DUNHAM-BUSH®

*Products That Perform...By People Who Care*

Form No: MS0464A

# Air Cooled Horizontal Rotary Screw Chillers

## ACHDX Series

## R22
## R407C

## 225 to 415 Tons

60Hz

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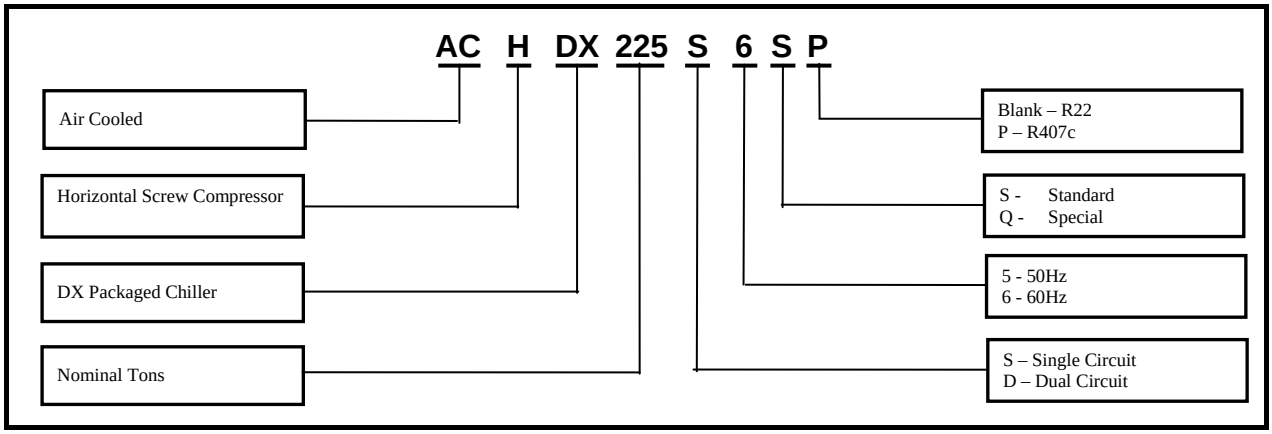
# NOMENCLATURE




# STANDARD FEATURES

## Size Range

☆12 models from 225 to 415 tons.
☆Standard version available.
☆Rated with either HCFC R22 or HFC R407c.

## Compressor

☆Semi-hermetic rotary screw type at 3550 RPM.
☆Infinite variable slide valve unloading for precise load matching.
☆Compressor cycling for maximum efficiency.

## Evaporator

☆Vessels constructed in accordance to ASME CODES Sections Vlll Division I for unfired pressure vessels.
☆Dunham-Bush high efficiency inner-fin tubes design for compactness and weight reduction.
☆300 psig on refrigerant side design pressure.
☆200 psig on water side design pressure.
☆Approval Stamp available from JKKP (Malaysia), UDT (Poland), BPA, China State Bureau of Quality and Technical Supervision of the People's Republic of China and ASME.
☆1" thick PE foam closed cell insulation.

## Air Side Condenser

☆Inner ridged copper tubes with aluminum fins.
☆450 psig test pressure for condenser coils.
☆Standard unit fans- direct drive at 1140 RPM
☆All fan motors are designed for outdoor installations.
☆Fan cycling is standard for all units. Fan speed control is an option for low ambient application.
☆Copper, hydrophilic and electro-tined coil are available options.

## Electrical/Control

☆Reliable Multi-function programmable electronic controller is standard for all models.
☆3 digits LED display with decimal point and sign.
☆Compressor loading/ staging based on leaving fluid temperature.
☆High and low pressure protection.
☆Cooler fluid freeze protection.
☆Staggered starting compressors.
☆Anti recycle timing.
☆Fan cycling.
☆Accept remote and stop signal.
☆Cooler leaving fluid temperature.
☆Discharge and suction pressure gauges for all circuits.
☆115V control circuit transformer standard for all models.

# UNIT FEATURES: EVAPORATORS

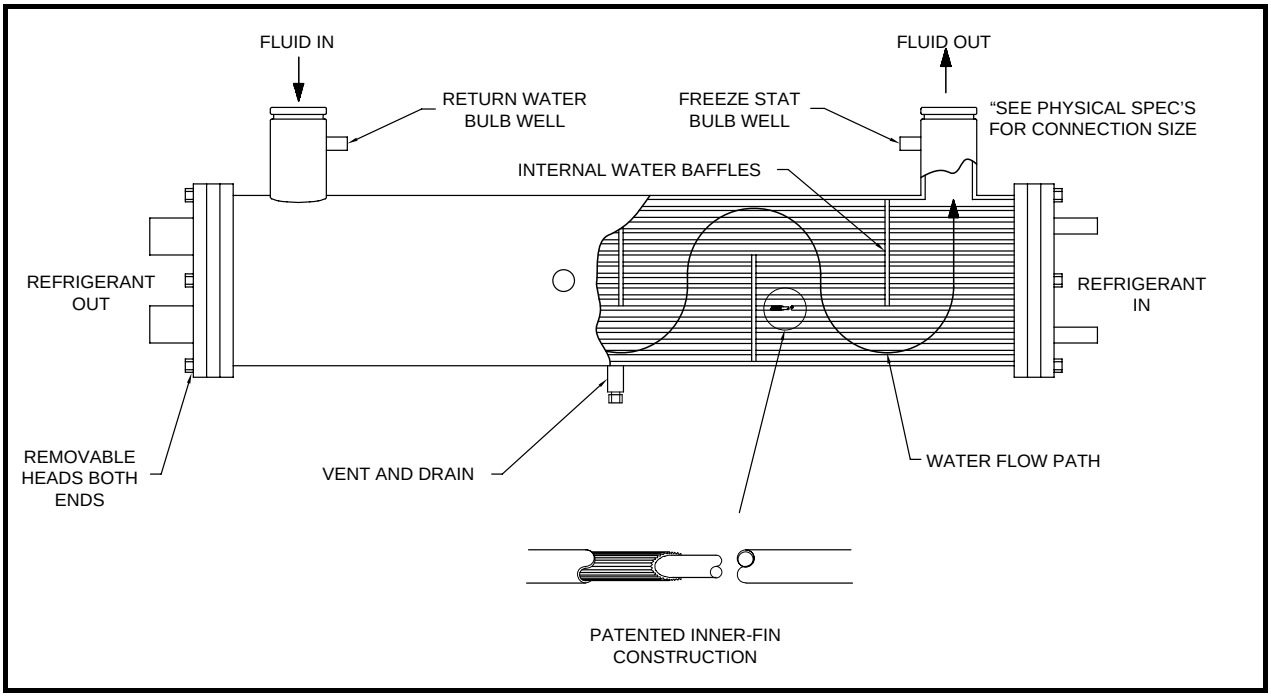
The evaporators incorporate the most advanced vessel technology available today, including the patented Inner-Finned construction of the CH and EX evaporators. Vessels are designed and constructed to meet the requirements of the ASME Code, Section Vlll, Division 1 for unfired pressure vessels and are approved and certified by the JKKP (the Malaysian DOSH), as well as the Polish and the Chinese authorities.

The CH evaporators incorporate 1/2 inch (12.7 mm) copper tubes brazed into tube-sheets. The vessel is supplied with welded heads.

The EX evaporators incorporate 5/8 inch (15.9mm) copper tubes and removable heads for ease of tube maintenance.

Vent and drain connections are included on all vessels.

### Typical For 2 Circuit Evaporators




### Table 1 : Vessel Design Pressure

| Shell & Tube Heat Exchanger (Evaporator) | Water Side | | Refrigerant Side | |
|---|---|---|---|---|
| | Design Pressure (Psig)(Kpa) | Test Pressure (Psig)(Kpa) | Design Pressure (Psig)(Kpa) | Test Pressure (Psig)(Kpa) |
| CH, EX | 200 (1379) | 260 (1793) | 300 (2069) | 330 (2275) |

## Air Side Condenser

All units have direct driven propeller fans and motors. Close blade tip clearance with the fan venturi ensures smooth, quiet operation.

All air-cooled condensers are constructed with 3/8 inch (9.5 mm) diameter copper tubes mechanically expanded into aluminum fins for maximum efficiency of heat transfer between the circulating refrigerant and air. The fins have full-spacing collars which completely cover each tube. The staggered tube design improves the thermal efficiency of the coil and eliminates bypassing of air around the tubes. The return bends, headers and nipples are all copper, sized for minimum pressure drop, brazed with inert gas in the tubes and tested after fabrication to 450 psig.

Partitions separate each fan section to eliminate possible back spin. The controller Vision 2020i fan cycling control is able to decrease the minimum ambient temperature at which the package equipment will effectively start and operate.

All unit casing is constructed with heavy-gauge galvanized steel sheets. Powder-coat painting is applied for maximum protection and appearance.

# UNIT FEATURES: ADVANCED CONTROLLER


Vision 2020i a flexible and advance programmable electronic controller designed specifically for the applications and precise control of Dunham-Bush Rotary Screw compressor chillers.

The controller board is provided with a set of terminals that connected to various devices such as temperature sensors, pressure and current transducers, solenoid valves, compressors and fans contactors, control relays and etc. Three sizes of controller boards are provided to handle different number of input and output requirements: DB3-S small board, DB3-M medium board and DB3-L large board.

The unit algorithm program and operating parameters are stored in FLASH-MEMORY that does not require a back-up battery. The program can be loaded through PC or programming key.

Vision2020i controller is equipped with a user friendly terminal with a semi-graphic display and dedicated keys that provides easy access to the unit operating conditions, control set points and alarm history.

Each unit's controller can be configured and connected to the local DBLAN network that allows multiple units sequencing control without additional hardware. The DBLAN is local area network made up of several chillers' controller.

## Display and User Terminal

Vision 2020i controller is design to work with a user friendly back-lit 132 by 64 pixels DBG1 semi-graphic Display panel connected with controller through telephone cable. The terminal allows carrying out all program operations. The user terminal allows displaying the unit working conditions, compressor run times, alarm history and modifying the parameters. The display also has an automatically self-test of the controller on system start-up. Multiple messages will be displayed by automatically scrolling from each message to the next. All of these messages are spelled out in English language on the display terminal.

