On-Demand Water Heater Installation Manual and Owner's Guide





LOW-LEAD

ANSI Z21.10.3 • CSA 4.3



510U (AT-D3U-IN/OS) only



Models

- 110U Indoor (AT-KJr3U-IN)
- 310U Indoor (AT-K5U-IN)
- 510U Indoor (AT-D3U-IN)
- 110U Outdoor (AT-KJr3U-OS)
- 310U Outdoor (AT-K5U-OS)
- 510U Outdoor (AT-D3U-OS)
- Series 200





Gas Tankless Water Heater™

Suitable for combination potable water heating and space-heating Please refer to local codes for space-heating compliance.

FEATURING

- ENDLESS HOT WATER
- ON-DEMAND USAGE
- COMPACT, SPACE SAVING
- ENERGY CONSERVATION
- COMPUTERIZED SAFETY
- NO PILOT LIGHT
- Complies with SCAQMD Rule 1146.2 for NOx emissions requirement of 14 ng/J or 20 ppm
- FIELD GAS CONVERTIBLE
- EASY-LINK SYSTEM AND MULTI-UNIT SYSTEM (510U (AT-D3U-IN/OS) only)

WARNING

If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electric switch, do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

If you have any questions, please call or write to: 500 Tennessee Waltz Parkway Ashland City, TN 37015 Toll Free: 1-877-737-2840



Owner's Guide

CONGRATULATIONS

Congratulations and thank you for choosing our tankless water heater. Before use, we recommend that you read through this owner's guide carefully. Please refer to the back of the manual for details about the warranty. Keep this manual for future reference.

If you need an additional manual, contact the manufacturer or your local distributor. When you call, please tell us the product name and the serial number of your unit written on the rating plate of the water heater.

OPERATING SAFETY

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do <u>not</u> try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

- WHAT TO DO IF YOU SMELL GAS
 - Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas shutoff valve. Never use tools. If the valve will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

OPERATING INSTRUCTIONS

- 1. STOP! Read the safety information above on this label.
- 2. Turn off all electric power to the appliance.
- 3. Do not attempt to light the burner by hand.
- 4. Turn the gas shutoff valve located on the outside of the unit to the closed position.
- 5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
- 6. Turn the gas shutoff valve located on the outside of the unit to the open position.
- 7. Turn on all electrical power to the appliance.
- 8. If the appliance will not operate, follow the instructions in "To Turn Off Gas to Appliance," and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

- 1. Turn off all electric power to the appliance if service is to be performed.
- 2. Turn the gas shutoff valve located on the outside of the unit to the closed position.

Vapors from flammable liquids will explode and catch fire causing death or severe burns. Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.



Do not install water heater where flammable products will be stored or used unless the main burner is at least 18" above the floor. This will reduce, but not eliminate the risk of vapors being ignited by the main burner.

FLAMMABLES

Read and follow water heater warnings and instructions. If the owner's manual is missing, contact the retailer or manufacturer.

Keep flammable products:

- 1. Far away from heater.
- 2. In approved containers.
- 3. Tightly closed and out of reach of children.
- Water heater has a main burner, which may come on at any time and will ignite flammable vapors.

Vapors:

- 1. Cannot be seen.
- 2. Are heavier than air.
- 3. Go a long way on the floor.
- 4. Can be carried from other rooms to the main burner by air currents.

- Water temperature over 125°F (52°C) can cause severe burns instantly or death from scalds.
- 2. Children, disabled and elderly are at highest risk of being scalded.
- 3. Feel water before bathing or showering.
- 4. Temperature limiting valves are available. See manual.
- 5. The outlet temperature of the water heater is set at 120°F (50°C). If you require water temperatures below this setting, follow the instruction manual.
- 6. Use this heater at your own risk. Test the water before bathing or showering. Do not leave children or an infirm person unsupervised. See your local water supply company [plumbing hardware retailer] for temperature limiting valves that are available.

A pressure relief valve listed as complying with the standard for Relief Valve and Automatic Gas Shutoff Devices for Hot Water Supply System, ANSI Z21.22 • CSA 4.4, shall be installed at the time of installation of the water heater in the location specified by the manufacturer. Local codes shall govern the installation of relief devices for safety operation of the water heater. The relief valve must not be removed or plugged. No valve shall be placed between the relief valve and the water heater. The relief from the discharge of the pressure relief valve shall be disposed of in a suitable place where it will cause no damage. Also, there shall be no other reducing coupling or other restrictions installed on the discharge line to restrict flow. See Installation Manual heading "PRESSURE RELIEF VALVES" for installation and maintenance of relief valve discharge line and other safety precautions.

NORMAL OPERATION

BUILT-IN CONTROLLER and REMOTE CONTROLLER

The illustrations below show examples of the displays of the controller. The exact display may differ from examples.

Built-in controller

Remote controller



button to set the hot water temperature.

- When the remote controller is installed, it will take priority over the built-in controller.
- The controller has an energy saving mode. Five minutes after the water heater stops operating, the backlight of the controller turns off.
- The backlight of the remote will turn back on once the water heater begins firing again.

