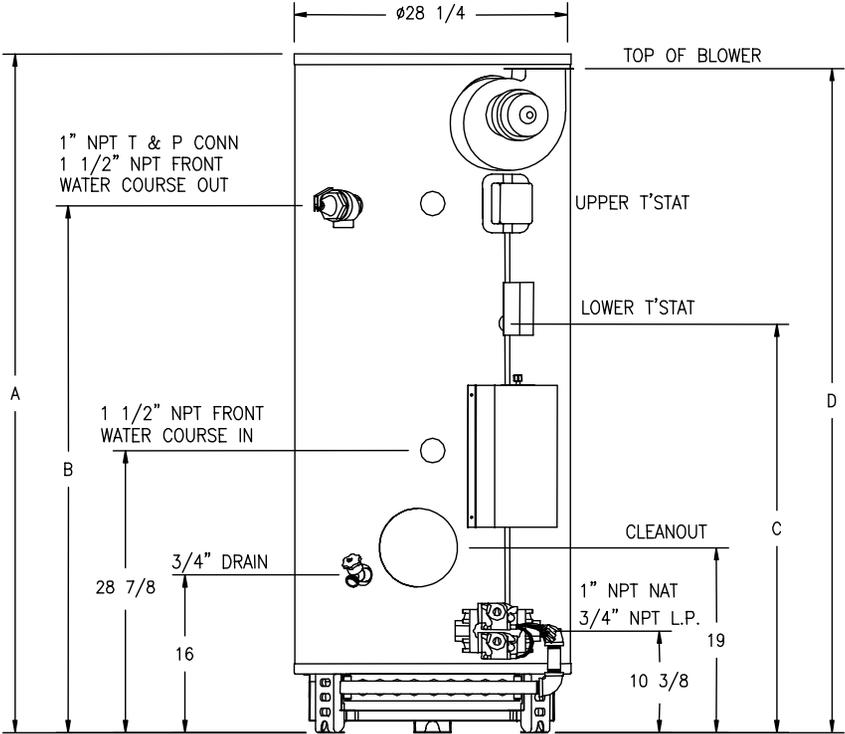


**INDUCED DRAFT COMMERCIAL WATER HEATERS  
SUPPLEMENT INSTRUCTIONS  
TO PART #238-39387-00**

**THIS INSTRUCTION SUPPLEMENT IS ONLY INTENDED TO GIVE INSTALLATION INSTRUCTIONS AND INFORMATION RELATED TO THE INDUCED DRAFT WATER HEATERS WHERE THESE MODELS DIFFER FROM THE ATMOSPHERICALLY VENTED MODELS IN THE GENERAL INSTALLATION INSTRUCTIONS (238-39387-00). REFER TO THE GENERAL INSTRUCTIONS (238-39387-00) FOR ALL APPLICABLE WARNINGS AND INSTALLATION PROCEDURES.**



**Specifications and Dimensions**

Capacity (gal.)	Input (BTU/Hr)	AMP Draw	A (in.)	B (in.)	C (in.)	D (in.)	Vent Dia (in.)
65	625,000	3.00	69.38	54.13	41.88	68.88	8.00
80	725,000	3.00	79.63	64.25	55.13	79.13	8.00

Capacity (Liters)	Input (kW/Hr)	AMP Draw	A (cm)	B (cm)	C (cm)	D (cm)	Vent Dia (cm)
246	183.0	3.00	176	137.5	106	175	20.3
303	212.5	3.00	202	163	135	201	20.3

Clearances To Combustible Materials		
Sides and Rear	Ceiling	Vent
6 in. (15.2 cm)	20 in. (51 cm)	6 in. (15.2 cm)

Notes:

1. All models use an induced draft blower with integral damper and intermittent pilot ignition requiring a power source of (120volt, 60Hz or 220 volt, 50 Hz).
2. Suffix "N" denotes natural gas, Suffix "X" or "P" denotes L.P. gas. Prefix "L" denotes L.P. on some models.
3. May be installed on combustible flooring.

