Tip Sheet #216
Pump Motor Diagnosis and Replacement for Steel and Plastic Tanks
Kit 800302

 Issued: April 2005 #82-L0521 Rev. 0B 8/12

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WARNING

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CAUTION

Make sure to remove the fuse or turn off circuit breaker to the pump before working on the pump motor.

Read, understand, and follow all instructions in this document before starting.

800302 is a motor service kit: contains the replacement motor & bearing, two shaft seals: P/N: 030-1071 (Metal tanks only) and 3510000276 (Plastic tanks only) and this TIP sheet.

Hydraulic pump motor noise or failure to operate correctly can be a very costly failure if the entire pump assembly is replaced. In order to reduce the cost of such repairs, Power Gear has made individual pumps and motors available for service. This TIP sheet addresses steps necessary to diagnose and repair a failed pump motor.

TROUBLESHOOTING A PUMP MOTOR

JACKS WILL NOT EXTEND AND THE PUMP IS NOT RUNNING	
PROBABLE CAUSE	**CORRECTIVE ACTION**
Coach ignition not in run position	Turn ignition to run position and have engine running.
Touch pad has been left on for more than four minutes, auto shut off has occurred	Push ON/OFF button until LED is lit on touch pad.
No power from battery to pump	Check for +12vdc at the large battery terminal of the motor solenoid, if no voltage or if voltage is less than +12vdc, recharge battery or replace power cable.
Bad ground to pump assembly	Inspect / clean surface of star washers around mounting bolt holes of pump assembly. The bolts lock into the pump block assembly through the pump mounting plate. Add a new ground from chassis to pump motor bolts.
Motor starter solenoid blue wire defective (see wiring diagram)	Check for +12vdc at the blue signal wire at the motor starter solenoid when the front or rear button is pushed. If no voltage, check blue wire at pin #3 of the 8 pin connector (on control board or touchpad) for +12vdc when the front or rear button is pushed. If no voltage is present, remove blue wire from starter solenoid and check again at pin #3 for +12vdc while front or rear button is pushed. If there is +12vdc, check the blue wire for continuity, if no continuity replace or repair blue wire. If no voltage is present at Pin 3, contact Power Gear Technical Support.
Motor starter solenoid defective	Check for +12vdc at the blue signal wire at the motor starter solenoid when the front or rear button is pushed. If no voltage, check blue wire at pin #3 of the 8 pin connector (at control box or touchpad) for +12vdc when the front or rear button is pushed. If voltage is present, connect +12vdc to motor side terminal of starter solenoid; if motor runs, replace starter solenoid.
Pump motor defective	Check for continuity between the motor and ground. Connect +12vdc to motor side terminal of motor starter solenoid; if motor does not run, replace pump motor (see TIP sheet 216 for details).

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NOTE

* This motor kit 800302 is NOT compatible with all of the pump assemblies with steel tanks. If the pump assembly you have is not listed, contact Power Gear at www.powergearus.com for further information.

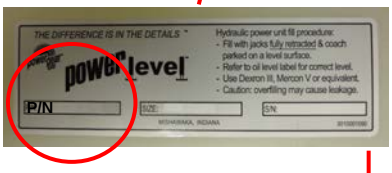

Figure 1A – Power Gear sticker on tank with complete pump assembly part number.

Figure 1B - Motor sticker with base motor, pump and tank assembly part number.

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**See Note to Left*

Compatible Pump Assemblies

The part numbers listed below are compatible to use the 800302 motor replacement kit. Use Figure 1A and Figure 1B to identify the part number on the existing pump assembly. FW is for Fleetwood Pumps.

