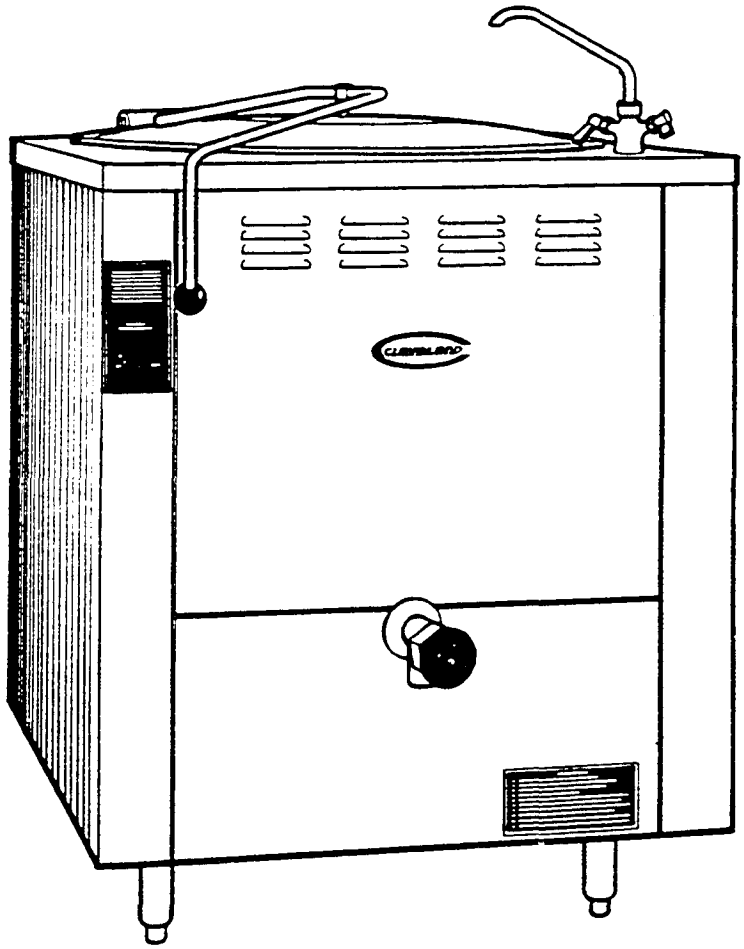
Repair Manual

Gas Kettles

Model KGM



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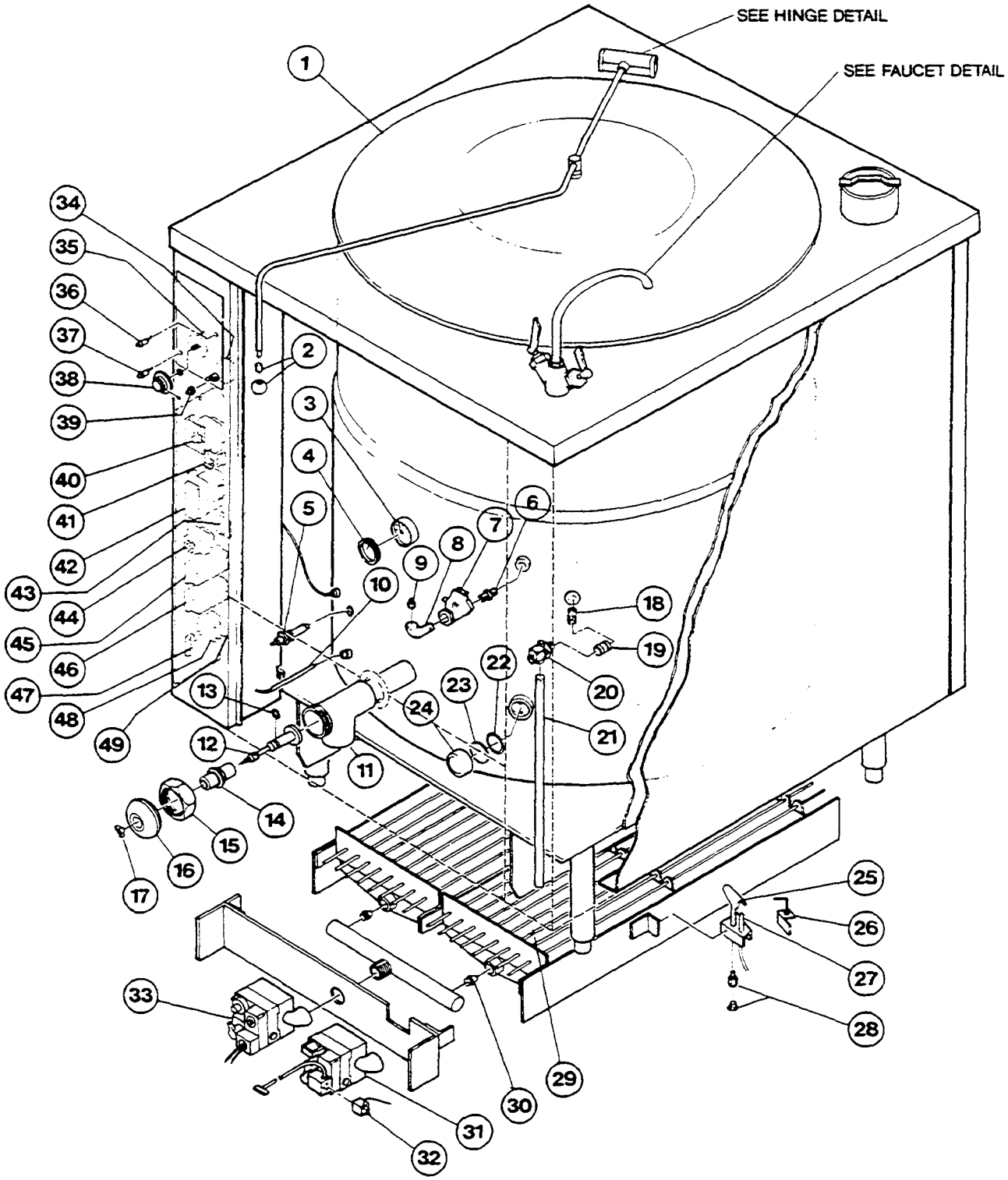
KET-08

