



DAKA FURNACE INSTALLATION AND OPERATION MANUAL

Price \$2.00

Deluxe Line Furnace Model Nos. 501/601

PRINCIPLE OF OPERATION

This DAKA furnace is designed to be used as an add-on unit to present forced-air upflow gas, oil or electric furnace. The DAKA furnace consists of a 3/16" steel combustion chamber, around which a 20 ga. air jacket is fitted. The 465-cfm blower on the DAKA furnace turns on automatically as the air around the combustion chamber heats up during woodburning; this heat is picked up from the sides of the combustion chamber before being ducted to the main furnace supply (hot air) plenum via piping. The main system blower is then employed to distribute the heat evenly throughout the house via the present ductwork.

As long as the heat produced by the DAKA woodburning furnace keeps your living area temperature above the setting on your present room thermostat, your present furnace will not burn any gas or oil, or use any electricity beyond the small amount required to run the system blower. If the wood fire should die down in your absence, your regular furnace will start up as usual to maintain the preset living area temperature.

CAUTIONARY NOTES

NOT FOR USE IN MOBILE HOMES

1. The DAKA furnace is designed for use only with conventional upflow furnaces, and must deliver wood-heated air to the supply (hot air) plenum of same, never to ductwork or cold-air returns.
2. The DAKA furnace smoke outlet is to be connected only to a Class A Factory-built or tile-lined masonry 6" listed low-heat appliance chimney.
3. A barometric regulator and cast-iron damper must be used in the smoke pipe leading to chimney, and setting must maintain .04" to .06" water column updraft during operation, as tested by a draft gauge.
4. The DAKA 465-cfm blower must be connected to the cold air return on the main furnace by means of sheet metal ductwork.
5. The DAKA furnace must be installed with the following minimum clearances to combustibile surfaces; any wood framing behind a brick or concrete wall should be considered a combustibile surface:
18" from sides and 36" from back of add-on furnace
18" from chimney connector. 6" from main furnace
18" from horizontal warm air duct within 3 ft. of plenum
48" from front of add-on furnace
6. The DAKA furnace must be installed on a non-combustibile surface extending 8" on sides and back and 32" from front of unit.
7. The DAKA furnace is designed for woodburning only; use wood that has been air-dried for at least six months after cutting to approximately 20-30% moisture content. Burning trash, paper, or coal could cause overheating and shorten the life of the unit, as well as causing a fire hazard.

8. As a forced-draft Furnace, model 601 requires a separate Flue. Check local building codes for chimney requirements. Some communities require a separate chimney flue for each heating appliance. We do not recommend multiple use of a single flue, due to possible draft and fire safety problems. For more information, please write for publications 89M, 211 and HS-10 from:

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
Publication Sales Department
470 Atlantic Ave.
Boston, MA 02210

9. To insure that your DAKA furnace is installed in accordance with fire safety and building code regulations, we recommend professional installation and inspection. You should also notify your insurance company concerning the installation of any woodburning appliance.

DANGER! EXPLOSION HAZARD

Do not use chemicals or fluids to start fire. Do not burn garbage, gasoline, naphtha, engine oil or other flammable liquids.

WARNING! FIRE HAZARD

DO NOT EXCEED RATED FLUE DRAFT.
DO NOT STORE FLAMMABLE LIQUIDS IN FURNACE ROOM.
DO NOT STORE WOOD CLOSER TO FURNACE THAN MARKED CLEARANCES.
INSPECT FLUE PIPE AND CHIMNEY FREQUENTLY AND CLEAN OUT SOOT AND CREOSOTE DEPOSITS.
CLEAN OUT ASH PAN AS NEEDED; KEEP ASHES IN METAL CONTAINER WITH TIGHT-FITTING LID ON NON-COMBUSTIBLE SURFACE
FOLLOW POWER FAILURE OPERATING INSTRUCTIONS

TOOLS NEEDED FOR ASSEMBLY

Electric drill with 11/64" and 9/64" H.S.S. drill bits
Cabinet-head screwdrivers - small and large
Adjustable wrench
Tin snips or sabre saw with metal-cutting blade
Pliers

MATERIALS NEEDED FOR INSTALLATION - NOT PROVIDED

10" Sheet metal hot air pipes with two 90° elbows and plenum collar
6" smoke pipe, 24-ga. or heavier, with necessary elbows and chimney connector
Barometric regulator and solid cast-iron damper for 6" smoke pipe
Cold air return ductwork
Conduit and wiring to connect add-on furnace to 120V AC service
No. 7 Sheet metal screws for pipe connections - 50 or more

NOTE: Length of various pipes, number of elbows, etc., will be determined by individual installation requirements.

INSTALLATION INSTRUCTIONS

I. UNPACKING

Remove all component parts from the firebox for assembly; check piece count against parts list on last page of this manual.

Parts Shortage: Call or write factory immediately; provide model number and serial number of furnace, along with description and count of missing parts. Replacement items will be shipped immediately.

Concealed Damage: Immediately contact the dealer from whom the furnace was purchased, so that a freight claim can be filed.

II. FURNACE ASSEMBLY *Note: Some newer models have channels welded to air jacket; no S-clip channels are needed or included.*

Parts needed: Air Jacket, Blower(s), No. 12x1½" metal screws (3), No. 12x½" metal screws (8), S-clip channels (4).

