

DAKA Corporation . Rt. 3 Box 65F . Pine City, Minnesota 55063
(612) 629-6737

INSTALLATION AND OPERATION INSTRUCTION MANUAL

NOTE: These models have been tested and listed in accordance with Underwriters Laboratories standard UL 391 for Solid Fuel Central and Supplementary Furnaces by Warnock Hersey International Inc. ICBO Report No. TL116; NER Qa219.

PRINCIPLE OF OPERATION:

These furnace models are designed for conventional upflow residential central forced air heating systems, to be installed in either of the following ways:

1. Supplementary "Add-on" Furnace Application (See Figure 1)

As a supplementary furnace, these models are connected in parallel to a conventional primary furnace system, using present ductwork to distribute wood-heated air throughout the home. As long as the heat produced by the supplementary furnace keeps the living area temperature above the setting on the primary furnace wall thermostat, the primary furnace should not burn any gas, oil or use any electricity beyond that required to run the primary distribution blower. Should the wood fire fail to provide sufficient heat, however, the primary furnace will begin operating as usual.

2. Central Furnace Application (See Figure 2)

This furnace may also be used as a freestanding central furnace, with its own plenums and ductwork. The single 1200-cfm blower provided with this furnace is sufficient to provide air distribution for most homes. As woodburning requires periodic attention, use of this unit as a central furnace is somewhat inconvenient and requires a second heating system (electric baseboard, vented gas room heaters, etc.) to act as a backup.

CAUTIONARY NOTES:

1. This furnace is designed for use only in conventional upflow systems, and must deliver heated air to a supply (warm air) plenum, never to ductwork. The warm air supply from this furnace must never be connected to the cold-air return inlet of a central primary furnace, as a possibility exists of components of the central furnace overheating and causing the central furnace to operate other than as intended.
2. Installation of this unit must be performed by a qualified installer familiar with solid-fuel systems.

3. This furnace must be connected to a minimum 6" listed low-heat Appliance type chimney, or a code-complying tile-lined masonry chimney. Connection to a chimney flue serving another appliance is prohibited.
 4. A barometric regulator/damper must be used in the chimney connector (smoke pipe) leading to chimney flue and must be set to maintain no more than .06" water column updraft (DAKA barometric regulator #283 with adjustable settings available at extra cost.)
 5. Installation of this furnace in mobile homes or garages is prohibited.
 6. This furnace must be installed on a non-combustible floor surface, such as concrete or 3/8" asbestos millboard, or equivalent. This surface must extend at least 16" in front and 8" to sides of DAKA furnace, under the chimney connector and at least 2" to each side of connector. Clearances to combustible surfaces are as follow:

To side wall:	12"	Flue to back wall:	18"
To back wall:	28"	Flue to side wall:	21"
To front wall:	48"	Top of plenum to ceiling:	6"
- See Fig. 3 for ductwork clearances, and Fig. 4 for wall clearances. For more information, including instructions for installation requiring reduced clearances, please write for publication 211 from National Fire Protection Assn. Inc., Publication Sales Dept., Battery Park, Quincy MA 02269, or contact local building officials.
7. Check local building and mechanical codes prior to installation to insure conformance with all requirements; review home insurance policy for coverage.
 8. Chimney connector must be of minimum 24-ga. pipe with each section joined with three sheet metal screws, with all fissures sealed with furnace cement. Do not use galvanized pipe as the coating could melt and cause toxic fumes.
 9. These furnaces have been designed to operate with a maximum warm air duct pressure of 0.2" water column and a maximum warm air duct temperature of 200°F. When used in a supplementary "add-on" mode, check the nameplate on the primary furnace to determine compatibility.
 10. When any supplementary furnace is connected in parallel to an existing primary central furnace, a back-draft damper must be installed in the plenum of the primary furnace below the warm air inlet from the supplementary furnace to prevent the primary furnace from operating in an unintended manner; see Fig. 1 for an illustration of the position of this damper.

DANGER - RISK OF FIRE OR EXPLOSION - DO NOT BURN GARBAGE, GASOLINE, DRAIN OIL OR OTHER FLAMMABLE LIQUIDS.

WARNING -RISK OF FIRE - DO NOT OPERATE WITH FLUE DRAFT EXCEEDING .06" WATER COLUMN. DO NOT OPERATE WITH FUEL LOADING OR ASH REMOVAL DOORS OPEN. DO NOT STORE FUEL OR OTHER COMBUSTIBLE MATERIAL WITHIN MARKED INSTALLATION CLEARANCES. INSPECT AND CLEAN FLUES AND CHIMNEY REGULARLY.

