

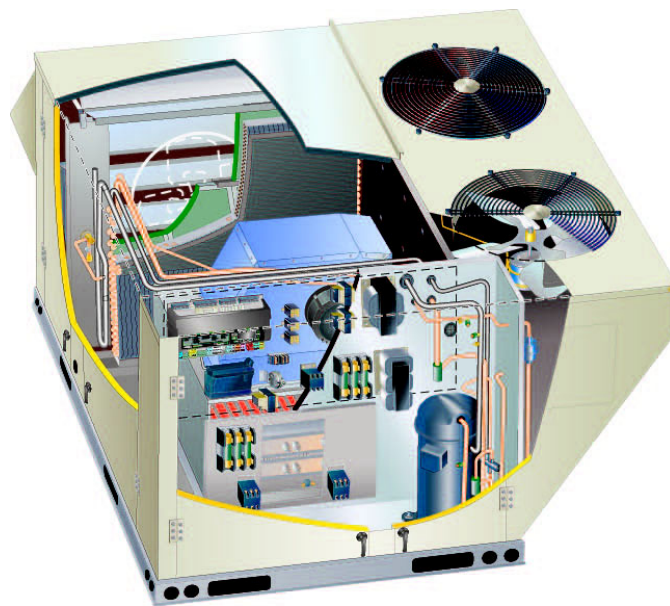
SCH 3 & 5 TON

The SCH 3 and 5 ton (10.5 and 17.5 kW) units are configured to order units (CTO) with a wide selection of factory installed options.

Electric heat operates in single or multiple stages depending on the kW input size. 10, 15, 20, and 30kW heat sections are available. SCH units have identical refrigerant circuits with 3, and 5 ton (10.5 and 17.5 kW) cooling capacities. All units utilize one compressor.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.



| | |
|---|--|
| ⚠ WARNING | |
|  | Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies. |

| | |
|---|--|
| ⚠ CAUTION | |
| As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing. | |

| | |
|---|--|
| ⚠ WARNING | |
| Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly. | |
| Failure to follow this warning may result in personal injury or death. | |

| | |
|--|--|
| ⚠ WARNING | |
| Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer (or equivalent), service agency or the gas supplier. | |

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OPTIONS / ACCESSORIES

| Item Description | Model Number | Catalog Number | Unit Model No. | |
|--|---|----------------|----------------|-----|
| | | | 036 | 060 |
| COOLING SYSTEM | | | | |
| Condensate Drain Trap | | Factory | O | O |
| Corrosion Protection | Coated indoor/outdoor coil assemblies, painted cabinet interior | Factory | O | O |
| | Coated outdoor coil assembly | Factory | O | O |
| Drain Pan Overflow Switch | E1SNSR71AD1 | 68W88 | OX | OX |
| BLOWER - SUPPLY AIR | | | | |
| ECM Direct Drive, MSAV® (Multi-Stage Air Volume) | 1.5 hp | Factory | O | O |
| Belt Drive, MSAV® (Multi-Stage Air Volume) | 3 hp | Factory | | |
| | 5 hp | Factory | | |
| | 7.5 hp | Factory | | |
| CABINET | | | | |
| Combination Coil/Hail Guards | S1GARD22101 | 19H54 | OX | OX |
| | S1GARD22111 | 19H55 | | |
| | C1GARD52D-1 | 13T16 | | |
| CONTROLS | | | | |
| Blower Proving Switch | | Factory | O | O |
| Commercial Controls | Prodigy® Control System - BACnet® Module | Factory | O | O |
| | Prodigy® Control System - LonTalk® Module | Factory | O | O |
| | CPC Einstein Integration | Factory | O | O |
| | L Connection® Network | Factory | O | O |
| Dirty Filter Switch | S1SNSR55S-1 | 12P68 | OX | OX |
| Fresh Air Tempering | C1SNSR75AD1 | 58W63 | X | X |
| ¹ Smoke Detector | Supply | Factory | O | O |
| | Return | Factory | O | O |
| ELECTRICAL | | | | |
| Voltage 60 hz | 208/230V - 3 phase | Factory | O | O |
| | 460V - 3 phase | Factory | O | O |
| | 575V - 3 phase | Factory | O | O |
| GFI Service Outlets | 20 amp non-powered, field-wired (all voltages) C1GFCI20FF1 | 67E01 | OX | OX |
| | 15 amp, factory-wired and powered C1GFCI15FF1 | 74M70 | | |
| ² Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection) | | Factory | | |
| Weatherproof Cover for GFI | C1GFCI99FF1 | 10C89 | X | X |
| ELECTRIC HEAT | | | | |
| 15 kW | 208/230V, 460V or 575V-3ph | Factory | O | O |
| 30 kW | 208/230V, 460V or 575V-3ph | Factory | | O |
| 45 kW | 208/230V or 575V-3ph | Factory | | |
| 60 kW | 208/230V or 575V-3ph | Factory | | |
| 90 kW | 208/230V or 575V-3ph | Factory | | |
| 10 kW | 460V-3ph | Factory | O | O |
| 20 kW | 460V-3ph | Factory | | O |
| 40 kW | 460V-3ph | Factory | | |
| 80 kW | 460V-3ph | Factory | | |
| HUMIDITROL® CONDENSER REHEAT OPTION | | | | |
| Humiditrol® Dehumidification Option | | Factory | O | O |
| Humidity Sensor Kit, Remote mounted (required) | C0SNSR31AE-1 | 17M50 | X | X |

¹ Factory installed smoke detectors must be ordered for use with either 115V or 24V external power supply only.

² SCCR option not available with 90 kW - 208/230V electric heat option.

NOTE - Catalog and model numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

| Item Description | Model Number | Catalog Number | Unit Model No. | | |
|---|---|----------------|----------------|--------------|----|
| | | | 036 | 060 | |
| INDOOR AIR QUALITY | | | | | |
| Air Filters | | | | | |
| Healthy Climate® | MERV 13 (16 x 20 x 2 - Order 4 per unit) | C1FLTR40A-1 | 52W37 | X | X |
| High Efficiency Air Filters | MERV 13 (20 x 25 x 2 - Order 4 per unit) | C1FLTR40B-1 | 52W41 | | |
| | MERV 13 (20 x 20 x 2 - Order 12 per unit) | C1FLTR40D-1 | 52W39 | | |
| Replacement Media Filter With Metal Mesh Frame 20 x 20 x 2 Order 12 per unit (includes non-pleated filter media) | | C1FLTR30D-1- | 44N60 | | |
| Indoor Air Quality (CO₂) Sensors | | | | | |
| Sensor - Wall-mount, off-white plastic cover with LCD display | | C0SNSR50AE1L | 77N39 | X | X |
| Sensor - Wall-mount, off-white plastic cover, no display | | C0SNSR52AE1L | 87N53 | X | X |
| Sensor - Black plastic case with LCD display, rated for plenum mounting | | C0SNSR51AE1L | 87N52 | X | X |
| Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting | | C0MISC19AE1 | 87N54 | X | X |
| CO ₂ Sensor Duct Mounting Kit - for downflow applications | | C0MISC19AE1- | 85L43 | X | X |
| Aspiration Box - for duct mounting non-plenum rated CO ₂ sensors (87N53 or 77N39) | | C0MISC16AE1- | 90N43 | X | X |
| ECONOMIZER | | | | | |
| High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified) | | | | | |
| High Performance Economizer - Includes Outdoor Air Hood (Global Sensor, field provided, order Barometric Relief Dampers separately) | | E1ECON17D-2 | 18X87 | Factory O | O |
| Economizer Controls (Not for Title 24) | | | | | |
| Single Enthalpy NOTE - For Differential Enthalpy Order 2 Single Enthalpy Controls | | C1SNSR64FF1 | 53W64 | OX | OX |
| Barometric Relief Dampers | | | | | |
| | Barometric Relief Dampers (No Hood) | | 30W72 | OX | OX |
| | Barometric Relief Dampers With Power Exhaust Fans (Hood Furnished) | | 30W92 | | |
| | Barometric Relief Dampers Without Power Exhaust Fans (No Hood) | | 47M14 | | |
| | Barometric Relief Dampers Without Power Exhaust Fans (Hood Furnished) | | 76W17 | | |
| POWER EXHAUST | | | | | |
| Standard Static | | | Factory | | |
| OUTDOOR AIR | | | | | |
| Manual Outdoor Air Damper with Outdoor Air Hood and Bird Screen | | | Factory | | |
| Motorized Outdoor Air Dampers with Outdoor Air Hood and Bird Screen | | | Factory | | |
| ROOF CURBS | | | | | |
| Hybrid Roof Curbs, Downflow, 14 in. height | | S1CURB71101 | 11F70 | X | X |
| | | S1CURB71111 | 11F72 | | |
| | Full Perimeter - | S1CURB71121 | 11F74 | | |
| Hybrid Roof Curbs, Downflow 24 in. height | | S1CURB73101 | 11F71 | X | X |
| | | S1CURB73111 | 11F73 | | |
| | Full Perimeter - | S1CURB73121 | 11F75 | | |
| Curb Alignment (Adapter plate mates new unit to existing roof curb for replacement of LCE240) | | | Factory | | |
| NOTE - Catalog and model numbers shown are for ordering field installed accessories. OX - Configure To Order (Factory Installed) or Field Installed O = Configure To Order (Factory Installed) X = Field Installed | | | | | |

| SPECIFICATIONS | | DIRECT DRIVE 3 - 5 TON | |
|---|---|---|---|
| General Data | Nominal Tonnage | 3 Ton | 5 Ton |
| | Model No. | SCH036H4E | SCH060H4E |
| | Efficiency Type | High | High |
| | Blower Type | ECM Direct Drive MSAV® (Multi-Stage Air Volume) | ECM Direct Drive MSAV® (Multi-Stage Air Volume) |
| Cooling Performance | Gross Cooling Capacity - Btuh | 37,200 | 60,300 |
| | ¹ Net Cooling Capacity - Btuh | 36,000 | 59,000 |
| | AHRI Rated Air Flow - cfm | 1200 | 1700 |
| | Total Unit Power - kW | 2.6 | 4.5 |
| | ¹ SEER (Btuh/Watt) - 208/230V-3ph | 19.3 | 17.8 |
| | ¹ SEER (Btuh/Watt) - 460V/575V-3ph | 18.6 | 17.4 |
| | ¹ EER (Btuh/Watt) - 208/230V-3ph | 14.2 | 13.0 |
| | ¹ EER (Btuh/Watt) - 460V/575V-3ph | 13.9 | 12.8 |
| Refrigerant Charge | Refrigerant Type | R-410A | R-410A |
| | Environ™ Coil System | 7 lbs. 11 oz. | 8 lbs. 3 oz. |
| | Environ™ Coil System With Humiditrol® Dehumidification Option | 8 lbs. 4 oz. | 8 lbs. 4 oz. |
| ² Sound Rating Number (dBA) | | 67 | 78 |
| Electric Heat Options Available | | 10, 15 kW | 10, 15, 20, 30 kW |
| Compressor Type (No.) | | Two-Stage Scroll (1) | Two-Stage Scroll (1) |
| Condenser Coil | Net face area - sq. ft. | 18.7 | 18.7 |
| | Number of rows | 1 | 1 |
| | Fins per inch | 23 | 23 |
| Condenser Fan(s) | Motor (No.) horsepower | (2) 1/3 (ECM) | (2) 1/3 (ECM) |
| | Motor rpm | 340-560 | 340-860 |
| | Total Motor watts | 90-136 | 90-354 |
| | Diameter (No.) - in. | (2) 24 | (2) 24 |
| | Number of blades | 3 | 3 |
| | Total air volume - cfm | 3900 | 6300 |
| Evaporator Coil | Net face area - sq. ft. | 7.78 | 7.78 |
| | Tube diameter - in. | 3/8 | 3/8 |
| | Number of rows | 4 | 4 |
| | Fins per inch | 14 | 14 |
| | Drain connection - no. & size | (1) 1 NPT | (1) 1 NPT |
| | Expansion device type | Balance Port TXV, removable head | |
| ³ Indoor Blower | Nominal motor output HP | 1.5 (ECM) | 1.5 (ECM) |
| | Wheel nominal diameter x width - in. | (1) 14 x 5 | (1) 14 x 5 |
| Filters | Type of filter | MERV 8 or equivalent | |
| | Number and size - in. | (4) 16 x 20 x 2 | (4) 16 x 20 x 2 |
| Electrical characteristics | | 208/230V, 460V, or 575V - 60 hertz - 3 phase | |

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

¹ AHRI Certified to AHRI Standard 210/240; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

² Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270-95.

³ Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

BLOWER DATA ACCESSORIES

DIRECT DRIVE | 3 - 5 TON

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE - in. w.g.

| Air Volume cfm | Humiditrol Dehumidification Coil | Economizer | Filters MERV 13 |
|-------------------|-------------------------------------|------------|--------------------|
| 036, 060 MODELS | | | |
| 800 | 0.00 | 0.04 | 0.05 |
| 1000 | 0.00 | 0.04 | 0.07 |
| 1200 | 0.01 | 0.04 | 0.07 |
| 1400 | 0.02 | 0.04 | 0.07 |
| 1600 | 0.03 | 0.04 | 0.07 |
| 1800 | 0.04 | 0.05 | 0.07 |
| 2000 | 0.04 | 0.05 | 0.08 |

ELECTRICAL DATA

DIRECT DRIVE | 3 - 5 TON

| Model No. | | SCH036H4E | | | SCH060H4E | | |
|--|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| ¹ Voltage - 60hz | | 208/230V-3ph | 460V-3ph | 575V-3ph | 208/230V-3ph | 460V-3ph | 575V-3ph |
| Compressor | Rated Load Amps | 11.6 | 5.7 | 4 | 16.5 | 7.2 | 5.5 |
| | Locked Rotor Amps | 73 | 38 | 25.6 | 110 | 52 | 38.9 |
| Outdoor Fan Motor(s) | Full Load Amps (total) | 0.3 (0.6) | 0.3 (0.6) | 0.3 (0.6) | 0.7 (1.4) | 0.7 (1.4) | 0.7 (1.4) |
| | Service Outlet 115V GFI (Amps) | 20 | 20 | 20 | 20 | 20 | 20 |
| Indoor Blower Motor | Horsepower | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| | Type | Direct (ECM) | Direct (ECM) | Direct (ECM) | Direct (ECM) | Direct (ECM) | Direct (ECM) |
| | Full Load Amps | 4.4 | 2.3 | 2.3 | 4.4 | 2.3 | 2.3 |
| ² Maximum Overcurrent Protection | Unit Only | 30 | 15 | 15 | 40 | 15 | 15 |
| ³ Minimum Circuit Ampacity | Unit Only | 20 | 11 | 9 | 27 | 13 | 11 |

ELECTRICAL HEAT DATA

| Electric Heat Voltage | | | 208V | 240V | 480V | 575V | 208V | 240V | 480V | 575V |
|--|------------------------|-------|-----------------|------|------|------|-----------------|------|------|------|
| ² Maximum Overcurrent Protection | Unit+ Electric Heat | 10 kW | --- | --- | 20 | --- | --- | --- | 20 | --- |
| | | 15 kW | ⁴ 45 | 60 | 30 | 25 | ⁴ 45 | 60 | 30 | 25 |
| | | 20 kW | --- | --- | --- | --- | --- | --- | 35 | --- |
| | | 30 kW | --- | --- | --- | --- | ⁴ 90 | 100 | 50 | 40 |
| ³ Minimum Circuit Ampacity | Unit+ Electric Heat | 10 kW | --- | --- | 18 | --- | --- | --- | 18 | --- |
| | | 15 kW | 45 | 51 | 26 | 21 | 45 | 51 | 26 | 21 |
| | | 20 kW | --- | --- | --- | --- | --- | --- | 33 | --- |
| | | 30 kW | --- | --- | --- | --- | 84 | 96 | 48 | 39 |

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

¹ NOTE - Extremes of operating range are plus and minus 10% of line voltage.

² HACR type breaker or fuse.

³ Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

⁴ Factory installed circuit breaker not available.

SCH036/060 PARTS ARRANGEMENT

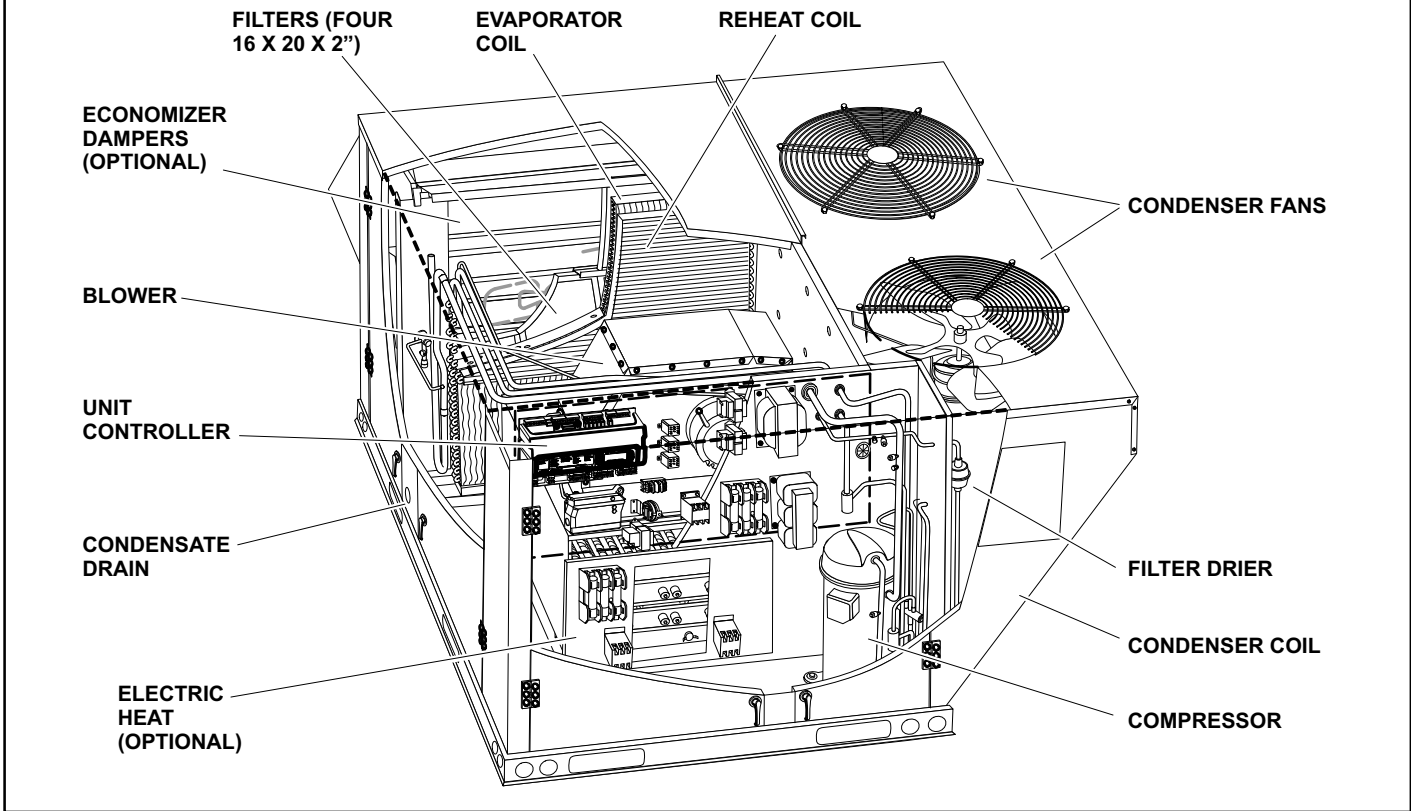


FIGURE 1

SCH036/060 CONTROL BOX

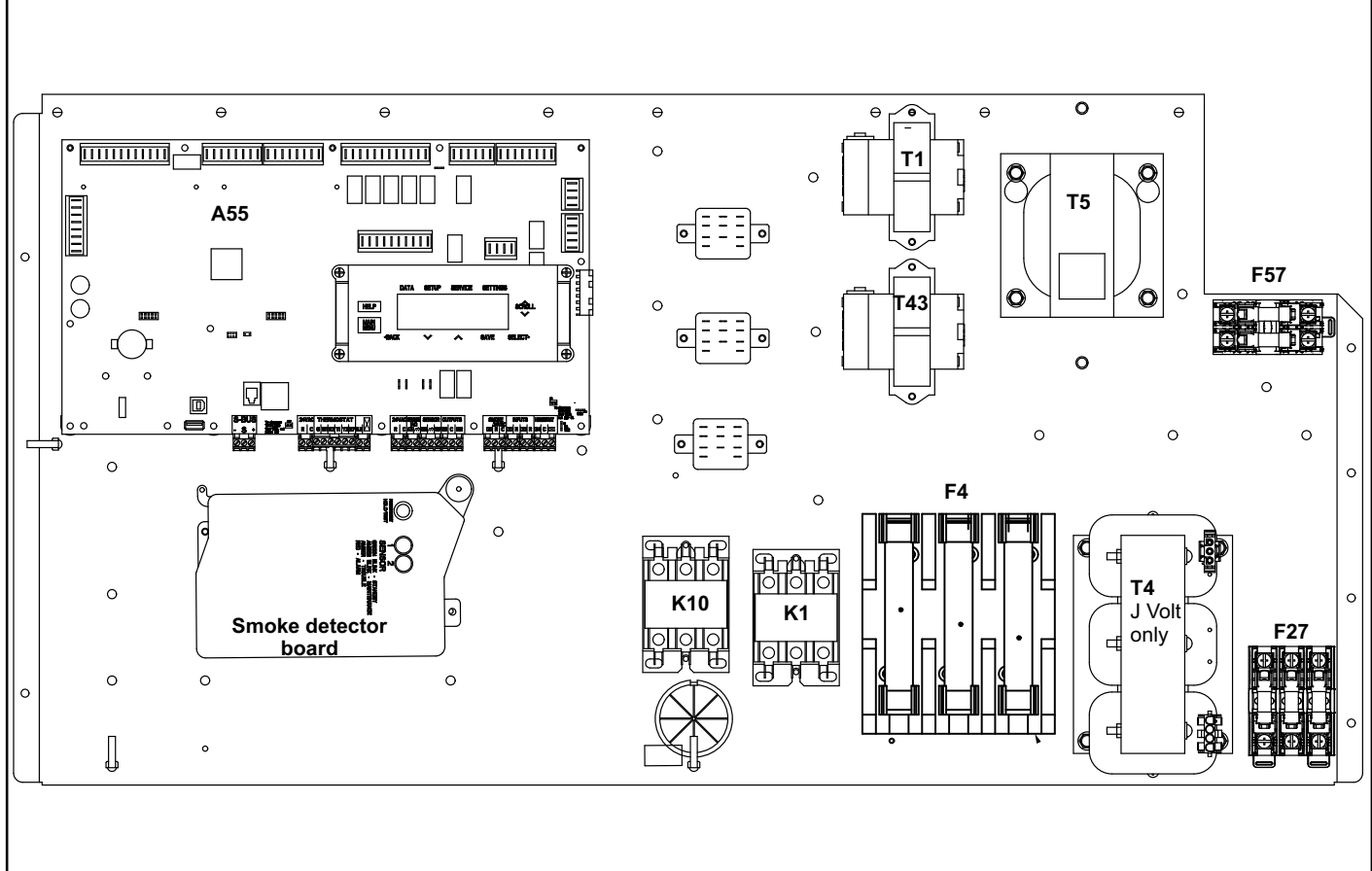


FIGURE 2

I-UNIT COMPONENTS

SCH units are configured to order units (CTO). The SCH unit components are shown in figure 1. L1, L2, and L3 wiring is color coded; L1 is red/pink, L2 is yellow, and L3 is blue.

A-Control Box Components

SCH control box components are shown in figure 2. The control box is located in the upper portion of the compressor compartment.

1-Circuit Breaker CB10

All units are equipped with circuit breaker CB10. Circuit breaker CB10 is a toggle switch which can be used by the service technician to disconnect power to the unit.

2-Control Transformer T1 (all units)

All SCH series units use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

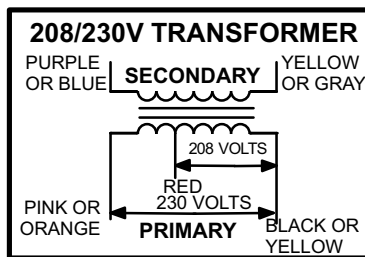


FIGURE 3

3-Transformer T43 (all units)

All reheat units and units with phase detection components are equipped with transformer T43 located in the control box. The transformer is rated at 70VA and is connected to line voltage and powered at all times.

4-Transformer T5 (G and J voltage)

All (G, J) 460, 575 voltage units use transformer T5 mounted in the control box. T5 is a line voltage to 230V transformer used to power the outdoor fan motors. It is connected to line voltage and is powered at all times.

5-Compressor Contactor K1 (all units)

K1 is a 24V to line voltage contactor used to energize the compressor in response to thermostat demand. SCH units use three-pole-double-break contactors.

NOTE-Contactor K1 is energized by the Prodigy board. Refer to the operation sequence for the control system installed. There may be a 5 minute delay depending on the system installed.

6- Outdoor Fan Contactor K10 (all units)

K10 has a 24VAC coil used to power the outdoor fans. K10 is energized by the Prodigy board (A55) at all times.

| | |
|---|--|
| ⚠ CAUTION | |
|  | Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control. |

7-Unit Controller A55 (all units)

The Unit Controller provides all unit control functions, unit status information, unit diagnostics, programmable parameters, and USB verification and profile sharing. Refer to the Unit Controller guide provided with the unit. Thermostat wires are connected to J297 on the Unit Controller.

8- Blower Transformer T4 (J voltage)

(J) 575 voltage units use transformer T4 mounted in the control box. T4 is a line voltage to 460V transformer used to power the indoor blower. It is connected to line voltage and is powered at all times.

COMPRESSOR AND COOLING COMPONENTS DETAIL

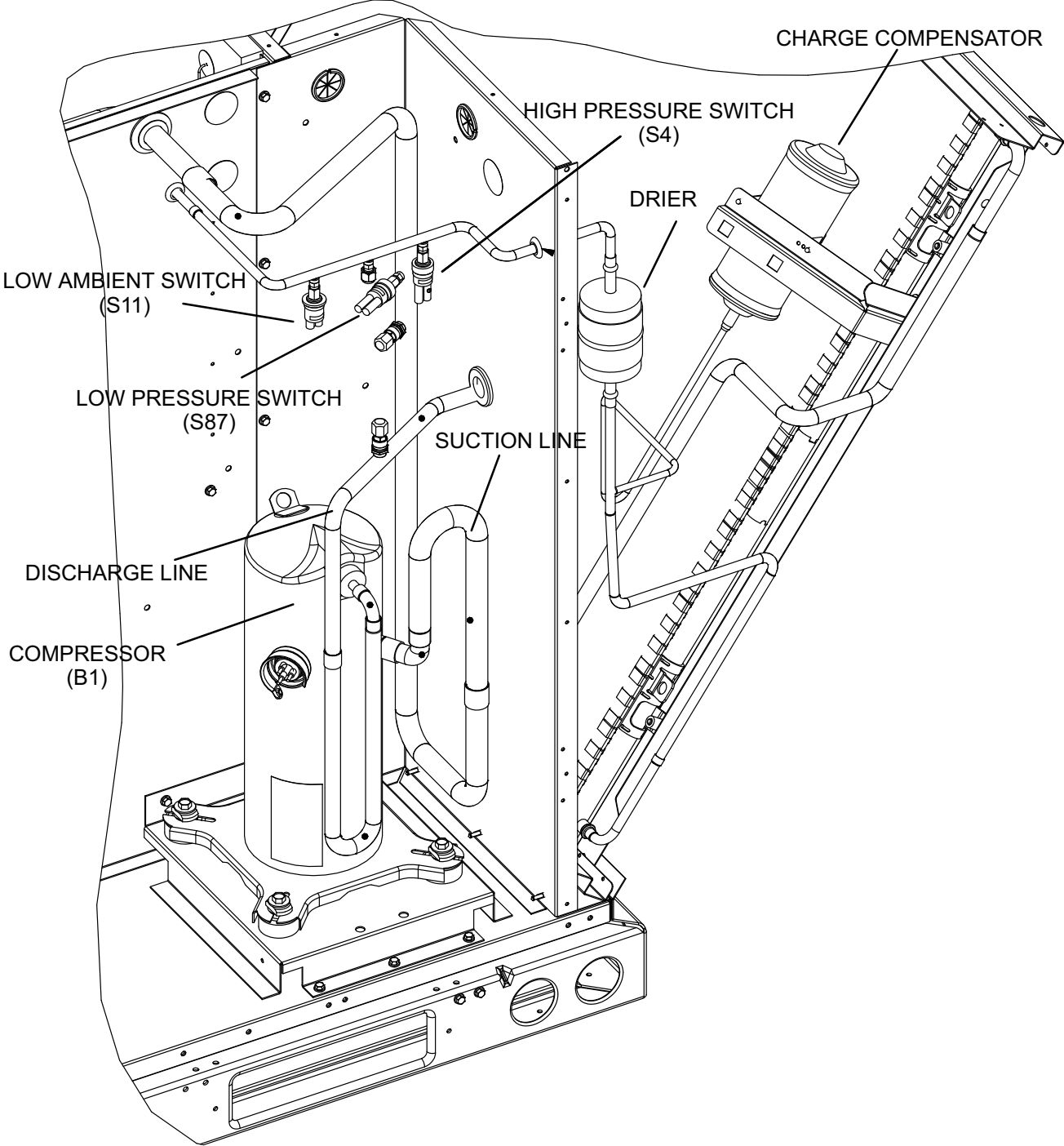


FIGURE 4

B-Cooling Components

See figure 4 for cooling components. Units are equipped with a draw-through type condenser fan. All units are equipped with direct drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory installed economizer. The evaporator is slab type and uses a thermostatic expansion valve as the primary expansion device. Each evaporator is also equipped with enhanced fins and rifled tubing. In all units each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by the low ambient switch and freestat.

