

DAKA Corporation . P.O. Box 90 . Pine City, Minnesota 55063

## 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., a nationally recognized independent testing facility. I.C.B.O. Research Report number pending.

## 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, utilizing present ductwork to distribute wood-heated air throughout the home with the assistance of the primary furnace blower. 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 500-cfm blower provided with this furnace is usually sufficient to provide air distribution for smaller homes with relatively short duct runs, but a second optional 500-cfm blower may be required for larger homes with longer ductwork. 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. This furnace must be connected to a minimum 6" listed low-heat appliance type chimney. Connection to a chimney flue serving another appliance is prohibited.
3. 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).
4. Installation of this furnace in mobile homes is prohibited.
5. This furnace must be installed with the following clearances to combustible surfaces:
 

To side wall:	12"	To front wall:	48"
To back wall:	32½"	Flue to back wall:	23"

See Figure 3 for ductwork clearances required.

For more information, including instructions for installations requiring reduced clearances, please write for publications 89M, 211 and HS-10 from:

NATIONAL FIRE PROTECTION ASSOCIATION, INC.  
 PUBLICATION SALES DEPARTMENT  
 BATTERYMARCH PARK  
 QUINCY, MA 02269

6. Check local building and mechanical codes prior to installation to insure conformance with all requirements; review home insurance policy for coverage.
  7. 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.
  8. To insure that your furnace is installed in accordance with fire safety and building code regulations, installation by a professional contractor familiar with solid-fuel systems is required.
- 
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.

11. Installation on a non-combustible floor surface, such as concrete or 3/8" asbestos millboard, is required. Non-combustible surface must extend at least 16" in front of unit, under the chimney connector and at least 2" to each side of connector.
12. Do not connect this unit to a chimney flue serving another appliance. Air filters are not to be used on this furnace due to certification requirements.

**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:

#### 1. 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.)

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.

## II. FURNACE ASSEMBLY

- A. Attach firedoor (Key No. 1 in Figure 7) 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 counterclockwise to lock.
- B. Insert thermal gasket (6) between ash door (5) and ash pan (7) front, and assemble using two 1/4" bolts and nuts provided.
- C. On model 912 only, insert Smoke Bypass Damper Rod (8) through small hole above firedoor, handle pointing up, and run rod directly back onto smoke baffle plate inside firebox. Reaching in through smoke collar on back of furnace, screw one large nut onto threaded rod all the way to the end of the thread. Insert threaded rod end into the hole on the upright plate on the Smoke Bypass Damper sliding plate, screw on two large nuts and tighten fully. (see Figure 4).
- D. Install firebricks (Key 12) along sides and back of firebox, starting at the front, by slipping bricks under retaining angle iron and standing them upright on the grate support rails.

**CAUTION!** FIREBRICK MUST BE INSTALLED CORRECTLY OR HEAT DAMAGE MAY OCCUR.

- E. Install shaker grate sections in following manner:
  1. Insert first Rectangular Grate Section (Key 10A) in firebox with round section supports in a 10:30-2:30-6:30 clock position. Drop Round Grate Section (10B) into place with tang on bottom between 6:30 and 10:30 position support arms on rectangular grate section.
  2. Install Coupling Nut (10D) on straight end of Connecting Rod (10C).
  3. Remove ash pan from furnace. Insert Connecting Rod through ash pan opening bent end first. Reach up and insert threaded end of first welded angle rod into tang on round grate section. Install locknut on threaded end of rod using 7/16" socket or wrench.
  4. Move grate assembly back about 7" and continue with second and third rectangular and round grate sections in same manner.
  5. Run Handle (10E) through hole on front of furnace, about 12" down from firedoor and 9" in from left side, and screw tightly into coupling nut on end of grate section connecting rod.

6. On model 912 only, install Grate Spacer (11) at back of grate sections.
  7. Run handle back and forth--round grate sections should rotate about 1".
- F. Attach Blower Adapter Plate (21) to front of furnace below firedoor using six #12x $\frac{1}{2}$ " screws provided, and then attach 35-cfm Draft Blower (9) to adapter plate using three #12x $\frac{1}{2}$ " screws. TIP: Put a drop of oil on each screw thread to ease insertion in heavy-gauge steel.
  - G. Install 500-cfm Blower (14) on back of furnace using four #12x $\frac{1}{2}$ " 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. Furnace is shipped with air jacket already fitted and installed. If it has worked loose during shipping or unpacking, do the following:
    1. Remove air jacket top (15) by lifting up from front to back only, not side to side.
    2. Ensure that bottom air jacket panel (16) is fully seated between lower bottom support angles.
    3. Ensure that channels welded on air jacket sides (17) engage the lower support channels, and that the side panels are pressed tightly onto furnace around the front and back corners.
    4. Reinstall the air jacket top from back to front, making sure that welded channels along inside edges of top fully engage the top edges of each of the air jacket sides.

