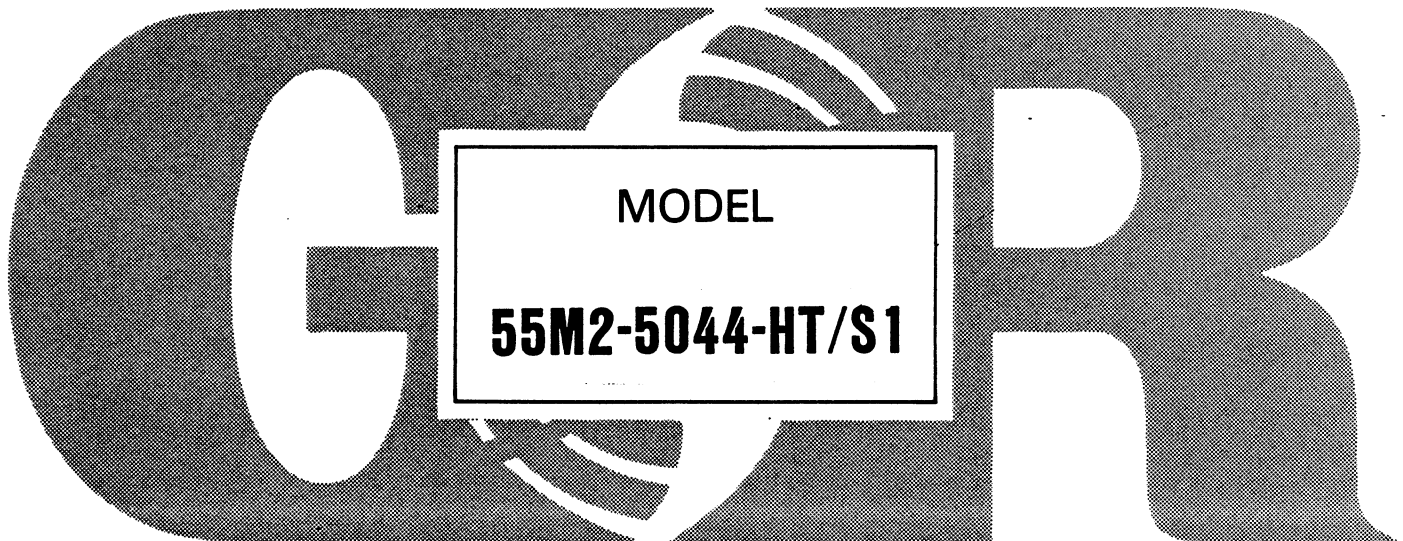


50SERIES

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

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TABLE OF CONTENTS

INTRODUCTION	I-1
WARNINGS - SECTION A	A-1
INSTALLATION - SECTION B	B-1
Pump Dimensions	B-1
PREINSTALLATION INSPECTION	B-2
POSITIONING PUMP	B-3
Lifting	B-3
Mounting	B-3
SUCTION AND DISCHARGE PIPING	B-4
Materials	B-4
Line Configuration	B-4
Connections to Pump	B-4
Gauges	B-4
SUCTION LINES	B-5
Fittings	B-5
Strainers	B-5
Sealing	B-5
Suction Lines In Sumps	B-5
Suction Line Positioning	B-6
DISCHARGE LINES	B-7
Siphoning	B-7
Valves	B-7
ALIGNMENT	B-7
OPERATION - SECTION C	C-1
PRIMING	C-1
Hand-Operated Priming Pump	C-1
STARTING	C-2
OPERATION	C-2
Leakage	C-2
Liquid Temperature And Overheating	C-2
Strainer Check	C-3
Pump Vacuum Check	C-3
STOPPING	C-3
Cold Weather Preservation	C-4
BEARING TEMPERATURE CHECK	C-4
PUMP TROUBLESHOOTING - SECTION D	D-1
PUMP MAINTENANCE AND REPAIR - SECTION E	E-1
PERFORMANCE CURVE	E-1
PUMP MODEL ASSY - PARTS LIST	E-3
PUMP END ASSY - PARTS LIST	E-5
DRIVE ASSY - PARTS LIST	E-7
PUMP AND SEAL DISASSEMBLY AND REASSEMBLY	E-8
Check Valve Removal	E-8
Cover Plate Removal	E-9
Impeller Removal	E-9
Seal Removal	E-9
Separating Pump From Engine	E-10
Shaft And Bearing Disassembly	E-10
Shaft and Bearing Reassembly And Installation	E-11
Securing Pump To Engine	E-13
Seal Installation	E-13
Pump Reassembly	E-16
Check Valve Installation	E-17
Final Pump Reassembly	E-17
LUBRICATION	E-17
Seal Assembly	E-17

Bearings	E-18
Engine	E-19
TRAILER OPERATION, MAINTENANCE AND REPAIR	F-1
TRAILER SPECIFICATIONS	F-2
PRE-OPERATION INSPECTION	F-2
OPERATION	F-3
Brake System	F-3
Hitching Trailer To Vehicle	F-3
Towing	F-5
Backing	F-5
Parking	F-6
PERIODIC SERVICE	F-6
Wheel Bolt Adjustment	F-8
Tire Inflation	F-8
Brake Actuator Master Cylinder	F-9
Bleeding Brakes	F-9
Brake Adjustment	F-10
Wheel Bearing Adjustment And Lubrication	F-10
ELECTRICAL SYSTEM	F-13
TRAILER DRAWINGS AND PARTS LISTS	F-14
Original Equipment Manufacturers	F-14
TRAILER ASSY - PARTS LIST	F-16
AXLE ASSY - PARTS LIST	F-18
BRAKE LINE ASSY - PARTS LIST	F-20
WIRING HARNESS - PARTS LIST	F-21

INTRODUCTION

This Installation, Operation, and Maintenance Manual is designed to help you achieve the best performance and longest life from your Gorman-Rupp pump.

This pump is a 50 Series, enclosed impeller, centrifugal model. It is specifically designed for pumping clean liquids at high heads and high discharge pressures. The basic material of construction for wetted parts of the pump is gray iron, with brass wear ring and steel impeller shaft. The pump is powered by a model 5044 Detroit Diesel engine and mounted on a 2-wheel trailer meeting D.O.T. specifications.

If there are any questions regarding the pump or trailer application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or write:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901-1217

or
Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7

For information or technical assistance on the engine, contact the engine manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

CAUTION

Instructions which must be followed to avoid causing damage to the product or other equipment incidental to the installation. These instructions describe the requirements and the possible damage which could result from failure to follow the procedures.

WARNING

```
////////////////////////////////////  
//  
// These instructions must be followed to avoid causing in-  
// jury or death to personnel, and describe the procedure  
// required and the injury which could result from failure  
// to follow the procedure.  
//  
////////////////////////////////////
```


WARNINGS

WARNINGS - SECTION A

THESE WARNINGS APPLY TO 50 SERIES ENGINE DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE ENGINE BEFORE ATTEMPTING TO BEGIN OPERATION.

WARNING

```
//////////////////////////////////////  
//  
// Before attempting to open or service the pump: //  
//  
// 1. Familiarize yourself with this manual. //  
// 2. Switch off the engine ignition key and remove the //  
// key to ensure that the pump will remain inopera- //  
// tive. //  
// 3. Allow the pump to cool if overheated. //  
// 4. Vent the pump slowly and cautiously. //  
// 5. Close the suction and discharge valves. //  
// 6. Check the temperature before opening any covers, //  
// plates, or plugs. //  
// 7. Drain the pump. //  
//  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// This pump is designed to handle clear water. Do not at- //  
// tempt to pump volatile, corrosive, or flammable liquids //  
// which may damage the pump or endanger personnel as a re- //  
// sult of pump failure. //  
//  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// When lifting the entire unit, connect chains with //  
// spreader bars to the trailer lifting eyes. Use lifting //  
// and moving equipment in good repair and with adequate //  
// capacity to prevent injuries to personnel or damage to //  
// equipment. The lifting eyes are designed to support on- //  
// ly the weight of the unit. Remove suction and discharge //  
// piping before lifting. //  
//  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// After the trailer has been positioned, make certain that //  
// the pump and all piping or hose connections are tight, //  
// properly supported and secure before operation. //  
//  
//////////////////////////////////////
```

WARNINGS

WARNING

```
//////////////////////////////////////  
//  
// Do not operate the pump against a closed discharge valve //  
// for long periods of time. This could bring the liquid //  
// to a boil, build pressure, and cause the pump to rupture //  
// or explode. //  
// //  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// Overheated pumps can cause severe burns and injury. If //  
// overheating of the pump occurs: //  
// //  
// 1. Stop the pump immediately. //  
// 2. Allow the pump to cool. //  
// 3. Refer to instructions in this manual before re- //  
// starting the pump. //  
// //  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// Do not remove plates, covers, gauges, pipe plugs, or //  
// fittings from an overheated pump. Vapor pressure within //  
// the pump can cause parts being disengaged to be ejected //  
// with great force. Allow the pump to cool before servic- //  
// ing. //  
// //  
//////////////////////////////////////
```

WARNING

```
//////////////////////////////////////  
//  
// Do not operate an internal combustion engine in an ex- //  
// plosive atmosphere. When operating internal combustion //  
// engines in an enclosed area, make certain that exhaust //  
// fumes are piped to the outside. These fumes contain //  
// carbon monoxide, a deadly gas that is colorless, //  
// tasteless, and odorless. //  
// //  
//////////////////////////////////////
```

WARNINGS

WARNING

```
////////////////////////////////////  
//  
// Fuel used by internal combustion engines presents an ex- //  
// trem e explosion and fire hazard. Make certain that all //  
// fuel lines are securely connected and free of leaks. //  
// Never refuel a hot or running engine. Avoid overfilling //  
// the fuel tank. Always use the correct type of fuel. //  
//  
////////////////////////////////////
```

WARNING

```
////////////////////////////////////  
//  
// Never tamper with the governor to gain more power. The //  
// governor establishes safe operating limits that should //  
// not be exceeded. The maximum continuous operating speed //  
// is 2200 RPM. //  
//  
////////////////////////////////////
```

WARNING

```
////////////////////////////////////  
//  
// Read all instructions pertaining to the function and op- //  
// eration of the trailer (Section F) before attempting to //  
// hitch or move it. Failure to comply could result in //  
// equipment damage or vehicle accident. //  
//  
////////////////////////////////////
```

WARNING

```
////////////////////////////////////  
//  
// The approximate trailer tongue weight is 140 lbs. at //  
// level. Be sure the tow vehicle is rated for this capac- //  
// ity and fitted with the proper size pintle hook. //  
//  
////////////////////////////////////
```

WARNING

```
////////////////////////////////////  
//  
// Do not attempt to operate the pump unless the trailer is //  
// level. Be sure the trailer leveling stands are posi- //  
// tioned on a solid surface, and the wheels are chocked. //  
//  
////////////////////////////////////
```

INSTALLATION

INSTALLATION - SECTION B

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift application** where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to 50% of the maximum permissible operating pressure as shown on the pump performance curve. (See Section E, Page 1). If the pump is fitted with a Gorman-Rupp double grease lubricated seal, the maximum incoming pressure must be reduced to 10 p.s.i..

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump and trailer.

OUTLINE DRAWING

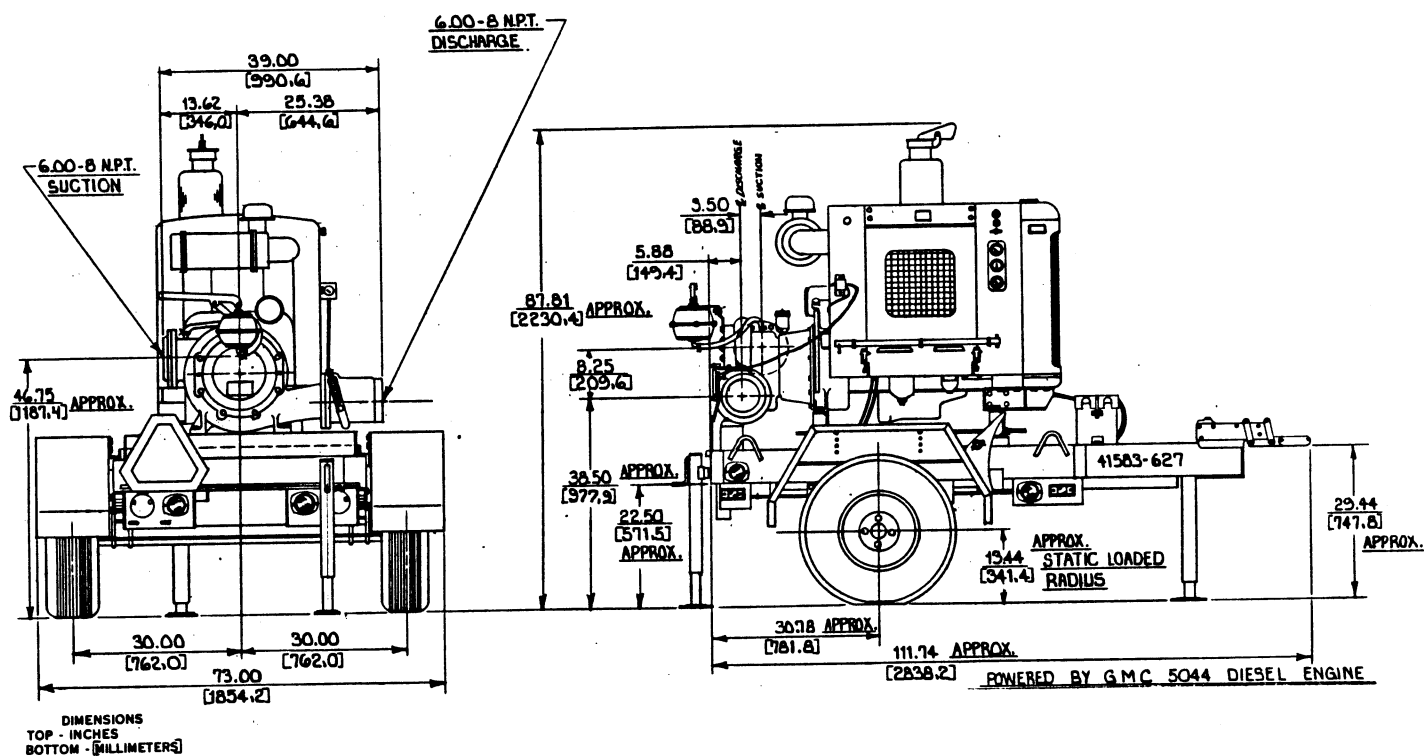


Figure 1. Pump Model 55M2-5044-HT /S1

WARNING

//////////////////////////////////////
 //
 // Read all instructions pertaining to the function and op-
 // eration of the trailer (Section F) before attempting to
 // hitch or move it. Failure to comply could result in
 // equipment damage or vehicle accident.
 //
 //////////////////////////////////////

PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

INSTALLATION

- a. Inspect the pump and trailer for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose bolts, nuts, capscrews, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and capscrews securing mating surfaces.
- c. Carefully read all tags, decals, and markings on the pump assembly, and follow the instructions indicated.
- d. Check all lubricant levels and lubricate as necessary. Refer to LUBRICATION in the MAINTENANCE AND REPAIR section of this manual and perform duties as instructed.
- e. If the pump and engine have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.
- f. See Section F for specific inspection points for the trailer assembly.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

POSITIONING PUMP

Lifting

To lift the complete unit, attach lifting equipment to the lifting eyes provided on the trailer. The lifting eyes are intended to support only the weight of the pump, engine, and trailer. Customer installed equipment such as suction and discharge hoses **must** be removed before attempting to lift.

