

WS-12A

Integrated Hot Water Delivery Unit



**WESTERN
SHELTER** SYSTEMS

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CONDITIONAL WARRANTY

Western Shelter Systems warrants all products against defects in materials or workmanship for a period of one (1) year from date of manufacture. Component manufacturers' warranties may exceed that of Western Shelter.

No warranty is made or implied regarding the intended use of the product. Warranty does not cover damage caused by abuse, misuse, neglect or improper care by the end user in the application of the Western Shelter Systems product.

Western Shelter Systems will repair or replace any component deemed to be faulty from manufacture in the most efficient and timely means available to Western Shelter Systems.

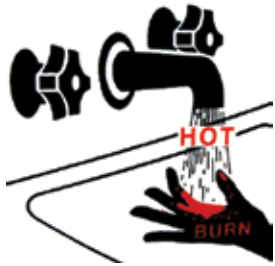
Western Shelter Systems must authorize all claims prior to any action taken by the end user.

For immediate attention regarding any defective product, please phone Customer Support at 1-800-971-7201, 7am-330pm PST.

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A. WARNINGS

**DANGER**



Water temperature over 125°F can cause severe burns instantly.

See instruction manual before setting temperature at water heater.

Feel the water before bathing or showering.

**WARNING**

If you do not follow all written and common sense safety procedures when operating this unit, a fire or explosion may result causing property damage or personal injury.

**WARNING**

Should unit lose ignition during operation, shut down water flow immediately. Slide gas valve slider to the "OFF" position and repeat ignition instructions.

**CAUTION**

The water in this heater remains cold when not in use. DO NOT store in an area where it might freeze. Drain the heater entirely if freezing temperatures are anticipated.

**CAUTION**

All flammable materials or other items that are potential fire hazards must not be placed on or adjacent to the heater. The top and bottom vents must remain clear at all times.

WHAT TO DO IF YOU SMELL GAS:

- Close gas valves on the unit and your propane tank
- Open windows if inside
- Do not try to light any appliances
- Do not touch any electrical switches
- If smell does not dissipate quickly, call your gas supplier or the fire department

B. APPLIANCE DETAILS

WS-12A / WS-21AHZ Propane Water Heater

Output

117,000 BTU

Flow Rate

1.90 GPM @ 100° rate of rise

4.0 GPM @ 45° rate of rise

Minimum flow .5 GPM

Maximum flow 4.2 GPM

Pressure Requirements

Minimum inlet pressure 2.0 PSI

Maximum working pressure 150 PSI

Measurements

39.5" high x 22.5" wide x 13.5" deep

Weight

WS-12A: 82 lbs.

Other Items/Features

Integrated primer

Aluminum powder-coated case

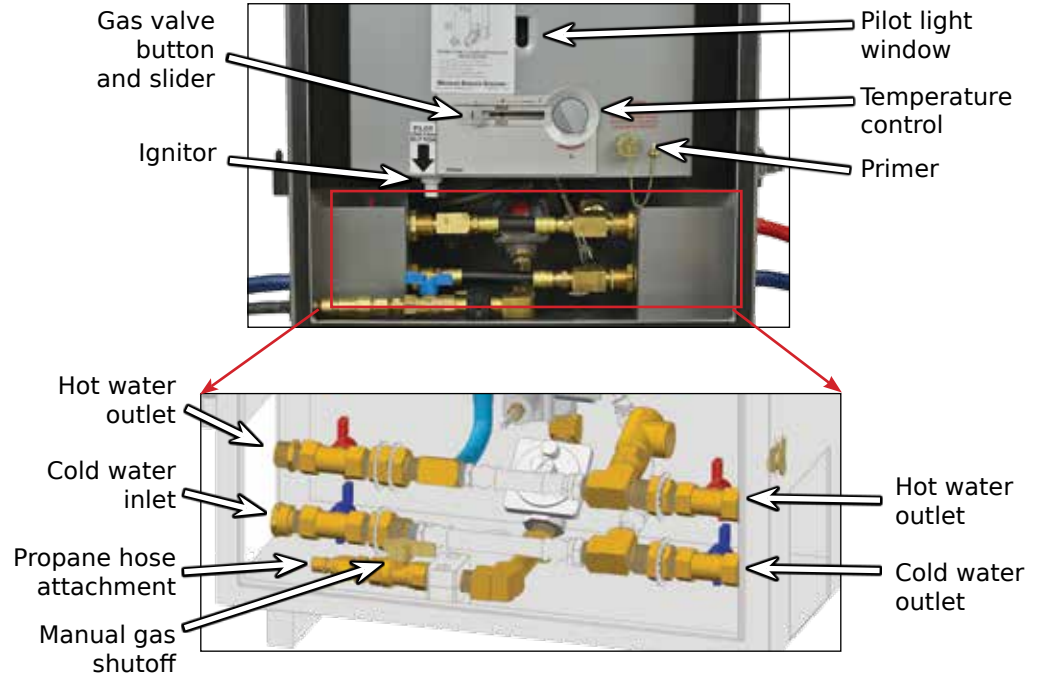
Propane hose with regulator

Wheel kit (optional) - WS-12WK - 5lbs

Thermostatic control (optional) - WS-TCS

C. COMPONENT IDENTIFICATION

Location of the controls may be different on your model, but all models operate identically.



