

Troubleshooting

correct operation/sizing and correct as required.

flowing inlet pressure at the incoming test point on the water heater should read 4" W.C. - 10.5" W.C. on natural gas

and 8" W.C. - 13.5 W.C. on propane gas. If the pressure is

may result in serious injury to yourself or damage to the unit.

APPLIANCE OPERATING PRESSURES Table 1

serviced and removed by a trained

Important Safety Notes

No.

High Altitude

Long flue length

Short flue length

UGTC-152 Long flue length

Commissioning

There are a number of (live) tests that are required when fault finding this product. Extreme care should be used at all times to avoid contact with energized components inside the water heater. Only trained and qualified service technicians should attempt to repair this product. Before checking for resistance readings, disconnect the power source to the unit and isolate the item from the circuit (unplug it) (SV1, SV2, SV3 and POV) Gas valve and Modulating solenoids: (Set meter above 2K)

(OVZ) Diack - I cliow	11 13 100	00 41 0111110	D2	4 - 1
(SV3) Black - Red	11 ~ 13 VDC	39 ~ 42 ohms	B4	4 - 5
(POV) Yellow - Yellow	2 ~ 15 VDC	67 ~ 81 ohms	D1	1 - 2
(M) Water F	low Control Device	Servo or Geared Moto	or.	
Red - Pink	5 ~ 8 VDC	44 ~ 52 ohms	G2	3 - 4
White - Blue	5 ~ 8 VDC	44 ~ 52 ohms	G2	1 - 2
Grey - Brown	N/A	N/A	G2	5 - 7
Grey - Orange	N/A	N/A	G2	6 - 7
(QS) Water Flow Sens	sor: 11 ~ 13 VDC	5.5 ~ 6.2 K ohms	L3	E10 - G7
· · /				
Yellow - Black	4 ~ 7 VDC	1 ~ 1.4 Mega ohms	L3	E10 - G7
		•		
By-pass Flow Contro	l:			
Red - Pink	2~6 VDC	44 ~ 52 ohms	G1	12 - 13
White - Blue			G1	10 - 11
(IG) Ignition System:				
Grey - Grey	90 ~ 110 VAC	N/A	C1	1 - 3
(FM) Combustion Far	n Motor:			
Red - Black	6 ~ 45 VDC	N/A	L2	5 - 6
White - Black	5 ~ 10 VDC	9.72 ~ 9.75 K ohms	L2	3 - 5
Yellow - Black	11 ~ 13 VDC	4.02 ~ 4.05 K ohms	L2	4 - 5
you should read betwe	en 60 and 420 hertz.	cross the white and bla	ck wires at termi	nals 3 and
Thermal Fuse / Overh	eat Switch:	1		1
D 1 14/1/	44 403/50	5	B8	D.4. 000

Flame Rod:

Place one lead of your meter to the flame rod and the other to ground. With the unit running you should read between 5-150 VAC. Set your meter to the μ amp scale and series your meter in line with the flame rod. You should read 1 µ amp or greater for proper flame circuit. In the event of low flame circuit remove the flame rod and check for carbon or damage.

Heat Exchanger, Outgoing Water Temperature and Inlet Thermistors:

Check all thermistors by inserting meter leads into each end of the thermistor plug. Set your meter to the 20 K scale and read resistance. Applying heat to the thermistor bulb should decrease the resistance. Applying ice to the thermistor bulb should increase the resistance. See below for examples of typical temperatures and resistance readings

Example: $59^{\circ}F = 11.4 \sim 14K\Omega$ $140^{\circ}F = 2.2 \sim 2.7K\Omega$ 86° F = $6.4 \sim 7.8$ KΩ 221° F = $0.6 \sim 0.8$ KΩ 113°F = $3.6 \sim 4.5$ KΩ **Outgoing Water Thermistor** White - White N / A See example above | E6 Heat Exchanger Temperature Thermistor: Pink - Pink N/A See example above E5 Inlet Thermistor: See example above E9 White - White Remote Controls: Terminals J 10 ~ 13 VDC 1.5 ~ 3.0 K ohms J

Frost Protection: This unit has frost protection heaters mounted at different points to protect the water heater from freezing. All of them should show a positive resistance reading.