### III. FURNACE CONTROL CENTER ASSEMBLY

NOTE: Furnace is designed for installation with supply connection to 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 air jacket panel, locate and remove the 3/4" knockout toward top of panel. Cut away insulation behind hole.
- B. Using three 1 $\frac{1}{2}$ " tube spacers as provided, proceed to mount the Fan Control (4) to the side of the panel, using #12x2 screws provided; Fan Control is to be held 1 $\frac{1}{2}$ " away from air jacket side by tube spacers to provide thermal protection for electronic components.
- C. Remove either knockout on bottom of Fan Control and install one straight Conduit Connector.
- D. Approximately 8" below Fan Control are four prepunched holes. Mount Junction Box Ring (2) here, using two #12x $\frac{1}{2}$ " screws through slots on back of ring. Remove one knockout on top of ring, and two knockouts on bottom. Install Straight Conduit Connectors provided for unit wiring.

- E. Mount Snap Disc fan control (20) on side of furnace within J-Box Ring, using two No. 12x $\frac{1}{2}$ " screws in prepunched holes.
- F. Join fan control and J-Box ring with 8" length of conduit provided.
- G. Remove knockout from small junction box on front blower motor housing, and attach right-angle conduit connector provided. Connect J-box ring and blower motor using 36" length of conduit provided. Repeat for large blower on back of furnace.

#### IV. WIRING INSTRUCTIONS (See Figure 6 for wiring schematic)

NOTE: For power supply connections, use No. 14 AWG or larger wires acceptable for at least 105°C. SHUT OFF ALL POWER WHILE INSTALLING.

- A. Attach approved conduit carrying 3-wire 120V AC 15 amp service to any unused knockout hole on J-box ring with conduit connector (not included for field wiring connections).
- B. On Relay/Transformer (Key No. 3), attach crimp terminal to either of black solenoid pigtailed; attach other crimp terminal to one end of 46" red wire. These crimp terminals will be attached to Snap Disc Fan Control (Key No. 20) blade terminals.
- C. Make all wiring connections per the schematic in Fig. 6; making all connections shown with wire nuts provided. Check all wiring connections for tightness and electrical safety.
- D. Tuck all wires into J-Box Ring, and install Transformer/Relay as J-Box cover. Reinstall cover plates on blower junction boxes.

#### V. CONNECTIONS TO DUCTWORK

- 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 (Key 13) as template, mark and cut out a 10" round hole in the top panel of the DAKA furnace air jacket, and a second 10" round hole 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 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.
4. Connect cold air return of primary furnace to DAKA furnace blower by means of a 6" pipe joining the primary cold air return to the 6" starter collar (18) which should be attached to the air inlet on the blower using inlet collar screws.

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 (Figure 2)

1. Install a minimum 16"x16" 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 fully surrounding the blower on the back of the DAKA furnace, leaving a minimum 2" clearance around the blower for proper air flow. A twin blower conversion kit No. 263 is available to increase airflow to 1000 CFM where necessary for better heat distribution.

#### 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. DAKA Furnace must be connected to a listed low-heat appliance type (Class "A" all-fuel) chimney of 6" diameter minimum. This flue must not serve any other appliance.
2. 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 settings is available through DAKA dealers or direct from factory for this purpose.
3. Smoke pipe should maintain a minimum 18" clearance to all combustibles, and should never pass through walls or ceilings; use proper thimbles for those passages.
4. 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.

5. 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.
6. 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.
7. 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, generally.
8. 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.

## VII. OPERATING CONTROLS

### A. Fan Controls

The fan control on the side of the DAKA furnace has a rotating thermostat disc. Holding the disc firmly in place, adjust the three tangs for these three settings from left to right as follow: FAN OFF - 90°, FAN ON - 130°, LIMIT - 200°. These fahrenheit settings will cause the 500-cfm back blower on the DAKA furnace to turn on when the temperature within the air jacket rises to 130°, and off when the temperature within falls to 90°. The limit setting will shut off the front 35-cfm draft blower should an unsafe bonnet temperature over 200°F be reached; the blower will be reactivated automatically when the temperature falls to 160°F.