There are 15 dedicated buttons enable user to access information, base on the security level of the password. For more detail operation of the DBG1 Display Terminal, please refer to the Unit Operation Manual.

☆Easily accessible measurements include:
☆Leaving chilled water temperature
☆Leaving chiller water temperature derivative
☆Evaporator Pressure
☆Condenser Pressure
☆Compressor amp draw of each compressor
☆Compressor elapsed run time of each compressor
☆Compressor starts status
☆Oil level sensor status
☆Water temperature reset value
☆Water flow switch status
☆External start/stop command status

Optional entering chilled water temperature, leaving and entering condenser water temperature are available. With this option the operator can quickly and accurately read all significant water temperatures and eliminate the need for often-inaccurate thermometers. Voltage readout is also offered as an optional feature.

## Capacity Control

Leaving chilled water temperature control is accomplished by entering the water temperature setpoint and placing the controller in automatic control. The unit will monitor all control functions and move the slide valve to the required operating position. The compressor ramp (loading) cycle is programmable and may be set for specific building requirements. Remote adjustment of the leaving chilled water setpoint is accomplished through either direct connection of other Dunham-Bush control packages to the controller through either the RS485 long distance differential communications port, via terminal or modem connected to the RS232 communication port, or from an external Building Automation System supplying a simple 4 to 20mA signal. Remote reset of compressor current limit may be accomplished in a similar fashion.

## System Control

The unit may be started or stopped manually, or through the use of an external signal from a Building Automation System. In addition, the controller may be programmed with seven-day operating cycle or other Dunham-Bush control packages may start and stop the system through inter-connecting wiring.

# UNIT FEATURES: ADVANCED CONTROLLER

## System Protection

The following system protection controls will automatically act to insure system reliability:

- ☆Low suction pressure
- ☆High discharge pressure
- ☆Freeze protection
- ☆Low differential pressure
- ☆Low oil level
- ☆Compressor run error
- ☆Power loss
- ☆Chilled water flow loss
- ☆Sensor error
- ☆Compressor over current
- ☆Compressor Anti-recycle

The controller can retains up to 99 alarm conditions complete with time of failure together data stamping on critical sensor readings in an alarm history. This tool will aid service technicians in troubleshooting tasks enabling downtime and nuisance trip-outs to be minimized.

## Remote Monitoring

Vision 2020i controller can be completed with an optional RS485 communications card and NETVISOR software for remote monitoring and controlled from a PC terminal and optional phone modem.

With various optional add-on cards the Vision2020i controller can also be interfaced directly to the Building Management System (BMS) with the standard communication protocols using MODBUS, LONWORKS, BACNET MSTP as well as over IP.

This sophisticated feature makes servicing easier and more convenient to the system. The controller as standard is additionally equipped with history files which may be used to take logs which may be retrieved via the phone modem or internet connection periodically. Now owners of multiple buildings have a simple and inexpensive method of investigating potential problems quickly and in a highly cost effective manner.

# UNIT OPTIONS

## Options Installed At The Factory

- ☆Controller (Vision 2020i) - A standard feature for all models.
- ☆Controller monitoring of return chilled water and leaving chilled water temperature.
- ☆Heat reclaim condensers (desuperheaters) are available for special applications.
- ☆Unit mounted disconnect for each compressor and control circuit with fuses and fuse block for 400 to 575 volt applications.
- ☆Copper Condenser Fins- Copper fins offer maximum corrosion protection for severe conditions. In more corrosive environments, hydrophilic or electro-tinned fins would be more appropriate.
- ☆Indicator Light Set - Provides indicator lights for control power, motor overload, high motor temperature and alarm status.
- ☆Hot Gas Bypass - Consists of hot gas bypass regulator(s) and solenoid valve(s) for each circuit for applications with a minimum load which may dip below the unit's minimum unloaded capacity.
- ☆Control Circuit Transformer - appropriate KVA rating to power the 115/1/60 control circuit and compressor oil heaters off the service voltage.
- ☆Chiller Heater Transformer - Appropriate KVA rating to power the 115/1/60 evaporator vessel heater tape.
- ☆115V Convenience Outlet - Duplex outlet located inside the control panel and protected by a 15 amp fuse.
- ☆Over/Undervoltage and Phase Protection Relay - Protects against low or high incoming voltage conditions as well as phase loss, phase reversal and phase imbalance by opening the control circuit. It is an automatic reset device.
- ☆Electronic Expansion Valves - For more precise control over a wider range of operation. Ideal for low ambient and wide operating ambient temperature range applications.
- ☆Gauges - Includes suction and discharge pressure gauges for all unit models. These are not necessary with the controller.
- ☆Low Ambient Controls (LAC option) [Kindly refer to Low Ambient Operation/ Freeze Protection].
- ☆Compressor Start Counter - One start counter provided for each compressor, located inside the control panel.
- ☆Compressor Elapsed Time Meter - One elapsed time meter to register run hours per compressor, located inside the control panel.
- ☆Three Phase Ammeter - Single analog ammeter with a 3 phase selector switch for indication, located inside the control panel.
- ☆Three Phase Voltmeter - Single analog voltmeter installed with a 3 phase selector switch for indication, located inside the control panel.
- ☆Entering Fluid Temperature Sensor - Temperature sensor and bulb installed in evaporator inlet connection to supplement the standard leaving (outlet) fluid temperature sensor.
- ☆Condenser coil guard protects the condenser coils from harsh environments.

# UNIT ACCESSORIES

## Accessories shipped unmounted

☆Water Flow Switch - Paddle type field adjustable flow switch available for all units, installed into the unit safety circuit so that the package will remain off until there is water flow. Helps to prevent evaporator from freezing. Vapor-proof enclosure, for use on water or glycol systems. The flow switch is to be shipped loose and installed at site.

☆Rubber-in-shear Isolators - Designed for ease of installation, these rubber, one-piece, molded isolators are applicable for most installations.

☆Spring Isolators - These housed spring assemblies have a neoprene friction pad at the bottom to prevent the passage of noise, and a spring locking levering bolt at the top. Neoprene inserts prevent contact between the steel upper and lower housings. Suitable for more critical applications as compared to rubber-in-shear isolators.

# APPLICATION DATA

## Low Ambient Operation / Freeze Protection

The heater strip must be wrapped around the evaporator shell as well as the water piping. If the unit is required to operate at an ambient temperature below 55°F (12.8°C), solenoid valves would have to be installed along the coil headers with the exception of the last running coil. If the unit is required to operate below 32°F (0°C). Both the solenoid coil control and VFD would have to be incorporated. An additional liquid receiver, wrapped with the heater strip, would have to be added for each refrigerant circuit if the required operating ambient temperature ranges between 0°F (-17.8°C) and 20°F (-6.7°C). In addition to the accessories mentioned, an additional electronic expansion valve is required for each refrigerant circuit if the operating ambient goes below 0°F (-17.8°C). Condenser pressure regulators would have to be incorporated as well to regulate the head pressure. The minimum operating ambient temperature is -20°F (-28.9°C). For low ambient applications, kindly consult factory as the unit would have to be redesigned to suit the customer's specific needs.

## Desuperheaters

A hot gas desuperheater can be factory supplied for field installation. Tees in refrigerant lines with shut off valves can be supplied. Kindly consult factory for further details.

## Water Circuit

Constant water flow required with a minimum of 3 gallons per ton ( 3.3 liters / kWo ) increasing to 10 gallons (11 liters) for process, low load applications with small temperature range and/or vastly fluctuating load conditions.

## Glycol Freeze Protection

If the chiller or fluid piping may be exposed to temperatures below freezing temperature, then glycol protection is recommended. The recommended protection is 15°F (8.3°C) below the minimum ambient temperature. Use only glycol solutions approved for the particular heat exchanger duty. The use of automotive anti-freeze is not recommended because they have short-lived inhibitors and fouling of the vessels will occur. If the equipment is exposed to freezing temperatures and not in used, the vessels and piping should be drained.

If the equipment is being used for operating conditions below 42°F (5.5°C) with standard vessels or below 40°F (4.4°C) with optional 40°F (4.4°C) vessels, glycol should be used to prevent damage due to freezing. The freeze protection level should be 20°F (11°C) lower than the leaving brine temperature. The use of glycol penalizes the causes a performance as shown in for ethylene glycol and propylene glycol and needs to be considered in the unit selection procedure.

## Ethylene Glycol

| % E. G. By Weight | Freeze Point | | C1 Capacity Factor | K1 kW Rate | G1 Flow Factor | P1 P.D. Factor |
|---|---|---|---|---|---|---|
| | °F | °C | | | | |
| **10** | 26.2 | -3.2 | 0.995 | 0.998 | 1.019 | 1.050 |
| **15** | 22.4 | -5.3 | 0.991 | 0.997 | 1.030 | 1.083 |
| **20** | 17.8 | -7.9 | 0.988 | 0.996 | 1.044 | 1.121 |
| **25** | 12.6 | -10.8 | 0.984 | 0.995 | 1.060 | 1.170 |
| **30** | 6.7 | -14.1 | 0.981 | 0.994 | 1.077 | 1.219 |
| **35** | 0.0 | -17.8 | 0.977 | 0.992 | 1.097 | 1.275 |
| **40** | -8.0 | -25.8 | 0.973 | 0.991 | 1.116 | 1.331 |
| **45** | -17.5 | -27.5 | 0.968 | 0.990 | 1.138 | 1.398 |
| **50** | -28.9 | -33.8 | 0.964 | 0.989 | 1.161 | 1.466 |

## Propylene Glycol

| % P. G. By Weight | Freeze Point | | C2 Capacity Factor | K2 kW Rate | G2 Flow Factor | P2 P.D. Factor |
|---|---|---|---|---|---|---|
| | °F | °C | | | | |
| **10** | 26.1 | -3.3 | 0.988 | 0.994 | 1.005 | 1.019 |
| **15** | 22.8 | -5.1 | 0.984 | 0.992 | 1.008 | 1.031 |
| **20** | 19.1 | -7.2 | 0.978 | 0.990 | 1.010 | 1.051 |
| **25** | 14.5 | -9.7 | 0.970 | 0.988 | 1.015 | 1.081 |
| **30** | 8.9 | -12.8 | 0.962 | 0.986 | 1.021 | 1.120 |
| **35** | 2.1 | -16.6 | 0.952 | 0.981 | 1.033 | 1.163 |
| **40** | -6.4 | -21.3 | 0.943 | 0.978 | 1.043 | 1.213 |
| **45** | -16.6 | -27.0 | 0.933 | 0.975 | 1.057 | 1.269 |
| **50** | -28.9 | -33.8 | 0.924 | 0.972 | 1.073 | 1.326 |