This unit has one inline (10) amp glass fuse. Remove the fuse and check continuity through it. If you have continuity through the fuse then it is good. Otherwise the fuse is blown and must be replaced.

On

7701-10200 ft

Amp Fuses: 11 ~ 13 VDC Below 1 ohms **Dip Switches Settings** Adjust switches 2 and 3 in the tan switches depending on your altitude according to the table below. SW1 SW2 **WARNING** ← High Altitude DO NOT adjust the other dip switches unless specifically instructed to do so. Incorrect Dip Switch Settings can cause the water heater to operate in an unsafe condition and may damage the water heater and void the warranty NOTES

Off

0-2000 ft

Level 1

2001-5200 ft

On

(0-610 m) On (610-1585 m) Off (1585-2347 m) On (2347-3109 m)

5201-7700 ft

• Check for improper conversion of product.

• Check for blockage in the heat exchanger.

· Check all components for electrical short.

• Check for restrictions in air flow around unit and vent terminal.

Condensate trap is full. Check condensate trap and drain pipe for

16 Over Temperature Warning

19 Electrical Grounding

Replace condensate trap.

Measure resistance of sensor.

25 Condensate Trap

31 Burner Sensor

Replace sensor.

blockage

Diagnostic Codes | 03 Power interruption during Bath fill (Water will not flow when | 32 Outgoing Water Temperature Sensor power returns) 33 Heat Exchanger Outgoing Temperature Sensor • Turn off all hot water taps. Press ON/OFF twice. 11 Outside Temperature Sensor 51 Inlet Water Temperature Sensor 05 Bypass Servo Check sensor wiring for damage. • Replace bypass servo Measure resistance of sensor. Clean sensor of scale build-up. 10 Air Supply or Exhaust Blockage Replace sensor. • Ensure approved venting materials are being used. • Check that nothing is blocking the flue inlet or exhaust. Modulating Solenoid Valve Signal Check all vent components for proper connections. Check modulating gas solenoid valve wiring harness for Ensure vent length is within limits. loose or damaged terminals. • Verify dip switches are set properly. Measure resistance of valve coil. Check fan for blockage Burner Sensor (see code 31) ⁷ Burner Contact a service provider 11 No Ignition Check that the gas is turned on at the water heater, meter, or cylinder. • If the system is propane, make sure that gas is in the tank. Secondary Heat Exchanger • Ensure appliance is properly grounded There is scale build up in the secondary heat exchanger and it needs • Ensure gas type and pressure is correct. to be flushed to prevent damage. Refer to the flushing instructions in • Ensure gas line, meter, and/or regulator is sized properly. the manual. Hard water must be treated to prevent scale build up or · Bleed all air from gas lines. damage to the heat exchanger. Verify dip switches are set properly. Ensure igniter is operational. 1 Combustion Fan Check igniter wiring harness for damage. • Check gas solenoid valves for open or short circuits. Ensure fan will turn freely. • Remove burner cover and ensure burners are properly seated. Check wiring harness to motor for damaged and/or loose • Remove burner plate; inspect burner surface for condensation/debris. connections. Check the ground wire for the PC board. Measure resistance of motor winding. 12 No Flame 5 Water Flow Servo • Check that the gas is turned on at the water heater, meter, or cylinder. The water flow control valve has failed to close during the bath fill • Check for obstructions in the flue outlet. function. Immediately turn off the water and discontinue the bath fill • If the system is propane, make sure that gas is in the tank. function. Contact a licensed professional. Ensure gas line, meter, and/or regulator is sized properly. Ensure gas type and pressure is correct. 70 PC Board Bleed all air from gas lines. • Check PC board DIP switches for correct positons. Ensure proper venting material was installed. Check the connection harness at the connection on the PC board. • Ensure condensation collar was installed properly. Replace PC board. Ensure vent length is within limits. • Verify dip switches are set properly. Check power supply for loose connections. Solenoid Valve Circuit Check power supply for proper voltage and voltage drops. Replace the PC Board. Ensure flame rod wire is connected Check flame rod for carbon build-up. Disconnect and reconnect all wiring harnesses on unit and 72 Flame Sensing Device PC board. Verify flame rod is touching flame when unit fires. • Check for DC shorts at components. Check all wiring to flame rod. • Check gas solenoid valves for open or short circuits. Remove flame rod; check for carbon build-up; clean with sand paper. • Remove burner plate; inspect burner surface for condensation/debris. Check inside burner chamber for any foreign material blocking flame 14 Thermal Fuse Measure micro amp output of sensor circuit with flame present. Replace flame rod. Check for restrictions in air flow around unit and vent terminal. • Check gas type of unit and ensure it matches gas type being used.

