Instructions, Parts and Maintenance

AIR WINCH
MODEL HU40 / HUL40
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RAM Winch & Hoist Parts Information
Failure to follow these warning signs may result in death, severe injury or property damage:

- Do not operate this hoist before reading the operation and maintenance manual.

- Do not lift more than rated load.

- Do not allow less than three wraps of wire rope to remain on drum at all times. Operator must stay in view of the hoist drum.

- Do not operate a damaged or malfunctioning hoist.

- Do not remove or obscure warning labels.
GENERAL GUIDELINES FOR SAFE OPERATION

The following warnings and precautions should be taken to ensure safe operating conditions.

Failure to remain alert and keep equipment in good operating condition could result in personal injury or death. To avoid such please read and understand this manual as well as all applicable laws and requirements for safe operation.

Keep a copy of this manual with the equipment at all times.

Be certain all operators of the equipment have been properly trained in the use of the equipment and have read the owners manual thoroughly.

!!WARNING!!

Keep hands, feet and any loose clothing away from rotating or moving parts. Never operate the equipment with any guards or safety equipment removed from winch. Failure to do so may result in injury or death.

When maintaining the equipment be sure to tag Out of Service on power supply to prevent accidental operation or activation.

Do not alter or modify the equipment in any way without first contacting RAM Winch & Hoist Engineering Department as to the alteration type or extent. Failure to do so could result in damage to the equipment or injury to personnel.
1. Read the manufacturer's instructions before operating the winch.
2. Always inspect, test maintain and operate this winch in accordance with American National Standards Institute Safety Standards B30.7.
3. Never lift a load greater than the rated line pull of the winch.
4. Use the recommended size wire rope for load to be handled.
5. Never use the wire rope as a sling.
6. Always stand clear of the load.
7. Unless the winch is designed for personnel handling, never use the winch for lifting or lowering people, and never stand on a suspended load.
8. Never carry loads over people.
9. Never disengage the clutch with a load applied to the winch.
10. Never engage the clutch with the winch motor running.
11. Always rig the winch properly and carefully, making certain the wire rope is properly anchored to the drum.
12. Before each shift, check the winch for wear or damage. Check the brakes, wire rope, hooks, guides, mounting bolts, etc. Lift a capacity load or a near capacity load a few inches off the floor and check the ability of the braking system to stop and hold the load without excessive drift, if the winch is being used for lifting.
13. Never operate a winch with a twisted, kinked or damaged wire rope.
14. Periodically inspect the winch thoroughly and replace worn or damaged parts. Keep accurate records of all inspections and repairs.
15. Follow the lubrication instructions provided by the manufacturer.
16. Do not attempt to repair the wire rope or hooks. Replace hooks when there is a 15% increase in the throat opening or when there is a 10% bend as shown by inspection records.
17. Keep the rope clean and well lubricated. Replace wire rope that is frayed.
18. Ease the slack out of the wire rope when starting. Do not jerk the winch.
19. If the drum is exposed to personnel walkways, place a guard over the drum.
20. Do not use your hands to guide the rope onto the drum when winding in the wire rope.
21. Be certain there are no objects in the way of the load or hook when operating the winch.
22. Do not use higher air pressure than recommended by the manufacturer.
23. Use compressed air carefully. Be sure the hose couplings are secure, and make certain a safety chain is provided to avoid hose whip if the coupling fails.
24. Wear proper clothing to avoid entanglement in rotating machinery.
25. Be certain the air supply is shut off before performing maintenance on the winch.
26. Properly secure a winch before leaving it unattended.
27. Do not leave a load suspended for any extended period of time.
29. Do not allow unqualified personnel to operate a winch.
30. Do not operate a winch if you are not physically fit to do so.
31. Be certain the load is properly seated in the saddle of the hook. Do not tip load the hook as this leads to spreading and eventual failure of the hook.
32. Do not force a hook into place by hammering.
33. Never operate a winch beyond the point where less than four wraps of wire rope remain on the drum.
34. Do not use the wire rope as a ground for welding. Do not attach a welding electrode to a winch or sling.
35. Never operate a winch that makes excessive mechanical noise. Report the problem immediately.
1.0 General Information

1.1 User Responsibility and Safety Precautions

This equipment will perform in conformity with the description thereof, contained in this manual, its accompanying labels and/or inserts when it is installed, operated, maintained and repaired according to the instructions provided. This equipment must be maintained properly.