<u>GENERAL</u>



Temperature above 125 °F (52 °C) can cause severe burns or death from scalding. Children, disabled and the elderly are at high risk of being injured.



- temperature (1.9 L/min).
- Flow rate to keep the water heater running: 0.4 gallon per minute (1.5 L/min).

TEMPERATURE SETTINGS

-Set temperature-

\backslash	Operation	Screen on the controller				
	Operation	Built-in controller	Remote controller			
1.	Turn on the 120 VAC power supply to the unit (the water heater or the multi-unit controller).					
2.	Press the "ON/OFF" button on the controller in order to turn the controller on.	ON/OFF				
3.	When ON, the STAND BY LED is lit.	STA	ND BY			
4.	It shows the set temperature on its display as shown in the picture on the right. (EX.: 120 °F)	[№] ^с (ЕХ.: 120 °F)				
	Press the "HOT" button or the "COLD" button to set the temperature setting of the unit.					
5.	 Increasing temperature from 120 °F (50 °C) to 125 °F (52 °C) : The water heater must be in Stand By to increase the temperature. Press the "HOT" button to set 120 °F (50 °C). Press and hold the "INFO" button and the "HOT" button for at least 3 seconds. The remote will emit a beep and change to 125 °F (52 °C). To increase the set temperature further, press the "HOT" button. You can increase the temperature setting up to 140 °F (60 °C). 	°C) to 125 °F (52 °C) : By to increase the °F (50 °C). nd the "HOT" emote will emit a etemperature				
	 Increasing temperature above 140 °F (60 °C) -510C model only-: 1. The water heater must be in Stand By to increase the temperature. 2. Press the "HOT" button to set 140 °F (60 °C). 3. Press and hold the "INFO" button and the "HOT" button for at least 3 seconds. The remote will emit a beep and change to 145 °F (63 °C). 4. To increase the set temperature further, press the "HOT" button. You can increase the temperature setting up to 160 °F (70 °C). 					

-Temperature table of controller-

Following are the temperature set points that are available with your built-in controller or remote controller:

a) For 110U (AT-KJr3U-IN/OS) and 310U (AT-K5U-IN/OS)

	°F	100	105	110	115	120*	125	130	135	140				
	°C	38	40	43	45	50*	52	55	57	60				
	b) For 510U (AT-D3U-IN/OS)													
	°F	100	105	110	115	120*	125	130	135	140	145	150	155	160
	°C	38	40	43	45	50*	52	55	57	60	63	65	68	70
ľ	*Eact	000 00	tting (Dofau	1+1.12	0 °E								

*Factory setting (Default): 120 °F

-Additional features-Information mode

You can get some information about the water heater's condition by pressing the **"INFO"** button. For more information, follow the procedures below:

INFO	Organstian	Screen on the controller			
Button	Operation	Built-in controller	Remote controller		
1st. press	Inlet water temperature will be displayed on the remote controller by pressing the " INFO " button.	Inlet v temper	7 * vater rature		
2nd. press	Outlet water temperature will be displayed on the remote controller by pressing the "INFO" button.	Outlet temper	water rature		
3rd. press	Water flow will be displayed on the remote controller by pressing the "INFO" button.	Row Vater	35 _{cm} flow		
4th. press	Press the "INFO" button to finish information mode.	IN OUT FLOW			

Unit conversion mode

The controller has a function that can change units of temperature and flow rate from $\underline{^{\circ}F}$ to $\underline{^{\circ}C}$ and from gallon per minute to liter per minute and vice versa. Please follow the procedures below:

\mathbf{N}	Onevetien	Screen on the controller				
	Operation	Built-in controller	Remote controller			
1.	Press the "ON/OFF" button on the controller in order to turn the controller on.	ONION				
2.	When ON, the orange LED is lit.	STA	ND BY			
3.	The previous set temperature will be displayed on the screen.		(EX.: 100 °F)			
4.	Press the "INFO" button for at least 3 seconds.	INFO.	INFO.			
5.	The set temperature should now be displayed in the alternate unit of measurement.	IN OUT FLOW	<u>₿</u> ° (EX.: 38 °C)			

<u>TEMPERATURE SETTINGS ON THE PCB</u> <u>WITHOUT CONTROLLER</u>



DO NOT adjust the upper bank of DIP switches for the 510U (AT-D3U-IN/OS).
 Turn off the power supply to the water heater before changing the DIP switch settings.

There are two preset temperatures, 120 °F (50 °C) and 140 °F (60 °C), that you can select by changing the DIP switch settings on the computer board without the controller. See the table below. When the controller is in normal operation, the set temperature of the controller is given priority over the set temperature of the DIP switch settings.

• The temperature has been preset at the factory to 120 °F (50 °C).



NOTE: The tables above show the correct DIP switch position for each temperature setting. (Each black square represents a switch.) For the 110U (AT-KJr3U-IN/OS) and 310U (AT-K5U-IN/OS), only adjust DIP switch No. 9. For the 510U (AT-D3U-IN/OS), only adjust DIP switch No. 5 on the lower bank. Do not adjust the other DIP switches for temperature adjustment.

