

# TROUBLESHOOTING LIGHT DUTY COMMERCIAL GAS HEATERS

CONDITION	CAUSE	REMEDY
Burner will not ignite	No Gas	Check with utility
	Thermostat set too low	Adjust temperature knob to a higher setting
	Trash in main burner orifice	Clean carefully—check source of trash and eliminate
	Gas cock not in proper position	Turn gas cock to “ON” position
	Inoperative Thermostat	Replace
Burner flame floats or lifts off of ports	High gas pressure	Check with utility—check control valve for correct manifold pressure
	Insufficient secondary air	Provide ventilation to the heater
	Heater not connected to flue	Provide and connect to proper flue
Burner flame yellow—lazy	Insufficient secondary air	Provide ventilation to the heater
	Low gas pressure	Check with utility—check control valve for correct manifold pressure
	Obstruction in main burner orifice	Carefully clean orifice—check for source of debris and eliminate
	Flueway clogged	Clean, check for source of obstruction and eliminate
	Heater not connected to vent system	Provide and connect to proper vent
Flame burns at orifice	Low gas pressure	Check with utility—check valve for proper manifold pressure
	Trash in main burner orifice	Carefully clean orifice—check for source of trash and eliminate
	Trash under thermostat valve seat	Change thermostat and install a drip leg in the gas line
	Inoperative thermostat	Replace
Pilot will not remain lit	Low gas pressure or high gas pressure	Check inlet gas pressure—check gas valve for proper manifold pressure
	Trash in pilot burner orifice	Clean orifice—check for source and eliminate
	Thermocouple loose or inoperative	Tighten connection and/or replace thermocouple
	Flueway clogged or obstructed	Clean, check for source of obstruction and eliminate
	Heater installed in a confined area	Provide adequate ventilation and combustion air to the heater
	Downdraft in vent system due to improper sizing or location	Replace with properly designed vent system

**TROUBLESHOOTING LIGHT DUTY COMMERCIAL GAS HEATERS (CONT'D)**

<b>CONDITION</b>	<b>CAUSE</b>	<b>REMEDY</b>
Insufficient hot water	Thermostat set too low	Adjust to higher setting
	Undersized heater	Install properly sized heater
	Leaking faucet or hot water leak	Repair faucet or leaks
	Low gas pressure	Check gas supply and manifold gas pressure
	Sediment or lime in tank	Drain and clean—water treatment may be necessary
	Heat loss through distribution system	Insulate piping to minimize heat loss
Drip from relief valve	Thermal expansion created by applying heat to a closed system	Remove obstruction creating the closed system (check valve) or install a properly sized diaphragm expansion tank
	Pressure surge from the operation of a solenoid valve	Install water hammer arrestor or shock absorber
	Excessive inlet water pressure	Install pressure reducing valve and lower inlet pressure
	Sediment or scale deposit in relief valve	Replace
Relief valve dumping large quantity of hot water	Improper thermostat calibration	Replace with a new thermostat
	Excessive water pressure	Install pressure reducing valve and lower inlet water pressure
Combustion odors	Heater installed in a confined area	Provide more ventilation and combustion air to heater
	Flueway clogged	Clean—check source of obstruction and correct
	Heater not connected to vent system	Provide and connect to properly designed vent system
	High gas pressure causing heater to overfire	Check inlet gas supply and manifold pressure—correct if necessary
Condensation	Flueway or vent clogged	Clean—check for source of obstruction and correct
	Heater installed in a confined area	Provide ventilation and combustion air to the area
	Heater not connected to flue or vent system	Provide and connect to properly designed vent system
	Undersized heater	Check usage of hot water and advise customer of model number of properly sized heater

# FLUE DAMPER MODELS

Flue Damper Assembly – Electrically operated device used to block air flow through heater to reduce heat loss during stand-by condition.

Hot Water Outlet

Compensating Thermostat with Hi-Limit – Primary control used for regulation of water temperature.

Ignition Module – Electronic device used to generate spark sequence required for main burner operation.

Transformer – Device used to step down incoming 120 volts to 24 volts for operation of intermittent ignition system.