**VENTING**

**The water heater models described above in this supplement are of the induced draft type which rely on an induced draft blower to pull the combustion products through the flue tubes of the water heater. An integral gravity damper on the induced draft blower outlet is forced open by the air pressure from the blower and closes at the end of each burner cycle. NO ADDITIONAL VENT DAMPERS ARE TO BE ATTACHED TO THE OUTLET OF THESE APPLIANCES.**

**These water heaters have been approved for vertical venting through a lined masonry chimney or double wall vent pipe. DO NOT VENT THESE WATER HEATERS HORIZONTALLY WITH THE VENT TERMINATING THROUGH THE WALL TO THE OUTSIDE. ALL VENTING MUST TERMINATE THROUGH THE ROOF WITH A VERTICAL DISCHARGE.**

The vent connector attached to the vent collar on the blower must be 8" (20 cm) in diameter. The venting size was designed to produce a negative pressure inside the venting system when properly installed. Horizontal piping must be sloped upward at least 1/4" inch per linear foot (2.1 cm/m) of length.

All vent piping must be well supported to avoid sagging or adding excessive weight onto the blower assembly. This water heater may be commonly vented with another gas appliance, providing the commonly shared vent is the proper size to handle exhaust gases from both appliances. **This water heater must not have another gas appliance vented into the vent connector.** Consult the venting tables in the latest edition of the National Fuel Gas Code ANSI Z223.1 or in Canada CAN1-B149.1 or B149.2 and/or local code officials for proper application for your area. For proper venting, limit the number of elbows in the venting system. All connections in the venting system must be securely fastened with sheet metal screws or other approved methods. Consult local codes and ordinances. Failure to install a proper venting system can result in fire, injury, or death. See Figures 2 & 3 on the following page for common venting connections.

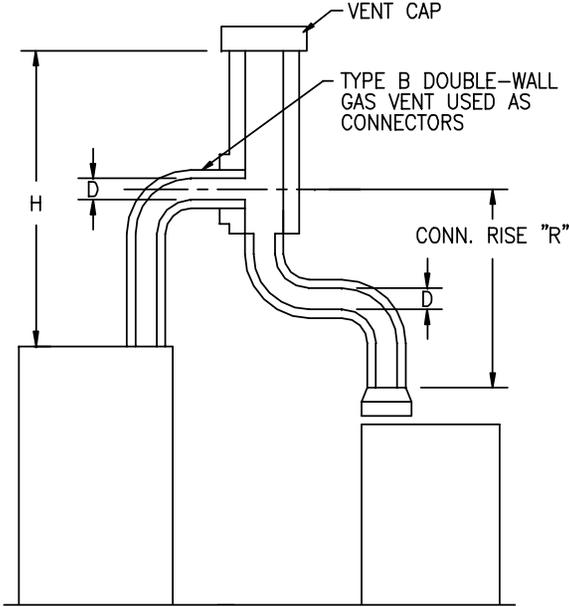
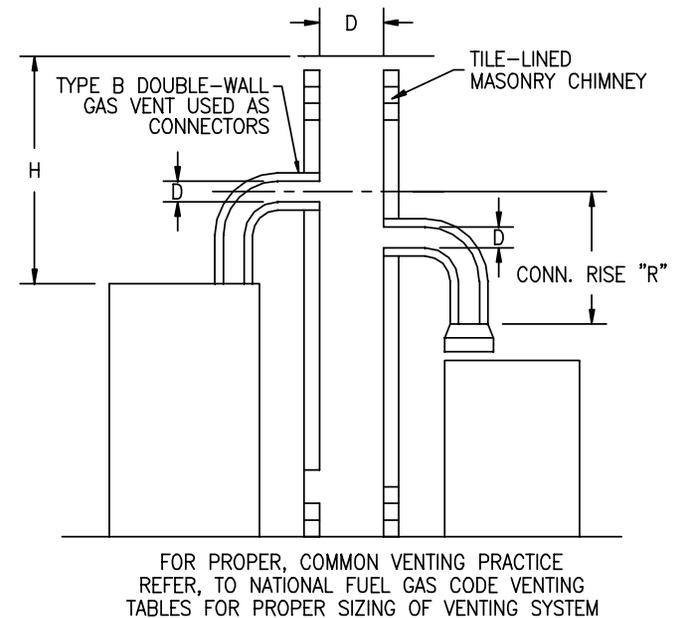