Use lifting equipment with a capacity of at least 15,600 pounds. The combined weight of the pump, engine, and trailer is approximately 3,120 pounds, not including weight of accessories. It is strongly recommended that a spreader bar be used to ensure proper chain positioning and load balance.

CAUTION

The pump assembly can be seriously damaged if the cables or chains used to lift and move the unit are improperly wrapped around the pump.

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation. Position the trailer

leveling stands on a solid surface and adjust the height as required. Secure the wheels with the wheel chocks provided.

To ensure sufficient lubrication and fuel supply to the engine, **do not** position the pump and engine more than 15° off horizontal for continuous operation. The pump and engine may be positioned up to 30° off horizontal for **intermittant operation only**; however, the engine manufacturer should be consulted for continuous operation at angles greater than 15°.

SUCTION AND DISCHARGE PIPING

Materials

Either pipe or hose may be used for suction and discharge lines; however, the materials must be compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

INSTALLATION

SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 3/4 inch diameter spherical solids.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to one and one-half times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

INSTALLATION

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance one and one-half times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least three times the diameter of the suction pipe.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 2 shows recommended minimum submergence vs. velocity.

NOTE

The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

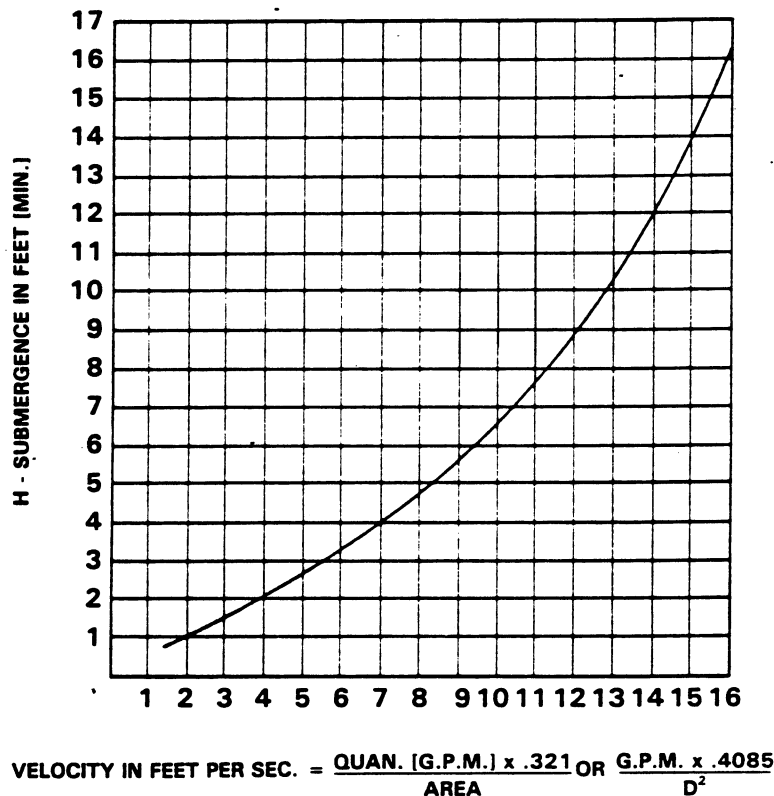


Figure 2. Recommended Minimum Suction Line Submergence Vs. Velocity

DISCHARGE LINES

Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe to minimize friction losses. Never install a throttling valve in a suction line.

With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

ALIGNMENT

The alignment of the pump and the engine is critical for trouble free mechanical operation. See Section E, **Securing Pump To Engine** for detailed information.

OPERATION

OPERATION - SECTION C

WARNING

```
////////////////////////////////////  
//  
// This pump is designed to handle clear water. Do not at- //  
// tempt to pump volatile, corrosive, or flammable liquids //  
// which may damage the pump or endanger personnel as a re- //  
// sult of pump failure. //  
// //  
////////////////////////////////////
```

WARNING

```
////////////////////////////////////  
//  
// Never tamper with the governor to gain more power. The //  
// governor establishes safe operating limits that should //  
// not be exceeded. The maximum continuous operating speed //  
// is 2200 RPM. //  
// //  
////////////////////////////////////
```

PRIMING

Position the trailer and install the piping as described in **INSTALLATION**. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see **LUBRICATION** in **MAINTENANCE AND REPAIR**).

Since this pump is not self-priming, it is equipped with a hand-operated vacuum priming pump, and a spring-loaded check valve.

Hand-Operated Priming Pump

The hand-operated priming pump (see Figure 1) is designed to draw air out of the suction line and the pump casing.

The hand-operated priming pump can be used while the pump is either stopped or operating.

Close the discharge line throttling valve and the spring-loaded check valve before engaging the priming device.

To prime the pump, open the cock in the bottom of the priming pump. Operate the handle of the pump until all of the air is expelled from the line and a small amount of liquid flows from the drain cock.

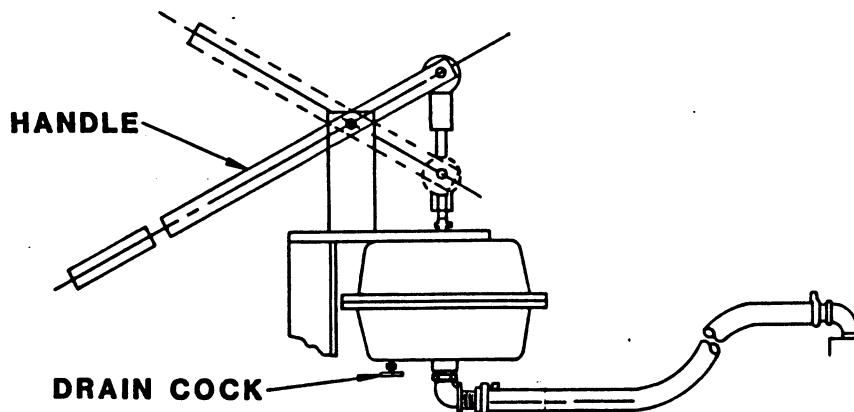


Figure 1. Hand Primer Assembly

Once the pump is fully primed, close the cock, open the discharge line throttling valve and start the pump.

STARTING

Consult the operations manual furnished with the engine.

NOTE

This pump is equipped with a safety shut down device to terminate engine operation if pump discharge pressure falls below 30 psi. During engine start up, the button on the discharge pressure gauge must be depressed to over-ride this safety feature.

OPERATION

Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 110°F. Do not apply it at a higher operating temperature.

OPERATION

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.

WARNING

```
////////////////////////////////////  
//  
// Do not remove plates, covers, gauges, pipe plugs, or //  
// fittings from an overheated pump. Vapor pressure within //  
// the pump can cause parts being disengaged to be ejected //  
// with great force. Allow the pump to cool before servic- //  
// ing. //  
//  
////////////////////////////////////
```

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

Pump Vacuum Check

Since this pump does not have a suction check valve, the discharge line must be fitted with a check valve if a pump vacuum reading is to be taken.

With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operating speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly. On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.

CAUTION

If application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, remove the engine ignition key or take other action to ensure that the pump will remain inoperative.

Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts.

If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F are considered normal for bearings, and they can operate safely to at least 180°F.

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperatures is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see LUBRICATION in MAINTENANCE AND REPAIR). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

PUMP TROUBLESHOOTING - SECTION D

WARNING

```

////////////////////////////////////
//
// Before attempting to open or service the pump:
//
// 1. Familiarize yourself with this manual.
// 2. Switch off the engine ignition key and remove the
// key to ensure that the pump will remain inopera-
// tive.
// 3. Allow the pump to cool if overheated.
// 4. Vent the pump slowly and cautiously.
// 5. Close the suction and discharge valves.
// 6. Check the temperature before opening any covers,
// plates, or plugs.
// 7. Drain the pump.
//
////////////////////////////////////

```

NOTE

Troubleshooting the trailer assembly is covered in Section F.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Auxiliary priming device faulty or improperly installed.	Repair priming device or check installation.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction check valve or foot valve clogged or binding.	Clean valve.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See INSTALLATION.
	Strainer clogged.	Check strainer and clean if necessary.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	<p>Air leak in suction line.</p> <p>Suction intake not submerged at proper level or sump too small.</p> <p>Lining of suction hose collapsed.</p> <p>Impeller or other wearing parts worn or damaged.</p>	<p>Correct leak.</p> <p>Check installation and correct submergence as needed.</p> <p>Replace suction hose.</p> <p>Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.</p>
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE(cont.)	<p>Impeller clogged.</p> <p>Pump speed too slow.</p> <p>Discharge head too high.</p> <p>Suction lift too high.</p> <p>Leaking or worn seal or pump gasket.</p> <p>Strainer clogged.</p>	<p>Free impeller of debris.</p> <p>Check engine output; consult engine operation manual.</p> <p>Install bypass line.</p> <p>Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line.</p> <p>Check pump vacuum. Replace leaking or worn seal or gasket.</p> <p>Check strainer and clean if necessary.</p>
PUMP REQUIRES TOO MUCH POWER	<p>Pump speed too high.</p> <p>Discharge head too low.</p> <p>Liquid solution too thick.</p>	<p>Check engine output.</p> <p>Adjust discharge valve.</p> <p>Dilute if possible.</p>
PUMP CLOGS FREQUENTLY	<p>Discharge flow too slow.</p> <p>Suction check valve or foot valve clogged or binding.</p>	<p>Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.</p> <p>Clean valve.</p>

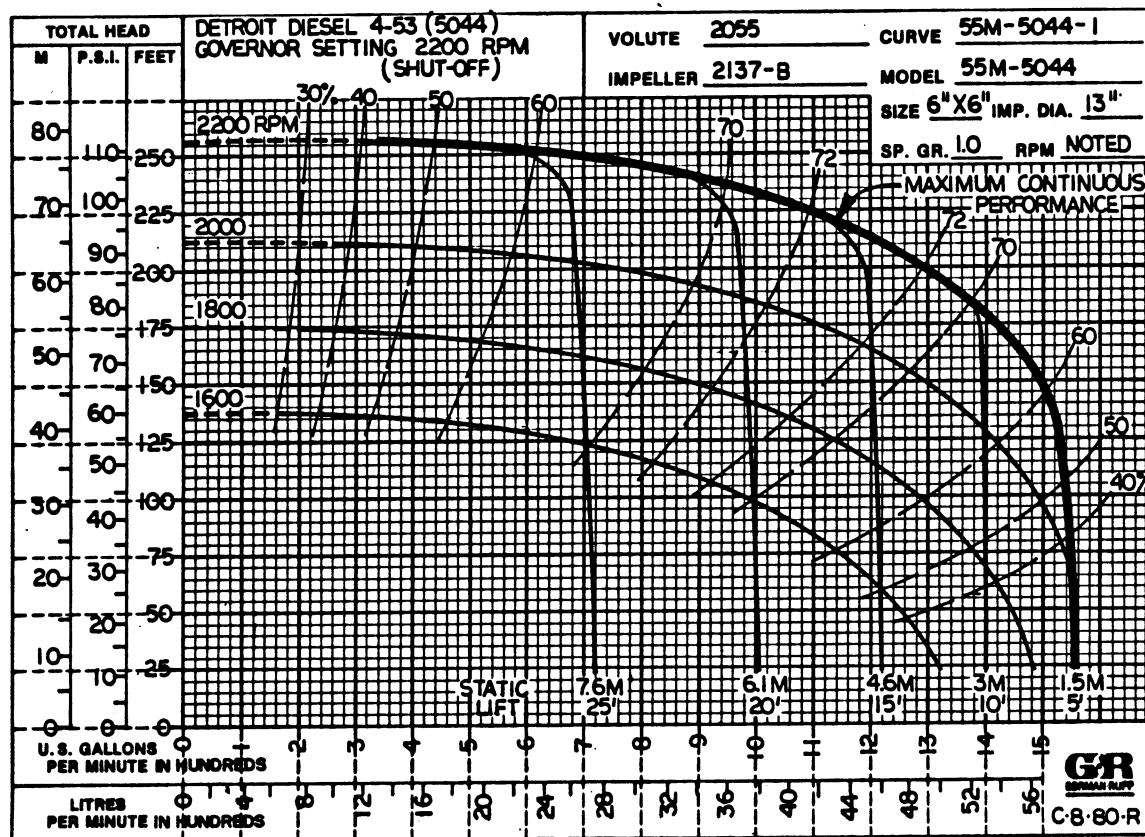
TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.