1-Compressors B1 (all units)

SCH units are equipped with with one two-stage scroll compressor. Compressors are supplied by various manufacturers. Compressor electrical specifications vary by manufacturer and type. See SPECIFICATIONS and ELECTRICAL DATA in this manual.

WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective cover over terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

Compressor B1 is energized by a corresponding compressor contactor.

NOTE-Refer to the wiring diagram section for specific unit operation.

2-Crankcase Heaters HR1 & Thermostat S40

The compressor is protected by a crankcase heater HR1 and thermostat S40. The purpose of the crankcase heater is to prevent liquid from accumulating in the compressor. The crankcase heater and compressor never run at the same time.

Thermostat S40 is located in the compressor discharge line and will open when discharge line temperature reaches 94°, de-energizing HR1. Once temperature drops down to 74° the thermostat closes energizing HR1.

3-High Pressure Switch S4

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. All SCH units are equipped with this switch. The switch is located in the compressor discharge line. S4 is wired in series with the compressor contactor coil.

When discharge pressure rises to 640 ± 10 psig (4413 ± 69 kPa) (indicating a problem in the system) the switch opens and the compressor is de-energized (the economizer can continue to operate). When discharge pressure drops to 475 ± 20 psig (3275 ± 138 kPa) the pressure switch will close.

Main control A55 has a three-strike counter before locking out. This means the control will allow three high pressure trips per one thermostat demand. The control can be reset by breaking and remaking the thermostat demand or manually resetting the control.

4-Low Ambient Switch S11

The low ambient switch is an auto-reset SPST N.O. pressure switch which allows for mechanical cooling operation at low outdoor temperatures. All SCH units are equipped with this switch. In all models a switch is located in each liquid line prior to the indoor coil section. When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fan is energized. When discharge pressure in the refrigerant circuit drops to 240 ± 10 psig (1655 ± 69 kPa), the switch opens and the condenser fan is de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

5-Low Pressure Switch S87

The low pressure switch is an auto-reset SPST N.O. switch (held N.C. by refrigerant pressure) which opens on a pressure drop. All units are equipped with this switch. The switch is located in the compressor suction line.

S87 is wired directly to the main control module A55.

The main control module A55 governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter during first thermostat demand before the compressor is locked out. The control is reset by breaking and remaking the thermostat demand or manually resetting the control.

When suction pressure drops to 40 ± 5 psig (276 ± 34 kPa) (indicating low pressure), the switch opens and the compressor is de-energized. The switch automatically resets when pressure in the suction line rises to 90 ± 5 psig (620 ± 34 kPa).

6-Filter Drier

SCH units have a filter drier located in the liquid line of the refrigerant circuit upstream of the TXV in the blower compartment. The drier removes contaminants and moisture from the system.

7-Freezestats S49

Each unit is equipped with a low temperature switch (freezestat) S49 located on a return bend of the evaporator coil.

Each freezestat is wired to the main control module A55. Each freezestat is a SPST N.C. auto-reset switch which opens at $29^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($-1.7^{\circ}\text{C} \pm 1.7^{\circ}\text{C}$) on a temperature drop and closes at $58^{\circ}\text{F} \pm 4^{\circ}\text{F}$ ($14.4^{\circ}\text{C} \pm 2.2^{\circ}\text{C}$) on a temperature rise. To prevent coil icing, freezestats open during compressor operation to temporarily disable the compressor until the coil warms sufficiently to melt any accumulated frost.

If the freezestat is tripping frequently due to coil icing, check the airflow, filters, ductwork for any restrictions and unit charge, before allowing unit back in operation. Make sure to eliminate conditions which might promote evaporator ice buildup.

8-Condenser Fans B4 & B5

Units are equipped with electronically commutated condenser fan motors (ECM). The ECM motors are wired directly to 230VAC power. The motors do not operate until a pulse width modulated (PWM) control signal is sent from the A55 Unit Controller. The PWM signal determines the condenser fan speed. Fans B4 and B5 run on low speed with a Y1 demand and on high speed with a Y2 demand.

Both low and high voltage plugs are located in the control compartment in the indoor section of the unit. Condenser fan motors B4 & B5 high voltage plugs are J86 & J87 respectively. Low voltage plugs are J336 & J337 respectively. Refer to wiring diagrams to identify plugs.

If an ECM fan is not operating

- 1- Using a VAC meter, check the high voltage at the appropriate motor plug (J86 or J87). High voltage must be present before checking for low voltage.
- 2- Using the duty cycle (%) or a VDC meter setting, check for low voltage (J336 or J337) from the unit controller.

NOTE - The VDC reading may fluctuate. This is normal for a PWM signal.

C-Blower Compartment

The blower housing can be removed for cleaning and inspection. In addition, removing blower allows access to the heat exchanger tubes for inspection.

Line and low voltage make-up in all models is located in the upper corner of the blower compartment. Electrical entrance is made through the base pan of the unit or through the corner mullion for horizontal position units. Low voltage connections can be accessed by removing the blower compartment front panel. High voltage can be accessed through the makeup box cover on corner mullion.

In all models, the evaporator coil, expansion valve and drain pan can be accessed by removing the blower compartment end panel.

1-Blower Wheel (all units)

Units are equipped with a direct drive blower assembly with a backward inclined blower wheel.

2-Indoor Blower Motor B3 (all units)

Units are equipped with a direct drive blower assembly with a three-phase, variable speed, direct drive blower motor.

IMPORTANT

Three phase scroll compressors must be phased sequentially for correct compressor and blower rotation. Follow "COOLING START-UP" section of installation instructions to ensure proper compressor and blower operation.

A-Blower Operation

Direct Drive Units - To check for proper voltage phasing, measure compressor suction and discharge pressures. Make sure suction pressure decreases and discharge pressure increases on start-up. *Checking blower rotation is not a valid method of determining voltage phasing for incoming power.*

Units Equipped With Factory-Installed Voltage or Phase Detection -

The Unit Controller checks the incoming power during start-up (A55 P269-1 and P269-2). If the voltage, phase, or frequency is incorrect, the Unit Controller will display an alarm and the unit will not start. After line voltage is corrected, the Unit Controller will energize the unit after five (default) minutes. While line voltage is continually checked by the Unit Controller, the voltage phasing is not. If one or more phases is interrupted, power to one or more transformers is interrupted and the unit is shut down by either the Unit Controller or the corresponding transformer.

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand.

- 1- Blower operation is manually set at the thermostat sub-base fan switch. With fan switch in **ON** position, blowers will operate continuously.
- 2- With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

B-Blower Access

- 1- Loosen the reusable wire tie which secures the controls and high voltage blower wiring to the blower housing.
- 2- Remove and retain screws in front and on either side of blower housing. Pull frame toward outside of unit. See figure 5.
- 3- Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower housing using the wire tie.
- 4- Replace retained screws in front and on either side of the blower housing.

C-Determining Unit CFM

- 1- Measure the indoor blower motor RPM. Air filters must be in place when measurements are taken.
- 2- With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure taken in locations shown in figure 6.

NOTE - Static pressure readings can vary if not taken where shown.

- 3- Referring to BLOWER DATA tables (table of contents), use static pressure and RPM readings to determine unit CFM.

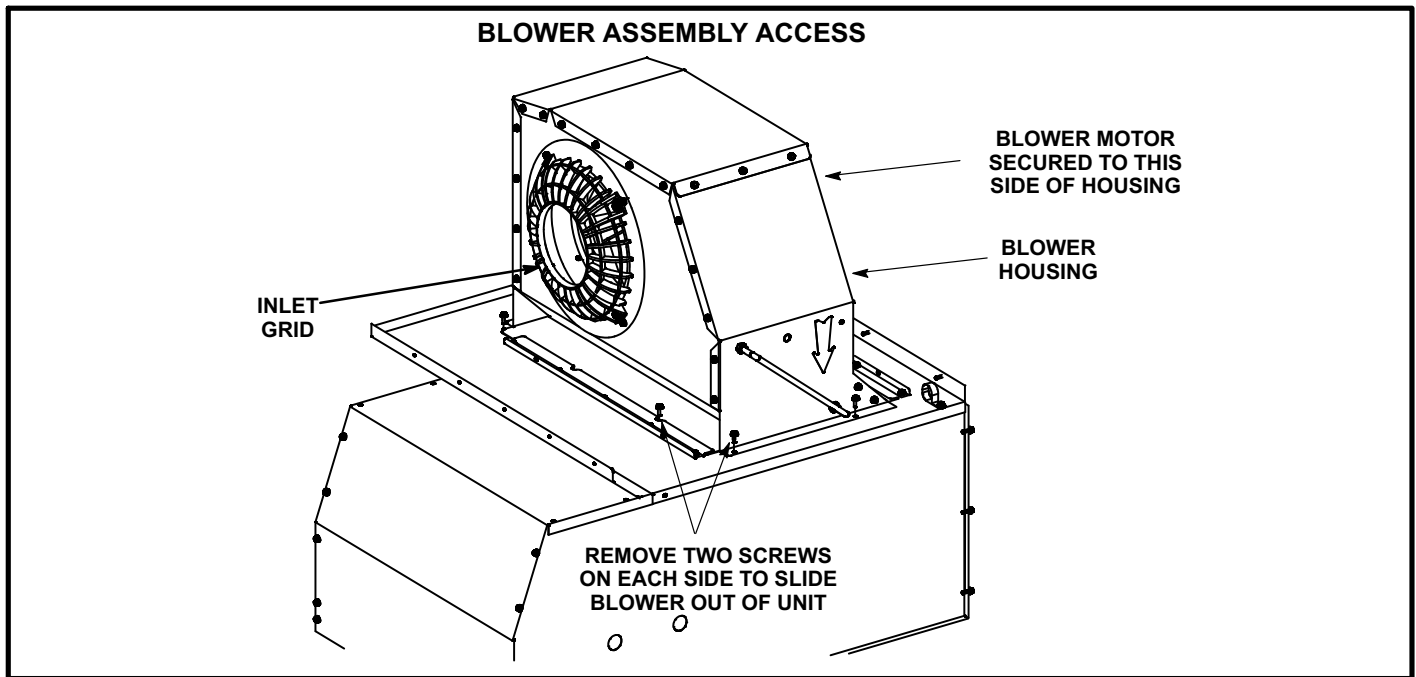


FIGURE 5

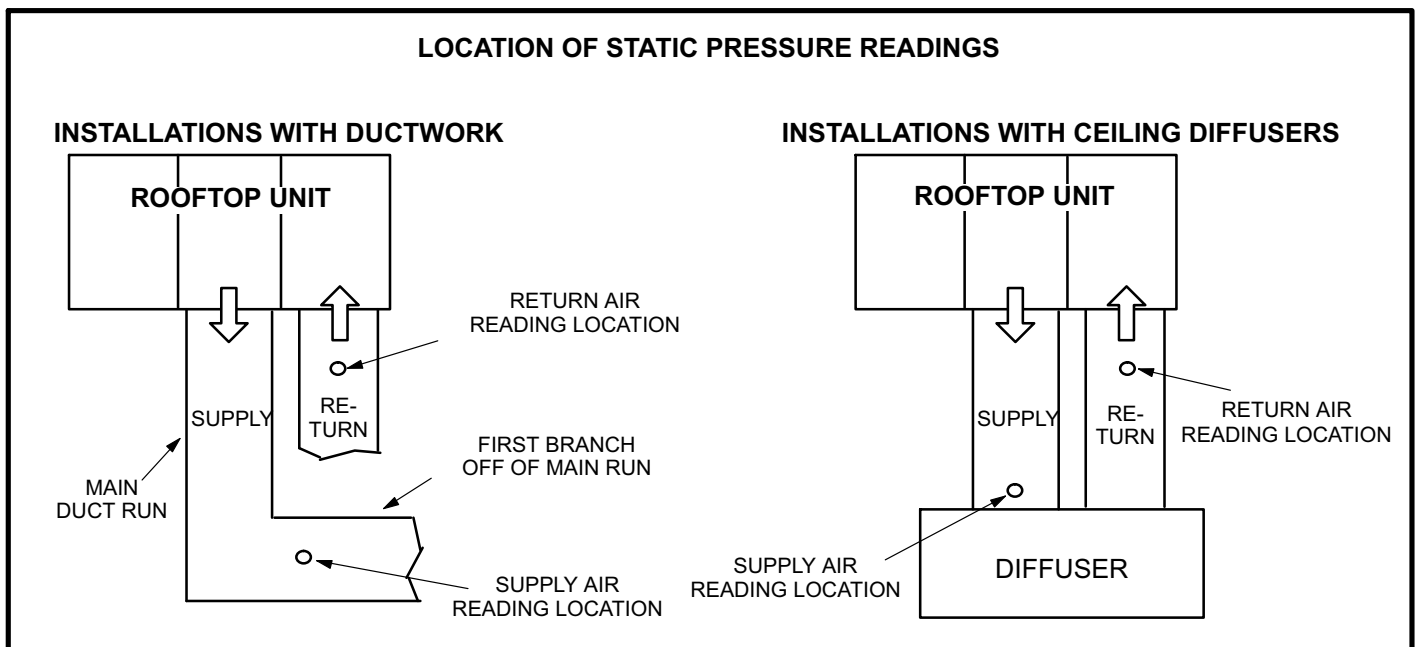


FIGURE 6

D-Optional Electric Heat Components Figure 7

See ELECTRIC HEAT AND ELECTRICAL DATA (table of contents) for all possible SCH to EHC matchups and electrical ratings.

