Maintenance sheet ATH3J, ATH3S 68B166-2

A. Troubleshooting

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

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

• The time it takes to deliver hot water from the water heater to your fixtures depends on the length of piping between the two. The longer the distance or the bigger the

- pipes, the longer it will take to get hot water.
- · If you would like to receive hot water to your fixtures quicker, 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" of the Installation manual
- Check cross plumbing between cold water lines and hot water lines.
- · Check if the gas supply valve is fully open, the gas line is sized properly and the gas supplies enough pressure. Refer to the "Gas supply and gas pipe sizing" of the Installation manual.
- · Check the set temperature, and change the set temperature with the remote controller or the DIPswitch setting. Refer to Section D.
- Refer to the "Water circuit" in this section.

<<The water is too hot>>

Check the set temperature, lower setting temperature.

<<The hot water is not available when a fixture is opened>> Refer to the "Power supply circuit" and "Water circuit" in this section.

<<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 the supply gas pressure is sufficient. Check for cross connection between cold water lines and hot water lines.
- Refer to the "Water circuit" in this section.

<< Unit does not ignite when water goes through the water heater>> Refer to the "Power supply circuit" and "Water circuit" in this section

- If you use the remote controller, turn the power button on and then check if the STAND BY LED will light up. Check if the filter on the cold water inlet is cleaned (Part #406).
- Refer to the "Water circuit" in this section.

*The 341, 751 and 941 error codes are applied to the 240 (T-H3J) and 340 (T-H3S) Indoor models only

B. Error codes

031: Incorrect DIPswitch setting Check the DIPswitch 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" of 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" of the Installation manual.
- · Check the total vent length. Refer to the "Venting instructions" of the Installation manual. Check the altitude/elevation of area of where the water heater is installed. Refer to the
- "High-altitude function" of Section D. And change the DIPswitch 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 Installation manual of the water heater.

111: Ignition failure

- 1. Check the gas supply and inlet gas pressure.
- 2. Check if the Hi-limit switch (Part #412) is properly functioning.
- 3. Check for connection/breakage of wires (Part #413, 708, 709, 710, 712), 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.
- 4. Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when water heater prepares for combustion.
- 5. Listen for the double "clunk" sound coming from the gas valve assembly (Part #102) when water heater goes into combustion.
- 6. (Only if sparking and/or kick 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 kick sound
- 7. Check if there is leaking from the heat exchanger (Part #401). 8. Check if there is dust and lint in nozzles of the manifold (Part #102).
- 9. Check the current on the flame rod (Part #108). Refer to #3 at "Appendix A" in Section C.

121: Loss of flame

- 1. Check the gas supply and inlet gas pressure.
- 2. Check if the Hi-limit switch (Part #412) is properly functioning.
- 3. Check for connection/breakage of wires (Part #413, 708, 709, 712), 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.
- 4. Check if there is leaking from the heat exchanger (Part #401).
- 5. Check if there is dust and lint in nozzles of the manifold (Part #102).
- 6. Check the current on the flame rod (Part #108). Refer to #3 at "Appendix A" in Section C.

311,321,341*: Disconnected/short-circuited thermistor

• Check for connection/breakage of wires and/or debris on the thermistor (Part #407, 408, 715, 718). 991: Imperfect combustion • Check the thermistor resistance. Refer to "Appendix D" in Section C.

<<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.

<<Abnormal sound from water heater>>

• An abnormal sound from the water heaters is caused by not enough air supply or wrong installations. The water heater needs more combustion air. Refer to the "101" error code in the section **B**.

<< Power supply circuit>>

- 1. If the remote controller is installed, press the "ON/OFF" button of the remote controller, and make sure that the STAND BY LED next to the "ON/OFF" button of the remote controller is lit. Restart the water heater.
- 2. 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 the "Water circuit" in this section.
- 3. Check the fuse on the surge box (Part #703), and if it has a brown spot, need to replace it.
- 4. Check the power supply, and make sure that the water heater has 120 VAC.
- 5. If the green LED on the PCB (Part #701) isn't lit, some electrical parts can be broken. Consult the manufacturer.