Complete Pump Assembly Part Number on Tank (Figure 1A)	Base Motor, Pump and Tank Assembly Part Number on Motor (Figure 1B)		
500348	13-1100	3510000146	S200T*4682 or S200T*4538
500432	13-1104		S200T*4681 or S200T*4569
500453	13-1104		S200T*4681 or S200T*4569
500465	13-1064		S200T*4392
500506	13-1100	3510000146	S200T*4682
500507	13-1100	3510000146	S200T*4682
500644	13-1100	3510000146	S200T*4682
500773	130-1150		S102T*4842 or S103T*4893
500825	130-1150		S102T*4842 or S103T*4893
500893	13-1100	3510000146	S200T*4682
500910	130-1193		S103T*4395
500911	130-1189	3510000146	S103T*4921
500920	130-1195		S103T*4920
500925	130-1195		S103T*4920
501000	130-1193	3510000109	S103T*4395
501013	130-1195		S103T*4920
501050	130-1150		S102T*4842 or S103T*4893
501059	130-1189	3510000146	S103T*4921
501090 (FW)	130-1225	3510000147	S103T*4991
501102	130-1189	3510000146	S103T*4921
501158	13-1100	3510000146	S200T*4682
501159	130-1193	3510000109	S103T*4395
501160	130-1195		S103T*4920
501196	130-1195		S103T*4920
501208	13-1100	3510000146	S200T*4682
501234 (FW)	130-1225	3510000147	S103T*5199
501364	130-1306		S103T*5007
501494	13-1100	3510000146	S103T*5198
1010000917	3510000011		S103T*5057
1010000918	3510000011		S103T*5057
1010001480 (FW)	3510000109		S103T*4395
3510000013	3510000013		S103T*5057
3510000068	13-1100	3510000146	S200T*4682 or S200T*4538
3510000091	13-1100	3510000146	S200T*4682 or S200T*4538
3510000103	13-1100	3510000146	S200T*4682 or S200T*4538
3510000151	3510000143		S103T*5200
3510000152 (FW)	3510000143		S103T*5200
3510000159	3510000146		S103T*5198
3510000160	3510000146		S103T*5198
3510000161 (FW)	3510000146		S103T*5198
3510000162	3510000146		S103T*5198
3510000180	3510000011		S103T*5057

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CAUTION

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SECTION A

This section is for the replacement procedure for pump assemblies with steel tanks and cast port plate assemblies.

For pump assemblies with plastic tanks proceed to Section B, Page 5.

1) Remove motor starter solenoid by loosening and removing the band clamp that holds it against motor. Remove the small blue wire from post at the end of the solenoid**.** Remove the two heavy cables that come from the battery and the motor. **(See Figure 2)**
2) Loosen and remove the two bolts from the end of the motor and remove the motor from the port plate. **(See Figure 3)**
   ***NOTE:* In some cases corrosion from water contamination can cause rust to seize the bearing to the port plate. Prying the motor off of the pump may be necessary. Damage to the motor is likely, but if rust has occurred to this extent, motor replacement may be required.**

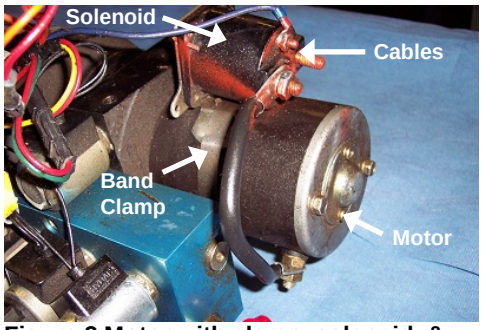

Figure 2 Motor with clamp, solenoid, & cables

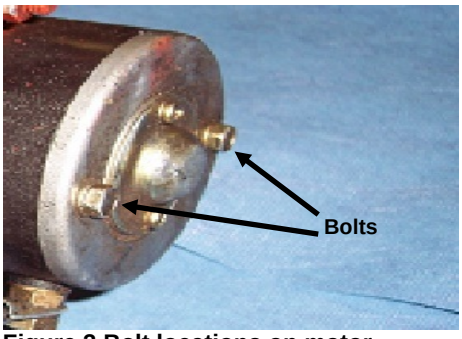

Figure 3 Bolt locations on motor

3) Your motor may come off with or without the bearing still on the armature shaft **(See Figure 4)**, or it may be stuck in the port plate. If the motor is replaced, use the new bearing that comes with it. If the motor works properly and is not badly rusted, simply reassemble.
4) If the bearing was rusty, you will need to replace the shaft seal.
5) Drain & remove the tank, then remove the hoses and pump **(Figure 5).**

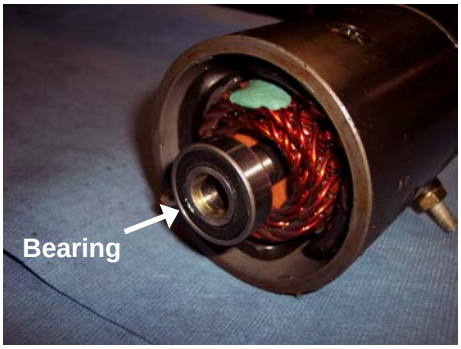

Figure 4 Bearing on shaft

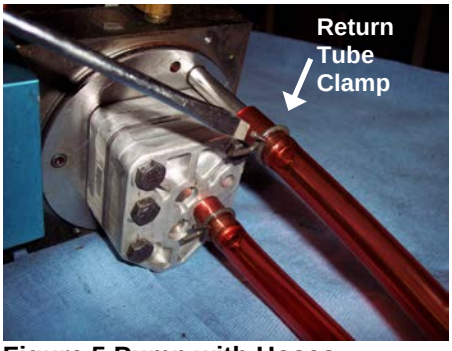

Figure 5 Pump with Hoses

6) Pull spacer from the seal port **(See Figure 6).**
7) Locate & remove the shaft seal **(See Figure 7).** Punch out the seal from the motor side of the port plate **(See Figure 8).** Clean the bearing and seal area with a Scotch-Brite Pad to remove rust if necessary.