MODEL KGM
OPERATING CONTROLS AND INDICATORS

For your better understanding and confidence, the following explanation of the control system on these kettles is offered.

Item No.	Description	Function
34	On-Off Toggle Switch (Main Body Dwg.)	Controls electric power to kettle.
38	Solid State Temperature Control Knob (Main Body Dwg.)	This control knob allows the operator to select kettle heat increments from Min. to Max.
37	Power Indicator Light (Green) (Main Body Dwg.)	When lit, indicates that there is electrical power to the kettle.
36	Low Water Indicator Light (Red) (Main Body Dwg.)	When lit. indicates that the burners have cut out and the unit requires water. (See jacket filling instructions).
3	Vacuum/Pressure Gauge (Main Body Dwg.)	Indicates steam pressure in PSI inside the steam jacket as well as vacuum.
20	Pressure Relief Valve (Main Body Dwg.)	In the unlikely event that there is an excess steam build-up in the jacket, this valve opens automatically to relieve this pressure.
23	Water Level Indicator (Main Body Dwg.)	This sight glass with "HI" and "LOW" (HI and LO) water level lines shows water level in the steam jacket.
31,33	Gas Control Valve (Main Body Dwg.)	Controls main gas supply to the kettle.

MODEL KGM
MAIN BODY



MODEL KGM - MAIN BODY

Item No.	Part No.	Description	Qty.
1	KE50142	Cover- 40 Gal. (see note')	1
	KE50143	Cover- 60 Gal. (see note*)	1
	KE50144	Cover- 80 Gal. (see note')	1
	KE50145	Cover-100 Gal. (see note*)	1
2	KE50151	Handle Knob	1
3	KE50429	Pressure Gauge (incl. Item no. 4)	1
4	SE50001	Pressure Gauge Glass Assy.	1
5	KE50556	Water Level Probe	1I
6	F105022	Hex Nipple	1
7	KE51014	Check Valve. 1/2"	1
8	Fl 00250	Street Elbow	1
9	F100151	Plug	1
10	KE00515	Thermistor	1
11-17	KE50219	1 1/2" Draw-Off Valve Assy,	1
	KE50972	2" Draw-Off Valve Assy.	1
	KE50973	3" Draw-Off Valve Assy	1
11	N/A	Body (1 1/2") (see note**)	1
	N/A	Body (2") (see note***)	1
	N/A	Body (3") (see note****)	1
12	SE50008	Stem (1 1/2")	1
	SE50009	Stem (2")	1
	SE50010	Stem (3")	1
13	FA00111	"0" Ring (1 1/2".2")	1
	FA00210	"0" Ring (3")	1
14	SE50011	Bonnet (1 1/2")	1
	SE50012	Bonnet (2")	1
	SE50013	Bonnet (3")	1
15	SE50014	Hex Nut 1 1/2")	1
	SE50015	Hex Nut (2")	1
	SE50016	Hex Nut (3")	1
16	SE50017	Knob(1'/2",2")	1
	SE50018	Knob (3")	1
17	SE50019	Wing Nut (1 1/2".2")	1
	SE50063	Knob Hex Nut (3")	1
18	F100598	Nipple	1
19	F105024	Coupling	1
20	KE51082	Safety Valve-25 P.S.I.	1
21	KE51087	Blow Down Pipe	1
22	FA00033	"0" Ring, Sight Glass	1
23	KE51053	Sight Glass	1
24	KE50955	Sight Glass Retaining Cover	1
25	KE51114	Pilot Burner	1
26	KE51160	Ignition Electrode	1
27	KE51111	Pilot Flame Sensor (Thermopile Type) (Manual Ignition)	1
	KE51159	Pilot Flame Sensor (Mercury Vapor Type) (Spark Ignition)	1

