

Maintenance sheet

ATD2
62S101-4

A. Troubleshooting

If the error code is indicated on the 7-Seg-LED 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 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 green LED will light up.
- Check if the filter on the cold water inlet is cleaned (Part #406).
- Refer to “**Water circuit**” in this section.

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). If it's wrong gas type model, replace 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.

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, 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.

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.

<<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 green LED on the “ON/OFF” button of the remote controller is lit.. Restart the water heater.
2. Check if the 7-Seg 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 7-Seg 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 green 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**.

311,321,331: Disconnected/short-circuited thermistor

- Check for connection/breakage of wires and/or debris on the thermistor (Part #407, 408, 411, 716).
- 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 System)

- Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402,717).

510: Abnormal Main and Solenoid gas 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), and check resistance between white wire and red wire. Refer to “**Appendix B**” in Section C.

651: Flow adjustment valve fault (Only Easy-Link system)

- Inspect the flow adjustment valve (Part #402), for connection/breakage of wires(Part #718), locked motor drive due to scale buildup, dust buildup, and/or water leakage.
- Check the voltage between black wire and red wire. Refer to “**Appendix F**” in Section C.

701: Computer board fault

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

721: False flame detection

1. Clean the flame rod (Part #108).
2. For indoor model, 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).

741: Miscommunication between water heater and remote controller

1. Check the model type of the remote controller. Model No. 9007603005 (TM-RE30) 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 7-Seg 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.

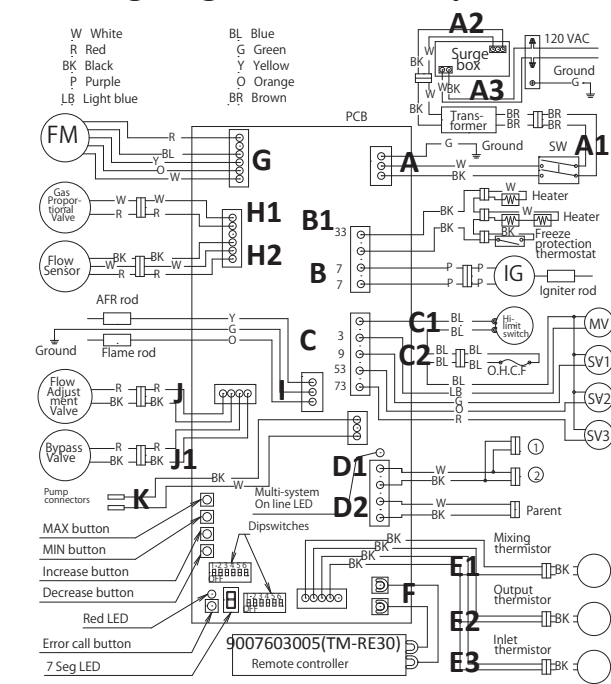
761: Miscommunication between Parent unit and Child units for Easy-Link System

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

991: Imperfect combustion

- Refer to the “**101” error code** in this section.

C. Wiring diagram and check point of the water heater



Appendix A (For error code 111)

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: 90 to 110 VAC)
 - This check point is normal?**
 - Yes >> Replace the igniter (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: 78 to 100 VDC)
 - C: Between blue wire and orange wire (#53). (Normal: 78 to 100 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 orange flame rod wire (Part #709). (Normal: more than 1 μA)
 - This check point is normal during operation?**
 - Yes >> Replace the PCB (Part #701).**
 - No >> Replace the flame rod (Part #108).**

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: 110 to 160 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)

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.

- 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 311, 321 and 331)

- Mixing thermistor (Find the marking of No.113 on the connector) Check point “**E1**”
- Outlet thermistor (Find the marking of No.12 on the connector) Check point “**E2**”
- Inlet thermistor (Find the marking of No.42 on the connector) Check point “**E3**”

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, 411).

Appendix E (For error code 741)

Refer to check point “**F**” on the wiring diagram above.

Check the voltage on the remote controller terminal on the PCB. (Normal: 11 to 15 VDC)

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

Appendix F (For 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)

This check point is normal?
Yes >> Replace the Flow adjustment valve. (Part #402)
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.

