AUDS-A

Air-Cooled Condensing Units

with Tandem Scroll Compressors

15 to 67 Tons—DX Air Handler Applications
13 to 60 Tons—Split-System Chiller Applications

Features

- ***DB Director*** **microcomputer controller**
- **Windows® based PC interface**
- **ETL, MEA unit approval**
- **New high efficiency design**
- **Compatible with HFC refrigerants**
- **Rated with HCFC-22**
- **Compact footprint**
- **Quiet operation**
- **Extra Quiet Option Available**

ETL LISTED

DUNHAM-BUSH®

Form No. 6017

INTRODUCTION

Direct Drive Fans

PC Windows® Based
Microcomputer
Standard All
Models

Optional
Unit Disconnect

Modular Design
with common components
throughout the line

Tandem Scroll Compressors

AUDS-A

Single Circuit Condensing Units with Tandem-Scroll Compressors for DX Air Handler or Split-System Chiller Operation

The Dunham-Bush Commitment...

The introduction of this new **AUDS-A** Tandem-Scroll Air Cooled Condensing Unit line is further evidence of our commitment to continuous product improvement and enhancement of our offering of quality products for the HVAC and Industrial Markets.

Scroll Compressors are designed for Commercial/Industrial Applications and provide the same high quality and efficiency as Reciprocating or Screw Compressors. They have been developed specifically for use in Packaged Chillers and Condensing Unit products.

New enhanced condenser fins, plus modular construction provide for increased commonality of parts, high unit electrical efficiency, and compact footprint throughout the line. This enables shorter lead times, while still offering all the optional features mounted, piped and wired to meet your exact needs. In fact, Dunham-Bush is famous for its design flexibility. Our customers find that we can handle special applications that others might turn away.

AUDS-A units feature state-of-the-art full function, PC Windows® based, microcomputer controller standard on all model sizes with an optional tie-in to a building management system. Remote monitoring via optional modem allows instant diagnosis by the user or a Dunham-Bush technician.

Upon shipment, the new **AUDS-A** unit is installation-ready with its compact size, reduced weight, and complete factory piping and wiring.

The **AUDS-A**

Delivering on the promise of the Dunham-Bush Commitment

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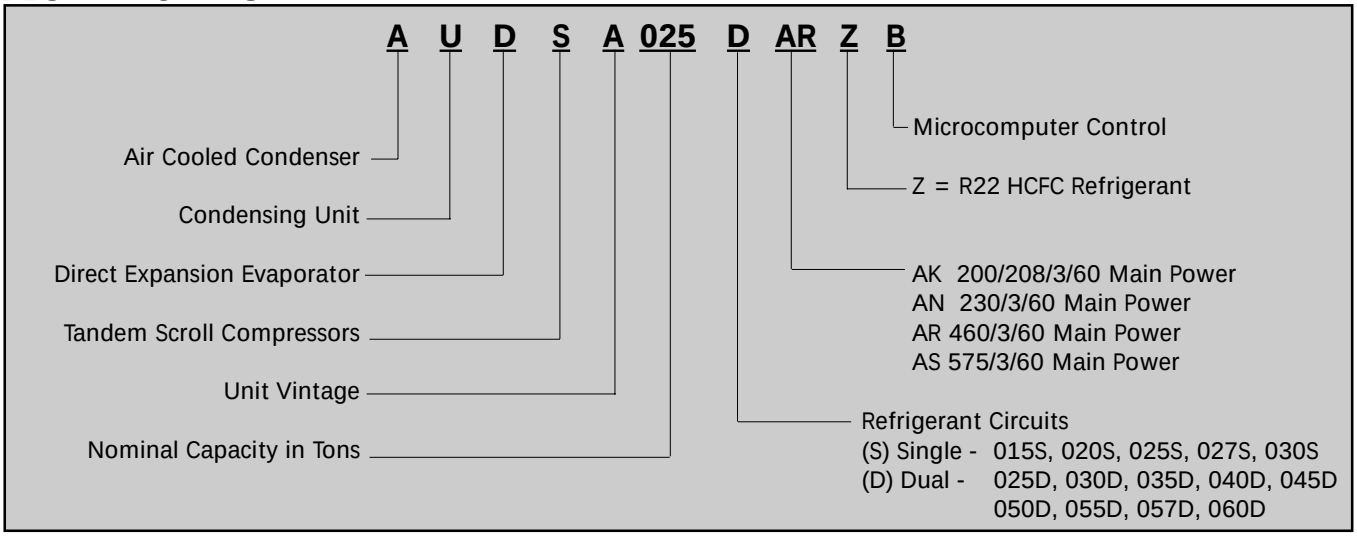
NOMENCLATURE



Standard Features and Owner Benefits

Size Range

- 14 Models from 13 to 60 Tons
- High Unit EER at ARI Standard Conditions
- Rated with HCFC-22. Compatible with HFC's (R-407C and R-134a) using Synthetic Oil (Consult Factory)

Compressor

- Reliable Hermetic Tandem Scroll Type at 3500 RPM
- (2) Refrigerant Circuits over 25 Tons for Redundancy
- Compressor Cycling of 2 compressors on single circuit units up to 30 tons
- Compressor Cycling of 4 compressors for dual circuit units from 25 to 60 tons
- Automatic compressor lead-lag all models
  If HGBP is desired, dual circuit HGBP is required to retain lead-lag function.

Evaporator

- **Optional Split-System Chiller—Remote Cooler Module**
  - RCH1—Standard Cooler Module for 44°F Leaving Water Temperature
  - RCH2—Oversized Cooler Module for 42°F Leaving Water Temperature when required
  - RCH3—Oversized Cooler Module for 40°F Leaving Water Temperature when required
  - ASME/CRN Stamped on all Sizes
  - DB High Efficiency Inner Fin Design for Compactness and Weight Reduction
  - 300 PSIG Refrigerant Side Design Pressure
  - 200 PSIG Water Side Design Pressure
- **Optional DX Air Handler Control Modes of Operation**
  - RAH1—DX Air handler with Return Air Control, Constant Volume Control Systems with less than 30% Outside Air
  - RAH2—DX Air handler with Leaving Air Control, for Constant or Variable Air Volume Systems with less than 30% Outside Air
  - RAH3—DX Air Handler with Fresh Air Economizer with Leaving Air Control, for Constant or Variable Volume Systems with up to 100% Outside Air
  - RAH4—DX Air handler with 100% Outside Air with Leaving Air Control for Constant or Variable Air Volume Systems with Hot Gas Bypass required
  - RMAH—DX Multiple Air handlers with Suction Pressure Control Requires Customer Contact Closure(s) Call for Cooling

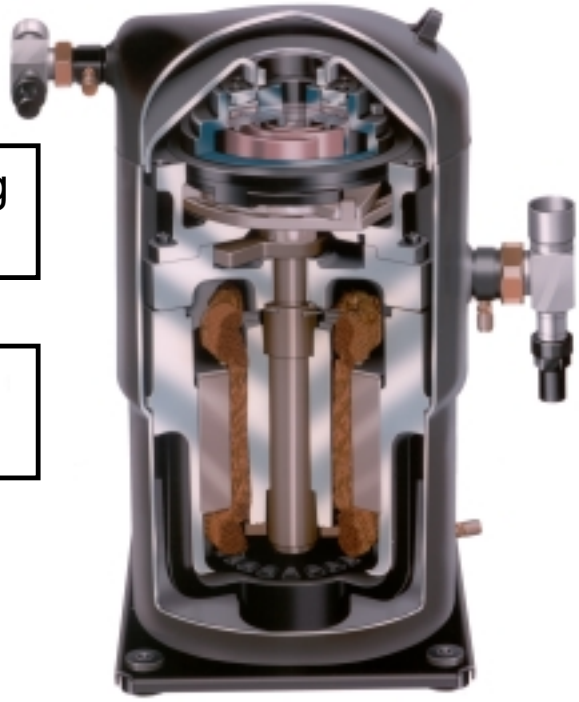
Condenser

- Long Life Copper Tubes with Aluminum Fins
- Sub-Cooling Circuit for Efficiency
- 450 PSIG Test Pressure
- Low Noise 30" Diameter Fans - Direct Drive at 1140 RPM
- Extra Quiet Option 30" Diameter Fans - direct drive at 855 RPM
- All Fan Motors Open Drip Proof with Rain Shield for Safety and Low Maintenance
- Minimum Clearance Required on Sizes 021S to 035S

Electrical/Control

- 115 Volt Control Transformer (supplied standard on all models)
- Widest range of optional equipment available
- Proactive Full Function PC Windows® Based Microcomputer Controller on all Sizes 015S to 060D for Precise Control
- Separate Power and Control Panels for all dual refrigerant circuit models Sizes 025D - 060D
- Separate Power and Control Compartments Sizes 015S to 030S
- ETL/CSA Unit Approval (IEC Control Panel Available)
- MEA Unit Approval

Scroll Compressor Technology



AUDS-A Condensing Units use Tandem Scroll Compressors. These rugged Commercial / Industrial Grade Scroll Compressors are designed and manufactured to meet the duty that our equipment demands. The construction includes cast iron frame and scroll sets, Teflon impregnated bearings and oil filtration devices internal to each compressor. Solid State motor protection is provided. Roto-Lock fittings are supplied for the suction and discharge connections for ease of change-out if a replacement is required.

Offering Scroll Compressor Products allows us to supply the same quality products that we have always supplied, but at a lower installed cost, over units with other types of compressors. Some of the attributes are durability, reliability, improved liquid handling capability, compact size, quiet operation, high operating efficiency, and reduced cost.

Scroll Compressor Technology has developed over many years in both Residential and Commercial/ Industrial markets and has proven the durability and reliability of these compressors. All units included in this catalog are supplied with Tandem Scroll Compressor sets.

Tandem Scroll Compressors consist of two individual compressors, mounted on a common base, manifolded into a single refrigerant circuit. Rubber inserts in the mounting rails provide sound dampening from the unit base, for extra quiet operation. A tandem compressor set(s) has suction, discharge, oil and gas equalization between the two compressors. A common discharge service valve is furnished to isolate the refrigerant charge in the condenser. An oil sight glass is provided in each compressor for oil monitoring and management purposes.

Scroll Compressor Design is based around two identical spirals or scrolls that, when inserted together, form crescent-shaped compression pockets. During a compression cycle, one scroll remains stationary while the other orbits around the first. As this motion occurs, gas is drawn into the scrolls and moved in increasingly smaller pockets toward the center. At this point, the gas, now compressed to a high pressure, is discharged from a port in the center of the fixed scroll to the condenser.

During each orbit, several pockets of gas are compressed simultaneously, creating smooth, nearly continuous compression. Figures 6A, B, and C show the compression cycle and comparisons to reciprocating compressors.

Suction and Compression Cycles occur simultaneously but only four portions of the continuous Compression Cycle are shown for clarity purposes. (See Figure 6A).

- 1. The suction cycle occurs when the suction pocket opens and enlarges, causing a low pressure area in the suction pocket, drawing suction gas into the chamber. The suction pocket then closes and the compression cycle begins.
- 2. The Intermediate Compression Cycle is continuous as the orbiting scroll moves and compresses the refrigerant gas.
- 3. The high pressure pocket forces the high pressure gas to the discharge port at the top of the fixed scroll.
- 4. The high pressure gas is forced through the discharge port and the discharge check valve at the top of the fixed scroll.

Scroll Compressors have few moving parts, as compared to Reciprocating Compressors. Fewer moving parts, and the smooth continuous rotary scroll compression cycle, ensures a long, quiet operating, compressor life. (See Figure 6B.)

Complete and Continuous Compression Cycle of the Scroll Compressor, with no Valve or Re-Expansion Volume losses, provide a smooth running, quiet, efficient, compressor. (See Figure 6C).

Figure 6A Scroll Compression Cycle—How A Scroll Works

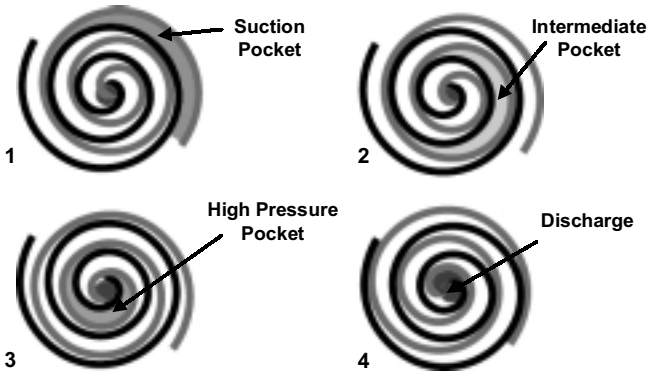


Figure 6B Scroll vs. Reciprocating Few Moving Parts

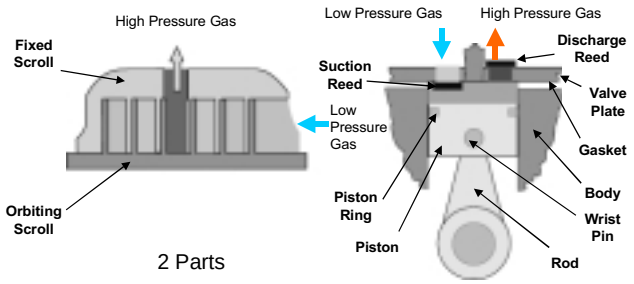
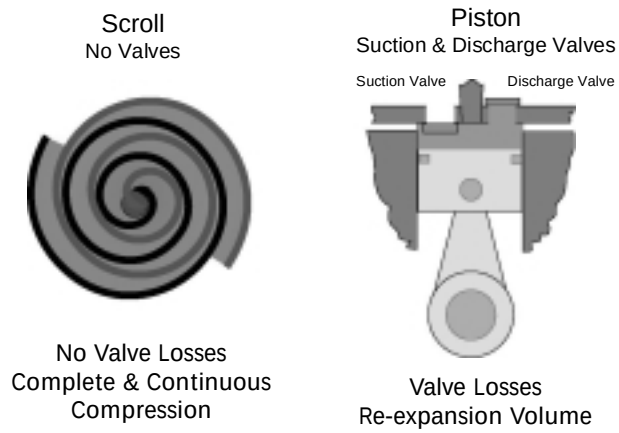


Figure 6C Complete and Continuous Compression Cycle



UNIT FEATURES: SCROLL COMPRESSORS (CONT.)

Scroll Compressors have much better liquid refrigerant handling capability than other types of compressors due to the nature of scroll design.

Scroll Compressor Durability and Reliability as well as Quiet Operation is inherent with the design of the scroll compressor. Scroll compressors have few moving parts, oversized Teflon impregnated bearings and a smooth gas flow compression cycle, to ensure durability and reliability.

A Large Capacity Built-In Suction Filter is located between the suction inlet and the motor to prevent abrasive material such as flux, dirt, scale or metal chips from entering the motor cavity. The abrasive action of this foreign material would crack, chip and wear the motor insulation which could cause premature motor failure. These same abrasives could also cause bearing seizures and excessive wear of all surfaces.

Compressor Motor Dependability has been developed with heavy duty motor windings cooled by suction refrigerant gas. Motor winding insulation systems exceed Class B requirements and overload protection is accomplished by solid state motor module with winding temperature thermistor sensor input.

Compressor Lubrication is provided by an integral centrifugal pumping system through the center of the motor/scroll shaft.

Quiet Operation of Scroll Compressors ensures considerably quieter unit operation, than other types of compressors. Heavy construction, few moving parts, small motor horsepower, and smooth gas flow through the orbital compression cycle, ensures quiet operation of our **AUDS-A Condensing Units**.

Vibration Free Operation is ensured by smooth quiet compressor operation plus having the compressors mounted with rubber grommets to the frame.

Capacity Control Modulation is managed by the units ***DB Director*** Microcomputer Controller in response to system load requirements. The split-system chiller load requirements are measured by sensing the chiller's leaving fluid temperature and staging the compressors accordingly. Split-systems using DX air handler evaporators have several control modes as outlined on pages 22 through 25. The **AUDS-A** condensing unit part load efficiency is excellent due to the staging sequence of the compressors to meet the required load for DX air handlers and split-system chillers. If the minimum load requirement is less than the unit's minimum mechanical step capability, hot gas by-pass option should be ordered with the unit. See table 8A for unit capacity control capabilities.

Capacity Control Modulation with Optional Hot Gas By-Pass, operates by imposing an artificial load on the evaporator. Discharge gas from the compressor is introduced to the liquid-vapor mixture of refrigerant downstream of the expansion valve. The discharge gas is cooled by the liquid refrigerant present in the turbulence of the evaporator so that the final temperature of refrigerant gas leaving the evaporator does not rise. Hot gas by-pass does not offer any energy savings, but does allow the cooling capacity to the equipment to vary precisely with the load requirements.

UNIT FEATURES: SCROLL COMPRESSORS (CONT.)

Table 8A **Package Mechanical Capacity Control Steps**

Model	% Full Load Capacity Control	
	Standard	**Standard with (Optional HGBP)[3] [4] [5]**
AUDS-A	**Single Circuit Units with Tandem Compressors[1]**	**Single Circuit Units with Tandem Compressors[1]**
015S	100 - 50 - 0	100 - 50 - (25) - 0
020S	100 - 50 - 0	100 - 50 - (25) - 0
025S	100 - 50 - 0	100 - 50 - (25) - 0
027S	100 - 46 - 0	100 - 46 - (23) - 0
030S	100 - 50 - 0	100 - 50 - (25) - 0
AUDS-A	**Dual Circuit Units with (2) Tandem Compressors[2]**	**Dual Circuit Units with (2) Tandem Compressors[2]**
025D	100 - 75 - 50 - 25 - 0	100 - 75 - 50 - 25 - (13) - 0
030D	100 - 75 - 50 - 25 - 0	100 - 75 - 50 - 25 - (13) - 0
035D	100 - 74 - 50 - 24 - 0	100 - 74 - 50 - 24 - (12) - 0
040D	100 - 69 - 46 - 23 - 0	100 - 70 - 46 - 23 - (12) - 0
045D	100 - 75 - 50- -25 - 0	100 - 75 - 50 - 25 - (13) - 0
050D	100 - 72 - 48 - 24 - 0	100 - 72 - 48 - 24 - (12) - 0
055D	100 - 74 - 48 - 22 - 0	100 - 74 - 48 - 22 - (11) - 0
057D	100 - 75 - 50 - 25 - 0	100 - 75 - 50 - 25 - (13) - 0
060D	100 - 75 - 50 - 25 - 0	100 - 75 - 50 - 25 - (13) - 0

Notes:

1. Models AUDSA 015S - 030S have 2 Manifolded compressors on a single refrigerant circuit.
2. Models AUDSA 025D - 060D have (2) Sets of 2 Manifolded Compressors on two refrigerant circuits.
3. HGBP = Hot Gas Bypass option available on lead circuit or both circuits for lead-lag operation on dual circuit units.
4. HGBP is only active on unloaded circuits.
5. HGBP modulates to approximately one half of the minimum mechanical step of unit loading shown above. EXAMPLE: AUDSA 060D w/HGBP (25% x .5 = 13% minimum unit capacity)
6. **If the minimum load requirement for split-system chillers** is less than a single unit minimum capacity step can provide, consider using two units of smaller size piped parallel, with the ***DB Director*** microcomputer linked together for proper System Control. See the Application Section of this catalog "Multiple Chiller Per Chilled Water System" on page 42.

UNIT FEATURES: QUIET AND *EXTRA QUIET* FAN OPERATION

Dunham-Bush units are quieter than most in the industry due to the design and construction of our units.

Scroll Compressors are considerably quieter than other types of compressors due to the smooth gas flow through the scroll compressor orbital compression cycle, small horsepower, and few moving parts.

Dunham-Bush standard condenser design uses 1140 RPM open dripproof condenser fan motors mounted in resilient motor supports.

Optional "***Extra Quiet* 855 RPM Fan and Fan Motors**" provide an "***Extra Quiet* Condenser**". Couple this with the "***Extra Quiet* Scroll Compressors"** and the **AUDS-A Condensing Units are very quiet, smooth operating units.**

The following chart provides sound levels for both the standard and *Extra Quiet* Option unit sound levels, based on ASHRAE Standard 370. All installations are different and offer varied amounts of radiated sound. Buildings, walls, fences, trees and shrubbery and distance, all affect the specific installed sound levels.

Table 8B **Standard and *Extra Quiet* Unit Sound Data**

Model	dBa @ 30 Feet Pressure Levels	
AUDS-A	**Standard 1140 RPM Fans**	***Extra Quiet* 855 RPM Fan - Option**
015S - 030S	65	59
025D - 055D	68	61
057D - 060D	70	63

Overall "A" Weighted Sound Pressure Level data listed above is based on sound power readings in accordance with ARI 370 Standard Sound Rating Ratings of Large Refrigerating and Air Conditioning Equipment. Measurements based at 30 feet distance from side of unit, and 5 feet above ground.

UNIT FEATURES: AIR COOLED CONDENSERS

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

All air cooled condensers are formed of 3/8 inch diameter copper tubes mechanically expanded into aluminum fins for maximum efficiency of heat transfer between the circulating refrigerant and air. The fins have full self-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.

See the electrical data for information on motor specifications on page 68.

A separate subcooling circuit is standard on all units to maximize energy efficiency.

Condenser Fan Section
Partitions separate each fan section to eliminate possible fan back spin and provide excellent head pressure controls. Two different fans cover the entire line and fan cycling control is supplied as standard. This lowers the minimum ambient temperature at which the packaged equipment will effectively start and operate. For lower ambient requirements than standard, variable speed options are available.

All cabinetry is heavy gauge galvanized steel construction with aluminum tube sheets. Control panels, fan decks, and header covers are coated with special high grade outdoor quality coating system tested to maintain integrity under the ASTM-B-117 specification.

UNIT FEATURES: REMOTE DX COOLER MODULES
RCH1, RCH2 and RCH 3

Water Coolers
The water coolers employ the most advanced vessel technology available today, including the patented Inner-Fin construction of the CH coolers. Larger vessels are designed and constructed to meet the requirements of the ASME Code, Section VIII, Division 1 for unfired pressure vessels and are stamped accordingly.

The CH model coolers have 1/2 inch diameter copper tubes brazed into tubesheets. The shells are constructed of steel and the entire assembly is welded and brazed for the best cost effectiveness possible. Vent and drain connections are included on all vessels.

See Table 9 below for appropriate pressure ratings, Table 45 for connection sizes, pressure drop curves and minimum/maximum flow rates.

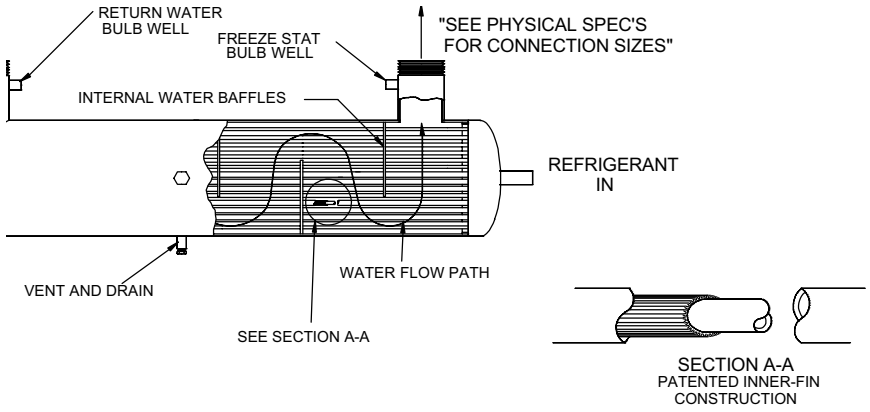
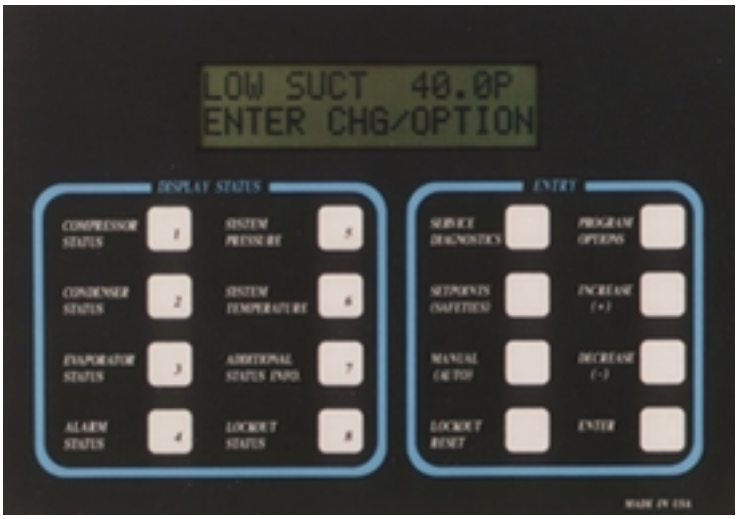


TABLE 9

Shell & Tube Heat Exchanger	Water Side		Refrigerant Side	
	Design Pressure (PSIG) (kPa)	Test Pressure (PSIG) (kPa)	Design Pressure (PSIG) (kPa)	Test Pressure (PSIG) (kPa)
Water Cooler CH	200 (1379)	300 (2068)	300 (2068)	375 (2586)

WINDOWS® BASED MICROCOMPUTER CONTROLLER



DB Director

Full Function Microcomputer Controller with Windows® Based PC Interface

Complementing our high-energy efficient product is a Full Function Microcomputer Controller designed to keep your system running at its most Energy Efficient Level, based on current load.

This system is designed as a Control 'State' (control status) microcomputer providing the user with the current Control State for the exact information on what the microcomputer is doing. Some of the main features of the controller are as follows:

- A large character LCD back-lit display that can be seen in bright or dim lighting.
- A 16 function keypad that is so user friendly it rarely requires a reference manual.
- A four-layer printed circuit board provides extremely high quality and unit control stability.
- A battery backed up Real Time Clock that should never need attention.
- An automatic power monitoring system that is designed to protect your system.
- Multiple authorization levels to provide complete security of the control system.
- Automatic history storage that provides data to a flexible static and dynamic graphing system.
- Extended temperature range of the ***DB Director*** to allow operation in either hot or cold climates, from -40°F (-40°C) to 140°F (60°C).
- A PC control programming download/pullback in only 45 seconds.
- Alarm information is provided in simple English for the previous 32 alarms, with data shown down to the second.
- The system provides 'last time' enabled & disabled, number cycles, and total run hours.
- A slope algorithm control function with all analogs read 10 times per second which provides unparalleled stability.
- A 'special control zone' based on leaving fluid temperature that reduces compressor cycling, and improves unit part load efficiency.
- A proactive compressor protection logic for protecting against low or high discharge pressure to minimize compressor cycling and nuisance trips.
- A Windows® based display providing all pertinent information on your 'PC'.
- A high speed RS232 port operating at 19,200 baud for connection to a local PC up to 100 feet (30 meters) away or a modem at 14,400 baud rate communications for remote communication.
- A high speed RS485 port for connection to a building management system, or PC at 38,400 baud rate communications up to 6000 feet (1829 meters) away from the chiller(s).

Display Information

All information is displayed using common terms that are easy to understand. It is a simple procedure to determine the actual status of the system and the individual circuits, as they are displayed in common terms that are meaningful. The 2 line by 16 extra large character alphanumeric liquid crystal display (LCD) utilizes easy to understand menu-driven software. The LCD displays eight character alphanumeric sensor names and twelve character alphanumeric set point names enabling the use of meaningful status names. This enables an inexperienced operator to quickly work through these menus to obtain the information they require or to modify control parameters. The well designed keypad is separated into a *DISPLAY STATUS* section and an *ENTRY* section each consisting of eight keys that are clearly labeled to identify the information that will be displayed. When data is being modified, the second display line contains help information to ensure that the desired modification is properly made. Easily accessible measurements include:

- Current capacity status
- Current circuit/compressor status
- Leaving chilled water temperature
- Evaporator pressure of each refrigerant circuit
- Condenser pressure of each refrigerant circuit
- Compressor elapsed run time, each compressor
- Number of compressor starts
- Compressor contactor status
- Fan on/off status
- Remote chilled water reset input (optional for remote cooler operation)
- Water flow switch status
- External start/stop command status
- Optional low ambient temperature sensor for easier cold ambient starting
- Optional low ambient lockout
- Optional entering fluid temperature monitoring
- Optional compressor amperage monitoring

Two proactive control features included in the microcomputer are low suction and high discharge pressure limiting. The second compressor in each circuit will shutdown if the discharge pressure exceeds the high pressure unload setpoint or if suction pressure from either refrigerant circuit approaches the low-pressure trip setpoint.

Capacity Control

Control is based upon leaving chilled water temperature. How fast the temperature is changing is calculated and capacity decisions are based upon the rate, the current temperature, and the control temperature zone. Capacity is never added if the system is moving toward the temperature target at an acceptable rate. The unit will monitor all control functions and stage the compressors to maintain the required operating capacity. Remote adjustment of the leaving chilled water setpoint is accomplished through either direct connection or a remote keypad to the microcomputer through the RS485 long distance differential communications port, via PC or a modem connected to the RS232 communication port, or from an external Building Automation System supplying a simple 0 to 5 VDC signal.

System Control

The unit may be enabled or disabled manually, or through the use of an external signal from a Building Automation System. In addition, the microcomputer may be programmed with a seven-day schedule or other DB control packages may start and stop the system through interconnecting wiring.

System Protection

The following system protection controls will automatically act to insure system reliability and protection of the unit:

- Low suction pressure limiting
- High discharge pressure limiting
- High motor temperature/over current
- Freeze protection (for optional remote cooler operation)
- Compressor run error
- Power loss
- Chilled water flow loss (for optional remote cooler operation)
- Sensor error
- Pump down and pumpout
- Anti-recycle
- Time delay between stages
- Load limiting via compressor current limiting (for optional remote cooler operation)

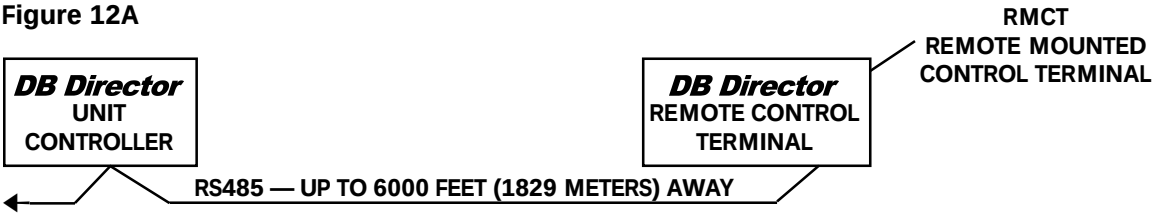
Remote Monitoring

The Microcomputer is equipped with a high speed RS232 communications port and two high speed RS485 communications ports, to allow for a variety of different remote monitoring operations. The RS232 communications port allows for remote communications at distances of up to 100 feet over a 4-wire shielded cable. The RS485 communication system allows for remote communications at up to 6000 feet (1829 meters) with a 2-wire shielded cable connection.

1) RMCT - Remote Mounted Control Terminal (Figure 12A)

This Remote Mounted Control Terminal (RMCT) is a stand alone Control Terminal to communicate and control the unit from a remote location up to 6000 feet (1829 meters) away, via the 485 communications port, when wired with a 2-wire shielded cable. The RMCT will then operate just like the controller in the unit. This enhanced version of the Remote Mounted Control Terminal with 8 relay outputs and 8 sensor inputs provides remote alarm capabilities and additional sensor inputs as may be required.

Figure 12A



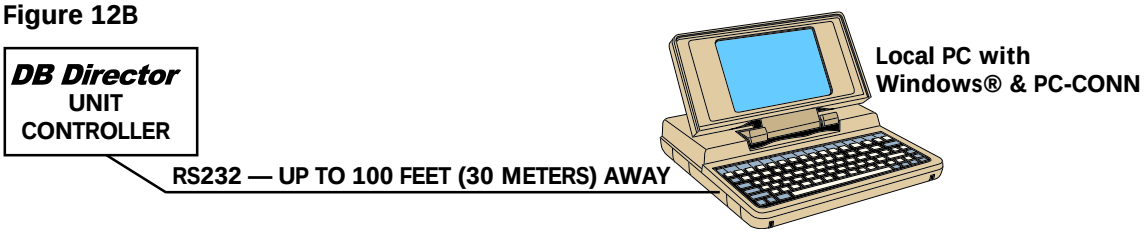
2) PCON - PC Connection:

The PC Connection program provides communications for complete operation of the condensing unit including graphing information. This option is available through two communications techniques as follows:

a) PCCB (Basic) (Figure 12B)

The standard communications for PCCB is via the RS232 connection which may be as far as 100 feet (30 meters) away from the condensing unit. Only one condensing unit can be accessed

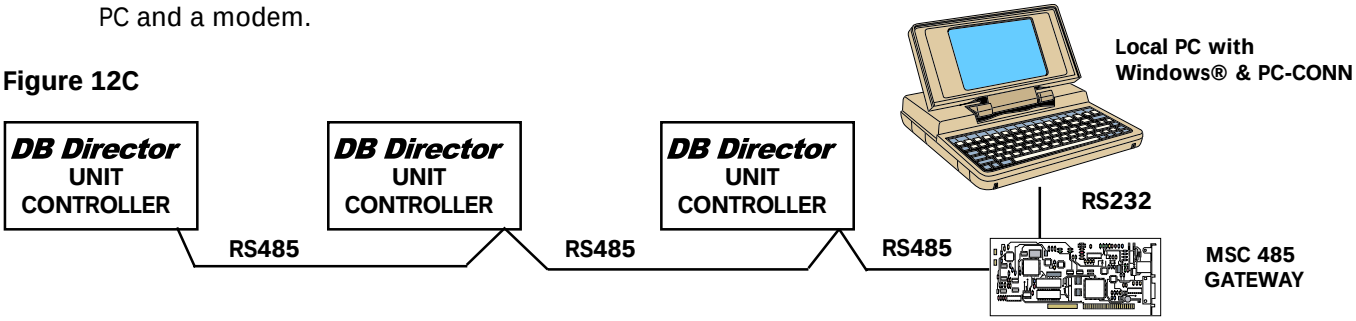
Figure 12B



b) PCCE (Enhanced) (Figure 12C)

The enhanced PCCE system allows for communications via the RS485 port and can be located as far as 6000 feet from the condensing unit(s). This option requires the addition of a gateway to convert the RS485 port back to a RS232 port and then may be connected to a modem or directly to a PC. One additional feature is that you may field install a manual AB switch, which allows switching between a local PC and a modem.

Figure 12C



As can be seen, the microcomputer system allows for a variety of remote connection capabilities for almost infinite flexibility. Utilizing the PC connection program, up to twenty condensing units connected via the RS485/RS232 ports can be monitored. The user may then select whichever condensing unit to review.

Unit Features: Optional Enclosures and Features

Optional plastic coated wire finguard. Available for upper half of unit (FGT) as shown on page 2, lower half of unit (FGB), or both.

Optional full length painted aluminum grilles (GRL) to protect condenser fins and mechanical components. This option also includes sheet metal enclosure panels for the unit ends.

Optional full length painted steel louvers (LUV) for the maximum protection for condenser fins and mechanical components. This option also includes sheet metal enclosure panels for the unit ends.

Optional weatherproof alarm bell (BEL2) to indicate a general alarm fault.

OPTIONS

Options ***are installed at the factory.***
Accessories ***are shipped unmounted.***

Extra Quiet Fan Operation (EQF)—using 855 RPM Fans and Scroll Compressors, provide the quietest operating refrigeration equipment possible. There is a slight capacity reduction caused by operating the unit with 855 RPM fans, however, the unit efficiency improves due to smaller fan motor HP. See the "Extra Quiet Unit" performance sections of this catalog on pages 32 through 38 and 54 through 61.

Copper Fin Condenser (CUF)—Copper fin and tube condenser.

Poly fin Condenser (PFC)—The material is a polyester paint baked onto the aluminum finstock prior to final manufacture, rather than material applied to the assembly after formation of the coils. The pre-painted fin material has been tested for salt spray corrosion resistance using ASTM B117 specification.

AUDS-A EVAPORATOR CONTROL MODES OF OPERATION (Select only one out of the eight AUDS-A Control Modes of Operation shown below)

"Split-System Chiller" Application Options:
(Select only one out of three "RCH" Modes shown below)

The ratings in the Catalog Performance Tables for Split-System Chillers require specific "RCH" Cooler Modules listed below:

1. **RCH1 - Standard Cooler Module** - for 44°F (6.5°C) leaving water temperature.
2. **RCH2 - Oversized Cooler Module** - for 42°F (5.5°C) leaving water temperature. This is required for water applications on Models AUDSA025D, 030D, 035D and 040D only.
3. **RCH3 - Oversized Cooler Module** - for 40°F (4.5°C) leaving water temperature. This is required for water applications on all AUDS-A models except AUDSA015S, 030S, and 060D.

"DX Air Handler" Application Options:

(Select only one out of the five DX Air Handler Control Modes shown below)

4. **RAH1 - DX Air Handler with Return Air Constant Volume Control,** and less than 30% outside air. Typical control range is 72°F to 80°F with specific points where stages turn On / Off. This mode is for normal comfort cooling only.
5. **RAH2 - DX Air Handler with Constant or Variable Air Volume Control,** with Leaving Air Temperature Sensing, with a dead-band inter-stage delay. A relatively large starting dead-band is required with typical leaving air temperature 15°F higher than set point before starting the first stage. Fresh air must be less than 30%, or use RAH3 option.

   If HGBP is required, it must be ordered for each circuit. Interlaced evaporator coil circuiting is required.

   Stacked Coils must have interlaced coil circuitry **for each coil-in-face.** The entire coil face area must be activated on the first step of cooling to eliminate by-pass air operation.
6. **RAH3 - DX Air Handler with Fresh Air Economizer,** Leaving Air Temperature Sensing for Constant or Variable Air Volume Controlled Systems. The outside air quantity can be up to 100% depending on the customer control of the economizer. Entering Air Enthalpy will be used to disable the unit below a set-point enthalpy, typically (25.0h).

   If HGBP is required, it must be ordered for each circuit. Interlaced evaporator coil circuitry is required. Stacked coils must have interlaced circuitry for each coil-in-face. The entire coil face area must be activated on the first step of cooling to eliminate by pass air operation.
7. **RAH4 - DX Air Handler for 100% Outside Air Control** for Constant or Variable Air Volume Controlled Systems. Control is based on leaving air temperature sensing. Entering outside air enthalpy will be used to disable the unit below a setpoint enthalpy (25.0h). This option must have HGBP on all circuits, wired with the liquid line solenoids. Re-heating the air may be necessary after over cooling for humidity control purposes.

   Interlaced evaporator coil circuiting is required. Stacked coils must have interlaced circuitry for each coil-in-face. The entire coil face area must

be activated on the first step of cooling to eliminate by-pass operation.

8. **RMAH - Multiple Evaporators with Suction Pressure Control,** controlled by customer supplied, contact closures to enable/disable each refrigerant circuit. When enabled, the first compressor on the circuit will start and stay on until disabled by the customer. The second compressor per circuit will be staged based on Suction Pressure Control.

   If HGBP is required, it must be ordered for each circuit.

Convenience Outlet (CON)—dual 3-prong ground fault receptacle powered from a dedicated transformer and fused for 15 amps.

Hot Gas Bypass (HGB1)—is for circuit #1 only to minimize compressor cycling when the "load" is less than the unit minimum mechanical capacity.

Hot Gas Bypass (HGB2)—is for dual circuit units where automatic compressor lead-lag is required and includes HGBP on both refrigerant circuits.