Deficient equipment should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, we recommend that a telephone or written request for service be made to RAM Winch & Hoist.

This equipment or any of its parts should not be altered without prior written approval of RAM Winch & Hoist. The user of this equipment shall have the sole responsibility for any malfunction that results from improper use, faulty maintenance, damage, improper repairs or alterations made by anyone other than RAM Winch & Hoist.

1.2 Introduction

1.2.1 Purpose

The purpose of this manual is to provide installation, operating and maintenance instructions and procedures for your RAM Winch & Hoist.

1.2.2 Model Number, Serial Number and Options

This manual covers the hoist built by RAM Winch & Hoist for your particular unit. The model number and serial number are listed on the nameplate attached to the unit.

1.2.3 Warranty

See standard warranty certificate.

1.3 Equipment Description

1.3.1 Capabilities and Limitations

The winch is an air, planetary driven cable-handling unit with manual release band brake designed for use in the marine or industrial environment.

2.0 Functional Description
2.1 **Major Assemblies**

The hoist consists of the following major assemblies:

a. Drive assembly.

b. Frame and drum assembly.

3.0 **Installation Instruction**

3.1 **Site Selection**

The winch should be installed in a location that meets the following requirements:

- Firm foundation that allows the unit to be welded or bolted down to withstand a minimum of 5 times the rated line pull of the hoist.

- Accessibility for the operator.

- Protection from heavy falling objects.

- Near an adequate air supply source.

- As far as possible from the first turn sheave.

- Out of the way of other operations.

3.2 **Handling**

Lifting the unit on the topside of the frame (via lifting eyes) will accommodate standard lifts. The unit may also be lifted from under the base by a forklift.

**WARNING**

*DO NOT LIFT HOIST BY CABLE DRUM - DAMAGE TO CABLE AND/OR BRAKE ASSEMBLY MAY RESULT.*
3.3 Installation Procedures

3.3.1 Welding / Bolting Down

When the winch is at or near the desired location, remove the shipping protection and position it exactly. If the winch is to be welded down, a qualified welder should be used. All exposed metal surfaces should be painted immediately after welding to inhibit rust.

You must have a qualified engineer determine the amount of weld required to securely hold the winch. If the unit is bolted down, be sure to use the proper size and a minimum of Grade 5 bolts and torque to the proper setting.

7/8-9 UNC Diameter SAE Grade 5 Bolts (Quantity 6)

<table>
<thead>
<tr>
<th>Torque Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Threads</td>
</tr>
<tr>
<td>430 ft-lbs</td>
</tr>
</tbody>
</table>

These specifications are the recommended assembly torque for grade 5 threaded fasteners with the following qualifications:
1. The torque values shown are for turning the NUT while holding the head of the bolt with a wrench. If the application demands tightening by the bolt head, increase the value shown by 20% (multiple by 1.20). This will allow for the natural torsional twist of the bolt shank.
2. Torque values are calculated at 75% of proof load. This provides a safety factor.
3. All dry torque values are based on the use of through hardened flat washers.
4. Lubricated torque values are calculated based on applying Anti-Seize Compound to the threads before assembly.

The above specifications are referenced from the following organizations: SAE, ASTM, General Motors, Military and Federal Standards.

** CAUTION **

*Extreme care should be taken to ensure the center of the winch drum exactly perpendicular to the cable running to the first sheave. This can be done by average sightings along the flat surface of the winch sidewall, drum flanges or with the help of a square to find the true perpendicular centerline. If it is not properly aligned, cable-laying problems may create difficulties and possibly damage the cable, winch and/or personnel.*

3.3.2 Requirements Prior to Start Up

Fill air motor to proper level with oil. Be certain all hoses and fittings are tightened and not leaking. *See Section 5.0 Preventative Maintenance for Lubrication Schedule.* Check lubricator on air supply line for proper oil level. If low, then fill with 30-wt. oil.
3.4 Installation Checkout

3.4.1 Phase 1 - Installation Inspection

⇒ Check all bolts and fasteners to ensure that they are tightened properly.

