Carrier
HEATING & COOLING

48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units

Installation, Start-Up and Service Instructions

48HD,LD/HDT,LDT Downshot; 48HH,LH Horizontal;
48HDD,LDD Downshot Dual Compressor; 48HHD,LHD Horizontal Dual Compressor

CONTENTS

	Page
SAFETY CONSIDERATIONS	1
INSTALLATION	1-18
Step 1 — Provide Unit Support	1
• ROOF CURB	
• SLAB MOUNT	
Step 2 — Field Fabricate Ductwork	1
Step 3 — Rig and Place Unit	1
• POSITIONING	
Step 4 — Install Flue Hood	8
Step 5 — Trap Condensate Drain	8
Step 6 — Install Skirt (Downshot Units)	8
Step 7 — Install Gas Piping	8
Step 8 — Make Electrical Connections	9
• FIELD POWER SUPPLY	
• FIELD CONTROL WIRING	
• HEAT ANTICIPATOR SETTINGS	
Step 9 — Make Outdoor Air Inlet Adjustments and Install Outdoor Air Hood	12
• OPTIONAL OUTDOOR AIR DAMPER	
• OPTIONAL ECONOMIZER	
Step 10 — Adjust Evaporator Fan Speed	17
START-UP	18,19
SERVICE	19-27

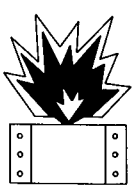
SAFETY CONSIDERATIONS

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

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

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ WARNING



Disconnect gas piping from unit when leak testing at pressure greater than 1/2 psig. Pressures greater than 1/2 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 1/2 psig, it *must* be replaced before use.

⚠ WARNING

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

INSTALLATION

NOTE: 004,005,006 size units in California require the installation of an accessory NOx baffle. Refer to Accessory NOx Baffle Installation Instructions for details.

Step 1 — Provide Unit Support

ROOF CURB (Downshot Units Only) — Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 1. Install insulation, cant strips, roofing and flashing as shown. *Ductwork must be attached to curb.*

IMPORTANT: The gasketing of the unit to the roof curb is critical for water integrity. Install gasketing material with the roof curb as shown in Fig. 1.

Curb should be level. Unit leveling tolerance is 1/16 in. per linear foot in any direction. This is necessary for unit drain to function properly. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. The slab should be 8 in. thick with 4 in. above grade. Install a gravel apron in front of condenser air inlet to prevent grass and foliage from obstructing airflow. Trap condensate drain. Allow for trap when pouring slab.

Step 2 — Field Fabricate Ductwork — On downshot units secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.* Insulate and weatherproof all external ductwork, joints and roof openings with flashing and mastic in accordance with applicable codes. On horizontal units secure all ductwork to flanges on unit supply air and return air openings and building structure.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

A minimum clearance is not required around ductwork. Cabinet return air static shall not exceed −.35 in. wg with economizer or −.45 in. wg without economizer.

Step 3 — Rig and Place Unit — Inspect unit for transportation damage. File any claim with transportation agency. Keep upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference, leveling tolerance is ± 1/16 in. per linear foot in any direction. See Fig. 2 for additional information. Weight is shown in Table 1.

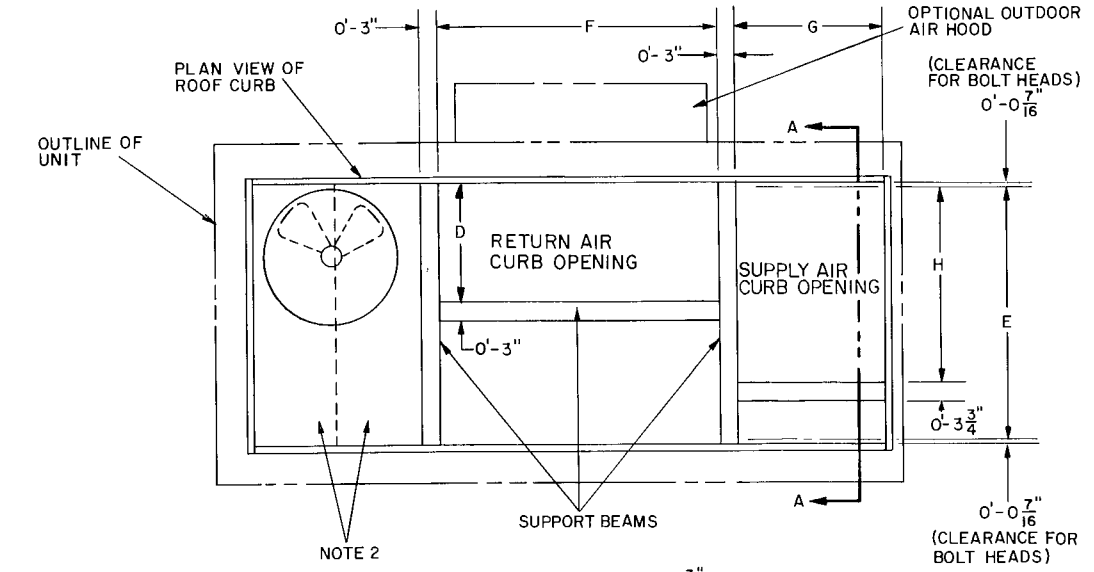
Lifting holes are provided in base rails as shown in Fig. 2. Refer to rigging instructions on unit.

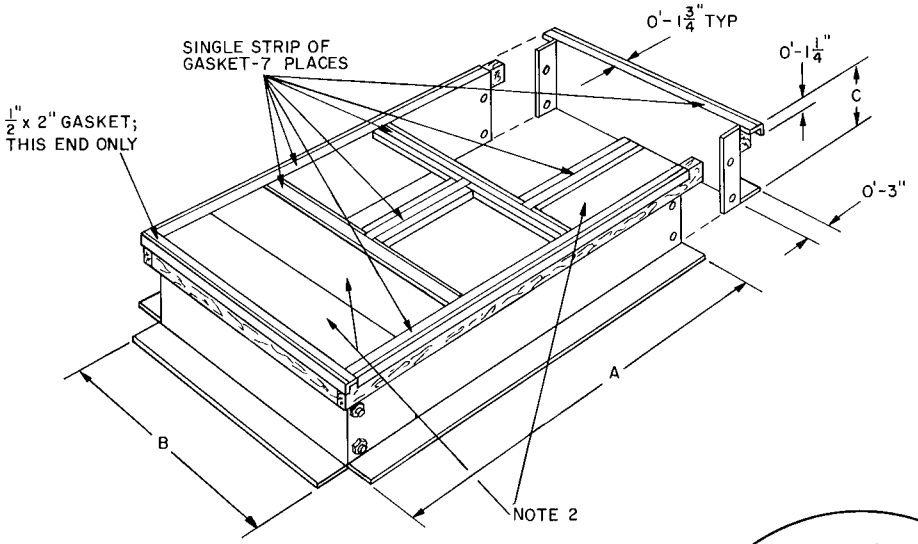
Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

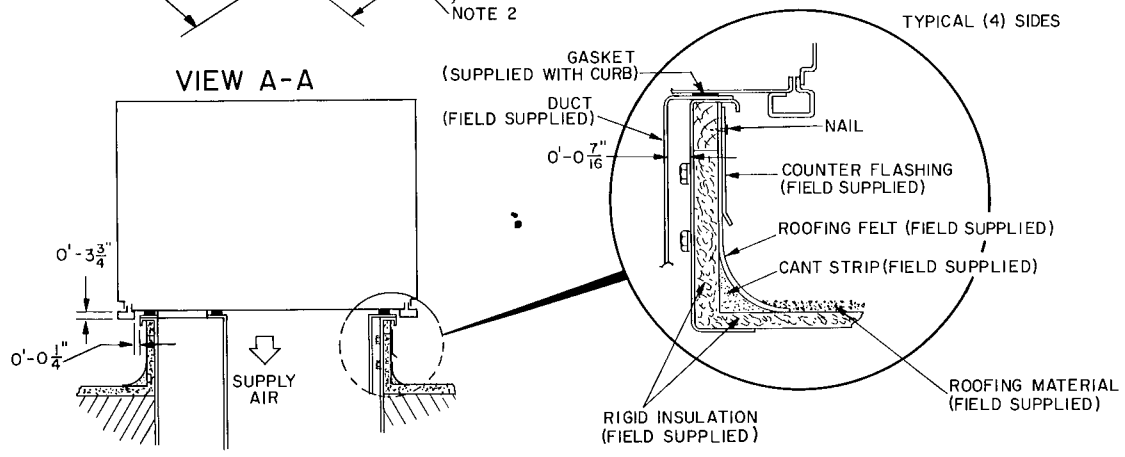
Book 1 | 4 Tab 1a | 6a PC 111 Catalog No 534-805 Printed in U S A Form 48H,L-9SI Pg 1 9-85 Replaces: 48H,L-7SI

For replacement items use Carrier Specified Parts.

48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units







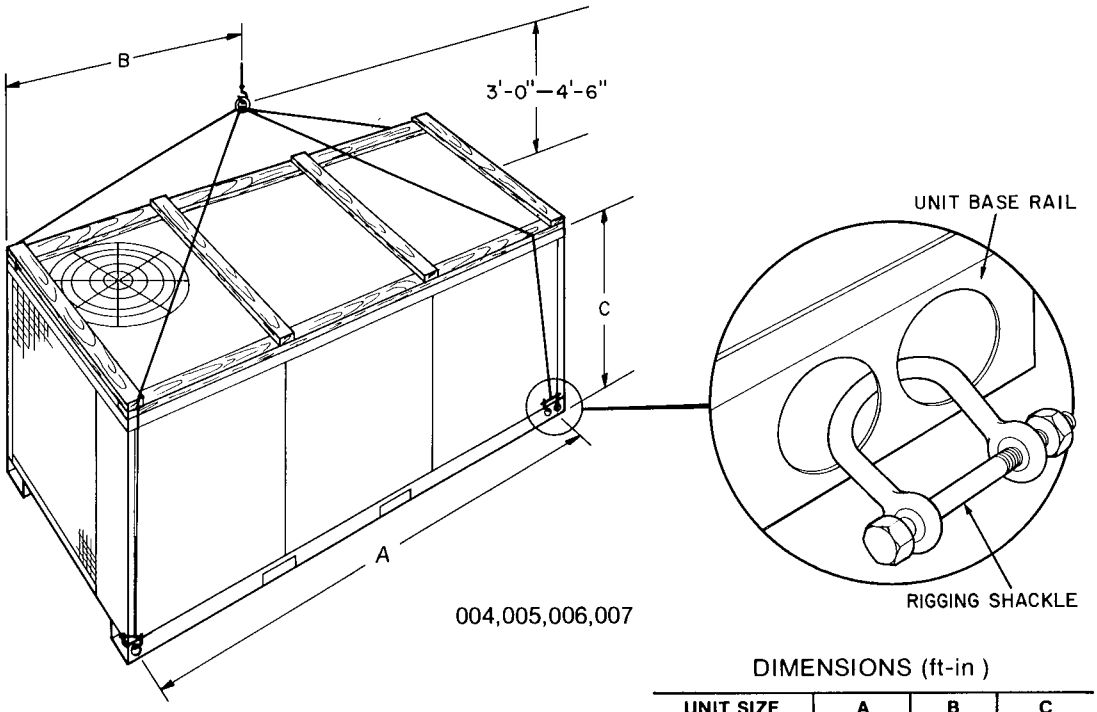
NOTES:
1 Roof curb accessory is shipped disassembled
2 Insulated panels, with one-in thick isocyanurate foam, 2lb density
3 Attach all ductwork to roof curb

DIMENSIONS (ft-in.)

UNIT MODEL 48 SERIES	ACCESSORY MODEL NO.	A	B	C	D	E	F	G	H
HDT,LDT005,006; LDT004; HD007	48HDT900051	5-5 5/8	2-9	1-2 1/4	1-3	2-8 1/8	2-10 5/8	1-2 3/16	2-8 1/2
HD,LD008; HDD,LDD008; HD009	48HD900031	6-5 1/16	4-9 1/4	1-2	2-3 1/8	4-8 3/8	3- 3 1/2	1-1 1/4	3-7

Fig. 1 — Roof Curb Details

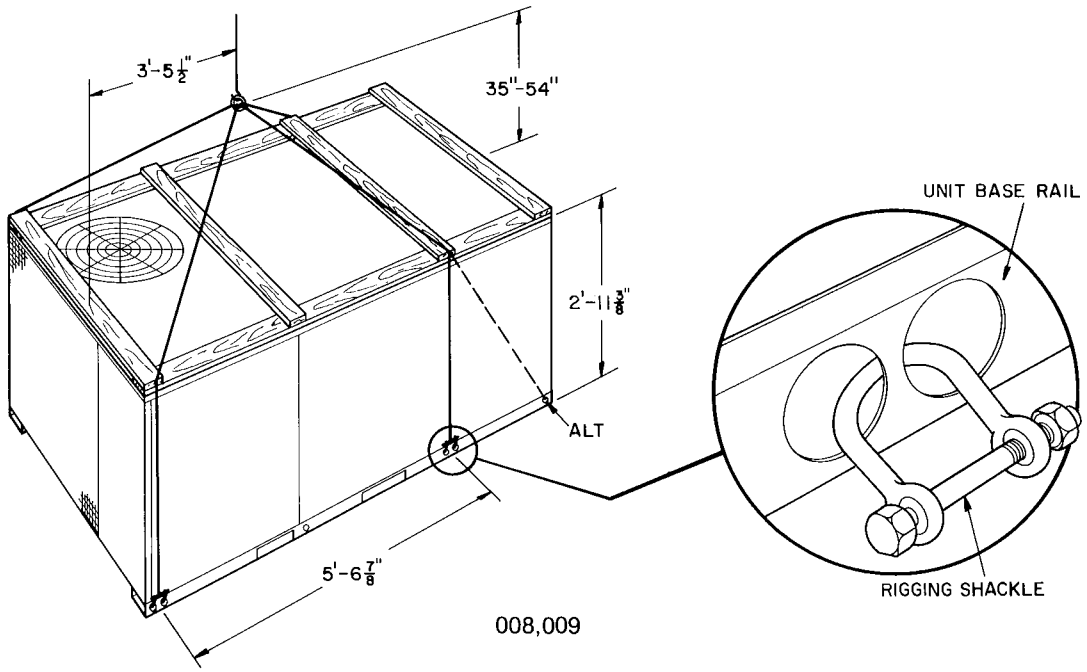
48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units



004,005,006,007

DIMENSIONS (ft-in)

UNIT SIZE	A	B	C
004,005,006	6- 5	3-7	2-5⅛
007	6-11	3-9	2-5⅛



008,009

CAUTION: All panels must be in place when rigging

NOTE: Hook rigging shackles through holes in base rail as shown Holes in base rails are centered around the unit center of gravity Use wooden top skid, when rigging, to prevent rigging straps from damaging unit

Fig. 2 — Rigging Details

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Carrier®
HEATING & COOLING

48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units

Table 1 — Physical Data

UNIT SIZE 48 SERIES		004	005		006		006		007	
OPER WT (lb)		LDT	HDT	LDT	HDT	LDT	HH	LH	HD	HH
Unit		630	650	630	660	640	660	640	720	720
with Economizer		655	675	655	685	665	—	—	745	—
Roof Curb		130	130		130		—	—	130	—
COMPRESSOR										
Quantity...Type		1 Copeland CRJ	1 Copeland CRM		1 Copeland CRN		1 Copeland CRN		1 .P77	
Oil (oz)		42	66		66				74	
REFRIGERANT (R-22)					Capillary Control					
Charge (lb)		4 5	6 2		7 3		7 3		9 3	
CONDENSER COIL					Copper Tube, Aluminum Plate Fins					
Rows		2	2		2		2		3	
Fins/In.		17 0	13 9		17.0		17 0		14 0	
Total Face Area (sq ft)		6 3	9 73		9.73		9.73		10.8	
CONDENSER FAN					Propeller Type					
Nominal Cfm		3100	3100		3800		3800		4000	
Quantity...Diameter (in.)		1 22	1 22		1 22		1 22		1 22	
Motor Hp		½	½		½		½		½	
Motor Rpm		1075	1075		1075		1075		1075	
EVAPORATOR COIL					Copper Tube, Aluminum Plate Fins					
Rows		2	2		3		3		4	
Fins/In.		14.0	14.0		14.0		14.0		14 0	
Total Face Area (sq ft)		5 33	5 33		5 33		5.33		6.3	
EVAPORATOR FAN					HDT	LDT	HH	LH		
Quantity...Size (in.)		1 10x10	1 10x10		1 11x10	1 11x10	1 11x10	1 11x10	1 11x10	
Type		DD	DD		DD	DD	BD	DD	BD	
Nominal Cfm		1200	1500		2000	2000	2000	2000	2200	
Motor Hp	Std	⅓	¾		1	¾	½	¾	¾	
	Opt	¾	—		—	1	¾	1	1	
Nominal Motor Rpm		—	—		—	—	1725	—	1725	
Standard/Optional	Low	800/ 890	890		1000	890/1000	—	890/1000	—	
	High	850/1050	1000		1130	1050/1130	—	1050/1130	—	
Rpm Range	Std	—	—		—	—	630- 960	—	796-1130	
	Opt	—	—		—	—	796-1130	—	930-1260	
Motor Pulley Pitch Diameter	Std	—	—		—	—	1 9-2 9	—	2 4-3 4	
(in.)	Opt	—	—		—	—	2 4-3 4	—	2 8-3 8	
Fan Pulley Pitch Diameter	Std	—	—		—	—	5 2	—	5 2	
(in.)	Opt	—	—		—	—	5 2	—	5 2	
Belt, Quantity...Type...Length (in.)		—	—		—	—	1 A 43	—	1 A 43	
Speed Change per Full Turn of Moveable Pulley Flange (Rpm)	Std	—	—		—	—	66	—	66	
	Opt	—	—		—	—	66	—	66	
Moveable Pulley Max Full Turns from Closed Position		—	—		—	—	5	—	5	
Factory Setting	Std	—	—		—	—	2	—	2	
Full Turns Open	Opt	—	—		—	—	2	—	2	
Factory Speed Setting (Rpm)	Std	—	—		—	—	830	—	995	
	Opt	—	—		—	—	995	—	1130	

