



SUPPLEMENTAL OPERATING INFORMATION FOR CANADIAN APPROVED CMS-J SERIES GRAIN DRYERS (MODELS CMS-320JG AND CMS-420JG)

INTRODUCTION

This bulletin contains additional information for the special fan-heater units installed onto Canadian approved models of CMS-J Series grain dryers.

These dryers have fan-heater units which are approved by the Canadian Gas Association to be in full accordance with the Canadian gas-fired equipment for drying farm crops, Standard CAN 1-38-77.

This new information supersedes some of the present material within the Operating Instructions for standard production type dryers.

Please read the information thoroughly and retain it within the standard dryer manual for future reference.

NOTE: Make sure to follow all of the other information and procedures within the manual, except for this special material.

Dryer installation must be made in accordance with Standard CAN 1-B149.1 or .2 and/or local codes.

DESCRIPTION OF CHANGES:

The main differences between fan-heater units installed on Canadian approved dryers and those on standard production type dryers, are described as follows:

- A. **APPEARANCE** - Canadian type units appear differently, primarily due to: (1) shape of the control box (2) externally mounted gas plumbing parts (3) revised fan guard and (4) conduit protection for external electrical wiring.

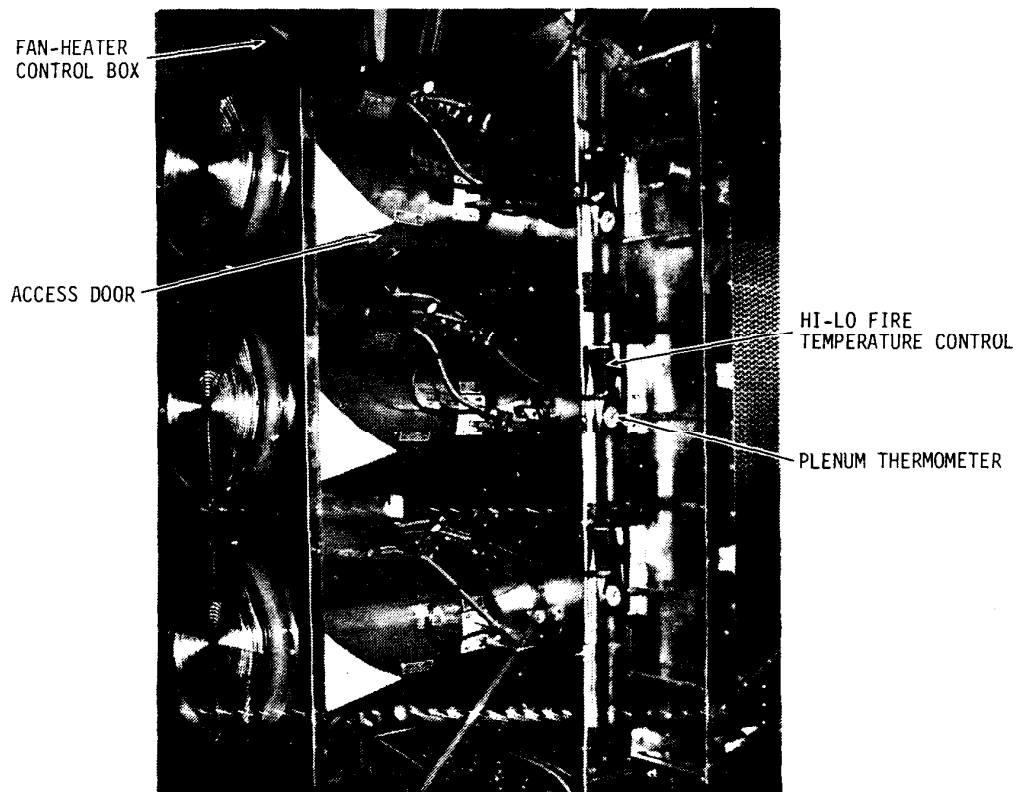


FIG. 1 - TYPICAL VIEW OF CANADIAN CMS-JG FAN-HEATERS



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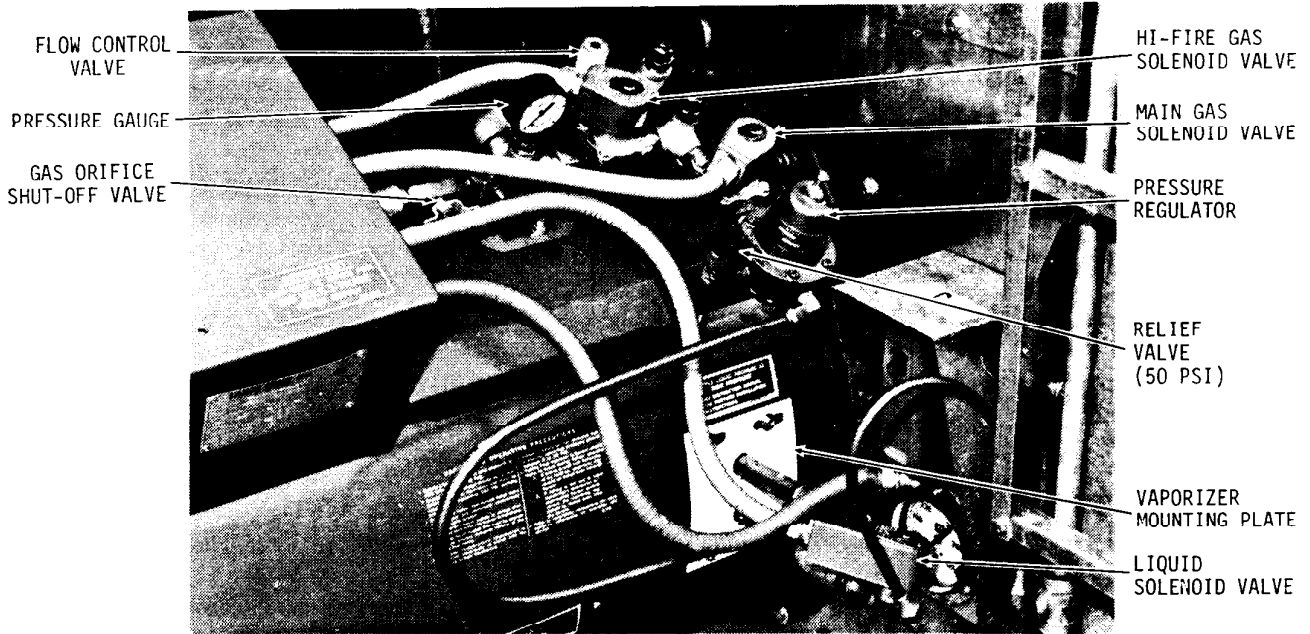


