or mounting rails as specified on CAD drawings.
- All local plumbing codes must be observed. Piping must be run in such a way that the proper required clearances for head removal for tube cleaning are observed.
- All National and Local Electrical codes must be observed. Installation of the electrical on the chiller must follow the associated documentation from the chiller manufacturer. Electrical installation shall be coordinated with electrical contractor.
- All National and Local Electrical codes must be observed. Controls installation shall be coordinated with the controls contractor.
- Provide all material required for a fully operational and functional chiller.

### 3.02 START-UP

- Units shall be factory charged with R-134A refrigerant.
- Factory Start-Up Services: An authorized factory start-up agent is required.
- During the start up period, the factory authorized agent will instruct the owner's representative on proper care and operation of the chiller.

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# Originators. Innovators. Never the Imitators.<sup>SM</sup>

## 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<sup>™</sup> compressor technology, and the first modular chiller to utilize R-134a.

## 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<sup>®</sup>.



# MULTISTACK<sup>®</sup>

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

Phone 608-366-2400 • Fax 608-366-2450

[www.multistack.com](http://www.multistack.com)



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