Low Ambient Control (LAC) TO 0°F (-17.8°C) Minimum Ambient—units use variable speed fans in conjunction with standard fan cycling.

Extra Low Ambient Control (ELAC) TO -20°F (-29°C) Minimum Ambient—includes LAC and EEV (Electronic Expansion Valve(s)) options for remote cooler operation and requires the use of 50% glycol and roughly 50% load to ensure extra low ambient starting, with a maximum of 5 MPH (8 KPH) wind.

Low Ambient Lock-out (LALO)—uses an ambient sensor and requires a lock-out set point entered into the microcomputer controller.

Unit Mounted Disconnect Switch (Non-fused) (UMD1)
—for 208 and 230 volt units - mounted in the control box with mechanical interlock through the door.

Unit Mounted Disconnect Switch (Non-fused) (UMD3)
—for 460 and 575 volt units
—mounted in the control box with mechanical interlock through the door.

Operating and Safety Lights (OSL)—lights indicating control power to the unit and faults for high discharge pressure, high motor temperature and alarm status.

Gauges (GAG2)—includes suction and discharge pressure for all unit models. The microcomputer displays discharge and suction pressure so these readings are redundant.

Louvers (Painted Galvanized Steel) (LUV)—for complete unit enclosure for general mechanical security and unit aesthetics.

Grille (Aluminum Painted) (GRL)—similar to the louver option except manufactured of aluminum with 3/8" X 3 1/2" slots instead of louvers for security and hail protection and unit aesthetics. Same unit enclosure as louvers, but much lighter weight and easy to handle.

Fin Guard Top (FGT) (1" x 4" Coated Wire)—protects the vertical condenser side coil only.

Fin Guard Bottom (FGB) (1" x 4" Coated Wire)—encloses the bottom compressor and condenser section of the unit only. Use FGT and FGB for full unit protection. This is the least expensive unit enclosure.

Over and Under Voltage and Phase Protection Relay (UVR2)—Combined relay offering protects against high and low incoming voltage conditions as well as single phasing, phase reversal and phase imbalance by opening the control circuit. It is an automatic reset device.

Circuit Breakers (CB)—provide additional short circuit protection for each compressor.

Electrical Panel Door Latch Solenoids (DLS)—to provide the security required by local codes. Main power must be disconnected to gain entry to power or control electrical panel for models AUDSA 015S-030S. On all other models the control panel can be accessed with a keylock override actuated switch. The power must be disconnected to gain entry to the high voltage power panel.

Weather Proof Alarm Bell (BEL2)—mounted and wired to indicate a common alarm fault.

OPTIONS (CONT.)

Unit Ground Fault Detector (GFD)—that takes the unit off line if a ground fault is detected.

500 Hour Salt Spray Coating (PNT)—special high-grade outdoor quality coating system tested to maintain integrity under the ASTM-B-117 specification.

Electronic Expansion Valves for Split-System Chiller Operation (EEV1)—for more precise control over a wide range of operating conditions such as dual mode air conditioning and thermal storage applications. The EEV option is supplied as part of the (ELAC) extra low ambient operation down to -20°F (-23.9°C) minimum ambient operation.

Electronic Expansion Valves for DX Air Handler Operation (EEV2)—ships loose for field installation in the air handler piping and requires wiring to the AUDS-A condensing unit control panel.

Remote Monitoring Modem (MOD1)—for single unit long distance communication, allows the system to be monitored, retrieve logs, and assist with investigating potential problems quickly and in a cost effective manner from a remote source.

Remote Monitoring Modem (MOD2)—for multiple condensing unit network long distance communication with the same features as MOD1, with the addition of a gateway to convert the RS485 ports for network operation.

Chiller*LINK* (CHLK)—for communication with (BMS) building management systems through N2 Bus, BacNet or Modbus. See Chiller*LINK* Data Acquisition Form SD202-22203.

Chilled Water Pump Control (CWPC)—for remote chiller operation provides a contact closure for pump starting prior to starting the chiller.

Auxiliary Control Module (ACM)—consisting of RWTM, UDL, LLC and CAM option package of special control functions.

- RWTM - Return Water (Fluid) Temperature Monitoring for split-system chiller operation is used for information only. Unit control is based on leaving water temperature with a specific temperature differential (range), so the return water temperature is for information only.

- UDL-Utility Demand Limiting—requires a remote analog input signal that is used to cycle compressors to limit electrical demand. The demand limiting can be one or two steps, based on the particular unit model. The required signal is 0 to 5VDC.

- LLC - Load Limiting Control—is based on compressor current limiting rather than return water temperature control load limiting method. This current limiting method is superior to return water temperature control method because it protects the compressor from over current while allowing the unit to run fully loaded when possible.

- **CAM -** Compressor Amp Monitoring—displays compressor amps for load monitoring and trend logging.

ACCESSORIES (SHIPPED LOOSE FOR FIELD MOUNTING)

Water Flow Switch (WFS) - paddle type field adjustable flow switch available for remote cooler operation. Must be tied into the unit safety circuit so that the package will remain off until water flow is proved. Helps prevent cooler freeze up. NEMA 3R enclosure, for use on water, ethylene or propylene glycol circuits.

Spring Isolators (SPG) - designed for 1" deflection, these housed spring assemblies have a neoprene friction pad on the bottom to help prevent the passage of noise and a spring locking leveling bolt at the top. Neoprene inserts prevent contact between the steel upper and lower housings. Suitable for more critical applications than RIS isolators.

Rubber-in-shear Isolators (RIS) - designed for ease of installation, these rubber, one piece, molded isolators have skid resistant baseplates. Applicable for most installations.

Weather Proof Bell (BEL1) - is a shipped-loose bell to be mounted remote of the unit and wired to the common alarm contacts in the unit by others.

PC Connection Basic (PCCB) - Provides communications via the RS232 connection port, for complete operation of the condensing unit, including graphing information, up to 100 feet (30 meters) from the packaged chiller. The PCONN software will be provided for use with a remote PC by others. See connection diagram page 12.

PC Connection Enhanced (PCCE) - Provides communications via the RS485 connection port, for complete operation of the condensing unit including graphing, up to 6000 feet (1829 meters) away. This option includes the addition of a gateway to convert the RS485 port of the ***DB Director*** to RS232, which then may be connected to a modem or directly to a PC. One additional feature is that a field supplied and installed AB switch can be added to allow switching between a local PC and a modem. The gateway and PCONN software will be supplied for use with a remote PC by others. See connection diagram page 12.

Remote Monitor-Control Terminal (RMCT) - is a stand alone microcomputer that interfaces with the microcomputer in the unit which provides all unit control functions, at a remote location.

Location and Space Requirements

AUDS-A Condensing Units are designed for outdoor application and can be installed on the roof or at grade level.

Proper locations and installation procedures for this equipment are very important to successful trouble free operation.

It is desirable to install these units with the Electric Box end of the unit facing into the prevailing breeze, to minimize re-circulation of the warm condenser discharge air back into the condenser.

Since the AUDS-A Condensing Units are air-cooled, it is important not to impede the air flow in or out of the condenser. Any re-circulation of warm condenser discharge air, or starvation of fresh cool air to the condenser, will cause a loss of capacity and higher operating costs due to higher condensing temperatures.

Unit Enclosures

Unit enclosures such as wire Fin Guards on the condenser vertical coil surface only, or full unit enclosures such as wire Fin Guards Top and Bottom, Full Length Aluminum Grills or Louvers will help protect from vandalism and dress the units up for grade level applications.

Fencing or Wall Enclosures

Fences or walls need to be designed to provide equipment security from vandalism, building and space esthetics, sufficient space for servicing the equipment, and supplying sufficient air flow to and from the condenser for proper unit operation. Free open area through and under fencing and walls should be considered carefully. The lack of sufficient cool air for the condensing unit can cause a loss of capacity and extra high operating costs.

Vertical Unit Clearance

There must not be any obstruction above the unit condenser fans that would impede the discharge air flow or cause re-circulation of warm discharge air back into the condensers. Ductwork should not be applied to the inlet or outlet of the unit condenser.

Lateral Unit Clearance

The unit must be installed with sufficient space all around for proper air supply and unit servicing.

See Installation Clearances on the last page of this catalog.

Roof Mounting

The unit should be installed on a level, steel channel or I-beam frame above the roof. The roof requires suitable strength to support the unit and mounting frame.

It is suggested that proper unit and piping vibration isolators, plus flexible electrical conduit connections be used to minimize sound and vibration that may otherwise be transmitted into the building.

An acoustical Engineer should always be consulted on critical sound and vibration applications. All state and local sound codes should be considered when laying out or installing mechanical equipment.

Ground Level Mounting

Ground or Grade level applications cause more installation concerns than roof top applications. At grade level, vandalism, sound, vibration and sufficient space for air supply to and from the condensers become more important.

The unit should be mounted on a level concrete slab or steel base. If a Concrete base is used it should be a one-piece level slab with a footer deep enough to extend below the frost line. Some grade level installations can be bolted down solid to the concrete slabs where noise and vibration is not a critical issue.

Grade Level Installations are often located near sound sensitive locations. Offices, meeting rooms, classrooms, living spaces and even sidewalks can be critical sound areas. These installations require careful consideration of methods to minimize sound and vibration.

Vibration eliminators are recommended under the unit and on piping and electrical conduit connected to the unit, to minimize sound transmission into the building.

An acoustical Engineer should always be consulted on critical sound and vibration applications.

All state and local sound codes should be considered when laying out or installing mechanical equipment.

Remote Cooler Module Mounting

The (RCH) Remote Cooler Module for Split-System Chiller applications can be mounted on the floor, shelf or wall supports, as well as on ceiling hangers of sufficient strenght to support the weight.

The (RCH) Remote Cooler Modules are fully assembled, piped and wired including water temperature sensors, refrigerant hand valve(s), solenoid valve(s), filter-dryer(s), sight-glass('s) and TX valve(s).

Refer to the Application Section for Split-System Chillers, for further detail information.

Remote Cooler - Freeze Protection

The ***DB Director*** monitors the leaving fluid temperature from the remote cooler module and will shut the unit down if a cooler freeze condition should occur.

A water flow switch should be supplied and mounted in the remote cooler water piping to protect the unit from low or no flow, which could cause cooler freezing.

Refrigerant Piping

Refrigerant piping should be designed according to the ASHRAE Standards for refrigerant piping to assure proper system operation. Specific details in the refrigerant piping design need to provide the following:

1. To assure proper refrigerant feed to the evaporator.
2. To provide proper refrigerant line sizing, without excessive pressure drop.
3. To assure return of the refrigerant oil back to the compressor at all operating conditions without slugging the compressor.
4. To provide proper suction line sizing to prevent slugging the compressor(s) with oil or liquid refrigerant, and maintain proper oil return to the compressor under all operating conditions.
5. To limit the length of refrigerant lines by locating the AUDS-A Condensing Unit as close to the cooler as possible.

Liquid Lines

Liquid line standard piping practice limits the liquid line losses to 1°F saturated temperature change or 2.9 psi pressure drop. The AUDS-A condensing unit(s) subcooler(s) provide 15°F subcooled liquid. This allows normal liquid lift without flashing before the expansion valve, up to 75 feet total suction line length, at full load.

Filter-Driers – For DX Air Handler Applications

Filter-Driers should be supplied by others, to assure clean moisture free operation, and should be piped as close to the evaporator expansion valve as possible.

On DX Air Handler Applications the refrigeration specialties are not supplied with the condensing unit and are to be supplied by others.

Filter-Driers – For (RCH) Remote Cooler Split-System Chiller Applications

Filter-Driers and other refrigerant specialties required are mounted and piped on the Remote Cooler Module Skid. After proper system piping and leak testing is complete, the filter/drier cores need to be installed in the field.

Suction Lines

Suction line piping standard practice limits the line losses to 2°F saturated temperature change or 2.9 psi pressure drop.

Suction lines should be designed as short as possible. They should be sized for proper suction pressure drop and suction lift to ensure oil return, at all operating conditions. Refrigerant circuits with unloaders or multiple compressors should be designed for proper oil return at the minimum circuit capacity without excessive pressure drop at full load.

The AUDS-A maximum saturated suction temperature should not be designed over 50°F at any condensing temperature. Contact our Application Engineering Department for special applications with conditions not listed in the performance tables.

Suction lines should be insulated to prevent loss of capacity and sweating indoors, and loss of capacity with high ambient temperature outdoors.

Electrical Connection Options

Refer to the Electrical Data Tables for specific electrical data required. All wiring must be done in accordance with the National Electric Code (NEC) and all local and state codes.

A typical wiring diagram is found near the back of this catalog. A complete set of wiring diagrams for all units can be found in the ACDS-A / AUDS-A Submittal Data Book form no. SD203-20000.

Unit Supply Voltages

(208/3/60, 230/3/60, 200/3/50, 460/3/60, 575/3/60, 400/3/50)

AUDSA015S – 060D units are standard, with **single point power source for above listed voltages.**

Refer to the Electrical Data Tables for detail information.

Power Sources

The term “Power Source” refers to the unit main power source.

The Control Power includes the compressor crankcase heater power, and is supplied by a unit mounted control transformer 115 Volt source.

Unit and Field Mounted Disconnects

“Disconnecting means” are described in Article 440 of the National Electric Code (NEC) which requires “disconnecting means capable of disconnecting air conditioning and refrigeration equipment including motor-compressors, and controllers from the circuit feeder”. Disconnects by others, should be selected and located within the NEC guidelines.

Location requirements per NEC, are that the disconnect be located in a readily accessible position within sight of the unit.

Maximum recommended fuse or HACR breaker sizes, are found in the Electrical Data Tables in this catalog.

Maximum wire sizes that the unit can accept, are listed in the Electrical Data Table in this catalog.

Control Circuits

Control circuit terminals are clearly marked on the electrical diagram found in the control panel for liquid line solenoid(s), electronic expansion valve(s) and all sensors used for Remote Cooler and DX Evaporator Control.

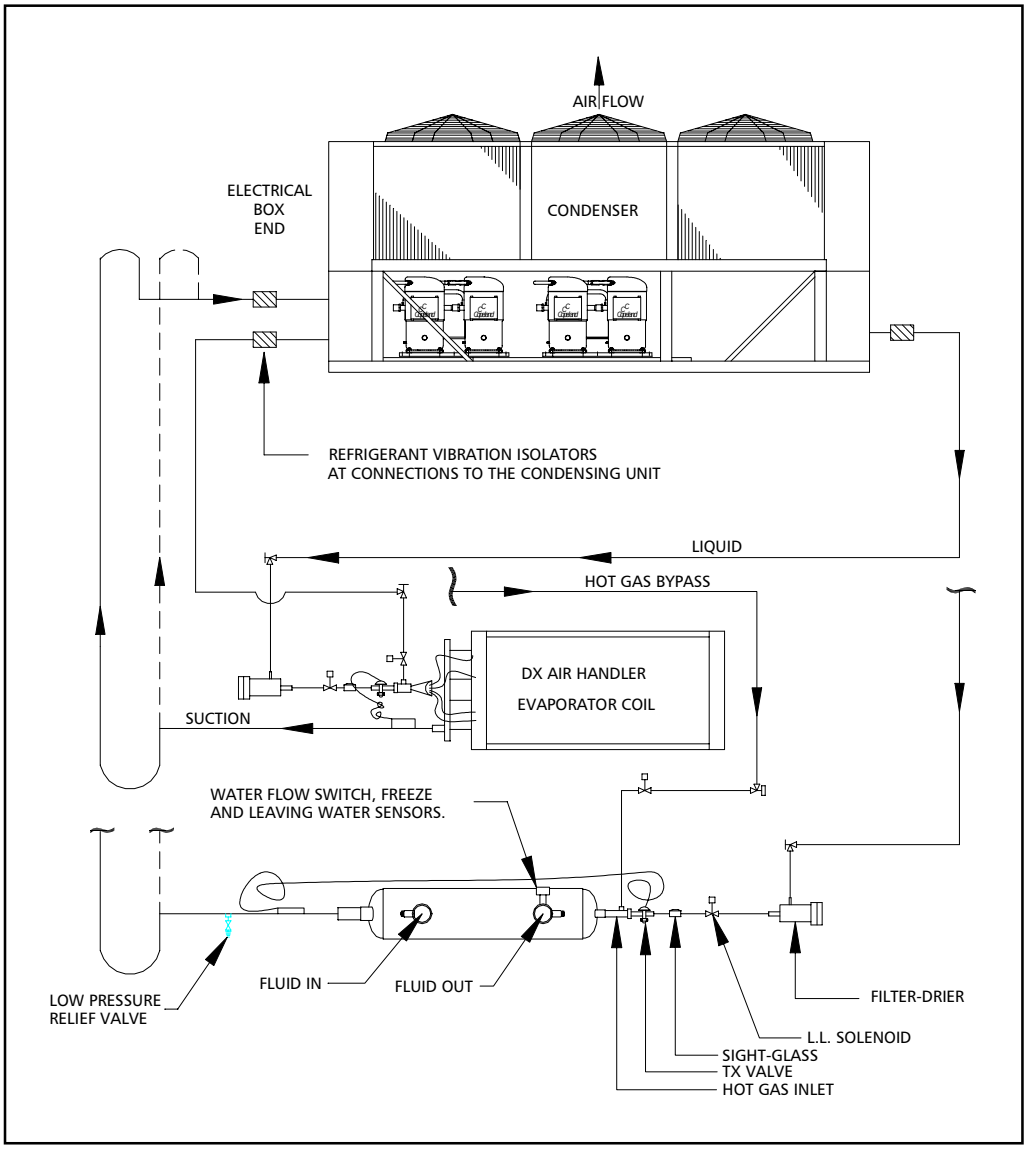
Typical Refrigerant Piping

Typical refrigerant piping is shown below and on the next page.

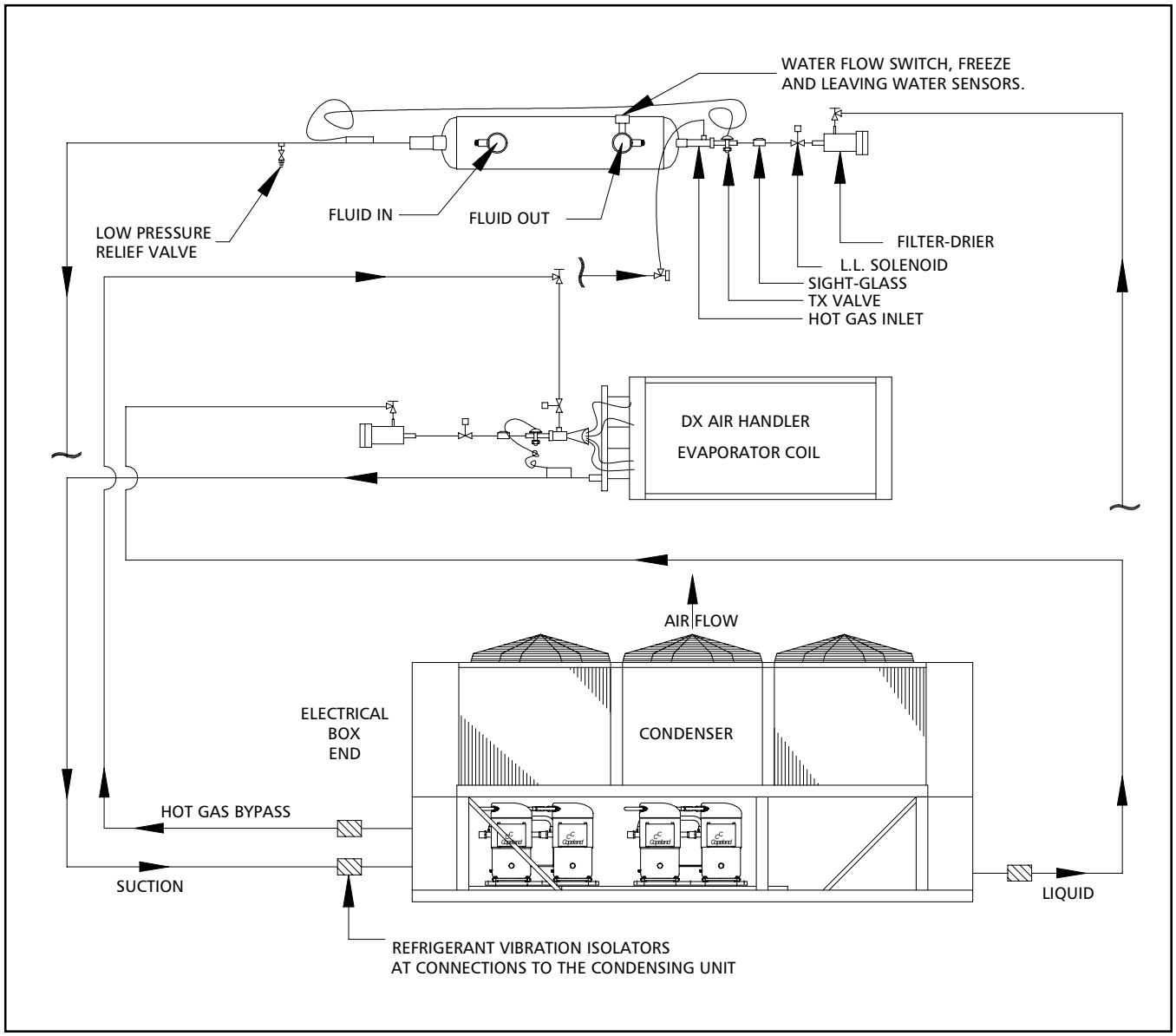
On **DX Air Handler** Applications the refrigeration specialties **are not supplied** with the condensing unit, and are to be supplied by others including the refrigerant piping vibration absorbers.

On **Remote Cooler** Split-System Chillers, the refrigeration specialties are supplied mounted, piped and wired to a junction box. Refrigerant piping vibration absorbers are not supplied with the Remote Cooler Module and are to be supplied and piped by others.

Typical Piping for Condensing Unit Above Evaporator



Typical Piping for Condensing Unit Below Evaporator



APPLICATION DATA: FOR CONDENSING UNITS WITH DX AIR HANDLERS • •

We offer six standard "Evaporator Control Modes of Operation". These control options include Split-System Chillers and Split-System DX Air Handler applications.

Contact our Application Engineering Department for other control functions or modifications of the five listed options.

AUDS-A Evaporator Control Modes of Operation

(Select only one out of the five below.)

Split-System Chiller Applications are covered on pages 38 to 45.

DX Air Handler Applications vary widely, from Return Air Constant Volume Systems to Variable Volume Systems with many variations of system control as listed below.

Contact our Application Engineering Department for help with other requirements not listed below.

Refer to the DX Air Handler Performance Tables for capacity data at saturated suction temperatures from 30°F to 50°F and design ambients from 85°F to 125°F.

DX Air Handler Application Options

The following "Evaporator Control Modes of Operation", describe briefly the basic function of the each system.

- **RAH1 – DX Air Handler with Return Air Constant Volume Control,** and less than 30% outside air. Typical control range is 72°F to 80°F with specific points where stages turn On / Off. This mode is for normal comfort cooling only.
- **RAH2 – DX Air Handler with Constant or Variable Air Volume Control**, with Leaving Air Temperature Sensing, with a dead-band interstage delay (typically ±5°F). A relatively large starting dead-band is required with typical leaving air temperature 15°F higher than set point before starting the first stage. Fresh air must be less than 30%, or use RAH3 option.

  If HGBP is required, it must be ordered for each circuit. Interlaced evaporator coil circuiting is required.

  Face Split Coils, must have interlaced coil circuitry **for each coil-in-face**, and be activated on the first step of cooling to eliminate by-pass air operation.
- **RAH3 – DX Air Handler with Fresh Air Economizer**, Leaving Air Temperature Sensing for Constant or Variable Air Volume controlled systems. The outside air quantity can be up to 100% depending on the customer control of the economizer. Entering Air Enthalpy will be used to disable the unit below a set-point enthalpy **(25.0h).**

  If HGBP is required, it must be ordered for each circuit. Interlaced evaporator coil circuitry is required. Face Split Coils must have interlaced circuitry **for each coil-in-face**, and be activated on the first step of cooling to eliminate by pass air operation.
- **RAH4 – DX Air Handler for 100% Outside Air** Control, for Constant or Variable Air Volume Controlled Systems. Control is based on leaving air temperature sensing. Entering outside air enthalpy will be used to disable the unit below a setpoint enthalpy (25.0h). This option must have HGBP on all circuits, wired with the liquid line solenoids. Re-heating the air may be necessary after over cooling for humidity control purposes. Interlaced evaporator coil circuitry is required. Face Split Coils must have interlaced circuitry **for each coil-in-face**, and be activated on the first step of cooling to eliminate by-pass operation.
- **RMAH - Multiple Evaporators with Suction Pressure Control**, controlled by customer supplied, contact closures to enable/disable each refrigerant circuit. When enabled, the first compressor on the circuit will start and stay on until disabled by the customer. The staging of the first and the second compressor per circuit will be staged based on that circuit's, **Suction Pressure Control** .

APPLICATION DATA: FOR DX AIR HANDLER APPLICATIONS

TYPICAL SEQUENCE OF OPERATION

RAH-1 - Return Air Temperature for Constant Volume Control

DB Director Microcomputer Controller

The following sequence of operation describes a two-compressor scroll condensing unit with constant air volume and return air temperature control. Operation is very similar for a four compressor unit.

For initial start-up, the following conditions must be met.

- All power supplied to the package energized for 24 hours prior to starting unit.
- Control power switch on.
- Compressor switches on.
- All safety conditions satisfied.
- Reset pressed on the microcomputer keypad if unit is in compressor LOCKOUT mode.
- Air handler unit fan or blower ON and air flow switch made.
- Customer control contact closed.
- Return air temperature higher than the Air Temperature setpoint plus Stage 1 Off setpoint plus the Stage Deadband setpoint.

Stage #1 - Increasing Load Sequence

After all above conditions are met, the microcomputer will call for compressor #1 to start. When the compressor #1 sensor input confirms that the compressor has started and after its suction pressure falls below the pumpdown cutout setpoint, the liquid line solenoid #1 is energized. **The first stage of capacity is now on-line.**

As discharge pressure of compressor #1 rises, fan #1 turns ON at the "Fan Stage 1 ON" setpoint. If discharge pressure continues to rise, the subsequent fan(s) will stage ON in increments of the "Condenser Differential" setpoint. For example, if the "Fan Stage 1 ON" is 190 psig and the "Condenser Differential" setpoint is 20, the stage on points will be 190, 210, 230. The microcomputer may automatically increase these settings if short cycling of fans is detected.

If discharge pressure falls, the fans will stage OFF at the "Fan Stage 2 OFF" setpoint plus corresponding number of "Condenser Differential" setpoints. For example, if the "Fan Stage 2 OFF" is 140 psig and the "Condenser Differential" setpoint is 20, the stage off points will be 140, 160, 180.

Stage #2 - Increasing Load Sequence

The next stage of unit capacity, which is when compressor #2 will start, will occur when the following conditions are met:

1. Minimum interstage time delay on increasing load of approximately 1 minute has expired.
2. Return air temperature is not falling rapidly or as desired.
3. Return air temperature is greater than the air temperature setpoint plus Stage 1 Off setpoint plus the Stage Deadband setpoint plus the Interstage Deadband setpoint.

If the above conditions are met, compressor #2 will start and the unit is now operating at full capacity.

Decreasing Load Sequence

As the applied load decreases and return air temperature falls below the air temperature setpoint plus Stage 1 Off setpoint plus the Interstage Deadband setpoint, stage 2 is turned off, compressor #2 cycles off.

If return air temperature continues to fall below the air temperature setpoint plus Stage 1 Off setpoint, stage 1 is turned off. Liquid line solenoid #1 is turned off. When circuit #1 suction pressure falls below the pumpdown-cutout setpoint, compressor #1 is turned off, and the fans are turned off.

When a refrigerant circuit is first put in standby mode, the condensing unit will pumpdown one or two times before staying OFF. After a time delay, if suction pressure rises above pumpdown-cut in setpoint a compressor will turn on with the liquid line solenoid closed. When suction pressure falls below pumpdown-cutout setpoint, the compressor will shut down.

Two proactive control features included in the microcomputer are low suction and high discharge pressure unload. If two compressors are operating on the circuit, the lag compressor will be cycled off if that circuit's discharge pressure exceeds the high pressure unload setpoint or if the suction pressure approaches the low pressure trip setpoint.

APPLICATION DATA: FOR DX AIR HANDLER APPLICATIONS

TYPICAL SEQUENCE OF OPERATION

RAH-2 - Leaving Air Temperature Control for Constant or Variable Air Volume Control
RAH-3 - Fresh Air Economizer for Constant or Variable Air Volume Control
RAH-4 - 100% Outside Air Temperature or Variable Air Volume Control

DB Director Microcomputer Controller

The following sequence of operation describes a two-compressor scroll compressor condensing unit with leaving air temperature control. Operation is very similar for a four compressor unit.

For initial start-up, the following conditions must be met.

- All power supplied to the package energized for 24 hours.
- Control power switch on.
- Compressor switches on.
- All safety conditions satisfied.
- Reset pressed on the microcomputer keypad if unit is in compressor LOCKOUT mode.
- Air handler fan switch or blower ON and air flow switch made.
- Customer control contact closed.
- Leaving air temperature higher than the Leaving Air Temperature setpoint plus the Start Deadband setpoint.
- If the unit is equipped with an entering air temperature/humidity sensor, the enthalpy measured must be higher than the Minimum Enthalpy setpoint.

Stage #1 - Increasing Load Sequence

After all above conditions are met, the microcomputer will call for compressor #1 to start. When the compressor #1 sensor input confirms that the compressor has started and when suction pressure falls below the pumpdown cutout setpoint, liquid line solenoid #1 becomes energized. **The first stage of capacity is now on-line.**

As discharge pressure of compressor #1 rises, fan #1 turns ON at the "Fan Stage 1 ON" setpoint. If discharge pressure continues to rise, the subsequent fans will stage ON in increments of the "Condenser Differential" setpoint. For example, if the "Fan Stage 1 ON" is 190 psig and the "Condenser Differential" setpoint is 20, the stage on points will be 190, 210, 230. The microcomputer may automatically increase these settings if short cycling of fans is detected.

If discharge pressure falls, the fans will stage OFF at the "Fan Stage 2 OFF" setpoint plus corresponding number of "Condenser Differential" setpoints. For example, if the "Fan Stage 2 OFF" is 140 psig and the "Condenser Differential" setpoint is 20, the stage off points will be 140, 160, 180.

Stage #2 - Increasing Load Sequence

If leaving air temperature is falling at a rate of approximately one degree per minute, no more stages of capacity will be added. After a minimum interstage delay of approximately one minute, if air temperature is not falling rapidly (or at a desired rate) and if the leaving air temperature is greater than the temperature setpoint plus "Control Zone +" setpoint, compressor #2 will start. The machine is now operating at full capacity.

Decreasing Load Sequence

As the applied load decreases and leaving air temperature falls below the air temperature setpoint minus a deadband setpoint called "Control Zone -", stage 2 is turned off. Compressor #2 is cycled off.

If the leaving air temperature continues to fall below air temperature setpoint minus "Control Zone -" setpoint, stage 1 is turned off. Liquid line solenoid #1 is turned off. When circuit #1 suction pressure falls below the pumpdown-cutout setpoint, compressor #1 and the fans are turned off.

When a refrigerant circuit is first put in standby mode, the condensing unit will pumpdown one or two times before staying OFF. After a time delay, if suction pressure rises above the pumpdown-cut in setpoint, a compressor will turn on with the liquid line solenoid closed. When suction pressure falls below pumpdown-cutout setpoint, the compressor will shut down.

Two proactive control features included in the microcomputer are low suction and high discharge pressure unload. If two compressors are operating on that circuit, the lag compressor will be cycled off if that circuit's discharge pressure exceeds the high pressure unload setpoint or if the suction pressure approaches the low pressure trip setpoint.

APPLICATION DATA: FOR DX AIR HANDLER APPLICATIONS

TYPICAL SEQUENCE OF OPERATION

RMAH - Suction Pressure Control - Multiple Evaporator Control

DB Director Microcomputer Controller

The following sequence of operation describes a two-compressor scroll condensing unit with suction pressure control. Operation is very similar for a four compressor unit.

For initial start-up, the following conditions must be met.

- All power supplied to the package energized for 24 hours.
- Control power switch on.
- Compressor switches on.
- All safety conditions satisfied.
- Reset pressed on the microcomputer keypad if unit is in compressor LOCKOUT mode.
- Air handler unit fan or blower ON and air flow switch made.
- Customer circuit 1 control contact closed.

Stage #1 - Increasing Load Sequence

After all above conditions are met, the microcomputer will call for compressor #1 to start. When the compressor #1 sensor input confirms that the compressor has started and after the suction pressure falls below the pumpdown cutout setpoint, the liquid line solenoid #1 is energized. The first stage of capacity is now on-line.

As discharge pressure of compressor #1 rises, fan #1 turns ON at the "Fan Stage 1 ON" setpoint. If discharge pressure continues to rise, the subsequent fans will stage ON in increments of the "Condenser Differential" setpoint. For example, if the "Fan Stage 1 ON" is 190 psig and the "Condenser Differential" setpoint is 20, the stage on points will be 190, 210, 230. The microcomputer may automatically increase these settings if short cycling of fans is detected.

If discharge pressure falls, the fans will stage OFF at the "Fan Stage 2 OFF" setpoint plus corresponding number of "Condenser Differential" setpoints. For example, if the "Fan Stage 2 OFF" is 140 psig and the "Condenser Differential" setpoint is 20, the stage off points will be 140, 160, 180.

Stage #2 - Increasing Load Sequence

If suction pressure is falling, no more stages of capacity will be added. However, if suction pressure is not falling rapidly (or at a desired rate) and if the suction pressure is greater than the suction pressure setpoint plus "Control Zone +" setpoint, compressor #2 will start. The machine is now operating at full capacity.

Decreasing Load Sequence

As the applied load decreases and the suction pressure falls below the suction pressure setpoint minus a deadband setpoint called "Control Zone -", compressor #2 cycles off. The circuit will not be turned off, however, until the Circuit control contact is opened by the customer. When the contact is opened, the corresponding liquid line solenoid is turned off. When the compressor suction pressure falls below the pumpdown-cutout setpoint, the compressor and fans are turned off.

When a refrigerant circuit is first put in standby mode, the condensing unit will pumpdown one or two times before staying OFF. After a time delay, if suction pressure rises above pumpdown-cut in setpoint, a compressor will turn on with the liquid line solenoid closed. When suction pressure falls below pumpdown-cutout setpoint, the compressor will shut down.

Two proactive control features included in the microcomputer are low suction and high discharge pressure unload. If two compressors are operating on that circuit, the lag compressor will be cycled off if that circuit's discharge pressure exceeds the high pressure unload setpoint or if the suction pressure approaches the low pressure trip setpoint.