FIG. 2 - CANADIAN MODEL PLUMBING PARTS - TYPICAL VIEW
(Liquid Propane Model Shown)

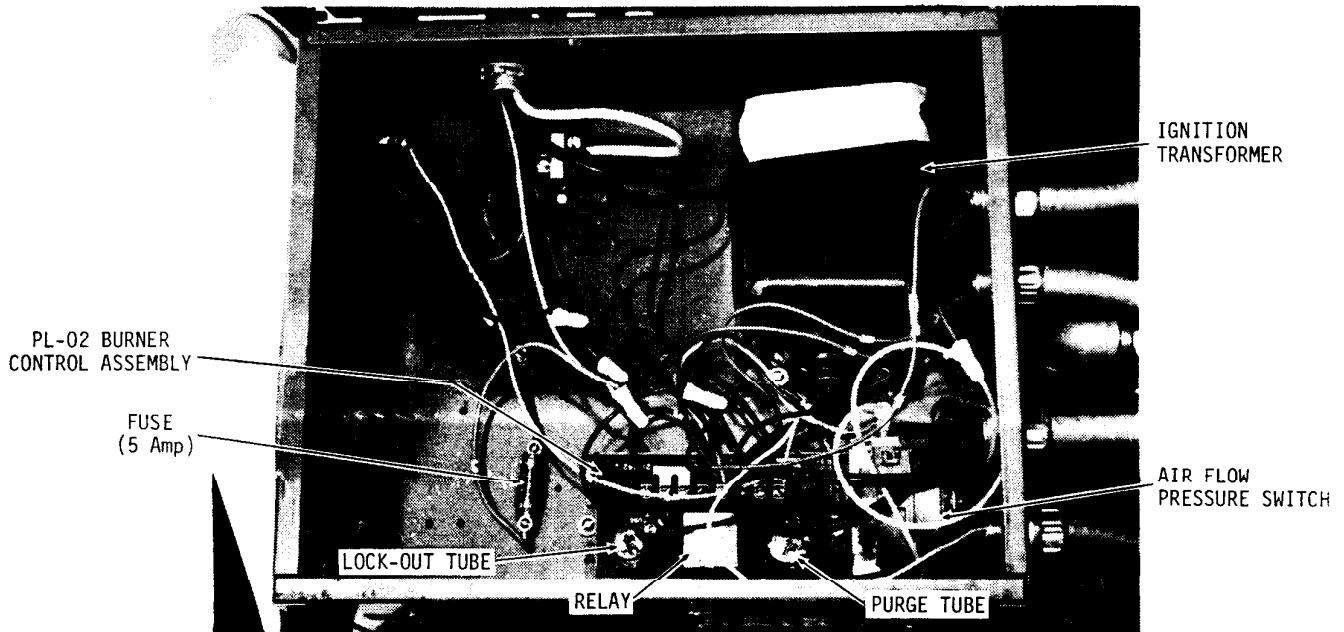


FIG. 3 - CANADIAN MODEL CONTROL BOX - TYPICAL VIEW
(Single Phase 230 Volt Model Shown)

- B. HEATER ELECTRICAL CONTROL SYSTEM - All of the fan-heaters are equipped with the same design of heater control system; however, the Canadian units are provided with a 115 volt heater control circuit, whereas the standard production units have a 230 volt circuit.

The 115 volt heater circuit has an additional step-down transformer (on 3-phase models) and is equipped with several altered components (lower operating voltages) within the burner electrical and gas supply systems. These parts having the lower operating voltages are the purge tube, lock-out tube, relay tube, ignition transformer and the gas solenoid valves.

- C. GAS PLUMBING PARTS - The Canadian fan-heaters also have a hi-lo fire type of gas supply system, but are equipped with a different configuration of parts which are located outside of the control box.

Aside from appearance, the main differences on the Canadian units, are the use of an additional low pressure relief valve (50 psi) and the 115 volt gas solenoid valves with conduit protected wiring.

- D. HEATER HIGH LIMIT PROTECTION - On Canadian type fan-heaters, the burner high limit thermostat (used on standard production models) has been replaced by an air flow venturi and an air flow pressure differential switch. With this arrangement, the air flow venturi senses the air from the fan and causes the pressure switch to close, thereby proving minimum air flow rates before allowing the heater to operate.

NOTE: In addition, each air plenum chamber of the dryer is equipped with a high limit thermostat to monitor the drying air temperature. If any of these devices sense excessive heat, the dryer will automatically shut-down and have to be manually restarted.