FURNACE SECTION	LDT	HDT	LDT	HDT	LDT	HH	LH	HD	HH
Temperature Rise (F)	30-60	35-65	30-60	35-65	30-60	35-65	30-60	35-65	35-65
Heating Input (Btuh)	80,000	120,000	80,000	120,000	80,000	120,000	80,000	120,000	120,000
Output Capacity (Btuh)	61,600	92,400	61,600	92,400	61,600	92,400	61,600	92,400	92,400
Burner Orifice Diameter (in ..drill size) Natural Gas					116 32				
Pilot Orifice Diameter (in. ..drill size) Natural Gas					033 66				
Thermostat Heat Anticipator Setting					1 2				
460 v					1 0				
208/230 v									
HIGH-PRESSURE SWITCH									
Cutout (psig)					—				
Reset (psig)					—				
LOW-PRESSURE SWITCH (Suction Line)									
Cutout (psig)					27 ±4				
Reset (psig)					67 ±7				
AIR INLET SCREENS									
Quantity...Size (in.)					1...32x19x½				
RETURN AIR FILTERS									
Quantity...Size (in.)					1 16x25x1				
					1 20x25x1				

BD — Belt Drive **DD** — Direct Drive

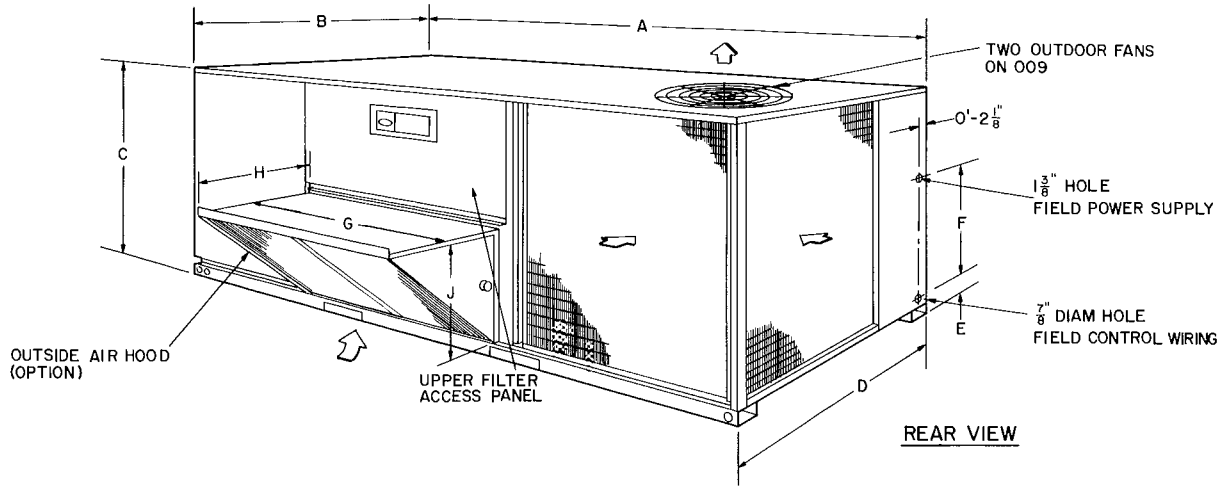
Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

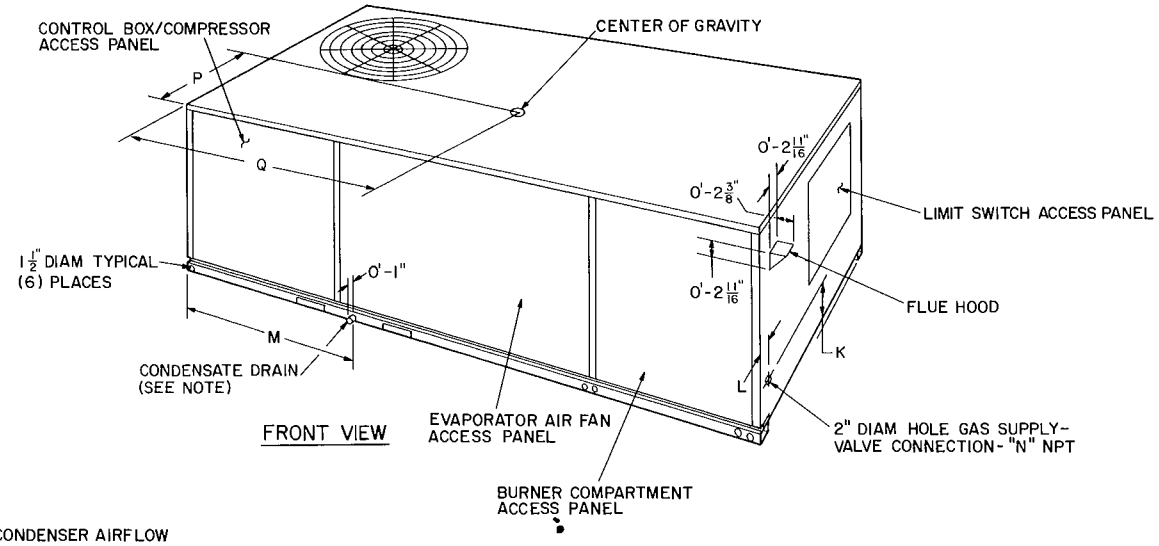
Table 1 — Physical Data (cont)

UNIT SIZE 48 SERIES		008		008		009
OPER WT (lb)		HD,HH	LD,LH	HDD,HHD	LDD,LHD	HD,HH
Unit		890	886	945	941	980
with Economizer		950 (HD)	946 (LD)	1005 (HDD)	965 (LDD)	1040 (HD)
Roof Curb		125 (HD)	125 (LD)	125 (HDD)	125 (LDD)	125 (HD)
COMPRESSOR						
Quantity...Type		1 Hermetic		2. P46		2 P46/P60
Oil (oz)		124		124		66
REFRIGERANT (R-22)						Ckt 1/Ckt 2
Charge (lb)		9 9		6 2 per system		7 45/4 8
CONDENSER COIL						
Rows		2				2
Fins/in.		13.9				13 9
Total Face Area (sq ft)		15 6				15 6
CONDENSER FAN						
Nominal Cfm		4500				6900
Quantity...Diameter (in.)		1 22				2 22
Motor Hp		½				½
Motor Rpm		1075				1075
EVAPORATOR COIL						
Rows		3				4
Fins/in.		13 9				13 9
Total Face Area (sq ft)		8 2				8 2
EVAPORATOR FAN						
Quantity...Size (in.)		1 12x12				1 12x12
Type		BD				BD
Nominal Cfm		3000				3400
Motor Hp	Std	1 0				1 5
	Opt	1 5				—
Nominal Motor Rpm		—				—
Std/Opt	Low	—				—
	High	—				—
Rpm Range	Std	838-1032 (@ 2 turns open)				765-1025
	Opt	852-1127 (@ 1 turn open)				—
Motor Pulley Pitch Diameter	Std	2 4-3 4				2 4-3 4
(in.)	Opt	2 4-3 4				—
Fan Pulley Pitch Diameter (in.)	Std	5 0				5 0
	Opt	5 0				—
Belt, Quantity ..Type...Length (in.)		1 A 45				1 A 45
Speed Change per Full Turn of Moveable Pulley Flange (Rpm)	Std	65				65
	Opt	69				—
Moveable Pulley Max Full Turns from Closed Position		5				5
Factory Setting	Std	4				4
Full Turns Open	Opt	4½				—
Factory Speed Setting (Rpm)	Std	907				916
	Opt	885				—
FURNACE SECTION		HD,HH	LD,LH	HHD,HDD	LDD,LHD	HD,HH
Temperature Rise (F)		35-65	15-45	35-65	15-45	35-65
Heating Input (Btuh)		203,000	114,000	203,000	114,000	203,000
Output Capacity (Btuh)		160,370	91,200	160,370	91,200	160,370
Burner Orifice Diameter (in ...drill size) Natural Gas		132 29	113 33	132 29	113 33	132 29
Pilot Orifice Diameter (in. ...drill size) Natural Gas		036 64	033 66	036 64	033 66	036 64
Thermostat Heat Anticipator Setting						
460 v		1 2				Stage 1: 1 2; Stage 2: 0 6
208/230 v		1 0				Stage 1: 1 0; Stage 2: 0 6
HIGH-PRESSURE SWITCH						
Cutout (psig)		426 ± 7				
Reset (psig)		320 ± 20				
LOW-PRESSURE SWITCH (Suction Line)						
Cutout (psig)		27 ± 4				
Reset (psig)		67 ± 7				
AIR INLET SCREENS						
Quantity. .Size (in.)		2 19x31x½				
RETURN AIR FILTERS						
Quantity...Size (in.)		2 16x20x1 2 20x20x1				

BD — Belt Drive **DD** — Direct Drive

48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units





⇛ CONDENSER AIRFLOW
⇨ EVAPORATOR AIRFLOW

DIMENSIONS (ft-in.)

UNIT MODEL 48 SERIES	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
LDT004; HDT,LDT005; HDT,LDT006	6-8 13/16	3-8 7/16	2-6 5/8	3-8 3/4	0-5 9/16	1-1 1/2	2-8 1/16	1-3 9/16	1-5	0-5 9/16	0-3 11/16	0-3 1/4	0 1/2	1-6	3-4
HD007	7-0 9/16	3-8 7/16	2-6 5/8	3-8 3/4	0-5 9/16	1-1 1/2	2-8 1/16	1-3 9/16	1-5	0-5 9/16	0-3 11/16	0-3 1/4	0 1/2	1-6	3-6
HD,LD008; HD009; HDD,LDD008	7-2 1/16	5-8 3/4	3-0 5/8	5-9 1/16	0-6 5/16	1-6 3/4	3-2 5/16	2-1 3/16	2-1	0-9 3/8	0-3 5/8	0-5 5/16	0 3/4 (HD) 0 1/2 (LD)	2-4	3-5 1/2*

*3-1½ on 48HD009

NOTES:
1 AGA minimum clearance to combustibles: 36 in opposite flue; 6 in all other sides.
2 Minimum clearance from condenser coil for proper airflow. 36 in opposite one coil; 12 in opposite other coil (optional as to which coil); 72 in overhead
3 Minimum recommended clearance for service: 36 in each side; 60 in overhead
4 Factory-supplied condensate drain hose to be field attached, 1⅛ in OD x ⅞ in ID, in horizontal position through base rail Field-supplied trap required.
5 Economizer available on downshot unit only

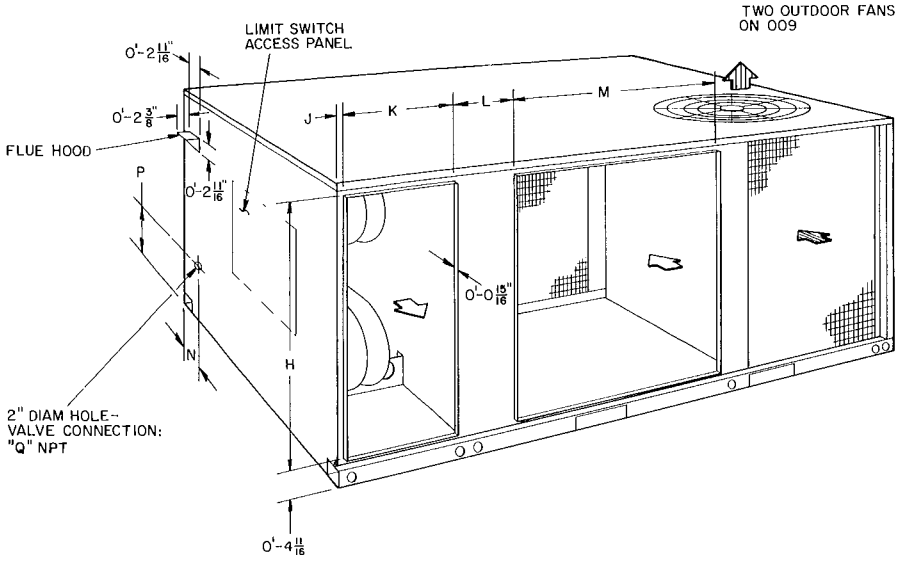
Fig. 3 — Downshot Base Unit Dimensions

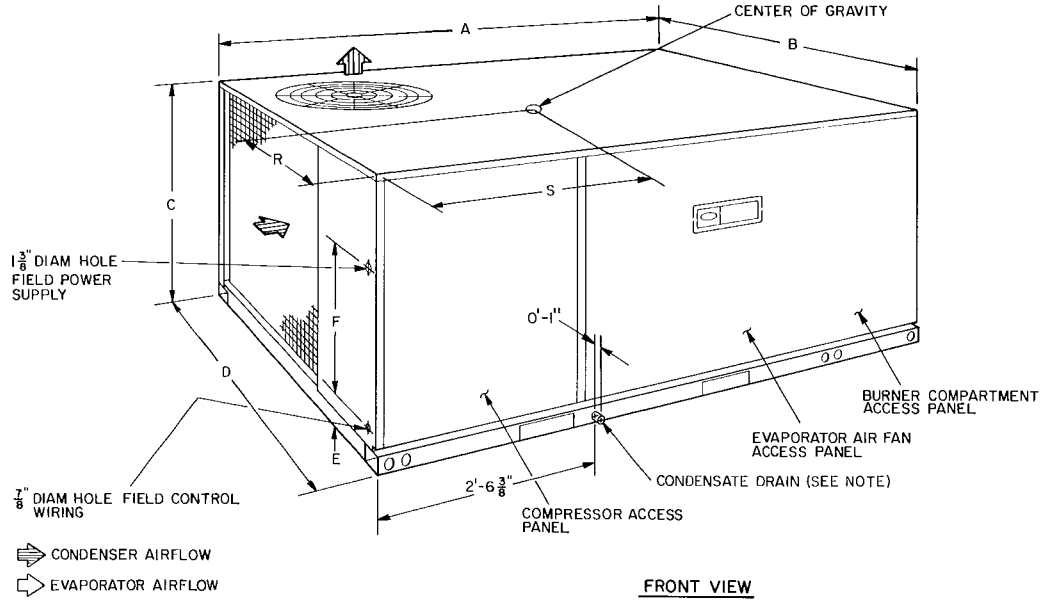
Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Book 1 4 | Tab 1a 6a | PC 111 | Catalog No 534-805 | Printed in U S A | Form 48H,L-9SI | Pg 6 | 9-85 | Replaces: 48H,L-7SI

For replacement items use Carrier Specified Parts

48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units





FRONT VIEW

DIMENSIONS (ft-in)

UNIT MODEL 48 SERIES	A	B	C	D	E	F	H	J	K	L	M	N	P	Q	R	S
HH,LH006	6-8 13/16	3-8 7/16	2-6 5/8	3-8 3/4	0-5 1/2	1-1 1/2	1-11	0-1 1/2	1-1 1/2	1-0	1-5 1/16	0-3 11/16	0-11 1/2	0 1/2	1-6	3-4
HH007	7-0 1/2	3-8 7/16	2-6 5/8	3-8 3/4	0-5 1/2	1-1 1/2	1-11	0-1 1/2	1-1 1/2	1-0	1-5 1/16	0-3 11/16	0-11 1/2	0 1/2	1-6	3-6
HH,LH008; HH009; HHD,LHD008	7-2 1/16	5-8 9/16	3-0 5/8	5-9 1/16	0-6 5/16	1-6 3/4	2-6 7/8	0-1 1/8	1-1 15/16	0-4 7/8	2-2	0-3 1/2	0- 9 3/8	0 1/2 (LH) 0 3/4 (HH)	2-4	3-5 1/2*

*3-1 1/2 on 48HH009

NOTES
1 AGA minimum clearance to combustibles: 36 in opposite flue; 6 in all other sides.
2 Minimum clearance from condenser coil for proper airflow: 36 in opposite one coil, 12 in opposite other coil (optional as to which coil); 72 in overhead
3 Minimum recommended clearance for service: 36 in each side; 60 in overhead
4 Factory-supplied condensate drain hose to be field attached, 1 1/8 in OD x 1/8 in ID, in horizontal position through base rail Field-supplied trap required
5 Economizer available on downshot unit only

Fig. 4 — Horizontal Base Unit Dimensions

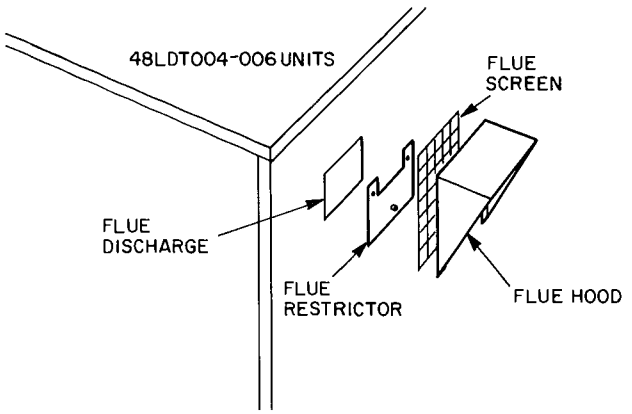


Fig. 5 — Flue Hood Details; 48LDT004-006 Units

POSITIONING — Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow and service access. See Fig. 3 and 4.