- A. Mount 465-cfm blower on back of furnace, using five No. 12x½" screws. Temporarily remove blower junction box cover; remove two knockouts on junction box.
- B. Install one S-clip channel on outside of each angle iron running from front of furnace to back. Drop unformed panel into place between angle irons to provide bottom air seal.
- C. Slip lower edge of air jacket side into S-clip channel, and press or lightly tap the edges around the front and back of furnace for a complete friction fit. NOTE: knockout on air jacket side should be at upper rear of furnace.
- D. Cut 10" circle in center of air jacket top using tin snips or sabre saw. Attach 10" clip on collar.
- E. Install one S-clip channel on outside of each top edge of air jacket side; slip top panel into each channel--press down and tap lightly for complete fit.
- F. Remove grate and insert firebrick upright in channel around sides and back of combustion chamber; reinstall grate.
- G. Using three No. 12x½" screws, mount small 15-cfm blower to front of furnace over draft hole.

III. FAN CONTROL ASSEMBLY

Parts needed: Fan Control, ½x1" tubular spacers (3), No. 12x1½" screws (3), blue wires (2), straight and 90° conduit connectors, wire nuts (2).

- A. On side of DAKA furnace that will face away from main furnace, remove 7/8" knockout with a sharp blow, using the large screwdriver.
- B. Spring and remove cover from fan control. Remove either knockout from base of control with pliers.
- C. Insert the probe tube of fan control into the knockout hole on the side of the DAKA furnace; holding the fan control tightly vertical against the side of the furnace, mark and drill three 9/64" holes top right and top left and bottom mounting holes of fan control on furnace side.

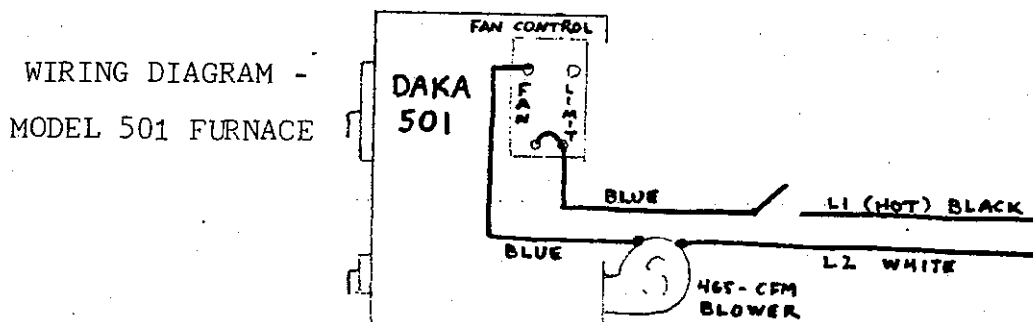
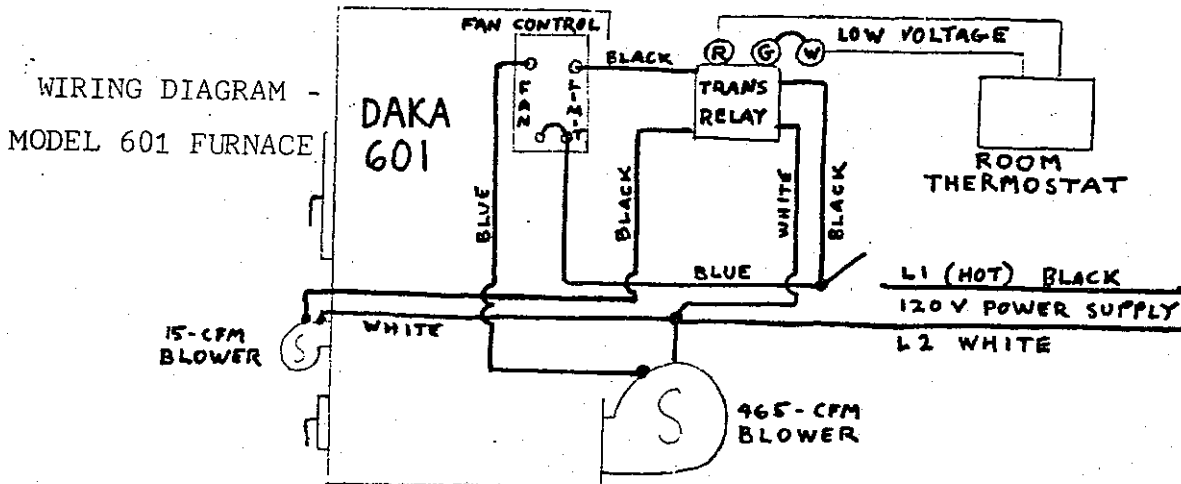
- D. Back control away from side of furnace, and position three spacer tubes between fan control and furnace over the screw holes: insert three No. 12x1½" screws through spacers and tighten. This installation holds control 1" away from side of furnace for thermal protection.
- E. Attach straight conduit connector to bottom of fan control in knockout opening. Attach one end of flexible conduit by tightening two clamping screws on conduit connector; be sure that end of conduit does not intrude into fan control. Run the two blue wires through conduit (tip: connect wire ends with a wire nut to facilitate travel through conduit).
- F. Attach 90° conduit connector to either junction box knockout hole on the 465-cfm blower, pointing toward fan control side of the furnace. Attach free end of flexible conduit to this conduit connector; conduit should not touch furnace itself at any point.

IV. FIELD AND UNIT WIRING CONNECTIONS

CAUTION! The DAKA furnace requires a separate protected 15-amp 120V AC 60Hz single phase circuit with 75°C minimum wiring. All field wiring must be enclosed in approved conduit and comply with national, state and local electrical codes.