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CAUTION

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Figure 10 Setting seal in place

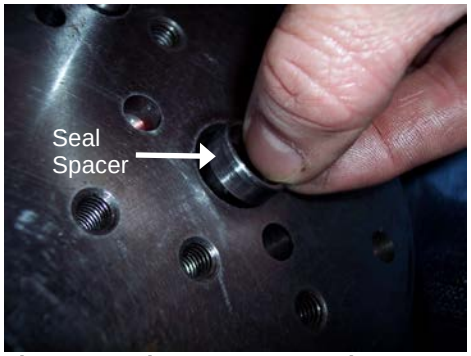

Figure 6 Seal spacer on port plate

Figure 7 Seal from pump side port hole

Figure 8 Punch out seal from motor side of the port plate

Figure 9 Close-up of the shaft seal (030-1071). Metal side goes in against the port plate.

8) Install the new seal (part #030-1071) with a socket the same or slightly smaller diameter as the seal. Use light taps with a hammer until the seal is fully seated. (**See Figure 9 & 10**)
9) Re-assemble the pump onto the port plate. Use torque wrench to tighten pump mounting bolts to 13-15 foot pounds.
10) Install the motor onto the pump. Tighten the bolts to 4-5 foot pounds.
11) Reinstall the complete pump assembly onto the coach.
12) Fill the tank with fresh fluid (**See page 8 for fluid details**) and run the jacks down to the ground, wait 30 seconds, and then retract. Check fluid level and fill as needed. Repeat 5 times to bleed the system of air, and confirm that the pump is working properly. Confirm that the fluid level is full.
13) Test complete leveling system.

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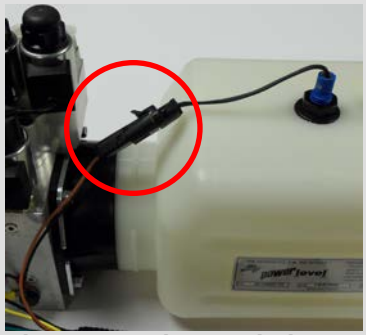

Figure 14 Float Switch Connector

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SECTION B

This section is for the replacement procedure for pump assemblies with plastic tanks and aluminum port plate assemblies.

1) To remove the motor, start by removing the small blue cable from the screw on the end of the solenoid. Remove the heavy cable coming from the battery positive, and the heavy cable going to the side of the motor. (**See Figure 10**)
2) Remove motor solenoid by loosening and removing the band clamp that hold it against the motor. (**See Figure 11**)
3) Loosen the two bolts from the end of the motor that secure the motor to the port plate. (**See Figure 12**)

