Maintenance sheet 8J3166-1

A. Troubleshooting

If the error code is indicated on the green LED (Refer to Section ${f c}$) on the PCB (Part #701) of the water heater (and/or the remote controller), refer to Section B

<< It takes a long time to get hot water at the fixtures >>

- The time it takes to deliver not water from the water heater to your fixtures depends on the <<Abnormal sound from water heater>> length of piping between the two. The longer the distance or the bigger the pipes, the longer it • An abnormal sound from the water heaters is caused by not enough air supply or incorrect will take to get hot water
- If you would like to receive hot water to your fixtures more quickly, you may want to consider a hot water recirculation system.

<< The water is not hot enough or turns cold and stays cold >>

- Compare the flow and temperature. Refer to the "Output temperature chart" in the Installation manual.
- Check cross plumbing between cold water lines and hot water lines.
- Check if the gas supply valve is open fully , the gas line is sized properly, and the gas supply pressure is within specified limits. Refer to the "Gas supply and gas pipe sizing" in the Installation manual.
- Check the set temperature, and change the set temperature with the remote controller or the DIP switch setting. Refer to Section D.
- Refer to the "Water circuit" in this section.
- Is the Easy-Link or Multi-Unit System set up correctly?

<<The water is too hot>>

· Check the set temperature and lower

<<The hot water is not available when a fixture is opened>>

- Refer to "Power supply circuit" and "Water circuit" in this section.
- Check if the gas supply valve is open fully, the gas line is sized properly, and the gas supply pressure is within specified limits.
- Is the Easy-Link or Multi-Unit System set up correctly?

<<Fluctuation in hot water temperature>>

- Check if the filter on the cold water inlet is cleaned. (Part #406)
- Check if the gas line is sized properly and and the gas supply pressure is within specified limits.
- Check for cross connection between cold water lines and hot water lines
- Refer to the "Water circuit" in this section
- Is the Easy-Link or Multi-Unit System set up correctly?

<< Unit does not ignite when water goes through the water heater>>

- Refer to "Power supply circuit" and "Water circuit" in this section
- Check if the inlet water temperature is too high. If it is too close to the set temperature, the water heater won't activate.
- Is the gas supply turned on?

<<The fan motor is still spinning after operation has stopped>>

• This is normal. After operation has stopped, the fan motor keeps running from 15 to 70 seconds in order to re-ignite quickly, as well as purge all the exhaust gas out of the flue.

installations. The water heater needs more combustion air. Refer to the "101" error code in the section B.

<< Power supply circuit>>

- Check the power supply, and make sure that the water heater has 120 VAC.
- Is the power switch inside water heater turned on? (Part #706)
- Press the "ON/OFF" button of the built-in controller (the remote controller, if it is installed*) and make sure that the STAND BY LED on the controller is lit. Run the water.
- Check if the green LED on the PCB (Part #701) of the water heater is lit. If so, the power supply circuit of the water heater is under normal condition. Next, refer to "Water circuit" in this section.
- Check the fuse on the surge box (Part #703), and if it has a brown spot, need to replace it
- If the green LED on the PCB (Part #701) isn't lit, some electrical parts may be broken. Consult the

<<Water circuit>>

- Turn on the power button on the built-in controller (the remote controller if it is installed*), and then check if the STAND BY LED will light up.
- Open all hot water faucets, and make sure that there is enough water flow. This water heater needs at least 0.5 GPM (1.9 L/m) water flow (at the default set temperature) to operate.
- Check for reverse connection and cross connection
- Check to see if the filter on the cold water inlet is clogged or if there is sediment buildup in the filter. (Part #406)
- · Check if water ways in the water heater are frozen. If so, thaw them. Refer to the installation manual to protect your water heater from freezing.
- Check if the inlet water pressure is higher than 40 psi. If it's lower than 40 psi, increase the pressure.
- Check for connections and breakage of wires (Part #402).
- Check if the motor drive of the flow adjustment valve (Part #402) is locked due to scale buildup, and/or water leakage. If so, consult the manufacturer.

*If a remote controller is installed, it will take priority over the built-in controller.

B. Error codes The 341, 751 and 941 error codes are applied to the CT-199 Indoor only.

031: Incorrect DIP switch setting

Check the DIP switch settings on the PCB. Refer to Section D.

101: Warning for the "991" error code

- Check the gas type of the house (and/or the building).
- Check if there is any blockage in the intake air and/or exhaust. Refer to the "Venting Instructions" in the Installation manual.
- If the water heater is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal. Refer to the "Vent termination clearances" in the Installation manual.
- Check the total vent length. Refer to the "Venting instructions" in the Installation manual
- Check the altitude/elevation of area of where the water heater is installed. Refer to the "High altitude function" of Section for the correct DIP switch settings.
- Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area
- Check if there is dust and lint in the heat exchanger.
- Check the manifold pressure of the water heater. Refer to the rating plate of the water heater.