Do not install unit in an indoor location. Do not locate unit air inlets near exhaust vents or other sources of contaminated air.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Locate mechanical draft system flue assembly at least 48 in. from any opening through which combustion products could enter the building, and at least 48 in. from an adjacent building. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

After unit is in position, remove polyethylene shipping wrapper and rigging skids.

Step 4 — Install Flue Hood — Flue hood and screen are shipped screwed to the basepan in furnace compartment. Remove from shipping location and using screws provided, install flue hood and screen in location shown in Fig. 3 or 4. On 48LDT004-006 units, a flue restrictor plate MUST be assembled to the flue discharge. The plate is shipped with the flue hood package. Install as shown in Fig. 5.

Step 5 — Trap Condensate Drain — See Fig. 3 or 4 for drain location. A 7/8-in. preformed drain hose is shipped clamped to the indoor basepan. At installation, reroute the hose so it passes through the hole in the indoor basepan and unit base rail.

When installed properly, the hose protrudes through the base rail one inch. Replace clamp over the hose where hose passes through the basepan to ensure that hose remains level. Use a trap at least 4 in deep and provide protection for trap against freeze-up.

Step 6 — Install Skirt (Downshot Units) — When the unit is installed on the curb, the skirt provided on the blower end of the unit must be lowered from its shipping position to its installed position.

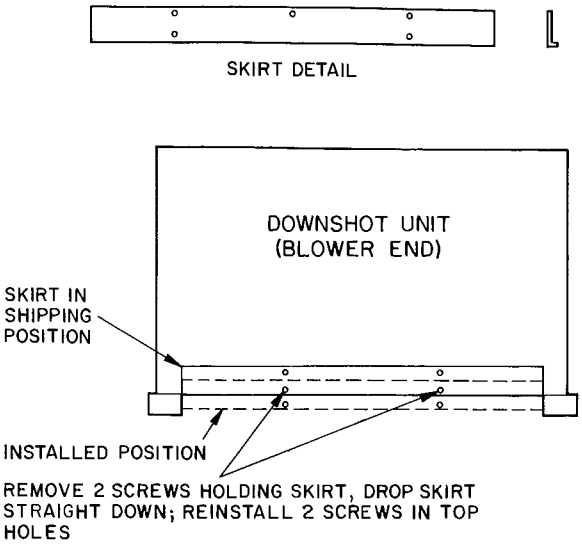


Fig. 6 — Skirt Installation

Remove the 2 screws holding the skirt and drop it straight down. Reinstall screws in the upper set of holes and fasten. See Fig. 6.

Skirt will now overhang the roof curb seal strip, protecting the seal strip from ultraviolet damage.

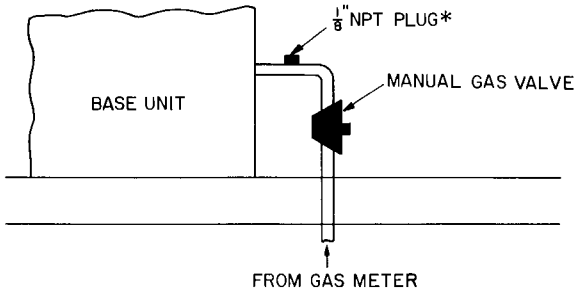
Step 7 — Install Gas Piping — Unit is equipped for use with type of gas shown on nameplate. Refer to local building codes, or, in the absence of local codes, to ANSI Z223.1-1980 entitled National Fuel Gas Code.

Natural gas pressure at unit gas connection must not be less than 5 in. wg or greater than 13.5 in. wg while unit is operating.

Size gas supply piping for 0.5 in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection. See Fig. 7 for typical pipe guide and location of external manual main shutoff valve.

For LP gas units, pressure at unit gas connection must not be less than 12 in. wg or greater than 13.5 in. wg.

A 1/8-in. NPT plugged tapping, accessible for test gage connection, must be installed immediately upstream of the gas supply connection to the furnace.



*NPT plug is field supplied
NOTE: Follow all local codes

Fig. 7 — Gas Piping Guide

Step 8 — Make Electrical Connections

⚠ WARNING

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with National Electrical Code ANSI/NFPA 70-1984 and local electrical codes. *Do not use gas piping as an electrical ground.* Failure to follow this warning could result in the installer being liable for personal injury of others.

FIELD POWER SUPPLY

004,005,006,007 — All units except 208/230-volt units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208 power supply, the transformer *must* be rewired by connecting the blue wire to C-13 and the red wire to C-DU1.

48HDD,LDD/HD,LD008; HD009 — 230- and 460-volt units are factory wired for the voltage shown on nameplate. If unit will be connected to a 208 power supply, the transformer *must* be rewired by connecting the black wire to the 200-volt lead and insulating the 230-volt lead.

48HHD,LHD/HH,LH008; HH009 — 230- and 460-volt units are factory wired for the voltage shown on nameplate. If 208/230-volt unit will be connected to a 208 power supply, the transformer *must* be rewired by connecting the blue wire to C-13 and red wire to C-DU1.

All Units — Refer to unit label diagram for additional information. Pigtails are provided for field service. Use factory-supplied splices or UL-approved copper/aluminum connector.

When installing units, provide a disconnect per NEC.

All field wiring must comply with National Electrical Code and local requirements.

Install conduit connectors in side panel openings indicated in Fig. 3 or 4. Route power lines through connector to terminal connections as shown in Fig. 8.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 2). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 2 to determine the % voltage imbalance. Contact local power company for correction of improper voltage or phase imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable warranty.

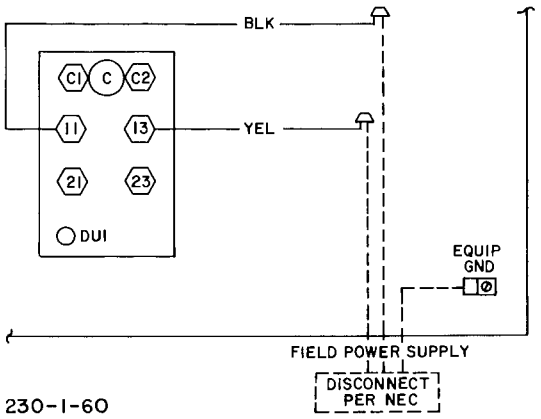
FIELD CONTROL WIRING — Install a Carrier-approved accessory thermostat assembly according to installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through connector on unit to low-voltage connections as shown in Fig. 9.

NOTE: For wire runs up to 50 ft, use no. 18 AWG insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum).

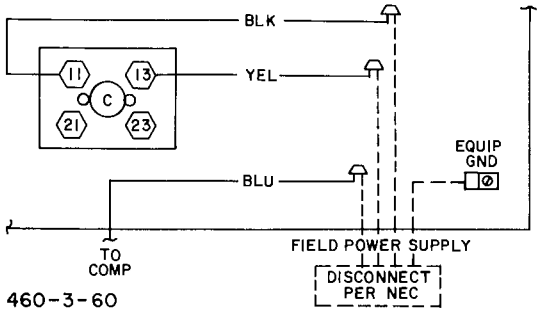
Pass the control wires through the hole provided in the corner post; then feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control box.

HEAT ANTICIPATOR SETTINGS — Set first-stage heat anticipator settings at 1.20 for 460-volt units and 1.00 for 208/230-volt units. Set second-stage settings at 0.6. Settings may be changed slightly to provide a greater degree of comfort for a particular installation.



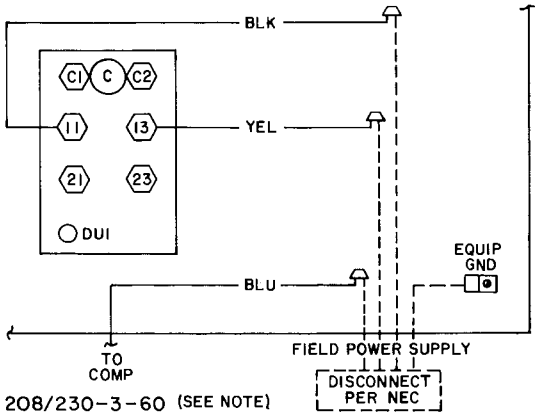
230-1-60

004,005,006,007 UNITS



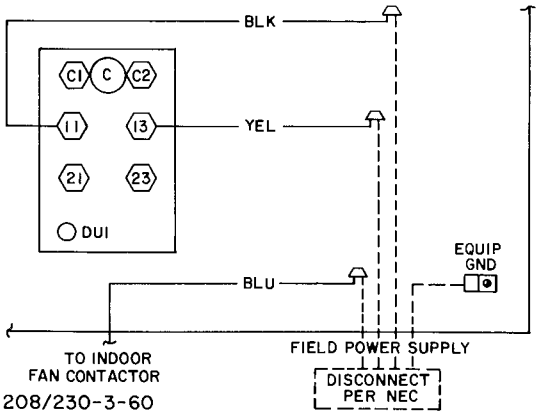
460-3-60

004,005,006,007 UNITS



208/230-3-60 (SEE NOTE)

004,005,006,007 UNITS



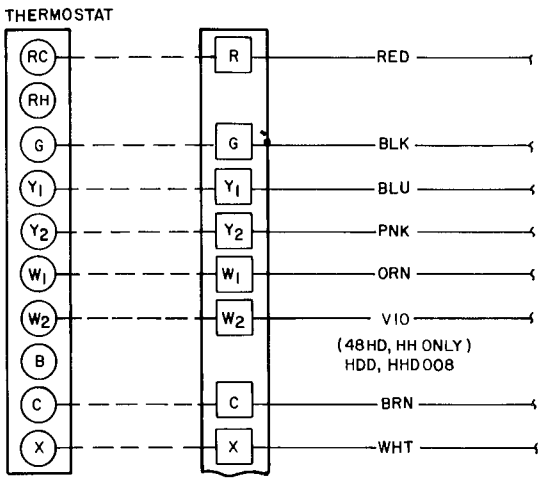
208/230-3-60

008,009 UNITS

_____ Factory Wiring
_ _ _ _ _ Field Wiring

NOTE: If connected to 208-v power supply, rewire unit transformer no 1 by:
1 Connecting blue wire from transformer no 1 to C-13
2 Connecting red wire from transformer no 1 to C-DU1

Fig. 8 — Power Wiring Connections



_____ Factory Wiring
_ _ _ _ _ Field Wiring

Fig. 9 — Control Wiring Connections

48 Series
Weathermaker I Single-Package Combination Gas Heating & Electric Cooling Rooftop Units

Table 2 — Electrical Data

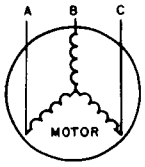
UNIT MODEL 48 SERIES	VOLTS-PH-HZ	VOLTAGE RANGE		COMPR		OUTDOOR FAN MTR		INDOOR FAN MTR		COMBUSTION FAN MTR	POWER SUPPLY (Amps)	
		Min	Max	RLA	LRA	Qty	FLA	Hp	FLA	FLA	MCA	MOCP
LDT004	208/230-1-60	197	254	22 5	93	1	2 9	33 75	1 4 4 0	90	33/33 36/36	50/50 50/50
	208/230-3-60	187	254	14 3	74	1	2 9	33 75	1 4 4 0	90	23/23 25/25	35/35 35/35
	460-3-60	414	508	6 7	41	1	1 5	33 75	1 0 2 0	57	11 12	15 15
HDT/LDT005	208/230-1-60	197	254	30 7	125	1	2 9	75	4 0	90	46/46	70/70
	208/230-3-60	187	254	17 9	90	1	2.9	.75	4.0	.90	30/30	45/45
	460-3-60	414	508	8 6	45	1	1.5	.75	2.0	.57	15	20
	575-3-60	518	632	7 9	52	1	2 9	75	4 0	90	13	20
HDT/LDT006 LH006	208/230-1-60	197	254	34 3	142	1	2 9	75 1 00	4 0 6 0	90	50/50 52/52	80/80 80/80
	208/230-3-60	187	254	21 4	130	1	2 9	75 1 00	4 0 6 0	90	34/34 36/36	50/50 50/50
	460-3-60	414	508	9 6	65	1	1 5	75 1 00	2 0 3 0	57	16 18	25 25
	575-3-60	518	632	7 9	52	1	2 9	75 1.00	4 0 6.0	90	13 14	20 20
HH006	208/230-1-60	197	254	34 3	142	1	2 9	50 75	3 0 4 0	90	50/50 50/50	80/80 80/80
	208/230-3-60	187	254	21 4	130	1	2 9	50 75	3 0 4 0	90	35/35 36/36	50/50 50/50
	460-3-60	414	508	9 6	65	1	1 5	50 75	1 5 2.0	.57	16 16	25 25
	575-3-60	518	632	7 9	52	1	2 9	50 75	4 0 6 0	90	13 13	20 20
HD/HH 007	208/230-3-60	187	254	26 7	137	1	2 9	75 1 00	3 6 4 8	90	40/40 42/42	60/60 60/60
	460-3-60	414	508	13 5	69	1	1 5	75 1 00	1 8 2 4	57	19 21	30 30
	575-3-60	518	632	9 6	55	1	2 9	1 00	7 5	90	17	25
HD,LD/ HH,LH008	208/230-3-60	187	254	32 5	183	1	2 9	1 0 1 5	5 4 6 0	90	50/50	60/60
	460-3-60	414	508	15 2	91 1	1	1 5	1 0 1.5	2 7 3.0	57	25	35
	575-3-60	518	632	15 8	73 3	1	1 5	1 0 1.5	1 4 2.1	57	25 26	35 40
HDD,LDD/ HHD,LHD008	208/230-3-60	187	254	15 2 (ea)	80 (ea)	1	2 9	1 0 1 5	4 8 6 5	90	43/43 45/45	50 50
	460-3-60	414	508	7 2 (ea)	35 (ea)	1	1 5	1 0 1 5	2 4 3 3	57	21 22	25 25
HD,HH009	208/230-3-60	187	254	21 1 15 7	98 80	2	2 9 (ea)	1 5	5 6	90	55/55	60/60
	460-3-60	414	508	10 4 7 3	49 35	2	1 5 (ea)	1 5	2 8	57	27	30

FLA — Full Load Amps
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps (for wire sizing) Complies with NEC, Section 430-24
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps

NOTES:
1 In compliance with NEC requirements for multimotor and combination load equipment (ref NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse only
2 **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase unbalance in supply voltage is greater than 2% Use the following formula to determine the % voltage unbalance

$$\% \text{ Voltage Unbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60



AB = 452 volts
BC = 464 volts
AC = 455 volts

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3} = \frac{1371}{3} = 457$$

NOTE: 575-volt units are CSA only

Determine maximum deviation from average voltage

(AB) 457 - 452 = 5 volts
(BC) 464 - 457 = 7 volts
(AC) 457 - 455 = 2 volts

Maximum deviation is 7 volts
Determine % voltage unbalance

$$\% \text{ Voltage Unbalance} = 100 \times \frac{7}{457} = 1\ 53\%$$

This amount of phase unbalance is satisfactory as it is below the maximum allowable 2%

IMPORTANT: If the supply voltage phase unbalance is more than 2%, contact your local electric utility company immediately

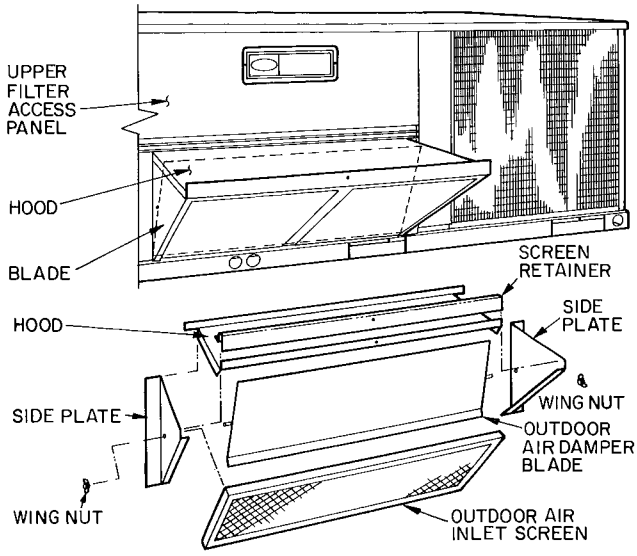


Fig. 10 — Outdoor Air Damper and Hood Installation and Details (004,005,006,007 Units)

Step 9 — Make Outdoor Air Inlet Adjustments and Install Outdoor Air Hood

OPTIONAL OUTDOOR AIR DAMPER

48HDT,LDT004,005,006 and HD007 — Optional outdoor air damper is shipped with hood broken down inside of unit. See Fig. 10.