DRYER INSPECTION

Although the fan-heater units are factory approved, as indicated by the CGA approval plate, in most Canadian provinces the complete dryer installation (including the electrical power supply system) will also have to be inspected and approved in the field by the appropriate regulatory agency. Authorities having jurisdiction should be consulted before installation is made.

FAN-HEATER APPLICATION CHART - CANADIAN TYPE		
Dryer Series	Dryer Model No.	Fan-Heater Model No.
CMS-J Series	CMS-320JG	U-524JCGHL
	CMS-420JG	U-724JCGHL

FUEL SYSTEM SPECIFICATIONS							
Fan-Heater Model No.	Burner Type	Burner Orifice Dia. (In.)	Gas Pressure Oper. Range	Lo-Fire Press. Setting	Supply Pressure	Burner Input - Btu/Hr.	
						Minimum Input	Maximum Input
U-524JCGHL & U-724JCGHL	LP	.187	5-30 psi	5 psi	180 psi	800,000 @ 5 psi	2,300,000 @ 30 psi
	PV	.187	5-20 psi	5 psi	30 psi	975,000 @ 5 psi	1,875,000 @ 20 psi
	N	.312	1-5 psi	1 psi	10 psi	975,000 @ 5 psi	1,875,000 @ 5 psi

RESTARTING AFTER SAFETY SHUT-DOWN

If the 115 volt PL-02 burner control shuts down the heater due to lack of fuel, or possible malfunction, the heater may be restarted as follows:

On all CMS-J Series dryers, the burner control will interrupt the dryer safety control circuit and cause the entire dryer to stop operating. To restart the dryer, allow the burner control to cool down for several minutes, then depress the START button.

WIRING DIAGRAMS

Figure 4 shows the new burner circuit wiring diagram for the Canadian CMS-JG with the 115 volt PL-02 burner control.

BURNER CONTROL - SEQUENCE OF CONTROL

The operating principle of the 115 volt PL-02 control is listed as follows (see wiring diagram):

1. Power is available to the burner control ONLY WHEN THE FAN IS OPERATING.

With the fan operating and the burner switch closed, power is transmitted from the indicated motor lead wires through the stepdown transformer (3-PH models only), fuse, air flow pressure switch, burner switch, and flame switch to supply power to P/L Terminals No. 2 and No. T, thereby energizing the heater elements within the purge and lock-out tubes.

2. After the purge tube has been energized for approximately 15 seconds, the purge tube contacts CLOSE the circuit between P/L Terminals No. 5 and No. 1 and energizes the control relay coil. As the relay coil becomes energized it supplies 115 volts to the ignition transformer and gas solenoid valves by CLOSING the relay contact points located between P/L Terminals No. 3 and No. T, thereby starting ignition spark and gas flow.
3. Shortly after the heater starts operating, the flame switch responds to burner heat and OPENS its contact points, thereby de-energizing the purge tube and lock-out tube heater element circuit. After the circuit becomes de-energized and the purge tube contacts reopen, a second set of closed contact points within the relay act to keep the relay coil energized to maintain heater operation.
4. The heater will operate on Hi-Fire with both gas solenoid valves energized until the hi-lo fire thermostat control opens its contacts and interrupts the circuit of the Hi-Fire gas solenoid valve.

When the thermostat control senses that additional heat is required and closes its contact points, the Hi-Fire gas solenoid valve will immediately open and repeat the ON-OFF cycle to maintain the desired heat.

5. If the heater fails to start operating, due to lack of fuel or possible malfunction, after the ignition transformer and gas solenoid valves are energized:
 - A. The flame switch remaining in its COLD (closed contacts) position will continue to energize the lock-out tube heater circuit.
 - B. After the lock-out heater has been energized for approximately 60 seconds, the lock-out tube contacts will OPEN and interrupt the circuit, thereby providing automatic shut-down.