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

The Snap-disc fan control inside the J-box ring is an operating control for the 35-cfm blower, with a built-in range of 190° OFF 170° ON, to prevent furnace overheating. During normal operation, this control may be activated frequently, and is designed to help level the furnace heat output.

**IMPORTANT:** In a supplementary "add-on" installation, the blower on the DAKA furnace is not used as a circulation blower for heating the house, but as a lift blower to get the heat into the supply plenum of the primary furnace. If your primary furnace is not equipped with a fan control in the supply plenum to turn on the primary blower as heat is received from the DAKA furnace, one will have to be installed, wiring it in parallel with the primary blower fan control at the heat exchanger lever (See Fig. 1 for necessary fan control location).



B. Living Area Thermostat (Key No. 22)

The Honeywell T822D thermostat is to be installed in any ground floor room on an inside wall, preferably beside the thermostat governing the primary furnace, which should be set approximately 5° lower than the DAKA thermostat. When falling room temperatures call for heat, the DAKA thermostat turns on the 35-cfm front draft blower on the DAKA furnace; the additional combustion air increases the heat output until the DAKA room thermostat signals the blower to cut off. Combustion air then reduces to a maintenance level with relatively low heat output, ready for the next firing cycle. Should there be insufficient fuel to increase the room temperature as called for, the primary furnace will fire when the temperature falls to the 5° lower setting. The DAKA draft blower will continue to run, however; to turn it off, lower the DAKA room thermostat setting below that of the primary furnace.

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 room thermostat 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.

C. Smoke Bypass Damper (Model 912 only)

Due to the extra long smoke baffle in this model, designed to create the longest possible flame path for maximum heat extraction, a sliding smoke bypass damper plate, controlled by the damper rod over the fire door, has been provided. Before opening fire door for reloading or checking fire, pull the damper rod out fully to allow the smoke to exit at rear of chamber, rather than rolling forward and possible spilling into the room. After closing fire door, push damper rod fully in to seal rear vent.

VIII. EMERGENCY OPERATION INSTRUCTIONS

A. Operation During Power Failure

1. Remove furnace filter(s) to prevent fire hazard.
2. Continue firing the fire with smaller loads, more frequently tended.
3. 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 or fire door.

B. In Case of a Chimney Fire:

1. Call the fire department immediately.
2. Reduce room thermostat setting to lowest point to shut off draft blower. Use chimney fire extinguishing flares if you have them. (Available at fireplace and woodstove 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

1. 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. Fire chamber and ash pan

1. 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.
2. 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<sup>o</sup>F-600<sup>o</sup>F. Lower temperature would indicate insufficient draft or inadequate combustion air.

To check flue gas temperature, we recommend that a smoke pipe surface thermometer be used. The Chingard thermometer is an excellent device for this purpose, available at many stores.

5. Insure that primary furnace blower is turning on to distribute heat effectively. Lower "FAN ON" setting on primary furnace fan control to start circulation earlier.

#### 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.

NOTE: To cover discoloration, obtain a high-combustion flat black spray paint from hardware store or fireplace shop.

#### Coal Burning

Coal is available in many types, grades and sizes. Hard coal (or anthracite) is mined only in the Eastern U.S.A., and should be burned only in stoves and furnaces designed specifically for it, due to its stringent burning requirements. Soft coal (bituminous, sub-bituminous and lignite) is found throughout the rest of the country in various grades and chemical compositions; these types of coal are the only ones recommended for use with the DAKA #213 Soft Coal Shaker Grate Kit. You should also try to get soft coal with the low sulphur, ash and volatile percentages, to reduce the incidence of air pollution, always greater with soft coal than with wood. Lower sulphur percentages will reduce the telltale smell of coal burning, and lower ash will minimize the amount of ash disposal required (coal burning produces 3-7 times the volume of ash created by wood burning, and necessitates much more frequent ash cleanout). (Warning: Do not burn canned coal in a closed heater, due to its highly volatile nature.) Coal comes in various sizes from buckwheat through egg; we recommend nut size (about 1-3/16") or larger for this grate. A proper coal burner provides primary air from below the coal grate, and admits secondary air above the coal bed, to mix with and burn the volatile gases released by the coal and prevent a build-up of explosive coal gas. The DAKA furnaces are designed with the primary air supply under the grate, and the air inlet on the fire-door provides the necessary secondary air for safe operation.

