

# INSTALLATION MANUAL

## SERIES 40 ROOFTOP 25, 30 & 40 TON

MODELS: V52  
V53  
V54

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### NOTES, CAUTIONS AND WARNINGS

Installer should pay particular attention to the words: *NOTE*, *CAUTION*, and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

**CAUTION:** READ ALL SAFETY GUIDES BEFORE YOU  
BEGIN TO INSTALL YOUR UNIT.

SAVE THIS MANUAL



ISO 9001  
Certified Quality  
Management System

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## NOMENCLATURE

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |    |   |    |   |    |   |    |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|----|---|----|---|----|---|----|---|---|---|---|
| V | 1 | 5 | 2 | 3 | 3 | A | 4 | N | 5 | 3 | 6 | 4 | 7 | B | 8 | 1 | 9 | A | 10 | A | 11 | C | 12 | A | 13 | D | 14 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|----|---|----|---|----|---|----|---|---|---|---|

|                       |  |
|-----------------------|--|
| <b>PACKAGE</b>        |  |
| V = JCI Brand R-410A  |  |
| S = Underfloor R-410A |  |

|                   |  |
|-------------------|--|
| <b>GENERATION</b> |  |
| 2 = 25 TON        |  |
| 3 = 30 TON        |  |
| 4 = 40 TON        |  |

|                                       |  |
|---------------------------------------|--|
| <b>CONFIGURATION</b>                  |  |
| A = 1,2 1 - BOTTOM RETURN             |  |
| B = 1,4 2 - BOTTOM SUPPLY             |  |
| C = 1,5 3 - END RETURN(S)             |  |
| D = 3,2 4 - REAR SUPPLY               |  |
| E = 3,4 5 - FRONT SUPPLY              |  |
| F = 3,5                               |  |
| FRONT SUPPLY - COOLING ONLY           |  |
| HOT WATER, STEAM & ELECTRIC HEAT -    |  |
| BOTTOM SUPPLY ONLY                    |  |
| GAS HEAT - BOTTOM OR REAR SUPPLY ONLY |  |

|                                       |  |
|---------------------------------------|--|
| <b>HEAT SOURCE</b>                    |  |
| N = NATURAL GAS                       |  |
| S = NATURAL GAS, SS HEAT EXCHANGER    |  |
| D = NATURAL GAS, MODULATING HEAT*     |  |
| T = NATURAL GAS, MODULATING HEAT, SS* |  |
| HEAT EXCHANGER                        |  |
| E = ELECTRIC HEAT                     |  |
| C = COOLING ONLY                      |  |
| W = HOT WATER COIL                    |  |
| X = STEAM COIL                        |  |

|                        |  |
|------------------------|--|
| <b>HEAT CAPACITY</b>   |  |
| 3 = 267 MBH            |  |
| 5 = 533 MBH            |  |
| 8 = 800 MBH (40T ONLY) |  |
| 4 = 40 KW              |  |
| 8 = 80 KW              |  |
| 1 = 108 KW (1)         |  |
| 0 (ZERO) NO HEAT       |  |
| 1 = 1 ROW              |  |
| 2 = 2 ROW              |  |
| 1 = 1 ROW              |  |

|                          |  |
|--------------------------|--|
| <b>VOLTAGE</b>           |  |
| 2 = 208/230-60           |  |
| 3 = 380-60               |  |
| 4 = 460-60               |  |
| 5 = 575-60               |  |
| 7 = 380/415-50 (30T/40T) |  |

|                                 |             |
|---------------------------------|-------------|
| <b>ID BLOWER (See note 4)</b>   |             |
| A = A, F, I                     | L = D, G, J |
| B = A, G, I                     | M = B, F, I |
| C = A, F, J                     | N = B, F, J |
| D = A, G, J                     | O = B, G, I |
| E = A, E, H                     | P = B, G, J |
| F = A, E, I                     | Q = C, F, I |
| G = A, E, J                     | R = C, F, J |
| H = A, F, H                     | S = C, G, I |
| I = D, F, I                     | T = C, G, J |
| J = D, F, J                     | U = D, E, H |
| K = D, G, I                     | V = D, E, I |
| Air Volume                      |             |
| a = CV                          |             |
| b = VAV (VFD-FACTORY INSTALLED) |             |
| c = BYPASS FACTORY VFD          |             |
| d = VAV (VFD-CUSTOMER)(3)       |             |

|                                               |  |
|-----------------------------------------------|--|
| <b>Fan (See note 6)</b>                       |  |
| e = FORWARD CURVE FAN Class I                 |  |
| f = FORWARD CURVE FAN Class II                |  |
| g = AIR FOIL PAN (always Class II)            |  |
| Class I blower is limited to 15HP in 25/30ton |  |
| Class II blower is limited to 20HP in 40ton   |  |
| Class II blowers are not HP limited           |  |
| <b>Blower Mount</b>                           |  |
| h = Neoprene                                  |  |
| i = 1 inch deflection spring                  |  |
| j = 2 inch deflection spring                  |  |

|                           |  |
|---------------------------|--|
| <b>ID MOTOR</b>           |  |
| 5 = 10 HIEFF              |  |
| 6 = 15 HIEFF              |  |
| 7 = 20 HIEFF              |  |
| 8 = 25 HIEFF (Except 25T) |  |
| 0 = 7.5 HIEFF (25T Only)  |  |

|                                                  |  |
|--------------------------------------------------|--|
| <b>CONSOLE</b>                                   |  |
| H = SIMPLICITY SE COM CARD                       |  |
| I = SIMPLICITY SE COM CARD W/IDISC & 110V OUTLET |  |
| J = SIMPLICITY SE COM CARD W/IDISC               |  |
| K = FAULT DETECTION DEVICE                       |  |
| L = FAULT DETECTION DEVICE, DISC & 110V OUTLET   |  |
| M = FAULT DETECTION DEVICE & DISC                |  |
| N = CCS CONTROL                                  |  |
| P = CCS CONTROL W/IDISC, 110V OUTLET             |  |
| Q = CCS ZONING CONTROL                           |  |
| R = CCS ZONING CONTROL W/IDISC, 110V OUTLET      |  |
| S = CCS-VAV CONTROL                              |  |
| T = CCS-VAV CONTROL W/IDISC, 110V OUTLET         |  |
| U = IPU CONTROL                                  |  |

|                      |                    |
|----------------------|--------------------|
| <b>REFRIGERATION</b> |                    |
| A = 1,3,5,7          | K = 14,5,8         |
| B = 2,3,5,7          | L = 2,4,5,8        |
| C = 1,4,5,7          | Q = 1,3,9,7        |
| D = 2,4,5,7          | R = 2,3,9,7        |
| I = 1,3,5,8          | S = 1,4,9,7        |
| J = 2,3,5,8          | T = 2,4,9,7        |
| Config               |                    |
| Condenser Coil       |                    |
| 1 = STANDARD         | 7 = YES            |
| 2 = TECHNICOAT       | 8 = NO             |
| Piping (See note 4)  |                    |
| 3 = STANDARD         | 4 = HOT GAS BYPASS |
| Evaporator Coil      |                    |
| 5 = STANDARD         |                    |
| 9 = STD W/TECHNICOAT |                    |

|                             |                                 |
|-----------------------------|---------------------------------|
| <b>EXHAUST (See note 5)</b> |                                 |
| A = BARO                    | K = 2, 6                        |
| E = 1, 6                    | L = 2, 7                        |
| F = 1, 7                    | M = 2, 8                        |
| G = 1, 8                    | N = NONE                        |
|                             | P = 1, 0                        |
|                             | R = 2, 0                        |
|                             | 9 = Non Std Config              |
| Power Exhaust               |                                 |
| 1 = MODULATING DAMPERS      | A = VFD MODULATING MOTOR        |
| 2 = NON-MOD. (ON/OFF)       |                                 |
| Motor                       |                                 |
| 0 = 5 HP HIEFF (25T Only)   | 7 = 10 HP HIEFF                 |
| 8 = 7.5 HP HIEFF            | 8 = 15 HP HIEFF (Except 25 Ton) |

|                                         |  |
|-----------------------------------------|--|
| <b>ADDITIONAL CONFIGURATION OPTIONS</b> |  |
| Cu/Cu Condenser Coil                    |  |
| Cu/Cu Evaporator Coil                   |  |
| E-Coat Condenser Coil                   |  |
| E-Coat Evaporator Coil                  |  |
| Cu/Cu TECHNICOAT Condenser Coil         |  |
| Exhaust VFD (Customer) (see note 3)     |  |
| * Premium Cabinet (6 doors)             |  |
| * Standard Cabinet (4 doors)            |  |
| * Drain Pan - powder coat               |  |
| * Drain Pan - stainless steel           |  |

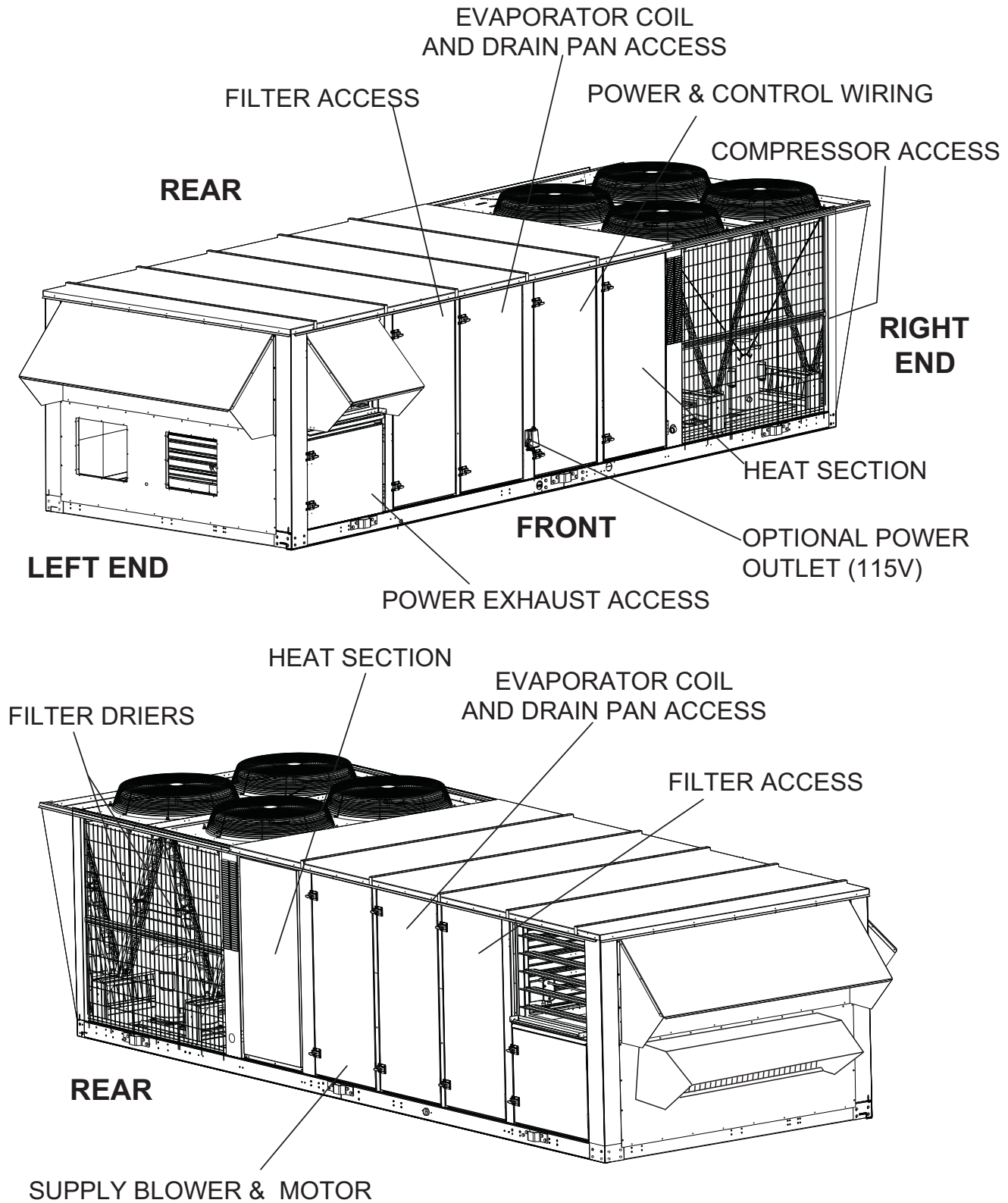


FIGURE 1 - COMPONENT LOCATION

## GENERAL

Johnson Controls Series 40 V52/V53/V54 units are single package cooling only or cooling with gas, electric, hot water or steam heating designed for outdoor installation on a rooftop and for non-residential use.

The units are completely assembled on rigid, permanently attached base rails. All piping, refrigerant charge, and electrical wiring is factory installed and tested. The units require electric power, gas, steam, or hot water connections and duct connections. Gas fired units also require installation of a flue gas outlet hood.

Reference R-410A Quick Reference Guide, Figure 62 for R-410A Refrigerant information.

## SAFETY CONSIDERATIONS

### NOTES, CAUTIONS AND WARNINGS

Installer should pay particular attention to the words: *NOTE*, *CAUTION*, and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

### GAS FIRED MODELS

DO NOT store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

### WHAT TO DO IF YOU SMELL GAS

Do not try to light any appliance. Do not touch any electrical switch. Do not use any phone in your building. Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

### CAUTION

The furnace and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 0.5 psig. Pressures greater than 0.5 will cause gas valve damage resulting in a hazardous condition. If gas valve is subjected to a pressure greater than 0.5 psig, it must be replaced. The furnace must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of that system at test pressures equal to or less than 0.5 psig.

### WARNING

This Furnace is not to be used for temporary heating of buildings or structures under construction.

### ALL MODELS

### CAUTION

This system uses R-410A Refrigerant which operates at higher pressures than R-22. No other refrigerant may be used in this system. Gage sets, hoses, refrigerant containers and recovery systems must be designed to handle R-410A. If you are unsure, consult the equipment manufacturer. Failure to use R-410A compatible servicing equipment may result in property damage or injury.

Installation and servicing of air conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair or service air conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit and other safety precautions that may apply.

Follow all safety codes, including ANSI Z223.1-Latest Edition: wear safety glasses and work gloves; use quenching cloth for unbrazing operations; have fire extinguisher available for all brazing operations.

### WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.

### INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing.

## REFERENCE

Additional information is available in the following reference form:

- 355278 - Technical Guide

## APPROVALS

Designed certified by CSA, ETL, CETL as follows:

- For use as a forced air furnace with cooling unit (gas heat models).
- For outdoor installation only.
- For installation on combustible material and may be installed directly on combustible flooring or Class A, Class B or Class C roof covering materials.
- For use with natural gas (convertible to LP with kit).

Not suitable for use with conventional venting systems.

## INSTALLATION

### PRECEDING INSTALLATION

If a factory option convenience outlet is installed, the weatherproof outlet cover must be field installed. The cover shall be located in the unit control box. To install the cover, remove the shipping label covering the convenience outlet, follow the instructions on the back of the weatherproof cover box, and attach the cover to the unit using the (4) screws provided..

### CAUTION

208/230-3-60 and 380/415-3-50 units with factory installed Powered Convenience Outlet Option are wired for 230v and 415v power supply respectively. Change tap on transformer for 208-3-60 or 380-3-50 operation. See unit wiring diagram.

### LIMITATIONS

The installation of this unit must conform to local building codes, or in the absence of local codes, with ANSI Z223.1 Natural Fuel Gas Code and /or CAN/CGA B149 installation codes.

In U.S.A.:

- National Electrical Code ANSI/NFPA No. 70-Latest Edition.
- National Fuel Gas Code Z223.1-Latest Edition.
- Gas-Fired Central Furnace Standard ANSI Z21.47-Latest Edition.
- Local gas utility requirements.

Refer to Table 1 for Cooling and Electrical Application Data and to Table 2 for Gas Heat Application Data.

After installation, gas fired units must be adjusted to obtain a temperature rise within the range specified on the unit rating plate.

If components are to be added to a unit to meet local codes, they are to be installed at the contractor's and/or the customer's expense.

Size of unit for proposed installation should be based on heat loss / heat gain calculation made according to the methods of the Air Conditioning Contractors of America (ACCA).

## LOCATION

Use the following guidelines to select a suitable location for these units:

**TABLE 1: COOLING & ELECTRICAL APPLICATION**

| UNIT POWER SUPPLY | VOLTAGE VARIATIONS |           |
|-------------------|--------------------|-----------|
|                   | MIN. VOLTS         | MAX VOLTS |
| 575-3-60          | 540                | 630       |
| 208/230-3-60      | 187                | 252       |
| 460-3-60          | 432                | 504       |

**TABLE 2: COOLING & ELEC. APP. LIMITATIONS**

| LIMITATIONS                            | MODEL        |              |              |
|----------------------------------------|--------------|--------------|--------------|
|                                        | V52          | V53          | V54          |
| Supply Air CFM (min./max)              | 6,000-12,500 | 6,000-15,000 | 8,000-20,000 |
| Entering Wet Bulb Temp (F°) (min./max) | 57/75        | 57/75        | 57/75        |
| Ambient Temp                           | 40/125       | 40/125       | 40/125       |

### Min. Air Temperature on Gas Fired Heat Exchangers (°F)

|            |    |    |    |
|------------|----|----|----|
| Aluminized | 25 | 25 | 25 |
| Stainless  | 0  | 0  | 0  |

- Unit is designed for outdoor installation only.
- Condenser coils must have an unlimited supply of air. Where a choice of location is possible, position the unit on either north or east side of building.
- Suitable for roof mount on curb.
- Roof structures must be able to support the weight of the unit and its accessories. Unit must be installed on a solid level roof curb or appropriate angle iron frame.
- Maintain level tolerance to 3/4 inches across width and 2 inches along length.

**TABLE 3: STANDARD GAS HEATING CAPACITIES**

| GAS HEAT OPTION | AVAILABLE ON MODELS | INPUT CAPACITY (MBH) <sup>1</sup> |       | OUTPUT CAPACITY (MBH) <sup>2</sup> | GAS RATE, CU. FT./HR. <sup>3</sup> |       |
|-----------------|---------------------|-----------------------------------|-------|------------------------------------|------------------------------------|-------|
|                 |                     | 1ST STAGE                         | TOTAL |                                    | 1ST STAGE                          | TOTAL |
| N3              | V52/V53/V54         | 267                               | 267   | 213                                | 247                                | 247   |
| N5              | V52/V53/V54         | 267                               | 533   | 426                                | 247                                | 495   |
| N8              | V54 ONLY            | 267 <sup>4</sup>                  | 800   | 638                                | 247                                | 742   |

1. Heating capacity is only staged on CV models. VAV models use only one stage at full capacity.
2. Blower motor heat not included.
3. Based on a heat content of 1075 Btu/Ft.<sup>3</sup>

$$\text{GAS RATE} = \frac{\text{Input MBH}}{(1.075 \text{ MBH})/\text{Ft}}^3$$

4. Unit Control Board with 3 heating outputs only. For all other Unit Control Boards the 1st Stage is 533 MBH.

**TABLE 4: TEMPERATURE RISE**

| TON | MODULES |       |       |
|-----|---------|-------|-------|
|     | 1       | 2     | 3     |
| 25  | 5-35    | 25-55 | -     |
| 30  | 5-35    | 20-50 | -     |
| 40  | 5-30    | 10-45 | 25-55 |

**TABLE 5: MINIMUM HEATING CFM**

| TON | MODULES        |       |        |
|-----|----------------|-------|--------|
|     | 1 <sup>1</sup> | 2     | 3      |
| 25  | 6,000          | 7,183 | -      |
| 30  | 6,000          | 7,901 | -      |
| 40  | 8,000          | 8,779 | 13,169 |

1. Calculated minimum CFM for maximum heat rise is 5,644 for 25/30T and 6,584 for 40T, 1 module.

**TABLE 6: MODULATING GAS HEATING CAPACITIES**

| GAS HEAT OPTION | AVAILABLE ON MODELS | INPUT CAPACITY (MBH) |         | STEPS | OUTPUT CAPACITY (MBH) <sup>1</sup> | GAS RATE, CU. FT./HR. |         |
|-----------------|---------------------|----------------------|---------|-------|------------------------------------|-----------------------|---------|
|                 |                     | MINIMUM              | MAXIMUM |       |                                    | MINIMUM               | MAXIMUM |
| D3 <sup>2</sup> | V52/V53/V54         | 69                   | 267     | 6     | 213                                | 64                    | 247     |
| D5 <sup>2</sup> | V52/V53/V54         | 69                   | 533     | 12    | 426                                | 64                    | 495     |
| D8 <sup>2</sup> | V54 ONLY            | 69                   | 800     | 17    | 638                                | 64                    | 744     |

1. Output Capacity at Full Fire.
2. Modulating Gas Heat available on CV models only.

TABLE 7: MODULATING HEAT

| STAGES OF GAS CONTROL (% OF FULL HEAT OUTPUT) |                     |      |         |         |                   |
|-----------------------------------------------|---------------------|------|---------|---------|-------------------|
| GAS HEAT OPTION                               | AVAILABLE ON MODELS | STEP | INPUT   | OUTPUT  | % OF TOTAL OUTPUT |
| D3<br>(Turn down ratio<br>3.8 to 1)           | V52, V53, V54       | 1    | 69,333  | 55,466  | 26%               |
|                                               |                     | 2    | 106,666 | 85,333  | 40%               |
|                                               |                     | 3    | 165,332 | 132,266 | 62%               |
|                                               |                     | 4    | 202,665 | 162,132 | 76%               |
|                                               |                     | 5    | 229,332 | 183,466 | 86%               |
|                                               |                     | 6    | 266,666 | 213,333 | 100%              |
| D5<br>(Turn down ratio<br>7.7 to 1)           | V52, V53, V54       | 1    | 69,333  | 55,466  | 13%               |
|                                               |                     | 2    | 106,666 | 85,333  | 20%               |
|                                               |                     | 3    | 165,332 | 132,266 | 31%               |
|                                               |                     | 4    | 202,665 | 162,132 | 38%               |
|                                               |                     | 5    | 229,332 | 183,466 | 43%               |
|                                               |                     | 6    | 266,666 | 213,333 | 50%               |
|                                               |                     | 7    | 325,331 | 260,265 | 61%               |
|                                               |                     | 8    | 362,664 | 290,132 | 68%               |
|                                               |                     | 9    | 389,331 | 311,465 | 73%               |
|                                               |                     | 10   | 426,664 | 341,331 | 80%               |
|                                               |                     | 11   | 495,997 | 396,798 | 93%               |
|                                               |                     | 12   | 533,330 | 426,664 | 100%              |
| D8<br>(Turn down ratio<br>11.5 to 1)          | V54 Only            | 1    | 69,333  | 55,466  | 9%                |
|                                               |                     | 2    | 106,666 | 85,333  | 13%               |
|                                               |                     | 3    | 165,332 | 132,266 | 21%               |
|                                               |                     | 4    | 202,665 | 162,132 | 25%               |
|                                               |                     | 5    | 229,332 | 183,466 | 29%               |
|                                               |                     | 6    | 266,666 | 213,333 | 33%               |
|                                               |                     | 7    | 325,331 | 260,265 | 41%               |
|                                               |                     | 8    | 362,664 | 290,132 | 45%               |
|                                               |                     | 9    | 389,331 | 311,465 | 49%               |
|                                               |                     | 10   | 426,664 | 341,331 | 53%               |
|                                               |                     | 11   | 495,997 | 396,798 | 62%               |
|                                               |                     | 12   | 533,330 | 426,664 | 67%               |
|                                               |                     | 13   | 586,663 | 469,330 | 73%               |
|                                               |                     | 14   | 655,996 | 524,797 | 82%               |
|                                               |                     | 15   | 693,329 | 554,663 | 87%               |
|                                               |                     | 16   | 762,662 | 610,130 | 95%               |
|                                               |                     | 17   | 799,995 | 639,996 | 100%              |

### CAUTION

If a unit is to be installed on a roof curb other than a UP roof curb, gasketing must be applied to all surfaces that come in contact with the unit underside.

If a unit is to be installed on an angle iron frame it is recommended that it be sized to allow the bottom rail to overhang to facilitate installation of condensate drains (see Fig. 4).

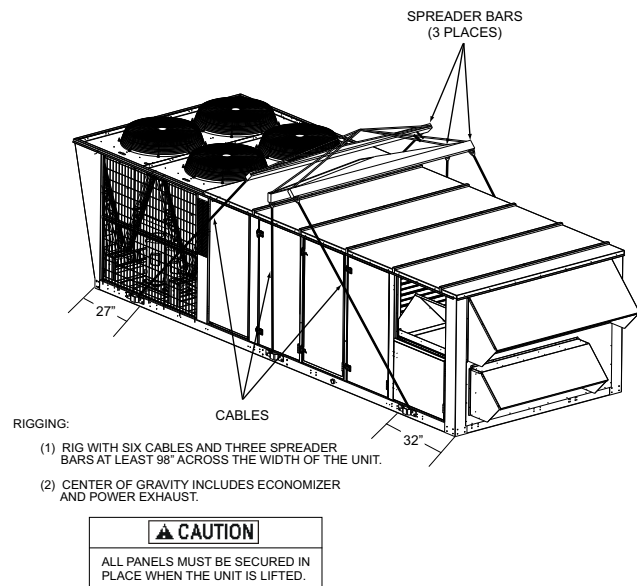


FIGURE 2 - TYPICAL RIGGING

TABLE 8: UNIT WEIGHTS

| COMPONENT                         | 25 TON       | 30 TON | 40 TON |
|-----------------------------------|--------------|--------|--------|
| Basic Unit                        | 4410         | 4565   | 4845   |
| Gas Heat                          |              |        |        |
| 267 MBH                           | 180          | 180    | 180    |
| 533 MBH                           | 320          | 320    | 320    |
| 800 MBH                           | -            | -      | 450    |
| Electric Heat                     |              |        |        |
| 40KW                              | 40           | 40     | 40     |
| 80KW                              | 105          | 105    | 105    |
| 108KW                             | 110          | 110    | 110    |
| Hot Water Heat                    |              |        |        |
| 1 Row Coil                        | 70           | 70     | 70     |
| 2 Row Coil                        | 85           | 85     | 85     |
| Steam Heat                        |              |        |        |
| 1 Row Coil                        | 85           | 85     | 85     |
| Blower                            |              |        |        |
| Forward Curve Fan (Std Fan)       | 0            | 0      | 0      |
| FC IGV                            | 155          | 155    | 175    |
| Air Foil Fan                      | 135          | 135    | 155    |
| AF IGV                            | 155          | 155    | 180    |
| Motor - Supply Fan                |              |        |        |
| 7.5hp                             | 110          | -      | -      |
| 10hp                              | 145          | 145    | 145    |
| 15hp                              | 200          | 200    | 200    |
| 20hp                              | 240          | 240    | 240    |
| 25hp                              | -            | 300    | 300    |
| Supply Fan Motor VFD              | See Table 9  |        |        |
| Refrigeration                     |              |        |        |
| T-Coat Evap.                      | 32           | 30     | 40     |
| T-Coat cond.                      | 32           | 30     | 40     |
| Hot Gas Bypass                    | 10           | 10     | 10     |
| Low Ambient Head Pressure Control |              |        |        |
| 208-230/380/460                   | 5            | 5      | 5      |
| 575                               | 25           | 25     | 25     |
| Filters                           |              |        |        |
| 6" Rigid                          | 70           | 70     | 70     |
| Exhaust <sup>1</sup>              |              |        |        |
| Exhaust Type                      |              |        |        |
| Barometric                        | 45           | 65     | 65     |
| Modulated                         | 140          | 275    | 275    |
| Exhaust Motor                     |              |        |        |
| 5hp                               | 80           | 80     | 80     |
| 7.5hp                             | 110          | 110    | 110    |
| 10hp                              | 145          | 145    | 145    |
| 15hp                              | 200          | 200    | 200    |
| Exhaust Motor VFD                 | See Table 10 |        |        |
| Economizer                        |              |        |        |
| Std. Econ.                        | 235          | 235    | 235    |
| Econ. w/ERV                       | 50           | 50     | 50     |
| Control                           |              |        |        |
| Disconnect                        | 15           | 15     | 15     |
| 110V outlet                       | 55           | 55     | 55     |
| IPU                               | 20           | 20     | 20     |
| Roof Curb                         |              |        |        |
| Partial Curb                      | 415          | 415    | 415    |

- <sup>1</sup>. If ERV and Supply Fan VAV are selected, add the weight of an Exhaust VFD, Table 9.

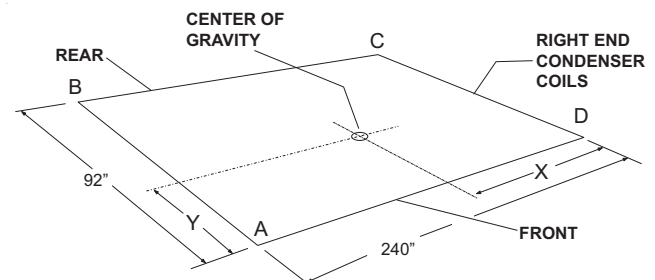
TABLE 9: SUPPLY FAN MOTOR VFD WEIGHTS

| Supply Fan Motor VFD | 230V | 460V | 575V |
|----------------------|------|------|------|
| <b>W/O Bypass</b>    |      |      |      |
| 7.5hp                | 60   | 25   | 30   |
| 10hp                 | 60   | 25   | 30   |
| 15hp                 | 75   | 50   | 60   |
| 20hp                 | 75   | 50   | 60   |
| 25hp                 | 115  | 50   | 60   |
| <b>W/Bypass</b>      |      |      |      |
| 7.5hp                | 155  | 90   | 120  |
| 10hp                 | 155  | 90   | 120  |
| 15hp                 | 185  | 140  | 155  |
| 20hp                 | 185  | 140  | 155  |
| 25hp                 | 255  | 140  | 155  |

TABLE 10: EXHAUST FAN MOTOR VFD WEIGHTS

| Exhaust Fan Motor | 230V | 460V | 575V |
|-------------------|------|------|------|
| <b>W/O Bypass</b> |      |      |      |
| 5hp               | 15   | 10   | 20   |
| 7.5hp             | 50   | 15   | 20   |
| 10hp              | 50   | 15   | 20   |
| 15hp              | 65   | 40   | 50   |

NOTE: If the unit is VAV with ERV, add the weight of an exhaust VFD - it will be in the unit.

FIGURE 3 - CENTER OF GRAVITY<sup>1</sup>

- <sup>1</sup>. Refer to Tables 11 and 12 for A, B, C, D and X and Y data respectively.

## ⚠ CAUTION

All panels must be secured in place when the unit is lifted.

The condenser coils should be protected from damage by the rigging cables with plywood or other suitable material.

An adhesive backed cover is provided over the outside of the combustion air inlet opening on gas fired units to prevent moisture from entering the unit which could cause damage to electrical components. Allow this closure label to remain in place until the combustion air hood is to be installed (Refer to Figures 7).

## RIGGING AND HANDLING

This unit is *not* designed to be handled with a fork-truck.

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching cable slings to the lifting lugs provided in the unit base rails. Spreaders **MUST** be used across the top of the unit. Refer to Figure 2.

- Rig with six cables and spread with three 98-inch spreaders across width of unit.
- Refer to Tables 8 and 11 for unit weight.
- Center of gravity includes economizer, exhaust or return air fan (Refer to Table 12).

**TABLE 11: UNIT CORNERWEIGHT**

| UNIT DESCRIPTION                                                      | 25 TON |      |      |      | 30 TON |      |      |      | 40 TON |      |      |      |
|-----------------------------------------------------------------------|--------|------|------|------|--------|------|------|------|--------|------|------|------|
|                                                                       | A      | B    | C    | D    | A      | B    | C    | D    | A      | B    | C    | D    |
| Basic Unit                                                            | 870    | 949  | 1352 | 1239 | 930    | 972  | 1360 | 1303 | 969    | 969  | 1454 | 1454 |
| Basic Unit With Economizer                                            | 1018   | 1111 | 1313 | 1203 | 1076   | 1124 | 1328 | 1272 | 1058   | 1058 | 1482 | 1482 |
| Basic Unit With Economizer and Gas or Electric Heat                   | 994    | 1084 | 1418 | 1300 | 1073   | 1073 | 1403 | 1403 | 1102   | 1055 | 1503 | 1570 |
| Basic Unit With Economizer and Gas or Electric Heat and Power Exhaust | 1220   | 1275 | 1318 | 1262 | 1275   | 1275 | 1410 | 1410 | 1335   | 1278 | 1485 | 1551 |

NOTES: Basic Unit = cooling only, 10hp FC fan.  
 + Econ = +235lb  
 + Heat = single stage gas, 180 lb  
 + Power Exhaust = modulating 7.5hp

**TABLE 12: UNIT CENTER OF GRAVITY**

| MODEL                                                             | 25 TON |     | 30 TON |     | 40 TON |     |
|-------------------------------------------------------------------|--------|-----|--------|-----|--------|-----|
|                                                                   | X      | Y   | X      | Y   | X      | Y   |
| Basic Unit                                                        | 99"    | 48" | 100"   | 47" | 96"    | 46" |
| Basic Unit /w Econ.                                               | 110"   | 48" | 110"   | 47" | 100"   | 46" |
| Basic Unit /w Econ. & Gas or Elect. Heat, Steam or Hot Water Heat | 104"   | 48" | 104"   | 46" | 99"    | 45" |
| Basic Unit /w Econ. & Gas or Elect. Heat, & Power Exhaust         | 118"   | 47" | 114"   | 46" | 111"   | 45" |

## CLEARANCES

All units require certain clearances for proper operation and service. Installer must make provisions for adequate combustion and ventilation air in accordance with section 5.3, Air for Combustion and Ventilation of the National Fuel Gas Code ANSI Z223.1 or Sections 7.2, 7.3 or 7.4 of CAN/CGA B149 installation codes-Latest Edition and/or applicable provisions of the local building codes. Refer to Figure 8 for clearances required for combustible construction, servicing, and proper unit operation.

## ⚠ WARNING

(COOLING OPERATION) Do not permit overhanging structures or shrubs to obstruct condenser air discharge outlet, combustion air inlet or vent outlets.

## ⚠ WARNING

### (GAS HEATING OPERATION)

Excessive exposure to contaminated combustion air will result in safety and performance related problems. To maintain combustion air quality, the recommended source of combustion air is the outdoor air supply.

The outdoor air supplied for combustion should be free from contaminants due to chemical exposure that may be present from the following sources:

- Commercial buildings
- Indoor pools
- Laundry rooms
- Hobby or craft rooms
- Chemical storage areas

The following substances should be avoided to maintain outdoor combustion air quality:

- Permanent wave solutions
- Chlorinated waxes and cleaners
- Chlorine based swimming pool cleaners
- Water softening chemicals
- De-icing salts or chemicals
- Carbon tetrachloride
- Halogen type refrigerants
- Cleaning solvents (such as perchloroethylene)
- Printing inks, paint removers, varnishes, etc.
- Hydrochloric acid
- Cements and glues
- Antistatic fabric softeners for clothes dryers
- Masonry acid washing materials

## DUCTWORK

Ductwork should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return duct system should be used. This will not preclude use of economizers or outdoor fresh air intake. The supply and return air duct connections at the unit should be made with flexible joints to minimize noise.

When the unit is equipped with power exhaust fans or return air fan the return duct should have a 90 elbow before opening to the building space to abate noise.

The supply and return air duct systems should be designed for the CFM and static pressure requirements of the job. They should NOT be sized to match the dimensions of the duct connections on the unit.

If the unit is equipped with hot water or steam heat then the supply air direction will be down only.

## AIR HOODS FOR FIXED OUTSIDE AIR (UNITS WITH MANUAL ECONOMIZER)

These hoods are factory installed. The dampers may be adjusted by loosening the thumb screw, turning the lever to the desired position, and retightening the thumb screw.

## AIR HOODS FOR ECONOMIZER

There are (3) economizer outside air intake hoods provided with the unit. The hood on the end of the unit is factory mounted. The (2) front and rear hoods are made operational per the following instructions.

Remove the screws holding the economizer hood shipping covers in place. Discard covers.

Rotate the hoods out (each hood is hinged in the lower corner). Secure the hoods with screws along the top and sides.

Apply a bead of RTV sealer along the edge of both hoods and each pivot joint to prevent water leakage.

Seal any unused screw holes with RTV or by replacing the screw.

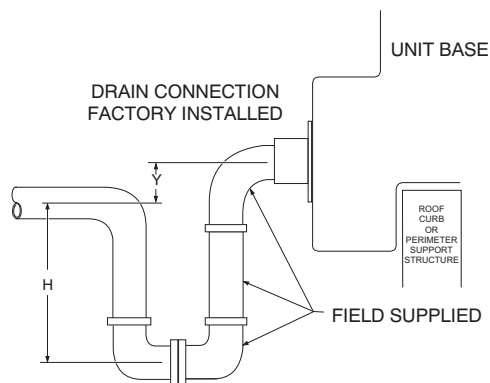
## AIR HOODS FOR EXHAUST AIR

When furnished, these hoods and dampers are factory installed.

## CONDENSATE DRAIN

There is one condensate drain connection. Trap the connection per Figure 4. The trap and drain lines should be protected from freezing.

Plumbing must conform to local codes. Use a sealing compound on male pipe threads. Install condensate drain lines from the 1-1/2 inch NPT female connections on the unit to an open drain.



Y - MINIMUM 2"  
H - 1/2" PLUS TOTAL STATIC PRESSURE - MINIMUM

FIGURE 4 - RECOMMENDED DRAIN PIPING

SERVICE ACCESS

Access to all serviceable components is provided by the following hinged doors:

- Furnace compartment
- Supply Air Fan compartment Evaporator Coil compartment (three doors)
- Filter compartment economizer compartment (two doors)
- Power Exhaust compartment (two doors)
- Main control panels (one door)

Refer to Figure 1 for location of these access panels.

Make sure that all screws and panel latches are replaced and properly positioned on the unit to maintain an air-tight seal.

COMPRESSORS

Units are shipped with compressor mountings factory-adjusted and ready for operation.

DO NOT loosen compressor mounting bolts.

FILTERS

Throwaway or rigid filters are supplied with each unit. Filters must always be installed ahead of evaporator coil and must be kept clean or replaced with same size and type. Dirty filters will reduce the capacity of the unit and will result in frosted coils or safety shutdown. Required filter sizes are shown in Table 15. The unit should not be operated without filters properly installed.

THERMOSTAT (CONSTANT VOLUME UNITS)

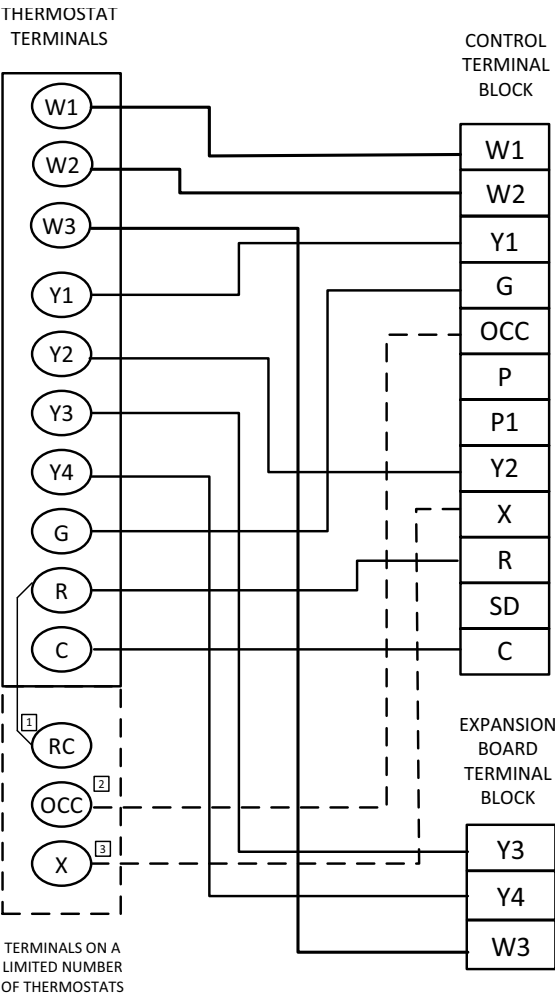


FIGURE 5 - TYPICAL THERMOSTAT WIRING

The thermostat, if used, should be located on an inside wall approximately 56 inches above the floor where it will not be

subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with sensor for general installation procedure (See Figure 5). Refer to Table 13 for control wire sizing and maximum length.

**TABLE 13: CONTROL WIRE SIZES**

| WIRE SIZE | MAXIMUM LENGTH |
|-----------|----------------|
| 20 AWG    | 100 Feet       |
| 18 AWG    | 150 Feet       |

### SPACE SENSOR (VARIABLE AIR VOLUME UNITS)

The space sensor, if used, should be located on an inside wall approximately 56 inch above the floor where it will not be subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with sensor for general installation procedure.

### POWER AND CONTROL WIRING

Field wiring to the unit must conform to provisions of National Electrical Code (NEC) ANSI / NFPA 70-Latest Edition and / or local ordinances. The unit must be electrically grounded in accordance with the NEC and / or local codes. Voltage tolerances which must be maintained at the compressor terminals during starting and running conditions are indicated on the unit Rating Plate and Table 1.

The internal wiring harnesses furnished with this unit are an integral part of the design certified unit. Field alteration to comply with electrical codes should not be required. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram and the same minimum gauge as the replaced wire.

Power supply to the unit must be NEC Class 1 and must comply with all applicable codes. A disconnect switch must be provided (factory option available). The switch must be separate from all other circuits. Wire entry at knockout openings requires conduit fittings to comply with NEC and/or Local Codes. Refer to Figures 13, 14, 15, and 16 for installation location of openings.

If installing a field mounted disconnect on the unit, refer to Figure 17 for the recommended mounting location. Unitstrut™ or equivalent rails should be mounted as shown to provide structure for mounting. The location of the rails should be adjusted to fit the disconnect within the dimensions shown. Conduit run from the disconnect to the power entry

location in the baserail should be routed so that it does not interfere with the doors of the unit access panels.

#### **CAUTION**

Use care to avoid damage when drilling holes for the disconnect mounting.

**NOTE:** Since not all local codes allow mounting a disconnect on the unit, please confirm compliance with local code before mounting a disconnect on the unit.

Electrical wiring must be sized properly to carry the load. Each unit must be wired with a separate branch circuit fed directly from the meter panel and properly fused.

#### **CAUTION**

When connecting electrical power and control wiring to the unit, waterproof connectors **MUST BE USED** so that water or moisture cannot be drawn into the unit during normal operation. The above waterproofing conditions will also apply when installing a field-supplied disconnect switch.

Refer to Figure 5 for typical field wiring and to the appropriate unit wiring diagram mounted inside control doors for control circuit and power wiring information.

### POWER WIRING DETAIL

Units are factory wired for the voltage shown on the unit nameplate. The main power block requires copper wires. Refer to Electrical Data Tables 17 through 28 to size power wiring, fuses and disconnect switch. All field supplied wiring, fuses and disconnects must comply with applicable NEC codes.

Power wiring is brought into the unit through the side of the baserail or the bottom of the unit/control box inside the curb. The baserail has a 2-1/2" diameter hole for field wiring and a 3-5/8" hole is provided for a through-the-curb connection. A removable patch plate covers both the openings.

#### **CAUTION**

Waterproof connections **MUST** be used to ensure that water cannot penetrate the roof or roof curb.

### ERV

The ERV [Energy Recovery Ventilation] is a separate air handler that attaches to the exhaust end of the 25-40T Series 40

packaged rooftop unit. The ERV is shipped separately and assembled to the Series 40 unit at the jobsite. An 'ERV' Series 40 is shipped with an end configuration and electric hookups designed to mate with the ERV. This option is available only with the standard control, and no other power exhaust option can be supplied if an ERV is selected.

The ERV incorporates a rotating heat exchange wheel and a pair of exhaust blowers. It exhausts return air through the wheel, capturing the thermal energy of the exiting hot or cold air as it passes. As the wheel rotates, the incoming airstream, pulled through by the supply fan, regains that energy.

The Series 40 ERV has a terminal block and mating connectors to simplify hooking up the two systems. The controls of both units are factory set to interact properly. Power for the ERV blower motors and controls is provided through the Series 40 unit. The Series 40 /ERV dataplate information includes the ERV electrical load.

The Series 40 standard control has parameters for the ERV; refer to the parameter list. When economizer and ERV options are selected on the same unit, the control and the ERV have specific connections and internal rules for that operation.

Also refer to the ERV Installation Instructions packaged with the ERV.

## GAS HEATING

### **⚠ WARNING**

On VAV units with gas fired furnace, ALL INDIVIDUAL ROOM DAMPER BOXES MUST BE CONTROLLED FULL OPEN DURING HEATING OPERATION TO ENSURE PROPER AIRFLOW OVER THE FURNACE. A control contact powered by the "VAV OPEN" terminals on the standard control is provided for the damper box interlock. this contact is normally open, and is closed during heating operation.

## GAS PIPING

Proper sizing of gas piping depends on the cubic feet per hour of gas flow required, specific gravity of the gas and the length of run. National Fuel Gas Code Z223.1-Latest Edition should be followed in all cases unless superseded by local codes or gas company requirements. Refer to Table 14.

The heating value of the gas may differ with locality. The value should be checked with the local gas utility.

**TABLE 14: PIPE SIZES**

| LENGTH IN FEET | NOMINAL IRON PIPE, SIZE |                        |                    |
|----------------|-------------------------|------------------------|--------------------|
|                | 1-1/4 IN. <sup>1</sup>  | 1-1/2 IN. <sup>1</sup> | 2 IN. <sup>1</sup> |
| 10             | 1,050                   | 1,600                  | 3,050              |
| 20             | 730                     | 1,100                  | 2,100              |
| 30             | 590                     | 890                    | 1,650              |
| 40             | -                       | 760                    | 1,450              |
| 50             | -                       | -                      | 1,270              |
| 60             | -                       | -                      | 1,150              |
| 70             | -                       | -                      | 1,050              |
| 80             | -                       | -                      | 990                |

1. Maximum capacity of pipe in cubic feet of gas per hour (based upon a pressure drop of 0.3 inch water column and 0.6 specific gravity gas).

**NOTE:** There may be a local gas utility requirement specifying a minimum diameter for gas piping. All units require a 1-1/4 inch pipe connection at the entrance fitting. Line should not be sized smaller than the entrance fitting size.

## GAS CONNECTION

The gas supply line should be routed within the space and penetrate the roof at the gas inlet connection of the unit. Refer to Figures 13 through 16 to locate the access opening. Typical supply piping arrangements are shown in Figure 6.

