

# Operator's Safety and Service Manual GPR135DE (DIESEL) GPR99H (GASOLINE)

It is the OWNER'S RESPONSIBILITY to communicate information on the SAFE USE and OPERATION of this machine to the operators!

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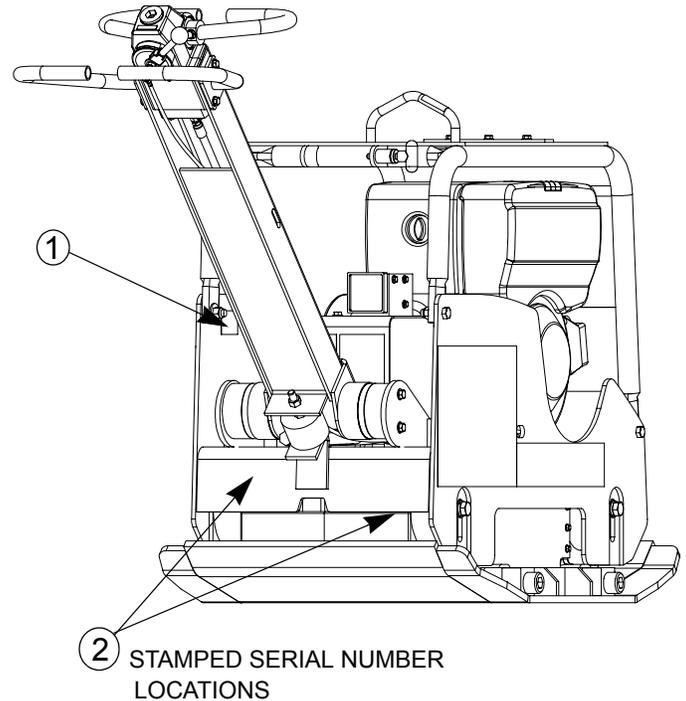
IN ENGLAND:  
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Bolton BL2 6RT  
Phone: 01204 387784 • Fax: 01204 387797

# SERIAL NUMBER LOCATION

1. Serial number decal location for MBW reversible plate compactors.
2. Serial number is also stamped on the baseplate housing (top edge near right rear shockmount) and engine deck (back edge near handle).

(Write model number in box)

(Write serial number in box)



The units year of Manufacture can be determined by the serial number. Contact your nearest Sales Branch or MBW Inc. for this information

## PARTS ORDERING PROCEDURE

The Warranty is stated in this book on page 40 . **Failure to return Warranty Registration Card renders the Warranty null and void.**

An "Owner's Manual" for the engine is also furnished. Engine parts may be ordered from any authorized dealer. Refer to the engine "Owner's Manual" for exploded views and part identifications.

### PARTS ORDERING:

MBW Inc. parts are available worldwide and must be ordered through your local MBW Inc. distributor. If you cannot locate an MBW Inc. distributor in your area, refer to page 41 of this manual to locate the MBW Inc. Sales Branch nearest you and call for assistance.

#### ALWAYS INCLUDE:

1. Model and Serial Number of machine when ordering MBW Inc. Parts.
2. Model and Serial Number of engine when ordering Engine Parts.
3. Item Part Number, Description, and Quantity.
4. Company Name, Address, Zip Code, and Purchase Order Number.
5. Preferred method of shipping.

**REMEMBER - you own the best. If repairs are needed use only MBW Inc. parts purchased from Authorized MBW Inc. distributors.**

# ⚠ SAFETY PRECAUTIONS ⚠

**READ AND STUDY THE FOLLOWING SAFETY INFORMATION BEFORE ATTEMPTING TO OPERATE THIS EQUIPMENT. IN ADDITION, ENSURE THAT EVERY INDIVIDUAL WHO OPERATES OR WORKS WITH THIS EQUIPMENT IS FAMILIAR WITH THESE SAFETY PRECAUTIONS.**

## **WARNING - LETHAL EXHAUST GAS!**

An internal combustion engine discharges carbon monoxide, a poisonous, odorless invisible gas. Death or serious illness may result if inhaled. Operate only in an area with good ventilation, **NEVER IN A CONFINED AREA!**

## **WARNING - DANGEROUS FUELS!**

Use extreme caution when storing, handling and using fuels - they are highly volatile and explosive in vapor state. Do not add fuel while engine is running. Stop and cool the engine before adding fuel.

**DO NOT SMOKE!**

## **SAFETY GUARDS**

It is the owner's responsibility to ensure **ALL GUARDS AND SHIELDS** are in place and in working order.

## **IGNITION SYSTEMS**

Breakerless, magneto and battery ignition systems **CAN CAUSE SEVERE ELECTRICAL SHOCKS**. Avoid contacting these units or their wiring.

## **SAFE DRESS**

**DO NOT WEAR** loose clothing, rings, wristwatches, etc., near machinery.

## **NOISE PROTECTION**

Wear O.S.H.A. specified hearing protection devices.

## **FOOT PROTECTION**

Wear O.S.H.A. specified steel tip safety shoes.

## **HEAD PROTECTION**

Wear O.S.H.A. specified safety helmets.

## **EYE PROTECTION**

Wear O.S.H.A. specified eye shields, safety glasses, and sweat bands.

## **DUST PROTECTION**

Wear O.S.H.A. specified dust mask or respirator.

## **OPERATOR**

Keep children and bystanders off and away from the equipment.

## **REFERENCES**

For details on safety rules and regulations in the United States, contact your local Occupational Safety and Health Administration (O.S.H.A.) office. Equipment operated in other countries must be operated and serviced in accordance and compliance with any and all safety requirements of that country. The publication of these safety precautions is done for your information. MBW Inc. does not by the publication of these precautions, imply or in any way represent that these are the sum of all dangers present near MBW equipment. If you are operating MBW Inc. equipment, it is your responsibility to insure that such operation is in full accordance with all applicable safety requirements and codes. All requirements of the United States Federal Occupational Safety and Healthy Administration Act must be met when operated in areas that are under the jurisdiction of that United States Department.

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# SAFETY NOTICE & DECALS

## ⚠ IMPORTANT NOTICE ⚠

The “**SAFETY ALERT SYMBOL**” is used to call attention to items or operations that may be dangerous to those operating or working with this equipment. The symbol can be found throughout the manual and on the unit itself. Please read these warnings and cautions carefully.

## READ SAFETY DECALS CAREFULLY

Carefully read and follow all safety decals. Keep them in good condition. If decals become damaged, replace as required. If repainting, **REPLACE ALL** decals. Decals are available from authorized MBW Distributors. Decals are not shown to scale. Decals on set #16031

<div data-bbox="136 659 532 1062"> <p><b>CAUTION</b></p> <p>Read the Operation Instructions before operating this piece of equipment. Keep unauthorized and untrained people away from this equipment. <b>ROTATING &amp; MOVING PARTS!</b> Make sure all guards and safety devices are in place. DO NOT RUN this machine in an enclosed area. The engine produces carbon monoxide, a <b>POISONOUS GAS</b>. Wear approved hearing protection, foot protection, eye protection and head protection. SHUT OFF the engine before servicing, cleaning or adding fuel. Failure to comply could result in serious bodily injury.</p> <p>15867</p> </div> <p>#15867 QTY 1</p>	<div data-bbox="579 659 1034 1050"> <p><b>GASOLINE PLATE OPERATING INSTRUCTIONS</b></p> <ol style="list-style-type: none"> <li>1. Check engine oil level.</li> <li>2. Open fuel valve.</li> <li>3. Choke engine. A warm engine may not need to be choked.</li> <li>4. Open throttle part way.</li> <li>5. Pull starter rope.</li> <li>6. After starting: open choke, return throttle to idle position.</li> <li>7. During operation, when excessive kickback is noticed, maximum compaction has been reached.</li> <li>8. To stop, return throttle to the idle position, use engine stop switch, close fuel valve.</li> </ol> <p>15866</p> </div> <p>#15866 QTY 1 (GPR99H ONLY)</p>	<div data-bbox="1092 659 1526 1096"> <p><b>DIESEL PLATE OPERATING INSTRUCTIONS</b></p> <ol style="list-style-type: none"> <li>1. Check engine oil level.</li> <li>2. Check fuel level.</li> <li>3. Set engine speed control in the middle position.</li> <li>4. Move decompression lever (if equipped) to the up position. (Located on top of the engine)</li> <li>5. Use key (if equipped) or starting handle to start engine (Refer to engine instruction book for proper "Manual Starting" procedure.)</li> <li>6. After starting return engine speed control to the idle position and allow engine to reach operation temperature.</li> <li>7. During operation run engine at full throttle, when excessive kickback is noticed maximum compaction has been reached.</li> <li>8. To stop, return throttle to the idle position and allow engine to idle for one minute then move control to stop position.</li> </ol> <p>15832</p> </div> <p>#15832 QTY 1 (GPR135DE ONLY)</p>
<div data-bbox="175 1318 500 1860"> <p><b>WARNING</b></p> <p><b>ROTATING PARTS Keep hands away!</b></p> <p>13484</p> </div> <p>#13484 QTY 1</p>	<div data-bbox="656 1304 964 1453"> <p><b>WARNING</b></p> <p>LIFT ONLY BY LIFT HOOK APPROXIMATE WEIGHT: 924 LBS (420 K.G)</p> <p>15853</p> </div> <p>#15853 QTY 1 (GPR135DE ONLY)</p> <div data-bbox="656 1619 964 1768"> <p><b>WARNING</b></p> <p>LIFT ONLY BY LIFT HOOK APPROXIMATE WEIGHT: 781 LBS (355 K.G)</p> <p>16026</p> </div> <p>#16026 QTY 1 (GPR99H ONLY)</p>	

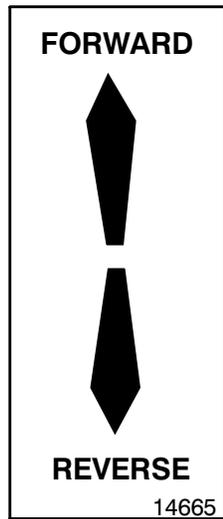
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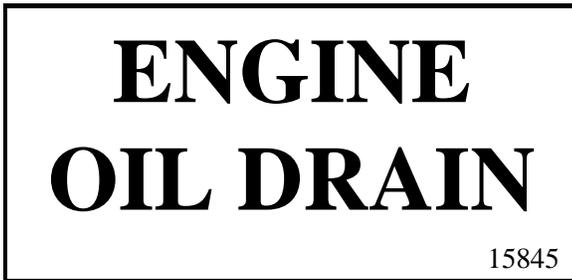
#14665 QTY 1



#13481 QTY 1 (GPR99H ONLY)



#15843 QTY 1 (GPR135DE ONLY)



#15845 QTY 1



#17449 QTY 1 (GPR99H ONLY)



#15844 QTY 1

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M-B-W

#15847



#01554

GPR99

#15856

GPR135

#15855

# DECAL LOCATIONS GPR135DE

HYDRAULIC OIL  
15844

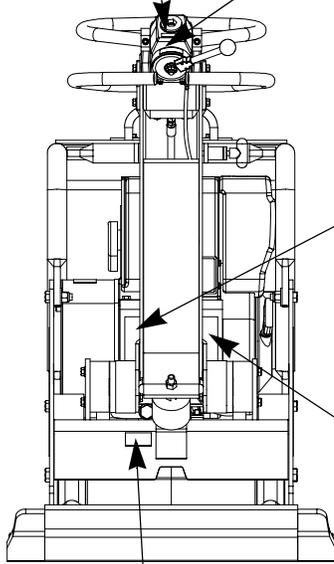
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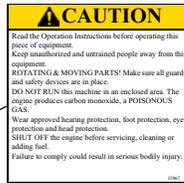
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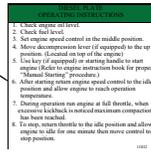


ENGINE OIL DRAIN  
15845

#15845



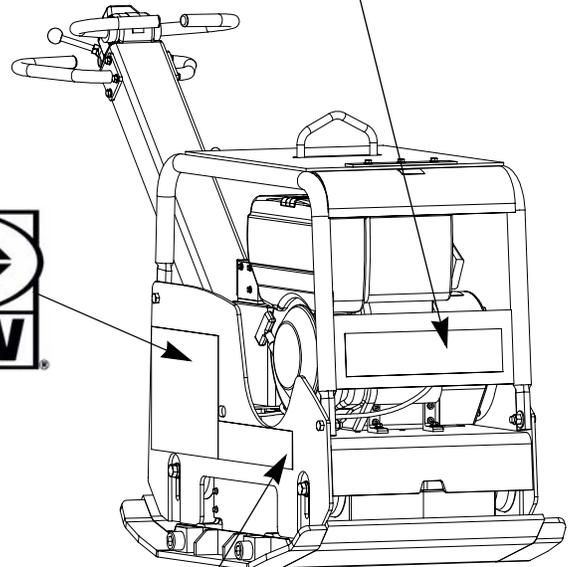
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GPR135

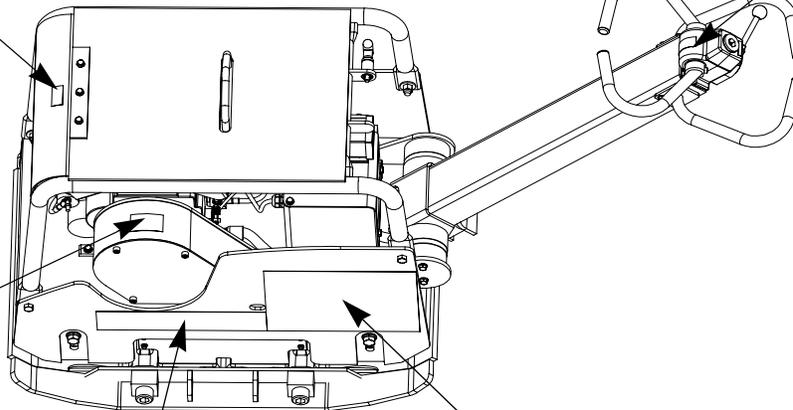
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#15853



