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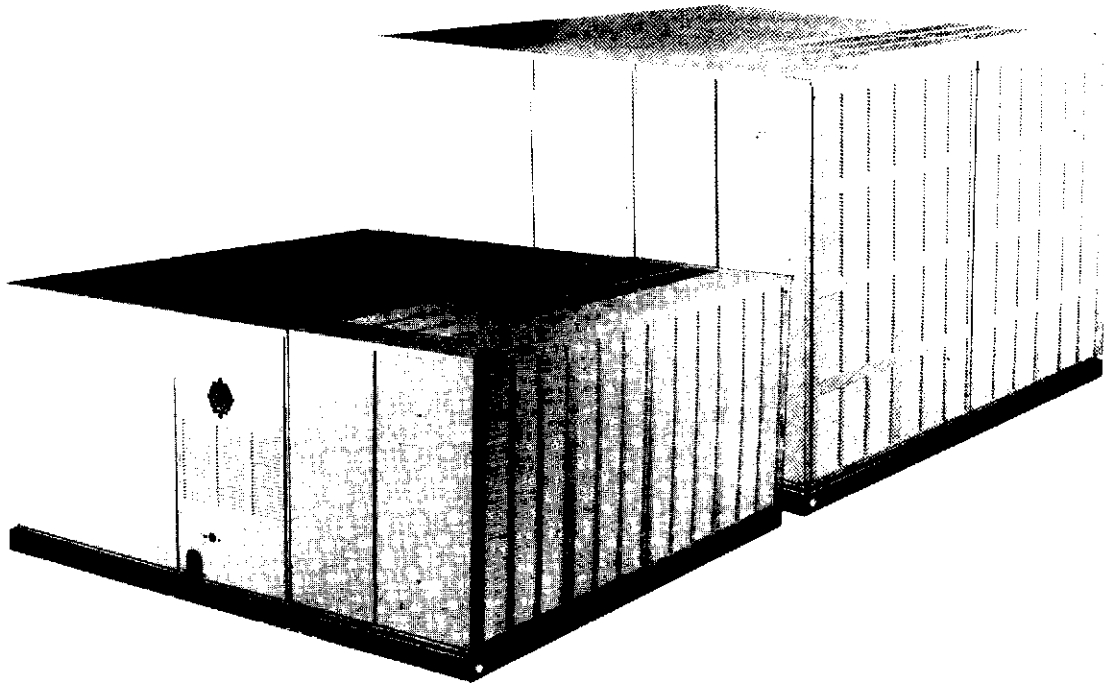
SnyderGeneral

Installation and Maintenance Data

Bulletin No. IM 530
April 1993
Form No. 573365Y-01

Packaged Rooftop Systems



Models CUR075G Thru CUR150G

ETL LISTED®

CSA

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NOMENCLATURE

CUR 075 G

COMMERCIAL UNITARY ROOFTOP

NOMINAL CAPACITY
- 075 = 7½ Tons
- 085 = 8½ Tons
- 110 = 10 Tons
- 125 = 12½ Tons
- 150 = 15 Tons

TO DESIGNATE VOLTAGE, HEAT & OPTIONS FOR STOCK UNITS

DESIGN VINTAGE

RECEIVING, INSPECTION & UNPACKING

When the equipment is received all items should be carefully checked against the bill of lading to be sure all crates and cartons have been received. Before accepting delivery, carefully inspect each carton or crate for visible shipping damage.

If any damage is noticed, the carrier should make the proper notation on the delivery receipt acknowledging the damage. Make notations of all damage on all copies of the bill of lading and have all copies countersigned by the delivering carrier. The carrier should also fill out a Carrier Inspection Report. The factory Traffic Department should then be contacted. File claim for damage with the carrier. Physical damage to the unit after acceptance is not the responsibility of SnyderGeneral Corporation.

Unpack each carton or crate and verify that all required parts and proper quantities of each item have been received. Refer to drawings for part descriptions. Report shortages or missing items to your local representative to arrange for replacement parts.

Due to availability of carriers and truck space, it is not possible to guarantee that all items will be shipped together. Verification of shipments must be limited to only those items on the bill of lading.

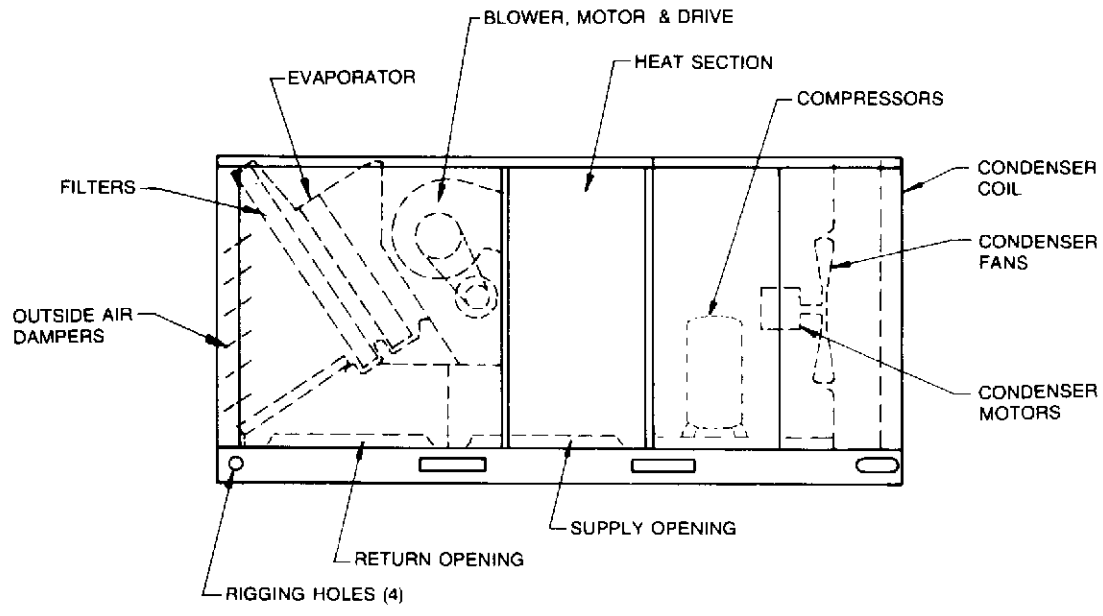
The unit nameplate must be checked to make sure the voltage agrees with the power supply available.

UNIT DESCRIPTION

Rooftop units are shipped fully assembled and factory tested. They are generally installed on a steel roof mounting curb assembly which has been shipped to the jobsite for installation on the roof structure prior to the arrival of the unit.

The model number shown on the unit identification plate identifies the various components of the unit such as refrigeration tonnage, vintage and voltage as shown above in the nomenclature.

Figure 1. Typical Component Location



GENERAL INSTALLATION

CAUTION: Sheet metal parts, screws, clips and similar items inherently have sharp edges, and it is necessary that the installer and service personnel exercise caution.

The installation of this equipment shall be in accordance with the regulations of authorities having jurisdiction and all applicable codes. It is the responsibility of the installer to determine and follow the applicable codes.

This equipment is to be installed by an experienced installation company and fully trained personnel. System design and installation should, where applicable, follow information presented in accepted industry guides such as the ASHRAE Handbooks. The manufacturer assumes no responsibility for equipment installed in violation of any code or regulation.

The mechanical installation of the packaged rooftop units consists of making final connections between the unit and building services; supply and return duct connections; and drain connections (if required).

The internal systems of the unit are completely factory installed and tested prior to shipment and no additional field labor is required.

SERVICE CLEARANCES

Adequate clearance around the unit should be kept for safety, service, maintenance, and proper unit operation. As shown in Figure 2, a total clearance of 75″ on the main control panel side of the unit is recommended to facilitate possible fan shaft, coil, electric heat and gas furnace removal. Clearance of 48″ is recommended on all other sides of the unit to facilitate possible compressor removal, to allow service access and to insure proper ventilation and condenser airflow. The unit must not be installed beneath any obstruction.

The unit should be installed remote from all building exhausts to inhibit ingestion of exhaust air into the unit fresh air intake.

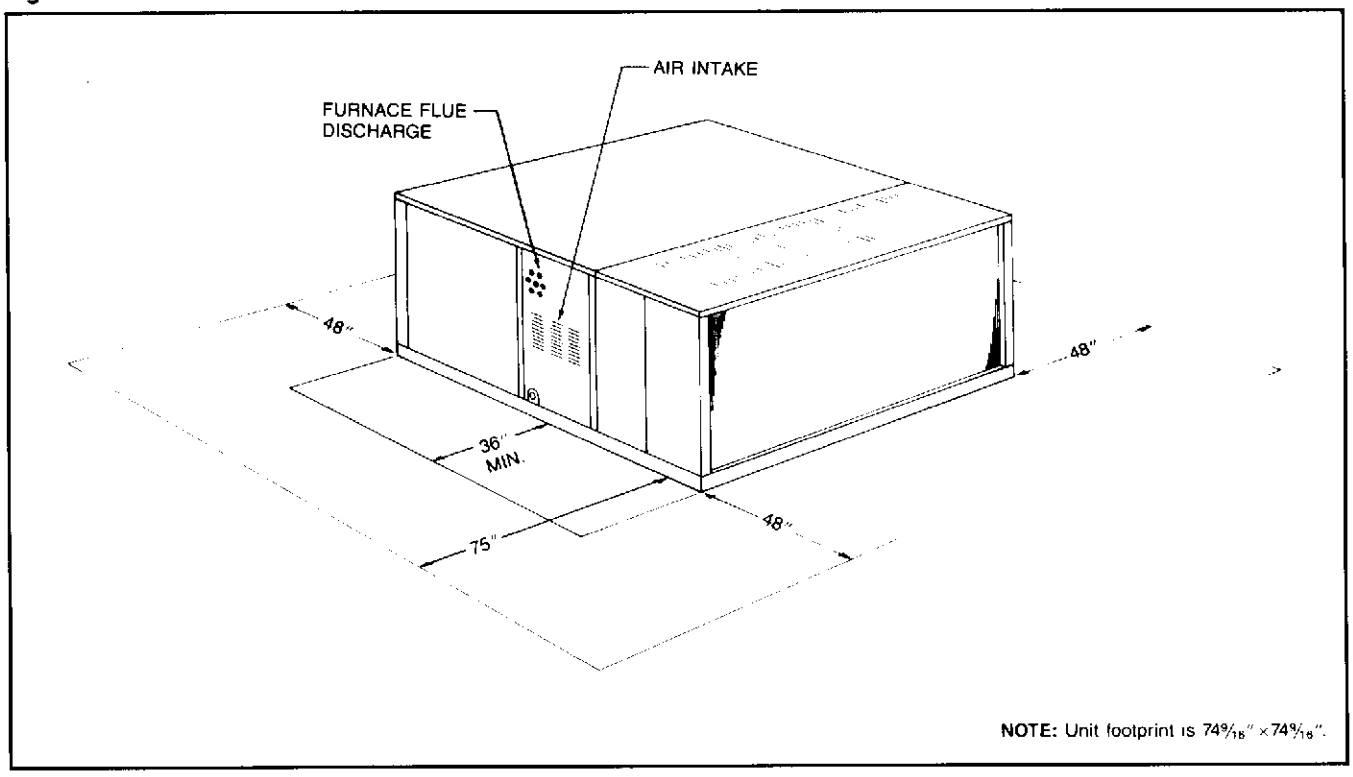
GAS HEAT UNITS

1. As shown in Figure 2 and as indicated on the unit dataplate, a minimum clearance of 36″ to any combustible material is required on the furnace access side of the unit. All combustile materials must be kept out of this area.
2. This 36″ minimum clearance must also be maintained to insure proper combustion air and flue gas flow. The combustion air intake and furnace flue discharge must not be blocked for any reason, including blockage by snow.
3. Adequate clearances from the furnace flue discharge to any adjacent public walkways, adjacent buildings, building openings or openable windows must be maintained in accordance with the latest edition of the National Fuel Gas Code (ANSI Z223.1).

   CAUTION: Flue gases are corrosive to certain building materials. Provide adequate clearance or other protection as required.
4. Minimum horizontal clearance of 48″ from the furnace flue discharge to any electric meters, gas meters, regulators and relief equipment is required.

   NOTE: Model CUR075 through 150 rooftop units are designed for outdoor installation only. They may be installed over wood flooring or over Class A, B or C roof covering materials.

Figure 2. Service Clearances



NOTE: Unit footprint is 74 9/16″ x 74 9/16″.

UNIT & COMPONENT WEIGHTS

Figure 3. Corner and Center of Gravity Locations

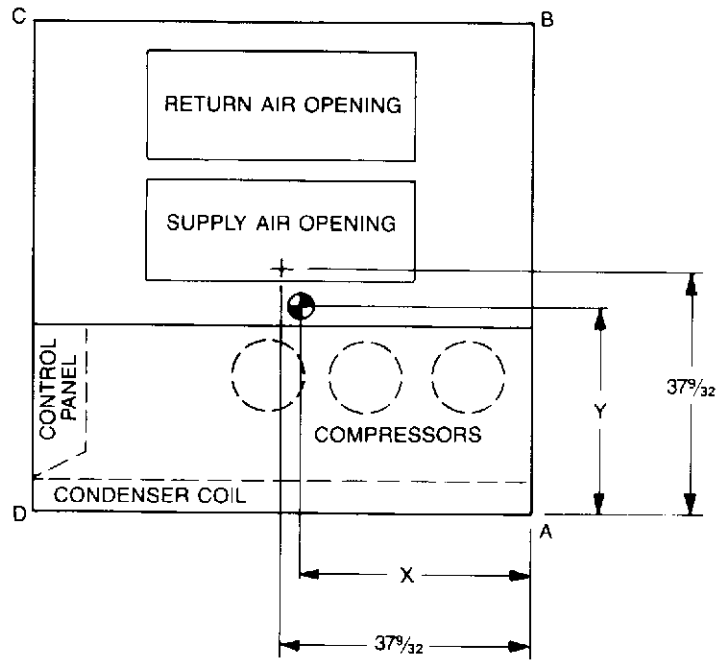


Table 1. Unit and Component Weights (lbs.) & Center of Gravity (inches)

DATA	CUR SERIES				
	075C	085C	110C	125C	150C
CORNER WEIGHT — A ①	263	278	352	376	426
CORNER WEIGHT — B ①	227	228	303	323	353
CORNER WEIGHT — C ①	185	191	257	273	293
CORNER WEIGHT — D ①	215	233	298	318	353
CENTER OF GRAVITY — X (IN.) ⑤	33.5	33.9	34.2	34.1	33.8
CENTER OF GRAVITY — Y (IN.) ⑤	34.5	33.6	34.5	34.4	33.8
UNIT SHIPPING WEIGHT ①	935	975	1265	1345	1480
UNIT OPERATING WEIGHT ①	890	930	1210	1290	1425
COIL GUARDS ②	30	30	40	40	40
MOTORIZED O.A. ACTUATOR ③	5	5	5	5	5
ECONOMIZER ③	28	28	39	39	39
GAS HEAT — MODEL N10 ④	80	80	90	90	90
GAS HEAT — MODEL N14 ④	90	90	100	100	100
GAS HEAT — MODEL N21 ④	110	110	120	120	120
GAS HEAT — MODEL N24 ④	120	120	130	130	130
GAS HEAT — MODEL N28 ④	NA	NA	NA	140	140
ELECTRIC HEATER ④	65	65	100	100	100
HOT WATER COIL ④	65	65	110	110	110
STEAM COIL ④	35	35	55	55	55
FULL PERIMETER CURB ④	120	120	120	120	120
CANTILEVER CURB	112	112	112	112	112
CANTILEVER CURB DUCT SUPPORT	27	27	27	27	27

NOTES:

NA - Not Available

① Weights are for basic cooling only unit; no options.
② Add 50% of weight listed to corners A and D.
③ Add 50% of weight listed to corners B and C.
④ Add 25% of weight listed to each corner.
⑤ Center of gravities are for cooling only units without options listed below.

ROOF CURB ASSEMBLY & INSTALLATION

GENERAL

1. Roof curbs are shipped unassembled. Field assembly, squaring, leveling and mounting on the roof structure are the responsibility of the installing contractor. All curb installations must comply with local codes and should be done in accordance with the established guidelines of the National Roofing Contractors Association.
2. All required hardware necessary for the assembly of the sheetmetal curb is included in the curb accessory.
3. Full perimeter or cantilever type curb accessories are available. The full perimeter curb (554208A-01) includes a duct connection frame to be assembled with the curb. A separate duct connection frame accessory (554208A-02) is available for use with the cantilever curb (8403100). The unit can be set on the cantilever curb so that either the condenser end or the two sides overhang the curb.
4. Curbs must be supported on at least two parallel sides by roof members. Roof members must not penetrate supply and return duct opening areas.
5. Curb insulation, cant strips, flashings and general roofing materials are to be furnished by the contractor. Wood nailing strip and curb gasketing is furnished with the curb accessory.
6. The unit and curb accessories are designed to allow vertical duct installation before unit placement. Duct installation after unit placement is not recommended.

INSPECTION

1. Before accepting delivery, inspect curb for shipping damage. Make notations of all damage on all copies of bill of lading and have all copies countersigned by the delivering carrier. File claim for damage with the carrier.
2. Verify that all required parts and proper quantities of each item as shown on bill of material have been received. Report shortages or missing items to delivering carrier and notify your local representative to arrange for replacement.

ASSEMBLY

CAUTION: All curbs look similar. To avoid incorrect curb positioning, check job plans carefully and verify markings on curb assembly.

CANTILEVER CURB:

1. Position perimeter pieces, items ① and ②, as shown in Figure 4. Check lengths of all pieces against bill of material to insure proper placement and assembly.
2. Assemble side channels, item ①, to front and back channels, item ②, using bolts, washers, lock washers, and nuts, items ③, ④, ⑤, and ⑥. Hand tighten only at this time.
   Note: Flanges on item ① must go outside of item ② and under wood nailer strip.
3. The assembled roof mounting curb should now be checked for squareness. The curb assembly must be adjusted until both diagonal measurements (dimension "C") are equal within a tolerance of 1/8". All hand tightened fasteners should now be fully secured (refer to Table 2 and Figure 6).
4. Assemble duct connection frame accessory as shown in Figure 5. Fasten pieces together using sheetmetal screws provided (3/8" hex head). Note that this duct connection frame can be oriented two ways when set into the curb. Frame position must correspond to the intended unit orientation on the curb. The gasket provided with the duct connection accessory should be applied after duct installation. Refer to the "Vertical Discharge Duct Connections" section of this manual.

Figure 4. Cantilever Curb Joint

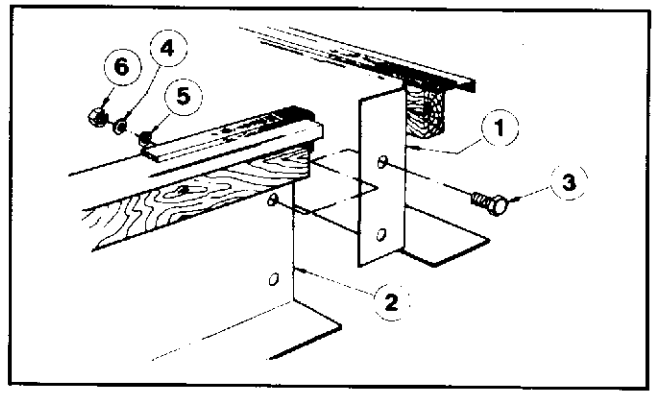


Figure 5. Cantilever Curb Duct Connection Accessory

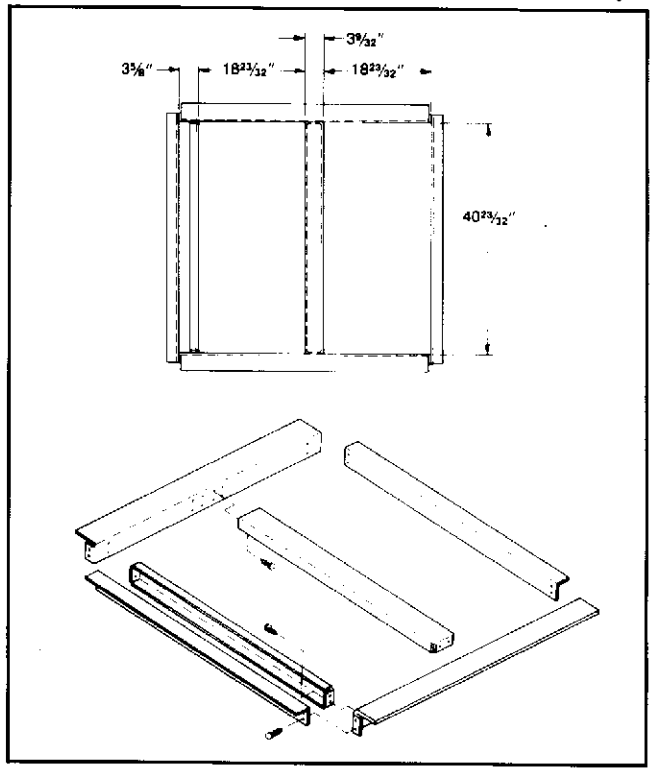


Figure 6. Typical Curb Installation

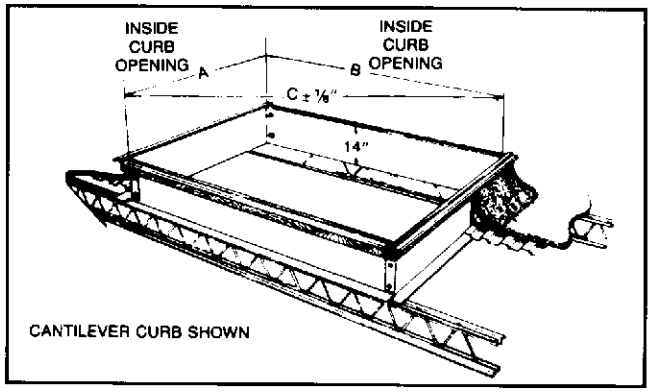


Table 2. Inside Opening Curb Dimensions

CURB TYPE	A	B	C
CANTILEVER	45	63 1/2	77 13/16
FULL PERIMETER	63 3/16	63 9/16	89 7/8

FULL PERIMETER CURB:

1. Position perimeter pieces, item A, as shown in Figures 7 and 8. All perimeter pieces are identical.
2. The duct connection frame, items B and C, should be assembled with the curb as shown in Figures 7 and 8.
   Note: Top of duct connection frame must be flush with top of curb as shown in Figure 8.
3. Fasten pieces together using sheetmetal screws provided (3/8" hex head). Screws are included in shipping package (item D, Figure 7). Use three screws at each corner of the curb frame (item A) and two screws at each joint of the duct connection members (items B and C).
4. The assembled roof mounting curb should now be checked for squareness. The curb assembly must be adjusted until both diagonal measurements (dimension "C") are equal within a tolerance of 1/8" (refer to Table 2 and Figure 6).
5. Gasket material sufficient to seal the curb perimeter and the duct connection frame is included and attached to a duct connection member. Note that it should not be applied to the curb perimeter and the duct connection frame until the ducts are placed in the frame. Refer to the "Vertical Discharge Duct Connections" section of this bulletin.

Figure 7. Full Perimeter Curb

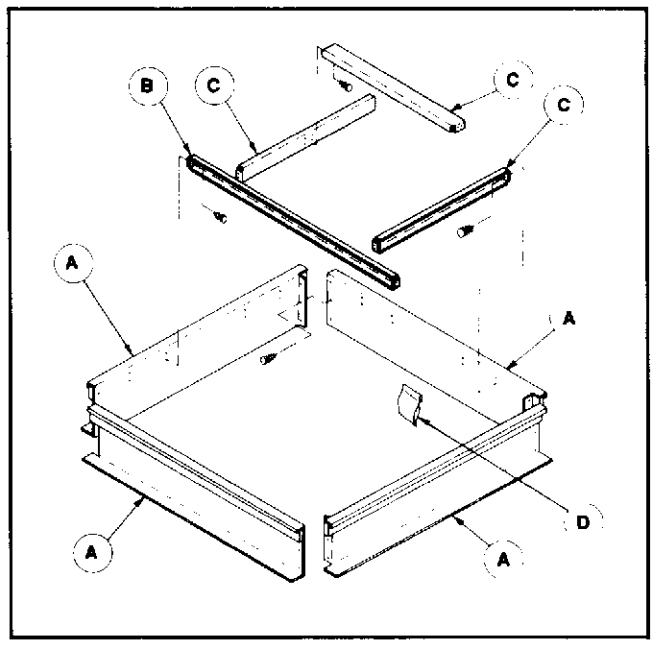
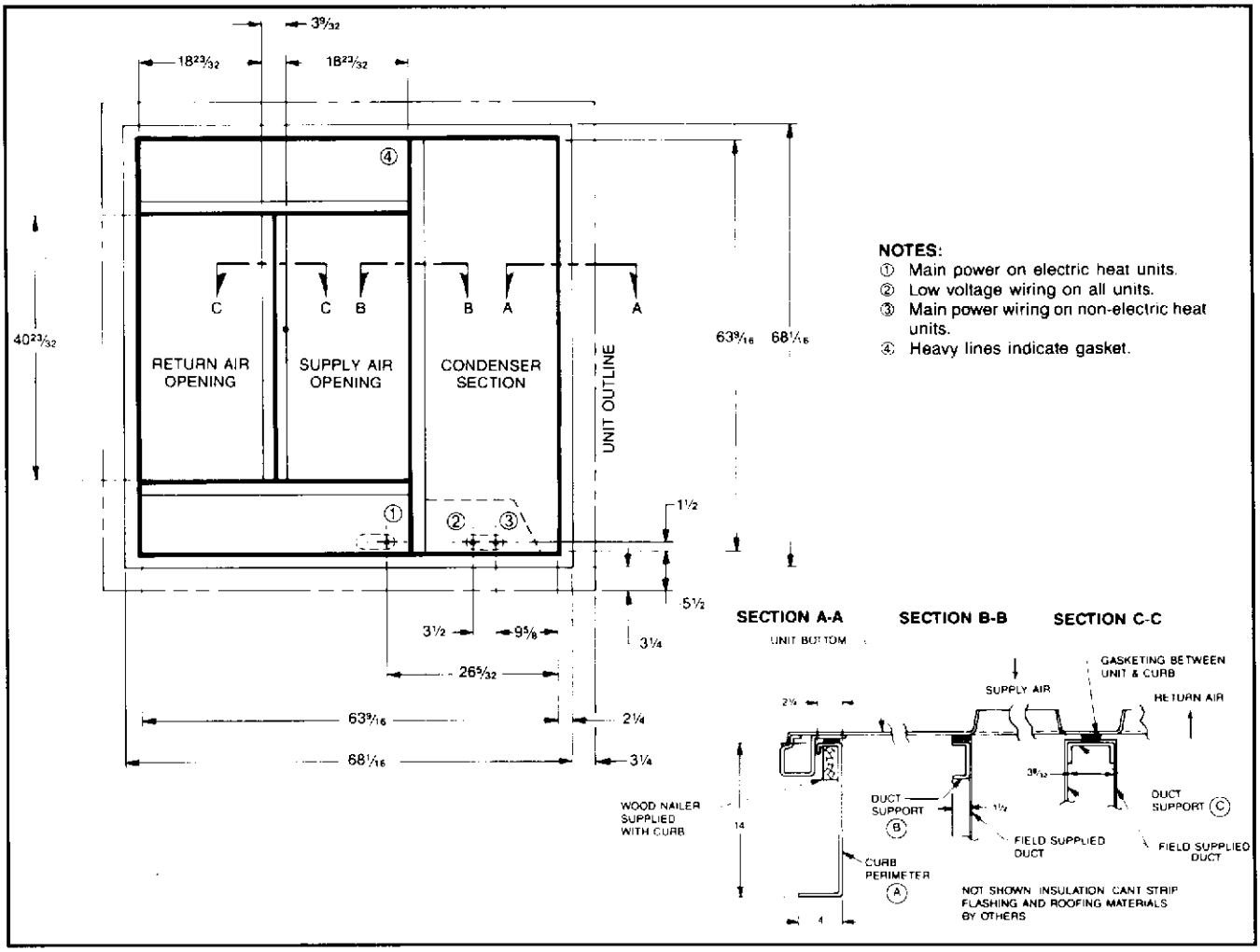


Figure 8. Full Perimeter Curb



INSTALLATION

1. Place assembled curb in proper location over roof opening. Check for squareness and adjust if required.
2. Curb must be installed level. One method to achieve a level installation is to stretch two diagonal lines across curb and equip them with line levels. There must not be more than 1/8" spacing between the two lines at the point of intersection. Should the lines touch at the intersection, recheck by placing the bottom line on top. Shim curb as required to bring it within the specified tolerance.
3. Attach the squared and leveled curb to the roof structure following industry accepted practice.
4. Install insulation, cant strips, roofing materials, flashing and counterflashing in accordance with the established guidelines of the National Roofing Contractors Association. The finished roof, including counterflashing around the curb, must be installed prior to setting the unit on the curb.

VERTICAL DISCHARGE DUCT CONNECTIONS

NOTE: The unit and curb accessories have been designed to allow duct installation before unit placement. Duct installation after unit placement is possible but not recommended.

NOTE: Ducts must never be fastened to bottom of unit so that the base pan is penetrated. Flexible duct connectors in the ducts near the unit are recommended. Support all ducts by securing to building structure. Weatherproof all external ductwork, joints and roof openings with flashing and mastic in accordance with applicable codes. Ducts in unconditioned spaces must be insulated and covered with a vapor barrier.

DUCT INSTALLATION BEFORE UNIT PLACEMENT

Ductwork may be installed prior to unit placement by using a duct connection frame. Two duct connection frame systems fit into the three possible curb configurations as shown in Figures 8, 9 and 10.

The frame to be used with full perimeter curbs is included with the curbs. It must be assembled and attached to the curb as shown in Figures 7 and 8.

The frame to be used with either configuration of the cantilever curb comes as an accessory (554208A-02). It must be assembled as shown in Figure 5 and then set into the curb as shown in Figure 9 or 10. Fastening the frame to the curb is not necessary.

Figure 9. Cantilever Curb and Duct Connection Frame Kit (Condenser Section Overhang)

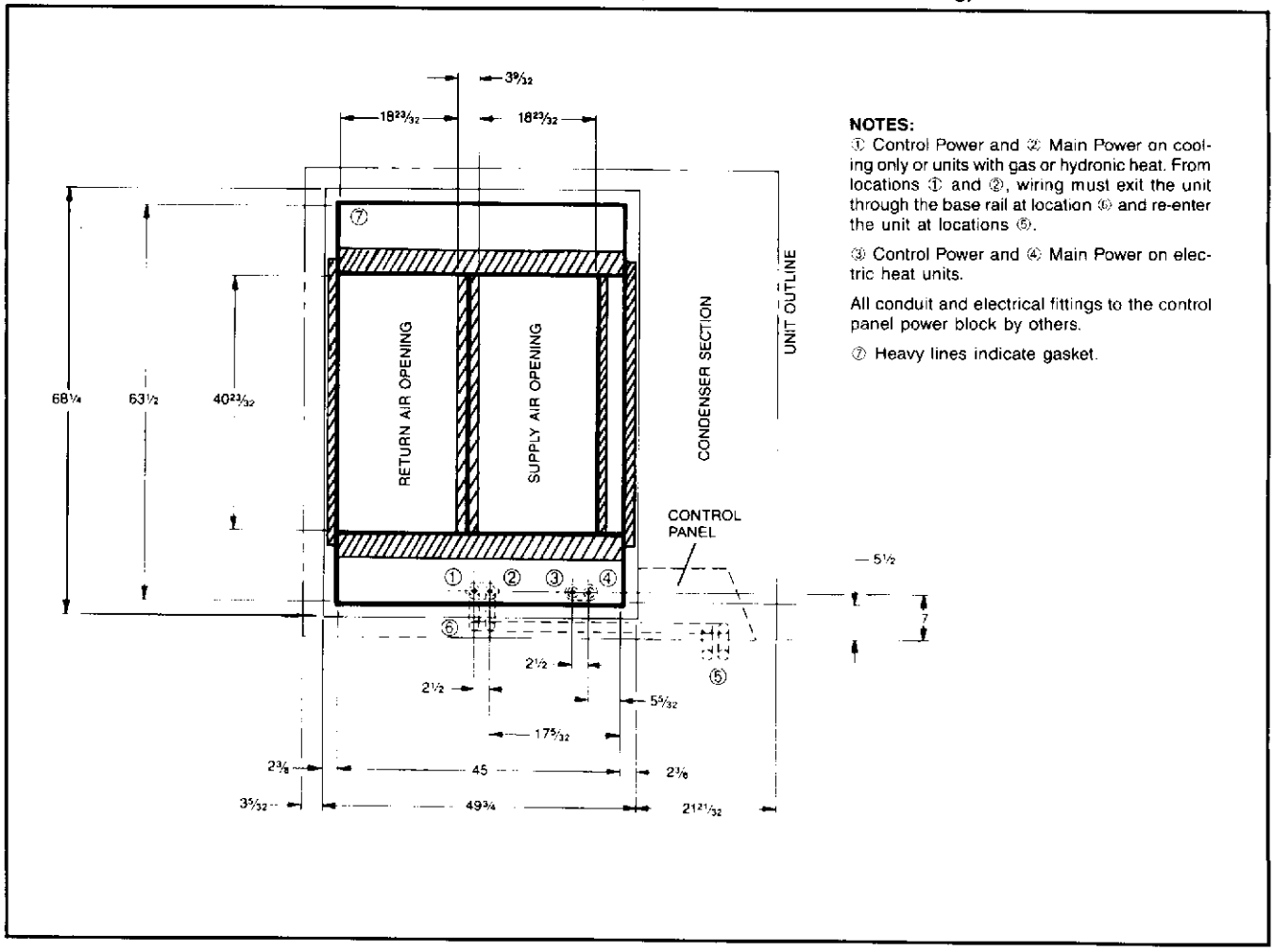
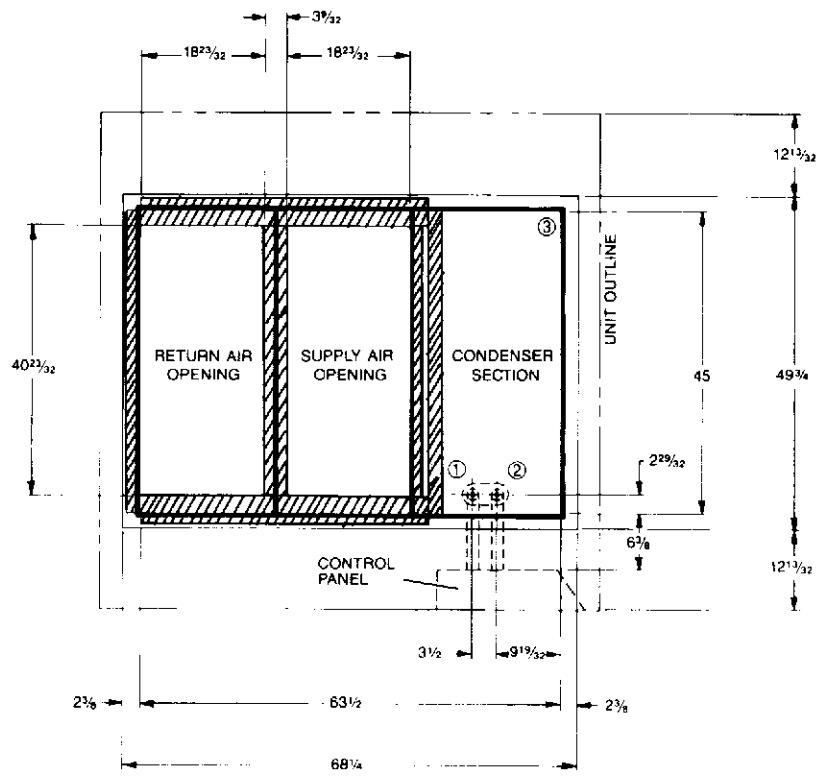


Figure 10. Cantilever Curb and Duct Connection Frame Kit (Side Overhang)



NOTES:
① Low voltage wiring on non-hydronic units.
② Main power wiring on cooling only and gas heat units.
③ Heavy lines indicate gasket.