Turbo Force Ring – Patented device placed in cold water inlet, inside the tank, to diffuse incoming water and create sweeping action of tank bottom to stir up sediment deposits.

Cold Water Inlet

Gas Supply – Supply line providing gas to control valve.

Gas Control Valve – Regulating device used to control gas flow to pilot and main burner.

Draft Hood – A device built into an appliance, or made a part of the flue or vent connector from an appliance, which is designed to (1) provide for the ready escape of the flue gases in the event of no draft, back draft, or stoppage beyond the draft hood; (2) prevent a back draft from entering the appliance; and (3) neutralize the effect of stack action from the chimney or gas vent upon the operation of the appliance.

T & P Relief Valve – A device applied to a water heater which will open to pass water or steam if excessive pressure or temperature occurs in the water heater tank.

Discharge Pipe – A pipe used to carry water away from heater which is released from the T & P valve.

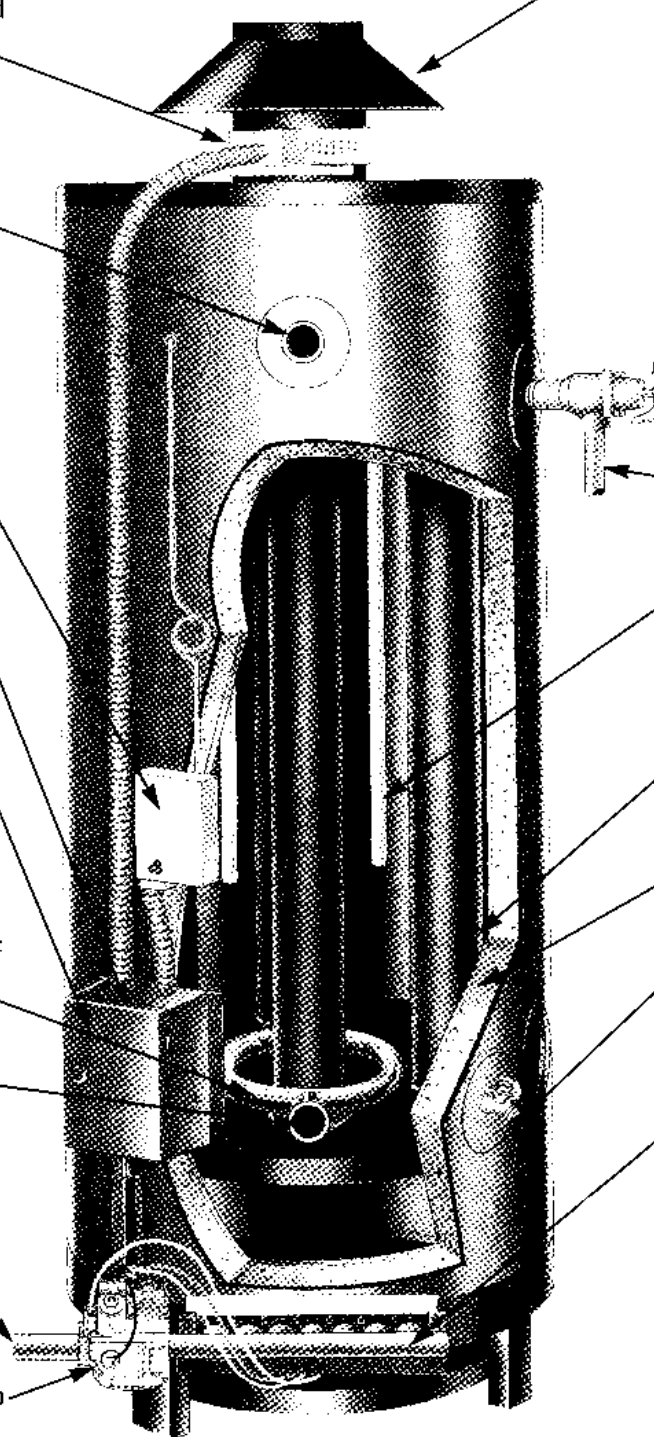
Sacrificial Anode – A rod used in preventing the corrosion or deterioration of the steel tank walls, through the control of electrolysis.