Item No.	Part No.	Description	Qty.
28	KE51116	Pilot Orifice Nat. Gas (.020")	1
	KE51162	Pilot Orifice LP. (.0145")	1
29	KE51066	Burner	2. 3. 4
30	KE51118	Burner Orifice Nat. Gas (0-2000 ft. elev. #43 drill)	2.3,4
	SE50065	Burner Orifice Nat. Gas (2000-4000 ft. elev #44 drill)	2.3.4
	SE50066	Burner Orifice Nat. Gas (4000-6000 ft. elev. #45 drill)	2.3.4
	KE51119	Burner Orifice L.P. (0-2000 ft. elev. #53 drill)	2. 3.4
	SK50342	Burner Orifice L.P. (2000-4000 ft. elev. #54 drill)	2.3.4
	SE50069	Burner Orifice L.P. (4000-6000 ft. elev #55 drill)	2.3.4
31	KE51155	Combination Control Valve N.G.-24 VAC (Spark Ignition)	1
	KE51163	Combination Control Valve L.P.-24 VAC (Spark Ignition)	1
32	KE51159	Pilot Flame Sensor (Mercury Vapor Type) (Spark Ignition)	1
33	KE51110	Combination Control Valve N.G.-120VAC (Manual Ignition)	1
	KE51161	Combination Control Valve •LP-120 VAC (Manual Ignition)	1
34	KE50504	Toggle Switch ON/OFF	1
35	KE50988	Potentiometer	1
36	KE50567	LE.D. Red	1
37	KE50568	L.E.D. Green	1
38	KE50569	Knob. Potentiometer	1
39	SK50062	Rubber Boot	1
40	KE51141	Transformer-120 /16V	
	KE50501	Transformer-240/16V	
41	KE50753	Relay. 12V DC	1
42	KE00459	Solid State Control Box	1
43	KE51138	Safety Thermostat	1
44	KE51164	Transformer-120/24V	1
	KE51165	Transformer-240/24V	1
45	KE51167	Pilot Re-Lite (Spark Ignition) (see note*****)	1
46	KE51168	Cycling Pilot Safety Timer (Spark Ignition) (L.P. Only) (see note*****)	1
47	KE51140	4/10 Amp Fuse (Manual Ignition)	1
	KE51169	1 1/2 Amp Fuse (Spark Ignition)	1
48	SK50055	Terminal Block Section	2
49	SK50054	Terminal Block End Section	1

note* Part number is different for full jacketed kettles. Please order by description.

note** Please order KE50219-1 1/2" Draw-Off Valve Assy (incl. Item No. 11-17)

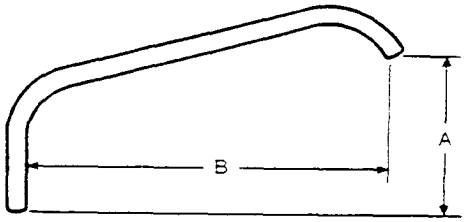
note*** Please order KE50972-2" Draw-Off Valve Assy. (incl. Item No. 11-17)

note****Please order KE50973-3" Draw-Off Valve Assy (incl. Item No. 11-17)

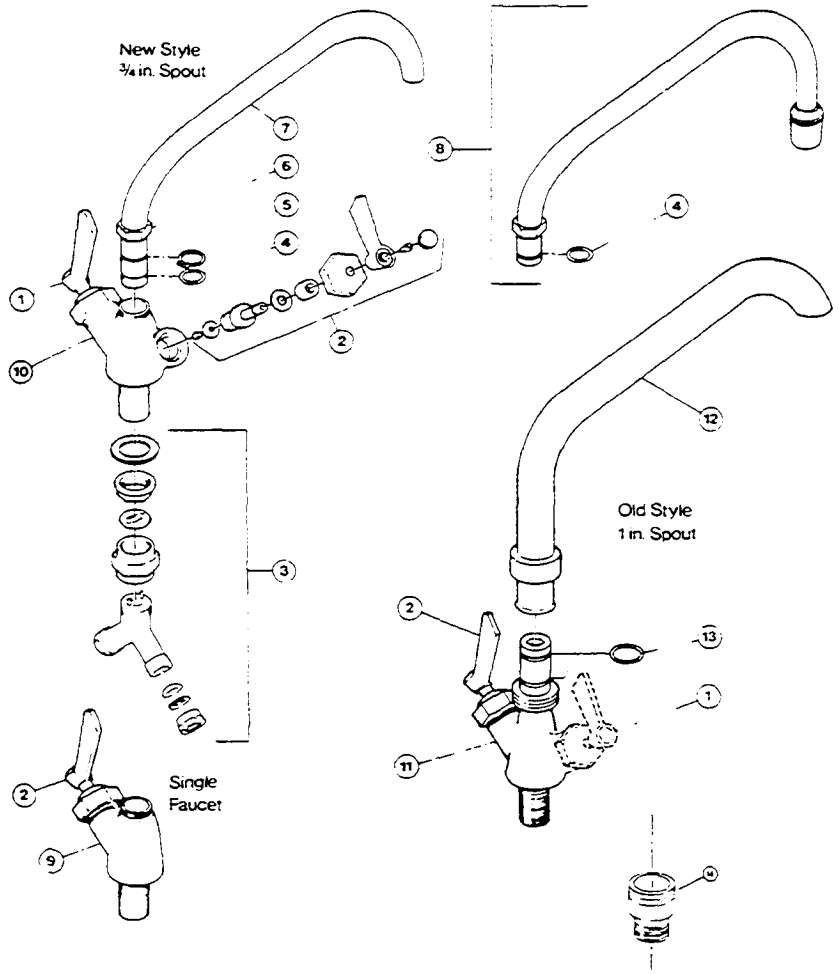
note***** Pilot Re-Lite and Cycling Pilot Safety Timer may be combined as one control cat. No. 50A22-1. Cleveland Part No. KE51405