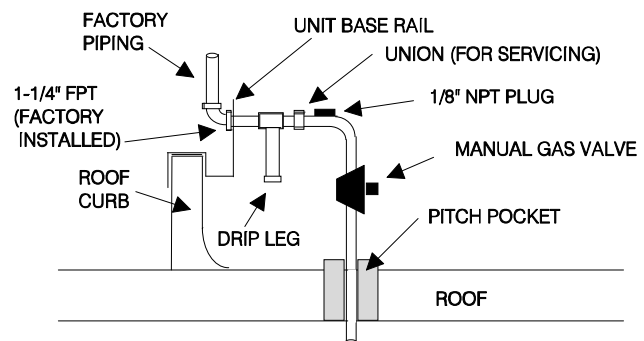


**FIGURE 6 - TYPICAL GAS PIPING CONNECTION**

Gas piping recommendations:

1. A drip leg and a ground joint union must be installed in the gas piping.
2. When required by local codes, a manual shut-off valve will have to be installed outside of the unit.
3. Use wrought iron or steel pipe for all gas lines. Pipe dope should be applied sparingly to male threads only.

## ⚠ WARNING

Natural gas may contain some propane. Propane, is an excellent solvent and will quickly dissolve white lead or most standard commercial pipe sealing compounds. Therefore, special shellac base pipe dope compounds such as Gaskolac or Stalastic, and compounds such as Rectorseal #5, Clyde's or John Crane must be applied for wrought iron or steel pipe.

4. All piping should be cleaned of dirt and scale by hammering on the outside of the pipe and blowing out the loose particles. Before initial start-up, be sure that all of the gas lines external to the unit have been purged of air.
5. The gas supply should be a separate line and installed in accordance with all safety codes as prescribed under Limitations. After the gas connections have been completed, open the main shutoff valve admitting normal gas pressure to the mains. Check all joints for leaks with soap solution or other material suitable for the purpose. NEVER USE A FLAME.
6. The furnace and its individual manual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 0.5 psig.

## ⚠ CAUTION

Disconnect gas piping from unit when leak testing at pressures greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in a hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it must be replaced.

7. A 1/8 inch N.P.T. plugged tapping, accessible for test gage connection, must be installed immediately upstream of the gas supply connection to the furnace.

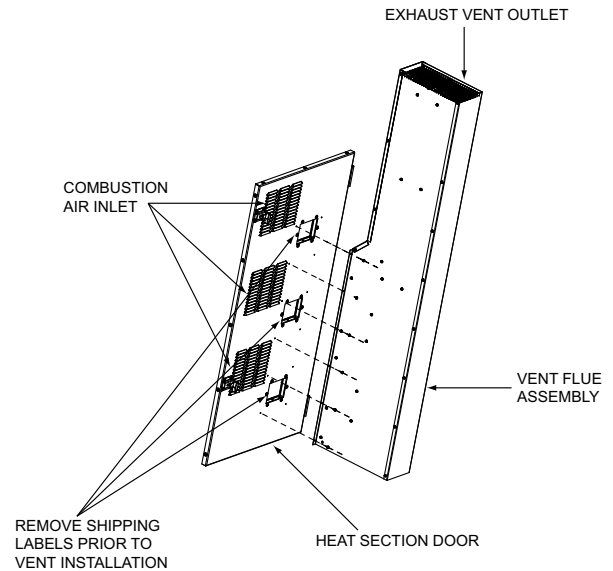


**FIGURE 7 - VENT AND COMBUSTION AIR HOODS**

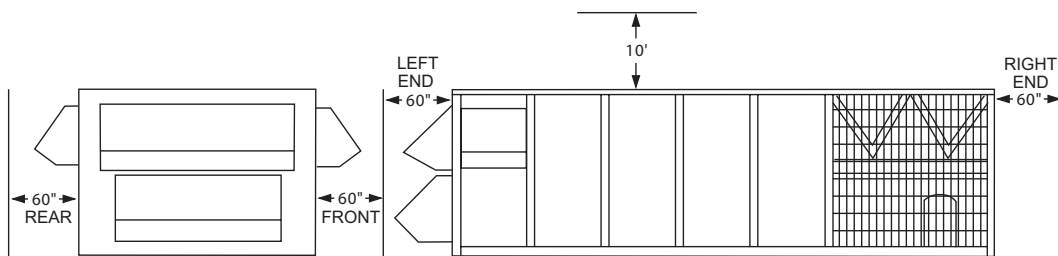
### VENT AND COMBUSTION AIR

**NOTE:** All the hoods and hardware are shipped within the evaporator section. Each hood must be properly attached to the furnace doors to assure proper operation and compliance with CSA/ETL safety certification. (Refer to Figure 7.)

The products of combustion are discharged horizontally through hooded openings in the gas heat access doors.

(Figure 7)

1. Remove the shipping covers that are attached to the heat section door covering the flue outlets.
2. Locate the flue which is shipped in the evaporator section.
3. Place the flue over the flue outlet and attach with screws provided.
4. Refer to the Gas Furnace Operation Instruction in the Start-up Section of this manual for further instructions.



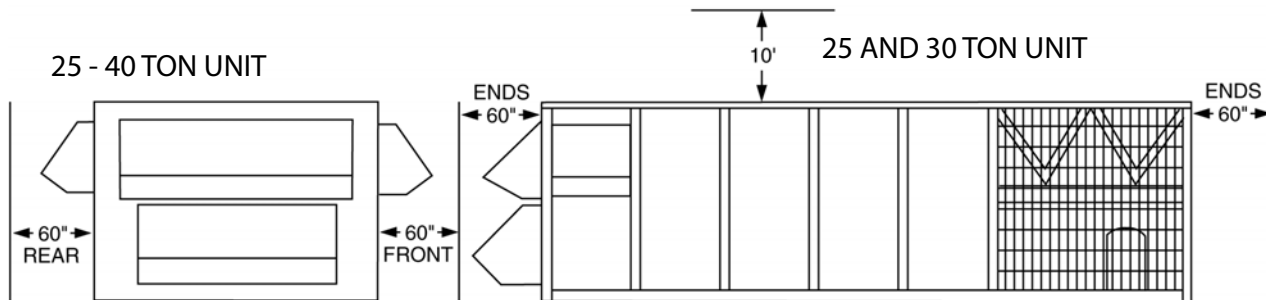
\* Front is the side with access to the Electrical/Gas Controls

|       |     |
|-------|-----|
| LEFT  | 60" |
| RIGHT | 60" |
| REAR  | 60" |
| FRONT | 60" |
| TOP   | 10' |

NOTE: DO NOT use the unit roof to support any type of structure bracing.

FIGURE 8 - CLEARANCES

### REQUIRED CLEARANCES



- \* Front is the side with access to the Electrical / Gas Controls.
- \* Right is the side with the Condenser Coils.

|       |     |
|-------|-----|
| LEFT  | 60" |
| RIGHT | 60" |
| REAR  | 60" |
| FRONT | 60" |
| TOP   | 10' |

NOTE: DO NOT use the unit roof to support any type of structure or bracing.

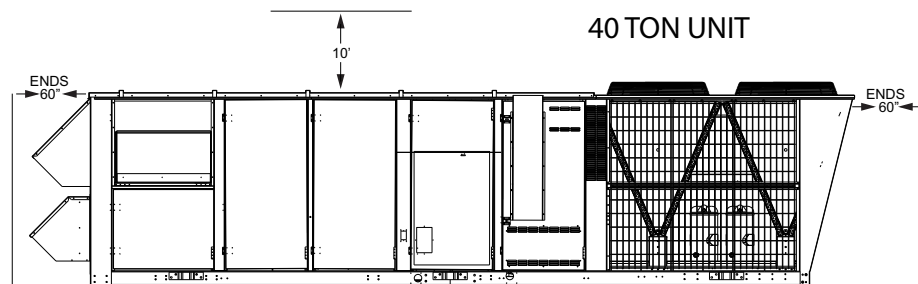


FIGURE 9 - CLEARANCES - HOOD/ECONOMIZER & MOTOR DRIVE - SIDE

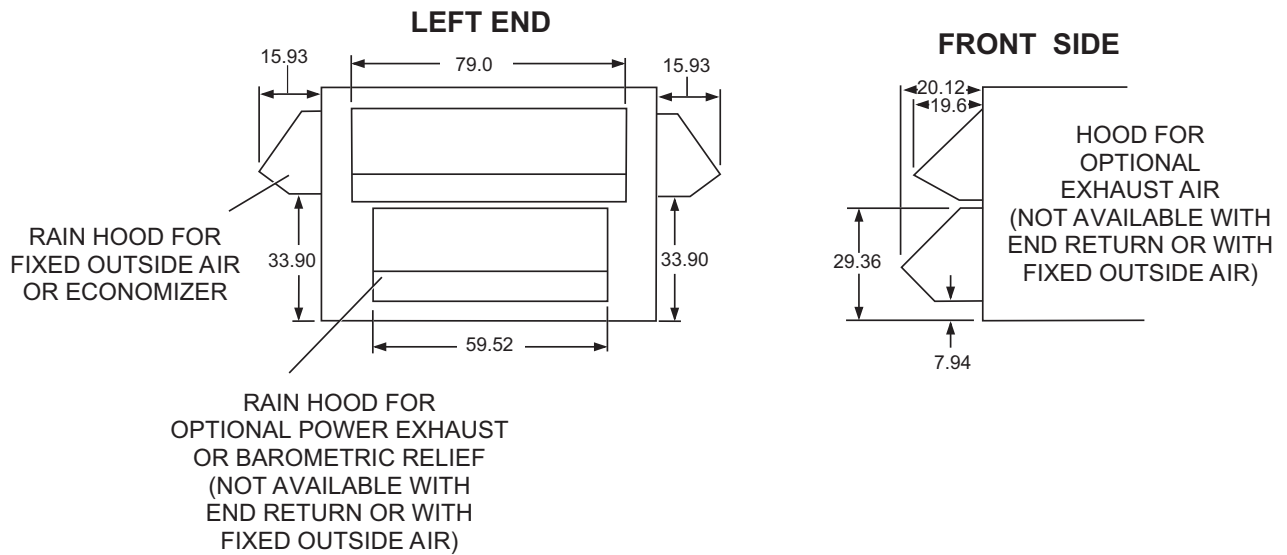


**FIGURE 10 - CLEARANCES - HOOD/ECONOMIZER & MOTOR DRIVE - FRONT & END**

## ELECTRIC HEAT

Units with electric heat are fully wired and operational when shipped. Constant volume units are designed for two equal steps of capacity for 80 and 108 kWh heat; 40 kW heat is one step only. Heat outputs on VAV units are all turned on together at full heat capacity.

## HOT WATER HEAT

The Johnson Controls Series 40 units (25, 30, and 40 Ton sizes) can be furnished with a Unitary Products hot water coil as the heat source. One or two row coil units will be factory installed in the heating section.

**NOTE:** The hot water control valve will not be provided. The installer will need to provide a hot water control valve, to connect the hot water piping and power wiring at the job site for the hot water heat section to be operational.

### CAUTION

DO NOT use hot water coils as steam coils under any circumstances.

All piping, control valves, and wiring that is field installed must be properly insulated and conform to all local and national codes.

**NOTE:** For all hot water coils the entering water temperature should not exceed 200°F.

The hot water coil is located downstream of the supply air fan and just above the supply air opening in the bottom of the unit.

Refer to Tables 50 through 58 and Figures 33 through 46 for flow rate and capacity.

### CAUTION

There are no provisions in the coil or control sequence to prevent freezing of condensate. The control valve, piping and field installed wiring connections are particularly vulnerable because they are installed in the vestibule outside of the conditioned air stream. The installing party will be responsible for properly insulating and installing power and control wiring, to the actuator and piping.

In one row hot water coil systems DO NOT exceed a 40 gallons per minute flow rate.

In two row hot water coil systems DO NOT exceed an 80 gallons per minute flow rate.

Condensate will freeze on the control valve and piping if they are not properly insulated. Insulating the control valve and piping is the responsibility of the installing party.

## PIPING CONNECTIONS

The hot water piping must enter the unit through the floor of the heat section compartment. The access doors to the com-

partment are gasketed so the compartment can be sealed. However, as added protection for water leakage into the space, the piping access holes should be sealed with a heat resistant mastic Figure 11 shows the location of the compartment and piping connections.

### CAUTION

Piping access holes should be sealed with a heat resistant mastic to prevent damage to equipment.

### WARNING

DO NOT use tin based solder. Brazing with tin based solder could cause equipment damage or possible injury to tenants of the structure that is being conditioned.

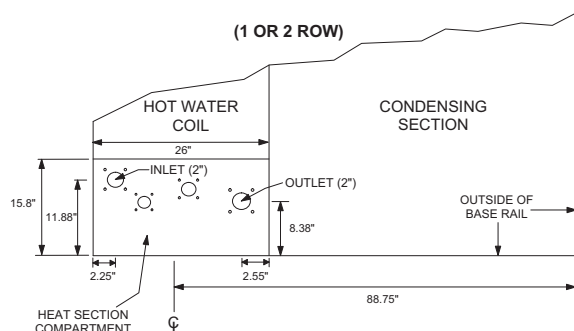


**FIGURE 11 - HOT WATER PIPING CROSS-SECTION**

## STEAM HEAT

The Johnson Controls Series 40 units (25, 30 and 40 Ton sizes) can be furnished with a Unitary Products single row steam coil. The steam coils are a factory installed option.

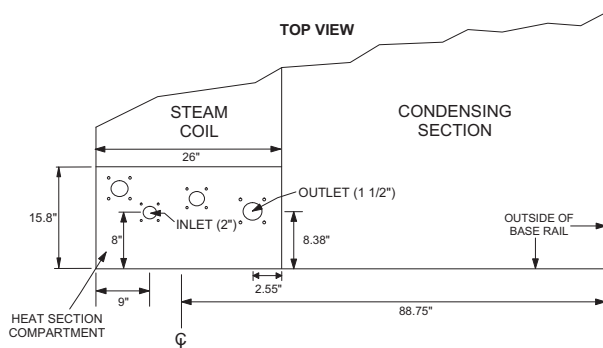


**FIGURE 12 - STEAM PIPING CROSS-SECTION**

**NOTE:** The steam control valve, power and control wiring to the actuator of the valve is the responsibility of the installing party.

### CAUTION

All piping and control valves, and wiring that is field installed must be properly insulated and conform to all local and national codes.

There are no provisions in the coil or control sequence to prevent freezing of condensate. The control valve, piping and field installed wiring connections are particularly vulnerable because they are installed in the vestibule outside of the conditioned air stream. The installing party will be responsible for properly insulating and installing power and control wiring, to the actuator and piping.

DO NOT use steam coils as hot water coils under any circumstances.

In steam coil systems, the steam pressure shall not exceed 15 PSI.

## PIPING CONNECTIONS

Refer to Tables 46 through 49 and Figures 47 and 48 for flow rate and capacity.

The steam piping must enter the unit through the floor of the heat section compartment. The access doors to the compartment are gasketed so the compartment can be sealed. However, as added protection for condensate leakage into the space, the piping access holes should be sealed with a heat resistant mastic. The following figure illustrates the location of the compartment and piping connections.

### CAUTION

Piping access holes should be sealed with a heat resistant mastic to prevent damage to equipment.

### WARNING

DO NOT use tin based solder. Brazing with tin based solder could cause equipment damage or possible injury to tenants of the structure that is being conditioned.

## STATIC PRESSURE CONTROL PLASTIC TUBING

On units with variable frequency drives (VFD's) or inlet guide vanes (IGV's) on the supply blower and/or power exhaust fans, pressure sensing tubing must be field supplied and installed. All tubing must be installed from the transducers (located in the unit) to the location in the building (or ductwork) where a constant pressure is desired. The tubing must also be installed from the transducers to a low-side reference to the atmosphere.

The supply air duct pressure sensor (DPS) is located in the control box directly below the Series 40 standard control. Plastic tubing (1/4") must be run from the high pressure tap of the transducer to a static pressure tap (field supplied) in the supply duct located at a point where constant pressure is desired. Tubing must also be run between the low pressure tap of the transducer to atmospheric pressure. Changing the adjustment is done to the duct pressure setpoint in the control.

## EXHAUST STATIC PRESSURE

If a modulating-damper or variable frequency drive power exhaust is installed, there will be a building pressure sensor (BPS) in the control box directly below the Series 40 standard control. This  $\pm .25$  IWG/0-5VDC transducer sends a building pressure signal to the control. A sensing tube must be installed from a representative location in the building to the HI port of the transducer. Tubing must also be run between the low pressure tap of the transducer to atmospheric pressure.

Changing the adjustment is done to the building pressure setpoint in the control.

### CAUTION

Do not run plastic tubes in the supply or return air ducts as air movement could cause erroneous sensing. If tubes penetrate bottom of unit be sure openings are sealed against air and water leakage.

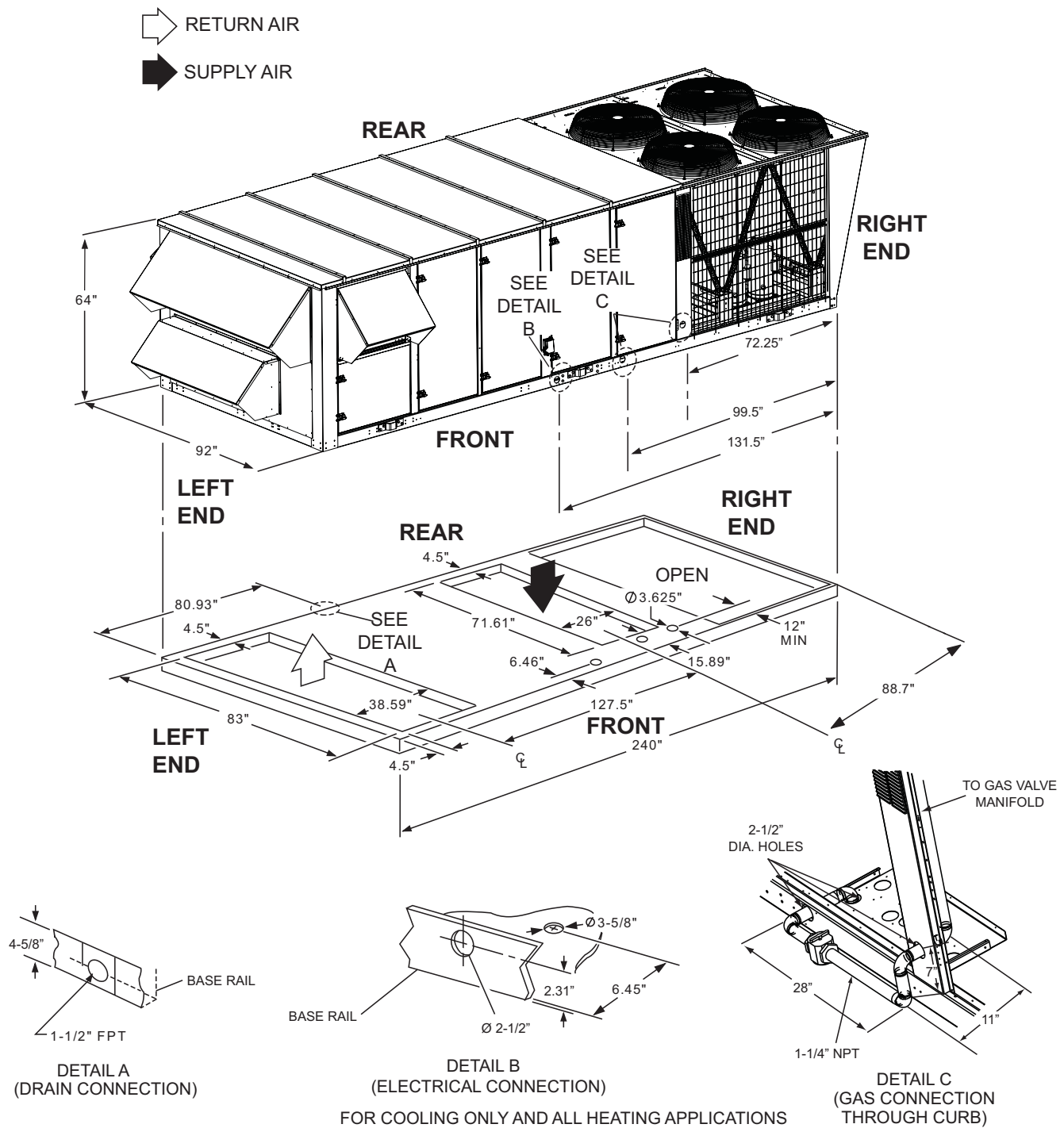


FIGURE 13 - BOTTOM SUPPLY AND RETURN

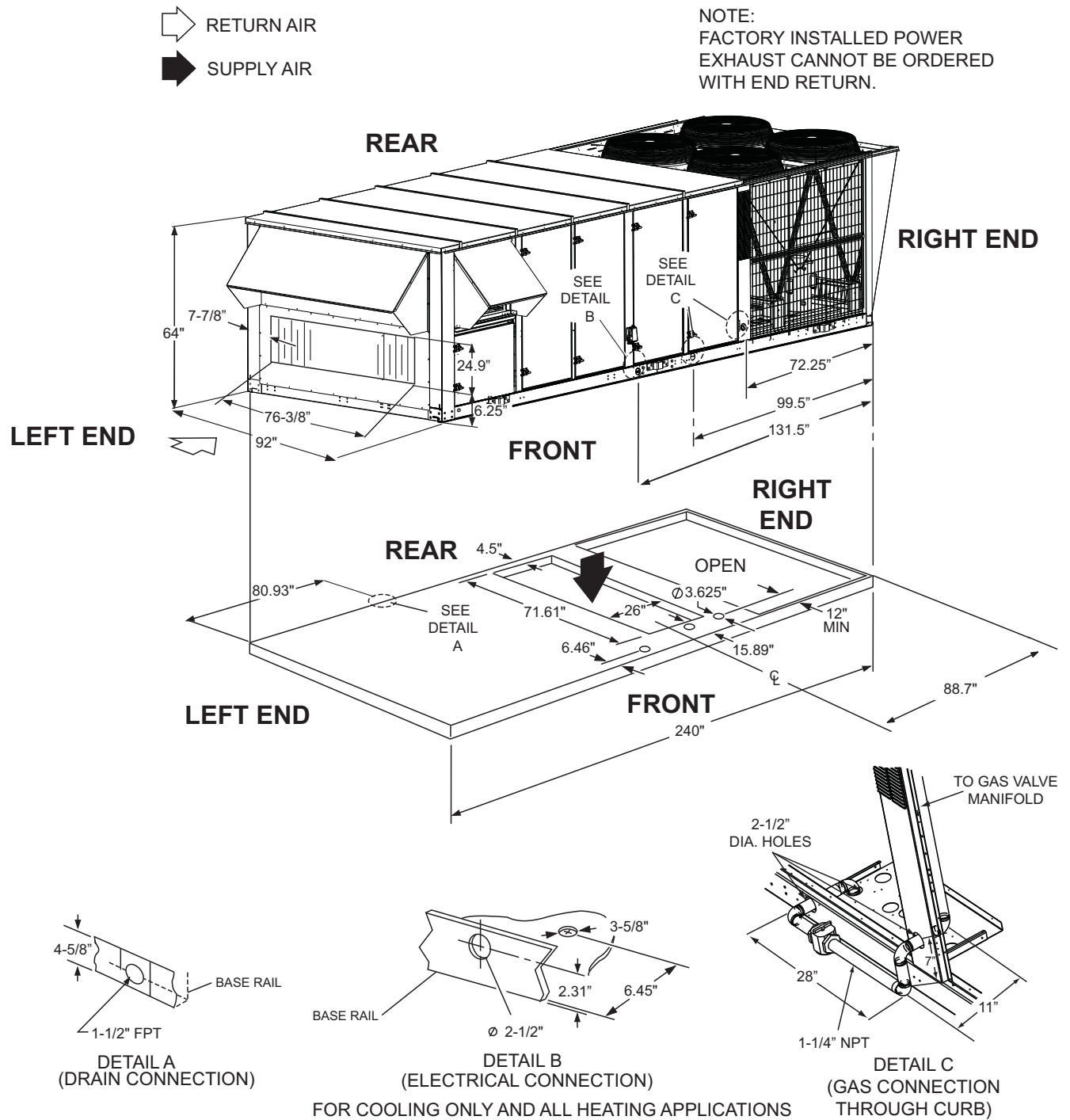


FIGURE 14 - END RETURN, BOTTOM SUPPLY

FRONT SUPPLY: FOR COOLING ONLY APPLICATIONS  
 REAR SUPPLY: FOR COOLING ONLY OR GAS HEAT APPLICATIONS

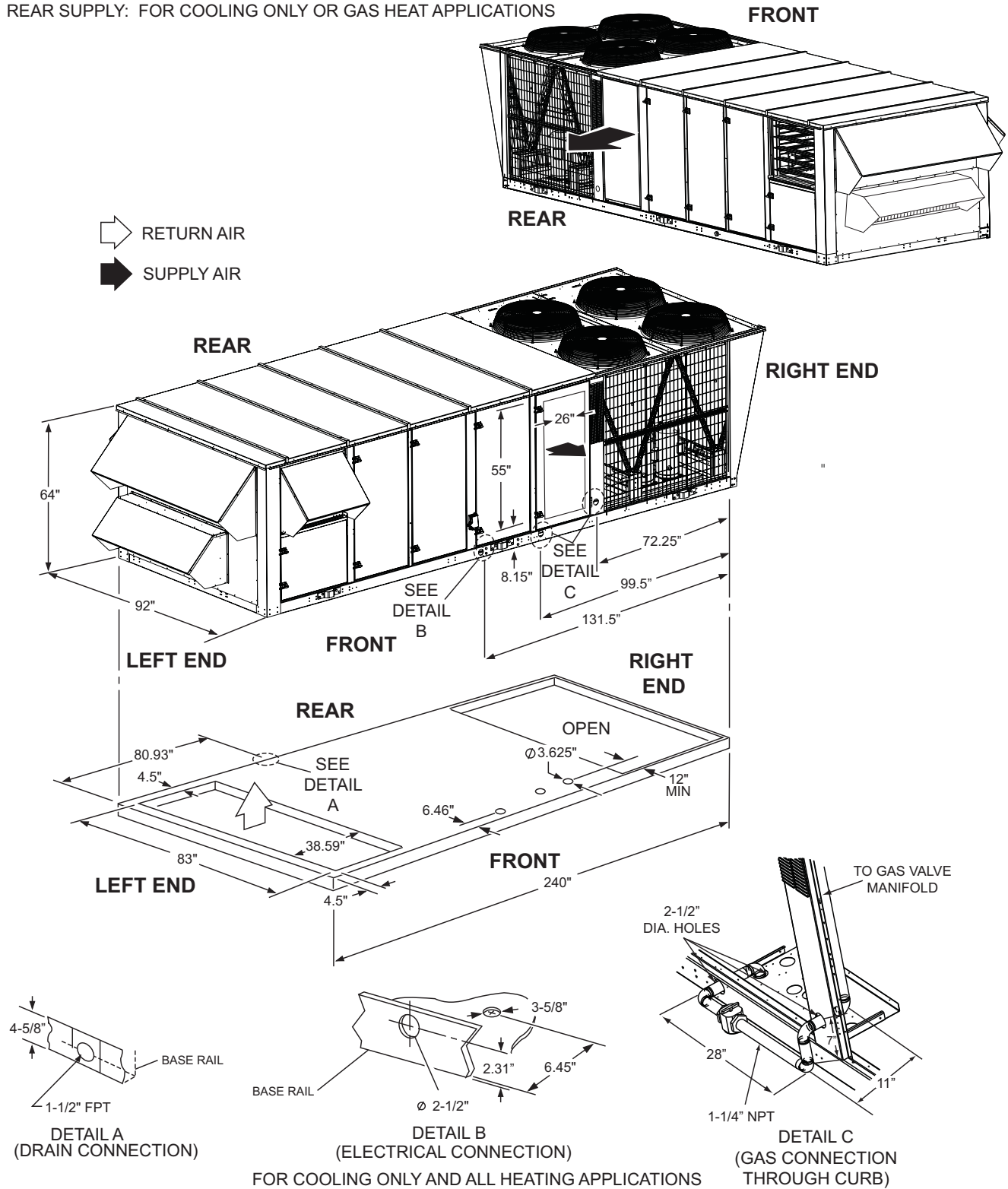


**FIGURE 15 - BOTTOM RETURN, FRONT & REAR SUPPLY**

FRONT SUPPLY: FOR COOLING ONLY APPLICATIONS  
 REAR SUPPLY: FOR COOLING ONLY OR GAS HEAT APPLICATIONS

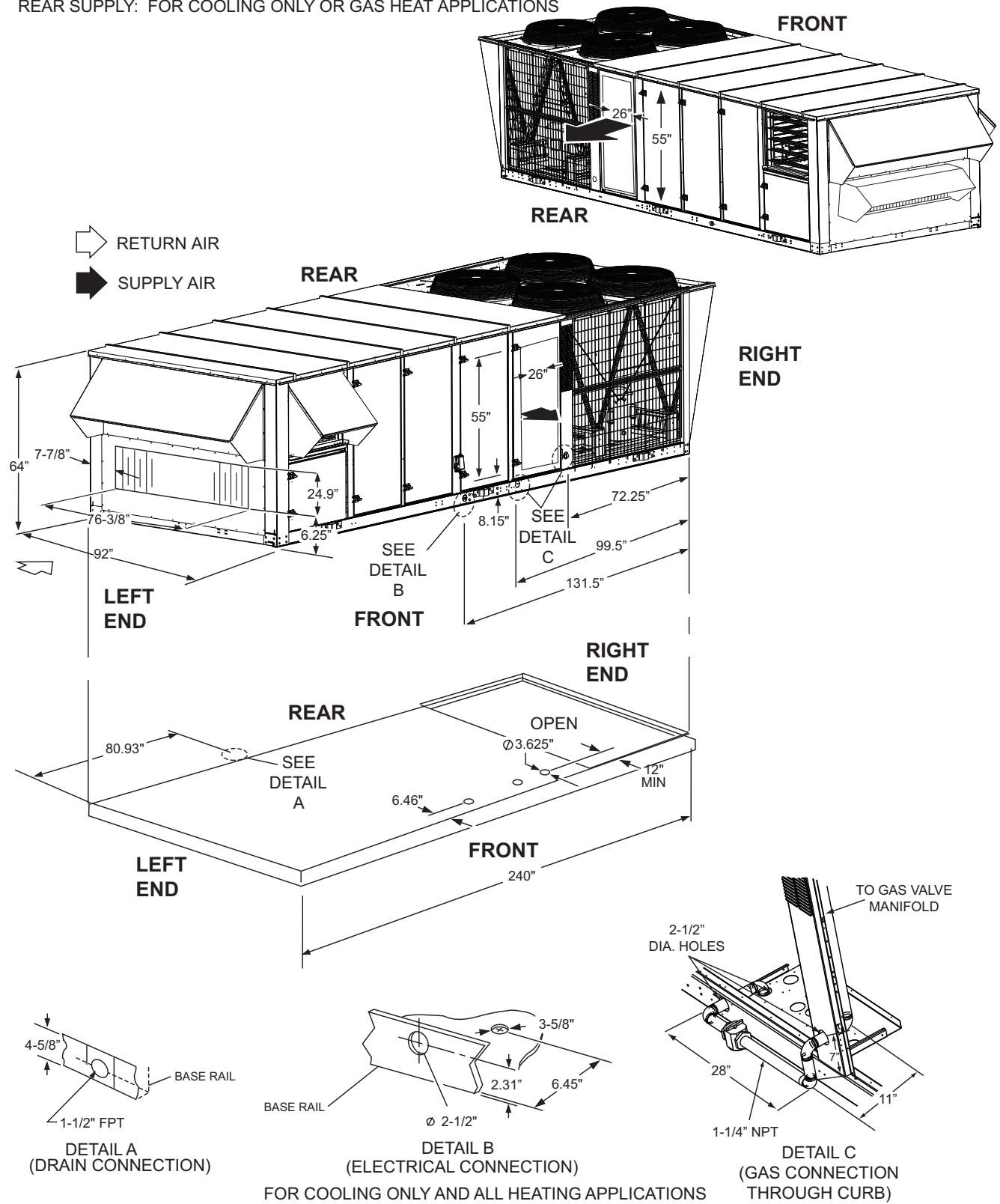


**FIGURE 16 - END RETURN, FRONT & REAR SUPPLY**

**TABLE 15: GENERAL PHYSICAL DATA**

| UNIT SIZE                                         | 25 TON                        | 30 TON                        | 40 TON                        |
|---------------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| UNIT EER / IEER<br>(STANDARD CAPACITY EVAPORATOR) | 10.5 / 11.5                   | 10.1 <sup>1</sup> / 11.1      | 10.0 <sup>1</sup> / 10.5      |
| COMPRESSOR DATA                                   |                               |                               |                               |
| NUMBER/SIZE                                       | 4 x 5.7Ton                    | 4 x 7 Ton                     | 4 x 8.6 Ton                   |
| TYPE                                              | Scroll                        | Scroll                        | Scroll                        |
| UNIT CAPACITY STEPS                               | 25%, 50%, 75%, 100%           | 25%, 50%, 75%, 100%           | 25%, 50%, 75%, 100%           |
| INDOOR FAN AND DRIVE                              |                               |                               |                               |
| NUMBER / TYPE                                     | 1 / FC                        | 1 / FC                        | 1 / FC                        |
| DIAMETER X WIDTH (INCHES)                         | 22 x20                        | 22 x 20                       | 25 x 22                       |
| HP RANGE                                          | 7.5 - 20                      | 10 - 25                       | 10 - 25                       |
| CFM RANGE (FULL LOAD)                             | 6,000 - 12,500                | 6,000 - 15,000                | 8,000 - 18,000                |
| ESP RANGE                                         | 0.2" - 4.0"                   | 0.2" - 4.0"                   | 0.2" - 4.0"                   |
| EXHAUST FAN                                       |                               |                               |                               |
| NUMBER/SIZE/TYPE                                  | 1/FC                          | 2/FC                          | 2/FC                          |
| HP RANGE (SINGLE MOTOR)                           | 5 - 10                        | 7.5 - 15                      | 7.5 - 15                      |
| CFM                                               | 3,000 - 9,000                 | 4,000 - 15,000                | 4,000 - 18,000                |
| EVAPORATOR COIL                                   |                               |                               |                               |
| SIZE (SQ. FT.)                                    | 26.0                          | 26.0                          | 30.4                          |
| ROWS/FPI                                          | 3 / 16                        | 4 / 16                        | 4 / 16                        |
| CONDENSER COIL                                    |                               |                               |                               |
| SIZE (SQ. FT.)                                    | 65                            | 78                            | 104                           |
| ROWS/FPI                                          | 2/16                          | 2 /16                         | 2 /16                         |
| CONDENSER FANS                                    |                               |                               |                               |
| QUANTITY / DIAMETER (INCHES)                      | 4 / 24                        | 4 / 24                        | 4 / 30                        |
| NOMINAL CFM                                       | 6,800                         | 7,200                         | 9,600                         |
| MOTOR HP                                          | 1.0                           | 1.5                           | 1.5                           |
| ELECTRIC HEAT                                     |                               |                               |                               |
| KW RANGE                                          | 40 - 108                      | 40 - 108                      | 40 - 108                      |
| 40 kW / CAPACITY STEPS (CV/VAV)                   | 1                             | 1                             | 1                             |
| 80 kW / CAPACITY STEPS (CV/VAV)                   | 2 / 1                         | 2 / 1                         | 2 / 1                         |
| 108 kW / CAPACITY STEPS (CV/VAV)                  | 3 / 1 <sup>2</sup>            | 3 / 1 <sup>2</sup>            | 3 / 1 <sup>2</sup>            |
| NATURAL GAS HEAT                                  |                               |                               |                               |
| UNIT SIZE                                         | 25 TON                        | 30 TON                        | 40 TON                        |
| 267 MBH CAPACITY STEPS (CV/VAV)                   | 1 / 1                         | 1 / 1                         | 1 / 1                         |
| 533 MBH CAPACITY STEPS (CV/VAV)                   | 2 / 1                         | 2 / 1                         | 2 / 1                         |
| 800 MBH CAPACITY STEPS (CV/VAV)                   | -                             | -                             | 3 / 1 <sup>2</sup>            |
| 267 MBH "MODULATING" CAPACITY STEPS (CV ONLY)     | 6 / 1                         | 6 / 1                         | 6 / 1                         |
| 533 MBH "MODULATING" CAPACITY STEPS (CV ONLY)     | 12 / 2                        | 12 / 2                        | 12 / 2                        |
| 800 MBH "MODULATING" CAPACITY STEPS (CV ONLY)     | -                             | -                             | 17 / 3                        |
| HOT WATER COIL                                    |                               |                               |                               |
| SIZE (INCHES)                                     | 22.5" x 65"                   | 22.5" X 65"                   | 22.5" X 65"                   |
| CAPACITY                                          | 25 Ton                        | 30 Ton                        | 40 Ton                        |
| STEAM COIL                                        |                               |                               |                               |
| SIZE (INCHES)                                     | 21" X 65"                     |                               |                               |
| TYPE                                              | Steam Coil                    |                               |                               |
| FILTERS 2" TA                                     |                               |                               |                               |
| NUMBER / SIZE                                     | 4 / 16 x 25 & 6 / 20 x 25     | 4 / 16 x 25 & 6 / 20 x 25     | 4 / 16 x 25 & 6 / 20 x 25     |
| FACE AREA (SQ. FT.)                               | 30.4                          | 30.4                          | 30.4                          |
| FILTERS 2" PLEATED, 30%                           |                               |                               |                               |
| NUMBER / SIZE                                     | 4 / 16 x 25 & 6 / 20 x 25     | 4 / 16 x 25 & 6 / 20 x 25     | 4 / 16 x 25 & 6 / 20 x 25     |
| FACE AREA (SQ. FT.)                               | 30.4                          | 30.4                          | 30.4                          |
| FILTERS 65% RIGID w/ 2" TA PREFILTERS             |                               |                               |                               |
| NUMBER / SIZE                                     | 4 / 16 x 25 & 6 / 20 x 25     | 4 / 16 x 25 & 6 / 20 x 25     | 4 / 16 x 25 & 6 / 20 x 25     |
| FACE AREA (SQ. FT.)                               | 30.4                          | 30.4                          | 30.4                          |
| FILTERS 95% RIGID w/ 2" TA PREFILTERS             |                               |                               |                               |
| NUMBER / SIZE                                     | 4 ea. 16 x 25 / 6 ea. 20 x 25 | 4 ea. 16 x 25 / 6 ea. 20 x 25 | 4 ea. 16 x 25 / 6 ea. 20 x 25 |
| FACE AREA (SQ. FT.)                               | 30.4                          | 30.4                          | 30.4                          |

<sup>1.</sup> Cooling Only Unit Efficiency/ Gas Electric Unit Efficiency is V53 (10.0 / 10.6) and V54 (10.0 / 10.5)

<sup>2.</sup> Unit Control Board with 3 heating outputs only, all other Unit Control Boards 2 / 1.

**TABLE 16: REFRIGERANT FACTORY CHARGE R-410A**

| UNIT (TONS) | MODEL   | CHARGE    |           |           |           |
|-------------|---------|-----------|-----------|-----------|-----------|
|             |         | SYSTEM #1 | SYSTEM #2 | SYSTEM #3 | SYSTEM #4 |
| 25          | wo/HGBP | 13lb 8oz  | 12lb 8oz  | 12lb 8oz  | 12lb 8oz  |
| 25          | w/HGBP  | 14lb      | 12lb 8oz  | 12lb 8oz  | 12lb 8oz  |
| 30          | wo/HGBP | 16lb      | 16lb 8oz  | 14lb      | 18lb 4oz  |
| 30          | w/HGBP  | 16lb 8oz  | 17lb      | 14lb 8oz  | 18lb 12oz |
| 40          | wo/HGBP | 17lb 10oz | 17lb 10oz | 19lb 13oz | 19lb 13oz |
| 40          | w/HGBP  | 18lb 2oz  | 18lb 2oz  | 20lb 5oz  | 20lb 5oz  |

**TABLE 17: ELECTRICAL DATA 25 TON BASIC UNIT R-410A**

| Voltage  | Compressors (each) |      |     |      | OD Fan Motors |      | Supply Blower Motor |      | MCA <sup>1</sup><br>(Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup><br>Size<br>(Amps) |
|----------|--------------------|------|-----|------|---------------|------|---------------------|------|----------------------------|-------------------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC  | Qty           | FLA  | HP                  | FLA  |                            |                                                                   |
| 208-3-60 | 4                  | 22.4 | 149 | 35   | 4             | 4.5  | 7.5                 | 24.2 | 138                        | 150                                                               |
|          |                    |      |     |      |               |      | 10                  | 30.8 | 146                        | 175                                                               |
|          |                    |      |     |      |               |      | 15                  | 46.2 | 165                        | 200                                                               |
|          |                    |      |     |      |               |      | 20                  | 59.4 | 182                        | 225                                                               |
| 230-3-60 | 4                  | 22.4 | 149 | 35   | 4             | 4.3  | 7.5                 | 22   | 134                        | 150                                                               |
|          |                    |      |     |      |               |      | 10                  | 28   | 142                        | 150                                                               |
|          |                    |      |     |      |               |      | 15                  | 42   | 159                        | 200                                                               |
|          |                    |      |     |      |               |      | 20                  | 54   | 174                        | 225                                                               |
| 460-3-60 | 4                  | 10.6 | 75  | 16.5 | 4             | 2.15 | 7.5                 | 11   | 65                         | 70                                                                |
|          |                    |      |     |      |               |      | 10                  | 14   | 69                         | 80                                                                |
|          |                    |      |     |      |               |      | 15                  | 21   | 77                         | 90                                                                |
|          |                    |      |     |      |               |      | 20                  | 27   | 85                         | 110                                                               |
| 575-3-60 | 4                  | 7.7  | 54  | 12   | 4             | 1.7  | 7.5                 | 9    | 49                         | 50                                                                |
|          |                    |      |     |      |               |      | 10                  | 11   | 51                         | 60                                                                |
|          |                    |      |     |      |               |      | 15                  | 17   | 59                         | 70                                                                |
|          |                    |      |     |      |               |      | 20                  | 22   | 65                         | 80                                                                |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

**TABLE 18: ELECTRICAL DATA 30 TON BASIC UNIT R-410A**

| Voltage  | Compressors (each) |      |     |     | OD Fan Motors |     | Supply Blower Motor |      | MCA <sup>1</sup><br>(Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup><br>Size<br>(Amps) |
|----------|--------------------|------|-----|-----|---------------|-----|---------------------|------|----------------------------|-------------------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC | Qty           | FLA | HP                  | FLA  |                            |                                                                   |
| 208-3-60 | 4                  | 25.0 | 164 | 39  | 4             | 5.8 | 10                  | 30.8 | 162                        | 175                                                               |
|          |                    |      |     |     |               |     | 15                  | 46.2 | 181                        | 225                                                               |
|          |                    |      |     |     |               |     | 25                  | 74.8 | 217                        | 250                                                               |
|          |                    |      |     |     |               |     | 20                  | 59.4 | 197                        | 250                                                               |
| 230-3-60 | 4                  | 25.0 | 164 | 39  | 4             | 5.8 | 10                  | 28   | 158                        | 175                                                               |
|          |                    |      |     |     |               |     | 15                  | 42   | 176                        | 200                                                               |
|          |                    |      |     |     |               |     | 25                  | 68   | 208                        | 250                                                               |
|          |                    |      |     |     |               |     | 20                  | 54   | 191                        | 225                                                               |
| 460-3-60 | 4                  | 12.0 | 100 | 19  | 4             | 2.9 | 10                  | 14   | 77                         | 90                                                                |
|          |                    |      |     |     |               |     | 15                  | 21   | 86                         | 100                                                               |
|          |                    |      |     |     |               |     | 20                  | 27   | 93                         | 110                                                               |
|          |                    |      |     |     |               |     | 25                  | 34   | 102                        | 125                                                               |
| 575-3-60 | 4                  | 9.0  | 78  | 14  | 4             | 2.2 | 10                  | 11   | 59                         | 60                                                                |
|          |                    |      |     |     |               |     | 15                  | 17   | 66                         | 80                                                                |
|          |                    |      |     |     |               |     | 20                  | 22   | 72                         | 90                                                                |
|          |                    |      |     |     |               |     | 25                  | 27   | 79                         | 100                                                               |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