Propane tank not included

D. OPERATING INSTRUCTIONS

ATTENTION

Be sure you have read and understood all safety warnings before attempting to operate this unit.

1. Setup

- Remove the door from the heater case. It can be reattached once the heater is running.
- Attach the supplied regulator hose to the propane intake valve on the left of the unit, pull back on the quick release collar, then push into place and release to secure.



- Attach the propane tank to regulator.
- Attach your water source to the lower inlet valve, located on the lower left of the unit.



- Open the valve and allow the unit to fill with water.
- Attach your cold and hot water discharges to the outlets on the right of the unit. Connect discharges to your water system.



- Check the exhaust vent for any obstructions or flammable debris.

2. Lighting instructions

- Open the valve on your propane tank, and the manual gas shut-off valve on the unit.
- Slide the gas valve to the center ignition position.
- Remove the primer cap and hold the primer button down for 5 to 10 seconds or until you faintly smell propane. Replace the primer cap.



- Fully depress the gas valve button.
- With the gas valve button depressed, strike the ignition button repeatedly while looking for the pilot flame through the peephole.



➤ If the pilot light does not ignite within one minute, reprime the system and repeat.

➤ Slowly release the gas valve button and ensure the pilot light remains on.

3. Setting water temperature

➤ There are two controls on the heater relevant to water temperature. The temperature adjustment knob changes temperature by adjusting flow rate. The gas valve slider controls temperature by adjusting how much fuel is allowed into the burner.

➤ Turn the temperature adjustment knob counterclockwise to lower the output temperature, clockwise to raise it. The higher the output temperature, the lower the flow.

➤ In most situations, you will want to slide the gas valve slider all the way to the right for the hottest flame.

➤ Open the output valves.



➤ You may have to mix hot and cold lines to achieve your desired temperature.



➤ The optional Temperature Control System (WS-TCS) allows precise control over output temperature.

➤ Heater will fire automatically when water draw is greater than the minimum activation rate (0.5 GPM).

4. Turning off the heater

➤ Shut off water supply.

➤ Slide the gas valve slider all the way to the left. Turn off the manual gas shutoff and the propane tank valve.

➤ Allow the unit time to cool before moving or storing.

5. Draining water

➤ If there is a risk of freezing, you must drain the unit.

➤ The unit should also be drained before storage.

➤ Turn the unit off (see section D4). Allow it to cool.

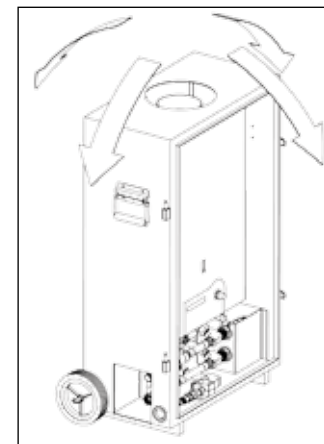
➤ Close the cold water inlet valve.

➤ Open a hot water tap and allow pressure to drain.

➤ Disconnect all hoses, open all valves, and allow the system to drain.

➤ Drain the system completely by tipping the unit right and left, then forward and back, allowing all water to drain.

➤ Wait 3 minutes and repeat until flow of water ceases.



E. MAINTENANCE

The efficiency and dependability of your WS-12A or WS-12AHZ unit begins with proper care and use. This section will identify key areas of general care and preventative maintenance that will prolong the life of your system.

ATTENTION

Any procedures not covered here should be carried out by a qualified gas technician.

ATTENTION

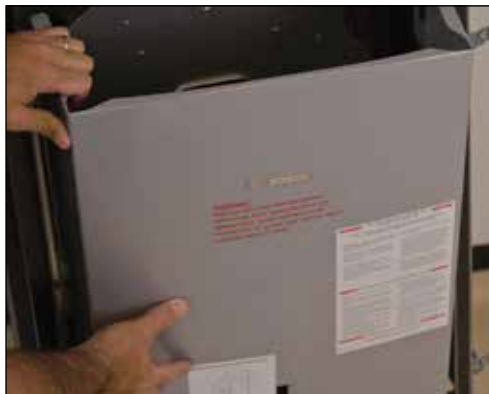
Failure to perform all recommended maintenance may result in failure of the unit over time. The warranty does not cover failure due to improper or insufficient maintenance.