All electric heat sections consist of electric heating elements exposed directly to the airstream. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Contactors K15, K16

All contactors are double break and either single, double or three pole (see diagram) and equipped with a 24VAC coil. The coils in the K15 and K16 contactors are energized by the indoor thermostat. In all units K15 energizes the heating elements, while in the 20 & 30 kW units, K15 and K16 energize the heating elements simultaneously.

2-High Temperature Limit S15 (Primary)

S15 is a SPST N.C. auto-reset thermostat located on the electric heat section. S15 is the high temperature limit for the electric heat section. When S15 opens, indicating a problem in the system, contactors K15 and K16 are de-energized. See table 1 for set points. Set points are factory set and not adjustable

TABLE 1

| Unit kW (Voltage) | Opens °F | Closes °F |
|-------------------|----------|-----------|
| 10 (G) | 160 | 120 |
| 15 (Y,G,J) | 125 | 85 |
| 20 (G) | 150 | 110 |
| 30 (Y,G, J) | 150 | 110 |

3-High Temperature Limit S20 and S157 (Secondary)

S20 and S157 are SPST N.C. manual-reset thermostats. S20 and S157 are wired in series with the heating elements.

See EHC wiring diagrams. When S20 or S157 open, power is interrupted to the heating elements which are wired in series with the limits. K15/K16 are only de-energized when S15 opens. When the contactors are de-energized, all stages of heat are de-energized. The thermostat is factory set to open at 220F + 6F (104C + 3.3C) on a temperature rise and can be manually reset when temperature falls below 160F (71.0C).

4-Heating Elements HE1 & HE2

Heating elements are composed of helix wound bare nichrome wire exposed directly to the air stream. Three

elements are connected in a three-phase arrangement. The elements in 208/230V units are connected in a "Delta" arrangement. Elements in 460 and 575V units are connected in "Wye" arrangement. Each stage is energized independently by the corresponding contactors located on the electric heat vestibule panel. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and redundant high temperature limits and overcurrent protection is provided by fuses

5-Fuse F3

Fuse F3 is housed in a fuse block which holds two or three fuses. Each F3 fuse is connected in series with each leg of electric heat. Figure 7 and table 2 show the fuses used with each electric heat section.

TABLE 2

| Unit | Quantity | Rating | |
|---------------|----------|--------|---------|
| | | Amp | Voltage |
| ECH060-15-1Y | 3 | 50 | 250 |
| ECH060-30-1Y | 6 | 50 | 250 |
| ECH060-15-1G | 3 | 25 | 600 |
| ECH060-30-1G | 3 | 50 | 600 |
| ECH060-10-1G | 3 | 15 | 600 |
| ECH060-20-1G | 3 | 35 | 600 |
| ECH060-15-1J | 3 | 20 | 600 |
| ECH-060-30-1J | 3 | 40 | 600 |

6-Unit Fuse Block & Fuse F4

Three line voltage fuses F4 provide short circuit and ground fault protection to all cooling components in the SCH units with electric heat. The fuses are rated in accordance with the amperage of the cooling components. The F4 fuse block is located on the control panel.

7-Terminal Strip TB2

Terminal strip TB2 is used for single point power installations only. TB2 distributes power to TB3. Units with multipoint power connections will not use TB2.

8-Terminal Strip TB3

EHC060-30-1Y voltage units are equipped with terminal strip TB3. Electric heat line voltage connections are made to TB3, which distributes power to the electric heat components and is located on the vestibule. See figure 7.

ELECTRIC HEAT SECTION

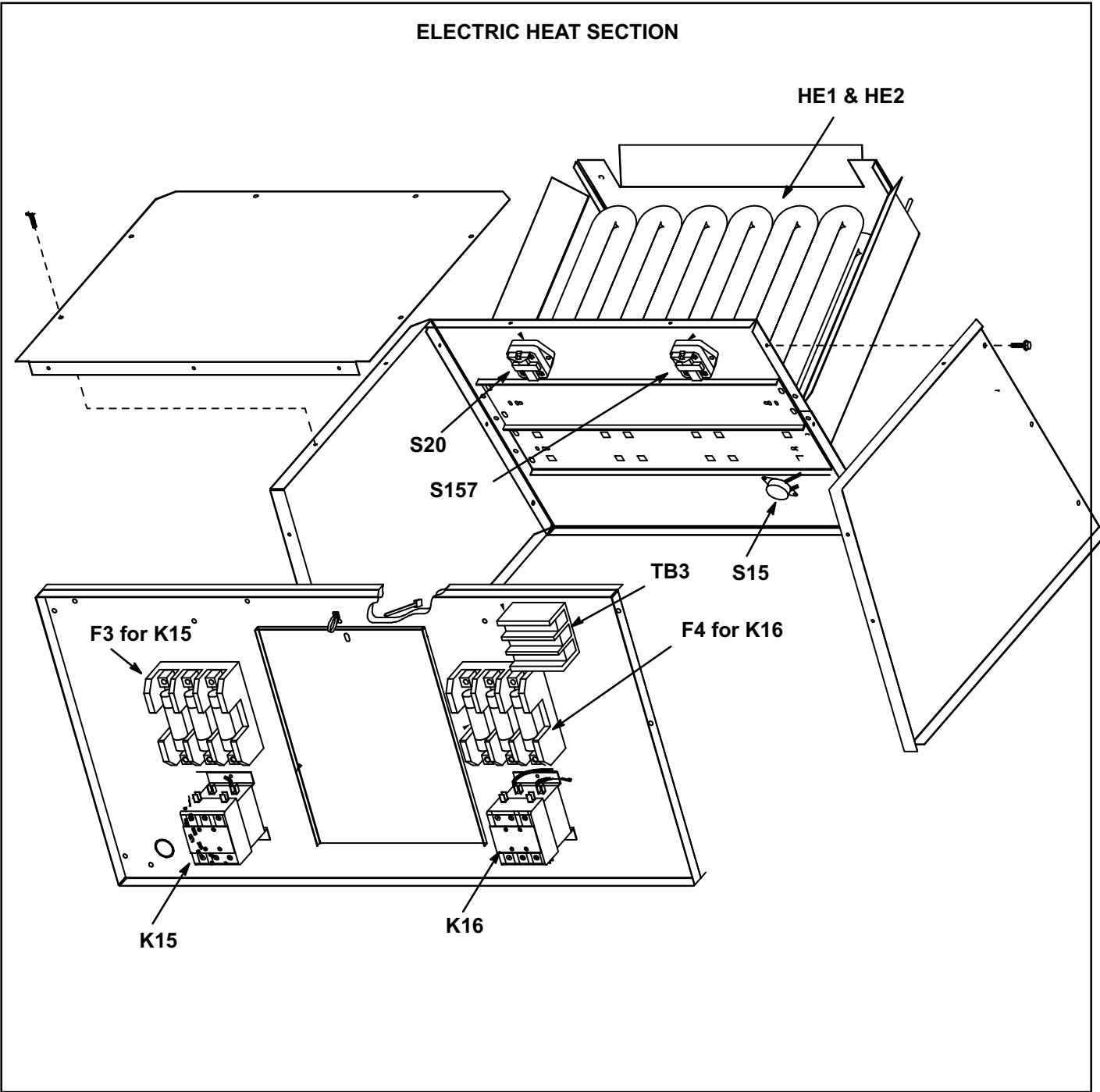


FIGURE 7

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (S1CURB1101).

III-CHARGING

A-Preliminary and Seasonal Checks

- 1- Make sure that unit is installed in accordance with the installation instructions and applicable codes.
- 2- Inspect all electrical wiring, both field and factory installed, for loose connections. Tighten as required.
- 3- Check to ensure that refrigerant lines do not rub against the cabinet or against other refrigerant lines.
- 4- Check voltage at disconnect switch. Voltage must be within range listed on nameplate. If not, consult power company and have voltage condition corrected before starting unit.
- 5- Refer to unit diagram located on inside of compressor access door for unit wiring.
- 6- Adjust blower belt according to "Blower Operation and Adjustments" section.
- 7- Make sure filters are in place before start-up.

B-Refrigerant Charge and Check

⚠ WARNING

Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, reclaim the charge, evacuate the system, and add required nameplate charge.

*NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge **must** be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

IMPORTANT - Charge unit in standard cooling mode.

1. Make sure outdoor coil is clean. Attach gauge manifolds and operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.
2. Check each system separately with all stages operating. Compare the normal operating pressures (see tables 3 - 6) to the pressures obtained from the gauges. Check unit components if there are significant differences.
3. Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

Note - Pressures are listed for sea level applications.

4. Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).
 - If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
 - If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.
5. Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.
6. Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.
7. Example: SG/SC 036 no reheat: At 95°F outdoor ambient and a measured suction pressure of 160psig, the target liquid temperature is 98°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 3

| SG/SC 036 Normal Operating Pressures - No Reheat - 580971-01 | | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Outdoor Coil Entering Air Temperature | | | | | | | | | | | |
| 65 °F | | 75 °F | | 85 °F | | 95 °F | | 105 °F | | 115 °F | |
| Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) |
| 120 | 229 | 117 | 269 | 122 | 316 | 125 | 363 | 127 | 418 | 130 | 488 |
| 128 | 230 | 131 | 268 | 132 | 313 | 134 | 361 | 135 | 417 | 138 | 482 |
| 147 | 239 | 147 | 273 | 152 | 314 | 154 | 360 | 158 | 413 | 161 | 474 |
| 165 | 254 | 167 | 282 | 172 | 325 | 174 | 368 | 176 | 424 | 180 | 489 |

TABLE 4

| SG/SC 036 Normal Operating Pressures - Reheat - 580979-01 | | | | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Outdoor Coil Entering Air Temperature | | | | | | | | | | | |
| 65 °F | | 75 °F | | 85 °F | | 95 °F | | 105 °F | | 115 °F | |
| Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) |
| 113 | 246 | 114 | 293 | 113 | 363 | 115 | 439 | 119 | 534 | 125 | 561 |
| 121 | 249 | 125 | 276 | 124 | 352 | 125 | 423 | 129 | 475 | 133 | 540 |
| 136 | 264 | 143 | 288 | 147 | 324 | 148 | 380 | 151 | 440 | 152 | 514 |
| 154 | 278 | 160 | 307 | 168 | 339 | 171 | 382 | 174 | 439 | 176 | 507 |

TABLE 5

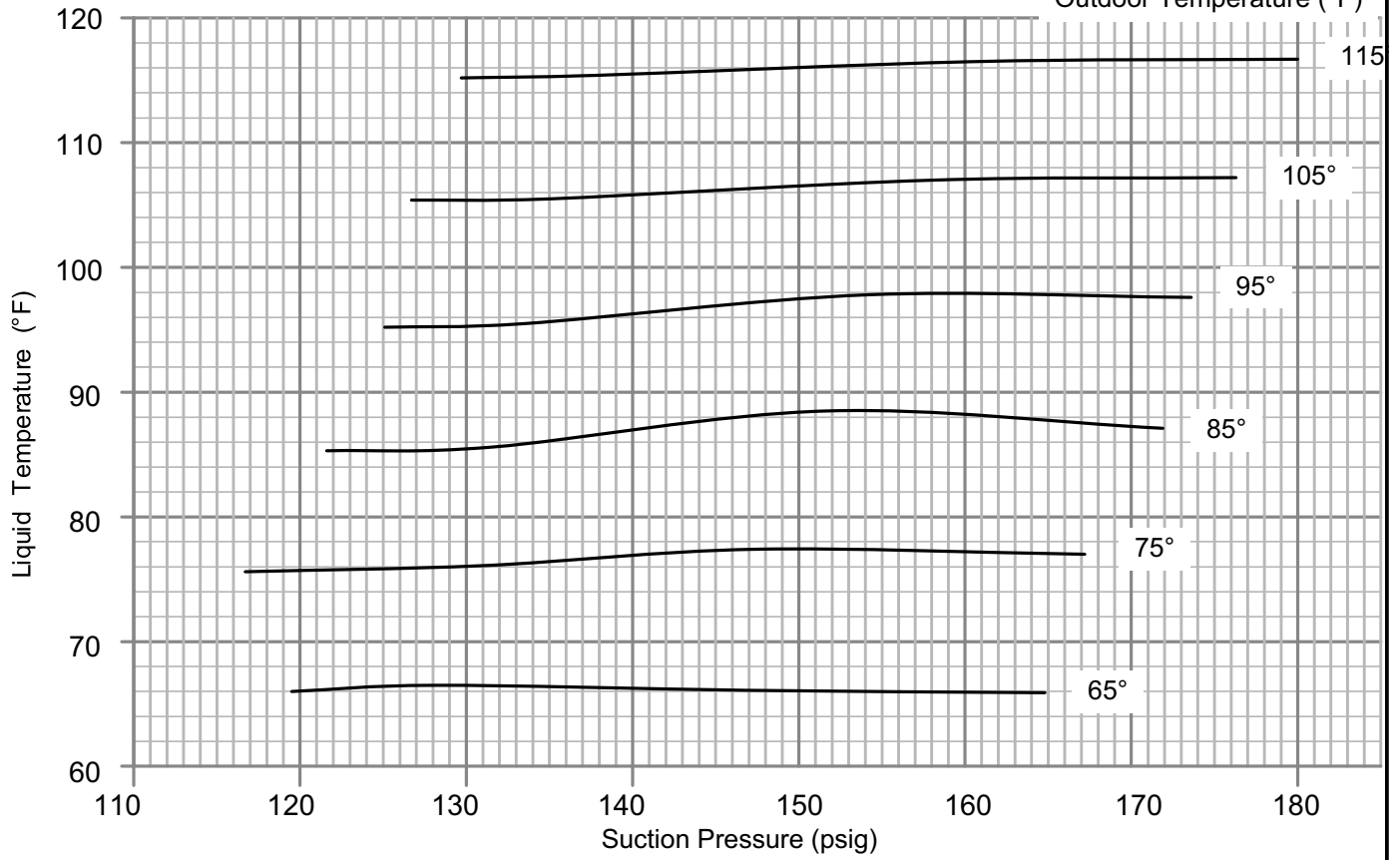
| SG/SC 060 Normal Operating Pressures - No Reheat - 580972-01 | | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Outdoor Coil Entering Air Temperature | | | | | | | | | | | |
| 65 °F | | 75 °F | | 85 °F | | 95 °F | | 105 °F | | 115 °F | |
| Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) |
| 109 | 229 | 112 | 267 | 112 | 313 | 115 | 362 | 117 | 437 | 120 | 536 |
| 118 | 232 | 119 | 269 | 122 | 312 | 124 | 364 | 124 | 430 | 129 | 513 |
| 133 | 240 | 136 | 275 | 141 | 316 | 142 | 364 | 143 | 422 | 147 | 489 |
| 148 | 253 | 152 | 286 | 160 | 325 | 162 | 371 | 164 | 424 | 168 | 484 |