Figure 2



**Figure 3**

### **ELECTRICAL CONNECTIONS**

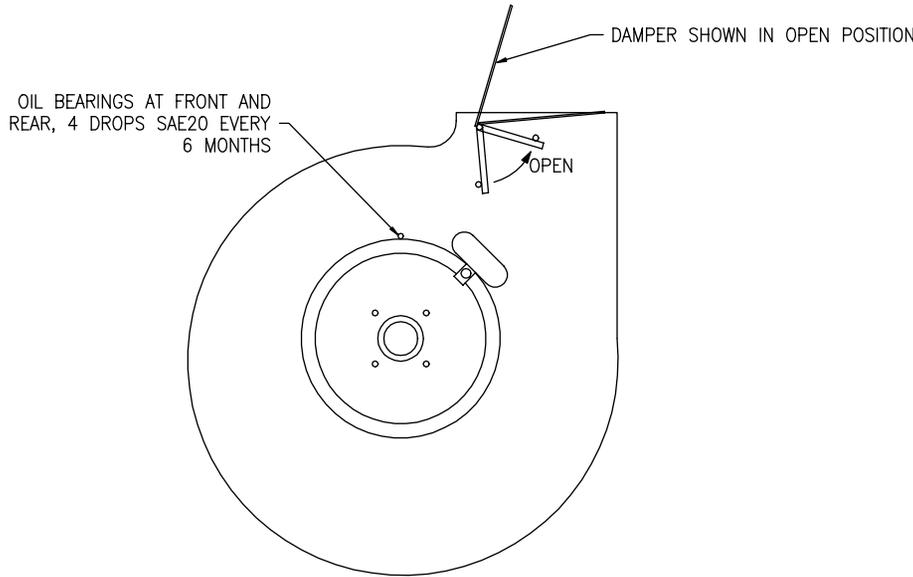
This water heaters must be wired to a (120volt, 60Hz or 220 volt, 50 Hz). power supply. Refer to the wiring diagram on the water heater and with these supplemental instructions for proper field wiring connections to the terminal block. All wiring and conduit must be installed and electrically grounded in accordance with the latest edition of the National Electric Code (ANSI/NFPA 70) or local applicable codes. In Canada, follow the latest edition of the Canadian Electrical Code (Part 1, CSA-C22.1) and all applicable local codes. Refer to the nameplate for the total amp draw for this water heater. The water heater should be wired on a separate circuit and breaker.

### **MAINTENANCE OF INDUCED DRAFT BLOWER**

The following maintenance should be performed by a qualified service technician at the minimum periodic interval listed below.

1. Bi-annually, oil the induced draft motor in the ports of the front and rear motor bearings with 4 drops each of SAE 20 motor oil.
2. Annually, inspect the blower wheel for debris and clean as necessary.
3. Inspect the venting system for corrosion and leaks. Replace any defective sections of vent pipe.

4. Inspect the blower vent damper for proper movement, making sure the damper extends to the full open position after the blower reaches full speed (see Figure 5). If the damper blade does not fully open, remove the vent connector and make sure the blower wheel is clean and debris has not fallen on the damper blade or blower wheel. If the damper binds, replace the blower assembly. **DO NOT ATTEMPT TO REPAIR THE DAMPER!**



**Figure 5**

**REPLACEMENT PARTS LIST FOR INDUCED DRAFT MODELS**

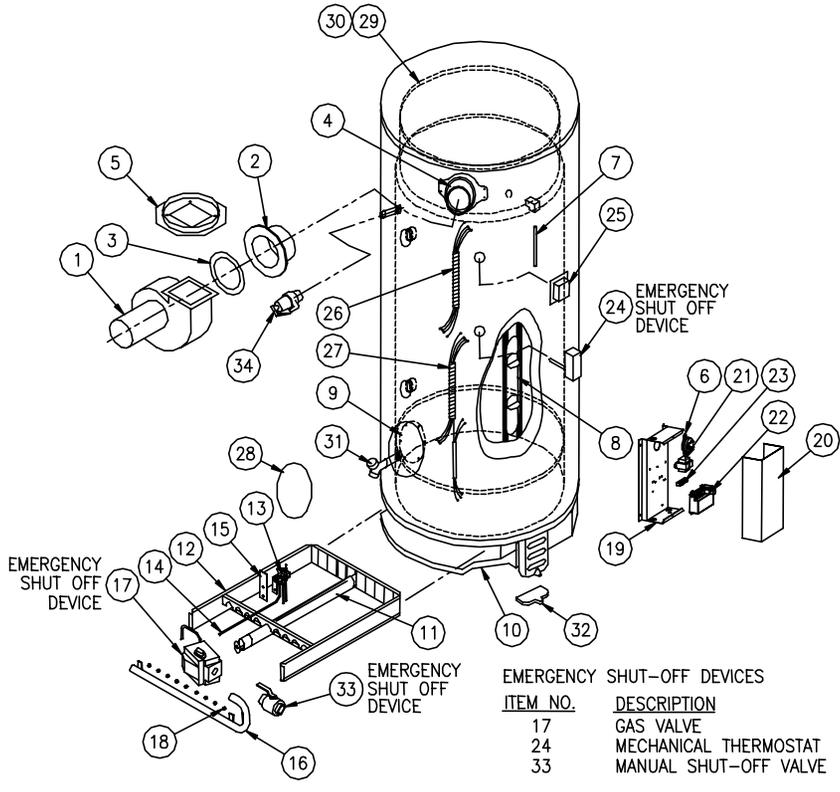
Contact your supplier, plumbing professional or the company listed on the rating plate of the water heater for replacement parts.

