



TECHNICAL SERVICE DEPARTMENT
Technical Service Bulletin
1-800-432-8373



Induced Draft
Sequence of Operations

Notice: This product does not have a draft diverter. It uses a fan – called an inducer – to draw the combustion gases thru the flue bundle of the water heater and into the metal venting structure. Category I fan-assisted appliances are induced draft burners operating with gravity vents. In place of the draft hood, a fan is installed between the flue collar and the vent connector inlet. This fan serves only to draw flue products through the heat exchanger (flue bundle in this case) and exhaust them into the vent at non-positive pressure. The venting action is still dependent on the vent height and the temperature difference between the flue gases and the surrounding atmosphere. A pressure/vacuum switch shuts the appliance off in case of downdraft or blocked flue or vent. This water heater uses Category 1, Type B Appliance venting standards. Double wall venting is preferred.

Action	What to check or look for	Service Remedy
Tank is cold and full of water. Heater is wired to a 120 VAC source. Gas supply is connected to heater and valve is set to ON position.	Fill tank Check fuse or reset breaker at service panel Check Natural Gas pressure between 4.5 and 10.5 inches w.c. Turn gas valve to ON Turn ON/OFF switch to ON	All voltages are AC and can be measured to ground.
120V is extended from the switch to the 24V AC step down transformer. At the same time, 120V is passes to the #3 terminal of the relay.	Check for 120V at the transformer Check for 120 at the #3 terminal of relay	Replace switch Check wiring to ON/OFF switch Check wiring to relay
24V is extended from the transformer to the thermostat.	Check for 24V AC at the yellow wire on the thermostat	Replace transformer
Thermostat demands heat. 24V is extended through the red wire to the relay switch.	Check for 24V at the red wire on the thermostat	Turn temperature up Replace thermostat
24V is passed via the #6 terminal at the relay to Pressure Switch (PS) along the blue wire	Verify 24V at the blue wire terminal of the Molex connection of the PS box	Check wiring harness and Molex
24V power waits at PS (normally closed) blue wire for the inducer motor to operate.	PS proves the exhaust side of the venting. If the exhaust is restricted, then PS will not allow power to the Ignition Control Module (ICM). Normally open vacuum switch closes on maximum vacuum of 1.77" w.c. Normally closed opens on a vacuum fall to 1.50" w.c.	Verify free and clear exhaust venting



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24V is applied to the #5 terminal of the relay. The connection inside the relay closes allowing 120V (hot side) to pass to inducer from terminal #3 to #1 and the inducer motor.	Inducer motor should come on. Verify 24V at the #5 terminal of relay. Verify 24V at the yellow wire of the Molex connection on the pressure switch box. Verify 120V to ground at #3 on relay; then on #1 on relay. Verify 120V at the between the black and white wires on the Molex at inducer motor.	Check and replace relay. Verify 120V to unit.
The inducer motor operates and causes a vacuum at the PS.	Verify inducer motor is operating.	Check and replace inducer Verify free and clear venting
PS will close and allow 24V power to move to the control module thru the red wire.	Good inducer motor and venting will allow PS to open and pass 24V to ICM.	Check Molex and wiring harness Verify 24V at the red wire to the Molex
24V is extended from the ignition control to the pilot electrode. You should hear it sparking. At the same time, 24V is extended to the ECO.	Spark generator in the ignition module produces a continuous 10,000V DC spark pulse through the orange wire. Visually check pilot electrode assembly for a spark Check ignition cable for continuity Check for 24V at the PV and GND terminal of the ICM	Replace control module Replace pilot electrode Replace ignition cable
24V is extended to the ECO to the pilot side PV terminal of the gas valve.	Check for 24V at the left and right terminals of the thermostats ECO (brown wires) ECO may be tripped due to water too hot Check for 24V at the PV terminal of the gas valve Remember - At the same time there is power at the PV terminal of the gas valve, the pilot electrode should be sparking.	Cool water in tank to reset ECO Replace ECO
Pilot flame ignites and remains lit. Spark generator shuts off when flame is rectified.	Check gas control valve is turned on. Verify 24V at the PV terminal of the gas valve. Verify minimum gas pressure at the inlet and outlet sides of the gas valve. Check grounding of pilot electrode assembly Check pilot electrode for cracks Check gap of pilot electrode Pilot flame is rectified by the ignition control module	Check gas pressure Check pilot burner for obstructions Tighten or replace pilot electrode assembly Gap to 1/8" Replace ignition module or gas valve

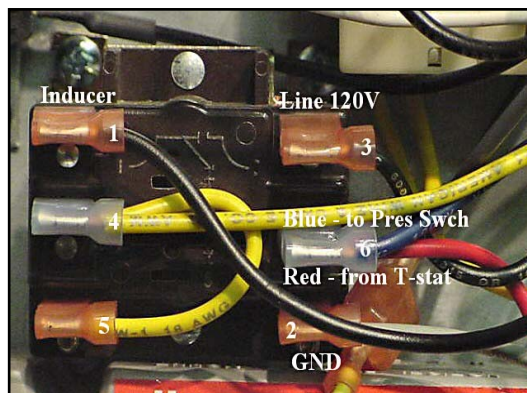


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Control models sends 24V is to the MV terminal of the gas valve.	Check for 24V at the MV terminal of the ignition control module Check for 24V at the MV terminal of the gas valve Verify minimum gas pressure at the inlet and outlet sides of the gas valve.	Replace ignition module Replace gas valve Adjust gas pressure Clean or replace
Main burner ignites. Water is heated to thermostat setting.	Verify calibration of thermostat compared to water temperature	Replace thermostat
Water is hot. Thermostat opens and suspends power to blue wire and relay switch.	Check thermostat	Replace thermostat
Inducer motor, main burner and pilot shut off.	Heater is in stand-by until the thermostat demands heat	