<u>FLOW</u>

- The flow rate through the water heater is limited to a maximum of 6.6 GPM (25 L/min) for the 110U model, 8.0 GPM (30 L/min) for the 310U model, and 10.0 GPM (38 L/min) for the 510U model.
- The temperature setting, along with the supply temperature of the water, will determine the flow rate output of the unit.
- Please refer to the temperature vs. gallons per minute charts on p. 60 to determine the likely flow rates based on your local ground water temperature and your desired outlet water temperature.
- Based on the United States Department of Energy method of testing water heater output, the water heater is rated for gallons per minute (GPM) (liters per minute (L/min)) for Natural Gas and Propane, when raising the water temperature by 77 °F (43 °C) (from 58 °F to 135 °F (14 °C to 57 °C)). See the chart on the right.
- Refer to the table to the top right for typical household plumbing fixture flow rates to determine what the water heater can do in a household application.

	Househo	ld Flow Rates				
	Flow rate					
Appliance/ Use	GPM (US)	L/min				
Lavatory Faucet	1.0	3.8				
Bath Tub	4.0 - 10.0	15.2 - 37.8				
Shower	2.0	7.5				
Kitchen Sink	1.5	5.6				
Dishwasher	1.5	5.6				
Washing machine	4.0	15.2				
Taken from UPC 2000	5					

Unit: GPM (L/min) Flow rate $110U \frac{Indoor}{Outdoor} 3.0 (11.4)$ $310U \frac{Indoor}{Outdoor} 4.1 (15.5)$ Indoor

4.2 (15.9)

FREEZE PROTECTION SYSTEM

510U

Outdoor

- This unit comes equipped with heating blocks to protect it against damages associated with freezing.
- For this freeze protection system to operate, there has to be electrical power to the unit. Damage to the heat exchanger caused by freezing temperatures due to power loss is not covered under the warranty. In cases where power losses can occur, consider the use of a backup power supply.
- The freeze protection system will activate when the air temperature inside the case or water in the heat exchanger is less than 36.5 °F (2.5 °C).
- In any areas subject to freezing temperatures, the manufacturer highly recommends an indoor installation with an indoor model. In such an installation, freezing issues can occur if cold air enters through the venting into the heat exchanger, whether by negative pressures within the installation location or by strong outside winds.
- The manufacturer also highly recommends the use of a backflow preventer (sold separately) to minimize the amount of cold air entering through the exhaust venting when the water heater is off.
- It is the installer's responsibility to be aware of freezing issues and take all preventative measures. The manufacturer will not be responsible for any damage to the heat exchanger as a result of freezing.
- If you will not be using your heater for a long period of time:
 - 1. Completely drain the water out of the unit. Refer to p. 46.
 - 2. Disconnect power to your heater.

This will keep your unit from freezing and being damaged.



Only pipes within the water heater are protected by the freeze protection system. Any water pipes (hot or cold) located outside the unit will not be protected. Properly protect and insulate these pipes from freezing.

MAINTENANCE AND SERVICE



Turn off the electrical power supply and close the manual gas shutoff valve and the manual water control valve before servicing.

- Clean the cold-water inlet filter. (Refer to "Unit Draining and Filter Cleaning" on this page.)
- Be sure that all openings for combustion and ventilation air are not blocked.
- The venting system should be checked annually for any leaks, corrosion, blockages or damage.
- The burner should be checked annually for dust, lint, grease or dirt.
- Keep the area around the water heater and terminations clear. Remove any combustible materials, gasoline, flammable vapors, and liquids.
- In accordance with all local codes and common safety practices, water discharged from the pressure relief valve can cause severe burns instantly from scalding. DO NOT touch the pressure relief valve.
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation.
- Visual check of burner flames (see below) through the burner window in the burner assembly located at the middle of the water heater.



The manufacturer recommends having the unit checked once a year or as necessary by a licensed technician. If repairs are needed, any repairs should be done by a licensed technician.

UNIT DRAINING and FILTER CLEANING

- 1. Close the manual gas shutoff valve.
- 2. Turn off power to the unit and wait a couple of seconds. Turn on again.
- **3.** Wait 30 seconds, and then turn off power to the unit.
- **4.** Close the **inlet** water shutoff valve.
- If the heater is part of an Easy-Link or Multi-Unit System, close the inlet and outlet shutoff valves to isolate the heater. Then proceed to step 6.
- **5.** Open all hot water taps in the house. When the residual water flow has ceased, close all hot water taps.
- 6. Have a bucket or pan to catch the water from the unit's drain plugs. If Isolation valves are installed, open the drains to drain the water. If isolation valves are not installed, <u>unscrew</u> the two drain plugs (large and small) to drain the water out of the unit. Do not lose the o-rings that will be on the two drain plugs.
- **7.** Wait a few minutes to ensure all water has completely drained from the unit.
- 8. Clean the filter: Check the water filter located within the cold inlet. With a tiny brush, clean the water filter of any debris which may have accumulated and reinsert the filter back into the cold water inlet.
- 9. Securely screw the drain plugs back into place. Hand-tighten only.