⇒ Grease all bearings.

⇒ Test manual brake release / set with no load on the drum to ensure operating properly.

3.4.2 Phase 2 - Start Up and Preliminary Tests

⇒ Leaks - All fittings and hoses have been inspected for leaks at the factory prior to shipment. If leakage is noticed, tighten or replace as required to correct.

⇒ Using correct valve, operate unit to rotate drum and inspect for automatic brake release and free movement of the drum.

3.5 Cable Installation

3.5.1 Cable Termination on Drum

A cable lead-in hole is cut in the drum to allow termination in the drum. There are two (2) set screws placed in the drum feed thru hole to constrain the cable.

** CAUTION **

_The set screws are not intended to take a full line pull on the cable. Three or more full wraps of cable must remain on the drum at all times and at any load case._

3.5.2 Spooling Cable onto Drum

Bring the cable under/over the drum and through the slot in the drum wall. Position the cable through the hole and secure the set screws. Handling and wrapping cable on the drum must be attended by a gloved operator to make certain that the cables lie on the drum properly.

The cable must not stack up above the drum flanges or it will fall off the side of the drum and possibly damage the cable. Whenever the equipment is being raised, the winch operator must watch for the end of the cable markings or the equipment itself. Before the equipment gets near the sheave, the operator should stop the winch.
** CAUTION **

Spooling of the cable must be done very carefully. To prevent injury, keep hands, clothing and anything that could catch on or get caught in the cable clear when the drum is rotating. This would pull the item or person into the cable spooling on the drum. Since spooling of the cable requires at least two people, an operator and someone to guide and control the cable, they must stay alert and maintain visual contact with each other at all times. We strongly recommend qualified and experienced personnel complete this procedure. For units with Levelwind, refer to spooling device instructions.

4.0 Operating Instructions

4.1 Operator Start Up

⇒ Ensure the control valve handle is in mid position.

⇒ Check that the air supply is on and functioning properly.

⇒ Open the band brake if the unit has one. If brake is automatic then normal operation of control handle will operate brake.

⇒ Move the control valve handle in the direction of desired operation (payout/retrieve).

When lifting loads, the band brake should be used to help secure the load after lifting.

When lowering the load, the control valve should be operated in the payout direction slightly while loosening the band brake. The band brake will help control the descent rate by the amount of drag allowed.

4.2 Shutdown / Turn Off

⇒ Release winch control handle (The valve handle should return to center or neutral positions.)

⇒ Shut off air supply.

⇒ Tighten band brake.

⇒ Do not shut the unit down with a suspended load that relies on the winch as the only support.
5.0 Preventative Maintenance

5.1 Introduction

This section gives necessary information for periodic and preventive maintenance, and for some repairs or replacements. For further information, service assistance or problems, call RAM Winch & Hoist Service Department.

5.2 Maintenance Plan

5.2.1 Lubrication Schedule

Under normal operating conditions on a permanent installation, the following lubrication schedule is recommended:

1. The gear reducer is filled with grease (Lubriplate 1300AA) at the factory. After 500 hours of operation, remove 1 ¼” plug on gear case and check. If unit needs more grease then add thru this hole.

2. Lubricate the bearings with Lubriplate 130AA or equivalent at 50 hour intervals.

3. **WARNING:** *Lubricate the motor before operating the winch.* To avoid leakage during shipment the oil is drained from the motor. A sufficient quantity of oil for filling each unit is packed with the winch. Make certain the proper lubricant is used for each unit. Make certain the oil level plugs and drain plugs are securely threaded in place. Remove the vent cap and oil level plug. Pour the recommended oil into the motor case until it starts to come out the level plug hole. Replace the level plug and vent cap.

Motor Lubrication

Check oil daily and maintain level with opening in the side of the motor case. If the winch is being used more than four (4) hours per day, it may be necessary to check the level more often.