#### Operation

All coal fires start with a wood fire; coal is more difficult than wood to ignite, and requires a good bed of hot wood coals for ignition. Coal firing steps are as follows:

1. Unscrew nut and bolt on disc on face of fire-door and remove for coal burning operation. This disc must be replaced and tightly secured for woodburning to prevent possible overheating and damage to furnace.
2. Start a wood fire in the conventional manner, using newspaper, kindling and split wood. Establish a good shallow bed of coals.

3. Add an even layer of coal 2-3 inches deep on top of the wood coals. Wait until this layer is ignited and burning (look for telltale blue flame) before adding more coal in a level bed.
4. Whenever adding coal or checking on the fire, the firedoor should always be opened 1" and held for at least 30 seconds to minimize flashback and puffout.

**CAUTION:** DO NOT LOAD COAL HIGHER THAN TOP OF FIREBRICK AT ANY TIME, OR DAMAGE TO COMBUSTION CHAMBER MAY RESULT.

A load of coal has almost twice the potential heat value as the best hardwood per pound, so a little goes a long way. The much lower moisture content means that more recoverable heat per pound is also available, and coal fires tend to burn much longer than wood fires. Coal fires are more hazardous than woodfires, however, due to increased carbon monoxide and sulphur dioxide production if burned improperly, so extreme care should always be taken. Coal ashes are also toxic (unlike wood ashes) and should always be disposed of in a safe manner; do not use in gardens, or allow them to enter water supply in any manner. Check with local officials on recommended disposal for your area.

### Shaking

Due to the large buildup of ash with a coal fire, it is necessary periodically (usually once a day) to "shake down" the fire by moving the shaker grate handle in and out several times. This will agitate the ash bed and drop ashes through the grate into the ash pit. When red coals begin dropping into the pit, stop shaking.

### Soot

Although by burning coal you will minimize the chances of a chimney fire due to creosote buildup (coal does not form creosote), coal does deposit soot on chimney walls to some extent. All flues should be inspected frequently, and soot over 1/8" thick should be brushed out. Due to the higher sulphur content of coal, metal flues (even stainless steel ones) are more susceptible to corrosion and early deterioration from coal burning. If burning coal with a factory built metal chimney, follow chimney manufacturer's instructions carefully to avoid early chimney failure and costly replacements.

### Draft

Due to its higher ignition point and other factors, burning coal requires a stronger draft than when burning wood. While a wood burner is best served with a .04" to .06" water column draft, coal firing requires .06" to .08". An adjustable barometric regulator makes changing draft a relatively easy job.

If any special guidance is needed in installation or operating of furnace, contact:

Customer Service Department  
DAKA Corporation  
P.O. Box 90  
Pine City, MN 55063  
Telephone: 612/629-6737