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

SST	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE								
		85°F			95°F			105°F		
°F	MODEL	TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
25	015S	10.6	11.7	9.20	10.1	13.1	7.95	9.6	14.6	6.83
	020S	15.0	16.4	9.34	14.2	18.4	8.02	13.4	20.5	6.84
	025S	18.9	21.7	9.19	17.8	24.2	7.88	16.6	27.0	6.67
	027S	22.2	25.7	9.29	20.8	28.6	7.93	19.4	31.8	6.73
	030S	24.7	29.4	9.17	23.2	32.7	7.82	21.6	36.1	6.65
	025D	21.3	23.4	9.19	20.2	26.2	7.94	19.2	29.3	6.82
	030D	26.6	29.1	9.54	25.2	32.5	8.17	23.7	36.4	6.96
	035D	28.2	31.5	9.42	26.6	35.3	8.05	25.0	39.4	6.85
	040D	32.2	35.4	9.40	30.5	39.5	8.06	28.6	44.2	6.87
	045D	38.8	43.4	9.46	36.6	48.3	8.11	34.1	53.8	6.87
	050D	40.7	47.5	9.17	38.3	52.8	7.85	35.8	58.7	6.65
	055D	45.8	53.4	9.28	43.1	59.4	7.93	40.3	65.9	6.74
	057D	47.7	53.8	9.16	45.0	60.0	7.87	42.2	66.7	6.72
	060D	47.7	54.4	9.07	45.0	60.7	7.79	42.2	67.4	6.65
30	015S	11.8	11.8	10.10	11.2	13.2	8.74	10.7	14.8	7.51
	020S	16.7	16.6	10.24	15.8	18.6	8.79	14.8	20.8	7.50
	025S	20.9	22.2	10.02	19.8	24.7	8.60	18.5	27.5	7.30
	027S	24.6	26.3	10.11	23.1	29.3	8.63	21.6	32.5	7.32
	030S	27.3	30.0	9.97	25.7	33.4	8.50	24.0	37.0	7.23
	025D	23.6	23.7	10.09	22.4	26.5	8.72	21.3	29.7	7.50
	030D	29.5	29.5	10.45	27.9	33.1	8.95	26.3	37.0	7.62
	035D	31.3	32.0	10.30	29.6	35.9	8.81	27.8	40.1	7.49
	040D	35.8	36.0	10.28	33.8	40.2	8.83	31.8	44.9	7.52
	045D	43.1	44.3	10.31	40.7	49.3	8.85	38.0	55.0	7.51
	050D	45.2	48.5	9.99	42.6	54.0	8.55	39.8	60.1	7.25
	055D	50.8	54.5	10.11	47.8	60.7	8.63	44.7	67.4	7.34
	057D	52.9	54.5	10.05	50.0	60.9	8.62	46.9	67.8	7.36
	060D	52.9	55.1	9.95	50.0	61.6	8.53	46.9	68.6	7.28
35	015S	13.1	12.0	11.06	12.4	13.4	9.57	11.8	15.0	8.23
	020S	18.4	16.9	11.18	17.5	18.9	9.60	16.4	21.2	8.19
	025S	23.2	22.6	10.88	21.9	25.2	9.35	20.5	28.1	7.94
	027S	27.2	26.9	10.95	25.6	30.0	9.35	23.9	33.3	7.93
	030S	30.2	30.7	10.80	28.4	34.2	9.21	26.6	37.9	7.82
	025D	26.2	24.0	11.05	24.9	26.8	9.56	23.6	30.0	8.22
	030D	32.7	30.0	11.40	30.9	33.6	9.77	29.1	37.6	8.32
	035D	34.6	32.6	11.22	32.7	36.5	9.60	30.8	40.8	8.17
	040D	39.6	36.6	11.20	37.5	40.9	9.62	35.2	45.7	8.21
	045D	47.6	45.3	11.19	45.0	50.4	9.61	42.2	56.2	8.16
	050D	50.0	49.5	10.84	47.1	55.2	9.28	44.1	61.4	7.88
	055D	56.2	55.7	10.97	52.9	62.0	9.36	49.5	68.9	7.96
	057D	58.5	55.3	10.97	55.3	61.8	9.41	52.0	68.9	8.04
	060D	58.5	55.9	10.86	55.3	62.5	9.32	51.9	69.7	7.95

NOTES:
(1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

SST °F	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		115°F			120°F (See Note 6)			125°F (See Note 6)		
		TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
25	015S	9.0	16.4	5.82	8.7	17.4	5.33	8.3	18.4	4.87
	020S	12.5	22.9	5.81	12.0	24.2	5.34	11.6	25.5	4.90
	025S	15.3	30.0	5.57	14.5	31.6	5.06	13.8	33.3	4.57
	027S	17.9	35.1	5.66	17.1	36.9	5.17	16.3	38.7	4.72
	030S	20.1	39.8	5.65	19.3	41.7	5.20	18.6	43.6	4.79
	025D	18.0	32.9	5.81	17.4	34.8	5.33	16.7	36.8	4.86
	030D	22.1	40.6	5.89	21.3	42.8	5.41	20.5	45.2	4.96
	035D	23.3	43.9	5.79	22.5	46.4	5.32	21.6	48.9	4.87
	040D	26.6	49.2	5.81	25.6	51.9	5.32	24.5	54.8	4.86
	045D	31.4	59.9	5.73	29.9	63.1	5.20	28.3	66.4	4.70
	050D	32.9	65.1	5.57	31.4	68.5	5.08	29.9	72.0	4.61
	055D	37.3	72.8	5.70	35.8	76.3	5.23	34.3	80.0	4.80
	057D	39.4	73.8	5.73	37.9	77.4	5.28	36.5	81.2	4.87
	060D	39.3	74.6	5.67	37.9	78.3	5.23	36.5	82.1	4.82
30	015S	10.0	16.6	6.40	9.7	17.6	5.87	9.3	18.6	5.36
	020S	13.9	23.3	6.37	13.4	24.6	5.86	12.9	25.9	5.37
	025S	17.1	30.7	6.11	16.3	32.4	5.56	15.5	34.1	5.04
	027S	20.0	36.0	6.16	19.2	37.9	5.64	18.3	39.8	5.15
	030S	22.3	40.8	6.13	21.5	42.8	5.65	20.7	44.8	5.20
	025D	20.0	33.2	6.39	19.3	35.2	5.86	18.5	37.2	5.35
	030D	24.6	41.3	6.46	23.7	43.6	5.93	22.9	46.0	5.44
	035D	26.0	44.7	6.34	25.0	47.2	5.82	24.1	49.8	5.34
	040D	29.7	50.1	6.37	28.6	52.9	5.84	27.4	55.8	5.34
	045D	35.1	61.2	6.29	33.5	64.6	5.72	31.9	68.1	5.18
	050D	36.8	66.7	6.09	35.2	70.2	5.56	33.6	73.9	5.06
	055D	41.6	74.6	6.21	39.9	78.3	5.70	38.3	82.1	5.23
	057D	43.8	75.2	6.27	42.2	79.0	5.78	40.7	83.0	5.32
	060D	43.8	76.0	6.20	42.2	79.9	5.72	40.7	83.9	5.27
35	015S	11.1	16.8	7.01	10.7	17.8	6.43	10.3	18.8	5.88
	020S	15.4	23.7	6.96	14.9	25.0	6.40	14.3	26.4	5.87
	025S	19.0	31.3	6.66	18.2	33.1	6.07	17.4	34.9	5.52
	027S	22.2	36.9	6.69	21.3	38.8	6.12	--	--	--
	030S	24.8	41.9	6.63	23.8	44.0	6.10	--	--	--
	025D	22.2	33.6	7.00	21.4	35.6	6.43	20.6	37.6	5.87
	030D	27.3	42.0	7.05	26.3	44.3	6.48	25.4	46.8	5.94
	035D	28.8	45.6	6.91	27.8	48.1	6.35	26.8	50.8	5.82
	040D	32.9	51.0	6.95	31.7	53.9	6.38	30.5	56.9	5.84
	045D	39.0	62.6	6.85	37.4	66.0	6.25	35.7	69.7	5.67
	050D	40.9	68.3	6.62	39.2	71.9	6.05	37.5	75.8	5.51
	055D	46.1	76.4	6.73	44.3	80.3	6.18	--	--	--
	057D	48.6	76.5	6.84	46.9	80.5	6.30	45.2	84.7	5.80
	060D	48.5	77.4	6.76	46.8	81.5	6.23	45.1	85.6	5.74

NOTES:
(1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss
(6) **High Ambient Applications over 118°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

SST °F	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		85°F			95°F			105°F		
		TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
40	015S	14.5	12.2	12.08	13.8	13.6	10.46	13.1	15.2	9.00
	020S	20.4	17.2	12.16	19.3	19.2	10.44	18.2	21.5	8.92
	025S	25.6	23.1	11.78	24.2	25.7	10.12	22.7	28.7	8.60
	027S	30.0	27.6	11.81	28.2	30.7	10.09	26.4	34.1	8.56
	030S	33.0	31.4	11.56	31.2	35.0	9.87	29.3	38.8	8.41
	025D	28.9	24.4	12.06	27.5	27.2	10.44	26.1	30.4	8.98
	030D	36.1	30.6	12.39	34.1	34.2	10.62	32.2	38.2	9.05
	035D	38.2	33.2	12.18	36.1	37.2	10.42	34.0	41.5	8.87
	040D	43.7	37.3	12.17	41.3	41.6	10.46	38.9	46.5	8.92
	045D	52.5	46.3	12.11	49.6	51.5	10.40	46.5	57.4	8.84
	050D	55.1	50.7	11.71	52.0	56.4	10.03	48.7	62.8	8.52
	055D	61.8	56.9	11.82	58.3	63.4	10.10	54.7	70.5	8.60
	057D	64.6	56.2	11.94	61.0	62.8	10.24	57.4	70.0	8.74
	060D	64.5	56.8	11.82	61.0	63.5	10.14	57.4	70.8	8.65
45	015S	16.0	12.4	13.15	15.2	13.8	11.39	14.4	15.4	9.80
	020S	22.4	17.5	13.18	21.2	19.6	11.33	20.0	21.9	9.67
	025S	28.1	23.7	12.69	26.6	26.3	10.91	24.9	29.3	9.28
	027S	32.6	28.3	12.56	30.8	31.4	10.76	28.9	35.0	9.16
	030S	35.9	32.2	12.27	33.9	35.9	10.50	31.8	39.8	8.94
	025D	31.9	24.8	13.13	30.4	27.6	11.38	28.8	30.9	9.79
	030D	39.7	31.1	13.42	37.6	34.8	11.50	35.4	38.9	9.81
	035D	42.0	33.9	13.17	39.7	37.9	11.28	37.4	42.3	9.60
	040D	48.1	38.0	13.17	45.5	42.4	11.32	42.8	47.4	9.66
	045D	57.8	47.4	13.04	54.6	52.6	11.21	51.2	58.6	9.54
	050D	60.4	51.9	12.55	57.0	57.7	10.77	53.5	64.3	9.17
	055D	67.5	58.3	12.64	63.7	64.9	10.81	59.8	72.2	9.20
	057D	71.0	57.2	12.93	67.1	63.9	11.10	63.2	71.3	9.48
	060D	71.0	57.8	12.80	67.1	64.6	10.99	63.2	72.1	9.38
50	015S	17.6	12.6	14.27	16.8	14.1	12.37	15.9	15.7	10.65
	020S	24.6	17.8	14.24	23.3	19.9	12.24	21.9	22.3	10.46
	025S	30.8	24.3	13.63	29.1	26.9	11.73	27.3	30.0	9.99
	027S	35.3	29.0	13.28	33.4	32.3	11.40	31.4	35.9	9.71
	030S	38.9	33.1	12.97	36.8	36.8	11.10	34.6	40.9	9.47
	025D	35.2	25.3	14.25	33.5	28.1	12.35	31.8	31.4	10.64
	030D	43.6	31.8	14.48	41.3	35.5	12.42	38.9	39.6	10.59
	035D	46.2	34.6	14.19	43.6	38.7	12.16	41.0	43.2	10.35
	040D	52.8	38.8	14.20	50.0	43.3	12.21	47.0	48.3	10.43
	045D	63.3	48.5	13.97	59.9	53.9	12.04	56.2	60.0	10.25
	050D	65.8	53.2	13.38	62.2	59.1	11.49	58.4	65.8	9.79
	055D	73.2	59.8	13.39	69.3	66.6	11.48	65.2	74.0	9.79
	057D	77.9	58.4	13.94	73.7	65.1	11.99	69.4	72.6	10.24
	060D	77.9	59.0	13.80	73.7	65.8	11.86	69.4	73.4	10.13

NOTES:
(1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

SST	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE								
		115°F			120°F (See Note 6)			125°F (See Note 6)		
°F	MODEL	TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
40	015S	12.3	17.0	7.67	11.8	18.0	7.04	11.4	19.0	6.43
	020S	17.0	24.1	7.57	16.4	25.4	6.96	15.8	26.8	6.39
	025S	21.0	32.0	7.23	20.2	33.8	6.60	19.3	35.7	6.01
	027S	24.5	37.9	7.22	23.6	39.9	6.62	--	--	--
	030S	27.3	43.0	7.14	26.3	45.1	6.58	--	--	--
	025D	24.5	34.1	7.65	23.7	36.0	7.03	22.7	38.1	6.43
	030D	30.1	42.7	7.67	29.1	45.1	7.05	28.0	47.6	6.46
	035D	31.8	46.4	7.51	30.7	49.0	6.89	29.6	51.7	6.32
	040D	36.4	51.9	7.56	35.1	54.9	6.94	33.8	57.9	6.36
	045D	43.2	64.0	7.44	41.5	67.5	6.79	39.6	71.2	6.18
	050D	45.2	69.9	7.17	43.4	73.7	6.56	--	--	--
	055D	50.9	78.2	7.28	49.1	82.3	6.68	--	--	--
	057D	53.7	77.9	7.44	51.8	82.1	6.85	50.0	86.4	6.31
	060D	53.7	78.8	7.36	51.8	83.0	6.78	50.0	87.4	6.24
45	015S	13.6	17.3	8.36	13.1	18.2	7.68	12.6	19.3	7.02
	020S	18.7	24.5	8.21	18.1	25.8	7.55	17.4	27.3	6.94
	025S	23.2	32.7	7.82	22.3	34.5	7.15	21.4	36.5	6.51
	027S	27.0	38.8	7.76	26.0	40.9	7.12	--	--	--
	030S	29.8	44.1	7.60	--	--	--	--	--	--
	025D	27.1	34.5	8.34	26.1	36.5	7.67	25.1	38.6	7.01
	030D	33.1	43.5	8.31	32.0	45.9	7.64	30.9	48.5	7.01
	035D	35.0	47.3	8.13	33.8	49.9	7.46	32.6	52.7	6.84
	040D	40.1	52.9	8.19	38.6	55.9	7.52	37.2	59.0	6.89
	045D	47.6	65.4	8.03	45.8	69.0	7.34	--	--	--
	050D	49.8	71.5	7.73	47.9	75.4	7.08	--	--	--
	055D	55.9	80.2	7.80	53.9	84.4	7.17	--	--	--
	057D	59.2	79.4	8.06	57.1	83.6	7.43	55.1	88.1	6.84
	060D	59.1	80.3	7.98	57.1	84.6	7.35	55.1	89.1	6.76
50	015S	14.9	17.5	9.09	14.4	18.5	8.35	13.9	19.6	7.64
	020S	20.6	24.9	8.88	19.9	26.3	8.17	19.2	27.8	7.50
	025S	25.5	33.4	8.42	24.5	35.3	7.70	--	--	--
	027S	29.3	39.9	8.23	--	--	--	--	--	--
	030S	32.4	45.4	8.05	--	--	--	--	--	--
	025D	29.9	35.1	9.07	28.8	37.1	8.34	27.7	39.2	7.63
	030D	36.4	44.2	8.98	35.2	46.7	8.25	33.9	49.3	7.57
	035D	38.4	48.2	8.77	37.1	50.9	8.05	--	--	--
	040D	44.0	53.9	8.85	42.5	56.9	8.12	40.9	60.1	7.45
	045D	52.3	66.8	8.64	50.3	70.6	7.91	--	--	--
	050D	54.5	73.2	8.27	--	--	--	--	--	--
	055D	61.0	82.2	8.32	--	--	--	--	--	--
	057D	65.0	80.9	8.71	62.9	85.3	8.02	60.7	89.9	7.39
	060D	65.0	81.8	8.62	62.8	86.3	7.94	60.7	90.9	7.31

NOTES:
(1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss
(6) **High Ambient Applications over 118°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

SST °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		30°C			35°C			40°C		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
5.0	015S	51.7	12.4	3.55	49.4	13.6	3.12	47.1	15.1	2.72
	020S	72.6	17.4	3.57	69.1	19.3	3.11	65.5	21.4	2.70
	025S	91.1	23.5	3.45	86.6	25.9	3.01	81.8	28.5	2.60
	027S	106.7	28.0	3.45	101.2	30.8	3.00	95.4	33.9	2.59
	030S	117.5	31.9	3.38	111.5	35.1	2.93	105.3	38.6	2.54
5.0	025D	103.2	24.7	3.55	98.7	27.3	3.11	94.1	30.2	2.72
	030D	128.7	31.0	3.63	122.4	34.3	3.16	116.0	37.9	2.74
	035D	136.2	33.7	3.57	129.5	37.3	3.10	122.6	41.2	2.69
	040D	155.8	37.8	3.57	148.3	41.8	3.11	140.4	46.2	2.70
	045D	187.4	47.0	3.55	178.0	51.7	3.09	168.0	57.0	2.68
	050D	196.4	51.5	3.43	186.3	56.7	2.98	175.8	62.4	2.58
	055D	220.0	57.8	3.46	208.7	63.7	3.00	197.1	70.1	2.60
	057D	230.2	57.0	3.50	218.8	63.0	3.05	207.0	69.5	2.65
	060D	230.2	57.7	3.47	218.7	63.7	3.02	207.0	70.3	2.62

NOTES: (1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. COP is for entire unit. See Electrical Data Tables on pages 68, 69 and 70 for fan kW.
(3) Performance shown is based on 0°F Suction Line Loss

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

SST °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		45°C			49°C (See Note 4)			52°C (See Note 4)		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
5.0	015S	44.6	16.7	2.36	42.4	18.1	2.09	40.6	19.2	1.90
	020S	61.8	23.6	2.33	58.8	25.5	2.07	56.6	27.1	1.89
	025S	76.7	31.5	2.23	72.3	34.0	1.96	68.9	36.1	1.77
	027S	89.4	37.3	2.22	84.4	40.1	1.96	--	--	--
	030S	99.1	42.4	2.19	94.2	45.5	1.95	--	--	--
5.0	025D	89.2	33.4	2.36	84.8	36.2	2.09	81.2	38.4	1.90
	030D	109.4	41.9	2.36	104.1	45.4	2.09	100.1	48.1	1.91
	035D	115.5	45.5	2.31	109.8	49.3	2.05	105.5	52.2	1.86
	040D	132.3	51.0	2.33	125.6	55.2	2.06	120.5	58.5	1.87
	045D	157.5	62.8	2.29	148.5	68.0	2.01	141.5	72.0	1.82
	050D	164.8	68.7	2.21	155.6	74.2	1.95	--	--	--
	055D	185.3	77.0	2.24	175.7	82.9	1.98	--	--	--
	057D	195.2	76.6	2.29	185.6	82.6	2.03	178.5	87.2	1.86
	060D	195.1	77.4	2.26	185.6	83.5	2.01	178.4	88.2	1.84

NOTES: (1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. COP is for entire unit. See Electrical Data Tables on pages 68, 69 and 70 for fan kW.
(3) Performance shown is based on 0°F Suction Line Loss
(4) High Ambient Applications over 48°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

SST	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE								
		85°F			95°F			105°F		
°F	MODEL	TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
25	015S	10.6	12.1	9.52	10.1	13.6	8.16	9.6	15.2	6.96
	020S	15.0	17.1	9.63	14.2	19.1	8.20	13.3	21.3	6.95
	025S	18.8	22.8	9.24	17.7	25.4	7.85	16.4	28.3	6.58
	027S	22.0	27.2	9.17	20.6	30.2	7.78	19.1	33.4	6.55
	030S	24.3	31.4	8.86	22.8	34.7	7.54	21.3	38.3	6.40
	025D	21.3	24.3	9.50	20.2	27.2	8.15	19.1	30.5	6.95
	030D	26.6	30.5	9.64	25.1	34.1	8.20	23.5	38.1	6.94
	035D	28.1	33.2	9.44	26.5	37.1	8.02	24.8	41.4	6.78
	040D	32.2	36.9	9.62	30.3	41.3	8.19	28.4	46.0	6.92
	045D	38.7	45.6	9.51	36.3	50.7	8.07	33.7	56.4	6.77
	050D	40.5	50.0	9.14	38.0	55.6	7.75	35.3	61.7	6.52
	055D	45.5	56.8	9.09	42.7	63.0	7.73	39.7	69.7	6.53
	057D	47.6	56.1	9.37	44.8	62.5	7.99	41.9	69.3	6.79
	060D	47.6	56.7	9.27	44.8	63.2	7.90	41.9	70.1	6.71
30	015S	11.8	12.3	10.42	11.2	13.8	8.94	10.6	15.5	7.62
	020S	16.6	17.4	10.51	15.7	19.5	8.95	14.8	21.7	7.59
	025S	20.9	23.4	10.03	19.6	26.0	8.53	18.3	29.0	7.17
	027S	24.3	28.0	9.87	22.9	31.1	8.39	21.3	34.4	7.09
	030S	26.7	32.2	9.45	25.0	35.7	8.04	23.4	39.4	6.83
	025D	23.6	24.7	10.40	22.4	27.6	8.93	21.2	30.9	7.61
	030D	29.5	31.1	10.51	27.8	34.8	8.94	26.1	38.9	7.57
	035D	31.2	33.9	10.27	29.4	37.9	8.73	27.6	42.3	7.38
	040D	35.7	37.7	10.48	33.7	42.1	8.92	31.6	47.0	7.55
	045D	42.9	46.7	10.31	40.4	52.0	8.77	37.5	57.9	7.37
	050D	44.9	51.3	9.89	42.2	57.0	8.40	39.3	63.4	7.07
	055D	50.1	58.3	9.78	47.1	64.7	8.31	43.9	71.6	7.03
	057D	52.8	57.1	10.23	49.7	63.6	8.72	46.6	70.7	7.40
	060D	52.8	57.7	10.12	49.7	64.3	8.62	46.6	71.5	7.32
35	015S	13.1	12.5	11.36	12.4	14.0	9.76	11.8	15.7	8.32
	020S	18.4	17.7	11.43	17.4	19.8	9.73	16.4	22.2	8.25
	025S	23.1	23.9	10.84	21.7	26.7	9.22	20.3	29.7	7.76
	027S	26.6	28.7	10.51	25.0	31.9	8.94	23.3	35.4	7.56
	030S	29.1	33.1	10.05	27.3	36.7	8.55	25.5	40.6	7.26
	025D	26.2	25.1	11.35	24.9	28.1	9.75	23.5	31.4	8.31
	030D	32.6	31.8	11.41	30.8	35.5	9.71	28.9	39.7	8.22
	035D	34.5	34.6	11.14	32.5	38.7	9.46	30.5	43.2	8.00
	040D	39.5	38.5	11.37	37.3	43.0	9.69	35.0	48.0	8.20
	045D	47.5	47.9	11.14	44.7	53.3	9.47	41.6	59.4	7.97
	050D	49.4	52.6	10.61	46.4	58.6	9.02	43.3	65.1	7.61
	055D	54.8	59.8	10.43	51.6	66.5	8.88	48.2	73.6	7.52
	057D	58.4	58.1	11.13	55.0	64.8	9.48	51.6	72.1	8.04
	060D	58.4	58.8	11.01	55.0	65.6	9.37	51.6	72.9	7.95

NOTES: (1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

SST	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE								
		115°F (See Note 6)			120°F (See Note 6)			125°F (See Note 6)		
°F	MODEL	TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
25	015S	9.0	17.1	5.86	8.6	18.1	5.35	8.2	19.1	4.84
	020S	12.4	23.8	5.85	11.9	25.1	5.36	11.5	26.4	4.91
	025S	15.0	31.4	5.44	14.2	33.1	4.91	13.4	34.8	4.41
	027S	17.6	36.9	5.48	16.7	38.6	4.99	--	--	--
	030S	19.7	42.0	5.43	19.0	43.9	5.00	--	--	--
	025D	17.9	34.2	5.85	17.2	36.1	5.34	16.4	38.2	4.84
	030D	21.9	42.4	5.84	21.1	44.7	5.35	20.3	47.2	4.89
	035D	23.1	46.1	5.70	22.2	48.6	5.21	21.3	51.2	4.76
	040D	26.3	51.2	5.80	25.3	54.0	5.30	24.2	56.9	4.82
	045D	30.7	62.7	5.60	29.1	66.0	5.05	27.5	69.4	4.53
	050D	32.3	68.3	5.42	30.7	71.7	4.91	--	--	--
	055D	36.6	76.7	5.50	35.1	80.3	5.04	--	--	--
	057D	39.0	76.5	5.76	37.6	80.2	5.30	36.1	84.0	4.88
	060D	39.0	77.4	5.69	37.6	81.1	5.24	36.1	85.0	4.82
30	015S	10.0	17.3	6.43	9.6	18.3	5.86	9.1	19.3	5.32
	020S	13.8	24.2	6.40	13.3	25.6	5.86	12.8	27.0	5.36
	025S	16.8	32.2	5.94	16.0	34.0	5.38	15.1	35.8	4.85
	027S	19.6	38.0	5.93	18.7	39.9	5.41	--	--	--
	030S	21.7	43.3	5.79	--	--	--	--	--	--
	025D	19.9	34.6	6.42	19.1	36.6	5.85	18.3	38.7	5.31
	030D	24.4	43.3	6.37	23.5	45.7	5.84	22.6	48.2	5.34
	035D	25.7	47.1	6.21	24.7	49.7	5.68	23.8	52.4	5.19
	040D	29.4	52.3	6.34	28.2	55.2	5.79	27.0	58.2	5.28
	045D	34.4	64.4	6.11	32.7	67.8	5.53	31.0	71.4	4.98
	050D	36.1	70.2	5.89	34.4	73.9	5.35	--	--	--
	055D	40.6	79.0	5.93	39.0	82.8	5.44	--	--	--
	057D	43.4	78.2	6.27	41.8	82.1	5.77	40.2	86.1	5.31
	060D	43.4	79.1	6.20	41.8	83.1	5.70	40.2	87.1	5.25
35	015S	11.0	17.6	7.02	10.6	18.6	6.41	10.1	19.6	5.82
	020S	15.3	24.7	6.96	14.7	26.1	6.38	14.2	27.5	5.84
	025S	18.7	33.1	6.45	17.8	34.9	5.85	--	--	--
	027S	21.6	39.2	6.35	--	--	--	--	--	--
	030S	23.8	44.7	6.15	--	--	--	--	--	--
	025D	22.0	35.1	7.01	21.2	37.1	6.40	20.2	39.2	5.81
	030D	27.0	44.2	6.92	26.0	46.7	6.34	25.0	49.2	5.80
	035D	28.5	48.1	6.73	27.4	50.8	6.17	--	--	--
	040D	32.6	53.5	6.89	31.3	56.4	6.30	30.1	59.5	5.75
	045D	38.3	66.1	6.63	36.5	69.7	6.01	--	--	--
	050D	40.0	72.2	6.36	--	--	--	--	--	--
	055D	44.8	81.3	6.35	--	--	--	--	--	--
	057D	48.1	79.9	6.81	46.4	84.0	6.26	44.7	88.2	5.76
	060D	48.1	80.9	6.73	46.4	85.0	6.19	44.6	89.2	5.69

NOTES:
(1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss
(6) **High Ambient Applications over 113°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

SST	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE								
		85°F			95°F			105°F		
°F	MODEL	TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
40	015S	14.5	12.8	12.36	13.8	14.3	10.62	13.0	16.0	9.06
	020S	20.3	18.1	12.38	19.2	20.2	10.55	18.0	22.6	8.94
	025S	25.3	24.6	11.61	23.9	27.3	9.91	22.4	30.5	8.37
	027S	28.9	29.5	11.14	27.2	32.8	9.48	25.4	36.4	8.02
	030S	31.6	34.1	10.63	29.7	37.8	9.05	27.8	41.9	7.68
	025D	28.9	25.6	12.34	27.5	28.5	10.60	26.0	31.9	9.05
	030D	36.0	32.4	12.34	34.0	36.3	10.50	31.9	40.5	8.89
	035D	38.0	35.4	12.02	35.9	39.6	10.22	33.7	44.2	8.65
	040D	43.6	39.3	12.29	41.2	43.9	10.48	38.6	49.0	8.87
	045D	51.9	49.2	11.89	49.0	54.7	10.15	45.9	60.9	8.57
	050D	53.9	54.1	11.29	50.8	60.1	9.62	47.5	66.9	8.13
	055D	59.7	61.5	11.07	56.2	68.3	9.42	52.6	75.7	7.99
	057D	64.4	59.2	12.05	60.7	66.1	10.27	56.9	73.6	8.71
	060D	64.4	59.9	11.92	60.7	66.9	10.15	56.9	74.4	8.61
45	015S	16.0	13.0	13.40	15.2	14.5	11.52	14.4	16.2	9.83
	020S	22.4	18.5	13.35	21.1	20.6	11.38	19.9	23.1	9.65
	025S	27.5	25.2	12.31	26.0	28.0	10.52	24.4	31.2	8.90
	027S	31.4	30.4	11.74	29.5	33.8	10.00	27.6	37.5	8.47
	030S	34.3	35.1	11.20	32.3	39.0	9.53	30.2	43.2	8.10
	025D	31.9	26.1	13.38	30.3	29.1	11.50	28.7	32.5	9.82
	030D	39.6	33.2	13.29	37.4	37.1	11.31	35.1	41.4	9.59
	035D	41.7	36.3	12.87	39.3	40.5	10.96	37.0	45.2	9.29
	040D	48.0	40.3	13.23	45.3	44.9	11.28	42.5	50.1	9.56
	045D	56.4	50.5	12.60	53.3	56.2	10.76	49.9	62.5	9.11
	050D	58.5	55.6	11.94	55.2	61.8	10.18	51.7	68.7	8.62
	055D	64.7	63.3	11.68	61.0	70.3	9.95	57.2	78.0	8.45
	057D	70.8	60.5	12.99	66.8	67.5	11.07	62.7	75.2	9.40
	060D	70.8	61.2	12.85	66.8	68.3	10.95	62.7	76.0	9.29
50	015S	17.6	13.3	14.48	16.7	14.9	12.45	15.8	16.6	10.63
	020S	24.6	18.9	14.35	23.2	21.1	12.24	21.8	23.6	10.38
	025S	29.8	25.9	13.00	28.2	28.8	11.12	26.4	32.1	9.42
	027S	33.9	31.4	12.32	31.9	34.9	10.51	29.9	38.7	8.91
	030S	37.1	36.3	11.72	34.9	40.3	10.00	32.7	44.6	8.50
	025D	35.2	26.7	14.46	33.5	29.7	12.44	31.6	33.2	10.62
	030D	43.4	34.0	14.24	41.0	38.0	12.15	38.5	42.3	10.29
	035D	45.4	37.2	13.71	42.9	41.5	11.69	40.3	46.3	9.91
	040D	52.3	41.2	14.12	49.5	45.9	12.07	46.5	51.2	10.25
	045D	61.1	51.9	13.29	57.7	57.7	11.37	54.1	64.2	9.63
	050D	63.4	57.2	12.57	59.8	63.6	10.73	56.0	70.7	9.09
	055D	70.0	65.2	12.27	66.0	72.4	10.47	61.9	80.4	8.89
	057D	77.6	62.0	13.93	73.3	69.1	11.89	68.8	76.9	10.10
	060D	77.6	62.7	13.78	73.2	69.9	11.76	68.8	77.8	9.98

NOTES: (1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

SST °F	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		115°F (See Note 6)			120°F (See Note 6)			125°F (See Note 6)		
		TONS	KW	EER	TONS	KW	EER	TONS	KW	EER
40	015S	12.2	17.8	7.64	11.7	18.8	6.98	11.2	19.9	6.34
	020S	16.9	25.2	7.54	16.3	26.6	6.91	15.7	28.1	6.33
	025S	20.7	33.9	6.97	19.8	35.8	6.34	--	--	--
	027S	23.6	40.3	6.74	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--
	025D	24.3	35.7	7.63	23.4	37.7	6.97	22.4	39.8	6.33
	030D	29.8	45.2	7.49	28.7	47.7	6.86	27.6	50.3	6.28
	035D	31.4	49.2	7.28	30.3	51.9	6.66	--	--	--
	040D	36.0	54.6	7.46	34.6	57.7	6.82	--	--	--
	045D	42.4	67.8	7.16	40.5	71.6	6.50	--	--	--
	050D	44.0	74.3	6.81	--	--	--	--	--	--
	055D	48.9	83.7	6.75	--	--	--	--	--	--
	057D	53.2	81.7	7.37	51.3	85.9	6.78	49.4	90.3	6.23
	060D	53.2	82.6	7.29	51.3	86.9	6.70	49.4	91.4	6.16
45	015S	13.4	18.1	8.30	12.9	19.2	7.58	12.4	20.2	6.90
	020S	18.6	25.7	8.14	17.9	27.2	7.47	17.2	28.7	6.84
	025S	22.6	34.8	7.45	--	--	--	--	--	--
	027S	--	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--
	025D	26.8	36.3	8.29	25.8	38.3	7.57	24.7	40.5	6.89
	030D	32.8	46.1	8.08	31.6	48.7	7.40	--	--	--
	035D	34.5	50.4	7.83	33.3	53.1	7.17	--	--	--
	040D	39.6	55.8	8.05	38.1	58.9	7.36	--	--	--
	045D	46.3	69.6	7.63	--	--	--	--	--	--
	050D	--	--	--	--	--	--	--	--	--
	055D	--	--	--	--	--	--	--	--	--
	057D	58.6	83.5	7.95	56.5	87.9	7.31	--	--	--
	060D	58.6	84.5	7.86	56.5	88.9	7.23	--	--	--
50	015S	14.8	18.5	8.98	14.2	19.5	8.21	13.6	20.6	7.47
	020S	20.4	26.3	8.76	19.7	27.7	8.04	--	--	--
	025S	24.6	35.7	7.90	--	--	--	--	--	--
	027S	--	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--
	025D	29.6	37.0	8.97	28.4	39.0	8.20	27.2	41.2	7.46
	030D	36.0	47.2	8.68	34.7	49.8	7.95	--	--	--
	035D	37.7	51.5	8.35	--	--	--	--	--	--
	040D	43.4	57.1	8.64	41.9	60.3	7.91	--	--	--
	045D	50.3	71.5	8.08	--	--	--	--	--	--
	050D	--	--	--	--	--	--	--	--	--
	055D	--	--	--	--	--	--	--	--	--
	057D	64.4	85.5	8.55	62.2	90.0	7.86	--	--	--
	060D	64.3	86.5	8.45	62.1	91.1	7.77	--	--	--

NOTES:
(1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. See Electrical Data Tables on pages 68, 69 and 70 for fan kW
(3) EER is for entire unit
(4) For 50 Hz operation, multiply capacity by .85 and kW by .83
(5) Performance shown is based on 0°F Suction Line Loss
(6) **High Ambient Applications over 113°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: WITH DX AIR HANDLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

SST °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		30°C			35°C			40°C		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
5.0	015S	51.7	13.0	3.63	49.4	14.3	3.16	47.0	15.8	2.74
	020S	72.5	18.4	3.63	68.8	20.3	3.14	65.1	22.4	2.71
	025S	90.2	25.0	3.39	85.6	27.5	2.94	80.7	30.3	2.53
	027S	102.8	30.0	3.25	97.3	33.0	2.81	91.6	36.3	2.42
	030S	112.4	34.6	3.10	106.4	38.0	2.68	100.2	41.7	2.31
5.0	025D	103.3	25.9	3.62	98.6	28.7	3.16	93.8	31.7	2.74
	030D	128.3	33.0	3.61	121.8	36.4	3.12	115.1	40.2	2.69
	035D	135.6	36.0	3.52	128.6	39.8	3.04	121.5	43.9	2.62
	040D	155.4	40.0	3.60	147.5	44.1	3.12	139.4	48.7	2.69
	045D	184.8	50.0	3.47	175.3	55.0	3.01	165.3	60.6	2.59
	050D	191.7	54.9	3.30	181.7	60.5	2.85	171.2	66.5	2.45
	055D	212.1	62.5	3.23	200.9	68.7	2.79	189.4	75.4	2.41
	057D	229.5	60.1	3.53	217.6	66.4	3.06	205.6	73.1	2.64
	060D	229.4	60.8	3.49	217.6	67.1	3.02	205.5	74.0	2.61

NOTES: (1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. COP is for entire unit. See Electrical Data Tables on pages 68, 69 and 70 for fan kW.
(3) Performance shown is based on 0°F Suction Line Loss

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

SST °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		45°C			49°C (See Note 4)			52°C (See Note 4)		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
5.0	015S	44.3	17.5	2.36	41.9	19.0	2.07	39.9	20.1	1.87
	020S	61.3	24.8	2.32	58.2	26.8	2.05	55.9	28.4	1.86
	025S	75.4	33.4	2.15	70.8	36.1	1.88	--	--	--
	027S	85.7	39.8	2.07	--	--	--	--	--	--
	030S	94.1	45.5	2.00	--	--	--	--	--	--
5.0	025D	88.5	35.0	2.36	83.8	37.9	2.07	79.8	40.2	1.87
	030D	108.3	44.4	2.31	102.8	48.0	2.04	98.7	50.8	1.85
	035D	114.2	48.4	2.24	108.3	52.3	1.98	--	--	--
	040D	130.9	53.7	2.30	124.0	58.0	2.02	--	--	--
	045D	154.5	66.8	2.21	145.2	72.1	1.93	--	--	--
	050D	160.1	73.1	2.10	--	--	--	--	--	--
	055D	177.6	82.6	2.07	--	--	--	--	--	--
	057D	193.4	80.4	2.27	183.7	86.5	2.01	176.5	91.3	1.84
	060D	193.3	81.3	2.24	183.6	87.5	1.99	176.4	92.3	1.81

NOTES: (1) Interpolation between ratings is permissible but extrapolation is **not**
(2) KW is for compressor only. COP is for entire unit. See Electrical Data Tables on pages 68, 69 and 70 for fan kW.
(3) Performance shown is based on 0°F Suction Line Loss
(4) **High Ambient Applications over 45°C may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

Application Data: For Split-System Chillers

Split-System Chillers

Split-System Chillers, such as the AUDS-A Condensing Unit and a Remote Cooler module, mounted indoors is a popular application for condensing units.

Such **Split-System Chillers** are popular in Northern climates and for many process applications. The cooler can be mounted inside where the cooler freeze potential is minimized. We offer such **Split-System Chillers** as indicated below with specific coolers for chilled water applications. Glycol can be used for lower temperature applications below 40°F, for freeze protection of the cooler for process applications. Refer to the Split-System Chiller Performance Tables, for capacities and the cooler reference information on which units require oversized coolers for your application. We use the same coolers in our ACDS-A Packaged Chiller line.

Contact our Application Engineering Department if you need modifications of the options shown.

AUDS-A Split-System Chiller operating temperatures, can be applied down to 20°F with glycol and as high as 60°F, for special applications.

Remote Cooler - Freeze Protection

The ***DB Director*** monitors the remote cooler's leaving fluid temperature and shuts down the unit if a cooler freeze condition should occur.

A water flow switch should be supplied and mounted in the water piping to protect the unit from low or no flow, which could cause cooler freezing.

Remote Cooler Module Mounting

The (RCH) Remote Cooler Module for Split-System Chiller applications can be mounted on the floor, shelf or wall supports, as well as on ceiling hangers of sufficient strength to support the weight.

The (RCH) Remote Cooler Modules are fully assembled, piped and wired including water temperature sensors, freeze protection thermostat, refrigerant hand valve(s), solenoid valve(s), filter-drier(s), sight-glass('s) and TX valve(s).

AUDS-A Evaporator Control Modes of Operation

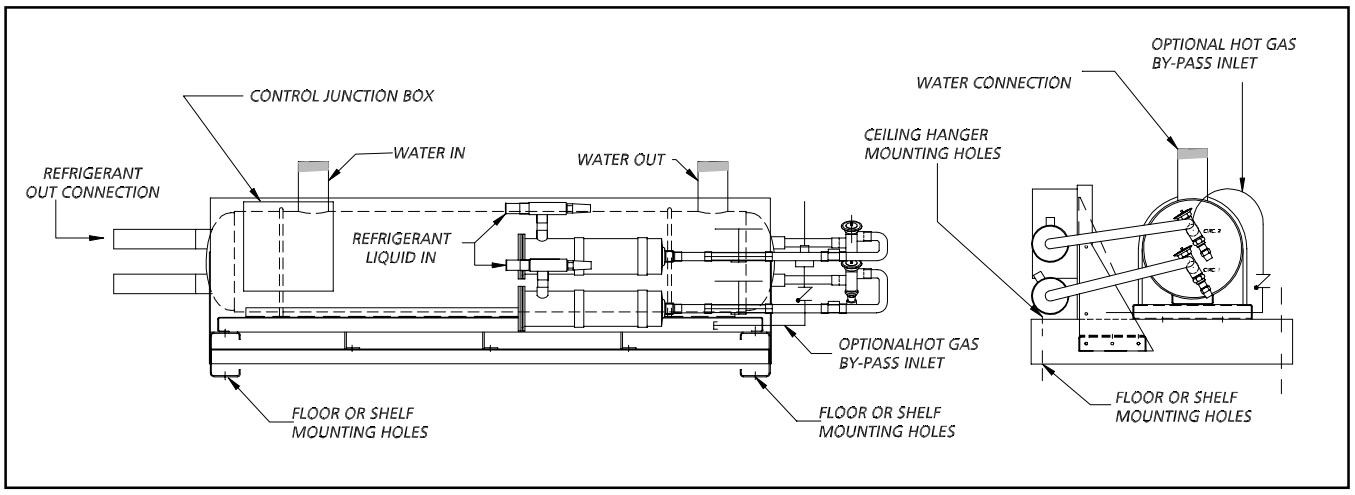
(Select only one out of the three)

Split-System Chiller Application Options:

The ratings in the Catalog Performance Tables for Split-System Chillers require specific RCH Cooler Modules listed below:

1. **RCH1 – Standard Cooler Module** - for 44°F (6.5°C) leaving water temperature.
2. **RCH2 – Oversized Cooler Module** - for 42°F (5.5°C) leaving water temperature, required for water applications on Models AUDSA025D, 030D, 035D and 040D only.
3. **RCH3 – Oversized Cooler Module** - for 40°F (4.5°C) leaving water temperature, required for water applications on all AUDS-A models except AUDSA015S, 030S and 060D.

Typical Dual Circuit - Remote Cooler Module



TYPICAL SEQUENCE OF OPERATION

DB Director Microcomputer Controller

The following sequence of operation describes a four-compressor scroll split-system chiller. Operation is very similar for a two-compressor unit. For initial start-up, the following conditions must be met.

- All power supplied to the package energized for 24 hours prior to starting a compressor.
- Control power switch on for at least 5 minutes.
- Compressor switches on.
- All safety conditions satisfied.
- Reset pressed on the microcomputer keypad.
- Chilled water pump running and chilled water flow switch made.
- Customer control contact closed or Unit Enable switch in the "ON" position.
- Leaving chilled water temperature higher than water temperature setpoint plus a deadband setpoint called "Control Zone +".

After all above conditions are met, the microcomputer will call for compressor #1 to start. When feedback to the compressor #1 status sensor input confirms that the compressor has started, liquid line solenoid #1 is energized. The first stage of capacity is now on-line.