<<Water circuit>>

- 1. If you use the remote controller, turn the power button on and then check if the STAND BY LED will light up.
- 2. Open all hot water faucets, and make sure that there is enough water flow. This water heater needs at least 0.5 GPM water flow (at the default set temperature) to operate.
- 3. Check for reverse connection and cross connection.
- 4. Check if the filter on the cold water inlet is cleaned (Part #406).
- 5. Check if there is no debris or obstruction on the fixtures.
- 6. Check if water ways in the water heater are frozen. If so, unfreeze them. And refer to the Installation manual to protect your water heater from freezing.
- 7. Check if the inlet water pressure is higher than 40 psi. And if it's lower than 40 psi, need to increase the pressure.
- 8. Check for connections and breakage of wires (Part #402).
- 9. 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.

391: Air-fuel ratio rod failure

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

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.

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.

711: Gas solenoid valve drive circuit failure

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

721: False flame detection

- 1. Clean the flame rod (Part #108).
- 2. For indoor models, check if a condensate drain is installed on the vent collar of the water heate 3. Check if there is leaking from the heat exchanger (Part #401).

741: Miscommunication between water heater and remote controller

- 1. Check the model type of the remote controller. Model No. 9009069005 (TM-RE42) is the correct one. 2. Inspect the connections between the water heater and remote controller. Refer to the "Remote controller connections" of the Installation manual.
- 3. Check the power supply of the water heater.
- 4. 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.
- 5. If this error code appears only on the remote controller, replace the PCB (Part #701). 6. 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 temperature controller

4. If this error code appears on both the PCB (Part #701) and the temperature controller,

· Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or

941*: Abnormal exhaust temperature (Only 240 (T-H3J) and 340 (T-H3S)

· Check the exhaust thermistor resistance. Refer to "Appendix D" in Section C.

1. Check the power supply of the water heater.

replace the temperature controller.

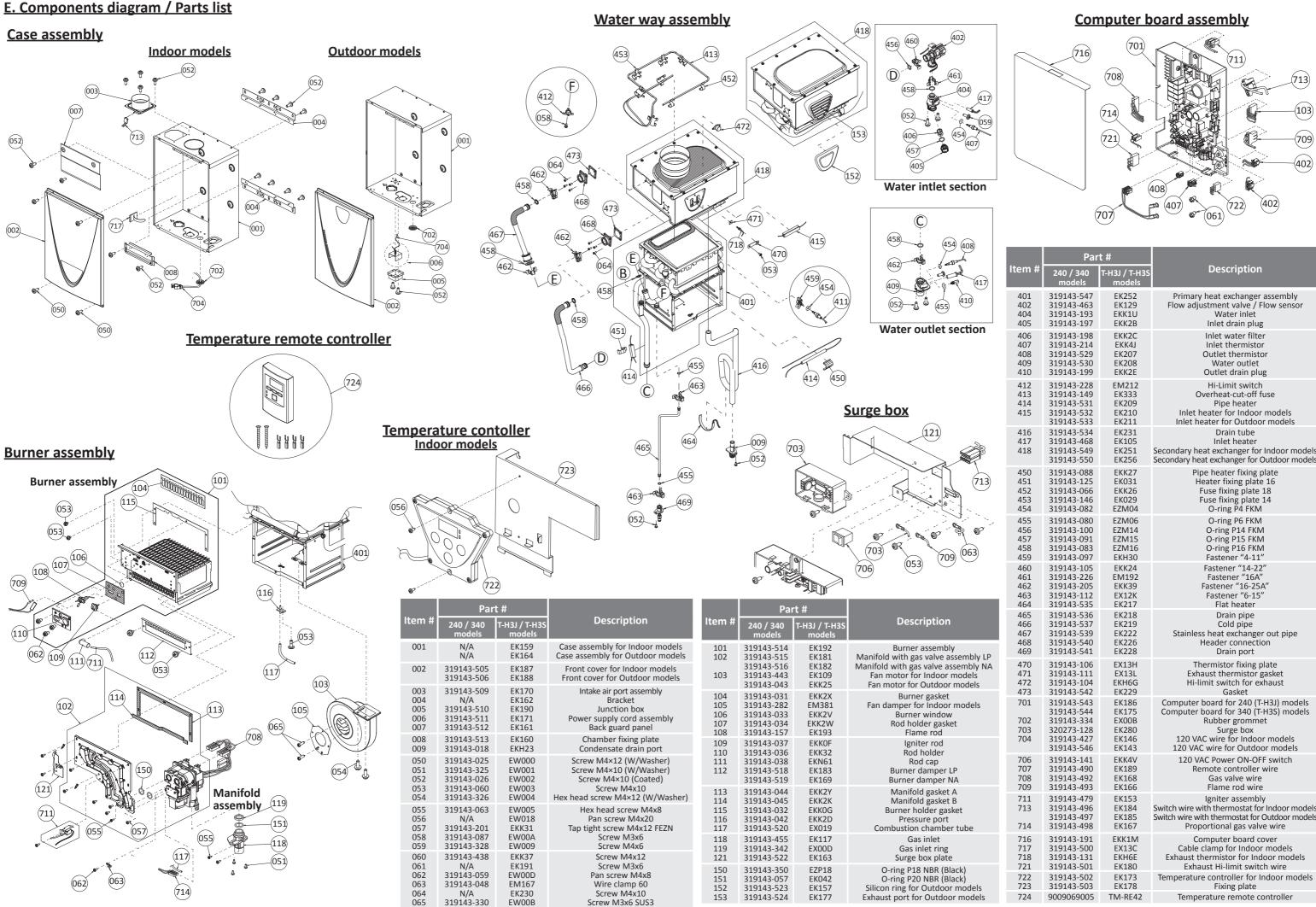
burn marks on the computer board (Part #701).