Tank & Glasslining – Container used to store heated water with special lining to reduce corrosion.

Insulation – A material having a relatively high resistance to heat transfer.

Drain Valve – A valve used primarily when draining heater for periodic cleaning or replacement of leaking heater.

Burner Assembly – A device used for the final conveyance of gas, or mixture of air and gas, to the combustion zone.



## FLUE DAMPER HEATERS

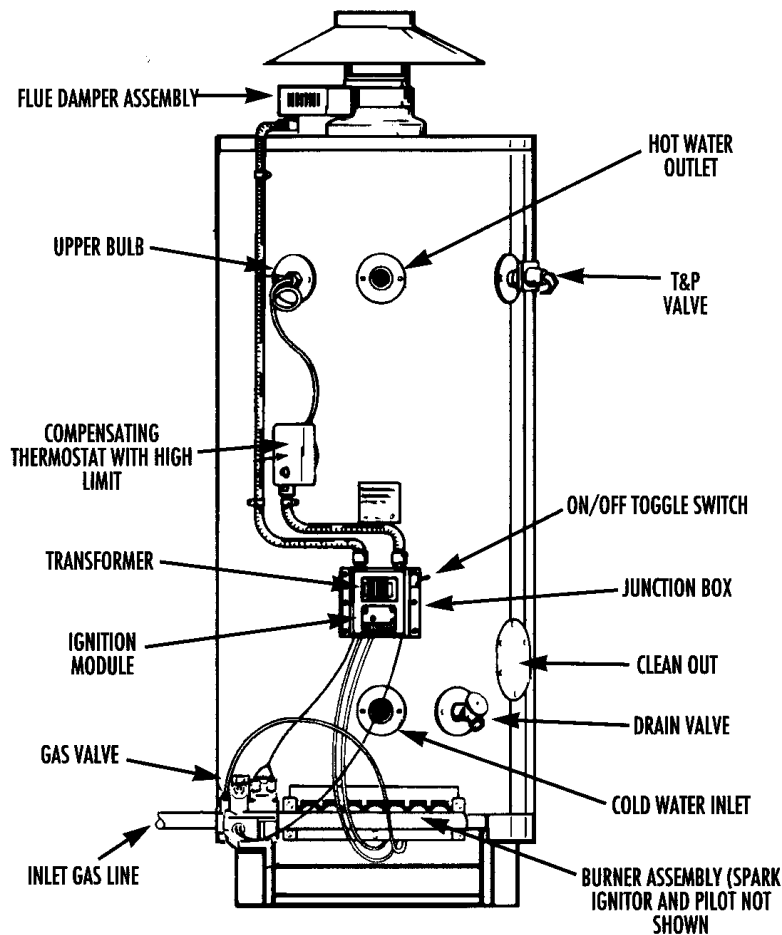
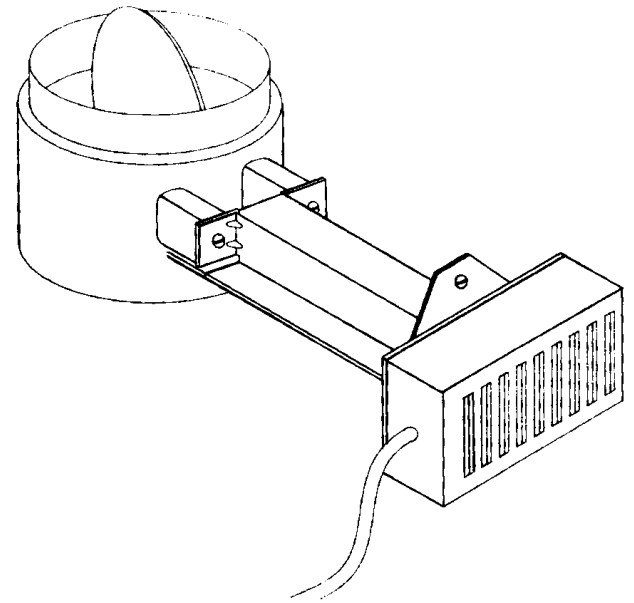
These models are equipped with an intermittent ignition system used in conjunction with an automatic flue damper. When the heater is in a stand by condition (burners off) the automatic flue damper closes to a horizontal position and blocks all air flow between the outlet of the flue collector and the vent system. The heat that would normally be lost because of air flow through the tank flues and into the vent system will now be retained inside the heater.