#13484



GPR135

#15855

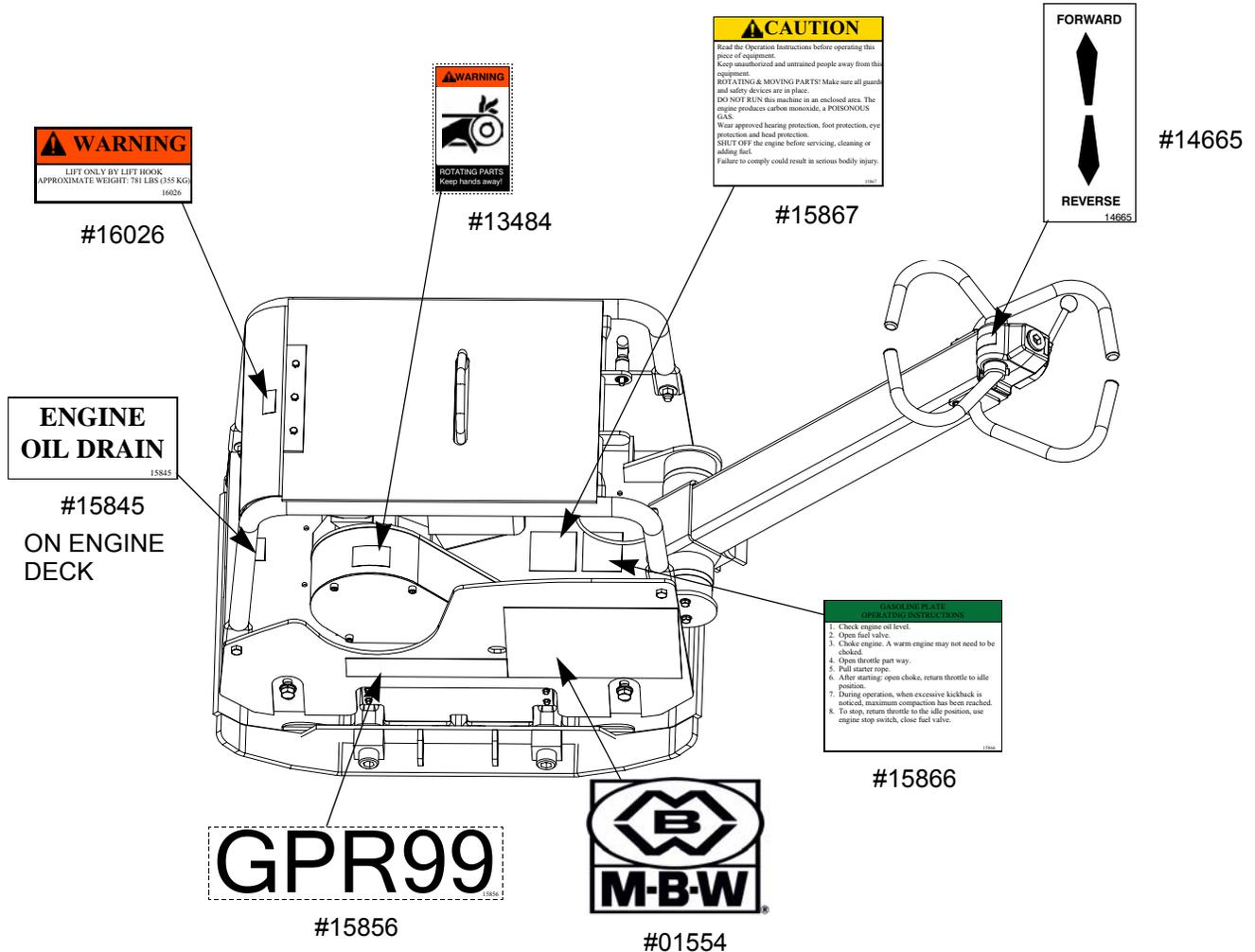
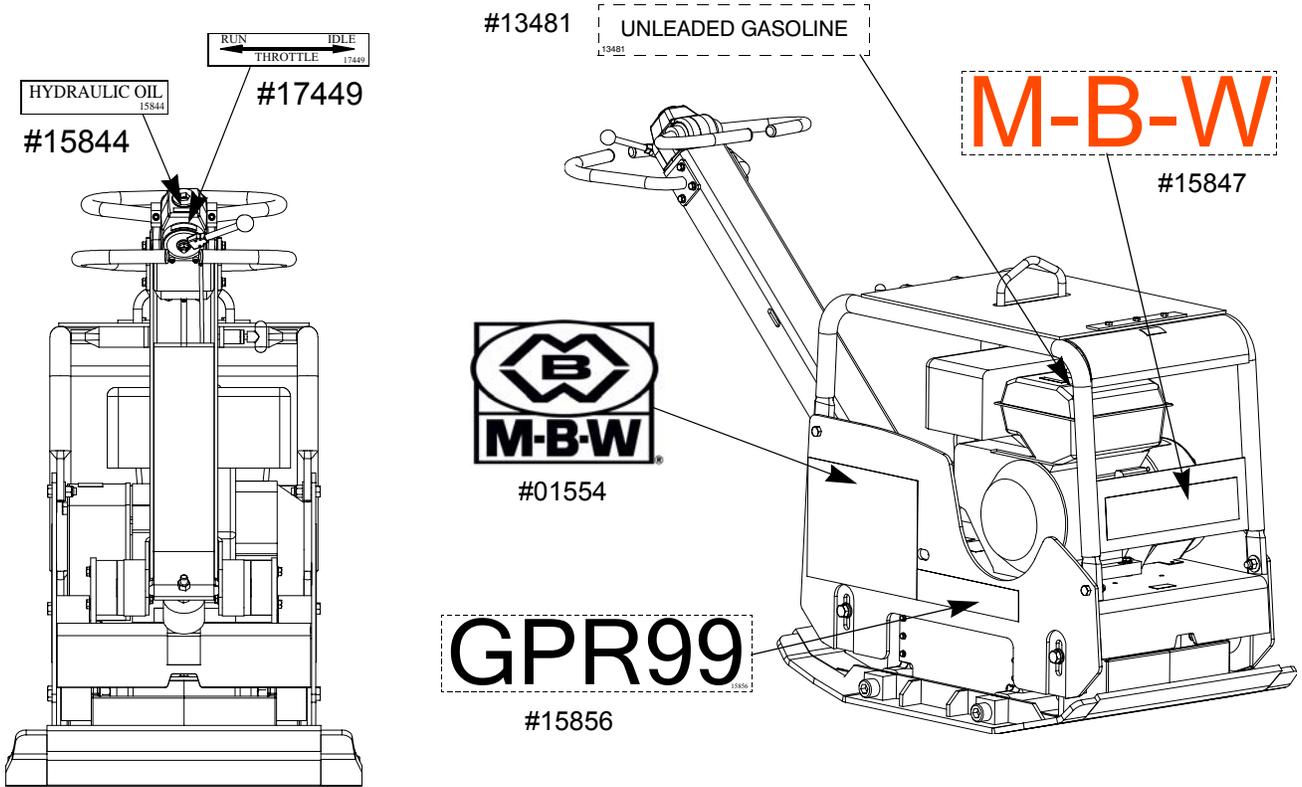


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#14665

# DECAL LOCATIONS GPR99H



# OPERATING INSTRUCTIONS

## INTRODUCTION

MBW Inc. Compaction Equipment is intended for use in very severe applications. They are powered by four stroke engines and are available in different sizes and a selection of engines.

The MBW Reversible Plate Compactor is intended to compact various soils types. Recommended soil types include granular soils, gravel/sand mixtures, and semi-granular cohesive soils.

The MBW Reversible Plate Compactor is not recommended for use in cohesive soils nor for very hard surfaces such as concrete or asphalt.

This parts manual contains only standard or standard option parts. Variations of these parts as well as other special parts are not included. Contact your local MBW Inc. Distributor for assistance in identifying parts not included in this manual.

## BEFORE OPERATION

After receiving your new MBW Inc. Reversible Plate Compactor, inspect it for any visible damage done during shipment. Make sure the engine throttle works properly. Contact your nearest MBW Inc. Distributor if there are any problems.

Your new MBW Inc. Reversible Plate Compactor is shipped complete and ready for use.

**REMEMBER! It is the owner's responsibility for communicating information on the safe use and proper operation of this unit to the operators.**

- **Before operating, review related SAFETY PRECAUTIONS listed on page ii of this manual.**
- **Familiarize yourself with the operation of the equipment BEFORE starting the engine.**
- **Know how to STOP the equipment.**
- **Make sure hands, feet, and clothing are at a safe distance from any moveable parts prior to starting.**
- **OIL LEVEL-** Check the oil level in the engine. For more information see “Lubrication” under the respective engine's “Owner’s Manual” or the PERIODIC MAINTENANCE section of this manual.
- **AIR CLEANER-** Check to ensure element is in good condition and properly installed.
- **FUEL SUPPLY-** The engines on MBW Inc. Compaction equipment require an automotive grade of clean, fresh, diesel fuel or unleaded gasoline dependent on engine type. (See Engine “Owner’s Manual”)
- **FUEL FILTER-**If clogged or damaged, replace.

# OPERATING

## ENGINE

Refer to the engine manual for location of all controls and features.

## STARTING ENGINE

**For detailed instructions refer to the Engine Manual.**

1. When starting engine, THROTTLE MUST BE IN AN IDLE POSITION. Open fuel valve. Choke engine if necessary, (when starting a warm engine it may not be necessary to choke it).
2. Pull starter rope. After engine starts, the choke lever can be moved back to the open position. Let the engine warm up in the idle position for one or two minutes.

## STARTING DIESEL ENGINE

**For detailed instructions refer to the Engine Manual.**

1. When starting the engine, the THROTTLE LEVER ON THE HANDLE MUST BE IN AN IDLE POSITION.
2. Slowly pull the starter rope to its full extended length to open the decompression valve in the engine. Let the starter rope recoil completely and pull the starter rope quickly to start the engine. After the engine starts make sure the throttle lever is in the idle position. Let the engine warm up in the idle position for one or two minutes.

## RUNNING ENGINE

1. After the engine warms up, fully open throttle. The compactor will begin vibrating and moving in a forward direction. **Never leave compactor idling unattended.** The MBW Reversible Plate Compactor is designed to slowly move forward without application of the control lever. The number of passes needed to reach the compaction level desired will depend on soil type and moisture. Maximum compaction of the soil has been reached when excessive kickback is noticed in the compactor.

## STOPPING ENGINE

1. To stop the compactor from traveling forward return the engine throttle to idle position.
2. Whenever possible, it is recommended to let the engine idle before stopping.
3. Gas engines: Turn the switch on the engine to "STOP" position.  
Diesel engines: Move the throttle control to the "STOP" position.
4. Turn off the fuel valve where applicable.



STOP THE ENGINE BEFORE:

ADDING FUEL.

LEAVING EQUIPMENT UNATTENDED, EVEN IF ONLY FOR A MINUTE.

MAKING ANY REPAIRS OR ADJUSTMENTS TO UNIT.

# MAINTENANCE SCHEDULE

System	Maintenance	Each Use	Every 50 Hours	Every 100 Hours	Every 250 Hours	Yearly
<b>Engine</b>	Refer to engine operator/owner manual	x				
	Clean cooling fins		x			x
<b>Belt</b>	Check for wear and retighten <sup>1</sup>			x		
<b>Exciter</b>	Check for oil leaks	x				
	Change oil				x	x
	Tighten bolts <sup>1</sup>		x			x
<b>Hydraulics</b>	Check level and refill			x		
<b>Hardware</b>	Check and tighten as needed		x			x
<b>Shock Mounts</b>	Check for cracks or tears		x			x

1. To be done after the first 5 hours, then do as shown in the maintenance schedule.

## FLUID LEVELS

System	Fluid Volume	Recommended Brand
<b>Engine Oil</b>	Refer to engine operator/owner manual	Refer to engine operator/owner manual
<b>Exciter Oil</b>		
GPR99	48 oz. (0.95 Liter)	MBW Inc. Ground Pounder <sup>®</sup> Exciter Oil
GPR135	48 oz. (0.95 Liter)	MBW Inc. Ground Pounder <sup>®</sup> Exciter Oil
<b>Hydraulic Oil</b>		
GPR99	8 oz. (.24 Liter)	CHEVRON AW ISO32 OR RYKON 32
GPR135	8 oz. (.24 Liter)	CHEVRON AW ISO32 OR RYKON 32

# SPECIFICATIONS

Specifications	GPR99H	GPR135DE
<b>Machine Data:</b>		
Operating Weight	814 lb (369 kg)	925 lb (420 kg)
Drive System	Mechanical w/V-belt	Mechanical w/V-belt
Starter System	Recoil	Electric w/Recoil
Fuel Capacity	1.72 gal (6.5 liters)	1.32 gal (5 liters)
Base Plate Width	19.7 in (480 mm)	19.7 in (480 mm)
Base Plate Length (Overall)	37.2 in (945mm)	37.2 (945 mm)
Extensions	2 x 3/6 in (2 x 75/150 mm)	2 x 3/6 in (2 x 75/150 mm)
<b>Performance:</b>		
Centrifugal Force	9900 lbf (44 kN/blow)	13500 lbf (60 kN/blow)
Exciter Speed	3840 vpm	3840 vpm
Travel Speed	78 ft/min (24m/min)	76 ft/min (23 m/min)
<b>Engine Data:</b>		
Engine Speed	3600 rpm	3600 rpm
Make	Honda	Hatz
Model	GX340	1B40
Fuel	Gas	Diesel
Power	11.0 HP	9.9 HP

Data in parenthesis ( ) are Metric Measurements  
Specifications are subject to change without notice.

# TROUBLESHOOTING

Symptom	Repair
<b>Engine does not start or stalls</b>	<ol style="list-style-type: none"> <li>1. No fuel in the tank.</li> <li>2. The fuel valve is closed (gasoline engines).</li> <li>3. On gasoline engines, the stop switch is not in the ON position.</li> <li>4. Fouled spark plugs (gasoline engines).</li> <li>5. Electric Start; battery charge low (recharge).</li> <li>6. Starter Motor defective or worn (replace).</li> <li>7. Defective ignition switch (replace).</li> </ol>
<b>Engine does not accelerate, is hard to start or runs erratically.</b>	<ol style="list-style-type: none"> <li>1. Improper fuel.</li> <li>2. Spark plug or injection nozzle fouled (clean).</li> <li>3. Fuel filter clogged (replace).</li> <li>4. Air cleaner dirty or clogged (replace).</li> </ol>
<b>Engine overheats or runs hot.</b>	<ol style="list-style-type: none"> <li>1. Cooling fins and blower are dirty (clean).</li> </ol>
<b>Engine runs at full speed but machine does not move.</b>	<ol style="list-style-type: none"> <li>1. Check the belt for excessive wear (replace).</li> <li>2. Centrifugal clutch worn (replace).</li> </ol>
<b>Engine runs but machine operates erratically.</b>	<ol style="list-style-type: none"> <li>1. Retension the belt (replace if needed).</li> <li>2. Centrifugal clutch worn (replace).</li> </ol>
<b>Forward speed too slow.</b>	<ol style="list-style-type: none"> <li>1. Too much oil in the hydraulic head (reduce).</li> <li>2. Improper adjustment of the control system (requires authorized <b>MBW</b> service).</li> </ol>
<b>Reverse speed too slow.</b>	<ol style="list-style-type: none"> <li>1. Not enough oil in the hydraulic head (fill).</li> <li>2. Air in control system (bleed).</li> <li>3. Improper adjustment of of the control system (requires authorized <b>MBW</b> service).</li> </ol>
<b>Plate vibrates but has no forward or reverse movement.</b>	<ol style="list-style-type: none"> <li>1. Mechanical failure (requires authorized <b>MBW</b> service).</li> </ol>
<b>Loss of hydraulic oil</b>	<ol style="list-style-type: none"> <li>1. Leaking hydraulic line connections (tighten / replace).</li> <li>2. Damaged hydraulic hose (replace).</li> <li>3. Seal on the piston in gearbox is worn / damaged (requires authorized <b>MBW</b> service).</li> </ol>

**NOTE: If the engine performance is poor or erratic, check, clean and replace the air filter and or the fuel filter as needed.**

# SERVICE

## ENGINE MAINTENANCE

Refer to the engine owner's manual for maintenance schedule.