*When the winch is subject to temperatures above freezing:* After the winch has been idle for several hours or overnight, loosen the drain plug located at the bottom of the motor case and allow the accumulated water to drain out. After draining the water, tighten the plug in the bottom and remove a similar plug on the side of the motor case. Unscrew the vent cap and pour a sufficient quantity of the recommended oil through this opening to bring the oil level up to the side opening.

*When the winch is subject to freezing temperatures:* Allow the winch to remain idle long enough for the water content in the motor case to separate from the oil, but not long enough for it to freeze. Drain the water and replenish the oil as above. Should this procedure be impractical, drain the entire contents for the motor case immediately after operation ceases, and pour the oil back into the motor case before resuming operation. If not drained, a sufficient quantity of water will eventually accumulate and the oil splasher will freeze fast.
For temperatures 30° to 80°F (-1.1° to 26.6°C) use SAE 20 or 20W motor oil.
For temperatures below 30°F (-1.1°C) use SAE 10 or 10W motor oil.
For temperatures below 80°F (26.6°C) use SAE 30 motor oil.

**CAUTION**

DO NOT LUBRICATE WHILE UNIT IS OPERATING

4. Check the air supply lubricator prior to running and during operation. Do not operate without oil in the lubricator as this may damage the air motor. The lubricator should be set at about 10-15 drops per minute.

LUBRICATION SCHEDULE

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>TYPE OF LUBRICANT</th>
<th>REPLACEMENT SCHEDULE</th>
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<tr>
<td>Gear Reducer</td>
<td>Grease</td>
<td>Once per Year</td>
</tr>
<tr>
<td>Air Motor</td>
<td>Oil SAE 30 Wt</td>
<td>As required by usage</td>
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<tr>
<td>Outboard Drum Bearing</td>
<td>Grease</td>
<td>Every 200 hours of operation</td>
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<tr>
<td>Air Motor Lubricator</td>
<td>Oil SAE 10 Wt</td>
<td>Daily or as required for heavy use</td>
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5.2.2 Cleaning

The winch will last longer and easier to maintain if it is kept relatively free of oil, dirt and rust. Rinsing as often as possible with fresh water will help minimize corrosion.

5.2.3 Cables and Hoses

All hose assemblies in service should be checked periodically for leaks, abrasions, kinks, cover blister or other damage. Assemblies showing signs of wear or damage must be replaced before they cause failure or create a hazard.

5.2.4 Brake Adjustment

To adjust the brake, rotate the Brake Adjusting Nut. Threading the nut further down the Brake Adjusting Screw tightens the brake; backing the nut off loosens the brake.
5.2.5 **General Inspection**

Frequent inspections should be conducted if the winch is in consistent service. This should be done by operators or personnel trained or qualified to conduct safety, operation and maintenance inspections on the equipment. The equipment should be inspected quarterly for the following:

**Fasteners**
Check all bolts, nuts, springs, pins, screws, etc. Replace if worn, corroded or broken. Torque all bolts or nuts to proper values according to ASME standards.

**Frames, Drum, Bracket and Base**
The frames, drums, brackets and base should be inspected for deformation, cracks, corrosion, damage or wear. It may be necessary to disassemble the unit to find additional damage if there is deformation of the frames, base, drum, or flanges of the drum. Replace any of the above items if excessive wear is noticed.

**Brakes**
Replace the brake band if the lining is worn down to the head of the rivets. Failure to do so could result in a malfunction of the brake and possible damage to the winch, to personnel or to equipment.

**Wire Rope**
The wire rope should be inspected after each use. Inspect and replace according to the wire rope manufacturer’s guidelines.

6.0 **Component Removal / Replacement**

Maintenance of the winch consists of determining the defective part and removing and repairing or replacing that component. All work should be done only after the air supply is shut off and tagged *Out of Service*. If needed, consult with **RAM Winch & Hoist** or its nearest trained representative for service.
RAM AIR WINCH PARTS

When ordering parts, please have the model number and serial number for your unit. If possible, please supply us with the original purchase order number.

See the following pages for part ordering information.