## OPERATIONAL SEQUENCE

When the thermostat calls for heat, a circuit is made to the relay coil in the flue damper, de-energizing the flue damper motor. The flue damper blade opens. The blade opening may take up to 25 seconds. When the flue damper blade reaches a fully open position, internal switches close making continuity to the ignition module. The ignition module will then complete a circuit to the spark ignitor. The spark ignitor will spark and the solenoid will open allowing gas to pass to the pilot. When a pilot flame has been established, a flame sensor in the pilot burner assembly will signal the ignition module shutting off the spark ignitor. The ignition module will now complete a circuit to the gas control valve allowing gas to pass to the main burner.

## LOCK OUT (LP MODELS ONLY)

When the thermostat calls for heat a circuit is made to the relay coil in the flue damper. The R1 relay contacts open, de-energizing the flue damper motor. The spring loaded flue damper blade opens to a vertical position. The blade opening may take up to 25 seconds and only then will the sequencing continue. When the flue damper blade reaches a fully open position, internal switches close making continuity to the ignition module. The ignition module then completes a circuit to the spark ignitor. The spark ignitor should begin sparking at this point. The ignition module will create a circuit to the pilot gas solenoid, which will then open and allow gas to pass to the pilot. The spark and the spark ignitor must ignite the pilot gas creating a pilot flame within 25 to 45 seconds. If a pilot flame has not been established within the "Safety Timing" the system will "Lock Out". The pilot gas solenoid will shut off, R1 relay contacts will remain de-energized, the flue damper blade will remain open, and the spark ignitor will stop.