As discharge pressure of compressor #1 rises, fan #1 turns ON at the "Fan Stage 1 ON" setpoint. If discharge pressure continues to rise, the subsequent odd-numbered fans will stage ON in increments of the "Condenser Differential_ON" setpoint. For example, if the "Fan Stage 1 ON" is 190 psig and the "Condenser Differential_ON" setpoint is 20, the stage on points will be 190, 210, 230, etc. The microcomputer may automatically increase these settings if short cycling of fans is detected.

If discharge pressure falls, the odd-numbered fans will stage OFF at the "Fan Stage 2 OFF" setpoint plus corresponding number of "Condenser Differential_OFF" setpoints. For example, if the "Fan Stage 2 OFF" is 140 psig and the "Condenser Differential_OFF" setpoint is 10, the stage off points will be 140, 150, 160, etc.

After a minimum interstage delay of approximately one-minute, and if water temperature is not falling at a faster rate than the value stored in the "MAX_SLOPE-" setpoint, and the leaving water temperature is greater than the temperature setpoint plus "Control Zone +" setpoint, the microcomputer will call for compressor #3 to start. However, if leaving water temperature is falling at a faster rate than the value stored in the "MAX_SLOPE-" setpoint, no more stages of capacity will be added at this time.

When feedback to the compressor #3 status sensor input confirms that the compressor has started, liquid line solenoid #2 is energized. The second stage of capacity is now on-line.

As discharge pressure of compressor #3 rises, the even numbered fans are activated according to the fan stage setpoints as described for circuit #1 fans.

The third and fourth stages of unit capacity, will occur when the following conditions are met:

1. Minimum interstage time delay on increasing load of approximately 1 minute has expired.
2. Leaving water temperature is not falling at a faster rate than the value stored in the "MAX_SLOPE-" setpoint.
3. Leaving water temperature is greater than the water temperature setpoint plus "Control Zone +".

After all above conditions are met, the microcomputer will call for compressor #2 to start. The microcomputer then confirms that compressor #2 has started by its feedback to the compressor #2 status sensor input. The third stage of capacity is now on-line.

As the load continues to increase and the conditions described above are met, the microcomputer will call for compressor #4 to start. After compressor #4 is commanded to start, the microcomputer confirms that compressor #4 has started by its feedback to the compressor #4 status sensor input.

As the applied load decreases and the supply water temperature falls below the water temperature setpoint minus a deadband setpoint called "Control Zone -" stage 4 is turned off. Compressor #4 turns off.

If supply water temperature continues to fall below water temperature setpoint minus "Control Zone -" setpoint, stage 3 is turned off. Compressor #2 turns off.

If supply water temperature continues to fall below water temperature setpoint minus "Control Zone -" setpoint, stage 2 is turned off. Liquid line solenoid #2 is turned off. When compressor #3&4 suction pressure falls below the pumpdown-cutout setpoint, compressor #3 is turned off, and the even-numbered fans are turned off. The unit is now at 25% capacity. Note that if there is more than one compressor on a refrigerant circuit, only the last compressor to shut down will perform the pumpdown.

Stage 1 will shut down in a similar manner to stage 2 mentioned above.

When a refrigerant circuit is cycled off, a one-time pumpdown of that circuit is performed. When suction pressure falls below pumpdown-cutout setpoint, the compressor will shut down.

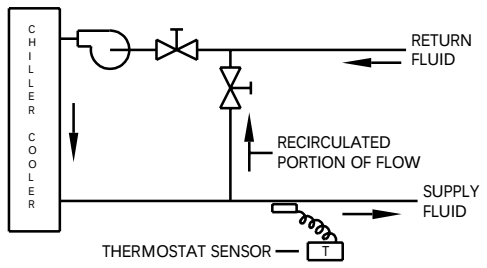
Two proactive control features included in the microcomputer are low suction and high discharge pressures unload. If there is more than one compressor operating on a refrigerant circuit, a compressor will be cycled off if that circuit's discharge pressure exceeds the high pressure unload setpoint or if the suction pressure approaches the low pressure trip setpoint. The cycled off compressor will remain off for a duration of times as specified in the "SAFETY DELAY" setpoint.

OPTIONAL REMOTE DX COOLER MODULE

Cooler Design Data

1. ***Maximum*** - Leaving chilled fluid temperature (LCFT) is 60°F (18°C). The unit can start and pull down with up to 80°F (27°C) entering-water temperature. For sustained operation, it is recommended that the entering water temperature not exceed 70°F (21°C).
2. ***Minimum*** - LCFT is 42°F (5.5°C) for all models except AUDS-A 025D, 030D, 035D, and 040D for *water applications with standard coolers*. Oversized coolers RCH2 are required for 42°F (5.5°C) water on models AUDS-A 025D, 030D, 035D, and 040D. Oversized coolers RCH3 are available for 40°F (4.4°C) water for most models for chilled *water* applications. Medium temperature glycol application selections from 20°F (6.6°C) to 39°F (3.9°C) are available from the factory.
3. Minimum/Maximum Flow Rates and Vessel Fluid Volume - refer to Physical Specifications.
4. Pressure Drop Data - refer to Figure 45 and glycol correction factors, Tables 43A and 43B.
5. Wide Range ΔT - Low Flow Applications
   a. Multiple smaller chillers may be applied in series, each providing a portion of the design temperature range of roughly 10°F (5.5°C) each.
   b. Special cooler baffling may be provided from the factory for applications from 12.5°F to 20°F (7°C to 11°C) chiller fluid ranges.
   c. Chilled fluid may be recirculated through the cooler as shown below to allow the chiller to operate with acceptable flow rates and temperature ranges (Figure 38A).

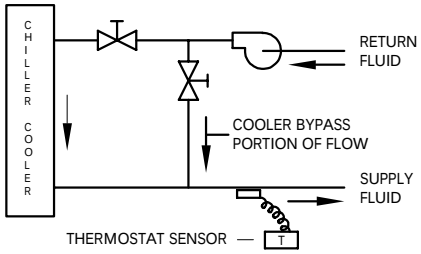
Figure 40A



The mixed fluid temperature range through the cooler for units with standard coolers, should not be less than 7.5°F (4.2°C) at full load.

6. Narrow Range ΔT - High Flow Applications
   a. Special cooler baffling is available from the factory for 5°F to 7.5°F (2.7°C to 4.2°C) ΔT applications.
   b. For extra-narrow range ΔT applications a partial cooler bypass piping and valve configuration can be used as shown below. This permits a higher ΔT and lower ΔP (pressure drop) through the cooler (Figure 38B).

Figure 40B



The fluid mixes after the cooler.

Chilled Fluid Loop Volume (CFLV)

Careful consideration needs to be given to the "Chilled Fluid Loop Volume" (CFLV) or system inertia to maintain an acceptable leaving fluid temperature.

In close-coupled systems as the compressor starts, loads, unloads and stops, the leaving fluid temperature will shift up and down 2°F to 4°F (1.1°C to 2.2°C) per step of capacity control. The 5-minute anti-recycle timer will prevent the compressor from starting for up to 5 minutes and will further complicate the leaving fluid temperature shift.

Air Conditioning Applications
The chilled fluid loop volume must equal or exceed 3 gallons per nominal ton of cooling (3.25 L per kW).

Process & Special Air Conditioning Applications
Where leaving fluid temperature is often more critical, the chilled fluid loop volume should be increased to 6 to 10 gallons per ton minimum (6.5 to 10.8 L per KW).

Table 41A **Quick Reference - Minimum Chilled Fluid Loop Volume***

	Air Conditioning Applications		Process Applications				
AUDS-A Model	Gallons	Liters	Gallons	Liters		Gallons	Liters
015S	41	157	83	313	To	138	522
020S	56	213	113	427	To	188	712
025S	71	268	142	536	To	236	893
027S	77	293	155	586	To	258	977
030S	87	329	174	659	To	290	1098
025D	78	296	157	593	To	261	988
030D	94	354	187	709	To	312	1181
035D	104	393	208	786	To	346	1310
040D	116	439	232	879	To	387	1465
045D	137	518	274	1036	To	456	1726
050D	148	561	296	1122	To	494	1870
055D	162	613	324	1226	To	540	2044
057D	170	644	340	1288	To	567	2146
060D	175	663	350	1326	To	584	2210

*Values calculated for ARI Conditions of Service (C.O.S.)

Type of Application	Gal/Ton	L/kW
Normal Air Conditioning	3	3.25
Process Cooling	6 - 10	6.5 - 10.8

Gallons = Gal/Ton x ARI Capacity in Tons
Liters = L/kW x ARI capacity in kW

For applications with other than ARI C.O.S., calculate the system loop volume based on the adjusted or corrected unit capacity.

Tanks for System Volume Enhancement
It may be necessary to install a tank in the system to provide sufficient system fluid volume, as shown below. The tank should be baffled and piped for proper fluid mixing to prevent stratification.

Figure 41A

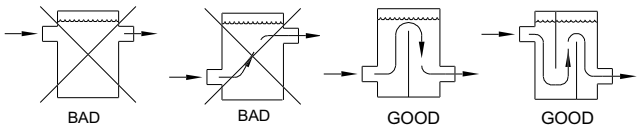


Figure 41B **Single Loop System with Storage Tank to Increase Loop Volume**

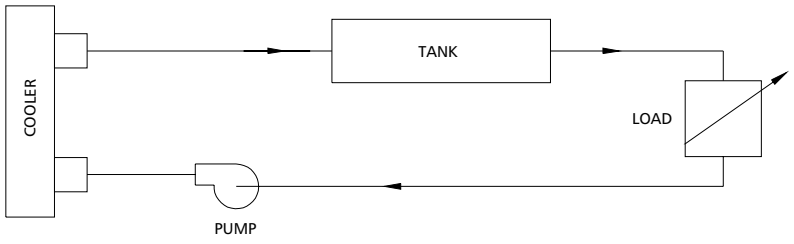
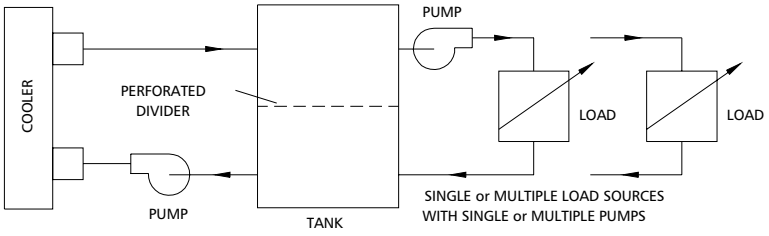


Figure 41C **Primary and Secondary Loop Systems are normally used where the secondary system has variable flow and/or multiple loads. See example below.**

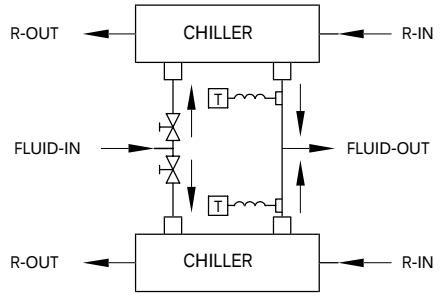


Multiple Chillers Per Chilled Water System

Contact the Dunham-Bush Application Engineering Department tfor control requirements for specific applications.

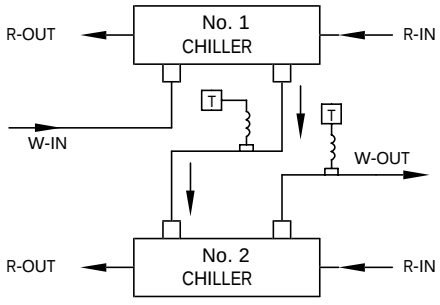
1. Where the load is greater than one **AUDS-A** can supply or where standby capacity is required or the load profile dictates, multiple chillers may be piped in parallel. Units of equal size help to ensure fluid flow balance, but balancing valves ensure balanced flows even with dissimilar sized chillers. Temperature controller sensors may or may not need to be moved to the common fluid piping depending on the specific application.
2. Parallel Chiller Applications (Figure 42A). Both units operate simultaneously modulating with load variations. Each unit operates independently sensing its own leaving water temperature. The set point of each thermostat is set to maintain the desired loading scheme.

Figure 42A



3. Series Chiller Applications (Figure 42B) Where a large temperature range is required (over 25°F [13.9°C]), the chiller may be piped in series. In this case the units are controlled independently. The load is progressive by temperature so the chiller selections are critical.

Figure 42B



Oversizing Chillers

Oversizing of chillers more than 5-10% is not recommended. Oversizing causes energy inefficiency and shortened compressor life due to excessive compressor cycling. Larger future load requirements may cause temporary oversizing of equipment which will require careful unit selection. It may be better to properly size for the present load and add another unit later for future expansion. It is also recommended using multiple units where operation at minimum load is critical. Fully loaded equipment operates better and more efficiently than large equipment running at or near minimum capacity.

Hot gas bypass should not be a means to allow oversizing of chillers. Hot gas bypass should only be used where the equipment is sized properly for full load but the load turn down is less than the minimum unloading step available. See Table 8A on Page 8 for estimated hot gas bypass turndown.

Sound and Vibration

AUDS-A compressors are mounted with rubber grommets to the frame to absorb sound and vibration. The compressors are not mounted on springs because extra movement may cause line breakage and refrigerant leaks. Unit isolation helps prevent any remaining sound or vibration from entering the building structure, piping or electrical service.

Water (Fluid) Strainers

It is recommended that 40-mesh strainers be installed in the fluid piping as close to unit cooler as possible.

Glycol Freeze Protection

If the chiller or fluid piping may be exposed to temperatures below freezing, glycol protection is recommended. The recommended protection is 15°F (8.3°C) below the minimum ambient temperature. Use only glycol solutions approved for 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 temperature and not being used, the vessels and piping should be drained.

If the equipment is being used for operating conditions below the water rated vessel capability, glycol should be used to prevent freeze damage. The freeze protection level should be 20°F (11°C) lower than the leaving brine temperature. The use of glycol causes a performance derate as shown below in Table 43A for ethylene glycol and Table 43B for propylene glycol and needs to be included in the unit selection procedure.

Table 43A

Ethylene Glycol

% E.G.	FREEZE POINT		C1 CAPACITY FACTOR	K1 kW FACTOR	G1 FLOW RATE	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	12.75
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

Table 43B

Propylene Glycol

% P.G.	FREEZE POINT		C2 CAPACITY FACTOR	K2 kW FACTOR	G2 FLOW RATE	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

EXAMPLE

Select an air cooled split-system chiller for the following conditions of service:

50 Tons (175 kWo) at 54°F (13°C) entering, 44°F (6.5°C) leaving chilled water. Design ambient is 95°F (35°C). Minimum operating ambient is 50°F (10°C). Altitude is 6000 feet (1800 meters). Evaporator fouling is .00025 (0.044). Electrical characteristics are 460/3/60.

Step 1 - Unit Selection

For 6000 feet (1800 meters) elevation, divide the required tonnage by the altitude correction factor from Table 44A.

$$\frac{50}{.97} = 51.5 \text{ Tons} \qquad \frac{175}{.97} = 181.1 \text{ kWo}$$

To correct for evaporator fouling, consult Table 44B. In this example, the fouling factor is .00025 which has a capacity factor of 0.993 and a kW factor of 0.998, so the capacity correction is as follows:

$$\frac{51.5 \text{ Tons}}{.993} = 51.8 \text{ Tons} \qquad \frac{182.0 \text{ kWo}}{.993} = 183.2 \text{ kWo}$$

Entering the tables on page 46 (56), we see that an AUDS-A 055D for water at sea level will do 54.3 (190.8 kWo) tons drawing 62.4 compressor kW (62.4 compressor kW).

The unit will do the following, when corrected for altitude fouling:

Capacity 54.3 x .993 x .97 = 52.3 Tons
(Capacity 190.8 x .993 x .97 = 183.8 kWo)

which exceeds the original requirement.

Compressor kW needs to be adjusted from Table 44B for 0.00025 (0.044) fouling as follows:

62.4 kW x .998 = 62.3 kW
(62.4 kW x .998 = 62.3 kW)

Step 2 - Cooler Flow and Pressure Drop

$$\text{Water GPM} = \frac{\text{Tons (water)} \times 24}{\text{Cooling Range}} = \frac{50 \times 24}{10} = 120 \text{ GPM}$$

$$\text{(Water Flow Rate} = \frac{\text{kWo (water)}}{4.187 \times \text{Range}} = \frac{175.7 \text{ kWo}}{4.187 \times 6} = 6.99 \text{ Lit./Sec.)}$$

Referring to pressure drop curve #9 on page 45 for the evaporator pressure drop, we see a 8.5 feet of water (22.5 kPa) pressure drop for 120 GPM (6.99 liters/sec.) of water.

TABLE 44A

Elevation above Sea Level (ft.) (m)	Capacity Factor	kW Correction Factor
0	1.00	1.00
2000 (600)	0.99	1.01
4000 (1200)	0.98	1.02
6000 (1800)	0.97	1.03

TABLE 44B

Evaporator Fouling Factor hr-ft- F/BTU (M^2 °C kW^{-1})	Capacity Factor	kW Factor
.00010 (0.0176)	1.000	1.000
.00025 (0.0440)	0.993	0.998
.00050 (0.0880)	0.981	0.994
.00100 (0.1760)	0.958	0.986

TABLE 44C

Unit Model Size	Cooler Curve No. for Table 43		
	Std RCH1 44°F (7°C)	RCH2 42°F (5.5°C)	RCH3 40°F (4.5°C)
021S	1	1	1
024S	1	1	1
027S	1	1	23
030S	2	2	24
035S	3	3	24
030D	25	25	26
035D	25	6	8
040D	6	6	8
045D	7	7	11
050D	9	9	11
052D	9	9	11
055D	9	9	11
062D	10	10	28
070D	10	10	28
075D	12	12	28
080D	12	12	28
085D	13	13	27
090D	13	14	29
100D	14	14	29
102D	14	14	29
112D	14	15	30
120D	16	16	21
130D	16	16	21
140D	16	16	21
155D	18	18	31
170D	20	20	31
180D	20	20	22
185D	22	22	22
190D	20	20	22
200D	22	22	22

DX Cooler: Water Side Pressure Drop

Figure 45

English I.P. and S.I. Units

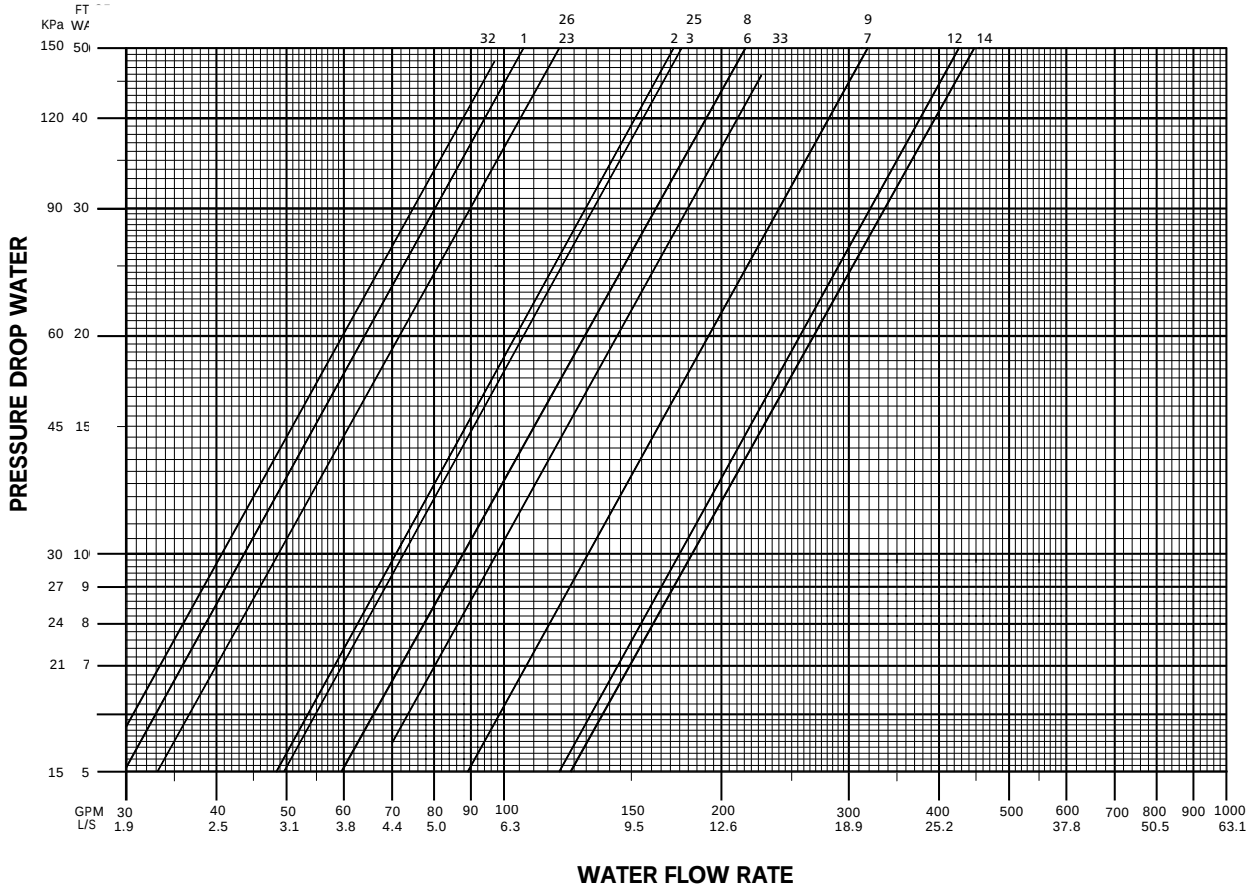


TABLE 45

Curve No.	Cooler		I.P. Units		S.I. Units	
	Model	*Conn. Size	Minimum GPM	Maximum GPM	Min. Lit./Sec.	Max. Lit./Sec.
	Single Circuit Coolers					
32	CHS006601B	3" NPTE	29	97	1.83	6.13
1	CHS007601A	3" NPTE	37	101	2.34	6.39
2	CHS007601B	3" NPTE	50	164	3.16	10.38
3	CHS008601A	3" NPTE	56	168	3.54	10.63
	Dual Circuit Coolers					
2	CHD007601B	3" NPTE	50	164	3.16	10.38
25	CHD008601A	3" NPTE	56	168	3.54	10.63
33	CHD008601B	3" NPTE	70	227	4.42	14.32
6	CHD010601A	4" NPTE	62	205	3.92	12.97
7	CHD010601B	4" NPTE	78	315	4.93	19.23
8	CHD011601A	4" NPTE	69	206	4.37	13.03
9	CHD011601B	4" NPTE	86	304	5.44	19.23
12	CHD013601B	4" NPTE	101	407	6.39	25.75

*Non-metric compliance

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		85°F				95°F				105°F			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
40	015S	13.0	12.0	10.99	14.89	12.3	13.4	9.50	14.15	11.7	15.0	8.16	13.45
	**020S	18.5	16.9	11.21	15.22	17.5	18.9	9.62	14.45	16.5	21.2	8.21	13.72
	**025S	22.8	22.6	10.73	14.72	21.5	25.1	9.21	14.02	20.1	28.0	7.82	13.27
	**027S	26.9	26.8	10.84	15.50	25.3	29.9	9.25	14.77	23.6	33.2	7.85	14.07
	030S	29.6	30.5	10.61	14.99	27.8	34.0	9.04	14.22	26.0	37.7	7.68	13.68
	**025D	25.7	24.0	10.88	14.93	24.4	26.8	9.40	14.23	23.1	30.0	8.08	13.59
	**030D	32.3	30.0	11.28	15.55	30.5	33.5	9.66	14.80	28.7	37.5	8.23	14.12
	**035D	34.8	32.6	11.29	15.54	32.9	36.5	9.65	14.76	30.9	40.8	8.21	14.05
	**040D	39.2	36.5	11.12	15.52	37.1	40.8	9.55	14.77	34.9	45.6	8.14	14.08
	045D	46.6	45.1	10.99	15.23	44.0	50.2	9.43	14.54	41.1	55.9	8.00	13.76
	**050D	49.7	49.5	10.78	15.18	46.8	55.1	9.22	14.47	43.7	61.3	7.82	13.82
	**055D	55.3	55.5	10.82	15.48	52.0	61.8	9.23	14.73	48.6	68.6	7.83	14.20
	**057D	57.3	55.1	10.77	14.45	54.0	61.6	9.23	14.14	50.6	68.6	7.86	13.52
	060D	57.3	55.7	10.67	14.30	54.0	62.3	9.13	14.00	50.6	69.4	7.78	13.39
42	015S	13.5	12.1	11.36	15.37	12.8	13.5	9.82	14.61	12.1	15.1	8.43	13.89
	020S	18.3	16.9	11.12	15.27	17.3	18.9	9.54	14.51	16.3	21.1	8.13	13.78
	025S	23.4	22.7	10.98	15.09	22.1	25.3	9.43	14.37	20.7	28.2	8.01	13.61
	027S	27.0	26.9	10.88	15.70	25.4	29.9	9.30	14.97	23.8	33.2	7.89	14.26
	030S	30.6	30.8	10.92	15.37	28.8	34.3	9.30	14.57	27.0	38.0	7.90	14.06
	*025D	26.7	24.1	11.25	15.41	25.4	26.9	9.72	14.69	24.0	30.1	8.35	14.03
	*030D	32.6	30.0	11.36	15.77	30.8	33.6	9.73	15.01	29.0	37.6	8.28	14.32
	*035D	35.0	32.7	11.34	15.75	33.1	36.6	9.70	14.96	31.1	40.9	8.25	14.23
	*040D	39.5	36.6	11.19	15.74	37.4	40.9	9.61	14.98	35.1	45.7	8.19	14.29
	045D	46.5	45.0	10.98	15.36	43.9	50.1	9.43	14.67	41.1	55.9	8.00	13.90
	050D	50.2	49.6	10.87	15.41	47.3	55.2	9.30	14.70	44.2	61.5	7.89	13.97
	055D	55.7	55.6	10.88	15.70	52.4	61.9	9.29	14.94	49.0	68.8	7.89	14.43
	057D	57.7	55.2	10.83	14.62	54.5	61.6	9.29	14.34	51.1	68.7	7.92	13.71
	060D	59.4	56.1	11.01	14.66	56.0	62.6	9.43	14.42	52.5	69.8	8.03	13.79
44	015S	14.0	12.1	11.74	15.86	13.3	13.5	10.15	15.08	12.6	15.1	8.72	14.34
	020S	19.0	17.0	11.47	15.75	18.0	19.0	9.84	14.96	16.9	21.3	8.39	14.21
	025S	24.3	22.9	11.31	15.53	22.9	25.5	9.71	14.79	21.5	28.4	8.25	14.03
	027S	28.0	27.1	11.20	16.15	26.4	30.2	9.57	15.40	24.7	33.5	8.12	14.67
	030S	31.7	31.1	11.20	15.73	29.9	34.6	9.57	14.93	27.9	38.4	8.12	14.44
	025D	26.6	24.1	11.20	15.51	25.2	26.9	9.68	14.79	23.9	30.1	8.31	14.12
	030D	32.2	29.9	11.24	15.82	30.4	33.5	9.63	15.06	28.6	37.5	8.20	14.36
	035D	35.2	32.7	11.38	15.94	33.3	36.6	9.74	15.15	31.3	40.9	8.28	14.43
	040D	39.6	36.6	11.20	15.91	37.4	40.9	9.62	15.15	35.2	45.7	8.20	14.46
	045D	48.2	45.4	11.30	15.80	45.5	50.5	9.70	15.09	42.6	56.3	8.24	14.33
	050D	52.0	50.0	11.19	15.86	49.0	55.6	9.57	15.13	45.9	62.0	8.12	14.33
	055D	57.7	56.0	11.20	16.12	54.3	62.4	9.56	15.35	50.8	69.3	8.12	14.88
	057D	59.8	55.5	11.18	14.97	56.4	62.0	9.58	14.76	53.0	69.1	8.17	14.12
	060D	61.6	56.4	11.35	15.01	58.1	63.0	9.72	14.84	54.4	70.2	8.28	14.19

NOTES:
(1) Double asterisk (**) indicates ratings with CH3 oversized evaporator for 40°F LWT
(2) Asterisk (*) indicates ratings with CH2 oversized evaporator for 42°F LWT
(3) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(4) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(5) Interpolation between ratings is permissible but extrapolation is **not**
(6) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		115°F				120°F (See Note 7)				125°F (See Note 7)			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
40	015S	11.0	16.8	6.93	12.52	10.6	17.7	6.36	12.21	10.1	18.8	5.80	11.91
	**020S	15.4	23.7	6.96	12.83	14.9	25.0	6.40	12.53	14.3	26.4	5.87	12.22
	**025S	18.6	31.2	6.55	12.65	17.8	32.9	5.97	12.37	17.0	34.8	5.42	12.08
	**027S	21.9	36.8	6.61	13.35	21.0	38.7	6.05	13.04	--	--	--	--
	030S	24.2	41.6	6.51	13.02	23.2	43.7	5.99	12.70	--	--	--	--
	**025D	21.7	33.5	6.87	12.49	20.9	35.5	6.30	12.23	20.1	37.5	5.75	11.98
	**030D	26.8	41.9	6.96	13.21	25.9	44.2	6.39	12.91	24.9	46.6	5.85	12.68
	**035D	28.9	45.6	6.94	13.34	27.9	48.1	6.37	13.09	26.8	50.8	5.83	12.81
	**040D	32.5	50.9	6.88	13.07	31.3	53.7	6.31	12.79	30.1	56.7	5.77	12.58
	045D	38.0	62.3	6.71	13.20	36.4	65.7	6.11	12.95	34.7	69.3	5.54	12.68
	050D	40.4	68.1	6.56	13.15	38.7	71.7	5.99	12.87	36.9	75.5	5.45	12.64
	055D	45.1	76.0	6.61	13.53	43.3	79.8	6.07	13.27	--	--	--	--
	057D	47.2	76.1	6.67	12.57	45.4	80.1	6.14	12.31	43.6	84.1	5.64	12.04
	060D	47.1	77.0	6.60	12.46	45.4	81.0	6.07	12.20	43.6	85.1	5.58	11.93
42	015S	11.4	16.9	7.17	12.94	11.0	17.8	6.57	12.62	10.5	18.8	6.00	12.31
	020S	15.2	23.6	6.89	12.89	14.7	24.9	6.32	12.58	14.1	26.3	5.79	12.28
	025S	19.2	31.4	6.72	12.98	18.4	33.2	6.12	12.69	17.6	35.0	5.56	12.40
	027S	22.0	36.9	6.65	13.55	21.1	38.8	6.08	13.23	--	--	--	--
	030S	25.1	42.0	6.70	13.38	24.1	44.1	6.16	13.05	--	--	--	--
	*025D	22.5	33.7	7.10	12.90	21.7	35.6	6.51	12.64	20.8	37.7	5.95	12.38
	*030D	27.1	41.9	7.01	13.42	26.1	44.3	6.43	13.11	25.1	46.7	5.89	12.87
	*035D	29.1	45.6	6.98	13.53	28.0	48.2	6.40	13.28	27.0	50.8	5.86	13.00
	*040D	32.8	51.0	6.93	13.28	31.5	53.8	6.35	13.00	30.3	56.8	5.81	12.77
	045D	38.0	62.2	6.71	13.33	36.4	65.7	6.11	13.07	34.7	69.3	5.54	12.80
	050D	41.0	68.3	6.63	13.38	39.3	72.0	6.06	13.09	37.5	75.8	5.52	12.86
	055D	45.6	76.2	6.67	13.76	43.8	80.0	6.12	13.56	--	--	--	--
	057D	47.6	76.3	6.73	12.76	45.9	80.2	6.19	12.49	44.1	84.3	5.70	12.22
	060D	48.9	77.5	6.81	12.83	47.1	81.5	6.26	12.56	45.3	85.7	5.76	12.29
44	015S	11.8	16.9	7.41	13.37	11.4	17.9	6.79	13.04	10.9	18.9	6.20	12.72
	020S	15.8	23.7	7.10	13.31	15.2	25.1	6.52	12.99	14.6	26.5	5.98	12.67
	025S	19.9	31.6	6.93	13.38	19.1	33.4	6.32	13.08	18.3	35.3	5.74	12.78
	027S	22.9	37.2	6.84	13.96	21.9	39.1	6.26	13.63	--	--	--	--
	030S	26.0	42.4	6.88	13.75	25.0	44.5	6.33	13.41	--	--	--	--
	025D	22.4	33.7	7.07	13.00	21.6	35.6	6.48	12.73	20.7	37.6	5.91	12.47
	030D	26.7	41.8	6.94	13.47	25.8	44.2	6.37	13.20	24.8	46.6	5.83	12.91
	035D	29.2	45.7	7.00	13.72	28.2	48.2	6.42	13.46	27.1	50.9	5.88	13.17
	040D	32.8	51.0	6.93	13.45	31.6	53.8	6.36	13.16	30.3	56.8	5.81	12.92
	045D	39.5	62.7	6.91	13.74	37.8	66.2	6.30	13.47	36.0	69.8	5.72	13.19
	050D	42.5	68.9	6.83	13.79	40.8	72.6	6.24	13.50	--	--	--	--
	055D	47.3	76.8	6.87	14.20	45.4	80.7	6.30	13.99	--	--	--	--
	057D	49.4	76.8	6.94	13.14	47.6	80.8	6.38	12.87	45.8	84.9	5.87	12.58
	060D	50.7	78.0	7.02	13.21	48.8	82.1	6.45	12.93	46.9	86.3	5.93	12.63

NOTES:
(1) Double asterisk (**) indicates ratings with CH3 oversized evaporator for 40°F LWT
(2) Asterisk (*) indicates ratings with CH2 oversized evaporator for 42°F LWT
(3) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(4) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(5) Interpolation between ratings is permissible but extrapolation is **not**
(6) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW
(7) **High Ambient Applications over 118°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		85°F				95°F				105°F			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
45	015S	14.3	12.2	11.93	16.10	13.5	13.6	10.31	15.32	12.8	15.2	8.86	14.57
	020S	19.4	17.0	11.65	15.98	18.3	19.1	9.99	15.19	17.2	21.3	8.52	14.42
	025S	24.7	23.0	11.47	15.75	23.4	25.6	9.85	15.00	21.9	28.5	8.37	14.24
	027S	28.5	27.2	11.35	16.38	26.8	30.3	9.70	15.62	25.1	33.7	8.23	14.88
	030S	32.2	31.2	11.33	15.91	30.4	34.7	9.68	15.10	28.5	38.5	8.24	14.63
	025D	27.0	24.1	11.38	15.75	25.7	26.9	9.84	15.02	24.3	30.1	8.45	14.34
	030D	32.7	30.0	11.41	16.06	31.0	33.6	9.78	15.29	29.1	37.6	8.33	14.58
	035D	35.8	32.8	11.56	16.17	33.9	36.7	9.89	15.37	31.9	41.1	8.41	14.66
	040D	40.3	36.7	11.37	16.15	38.1	41.0	9.77	15.38	35.8	45.8	8.33	14.68
	045D	49.1	45.6	11.47	16.03	46.4	50.7	9.84	15.31	43.4	56.5	8.36	14.55
	050D	52.9	50.2	11.34	16.08	49.9	55.9	9.71	15.34	46.7	62.2	8.24	14.55
	055D	58.7	56.2	11.36	16.34	55.3	62.6	9.70	15.55	51.8	69.6	8.24	15.10
	057D	60.8	55.6	11.35	15.15	57.5	62.2	9.73	14.97	53.9	69.3	8.30	14.32
	060D	62.7	56.5	11.53	15.19	59.1	63.1	9.87	15.05	55.4	70.4	8.41	14.40
46	015S	14.5	12.2	12.12	16.35	13.8	13.6	10.48	15.56	13.1	15.2	9.00	14.80
	020S	19.7	17.1	11.83	16.22	18.6	19.1	10.15	15.42	17.5	21.4	8.65	14.64
	025S	25.2	23.1	11.64	15.97	23.8	25.7	10.00	15.22	22.3	28.6	8.49	14.45
	027S	29.0	27.3	11.52	16.61	27.3	30.4	9.84	15.83	25.6	33.8	8.35	15.09
	030S	32.7	31.3	11.47	16.09	30.8	34.9	9.80	15.27	28.9	38.7	8.34	14.82
	025D	27.5	24.2	11.56	15.99	26.2	27.0	10.00	15.26	24.8	30.2	8.59	14.56
	030D	33.3	30.1	11.59	16.30	31.5	33.7	9.93	15.52	29.7	37.7	8.46	14.80
	035D	36.5	32.9	11.73	16.41	34.5	36.8	10.04	15.60	32.4	41.2	8.54	14.88
	040D	41.0	36.8	11.54	16.39	38.8	41.2	9.92	15.61	36.5	46.0	8.45	14.90
	045D	50.0	45.7	11.63	16.25	47.2	50.9	9.98	15.52	44.2	56.7	8.48	14.77
	050D	53.9	50.4	11.50	16.31	50.8	56.1	9.85	15.56	47.5	62.5	8.36	14.77
	055D	59.8	56.5	11.52	16.55	56.3	62.9	9.83	15.76	52.7	69.9	8.35	15.32
	057D	61.9	55.8	11.52	15.33	58.5	62.3	9.88	15.19	54.9	69.5	8.42	14.52
	060D	63.8	56.7	11.70	15.36	60.2	63.3	10.02	15.26	56.4	70.6	8.53	14.60
48	015S	15.1	12.3	12.51	16.86	14.3	13.7	10.82	16.04	13.5	15.3	9.29	15.26
	020S	20.4	17.2	12.19	16.71	19.3	19.2	10.46	15.88	18.1	21.5	8.91	15.08
	025S	26.1	23.3	11.97	16.41	24.6	25.9	10.28	15.64	23.1	28.8	8.74	14.87
	027S	30.1	27.6	11.84	17.06	28.3	30.7	10.11	16.27	26.5	34.1	8.58	15.46
	030S	33.7	31.6	11.73	16.44	31.8	35.2	10.03	15.95	29.8	39.1	8.54	15.19
	025D	28.6	24.3	11.93	16.48	27.1	27.1	10.32	15.73	25.7	30.4	8.86	15.01
	030D	34.5	30.3	11.94	16.78	32.7	33.9	10.23	15.98	30.7	37.9	8.71	15.24
	035D	37.8	33.1	12.08	16.90	35.7	37.1	10.34	16.06	33.6	41.5	8.79	15.34
	040D	42.5	37.1	11.89	16.88	40.2	41.4	10.21	16.08	37.8	46.3	8.71	15.35
	045D	51.7	46.1	11.96	16.70	48.9	51.3	10.27	15.96	45.8	57.2	8.72	15.21
	050D	55.8	50.8	11.83	16.76	52.6	56.6	10.13	15.99	49.3	63.0	8.59	15.22
	055D	61.8	56.9	11.82	16.98	58.3	63.4	10.10	16.17	54.6	70.5	8.59	15.68
	057D	64.1	56.1	11.87	15.67	60.6	62.7	10.18	15.61	56.9	69.9	8.68	14.71
	060D	66.1	57.1	12.06	15.71	62.3	63.7	10.33	15.68	58.4	71.1	8.79	14.98

