O11R SERIES UNITS

I - INTRODUCTION

O11R units utilize the OL1-70 series oil burner. The unit is shipped standard with single stage oil pump, but a two stage oil burner is available. Table 1 lists the oil burner model numbers applicable to each size furnace. Detailed operation, maintenance and service procedures for the OL1 oil burner are included in the "Oil Heat" section.

Units are shipped with standard nozzle sizes. Maximum nozzle sizes must be ordered if required. When installing a maximum size nozzle on an O11R-105, a static disc change is required. The alternate disc is sent with unit. When installing a maximum size nozzle on an O11R-140, the static disc must be removed. Check "Nozzle Information" to verify static usage and size.

Units are sent standard for a single line system but the oil pump can be converted to two line operation. Simply install the by-pass plug provided in attached bag according to the accompanying instructions. Never operate the pump with a single line when by-pass is installed. This will blow the oil bearing seal and damage pump.

Figure 1 shows a cutaway of an O11R unit.

TABLE 1

Unit Model No.	Burner Model No.
O11R-105	OL1-70-311 (single stage) OL1-70-312 (two stage)
O11R-140	OL1-70-321 (single stage) OL1-70-322 (two stage)
O11R-168	OL1-70-331 (single stage) OL1-70-332 (two stage)

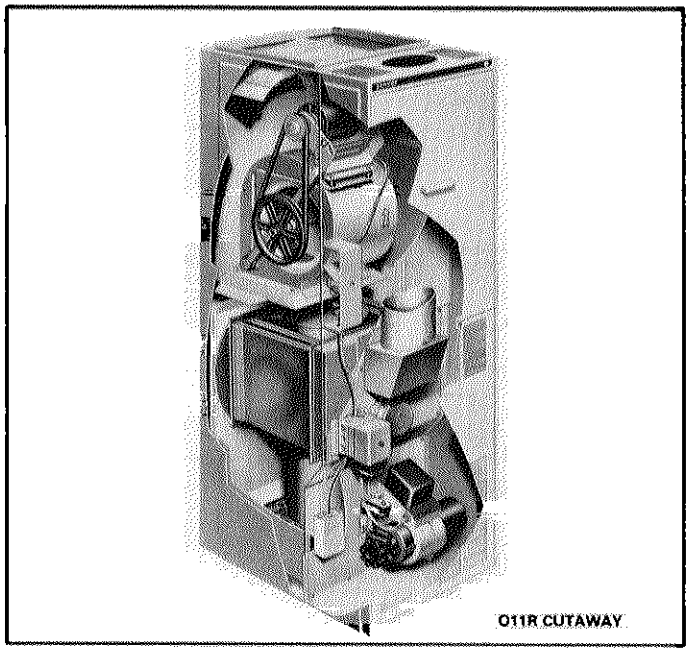


FIGURE 1

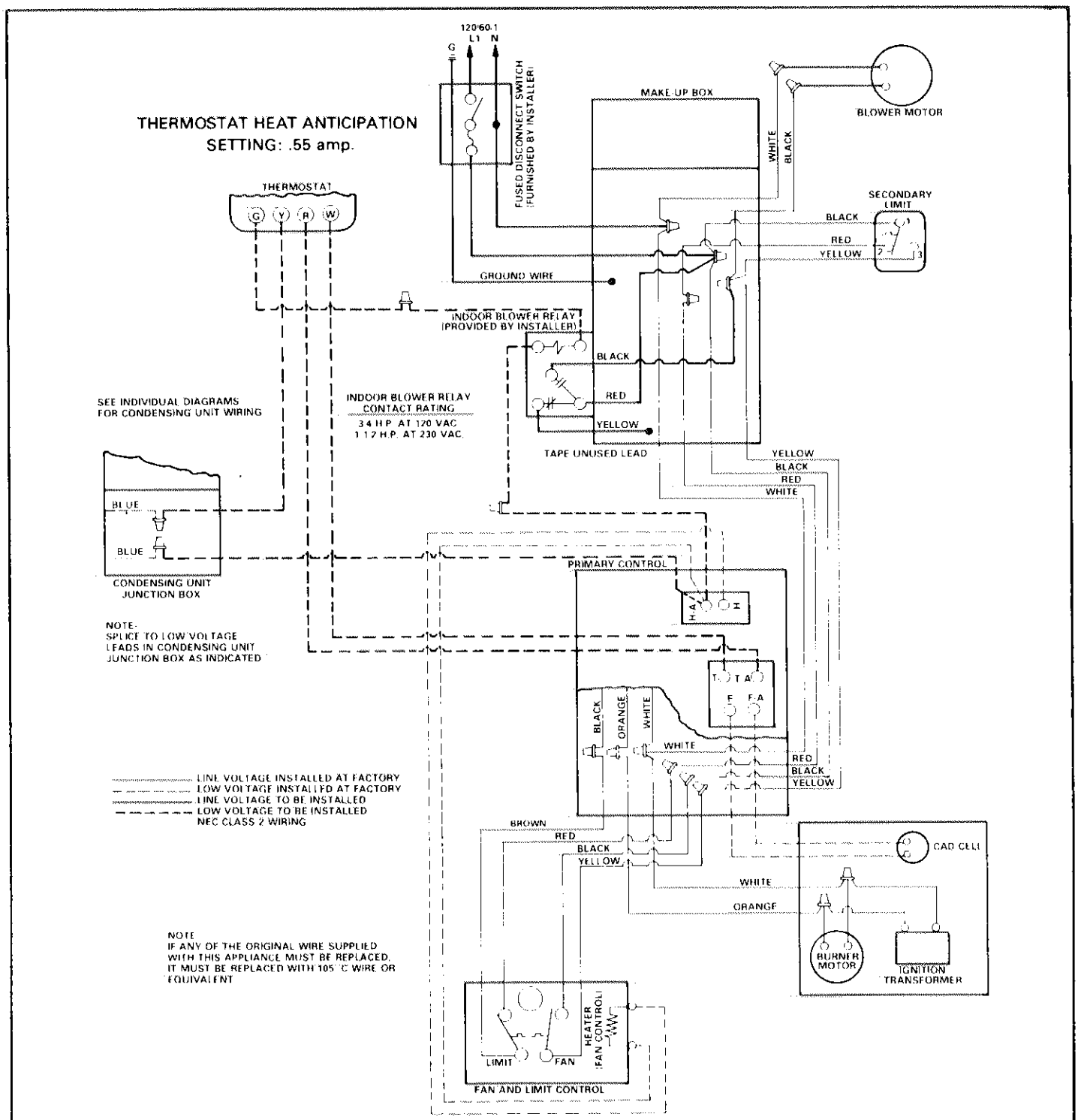
II - UNIT INFORMATION

A - Specifications

Model No.	O11R-105	O11R-140	O11R-168
Btuh input (maximum U.L. Listing)	105,000	140,000	168,000
Btuh input (nozzle furnished)	91,000	119,000	140,000
Btuh input (minimum)	91,000	119,000	140,000
Btuh output (maximum U.L. Listing)	84,000	112,000	134,000
Btuh output (nozzle furnished)	73,000	95,000	112,000
Btuh output (minimum)	73,000	95,000	112,000
Nozzle range (gph)	.65 — .75	.85 — 1.00	1.00 — 1.20
Nozzle furnished (gph)	.65	.85	1.00
Flue size (in. Oval)	6	7	7
Oil burner — standard (1 stage)	OL1-60-311	OL1-61-321	OL1-62-331
Oil burner — optional (2 stage)	OL1-60-312	OL1-61-322	OL1-62-332
Blower wheel nom. diam. x width (in.)	10 x 8	12 x 12	12 x 12
Blower motor hp Blower drives (shipped separate)	See Drive Selection	See Drive Selection	See Drive Selection
Tons of cooling that can be added	1-1/2, 2, 2-1/2, 3	3, 3-1/2, 4, 5	3, 3-1/2, 4, 5
Free filter area (sq. ft.) and cut size (in.)	3.1 — 24 x 26 x 1	4.7 — 24 x 38 x 1	5.3 — 24 x 42 x 1
*No. of packages in shipment	2	2	2
Net weight (lbs.)	345	375	405
Electrical characteristics	120 volts — 60 hertz — 1 phase		