Figure 10 Motor solenoid wiring

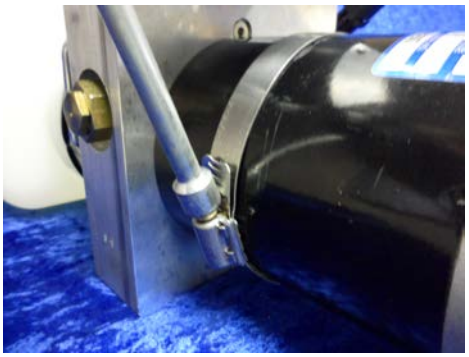

Figure 11 Band clamp removal

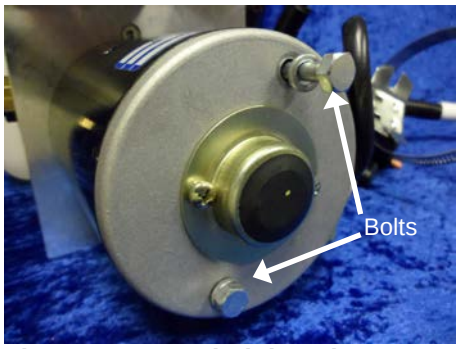

Figure 12 Motor bolt locations

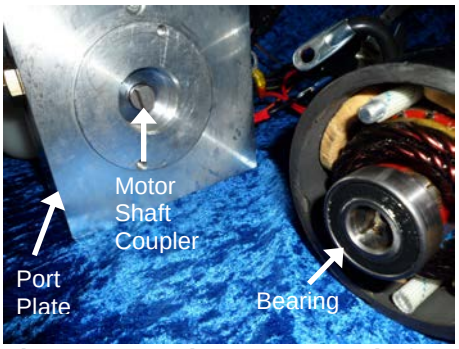

Figure 13 Bearing on motor shaft

4) When the motor is removed, (**See Figure 13**) the bearing will generally stay on the armature shaft, but may stay in the port plate. **NOTE: Be careful not to lose the motor shaft coupler.**
5) If the shaft seal is not leaking between the pump and motor, then do not replace the shaft seal, and skip to step 20. If the shaft seal has leaked fluid into the motor, then proceed to replace the shaft seal.
6) Fluid in the tank will need to be drained before removing a horizontal tank. This can be done by a siphon pump, or by tipping the pump assembly over if removed from the coach. **NOTE: In some situations, vertical tanks may be carefully removed with the fluid still in the tank.**
7) If the tank has a float switch installed, disconnect the wire connector to the float switch. (**See Figure 14**)

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Figure 15 Bolts and clamps (4) on tank flange

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Figure 20 Side of seal to face out toward pump

8) Loosen and remove the 4 bolts and mounting clamps around the neck of the tank. (**See Figure 15**) **NOTE: Extra help may be required to support and lower tank.**
9) Pull the tank assembly away from the pump port plate and set aside.
10) Use pliers to squeeze the spring hose clamp and move it toward the middle of the hose on the pump. (**See Figure 16 & 17**) Then pull the hose off the black fitting on the end of the pump body.
11) Use a 7/16" wrench or socket to loosen and remove the four bolts. Pull the old pump away from the port plate and set aside. (**See Figure 18**)

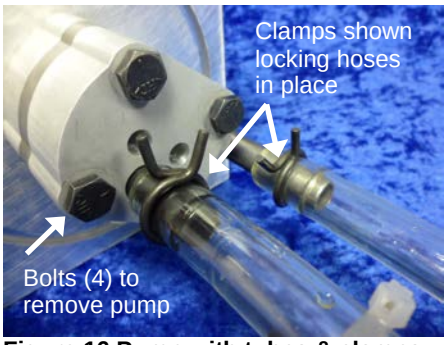

Figure 16 Pump with tubes & clamps

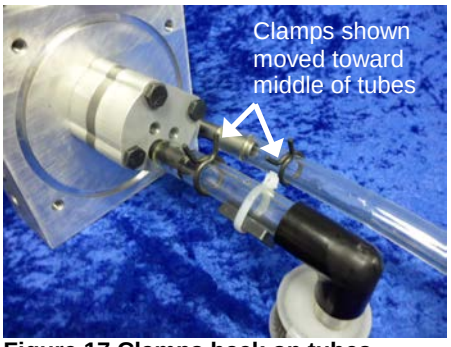

Figure 17 Clamps back on tubes

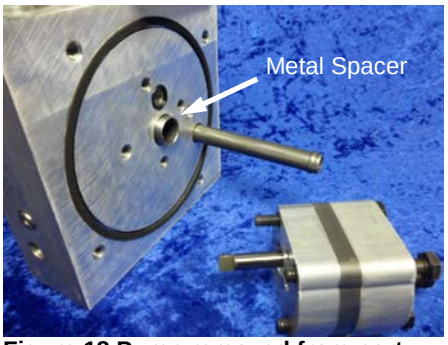

Figure 18 Pump removed from port plate assembly

Figure 19 Removing the seal

12) Remove the metal spacer and set aside. (**See Figure 18**)
13) Remove the old shaft seal and discard. First, try to use a pick tool to get behind the seal from the pump side. (**See Figure 19**) If that does not work, then carefully use a socket or nut driver the same size or slightly smaller as the opening from the motor side to tap the seal out.
14) Insert the new seal (part #3510000276) making sure the open spring side faces out toward pump. (**See Figure 20)** Use a socket of the same or slightly smaller diameter, and a hammer to gently tap the seal into place. (**See Figure 21**) **NOTE: Use the square drive side of the socket against the seal to provide more surface area.**
15) Insert the metal spacer over the seal and lightly tap. (**See Figure 21**)
16) Re-install pump assembly. Use caution when pushing shaft through the shaft seal assembly so as to not damage the new shaft seal. Tighten the bolts to 5-7 foot pounds using a torque wrench.
17) Inspect and clean the fluid filter, and insert the pickup tube over the black fitting at the end of the pump, making sure the filter is toward the bottom of the tank. Squeeze the spring clamp (Continued on next page)