DUCT INSTALLATION

After the duct connection system has been assembled and installed, the ductwork may be set in place. To make the connection, prepare the duct with a 1½″ flange as shown in Figures 11 and 12. Then simply place the section into position on the connection frame. Riveting or bolting is not necessary and is not recommended.

Both duct connection systems include gasketing which must be applied to the connection frame and duct flanges after duct installation. Gasket must be installed over the duct flanges so that an airtight seal is made between the unit and the ductwork after the unit is placed on the curb.

Full Perimeter Curb: All gasketing must be field installed on the full perimeter curbs as shown in Figure 8. After duct sections have been installed, gasketing supplied with the curb accessory should be applied over the duct flanges, exposed connection frame, and curb perimeter.

Cantilever Curb: Gasket is factory installed on perimeter of curb. After duct connection frame and duct sections have been set on curb, gasketing supplied with connection frame accessory should be applied over duct flanges and exposed frame as shown in Figures 9 and 10.

Figure 11. Duct Placement (Full Perimeter Curb)

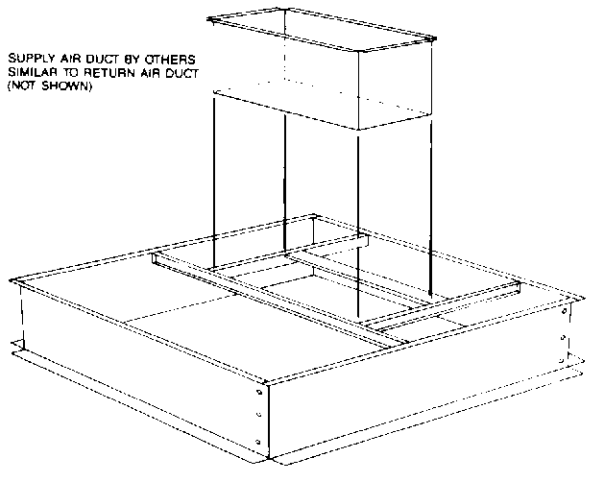
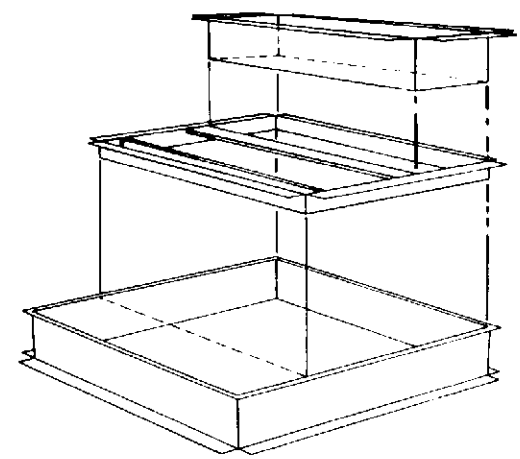


Figure 12. Duct Placement (Cantilever Curb)



SIDE OVERHANG POSITION SHOWN

DUCT INSTALLATION AFTER UNIT PLACEMENT

Duct installation after unit placement is not recommended. If ductwork must be installed after the unit is placed on the curb, one of the duct connection frame systems should still be used. Apply gasketing to the curb and duct connection frames before unit placement as shown in Figures 8, 9 and 10. (Gasket is factory installed on cantilever curb perimeter.) The duct sections should be fastened to the vertical flanges of the connection frame and curb and sealed as required. Ducts must never be fastened to the bottom of the unit so that the base pan is penetrated.

HANDLING & RIGGING

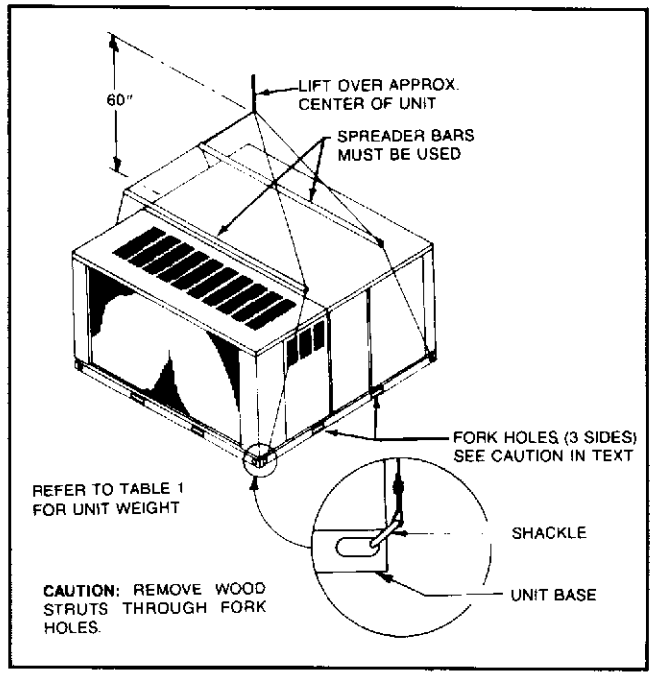
GENERAL HANDLING

1. To assist in determining rigging requirements, unit weights are shown in Table 1.
2. Provisions for forks have been included in the unit base frame on three sides. If unit is moved by forklift, no other fork locations are approved.
   CAUTION: If units are to be lifted two at a time, the fork holes on the condenser end of the unit MUST NOT be used. Minimum fork length required is 42″ to prevent damage to unit; 48″ is recommended.
3. Do not stand or walk on unit.
4. Do not drill holes anywhere in panels or in base frame of unit.
5. Unit access panels provide structural support. Do not remove any access panels until unit has been installed on roof curb or field supplied structure.
6. Do not roll unit across finished roof without prior approval of owner or architect. Do not skid or slide on any surface as this may damage unit base.
7. The unit must be stored on a flat, level surface.
8. Protect the condenser coil because it is easily damaged.

RIGGING DETAILS

1. Units must be lifted by the four lifting holes located at the base frame corners.
2. Lifting cables should be attached to the unit with shackles as shown in Figure 13.
3. The distance between the crane hook and the top of the unit must not be less than 60″.
4. Two spreader bars must span over the unit to prevent damage to the cabinet by the lift cables. Spreader bars must be of sufficient length so that cables do not come in contact with the unit during transport.
5. Remove wood struts mounted beneath unit base frame before setting unit on roof curb. These struts are intended to protect unit base frame from forklift damage. Removal is accomplished by extracting the sheetmetal retainers and pulling the struts through the base of the unit. Refer to rigging label on the unit. **DO NOT FORK LIFT UNIT AFTER WOOD STRUTS HAVE BEEN REMOVED; SEVERE DAMAGE WILL OCCUR TO BOTTOM OF UNIT.**

Figure 13. Rigging



UNIT INSTALLATION ON ROOF CURB

UNIT LOCATION

NOTE: Units may look identical but can have significant internal differences. Check specific unit location carefully (referring to plans if necessary) prior to setting unit.

CURB INSTALLATION

Proper unit installation requires that the roof curb be firmly and permanently attached to the roof structure. Check for adequate fastening method prior to setting unit on curb. Insure that top of duct connection frame is flush with top of roof curb. Refer to the "Roof Curb Assembly & Installation" section of this manual.

GASKET

Check top of curb, duct connection frame and duct flanges to make sure gasket has been applied properly. Gasket should be firmly applied to top of the curb perimeter, duct flanges and any exposed duct connection frame. If gasket is loose, re-apply using strong weather resistant adhesive.

PROTRUSIONS

Inspect curb to insure that none of the utility services (electric, steam, hot water) routed through the curb protrude above the curb. DO NOT ATTEMPT TO SET UNIT ON CURB IF PROTRUSIONS EXIST.

UNIT INSTALLATION

Lower unit carefully onto roof curb. While rigging unit, center of gravity may cause condenser end to be slightly lower than supply/return air end. Bring condenser end of unit into alignment with the curb. With condenser end of unit resting on curb member and using curb as a fulcrum, lower opposite end of unit until entire unit is seated on curb. When a rectangular cantilever curb is used, care should be taken to center the unit. Check for proper alignment and orientation of supply and return openings with duct. Refer to the "Roof Curb Assembly & Installation" section of this manual.

RIGGING REMOVAL

Remove spreader bars, lifting cables and other rigging equipment. **CAUTION:** Do not allow crane hooks and spreader bars to rest on roof of unit.

HORIZONTAL DISCHARGE DUCT CONNECTIONS

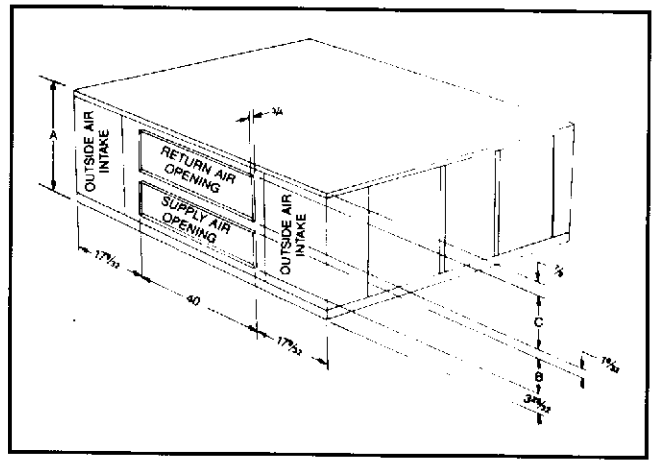
A ¾" duct flange is provided for making duct connections on units with the optional factory installed horizontal discharge configuration. Refer to Figure 14. Units not equipped with an economizer may be converted from vertical to horizontal discharge in the field by using accessory number 554214AG01 (CUR075 through 085) or 554214AG02 (CUR110 through 150).

NOTE: Flexible duct connectors between the unit and ducts are recommended. Insulate and weatherproof all external ductwork and joints as required and in accordance with local codes.

Table 3. Horizontal Duct Connection Dimensions

UNIT SIZE CUR	A HEIGHT	B SUPPLY AIR	C RETURN AIR
075, 085	36	12½	17 9/16
110, 125, 150	52	20¼	25 13/16

Figure 14. Horizontal Discharge Duct Connections



0 — 100% ECONOMIZER AIR INTAKE HOOD (RAINHOOD)

Units equipped with a factory installed 0 to 100% economizer utilize a three-piece rainhood which is shipped inside the econmoizer compartment. Check for correct accessory and install the rainhood per the following instructions.

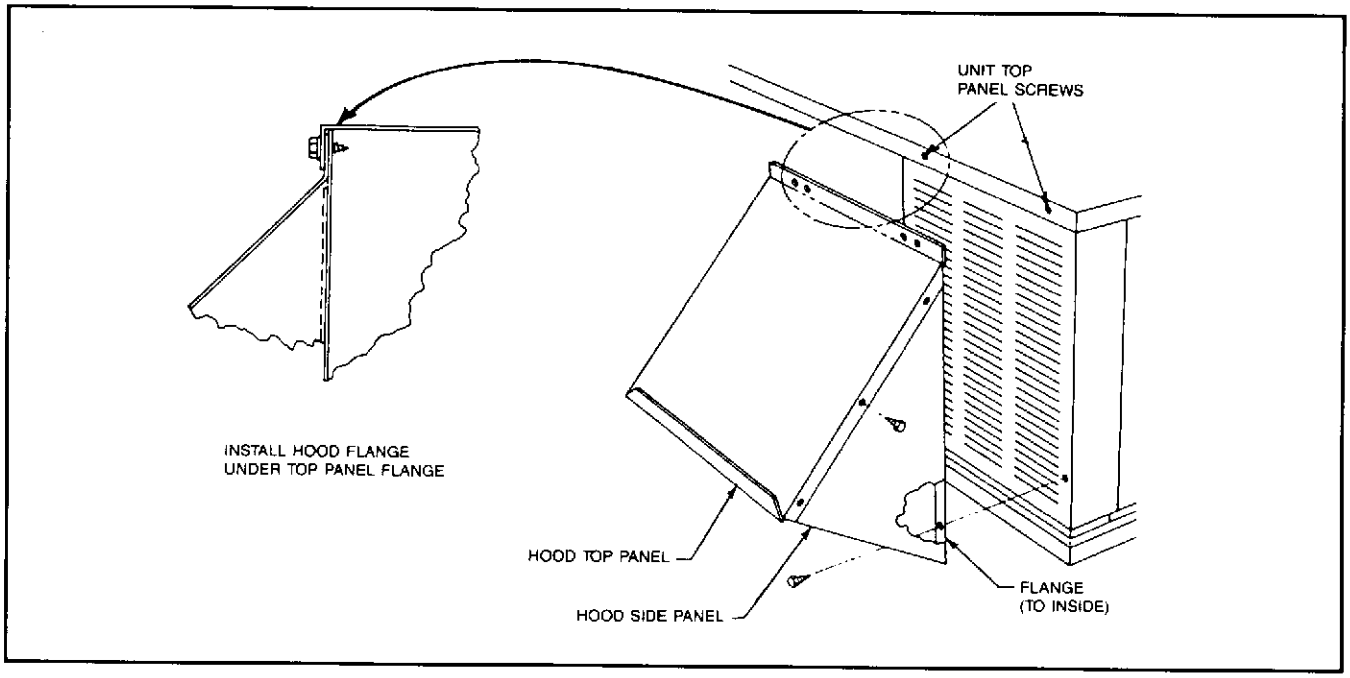
Accessory #554600AG01:For use with CUR075G—085G
Accessory #554600AG02: For use with CUR110G—150G

HOOD INSTALLATION

CAUTION: Sheet metal parts, screws, clips and similar items inherently have sharp edges, and it is necessary that the installer exercise caution.

1. Assemble hood side panels to hood top panel with sheet metal screws. Position side panel flanges to the inside. Refer to Figure 15.
2. Remove two screws from the unit top panel flange.
3. Insert hood top panel flange behind the unit top panel flange and replace two screws. Refer to inset in Figure 15.
4. Fasten bottom of hood side panels to unit with two screws.
5. Repeat steps 1 through 4 for second hood.

Figure 15. Hood Installation



ELECTRICAL INSTALLATION

GENERAL INSTRUCTIONS

1. The main power supply wiring to the unit and low voltage wiring to accessory controls must be done in accordance with these instructions, the latest edition of the National Electrical Code (ANSI/NFPA 70), and all local codes and ordinances. All field wiring shall conform with the temperature limitations for Type T wire (63°F/35°C rise).
2. Main power and low voltage wiring may enter the unit through the side or, with some models and curb configurations, through the roof curb and base frame. Refer to Figures 17 and 18 for external electrical entrance locations. Refer to Table 4 and Figures 8, 9, 10 and 16 for through-the-curb electrical entrance locations. Install conduit connectors at the desired entrance locations. External connectors must be weatherproof. All holes in unit base must be sealed (including around conduit nuts) to prevent water leakage into building. All required conduit and fittings must be supplied by others.
3. It is recommended that an independent 115V power source be brought to the vicinity of the rooftop unit for portable lights and tools used by the service mechanic.

WARNING: Do not tamper with factory wiring. The internal power and control wiring of these units is factory installed and each unit is thoroughly tested prior to shipment. Contact your local representative or the factory if assistance is required.

Figure 16. Through-the-curb Electrical Entrance Locations

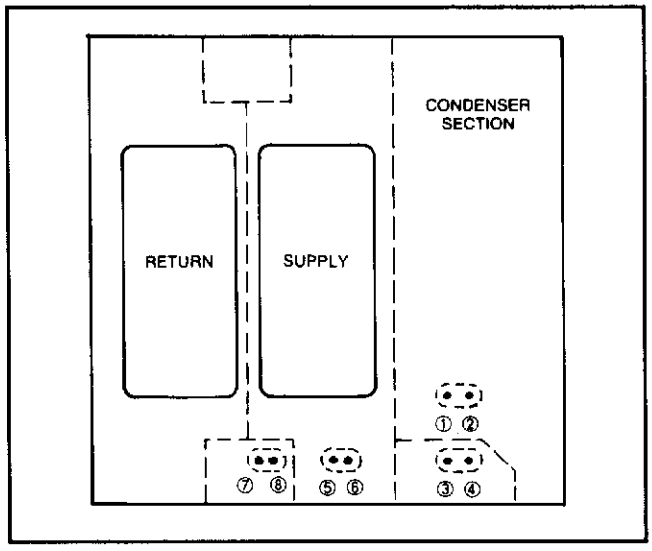


Table 4. Through-the-curb Electrical Entrance Locations (Refer to Figure 16)

MODEL TYPE	CURB CONFIGURATION					
	FULL PERIMETER		CONDENSER OVERHANG		SIDE ENTRANCE	
	POWER	LOW VOLTAGE	POWER	LOW VOLTAGE	POWER	LOW VOLTAGE
COOLING ONLY	4	3	8	7	2	1
GAS HEAT	4	3	8	7	2	1
ELECTRIC HEAT	6	3	5, 6	7	N/A	1
HYDRONIC	4	3	8	7	2	1

NOTES:

1. Protect wiring from sharp edges. Follow National Electrical Code and all local codes and ordinances. Do not route wires through removable access panels.
2. Locations 7* and 8* require wiring to exit unit through the base rail and then re-enter unit at the external electrical entrance locations shown in Figures 17 and 18. Refer also to Figure 9.
3. Locations 1 and 2 require wiring to be routed through back of main control box. Refer to Figure 10. **CAUTION:** Conduit and fittings must be weathertight to prevent water entry into the building.
4. Knockouts are provided at locations 3, 4, 5 and 6.
5. If an external field supplied disconnect is used, the power wiring will route as follows:
   a. POWER ENTRY LOCATION OTHER THAN 8: Exit unit via side location shown in Figures 17 and 18. Then enter disconnect box, connect to the disconnect, and leave the disconnect box. And then enter the unit again at the side location shown in Figures 17 and 18.
   b. POWER ENTRY AT LOCATION 8*: Exit the unit via base rail as shown in Figure 9. Then enter the disconnect box, connect to the disconnect, and leave the disconnect box. And then enter the unit again at the side location shown in Figure 18.

**It may be easier to penetrate the roof outside the curb rather than use Locations 7 and 8.*

Figure 17. External Electrical Entrance Locations (Electric Heat Units)

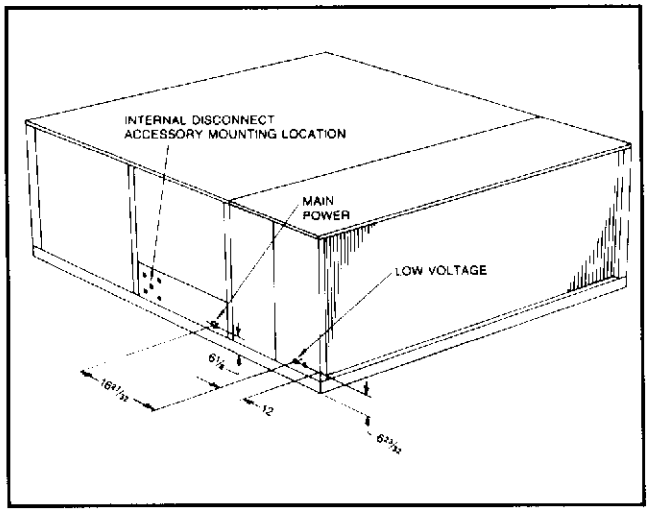
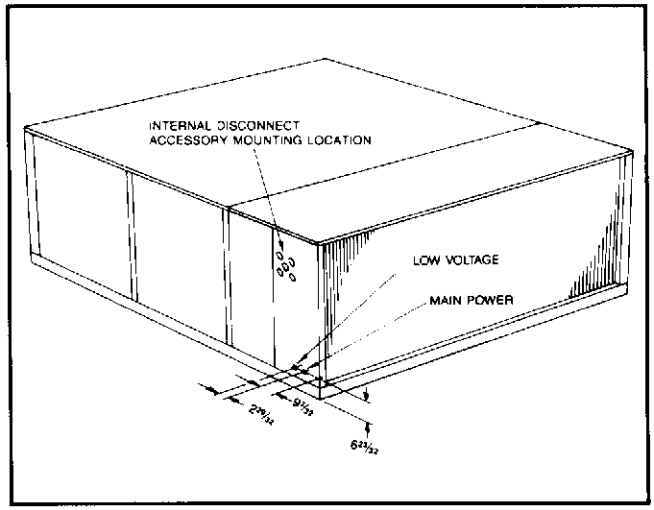


Figure 18. External Electrical Entrance Locations (Non-electric Heat Units)



MAIN POWER WIRING

1. The main power supply for the CUR075 thru 150 rooftop units shall be three phase, three wire. The unit is factory wired for the voltage shown on the unit dataplate.
   NOTE: If supply voltage is 208V, lead on primary of transformer T1 must be moved from the 230V to the 208V tap.
2. Main power wiring should be sized for the minimum wire ampacity shown on the unit dataplate. Size wires in accordance with the ampacity tables in Article 310 of the National Electrical Code. If long wires are required, it may be necessary to increase the wire size to prevent excessive voltage drop. Wires should be sized for a maximum of 3% voltage drop.
   CAUTION: Use copper conductors only.
3. A weathertight disconnect switch, properly sized for the unit total load, must be field installed. A non-fused internal disconnect accessory is available which fits into the units at the locations shown in Figures 17 and 18. Knockouts for mounting disconnect are provided in the exterior panels. Refer to instructions packaged with disconnect accessory (Bulletin No. IM 465) for installation procedure. An external, field supplied disconnet may be mounted on the same fixed exterior panel shown in Figures 17 and 18.
   NOTE: Do not cover dataplate with field supplied disconnect switch.
3. Accessory disconnect switches are not fused. The power leads must be protected at the point of distribution in accordance with the unit dataplate.
5. All units must be electrically grounded in accordance with local codes or, in the absense of local codes, with the latest edition of the National Electrical Code (ANSI/NFPA 70). A ground lug is provided for this purpose. Size grounding conductor in accordance with Table 250-95 of the National Electrical Code. DO NOT use the ground lug for connecting a neutral conductor.
6. Power wiring should be connected to the main power terminal block. This terminal block is located within the main control box on units without electric heat (PB1) and within the electrical heat control box on units with electric heat (PB3).
7. Supply voltage to rooftop unit must not vary by more than 10% of the value indicated on the unit dataplate. Phase voltage unbalance must not exceed 2%. Contact local power company for correction of improper voltage or phase unbalance.

WARNING: *Failure of unit due to operation on improper line voltage or with excessive phase unbalance constitutes product abuse and may cause severe damage to the unit electrical components.*

LOW VOLTAGE CONTROL WIRING

SPACE THERMOSTAT

1. A 24V thermostat must be field installed. It may be purchased with the unit or field supplied. All cooling and heating systems available in Models CUR075 thru 150 are 2-stage. (Controls and valves are field supplied in hydronic or steam heat units.) Thermostats may be programmable or electromechanical as required.
2. Locate thermostat or remote sensor in the conditioned space where it will sense average temperature. Do not locate the device where it may be directly exposed to supply air, sunlight or other sources of heat. Follow installation instructions packaged with the thermostat.
3. Use #18 AWG wire for 24V control wiring runs not exceeding 75 feet. Use #16 AWG wire for 24V control wiring runs not exceeding 125 feet. Use #14 AWG wire for 24V control wiring runs not exceeding 200 feet. Low voltage wiring may be National Electrical Code (NEC) Class 2 where permitted by local codes.
4. Route thermostat wires from subbase terminals to the unit. Control wiring should enter through the unit base frame as shown in Figure 16 or through the fixed side panel as shown in Figures 17 and 18. Connect thermostat and any accessory wiring to low voltage terminal block TB1 in the main control box as shown in Figures 19, 20, 21 and 22.
   NOTE: Field supplied conduit may need to be installed depending on unit/curb configuration. **NOTE:** Use 18 gauge solid conductor wire whenever connecting thermostat wires to terminals on subbase. DO NOT use larger than 18 gauge wire. A transition to 18 gauge wire may be required before entering thermostat subbase.

NIGHT SETBACK THERMOSTAT & TIMECLOCK (OPTIONAL)

1. If a programmable type thermostat is not used, start/stop operation may be controlled with a field installed timeclock either purchased with the unit or field supplied. A night setback thermostat may also be incorporated for reduced space temperature control during unoccupied periods. Refer to Figures 21 and 22.
2. Timeclock and night setback field wiring may be routed to the rooftop unit with the thermostat wiring.
3. Timeclocks require a separate continuous power supply for operation of the timer motor. The timeclock accessory available from SnyderGeneral (711956B-01) requires a 120V/60Hz power supply.
4. Thermostats to be used for night setback may be purchased with the unit. If provided locally, they should be Honeywell Model T8034 or equal. Follow installation instructions provided with the thermostat.

REMOTE STATUS PANEL (OPTIONAL)

1. Remote status panel accessories are available for use with the rooftop unit and require field installation and wiring. (Optional unit mounted status monitor module must be provided for remote status indication.) Panels may be equipped with or without switches and are field convertible to 4- or 6-light indication. Follow installation instructions furnished with the status panel.
2. Indication only (non-switching) status panel must be used with a thermostat subbase with system switches.
3. Wiring between unit, thermostat and status panel may be 24V NEC Class 2 where permitted by local codes. Use #18 AWG wire for 24V control wiring runs not exceeding 75 feet. Use #16 AWG wire for 24V control wiring runs not exceeding 125 feet.

SPECIAL VENTILATION (OPTIONAL)

1. If special ventilation accessory relay is to be used with the unit, a field supplied device with a set of normally open contacts must be field installed as shown in Figures 19, 20, 21 and 22.
2. Wiring to field supplied special ventilation device may have to be 24V NEC Class 1. Specific application must be installed in accordance with the National Electrical Code and all local codes and ordinances.

ECONOMIZER & 2-POSITION MOTOR OPTION

CUR rooftop units may be equipped with an economizer or 2-position motorized damper option. When these motorized damper controls are used in conjunction with a timeclock (external or within programmable thermostat), a normally open (unoccupied) set of timeclock contacts may be wired between unit terminals R (or A2) and D as shown in Figures 19, 20, 21 and 22. This configuration will cause the spring-return damper motor to close completely during the unoccupied period.

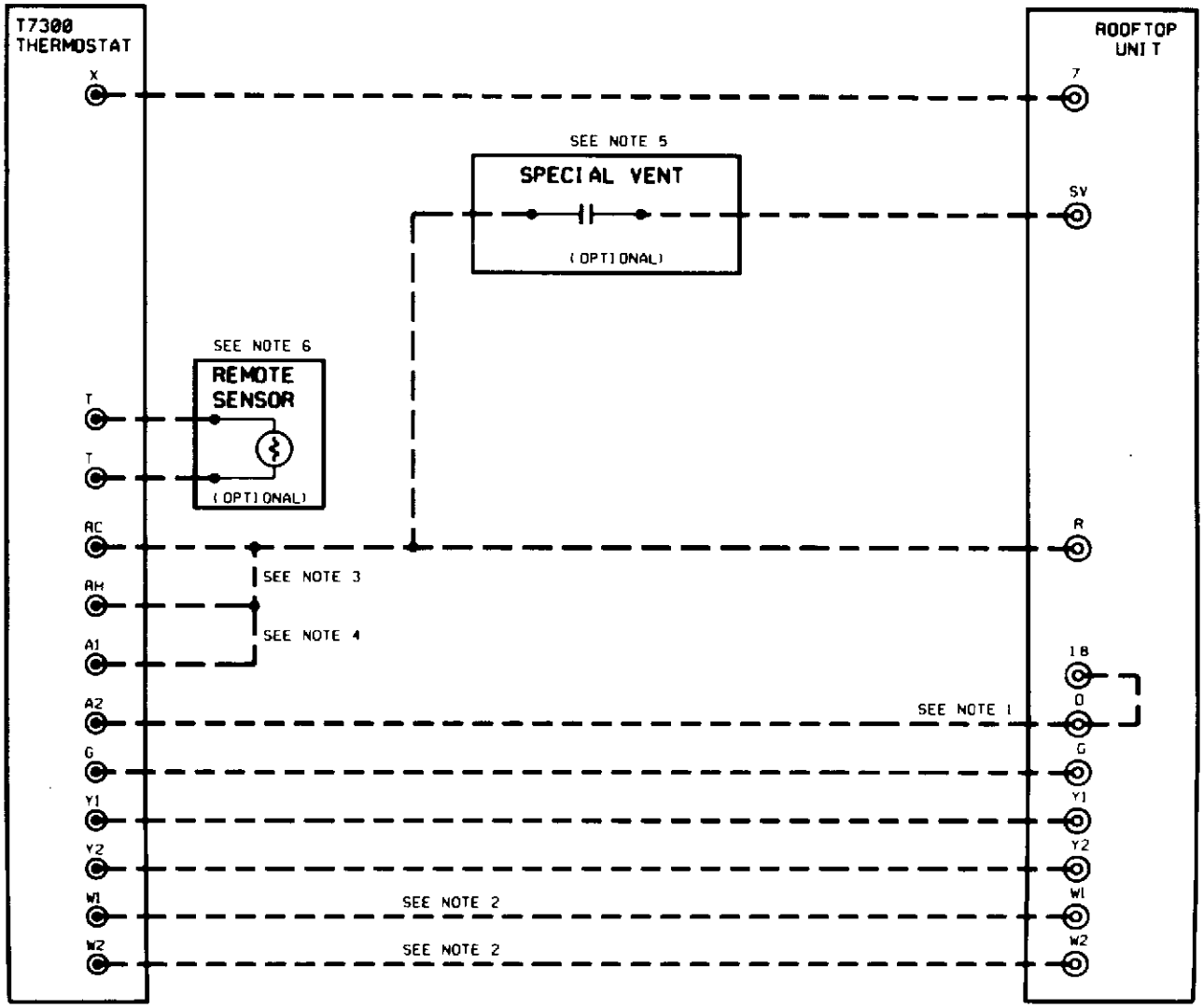
If a timeclock is not used (or if it is used and fan switch is set to AUTO), unit terminals D and 18 should be jumped together as shown in Figures 19, 20, 21 and 22. This configuration will cause the spring-return motor to close completely whenever the fan is off.

HOT WATER & STEAM HEAT OPTION

Factory installed or accessory hot water or steam coils are available for use with the unit. The valve and all controls required to operate it and the fan must be field supplied. One method of controlling the fan is shown in Figure 23.