PUMP MAINTENANCE AND REPAIR - SECTION E

(Trailer assembly maintenance and repair is covered in Section F.)

MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



*STANDARD PERFORMANCE FOR PUMP MODEL 55M2-5044-HT /S1

*Based on 70°F clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.

CAUTION

Pump speed and operating condition points must be within the continuous performance range shown on the curve.

SECTIONAL DRAWING

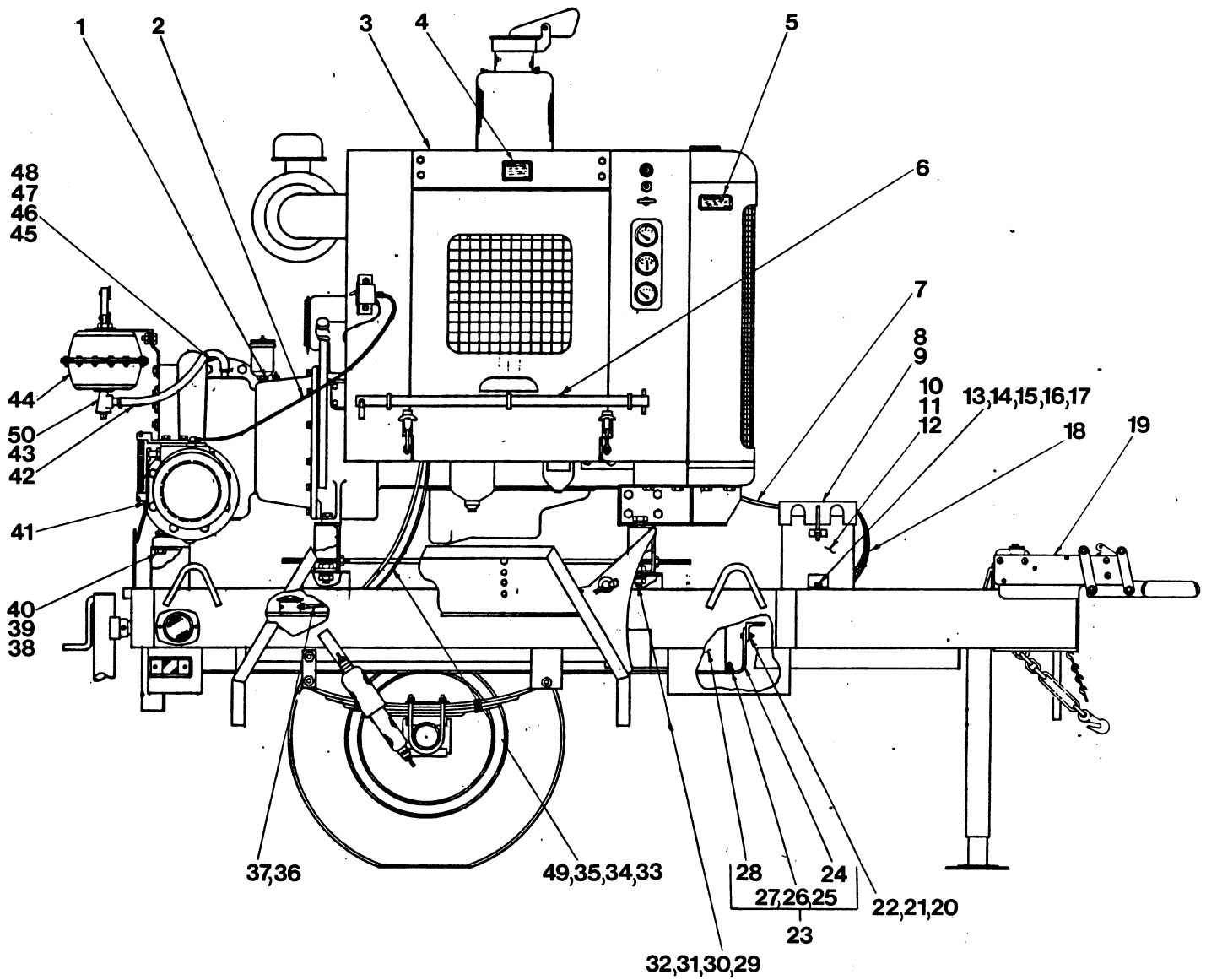


Figure 1. Pump Model Assembly 55M2-5044-HT/S1

MAINTENANCE AND REPAIR

PARTS LIST
Pump Model Assembly 55M2-5044-HT/S1
 (From S/N 833817 up)

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

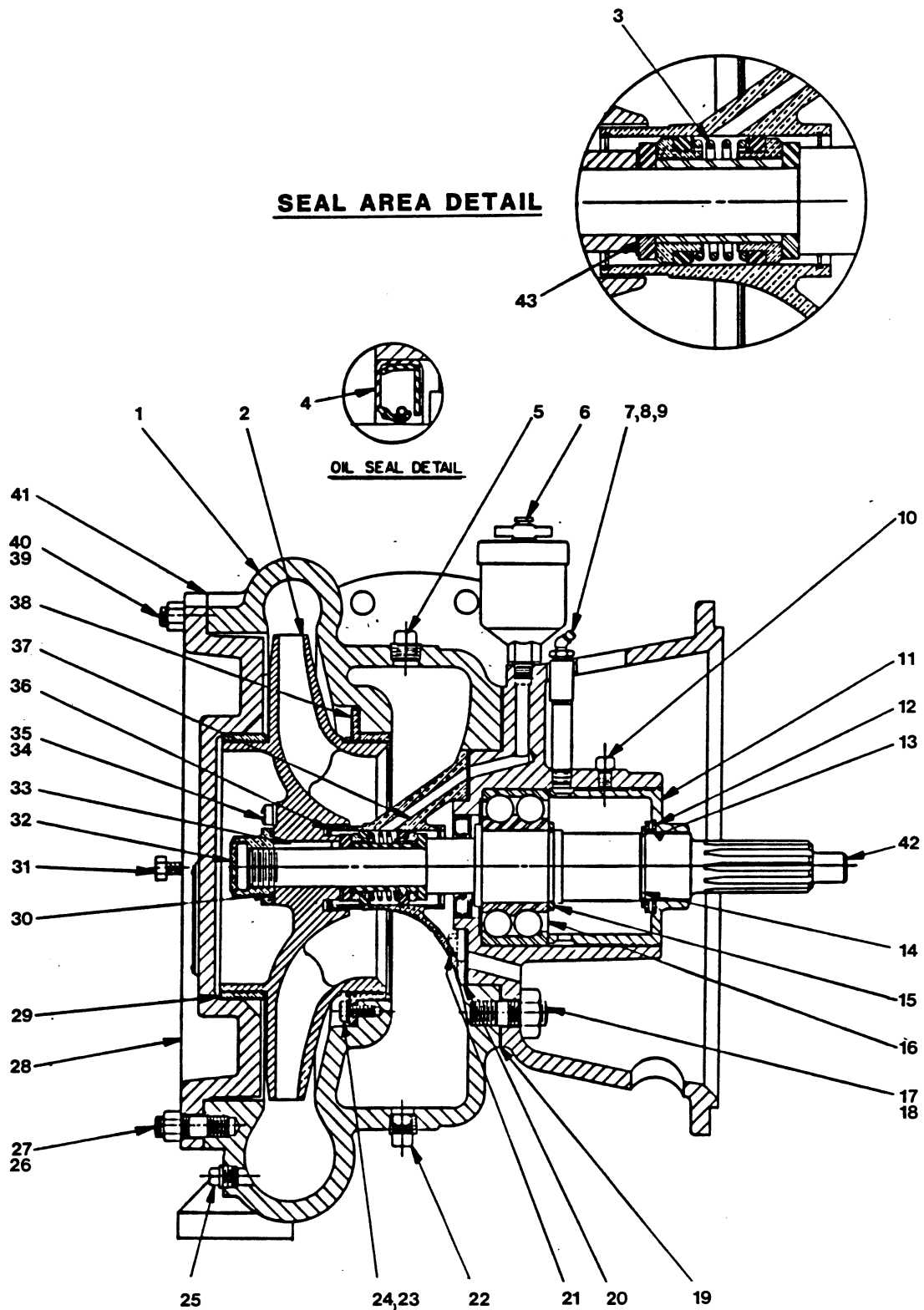
ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP END ASSY	55M2	-----	1	26	-LOCKWASHER	J00006	15991	6
2	PRESS SWITCH ASSY	48312-004	-----	1	27	-FLAT WASHER	K00006	15991	6
3	GMC 5044 ENGINE	206-E2	-----	1	28	-FUEL TANK ASSY	46711-042	24150	1
4	WARNING DECAL	38816-132	-----	2	29	HEX HD CAPSCREW	B01206	15991	4
5	WARNING DECAL	2613-FE	-----	1	30	FLAT WASHER	K00012	15991	4
6	LOCKING BAR ASSY	41153-006	24150	1	31	LOCKWASHER	J00012	15991	4
7	*CABLE ASSY-POS	6926-W	24040	1	32	HEX NUT	D00012	15991	4
8	BATTERY TAG	6588-S	00000	1	33	FUEL RET ASSY	14294	24030	1
9	BATT BOX COVER	42113-014	24150	1	34	HALF UNION	S00468	-----	1
10	*BATTERY	S00978	-----	2	35	FUEL LINE RET	12641	-----	1
11	*CABLE ASSY-CONN	5795-CR	24040	1	36	FUEL LINE ASSY	9072	-----	1
12	BATTERY BOX	42431-031	24150	1	37	CONNECTOR	S01447	-----	1
13	HEX HD CAPSCREW	B00605	15991	1	38	HEX HD CAPSCREW	B01009	15991	2
14	HEX HD CAPSCREW	B00604	15991	1	39	LOCKWASHER	J00010	15991	2
15	FLAT WASHER	K00006	15991	2	40	HEX NUT	D00010	15991	2
16	LOCKWASHER	J00006	15991	2	41	CHECK VALVE ASSY	GRP14-02A	-----	1
17	HEX NUT	D00006	15991	2		(SEE ACCOMPANYING LITERATURE)			
18	*GRND CABLE ASSY	5795-AC	24040	1	42	HOSE	31412-101	19360	1
19	TRAILER ASSY	41583-627	-----	1	43	SERVICE TEE	US00006	11990	1
	(SEE SECTION F)				44	HAND PRIMER ASSY	GRP43-01	-----	1
20	HEX HD CAPSCREW	B00704	15991	10		(SEE ACCOMPANYING LITERATURE)			
21	LOCKWASHER	J00007	15991	10	45	SUCTION FLANGE	1758	10010	1
22	HEX NUT	D00007	15991	10	46	SUCT FLANGE GSKT	1679-G	18000	1
23	FUEL TANK & GUARD ASSY	46711-041	-----	1	47	HEX HD CAPSCREW	B01011	15991	8
24	-FUEL TANK GUARD	42381-046	24150	1	48	HEX NUT	D00010	15991	8
25	-HEX NUT	D00006	15991	6	49	PIPE ELBOW	R00004	11990	1
					50	PIPE PLUG	P00006	11990	1

*INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

CANADIAN SERIAL NO AND UP

SECTIONAL DRAWING



MAINTENANCE AND REPAIR

PARTS LIST Pump End Assembly 55M2-5044-HT/S1

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING	2055	10030	1	27	STUD	C01009	15991	10
2	*IMPELLER	2137-B	10010	1	28	COVER PLATE	953-E	10010	1
3	*SEAL ASSY	GS01250	-----	1	29	*WEAR RING	12095	14000	1
4	*OIL SEAL	S00079	-----	1	30	*O-RING	S00461	-----	1
5	PIPE PLUG	P00008	11990	1	31	HEX HD CAPSCREW	B00605	15991	2
6	GREASE CUP	S01509	-----	1	32	IMPELLER NUT	2177-A	14000	1
7	LUB FITTING	S00194	-----	1	33	*KEY	N00407	15990	1
8	PIPE COUPLING	AE00004	11990	1	34	LOCKWASHER	J00006	15991	1
9	PIPE NIPPLE	T00412	15070	1	35	FIL HD SCREW	AW00602	14990	1
10	SQ HD SETSCREW	G00604	15990	1	36	LOCK SPRING	947-A	16030	2
11	RETAINING NUT	2196	10010	1	37	SEAL HOUSING	2178	14000	1
12	*THRUST RACE	23965-056	-----	2	38	*WEAR RING	2057	14000	1
13	*NEEDLE BEARING	23588-016	-----	1	39	HEX NUT	D00010	15991	2
14	RETAINING RING	24124-428	-----	1	40	STUD	C01010	15991	2
15	RETAINING RING	S00215	-----	1	41	*COVER PLATE GSKT	1210-G	18000	1
16	*BALL BEARING	S01033	-----	1	42	*IMPELLER SHAFT	5949-A	16040	REF
17	STUD	C01209	15991	8	43	*IMP ADJ SHIM SET	37-J	17090	REF
18	HEX NUT	D00012	15991	8	NOT SHOWN:				
19	*PUMP CASING GSKT	922-G	18000	1		NAME PLATE	2613-D	13990	1
20	*SEAL HOUSING GSKT	2178-G	18000	1		PIPE PLUG	P00006	11990	1
21	HEX HD CAPSCREW	B00603	14990	6		PIPE PLUG	P00008	11990	1
22	PIPE PLUG	P00008	11990	1		DRIVE SCREW	BM#04-03	15990	4
23	LOCKWASHER	J00005	15991	2		STRAINER	S01529	-----	1
24	HEX HD CAPSCREW	B00503	14990	2		STREET ELBOW	RS00004	11990	1
25	PIPE PLUG	P00006	11990	1		SUCT STICKER	6588-AG	00000	1
26	HEX NUT	D00010	15991	10		DISCH STICKER	6588-BJ	00000	1