TROUBLESHOOTING

<u>GENERAL</u>

\sum	PROBLEM	SOLUTIONS
	It takes a 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. (p. 35)
OT WATER	The water is not hot enough.	 Compare the flow and temperature. See the charts on p. 60. Check cross plumbing between cold water lines and hot water lines. Is the gas supply valve fully open? (p. 37) Is the gas line sized properly? (p. 26) Is the gas supply pressure within specified limits? (p. 26) Is the set temperature set too low? (pp. 42 and 44) Is the Easy Link or Multi-Unit system set up correctly?
Ĭ	The water is too hot.	 Is the set temperature set too high? (pp. 42 and 44)
TEMPERATURE and AMOUNT OF	The hot water is not available when a fixture is opened.	 Make sure the unit has 120 VAC, 60 Hz power supply. Is the power button on the controller or inside the water heater turned on? Is the gas supply valve fully open? (p.37) Is the water supply valve fully open? (p. 37) Is the filter on the cold water inlet clean? (p. 46) Is the hot water fixture sufficiently open to draw at least 0.5 GPM (1.9 L/min) through the water heater? (p. 41) Is the unit frozen? (p. 45) Check for cross plumbing between the hot and cold water lines. Is the Easy Link or Multi-Unit system set up correctly?
	The hot water turns cold and stays cold.	 Is the flow rate enough to keep the water heater running? (p. 41) If there is a recirculation system installed, does the recirculation line have enough check valves? (p. 35) Is the gas supply valve fully open? (p. 37) Is the filter on the cold water inlet clean? (p. 46) Are the fixtures clean of debris and obstructions?
	Fluctuation in hot water temperature.	 Is the filter on the cold water inlet clean? (p. 46) Is the gas line sized properly? (p. 26) Is the supply gas pressure within specified limits? (p. 26) Check for cross connection between cold water lines and hot water lines. Is the Easy Link or Multi-Unit system set up correctly?

\searrow	PROBLEM	SOLUTIONS						
ATER HEATER	Unit does not ignite when water goes through the unit.	 Is the flow rate over 0.5 GPM (1.9 L/min)? (p. 41) Check the filter on the cold water inlet. (p. 46) Check for reverse connection and cross connection. If you use the remote controller, is the power button turned on? Check if the inlet water temperature is too high. If it is too close to the set temperature, the water heater won't work. Is the gas supply turned on? Is power available to the unit? If so, is the power button on the controller or inside the water heater turned on? 						
Ň	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. 						
	Unit sounds abnormal while in operation	• Contact the manufacturer at 1-877-737-2840.						
Buit-in controller and remote controller	Built-in and remote controller do not display anything when the power button is turned on.	 Make sure the unit is supplied with power. For the remote controller: Make sure the connection to the unit is correct. (pp. 30 and 31) Buit-in controller When the controller turned ON, STAND BY LED is lit. It. I						
	An ERROR code is displayed.	• Please see pp. 49 to 52.						
EASY-LINK SYSTEM 510U model only	How are the unit numbers assigned?	 For an Easy-Link System, the Parent unit is always labeled #1 and all other subsequent Child units are numbered randomly. To check which numbers are assigned to which Child units, push the button on the computer board of any Child unit as shown below. The unit number will be displayed on the controller of each Child unit. (Refer to p. 33.) 						

ERROR CODES

-General-

- The units have self-diagnostic functions for safety and convenience when troubleshooting.
- If there is a problem with the installation or the unit, the error code will be displayed on the built-in controller or remote controller.
- Consult the table on the following pages for the description of each error code.



-Single unit Installations-

Example: If your unit has the "321" error code (which signifies an inlet thermistor failure)

Indicator on the built-in controller
 and/or remote controller: "321" will be displayed

on the screen in its entirety.



• Green LED on the computer board: The green LED on the computer board will indicate this code with two flashes every 1/2 second. The pattern will repeat with a three second delay between patterns.



Error Indication

Error Code	Green LED				
on the temperature controller	The number of flashes	Flash pattern			
031 701 711	One	※ ○ ※ ○ ※ ○ ※ ^{on} off ∩			
311 321 331 391 441	Two	** 0 ** 0 ** 0 nn			
111 121	Three	*** 0 *** 0 *** nnn			
611 651 661	Four	**** 0 **** 0 nnn			
101 991	Five	**** 0 **** 0 			
510 551 721	Six				
0.5 sec. on O.5 sec. off 3 sec. off					

-For the 510U (AT-D3U-IN/OS) model in an Easy-Link System-

Error codes will be displayed differently with units installed within an Easy-Link System, not only to show what the error code is, but to also indicate which unit within the system has the error code. Below is a sample of how the error code of "321" is displayed in an Easy-Link System.

Example: If Unit #2 has the "321" error code (inlet thermistor failure)





9009069005 (TM-RE42)

Indoor model installation

• Unit #2:

"321" will intermittently flash on the display. The green LED on the computer board will be flashing twice, just like in the single unit example.

• Unit #3 and #4:

These units will not display anything, as the error code does not pertain to them.