# INSTALLATION AS SUPPLEMENTARY "ADD-ON" FURNACE

6" J. LISTED  
LOW HEAT  
APPLIANCE TYPE  
CHIMNEY FLUE  
SERVING THIS  
FURNACE ONLY

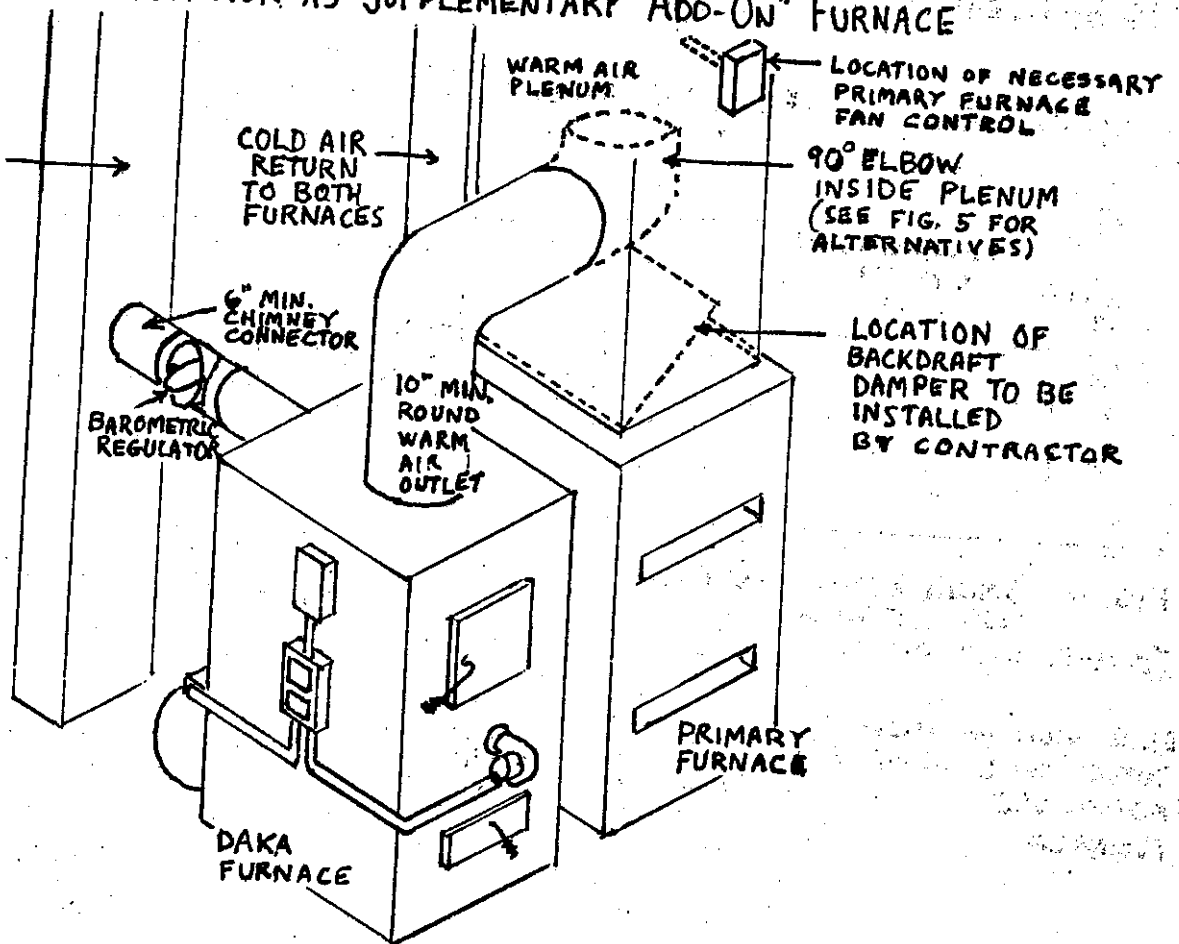
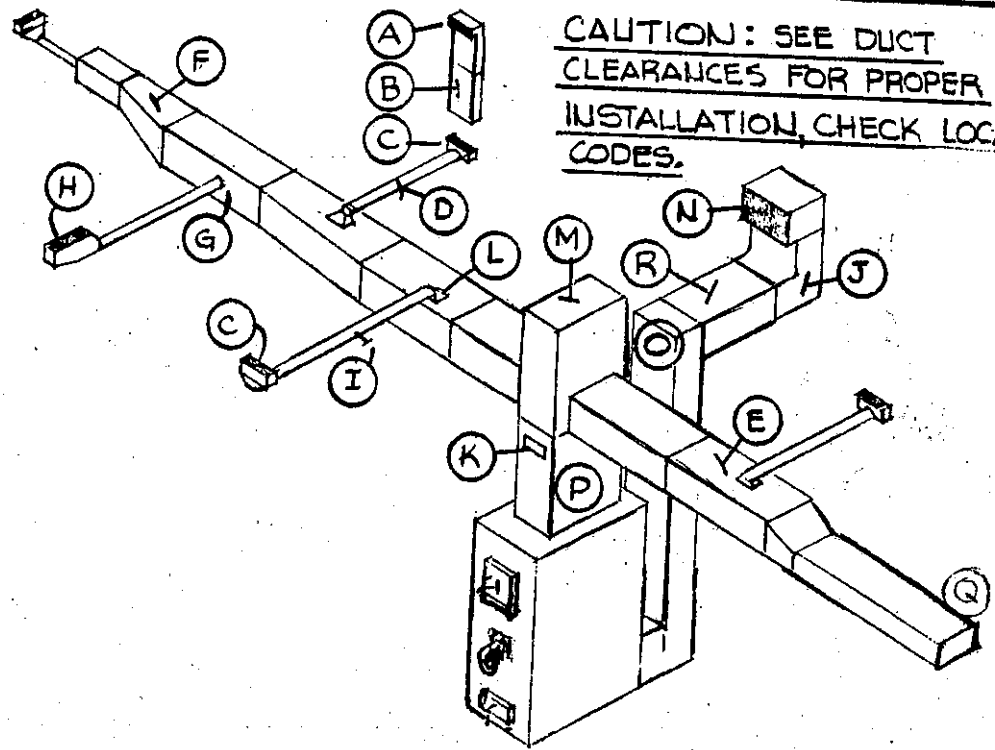


