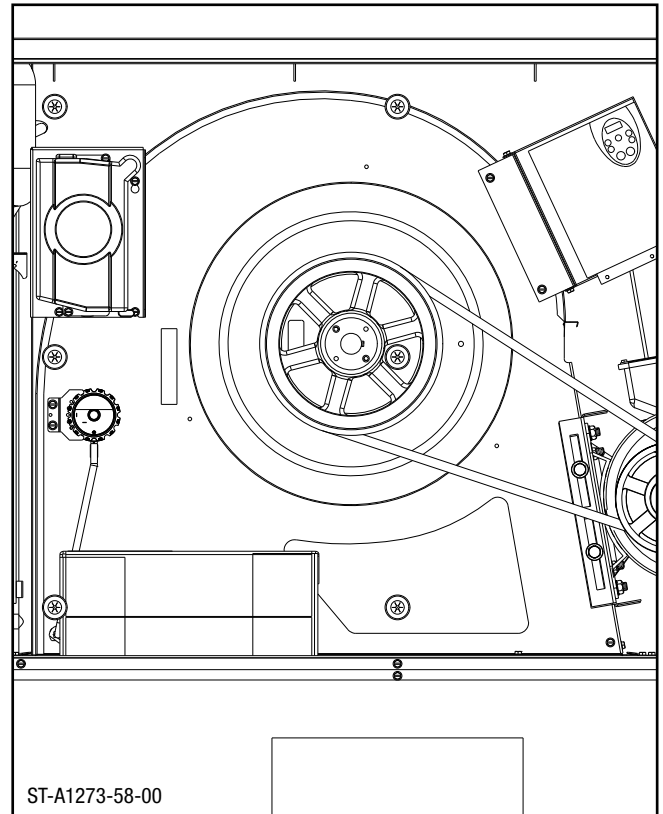
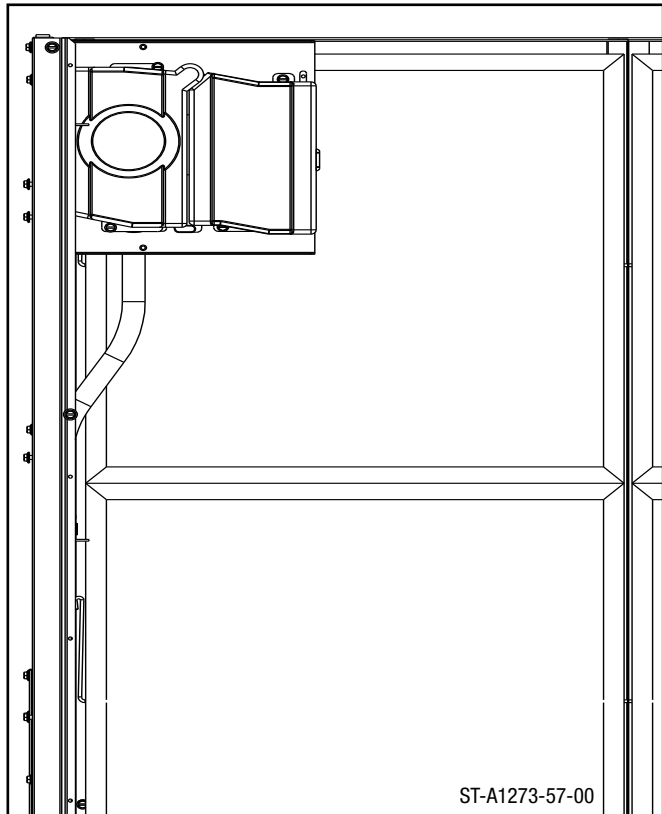


D. DUCT AND VENTING

D.5. Smoke Detectors

Figure D.5. – A: Smoke Detector Assembly



D.5.1. Supply Duct Smoke Detectors

D.5.1.1. Field Installed – Installation, Wiring, and Setup

Field install Supply and Return Duct Smoke Detectors come shipped with a separate document for Installation & Operation instructions. Refer to the separate Installation Instructions for installing, wiring, and setup of a supply and return smoke detector.

D.5.1.2. Factory Installed – Inspection and Setup

Inspect the smoke detector assembly for any damage during shipping. Use **Figure D.5. – A** for reference. Confirm that all wiring connections are still secure. Refer to the separate Installation Instructions for smoke detector for wiring diagrams and additional assembly instructions.