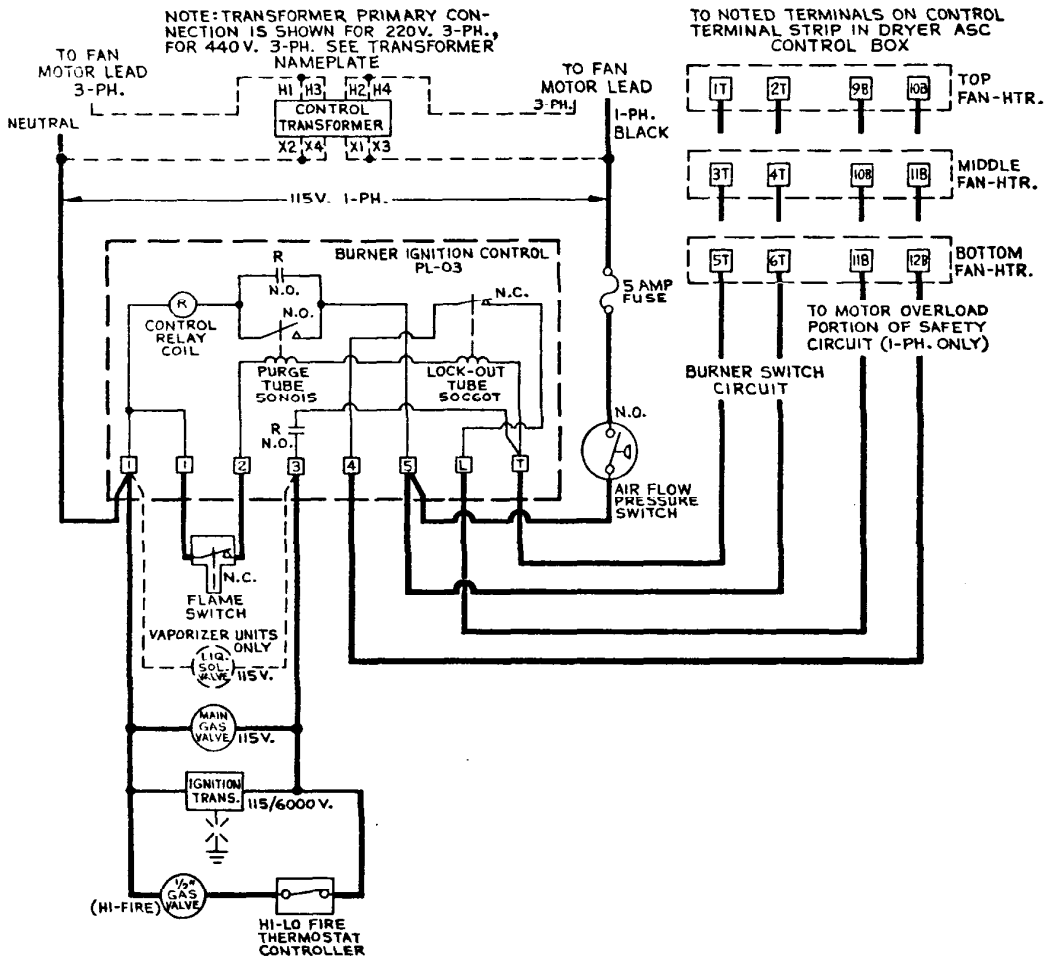


FIG. 4 - CANADIAN CMS-JG BURNER CONTROL WIRING DIAGRAM (U-24JCGHL Model Fan-Heaters)

CMS-320JG AND CMS-420JG
HEATER TROUBLE-ANALYSIS AND CHECK-OUT PROCEDURE

NOTE: Refer to wiring diagrams and parts list for identification of parts and electrical terminals.

The electrical circuit for all model heaters is 115 volts for both single and three phase models.



CAUTION: When making voltage tests with "live" circuits, be extremely careful --- follow established safety practices.

DO NOT ATTEMPT TO OPERATE THE HEATER FOR DRYING PURPOSES BY USING A JUMPER WIRE TO BY-PASS A DEFECTIVE COMPONENT.

HEATER - EQUIPPED WITH 115 VOLT PL-02 BURNER CONTROL

TROUBLE	CHECK-OUT PROCEDURE AND CORRECTION
<p>Burner will not fire with fan operating (control circuit malfunction).</p>	<ol style="list-style-type: none"> 1. Burner switch must be set to ON or AUTO. position. If operating in STAGED AUTOMATIC MODE, with burner switch on AUTO (bottom and middle switches only), check that burner timer is adjusted to the proper time setting. 2. Check for 115 volts across burner side of fuse located within fan-heater control box. Replace fuse if blown and determine cause of excess current (shorted wiring connections, etc.). 3. Check for 115 volts across P/L Terminals No. 1 and No. 5. If there is no voltage, check condition of wiring connections, also air flow pressure switch and its nylon tubes. 4. Check for proper voltage across No. 1 and No. T terminals. If there is no voltage, check burner switch circuit. If proper voltage exists with switch ON, but not with switch in AUTO, check burner relay (R_B). Replace R_B relay if defective.
<p>Burner will not fire - no gas pressure with fan operating at least 15 seconds (gas supply or fan-heater component malfunction)</p>	<ol style="list-style-type: none"> 1. Check gas supply. Also, check gas filter and gas line for possible obstructions or closed valves. Refill tank and service parts, as required. 2. Check for proper voltage across P/L Terminals No. 2 and No. T. If there is no voltage, check for a defective flame switch or improper wiring. 3. Check voltage across Terminals No. 2 and No. 3. If no voltage, substitute a new purge tube, lock-out tube and control circuit relay and repeat test. If these new parts do not correct the problem, replace the printed circuit base and repeat test. 4. If 115 volts is present across Terminals No. 2 and No. 3, but burner will not operate, check the following: <ol style="list-style-type: none"> a) Inspect gas solenoid valves (includes liquid valve on LP units) for defective coils or improper wiring. Replace valve or valve coil if valve will not open with proper voltage applied. b) Inspect for a defective high vapor thermostat (LP models only). Replace thermostat if its circuit is open (without overheated vapor).

HEATER - CONT'D.