**TABLE 19: ELECTRICAL DATA 40 TON BASIC UNIT R-410A**

| Voltage  | Compressors (each) |      |     |     | OD Fan Motors |     | Supply Blower Motor |      | MCA <sup>1</sup><br>(Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup><br>Size<br>(Amps) |
|----------|--------------------|------|-----|-----|---------------|-----|---------------------|------|----------------------------|-------------------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC | Qty           | FLA | HP                  | FLA  |                            |                                                                   |
| 208-3-60 | 4                  | 30.1 | 255 | 47  | 4             | 5.8 | 10                  | 30.8 | 182                        | 200                                                               |
|          |                    |      |     |     |               |     | 15                  | 46.2 | 201                        | 225                                                               |
|          |                    |      |     |     |               |     | 20                  | 59.4 | 218                        | 250                                                               |
|          |                    |      |     |     |               |     | 25                  | 74.8 | 237                        | 300                                                               |
| 230-3-60 | 4                  | 30.1 | 255 | 47  | 4             | 5.8 | 10                  | 28   | 179                        | 200                                                               |
|          |                    |      |     |     |               |     | 15                  | 42   | 196                        | 225                                                               |
|          |                    |      |     |     |               |     | 20                  | 54   | 211                        | 250                                                               |
|          |                    |      |     |     |               |     | 25                  | 68   | 229                        | 250                                                               |
| 460-3-60 | 4                  | 16.7 | 114 | 26  | 4             | 2.9 | 10                  | 14   | 97                         | 110                                                               |
|          |                    |      |     |     |               |     | 15                  | 21   | 105                        | 125                                                               |
|          |                    |      |     |     |               |     | 20                  | 27   | 112                        | 125                                                               |
|          |                    |      |     |     |               |     | 25                  | 34   | 121                        | 150                                                               |
| 575-3-60 | 4                  | 12.2 | 80  | 19  | 4             | 2.2 | 10                  | 11   | 72                         | 80                                                                |
|          |                    |      |     |     |               |     | 15                  | 17   | 79                         | 90                                                                |
|          |                    |      |     |     |               |     | 20                  | 22   | 85                         | 100                                                               |
|          |                    |      |     |     |               |     | 25                  | 27   | 91                         | 110                                                               |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 20: ELECTRICAL DATA 25 TON W/ELECTRIC HEAT R-410A

| Voltage  | Compressors (each) |      |     |      | OD Fan Motors (each) | Supply Blower Motor |      | Electric Heat Option |     |         |        |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> / Breaker <sup>3</sup> Size (Amps) |
|----------|--------------------|------|-----|------|----------------------|---------------------|------|----------------------|-----|---------|--------|------|-------------------------|----------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC  | FLA                  | HP                  | FLA  | Option               | KW  | Applied | Stages | Amps |                         |                                                          |
| 208-3-60 | 4                  | 22.4 | 149 | 35   | 4.5                  | 7.5                 | 24.2 | E4                   | 40  | 30      | 1      | 83   | 138                     | 150                                                      |
|          |                    |      |     |      |                      | 10                  | 30.8 |                      |     |         |        |      | 146                     | 175                                                      |
|          |                    |      |     |      |                      | 15                  | 46.2 |                      |     |         |        |      | 165                     | 200                                                      |
|          |                    |      |     |      |                      | 20                  | 59.4 |                      |     |         |        |      | 182                     | 225                                                      |
|          |                    |      |     |      |                      | 7.5                 | 24.2 | E8                   | 80  | 60      | 2      | 167  | 197                     | 225                                                      |
|          |                    |      |     |      |                      | 10                  | 30.8 |                      |     |         |        |      | 205                     | 225                                                      |
|          |                    |      |     |      |                      | 15                  | 46.2 |                      |     |         |        |      | 225                     | 250                                                      |
|          |                    |      |     |      |                      | 20                  | 59.4 |                      |     |         |        |      | 241                     | 300                                                      |
| 230-3-60 | 4                  | 22.4 | 149 | 35   | 4.3                  | 7.5                 | 22   | E4                   | 40  | 36.8    | 1      | 92   | 143                     | 150                                                      |
|          |                    |      |     |      |                      | 10                  | 28   |                      |     |         |        |      | 150                     | 150                                                      |
|          |                    |      |     |      |                      | 15                  | 42   |                      |     |         |        |      | 168                     | 200                                                      |
|          |                    |      |     |      |                      | 20                  | 54   |                      |     |         |        |      | 183                     | 225                                                      |
|          |                    |      |     |      |                      | 7.5                 | 22   | E8                   | 80  | 73.6    | 2      | 184  | 212                     | 250                                                      |
|          |                    |      |     |      |                      | 10                  | 28   |                      |     |         |        |      | 220                     | 250                                                      |
|          |                    |      |     |      |                      | 15                  | 42   |                      |     |         |        |      | 237                     | 250                                                      |
|          |                    |      |     |      |                      | 20                  | 54   |                      |     |         |        |      | 252                     | 300                                                      |
| 460-3-60 | 4                  | 10.6 | 75  | 16.5 | 2.15                 | 7.5                 | 11   | E4                   | 40  | 36.8    | 1      | 46   | 71                      | 80                                                       |
|          |                    |      |     |      |                      | 10                  | 14   |                      |     |         |        |      | 75                      | 80                                                       |
|          |                    |      |     |      |                      | 15                  | 21   |                      |     |         |        |      | 84                      | 90                                                       |
|          |                    |      |     |      |                      | 20                  | 27   |                      |     |         |        |      | 91                      | 110                                                      |
|          |                    |      |     |      |                      | 7.5                 | 11   | E8                   | 80  | 73.6    | 2      | 92   | 106                     | 125                                                      |
|          |                    |      |     |      |                      | 10                  | 14   |                      |     |         |        |      | 110                     | 125                                                      |
|          |                    |      |     |      |                      | 15                  | 21   |                      |     |         |        |      | 119                     | 125                                                      |
|          |                    |      |     |      |                      | 20                  | 27   |                      |     |         |        |      | 126                     | 150                                                      |
|          |                    |      |     |      |                      | 7.5                 | 11   | E1                   | 108 | 99.4    | 3      | 125  | 138                     | 150                                                      |
|          |                    |      |     |      |                      | 10                  | 14   |                      |     |         |        |      | 142                     | 175                                                      |
|          |                    |      |     |      |                      | 15                  | 21   |                      |     |         |        |      | 151                     | 175                                                      |
|          |                    |      |     |      |                      | 20                  | 27   |                      |     |         |        |      | 158                     | 175                                                      |
| 575-3-60 | 4                  | 7.7  | 54  | 12   | 1.7                  | 7.5                 | 9    | E4                   | 40  | 36.8    | 1      | 40   | 62                      | 70                                                       |
|          |                    |      |     |      |                      | 10                  | 11   |                      |     |         |        |      | 64                      | 70                                                       |
|          |                    |      |     |      |                      | 15                  | 17   |                      |     |         |        |      | 72                      | 80                                                       |
|          |                    |      |     |      |                      | 20                  | 22   |                      |     |         |        |      | 78                      | 80                                                       |
|          |                    |      |     |      |                      | 7.5                 | 9    | E8                   | 80  | 73.6    | 2      | 80   | 92                      | 110                                                      |
|          |                    |      |     |      |                      | 10                  | 11   |                      |     |         |        |      | 94                      | 110                                                      |
|          |                    |      |     |      |                      | 15                  | 17   |                      |     |         |        |      | 102                     | 110                                                      |
|          |                    |      |     |      |                      | 20                  | 22   |                      |     |         |        |      | 108                     | 125                                                      |
|          |                    |      |     |      |                      | 7.5                 | 9    | E1                   | 108 | 99.4    | 3      | 108  | 120                     | 150                                                      |
|          |                    |      |     |      |                      | 10                  | 11   |                      |     |         |        |      | 122                     | 150                                                      |
|          |                    |      |     |      |                      | 15                  | 17   |                      |     |         |        |      | 130                     | 150                                                      |
|          |                    |      |     |      |                      | 20                  | 22   |                      |     |         |        |      | 136                     | 150                                                      |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 21: ELECTRICAL DATA 30 TON W/ELECTRIC HEAT R-410A

| Voltage  | Compressors (each) |      |     |     | OD Fan Motors (each) | Supply Blower Motor |      | Electric Heat Option |     |         |        |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> / Breaker <sup>3</sup> Size (Amps) |
|----------|--------------------|------|-----|-----|----------------------|---------------------|------|----------------------|-----|---------|--------|------|-------------------------|----------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC | FLA                  | HP                  | FLA  | Option               | KW  | Applied | Stages | Amps |                         |                                                          |
| 208-3-60 | 4                  | 25.0 | 164 | 39  | 5.8                  | 10                  | 30.8 | E4                   | 40  | 30      | 1      | 83   | 162                     | 175                                                      |
|          |                    |      |     |     |                      | 15                  | 46.2 |                      |     |         |        |      | 181                     | 225                                                      |
|          |                    |      |     |     |                      | 20                  | 59.4 |                      |     |         |        |      | 197                     | 250                                                      |
|          |                    |      |     |     |                      | 25                  | 74.8 |                      |     |         |        |      | 217                     | 250                                                      |
|          |                    |      |     |     |                      | 10                  | 30.8 | E8                   | 80  | 60      | 2      | 167  | 205                     | 225                                                      |
|          |                    |      |     |     |                      | 15                  | 46.2 |                      |     |         |        |      | 225                     | 250                                                      |
|          |                    |      |     |     |                      | 20                  | 59.4 |                      |     |         |        |      | 241                     | 300                                                      |
|          |                    |      |     |     |                      | 25                  | 74.8 |                      |     |         |        |      | 260                     | 300                                                      |
| 230-3-60 | 4                  | 25.0 | 164 | 39  | 5.8                  | 10                  | 28   | E4                   | 40  | 36.8    | 1      | 92   | 158                     | 175                                                      |
|          |                    |      |     |     |                      | 15                  | 42   |                      |     |         |        |      | 176                     | 200                                                      |
|          |                    |      |     |     |                      | 20                  | 54   |                      |     |         |        |      | 191                     | 225                                                      |
|          |                    |      |     |     |                      | 25                  | 68   |                      |     |         |        |      | 208                     | 250                                                      |
|          |                    |      |     |     |                      | 10                  | 28   | E8                   | 80  | 73.6    | 2      | 184  | 220                     | 250                                                      |
|          |                    |      |     |     |                      | 15                  | 42   |                      |     |         |        |      | 237                     | 250                                                      |
|          |                    |      |     |     |                      | 20                  | 54   |                      |     |         |        |      | 252                     | 300                                                      |
|          |                    |      |     |     |                      | 25                  | 68   |                      |     |         |        |      | 270                     | 300                                                      |
| 460-3-60 | 4                  | 12.0 | 100 | 19  | 2.9                  | 10                  | 14   | E4                   | 40  | 36.8    | 1      | 46   | 77                      | 90                                                       |
|          |                    |      |     |     |                      | 15                  | 21   |                      |     |         |        |      | 86                      | 100                                                      |
|          |                    |      |     |     |                      | 20                  | 27   |                      |     |         |        |      | 93                      | 110                                                      |
|          |                    |      |     |     |                      | 25                  | 34   |                      |     |         |        |      | 102                     | 125                                                      |
|          |                    |      |     |     |                      | 10                  | 14   | E8                   | 80  | 73.6    | 2      | 92   | 110                     | 125                                                      |
|          |                    |      |     |     |                      | 15                  | 21   |                      |     |         |        |      | 119                     | 125                                                      |
|          |                    |      |     |     |                      | 20                  | 27   |                      |     |         |        |      | 126                     | 150                                                      |
|          |                    |      |     |     |                      | 25                  | 34   |                      |     |         |        |      | 135                     | 150                                                      |
|          |                    |      |     |     |                      | 10                  | 14   | E1                   | 108 | 99.4    | 3      | 125  | 142                     | 175                                                      |
|          |                    |      |     |     |                      | 15                  | 21   |                      |     |         |        |      | 151                     | 175                                                      |
|          |                    |      |     |     |                      | 20                  | 27   |                      |     |         |        |      | 158                     | 175                                                      |
|          |                    |      |     |     |                      | 25                  | 34   |                      |     |         |        |      | 167                     | 200                                                      |
| 575-3-60 | 4                  | 9.0  | 78  | 14  | 2.2                  | 10                  | 11   | E4                   | 40  | 36.8    | 1      | 40   | 64                      | 70                                                       |
|          |                    |      |     |     |                      | 15                  | 17   |                      |     |         |        |      | 72                      | 80                                                       |
|          |                    |      |     |     |                      | 20                  | 22   |                      |     |         |        |      | 78                      | 90                                                       |
|          |                    |      |     |     |                      | 25                  | 27   |                      |     |         |        |      | 84                      | 100                                                      |
|          |                    |      |     |     |                      | 10                  | 11   | E8                   | 80  | 73.6    | 2      | 80   | 94                      | 110                                                      |
|          |                    |      |     |     |                      | 15                  | 17   |                      |     |         |        |      | 102                     | 110                                                      |
|          |                    |      |     |     |                      | 20                  | 22   |                      |     |         |        |      | 108                     | 125                                                      |
|          |                    |      |     |     |                      | 25                  | 27   |                      |     |         |        |      | 114                     | 125                                                      |
|          |                    |      |     |     |                      | 10                  | 11   | E1                   | 108 | 99.4    | 3      | 108  | 122                     | 150                                                      |
|          |                    |      |     |     |                      | 15                  | 17   |                      |     |         |        |      | 130                     | 150                                                      |
|          |                    |      |     |     |                      | 20                  | 22   |                      |     |         |        |      | 136                     | 150                                                      |
|          |                    |      |     |     |                      | 25                  | 27   |                      |     |         |        |      | 142                     | 150                                                      |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 22: ELECTRICAL DATA 40 TON W/ELECTRIC HEAT R-410A

| Voltage  | Compressors (each) |      |     |     | OD Fan Motors (each) | Supply Blower Motor |      | Electric Heat Option |     |         |        |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> / Breaker <sup>3</sup> Size (Amps) |
|----------|--------------------|------|-----|-----|----------------------|---------------------|------|----------------------|-----|---------|--------|------|-------------------------|----------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC | FLA                  | HP                  | FLA  | Option               | KW  | Applied | Stages | Amps |                         |                                                          |
| 208-3-60 | 4                  | 30.1 | 255 | 47  | 5.8                  | 10                  | 30.8 | E4                   | 40  | 30      | 1      | 83   | 182                     | 200                                                      |
|          |                    |      |     |     |                      | 15                  | 46.2 |                      |     |         |        |      | 201                     | 225                                                      |
|          |                    |      |     |     |                      | 20                  | 59.4 |                      |     |         |        |      | 218                     | 250                                                      |
|          |                    |      |     |     |                      | 25                  | 74.8 |                      |     |         |        |      | 237                     | 300                                                      |
|          |                    |      |     |     |                      | 10                  | 30.8 | E8                   | 80  | 60      | 2      | 167  | 205                     | 225                                                      |
|          |                    |      |     |     |                      | 15                  | 46.2 |                      |     |         |        |      | 225                     | 250                                                      |
|          |                    |      |     |     |                      | 20                  | 59.4 |                      |     |         |        |      | 241                     | 300                                                      |
|          |                    |      |     |     |                      | 25                  | 74.8 |                      |     |         |        |      | 260                     | 300                                                      |
| 230-3-60 | 4                  | 30.1 | 255 | 47  | 5.8                  | 10                  | 28   | E4                   | 40  | 36.8    | 1      | 92   | 179                     | 200                                                      |
|          |                    |      |     |     |                      | 15                  | 42   |                      |     |         |        |      | 196                     | 225                                                      |
|          |                    |      |     |     |                      | 20                  | 54   |                      |     |         |        |      | 211                     | 250                                                      |
|          |                    |      |     |     |                      | 25                  | 68   |                      |     |         |        |      | 229                     | 250                                                      |
|          |                    |      |     |     |                      | 10                  | 28   | E8                   | 80  | 73.6    | 2      | 184  | 220                     | 250                                                      |
|          |                    |      |     |     |                      | 15                  | 42   |                      |     |         |        |      | 237                     | 250                                                      |
|          |                    |      |     |     |                      | 20                  | 54   |                      |     |         |        |      | 252                     | 300                                                      |
|          |                    |      |     |     |                      | 25                  | 68   |                      |     |         |        |      | 270                     | 300                                                      |
| 460-3-60 | 4                  | 16.7 | 114 | 26  | 2.9                  | 10                  | 14   | E4                   | 40  | 36.8    | 1      | 46   | 97                      | 110                                                      |
|          |                    |      |     |     |                      | 15                  | 21   |                      |     |         |        |      | 105                     | 125                                                      |
|          |                    |      |     |     |                      | 20                  | 27   |                      |     |         |        |      | 112                     | 125                                                      |
|          |                    |      |     |     |                      | 25                  | 34   |                      |     |         |        |      | 121                     | 150                                                      |
|          |                    |      |     |     |                      | 10                  | 14   | E8                   | 80  | 73.6    | 2      | 92   | 110                     | 125                                                      |
|          |                    |      |     |     |                      | 15                  | 21   |                      |     |         |        |      | 119                     | 125                                                      |
|          |                    |      |     |     |                      | 20                  | 27   |                      |     |         |        |      | 126                     | 150                                                      |
|          |                    |      |     |     |                      | 25                  | 34   |                      |     |         |        |      | 135                     | 150                                                      |
|          |                    |      |     |     |                      | 10                  | 14   | E1                   | 108 | 99.4    | 3      | 125  | 142                     | 175                                                      |
|          |                    |      |     |     |                      | 15                  | 21   |                      |     |         |        |      | 151                     | 175                                                      |
|          |                    |      |     |     |                      | 20                  | 27   |                      |     |         |        |      | 158                     | 175                                                      |
|          |                    |      |     |     |                      | 25                  | 34   |                      |     |         |        |      | 167                     | 200                                                      |
| 575-3-60 | 4                  | 12.2 | 80  | 19  | 2.2                  | 10                  | 11   | E4                   | 40  | 36.8    | 1      | 40   | 72                      | 80                                                       |
|          |                    |      |     |     |                      | 15                  | 17   |                      |     |         |        |      | 79                      | 90                                                       |
|          |                    |      |     |     |                      | 20                  | 22   |                      |     |         |        |      | 85                      | 100                                                      |
|          |                    |      |     |     |                      | 25                  | 27   |                      |     |         |        |      | 91                      | 110                                                      |
|          |                    |      |     |     |                      | 10                  | 11   | E8                   | 80  | 73.6    | 2      | 80   | 94                      | 110                                                      |
|          |                    |      |     |     |                      | 15                  | 17   |                      |     |         |        |      | 102                     | 110                                                      |
|          |                    |      |     |     |                      | 20                  | 22   |                      |     |         |        |      | 108                     | 125                                                      |
|          |                    |      |     |     |                      | 25                  | 27   |                      |     |         |        |      | 114                     | 125                                                      |
|          |                    |      |     |     |                      | 10                  | 11   | E1                   | 108 | 99.4    | 3      | 108  | 122                     | 150                                                      |
|          |                    |      |     |     |                      | 15                  | 17   |                      |     |         |        |      | 130                     | 150                                                      |
|          |                    |      |     |     |                      | 20                  | 22   |                      |     |         |        |      | 136                     | 150                                                      |
|          |                    |      |     |     |                      | 25                  | 27   |                      |     |         |        |      | 142                     | 150                                                      |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

**TABLE 23: ELECTRICAL DATA 25 TON W/POWER EXHAUST R-410A**

| Voltage  | Compressors (each) |      |     |      | OD Fan Motors (each) | Supply Blower Motor |      | Pwr Exh Motor |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|--------------------|------|-----|------|----------------------|---------------------|------|---------------|------|-------------------------|-------------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC  | FLA                  | HP                  | FLA  | HP            | FLA  |                         |                                                             |
| 208-3-60 | 4                  | 22.4 | 149 | 35   | 4.5                  | 7.5                 | 24.2 | 5             | 16.7 | 155                     | 175                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 24.2 | 162                     | 175                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 30.8 | 170                     | 200                                                         |
|          |                    |      |     |      |                      | 10                  | 30.8 | 5             | 16.7 | 163                     | 175                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 24.2 | 170                     | 200                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 30.8 | 177                     | 200                                                         |
|          |                    |      |     |      |                      | 15                  | 46.2 | 5             | 16.7 | 182                     | 225                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 24.2 | 190                     | 225                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 30.8 | 196                     | 225                                                         |
|          |                    |      |     |      |                      | 20                  | 59.4 | 5             | 16.7 | 199                     | 250                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 24.2 | 206                     | 250                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 30.8 | 213                     | 250                                                         |
| 230-3-60 | 4                  | 22.4 | 149 | 35   | 4.3                  | 7.5                 | 22   | 5             | 15.2 | 150                     | 150                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 22   | 156                     | 175                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 28   | 164                     | 175                                                         |
|          |                    |      |     |      |                      | 10                  | 28   | 5             | 15.2 | 157                     | 175                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 22   | 164                     | 175                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 28   | 170                     | 175                                                         |
|          |                    |      |     |      |                      | 15                  | 42   | 5             | 15.2 | 175                     | 200                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 22   | 181                     | 200                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 28   | 187                     | 225                                                         |
|          |                    |      |     |      |                      | 20                  | 54   | 5             | 15.2 | 190                     | 225                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 22   | 196                     | 250                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 28   | 202                     | 250                                                         |
| 460-3-60 | 4                  | 10.6 | 75  | 16.5 | 2.15                 | 7.5                 | 11   | 5             | 7.6  | 72                      | 80                                                          |
|          |                    |      |     |      |                      |                     |      | 7.5           | 11   | 76                      | 80                                                          |
|          |                    |      |     |      |                      |                     |      | 10            | 14   | 80                      | 90                                                          |
|          |                    |      |     |      |                      | 10                  | 14   | 5             | 7.6  | 76                      | 90                                                          |
|          |                    |      |     |      |                      |                     |      | 7.5           | 11   | 80                      | 90                                                          |
|          |                    |      |     |      |                      |                     |      | 10            | 14   | 83                      | 90                                                          |
|          |                    |      |     |      |                      | 15                  | 21   | 5             | 7.6  | 85                      | 100                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 11   | 88                      | 100                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 14   | 91                      | 110                                                         |
|          |                    |      |     |      |                      | 20                  | 27   | 5             | 7.6  | 92                      | 110                                                         |
|          |                    |      |     |      |                      |                     |      | 7.5           | 11   | 96                      | 110                                                         |
|          |                    |      |     |      |                      |                     |      | 10            | 14   | 99                      | 125                                                         |
| 575-3-60 | 4                  | 7.7  | 54  | 12   | 1.7                  | 7.5                 | 9    | 5             | 6.1  | 55                      | 60                                                          |
|          |                    |      |     |      |                      |                     |      | 7.5           | 9    | 58                      | 60                                                          |
|          |                    |      |     |      |                      |                     |      | 10            | 11   | 60                      | 70                                                          |
|          |                    |      |     |      |                      | 10                  | 11   | 5             | 6.1  | 57                      | 60                                                          |
|          |                    |      |     |      |                      |                     |      | 7.5           | 9    | 60                      | 70                                                          |
|          |                    |      |     |      |                      |                     |      | 10            | 11   | 62                      | 70                                                          |
|          |                    |      |     |      |                      | 15                  | 17   | 5             | 6.1  | 65                      | 80                                                          |
|          |                    |      |     |      |                      |                     |      | 7.5           | 9    | 68                      | 80                                                          |
|          |                    |      |     |      |                      |                     |      | 10            | 11   | 70                      | 80                                                          |
|          |                    |      |     |      |                      | 20                  | 22   | 5             | 6.1  | 71                      | 90                                                          |
|          |                    |      |     |      |                      |                     |      | 7.5           | 9    | 74                      | 90                                                          |
|          |                    |      |     |      |                      |                     |      | 10            | 11   | 76                      | 90                                                          |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

**TABLE 24: ELECTRICAL DATA 30 TON W/POWER EXHAUST R-410A**

| Voltage  | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |      | Pwr Exh Motor |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|--------------------|------|-----|-----|----------------------|-----|---------------------|------|---------------|------|-------------------------|-------------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA  | HP            | FLA  |                         |                                                             |
| 208-3-60 | 4                  | 25.0 | 164 | 39  | 4                    | 5.8 | 10                  | 30.8 | 7.5           | 24.2 | 186                     | 200                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 193                     | 200                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 212                     | 250                                                         |
|          |                    |      |     |     |                      |     | 15                  | 46.2 | 7.5           | 24.2 | 205                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 212                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 227                     | 250                                                         |
|          |                    |      |     |     |                      |     | 20                  | 59.4 | 7.5           | 24.2 | 222                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 228                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 244                     | 300                                                         |
|          |                    |      |     |     |                      |     | 25                  | 74.8 | 7.5           | 24.2 | 241                     | 300                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 248                     | 300                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 263                     | 300                                                         |
| 230-3-60 | 4                  | 25.0 | 164 | 39  | 4                    | 5.8 | 10                  | 28   | 7.5           | 22   | 180                     | 200                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 28   | 186                     | 200                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 42   | 204                     | 225                                                         |
|          |                    |      |     |     |                      |     | 15                  | 42   | 7.5           | 22   | 198                     | 225                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 28   | 204                     | 225                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 42   | 218                     | 250                                                         |
|          |                    |      |     |     |                      |     | 20                  | 54   | 7.5           | 22   | 213                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 28   | 219                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 42   | 233                     | 250                                                         |
|          |                    |      |     |     |                      |     | 25                  | 68   | 7.5           | 22   | 230                     | 250                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 28   | 236                     | 300                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 42   | 250                     | 300                                                         |
| 460-3-60 | 4                  | 12.0 | 100 | 19  | 4                    | 2.9 | 10                  | 14   | 7.5           | 11   | 88                      | 100                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 14   | 91                      | 100                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 21   | 100                     | 110                                                         |
|          |                    |      |     |     |                      |     | 15                  | 21   | 7.5           | 11   | 97                      | 110                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 14   | 100                     | 110                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 21   | 107                     | 125                                                         |
|          |                    |      |     |     |                      |     | 20                  | 27   | 7.5           | 11   | 104                     | 125                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 14   | 107                     | 125                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 21   | 114                     | 125                                                         |
|          |                    |      |     |     |                      |     | 25                  | 34   | 7.5           | 11   | 113                     | 125                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 14   | 116                     | 150                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 21   | 123                     | 150                                                         |
| 575-3-60 | 4                  | 9.0  | 78  | 14  | 4                    | 2.2 | 10                  | 11   | 7.5           | 9    | 68                      | 70                                                          |
|          |                    |      |     |     |                      |     |                     |      | 10            | 11   | 70                      | 80                                                          |
|          |                    |      |     |     |                      |     |                     |      | 15            | 17   | 77                      | 90                                                          |
|          |                    |      |     |     |                      |     | 15                  | 17   | 7.5           | 9    | 75                      | 90                                                          |
|          |                    |      |     |     |                      |     |                     |      | 10            | 11   | 77                      | 90                                                          |
|          |                    |      |     |     |                      |     |                     |      | 15            | 17   | 83                      | 100                                                         |
|          |                    |      |     |     |                      |     | 20                  | 22   | 7.5           | 9    | 81                      | 100                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 11   | 83                      | 100                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 17   | 89                      | 110                                                         |
|          |                    |      |     |     |                      |     | 25                  | 27   | 7.5           | 9    | 88                      | 110                                                         |
|          |                    |      |     |     |                      |     |                     |      | 10            | 11   | 90                      | 110                                                         |
|          |                    |      |     |     |                      |     |                     |      | 15            | 17   | 96                      | 110                                                         |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

**TABLE 25: ELECTRICAL DATA 40 TON W/POWER EXHAUST R-410A**

| Voltage  | Compressors (each) |      |     |      | OD Fan Motors (each) |     | Supply Blower Motor |      | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|--------------------|------|-----|------|----------------------|-----|---------------------|------|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Qty                | RLA  | LRA | MCC  | Qty                  | FLA | HP                  | FLA  | HP            | FLA |                         |                                                             |
| 208-3-60 | 4                  | 30.1 | 225 | 47.0 | 4                    | 5.8 | 10                  | 30.8 | 7.5           | 24  | 206                     | 225                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 31  | 213                     | 225                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 46  | 232                     | 250                                                         |
|          |                    |      |     |      |                      |     | 15                  | 46.2 | 7.5           | 24  | 226                     | 250                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 31  | 232                     | 250                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 46  | 248                     | 250                                                         |
|          |                    |      |     |      |                      |     | 20                  | 59.4 | 7.5           | 24  | 242                     | 300                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 31  | 249                     | 300                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 46  | 264                     | 300                                                         |
|          |                    |      |     |      |                      |     | 25                  | 74.8 | 7.5           | 24  | 261                     | 300                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 31  | 268                     | 300                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 46  | 283                     | 350                                                         |
| 230-3-60 | 4                  | 30.1 | 225 | 47.0 | 4                    | 5.2 | 10                  | 28.0 | 7.5           | 22  | 199                     | 225                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 28  | 205                     | 225                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 42  | 222                     | 250                                                         |
|          |                    |      |     |      |                      |     | 15                  | 42.0 | 7.5           | 22  | 216                     | 250                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 28  | 222                     | 250                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 42  | 236                     | 250                                                         |
|          |                    |      |     |      |                      |     | 20                  | 54.0 | 7.5           | 22  | 231                     | 250                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 28  | 237                     | 250                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 42  | 251                     | 300                                                         |
|          |                    |      |     |      |                      |     | 25                  | 68.0 | 7.5           | 22  | 248                     | 300                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 28  | 254                     | 300                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 42  | 268                     | 300                                                         |
| 460-3-60 | 4                  | 16.7 | 114 | 26.0 | 4                    | 2.6 | 10                  | 14.0 | 7.5           | 11  | 108                     | 110                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 14  | 111                     | 125                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 21  | 119                     | 125                                                         |
|          |                    |      |     |      |                      |     | 15                  | 21.0 | 7.5           | 11  | 116                     | 125                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 14  | 119                     | 125                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 21  | 126                     | 150                                                         |
|          |                    |      |     |      |                      |     | 20                  | 27.0 | 7.5           | 11  | 123                     | 150                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 14  | 126                     | 150                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 21  | 133                     | 150                                                         |
|          |                    |      |     |      |                      |     | 25                  | 34.0 | 7.5           | 11  | 132                     | 150                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 14  | 135                     | 150                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 21  | 142                     | 175                                                         |
| 575-3-60 | 4                  | 12.2 | 80  | 19.0 | 4                    | 2.2 | 10                  | 11.0 | 7.5           | 9   | 81                      | 90                                                          |
|          |                    |      |     |      |                      |     |                     |      | 10            | 11  | 83                      | 90                                                          |
|          |                    |      |     |      |                      |     |                     |      | 15            | 17  | 90                      | 100                                                         |
|          |                    |      |     |      |                      |     | 15                  | 17.0 | 7.5           | 9   | 88                      | 100                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 11  | 90                      | 100                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 17  | 96                      | 110                                                         |
|          |                    |      |     |      |                      |     | 20                  | 22.0 | 7.5           | 9   | 94                      | 110                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 11  | 96                      | 110                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 17  | 102                     | 110                                                         |
|          |                    |      |     |      |                      |     | 25                  | 27.0 | 7.5           | 9   | 100                     | 125                                                         |
|          |                    |      |     |      |                      |     |                     |      | 10            | 11  | 102                     | 125                                                         |
|          |                    |      |     |      |                      |     |                     |      | 15            | 17  | 108                     | 125                                                         |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

**TABLE 26: ELECTRICAL DATA 25 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A**

| Voltage  | Electric Heat Option |    |        |      | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |      | Pwr Exh Motor |      | MCA <sup>1</sup><br>(Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup><br>Size (Amps) |
|----------|----------------------|----|--------|------|--------------------|------|-----|-----|----------------------|-----|---------------------|------|---------------|------|----------------------------|----------------------------------------------------------------|
|          | Model                | KW | Stages | Amps | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA  | HP            | FLA  |                            |                                                                |
| 208-3-60 | E4                   | 40 | 1      | 83   | 4                  | 22.4 | 149 | 35  | 4                    | 4.5 | 7.5                 | 24.2 | 5             | 16.7 | 155                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 162                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 170                        | 200                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 10                  | 30.8 | 5             | 16.7 | 163                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 170                        | 200                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 177                        | 200                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 46.2 | 5             | 16.7 | 182                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 190                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 196                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 59.4 | 5             | 16.7 | 199                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 206                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 213                        | 250                                                            |
|          | E8                   | 80 | 2      | 167  | 4                  | 22.4 | 149 | 35  | 4                    | 4.5 | 7.5                 | 24.2 | 5             | 16.7 | 214                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 221                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 230                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 10                  | 30.8 | 5             | 16.7 | 222                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 230                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 236                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 46.2 | 5             | 16.7 | 241                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 249                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 256                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 59.4 | 5             | 16.7 | 258                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 24.2 | 265                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 272                        | 300                                                            |
| 230-3-60 | E4                   | 40 | 1      | 92   | 4                  | 22.4 | 149 | 35  | 4                    | 4.3 | 7.5                 | 22   | 5             | 15.2 | 158                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 165                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 172                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 10                  | 28   | 5             | 15.2 | 166                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 172                        | 175                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 178                        | 200                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 42   | 5             | 15.2 | 183                        | 200                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 190                        | 200                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 196                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 54   | 5             | 15.2 | 198                        | 225                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 205                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 211                        | 250                                                            |
|          | E8                   | 80 | 2      | 184  | 4                  | 22.4 | 149 | 35  | 4                    | 4.3 | 7.5                 | 22   | 5             | 15.2 | 227                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 234                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 242                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 10                  | 28   | 5             | 15.2 | 235                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 242                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 248                        | 250                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 42   | 5             | 15.2 | 252                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 259                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 265                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 54   | 5             | 15.2 | 267                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 7.5           | 22   | 274                        | 300                                                            |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 280                        | 300                                                            |

**TABLE 26: ELECTRICAL DATA 25 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A (CONTINUED)**

| Voltage  | Electric Heat Option |     |        |      | Compressors (each) |      |     |      | OD Fan Motors (each) |      | Supply Blower Motor |     | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|-----|--------|------|--------------------|------|-----|------|----------------------|------|---------------------|-----|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Model                | KW  | Stages | Amps | Qty                | RLA  | LRA | MCC  | Qty                  | FLA  | HP                  | FLA | HP            | FLA |                         |                                                             |
| 460-3-60 | E4                   | 40  | 1      | 46   | 4                  | 10.6 | 75  | 16.5 | 4                    | 2.15 | 7.5                 | 11  | 5             | 7.6 | 79                      | 80                                                          |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 82                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 86                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |      |                      |      | 10                  | 14  | 5             | 7.6 | 83                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 86                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 89                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |      |                      |      | 15                  | 21  | 5             | 7.6 | 92                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 95                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 98                      | 110                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 20                  | 27  | 5             | 7.6 | 99                      | 110                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 102                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 105                     | 125                                                         |
|          | E8                   | 80  | 2      | 92   | 4                  | 10.6 | 75  | 16.5 | 4                    | 2.15 | 7.5                 | 11  | 5             | 7.6 | 114                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 117                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 121                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 10                  | 14  | 5             | 7.6 | 117                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 121                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 124                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 15                  | 21  | 5             | 7.6 | 126                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 130                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 20                  | 27  | 5             | 7.6 | 134                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 137                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 140                     | 150                                                         |
|          | E1                   | 108 | 3      | 125  | 4                  | 10.6 | 75  | 16.5 | 4                    | 2.15 | 7.5                 | 11  | 5             | 7.6 | 146                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 149                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 10                  | 14  | 5             | 7.6 | 150                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 156                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 15                  | 21  | 5             | 7.6 | 158                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 162                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 165                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      | 20                  | 27  | 5             | 7.6 | 166                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 7.5           | 11  | 169                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |      |                      |      |                     |     | 10            | 14  | 172                     | 175                                                         |

**TABLE 26: ELECTRICAL DATA 25 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A (CONTINUED)**

| Voltage  | Electric Heat Option |     |        |      | Compressors (each) |     |     |     | OD Fan Motors (each) |     | Supply Blower Motor |     | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|-----|--------|------|--------------------|-----|-----|-----|----------------------|-----|---------------------|-----|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Model                | KW  | Stages | Amps | Qty                | RLA | LRA | MCC | Qty                  | FLA | HP                  | FLA | HP            | FLA |                         |                                                             |
| 575-3-60 | E4                   | 40  | 1      | 40   | 4                  | 7.7 | 54  | 12  | 4                    | 1.7 | 7.5                 | 9   | 5             | 6.1 | 68                      | 70                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 71                      | 70                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 73                      | 80                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     | 10                  | 11  | 5             | 6.1 | 70                      | 70                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 73                      | 80                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 75                      | 80                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     | 15                  | 17  | 5             | 6.1 | 78                      | 80                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 81                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 83                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     | 20                  | 22  | 5             | 6.1 | 84                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 87                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 89                      | 100                                                         |
|          | E8                   | 80  | 2      | 80   | 4                  | 7.7 | 54  | 12  | 4                    | 1.7 | 7.5                 | 9   | 5             | 6.1 | 98                      | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 101                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 103                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 10                  | 11  | 5             | 6.1 | 100                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 103                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 105                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 15                  | 17  | 5             | 6.1 | 108                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 111                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 113                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 20                  | 22  | 5             | 6.1 | 114                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 117                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 119                     | 125                                                         |
|          | E1                   | 108 | 3      | 108  | 4                  | 4   | 7.7 | 54  | 12                   | 4   | 7.5                 | 9   | 5             | 6.1 | 126                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 129                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 131                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 10                  | 11  | 5             | 6.1 | 128                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 131                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 15                  | 17  | 5             | 6.1 | 136                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 139                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 141                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 20                  | 22  | 5             | 6.1 | 142                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 7.5           | 9   | 145                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 147                     | 150                                                         |

1. Minimum Circuit Ampacity.

2. Dual Element, Time Delay Type.

3. HACR type per NEC.

**TABLE 27: ELECTRICAL DATA 30 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A**

| Voltage  | Electric Heat Option |    |        |      | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |      | Pwr Exh Motor |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|----|--------|------|--------------------|------|-----|-----|----------------------|-----|---------------------|------|---------------|------|-------------------------|-------------------------------------------------------------|
|          | Model                | KW | Stages | Amps | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA  | HP            | FLA  |                         |                                                             |
| 208-3-60 | E4                   | 40 | 1      | 83   | 4                  | 25.0 | 164 | 39  | 4                    | 5.8 | 10                  | 30.8 | 7.5           | 24.2 | 186                     | 200                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 193                     | 200                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 212                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 46.2 | 7.5           | 24.2 | 205                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 212                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 227                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 59.4 | 7.5           | 24.2 | 222                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 228                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 244                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 74.8 | 7.5           | 24.2 | 241                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 248                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 263                     | 300                                                         |
|          | E8                   | 80 | 2      | 167  | 4                  | 25.0 | 164 | 39  | 4                    | 5.8 | 10                  | 30.8 | 7.5           | 24.2 | 230                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 236                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 256                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 46.2 | 7.5           | 24.2 | 249                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 256                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 271                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 59.4 | 7.5           | 24.2 | 265                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 272                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 287                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 74.8 | 7.5           | 24.2 | 285                     | 350                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 291                     | 350                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 307                     | 350                                                         |
| 230-3-60 | E4                   | 40 | 1      | 92   | 4                  | 25.0 | 164 | 39  | 4                    | 5.8 | 10                  | 28   | 7.5           | 22   | 180                     | 200                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 186                     | 200                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 204                     | 225                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 42   | 7.5           | 22   | 198                     | 225                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 204                     | 225                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 218                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 54   | 7.5           | 22   | 213                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 219                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 233                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 68   | 7.5           | 22   | 230                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 236                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 250                     | 300                                                         |
|          | E8                   | 80 | 2      | 184  | 4                  | 25.0 | 164 | 39  | 4                    | 5.8 | 10                  | 28   | 7.5           | 22   | 242                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 248                     | 250                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 265                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 42   | 7.5           | 22   | 259                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 265                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 279                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 54   | 7.5           | 22   | 274                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 280                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 294                     | 300                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 68   | 7.5           | 22   | 292                     | 350                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 298                     | 350                                                         |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 312                     | 350                                                         |

**TABLE 27: ELECTRICAL DATA 30 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A (CONTINUED)**

| Voltage  | Electric Heat Option |     |        |      | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |     | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|-----|--------|------|--------------------|------|-----|-----|----------------------|-----|---------------------|-----|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Model                | KW  | Stages | Amps | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA | HP            | FLA |                         |                                                             |
| 460-3-60 | E4                   | 40  | 1      | 46   | 4                  | 12.0 | 100 | 19  | 4                    | 2.9 | 10                  | 14  | 7.5           | 11  | 88                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 91                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 100                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 21  | 7.5           | 11  | 97                      | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 100                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 107                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 27  | 7.5           | 11  | 104                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 107                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 114                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 34  | 7.5           | 11  | 113                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 116                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 123                     | 150                                                         |
|          | E8                   | 80  | 2      | 92   | 4                  | 12.0 | 100 | 19  | 4                    | 2.9 | 10                  | 14  | 7.5           | 11  | 121                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 124                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 21  | 7.5           | 11  | 130                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 140                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 27  | 7.5           | 11  | 137                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 140                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 147                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 34  | 7.5           | 11  | 146                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 149                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 156                     | 175                                                         |
|          | E1                   | 108 | 3      | 125  | 4                  | 12.0 | 100 | 19  | 4                    | 2.9 | 10                  | 14  | 7.5           | 11  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 156                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 165                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 21  | 7.5           | 11  | 162                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 165                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 172                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 27  | 7.5           | 11  | 169                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 172                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 179                     | 200                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 34  | 7.5           | 11  | 178                     | 200                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 181                     | 200                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 188                     | 200                                                         |

TABLE 27: ELECTRICAL DATA 30 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A (CONTINUED)

| Voltage  | Electric Heat Option |     |        |      | Compressors (each) |     |     |     | OD Fan Motors (each) |     | Supply Blower Motor |     | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|-----|--------|------|--------------------|-----|-----|-----|----------------------|-----|---------------------|-----|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Model                | KW  | Stages | Amps | Qty                | RLA | LRA | MCC | Qty                  | FLA | HP                  | FLA | HP            | FLA |                         |                                                             |
| 575-3-60 | E4                   | 40  | 1      | 40   | 4                  | 9.0 | 78  | 14  | 4                    | 2.2 | 10                  | 11  | 7.5           | 9   | 73                      | 80                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 75                      | 80                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 83                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     | 15                  | 17  | 7.5           | 9   | 81                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 83                      | 90                                                          |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 89                      | 100                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 20                  | 22  | 7.5           | 9   | 87                      | 100                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 89                      | 100                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 95                      | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 25                  | 27  | 7.5           | 9   | 93                      | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 95                      | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 101                     | 110                                                         |
|          | E8                   | 80  | 2      | 80   | 4                  | 9.0 | 78  | 14  | 4                    | 2.2 | 10                  | 11  | 7.5           | 9   | 103                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 105                     | 110                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 113                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 15                  | 17  | 7.5           | 9   | 111                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 113                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 119                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 20                  | 22  | 7.5           | 9   | 117                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 119                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 125                     | 125                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 25                  | 27  | 7.5           | 9   | 123                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 125                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 131                     | 150                                                         |
|          | E1                   | 108 | 3      | 108  | 4                  | 9.0 | 78  | 14  | 4                    | 2.2 | 10                  | 11  | 7.5           | 9   | 131                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 141                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 15                  | 17  | 7.5           | 9   | 139                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 141                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 147                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 20                  | 22  | 7.5           | 9   | 145                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 10            | 11  | 147                     | 150                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     | 15            | 17  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     | 25                  | 27  | 7.5           | 9   | 151                     | 175                                                         |
|          |                      |     |        |      |                    |     |     |     |                      |     |                     |     |               |     |                         |                                                             |

1. Minimum Circuit Ampacity.
2. Dual Element, Time Delay Type.
3. HACR type per NEC.

TABLE 28: ELECTRICAL DATA 40 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A

| Voltage  | Electric Heat Option |    |        |      | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |      | Pwr Exh Motor |      | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> / Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|----|--------|------|--------------------|------|-----|-----|----------------------|-----|---------------------|------|---------------|------|-------------------------|----------------------------------------------------------|
|          | Model                | KW | Stages | Amps | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA  | HP            | FLA  |                         |                                                          |
| 208-3-60 | E4                   | 40 | 1      | 83   | 4                  | 30.1 | 255 | 47  | 4                    | 5.8 | 10                  | 30.8 | 7.5           | 24.2 | 206                     | 225                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 213                     | 225                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 232                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 46.2 | 7.5           | 24.2 | 226                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 232                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 248                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 59.4 | 7.5           | 24.2 | 242                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 249                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 264                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 74.8 | 7.5           | 24.2 | 261                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 268                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 283                     | 350                                                      |
|          | E8                   | 80 | 2      | 167  | 4                  | 30.1 | 255 | 47  | 4                    | 5.8 | 10                  | 30.8 | 7.5           | 24.2 | 230                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 236                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 256                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 46.2 | 7.5           | 24.2 | 249                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 256                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 271                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 59.4 | 7.5           | 24.2 | 265                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 272                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 287                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 74.8 | 7.5           | 24.2 | 285                     | 350                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 30.8 | 291                     | 350                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 46.2 | 307                     | 350                                                      |
| 230-3-60 | E4                   | 40 | 1      | 92   | 4                  | 30.1 | 255 | 47  | 4                    | 5.8 | 10                  | 28   | 7.5           | 22   | 201                     | 225                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 207                     | 225                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 224                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 42   | 7.5           | 22   | 218                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 224                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 238                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 54   | 7.5           | 22   | 233                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 239                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 253                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 68   | 7.5           | 22   | 251                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 257                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 271                     | 300                                                      |
|          | E8                   | 80 | 2      | 184  | 4                  | 30.1 | 255 | 47  | 4                    | 5.8 | 10                  | 28   | 7.5           | 22   | 242                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 248                     | 250                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 265                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 15                  | 42   | 7.5           | 22   | 259                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 265                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 279                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 20                  | 54   | 7.5           | 22   | 274                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 280                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 294                     | 300                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     | 25                  | 68   | 7.5           | 22   | 292                     | 350                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 10            | 28   | 298                     | 350                                                      |
|          |                      |    |        |      |                    |      |     |     |                      |     |                     |      | 15            | 42   | 312                     | 350                                                      |

**TABLE 28: ELECTRICAL DATA 40 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A (CONTINUED)**

| Voltage  | Electric Heat Option |     |        |      | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |     | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|-----|--------|------|--------------------|------|-----|-----|----------------------|-----|---------------------|-----|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Model                | KW  | Stages | Amps | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA | HP            | FLA |                         |                                                             |
| 460-3-60 | E4                   | 40  | 1      | 46   | 4                  | 16.7 | 114 | 26  | 4                    | 2.9 | 10                  | 14  | 7.5           | 11  | 108                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 111                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 119                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 21  | 7.5           | 11  | 116                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 119                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 126                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 27  | 7.5           | 11  | 123                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 126                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 34  | 7.5           | 11  | 132                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 135                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 142                     | 175                                                         |
|          | E8                   | 80  | 2      | 92   | 4                  | 16.7 | 114 | 26  | 4                    | 2.9 | 10                  | 14  | 7.5           | 11  | 121                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 124                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 21  | 7.5           | 11  | 130                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 140                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 27  | 7.5           | 11  | 137                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 140                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 147                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 34  | 7.5           | 11  | 146                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 149                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 156                     | 175                                                         |
|          | E1                   | 108 | 3      | 125  | 4                  | 16.7 | 114 | 26  | 4                    | 2.9 | 10                  | 14  | 7.5           | 11  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 156                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 165                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 21  | 7.5           | 11  | 162                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 165                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 172                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 27  | 7.5           | 11  | 169                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 172                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 179                     | 200                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 34  | 7.5           | 11  | 178                     | 200                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 14  | 181                     | 200                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 21  | 188                     | 200                                                         |

**TABLE 28: ELECTRICAL DATA 40 TON W/ELECTRIC HEAT AND POWER EXHAUST R-410A (CONTINUED)**

| Voltage  | Electric Heat Option |     |        |      | Compressors (each) |      |     |     | OD Fan Motors (each) |     | Supply Blower Motor |     | Pwr Exh Motor |     | MCA <sup>1</sup> (Amps) | Max Fuse <sup>2</sup> /<br>Breaker <sup>3</sup> Size (Amps) |
|----------|----------------------|-----|--------|------|--------------------|------|-----|-----|----------------------|-----|---------------------|-----|---------------|-----|-------------------------|-------------------------------------------------------------|
|          | Model                | KW  | Stages | Amps | Qty                | RLA  | LRA | MCC | Qty                  | FLA | HP                  | FLA | HP            | FLA |                         |                                                             |
| 575-3-60 | E4                   | 40  | 1      | 40   | 4                  | 12.2 | 80  | 19  | 4                    | 2.2 | 10                  | 11  | 7.5           | 9   | 81                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 83                      | 90                                                          |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 90                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 17  | 7.5           | 9   | 88                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 90                      | 100                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 96                      | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 22  | 7.5           | 9   | 94                      | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 96                      | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 102                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 27  | 7.5           | 9   | 100                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 102                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 108                     | 125                                                         |
|          | E8                   | 80  | 2      | 80   | 4                  | 12.2 | 80  | 19  | 4                    | 2.2 | 10                  | 11  | 7.5           | 9   | 103                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 105                     | 110                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 113                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 17  | 7.5           | 9   | 111                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 113                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 119                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 22  | 7.5           | 9   | 117                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 119                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 125                     | 125                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 27  | 7.5           | 9   | 123                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 125                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 131                     | 150                                                         |
|          | E1                   | 108 | 3      | 108  | 4                  | 12.2 | 80  | 19  | 4                    | 2.2 | 10                  | 11  | 7.5           | 9   | 131                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 133                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 141                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 15                  | 17  | 7.5           | 9   | 139                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 141                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 147                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 20                  | 22  | 7.5           | 9   | 145                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 147                     | 150                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 15            | 17  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     | 25                  | 27  | 7.5           | 9   | 151                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 10            | 11  | 153                     | 175                                                         |
|          |                      |     |        |      |                    |      |     |     |                      |     |                     |     | 0             | 0   | 0                       | 0                                                           |