B - Nozzle Information

UNIT		STATIC DISC (dia.)	*NOZZLE SIZE		INPUT RATING		OUTPUT RATING		SPRAY ANGLE	NOZZLE TYPE
			Gal/hr.	kg/hr.	Btuh	kcal/hr.	Btuh	kcal/hr.		
O11R-105	Stand.	3.750	0.65	2,10	91,000	22 930	73,000	18 396	70°	Delavan A, Steinen H
	Max.	3.250	0.75	2,42	105,000	26 460	84,000	21 168		Hago H, Monarch NS
O11R-140	Stand.	3.250	0.85	2,75	119,000	30 000	95,000	23 940	70°	Delavan H, Steinen H
	Max.	NONE	1.00	3,23	140,000	35 280	112,000	28 224		Hago H, Monarch NS
O11R-168	Stand.	NONE	1.00	3,23	140,000	35 280	112,000	28 224	70°	Delavan A. Steinen H
	Max.	NONE	1.20	3,88	168,000	42 336	134,000	33 768		Hago H, Monarch NS



TYPICAL O11R FIELD WIRING DIAGRAM

FIGURE 2

C - Field Wiring (Figure 2)

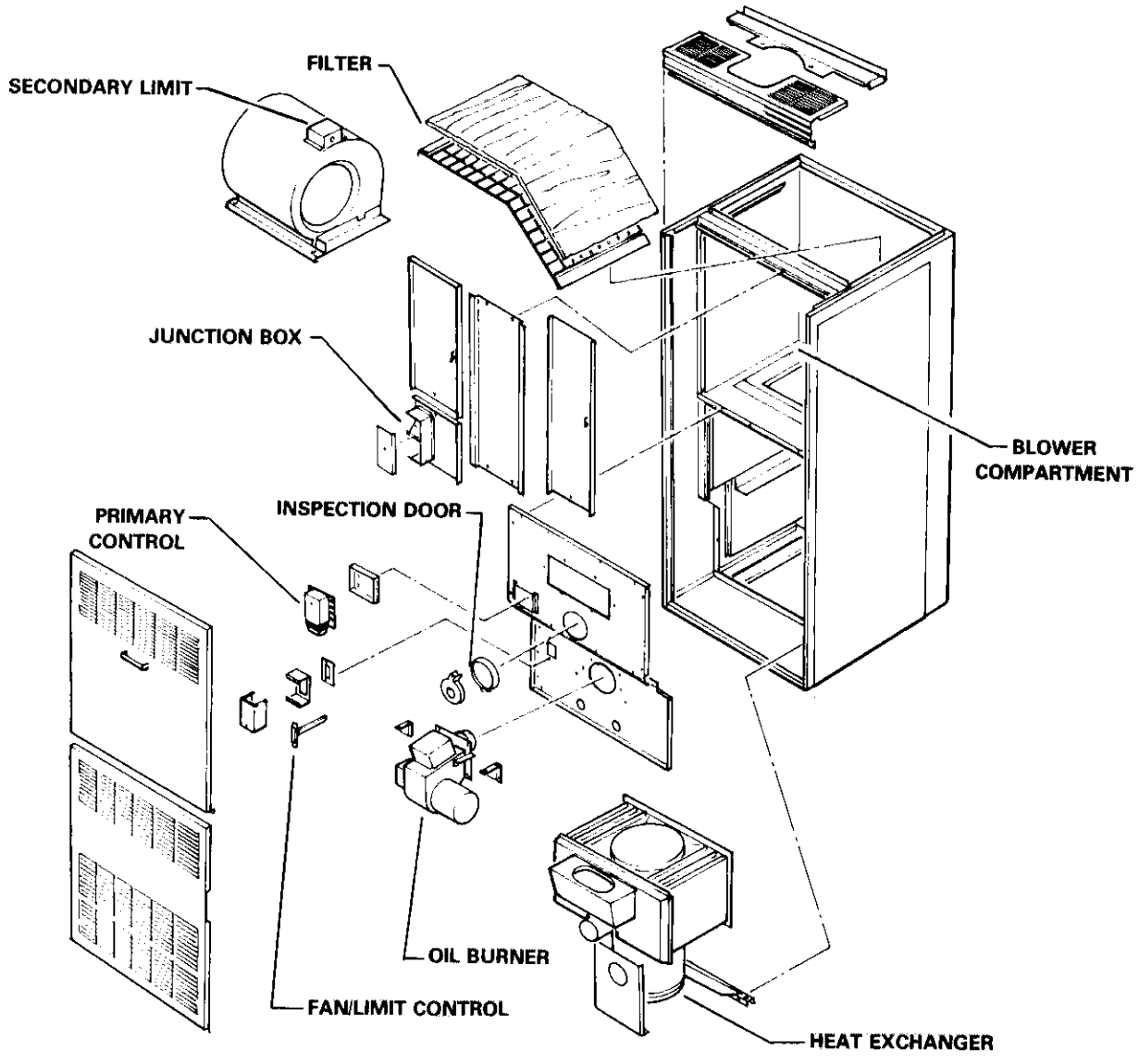
The "R" and "W" thermostat leads wire directly to primary control. An indoor blower relay must be field provided for cooling applications.