FIG. 2 TYPICAL INDEPENDENT CENTRAL FURNACE INSTALLATION

- 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



**CAUTION: SEE DUCT CLEARANCES FOR PROPER INSTALLATION, CHECK LOCAL CODES.**

FIG 3- CLEARANCES FROM HORIZONTAL WARM AIR DUCTS

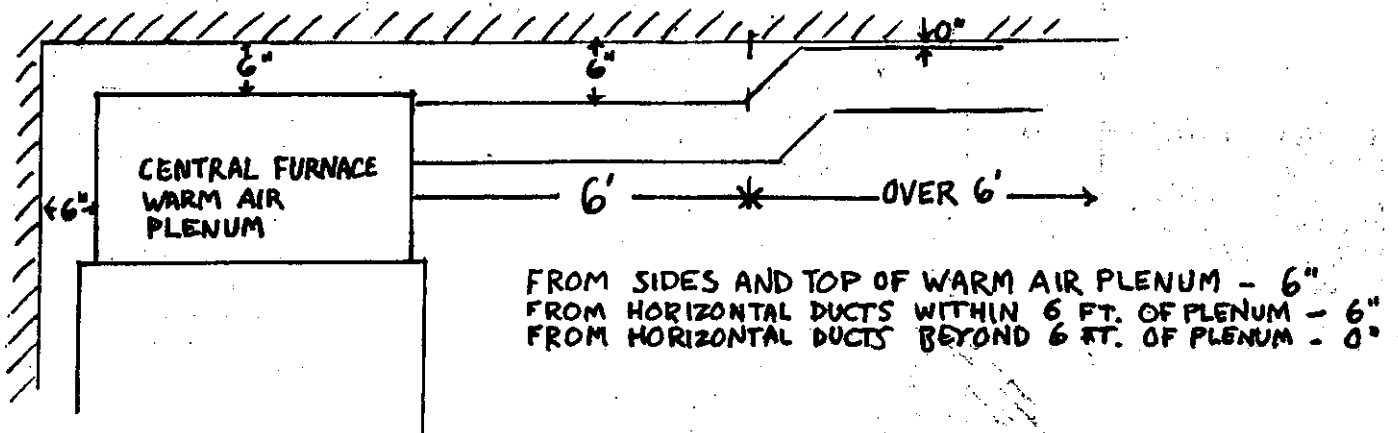


FIG. 4 - SMOKE BYPASS DAMPER ROD INSTALLATION (MODEL 912 ONLY)