## ENGINE SPEED

1. The engine should be set at an operating speed of 3600 rpm. Check the engine owner's manual for the procedure on setting the operating speed.
2. The idle speed of the engine must not exceed 1800 rpm. If the idle speed is greater the clutch may not disengage. Check the engine owner's manual for the procedure on setting the idle speed.

## BATTERY MAINTENANCE

The Odyssey battery is very different from standard liquid-acid batteries that are openly vented. The battery is, and operates as, a sealed battery, recycling all gases internally. There is no corrosion to the surrounding area. The battery is shipped fully charged from the factory, but prior to installation, check the battery's voltage to see if it is 12.65 volts or greater. If not, recharge it using the procedure below.

**Caution: Never attempt to remove the top decal cover, as it will cause the battery to fail.**

## BATTERY CHARGING

The state of charge in an Odyssey battery can be determined from the following chart:

Voltmeter Reading	State of Charge
12.84 Volts	100%
12.50 Volts	75%
12.18 Volts	50%
11.88 Volts	25%

To get long life from the Odyssey battery, it is important that the battery is kept near full charge, approximately 12.8 volts. If there are electrical loads during storage, then the negative battery cable should be disconnected or a Battery Tender trickle charger used. Low power 1.25 amp Battery Tenders will keep a fully charged battery fully charged but cannot recharge if the battery becomes discharged.

If a standard automotive charger is used to boost charge a discharged battery it is important to make sure the charging voltage does not exceed 15 volts during charge. A hand held voltmeter can be used to monitor this periodically. The following chart provides recharge times under this type of boost charging to an 80-95% recharge.

ODYSSEY	Charge time for 100% discharged battery (11.5 volts)	
Model	10-amp charger	20-amp charger
PC 925	2½ hours	1¼ hours

## MAIN DISASSEMBLY PROCEDURE (DIESEL ENGINE)

(Separating the Engine Deck from the Exciter subassembly)

**Reference the figure on page 28.**

1. Clean all visible debris from the machine before servicing.

2. Remove the four hex head capscrews (#29) securing the engine deck (#3) to the baseplate (#6). Use caution as the engine deck will drop down.

**Reference the figure on page 38 for steps 3 & 4.**

3. Remove the four socket head capscrews (#34) securing the belt guard (#14) to the mount plate (#22) on the engine (#19) and remove the beltguard.
4. Slide the belt (#3) off the clutch (#9).
5. Remove the two flange screws (#21) securing the bellows retainer (#19), and remove the retainer.
6. Push the lip of the bellows (#4) through the hole in the engine deck.
7. Disconnect the hydraulic line (#1) from the control head in the handle assembly. Keep the end of the hydraulic line and control head fitting free of dirt and debris by using tape. **Be careful to use a drain pan to catch the hydraulic oil.**
8. Use the main lift hook on the rollcage (#7) to separate the engine deck from the baseplate. If further disassembly of the engine deck is required proceed to step 9. If baseplate service is required refer to page 17.
9. Disconnect the throttle cable (#18) from the engine.
10. Remove the handle assembly by removing the four flange screws (#24) securing the handle mount (#5) to the engine deck. **Be careful to guide the hydraulic line through the handle assembly and engine deck as the subassemblies are separated to prevent damage to components.**
11. Remove the four hex head capscrews (#26) securing the rollcage to the engine deck and remove the rollcage.

**Reference the figure on page 38 for steps 12 thru 18.**

12. Disconnect the negative “black” battery cable (#12) from the engine mount bolt (#30).
13. Use electrical tape to enclose the terminal of the negative “black” battery cable to prevent “accidental discharge” of the battery.
14. Disconnect the positive “red” battery cable (#13) from the starter of the engine.
15. Use electrical tape to enclose the terminal of the positive “red” battery cable to prevent “accidental discharge” of the battery.
16. Remove the three 6mm bolts (#36) securing the ignition box to the mount (#18).
17. Remove the four hex head flange screws (#31) securing the battery box (#16) to the engine deck, and remove the battery box, mount bars (#4) and battery cables.
18. Remove the four hex head capscrews (#30) securing the engine to the engine deck and remove the engine.

## MAIN DISASSEMBLY PROCEDURE (GASOLINE ENGINE)

(Separating the Engine Deck from the Exciter subassembly)

**Reference the figure on page 28.**

1. Clean all visible debris from the machine before servicing.
2. Remove the four hex head capscrews (#29) securing the engine deck (#3) to the baseplate (#6).

**Use caution as the engine deck will drop down.**

**Reference the figure on page 36 for steps 3 & 4.**

3. Remove the four socket head capscrews (#12) securing the belt guard (#7) to the mount plate (#9) on the engine (#2) and remove the beltguard.
4. Slide the belt (#3) off the clutch (#4).
5. Remove the two flange screws (#21) securing the bellows retainer (#19), and remove the retainer.
6. Push the lip of the bellows (#4) through the hole in the engine deck.
7. Disconnect the hydraulic line (#1) from the control head in the handle assembly. Keep the end of the hydraulic line and control head fitting free of dirt and debris by using tape . **Be careful to use a drain pan to catch the hydraulic oil.**
8. Use the main lift hook on the rollcage (#7) to separate the engine deck from the baseplate. If further disassembly of the engine deck is required proceed to step 9. If baseplate service is required refer to page 17.
9. Disconnect the throttle cable (#18) from the engine.
10. Remove the handle assembly by removing the four flange screws (#24) securing the handle mount (#5) to the engine deck. **Be careful to guide the hydraulic line through the handle assembly and engine deck as the subassemblies are separated to prevent damage to components and personal injury.**
11. Remove the four hex head capscrews (#26) securing the rollcage to the engine deck and remove the rollcage.
12. Remove the four hex head capscrews (page 36, #11) securing the engine to the engine deck and remove the engine.

## BELT ADJUSTMENT

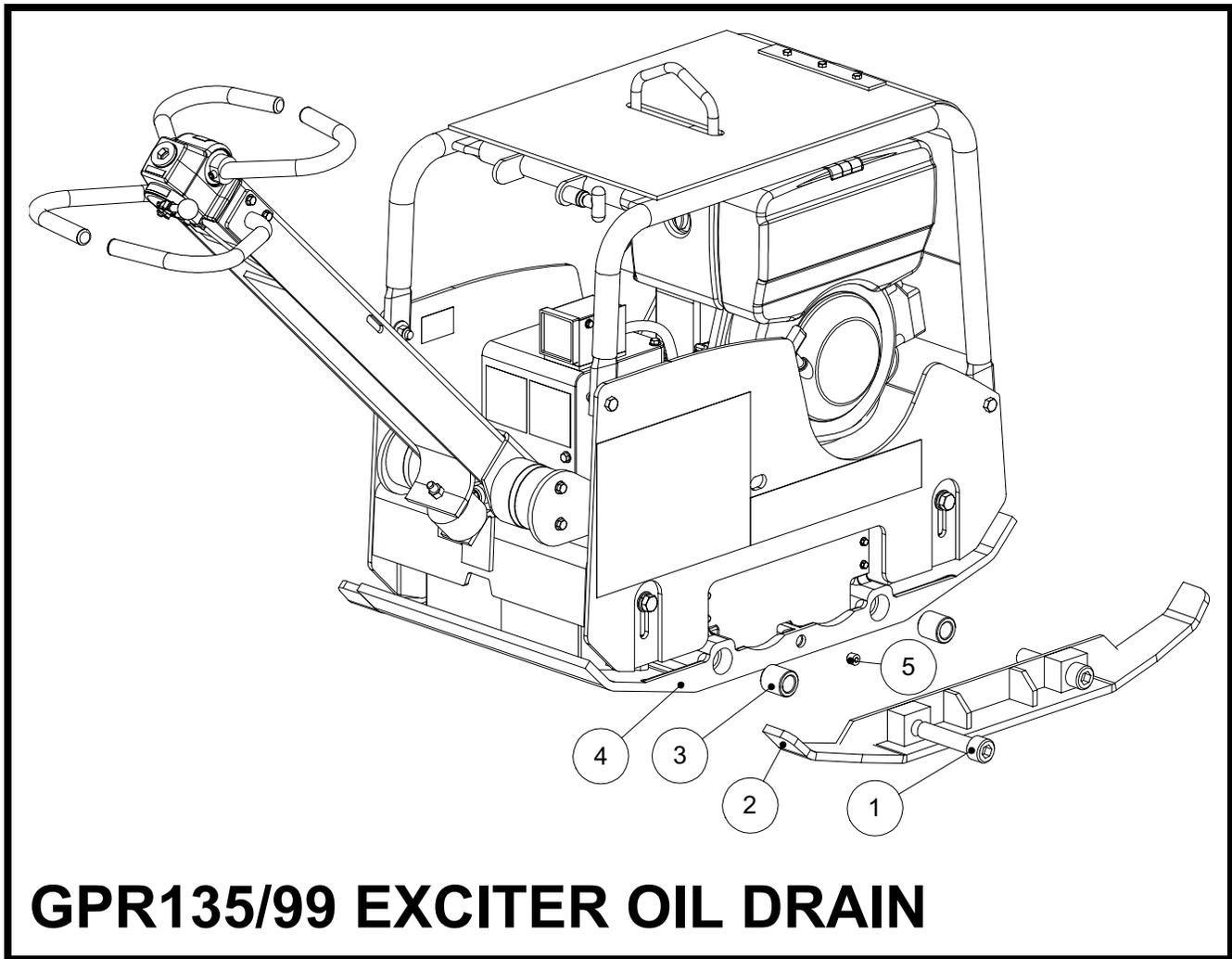
**Reference the figure on page 28.**

1. Remove the belt guard (for gas engine refer to page 36, #7; for diesel engine refer to page 38, #14).
2. Loosen (**do not remove**) the four hex head capscrews (#29) securing the engine deck (#3) to the baseplate (#6).
3. Retension the belt by lifting the engine deck to provide 3/8 - 3/4 inch of "play" on one side of the belt. **Be sure to keep the engine deck level with the baseplate when retensioning the belt.**
4. Retighten the four hex head capscrews.
5. Reinstall the beltguard.

## EXCITER OIL CHANGE PROCEDURE

Reference the drawing below.

1. If installed; remove the two (2) 1" socket head capscrews (#1) and bushings (#3) securing the baseplate extensions (#2) to the baseplate (#4) from the recoil/oil drain side of the baseplate.
2. Tilt the plate toward a drain pan to aid in the removal of all used oil and particles.
3. Remove the socket head pipe plug (#5) from the baseplate and drain the oil. **Examine the oil for metal chips as a precaution to future troubles.**
4. Tip the plate opposite the drain hole, and fill the baseplate subassembly through the pipe plug opening. Use only MBW Ground Pounder<sup>®</sup> Exciter Oil (Oil can be purchased from your local MBW Distributor) (See page 8 for amount of oil to be used.)
5. Reinstall the socket head pipe plug using sealant (LOCTITE #565 ).
6. If equipped, reinstall the bushings and baseplate extension using antisieze lubricant (LOCTITE #767).



### GPR135/99 EXCITER OIL DRAIN

## LOWER HYDRAULIC SEAL REPLACEMENT

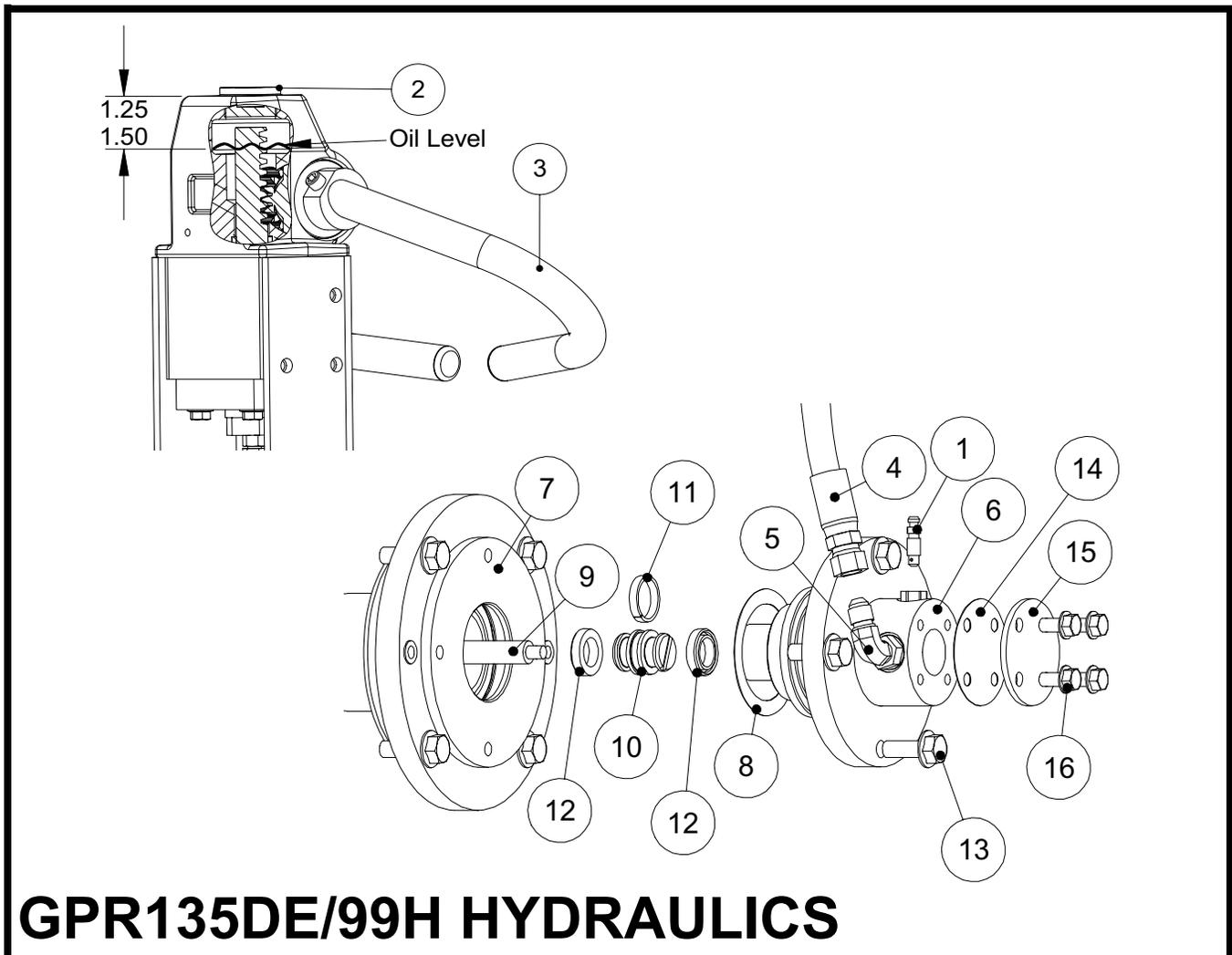
Reference the figure on page 16.