1. Accessing internal components

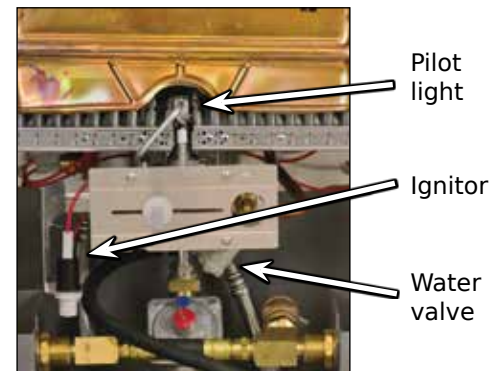
- Remove the temperature control knob by pulling it away from the faceplate. Remove the two screws at the base of the heater faceplate.



- Carefully lift and remove the heater faceplate.



2. Internal components



3. General care

- The rubber gasket around the lid of the aluminum field case should be coated occasionally with small amounts of O-ring lubricate or silicone spray to prevent drying and cracking.
- Your fuel tank and fuel and water lines should be inspected to ensure they are free from damage. Any leaking or damaged components should be replaced immediately.

- Clean, drain, and dry all hoses before putting them into storage.
- Carefully inspect and clean the vent of the unit to keep it free from all trash, obstructions, and dust build-up.

4. Water valve inspection

- The water valve is the main control that tells the heater to fire. It should be inspected after each deployment.
- Shut off the cold water inlet.
- Open the nearest hot water tap to drain the unit.
- Remove the filter retaining clip at the base of the water valve.



- Remove the water valve bushing to access the filter inside.
- Remove and clean filter with fresh water.

- Inspect for damage. If any damage is apparent, the filter must be replaced.



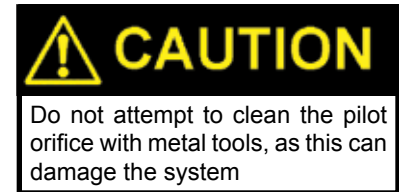
5. Pilot inspection

- The ignitor wires may become loose over time or when the unit is jostled. Check for a solid connection.



- The pilot light should burn with a clean, constant blue flame that engulfs the tip of the thermocouple. If does not, inspect and clean the pilot assembly as detailed below.
- Shut off gas supply to the unit using the manual gas shutoff valve.

- Locate pilot light gas tubing at the base of the burner assembly.
- Release pilot light gas tubing from its retaining clip.
- Push upwards on the other end of the pilot light gas tubing to release it from the burner mount.
- Remove the brass pilot orifice from the gas valve.
- Soak the pilot orifice in carburetor cleaner for 30 minutes.
- Dry off and replace orifice.



6. Mineral scale build-up

- When operating the unit at high temperatures or with mineral-rich water, periodic descaling of the heating coils is necessary.

- Shut off the cold water inlet valve.
- Open all hot water taps and drain the unit.
- Disconnect all inlet and outlet water connections.
- Connect the outlet of a circulating pump to the water inlet.
- Use a second line to connect the hot water outlet to your descaling reservoir.
- Use a third line to connect the reservoir with the inlet of the circulating pump.
- Make sure all connections are hand-tight.
- Fill tank with descaling solution (white vinegar or commercial solution).
- Operate the circulating pump.
- Run solution through the heat exchanger until it comes out clear.
- Disconnect all lines and drain the unit.
- Flush the unit with cold water.
- Shut off all valves, reconnect hoses, and return the unit to service.

F. STORAGE PROCEDURES

- Slide the gas valve slider all the way to the left to extinguish pilot.
- Allow the unit to cool.
- Close the manual gas shutoff and the valve on your propane tank.
- Close the cold water inlet valve.
- Open a hot water tap and allow pressure to drain from the unit.
- Disconnect the propane hose.
- Disconnect all water lines from the unit.
- Open all valves and drain the unit completely (see section D5).
- Drain all hoses of remaining water.
- Allow the hoses and heater to dry out before being put into storage.

G. TROUBLESHOOTING

Pilot does not light

- Verify the flow of gas. Check all valves and fittings
- Repeatedly push the ignitor button to confirm that a spark is being created.

- Ensure that the gas valve is in the ignition (center) position.
- Reprime the system and follow the lighting instructions (see section D)
- Inspect and clean the pilot (see section E).

Pilot light ignites, but goes out when gas valve is released

- Depress the gas valve fully for 20 seconds after the pilot is lit.
- Slide the gas valve slider all the way to the right (highest flame).
- Inspect and clean the pilot (see section E).

Pilot goes out during or after hot water use

- The unit's safety heat sensor may have been tripped. If inlet water is above room temperature, the unit may overheat. Plumb inlet with cold water only.
- The unit may not be venting properly. Ensure that the upper and lower vents are clear of debris and have sufficient airflow.
- Inspect and clean the pilot (see section E).