Please call (281) 999-8665 or fax an order to (281) 999-8666.
# REPAIR PARTS LIST

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<tr>
<th>ILLUS. NUMBER</th>
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<td>+</td>
<td><strong>Motor Assembly</strong></td>
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<td>+ 34</td>
<td>Throttle Lever Spring Stop Pin</td>
<td>D02-553</td>
<td>59</td>
<td>Motor Mounting Bracket</td>
<td>H5U-502</td>
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* Not Illustrated

**Important:** The complete size symbol of the Winch must be stated when ordering a Motor Assembly, Motor Case (1) or Gear Case (88).
<table>
<thead>
<tr>
<th>ILLUS. NUMBER</th>
<th>PART NAME FOR ORDERING</th>
<th>PART NUMBER FOR ORDERING</th>
<th>ILLUS. NUMBER</th>
<th>PART NAME FOR ORDERING</th>
<th>PART NUMBER FOR ORDERING</th>
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<td>(Parts indented after an item are included with that item)</td>
<td>(Do not use for ordering)</td>
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<td>*</td>
<td>Rope Instruction Plate</td>
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<td>60</td>
<td>Rope Drum</td>
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<td>61</td>
<td>Wire Rope Set Screw (2)</td>
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<td>62</td>
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<tr>
<td>63</td>
<td>Drum Bearing (2) (Hyatt C99211 or its equivalent)</td>
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<td>Brake Bracket Pin</td>
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<td>Motor Shaft Pinion</td>
<td>HU-319A</td>
<td>111</td>
<td>Brake Support Pin or Brake Anchor (3)</td>
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<td>72</td>
<td>Motor Shaft Pinion Space</td>
<td>HU40-397</td>
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<td>Cotter (8)</td>
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<td>Motor Shaft Inner Bearing (AFBMA No. 35BC02)</td>
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<td>Motor Shaft Outer Bearing (AFBMA No. 25BC02)</td>
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<td>HU-564A</td>
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<td>75</td>
<td>Motor Shaft Bearing Screw</td>
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<td>HU-564A</td>
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<td>Intermediate Gear</td>
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<td>Base Bolt (8)</td>
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<td>78</td>
<td>Intermediate Gear Bearing (2) (AFBMA No. 30BC03)</td>
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<td>Base Bolt Nut (8)</td>
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<td>79</td>
<td>Drive Shaft</td>
<td>HU40-358</td>
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<td>Base Bolt Lock Washer (8)</td>
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<td>80</td>
<td>Drive Gear Key</td>
<td>HU40-357</td>
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<td>Winch Nameplate (1)</td>
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<td>Drive Gear</td>
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<td>Driver Gear Spacer</td>
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<td>Fiber Washer</td>
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<td>Drive Shaft Nut</td>
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<td>88</td>
<td>Gear Case</td>
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</table>

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# MAINTENANCE TOOLS

<table>
<thead>
<tr>
<th>TOOL NUMBER FOR ORDERING</th>
<th>TOOL NAME FOR ORDERING</th>
<th>OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>P25-228</td>
<td>Grease Gun</td>
<td>Lubrication</td>
</tr>
<tr>
<td>D02-426</td>
<td>Wire Rope Set Screw Wrench</td>
<td>Loosening or tightening the Wire Rope Set Screws (61) in the Rope Drum (60).</td>
</tr>
<tr>
<td>HU-932</td>
<td>Jack Bolt (2 required)</td>
<td>Removing the Valve Chest (10) from the Motor Case (1).</td>
</tr>
<tr>
<td>HU-933</td>
<td>Piston Ring Compressor</td>
<td>Compressing the Piston Rings (49 and 50) when installing the Cylinder (52).</td>
</tr>
<tr>
<td>23470</td>
<td>Throttle Valve Stem Reamer</td>
<td>Reaming the throttle valve stem hole in Reverse Valve Bushing (12) after installing a new Bushing.</td>
</tr>
<tr>
<td>25673</td>
<td>Throttle Valve Seat Reamer</td>
<td>Smoothing the seat in the Valve Chest (10) for the Poppet Throttle Valve (23).</td>
</tr>
</tbody>
</table>

* Not Illustrated

**Important:** The complete size symbol of the Winch must be stated when ordering a Motor Assembly, Motor Case (1) or Gear Case (88).
MAINTENANCE INSTRUCTIONS

Apply the Wire Rope to wind on the Rope Drum in the direction indicated by the instruction plate on the Winch.