KETTLE AND SKILLET FAUCET

Item No.	Part No.	Description	Qty.
1	SE50020	Hot Water Stem Assy.	1
2	SE50021	Cold Water Stem Assy.	1
3	SE50022	Yoke Connection Kit	1
4	FA00016	"O" Ring	1
5	FA95022	Retaining Ring	1
6	SE50064	Spout Nut	1
7	see chart	3/4" spout (please see 3/4" spout chart below)	1
8	N/A	3/4" spout with Aerator (please order Item No. 4, 5. 6. 7)	1
9	KE51401	Single Pantry Control Valve (incl. Item No. 2)	1
10	KE51403	Double Pantry Control Valve (incl, item No. 1. 2. 3)	1
11	N/A	Old Style Single Pantry Control Valve (please order Hem No. 4, 5. 6. 7, 9)	1
	N/A	Old Style Double Pantry Control Valve (please order item No. 4. 5. 6. 7. 10)	
12	N/A	1" Spout (please order Item No. 4. 5. 6. 7. 1 4)	1
13	FA00115	"O" Ring	2
14	SE50061	Adapter (to adapt new style spout to old style control valve)	1

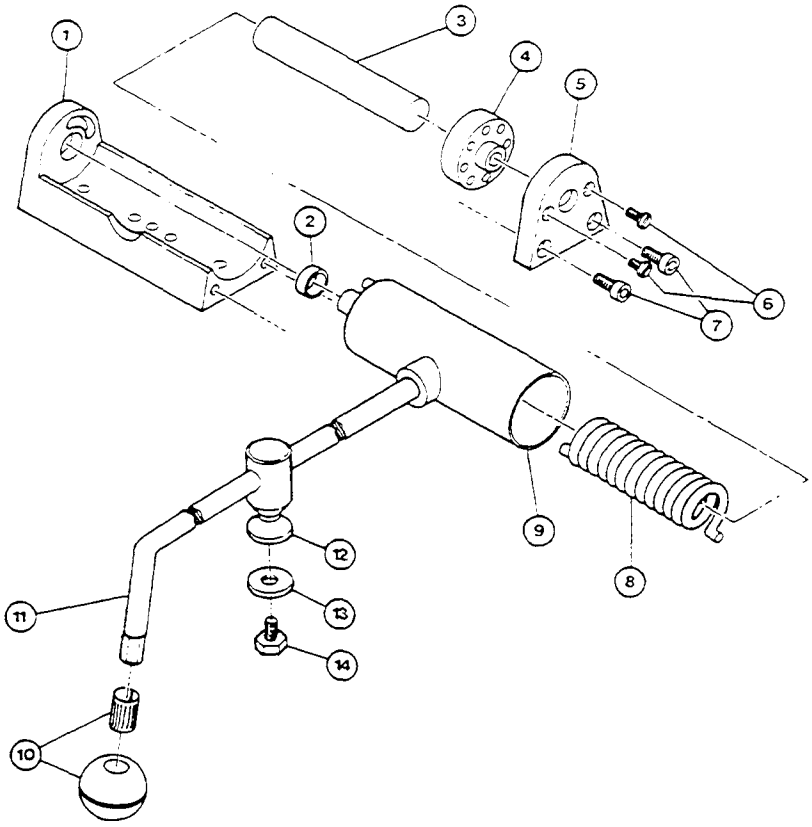


A	B	Part No.
4"	8"	KE50833
10"	9"	KE50832
6"	22-	KE50831
12 1/2"	14"	KE50830
10 3/4	14"	KE50829
5"	14"	KE50828
24-	9"	KE50827
20"	9"	KE50826
12 1/2"	9"	KE50825



Use only replacement parts which are factory supplied as to preserve the certification of Underwriters Laboratories, American Gas Association. Canadian Standards Association or Canadian Gas Association (as applicable). The use of other than factory supplied replacement pans will void the warranty.

HINGE ASSEMBLY FOR GAS KETTLES



Item No.	Part No.	Description	Qty.
1-9	KE00598	Hinge Assy. (40 gal. and under)	1
	KE00677	Hinge Assy. (60 gal. and over)	1
1	KE51218	Body Spring Assist Hinge	1
2	KE50824	Hinge Bearing	1
3	KE50823	Pin (Hinge)	1
4	KE50820	Insert Brass Adjust	1
5	KE50819	End Piece	1
6	FA11507	Screws Ad just	2
7	FA11284	Bolts End Block	2
8	KE50122	Spring (40 gal. and under)	1
	KE50121	Spring (60 gal. and over)	1
9	KE50821	Cylinder (40 gal. and under)	1
	KE00653	Cylinder (60 gal. and over)	1
10	KE50151	Knob Ball Type	1
11		Cover Handle (Specify Model)	1
12	KE00095	Lid Holder	1
13	FA30500	Washer Lid Holder	1
14	FA11223	Bolt Lid Holder	1

Use only replacement parts which are factory supplied as to preserve the certification of Underwriters Laboratories. American Gas Association. Canadian Standards Association or Canadian Gas Association (as applicable). The use of other than factory supplied replacement parts will void the warranty.

