



1120 North Main Street • Elkhart, IN 46514  
 PHONE: 574•264•2131 FAX: 574•206•9713  
 INTERNET: <http://www.atwoodmobile.com>

LITERATURE NUMBER MPD 70381

# FOLDING HITCH BALL

## OPTIONAL UNDER TRUCK INSTALLATION KIT

### ENGLISH

### •Installation •Operation •Maintenance

Effective 11/21/07

REFERENCE NUMBERS REFER TO ILLUSTRATIONS ON PAGE 4.

### INSTALLATION

#### SAFETY ALERT SYMBOLS

Safety Symbols alerting you to potential personal safety hazards. Obey all safety messages following these symbols.

**WARNING**  
avoid possible injury or death

**CAUTION**  
avoid possible injury and/or property damage

#### FOR YOUR SAFETY READ ALL INSTRUCTIONS BEFORE INSTALLATION AND OPERATION

**Installer:** Provide these instructions to the consumer.  
**Consumer:** Keep documents for future reference.

#### **WARNING**

#### PERSONAL INJURY / PRODUCT DAMAGE

- Know the trailer weight and added load weight. Do not exceed the capacity of the coupler, ball or stem, whichever is lower.
- Do not exceed the towing vehicles rated towing capacity.

### FOLDING HITCH BALLS

The Atwood Folding Hitch Ball is a hitch ball designed to be mounted on a pickup truck, positioned above and forward of the rear axle for towing gooseneck type trailers.

**Max. Gross Vehicle Weight:** 25,000 lbs.  
**Ball Size:** 2-5/16" diameter  
**Tongue Load:** 5,000 lbs.

For larger trucks, contact the vehicle manufacturer or Atwood Mobile Products for recommendations.

To adequately transfer towing forces to the truck, the folding hitch ball must be supported by a structure that ties the folding hitch ball into the truck frame. The Atwood Under Truck Installation Kit is a complete bolt-on support structure. Fabrication instructions for an alternate support structure using the Bed Plate or H Frame method of installation are also included.

### ATWOOD UNDER TRUCK INSTALLATION KIT

Use Installation Kit with Atwood Folding Hitch Ball

#### TOOLS REQUIRED:

Drill with 3/4", 7/16" bit	Hammer	Torque Wrench
9/16" wrench & sockets	Center Punch	
15/16" wrench or sockets	Saber Saw	

#### INSTALLATION PARTS:

QTY	DESCRIPTION
2	CROSS ANGLES (LONG PARTS)
2	SIDE FRAME MOUNT BRACKET (14")
1	BOLT PACK
	8-CARRIAGE BOLTS 3/8" x 2" GRADE 5 ZINC PLATED
	8-STANDARD BOLTS 3/8" x 1-3/4" GRADE 5 ZINC PLATED
	16-WASHERS 3/8" x 1 ZINC PLATED
	16-NYLON LOCK NUTS 3/8" GRADE 5 ZINC PLATED
	4 SPACERS

#### **CAUTION** VEHICLE DAMAGE

- For adequate transfer of forces produced during towing these instructions MUST be followed.

1. Raise truck at frame so that the weight will be taken off the suspension and rear wheels will be away from wheel well openings. This will give more access to the side of the truck frame where the mounting plates will be installed.
2. VEHICLES EQUIPPED WITH EXHAUST HEAT SHIELDS AND/OR WHEEL WELL LINERS - Temporarily remove shields and liners to provide adequate space for installation of long cross angles and side frame mount brackets. Keep these parts for replacement after hitch installation.
3. Place carriage bolts in square holes at the ends of the angles.
4. Slide cross angles (long) in between frame and bed under the vehicle, one end at a time (the downward portion of the angles will be facing each other) FIG 3 & 4.
5. Insert side frame mounting brackets (end with slots) from side of vehicle between vehicle frame and angles installed in previous step FIG 5.
6. Loosely bolt cross angles to side frame mount bracket (14" long) FIG 5.