**FLUE DAMPER HEATER**

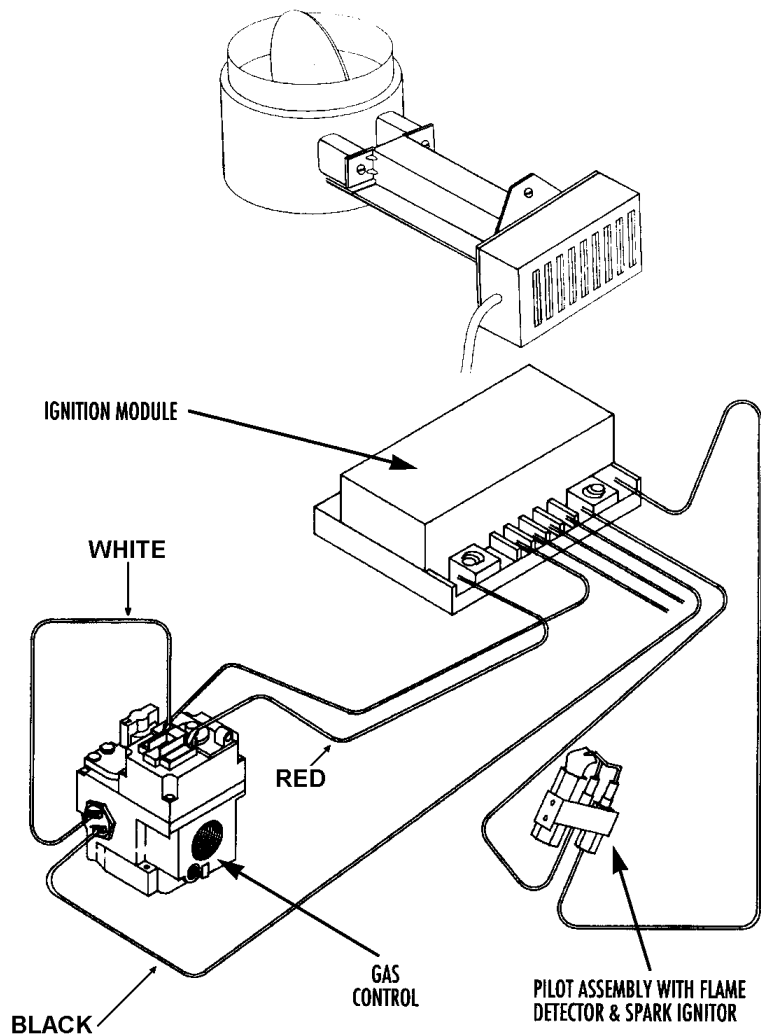
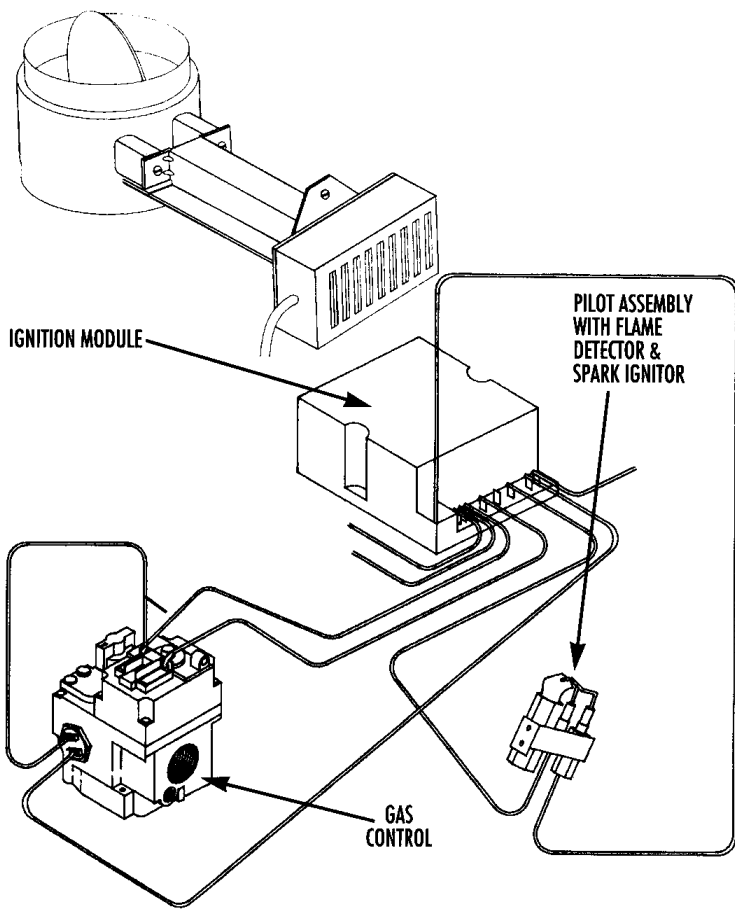
## LIGHTING INSTRUCTIONS FOR MODELS EQUIPPED WITH AUTOMATIC FLUE DAMPERS