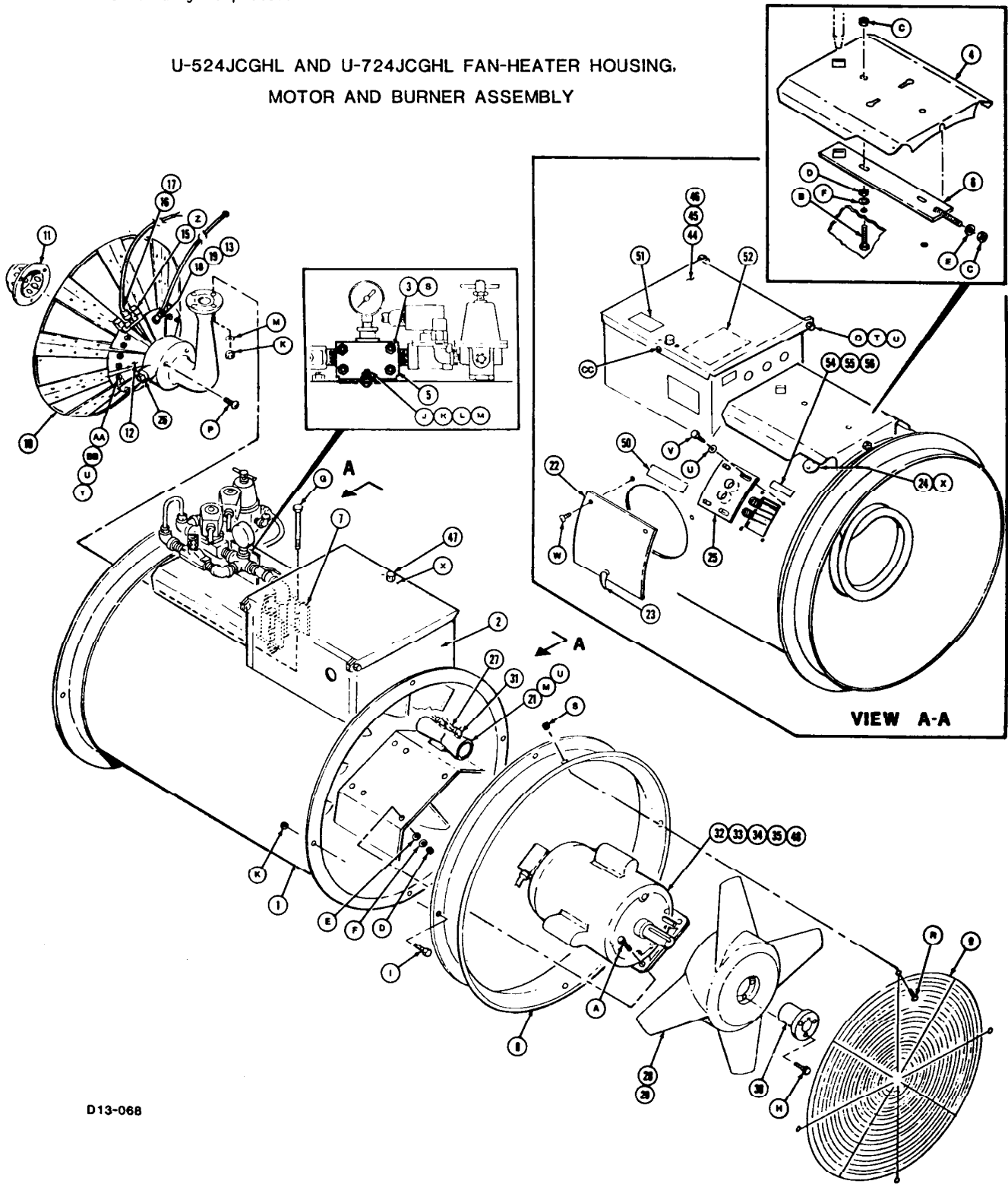
TROUBLE	CHECK-OUT PROCEDURE AND CORRECTION
<p>Burner fires - but operates only about one minute and dryer shuts down.</p>	<ol style="list-style-type: none"> 1. Wait for several minutes for the lock-out tube to cool down, then restart the dryer. Immediately after the burner starts operating, connect voltmeter leads across Terminals No. 2 and No. T and continue to observe the meter. When burner first comes ON (with a cold flame switch), the voltmeter should indicate 115 volts. After the flame switch becomes HOT and opens its contacts, the meter should read ZERO. If burner shuts down without the meter indicating that the contact points have opened, it indicates either a defective flame switch or insufficient heat exposure on the flame switch.
<p>Burner will not fire - but gauge shows gas pressure.</p>	<ol style="list-style-type: none"> 1. IGNITION TRANSFORMER - Check transformer for spark by removing ignition wire from transformer and holding an insulated handle screwdriver against the output terminal and 1/4" away from the case. There should be a strong spark. Check transformer wiring and connections. Replace the ignition transformer, if required. Make sure transformer case is properly grounded to heater housing. 2. IGNITOR PLUG - Check that ignition plug has a strong spark. Refer to "Specifications" heading for proper electrode setting. Inspect ignition wire and its connections. Make sure wire is not shorted or broken. Check ignitor plug for damaged electrodes or cracked insulator. Clean and service ignitor plug as described in manual. 3. FUEL SUPPLY - Inspect gas line piping, fuel strainer, burner venturi and orifice for possible obstructions. Clean parts as required.

FAN-HEATER PARTS

Replacement parts can be obtained from the local FARM FANS Representative or by contacting FARM FANS, INC., Indianapolis, Indiana 46203. SPECIFY COMPLETE MODEL NUMBER AND SERIAL NUMBER, WITH THE PART NUMBER.

Any parts or equipment sent to the factory must be shipped freight prepaid and be accompanied with Form RMF-03-5 fully completed.