Burner does not activate with water flow

- Verify pilot light is lit and the gas valve slider is not in the off or ignition position.
- Verify the cold inlet, and cold and hot outlets, are plumbed to the correct locations.
- Verify flow through the unit is sufficient
- With the temperature control all the way clockwise, fill a quart container. If it fills in fewer than 30 seconds, flow is sufficient to activate burners.
- Inspect the water path outside the heater. Make sure all outlets are clear of debris, and all lines are free of knots and kinks.
- Inspect and clean the water valve (see section E).

Temperature fluctuates at tap

- The water pressure may be inconsistent. The unit is unable to maintain a constant temperature if the input pressure varies.
- You may be mixing in cold water at too high a pressure. Lower the flame level if the water is too hot to correct this.
- Gas pressure may not be stable. Check pressure, lines, and valves.

- Inspect and clean the water valve (see section E).

Water is too hot

- Move the gas valve slider more toward the center.
- Your inlet water may be too hot. Use cold water if possible, or mix in cold water before your sink or shower.
- Water flow may be restricted, resulting in very hot outlet temperatures. Check the water path.

Water is too cold

- You may be overtaxing the heater. Try running fewer taps.
- Ensure gas valve slider is all the way to the right.
- Inspect the water path outside the heater for obstructions.
- Check gas flow and pressure.
- Inspect and clean the water valve (see section E).

Low hot water pressure

- Confirm adequate input pressure (at least 30psi).
- You may be overtaxing the heater. Try running fewer taps.
- Clean the water valve filter (see section E).

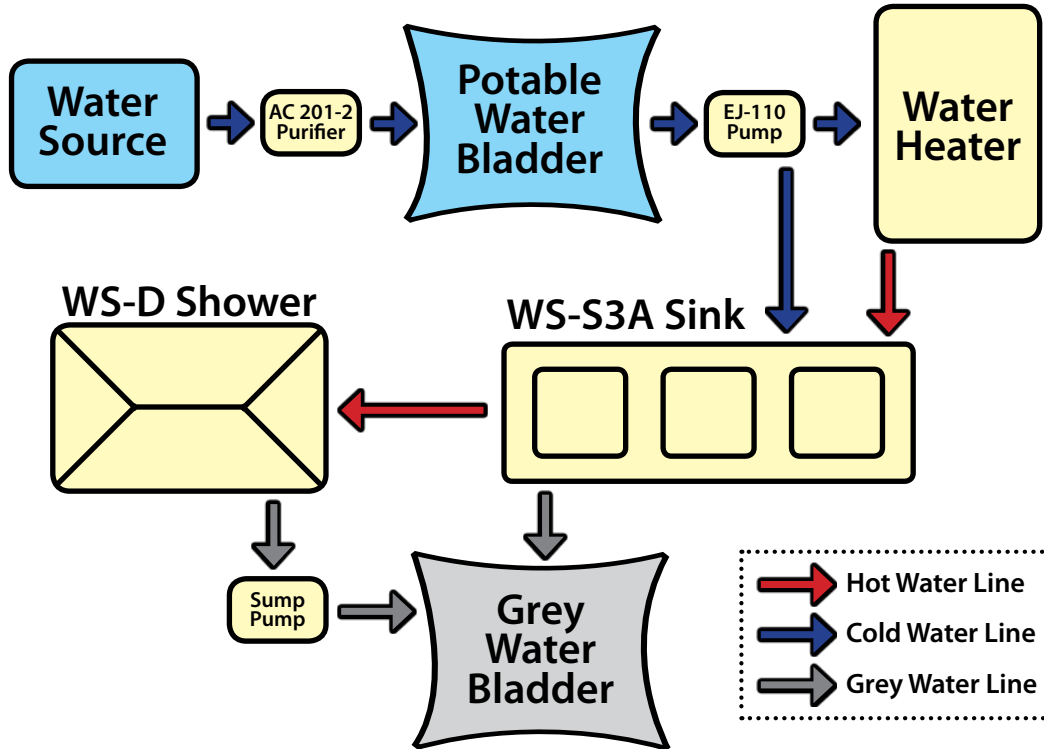
Heater makes unusual noises when running

- Inspect the water path for obstructions.
- Confirm adequate flow rate (between 2 and 4 gpm) by timing how long it takes to fill a quart jug.
- Inspect and clean the water valve (see section E).

Burner does not operate cleanly; yellow flames when operating

- Gas pressure may be inadequate. Try using a fully-charged tank.
- Ventilation may not be adequate. Ensure the area around the unit is clear and has sufficient airflow.
- Burner service should be performed by a qualified gas technician.

H. WATER HANDLING DIAGRAM



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