- A. Turn off all power to field wiring circuit.
- B. Make wiring connections per the following diagrams, depending on which model furnace purchased. Connections for model 501 furnace can be made at 465-cfm blower junction box, while model 601 furnace will require a separate junction box for the more complex connections.

NOTE: furnace components include two blue wires and fan-control/465-cfm blower conduit. All other wiring and conduit must be purchased separately for your particular installation.



V. CONNECTING DAKA FURNACE BLOWER TO COLD AIR RETURN ON MAIN FURNACE

Note: Not only is this connection required by building codes, but it also serves to maintain level pressures throughout the home, eliminating many causes of poor draft and resulting furnace smoking.

- A. The piping run from the cold air return on your present furnace can be made with 10" diameter stove pipe inserted in cold air return run preferably after the furnace filter. The size of the 465-cfm blower will require a sheet metal box at least 20"Lx12"Hx11"D; the 10" pipe should be attached securely to this box; use at least three No. 7 sheet metal screws per connection.

VI. CONNECTING HOT-AIR OUTLET ON DAKA FURNACE TO SUPPLY PLENUM ON MAIN FURNACE

Parts needed: 10" clip-on collar, 10"diam. 90° elbows (2), 10" diam. plenum collar, 10" diam. stove pipes (2), screws.

- A. With tin snips or saber saw, cut a 10" circular hole in the supply (hot air) plenum of main furnace on side nearest DAKA furnace, in line with top center air outlet.
- B. Attach a 90° diam. elbow to 10" diam. stove pipe of a length sufficient to reach out over DAKA furnace; insert this 90° elbow into main furnace plenum with outlet pointing upward. Slip plenum collar over pipe and push up tight against main furnace plenum for a good seal.
- C. Attach another 10" diameter pipe to top center air outlet on DAKA furnace. Join to hot air pipe from main furnace plenum with second 90° elbow. Secure all connections with at least three No. 7 metal screws per joint.

VII. CONNECTING DAKA FURNACE TO CHIMNEY

Mount and secure a 6" diam. crimped end pipe of 24-ga. or heavier sheet metal to rear smoke outlet on DAKA furnace. Continue same gauge pipe run to chimney connector, with following rules in mind:

1. Do not use more than two 90° elbows in smoke pipe; each elbow is equivalent to six feet of pipe.
2. Smoke pipe length should not exceed 75% of chimney height above point of connection.
3. A barometric regulator should be installed in smoke pipe at convenient point, and should be adjusted to maintain draft from .04" to .06" water column with good fire burning, following complete installation.
4. A solid damper should be installed in smoke pipe close to chimney connection; in the event of a chimney fire, it can be quickly closed to cut off draft.
5. Maintain at least ¼" per foot upslope on smoke pipe from DAKA furnace to chimney connection.
6. Secure all connections with at least three No. 7 metal screws per joint.
7. Do not use any heat reclaimers on smoke pipe, as they cool flue gases, and greatly add to creosote formation problems when used on stoves and furnaces of advanced airtight design.

VIII. HOW TO OPERATE YOUR DAKA ADD-ON FURNACE

A. To Start A Fire

1. Take six double sheets of newspaper. Start at corner of one and roll up. Twist roll into a single knot, and do same to remaining sheets.
2. Lay rolls in firebox atop grate; place several pieces of kindling over them.
3. Light the newspaper rolls; once the kindling is burning well, you can add wood logs as required. You may fill firebox to top of door frame for most heat output and/or longest burn time.

B. Draft Control

Model 501 Furnace: Automatic Draft Control on front of furnace consists of a bimetallic coil spring and draft door assembly. As the heat from the firebox reaches the spring, it automatically contracts and lowers the draft door to reduce the combustion air; as the fire dies down, the coil spring automatically expands and lifts the draft door, adding more combustion air and freshening the fire. To start fire, we recommend the knob control be set on "HI"; for extended burning, a setting between "MED" and "HI" will have to be found through experimentation for your particular installation.

Model 601 Furnace: Combustion air is provided by 15-cfm blower mounted on front of furnace. When DAKA living area thermostat senses a drop in room temperature, the transformer/relay automatically turns on this blower, increasing the heat output of the fire. When the preset room temperature is reached, the room thermostat signals the furnace to shut off the 15-cfm blower, reducing the heat output. Your gas/oil furnace room thermostat, should be set approximately five degrees lower than the DAKA furnace thermostat, to prevent it turning on unless needed. NOTE: the 15-cfm blower on the DAKA furnace will continue to run after a wood fire has burned out; to turn it off, reduce the setting on the DAKA room thermostat to a point below the setting of the main furnace thermostat.

On the model 601 furnace, the sliding rod over the fire door is a smoke bypass damper. Slide rod out for lighting and refueling furnace while in operation for best draft, and to prevent smoke from exiting through open fire door. Slide damper back in when door is closed.

C. Adjusting the Fan Control

This control will automatically turn DAKA 465-cfm furnace blower on and off when inner air temperature reaches a preset level. To adjust, hold circular dial firmly in place--DO NOT ROTATE. Adjust the three indicators in the slot from left to right as follows: left indicator (FAN OFF) to 90°; middle indicator (FAN ON) to 130°; right indicator (LIMIT OFF) to 200°. Right indicator is only operative on Model 601 furnace, as it turns 15-cfm blower off if inner temperature reaches 200°, to avoid overheating furnace and ductwork.