D.5.1.3. Field Installed 3rd Party Smoke Detectors or Fire Control Panels

See **Section F.1.2.** for the proper connection points for a remote smoke detector. DO NOT break 24VAC to the Thermostat: shutdown will not occur. DO NOT break 24VAC from the transformer: it can overload the smoke detector controls.

D.5.2. Remote Smoke Detection Reference

Refer to **Section F.1.2. Occupancy and Remote Smoke Detector Connections** for Non-DDC connections.

Refer to **Section F.2.5.1. Remote Smoke Detector/Fire Control Connection** for DDC connections.

E. ELECTRICAL

E.1. Electrical Safety Information

E.1.1. Information on Power Supply

⚠ WARNING: Turn off the main electrical power at the branch circuit disconnect closest to the unit before attempting any wiring. Failure to do so can cause electrical shock resulting in personal injury or death.

1. All wiring should be made in accordance with the **National Electrical Code**. Consult the local power company to determine the availability of sufficient power to operate the unit. Check the voltage at power supply to make sure it corresponds to the unit's **RATED VOLTAGE REQUIREMENT**. Install a branch circuit disconnect near the rooftop, in accordance with the N.E.C., C.E.C. or local codes.

2. It is important that proper electrical power is available at the unit. Voltage should not vary more than 10% from that stamped on the unit nameplate. On **three phase units**, phases must be balanced within 3%.

3. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from the **N.E.C.** using the circuit ampacity found on the unit rating plate. Use the smallest wire size allowable in **Figure F. – A** from the unit disconnect to unit.

4. For through the base wiring entry reference **Figure F.3. – A: Power and Control Routing**. All fittings and conduit are field supplied for this application. Reference the chart with **Figure F.3. – B: Hole Sizing for Conduit** for proper hole and conduit size.

NOTES:

1. For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from **Appendix B – Electrical Data** or the unit rating plate for circuit ampacity and the National Electrical Code to determine proper wire sizing. From the unit disconnect to unit, the smallest wire size allowable in **Figure F. – A** for the circuit ampacity may be used, as the disconnect must be in sight of the unit.

2. Wire size based on 75°C rated wire insulation for 1% voltage drop.

3. For more than 3 conductors in a raceway or cable, see the National Electrical Code (or C.E.C. in Canada) for derating the ampacity of each conductor.

IMPORTANT: This unit is approved for use with copper conductors only connected to unit contactor.

WARRANTY MAY BE JEOPARDIZED IF ALUMINUM WIRE IS CONNECTED TO UNIT CONTACTOR.

Special instructions apply for power wiring with aluminum conductors:

Warranty is void if connections are not made per instructions.

Attach a length (6" or more) of recommended size copper wire to the unit contactor terminals L1, L2 and L3 for three phase.

Select the equivalent aluminum wire size from the tabulation below:

Splice copper wire pigtails to aluminum wire with U.L. recognized connectors for copper-aluminum splices. Please exercise the following instructions very carefully to obtain a positive and lasting connection:

1. Strip insulation from aluminum conductor.
2. Coat the stripped end of the aluminum wire with the recommended inhibitor, and wire brush the aluminum surface through inhibitor. INHIBITORS: Brundy-Pentex "A"; Alcoa-No. 2EJC; T & B-KPOR Shield.
3. Clean and recoat aluminum conductor with inhibitor.
4. Make the splice using the above listed wire nuts or split bolt connectors.
5. Coat the entire connection with inhibitor and wrap with electrical insulating tape.

NOTE: Wiring to be done in the field between the unit and devices not attached to the unit, or between separate devices which are field installed and located, shall conform with the temperature limitation for Type T wire [63°F rise (35°C)] when installed in accordance with the manufacturer's instructions.

E.1.2. 208/230 Volt Operation and Required Adjustments

E.1.2.1. Low Voltage Transformer Tap

Adjustment for 208Volt

Transformer is factory wired for 230 volts on 208/230 volt models and must be changed for 208 volt applications. See unit wiring diagram for 208 volt wiring.

E.1.3. 460 Volt Operation

460V units will not require any additional setup.

E.1.4. 575 Volt Operation

Setup for 575V units will not require any additional setup. There will be an additional transformer in the unit that is stored in a metal box and mounted next to the compressor. It will be pre-wired from the factory and no setup will be needed.

E.1.5. Potential Ignition Sources

The UL safety standard defines potential ignition sources as hot surfaces, flames, and current carrying devices which can be the source of arcing or sparking.