NOTES: (1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		115°F				120°F (See Note 5)				125°F (See Note 5)			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
45	015S	12.0	17.0	7.53	13.58	11.6	17.9	6.91	13.25	11.1	19.0	6.30	12.93
	020S	16.1	23.8	7.21	13.52	15.5	25.2	6.62	13.19	14.9	26.5	6.07	12.87
	025S	20.3	31.8	7.03	13.58	19.5	33.5	6.41	13.28	18.6	35.4	5.83	12.97
	027S	23.3	37.4	6.94	14.16	22.3	39.3	6.35	13.85	--	--	--	--
	030S	26.5	42.6	6.98	13.93	25.5	44.7	6.42	13.58	--	--	--	--
	025D	22.8	33.7	7.18	13.21	22.0	35.7	6.59	12.94	21.1	37.7	6.01	12.67
	030D	27.2	42.0	7.04	13.69	26.2	44.3	6.46	13.41	25.2	46.8	5.92	13.12
	035D	29.7	45.8	7.11	13.94	28.7	48.4	6.52	13.67	27.6	51.0	5.97	13.38
	040D	33.4	51.2	7.04	13.67	32.2	54.0	6.45	13.37	30.9	57.0	5.90	13.13
	045D	40.2	63.0	7.01	13.95	38.5	66.5	6.39	13.68	36.7	70.1	5.81	13.39
	050D	43.3	69.2	6.93	14.00	41.5	72.9	6.33	13.71	--	--	--	--
	055D	48.1	77.1	6.96	14.42	46.3	81.1	6.39	14.20	--	--	--	--
	057D	50.3	77.0	7.04	13.33	48.5	81.0	6.48	13.05	46.6	85.2	5.96	12.75
	060D	51.6	78.2	7.13	13.40	49.7	82.4	6.55	13.11	47.8	86.6	6.02	12.81
46	015S	12.3	17.0	7.65	13.80	11.8	18.0	7.02	13.47	11.3	19.0	6.41	13.14
	020S	16.3	23.9	7.32	13.73	15.8	25.2	6.72	13.40	15.2	26.6	6.16	13.07
	025S	20.7	31.9	7.14	13.78	19.8	33.7	6.51	13.48	19.0	35.5	5.92	13.17
	027S	23.7	37.5	7.03	14.37	22.8	39.5	6.44	14.05	--	--	--	--
	030S	27.0	42.8	7.07	14.11	25.9	45.0	6.50	13.76	--	--	--	--
	025D	23.2	33.8	7.30	13.42	22.4	35.8	6.69	13.15	21.5	37.8	6.11	12.87
	030D	27.7	42.1	7.15	13.91	26.7	44.5	6.56	13.62	25.7	46.9	6.01	13.32
	035D	30.3	46.0	7.22	14.16	29.2	48.5	6.62	13.89	28.1	51.2	6.06	13.59
	040D	34.0	51.3	7.15	13.89	32.8	54.2	6.55	13.59	31.4	57.2	5.99	13.34
	045D	40.9	63.2	7.12	14.16	39.2	66.7	6.49	13.89	37.4	70.4	5.89	13.59
	050D	44.1	69.5	7.03	14.21	42.3	73.2	6.42	13.91	--	--	--	--
	055D	49.0	77.5	7.06	14.64	47.1	81.4	6.48	14.42	--	--	--	--
	057D	51.2	77.3	7.15	13.52	49.3	81.3	6.58	13.23	47.5	85.5	6.05	12.93
	060D	52.6	78.5	7.23	13.59	50.6	82.6	6.65	13.29	48.7	86.9	6.11	12.99
48	015S	12.7	17.1	7.90	14.24	12.2	18.1	7.25	13.90	11.7	19.1	6.62	13.56
	020S	16.9	24.0	7.55	14.16	16.3	25.4	6.93	13.82	15.7	26.8	6.35	13.48
	025S	21.5	32.1	7.35	14.20	20.6	33.9	6.71	13.88	19.7	35.8	6.10	13.56
	027S	24.6	37.9	7.23	14.78	23.6	39.9	6.61	14.45	--	--	--	--
	030S	27.8	43.2	7.24	14.47	26.8	45.4	6.67	14.11	--	--	--	--
	025D	24.1	34.0	7.53	13.85	23.2	35.9	6.91	13.57	22.3	38.0	6.31	13.29
	030D	28.7	42.4	7.37	14.35	27.7	44.7	6.76	14.05	26.6	47.2	6.19	13.74
	035D	31.4	46.3	7.43	14.61	30.2	48.9	6.82	14.33	29.1	51.5	6.24	14.02
	040D	35.3	51.7	7.36	14.33	33.9	54.5	6.75	14.02	32.6	57.6	6.17	13.76
	045D	42.4	63.7	7.33	14.59	40.7	67.2	6.68	14.30	38.8	71.0	6.07	14.00
	050D	45.7	70.0	7.23	14.63	43.8	73.8	6.61	14.35	--	--	--	--
	055D	50.8	78.1	7.25	15.08	48.8	82.2	6.66	14.85	--	--	--	--
	057D	53.1	77.8	7.36	13.89	51.1	81.9	6.77	13.60	49.2	86.1	6.23	13.29
	060D	54.4	79.0	7.45	13.97	52.4	83.2	6.85	13.66	50.4	87.5	6.29	13.35

NOTES:
(1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW
(5) **High Ambient Applications over 118°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		85°F				95°F				105°F			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
50	015S	15.6	12.3	12.91	17.37	14.9	13.8	11.17	16.53	14.0	15.4	9.59	15.73
	020S	21.1	17.3	12.55	17.19	20.0	19.4	10.77	16.34	18.8	21.7	9.18	15.32
	025S	27.0	23.5	12.30	16.86	25.5	26.1	10.58	16.07	23.9	29.0	8.99	15.29
	027S	31.0	27.8	12.11	17.45	29.3	31.0	10.37	16.66	27.4	34.4	8.81	15.87
	030S	34.8	31.9	11.99	16.78	32.8	35.5	10.25	16.33	30.8	39.4	8.73	15.56
	025D	29.6	24.5	12.31	16.98	28.1	27.3	10.65	16.20	26.6	30.5	9.14	15.47
	030D	35.8	30.5	12.29	17.27	33.8	34.1	10.53	16.45	31.8	38.2	8.97	15.46
	035D	39.2	33.4	12.44	17.38	37.0	37.3	10.64	16.53	34.8	41.7	9.05	15.70
	040D	44.0	37.3	12.24	17.37	41.6	41.7	10.51	16.55	39.1	46.6	8.96	15.80
	045D	53.6	46.5	12.29	17.16	50.6	51.7	10.56	16.40	47.4	57.6	8.97	15.65
	050D	57.8	51.3	12.14	17.21	54.5	57.0	10.40	16.43	51.0	63.5	8.83	15.67
	055D	63.8	57.4	12.11	17.40	60.2	63.9	10.36	16.59	56.4	71.1	8.81	16.14
	057D	66.4	56.5	12.23	16.02	62.7	63.1	10.49	16.03	58.9	70.4	8.94	14.92
	060D	68.4	57.4	12.41	16.05	64.5	64.1	10.63	16.11	60.5	71.5	9.05	14.98
55	015S	17.1	12.6	13.93	18.68	16.3	14.0	12.06	17.79	15.4	15.6	10.36	16.93
	020S	23.0	17.6	13.49	18.44	21.8	19.7	11.57	17.53	20.5	22.0	9.86	16.48
	025S	29.5	24.0	13.16	17.84	27.8	26.6	11.32	17.02	26.1	29.6	9.63	16.28
	027S	33.4	28.5	12.78	18.39	31.6	31.7	10.95	17.57	29.6	35.2	9.32	16.84
	030S	37.5	32.7	12.64	17.62	35.3	36.3	10.81	17.28	33.2	40.4	9.21	16.47
	025D	32.4	24.8	13.28	18.25	30.7	27.7	11.49	17.43	29.1	30.9	9.87	16.65
	030D	39.0	31.0	13.20	18.51	36.8	34.7	11.31	17.63	34.6	38.8	9.63	16.65
	035D	42.7	34.0	13.34	18.62	40.3	38.0	11.42	17.72	37.9	42.4	9.71	16.91
	040D	47.9	38.0	13.13	18.63	45.3	42.4	11.29	17.75	42.6	47.3	9.63	16.96
	045D	58.3	47.5	13.13	18.15	55.1	52.8	11.28	17.36	51.6	58.8	9.59	16.73
	050D	62.6	52.4	12.90	18.17	59.1	58.3	11.06	17.36	55.4	64.8	9.41	16.74
	055D	68.9	58.7	12.83	18.41	65.1	65.3	11.00	18.09	61.1	72.6	9.35	17.29
	057D	72.3	57.4	13.12	17.90	68.3	64.1	11.26	17.08	64.1	71.5	9.59	15.90
	060D	74.5	58.4	13.31	17.98	70.2	65.2	11.41	17.15	65.9	72.7	9.71	15.96
60	015S	18.7	12.8	14.99	20.03	17.8	14.2	12.98	19.09	16.8	15.9	11.15	18.18
	020S	25.1	17.9	14.45	19.70	23.7	20.0	12.40	18.74	22.2	22.3	10.57	17.66
	025S	32.0	24.5	14.00	18.79	30.3	27.2	12.08	18.04	28.4	30.2	10.28	17.27
	027S	35.9	29.2	13.42	19.32	33.9	32.4	11.52	18.46	31.9	36.1	9.82	17.82
	030S	40.2	33.5	13.26	18.40	38.0	37.3	11.35	18.19	35.7	41.4	9.67	17.36
	025D	35.3	25.3	14.28	19.58	33.5	28.2	12.36	18.70	31.7	31.4	10.63	17.87
	030D	42.3	31.6	14.13	19.78	40.0	35.3	12.12	18.85	37.7	39.4	10.32	17.88
	035D	46.4	34.7	14.27	19.84	43.9	38.7	12.22	18.89	41.2	43.2	10.39	18.17
	040D	52.1	38.7	14.05	19.91	49.3	43.1	12.08	18.98	46.3	48.1	10.31	17.83
	045D	63.2	48.5	13.97	19.11	59.8	53.9	12.03	18.50	56.0	59.9	10.23	17.81
	050D	67.4	53.6	13.62	19.10	63.8	59.6	11.71	18.27	59.9	66.2	9.97	17.82
	055D	74.1	60.0	13.50	19.33	70.0	66.8	11.58	19.14	65.8	74.2	9.86	18.40
	057D	78.5	58.5	14.03	18.99	74.2	65.2	12.05	18.12	69.7	72.7	10.27	16.88
	060D	80.9	59.6	14.22	19.06	76.3	66.4	12.20	18.18	71.6	74.0	10.39	16.93

NOTES: (1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		115°F				120°F (See Note 5)				125°F (See Note 5)			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
50	015S	13.2	17.2	8.15	14.69	12.7	18.2	7.48	14.34	12.2	19.2	6.83	13.99
	020S	17.5	24.2	7.77	14.59	16.9	25.5	7.13	14.24	16.3	26.9	6.54	13.89
	025S	22.2	32.4	7.56	14.61	21.3	34.2	6.90	14.27	20.4	36.1	6.28	13.95
	027S	25.4	38.2	7.42	15.17	24.4	40.2	6.80	14.85	--	--	--	--
	030S	28.7	43.6	7.41	14.82	27.7	45.8	6.82	15.06	--	--	--	--
	025D	25.0	34.1	7.77	14.30	24.1	36.1	7.13	14.00	23.1	38.1	6.51	13.71
	030D	29.7	42.6	7.58	14.79	28.6	45.0	6.96	14.49	27.6	47.5	6.37	14.17
	035D	32.5	46.6	7.65	15.07	31.3	49.2	7.02	14.77	30.1	51.9	6.42	14.45
	040D	36.5	52.0	7.58	14.78	35.2	54.9	6.95	14.46	33.8	57.9	6.36	14.19
	045D	44.0	64.2	7.53	15.01	42.1	67.8	6.87	14.71	40.3	71.5	6.25	14.39
	050D	47.3	70.6	7.43	15.07	45.4	74.4	6.79	14.79	--	--	--	--
	055D	52.5	78.8	7.45	15.53	50.5	82.9	6.84	15.29	--	--	--	--
	057D	54.9	78.3	7.58	14.27	53.0	82.4	6.97	13.97	50.9	86.7	6.41	13.64
	060D	56.4	79.5	7.67	14.35	54.3	83.8	7.05	14.03	52.2	88.1	6.47	13.70
55	015S	14.4	17.4	8.81	15.85	13.9	18.4	8.08	15.48	13.3	19.4	7.38	15.10
	020S	19.1	24.5	8.35	15.69	18.4	25.9	7.66	15.32	17.7	27.4	7.02	14.95
	025S	24.3	33.0	8.10	15.57	23.3	34.9	7.40	15.22	--	--	--	--
	027S	27.6	39.1	7.89	16.13	--	--	--	--	--	--	--	--
	030S	31.0	44.7	7.81	16.49	--	--	--	--	--	--	--	--
	025D	27.3	34.6	8.39	15.44	26.3	36.5	7.70	15.12	25.2	38.6	7.03	14.81
	030D	32.4	43.3	8.15	15.94	31.2	45.7	7.48	15.60	30.0	48.2	6.85	15.25
	035D	35.4	47.4	8.21	16.23	34.1	50.0	7.53	15.90	32.8	52.8	6.89	15.56
	040D	39.8	52.8	8.14	15.93	38.3	55.8	7.47	15.59	36.8	58.9	6.83	15.29
	045D	47.9	65.5	8.07	16.04	46.0	69.1	7.37	15.73	--	--	--	--
	050D	51.5	72.1	7.94	16.09	49.5	76.0	7.26	15.79	--	--	--	--
	055D	56.9	80.6	7.91	16.64	--	--	--	--	--	--	--	--
	057D	59.9	79.5	8.14	15.23	57.7	83.8	7.49	14.90	55.5	88.2	6.88	14.56
	060D	61.4	80.9	8.23	15.30	59.2	85.2	7.56	14.94	56.9	89.7	6.94	14.61
60	015S	15.7	17.7	9.49	17.06	15.2	18.7	8.71	16.66	14.5	19.7	7.96	16.26
	020S	20.8	24.9	8.95	16.83	20.0	26.3	8.21	16.43	19.2	27.8	7.52	16.04
	025S	26.4	33.7	8.65	16.53	25.4	35.6	7.91	16.30	--	--	--	--
	027S	29.7	40.0	8.31	17.08	--	--	--	--	--	--	--	--
	030S	33.3	45.8	8.21	17.57	--	--	--	--	--	--	--	--
	025D	29.7	35.1	9.04	16.63	28.6	37.0	8.29	16.29	27.5	39.1	7.57	15.95
	030D	35.2	43.9	8.73	17.12	33.9	46.4	8.01	16.75	32.6	49.0	7.33	16.38
	035D	38.5	48.2	8.79	17.43	37.1	50.9	8.06	17.08	35.7	53.7	7.38	16.70
	040D	43.2	53.7	8.72	17.12	41.7	56.7	8.00	16.75	40.0	59.8	7.32	16.43
	045D	52.1	66.7	8.62	17.08	50.0	70.5	7.87	16.74	--	--	--	--
	050D	55.7	73.7	8.41	17.16	--	--	--	--	--	--	--	--
	055D	61.4	82.4	8.36	17.71	--	--	--	--	--	--	--	--
	057D	65.1	80.9	8.71	16.19	62.8	85.3	8.01	15.81	60.4	89.8	7.36	15.46
	060D	66.7	82.3	8.80	16.24	64.3	86.8	8.08	15.87	61.9	91.3	7.42	15.50

NOTES:
(1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW
(5) **High Ambient Applications over 118°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

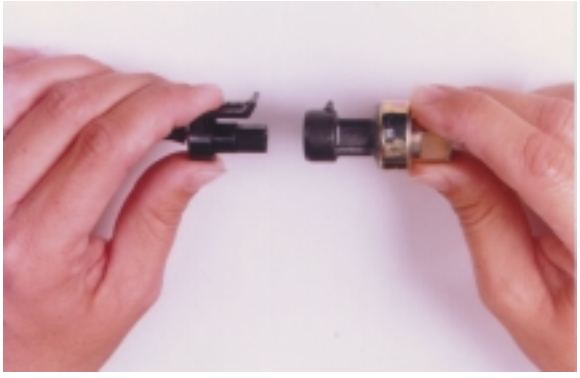
R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		30°C			35°C			40°C		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
6.5	015S	48.5	12.2	3.36	46.30	13.5	3.0	44.10	14.90	2.6
	020S	65.8	17.1	3.28	62.50	19.0	2.9	59.10	21.00	2.5
	025S	84.2	23.1	3.24	79.90	25.4	2.8	75.40	28.00	2.4
	027S	97.0	27.3	3.21	91.80	30.1	2.8	86.40	33.10	2.4
	030S	109.8	31.3	3.21	104.00	34.5	2.8	98.00	37.90	2.4
6.5	025D	96.0	24.4	3.33	91.60	27.0	2.9	87.20	29.90	2.6
	030D	117.0	30.5	3.35	111.20	33.7	2.9	105.20	37.30	2.5
	035D	125.9	33.2	3.35	119.70	36.7	2.9	113.20	40.60	2.5
	040D	142.0	37.2	3.31	135.00	41.1	2.9	127.70	45.40	2.5
	045D	167.0	45.8	3.24	158.50	50.4	2.8	149.40	55.60	2.4
	050D	180.0	50.4	3.20	170.60	55.5	2.8	160.70	61.10	2.4
	055D	199.7	56.5	3.21	189.10	62.2	2.8	178.10	68.40	2.4
	057D	206.9	56.0	3.20	196.40	61.9	2.8	185.50	68.20	2.4
	060D	212.8	56.9	3.24	201.80	62.8	2.8	190.40	69.30	2.4

NOTES: (1) Other performance requirements can be selected from the Dunham-Bush Electronic Catalog
(2) Ratings based on ARI Standard 550/590-98, 5°C water range in evaporator & .018 fouling factor
(3) Interpolation between ratings is permissable but extrapolation is **not**
(4) KWi is for compressor only. COP is for entire unit. See Physical Specs for fan kW

For your information...

All units feature standard pressure transducers with automotive-type quick-connect fittings to eliminate rewiring. These weatherproof transducers feature an ultra-fast reaction time for smooth, accurate unit operation.



PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

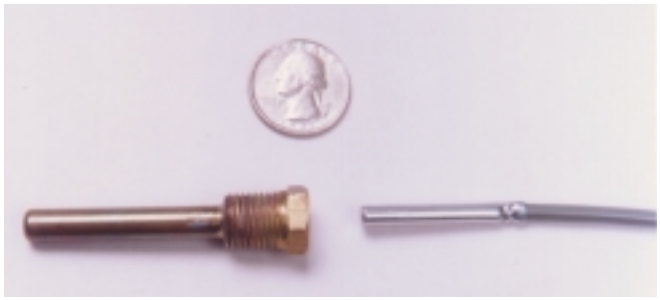
R22 - 60 HZ - Standard Unit - 1140 RPM Fans

LWT °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		45°C			49°C (See Note 5)			52°C (See Note 5)		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
6.5	015S	41.7	16.50	2.22	39.5	17.9	1.96	37.80	19.0	1.8
	020S	55.6	23.20	2.13	52.8	25.1	1.89	50.60	26.6	1.7
	025S	70.6	30.90	2.09	66.4	33.4	1.83	63.10	35.4	1.7
	027S	80.8	36.40	2.06	76.2	39.1	1.81	--	--	--
	030S	91.8	41.50	2.07	86.9	44.5	1.83	--	--	--
6.5	025D	82.5	33.00	2.20	78.3	35.8	1.95	74.80	38.0	1.8
	030D	99.0	41.20	2.17	93.9	44.6	1.92	90.00	47.2	1.7
	035D	106.5	44.90	2.16	101.0	48.5	1.91	96.90	51.4	1.7
	040D	120.0	50.10	2.15	113.6	54.2	1.89	108.70	57.4	1.7
	045D	139.5	61.30	2.08	131.1	66.2	1.82	124.40	70.1	1.6
	050D	150.2	67.30	2.06	141.4	72.5	1.80	--	--	--
	055D	166.8	75.10	2.06	157.6	80.7	1.82	--	--	--
	057D	174.3	75.00	2.08	165.1	80.8	1.85	158.20	85.2	1.7
	060D	178.7	76.20	2.10	169.2	82.0	1.86	162.10	86.6	1.7

NOTES:
(1) Other performance requirements can be selected from the Dunham-Bush Electronic Catalog
(2) Ratings based on ARI Standard 550/590-98, 5°C water range in evaporator & .018 fouling factor
(3) Interpolation between ratings is permissable but extrapolation is **not**
(4) KWi is for compressor only. COP is for entire unit. See Physical Specs for fan kW
(5) **High Ambient Applications over 48°C may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

For your information...

All units feature standard temperature sensors with a reduced-mass element for fast reaction time. The element is only 0.188" OD x 1 1/2" long.



R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		85°F				95°F				105°F			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
40	015S	13.0	12.5	11.30	15.49	12.3	14.0	9.69	14.69	11.7	15.7	8.25	13.94
	**020S	18.5	17.7	11.46	15.80	17.5	19.8	9.76	14.96	16.4	22.2	8.27	14.29
	**025S	22.7	23.9	10.70	14.90	21.4	26.6	9.10	14.15	19.9	29.6	7.66	13.71
	**027S	26.3	28.6	10.43	15.48	24.7	31.8	8.87	14.73	23.1	35.3	7.50	14.31
	030S	28.5	32.9	9.92	14.13	26.8	36.5	8.44	14.09	25.0	40.3	7.16	13.37
	**025D	25.7	25.0	11.18	15.53	24.4	28.0	9.60	14.78	23.1	31.3	8.18	14.09
	**030D	32.2	31.7	11.30	15.82	30.4	35.4	9.61	15.02	28.5	39.6	8.13	14.66
	**035D	34.8	34.7	11.20	15.70	32.8	38.7	9.52	14.88	30.7	43.2	8.05	14.67
	**040D	39.2	38.4	11.29	16.10	37.0	42.9	9.62	15.29	34.7	47.9	8.14	14.55
	045D	46.4	47.7	10.95	15.38	43.7	53.1	9.31	14.65	40.7	59.1	7.83	14.54
	050D	49.1	52.6	10.57	15.29	46.2	58.5	8.98	14.55	43.0	65.0	7.57	14.47
	055D	54.0	59.5	10.32	15.23	50.8	66.1	8.78	15.28	47.4	73.2	7.43	14.79
	057D	57.2	57.9	10.93	15.36	53.8	64.5	9.30	14.53	50.3	71.8	7.88	13.77
	060D	57.1	58.5	10.81	15.20	53.8	65.3	9.20	14.38	50.3	72.6	7.79	13.63
42	015S	13.5	12.6	11.66	15.97	12.8	14.1	10.00	15.15	12.1	15.8	8.52	14.37
	020S	18.3	17.7	11.37	15.86	17.3	19.8	9.68	15.02	16.2	22.1	8.20	14.36
	025S	23.3	24.0	10.92	15.19	22.0	26.7	9.30	14.42	20.5	29.8	7.83	14.01
	027S	26.4	28.7	10.47	15.63	24.9	31.9	8.91	14.88	23.2	35.3	7.53	14.49
	030S	29.4	33.2	10.14	14.43	27.7	36.9	8.62	14.44	25.9	40.8	7.32	13.71
	*025D	26.7	25.2	11.54	16.01	25.3	28.1	9.91	15.24	23.9	31.5	8.44	14.52
	*030D	32.5	31.7	11.37	16.03	30.7	35.5	9.67	15.23	28.8	39.6	8.19	14.88
	*035D	34.9	34.7	11.25	15.89	33.0	38.8	9.56	15.08	30.9	43.3	8.08	14.88
	*040D	39.5	38.5	11.35	16.32	37.2	42.9	9.68	15.50	34.9	47.9	8.19	14.76
	045D	46.4	47.6	10.94	15.48	43.6	53.0	9.31	14.75	40.7	59.0	7.83	14.66
	050D	49.6	52.7	10.64	15.47	46.7	58.6	9.05	14.73	43.5	65.2	7.63	14.70
	055D	54.4	59.7	10.38	15.41	51.2	66.3	8.83	15.49	47.8	73.4	7.48	15.02
	057D	57.5	57.9	11.00	15.55	54.2	64.6	9.36	14.72	50.8	71.9	7.94	13.96
	060D	59.2	58.9	11.14	15.64	55.8	65.7	9.48	14.79	52.2	73.1	8.03	14.02
44	015S	14.0	12.7	12.03	16.45	13.3	14.2	10.32	15.61	12.6	15.9	8.79	14.81
	020S	19.0	17.8	11.71	16.32	17.9	19.9	9.97	15.46	16.8	22.3	8.44	14.80
	025S	24.2	24.2	11.23	15.54	22.8	27.0	9.56	14.76	21.3	30.1	8.05	14.38
	027S	27.3	29.0	10.70	15.98	25.7	32.2	9.11	15.20	24.0	35.7	7.70	14.85
	030S	30.4	33.6	10.35	14.72	28.5	37.3	8.81	14.80	26.7	41.2	7.47	14.05
	025D	26.6	25.2	11.50	16.11	25.2	28.1	9.87	15.34	23.8	31.5	8.40	14.61
	030D	32.1	31.7	11.26	16.08	30.3	35.4	9.58	15.28	28.5	39.5	8.11	14.92
	035D	35.1	34.7	11.29	16.07	33.1	38.8	9.60	15.25	31.1	43.4	8.12	15.08
	040D	39.5	38.5	11.37	16.49	37.3	43.0	9.69	15.66	35.0	48.0	8.20	15.23
	045D	48.1	48.1	11.24	15.83	45.2	53.5	9.56	15.08	42.2	59.6	8.05	15.07
	050D	51.3	53.2	10.90	15.82	48.2	59.2	9.28	15.06	45.0	65.8	7.83	15.11
	055D	56.1	60.2	10.61	15.75	52.8	66.9	9.03	15.88	49.4	74.2	7.65	15.44
	057D	59.6	58.3	11.33	15.99	56.2	65.1	9.64	15.13	52.7	72.4	8.18	14.35
	060D	61.4	59.4	11.47	16.07	57.8	66.2	9.76	15.20	54.1	73.6	8.27	14.42

NOTES:
(1) Double asterisk (**) indicates ratings with CH3 oversized evaporator for 40°F LWT
(2) Asterisk (*) indicates ratings with CH2 oversized evaporator for 42°F LWT
(3) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(4) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(5) Interpolation between ratings is permissible but extrapolation is **not**
(6) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		115°F (See Note 7)				120°F (See Note 7)				125°F (See Note 7)			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
40	015S	10.9	17.5	6.95	13.24	10.5	18.5	6.34	12.90	10.0	19.6	5.75	12.56
	**020S	15.3	24.7	6.97	13.55	14.7	26.1	6.38	13.22	14.2	27.5	5.84	12.88
	**025S	18.3	32.9	6.36	13.03	17.5	34.7	5.77	12.74	--	--	--	--
	**027S	21.3	39.0	6.30	13.64	--	--	--	--	--	--	--	--
	030S	23.3	44.4	6.07	13.79	--	--	--	--	--	--	--	--
	**025D	21.6	35.0	6.89	13.45	20.7	37.0	6.28	13.14	19.8	39.1	5.70	12.83
	**030D	26.6	44.1	6.84	13.93	25.6	46.5	6.26	13.63	24.6	49.0	5.72	13.29
	**035D	28.6	48.2	6.76	14.05	27.5	50.8	6.19	13.71	--	--	--	--
	**040D	32.2	53.3	6.83	14.12	31.0	56.3	6.24	13.82	29.7	59.3	5.69	13.49
	045D	37.4	65.7	6.51	13.83	35.6	69.3	5.90	13.53	--	--	--	--
	**050D	39.6	72.0	6.32	13.82	--	--	--	--	--	--	--	--
	**055D	43.9	80.8	6.27	14.16	--	--	--	--	--	--	--	--
	**057D	46.8	79.4	6.66	13.04	45.0	83.4	6.12	12.70	43.2	87.5	5.61	12.35
	060D	46.8	80.4	6.59	12.91	45.0	84.4	6.05	12.57	43.2	88.5	5.55	12.23
42	015S	11.3	17.6	7.17	13.67	10.9	18.6	6.54	13.31	10.4	19.7	5.94	12.97
	020S	15.1	24.7	6.90	13.62	14.5	26.0	6.31	13.28	14.0	27.4	5.77	12.93
	025S	18.9	33.2	6.51	13.35	18.0	35.0	5.91	13.02	--	--	--	--
	027S	21.5	39.1	6.33	13.81	--	--	--	--	--	--	--	--
	030S	24.0	44.9	6.20	14.21	--	--	--	--	--	--	--	--
	*025D	22.4	35.2	7.11	13.89	21.5	37.2	6.49	13.57	20.5	39.3	5.89	13.25
	*030D	26.8	44.2	6.89	14.13	25.8	46.6	6.30	13.82	24.8	49.1	5.76	13.48
	*035D	28.8	48.3	6.80	14.24	27.7	50.9	6.22	13.90	--	--	--	--
	*040D	32.5	53.4	6.88	14.33	31.2	56.4	6.28	14.02	29.9	59.4	5.73	13.69
	045D	37.4	65.7	6.51	13.95	35.7	69.3	5.90	13.64	--	--	--	--
	050D	40.2	72.3	6.38	14.03	--	--	--	--	--	--	--	--
	055D	44.4	81.1	6.32	14.41	--	--	--	--	--	--	--	--
	057D	47.3	79.6	6.72	13.21	45.5	83.6	6.17	12.88	43.7	87.8	5.66	12.53
	060D	48.5	81.0	6.78	13.28	46.7	85.1	6.23	12.93	44.8	89.3	5.71	12.58
44	015S	11.7	17.7	7.40	14.10	11.3	18.7	6.75	13.74	10.8	19.8	6.13	13.38
	020S	15.7	24.8	7.10	14.04	15.1	26.2	6.50	13.69	14.5	27.6	5.94	13.33
	025S	19.6	33.5	6.71	13.70	18.7	35.3	6.09	13.37	--	--	--	--
	027S	22.2	39.5	6.47	14.16	--	--	--	--	--	--	--	--
	030S	24.8	45.4	6.33	14.63	--	--	--	--	--	--	--	--
	025D	22.3	35.2	7.08	13.98	21.4	37.2	6.46	13.65	20.4	39.3	5.86	13.33
	030D	26.5	44.1	6.82	14.18	25.5	46.5	6.24	13.85	24.5	49.0	5.70	13.50
	035D	28.9	48.3	6.82	14.42	27.8	51.0	6.24	14.07	--	--	--	--
	040D	32.5	53.5	6.88	14.50	31.3	56.4	6.29	14.12	30.0	59.5	5.73	13.83
	045D	38.8	66.3	6.70	14.34	37.0	69.9	6.08	14.02	--	--	--	--
	050D	41.6	73.0	6.54	14.42	--	--	--	--	--	--	--	--
	055D	45.8	81.9	6.46	14.82	--	--	--	--	--	--	--	--
	057D	49.0	80.2	6.91	13.59	47.2	84.3	6.35	13.24	45.3	88.5	5.83	12.88
	060D	50.3	81.6	6.98	13.66	48.4	85.8	6.41	13.30	46.5	90.1	5.88	12.93

NOTES:
(1) Double asterisk (**) indicates ratings with CH3 oversized evaporator for 40°F LWT
(2) Asterisk (*) indicates ratings with CH2 oversized evaporator for 42°F LWT
(3) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(4) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(5) Interpolation between ratings is permissible but extrapolation is **not**
(6) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW
(7) **High Ambient Applications over 113°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		85°F				95°F				105°F			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
45	015S	14.3	12.7	12.22	16.70	13.5	14.2	10.48	15.85	12.8	15.9	8.93	15.04
	020S	19.3	17.9	11.88	16.55	18.2	20.0	10.12	15.68	17.1	22.4	8.56	15.02
	025S	24.6	24.4	11.38	15.71	23.2	27.1	9.69	14.92	21.7	30.2	8.16	14.56
	027S	27.7	29.1	10.81	16.14	26.1	32.3	9.21	15.37	24.3	35.9	7.79	15.03
	030S	30.8	33.8	10.46	14.87	29.0	37.5	8.90	14.97	27.1	41.4	7.55	14.21
	025D	27.0	25.2	11.67	16.35	25.7	28.2	10.02	15.57	24.3	31.6	8.53	14.83
	030D	32.7	31.8	11.42	16.31	30.9	35.5	9.72	15.49	29.0	39.7	8.23	15.15
	035D	35.7	34.9	11.45	16.27	33.7	39.0	9.73	15.45	31.6	43.5	8.23	15.32
	040D	40.2	38.6	11.53	16.72	38.0	43.1	9.83	15.89	35.6	48.1	8.32	15.46
	045D	48.9	48.3	11.39	16.01	46.0	53.8	9.69	15.98	42.9	59.9	8.16	15.28
	050D	52.1	53.5	11.02	15.99	49.1	59.5	9.39	15.23	45.8	66.1	7.92	15.31
	055D	57.0	60.5	10.72	15.91	53.6	67.3	9.13	16.08	50.1	74.5	7.73	15.65
	057D	60.7	58.5	11.49	16.20	57.2	65.3	9.79	15.33	53.6	72.7	8.30	14.55
	060D	62.5	59.6	11.64	16.29	58.8	66.4	9.90	15.40	55.1	73.9	8.39	14.62
46	015S	14.5	12.8	12.40	16.94	13.8	14.3	10.65	16.08	13.0	16.0	9.07	15.26
	020S	19.7	18.0	12.06	16.79	18.6	20.1	10.26	15.90	17.4	22.4	8.69	15.24
	025S	25.0	24.5	11.51	15.88	23.6	27.2	9.82	15.47	22.1	30.3	8.28	14.75
	027S	28.1	29.3	10.93	16.31	26.5	32.5	9.30	15.53	24.7	36.1	7.87	15.21
	030S	31.3	33.9	10.56	15.01	29.4	37.7	8.99	15.15	27.5	41.7	7.63	14.38
	025D	27.5	25.3	11.85	16.59	26.2	28.3	10.17	15.80	24.7	31.7	8.67	15.06
	030D	33.3	31.9	11.59	16.54	31.4	35.7	9.86	15.71	29.5	39.8	8.34	15.38
	035D	36.4	35.0	11.61	16.49	34.3	39.2	9.87	15.65	32.2	43.7	8.35	15.55
	040D	40.9	38.8	11.69	16.96	38.7	43.3	9.97	16.11	36.2	48.3	8.43	15.70
	045D	49.7	48.5	11.53	16.18	46.9	54.0	9.82	16.20	43.7	60.1	8.27	15.48
	050D	52.9	53.7	11.14	16.15	49.8	59.8	9.49	15.39	46.5	66.4	8.02	15.52
	055D	57.9	60.8	10.84	16.08	54.5	67.6	9.22	16.28	50.9	74.9	7.82	15.86
	057D	61.8	58.7	11.66	16.42	58.2	65.5	9.93	15.54	54.6	72.9	8.42	14.75
	060D	63.6	59.8	11.81	16.51	59.9	66.7	10.04	15.61	56.0	74.2	8.51	14.81
48	015S	15.1	12.9	12.78	17.44	14.3	14.4	10.97	16.56	13.5	16.1	9.35	15.72
	020S	20.4	18.1	12.40	17.26	19.2	20.2	10.56	16.35	18.0	22.6	8.94	15.69
	025S	25.8	24.7	11.77	16.22	24.4	27.5	10.04	15.85	22.8	30.6	8.49	15.11
	027S	29.0	29.6	11.15	16.64	27.3	32.8	9.50	15.85	25.5	36.5	8.03	15.58
	030S	32.3	34.3	10.77	16.29	30.3	38.1	9.17	15.49	28.4	42.1	7.78	16.23
	025D	28.6	25.5	12.21	17.08	27.1	28.5	10.49	16.27	25.6	31.8	8.93	15.50
	030D	34.5	32.1	11.92	16.99	32.5	35.9	10.14	16.15	30.5	40.1	8.58	15.85
	035D	37.7	35.3	11.94	16.92	35.6	39.5	10.15	16.06	33.3	44.1	8.58	16.02
	040D	42.4	39.1	12.02	17.43	40.0	43.6	10.25	16.57	37.5	48.7	8.67	16.18
	045D	51.3	49.0	11.78	16.52	48.4	54.5	10.06	16.62	45.3	60.7	8.49	15.89
	050D	54.5	54.2	11.38	16.49	51.4	60.3	9.70	15.71	48.0	67.1	8.20	15.93
	055D	59.6	61.4	11.06	16.42	56.1	68.3	9.42	16.67	52.5	75.7	7.98	16.28
	057D	64.0	59.2	11.99	16.86	60.3	66.0	10.21	15.95	56.5	73.5	8.66	15.15
	060D	65.9	60.2	12.14	16.94	62.0	67.2	10.33	16.01	58.0	74.7	8.75	15.21

NOTES: (1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		115°F (See Note 5)				120°F (See Note 5)				125°F (See Note 5)			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
45	015S	11.9	17.8	7.52	14.32	11.5	18.8	6.86	13.95	11.0	19.8	6.23	13.59
	020S	15.9	24.9	7.21	14.25	15.4	26.3	6.60	13.89	14.7	27.7	6.03	13.53
	025S	20.0	33.6	6.80	13.87	19.1	35.5	6.18	13.54	--	--	--	--
	027S	22.5	39.7	6.54	14.35	--	--	--	--	--	--	--	--
	030S	25.2	45.6	6.39	14.84	--	--	--	--	--	--	--	--
	025D	22.7	35.3	7.19	14.20	21.8	37.3	6.56	13.87	20.8	39.4	5.95	13.54
	030D	27.0	44.2	6.92	14.39	26.0	46.7	6.33	14.06	25.0	49.2	5.79	13.71
	035D	29.5	48.5	6.92	14.64	28.3	51.2	6.33	14.28	--	--	--	--
	040D	33.1	53.7	6.98	14.72	31.8	56.6	6.38	14.34	30.5	59.7	5.82	14.05
	045D	39.5	66.6	6.79	14.53	37.7	70.3	6.16	14.21	--	--	--	--
	050D	42.3	73.4	6.62	14.61	--	--	--	--	--	--	--	--
	055D	46.5	82.3	6.53	15.02	--	--	--	--	--	--	--	--
	057D	49.9	80.6	7.01	13.78	48.0	84.7	6.44	13.43	46.2	88.9	5.91	13.06
	060D	51.2	81.9	7.08	13.85	49.3	86.1	6.50	13.48	47.3	90.4	5.96	13.10
46	015S	12.2	17.8	7.64	14.54	11.7	18.8	6.97	14.17	11.2	19.9	6.33	13.81
	020S	16.2	25.0	7.31	14.46	15.6	26.4	6.69	14.10	15.0	27.8	6.11	13.74
	025S	20.4	33.8	6.90	14.05	19.5	35.7	6.27	13.71	--	--	--	--
	027S	22.9	39.9	6.61	14.53	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--	--	--	--
	025D	23.1	35.4	7.30	14.43	22.2	37.4	6.66	14.08	21.2	39.5	6.04	13.75
	030D	27.5	44.4	7.02	14.61	26.4	46.8	6.42	14.28	25.4	49.4	5.87	13.92
	035D	30.0	48.7	7.02	14.86	28.9	51.4	6.42	14.50	--	--	--	--
	040D	33.7	53.9	7.09	14.95	32.4	56.8	6.47	14.61	31.1	59.9	5.90	14.26
	045D	40.3	67.0	6.88	14.72	38.5	70.6	6.25	14.39	--	--	--	--
	050D	43.0	73.7	6.71	14.80	--	--	--	--	--	--	--	--
	055D	47.3	82.8	6.60	15.22	--	--	--	--	--	--	--	--
	057D	50.8	80.9	7.11	13.97	48.9	85.0	6.53	13.61	47.0	89.3	5.99	13.23
	060D	52.1	82.3	7.18	14.03	50.2	86.5	6.59	13.66	48.2	90.8	6.04	13.28
48	015S	12.6	17.9	7.87	14.99	12.1	18.9	7.18	14.61	11.6	20.0	6.52	14.23
	020S	16.8	25.2	7.52	14.89	16.2	26.6	6.89	14.52	15.6	28.0	6.29	14.14
	025S	21.1	34.1	7.09	14.40	20.2	36.0	6.44	14.72	--	--	--	--
	027S	23.6	40.3	6.75	14.88	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--	--	--	--
	025D	23.9	35.6	7.52	14.88	23.0	37.6	6.86	14.52	21.9	39.7	6.23	14.18
	030D	28.5	44.7	7.22	15.05	27.4	47.2	6.61	14.70	26.3	49.8	6.04	14.33
	035D	31.1	49.1	7.21	15.31	29.9	51.8	6.60	14.94	--	--	--	--
	040D	34.9	54.3	7.29	15.40	33.6	57.3	6.66	15.06	32.2	60.4	6.07	14.69
	045D	41.8	67.6	7.08	15.11	39.9	71.2	6.43	14.77	--	--	--	--
	050D	44.5	74.5	6.87	15.19	--	--	--	--	--	--	--	--
	055D	48.8	83.6	6.74	15.62	--	--	--	--	--	--	--	--
	057D	52.6	81.5	7.31	14.35	50.7	85.7	6.71	13.97	48.7	90.0	6.16	13.58
	060D	54.0	82.9	7.38	14.42	52.0	87.2	6.77	14.03	49.9	91.6	6.21	13.63