## Correction Factor - Elevation

| Election Above Sea Level | | Capacity Correction Factor | kW Correction Factor |
|---|---|---|---|
| Feet | Meters Factor | | |
| 0 | 0 | 1.00 | 1.00 |
| 2000 | 600 | 0.99 | 1.01 |
| 4000 | 1200 | 0.98 | 1.02 |
| 6000 | 1800 | 0.97 | 1.03 |

## Correction Factor - FF

| Fouling Factor | | Capacity Correction Factor | kW Correction Factor |
|---|---|---|---|
| hr-ft. - °F/BTU | m² °C kw | | |
| 0.00010 | 0.018 | 1.000 | 1.000 |
| 0.00025 | 0.044 | 0.993 | 0.997 |
| 0.00050 | 0.088 | 0.978 | 0.990 |
| 0.00100 | 0.176 | 0.951 | 0.978 |

# PHYSICAL SPECIFICATIONS

## R22

| MODEL ACHDX | | 235S-6S | 255S-6S | 285D-6S | 325D-6S | 365D-6S | 415D-6S |
|---|---|---|---|---|---|---|---|
| **COMPRESSOR** | | | | | | | |
| **MODEL (QTY)** | | HSC 1816 x 1 | HSC 1817 x 1 | HSC 1711 x 2 | HSC 1811 x 2 | HSC 1813 x 2 | HSC 1813 x 1, HSC 1816 x 1 |
| **RPM** | | 3550 | 3550 | 3550 | 3550 | 3550 | 3550 |
| **NOMINAL CAPACITY** | **TR** | 236 | 255 | 283 | 324 | 366 | 416 |
| **MIN. % UNIT CAPACITY REDUCTION** | | 25% | 25% | 12.5% | 12.5% | 12.5% | 12.5% |
| **EVAPORATOR** | | | | | | | |
| **MODEL (QTY)** | | XFQ12d | XFR14e | XFR14f | XFR14f | XFS14f | XFS14f |
| **WATER CONNECTOR** | **INCH[MM]** | 10[254] | 10[254] | 10[254] | 10[254] | 10[254] | 10[254] |
| **NOM. WATER FLOW / P D** | **GPM / FT IN WG** | 565.9/13.8 | 613.0/6.4 | 679.1/11.4 | 777.5/14.5 | 879.4/19.7 | 998.4/24.6 |
| **MIN/ MAX WATER FLOW** | **GPM** | 299.1/892.6 | 389.5/1158.4 | 311.4/926.5 | 311.4/926.5 | 338.8/1014.0 | 340.0/1015.2 |
| **MIN/ MAX WATER PD** | **FT IN WG** | 4.5/31.0 | 2.8/19.7 | 2.9/19.8 | 2.9/19.8 | 3.7/25.32 | 3.7/25.4 |
| **CONDENSER** | | | | | | | |
| **COIL ROWS DEEP/ TOTAL FA (SQ.FT)** | | 3/329.4 | 4/329.4 | 4/376.4 | 4/423.5 | 4/423.5 | 3/256.6, 3/385 |
| **NO. OF FAN** | | 14 | 14 | 16 | 18 | 18 | 20 |
| **FAN DIA. (QTY)** | **MM** | 800(14) | 800(14) | 800(16) | 800(18) | 860(18) | 860(20) |
| **MOTOR KWi (QTY)** | | 2.0(14) | 2.0(14) | 2.0(16) | 2.0(18) | 3.0(18) | 3.0(20) |
| **FLA, AMP (QTY)** | | 3.8(14) | 3.8(14) | 3.8(16) | 3.8(18) | 4.9(18) | 4.9(20) |
| **TOTAL CFM** | | 171850 | 174790 | 199760 | 224730 | 273600 | 336280 |
| **MIN. AMBIENT TEMP. (F) AT MIN. LOAD** | | 55 | 55 | 55 | 55 | 55 | 55 |
| **ELECTRICAL** | | | | | | | |
| **NOM. VOLTAGE** | | 460/3/60 | 460/3/60 | 460/3/60 | 460/3/60 | 460/3/60 | 460/3/60 |
| **UNIT RLA** | **A** | 423 | 452 | 516 | 588 | 660 | 748 |
| **UNIT MAX. INRUSH** | **A** | 658 | 658 | 603 | 684 | 880 | 989 |
| **GENERAL** | | | | | | | |
| **UNIT LENGTH** | **INCH[MM]** | 318[8077] | 318[8077] | 349.5[8877] | 412.5[10478] | 412.5[10478] | 433.5[11011] |
| **UNIT WIDTH** | **INCH[MM]** | 88[2235] | 88[2235] | 88[2235] | 88[2235] | 88[2235] | 88[2235] |
| **UNIT HEIGHT** | **INCH[MM]** | 96.5[2451] | 96.5[2451] | 96.5[2451] | 96.5[2451] | 96.5[2451] | 120[3048] |
| **SHIPPING WEIGHT** | **LBS[KG]** | 19275[8743] | 20246[9183] | 22063[10008] | 23597[10703] | 26383[11967] | 30242[13718] |
| **OPERATING WEIGHT** | **LBS[KG]** | 20039[9090] | 21750[9866] | 23567[10690] | 25100[11386] | 28154[12771] | 32014[14521] |
| **OPERATING CHARGE R-22** | **LBS[KG]** | 518[235] | 562[255] | 628[285] | 717[325] | 807[366] | 915[415] |

## R407c

| MODEL ACHDX | | 225S-6SP | 240S-6SP | 265D-6SP | 305D-6SP | 345D-6SP | 395D-6SP |
|---|---|---|---|---|---|---|---|
| **COMPRESSOR** | | | | | | | |
| **MODEL (QTY)** | | HSC 1816 x 1 | HSC 1817 x 1 | HSC 1711 x 2 | HSC 1811 x 2 | HSC 1813 x 2 | HSC 1813 x 1, HSC 1816 x 1 |
| **RPM** | | 3550 | 3550 | 3550 | 3550 | 3550 | 3550 |
| **NOMINAL CAPACITY** | **TR** | 226 | 238 | 266 | 306 | 344 | 394 |
| **MIN. % UNIT CAPACITY REDUCTION** | | 25% | 25% | 12.5% | 12.5% | 12.5% | 12.5% |
| **EVAPORATOR** | | | | | | | |
| **MODEL (QTY)** | | XFQ12d | XFQ12d | XFR14e | XFR14e | XFR14e | XFS14e |
| **WATER CONNECTOR** | **INCH[MM]** | 10[254] | 10[254] | 10[254] | 10[254] | 10[254] | 10[254] |
| **NOM. WATER FLOW / P D** | **GPM / FT IN WG** | 543.6/12.8 | 571.9/14.0 | 638.8/6.8 | 735.7/8.8 | 825.3/10.8 | 946.2/14.8 |
| **MIN/ MAX WATER FLOW** | **GPM** | 298.4/894.3 | 300.3/893.8 | 389.0/1160.3 | 387.3/1161.0 | 388.0/1159.3 | 424.8/1268.2 |
| **MIN/ MAX WATER PD** | **FT IN WG** | 4.4/31.1 | 4.5/31.1 | 2.8/19.72 | 2.81/19.74 | 2.8/19.7 | 3.6/24.9 |
| **CONDENSER** | | | | | | | |
| **COIL ROWS DEEP/ TOTAL FA (SQ.FT)** | | 4/329.4 | 4/329.4 | 4/376.4 | 4/423.5 | 4/423.5 | 4/256.7, 3/385 |
| **NO. OF FAN** | | 14 | 14 | 16 | 18 | 18 | 20 |
| **FAN DIA. (QTY)** | **MM** | 800(14) | 800(14) | 800(16) | 800(18) | 860(18) | 860(20) |
| **MOTOR KWi (QTY)** | | 2.0(14 | 2.0(14) | 2.0(16) | 2.0(18) | 3.0(18) | 3.0(20) |
| **FLA, AMP (QTY)** | | 3.8(14) | 3.8(14) | 3.8(16) | 3.8(18) | 4.9(18) | 4.9(20) |
| **TOTAL CFM** | | 171850 | 171850 | 196400 | 217260 | 261720 | 330800 |
| **MIN. AMBIENT TEMP. (F) AT MIN. LOAD** | | 55 | 55 | 55 | 55 | 55 | 55 |
| **ELECTRICAL** | | | | | | | |
| **NOM. VOLTAGE** | | 460/3/60 | 460/3/60 | 460/3/60 | 460/3/60 | 460/3/60 | 460/3/60 |
| **UNIT RLA** | **A** | 397 | 431 | 476 | 555 | 616 | 709 |
| **UNIT MAX. INRUSH** | **A** | 658 | 658 | 583 | 668 | 858 | 969 |
| **GENERAL** | | | | | | | |
| **UNIT LENGTH** | **INCH[MM]** | 318[8077] | 318[8077] | 349.5[8877] | 412.5[10478] | 412.5[10478] | 433.5[11011] |
| **UNIT WIDTH** | **INCH[MM]** | 88[2235] | 88[2235] | 88[2235] | 88[2235] | 88[2235] | 88[2235] |
| **UNIT HEIGHT** | **INCH[MM]** | 96.5[2451] | 96.5[2451] | 96.5[2451] | 96.5[2451] | 96.5[2451] | 120[3048] |
| **SHIPPING WEIGHT** | **LBS[KG]** | 19971[9059] | 20050[9095] | 22291[10111] | 24165[10961] | 25159[11412] | 30827[13983] |
| **OPERATING WEIGHT** | **LBS[KG]** | 20735[9405] | 20814[9441] | 23795[10793] | 25669[11643] | 26663[12094] | 32598[14786] |
| **OPERATING CHARGE R-407c** | **LBS[KG]** | 496[225] | 529[240] | 584[265] | 672[305] | 761[345] | 871[395] |

