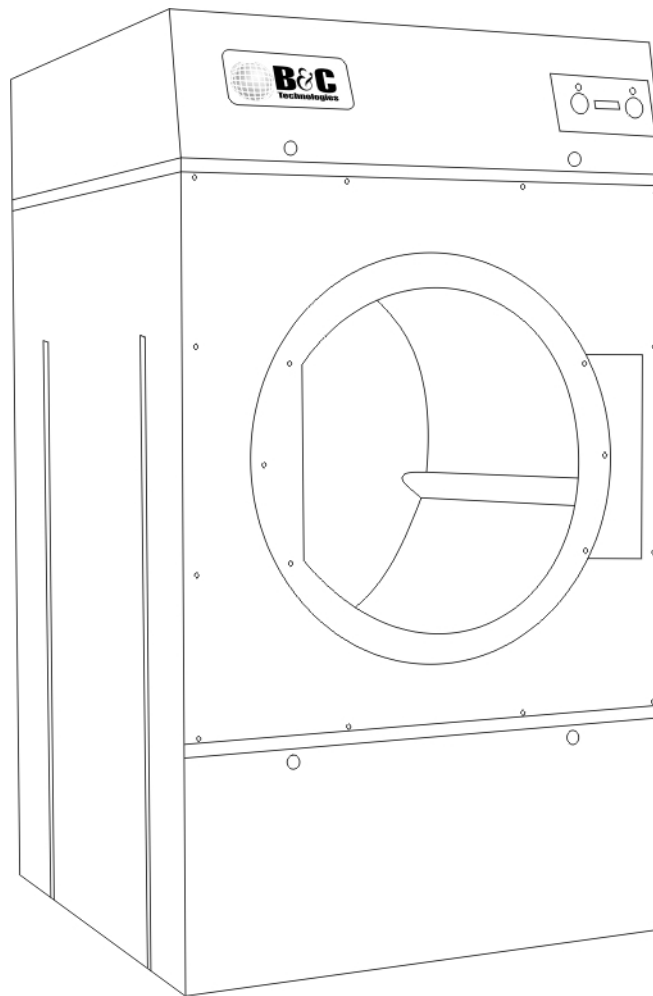


Dryer

DE Series Installation and Operation Manual

November 9, 2023

Revision 2.1



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Chapter 1

Important Safety Information

1.1 FOR YOUR SAFETY - CAUTION!

WARNING: FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death, or property damage.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS:
 - Do not try to light any appliance
 - Do not touch any electrical switch; do not use any phone in your building.
 - Clear the room, building or area of all occupants.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

Contact your local gas supplier to obtain particular instructions in the event that a user smells gas. Place this sheet and any other instructions obtained from your gas supplier in a prominent location.

Remove this page from this manual and post in a prominent location

FOR YOUR SAFETY

**Do not store or use
gasoline or other
flammable vapors and
liquids in the vicinity of
this or any other appliance**

Family	Size	Control	Reversing	- Voltage	-
DE	30	T - Timer	R - Reversing	11 - 115V, 60Hz, 1ph	
	50	P - Micro	N - Not Rev.	21 - 208/230V, 60Hz, 1ph	
	75			23 - 208/230V, 60Hz, 3ph	
	120			43 - 440/480V, 60Hz, 3ph	
	170			45 - 380/415V, 50Hz, 3ph	

Heat	Recirculation	Rotation Sensor	Fire Supression	Door
S - Steam	0 - No Heat Recirc	0 - No sensing	0 - No Supression	R - Right Open
E - Electric	1 - Heat Recirc	1 - Sensing	1 - Supression	L - Left Open
N - Natural Gas				
P - Propane Gas				

Cylinder	Cabinet	Approvals	Packing	Design Rev.
G - Galvanized	0 - Standard	A - USA	B - Bag	A
S - Stainless Steel	F - Stainless Front	E - Europe	C - Crate	
		N - None		

DE50TR-23-E000RS0ABA
 Design
 Packing
 Approvals
 Cabinet
 Cylinder
 Door
 Fire Supression
 Rotation Sense
 Recirculation
 Heat
 Voltage
 Reversing
 Control
 Size
 Family

Figure 1.1: DE Product Family

Chapter 2

Important Instructions

2.1 Before Attempting Repairs



Moving parts can cause serious injury or death. Before attempting repairs, follow proper shut-down procedures, remove power, and allow the machine to fully cool before commencement of service.

Safety is of primary concern with any maintenance or repair operation. If you are in any way unsure of how to proceed with a repair or adjustment, consult this manual, a qualified maintenance technician, your local distributor, or the B&C Technologies Technical Service Department at 850-249-2222.

Only trained and experienced personnel should attempt maintenance or repair work on this equipment. Follow all safety procedures including lock-out/tag-out procedures carefully. Ensure that any loose fitting clothing or jewelry is tucked in or not worn to avoid being pulled into the machine. Remember, the machine has no brain - you must use your own.

Before attempting repairs, follow proper shutdown procedures, remove power, and allow the machine to fully cool before commencement of service.

Never attempt to clean or service any area of the machine without removing power at the main disconnect and allowing time for the machine to cool completely.

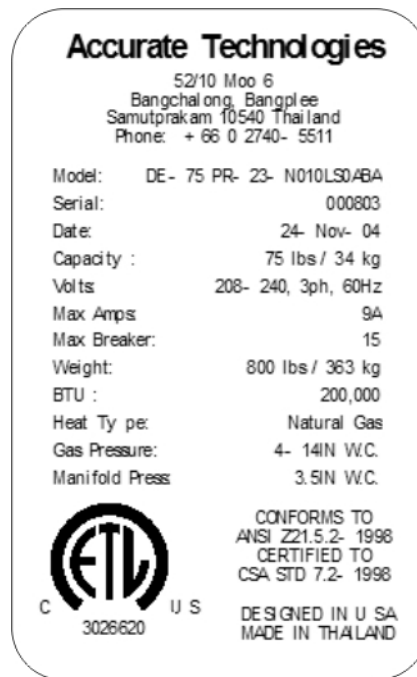


Figure 2.1: Serial Decal

Read, follow, and obey these safety rules! The B&C Technologies Technical Service Department is available to answer any questions you may have about the operation and servicing of your machine. Please call with any questions or concerns about the operation of your machine.

2.2 Parts Ordering Information

If you require literature or spare parts, please contact your local distributor. If a local distributor is unavailable, you may contact B&C Technologies directly at (850) 249-2222 for the name of your nearest parts dealer.

For technical assistance in the United States, contact B&C Technologies:

(850) 249-2222 Phone

(850) 249-2226 FAX

parts@bandctech.com

www.bandctech.com

2.2.1 Nameplate Location

When contacting B&C Technologies about your equipment, please make note of the model and serial number, located on the nameplate as shown in figure 2.1.



Figure 2.2: Key Symbols

2.3 Key Symbols

Anyone operating or servicing this machine must follow the safety rules in this manual. Particular attention must be paid to the DANGER, WARNING, and CAUTION blocks which appear throughout the manual and shown in figures 2.2 on page 6 and 2.3 on page 7.



Figure 2.3: Key Symbols

2.4 Safety Information

Installation Notice: For personal safety and for proper operation, the machine must be grounded in accordance with state and local codes and in the USA in accordance with the National Electric Code, article 250-96. Elsewhere, the equipment should be grounded in accordance with ANSI/NFPA 70, or the Canadian Electrical Code, CSA C22.1. The ground connection must be to a proven earth ground, not to conduit or water pipes.

Natural Gas or Propane Gas (LP Gas) heated equipment installation must comply with state and local codes, and in the USA, in accordance with the National Fuel Gas Code. Elsewhere, the equipment should comply with ANSI Z22.1, or CSA B149.

Provisions must be made for adequate make-up air and ventilation, and access for equipment service and installation.

2.5 Installation and Operational Safety Instructions

1. Read all instructions prior to operating this equipment.
2. Ensure that the equipment is properly grounded before applying power and operation commences.
3. Do not process goods that have been previously cleaned in, soaked in, or exposed to gasoline, dry cleaning chemicals, or any other flammable or explosive materials, as they could catch fire or explode without warning, even after being washed.
4. Do not allow children to play in or around or operate this equipment.
5. Check the operation of all safety interlocks at the start of every shift. If the interlocks do not stop the equipment immediately, the machine must be removed from service. Notify your immediate supervisor, and do not operate the machine.

6. Never attempt to service the machine while it is running. Never reach over, under, around, or behind any safety device, or into any area near moving parts or hot surfaces without shutting off power and allowing the machine to adequately cool.
7. Read, understand, and follow all safety instructions. Do not come close to moving parts and hot surfaces. Do not wear loose clothing, jewelry, neckties, or any other garment that could be come caught in the machine while operating or near the machine.
8. Only a qualified technician should attempt to service or repair the dryer.
9. Do not install the machine in an area where it could be exposed to water or weather.
10. Do not alter or tamper with the control system.
11. To reduce the risk of fire, do not process plastics or articles containing foam rubber or similarly textured rubber-like materials.
12. Keep the area near the exhaust ducting clean and free of lint, dust, dirt or debris.
13. Keep the interior and exterior of the machine clean of lint, dirt, dust and debris. The interior of the machine, along with the exhaust ductwork should be periodically inspected and cleaned to avoid potential fires (lint is highly flammable).
14. Improper installation, operation and maintenance of this machine can cause exposure to substances in the fuel or from combustion that can cause serious illness or death. The machine must be exhausted to the outside.
15. Always disconnect the electrical service from the machine and allow it to cool before performing service.
16. This machine must be installed according to the installation instructions. All exhaust, electrical connections, and gas or steam connections must comply with state and local codes and must be made by a licensed installer where required.
17. Remove articles from the dryer as soon as the drying cycle has completed. Articles left in the dryer can create a fire hazzard.

Chapter 3

Installation

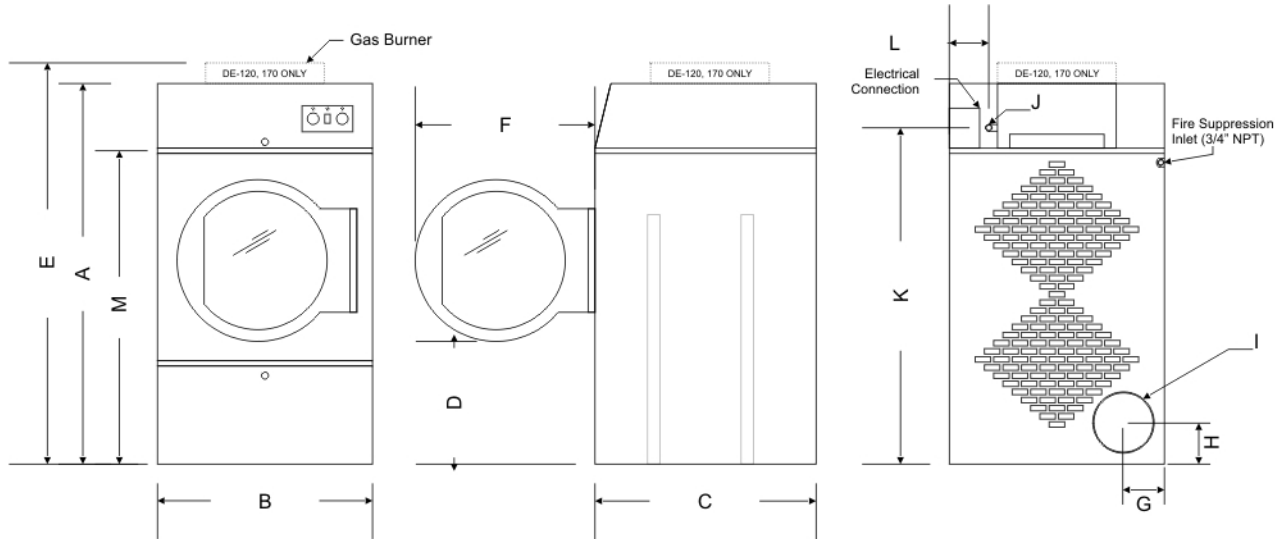
3.1 Receiving Inspection

Upon receipt of the equipment, visually inspect for shipping damage and note any damage with the carrier before signing the shipping receipt, or advise the carrier of the damage as soon as it is noted.

If damage is discovered, a written claim must be filed with the carrier as soon as possible.