GAS KETTLE SERVICING GUIDE

This section contains servicing information intended for use by Authorized Service Personnel.

Note: If Fault Isolation Procedure is needed, be sure to start at step # 1.

A/ **PROBLEM:** Kettle is not heating at all. (Burners fail to ignite) (Kettle must be on and temperature control set).

Possible Causes

1. No power — either gas or electric.
2. Low water condition.
3. Defective on/off switch.
4. Defective 24 VAC transformer.
5. Defective 16 VAC transformer.
6. Defective safety thermostat.
7. Defective 12 VDC relay.
8. Defective low water probe.
9. Defective thermistor.
10. Defective potentiometer.
11. Defective or incorrectly adjusted control box.
12. Defective pilot flame sensor.
13. Defective pilot re-light.
14. Defective cycling pilot safety timer.
15. Defective or incorrectly adjusted gas control valve.
16. Blown 4/10 or 1 1/2 amp fuse.
17. Poor ground.
18. Incorrect spark gap.
19. Faulty wiring.

Fault Isolation Procedure

Step	Test	Result	Remedy
1.	Are both gas and electrical supplies on? (120 VAC at terminal block)	Yes	Go to step # 2
		No	Correct external power supply.
2.	Is red LED illuminated?	Yes	Follow kettle filling procedure.
		No	Go to step #3.
3.	Is green LED illuminated?	Yes	Go to step # 4.
		No	Go to step # 8.
4.	Is 24 VAC present at output of 24 V transformer?	Yes	Go to step # 14.
	Or if manual ignition, is 120 VAC present at gas control valve?	No	Go to step #5.
5.	Is there 12-16 VDC at circuit path #8?	Yes	Go to step #6.
	SEE NOTE * SEE NOTE**	No	Go to step #8.

6.	Is 120 VAC present across 12 VDC relay contacts?	Yes	Replace defective 12 VDC relay.
		No	Go to step #7.
7.	Is 120 VAC present across safety thermostat?	Yes	Replace defective safety thermostat.
		No	Replace defective 24 V transformer.
8.	Remove on/off switch wiring. Is there proper continuity when switch is activated?	Yes	Go to step #9.
		No	Replace defective on/off switch.
9.	Is there 16 VAC present across the output of the 16V transformer?	Yes	Go to step #10.
		No	Replace defective 16 V transformer.
10.	Is there ground to circuit path #7	Yes	Go to step #11.
	SEE NOTE*	No	Correct poor ground connection
11.	Is there continuity between ground and circuit path # 5?	Yes	Go to step # 12.
	SEE NOTE*	No	Replace defective low water cut-off probe.
12.	Measure continuity across the potentiometer. Does resistance change while turning the potentiometer knob?	Yes	Go to step #13.
		No	Replace defective potentiometer.
13.	While kettle is cold, remove edge connector from control box. Test resistance on edge connector between pins #2 and #7. Is there approx. 100,000 ohms?	Yes	Replace defective control box.
		No	Replace defective thermistor.
14.	It is assumed that there is proper incoming gas pressure of minimum 7" W.C. tor natural gas and 12" W.C. for LP gas. For manual ignition go to step # 15. For spark ignition natural gas go to step #19. For spark ignition LP. gas go to step # 25.		
15.	Is there 120 VAC across the 4/10 amp fuse?	Yes	Replace blown 4/10 amp -fuse.
		No	Go to step #16.

16.	Can a pilot be achieved?	Yes	Go to step #17.
		No	Refer to pilot adjustment procedure. If adjustment of pilot is unsuccessful, replace defective gas control valve.
17.	Do burners fail to ignite?	Yes	Go to step #18.
		No	Refer to "kettle heats too slowly" servicing guide.
18.	Does the pilot flame sensor (thermopile) generate 450-750 mV?	Yes	Replace defective gas control valve.
		No	Replace defective pilot flame sensor (thermopile).
19.	Can a pilot be achieved?	Yes	Go to step #24.
		No	Go to step #20.
20.	Is the pilot re-light generating a spark?	Yes	Go to step #23.
		No	Go to step #21.
21.	Is there 24 VAC across the 1 1/2 amp fuse?	Yes	Replace blown 1 1/2 amp fuse.
		No	Go to step #22.
22.	Is the spark gap *1/8*" ± 1/32"?	Yes	Replace defective pilot re-light.
		No	Adjust spark gap.
23.	Measure continuity across pilot flame sensor's pins #3 and #4. Is it a closed circuit?	Yes	Replace defective gas control valve.
		No	Replace defective pilot flame sensor.
24.	After pilot has been lit for 5 minutes, pull pilot flame sensor's connection off and quickly measure continuity between pins *#2* and #4. Is it a closed circuit at first and after pilot flame sensor cools down the circuit opens?	Yes No	Replace defective gas control valve. Replace defective pilot flame sensor.
25.	Can a pilot be achieved?	Yes	Go to step #31.
		No	Go to step #26.
26.	Is the pilot re-light generating a spark?	Yes	Go to step #29.
		No	Go to step #27.