While the fan control is designed for fully automatic operation, you can turn blower on manually at any time by pushing white button in. Pulling white button out will turn the 465-cfm blower off, unless the temperature within the air jacket is above the "FAN ON" setting, in which case the blower will continue to run until the temperature drops.

D. Operation During a Power Failure

1. Remove furnace filter from main furnace to prevent fire hazard.
2. On model 501 furnace, adjust automatic draft control knob to lowest possible setting to keep fire going with smaller loads, more frequently tended. No adjustment is necessary on model 601 furnace, but smaller loads should be burned.
3. Exercise extreme care and vigilance during power failure to keep furnace from overheating, which could cause warpage or breakage.

CAUTION! Do not expect the DAKA furnace to keep your house as warm during power failure as when power is on.

E. What To Do In Case of Chimney Fire

1. Call the fire department immediately.
2. Close off solid damper in smoke pipe to cut off air to chimney.
3. After chimney fire, do not use chimney until a professional inspection has been made to determine safety.

IX. MAINTENANCE OF YOUR DAKA FURNACE

A. Flue Pipe and Chimney

1. These must be checked often during heating season, and deposits of soot and creosote removed.
2. Use stiff brushes to clean flues and pipes--wear an air mask, gloves and old clothes.
3. Do not use a standard vacuum cleaner to clean up soot-- the soot is fine enough to pass through the bag and ruin the cleaner motor.

B. DAKA Furnace Blower(s)

Lubricate motor bearings every six months with SAE 20 oil.

C. Fire Chamber and Ash Pan

1. Check ash pan every few days and safely dispose of ashes. Keep ashes from building up too high on grate.
2. At end of heating season, clean out all residual ashes and soot from the furnace. The moisture they contain could rust your furnace over the summer months, and shorten the life of the unit.

X. TROUBLE SHOOTING GUIDE

A. Smoke puffback; poor burning; inadequate draft

1. Check chimney draft; debris could be blocking flue; inadequate chimney height could be causing downdrafts.
2. Add outside air to furnace room--your home might be too well insulated to let outside air get to fire; open a window or install a vent to the outside in furnace area.
3. Start with a small, hot fire to warm the chimney and get a heat siphon action going to overcome cold air in chimney.
4. Consult a heating contractor for other possible reasons.

B. Poor heat throughout house when burning wood

1. Make sure all pipe and duct connections are airtight.

2. Check to insure that all cold air return vents throughout house are not blocked by furniture, etc.
3. If cold air return is inadequate, venting outside air to return may help.
4. Check quality and moisture content of wood. Poor wood, unseasoned and moisture-laden will not put out adequate heat.

C. Paint discoloration (whitish appearance)

Paint is rated for 600°F, and overheating of furnace will cause whitish appearance on external combustion chamber surfaces; reduce draft and rate of burn. To cover discoloration, obtain a high-combustion flat black spray paint and apply in accordance with manufacturer's directions.

<u>PARTS LIST</u>	<u>Model 501</u>	<u>Model 601</u>
4-pc. Air Jacket Set (cartoned)	1 set	1 set
Firedoor with fireproof gasket	1 ea.	1 ea.
Ash Door with fireproof gasket	1 ea.	1 ea.
Ash Pan	1 ea.	1 ea.
465-cfm Blower	1 ea.	1 ea.
15-cfm Blower	n/a	1 ea.
Cast-iron Grate	1 ea.	1 ea.
Steel Grate Spacer	n/a	1 ea.
Transformer/Relay	n/a	1 ea.
Room Thermostat	n/a	1 ea.
Fan/Limit Control	1 ea.	1 ea.
Flexible Conduit	1 ea.	1 ea.
Unit Wiring - Set/2	1 set	1 set
Straight Conduit Connector	1 ea.	1 ea.
90° Conduit Connector	1 ea.	1 ea.
Fan Control Spacer Tube	3 ea.	3 ea.
Wire Nut	3 ea.	3 ea.
Sheet Metal Screw - #12x1½"	3 ea.	3 ea.
Sheet Metal Screw - #12x½"	8 ea.	8 ea.
S-clip Channel	4 ea.	4 ea.
Fire Brick	13 ea.	15 ea.