REAR VIEW OF SMOKE OUTLET ON BACK OF MODEL 912 FURNACE

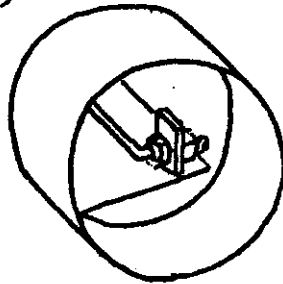


FIG. 5 - ALTERNATIVE WARM AIR PLENUM PIPE INSERT DESIGNS

NOTE: MUST MAINTAIN MINIMUM 2" CLEARANCE ABOVE OUTLET

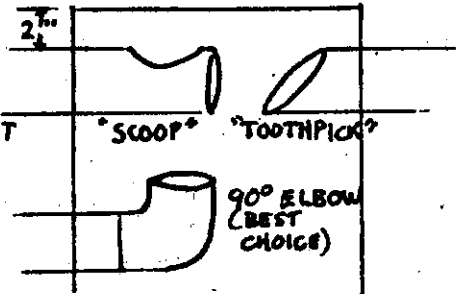


FIG. 6 - WIRING SCHEMATIC

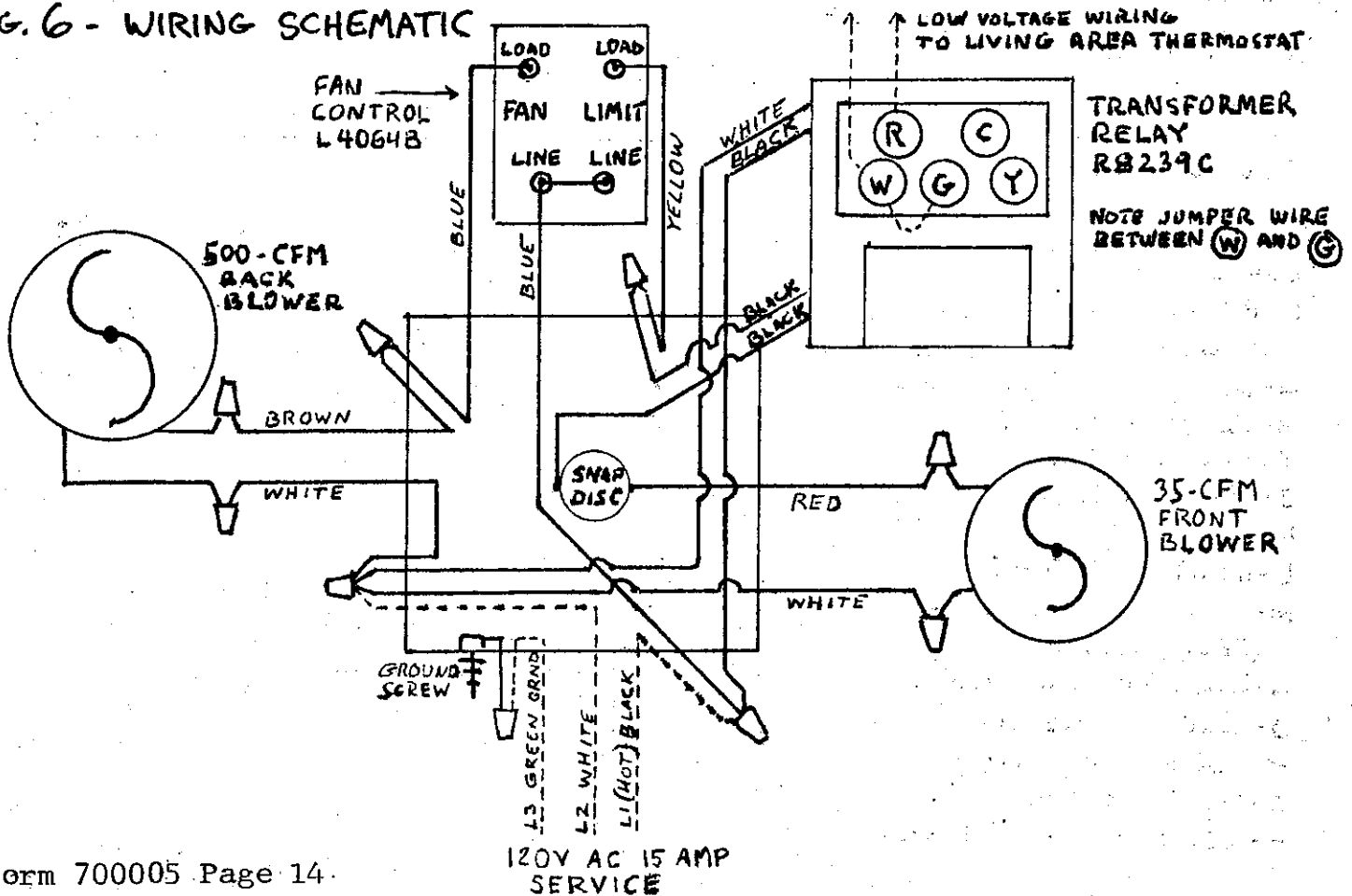
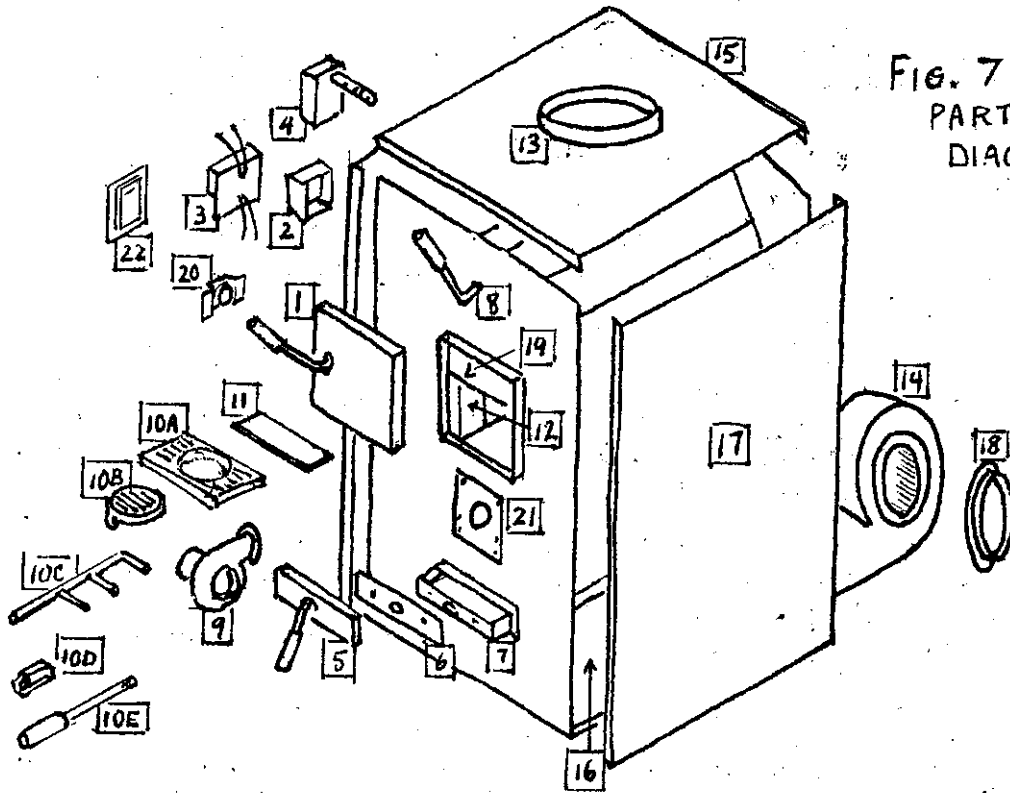