NOTES:
(1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW
(5) **High Ambient Applications over 113°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		85°F				95°F				105°F			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
50	015S	15.6	13.0	13.17	17.95	14.8	14.5	11.31	17.04	14.0	16.2	9.63	16.18
	020S	21.1	18.2	12.75	17.73	19.9	20.4	10.86	16.80	18.7	22.8	9.19	16.15
	025S	26.6	24.9	12.03	16.55	25.1	27.8	10.27	16.22	23.5	30.9	8.68	15.47
	027S	29.9	29.9	11.38	16.97	28.1	33.2	9.69	16.68	26.3	36.8	8.20	15.94
	030S	33.2	34.7	10.98	16.64	31.2	38.5	9.34	15.84	29.2	42.6	7.93	16.69
	025D	29.6	25.7	12.58	17.57	28.1	28.7	10.80	16.74	26.5	32.0	9.20	16.07
	030D	35.7	32.4	12.25	17.45	33.7	36.2	10.42	16.59	31.6	40.4	8.82	16.32
	035D	39.0	35.6	12.26	17.35	36.8	39.8	10.43	17.02	34.5	44.4	8.82	16.50
	040D	43.9	39.4	12.36	17.91	41.4	44.0	10.53	17.02	38.9	49.1	8.92	16.66
	045D	52.9	49.4	12.04	16.85	49.9	55.0	10.27	17.05	46.7	61.3	8.68	16.30
	050D	56.2	54.8	11.62	16.82	53.0	60.9	9.90	17.06	49.5	67.7	8.37	16.34
	055D	61.4	62.1	11.29	16.74	57.8	69.0	9.61	17.48	54.1	76.4	8.15	16.71
	057D	66.2	59.6	12.33	17.29	62.4	66.5	10.50	16.35	58.5	74.0	8.90	15.54
	060D	68.2	60.7	12.48	17.38	64.2	67.7	10.62	16.42	60.1	75.3	8.99	15.60
55	015S	17.1	13.2	14.15	19.23	16.2	14.7	12.16	18.27	15.3	16.5	10.36	17.47
	020S	23.0	18.6	13.64	18.90	21.7	20.8	11.62	17.91	20.3	23.2	9.84	17.28
	025S	28.7	25.6	12.66	17.36	27.1	28.4	10.83	17.17	25.4	31.6	9.16	16.38
	027S	32.1	30.7	11.93	17.78	30.2	34.1	10.16	17.62	28.3	37.8	8.60	16.85
	030S	35.7	35.7	11.47	17.51	33.6	39.6	9.77	18.63	31.4	43.8	8.29	17.80
	025D	32.4	26.2	13.52	18.83	30.7	29.2	11.61	17.94	29.0	32.6	9.90	17.31
	030D	38.9	33.0	13.09	18.56	36.7	36.9	11.15	17.66	34.4	41.2	9.44	17.49
	035D	42.3	36.4	13.03	18.34	40.0	40.7	11.10	18.15	37.5	45.3	9.40	17.66
	040D	47.8	40.2	13.20	19.10	45.1	44.9	11.26	18.18	42.3	50.0	9.54	17.90
	045D	56.9	50.7	12.67	17.68	53.7	56.3	10.82	18.13	50.3	62.7	9.15	17.33
	050D	60.5	56.2	12.20	17.64	57.0	62.5	10.41	18.13	53.3	69.4	8.80	17.37
	055D	66.0	63.7	11.84	18.89	62.2	70.8	10.08	18.58	58.2	78.4	8.55	17.77
	057D	72.1	60.8	13.18	18.37	67.9	67.8	11.22	17.36	63.7	75.5	9.52	16.53
	060D	74.2	61.9	13.33	18.44	69.9	69.0	11.35	17.42	65.4	76.8	9.61	16.58
60	015S	18.7	13.5	15.16	20.53	17.7	15.1	13.03	19.52	16.7	16.8	11.11	18.72
	020S	25.0	19.0	14.55	19.92	23.6	21.2	12.39	18.89	22.1	23.6	10.50	18.34
	025S	30.8	26.2	13.29	18.93	29.1	29.1	11.37	18.11	27.3	32.4	9.63	18.47
	027S	34.4	31.6	12.45	18.55	32.4	35.1	10.61	18.55	30.3	38.9	8.99	19.10
	030S	38.2	36.8	11.94	18.35	36.0	40.8	10.17	19.77	33.7	45.1	8.64	18.91
	025D	35.3	26.7	14.48	20.11	33.5	29.7	12.45	19.17	31.6	33.2	10.61	18.58
	030D	42.2	33.8	13.95	19.55	39.8	37.7	11.88	19.56	37.4	42.0	10.06	18.64
	035D	45.7	37.3	13.77	19.28	43.2	41.6	11.75	19.72	40.5	46.3	9.95	18.81
	040D	51.8	41.1	14.01	20.12	48.9	45.8	11.97	19.15	45.9	51.0	10.16	19.09
	045D	61.1	51.9	13.28	20.06	57.6	57.7	11.36	19.21	54.0	64.1	9.61	18.36
	050D	64.9	57.7	12.77	18.42	61.1	64.1	10.90	19.22	57.2	71.2	9.22	18.42
	055D	70.8	65.5	12.36	19.88	66.7	72.7	10.53	19.68	62.4	80.6	8.93	18.83
	057D	78.2	62.1	14.00	19.41	73.8	69.2	11.96	18.38	69.2	77.1	10.14	17.50
	060D	80.2	63.3	14.11	19.46	75.7	70.5	12.06	18.43	71.0	78.5	10.23	17.55

NOTES: (1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE											
		115°F (See Note 5)				120°F (See Note 5)				125°F (See Note 5)			
°F	MODEL	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV	TONS	KW	EER	NPLV
50	015S	13.1	18.1	8.11	15.45	12.6	19.1	7.40	15.05	12.0	20.1	6.73	14.67
	020S	17.4	25.4	7.74	15.32	16.8	26.8	7.08	14.94	16.1	28.3	6.46	14.55
	025S	21.8	34.4	7.26	14.76	20.9	36.3	6.61	15.14	--	--	--	--
	027S	24.3	40.8	6.89	16.08	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--	--	--	--
	025D	24.8	35.8	7.75	15.33	23.8	37.8	7.07	14.97	22.7	39.9	6.43	14.61
	030D	29.5	45.1	7.43	15.50	28.4	47.5	6.80	15.14	27.3	50.1	6.21	14.75
	035D	32.2	49.5	7.41	15.76	30.9	52.2	6.78	15.37	--	--	--	--
	040D	36.2	54.7	7.49	15.86	34.8	57.7	6.85	15.51	--	--	--	--
	045D	43.2	68.2	7.26	15.53	41.4	71.9	6.60	15.15	--	--	--	--
	050D	45.9	75.2	7.02	15.61	--	--	--	--	--	--	--	--
	055D	--	--	--	--	--	--	--	--	--	--	--	--
	057D	54.5	82.2	7.51	14.73	52.5	86.4	6.90	14.34	50.5	90.7	6.33	13.94
	060D	55.9	83.6	7.59	14.79	53.8	87.9	6.96	14.39	51.7	92.4	6.38	13.98
55	015S	14.3	18.4	8.73	16.61	13.7	19.4	7.97	16.19	13.1	20.4	7.24	15.78
	020S	18.9	25.8	8.28	16.41	18.2	27.3	7.58	16.00	17.5	28.8	6.92	15.59
	025S	23.6	35.2	7.67	16.58	--	--	--	--	--	--	--	--
	027S	--	--	--	--	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--	--	--	--
	025D	27.0	36.4	8.34	16.51	26.0	38.4	7.61	16.12	24.8	40.5	6.91	15.74
	030D	32.1	45.9	7.94	16.62	30.9	48.4	7.27	16.23	--	--	--	--
	035D	35.0	50.5	7.91	16.87	33.7	53.3	7.24	16.46	--	--	--	--
	040D	39.4	55.8	8.02	17.04	37.9	58.8	7.33	16.65	--	--	--	--
	045D	46.6	69.8	7.66	16.52	--	--	--	--	--	--	--	--
	050D	--	--	--	--	--	--	--	--	--	--	--	--
	055D	--	--	--	--	--	--	--	--	--	--	--	--
	057D	59.4	83.8	8.03	15.68	57.2	88.2	7.37	15.25	--	--	--	--
	060D	60.9	85.3	8.10	15.73	58.6	89.7	7.43	15.30	--	--	--	--
60	015S	15.6	18.7	9.36	17.81	15.0	19.7	8.55	17.37	14.3	20.8	7.78	16.93
	020S	20.6	26.3	8.83	17.43	19.8	27.8	8.08	16.99	--	--	--	--
	025S	25.3	36.1	8.07	17.70	--	--	--	--	--	--	--	--
	027S	--	--	--	--	--	--	--	--	--	--	--	--
	030S	--	--	--	--	--	--	--	--	--	--	--	--
	025D	29.5	37.0	8.94	17.73	28.3	39.0	8.17	17.32	27.1	41.2	7.43	16.90
	030D	34.8	46.8	8.47	17.71	33.5	49.4	7.75	17.27	--	--	--	--
	035D	37.8	51.6	8.38	17.95	--	--	--	--	--	--	--	--
	040D	42.8	56.9	8.55	18.17	41.2	60.0	7.82	17.74	--	--	--	--
	045D	50.1	71.4	8.06	17.51	--	--	--	--	--	--	--	--
	050D	--	--	--	--	--	--	--	--	--	--	--	--
	055D	--	--	--	--	--	--	--	--	--	--	--	--
	057D	64.5	85.6	8.57	16.61	62.2	90.0	7.86	17.30	--	--	--	--
	060D	66.1	87.1	8.63	16.66	63.7	91.7	7.91	17.34	--	--	--	--

NOTES:
(1) Ratings based on ARI Standard 550/590-98, 10°F water range in evaporator & .0001 fouling factor
(2) ARI Standard 550/590-98 **"NPLV"** ("**N**on-**S**tandard **P**art **L**oad **V**alue) has replaced ARI Standard 590-92 **"APLV"** (**A**pplied **P**art **L**oad **V**alue) ratings.
(3) Interpolation between ratings is permissible but extrapolation is **not**
(4) KW is for compressor only. EER is for entire unit. See Physical Specs for fan kW
(5) **High Ambient Applications over 113°F may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PERFORMANCE DATA: SPLIT-SYSTEM CHILLERS

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT	AUDS-A	ENTERING CONDENSER AIR TEMPERATURE								
		30°C			35°C			40°C		
°C	MODEL	kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
6.5	015S	48.5	12.8	3.44	46.30	14.2	3.0	44.00	15.70	2.6
	020S	65.7	18.0	3.35	62.30	19.9	2.9	58.90	22.00	2.5
	025S	83.9	24.4	3.22	79.40	26.9	2.8	74.60	29.70	2.4
	027S	94.6	29.2	3.07	89.50	32.1	2.7	84.10	35.20	2.3
	030S	105.3	33.8	2.97	99.50	37.2	2.6	93.60	40.70	2.2
6.5	025D	96.0	25.6	3.41	91.60	28.3	3.0	87.00	31.30	2.6
	030D	116.7	32.3	3.35	110.70	35.7	2.9	104.50	39.40	2.5
	035D	125.6	35.3	3.31	119.00	39.0	2.9	112.40	43.10	2.5
	040D	141.8	39.1	3.35	134.50	43.2	2.9	126.90	47.70	2.5
	045D	166.4	48.5	3.22	157.50	53.4	2.8	147.80	58.80	2.4
	050D	177.7	53.6	3.12	168.00	59.0	2.7	157.90	64.90	2.3
	055D	194.4	60.7	3.04	184.00	66.7	2.6	173.10	73.20	2.3
	057D	206.4	58.9	3.24	195.60	64.9	2.8	184.40	71.50	2.4
	060D	212.2	59.9	3.28	200.90	66.0	2.8	189.20	72.70	2.4

NOTES: (1) Other performance requirements can be selected from the Dunham-Bush Electronic Catalog
(2) Ratings based on ARI Standard 550/590-98, 5°C water range in evaporator & .018 fouling factor
(3) Interpolation between ratings is permissable but extrapolation is **not**
(4) KWi is for compressor only. COP is for entire unit. See Physical Specs for fan kW

R22 - 60 HZ - *Extra Quiet* Unit - 855 RPM Fans

LWT °C	AUDS-A MODEL	ENTERING CONDENSER AIR TEMPERATURE								
		45°C (See Note 5)			49°C (See Note 5)			52°C (See Note 5)		
		kWo	kWi	COP	kWo	kWi	COP	kWo	kWi	COP
6.5	015S	41.4	17.30	2.23	39.1	18.7	1.95	37.20	19.9	1.8
	020S	55.3	24.30	2.14	52.3	26.2	1.88	50.10	27.8	1.7
	025S	69.5	32.70	2.03	65.1	35.3	1.76	--	--	--
	027S	78.5	38.60	1.95	--	--	--	--	--	--
	030S	87.7	44.40	1.91	--	--	--	--	--	--
6.5	025D	82.0	34.60	2.21	77.5	37.5	1.94	73.70	39.7	1.7
	030D	98.2	43.50	2.13	93.0	46.9	1.88	89.00	49.7	1.7
	035D	105.5	47.50	2.11	99.9	51.3	1.85	--	--	--
	040D	119.0	52.60	2.13	112.4	56.8	1.87	107.30	60.1	1.7
	045D	137.4	64.70	2.02	128.5	69.9	1.76	--	--	--
	050D	147.1	71.30	1.97	--	--	--	--	--	--
	055D	162.0	80.10	1.94	--	--	--	--	--	--
	057D	172.9	78.40	2.08	163.7	84.3	1.84	156.70	88.8	1.7
	060D	177.3	79.80	2.09	167.7	85.7	1.85	160.50	90.3	1.7

NOTES:
(1) Other performance requirements can be selected from the Dunham-Bush Electronic Catalog
(2) Ratings based on ARI Standard 550/590-98, 5°C water range in evaporator & .018 fouling factor
(3) Interpolation between ratings is permissable but extrapolation is **not**
(4) KWi is for compressor only. COP is for entire unit. See Physical Specs for fan kW
(5) **High Ambient Applications over 45°C may be affected by the unit's automatic "High Pressure Limiting" function that unloads the circuit if head pressure reaches limits by allowing only one compressor per circuit to run.**

PHYSICAL SPECIFICATIONS: ENGLISH I.P. & S.I. UNITS

AUDS-A 015S, 020S, 025S, 027S, 030S

AUDS-A MODEL	015S	020S	025S	027S	030S
Nominal Capacity in Tons (kW)	15 (52)	20 (70)	25 (88)	27 (95)	30 (105)
Quantity of Compressors	2	2	2	2	2
STANDARD REMOTE COOLER MODULE (RCH1)[2] for 44°F (6.7°C) LWT	CHS006601B	CHS006601B	CHS007601B	CHS007601B	CHS008601A
Water Volume, Gallons (Liters)	3.4 (12.9)	3.4 (12.9)	5.5 (20.8)	5.5 (20.8)	7.0 (26.5)
Minimum Flow Rate, GPM (L/S)	29 (1.83)	29 (1.83)	50 (3.15)	50 (3.15)	56 (3.53)
Maximum Flow Rate, GPM (L/S)	97 (6.12)	97 (6.12)	168 (10.60)	168 (10.60)	172 (10.85)
Water Conn. Size In/Out (Type)	3" NPTE	3" NPTE	3" NPTE	3" NPTE	3" NPTE
OPTIONAL REMOTE COOLER MODULE (RCH2)[3] for 42°F (5.5°C) LWT	NR	NR	NR	NR	NR
Water Volume, Gallons (Liters)	NR	NR	NR	NR	NR
Minimum Flow Rate, GPM (L/S)	NR	NR	NR	NR	NR
Maximum Flow Rate, GPM (L/S)	NR	NR	NR	NR	NR
Water Conn. Size In/Out (Type)	NR	NR	NR	NR	NR
OPTIONAL REMOTE COOLER MODULE (RCH3)[4] for 40°F (4.5°C) LWT	NR	CHS007601A	CHS007601A	CHS007601A	NR
Water Volume, Gallons (Liters)	NR	27 (102.2)	27 (102.2)	35 (132.5)	NR
Minimum Flow Rate, GPM (L/S)	NR	37 (2.33)	37 (2.33)	56 (3.53)	NR
Maximum Flow Rate, GPM (L/S)	NR	101 (6.37)	101 (6.37)	168 (10.60)	NR
Water Conn. Size In/Out (Type)	NR	3" NPTE	3" NPTE	3" NPTE	NR
CONDENSER	L216	L216	L216	L216	L312
Fan Quantity - All 30" (766mm) Diameter	2	2	2	2	2
Motor Quantity[5]	(1) 2	(1) 2	(1) 2	(1) 2	(1) 2
Standard Fans - Nominal RPM	1140	1140	1140	1140	1140
Standard Fans - HP[5]	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5
Standard Fans - (kW)[5]	(.76) 1.15	(.76) 1.15	(.76) 1.15	(.76) 1.15	(.76) 1.15
Opt. Extra Quiet Fans - Nominal RPM	855	855	855	855	855
Opt. Extra Quiet Fan Motor - HP (kW)[5]	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)
GENERAL DATA					
Min.Starting/Operating Ambient °F (°C)[6]	30 (-1.1)	30 (-1.1)	30 (-1.1)	30 (-1.1)	30 (-1.1)
with HGBP, °F (°C)[6]	40 (4.4)	40 (4.4)	40 (4.4)	40 (4.4)	40 (4.4)
Low Ambient Option, °F (°C)[7]	0 (-18)	0 (-18)	0 (-18)	0 (-18)	0 (-18)
Extra Low Ambient Option, °F (°C)[8]	-20 (-29)	-20 (-29)	-20 (-29)	-20 (-29)	-20 (-29)
Number of Circuits	1	1	1	1	1
Approx. Refrigerant Charge, lbs. (kgs) R22 (Plus Line Charge)	33 (15.0)	45 (20.4)	57 (25.9)	62 (28.1)	70 (31.8)
Shipping Wt., lbs. (kgs) Alum. Fin Cond.	1431 (650)	1431 (760)	1479 (671)	1501 (681)	1650 (749)
Shipping Wt., lbs. (kgs) Copper Fin Cond.	1661 (754)	1661 (754)	1708 (775)	1731 (786)	1997 (907)

NOTES: (1) Based on GPM per Performance Data. 95°F Ambient, 44°F LWT. (10°F range) **NR - Not Required**

(2) RCH1 - Standard optional remote cooler module for 44°F LWT. **NPTE - National Pipe Thread External**

(3) RCH2 - Oversized optional remote cooler module required where indicated for 42°F LWT.

(4) RCH3 - Oversized optional remote cooler module required where indicated for 40°F LWT.

(5) Units with Low Ambient Option use (1) 1 HP in lieu of (1) 1 1/2 HP fan motor per circuit.

(6) Minimum Starting/Operation Ambient with a maximum of 5 MPH wind across coil & minimum load per Table 8A.

(7) Low Ambient Option requires (1) 1 HP variable speed fan motor.

(8) Extra Low Ambient Option includes LAC and requires electronic expansion valve(s) for DX Air Handler operation, and requires the use of 50% glycol and roughly 50% load to ensure extra low ambient starting, with a maximum of 5 MPH wind for Split-System Chiller applications.

PHYSICAL SPECIFICATIONS: ENGLISH I.P. & S.I. UNITS

AUDS-A 025D, 030D, 035D, 040D, 045D

AUDS-A MODEL	025D	030D	035D	040D	045D
Nominal Capacity in Tons (kW)	25 (88)	30 (105)	35 (120)	40 (140)	45 (150)
Quantity of Compressors	4	4	4	4	4
STANDARD REMOTE COOLER MODULE (RCH1)[2] for 44°F (6.7°C) LWT	CHD007601B	CHD007601B	CHD008601B	CHD008601B	CHD010601B
Water Volume, Gallons (Liters)	5.5 (20.8)	5.5 (20.8)	7 (26.50	7 (26.5)	10.7 (40.5)
Minimum Flow Rate, GPM (L/S)	50 (3.15)	50 (3.515)	70 (4.420	70 (4.42)	78 (4.93)
Maximum Flow Rate, GPM (L/S)	164 (10.35)	164 (10.35)	227 (14.32)	227 (14.32)	315 (19.23)
Water Conn. Size In/Out (Type)	3"NPTE	3"NPTE	3"NPTE	3"NPTE	4"NPTE
OPTIONAL REMOTE COOLER MODULE (RCH2)[3] for 42°F (5.5°C) LWT	CHD008601A	CHD008601A	CHD010601B	CHD010601B	NR
Water Volume, Gallons (Liters)	7.7 (29.1)	7.7 (29.1)	10.7 (40.5)	10.7 (10.5)	NR
Minimum Flow Rate, GPM (L/S)	56 (3.53)	59 (3.53)	78 (4.92)	78 (4.92)	NR
Maximum Flow Rate, GPM (L/S)	168 (10.60)	168 (10.60)	315 (19.87)	315 (19.87)	NR
Water Conn. Size In/Out (Type)	3" NPTE	3" NPTE	4" NPTE	4" NPTE	NR
OPTIONAL REMOTE COOLER MODULE (RCH3)[4] for 40°F (4.5°C) LWT	CHD008601A	CHD010601A	CHD011601A	CHD911601B	CHD011601A
Water Volume, Gallons (Liters)	7.7 (29.1)	10.7 (40.5)	12.9 (48.8)	12.9 (48.8)	12.9 (48.8)
Minimum Flow Rate, GPM (L/S)	56 (3.53)	62 (3.91)	69 (4.35)	86 (5.42)	69 (4.35)
Maximum Flow Rate, GPM (L/S)	168 (10.60)	205 (12.93)	206 (12.99)	304 (19.18)	306 (12.99)
Water Conn. Size In/Out (Type)	3" NPTE	4" NPTE	4" NPTE	4" NPTE	4" NPTE
CONDENSER	L216	L216	L216	L216	L216
Fan Quantity - All 30" (766mm) Diameter	4	4	4	4	4
Motor Quantity[5]	(2) 4	(2) 4	(2) 4	(2) 4	(2) 4
Standard Fans - Nominal RPM	1140	1140	1140	1140	1140
Standard Fans - HP[5]	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5
Standard Fans - (kW)[5]	(.76) 1.15	(.76) 1.15	(.76) 1.15	(.76) 1.15	(.76) 1.15
Opt. Extra Quiet Fans - Nominal RPM	855	855	855	855	855
Opt. Extra Quiet Fan Motor - HP (kW)[5]	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)
GENERAL DATA					
Min.Starting/Operating Ambient °F (°C)[6]	30 (-1.1)	30 (-1.1)	30 (-1.1)	30 (-1.1)	30 (-1.1)
with HGBP, °F (°C)[6]	40 (4.4)	40 (4.4)	40 (4.4)	40 (4.4)	40 (4.4)
Low Ambient Option, °F (°C)[7]	0 (-18)	0 (-18)	0 (-18)	0 (-18)	0 (-18)
Extra Low Ambient Option, °F (°C)[8]	-20 (-29)	-20 (-29)	-20 (-29)	-20 (-29)	-20 (-29)
Number of Circuits	2	2	2	2	2
Approx. Refrigerant Charge, lbs. (kgs) R22 (Plus Line Charge)	62 (28.1)	75 (34.0)	83 (37.6)	93 (42.2)	109 (49.4)
Shipping Wt., lbs. (kgs) Alum. Fin Cond.	3123 (1418)	3123 (1418)	3123 (1418)	3148 (1429)	3220 (1462)
Shipping Wt., lbs. (kgs) Copper Fin Cond.	3575 (1623)	3575 (1623)	3575 (1623)	3599 (1634)	3672 (1667)

NOTES:
(1) Based on GPM per Performance Data. 95°F Ambient, 44°F LWT. (10°F range)
(2) RCH1 - Standard optional remote cooler module for 44°F LWT.
(3) RCH2 - Oversized optional remote cooler module required where indicated for 42°F LWT.
(4) RCH3 - Oversized optional remote cooler module required where indicated for 40°F LWT.
(5) Units with Low Ambient Option use (1) 1 HP in lieu of (1) 1 1/2 HP fan motor per circuit.
(6) Minimum Starting/Operation Ambient with a maximum of 5 MPH wind across coil & minimum load per Table 8A.
(7) Low Ambient Option requires (1) 1 HP variable speed fan motor.
(8) Extra Low Ambient Option includes LAC and requires electronic expansion valve(s) for DX Air Handler operation, and requires the use of 50% glycol and roughly 50% load to ensure extra low ambient starting, with a maximum of 5 MPH wind for Split-System Chiller applications.

NR - Not Required
NPTE - National Pipe Thread External

PHYSICAL SPECIFICATIONS: ENGLISH I.P. & S.I. UNITS

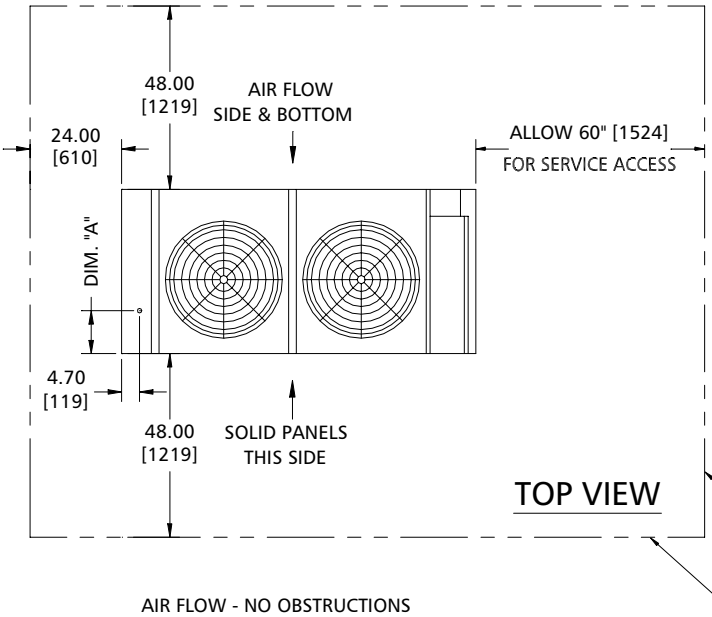
AUDS-A 050D, 055D, 057D, 060D

AUDS-A MODEL	050D	055D	057D	060D
Nominal Capacity in Tons (kW)	50 (175)	55 (190)	57 (200)	60 (210)
Quantity of Compressors	4	4	4	4
STANDARD REMOTE COOLER MODULE (RCH1)[2] for 44°F (6.7°C) LWT	CHD011601B	CHD011601B	CHD011601B	CHD013601B
Water Volume, Gallons (Liters)	12.9 (49.0)	12.9 (49.0)	12.9 (49.0)	18.1 (68.5)
Minimum Flow Rate, GPM (L/S)	86 (5.44)	86 (5.44)	86 (5.44)	101 (6.39)
Maximum Flow Rate, GPM (L/S)	315 (19.23)	315 (19.23)	315 (19.23)	420 (25.76)
Water Conn. Size In/Out (Type)	4" NPTE	4" NPTE	4" NPTE	4" NPTE
OPTIONAL REMOTE COOLER MODULE (RCH2)[3] for 42°F (5.5°C) LWT	NR	NR	NR	NR
Water Volume, Gallons (Liters)	NR	NR	NR	NR
Minimum Flow Rate, GPM (L/S)	NR	NR	NR	NR
Maximum Flow Rate, GPM (L/S)	NR	NR	NR	NR
Water Conn. Size In/Out (Type)	NR	NR	NR	NR
OPTIONAL REMOTE COOLER MODULE (RCH3)[4] for 40°F (4.5°C) LWT	CHD013601B	CHD013601B	CHD013601B	NR
Water Volume, Gallons (Liters)	18.1 (68.5)	18.1 (68.5)	18.1 (68.5)	NR
Minimum Flow Rate, GPM (L/S)	101 (6.39)	101 (6.39)	101 (6.39)	NR
Maximum Flow Rate, GPM (L/S)	420 (25.76)	420 (25.76)	420 (25.76)	NR
Water Conn. Size In/Out (Type)	4" NPTE	4" NPTE	4" NPTE	NR
CONDENSER	L216	L312	L216	L216
Fan Quantity - All 30" (766mm) Diameter	4	4	6	6
Motor Quantity[5]	(2) 4	(2) 4	(2) 6	(2) 6
Standard Fans - Nominal RPM	1140	1140	1140	1140
Standard Fans - HP[5]	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5	(1.0) 1.5
Standard Fans - (kW)[5]	(.76) 1.15	(.76) 1.15	(.76) 1.15	(.76) 1.15
Opt. Extra Quiet Fans - Nominal RPM	855	855	855	855
Opt. Extra Quiet Fan Motor - HP (kW)[5]	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)	1.0 (0.76)
GENERAL DATA				
Min.Starting/Operating Ambient °F (°C)[6]	30 (-1.1)	30 (-1.1)	30 (-1.1)	30 (-1.1)
with HGBP, °F (°C)[6]	40 (4.4)	40 (4.4)	40 (4.4)	40 (4.4)
Low Ambient Option, °F (°C)[7]	0 (-18)	0 (-18)	0 (-18)	0 (-18)
Extra Low Ambient Option, °F (°C)[8]	-20 (-29)	-20 (-29)	-20 (-29)	-20 (-29)
Number of Circuits	2	2	2	2
Approx. Refrigerant Charge, lbs. (kgs) R22 (Plus Line Charge)	119 (54.0)	130 (59.0)	136 (61.7)	140 (63.5)
Shipping Wt., lbs. (kgs) Alum. Fin Cond.	3242 (1472)	3560 (1616)	3981 (1807)	3981 (1807)
Shipping Wt., lbs. (kgs) Copper Fin Cond.	3694 (1677)	4258 (1933)	4656 (2114)	4656 (2114)

NOTES:
(1) Based on GPM per Performance Data. 95°F Ambient, 44°F LWT. (10°F range)
(2) RCH1 - Standard optional remote cooler module for 44°F LWT.
(3) RCH2 - Oversized optional remote cooler module required where indicated for 42°F LWT.
(4) RCH3 - Oversized optional remote cooler module required where indicated for 40°F LWT.
(5) Units with Low Ambient Option use (1) 1 HP in lieu of (1) 1 1/2 HP fan motor per circuit.
(6) Minimum Starting/Operation Ambient with a maximum of 5 MPH wind across coil & minimum load per Table 8A.
(7) Low Ambient Option requires (1) 1 HP variable speed fan motor.
(8) Extra Low Ambient Option includes LAC and requires electronic expansion valve(s) for DX Air Handler operation, and requires the use of 50% glycol and roughly 50% load to ensure extra low ambient starting, with a maximum of 5 MPH wind for Split-System Chiller applications.

NR - Not Required
NPTE - National Pipe Thread External

DIMENSIONAL DATA: AUDS-A 015S TO 030S

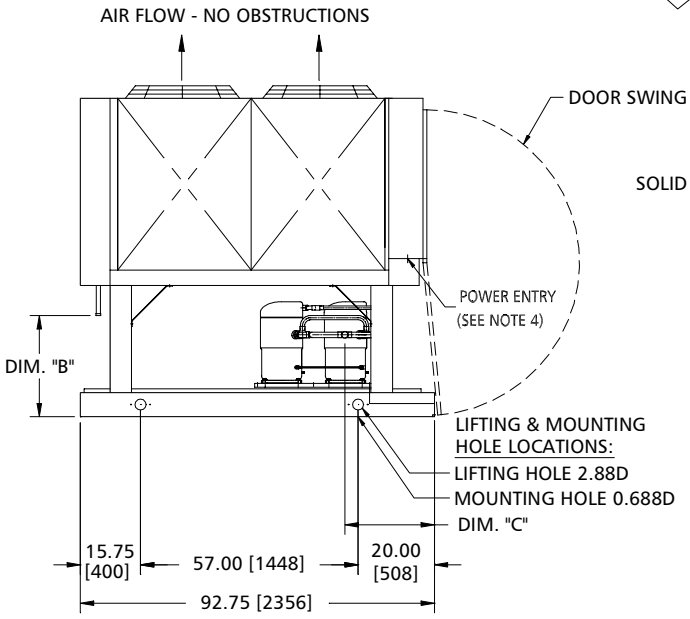


TOP VIEW

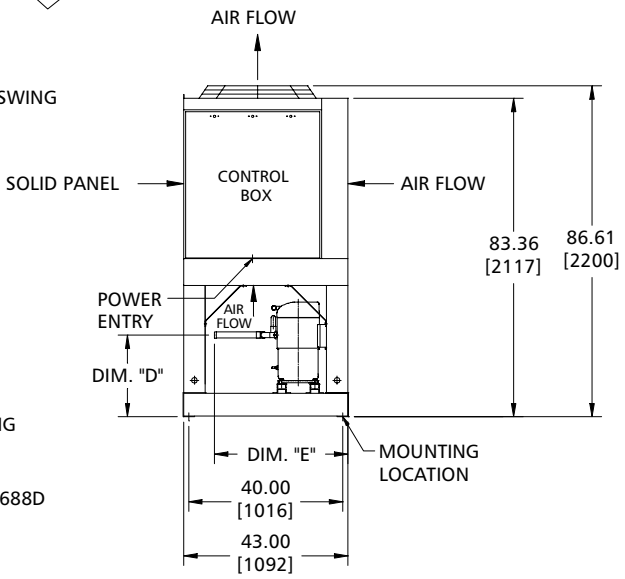
NOTE:

1 - ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
2 - ALLOW 60 [1524] CLEARANCE AT CONTROL PANEL END OF UNIT FOR SERVICE.
3 - USE MINIMUM 36 [914] FLEXIBLE CONDUIT TO CONTROL BOX TO ISOLATE UNIT.
4 - REFRIGERANT PIPING TO BE SUPPORTED TO MINIMIZE LOAD ON UNIT.
5 - ALL DIMENSIONS AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
6 - REFERENCE CATALOG DRAWING 022555A0.

CLEARANCE, SERVICE AND ACCESS REQUIREMENTS (NOT WALL OR WELL DIMENSIONS).



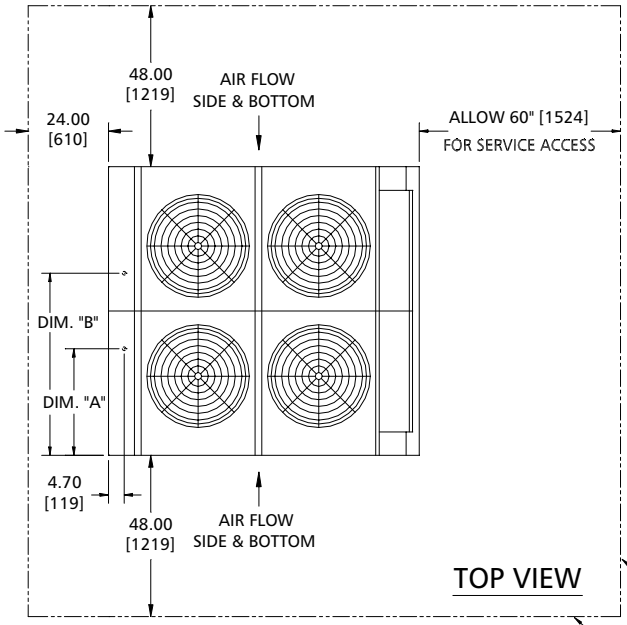
LEFT SIDE VIEW



CONTROL BOX END

MODEL	SUB-COOLER OUT		SUCTION CONNECTION TUBE			LIQUID CONNECTION	SUCTION CONNECTION
2-FAN UNIT	A	B	C	D	E		
AUDSA 015S	11.25 [286]	26.63 [676]	23.50 [597]	21.43 [544]	35.10 [892]	1.125 [29]	1.625 [41]
AUDSA 020S							
AUDSA 025S							
AUDSA 027S	11.25 [286]	26.63 [676]	20.50 [521]	15.50 [394]	35.54 [903]	1.125 [29]	2.125 [54]
AUDSA 030S	11.75 [298]	25.75 [654]					

DIMENSIONAL DATA: AUDS-A 025D TO 055D

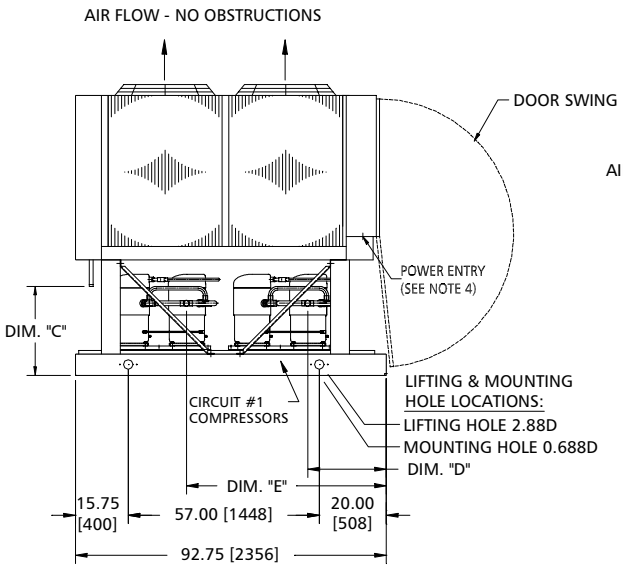


TOP VIEW

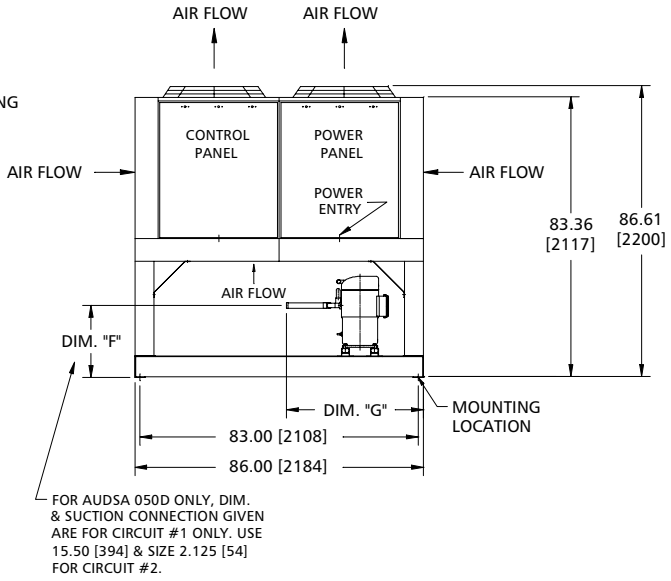
NOTE:

1 - ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
2 - ALLOW 60 [1524] CLEARANCE AT CONTROL PANEL END OF UNIT FOR SERVICE.
3 - USE MINIMUM 36 [914] FLEXIBLE CONDUIT TO CONTROL BOX TO ISOLATE UNIT.
4 - REFRIGERANT PIPING TO BE SUPPORTED TO MINIMIZE LOAD ON UNIT.
5 - ALL DIMENSIONS AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
6 - REFERENCE CATALOG DRAWING 022556A0.