U-524JCGHL AND U-724JCGHL FAN-HEATER HOUSING,
MOTOR AND BURNER ASSEMBLY



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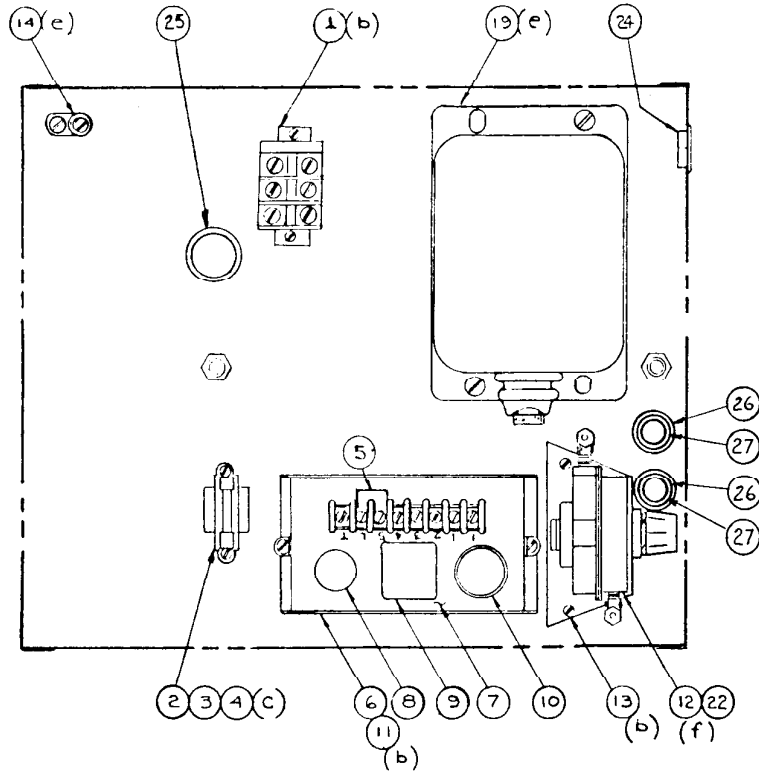
U-524JCGHL AND U-724JCGHL FAN-HEATER HOUSING, MOTOR AND BURNER ASSEMBLY PARTS

ITEM	PART NO.	DESCRIPTION	PROP. VAPOR	NAT. GAS	LIQUID PROP.
1	01-062	Welded Housing	-	-	-
2	36-095	Control Box Weldment	1	1	1
3	A11-117	"U"-Bolt - 1/4"-20 NC	2	2	2
4	21-046	Plumbing Mounting Base	1	1	1
5	25-052	Plumbing Anchor Bracket	1	1	1
6	54-018	Orifice Lock	1	1	1
7	51-004	Air Scoop	1	1	1
8	04 006	Venturi	1	1	1
9	14-027	Guard	1	1	1
10	39-035	Burner Weldment	1	1	1
11	39-003	Burner Cup	1	1	1
12	39-062	Closure Vane	7	7	7
13	39-048	Closure Vane-Ignitor	1	1	1
15	407-26-46	Flame Switch Adaption Bracket	1	1	1
16	26-009	Flame Switch	1	1	1
17	38-199	Flame Switch Cord Assembly	1	1	1
18	48-001	Ignitor Plug - 14MM	1	1	1
19	53-004	Ignitor Plug Nut - 14MM	1	1	1
20	38-003	Ignitor Wire Assembly	1	1	1
21	04-008A	Air Flow Venturi	1	1	1
22	11-028	Access Door	1	1	1
23	23-011	Access Door Handle	1	1	1
24	A25-865	Cover Plate	1	1	1
25	11-056	Vaporizer Hole Cover	1	1	-
26	----	Sq. Hd. Pipe Plug - 1/2" NPT	1	1	1
27	33-025-30	Nylon Tube	2	2	2
28	467-3	Blade - 5 HP Only	1AR	1AR	1AR
29	469-3	Blade - 7.5 HP Only	1AR	1AR	1AR
30	19-P29	Taper Lock Bushing	1	1	1
31	07-080	90° Male Elbow - 1/8" NPT, Brass	2	2	2
32	02-050-12FO-1	Motor - U524B-1, 5HP, 1PH.	1AR	1AR	1AR
33	02-050-32FO-1	Motor - U524B-3, 5HP, 3PH.	1AR	1AR	1AR
34	02-075-12FO-1	Motor - U724B-1, 7.5HP, 1PH.	1AR	1AR	1AR
35	02-075-32FO-1	Motor - U724B-3, 7.5HP, 3PH.	1AR	1AR	1AR
44	11-100	Control Box Cover	1	1	1
45	22-018-13 1/4	Control Box Cover Gasket - Sides	2	2	2
46	22-018-14 7/8	Control Box Cover Gasket - Ends	2	2	2
47	23-019	Spring Latch	1	1	1
48	510-40	Motor Shim	AR	AR	AR
50	29-170	Decal - "Warning - This Compartment"	1	1	1
51	29-082	Decal - "Warning - Disconnect Power"	1	1	1
53	420-1034-8	Decal - Burner Control Wiring Diagram	1	1	1
54	29-072	Decal - Propane Vapor	1	-	-
55	29-073	Decal - Natural Gas	-	1	-
56	29-071	Decal - Liquid Propane	-	-	1