In case any internal electrical components need to be replaced, those replacement parts must be ordered from the unit manufacturer's website to ensure that the internal electrical components are not potential ignition sources.

Examples of internal electrical components include contactors, relays, and control boards. This is not an exhaustive list. For the safety of customers and technicians, refer to the unit manufacturer's website for proper unit component replacement.

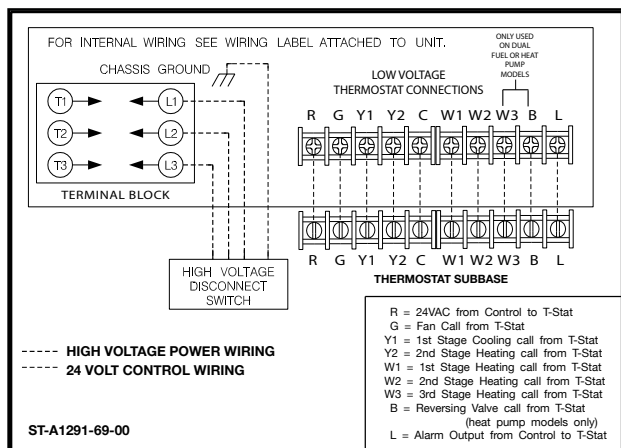
E. ELECTRICAL

E.2. Electrical Data

See **Appendix B** towards the end of this manual for Electric Data.

E.3. Electrical Connections

Figure E.3. – A: Typical Thermostat Wiring



Use **Appendix B** and National Electrical Code for circuit ampacity to determine proper wire sizing.

Refer to **Figure F.3. – A: Power and Control Routing** for location of wiring entrances, and **Figure F.3. – B: Hole Sizing for Conduit**.

E.3.1. Field Supplied Disconnect

The field supplied service disconnect will come with a separate Installation Instruction document. Please refer to that document for more information.

E.3.1.1. Mounting Disconnect on Cabinet

Attach the disconnect to the top of the left hand side of the control box, above the knockouts and refrigerant test ports. Do not use screws above or below the label specifying “TO PREVENT COIL DAMAGE – DO NOT ADD SCREWS HERE, ABOVE, OR BELOW LABEL” as hidden coil and tubing could be damaged. An example of this label is shown in **Figure E.3.1.1 – B**.

Figure E.3.1.1. – A: Standard Location for Mounting Disconnect

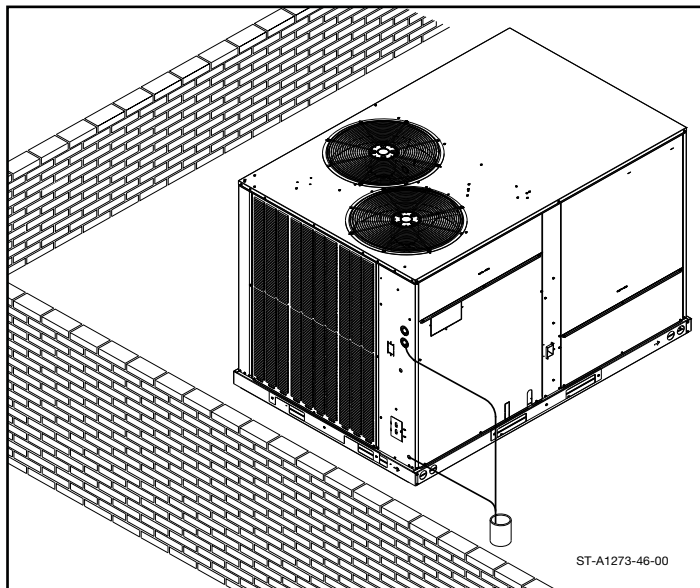
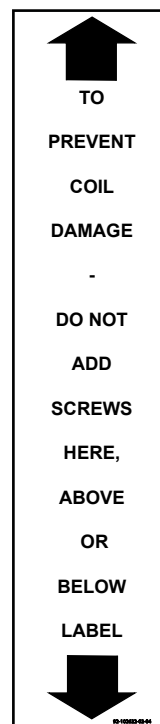


Figure E.3.1.1. – B: Label Showing Where to NOT Use Screws



E.3.1.2. Routing Wires into Cabinet

See **Figure F.3. – A: Electrical and Piping Routing** for conduit entry points and routing locations for wiring into the control box.