 Check for low water flow in a circulating system causing short-cycling. 73 Burner Sensor Circuit • Ensure dip switches are set to the proper position. Check sensor wiring and PC board for damage. If switch #5 in the SW2 bank is in the OFF position, turn it to the ON Replace sensor. Check for foreign materials in combustion chamber and exhaust piping. 79 Water leakage detected Check heat exchanger for cracks or separations. • Check heat exchanger surface for hot spots which indicate blockage due | • Turn off water supply and contact licenced professional. to scale build-up. Refer to instructions in manual for flushing heat exchanger. Hard water must be treated to prevent scale build up/damage. LC# Scale Build-up in Heat Exchanger (when checking Measure resistance of safety circuit. maintenance code history "00" is substituted for "LC") • Ensure high fire and low fire manifold pressure is correct.

LC0~LC9 indicates that there is scale build up in the heat exchanger and that the heat exchanger needs to be flushed to prevent damage. Refer to the flushing instructions in the manual. Hard water must be treated to prevent scale build up or damage to the heat exchanger. To operate the water heater temporarily until the heat exchanger can Check for low water flow in a circulating system causing short-cycling be flushed, push the On/Off button on the temperature controller 5 • Check for foreign materials in combustion chamber and exhaust piping. times. Repeated LC# codes will eventually lock out the water heater.