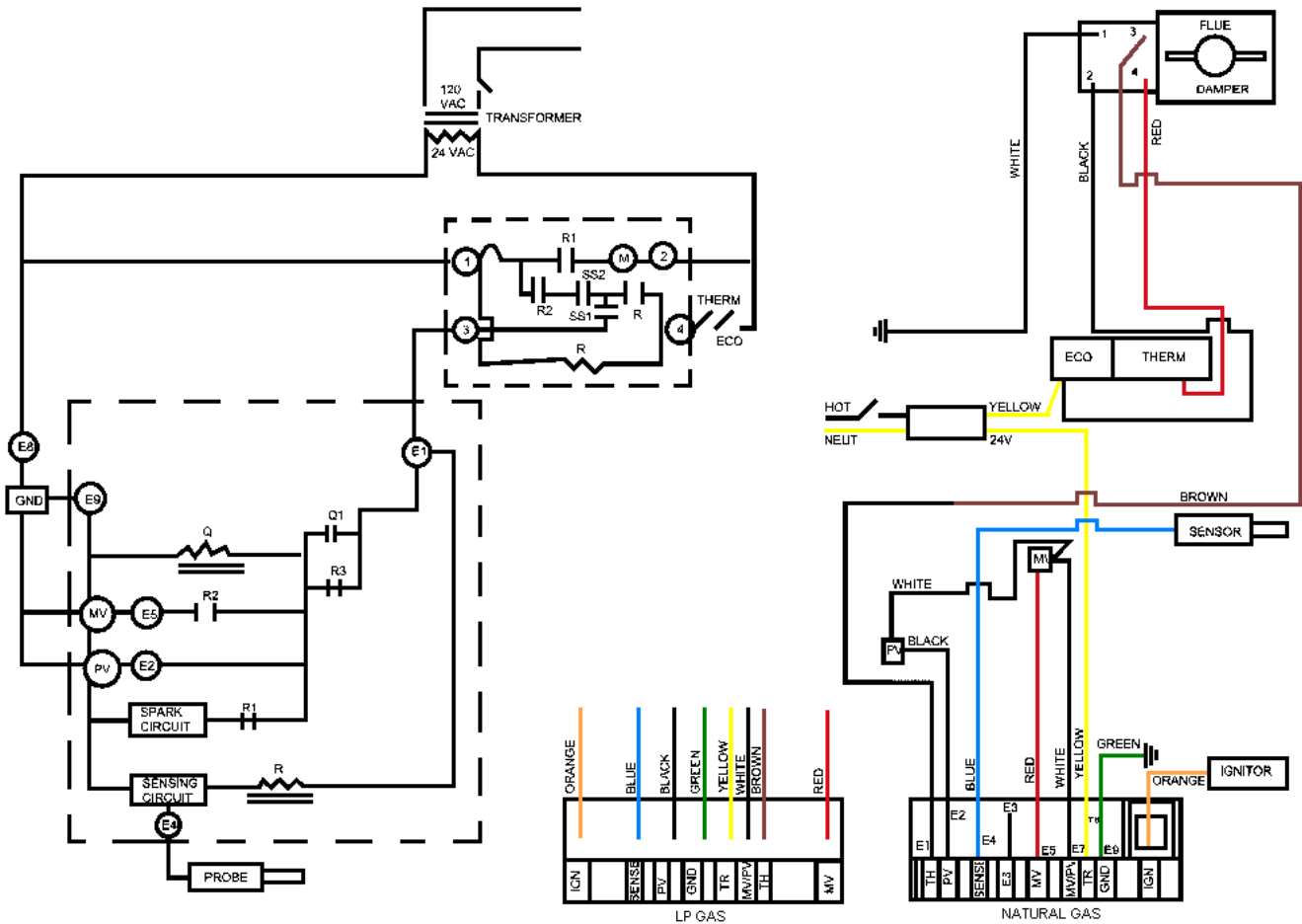
These models are equipped with an intermittent ignition system. For the pilot to light and the burner to come on, the heater's thermostat must call for heat. Then the system will begin sequencing, each section proving itself before actual pilot ignition takes place. See Operational Sequence.

**CAUTION:** The electrical supply to this heater must NOT be turned on before the tank is completely full of water and the gas supply is available. Because there is normally a certain amount of air in a gas line when a new heater has been installed, it may be necessary to re-sequence the heater several times before it lights on its initial start-up.

### Check:

1. The on/off toggle switch, located on the junction box must be in the "ON" position for the electrical control system of the heater to operate.
2. The gas cock knob, located on the gas control valve must be turned to the "ON" position for gas to be able to flow. **IMPORTANT:** Do not use gas cock dial to adjust gas input.
3. The manual E.C.O. must be in the closed position.
4. To shut down: Turn electrical power and gas cock to the "OFF" position.