Rotate the Brake Adjusting Nut (100) to adjust the brake.

Remove the Throttle Valve Spring (25), Poppet Throttle Valve (23) and Throttle Valve Ball (24) from the Valve Chest (10) before attempting to withdraw the Reverse Valve (27) from the Reverse Valve Brushing (12).

The following procedure is recommended when replacement of the Rotary Valve Bushing (11) or Reverse Valve Bushing (12) is necessary:

1. Unscrew the Valve Chest Screws (21) and remove the Valve Chest Cover (20).
2. Screw A NO. HU-932 Jack Bolt into each tapped lug on the Valve Chest (10) until the Jack Bolts contact the Motor Case (1), then turn each one a little at a time to jack the Chest with assembled parts from the Motor Case.
3. Unscrew the Throttle Valve Cap (26) and remove the Spring (25), Poppet Throttle Valve (23) and Ball (24) from the Valve Chest (10).
4. Withdraw the Rotary Valve (17), Reverse Valve (27) and remove the Throttle Lever Spring (35).
5. Support the face of the Valve Chest (10) that contacts the Motor Case (1) and press out the old Bushing with an arbor that will clear the Bushing Keys (13).

Caution:

6. Failure to use an arbor that will clear the Bushing Keys (13), or pressing the Bushings in the opposite direction than instructed will destroy the Keys.
7. Support the face of the Valve Chest (10) that contacts the Valve Chest Cover (20), align the keyslot in the new Reverse Valve Bushing with the Bushing Key (13) and press the Bushing into the Chest until the leading face of the Bushing is flush with the supported face of the Chest. Align the keyslot in the new Rotary Valve Bushing with the Bushing Key and press the Bushing into the Chest until the bushing shoulder is flush with the supported face of the Chest.
8. Insert the No. 23470 Throttle Valve Stem Reamer or a .505" (12.8 mm) hand reamer through the throttle valve chamber in the Valve Chest and ream the hole through the wall of the new Reverse Valve Bushing.
9. Check the fit of the Rotary Valve (17) in the new Rotary Valve Bushing. If the Valve is tighter than a good running fit in the Bushing, lap in the Valve using a fine grain lapping compound whose abrasive agent will break up rapidly. Remove all trace of the compound with kerosene after obtaining the desired fit.
10. Check the fit of the Reverse Valve (27) in the new Reverse Valve Bushing. If he fit is too tight, ream the Bushing 1.750”. Caution: The Reverse Valve is chrome plated; do not lap. 
11. Rotate the Reverse Valve in the Reverse Valve Bushing until the arrows on the two parts align, and install the Throttle Valve Ball, Poppet Throttle Valve, Spring and Cap.
12. Install the Throttle Lever Spring (35) and Throttle Control Arm (28).
13. Align the holes through the Valve Chest (10) with those in the face of Motor Case (1) and squarely start the protruding end of the rotary Valve Bushing into the Case. Place a hardwood block on the chest face and press or drive in the Bushing until the Valve chest contacts the Motor Case.

The two sections of the Crank (36) are matched before final machining, and the web of each section is stamped with an identification mark as AA17, CC21, XX19, etc. Only sections bearing identical markings can be used together. If more than one Crank is disassembled at one time, be sure only matched parts are assembled together.

Slide the Crank Pin Sleeve (37), plain end first, onto the crank pin when assembling the Crank (36).

Install the Connecting Rod Rings (44) so that the internally beveled ends are toward the Connecting Rods (43) when assembling the Crank (36).

REPAIR PARTS

To keep costly downtime to a minimum, it is desirable to have on hand certain repair parts. To guide you in the stocking of repair parts, certain Illustration Numbers of the Repair Part List are marked with a bullet (●). We recommend that with parts so indicated, you stock one (pair or set) repair part for every four tools in service.