1. Minimum Circuit Ampacity.

2. Dual Element, Time Delay Type.

3. HACR type per NEC.

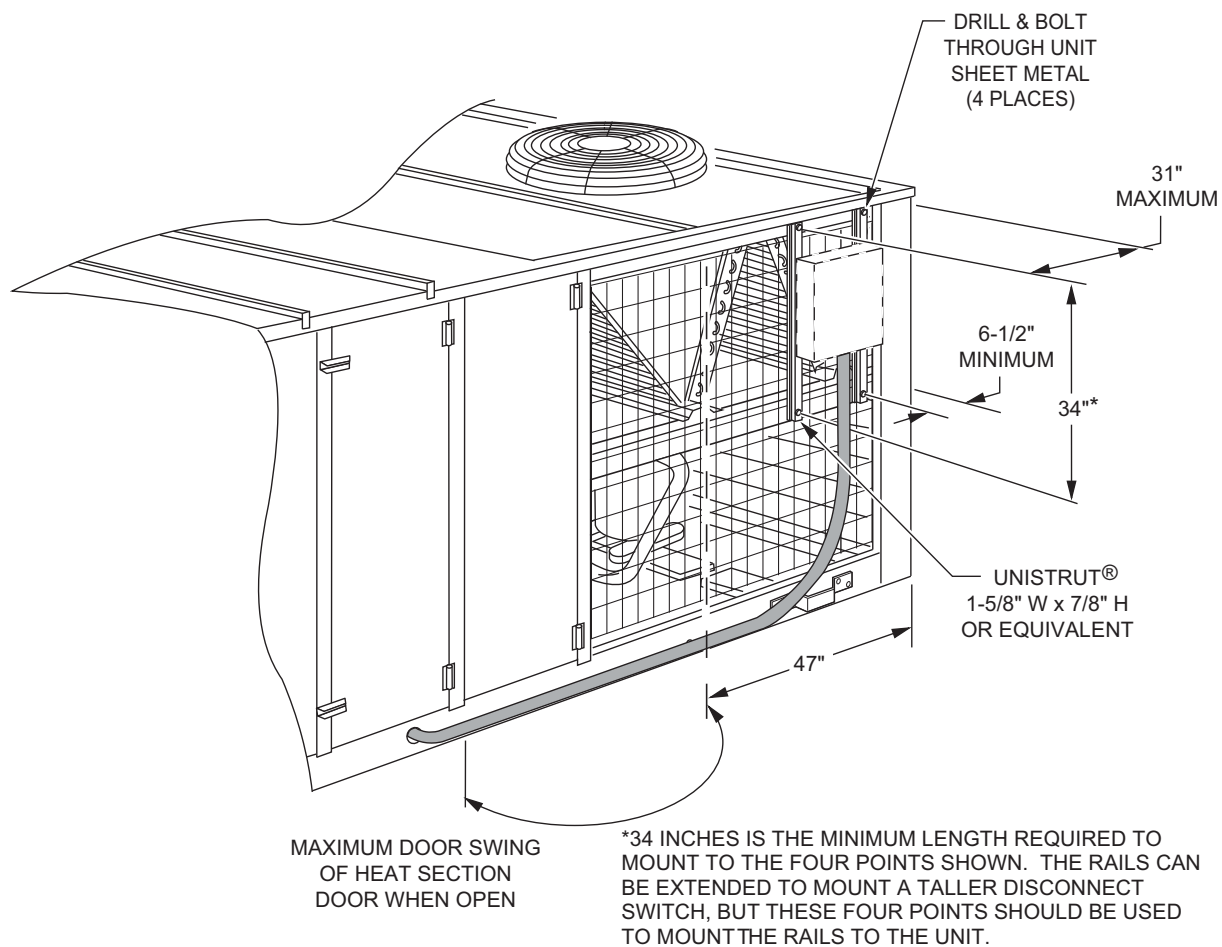
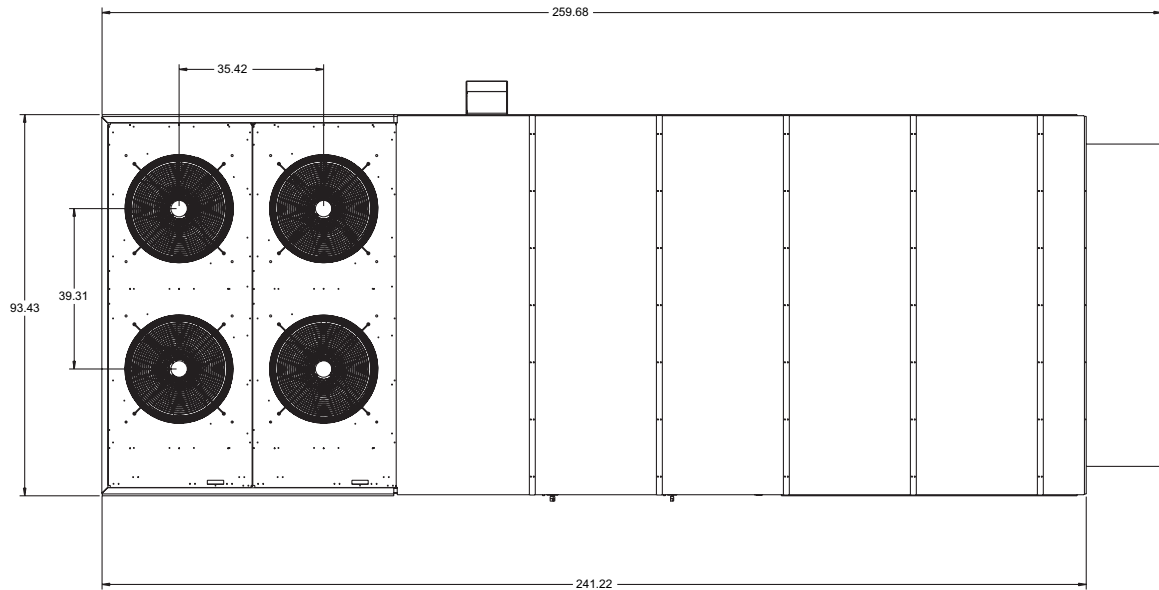
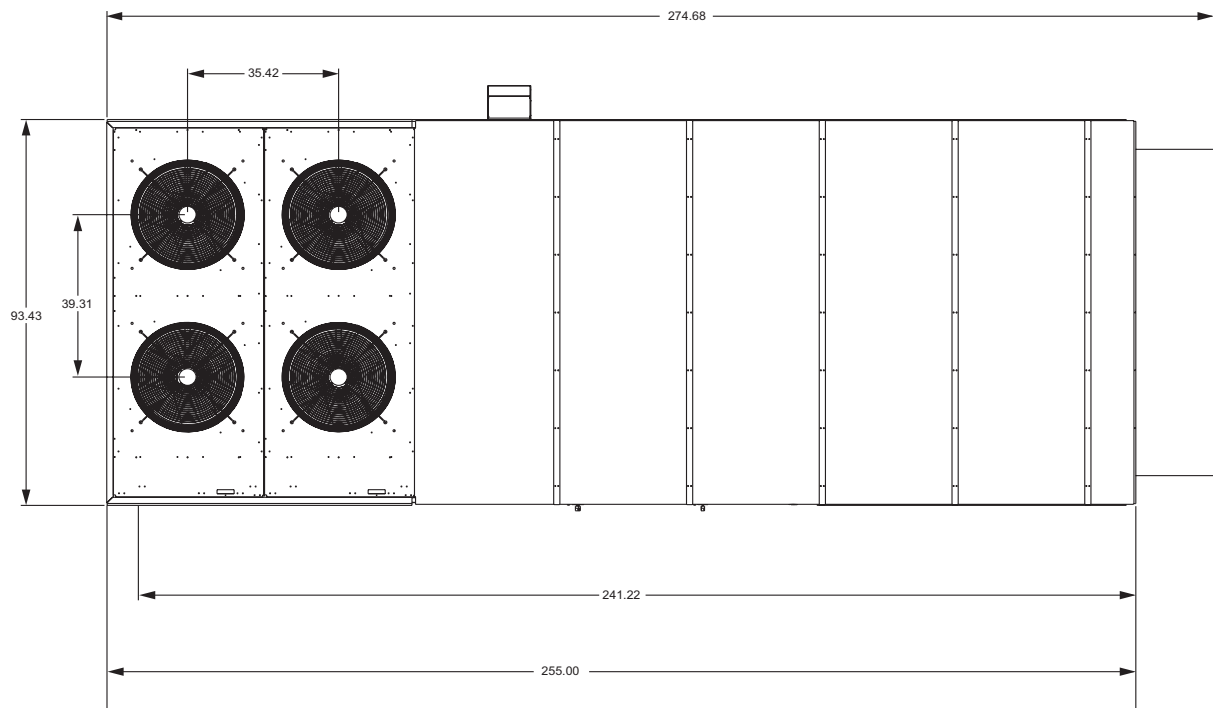
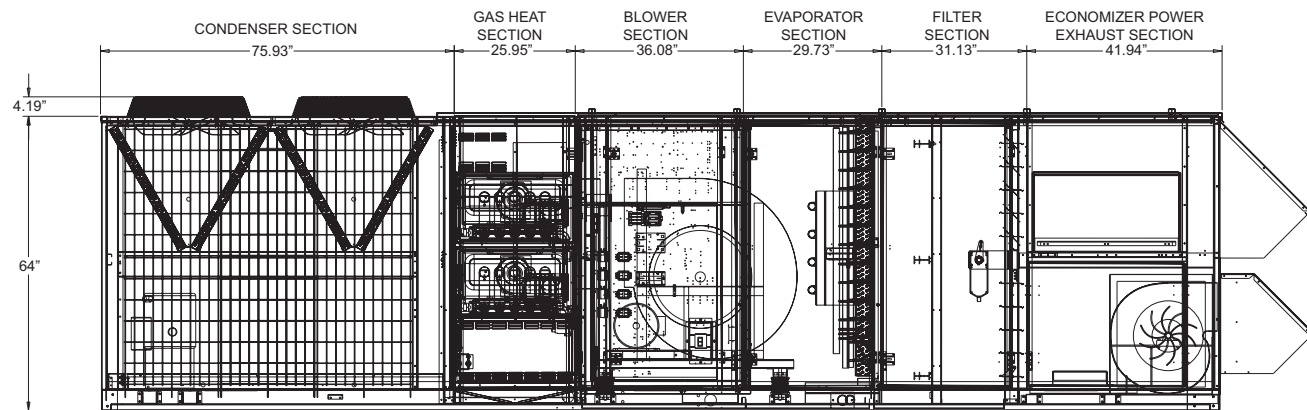
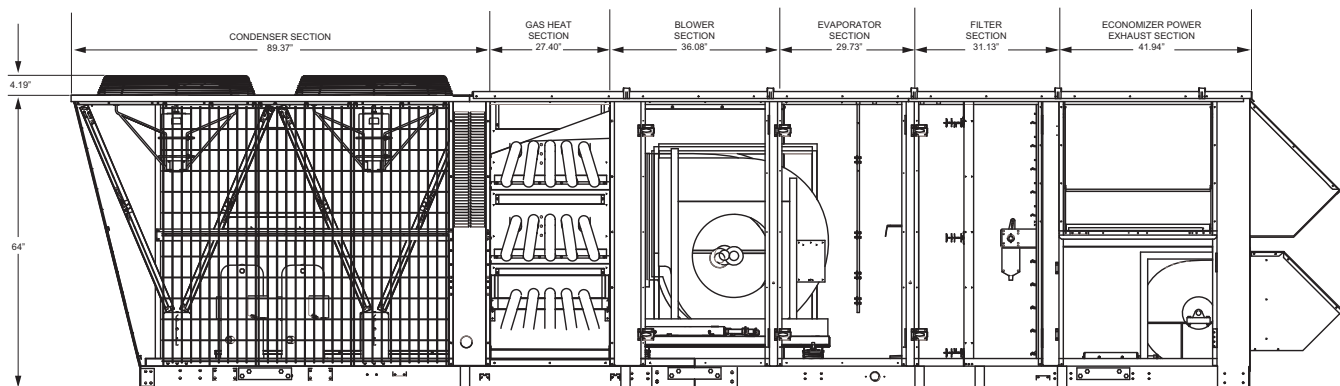
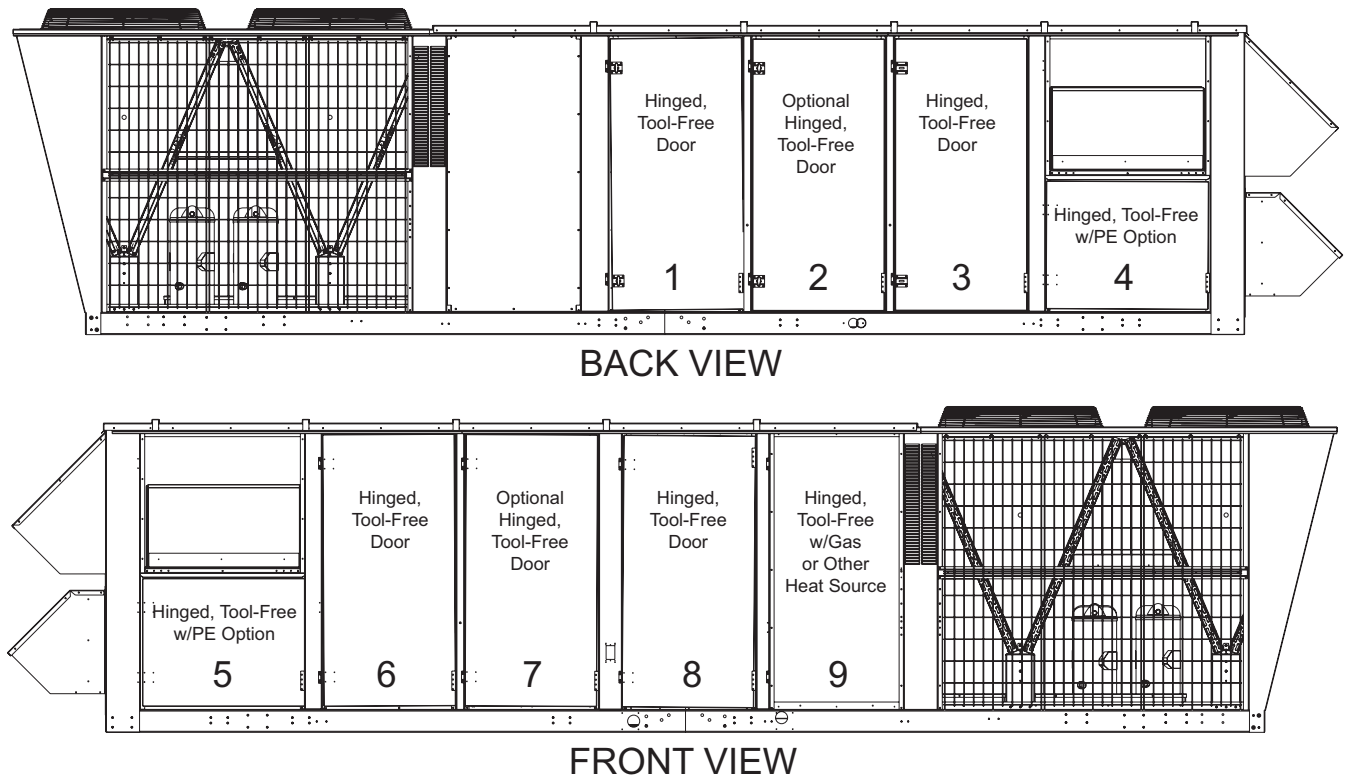


FIGURE 17 - FIELD INSTALLED DISCONNECT

**FIGURE 18 - 25 AND 30 TON SERIES 40 OVERHEAD VIEW****FIGURE 19 - 40 TON SERIES 40 OVERHEAD VIEW**

**FIGURE 20 - 25 AND 30 TON SERIES 40 MAJOR COMPONENT LAYOUT****FIGURE 21 - 40 TON SEER Series 40 MAJOR COMPONENT LAYOUT**



1. STD Cabinet Option includes Hinged, Tool-Free Doors # 1, 3, 6, 8.
2. Premium Cabinet Option includes Hinged, Tool-Free Doors # 1, 2, 3, 6, 7, 8.
3. Doors # 4, 5, 9 are dependent upon unit Heating and Power Exhaust Options.
4. Doors 1, 2, 3, 6, 7, 8 & 9 are 56.31 inches high by 27.33 inches wide.
5. Doors 4 & 5 are 26.5 inches high by 33.63 inches wide.
6. Door configurations are the same on all tonnages (40 ton shown).

**FIGURE 23 - SERIEES 40 CABINET DOOR CONFIGURATION**

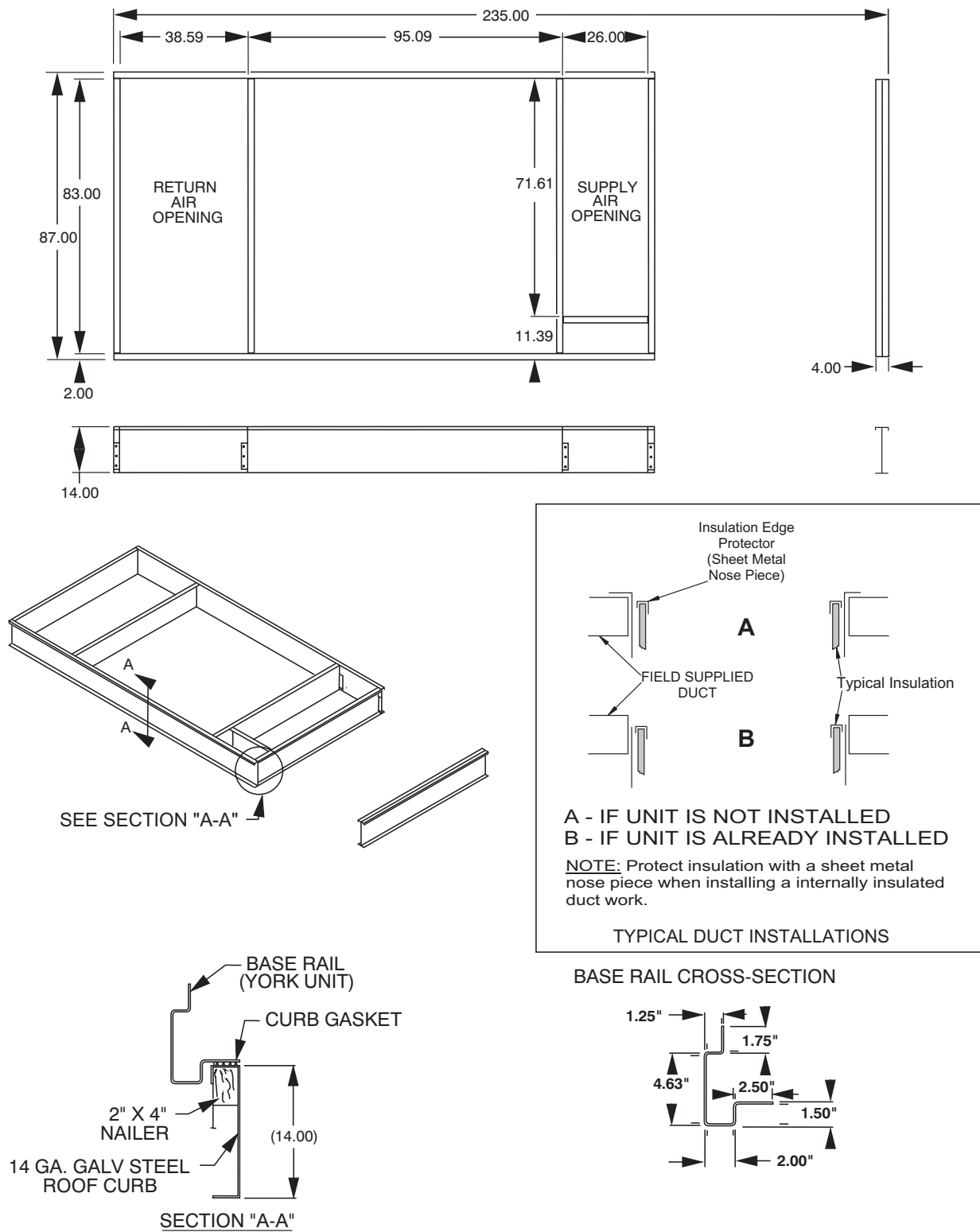


FIGURE 22 - PARTIAL ROOF CURB MODEL 1RC0455P

## CFM, STATIC PRESSURE, AND POWER - ALTITUDE AND TEMPERATURE CORRECTIONS

The information below should be used to assist in application of product when being applied at altitudes at or exceeding 1000 feet above sea level.

The air flow rates listed in the standard blower performance tables are based on standard air at sea level. As the altitude or temperature increases, the density of air decreases. In

order to use the indoor blower tables for high altitude applications, certain corrections are necessary.

A centrifugal fan is a "constant volume" device. This means that, if the rpm remains constant, the CFM delivered is the same regardless of the density of the air. However, since the air at high altitude is less dense, less static pressure will be generated and less power will be required than a similar application at sea level. Air density correction factors are shown in Table 29 and Figure 24.

**TABLE 29: ALTITUDE CORRECTION FACTORS**

| AIR TEMP | ALTITUDE (FEET) |       |       |       |       |       |       |       |       |       |       |
|----------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|          | 0               | 1000  | 2000  | 3000  | 4000  | 5000  | 6000  | 7000  | 8000  | 9000  | 10000 |
| 40       | 1.060           | 1.022 | 0.986 | 0.950 | 0.916 | 0.882 | 0.849 | 0.818 | 0.788 | 0.758 | 0.729 |
| 50       | 1.039           | 1.002 | 0.966 | 0.931 | 0.898 | 0.864 | 0.832 | 0.802 | 0.772 | 0.743 | 0.715 |
| 60       | 1.019           | 0.982 | 0.948 | 0.913 | 0.880 | 0.848 | 0.816 | 0.787 | 0.757 | 0.729 | 0.701 |
| 70       | 1.000           | 0.964 | 0.930 | 0.896 | 0.864 | 0.832 | 0.801 | 0.772 | 0.743 | 0.715 | 0.688 |
| 80       | 0.982           | 0.947 | 0.913 | 0.880 | 0.848 | 0.817 | 0.787 | 0.758 | 0.730 | 0.702 | 0.676 |
| 90       | 0.964           | 0.929 | 0.897 | 0.864 | 0.833 | 0.802 | 0.772 | 0.744 | 0.716 | 0.689 | 0.663 |
| 100      | 0.946           | 0.912 | 0.880 | 0.848 | 0.817 | 0.787 | 0.758 | 0.730 | 0.703 | 0.676 | 0.651 |

The examples below will assist in determining the airflow performance of the product at altitude.

**Example 1:** What are the corrected CFM, static pressure, and BHP at an elevation of 5,000 ft. if the blower performance data is 6,000 CFM, 1.5 IWC and 4.0 BHP?

**Solution:** At an elevation of 5,000 ft the indoor blower will still deliver 6,000 CFM if the rpm is unchanged. However, Table 29 must be used to determine the static pressure and BHP. Since no temperature data is given, we will assume an air temperature of 70°F. Table 29 shows the correction factor to be 0.832.

$$\text{Corrected static pressure} = 1.5 \times 0.832 = 1.248 \text{ IWC}$$

$$\text{Corrected BHP} = 4.0 \times 0.832 = 3.328$$

**Example 2:** A system, located at 5,000 feet of elevation, is to deliver 6,000 CFM at a static pressure of 1.5". Use the unit blower tables to select the blower speed and the BHP requirement.

**Solution:** As in the example above, no temperature information is given so 70°F is assumed.

The 1.5" static pressure given is at an elevation of 5,000 ft. The first step is to convert this static pressure to equivalent sea level conditions.

$$\text{Sea level static pressure} = 1.5 / .832 = 1.80"$$

Enter the blower table at 6000 sCFM and static pressure of 1.8". The rpm listed will be the same rpm needed at 5,000 ft.

Suppose that the corresponding BHP listed in the table is 3.2. This value must be corrected for elevation.

$$\text{BHP at 5,000 ft} = 3.2 \times .832 = 2.66$$

# Altitude/Temperature Conversion Factor

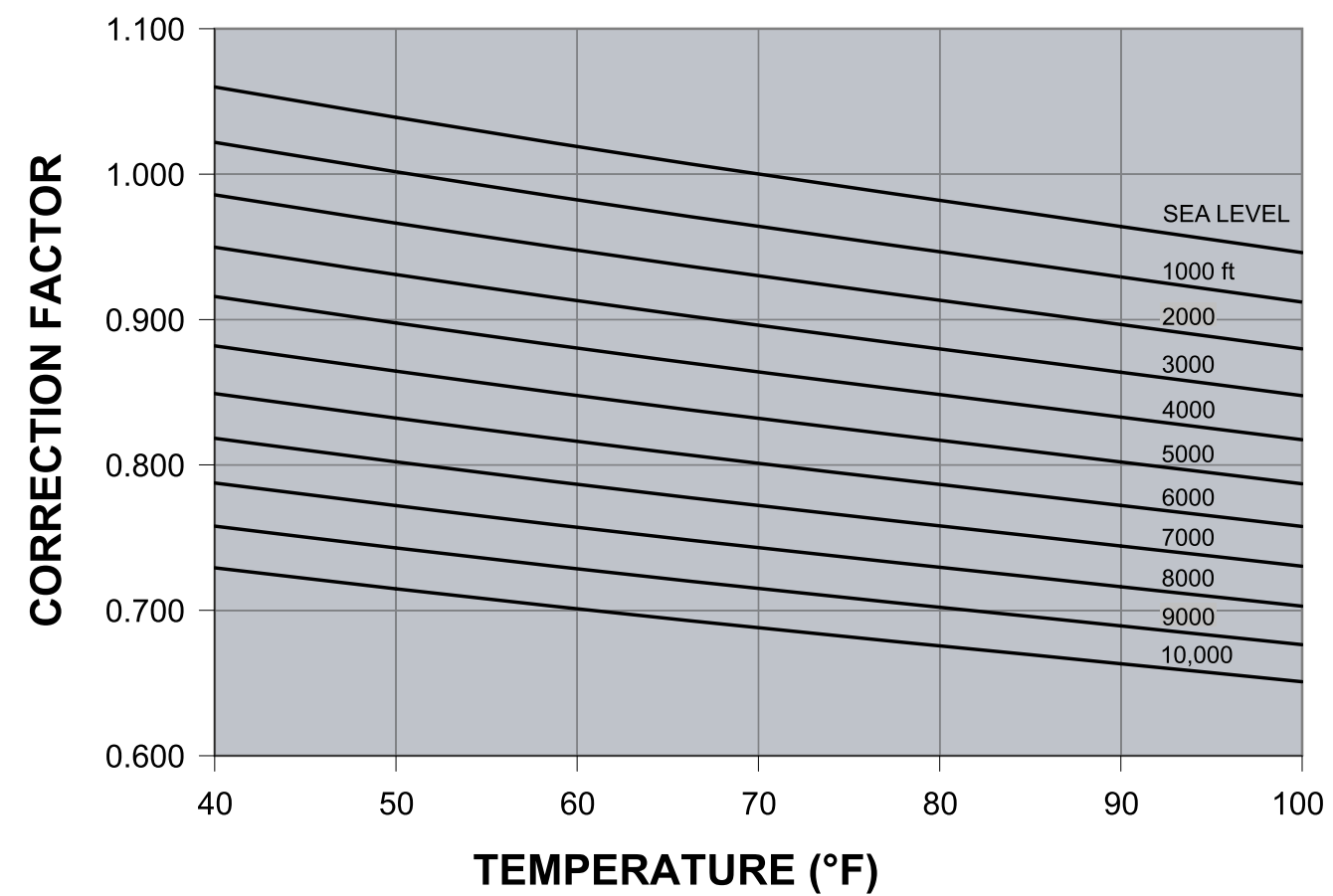


FIGURE 24 - ALTITUDE/TEMPERATURE CONVERSION FACTOR

TABLE 30: FAN PERFORMANCE - 25 TON<sup>1, 2</sup>

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|-------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|             | 0.2                                      |                  | 0.4 |                  | 0.6 |                  | 0.8 |                  | 1.0 |                  |
|             | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 4000        | 302                                      | 0.5              | 365 | 0.7              | 422 | 1.0              | 475 | 1.3              | 523 | 1.5              |
| 5000        | 341                                      | 0.9              | 396 | 1.1              | 447 | 1.4              | 495 | 1.7              | 540 | 2.0              |
| 6000        | 380                                      | 1.2              | 427 | 1.5              | 473 | 1.8              | 516 | 2.1              | 557 | 2.5              |
| 7000        | 416                                      | 1.8              | 459 | 2.1              | 500 | 2.5              | 540 | 2.8              | 578 | 3.2              |
| 8000        | 452                                      | 2.3              | 491 | 2.7              | 528 | 3.1              | 565 | 3.5              | 600 | 3.9              |
| 9000        | 492                                      | 3.2              | 527 | 3.6              | 561 | 4.0              | 594 | 4.5              | 626 | 4.9              |
| 10000       | 532                                      | 4.2              | 563 | 4.5              | 594 | 4.9              | 624 | 5.4              | 653 | 5.8              |
| 11000       | 578                                      | 5.5              | 605 | 5.9              | 632 | 6.3              | 659 | 6.7              | 686 | 7.2              |
| 12000       | 623                                      | 6.8              | 647 | 7.2              | 671 | 7.6              | 695 | 8.1              | 719 | 8.6              |
| 12500       | 639                                      | 7.4              | 664 | 7.9              | 688 | 8.4              | 712 | 8.9              | 736 | 9.5              |

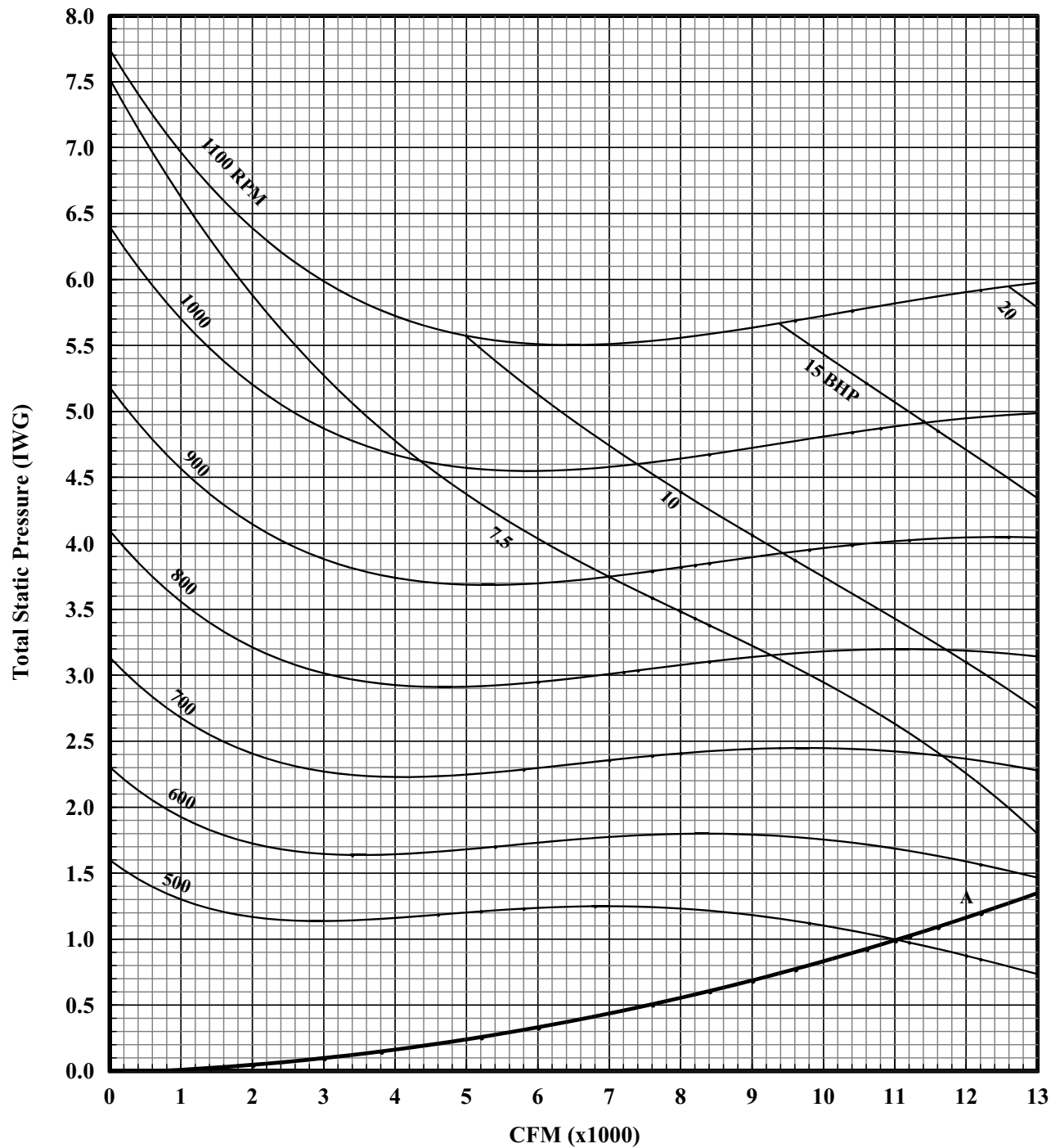
| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|-------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|             | 1.2                                      |                  | 1.4 |                  | 1.6 |                  | 1.8 |                  | 2.0 |                  |
|             | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 4000        | 568                                      | 1.8              | 609 | 2.2              | 646 | 2.5              | 681 | 2.8              | 713 | 3.2              |
| 5000        | 582                                      | 2.4              | 621 | 2.7              | 657 | 3.1              | 692 | 3.5              | 724 | 3.9              |
| 6000        | 596                                      | 2.9              | 633 | 3.3              | 669 | 3.7              | 702 | 4.1              | 735 | 4.5              |
| 7000        | 615                                      | 3.6              | 650 | 4.0              | 683 | 4.5              | 716 | 4.9              | 747 | 5.4              |
| 8000        | 633                                      | 4.4              | 666 | 4.8              | 698 | 5.3              | 729 | 5.7              | 759 | 6.2              |
| 9000        | 658                                      | 5.3              | 688 | 5.8              | 718 | 6.3              | 747 | 6.8              | 776 | 7.3              |
| 10000       | 682                                      | 6.3              | 710 | 6.8              | 738 | 7.3              | 766 | 7.8              | 793 | 8.4              |
| 11000       | 713                                      | 7.7              | 739 | 8.2              | 765 | 8.8              | 791 | 9.3              | 816 | 9.9              |
| 12000       | 743                                      | 9.1              | 767 | 9.7              | 791 | 10.2             | 815 | 10.8             | 839 | 11.4             |
| 12500       | 760                                      | 10.0             | 784 | 10.6             | 807 | 11.2             | 830 | 11.7             | 853 | 12.3             |

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|-------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|             | 2.2                                      |                  | 2.4 |                  | 2.6 |                  | 2.8 |                  | 3.0 |                  |
|             | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 4000        | 743                                      | 3.5              | 770 | 3.9              | 796 | 4.3              | 821 | 4.6              | 844 | 5.0              |
| 5000        | 754                                      | 4.3              | 783 | 4.7              | 810 | 5.1              | 836 | 5.5              | 861 | 5.9              |
| 6000        | 766                                      | 5.0              | 795 | 5.4              | 824 | 5.9              | 851 | 6.4              | 878 | 6.8              |
| 7000        | 777                                      | 5.8              | 806 | 6.3              | 834 | 6.8              | 861 | 7.3              | 888 | 7.8              |
| 8000        | 788                                      | 6.7              | 817 | 7.2              | 844 | 7.7              | 871 | 8.2              | 898 | 8.8              |
| 9000        | 804                                      | 7.8              | 831 | 8.3              | 857 | 8.9              | 883 | 9.5              | 909 | 10.0             |
| 10000       | 819                                      | 8.9              | 845 | 9.5              | 870 | 10.1             | 896 | 10.7             | 920 | 11.3             |
| 11000       | 841                                      | 10.5             | 866 | 11.1             | 890 | 11.7             | 914 | 12.3             | 938 | 12.9             |
| 12000       | 863                                      | 12.0             | 887 | 12.6             | 910 | 13.2             | 933 | 13.9             | 956 | 14.5             |
| 12500       | 876                                      | 12.9             | 899 | 13.6             | 921 | 14.2             | 943 | 14.8             | 965 | 15.5             |

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |      |                  |      |                  |      |                  |      |                  |
|-------------|------------------------------------------|------------------|------|------------------|------|------------------|------|------------------|------|------------------|
|             | 3.2                                      |                  | 3.4  |                  | 3.6  |                  | 3.8  |                  | 4.0  |                  |
|             | RPM                                      | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> |
| 4000        | 867                                      | 5.4              | 890  | 5.8              | 912  | 6.2              | 935  | 6.6              | 958  | 6.9              |
| 5000        | 885                                      | 6.4              | 909  | 6.8              | 932  | 7.2              | 956  | 7.6              | 979  | 8.0              |
| 6000        | 903                                      | 7.3              | 928  | 7.8              | 953  | 8.2              | 976  | 8.7              | 1000 | 9.1              |
| 7000        | 914                                      | 8.3              | 939  | 8.8              | 963  | 9.4              | 988  | 9.9              | 1012 | 10.5             |
| 8000        | 924                                      | 9.3              | 949  | 9.9              | 974  | 10.5             | 999  | 11.2             | 1023 | 11.8             |
| 9000        | 934                                      | 10.6             | 959  | 11.2             | 983  | 11.9             | 1007 | 12.5             | 1030 | 13.2             |
| 10000       | 944                                      | 11.9             | 968  | 12.6             | 992  | 13.2             | 1015 | 13.8             | 1037 | 14.5             |
| 11000       | 961                                      | 13.6             | 984  | 14.2             | 1007 | 14.9             | 1029 | 15.6             | 1051 | 16.2             |
| 12000       | 978                                      | 15.2             | 1000 | 15.9             | 1022 | 16.6             | 1043 | 17.3             | 1064 | 18.0             |
| 13000       | 986                                      | 16.2             | 1008 | 16.8             | 1029 | 17.5             | 1050 | 18.2             | 1070 | 19.0             |

1. Fan performance is based on wet evaporator coils, clean 2" throwaway filters and system/cabinet effects at standard air density and 0 feet elevation.
2. Refer to Tables 57, 15, 21 and 33 for component additions and deductions to fan performance tables.
3. BHP includes drive losses.
4. Shaded RPMs require Class II blower.

## 25 Ton Forward Curve



A - Standard Unit

Note: Standard Unit includes wet evaporator coil, clean 2" throwaway filters, system and cabinet effects at standard air density and 0' elevation.

FIGURE 25 - FAN PERFORMANCE - 25 TON

TABLE 31: FAN PERFORMANCE - 30 TON <sup>1, 2</sup>

| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|---------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|               | 0.2                                      |                  | 0.4 |                  | 0.6 |                  | 0.8 |                  | 1.0 |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 6000          | 405                                      | 1.3              | 450 | 1.6              | 494 | 2.0              | 535 | 2.3              | 575 | 2.7              |
| 7000          | 444                                      | 1.9              | 485 | 2.3              | 524 | 2.7              | 562 | 3.0              | 599 | 3.4              |
| 8000          | 483                                      | 2.6              | 519 | 2.9              | 555 | 3.3              | 589 | 3.7              | 623 | 4.2              |
| 9000          | 520                                      | 3.5              | 554 | 3.9              | 586 | 4.3              | 618 | 4.7              | 649 | 5.2              |
| 10000         | 558                                      | 4.5              | 588 | 4.8              | 618 | 5.2              | 647 | 5.7              | 676 | 6.2              |
| 11000         | 603                                      | 5.7              | 629 | 6.2              | 656 | 6.7              | 683 | 7.2              | 709 | 7.7              |
| 12000         | 647                                      | 7.0              | 671 | 7.5              | 695 | 8.1              | 718 | 8.6              | 742 | 9.2              |
| 13000         | 687                                      | 8.9              | 709 | 9.3              | 731 | 9.9              | 753 | 10.4             | 776 | 10.9             |
| 14000         | 728                                      | 10.7             | 748 | 11.2             | 768 | 11.6             | 789 | 12.2             | 809 | 12.7             |
| 15000         | 767                                      | 12.7             | 786 | 13.2             | 805 | 13.8             | 825 | 14.4             | 845 | 15.0             |

| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|---------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|               | 1.2                                      |                  | 1.4 |                  | 1.6 |                  | 1.8 |                  | 2.0 |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 6000          | 612                                      | 3.1              | 649 | 3.5              | 683 | 3.9              | 717 | 4.3              | 748 | 4.7              |
| 7000          | 634                                      | 3.8              | 668 | 4.3              | 701 | 4.7              | 733 | 5.1              | 763 | 5.6              |
| 8000          | 655                                      | 4.6              | 687 | 5.1              | 719 | 5.5              | 749 | 6.0              | 779 | 6.5              |
| 9000          | 680                                      | 5.6              | 710 | 6.1              | 739 | 6.6              | 768 | 7.2              | 796 | 7.7              |
| 10000         | 704                                      | 6.7              | 732 | 7.2              | 760 | 7.7              | 787 | 8.3              | 813 | 8.9              |
| 11000         | 735                                      | 8.2              | 761 | 8.7              | 787 | 9.3              | 812 | 9.8              | 837 | 10.4             |
| 12000         | 766                                      | 9.7              | 790 | 10.3             | 814 | 10.8             | 837 | 11.4             | 861 | 12.0             |
| 13000         | 798                                      | 11.5             | 820 | 12.1             | 843 | 12.7             | 865 | 13.3             | 887 | 13.9             |
| 14000         | 830                                      | 13.3             | 851 | 13.9             | 872 | 14.6             | 893 | 15.2             | 914 | 15.9             |
| 15000         | 864                                      | 15.6             | 884 | 16.3             | 904 | 16.9             | 923 | 17.6             | 943 | 18.3             |

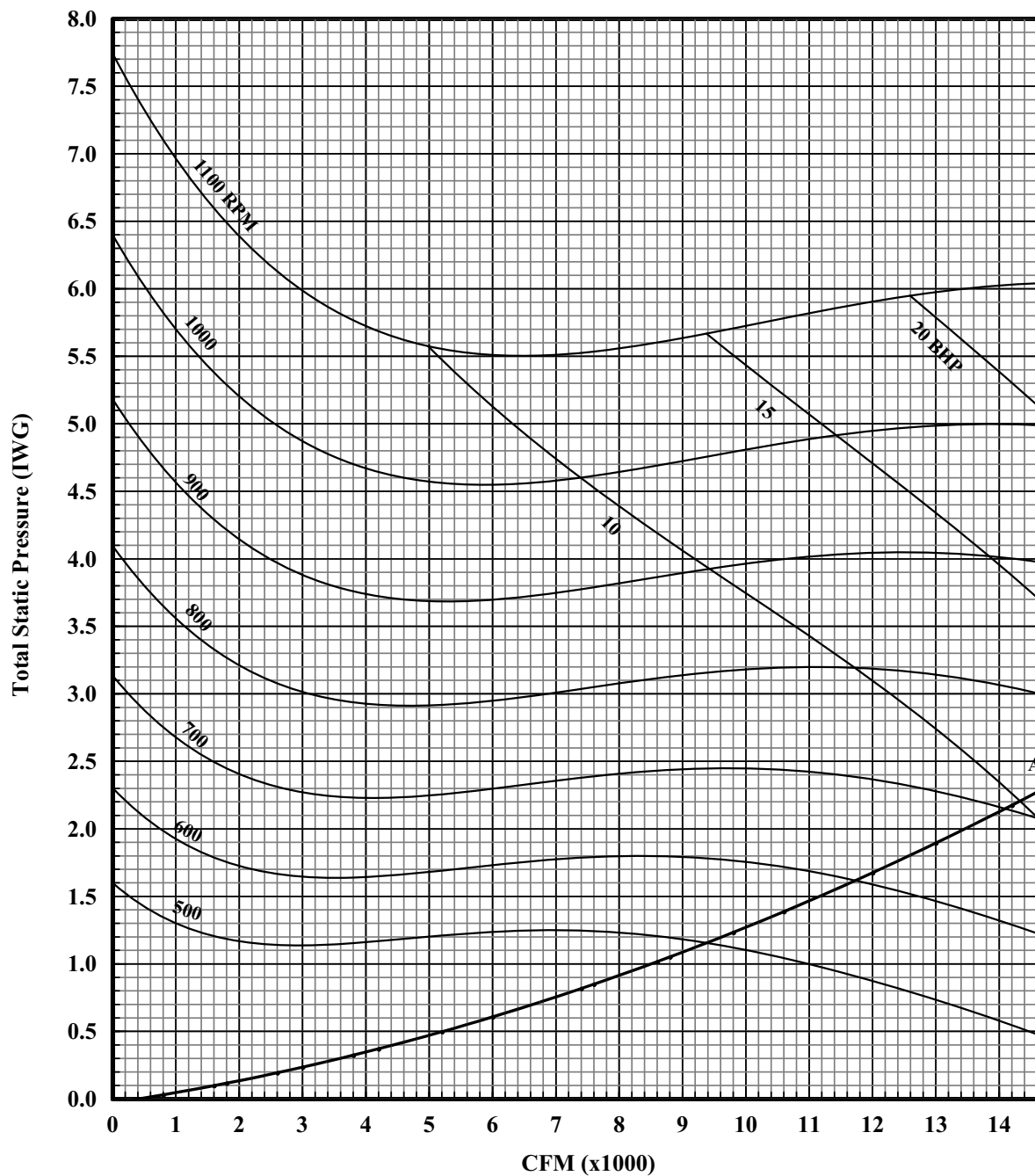
| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |      |                  |      |                  |      |                  |
|---------------|------------------------------------------|------------------|-----|------------------|------|------------------|------|------------------|------|------------------|
|               | 2.2                                      |                  | 2.4 |                  | 2.6  |                  | 2.8  |                  | 3.0  |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> |
| 6000          | 779                                      | 5.1              | 808 | 5.5              | 837  | 6.0              | 864  | 6.4              | 890  | 6.9              |
| 7000          | 793                                      | 6.1              | 822 | 6.6              | 850  | 7.0              | 877  | 7.5              | 903  | 8.1              |
| 8000          | 807                                      | 7.0              | 836 | 7.6              | 863  | 8.1              | 890  | 8.6              | 916  | 9.2              |
| 9000          | 823                                      | 8.3              | 850 | 8.8              | 877  | 9.4              | 902  | 10.0             | 928  | 10.6             |
| 10000         | 839                                      | 9.5              | 865 | 10.1             | 890  | 10.7             | 915  | 11.3             | 940  | 12.0             |
| 11000         | 862                                      | 11.0             | 886 | 11.6             | 910  | 12.2             | 934  | 12.9             | 957  | 13.5             |
| 12000         | 884                                      | 12.5             | 907 | 13.2             | 930  | 13.8             | 953  | 14.4             | 975  | 15.0             |
| 13000         | 909                                      | 14.6             | 931 | 15.2             | 953  | 15.9             | 975  | 16.5             | 996  | 17.2             |
| 14000         | 935                                      | 16.6             | 956 | 17.3             | 976  | 18.0             | 997  | 18.7             | 1017 | 19.4             |
| 15000         | 963                                      | 18.9             | 982 | 19.6             | 1002 | 20.4             | 1021 | 21.1             | 1040 | 21.8             |

| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |      |                  |      |                  |      |                  |      |                  |
|---------------|------------------------------------------|------------------|------|------------------|------|------------------|------|------------------|------|------------------|
|               | 3.2                                      |                  | 3.4  |                  | 3.6  |                  | 3.8  |                  | 4.0  |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> | RPM  | BHP <sup>3</sup> |
| 6000          | 916                                      | 7.4              | 940  | 7.9              | 964  | 8.3              | 988  | 8.8              | 1011 | 9.3              |
| 7000          | 928                                      | 8.6              | 953  | 9.1              | 977  | 9.6              | 1000 | 10.1             | 1023 | 10.7             |
| 8000          | 941                                      | 9.8              | 965  | 10.3             | 989  | 10.9             | 1013 | 11.5             | 1035 | 12.0             |
| 9000          | 952                                      | 11.2             | 976  | 11.8             | 1000 | 12.4             | 1023 | 13.0             | 1045 | 13.6             |
| 10000         | 964                                      | 12.6             | 987  | 13.2             | 1010 | 13.9             | 1033 | 14.5             | 1055 | 15.1             |
| 11000         | 981                                      | 14.1             | 1003 | 14.8             | 1025 | 15.5             | 1047 | 16.1             | 1069 | 16.8             |
| 12000         | 997                                      | 15.7             | 1019 | 16.4             | 1040 | 17.1             | 1061 | 17.8             | 1082 | 18.5             |
| 13000         | 1017                                     | 17.9             | 1038 | 18.6             | 1058 | 19.4             | 1078 | 20.1             | 1097 | 20.8             |
| 14000         | 1037                                     | 20.2             | 1056 | 20.9             | 1076 | 21.6             | 1094 | 22.4             | 1113 | 23.1             |
| 15000         | 1059                                     | 22.6             | 1078 | 23.3             | 1097 | 24.1             | 1115 | 24.9             | 1134 | 25.7             |

1. Fan performance is based on wet evaporator coils, clean 2" throwaway filters and system/cabinet effects at standard air density and 0 feet elevation.
2. Refer to Tables 57, 15, 21 and 33 for component additions and deductions to fan performance tables.
3. BHP includes drive losses.