111: Ignition failure*

- Check the gas supply and inlet gas pressure.
- Check if the Hi-limit switch (Part #412) is functioning properly.
- Check for connection/breakage of wires (Part #413, 708, 709, 711), and/or soot on the flame rod (Part #108). And then if the O.H.C.F (Part #413) has a breakage, consult the manufacturer. Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when water heater prepares for combustion.
- Listen for the double "clunk" sound coming from the gas valve assembly (Part #102) when water heater goes into combustion.
- (Only if sparking and/or clunk sound) Check the voltage on each wire to gas valve assembly (Part #102) and/or the igniter assembly (Part #711). Refer to "Appendix A" in Section C.

*No sparking sound >>>>> Refer to #1 at "Appendix A" in Section C. >>>> Refer to #2 at "Appendix A" in Section C. *No clunk sound

Check if there is leaking from the heat exchanger (Part #401).

- Check if there is dust and lint in nozzles of the manifold (Part #102).
- Check the current on the flame rod (Part #108). Refer to #3 at "Appendix A" in Section C.

121: Loss of flame*

- Check the gas supply and inlet gas pressure.
- Check if the Hi-limit switch (Part #412) is functioning properly.
- Check for connection/breakage of wires (Part #413, 708, 709, 711), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108). And then if the O.H.C.F (Part #413) has a breakage, consult the manufacturer.
- Check if there is leaking from the heat exchanger (Part #401).
- Check if there is dust and lint in nozzles of the manifold (Part #102).
- Check the current on the flame rod (Part #108). Refer to #3 at "Appendix A" in Section C.

311.321.331.341: Disconnected/short-circuited thermistor

- Check for connection/breakage of wires and/or debris on the thermistor (Part #407, 408, 411,
- Check the thermistor resistance. Refer to "Appendix D" in Section C.

391: Air-fuel ratio rod failure*

Check for connection/breakage of wires (Part #709) and/or soot on the flame rod (Part #108).

441: Flow sensor failure (Only Easy-Link & Multi-Unit Systems)

Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402).

510,551: Abnormal main gas solenoid valve and gas solenoid valve

- · Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).
- Reset power supply of the water heater.
- Check the voltage of each valve on the gas valve assembly (Part #102). Refer to "Appendix C" in Section C.

611: Fan motor fault*

- Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or burn marks on the computer board (Part #701).
- Check for frozen/corrosion of connectors of the fan motor (Part #103).
- Check the voltage between blue wire and each wire of the fan motor (Part #103). Refer to 'Appendix B" in Section C.

651: Flow adjustment valve fault (Only Easy-Link & Multi-Unit Systems)

- · Inspect the flow adjustment valve (Part #402), for connection/breakage of wires, locked motor drive due to scale buildup, and/or water leakage. Check the voltage between black wire and red wire. Refer to "Appendix F" in Section C.
- 661: Bypass valve fault*

- Inspect the bypass valve (Part #403), for connection/breakage of wires, locked motor drive due to scale buildup, and/or water leakage.
- Check the voltage between brown wire and red wire. Refer to "Appendix F" in Section C.

701: Computer board fault*

- · Check for connection/breakage of wires (Part #714), and check the resistance between white wire and red wire. Refer to "Appendix A" in Section C.
- · Check the outlet thermistor (Part #408) for proper readings as it may need to be cleaned.

711: Gas solenoid valve drive circuit failure*

· Refer to the "111" and "121" error codes in this section

721: False flame detection*

- Clean the flame rod (Part #108).
- Check if there is leaking from the heat exchanger (Part #401).

741: Miscommunication between water heater and remote controller

- Check the model type of the remote controller. Model No. 100112572 (TM-RE40)
- Inspect the connections between the water heater and remote controller. Refer to the "Temperature Remote Controller" in the Installation manual.
- Check the power supply of the water heater.
- If this error code appears only on the green LED in the PCB (Part #701), check the voltage on the remote controller terminal on the PCB. Refer to "Appendix E" in Section C.
- If this error code appears only on the remote controller, replace the PCB (Part #701).
- If this error code appears on both the PCB (Part #701) and the remote controller, replace the remote controller.

751: Miscommunication between water heater and built-in controller

- Check the power supply of the water heater.
- If this error code appears only on the green LED in the PCB (Part #701), check the voltage on the built-in controller terminal on the PCB. Refer to "Appendix E" in Section C.
- If this error code appears only on the built-in controller, replace the PCB (Part #701)
- If this error code appears on both the PCB (Part #701) and built-in controller (Part #722), replace the built-in controller (Part #722).

761: Miscommunication between Parent unit and Child units for Easy-Link System

• Check if the connections between the parent unit and the child units are correct. Refer to the "Easy-Link system" section in the Installation manual

941: Abnormal exhaust temperature (Only Indoor)

- · Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or burn marks on the computer board (Part #701).
- Check the exhaust thermistor resistance. Refer to "Appendix D" in Section C.

991: Imperfect combustion*

• Refer to the "101" error code in this section.

*These error codes will be cleared when water flow stops in a single unit installation.

C. Wiring diagram and check point of the water heater

The tech should power the heater off and then

Are all of the voltages within normal range?

Are all of the voltages within normal range?

Check the resistance between white wire and white wire

No >> Replace the thermistor (Part #407, 408, 411, 718).