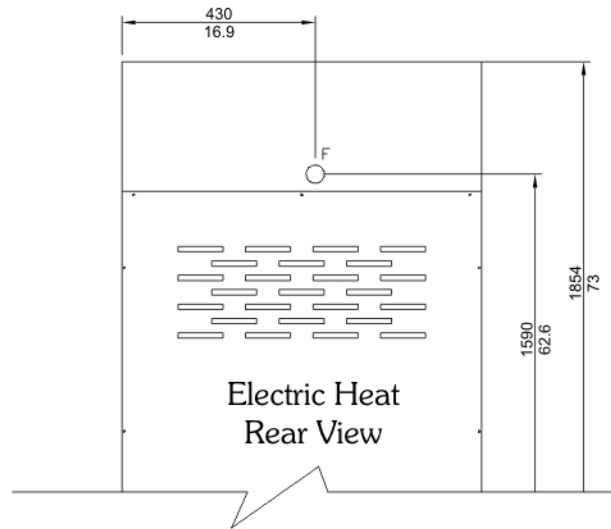
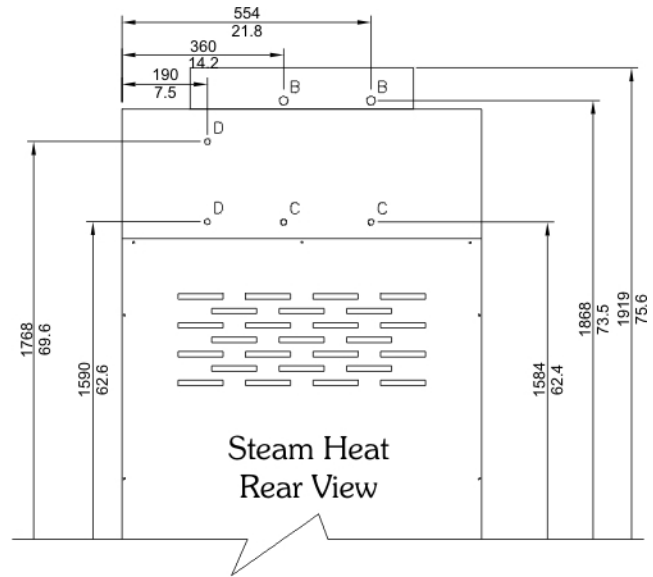
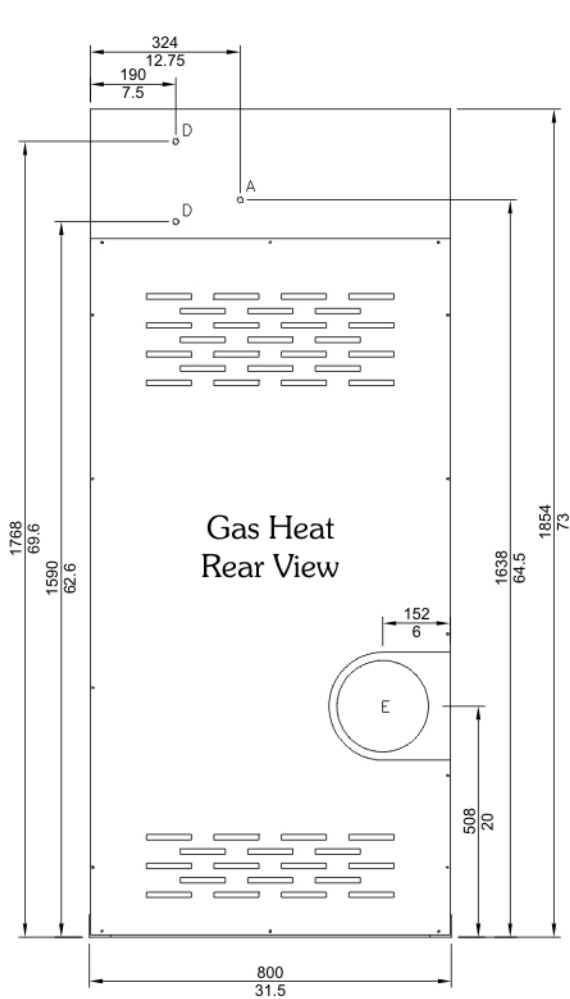
Note: Warranty is VOID unless the equipment is installed according to instructions. The installation must comply with the minimum requirements listed in this manual. All national, state and local codes must be followed including but not limited to gas, electrical, plumbing and HVAC. Due to various requirements, statutory codes should be well understood before installation commences.

Important: The dryer should be transported and handled in an upright position.



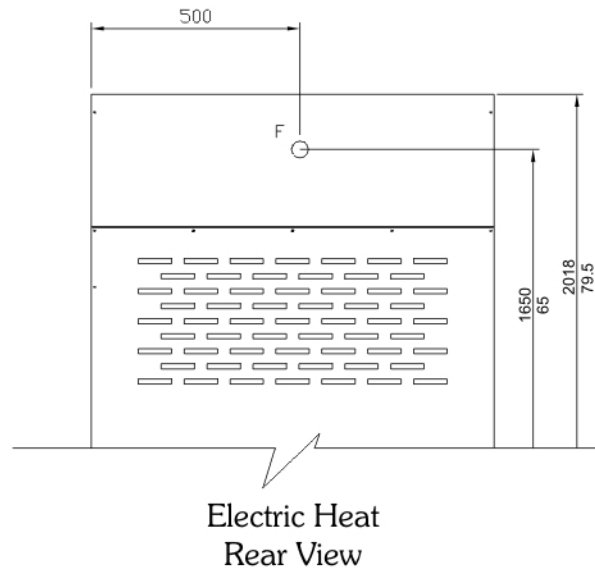
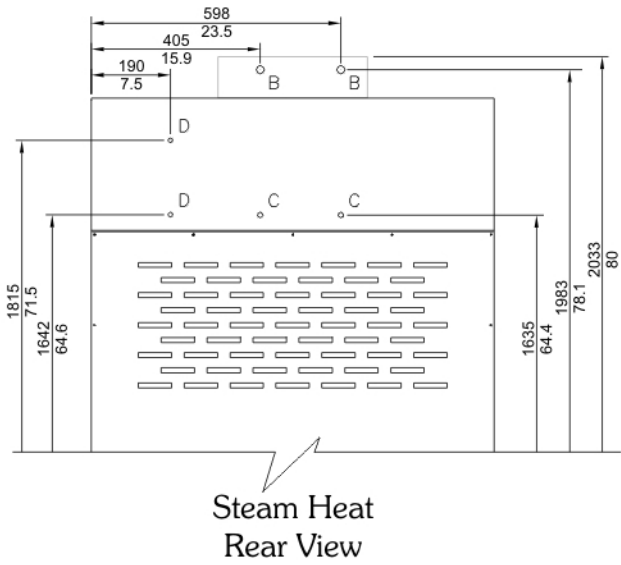
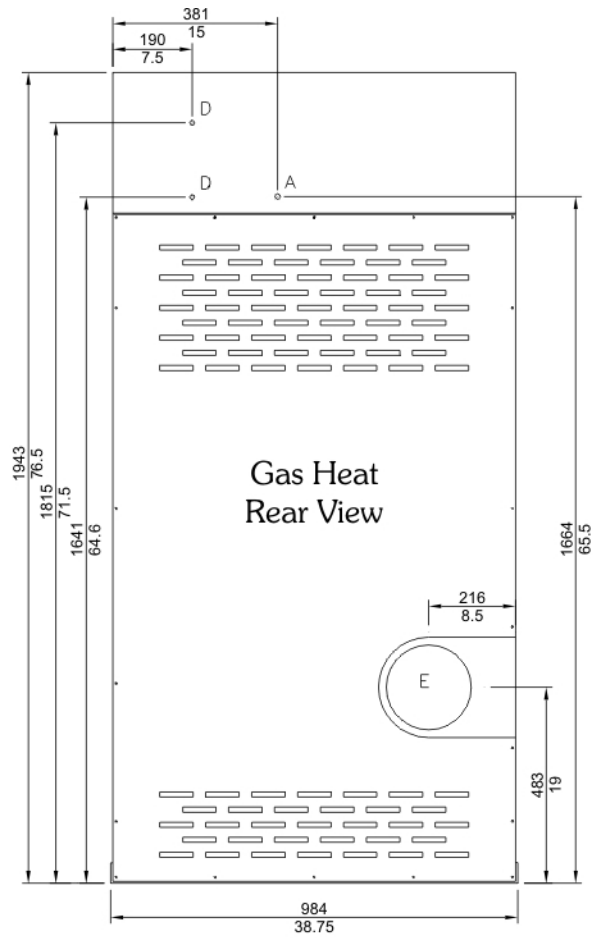
		DE-30		DE-50		DE-75		DE-120		DE-170	
		English	Metric	English	Metric	English	Metric	English	Metric	English	Metric
A	Cabinet Height	73	1854	76.5	1943	76.5	1943	82.75	2102	94.25	2394
B	Cabinet Width	31.5	800	38.75	984	38.75	984	47.25	1200	56.25	1429
C	Cabinet Depth	42	1067	42.75	1086	47.75	1213	63	1600	66.5	1689
D	Door Height	32.25	819	30.25	768	30.25	768	27.25	692	32.5	826
E	Height to Burner Top							88.75	2254	99.75	2534
F	Door Swing	27.75	705	31.75	806	31.75	806	38.75	984	41.75	1060
G	Exhaust Horizontal	6	152	8.5	216	8.5	216	10.5	267	8.5	216
H	Exhaust Vertical	20	508	19	483	19	483	8.5	216	10.75	273
I	Exhaust Diameter	8	203	8	203	8	203	12	305	16	406
J	Gas Inlet Diameter	0.5	13	0.75	19	0.75	19	1	25	1	25
K	Height to Gas Inlet	63.75	1619	65.5	1664	65.5	1664	74	1880	85.75	2178
L	Side to Gas Inlet	12.75	324	15	381	15	381	37	940	41.5	1054
M	Height to Cabinet Top							70	1778	80.75	2051
	Shipping Weight	630	286	844	384	888	404	1760	800	2342	1065
	Net Weight	612	278	824	375	865	393	1738	790	2316	1053