4. Shaded RPMs require Class II blower.



A - Standard Unit

Note: Standard Unit includes wet evaporator coil, clean 2" throwaway filters, system and cabinet effects at standard air density and 0' elevation.

FIGURE 26 - FAN PERFORMANCE - 30 TON

**TABLE 32: FAN PERFORMANCE - 40 TON<sup>1,2</sup>**

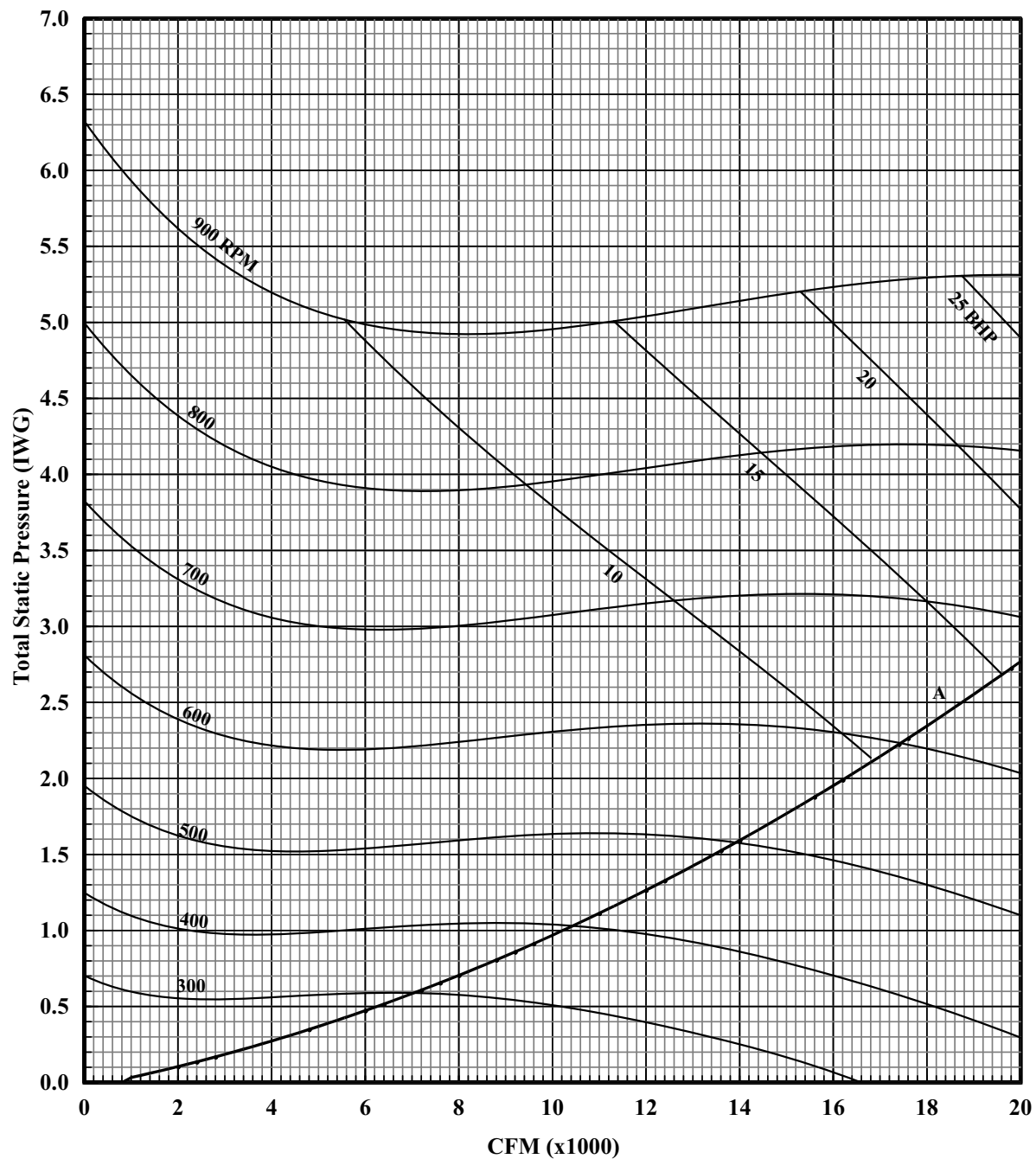
| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|---------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|               | 0.2                                      |                  | 0.4 |                  | 0.6 |                  | 0.8 |                  | 1.0 |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 8000          | 367                                      | 1.9              | 409 | 2.3              | 448 | 2.8              | 485 | 3.3              | 519 | 3.8              |
| 9000          | 396                                      | 2.5              | 433 | 3.0              | 469 | 3.5              | 504 | 4.0              | 536 | 4.5              |
| 10000         | 424                                      | 3.1              | 458 | 3.6              | 491 | 4.1              | 523 | 4.6              | 553 | 5.2              |
| 11000         | 454                                      | 4.0              | 486 | 4.5              | 516 | 5.1              | 546 | 5.6              | 574 | 6.2              |
| 12000         | 484                                      | 5.0              | 513 | 5.5              | 542 | 6.1              | 569 | 6.6              | 596 | 7.2              |
| 13000         | 507                                      | 5.9              | 535 | 6.5              | 562 | 7.1              | 589 | 7.8              | 614 | 8.4              |
| 14000         | 530                                      | 6.9              | 557 | 7.6              | 583 | 8.2              | 608 | 8.9              | 633 | 9.6              |
| 15000         | 560                                      | 8.4              | 584 | 9.1              | 609 | 9.7              | 632 | 10.4             | 655 | 11.2             |
| 16000         | 589                                      | 9.8              | 612 | 10.5             | 634 | 11.3             | 656 | 12.0             | 678 | 12.7             |
| 17000         | 613                                      | 11.7             | 635 | 12.4             | 657 | 13.1             | 678 | 13.8             | 699 | 14.6             |
| 18000         | 638                                      | 13.6             | 659 | 14.3             | 680 | 15.0             | 700 | 15.7             | 721 | 16.5             |

| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|---------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|               | 1.2                                      |                  | 1.4 |                  | 1.6 |                  | 1.8 |                  | 2.0 |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 8000          | 552                                      | 4.2              | 583 | 4.7              | 612 | 5.2              | 639 | 5.7              | 665 | 6.2              |
| 9000          | 567                                      | 5.0              | 596 | 5.5              | 624 | 6.0              | 651 | 6.6              | 677 | 7.1              |
| 10000         | 582                                      | 5.7              | 610 | 6.3              | 637 | 6.9              | 663 | 7.4              | 688 | 8.0              |
| 11000         | 602                                      | 6.8              | 628 | 7.4              | 654 | 8.0              | 679 | 8.6              | 703 | 9.2              |
| 12000         | 621                                      | 7.9              | 647 | 8.5              | 671 | 9.1              | 695 | 9.8              | 718 | 10.4             |
| 13000         | 639                                      | 9.1              | 664 | 9.7              | 687 | 10.4             | 710 | 11.1             | 733 | 11.8             |
| 14000         | 657                                      | 10.3             | 681 | 11.0             | 704 | 11.7             | 726 | 12.5             | 748 | 13.2             |
| 15000         | 678                                      | 11.9             | 700 | 12.6             | 722 | 13.3             | 744 | 14.1             | 765 | 14.9             |
| 16000         | 699                                      | 13.5             | 720 | 14.2             | 741 | 15.0             | 761 | 15.8             | 781 | 16.5             |
| 17000         | 720                                      | 15.4             | 740 | 16.1             | 760 | 16.9             | 780 | 17.8             | 799 | 18.6             |
| 18000         | 740                                      | 17.3             | 760 | 18.1             | 780 | 18.9             | 799 | 19.7             | 818 | 20.6             |

| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|---------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|               | 2.2                                      |                  | 2.4 |                  | 2.6 |                  | 2.8 |                  | 3.0 |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 8000          | 690                                      | 6.7              | 713 | 7.2              | 736 | 7.7              | 758 | 8.2              | 779 | 8.8              |
| 9000          | 701                                      | 7.7              | 725 | 8.2              | 747 | 8.8              | 769 | 9.4              | 790 | 10.0             |
| 10000         | 712                                      | 8.7              | 736 | 9.3              | 759 | 9.9              | 781 | 10.6             | 802 | 11.2             |
| 11000         | 726                                      | 9.9              | 749 | 10.5             | 771 | 11.2             | 793 | 11.9             | 814 | 12.6             |
| 12000         | 740                                      | 11.1             | 762 | 11.8             | 784 | 12.5             | 805 | 13.2             | 826 | 13.9             |
| 13000         | 755                                      | 12.5             | 776 | 13.3             | 797 | 14.0             | 818 | 14.7             | 838 | 15.5             |
| 14000         | 769                                      | 14.0             | 790 | 14.7             | 811 | 15.5             | 831 | 16.3             | 851 | 17.1             |
| 15000         | 785                                      | 15.6             | 805 | 16.4             | 825 | 17.2             | 845 | 18.0             | 864 | 18.9             |
| 16000         | 801                                      | 17.3             | 820 | 18.1             | 839 | 19.0             | 858 | 19.8             | 877 | 20.6             |
| 17000         | 819                                      | 19.4             | 837 | 20.3             | 856 | 21.1             | 874 | 22.0             | 892 | 22.9             |
| 18000         | 836                                      | 21.5             | 855 | 22.4             | 873 | 23.3             | 890 | 24.2             | 908 | 25.1             |

| AIRFLOW (CFM) | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |     |                  |     |                  |     |                  |     |                  |
|---------------|------------------------------------------|------------------|-----|------------------|-----|------------------|-----|------------------|-----|------------------|
|               | 3.2                                      |                  | 3.4 |                  | 3.6 |                  | 3.8 |                  | 4.0 |                  |
|               | RPM                                      | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> | RPM | BHP <sup>3</sup> |
| 8000          | 799                                      | 9.3              | 819 | 9.9              | 839 | 10.6             | 859 | 11.2             | 879 | 11.9             |
| 9000          | 811                                      | 10.6             | 831 | 11.3             | 851 | 11.9             | 871 | 12.6             | 891 | 13.3             |
| 10000         | 823                                      | 11.9             | 843 | 12.6             | 863 | 13.3             | 883 | 13.9             | 902 | 14.6             |
| 11000         | 834                                      | 13.3             | 855 | 14.0             | 874 | 14.7             | 894 | 15.4             | 913 | 16.1             |
| 12000         | 846                                      | 14.6             | 866 | 15.4             | 885 | 16.1             | 905 | 16.8             | 924 | 17.5             |
| 13000         | 858                                      | 16.3             | 877 | 17.0             | 896 | 17.8             | 915 | 18.6             | 934 | 19.3             |
| 14000         | 870                                      | 17.9             | 889 | 18.7             | 908 | 19.5             | 926 | 20.3             | 944 | 21.1             |
| 15000         | 882                                      | 19.7             | 901 | 20.5             | 919 | 21.4             | 937 | 22.2             | 955 | 23.1             |
| 16000         | 895                                      | 21.5             | 913 | 22.4             | 931 | 23.3             | 948 | 24.2             | 966 | 25.1             |
| 17000         | 910                                      | 23.8             | 928 | 24.7             | 945 | 25.6             | 962 | -                | -   | -                |
| 18000         | 925                                      | 26.0             | -   | -                | -   | -                | -   | -                | -   | -                |

1. Fan performance is based on wet evaporator coils, clean 2" throwaway filters and system/cabinet effects at standard air density and 0 feet elevation.
2. Refer to Tables 58, 18, 49 and 33 for component additions and deductions to fan performance tables.
3. BHP includes drive losses.
4. Shaded RPMs require Class II blower.

**40 Ton Forward Curve**

A - Standard Unit

Note: Standard Unit includes wet evaporator coil, clean 2" throwaway filters, system and cabinet effects at standard air density and 0' elevation.

**FIGURE 27 - FAN PERFORMANCE - 40 TON**

**TABLE 33: COMPONENT STATIC RESISTANCE<sup>1, 2</sup>**

| COMPONENT COIL LOSSES  | CFM      |          |          |          |          |          |          |          |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
|                        | 4,000    | 6,000    | 8,000    | 10,000   | 12,000   | 14,000   | 16,000   | 18,000   |
| <b>COIL LOSSES 25T</b> |          |          |          |          |          |          |          |          |
| 3 Row, 16 FPI, dry     | -0.14    | -0.18    | -0.24    | -0.34    | -0.45    | -        | -        | -        |
| 3 Row, 16 FPI, wet     | Baseline | Baseline | Baseline | Baseline | Baseline | -        | -        | -        |
| <b>COIL LOSSES 30T</b> |          |          |          |          |          |          |          |          |
| 4 Row, 16 FPI, dry     | -0.18    | -0.22    | -0.32    | -0.45    | -0.60    | -0.76    | -        | -        |
| 4 Row, 16 FPI, wet     | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline | -        | -        |
| <b>COIL LOSSES 40T</b> |          |          |          |          |          |          |          |          |
| 4 Row, 16 FPI, dry     | -0.15    | -0.22    | -0.26    | -0.31    | -0.42    | -0.53    | -0.65    | -0.79    |
| 4 Row, 16 FPI, wet     | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline |
| <b>FILTER LOSSES</b>   |          |          |          |          |          |          |          |          |
| 2" TA or HI EFF.       | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline | Baseline |
| Rigid 6", 65%          | 0.06     | 0.12     | 0.19     | 0.27     | 0.36     | 0.46     | 0.58     | 0.70     |
| Rigid 6", 95%          | 0.13     | 0.26     | 0.41     | 0.60     | 0.81     | 1.04     | 1.29     | 1.57     |
| <b>IGV LOSSES</b>      |          |          |          |          |          |          |          |          |
| 25 & 30 Ton F.C.       | 0.02     | 0.05     | 0.08     | 0.13     | 0.19     | 0.26     | 0.34     | 0.43     |
| 40 Ton F.C.            | 0.01     | 0.03     | 0.05     | 0.08     | 0.11     | 0.15     | 0.19     | 0.25     |
| <b>GAS HEAT</b>        |          |          |          |          |          |          |          |          |
| 267 MBH Heat           | 0.07     | 0.11     | 0.14     | 0.18     | 0.21     | 0.25     | 0.28     | 0.32     |
| 533 MBH Heat           | 0.14     | 0.21     | 0.28     | 0.35     | 0.42     | 0.49     | 0.57     | 0.64     |
| 800 MBH Heat           | 0.21     | 0.32     | 0.42     | 0.53     | 0.64     | 0.74     | 0.85     | 0.95     |
| <b>ELECTRIC HEAT</b>   |          |          |          |          |          |          |          |          |
| 40KW                   | 0.01     | 0.02     | 0.04     | 0.06     | 0.10     | 0.20     | 0.31     | 0.40     |
| 80KW                   | 0.01     | 0.04     | 0.08     | 0.13     | 0.20     | 0.31     | 0.44     | 0.56     |
| 108KW                  | 0.02     | 0.05     | 0.10     | 0.15     | 0.31     | 0.43     | 0.53     | 0.68     |
| <b>ECONOMIZER</b>      |          |          |          |          |          |          |          |          |
|                        | 0.03     | 0.06     | 0.10     | 0.15     | 0.21     | 0.28     | 0.35     | 0.43     |
| <b>POWER EXHAUST</b>   |          |          |          |          |          |          |          |          |
|                        | 0.02     | 0.05     | 0.08     | 0.13     | 0.18     | 0.25     | 0.32     | 0.41     |

1. Baseline losses based on system/cabinet effects, wet standard coil and 2" throwaway filters at 70°F, 0 feet elevation with standard air.

2. See Tables 57, 58, 15, 18 and 21 for hot water and steam water coil static resistance.

TABLE 34: SUPPLY FAN MOTOR AND DRIVE DATA

| Model  | Blower RPM Range | Motor |            |                               |                                     | Motor Pulley       |               | Blower Pulley      |               | Belts       |     |
|--------|------------------|-------|------------|-------------------------------|-------------------------------------|--------------------|---------------|--------------------|---------------|-------------|-----|
|        |                  | HP    | Frame Size | Motor Efficiency (Std. Motor) | Motor Efficiency (Ultra Hi Eff Opt) | Pitch Dia (Inches) | Bore (Inches) | Pitch Dia (Inches) | Bore (Inches) | Designation | Qty |
| 25 Ton | 567              | 7.5   | 213T       | 88.5                          | 91.7                                | 4.5                | 1-3/8         | 13.9               | 2-3/16        | BX56        | 2   |
|        | 692              | 10    | 215T       | 89.5                          | 91                                  | 5.5                | 1-3/8         | 13.9               | 2-3/16        | BX56        | 2   |
|        | 793              | 15    | 254T       | 91                            | 91.7                                | 6.3                | 1-5/8         | 13.9               | 2-3/16        | BX56        | 2   |
|        | 894              | 20    | 256T       | 91                            | 93                                  | 7.1                | 1-5/8         | 13.9               | 2-3/16        | BX56        | 2   |
| 30 Ton | 617              | 10    | 215T       | 89.5                          | 91                                  | 4.9                | 1-3/8         | 13.9               | 2-3/16        | BX56        | 2   |
|        | 743              | 15    | 254T       | 91                            | 91.7                                | 5.9                | 1-5/8         | 13.9               | 2-3/16        | BX56        | 2   |
|        | 856              | 20    | 256T       | 91                            | 93                                  | 6.7                | 1-5/8         | 13.7               | 2-3/16        | 5VX610      | 2   |
|        | 907              | 25    | 284T       | 91.7                          | 93.6                                | 7.1                | 1-7/8         | 13.7               | 2-3/16        | 5VX610      | 2   |
| 40 Ton | 617              | 10    | 215T       | 89.5                          | 91                                  | 4.9                | 1-3/8         | 13.9               | 2-7/16        | BX67        | 2   |
|        | 652              | 15    | 254T       | 91                            | 91.7                                | 5.1                | 1-5/8         | 13.7               | 2-7/16        | 5VX710      | 2   |
|        | 728              | 20    | 256T       | 91                            | 93                                  | 5.7                | 1-5/8         | 13.7               | 2-7/16        | 5VX710      | 2   |
|        | 780              | 25    | 284T       | 91.7                          | 93.6                                | 6.1                | 1-7/8         | 13.7               | 2-7/16        | 5VX710      | 2   |

TABLE 35: EXHAUST FAN DRIVE DATA

| Model  | Blower RPM Range | Motor |            |                        |                        | Motor Pulley       |               | Blower Pulley      |               | Belts       |     |
|--------|------------------|-------|------------|------------------------|------------------------|--------------------|---------------|--------------------|---------------|-------------|-----|
|        |                  | HP    | Frame Size | Motor Eff (Std. Motor) | Motor Eff (Hi Eff opt) | Pitch Dia (Inches) | Bore (Inches) | Pitch Dia (Inches) | Bore (Inches) | Designation | Qty |
| 25 Ton | 758              | 5     | 213T       | 87.5                   | 89.5                   | 4.9                | 1-3/8         | 11.3               | 2-3/16        | BX63        | 2   |
|        | 852              | 7.5   | 215T       | 88.5                   | 91.7                   | 5.5                | 1-3/8         | 11.3               | 2-3/16        | BX63        | 2   |
|        | 976              | 10    | 215T       | 89.5                   | 91                     | 6.3                | 1-5/8         | 11.3               | 2-3/16        | BX63        | 2   |
| 30 Ton | 852              | 7.5   | 213T       | 84                     | 86.5                   | 5.5                | 1-3/8         | 11.3               | 1-11/16       | B65         | 2   |
|        | 976              | 10    | 215T       | 86.5                   | 89.5                   | 6.3                | 1-3/8         | 11.3               | 1-11/16       | B65         | 2   |
|        | 1069             | 15    | 254T       | 85.7                   | 89.5                   | 6.9                | 1-3/8         | 11.3               | 1-11/16       | B65         | 2   |
| 40 Ton | 852              | 7.5   | 184T       | 84                     | 86.5                   | 5.5                | 1-3/8         | 11.3               | 1-11/16       | B65         | 2   |
|        | 976              | 10    | 215T       | 86.5                   | 89.5                   | 6.3                | 1-3/8         | 11.3               | 1-11/16       | B65         | 2   |
|        | 1069             | 15    | 254T       | 85.7                   | 89.5                   | 6.9                | 1-3/8         | 11.3               | 1-11/16       | B65         | 2   |

**TABLE 36: POWER EXHAUST - ONE FORWARD CURVED FAN 25 TON<sup>1</sup>**

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |      |                  |      |                  |      |                  |      |                  |
|-------------|------------------------------------------|------------------|------|------------------|------|------------------|------|------------------|------|------------------|
|             | 0.2                                      |                  | 0.4  |                  | 0.6  |                  | 0.8  |                  | 1.0  |                  |
|             | RPM                                      | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> |
| 2000        | ---                                      | ---              | ---  | ---              | 524  | 0.3              | 609  | 0.4              | 685  | 0.6              |
| 3000        | ---                                      | ---              | 450  | 0.4              | 531  | 0.5              | 605  | 0.7              | 672  | 0.8              |
| 4000        | 442                                      | 0.7              | 496  | 0.8              | 562  | 0.9              | 626  | 1.1              | 687  | 1.2              |
| 5000        | 524                                      | 1.2              | 566  | 1.4              | 609  | 1.5              | 663  | 1.7              | 717  | 1.8              |
| 6000        | 612                                      | 1.9              | 646  | 2.2              | 679  | 2.4              | 717  | 2.6              | 762  | 2.7              |
| 7000        | 703                                      | 3.0              | 731  | 3.3              | 759  | 3.5              | 787  | 3.7              | 820  | 4.0              |
| 8000        | 791                                      | 3.8              | 821  | 4.3              | 844  | 4.8              | 868  | 5.2              | 892  | 5.5              |
| 9000        | 877                                      | 5.8              | 911  | 6.2              | 932  | 6.5              | 953  | 6.9              | 974  | 7.3              |
| 10000       | 967                                      | 8.4              | 1004 | 8.8              | 1022 | 9.1              | 1041 | 9.4              | 1059 | 9.8              |

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                  |      |                  |      |                  |      |                  |      |                  |
|-------------|------------------------------------------|------------------|------|------------------|------|------------------|------|------------------|------|------------------|
|             | 1.2                                      |                  | 1.4  |                  | 1.6  |                  | 1.8  |                  | 2.0  |                  |
|             | RPM                                      | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> | RPM  | BHP <sup>2</sup> |
| 2000        | 754                                      | 0.7              | 819  | 0.8              | 878  | 0.9              | 933  | 1.1              | 986  | 1.2              |
| 3000        | 736                                      | 1.0              | 797  | 1.1              | 854  | 1.3              | 909  | 1.5              | 961  | 1.7              |
| 4000        | 743                                      | 1.4              | 799  | 1.5              | 850  | 1.7              | 900  | 1.9              | 948  | 2.1              |
| 5000        | 768                                      | 2.0              | 818  | 2.2              | 865  | 2.4              | 911  | 2.6              | 955  | 2.8              |
| 6000        | 806                                      | 2.9              | 850  | 3.1              | 895  | 3.3              | 937  | 3.6              | 978  | 3.8              |
| 7000        | 857                                      | 4.2              | 895  | 4.4              | 933  | 4.6              | 972  | 4.8              | 1010 | 5.0              |
| 8000        | 921                                      | 5.7              | 953  | 6.0              | 985  | 6.2              | 1018 | 6.5              | 1052 | 6.8              |
| 9000        | 995                                      | 7.6              | 1020 | 8.0              | 1048 | 8.3              | 1075 | 8.5              | 1103 | 8.8              |
| 10000       | 1077                                     | 10.1             | 1096 | 10.4             | 1119 | 10.8             | 1143 | 11.1             | 1167 | 11.4             |

<sup>1.</sup> Fan performance is based on system/cabinet effects and back draft damper effects at standard air density and 0 feet of elevation.

<sup>2.</sup> BHP includes 5% drive losses.

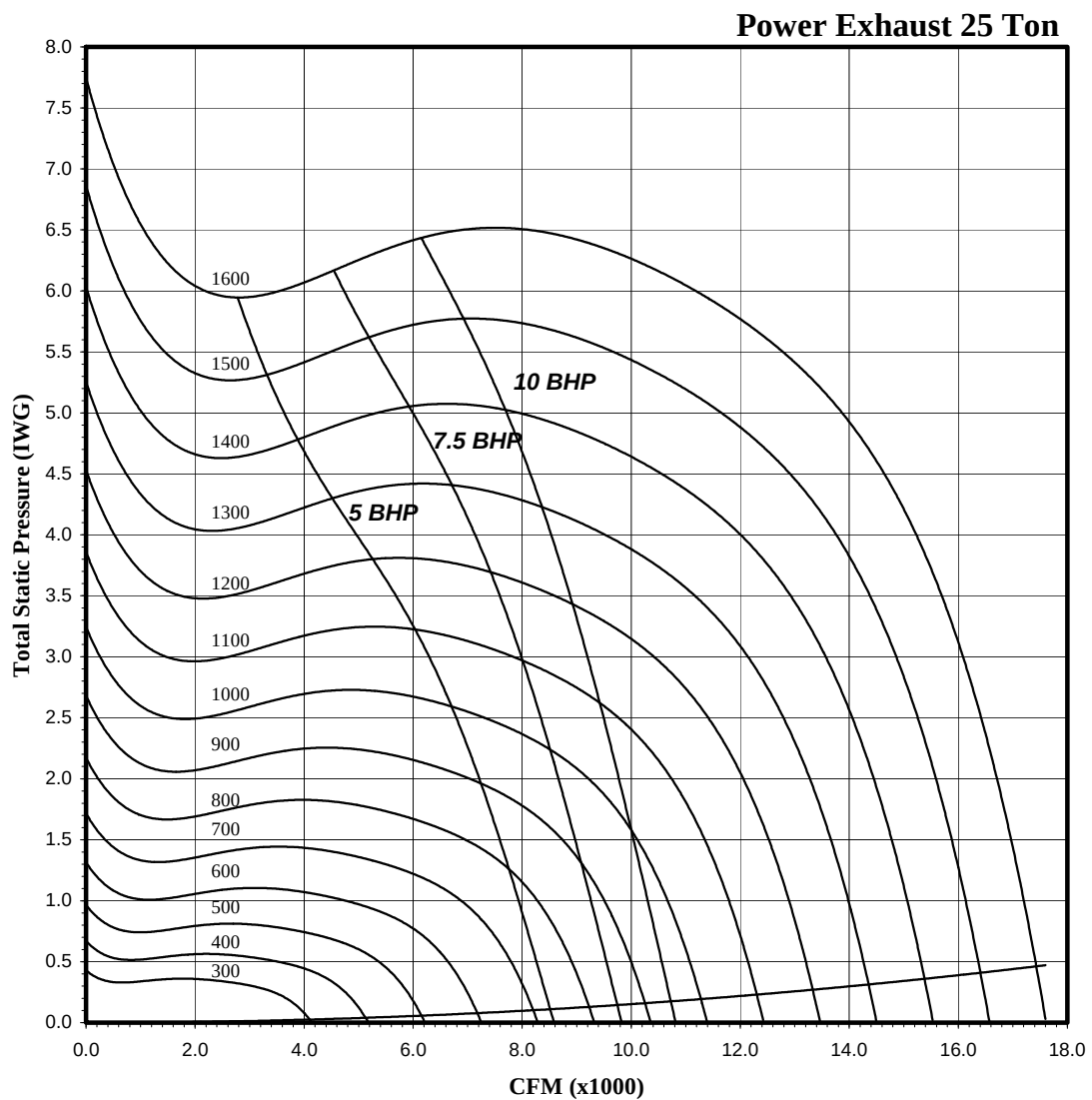
**FIGURE 28 - POWER EXHAUST - ONE FORWARD CURVE FAN - 25 TONS**

**TABLE 37: POWER EXHAUST - TWO FORWARD CURVED FANS - 30 & 40 TON<sup>1</sup>**

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                    |      |                    |      |                    |      |                    |      |                    |
|-------------|------------------------------------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|
|             | 0.2                                      |                    | 0.4  |                    | .06  |                    | 0.8  |                    | 1.0  |                    |
|             | RPM                                      | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> |
| 4000        | 363                                      | 0.32               | 468  | 0.53               | 560  | 0.74               | 641  | 0.95               | 716  | 1.16               |
| 5000        | 402                                      | 0.53               | 494  | 0.74               | 576  | 1.05               | 652  | 1.26               | 722  | 1.47               |
| 6000        | 445                                      | 0.84               | 527  | 1.05               | 602  | 1.37               | 670  | 1.68               | 735  | 2.00               |
| 7000        | 494                                      | 1.26               | 565  | 1.58               | 633  | 1.79               | 697  | 2.10               | 757  | 2.52               |
| 8000        | 544                                      | 1.79               | 609  | 2.10               | 670  | 2.42               | 729  | 2.73               | 784  | 3.15               |
| 9000        | 597                                      | 2.42               | 654  | 2.84               | 711  | 3.15               | 765  | 3.47               | 817  | 3.89               |
| 10000       | 651                                      | 3.26               | 703  | 3.68               | 754  | 3.99               | 805  | 4.41               | 853  | 4.83               |
| 11000       | 705                                      | 4.31               | 753  | 4.73               | 801  | 5.15               | 847  | 5.57               | 893  | 5.99               |
| 12000       | 761                                      | 5.46               | 805  | 5.88               | 849  | 6.30               | 893  | 6.83               | 934  | 7.25               |
| 13000       | 817                                      | 6.93               | 858  | 7.35               | 899  | 7.77               | 939  | 8.30               | 979  | 8.82               |
| 14000       | 874                                      | 8.51               | 912  | 9.03               | 950  | 9.56               | 988  | 9.98               | 1025 | 10.50              |
| 15000       | 932                                      | 10.40              | 967  | 10.92              | 1002 | 11.55              | 1037 | 12.08              | 1072 | 12.60              |
| 16000       | 989                                      | 12.60              | 1022 | 13.23              | 1055 | 13.76              | 1088 | 14.28              | -    | -                  |

| AIRFLOW CFM | AVAILABLE EXTERNAL STATIC PRESSURE (IWG) |                    |      |                    |      |                    |      |                    |      |                    |
|-------------|------------------------------------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|
|             | 1.2                                      |                    | 1.4  |                    | 1.6  |                    | 1.8  |                    | 2    |                    |
|             | RPM                                      | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> | RPM  | BHP <sup>2 3</sup> |
| 4000        | 783                                      | 1.47               | 844  | 1.68               | 903  | 1.89               | 956  | 2.21               | 1008 | 2.42               |
| 5000        | 788                                      | 1.79               | 848  | 2.10               | 906  | 2.42               | 959  | 2.63               | 1011 | 2.94               |
| 6000        | 798                                      | 2.21               | 855  | 2.63               | 911  | 2.94               | 963  | 3.26               | 1014 | 3.57               |
| 7000        | 814                                      | 2.84               | 869  | 3.15               | 922  | 3.47               | 972  | 3.89               | 1021 | 4.20               |
| 8000        | 837                                      | 3.47               | 889  | 3.89               | 938  | 4.20               | 987  | 4.62               | 1033 | 5.04               |
| 9000        | 866                                      | 4.31               | 915  | 4.73               | 961  | 5.15               | 1007 | 5.57               | 1050 | 5.99               |
| 10000       | 900                                      | 5.25               | 945  | 5.67               | 989  | 6.20               | 1032 | 6.62               | 1073 | 7.14               |
| 11000       | 936                                      | 6.41               | 979  | 6.93               | 1020 | 7.35               | 1061 | 7.88               | 1101 | 8.30               |
| 12000       | 976                                      | 7.77               | 1016 | 8.30               | 1055 | 8.72               | 1094 | 9.24               | 1131 | 9.77               |
| 13000       | 1018                                     | 9.35               | 1055 | 9.87               | 1093 | 10.40              | 1129 | 10.92              | 1165 | 11.55              |
| 14000       | 1061                                     | 11.13              | 1098 | 11.66              | 1133 | 12.29              | 1167 | 12.92              | 1202 | 13.44              |
| 15000       | 1107                                     | 13.23              | 1141 | 13.76              | 1175 | 14.39              | 1208 | 14.91              | 1240 | 15.54              |

1. Fan performance is based on system/cabinet effects and back draft damper effects at standard air density and 0 feet elevation.
2. BHP includes the sum of both exhaust fan motors.
3. BHP includes 5% drive losses.

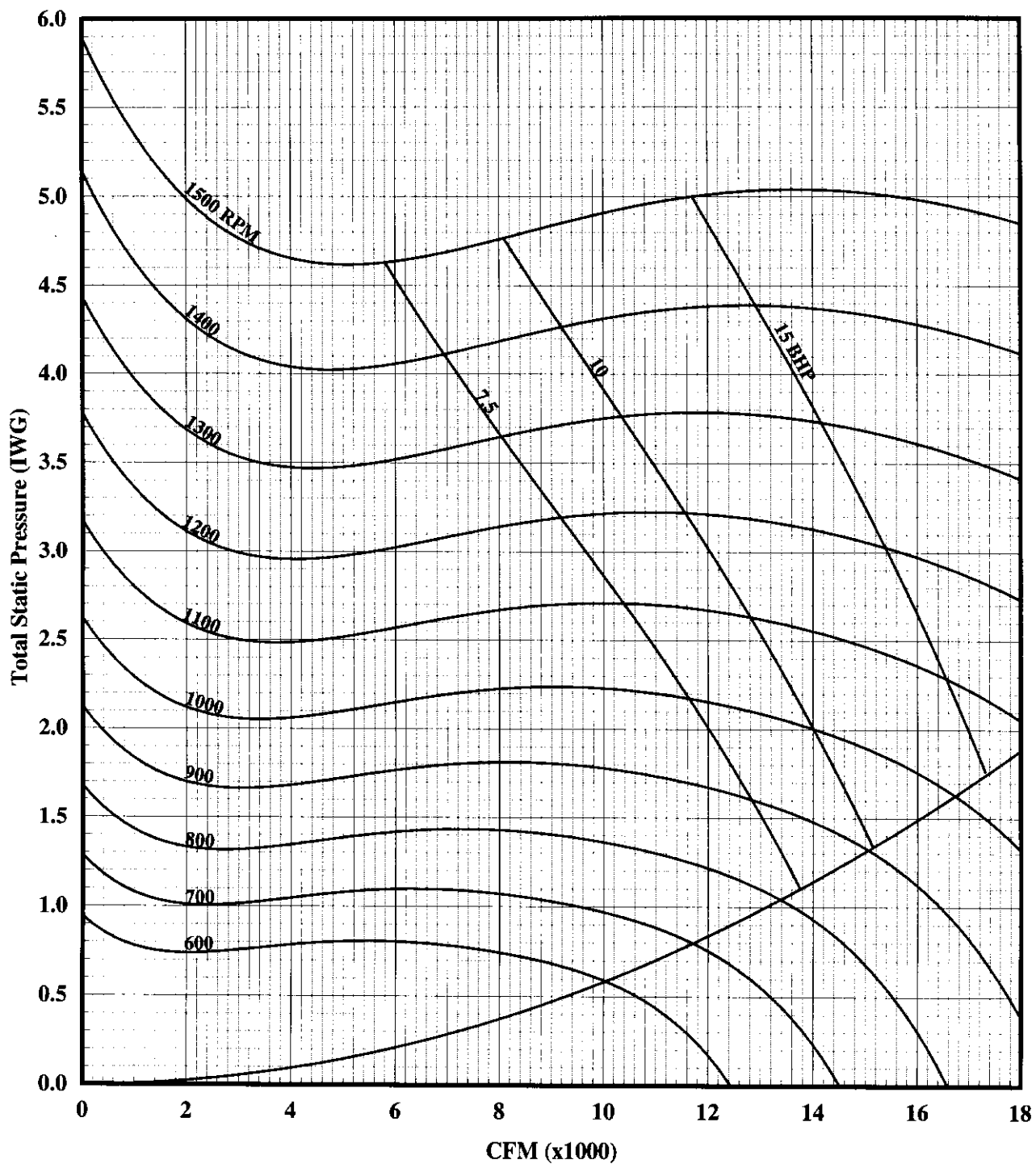
**Power Exhaust**

FIGURE 29 - POWER EXHAUST - TWO FORWARD CURVED FANS - 30 &amp; 40 TONS

## START-UP

### COMPRESSOR ROTATION

Check for proper compressor rotation (See page 70 for symptoms of reverse compressor operations). Series 40 units are properly phased at the factory. If the blower, condenser fan, or compressor, rotate in the wrong direction at start-up, the electrical connection to the unit is misphased. Change the incoming line connection phasing to obtain proper rotation.

### CAUTION

Scroll compressors require proper rotation to operate correctly. Units are properly phased at the factory. DO NOT change the internal wiring to make the blower, condenser fans or compressor rotate correctly.

### SUPPLY AIR FAN INSTRUCTIONS

#### CHECK BLOWER BEARING SET SCREWS

- The bearing set screws on the supply air blower are properly torqued before shipment. However, in transit they may loosen. Prior to start up they should be rechecked. The set screws are 3/8" and the torque range is 200 - 215 in.-lbs.

**NOTE:** If a unit is equipped with exhaust fans, those bearing set screws should also be rechecked. The set screws are 1/4 inch and the torque range is 70 - 87 in.-lbs.

#### CHECKING SUPPLY AIR CFM

The RPM of the supply air blower will depend on the required CFM, the static pressure resistances of the unit components (Tables 33, 48, 49, 57, and 58) and the static pressure resistances of both the supply and the return air duct systems. With this information, the RPM for the supply air blower can be determined from the blower performance data in Tables 30, 31, and 32. See Table 34 for pulley and drive information for the fixed pitch pulleys supplied on the unit.

The supply air CFM must be within the limitations shown in Table 2, and Class II fans must be specified where conditions exceed the rpm limitations of Class I.

**NOTE:** If unit is equipped with power exhaust fans or return air fan see Tables 36 and 37 for fan performance and for pulley and drive information see Table 35.

#### FAN ROTATION

Check for proper supply air blower rotation. If fans are rotating backwards the line voltage to unit point of power connection is misphased (see Compressor Rotation above.) If the

condenser fans are rotating in the correct direction and the supply fan is not, it will be necessary to switch leads on the output side of the VFD, since changing phase on the input side of a VFD does not change rotation on the output side. If the VFD is equipped with a bypass, verify that rotation is correct in the bypass mode.

**NOTE:** If unit is equipped with power exhaust fans or return air fan also check them for proper rotation.

VFD units with bypass must not have the bypass activated unless all individual space dampers are full open. It is the responsibility of the installer to interconnect the bypass mode to the signal to open all boxes on the circuit.

### BELT TENSION

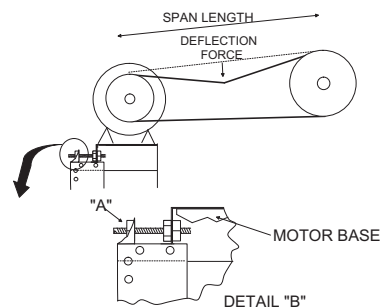
The tension on the belt should be adjusted as shown in Figure 30 and Table 38.

**NOTE:** If unit is equipped with power exhaust fans or return air fan check belt tension and adjust as necessary.

#### CAUTION

##### PROCEDURE FOR ADJUSTING BELT TENSION

- Loosen four bolts holding motor base to channels
- Adjust belt by turning nuts "A" (see detail "B").
- Using a belt tension checker, apply a perpendicular force to one belt at the midpoint of the span as shown. The deflection force should be applied until a specific deflection distance of 1/64" per inch of span length is obtained.
- To determine the deflection distance from normal position, use a straight edge from sheave to sheave as a reference line. Use the recommended deflection force per Belt Adjustment Table.



Tension new belts at the maximum deflection force recommended. Check the belt tension at least two times during the first 24 hrs. of operation. Any re-tensioning should fall between the min. and max. deflection force values.

- After adjusting, retighten bolts holding motor base to channel.

**FIGURE 30 - BELT TENSION ADJUSTMENT**

### AIR BALANCE

Start the supply air blower motor. Adjust the resistances in both the supply and the return air duct systems to balance the air distribution throughout the conditioned space. The job specifications may require that this balancing be done by someone other than the equipment installer.

**CHECKING AIR QUANTITY****⚠ CAUTION**

On VAV and VFD units be certain all IGV's on VAV unit are full open, VFD drive is set to maximum output, exhaust dampers are closed and individual space damper boxes are full open.

VFD units with bypass must not have the bypass activated unless all individual space dampers are full open.

**TABLE 38: BELT ADJUSTMENT**

| FAN MOTOR HORSE POWER                    | 5                 | 7.5  | 10   | 15   | 20   | 25   |
|------------------------------------------|-------------------|------|------|------|------|------|
| <b>30 TON FORWARD CURVED SUPPLY FAN</b>  | SIZE: 22 X 20     |      |      |      |      |      |
| Belt Deflection Force (lbs) new belts    | -                 | -    | 10.5 | 12.6 | 15.2 | 22.1 |
| Belt Deflection Force (lbs) old belts    | -                 | -    | 7.1  | 8.5  | 10.2 | 14.8 |
| <b>40 TON FORWARD CURVED SUPPLY FAN</b>  | SIZE: 25 X 20     |      |      |      |      |      |
| Belt Deflection Force (lbs) new belts    | -                 | -    | 10.5 | 12.6 | 15.2 | 15.2 |
| Belt Deflection Force (lbs) old belts    | -                 | -    | 7.1  | 8.5  | 10.2 | 10.2 |
| <b>30 &amp; 40 TON POWER EXHAUST FAN</b> | SIZE: (2) 15 X 15 |      |      |      |      |      |
| Belt Deflection Force (lbs) new belts    | -                 | 7.9  | 9.4  | 9.4  | -    | -    |
| Belt Deflection Force (lbs) old belts    | -                 | 5.3  | 6.3  | 6.3  | -    | -    |
| <b>25 TON FORWARD CURVE SUPPLY FAN</b>   | SIZE: 22 X 20     |      |      |      |      |      |
| New Belt                                 | -                 | 10.5 | 10.5 | 12.6 | 15.2 | -    |
| Old Belt                                 | -                 | 7.1  | 7.1  | 8.5  | 10.2 | -    |
| <b>25 TON POWER EXHAUST</b>              |                   |      |      |      |      |      |
| New Belt                                 | 10.5              | 10.5 | 12.6 | -    | -    | -    |
| Old Belt                                 | 7.1               | 7.1  | 8.5  | -    | -    | -    |

1. Remove the dot plugs from the two 5/16 inch holes in the blower motor and the filter access doors.
2. Insert at least 8 inch of 1/4 inch metal tubing into each of these holes for sufficient penetration into the air flow on both sides of the indoor coil.
3. Using an inclined manometer or other high resolution pressure measurement device, determine the pressure drop across a dry evaporator coil. Since the moisture on an evaporator coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To assure a dry coil, the compressors should be de-activated while the test is being run.
4. Knowing the pressure drop across a dry coil, the actual CFM through the unit with clean 2 inch filters, can be determined from the curve in Figure 59 and 60.

**NOTE:** De-energize the compressors before taking any test measurements to assure a dry evaporator coil.

**⚠ WARNING**

Failure to properly adjust the total system air quantity can result in extensive blower or duct damage.

After readings have been obtained, remove the tubes and reinstall the two 5/16 inch dot plugs.

It is especially important to limit the rpm of the fan in VFD-bypass-equipped units; it may be tempting to set max rpm in the VFD to less than 60 Hz - but the bypass will go to 60 Hz immediately on activation.

**SUPPLY AIR DRIVE ADJUSTMENT****⚠ CAUTION**

Before making any blower speed changes review the installation for any installation errors, leaks or undesirable systems effects that can result in loss of air flow.

Even small changes in blower speed can result in substantial changes in static pressure and BHP. BHP or AMP draw of the blower motor will increase (see table 39) by the cube ratio of the blower speed. Static pressure will increase by the square ratio of the blower speed. Tables 40, 41 and 42 are for reference only. All blower speed changes must be made by qualified personnel with strict adherence to the fan laws.

At unit start-up the measured CFM based on Figures 59 and 60 may be higher or lower than the specified CFM. To achieve the specified CFM, the speed of the drive may have to be decreased or increased by changing the pitch diameter (PD) of the motor sheave as outlined below:

- $(\text{Specified CFM} / \text{Measured CFM}) \times \text{PD of standard sheave} = \text{PD of new sheave}.$

Use the following tables and the PD calculated per the above equation to select a new motor sheave.

**EXAMPLE**

- A 30 ton unit was selected to deliver 12,000 CFM with a 20 HP motor and a 856 RPM drive, but the unit is only delivering 11,000 CFM per Figure 26.
- Use the equation to determine the required PD for the new motor sheave  $(12,000 \text{ CFM} / 11,000 \text{ CFM} \times 6.7" = 7.3091 \text{ inch}).$
- Use the 30 ton table to select a Browning 2B5V74 which will increase the speed of the unit's drive and its supply air CFM to 111.9%. Thus select the 7.5" PD at 112% increase over standard.