TABLE 6

| SG/SC 060 Normal Operating Pressures - Reheat - 580980-01 | | | | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Outdoor Coil Entering Air Temperature | | | | | | | | | | | |
| 65 °F | | 75 °F | | 85 °F | | 95 °F | | 105 °F | | 115 °F | |
| Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) | Suct (psig) | Disc (psig) |
| 107 | 250 | 110 | 285 | 111 | 335 | 114 | 393 | 117 | 470 | 120 | 562 |
| 114 | 254 | 118 | 287 | 120 | 333 | 123 | 388 | 125 | 452 | 128 | 535 |
| 129 | 270 | 135 | 298 | 139 | 339 | 142 | 385 | 145 | 444 | 148 | 511 |
| 146 | 284 | 152 | 313 | 158 | 348 | 162 | 395 | 166 | 449 | 169 | 510 |

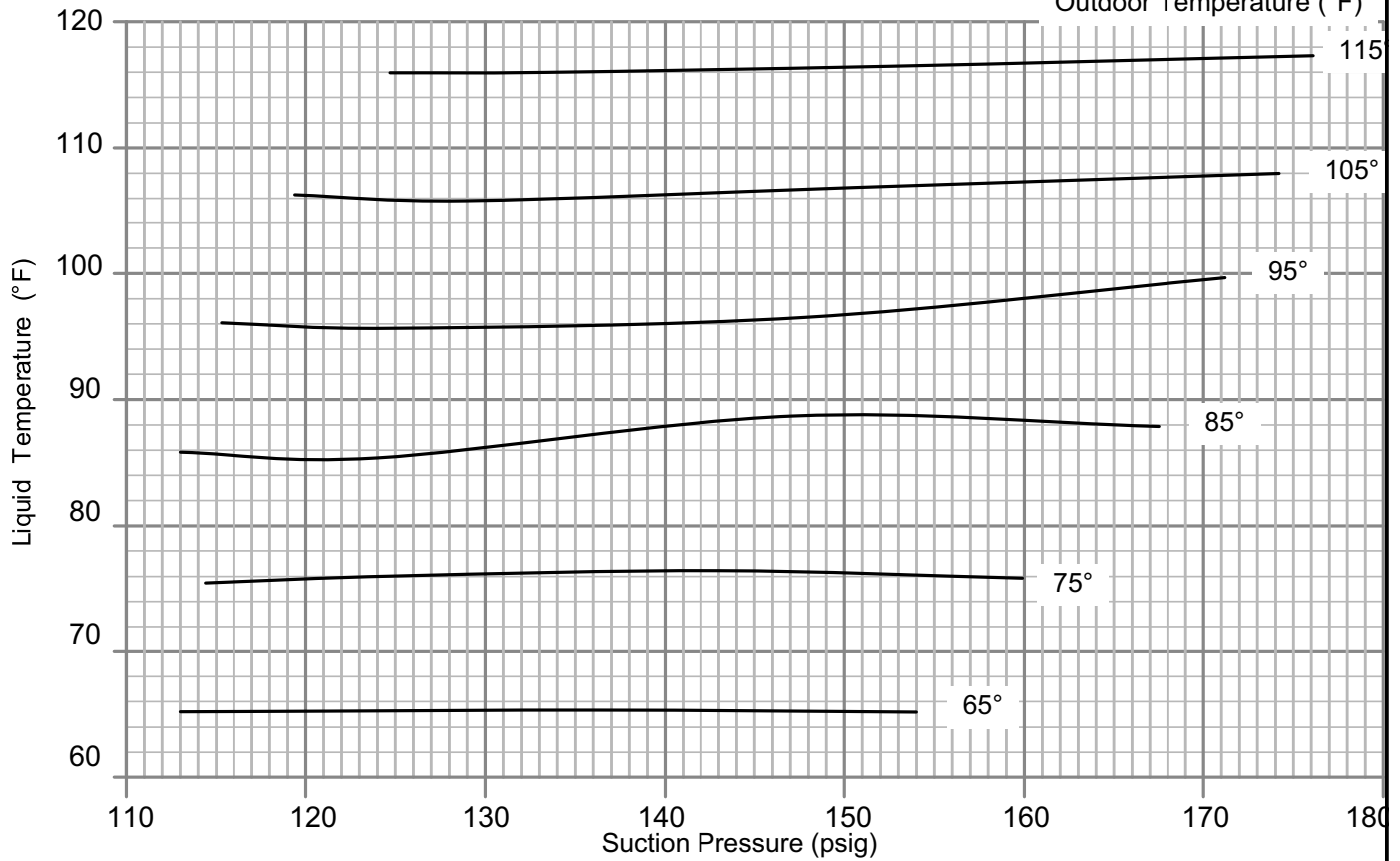
SG/SC 036 Charging Curves - No Reheat - 580971-01

Outdoor Temperature (°F)



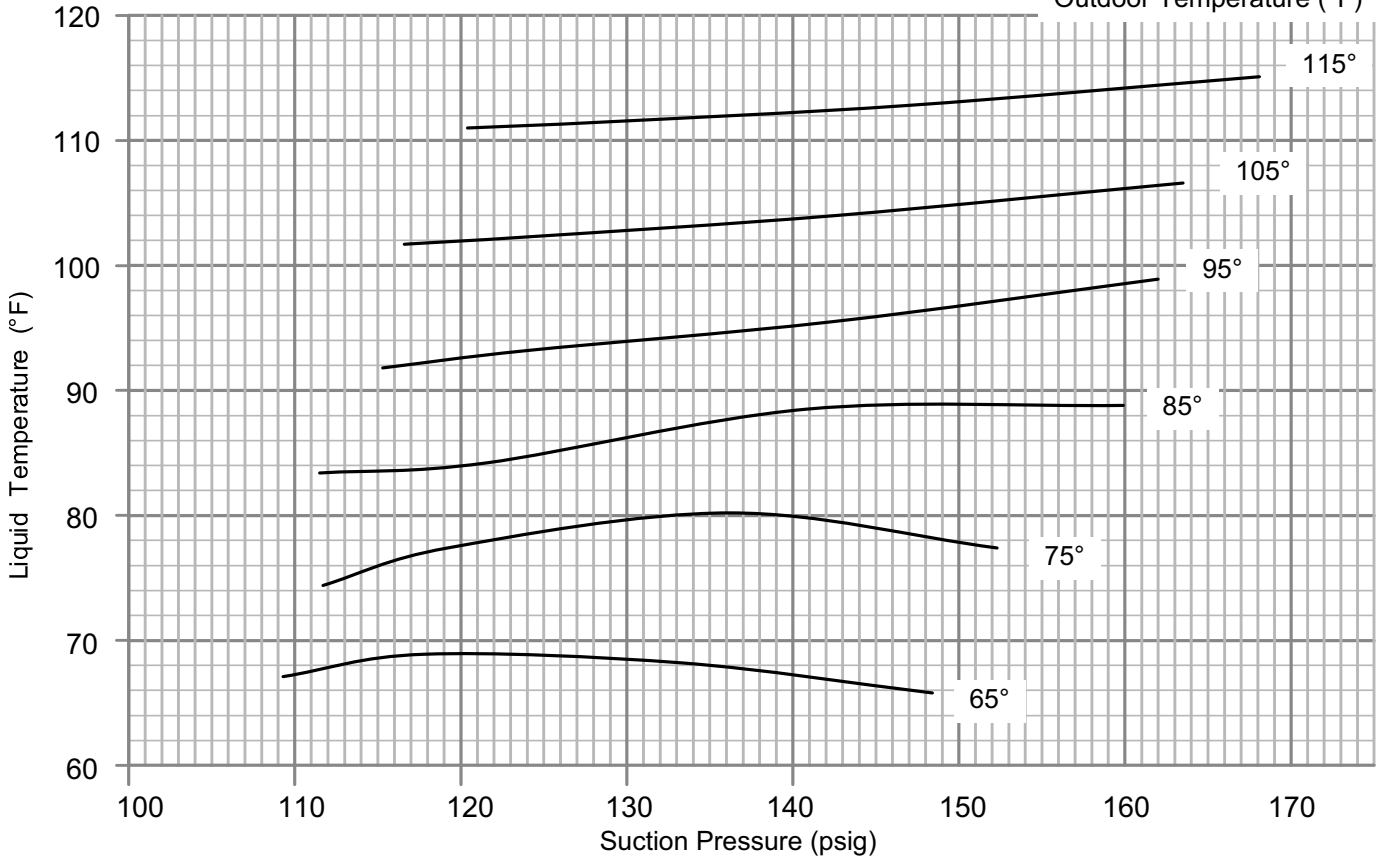
SG/SC 036 Charging Curves - Reheat - 580979-01

Outdoor Temperature (°F)



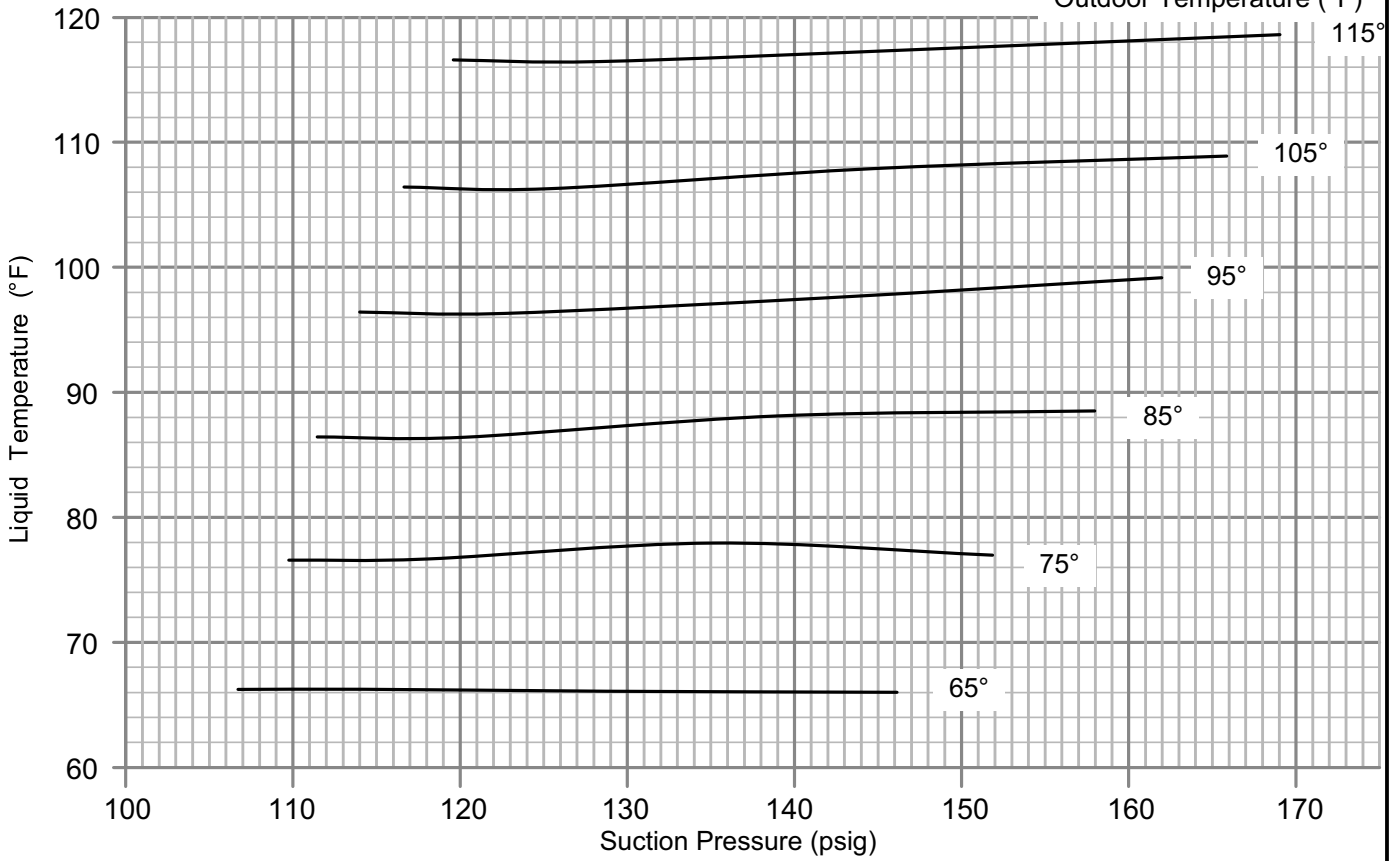
SG/SC 060 Charging Curves - No Reheat - 580972-01

Outdoor Temperature (°F)



SG/SC 060 Charging Curves - Reheat - 580980-01

Outdoor Temperature (°F)



C-Cooling Start Up

IMPORTANT- *The crankcase heater must be energized for 24 hours before attempting to start compressor. Set thermostat so there is no demand to prevent compressor from cycling. Apply power to unit.*

- 1- Set fan switch to AUTO or ON and move system selection switch to cool. Adjust thermostat to a setting below room temperature to bring on the compressor. Compressor will start and cycle on demand from thermostat.
- 2- The refrigerant circuit is charged with R410A refrigerant. See unit rating plate for type of refrigerant and correct amount of charge.
- 3- Refer to Cooling Operation and Adjustment section for proper method to check refrigerant charge.