Assembly

1. Remove filter access panel.
2. Remove sheet metal parts from filter area.
3. Using screws provided, assemble sides to the inside of the hood.
4. Discard baffle.
5. Install damper blade by inserting threaded pins through hole in side plates.
6. Use wing nuts provided to hold blade in place.
7. Install outdoor air hood assembly, using screws provided.
8. Install outdoor air inlet screen and screen retainer.
9. Replace access panel.
10. Loosen wing nut on side plate to adjust blade. Adjust damper blade to desired setting for outside air intake.

48HD,LD/HDD,LDD008; 48HD,HH009 — Optional outdoor air damper is shipped with hood broken down in unit filter section. See Fig. 11.

Assembly

1 Remove protective cover from unit.
2. Remove upper filter access panel (save screws).
3. Remove hood parts from unit evaporator fan and filter area. Assemble hood top and side plates as shown in Fig 12. *Do not attach hood to unit at this time.*
4. Adjust outdoor air damper blade to desired setting for outside air intake by releasing linkage rod setscrew and adjusting linkage rod. See Fig. 13. Secure damper blade in desired position with setscrew.

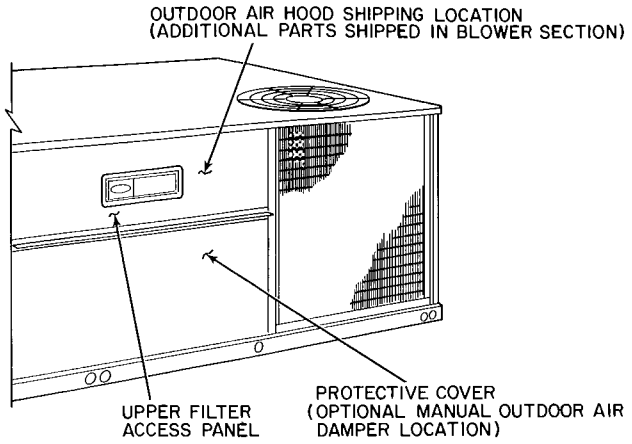
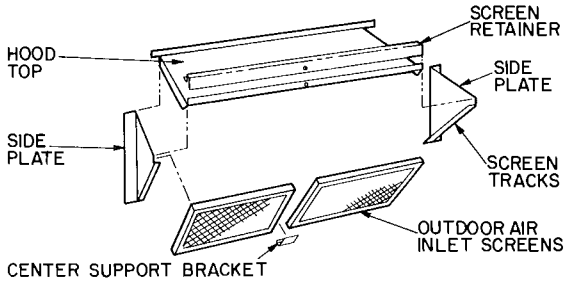
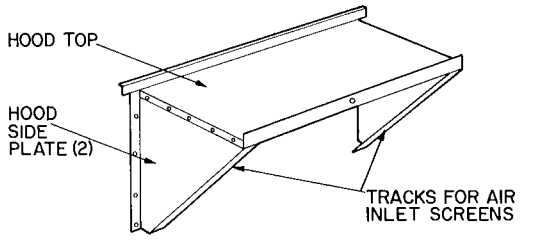


Fig. 11 — Access Panel Location (008,009 Units)



OUTDOOR AIR HOOD - UNASSEMBLED



OUTDOOR AIR HOOD - TOP AND SIDES ASSEMBLED

Fig. 12 — Outdoor Air Hood Details (008,009 Units)

5 Remove screws holding manual outdoor air damper to unit. See Fig. 14.
6. Install outdoor air hood assembly, using screws from step 5. These screws secure the manual outdoor air damper assembly and the outdoor air hood to unit. See Fig 14
7. Install center support bracket (provided in kit for use on units size 008 and larger), using screw provided, at bottom center of base rail. Slide outdoor air inlet screens into screen tracks on hood side plates. While holding screens in place, fasten screen retainer to hood using screw provided. Make sure bottom edge of screens rest inside base rail and behind center support bracket as shown in Fig. 15.
8. Replace upper access panel with screws saved from step 2.

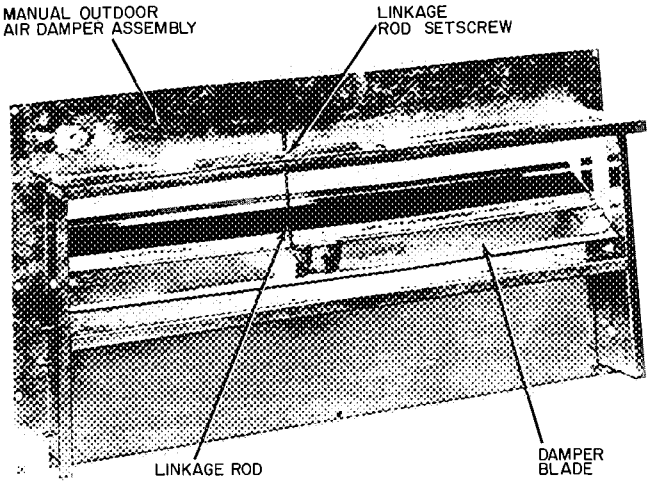
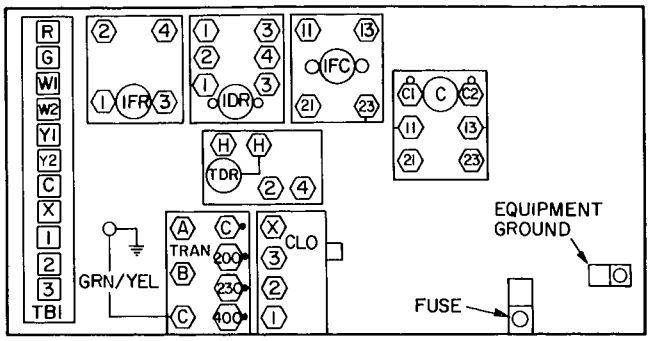


Fig. 13 — Damper Blade Adjustment (008,009 Units)



C — Contactor Compressor
CLO — Compressor Lockout
IDR — Induced-Draft Relay
IFC — Indoor Fan Contactor
IFR — Indoor Fan Relay
TB — Terminal Block
TDR — Time-Delay Relay
TRAN — Transformer

Fig. 16 — Control Box Details (008,009 Units)

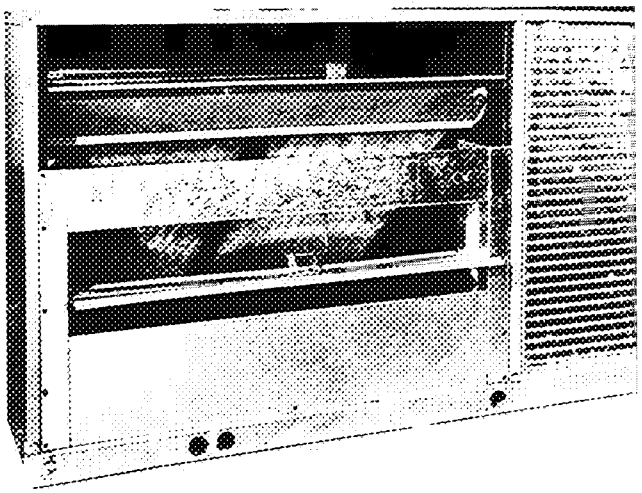


Fig. 14 — Manual Outdoor Air Damper (008,009 Units)

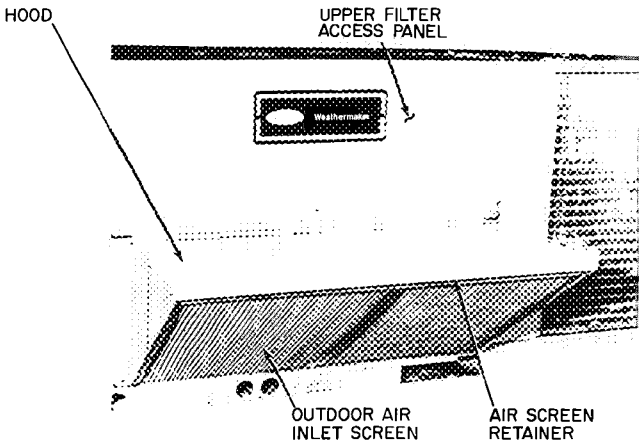


Fig. 17 — Removing Economizer Upper Filter Access Panel (004,005,006,007 Units)

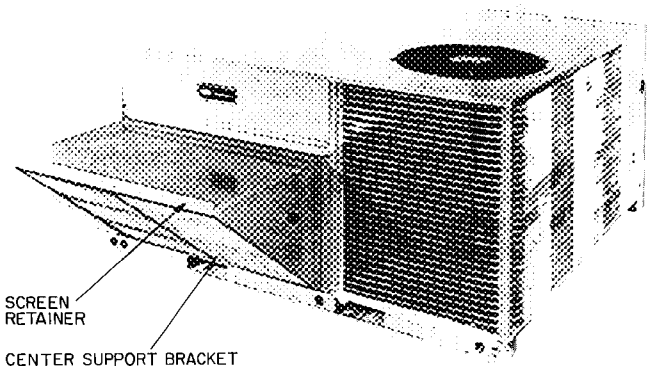


Fig. 15 — Outdoor Air Hood Installed (008,009 Units)

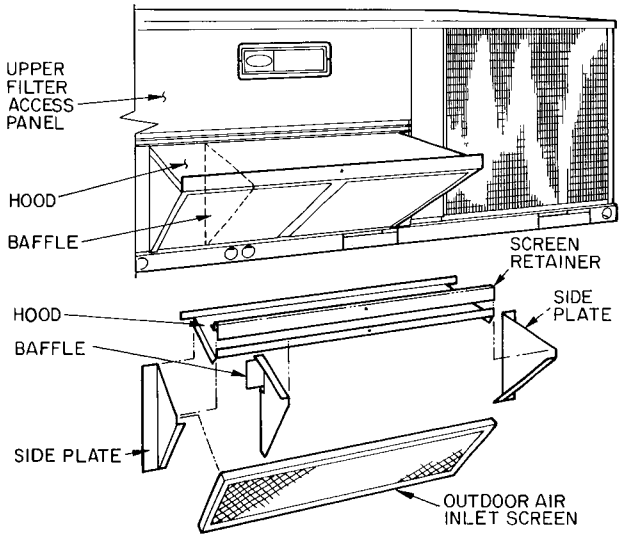


Fig. 18 — Economizer Hood Installation and Details (004,005,006,007 Units)

OPTIONAL ECONOMIZER
48HDT,LDT004,005,006/HD007

1. Remove upper filter access panel (save screws). See Fig. 17.

2. Remove economizer hood parts from unit filter area, and assemble leaving out the damper blade. See Fig. 18. Remove tape from barometric relief damper.
3. Remove indoor blade linkage retaining strap (Fig. 19). Place washer on linkage rod supplied with accessory. Place linkage rod into hole "B" of outdoor damper blade. Secure rod with blue retaining clip provided.
4. Remove mixed air thermostat (MAT.) capillary retaining strap and stretch capillary through notch in filter support. See Fig. 20. Route through hook on upper left side of indoor coil and secure end of capillary to retainer on lower right side of indoor coil.
5. Fasten baffle to left side of damper plate with round head screws provided. See Fig. 20.
6. Set vent position of damper by turning base unit power on and allowing only the indoor fan to run. Adjustment is made on left side of damper motor by loosening vent position setscrew and moving vent position lever back towards indoor coil to CLOSE DAMPER or forward to OPEN DAMPER. Once adjustment is made, retighten setscrew and turn indoor fan off.
7. Remove 4 screws holding economizer to unit. Use screws to fasten hood to front of economizer section.
8. Remove tape from outdoor air thermostat (OAT.) and cooling lockout switch (CLS), and fasten to inside of the hood with screws and speed clips provided. See Fig. 21. Place knob, supplied with accessory, on OAT. and set for 3 F below indoor room thermostat setting.

   If accessory enthalpy control is used in lieu of OAT., refer to instructions shipped with accessory.
9. Place outdoor air inlet screen in hood and secure with retaining bracket across hood front. See Fig. 17.
10. Replace upper filter access panel with screws saved from step 1.

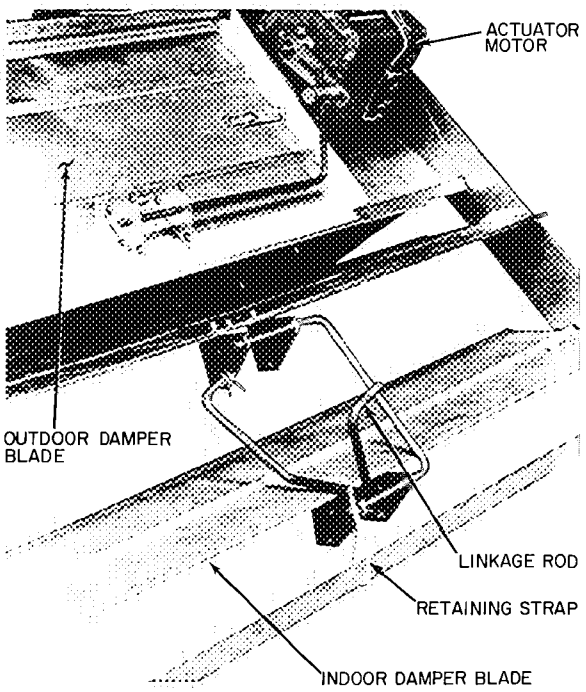


Fig. 19 — Removing Indoor Blade Linkage Retaining Strap (004,005,006,007 Units)

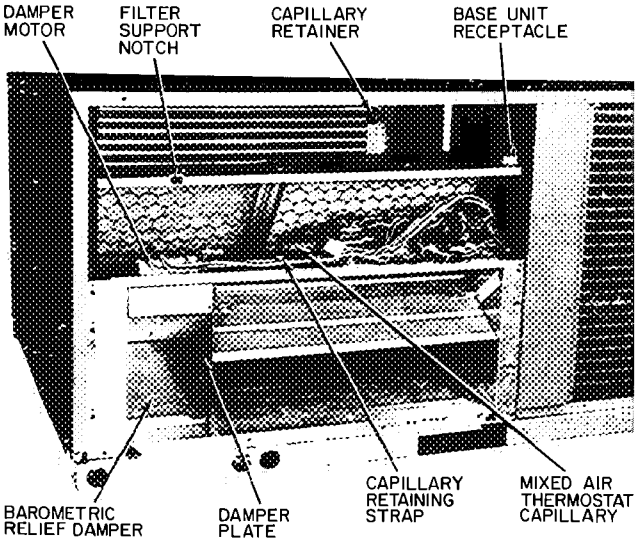


Fig. 20 — Economizer (004,005,006,007 Units)

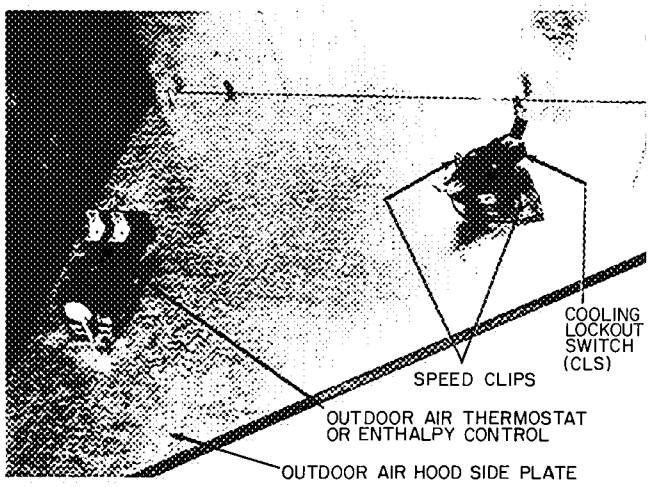


Fig. 21 — Enthalpy Control Position (004,005,006,007 Units)

POWER FAILURE — Dampers have a spring return. In event of power failure, dampers close until power is restored. Do not manually operate damper motor.