1. **Note: The seals (#12), guide ring (#11), and gaskets (#8 and #14) should be replaced as a set. MBW recommends purchasing rebuild kit #17368 for ease of repairs (Seals are pre-assembled to the spool).**
2. Position the handle in locked position and set the lock pin.
3. Remove the six flange screws securing the side cover to the recoil/oil drain side of the baseplate. Loosen hex head bolts (page 28, #29) on the oil drain side only. Lift the engine deck up to allow the side cover to be removed.
4. Remove the pipe plug (#2) from the control head housing.
5. Remove the hydraulic line (#4) from the 90 degree fitting (#5) on the hydraulic housing. **Be careful to use a drain pan to catch the hydraulic oil.**
6. Remove the 90 degree fitting (#5) from the hydraulic housing.
7. Remove the four flange screws (#13) securing the hydraulic housing and cylinder mount plate (#6) to the input shaft cover (#7) and remove the hydraulic housing.
8. Remove the shift spool (#10) from the shift shaft (#9) by sliding the shift spool out of the baseplate and holding it secure while unthreading the shift spool. **NOTE: This connection is left hand thread.**
9. If you purchased the **rebuild kit (MBW Part Number 17368)** go to step #12.
10. Remove the seal guide ring (#11) from the shift spool.
11. Remove the damaged or worn seals (#12) from the shift spool. **Note the orientation of the sealing lips of the seals to be replaced. Be careful not to scratch the inner diameter sealing surface of the shift spool when removing the seals.**
12. Remove the four flanged capscrews (#16), the cylinder cover (#15) and the cylinder gasket (#14). **Be sure to remove all of the gasket pieces from the hydraulic housing to provide a good seal surface for the new gasket.**
13. Remove the bleeder screw (#1) from its port on the hydraulic housing. Thoroughly clean and inspect the bleeder screw for damage. Replace if needed.
14. Clean and inspect the shift spool and the hydraulic housing.
15. Reinstall the bleeder screw into its port in the hydraulic housing (#6).
16. Install the new cylinder gasket (#14), the cylinder cover (#15) and the four flanged capscrews (#16).
17. Remove all mount gasket material (#8) from the input shaft cover (#7). **Be careful to keep debris and gasket pieces from entering the exciter assembly when cleaning the cover.**
18. If you purchased the **rebuild kit (MBW Part Number 17368)** go to step #20.
19. Assemble the new seals (#12) to the shift spool (#10). **Note the orientation of the seal lips. Hint: use hydraulic oil to lubricate the seal inner diameter before pressing onto the spool. Beware the slot cut on the shift spool it may be sharp. Press the seal on "WITH" the slot and NOT "ACROSS" the slot.**
20. Assemble the new guide ring (#11) to the shift spool (#10).
21. Thread the shift spool (#10) onto the shift shaft (#9). **Note the left hand thread.**
22. Install a new mount gasket (#8) on the hydraulic housing (#6).
23. Guide the hydraulic housing over the shift spool seals and guide ring and secure the cylinder mount plate to the input shaft cover using the four flange screws removed in step 5 using LOCTITE #243 on the screw threads. **Note: Tighten the screws in a criss-cross pattern, tighten evenly.**
24. Reinstall the 90 degree fitting (#5) into the hydraulic housing.
25. Clean and reattach the hydraulic line (#4) to the 90 degree fitting (#5) on the hydraulic housing. **Be sure the hydraulic line does not bind in the grommet. Loosen and rotate the hydraulic fitting (#5) and rotate it as required.**
26. **Follow the steps for bleeding and adjusting the hydraulic controls on page 16.**
27. **Follow the steps for changing the exciter oil on page 14.**
28. Reinstall the side cover removed in step 2 using LOCTITE #243 on the screw threads.

## BLEEDING AND ADJUSTMENT OF HYDRAULIC CONTROLS

Reference the figure on page 16.

1. Remove the six flange screws securing the side cover to the recoil/oil drain side of the baseplate. Loosen hex head bolts (page 28, #29) on the oil drain side only. Lift the engine deck up to allow the hydraulic guard to be removed.
2. Check the hydraulic line (#4) for loose fittings and tighten as needed.
3. Position the handle in the locked position and set the lock pin.
4. Remove the pipe plug (#2) from the control head.
5. Loosen the bleeder screw (#1) located at the hydraulic control housing of the exciter.
6. Fill the control head with hydraulic fluid (see page 8 for fluid type and amount).
7. Place a drip pan or shop rag below the bleeder to catch any excess oil.
8. Slowly operate the control handle (#3) from the forward to the reverse position while watching the bleeder screw hole for air bubbles. If no air bubbles are seen hold the control handle in the reverse position and tighten the bleeder. If air bubbles are still present at the end of the stroke, refill the control head with hydraulic oil and repeat this procedure.
9. After the air bubbles have been removed, tighten the bleeder screw (#1) and adjust the hydraulic oil level in the control head by pushing the shift handle to the forward position and then pulling it into the reverse position until it stops. Repeat this procedure two times.
10. With the shift lever in the forward position and the handle in the locked position (as shown) oil level should be about 1-1/4" to 1-1/2" from top of control head.
11. Reinstall the pipe plug (#2).
12. Reinstall the side cover removed in step 1 using LOCTITE #243 on the screw threads.



## GPR135DE/99H HYDRAULICS

## BASEPLATE DISASSEMBLY PROCEDURE

Reference the Main Disassembly Procedure on page 11 (diesel) or page 13 (gasoline) to separate the engine deck from the exciter subassembly .

Reference the main assembly figure on page 28.

1. Remove the four socket head capscrews (#34), extension plates (#11) and bushings (#12) (if equipped) from the sides of baseplate (#6).
2. Remove the twelve hex head flange screws (#20) securing the side covers (#15) to the baseplate.
3. Remove the four hex head flange screws (#21) securing the bellows mounts (#17) to the baseplate and remove the bellows mounts and bellows (#4).
4. Disconnect the hydraulic line (#1) from the hydraulic fitting.
5. Remove the four hex head flange screws (#20) securing the hydraulic guard (#16) to the baseplate and remove the hydraulic guard and hydraulic line from the baseplate.

Reference the baseplate assembly figure on page 30.

6. Remove the hex head flange screw (#22) and washer (#14) securing the pulley (#19) to the input shaft (#16) and remove the pulley.
7. Remove the twenty hex head flange screws (#22) securing the baseplate cover (#13) to the baseplate (#15) and remove the baseplate cover.
8. Remove the oil drain plug (#25) and completely drain the exciter oil into a drain pan. **Examine the oil for metal chips as a precaution to future troubles.**
9. **Note the position of the gear timing marks.**
10. Remove the socket head capscrews (#24) securing the exciter weights (#17) to the shafts and remove the exciter weights.
11. Place a shop rag under the hydraulic housing (page 34, #16) to catch the oil and remove the four flange screws (page 34, #22) securing the cylinder mount plate (page 34, #20) to the input shaft cover (page 34, #12) and remove the hydraulic housing from the baseplate.
12. Remove the 90 degree hydraulic port fitting (page 34, #13).
13. Remove the four hex head flange screws (page 34, #21) securing the cylinder cover (page 34, #19) to the hydraulic housing and remove the cylinder cover and gasket (page 34, #18).
14. Remove the shift spool (page 34, #15) from the shift shaft (page 34, #10) by sliding the shift spool out of the baseplate and holding it secure while unthreading the shift spool. **NOTE: This connection is left hand thread.**
15. Remove the plastic plugs (#1) from the threaded holes in the shaft covers (#7, #9, #18 and page 34, #12). This can be done using a #2 phillips screwdriver lightly tapped into the center of the plug and unthreading it as a screw.
16. Clean all dirt from the threaded holes in the shaft covers which were not plugged and “chase” the threads with a 5/16-18 UNC thread tap.
17. Remove the covers from the idler shaft (#8) ends of the baseplate by removing the flange screws (#23) and using two 5/16-18 x 2” long screws to press off the covers by installing them into the threaded holes cleaned in the previous steps. **Turn both screws evenly to prevent binding of the cover in the bore.**
18. **Note: Make sure the bearings and their inner races are kept as a matched set.**
19. Remove the idler shaft (#8) and idler gear (#11) from the baseplate.
20. Press the inner bearing races from the ends of the idler shaft.
21. Press the idler gear off of the idler shaft and remove the key (#12).
22. Repeat steps 16 and 17 for the input shaft covers.
23. Remove the input shaft (#16) as an assembly from the baseplate.
24. Slide the input gear (#10) to one end of the input shaft and remove the helix pin (page 34, #11) from the input shaft and slide out the helix pin carrier (page 34, #9) as a subassembly.
25. Press the inner bearing races from the ends of the input shaft.

26. Slide the input gear off of the input shaft.
27. Remove the roller bearings (#4 and page 34, #2) from the shaft covers(#7, #9, #18 and page 34, #12) by removing two 5/16" flange head bolts (#21) from the covers and use a 1/4" x 2" long pin punch to "tap" the bearings out of the covers. **Alternate between the access holes evenly to prevent binding of the bearings in the covers.**
28. **Note: performance of the following steps will require replacement of the ball bearings (page 34, #3). M-B-W recommends replacement of these bearings as a set at every complete disassembly or rebuild.**
29. Remove the internal retaining ring (page 34, #8) from the helix pin carrier (page 34, #9) and remove the shift shaft (page 34, #10) and bearings (page 34, #3) as a subassembly from the carrier.
30. Remove the e-clip retaining ring (page 34, #5) securing the bearings to the shift shaft.
31. Secure the bearings in a vice and press out the shift shaft. **Note the position of spacer washer (page 34, #7).**

## **HANDLE DISASSEMBLY PROCEDURE**

**Reference the main assembly figure on page 28.**

1. Disconnect the hydraulic line (#1) from the fitting (page 32, #1) in control head of the handle. **Use a drain pan to catch the hydraulic oil.**
2. Disconnect the throttle cable (#18) from the engine.
3. Remove the two hex head flange screws (#21) securing the throttle lever (#14) to the handle and remove the throttle lever and throttle cable as a subassembly from the handle.
4. Remove the four hex head flange screws (#24) securing the handle mount to the engine deck (#3).
5. Remove the handle assembly from the main assembly.

**Reference the handle assembly figure on page 32.**

6. Remove the four flat head socket screws (#30) securing the spindle mounts (#21) to the shockmounts (#11).
7. Remove the four hex head flange screws (#33) securing the shockmounts to the handle (#22) from inside the tube.
8. Remove the two jam nuts (#32) securing the threaded rod (#10) to the handle and remove the handle bumper shockmount (#12) and threaded rod.
9. Remove the two socket head cap screws (#28) from the control handles (#18) and separate the control handles from the control head (#13).
10. Remove the six hex head flange screws (#27) securing the handle bars (#19 and #20) to the handle and remove the handlebars and the control head from the handle.

## CONTROL HEAD DISASSEMBLY PROCEDURE

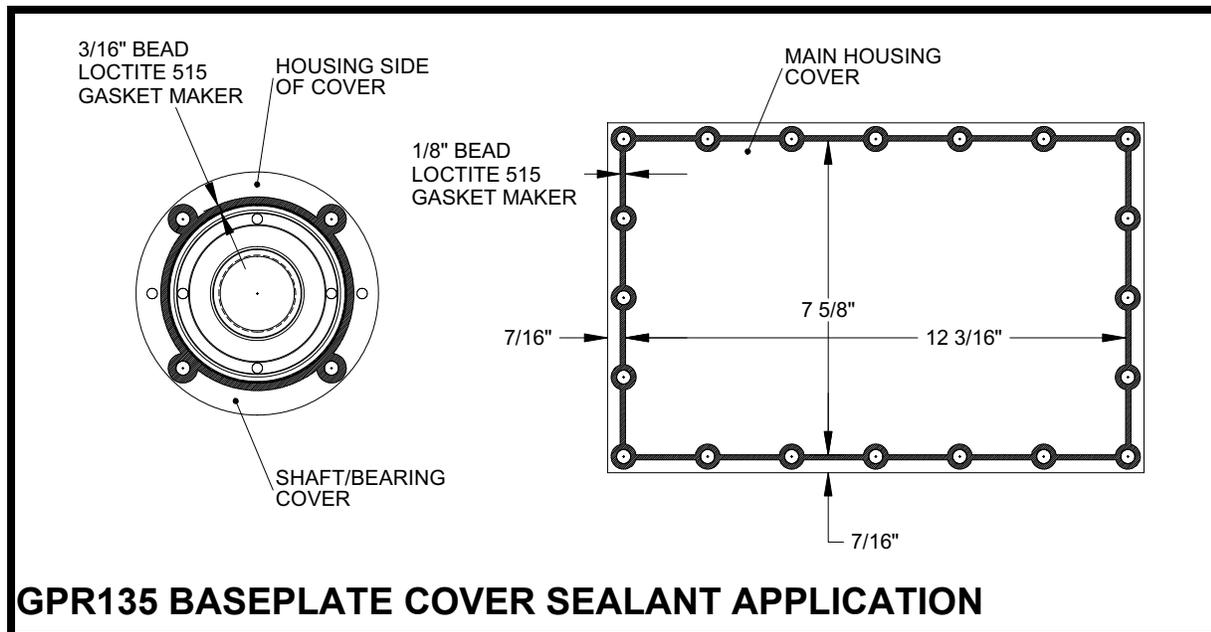
Reference the figure on page 32.

1. **Note the position of the threaded holes in the pinion shaft (#24).**
2. Remove the hydraulic fitting (#1) and the adapter fitting (#23) from the shaft guide housing (#16).
3. Remove the four hex head flange screws (#29) securing the shaft guide housing to the control head housing (#13). **Be sure to note the locations of the o'rings for assembly.**
4. Remove o'ring (#7) from the shaft guide housing.
5. Remove the pipe plug (#8) and seal washer (#9) from the control head housing.
6. Remove the external snap ring (#6) from the pinion shaft (#24).
7. Slide the pinion shaft out of the control housing. **Note the size and location of the o'rings for assembly.**
8. Remove the o'rings (#4 and #5) from the pinion shaft.
9. Slide the rack gear (#15), seal (#2) and guide ring (#3) out of the control head housing. **Note the orientation of the seal lip.**
10. Remove the hex head cap screw (#26) and washer (#31) from the rack gear (#15).
11. Remove the hydraulic seal (#2) from the rack gear. **Be careful to prevent scratching the seal mounting area of the rack gear.**
12. Use a 1/4" pin punch to drive the slide bushing (#14) out of the control head housing.