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

Indoor models)

2. 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. 3. If this error code appears only on the temperature controller, replace the PCB (Part #701).

C. Wiring diagram and check point of the w	ater heater			
W: WHITE BK: BLACK LB: LIGHT BLUE R: RED BL: BLUE Y: YELLOW	Appendix B (For error code 611)			
W: WHITE BK: BLACK LB: LIGHT BLUE	Appendix B (For error code 611)Refer to check point "G" in the diagram to the left and the following.Check the voltage between red wire and blue wire. (Normal: 132 to 192 VDC)Check the voltage between yellow wire and blue wire. (Normal: 13 to 17 VDC)Check the voltage between orange wire and blue wire. (Normal: 2.0 to 6.5 VDC) All check points are normal? Yes >> Replace the fan motor (Part #103). No >> Replace the PCB (Part #701).Appendix C (For error code 510 and 551)Refer to check point "C" in the diagram to the left and the following. Check the voltage on each valve on the gas valve assembly. • Between blue wire and green wire (#3) (Normal: 93 to 120 VDC). • Between blue wire and green wire (#3) (Normal: 93 to 120 VDC). • Between blue wire and orange wire (#33) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Between blue wire and red wire (#73) (Normal: 93 to 120 VDC). • Divention to "EXAMPLE"Check the resistance between black wire and black wire.Outlet thermistor (Find the marking of			
 (Normal: 93 to 120 VDC) H1: Check the voltage between white wire and red wire. (Normal: 1 to 15 VDC) These check points are normal? Yes >> Replace the gas valve assembly (Part #102). No >> Replace the PCB (Part #701). # 3. Check the current through the yellow flame rod wire (Part #709). (Normal: more than 5 μA) This check point is normal during operation? Yes >> Replace the PCB (Part #701). 	All check points are normal? Yes >> Replace the PCB (Part #701). No >> Replace the thermistor (Part #407, 408, 718). Appendix E (For error code 741 and 751) 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 temperature controller on the PCB. • Between black wire and white wire. (Normal: 11 to 25 VDC) This check point is normal?			
No >> Replace the flame rod (Part #108).	Yes >> Replace the remote controller and/or temperature controller. No >> Replace the PCB (Part #701).			
D. DIPswitch settings on the computer board of the water heater Locate the bank of DIPswitches at the bottom left of the computer board of the unit. Change the DIPswitch settings when the power supply is turned off. The dark square is the direction the DIPswitch should be set to. DEFAULT is the factory setting. Gas type* Propane ON ON 12345678910 Natural ON 12345678910 ON 12345678910 ON 12345678910 ON 12345678910 ON 12345678910				
Gas OFF	Temperature set			
*Factory setting High-altitude function	120 °F (49 °C) ON 1 2 3 4 5 6 7 8 9 10			
Indoor models Outdoor models 0 to 2,000 ft. (DEFAULT) ON 1 2 3 4 5 6 OFF 0 to 2,000 ft. (DEFAULT) ON 1 2 3 4 5 6 OFF 2,000 to 3,000 ON 1 2 3 4 5 6 OFF 2,000 to 4,000 ON 1 2 3 4 5 6 OFF	DEFAULT OFF Image: 1 2 3 4 5 6 7 8 9 10 140 °F (60 °C) ON Image: 1 2 3 4 5 6 7 8 9 10 OFF Image: 1 2 3 4 5 6 7 8 9 10 OFF Image: 1 2 3 4 5 6 7 8 9 10			
ft. OFF ft. OFF ft.3,000 to 5,000 ft. OFF 4,000 to 6,000 ft. ON $1 \ge 3 + 5 = 6$ ft. ON $1 \ge 3 + 5 = 6$ ft. ON $1 \ge 3 + 5 = 6$ orf ON				