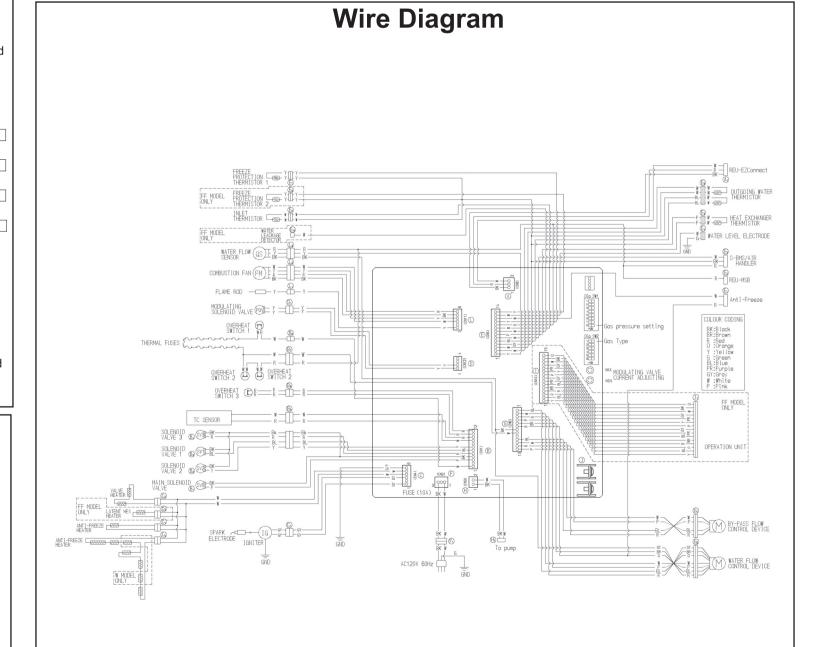
Maintenance Performed

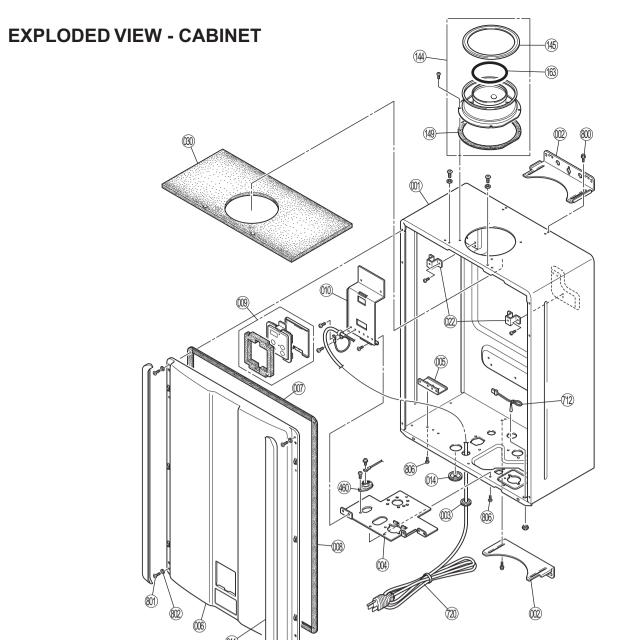
this code by pressing up, down, and ON/OFF simultaneously. **No Code** (Nothing happens when water flow is activated. Clean inlet water supply filter.

 On new installations ensure hot and cold water lines are not reversed. Verify you have at least the minimum flow rate required to fire unit. Check for cold to hot cross over. Isolate circulating system if present Turn off cold water to the unit, open pressure relief valve; if water continues to flow, there is bleed over in your plumbing. Verify turbine spins freely Measure the resistance of the water flow control sensor.

Indicates a service provider performed maintenance or repair. Enter

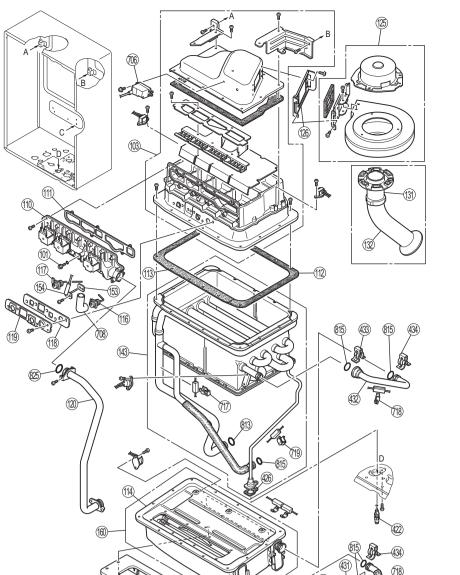
 If the display is blank and clicking is coming from the unit, disconnect the water flow servo motor (GY, BR, O, W, P, BL, R). If the display comes on then replace the water flow servo motor.