<Left bank of DIPswitches>

The left bank DIPswitch settings have special functions and generally should not need adjustment

Gas type	
Propane	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
Natural gas	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6

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

High-altitude function	
DEFAULT (0 to 2,000 ft.)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
FM+ (2,000 to 4,000 ft.)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
FM++ (4,000 to 6,000 ft.)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6

FM speed is increased automatically.

<Right bank of DIPswitches>

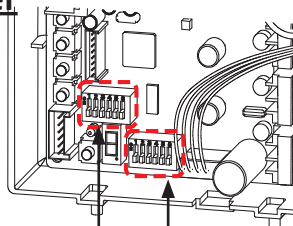
The right bank DIPswitch settings have the following functions

Easy-Link System	
Parent unit	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
Child units (DEFAULT)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6

Single unit is the same as the child unit.

Model type	
510 Indoor (T-D2-IN)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
510 Outdoor (T-D2-OS)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6

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

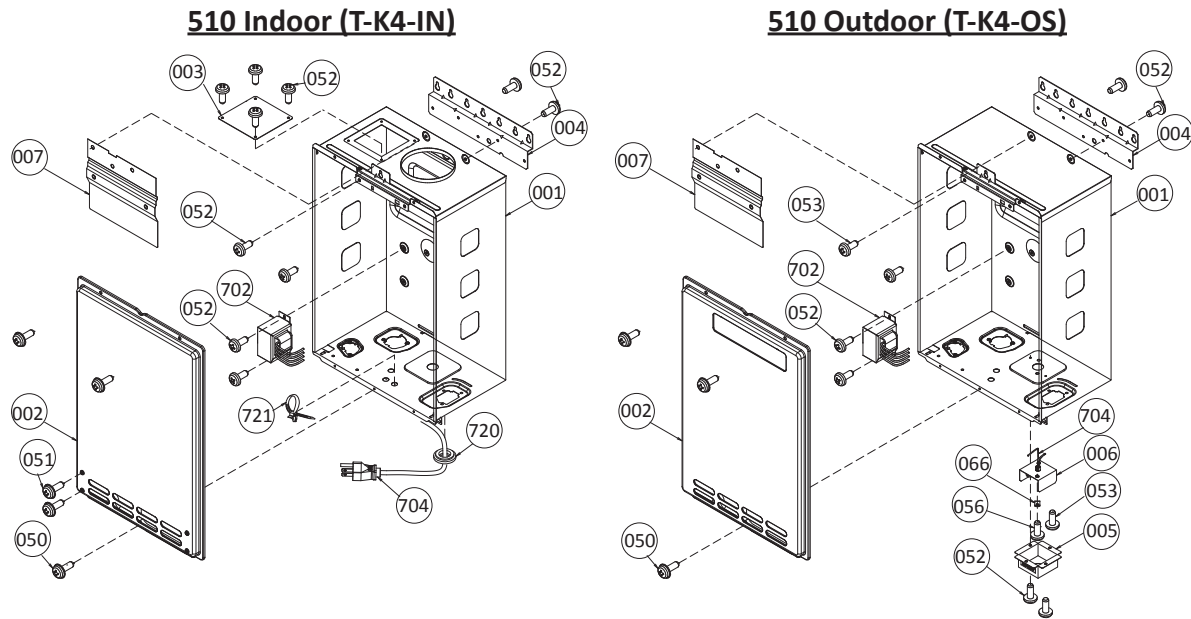


Temperature set

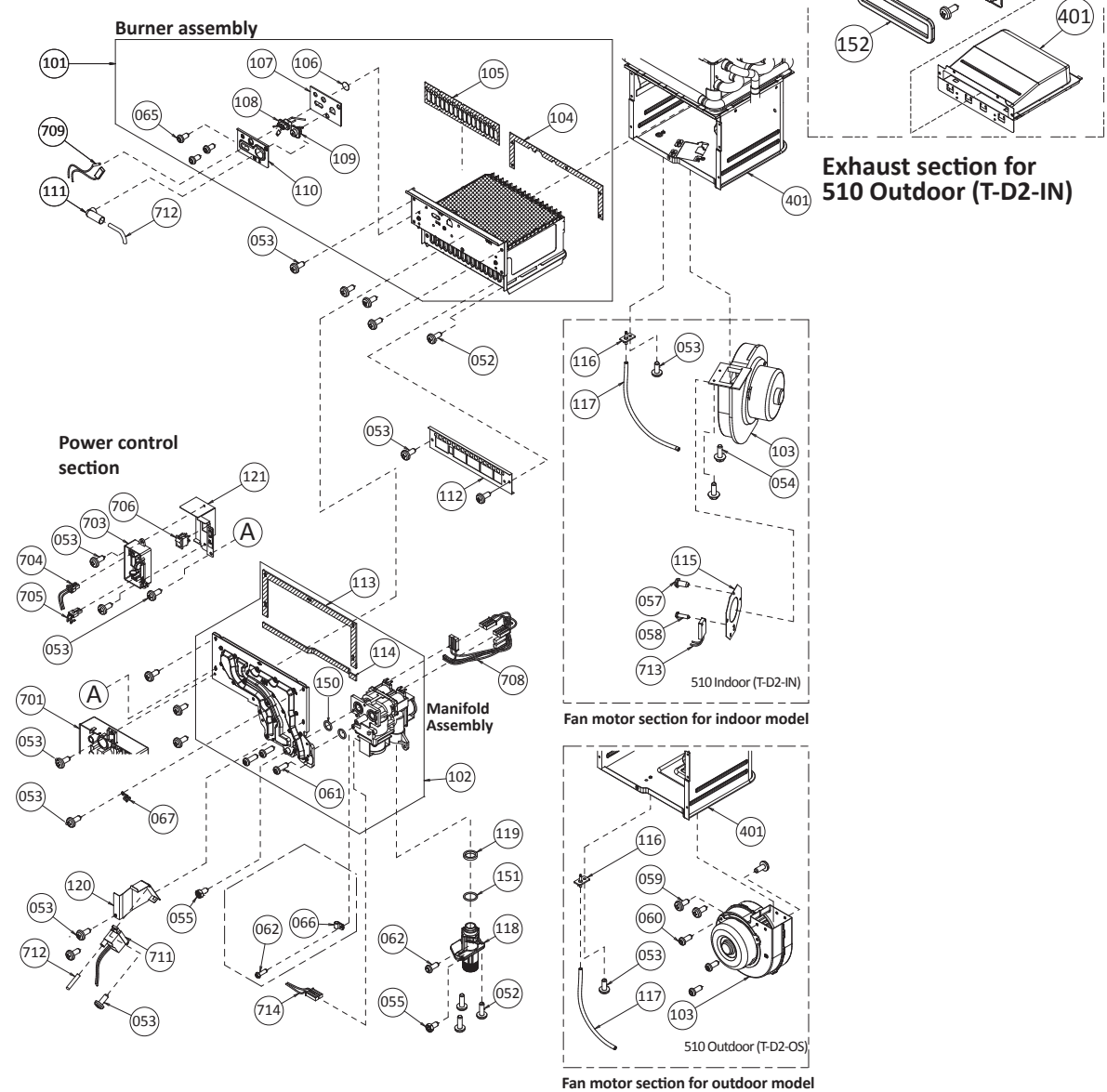
104 °F (40 °C)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
113 °F (45 °C)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
122 °F (50 °C) Default	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6
140 °F (60 °C)	ON 1 2 3 4 5 6 OFF 1 2 3 4 5 6