	Part #		
Item #	240 / 340 models	T-H3J / T-H3S models	Description
401	319143-547	EK252	Primary heat exchanger assembly
402	319143-463	EK129	Flow adjustment valve / Flow sensor
404	319143-193	EKK1U	Water inlet
405	319143-197	EKK2B	Inlet drain plug
406	319143-198	EKK2C	Inlet water filter
407	319143-214	EKK4J	Inlet thermistor
408	319143-529	EK207	Outlet thermistor
409	319143-530	EK208	Water outlet
410	319143-199	EKK2E	Outlet drain plug
412 413 414 415	319143-228 319143-149 319143-531 319143-532 319143-533	EM212 EK333 EK209 EK210 EK211	Hi-Limit switch Overheat-cut-off fuse Pipe heater Inlet heater for Indoor models Inlet heater for Outdoor models
416 417 418	319143-534 319143-468 319143-549 319143-550	EK231 EK105 EK251 EK256	Drain tube Inlet heater Secondary heat exchanger for Indoor models Secondary heat exchanger for Outdoor models
450	319143-088	EKK27	Pipe heater fixing plate
451	319143-125	EK031	Heater fixing plate 16
452	319143-066	EKK26	Fuse fixing plate 18
453	319143-146	EK029	Fuse fixing plate 14
454	319143-082	EZM04	O-ring P4 FKM
455	319143-080	EZM06	O-ring P6 FKM
456	319143-100	EZM14	O-ring P14 FKM
457	319143-091	EZM15	O-ring P15 FKM
458	319143-083	EZM16	O-ring P16 FKM
459	319143-097	EKH30	Fastener "4-11"
460	319143-105	EKK24	Fastener "14-22"
461	319143-226	EM192	Fastener "16A"
462	319143-205	EKK39	Fastener "16-25A"
463	319143-112	EX12K	Fastener "6-15"
464	319143-535	EK217	Flat heater
465	319143-536	EK218	Drain pipe
466	319143-537	EK219	Cold pipe
467	319143-539	EK222	Stainless heat exchanger out pipe
468	319143-540	EK226	Header connection
469	319143-541	EK228	Drain port
470	319143-106	EX13H	Thermistor fixing plate
471	319143-111	EX13L	Exhaust thermistor gasket
472	319143-104	EKH6G	Hi-limit switch for exhaust
473	319143-542	EK229	Gasket
701 702 703 704	319143-543 319143-544 319143-334 320273-128 319143-427 319143-546	EK186 EK175 EX00B EK280 EK146 EK143	Computer board for 240 (T-H3J) models Computer board for 340 (T-H3S) models Rubber grommet Surge box 120 VAC wire for Indoor models 120 VAC wire for Outdoor models
706	319143-141	EKK4V	120 VAC Power ON-OFF switch
707	319143-490	EK189	Remote controller wire
708	319143-492	EK168	Gas valve wire
709	319143-493	EK166	Flame rod wire
711 713 714	319143-479 319143-496 319143-497 319143-498	EK153 EK184 EK185 EK167	Igniter assembly Switch wire with thermostat for Indoor models Switch wire with thermostat for Outdoor models Proportional gas valve wire
716	319143-191	EKK1M	Computer board cover
717	319143-500	EX13C	Cable clamp for Indoor models
718	319143-131	EKH6E	Exhaust thermistor for Indoor models
721	319143-501	EK180	Exhaust Hi-limit switch wire
722	319143-502	EK173	Temperature controller for Indoor models
723	319143-503	EK178	Fixing plate
724	9009069005	TM-RE42	Temperature remote controller