Fig. 7  
PARTS  
DIAGRAM



Key No.	Part Description	Model 812		Model 912	
		Part No.	Qty.	Part No.	Qty.
1	Firedoor w/gasket	811191	1	811191	1
2	Junction Box Ring - 4x4	630601	1	630601	1
3	Relay/Transformer R8239C	640002	1	640002	1
4	Fan/Limit Control L4064B	640001	1	640001	1
5	Ash Door	811135	1	811135	1
6	Thermal Gasket - Ash Door	610202	1	610202	1
7	Ash Pan	811139	1	811140	1
8	Bypass Damper Rod	-	N/A	660020	1
9	Blower - 35 cfm	610001	1	610001	1
10A	Grate Section - Rectangular	650002A	3	650002A	1
10B	Grate Section - Round	650002B	3	650002B	1
10C	Connecting Rod	660022	1	660022	1
10D	Coupling Nut	660032	1	660032	1
10E	Handle	660021W	1	660021W	1
11	Grate Spacer	-	N/A	660001	1
12	Firebrick	600001	13	600001	15
13	Starter Collar - 10"	660026	1	660026	1
14	Blower - 500 cfm	610003	1	610003	1
15	Air Jacket-Top Panel-Brown	590409	1	590210	1
16	" " -Bottom Panel-Brown	590407	1	590208	1
17	" " -Side Panel-Brown(L&R)	590408	2	590209	2
18	Starter Collar - 6"	811158	1	811158	1
19	Swing Plate	590211	1	590211	1
20	Fan Control - Snap Disc	640005	1	640005	1
21	Blower Adapter Plate	670603	1	670603	1
22	Wall Thermostat - T822D	640003	1	640003	1
-	Conduit - 8"	630401	1	630401	1
-	Conduit - 3/4"	630405	2	630405	2
-	Wire Nut	630802	9	630802	9
-	Sheet Metal Screw - #12x1/2"	660208	17	660208	17
-	" " " - #12x2"	660209	3	660209	3
-	Wire Set	670005	1	670005	1
-	Conduit Connector - Straight	670201	4	670201	4
-	Conduit Connector - 90°	670202	2	670202	2
-	Tube Spacer	670204	3	670204	3
-	Crimp Terminals	670205	2	670205	2
-	Lock Nut	660033	3	660033	3

## 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,

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, P.O. Box 90, Pine City MN 55063; telephone 612/629-6737.

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