## BASEPLATE ASSEMBLY PROCEDURE

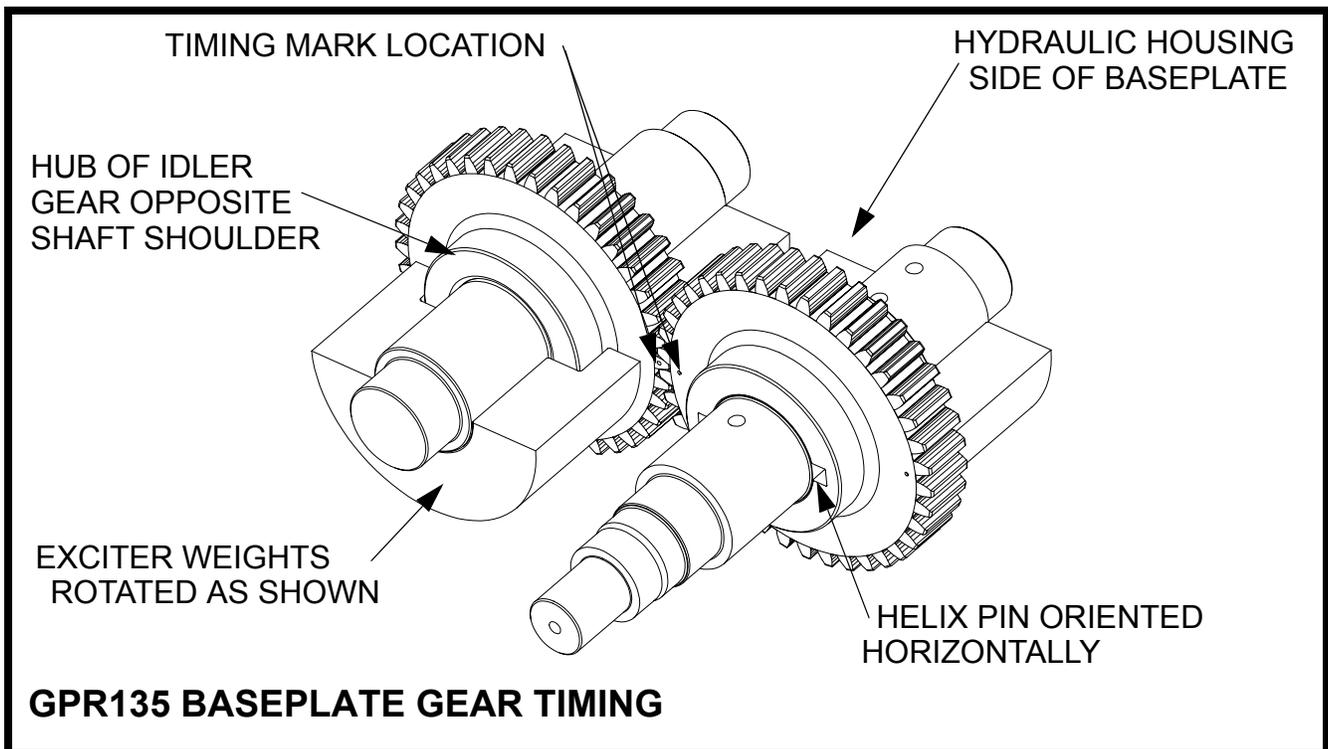
Reference the figure on page 30.

1. Clean all baseplate components.
2. **Note: Make sure the bearings and their inner races are kept as a matched set.**
3. Inspect all bearings, shafts, helix pin carrier and gears for wear, debris and discoloration from heat. Replace as needed. **Replace the roller bearings and the inner races on each shaft as a set (both bearings on the shaft) as needed. Replace the helix carrier ball bearings as a set at each complete disassembly or rebuild. Replace all seals and gaskets removed at each disassembly or inspection.**
4. Install the input shaft cover seal (#5) into cover (#9).
5. Press the roller bearings (#4 and page 34, #2) into all four of the covers (#7, #9, #18 and page 34, #12). **Note: Make sure the bearings and their inner races are kept as a matched set.**
6. Install the hex head flange screws (#21) into the shaft bearing covers using LOCTITE #243 thread locker sealant.
7. Install the plastic plugs (#1) in the threaded holes used to press the covers out of the baseplate.
8. Install the key (#12) into the idler shaft (#8).
9. Align the idler gear (#11) with the key and idler shaft and press the idler gear onto the idler shaft using exciter oil as a lubricant. **Reference the figure on page 21 for idler gear and shaft orientation.**
10. Press the bearing inner races onto the idler shaft/gear assembly. **The flanged end of the inner race goes toward the shoulder on the shaft.**
11. Place the idler shaft and gear assembly into the baseplate housing in the forward location. **Note: The housing is not symmetric. The input/pulley side of the housing has a pocket machined for the belt bellows. This pocket is to be oriented toward the front left side of the machine. The end of the idler shaft with the hole goes toward the front right side of the machine with the breather/cover (#18).**



12. Install the idler shaft covers (#7 on the pulley side, and #18 on the hydraulic side). Secure each cover with four hex head flange screws (#23) using LOCTITE #243 on the bolt threads and torque the flange screws to 13 ft-lbs. **See the figure on page 20 for LOCTITE #515 gasket maker application. Check idler shaft for minimum of .020" endplay after covers are installed and the bolts are torqued to specifications.**

13. Install the 90 degree fitting (#2) containing the roll pin (#20) into the bearing cover (#18) using LOCTITE #565 sealant on the threads. **Make sure the port for the breather faces the top of the baseplate housing.**
14. Install the breather (#3) into the 90 degree fitting.
15. Install the exciter weights (#17) on the idler shaft and secure with four socket head cap screws (#24) using LOCTITE #243 threadlocker sealant and torque the cap screws to 32 ft-lbs.
16. Press one bearing inner race onto one end of the input shaft (#16). **Note: Make sure the bearings and their inner races are kept as a matched set. The flange on the inner race goes toward the shoulder of the shaft.**
17. Install the input gear (#10) onto the input shaft and slide to the end with the bearing inner race.
18. Press the other bearing inner race onto the input shaft.
19. Install the input shaft subassembly into the baseplate with the keyed end toward the left side (pulley side) of the baseplate.
20. Install the pulley side shaft cover (#9), containing the shaft seal (#5) over the input shaft on the pulley side of the baseplate. **Lubricate the input shaft seal and bearing with exciter oil before inserting the input shaft through the oil seal in the cover to prevent tearing the seal.**
21. Secure the input shaft cover with the four flange head screws (#23) using LOCTITE #243 threadlocker sealant on the bolt threads and torque the capscrews to 13 ft-lbs. **See the figure on page 20 for LOCTITE #515 gasket maker application.**
22. Install the other input shaft cover (page 34, #12) and secure with the four flange head screws (page 34, #22) using LOCTITE #243 threadlocker sealant and torque the screws to 13 ft-lbs. **See the figure on page 20 for LOCTITE #515 gasket maker application. Check input shaft for minimum of .020" endplay after covers are installed and the bolts are torqued to specifications.**
23. Install one exciter weight (#17) to the input shaft on the hydraulic housing side of the baseplate with two socket head cap screws (#24) using LOCTITE #243 threadlocker sealant and torque the cap screws to 30 ft-lbs. **Be careful to use a small amount of threadlocker to avoid dripping it into the helix pin carrier bearings at installation.**



24. Slide the input gear (#10) toward the pulley side of the input shaft (#16). The gears should not be meshing at this time.
25. Install the ball bearings (page 34, #3) and the spacer washer (page 34, #7) onto the shift shaft (page 34, #10) and secure with the e-clip (page 34, #5).
26. Press the shift shaft and ball bearing assembly into the helix pin carrier (page 34, #9) and secure with the internal snapping (page 34, #8).
27. Lubricate the helix pin carrier/shift shaft assembly with exciter oil and slide it into the input shaft and install the dowel pin (page 34, #11).
28. Slide the helix pin/carrier to the middle of the helix and orient the dowel pin parallel with the bottom of the baseplate housing (#15).
29. Align the timing marks on both gears and slide the input gear over the helix pin/carrier and into mesh with the gear on the idler shaft. **See the illustration on page 21 for setting the gear timing.**
30. Install the other exciter weight (#17) to the input shaft with two socket head cap screws (#24) using LOCTITE #243 threadlocker sealant on the threads and torque the cap screws to 30 ft-lbs. **Be careful to use a small amount of threadlocker to avoid dripping it into the helix pin carrier bearings at installation.**
31. Check the gear timing to assure free motion of the shift shaft/helix pin carrier within the helix of the input shaft for the full range of motion from one end of the helix to the other.
32. **Note: The seals (page 34, #6), guide ring (page 34, #4), and gaskets (page 34, #17 and #18) should be replaced as a set. MBW recommends purchasing rebuild kit #17368 for ease of repairs (Seals are pre-assembled to the spool).**
33. If rebuild kit #17368 was purchased, skip to step #35.
34. Assemble the new seals (page 34, #6) to the shift spool (page 34, #15). **Note the orientation of the seal lips. Hint: use hydraulic oil to lubricate the seal inner diameter before pressing onto the spool. Beware the slot cut on the shift spool. It may be sharp. Press the seal on "WITH" the slot and NOT "ACROSS" the slot.**
35. Thread the shift spool with seals onto the shift shaft (page 34, #10). **Note the left hand thread.**
36. Assemble the new guide ring (page 34, #4) to the shift spool.
37. Install a new mount gasket (page 34, #17) onto the hydraulic housing (page 34, #16).
38. Lubricate the inside of the hydraulic housing and the seal lips with hydraulic oil. **See page 8 for hydraulic fluid type.**
39. Install the hydraulic housing over the hydraulic seals and guide ring. **Be careful not to damage the guide ring and hydraulic seals during installation.**
40. Secure the mount plate (page 34, #20) over the hydraulic housing (page 34, #16) to the input shaft cover (page 34, #12) with the four flanged cap screws (page 34, #22) using LOCTITE #243 threadlocker sealant on the threads and torque the cap screws evenly in stages to 13 ft-lbs. **Make sure the bleeder screw port (page 34, #14) is in the vertical position.**
41. Install the gasket (page 34, #18) and cover (page 34, #19) to the hydraulic housing with four hex head flange screws (page 34, #21) using LOCTITE #243 threadlocker sealant on the threads and torque the cap screws to 76 in-lbs.
42. Install the 90 degree fitting (page 34, #13) into the port on the hydraulic housing.
43. Install the bleeder screw (page 34, #14) loosely into the port fitting of the hydraulic housing.
44. Install the socket head pipe plug (#25) into the oil drain port using LOCTITE #565 pipe sealant.
45. Pour in the exciter oil. **Use only MBW Ground Pounder® Exciter Oil. The amount of exciter oil required is shown in the FLUID LEVELS section of this manual on page 8.**
46. Install the baseplate cover (#13) using LOCTITE #515 gasket maker on the lip of the mounting surface and secure with twenty hex head flange screws (#22) using LOCTITE #243 on the threads. **See the figure on page 20 for LOCTITE #515 gasket maker application.**
47. Install the key (#6) into the input shaft (#16).
48. Install the pulley (#19) with the longer hub shoulder toward the baseplate housing.

49. Install the pulley mount washer (#14) and secure it to the input shaft with the hex head flange screw (#22) using LOCTITE #243 threadlocker sealant on the threads.

**Reference the figure on page 28 for further assembly.**

50. Install the v-belt (page 36, #3; or page 38, #3) to the pulley of the baseplate assembly.

51. Install the side cover (#15) on the pulley side of the baseplate housing and secure with six hex head flange screws (#20) using LOCTITE #243 thread locker sealant.

52. Install the bellows (#4) into the bellows mount plate (#17) and secure it to the baseplate with four hex head flange screws (#21).

53. Connect the hydraulic line (#1) to the 90 degree fitting on the hydraulic housing.

54. Install the grommet (#2) into the hydraulic guard (#16).

55. Guide the hydraulic line through the grommet in the hydraulic guard and secure the guard to the hydraulic side of the baseplate with the four hex head flange screws (#20). **Set the side cover off to the side until bleeding and final assembly is done. The exciter is now ready for final assembly.**

56. If required, install the bushings (#12), extension plates (#11), and 1" socket head cap screws (#34) to the sides of baseplate housing using LOCTITE #767 antiseize compound on the bushings and bolt threads.

## CONTROL HEAD ASSEMBLY PROCEDURE

**Reference the figure on page 32.**

1. Clean and dry all parts to be assembled.

2. Press the slide bushing (#14) into the control housing (#13).

3. Press the hydraulic seal (#2) onto the rack gear (#15). **Be careful to orient the seal lip to face the shaft guide housing (#16). Tip: Use approved hydraulic oil to lubricate the seal inside diameter to ease assembly. See page 8 for type of hydraulic oil.**

4. Assemble the hex head cap screw (#26) and washer (#31) to the rack gear using LOCTITE #243 threadlocker sealant on the threads.

5. Install the o'ring (#7) onto the shaft guide housing.

6. Install the guide ring (#3) onto the rack gear.

7. Lubricate the inside of the shaft guide housing and the rack gear subassembly with hydraulic oil. **See page 8 for hydraulic fluid type.**

8. Slide the rack gear subassembly into the shaft guide housing until the guide ring is fully inserted into the shaft guide housing.

9. Slide the shaft guide housing/rack gear subassembly into the control housing while guiding the rack gear into the slide bushing.

10. Secure the shaft guide housing to the control housing with the four hex head flange screws (#29) using LOCTITE #243 threadlocker sealant on the threads and torque the cap screws to 13 ft-lbs.