| LWT °F | MODEL ACHDX | AMBIENT TEMPERATURE, °F | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 85.0 | | | 95.0 | | | 105.0 | | | 115.0 | | |
| | | TR | kWO | kWI | TR | kWO | kWI | TR | kWO | kWI | TR | kWO | kWI |
| 40.0 | 235S-6S | 233.9 | 822.6 | 227.6 | 217.4 | 764.6 | 257.0 | 200.5 | 705.2 | 292.6 | 178.0 | 626.0 | 332.1 |
| | 255S-6S | 253.4 | 891.2 | 245.7 | 235.5 | 828.2 | 277.5 | 217.2 | 763.9 | 315.9 | 192.8 | 678.1 | 358.4 |
| | 285D-6S | 280.6 | 986.8 | 280.0 | 260.9 | 917.6 | 316.2 | 240.7 | 846.7 | 360.0 | 213.8 | 751.9 | 409.4 |
| | 325D-6S | 321.4 | 1130.3 | 320.2 | 298.7 | 1050.4 | 361.6 | 275.4 | 968.6 | 411.8 | 244.5 | 859.8 | 467.8 |
| | 365D-6S | 363.4 | 1278.0 | 352.2 | 337.9 | 1188.4 | 397.6 | 311.8 | 1096.6 | 452.6 | 276.9 | 973.9 | 513.8 |
| | 415D-6S | 412.5 | 1450.7 | 400.4 | 383.5 | 1348.9 | 451.9 | 353.9 | 1244.7 | 514.3 | 314.3 | 1105.3 | 584.5 |
| 42.0 | 235S-6S | 243.4 | 855.9 | 229.9 | 226.3 | 795.9 | 259.5 | 208.9 | 734.5 | 295.3 | 185.5 | 652.4 | 334.8 |
| | 255S-6S | 263.6 | 927.2 | 248.3 | 245.1 | 862.2 | 280.2 | 226.2 | 795.6 | 318.8 | 200.9 | 706.7 | 361.5 |
| | 285D-6S | 291.9 | 1026.7 | 282.8 | 271.6 | 955.2 | 319.2 | 250.8 | 881.9 | 363.2 | 222.8 | 783.8 | 413.0 |
| | 325D-6S | 334.4 | 1176.1 | 323.4 | 310.9 | 1093.5 | 365.2 | 286.9 | 1009.0 | 415.6 | 254.8 | 896.2 | 471.8 |
| | 365D-6S | 378.1 | 1329.6 | 355.8 | 351.7 | 1237.0 | 401.6 | 324.7 | 1142.1 | 456.8 | 288.6 | 1015.0 | 518.6 |
| | 415D-6S | 429.2 | 1509.4 | 404.5 | 399.3 | 1404.2 | 456.4 | 368.6 | 1296.4 | 519.0 | 327.5 | 1152.0 | 589.6 |
| 44.0 | 235S-6S | 253.1 | 890.3 | 232.3 | 235.5 | 828.3 | 262.1 | 217.5 | 764.9 | 298.0 | 193.3 | 679.9 | 337.9 |
| | 255S-6S | 274.2 | 964.4 | 250.9 | 255.1 | 897.3 | 283.1 | 235.6 | 828.5 | 321.8 | 209.4 | 736.4 | 364.6 |
| | 285D-6S | 303.6 | 1067.9 | 285.8 | 282.6 | 994.0 | 322.4 | 261.1 | 918.3 | 366.6 | 232.2 | 816.7 | 416.4 |
| | 325D-6S | 347.9 | 1223.5 | 326.8 | 323.6 | 1138.1 | 368.8 | 298.8 | 1050.8 | 419.4 | 265.5 | 933.9 | 476.0 |
| | 365D-6S | 393.2 | 1382.9 | 359.6 | 366.0 | 1287.2 | 405.6 | 338.1 | 1189.2 | 461.0 | 300.7 | 1057.5 | 523.2 |
| | 415D-6S | 446.4 | 1570.1 | 408.7 | 415.5 | 1461.4 | 460.9 | 383.9 | 1350.0 | 523.9 | 341.3 | 1200.5 | 594.8 |
| 46.0 | 235S-6S | 263.3 | 925.9 | 234.8 | 245.1 | 861.8 | 264.7 | 226.4 | 796.4 | 300.8 | 201.4 | 708.4 | 340.8 |
| | 255S-6S | 285.2 | 1002.9 | 253.5 | 265.4 | 933.6 | 285.9 | 245.3 | 862.6 | 324.8 | 218.2 | 767.2 | 367.9 |
| | 285D-6S | 315.8 | 1110.5 | 288.8 | 294.1 | 1034.2 | 325.6 | 271.8 | 956.0 | 370.0 | 241.9 | 850.8 | 420.0 |
| | 325D-6S | 361.8 | 1272.4 | 330.2 | 336.7 | 1184.3 | 372.4 | 311.1 | 1094.1 | 423.4 | 276.7 | 973.1 | 479.8 |
| | 365D-6S | 408.9 | 1438.1 | 363.4 | 380.8 | 1339.2 | 409.6 | 352.0 | 1238.0 | 465.4 | 313.3 | 1101.7 | 527.8 |
| | 415D-6S | 464.3 | 1632.8 | 413.0 | 432.3 | 1520.5 | 465.5 | 399.6 | 1405.5 | 528.8 | 355.6 | 1250.6 | 600.0 |
| 48.0 | 235S-6S | 273.7 | 962.6 | 237.3 | 254.9 | 896.5 | 267.4 | 235.7 | 828.9 | 303.7 | 209.8 | 737.8 | 344.0 |
| | 255S-6S | 296.5 | 1042.7 | 256.3 | 276.1 | 971.1 | 288.8 | 255.3 | 897.8 | 328.0 | 227.2 | 799.1 | 371.2 |
| | 285D-6S | 328.3 | 1154.6 | 291.8 | 305.9 | 1075.8 | 329.0 | 282.9 | 995.0 | 373.6 | 251.9 | 886.1 | 423.6 |
| | 325D-6S | 376.2 | 1323.1 | 333.6 | 350.3 | 1232.1 | 376.2 | 323.8 | 1138.9 | 427.4 | 288.2 | 1013.6 | 484.2 |
| | 365D-6S | 425.1 | 1495.0 | 367.4 | 396.1 | 1392.9 | 413.8 | 366.3 | 1288.4 | 469.8 | 326.2 | 1147.3 | 532.6 |
| | 415D-6S | 482.7 | 1697.6 | 417.5 | 449.7 | 1581.7 | 470.2 | 415.9 | 1462.9 | 533.9 | 370.4 | 1302.7 | 605.4 |
| 50.0 | 235S-6S | 284.5 | 1000.6 | 239.9 | 265.1 | 932.4 | 270.2 | 245.3 | 862.6 | 306.7 | 218.5 | 768.3 | 347.1 |
| | 255S-6S | 308.2 | 1083.9 | 259.1 | 287.1 | 1009.9 | 291.8 | 265.6 | 934.2 | 331.2 | 236.6 | 832.1 | 374.7 |
| | 285D-6S | 341.2 | 1200.1 | 295.0 | 318.1 | 1118.7 | 332.4 | 294.4 | 1035.4 | 377.2 | 262.3 | 922.7 | 427.6 |
| | 325D-6S | 391.1 | 1375.3 | 337.2 | 364.4 | 1281.4 | 380.0 | 337.0 | 1185.2 | 431.6 | 300.1 | 1055.6 | 488.6 |
| | 365D-6S | 441.8 | 1553.8 | 371.4 | 411.8 | 1448.5 | 418.2 | 381.2 | 1340.6 | 474.4 | 339.7 | 1194.7 | 537.6 |
| | 415D-6S | 501.7 | 1764.6 | 422.0 | 467.7 | 1644.9 | 475.1 | 432.8 | 1522.3 | 539.1 | 385.7 | 1356.5 | 611.2 |

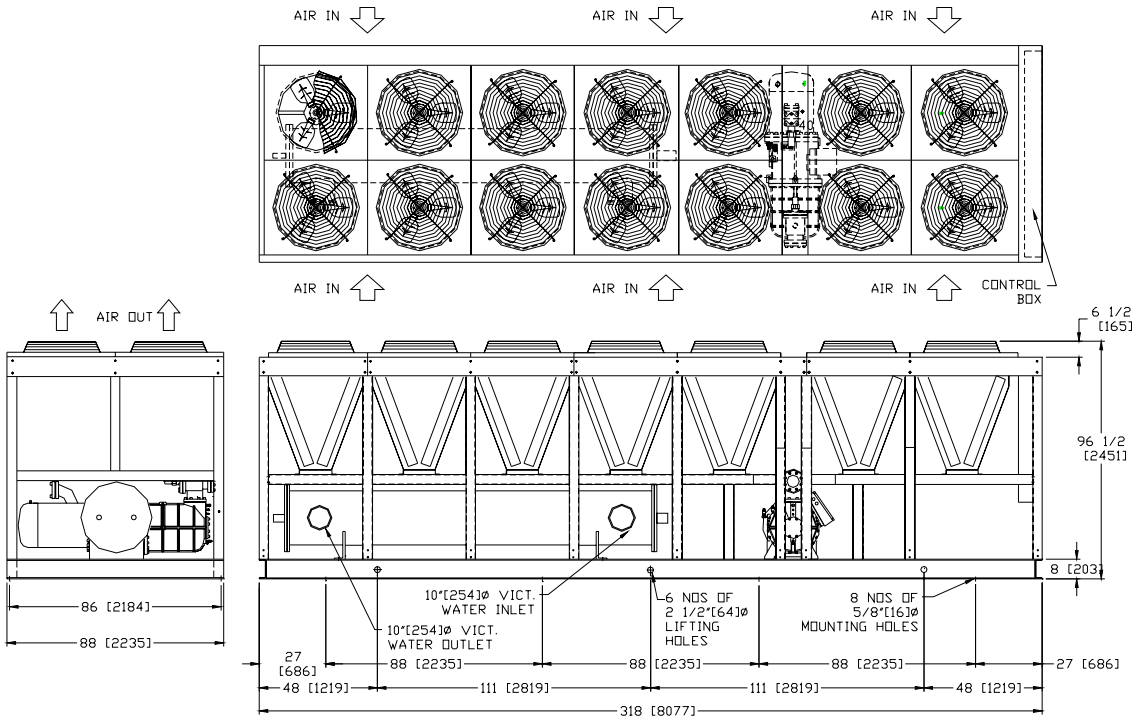
Notes:
1.) Ratings based on 10°F water range in evaporator and .0001 fouling factor.
2.) Interpolation between ratings is permissible but extrapolation is NOT.
3.) KWI is for compressor input.
4.) Unit is running on part load for ambient temperature of 115°F and above due to current limiter.