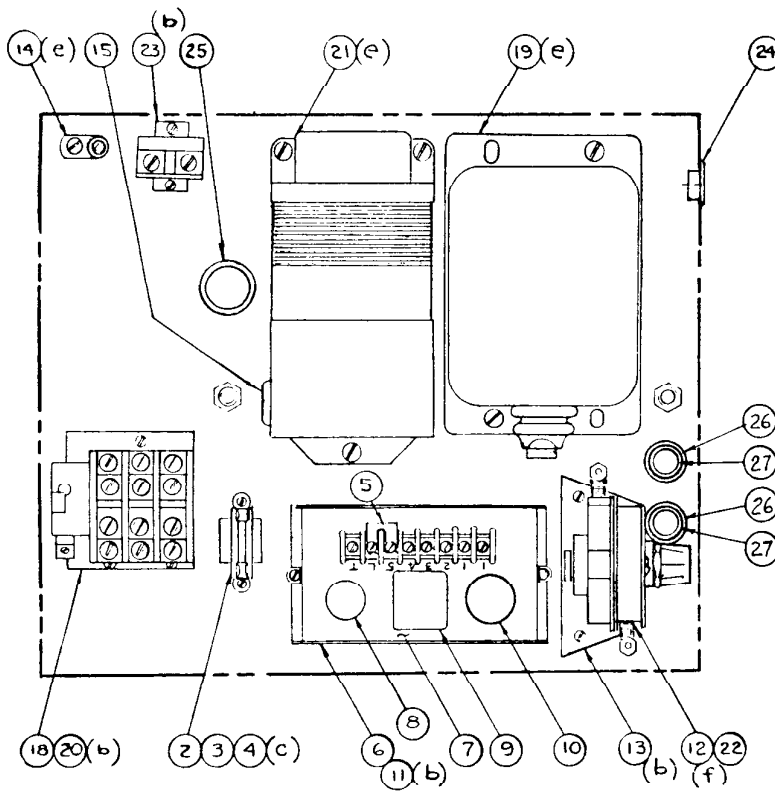
STANDARD HARDWARE ITEMS - PURCHASE LOCALLY

ITEM	DESCRIPTION	ITEM	DESCRIPTION
A	Bolt - 3/8"-16 NC x 1 1/2" Lg.	P	Machine Screw - 1/4"-20 NC x 5/8" Lg.
B	Bolt - 3/8"-16 NC x 1 3/4" Lg.	Q	Bolt - 1/4"-20 NC x 5/8" Lg.
C	Lock Nut - 3/8"-16 NC	R	Machine Screw - 1/4"-20 NC x 1/2" Lg.
D	Hex Nut - 3/8"-16 NC	S	Hex Nut - 1/4"-20 NC
E	Flat Washer - 3/8" Dia.	T	Lock Nut (Thin) - 1/4"-20 NC
F	Lock Washer - 3/8" Dia.	U	Flat Washer - 1/4" Dia.
G	Bolt - 5/16"-18 NC x 4 1/2" Lg.	V	Self Tap Screw - 1/4 x 3/4" Lg.
H	Bolt - 5/16"-18 NC x 1 1/2" Lg.	W	Self Tap Screw - No. 10 x 1/2" Lg.
I	Bolt - 5/16"-18 NC x 3/4" Lg.	X	Self Tap Screw - No. 8 x 3/8" Lg.
J	Carriage Bolt - 5/16"-18 NC x 3/4" Lg.	Y	Lock Washer - 1/4" Dia.
K	Hex Nut - 5/16"-18 NC	Z	Self Tap Screw - No. 6-32 NC x 3/8" Lg.
L	Flat Washer - 5/16" Dia.	AA	Machine Screw - 1/4"-20 NC x 1/2" Lg.
M	Lock Washer - 5/16" Dia.	BB	Hex Nut - Stainless Steel, 1/4"-20 NC
N	Machine Screw - 1/4"-20 NC x 3/4" Lg.	CC	Self Tap Screw - No. 8 x 3/8" Lg.

U-524JCGHL AND U-724JCGHL CONTROL BOX PARTS - 1 PH. 230 VOLTS AND 3 PH. 220 V. & 440 V.



230V. 1-PH.



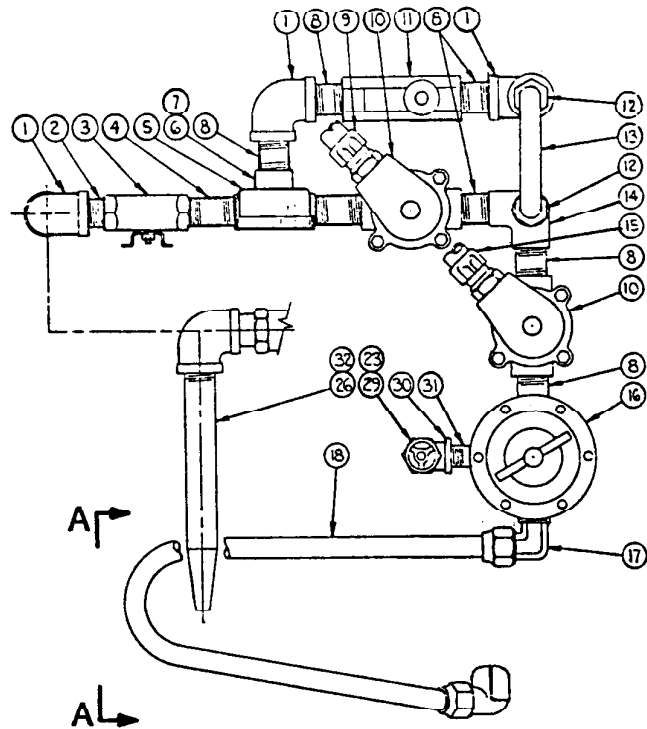
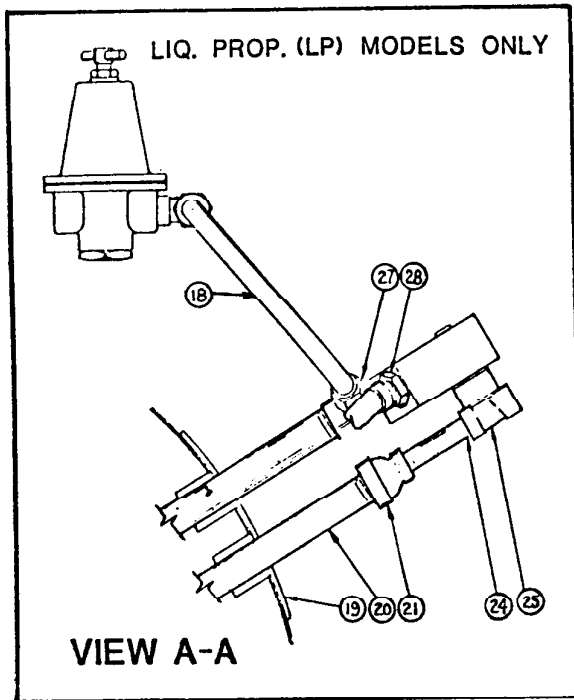
220V. & 440V. 3-PH.