FIG. 1 TYPICAL PARALLEL INSTALLATION AS SUPPLEMENTARY FURNACE

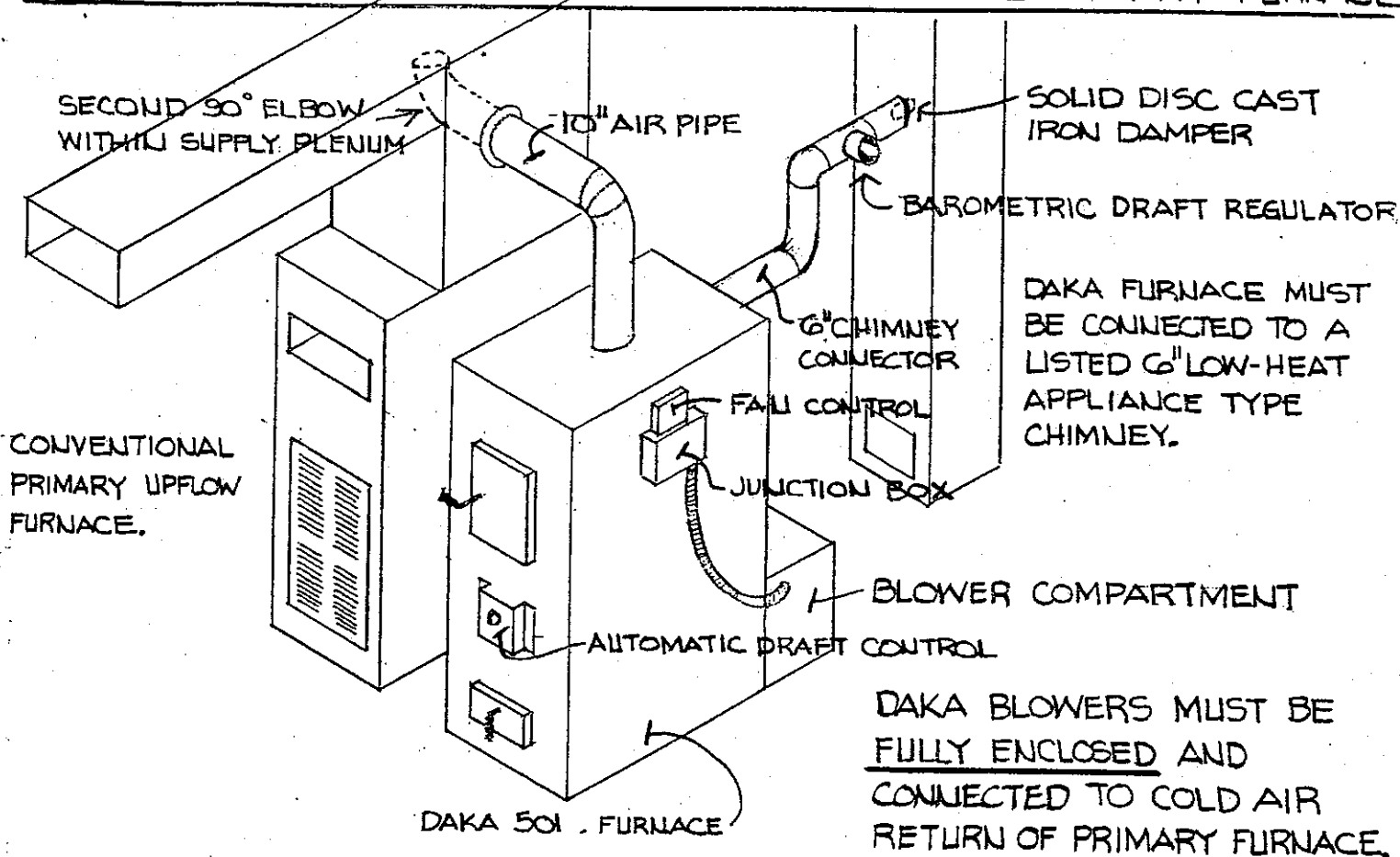


FIG. 2 TYPICAL INDEPENDENT CENTRAL FURNACE INSTALLATION

NOTE: REQUIRES TWO 465-CFM BLOWERS; SECOND BLOWER OPTIONAL

- A- STACKHEAD
- B- VERTICAL STACK (2-STORY HOUSE)
- C- REGISTER BOOT
- D- 6" DIA. OR LARGER HEAT PIPE.
- E- RECTANGULAR DUCT
- F- RECTANGULAR DUCT REDUCER
- G- SIDE DUCT STARTING COLLAR
- H- END BOOT (RIGHT OR LEFT)
- I- DUCT DAMPER
- J- 90° SHORT ELBOW
- K- BASEMENT HEAT REGISTER
- L- UNIVERSAL OR TOP TAKE-OFF
- M- DUCT STARTING COLLAR (RECTANGULAR)
- N- COLD AIR RETURN GRILL
- O- COLD AIR PLENUM
- P- WARM AIR PLENUM
- Q- DUCT END CAP
- R- COLD AIR RETURN DUCT