Figure 3.1: DE Gas General Specifications



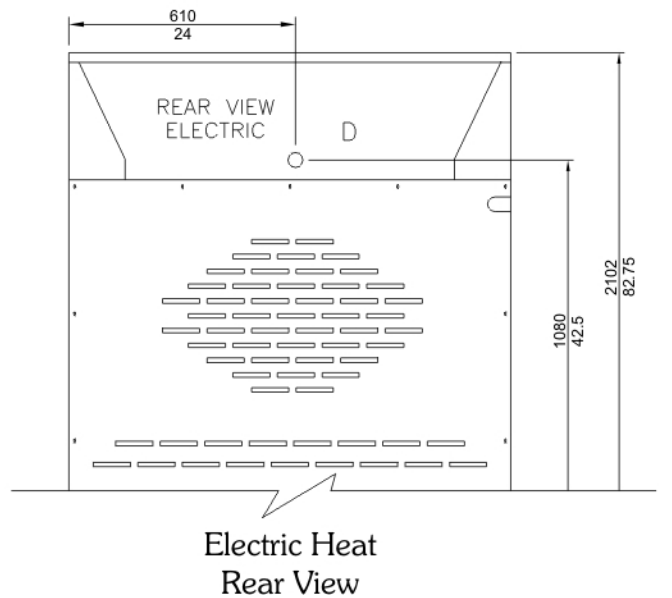
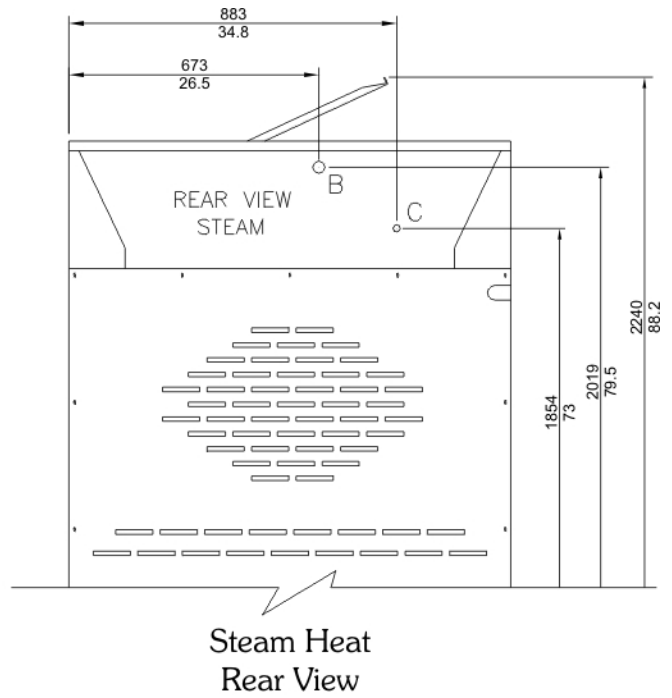
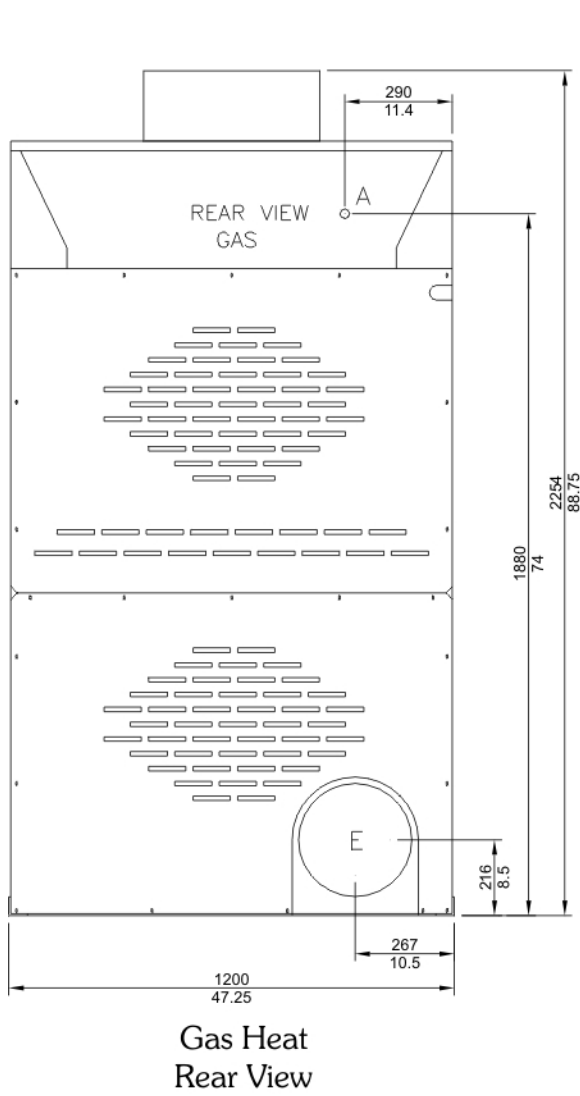
- A - Gas Inlet, 1/2"NPT
- B - Steam Supply, 3/4"NPT
- C - Steam Return, 3/4"NPT
- D - Electrical Connection
- E - Exhaust Duct, 8"
- F - Electric Connection

Figure 3.2: DE-30 Utility Connections



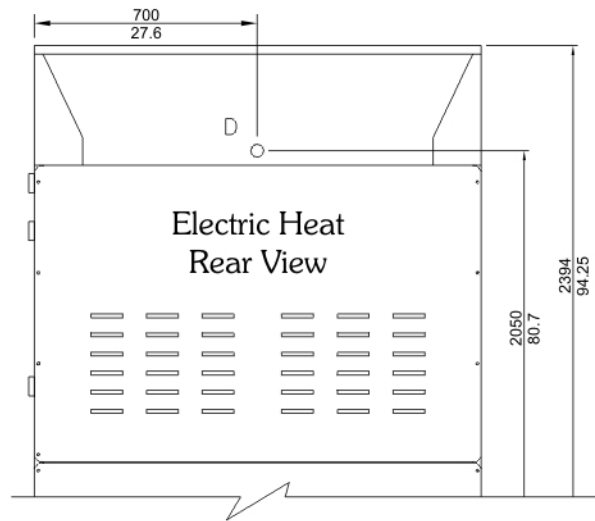
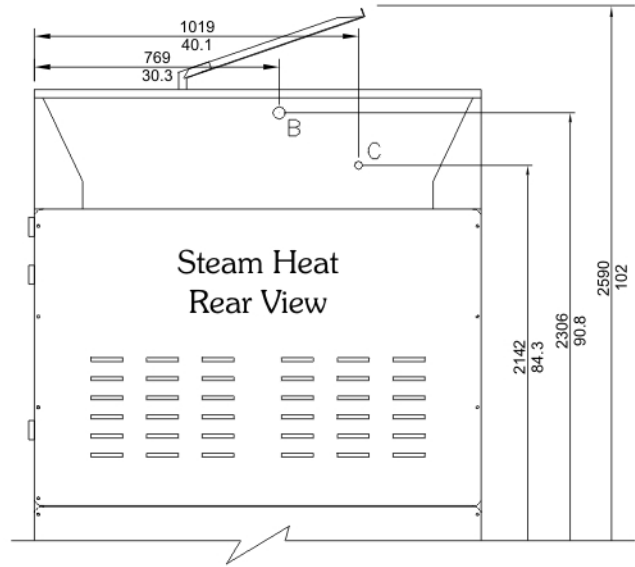
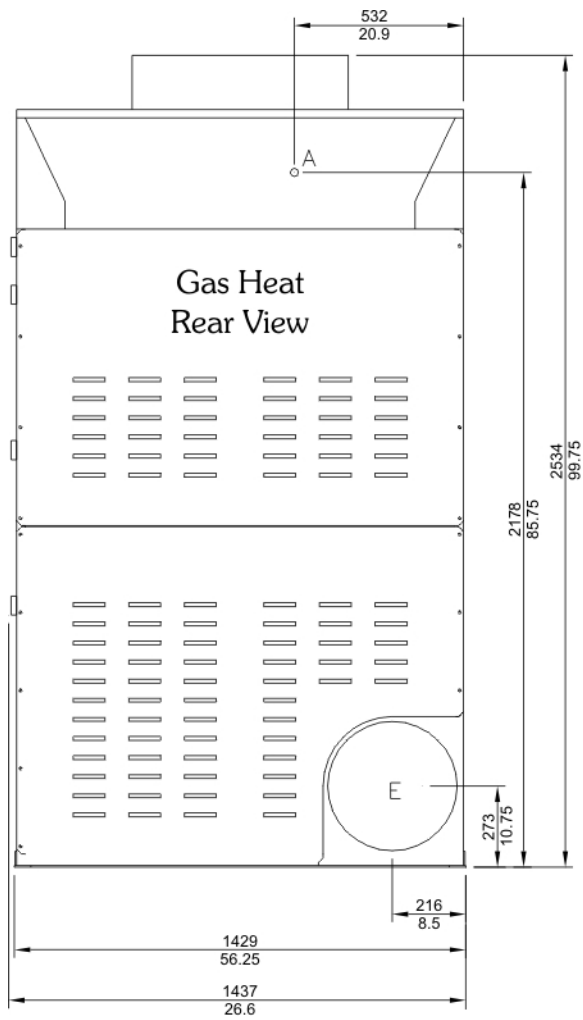
- A - Gas Inlet, 3/4"NPT
- B - Steam Supply, 3/4"NPT
- C - Steam Return, 3/4"NPT
- D - Electrical Connection
- E - Exhaust Duct, 8"
- F - Electric Connection

Figure 3.3: DE-50/75 Utility Connections



- A - Gas Inlet, 1"NPT
- B - Steam Supply, 1-1/4"NPT
- C - Steam Return, 1-1/4"NPT
- D - Electrical Connection
- E - Exhaust Duct, 12"
- F - Electric Connection

Figure 3.4: DE-120 Utility Connections



- A - Gas Inlet, 1"NPT
- B - Steam Supply, 1-1/2"NPT
- C - Steam Return, 1-1/2"NPT
- D - Electrical Connection
- E - Exhaust Duct, 16"
- F - Electric Connection

Figure 3.5: DE-170 Utility Connections

			DE-30		DE-50		DE-75		DE-120		DE-170	
Air Flow	CFM	cmm	500	14	750	21.25	900	25	2200	62	4000	113
Heat Input	BTU/hr	kcal/hr	90,000	22,500	150,000	37,500	200,000	50,000	375,000	93,750	500,000	125,000
Electrical Requirements												
120V, 60Hz, 1PH	Amp	Breaker	10	20	12	20	14	20	n/a	n/a	n/a	n/a
240V, 50/60Hz, 1PH	Amp	Breaker	13	15	14	15	21	25	n/a	n/a	n/a	n/a
240V, 50/60Hz, 3PH	Amp	Breaker	5	15	6	15	9	15	23	30	32	40
380-440V, 50/60Hz, 3PH	Amp	Breaker	1.4	15	3.5	15	4.5	15	11	15	16	20

Figure 3.6: Gas/Steam Heat Electrical Requirements

			DE-30		DE-50		DE-75		DE-120	
Air Flow	CFM	cmm	500	14	750	21.25	900	25	2200	62
Heat Input	kW		24		24		36		75	
Electrical Requirements										
208-230V, 50/60Hz, 3PH	Amp	Breaker	60	70	60	70	98	100	196	200
380-440V, 50/60Hz, 3PH	Amp	Breaker	30	40	30	40	32	45	97	100

Figure 3.7: Electric Heat Electrical Requirements

3.2 Electrical Installation

Electrical connections should be made by a qualified electrician in accordance with all applicable codes or requirements. Use a separate branch circuit to power each machine. Do not share circuits with lighting or any other equipment.

Because this is a vibrating machine, the use of SO cable or similar, with a twist-lock plug, to connect the machine to main power is recommended. A shielded liquid tight or approved flexible conduit with proper conductor of correct size installed in accordance with National Electric Code (USA) or other applicable codes is required. The connection must be made by a qualified electrician using the wiring diagram provided with the machine.

For personal safety and for proper operation, the machine must be grounded in accordance with state and local codes and in the USA in accordance with the National Electric Code, article 250-96. The ground connection must be to a proven earth ground, not to conduit or water pipes.

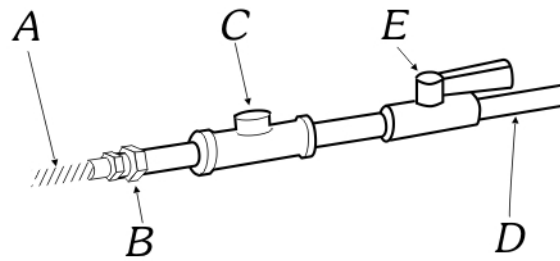
Do not connect the ground to the neutral (N) leg at the terminal strip (if so equipped).

If a DELTA supply system is used, the high leg should be connected to L3, since control voltage is derived from L1 and L2.

Insure that the control transformer taps are connected in accordance with the incoming line voltage. Verify connections as shown on the schematic with each machine.

Note:

Ensure that all power connections are tight. Loose connections will cause burned wires and contactors on electrically heated machines. Check the electrical connections at the incoming power terminal block, contactors, and heating elements at installation, after the first week of operation, and quarterly thereafter. Failure of switchgear due to negligence in this area is not covered under any warranty!



- A. 1" flexible gas connector
- B. 1" pipe to flare adapter fitting
- C. 1/8" NPT plugged tapping
- D. 1" NPT gas supply line
- E. Gas shutoff valve

Figure 3.8: Gas Plumbing Detail

3.3 Gas Connection

3.3.1 Gas Supply Line

- 1" IPS pipe is recommended.
- 1" approved tubing is acceptable for lengths under 25 ft (6.1 m) if local codes and gas supplier permit.
- Must include 1/8" NPT minimum plugged tapping accessible for test gauge connection, immediately upstream of the gas connection to the dryer (see figure 3.8 on page 16).
- Must include a shutoff valve:

An individual manual shutoff valve must be installed within 6 feet (1.8m) of the equipment in accordance with the National Fuel Gas Code, ANSI Z223.1. The location should be easy to reach for opening and closing.

3.3.2 Gas Supply Connection Requirements

There are many methods by which the DE series dryer can be connected to the gas supply. Following are some guidelines for methods of connection.