III - COMPONENTS

Figure 3 shows an exploded view of unit.

1 - **Combination Fan/Limit Control**

The limit de-energizes the control circuit at excessive temperatures. Do not alter limit setting. A sure start fan control is used. The fan control heater is activated through the primary control upon a thermostat demand. The fan contacts close after a short delay. The fan control is adjustable. See Figure 4.



O11R EXPLODED VIEW

FIGURE 3

2 - **Secondary Limit**
O11R units have a secondary limit control wired in series to the other limit. Should this control break contacts, it still allows blower motor operation.

3 - **Primary Control**
A White-Rodgers (style 668-453) primary control is used. It provides complete unit shutdown in case of flame failure. Mounts on wiring junction box in furnace vestibule. A 40 VA transformer is an integral part of the primary control. If the control locks out, the reset button must be "pushed in" before unit can try for a restart. See Figure 5.

4 - **Oil Burner**
O11R uses the OL1-70 series oil burner. The burner motor has thermal cutout protection. In the event of motor lockout, push reset button after motor has had sufficient time to cool. See Figure 5. Refer to oil burner section for additional information.

5 - **Heat Exchanger And Combustion Chamber (Figure 6)**
Heat exchanger construction consists of a primary and secondary heating surface. The oil is ignited in the primary chamber and the combustion gases pass through a rear opening into the secondary chamber before being vented.

Two cleanout openings are provided in the front of secondary chamber. Remove vestibule panel for access. Primary heating surface cleanout access is through the inspection tube. The inspection tube is also used for flame observation.