Three Phase Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory

- 1- Observe suction and discharge pressures and blower rotation on unit start-up.
- 2- Suction pressure must drop, discharge pressure must rise, and blower rotation must match rotation marking.

If pressure differential is not observed or blower rotation is not correct:

- 3- Disconnect all remote electrical power supplies.
- 4- Reverse any two field-installed wires connected to the line side of S48 disconnect, CB10 circuit breaker, or TB2 terminal strip.
- 5- Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

R410A Refrigerant

Units charged with R-410A refrigerant operate at much higher pressures than R-22. The expansion valve and liquid line drier provided with the unit are approved for use with R-410A. Do not replace them with components designed for use with R-22.

R-410A refrigerant is stored in a pink cylinder.

Manifold gauge sets used with systems charged with R410A refrigerant must be capable of handling the higher system operating pressures. The gauges should be rated for use with pressures of 0-800 on the high side and a low side of 30" vacuum to 250 psi with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psi of pressure with a 4000 psi burst rating.

IMPORTANT

Mineral oils are not compatible with R-410A. If oil must be added, it must be a polyol ester oil.

IV- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

SCH units are factory charged and require no further adjustment; however, charge should be checked periodically. See section III.

1-Gauge Manifold Attachment

Service gauge ports are identified in figure 4. Attach high pressure line to discharge line schrader port and the low pressure line to the suction line schrader port.

NOTE-When unit is properly charged discharge and suction line pressures should approximate those in tables 3 - 6.

V-MAINTENANCE

CAUTION

Electrical shock hazard. Turn off power to unit before performing any maintenance, cleaning or service operation on the unit.

A-Filters

Units are equipped with filters as shown in table 7. Units will accept 4" filters. Filters should be checked monthly and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters.

NOTE-Filters must be U.L.C. certified or equivalent for use in Canada.

**TABLE 7
NUMBER AND SIZE OF FILTER BY UNIT**

| SCH Unit | Qty | Filter Size - inches (mm) |
|----------|-----|------------------------------|
| 036, 060 | 4 | 16 X 20 X 2 (406 X 508 X 51) |

B-Lubrication

All motors used in SCH units are prelubricated; no further lubrication is required.

C-Supply Air Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

CAUTION

Be careful when servicing unit to avoid accidental contact with sharp metallic edges which may cause personal injury.

D-Evaporator Coil

Inspect and clean coil at beginning of each season. Clean using mild detergent or commercial coil cleanser. Check condensate drain pan and line, if necessary. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet. Check connecting lines and coil for evidence of oil and refrigerant leaks.

E-Condenser Coil

Clean condenser coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season. Check connecting lines and coil for evidence of oil and refrigerant leaks.

NOTE-If owner complains of insufficient cooling, the units refrigerant charge should be checked. See section III- subsection NO TAG Charging.

F-Electrical

- 1- Check all wiring for loose connections.
- 2- Check for correct voltage at unit (unit operating).
- 3- Check amp-draw on both condenser fan motor and blower motor.
Fan Motor Rating Plate ____ Actual ____
Indoor Blower Motor Rating Plate ____ Actual ____

VI-ACCESSORIES

A-S1CURB Mounting Frame

When installing either the SCH units on a combustible surface for downflow discharge applications, the Lennox S1CURB71101 14-inch or S1CURB73101 24-inch height roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the SCH units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled mounting frame is shown in figure 8. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in figure 9. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

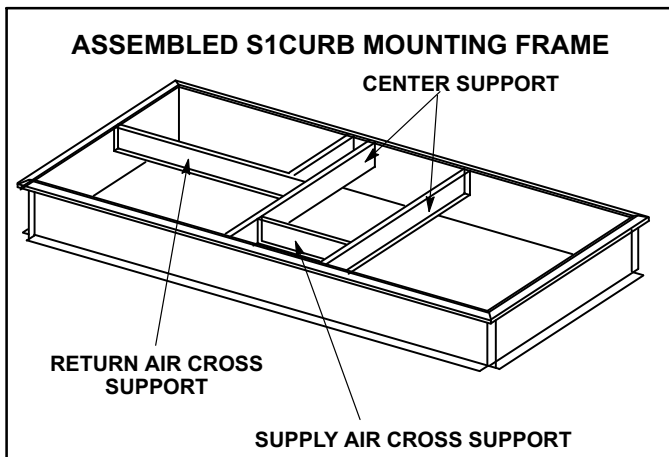


FIGURE 8

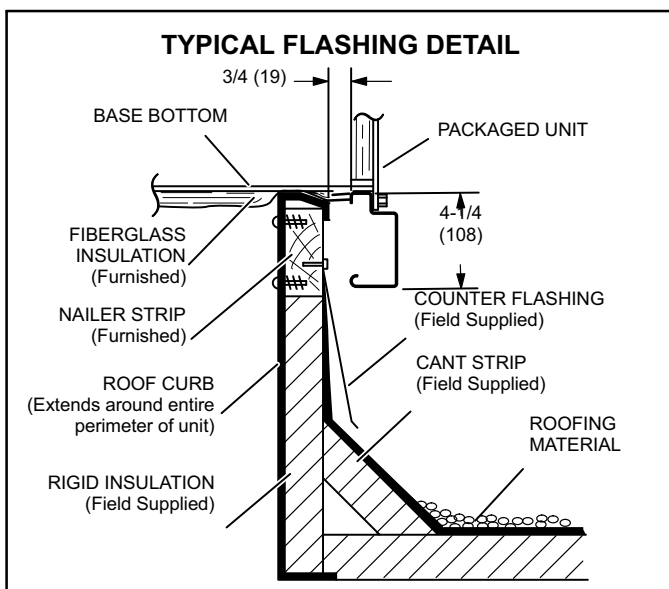


FIGURE 9

B-Outdoor Air Dampers

Dampers are manually operated to allow up to 25 percent outside air into the system at all times (see figure 10).

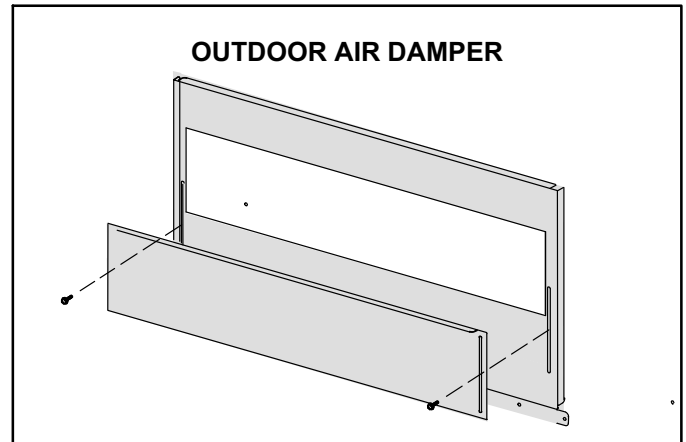


FIGURE 10

C-Economizer (Factory Installed)

Units may contain an optional economizer. The economizer uses outdoor air for free cooling when the outdoor temperature and/or humidity is suitable. The economizer is controlled by the A55 Unit Controller.

D- Gravity Exhaust Dampers

Gravity exhaust dampers may be used in downflow and horizontal air discharge applications. Gravity exhaust dampers are installed in the return air duct.

The dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail.

E-Control Systems

The A55 Unit Controller provides all control function for the rooftop unit. Default operation requires a standard room thermostat or direct digital controller (DDC). The A55 can also control the unit from a zone temperature sensor. The A55 Unit Controller is a network controller when daisy-chained to the L Connection® Network Control System. For ease of configuration, the A55 can be connected to a PC with Unit Controller PC software installed.

F-Smoke Detectors A17 and A64

Photoelectric smoke detectors are a factory installed option. The smoke detectors can be installed in the supply air section (A64), return air section (A17), or in both the supply and return air section.

G-Blower Proving Switch S52

The blower proving switch monitors blower operation and locks out the unit in case of blower failure. The switch is N.O. and closes at 0.14" W.C. (34.9 Pa) The switch is mounted on the side of the front of the blower enclosure.

H-Indoor Air Quality (CO₂) Sensor A63

The indoor air quality sensor monitors CO₂ levels and reports the levels to the main control module A55. The board adjusts the economizer dampers according to the CO₂ levels. The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation instructions for proper adjustment.

I-Drain Pan Overflow Switch S149 (optional)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.O. overflow switch is controlled by A55 Prodigy board located in the unit control panel. When the overflow switch closes, 24VAC power is interrupted and after a five-second delay unit compressors are de-energized. Once the condensate level drops below the set level, the switch will open. After a five-minute delay the compressor will be energized.

J-Dirty Filter Switch S27

The dirty filter switch senses static pressure increase indicating a dirty filter condition. The switch is N.O. and closes at 1" W.C. (248.6 Pa) The switch is mounted on the side of the economizer. Wiring for the dirty filter switch is shown on the temperature control section (C) wiring diagram in back of this manual.

K-Factory Installed Hot Gas Reheat (option)

General

Hot gas reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air.

See figure 11 for reheat refrigerant routing.

L14 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14 reheat valve is energized (Unit Controller P269-3 or P269-4) and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). The reheat setpoint can be adjusted by changing Unit Controller Settings - Control menu. A setting of 100% will operate reheat from an energy management system digital output.

Reheat will terminate when the indoor relative humidity falls 3% (57% default) or the digital output de-energizes. The reheat deadband can be adjusted at Settings - Control menu.

Check-Out

Test reheat operation using the following procedure.

1. Make sure reheat is wired as shown in wiring section.
2. Make sure unit is in local thermostat mode.
3. Use Unit Controller key pad to elect SERVICE > TEST > DEHUMIDIFIER.

The blower and compressor (reheat) should be operating. DEHUMIDIFIER 1 ON will be appear on the Unit Controller display.

4. Press BACK on the Unit Controller display to stop the testing mode.

Default Reheat Operation

During reheat mode free cooling is locked out.

No Y1 demand but a call for dehumidification:

Compressor is operating, blower is on, and the reheat valve is energized.

Y1 demand:

Compressor is operating, blower is on, and the reheat valve is energized.

Y2 demand:

Compressor is operating, blower is on, and the reheat valve is de-energized.

IMPORTANT - Free cooling does not operate during reheat.

For other reheat control options, refer to the Unit Controller manual.

Additional Cooling Stages

Units are shipped from the factory to provide two stages of cooling.

Three stages of cooling is available in zone sensor mode. Three stages of cooling is also available by installing a transfer relay and a three-stage thermostat. Refer to the Main Control Operation section in the Unit Controller manual when using the transfer relay.