| LWT °F | MODEL ACHDX | AMBIENT TEMPERATURE, °F | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 85.0 | | | 95.0 | | | 105.0 | | | 115.0 | | |
| | | TR | kWO | kWI | TR | kWO | kWI | TR | kWO | kWI | TR | kWO | kWI |
| 40.0 | 225S-6SP | 227.3 | 799.5 | 213.4 | 206.3 | 725.5 | 241.8 | 183.2 | 644.3 | 278.7 | 158.1 | 556.0 | 323.2 |
| | 240S-6SP | 239.7 | 843.0 | 233.1 | 216.8 | 762.5 | 265.4 | 191.7 | 674.1 | 306.3 | 164.4 | 578.1 | 355.7 |
| | 265D-6SP | 267.5 | 940.7 | 256.8 | 242.3 | 852.1 | 292.0 | 214.7 | 755.0 | 336.8 | 184.7 | 649.4 | 390.8 |
| | 305D-6SP | 308.0 | 1083.1 | 300.8 | 279.0 | 981.1 | 342.4 | 247.1 | 869.0 | 395.2 | 212.4 | 747.1 | 458.8 |
| | 345D-6SP | 345.1 | 1213.6 | 326.4 | 313.0 | 1100.7 | 370.8 | 277.7 | 976.5 | 427.8 | 239.2 | 841.4 | 496.6 |
| | 395D-6SP | 395.8 | 1392.2 | 378.0 | 358.9 | 1262.3 | 429.3 | 318.4 | 1119.7 | 495.1 | 274.3 | 964.6 | 574.5 |
| 42.0 | 225S-6SP | 237.6 | 835.8 | 215.0 | 216.1 | 760.1 | 242.8 | 192.5 | 677.0 | 279.6 | 166.8 | 586.7 | 323.8 |
| | 240S-6SP | 250.7 | 881.6 | 234.9 | 227.2 | 799.2 | 266.5 | 201.5 | 708.8 | 307.2 | 173.7 | 610.8 | 356.2 |
| | 265D-6SP | 279.7 | 983.6 | 258.8 | 253.9 | 893.0 | 293.2 | 225.7 | 793.7 | 337.8 | 195.0 | 685.8 | 391.4 |
| | 305D-6SP | 322.1 | 1132.7 | 303.0 | 292.4 | 1028.3 | 343.8 | 259.8 | 913.7 | 396.2 | 224.4 | 789.1 | 459.6 |
| | 345D-6SP | 360.9 | 1269.1 | 328.8 | 328.0 | 1153.5 | 372.2 | 291.9 | 1026.6 | 429.0 | 252.6 | 888.6 | 497.2 |
| | 395D-6SP | 413.9 | 1455.7 | 380.9 | 376.1 | 1322.7 | 431.0 | 334.6 | 1176.9 | 496.6 | 289.6 | 1018.4 | 575.5 |
| 44.0 | 225S-6SP | 248.3 | 873.3 | 216.7 | 226.2 | 795.7 | 243.9 | 202.1 | 710.7 | 280.6 | 175.8 | 618.4 | 324.5 |
| | 240S-6SP | 262.0 | 921.5 | 236.8 | 238.0 | 837.0 | 267.7 | 211.7 | 744.6 | 308.2 | 183.2 | 644.4 | 356.9 |
| | 265D-6SP | 292.3 | 1027.9 | 260.8 | 265.9 | 935.1 | 294.4 | 237.0 | 833.4 | 338.8 | 205.6 | 723.2 | 392.2 |
| | 305D-6SP | 336.6 | 1183.9 | 305.4 | 306.2 | 1076.9 | 345.2 | 272.9 | 959.7 | 397.6 | 236.7 | 832.4 | 460.4 |
| | 345D-6SP | 377.2 | 1326.5 | 331.4 | 343.5 | 1208.0 | 374.0 | 306.6 | 1078.2 | 430.4 | 266.4 | 937.1 | 498.2 |
| | 395D-6SP | 432.5 | 1521.2 | 384.0 | 393.8 | 1385.0 | 433.0 | 351.4 | 1235.8 | 498.3 | 305.3 | 1073.8 | 576.6 |
| 46.0 | 225S-6SP | 259.3 | 911.9 | 218.5 | 236.7 | 832.4 | 245.1 | 212.0 | 745.4 | 281.6 | 185.1 | 651.1 | 325.2 |
| | 240S-6SP | 273.7 | 962.6 | 238.7 | 249.1 | 876.1 | 268.9 | 222.2 | 781.6 | 309.2 | 193.1 | 679.1 | 357.6 |
| | 265D-6SP | 305.3 | 1073.6 | 263.0 | 278.2 | 978.5 | 295.8 | 248.6 | 874.5 | 340.0 | 216.6 | 761.7 | 393.0 |
| | 305D-6SP | 351.6 | 1236.7 | 307.8 | 320.5 | 1127.1 | 346.8 | 286.4 | 1007.2 | 398.8 | 249.4 | 877.1 | 461.2 |
| | 345D-6SP | 394.0 | 1385.6 | 334.2 | 359.5 | 1264.3 | 375.6 | 321.7 | 1131.4 | 432.0 | 280.7 | 987.1 | 499.4 |
| | 395D-6SP | 451.8 | 1588.9 | 387.2 | 412.1 | 1449.3 | 435.0 | 368.7 | 1296.6 | 500.0 | 321.6 | 1130.9 | 577.9 |
| 48.0 | 225S-6SP | 270.6 | 951.9 | 220.4 | 247.5 | 870.4 | 246.4 | 222.1 | 781.3 | 282.7 | 194.7 | 684.8 | 326.1 |
| | 240S-6SP | 285.8 | 1005.1 | 240.6 | 260.6 | 916.4 | 270.3 | 233.0 | 819.6 | 310.3 | 203.3 | 714.8 | 358.4 |
| | 265D-6SP | 318.7 | 1120.8 | 265.2 | 291.0 | 1023.3 | 297.4 | 260.7 | 916.8 | 341.2 | 227.9 | 801.5 | 394.0 |
| | 305D-6SP | 367.2 | 1291.3 | 310.4 | 335.2 | 1178.9 | 348.6 | 300.3 | 1056.2 | 400.4 | 262.4 | 923.0 | 462.4 |
| | 345D-6SP | 411.3 | 1446.6 | 337.0 | 376.0 | 1322.3 | 377.6 | 337.3 | 1186.3 | 433.6 | 295.3 | 1038.7 | 500.6 |
| | 395D-6SP | 471.6 | 1658.7 | 390.4 | 430.9 | 1515.6 | 437.3 | 386.5 | 1359.3 | 501.9 | 338.3 | 1189.8 | 579.2 |
| 50.0 | 225S-6SP | 282.4 | 993.1 | 222.3 | 258.6 | 909.5 | 247.8 | 232.7 | 818.3 | 283.9 | 204.6 | 719.5 | 327.1 |
| | 240S-6SP | 298.3 | 1049.0 | 242.7 | 272.4 | 958.0 | 271.7 | 244.2 | 858.9 | 311.6 | 213.7 | 751.7 | 359.4 |
| | 265D-6SP | 332.5 | 1169.5 | 267.4 | 304.1 | 1069.6 | 299.0 | 273.1 | 960.5 | 342.8 | 239.6 | 842.5 | 395.2 |
| | 305D-6SP | 383.2 | 1347.6 | 313.2 | 350.4 | 1232.4 | 350.4 | 314.7 | 1106.6 | 402.0 | 275.9 | 970.5 | 463.6 |
| | 345D-6SP | 429.2 | 1509.7 | 339.8 | 393.0 | 1382.2 | 379.6 | 353.4 | 1242.9 | 435.2 | 310.5 | 1091.9 | 501.8 |
| | 395D-6SP | 492.1 | 1730.7 | 393.8 | 450.4 | 1584.1 | 439.7 | 404.9 | 1423.9 | 504.0 | 355.6 | 1250.6 | 580.9 |

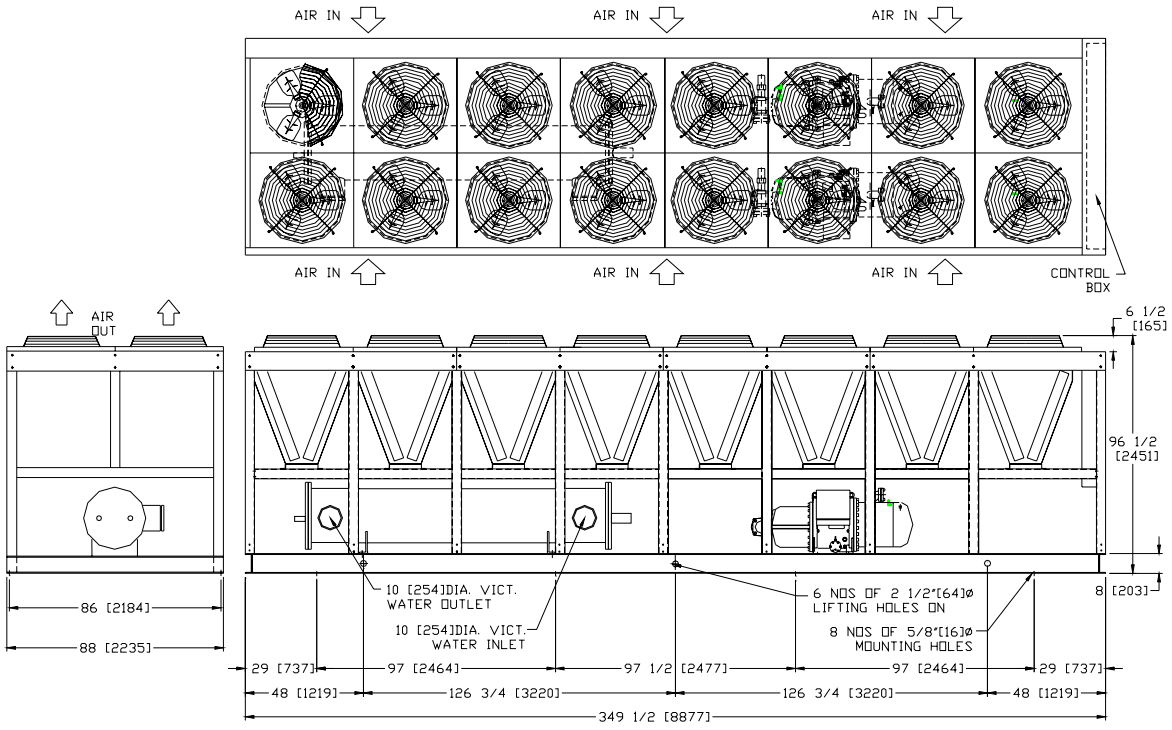
Notes:
1.) Ratings based on 10°F water range in evaporator and .0001 fouling factor.
2.) Interpolation between ratings is permissible but extrapolation is NOT.
3.) KWI is for compressor input.
4.) Unit is running on part load for ambient temperature of 115°F and above due to current limiter.