27.	Is there 24 VAC across the 1 1/2 amp fuse?	Yes	Replace blown 1 1/2 amp fuse.
		No	Go to step #28.
28.	Is the spark gap 1/8" ± 1/32"	Yes	Go to step #29.
		No	Adjust spark gap.
29.	Turn power on/off switch to "off" for 5 minutes. This will zero cycling pilot safety timer. Then turn unit back on. Is a pilot now achieved?	Yes	If burners now do not ignite, go to step #31.
		No	Go to step #30.
30.	Measure continuity across pilot flame sensor's pins #3 and #4. Is it a closed circuit?	Yes	Replace either defective pilot re-light or defective gas control valve.
		No	Replace defective pilot flame sensor.
31.	After pilot has been lit for 5 minutes, pull pilot flame sensor's connection off and quickly measure continuity between pins #2 and #4. is it a closed circuit at first and after pilot flame sensor cools down the circuit opens?	Yes No	Replace defective gas control valve. Replace defective pilot flame sensor.

NOTE* Slightly pull off edge connector from control box. Edge connector must still contact with circuit paths. Pin numbers are marked on edge connector.

NOTE** Measure DC to ground.

B/ PROBLEM: Kettle heats too slowly or not hot enough (Note: Operating pressure is 10-12 psi).

Possible Causes

1. Loss of vacuum.
2. Low incoming gas pressure.
3. Defective safety thermostat.
4. Defective potentiometer.
5. Defective thermistor.
6. Defective control box.
7. Defective gas control valve.

Fault Isolation Procedure

Step	Test	Result	Remedy
1.	In a cold state, does the pressure guage read "vent air"?	Yes	Follow kettle venting procedure.
		No	Go to step #2.
2.	Do the burners shut off too early?	Yes	Go to step #3.
		No	Go to step #6.

3.	After the burners shut off, is the green LED still illuminated?	Yes	Replace defective safety thermostat.
		No	Go to step #4.
4.	Unplug the control box and measure the resistance across the potentiometer. Is the resistance approx. 0 ohms at max. and 50,000 ohms at min?	Yes	Go to step #5.
		No	Replace defective potentiometer.
5.	Remove thermistor from kettle and allow to cool. Remove edge connector from control box. Test resistance on edge connector between pins #2 and #7. Is there approx. 100,000 ohms? NOTE: Pin numbers are marked on edge connector.	Yes	Adjust or replace defective control box.
		No	Replace defective thermistor.
6.	Is there min. 7" W.C. for natural gas or 12" W.C. for LP gas incoming gas pressure?	Yes	Go to step #7
		No	Correct gas pressure.
7.	Is there 6" W.C. for natural gas or 11" W.C. for LP gas outgoing gas pressure?	Yes	If burners are not operating properly, check gas line, orifices, etc. for obstruction.
		No	Adjust or replace gas control valve.

C/ PROBLEM: Kettle is overheating.

Possible Causes

1. Defective thermistor
2. Defective potentiometer.
3. Defective 12 VDC relay
4. Defective control box.

Fault Isolation Procedures

Step	Test	Result	Remedy
1.	Do the burners shut off at all?	Yes	Go to step #3
		No	Go to step #2
2.	Does the green LED ever turn off?	Yes	Replace defective 12 VDC relay.
		No	Go to step #3.
3.	Unplug the control box and measure the resistance across the potentiometer. Is the resistance approx. 0 ohms at max. and 50,000 ohms at min.?	Yes	Go to step #4.
		No	Replace defective potentiometer.

4.	Remove thermistor from kettle and allow to cool. Remove edge connector from control box. Test resistance on edge connector between pins #2 and #7. Is there approx. 100,000 ohms?	Yes	Adjust or replace defective control box.
		No	Replace defective thermistor.

NOTE: Pin numbers are marked on edge connector.

D/ PROBLEM: Red LED remains illuminated even though water has been added.

Possible Causes

1. Defective low water probe.
2. Defective control box.
3. Faulty wiring.

Fault Isolation Procedure

Step	Test	Result	Remedy
1.	Remove wire from low water probe and ground the wire to the body of the unit. Does the red LED turn off?	Yes	Replace defective low water probe.
		No	Check for faulty wiring or poor connection. If this is all correct, replace control box.

GAS KETTLE RESERVOIR FILL PROCEDURES

The reservoir's water level must be maintained at the proper level. Under normal operating conditions, the sealed water reservoir should never require the addition of water. If the red "low water" light comes on during use, the water level has reached a critically low level. The low water protection control has automatically shut off the gas burners. The following procedure must be completed before further use:

1. Shut off power to the kettle.
2. Remove the front panel.
3. Unscrew and remove the 1/2" male NPT plug (only) located at the end of the check valve elbow.
4. Hold the safety valve pin out while adding distilled water through the check valve elbow using a funnel. Fill the water jacket until the water level is between the "HI" and "LO" markings on the sight gauge glass.
5. Place the plug into the elbow and carefully tighten. Do not over-tighten. Replace the front panel.
6. Restore power to the kettle.
7. The kettle must now be vented. Refer to the "Kettle Venting Instructions."