CAUTION - HOT SURFACES - KEEP CHILDREN AWAY. DO NOT TOUCH DURING OPERATION. MAXIMUM DRAFT MARKED ON NAMEPLATE.

Disposal of Ashes

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in the soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

Creosote - Formation and Need for Removal

When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire.

The chimney connector and chimney should be inspected at least twice monthly during the heating season to determine if a creosote buildup has occurred. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

INSTALLATION INSTRUCTIONS:

I. UNPACKING

Remove all component parts from firebox for assembly; check piece count against parts list on last page of this manual. (NOTE: Remove firebrick from carton while still within firebox; do not attempt to lift full carton.) 1200-cfm blower is packed in a separate carton.

Parts Shortage:

Call or write factory immediately; provide model number and serial number of furnace, found on front mounted data plate, along with a description and quantity of missing parts. Replacements will be shipped at once.

Concealed Damage:

If any components have been damaged in transit, advise the dealer from whom the furnace was purchased of the nature of the problem so that a freight claim can be filed.

III. FURNACE ASSEMBLY

- A. Attach firedoor (Key No. 1 on parts list) to door frame using hinge pin as provided. Note that door features a double latch operation to limit initial swing of door to 1" on opening. Continue turning handle clockwise beyond 3 o'clock position to permit full opening of door. Close door with handle in same position, and rotate counter-clockwise to lock. Note: The round cast-iron piece on the face of the firedoor is inoperative in these models, and should be left securely closed.

- B. Attach Ash Door (5) to Ash Pan (7) using 1/4" nuts and bolts provided. Insure that Ash Pan Gasket (6) is in place on Ash Door when received.
- C. Remove cast-iron grates in firebox. Proceed to install firebricks (12) along sides and back of firebox, starting at the front, standing them upright on the grate support rails.
CAUTION! FIREBRICK MUST BE INSTALLED CORRECTLY OR HEAT DAMAGE MAY OCCUR!
- D. Reinstall cast iron grates in firebox, reinforcing ribs down, resting on side rails.
- E. Attach Automatic Damper Control assembly (9) to face of furnace below fire door using six No. 12 x 1/2" screws provided. Tip: put a drop of oil on each screw tip to ease insertion in heavy-gauge steel front.
- F. Attach Mounting Flanges (11) to each side of 1200-cfm blower air outlet using four #12 x 1/2" sheet metal screws inserted in prepunched holes on blower housing.
- G. Install Blower (14) on back of furnace using four No. 12 x 1/2" screws provided. Note: if using this unit as a central (not add-on) furnace, remove the back-draft damper plate inside blower inlet at this time; leave in place for add-on furnace installation.
- H. Install Swing Plate (19) on hooks inside combustion chamber above firedoor opening, with bent edge inward.

III. FURNACE CONTROL CENTER ASSEMBLY

NOTE: Furnace is designed for installation with supply connection on left side; should right side supply connection be preferred, it is possible to exchange side air jacket panels, but conduit and wiring provided will not be usable then, and will have to be replaced locally.

- A. On left side of furnace, mount Snap Disc Fan Control (4) over inner two of four 13/64" holes prepunched toward top of furnace, using two No. 12-1/2" metal screws provided.
- B. Mount 4x4-in. Junction Box Extension Ring (3) over Snap Disc Fan Control, using two metal screws provided in prepunched holes; remove two knockout plugs from bottom of extension ring.
- C. Run the two blue electrical wires through the flexible conduit. Attach the straight and 90° connectors to the ends of the flexible conduit. Attach the 90° connector to the junction box on the blower motor, and the straight connector end into one knockout hole on the side mounted junction box ring.

IV. WIRING INSTRUCTIONS

WARNING: DISCONNECT ALL POWER BEFORE MAKING ELECTRICAL CONNECTIONS. FOR POWER SUPPLY CONNECTIONS, USE #14 AWG OR LARGER WIRES ACCEPTABLE FOR AT LEAST 105°C. (Not provided). CHECK LOCAL CODES FOR ACCEPTABLE COMPONENTS..

- A. Using an approved conduit and connector, bring a 3-wire 120V AC 15-amp minimum electrical service to the Junction Box on the side of the DAKA furnace.
- B. Wire unit in accordance with wiring schematic in Figure 6. Attach one of the crimp terminals provided to black (hot) power supply wire, the other to one end of one blue wire to blower. Attach crimp terminals to each side of the Snap Disc Fan Control.
- C. Check all connections for tightness and electrical safety; coil all wires within junction boxes and install blower junction box cover, and 4" square J-box Cover Plate (3).