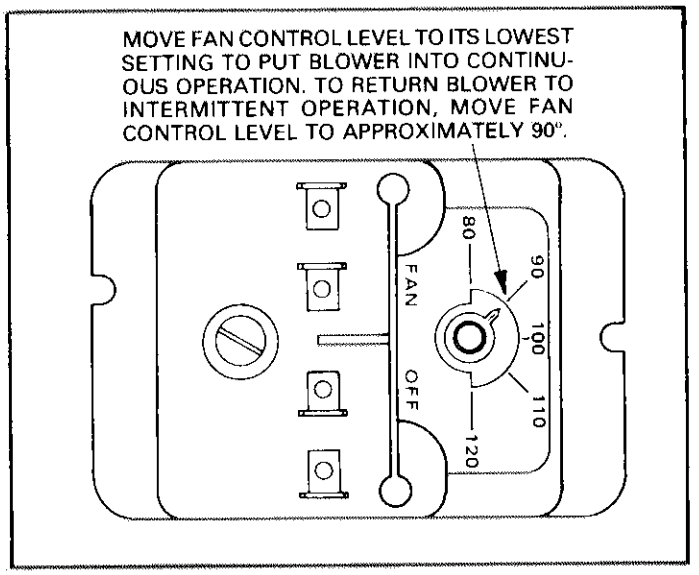


FIGURE 4

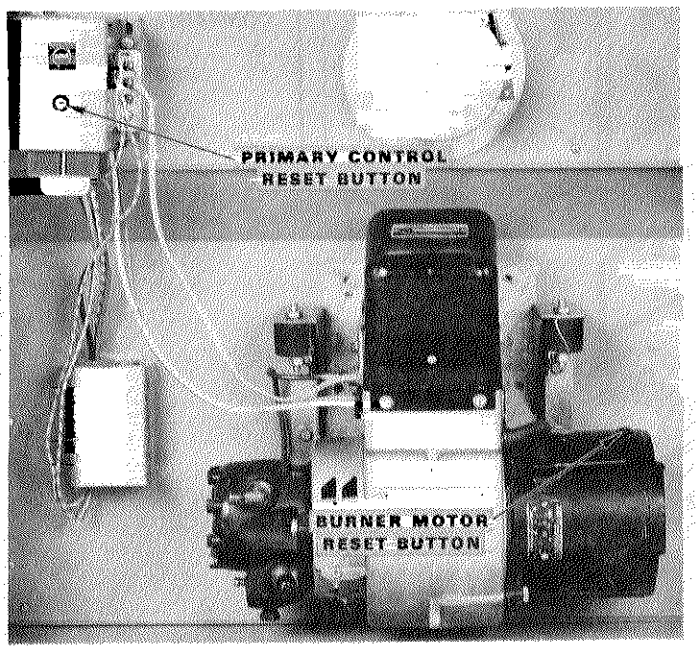


FIGURE 5

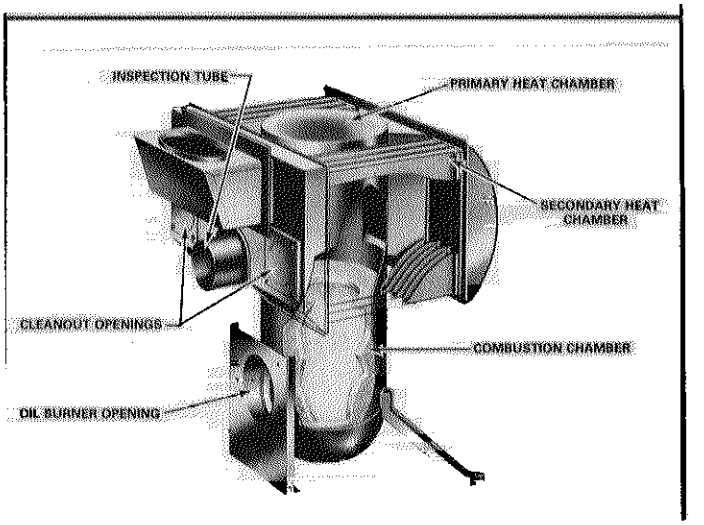


FIGURE 6

The fiber combustion chamber provides a high temperature zone for clean, quiet and efficient combustion. Chemical soot removers should not be used for cleaning. When installing, cleaning or servicing furnace, do not scrape or mutilate combustion chamber lining. Replacement combustion chamber kits are available. See Table 2.