Between black wire and white wire. (Normal: 11 to 25 VDC)

Error code 741: Refer to check point "F" on the wiring diagram above.

Error code 751: Refer to check point "L" on the wiring diagram above.

Check the voltage on the remote controller and/or built-in controller on the PCB.

Yes >> Replace the remote controller and/or built-in controller.

Are all of the check points normal?

Yes >> Replace the PCB (Part #701).

Appendix E (For error code 741 and 751)

Is the voltage within normal range?

No >> Replace the PCB (Part #701).

Yes >> Replace the gas valve assembly (Part #102).

50 59 68 77

10 15 20 25 30 35

10 15 20 25 30 35

15.4 12.6 10.3 8.5 7.0 5.9

50 59 68 77 86

kΩ 19.5 15.9 13.0 10.7 8.9 7.4

86 95

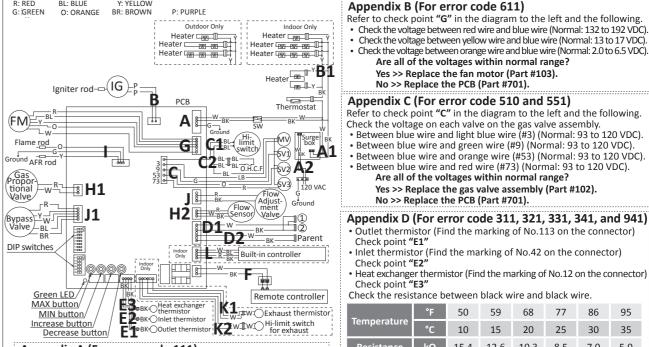
Yes >> Replace the fan motor (Part #103).

No >> Replace the PCB (Part #701).

No >> Replace the PCB (Part #701).

Exhaust thermistor

Check point "K1"



Appendix A (For error code 111)

BK: BLACK

BL: BLUE

LB: LIGHT BLUE

Y: YELLOW

Check the following points during ignition stage. #1. Refer to check point "B" on the wiring diagram above

Check the voltage between purple wires. (Normal: 108 to 132 VAC) Is the voltage within normal range? >> Replace the igniter assembly (Part #711).

No >> Go to Next. # 2. Refer to check points "C" and "H1" on the wiring diagram above.

Check the voltages below: C: Between blue wire and light blue wire (#3). (Normal: 93 to 120 VDC)

(Normal: 93 to 120 VDC) H1: Check the voltage between white wire and red wire.

C: Between blue wire and orange wire (#53).

(Normal: 1 to 15 VDC) Are these voltages within normal range?

Yes >> Replace the PCB (Part #701).

Yes >> Replace the gas valve assembly (Part #102). No >> Replace the PCB (Part #701).

Check the current through the yellow flame rod wire (Part #709) (Normal: more than 5 μA) Is the current normal when there is a flame?

No >> Replace the flame rod (Part #108)

Appendix F (For error code 651 and 661) Error code 651: Refer to check point "J" on the wiring diagram above. Check the voltage between black wire and red wire. (Normal: 7 to 16 VDC) Error code 661: Refer to check point "11" on the wiring diagram above. Check the voltage between brown wire and red wire. (Normal: 3 to 11 VDC)

Is the voltage within normal range? Yes >> Error code 651: Replace the Flow adjustment valve (Part #402). / Error code 661: Replace the Bypass valve (Part #403). No >> Replace the PCB (Part #701).

D. DIP switch settings on the computer board of the water heater

· Locate the bank of DIP switches at the bottom left of the computer board of the unit.

Change the DIP switch settings when the power supply is turned off.

The dark squares indicate the correct DIP switch set positions. DEFAULT is the factory setting.

Upper bank

Lower bank

<Upper bank of DIP switches>

Vent settings (Indoor model on 41 to 70 ft 5 to 20 ft (1.5 to 6.1 m) 21 to 40 ft (DEFAULT) (6.2 to 12.2 m) (12.3 to 21.3 m) 46 to 70 ft 5 to 45 ft (1.5 to 13.7 m) (DÈFAULT) (13.8 to 12.3 m) 5 to 50 ft (DEFAULT) 51 to 100 ft N/A (1.5 to 15.2 m) (15.3 to 30.5 m) ON 12345678 ON 12345678 ON 12345678

*Factory setting

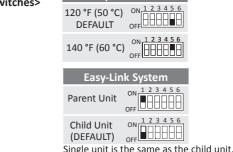
Propane ON 1 2 3 4/ Natural ON 1 2 3 4/OFF

Outdoor model* OFF HH

Outdoor model

Set DIP switches shown in the table above depending on the vent length.

<Lower bank of DIP switches>



Temperature set ON 1 2 3 4 5 6

OFF

0 to 2,000 ft 0 to 2,000 ft (0 to 610 m) DEFAULT OFF HEIGHT (611 to 914 m) 3 000 to 5 000 ft 5,000 to 7,500 ft (1.525 to 2.286 m) 7,500 to 10,100 ft ON

(0 to 610 m) DEFAULT (611 to 1,219 m) 4,000 to 6,000 ft ON

FM speed is increased

(2,287 to 3,078 m)