- New drive speed =  $1.1194 \times 856 = 958.2 \text{ RPM}$
- New supply air =  $1.1194 \times 11,000 = 12,313 \text{ CFM}$
- Re-use the existing belts and blower sheave.

New motor BHP =  $(\text{speed increase})^3 \times \text{estimated motor BHP at original start-up with 11,000 CFM and 856 RPM} = (1.119)^3 \times 11 \text{ BHP} = 1.4012 \times 11 \text{ BHP} = 15.41 \text{ BHP}$  New motor amps =  $(\text{speed increase})^3 \times \text{measured motor amps at original start-up with 11,000 CFM and 856 RPM}.$

**TABLE 39: BLOWER SPEED RATE OF CHANGE**

| CHANGE IN RPM | CHANGE IN |      |                    |
|---------------|-----------|------|--------------------|
|               | CFM       | TSP  | BHP AND MOTOR AMPS |
| .90           | .90       | .81  | .73                |
| .93           | .93       | .86  | .79                |
| .95           | .95       | .90  | .86                |
| .98           | .98       | .95  | .93                |
| 1.00          | 1.00      | 1.00 | 1.00               |
| 1.03          | 1.03      | 1.05 | 1.08               |
| 1.05          | 1.05      | 1.10 | 1.16               |
| 1.08          | 1.08      | 1.16 | 1.24               |
| 1.10          | 1.10      | 1.21 | 1.33               |
| 1.13          | 1.13      | 1.27 | 1.42               |
| 1.15          | 1.15      | 1.32 | 1.52               |
| 1.18          | 1.18      | 1.38 | 1.62               |
| 1.20          | 1.20      | 1.44 | 1.73               |

**SYSTEM SETPOINTS****Constant Volume and Variable Air Volume:**

Thermostat and space sensor offsets must be made external to the unit. For internal settings, refer to the Settable Parameters in the Unit Control document. All parameters affecting the unit with that specific set of options and for that specific application must be reviewed. In many cases, the default settings will be fine - but verify and fine tune where necessary.

**TABLE 40: 25 TON DRIVE ADJUSTMENT**

| 7.5 HP MOTOR & 567 RPM DRIVE |             |                    | 10 HP MOTOR & 692 RPM DRIVE |               |                    | 15 HP MOTOR & 793 RPM DRIVE |               |                    | 20 HP MOTOR & 894 RPM DRIVE |               |                    |
|------------------------------|-------------|--------------------|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|
| %RPM<br>& CFM                | REQ'D<br>PD | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ |
| -                            | -           | -                  | 82                          | 4.5           | 42                 | 84                          | 5.3           | 50                 | 86                          | 6.1           | 58                 |
| -                            | -           | -                  | 86                          | 4.7           | 44                 | 87                          | 5.5           | 52                 | 89                          | 6.3           | 60                 |
| 100                          | (Std.)4.5   | 42                 | 89                          | 4.9           | 46                 | 90                          | 5.7           | 54                 | 91                          | 6.5           | 62                 |
| 104                          | 4.7         | 44                 | 93                          | 5.1           | 48                 | 94                          | 5.9           | 56                 | 94                          | 6.7           | 64                 |
| 109                          | 4.9         | 46                 | 96                          | 5.3           | 50                 | 97                          | 6.1           | 58                 | 97                          | 6.9           | 66                 |
| 113                          | 5.1         | 48                 | 100                         | (Std.)<br>5.5 | 52                 | 100                         | (Std.)<br>6.3 | 60                 | 100                         | (Std.)<br>7.1 | 68                 |
| 118                          | 5.3         | 50                 | 104                         | 5.7           | 54                 | 103                         | 6.5           | 62                 | 103                         | 7.3           | 70                 |
| 122                          | 5.5         | 52                 | 107                         | 5.9           | 56                 | 106                         | 6.7           | 64                 | 108                         | 7.7           | 74                 |
| 126                          | 5.7         | 54                 | 111                         | 6.1           | 58                 | 110                         | 6.9           | 66                 | 117                         | 8.3           | 80                 |
| -                            | -           | -                  | 115                         | 6.3           | 60                 | 113                         | 7.1           | 68                 | 125                         | 8.9           | 86                 |
| -                            | -           | -                  | 118                         | 6.5           | 62                 | 116                         | 7.3           | 70                 | -                           | -             | -                  |
| -                            | -           | -                  | 122                         | 6.7           | 64                 | 122                         | 7.7           | 74                 | -                           | -             | -                  |

**TABLE 41: 30 TON DRIVE ADJUSTMENT**

| 10 HP MOTOR & 617 RPM DRIVE |               |                    | 15 HP MOTOR & 743 RPM DRIVE |               |                    | 20 HP MOTOR & 856 RPM DRIVE |               |                    | 25 HP MOTOR & 907 RPM DRIVE |               |                    |
|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|
| %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ |
| 91.8                        | 4.5           | 42                 | 86.4                        | 5.1           | 48                 | 82.1                        | 5.5           | 54                 | 86.3                        | 6.1           | 60                 |
| 95.9                        | 4.7           | 44                 | 89.8                        | 5.3           | 50                 | 85.1                        | 5.7           | 56                 | 89.0                        | 6.3           | 62                 |
| 100.0                       | (Std.)<br>4.9 | 46                 | 93.2                        | 5.5           | 52                 | 88.1                        | 5.9           | 58                 | 91.8                        | 6.5           | 64                 |
| 104.1                       | 5.1           | 48                 | 96.6                        | 5.7           | 54                 | 91.0                        | 6.1           | 60                 | 94.5                        | 6.7           | 66                 |
| 108.2                       | 5.3           | 50                 | 100.0                       | (Std.)<br>5.9 | 56                 | 94.0                        | 6.3           | 62                 | 97.3                        | 6.9           | 68                 |
| 112.2                       | 5.5           | 52                 | 103.4                       | 6.1           | 58                 | 97.0                        | 6.5           | 64                 | 100.0                       | (Std.)<br>7.1 | 70                 |
| 116.3                       | 5.7           | 54                 | 106.8                       | 6.3           | 60                 | 100.0                       | (Std.)<br>6.7 | 66                 | 105.5                       | 7.5           | 74                 |
| 120.4                       | 5.9           | 56                 | 110.2                       | 6.5           | 62                 | 103.0                       | 6.9           | 68                 | 113.7                       | 8.1           | 80                 |
| 124.5                       | 6.1           | 58                 | 113.6                       | 6.7           | 64                 | 106.0                       | 7.1           | 70                 | 121.9                       | 8.7           | 86                 |
| -                           | -             | -                  | 116.9                       | 6.9           | 66                 | 112.0                       | 7.5           | 74                 | -                           | -             | -                  |
| -                           | -             | -                  | 120.3                       | 7.1           | 68                 | 120.9                       | 8.1           | 80                 | -                           | -             | -                  |
| -                           | -             | -                  | 123.7                       | 7.3           | 70                 | 129.9                       | 8.7           | 86                 | -                           | -             | -                  |

**TABLE 42: 40 TON DRIVE ADJUSTMENT**

| 10 HP MOTOR & 617 RPM DRIVE |               |                    | 15 HP MOTOR & 652 RPM DRIVE |               |                    | 20 HP MOTOR & 728 RPM DRIVE |               |                    | 25 HP MOTOR & 780 RPM DRIVE |               |                    |
|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|-----------------------------|---------------|--------------------|
| %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | % RPM<br>& CFM              | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ | %RPM<br>& CFM               | REQ'D<br>PD   | BROWNING<br>2B5V__ |
| 91.8                        | 4.5           | 42                 | 88.2                        | 4.5           | 44                 | 82.5                        | 4.7           | 46                 | 83.7                        | 5.1           | 50                 |
| 95.9                        | 4.7           | 44                 | 92.1                        | 4.7           | 46                 | 86.0                        | 4.9           | 48                 | 86.9                        | 5.3           | 52                 |
| 100.0                       | (Std.)<br>4.9 | 46                 | 96.0                        | 4.9           | 48                 | 89.5                        | 5.1           | 50                 | 90.2                        | 5.5           | 54                 |
| 104.1                       | 5.1           | 48                 | 100.0                       | (Std.)<br>5.1 | 50                 | 93.0                        | 5.3           | 52                 | 93.4                        | 5.7           | 56                 |
| 108.2                       | 5.3           | 50                 | 103.9                       | 5.3           | 52                 | 96.5                        | 5.5           | 54                 | 96.7                        | 5.9           | 58                 |
| 112.2                       | 5.5           | 52                 | 107.8                       | 5.5           | 54                 | 100.0                       | (Std.)<br>5.7 | 56                 | 100.0                       | (Std.)<br>6.1 | 60                 |
| 116.3                       | 5.7           | 54                 | 111.7                       | 5.7           | 56                 | 103.5                       | 5.9           | 58                 | 103.3                       | 6.3           | 62                 |
| -                           | -             | -                  | 115.6                       | 5.9           | 58                 | 107.0                       | 6.1           | 60                 | 106.6                       | 6.5           | 64                 |
| -                           | -             | -                  | 119.5                       | 6.1           | 60                 | 110.5                       | 6.3           | 62                 | 109.8                       | 6.7           | 66                 |
| -                           | -             | -                  | 123.4                       | 6.3           | 62                 | 114.0                       | 6.5           | 64                 | 113.1                       | 6.9           | 68                 |
| -                           | -             | -                  | 127.4                       | 6.5           | 64                 | 117.5                       | 6.7           | 66                 | 116.4                       | 7.1           | 70                 |
| -                           | -             | -                  | -                           | -             | 66                 | 121.1                       | 6.9           | 68                 | 119.7                       | 7.5           | 74                 |

**TABLE 43: DRIVE ADJUSTMENT FOR POWER EXHAUST - 25 TON**

| 5 HP Motor & 758 RPM Drive |             |                    | 7.5 HP Motor & 852 RPM Drive |             |                    | 10 HP Motor & 976 RPM Drive |            |                    |
|----------------------------|-------------|--------------------|------------------------------|-------------|--------------------|-----------------------------|------------|--------------------|
| %RPM<br>& CFM              | Req'd<br>PD | Browning<br>2b5v__ | %RPM<br>& CFM                | Req'd<br>PD | Browning<br>2b5v__ | %RPM<br>& CFM               | Req'd PD   | Browning<br>2b5v__ |
| 100                        | 4.9 (Std.)  | 46                 | 92                           | 5.1         | 48                 | 93                          | 5.9        | 56                 |
| 104                        | 5.1         | 48                 | 96                           | 5.3         | 50                 | 97                          | 6.1        | 58                 |
| 109                        | 5.3         | 50                 | 100                          | 5.5 (Std.)  | 52                 | 100                         | 6.3 (Std.) | 60                 |
| 113                        | 5.5         | 52                 | 104                          | 5.7         | 54                 | 103                         | 6.5        | 62                 |
| 117                        | 5.7         | 54                 | 108                          | 5.9         | 56                 | 107                         | 6.7        | 64                 |
| 122                        | 5.9         | 56                 | 112                          | 6.1         | 58                 | 110                         | 6.9        | 66                 |

**TABLE 44: DRIVE ADJUSTMENT FOR POWER EXHAUST - 30 & 40 TON**

| 7.5 HP Motor & 852 RPM Drive |               |                   | 10 HP Motor & 976 RPM Drive |               |                   | 15 HP Motor & 1069 RPM Drive |               |                   |
|------------------------------|---------------|-------------------|-----------------------------|---------------|-------------------|------------------------------|---------------|-------------------|
| % RPM & CFM                  | REQ'D PD (in) | Browning 2B5V _ _ | % RPM & CFM                 | REQ'D PD (in) | Browning 2B5V _ _ | % RPM & CFM                  | REQ'D PD (in) | Browning 2B5V _ _ |
| 96.4                         | 5.3           | 52                | 93.7                        | 5.9           | 58                | 94.2                         | 6.5           | 64                |
| 100.0                        | (Std.) 5.5    | 54                | 96.8                        | 6.1           | 60                | 97.1                         | 6.7           | 66                |
| 103.6                        | 5.7           | 56                | 100.0                       | (Std.) 6.3    | 62                | 100.0                        | (Std.) 6.9    | 68                |
| 107.3                        | 5.9           | 58                | 103.2                       | 6.5           | 64                | 102.9                        | 7.1           | 70                |
| 110.9                        | 6.1           | 60                | 106.3                       | 6.7           | 66                | 108.7                        | 7.5           | 74                |
| 114.5                        | 6.3           | 62                | 109.5                       | 6.9           | 68                | 117.4                        | 8.1           | 80                |

## GAS FURNACE OPERATING INSTRUCTIONS



Each furnace module is equipped with an automatic re-ignition system. DO NOT attempt to manually light the burners.

### TO LIGHT THE MAIN BURNERS

1. Turn off electric power to unit.
2. Turn space temperature sensor to lowest setting.
3. Turn gas valve knobs to on position (Refer to Figure 31).
4. Turn on electric power to unit.
5. On Constant Volume units, set space setpoint to warmer or cooler as desired. (If sensor set point temperature is above room temperature, the main burners will ignite). If a second stage of heat is called for, the main burners for second stage heat will ignite for the second stage heat. For VAV units set morning warm-up thermostat far above the return air temperature and cycle the time clock OFF, then ON.

### TO SHUT DOWN

1. Turn off electric power to unit.
2. Depress knob of gas valve while turning to off position or move switch to off position. (Refer to Figure 31).

### POST-START CHECKLIST (GAS)

After the entire control circuit has been energized and the heating section is operating, make the following checks:

1. Check for gas leaks in the unit piping as well as the supply piping.
2. Check for correct manifold gas pressures. See Checking Gas Input.
3. Check the supply gas pressure. It must be within the limits shown on rating nameplate. Supply pressure should be checked with all gas appliances in the building at full fire. At no time should the standby gas pressure exceed 13 inches, nor the operating pressure drop below 6 inches. If gas pressure is outside these limits, contact the local gas utility for corrective action.

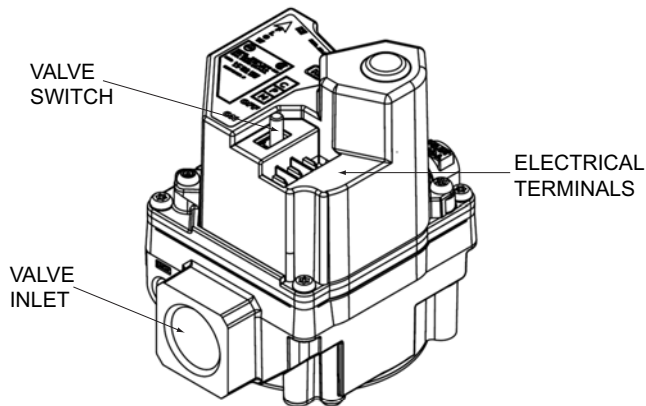
### MANIFOLD GAS PRESSURE ADJUSTMENT

Small adjustments to the gas flow may be made by turning the pressure regulator adjusting screw on the automatic gas valve. Refer to Figure 31.

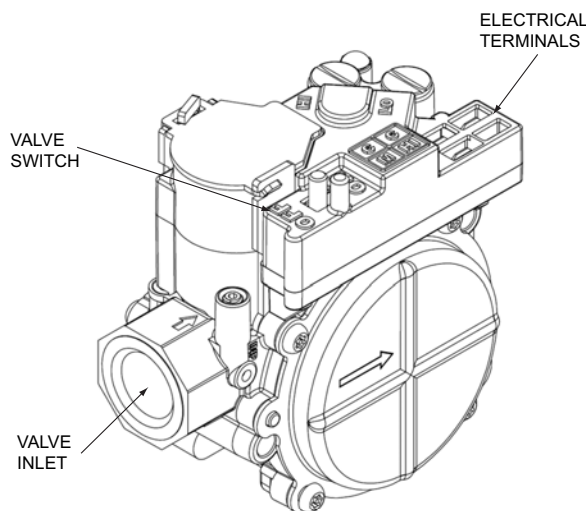
Adjust as follows:

1. Remove the cap on the regulator. It's located next to the push-on electrical terminals.
2. To decrease the gas pressure, turn the adjusting screw counterclockwise.
3. To increase the gas pressure, turn the adjusting screw clockwise.

**NOTE:** The factory manifold pressure for each furnace module is 3.50 IWG.



STANDARD GAS VALVE

2 STAGE GAS VALVE USED  
ON MODULATING GAS HEAT**FIGURE 31 - TYPICAL GAS VALVES****BURNER INSTRUCTIONS**

To check or change burners, pilot or orifices, CLOSE MAIN MANUAL SHUT-OFF VALVE AND SHUT OFF ALL POWER TO THE UNIT.

1. Remove the screws holding either end of the manifold to the burner supports.
2. Open the union fitting in the gas supply line just upstream of the unit gas valves and downstream from the main manual shut-off valve.
3. Disconnect wiring to the gas valves and spark ignitors. Remove the manifold-burner gas valve assemblies by pulling back.
4. Remove the heat shield on top of the manifold support.

Burners are now accessible for service.

Reverse the above procedure to replace the assemblies. Make sure that burners are level and seat at the rear of the gas orifice.

**ADJUSTMENT OF TEMPERATURE RISE**

The temperature rise (or temperature difference between the return air and the heated air from the furnace) must lie within the range shown on the CGA/ETL rating plate and the data in Table 3.

After the temperature rise has been determined, the CFM can be calculated as follows:

$$CFM = \frac{Btuh \times 0.8}{1.08 \times F \text{ Degrees Temp Rise}}$$

After about 20 minutes of operation, determine the furnace temperature rise. Take readings of both the return air and the heated air in the ducts (about six feet from the furnace) where they will not be affected by radiant heat. Increase the blower CFM to decrease the temperature rise; decrease the blower CFM to increase the rise. Refer to Table 34 for supply air blower motor and drive data. Minimum allowable CFM is 6,000 CFM. Limit will open below this rating.

**CHECKING GAS INPUT****NATURAL GAS**

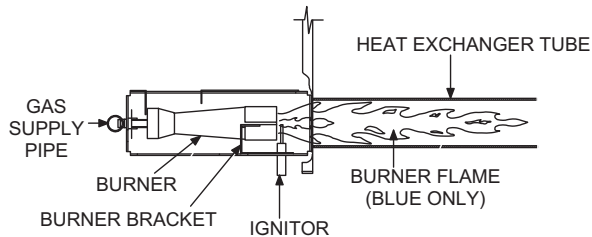
1. Turn off all other gas appliances connected to the gas meter.
2. With the furnace turned on, measure the time needed for one revolution of the hand on the smallest dial on the meter. A typical gas meter usually has a 1/2 or a 1 cubic foot test dial.
3. Using the number of seconds for each revolution and the size of the test dial increment, find the cubic feet of gas consumed per hour from Table 45.

If the actual input is not within 5% of the furnace rating (with allowance being made for the permissible range of the regulator setting), replace the orifice spuds with spuds of the proper size.

**NOTE:** To find the Btu input, multiply the number of cubic feet of gas consumed per hour by the Btu content of the gas in your particular locality (contact your gas company for this information - it varies widely from city to city).

**TABLE 45: GAS RATE - CUBIC FEET PER HOUR**

| Seconds for One Rev. | Size of Test Dial |           |
|----------------------|-------------------|-----------|
|                      | 1/2 cu. Ft.       | 1 cu. Ft. |
| 2                    | 900               | 1800      |
| 4                    | 450               | 900       |
| 6                    | 300               | 600       |
| 8                    | 225               | 450       |
| 10                   | 180               | 360       |

**FIGURE 32 - TYPICAL FLAME APPEARANCE**

Example: By actual measurement, it takes 7 seconds for the hand on the one cubic foot dial to make a revolution with just a 570,000 Btuh furnace running. Read across to the column in Table 24, headed 1 Cubic Foot where you will determine that 525 cubic feet of gas per hour are consumed by the furnace at that rate. Multiply 525 x 1050 (the Btu rating of the gas obtained from the local gas company). The result of 551,000 Btuh is within 5% of the 570,000 Btuh rating of the furnace.

## ELECTRIC HEATING

The electric furnace is operational as shipped from the factory and does not receive any field adjustments.

## COOLING OPERATING INSTRUCTIONS

### COMPRESSOR

Compressors are factory mounted ready for operation (See page 63 Compressor Rotation).

### INTERNAL WIRING

Check all electrical connections in the unit control box; tighten as required.

### CONDENSER FANS

Check for proper condenser fan rotation; clockwise facing the air discharge. If condenser fans are rotating backwards, line voltage to unit single point power connection is misphased (See page 63 Compressor Rotation).

## SERVICE

### REFRIGERATION SYSTEM

**CHARGE:** Each system is fully factory charged with R-410A. The correct charge appears on the unit nameplate.

**Thermal Expansion Valves:** The 30 ton unit has 3 and the 40 ton unit has 4 independent refrigeration systems. These TXVs are set to maintain 15°F superheat leaving the evaporator coil. The superheat on each valve is adjustable, however, adjustments should only be made if absolutely necessary.

**FILTER DRIER:** Each system is equipped with a filter drier. The drier should be replaced whenever moisture is indicated in the system.

### COMPRESSORS

Each compressor is inherently protected from over current and over temperature. High and low pressure switches are installed on the discharge and suction lines respectively for high and low pressure protection. Scroll compressors operate in only one direction. If the compressor is experiencing low amperage draw, similar discharge and suction pressure or increased noise level, it is operating in reverse. Switch two line voltage connections to correct (See Compressor Rotation page 63).

### MOTORS

#### INDOOR BLOWER MOTORS

All indoor blower motors are non-inherently protected three phase motors. Overcurrent protection is provided by a manual reset starter/overload relay and short circuit protection is provided by fuses. Where there is a supply fan VFD, an auxiliary contact provides the overcurrent indication to the standard control.

#### POWER EXHAUST OR RETURN AIR FAN MOTORS

All motors are non-inherently protected three phase motors. Overcurrent protection is provided by a manual reset starter/overload relay and short circuit protection is provided by fuses.

#### CONDENSER FAN MOTORS

All condenser fan motors are inherently protected three phase motors. Short circuit protection is provided by fuses.

#### DRAFT MOTOR (GAS FURNACE)

All draft motors are line voltage, inherently protected, single phase PSC motors. Short circuit protection is provided by fuses.

**TABLE 46: STEAM COIL (1 ROW, 25 & 30 TON)<sup>1</sup>**

| CFM   | Capacity (MBH) at Steam Pressure (PSI) |       |       |       |
|-------|----------------------------------------|-------|-------|-------|
|       | 2                                      | 6     | 10    | 15    |
| 6000  | 194.1                                  | 207.9 | 219.8 | 232.6 |
| 8000  | 221.1                                  | 236.9 | 250.4 | 265.0 |
| 10000 | 243.2                                  | 260.5 | 275.4 | 291.4 |
| 12000 | 261.9                                  | 280.6 | 296.6 | 313.9 |
| 15000 | 285.6                                  | 306.0 | 323.5 | 342.4 |

<sup>1</sup>. Based on 60°F entering air temperature, 2.00" maximum air pressure drop across the coil.

**TABLE 47: STEAM COIL (1 ROW, 40 TON)<sup>1</sup>**

| CFM   | Capacity (MBH) at Steam Pressure (PSI) |       |       |       |
|-------|----------------------------------------|-------|-------|-------|
|       | 2                                      | 6     | 10    | 15    |
| 8000  | 221.1                                  | 236.9 | 250.4 | 265.0 |
| 11000 | 252.9                                  | 271.0 | 286.4 | 303.1 |
| 14000 | 278.2                                  | 298.0 | 315.0 | 333.4 |
| 17000 | 299.4                                  | 320.7 | 339.0 | 358.8 |
| 20000 | 317.6                                  | 340.2 | 359.6 | 380.6 |

<sup>1</sup>. Based on 60°F entering air temperature, 2.00" maximum air pressure drop across the coil.

**TABLE 48: STATIC RESISTANCE STEAM COIL (25 & 30 TON)**

| CFM               | 6000 | 8000 | 10000 | 12000 | 15000 |
|-------------------|------|------|-------|-------|-------|
| Air Pressure Drop | 0.11 | 0.18 | 0.26  | 0.36  | 0.54  |

**TABLE 49: STATIC RESISTANCE STEAM COIL (40 TON)**

| CFM               | 8000 | 11000 | 14000 | 17000 | 20000 |
|-------------------|------|-------|-------|-------|-------|
| Air Pressure Drop | 0.18 | 0.31  | 0.48  | 0.67  | 0.88  |

**TABLE 50: HOT WATER COIL (1 ROW 25 & 30 TON)<sup>1</sup>**

| GPM | CFM   | Capacity (MBH) at Entering Water Temperature |        |        |        |
|-----|-------|----------------------------------------------|--------|--------|--------|
|     |       | 140 °F                                       | 160 °F | 180 °F | 200 °F |
| 10  | 6000  | 91.4                                         | 115.3  | 139.3  | 163.6  |
|     | 8000  | 102                                          | 128.8  | 155.8  | 182.9  |
|     | 10000 | 110.4                                        | 139.5  | 168.8  | 198.4  |
|     | 12000 | 117.3                                        | 148.4  | 179.6  | 211.2  |
|     | 15000 | 125.9                                        | 159.2  | 192.9  | 226.9  |
| 20  | 6000  | 103                                          | 129.4  | 156    | 182.7  |
|     | 8000  | 116.8                                        | 147    | 177.2  | 207.7  |
|     | 10000 | 128.2                                        | 161.3  | 194.7  | 228.2  |
|     | 12000 | 137.8                                        | 173.6  | 209.5  | 245.6  |
|     | 15000 | 150                                          | 189    | 228.2  | 267.8  |
| 30  | 6000  | 107.6                                        | 135    | 162.5  | 190.1  |
|     | 8000  | 122.8                                        | 154.3  | 185.8  | 217.5  |
|     | 10000 | 135.5                                        | 170.3  | 205.1  | 240.2  |
|     | 12000 | 146.4                                        | 184    | 221.8  | 259.7  |
|     | 15000 | 160.3                                        | 201.6  | 243    | 284.8  |
| 40  | 6000  | 110.1                                        | 138    | 166    | 194.1  |
|     | 8000  | 126.1                                        | 158.2  | 190.5  | 222.8  |
|     | 10000 | 139.6                                        | 175.2  | 210.9  | 246.8  |
|     | 12000 | 151.2                                        | 189.8  | 228.5  | 267.5  |
|     | 15000 | 166.1                                        | 208.6  | 251.3  | 294.1  |

<sup>1</sup>. Based on 60°F entering air temperature, 2.00" maximum pressure drop across the hot water coil.

**TABLE 51: HOT WATER COIL (1 ROW, 40 TON)<sup>1</sup>**

| GPM | CFM   | Capacity (MBH) at Entering Water Temperature |        |        |        |
|-----|-------|----------------------------------------------|--------|--------|--------|
|     |       | 140 °F                                       | 160 °F | 180 °F | 200 °F |
| 10  | 8000  | 102                                          | 128.8  | 155.8  | 182.9  |
|     | 11000 | 114                                          | 144.1  | 174.4  | 205.1  |
|     | 14000 | 123.2                                        | 155.9  | 188.8  | 222.1  |
|     | 17000 | 130.6                                        | 165.4  | 200.4  | 235.8  |
|     | 20000 | 136.8                                        | 173.3  | 210.1  | 247.3  |
| 20  | 8000  | 116.8                                        | 147    | 177.2  | 207.7  |
|     | 11000 | 133.2                                        | 167.7  | 202.3  | 237.2  |
|     | 14000 | 146.2                                        | 184.2  | 222.4  | 260.8  |
|     | 17000 | 157                                          | 197.9  | 239    | 280.5  |
|     | 20000 | 166.2                                        | 209.6  | 253.2  | 297.3  |
| 30  | 8000  | 122.8                                        | 154.3  | 185.8  | 217.5  |
|     | 11000 | 141.2                                        | 177.4  | 213.8  | 250.3  |
|     | 14000 | 155.9                                        | 196.1  | 236.4  | 276.9  |
|     | 17000 | 168.3                                        | 211.8  | 255.4  | 299.3  |
|     | 20000 | 179.1                                        | 225.3  | 271.8  | 318.6  |
| 40  | 8000  | 126.1                                        | 158.2  | 190.5  | 222.8  |
|     | 11000 | 145.6                                        | 182.7  | 220    | 257.5  |
|     | 14000 | 161.4                                        | 202.6  | 244.1  | 285.8  |
|     | 17000 | 174.7                                        | 219.5  | 264.5  | 309.7  |
|     | 20000 | 186.3                                        | 234.2  | 282.3  | 330.6  |

<sup>1</sup>. Based on 60°F entering air temperature, 2.00" maximum pressure drop across the hot water coil.

**TABLE 52: WATER PRESSURE DROP (1 ROW, 25 & 30 TON)**

| GPM                 | 10  | 20  | 30  | 40   |
|---------------------|-----|-----|-----|------|
| Water Pressure Drop | 0.9 | 3.0 | 6.0 | 10.0 |

**TABLE 53: WATER PRESSURE DROP (1 ROW, 40 TONS)**

| GPM                 | 10  | 20  | 30  | 40   |
|---------------------|-----|-----|-----|------|
| Water Pressure Drop | 0.9 | 3.0 | 6.0 | 10.0 |

**TABLE 54: HOT WATER COIL (2 ROW, 25 & 30 TON)<sup>1</sup>**

| GPM | CFM   | Capacity (MBH) at Entering Water Temperature |        |        |        |
|-----|-------|----------------------------------------------|--------|--------|--------|
|     |       | 140 °F                                       | 160 °F | 180 °F | 200 °F |
| 20  | 6000  | 177.5                                        | 223.8  | 270.4  | 317.3  |
|     | 8000  | 203.8                                        | 257.2  | 311.1  | 365.5  |
|     | 10000 | 224.8                                        | 284.1  | 343.9  | 404.2  |
|     | 12000 | 242.2                                        | 306.4  | 371.1  | 436.4  |
|     | 15000 | 263.6                                        | 333.8  | 404.6  | 476.1  |
| 40  | 6000  | 198.1                                        | 248.9  | 300.0  | 351.3  |
|     | 8000  | 232.2                                        | 292.0  | 352.2  | 412.7  |
|     | 10000 | 260.7                                        | 328.1  | 395.9  | 464.1  |
|     | 12000 | 285.0                                        | 359.0  | 433.4  | 508.3  |
|     | 15000 | 316.0                                        | 398.4  | 481.3  | 564.8  |
| 60  | 6000  | 206.1                                        | 258.7  | 311.4  | 364.2  |
|     | 8000  | 243.6                                        | 305.9  | 368.4  | 431.1  |
|     | 10000 | 275.3                                        | 345.9  | 416.8  | 488.0  |
|     | 12000 | 302.9                                        | 380.7  | 458.9  | 537.6  |
|     | 15000 | 338.4                                        | 425.7  | 513.4  | 601.7  |
| 80  | 6000  | 210.5                                        | 263.9  | 317.4  | 371.1  |
|     | 8000  | 249.8                                        | 313.3  | 377.1  | 441.1  |
|     | 10000 | 283.3                                        | 355.6  | 428.2  | 501.0  |
|     | 12000 | 312.7                                        | 392.7  | 473.0  | 553.6  |
|     | 15000 | 351.0                                        | 440.9  | 531.3  | 622.1  |

<sup>1</sup>. Based on 60°F entering air temperature, 2.00" maximum pressure drop across the hot water coil.

**TABLE 55: WATER PRESSURE DROP (2 ROW, 25 & 30 TON)**

| GPM                 | 20  | 40  | 60  | 80   |
|---------------------|-----|-----|-----|------|
| Water Pressure Drop | 0.9 | 3.0 | 6.0 | 10.0 |

**TABLE 56: WATER PRESSURE DROP (2 ROW, 40 TON)**

| GPM                 | 20  | 40  | 60  | 80   |
|---------------------|-----|-----|-----|------|
| Water Pressure Drop | 0.9 | 3.0 | 6.0 | 10.0 |

**TABLE 57: STATIC RESISTANCE HOT WATER COIL (25 & 30 TON)**

| CFM                     | 6000 | 8000 | 10000 | 15000 |
|-------------------------|------|------|-------|-------|
| Air Pressure Drop 1 Row | 0.07 | 0.11 | 0.16  | 0.32  |
| Air Pressure Drop 2 Row | 0.14 | 0.23 | 0.33  | 0.65  |

**TABLE 58: STATIC RESISTANCE HOT WATER COIL (40 TON)**

| CFM                     | 8000 | 11000 | 14000 | 20000 |
|-------------------------|------|-------|-------|-------|
| Air Pressure Drop 1 Row | 0.11 | 0.19  | 0.29  | 0.52  |
| Air Pressure Drop 2 Row | 0.23 | 0.39  | 0.58  | 1.06  |

**NOTE:** Water pressure drop numbers are based on 60°F entering air temperature, 2.00" maximum air pressure drop across the hot water coil(s). AHRI certified ratings at covering other conditions are available upon request. Hot water coils are approved for use with glycol (rates available upon request).