*INDICATES PARTS RECOMMENDED FOR STOCK

SECTIONAL DRAWING

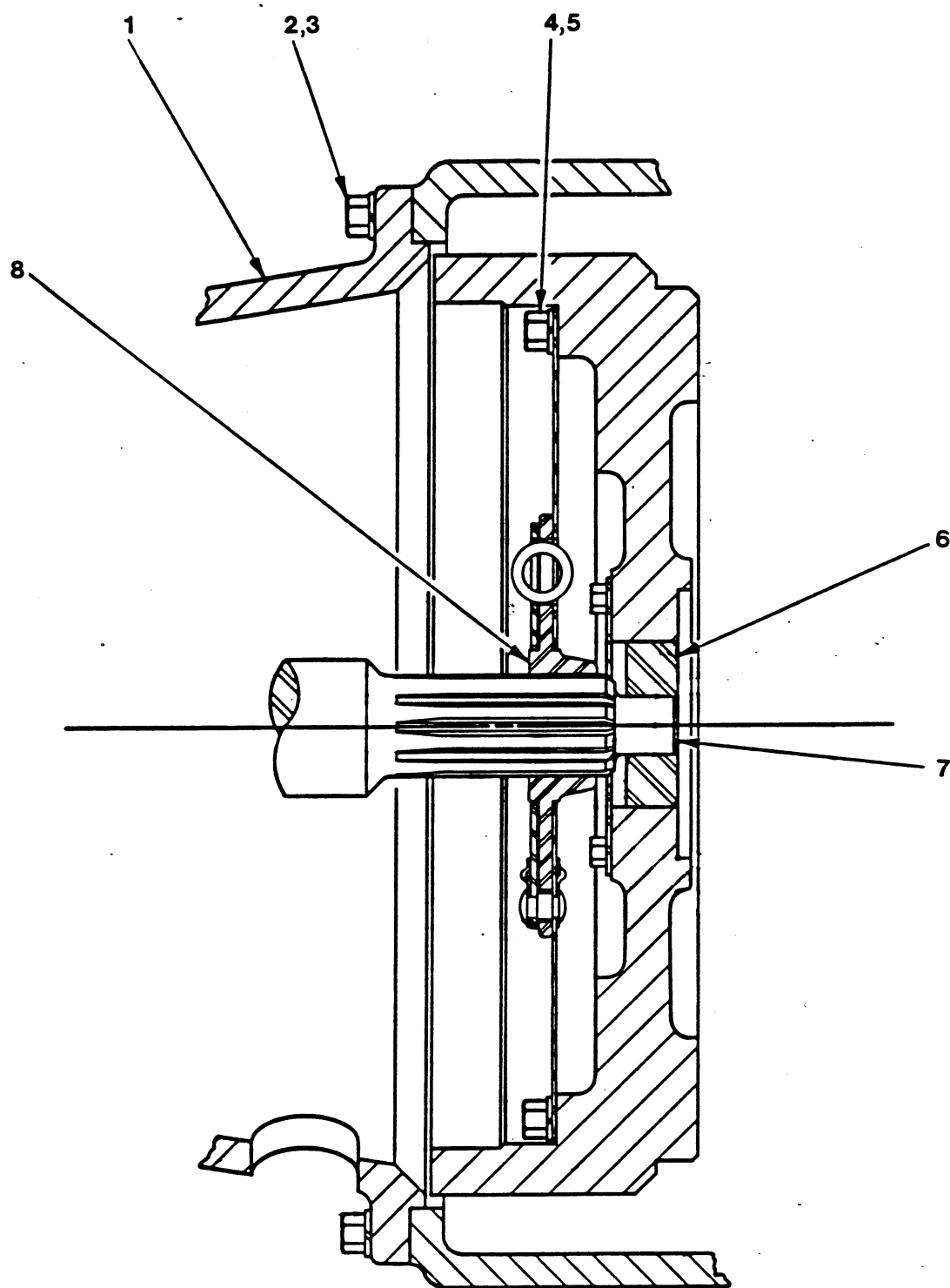


Figure 3. Drive Assembly For Model 55M2-5044-HT/S1

PARTS LIST
Drive Assembly For Model 55M2-5044-HT/S1

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	INTERMEDIATE	2175-C	10010	1
2	HEX HD CAPSCREW	B00605	15991	12
3	LOCKWASHER	J00006	15991	12
4	HEX HD CAPSCREW	B00603	15991	8
5	LOCKWASHER	J00006	15991	8
6	* BUSHING	4115	15010	1
7	IMPELLER SHAFT	5949-A	16040	1
8	DRIVE PLATE ASSEMBLY	24521-165	24020	1

*INDICATES PARTS RECOMMENDED FOR STOCK

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions, which are keyed to the sectional views (see Figures 1, 2, and 3) and the accompanying parts lists. Trailer assembly maintenance and repair is covered in Section F.

Most service functions may be performed by draining the pump and removing the cover plate. If major repair is required, the piping and/or engine must be disconnected.

Before attempting to service the pump, take precautions to ensure that the engine will remain inoperative and close all valves in the suction and discharge lines.

For engine disassembly and repair, consult the literature supplied with the engine or contact your local Detroit Diesel representative.

WARNING

```
////////////////////////////////////  
//  
// Before attempting to open or service the pump: //  
//  
// 1. Familiarize yourself with this manual. //  
// 2. Switch off the engine ignition key and remove the //  
// key to ensure that the pump will remain inopera- //  
// tive. //  
// 3. Allow the pump to cool if overheated. //  
// 4. Vent the pump slowly and cautiously. //  
// 5. Close the suction and discharge valves. //  
// 6. Check the temperature before opening any covers, //  
// plates, or plugs. //  
// 7. Drain the pump. //  
//  
////////////////////////////////////
```

Check Valve Removal

(Figure 1)

Disconnect the discharge piping.

Remove the hardware securing the check valve assembly (41) to the pump casing and remove the check valve and check valve gasket.

Refer to the accompanying literature for maintenance instructions of the check valve.

If no further disassembly is required, see **Check Valve Assembly Installation**.

MAINTENANCE AND REPAIR

Cover Plate Removal

(Figure 2)

The impeller, wear ring and seal assembly may be serviced by removing the cover plate (28).

Remove the casing drain plugs (22 and 25) and drain the pump. Clean and reinstall the drain plugs.

See Figure 1 and remove the hardware securing the priming pump (44) and bracket to the pump casing. Disengage the hose (42) at the pump and remove the priming pump assembly. Refer to the accompanying literature for maintenance and repair of the priming pump.

Remove the remaining hardware (26) and use the jacking screws (31) to break the cover plate loose from the pump casing. Remove the cover plate and gasket (41).

Inspect the wear ring (29) for excessive wear or damage. If replacement is necessary, use a bearing puller to remove it from the cover plate.

Impeller Removal

(Figure 2)

To remove the impeller (2), remove the fillister head screw and lockwasher (34 and 35), impeller cap nut (32), and O-ring (30). The impeller is keyed onto the shaft and may require the use of an impeller puller for removal.

Inspect the impeller and replace it if cracked or badly worn. Slide the impeller adjusting shims (43) off the shaft. To ease reassembly, tie and tag the shims.

Inspect the wear ring (38) for excessive wear or damage. If replacement is necessary, remove the hardware (23 and 24) and install two 5/16 - 18 X 2 1/2 inch NC jacking screws (not supplied) in the threaded holes in the wear ring. Tighten the jacking screws evenly to prevent binding until the wear ring separates from the pump casing.

Seal Removal

(Figure 2)

Before removing the seal assembly, turn the cross arm on the grease cup (6) clockwise until it rests against the cover (see Figure 6). This will prevent the grease in the cup from escaping after the seal is removed.

The seal assembly (3) and seal housing (37) may be removed and serviced as a unit. Remove the hardware (21) and install 3/8 - 16 NC jacking screws (not supplied) in the threaded holes in the seal housing. Tighten the jacking screws evenly to prevent binding and slide the assembled seal housing and seal off of the impeller shaft. Remove the seal housing gasket (20).

Remove the outer lock spring (36) from the seal housing. Use caution when removing the lock spring; tension on the seal spring will be released when the lock spring is removed.

Remove the outer rotating element, stationary seat, packing ring, stationary washer and the seal spring. Remove the shaft sleeve. Remove the inner stationary washer, packing ring, stationary seat and rotating element using a stiff wire with a hooked end if necessary. It is not necessary to remove the inner lock spring from the seal housing.

If no further disassembly is required, see **Seal Reassembly And Installation**.

Separating Pump From Engine

(Figure 3)

To service the impeller shaft, bearings, or drive plate, the pump must be separated from the engine. To accomplish this, disconnect the suction and discharge piping and remove the hardware (38, 39 and 40, Figure 1) securing the pump to the base.

Use a hoist and sling to support the pump and remove the hardware (2 and 3) securing the intermediate to the engine bellhousing. Separate the two assemblies by pulling the pump straight away from the engine.

As the assemblies are separated, the impeller shaft (7) will disengage from the drive plate assembly (8).

It is not necessary to remove the drive plate from the flywheel unless the pilot bushing (6) is worn and requires replacement. If replacement is necessary, disengage the hardware (4 and 5) and remove the drive plate. Remove the hardware and plate (supplied with the engine) covering the pilot bushing and use a bearing puller to remove the pilot bushing.

Shaft And Bearing Disassembly

(Figure 2).

When the pump is properly operated and maintained, the intermediate should not require disassembly. Disassemble the shaft and bearing **only** when there is evidence of wear or damage.

CAUTION

Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

After separating the pump end from the engine, reach through the back of the intermediate and disengage the nuts (18). Separate the intermediate from the pump casing (1) and remove the gasket (19).

MAINTENANCE AND REPAIR

Loosen the square head set screw (10) and unscrew the retaining nut (11) from the intermediate.

NOTE

There are no provisions for draining the grease from the intermediate cavity. Place a drip pan under the intermediate before removing the retaining nut.

Remove the thrust races (12) and needle bearing (13).

Place a block of wood against the impeller end of the shaft and tap the shaft and assembled bearing (16) out of the intermediate.

Remove the bearing retaining ring (15) and the thrust bearing retaining ring (14) and use a bearing puller to remove the bearing from the impeller shaft.

Inspect the oil seal (4) for wear or damage and, if replacement is required, press it from the intermediate bore.

Shaft and Bearing Reassembly And Installation**(Figure 3)**

Clean the intermediate, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.

WARNING

```
////////////////////////////////////  
//  
// Most cleaning solvents are toxic and flammable. Use //  
// them only in a well-ventilated area free from excessive //  
// heat, sparks, and flame. Read and follow all prec- //  
// autions printed on solvent containers. //  
//  
////////////////////////////////////
```

Inspect the shaft for distortion, nicks or scratches or thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

Rotate the bearings by hand to check for roughness or binding and inspect the needles and bearing balls. If rotation is rough or the needles and bearing balls are discolored, replace the bearings.

CAUTION

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. DO NOT spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the intermediate. Replace the shaft or intermediate if the proper bearing fit is not achieved.

Pre-pack the bearings with No. 0 lithium base grease by hand (or use a bearing packer if available) until the bearing balls and needles are thoroughly lubricated.

Position the bearing so that the loading groove faces toward the impeller end of the shaft and press it on until seated squarely against the shaft shoulder. Secure the bearing with the retaining ring (15).

CAUTION

When installing the bearings onto the shaft, NEVER press or hit against the outer race, balls, or ball cage. Press ONLY on the inner race.

Install the thrust bearing retaining ring (14).

Press the oil seal (4) into the intermediate bore with the lip positioned as shown in Figure 2.

Slide the shaft and assembled bearing into the intermediate bore until the outer race of the bearing seats squarely against the intermediate shoulder. **Be careful** not to damage the oil seal already installed.

CAUTION

When installing the shaft and bearings into the bearing bore, push against the outer race. NEVER hit the balls or ball cage.

Install the needle bearing (13) and thrust races (12).

Screw the retaining nut (11) into the intermediate and secure it with the square head set screw (10).

NOTE

Shaft endplay should be between .002 and .010 inch. Adjust the retaining nut to establish the correct endplay.

Replace the casing gasket (19) and reassemble the intermediate onto the pump casing using the nuts (18).

Reinstall the pipe nipple, pipe coupling and lubrication fitting (7, 8, and 9) and lubricate the bearing cavity as indicated in **LUBRICATION**, Section E.

Securing Pump To Engine

(Figure 3)

Press the pilot bushing (6) into the engine flywheel and apply a coating of 'Never-Seez' lubricant to the inside diameter. Make certain the bushing does not protrude and preload the shaft and bearing.

CAUTION

If the pilot bushing and drive plate are not properly positioned on the shaft, excessive wear and a preload condition could cause premature thrust bearing failure.

Install the pilot bushing retainer plate.

Secure the drive plate assembly to the flywheel as shown in Figure 3 with the previously removed hardware.

Slide the shaft splines into the drive plate and use the hardware (2 and 3) to secure the intermediate assembly to the engine bellhousing.

Install any leveling shims used under the pump casing, and secure the casing to the base with the hardware (38, 39 and 40, Figure 1).