11. Push the rack gear toward the pipe plug end of the control housing until it is approximately 0.90" from the end of the control housing. **Note: this measurement is approximate.**

12. Install the o'rings (#4 and #5) on the pinion gear (#24). **Tip: Use hydraulic oil to lubricate the o'rings to ease assembly.**

13. Slide the pinion gear with seals into the control housing. **Note the positions of the rack gear and the pinion gear and align as shown, use care when meshing the gears.**

14. Install the external snap ring (#6) onto the pinion gear shaft.

15. Install the hydraulic adapter (#23) into the shaft guide housing using hydraulic oil as a seal lubricant.

16. Install the hydraulic fitting (#1) into the hydraulic adapter using hydraulic oil as a seal lubricant.

17. Install the pipe plug (#8) and the sealing washer (#9) into the control housing all the way, but do not tighten.

## **HANDLE ASSEMBLY PROCEDURE**

### **Reference the figure on page 32.**

1. Install the control head assembly into the handle tube (#22) and secure the handlebars (#19 and #20) to the handle and control head with the four hex head flange screws (#27) using LOCTITE #243 threadlocker sealant on the threads.
2. Slide the two control handles (#18) onto the control head and secure them with the two socket head cap screws (#28) using LOCTITE #243 threadlocker sealant on the threads.
3. Thread one hex nut (#32) onto the threaded rod (#10).
4. Install the threaded rod into the handle and thread on the other jam nut.
5. Thread the handle bumper shockmount (#12) onto the threaded rod and secure it with the hex nut.
6. Connect the shockmounts (#11) to the handle from inside the tube with four 8mm hex head flange screws (#33) using LOCTITE #243 threadlocker sealant on the threads.
7. Secure the spindle mounts (#21) to the shockmounts with four 8mm flat head socket screws (#34) using LOCTITE #243 threadlocker sealant on the threads.

### **Reference the figure on page 28.**

8. Install the handle mounts (#5) onto the handle assembly.
9. Route the hydraulic line (#1) through the handle tube.
10. Secure the handle assembly to the engine deck with four hex head flange screws (#24).
11. Secure the hydraulic line to the hydraulic control head fitting.
12. Bleed the hydraulics according to the procedures on page 16.

## **FINAL ASSEMBLY**

### **Reference the figure on page 28.**

1. Lower engine assembly onto baseplate. Use care to route hydraulic hose through engine deck and up handle tube.
2. Install four bolts (#29), lockwashers (#31) and washers (#32) through the engine deck into the shockmounts on the baseplate.
3. Refer to Belt Adjustment on page 13, and to Bleeding and Adjustment of Hydraulic Controls on page 16 to complete assembly.

# REPLACEMENT

<u>Part</u>	<u>Tolerance or Replacement Cycle</u>
<b>Engine Components</b>	Refer to your authorized engine dealer
<b>Bearings</b>	<b>Replace anytime</b> a bearing is rough, binding or discolored.
<b>Clutch</b>	Replace clutch if it does not disengage the exciter below 1800 rpm or engage above 1800 rpm. (The clutch is not serviceable so it must be replaced as an assembly)
<b>Exciter Oil</b>	Replace once every season or every 250 hours. Use Only <b>MBW Ground Pounder<sup>®</sup> Exciter Oil.</b>
<b>Hardware</b>	Re-torque all bolts after the first eight hours of operation and check <b>every 50 hours.</b> All hardware is zinc plate, grade 5 unless otherwise specified.
<b>Safety Decals</b>	Replace if they become damaged or illegible.
<b>Seals and Gaskets</b>	<b>Replace at every overhaul or teardown.</b>
<b>Special MBW Tools and Kits</b>	

#01058 6-Pack (8 oz bottles) Ground Pounder<sup>®</sup> Exciter Oil

#17320 1 quart (32 oz) Ground Pounder<sup>®</sup> Exciter Oil

#01469 1 gallon (U.S.) Ground Pounder<sup>®</sup> Exciter Oil

#16031 DECAL SET, HYD REV PLATE

#17337 KIT, EXT, PLATES, GPR135/99 (2X3")(2X76mm)

#17338 KIT, EXT, PLATES, GPR135/99 (2X6")(2X152mm)

#17368 KIT,REBUILD,HYD,LOWER,GPR135/99

#17369 KIT,REBUILD,HYD,UPPER,GPR135/99

# TORQUE CHART

## APPROXIMATE TIGHTENING TORQUE

<u>SIZE</u>	<u>GRADE 2</u>	<u>GRADE 5</u>	<u>GRADE 8</u>
#10-24	21 in·lbs	32 in·lbs	45 in·lbs
#10-32	23 in·lbs	36 in·lbs	51 in·lbs
1/4-20	49 in·lbs	76 in·lbs	9 ft·lbs
1/4-28	56 in·lbs	87 in·lbs	10 ft·lbs
5/16-18	8 ft·lbs	13 ft·lbs	18 ft·lbs
5/16-24	9 ft·lbs	14 ft·lbs	20 ft·lbs
3/8-16	15 ft·lbs	23 ft·lbs	33 ft·lbs
3/8-24	17 ft·lbs	26 ft·lbs	37 ft·lbs
7/16-14	24 ft·lbs	37 ft·lbs	52 ft·lbs
7/16-20	27 ft·lbs	41 ft·lbs	58 ft·lbs
1/2-13	37 ft·lbs	57 ft·lbs	80 ft·lbs
1/2-20	41 ft·lbs	64 ft·lbs	90 ft·lbs
9/16-12	53 ft·lbs	82 ft·lbs	115 ft·lbs
9/16-18	59 ft·lbs	82 ft·lbs	129 ft·lbs
5/8-11	73 ft·lbs	112 ft·lbs	159 ft·lbs
5/8-18	83 ft·lbs	112 ft·lbs	180 ft·lbs
3/4-10	129 ft·lbs	223 ft·lbs	282 ft·lbs
3/4-16	144 ft·lbs	200 ft·lbs	315 ft·lbs
7/8-9	125 ft·lbs	322 ft·lbs	454 ft·lbs
7/8-14	138 ft·lbs	355 ft·lbs	501 ft·lbs

## APPROXIMATE TIGHTENING TORQUE

<u>SIZE</u>	<u>GRADE 2</u>	<u>GRADE 5</u>	<u>GRADE 8</u>
1-8	188 ft·lbs	483 ft·lbs	682 ft·lbs
1-12	205 ft·lbs	529 ft·lbs	746 ft·lbs
1-14	210 ft·lbs	541 ft·lbs	764 ft·lbs
1-1/8-7	266 ft·lbs	596 ft·lbs	966 ft·lbs
1-1/8-12	297 ft·lbs	668 ft·lbs	1083 ft·lbs
1-1/4-7	375 ft·lbs	840 ft·lbs	1363 ft·lbs
1-1/4-12	415 ft·lbs	930 ft·lbs	1509 ft·lbs
1-3/8-6	491 ft·lbs	1102 ft·lbs	1787 ft·lbs
1-3/8-12	559 ft·lbs	1254 ft·lbs	2034 ft·lbs
1-1/2-6	652 ft·lbs	1462 ft·lbs	2371 ft·lbs
1-1/2-12	734 ft·lbs	1645 ft·lbs	2668 ft·lbs
M 6	3 ft·lbs	4 ft·lbs	7 ft·lbs
M 8	6 ft·lbs	10 ft·lbs	18 ft·lbs
M 10	10 ft·lbs	20 ft·lbs	30 ft·lbs

### CONVERSIONS

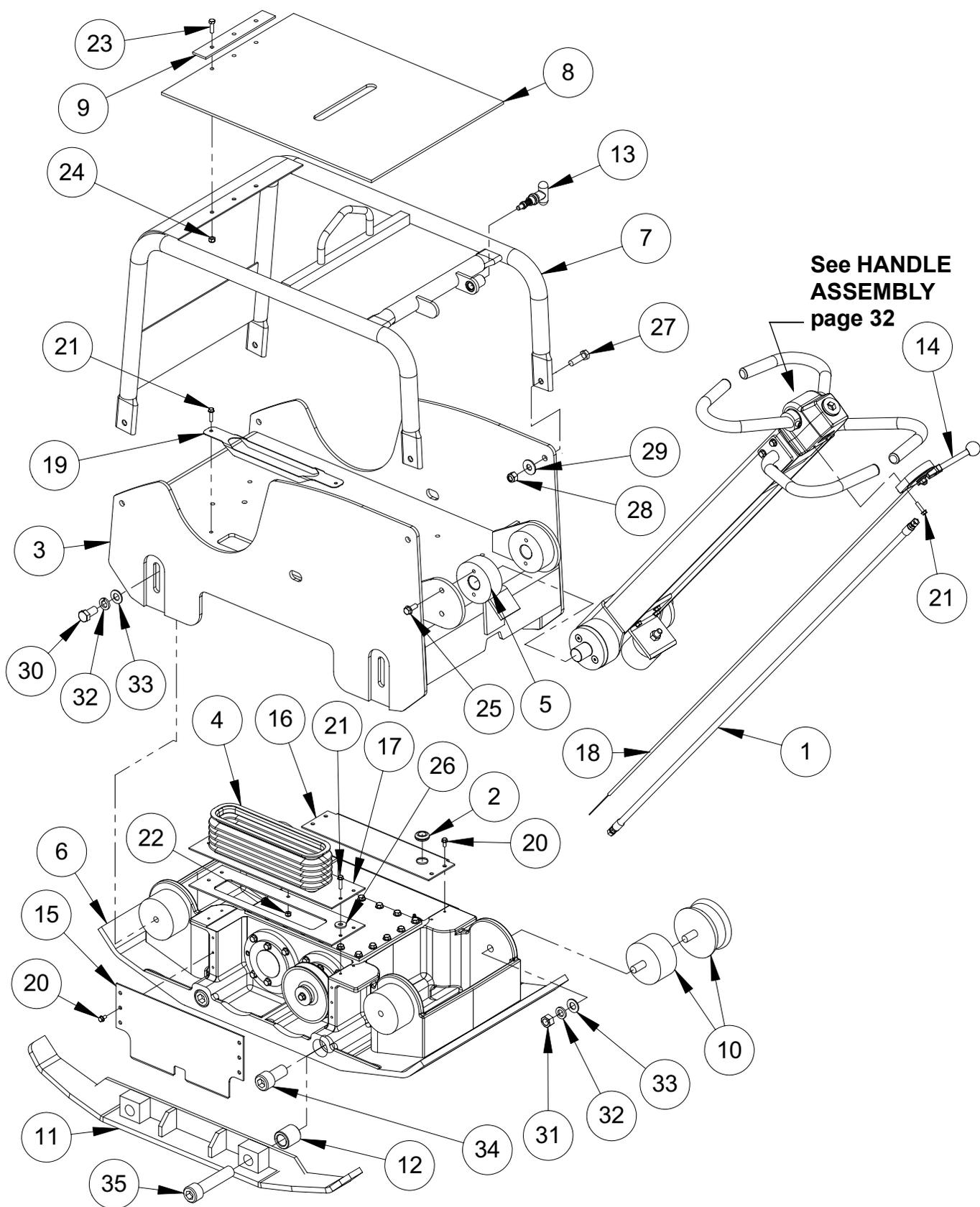
in·lbs x 0.083 = ft·lbs

ft·lbs x 12 = in·lbs

ft·lbs x 0.1383 = kg·m

ft·lbs x 1.3558 = N·m

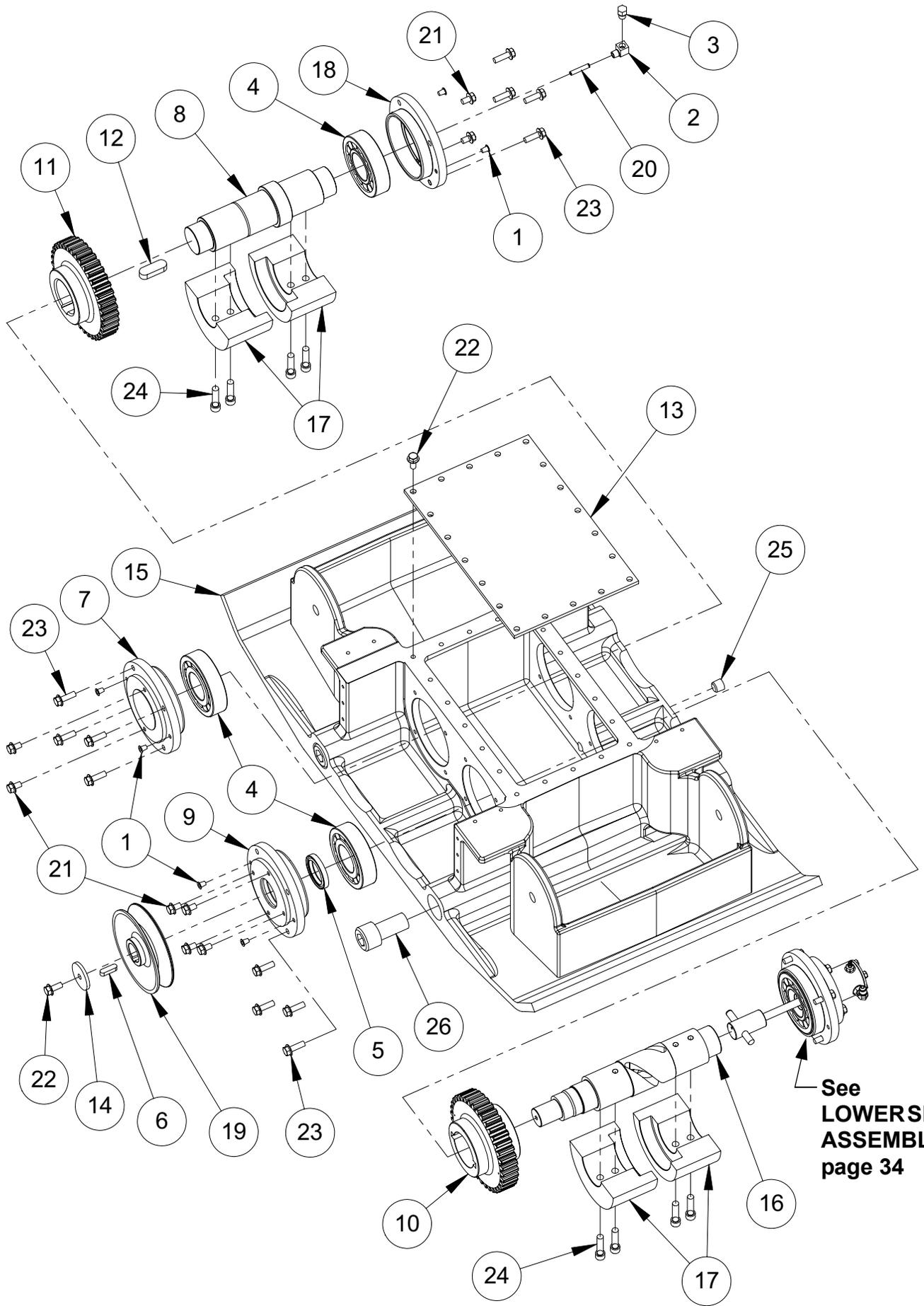
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# MAIN ASSEMBLY