E. Components diagram / Parts list

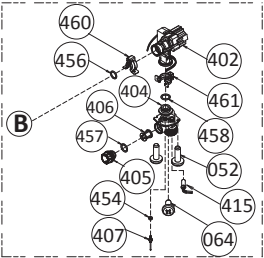
Case assembly



Burner assembly

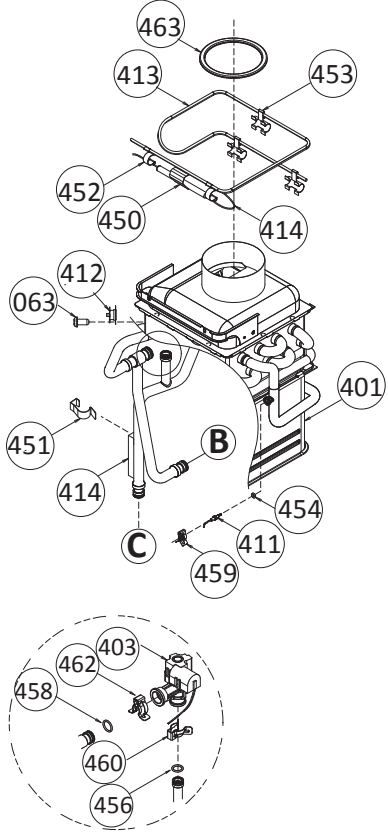


Item #	Part #		Description
	510 model	T-D2 model	
001	319143-151 319143-211	EK402 EKK41	Case assembly for 510 Indoor (T-D2-IN) for 510 Outdoor (T-D2-OS)
002	319143-174 319143-175	EK434 EK435	Front cover for 510 Indoor (T-D2-IN) for 510 Outdoor (T-D2-OS)
003	319143-150	EK401	Air blockage plate for 510 Indoor (T-D2-IN)
004	319143-184	EKJ09	Bracket
005	319143-014	EKJ64	Junction box
006	319143-128	EKJ66	Junction box inner plate
007	319143-221	EKK5H	Back guard panel for 510 (T-D2) model
050	319143-025	EW000	Screw M4×12 (W/Washer)
051	319143-325	EW001	Screw M4×10 (W/Washer)
052	319143-026	EW002	Screw M4×10 (Coated)
053	319143-060	EW003	Screw M4×10
054	319143-326	EW004	Hex head screw M4×12 (W/Washer)
055	319143-063	EW005	Hex head screw M4x8
056	319143-372	EX014	Screw M4x10
057	319143-330	EW00B	Screw M3x6 SUS3
058	319143-327	EW008	Screw M3x10
059	319143-061	EW00H	Pan screw M4x12 (W/Washer)
060	319143-332	EW024	Pan screw M4x10 FEZN
061	319143-201	EKK31	Tap tight screw M4x12 FEZN
062	319143-062	EW006	Pan screw M4x10
063	319143-087	EW00A	Screw M3x6
064	319143-328	EW009	Screw M4x6
065	319143-059	EW00D	Pan screw M4x8
066	319143-143	EC00X	Nylon clamp
067	319143-048	EM167	Wire clamp 60



Water inlet section

Water way assembly

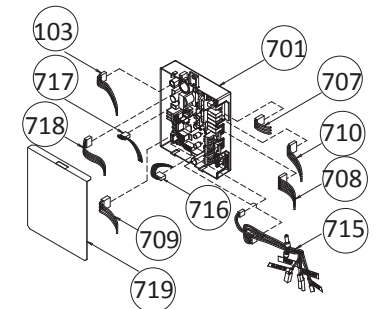


Water outlet section

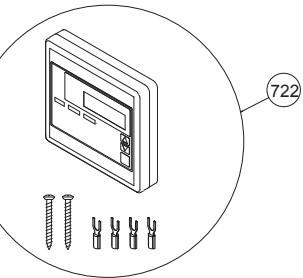
Item #	Part #		Description
	510 model	T-D2 model	
401	319143-369 319143-177	TU002 EK437	Heat exchanger assembly for 510 Indoor (T-D2-IN) for 510 Outdoor (T-D2-OS)
402	319143-178	EK438	Flow adjustment valve/Flow sensor for 510 (T-D2)
403	319143-186	EKK0U	Bypass valve for 510 (T-D2) model
404	319143-193	EKK1U	Water inlet
405	319143-197	EKK2B	Inlet drain plug
406	319143-198	EKK2C	Inlet water filter
407	319143-085	EKK38	Inlet thermistor for 510 (T-D2) model
408	319143-190	EKK1A	Mixing thermistor for 510 (T-D2) model
409	319143-194	EKK1V	Water outlet
410	319143-199	EKK2E	Outlet drain plug
411	319143-096	EKK2T	Output thermistor for 510 (T-D2) model
412	319143-095	EKN34	Hi-Limit switch for 510 (T-D2) model
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	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" for 510 (T-D2) model
460	319143-105	EKK24	Fastener "14-22"
461	319143-226	EM192	Fastener "16A"
462	319143-205	EKK39	Fastener "16-25A" for 510 (T-D2) model
463	319143-065	EKN50	Silicon ring for 510 Indoor (T-D2-IN)