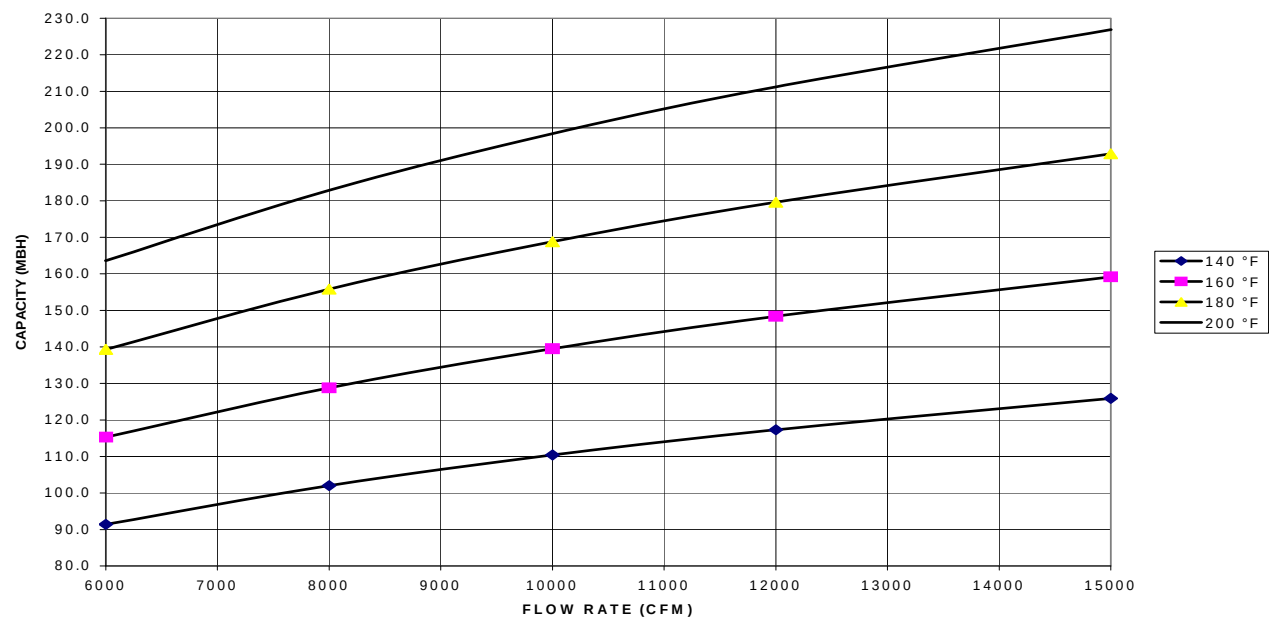


FIGURE 33 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 10 GPM

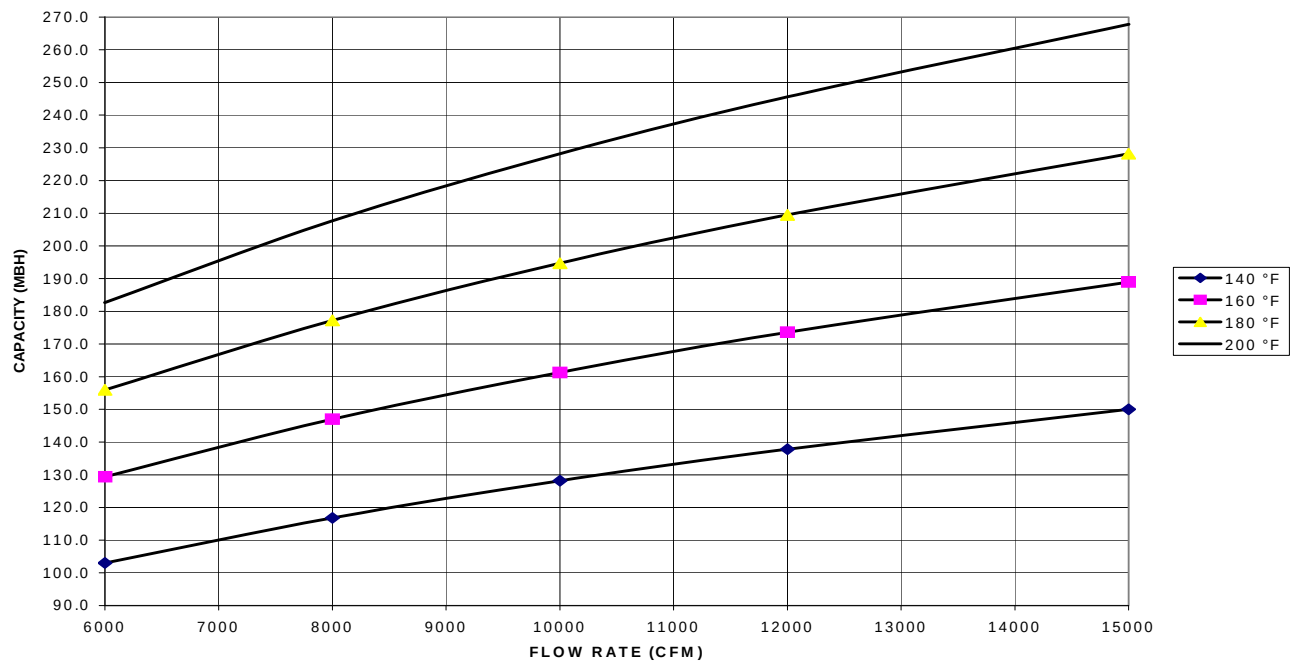


FIGURE 34 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 20 GPM

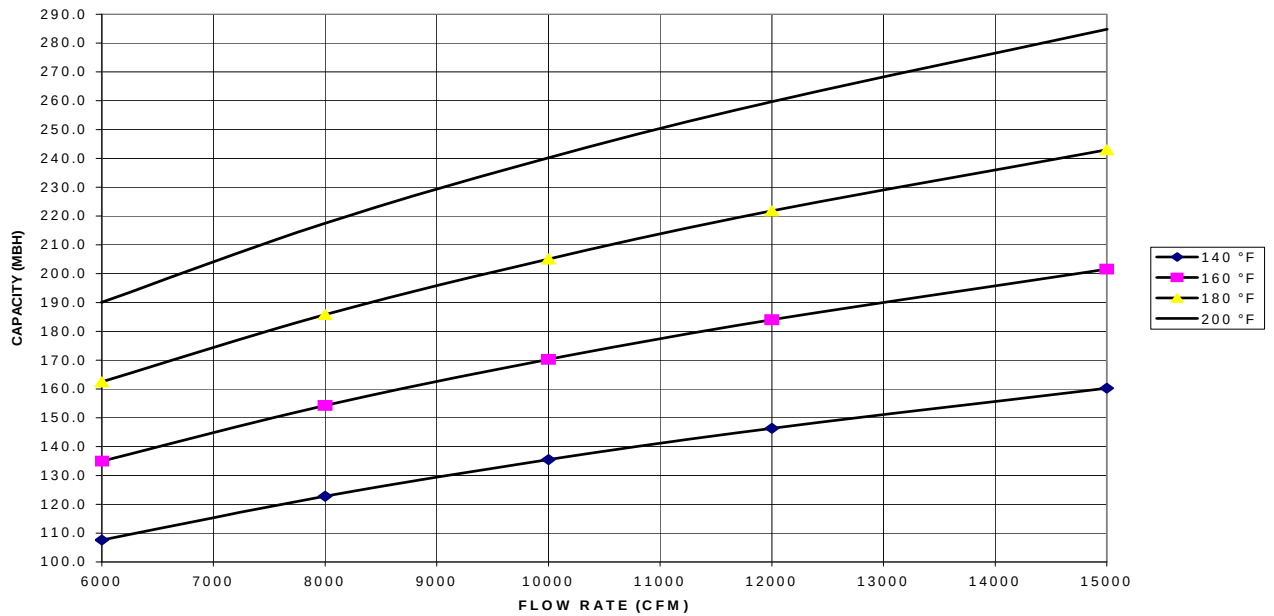


**FIGURE 35 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 30 GPM**

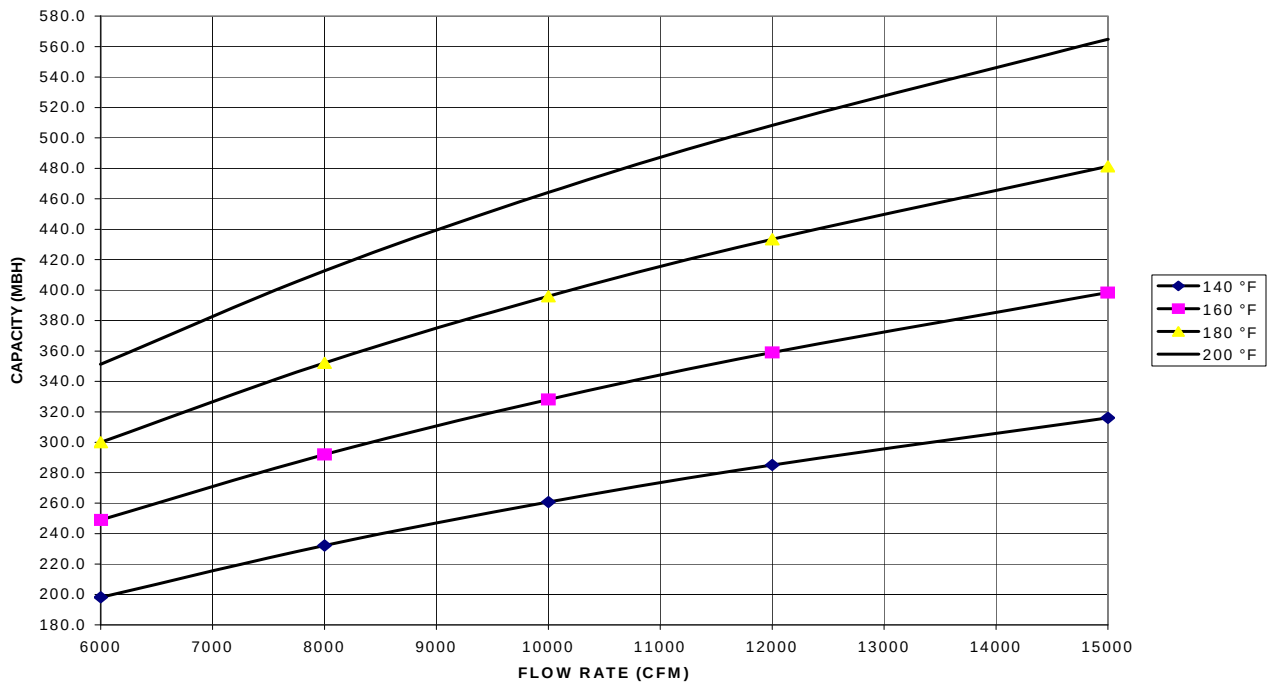


**FIGURE 36 - HOT WATER COIL - 25 & 30 TON, 1 ROW, AT 40 GPM**

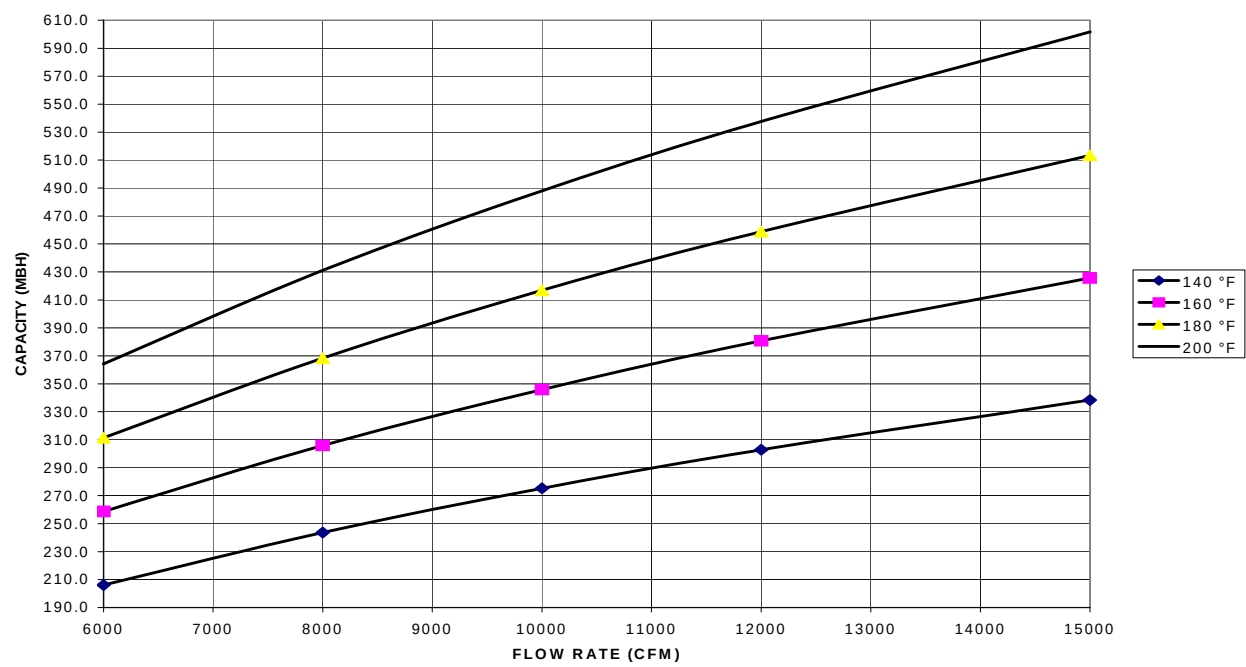


FIGURE 37 - HOT WATER COIL - 25 & 30 TON, 2 ROW, AT 60 GPM

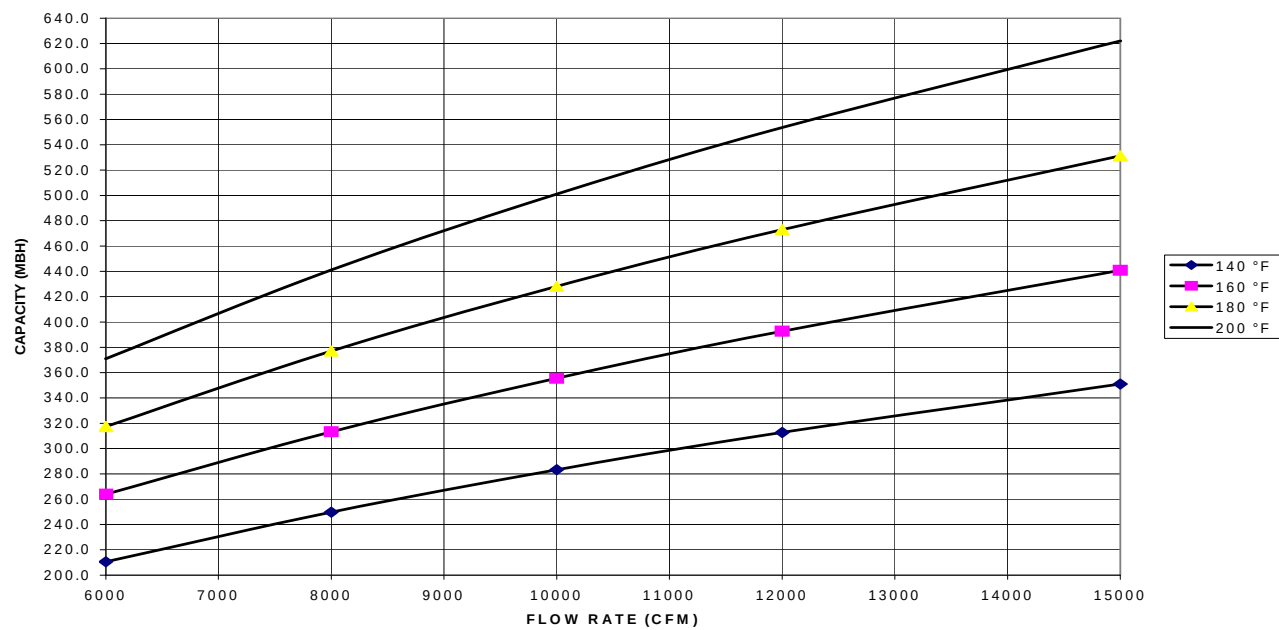
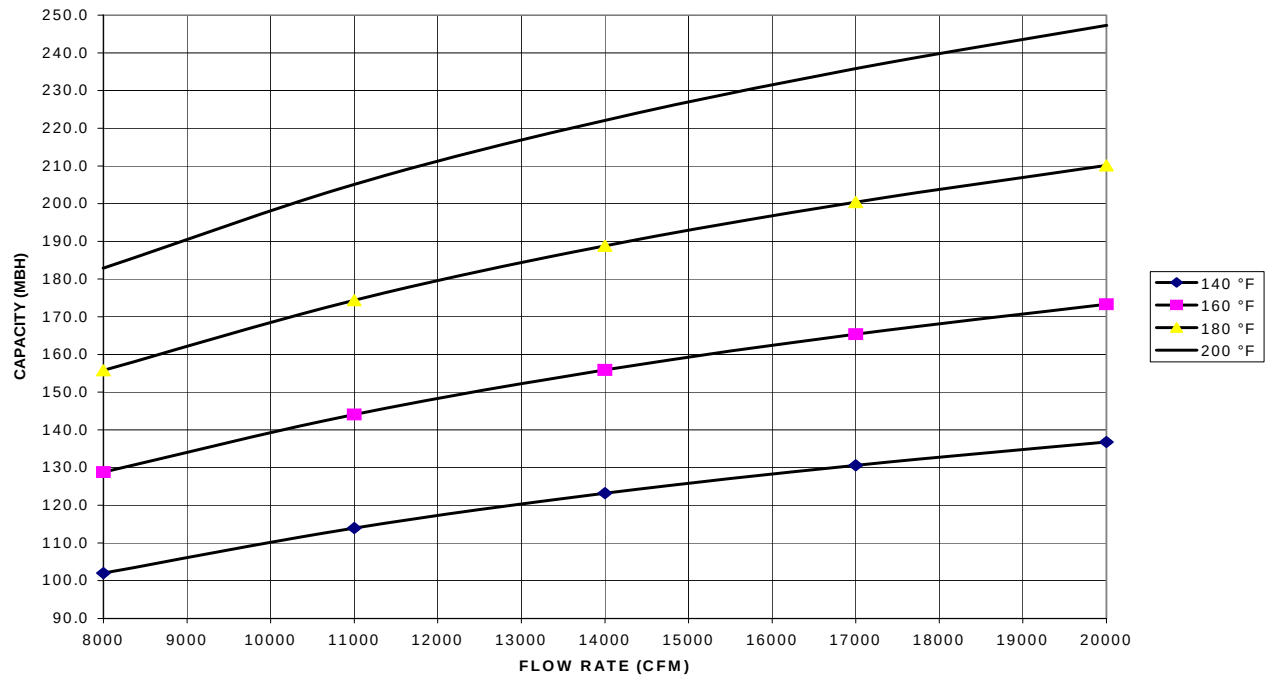
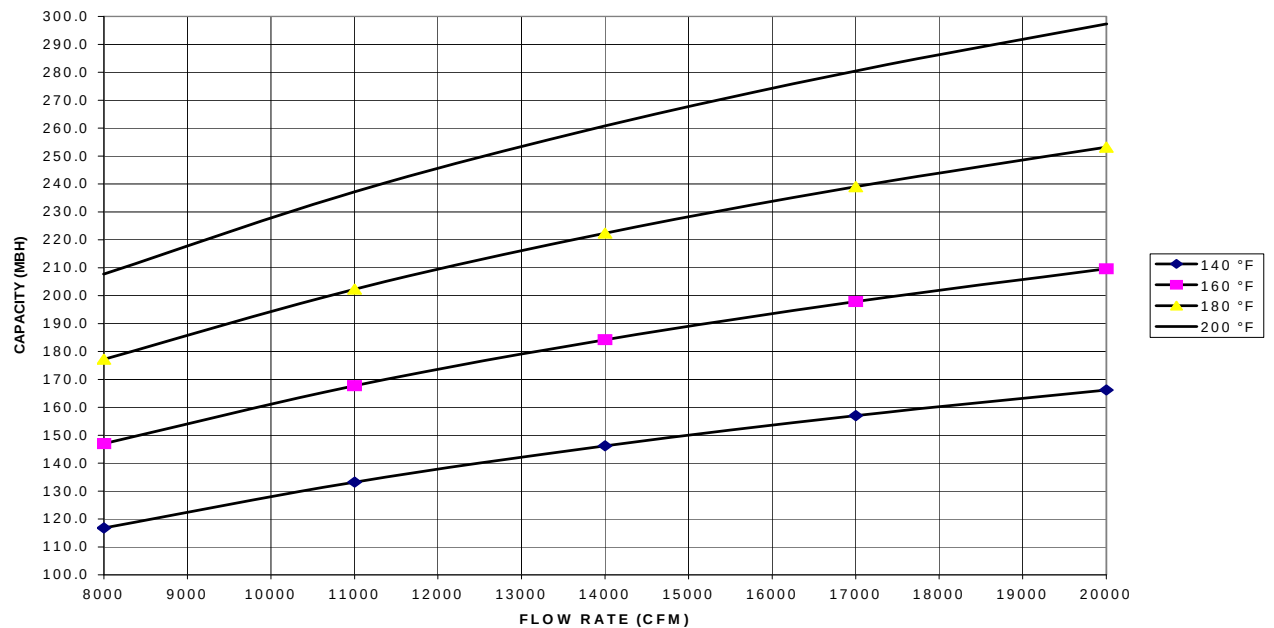


FIGURE 38 - HOT WATER COIL - 25 & 30 TON, 2 ROW, AT 80 GPM

**FIGURE 39 - HOT WATER COIL - 40 TON, 1 ROW, AT 10 GPM****FIGURE 40 - HOT WATER COIL - 40 TON, 1 ROW, AT 20 GPM**

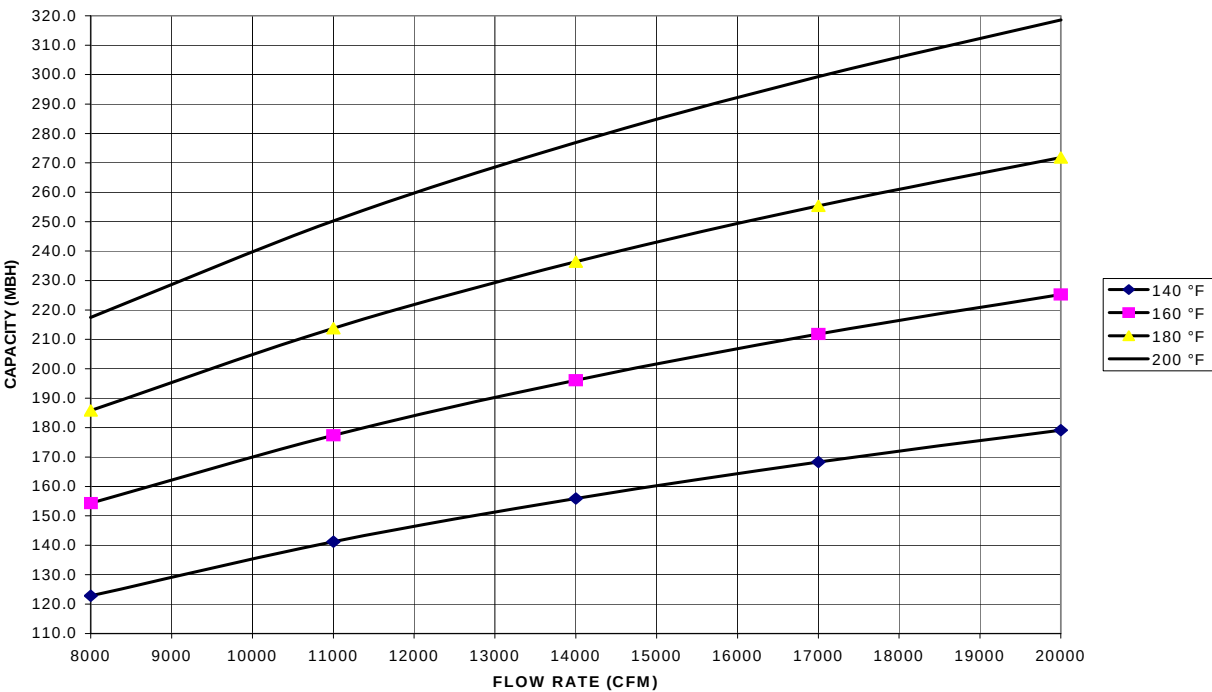


FIGURE 41 - HOT WATER COIL - 40 TON, 1 ROW, AT 30 GPM

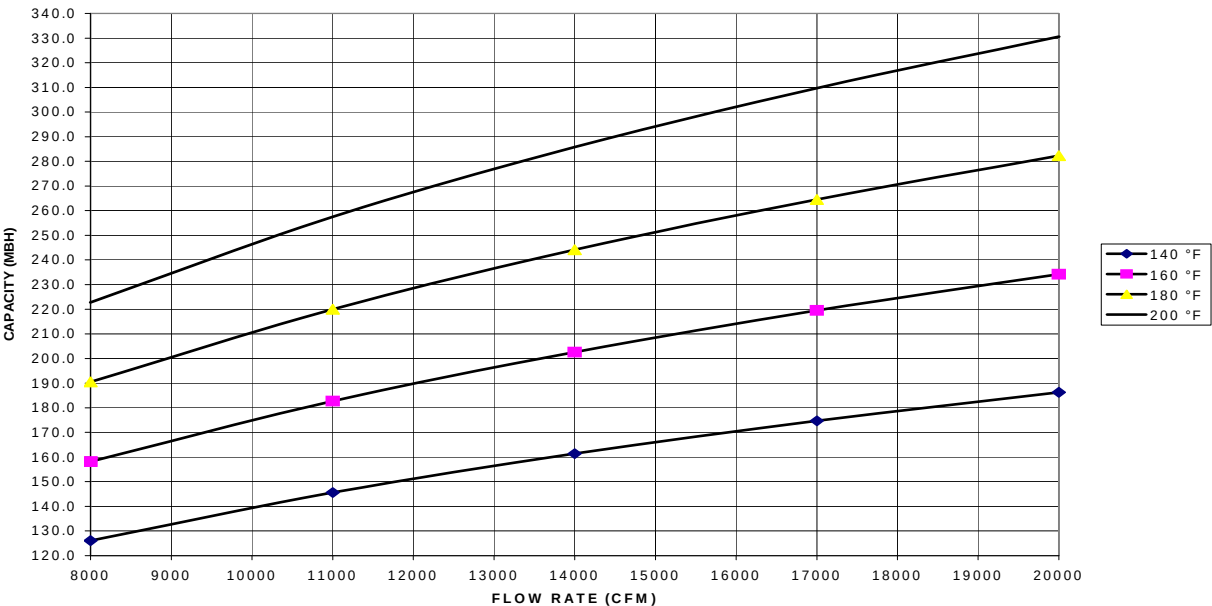
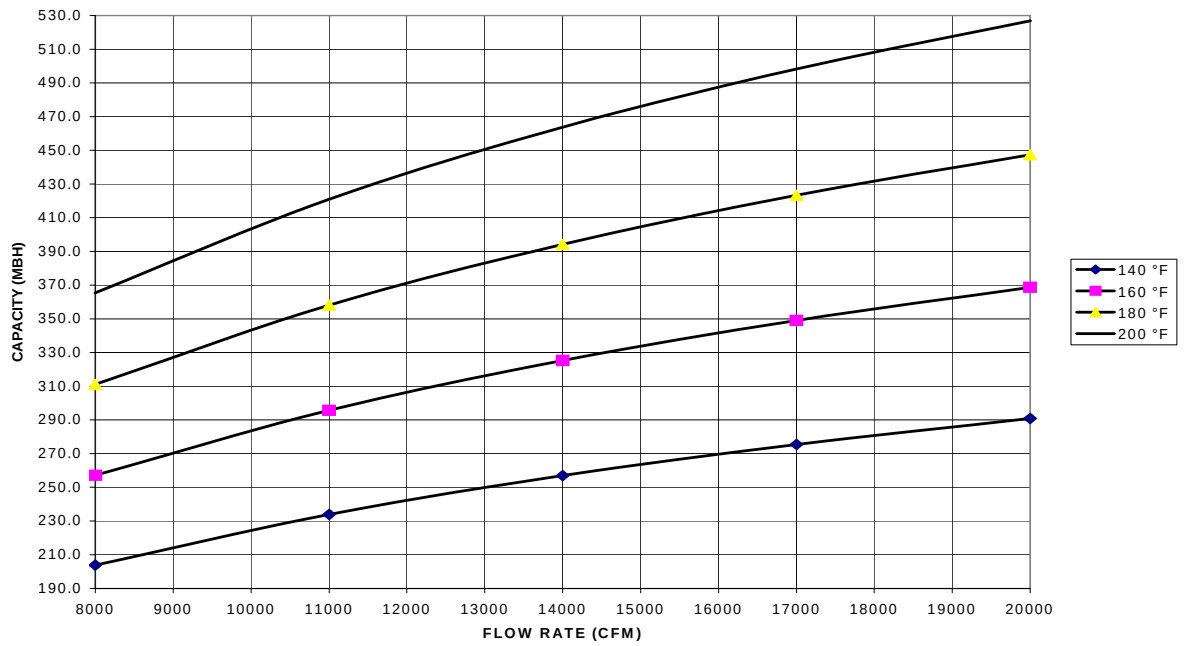
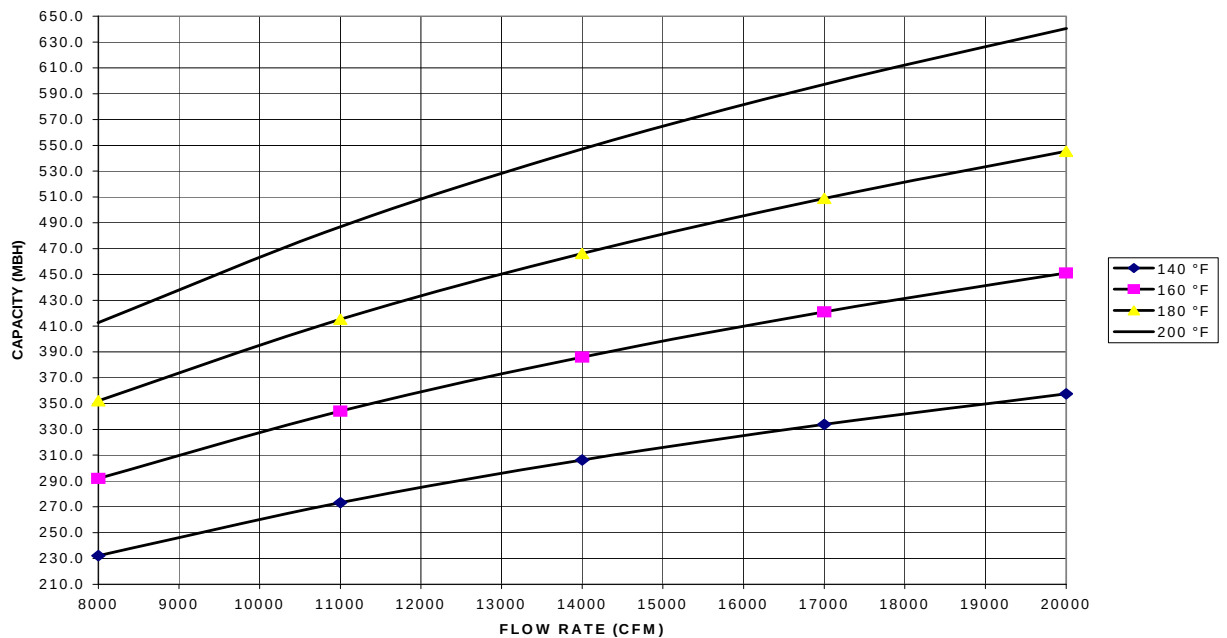


FIGURE 42 - HOT WATER COIL - 40 TON, 1 ROW, AT 40 GPM

**FIGURE 43 - HOT WATER COIL - 40 TON, 2 ROW, AT 20 GPM****FIGURE 44 - HOT WATER COIL - 40 TON, 2 ROW, AT 40 GPM**

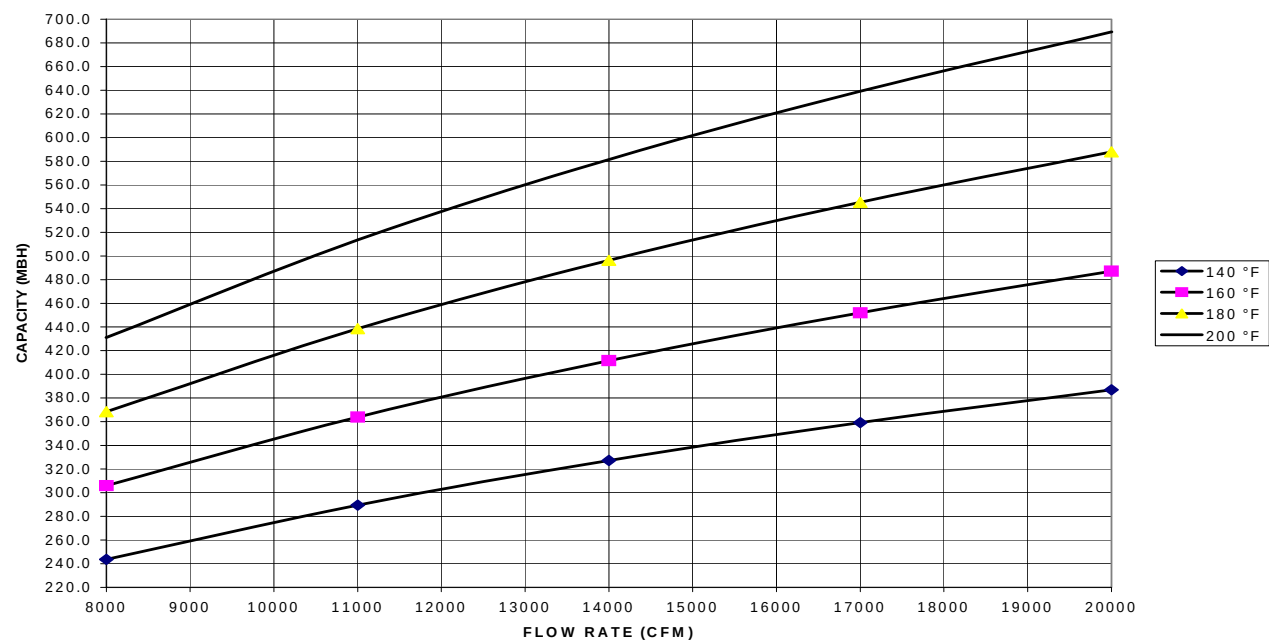


FIGURE 45 - HOT WATER COIL - 40 TON, 2 ROW, AT 60 GPM

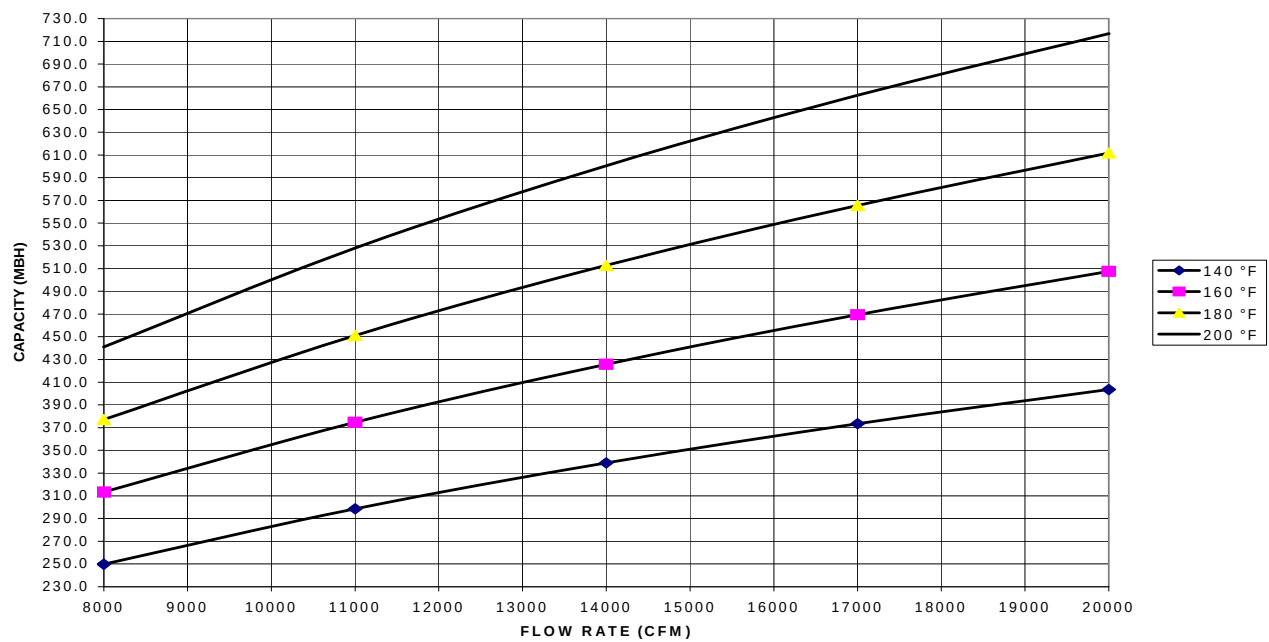
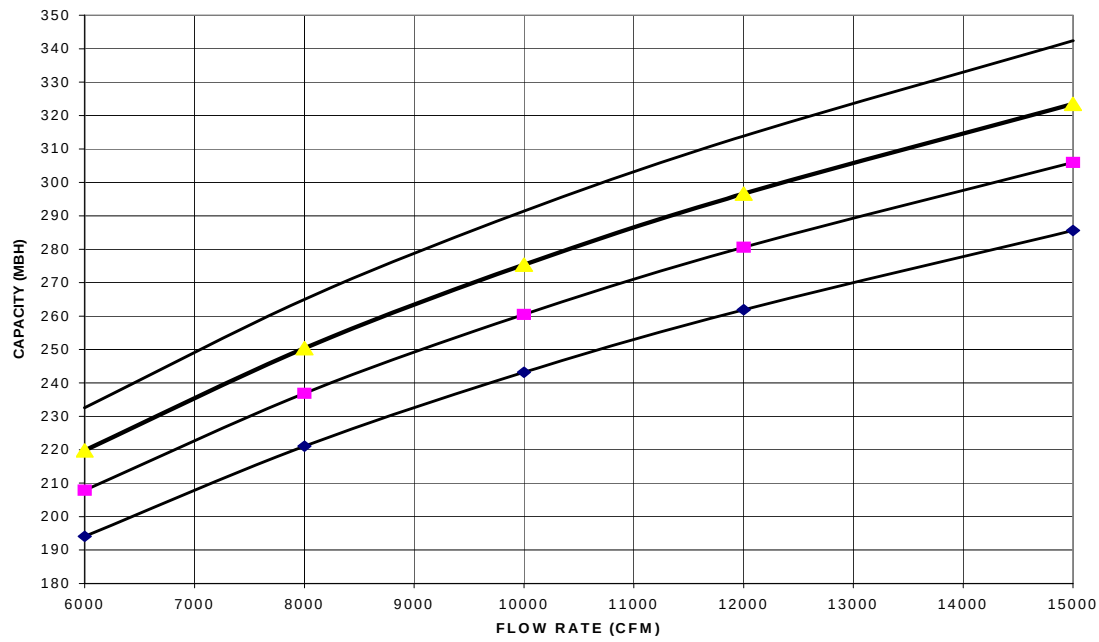
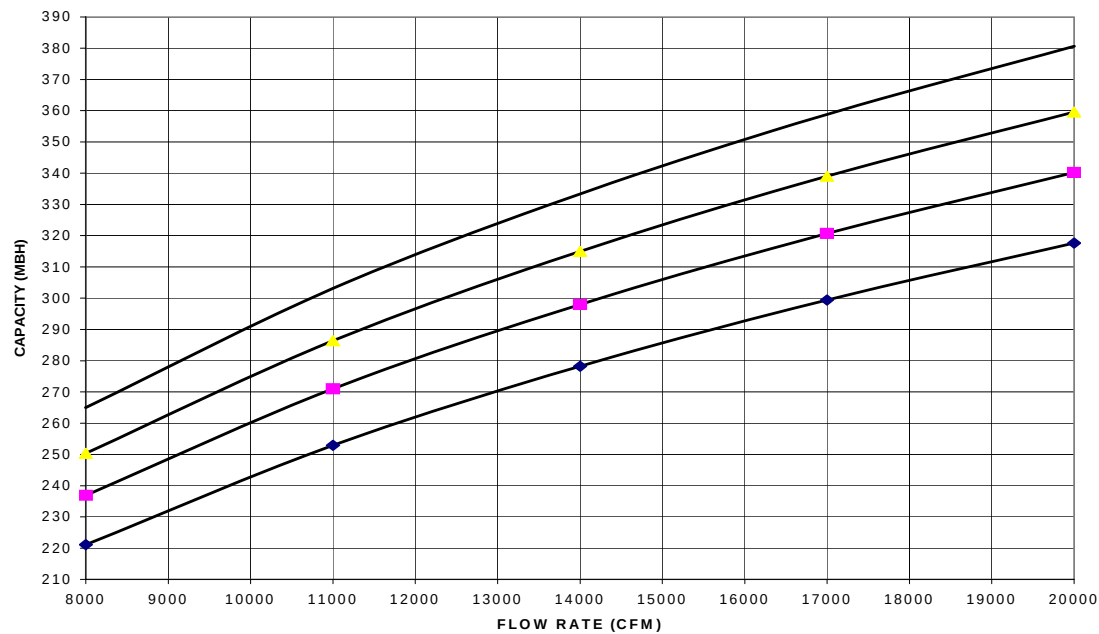


FIGURE 46 - HOT WATER COIL - 40 TON, 2 ROW, AT 80 GPM

**FIGURE 47 - STEAM COIL - 25 & 30 TON (1 ROW)****FIGURE 48 - STEAM COIL - 40 TON (1 ROW)**

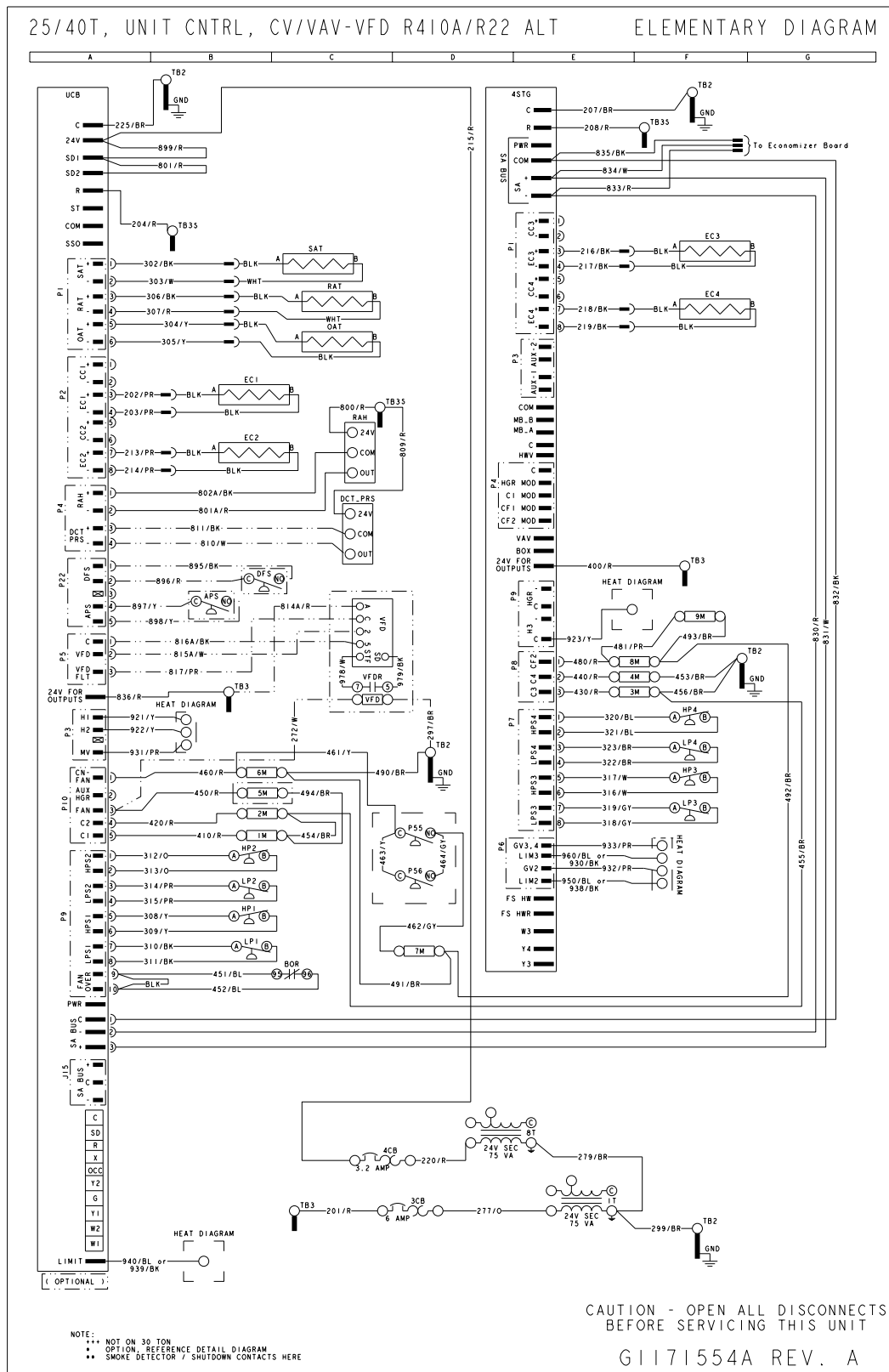
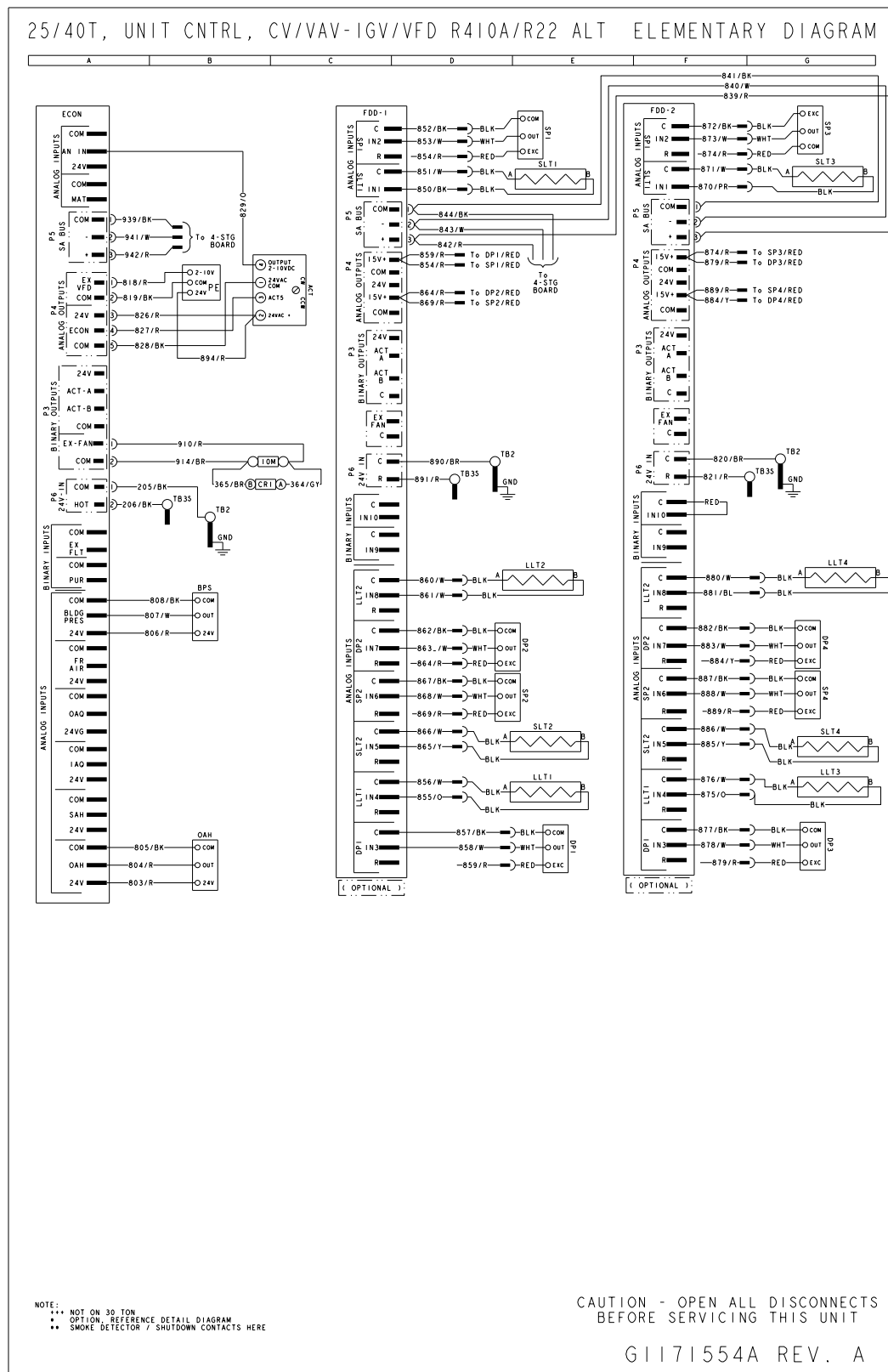


FIGURE 49 - TYPICAL CONTROL WIRING



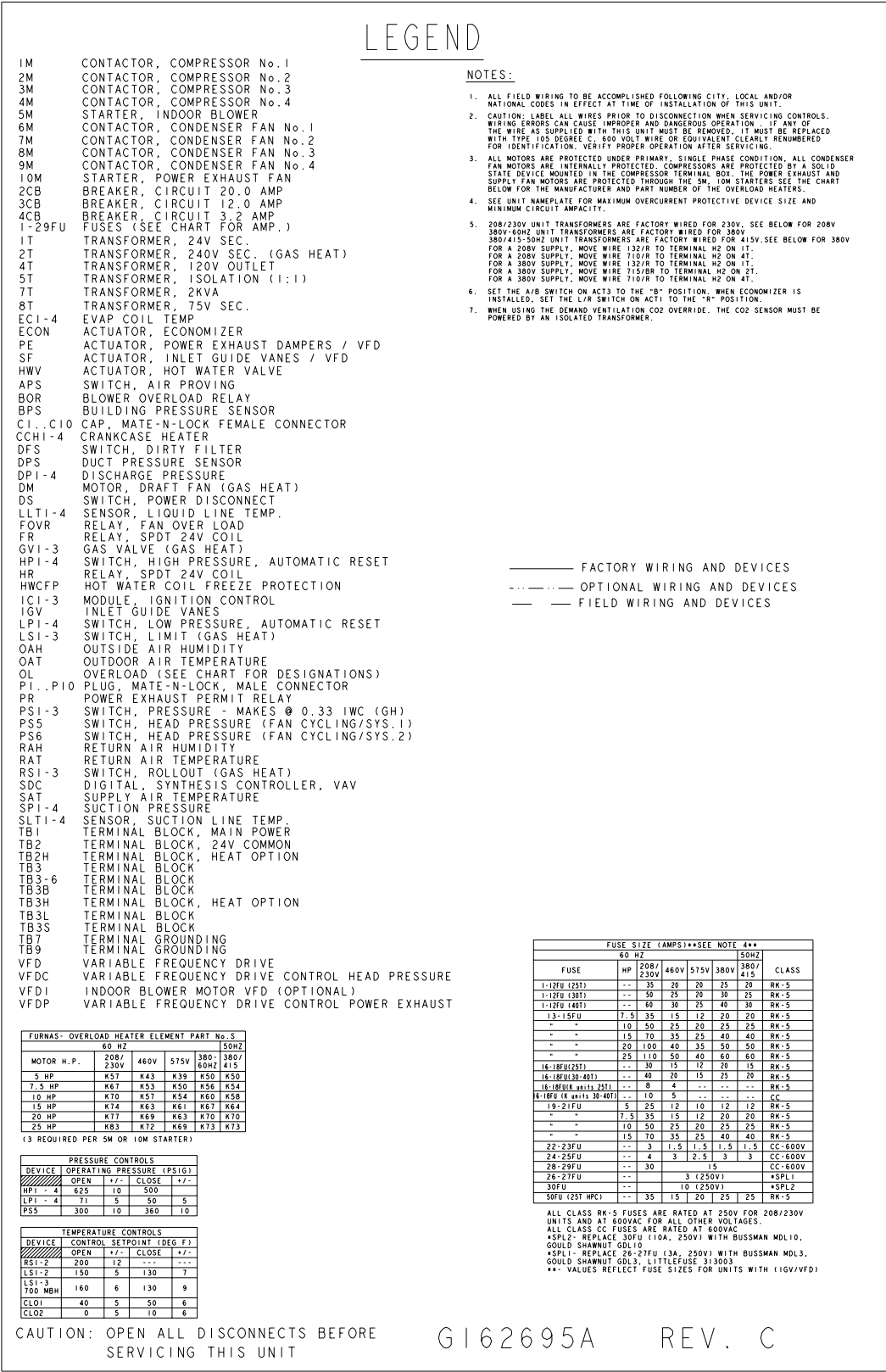
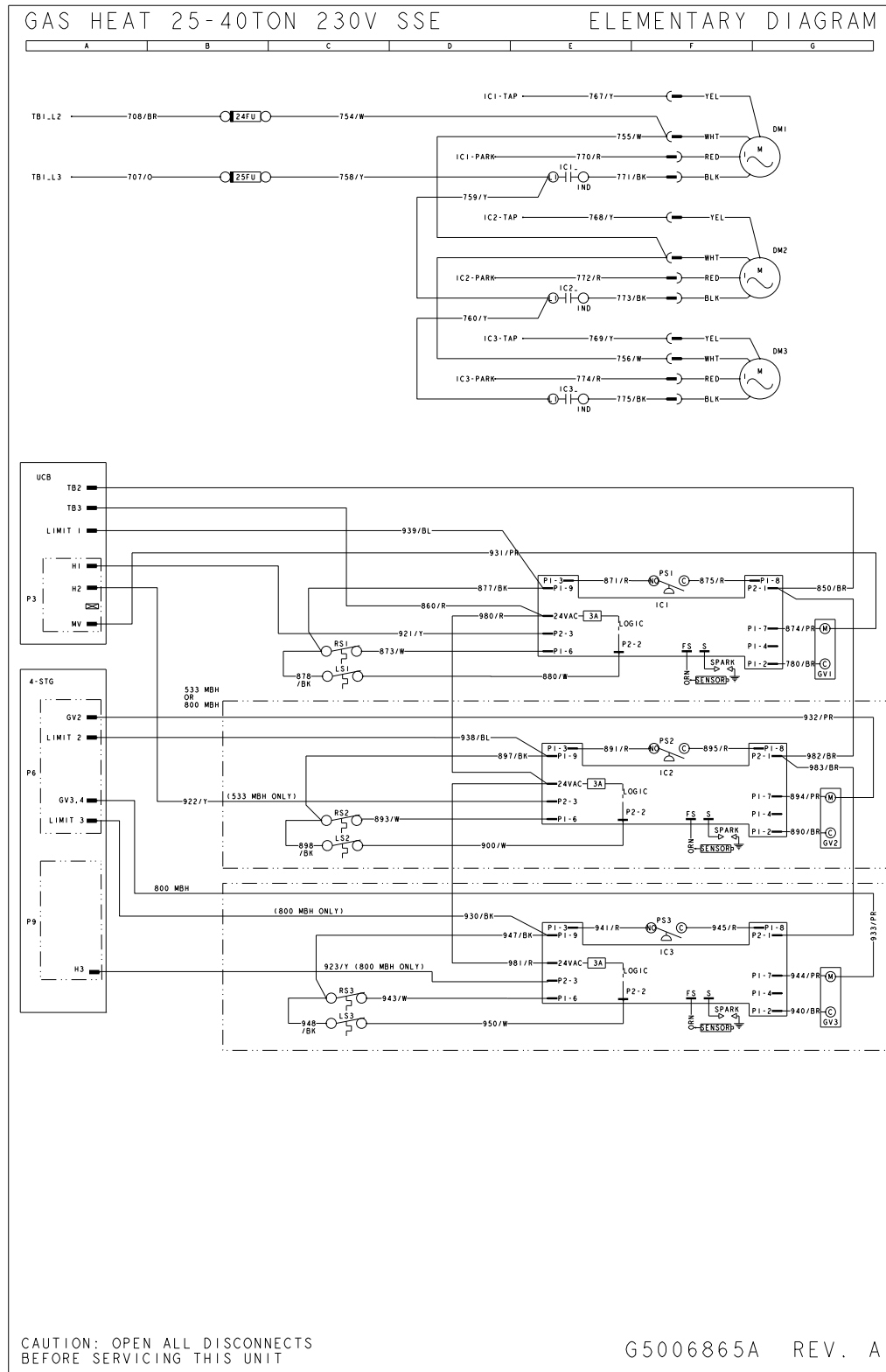
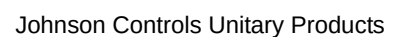
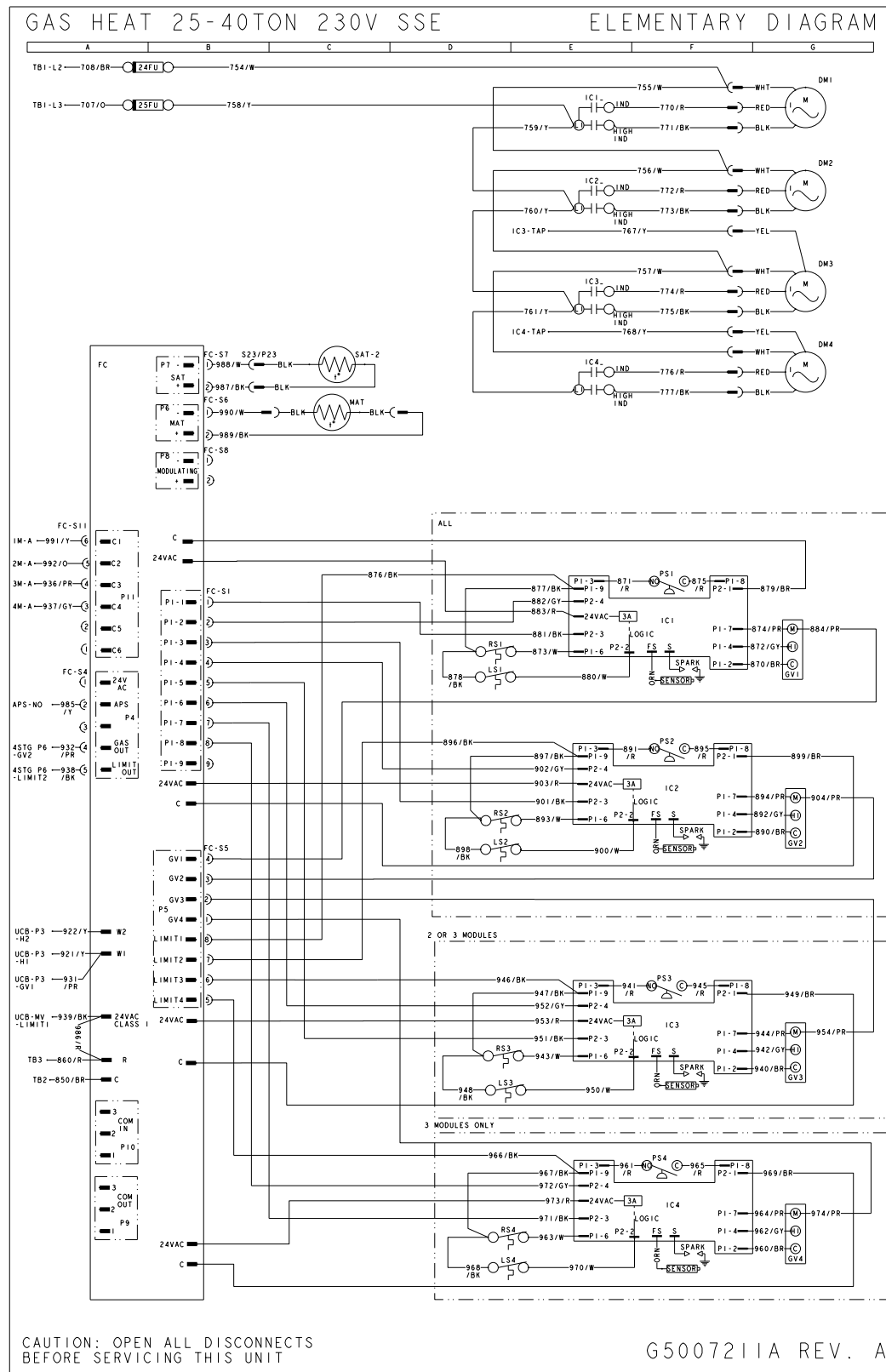


FIGURE 51 - LEGEND

**FIGURE 52 - TYPICAL 25 TON POWER WIRING**



### FIGURE 53 - TYPICAL STANDARD GAS HEAT WIRING

**FIGURE 54 - TYPICAL MODULATING GAS HEAT WIRING**

## GAS FURNACE SAFETY FEATURES

### COMBUSTION AIR PROVING

Combustion air proving is provided by a pressure switch. As the motor approaches full speed, this switch closes before any other circuit or gas component can be energized.

