Maintenance sheet 62V101-4

A. Troubleshooting

If the error code is indicated on the Red LED (Refer to the 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 guicker, 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 pressure enough. 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 set temperature will be displayed on the screen.
- · Check if the filter on the cold water inlet is cleaned (Part #406).

<< 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 "10" 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 set temperature is displayed on the remote controller. Restart the water heater.
- 2. Check if the Red LED on the PCB (Part #701) of the water heater is lit for a few seconds right after the power is supplied. 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 Red 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 set temperature will be displayed on the screen.
- 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.
- 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

B. Error codes

The numbers in parentheses below are the numbers of blinking of the Red LED on the PCB to indicate the error codes.

03 (One time): Incorrect DIPswitch setting

Check the DIPswitch settings on the PCB. Refer to Section D.

10 (Five times): Warning for the "99" error code

- Check the gas type of the house (and/or the building). If it's wrong gas type model, replace 39 (Two times): Air-fuel ratio rod failure the water heater to correct one.
- Check if there is any blockage (For example, Damper sticking, Vent Flaps installed on the terminator, Snow build up around terminator, Installed in a closet (No ventilation or lack of combustion air)) in the intake air and/or exhaust. Refer to the "Vent termination clearances" 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 if the total vent length doesn't exceed 50 ft and the # of elbows is less than 5Ea.
- 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 heter.

11 (Three times): 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, 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 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 no sparking and/or kick sound) Check the voltage on each wire to gas valve assembly (Part #102) and/or the igniter (Part #711). Refer to "Appendix A" in Section C.
 - *No sparking sound >>>>> Refer to #1 at "Appendix A" in Section C. *No kick sound >>>> Refer to #2 at "Appendix A" in Section C.
- 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.

12 (Three times): 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.

31,32 (Two times): Disconnected/short-circuited thermistor

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

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

51,55 (six times): Abnormal gas solenoid valve and main gas valve

- Check for connection/breakage of wires (Part #708) and/or burn marks on the computer hoard (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.

61 (Four times): 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), and check resistance between white wire and red wire. Refer to "Appendix B" in Section C.

70 (One time): Computer board fault

 Check for connection/breakage of wires (Part #714) and/or burn marks on the computer board (Part #701)

72 (Six times): False flame detection

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

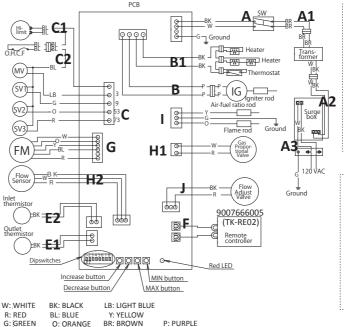
74: Miscommunication between water heater and remote controller

- 1. Check the model type of the remote controller. Model No. 9007666005 (TK-RE02) is the
- 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 Red 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

99 (Five times): Imperfect combustion

Refer to the "10" error code in this section.

C. Wiring diagram and check point of the water heater



Appendix A (For error code 11)

(Normal: 90 to 110 VAC) This check point is normal?

No >> Go to Next.

Check the voltages below:

(Normal: more than 1 µA)

Check the following points during ignition stage.

Check the voltage between purple wires.

Yes >> Replace the igniter (Part #711).

(Normal: 78 to 100 VDC)

(Normal: 78 to 100 VDC)

These check points are normal?

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

This check point is normal during operation?

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

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

(Normal: 1 to 15 VDC)

#1. Refer to check point "B" on the wiring diagram above.

C: Between blue wire and light blue wire (#3).

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

2. Refer to check points "C" and "H1" on the wiring diagram above

H1: Check the voltage between white wire and red wire.

#3. Check the current through the orange flame rod wire (Part #709).

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

Appendix C (For error code 51 and 55)

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

Appendix B (For error code 61)

All check points are normal?

(Normal: 110 to 160 VDC)

(Normal: 13 to 17 VDC)

(Normal: 2.0 to 6.5 VDC)

Refer to check point "C" in the diagram to the left and the following. Check the voltage on the each valve on the gas valve assembly.

Refer to check point "G" in the diagram to the left and the following.

Check the voltage between red wire and blue wire.

Check the voltage between yellow wire and blue wire.

Check the voltage between orange wire and blue wire.

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

- Between blue wire and light blue wire (#3) (Normal: 78 to 100 VDC).
- Between blue wire and green wire (#9) (Normal: 78 to 100 VDC).
- Between blue wire and orange wire (#53) (Normal: 78 to 100 VDC). • Between blue wire and red wire (#73) (Normal: 78 to 100 VDC).

All check points are normal?

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

Appendix D (For error code 31 and 32)

- Outlet thermistor (Find the marking of No.113 on the connector) Check point "E1"
- Inlet thermistor (Find the marking of No.42 on the connector) Check point "E2"

Check the resistance between black wire and black wire

Temperature	°F	50	59	68	77	86	95
	°C	10	15	20	25	30	35
Resistance	kΩ	15.4	12.6	10.3	8.5	7.0	5.9

All check points are normal? Yes >> Replace the PCB (Part #701). No >> Replace the thermistor (Part #407, 408).