U-524JCGHL AND U-724JCGHL CONTROL BOX PARTS - 1 PH. 230 VOLTS AND 3 PH. 220 V. & 440 V.

ITEM	PART NO.	DESCRIPTION	QUANTITY	
			1-PH. 230V.	3-PH. 220 & 440V.
1	45-014	Power Terminal Strip	1	-
2	344-21-37	Fuse Block	1	1
3	37-008	Fuse Block Spacer	1	1
4	344-21-50	Fuse - 5 Amp., 1/4" Dia. x 1 1/4" Lg., 250V.	1	1
5	38-217	Terminal Jumper - 2 Pos.	1	1
6	21-025-6S	Mounting Track	1	1
7	21-042	Printed Circuit Base	1	1
8	44-055	Lockout Tube - 50C60T	1	1
9	44-014	Relay - D.P.D.T., 115V.	1	1
10	44-045	Purge Tube - 50N015	1	1
11	65-010	Retainer Clip	2	2
12	26-054-25	Differential Pressure Switch (Set at 2 1/2" H ₂ O)	1	1
13	25-039	Mounting Bracket	1	1
14	53-005	Grounding Lug	1	1
15	406-16	Rubber Grommet	-	1
19	319-21-43	Ignition Transformer - 110V.	1	1
21	43-002	Transformer - 240/480V. to 120V., 2 KVA	-	1
22	07-080	90° Male Elbow - Brass, 1/8" NPT	2	2
23	45-033	Power Terminal Strip - Neutral	-	1
24	48-008	Hole Filler Plug - Plastic	AR	AR
25	48-024	Snap Bushing	1	1
26	48-023	Snap Bushing (Located in Control Box)	1	1
27	48-022	Snap Bushing (Located in Housing Wrap)	1	1

STANDARD HARDWARE ITEMS - PURCHASE LOCALLY

ITEM	DESCRIPTION
B	Self Tap Screw - No. 8 x 3/8" Lg.
C	Self Tap Screw - No. 6-32 x 1/2" Lg.
E	Self Tap Screw - No. 12 x 1/2" Lg.
F	Machine Screw - No. 10-32 x 3/8" Lg.



U-524JCGHL AND U-724JCGHL GAS PLUMBING PARTS - LP, PV AND NAT. GAS MODELS

ITEM	PART NO.	DESCRIPTION	REQ'D.		
			L.P.	P.V.	NAT.
1	-----	Elbow - 1/2 NPT x 90°	3	3	3
2	-----	Closed Nipple - 1/2 NPT	1	1	1
3	07-086	Ball Valve - 1/2 NPT	1	1	1
4	-----	Nipple - 1/2 NPT x 2" Long	2	2	2
5	344-41	Pressure Gauge - 0-30 PSI, 1/4 NPT Male	1	1	1
6	-----	Side Outlet Tee - 1/2 NPT	1	1	1
7	-----	Bushing - 1/2 NPT x 1/4 NPT	1	1	1
8	-----	Nipple - 1/2 NPT x 1-1/2" Long	6	6	6
9	38-276	Vapor Gas Valve Conduit Assembly	1	1	1
10	31-033	Solenoid Gas Valve - 1/2 NPT	2	2	2
11	31-009	Flow Control Valve - 1/2 NPT	1	1	1
12	07-083	External Flare Connector - 3/8"-45° Flare to 1/2 NPT	2	2	2
13	33-046	Copper Tube Assembly - 3/8"	1	1	1
14	-----	Elbow - 90° Side Outlet, 1/2 NPT	1	1	1
15	38-291	Vapor Gas Valve Conduit Assembly	1	1	1
16	42-002	Pressure Regulator - 1-50 PSIG, 1/2 NPT.	1	1	1
17	07-081	Elbow - 90°, 1/2"-45° Flare to 1/2 NPT Male	1	1	1
18	33-045	Copper Tube Assembly - 1/2"	1	-	-
19	61-003-5	Support Bracket Weldment	1	-	-
20	61-023L	Coil Type Vaporizer	1	-	-
21	-----	Reducing Coupling - 1/2 x 1/4 NPT, Sch. 80	1	-	-
23	-----	Relief Valve Cover	1	1	1
24	-----	Nipple - 1/4 NPT x 2" Long, Sch. 80	1	-	-
25	31-032	Solenoid Gas Valve - 1/4 NPT	1	-	-
26	32-028	Burner Orifice - 1/2 NPT (.187)	1	1	-
27	07-082	Elbow - 90°, 1/2"-45° Flare to 1/2 NPT Female	1	-	-
28	38-293	Liquid Gas Valve Conduit Assembly	1	-	-
29	31-022	Pressure Relief Valve - 1/4" NPT, 50 PSI	1	1	1
30	-----	Elbow - 1/4 NPT x 90°	1	1	1
31	-----	Nipple - 1/4 NPT x 1-1/2" Long	1	1	1
32	32-029	Burner Orifice - 1/2 NPT (.312)	-	-	1



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