IV - TEMPERATURE RISE

To measure temperature rise, place plenum thermometers in warm air and return air plenums. Locate thermometer in warm air plenum where thermometer will not "see" heat exchanger, thus picking up radiant heat. Turn up thermostat as high as possible to start unit. After plenum thermometers have reached their highest and steadiest readings, subtract the readings. The difference should be approximately 80°F. If

TABLE 2

Unit Model No.	Combustion Chamber Replacement Kit
O11R-105	LB-33041BA
O11R-140	LB-33041BB
O11R-168	LB-33041BC

TABLE 3

Heating Drive Kits							
Furnace Model No.		Drive Kit Model No.	Motor hp	Motor Pulley (in.) & Groove	**Blower Pulley (in.) & Groove	*Rpm Range	Belt
O11R-105		DK-2001 (BM-7453)	1/4	1/2 x 2-7/8 — O	3/4 x 6 — O	518 — 776	3L400
O11R-140		DK-2003 (BM-7455)	1/4	1/2 x 3-1/4 — A	1 x 8 — A	410 — 625	4L450
O11R-168		DK-2003 (BM-7455)	1/4	1/2 x 3-1/4 — A	1 x 8 — A	410 — 625	4L450
Cooling Drive Kits							
Furnace Model No.		**Drive Kit Model No.**	**Motor hp**	**Motor Pulley (in.) & Groove**	**Blower Pulley (in.) & Groove**	**Rpm Range**	**Belt**
O11R-105	2 tons	DK-2001 (BM-7453)	1/4	1/2 x 2-7/8 — O	3/4 x 6 — O	518 — 776	3L400
	2-1/2 & 3 tons	DK-2002 (BM-7454)	1/3	1/2 x 4-1/8 — O	3/4 x 6 — O	775 — 1000	3L410
O11R-140	3 tons	DK-2004 (BM-7456)	1/3	1/2 x 4-1/8 — A	1 x 8 — A	605 — 820	4L460
	3-1/2 & 4 tons	DK-2005 (BM-7457)	1/2	5/8 x 4-1/8 — A	1 x 8 — A	605 — 820	4L460
	5 tons	DK-2006 (BM-7458)	3/4	5/8 x 4-3/4 — A	1 x 8 — A	735 — 950	4L470
O11R-168	3 & 3-1/2 tons	DK-2004 (BM-7456)	1/3	1/2 x 4-1/8 — A	1 x 8 — A	605 — 820	4L460
	4 tons	DK-2005 (BM-7457)	1/2	5/8 x 4-1/8 — A	1 x 8 — A	605 — 820	4L460
	5 tons	DK-2006 (BM-7458)	3/4	5/8 x 4-3/4 — A	1 x 8 — A	735 — 950	4L470

*At 1725 rpm motor speed.