CLEARANCE, SERVICE AND ACCESS REQUIREMENTS (NOT WALL OR WELL DIMENSIONS).



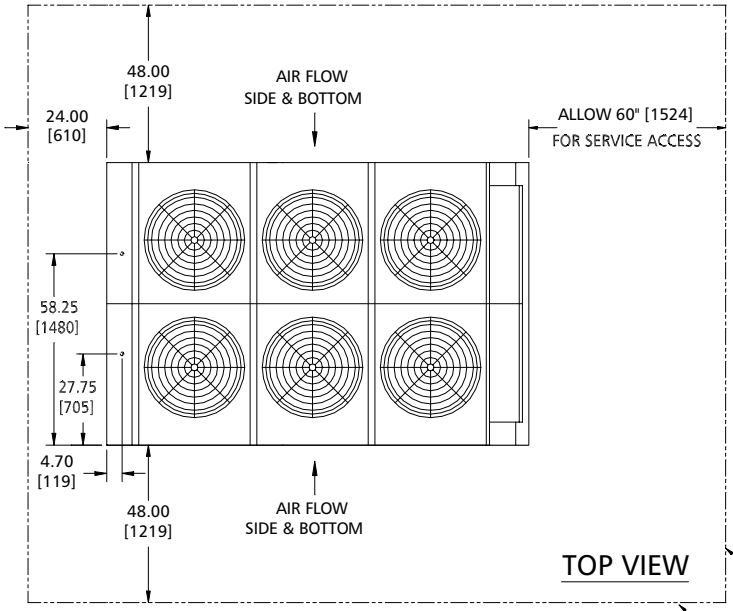
LEFT SIDE VIEW



CONTROL BOX END

MODEL	SUB-COOLER OUT			SUCTION CONNECTION TUBE				CONNECTIONS	
4-FAN UNIT	A	B	C	D	E	F	G	LIQUID	SUCTION
AUDSA 025D	31.75 [806]	54.25 [1378]	26.63 [676]	23.50 [597]	59.66 [1515]	21.43 [544]	41.00 [1041]	1.125 [29]	1.625 [41]
AUDSA 030D									
AUDSA 035D									
AUDSA 040D									
AUDSA 045D									
AUDSA 050D	31.75 [806]	54.25 [1378]	26.63 [676]	23.50 [597]	56.66 [1439]	21.43 [544]	41.40 [1052]	1.125 [29]	1.625 [41]
AUDSA 055D	31.25 [794]	54.75 [1391]	25.75 [654]	20.50 [521]	56.66 [1439]	15.50 [394]	41.40 [1052]	1.125 [29]	2.125 [54]

DIMENSIONAL DATA: AUDS-A 057D TO 060D

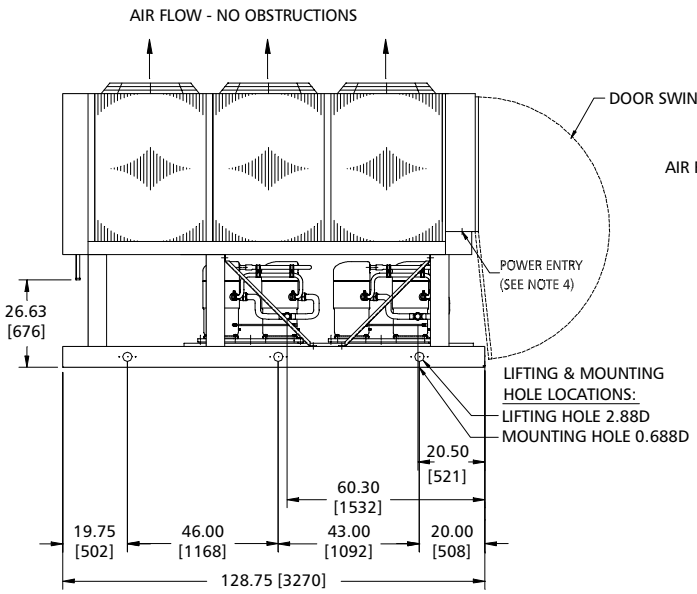


TOP VIEW

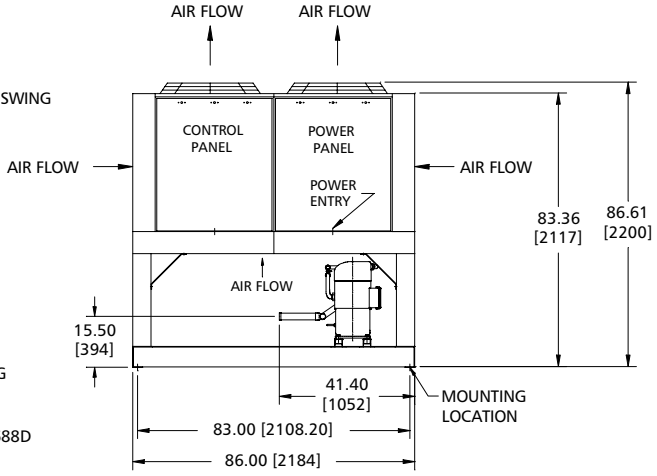
NOTE:

1 - ALL DIMENSIONS ARE IN INCHES [MILLIMETERS].
2 - ALLOW 60 [1524] CLEARANCE AT CONTROL PANEL END OF UNIT FOR SERVICE.
3 - USE MINIMUM 36 [914] FLEXIBLE CONDUIT TO CONTROL BOX TO ISOLATE UNIT.
4 - REFRIGERANT PIPING TO BE SUPPORTED TO MINIMIZE LOAD ON UNIT.
5 - ALL DIMENSIONS AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
6 - REFERENCE CATALOG DRAWING 022557A0.

CLEARANCE, SERVICE AND ACCESS REQUIREMENTS (NOT WALL OR WELL DIMENSIONS).



LEFT SIDE VIEW



CONTROL BOX END

MODEL	CONNECTIONS	
6-FAN UNIT	LIQUID	SUCTION
AUDSA 057D	1.125 [29]	2.125 [54]
AUDSA 060D		

ELECTRICAL DATA: (60Hz/3PH)

AUDS-A Model		60 Hz Nom. Volts	Standard Unit Electrical Data			Optional Quiet Fan Unit Electrical Data			Each Compressor			Standard 1140 RPM Condenser Fan Motors				Optional 855 RPM Condenser Fan Motors			
			RLA	MCA	MFS/ HACR	RLA	MCA	MFS/ HACR	Qty./ Unit	RLA	LRA - XL	Qty	HP	Total kW	FLA Each	Qty	HP	Total kW	FLA Each
015S	CD	208	62	68	90	59	65	80	2	23.8	189	2*	1.5	2.2	5.9	2	1.0	1.3	4.4
	AN	230	62	68	90	59	65	80	2	23.8	189	2*	1.5		5.9	2	1.0		4.4
	AR	460	33	36	45	31	34	45	2	12.6	94	2*	1.5		3.0	2	1.0		2.2
	AS	575	24	26	30	23	26	30	2	9.2	74	2*	1.5		2.1	2	1.0		1.8
020S	CD	208	82	90	110	79	87	110	2	33.6	278	2*	1.5	2.9	5.9	2	1.0	1.6	4.4
	AN	230	82	90	110	79	87	110	2	33.6	278	2*	1.5		5.9	2	1.0		4.4
	AR	460	41	45	60	39	43	50	2	16.5	127	2*	1.5		3.0	2	1.0		2.2
	AS	575	33	36	45	32	36	45	2	13.7	100	2*	1.5		2.1	2	1.0		1.8
025S	CD	208	97	107	125	94	104	125	2	41.1	350	2*	1.5	2.9	5.9	2	1.0	1.6	4.4
	AN	230	97	107	125	94	104	125	2	41.1	350	2*	1.5		5.9	2	1.0		4.4
	AR	460	51	57	70	50	55	70	2	21.8	158	2*	1.5		3.0	2	1.0		2.2
	AS	575	40	45	60	40	44	60	2	17.4	125	2*	1.5		2.1	2	1.0		1.8
027S	CD	208	104	116	150	101	113	150	1/1	41.1/48.1	350/425	2*	1.5	2.9	5.9	2	1.0	1.6	4.4
	AN	230	104	116	150	101	113	150	1/1	41.1/48.1	350/425	2*	1.5		5.9	2	1.0		4.4
	AR	460	53	59	80	52	58	80	1/1	21.8/23.8	158/187	2*	1.5		3.0	2	1.0		2.2
	AS	575	44	49	70	44	49	60	1/1	17.4/21.2	125/148	2*	1.5		2.1	2	1.0		1.8
030S	CD	208	111	123	150	108	120	150	2	48.1	425	2*	1.5	2.9	5.9	2	1.0	1.6	4.4
	AN	230	111	123	150	108	120	150	2	48.1	425	2*	1.5		5.9	2	1.0		4.4
	AR	460	55	61	80	54	59	80	2	23.8	187	2*	1.5		3.0	2	1.0		2.2
	AS	575	48	53	70	47	53	70	2	21.2	148	2*	1.5		2.1	2	1.0		1.8
025D	CD	208	127	133	150	121	127	150	4	25.1	189	4*	1.5	4.4	5.9	4	1.0	2.6	4.4
	AN	230	127	133	150	121	127	150	4	25.1	189	4*	1.5		5.9	4	1.0		4.4
	AR	460	68	71	80	65	68	80	4	13.6	94	4*	1.5		3.0	4	1.0		2.2
	AS	575	50	53	60	49	51	60	4	10.1	74	4*	1.5		2.1	4	1.0		1.8
030D	CD	208	146	154	175	140	148	175	4	29.9	232	4*	1.5	4.4	5.9	4	1.0	2.6	4.4
	AN	230	146	153	175	140	147	175	4	29.9	232	4*	1.5		5.9	4	1.0		4.4
	AR	460	75	79	90	72	75	90	4	15.3	125	4*	1.5		3.0	4	1.0		2.2
	AS	575	57	60	70	56	59	70	4	11.9	100	4*	1.5		2.1	4	1.0		1.8
035D	CD	208	158	167	200	152	161	175	2/2	31.1/34.8	232/278	4*	1.5	4.4	5.9	4	1.0	2.6	4.4
	AN	230	158	167	200	152	161	175	2/2	31.2/34.9	232/278	4*	1.5		5.9	4	1.0		4.4
	AR	460	80	84	100	77	81	90	2/2	16/17.2	125/127	4*	1.5		3.0	4	1.0		2.2
	AS	575	63	67	80	62	66	70	2/2	12.3/14.5	100/100	4*	1.5		2.1	4	1.0		1.8
040D	CD	208	168	179	200	162	173	200	3/1	33.6/41.1	278/350	4*	1.5	5.8	5.9	4	1.0	3.2	4.4
	AN	230	168	178	200	162	172	200	3/1	33.6/41.1	278/350	4*	1.5		5.9	4	1.0		4.4
	AR	460	85	90	110	82	87	100	3/1	16.5/21.8	127/158	4*	1.5		3.0	4	1.0		2.2
	AS	575	69	73	90	67	72	80	3/1	13.8/17.5	100/125	4*	1.5		2.1	4	1.0		1.8
045D	CD	208	191	201	225	185	195	225	4	41.1	350	4*	1.5	5.8	5.9	4	1.0	3.2	4.4
	AN	230	191	201	225	185	195	225	4	41.1	350	4*	1.5		5.9	4	1.0		4.4
	AR	460	103	107	125	99	104	125	4	22.0	158	4*	1.5		3.0	4	1.0		2.2
	AS	575	80	85	100	79	83	100	4	17.6	125	4*	1.5		2.1	4	1.0		1.8
050D	CD	208	198	210	250	192	204	250	3/1	41.1/48.1	350/425	4*	1.5	5.8	5.9	4	1.0	3.2	4.4
	AN	230	198	210	250	192	204	250	3/1	41.1/48.1	350/425	4*	1.5		5.9	4	1.0		4.4
	AR	460	103	109	125	100	106	125	3/1	21.8/23.8	158/187	4*	1.5		3.0	4	1.0		2.2
	AS	575	83	88	100	82	87	100	3/1	17.4/21.2	125/148	4*	1.5		2.1	4	1.0		1.8
055D	CD	208	212	224	250	206	218	250	1/3	41.1/48.1	350/425	4*	1.5	5.8	5.9	4	1.0	3.2	4.4
	AN	230	212	224	250	206	218	250	1/3	41.1/48.1	350/425	4*	1.5		5.9	4	1.0		4.4
	AR	460	121	128	150	118	125	150	1/3	25.4/27.3	158/187	4*	1.5		3.0	4	1.0		2.2
	AS	575	91	96	110	90	95	110	1/3	17.4/21.2	125/148	4*	1.5		2.1	4	1.0		1.8
057D	CD	208	249	263	300	240	254	300	4	52.8	425	6*	1.5	8.7	5.9	6	1.0	4.9	4.4
	AN	230	249	262	300	240	253	300	4	52.8	425	6*	1.5		5.9	6	1.0		4.4
	AR	460	127	132	150	122	128	150	4	26.5	187	6*	1.5		3.0	6	1.0		2.2
	AS	575	101	106	125	99	104	125	4	21.7	148	6*	1.5		2.1	6	1.0		1.8
060D	CD	208	249	263	300	240	254	300	4	52.8	425	6*	1.5	8.7	5.9	6	1.0	4.9	4.4
	AN	230	249	262	300	240	253	300	4	52.8	425	6*	1.5		5.9	6	1.0		4.4
	AR	460	127	132	150	122	128	150	4	26.5	187	6*	1.5		3.0	6	1.0		2.2
	AS	575	101	106	125	99	104	125	4	21.7	148	6*	1.5		2.1	6	1.0		1.8

NOTES: RLA - Rated Load Amps at ARI Conditions of Service
MCA - Minimum Circuit Ampacity
MFS / HACR - Maximum fuse or HACR breaker size, protective device
LRA-XL - Locked Rotor Amps Standard Across the Line Starting

*Replace (1) 1.5 HP motor with (1) 1 HP single phase motor per circuit on units with Low Ambient Option

IMPORTANT: See additional notes on page 70.

ELECTRICAL DATA: FIELD WIRING (60HZ/3PH)

AUDS-A Model	Supply Voltage 60 Hz. Code	Nom. Volts	Single Source Power - Wire Size Range and Quantity: Standard Terminal Block Qty. Wires Per Pole	Standard Terminal Block Wire Size Range	Optional - Unit Mtd. Disconnect Switch Qty. Wires Per Pole	Optional - Unit Mtd. Disconnect Switch Wire Size Range
015S	CD	208	1	#12 TO 2/0	1	#14 TO 1/0
	AN	230	1	#12 TO 2/0	1	#14 TO 1/0
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
020S	CD	208	1	#12 TO 2/0	1	#14 TO 1/0
	AN	230	1	#12 TO 2/0	1	#14 TO 1/0
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
025S	CD	208	1	#12 TO 2/0	1	#4 TO 4/0
	AN	230	1	#12 TO 2/0	1	#4 TO 4/0
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
027S	CD	208	1	#12 TO 2/0	1	#4 TO 4/0
	AN	230	1	#12 TO 2/0	1	#4 TO 4/0
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
030S	CD	208	1	#12 TO 2/0	1	#4 TO 4/0
	AN	230	1	#12 TO 2/0	1	#4 TO 4/0
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
025D	CD	208	1	#12 TO 2/0	1	#4 TO 4/0
	AN	230	1	#12 TO 2/0	1	#4 TO 4/0
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
030D	CD	208	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AN	230	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
035D	CD	208	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AN	230	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
040D	CD	208	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AN	230	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AR	460	1	#12 TO 2/0	1	#14 TO 1/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
045D	CD	208	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AN	230	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AR	460	1	#12 TO 2/0	1	#4 TO 4/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
050D	CD	208	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AN	230	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AR	460	1	#12 TO 2/0	1	#4 TO 4/0
	AS	575	1	#12 TO 2/0	1	#14 TO 1/0
055D	CD	208	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AN	230	1	#6 TO 400 MCM	1	#4 TO 350MCM
	AR	460	1	#12 TO 2/0	1	#4 TO 4/0
	AS	575	1	#12 TO 2/0	1	#4 TO 4/0
057D	CD	208	1	#6 TO 400 MCM	2	3/0 TO 250MCM
	AN	230	1	#6 TO 400 MCM	2	3/0 TO 250MCM
	AR	460	1	#12 TO 2/0	1	#4 TO 4/0
	AS	575	1	#12 TO 2/0	1	#4 TO 4/0
060D	CD	208	1	#6 TO 400 MCM	2	3/0 TO 250MCM
	AN	230	1	#6 TO 400 MCM	2	3/0 TO 250MCM
	AR	460	1	#12 TO 2/0	1	#4 TO 4/0
	AS	575	1	#12 TO 2/0	1	#4 TO 4/0

NOTE: Single point power is standard for all models AUDSA 015S to AUDSA 060D.

ELECTRICAL DATA: (60HZ/3PH)

General Electrical Notes

1. Main power must be supplied from a single power source field-supplied fused disconnect(s) using dual element time delay fuses or a HACR rated circuit breaker. Power supply is three phase unless otherwise shown.
2. The maximum terminal block incoming wire size is shown in the electrical field wiring data table.
3. Compressor starting is XL only.
4. Control circuit transformer (115VAC) is supplied as standard feature.
5. Cooler heater power (115VAC) must be field-supplied from a separate field-mounted fused disconnect (15 amp max. fuse size).
6. Crankcase heaters are wired in the control circuit. **The main unit power field disconnect and local safety switch must be closed (on) at all times for heater operation.**
7. The compressor crankcase heaters must be energized for 24 hours before the unit is initially started or after a prolonged open disconnect.
8. All field wiring must be in accordance with all applicable local and national codes.
9. Minimum and maximum unit supply voltages are shown in the following tabulated data.

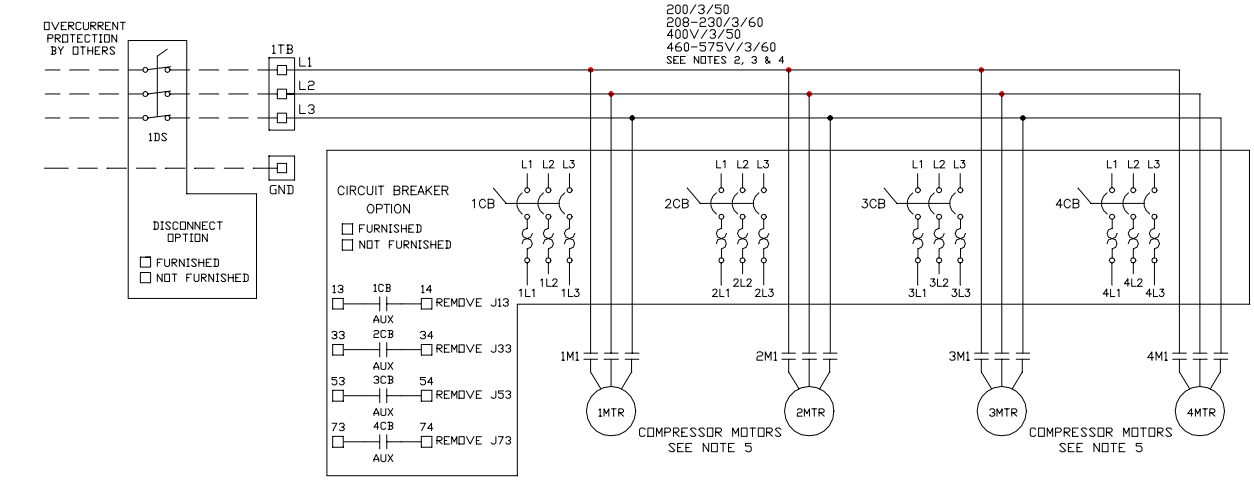
Supply Voltage:

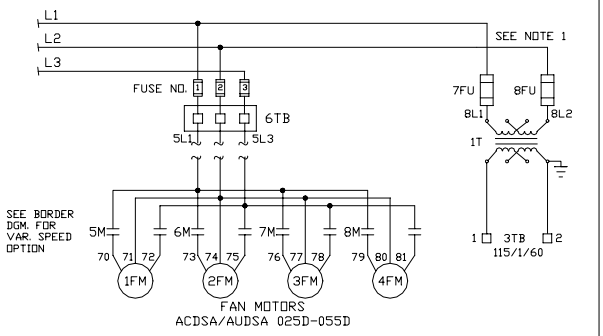
Nominal	Voltage Code	Minimum	Maximum
208V	CD	187V	220V
230V	AN	207V	253V
460V	AR	414V	506V
575V	AS	518V	632V

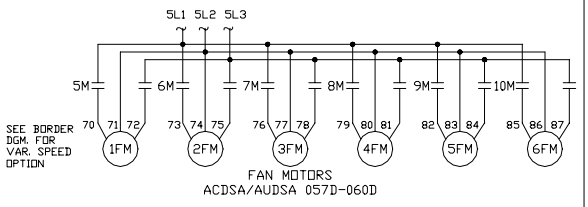
TABLE 70A

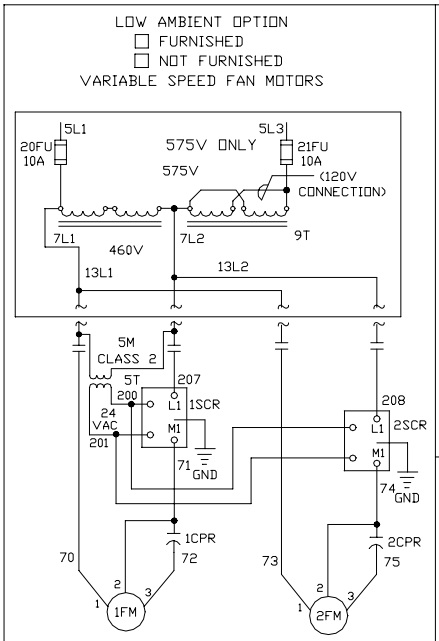
Unit Model AUDS-A	Crankcase Heater Data - Belt or Strap Type		
	Qty.	Total Watts (70 Watts each)	Total FLA (0.61 FLA each)
015S	2	140	1.22
020S	2	140	1.22
025S	2	140	1.22
027S	2	140	1.22
030S	2	140	1.22
025D	4	280	2.44
030D	4	280	2.44
035D	4	280	2.44
040D	4	280	2.44
045D	4	280	2.44
050D	4	280	2.44
055D	4	280	2.44
057D	4	280	2.44
060D	4	280	2.44

TYPICAL POWER WIRING DIAGRAM (FOUR COMPRESSOR MODEL)









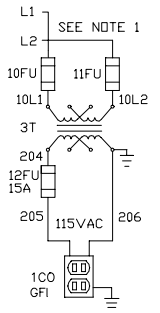
LEGEND

CB	CIRCUIT BREAKER
COMP	COMPRESSOR
CPR	CAPACITOR
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
CTR	CONTACTOR
DS	DISCONNECT SWITCH
FM	FAN MOTOR
FU	FUSE
GF	GROUND FAULT
GFI	GROUND FAULT INTERRUPT
GND	GROUND
HTR	HEATER
J	JUMPER
M	CONTACTOR
MIN	MINIMUM
MTR	MOTOR
SCR	SPEED CONTROL
SN	SNUBBER
SOL	SOLEDOID
T	TRANSFORMER
TB	TERMINAL BLOCK
UVR	UNDERVOLTAGE RELAY
VC	VALVE CONTROLLER
ZD	ZENER DIODE
□	FACTORY TERMINAL
*	FIELD SUPPLIED
- - -	FIELD WIRING
▲	MANUAL RESET

NOTES

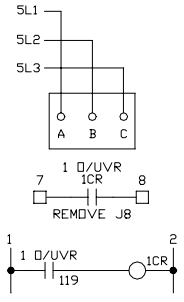
1 FUSES TO BE TIME DELAY TYPE.
2 ALL FIELD WIRING TO COMPLY WITH LOCAL, STATE & NATIONAL CODES.
3 COPPER CONDUCTORS ONLY.
4 DISCONNECT MEANS & BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY INSTALLER.
5 IF POWER SUPPLY HAS BEEN INTERRUPTED FOR A PROLONGED PERIOD, OIL SUMP HEATERS MUST BE ENERGIZED FOR 24 HRS. MINIMUM BEFORE STARTING COMPRESSORS.

CONVENIENCE OUTLET OPTION
FURNISHED
NOT FURNISHED

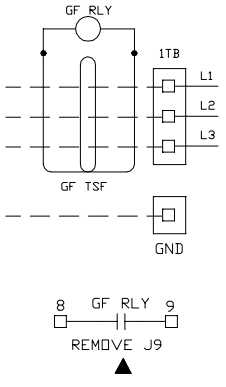


VOLT	3T	10FU & 11FU
200	1.5KVA	15A
208-230	1.5KVA	15A
400	2.0KVA	12A
460	1.5KVA	8A
575	1.5KVA	6A

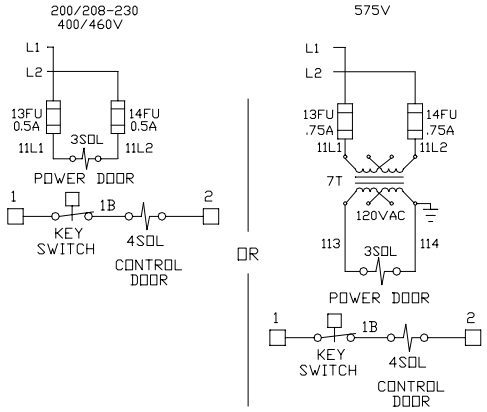
OVER/UNDER VOLTAGE RELAY OPTION
FURNISHED
NOT FURNISHED



GROUND FAULT OPTION
FURNISHED
NOT FURNISHED

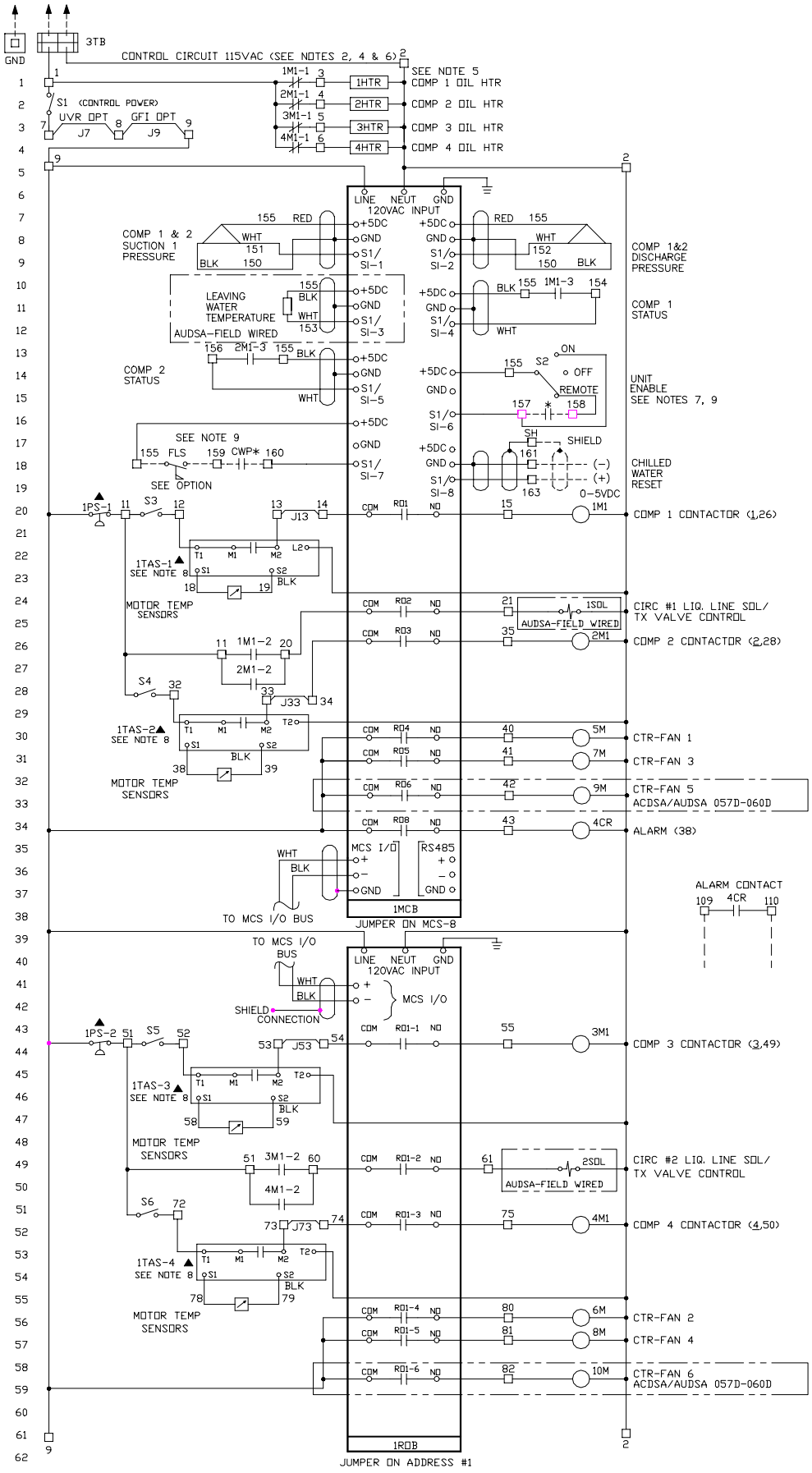


DOOR LATCH SOLENOID OPTION
FURNISHED
NOT FURNISHED



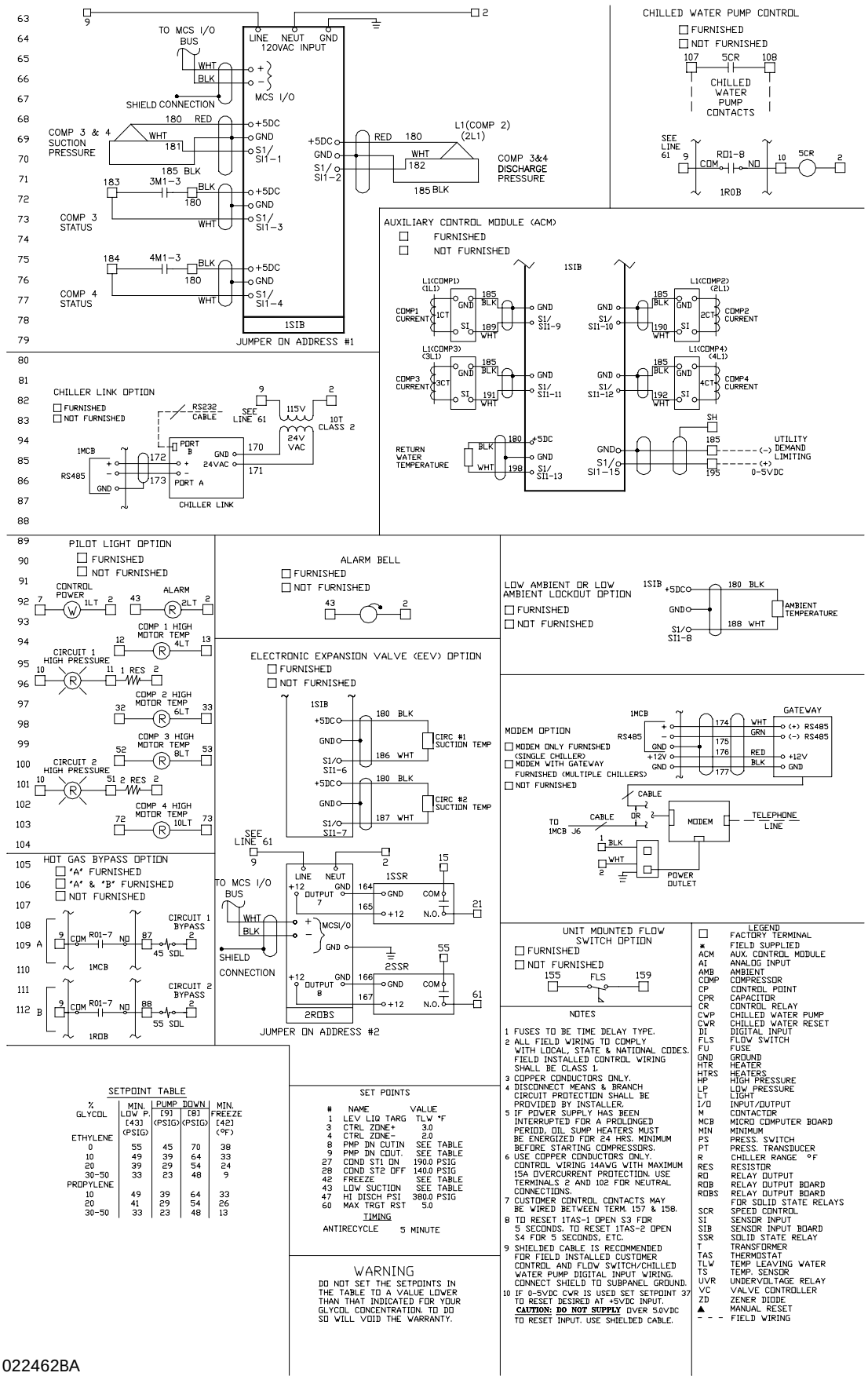
022633AA

TYPICAL SPLIT-SYSTEM CHILLER CONTROL WIRING DIAGRAM ••••••••
(FOUR COMPRESSOR MODEL)



022462AA

TYPICAL SPLIT-SYSTEM CHILLER CONTROL WIRING DIAGRAM ..... (FOUR COMPRESSOR MODEL)



SETPOINT TABLE

% GLYCOL	MIN. LOW P. [43] (PSIG)	PUMP DOWN [9] (PSIG)	PUMP DOWN [8] (PSIG)	MIN. FREEZE [42] (°F)
ETHYLENE				
0	55	45	70	38
10	49	39	64	33
20	39	29	54	24
30-50	33	23	48	9
PROPYLENE				
10	49	39	64	33
20	41	29	54	26
30-50	33	23	48	13

SET POINTS

#	NAME	VALUE
1	LEV LIQ TARG	TLW °F
3	CTRL ZONE+	3.0
4	CTRL ZONE-	2.0
8	PMP DN CUTIN	SEE TABLE
9	PMP DN CDUT.	SEE TABLE
27	COND ST1 ON	190.0 PSIG
28	COND ST2 OFF	140.0 PSIG
42	FREEZE	SEE TABLE
43	LOW SUCTION	SEE TABLE
47	HI DISCH PSI	380.0 PSIG
60	MAX TRGT RST	5.0

TIMING

ANTIRECYCLE 5 MINUTE

WARNING

DO NOT SET THE SETPOINTS IN THE TABLE TO A VALUE LOWER THAN THAT INDICATED FOR YOUR GLYCOL CONCENTRATION. TO DO SO WILL VOID THE WARRANTY.

NOTES

1 FUSES TO BE TIME DELAY TYPE.
2 ALL FIELD WIRING TO COMPLY WITH LOCAL, STATE & NATIONAL CODES. FIELD INSTALLED CONTROL WIRING SHALL BE CLASS 1.
3 COPPER CONDUCTORS ONLY.
4 DISCONNECT MEANS & BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY INSTALLER.
5 IF POWER SUPPLY HAS BEEN INTERRUPTED FOR A PROLONGED PERIOD, OIL SUMP HEATERS MUST BE ENERGIZED FOR 24 HRS. MINIMUM BEFORE STARTING COMPRESSORS.
6 USE COPPER CONDUCTORS ONLY. CONTROL WIRING 14AWG WITH MAXIMUM 15A OVERCURRENT PROTECTION. USE TERMINALS 2 AND 102 FOR NEUTRAL CONNECTIONS.
7 CUSTOMER CONTROL CONTACTS MAY BE WIRED BETWEEN TERM. 157 & 158.
8 TO RESET 1TAS-1 OPEN S3 FOR 5 SECONDS. TO RESET 1TAS-2 OPEN S4 FOR 5 SECONDS, ETC.
9 SHIELDED CABLE IS RECOMMENDED FOR FIELD INSTALLED CUSTOMER CONTROL AND FLOW SWITCH/CHILLED WATER PUMP DIGITAL INPUT WIRING. CONNECT SHIELD TO SUBPANEL GROUND.
10 IF 0-5VDC CWR IS USED SET SETPOINT 37 TO RESET DESIRED AT +5VDC INPUT.
CAUTION: DO NOT SUPPLY OVER 5.0VDC TO RESET INPUT. USE SHIELDED CABLE.