Item #	Part #		Description
	510 model	T-D2 model	
701	319143-179	EK439	Computer board for 510 (T-D2) model
702	319143-182	EKH09	Transformer
703	319143-168	EK428	Surge box
704	319143-427	EK146	AC120V wire for Indoor model
	319143-138	EKK3C	AC 120 V wire for Outdoor model
705	319143-180	EK440	Transformer wire for 510 (T-D2) model
706	319143-141	EKK4V	AC120V Power ON-OFF switch
707	319143-181	EK441	Switch wire for 510 (T-D2) model
708	319143-188	EKK10	Gas valve wire for 510 (T-D2) model
709	319143-189	EKK11	Flame rod wire for 510 (T-D2) model
710	319143-187	EKK0Z EKK40	EH-IG wire for 510 Indoor (T-D2-IN) EH-IG wire with freeze protection thermostat for 510 Outdoor (T-D2-OS)
711	319143-052	EKN74	Igniter
712	319143-039	EKK2M	High voltage igniter cable
713	319143-185	EKJ59	Freeze protection thermostat for 510 Indoor (T-D2-IN)
714	319143-133	EKK12	Proportional gas valve wire for 510 (T-D2) model
715	319143-204	EKK36	Pump and multi cable for 510 (T-D2) model
716	319143-195	EKK1Z	Thermistors wire for 510 (T-D2) model
717	319143-203	EKK35	RS-VG wire for 510 (T-D2) model
718	319143-202	EKK33	Water valves wire for 510 (T-D2) model
719	319143-191	EKK1M	Computer board cover for 510 (T-D2) model
720	319143-426	EK148	Rubber grommet for Indoor models
721	319143-425	EW022	Cable strap for Indoor models
722	9007603005	TM-RE30	Temperature remote controller for 510 (T-D2) model

Computer board assembly



Temperature remote controller



Item #	Part #		Description
	510 model	T-D2 model	
101	319143-030	EKH5W	Burner assembly for 510 (T-D2) model
102	319143-046 319143-368	EKH6T EKK5K	Manifold with gas valve assembly LP for 510 (T-D2) Manifold with gas valve assembly NA for 510 (T-D2)
103	319143-043 319143-217	EKK25 EKK54	Fan motor for 510 Indoor (T-D2-IN) Fan motor for 510 Outdoor (T-D2-OS)
104	319143-032	EKK0G	Burner holder gasket for 510 (T-D2)
105	319143-031	EKK2X	Burner gasket
106	319143-033	EKK2V	Burner window
107	319143-034	EKK2W	Rod holder gasket
108	319143-035	EKK0E	Flame rod for 510 (T-D2) model
109	319143-037	EKK0F	Igniter rod for 510 (T-D2) model
110	319143-036	EKK32	Rod holder for 510 (T-D2) model
111	319143-038	EKN61	Rod cap
112	9009012005 9009014005	EK2AJ EK492	Burner damper for 510 Indoor (T-D2-IN) Burner damper for 510 Outdoor (T-D2-OS)
113	319143-044	EKK2Y	Manifold gasket A
114	319143-045	EKK2K	Manifold gasket B
115	319143-367	TU001	Fan damper for 510 Indoor (T-D2-IN)
116	319143-042	EKK2D	Pressure port for 510 (T-D2) model
117	319143-041 319143-344	EKK2N EX019	Combustion chamber tube for 510 Indoor (T-D2-IN) Combustion chamber tube for 510 Outdoor (T-D2-OS)
118	319143-050	EKK1E	Gas inlet
119	319143-049	EKK2Z	Gas inlet ring
120	319143-051	EKK1B	Igniter plate
121	319143-176	EK436	Surge box plate for 510 (T-D2) model
150	319143-350	EZP18	O-ring P18 NBR (Black)
151	319143-057	EK042	O-ring P20 NBR (Black)
152	319143-206	EKK3G	Silicon ring for 510 Outdoor (T-D2-OS)
153	319143-216	EKK53	Rain protection plate in Exhaust chamber for 510 Outdoor (T-D2-OS)
154	319143-219	EKK56	Exhaust port for 510 Outdoor (T-D2-OS)