# DIMENSIONAL DATA

## ACHDX 235S-6S, 255S-6S & 225S-6SP, 240S-6SP



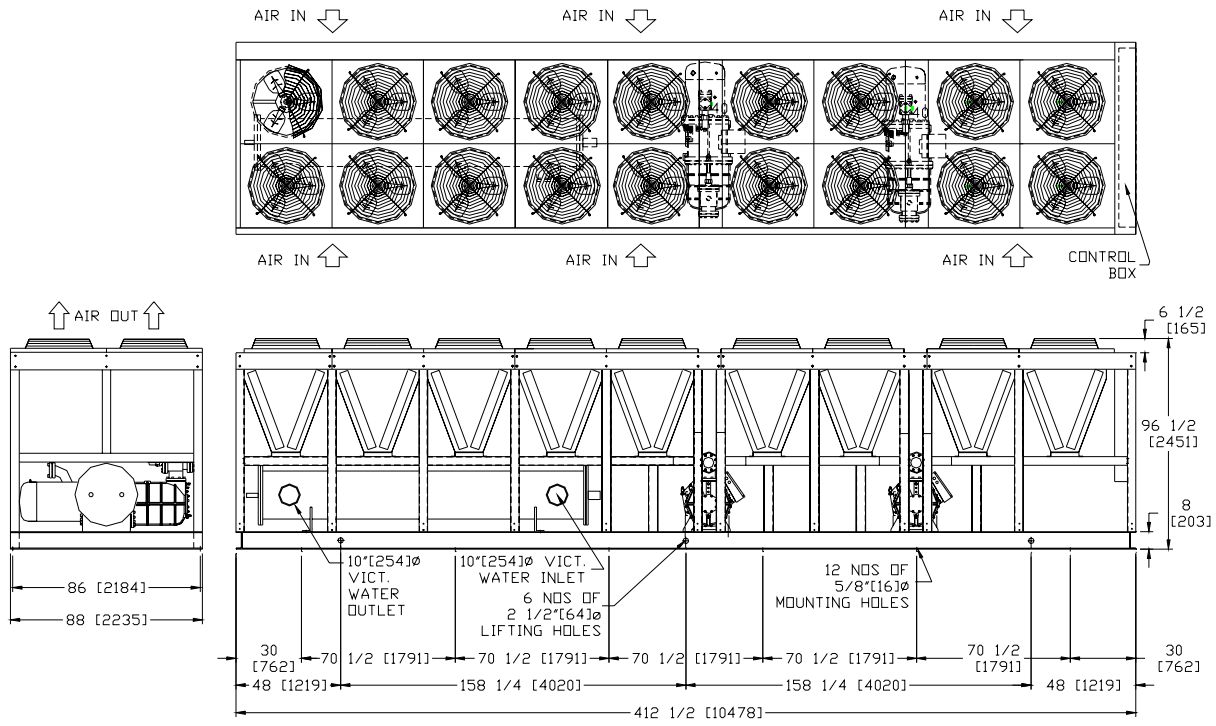

## ACHDX 285D-6S & 265D-6SP



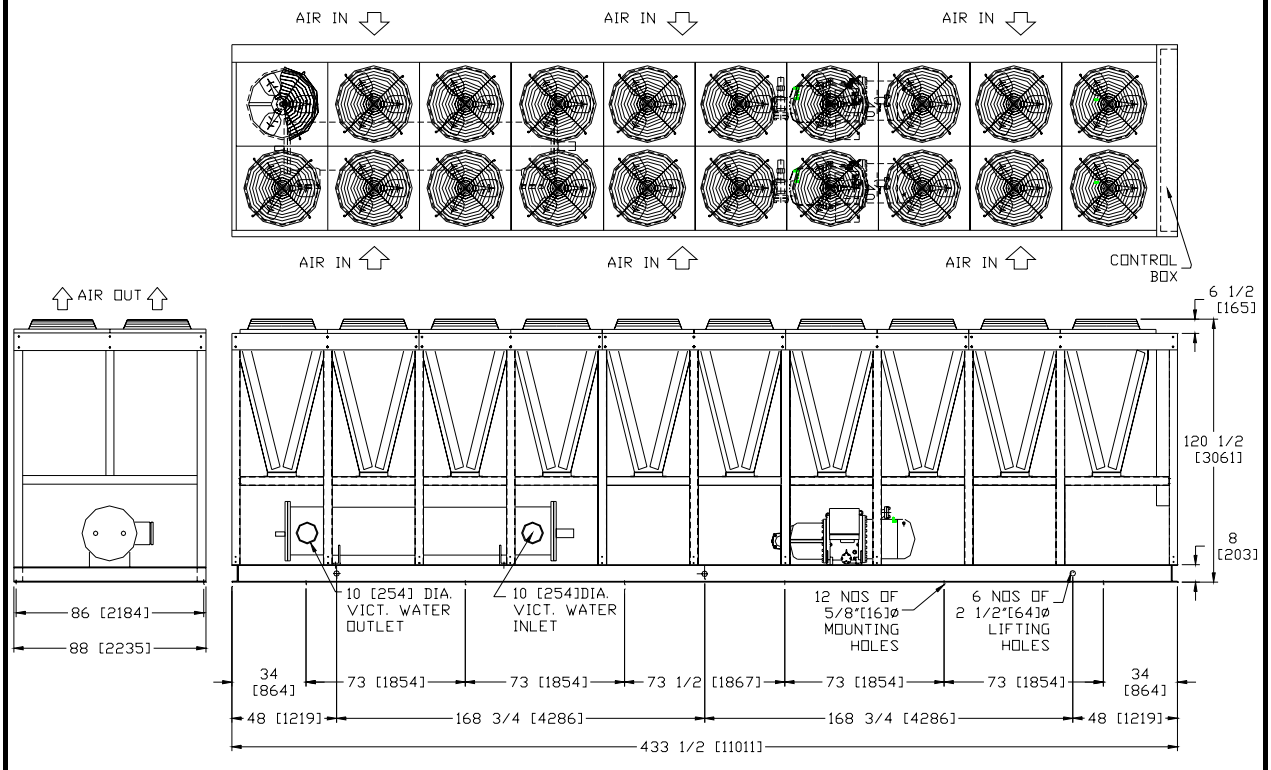

NOTE: ALL DIMENSIONS ARE IN INCHES [MM].