EXPLODED VIEW - INTERNALS

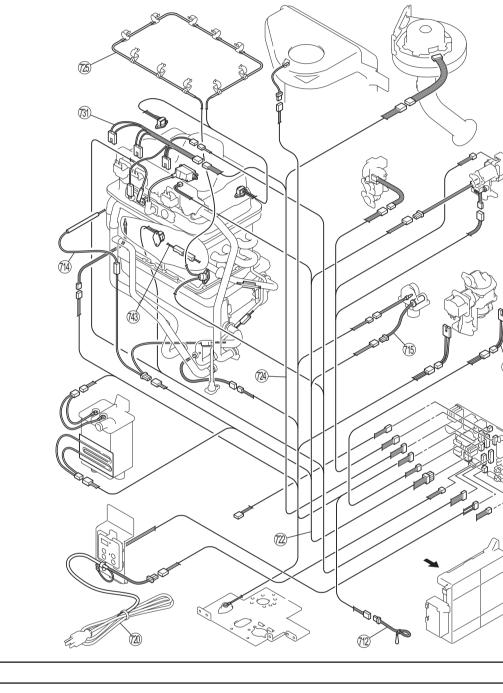
EXPLODED VIEW - INTERNALS

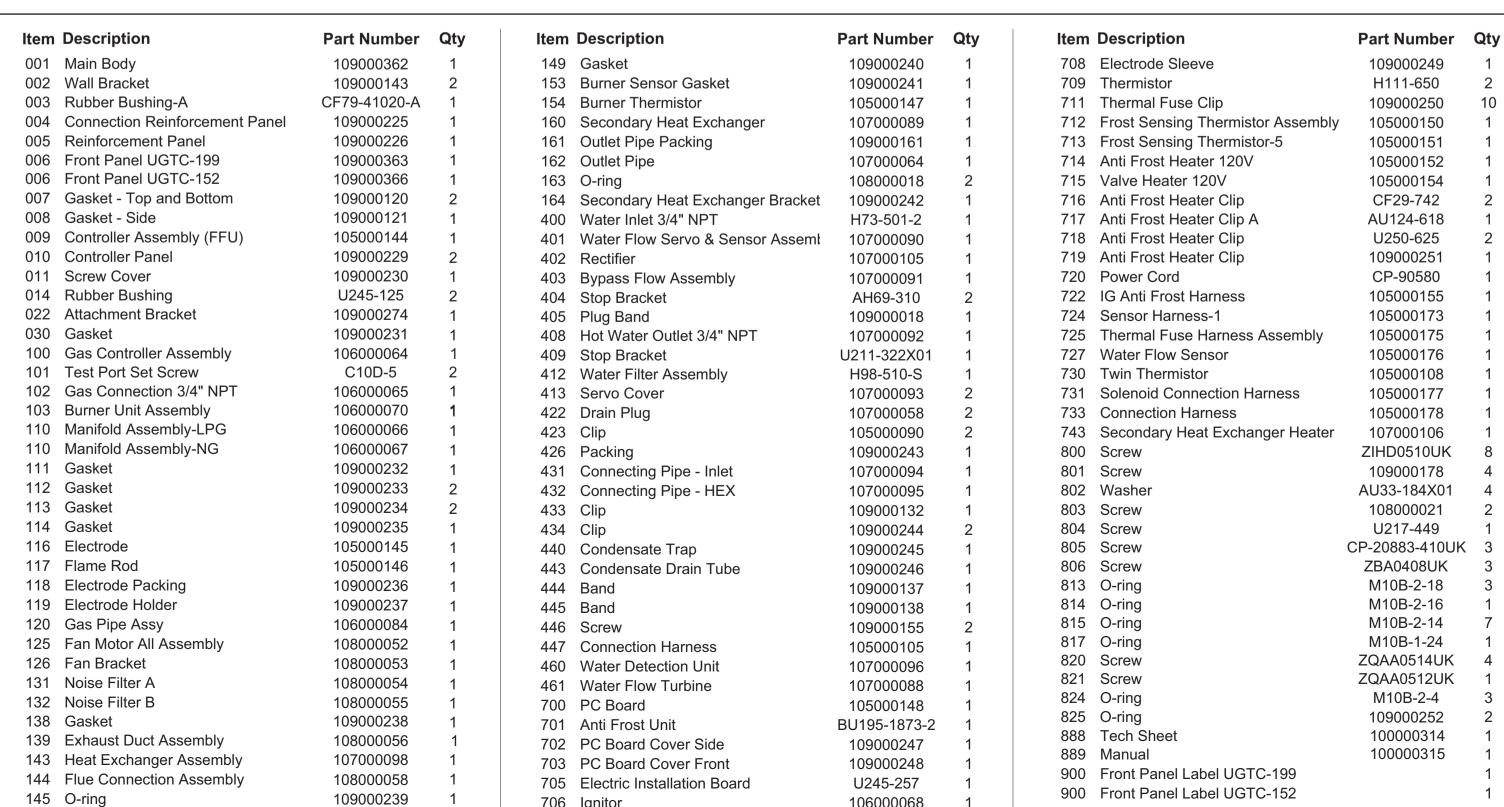


UGTC-152

U306-1622(00)

EXPLODED VIEW - ELECTRICAL





106000068

706 Ignitor