CAUTION: It is recommended that only distilled water be used when adding water to a partially filled water reservoir. Local tap water conditions may cause kettle damage which is not covered under warranty. If the water reservoir is completely empty, add formula* until the level is between the "HI" and "LO" marks on the sight gauge.

(See chart next page)

*Anti-freeze and rust inhibitor formula:		
Rust Inhibitor: 3 oz.	=	0.6%
Anti-Freeze: 64 oz.	(.5 gal.) =	12.4%
Tap Water: 448 oz.	(3.5 gal.) =	87.0%

GAS KETTLE VENTING INSTRUCTIONS

If the vacuum/pressure gauge reading is in the "vent air" zone, it means that air has entered the steam/water jacket, resulting in little or no vacuum. This reduces kettle efficiency by slowing its heating process. To remedy this situation, the following venting procedures should be followed:

1. With the temperature control knob set at number 9, heat the empty kettle until the vacuum / pressure gauge indicates 5-10 psi.
2. Release steam and air from the steam/water jacket by pulling out on the pin of the safety valve for approximately 10-15 seconds.

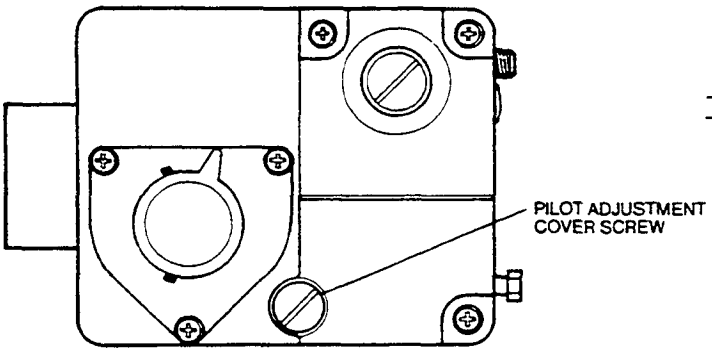
The kettle's steam/water jacket should now be free of air. At room temperature, the pressure gauge needle should rest in the green zone, indicating a vacuum in the kettle's jacket. To check the gauge for proper vacuum after venting, the temperature can be quickly reduced by filling the kettle with cold water.

If the kettle will not hold a vacuum, have a qualified service technician test for leaks at the water fill plug, the sight gauge, the safety valve, the probe, and the vacuum/pressure gauge fittings. We suggest mixing a 50/50 solution of liquid detergent and water while heating the kettle to at least 5 psi pressure. Then, shut off power to the kettle. The soapy solution should be applied to the suspected area while the gauge shows at least 5 psi pressure. Any bubbles which appear will indicate a leak.

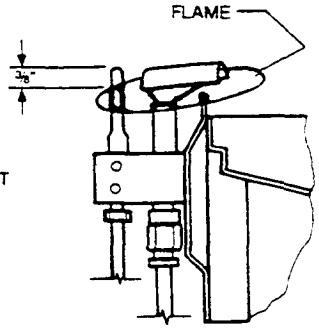
PILOT ADJUSTMENT

CAUTION: The following procedure, as well as all other work on gas controls, should be performed only by a qualified service technician.

1. Remove pilot adjustment cover screw.
2. Turn pilot flow adjustment screw clockwise to decrease or counterclockwise to increase flame (see below drawing for correct flame adjustment).
3. Replace cover screw.