# DIMENSIONAL DATA

## ACHDX 325D-6S, 365D-6S & 305D-6SP, 345D-6SP



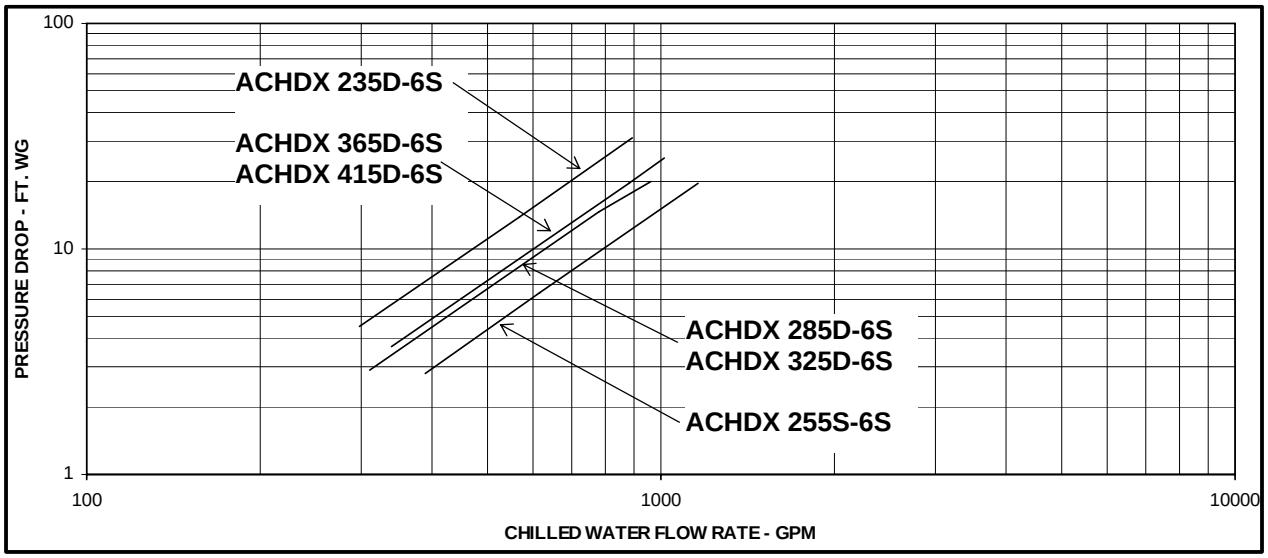

## ACHDX 415D-6S & 395D-6SP



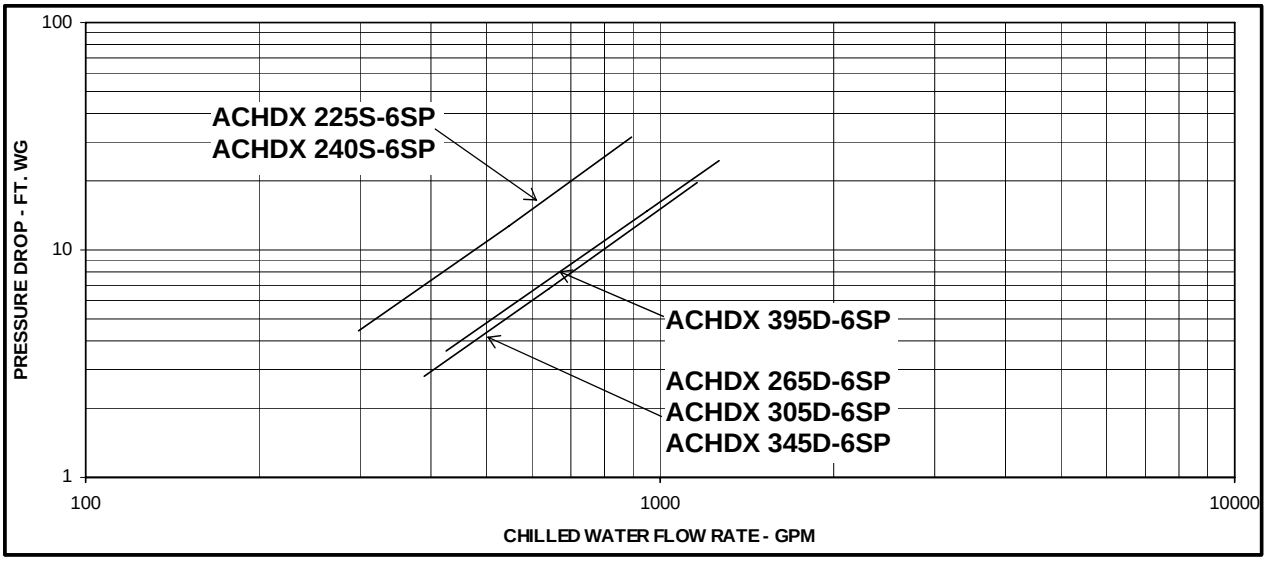

NOTE: ALL DIMENSIONS ARE IN INCHES [MM].

# PRESSURE DROP

**R22**




**R407C**

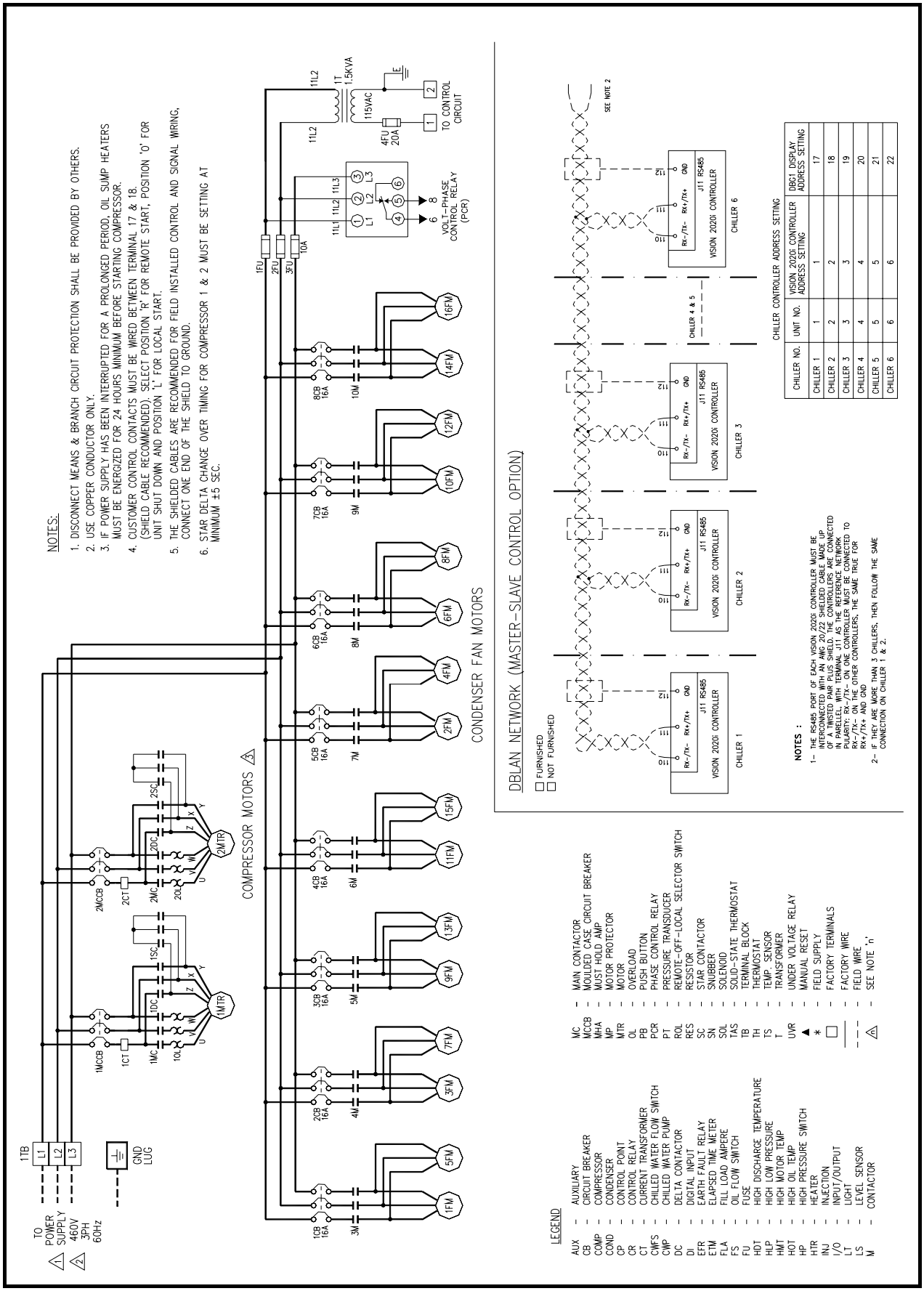



# SOUND PRESSURE LEVEL AT 10 METER- FREE FIELD

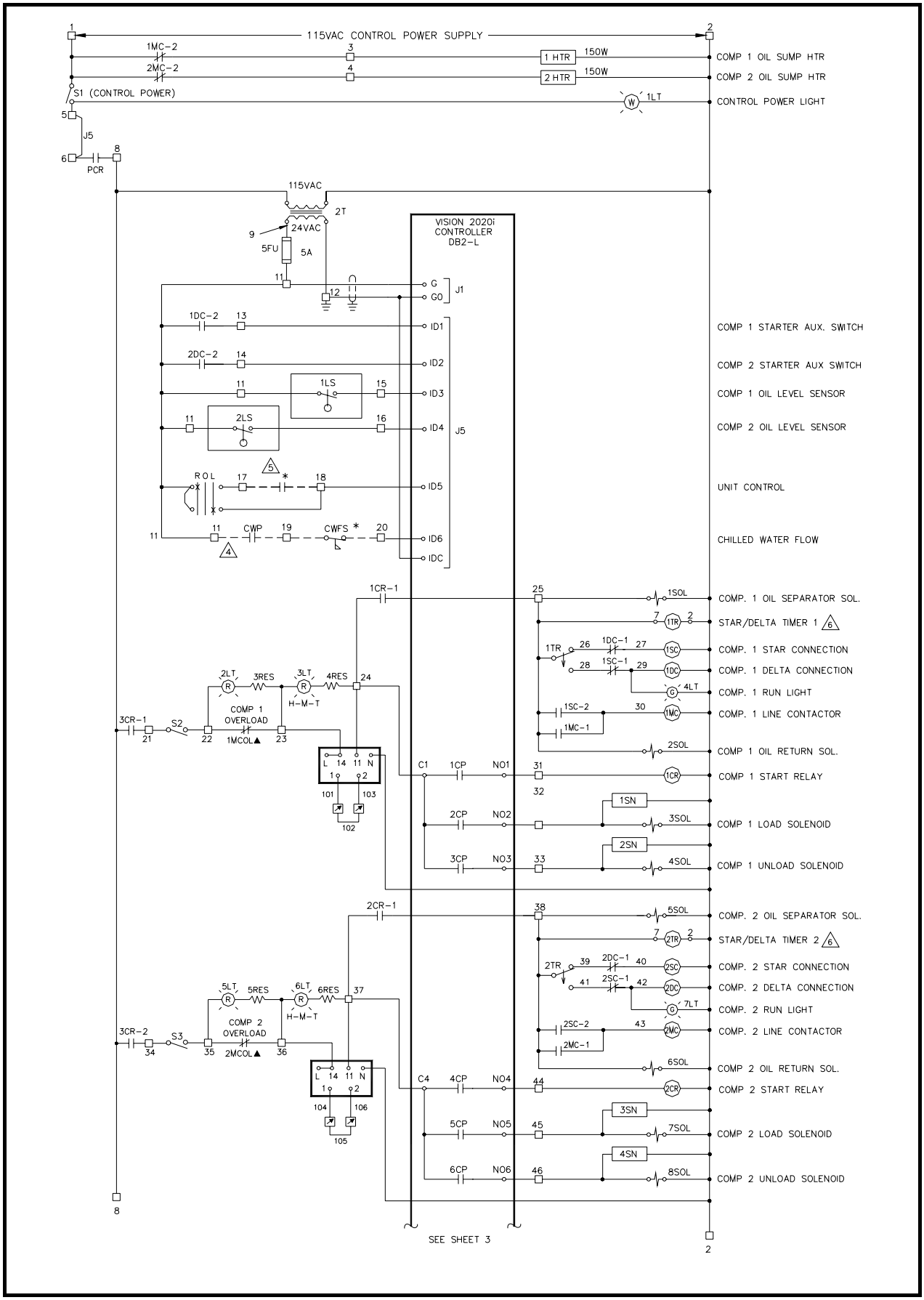
| R22 - BAND (Hz) | | | | | | | | | | | R407c - BAND (Hz) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Model** | **63** | **125** | **250** | **500** | **1K** | **2K** | **4K** | **8K** | **Total** | **NC** | **Model** | **63** | **125** | **250** | **500** | **1K** | **2K** | **4K** | **8K** | **Total** | **NC** |
| **ACHDX 235S-6S** | 51 | 49 | 55 | 56 | 63 | 61 | 56 | 47 | 67 | 65 | **ACHDX 225S-6SP** | 51 | 49 | 55 | 56 | 63 | 61 | 56 | 47 | 67 | 65 |
| **ACHDX 255S-6S** | 51 | 50 | 55 | 56 | 64 | 61 | 56 | 47 | 67 | 65 | **ACHDX 240S-6SP** | 51 | 50 | 55 | 56 | 64 | 61 | 56 | 47 | 67 | 65 |
| **ACHDX 285D-6S** | 51 | 50 | 55 | 57 | 63 | 61 | 56 | 48 | 67 | 65 | **ACHDX 265D-6SP** | 51 | 50 | 55 | 57 | 63 | 61 | 56 | 48 | 67 | 65 |
| **ACHDX 325D-6S** | 53 | 51 | 57 | 58 | 65 | 62 | 57 | 48 | 68 | 65 | **ACHDX 305D-6SP** | 53 | 51 | 57 | 58 | 65 | 62 | 57 | 48 | 68 | 65 |
| **ACHDX 365D-6S** | 53 | 52 | 58 | 60 | 66 | 63 | 58 | 51 | 69 | 65 | **ACHDX 345D-6SP** | 53 | 52 | 58 | 60 | 66 | 63 | 58 | 51 | 69 | 65 |
| **ACHDX 415D-6S** | 53 | 52 | 58 | 60 | 66 | 63 | 58 | 51 | 69 | 65 | **ACHDX 395D-6SP** | 53 | 52 | 58 | 60 | 66 | 63 | 58 | 51 | 69 | 65 |