Provide the part name as well as the model and serial number(s) of the water heater(s) when ordering parts. When applicable, the following information shall be provided: type of gas, voltage and amperage, item number (from the following list) and description (from the following list).

PART NAME AND DESCRIPTION	
1. Induced Draft Blower/Motor Assembly	17. Gas Valve (Emergency Shut-off Device)
2. Blower Mounting Flange	18. Main Burner Orifice(s)
3. Blower Mounting Flange Gasket	19. Control Box

4. Collector to Blower Transition Duct	20. Control Box Cover
5. Blower-Vent Pipe Adapter	21. Transformer
6. Air Pressure Switch	22. Ignition Control Module
7. Pressure Switch Tubing	23. Terminal Block
8. Flue Baffle	24. Thermostat
9. Clean-out Hole Tank Cover	25. Capillary Tube Cover
9a. Clean-out Hole Cover O-Ring (not shown)	26. Wire Harness - Thermostat to Blower
9b. Clean-out Hole Cover Gasket (not shown)	27. Wire Harness - Control Box
10. Radiation Shield	28. Wire Harness - Gas Valve
11. Main Burner(s)	29. Flue Collector Cover
12. Burner Tray	30. Flue Collector Cover Gasket
13. Pilot Burner Assembly	31. Anode Rod (Not Shown)
14. Pilot Supply Tube	32. Tank Leg Thermal Break
15. Pilot Draft Shield	33. Manual shut-off (optional)
16. Main Burner Manifold	34. T&P Relief Valve

See the Figure below for parts list drawing



**Operating and Troubleshooting Guide - Sequence Of Normal Operation  
(White-Rodgers Thermostat With Intermittent Pilot Ignition)**

1. Thermostat contacts close on temperature drop in the tank causing the high voltage circuit through the thermostat to be completed to the transformer and induced draft blower.
2. When the induced draft blower comes up to operating speed, the gravity damper on the blower outlet is pushed open by the air pressure. The air pressure in the flue collector chamber is reduced until the vacuum is sufficient to close the pressure switch contacts (-1.45" w.c. or -.036 kPa).
3. When the pressure switch contacts close, the 24 volt control circuit is completed to the ("TH" or 24V terminals) ignition control module. The ignition control module may have a pre-purge time delay of up to 45 seconds. After the pre-purge timing, the ignition control sends 24 volt power through the thermostat ECO to the pilot valve "PV" terminals on the gas valve allowing pilot gas to flow to the pilot. The ignition control also simultaneously sends high voltage, low current electricity through the electrode wire to the pilot electrode causing sparks to ignite the pilot gas. If the pilot gas fails to ignite within 90 seconds, the ignition control stops the pilot gas and sparking. The ignition control may allow the ignition sequence to "retry" up to 2 more attempts after a 5 minute delay before the control will "lock out" ignition attempts until the thermostat circuit is reset by interrupting power for 15 seconds. The induced draft blower continues to operate as long as the thermostat contacts are closed.
4. When the pilot gas ignites, the flame is sensed by the electrode or a flame sensing rod. The flame sensing signal received by the ignition control causes the sparking to stop and the main gas valve to open. The main burners ignite from the pilot flame. The pilot flame is continually monitored by the flame sensing circuit. If for any reason, the pilot flame is not sensed by the electrode or flame sensing rod, the main gas valve closes, the spark electrode is re-energized, and the ignition trial period is reestablished. The same sequence occurs during a power or gas supply interruption.
5. The main burners continue to operate until the water temperature in the tank increases enough to cause the thermostat contacts to open. When the thermostat contacts open, the 120 volt or 220 volt power is interrupted to the induced draft blower and the primary transformer windings. The gas valve closes causing the main and pilot burners to extinguish. The damper on the blower outlet closes and the pressure switch contacts open.