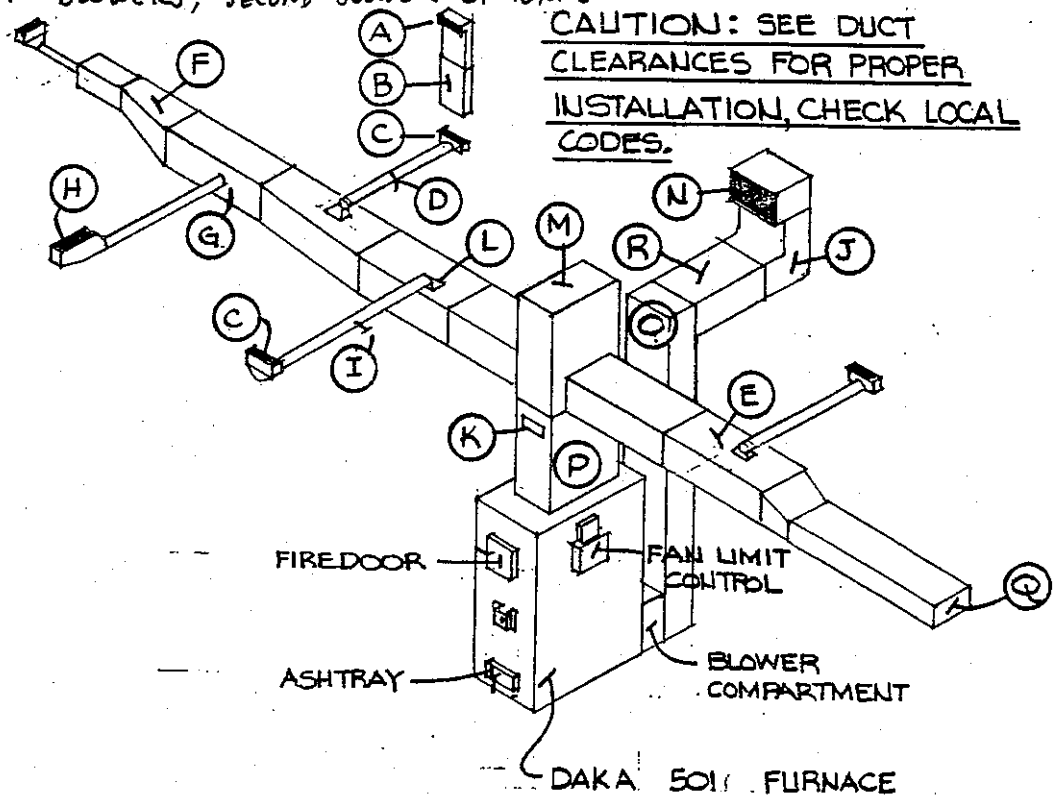
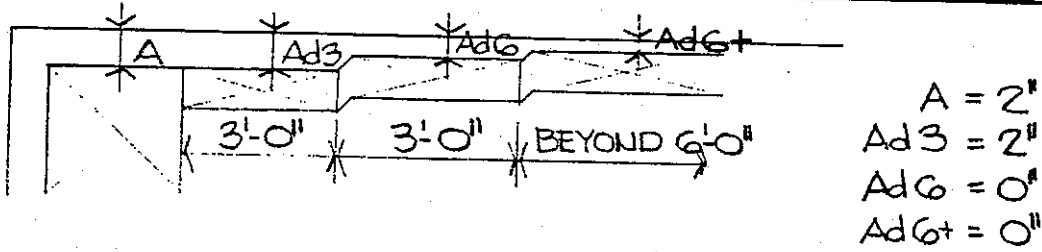


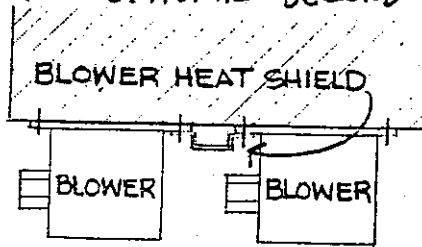
FIG. 3 DUCT CLEARANCE FOR HORIZONTAL WARM AIR DUCTS.



CAUTION: CHECK LOCAL CODES BEFORE INSTALLATION!!

FIG. 4 BLOWER HEAT SHIELD INSTALLATION.

TO BE USED WHEN OPTIONAL SECOND BLOWER INSTALLED.



TOP REAR VIEW OF FURNACE BLOWERS MOUNTED

FIG. 5 WIRING DIAGRAM.