V. CONNECTIONS TO DUCTWORK (SUPPLY PLENUMS MUST BE METAL!)

- A. For Use as a Supplementary "add-on" Furnace (see Fig. 1)

NOTE A back-draft damper must be installed in the warm-air supply plenum of the primary furnace below the point where the warm air ductwork connection from the DAKA furnace enters the plenum. Actual design and installation procedure for such a back-draft damper is left to the installer, due to the large number of plenum configurations involved. See Fig. 1 for illustration of placement.

1. Using 10" round starter collar as template, mark and cut out two 10" round holes in the side of the supply (warm air) plenum of the primary furnace.

IMPORTANT: Verify beforehand that sufficient clearance is available above air conditioner coils, etc. If sufficient clearance is not available, air conditioner coil may have to be moved to a second plenum with diversion baffles for summer use.

2. Attach a 90° sheet metal elbow to one end of a straight 10" pipe of a length sufficient to project out over the DAKA furnace; insert this 90° elbow into supply plenum of primary furnace with outlet pointing upward. Slip plenum collar over straight end of 10" pipe and push up tight against supply plenum for a good air seal.

IMPORTANT: The 90° elbow within the supply plenum forms a venturi to extract air from DAKA furnace when primary furnace blower comes on. An absence of this elbow will cause back pressure down the warm air pipe to the DAKA furnace, adversely affecting heat distribution, and possibly damaging the DAKA furnace. If space prohibits installation of 90° elbow as recommended see Fig. 5 for alternate designs.

3. Using 10" starter collar (13) included, attach another straight 10" pipe to top of DAKA air jacket. Join it to pipe leading to primary furnace supply plenum with another 90° elbow. For best seal, apply duct tape to all pipe joints. Repeat steps 2 and 3 for second 10" air outlet.
4. Connect cold air return of primary furnace to DAKA furnace blower by means of a minimum 12" pipe joining the cold air return to the 8" starter collar on the face of the DAKA blower; the use of 12" to 10" and 10" to 8" reducers is recommended.

NOTE: After attaching warm and cold air supply and return pipes to primary furnace, check entire system to insure that static pressure remains unaffected. Verify horizontal duct clearances per Fig. 3.

B. For Use as a Central Furnace (See Fig. 2) ALL PLENUMS MUST BE METAL!

1. Install a minimum 16" x 16" plenum on air jacket top, cutting top with tin snips or sabre saw as needed, and using starting collar to attach.
2. Install ductwork with proper clearances to combustibles in accordance with local building codes.
3. Connect cold air return to a sheet metal box, such as the DAKA No. 268, fully surrounding the blower on the back of the DAKA furnace, leaving a minimum 2" clearance around the blower for proper air flow.

VI. CONNECTING DAKA FURNACE TO CHIMNEY

Mount and secure 6" non-galvanized smoke pipe, 24-ga. or heavier, to rear smoke outlet on DAKA furnace. Continue same gauge single-wall pipe to chimney connection, with following safety rules in mind:

1. A barometric regulator should be installed in smoke pipe at least 18" from furnace, to permit adjustment of chimney draft to a maximum of .06" water column draft. Barometric Regulator No. 283 with adjustable draft setting is available through DAKA dealers or direct from factory for this purpose.
2. Single wall smoke pipe should maintain a minimum 18" clearance to all combustibles and should never pass unprotected through walls or ceilings; use proper pass-through devices for those passages.
3. Heat reclaimers, fins or the like should not be used on smoke pipe, as they tend to cool flue gases and add to creosote formation on stoves and furnaces of advanced airtight design.
4. All joints of chimney connector pipe should be secured with a minimum of three No. 7 sheet metal screws, and further sealed with furnace cement to maintain good draft.

5. Smoke pipe should normally be installed with male ends leading from chimney to furnace; should runny creosote be formed in chimney connector, it will then return through pipe to furnace without dripping out of joints.
6. Maintain a minimum of 1/4" per foot of pipe rise to chimney connection; the steeper the rise, the more easily draft will be maintained.
7. Avoid the use of 90° elbows in any chimney connector, as they adversely affect draft. If 90° elbows must be used, do not install more than two in any chimney connector.
8. Adequate combustion air must be provided in furnace area to prevent poor firing and smoking. Keep a window cracked open in furnace area, or install a minimum 3" vent to bring in fresh air.