Seal Installation

(Figure 4)

Clean the seal cavity and shaft with a cloth soaked in fresh cleaning solvent.

WARNING

```
////////////////////////////////////  
//  
// Most cleaning solvents are toxic and flammable. Use //  
// them only in a well-ventilated area free from excessive //  
// heat, sparks, and flame. Read and follow all prec- //  
// autions printed on solvent containers. //  
//  
////////////////////////////////////
```

The seal is not normally reused because wear patterns on the finished faces cannot be realigned during reassembly. This could result in premature failure. If necessary to reuse an old seal in an emergency, **carefully** wash all metallic parts in fresh cleaning solvent and allow to dry thoroughly.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean lint free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Clean and polish the seal spacer sleeve, or replace it if there are nicks or cuts on either end. If any components are worn, replace the complete seal; **never mix old and new seal parts**.

If a replacement seal is being used, remove it from the container and inspect the precision finished faces to ensure that they are free of any foreign matter.

To ease installation of the seal, lubricate the packing rings and seal housing bore with water or a very **small** amount of oil, and apply a drop of light lubricating oil on the finished faces. Assemble the seal as follows, (see Figure 4).

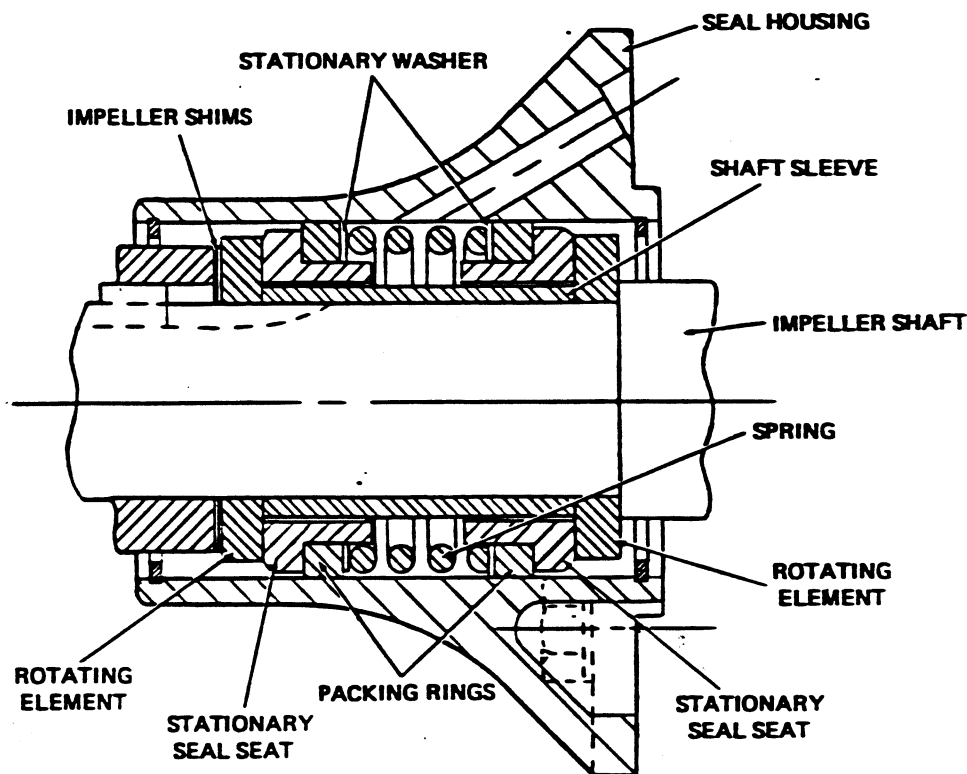


Figure 4: GS01250 Seal Assembly

CAUTION

This seal is not designed for operation at temperatures above 110°F. Do not use at higher operating temperatures.

Remove the jacking screws from the seal housing.

Install the inboard rotating element into the seal housing with the chamfered side toward the lock spring.

Subassemble the inboard stationary seat, packing ring, and spring washer. Press the unit into the lubricated seal housing.

Install the shaft spacer sleeve and spring.

Subassemble the outboard stationary seat, packing ring, and spring washer. Press this unit into the lubricated seal housing.

Install the outboard rotating element with chamfered side toward the impeller. Compress the seal assembly and install the outer lock spring.

Use two of the capscrews (21) to position the gasket on the seal housing. Make certain the slotted hole in the gasket aligns with the grease passage in the housing.

Slide the sub-assembled seal, housing and gasket onto the shaft and secure to the intermediate with the two capscrews. Be careful not to damage the rotating elements on the shaft threads. Install the remaining hardware (21).

After the impeller is installed, lubricate the seal as indicated in LUBRICATION, Section E.

Pump Reassembly

(Figure 2)

If the wear ring (38) was removed, remove the jacking screws, align the mounting holes, and press the wear ring into the pump casing. Apply "Never-Seez" lubricant (or equivalent) to the attaching hardware (23 and 24) and secure the wear ring to the pump casing.

For maximum pump efficiency, the impeller must be centered in the volute scroll.

To verify the impeller positioning, measure the pump casing and impeller as shown in Figure 5. Use these measurements to calculate the required impeller location (dimension E). Add or remove impeller adjusting shims until dimension E is obtained.

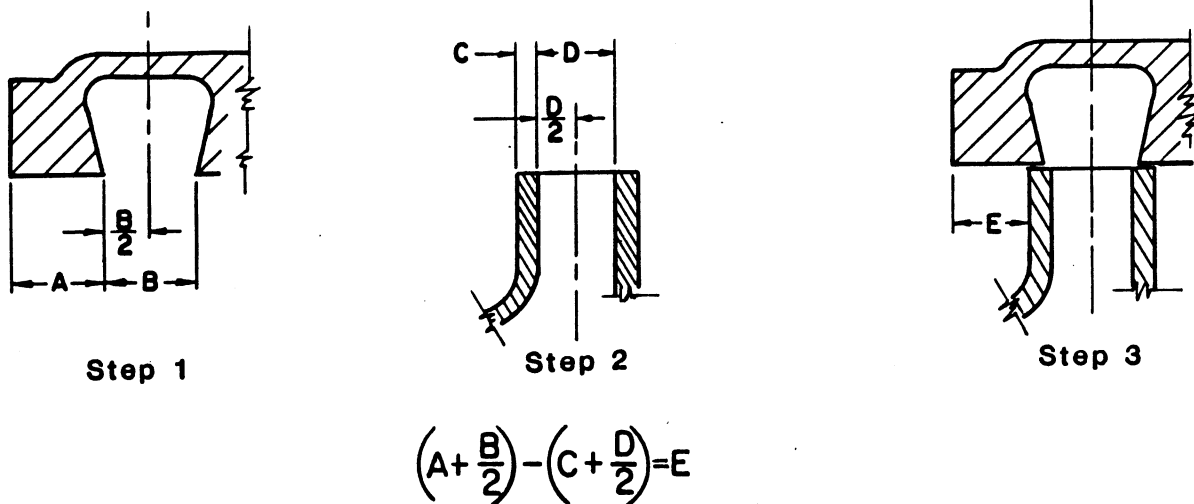


Figure 5. Centering Impeller Within Volute Scroll

NOTE

After the impeller has been properly positioned, check for free rotation. Correct any scraping binding before further reassembly.

MAINTENANCE AND REPAIR

When the proper clearance is reached, install the key and press the impeller on the shaft until it seats against the impeller shims. Replace the cap nut O-ring (30). Install the cap nut and lock it into position with the fillister head screw and lockwasher.

If the wear ring (29) was removed, position it on the cover plate with the chamfered side facing the cover plate. Tap lightly and evenly around the circumference with a block of wood or rubber mallet until the wear ring bottoms out against the bore in the cover plate.

Reassemble the cover plate to the pump casing, replacing the cover gasket (41). Make certain the jacking screws (31) do not interfere with the cover plate seating. Reinstall the hand priming pump (44, Figure 1) and reconnect the hose (42) to the pump casing.

Before starting the pump, turn the shaft to be sure the impeller does not bind or scrape.

Check Valve Installation

(Figure 1)

Install the check valve gasket and check valve assembly and secure with the attaching hardware.

Final Pump Reassembly

(Figure 1)

Be sure the pump end assembly is secure to the engine and base.

Install the suction and discharge lines and open all valves. Make certain that all piping connections are tight and properly supported.

Be sure the pump and engine have been properly lubricated, see **LUBRICATION**.

Before starting refer to **OPERATION**, Section C, and start the pump.

LUBRICATION

Seal Assembly

Fill the grease cup through the grease fitting with a good grade of No. 2 lithium base grease until grease escapes from the relief hole. Turn the grease cup arm counterclockwise until it is at the top of the stem; this will release the spring to apply grease to the seal (see Figure 6).

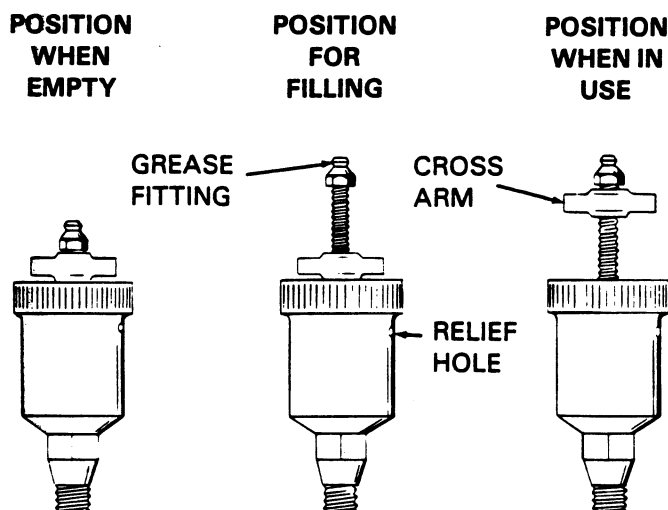


Figure 6. Automatic Lubricating Grease Cup

Bearings

(Figure 3)

The intermediate was fully lubricated when shipped from the factory. Under normal conditions, add three shots of No. 0 lithium base grease from a grease gun through the grease fitting (7) after each 250 hours of operation or once each month, whichever comes first. **Do not** over-lubricate. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.

CAUTION

If grease is forced out around the shaft as new grease is added, the bearing cavity is full and should be disassembled and cleaned immediately.

There are no provisions in the bearing cavity to drain or flush the lubricant. The pump and intermediate must be disassembled to completely clean and maintain this cavity.

Under normal conditions, change the grease after each 5000 hours of operation, or at 12 month intervals, whichever comes first. Change the grease more frequently if the pump is operated continuously or installed in an environment where variable hot and cold temperatures are common.

MAINTENANCE AND REPAIR

When lubricating a dry (overhauled) intermediate, fill the cavity through the lubrication fitting with approximately one-quarter of a pound of grease (approximately one-third full).

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of lubricant.

Engine

Consult the literature supplied with the engine, or contact your local engine representative.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

TRAILER OPERATION, MAINTENANCE AND REPAIR

This section contains information necessary for operation, maintenance and repair of the trailer assembly. Follow all operating and safety precautions to ensure safe and proper operation of the trailer. Regular maintenance and repair of the trailer, as any other piece of machinery, will ensure long life and safe, trouble-free operation.

Drawings and parts lists for the trailer assembly and subassemblies are included at the end of this section.

NOTE

The brake actuator, axle, and wheel brake assemblies are proprietary items purchased by Gorman-Rupp for use on the trailer. Complete replacement kits for these proprietary items are available from the factory. Gorman-Rupp does not, however, stock or furnish individual repair parts for these assemblies.

Drawings and parts lists for the axle assembly are included at the end of this section. The brakes are covered separately in the attached vendor data. Repair parts for these assemblies may be ordered directly from the original vendors listed at the end of this section.

WARNING

```
////////////////////////////////////  
//  
// Read this entire section before hitching the trailer to //  
// the towing vehicle and attempting to tow it. Failure to //  
// follow proper operating and safety precautions described //  
// in this section could result in equipment damage and/or //  
// personal injury. //  
//  
////////////////////////////////////
```

WARNING

```
////////////////////////////////////  
//  
// Do not attempt to operate the pump unless the trailer is //  
// level. Be sure the trailer leveling stands are posi- //  
// tioned on a solid surface, and the wheels are chocked. //  
//  
////////////////////////////////////
```

TRAILER OPERATION, MAINTENANCE, AND REPAIR

TRAILER SPECIFICATIONS

ITEM	SPECIFICATION
Gross vehicle weight.	3,120 lbs.
Tongue weight.	140 lbs. at level.
Maximum capacity for customer installed accessories.	1000 lbs. in addition to weight of pump and engine. Do not overload.
Maximum recommended towing speed.	45 mph.
Tire size/inflation	Noted on tires.
Wheel bolt torque.	90 - 95 ft. lbs.
Hitch connection.	3 inch Lunette eye.
Electrical system.	12 volt.
Braking system.	Self-contained hydraulic surge type. (Use SAE j1702 or j1703 motor vehicle brake fluid in actuator master cylinder as required.)

PRE-OPERATION INSPECTION

The trailer was inspected and tested before being shipped from the factory; however, the following items should be inspected and checked before hitching or moving the trailer.

- Inspect trailer for scratched paint, dents, broken lights or other obvious damage.
- Check to ensure wheel chocks are in place and secure.
- Check brake fluid level in actuator master cylinder and inspect complete hydraulic system for leaks.
- Be sure capacity and hitch of tow vehicle is compatible with trailer.
- Be sure electrical connector on tow vehicle mates with trailer connector and all lights function properly.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

- f. Check trailer and tow vehicle tire inflation (noted on tires).
- g. Check trailer wheel bolts for proper torque (90-95 ft. lbs.).