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Figure 21 Tap seal into place using upside down socket

Figure 22 Insert metal spacer over new seal

- and move it over the black fitting. Make sure the return tube is similarly installed & pointed to the bottom of the tank. (**See Figure 23**)

18) Check the O-Ring (part #3510000266) installed in the port plate recess and make certain it sits inside the recess. (**See Figure 23**)

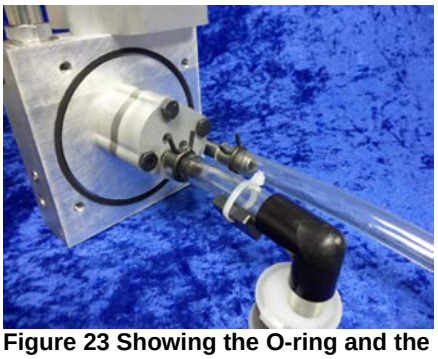

Figure 23 Showing the O-ring and the tubes with spring clamps

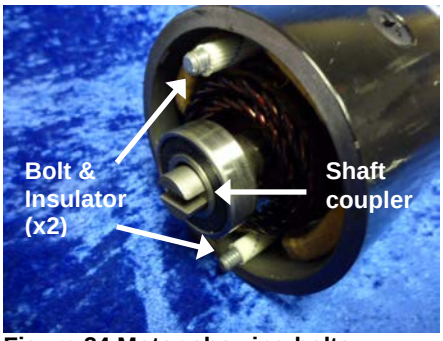

Figure 24 Motor showing bolts, insulators, and shaft coupler

19) Hold tank to the pump port plate, install and finger tighten the bolts thru the mounting clamps. Tighten the bolts to 3-4 foot pounds using a torque wrench.
20) Connect the float switch (**See Figure 14**) to the harness connector. If float switch sits in vertical tank, make sure to follow Tip Sheet 81 (81-1298) for proper orientation.
21) Inspect the motor to make sure the new bolts have the insulation tubes over them. (**See Figure 24**)
22) Install the new motor making sure the shaft coupler lines up with the pump and the motor shaft. Tighten bolts to 4-5 foot pounds.
23) Re-install the motor starter solenoid and attach wires. **(See Tip Sheet 81-1290)**
24) Confirm power is being supplied to battery side of the solenoid.
25) If tank was removed, or fluid has been in use for more than 24 months, fill the tank with fresh fluid (**See Figure 25**) and run jacks down to the ground, wait 30 seconds, then retract. Check fluid level and fill as needed. Repeat 5 times to bleed system of air, and confirm the pump is working properly. Confirm fluid level is full.
26) Check for leaks around the tank, motor, and the port plate.
27) Verify the “Jacks Down” light is off when the jacks are retracted.
28) Test complete leveling system.

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Recommended Hydraulic Fluids for Your Hydraulic Pump

The fluids listed here are acceptable to use in your pump assembly. Contact coach manufacturer or selling dealer for information about what specific fluid was installed in your system.

- It is not recommended that hydraulic oil and automatic transmission fluids be mixed in the reservoir.
- In most applications, Type A automatic transmission fluid (ATF, Dexron III, etc.,) will work satisfactorily. Mercon V is also recommended as an alternative fluid for Power Gear hydraulic systems.
- If operating in cold temperatures (less than -10° F), the jacks may extend and retract slowly.
- For cold weather operation, fluid specially-formulated for low temperatures may be desirable. Mobil DTE 11M, Texaco Rando HDZ-15HVI, Kendall Hyden Glacial Blu, or any Mil. Spec. H5606 hydraulic fluids are recommended for cold weather operation.

Figure 25

ADDITIONAL REFERENCE PUBLICATIONS LOCATED AT WWW.POWERGEARUS.COM

Document #	Tip Sheet #	Description
81-1298	#81	Float Switch Replacement Procedure (For Vertical Tanks)
82-L0508		Float Switch Replacement Procedure (For Horizontal Tanks)
82-L0509		Testing float switch 14-1085, 14-1101, & 14-1106 Without resistor in vertical tanks
82-L0510		Testing float switch 14-1136 & 14-1137 With resistor in vertical tanks
82-L0511		Testing float switch 140-1146, 3510000030, & 3510000070 in horizontal tanks
82-L0512		Float switch ID Chart
82-L0516		Magnet Proximity to Float Switch
82-L0518		Plastic Tank Procedure for Systems with Plastic Tanks
82-L0519		Pump Replacement Procedure for Systems With Plastic Tanks
81-1290	#76	Solenoid Torque Specs
81-1320	#89	Starter Solenoid Replacement

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