VII. OPERATING CONTROLS

A. Snap Disc Fan Control

The snap disc fan control (mounted in the J-box extension ring on the side of the DAKA furnace) is designed to turn on the 1200-cfm lift blower on the DAKA furnace whenever the air temperature within the air jacket exceeds 110°F, and turn it off whenever the air jacket temperature falls below 90°F. This range is built into the snap disc thermostat and cannot be adjusted.

B. Automatic Damper Control

The automatic damper control below the firedoor consists of a bi-metallic 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 the fire, we recommend the knob control be set on "HIGH"; for extended burning, a setting between "OFF" and "HIGH" will have to be found through experimentation for your particular installation. Opening the ash door slightly to aid in starting a fire is permissible, but never for more than a few minutes.

IMPORTANT: Normal operation will produce flue gas temperatures in the 300°-600°F range. If higher or lower operating temperatures are normally obtained, increase or decrease the barometric draft control setting and/or the automatic damper control setting to bring temperatures to within range. Too cool a flue gas temperature can result in heavy creosote formation, while too hot a temperature increases danger of chimney fire.

VIII. EMERGENCY OPERATION INSTRUCTIONS

A. Operation During Power Failure

1. Remove furnace filter(s) to prevent fire hazard.

2. Set automatic draft control to "EPF" (Electrical Power Failure) setting.
3. Continue firing the fire with smaller loads, more frequently tended. Do not fill above bottom of door opening.
4. Use extreme care and vigilance during power failure to keep furnace from overheating, which could cause severe warpage or breakage.

CAUTION! Do not expect the DAKA furnace to keep the house as warm during a power failure as when power is on. Do not attempt to increase heat output by opening ash door or firedoor.

B. In Case of Chimney Fire:

1. Call the fire department immediately.
2. Turn Automatic Damper Control Knob to "OFF" position to cut off oxygen to the chimney. Use chimney fire extinguishing flares if you have them. (Available at fireplace and wood-stove shops).
3. After chimney fire, do not attempt to use chimney again until a professional inspection is made to determine safety.

IX. MAINTENANCE OF YOUR DAKA FURNACE

A. Flue pipe and chimney

These must be checked frequently during heating season, and deposits of soot and creosote over 1/8" thick removed using stiff-wire brushes designed for the job. Professional cleaning by a chimney sweep at least once a season is highly recommended.

B. DAKA Furnace Blowers

Lubricate motor bearings after each six months of use; lubrication points are at each end of the motor housing on the side of the motor. Use SAE 20 oil for lubrication. Vacuum away dust and dirt on motor air inlets, and also on blower impellers at least once each season.

CAUTION! TURN OFF ALL POWER TO UNIT BEFORE CLEANING OR LUBRICATION.

C. Fueling Procedure

Fill with cordwood (and/or coal, if applicable) to the top of the firebrick. Before burning coal, you must have a coal burning grate, available from dealer or factory.

D. Fire Chamber and Ash Pan

Check ash pan every few days and safely dispose of ashes. Keep ashes from building up on grate and interfering with combustion air flow from below. At end of heating season, clean out all

residual ashes and soot from furnace. The moisture they contain could rust your furnace over the summer months, thereby shortening the life of the unit.

X. TROUBLE SHOOTING

A. Problem: Smoke puffback when loading, poor burning, insufficient heat

Solutions:

1. Insufficient draft--debris or creosote could be blocking flue; inadequate chimney height or design could be causing downdrafts; check chimney connector for air leaks and seal with furnace cement; adjust barometric regulator to higher setting.
2. Insufficient make-up air--the house could be so well insulated that infiltration air is not getting in to replace air used in combustion; open a window slightly in furnace room or install a vent to the outside in furnace area.

B. Problem: Poor heat throughout house while burning wood

Solutions:

1. Poor quality wood--burn only wood which has been air dried for at least six months, preferably a year or more. Use hardwoods such as hickory, oak, maple, etc. for highest heat value per load.
2. Check to insure that all cold air return vents are open and not blocked with furniture, etc.
3. Make sure that all duct joints are airtight, and apply duct tape to seal.
4. Check flue gas temperature--normal operating range is 300°F - 600°F. Lower temperature would indicate insufficient draft or inadequate combustion air. To check flue gas temperature, we recommend the use of a smoke pipe surface thermometer or probe type thermometer, available through woodburning equipment dealers.