See Periodic Service under TRAILER MAINTENANCE AND REPAIR in this section for further information.

OPERATION

Brake System

The trailer is equipped with a self-contained, surge-type hydraulic brake system which functions independent of the tow vehicle brake or electrical systems.

The trailer brakes are automatically engaged when the tow vehicle slows down and the weight of the trailer pushes against the actuator mounted on the tongue. The actuator forces brake fluid to the wheel cylinders, applying the brakes. The faster the deceleration of the tow vehicle, the greater the braking effort on the trailer.

The actuator master cylinder was filled and the brakes were tested at the factory; however, periodic adjustment may be required. The complete brake system should be inspected and serviced on a regular schedule. (See **TRAILER MAINTENANCE AND REPAIR** in this section). Failure to observe normal maintenance procedures may result in ineffective operation or complete failure of the brake system.

Hitching Trailer To Vehicle

The following instructions are keyed to Figures 1 and 3.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

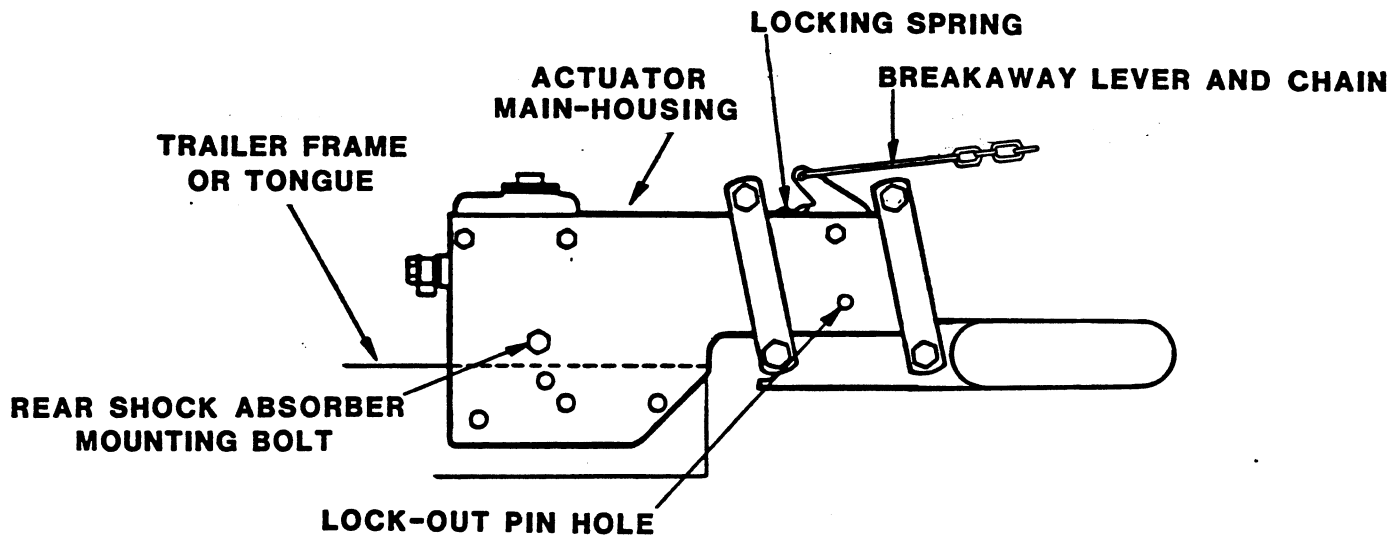


Figure 1.

Remove the lock-out pin assembly (38, Figure 3) from the brake actuator and insert it into the storage clip. Check that the breakaway lever on the brake actuator is fully released (pointing all the way back toward the rear of the trailer) and that the locking spring is not engaging any teeth in the breakaway lever. Check the actuator for free movement through its full range of travel (do not mistake brake shock absorber resistance for binding).

Use the front trailer jack (10, Figure 3) to raise the trailer tongue high enough to permit alignment of the Lunette eye with the tow vehicle pintle hook.

Back the towing vehicle up to the Lunette eye on the trailer. Remove the safety pin and open the pintle hook. Lift the trailer tongue and position the Lunette eye on the pintle hook. Close the pintle hook and insert the safety pin. Check to ensure that the pintle hook will not open while towing.

Fully retract the front trailer jack, rotate it 90°, and secure it with the locking pin.

Plug the 4-way connector on the trailer wiring harness into the mating connector on the tow vehicle. Check the brake lights, turn signals, tail and clearance lights. (See Figures 2 and 5 for the electrical wiring harness and connections.)

Cross the safety chains (16, Figure 3) under the trailer tongue so the chains will cradle the tongue in the event of a breakaway. Attach the safety chains to the tow vehicle with sufficient slack to permit full turns.

Fasten the emergency breakaway chain securely to the tow vehicle in a manner and position that will permit normal operation of the tow vehicle and trailer, but assure application of the trailer brakes if the two vehicles accidentally separate.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

CAUTION

Always check to ensure that the breakaway lever is fully released and the breakaway chain does not pull taut during towing. Accidental application of the lever will cause the trailer brakes to drag, heat up, and possibly burn out.

Fully retract the rear trailer jack (12, Figure 3), rotate it 90°, and secure it with the locking pin.

Towing

The maximum recommended towing speed is 45 mph.

The brakes should release when the trailer is pulled from a dead stop. Because a slight drag may not be noticeable to the driver, perform the following test periodically to ensure the brakes are releasing properly.

1. Tap each brake drum with a hammer while the actuator is fully compressed.
2. Fully extend the actuator mechanism and tap on the brake drums again. The drums should ring clearly when the brakes are released.

The trailer should not push the tow vehicle or jackknife during stops. Investigate **any** erratic brake performance **immediately**.

Do not attempt tighter turns than the vehicle combination is capable of making.

CAUTION

Tight turns and jackknifing while backing can damage the actuator or other equipment.

Backing

The brake actuator is designed to permit backing when on a level surface. Limited braking occurs during backing but should not interfere with maneuvering the trailer under normal conditions. Back slowly and steadily to avoid jamming. Do not lurch.

When backing up hill or on loose gravel, the brake actuator can be temporarily immobilized by removing the lock-out pin assembly (38, Figure 3) from the storage clip and inserting it into the lock-out hole in the actuator. This will prevent the tow vehicle from compressing the master brake cylinder.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

CAUTION

If the lock-out pin is used to immobilize the actuator during backing, be sure to remove the pin and check that the mechanism is operating freely before resuming normal operation.

Parking

The hydraulic system is not designed to be used as a parking brake. When parking, set and lower the front and rear trailer jacks and chock the wheels.

WARNING

```

////////////////////////////////////
//                               //
// Do not attempt to operate the pump unless the trailer is //
// level. Be sure the trailer leveling stands are posi- //
// tioned on a solid surface, and the wheels are chocked. //
//                               //
////////////////////////////////////
  
```

PERIODIC SERVICE

Trailer Troubleshooting

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
BRAKES GRAB- BING OR LOCK- ING	Grease on lining.	Replace seals and lining.
	Loose parts.	Check for broken springs, loose rivets and bolts.
	Rust on brake drums from non-use.	Normal use will remove rust.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
NOISY BRAKES	Poor bearing adjustment.	Adjust bearings. Check for worn or damaged bearings and replace if necessary.
	Loose parts.	Check for broken springs, loose rivets and bolts.
	Lining worn to rivets.	Install new linings.
	Bent backing plate.	Replace if necessary.
	Grease on lining.	Replace seals and lining.
	Brake release.	Eliminate or minimize through adjustment.
INOPERATIVE STOP LIGHTS OR TURN SIGNALS	Defective light bulb.	Replace bulb.
	Incorrectly wired.	Check wiring harness drawing and rewire.
	Blown fuse on tow vehicle.	Replace fuse.
WEAK BRAKES	Actuator master cylinder low on fluid.	Add brake fluid.
	Improper adjustment.	Adjust brakes to compensate for wear.
	Air in lines.	Bleed brakes.
	Grease on lining.	Replace seals and lining.
	Excessive trailer load.	Reduce load to within limits.
	Bent backing plate.	Replace if necessary.
INTERMITTENT OR SURGING BRAKES	Loose wheel bearings.	Adjust bearings and replace if defective.
	Drums out of round.	Resurface drums if over .015 inch out of round.
BRAKES DRAG- GING OR OVER HEATING	Improper adjustment.	Adjust brakes to compensate for wear.
	Bent backing plate.	Replace if necessary.
	Breakaway lever engaged.	Release lever.
	Weak or broken shoe return springs.	Replace if necessary.
	Rusted brake assembly.	Clean and lubricate.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

Trailer Periodic Service Table

COMPONENT	SERVICE REQUIRED	FREQUENCY
WHEEL BOLTS	Torque to 90-95 ft. lbs.	At delivery/After first 100 miles/Monthly or every 2,500 miles thereafter.
TIRE INFLATION	Check pressure - inflate as required.	At delivery/Monthly or every 2,500 miles thereafter.
BRAKE ACTUATOR MASTER CYLINDER	Check level - add brake fluid. Bleed system if necessary.	At delivery/As required.
BRAKES	Check function - adjust brakes.	As required.
WHEEL BEARINGS	Inspect - Repack.	Every 20,000 miles/After 4 months or more of non-use.

Refer to the specific instructions on the following pages for further information.

Wheel Bolt Adjustment

Under normal operating conditions, the wheel bolts will seat in within the first 100 miles, resulting in a drop in torque. Each bolt should be checked at that time and retorqued to 90-95 ft. lbs. Recheck the bolt torque every month or 2,500 miles, whichever comes first.

When reinstalling the wheel after service, install each bolt and torque to no more than 20 ft. lbs. each. Continue torquing the bolts in an opposite and alternating sequence, increasing the torque each time around by 20-25 ft. lbs. until each is torqued to 90-95 ft. lbs.

Tire Inflation

The tire size and recommended maximum inflation pressure is noted on the tires.

Always use a quality tire pressure gauge when checking inflation pressures. Simply looking at the tires to check inflation pressures is not enough, especially with radial tires. Underinflated radial tires may **appear** properly inflated.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

Be sure to reinstall the valve caps after checking the air pressure. This will prevent contamination of the valve core by dirt or moisture which could cause a leak.

Brake Actuator Master Cylinder

The brake actuator master cylinder was filled and the brake lines were pressurized before the trailer left the factory.

If necessary to add brake fluid, remove the master cylinder plug and add clean SAE j1702 or j1703 motor vehicle brake fluid. Clean and replace the fill plug.

CAUTION

Use of improper brake fluid will void all brake system warranties.

Keep the system protected from dirt and moisture during storage. Inspect and test the complete system after long periods of idleness. Look for rust inside the master cylinder reservoir and around the mouth of the cylinder bore. Replace cloudy, dirty, or watery brake fluid.

Bleeding Brakes

Use of a pressure bleeder to bleed the brake system is preferable, but the brakes may be bled manually by pumping the actuator coupler back and forth through its full range of travel. Manual bleeding requires a two-man team.

To simplify manual bleeding, remove the rear shock absorber mounting bolt (see Figure 1) to eliminate shock absorber resistance to the compression and extension strokes. Leave the bolt out until the brakes have been fully adjusted.

Check that the breakaway lever is fully released (pointing all the way back toward the rear of the trailer).

Bleed one wheel cylinder at a time. Connect a tube or hose to the wheel cylinder bleeder screw. Place the free end of the hose in a glass jar containing clean brake fluid.

Remove the master cylinder fill plug and make sure the cylinder is full. The first operator should open the bleeder screw while the second operator compresses the actuator coupler. The first operator then closes the bleeder screw **before** the coupler is pulled forward. Repeat this procedure until no bubbles appear in the jar of brake fluid. Close the bleeder screw, remove the hose and repeat the complete procedure on the other wheel cylinder.

Make sure to keep the master cylinder full to prevent air from being reintroduced to the system. All air must be removed from the system or the brakes will not work properly.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

When bleeding is complete, install the fill plug, apply pressure and check the system for leaks.

If no further adjustments are necessary, align the shock absorber and reinstall the mounting bolt.

Brake Adjustment

Position the trailer on a solid, level surface and jack up the wheels just high enough to rotate freely. **Be sure** to rest the trailer frame securely on blocks or jack stands to ensure personal safety.

With the brake drums cool, the breakaway lever fully released, and the brake actuator in the towing position, remove the shock absorber rear mounting bolt (see bleeding instructions above) and proceed as follows:

1. Compress the actuator several times to center the shoes in the brake drum.
2. Return the actuator to the fully-extended towing position.
3. While turning the wheel by hand, use a brake adjusting tool or screwdriver to turn the brake adjusting screw (located at the bottom of the drum and accessible through the backplate) until there is enough drag on the wheel to make it difficult to turn. Back off the adjusting screw until the wheel turns freely.
4. Repeat the procedure for the other wheel.
5. Be sure to replace the shock absorber rear mounting bolt after both brakes are adjusted.

Wheel Bearing Adjustment And Lubrication

These instructions are keyed to Figure 4 and the accompanying parts list at the end of this section.

The wheel bearings were adjusted and fully packed before the trailer left the factory. The bearings should be inspected and repacked every 20,000 miles or if the trailer has been idle for 4 months or longer.

Position the trailer on a solid, level surface and jack one wheel off the ground just far enough to allow free rotation and perform the following checks. **Be sure** to rest the axle securely on a block or jack stand to ensure personal safety.

1. Check the wheel end play by pushing and pulling on each wheel several times. Excess wheel play indicates loose adjustment or defective bearing(s).
2. Spin each wheel by hand to check for freedom of rotation. Drag or difficult rotation can indicate improper bearing or brake adjustment.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

3. While rotating each wheel, listen for any unusual noise. If there is any unusual noise, further examination will likely show a defective bearing.