# MAIN ASSEMBLY

ITEM #	PART #	DESCRIPTION	QTY
1.	09642	HOSE, HYDRAULIC	1
2.	10088	GROMMET	1
3.	16281	DECK, ENGINE	1
4.	16442	BELLOWS	1
5.	16543	MOUNT, HANDLE	2
6.	16609	BASEPLATE, GPR99	1
	16607	BASEPLATE, GPR135	1
7.	16652	ROLLCAGE	1
8.	16653	MAT, RUBBER	1
9.	16654	PLATE, MOUNT	1
10.	17160	SHOCKMOUNT, GPR99	4
	17419	SHOCKMOUNT, GPR135	4
11.	17326	PLATE, EXTENSION, GPR99-135 (3 IN)*	2
	17333	PLATE, EXTENSION, GPR99-135 (6 IN)*	2
12.	17335	BUSHING, WING MOUNT	4
13.	17340	POP-PIN	1
14.	17403	LEVER, THROTTLE 	1
15.	17434	COVER, SIDE	2
16.	17435	GUARD, HYDRAULIC	1
17.	17436	GUARD, BELLOWS MOUNT	2
18.	17438	CABLE, THROTTLE, GPR99	1
	16615	CABLE, THROTTLE, GPR135	1
19.	17462	RETAINER, BELLOWS	1
20.	F042004FWS	FWLS, 1/4-20 x 1/2 ZP	16
21.	F042008FWS	FWLS, 1/4-20 x 1 ZP	9
22.	F0420ELN	LOCKNUT, ELASTIC 1/4-20 ZP	1
23.	F051808HCS	HHCS, 5/16-18 x 1 GR5 ZP	3
24.	F0518ELN	LOCKNUT, ELASTIC 5/16-18 ZP	3
25.	F061608FWS	FWLS, 3/8-16 x 1 ZP	4
26.	F06SW	WASHER, 25/64 x 1 x 1/8 ZP	5
27.	F081314HCS	HHCS, 1/2-13 x 1-3/4 GR5 ZP	4
28.	F0813ELN	LOCKNUT, 1/2-13 NYLOC ZP	4
29.	F08SW	WASHER, 9/16 x 1-3/8 x 12GA ZP	4
30.	F101110HCS	HHCS, 5/8-11 x 1-1/4 GR5 ZP	4
31.	F1011HN	NUT, HEX 5/8-11 ZP	4
32.	F10LW	LOCKWASHER, 5/8 ZP	8
33.	F10PW	WASHER, 5/8 x 1-1/4 x 12GA ZP	8
34.	F160816SCS	SHCS, 1"-8 x 2 GR8 ZP	4
35.	F160836SCS	SHCS, 1"-8 x 4-1/2 GR8 ZP	4
	*17337	KIT, 3" EXTENSION, GPR135/99 (CONTAINS ITEMS 11, 12 AND 35)	
	*17338	KIT, 6" EXTENSION, GPR135/99 (CONTAINS ITEMS 11, 12 AND 35)	

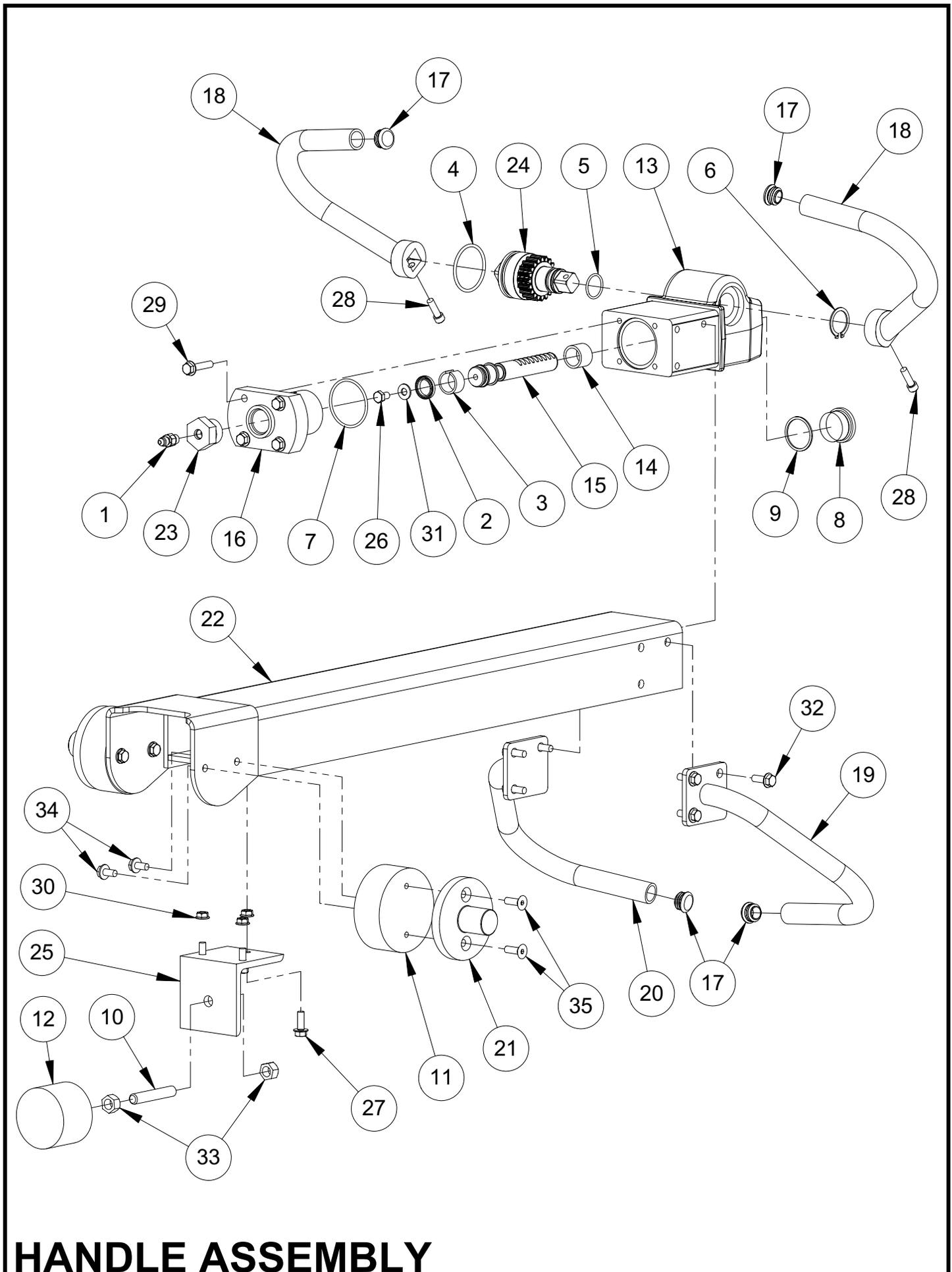


See  
**LOWERSHIFT  
 ASSEMBLY**  
 page 34

# BASEPLATE ASSEMBLY

# BASEPLATE ASSEMBLY

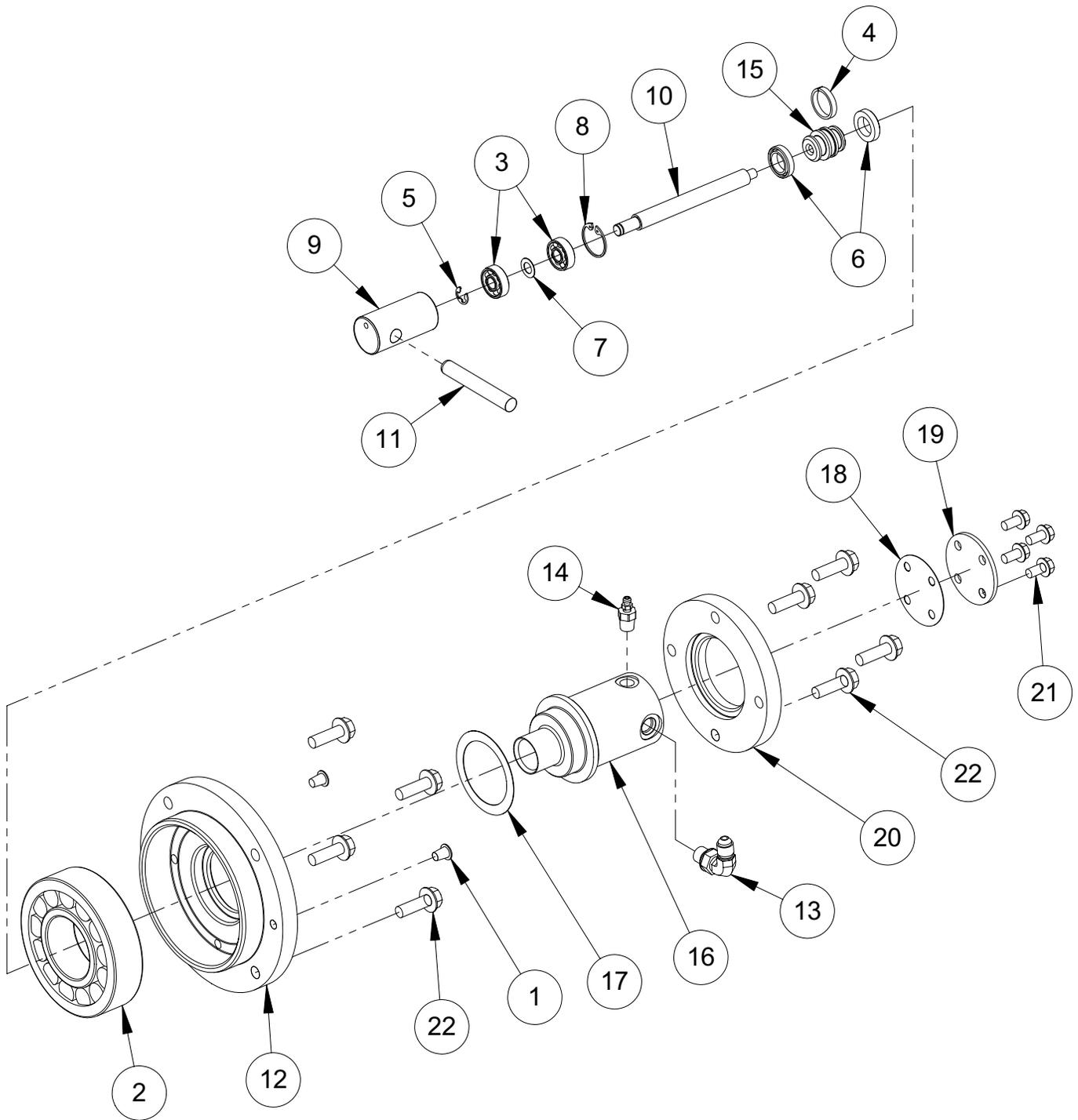
ITEM #	PART #	DESCRIPTION	QTY
1.	05559	CAPLUG	6
2.	09748	FITTING, PIPE 90 DEGREE	1
3.	09749	PLUG, BREATHER	1
4.	16228	BEARING, ROLLER 100 x 45	4
5.	16232	SEAL, SHAFT	1
6.	16259	KEY, METRIC 8 x 7 x 28 ROUND ENDS	1
7.	16262	COVER, BEARING, EXCITER	1
8.	16263	SHAFT, EXCITER	1
9.	16264	COVER, BEARING, EXCITER	2
10.	16265	GEAR, INPUT	1
11.	16266	GEAR, IDLER	1
12.	16321	KEY, METRIC 16 x 10 x 45 ROUND ENDS	1
13.	16322	COVER, EXCITER	1
14.	16328	WASHER, 11/32 x 1-3/4 x 3/16 ZP	1
15.	16331	BASEPLATE, MACHINED	1
16.	16599	SHAFT, INPUT	1
17.	16608	WEIGHT, EXCITER, GPR99	4
	16260	WEIGHT, EXCITER, GPR135	4
18.	17104	COVER, BREATHER	1
19.	17502	PULLEY, EXCITER	1
20.	F0410SP	PIN, SPIROL 1/4 x 1-1/4	1
21.	F051804FWS	FWLS, 5/16-18 x 1/2 ZP	8
22.	F051806FWS	FWLS, 5/16-18 x 3/4 ZP	21
23.	F051808FWS	FWLS, 5/16-18 x 1 ZP	12
24.	F061612SCS	SHCS, 3/8-16 x 1-1/2 GR8 ZP	8
25.	F0618SPP	PLUG, PIPE 3/8-16	1
26.	F160816SCS	SHCS, 1"-8 x 2 GR8 ZP	4
	16609	BASEPLATE, GPR99 (CONTAINS ALL ABOVE ITEMS)	
	16607	BASEPLATE, GPR135 (CONTAINS ALL ABOVE ITEMS)	