Appendix E (For error code 74)

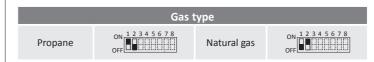
Refer to check point "F" on the wiring diagram above. Check the voltage on the remote controller terminal on the PCB. (Normal: 11 to 25 VDC)

This check point is normal? Yes >> Replace the remote controller. No >> Replace the PCB (Part #701).

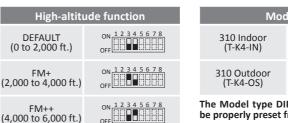
D. DIPswitch settings on the computer board of the water heater

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.

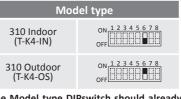
The DIPswitches have certain special functions and generally should not need adjustment. They have settings for four functions, shown below.



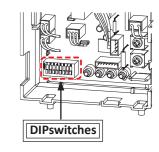
The Gas type DIPswitch should already be properly preset from the factory.

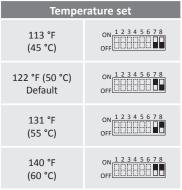


FM speed is increased automatically.



The Model type DIPswitch should already





E. Components diagram / Parts list

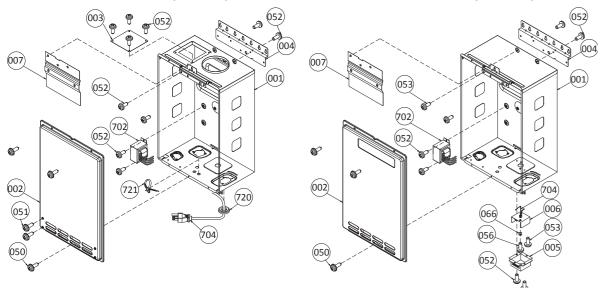
Case assembly

Burner assembly

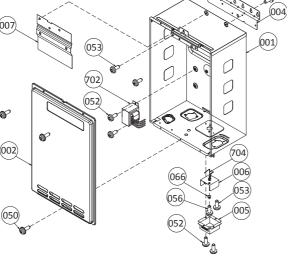
Power control/

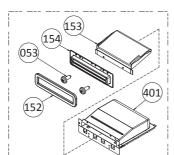
310 Indoor (T-K4-IN)

310 Outdoor (T-K4-OS)



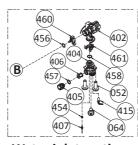
Fan motor section for outdoor model





Exhaust section for 310 Outdoor (T-K4-IN)

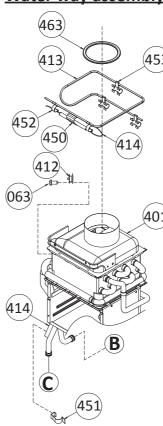
Item					
#	310 model	T-K4 model	Description		
001	319143-151 319143-211		Case assembly for 310 Indoor (T-K4-IN) for 310 Outdoor (T-K4-OS)		
002	319143-152 319143-371	EK403 EK409	Front coverfor 310 Indoor (T-K4-IN) for 310 Outdoor (T-K4-OS)		
003 004 005 006 007	319143-150 319143-184 319143-014 319143-128 319143-221	EKJ09 EKJ64	Air blockage plate for 310 Indoor (T-K4-IN) Bracket Junction box Junction box inner plate Back guard panel for 310 (T-K4)		
050 051 052 053	319143-025 319143-325 319143-026 319143-060	EW001 EW002	Screw M4×10 (W/Washer)		
054 055 056 057	319143-326 319143-063 319143-372 319143-330	EW005 EX014	Hex head screw M4x12 (W/Washer) Hex head screw M4x8 Screw M4x10 Screw M3x6 SUS3		
058 059 060 061 062 063 064 065 066	319143-061 319143-332 319143-201 319143-062 319143-087 319143-328 319143-059 319143-143	EW00H EW024 EKK31 EW006 EW00A EW009 EW00D EC00X	Screw M3x10 Pan screw M4x12 (W/Washer) Pan screw M4x10 FEZN Tap tight screw M4x12 FEZN Pan screw M4x10 Screw M3x6 Screw M4x6 Pan screw M4x8 Nylon clamp Wire clamp 60		