9009069005 (TM-RE42) **Outdoor model installation** 321 ↔ 2 • Unit #2: The green LED on the computer board will be flashing twice, just like in the single unit example. • Unit #3 and #4: Unit #1 Unit #2 Unit #3 Unit #4 The green LED on the computer board will stay off. PARENT CHILD CHILD CHILD 321

Green LED on the computer board



-Fault Analysis of Error Codes-

If the error code is displayed on the computer board of the water heater or the controller, please check the following. After checking, consult with the manufacturer.

Remote	Green LED	Malfunction description	Diagnosis
031	One Flash	Incorrect DIP switch setting	• Check the DIP switch settings on the PCB (Part #701).
101	Five Flashes	Warning for the "991" error code	 Check the gas type of the water heater. Check if there is any blockage in the intake air and/or exhaust. Check if there is enough distance between the exhaust and air intake terminals. Check the altitude/elevation of area of where the water heater is installed. 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.
111*	Three Flashes	Ignition failure	 Check if the Hi-limit switch (Part #412) is properly functioning. Check for connection/breakage of wires (Part #008, 413, 708, 709), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #107) and the ignitor (Part #108). Ensure that the gas supply is turned on. If your water heater has been properly converted to use propane, ensure that the tank is not empty. 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 the water heater goes into combustion. Check if there is leaking from heat exchanger (Part #401).
121*	Three Flashes	Loss of flame	 Check if the Hi-limit switch (Part #412) is properly functioning. Check for connection/breakage of wires (Part #008, 413, 708, 709), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #107) and the ignitor (Part #108). Ensure that the gas supply is turned on. If your water heater has been properly converted to use propane, ensure that the tank is not empty. Check if there is leaking from the heat exchanger (Part #401).
311*	Two Flashes	110U & 310U: Outlet thermistor failure 510U: Heat exchanger thermistor failure	 Check for connection/breakage of wires and/or debris on the thermistor (Part #407, 408, 411, 713).
521* 221*	Two Flashes	Outlet thermistor	
331 ^{**}	IWU FIdSITES	failure (510U model only)	
391	Two Flashes	Air-fuel ratio rod failure	 Check for connection/breakage of wires (Part #709) and/ or soot on the AFR rod (Part #107).
441	Two Flashes	Flow sensor failure (Only Easy-Link & Multi-Unit System)	 Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402). Check water filter. Ensure isolation valves are open.

Remote	Green LED	Malfunction description		Diagnosis
510	Six Flashes	Abnormal main gas solenoid valve	•	Check for connection/breakage of wires (Part #708) and/ or burn marks on the computer board (Part #701).
551	Six Flashes	Abnormal gas solenoid valve	•	Check for connection/breakage of wires (Part #714) and/ or burn marks on the computer board (Part #701).
611*	Four Flashes	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 (Part #103).
651*	Four Flashes	Flow adjustment valve fault (Only Easy-Link & Multi-Unit System)	 Inspect the flow adjustment valve (Part #402 connection/breakage of wires, locked motor drive of scale buildup, and/or water leakage. 	
661*	Four Flashes	Bypass valve fault (510U model only)	•	Inspect the bypass valve (Part #403), for connection/ breakage of wires, locked motor drive due to scale buildup, and/or water leakage.
701*	One Flash	Computer board fault	•	Check the outlet thermistor (Part #408) as it may need to be cleaned. Check for connection/breakage of wires (Part #714).
711*	One Flash	Gas solenoid valve drive circuit failure	•	Refer to the 111 and 121 error codes.
721*	Six Flashes	False flame detection	•	Check if condensate drain is installed on the vent collar of the water heater. Check if there is leaking from heat exchanger (Part #401).
741	N/A	Miscommunication between water heater and remote controller	•	Inspect the connections between the water heater and remote controller. Check the power supply of the water heater.
751	N/A	Miscommunication between water heater and built-in controller	•	Inspect the connections between the water heater and built-in controller. Check the power supply of the water heater.
761	N/A	Miscommunication in Easy-Link system	•	Check if the connections between the parent unit and the child units are correct. Refer to p. 33. Verify that each unit has power and that its power switch above the computer board is in the ON position.
991	Five Flashes	Imperfect combustion	•	Check the gas type of the water heater. Inspect the environment around the water heater. Determine how long the unit has been installed. Check the altitude/elevation of the area of where the water heater is installed. Check if there is any blockage in the intake air and/or exhaust. Check whether there is enough distance between the exhaust and air intake terminals. 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.