C. Problem: Paint discoloration (whitish appearance)

Solution:

Paint is rated for 900°F surfaces, and overheating of furnace will cause a whitish appearance on outside of combustion chamber surfaces; reduce chimney draft to control overheating. To cover discoloration, obtain a high-combustion flat black spray paint from hardware store or fireplace shop.

D. Problem: Auto Damper Control won't hold setting; shaft loose

Solution:

Tighten only the shaft nut closest to the coil spring by

turning counter-clockwise, using a 7/16" open end or adjustable wrench.

E. Problem: Loose Knob on Auto Damper Control

Solution:

With furnace in cool mode, turn shaft so that arm of coil spring is in 10 o'clock position. Turn loose knob to 12 noon position tighten set screw with 5/64" allen wrench.

If problems persist, or help is needed in installation or operating of furnace, contact:

Customer Service Department
DAKA Corporation
Rte 3 Box 65F
Pine City, MN 55063

Telephone: 612/629-6737

FIG. 1 TYPICAL INSTALLATION AS SUPPLEMENTARY "ADD-ON" FURNACE

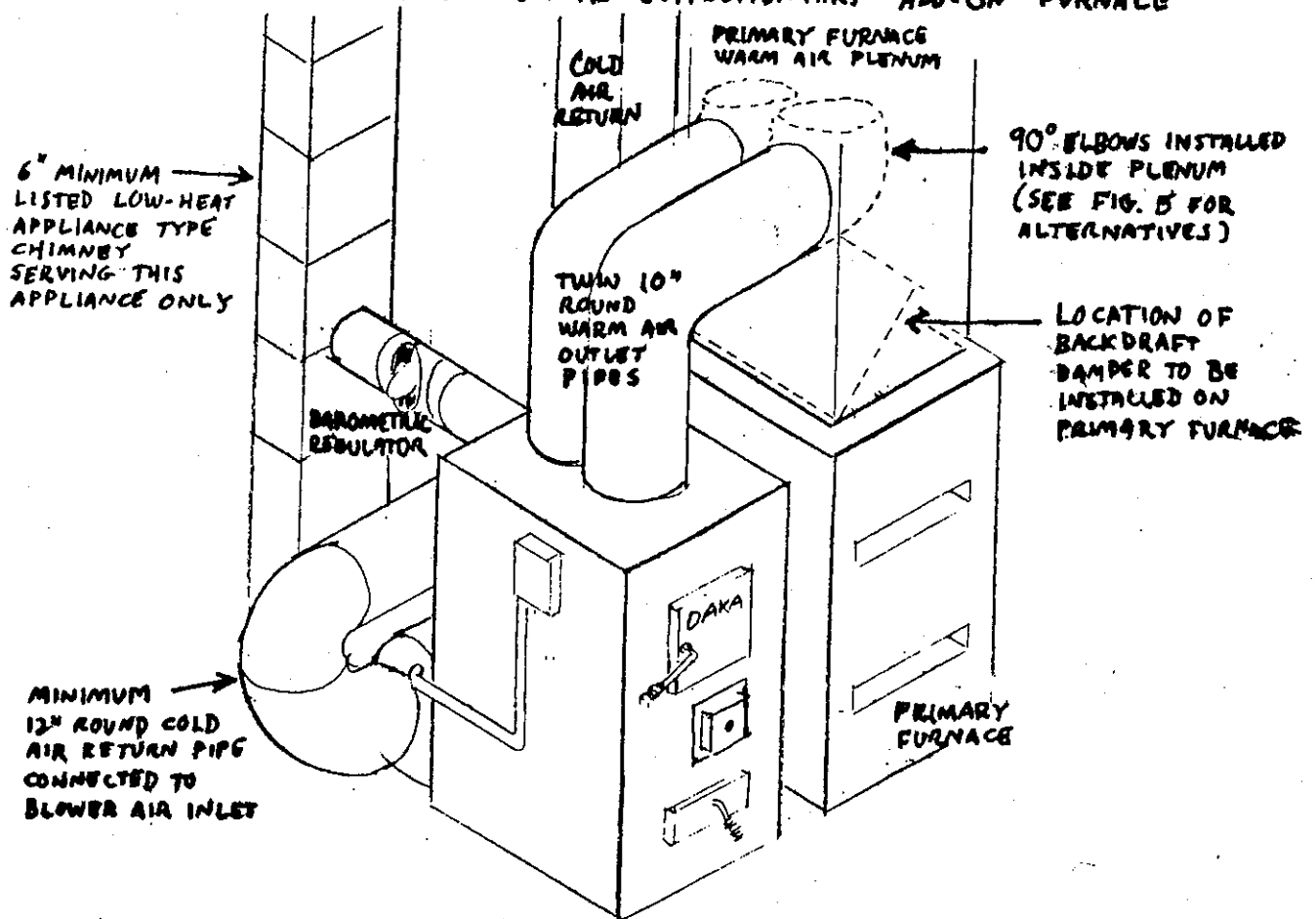