Option 1:

Flexible stainless steel gas connector:

If local codes permit, use a new flexible stainless steel connector (Design certified by the American Gas Association or CSA International) to connect between the dryer and the gas supply line. Use

an elbow and a 1" flare x 1" NPT adapter fitting between the stainless steel gas connector and the gas inlet of the machine as needed to prevent kinking.

Option 2:

Other approved piping:

Lengths under 25 feet (6.1m) use 1" approved tubing.

Lengths over 25 feet (6.1m) should use larger piping.

Pipe joint compounds that resist the action of gas must be used. DO NOT USE TEFLON ®/PTFE TAPE.

IMPORTANT: Be certain the dryer is configured for the type of gas being used. The gas type is shown on the serial sticker on the electrical panel of the unit.

Inlet Pressure

Use a manometer to verify that the inlet pressure meets the following requirements:

Natural Gas service must be supplied at 4-14 inches of water column pressure.

Propane (LP Gas) service must be supplied at 11-14 inches of water column pressure.

If the incoming gas pressure exceeds the above, install a locally obtained gas regulator that has sufficient BTU capacity to supply the machine (Maxitrol 325-5AL for up to 300,000 BTU, 327-7L for up to 900,000 BTU or equivalent). A chattering gas valve indicates improper line pressure, not a faulty gas valve.

Manifold Pressure (Secondary)

Be sure to check the manifold pressure. Use a manometer to verify that the manifold pressure matches the information on the serial sticker and the type of gas being used. A separate gas regulator (locally obtained) must be installed if the incoming line pressure is greater than 14 inches water column pressure.

1. Connect the manometer to the pressure connection on the gas valve (disconnect gas service).
2. Restore gas service, and determine the pressure while the burner is ignited. The pressure must match the indicated manifold pressure on the serial sticker.

Gas Conversion Notice: Do not connect a machine configured for Natural Gas to Propane (LP Gas) service or vice-versa without a qualified service technician doing a proper conversion. After the reconfiguration is complete, the manifold pressure must be verified. See Section 8.1 on page 42 for conversion details.

3.4 Steam Connection

For best results, operate with a steam pressure of 90 psi (6.2 bar). The steam inlet and return are located on the rear of the machine.

Important: Insulate all steam and return lines for the safety of the operator and service technician.

Important: All steam components must be rated for a minimum of 200 psi (14 bar) working pressure. Shut off valves must be installed upstream of the steam inlet, and downstream of the steam trap so that the equipment can be isolated for maintenance or emergency.

Important: Support all steam lines and components to minimize the load on the steam connections to the dryer.

Obtain steam service piping from a steam system supplier or a qualified steam fitter.

Use a minimum of 12 inch (300mm) rise above the header to prevent condensate from draining into the dryer. Do not make a steam connection to the header with a horizontal/downward facing tee or elbow.

Wherever possible, horizontal runs of steam lines must gravity drain to the steam header. Water pockets or improperly drained headers will yield poor results due to wet steam.

Install a union and valve in the steam supply and return lines for ease of service.

For best performance, install an inverted bucket trap with strainer and a check valve. Avoid thermostatic traps. For best results, install the trap at least 18 inches (450mm) below the inlet and as close to the machine as possible. Install the trap according to the instructions with the unit, noting the steam flow direction. If the steam is gravity returned to the boiler, install a vacuum breaker and check valve in the return line near the machine. Note that all return plumbing must be below the return inlet.

To prevent eventual water hammer, route all return lines below steam outlets.

Table 3.1: DE Series Steam Condensate Loading

Steam Pressure	Machine					
		DE-30	DE-50	DE-75	DE-120	DE-170
60 PSIG	904.7	99.5 lbs/hr	143.7 lbs/hr	221.1 lbs/hr	414.5 lbs/hr	607.9 lbs/hr
70 PSIG	898	100.2 lbs/hr	144.8 lbs/hr	222.7 lbs/hr	417.6 lbs/hr	612.5 lbs/hr
80 PSIG	891.9	100.9 lbs/hr	145.8 lbs/hr	224.2 lbs/hr	420.5 lbs/hr	616.7 lbs/hr
90 PSIG	886.2	101.6 lbs/hr	146.7 lbs/hr	225.7 lbs/hr	423.2 lbs/hr	620.6 lbs/hr
100 PSIG	880.8	102.2 lbs/hr	147.6 lbs/hr	227.1 lbs/hr	425.7 lbs/hr	624.4 lbs/hr
125 PSIG	868.3	103.7 lbs/hr	149.7 lbs/hr	230.3 lbs/hr	431.9 lbs/hr	633.4 lbs/hr

3.5 Steam Damper

The DE-120 and DE-170 are manufactured with a pneumatic (piston) damper system which requires an external supply of compressed air. The air connection is made to the steam damper solenoid valve which is located at the rear inner top area of the dryer just above the electric service relay box. See Table 3.2 on page 19 for details.

Table 3.2: DE Series Compressed Air Requirements

Compressed Air Pressure	
Minimum	70 psi
Nominal	80 psi
Maximum	90 psi

Air connection to system — 1/8-inch N.P.T.

No air regulation or filtration is provided with the dryer. External regulator and filtration must be provided. It is suggested that a filter be added to the compressed air line just before the dryer connection (B&C P/N 270-318 or locally obtained). This is necessary to insure that clean and dry air is delivered to the equipment. Wet and dirty air will cause rapid deterioration and failure of air system components.

3.5.1 Steam Damper Operation

The steam damper, as shown in figure 3.9 on page 20 allows the coil to stay constantly charged eliminating repeated expansion and contraction. When the damper is opened, the air immediately passes through the already hot coil, providing instant heat to start the drying process. When the damper is closed, ambient air is drawn directly into the basket (tumbler), allowing a rapid cool down.

The diagrams show the damper in the heating (open) mode, allowing heat into the drying cylinder and in the cool down (closed) mode, pulling ambient air directly into the basket (tumbler) without passing through the coils.

Note: With the dryer off or with no air supply, the damper is in the cool down mode.

3.5.2 Steam Damper Air Piston Adjustment

Although the damper operation was tested and adjusted prior to shipping at 80 psi, steam damper operation must be checked before the dryer is put into operation. If damper air adjustment is necessary, locate flow control valve and make necessary adjustments. See figure 3.10 on page 20 for details.

3.6 Exhaust Requirements

For best results, install the machine near an outside wall in order to keep the exhaust duct length as short as possible, and to provide a source of make-up air. The rear of the dryer should not

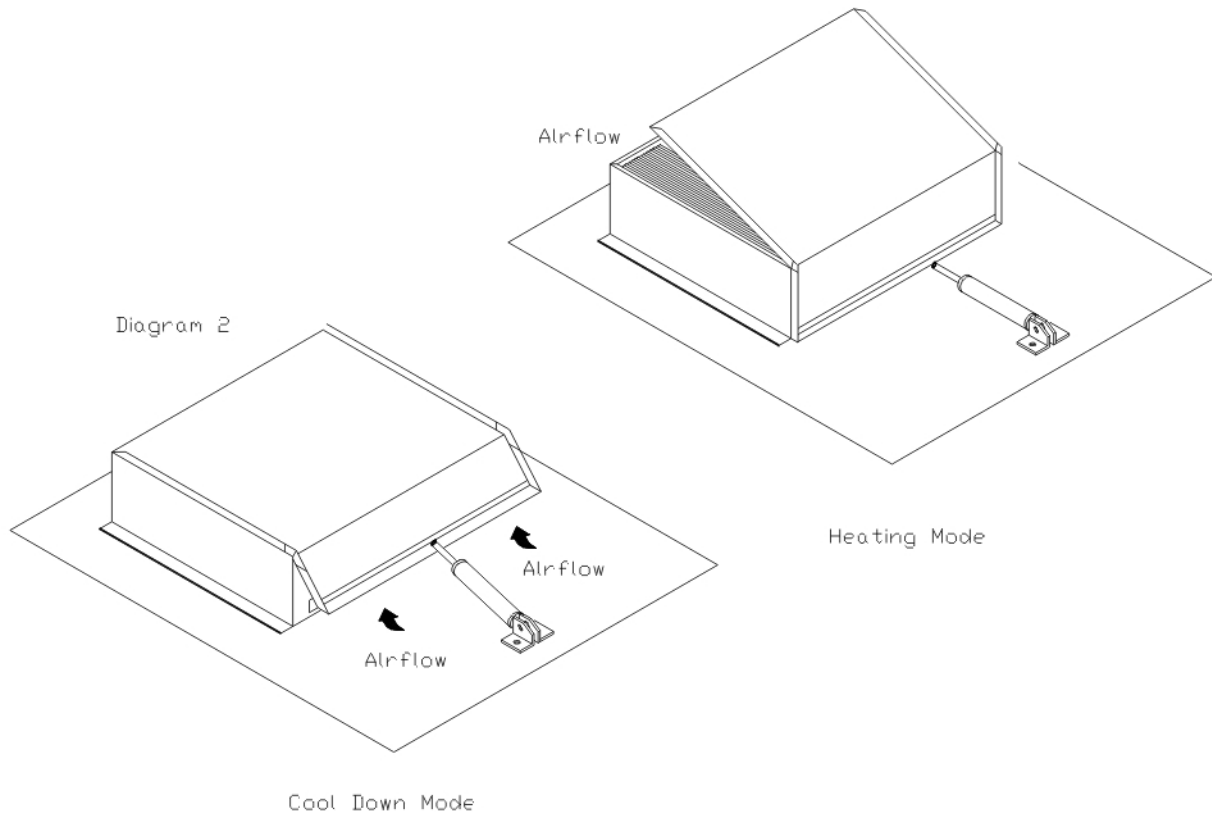


Figure 3.9: DE-120/170 Steam Damper Operation

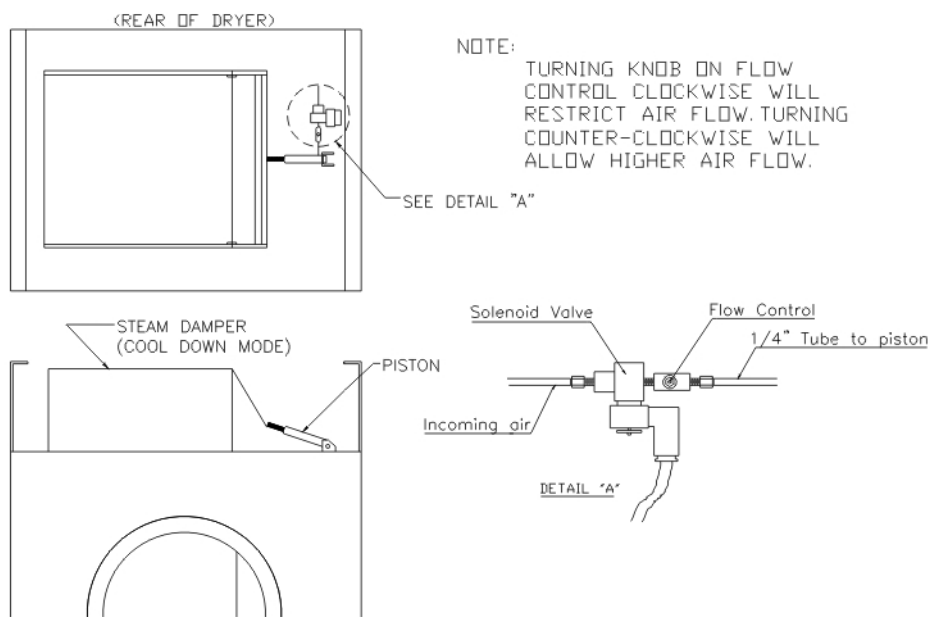


Figure 3.10: DE-120/170 Steam Damper Adjustment

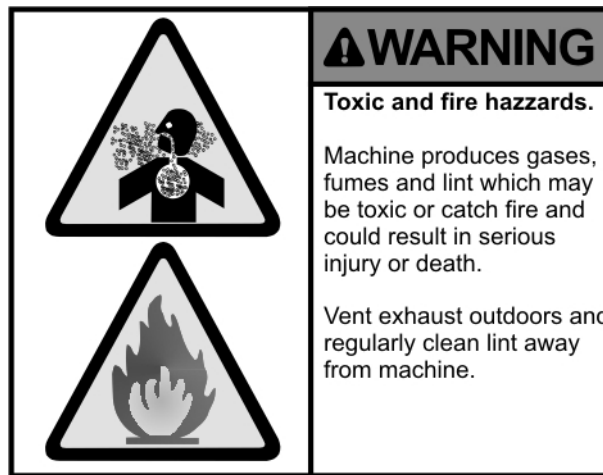


Figure 3.11: DE Series - Proper Exhaust is critical for safety!

be blocked. Blocking the air inlets prevents proper combustion, and will yield poor results, and possibly harmful combustion byproducts. See recommended exhaust style in Figure 3.12 on page 22.