COMPONENTS DIAGRAM

Case assembly



Built-intemperature controller



Computer board assembly







PARTS LIST

		Part #		
Item #	Description	110U, 310U and 510U models	AT-KJr3U-IN/OS, AT-K5U-IN/OS and AT-D3U-IN/OS	
001	Case assembly for Indoor models	N/A	EK596	
	for Outdoor models	N/A	EK597	
002	Front cover for Indoor models	N/A	EK598	
	for Outdoor models	N/A	EK599	
003	Bracket	N/A	EK455	
004	Intake air port assembly	N/A	EK600	
005	Junction box	319143-510	EK190	
006	Power supply cord assembly	319143-437	EKK4D	
007	Back guard panel	N/A	EK601	
008	Overheat-cut-off fuse for combustion chamber	319143-016	EM484	
050	Truss screw M4×12 (W/Washer) SUS410	319143-025	EW000	
051	Truss screw M4×10 (W/Washer) SUS410	319143-325	EW001	
052	Truss screw M4×10 (Coated) SUS3	319143-026	EW002	
053	Truss screw M4x10 SUS	319143-060	EW003	
054	Hex head screw M4×12 (W/Washer) SUS3	319143-326	EW004	
055	Hex head screw M4x8 FEZN	319143-063	EW005	
056	Pan screw M4x10 FEZN	319143-062	EW006	
057	Pan Screw M3x10 SUS	319143-327	EW008	
058	Tapping screw M4x6 SUS3 Truss head	319143-328	EW009	
059	Tapping screw M3x6 SUS3 Pan head	319143-087	EW00A	
060	Screw M3x6 SUS3 Binding head	320273-330	EW00B	
061	Pan screw M4x8 MFZN	319143-059	EW00D	
062	Tapping screw M4x14 SUS410 Truss head	320273-491	EW00E	
063	Screw M3x12 BSNI Raised counter sunk head	319143-331	EW00X	
064	Screw M3x6 BSNI Binding head	319143-439	EW016	
065	Pan screw M4x20 SUS410	N/A	EW018	
066	Truss screw M4x8 SUS3	N/A	EW02A	
067	Tap tight screw M4x12 FEZN	319143-201	EKK31	
068	Truss screw M4x10 MFZN3	319143-372	EX014	
101	Burner assembly	319143-555	EK554	
102 103	Manifold with gas valve assembly NA Fan motor for Indoor models Fan motor for Outdoor models	319143-556 319143-443 319143-043	EK555 EK109 FKK25	
104	Fan motor plate for Indoor models	319143-282	EM381	
	Fan motor plate for Outdoor models	319143-453	EK140	
105	Burner window	320273-625	EKN58	
106	Rod holder gasket	319143-560	EK559	
107	Flame rod with AFR function	319143-561	EK560	
108	Igniter rod	319143-562	EK561	
109	Rod holder	319143-563	EK562	
110	Bod cap	320273-358	FK462	
111	Burner damper	100270556	EK562	
112	Manifold gasket A	319143-565	EK564	
113	Manifold gasket B	319143-566	EK565	
114	Pressure port	319143-042	EKK2D	
115	Combustion chamber tube	319143-344	EX019	
116	Gas inlet	319143-050	EKK1E	
117	Gas inlet ring	319143-049	EKK2Z	

		Par	Part #		
Item #	Description	110U, 310U and 510U models	AT-KJr3U-IN/OS, AT-K5U-IN/OS and AT-D3U-IN/OS		
118	Burner gasket	319143-568	EK567		
119	Burner holder gasket	319143-569	EK568		
120	Surge box plate	319143-176	EK436		
121	PCB fixing plate	N/A	EK603		
122	Thermostat	319143-185	EKJ59		
130	LP Conversion kit	100270585	EK604		
131	Manifold gasket	319143-581	EK592		
150	O-ring P18 NBR (Manifold)	N/A	EK570		
151	O-ring P20 NBR (Black)	319143-057	EK042		
152	Silicon ring for Outdoor models	319143-206	EKK3G		
153	Rain protection plate in Exhaust chamber for Outdoor models	319143-216	EKK53		
154	Exhaust port for Outdoor models	319143-219	EKK56		
401	Heat exchanger assembly for 110U and 310U Indoor (AT-KJr3U-IN and AT-K5U-IN) for 110U and 310U Outdoor (AT-KJr3U-OS and AT-K5U-OS) for 510U Indoor (AT-D3U-IN) for 510U Outdoor (AT-D3U-OS)	100270557 100270558 100270559 100270560	EK605 EK606 EK607 EK608		
402	Flow adjustment valve / Flow sensor	319143-463	EK129		
403	Bypass valve for 510U (AT-D3U-IN/OS) model	319143-464	EKD58		
404	Water inlet	319143-193	EKK1U		
405	Inlet drain plug	319143-197	EKK2B		
406	Inlet water filter	319143-198	EKK2C		
407 408	Inlet thermistor for 110U (AT-KJr3U-IN/OS) and 310U (AT-K5U-IN/OS) Inlet thermistor for 510U (AT-D3U-IN/OS) Outlet thermistor for 110U (AT-KJr3U-IN/OS) and 310U (AT-K5U-IN/OS)	319143-214 319143-572 319143-529	EKK4J EK573 EK207		
409 410 411	Outlet thermistor for 510U (AT-D3U-IN/OS) Water outlet Outlet drain plug	319143-573 319143-466 319143-079 319143-574	EK574 EK104 EK239 EK575		
411	Hi-Limit switch for 110U (AT-KJr3U-IN/OS) and 310U (AT-K3U-IN/OS) Hi-Limit switch for 510U (AT-D3U-IN/OS) model	319143-374 319143-228 319143-095	EM212 EKN34		
413	Overheat-cut-off fuse for heat exchanger	319143-067	EX02A		
414	Pipe heater	319143-531	EK209		
415	Inlet heater	319143-468	EK105		
416	Pipe inlet	100270581	EK609		
417	Joint outlet	319143-576	EK577		
450	Fuse fixing plate 40	N/A	EK616		
451	Heater fixing plate 16	319143-125	EK031		
452	Fuse fixing plate 18	N/A	EK476		
453	Pipe heater fixing plate	N/A	EK610		
454	O-ring P4 FKM	319143-082	EZM04		
455	O-ring P6 FKM	319143-080	EZM06		
456	O-ring P14 FKM	319143-100	EZM14		
457	O-ring P15 FKM	319143-091	EZM15		
458	O-ring P16 FKM	319143-083	EZM16		
459	Fastener "4-11" for 510U (AT-D3U-IN/OS) model	319143-097	EKH30		
460	Fastener "14-22"	319143-105	EKK24		
461	Fastener "16A"	319143-226	EM192		
462	Fastener "16-25A"	319143-205	EKK39		
463	Silicon ring for Indoor models	319143-065	EKN50		