NOTE: PUBLISHED SOUND VALUES AS ABOVE ARE WITH ±2dB TOLERANCE.

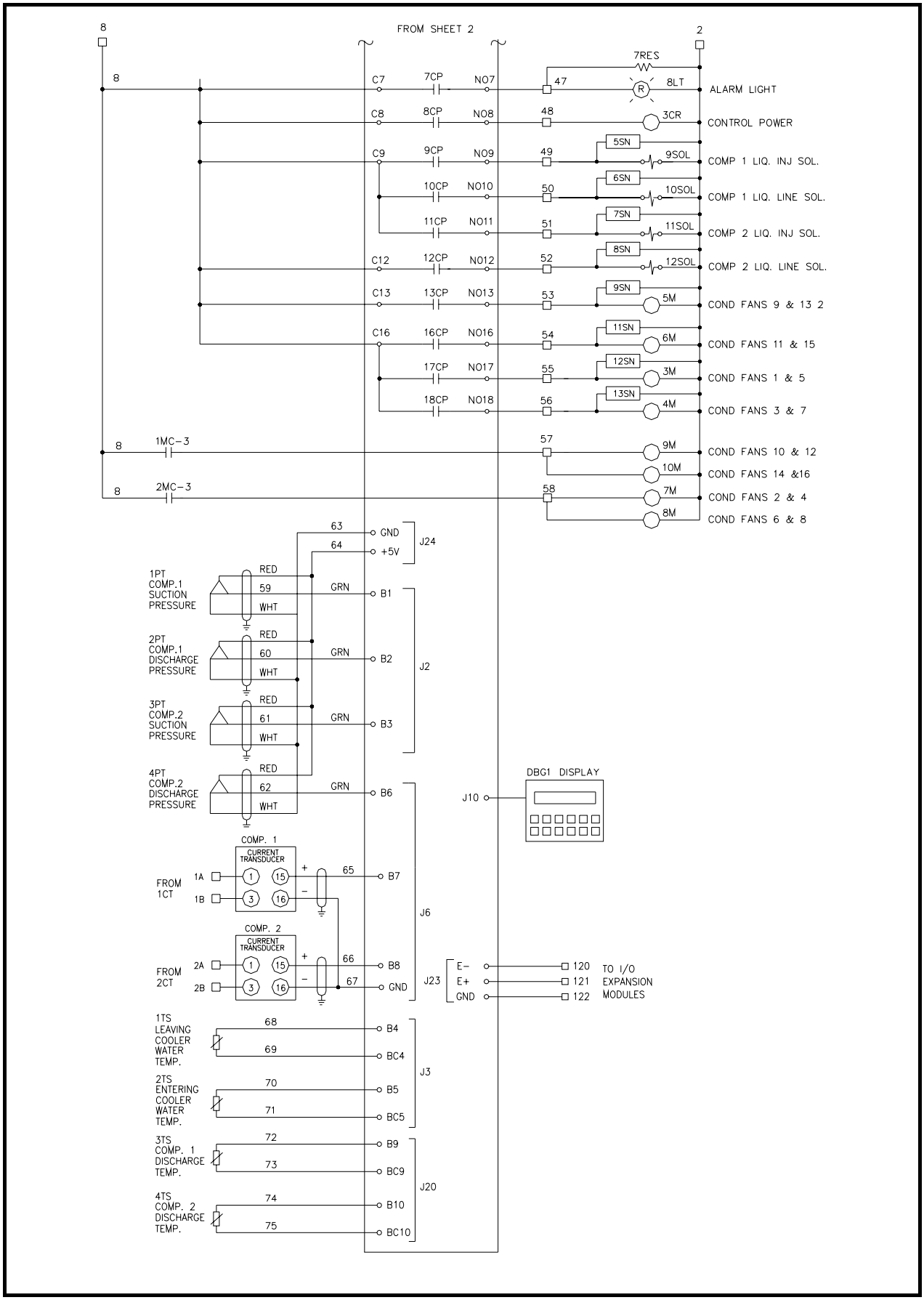
# TYPICAL WIRING SCHEMATIC- 2 COMPRESSORS



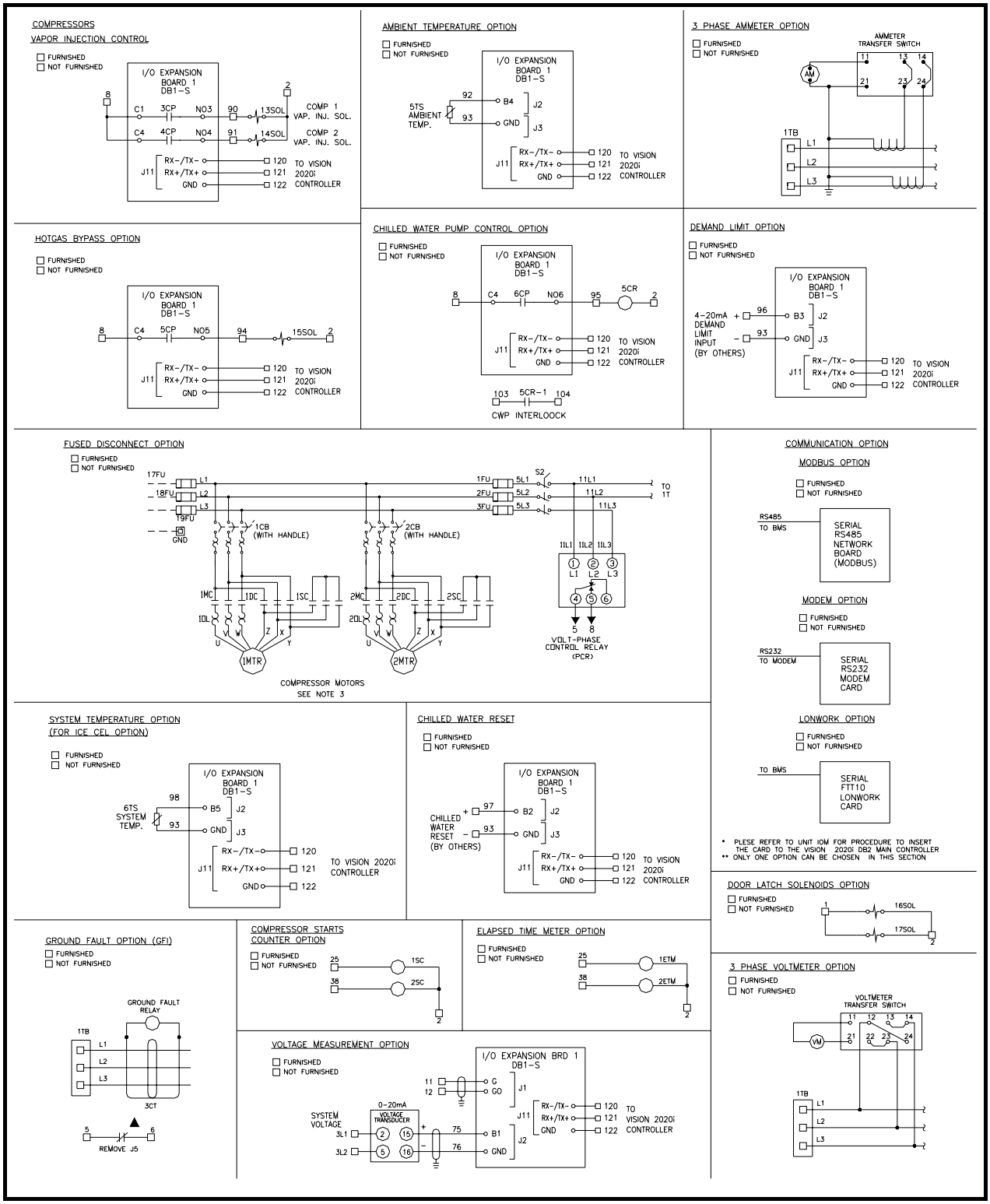
# TYPICAL WIRING SCHEMATIC- 2 COMPRESSORS



# TYPICAL WIRING SCHEMATIC- 2 COMPRESSORS



# TYPICAL WIRING SCHEMATIC- 2 COMPRESSORS

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