FIG. 2 TYPICAL INDEPENDENT CENTRAL FURNACE INSTALLATION

- 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

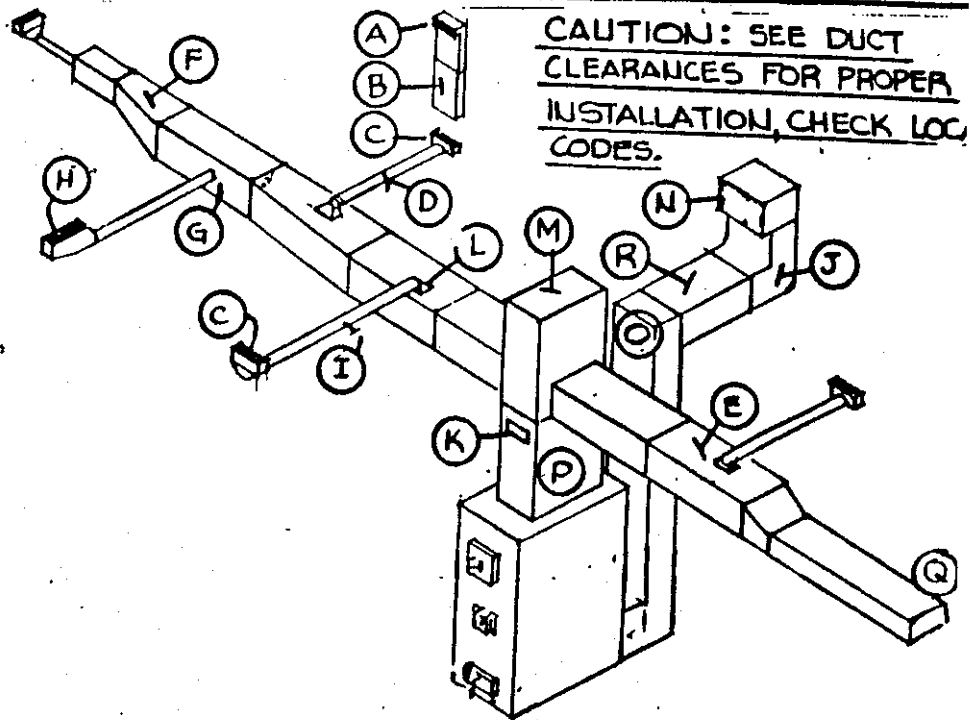


FIG 3- CLEARANCES FROM HORIZONTAL WARM AIR DUCTS

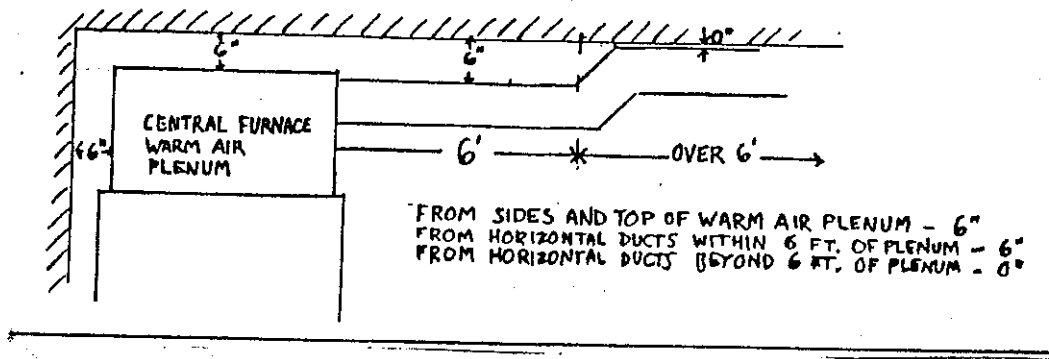


FIG. 4- CLEARANCES TO COMBUSTIBLES

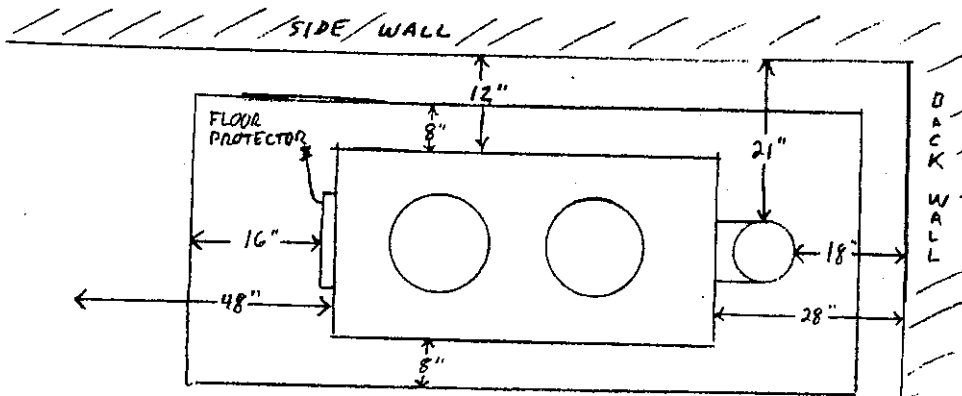


FIG. 5- ALTERNATIVE WARM AIR PLENUM PIPE INSERT DESIGNS

NOTE: MUST MAINTAIN MINIMUM 2" CLEARANCE ABOVE OUTLET

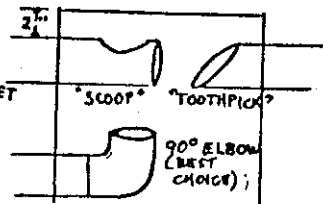
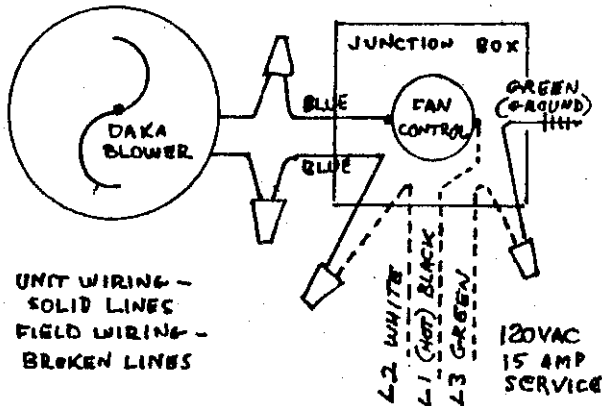
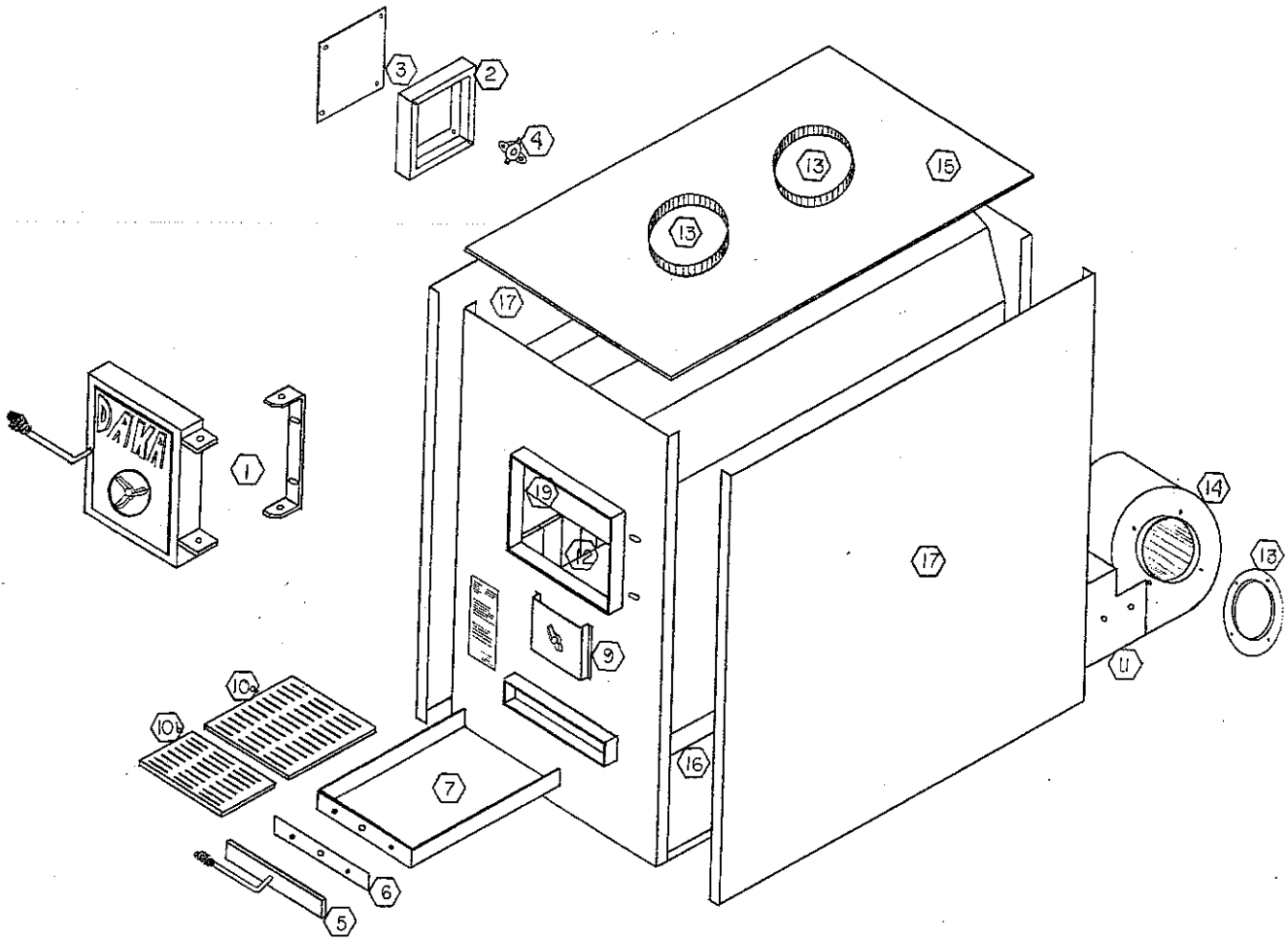