Figure 19. CUR075G Thru 150G (Cooling Only, Gas Heat, Electric Heat)

THERMOSTAT: T7300B 2 Heat/2 Cool (P/N 0049024906)
SUBBASE: Q7300B With Switches (P/N 0049024904)
REMOTE SENSOR: T7047C (P/N 0065496401)



NOTES:

1. If unit is equipped with economizer or motorized outside air damper (2-position), unit terminal "D" should be connected to either unit terminal "18" or thermostat terminal "A2" as shown.
   a. If "D" is connected to "18", the economizer damper motor or 2-position motor will be enabled with the supply fan.
   b. If "D" is connected to thermostat terminal "A2", the economizer damper motor or 2-position motor will be enabled in the "occupied" mode.
   c. If unit is not equipped with an economizer or 2-position motor, neither connection is required.
2. Connections between unit terminals "W1" and "W2" and the corresponding thermostat terminals "W1" and "W2" are not required on cooling only units. "W2" to "W2" is not required on units with 10 KW electric heat.
3. Field supplied jumper required between RC-RH.
4. Field supplied jumper is required between "A1" and "RC-RH" terminals on units with an economizer or 2-position motorized outside air damper.
5. If unit is equipped with "Ventilation/Smoke Relay", a field supplied and installed normally open contact is required.
6. Remote sensor is an optional accessory.

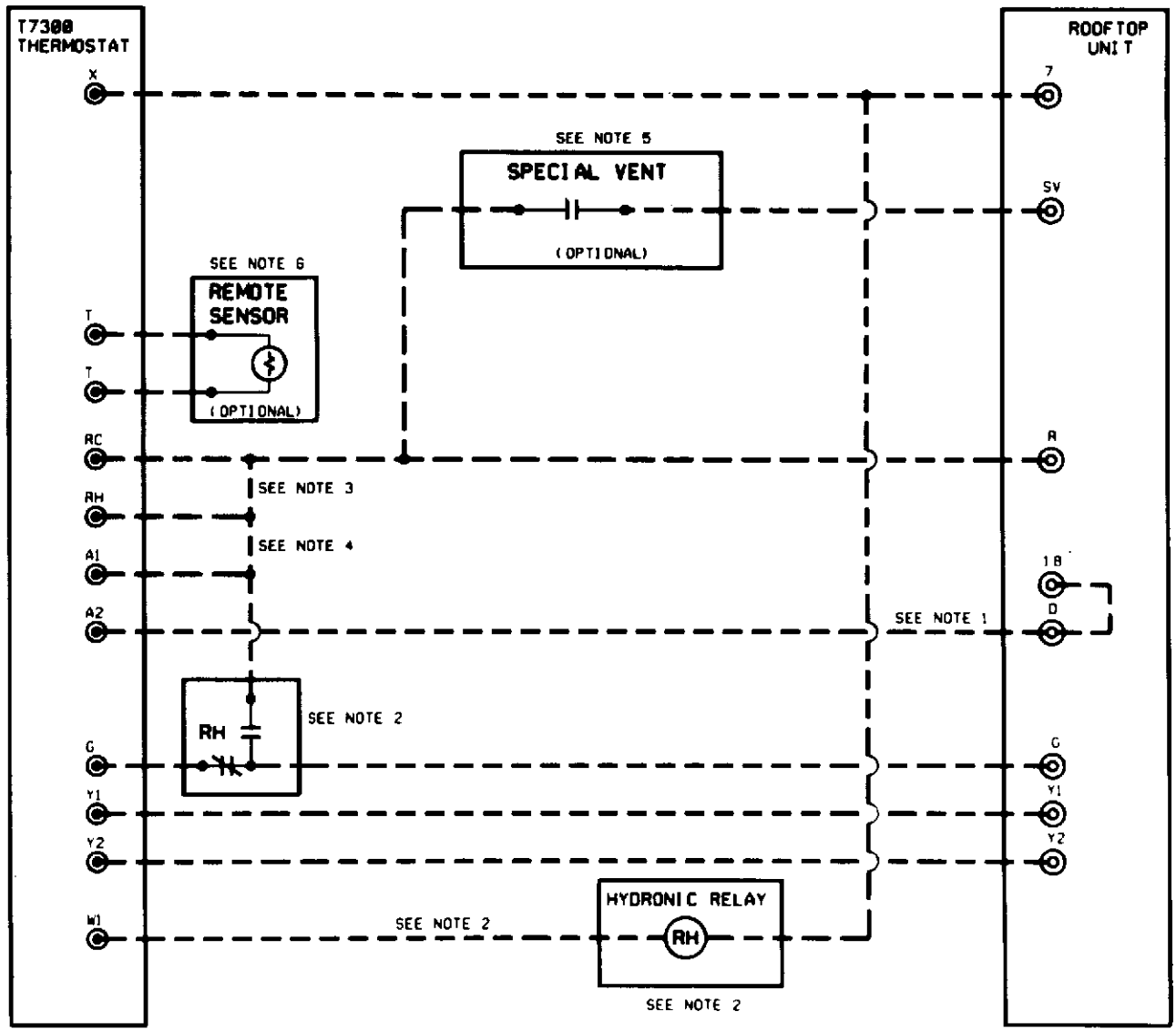
LEGEND

- ◎ FIELD WIRED TO TERMINAL
- ◉ FIELD WIRED TO DEVICE
- o TERMINAL CONNECTION
- • FIELD WIRING CONNECTION
- LIGHT
- FIELD WIRING

FOR OTHER THERMOSTAT/CONTROL WIRING DIAGRAMS, REFER TO E.D. 12003.

Figure 20. CUR075G Thru 150G (Hydronic Heat)

THERMOSTAT: T7300B 2 Heat/2 Cool (P/N 0049024906)
SUBBASE: Q7300B With Switches (P/N 0049024904)
REMOTE SENSOR: T7047C (P/N 0065496401)



LEGEND

- ◎ FIELD WIRED TO TERMINAL
- ⊛ FIELD WIRED TO DEVICE
- o TERMINAL CONNECTION
- • FIELD WIRING CONNECTION
- LIGHT
- FIELD WIRING

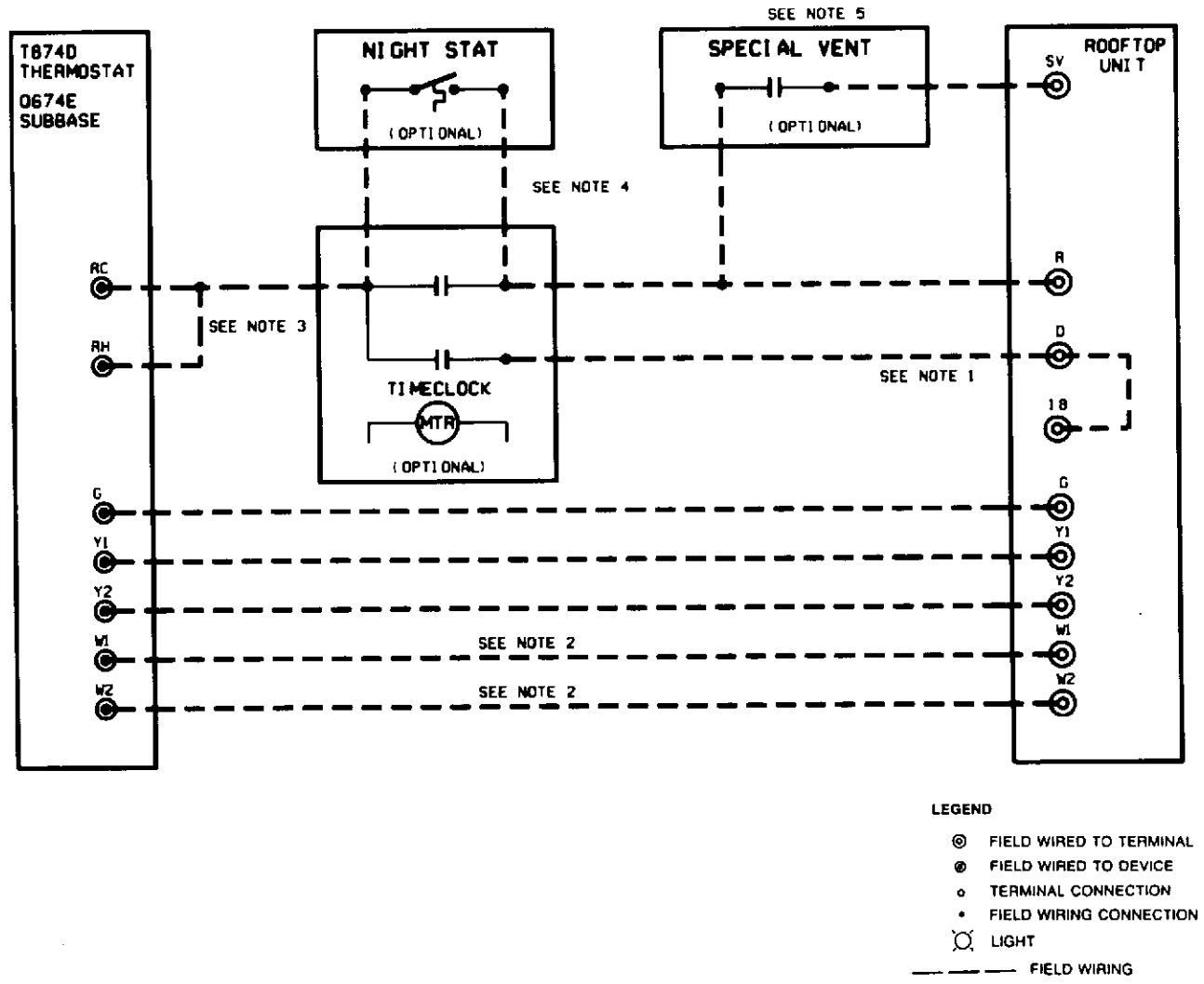
NOTES:

1. If unit is equipped with economizer or motorized outside air damper (2-position), unit terminal "D" should be connected to either unit terminal "18" or terminal "A2" as shown.
   a. If "D" is connected to "18", the economizer damper motor or 2-position motor will be enabled with the supply fan.
   b. If "D" is connected to thermostat terminal "A2", the economizer damper motor or 2-position motor will be enabled in the "occupied" mode.
   c. If unit is not equipped with an economizer or 2-position motor, neither connection is required.
2. Field supplied and installed hydronic heat relay is used to control hydronic heating coil valve (by others). Allow extra contact to energize heating coil valve.
3. Field supplied jumper required between RC-RH.
4. Field supplied jumper is required between "A1" and "RC-RH" terminals on units with an economizer or 2-position motorized outside air damper.
5. If unit is equipped with "Ventilation/Smoke Relay", a field supplied and installed normally open contact is required.
6. Remote sensor is an optional accessory. If remote sensor is used, DIP switch #5 on subbase must be switched to the "off" position.

FOR OTHER THERMOSTAT/CONTROL WIRING DIAGRAMS, REFER TO E.D. 12003.

Figure 21. CUR075G Thru 150G (Cooling Only, Gas Heat, Electric Heat)

THERMOSTAT: T874D 2 Heat/2 Cool (P/N 0065495805)
SUBBASE: Q674E With Switches (P/N 0065495802)



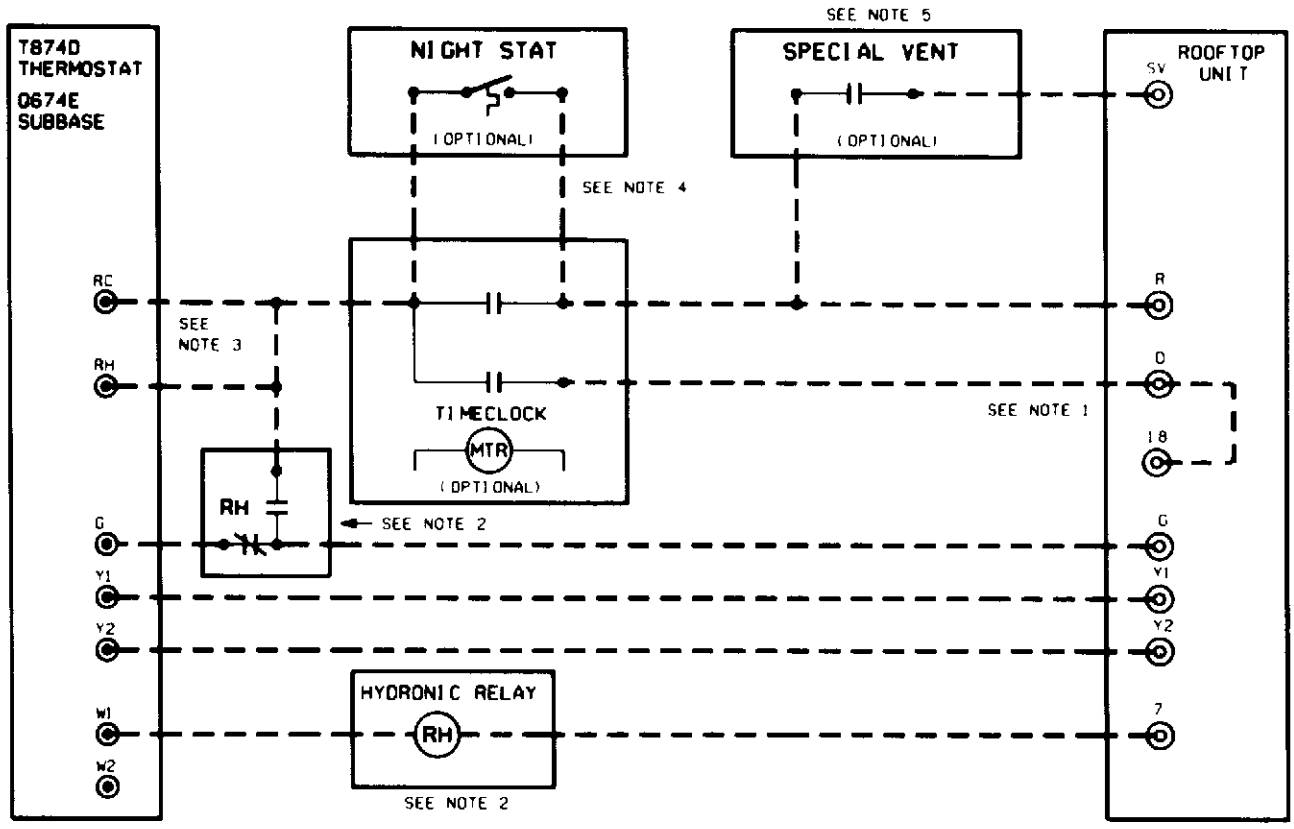
NOTES:

1. If unit is equipped with economizer or motorized outside air damper (2-position), unit terminal "D" should be connected to either unit terminal "18" or timeclock as shown.
   a. If "D" is connected to "18", the economizer damper motor or 2-position motor will be enabled with the supply fan.
   b. If "D" is connected to the timeclock, the economizer damper motor or 2-position motor will be enabled in the "occupied" mode.
   c. If unit is not equipped with an economizer or 2-position motor, neither connection is required.
2. Connections between unit terminals "W1" and "W2" and the corresponding thermostat terminals "W1" and "W2" are not required on cooling only units. "W2" to "W2" is not required on units with 10 KW electric heat.
3. Field supplied jumper required between RC-RH.
4. Timeclock and night thermostat are optional accessories.
5. If unit is equipped with "Ventilation/Smoke Relay", a field supplied and installed normally open contact is required.

FOR OTHER THERMOSTAT/CONTROL WIRING DIAGRAMS, REFER TO E.D. 12003.

Figure 22. CUR075G Thru 150G (Hydronic Heat)

THERMOSTAT: T874D 2 Heat/2 Cool (P/N 0065495805)
SUBBASE: Q674E With Switches (P/N 0065495802)



LEGEND

- ◎ FIELD WIRED TO TERMINAL
- ◍ FIELD WIRED TO DEVICE
- o TERMINAL CONNECTION
- • FIELD WIRING CONNECTION
- ☼ LIGHT
- —— FIELD WIRING

NOTES:

1. If unit is equipped with economizer or motorized outside air damper (2-position), unit terminal "D" should be connected to either unit terminal "18" or timeclock as shown.
   a. If "D" is connected to "18", the economizer damper motor or 2-position motor will be enabled with the supply fan.
   b. If "D" is connected to the timeclock, the economizer damper motor or 2-position motor will be enabled in the "occupied" mode.
   c. If unit is not equipped with an economizer or 2-position motor, neither connection is required.
2. Field supplied and installed hydronic heat relay is used to control hydronic heating coil valve (by others). Allow extra contact to energize heating coil valve.
3. Field supplied jumper required between RC-RH.
4. Timeclock and night thermostat are optional accessories.
5. If unit is equipped with "Ventilation/Smoke Relay", a field supplied and installed normally open contact is required.

FOR OTHER THERMOSTAT/CONTROL WIRING DIAGRAMS, REFER TO E.D. 12003.

GAS SUPPLY PIPING

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to the User's Information Manual provided with this furnace. For assistance or additional information, consult a qualified installer, service agency or the gas supplier.

LOCATION AND INSTALLATION

1. The gas supply piping location and installation on the rooftop unit must be in accordance with local codes or, in the absence of locals codes, with ordinances of the latest edition of the National Fuel Gas Code (ANSI Z223.1).

   A manual gas shutoff valve must be field installed external to the rooftop unit. In addition, a drip leg must be installed near the inlet connection. A ground joint union connection is required between the external shutoff valve and the unit connection to the gas valve to permit removal of the burner assembly for servicing. Union should be located near gas valve as shown in Figure 23. Route gas piping to unit so that it does not interfere with the removal of access panels. Piping must be supported and aligned to prevent strains or misalignment of the manifold assembly. Refer to Figure 23.

⚠ WARNING

ALIGNMENT OF BURNERS WITH FURNACE TUBES IS CRITICAL FOR GOOD COMBUSTION.

RIGIDLY SUPPORT AND ALIGN PIPING SUCH THAT IT DOES NOT DISPLACE OR TURN MANIFOLD OR CONTROL VALVE WHEN MAKING CONNECTION.

2. All units are furnished with standard female NPT pipe connections. Connection pipe sizes for CUR075 thru 150 units is ½" NPT on 105 and 140 MBH furnaces and ¾" NPT on 210, 245 and 280 MBH furnaces.

   The size of the gas supply piping to the unit must be based on length of run, number of units on the system, gas characteristics, BTU requirement and available supply pressure. All piping must be done in accordance with local codes or, in the absence of local codes, with the latest edition of the National Fuel Gas Code (ANSI Z223.1).

   NOTE: The gas connection size at the unit does NOT establish the size of the supply line.

3. **CAUTION:** These units are designed for either natural or LP gas and are specifically constructed at the factory for only one of these fuels. The fuels are NOT interchangeable. However, the furnace can be converted in the field from one fuel to the other with the appropriate factory kit. Only a qualified contractor, experienced with natural and propane gas systems, should attempt conversion. Kit instructions must be followed closely to assure safe and reliable unit operation.

4. With all units on a common line operating under full fire, natural gas main supply pressure should be adjusted to approximately 7.0" W.C., measured at the unit gas valve. If the gas pressure at the unit is greater than 10.5" W.C., the contractor must furnish and install an external type, positive shutoff service pressure regulator. The unit will not function satisfactorily if supply gas pressure is less than 5.5" W.C. or greater than 10.5" W.C.

   NOTE: A minimum horizontal distance of 48" between the regulator and the furnace flue discharge is required.

5. With all units on a common line operating under full fire, LP gas main supply pressure should be at least 11.0" W.C. and must be no greater than 13.0" W.C., measured at the unit gas valve. Unit will not function satisfactorily if supply gas pressure is less than 11.0" W.C. or greater than 13.0" W.C.

6. All pipe connections should be sealed with a pipe thread compound which is resistant to the fuel used with the furnace. A soapy water solution should be used to check all joints for leaks.

   A ⅛" NPT plugged tap is located on the entering side of the gas valve for test gauge connection to measure supply (main) gas pressure. Another ⅛" tap is provided on the side of the manifold for checking manifold pressure.

   CAUTION: The furnace and its individual shutoff valve must be DISCONNECTED from the gas supply system during any pressure testing of that system at test pressures in excess of ½ psig (13.8" W.C.)

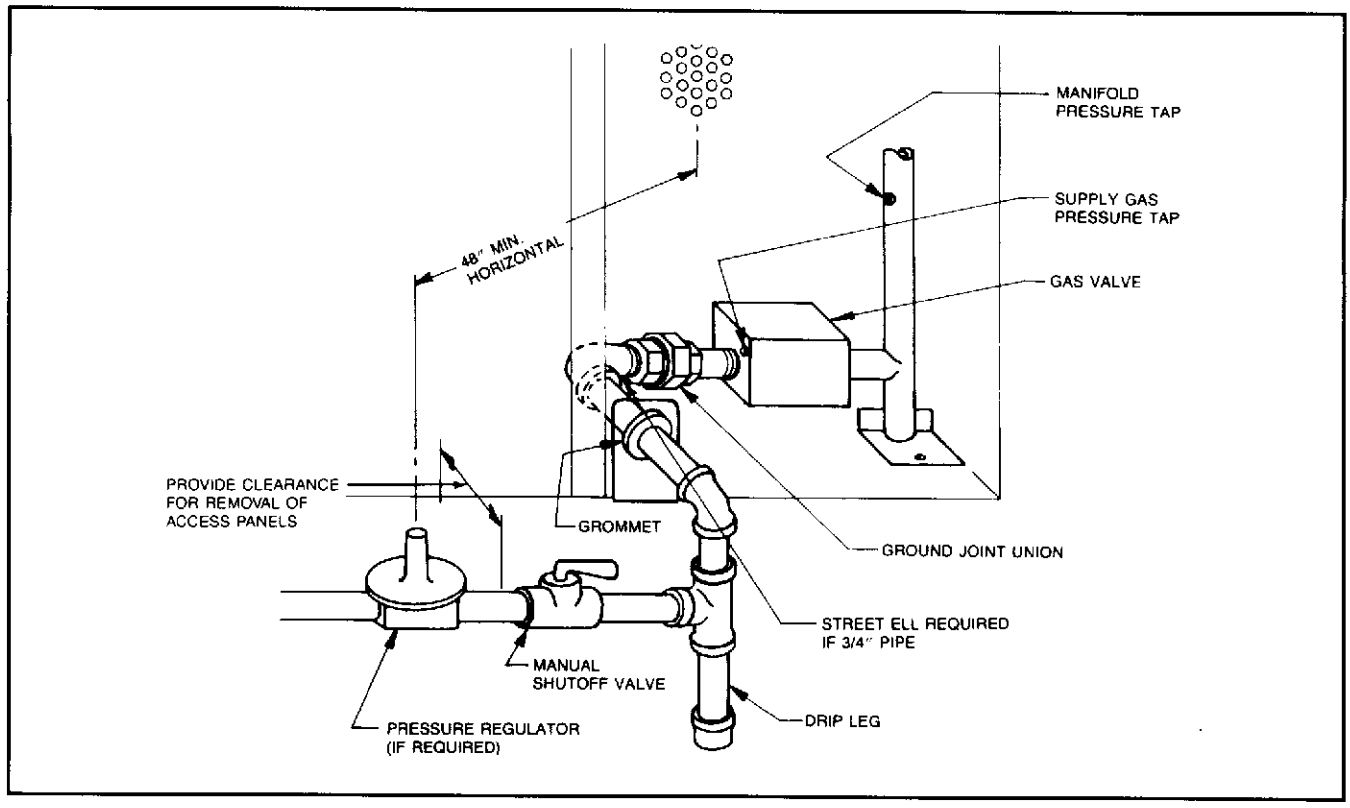
   CAUTION: The furnace must be ISOLATED from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing equal to or less than ½ psig.

7. There must be no obstruction to prevent the flow of combustion and ventilating air. A vent stack is not required and must never be used. The power ventor will supply an adequate amount of combustion air as long as the air passageways are kept free of any obstructions and the recommended external unit clearances are maintained.

⚠ WARNING

Units equipped with gas heating must not be operated in an atmosphere contaminated with chemicals which will corrode the unit such as halogenated hydrocarbons, chlorine, cleaning solvents, refrigerants, swimming pool exhaust, etc. Exposure to these compounds may cause severe damage to the gas furnace and result in improper or dangerous operation. Operation of the gas furnace in such a contaminated atmosphere constitutes product abuse and will void all warranty coverage by the manufacturer. Questions regarding specific contaminants should be referred to your local gas utility.

Figure 23. Gas Supply Piping



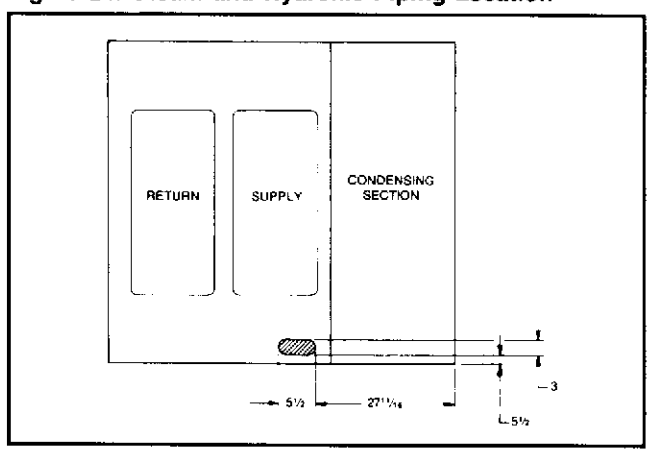
STEAM & HYDRONIC PIPING

LOCATION AND INSTALLATION

1. CUR075 thru 150 rooftop units furnished with hot water or steam coils require that supply and return lines be routed inside the curb and through the bottom of the unit. External lines are not recommended due to their exposure to freezing temperatures and interference with panel removal and service.

   NOTE: The side overhang curb configuration (refer to Figure 10) is not recommended for use with hydronic units.
2. Locate openings within the shaded area indicated in Figure 27. Openings for supply and return lines must be field cut in the embossment on the bottom of the unit.
3. Piping within the unit should be limited to only supply and return lines plus pipe unions to facilitate coil removal. All controls, valves, balancing cocks, strainers, etc. (furnished by others) should be located in the building.

Figure 24. Steam and Hydronic Piping Location



4. Coil connection sizes for both hot water and steam are 2½" NPT.
5. Upon completion of piping installation, all pipe openings in the unit must be sealed with plastic or rubber grommets, or with caulking compound to prevent pipe chaffing and air leakage.
6. **CAUTION:** Water coils must be protected from freezing (glycol, draining, etc.). Coil failure and water damage which results from freezing is not the responsibility of SnyderGeneral Corporation.

STEAM COIL PIPING RECOMMENDATIONS

1. Be certain that adequate piping flexibility is provided. Stresses resulting from expansion of closely coupled piping and coil arrangement can cause serious damage.
2. Do not reduce pipe size at the coil return connection. Carry return connection size through the dirt pocket, making the reduction at the branch leading to the trap.
3. It is recommended that vacuum breakers be installed on all applications to prevent retaining condensate in the coil. Generally, the vacuum breaker is to be connected between the coil inlet and the return main. However, if the system has a flooded return main, the vacuum breaker should be open to the atmosphere and the trap design should allow venting of large quantities of air.
4. Do not drain steam mains or take-offs through coils. Drain mains ahead of coils through a steam trap to the return line.
5. Do not attempt to lift condensate when using modulating or on-off control.
6. Pitch all supply and return steam piping down a minimum of 1 inch per 10 feet in direction of flow.

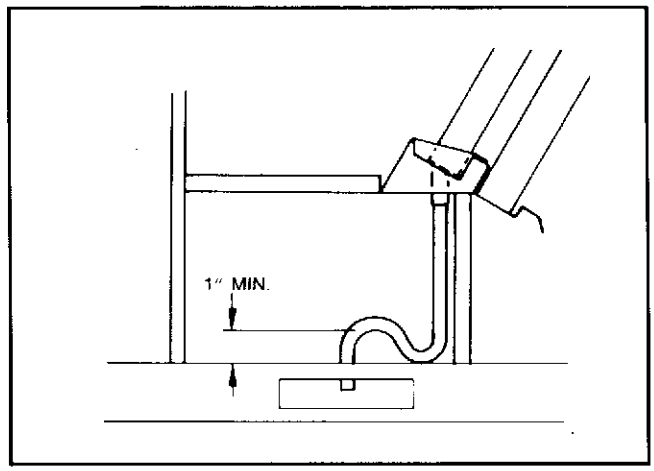
STEAM TRAP RECOMMENDATIONS

1. Size traps in accordance with trap manufacturer's recommendations. Be certain that the required pressure differential will always be available. Do not undersize.
2. Float and thermostatic or bucket traps are recommended for low pressure steam. Use bucket traps on systems with on-off control only.
3. Locate traps at least 12" below the coil return connection.
4. Always install strainers as close as possible to the inlet side of the trap.

CONDENSATE DRAIN CONNECTION

1. All units are equipped with a flexible tube condensate trap which may be connected to either side of the drain pan as shown in Figure 25.
   CAUTION: The end of the tube must be routed through the insulation and top of base rail so that the condensate has free access to the roof or external drainage system. Knockouts are provided in the base rails. The unused hole on the opposite side of the drain pan must be blocked with the plug provided.
2. Drainage of condensate directly onto the roof may be acceptable; refer to local code. It is recommended that a small drip pad of either stone, mortar, wood or metal be provided to prevent any possible damage to the roof.
3. If condensate is to be piped into the building drainage system, the drain line must penetrate the roof external to the unit. Refer to local codes for additional requirements. The flexible tube condensate trap may be connected to an external drain line with a hose clamp.
4. Due to the fact that drain pans in any air conditioning unit will have some moisture in them, algae and fungus will grow due to airborne bacteria and spores. Periodic cleaning is necessary to prevent this build-up from plugging the drain and causing the drain pan to overflow.

Figure 25. Internal Condensate Drain Routing



CAUTION: The drain pan should also be kept clean to prevent the spread of disease. Cleaning should be performed by qualifed personnel.

UNIT OPTIONS

The following options may be factory or field installed (except where noted). Field installation is to be performed only by qualified personnel who are familiar with local codes and regulations and experienced with this type of equipment. Field installation instructions are provided with each accessory kit.

NOTE: This is a partial listing of the optional accessories available. Refer to product catalog and price list for a complete listing and part numbers.

LOW AMBIENT CONTROL (Ref. also IM 460)

Standard on all units is a thermostat (TC1) which automatically controls condenser fan 1 in response to a combination of ambient and condenser air temperatures. The cut-in and cut-out temperatures for TC1 are 75°F and 55°F, respectively.

The low ambient control option will allow the unit's refrigeration system to operate in outdoor temperatures as low as 0°F (without wind effects) by automatically cycling condenser fan 2 in response to condenser pressure.

CUR150 ONLY: Condenser fans will operate as noted above except that fans 1 and 3 and 2 and 4 operate as pairs.

Each refrigerant circuit is equipped with an independent condensing pressure control (PC1, PC2 and, on CUR 125 thru 150 units, PC3) set to open at 150 PSIG and close at 225 PSIG. These control condenser fan motor 2 (2 and 4 on CUR150) in response to head pressure.

In addition to the condensing pressure switches, the low ambient option includes replacement low pressure switches (LP1, LP2, and on CUR125 thru 150 units, LP3) with a lower control band than the standard switches. These are provided to eliminate nuisance tripping which could otherwise occur during low ambient operation. The cut-in and cut-out pressures for the switches are 40 PSIG and 10 PSIG, respectively.

FREEZESTAT CONTROL (Ref. also IM 456)

The freezestat control option is intended to protect the unit's refrigeration system from liquid slugging due to evaporator coil freeze-up. One control (TC7) senses the coil temperature. When the coil temperature drops below the cut-out setpoint of the control, it breaks the refrigeration control circuit, thereby de-energizing any operational compressors. The cut-out setpoint is adjustable (15°F to 32°F), providing flexibility for different loading and airflow conditions. The cut-in setpoint is fixed at 39°F.

FIRESTAT CONTROL (Ref. also IM 457)

The firestat control option is intended to shut the unit down in case of a fire in the building. The option can include a supply air sensing thermostat, a return air sensing thermostat, or both. If either firestat is exposed to an air temperature over its setpoint, it will open, de-energizing the entire low voltage control circuit. As a result, any heating or cooling operation will be discontinued, the supply fan will shut down and the optional motorized outside air damper will close completely. The return air firestat TC5 is set to open at 125°F. The supply air firestat TC6 is set to open at 125°F on cooling only units and 240°F on heating/cooling units. Both firestats must be manually reset.

MOTORIZED OUTSIDE AIR DAMPER (Ref. also IM 453)

The motorized outside air option will provide 2-position control of the outside air damper. The open and closed positions of the damper may be set by adjusting the damper linkage arrangement.

The motorized outside air damper is energized through unit terminal D in two ways. It can be energized (1) with the fan, by connecting terminals D and 18 on terminal block TB1 or (2) with a 24-hour timeclock (refer to Figures 19, 20, 21 and 22). Whenever terminal D is energized, the outside air damper will open to its set position. Whenever terminal D is de-energized, the spring-return motor will fully close the outside air damper.

ECONOMIZER (Ref. also IM 451)

The purpose of the economizer is to use outdoor air for cooling to save energy. The economizer determines the suitability of using outdoor air by measuring its total heat content (enthalpy). The economizer functions as first stage of cooling. Mechanical cooling can run simultaneously with the economizer for additional cooling.

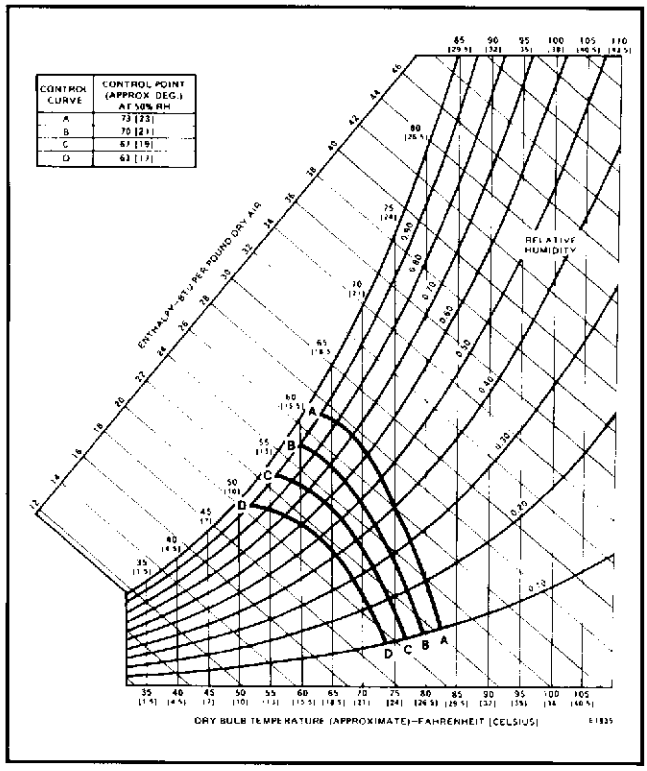
The economizer will modulate the outdoor air damper to maintain a discharge air temperature of between 50°F and 56°F on a call for cooling. The economizer will hold the outdoor dampers at minimum position during heating, or when the outdoor air enthalpy is undesirably high.

Operation of economizer and mechanical cooling must be considered when field wiring and servicing unit. Control power to the economizer MUST BE provided to unit terminal D. The economizer can be controlled by one of the following:

1. Energizing with supply fan by jumpering unit terminals 18 and D.
2. Energizing with timeclock (occupied/unoccupied periods) by connecting clock contacts (closed = occupied) between unit terminals R and D.

NOTICE: The compressors are interlocked through the economizer. Compressor operation is possible only through Scheme 1 or 2 above on units equipped with an economizer.

Figure 26. Enthalpy Control Setpoints



SINGLE ENTHALPY — Single enthalpy consists of one sensor monitoring outdoor air enthalpy. The control system works by comparing the outdoor air enthalpy directly to a control curve setpoint A, B, C or D (see Figure 26). Unit operation in outdoor air conditions to the left of the curve dictate economizer mode, and to the right mechanical cooling only. The control curve setpoint is field adjustable to accommodate application requirements.

CONDITION	SEQUENCE OF OPERATION
Outdoor Air Enthalpy Less Than Control Curve Setpoint	Stage 1 Cool = Economizer Stage 2 Cool = Economizer + 1 Stage Mechanical Cooling
Outdoor Air Enthalpy Greater Than Control Curve Setpoint	Stage 1 Cool = 1 Stage Mechanical Cooling Stage 2 Cool = 2 Stages Mechanical Cooling

DIFFERENTIAL ENTHALPY — Differential enthalpy consists of two enthalpy sensors. One monitors outdoor air and the other monitors return air (building) enthalpy. The control system works directly by comparing the two and choosing the more economical one for cooling. **NOTE:** The economizer control MUST be set to curve D to function properly. Differential enthalpy does not follow any control curve.

CONDITION	SEQUENCE OF OPERATION
Outside Air Enthalpy Less Than Return Air Enthalpy	Stage 1 Cool = Economizer Stage 2 Cool = Economizer + 1 Stage Mechanical Cooling
Outside Air Enthalpy Greater Than Return Air Enthalpy	Stage 1 Cool = 1 Stage Mechanical Cooling Stage 2 Cool = 2 Stages Mechanical Cooling

SPECIAL VENTILATION/SMOKE CONTROL (Ref. also IM 463)

The special ventilation option is intended to be used with a field supplied device (having normally open contacts), typically a smoke detector. Refer to Figures 19, 20, 21, and 22. When activated, all cooling and heating will be shut down, the supply fan will be energized and the outside air dampers will be opened completely to admit the maximum amount of ventilation air. (Unit must have economizer option.) A multi-pole relay (R10) performs the required switching in the unit.

This optional or accessory relay plugs into a socket which is standard on all models.

SEQUENCE OF OPERATION: If there is a special ventilation condition in the building, the field supplied device should make a contact closure, energizing unit terminal SV. Relay R10 is energized which simultaneously performs four functions:

1. Contacts between relay R10 terminals 1 and 9 open and contacts between 9 and 5 close, bypassing thermostat control and energizing supply fan contactor M10.
2. Contacts between R10 terminals 4 and 12 open and contacts between 12 and 8 close, bypassing timeclock or thermostat control and energizing the damper motor DM.
3. Normally closed contacts between R10 terminals 11 and 3 open, thereby de-energizing any heating or cooling that may be on.
4. Normally open contacts between R10 terminals 6 and 10 close, thereby jumping out the minimum position potentiometer on the optional economizer. As a result, the outside air damper will open completely.

POWER SAVER THERMOSTAT (Ref. also IM 468)

The power saver thermostat option is intended to provide energy savings by locking out a stage of electric heating when the ambient temperature is above the thermostat's setpoint. The setpoint of the power saver thermostat (TC15) is adjustable.

LOW AMBIENT LOCKOUT THERMOSTAT (Ref. also IM 472)

The low ambient lockout thermostat option provides automatic lockout of the compressors when the outdoor ambient drops below the setpoint of the thermostat (TC8). The thermostat is preset at 50°F nominal, but is adjustable to accommodate application requirements. This option is available field installed only.

LOCAL/REMOTE STATUS MONITOR (Ref. also IM 464)

The local/remote status option will monitor and provide status indication of the following conditions: Cool On, Cool Fail, Heat On, and Heat Fail. Clogged Filter and Fan On status indication require separate accessories.

LOCAL STATUS INDICATION: The "heart" of the status monitor option is a printed circuit board (PCB1) which is plugged into socket P3 located in the main control box. LED lights on PCB1 provide local status indication for each refrigeration circuit, the heating system and the filter (if Clogged Filter accessory is furnished). The green LED indicates ON status and the red LED indicates FAIL status.

REMOTE STATUS INDICATION: The status monitor module (PCB1) will provide remote status indication if a remote status panel accessory is connected to the unit terminal block TB1. On the remote panel, there is only one Cool On and one Cool Fail light. If any refrigeration circuit is on or if any circuit has failed, the appropriate indicator will light. There is a 5-minute delay before a Cool Fail or Heat Fail signal is sent to the remote status panel. This delay is necessary to eliminate any false signals that may indicate a failure otherwise; e.g., "3-try" spark ignition sequence.

If furnished, the fan switch accessory will provide indication (remote only) of Fan On status. Since this is a differential pressure switch, false indication will never occur due to overload tripping, broken belts, etc.

Labels are included with the remote status panel to identify the light functions. Four- and six-light panels with or without switching capability are available.

HOT GAS BYPASS (Factory Installed Option Only)

Hot gas bypass is a system for maintaining evaporator pressure at or above a minimum value when the refrigeration system is operating under low load conditions. The reason for doing this is to prevent evaporator coil freeze-up, to prevent excessive compressor cycling and to keep refrigerant velocity in the evaporator high enough for proper oil return to the compressor.

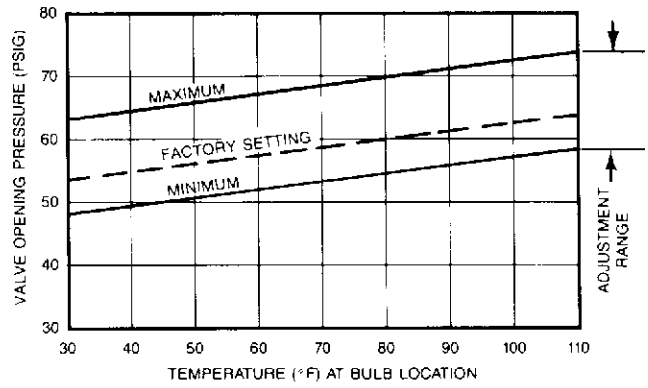
The hot gas bypass valve is factory set to begin opening at 57 PSIG suction pressure (32°F for R22) when the gas charged bulb is in a 60°F ambient temperature. Since the bulb is factory mounted in the discharge air, and discharge air temperatures are usually around 60°F, the valve should begin opening at 57 PSIG.

At a given bulb temperature, the valve opening pressure setting can be adjusted over a 15 PSI range by changing the pressure of the gas charge in the adjustable bulb. At a 60°F bulb temperature, the range is 52 to 67 PSIG (refer to Figure 30). To raise the valve opening pressure setting, remove the cap on the bulb and turn the adjustment screw clockwise. To lower the setting, turn the screw counterclockwise. One turn is equivalent to a change of about 1 PSI. Do not force the adjustment beyond the range for which it is designed or damage to the assembly will occur.

The valve opening pressure setting can also be changed by changing the air bulb ambient temperature. For every change of 7°F in the bulb temperature, the opening pressure will change 1 PSI in the same direction. For example, if the air bulb (factory setting) were strapped to a 102°F liquid line, the valve opening pressure would increase 6 PSI to 63 PSIG (refer to Figure 27.)

The circuit cooling capacity reduction of the hot gas bypass valve will vary significantly with operating conditions, but is about 4 tons. The valve will operate at full capacity when the suction temperature has dropped about 6°F (7 to 8 PSI for R22) relative to the suction temperature at valve opening.

Figure 27. Hot Gas Bypass Valve Adjustment



HIGH PRESSURE CONTROL

The high pressure control provides a way of independently shutting down each compressor in each refrigerant circuit if the circuit's condenser pressure rises too high. The high pressure switch works in conjunction with an impedance relay which prevents the compressor from starting until the control circuit is de-energized. This compressor lockout characteristic is intended to alert maintenance personnel to a possible system problem, and to prevent compressor cycling. Causes of high condenser pressure may include noncondensables in the system, refrigerant overcharging, dysfunctional condenser fans, or a dirty condenser coil. Any problem should be corrected before resetting the control.

SEQUENCE OF OPERATION: If the pressure in the condenser rises above 425 ± 10 PSIG, the high pressure switch (HP1, HP2 or, on CUR125 thru 150 units, HP3) opens, thereby energizing the impedance relay (R1, R2 or, on CUR125 thru 150 units, R3). The impedance relay locks itself on by opening its normally closed contacts in series with the high pressure switch. The compressor contactor is de-energized because the voltage drop across the impedance relay coil is so high.

To reset the high pressure control, the condenser pressure must drop below 325 ± 20 PSIG. In addition, power must be removed from the impedance relay's coil by (1) raising the setpoint of the thermostat, (2) disconnecting the thermostat wire from the R terminal on TB1 terminal block or (3) opening the disconnect switch.

LOW PRESSURE CONTROL

The low pressure control provides a way to independently cycle off each compressor if the circuit suction pressure is too low. The low pressure controls will allow the compressors to automatically restart once the suction pressure rises sufficiently for normal compressor operation.

CONDENSER FAN TEMPERATURE SWITCH

Standard on all units is a thermostat (TC1) which automatically controls condenser fan 1 (1 and 3 on CUR150) in response to a combination of ambient and condenser air temperatures. The cut-in and cut-out temperatures for TC1 are 75°F and 55°F, respectively.

COMPRESSOR LOCKOUT TIME DELAY

Standard on each compressor control circuit is an end of cycle time delay. This lockout time delay prevents short cycling of the compressors as well as providing brownout protection for the compressors during startup and mid-cycle operation.

CHECK, TEST & START PROCEDURE

⚠ WARNING

ELECTRIC SHOCK HAZARD. Could cause severe injury or death. Failure to bond the frame of this equipment to the building electrical ground by use of the grounding terminal provided or other acceptable means may result in electrical shock. Disconnect electric power before servicing equipment. Service to be performed only by qualified personnel.

BEFORE STARTUP

⚠ WARNING

MOVING MACHINERY HAZARD

DISCONNECT POWER TO THIS UNIT AND PADLOCK AT "OFF" BEFORE SERVICING THE FANS.

This procedure has been prepared as a guide for the proper Check, Test & Start of the rooftop unit.

The Check, Test & Start procedure provides a step-by-step sequence which, if followed, will assure the proper startup of the equipment in the minimum amount of time. Air balancing of duct system is not considered part of the Check, Test & Start of the rooftop unit. However, it is an important phase of any air conditioning system startup and should be performed upon completion of the Check, Test & Start procedure.

The Check, Test & Start procedure at outside ambients below 55°F should be limited to a readiness check of the refrigeration system with the required final check and calibration left to be completed when the outside ambient rises above 55°F.

TOOLS REQUIRED TO PERFORM CHECK, TEST & START

1. Refrigeration gauge and manifold.
2. Voltmeter.
3. Clamp-on ammeter.
4. Ohmmeter.
5. Test lead. Minimum #16 AWG with insulated alligator clips.
6. Manometer for verifying gas pressure 0 to 20" W.C.
7. Air temperature measuring device.
8. General refrigeration mechanics' tools.

TEMPORARY HEATING OR COOLING

If it is planned that the unit will be used for temporary heating or cooling, Check, Test & Start must first be performed in accordance with this bulletin. Failure to comply with this requirement will void the warranty. New filters should be installed after the machines are used for temporary heating or cooling and the coils, fans, and motors checked for unacceptable levels of construction dust and dirt.

CONTRACTOR RESPONSIBILITY

The installing contractor must be certain that:

- All supply and return air ductwork is in place and corresponds with installation instructions.
- All thermostats are mounted and wired in accordance with installation instructions.
- The remote status panel (optional equipment) is installed and wired in accordance with installation instructions.
- All electric power, all gas, hot water or steam line connections, and the condensate drain installation have been made to each unit on the job. These main supply lines must be functional and capable of operating all units simultaneously.

PRELIMINARY IN BUILDING

Prior to the beginning of Check, Test & Start procedures on the roof, the following steps should be completed in the building.

CAUTION: With the disconnect ON and the thermostat not satisfied, the machine will run. Do not start the machine until all the necessary pre-checks and tests have been performed.

1. THERMOSTAT. Set the thermostat in the conditioned space at a point at least 10°F below zone temperature. On cooling only models, set the thermostat system switch on COOL and the fan switch on AUTO. On heating/cooling models, set the thermostat system switch on AUTO and the fan switch on AUTO.
2. TIMECLOCK (OPTIONAL). Set the timeclock in the day or override mode.
3. NIGHT SETBACK THERMOSTAT (OPTIONAL). Set thermostat at a point at least 10°F below zone temperature.

CHECK OF ROOF CURB INSTALLATION

The proper installation of the unit on the roof curb should be checked. Any deficiencies observed should be noted in a separate report and forwarded to the contractor. The unit and curb assembly should have been installed level. The flashing of the roof mounting curb to the roof should be checked, especially at the corners, for good workmanship.

CHECK FOR MINIMUM CLEARANCES

A minimum of 36" clearance must be provided on the main control box side of the unit. A minimum of 48" clearance is recommended on all other sides. A clearance of 75" is desirable on the control box side for removal of the fan shaft or heating section.

The outside air intake must be remote from all building exhausts. The condenser air intake must be remote from all exhausts to assure full condenser capacity.

CHECK & REPORT DAMAGE

Damaged or missing parts, if any, should be itemized in a separate report stating what action has been initiated by the contractor to correct them. The absence of this information will be the basis for assuming that the unit was complete and in good condition on date of Check, Test & Start.

CHECK FOR OBSTRUCTIONS, FAN CLEARANCE, WIRING

During the performance of the Check, Test & Start procedure you will have occasion to work in the various sections of the unit. It is important that you remove extraneous construction and shipping materials that may be found during this procedure.

All fans should be rotated manually to check for proper clearances and make certain that they rotate freely. Bolts and screws that may have jarred loose during shipment to the jobsite should be checked for tightness. All electrical connections should be re-tightened.

PRE-STARTUP PRECAUTIONS

It is important to your safety that the unit has been properly grounded during installation. Check ground lug connection in main control box for tightness prior to closing circuit breaker or disconnect switch.

Verify that supply voltage on line side of disconnect agrees with voltage on unit identification plate and is within the utilization voltage range as indicated in Table 5.

Table 5.*

SYSTEM VOLTAGE	NAMEPLATE	UTILIZATION VOLTAGE	
		MIN.	MAX.
208-230/60/3	208/230	187	253
480/60/3	460	414	506
575/60/3	575	517	633
380/415/50/3	380/415	342	456

*Full load amp rating of the motors must not be exceeded.

System Voltage — That nominal voltage value assigned to a circuit or system for the purpose of designating its voltage class.

Nameplate Voltage — That voltage assigned to a piece of equipment for the purpose of designating its voltage class and for the purpose of defining the minimum and maximum voltage at which the equipment will operate.

Utilization Voltage — The voltage of the line terminals of the equipment at which the equipment must give fully satisfactory performance.

Once it is established that supply voltage will be maintained within the utilization range under all system conditions, check and calculate if an unbalanced condition exists between phases. Calculate percent voltage unbalance as follows:

$$\text{③ Percent Voltage Unbalance} = 100 \times \frac{\text{② Max. voltage deviations from average voltage}}{\text{① Average voltage}}$$

GIVEN: Example — With voltage of 220, 216 and 213.

HOW TO USE THE FORMULA:

① Average voltage = 220 + 216 + 213 = 649 ÷ 3 = 216

② Max. voltage deviation from average voltage = 220 − 216 = 4

$$\text{③ Percent Voltage Unbalance} = 100 \times \frac{4}{216} = \frac{400}{216} = 1.8\%$$

Percent voltage unbalance must not exceed 2%.

CHECK FIELD DUCT CONNECTIONS

Verify that all duct connections are tight and that there is no air bypass between supply and return.

CONTROL SYSTEM CHECK, TEST & START PROCEDURE

CONTROL VOLTAGE CHECK

With disconnect switch in the open (off) position, disconnect wire 500 from low voltage transformer T1. Close the disconnect switch to energize T1 control transformer. Check primary and secondary (24V) of control transformer T1.

THERMOSTAT PRELIMINARY CHECK

With disconnect switch open and wire 500 disconnected from T1 transformer, attach one lead of ohmmeter to terminal R on TB1 terminal block. Touch, in order, the other ohmmeter lead to terminals Y1, Y2 and G at TB1 terminal block. There must be continuity from terminal R to terminals Y1, Y2 and G.

R to Y1 indicates first stage cool.
R to Y2 indicates second stage cool.
R to G indicates fan (auto).

Replace wire 500 on T1 transformer.

ECONOMIZER DAMPERS & FILTERS CHECK, TEST & START PROCEDURE

FILTER SECTION CHECK

Remove filter section access panels and check that filters are properly installed. Note airflow arrows on filter frames. Refer to Figure 33.

ECONOMIZER AIR CYCLE CHECK

All Options:

1. Thermostat must call for cooling.
2. Open disconnect switch. If economizer is not set up to operate with timeclock, install jumper wire between terminals D and R, and disconnect jumper between terminals D and 18 on TB1 terminal block (disables fan).
3. In order to disable mechanical cooling, disconnect wire 542 or optional freezestat lead from terminal A7 or A8 on TB2 terminal block (labeled FREEZE).
4. In order to disable fan, remove thermostat wire from terminal G on TB1 terminal block.
5. To disable heat on heating/cooling units, remove thermostat wires from terminal W1 and W2 on TB1 terminal block. Disconnect jumper wire at terminals P or P1 on face of economizer module. Place a jumper across terminals T and T1 on the economizer module to simulate a warm mixed air temperature.

Standard Economizer Only:

1. A 620 ohm resistor should be in place across the S_R and + terminals of the economizer module. Set the enthalpy control on the face of the module to the "A" setting.
2. Close disconnect switch.
3. Fresh air damper should modulate toward its open position. In addition, the LED on the face of the economizer module should light.
4. Note that since the economizer is controlled by conditions of outside air temperature and humidity, it may not be possible to perform this check at outdoor temperatures above 75°F. Refer to Figure 26.
5. Disconnect the jumper and the mixed air sensor at T and T1 to simulate a low mixed air temperature. Fresh air damper should now modulate toward its full closed position.
6. Adjust and tighten damper motor and damper blade linkages.
7. Connect jumper wire across terminals P and P1 on economizer module. This enables the minimum fresh air position control so that outside air damper may now open to its minimum position.
8. Turn minimum position potentiometer screw counterclockwise. Fresh air damper should modulate toward its closed position.
9. Turn minimum position potentiometer screw clockwise. Fresh air damper should now modulate toward its open position.
10. Open disconnect switch.
11. Spring return motor should close fresh air damper 100%.
12. Set enthalpy control to its specified setpoint. If setpoint is not specified, it is recommended that the enthalpy control be set at "B."
13. Replace thermostat wires at terminals G, W1 and W2 on TB1 terminal block.
14. Reconnect wire 542 or freezestat lead at terminal A7 or A8 on TB2 terminal block.
15. If economizer is to be enabled with fan, remove R to D jumper and reconnect D to 18 jumper.
16. Connect mixed air sensor to terminals T and T1 on the economizer module.

Differential Enthalpy Option Only

1. The enthalpy control on the face of the economizer module should be turned to the "D" setting (full clockwise).

2. Close disconnect switch.
3. Gently blow through a tube or straw into the upper left vent of the C7400 return sensor to simulate high return air enthalpy, or disconnect S_R terminal. Fresh air damper should modulate toward its open position. In addition, the LED on the face of the economizer module should light. Replace wire on S_R terminal.
4. Gently blow through a tube or straw into the upper left vent of the C7400 outdoor sensor to simulate high outdoor air enthalpy, or disconnect S_O terminal. Fresh air damper should modulate toward its closed position. The LED on the economizer module should turn off. Replace wire on S_O terminal.
5. Adjust and tighten damper motor and damper blade linkages.
6. Connect jumper wire across terminals P and P1 on economizer module. This enables the minimum fresh air position control so that outside air damper may now open to its minimum position.
7. Turn minimum position potentiometer screw counterclockwise. Fresh air damper should modulate toward its closed position.
8. Turn minimum position potentiometer screw clockwise. Fresh air damper should now modulate toward its open position.
9. Open disconnect switch.
10. Spring return motor should close fresh air damper 100%.
11. Replace thermostat wires at terminals G, W1 and W2 on TB1 terminal block.
12. Reconnect wire 542 or freezestat lead at terminal A7 or A8 on TB2 terminal block.
13. If economizer is to be enabled with fan, remove R to D jumper and reconnect D to 18 jumper. Remove jumper and connect mixed air sensor across terminals T and T1 on the economizer module.

ECONOMIZER FRESH AIR DAMPER SETTINGS

The minimum position potentiometer is located on the face of the economizer module. Unless regulated by local codes or unusual conditions exist, a 15% fresh air setting should not be exceeded to maintain optimum heating and cooling efficiency. Determine the fresh air requirement and check position of minimum position potentiometer. Readjust if necessary. Note that 15% fresh air DOES NOT correspond to 15% of motor stroke.

EVAPORATOR BLOWER FAN CHECK, TEST & START PROCEDURE

BEARING CHECK

Prior to energizing any fans, check and make sure that all setscrews are tight so that bearings are properly secured to shafts. Bearings are the eccentric locking type. If the eccentric collar has come loose during shipping, the bearing must be resecured to the shaft using the following procedure:

1. Slide the collar up to the bearing and turn it by hand in the direction of shaft rotation until it slips over the inner extension and engages in the eccentric.
2. Keep turning the collar in the direction of shaft rotation until the collar and inner ring eccentric grooves lock.
3. Place a punch in the blind hole in the collar and strike it sharply in the direction of shaft rotation to lock the collar and inner ring tightly together. This also tightens the bearing to the shaft.
4. Now tighten the collar setscrew firmly to lock the bearing on the shaft.

SET EVAPORATOR FAN RPM

Actual RPM's must be set and verified with a tachometer. Refer to Tables 7 and 8 for basic unit fan RPM. Refer also to "Air Balancing" section of this manual.

With disconnect switch open, disconnect thermostat wires from terminals Y1, Y2, W1 and W2. This will prevent heating and mechanical cooling from coming on. Place a jumper wire across terminals R and G at TB1 terminal block. Close disconnect switch; evaporator fan motor will operate so RPM can be checked.

CAUTION: Airflow must be adjusted so that temperature rise does not exceed 40°F on electric heat units with 70°F entering air. For gas heat units, the airflow must be adjusted so that the air temperature rise falls within the ranges given in Table 16.

DRIVE BELT TENSION AND ALIGNMENT ADJUSTMENT

Check drive for adequate run-in belt tension. Correct belt tension is very important. A belt that is loose will have a substantially shorter life, and a belt that is too tight may cause premature motor and bearing failure.

Correct belt tension on these units can be checked by measuring the force required to deflect the belt ⅛" at the midpoint of the span length (Figure 28). Belt tension force can be measured using a belt tension checker, available through most belt manufacturers. The correct deflection force is 5 lbs. for a new belt and 3.5 lbs. for a belt that has been run in. New belt tension includes initial belt stretch.

When new V-belts are installed on a drive the initial tension will drop rapidly during the first few hours. Check tension frequently during the first 24 hours of operation. Subsequent retensioning should fall between the minimum and maximum force.

To determine the deflection distance from the normal position, use a straightedge or stretch a cord from sheave to sheave to use as a reference line. On multiple belt drives, an adjacent undeflected belt can be used as a reference.

EVAPORATOR FAN ROTATION CHECK

Check that fan rotates clockwise when viewed from the drive side of unit and in accordance with rotation arrow shown on blower housing. If it does not, reverse the two incoming power cables at PB terminal block. In this case, repeat bearing check.

Do not attempt to change load side wiring. Internal wiring assures all motors and compressors will rotate in correct direction once evaporator fan motor rotation check has been made.

ELECTRICAL INPUT CHECK

Make preliminary check of evaporator fan ampere draw and verify that motor nameplate amps are not exceeded. A final check of amp draw should be made upon completion of air balancing of the duct system. Refer to Table 11.

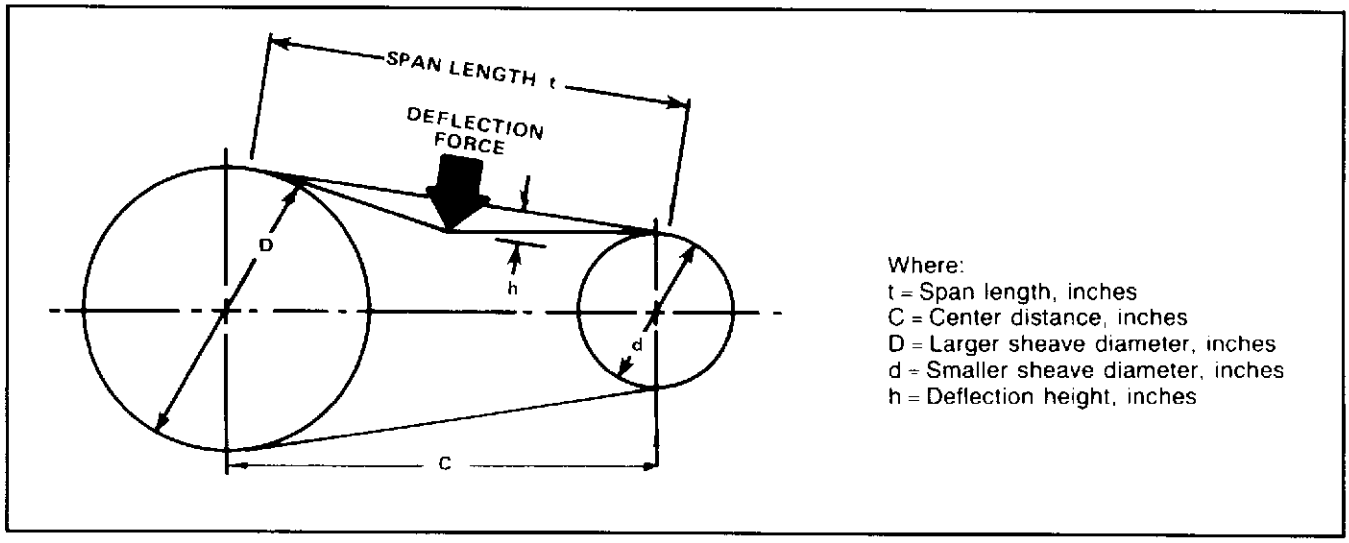
RESTORING CONNECTIONS

With disconnect switch open, remove jumper wire from terminals R and G at TB1 terminal block, and reconnect thermostat wires to terminals Y1, Y2, W1 and W2.

Table 6. Recommended Pounds of Force Per Belt

BELT SECTION	SMALL SHEAVE DIA. (IN.)	DRIVE RATIO 1.0 Min.—Max.	1.5 Min.—Max.	2.0 Min.—Max.	4.0 & Over Min.—Max.
A	3.0	2.0—3.0	2.3—3.5	2.4—3.6	2.6—3.9
	4.0	2.6—3.9	2.8—4.2	3.0—4.5	3.3—5.0
	5.0	3.0—4.5	3.3—5.0	3.4—5.1	3.7—5.6

Figure 28. Drive Belt Tension Adjustment



Where:
t = Span length, inches
C = Center distance, inches
D = Larger sheave diameter, inches
d = Smaller sheave diameter, inches
h = Deflection height, inches

Table 7. Supply Fan Performance Data ⑤

CUR MODEL	CFM	EXTERNAL STATIC PRESSURE (INCHES W.C.)															
		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
075G	2600	***669***	***0.44***	816	0.59	916	0.75	1004	0.92	1084	1.09	1157	1.28	***1226***	***1.47***	***1291***	***1.67***
	2800	***734***	***0.53***	847	0.69	944	0.85	1030	1.03	1109	1.21	1181	1.40	***1249***	***1.60***		
	3000	770	0.62	877	0.79	973	0.97	1053	1.15	1135	1.34	1206	1.54				
	3200	807	0.73	909	0.91	1002	1.10	1086	1.29	1162	1.49						
	3400	845	0.85	942	1.04	1032	1.24	1114	1.44	1159	1.65						
085G	3000	***770***	***0.62***	***877***	***0.79***	973	0.97	1053	1.15	1135	1.34	1206	1.54	1273	1.75	1336	1.96
	3200	***807***	***0.73***	909	0.91	1002	1.10	1086	1.29	1162	1.49	1232	1.70	1298	1.91	***1360***	***2.12***
	3400	***845***	***0.85***	942	1.04	1032	1.24	1114	1.44	1189	1.65	1259	1.87	1324	2.09		
	3600	***884***	***0.99***	976	1.19	1063	1.40	1144	1.61	1217	1.83	1285	2.05				
	3800	923	1.14	1010	1.35	1095	1.57	1173	1.79	1246	2.02						
110G	3400	***679***	***0.73***	***781***	***0.98***	873	1.26	957	1.58	1034	1.91	1105	2.26	1171	2.26	1233	2.99
	3600	***706***	***0.83***	805	1.10	894	1.39	975	1.71	1051	2.05	1121	2.41	1188	2.78	***1249***	***3.17***
	3800	***733***	***0.95***	829	123	916	1.53	995	1.85	1069	2.20	1139	2.57	1204	2.95		
	4000	***761***	***1.07***	855	1.37	938	1.68	1016	2.01	1088	2.36	1156	2.74	1221	3.14		
	4200	790	1.21	880	1.52	961	1.84	1037	2.18	1108	2.54	1175	2.93				
	4400	818	1.36	906	1.68	985	2.01	1059	2.36	1128	2.73	1194	3.13				
125G, 150G	4000	***784***	***1.14***	***876***	***1.44***	959	1.76	1036	2.10	1108	2.47	1176	2.86	1239	3.26	1300	3.67
	4200	***814***	***1.29***	***903***	***1.60***	983	1.93	1058	2.28	1129	2.66	1195	3.05	1258	3.46	1318	3.89
	4400	***844***	***1.45***	930	1.78	1008	2.12	1081	2.48	1150	2.86	1215	3.26	1277	3.68	1337	4.12
	4600	***874***	***1.63***	957	1.97	1034	2.32	1105	2.69	1172	3.08	1236	3.49	1297	3.92	1356	4.37
	4800	***904***	***1.82***	986	2.17	1060	2.54	1129	2.92	1195	3.32	1258	3.74	1318	4.17	1375	4.63
	5000	932	2.02	1014	2.39	1086	2.77	1154	3.16	1218	3.57	1280	4.00	1338	4.44	1395	4.91
	5200	966	2.24	1043	2.62	1113	3.01	1179	3.42	1242	3.84	1302	4.27	1360	4.73	***1416***	***5.20***
	5400	997	2.48	1071	2.87	1141	3.28	1205	3.70	1267	4.12	1326	4.57	1382	5.03		
	5600	1029	2.74	1101	3.14	1168	3.56	1231	3.99	1291	4.43	1349	4.88				

NOTES:

DO NOT SELECT IN SHADED AREAS (FOR INTERPOLATION ONLY)

① Selections in ***BOLD ITALICS*** require a field drive change. See Table 8 for drive ranges.
② Selections below **heavy line** require oversize motor.
③ Maximum fan RPM = 1500
④ Table includes all internal pressure drops including cabinet losses. See Table 27 in product catalog for additional pressure drops that must be considered as part of external
static pressure drop.
⑤ Refer to catalog for fan curves.

Table 8. Supply Fan RPM Range

CUR MODEL	MOTOR SHEAVE — ADJUSTABLE FAN SHEAVE — FIXED		FACTORY SETTING 2 TURNS OPEN					
	MOTOR SHEAVE — TURNS OPEN		0	1	2	3	4	5
075G	FAN RPM	1.0 HP MOTOR	1032	969	915	861	808	754
		1.5 HP MOTOR	1209	1146	1082	1018	955	891
085G	FAN RPM	1.5 HP MOTOR	1209	1146	1082	1018	955	891
		2.0 HP MOTOR	1351	1290	1228	1167	1105	1044
110G	FAN RPM	2.0 HP MOTOR	1073	1016	960	903	847	790
		3.0 HP MOTOR	1242	1186	1129	1073	1016	960
125G, 150G	FAN RPM	3.0 HP MOTOR	1185	1131	1077	1023	969	915
		5.0 HP MOTOR	1400	1336	1273	1209	1146	1082

NOTE: Allow ±5% variation in blower RPM due to pulley manufacturing tolerances.

COMPONENT ELECTRICAL DATA

Table 9. Compressors

MODEL	QUANTITY	HORSEPOWER	208-230/60/3		460/60/3		380-415/50/3		575/60/3	
			RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA
CUR075G	2	3.25	15.0	99.0	8.2	49.5	8.2	49.5	6.14	40.0
CUR085G	2	3.50	15.0	99.0	8.2	49.5	8.2	49.5	6.14	40.0
CUR110G	2	4.50	19.3	123.0	10.0	62.0	10.0	62.0	7.85	50.0
CUR125G	3	3.50	15.0	99.0	8.2	49.5	8.2	49.5	6.14	40.0
CUR150G	3	4.50	19.3	123.0	10.0	62.0	10.0	62.0	7.85	50.0

NOTE: All values are per compressor.

Table 10. Condenser Fan Motors

MODEL	QUANTITY	HORSEPOWER	FLA			
			208-230/60/1	460/60/1	380-415/50/1	575/60/1
CUR075G	2	1/2	3.5	1.8	1.8	1.4
CUR085G	2	1/2	3.5	1.8	1.8	1.4
CUR110G	2	1/2	3.5	1.8	1.8	1.4
CUR125G	2	1/2	3.5	1.8	1.8	1.4
CUR150G	4	1/2	3.5	1.8	1.8	1.4

NOTE: All values are per motor.

Table 11. Evaporator Fan Motors

HORSEPOWER	FLA			
	208-230/60/3	460/60/3	380-415/50/3	575/60/3
1.0	3.5 / 3.8	1.9	1.9	1.5
1.5	5.0 / 5.6	2.8	2.8	2.1
2.0	6.6 / 7.0	3.5	3.5	2.5
3.0	9.0 / 8.8	4.4	4.4	3.6
5.0	15.0 / 14.6	7.3	7.3	5.9

Table 12. Ventor Motor (Gas Furnace)

HORSEPOWER	208-230/60/1	
	FLA	LRA
1/16	.45/.40	.66/.60
1/12	.58/.52	.83/.75

NOTE: Transformer used on voltages other than 208-230.

REFRIGERATION SYSTEM CHECK, TEST & START PROCEDURE

PRELIMINARY CHECK

Make sure that hold-down bolts on compressors are secure and have not vibrated loose during shipment. Check that vibration grommets have been installed. Visually check all piping and clamps.

The entire refrigeration system has been factory charged and tested, making it unnecessary to field charge. Factory charges are shown in Table 13 and on the unit nameplate.

Table 13. Refrigerant Charge Per Circuit

CUR MODEL	CHARGE (LBS.)
075G	3.5
085G	5.0
110G	7.5
125G	5.0
150G	8.0

Install service manifold hoses. Gauges should read saturation pressure corresponding to ambient temperature (non-pumpdown units only).

CAUTION: Do not connect gauge hoses to manifolds located in control box. These ports are intended for optional pressure switch installation only.

REFRIGERATION SEQUENCE CHECK

With the disconnect switch open, remove the field connected thermostat wire from terminal R on TB1 terminal block. Place a jumper across terminals R and G, and across R and 11 on TB1 terminal block. This effectively bypasses the thermostat and optional economizer, simulating a first stage mechanical cooling call. Close the disconnect switch. The following operational sequence should be observed.

1. Current through primary winding of transformer T1 energizes the 24 volt control circuit.
2. The first stage of cooling is energized when the room temperature is above the thermostat setpoint. The thermostat makes R to G and R to Y1.
   a. Supply contactor M10 is energized.
   b. UNITS WITHOUT ECONOMIZER OPTION: The first stage compressor circuit is energized through low pressure switch LP1, high pressure switch HP1, time delay TD1 and optional freezestat TC7.
   c. UNITS WITH ECONOMIZER OPTION: The first stage of cooling is interlocked through terminal 1 and 2 on the economizer module. Control power must be available to the damper motor DM through terminal D on terminal block TB1 (refer to economizer instructions). If the outdoor enthalpy is not suitable for cooling, the economizer module terminals will be closed permitting the compressor circuit to be energized. As noted above, this feature has been bypassed with the test jumper.

      NOTE: Time delay relays TD1, TD2 and TD3 are the capacitor bleed-down type. They initiate a 2½ to 4 minute time delay when the control circuit is de-energized. There should be no time delay on start-ups that occur after the bleed-down time has elapsed.
3. Contactor M10 closes its contacts L1, L2 and L3 to T1, T2 and T3 to provide power to the supply fan motor (refer to "Evaporator Blower Fan Check, Test & Start Procedure"). Check supply fan rotation. If the supply fan is rotating in the wrong direction, disconnect and lock off power block PB1. Do not attempt to change load side wiring. Internal wiring is set at the factory to assure that the supply fan and compressors all rotate in the proper direction. Verification of correct supply fan rotation at initial startup will also indicate correct compressor rotation. Reconnect power and check for proper operation.
4. Contactor M10 closes its contacts L1 and L2 to T1 and T2 to provide power to the compressor motor COMPR. MTR. 1. In addition, contactor M1 closes its contact L3 to T3, energizing all of the condenser fan motors.

   NOTE: Condenser fan motor 1 (1 and 3 on CUR150) are further controlled by the outdoor air thermostat TC1 which prevents fan operation at the lower outdoor temperatures. Condenser fans 2 (2 and 4 on CUR150) will be energized when any compressor contactor is closed except when the optional low ambient control pressure switches PC1, PC2 and PC3 are provided. These pressure switches cycle fan motor 2 (2 and 4 on CUR150) with changes in condenser pressure.
5. Check that the compressors are operating correctly. **The scroll compressors in these units must operate in the proper rotation.** Check the compressor discharge line pressure or temperature. **CAUTION: DISCHARGE LINE MAY BE HOT. DO NOT TOUCH.** After each compressor is started, the discharge pressure and discharge line temperature should increase. If this does not occur, and if the compressor is producing an exceptional amount of noise, the compressor motor may be operating in the wrong direction. If a problem is encountered, it will be necessary to check all of the compressors and the supply fan motor. If a single motor is operating backward, check the power wiring for that motor and correct any leads that have been interchanged at the contactor or at the motor. If all of the motors are operating backward, disconnect the unit power supply and lock it in the OFF position. Switch two leads of the power supply at the unit power terminal block PB1. Reconnect power and check for compressor and supply fan motor operation.

To simulate a second stage mechanical call for cooling from the wall thermostat, place a jumper across terminals R and 13 of terminal block TB1.

6. The second stage of cooling is energized when the room temperature is above the thermostat setpoint for both first and second stages of cooling. The thermostat makes R to Y2.
   a. UNITS WITHOUT ECONOMIZER OPTION: The second stage compressor circuit is energized through low pressure switch LP2, high pressure switch HP1, time delay TD1 and optional freezestat TC7.
   b. UNIT WITH ECONOMIZER OPTION: The second stage compressor circuit is interlocked through terminals 3 and 4 of the economizer module (refer to 2c). If the outdoor air enthalpy is not suitable for cooling, the economizer terminals will be closed permitting compressor circuit 2 to be energized.

      NOTE: If the outdoor air is cool enough for free cooling (LED on economizer is lit), the second thermostat stage will energize the first stage compressor circuit through the crossover contacts 3 and 5 of the economizer module.
7. Contactor M2 closes its contacts L1 and L2 to T1 and T2 to provide power to the compressor motor COMPR. MTR. 2. In addition, contactor M2 closes its contact L3 to T3 duplicating the power circuit to all of the condenser fan motors (allowing condenser air for compressor circuit 2 to operate if compressor circuit 1 is tripped.

   CUR125 Thru 150 Only: Normally open auxiliary contacts on contactor M2 close, energizing the third stage compressro circuit through low pressure switch LP3, high pressure switch HP3, time delay TD3 and optional freezestat TC7. Contactor M3 closes its contacts L1 and L2 to T1 and T2 to provide power to the compressor motor COMPR. MTR. 3. In addition, contactor M3 closes its contact L3 to T3 duplicating the power circuit to all of the condenser fan motors. Auxiliary contacts on contactor M3 close, latching the third stage circuit in the energized condition, until the first stage circuit is de-energized.

8. With all safety devices closed, the system will continue cooling operation until the thermostat is satisfied.
9. Disconnecting the jumper wire between R and 13 on TB1 terminal block will simulate a satisfied second stage of the thermostat. The second stage compressor will cycle off and TD2 will initiate its time delay cycle.
10. Disconnecting the jumper wire between R and 11 and between R and G on TB1 terminal bock will simulate a satisfied first stage of the thermostat. The first stage compressor and the supply fan will cycle off and TD1 will initiate its time delay cycle.

    CUR125 Thru 150 Only: Simultaneously, the third stage compressor will cycle off and TD3 will initiate its time delay cycle.
11. After a time delay of approximately 2½ to 4 minutes, the compressor control circuits will be ready to respond to a subsequent call for cooling from the wall thermostat.
12. Open disconnect switch. Reconnect the field thermostat wire at terminal R on terminal block TB1.

REFRIGERATION PERFORMANCE CHECK

Under normal summertime (full load) operating conditions, superheat should be between 8°F and 14°F and subcooling measured at the condenser outlet should be 15°F (nominal). A 25°F to 35°F temperature difference should exist between the entering condenser air and the temperature corresponding to the compressor saturated discharge pressure.

The non-adjustable expansion valves in the units are equipped with a built-in MOP (Maximum Operating Suction Pressure) provision that limits evaporator pressure to approximately 90 to 95 psig. This feature acts to protect the compressors from excessive load.

NOTE: Under unusually high load conditions, the MOP feature may cause the superheat value to exceed 14°F.

Check that compressor RLA corresponds to values shown in Table 9. RLA draw can be much lower than values in Table 9 at low load conditions and low ambient condensing temperatures. Values in Table 9 can be slightly exceeded at high load conditions and high ambient condensing temperatures.

GAS HEAT CHECK, TEST & START PROCEDURE

⚠ WARNING

Should overheating occur or the gas supply fail to shut off, turn off the manual gas valve to the appliance before shutting off the electrical supply.

⚠ WARNING

Do not fire gas furnace with flue box cover removed. This is extremely hazardous.

CAUTION: Except during brief periods when gas pressures are being measured by qualified service personnel, the furnace access panel must always be secured in place when the furnace is in operation. An inspection port in the access panel is provided to monitor the flame.

GAS SUPPLY PRESSURES & REGULATOR ADJUSTMENTS

The first step in checking out the gas-fired furnace is to test the gas supply piping to the unit for tightness and purge the system of air using methods outlined in the latest edition of the National Fuel Gas Code (ANSI Z223.1).

Verify that the disconnect switch is in the "OFF" position.

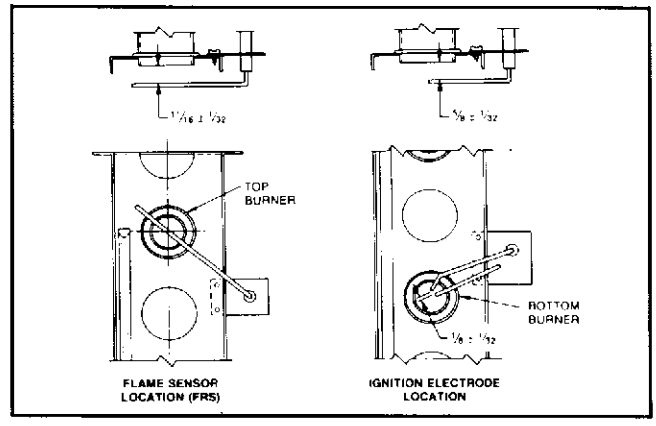
A soapy water solution should be used to check for gas leaks. Since the unit is subject to considerable jarring during shipment, it is extremely important that all gas connections and joints be tested for tightness.

Gas piping downstream from the unit inlet should be checked for leaks during the subsequent sequence check.

The supply gas pressure should be adjusted to 7.0" W.C. on natural gas and 11.0" on propane gas with the gas burners operating. If there is more than one unit on a common gas line, the pressures should be checked with all units under full fire. A supply pressure tap is provided on the upstream side of the gas valve. A manifold pressure tap is provided on the manifold as shown in Figure 23.

The normal manifold pressure for full input is 3.5" W.C. on natural gas and 9.5" W.C. for propane gas. Refer to rating plate for manifold pressures on high attitude units. Minimum gas supply pressure is 5.5" W.C. for natural gas and 11.0" for propane gas. In order to obtain rating, gas supply pressure must be 11.0" W.C. for propane gas. The pressure regulator on propane gas models is adjusted for 9.5" W.C. manifold pressure and is intended to prevent overfiring only. Do not attempt adjustment of the built-in pressure regulator unless the supply pressure is at least 7.0" W.C. on natural gas or 13.0" W.C. on propane gas. Check the location of the ignition electrode and the flame sensor for correct gap setting. Refer to Figure 29.

Figure 29.



Due to the fact that gas appliances located more than 2000 feet above sea level must be de-rated 4% per 1000 feet of total elevation and that variance in gas heating value and specific gravity require change in manifold pressure to obtain rating, it is mandatory that the input be adjusted at the installation site. **All installations should be made as outlined in the latest edition of the National Fuel Gas Code ANSI Z223.1.** The section entitled "Procedures To Be Followed To Place An Appliance in Operation" should be followed. Refer also to the "User's Information Manual" supplied with the unit for additional information on the gas furnace.

Table 14. Heat Exchanger Specifications

MAXIMUM INPUT BUTH	NUMBER OF BURNERS	MAXIMUM BTUH PER BURNER
105,000	3	35,000
140,000	4	35,000
210,000	6	35,000
245,000	7	35,000
280,000	8	35,000

Table 15. Burner Orifice Specifications

GAS FURNACE NO. OF TUBES	DRILL SIZE NUMBER (DIA.)			
	NATURAL GAS		LP GAS	
	MAIN ORIFICES	CARRYOVER ORIFICES	MAIN ORIFICES	CARRYOVER ORIFICES
3 & 4	34 (.111")	70 (.028")	50 (.070")	78 (.016")
6, 7, & 8	34 (.111")	58 (.042")	50 (.070")	73 (.024")

SEQUENCE OF OPERATION — GAS HEATING

This unit has two Manual Reset Limit Controls which could on occasion arrive at the jobsite in the tripped position as a result of shipping shock. Check if the HL22 or HL23 require resetting if the ventor motor will come on but the unit does not attempt ignition.

With electricity and gas turned on, the system switch in the "HEAT" or "AUTO" position and the fan switch in the "AUTO" position, the thermostat will close the circuit between unit terminals R and W1 (R-W1) when the temperature falls below the thermostat setting. This energizes relay R9 and time delay relay TD9. Relay R9 energizes the ventor motor VM1. Operation of the ventor motor closes the centrifugal switch VMS located in the ventor motor. Unless excessive temperatures or shipping shock have opened high limit controls HL21, HL22 or HL23, power is fed to the ignition control module which then initiates a 15-second pre-purge time delay. During this period, the ventor motor will clear the combustion chamber of any residual gas. After the pre-purge period, the ignition control energizes the first stage operator (W1-C) on the gas valve and simultaneously initiates a "3-try" spark ignition sequence. When the burners are ignited, a minimum 4 microamp DC current will flow through the flame between the sensor electrode and the grounded burner. When the controller proves that the flame has been established, it will keep the gas valve energized and discontinue the ignition spark. First stage manifold pressure will be approximately 1.3" W.C. for natural gas and 4.0" W.C. for propane.

If the control is unable to ignite the burners after its initial attempt, it will initiate another purge and spark sequence. A third purge and spark sequence will be initiated if the second attempt is unsuccessful. If the third attempt is unsuccessful, the controller will close the gas valve and lock itself out. It may be reset by momentarily interrupting power. This may be accomplished by briefly lowering the room thermostat setpoint below room temperature, or by shutting off the main power to the unit.

Time delay relay TD9 will close its normally open contacts (line 201) after a delay of approximately 15 seconds. This action energizes contactor M10 and starts the supply fan motor. Operation of the supply fan circulates air across the heat exchanger and delivers heated air to the conditioned space.

In the event that the temperature at the thermostat continues to fall, the thermostat will also close the contact between terminals R and W2. This will energize the second stage of the gas valve (W2-C). After a delay of about 30 seconds, the gas manifold pressure will increase to approximately 3.5" W.C. for natural gas and 9.5" W.C. for propane.

When the space temperature rises, the thermostat will first open R-W2 and finally R-W1. Opening R-W1 will cause the gas valve to close, and the furnace to shut down.

The furnace has three high temperature limit controls which can shut down the burner. They do not shut down the ventor motor.

HL21 Automatic Reset High Limit Control. Located in the blower compartment next to the rear blower, its sensing element projects through the blower section bulkhead and senses the temperature at the rear of the furnace. It will cycle the furnace off if the temperature exceeds 165°F and allow furnace operation again at 125°F.

HL22 Manual Reset High Limit Control. Located next to HL21 in the blower compartment, it senses air temperature within the blower compartment and protects the filters from excessive temperature. It will shut down the furnace if it senses temperatures in excess of 160°F. The limit can only be reset by manually depressing the control mounted reset button after it has cooled.

HL23 Manual Reset Flame Rollout Control. Located in the burner compartment on the top shelf behind the ventor motor, it senses high temperaure such as could occur if the heat exchanger tubes were plugged and the flame was rolling out instead of entering the tubes. It has a manual pushbutton reset that cannot be actuated until the limit control has cooled.

INPUT RATING

It is the responsibility of the contractor to adjust the gas input to the unit. The input rate can be calculated by using the formula:

$$\text{Input Btu/Hr.} = \frac{3600 \times \text{HV}}{\text{T}}$$

HV = Heating value of fuel = Btu/Ft³ of gas
T = Time in seconds per Ft³ of gas flow as read from gas meter

Adjust input rate by varying the adjustment of the gas pressure regulator on the gas valve. See Figure 30. All adjustments must be made with furnace operating at high fire and at normal operating temperature. Clockwise rotation of the pressure regulator screw increases pressure and gas flow rate. Turn screw counterclockwise to decrease pressure and gas flow rate. After adjustment the furnace temperature rise must be within the range specified on the unit dataplate. Refer to Table 16.

CAUTION: Do not exceed input rating or manifold pressure values on the unit dataplate. If input rating on dataplate cannot be attained without exceeding listed manifold pressure, contact your local service representative.

NOTE: Thermal efficiency of the furnace is a product efficiency rating determined under continuous operating conditions independent of any installed system.

Figure 30.

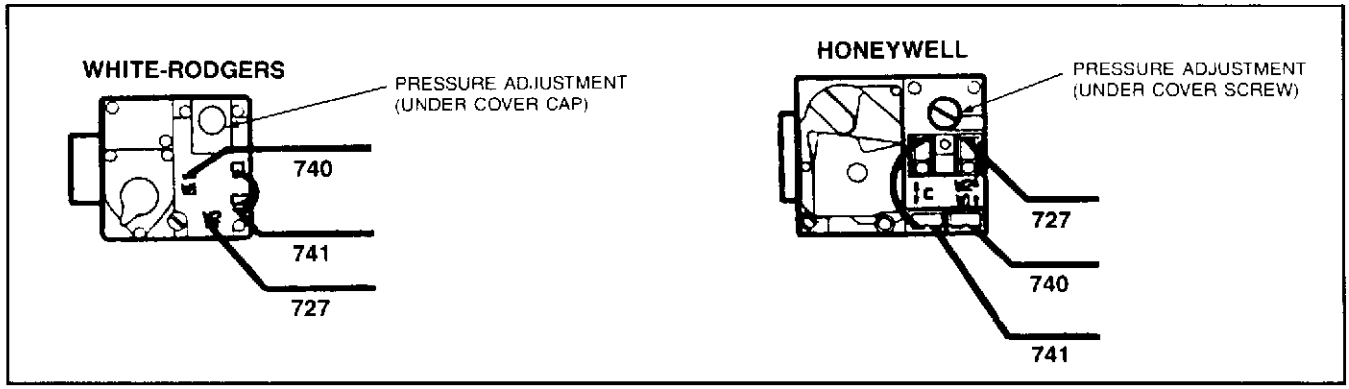


Table 16. Gas Furnace Air Temperature Rise

MODEL		N10, P10 ⑥	N14, P14 ⑥	N21, P21 ⑥	N24, P24 ⑥	N28, P28 ⑥
NUMBER OF TUBES		3	4	6	7	8
VENTOR MOTOR HP		1/16	1/16	1/16	1/16	1/12
BTUH INPUT		105,000	140,000	210,000	245,000	280,000
BTUH OUTPUT		83,600	109,200	163,800	189,900	218,400
MAX. AIR TEMP. RISE		40	45	55	60	60
CFM	2600	29.8	38.9	—	—	—
	2800	27.6	36.1	54.2	—	—
	3000	25.8	33.7	50.6	58.6	—
	3200	24.2	31.6	47.4	54.9	—
	3400	22.8	29.7	44.6	51.7	59.5
	3600	21.5	28.1	42.1	48.8	56.2
	3800	20.4	26.6	39.9	46.3	53.2
	4000	19.3	25.3	37.9	44.0	50.6
	4200	18.4	24.1	36.1	41.9	48.1
	4400	17.6	23.0	34.5	40.0	46.0
	4600	16.8	22.0	33.0	38.2	44.0
	4800	16.1	21.1	31.6	36.6	42.1
	5000	15.5	20.2	30.3	35.2	40.4
	5200	14.9	19.4	29.2	33.8	38.9
	5400	14.3	18.7	28.1	32.6	37.4
	5600	13.8	18.1	27.1	31.4	36.1
	5800	13.3	17.4	26.1	30.3	34.9
	6000	12.9	16.9	25.3	29.3	33.7

NOTES:

① Capacities are approved for altitudes to 2000 feet. At higher elevations, heating capacity must be reduced 4% (×0.96) for each 1000 feet above sea level.

② Air temperature rise is for total heating capacity. Temperature rises at other conditions may be calculated by using the formula:

$$\text{Temperature Rise} = \frac{\text{Output Capacity (BTUH)}}{1.08 \times \text{CFM (Airflow)}}$$

③ For altitudes over 2000 feet, air temperature rise must be calculated using the formula:

$$\text{Temperature Rise} = \frac{\text{Output Capacity (BTUH)}}{14.4 \times \text{CFM (Airflow)} \times \text{Density of Air (Lbs./Cu.Ft.)}}$$

④ Two-stage control is standard.

⑤ Output capacity based on nominal 1000 Btu/Ft³ natural gas or 2500 Btu/Ft³ propane.

⑥ N — Natural Gas; P — Propane Gas

ELECTRIC HEAT CHECK, TEST & START PROCEDURE

WIRING TIGHTNESS CHECK

With disconnect switch in the OFF position, check all electric heater connections for tightness. Since the unit is subject to considerable stress during shipment, it is extremely important that this check is thorough.

SEQUENCE CHECK

Set the thermostat in the conditioned space to a point at least 10°F above zone temperature.

Remove the thermostat wire from terminal W2 at TB1 terminal block and close disconnect switch. The following operational sequence should be observed.

1. First stage heat relay R9 makes and closes contacts 2-4 to energize supply fan motor contactor M10. If the temperature at the limit switch HL31 is low enough, heater contactor M31 will be energized.
2. While electric heater is operating at first stage, attach thermostat wire to terminal W2 at TB1 terminal block. If the temperature at limit switch HL32 is low enough, second stage heater contactor M32 will be energized. Auxiliary contacts on M32 close, energizing heater contactor M33. Auxiliary contacts on M33 in series with its coil act to lock M33 in.
3. When the thermostat's second stage is satisfied, it de-energizes heater contactor M32. Contactors M31 and M33 stay energized until the first stage is satisfied.

The number of heater contactors used depends on heating capacity and voltage. Observe contactors for several cycles. Contactors should cycle first and second stage according to thermostat demand.

NOTE: The optional Power Saver Thermostat acts to lock out one heating stage when the outdoor air temperature is above its setpoint.

THERMOSTAT, NIGHT SETBACK & TIMECLOCK CHECK, TEST & START PROCEDURE

THERMOSTAT FINAL CHECK

With the thermostat fan switch at AUTO, operate the unit through at least one complete cycle with the thermostat system switch at COOL and one cycle with the system switch at HEAT.

Place the fan switch at ON. The fan should run continuously.

Proper control of the indoor air temperature can only be achieved if the thermostat is calibrated to the heating and/or cooling system. A vital consideration of this calibration is related to the thermostat heat anticipator.

Anticipators for the cooling operation are generally preset by the thermostat manufacturer and require no adjustment. Anticipators for the heating operation are of two types: preset or adjustable. Those that are preset will not have an adjustable scale and are generally marked accordingly.

Thermostat models having a scale as shown in Figure 29 must be adjusted to each application. Refer to Tables 17 and 18 to set your heat anticipator, depending on the type of heating operation with which your unit is equipped.

NIGHT SETBACK THERMOSTAT CHECK (OPTIONAL EQUIPMENT)

The electromechanical night setback thermostat controls the unit by jumping the timeclock and completing the circuit through the main thermostat. Refer to Figures 22, 23, 24 and 25. The unit heating will cycle off the night thermostat setpoint since it is lower than the main thermostat setpoint.

With timeclock contacts open, set night setback thermostat and space thermostat 10°F above zone temperature. Unit should operate on heating cycle.

Restore night thermostat to normal setting (recommend 55°F). Reset space thermostat to desired position.

Table 17. Heat Anticipator Settings For CUR075 Thru 126 Gas Fired Rooftop Units

IGNITION MODULE	GAS VALVE	ANTICIPATOR SETTING (AMPS)		
		1-STAGE WALLSTAT	2-STAGE WALLSTAT	
			STG 1	STG 2
FENWALL #05-295-466-151	HONEYWELL #VR8540A-3006 -3014 -4111 -4129	0.97	.77	.20
	WHITE RODGERS #36C76-319 -320 -430 -431	1.03	.89	.14
WHITE RODGERS #50D20-60	HONEYWELL #VR8540A-3006 -3014 -4111 -4129	1.07	.88	.19
	WHITE RODGERS #36C76-319 -320 -430 -431	1.14	1.01	.13

The table above may be used to determine the low voltage circuit current through the thermostat and thus the heat anticipator setting. These current values are based on 24V.

TIMECLOCK CHECK (OPTIONAL EQUIPMENT)
Manually open and close timeclock contacts to check if it operates unit. Set time dial to correct time. Adjust cut-in and cut-out points.

Figure 31.

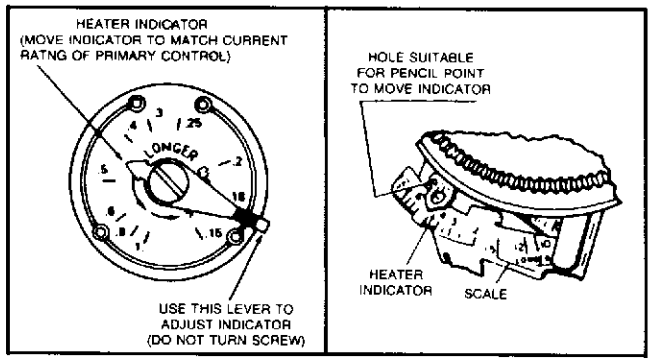


Table 18. Heat Anticipator Settings For CUR Series Electric Heat

KW	VOLTAGE	ANTICIPATOR SETTING (AMPS)		
		1-STAGE WALLSTAT	2-STAGE WALLSTAT	
			STG1 (W1)	STG2 (W2)
10	240/480/600	0.42	0.42	—
20/30/40	240/480/600	0.74	0.42	0.32
50/60	240	1.06	0.74	0.32
50/60	480/600	0.74	0.42	0.32

AIR BALANCING

The drive on the supply fan is typically set in the middle of the RPM range. The drive motor sheave pitch diameter is field adjustable for the required airflow. Refer to "Drive Adjustments" section below.

When the final adjustments are complete, the current draw of the motor should be checked and compared to the full load current rating of the motor. The amperage must not exceed the service factor stamped on the motor nameplate.

The total airflow must not be less than that required for operation of the electric heaters or the furnace.

The operating balance should be checked with the economizer at full outside air and at minimum outside air.

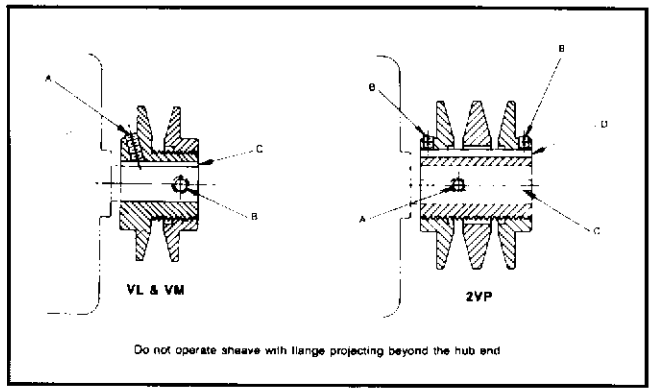
Upon completion of the air balance, it is a common industry recommendation that the variable pitched motor sheave be replaced with a properly sized fixed sheave. A matching fixed sheave will provide longer belt and bearing life and vibration free operation. Initially, it is best to have a variable pitched motor sheave for the purpose of air balancing, but once the balance has been achieved, fixed sheaves maintain alignment and minimize vibration more effectively.

DRIVE ADJUSTMENTS — MOUNTING & ADJUSTING MOTOR SHEAVES VL, VM & 2VP VARIABLE PITCH KEY TYPE SHEAVES (SEE FIGURE 32)

MOUNTING:

1. All sheaves should be mounted on the motor or driving shaft with the setscrew "A" toward the motor.
2. Be sure both driving and driven sheaves are in alignment and that shafts are parallel.
3. Fit internal key "C" between sheave and shaft, and lock setscrew "A" securely in place.

Figure 32.



ADJUSTING VL & VM SHEAVES:

1. Loosen setscrew "B" (5/32" Allen key).
2. Adjust sheave pitch diameter for desired speed by opening moving part by half or full turns from closed position. DO NOT OPEN MORE THAN FIVE FULL TURNS.
3. Securely tighten setscrew "B" over flat.

ADJUSTING 2VP SHEAVES:

1. Loosen setscrews "B" in moving parts of sheve and pull out external key "D." (This key projects a small amount to provide a grip for removing.)
2. Adjust sheave pitch diameter for desired speed by opening moving parts by half or full turns from closed position. Both halves must be adjusted by the same number of turns

from closed position to insure the same pitch diameter. DO NOT OPEN MORE THAN FIVE FULL TURNS.
3. Replace external key "D" and securely tighten setscrews "B" over key.

AFTER ADJUSTING:

1. Put on belts and adjust belt tension. DO NOT FORCE BELTS OVER GROOVES.
2. Future adjustments should be made by loosening the belt tension and increasing or decreasing the pitch diameter of the sheave by half or full turns as required. Readjust belt tension before starting drive.
3. Be sure that all keys are in place and that all setscrews are tight before starting drive. Check setscrews and belt tension after 24 hours service.

MAINTENANCE

Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and experienced with this type of equipment. CAUTION: Sharp edges and coil surfaces are a potential injury hazard. Avoid them.

⚠ WARNING

MOVING MACHINERY HAZARD
DISCONNECT POWER TO THIS UNIT AND PADLOCK AT "OFF" BEFORE SERVICING THE FANS.

Preventive maintenance is the best way to avoid unnecessary expense and inconvenience. Have this system inspected at regular intervals by qualified service personnel, at least twice a year. Routine maintenance should cover the following items:

1. Tighten all belts, setscrews, and wire connections.
2. Clean evaporator and condenser coils mechanically or with cold water, if necessary. Usually any fouling is only matted on the entering air face of the coil and can be removed by brushing.
3. Lubricate motor bearings (see below).
4. Align or replace belts as needed.
5. Replace filters as needed (see below).
6. Check for blockage of condensate drain.
7. Check power and control voltages.
8. Check running amperage.
9. Check operating temperatures and pressures.
10. Check and adjust temperature and pressure controls.
11. Check and adjust damper linkages.
12. Check operation of all safety controls.
13. Examine gas furnaces (see below and the User's Information Manual).
14. Check condenser fans and tighten setscrews.

FILTERS

Every application may require a different frequency of replacement of dirty filters. Filters must be replaced at least every three (3) months during operating seasons.

Filters supplied with the units are the disposable type and are as follows:

UNIT SIZE	QUANTITY	FILTER SIZE	PART NUMBER (ONE FILTER)
075 — 085	3	25 x 25 x 2	658104A-03
110 — 150	3	16 x 25 x 2	658104A-01
	3	20 x 25 x 2	658104A-02

To remove the filters, remove the filter access panel on either side of the unit. See Figure 33.

LUBRICATION

The fan shaft bearings, the 1 to 3 HP supply fan motors, and the condenser fan motors are permanently lubricated. For lubrication of the compressors, use Suniso 3GS, Texaco WF32, or Calumet R015 oils. All three oils are compatible if mixed, and are suitable for both high and low temperature systems.

5 HP SUPPLY FAN MOTOR

Motor should have grease added after every 6 monhts if under continuous operation or every 12 months if under 12 hour day

Figure 33. Filter Access

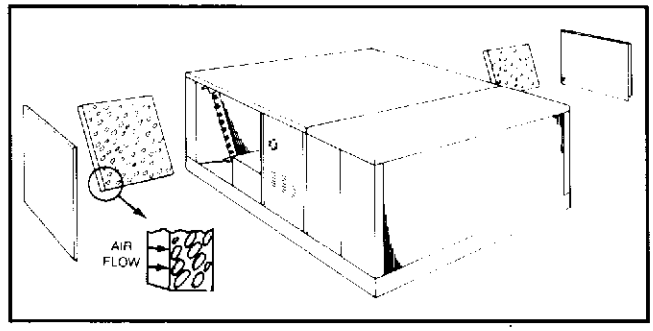
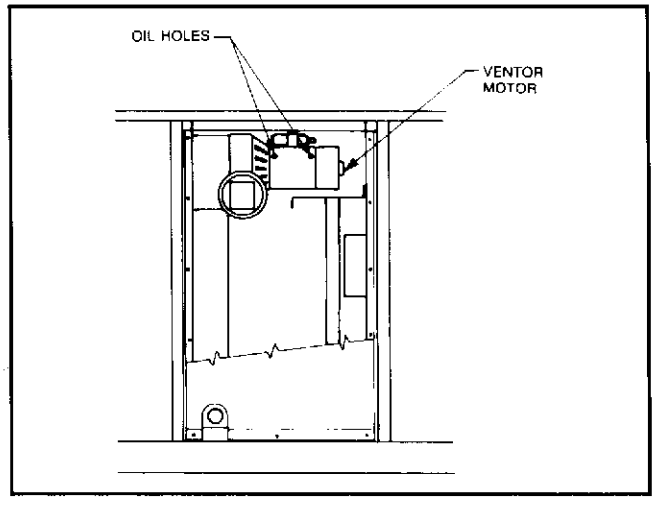


Figure 34.



operation. Relubricate while motor is warm and at a standstill. Remove and clean upper and lower grease plugs. Insert grease fitting into upper hole adding a small amount of clean grease with a low pressure gun. Run motor for ten minutes before replacing plugs.

CAUTION: Excessive grease will overheat the bearings. Use only a high grade lithium base grease with a 200°F safe operating temperature.

NOTE: Specific greasing instructions may be found on a tag attached to the motor. If special lubrication instructions are shown on the motor nameplate, they will supersede all other instructions.

VENTOR MOTOR

To lubricate the ventor motor, remove the furnace access panel. Lubricate the motor in two locations as shown in Figure 36. Use SAE 20W lubricant and add five (5) drops to each location. The motor should be lubricated at the beginning of each heating season. DO NOT OVERLUBRICATE.

WARNING: DO NOT DRIP OIL ON THE GAS VALVE BECAUSE THE OIL MAY DAMAGE THE NON-METALLIC

PARTS AND RENDER THE VALVE INOPERATIVE. REMOVE ANY OIL RESIDUES FROM THE BURNER COMPARTMENT.

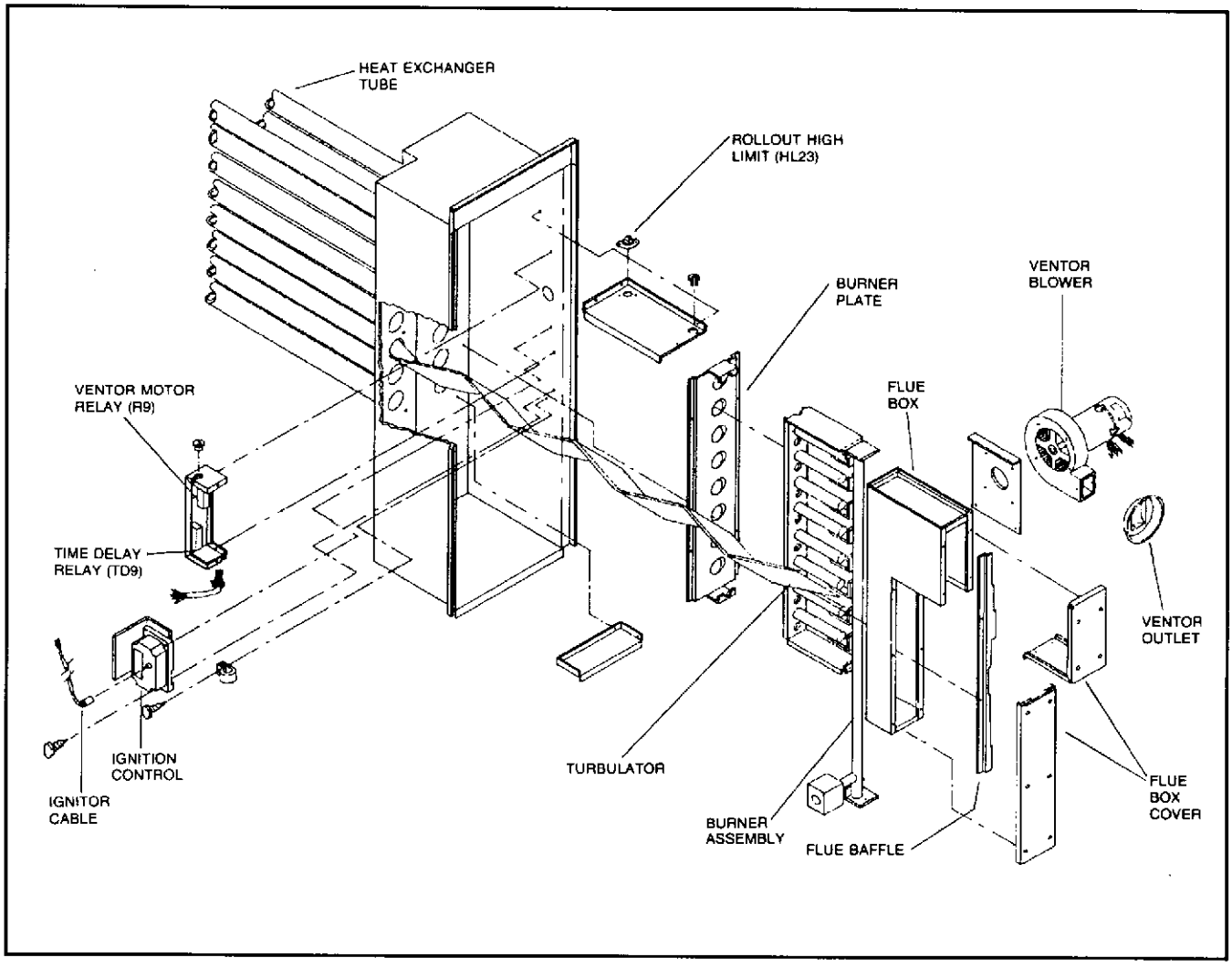
GAS FIRED FURNACE INSPECTION & CLEANING

All flue product carrying areas of the furnace, its vent system, and main burners should be examined by a qualified service agency before the start of each heating season. This examination is necessary for continued safe operation. Particular attention should be given to deterioration from corrosion or other sources. This examination is accomplished in the following manner.

1. Disconnect power to the unit and remove furnace section access panel.
2. Refer to Figure 35. Remove burner assembly:
   a. Disconnect the three wires from the gas valve after noting which wires are connected to each terminal.
   b. Disconnect wires from the flame rod and ignition electrode.
   c. Disconnect the gas piping at the union.
   d. The entire burner assembly can now be removed from the unit. Note how the front of the burner assembly nests around wide location tabs, one at the top and one at the bottom.
3. Remove the flue box cover. The cover consists of two pieces which can be removed as a single unit. Remove the flue baffle.
4. Remove the turbulator from within each heat exchanger tube. The end corner of the turbulator mates with the groove at the tube end seam. To release the turbulator, grip the end of the turbulator with a pliers, force the corner away from the groove, and pull the turbulator out of the tube.
5. Inspect the burner assembly, the heat exchanger tubes, the turbulators, the flue box, the ventor fan and the ventor fan outlet openings for accumulations of soot and deterioration. Soot can be removed with a flexible wire brush. The inside of the tubes can be cleaned with a boiler tube type wire brush. If the bends of the tubes must be cleaned, remove the plate surrounding the burner end of the tubes. A brush or wad of steel wool can then be pulled through the tube with a cable. Be cautious not to damage the corrosion resistant coating on the various metal parts. Remove all residue.
6. If deterioration is evident, contact a qualified service agency. Minor deterioration of the turbulator ends is not cause for concern.
7. Upon completion of inspection and cleaning, replace all parts in the reverse order in which they were removed.
   CAUTION: Use all screws that were removed; they are necessary for safe and proper operation of the unit.
8. Inspect and periodically clean the vent outlet (bird screen) on the access panel.

NOTE: Periodic observation of the flame through the inspection port and a log of CO_2 measurements are recommended. They will aid in determining whether the furnace is operating efficiently or if the furnace requires cleaning.

Figure 35. Gas Fired Furnace



SERVICE & WARRANTY PROCEDURE

MOTOR COMPRESSOR

Copeland Refrigeration Corporation has stocking wholesalers who maintain a stock of replacement motor compressors and service parts to serve refrigeration contractors and service personnel as required.

When a motor compressor fails in warranty, the inoperative compressor can be taken to any authorized Copeland wholesaler for an over-the-counter exchange or an advance replacement may be obtained. Credit is issued by the wholesaler for the returned compressor upon receipt and Copeland factory inspection of the inoperative compressor. If that compressor is out of Copeland's warranty, a salvage credit only is allowed. Provide your local sales representative or the SnyderGeneral factory Warranty Claims Department with full details including the unit model and serial numbers, the invoice and the salvage value credit memo copies. SnyderGeneral Corporation will reimburse the difference. In this transaction be certain that the motor compressor is definitely defective. If a compressor is received from the field that tests satisfactorily, a service fee plus a transportation fee will be charged against its original credit value.

On all out of warranty motor compressor failures, Copeland offers the same field facilities for service and/or replacement as described above. The credit issued on the return compressor will be determined by the repair charge established for that particular unit.

IN-WARRANTY RETURN MATERIAL PROCEDURE

Material may not be returned except by permission of authorized factory service personnel. Contact your local sales representative for further "who to contact" information.

A "return goods" tag will be sent to be included with the returned material. Enter the information as called for on the tag in order to expedite handling at our factories and prompt issuance of credits. All parts shall be returned to the factory designated on the return goods tag, transportation charges prepaid.

The return of the part does not constitute an order for replacement. Therefore, a purchase order must be entered through your nearest sales representative. The order should include part number, model number, and serial number of the unit involved.

Following our personal inspection of the returned part, and if it is determined that the failure is due to faulty material or workmanship, credit will be issued on customer's purchase order.

REPLACEMENT PARTS

Replacement parts may be obtained by contacting your local sales representative or parts distributor. If you do not know who to contact, call SnyderGeneral Corporation at (612) 553-5009 for assistance. Refer to the model number and serial number of the unit as stamped on the serial plate attached to the unit. If replacement parts are required, mention the date of installation of the unit and the date of failure, along with an explanation of the malfunctions and a description of the replacement parts required.

CUR 075 THRU 150 CONTROLS, SETTINGS & FUNCTIONS

DESCRIPTION	FUNCTION	SYMBOL	SETTING	RESET	LOCATION	DIFFERENTIAL
CONDENSER PRESSURE SWITCH (OPTIONAL)	Maintains condenser pressure by cycling condenser fan #2 in response to condenser pressure.	PC1, 2, 3	Opens at 150±10 psig Closes at 225±20 psig	Auto	Control Box	75 psig, fixed
CONDENSER FAN TEMPERATURE SWITCH	Disables condenser fan 1 when outdoor temperature is below setpoint.	TC1	Opens at 55°F Closes at 75°F	Auto	Control Box	20°F, fixed
COMPRESSOR LOCKOUT TIME DELAY	Prevents short cycling of compressors. Starts timing on loss of power.	TD1, 2, 3	2½ to 4 minute delay on break (180 sec.—15%+35%)	Auto	Control box	N/A
HIGH PRESSURE CONTROL	Stops compressor when discharge pressure is too high.	HP1, 2, 3	Opens at 425±10 psig Closes at 325±20 psig	Auto (latching relays R1, 2, 3 must be reset manually)	Control Box	100 psig, fixed
LOW PRESSURE CONTROL	Stops compressor when suction pressure is too low. Safety device and used for optional pumpdown.	LP1, 2, 3	Opens at 20±6 psig Closes at 60±8 psig (Opens at 10±6, Closes at 40±8 w/ PC1,2 & 3 option)	Auto	Control Box	40 psig, fixed (30 psig, fixed)
HOT GAS BYPASS CONTROL VALVE (OPTIONAL)	Bypasses discharge gas into distributor when suction pressure drops below valve setting.	N/A	Starts opening at 57 psig; full open at 50 psig, adjustable (assumes bulb seeing 60°F discharge air)	N/A	Supply Fan Section (bulb senses discharge air)	N/A
MIXED AIR/DISCHARGE AIR SENSOR (STD.)	NTC thermistor device senses discharge air temperature. Resistance is read by economizer control.	MAT	N/A	N/A	Supply Air Section	N/A
ENTHALPY SENSOR (OPTIONAL)	Senses temperature and humidity conditions. Sends signal to economizer control.	OAE (outdoor sensor) RAE (return sensor)	N/A	N/A	Fresh Air Intake Section Return Air Section	N/A
ECONOMIZER CONTROL (OPTIONAL)	Modulates outdoor & return air dampers, in response to a cooling call, to maintain a mixed air temperature between 50°F and 56°F. Enables free or mechanical cooling depending on outdoor air enthalpy.	N/A	"B" or as required (standard economizer option) "D" (differential enthalpy option)	N/A	Return Air Section	N/A
MINIMUM POSITION POTENTIOMETER (OPTIONAL)	Maintains a minimum opening in economizer damper to provide for ventilation requirements when outside air is unsuitable for cooling.	N/A	As required	N/A	On face of economizer control (terminals P & P1 must be jumped)	N/A
DAMPER MOTOR	Honeywell M7415: Modulates outdoor and return air dampers in response to economizer control. Honeywell M8415: 2-position motor opens outdoor air dampers when energized.	DM	N/A	N/A	Return Air Section	N/A
FILTER FLAG (OPTIONA)L	Indicates filters are clogged. Senses pressure drop across filters.	PC5	Closes at 0.1"—0.7" diff. W.C., adjustable	Manual	Evaporator Section	N/A
FREEZESTAT (OPTIONAL)	Protects compressors and evaporator from water freeze-up.	TC7	Closes at 39°F, fixed; Opens at 15—32°F, adjustable	Auto	Evaporator Section	7 to 24°F, adjustable
FIRESTAT (OPTIONAL)	Cuts power to control circuitry on temperature rise.	TC5 (return air) TC6 (supply air)	TC5: Opens at 125°F TC6 (cooling only): Opens at 125°F TC6 (heat units): Opens at 240°F	Manual	Supply Fan Section	25°F to reset

Continued on next page

CUR 075 THRU 150 CONTROLS, SETTINGS & FUNCTIONS (CONT'D.)

DESCRIPTION	FUNCTION	SYMBOL	SETTING	RESET	LOCATION	DIFFERENTIAL
POWER SAVER THERMOSTAT (OPTIONAL W/ ELECTRIC HEAT)	Locks out 2nd or 3rd stage of heat when outdoor temperature is above setpoint.	TC15	Adjustable 25 to 70°F Factory set to open at 50°F, close at 45°F	Auto	Electric Heat Control Box	5°F, fixed
HIGH LIMIT, SECONDARY ELECTRIC HEAT	Cuts power to heating elements on temperature rise.	HL1, 2, 3	Opens at 210°F ± 6°F	Manual	Electric Heat Control Box	60°F to reset
HIGH TEMPERATURE LIMIT SWITCH (ELECTRIC HEAT ONLY)	Cuts power to heater control circuit on temperature rise.	HL31, 32	Opens at 140 ± 5°F Closes at 110 ± 7°F	Auto	Electric Heat Control Box	30°F, fixed
GAS VALVE	Controls opening of stage 1 and stage 2 gas valves.	GV1	Refer to Gas Heat Check, Test & Start Procedure	N/A	Furnace Section	N/A
VENTOR CENTRIFUGAL SWITCH	Enables gas heat control circuit when ventor motor is running.	VMS	N/A	Auto	Mounted to ventor motor	N/A
FLAME SENSOR ELECTRODE	Proves burner flame exists (flame rectification method). Allows gas valve to remain energized.	FRS	Refer to Figure 32	N/A	Furnace Section	N/A
IGNITION ELECTRODE	Creates spark for direct ignition of burners.	IGN	Refer to Figure 32	N/A	Furnace Section	N/A
IGNITION CONTROL	Coordinates 3-try, 15-second pre-purge spark for ignition sequence.	N/A	N/A	N/A	Furnace Section	N/A
TIME DELAY RELAY (GAS HEAT ONLY)	On 1st stage heat call, provides power to supply fan contactor after a time delay. Allows furnace heat exchanger to warm up and cool down before and after heating operation.	TD9	15 seconds nominal. on make. 75—95 seconds on break.	N/A	Furnace Control Box	N/A
HIGH TEMPERATURE LIMIT SWITCH (GAS HEAT ONLY)	Senses high air temperature in furnace section. Cuts power to heater control circuit on temperature rise.	HL21	Opens at 165 ± 6°F Closes at 125 ± 9°F	Auto	Supply Fan Section (Sensor senses furnace section air)	40°F, fixed
REVERSED AIRFLOW HIGH TEMPERATURE LIMIT SWITCH (GAS HEAT ONLY)	Senses high air temperature in filter section. Cuts power to heater control circuit on temperature rise.	HL22	Opens at 160 ± 6°F	Manual	Supply Fan Section	60°F to reset
ROLLOUT LIMIT (GAS HEAT ONLY)	Senses burner flame rollout in burner compartment. Cuts power to heater control circuit on temperature rise.	HL23	Opens at 225 ± 7°F	Manual	Furnace Section	60°F to reset
FAN SWITCH (OPTIONAL)	Pressure switch provides supply airflow status. Senses pressure difference across filters and evaporator coil.	PC6	Closes at 0.1 ± .05" diff. W.C.	Auto	Supply Fan Section	N/A
LOW AMBIENT LOCKOUT THERMOSTAT	Locks out compressors when outdoor ambient drops below setpoint (field installed only).	TC8	Adjustable 25 to 70°F Factory set to open at 50°F, close at 55°F	Auto	Supply Fan Section	5°F, fixed

CONTROL LOCATIONS

Figure 36. Control Box Locations

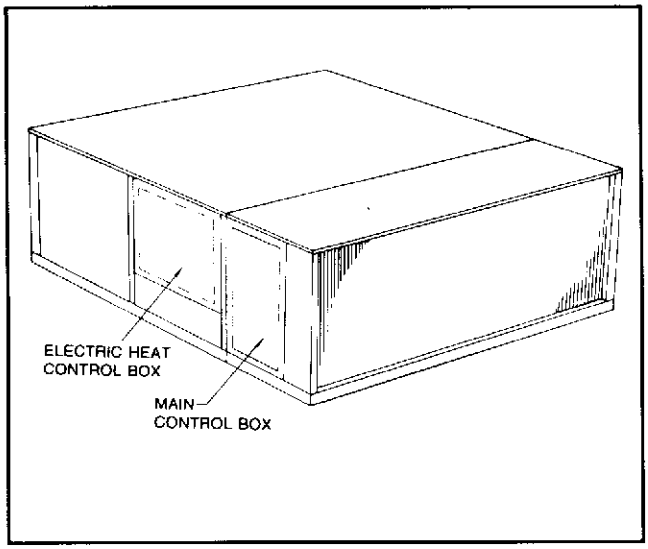


Figure 37. Electric Heat Control Box

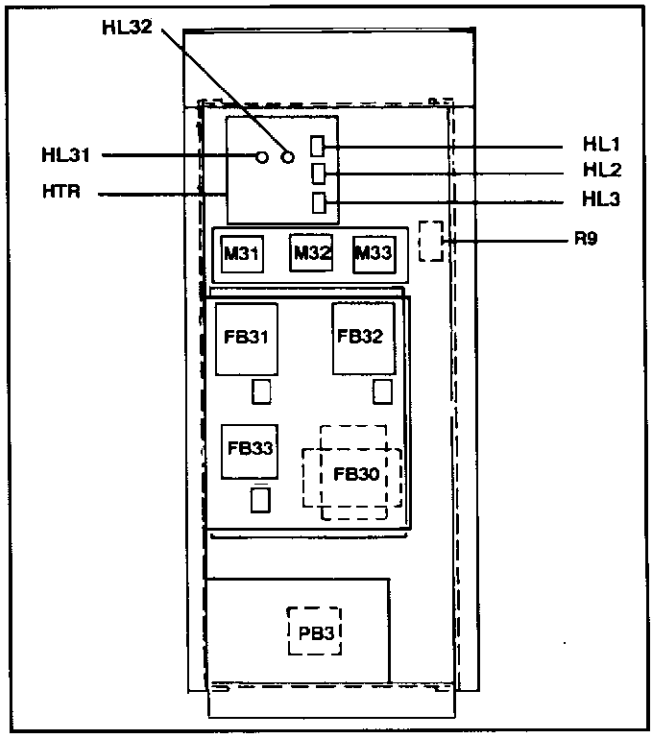
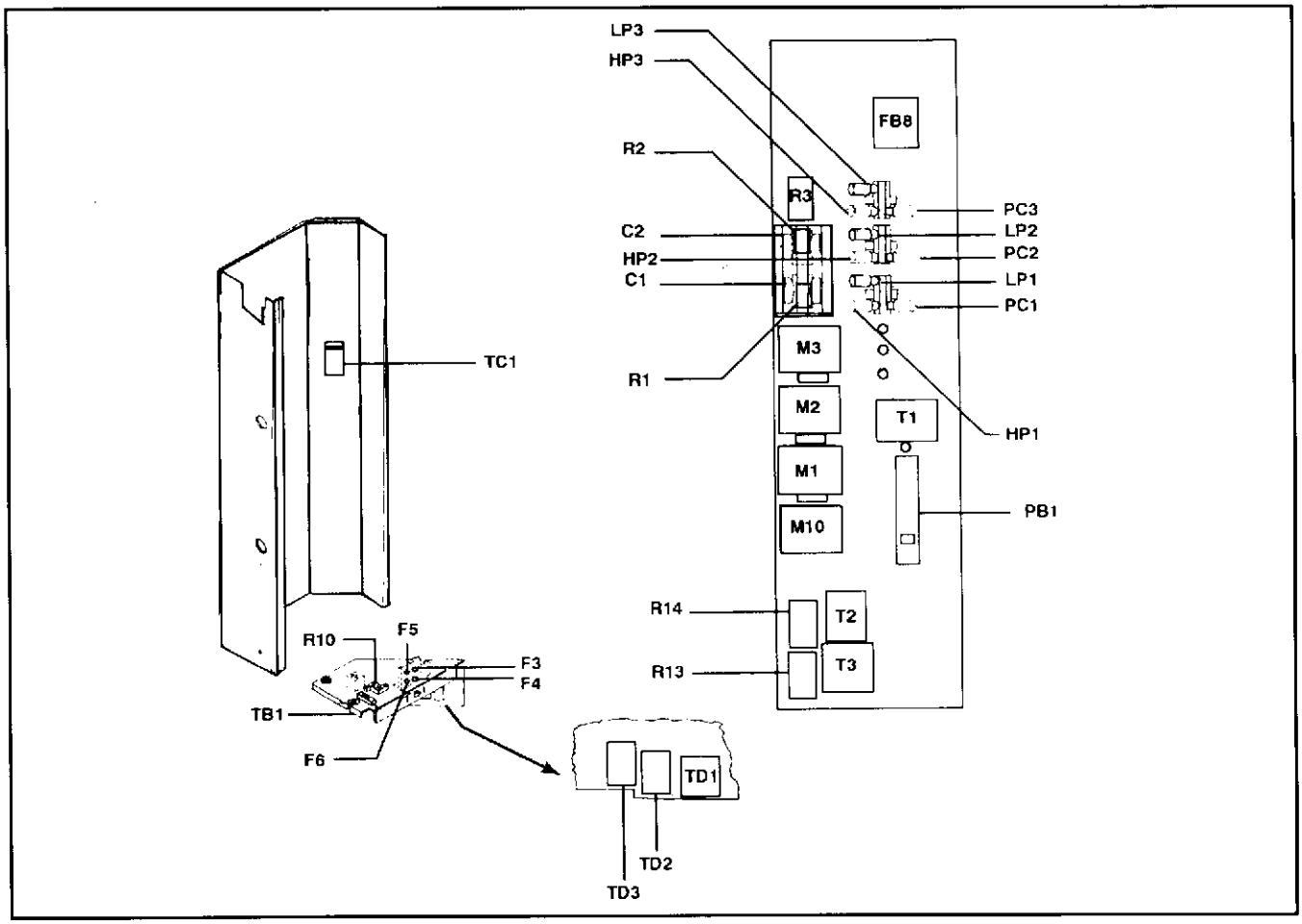


Figure 38. Main Control Box



PARTS LIST ①

QUANTITY PER UNIT 075G	085G	110G	125G	150G	DESCRIPTION	PART NO.
CONDENSING SECTION						
2					COMPRESSOR, 3.25 HP, 208-230/60/3	565148B-04
2					COMPRESSOR, 3.25 HP, 460/60/3, 380/50/3, 415/50/3	565148B-05
2					COMPRESSOR, 3.25 HP, 575/60/3	565148B-06
	2		3		COMPRESSOR, 3.5 HP, 208-230/60/3	565148B-07
	2		3		COMPRESSOR, 3.5 HP, 460/60/3, 380/50/3, 415/50/3	565148B-08
	2		3		COMPRESSOR, 3.5 HP, 575/60/3	565148B-09
		2		3	COMPRESSOR, 4.5 HP, 208-230/60/3	565148B-01
		2		3	COMPRESSOR, 4.5 HP, 460/60/3, 380/50/3, 415/50/3	565148B-02
		2		3	COMPRESSOR, 4.5 HP, 575/60/3	565148B-03
2	2	2	2	4	MOTOR MOUNT, CONDENSER FAN	491215B-01
2	2	2	2	4	MOTOR, CONDENSER FAN, 1/2 HP, TEFC, 208-230/60/1	491221B-00
2	2	2	2	4	MOTOR, CONDENSER FAN, 1/2 HP, TEFC, 460/60/1	491222B-00
2	2	2	2	4	MOTOR, CONDENSER FAN, 1/2 HP, TEFC, 575/60/1	497558B-00
2	2		2		CONDENSER FAN BLADE	491217B-01
		2			CONDENSER FAN BLADE	491217B-02
				4	CONDENSER FAN BLADE	565178B-01
1	1	1	1		PRESSURE REGULATING HOT GAS BYPASS VALVE (OPTIONAL)	181723B-00
EVAPORATOR SECTION						
2	2	2	3	3	EXPANSION VALVE, 4 TON	240296B-19
2	2	2			BLOWER/HOUSING ASSEMBLY (MODELS 075G THRU 085G)	489996AG01
		2	2	2	BLOWER/HOUSING ASSEMBLY (MODELS 110G THRU 150G)	489996AG02
1	1	1			EVAPORATOR FAN SHAFT (MODELS 075G THRU 085G)	551976B-01
		1	1	1	EVAPORATOR FAN SHAFT (MODELS 110G THRU 150G)	489723B-01
2	2	2	2	2	1/4 x 4.5" KEY	232213A-07
1	1	1	1	1	1/4 x 2.0" KEY	232213A-10
2	2	2			BEARING, BALL (MODELS 075G THRU 085G)	008299B-04
		2	2	2	BEARING, BALL (MODELS 110G THRU 150G)	008299B-07
2	2	2	2	2	BEARING MOUNTING BRACKET	491214B-01
1	1	1	1	1	MIXED AIR SENSOR	497541A-02
1	1	1	1	1	HIGH LIMIT (HL21)	497564B-01
1	1	1	1	1	REVERSED AIRFLOW HIGH LIMIT (HL22)	497564B-03
MODEL 075G STANDARD MOTOR						
1					SUPPLY FAN MOTOR, 1 HP, 208-230/460/60/3	497528B-00
1					SUPPLY FAN MOTOR, 1 HP, 575/60/3	497529B-00
1					MOTOR SHEAVE, 1 GROOVE, 3.80" PD, 5/8" BORE	292254A-00
1					BLOWER SHEAVE, 1 GROOVE, 6.50" PD, 1" BORE	005362X-00
1					BELT, A-31	003655A-00
MODEL 075G OVERSIZED MOTOR						
1					SUPPLY FAN MOTOR, 1.5 HP, 208-230/460/60/3	497530B-00
1					SUPPLY FAN MOTOR, 1.5 HP, 575/60/3	497531B-00
1					MOTOR SHEAVE, 1 GROOVE, 3.80" PD, 5/8" BORE	292254A-00
1					BLOWER SHEAVE, 1 GROOVE, 5.50" PD, 1" BORE	000971X-00
1					BELT, A-29	301834A-00
MODEL 085G STANDARD MOTOR						
	1				SUPPLY FAN MOTOR, 1.5 HP, 208-230/460/60/3	497530B-00
	1				SUPPLY FAN MOTOR, 1.5 HP, 575/60/3	497531B-00
	1				MOTOR SHEAVE, 1 GROOVE, 3.80" PD, 5/8" BORE	292254A-00
	1				BLOWER SHEAVE, 1 GROOVE, 5.50" PD, 1" BORE	000971X-00
	1				BELT, A-29	301834A-00
MODEL 085G OVERSIZED MOTOR						
	1				SUPPLY FAN MOTOR, 2 HP, 208-230/460/60/3	497532B-00
	1				SUPPLY FAN MOTOR, 2 HP, 575/60/3	497533B-00
	1				MOTOR SHEAVE, 1 GROOVE, 4.40" PD, 7/8" BORE	007289X-00
	1				BLOWER SHEAVE, 1 GROOVE, 5.70" PD, 1" BORE	000970X-00
	1				BELT, A-29	301834A-00
MODEL 110G STANDARD MOTOR						
		1			SUPPLY FAN MOTOR, 2 HP, 208-230/460/60/3	497532B-00
		1			SUPPLY FAN MOTOR, 2 HP, 575/60/3	497533B-00
		1			MOTOR SHEAVE, 1 GROOVE, 3.80" PD, 7/8" BORE	313106A-00
		1			BLOWER SHEAVE, 1 GROOVE, 6.20" PD	005414X-00
		1			BELT, A-31	003655A-00
		1			BLOWER SHEAVE BUSHING, 1.188" BORE	008044X-00

① This is only a partial listing of the replacement parts available.
Contact your local sales representative for additional information.

Continued on next page

PARTS LIST ①

QUANTITY PER UNIT					DESCRIPTION	PART NO.
075G	085G	110G	125G	150G		
MODEL 110G OVERSIZED MOTOR						
		1			SUPPLY FAN MOTOR, 3 HP, 208-230/460/60/3	497534B-00
		1			SUPPLY FAN MOTOR, 3 HP, 575/60/3	497535B-00
		1			MOTOR SHEAVE, 1 GROOVE, 4.40" PD, 7/8" BORE	007289X-00
		1			BLOWER SHEAVE, 1 GROOVE, 6.20" PD	005414X-00
		1			BELT, A-31	003655A-00
		1			BLOWER SHEAVE BUSHING, 1.188" BORE	008044X-00
MODELS 125G & 150G STANDARD MOTOR						
			1	1	SUPPLY FAN MOTOR, 3 HP, 208-230/460/60/3	497534B-00
			1	1	SUPPLY FAN MOTOR, 3 HP, 575/60/3	497535B-00
			1	1	MOTOR SHEAVE, 1 GROOVE, 4.40" PD, 7/8" BORE	007289X-00
			1	1	BLOWER SHEAVE, 1 GROOVE, 6.50" PD	005738X-00
			1	1	BELT, A-31	003655A-00
			1	1	BLOWER SHEAVE BUSHING, 1.188" BORE	008044X-00
MODELS 125G & 150G OVERSIZED MOTOR						
			1	1	SUPPLY FAN MOTOR, 5 HP, 208-230/460/60/3	497536B-00
			1	1	SUPPLY FAN MOTOR, 5 HP, 575/60/3	497537B-00
			1	1	MOTOR SHEAVE, 2 GROOVE, 4.40" PD, 7/8" BORE	006076X-00
			1	1	BLOWER SHEAVE, 2 GROOVE, 5.50" PD	200621X-00
			2	2	BELT, A-29	301834A-00
			1	1	BLOWER SHEAVE BUSHING, 1.188" BORE	008044X-00
FILTERS						
3	3	3			FILTER, 25 x 25 x 2 (MODELS 075G THRU 085G)	658104A-03
3	3	3			OPTIONAL PLEATED 25 x 25 x 2 (MODELS 075G THRU 085G)	312980B-07
		3	3	3	FILTER, 20 x 25 x 2 (MODELS 110G THRU 150G)	658104A-02
		3	3	3	FILTER, 16 x 25 x 2 (MODELS 110G THRU 150G)	658104A-01
		3	3	3	OPTIONAL PLEATED 16 x 25 x 2 (MODELS 110G THRU 150G)	312980B-02
		3	3	3	OPTIONAL PLEATED 20 x 25 x 2 (MODELS 110G THRU 150G)	312980B-04
MAIN CONTROL BOX COMPONENTS						
2	2	2	3	3	R1-2-3, HIGH PRESSURE RELAY, 1P, 24V	437558B-00
2	2	2	3	3	TD1-2-3, COMPRESSOR TIME DELAY, SPST, 24V	282101B-27
2	2	2	2	4	C1-2-3-4, 5.0 MFD FAN MOTOR CAPACITOR, 208-230V	492637A-01
2	2	2	2	4	C1-2-3-4, 7.5 MFD FAN MOTOR CAPACITOR, 460V, 575V	492637A-02
2	2	2	3	3	HP1-2-3, HIGH PRESSURE CONTROL	473561B-12
2	2	2	3	3	LP1-2-3, LOW PRESSURE SWITCH, NO LOW AMBIENT OPTION	473561B-13
2	2	2	3	3	LP1-2-3, LOW PRESSURE SWITCH WITH LOW AMBIENT OPTION	473561B-14
2	2	2	3	3	PC1-2-3, CONDENSER FAN LOW AMBIENT PRESSURE SWITCH	473561B-15
2	2	2	3	3	HIGH/LOW MANIFOLD	497538B-01
1	1	1	1	1	PB1, 3 POLE MAIN POWER BLOCK	491256B-01
2	2	2			M1-2, COMP. CONT. W/O AUX. CONTACT, 25 FLA, 208-230/460/575	417696B-03
			3	3	M1-2-3, COMP. CONT. W/ AUX. CONTACT, 25 FLA, 208-230/460/575	497647B-03
1	1	1	1	1	M10, SUPPLY FAN CONTACTOR, 25 FLA, 208-230/460/575	417696B-03
1	1	1	1	1	TC1, FANTROL THERMOSTAT, 208-230/460/575	497509B-01
TRANSFORMERS						
1	1	1	1	1	T1, MAIN CONTROL TRANSFORMER, 208-230V/24V, 75VA	467381B-01
1	1	1	1	1	T1, MAIN CONTROL TRANSFORMER, 460V/24V, 75VA	467381B-11
1	1	1	1	1	T1, MAIN CONTROL TRANSFORMER, 575V/24V, 75VA	467381B-12
FUSES						
2	2	2	2	2	F5-6, GAS HEAT FUSE, 0.8A, 460V	497598B-03
2	2	2	2	2	F5-6, GAS HEAT FUSE, 0.5A, 575V	497598B-02
			2	2	FUSE ON FB8, 15A, 208-230V	258605D-05
MISCELLANEOUS UNIT CONTROLS						
1	1	1	1	1	TC5, RETURN AIR FIRESTAT, ALL UNITS	479388B-02
1	1	1	1	1	TC6, SUPPLY AIR FIRESTAT, HEAT UNITS	479388B-03
1	1	1	1	1	TC6, SUPPLY AIR FIRESTAT, COOLING ONLY	479388B-02
1	1	1	1	1	TC7, FREEZESTAT	497540B-01
1	1	1	1	1	PC5, CLOGGED FILTER PRESSURE CONTROL	497627B-02
1	1	1	1	1	PC6, FAN SWITCH PRESSURE CONTROL	497555A-01
ECONOMIZER COMPONENTS						
1	1	1	1	1	2-POSITION DAMPER MOTOR, HONEYWELL 8415A	497505B-02
1	1	1	1	1	ENTHALPY CONTROL, HONEYWELL C7400A	492622B-02
1	1	1	1	1	PROPORTIONAL DAMPER MOTOR, HONEYWELL M7415A	497505B-01
1	1	1	1	1	ECONOMIZER CONTROL MODULE, HONEYWELL W7459A	491209B-01
1	1	1	1	1	MIXED AIR SENSOR	497541A-02

① This is only a partial listing of the replacement parts available. Contact your local sales representative for additional information.

GAS HEATING SECTION

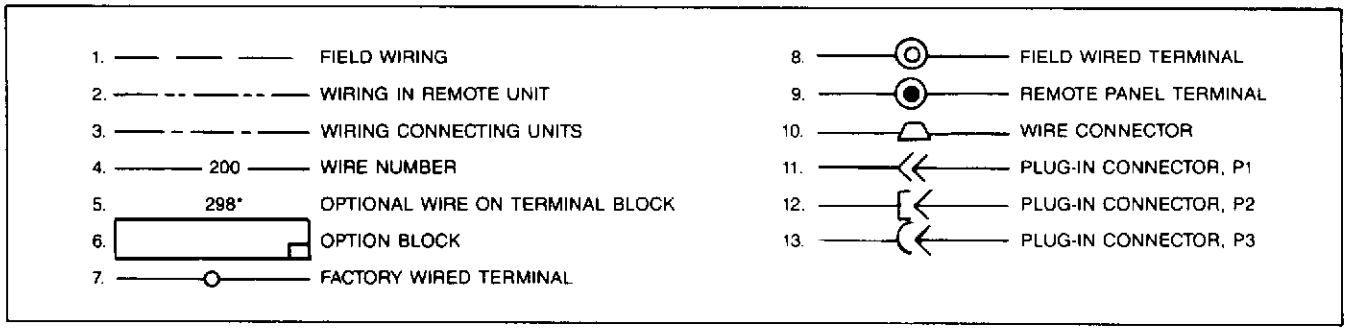
QUANTITY PER UNIT					DESCRIPTION	PART NO.
120	140	210	240	280		
1	1	1	1		FURNACE VENTOR MOTOR, 1/16 HP, NATURAL GAS & PROPANE	497570B-01
				1	FURNACE VENTOR MOTOR, 1/12 HP, NATURAL GAS & PROPANE	497570B-02
1	1	1	1	1	TD9, TIME DELAY RELAY, 24V, NATURAL GAS & PROPANE	497569B-01
1	1	1	1	1	R9, VENTOR MOTOR RELAY, 24V, NATURAL GAS & PROPANE	473565B-06
1	1	1	1	1	HL23, ROLLOUT TEMPERATURE LIMIT, NATURAL GAS & PROPANE	497564B-02
1	1	1	1	1	ELECTRONIC IGNITION MODULE, FENWAL	497510B-01
1	1				IGNITOR CABLE, 15", NATURAL GAS & PROPANE	554343AG02
		1	1	1	IGNITOR CABLE, 11", NATURAL GAS & PROPANE	554343AG01
1	1				GAS VALVE, NATURAL GAS	497511B-01
		1	1	1	GAS VALVE, NATURAL GAS	497511B-02
1	1				GAS VALVE, PROPANE	497511B-03
		1	1	1	GAS VALVE, PROPANE	497511B-04
1	1	1	1	1	FLAME SENSOR, NATURAL GAS & PROPANE	497561B-01
1	1	1	1	1	IGNITOR ELECTRODE, NATURAL GAS & PROPANE	497556B-01

① This is only a partial listing of the replacement parts available. Contact your local sales representative for additional information.

WIRING DIAGRAMS

LEGEND:

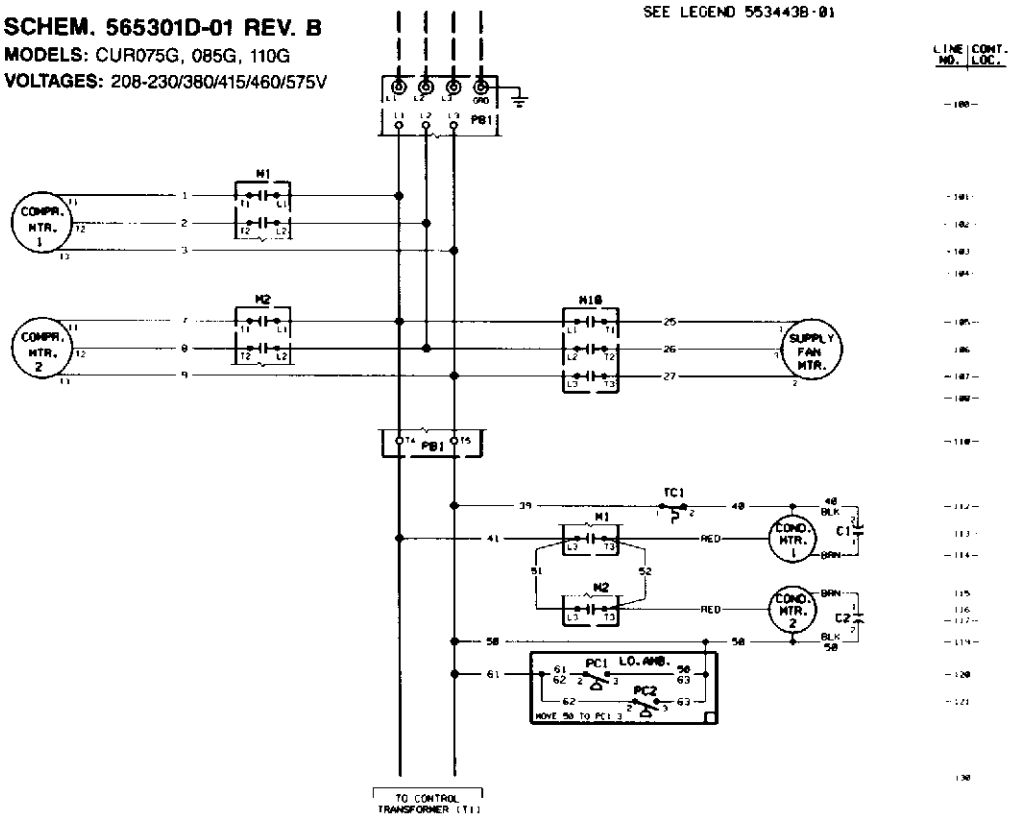
Designation	Description	Standard Location
C1, 2, 3, 4	Capacitors for Condenser Motors	Control Box
C5	Capacitor for Furnace Ventor Motor	Heat Sect.
CM1, 2, 3, 4	Condenser Fan Motor	Condenser Sect.
COMPR 1—3	Compressors 1—3	Condenser Sect.
DM	Damper Motor	Econ./Ret. Sect.
DS1	Disconnect Switch, Main	Control Box
DS3	Disconnect Switch, Main Elec. Heat	Heat Sect.
F1	Fuse, Control Circuit	Control Box
F3, 4	Fuse, Pumpdown	Control Box
F5, 6	Fuse, Gas Heat	Control Box
FB8	Fuseblock, Power Control	Control Box
FB30	Fuseblock, Power Control	Heat Sect.
FB31—33	Fuseblock, Electric Heat	Heat Sect.
FRS	Flame Rectification Sensor	Heat Sect.
GRD	Ground	Control Box & Heat Sect.
GV1	Gas Valve, Main	Heat Sect.
HL1—3	Hi-Limits, Elec. Heat, Secondary	Heat Sect.
HL21, 22	Hi-Limits, Gas Heat	Fan Sect.
HL23	Hi-Limit, Gas Heat, Rollout	Heat Sect.
HL31, 32	Hi-Limits, Elec. Heat, Primary	Heat Sect.
HP1—3	High Pressure Controls	Control Box
HTR1—3	Heaters, Crankcase Heaters	On Compressors
IGN	Ignition Electrode	Heat Sect.
LP1—3	Low Pressure Controls	Control Box
M1—3	Contactors, Compressor	Control Box
M1—3 AUX.	Auxiliary Contacts	Control Box
M10	Contactor, Supply Fan	Control Box
M31—33	Contactors, Electric Heat	Heat Sect.
M31—33 AUX.	Auxiliary Contacts	Heat Sect.
MAT	Mixed Air Sensor	Supply Fan Sect.
MJ	Mechanical Jumper	Control Box & Economizer Sect.
OAE	Outside Air Enthalpy Sensor	Econ./Ret. Sect.
P1	Plug, For Economizer	Supply Fan Sect.
P2	Plug, For Heat	Control Box
P3	Plug, For Alarms	Control Box
PB1	Powerblock, Main	Control Box
PB3	Powerblock, Electric Heat	Heat Sect.
PC1, 2, 3	Pressure Switch, Low Ambient	Control Box
PC5	Pressure Switch, Clogged Filter	Supply Fan Sect.
PC6	Pressure Switch, Fan	Supply Fan Sect.
PCB1	Local/Remote Status Board	Control Box
R1—3	Relays, High Pressure	Control Box
R9	Relay, Heat	Heat Sect.
R10	Relay, Ventilation/Smoke	Control Box
R13, 14	Relays, Pumpdown	Control Box
RAE	Return Air Enthalpy Sensor	Econ/Return Sect.
SAF	Supply Air Fan Motor	Supply Fan Sect.
SV1—3	Solenoid Valves, Liquid	Supply Fan Sect.
SV5	Solenoid Valve, Hot Gas Bypass	Supply Fan Sect.
T1	Transformer, Main Control	Control Box
T2	Transformer, Pumpdown	Control Box
T3	Transformer, Gas Heat	Control Box
TB1	Terminal Block, 24V Field	Control Box
TB2	Terminal Block, 24V Field	Supply Fan Sect.
TC1	Thermostat, FANTROL	Control Box
TC5	Thermostat, Return Air Firestat	Supply Fan Sect.
TC6	Thermostat, Supply Air Firestat	Supply Fan Sect.
TC7	Thermostat, Freezestat	Supply Fan Sect.
TC8	Thermostat, Low Ambient Lockout	Supply Fan Sect.
TC15	Thermostat, Power Saver	Heat Sect.
TD1—3	Time Delay, Compressor Lockout	Control Box
TD9	Time Delay, Heat	Heat Sect.
VM1	Furnace Ventor Motor	Gas Heat Sect.
VMS	Ventor Motor Centrifugal Switch	Gas Heat Sect.



POWER WIRING DIAGRAMS

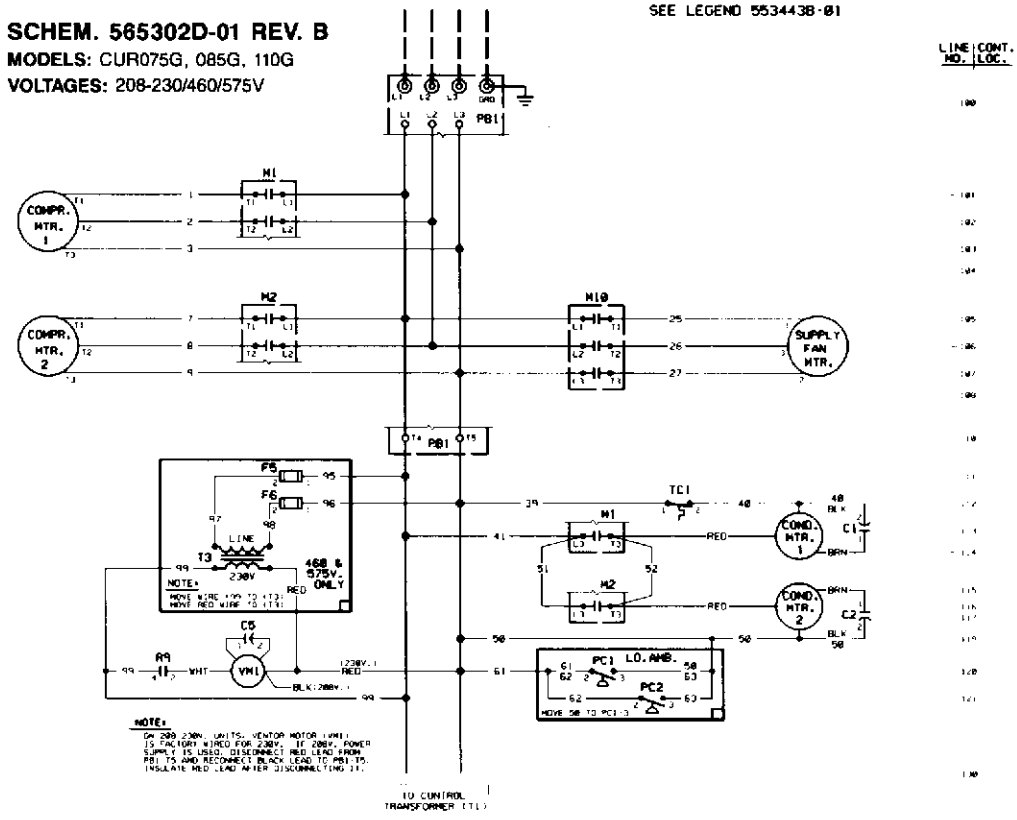
COOLING ONLY, ELECTRIC HEAT OR HYDRONIC HEAT

SCHEM. 565301D-01 REV. B
MODELS: CUR075G, 085G, 110G
VOLTAGES: 208-230/380/415/460/575V



GAS HEAT

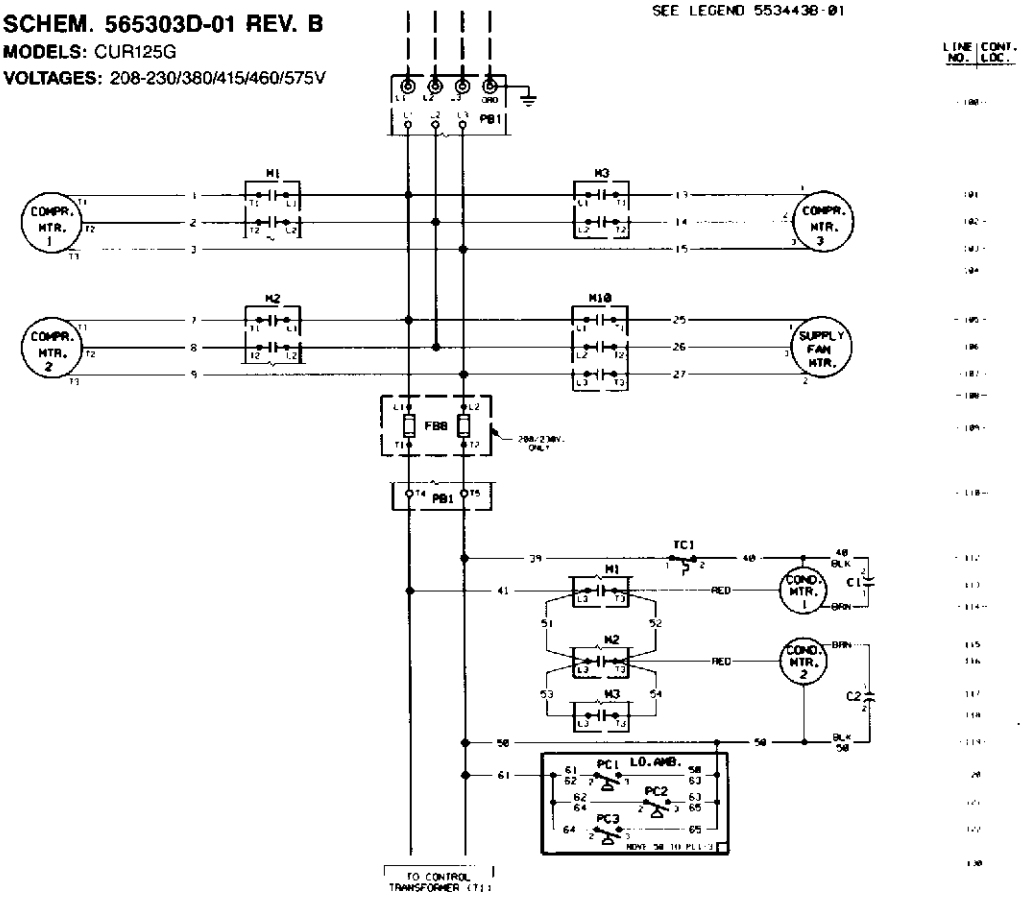
SCHEM. 565302D-01 REV. B
MODELS: CUR075G, 085G, 110G
VOLTAGES: 208-230/460/575V



COOLING ONLY, ELECTRIC HEAT OR HYDRONIC HEAT

SCHEM. 565303D-01 REV. B
MODELS: CUR125G
VOLTAGES: 208-230/380/415/460/575V

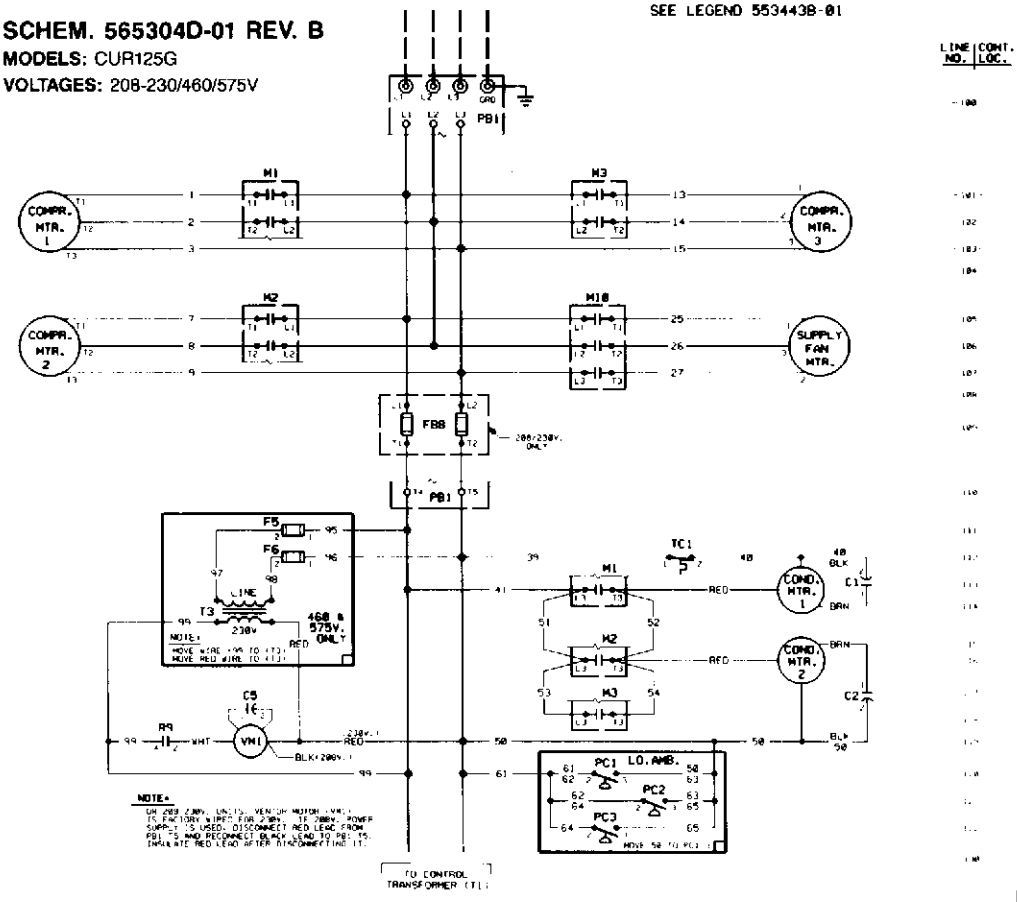
SEE LEGEND 553443B-01



GAS HEAT

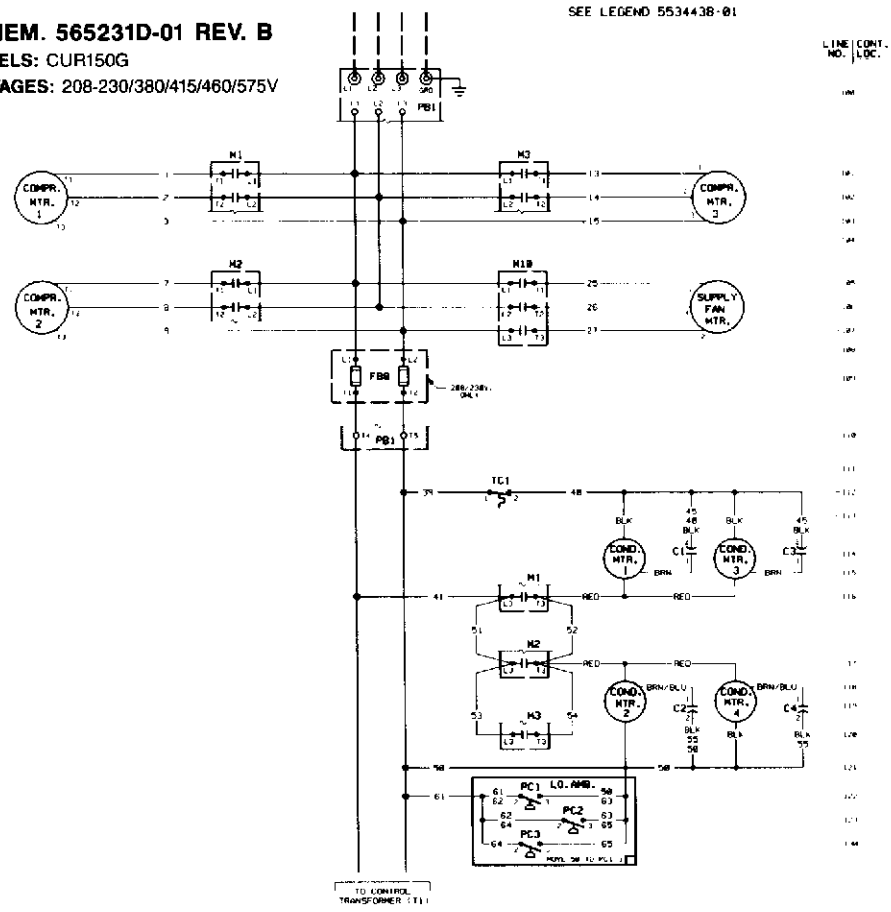
SCHEM. 565304D-01 REV. B
MODELS: CUR125G
VOLTAGES: 208-230/460/575V

SEE LEGEND 553443B-01



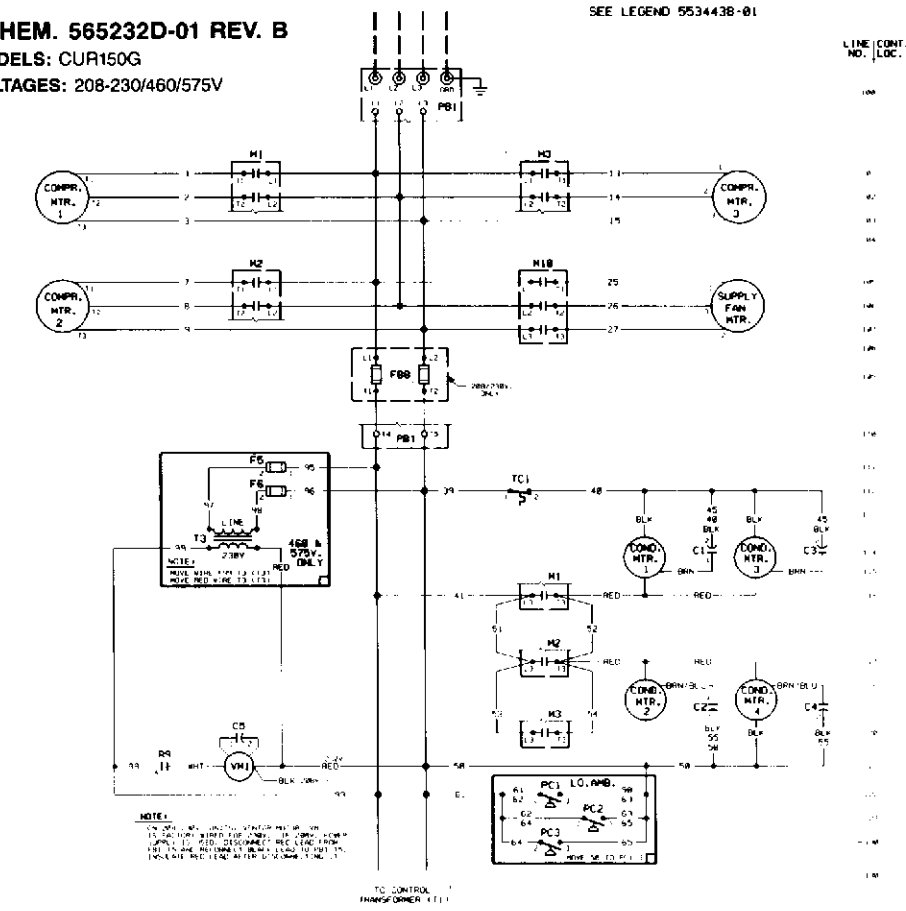
COOLING ONLY, ELECTRIC HEAT OR HYDRONIC HEAT

SCHEM. 565231D-01 REV. B
MODELS: CUR150G
VOLTAGES: 208-230/380/415/460/575V



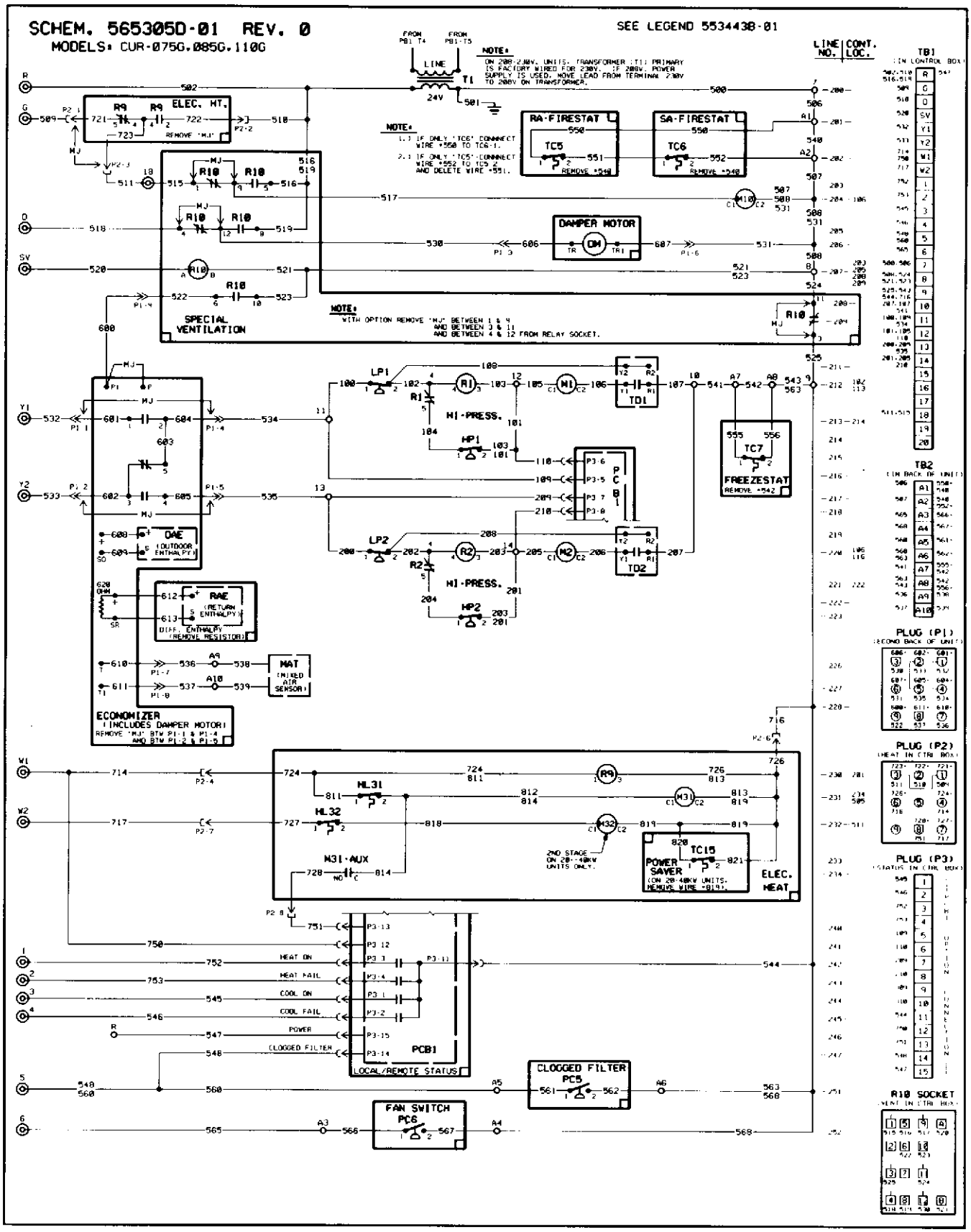
GAS HEAT

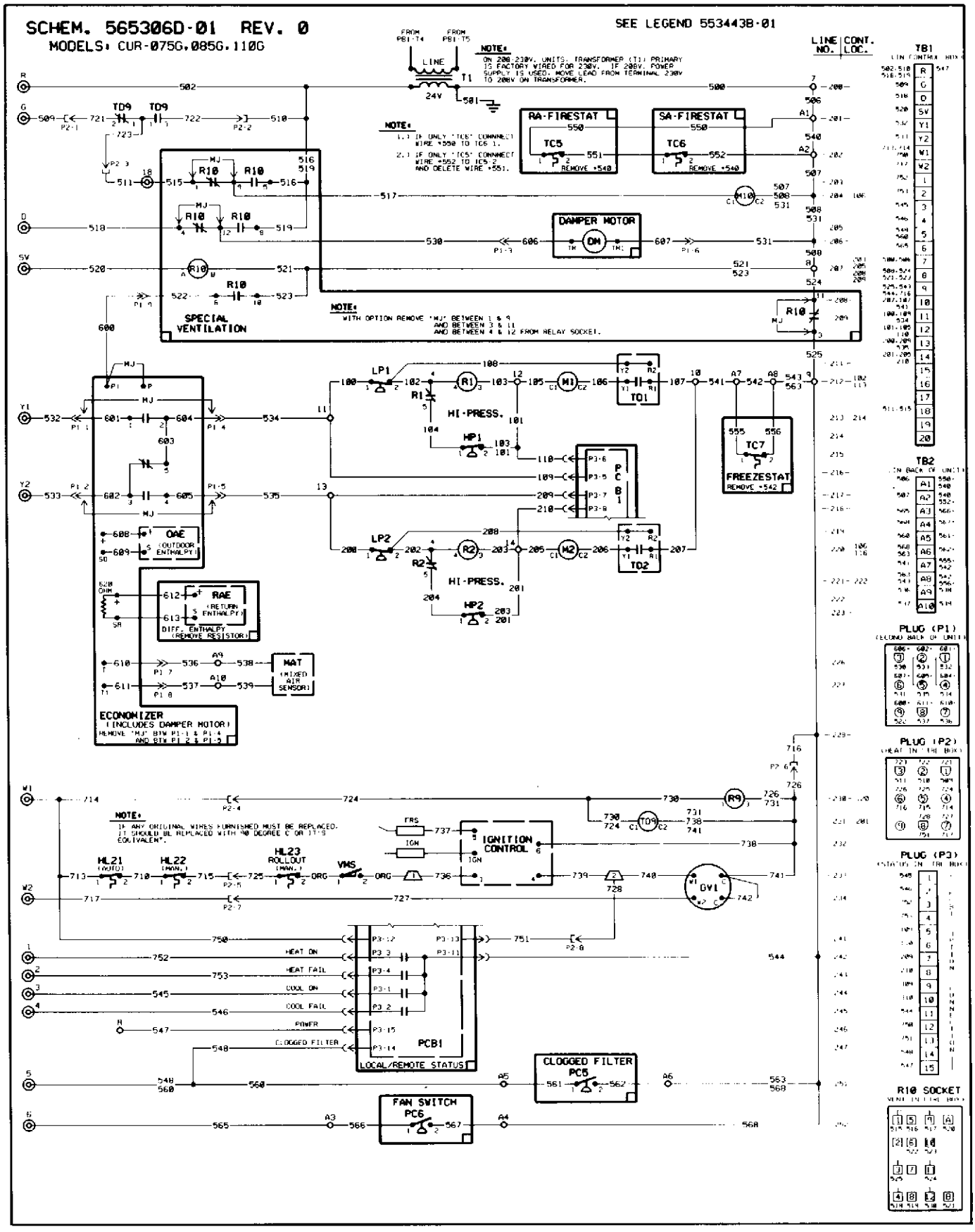
SCHEM. 565232D-01 REV. B
MODELS: CUR150G
VOLTAGES: 208-230/460/575V

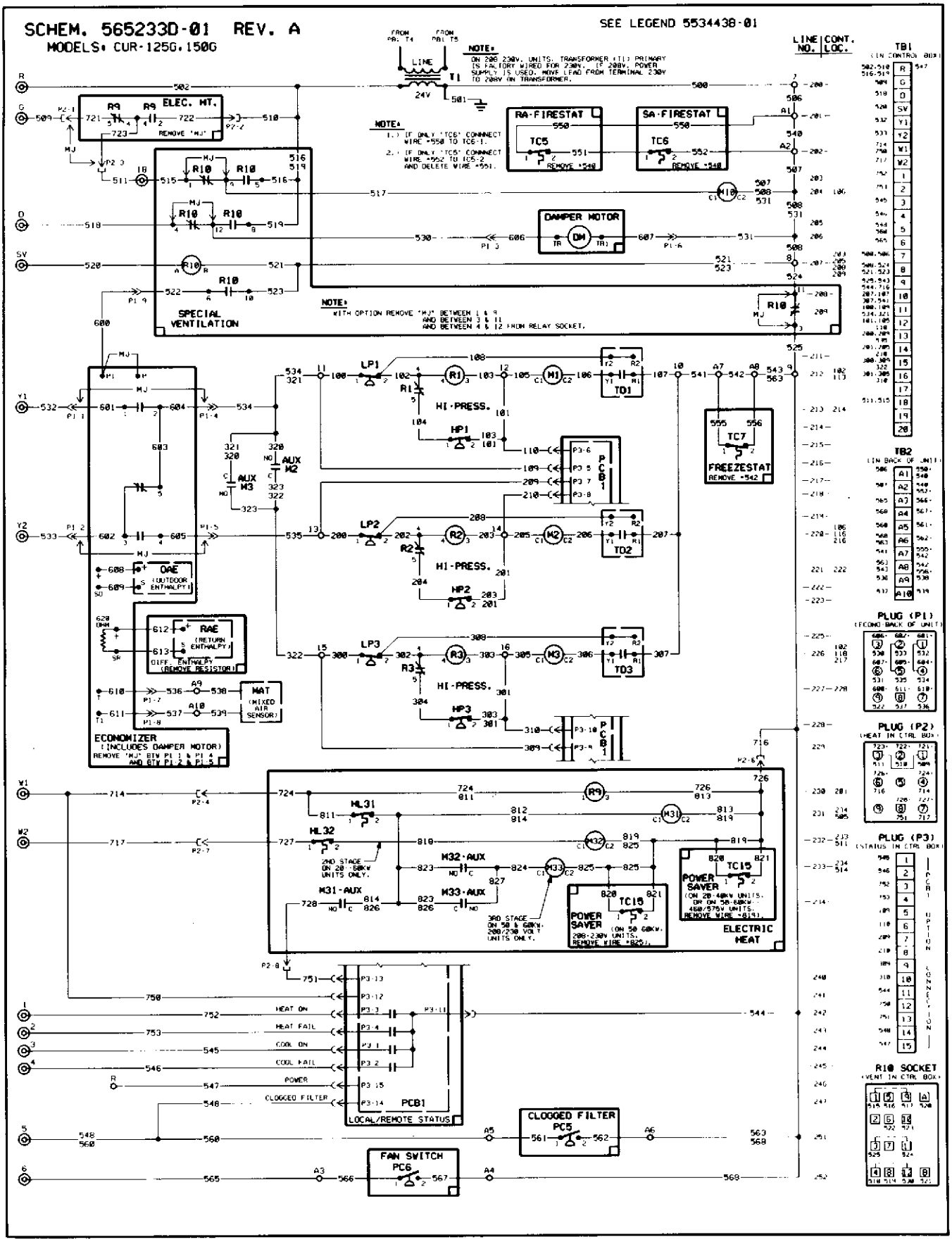


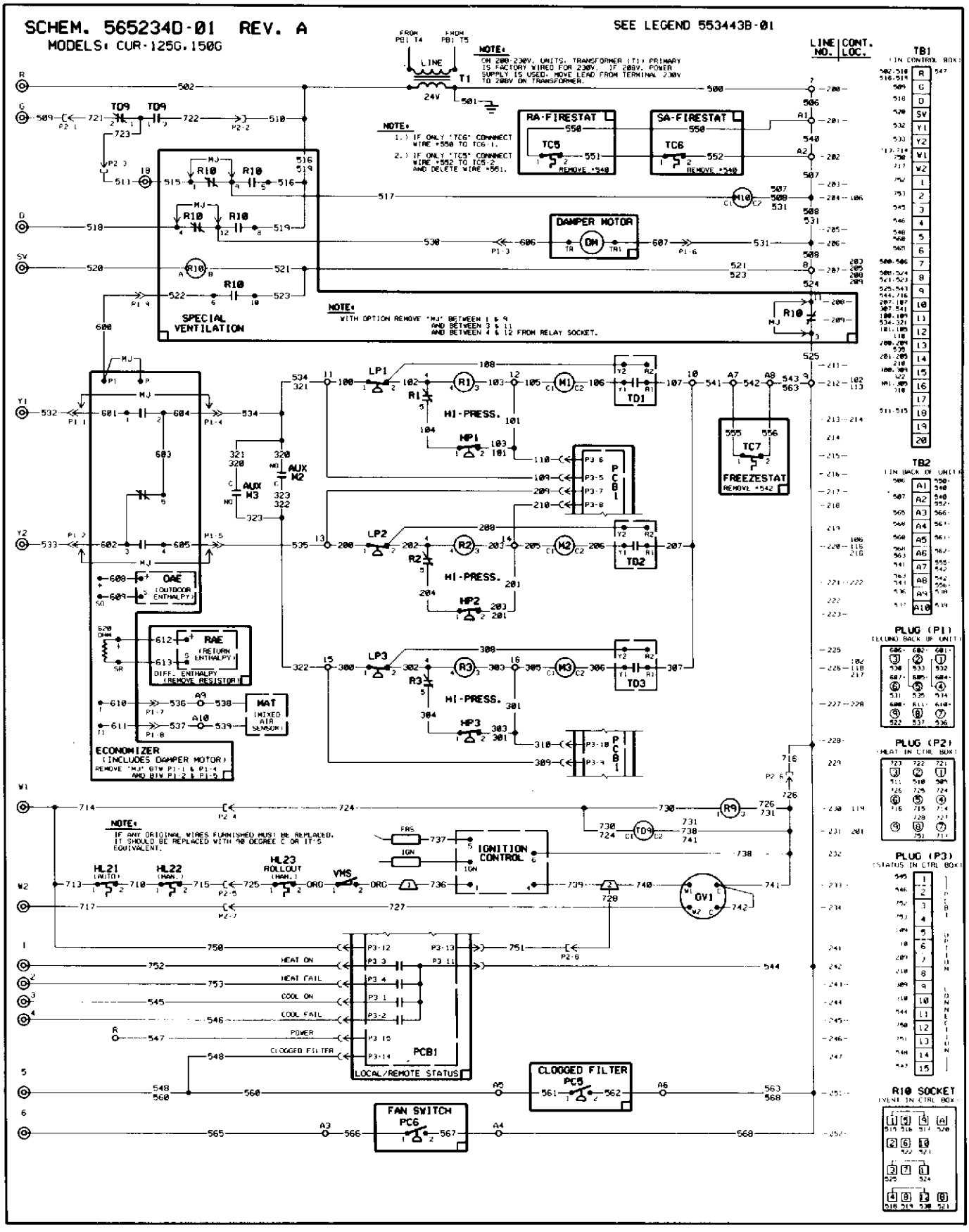
CONTROL WIRING DIAGRAMS

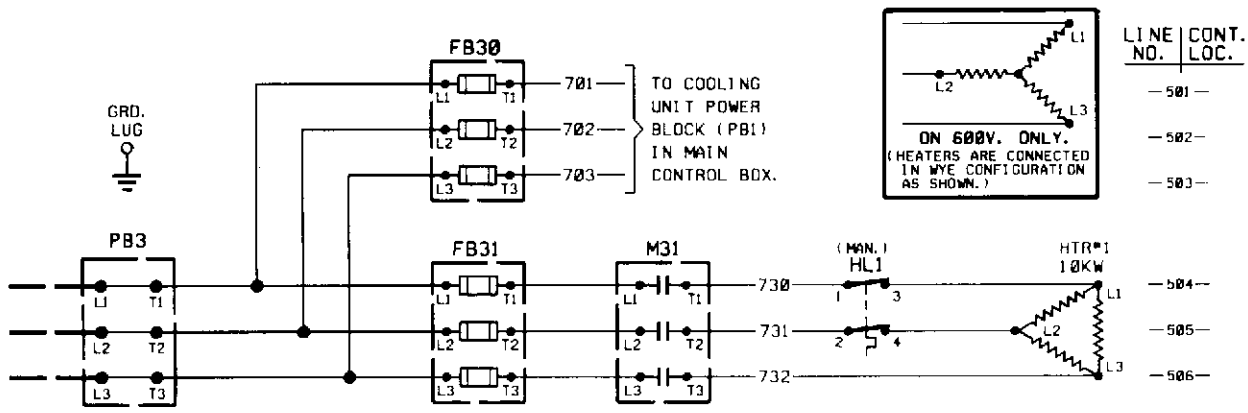
COOLING ONLY, ELECTRIC HEAT OR HYDRONIC HEAT




SCHEM. 565306D-01 REV. 0
MODELS: CUR-075G,085G,110G
SEE LEGEND 553443B-01
NOTE:
ON 208-230V. UNITS, TRANSFORMER (T1) PRIMARY IS FACTORY WIRED FOR 230V. IF 208V. POWER SUPPLY IS USED, MOVE LEAD FROM TERMINAL 230V TO 208V ON TRANSFORMER.
NOTE:
1.) IF ONLY "TC5" CONNECT WIRE #550 TO TC6 1.
2.) IF ONLY "TC6" CONNECT WIRE #552 TO TC5 2. AND DELETE WIRE #551.
RA-FIRESTAT
SA-FIRESTAT
TC5
TC6
REMOVE #540
REMOVE #542
DAMPER MOTOR
SPECIAL VENTILATION
NOTE:
WITH OPTION REMOVE "MJ" BETWEEN 1 & 9, AND BETWEEN 3 & 11 AND BETWEEN 4 & 12 FROM RELAY SOCKET.
LP1
LP2
HP1
HP2
HI-PRESS.
TD1
TD2
TC7
FREEZESTAT
PCB1
OAE
(OUTDOOR ENTHALPY)
RAE
(RETURN ENTHALPY)
DIFF. ENTHALPY (REMOVE RESISTOR)
MAT
(MIXED AIR SENSOR)
ECONOMIZER
(INCLUDES DAMPER MOTOR)
REMOVE "MJ" BTW P1-1 & P1-4 AND BTW P1-2 & P1-5
NOTE:
IF ANY ORIGINAL WIRES FURNISHED MUST BE REPLACED, IT SHOULD BE REPLACED WITH #90 DEGREE C OR IT'S EQUIVALENT.
HL21 (AUTO)
HL22 (MAN.)
HL23 ROLLOUT (MAN.)
VMS
IGNITION CONTROL
GV1
HEAT ON
HEAT FAIL
COOL ON
COOL FAIL
POWER
CLOGGED FILTER
LOCAL/REMOTE STATUS
CLOGGED FILTER PC5
FAN SWITCH PC6
TB1
TB2
PLUG (P1)
PLUG (P2)
PLUG (P3)
R10 SOCKET


SCHEM. 565233D-01 REV. A
MODELS: CUR-125G,150G
SEE LEGEND 5534438-01
ELEC. HT.
SPECIAL VENTILATION
RA-FIRESTAT
SA-FIRESTAT
DAMPER MOTOR
FREEZESTAT
ECONOMIZER
OAE
RAE
MAT
HI-PRESS.
POWER SAVER
ELECTRIC HEAT
FAN SWITCH PC6
CLOGGED FILTER PC5
LOCAL/REMOTE STATUS
PCB1
TB1
TB2
PLUG (P1)
PLUG (P2)
PLUG (P3)
R10 SOCKET

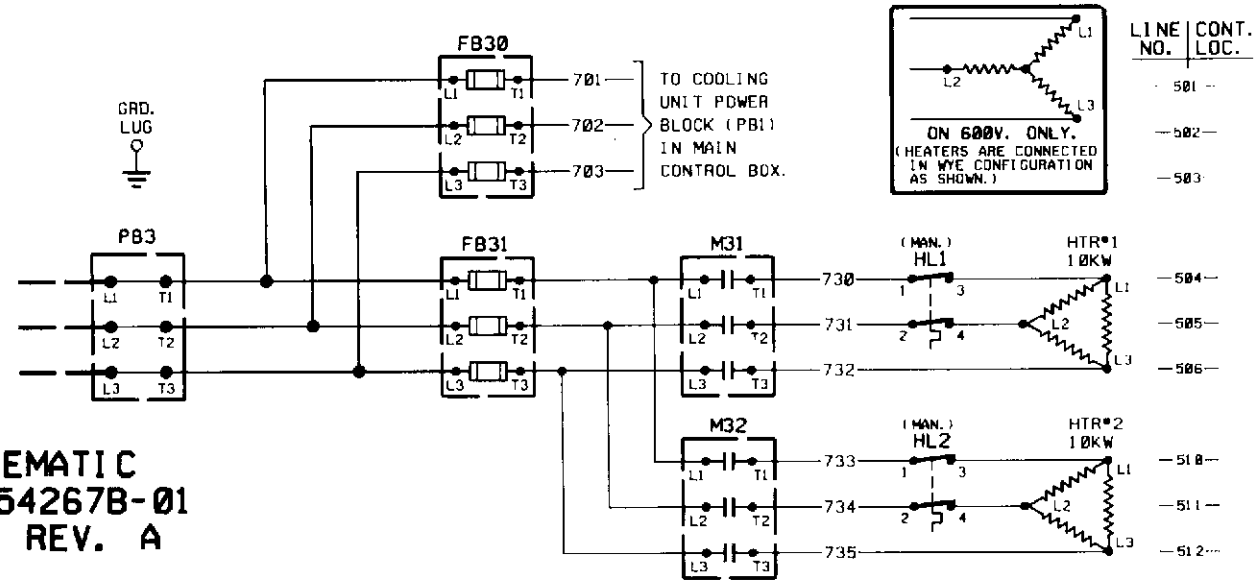

SCHEM. 565234D-01 REV. A
MODELS: CUR-125G,150G
SEE LEGEND 553443B-01
LINE | CONT. NO. | LOC.
TB1
TB2
PLUG (P1)
PLUG (P2)
PLUG (P3)
R10 SOCKET
SPECIAL VENTILATION
ECONOMIZER (INCLUDES DAMPER MOTOR)
RA-FIRESTAT
SA-FIRESTAT
DAMPER MOTOR
FREEZESTAT
HI-PRESS.
IGNITION CONTROL
CLOGGED FILTER PCB
FAN SWITCH PCB
LOCAL/REMOTE STATUS
HEAT ON
HEAT FAIL
COOL ON
COOL FAIL
POWER
CLOGGED FILTER



SCHEMATIC 554266B-01 REV. A

HTR. MODEL	NOM. KW	NOM. VOLTS
E02	10	208/240 380/480/600

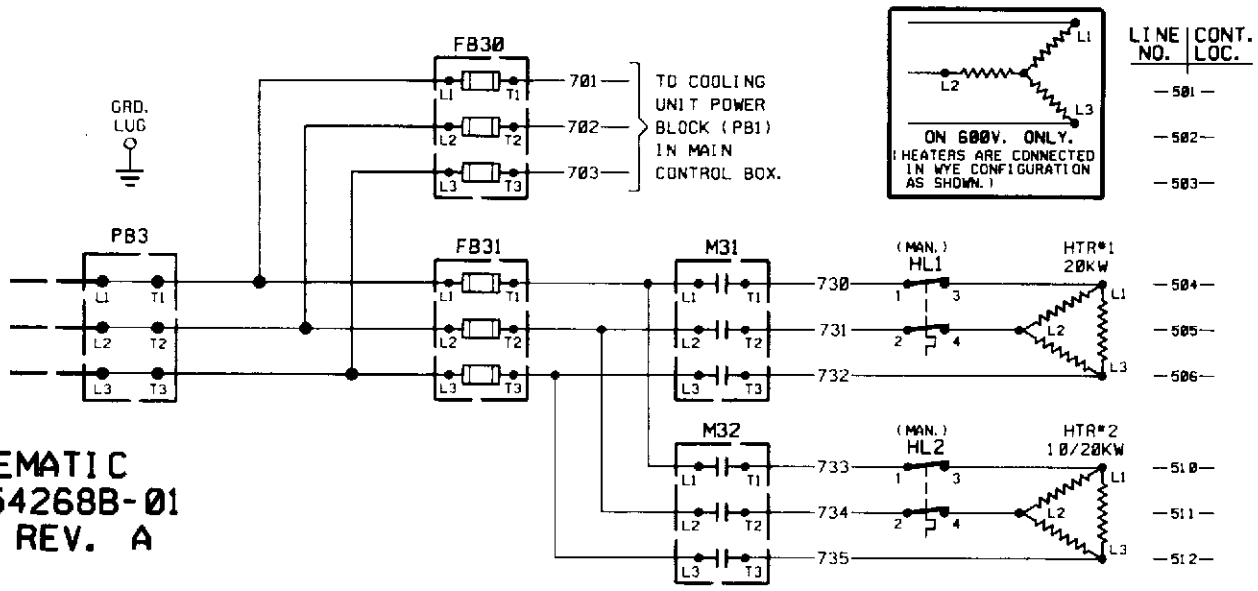
SEE LEGEND 553443B-01



SCHEMATIC 554267B-01 REV. A

HTR. MODEL	NOM. KW	NOM. VOLTS
E05	20	208/240 380/480/600

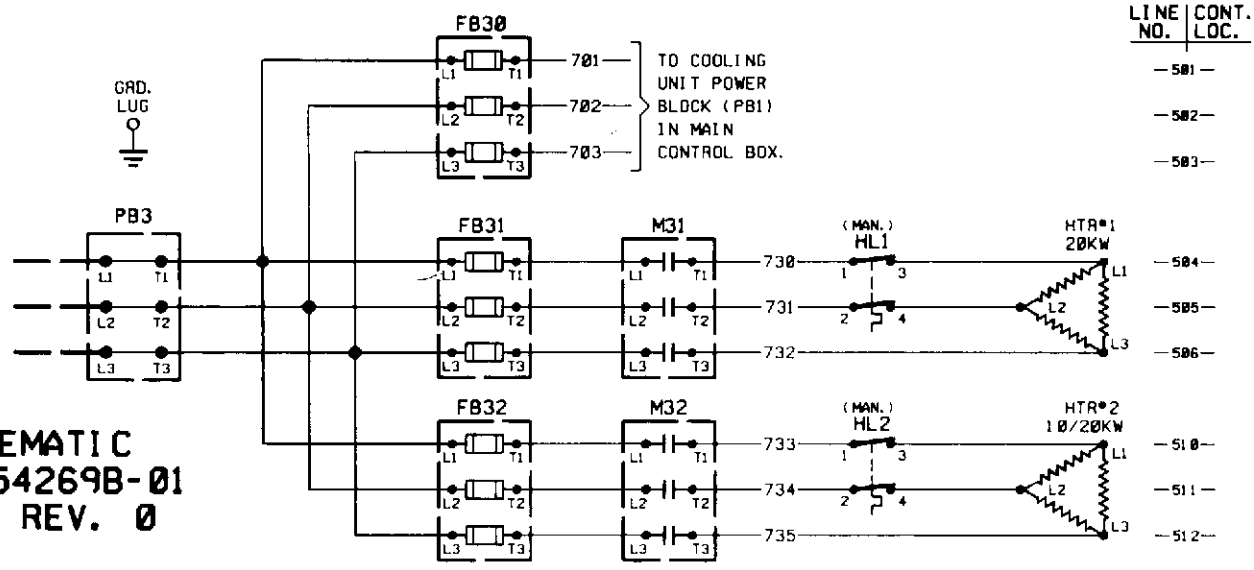
SEE LEGEND 553443B-01



SCHEMATIC 554268B-01 REV. A

HTR. MODEL	NOM. KW	NOM. VOLTS
E08	30	380/480/600
E11	40	380/480/600

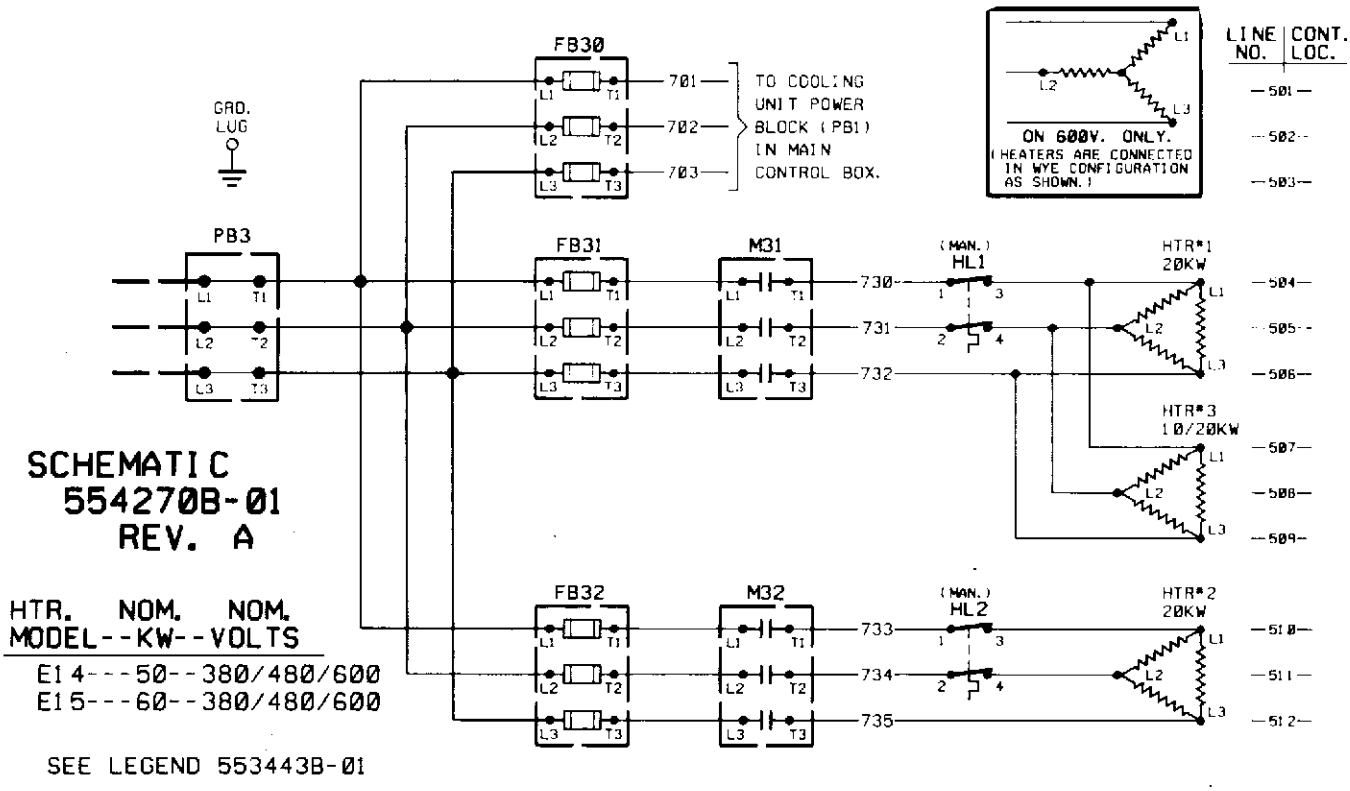
SEE LEGEND 553443B-01



SCHEMATIC 554269B-01 REV. 0

HTR. MODEL	NOM. KW	NOM. VOLTS
E08	30	208/240
E11	40	208/240

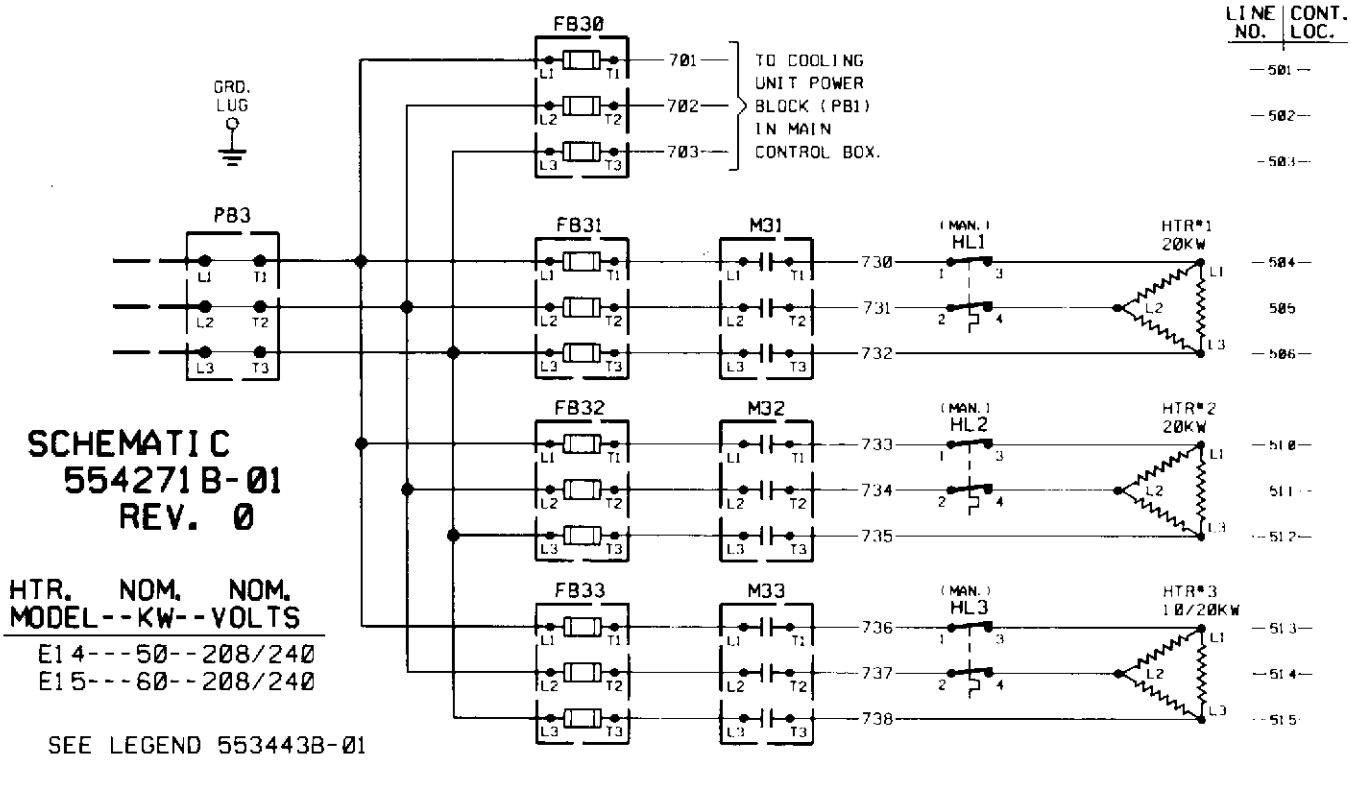
SEE LEGEND 553443B-01



SCHEMATIC
554270B-01
REV. A

HTR. MODEL	NOM. KW	NOM. VOLTS
E14	50	380/480/600
E15	60	380/480/600

SEE LEGEND 553443B-01



SCHEMATIC
554271B-01
REV. 0

HTR. MODEL	NOM. KW	NOM. VOLTS
E14	50	208/240
E15	60	208/240

SEE LEGEND 553443B-01

PRODUCT WARRANTY

SnyderGeneral Corporation, hereinafter referred to as the "Company," warrants that it will provide, at the Company's option, either free replacement parts or free repair of component parts in the event any product manufactured by the Company and used in the United States proves defective in material or workmanship within twelve (12) months from initial startup or eighteen (18) months from the date shipped by the Company, whichever comes first. For additional consideration, the Company warrants that for four (4) years following the initial warranty period it will provide, at the Company's option, free replacement parts for the motor-compressor, or, free replacement for any integral component of the motor-compressor which proves defective in material or workmanship. For an additional consideration, the Company warrants that for nine (9) years following the initial warranty period it will provide free replacement of the heat exchanger in gas-fired or oil-fired furnaces which proves defective in material and workmanship. (Extended warranties for motor-compressors and heat exchangers are not applicable unless separately purchased.)

To obtain assistance under this parts warranty, extended motor-compressor warranty, or extended heat exchanger warranty, simply contact the selling agency. To obtain information or to gain factory help for McQuay, JennFan, AAF, BarryBlower, or ClimateControl brandnames contact SnyderGeneral Corporation, Warranty Claims Department, P.O. Box 1551, Minneapolis, MN 55440, telephone (612) 553-5330.

THIS WARRANTY CONSTITUTES THE BUYER'S SOLE REMEDY. IT IS GIVEN IN LIEU OF ALL OTHER WARRANTIES. THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT AND UNDER NO CIRCUMSTANCES SHALL THE COMPANY BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER THE THEORY BE BREACH OF THIS OR ANY OTHER WARRANTY, NEGLIGENCE OR STRICT TORT.

This parts warranty and the optional extended warranties extend only to the original user. Of course, abuse, misuse, or alteration of the product in any manner voids the Company's warranty obligation. Neither the parts or extended warranty obligates the Company to pay any labor or service costs for removing or replacing parts, or any shipping charges. Refrigerants, fluids, oils, and expendable items such as filters are not covered by this warranty.

The extended warranties apply only to integral components of the motor-compressor or heat exchanger, not to refrigerant controls, electrical controls, or mechanical controls, or to failures caused by failure of those controls.

Attached to this warranty is a requirement for equipment containing motor-compressors and/or furnaces to report startup information. The registration form accompanying the product must be completed and returned to the Company within ten (10) days of original equipment start-up. If that is not done, the date of shipment shall be presumed to be the date of start-up and the warranty shall expire twelve (12) months from that date.

No person (including any agent, salesman, dealer or distributor) has authority to expand the Company's obligation beyond the terms of this express warranty, or to state that the performance of the product is other than that published by the Company.