Important: Do not interrupt the flow of make-up air or the exhaust!

For maximum efficiency and minimum lint accumulation, the dryer must be exhausted to the outdoors by the shortest possible route. Properly sized exhaust ducts are essential for proper operation. Any 90-degree elbows used should be sweep type, however, 45-degree elbows are preferable as they don't create as much back pressure. Exhaust ducts must be assembled such that all interior surfaces are smooth, so the joints do not permit the accumulation of lint. Do not use plastic or thin foil ducts rigid metal ducts are recommended. Use exhaust ducts made of sheet metal or other noncombustible material. Do not use sheet metal screws or fasteners on exhaust pipe joints which extend into the duct and catch lint. Use duct tape or pop-rivets on all seams and joints. The maximum allowable back pressure is 0.3 inches water column. *Don't guess, measure!*

Note: Check for proper exhaust fan rotation direction before placing the equipment into service. If the rotation is incorrect, remove power from the machine and exchange any two incoming power leads.

Note: Avoid locating the exhaust next to the fresh air supply intake.

Note: Avoid the use of "booster fans".

3.7 Plumbing Requirements

The DE series dryer can be equipped with an optional fire suppression system to reduce the risk of fire in your dryer. If so equipped, connect the water supply to the 3/4" GHT connection, located on the upper right rear of the machine as labeled.

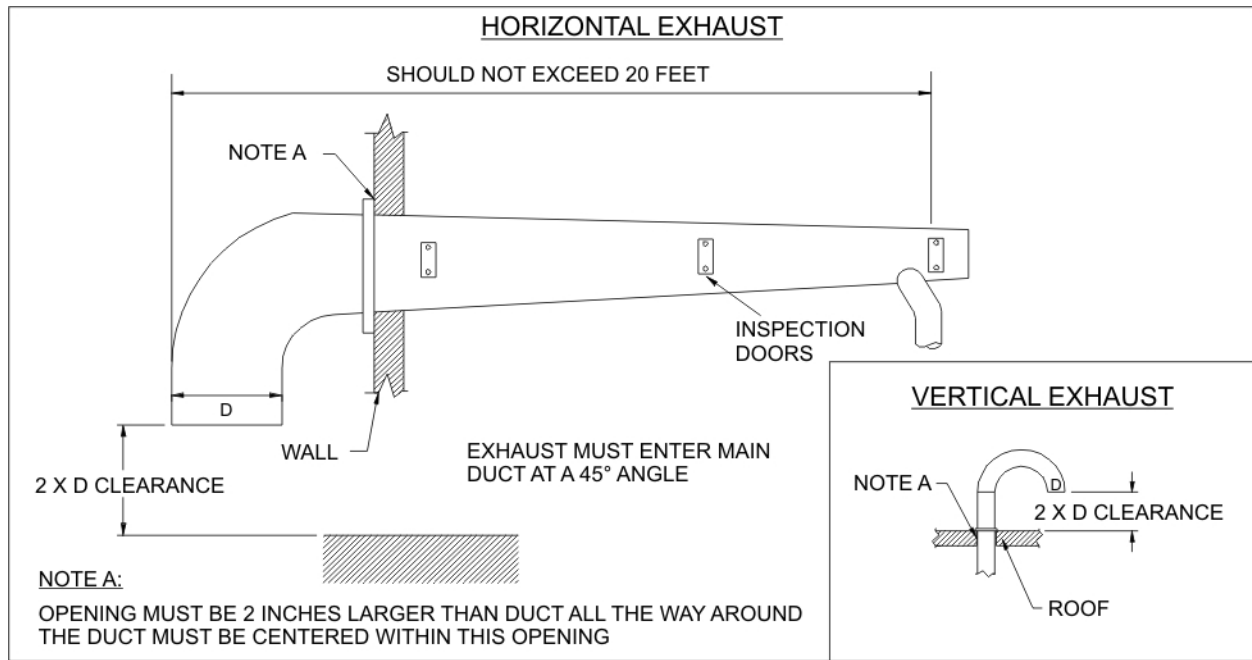


Figure 3.12: DE Series - Exhaust Detail

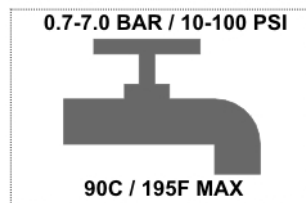


Figure 3.13: Fire Suppression Water Connection

If fire suppression activates, the blower will stop, the cylinder will rotate in the forward direction, and the emitters will lightly mist the goods until the temperature drops to a safe level.

To avoid fires, keep the equipment clean, as detailed elsewhere in this manual, and always program cool down time. No cool down time, or stopping the machine before the cycle has completed can cause fires, as spontaneous combustion can occur in the drying cylinder.

WARNING: Do not store flammable materials near the dryer.

WARNING: Do not allow lint to accumulate in or around the dryer. Lint is highly flammable.

WARNING: Do not allow the exhaust or fresh air supply to be restricted or interrupted in any way.

3.8 Enclosure Requirements

It is recommended that the rear of the dryer be positioned no less than 2 feet (24 inches) from nearest obstruction (i.e., wall) for ease of installation, maintenance, and service. Bulkheads and

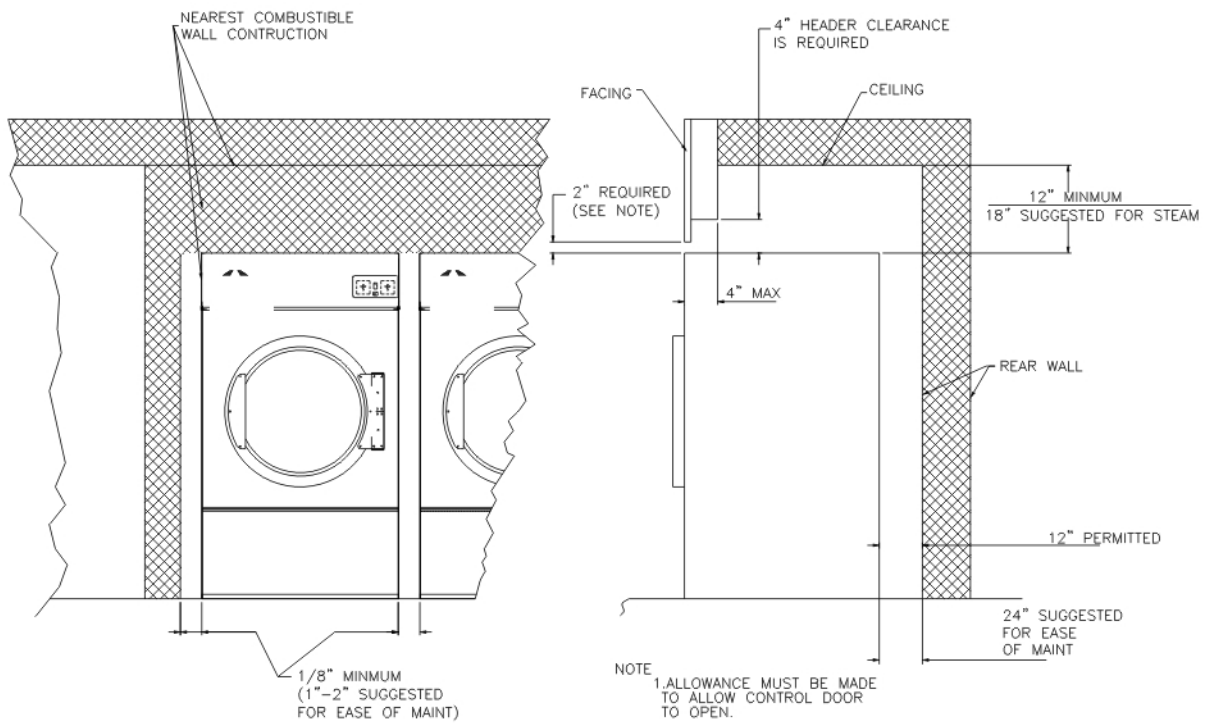


Figure 3.14: DE Series Bulkhead Installation Details

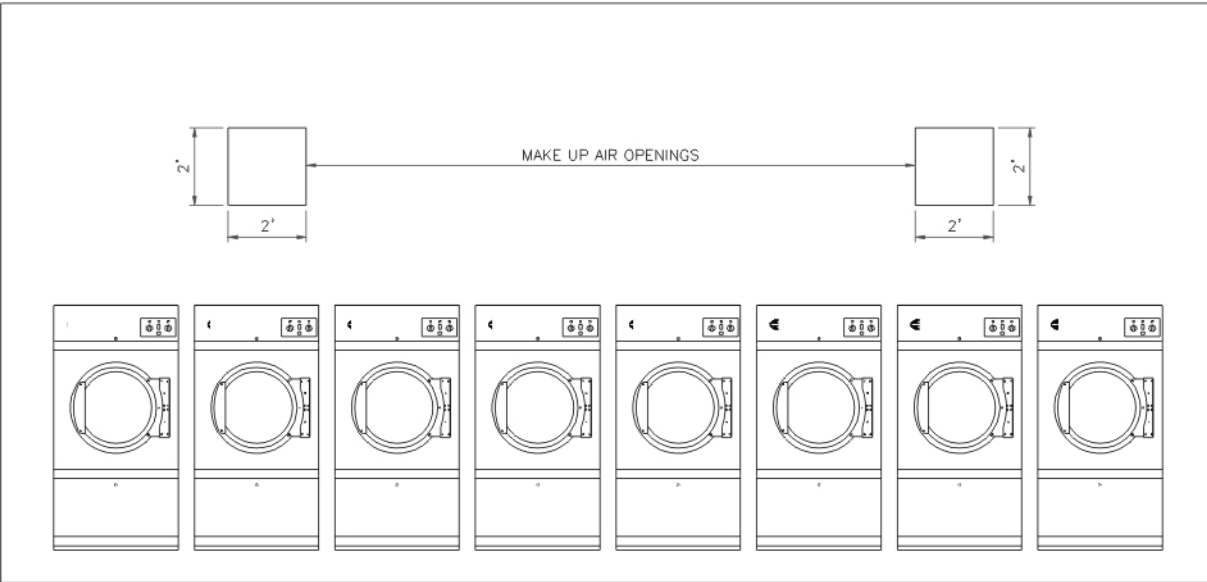


Figure 3.15: DE Series Make Up Air Detail

partitions should be made from noncombustible materials.

The clearance between the bulkhead header and the dryer must be a minimum of 4 inches and must not extend more than 4 inches to the rear of the dryer front. The bulkhead facing must not be closed in all the way to the top of the dryer. A 2 inch clearance is required.

Note: Bulkhead facing should not be installed until after dryer is in place. Ceiling area must be located a minimum of 12 inches above the top of the dryer.

Important: Even though a minimum of 12 inches is required, 18 inches or more is suggested, for steam dryers and especially in cases where sprinkler heads are over the dryers.

Note: When fire sprinkler systems are located above the dryers, a minimum of 18 inches above the dryer console (module) is suggested. Dryers may be positioned side wall to side wall however, 1 or 2 inches is suggested between dryers for ease of installation and maintenance. Allowances must be made for the opening and closing of the control and lint doors.

3.9 Fresh Air Requirements

When the dryer is operating, it draws in room air, heats it, passes this air through the drying cylinder and exhausts it out of the building. Therefore, the room air must be continually replenished from the outdoors.

If the make-up air is inadequate, drying time and drying efficiency will be adversely affected. Ignition problems and sail switch "fluttering" problems on gas dryers may result. The dryer will also likely suffer from premature component failure due to overheating.

Air supply (make-up air) must be given careful consideration to assure proper performance of each

dryer. An unrestricted source of air is necessary for each dryer. As a general rule, an unrestricted air entrance from the outdoors (atmosphere) of a minimum of 1 sq ft for the DE-30 and 50, 1-1/2 sq ft for the DE 75, 3 sq ft for the DE-120, and 4 sq ft for the DE-170 is required for each dryer. If registers or louvers are installed over the openings, then the area must be increased by at least one third. It is not necessary to have a separate make-up air opening for each dryer. Common make-up air openings are acceptable. However, they must be set up in such a manner that the make-up air is distributed equally to the dryers.