#### **CAUTION** VEHICLE DAMAGE

- The center of the ball must be 2" to 6" in front of axle centerline.
- The position of the ball must allow for proper clearance between trailer and both rear of cab, and rear corner of truck bumper when making turns of up to 90°.

7. Position the center of the frame mount brackets 2"- 6" forward of the rear wheel axle centerline (providing adequate clearance for brake, electrical and fuel systems) FIG 6.
8. Center the long cross angles on the vehicle from right to left. This is key to having the folding ball assembly centered in the bed FIG 4. Check installed cross angles to be sure that they are square with the truck frame.

#### **WARNING** PERSONAL INJURY / VEHICLE DAMAGE

- DO NOT CUT gas lines, brake lines, electrical wiring, etc. when making cutouts or drilling holes in truck.

9. From the under side of pickup truck, mark the center of holes in bed using the hitch as a template. Drill holes to fit carriage bolt using a 3/4" drill bit FIG 4.
10. Before cutting 12-7/8" x 8" hole in bed of vehicle be sure to recognize the hole must be offset 2-1/8" towards the driver's side for ball to be centered in truck bed FIG 2.
11. Make cutout on the floor of truck bed. See FIG 1 & 2.

12. Bolt the folding hitch ball assembly to installation kit through the truck bed using (4) four, SAE Grade 5, 5/8" carriage bolts, nuts and lock washers (supplied with Atwood folding hitch ball). Shim (not supplied) as necessary to accommodate corrugation in floor of truck bed.
13. Check operation of ball and safety chain attachments. Make adjustments to allow for free operation of parts. Tighten 5/8" carriage bolts to 150 (ft.lb) torque.
14. The tops of the steel angles must fit flush against the underside of the truck bed. The frame mount brackets and/or spacers must fit against the outside of the truck frame for proper installation.
15. Mark the center of the mounting holes being used with center punch.
16. Check inside frame before drilling to be sure no lines or wiring will be damaged by drill.
17. Drill (4) four holes on each side of vehicle using 7/16" drill bit.
18. Use spacers as needed FIG 7.
19. Tighten all 3/8" bolts to 33 (ft.lb) torque. Failure to tighten bolts as described may result in fastener loss or failure.
20. Replace wheel well liners and heat shields to original locations in reverse order if removed.
21. Proceed to **INSTALLATION CHECK**.

**H-FRAME METHOD - FIG 8**

The H-Frame support structure consists of

- |                        |   |     |
|------------------------|---|-----|
| 2 - support structures | 6" by width of truck frame x 1/2" thick | 8-G |
| 2 - support structures | 6" x 8" x 1/2" thick                    | 8-H |
| 2 - stiffener angles   | 2" x 2" x 26" long x 1/4" thick         | 8-E |
| 4 - frame brackets     | 2" wide x 3/8" thick                    | 8-F |

1. To form H-Frame support - Weld support structures FIG 10-G and 10-H together with 1/4" uninterrupted fillet square butt joint welds on both sides of the plates FIG 10-A.
2. Weld stiffener angles (FIG 8-E) to bottom of H-Frame using 1/4" fillet 1" - 2" skip weld full length of each stiffener angle on both sides of leg FIG 10-B. Stiffener angle may also be through bolted with 4-1/2" Grade 5 bolts. Tighten to 60 (ft.lb) torque.)
3. **MOUNTING LOCATION AND TRUCK BED FLOOR CUT-OUT**  
Proper mounting location for folding hitch ball to distribute weight properly between truck axles -
  - a. Center BALL between sides of truck bed floor, FIG 1-A
  - b. Locate BALL 2" to 6" in front of rear axle centerline FIG 1-A
4. Before cutting 12-7/8" x 8" hole in bed of vehicle be sure to recognize the hole must be offset 2-1/8" towards the driver's side for ball to be centered in truck bed FIG 2.
5. Make cutout on the floor of truck bed FIG 1 & 2.
6. Put Folding Hitch Ball in truck bed, align with cutout in floor of bed FIG 8-A & 9.
7. Mark holes to be drilled on truck bed using holes in folding hitch ball as a guide for locations. Drill 11/16" diameter holes.
8. Place H-Frame FIG 8-G/H under floor of truck bed and above frame of truck. Align with cutout in floor of truck bed. Clamp in place against bottom of bed.
9. Drill four holes in H-Frame using holes previously drilled in truck bed for a guide.
10. Bolt the folding hitch ball assembly and H-Frame to the truck bed. Use (4) four, SAE Grade 5, 5/8" carriage bolts FIG 8-D, nuts and lock washers (supplied). Shim as necessary to accommodate corrugation in floor of truck bed.
11. Tighten 5/8" nuts to 150 (ft.lb) torque.
12. The tops of the steel frame brackets must fit flush against the underside of the truck bed. The inside of the steel frame brackets must fit flush against the truck frame for proper installation.

 **CAUTION**  
**VEHICLE DAMAGE**

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- For adequate transfer of forces produced during towing these instructions **MUST** be followed.

 **WARNING**  
**VEHICLE DAMAGE**

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- Mounting brackets must be bolted to frame. Welding will **NOT** provide the structural strength needed for towing and may void factory warranty on vehicle.

**WELDING INSTRUCTION**

- **M.I.G. OR STICK** - 5/32" fillet weld minimum.
- **M.I.G. WELDING** - Use A.W.S. ER 70S-3 or 6 wire or equivalent with a diameter of .035 - .045. The recommended shielding gas mixture is 75% - 95% Argon & 25% - 5% CO<sub>2</sub>.
- **STICK WELDING** - Use E6011 A.W.S. welding rod or equivalent with a diameter are as follows: 1/8" electrode set power between 115-130 Amps DC or 5/32" electrode set power between 140-160 Amps DC.

The installer must make his own H-frame, stiffener angles, and frame brackets. Use structural quality hot rolled or cold rolled steel bar. All steel used must meet minimum ASTM A-36 specifications.

13. Position the frame brackets along each side of the truck frame providing clearance to any crossmember, fuel line, electrical or brake system. Drill 17/32" (.531") diameter holes through truck bed and H-frame.
14. Secure the frame brackets to the truck bed and H-Frame with SAE Grade 5, 1/2" diameter bolts, nuts and lock washers (not supplied).
15. Drill two (2) 17/32" (.531") diameter holes through the lower leg of the frame brackets and truck frame. Position the holes in vertical center of the truck frame.
16. Secure frame brackets to the truck frame with 2 each SAE Grade 5, 1/2" dia. bolts, nuts and lock washers (not supplied).
17. Tighten all 1/2" bolts to 60 (ft.lb) torque.
18. Proceed to **INSTALLATION CHECK**.

## BED PLATE METHOD - FIG 11

The Bed Plate support structure consists of

1 - bed plate	26" x 44" by 3/8" thick	11-G
2 - stiffener angles	2" x 2" by 26" long x 1/4" thick	11-E
6 - L shaped frame brackets	2" wide x 3/8" thick	11-F

### **CAUTION** **VEHICLE DAMAGE**

- For adequate transfer of forces produced during towing these instructions **MUST** be followed.

The installer must make his own bed plate, stiffener angles, and L shaped frame brackets. All steel used must meet ASTM A-36 steel specifications. Bed plate must be structural quality, hot-rolled steel plate. Stiffener angles must be 2" x 2" x 1/4" steel bar size angles.

1. Layout and cut bed plate cutout (like truck bed) FIG 12.
2. Center bed plate in bed of pickup truck FIG 1 & 11.
3. Align cutout in bed plate FIG 11-B with cutout in truck bed FIG 11-C.
4. Place folding hitch ball assembly into hole in bed plate and pick-up truck bed floor. Arrow and "FRONT" stamped into the top plate of folding ball assembly must point to cab of truck FIG 1-A.
5. Drill 11/16" diameter holes through bed plates and truck bed to secure folding hitch ball to bed plate. Use holes in base of folding hitch ball as a guide for hole locations.
6. Bolt the folding hitch ball assembly to the bed plate and truck bed. Use the four supplied SAE Grade 5, 5/8" carriage bolts FIG 11-D, nuts and lock washers. Use flat washers (not supplied) on the underside of the truck bed to help distribute the load evenly.
7. Tighten all 5/8" nuts to 150 (ft.lb) torque.
8. Position the 2 stiffener angles FIG 11-E to the underside of the truck bed using frame brackets FIG 11-F so bolts will pass through truck bed and bed plate.

NOTE: It may be necessary to shift the stiffener angles front or back to clear any truck bed crossmembers.

9. Drill holes at the front and rear end areas of the bed plate to mount the 2 stiffener angles. Holes must be 17/32" (.531") diameter.
10. Secure each stiffener angle to underside of truck bed with 4, SAE Grade 5, 1/2" bolts, nuts and lock washers, tighten to 60 (ft.lb) torque.

### **WARNING** **VEHICLE DAMAGE**

- Mounting brackets must be bolted to frame. Welding will **NOT** provide the structural strength needed for towing and may void factory warranty on vehicle.

11. The tops of the steel frame brackets must fit flush against the underside of the truck bed and the inside of the steel frame brackets must fit flush against the truck frame for proper installation.
12. Position the frame brackets along each side of the truck frame providing clearance to any crossmember, fuel line, electrical or brake system. Drill 17/32" (.531") diameter holes through truck bed and bed plate.
13. Secure the frame brackets to the truck bed and bed plate with SAE Grade 5, 1/2" diameter bolts, nuts and lock washers (not supplied).
14. Drill 17/32" (.531") diameter holes through the lower leg of the frame brackets and truck frame. The holes should be positioned in the vertical center of the truck frame.
15. Secure frame brackets to the truck frame with SAE Grade 5, 1/2" dia. bolts, nuts and lock washers (not supplied).
16. Tighten all 1/2" bolts to 60 (ft.lb) torque.
17. Proceed with **INSTALLATION CHECK**.

## INSTALLATION CHECK

After finishing the installation, follow these steps:

1. Coat surface of hitch ball with wheel bearing grease to reduce wear and corrosion.
2. Connect the trailer to the towing vehicle and adjust coupler drop tube (see the coupler owner's manual provided by the trailer manufacturer) to provide approximately 6" clearance between the bottom of the trailer's overhang and the top of the pickup box sides.
3. Check for proper clearance between trailer and both rear of cab, and rear corner of truck bumper when making turns of up to 90°.
4. If trailer will be towed at this point; make sure coupler is securely latched, connect wiring, safety chains, brake system breakaway switch and any other appropriate connections and complete all system checks.

Your system is now ready for use.

## OPERATION

### FOLDING BALL

1. To raise hitch ball to towing position, open door and lift hitch ball into vertical position.
2. Close door to lock the hitch ball in place for towing.
3. To fold hitch ball out of the way, door open, fold ball down, and re-close door.

### SAFETY CHAINS - (IF APPLICABLE)

1. Lift up safety chain attachment link from top plate of folding ball unit.
2. Hook safety chain into attachment link. **AFFIX HOOK SECURELY TO KEEP FROM BOUNCING LOOSE FROM ATTACHMENT LINK.**

## MAINTENANCE

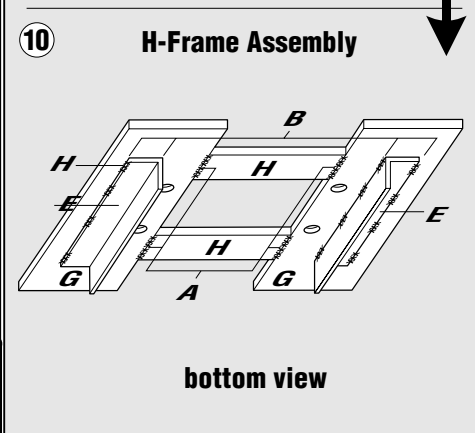
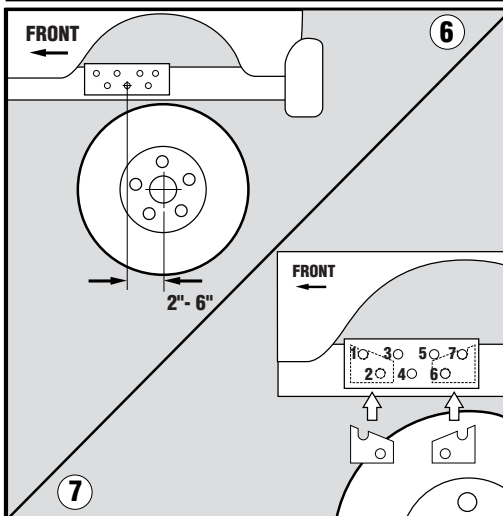
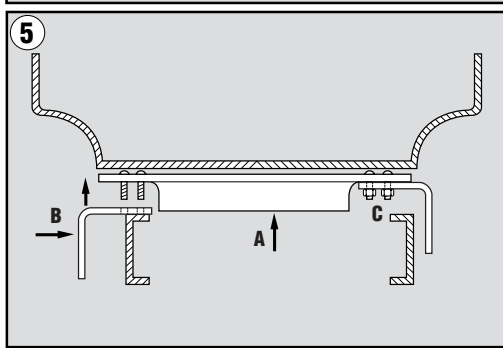
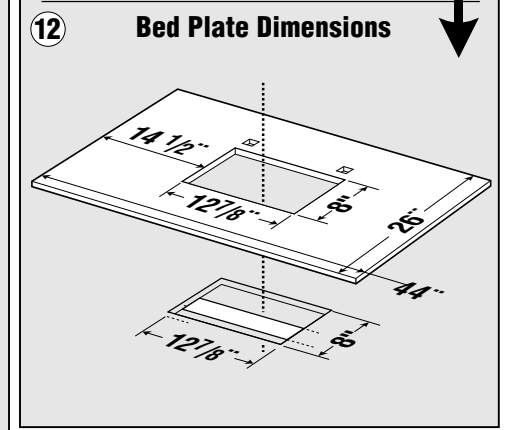
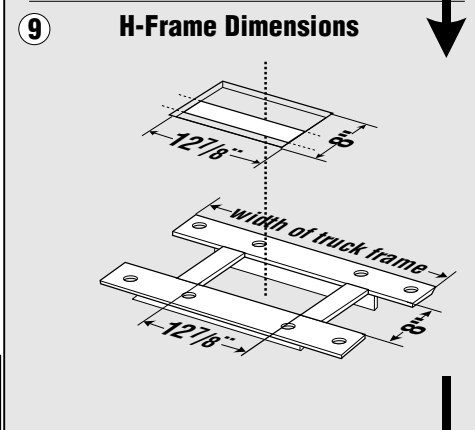
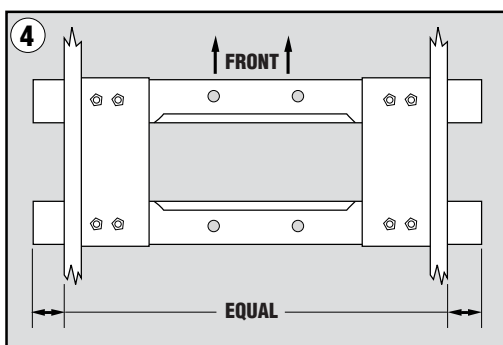
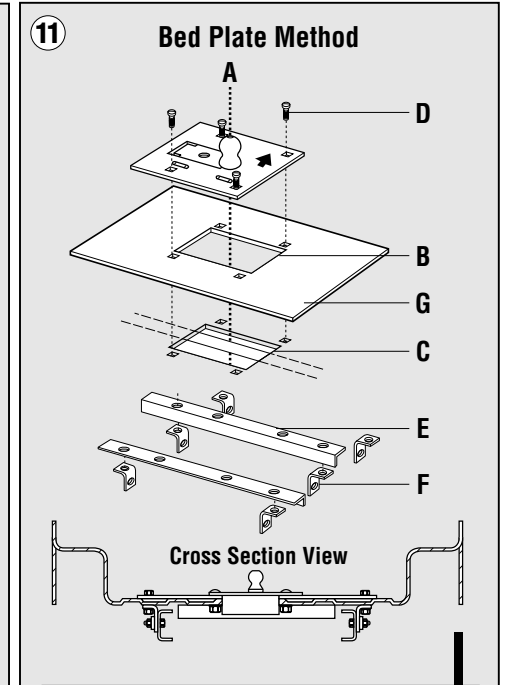
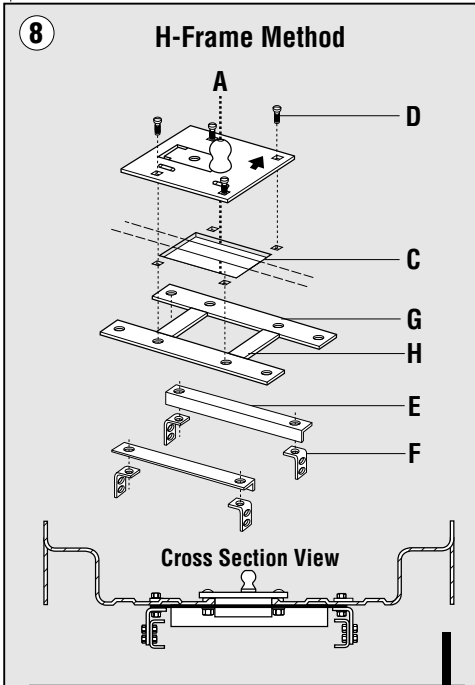
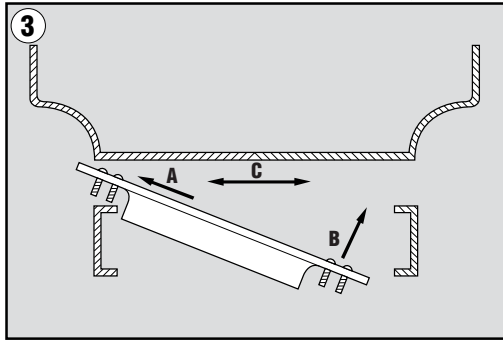
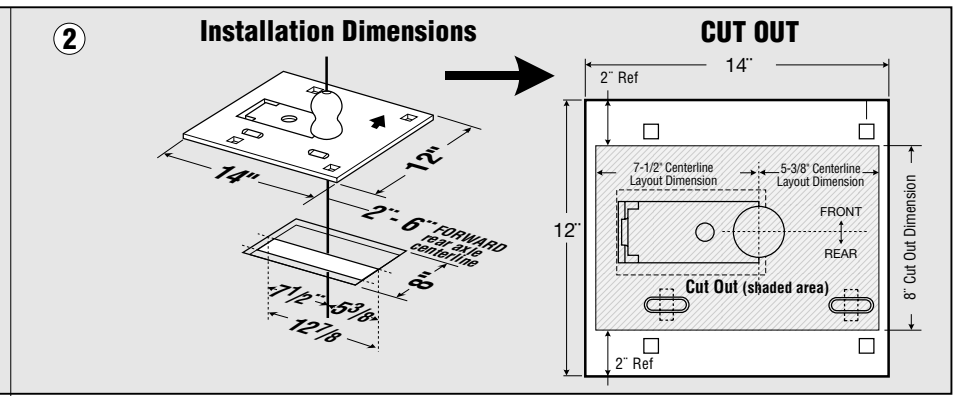
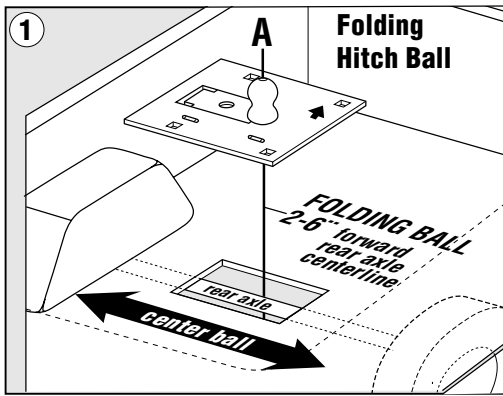
1. Keep assembly free of dirt, mud and foreign matter.
2. Lubricate door hinge points with SAE 30 oil at least once every 3 months.
3. Lubricate hitch ball through standard grease fitting from underneath the truck while the ball is in stowed position with a multipurpose grease every 3 months.
4. Coat surface of hitch ball monthly with wheel bearing grease to prevent wear and corrosion.
5. Check for ball wear before each use. If hitch ball shows signs of cracking, bending or flat spotting, it must be replaced. Do not tow trailer with damaged or worn parts.
6. Check monthly for any looseness or excessive wear that may occur from loose nuts and bolts. Assure that the bolts/nuts are properly tightened.

### **WARNING**

#### **PERSONAL INJURY AND PROPERTY DAMAGE**

- Replace ball if signs of cracking or flat spotting appear.

For problems or questions, contact your dealer, the trailer manufacturer, or Atwood's Consumer Service Department 574-264-2131.



## Atwood Hardware Systems & Components Limited Warranty

Atwood Mobile Products warrants to the original owner this product will be free of defects in material and workmanship for a period of two years from the date of purchase. Atwood's liability hereunder is limited to the replacement of product, repair of product or replacement of product with a reconditioned product, at the discretion of the manufacturer. The warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material workmanship. The warranty extends to the original consumer purchaser of the product only, and is subject to the following conditions:

1. For two (2) year commencing with the date of purchase, Atwood will replace or repair any Hardware System & Components that are found to be defective by Atwood in material or workmanship.
2. In the event of a warranty claim, the Original Purchaser must contact the Atwood Consumer Service Department, 1120 North Main St., Elkhart, IN 46514, Telephone: 574-264-2131 Fax: 574-206-9713. Warranty claim service must be performed as approved by the Atwood Consumer Service Department. Warranty replacement hardware systems and components or parts will be furnished freight prepaid. Labor cost to repair or replace will be limited to the amount of the original purchase price of the systems and components. The replaced warranty products or parts become the property of Atwood Mobile Products and must be returned to the Atwood Consumer Service Department freight prepaid, unless prior arrangements have been agreed to.
3. This limited warranty is valid only when the product is applied, installed, maintained and operated in accordance with this Atwood Installation, Maintenance and Operating Manual. Any deviation from these recommended specifications must be approved in writing by Atwood.
4. Any implied warranties are limited to the duration of this limited warranty as stated above. Atwood does not assume responsibility for consequential damage or loss, including loss of use of vehicle, loss of time, inconvenience, expense for gasoline, telephone, travel, lodging, loss or damage to personal properties, or loss of revenues. Some states do not allow limitations on how long an implied warranty lasts or limitations on consequential damages, so the above limitations may not apply to you. This limited warranty gives you specific legal rights which may vary from state to state.