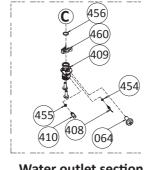
Water inlet section

Item	Part # 310 T-K4 model model		
#			Description
101	319143-030	EKH5W	Burner assembly for 310 (T-K4)
102	319143-046 319143-368	EKH6T EKK5K	Manifold with gas valve assembly LP for 310 (T-K4) Manifold with gas valve assembly NA for 310 (T-K4)
103	319143-043 319143-217	EKK25 EKK54	Fan motor for 310 Indoor (T-K4-IN) Fan motor for 310 Outdoor (T-K4-OS)
104	319143-032	EKK0G	Burner holder gasket for 310 (T-K4)
105 106 107 108	319143-031 319143-033 319143-034 319143-035	EKK2X EKK2V EKK2W EKK0E	Burner gasket Burner window Rod holder gasket Flame rod for 310 (T-K4)
109	319143-037	EKK0F	Igniter rod for 310 (T-K4)
110 111	319143-036 319143-038	EKK32 EKN61	Rod holder for 310 (T-K4) Rod cap
112	9009012005 9009014005	EK2AJ EK492	Burner damper for 310 Indoor (T-K4-IN) Burner damper for 310 Outdoor (T-K4-OS)
113 114 115	319143-044 319143-045 319143-367	EKK2Y EKK2K TU001	Manifold gasket A Manifold gasket B Fan damper for 310 Indoor (T-K4-IN)
116 117	319143-042 319143-041 319143-344	EKK2D EKK2N EX019	Pressure port for 310 (T-K4) Combustion chamber tube for 310 Indoor (T-K4-IN) Combustion chamber tube for 310 Outdoor (T-K4-OS)
118 119 120	319143-050 319143-049 319143-051	EKK1E EKK2Z EKK1B	Gas inlet Gas inlet ring Igniter plate
121	319143-213	EKK4H	Surge box plate for 310 (T-K4)
150 151 152	319143-350 319143-057 319143-206	EZP18 EK042 EKK3G	O-ring P18 NBR (Black) O-ring P20 NBR (Black) Silicon ring for 310 Outdoor (T-K4-OS)
153	319143-216	EKK53	Rain protection plate in Exhaust chamber for 310 Outdoor (T-K4-OS)
154	319143-219	EKK56	Exhaust port





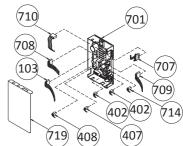
lha	Part #		
Item #	310 model	T-K4 model	Description
401	319143-153 319143-157	EK406 EK413	Heat exchanger assembly for 310 Indoor (T-K4-IN) for 310 Outdoor (T-K4-OS)
402	319143-167	EK427	Flow adjustment valve/Flow sensor for 310 (T-K4)
404	319143-193	EKK1U	Water inlet
405	319143-197	EKK2B	Inlet drain plug
406	319143-198	EKK2C	Inlet water filter
407	319143-214	EKK4J	Inlet thermistor for 310 (T-K4)
408	319143-218	EKK55	Outlet thermistor for 310 (T-K4)
409	319143-194	EKK1V	Water outlet
410	319143-199	EKK2E	Outlet drain plug
412	319143-228	EM212	Hi-Limit switch for 310 (T-K4)
413	319143-149	EK333	Overheat-cut-off fuse
414	319143-200	EKK2R	Heater
415	319143-078	EKK2P	Inlet heater
450	319143-088	EKK27	Pipe heater fixing plate
451	319143-125	EK031	Heater fixing plate 16
452	319143-066	EKK26	Fuse fixing plate 18
453 454	319143-146 319143-082	EK029 EZM04	Fuse fixing plate 14 O-ring P4 FKM
454	319143-082	EZIVIO4 EZM06	O-ring P6 FKM
456	319143-080	EZM14	O-ring P14 FKM
457	319143-100	EZM15	O-ring P14 FKM
458	319143-083	EZM16	O-ring P16 FKM
460	319143-105	EKK24	Fastener "14-22"
461	319143-226	EM192	Fastener "16A"
463	319143-065	EKN50	Silicon ring

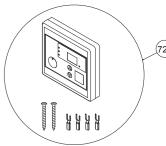


Water outlet section

	Item #	Part #			
		310 model	T-K4 model	Description	
	701 702	319143-158 319143-182	EK414 EKH09	Computer board for 310 (T-K4) model Transformer	
	703 704	319143-168 319143-427 319143-138	EK428 EK146 EKK3C	Surge box AC120V wire for 310 Indoor (T-K4-IN) AC 120 V wire for 310 Outdoor (T-K4-OS)	
	705	319143-180	EK440	Transformer wire for 310 (T-K4)	
	706 707	319143-141 319143-181	EKK4V EK441	AC120V Power ON-OFF switch Switch wire for 310 (T-K4)	
	708	319143-207	EKK3K	Gas valve wire for 310 (T-K4) model	
	709	319143-208	EKK3L	Flame rod wire for 310 (T-K4) model	
	710	319143-209 319143-210	EKK3R EKK40	EH-IG wire for 310 Indoor (T-K4-IN) EH-IG wire with freeze protection thermostat for 310 Outdoor (T-K4-OS)	
	711 712	319143-052 319143-039	EKN74 EKK2M	Igniter High voltage igniter cable	
	713	319143-185	EKJ59	Freeze protection thermostat for 310 Indoor (T-K4-IN)	
Ì	714	319143-220	EKK58	Proportional gas valve wire for 310 (T-K4)	
	719 720 721	319143-212 319143-426 319143-425	EKK49 EK148 EW022	Computer board cover for 310 (T-K4) model Rubber grommet for Indoor model Cable strap for Indoor model	
	722	9007666005	TK-RE02	Temperature remote controller for 310 (T-K4)	

Computer board assembly





<u>Temperature</u> <u>remote controller</u>