See **Figure E.3. – A: Typical Thermostat Wiring** for wiring to the terminal block and thermostat in the control box.

E. ELECTRICAL

E.3.1.3. Routing Wires through Curb (Option)

Use liquid tight connectors and tubing to connect the electrical and low voltage control cables between the base of the cabinet at the raised section (See **Figure B.3.6. - A: Supply And Return Dimensions For Downflow Applications** for location of raised section) and bottom of the control panel. Conduit and fittings must meet all applicable codes.

Use Silicon and gaskets to seal the connection at the base pan.

E.3.1.4. Connecting to Contactor Terminal Blocks

The recommended torque for securing wiring to the contactor is **40 in-lb**.

See **Figure E.3. - A: Typical Thermostat Wiring** for wiring to the contactor.

E.3.2. Factory Installed Disconnect

Refer to **Appendix H** for the unit wiring diagrams, and to **Figure F.3. - A** for locations to route wires into the cabinet or through the curb/basepan of the unit.

E.3.2.1. Routing Wires into Cabinet

Refer to section **E.3.1.1.** and/or **Section F.3.** for routing wires into the cabinet with a factory installed disconnect.

E.3.2.2. Routing wires through Curb (Option)

Refer to **Section E.3.1.3.** for routing wires through the curb with a factory installed disconnect.

E.3.3. Connecting the Convenience Outlet

E.3.3.1. Non-powered

The non-powered convenience outlet, if purchased as an option for the unit, will come shipped in a box within the blower compartment of the unit. It will need to be removed and installed into its proper configuration.

For connecting the non-powered convenience outlet and all other information, refer to the installation instructions for the accessory.

E.3.4. Checking Phase and Motor Rotation

When using 3 phase power the only device that is rotation dependent is the compressor. The outdoor fan and indoor blower do not require any adjustment and will turn backwards if the phase is incorrect. Verify the direction of rotation for the indoor blower motor before starting up the compressors.

E.3.4.1. Checking Phase with VFD Drive

On any models with an ECM Direct Drive Blower Motor or belt drive units with a Variable Frequency Drive, VFD, the motor will always rotate in the correct direction.

Correction phase must be checked by the operation of the compressor. It is recommended that a phase rotation meter be used to verify the system is connected properly to the three-phase power. This helps prevent compressor damage.

E.3.5. Grounding Requirements

Refer to local codes as required. Must be grounded to a common earth ground.

National Electric Code (NEC) / International Building Code / Canadian Electrical Code

A diagram of the internal wiring of this unit is located on the inside of control access panel and in this manual. If any of original wire as supplied with the appliance must be replaced, the wire gauge and insulation must be same as original wiring.

The low voltage wiring should be sized as shown in **Figure F. - A: Field Wire Size for 24VAC Thermostat Circuits**.

F. CONTROL / THERMOSTAT WIRING

Figure F. - A

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS						
THERMOSTAT LOAD - AMPS	SOLID COPPER WIRE - AWG.					
	16	14	12	10	10	10
	16	14	12	12	12	10
	16	16	14	12	12	10
THERMOSTAT LOAD - AMPS	LENGTH OF RUN - FEET (1)					
	50	100	150	200	250	300

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(1) THE TOTAL WIRE LENGTH IS THE DISTANCE FROM THE FURNACE TO THE THERMOSTAT AND BACK TO THE FURNACE.

NOTE: DO NOT USE CONTROL WIRING SMALLER THAN NO. 18 AWG.

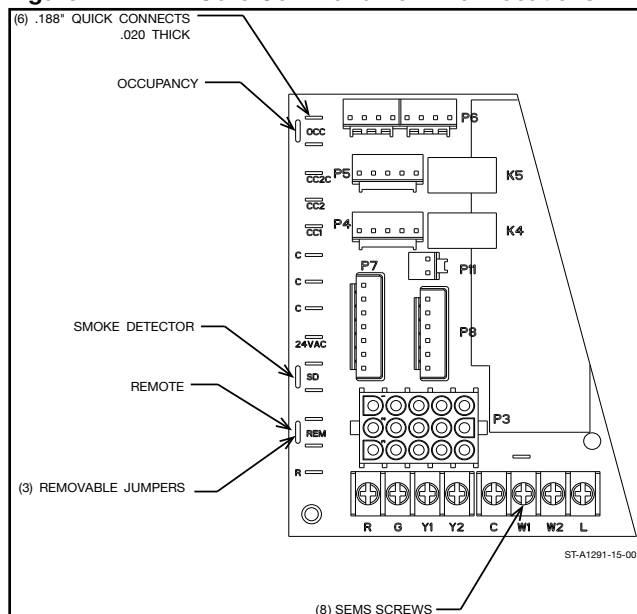
Install the room thermostat in accordance with the instruction sheet packed in the box with the thermostat. Run the thermostat lead wires through the control entry opening (**Figure F.2. – A: Electrical and Piping Routing**) and connect to the low voltage thermostat connections (see **Appendix H** for wiring diagrams and **Section F.1.** for T-Stat field connections). Never install the thermostat on an outside wall or where it will be influenced by drafts, concealed hot or cold water pipes or ducts, lighting fixtures, radiation from fireplace, sun rays, lamps, televisions, radios or air streams from registers. Refer to instructions packed with the thermostat for “heater” selection or adjustment.