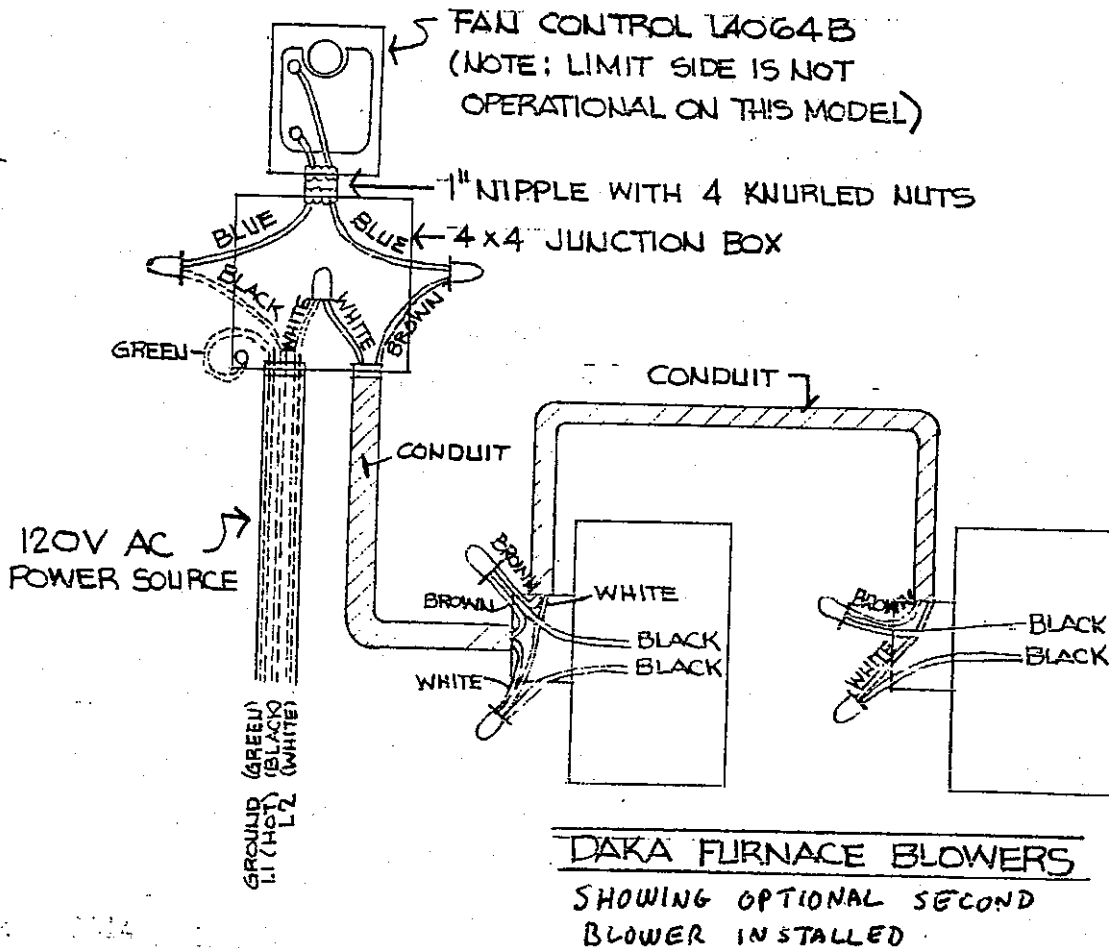


FIG. 1 TYPICAL PARALLEL INSTALLATION AS SUPPLEMENTARY FURNACE

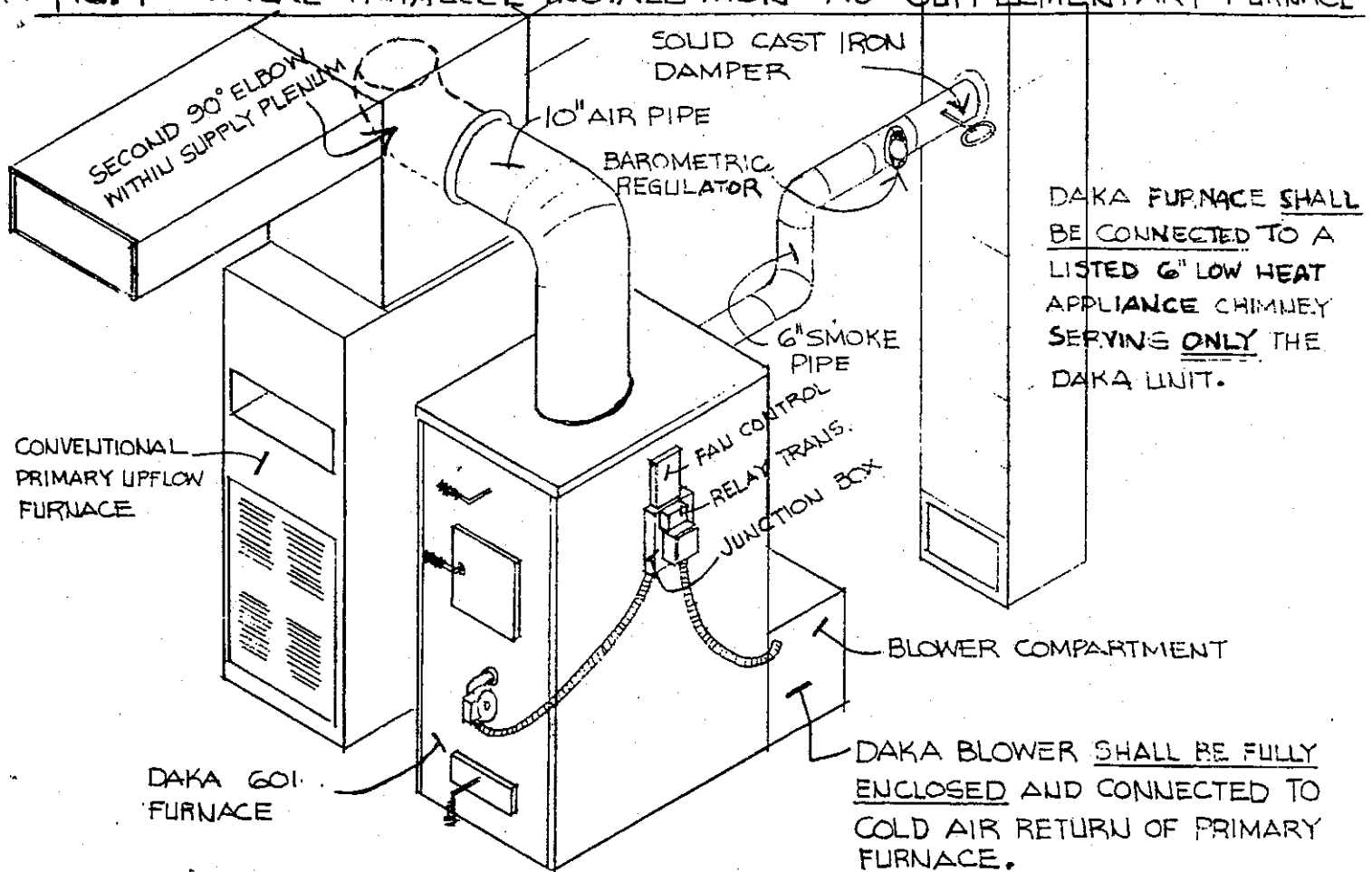


FIG. 2 TYPICAL INDEPENDENT CENTRAL FURNACE INSTALLATION :