REHEAT MODE REFRIGERANT ROUTING 036/060

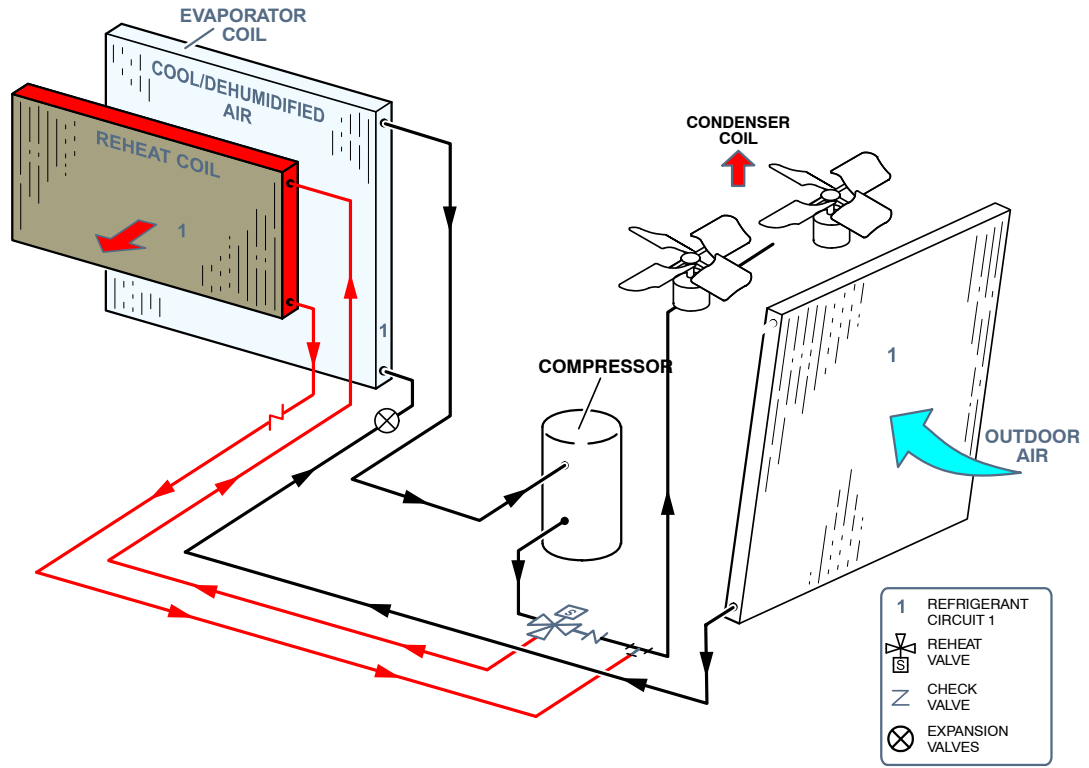


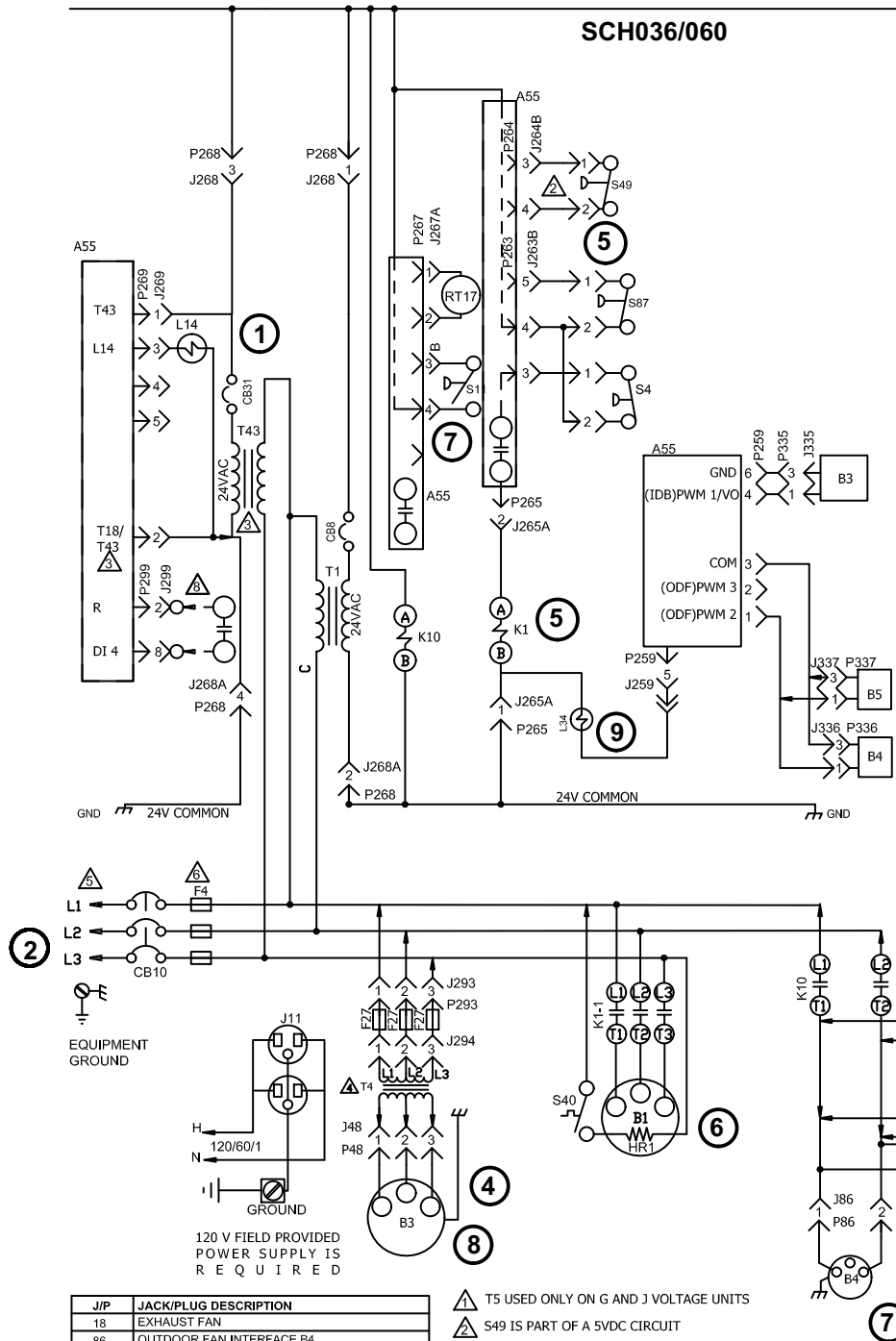
FIGURE 11

VII- WIRING DIAGRAMS / SEQUENCE OF OPERATION

SCH036/060

24V POWER


| KEY | COMPONENT |
|------|---------------------------------|
| A55 | PANEL, MAIN |
| A185 | PRESSURE TRANSDUCER |
| B1 | COMPRESSOR 1 |
| B3 | MOTOR, BLOWER |
| B4 | MOTOR, OUTDOOR FAN 1 |
| B5 | MOTOR, OUTDOOR FAN 2 |
| CB8 | CIRCUIT BRKR, TRANSFORMER T1 |
| CB10 | CIRCUIT BRKR, UNIT MAIN DISCONN |
| CB31 | CIRCUIT BRKR, TRANSFORMER T43 |
| F4 | FUSE, UNIT |
| F27 | FUSE, T4 TRANSFORMER PRIMARY |
| F57 | FUSE, T5 TRANSFORMER PRIMARY |
| HR1 | HEATER, COMPRESSOR 1 |
| J11 | JACK, GFI RECEPTICLE |
| K1-1 | CONTACTOR, COMPRESSOR 1 |
| K10 | CONTACTOR, OUTDOOR FANS |
| L14 | VALVE, SOLENOID REHEAT COIL 1 |
| L34 | VALVE, SOLENOID TWO STAGE |
| L41 | TXV VALVE, SOLENOID |
| RT17 | SENSOR, OUTSIDE AIR TEMP. |
| S4 | SWITCH, LMT HI PRESS COMP 1 & 2 |
| S11 | SW., LW PR. LW AMBNT KIT CMP 1 |
| S42 | SWITCH, OVERLDRY BLWR MTR |
| S40 | THERMOSTAT, CRANKCASE |
| S49 | SWITCH, FREEZESTAT COMP 1 |
| S87 | SWITCH, LOW PRESS, COMPR. 1 |
| T1 | TRANSFORMER, CONTROL |
| T4 | TRANSFORMER |
| T5 | TRANSFORMER |
| T43 | TRANSFORMER, REHEAT |
| TB2 | TERMINAL STRIP, UNIT |
| TB13 | TERMINAL STRIP, POWER DISTR. |



| J/P | JACK/PLUG DESCRIPTION |
|-----|--------------------------------|
| 18 | EXHAUST FAN |
| 86 | OUTDOOR FAN INTERFACE B4 |
| 87 | OUTDOOR FAN INTERFACE B5 |
| 88 | OUTDOOR FAN INTERFACE B21 |
| 132 | EXHAUST FAN MOTOR |
| 259 | ECM BLOWER MOTOR CONTROL |
| 263 | HIGH AND LOW PRESSURE SWITCHES |
| 264 | BLOWER DECK |
| 265 | CONTACTORS AND RELAYS |
| 267 | OUTDOOR FAN AREA |
| 268 | TRANSFORMER T1 POWER |
| 269 | HUMIDITROL CONTROL |
| 293 | F27 LINE SIDE |
| 294 | F27 LOAD SIDE |
| 333 | 0-5V TRANSDUCER INPUT |
| 335 | BLOWER CONTROL |
| 336 | OUTDOOR FAN CONTROL 1 |
| 337 | OUTDOOR FAN CONTROL 2 |

- ⚠ T5 USED ONLY ON G AND J VOLTAGE UNITS
- ⚠ S49 IS PART OF A 5VDC CIRCUIT
- ⚠ ONLY IN UNITS WITH HUMIDITROL OR PHASE DETECTION OPTION
- ⚠ T4 USED ONLY ON J VOLTAGE UNITS
- ⚠ NOTE: FOR USE WITH COPPER CONDUCTORS ONLY. REFER UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERPROTECTION CURRENT
- ⚠ F4 USED ON SCH UNITS
- ⚠ MOVE WIRE FROM 240 TO 208 TAP ON T1 OR T43 TRANSFORMERS FOR 208 LINE VOLTAGE APPLICATIONS
- ⚠ EXTERNAL HUMIDITROL CONTACTS

— DENOTES OPTIONAL COMPONENTS
 - - - LINE VOLTAGE FIELD INSTALLED

| | | | |
|-----------------------------|--|----------------|-------|
| 2019/05 |  | WIRING DIAGRAM | 05/19 |
| | | 538047-01 | |
| COOLING | | | |
| SCH/SGH - 036H,060H - G,J,Y | | | |
| SECTION B | | | REV 0 |
| Supersedes | | Form No. | |
| | | 538047-01 | |

SCH036, SCH060 Y,G &Y Voltage Sequence of Operation

Power:

- 1 Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to the A55 Unit Controller. A55 provides 24VAC to the unit cooling, heating and blower controls.
- 2 Line voltage from unit disconnect provides voltage to compressor crankcase heaters HR1 (through discharge line thermostat) and compressor contactor K1. Voltage is distributed directly to blower motor B3 and outdoor fan motors B4 and B5.

Blower Operation:

The A55 Unit Controller receives a demand from thermostat terminal G. A55 energizes blower motor circuit follows:

- 3 A55, through motor control board energizes blower B3 via programmed motor settings. Motor settings are field-adjustable.

First-Stage Cooling

- 4 A55 Unit Controller receives a Y1 and G cooling de-

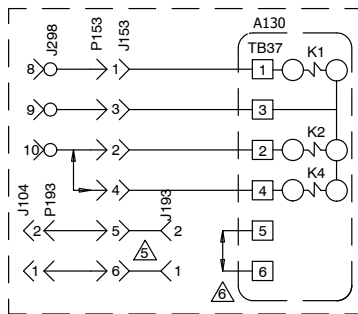
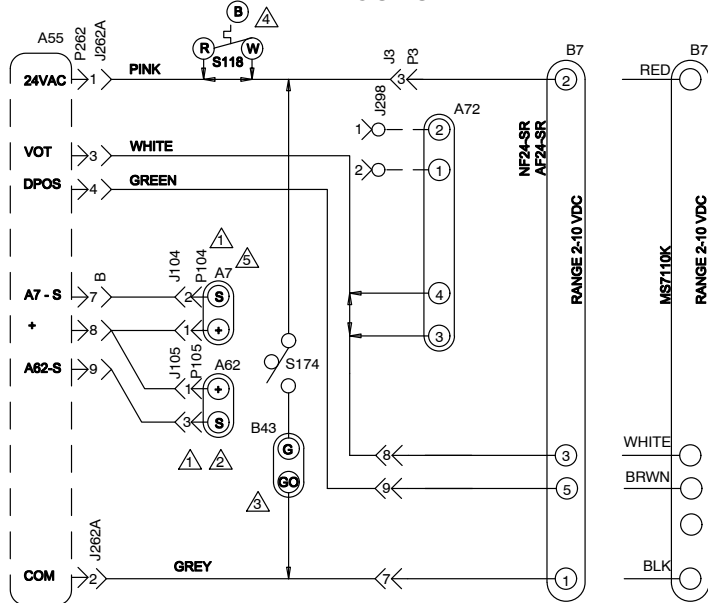
mand and energizes blower B3 in low speed.

- 5 After A55 proves n.c. low pressure switch S87, n.c. freezestat S49, and n.c. high pressure switch S4, compressor contactor K1 is energized.
- 6 N.O. contacts K1-1 close energizing the compressor B1. On two-speed systems (3, 4, and 5 tons) compressor is energized on low speed.
- 7 S11 n.o. contact close below 62°F. A55 energizes outdoor fan motors B4 and B5 on low speed.

Second-Stage Cooling

- 8 A55 receives a Y2 and G cooling demand and energizes blower B3 in high speed.
- 9 A55 energizes compressor solenoid L34, switching compressor to high speed.
- 10 - A55 energizes outdoor fan motors B4 and B5 on high speed.

ECONOMIZER



ENERGY RECOVERY WHEEL HOOK UP
 NOTE - THIS DIAGRAM USED ONLY WHEN ECONOMIZER OR MOTORIZED OUTDOOR AIR DAMPERS ARE INSTALLED.

- ⚠ S118 USED ON 35 TO 50 TON EMERGENCE UNITS WITH ENERGY RECOVERY WHEEL (ERW)
- ⚠ REPOSITION A7 ENTHALPHY SENSOR FROM ROOFTOP UNIT ECONOMIZER INTO INTAKE HOOD OF THE ERW ROOFTOP UNIT
- ⚠ REMOVE JUMPER WHEN INSTALLING OPTIONAL LOW AMBIENT SWITCH

- ⚠ DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPHY OR SENSIBLE TEMPERATURE CONTROL
- ⚠ FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPHY SENSOR
- ⚠ OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED

————— DESIGNATES OPTIONAL WIRING
 - - - - - CLASS II FIELD WIRING

| | | | |
|--|---|----------------|-------|
| 04/18 |  | WIRING DIAGRAM | 04/18 |
| | | 537189-01 | |
| ACCESSORIES | | | |
| EMERGENCE/STRATEGOS SERIES ECONOMIZER AND MOTORIZED OAD PIVOTING WHEEL ENERGY RECOVERY SYSTEM OPTION | | | |
| SECTION D | | REV 3 | |
| Supersedes | New Form No. | | |
| | 537189-01 | | |

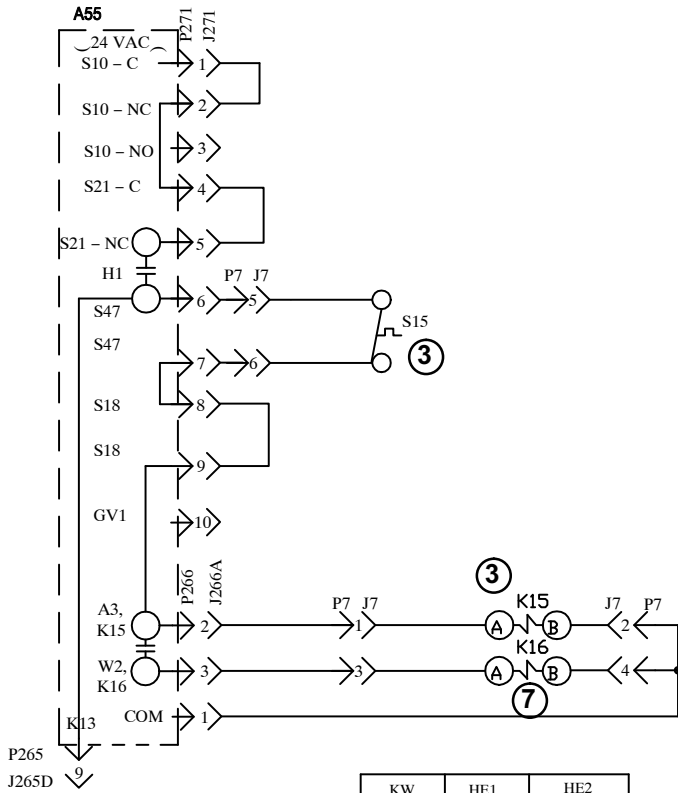
POWER:

- Terminal strip TB34 energizes the economizer components with 24VAC.