F.1. T-Stat field connections

F.1.1. Misc. Connections

Refer to **Appendix H** for the unit wiring diagrams and to **Figure E.3. – A: Typical Thermostat Wiring**.

Figure F.1.1. - A: Core Command Terminal Locations



F.1.2. Occupancy connections / Remote connections / Etc

Figure F.1.2. – A: Occupancy and Remote Connections

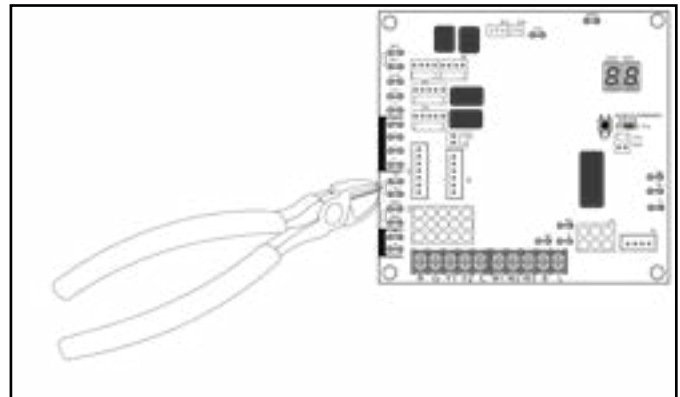


Figure F.1.2. - B: Non-DDC Board

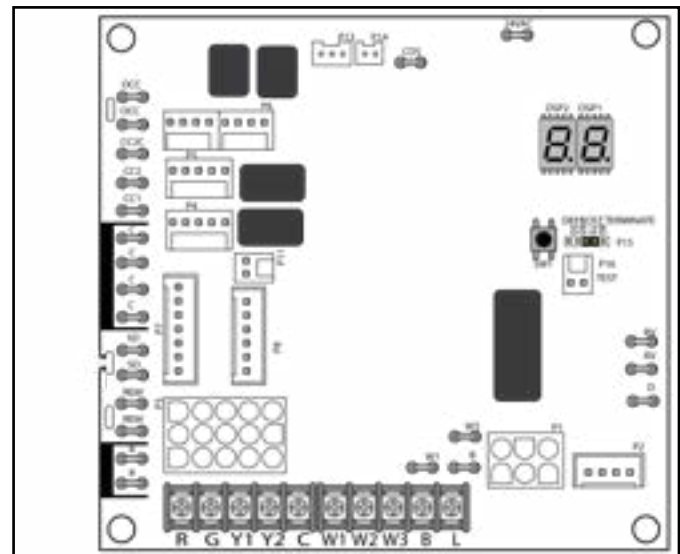
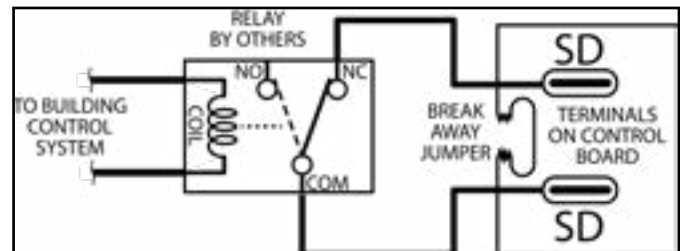


Figure F.1.2. - C: Using a Dry-Contact Relay



NOTE: This is an example of breaking the jumper for Smoke Detector connections, apply the same process for the Occupancy and/or Remote connections.

These features are only available on the Non-DDC Furnace, Heat pump, or cooling only control boards.