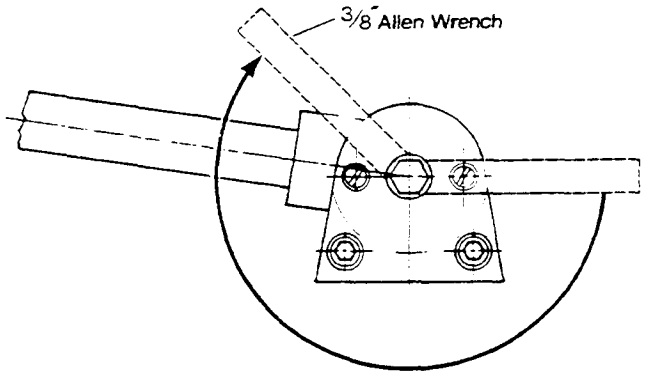


COMBINATION CONTROL VALVE



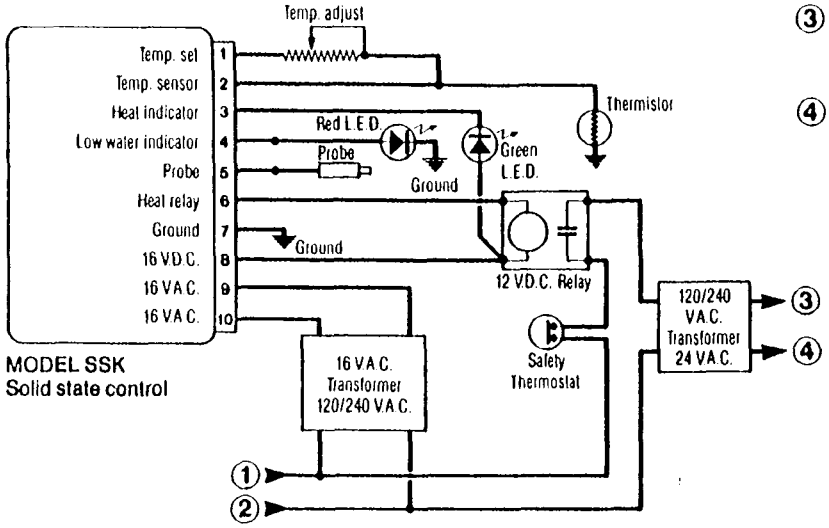
PILOT GENERATOR

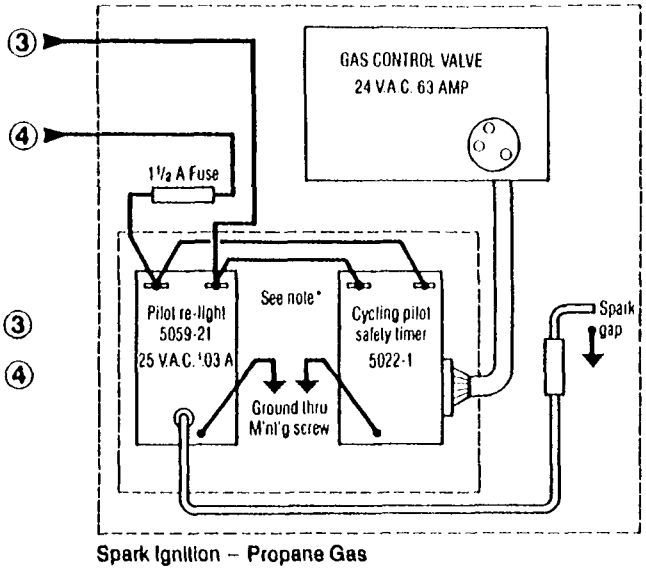
HINGE ADJUSTMENT INSTRUCTIONS



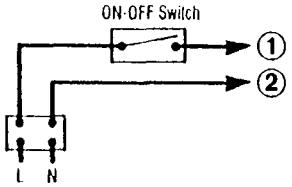
1. Insert 3/8" Allen wrench.
2. Turn clockwise to relieve tension on spring.
3 While tension is released remove one of the two slotted screws.
4. To prevent Allen wrench from springing back abruptly while the second slotted screw is removed, insert a pin (approximately 1/8") in the hole where the first slotted screw was removed from.
5. Remove second slotted screw.
6 While holding Allen wrench remove pin.
7. Turn Allen wrench clockwise to tighten or counter-clockwise to loosen tension to produce desired effect.
8. Re-insert pin in one of the two holes.
9. Tighten one slotted screw in the other hole (it may be necessary to turn Allen wrench slightly to align holes.)
10. Remove pin and repeat step number 9 for other slotted screw.

WIRING DIAGRAM FOR GAS FIRED STEAM JACKETED KETTLES

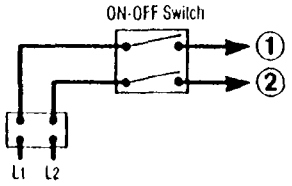




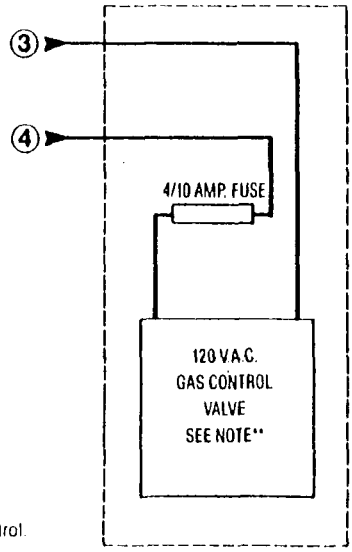
Spark Ignition – Propane Gas



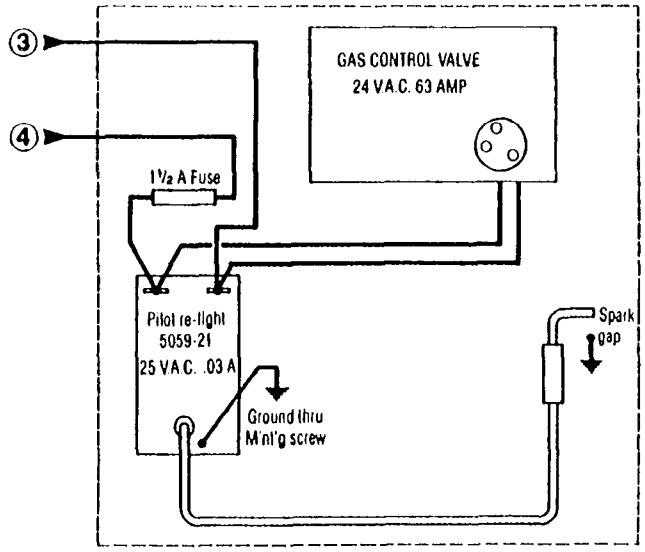
120 V.A.C.



240 V.A.C.



Manual Ignition – Natural or Propane Gas



Spark Ignition – Natural Gas

NOTE – Thermocouple is part of the gas control valve; therefore not shown on this electrical diagram

NOTE* – Pilot re-light and cycling pilot safety timer may be combined as one control. Cat. No. 50A22-1

NOTE** – 24 V.A.C. transformer not used with 120 V.A.C. gas control value