NOTE: REQUIRES TWO 465-CFM BLOWERS

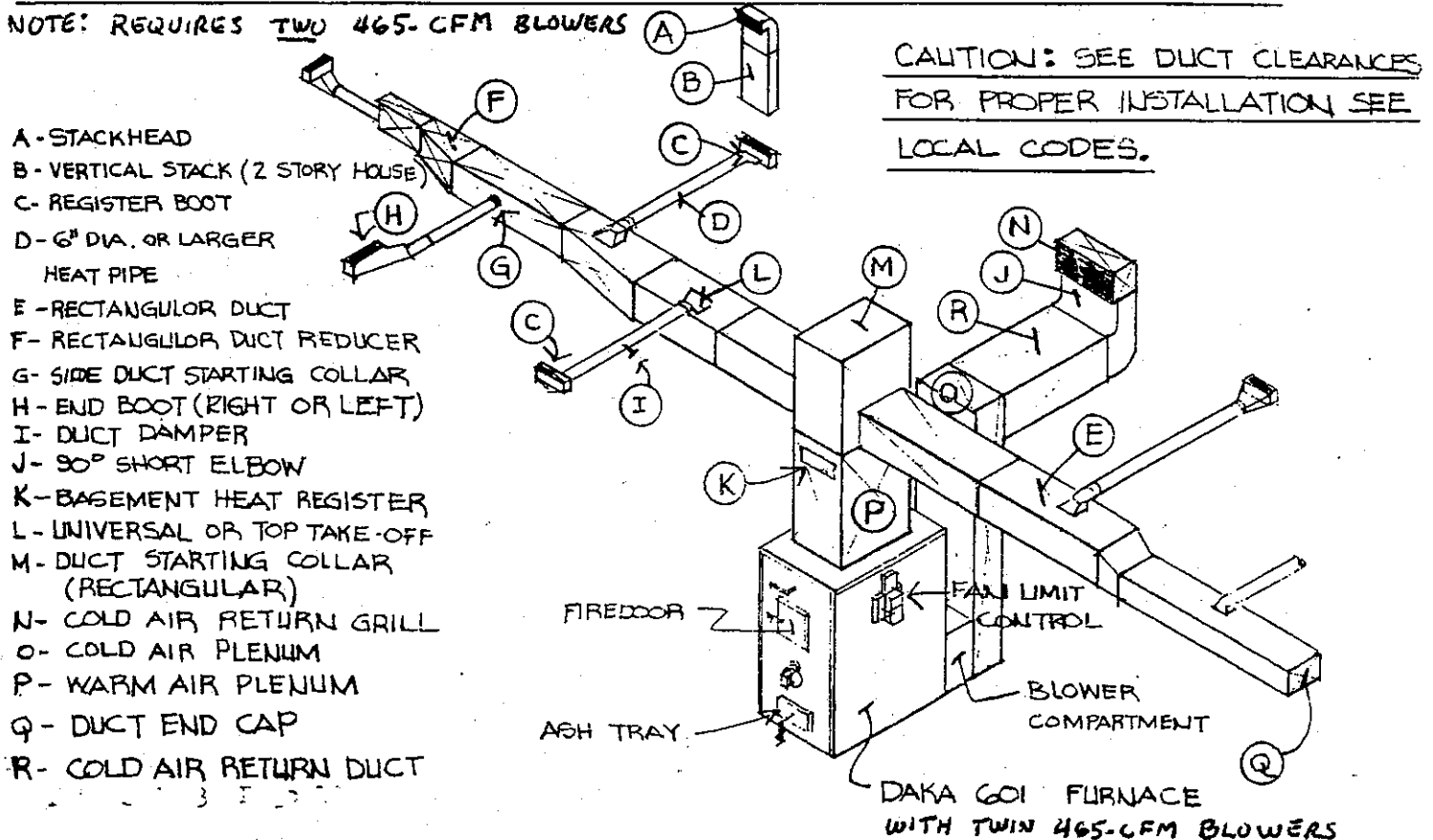
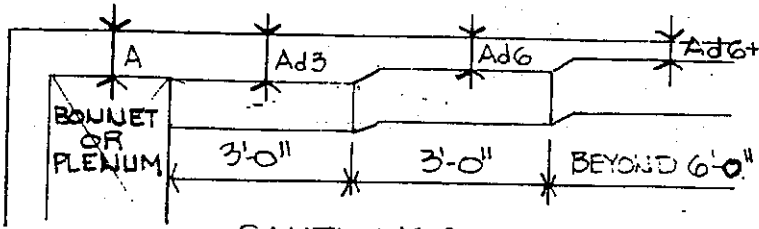


FIGURE 3- DUCT CLEARANCE FOR HORIZONTAL WARM AIR DUCTS.



CAUTION: CHECK LOCAL CODES BEFORE INSTALLATION!!

FIGURE 4- SMOKE BYPASS DAMPER ROD INSTALLATION.

REAR VIEW OF SMOKE
OUTLET ON BACK OF
DAKA 601
FURNACE

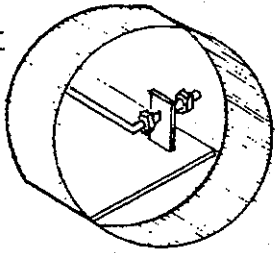
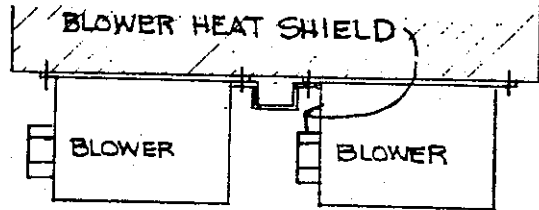


FIGURE 5- BLOWER HEAT SHIELD INSTALLATION.



PLAN VIEW OF FURNACE BLOWERS MOUNTED
(SHOWING OPTIONAL SECOND BLOWER)

FIGURE 6 WIRING DIAGRAM.

FAN LIMIT CONTROL
L4064 (LEAVE JUMPER
IN PLACE)