		Part #		
Item #	Description	110U, 310U and 510U models	AT-KJr3U-IN/OS, AT-K5U-IN/OS and AT-D3U-IN/OS	
701	Computer board for 110U (AT-KJr3U-IN/OS) model	100270582	EK611	
	for 310U (AT-K5U-IN/OS) model	100270583	EK612	
	for 510U (AT-D3U-IN/OS) model	100270584	EK613	
702	Remote fixing plate for 510U (AT-D3U-IN/OS)	319143-484	EK152	
703	Surge box	320273-128	EK280	
704	120 VAC wire for Indoor models	319143-427	EK146	
	for Outdoor models	319143-138	EKK3C	
705	Switch wire	N/A	EK614	
706	120 VAC Power ON-OFF switch	N/A	EK590	
707	Remote controller wire for 110U (AT-KJr3U-IN/OS) and 310U (AT-K5U-IN/OS)	319143-490	EK189	
	for 510U (AT-D3U-IN/OS)	319143-491	EK165	
708	Gas valve wire	N/A	EK585	
709	Flame rod wire	N/A	EK586	
710	Cable strap	319143-425	EW022	
711	Igniter assembly	319143-479	EK153	
712	Computer board cover	319143-274	EM329	
713	24V cables for 510U (AT-D3U-IN/OS)	N/A	EK587	
714	Proportional gas valve wire	319143-481	EK112	
715	Rubber grommet for Indoor models	319143-426	EK184	
716	Surge box cover	N/A	EK615	
721	Temperature controller	319143-502	EK173	
722	Controller fixing plate	N/A	EK588	
N/A	Communication cable for linking	320273-585	EKKOJ	

OUTPUT TEMPERATURE CHART

Chart is based on properly sized gas line

110U (AT-KJr3U-IN/OS)

	Out	put Tempe	rature vs. (GPM (Max.	6.6 GPM	1) with Various Inlet Water Temperature			
GPN	×—	×				40 F	— ■ — 50 F	_ ▲ 60 F	— × — 70 F
0.0 Hot Mater				×		i	Ť	Ť	
0 0.0 Set Temp. (°F)	100	105	110	115	120	125	130	135	140
	3.9	3.6	3.3	3.1	2.9	2.7	2.6	2.4	2.3
	<mark>4</mark> .6	4.2	3.9	3.6	3.3	3.1	2.9	2.7	2.6
∞60 F	5.8	5.2	4.6	4.2	3.9	3.6	3.3	3.1	2.9
	6.6	6.6	5.8	5.2	4.6	4.2	3.9	3.6	3.3

310U (AT-K5U-IN/OS)



510U (AT-D3U-IN/OS)

Output Temperature vs. GPM (Max. 10.0 GPM) with Various Inlet Water Temperature 70 F 40 F 50 F 60 F 105 120 150 160 100 110 115 125 130 135 140 Set Temp. (°F) Incoming Temp. (°F) -40 F 4.4 3.7 3.3 3.0 2.7 5.5 5.1 4.7 4.1 3.9 3.5 -50 F 6.6 6.0 5.5 5.1 4.7 4.4 3.9 3.7 3.3 3.0 4.1 60 F 8.2 7.3 4.7 6.6 6.0 5.5 5.1 4.4 4.1 3.7 3.3 70 F 10.0 9.4 8.2 7.3 6.6 6.0 5.5 5.1 4.7 4.1 3.7

*When the set temperature is 130 °F (55 °C) or higher, maximum flow rate is limited to 8.0 GPM.

[Unit: Voor]

LIMITED WARRANTY

1. The manufacturer warrants this product against defects in materials or workmanship as described in this document if installed within the United States or Canada. The manufacturer or its authorized Service Representative will, at its sole discretion, repair or replace any failed or defective mechanical or electrical parts, or components thereof, or, if the manufacturer or its authorized Service Representative cannot replace said parts, and repair is not commercially practicable, the manufacturer or its authorized Service Representative will refund the purchase price. The manufacturer or its authorized Service Representative may, at its sole discretion, use new, refurbished or reconditioned parts.

2. <u>Warranty for all models:</u>

	[Unit. lear]		
Application Type	Heat Exchanger	Parts	Labor ⁽¹⁾
Single Family Domestic Hot Water	15 ⁽²⁾⁽³⁾		
Commercial or Multi-Family Domestic Hot Water	10 ⁽²⁾⁽³⁾	5	1
Heating	10 ⁽³⁾⁽⁴⁾		

(1) Limited Labor Coverage

- The manufacturer will provide for reasonable labor charges associated with warranty repairs or replacements within one (1) year from the date of purchase. The manufacturer will only pay directly to the service provider.
- Warranty service must be performed by an authorized Service Representative. A list of authorized Service Representatives is available upon request.
- All warranty claims and warranty service must be authorized and approved by the manufacturer.
- (2) Includes recirculation and storage tank applications with proper circulation pump control (e.g. aquastat and/or timer).
 - Lack of a proper pump control will reduce the heat exchanger and parts warranty to 3 years.
- (3) In all applications, the total of length of operation time must be less than 3,000 hours for the 110U (AT-KJr3U-IN/OS) and 310U (AT-K5U-IN/OS) models, and less than 9,000 hours for the 510U (AT-D3U-IN/OS) model.
- (4) Includes dual-purpose applications (combination heating and domestic)

3. General terms of limited warranty:

This limited warranty gives you specific legal rights, and you may also have other rights which vary from State to State. The manufacturer will honor the warranty to the original retail buyer at the original location only, within the United States or Canada, and it is not transferable.

THIS WARRANTY COVERS ONLY FAILED MECHANICAL AND ELECTRICAL PARTS DUE TO FACTORY DEFECTS UNDER NORMAL USAGE FOR THE PRODUCT'S INTENDED PURPOSES AND WITHIN THE APPLICABLE PERIOD SPECIFIED IN THE TABLE ABOVE. ONLY DIRECT DAMAGES SHALL BE RECOVERABLE BY A CLAIMANT UNDER THIS LIMITED WARRANTY AND, IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, BREACH OF WARRANTY, TORT LIABILITY (INCLUDING NEGLIGENCE), STRICT LIABILITY, INDEMNITY OR OTHERWISE WILL BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR INDIRECT CONSEQUENTIAL DAMAGES INCLUDING PROPERTY DAMAGE, PERSONAL DAMAGES, LOSS OF USE, OR INCONVENIENCE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

4. Limitation on Duration of Implied Warranties:

ANY IMPLIED WARRANTIES ARISING UNDER STATE LAW, INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, SHALL IN NO EVENT EXTEND PAST THE EXPIRATION OF ANY WARRANTY PERIOD HEREUNDER. SOME STATES DO NO ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

5. THIS WARRANTY WILL NOT COVER THE FOLLOWING:

- Any product that is not installed by a licensed plumber, gas installer, or contractor.
- Damages due to accidents, abuse, misuse, improper installation, misapplication, or incorrect sizing.
- Damages due to fires, flooding, freezing, electrical surges, or any Acts of God.
- Damages due to unauthorized alterations, attachments, and/or repairs.
- Damages due to a lack of maintenance (e.g. water filter, water treatment system, vent blockage, etc.).
- Any product installed in an improper environment (e.g. corrosive, dusty, chemically contaminated, excessive lint, etc.).

- Freeze damage that occurs without taking proper preventive measures as described in the installation manual.
- Condensate damage due to improperly installed or lack of a condensate trap (drain).
- Any product not installed in compliance with all applicable local & provincial codes, ordinances, and good trade practices.
- Any product sold to or installed in areas outside of the fifty states (and the District of Columbia) of the United States of America and Canada.
- Any product installed in applications that cause the water heater to activate more than 300 times per day. (This averages to an activation every 5 minutes in a 24-hour period.)
- Any failures that are not due to defects in materials or workmanship (mechanical and/or electrical parts).
- Damages due to improper installation:
 - Gas: incorrect gas pipe sizing, incorrect gas meter sizing, incorrect gas type, and/or gas pressures that fall outside the product's specified range.
 - Water: incorrect water pipe sizing, water pressures that fall outside the product's specified range, recirculation flow rates that fall outside the product's specified range (air removal), and/or lack of proper methods of air removal in a closed-loop, circulation system. (See installation manual for details.)
 - Electric: supply power voltages that fall outside the product's specified range.
- Damages due to water quality:
 - Introduction of liquids other than potable water into the product.
 - Introduction of pool water, spa water, or any chemically treated water into the product.
 - Introduction of hard water measuring more than 7 grains per gallon (120 ppm) for single family domestic applications or more than 4 grains per gallon (70 ppm) for all other types of applications into the product.
 - Introduction of untreated or poorly treated well water into the product.
 - Introduction of water with pH levels less than 6.5 and greater than 8.5 into the product.

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