OPERATION:

- The main control module A55 along with outdoor enthalpy sensor A7 and indoor enthalpy sensor A62 (if differential enthalpy is used) communicates to the economizer control module A56 when to power the damper motor B7.
- The economizer control module A56 supplies B7 with 0 - 10 VDC to control the positioning of economizer.
- The damper actuator provides 2 to 10 VDC position feedback.

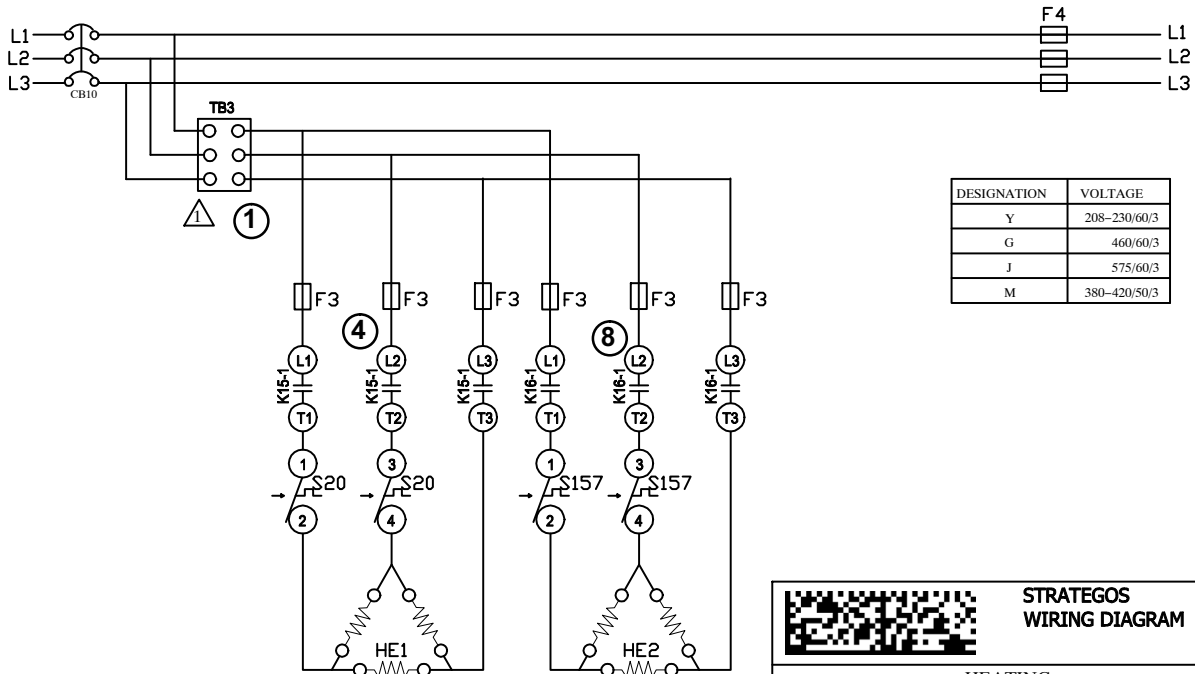
EHC- 15, 30kW Y VOLTAGE



| KEY | DESCRIPTION |
|--------|---|
| A55 | PANEL, MAIN |
| CB10 | CIRCUIT BREAKER, MAIN DISCONNECT |
| F3 | FUSE, ELECTRIC HEAT 1 |
| F4 | FUSE, UNIT |
| HE1 | ELEMENT, ELECTRIC HEAT 1 |
| HE2 | ELEMENT, ELECTRIC HEAT 2 |
| J7 | JACK, ELECTRIC HEAT |
| J265 | JACK, CAB RELAY |
| J266 | JACK, HEATING CONTROL STG 1 |
| J271 | JACK, HEATING SENSORS STG 1 |
| K15,-1 | CONTACTOR, ELECTRIC HEAT 1 |
| K16,-1 | CONTACTOR, ELECTRIC HEAT 2 |
| P7 | PLUG, ELECTRIC HEAT |
| P265 | PLUG, CONTACTOR RELAY |
| P266 | PLUG, HEATING CONTROL |
| P271 | PLUG, HEATING SENSORS STG 1 |
| S15 | SWITCH, LIMIT PRIMARY ELECTRIC HEAT |
| S20 | SWITCH, LIMIT SECONDARY ELECTRIC HEAT 1 |
| S157 | SWITCH, LIMIT SECONDARY ELECTRIC HEAT 2 |
| TB3 | TERMINAL STRIP, ELECTRIC HEAT |

| KW | HE1 | HE2 |
|----|-----|-----|
| 10 | 10 | |
| 15 | 15 | |
| 20 | 10 | 10 |
| 30 | 15 | 15 |

⚠ TB3 IS USED ON SOME UNITS

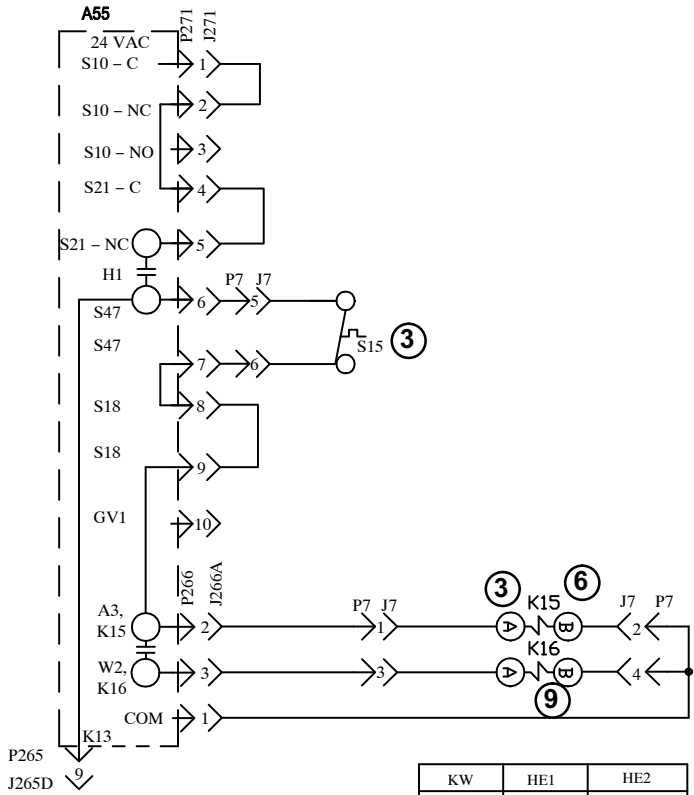


| DESIGNATION | VOLTAGE |
|-------------|--------------|
| Y | 208-230/60/3 |
| G | 460/60/3 |
| J | 575/60/3 |
| M | 380-420/50/3 |

← DENOTES OPTIONAL COMPONENTS

| | | |
|--|---------------------------------|-------|
| | STRATEGOS WIRING DIAGRAM | 12/05 |
| | HEATING | |
| ELECTRIC HEAT FOR STRATEGOS EHA/EHB/EHC - 10,15,20,30 - Y | | |
| SECTION A | | |
| Supersedes | New Form No. 537473-01 | |

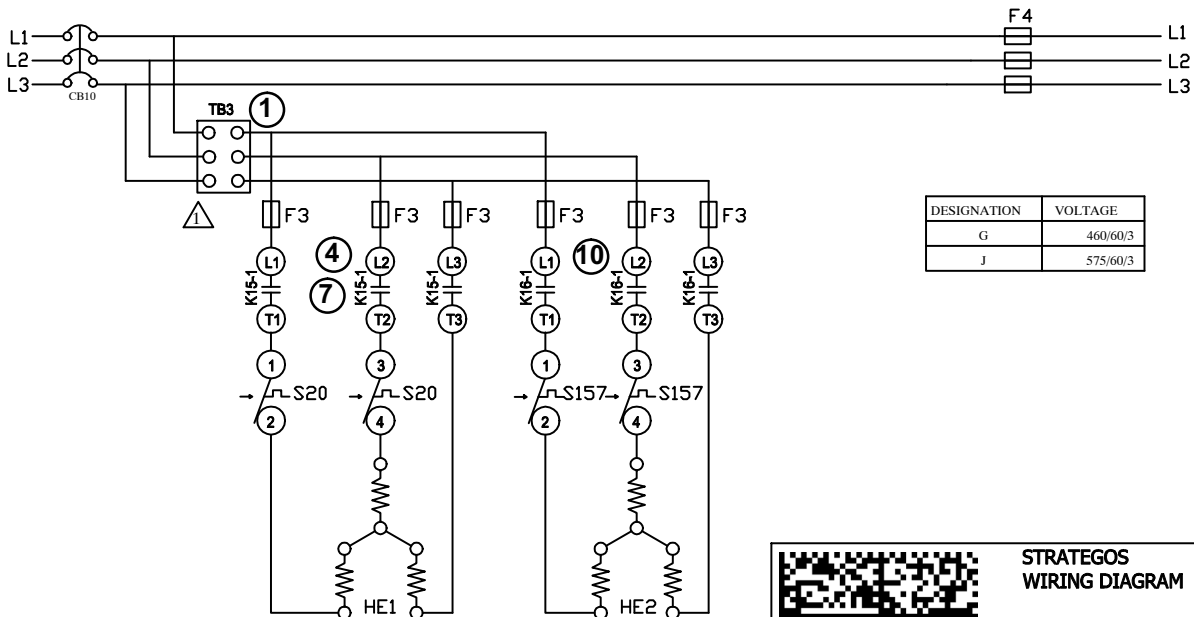
EHC- 10, 15, 20, 30kW G, J VOLTAGE



| KEY | DESCRIPTION |
|--------|--|
| A55 | PANEL, MAIN |
| CB10 | CIRCUIT BREAKER, MAIN DISCONNECT |
| F3 | FUSE, ELECTRIC HEAT |
| F4 | FUSE, UNIT |
| HE1 | ELEMENT, ELECTRIC HEAT 1 |
| HE2 | ELEMENT, ELECTRIC HEAT 2 |
| J7 | JACK, ELECTRIC HEAT |
| J265 | JACK, CAB RELAY |
| J266 | JACK, HEATING CONTROL STG 1 |
| J271 | JACK, HEATING SENSORS STG 1 |
| K15,-1 | CONTACTOR, ELECTRIC HEAT 1 |
| K16,-1 | CONTACTOR, ELECTRIC HEAT 2 |
| P7 | PLUG, ELECTRIC HEAT |
| P265 | PLUG, CONTACTOR RELAY |
| P266 | PLUG, HEATING CONTROL |
| P271 | PLUG, HEATING SENSORS STG 1 |
| S15 | SWITCH LIMIT PRIMARY ELECTRIC HEAT |
| S20 | SWITCH LIMIT SECONDARY ELECTRIC HEAT 1 |
| S157 | SWITCH LIMIT SECONDARY ELECTRIC HEAT 2 |
| TB3 | TERMINAL STRIP, ELECTRIC HEAT |

| KW | HE1 | HE2 |
|----|-----|-----|
| 10 | 10 | |
| 15 | 15 | |
| 20 | 10 | 10 |
| 30 | 15 | 15 |

⚠ TB3 IS USED ON SOME UNITS



| DESIGNATION | VOLTAGE |
|-------------|----------|
| G | 460/60/3 |
| J | 575/60/3 |

← DENOTES OPTIONAL COMPONENTS

| | | |
|---|--------------------------|-------|
| | STRATEGOS WIRING DIAGRAM | 12/05 |
| | HEATING | |
| ELECTRIC HEAT FOR STRATEGOS™ EHA/EHB/EHC - 10,15,20,30 - G,J | | |
| SECTION A | | |
| Supersedes | New Form No. 537474-01 | |

Sequence of Operation -EHC 10, 15, 20 & 30kW - G, J and Y

G and J Voltage

1. Terminal strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1 and HE2 are protected by F3,

First Stage Heat:

- 2 Heating demand initiates at W1 in the thermostat.
- 3 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S15, contactor K15 is energized.
- 4- N.O. K15-1 contacts close energizing HE1.

Second Stage Heat:

- 5 With first stage heat operating, an additional heating demand initiates W2 in the thermostat.
- 6 A second stage heating demand is received by A55 control module.
- 7 A55 energizes contactor K16.
- 8 N.O. K16-1 contacts close energizing HE2.

Y Voltage

- 1 Terminal strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1 and HE2.

First Stage Heat:

- 2 **15KW** - Heating demand initiates at W1 in the thermostat.
- 3 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S15 contactor K15 is energized.
- 4- N.O. K15 contacts close energizing HE1.
- 5 **30KW**- Heating demand initiates at W1 in the thermostat.
- 6 24VAC is routed through A55 Unit Controller. After A55 proves N.C. primary limit S15, contactor K15 is energized.
- 7- N.O. K15 contacts close energizing HE1.

Second Stage Heat:

- 8 **30KW** - With first stage heat operating, an additional heating demand initiates W2 in the thermostat.
- 9 A second stage heating demand is received by A55 control module. After A55 proves N.C. primary limit S15, contactor K16 is energized.
- 10 N.O. K16 contacts close energizing HE2.