Sequence of Operations for the pressure switch & relay switch:

1. 24V is received from the thermostat during a call for heat along the red wire.
2. 24V is passed via the #6 terminal at the relay to Pressure Switch (PS) along the blue wire.
3. 24V power waits at PS (normally closed) blue wire for the inducer motor to operate.
4. 24V is applied to the #5 terminal of the relay. The connection inside the relay closes allowing 120V to pass from terminal #3 to #1 and the inducer motor.
5. The inducer motor operates and causes a vacuum at the Pressure Switch. Inducer and the venting structure must be within standard for the Pressure Switch to operate.
6. PS (normally closed) will open (if the inducer works and venting is OK) - and passes power to the red wire side of the pressure switch.
7. 24V power now passes to the control module thru the red wire.
8. Ignition sequence begins in burner chamber.



As long as the venting is free and clear, is within standard from the vent tables of the Use and Care Manual and the inducer motor is operating, you will have power to the control module and combustion.



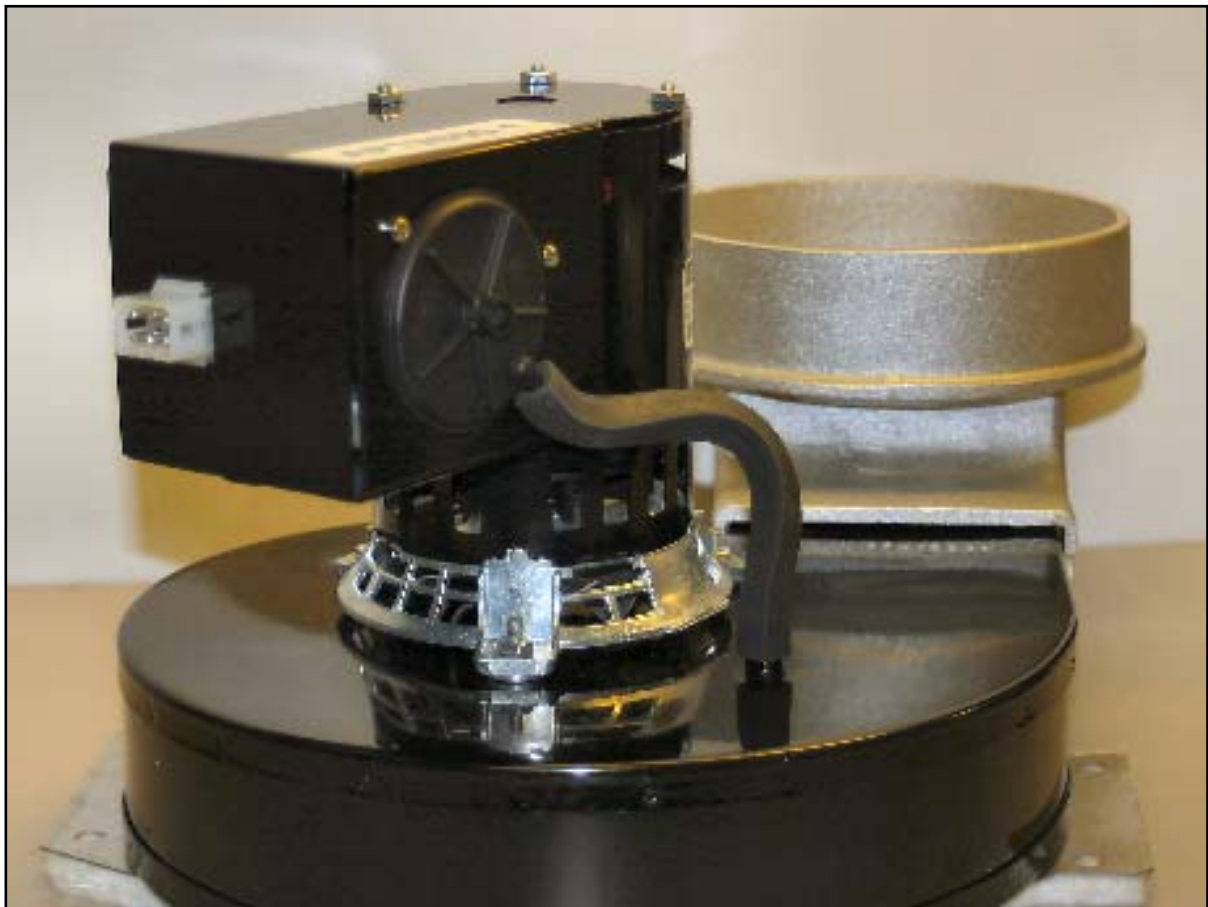
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If this is not the case, rule out the inducer motor, pressure switch, relay and venting structure by removing the 6 pin Molex connector to the pressure switch box. Jumper the Molex at the blue and red wires with a jumper wire.

If the unit goes to main burner, the problem is with the inducer, pressure switch, relay or venting. If the unit does not go to main burner, then recheck the sequence of operations and follow the power flow.



Induced Draft (GD) Series

Molex's and LED display connections removed for clarity