LEGEND

□	FACTORY TERMINAL
*	FIELD SUPPLIED
ACM	AUX. CONTROL MODULE
AI	ANALOG INPUT
AMB	AMBIENT
COMP	COMPRESSOR
CP	CONTROL POINT
CPR	CAPACITOR
CR	CONTROL RELAY
CWP	CHILLED WATER PUMP
CWR	CHILLED WATER RESET
DI	DIGITAL INPUT
FLS	FLOW SWITCH
FU	FUSE
GND	GROUND
HTR	HEATER
HTRS	HEATERS
HP	HIGH PRESSURE
LP	LOW PRESSURE
LT	LIGHT
I/O	INPUT/OUTPUT
M	CONTACTOR
MCB	MICRO COMPUTER BOARD
MIN	MINIMUM
PS	PRESS. SWITCH
PT	PRESS. TRANSDUCER
R	CHILLER RANGE °F
RES	RESISTOR
RO	RELAY OUTPUT
ROB	RELAY OUTPUT BOARD
ROBS	RELAY OUTPUT BOARD FOR SOLID STATE RELAYS
SCR	SPEED CONTROL
SI	SENSOR INPUT
SIB	SENSOR INPUT BOARD
SSR	SOLID STATE RELAY
T	TRANSFORMER
TAS	THERMOSTAT
TLW	TEMP LEAVING WATER
TS	TEMP. SENSOR
UVR	UNDERVOLTAGE RELAY
VC	VALVE CONTROLLER
ZD	ZENER DIODE
▲	MANUAL RESET
- - -	FIELD WIRING

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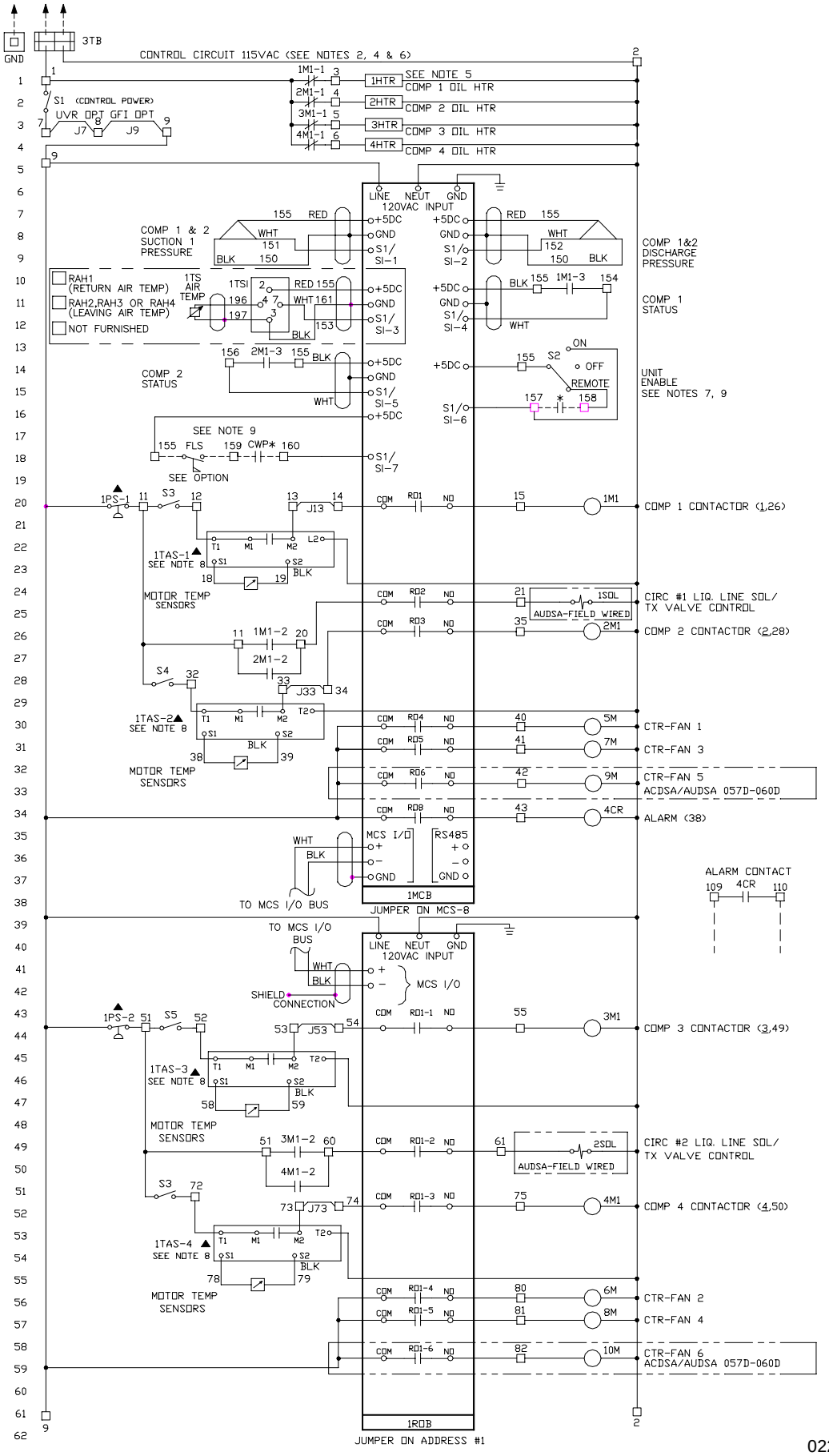
TYPICAL DX AIR HANDLER CONTROL WIRING DIAGRAM (FOUR COMPRESSOR MODEL)



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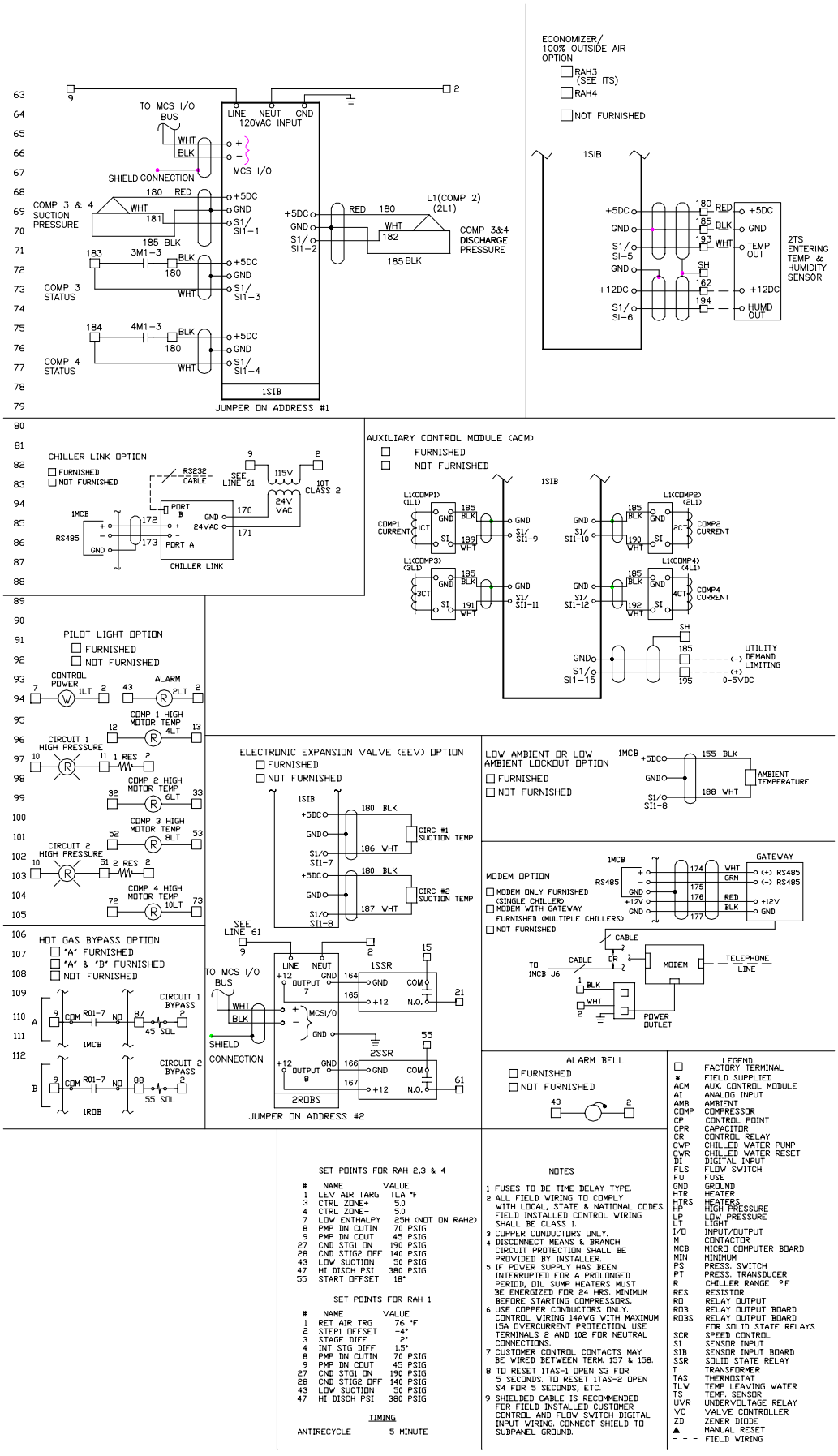
TYPICAL DX AIR HANDLER CONTROL WIRING DIAGRAM (FOUR COMPRESSOR MODEL)



SET POINTS FOR RAH 2,3 & 4

#	NAME	VALUE
1	LEV AIR TARG	TLA °F
3	CTRL ZONE+	5.0
4	CTRL ZONE-	5.0
7	LOW ENTHALPY	25H (NOT ON RAH2)
8	PMP DN CUTIN	70 PSIG
9	PMP DN COUT	45 PSIG
27	CND STG1 ON	190 PSIG
28	CND STG2 OFF	140 PSIG
43	LOW SUCTION	50 PSIG
47	HI DISCH PSI	380 PSIG
55	START OFFSET	18°

SET POINTS FOR RAH 1

#	NAME	VALUE
1	RET AIR TRG	76 °F
2	STEP1 OFFSET	-4°
3	STAGE DIFF	2°
4	INT STG DIFF	1.5°
8	PMP DN CUTIN	70 PSIG
9	PMP DN COUT	45 PSIG
27	CND STG1 ON	190 PSIG
28	CND STG2 OFF	140 PSIG
43	LOW SUCTION	50 PSIG
47	HI DISCH PSI	380 PSIG

TIMING

ANTIRECYCLE	5 MINUTE

NOTES

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LEGEND

□	FACTORY TERMINAL
*	FIELD SUPPLIED
ACM	AUX. CONTROL MODULE
AI	ANALOG INPUT
AMB	AMBIENT
COMP	COMPRESSOR
CP	CONTROL POINT
CPR	CAPACITOR
CR	CONTROL RELAY
CWP	CHILLED WATER PUMP
CWR	CHILLED WATER RESET
DI	DIGITAL INPUT
FLS	FLOW SWITCH
FU	FUSE
GND	GROUND
HTR	HEATER
HTRS	HEATERS
HP	HIGH PRESSURE
LP	LOW PRESSURE
LT	LIGHT
I/O	INPUT/OUTPUT
M	CONTACTOR
MCB	MICRO COMPUTER BOARD
MIN	MINIMUM
PS	PRESS. SWITCH
PT	PRESS. TRANSDUCER
R	CHILLER RANGE °F
RES	RESISTOR
RO	RELAY OUTPUT
ROB	RELAY OUTPUT BOARD
ROBS	RELAY OUTPUT BOARD FOR SOLID STATE RELAYS
SCR	SPEED CONTROL
SI	SENSOR INPUT
SIB	SENSOR INPUT BOARD
SSR	SOLID STATE RELAY
T	TRANSFORMER
TAS	THERMOSTAT
TLW	TEMP LEAVING WATER
TS	TEMP. SENSOR
UVR	UNDERVOLTAGE RELAY
VC	VALVE CONTROLLER
ZD	ZENER DIODE
▲	MANUAL RESET
- - -	FIELD WIRING

022467BA

PRODUCT SPECIFICATION

Part 1: General

1.01 Work Included

A. Provide complete Air Cooled Condensing Units utilizing tandem-scroll compressors suitable for outdoor installation and a Full Function Microcomputer Controller with Windows® based PC interface. Contractor shall furnish and install Condensing Units coupled with remote DX Air Handlers or Remote Cooler Modules for Split-System Chillers as shown and scheduled on the drawings. Units shall be installed in accordance with this specification.

B. (Condensing Units used as Split-System Chillers coupled with (Optional) Remote Cooler Modules shall be selected for use with water / (% ethylene or propylene glycol)).

C. (Condensing Units used with DX Air Handlers shall be selected for use as
(Return Air Temperature Control Constant Volume systems)
(Leaving Air Temperature Control Constant or Variable Volume systems)
(Leaving Air Temperature Control with Fresh Air Economizer for Constant or Variable Volume Systems with Entering Air Enthalpy override)
(Entering Air Control for 100% Outside Air Systems with Hot Gas Bypass supplied on all circuits for Constant Air Volume only)
(Multiple Evaporator Systems with Suction Pressure Control)

1.02 Quality Assurance

A. Unit construction shall be designed to conform to ANSI / ASHRAE 15 latest version safety standards, NEC (USA), and ASME Section VIII (USA) applicable codes.

B. Unit shall have ETL (USA) and cETL (Canadian) approval (60Hz)

C. The unit shall comply with all local codes.

D. Unit efficiency shall meet or exceed ASHRAE Standard 90.1 (1989)

1.03 Design Base

A. The construction drawings indicate a system based on a selected manufacturer of equipment and the design data available to the Engineer during construction document preparation. Electrical services, size, configuration and space allocations are consistent with that manufacturer's recommendations and requirements.

B. Other listed or approved manufacturers are encouraged to provide equipment on this project; however, it shall be the Contractor and/or Supplier's responsibility to assure the equipment is consistent with the design base. No compensation will be approved for revisions required by the design base or other manufacturers for any different services, space, clearances, etc.

1.04 Related Work Specified Elsewhere

A. General Provisions: Section 15XXX
B. General Completion and Startup: Section 15XXX
C. Equipment & Pipe Identification: Section 15XXX
D. Tests: Section 15XXX
E. Vibration Isolation: Section 15XXX
F. (Optional Split-System Chiller with Remote Cooler Module): Section 15XXX

1.05 Submittals

A. Submit shop drawings on each piece of equipment specified in accordance with Specifications Section 51010, General Provisions.

B. Furnish three (3) sets of Operations and Maintenance Data.

C. Furnish one (1) copy of submittal for each chiller unit to the Temperature Control Contractor.

1.06 Delivery and Handling

A. The unit shall be delivered to the job site completely assembled and charged with compressor oil and a positive charge of dry nitrogen to ensure clean dry refrigerant circuits by the unit manufacturer. The refrigerant shall be supplied by the contractor.

B. Delivery and handling shall comply with the manufacturer's instruction for rigging and handling.

C. The unit controls shall be capable of withstanding 150°F (66°C) - storage temperature in the control panel for an indefinite period of time.

1.07 Start-up

A. The contractor shall provide labor to accomplish the check, test and startup procedure as recommended by the unit manufacturer.

B. The startup serviceman shall provide and complete the manufacturer's check, test and start forms. One copy shall be sent to the engineer and one copy to the manufacturer's factory.

C. (The unit manufacturer shall provide a factory-trained serviceman to supervise the original startup of the units for final operation.)

1.08 Warranty

A. The equipment supplier shall provide a warranty on the equipment supplied by them exclusive of inter-connecting piping and refrigerant for a period of one (1) year from date of start-up or 18 months from date of shipment, whichever occurs first.
B. The start-up date shall be certified by the Mechanical Contractor, and provided to the Manufacturer, Engineer and Owner.
C. (Provide an optional extended (4) four-year warranty on the compressors only, 5 years total).
D. (During the warranty period, the equipment supplier shall furnish the services of an authorized service agency for all labor associated with parts replacement or repair, and start-up of the refrigeration equipment at the beginning of each cooling season. The equipment supplier shall also furnish the services of an authorized service agent for one maintenance visit during winter months of operation, such times shall be designated by the Owner.)

1.09 Maintenance

Maintenance of the equipment shall be the responsibility of the owner and performed in accordance with the manufacturer's instructions.

Part 2: Products

2.01 Tandem-Scroll Air Cooled Condensing Units

2.02 Acceptable Manufacturers

A. Dunham-Bush, Inc.
B. (Approved equal)

2.03 General

A. Furnish and install as shown on the plans, air-cooled reciprocating compressor condensing units. Units shall be Dunham-Bush Model AUDS-A or equal.
B. The units are to be completely factory assembled and wired in a single unit complete with tandem-scroll compressors, condenser, starting control with safety and operating controls. The unit is to be given a complete factory electrical and control functional sequence test.
C. The units shall be built in accordance with all applicable national and local codes including the ANSI safety code; the National Electrical Code and applicable ASME Code for Unfired Pressure Vessels for (Optional Remote Cooler Module) if supplied.

2.04 Performance

The units shall be furnished as shown on capacity schedules and drawings.

2.05 Construction

The unit will be designed for maximum corrosion protection being of heavy gauge, G90 approved galvanized steel construction. The base and legs shall be manufactured of 10 gauge galvanized steel formed channel. Frame members are constructed of 12 gauge, galvanized steel. The Unit Control Center, end enclosure panels, and fan decking shall be constructed of 16 gauge galvanized steel and be finished with a baked powder high grade outdoor quality coating system which exceeds 500 hour salt spray requirements when tested in accordance with the ASTM-B-117 specifications.

2.06 Evaporator And Condensing Unit Control Functions

A. Split-System Chiller Operation

(Optional Remote Cooler Module shall consist of an insulated cooler mounted on a support frame for floor, shelf or suspended installation. The Remote Cooler Module shall include expansion valves, sight glasses, moisture indicators, liquid line solenoid valves, replaceable core filter/dryers, liquid line shut off valves charging and gauge connections. All operating controls including freeze protection and leaving water temperature sensor shall be wired to a junction box for field connection back to the condensing unit. The refrigerant shall be supplied by the contractor. The cooler shall be direct expansion, shell and tube type. The shell shall be fabricated from carbon steel, with enhanced inner fin construction inside seamless copper tubes. The tube sheets shall be heavy gauge copper or heavy carbon plate steel. The tubes shall be roller-expanded or brazed into the tubesheets. Water control baffles shall be copper or cold-rolled steel. The heads shall be constructed of carbon steel. Evaporators shall be designed, constructed and inspected to comply with latest edition ASME code for unfired pressure vessels. Shell side (water) design working pressure shall be minimum 200 PSIG and tube side (refrigerant) design working pressure shall be minimum 300 PSIG.)

B. DX Air Handler Operation
Refrigeration specialties such as expansion valves, sight glasses, moisture indicators, liquid line solenoid valves, replaceable core filter/dryers, liquid line shut off valves charging and gauge connections shall be supplied by the contractor.
The refrigerant shall be supplied by the contractor.
(The DX Air Handler shall be supplied by Dunham-Bush Inc. or equal.)
(Duct sensors shall be supplied by the condensing unit manufacturer, for field wiring to the condensing unit.)
(Enthalpy sensors shall be supplied by the condensing unit manufacturer, for Air Handler applications with Economizer Control.)
(Enthalpy sensors shall be supplied by the condensing unit manufacturer, for Air Handler applications requiring 100% Outside Air control.)

2.07 Condenser

The condenser coil is to be constructed of copper tubes and die formed aluminum fins having self-spacing collars. Fins shall be mechanically bonded to the tubes. An integral sub-cooling loop shall be incorporated into the coil. Condenser divider baffles shall fully separate each condenser fan section to control the airflow to maintain proper head pressure control.

2.08 Fans

The fans shall be heavy duty, aluminum blade, direct drive propeller type. Motors shall be three phase with internal overloads and are to be permanently lubricated. One single phase variable speed fan motor per circuit shall be supplied for 0°F and below minimum operating ambient applications.

2.09 Compressor

A. The tandem-scroll compressors shall be of the hermetic type. All compressors shall be 3500 RPM direct drive with an integral two-pole hermetic squirrel cage motor. A dust-proof terminal box, located in an accessible location on the compressor, shall contain all connection terminals.
B. The compressors shall be fitted with a crankcase heater, large suction filter, oil sight glass, oil strainer and magnetic crankcase plug. The lubrication system shall include a forced feed, integral centrifugal pumping system through the center of the motor/scroll shaft.

2.10 Capacity Control

Compressor cycling shall be utilized to match the demand requirement of the system.
A Pro-active Full Function Microcomputer Controller with Windows® based interface shall cycle compressors in response to leaving water temperature for Split-System Chillers. This system is to provide precise and stable control of supply water temperature over the complete range of operating conditions. It shall be capable of a system capacity range from 100% to _____% at specified conditions without hot gas bypass.
A Pro-active Full Function Microcomputer Controller with Windows® based interface shall cycle compressors in response to return air temperature sensing, leaving air temperature sensing or suction pressure control for Condensing Units used with DX Air Handlers.

2.11 Refrigerant Circuit

A. (Single tandem-scroll compressor) (Dual tandem-scroll compressors) shall be used with a direct expansion evaporator.
B. Condensing units shall have no more than two compressors per refrigerant circuit.
C. The condensing unit shall use HCFC-22 refrigerant, a positive pressure refrigerant that will not require a purge system.
D. The condensing unit shall have a high pressure relief valve in each circuit.
E. (Optional Remote Cooler Modules) and other cold surfaces shall be insulated as required by the contractor to prevent condensation at ambient conditions of 75% humidity of 90°F wet bulb with no air movement. Each refrigerant circuit shall include high pressure relief valve, expansion valve, sight glass, moisture indicator, solenoid valve, replaceable core filter-drier, liquid line shut off valves, charging and gauge connections.

2.12 Control Center

A. Control Center shall be fully enclosed in a steel, baked powder high grade outdoor quality coating system tested to maintain integrity under the ASTM-B-117 specifications, control panel with hinged access doors. Dual compartments, separating safety and operating controls from the power controls, are to be provided. Controls shall include:
    1. Compressor solid state, thermal sensing overloads, manual reset
    2. High refrigerant discharge pressure, manual reset
    3. Separate power terminal blocks for main power, 115vAC control power
    4. Compressor contactors

5. Pro-active Full Function PC Windows® Based Microcomputer Controller with factory installed sensors including integral anti-recycle protection
6. Complete labeling of all control components
7. Numbered terminal strips and labeled components for easier wire tracing
8. Condenser pressure sensing fan cycling control for start-up and operation down to 30°F.
9. (Over and under voltage protection relay protects against high and low incoming voltage conditions as well as single phasing, phase reversal and phase imbalance.)
10. (Operating and safety lights visible from unit exterior including:)
    a. Power on
    b. Individual compressor operation
    c. Safety failure for each refrigerant circuit
11. (Control panel solenoid door latch to prevent door opening before turning off power to the unit).
12. (Electronic expansion valves which shall be controlled by the microcomputer.)

B. **Control Center's** individual Microcomputer Controller with Full Function PC Windows® based interface shall provide compressor staging based on (Select only one of the following)

(Leaving Water Temperature control for Split-System Chillers)

(Return Air Temperature Control for Constant Volume DX Air Handler Systems)

(Leaving Air Temperature Control for Constant or Variable Volume DX Air Handler Systems with less than 30% outside air volume)

(Leaving Air Temperature Control for Fresh Air Economizer with Entering Air Enthalpy override for Constant or Variable Volume DX Air Handler Systems)

(Entering Air Enthalpy Control for 100% Outside Fresh Air DX Air Handler Systems with Hot Gas Bypass active on all circuits)

(Suction Pressure Control for Multiple Evaporator DX Air Handler Systems)

It shall have two lines of 16 large characters each Alpha-Numeric Liquid Crystal display, and the inputs shall be through a 16 single function keypad through menu driven prompts. The displayed data shall be updated once per second and the microcomputer shall have a Non-Volatile memory used for all control information. The microcomputer shall have an extended operating range of -20°F to +158°F (-29 to +70°C). (It shall be proactive in control and accommodate system anomalies such as high condenser temperature and high entering water temperature by controlling loading and refrigerant flow to keep the machine on line but at reduced capacity until the condition is corrected.)

C. **Microcomputer** individual unit controller shall provide as a minimum the following features and options.
1. Microcomputer - Unit Control shall provide the following capabilities:
    a. Power control relay with start-up control sequence
    b. Staging of compressors and hot gas bypass to achieve precise control of Split-System functions
    c. Activating fans of the air-cooled condensing unit to control head pressure
    d. Seven day time clock with schedules for machine control
    e. Automatic pump down with pro-active cycle detection to eliminate excessive compressor cycling
    f. Pro-Active control of compressor cycling and /or hot gas bypass to help prevent high pressure or low pressure trips
    g. Pro-Active control providing safeties for high and low refrigerant pressures, (freeze protection for the cooler on Split-System Chillers), to eliminate nuisance trips
    h. Pro-Active loading & unloading to eliminate overloading during start-up to reduce compressor cycling
    i. Continuous evaluation of sensors
    j. (Control of Hot Gas bypass circuit)
2. **Microcomputer - Unit Protection** shall provide the following:
    a. Low pressure cutout with adjustable time parameters & Pro-Active safety
    b. High pressure cutout & Pro-Active safety
    c. Automatic re-start from power outage with event posting
    d. Battery backed-up real time clock and memory with over 10 years life and automatic recharge of lithium ion battery that requires no service.
    e. Safeties for temporary shutdown as well as lockout protection that requires manual reset
    f. (Freeze protection on leaving chilled water temperature for optional Remote Cooler Split-System Chiller operation)
    g. Anti-recycle timing
    h. Sensor error
    i. Pump down failure
    j. (Pro-active Oil Pressure Safety for compressor protection with time and pressure parameters)

k. (Chilled water pump control system with both safety or lockout ability for optional Remote Cooler Split-System Chiller operation)

3. **Microcomputer - Readouts** shall provide the following:
   a. Sensor inputs
   b. (Leaving liquid temperature for optional Remote Cooler Split-System Chiller operation)
   c. (Entering liquid temperature for optional Remote Cooler Split-System Chiller operation)
   d. (Compressor ampere draw)
   e. Suction pressure each circuit
   f. Discharge pressure each compressor
   g. Unit control contacts
   h. (Water flow switch for optional Remote Cooler Split-System Chiller operation)
   i. (Chilled air or liquid reset temperature)
   j. Digital Outputs
   k. Compressor control status
   l. Liquid line solenoid control status
   m. Condenser fan control status
   n. Alarm control status
   o. Control power status
   p. (Low ambient temperature)
   q. (Utility demand limit)
   r. (Chilled water pump control for optional Remote Cooler Split-System Chiller operation)
   s. (Electronic expansion valve)
4. **Microcomputer - Setpoints** shall provide the following:
   a. High discharge pressure
   b. Low suction pressure
   c. (Freeze protection temperature for Split-System Chiller operation)
   d. (Leaving liquid temperature for Split-System Chiller operation)
   e. Control zone settings
   f. Fan condenser control
   g. Pump down settings
   h. High & low compressor amperes
   i. Low suction unload
   j. High discharge unload
   k. Anti-recycle delay setting
5. **Microcomputer - Alarm History** shall provide the following:
   a. The 32 most recent alarms can be displayed
   b. Low suction pressure of all circuits
   c. High discharge pressure of all circuits
   d. Freeze protection cutout
   e. Pump down failure of all circuits
   f. External shutdown of each compressor
   g. Communication failure
   h. Battery failure
   i. Time/date invalid
   j. Memory failure
   k. Power failure
6. **Microcomputer Remote Monitoring Capabilities** - shall include a complete Full Function Windows® based communication system through the following means:
   a. **PC Connection** - shall provide communications to a 3.1 or higher level Windows® based Personal Computer, or BMS (Building Management System) to provide, as a minimum, the following:
      1. Dynamic system data update of all outputs, inputs, control states, and alarms
      2. Complete History Storage of all data needed for both Static and Dynamic graphing
      3. Multiple Authorization Code Levels based on operator or full service authorization for modification of setpoints and manual status
      4. Capability of up to 20 Chiller Packages networked together via RS485 (up to 6000 feet)
   b. **(Remote Mounted-Stand Alone Control Panel** - shall communicate and control a single unit, or network of up to twenty (20) units in a network, from a remote location up to 6000 feet away. The RS485 communications port shall be wired with a 3 wire shielded cable for up to 6000 feet away from the chiller, or 100 feet away through the

1. This option utilizes a duplicate display and keypad Control Terminal, similar to the one that shall be installed in the packaged chiller, or chiller network, and shall provide a full function operating terminal as well as a remote alarm function.
2. This remote Control Terminal must be in addition to the unit mounted controller, so the unit can be fully serviced locally, without using the Remote Control Terminal that may be as much as 6000 feet away.
3. The remote communications shall be accomplished through the RS485 high speed communications system up to 6000 feet away, or the RS232 communication system up to 100 feet away.

c. **(Telephone Modem** - for extended distance communications to a remote BMS System, a remote PC Computer or a Remote Mounted Stand Alone Control Terminal through the telephone system.)
   1. (Option 1. A 14400 baud modem shall be connected directly to the RS232 port on the microcomputer.)
   2. (Option 2. The Modem Option shall be capable of operating a network of up to 20 units in the network, connected via the RS485 port high speed communication system and a GATEWAY card, then connected through the modem for extended network communications via the telephone system.)

d. **(Communications to a Building Management System (BMS)** - shall be connected to the condensing unit (or condensing unit network system) as follows for remote communication:
   1. (A modem shall be connected to the RS232 communication port for long distance communication through the telephone system, and a translator must be provided for communication with the Building Management System.)
   2. (The RS232 communication system shall be used for connection up to 100 feet away from the chiller (or chiller network) when connected by a 4 wire shielded cable, and a translator must be supplied for communication with the Building Management System.)
   3. (The RS485 high speed communication system shall be connected up to 6000 feet away from the packaged chiller (or chiller network) when connected with a 3 wire shielded cable, and a translator must be supplied for communication with the Building Management System.)

e. (Chiller*LINK* - shall be supplied for communication from the condensing unit (or condensing unit Network) to the BMS (Building Management System) through BACnet or MODBUS communicating systems)

2.13 Starting Equipment

A. Unit mounted contactors with compressor motor module protection for each compressor.
B. Five (5) minute anti-recycle timer
C. (Non-fused disconnect switch with through-the-door interlocking handle.)
D. Unit mounted power transformer to provide 115 Vac control power.
E. (Ground fault interrupter.)

2.14 Additional Equipment

A. (Copper Fin/Copper Tube condenser coil.)
B. (Silicone polyester Poly-Coat condenser fin coating per ASTM B117 specification for maximum salt spray and corrosion resistance.)
C. Evaporator – Control Modes of Operation (Select only one of the eight control options following)
   (Remote Cooler Module for 44°F Chilled Water Temperature)
   (Remote Cooler Module for 42°F Chilled Water Temperature)
   (Remote Cooler Module for 40°F Chilled Water Temperature)
   (Remote Air Handler – Return Air – Constant Air Volume Control)
   (Remote Air Handler – Leaving Air – Constant or Variable Air Volume Control)
   (Remote Air Handler with Economizer – Leaving Air – Constant or Variable Air Volume Control)
   (Remote Air Handler – 100% Outside Air – Constant Air Volume Control – Only)
   (Remote Multiple Air Handlers – Suction Pressure Control)
D. (Convenience Outlet 115 volt AC powered dual 3 prong ground fault receptacle powered by dedicated transformer and fused for 15 amps.)
E. (Hot gas bypass valve to permit operation down to 50% of the last step of unit mechanical capability.)
F. (Low ambient control to 0°F (-17.8°C) minimum starting ambient.)
G. (Extra low ambient control to -20°C) minimum starting ambient.)
H. (Low ambient lock-out control requiring a field setpoint.)

I. (Gauges include suction and discharge for each refrigerant circuit in addition to the readings through the microcomputer.)
J. (Steel Painted Louvers for complete unit enclosure for general mechanical security and unit aesthetics.)
K. (Aluminum Painted Grilles similar to louvers except manufactured of aluminum with 3/8" x 3 1/2" slots instead of louvers for hail damage protection and unit aesthetics.)
L. (Fin Guards Top only (1" x 4" wire mesh) for vertical side condenser coil protection.)
M. (Fin Guards Bottom only (1" x 4" wire mesh) for general unit mechanical security for the lower portion of the unit.)
N. (Over and under voltage protection relay protects against high and low incoming voltage conditions as well as single phasing, phase reversal and phase imbalance.)
O. (Circuit Breakers to provide branch circuit protection.)
P. (Weatherproof Alarm Bell mounted and wired to indicate a common alarm fault.)
Q. (Fully Painted Unit meets the requirements for outdoor unit application of 500 Hour Salt Spray Paint tested in accordance with ASTM-B-117.)
R. (Chilled Water Pump Control providing a contact closure for pump starting prior to starting the chiller.)
S. (Water Flow Switch for Optional Remote Cooler Split-Systems Chiller operation to be field mounted and wired.)
T. (Auxiliary Control Module providing return water (fluid) temperature monitoring (on Split-System Chillers), utility demand limiting (requires an external 0 to 5 volt DC signal), load limiting by compressor over current protection, amp monitoring that displays compressor amps for load and compressor monitoring and trend logging.)

Part 3: Execution

3.01 Installation Work By Mechanical Contractor

A. Install on a flat surface level within 1/8 inch and of sufficient strength to support concentrated loading. Place vibration isolators under the unit.
B. Assemble and install all components furnished loose by manufacturer as recommended by the manufacturer's literature.
C. Complete all refrigerant piping per ASHRAE Standards for refrigerant piping and electrical connections per all local, state and National Electrical codes.
D. (Provide and install valves in water piping upstream and downstream of the Optional Remote Cooler Module water connections to provide means of isolating the cooler for maintenance and to balance the water flow and trim the system.)
E. (Provide soft sound and vibration eliminator connections to the cooler water inlet and outlet as well as electrical connections to the unit.)
F. (Chilled water pump control interlocked through the chilled water flow switch, mounted in the chilled water line, to ensure water flow for proper split-system chiller operation.)
G. (Furnish and install taps for thermometers and pressure gauges in water piping adjacent to inlet and outlet connections of the evaporator.)
H. (Provide and install drain valves with capped hose ends to each cooler shell.)
I. (Install vent cocks to each cooler shell.)

3.02 Work By Temperature Control Contractor

A. Furnish interlock wiring per manufacturer's recommendations and install loose control components furnished by condensing unit manufacturer.

3.03 Work By Electrical Contractor

A. Furnish power wiring to the condensing unit control panel and obtain required code approval.
B. Install duct sensors provided by the condensing unit manufacturer for DX Air Handler applications.
C. Install Enthalpy sensors provided by the condensing unit manufacturer for DX Air Handler applications requiring Enthalpy Control.
D. Furnish inter-connecting control wiring between the condensing unit and the remote evaporator.
E. (Furnish and install approved disconnect switch.)
F. (Furnish and install approved water flow switch.)

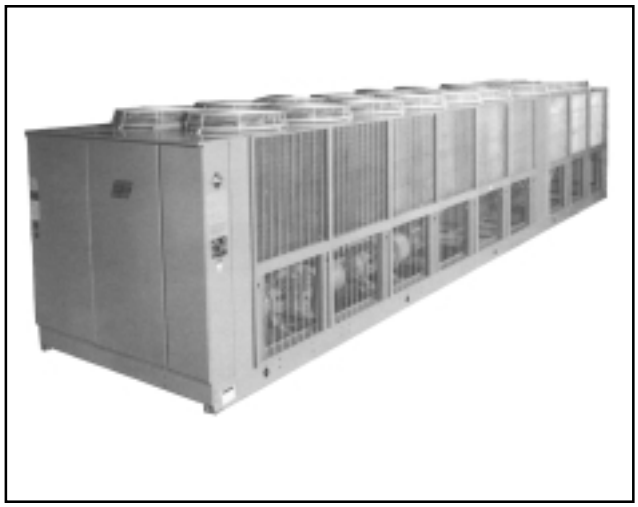
END OF SECTION

Specifications subject to change without notice

Other Quality DUNHAM-BUSH® Products

ACDRB021S to 200D
(21 to 200 tons)
Reciprocating Compressors

ACDRB160 to 270
(160 to 270 tons)
Reciprocating Compressors



ACDXB048 to 208
(50 to 205 tons)
Screw Compressors

INSTALLATION CLEARANCE

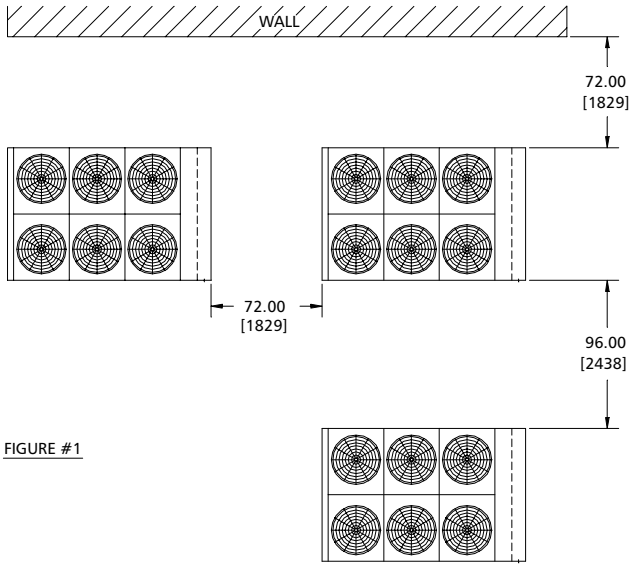


FIGURE #1

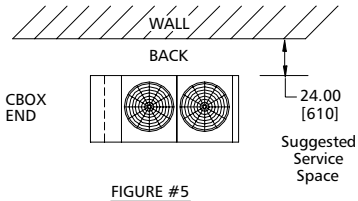


FIGURE #5
ACDSA 015S-030S
LEVEL SURFACE - BACK TO WALL

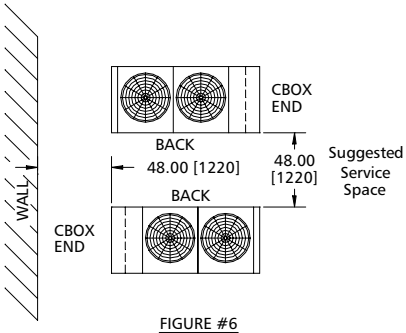


FIGURE #6
ACDSA 015S-030S
LEVEL SURFACE - BACK TO WALL

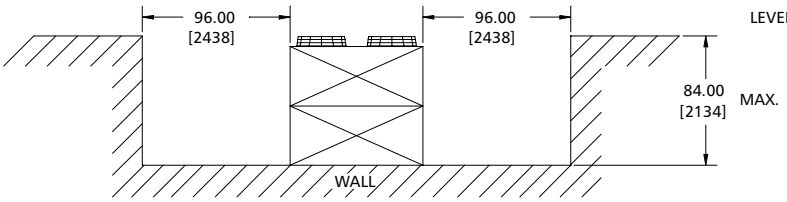


FIGURE #2
SINGLE PIT
(SEE NOTE 3)

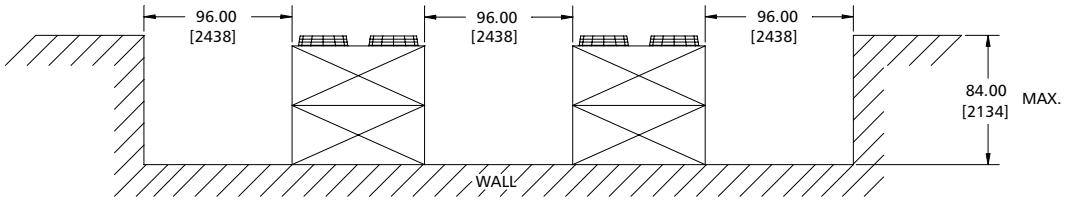


FIGURE #3
DOUBLE PIT
(SEE NOTE 3)

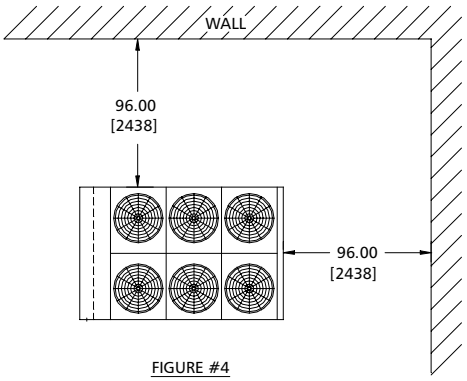


FIGURE #4
CORNER WALL

NOTE:
1) SCALE: 1/2" = 1" (INCHES) - 12.7MM = 25.4MM (MILLIMETERS)
2) ALL DIMENSIONS ARE MINIMAL, UNLESS OTHERWISE NOTED.
3) PIT INSTALLATIONS ARE NOT RECOMMENDED. RE-CIRCULATION OF HOT CONDENSER AIR IN COMBINATION WITH SURFACE AIR TURBULENCE CANNOT BE PREDICTED. HOT AIR RE-CIRCULATION WILL SEVERELY AFFECT UNIT EFFICIENCY (EER) AND CAN CAUSE HIGH PRESSURE TRIPS OR FAN MOTOR TEMPERATURE TRIPS. DUNHAM-BUSH WILL NOT BE REPSONSIBLE FOR DUCTING FANS TO A HIGHER LEVEL TO ALLEVIATE THE ABOVE MENTIONED CONDITIONS.
4) REFERENCE DIMENSIONAL DRAWING 022550A0.

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