# HANDLE ASSEMBLY

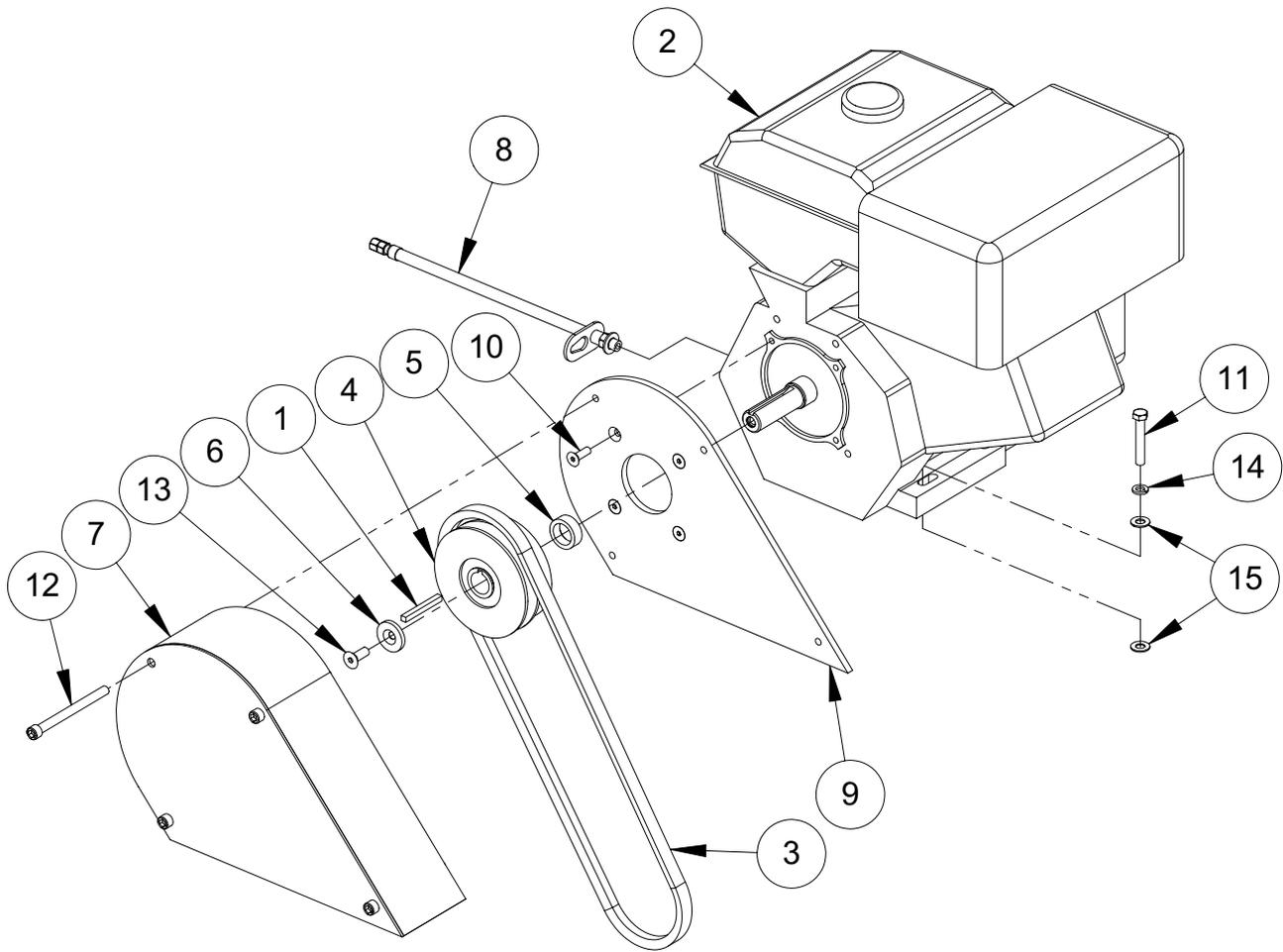
# HANDLE ASSEMBLY

ITEM #	PART #	DESCRIPTION	QTY
1.	08355	FITTING, ST PARKER 4F50X	1
2.	16350	SEAL, HYDRAULIC	1
3.	16351	GUIDE RING, HYDRAULIC	1
4.	16352	O'RING, METRIC 52 ID x 3.5	1
5.	16353	O'RING, METRIC 26 ID x 2.5	1
6.	16354	RETAINING RING, EXTERNAL, METRIC	1
7.	16355	O'RING, METRIC 52 ID x 3	1
8.	16358	PIPE PLUG, METRIC, SPECIAL	1
9.	16359	WASHER, METRIC, SPECIAL	1
10.	16410	THREADED ROD, 1/2-13 x 3	1
11.	16460	SHOCKMOUNT	2
12.	16493	SHOCKMOUNT, BUMPER, HANDLE	1
13.	16629	HOUSING, CONTROL	1
14.	16632	BUSHING, SLIDE	1
15.	16633	GEAR, RACK	1
16.	16636	HOUSING, GUIDE, SHAFT	1
17.	17058	CAP, TUBE	4
18.	17377	HANDLE, CONTROL	2
19.	17379	HANDLEBAR, LEFT	1
20.	17380	HANDLEBAR, RIGHT	1
21.	17402	MOUNT, SPINDLE	2
22.	17417	HANDLE, TUBE	1
23.	17445	FITTING, ADAPTER, HYDRAULIC	1
24.	17509	GEAR, PINION	1
25.	17546	ANGLE, MOUNT	1
26.	F051804HCS	HHCS, 5/16-18 x 1/2 GR5 ZP	1
27.	F051808FWS	FWLS, 5/16-18 x 1 ZP	3
28.	F051808SCS	SHCS, 5/16-18 x 1	2
29.	F051812FWS	FWLS, 5/16-18 x 1-1/2 ZP	4
30.	F0518FN	NUT, FLANGE WHIZ-LOCK 5/16-18 ZP	3
31.	F05SW	WASHER, 5/16 x 3/4 x 15GA ZP	1
32.	F061607FWS	FWLS, 3/8-16 x 7/8 ZP	6
33.	F0813HN	NUT, HEX 1/2-13 ZP	2
34.	M08C016FWS	FWLS, M8 x 1.25 x 16MM ZP	4
35.	M08C025FSS	FHSS, M8 x 1.25 x 25MM ZP	4
	16638	CONTROL HEAD (INCLUDES ITEMS 1-9, 13-16, 23, 24, 26, 29, 31)	



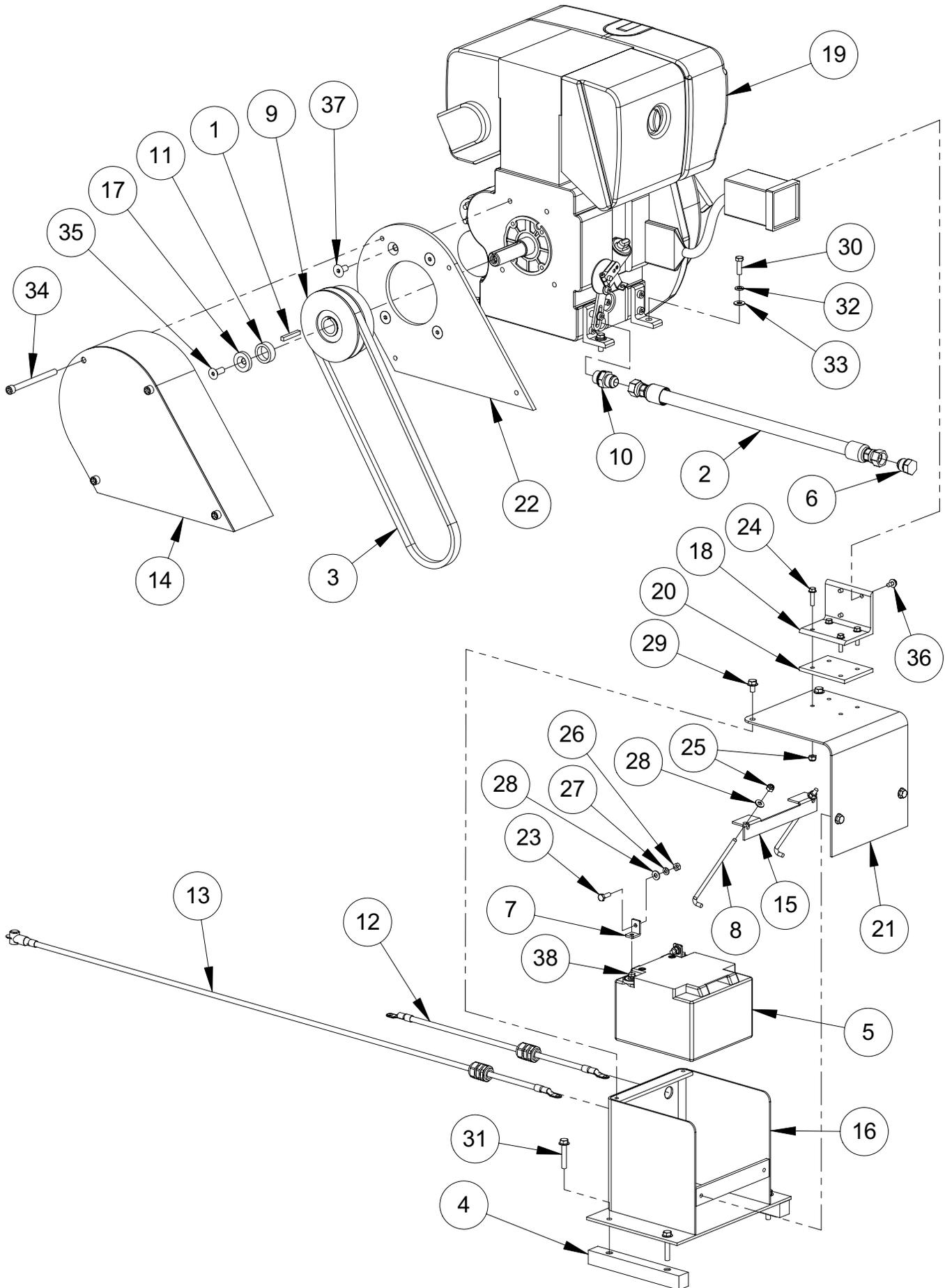
# LOWER SHIFT ASSEMBLY





# HONDA ENGINE ASSEMBLY





# HATZ DIESEL ENGINE ASSEMBLY

# HATZ DIESEL ENGINE ASSEMBLY

ITEM #	PART #	DESCRIPTION	QTY
1.	00808	KEY, 1/4 SQ x 1-3/4	1
2.	08505	HOSE, HYDRAULIC 1/2 x 22"	1
3.	09375	V-BELT (B-44)	1
4.	16332	BAR, MOUNT	2
5.	16360	BATTERY, 12V, ODYSSEY	1
6.	16523	FITTING, PLUG, HYDRAULIC	1
7.	16537	L-BRACKET, TERMINAL, BATTERY	2
8.	16556	J-BOLT, 1/4-20 x 6-1/2	2
9.	16576	CLUTCH	1
10.	16578	FITTING, ADAPTER, HYDRAULIC	1
11.	16580	SPACER, CLUTCH	1
12.	16600	CABLE, BATTERY, 4GA, BLACK, 19"	1
13.	16604	CABLE, BATTERY, 4GA, RED, 48"	1
14.	16621	BELT GUARD	1
15.	16659	HOLD DOWN, BATTERY	1
16.	16660	BOX, BATTERY	1
17.	16665	WASHER, MOUNT	1
18.	16969	MOUNT, IGNITION BOX	1
19.	17144	ENGINE, HATZ DIESEL	1
20.	17415	CUSHION, CONTROL BOX	1
21.	17426	COVER, BATTERY	1
22.	17468	MOUNT, BELTGUARD	1
23.	F042006HCS	HHCS, 1/4-20 x 3/4 GR5 ZP	2
24.	F042008FWS	FWLS, 1/4-20 x 1 ZP	4
25.	F0420ELN	LOCKNUT, 1/4-20 NYLOC	6
26.	F0420HN	NUT, HEX 1/4-20 ZP	2
27.	F04LW	LOCKWASHER, 1/4 ZP	2
28.	F04PW	WASHER, 1/4 ZP	4
29.	F051804FWS	FWLS, 5/16-18 x 1/2 ZP	4
30.	F051808HCS	HHCS, 5/16-18 x 1 GR5 ZP	4
31.	F051814FWS	FWLS, 5/16-18 x 1-3/4 GR5 ZP	4
32.	F05LW	LOCKWASHER, 5/16 ZP	4
33.	F05SW	WASHER, 5/16 ZP	4
34.	F061636SCS	SHCS, 3/8-16 x 4-1/2 GR8 ZP	4
35.	F062408FSS	FHSS, 3/8-24 x 1 ZP	1
36.	M06C012FWS	FWLS, M6 x 1.0 x 12 ZP	3
37.	M10C020FSS	FHSS, M10 x 1.5 x 20 ZP	4
38.		BATTERY BOLT, METRIC (Not Provided by MBW Inc.)	2

# WARRANTY

1. **MBW, Inc.**, Slinger, Wisconsin, warrants each new machine against defects in material and workmanship under normal use and service for a period of six (6) months. This warranty commences the first day the machine is sold, assigned to a rental fleet, or otherwise put to first use.
2. The obligation under this warranty is limited to the replacement or repair of parts and/or machine at **MBW, Inc.** factory branches or at authorized **MBW, Inc.** Distributors.
3. Machines altered or modified without **MBW, Inc.** written consent voids this warranty. Misuse, negligence, accidents or the operation of machines in any way other than recommended by **MBW, Inc.** will void this warranty. This warranty shall not apply to machines repaired by other than **MBW, Inc.** factory branches or authorized **MBW, Inc.** Distributors.
4. This warranty includes labor on all **MBW, Inc.** products. Labor must be performed at an authorized **MBW, Inc.** Distributor.
5. The cost of transportation and other expenses connected therewith are not covered by this warranty.
6. Written authorization for the return of merchandise under warranty must be obtained from **MBW, Inc.**, Slinger, Wisconsin. In England: MBW (UK) LIMITED, Bradley Fold Trading Estate Unit 6, Radcliffe Moor Road, Bolton BL2 6RT.
7. **MBW, Inc.** reserves the right to inspect and render final decision on each warranty case.
8. **MBW, Inc.** reserves the right to improve or make product changes without incurring any obligation to update, refit, or install the same on machines previously sold.
9. **MBW, Inc.** is not responsible for any liability or damage or injury directly or indirectly from design, material or operation of its products.
10. Warranty card must be returned to **MBW, Inc.**, P.O. Box 440, Slinger, Wisconsin 53086-0440, within 10 days after purchase, assignment to a rental fleet, or first use. In England: MBW (UK) LIMITED, Bradley Fold Trading Estate Unit 6, Radcliffe Moor Road, Bolton BL2 6RT. Failure to return warranty card as specified renders the warranty null and void.
11. Requests for warranty must be submitted in writing within 30 days after machine failure to **MBW, Inc.**, P.O. Box 440, Slinger, Wisconsin 53086-0440. In England: MBW (UK) LIMITED, Bradley Fold Trading Estate Unit 6, Radcliffe Moor Road, Bolton BL2 6RT.
12. The foregoing warranty is expressly in lieu of all other warranties, expressed or implied, including the warranties of merchantability and fitness for use, and of all other obligation or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability or warranty in connection with the sale or service of any of our products. Likewise, this warranty shall not apply with respect to engines, motors and other component parts produced by other manufactures and used on **MBW, Inc.** products, but such items shall have such warranties as may be provided by the manufacturer thereof.



## **MBW, Inc.**

250 Hartford Rd • PO Box 440

Slinger, WI 53086-0440

Phone: (262) 644-5234 • Fax: (262) 644-5169

Email: [mbw@mbw.com](mailto:mbw@mbw.com) • Website: [www.mbw.com](http://www.mbw.com)

### **MBW (UK) Ltd.**

Unit 6, Bradley Fold Trading Estate

Radcliffe Moor Road

Bolton BL2 6RT, England

Phone: 01204 387784 • Fax: 01204 387797

# WAREHOUSE LOCATIONS

MBW, Inc. has established a network of reputable distributors with trained mechanics and full facilities for maintenance and rebuilding, and to carry an adequate parts stock in all areas of the country. Their sales engineers are available for professional consultation. If you cannot locate an M-B-W distributor in your area, contact one of our Sales Branches or MBW, Inc. The locations and phone numbers of the Sales Branches are listed below.

**REMEMBER - You own the best! If repairs are needed, use only M-B-W parts purchased from authorized M-B-W distributors.**

## Sales Branches:

- |  |   |
|--|---|
| 1. MBW, INC.<br>250 Hartford Rd.<br>P.O. Box 440<br>Slinger, WI 53086-0440<br>Phone: (262) 644-5234<br>Fax: (262) 644-5169<br>Email: <a href="mailto:mbw@mbw.com">mbw@mbw.com</a><br>Website: <a href="http://www.mbw.com">www.mbw.com</a> | 2. MBW (UK) LIMITED<br>Bradley Fold Trading Estate Unit 6<br>Radcliffe Moor Rd.<br>Bolton BL2 6RT<br>Phone: 01204 387784<br>Fax: 01204 387797 |
|--|---|



# NOTES:



# NOTES: