

Please read and save this Repair Parts Manual. Read this manual and the General Operating Instructions carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. The Safety Instructions are contained in the General Operating Instructions. Failure to comply with the safety instructions accompanying this product could result in personal injury and/or property damage! Retain instructions for future reference. AMT reserves the right to discontinue any model or change specifications at any time without incurring any obligation.

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Periodic maintenance and inspection is required on all pumps to ensure proper operation. Unit must be clear of debris and sediment. Inspect for leaks and loose bolts. Failure to do so voids warranty.

# Electric Motor-Driven Submersible Pumps

Refer to Specific Information and Repair Parts Manual for product specific information.



## SAFETY GUIDELINES

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols:

### DANGER

*Danger indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.*

### WARNING

*Warning indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.*

### CAUTION

*Caution Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.*

**NOTE:** *Indicates important information that, if not followed, may cause damage to equipment.*

## UNPACKING

When unpacking the unit, inspect carefully for any damage that may have occurred during transit. Check for loose, missing or damaged parts. (See pump exploded view and Repair Parts List.) **Do not attempt to assemble or operate pump if any parts are missing or damaged. Determine that all parts are properly installed.**

## GENERAL SAFETY INFORMATION

1. Know the pump application, limitations, and potential hazards. Read all manuals included with this product carefully. Be thoroughly familiar with the pump and the proper use of the equipment.

### WARNING

***Pump should only be used with liquids compatible with pump component materials.***



***Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in flammable and/or explosive atmospheres.***

***When pumping hazardous or dangerous materials, use only in room or area designated for that purpose. For your protection, always wear proper clothing, eye protection, etc. in case of any malfunction. For proper handling techniques and cautions, contact your chemical supplier, insurance company and local agencies (fire dept., etc.). Failure to comply with this warning could result in personal injury and/or property damage.***

2. Make certain that the power source (engine) conforms to the requirements of your equipment.
3. Provide adequate protection and guarding around moving parts.
4. Disconnect power before servicing. If the power disconnect is out of sight, lock in the open position and tag it to prevent unexpected application of power. Failure to do so could result in fatal electric shock!
5. Release all pressure within the system before servicing any component.
6. Drain all liquids from the system before servicing.
7. Secure the discharge line before starting the pump. An unsecured discharge line will whip, possibly causing personal injury and/or property damage.
8. Check hoses for weak or worn condition before each use, making certain that all connections are secure.
9. Periodically inspect pump and system components. Perform routine maintenance as required (See Maintenance section).
10. Provide a means of pressure relief for pumps whose discharge line can be shut-off or obstructed.
11. **Personal Safety:**
  - a. Wear safety glasses at all times when working with pumps.
  - b. Wear a face shield and proper apparel when pumping hazardous chemicals.
  - c. Keep work area clean, uncluttered and properly lighted; replace all unused tools and equipment.
  - d. Keep visitors at a safe distance from the work area.
  - e. Make workshop childproof – with padlocks, master switches, and by removing starter keys.
12. This unit is not waterproof and is not intended to be used in showers or saunas
13. When wiring an electrically driven pump, follow all electrical and safety codes, as well as the most recent United States National Electrical Code

# Electric Motor-Driven Pumps

(NEC) and the Occupational Safety and Health Act (OSHA).

## ⚠ WARNING

### **Risk of Electric shock!**

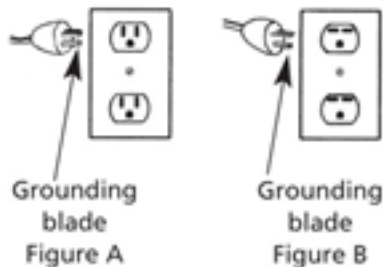
14. **THREE-PHASE MOTORS:** These units are for permanent installation using a power supply with a ground. To reduce the risk of electric shock, electric motor must be adequately grounded to a metal raceway system by using ground wire.
- Refer to the most recent National Electrical Code (NEC) Article 250 (Grounding) for additional information. ALL WIRING SHOULD BE DONE BY A QUALIFIED ELECTRICIAN.

On three-phase power, voltages on all three lines should be balanced within 1%. Unbalanced voltages cause motor overheating and poor performance.

## ⚠ WARNING

### **Risk of Electric Shock! Never connect the green (or green and yellow) wire to a live terminal!**

15. **SINGLE PHASE MOTORS:** These units can be wired for either portability with flexible 3-wire cord, or permanent installation using a supply with a ground. To reduce the risk of electric shock, the motor must be securely and adequately grounded! This can be accomplished by either (1) inserting plug (portable) directly into a properly installed and grounded 3-prong grounding type receptacle (as shown in Figure A for 110-120 volt, or Figure B for 220-240 volt) (2) permanently wiring unit with a grounded, metal raceway system or (3) other suitable means. The green (or green and yellow) conductor in the cord is the grounding wire.



**Figure 1 - Grounding Methods**

Where a 2-prong wall receptacle is encountered, it must be replaced with a properly grounded 3-prong receptacle installed in accordance with the National Electrical Code, local codes and ordinances. To ensure a proper ground, the grounding means must be tested by a qualified electrician.

16. Use only 3-wire extension cords that have 3-prong grounding type plugs and 3-pole receptacles that accept the equipment plug.
17. All wiring should be performed by a qualified electrician.
18. Protect electrical cord from sharp objects, hot surfaces, oil and chemicals. Avoid kinking the cord. Replace or repair damaged or worn cords immediately.
19. Use wire of adequate size to minimize voltage drop at the motor.
20. Disconnect power before servicing a motor or its load. If the power disconnect is out of sight, lock it in the open position and tag it to prevent unexpected application of power.

## ⚠ WARNING

*Do not handle a pump or pump motor with wet hands, when standing on a wet or damp surface or in water.*

## ⚠ WARNING

*All single phase pump motors are equipped with an automatic resetting thermal protector and may restart unexpectedly. Protector tripping is an indication of motor overloading as a result of operating the pump at low heads (low discharge restriction), excessively high or low voltage, inadequate wiring, incorrect motor connections or a defective motor or pump.*

21. Do not use power cord to lift or support weight of pump. Always use handle provided to lift pump.

## PREINSTALLATION

### SUMP PITS

A pit may be constructed of tile, concrete, steel or plastic. Check local codes for approved materials. Pit should have a hard bottom. A patio block will form a solid foundation for pump and still allow seepage water to enter pit from below. A pit cover will prevent debris from possibly clogging or damaging pump, it will also prevent persons from falling in and causing injury.

If you are installing a new sump pit:

1. Locate pump approximately 6" from basement wall in lowest point of basement floor.
2. With chalk, mark out diameter on floor.
3. Cut through floor with masonry drill or other concrete cutting tool and excavate below floor to required depth.
4. Level bottom and set sump tile in place. Tie in any sub-floor drains. Backfill and mortar tile or sump pit in place. Top should be flush with floor for surface drainage.
5. It is recommended that bottom of tile be provided with a concrete base. However, a concrete block or bricks may be used to provide a support for pump.

## INSTALLATION

## ⚠ WARNING

*The pumps should not be used in flammable or explosive atmospheres. In order to safely use this product, familiarize yourself with this pump and also with the liquid (chemical, etc.) that is going to be pumped through the unit. This pump is not suitable for many liquids.*

*For installations where property damage might result from an inoperative or leaking pump due to power outages, discharge line blockage or any other reason, a backup system(s) should be used.*

*Failure to follow any warning can result in personal injury and/or property damage.*

# Electric Motor-Driven Pumps

## LOCATION

- a. Use only UL listed Hazardous Location motors for service in Hazardous Locations as defined in Article 500 of NEC.
  - b. Temperature around motor should not exceed 104°F (40°C). Minimum temperature is -20°F (-29°C).
1. Pump should be located and should rest on a level solid foundation. Do not suspend pump by means of discharge pipe or power cord. Keep pump inlet clear. Do not install pump directly on clay, earth or sand surfaces. Clean tank/sump of small stones, gravel, sand, dirt, silt, etc., which could clog or damage pump, or seal and cause pump failure. Keep pump inlet clear.
  2. Locate pump in center of pit so that pump housing and any float control (where applicable) will not come in contact with side of pit and create operational problems.
  3. Discharge piping should be as short as possible to reduce pipe friction losses. It is recommended that discharge pipe diameter should be equal to or larger than discharge size of pump. Smaller pipe diameters will restrict capacity of pump and reduce performance. These pumps are provided with an NPT discharge connection. Assure airtight pipe connections with use of a pipe joint sealant.
  4. It is recommended that a nipple be installed in discharge outlet first and balance of piping attached to nipple. Install a union in discharge line, preferably just above top of pump, to allow easy removal of pump for cleaning or repair. To reduce motor noise and vibration transmission to surrounding structure, a short length of rubber hose can be connected into discharge line, using suitable clamps.
  5. In installations where piping is long, vertical discharge is above 7 or 8 feet, or a small tank/sump has been provided, use of a check valve is recommended to prevent backflow of water into tank/sump. Where a check valve is used, drill a relief hole (1/8" or 3/16" diameter) in discharge pipe. This hole should be located below floor line between pump discharge and check valve. Unless such a relief hole is provided, pump could "air lock" and will not pump water even though it will run. Do not bend, kink or cut power cord.
  6. Support piping independently of pump to avoid universal or excessive stresses on pump casing, which would cause impeller misalignment and possible pump failure.
  7. **WIRING:** For proper connections, refer to diagram located on nameplate or inside terminal of motor. Make sure connections are correct for voltage being supplied to motor.

Whenever possible, pump should be powered from a separate branch circuit of adequate capacity to keep voltage drop to minimum during starting and running. For longer runs, increase wire size in accordance with Wire Selection Guide.

Make sure unit is properly grounded. A motor to be used with single-phase power cannot be used with three-phase power and vice versa. If unsure about above information or wiring diagrams, consult an electrician familiar with motor wiring.

## ▲ WARNING

**A wrong connection can burn out pump motor, cause an short, or produce a shock. Failure to follow above warning can result in property damage and/or personal injury. Always wire motor with a three-wire system, ensuring that a ground wire runs to a good ground such as a grounded water system or conduit. Also, ensure that a good ground is provided at supply end of line.**

8. Do not allow cord to interfere with float control motion (where applicable) or to drape over pump motor. With plastic zip ties or clamps, secure cord to discharge pipe. This will provide protection for cord and make a neat installation.
9. Install any auxiliary components (e.g. pressure switch, float).
10. After all piping and controls have been installed, run water into sump/tank to test pump (see "Operation" section).
11. Unit is ready for operation.

## OPERATION

### ▲ CAUTION

**Do not run pump dry as permanent damage to the mechanical seal will result.**

1. Activate the unit.

**IMPORTANT:** Proper Rotation- Power supply should be applied momentarily to the pump at first and the direction of rotation checked. When viewing the front of the pump, the motor shaft (impeller) should be rotating counterclockwise. If it is not, disconnect power and re-check wiring to motor. (See "Installation" section.) To change rotation on three phase models, interchange any two incoming line (power) leads. Other models, consult driver information that came with driver.

### ▲ CAUTION

**Wrong rotation will give low performance, low head and could damage unit and/or injure personnel.**

**NOTE:** Never shut off discharge or restrict suction flow while the pump is operating.

2. On initial start-up (after 15 minutes running time), check power consumption to be sure motor is not overloaded.
3. If motor is overloaded, install a valve on discharge to increase back pressure. Close the valve until pump motor is below full nameplate or within Service Factor (SF) amps.

## MAINTENANCE

### ▲ WARNING

**Make certain that the unit is disconnected from the power source before attempting to service or remove any components!**

**NOTE:** Always flush pump thoroughly after use or if unit is not going to be used for any prolonged length of time to prevent crystallization and/or damage to seal and pump.

## ROUTINE

1. Pump should be drained when subjected to freezing temperatures. A drain plug is provided on the pump casing.
2. Clean the suction line strainer at regular intervals.
3. Periodically check to see if electrical connections are tight.
4. Pump should be checked daily, weekly, monthly, etc. for proper operation. If anything has changed since unit was new, unit should be removed and repaired or replaced. Only qualified electricians or service personnel should attempt to repair this unit. Improper repair and/or assembly can cause an electrical shock hazard.

## TROUBLESHOOTING CHART

Problem	Possible Cause(s)	Corrective Action
Motor will not start or run..	<ol style="list-style-type: none"> <li>1 Improperly wired.</li> <li>2 Blown fuse or open circuit breaker.</li> <li>3 Loose or broken wiring.</li> <li>4 Stone or foreign object lodged in impeller.</li> <li>5 Motor shorted out.</li> <li>6 Thermal overload has opened circuit.</li> <li>7 Voltage too low at motor terminals due to line drop.</li> <li>8 Defective float switch (where applicable).</li> <li>9 Float jammer (where applicable).</li> </ol>	<ol style="list-style-type: none"> <li>1 Check wiring diagram on motor.</li> <li>2 Replace fuse or close circuit breaker after reason for overload has been determined and corrected.</li> <li>3 Tighten connections, replace broken wiring.</li> <li>4 Disassemble pump and remove foreign object.</li> <li>5 Replace</li> <li>6 Allow unit to cool. Restart after reason for overload has been determined.</li> <li>7 Consult local power company. Increase wire size. Check for poor connections.</li> <li>8 Replace switch.</li> <li>9 Reposition pump away from sides.</li> </ol>
Motor runs slowly; will not get up to speed	<ol style="list-style-type: none"> <li>1 Motor wired improperly.</li> <li>2 Capacitor burned out (single phase units only).</li> <li>3 Voltage too low at motor terminals.</li> </ol>	<ol style="list-style-type: none"> <li>1 Check and recheck wiring diagram on motor. Make internal wiring changes in wiring compartment.</li> <li>2 Replace capacitor.</li> <li>3 Increase wire size. Check for poor connections. Check for voltage unbalance (3 phase).</li> </ol>
Motor overheats while running under load.	<ol style="list-style-type: none"> <li>1 Unbalanced supply voltage.</li> <li>2 Faulty connection.</li> <li>3 High or low voltage.</li> </ol>	<ol style="list-style-type: none"> <li>1 Check for faulty connections. Voltage on all three lines should be balanced within 1%. Excessive single phase loads.</li> <li>2 Clean, tighten, or replace.</li> <li>3 Check voltage at motor, should not be more than 10% above or below rated.</li> </ol>
Little or no discharge.	<ol style="list-style-type: none"> <li>1 Total head too high.</li> <li>2 Impeller plugged.</li> <li>3 Rotation incorrect.</li> <li>4 Impeller damaged.</li> <li>5 Discharge piping too small.</li> <li>6 Motor wired incorrectly.</li> <li>7 Casing gasket leaking.</li> <li>8 Discharge line valve closed.</li> <li>9 Strainer clogged.</li> <li>10 Pump air locked.</li> </ol>	<ol style="list-style-type: none"> <li>1 Shorten suction lift and/or discharge head.</li> <li>2 Disassemble pump and clean impeller.</li> <li>3 Correct (See wiring diagram on motor).</li> <li>4 Replace.</li> <li>5 Match to discharge outlet size on pump.</li> <li>6 Check wiring diagram.</li> <li>7 Replace.</li> <li>8 Open.</li> <li>9 Clean debris from strainer and tank/sump.</li> <li>10 Drill 1/8" hole in discharge piping between pump and check valve.</li> </ol>
Pump vibrates and/or makes excessive noise	<ol style="list-style-type: none"> <li>1 Mounting plate or foundation not rigid enough.</li> <li>2 Foreign material in pump.</li> <li>3 Impeller damaged.</li> <li>4 Worn motor bearings.</li> <li>6 Cavitation present.</li> </ol>	<ol style="list-style-type: none"> <li>1 Reinforce.</li> <li>2 Disassemble pump and clean.</li> <li>3 Replace.</li> <li>4 Replace.</li> <li>6 Check suction line for proper size and be sure valve is open. Remove excessive loops in suction line. Install gate valve on discharge side of pump and reduce flow as necessary to match suction conditions available.</li> </ol>

**TROUBLESHOOTING CHART (continued)**

Problem	Possible Cause(s)	Corrective Action
Pump won't shut off	1 Defective switch.	1 Replace switch.
	2 Clogged discharge.	2 Remove pump and clean pump as well as piping.
	3 Float jammed (where applicable).	3 Reposition pump away from sides.
Pump starts and stops too often.	1 Backflow of water from piping.	1 Install check valve.
	2 Very low discharge head or pit too small.	2 Increase discharge head by restricting discharge with use of gate valve (1/2 open) or make pit larger.

**Operating Instructions & Maintenance**

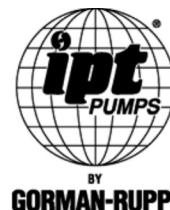
**NOTES:**

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## General Information

**SALES POLICY:** AMT products are sold through our established Distributors. We do not sell direct to the consumer or organization not entitled to trade recognition. Therefore, possession of our catalogs and/or price list(s) does not infer an offer to sell.

**MINIMUM ORDER:** We appreciate your order, however, all orders are subject to a minimum \$35.00 net invoice charge (excluding freight). This applies to all pump and parts purchase orders.

**PRICES:** Prices are subject to change without notice. All orders accepted are subject to prices in effect at time of shipment.

**PAYMENT TERMS:** Terms, upon establishment of credit, are Net 30 days. Past due accounts may be subject to a service charge of 1.5% per month. Domestic or assignable letter of credit is required for all export trade.

**PAST DUE ACCOUNTS:** AMT reserves the right to withhold open account shipments on any past due account. Invoices are considered past due after thirty (30) days. In the interest of sound business, all orders are subject to approval of the Credit Department.

**SHIPPING INSTRUCTIONS:** All shipments will be made F.O.B. the factory. Where instructions for shipment do not appear on the order, the shipment will be made according to our best judgment. Full risk of loss (including transportation delays and losses) shall pass to the customer upon delivery of the products to the carrier at the F.O.B. point. When loss or delay occurs, primary responsibility for tracing rests with the customer. When there is LOSS or APPARENT VISIBLE DAMAGE to a shipment, when tendered for delivery, **DO NOT** give the carrier a clear receipt. Note such damage on the carrier's delivery receipt and **HAVE THE DRIVER SIGN THE RECEIPT.**

**PRODUCT REVISIONS:** AMT reserves the right to discontinue, change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and/or shipped prior to such a change or improvement.

**LEAD TIME:** Products designated "Quick Ship Product", also referred to as "QSP" will normally be shipped within 24 hours of receipt of a non-cancellable purchase order. Only limited quantities of "QSP" pumps are available.

**STANDARD LEAD TIME:** Lead time is two weeks for all non "QSP" product. AMT reserves the right to revise lead times as required due to availability of materials and all other causes beyond our control.

**VIP SHIPMENT:** Select AMT and IPT branded pumps are available for next day shipment for non-QSP (Quick Ship Products) items and subjected to a specific model surcharge per unit noted in the respective price book. Requires calling for availability, confirmation and a non-cancellable purchase order or credit card payment prior to shipment. The expedited shipping charges are an additional cost added separately from the VIP charges per item. AMT reserves the right to revise lead times as required due to availability of materials and all other causes beyond our control. QSP quantities are limited as determined by AMT.

ALL purchase orders must be submitted via hard copy sent to AMT customer service department by fax, EDI or e-mail.

**RETURN GOODS POLICY:** Goods shall not be returned without a return goods authorization number (RGA) issued by AMT customer service. The RGA number must be listed on the packing list. Only current model and part numbers with a valid date code may be returned (within one year from date of purchase). **A 20% restocking and packaging charge will apply to all returns. All shipping charges must be pre-paid. No exceptions.**

**ORDER CHANGES BY CUSTOMER:** Orders in process may not be changed except with written consent and may be subject to special charges.

## 12 Month Limited Warranty

### EXTENT AND DURATION OF LIMITED WARRANTY

**Coverage:** AMT Pump Company (herein "AMT") or IPT Pumps by Gorman-Rupp (herein "IPT") or Gorman-Rupp Industries Division of The Gorman-Rupp Company, Patterson, or the Gorman-Rupp Company (herein referred to as "G-R Unit") each individually warrants that its products and parts shall be free from defects in material and workmanship for twelve (12) months from the date of purchase by the original end user when installation is made and maintenance is performed in accordance with G-R Unit's recommendations. Wear and tear resulting from use and items normally consumed in use are not covered.

### EXCEPTIONS

( A ) This Limited Warranty shall not apply to mechanical seals in AMT or IPT pumps and the following products and parts: engines, motors, trade accessories and all other products, components, parts and materials not manufactured by the G-R Units. These items may, however, be covered by the warranties of their respective manufacturers. ( B ) This warranty does not extend to or apply to any unit which has been repaired or altered at any place other than by a G-R Unit, or by persons not expressly approved by a G-R Unit to make repairs or alterations, nor to any unit the serial number, model number or identification of which has been removed, defaced or altered. ( C ) This warranty does not extend to any product manufactured by a G-R Unit, which has been subjected to mis-use, neglect, accident, improper installation, or use in violation of instructions furnished by a G-R Unit. ( D ) Pump Kits: This warranty does not extend to any product sold by a G-R Unit unassembled as a Pump Kit. Pump Kits are warranted against defects in material and workmanship for 60 days from the date of shipment from a G-R Unit. Any Pump Kit parts deemed defective by a G-R Unit will be replaced free of charge within 60 days of shipment. Pump Kits are not returnable for credit.

### LIMITATIONS

**THE G-R UNITS' SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO THEIR PRODUCTS AND PARTS IS THIS LIMITED WARRANTY. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS AND/OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.**

### EXCLUSIVE REMEDY AND DAMAGES

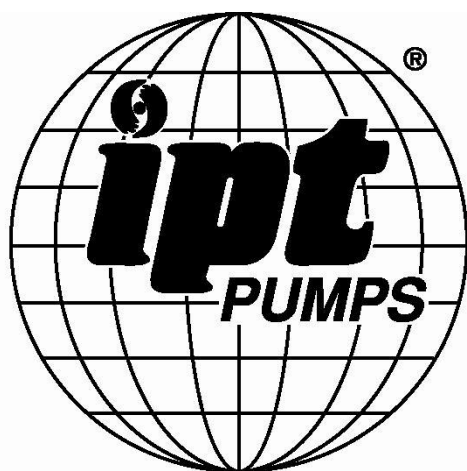
The sole and exclusive remedy for breach of this Warranty by a G-R Unit and the entire extent of its liability for such breach or for damages arising from the use of the products and parts covered under this Limited Warranty, shall be as follows:

1. **Repair or Replacement:** If inspection shows that any G-R Unit product or part covered under this Limited Warranty is defective in materials or workmanship, the G-R Unit shall repair or replace the defective or non-conforming product or part without charge, whichever the G-R Unit chooses. You must have properly maintained and used the product or part claimed to be defective in accordance with the maintenance schedule or manual, which comes with the product. No allowance will be made for labor, installation, removal, transportation or other charges incurred by you in connection with such repair or replacement.
2. To obtain the above remedy:
  - A. Immediately notify the G-R Unit upon discovery of the claimed defect in materials or workmanship and provide the serial number or date code of the product and/or part(s) or provide the G-R Unit with the invoice or bill of sale referencing the product by no later than the expiration date of the warranty period.
  - B. The G-R Unit will advise whether inspection will be necessary and how whether repair or replacement will be made. If inspection by the G-R Unit is necessary, the pump or defective part must be sent freight pre-paid to the G-R Unit. Return shipment will be F.O.B. the G-R Unit's plant.
  - C. **Return Goods Authorization Requirement:** No product will be accepted for return or replacement without the prior written authorization of the G-R Unit. Upon such authorization, and in accordance with instructions from the G-R Unit, the product will be returned to the G-R Unit, shipping charges prepaid by the Buyer.
3. **Damages:** The G-R Unit's liability for damages for breach of this Limited Warranty shall not exceed the amount of the purchase price of the product or part(s) in respect to which Such damages are claimed. **IN NO EVENT SHALL THE G-R UNITS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES FOR BREACH OF THIS LIMITED WARRANTY.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.



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