Allowances must be made for remote or constricting passageways or where dryers are located at excessive altitudes or predominantly low-pressure areas.

Note: Avoid locating the exhaust next to the fresh air supply intake.

Chapter 4

Operation

The following items should be checked before attempting to operate the dryer:

1. Read and follow caution, warning and direction labels attached to the dryer.
2. Check incoming supply voltage to be sure that it is the same as indicated on the dryer serial decal.
3. GAS MODELS – check to assure that the dryer is connected to the type of gas indicated on the dryer serial decal.
4. GAS MODELS – the sail switch damper assembly was installed and adjusted at the factory prior to shipping. However, each sail switch adjustment must be checked to assure that this important safety control is functioning.
5. GAS MODELS – be sure that ALL gas shut-off valves are in the open position.
6. Be sure ALL back panels (guards) and electric box covers have been replaced.
7. Check ALL service doors to assure that they are closed and secured in place.
8. Be sure lint drawer is securely in place.

NOTE: LINT DRAWER/DOOR MUST BE ALL THE WAY IN PLACE TO ACTIVATE SAFETY SWITCH OTHERWISE THE DRYER WILL NOT START.

9. Rotate the drying cylinder by hand to be sure it moves freely.
10. Check bolts, nuts, screws, terminals, and fittings for security.
11. STEAM MODELS – check to insure air supply (70-90 psi) is on to the dryer (DE-120, DE-170 only).
12. STEAM MODELS – check to insure ALL steam shut-off valves are open.
13. STEAM MODELS, DE-120 & DE-170 – check steam damper operation.
14. Check bearing set screws to insure they are ALL tight.

ALL dryers are thoroughly tested and inspected before leaving the factory. However, a pre-operational test should be performed before the dryer is placed into service. It is possible that adjustments have changed in transit or due to marginal location (installation) conditions.

1. Turn on electric power to the dryer.
2. Make sure the main door is closed and the lint drawer is securely in place.
3. Check the direction of the blower motor impeller (fan) to insure that impeller (fan) rotates in the direction shown on the directional decal. If the phasing is incorrect, reverse two (2) of the leads at L1, L2, or L3 of the power supply connections made to the dryer.

IMPORTANT: Dryer blower motor impeller / fan must turn in the direction indicated on the directional decal, otherwise dryer efficiency will drastically be reduced and premature component failure can result.

4.1 Heat Circuit Operation Test

1. Gas Models

- (a) When the dryer is first started (during initial start-up), the burner has a tendency not to ignite on the first attempt. This is because the gas supply piping is filled with air, so it may take a few minutes for this air to be purged from the lines.
- (b) The dryer is equipped with a direct spark ignition (DSI) system which has internal diagnostics. If ignition is not established after the first attempt, the heat circuit DSI module will lock out until it is manually reset. To reset the DSI system, open and close main door and restart dryer (press the "ENTER/START" key).

NOTE: During the purging period, check to be sure that ALL gas shut-off valves are open.

- (c) Once ignition is established, a gas pressure test should be taken at the gas valve pressure tap of each dryer to assure that the water column pressure is correct and consistent.

NOTE: Water column pressure requirements (measured at the gas valve pressure tap): Natural gas: 3.5 to 4.0" water column. L.P. Gas: 10.5 to 11.0" water column.

2. Electric Models

- (a) Check the oven contactor(s) to insure that the electric oven is cycling properly.
- (b) Ensure all contactor and input power terminals are TIGHT! Loose connections will cause premature failure of switchgear components. Check these connections regularly after the machine is placed in operation.

3. Steam Models

- (a) Check to insure that steam damper is functioning properly.

- i. The steam damper should not "slam" (open or closed) when it reaches the end of (piston) travel. Additionally, the steam damper should not bind and/ or stop during travel. If either of these conditions occur, the flow control must be adjusted.

Make a complete operational check of ALL safety-related circuits (i.e., lint drawer switch, and sail switch on gas models).

IMPORTANT: The drying cylinder is treated with a protective coating. Tumble old clothes or material in the basket (tumbler), using a mild detergent to remove the protective coating.

Each dryer should be operated through one complete cycle to assure that no further adjustments are necessary and that ALL components are functioning properly.

Make a complete operational check of ALL operating controls.

1. Microprocessor controller (computer) programs/selections.
 - (a) Each microprocessor controller has been preprogrammed by the factory with the most commonly used program selections. A listing of factory programs is provided in the control manual, shipped with the machine. If computer program changes are required, refer to the control's programming manual which was shipped with the dryer.
2. Dual timer dryers check.
 - (a) Heating Timer
 - (b) Cool Down Timer
 - (c) Temperature Selection Switch

Note: You must program cool down time in order to start the dryer.

4.2 Operating Instructions

NOTE: Before attempting to start the dryer make sure that the main door is closed and the lint drawer is securely in place.

1. Microprocessor Dryer
 - (a) Clean lint filter.
 - (b) Open the front door for loading and close the front door.
 - (c) Choose a program, then push "START". The machine will start the operation when the program finishes.
2. Dual Timer Dryer
 - (a) Clean lint filter.

- (b) Select Heat Level:
 - i. No Heat
 - ii. Perm Press (150 F, 65 C)
 - iii. Low Heat (180 F, 80 C)
 - iv. High Heat (200 F, 93 C)
- (c) Turn Dry Time knob to desired time (at least 5 minutes or more).
- (d) Turn Cool Down knob to desired time (must be set, or dryer will not start).
- (e) Press Start button.

Chapter 5

Troubleshooting

5.1 No Heat

Familiarize yourself with the call for heat path as highlighted on the portion of the schematic, figure 5.3 on page 33, and the simplified flow chart shown in figure 5.1 on page 31. Figure 5.2 on page 32 has a troubleshooting flow chart which will enable you to quickly diagnose the problem and take corrective action. Before you begin your diagnostics, ensure that the machine is programmed for a temperature greater than room temperature (Microprocessor models) and is in good working order otherwise. For information on programming, see the programming manual which is included with each machine or available on the B&C Technologies website. If there is sparking from the ignitor but no ignition, check the incoming gas pressure and verify that the locally obtained main gas regulator has sufficient BTU capacity to supply the machine (Maxitrol 325-5AL for up to 300,000 BTU, 327-7L for up to 900,000 BTU). A chattering gas valve indicates improper line pressure, not a faulty gas valve. The following troubleshooting guide assumes that there is no sparking and no ignition fault lamp illumination.

5.2 Machine Will Not Start

Mechanical Timer Models

If the start button is pushed, but the machine won't start, refer to figure 5.6 on page 35 and check the following items:

1. Has cooldown time been added?
 - (a) The machine will not start unless cooldown time is added.
2. Is the Loading Door closed?
 - (a) Close the loading door.

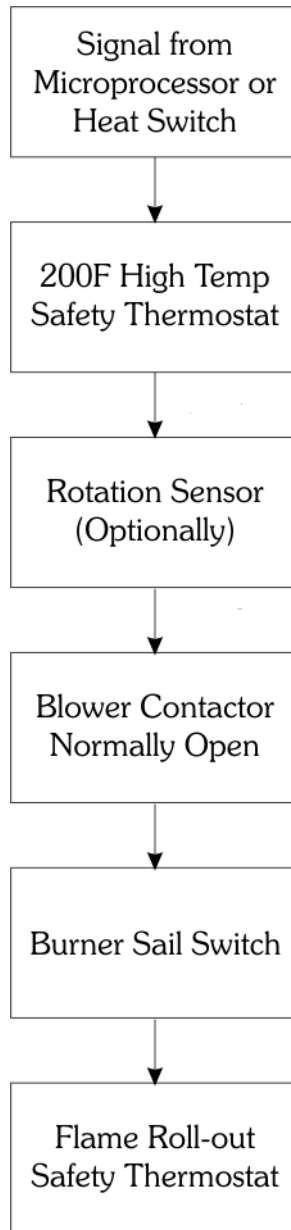
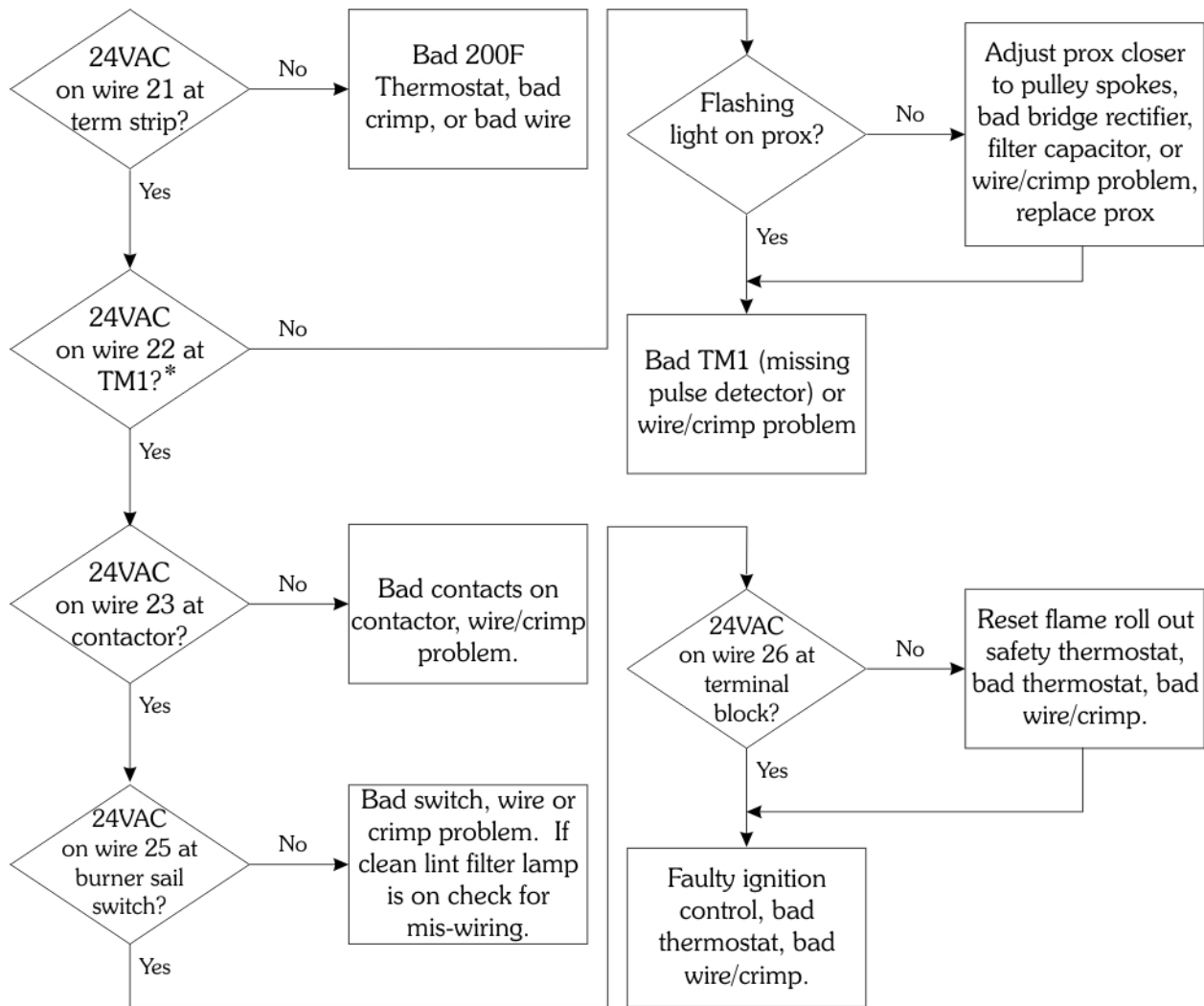


Figure 5.1: Simplified Call for Heat Path



* - TM1 is the missing pulse detector and is optional. The machine must be running and calling for heat in order to check TM1. If your machine isn't so equipped, skip