### ROLLOUT

Rollout protection is provided by a switch mounted on the heat shield of each furnace module. The switch senses any flame or excessive heat in the burner compartment. When the switch opens, the furnace module is immediately locked out until there is a break in power to the specific furnace module and the manual reset is reset. Note that only the module with the open rollout switch will be locked out, the remaining modules will continue to operate although all should be inspected.

A trip of the rollout switch likely indicates a flue restriction, an opening in the flue passageway, defective pressure switch or a loose combustion blower wheel. Corrective action should be taken accordingly.

## MAINTENANCE

### NORMAL MAINTENANCE

#### CAUTION

Prior to any of the following maintenance procedures, shut off all power to the unit. Failure to do so could cause personal injury.

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

Periodic maintenance normally consists of changing or cleaning filters and (under some conditions) cleaning the main burners.

### FILTERS

Inspect once a month. Replace disposable or clean permanent type as necessary. The dimensional size of the replacement filter must be the same as the replaced filter (Refer to Table 15).

## MOTORS

Outdoor fan motors are permanently lubricated and require no maintenance. Lubrication, if desired, is to be performed by a qualified service agency.

Ventor motors are factory lubricated for an estimated 10-year life.

Indoor Fan Motors - The indoor blower motor features ball-bearings that do not require periodic lubrication. Periodic lubrication of the motor bearings can extend the life but is optional.

#### CAUTION

Damage can occur if the bearings are over lubricated. Use grease sparingly.

To go to bypass mode, the bypass VFD as installed in this unit must be switched by hand on the front of the bypass enclosure in the fan cabinet of the rooftop unit. It does not automatically go to bypass mode if the drive fails.

The switches on the front of the bypass box control its run mode. For normal running:

- The ON/OFF rotary power switch must be in the ON position.
- The BYPASS/OFF/DRIVE switch S1 should be in the DRIVE position.
- The HAND/STOP/AUTO switch S2 should be in the AUTO position, so that the unit control will properly run the fan and control the speed.
- The TEST/NORMAL switch S3 should be in the NORMAL position.

#### CAUTION

If the unit is operated with the manual bypass switch in the LINE (BYPASS) position and there are VAV boxes present, the boxes must be driven to the full-open position using a customer-supplied power source to prevent over-pressuring the ductwork.

#### WARNING

Perform all maintenance operations on the blower motor with power disconnected from the unit. Do not attempt to lubricate bearings with the unit in operation.

**TABLE 59: INDOOR BLOWER BEARING LUBRICATION SCHEDULE**

| Shaft Size (Inches) | Operating Speed (RPM)        |      |      |      |
|---------------------|------------------------------|------|------|------|
|                     | 500                          | 1000 | 1500 | 2000 |
|                     | Relubrication Cycle (Months) |      |      |      |
| 1-1/16 - 1-7/16     | 6                            | 6    | 6    | 6    |
| 1-1/2 - 1-3/4       | 6                            | 6    | 6    | 4    |
| 1-7/8 - 2-3/16      | 6                            | 6    | 4    | 4    |
| 2 -1/4 - 3          | 6                            | 4    | 4    | 2    |

On an annual basis, check the motor for accumulations of dust, etc. That may block the cooling slots in the motor shell. Check for loose, damaged or misaligned drive components. Check that all mounting bolts are tight. Replace defective parts as required.

If desired, every three years remove both pipe plugs at each end shell and clean out any hardened grease or foreign matter. Replace one plug on each end with a clean grease fitting. Using a low pressure grease gun, pump grease (Chevron SRI-2 or equivalent) into the bearing cavity until new grease shows at the open port. Do not over-lubricate. Run the motor for ten minutes until excess grease is purged from the cavity. Replace the plugs.

#### FAN DRIVES

Units are supplied with fan shaft bearings that do not require maintenance but may be relubricated per Table 59.

Lubricate with a premium quality NLGI 2 grade multi-purpose roller bearing grease having corrosion inhibitors, anti-oxidant additives and mechanical stability for high speed operation. The grease should also have a minimum base oil viscosity of 500 SUS at 100°F. Do not use a heavy, long fibered grease.

The presents of dirt, moisture or chemical fumes around the bearings requires more frequent lubrication.

Fill bearings with lubricant prior to extended shutdown or storage. Rotate the shaft monthly during idle periods.

Avoid excessive grease purging from seals during lubrication, this reduces the life of the bearing.

#### OUTDOOR COIL

Dirt should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean coil, be sure power to the unit is shut off prior to cleaning.

**NOTE:** Exercise care when cleaning the coil so that the coil fins are not damaged.

Do not permit the hot condenser air discharge to be obstructed by overhanging structures or shrubs.

#### GAS BURNER

Periodically (at least annually at the beginning of each heating season) make a visual check of the main burner flame.

#### TO CLEAN BURNERS

Remove them from the furnace as explained in BURNER INSTRUCTIONS. Clean burners with hot water applied along top of the burner.

#### COMBUSTION AIR DISCHARGE

Visually inspect discharge outlet periodically to make sure that the buildup of soot and dirt is not excessive. If necessary, clean to maintain adequate combustion air discharge.

#### CLEANING FLUE PASSAGES AND HEATING ELEMENTS

With proper combustion adjustment, the heating element of a gas fired furnace will seldom need cleaning. If the element should become sooted, it can be cleaned as follows:

1. Remove the burner assembly as outlined in BURNER INSTRUCTIONS.
2. Remove the screws holding the top of the flue collector box. Carefully remove the top of the flue collector box. The draft wheel, housing, and draft motor can remain assembled to the flue box top, if cleaning of these components is not required.
3. This will provide access to flue baffles, then remove the flue baffles from the tube interiors. To remove, the flue baffles, remove the stainless steel screws from the vest panel. Refer to Figure 55.
4. Using a wire brush on a flexible wand, brush out the inside of each heat exchanger from the burner inlet and flue outlet ends.
5. Brush out the inside of the flue collector box, and the flue baffles.
6. Run the wire brush down the vent hoods from the flue collector end.
7. If soot build-up is particularly bad, remove the vent motor and clean the wheels and housings. Run the wire brush down the flue extension at the outlet of the vent housings.
8. After brushing is complete, blow all brushed areas with air or nitrogen. Vacuum as needed.
9. Replace parts in the order they were moved in steps 1 to 4.

10. Assure that all seams on the vent side of the combustion systems are air tight. Apply a high temperature (+500°F) sealing compound where needed (Dow Corning, Silastic 736, Loctite Superflex 596 or equivalent).

**NOTE:** One end of each flue baffle is provided with a sharper bend than the other end - this sharper bend must be positioned at the tube and attached with a stainless steel screw.

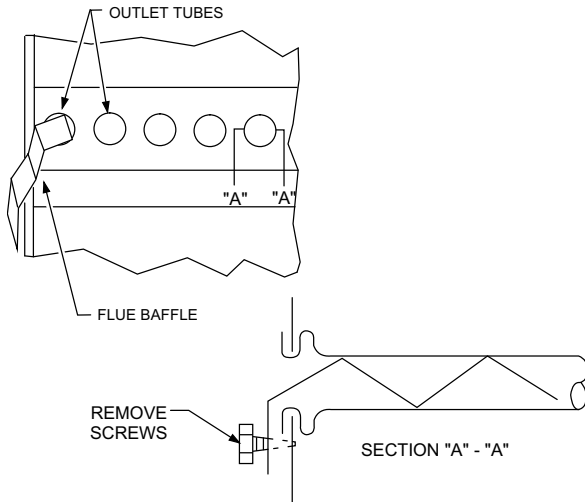


**FIGURE 55 - TYPICAL FLUE BAFFLE**

The restrictor plate must also be sealed to furnace tube sheet.

### **SECURE OWNERS APPROVAL**

When the system is functioning properly, secure the owner's approval. Show him the location of all disconnect switches and the room temperature sensors. Teach him how to start and stop the unit and how to adjust the temperature settings within the limitations of the system.

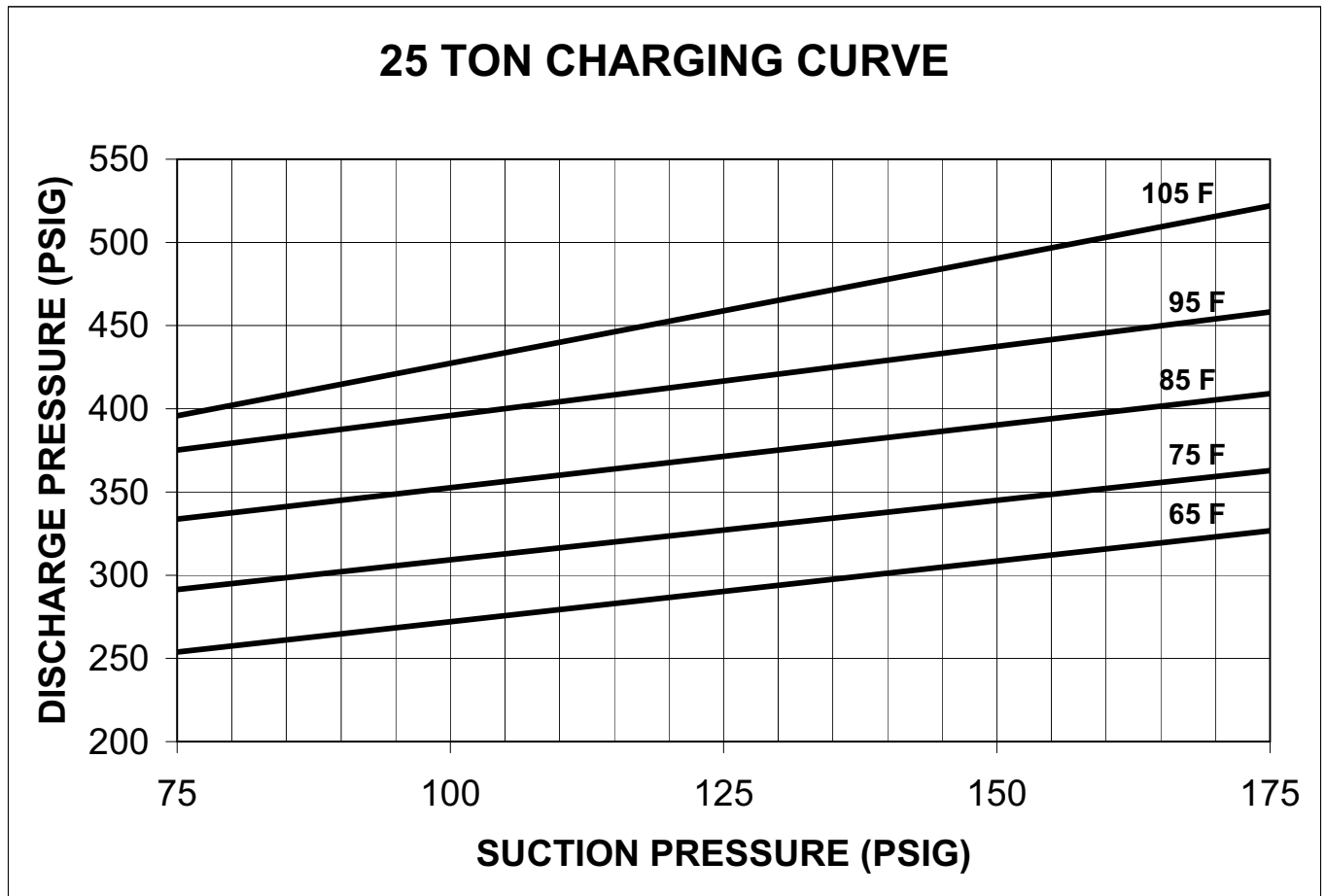


FIGURE 56 - 25 TON CHARGING CURVE

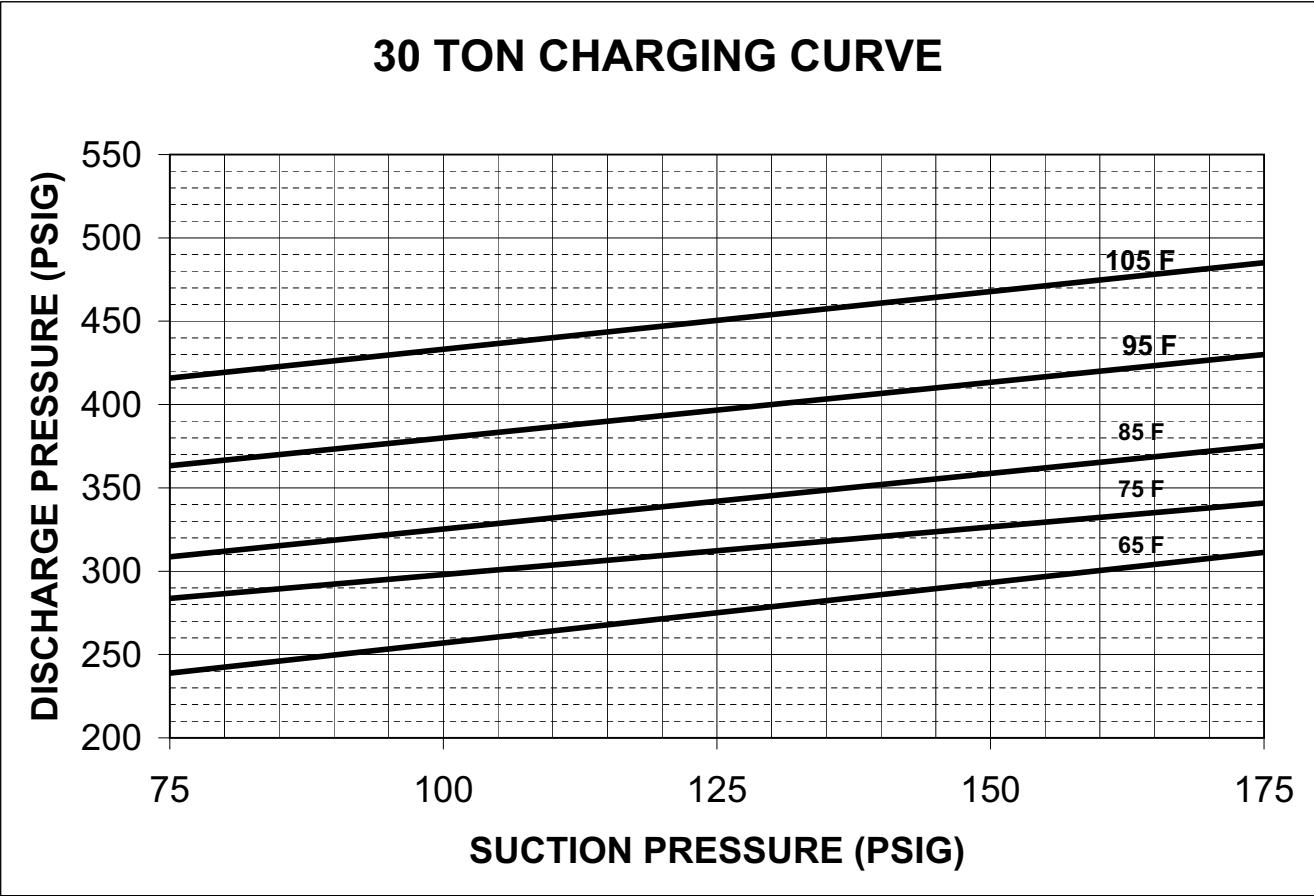


FIGURE 57 - 30 TON CHARGING CURVE

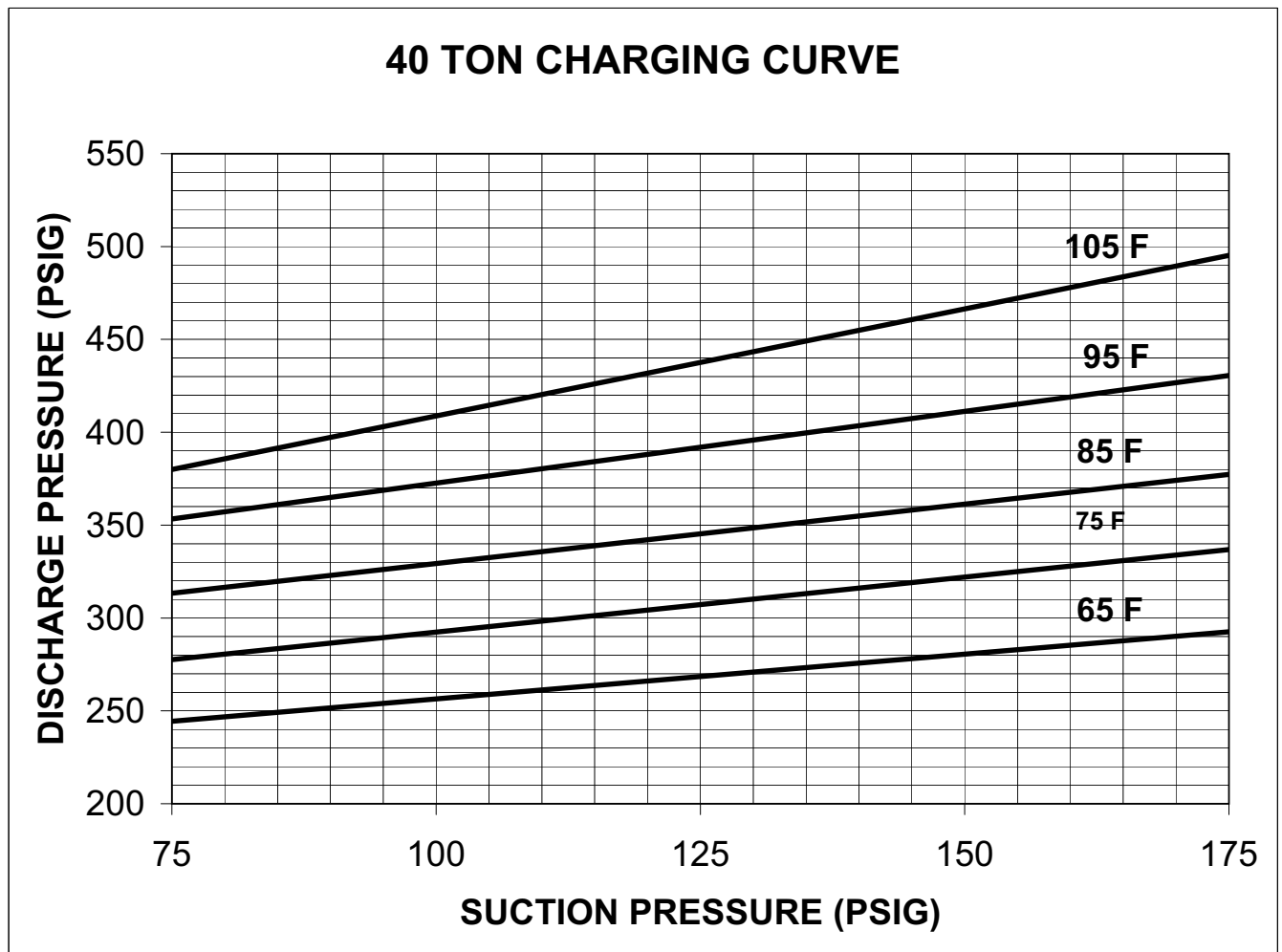


FIGURE 58 - 40 TON CHARGING CURVE

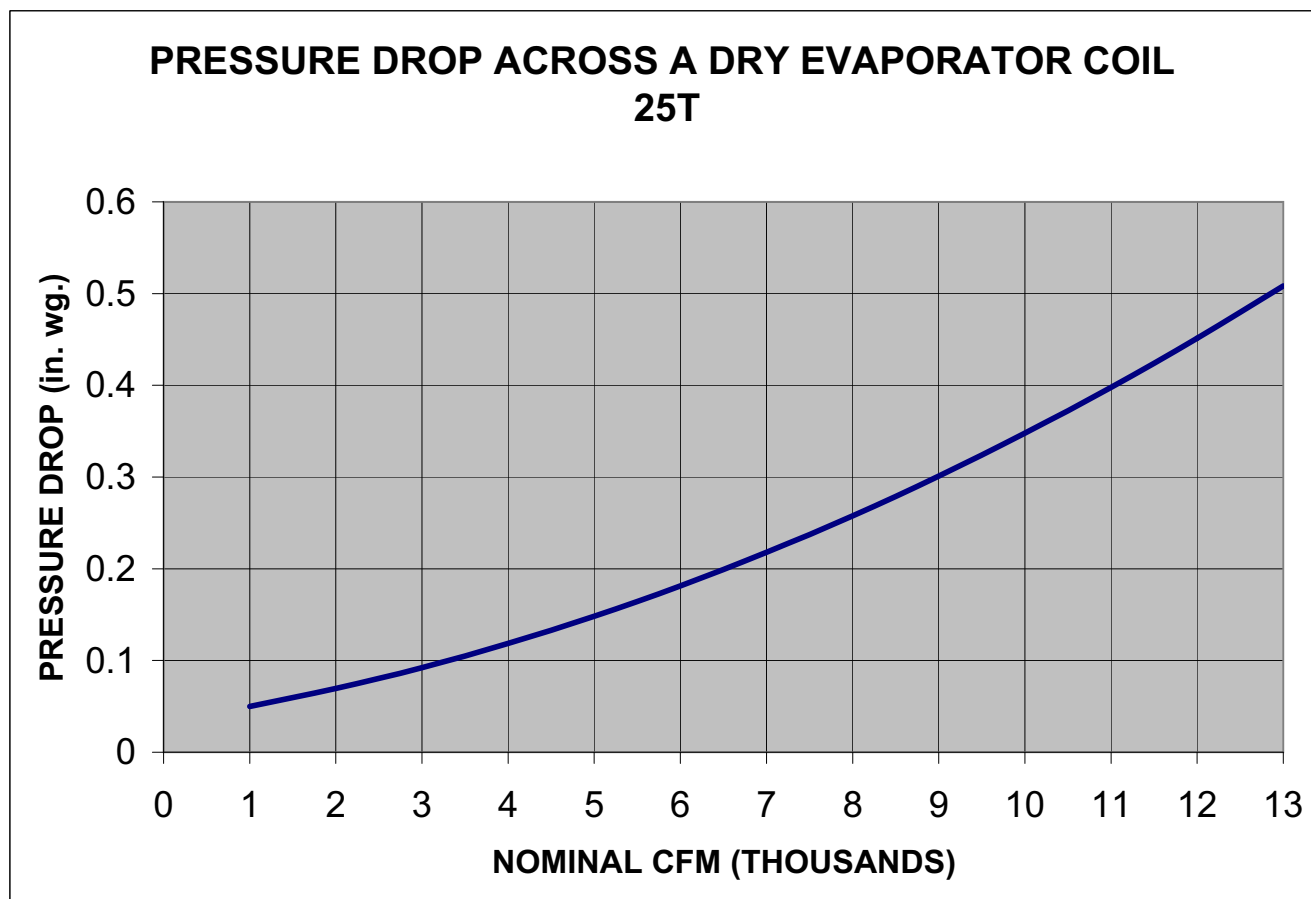


FIGURE 59 - PRESSURE DROP DRY EVAPORATOR COIL VS SUPPLY AIR CFM - 25 TON

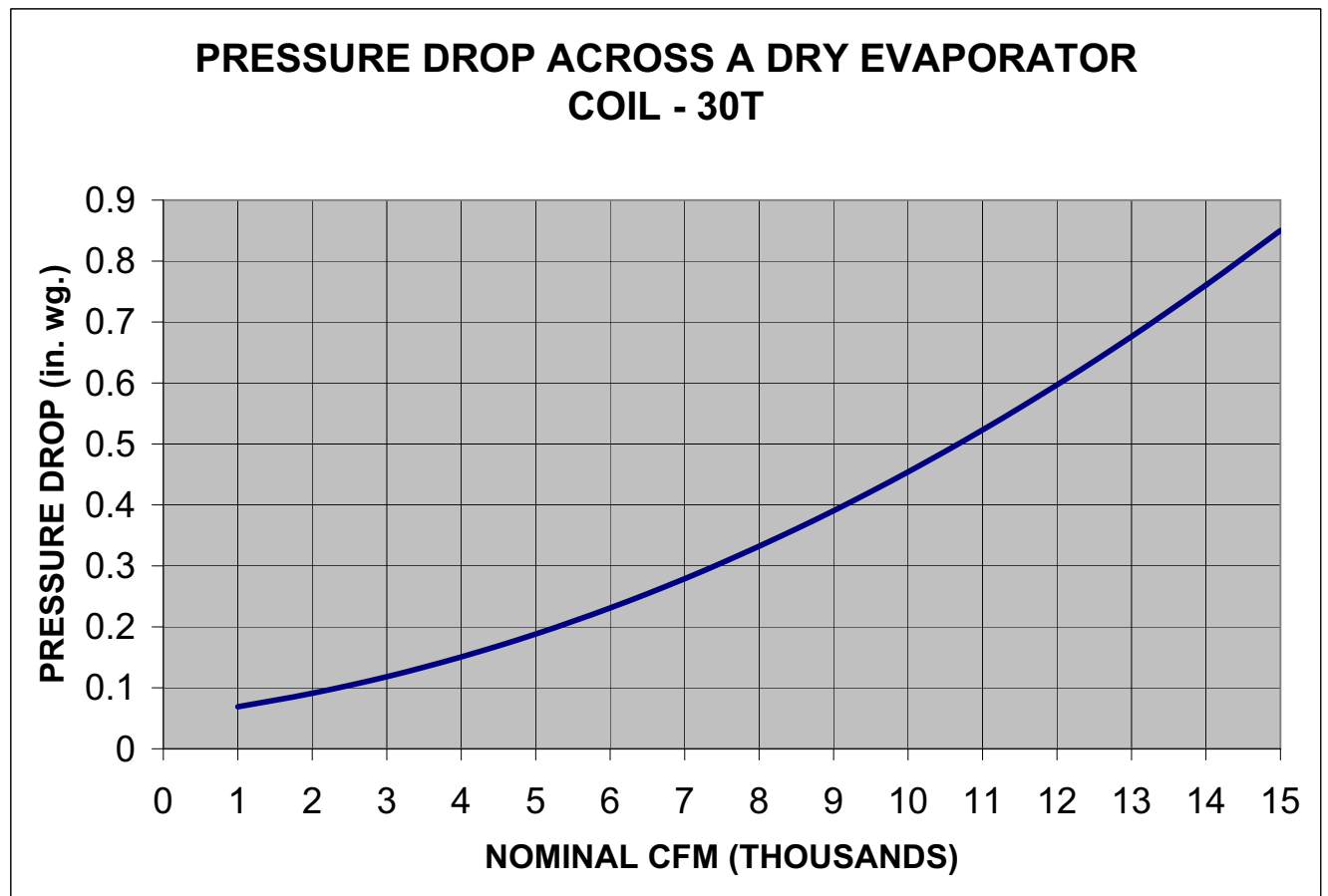


**FIGURE 60 - PRESSURE DROP DRY EVAPORATOR COIL VS SUPPLY AIR CFM - 30 TON**

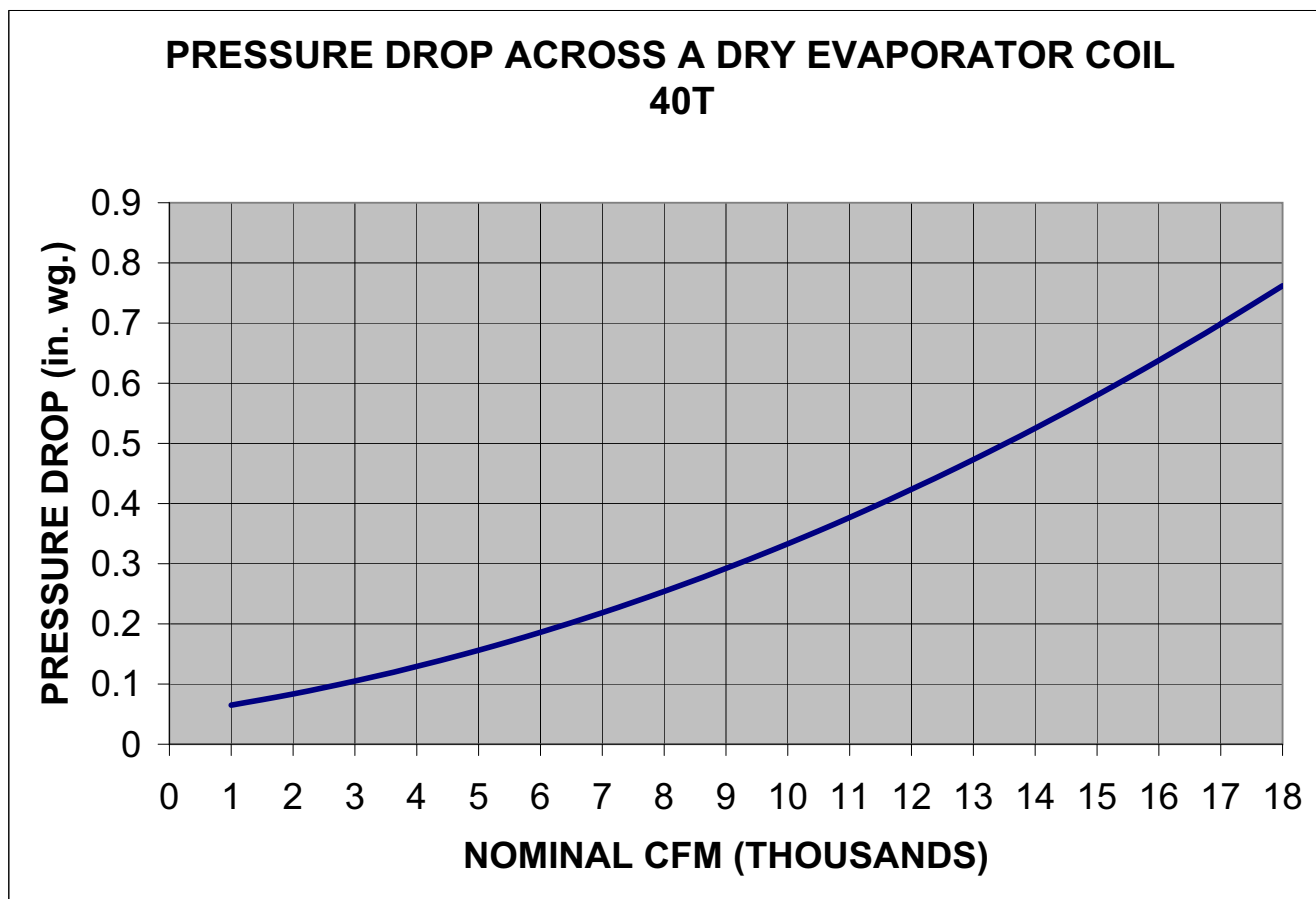


FIGURE 61 - PRESSURE DROP DRY EVAPORATOR COIL VS SUPPLY AIR CFM - 40 TON

**START-UP SHEET****START-UP & SERVICE DATA INSTRUCTION****COMMERCIAL PACKAGE UNITS****3.0 To 40.0 TONS****START-UP CHECKLIST**

Date: \_\_\_\_\_

Job Name: \_\_\_\_\_

Customer Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Model Number: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Qualified Start-up Technician: \_\_\_\_\_ Signature: \_\_\_\_\_

HVAC Contractor: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

Contractor's E-mail Address: \_\_\_\_\_

Electrical Contractor: \_\_\_\_\_ Phone: \_\_\_\_\_

Distributor Name: \_\_\_\_\_ Phone: \_\_\_\_\_

**WARRANTY STATEMENT**

Johnson Controls/UPG is confident that this equipment will operate to the owner's satisfaction if the proper procedures are followed and checks are made at initial start-up. This confidence is supported by the 30 day dealer protection coverage portion of our standard warranty policy which states that Johnson Controls/UPG will cover parts and labor on new equipment start-up failures that are caused by a defect in factory workmanship or material, for a period of 30 days from installation. Refer to current standard warranty policy and warranty manual found on UPGnet for details.

In the event that communication with Johnson Controls/UPG is required regarding technical and/or warranty concerns, all parties to the discussion should have a copy of the equipment start-up sheet for reference. A copy of the original start-up sheet should be filed with the Technical Services Department.

The packaged unit is available in constant or variable air volume versions with a large variety of custom options and accessories available. Therefore, some variation in the startup procedure will exist depending upon the products capacity, control system, options and accessories installed.

This start-up sheet covers all startup check points common to all package equipment. In addition it covers essential startup check points for a number of common installation options. Depending upon the particular unit being started not all sections of this startup sheet will apply. Complete those sections applicable and use the notes section to record any additional information pertinent to your particular installation.

Warranty claims are to be made through the distributor from whom the equipment was purchased.

**EQUIPMENT STARTUP**

**Use the local LCD or Mobile Access Portal (MAP) Gateway to complete the start-up.**

**A copy of the completed start-up sheet should be kept on file by the distributor providing the equipment and a copy sent to:**

Johnson Controls/UPG  
Technical Services Department  
5005 York Drive  
Norman, OK 73069

## SAFETY WARNINGS

The inspections and recording of data outlined in this procedure are required for start-up of Johnson Controls/UPG's packaged products. Industry recognized safety standards and practices must be observed at all times. General industry knowledge and experience are required to assure technician safety. It is the responsibility of the technician to assess all potential dangers and take all steps warranted to perform the work in a safe manner. By addressing those potential dangers, prior to beginning any work, the technician can perform the work in a safe manner with minimal risk of injury.

### WARNING

Lethal voltages are present during some start-up checks. Extreme caution must be used at all times.

### WARNING

Moving parts may be exposed during some startup checks. Extreme caution must be used at all times.

**NOTE:** Read and review this entire document before beginning any of the startup procedures.

## DESIGN APPLICATION INFORMATION

This information will be available from the specifying engineer who selected the equipment. If the system is a VAV system the CFM will be the airflow when the remote VAV boxes are in the

full open position and the frequency drive is operating at 60 HZ. **Do not proceed with the equipment start-up without the design CFM information.**

Design Supply Air CFM: \_\_\_\_\_ Design Return Air CFM: \_\_\_\_\_

Design Outdoor Air CFM At Minimum Position: \_\_\_\_\_

Total External Static Pressure: \_\_\_\_\_

Supply Static Pressure: \_\_\_\_\_

Return Static Pressure: \_\_\_\_\_

Design Building Static Pressure: \_\_\_\_\_

Outside Air Dilution: Economizer Position Percentage: \_\_\_\_\_ CFM: \_\_\_\_\_

Supply Gas Pressure After Regulator W/o Heat Active \_\_\_\_\_ Inches \_\_\_\_\_

ADDITIONAL APPLICATION NOTES FROM SPECIFYING ENGINEER:

1034349-UCL-C-0315

**REFERENCE**

| <b>General Inspection</b>                                       | <b>Completed</b>         | <b>See Notes</b>         |
|-----------------------------------------------------------------|--------------------------|--------------------------|
| Unit inspected for shipping, storage, or rigging damage         | <input type="checkbox"/> | <input type="checkbox"/> |
| Unit installed with proper clearances                           | <input type="checkbox"/> | <input type="checkbox"/> |
| Unit installed within slope limitations                         | <input type="checkbox"/> | <input type="checkbox"/> |
| Refrigeration system checked for gross leaks (presence of oil)  | <input type="checkbox"/> | <input type="checkbox"/> |
| Terminal screws and wiring connections checked for tightness    | <input type="checkbox"/> | <input type="checkbox"/> |
| Filters installed correctly and clean                           | <input type="checkbox"/> | <input type="checkbox"/> |
| Economizer hoods installed in operating position                | <input type="checkbox"/> | <input type="checkbox"/> |
| Condensate drain trapped properly, refer to Installation Manual | <input type="checkbox"/> | <input type="checkbox"/> |
| Economizer damper linkage tight                                 | <input type="checkbox"/> | <input type="checkbox"/> |
| Gas Heat vent hood installed                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| All field wiring (power and control) complete                   | <input type="checkbox"/> | <input type="checkbox"/> |

| <b>Air Moving Inspection</b>                                                  | <b>Completed</b>         | <b>See Notes</b>         |
|-------------------------------------------------------------------------------|--------------------------|--------------------------|
| Alignment of drive components                                                 | <input type="checkbox"/> | <input type="checkbox"/> |
| Belt tension adjusted properly                                                | <input type="checkbox"/> | <input type="checkbox"/> |
| Blower pulleys tight on shaft, bearing set screws tight, wheel tight to shaft | <input type="checkbox"/> | <input type="checkbox"/> |
| Pressure switch or transducer tubing installed properly                       | <input type="checkbox"/> | <input type="checkbox"/> |

| <b>Exhaust Inspection</b> Powered <input type="checkbox"/> Barometric Relief <input type="checkbox"/> | <b>Completed</b>         | <b>See Notes</b>         |
|-------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| Check hub for tightness                                                                               | <input type="checkbox"/> | <input type="checkbox"/> |
| Check fan blade for clearance                                                                         | <input type="checkbox"/> | <input type="checkbox"/> |
| Check for proper rotation                                                                             | <input type="checkbox"/> | <input type="checkbox"/> |
| Check for proper mounting (screen faces towards unit)                                                 | <input type="checkbox"/> | <input type="checkbox"/> |
| Prove operation by increasing minimum setting on economizer                                           | <input type="checkbox"/> | <input type="checkbox"/> |

| <b>Economizer Inspection</b> Standard <input type="checkbox"/> BAS <input type="checkbox"/>  | <b>Completed</b>         | <b>See Notes</b>         |
|----------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| CO <sub>2</sub> sensor installed    Yes <input type="checkbox"/> No <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Check economizer setting (Reference SSE Control Board LCD menu location)                     | <input type="checkbox"/> | <input type="checkbox"/> |
| Prove economizer open/close through SSE Board Setting                                        | <input type="checkbox"/> | <input type="checkbox"/> |

| <b>Reheat Mode</b> Normal <input type="checkbox"/> or Alternate <input type="checkbox"/> Not Applicable <input type="checkbox"/> |
|----------------------------------------------------------------------------------------------------------------------------------|
| Humidity Sensor (2SH0401) _____                                                                                                  |

### Operating Measurements - Air Flow

|                                                                               |                                  |                                    |                                     |
|-------------------------------------------------------------------------------|----------------------------------|------------------------------------|-------------------------------------|
| Fan operates with proper rotation                                             | ID Fans <input type="checkbox"/> | Exh. Fans <input type="checkbox"/> | Cond. Fans <input type="checkbox"/> |
| Pressure drop across dry evaporator coil (At maximum design CFM) <sup>1</sup> | IWC                              |                                    |                                     |
| External Static Pressure                                                      | IWC                              |                                    |                                     |
| Return Static Pressure                                                        | IWC                              |                                    |                                     |
| Supply Static Pressure                                                        | IWC                              |                                    |                                     |
| Supply Air CFM Using Dry Coil Chart                                           | CFM                              |                                    |                                     |
| Final Adjusted Supply Air CFM <sup>2</sup>                                    | CFM                              |                                    |                                     |

1. Consult the proper airflow to pressure drop table to obtain the actual airflow at the measured pressure differential.  
 2. Was a motor pulley adjustment or change required to obtain the correct airflow?  
 Was it necessary to increase or decrease the airflow to meet the design conditions?  
 If the motor pulley size was changed, measure the outside diameters of the motor and blower pulleys and record those diameters here;

Blower Motor HP \_\_\_\_\_ FLA \_\_\_\_\_ RPM \_\_\_\_\_

Pulley Pitch Diameter \_\_\_\_\_ Turns Out \_\_\_\_\_ Final Turns Out \_\_\_\_\_

Blower Pulley Pitch Diameter \_\_\_\_\_ Fixed Sheave \_\_\_\_\_

### ELECTRICAL DATA

T1 - T2 \_\_\_\_\_ Volts      T2 - T3 \_\_\_\_\_ Volts  
 Control Voltage \_\_\_\_\_ Volts      T1 - T3 \_\_\_\_\_ Volts

| Device                           | Nameplate | Measured<br>List All Three Amperages |
|----------------------------------|-----------|--------------------------------------|
| Supply Fan Motor <sup>1, 2</sup> | AMPS      | AMPS                                 |
| Exhaust Motor (Dampers 100%)     | AMPS      | AMPS                                 |
| Condenser Fan #1                 | AMPS      | AMPS                                 |
| Condenser Fan #2 (if equipped)   | AMPS      | AMPS                                 |
| Condenser Fan #3 (if equipped)   | AMPS      | AMPS                                 |
| Condenser Fan #4 (if equipped)   | AMPS      | AMPS                                 |
| Compressor #1                    | AMPS      | AMPS                                 |
| Compressor #2 (if equipped)      | AMPS      | AMPS                                 |
| Compressor #3 (if equipped)      | AMPS      | AMPS                                 |
| Compressor #4 (if equipped)      | AMPS      | AMPS                                 |

1. VAV units with heat section - simulate heat call to drive VAV boxes and VFD/IGV to maximum design airflow position.  
 2. VAV units without heat section - VAV boxes must be set to maximum design airflow position.

1034349-UCL-C-0315

**OPERATING MEASUREMENTS - COOLING**

| Stage                | Discharge Pressure | Discharge Temp. | Liquid Line Temp. <sup>1</sup> | Subcooling <sup>2</sup> | Suction Pressure | Suction Temp. | Superheat |
|----------------------|--------------------|-----------------|--------------------------------|-------------------------|------------------|---------------|-----------|
| First                | #                  | °               | °                              | °                       | #                | °             | °         |
| Second (if equipped) | #                  | °               | °                              | °                       | #                | °             | °         |
| Third (if equipped)  | #                  | °               | °                              | °                       | #                | °             | °         |
| Fourth (if equipped) | #                  | °               | °                              | °                       | #                | °             | °         |
| Reheat 1st Stage     | #                  | °               | °                              | °                       | #                | °             | °         |

1. Liquid temperature should be taken before filter/drier.

2. Subtract 10 psi from discharge pressure for estimated liquid line pressure

Outside air temperature \_\_\_\_\_ °F db \_\_\_\_\_ °F wb \_\_\_\_\_ %RH  
 Return Air Temperature \_\_\_\_\_ °F db \_\_\_\_\_ °F wb \_\_\_\_\_ %RH  
 Mixed Air Temperature \_\_\_\_\_ °F db \_\_\_\_\_ °F wb \_\_\_\_\_ %RH  
 Supply Air Temperature \_\_\_\_\_ °F db \_\_\_\_\_ °F wb \_\_\_\_\_ %RH

**REFRIGERANT SAFETIES**

| Action                                                     | Completed                | See Notes                |
|------------------------------------------------------------|--------------------------|--------------------------|
| Prove Compressor Rotation (3 phase only) by gauge pressure | <input type="checkbox"/> | <input type="checkbox"/> |
| Prove High Pressure Safety, All Systems                    | <input type="checkbox"/> | <input type="checkbox"/> |
| Prove Low Pressure Safety, All Systems                     | <input type="checkbox"/> | <input type="checkbox"/> |

**OPERATING MEASUREMENTS - GAS HEATING**
 Fuel Type: ☐ Natural Gas ☐ LP Gas

| Action                              | Completed                                      | See Notes                    |
|-------------------------------------|------------------------------------------------|------------------------------|
| Check for gas leaks                 | <input type="checkbox"/>                       | <input type="checkbox"/>     |
| Prove Ventor Motor Operation        | <input type="checkbox"/>                       | <input type="checkbox"/>     |
| Prove Primary Safety Operation      | <input type="checkbox"/>                       | <input type="checkbox"/>     |
| Prove Auxiliary Safety Operation    | <input type="checkbox"/>                       | <input type="checkbox"/>     |
| Prove Rollout Switch Operation      | <input type="checkbox"/>                       | <input type="checkbox"/>     |
| Prove Smoke Detector Operation      | <input type="checkbox"/>                       | <input type="checkbox"/>     |
| Manifold Pressure                   | Stage 1                                        | IWC <input type="checkbox"/> |
|                                     | Stage 2 (If Equipped)                          | IWC <input type="checkbox"/> |
|                                     | Stage 3 (If Equipped)                          | IWC <input type="checkbox"/> |
| Supply gas pressure at full fire    | IWC                                            | <input type="checkbox"/>     |
| Check temperature rise <sup>1</sup> | <input type="checkbox"/> measured at full fire | °F <input type="checkbox"/>  |

1. Input X Eff. (BTU output)

1.08 X Temp. Rise

## OPERATIONAL MEASUREMENTS - STAGING CONTROLS

|                                                                                                                                |                          |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Verify Proper Operation of Heating/Cooling Staging Controls</b>                                                             |                          |
| Create a cooling demand at the Thermostat, BAS System or Simplicity SE<br>Verify that cooling/economizer stages are energized. | <input type="checkbox"/> |
| Create a heating demand at the Thermostat, BAS System or Simplicity SE<br>Verify that heating stages are energized.            | <input type="checkbox"/> |
| <b>Verify Proper Operation of the Variable Frequency Drive (If Required)</b>                                                   |                          |
| Verify that motor speed modulates with duct pressure change.                                                                   | <input type="checkbox"/> |

## FINAL - INSPECTION

|                                                                                                                                                                                                                                                                     |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Verify that all operational control set points have been set to desired value<br>Scroll through all setpoints and change as may be necessary to suit the occupant requirements.                                                                                     | <input type="checkbox"/> |
| Verify that all option parameters are correct<br>Scroll through all option parameters and ensure that all installed options are enabled in the software and all others are disabled in the software. (Factory software settings should match the installed options) | <input type="checkbox"/> |
| Verify that all access panels have been closed and secured                                                                                                                                                                                                          | <input type="checkbox"/> |

### OBSERVED PRODUCT DIFFICIENCIES & CONCERNS:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

## R-410A QUICK REFERENCE GUIDE

**Refer to Installation Instructions for specific installation requirements.**

- R-410A Refrigerant operates at 50 - 70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A Refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig, DOT 4BA400, or DOT BW400.
- Recovery equipment must be rated for R-410A.
- Do Not use R-410A service equipment on R-22 systems. All hoses, gages, recovery cylinders, charging cylinders and recovery equipment must be dedicated for use on R-410A systems only.
- Manifold sets must be at least 700 psig high side, and 180 psig low side, with 550 psig retard.
- All hoses must have a service pressure rating of 800 psig.
- Leak detectors must be designed to detect HFC refrigerants.
- Systems must be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose.
- R-410A can only be used with POE type oils.
- POE type oils rapidly absorb moisture from the atmosphere.
- Vacuum pumps will not remove moisture from POE type oils.
- Do not use liquid line driers with a rated working pressure rating less than 600 psig.
- Do not install suction line driers in the liquid line.
- A liquid line drier is required on every unit.
- Do not use a R-22 TXV. If a TXV is to be used, it must be a R-410A TXV.
- Never open system to atmosphere when under a vacuum.
- If system must be opened for service, evacuate system then break the vacuum with dry nitrogen and replace all filter driers.

FIGURE 62 - R-410A QUICK REFERENCE GUIDE