



DAKA FURNACE INSTALLATION AND OPERATION MANUAL

Price \$2.00

Classic Line Furnace Model Nos. 101/201/301/401

PRINCIPLE OF OPERATION

This DAKA furnace is designed to be used as an add-on unit to your present forced-air upflow gas, oil or electric furnace. The DAKA furnace consists of a 12-ga. steel combustion chamber, around which a 14-ga. air jacket has been welded in place. The bottom-mounted 265-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 five 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

1. The DAKA furnace is designed for use only with conventional up-flow 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 residential and building heating type 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 furnace blower air inlet must be connected to the cold air return on the main furnace by means of a 6" or larger pipe.
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 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. 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 13/64" H.S.S. drill bits
Cabinet-head screwdrivers- small and large
Adjustable wrench
Tin snips or sabre saw with metal-cutting blade
Pliers
Hammer/mallet

MATERIALS NEEDED FOR INSTALLATION - NOT PROVIDED

6" 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
6" cold air return pipe with necessary elbows and two starting collars
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

Open all cartons and check piece count against parts list on back page of this manual.

Parts Shortage: Call or write factory immediately; provide model number and serial number of unit along with description and count of missing parts. Replacements 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

Parts needed: Firedoor, Ash Pan Door, Ash Pan, Blower, Legs (4), No. 10x $\frac{1}{2}$ " sheet metal screws (4 ea.)

- A. Remove all items from within furnace; turn furnace on its back and mount blower on bottom with sheet metal screws; make sure air inlet on blower will point towards main furnace when installed. Temporarily remove cover on blower junction box and remove two knockout plugs on box.
- B. Slide four legs into corner tabs on bottom of furnace, and turn unit upright.
- C. Mount ash pan door to ash pan using nuts and bolts provided.
- D. Remove hinge rod from firedoor frame and mount firedoor. Reinsert hinge rod and check door operation; turn handle counterclockwise to lock.

III. FAN CONTROL ASSEMBLY

Parts needed: Fan Control, $\frac{1}{2}$ x1" tubular spacers (2), No. 12x $\frac{1}{2}$ " screws (2), flexible conduit, blue wires (2), straight and 90° conduit connectors; wire nuts (2).

- A. On side of DAKA furnace that will face away from main furnace, locate and remove 7/8" round 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 the fan control into the knockout hole on the side of the furnace; holding the fan control tightly vertical against the side of the furnace, mark and drill two 13/64" holes at bottom center and bottom right mounting slots of fan control on furnace.
- D. Back control away from side of furnace, and position two spacer tubes between fan control and furnace over the screw holes; insert two No. 12x $\frac{1}{2}$ " screws through spacers and tighten. This installation holds fan control 1" away from side of furnace for thermal protection.
- E. Attach straight conduit connector to bottom of fan control in knockout. Attach 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 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 blower junction box hole, pointing toward fan control side of 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. Attach an approved 3-wire field conduit from 120V service to unused blower junction box hole; conduit should not touch furnace itself at any point.
- C. Connect black (hot) wire from field conduit to one blue wire leading to fan control through unit conduit, using wire nut provided.
- D. At fan control, insert one blue wire end into lower left wiring hole (marked FAN LINE), using small screwdriver to spring clip to accept wire. Insert other blue wire into upper left wiring hole (marked FAN LOAD) in the same manner.
- E. In blower junction box, attach second blue wire to one black blower pigtail wire, using wire nut provided.
- F. Attach second black blower pigtail wire to white wire from field conduit, using wire nut provided.
- G. Attach green wire (ground) from field conduit to blower box by twisting wire around one cover plate mounting screw between plate and box.
- H. Check all connections for tightness and conformance with foregoing instructions, tuck all wires within blower junction box, and reinstall cover plate, before re-energizing circuit.

V. CONNECTING AIR INLET ON 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.

Parts needed: 6" starting collars (2), 6" diameter pipe, connecting screws.

- A. Remove the screws holding the DAKA furnace blower air inlet orifice; note that the orifice is flanged inward, as it must be reinstalled the same way.
- B. Install one 6" starting collar on blower over orifice, using the orifice mounting screws for positioning.
- C. Using tin snips or sabre saw with metal cutting blade, cut a 6" circular hole in cold air return below furnace filter, if possible, and mount second 6" starting collar to return.