## FLUE DAMPER HEATERS EQUIPPED WITH ROBERTSHAW IGNITION SYSTEM

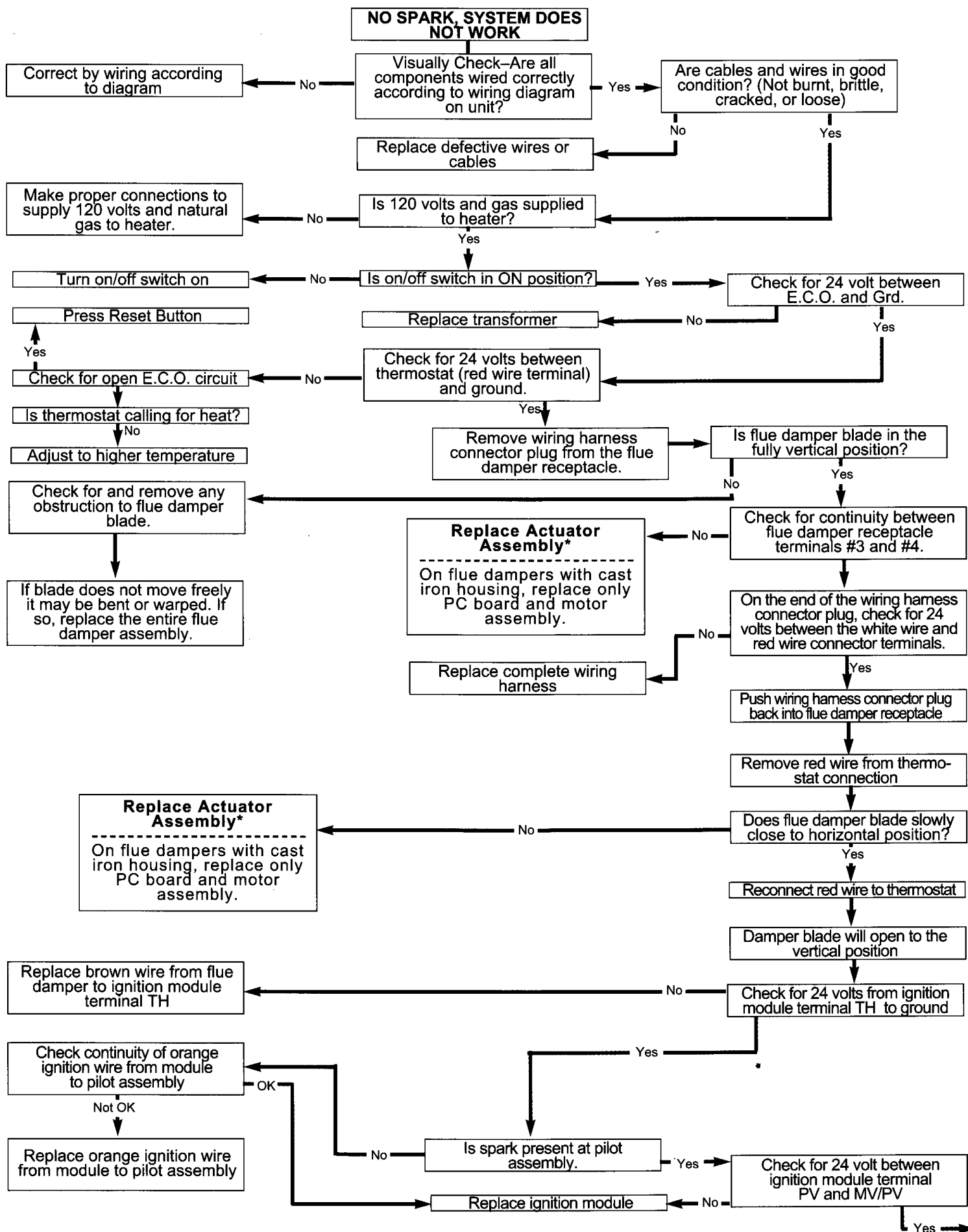
### MINIMUM LINE VOLTAGE WIRE – NO. 14 AWG

This water heater must be electrically “grounded” by the installer. Using a screw on the heater junction box, a wire must be run to connect the heater to an uninterrupted metallic ground.

This appliance must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code A.N.S.I./N.E.P.A. No. 70 1978.

NOTE: IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE HEATER MUST BE REPLACED, IT MUST BE REPLACED WITH 105°C. THERMOPLASTIC AWM WIRE OR ITS EQUIVALENT.

# TROUBLESHOOTING GUIDE FOR FLUE DAMPERS HEATERS EQUIPPED WITH ROBERTSHAW IGNITION SYSTEM



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