Perform the following steps if repacking, replacement or adjustment of bearings is indicated.

Disassembly

Remove the wheel bolts (2) and wheel (1).

Remove the dust cap (9) and cotter pin (12). (If repacking or replacement of wheel bearings is not required, see **Adjustment**, Page F-12.) Remove the spindle nut (10), and spindle washer (11).

Loosen the outer cup and bearing (6 and 7) by shaking the hub slightly. In most cases this will loosen the outer bearing so that it can be removed by hand.

Remove the entire hub and drum (3). This assembly contains the inner cup and bearing (4 and 5) and the grease seal (8).

NOTE

Pay particular attention to the position of the inner cup and bearing and the grease seal. You will need to remember this during reassembly.

Remove the inner cup and bearing and grease seal from the hub by inserting a brass drift pin or piece of wood through the small end of the hub and tapping gently until the bearing and seal loosen.

Use a soft cloth soaked in solvent to clean all dirt and grease from the inside of the hub and spindle.

WARNING

```
////////////////////////////////////  
//  
// Most cleaning solvents are toxic and flammable. Use //  
// them only in a well-ventilated area free from excessive //  
// heat, sparks, and flame. Read and follow all prec- //  
// autions printed on solvent containers. //  
// //  
////////////////////////////////////
```

Cleaning And Inspection

Prior to relubrication, used bearings must be thoroughly cleaned.

Do not immerse the grease seals in solvent. Merely wipe them clean with a cloth.

Immerse the cups and bearings in solvent and rotate then bearings by hand. When the bearings appear clean, remove the bearings and cups and allow the bearings to drain free of solvent. Solvent on bearings may dilute and harm the lubricant effectiveness.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

CAUTION

Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. DO NOT spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Carefully inspect the bearing cups (races) and bearing cones for pitting, scratches, spalling, wear, discoloration, or other damage. Rotate the bearings by hand to check for roughness or binding. If rotation is rough or any physical damage is observed, replace the entire bearing assembly. **Never replace a bearing cone without replacing its mating cup.**

Inspect the grease seals and replace them if cracked or brittle.

Repacking

Bearings should be repacked with the **minimum** amount of the lightest bodied lubricant that will keep the bearing surfaces separated. Bearings can overheat if too much, too little or too heavy a lubricant is applied. The lubricant must allow the bearings to function under high temperatures caused by loads and brake heat and still return to its original consistency, with little or no oil separation, when cool. With this in mind, Sunoco 802 or Sunoco Prestige 742 EP lubricant, or their equivalent, is recommended.

If possible, use a bearing packer to repack the bearing cones. If a bearing packer is not available, the bearings may be lubricated by hand by pressing grease into and around each and every roller. Additional grease within the hub is not required.

Reassembly

Install the inner bearing and cup in the hub and replace the grease seal by tapping gently with a wooden block. Make sure the seal is installed **exactly** as it was before disassembly.

Replace the hub on the spindle taking extreme care not to damage the spindle thread or the grease seal. **This must be done very carefully.**

Replace the outer bearing and cup, washer and spindle nut.

Adjustment

Slowly rotate the hub in either direction while tightening the spindle nut to 50 ft. lbs. torque, or until there is a slight bind. When this occurs, back the adjusting nut off to the nearest locking hole in the castellation. This should allow the wheel to rotate freely without excessive end play.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

NOTE

The total amount of internal running clearance between the roller and the raceway of the bearings should be between .002 and .008 inch. Since this clearance can only be measured accurately with the use of special instruments, the common method of measuring end play is by pushing inward and pulling outward on the hubs several times. A very **slight** end play should be felt.

Install the cotter pin, bend it to a lock position and install the dust cap.

Reinstall the wheels and wheel bolts (see **Wheel Bolt Torque**, this section).

ELECTRICAL SYSTEM

A schematic of the trailer wiring harness is included at the end of this section. The only part sold separately from the complete wiring harness is the 4-way connector. This is a 2-part connector, with one part attached to the wiring harness and the other part shipped loose to be attached to the tow vehicle electrical system.

Pay particular attention to wire color location shown in the detail of the trailer connector. Be sure to connect the correct wires from the tow vehicle electrical system to the proper contacts in the tow vehicle connector indicated in parenthesis under the wire color. (See Figure 2 below.)

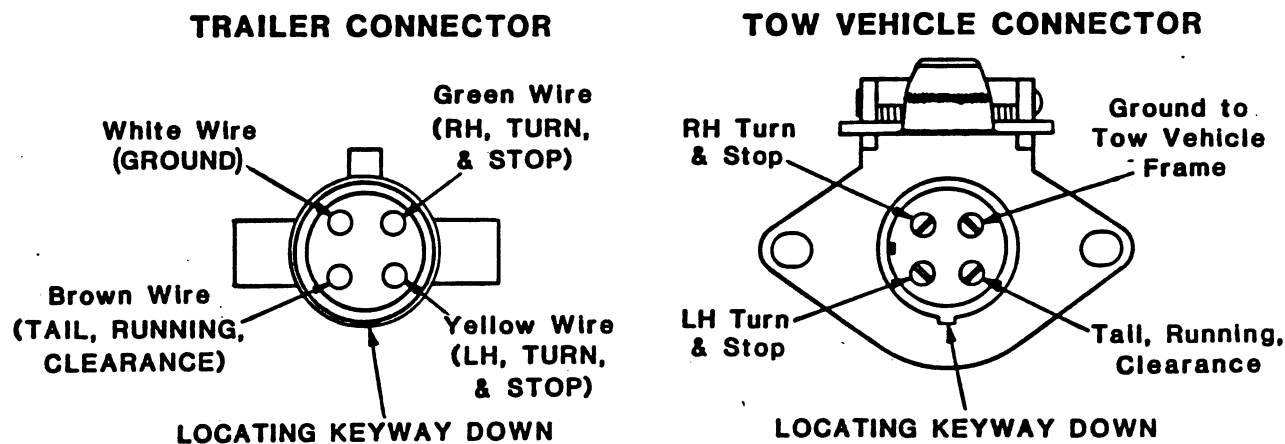


Figure 2.

NOTE

The ground wire from the tow vehicle connector to the frame is not supplied with the wiring harness or the connector.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

TRAILER DRAWINGS AND PARTS LISTS**Original Equipment Manufacturers**

The brake actuator, axle and wheel brake assemblies are proprietary items purchased by Gorman-Rupp for use on the trailer. Complete replacement kits for these proprietary items are available from the factory. Gorman-Rupp does not, however, stock or furnish individual repair parts for these assemblies.

Drawings and parts lists for the axle assembly are included at the end of this section. The wheel brakes and towing brake actuator are covered separately in the attached vendor data. Repair parts for these assemblies may be ordered directly from the following Original Equipment Manufacturers.

1. 29310-315 Coupler With Actuator (O.E.M. assembly number 16032)
 - a. O.E.M. Model TA6 (Modified with 3 inch Lunette eye) - Manufactured by:
Toledo Stamping And Manufacturing Company
P.O. Box 596
Toledo, Ohio 43693
Phone - (419) 382-3407
2. 29311-101 Axle Assembly
 - a. O.E.M. Model 5SF0 - Manufactured by:
Dalton-Walther Corporation
Fayette/Franklin Division
Fayette, Ohio 43521
Phone - (419) 237-2511
3. 12" X 2" Hydraulic Brake Assemblies
 - a. O.E.M. Free-Backing Type - Manufactured by:
Dico
200 S. W. 16th St.
Des Moines, Iowa 50305
Phone - (515) 224-7286

TRAILER OPERATION, MAINTENANCE, AND REPAIR

ASSEMBLY DRAWING

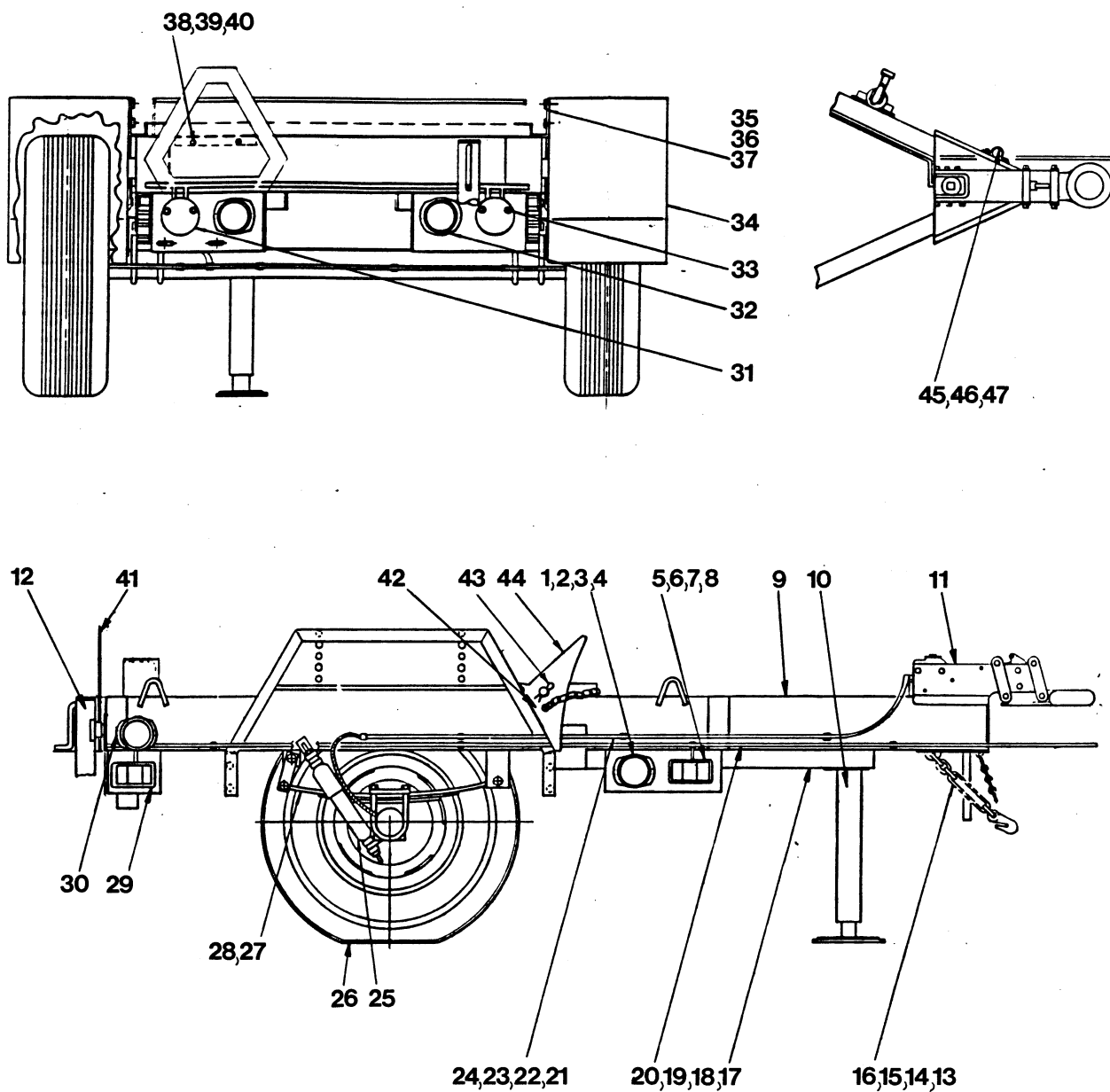


Figure 3. 41583-627 Trailer Assembly

TRAILER OPERATION, MAINTENANCE, AND REPAIR

PARTS LIST
41583-627 Trailer Assembly

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY	ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	REFLECTOR - AMBER	29338-405	-----	4	26	*TIRE	29337-164	-----	2
2	HEX HD CAPSCREW	B00403	15991	12	27	AXLE KIT	29311-101	-----	1
3	LOCKWASHER	J00004	15991	12	28	SHACKLE PARTS KIT	29311-901	-----	2
4	HEX NUT	D00004	15991	12		-SHACKLE PLATE	NOT AVAILABLE		4
5	CLEARANCE LAMP	29338-903	-----	2		-SHACKLE BOLT	NOT AVAILABLE		6
6	RD HD MACH SCREW	X#10-03	15991	16		-SHACKLE NUT	NOT AVAILABLE		6
7	T TYPE LOCKWASHER	AK#00010	15991	16	29	REAR MARKER LAMP	29338-902	-----	2
8	FLAT WASHER	K#00010	15991	16	30	PAN HD TAPSCREW	CC00402	15990	4
9	TRAILER SUB-ASSY	41583-626	24150	1	31	TAIL & DIR LIGHT	29338-952	-----	1
10	-FRONT JACK	29313-145	-----	1	32	REFLECTOR - RED	29338-404	-----	4
11	-CPLR W/ACTUATOR	29310-315	-----	1	33	TAIL & DIR LIGHT	29338-942	-----	1
12	-REAR JACK	29313-147	-----	1	34	FENDER ASSY	42172-001	24150	2
13	U-BOLT	5495	15990	2	35	HEX HD CAPSCREW	B00806	15991	8
14	LOCKWASHER	J00006	15991	4	36	LOCKWASHER	J00008	15991	8
15	HEX NUT	D00006	15991	4	37	HEX NUT	D00008	15991	8
16	SAFETY CHAIN ASSY	41158-011	24150	2	38	HEX HD CAPSCREW	B00403	15991	2
17	WIRING HARNESS	47381-015	-----	1	39	LOCKWASHER	J00004	15991	2
18	CABLE CLAMP	27111-315	-----	8	40	SPEED NUT	21768-690	-----	2
19	PAN HD TAPSCREW	CC#08-01 1/2	15991	8	41	SLOW VEHICLE SIGN	29821-001	-----	1
20	T TYPE LOCKWASHER	AK#00010	15991	8	42	FENDER PAD	33541-013	19140	2
21	BRAKE LINE ASSY	29313-515	-----	1	43	*HAIR PIN CLIP	21120-601	-----	2
22	CABLE CLAMP	27111-321	-----	7	44	WHEEL CHOCK ASSY	41323-001	-----	2
23	PAN HD TAPSCREW	CC#08-01 1/2	15991	7	45	LOCK OUT PIN ASSY	41152-004	24030	1
24	T TYPE LOCKWASHER	AK#00008	15991	7	46	CLIP	38116-015	15990	1
25	SHOCK ABSORBER	29337-501	-----	2	47	PAN HD TAPSCREW	CC00402	15990	2