48HD,LD/HDD,LDD008; 48HD,HH009 — Optional economizer is shipped with hood broken down in unit filter section. See Fig. 22.

Assembly

1. Remove protective cover from unit.
2. Remove upper filter access panel (save screws). See Fig. 22.

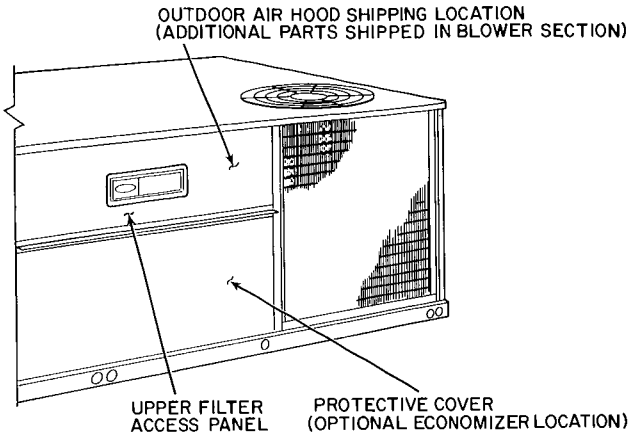


Fig. 22 — Access Panel Location (008,009 Units)

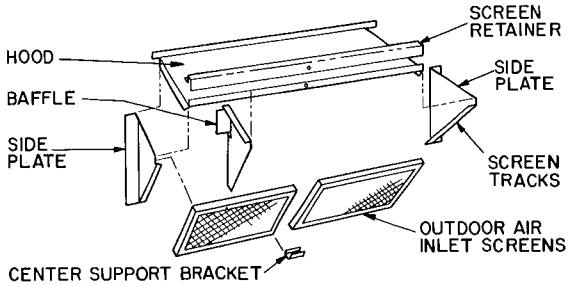
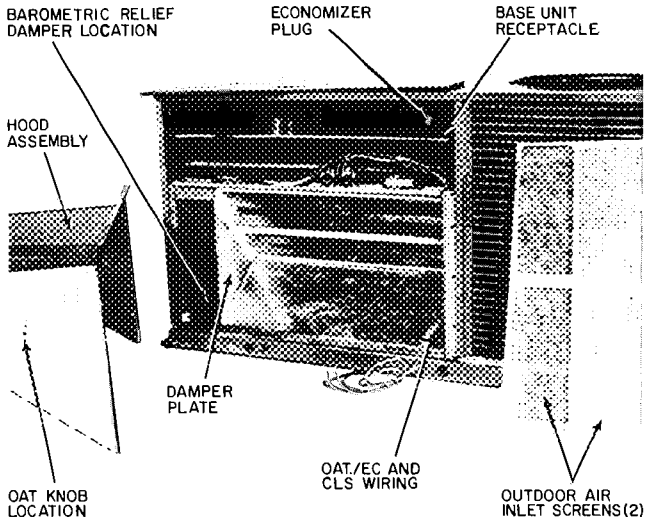


Fig. 23 — Outdoor Air Hood Details (008,009 Units)



CLS — Cooling Lockout Switch
EC — Enthalpy Control
OAT. — Outdoor Air Thermostat

Fig. 24 — Economizer Installed in Unit (008,009 Units)

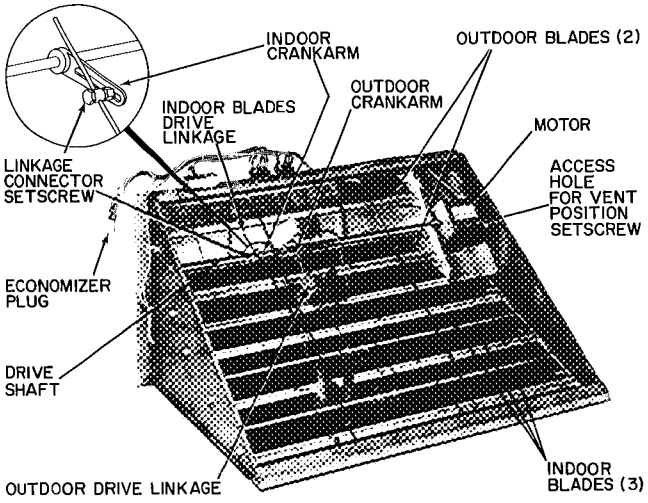


Fig. 25 — Economizer Details (008,009 Units)

3. Remove hood parts from unit evaporator fan and filter area. Assemble hood top and side plates as shown in Fig. 23. Remove tape from barometric relief damper (see Fig. 24). *Do not attach hood to unit at this time.* Put aside baffle, screen retainer and retainer screw for later assembly.
4. Determine if vent air is required in building to be conditioned. If so, check for percentage of vent air needed and record quantity for vent adjustment in step 11.
5. Remove jumper plug from base unit receptacle and discard. Insert economizer plug into receptacle. See Fig. 24.

   Steps 6 through 8 involve releasing and adjusting indoor damper blades from factory set position.

6. Release indoor blades drive linkage by loosening linkage connector setscrew at indoor crankarm on drive shaft. See Fig. 25.

   Remove pink wire from economizer damper motor terminal D and temporarily tape bare wire end.

   Remove violet wire from economizer damper motor and connect to terminal D on economizer damper motor. See Fig. 26.
7. Jumper red (base unit 24-v power) and black wires in 24-volt control box compartment. See Fig. 16.

   Turn on base unit power to energize evaporator fan. The economizer's outdoor blades should open completely.

8. Adjust the indoor blades drive linkage so that indoor blades are fully closed. Tighten the linkage connector setscrew. Turn off base unit power. Reconnect pink and violet wires to economizer motor, as shown in Fig. 26.
9. If vent air is required, leave red and black wires jumpered. If vent air is not needed, remove jumper between red and black wires.
10. Fasten baffle to left side of damper plate with round head screws provided. See Fig. 27.
11. If vent air is not required, go on to step 12. If vent air is required, proceed as follows:
    a. Turn on base unit power. This energizes the evaporator fan motor.
    b. Slide economizer out of unit so that access hole to vent position setscrew is visible. See Fig. 28.
    c. Adjust vent opening by loosening vent position setscrew on left side of economizer damper motor and setting vent position lever to adjust damper (see Fig. 29). Move vent position lever back toward evaporator coil to close damper or forward to open damper. When adjustment is completed, retighten setscrew.
    d. Turn off base unit power and remove jumper from red and black wires.
    e. Slide economizer assembly back into unit.
12. Remove tape from outdoor air thermostat (OAT.) and cooling lockout switch (CLS), and fasten to inside of hood with screws and speed clips provided. Make sure terminals on OAT. are up. See Fig. 29.
13. Fasten hood top and side plate assembly (Fig. 30) and economizer to unit with screws supplied. Before attaching, make sure bottom of hood assembly is resting on top of unit base rail.
14. Place knob supplied with accessory economizer on OAT. See Fig. 29. Set for 3 degrees below indoor room thermostat setting.

    If accessory enthalpy control (EC) (Fig. 29) is used in lieu of OAT., refer to instructions shipped with accessory enthalpy control for installation and adjustment.
15. Connect OAT./EC and CLS per unit label. See Fig. 31.

    Connect 2 economizer wires to each switch with quick-connects. Unit connecting wires are shipped taped on outdoor blade. See Fig. 24.
16. Install center support bracket (provided in kit for use on units size 008 and larger), using screw provided, at bottom center of base rail. Slide outdoor air inlet screens into screen tracks on hood side plates. While holding screens in place, fasten screen retainer to hood using screw provided. Make sure bottom edge of screens rest inside base rail and behind center support bracket as shown in Fig. 30.
17. Replace upper access panel with screws saved from step 2.
18. Turn base unit power on.

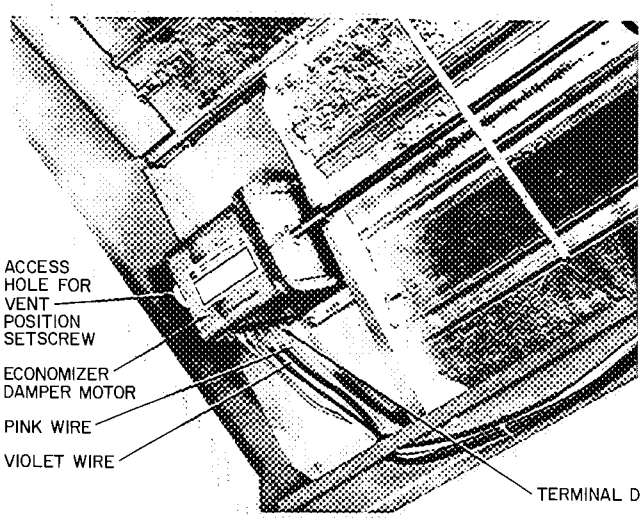


Fig. 26 — Economizer Motor Connections (008,009 Units)

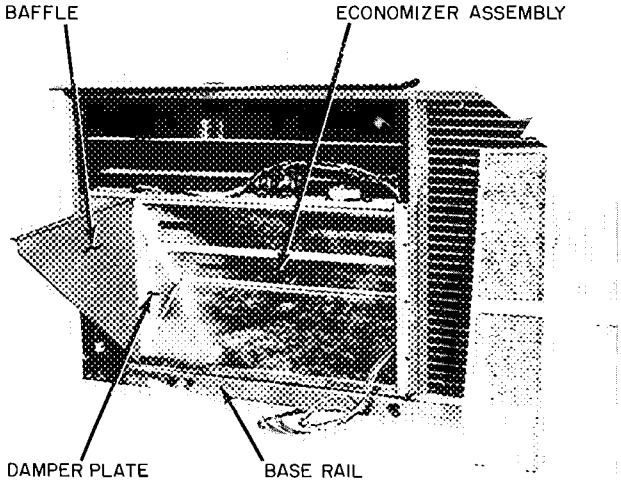


Fig. 27 — Baffle Installation Details (008,009 Units)

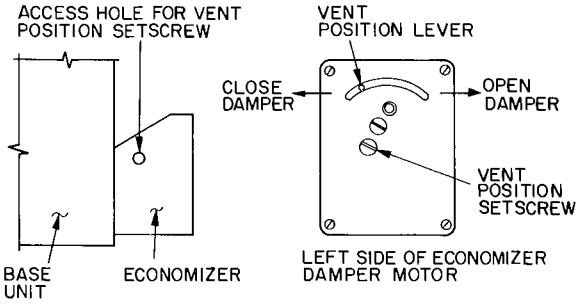
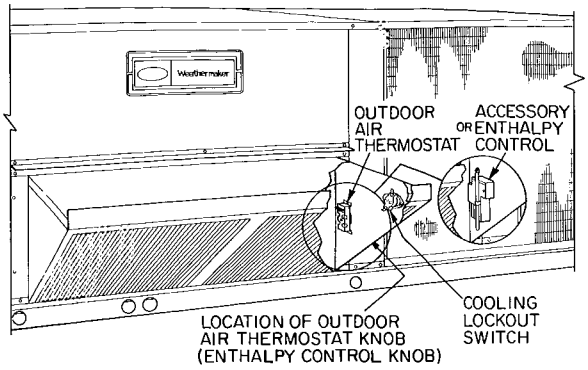
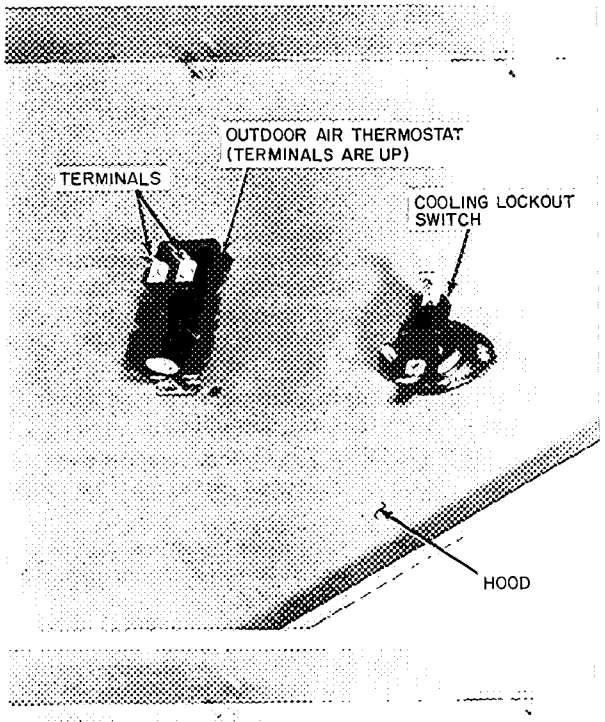


Fig. 28 — Vent Position Setting Details (008,009 Units)





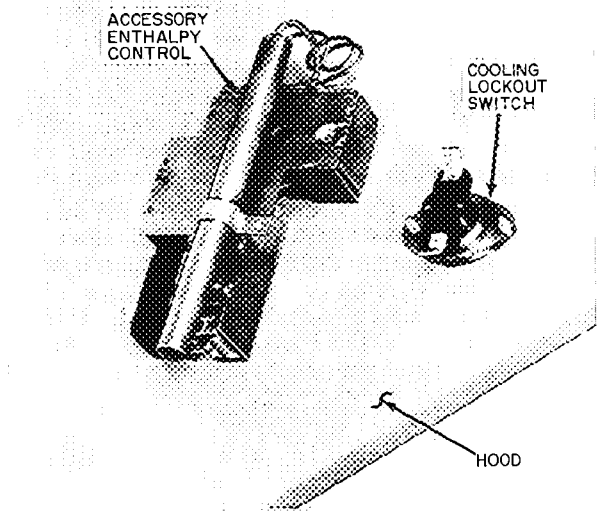


Fig. 29 — Outdoor Air Thermostat/Enthalpy Control and Cooling Lockout Switch Installation (008,009 Units)

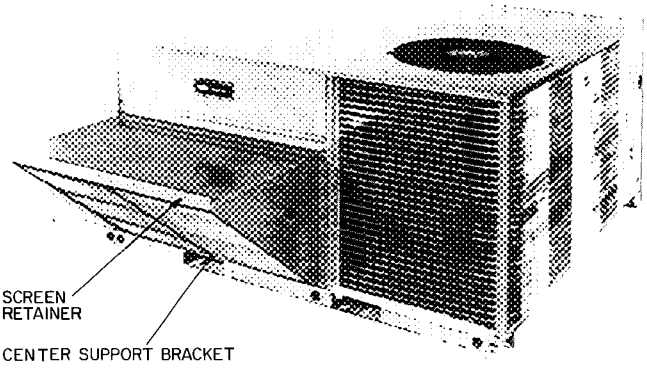
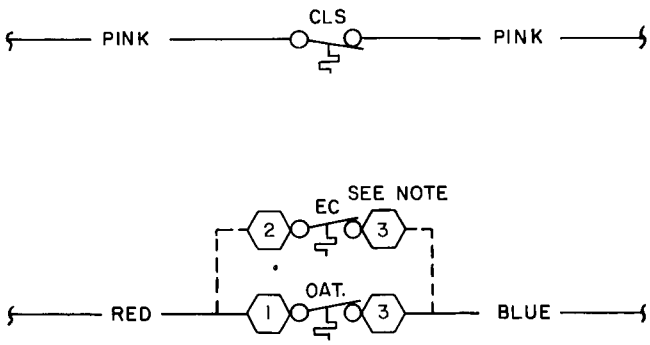


Fig. 30 — Economizer and Outdoor Air Hood Assembled to Unit (008,009 Units)



CLS — Cooling Lockout Switch
EC — Enthalpy Control
OAT. — Outdoor Air Thermostat

NOTE: When enthalpy control (EC) is installed, outdoor air thermostat (OAT) is removed from economizer

Fig. 31 — Wiring Connections for Outdoor Air Thermostat/or Enthalpy Control and Cooling Lockout Switch (008,009 Units)

Step 10 — Adjust Evaporator Fan Speed — On 48HDT,LDT004,005,006 and 48LH006 units, the evaporator fan motor factory speed setting is shown on label diagram affixed to base unit. If other than factory setting is desired, refer to label diagram for motor reconnection.

On 48HH006 and all 007 and 008 units, fan motor pulleys are factory set for speed shown in Table 1.

To change fan speeds:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting plate nuts.
3. Loosen movable pulley flange setscrew (see Fig. 32).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)

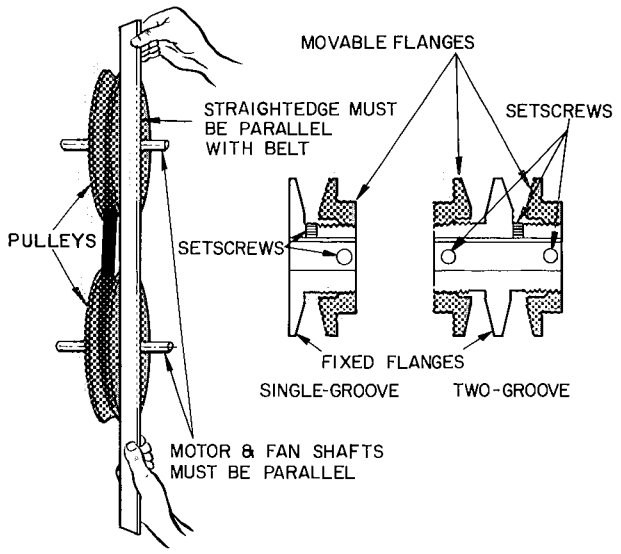


Fig. 32 — Indoor Air Fan Pulley Adjustment

To align fan and motor pulleys, loosen fan pulley setscrews and slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting plate.

To Adjust Belt Tension — Loosen fan motor pivot bolts. Move motor mounting plate up or down for proper belt tension (1/2-in. deflection with one finger) and tighten pivot bolts. Adjust lock bolt and nut on mounting plate to secure in fixed position.

START-UP

Crankcase heater(s) are energized as long as there is power to the unit. Energize heater(s) 24 hours prior to base unit start-up.

Unit Preparation — Make sure that unit has been installed in accordance with installation instructions and applicable codes.

Return Air Filters — Make sure correct filters are installed in filter tracks. See Table 1 Do not operate unit without return air filters.

Outdoor Air Inlet Screens — Outdoor air inlet screen(s) must be in place before operating unit.

Compressor Mounting — Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.

Internal Wiring — Check all electrical connections in unit control boxes Tighten as required.

Refrigerant Service Valves — Each unit system has 2 Schrader type service ports, one on the suction line and one on the compressor discharge line. Be sure that caps on the ports are tight.

Cooling — To start unit, turn on main power supply. Set system selector switch at COOL and fan switch at AUTO. Adjust thermostat to a setting below room temperature. Compressor starts on closure of contactor.

Check cooling effects at a setting above room temperature. Check unit charge. Refer to Refrigerant Charge in Service section.

Reset thermostat at a position above room temperature. Compressor will shut off.

TO SHUT OFF UNIT — Set system selector switch at OFF position or reset thermostat at a position above room temperature. Units are equipped with Signal-LOC™ protection device. Unit shuts down on any safety trip, and indicator light on thermostat comes on. Check reason for safety trip.

Compressor restart is accomplished by manual reset at the thermostat by turning the selector switch to OFF and then to ON.

Heating

1. Purge gas supply line of air by opening union ahead of gas valve. When gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on manual gas valve and unit electrical supply.
3. Set system switch selector at HEAT and fan switch at AUTO. or ON. Set heating temperature lever at above room temperature.
4. The induced draft combustion air fan will start. Pilot lights within 30 seconds. Refer to Service, Pilot Light if pilots do not light.
5. Main gas valve will open and main burners ignite within 2 minutes from the pilot light ignition. Natural gas burners are factory adjusted and should burn with a soft blue flame. Flame should not lift off burner face. Refer to Service, Main Burners, if required.
6. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate.

TO SHUT OFF UNIT — Set system selector switch at OFF or set heating selector lever below room temperature.

Safety Relief — A soft solder joint at the service Schrader port provides pressure relief under abnormal temperature and pressure conditions.

Ventilation (Continuous Fan) — Set fan and system selector switches at ON and OFF, respectively. Indoor air fan operates continuously to provide constant air circulation.

Economizer Operating Sequence

COOLING MODE — When there is no power applied to the indoor fan motor, the outdoor damper is closed.

If outdoor ambient temperature is above the outdoor air thermostat (OAT.) setting, the OAT. contact is open. No power is supplied to DR2. Upon a first-stage call for cooling, the indoor and outdoor fans and compressor energize. The economizer goes to vent position.

If outdoor ambient temperature is below the outdoor air thermostat (OAT.) setting, the OAT. contact is closed and power is supplied to DR2 (normally open contacts close and normally closed contacts open). Upon a first-stage call for cooling through Y1, power goes through contacts 4 and 6 of DR2 causing DR1 to energize (normally open contacts close and normally closed contacts open). The economizer switches from vent or closed position to modulation mode.

Modulation is accomplished by using the mixed air thermostat (MAT.) in conjunction with the stall circuitry inside the actuator. If the mixed air temperature is above the MAT. setting, C-T1 and C-T2 are made causing the damper motor to open (which causes the air temperature to fall) As the mixed air temperature falls to the MAT.

setting (54 F), C-T2 opens causing the motor to stall. When mixed air temperature goes 4 F below the MAT. setting, C-T1 opens causing the spring to close the damper. This in turn raises the mixed air temperature and causes C-T1 to again stall the motor into a less than full open position. If over-shoot should occur, this process would oscillate a few times until the mixed air temperature stabilizes.

Upon a second-stage call for cooling through Y2, power goes through contacts 1, 3 and 5 of DR2 and CLO and the compressor is energized. Mechanical cooling is integrated with economizer cooling. Economizer continues in modulation mode.

When outdoor ambient temperature goes below 50 F, the cooling lockout switch (CLS) opens and mechanical cooling is locked out.

An economizer control thermostat (ECT) on the evaporator coil guards against abnormally low suction temperatures while operating mechanical cooling in conjunction with economizer. Low suction temperatures can lead to frost on the evaporator coil. If frost buildup is detected, thermostat de-energizes economizer, thus closing the outdoor air damper This raises air temperature entering the evaporator coil and melts frost. Once frost is melted, the economizer is re-energized.

When cooling load is satisfied, the damper motor is de-energized causing the spring to close the damper.

During unoccupied periods, if a field-supplied night switch is used and is opened, the outdoor air damper closes.

HEATING MODE — With no power applied to the indoor fan motor, the outdoor air damper is closed.

Upon a call for heat through W1, the indoor fan contactor is energized and provides power to the indoor fan motor and economizer.

If the night set-back switch is closed, the outdoor dampers will open to the manually preset vent position by power passing through contacts 1 and 2 of DR1 and going to switches SW1 and SW2 through terminal XV of actuator. The switches are set with 3 degree angular difference between each other, acting as a dead spot or stall region. Thus, if the damper is below vent position, SW2 is closed powering the damper open until SW1 closes and SW2 opens which stalls the motor. If the damper is too far open, both SW1 and SW2 are open causing the spring to close the damper until SW1 closes, again stalling the motor.

When heating load is satisfied, the damper motor is de-energized causing the spring to close the damper.

During unoccupied periods, if a night set-back switch is used and opened, the damper closes.

SERVICE

⚠ CAUTION

When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

Cleaning — Inspect unit interior at the beginning of each heating and cooling season or as operating conditions require.

EVAPORATOR COIL

1. Turn unit power off. Remove indoor fan motor access panel.
2. Disconnect indoor motor wiring from main control box.
3. Remove screws from base of fan motor housing.
4. Slide fan motor housing out of base unit.
5. Clean coil using a commercial coil cleaner (i.e., Oakite 164) or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, backflush toward return air section to remove foreign material. Flush condensate pan after completion.
6. Reinstall fan motor housing, reconnect wiring and replace indoor fan motor access panel.

CONDENSER COIL — Inspect coil monthly. Clean condenser coil annually, or as required by location or outdoor air conditions.

Fins are not continuous through coil sections. Dirt and debris may pass through first section, become trapped between the 2 rows of fins, and restrict condenser airflow. Shine flashlight through coil to determine if dirt or debris has collected between coil sections.

Clean coil as follows:

1. Turn off unit power.
2. Remove top panel screws on condenser end of unit. Remove screws from coil side of coil center post. Do not remove center post.
3. Remove condenser coil corner post. See Fig. 33. To hold top panel open, place coil corner post between top panel and center baffle. See Fig. 34.

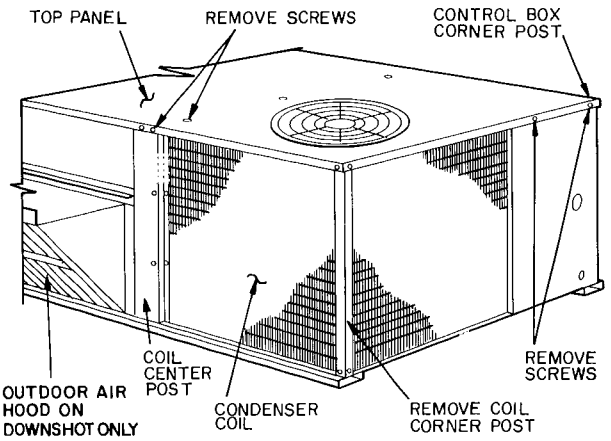


Fig. 33 — Cleaning Condenser Coil

4. Remove device holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 35.
5. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
6. Reposition the outer coil section, remove the coil corner post from between the top panel and center

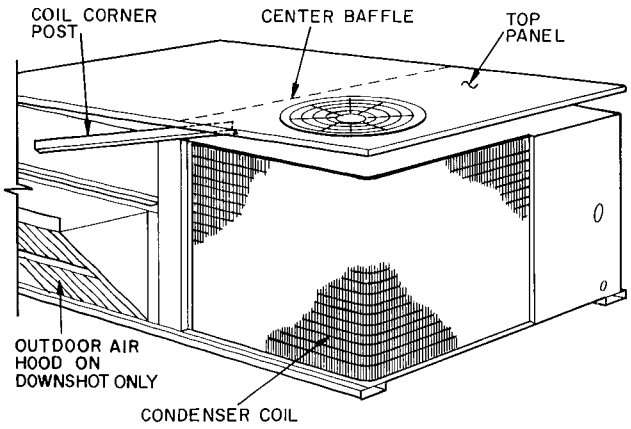


Fig. 34 — Propping Up Top Panel

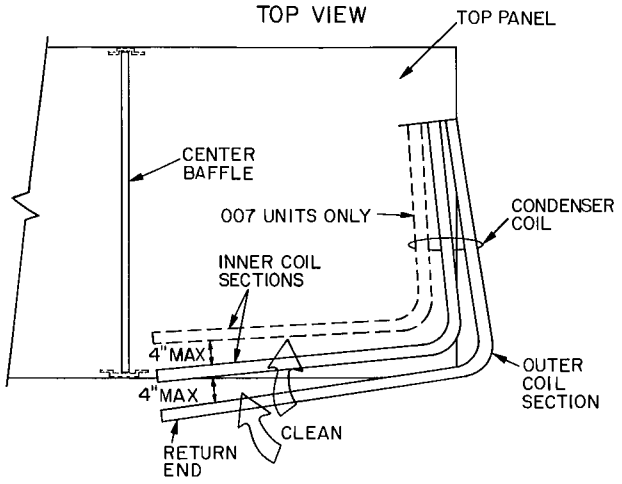


Fig. 35 — Separating Coil Sections

baffle. Secure the sections together. Install the coil corner post, coil center post and replace all screws.

CONDENSATE DRAIN — Check and clean each year at start of cooling season. In winter, keep drain and trap dry or protect against freeze-up.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require it.

OUTDOOR AIR INLET SCREENS (Downshot Units) — Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens.

Lubrication

COMPRESSORS — Each compressor is charged with correct amount of oil at the factory.

FAN MOTOR BEARINGS — No lubrication of condenser or evaporator fan motors is required for first 5 years of operation. Annually thereafter, clean and repack bearings with a suitable bearing grease.

Condenser Air Fan Adjustment (Fig. 36) — Shut off unit power supply. Remove condenser fan assembly (grille, motor, motor cover and fan) and loosen fan hub setscrews. Adjust fan height as shown in Fig. 36. Tighten setscrews and replace condenser fan assembly.

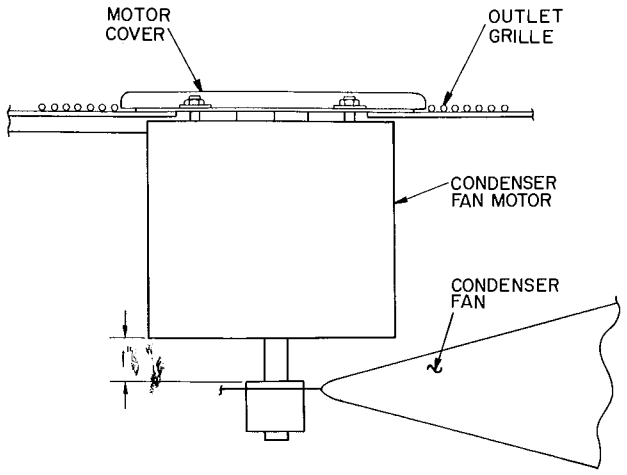


Fig. 36 — Condenser Air Fan Adjustment

Manual Outdoor Air Damper (Downshot Units Only) — If outdoor air damper blade adjustment is required, see Optional Manual Outdoor Air Damper section.

Economizer Adjustment (Downshot Units) — Refer to Economizer section under Installation.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants.

Unit panels must be in place when unit is operating during charging procedure.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant. (Refer to Table 1.)

LOW CHARGE COOLING — Using Cooling Charging Chart, Fig. 37 - 44, vary refrigerant until the conditions of the chart are met. Note the charging chart is different from type normally used. Chart is based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor air cfm must be within the normal operating range of the unit.

TO USE COOLING CHARGING CHART — Take the outdoor ambient temperature and read the suction pressure gage Refer to chart to determine what suction temperature should be. If suction temperature is high, add refrigerant If suction temperature is low, carefully blow some of the charge. Recheck the suction pressure as charge is adjusted.

Example (Fig. 41)

Outdoor Temperature ..... 85 F
Suction Pressure ..... 70 psig
Suction Temperature should be ..... 52 F
(Suction Temperature may vary ± 5 F)

If Chargemaster® charging device is used, temperature and pressure readings must be accomplished using the charging chart.

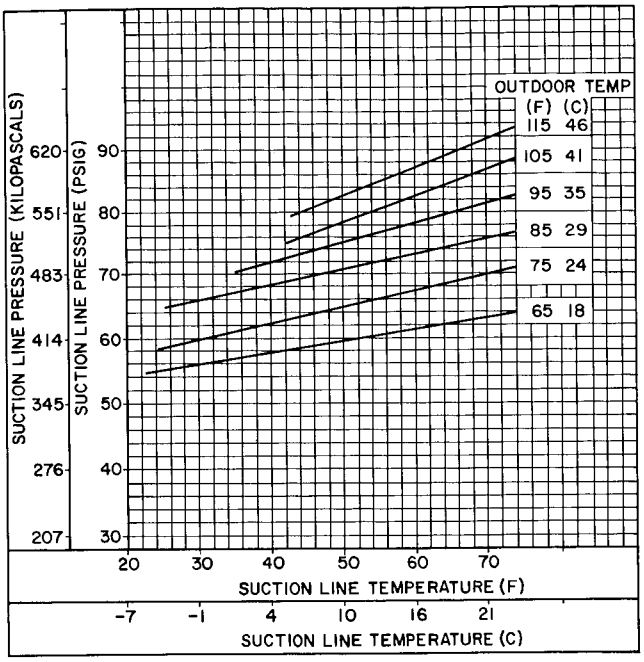


Fig. 37 — Cooling Charging Chart; 48LDT004

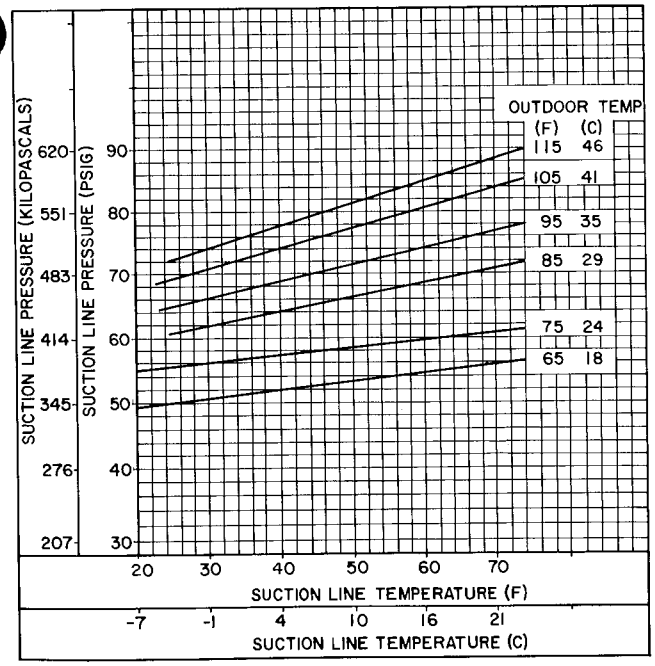


Fig. 38 — Cooling Charging Chart; 48HDT,LDT005

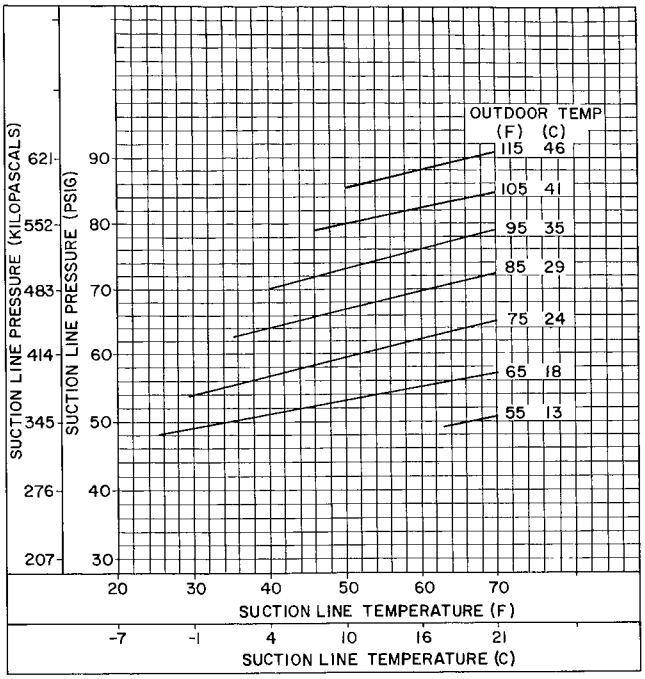


Fig. 39 — Cooling Charging Chart; 48HDT,LDT006; HH,LH006

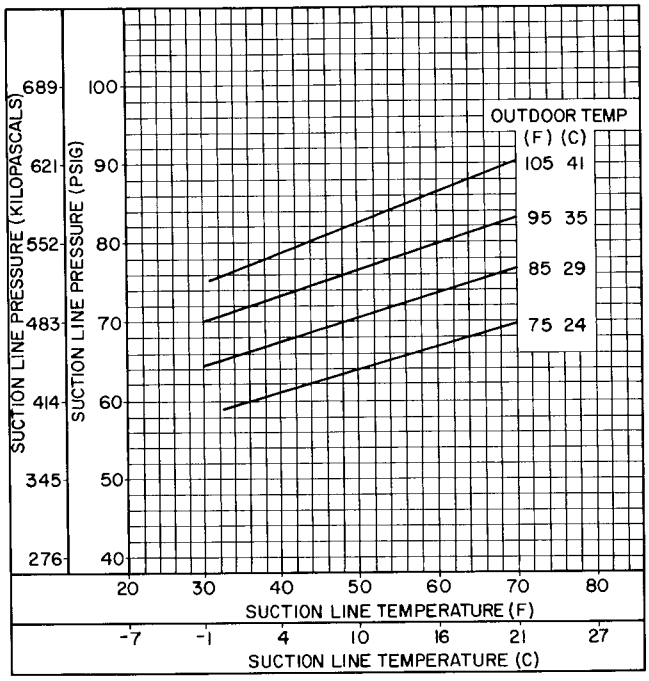


Fig. 40 — Cooling Charging Chart; 48HD,HH007

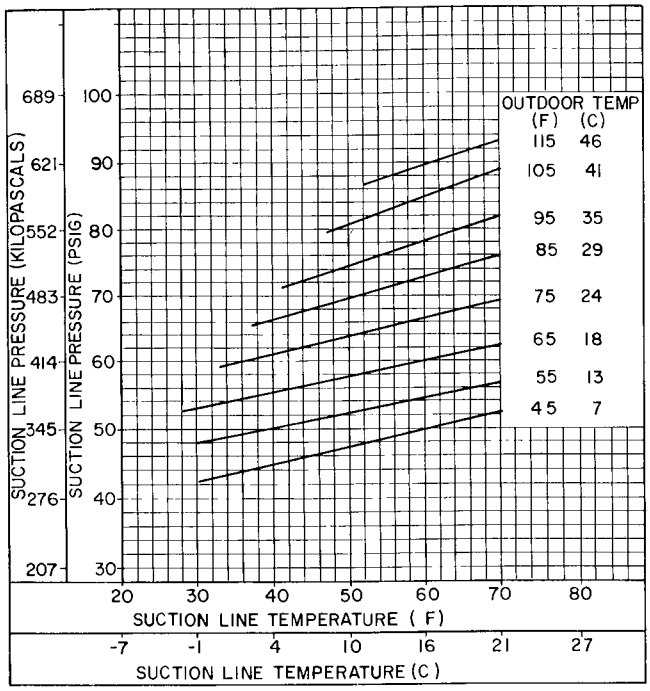


Fig. 41 — Cooling Charging Chart; 48HD,LD,HH,LH008

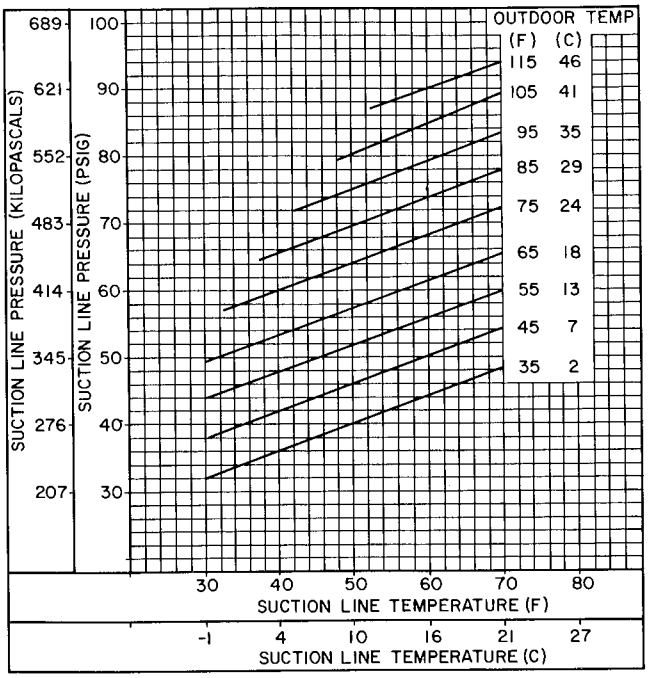


Fig. 43 — Cooling Charging Chart; 48HD/HH009; Ckt 1

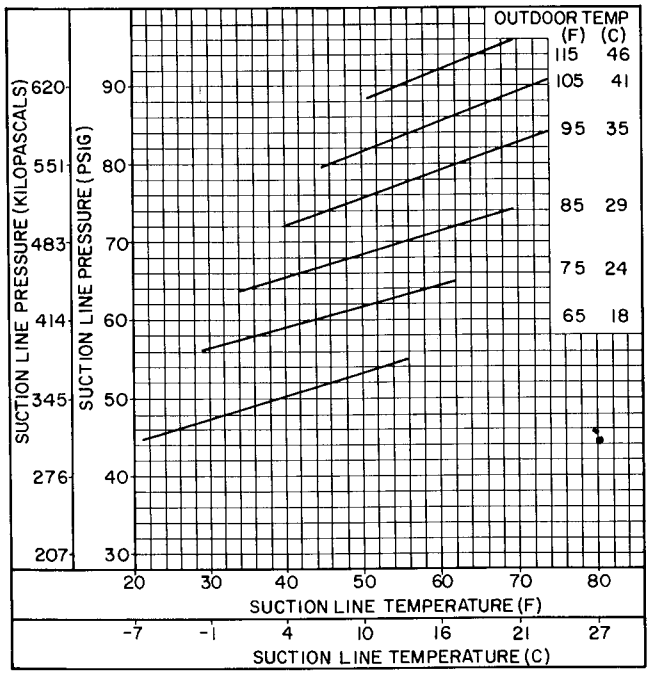


Fig. 42 — Cooling Charging Chart; 48HDD,LDD,HHD,LHD008; Ea Ckt Equal

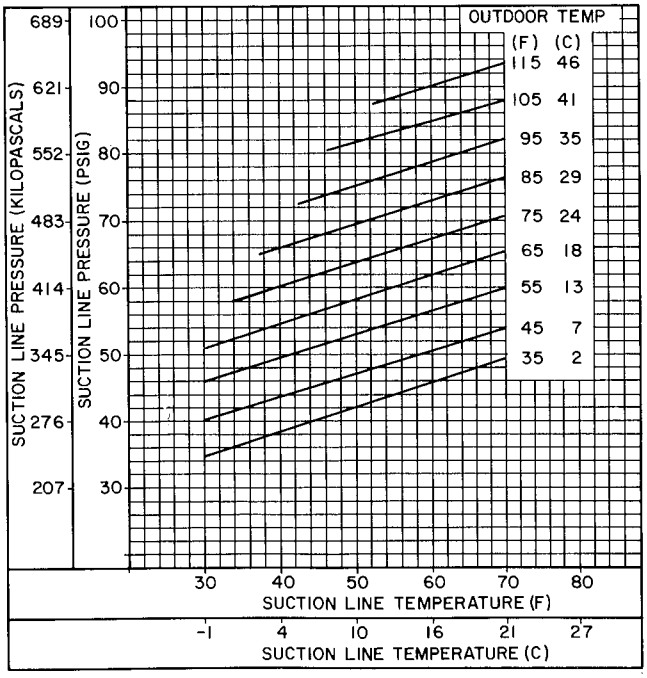


Fig. 44 — Cooling Charging Chart; 48HD/HH009; Ckt 2

Main and Pilot Burners — At the beginning of each heating season, inspect for deterioration of blockage due to corrosion or other causes. Observe the pilot and main burner flames and adjust, if necessary, referring to Automatic Pilot Adjustment or Main Burners sections of instructions.

Flue Gas Passageways — Inspect flue collector box and upper areas of heat exchanger cells by removing burner compartment access panel; then remove flue cover and inspect heat exchangers. Using a wire brush, clean all surfaces as required.

Combustion Air Blower — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bimonthly to determine proper cleaning frequency.

To inspect blower wheel, remove draft hood and screen. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel as follows:

1. Remove burner access panel.
2. Remove the 6 screws that attach induced draft motor mounting plate to blower housing (Fig. 45). The mounting plate will drop down.
3. Remove the 4 wires attached to the motor and remove assembly from unit.
4. To remove blower, remove setscrews.
5. To remove motor, remove blower, then remove the nuts that hold motor to mounting plate.

   NOTE: Do not lose spacers for induced draft motor.
6. To reinstall, reverse the procedure outlined above.

Limit Switch — Access panel is located on the heat section side panel (Fig. 3 and 4).

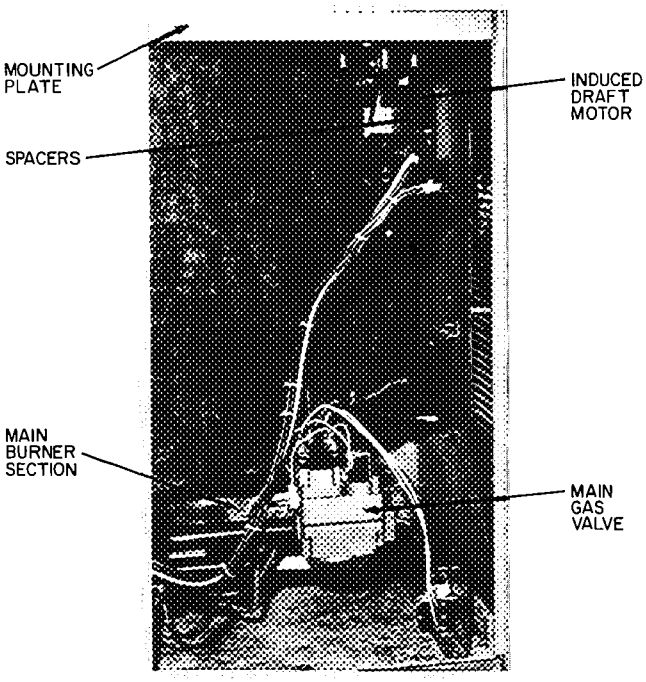


Fig. 45 — Burner Section Details

004,005,006,007 UNITS AND 48HDD,LDD/HD, LD008 UNITS — Limit switch is located in the upper section of the heat exchangers. Bi-metal sensor is facing the airstream. Remove bracket holding limit switch and remove screw holding switch.

48HHD,LHD/HH,LH008; 48HD,HH009 UNITS — Limit switch is located on partition between blower section and heat section. Remove plate and screw holding switch.

Pilot Light — If pilot does not light as described in Start-Up, Heating: Be sure pilot orifice is not obstructed, gas pressure is not less than 3 in. wg; and air has been bled from gas supply. Check for spark ignitor malfunctions as follows:

1. Shut off unit power supply.
2. Check that spark gap is 1/8 to 3/16 inch.
3. Check that spark generator is securely grounded to furnace vestibule plate.
4. Check that high-voltage lead is securely connected between generator and electrode body.
5. Restore power. Check that 24 volts is supplied to primary side of generator.
6. Check unit label diagram for correct terminal usage if any wires are removed.

Automatic Pilot Adjustment

1. Turn off unit power supply, set system selector switch at HEAT, and adjust thermostat to call for heat.
2. Remove burner compartment access panel.
3. Remove screw cap cover on the top of the main gas valve to expose pilot adjusting screw.
4. With a small screwdriver, turn adjustment screw until flame is approximately 1 to 1-1/2 in. high.
5. Replace screw cap cover on pilot gas valve.
6. Observe burner operation and adjust main gas valve for correct burner operation as required. See Fig. 46 for proper flame appearance.
7. Replace all panels.

Automatic Gas Valve Sequence of Operation

— Thermostat calls for heat, energizing the spark ignitor and simultaneously opening the pickup and hold solenoids of the pilot gas valve (inside main gas valve). The pilot gas ignites within 2 seconds, stopping the ignitor. Within 11 seconds, the pilot contact (normally closed) opens, drops out the pickup solenoid. Within 35 seconds, the pilot contact (normally open) closes, energizing the heat motor in the main gas valve. The main gas valve will open within 45 seconds.

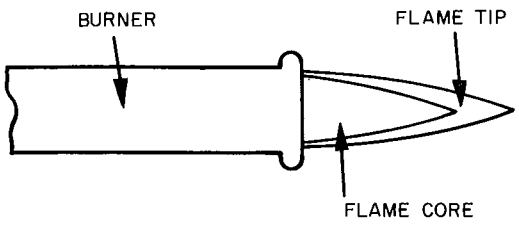


Fig. 46 — Proper Flame Appearance

Main Burners are factory set and should require no adjustment. However, if burner adjustment is necessary:

1. Perform Automatic Pilot Adjustment.
2. Turn gas valve to ON. Allow unit to operate at least 15 minutes with furnace access panel in place.
3. Remove access panel.
4. Loosen primary air shutter and adjust to a minimum opening of 5/8 inch.
5. Retighten primary air shutter and reinstall access panel.

TO CHECK ignition of main burners and fan switch operation, move thermostat dial above and below room temperature several times pausing at least one minute between cycles.