Figure 5.2: Detailed Call for Heat Path

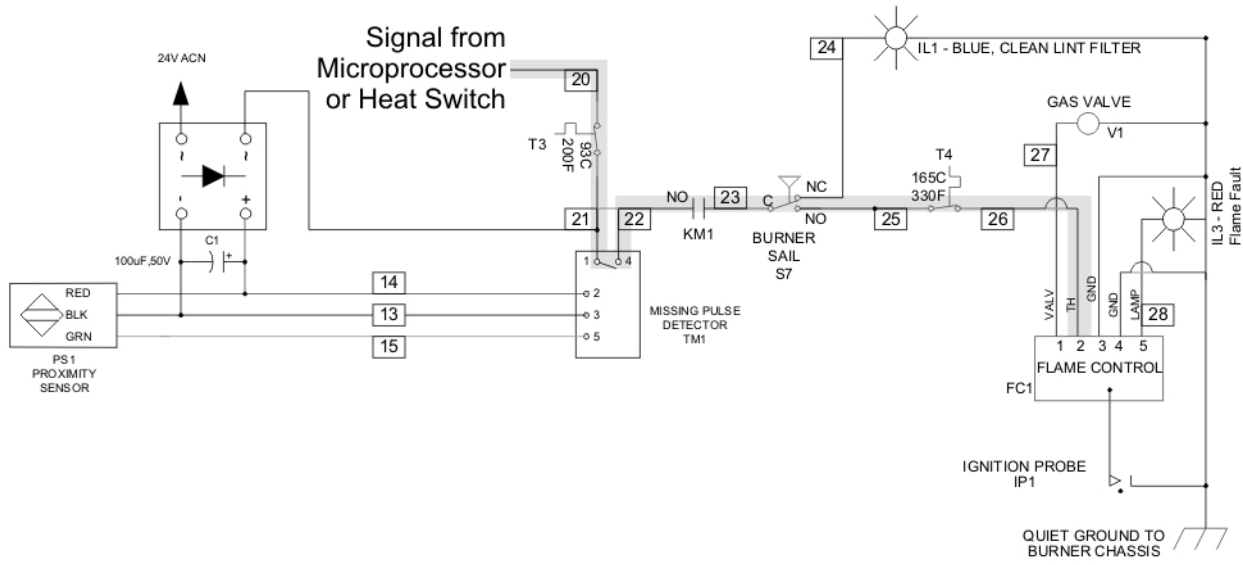


Figure 5.3: Call for Heat Path Schematic

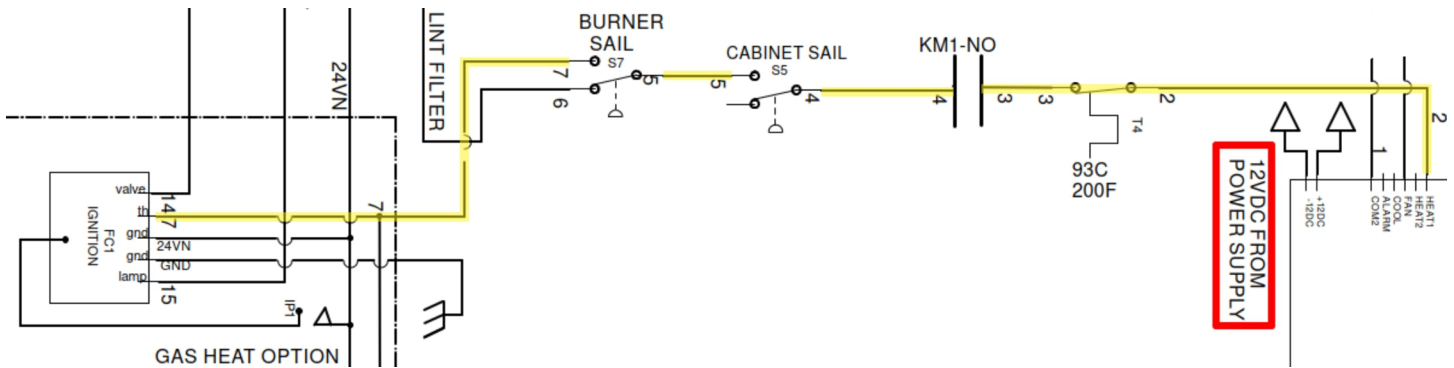


Figure 5.4: SimpliDri Call for Heat Path Schematic

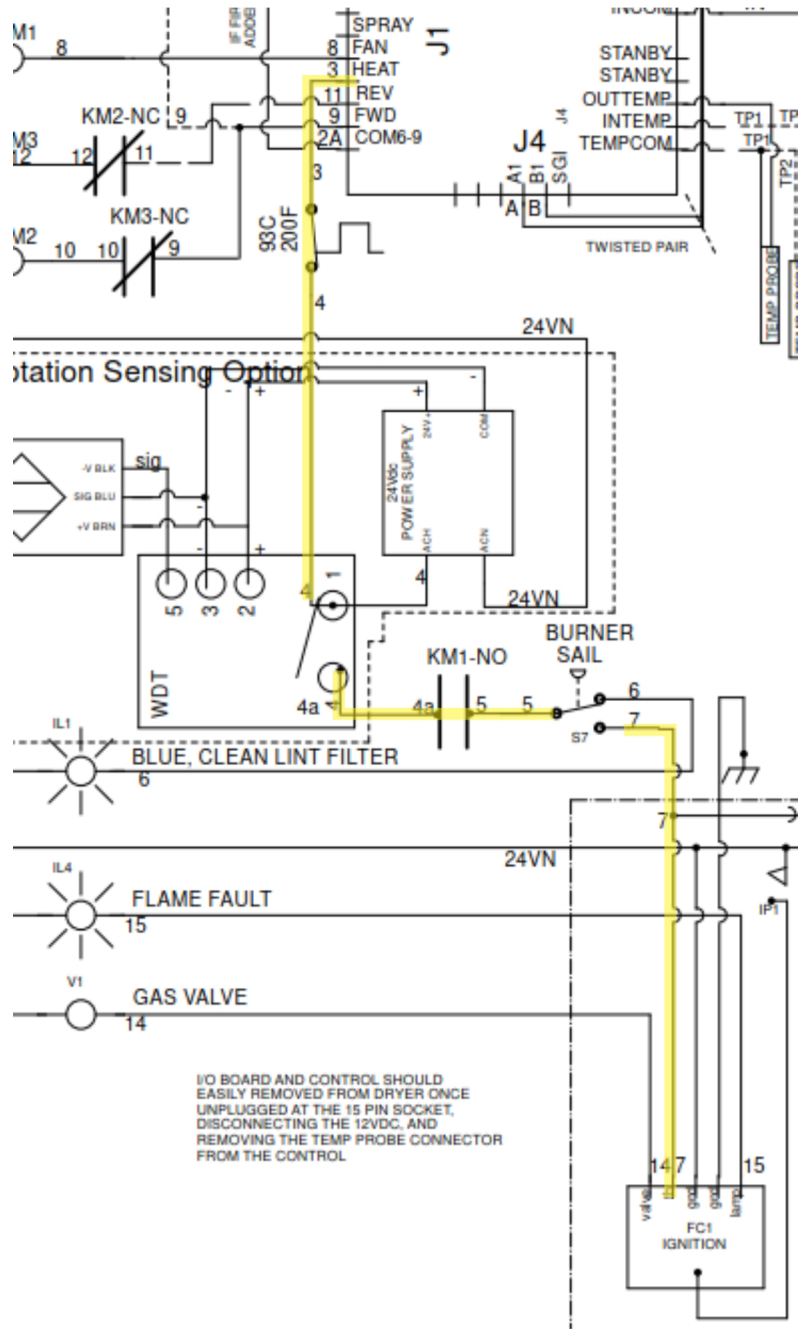


Figure 5.5: SimpliTouch Call for Heat Path Schematic

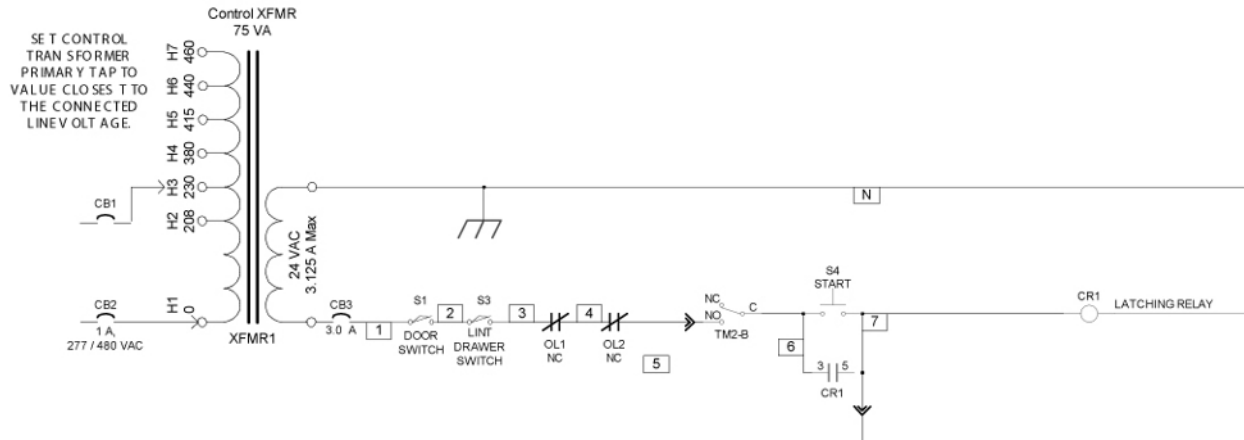


Figure 5.6: Mechanical Timer Start Path

- (b) Check the function of the door closed switch.
3. Is the lint door or drawer completely closed?
 - (a) Close the lint door or drawer.
 - (b) Check the function of the lint door/drawer switch.
4. Has the transformer primary or secondary circuit breaker tripped?
 - (a) Reset circuit breaker.
 - (b) Determine why the circuit breaker tripped.
5. Have the motor thermal overloads tripped?
 - (a) Disconnect the main power supply.
 - (b) Press reset buttons on one or both of the motor overloads located in the rear control panel.
6. Has the fire suppression system been activated (if so equipped)?
 - (a) If you see or smell smoke within the drying cylinder, call the fire department and leave the premises.
 - (b) Check the function of the fire suppression thermostat and relay.
7. Does the machine momentarily start when the button is pressed, but stop when the button is released?
 - (a) Check the function of CR1, latching relay.

To troubleshoot using the schematic, begin by measuring for 24VAC at wire one on the terminal strip located in the front control panel (always measure between the wire and a neutral wire, not ground). Refer to figure 5.6 on page 35 and follow the path from wire 1 to wire 7. Where the voltage is lost will indicate the problem component. For example, if you have voltage on wire 3

but not wire 5, there is a problem with the motor overloads or associated wiring.

Microprocessor Models

Refer to the Programming and Operation manual for the microprocessor for a complete list of error messages and remedies. Typically, the error messages displayed will lead directly to a solution to the problem.

Chapter 6

Maintenance

6.1 Warranty

For a copy of the commercial warranty covering your particular dryer(s), contact the distributor from whom you purchased the equipment and request dryer warranty form, or visit our website:

www.bandctech.com

NOTE: Whenever contacting B&C Technologies for warranty information, be sure to have the dryer(s) model number and serial number available so that your inquiry can be handled in an expeditious manner.

RETURNING WARRANTY PART(S)

ALL dryer or parts warranty claims or inquires should be addressed to your local dealer. To expedite processing, the following procedures must be followed:

1. No parts are to be returned to B&C Technologies without prior authorization (Return Material Authorization) from the factory.

NOTE: An RMA (Return Material Authorization) is valid for 60 days from date of issue.

- (a) The RMA issued by the factory as well as any other correspondence pertaining to the returned part(s) must be included inside the package with the failed merchandise.
2. Each part must be tagged with the following information:
 - (a) Model number and serial number of the dryer from which part was removed.
 - (b) Nature of failure (be specific).
 - (c) Date of dryer installation.
 - (d) Date of part failure.
3. The company returning the part(s) must clearly note the complete company name and address on the outside of the package as well as the RMA number.

4. ALL returns must be properly packaged to insure that they are not damaged in transit. Damage claims are the responsibility of the shipper.
IMPORTANT: No replacements, credits, or refunds will be issued for merchandise damaged in transit.
5. ALL returns should be shipped to B&C Technologies in such a manner that they are insured and a proof of delivery can be obtained by the sender.
6. Shipping charges are not the responsibility of B&C Technologies. ALL returns should be prepaid to the factory. Any C.O.D. or COLLECT returns will not be accepted.