*INDICATES PARTS RECOMMENDED FOR STOCK

TRAILER OPERATION, MAINTENANCE, AND REPAIR

ASSEMBLY DRAWING

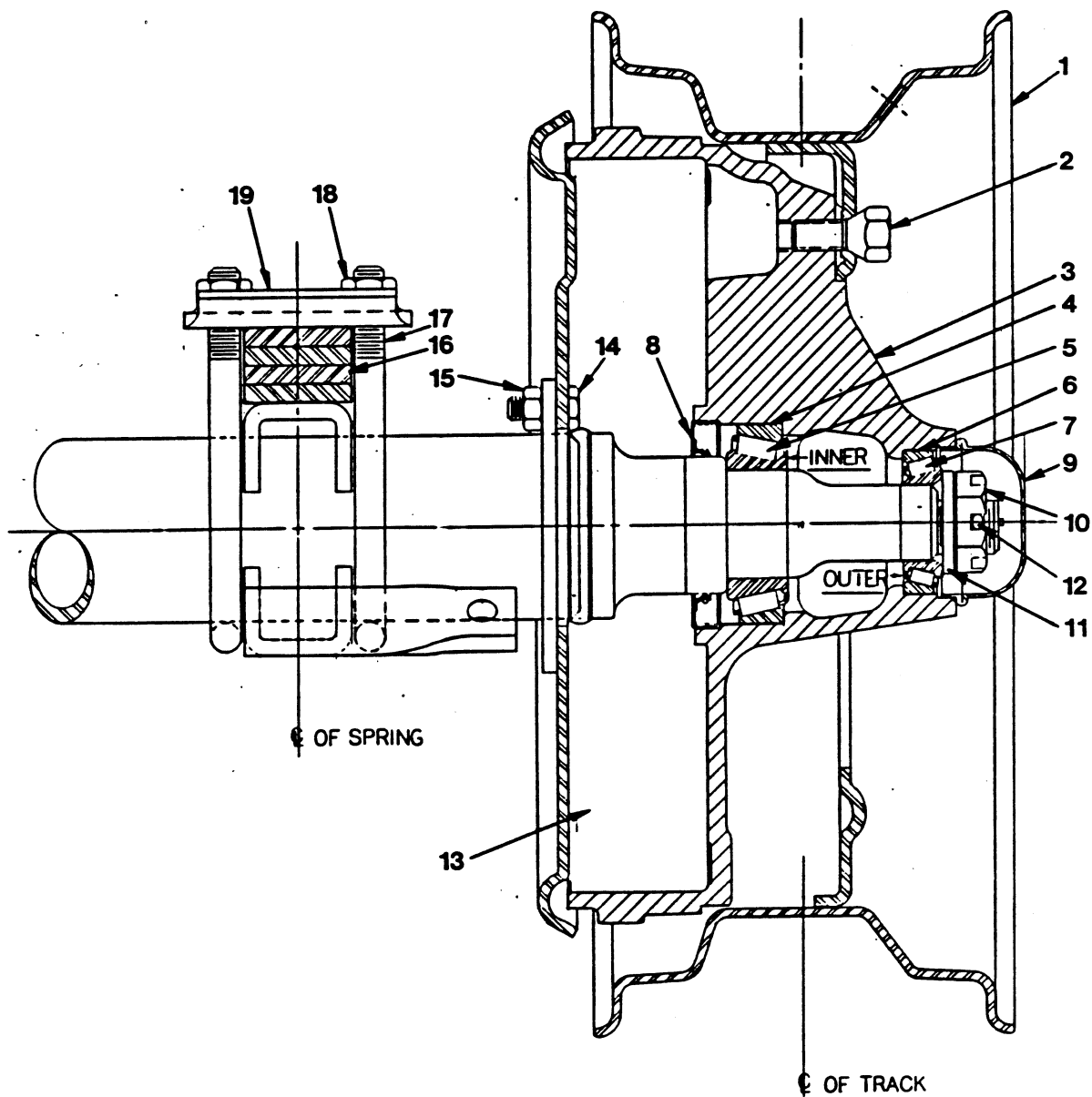


Figure 4. 29311-101 Axle Assembly

TRAILER OPERATION, MAINTENANCE, AND REPAIR

PARTS LIST
29311-101 Axle Assembly

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	15 X 6 US WHEEL	79-001075		2
2	WHEEL MOUNTING BOLT	08-900108		8
3	HUB AND DRUM (US-12)	11-9230-50		2
4	-INNER CUP (25520)	08-201859		1
5	-INNER BEARING (25580)	08-202736		1
6	-OUTER CUP (LM67010)	08-201923		1
7	-OUTER BEARING (LM67048)	08-202737		1
8	-GREASE SEAL	08-900106		1
9	GREASE CAP	79-000196		2
10	SPINDLE NUT	08-202734		2
11	SPINDLE WASHER	79-000053		2
12	SPINDLE COTTER PIN	08-201996		2
13	DICO HYDRAULIC BRAKE ASSY, RH	79-000840		1
	DICO HYDRAULIC BRAKE ASSY, LH	79-000841		1
14	BRAKE MOUNTING BOLT	08-202729		5
15	BRAKE MOUNTING BOLT NUT	08-201789		5
16	E2200-26" EYED SPRING	79-009976		2
17	U-BOLT	79-000229		4
18	U-BOLT NUT	08-202259		8
19	SPRING CLAMP	79-000267		2

Note: Numbers shown above are the Original Equipment Manufacturer's part numbers.

See Page F-14 for O.E.M. address.

TRAILER OPERATION, MAINTENANCE, AND REPAIR

ASSEMBLY DRAWING

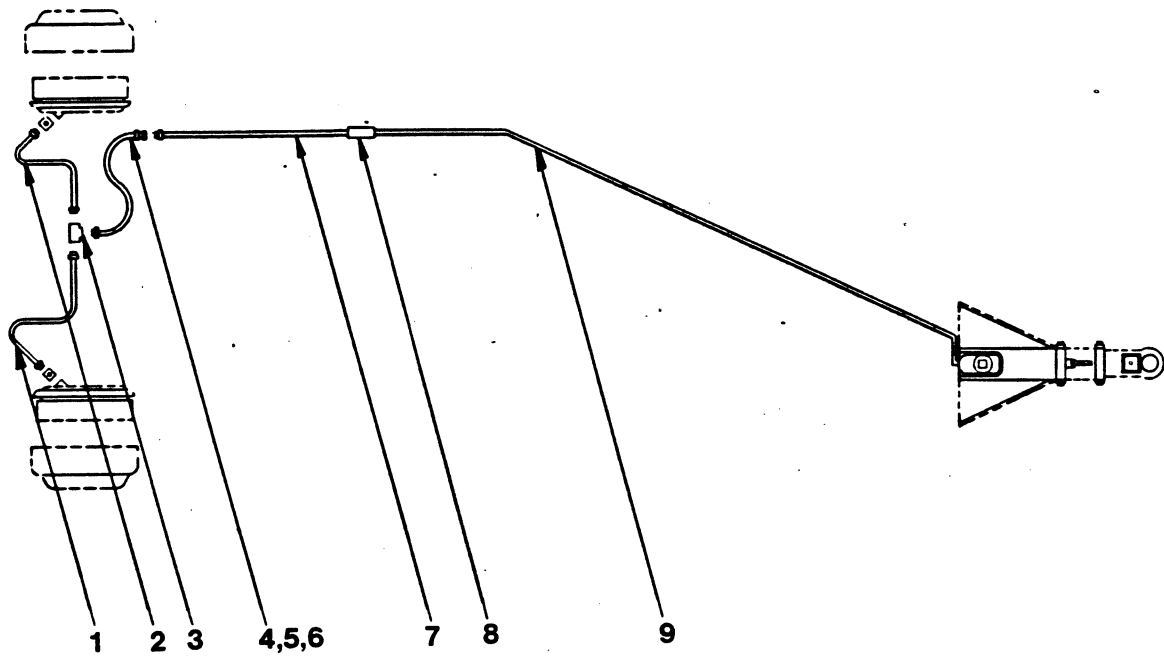


Figure 5. 29313-515 Brake Line Assembly

TRAILER OPERATION, MAINTENANCE, AND REPAIR

PARTS LIST

29313-515 Brake Line Assembly

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	TUBING	29313-516	-----	1
2	TUBING	29313-504	-----	1
3	TEE	29313-507	-----	1
4	HOSE W/FITTINGS	29313-510	-----	1
5	BRACKET	29313-508	-----	1
6	CLIP	29313-509	-----	1
7	TUBING	29313-516	-----	1
8	TUBE UNION	29313-506	-----	1
9	TUBING	29313-505	-----	1

TRAILER OPERATION, MAINTENANCE, AND REPAIR

ASSEMBLY DRAWING

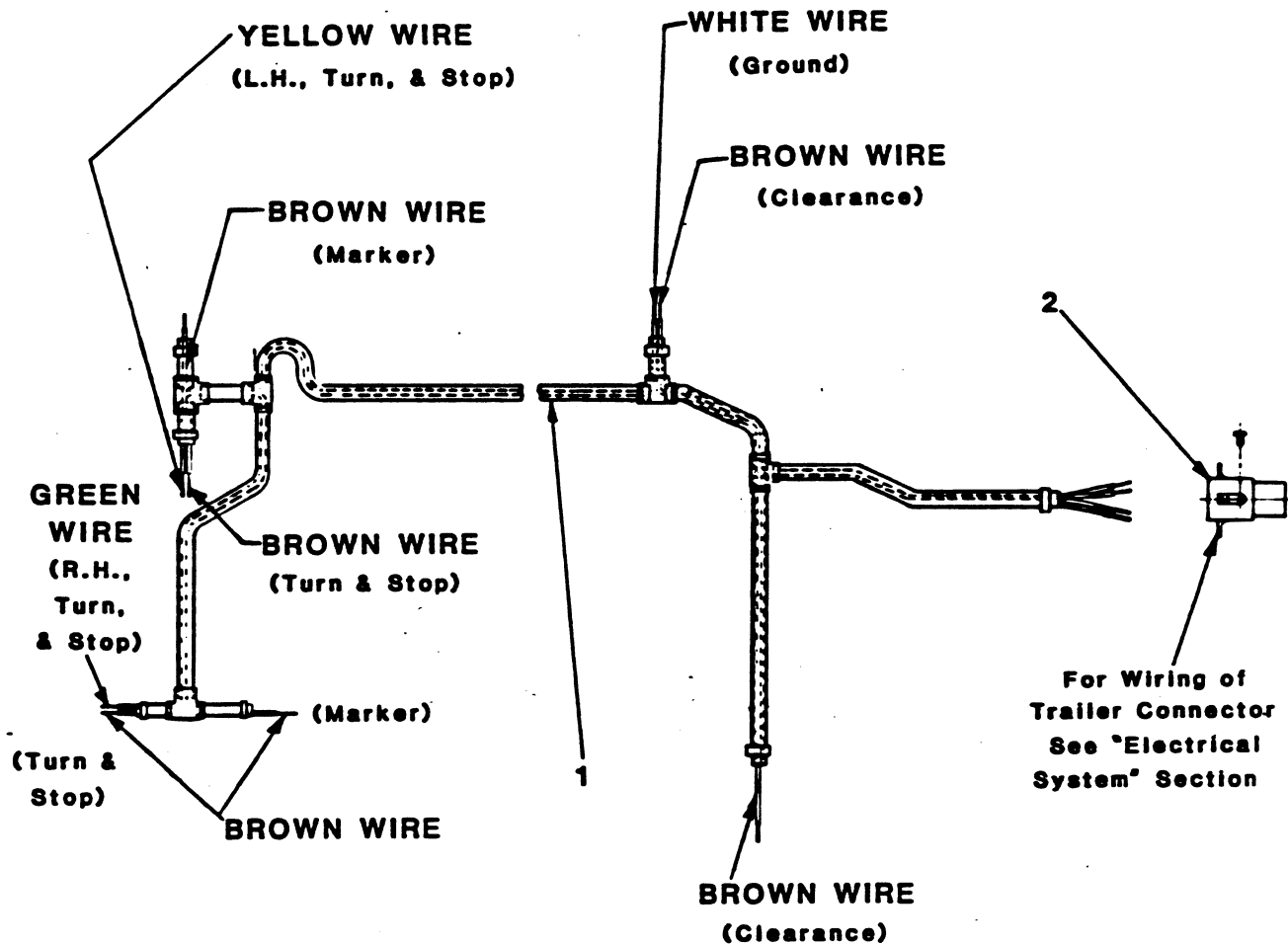


Figure 6. 47381-015 Wiring Harness

PARTS LIST

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	WIRING HARNESS	47315-015	----	1
2	** 4-WAY CONNECTOR ASSEMBLY	27235-021	----	1

** Assembly includes trailer and vehicle connectors.
Individual components are not sold separately.

**For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
U.S.: 419-755-1280
International: +1-419-755-1352**

**For Canadian Warranty Information,
Please Visit www.grcanada.com/warranty
or call:
519-631-2870**