REMOVAL

1. Shut off manual main gas valve.
2. Shut off power to unit.
3. Remove evaporator air fan access panel, burner compartment access panel and center post.
4. Disconnect gas piping at unit gas valve.
5. Remove (and mark) red wire from terminal no. 4 or W1 and brown wire from terminal no. 3 or C2 and violet wire from terminal W2 (connections are dependent on whether a 2-stage or single-stage valve is on the unit).
6. Remove the 2 screws at rear of housing just inside burner section.
7. Lift and slide assembly out.

REPLACEMENT

1. Slide assembly into burner section and push snugly against vestibule plate.
2. Screw assembly down.
3. Connect red wire to terminal no. 4 or W1 and brown wire to terminal no. 3 or C2 and violet wire to terminal W2 (connections are dependent on whether a 2-stage or single-stage valve is on the unit).
4. Connect gas piping at unit gas valve.
5. Replace center post and access panels.
6. Turn on manual main gas valve.
7. Restore power to unit.

CLEANING

1. Remove burner assembly from unit as described above.
2. Inspect burners and if dirty, remove by removing retaining plate.

⚠ CAUTION

Do not hit or plug orifice spuds.

3. Using a soft brush clean burners as required.
4. Replace burners.
5. Replace burner assembly as described above.

Replacement Parts — A complete list of replacement parts may be obtained from any Carrier distributor upon request.

TYPICAL WIRING DIAGRAM LEGEND (48HD,LD008)

AHA — Adjustable Heat Anticipator
Assy — Assembly
C — Contactor Compressor
Cap. — Capacitor
CC — Cooling Compensator
CH — Crankcase Heater
CLO — Compressor Lockout
CLS — Cooling Lockout Switch
Comp — Compressor Motor
CS — Centrifugal Switch
DM — Damper Motor
DR — Damper Relay
EC — Enthalpy Control
ECT — Economizer Thermostat
Equip — Equipment
Fu — Fuse
Gnd — Ground
HPS — High-Pressure Switch
I — Ignitor Electrode
IDM — Induced Draft Motor
IDR — Induced Draft Relay
IFC — Indoor Fan Contactor
IFM — Indoor Fan Motor
IFR — Indoor Fan Relay
IPP — Ignitor Power Pack
L — Light
LPS — Low-Pressure Switch
LS — Limit Switch
MAT. — Mixed Air Thermostat
MGV — Main Gas Valve
Mtr — Motor
NS — Night Setback Switch
OAT — Outdoor Air Thermostat
OFM — Outdoor Fan Motor
PGV — Pilot Gas Valve
PI — Plug Assembly
PS — Pilot Sensor
QT — Quadruple Terminal
RLC — Rotor Locking Circuit
RS — Rollout Switch
Std — Standard
Sw — Switch
TB — Terminal Block
TC — Thermostat, Cooling
TDR — Time-Delay Relay
TH — Thermostat, Heating
Tran — Transformer


Marked Wire


Denotes Connection Point Between Subbase and Thermostat


Terminal (Marked)


Terminal (Unmarked)


Terminal Block


Field Splice


Splice (Marked)

Factory Splice

Factory Wiring

Internal Connection

Accessory or Optional Wiring

Field Control Wiring

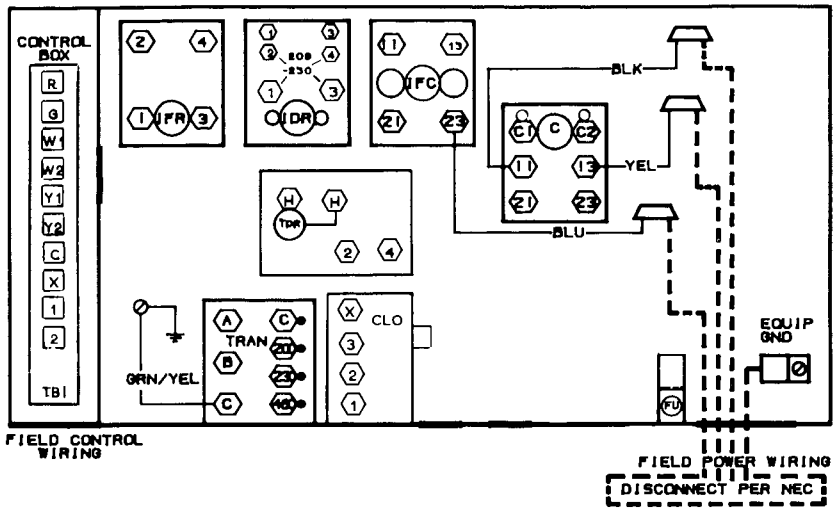

Field Power Wiring

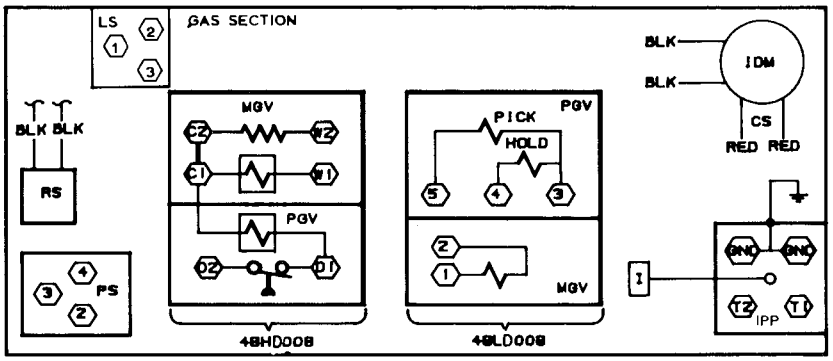
To indicate common potential only, not to represent wiring

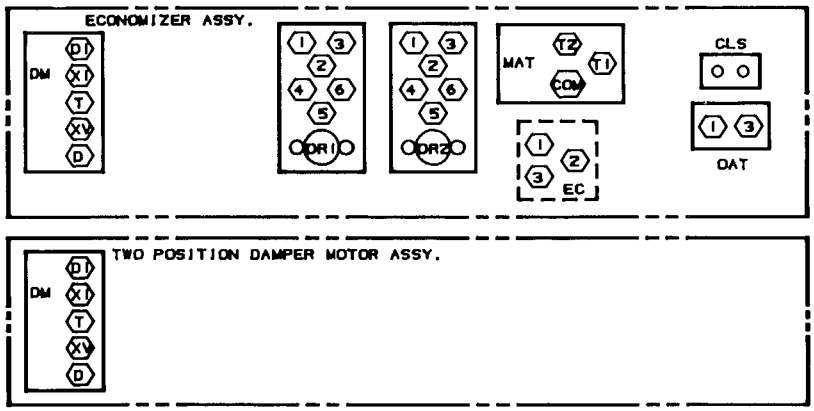
TYPICAL WIRING DIAGRAM NOTES (48HD,LD008)

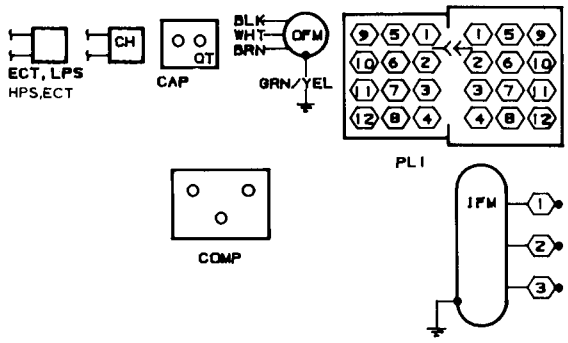
1. Compressor and fan motors are thermally protected — 3-phase motors are protected against primary single-phasing conditions.
2. If any original wires must be replaced, use 90 C wire or equivalent.
3. Numbers indicate the line location of used contacts. A bracket over (2) numbers signifies a single pole double throw contact. An underlined number signifies a normally closed contact. Plain (no line) number signifies a normally open contact.
4. Must use thermostat HH07AT172 or 174 with subbase HH93AZ177.
5. Set heat anticipators at one amp (208/230-3-60). Set heat anticipators at 1.2 amp (460-3-60).
6. Factory connected to 230-v or 460-v lead per unit rated voltage. If 208-v power supply is used, connect to 200-v lead and insulate 230-v lead.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations

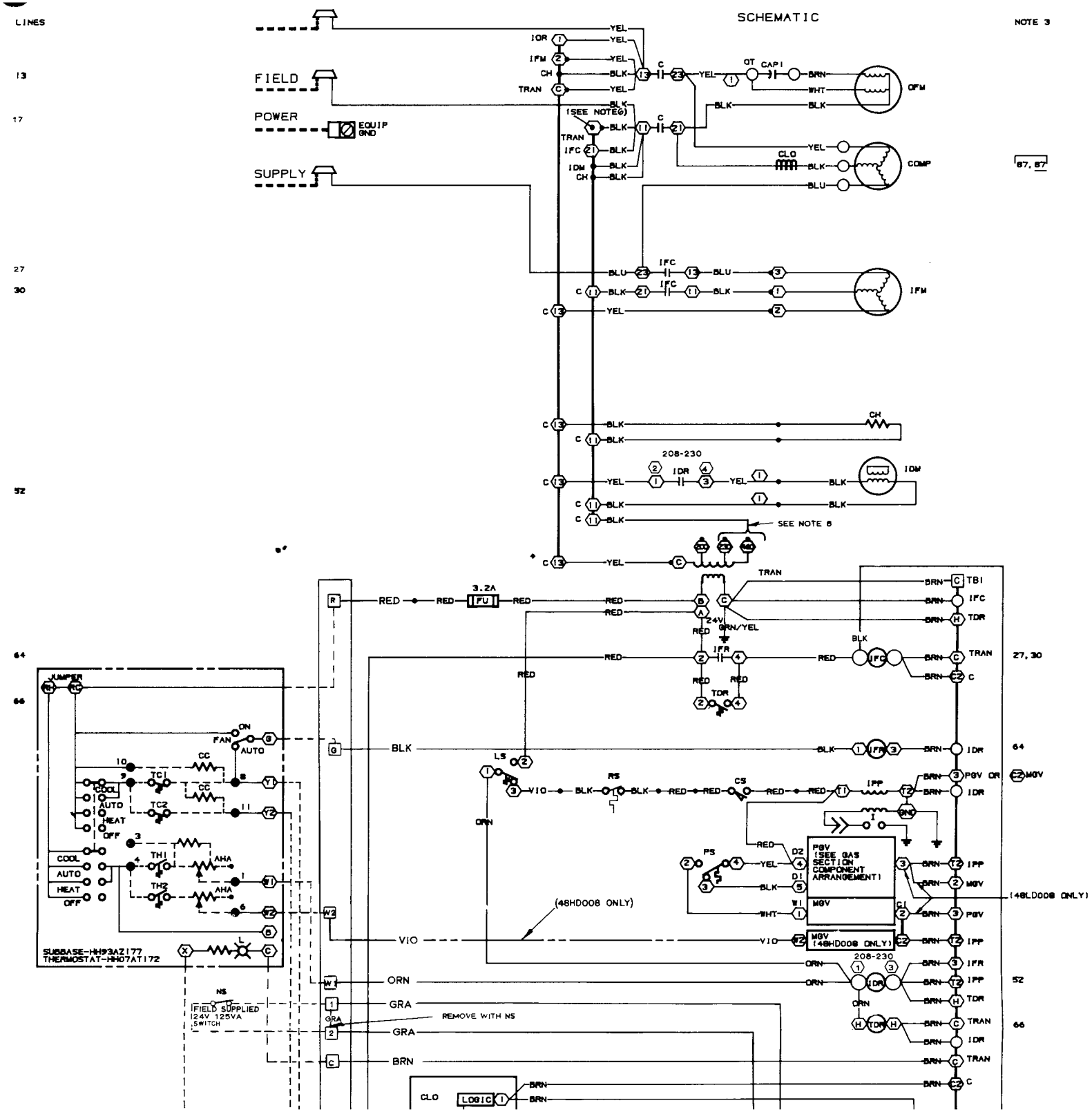


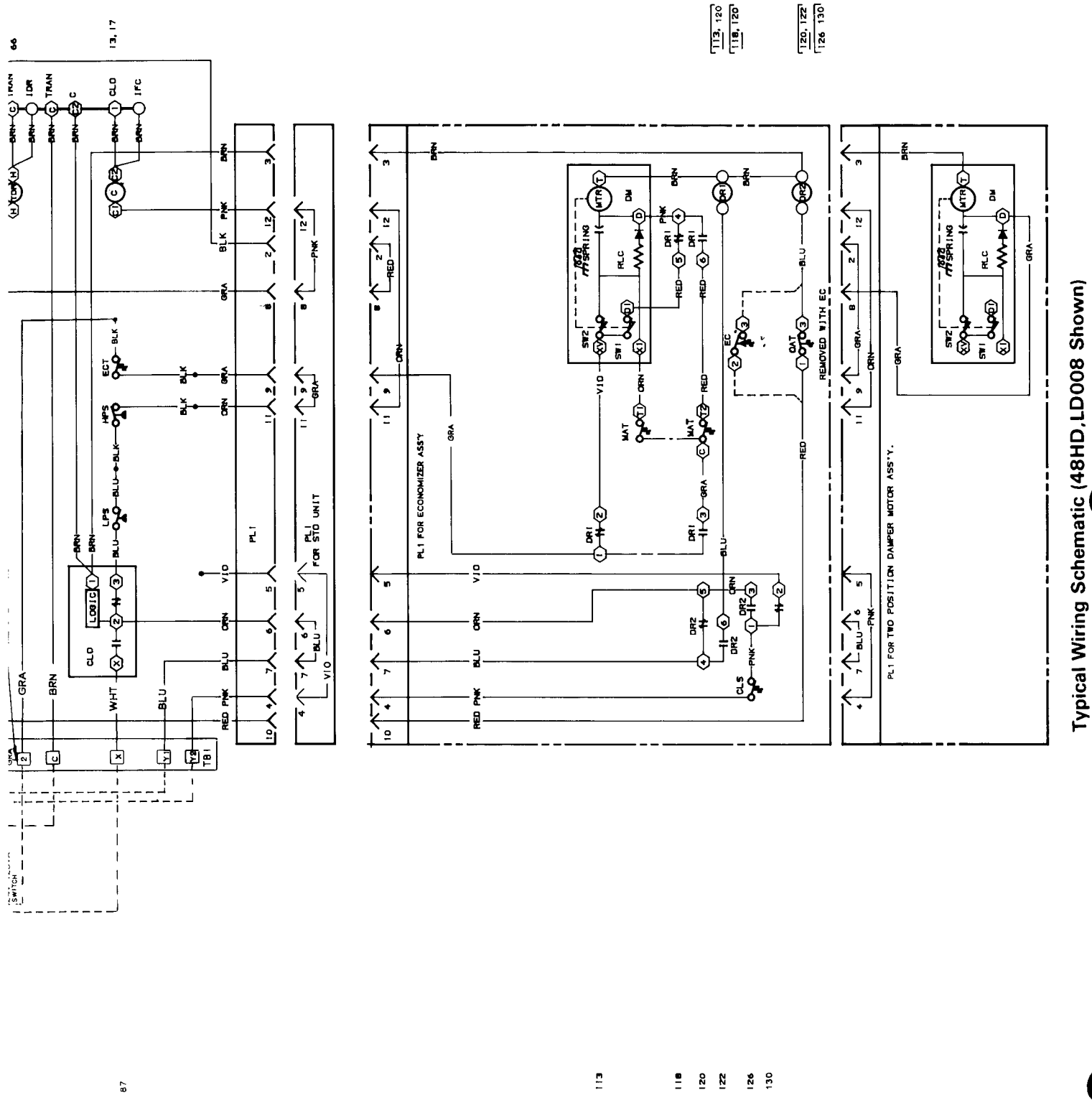






Typical Component Arrangement (48HD,LD008 Shown)


LINES
SCHEMATIC
NOTE 3
FIELD
POWER
SUPPLY
EQUIP GND
13
17
27
30
52
64
66
IDR
IFM
CH
TRAN
(SEE NOTE6)
OFM
COMP
CLO
CAP1
OT
IFC
IDM
208-230
SEE NOTE 6
3.2A
FU
TRAN
TBI
IFR
TDR
24V
GRN/YEL
JUMPER
FAN
ON
AUTO
CC
TC1
TC2
COOL
HEAT
OFF
TH1
TH2
AHA
SUBBASE-HH93AZ177
THERMOSTAT-HH07AT172
NS
FIELD SUPPLIED
24V 125VA
SWITCH
REMOVE WITH NS
LS
RS
CS
IPP
PGV
(SEE GAS SECTION COMPONENT ARRANGEMENT)
MGV
(48HD008 ONLY)
PS
D1
D2
LOGIC
BLK
VIO
ORN
GRA
BRN
RED
YEL
BLU
WHT
27, 30
87, 87



Typical Wiring Schematic (48HD,LD008 Shown)