FIG. 6 - WIRING DIAGRAM





Key	Description	Part No.	Quantity
1	Firedoor W/Hinge Pine & Rope Gasket	18034200	1
2	Junction Box Ring	62630601	1
3	Junction Box Ring Cover Plate	62630602	1
4	Snap Disc Fan Control	58640004	1
5	Ash Door	57620018	1
6	Ash Pan Gasket	57610203	1
7	Ash Pan	57590710	1
9	Auto Damper Control Assembly	17032100	1
10A	Cast Iron Grate - 16"	59650004A	1
10B	Cast Iron Grate - 8"	59650004B	1
11	Blower Mounting Flange Assy.	23030710	1
12	Firebrick	57600001	12
13	Starter Collar - 10"	56660026	3
14	Blower - 1200-cfm	63610007	1
15	Air Jacket - Top Panel	64590709	1
16	Air Jacket - Bottom Panel	64590707	1
17	Air Jacket - Side Panel	64590708	2
19	Swing Plate	57590512	1
-	Rope Gasket	57610204	1
-	Flexible Conduit	62630407	1
-	Wire Nut	62630802	4
-	Sheet Metal Screw #12- $\frac{1}{2}$	61660208	14
-	Wire Set	60670006	1
-	Conduit Connector - Straight	62670201	1
-	Conduit Connector - 90°	62670202	1
-	Crimp Slip-on Terminal	62670205	2
-	Sheet Metal Screw #10x3/8	61660217	2

LIMITED WARRANTY

DAKA Corporation warrants the combustion chambers of its supplementary furnaces to be free of defects in material or workmanship for five years from date of sale; all other components, including electronics, gaskets and grates are covered in the same manner for a period of one year.

DAKA will repair or replace defective components, at our option, at no charge for parts and labor, and will pay freight charge for one-way shipment for warranty claims during first year. In second and subsequent years, only parts and labor will be provided at no charge. DAKA is not responsible for installation or dismantling costs.

Warranty void if unit is used in other than residential service connected to conventional basement-type upflow central heating system, if non-approved fuels are used in firing of units, or if unit is damaged due to accident, improper installation or negligence.

For service under this warranty, contact selling dealer or DAKA Corporation, Customer Service Dept., Industrial Park, Rt. 3 Box 65F, Pine City MN 55063; telephone 612/629-6737.

Implied warranties including that of merchantability are expressly limited in duration to the duration of this warranty. DAKA Corporation disclaims any responsibility for consequential damages. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so this limitation and exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This is our exclusive written warranty.