- D. Run 6" diameter sheet metal pipe from collar on DAKA blower to collar on main furnace cold air return. Attach pipe to collar with at least three sheet metal screws per connection.

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

Parts needed: 6" diameter 90° elbows, plenum collar, 6" diameter sheet metal pipes (2), screws

- A. Cut 6" circular hole in supply (hot air) plenum of main furnace on side nearest DAKA furnace, in line with top front 6" outlet.
- B. Attach a 90° elbow to 6" diameter 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 plenum for a good seal.
- C. Attach another 6" diam. pipe to top front outlet on DAKA furnace. Join to pipe from main furnace plenum with other 90° elbow. Secure all connections with at least three No. 7 sheet metal screws per joint.

VII. CONNECTING DAKA FURNACE TO CHIMNEY

Parts needed: 6" diam. stove pipe and elbows as required; metal screws; chimney connector.

- A. Mount and secure a 6" diam. crimped end pipe of 24-ga. or heavier sheet metal to top rear 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.
 4. A solid damper should be installed in smoke pipe close to chimney connector; in the event of a chimney fire, it can be quickly closed to cut off draft.
 5. Maintain at least $\frac{1}{4}$ " per foot upslope on smoke pipe between DAKA furnace and chimney connection.
 6. Secure all connections with at least three No. 7 sheet 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. 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. Adjusting the Draft Control

Depending on the model of furnace you have purchased, you have either a manual draft control (on furnace models 101 and 201) or automatic draft control (on furnace models 301 and 401).

The manual draft control is a circular plate attached to the firedoor with a screw assembly. Turning the plate handle counterclockwise opens the draft, and turning it clockwise closes it. For starting a fire, an opening of about 3/4" is recommended; for longer burn times, adjust the draft opening from 1/8" to 1/4".

The automatic draft control 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 the 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.

C. Adjusting the Fan Control

This control will automatically turn DAKA 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) is inoperative on these furnaces.

While this unit is designed for fully automatic operation, you can turn blower on manually at any time by pushing white button 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.

D. Operation During a Power Failure

1. Remove furnace filter from main furnace to prevent fire hazard.
2. Adjust draft control to lowest possible setting to keep fire going with smaller loads, more frequently tended.
3. Use 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. Do not set draft control higher than recommended above.

E. What To Do In Case of a Chimney Fire

1. Call the fire department immediately.
2. Close the solid damper in the smoke pipe to cut off air to the 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

Lubricate motor bearings at beginning and end of each heating season 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 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 the 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 help get a heat siphon action going to overcome cold air in the chimney.
4. Consult a heating contractor for other possible reasons.

B. Poor heat throughout house while burning wood

1. Make sure all pipe and duct connections are airtight.
2. Check to insure that all cold air return vents throughout the 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)

1. Paint is rated for 600°F, and overheating of furnace will cause whitish appearance on external combustion chamber surfaces; reduce draft.
2. To cover discoloration, obtain high-combustion flat black spray paint from hardware store or fireplace shop. Follow directions for application.

PARTS LIST - DAKA Furnace Models 101/201/301/401

<u>Component Description</u>	<u>Quantity</u>
Furnace Shell. . . . .	.1 ea.
Firedoor with fireproof gasket. . . . .	.1 ea.
Ash Door with fireproof gasket. . . . .	.1 ea.
Leg. . . . .	.4 ea.
Ash Pan. . . . .	.1 ea.
265-cfm Blower. . . . .	.1 ea.
Fan Control. . . . .	.1 ea.
Flexible Conduit. . . . .	.1 ea.
Unit Wiring - Set/2 Blue Wires. . . . .	.1 set
Cast Iron Grate. . . . .	.1 ea.
Steel Grate Spacer (Models 201/401 only). . . . .	.2 ea.
Firedoor Hinge Rod. . . . .	.1 ea.
Straight Conduit Connector. . . . .	.1 ea.
90° Conduit Connector. . . . .	.1 ea.
Fan Control Spacer Tube. . . . .	.2 ea.
No. 10 - 1/2" Sheet Metal Screw. . . . .	.4 ea.
No. 12 - 1 1/2" Sheet Metal Screw. . . . .	.2 ea.
Wire Nut. . . . .	.3 ea.