**Factory installed in furnace package and not included in drive kit.

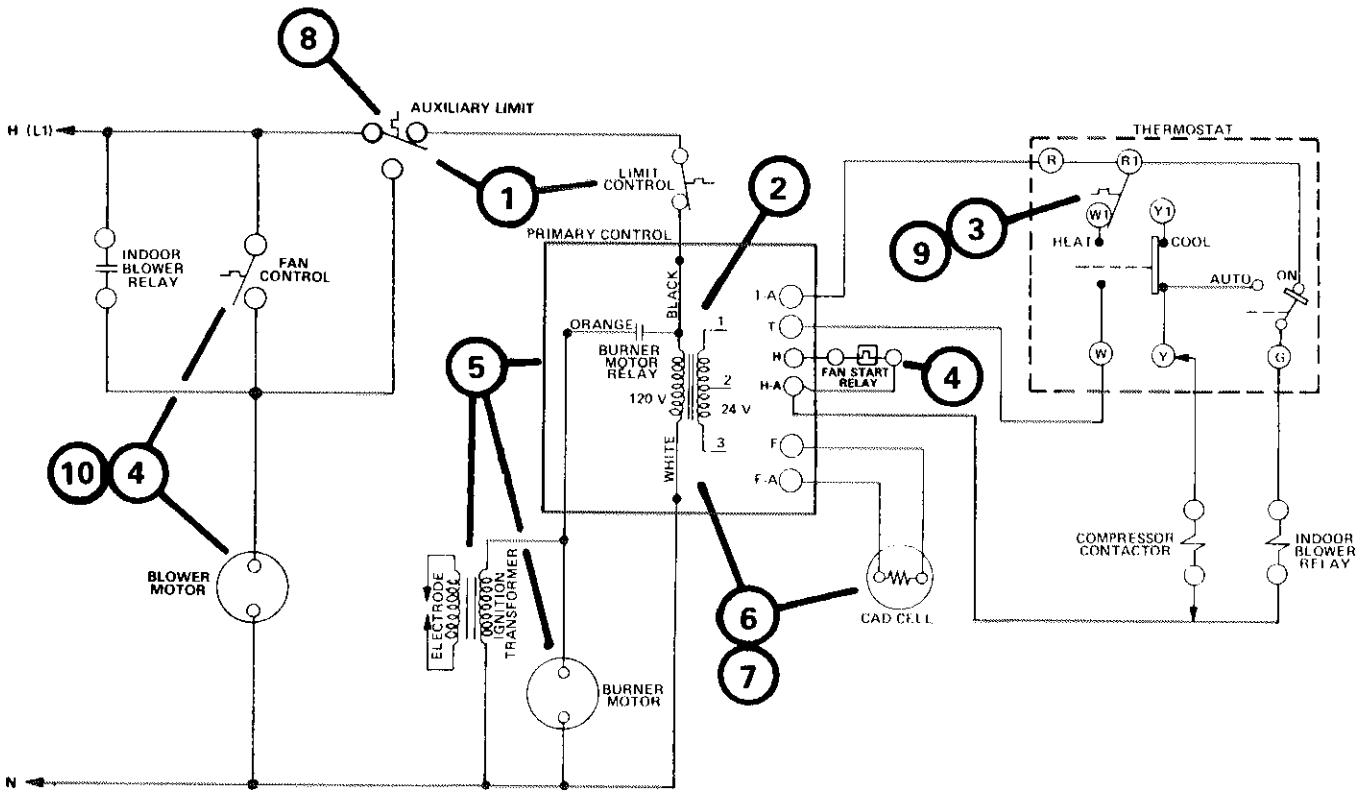
this temperature is low, decrease blower speed; if temperature is high, increase blower speed.

See Table 3 for available drive kits. Blower speed is regulated by means of an adjustable motor pulley. Open pulley to decrease speed and close pulley to increase speed. Adjust belt tension as loose as possible without allowing slippage.

V - SCHEMATIC WIRING DIAGRAM OPERATING SEQUENCE

Figure 7 illustrates a typical O11R.

TYPICAL O11R SEQUENCE OF OPERATION



1 - Line potential feeds through the secondary limit and limit controls to power primary control.

2 - The primary control provides 24 volt control circuit.

3 - On a heating demand, the thermostat heating bulb makes.

4 - The fan control heater is energized through primary control. After a short period, the heater provides sufficient heat to close the fan contacts. This energizes blower motor.

5 - The primary control simultaneously energizes the burner motor and ignition transformer at oil burner. The burner motor operates the oil pump and combustion blower to feed air and oil vapor into the combustion chamber. The fuel mixture should ignite with the spark furnished by ignition transformer.

6 - If combustion does not take place within approximately 45 seconds, as detected by cad cell, the primary control locks itself out.

7 - Should a flame failure occur during the "on" cycle, the primary control locks itself out in response to the cad cell.

8 - The secondary limit opens at temperatures above setpoint. This de-energizes the primary control but still allows blower motor operation through the N.O. contacts.

9 - As the heating demand is satisfied, the thermostat heating bulb breaks. This de-energizes the oil burner circuits.

10 - The blower motor continues running until furnace temperature drops below fan control setpoint.

FIGURE 7