IMPORTANT: NO replacements, credits, or refunds will be issued if the claim cannot be processed due to insufficient information.

6.2 Routine Maintenance

6.2.1 Cleaning

A program and/or schedule should be established for periodic inspection, cleaning and removal of lint from various areas of the dryer, as well as throughout the duct work system. The frequency of cleaning can best be determined from experience at each location. Maximum operating efficiency is dependent upon proper air circulation. The accumulation of lint can restrict this air flow. If the guidelines in this section are met, your dryer will provide many years of efficient, trouble-free, and most importantly, safe operation.

WARNING: LINT FROM MOST FABRICS IS HIGHLY COMBUSTIBLE. THE ACCUMULATION OF LINT CAN CREATE A POTENTIAL FIRE HAZARD.

WARNING: KEEP DRYER AREA CLEAR AND FREE FROM COMBUSTIBLE MATERIALS, GASOLINE AND OTHER FLAMMABLE VAPORS AND LIQUIDS.

NOTE: Suggested time intervals shown are for average usage which is considered 6 to 8 operational (running) hours per day.

CLEAN LINT FROM LINT DRAWER / SCREEN A MINIMUM OF EVERY THIRD OR FOURTH LOAD - EVERY LOAD FOR NEW GOODS.

NOTE: Frequency can best be determined at each location.

6.2.2 Maintenance Intervals

DAILY (beginning of each work shift)

Inspect lint screen and replace if torn.

WEEKLY

Clean lint accumulation from lint chamber, thermostat, and microprocessor temperature sensor (sensor bracket) area.

WARNING: TO AVOID THE HAZARD OF ELECTRICAL SHOCK, DISCONNECT ELECTRICAL SUPPLY.

STEAM DRYERS

Clean steam coil fins. Suggest using compressed air and a vacuum cleaner with brush attachment.

NOTE: When cleaning steam coil fins, be careful not to bend the fins. If fins are bent, straighten by using fin comb.

90 DAYS

Remove lint from around drying cylinder, drive motors, and surrounding areas. Remove lint from gas valve burner area with a dusting brush or vacuum cleaner attachment.

Tighten **all** electrical connections.

Remove lint accumulation from inside control box and at rear area behind control box.

Bearings should be lubricated. Use a lithium complex based grease EP II or equivalent.

6 MONTHS

Inspect and remove lint accumulation in customer furnished exhaust duct work system and from dryers internal exhaust ducting.

Impeller (fan /blower) Belts and drive belts should be examined. Cracked and/ or seriously frayed belts should be replaced. Tighten belts when necessary.

WARNING: THE ACCUMULATION OF LINT IN THE EXHAUST DUCT WORK CAN CREATE A POTENTIAL FIRE HAZARD.

WARNING: DO NOT OBSTRUCT THE FLOW OF COMBUSTION AND VENTILATION AIR. CHECK CUSTOMER FURNISHED BACK DRAFT DAMPERS IN EXHAUST DUCT WORK. INSPECT AND REMOVE ANY LINT ACCUMULATION WHICH CAN CAUSE DAMPER TO BIND OR STICK.

NOTE: A back draft damper that is sticking partially closed can result in slow drying and shut-down of the heat circuit safety switches or thermostats.

NOTE: When cleaning dryer cabinet(s), avoid using harsh abrasives. A product intended for the cleaning of appliances is recommended.

6.2.3 Adjustments

7 Days After Installation and Every 6 Months Thereafter

Inspect bolts, nuts, screws (bearing set screws), non-permanent gas connections (unions, shut-off valves, orifices, and grounding connections). Motor and drive belts should be examined. Cracked or seriously frayed belts should be replaced. Tighten loose V-belts when necessary. Complete

operational check of controls and valves. Complete operational check of ALL safety devices (door switch, lint drawer switch, sail switch, burner and high limit thermostats).

6.2.4 Lubrication

1. Impeller (fan/blower) shaft bearings should be lubricated every three (3) months. Use a lithium complex based grease EP II or equivalent.
2. Lubricate idler bearings and tumbler bearings. Use a lithium complex based grease EP II or equivalent.

6.3 Service & Parts

6.3.1 Service

Service must be performed by a qualified trained technician, service agency, or gas supplier. If service is required, contact the distributor from whom the equipment was purchased. If the distributor cannot be contacted or is unknown, contact B&C Technologies for a distributor in your area.

For technical assistance in the United States, contact B&C Technologies:

(850) 249-2222 Phone

(850) 249-2226 FAX

parts@bandctech.com

www.bandctech.com

NOTE: When contacting B&C Technologies be sure to supply the correct model number and serial number so that your inquiry is handled in an expeditious manner.

6.3.2 Parts

Replacement parts should be purchased from the distributor from whom the equipment was purchased. If the distributor cannot be contacted or is unknown, contact B&C Technologies for a distributor in your area. Parts may also be purchased directly from the factory

NOTE: When ordering replacement parts from a dealer or B&C Technologies, be sure to supply the correct model number and serial number so that your parts order can be processed in an expeditious manner.

Chapter 7

Decommissioning

In the event that the machine must be decommissioned, follow these steps:

1. Clean interior of machine, both basket and shell.
2. Disconnect electrical power.
 - (a) Shut of main power supply at the breaker box or main control panel.
 - (b) Do not attempt to disconnect power supply wires from power supply. Have a qualified electrician disconnect power to machine at its source.
3. Disconnect gas/steam supply.
4. Disconnect exhaust system.
5. Remove the machine from its foundation pad.
 - (a) Keep all panels in place to provide stability when moving the machine.
 - (b) Verify that door is closed and secure
 - (c) Place the machine on skid and bolt the frame to the skid. This will facilitate the removal of the machine on to a truck.
6. Recycle.

The manufacturer uses the highest quality material in their products so that those material may be recycled at the end of the product's service life.

Chapter 8

Appendix

8.1 Gas Conversion Technique

Follow the following procedure in order to convert a DE Series dryer from Natural Gas to Propane(LP gas) or vice versa:

8.1.1 Converting Gas Types, DE-30

Refer to figure 8.2 on page 44 for details.

IMPORTANT: When changing gas types, burner orifices/nozzles must also be changed. Refer to table 8.1 on page 45 for correct part numbers.

1. Turn off gas and electricity to machine.
2. Remove slotted cap (A), adjusting screw (B), and spring(C).
3. Install new spring (Propane/LP Gas spring is pink).
4. Install new adjusting screw, supplied with kit.
5. Remove fitting (D) and attach manometer adapter and manometer.
6. Restore gas and electricity.
7. With burner on, adjust screw (B) so that the manometer reads the pressure as recommended on the serial decal.
8. Turn off gas and electricity to machine.
9. Remove manometer and replace fitting (D).
10. Install replacement cap (A), supplied with kit.

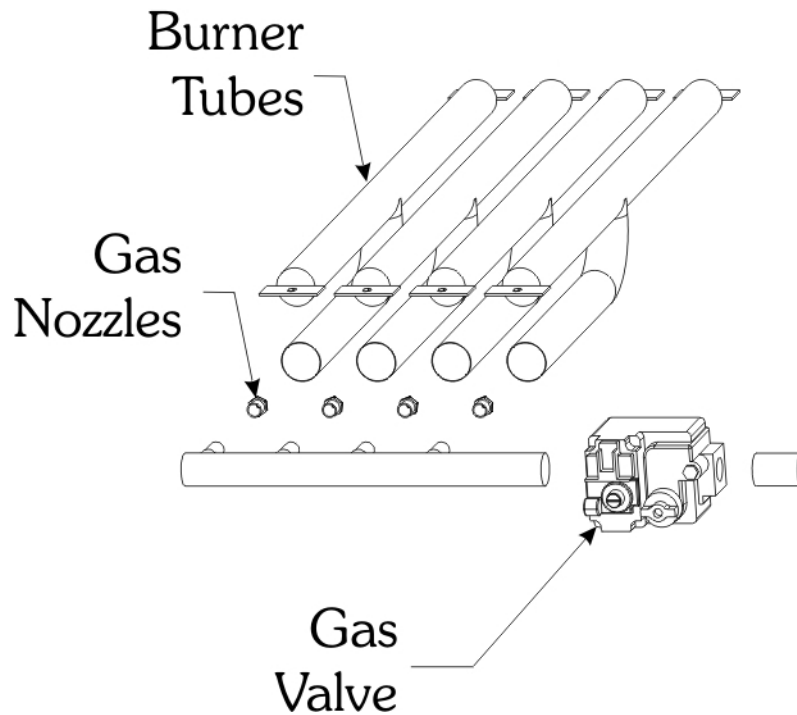


Figure 8.1: DE Series Burner Detail

11. Restore gas and electricity.
12. With burner operating, immediately check for leaks with soap solution.

8.1.2 Converting Gas Types, DE-50 and Larger

DE-50 and larger machines will require p/n 250-304 regulator kit for propane, or p/n 250-306 regulator kit for natural gas.

IMPORTANT: When changing gas types, burner orifices/nozzles must also be changed. Refer to table 8.1 on page 45 for correct part numbers.

1. Partially depress and turn gas cock dial to OFF.
2. Remove (refer to figure 8.3 on page 44):
 - (a) Two screws through regulator
 - (b) Regulator
 - (c) Gasket
3. Install Gasket, cover plate and 2 screws from conversion kit.
4. Turn gas cock to ON.
5. Leak test with soap solution while main burner is on.

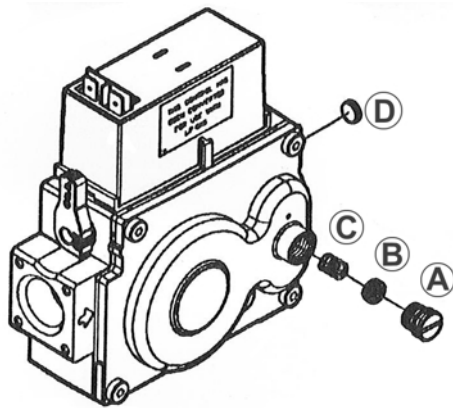


Figure 8.2: DE-30 Gas Valve Regulator Assembly

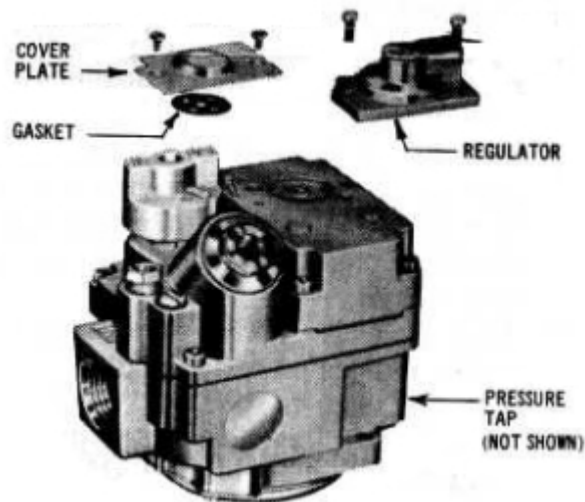


Figure 8.3: DE-50 and Larger Gas Valve Regulator Assembly

8.1.3 Regulator Adjustment

1. Turn gas cock OFF.
2. Remove pressure tap plug, located on the manifold side of the valve near the attaching pipe.
3. Attach the proper fitting and connect a manometer.
4. Turn gas cock ON, allow main burner to light.
5. If adjustment is needed (manifold pressure incorrect – check serial decal for proper pressure), remove regulator cap and turn adjusting screw to change the manifold pressure (clockwise to increase pressure, counter-clockwise to decrease pressure).
6. Turn gas cock OFF, remove manometer fitting and replace pressure tap plug.
7. Turn gas cock ON, allow main burner to light, and leak test with soap solution.

Table 8.1: DE Series Gas Nozzles

Model	qty	Natural Gas		Propane		Blank
		Standard	High Alt.	Standard	High Alt.	
DE-30	2	390-010	390-012	390-011	390-013	390-004
DE-50	3	390-006	390-014	390-018	390-015	390-004
DE-75	4	390-006	390-014	390-018	390-015	390-004
DE-120	3	390-016	390-001	390-019	390-017	390-005
DE-170	4	390-016	390-001	390-019	390-017	390-005