## **TROUBLESHOOTING PROCEDURE FOR WHITE-RODGERS THERMOSTAT**

**OPERATION:    CONDITION:                    CHECK FOR:**



		the PV terminal and the common terminal "PV/MV" wire has continuity to the module, the gas valve may be defective. If no voltage is present at "PV" on the ignition control, the control may be defective.
Main burner ignition	Pilot ignites, "proves", and main gas valve opens with main burners lighting. YES↓ NO→	<ul style="list-style-type: none"> <li>- If pilot flame is present, but main burners do not light (no main burner gas), check to make sure green ground wire from module to control box ground lug has continuity. This can be verified by disconnecting the wire and measuring the resistance through both ends of the wire with an ohmmeter. The reading should be "0" ohms.</li> <li>- Check to make sure pilot flame covers the electrode or flame sensing rod. Check the electrode or flame sensing wire for continuity. Replace wire if cracked.</li> <li>- Check for cracked ceramic electrode insulator. Clean electrode or flame sensing rod if carbon is present.</li> <li>- Make sure vertical pilot draft shield is installed. Pilot flame should be steady without wavering or blowing.</li> <li>- Check for voltage between the "MV" terminal of the ignition module and the ground lug. If no voltage is present, and above conditions (ground, pilot flame, flame sensor, wire leads) are O.K., replace ignition control.</li> <li>- Check for voltage between MV and MV/PV of the gas valve. If voltage is present, but valve does not open, replace gas valve.</li> </ul>
Main burners operate until thermostat is satisfied. Blower and burners stop.	Main burners and blower operate until thermostat is satisfied YES - Checks O.K. NO→	<ul style="list-style-type: none"> <li>- If blower continues to operate, but main burners cycle erratically, check for proper grounding of the ignition control and continuity of the pilot electrode wire. Make sure the pilot draft shield is in place. The pilot adjustment screw should be adjusted to the full open position (counterclockwise). Make sure the pilot electrode is clean and not damaged or bent. The flame sensing current output from the pilot can be measured by connecting a microamp meter from the pilot flame sense lead to the "sense" terminal on the ignition control. Replace the pilot if the electrode or wires have deteriorated or if the flame sense current is below 1.0 microamps. Replace ignition control if problem persists and above checks proved satisfactory.</li> <li>- If the blower continues to operate, but the burners cycle off, check the ECO (lower) terminals of the thermostat. If the ECO (high limit) trips, the ignition will "lock out" requiring resetting. Normally, the thermostat should open before the high limit trips. If the high limit opens before the thermostat, replace the control.</li> <li>- Another possible cause for the burner to cycle is the pressure switch contacts are opening. Make sure the pressure switch tubing fittings are snug, but do not use tools to tighten the plastic nut on the pressure switch connection. Check to make sure the flue collector lid under the jacket top is tightly secured. The gasket under the lid must be intact. The gasket under the blower mounting flange must be secure and the joint between the blower mounting flange and blower transition duct must be caulked with high temperature sealant (Dow RTV or equivalent). The vacuum at the pressure switch may be checked with a tee installed at the pressure switch tubing with a draft gauge or manometer connected. Cold starting vacuum should be close to -2.0" w.c. (-.49 kPa), with a hot running operation vacuum near -1.75" w.c. (-.44 kPa). The pressure switch contacts should close by -1.45"</li> </ul>
Main burners (continued)		

		w.c. (-.36 kPa) and open in a drop of vacuum to -1.25" w.c. (-.31 kPa). If outside of these specs, replace. DO NOT LEAVE THE WATER HEATER OPERATING WITH THE PRESSURE SWITCH BYPASSED.
Water heater operates, but water is not hot enough.	<ul style="list-style-type: none"> <li>- Water heater cycles</li>   <li>- Burners operate continuously</li> </ul>	<ul style="list-style-type: none"> <li>- Check water heater thermostat setting, adjust if necessary. Make sure cycling is due to thermostat setting (check previous sections). Also make sure high limit contacts are remaining closed by measuring voltage from each lower thermostat terminal to ground.</li> <li>- Check outlet water temperature from nearby faucet with a thermometer. If the outlet water temperature does not approximate the thermostat setting and the heater is otherwise functioning normally, the thermostat may be out of calibration. Remove from tank and replace.</li>   <li>- Make sure there is sufficient gas supply pressure (see nameplate).</li> <li>- Check burner manifold pressure (outlet pressure tap on gas valve)</li> <li>- Check for proper orifice size for the type of gas used.</li> <li>- Remove burners and flue baffles and clean as needed. Make sure gaskets are in good condition (replace if necessary) before reassembling lid.</li> <li>- Evaluate hot water usage to determine if hot water draw exceeds capacity of water heater.</li> </ul>

**NOTES**

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