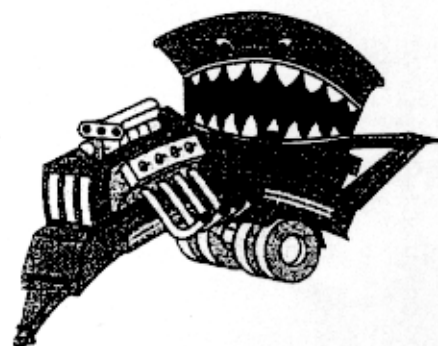




# **DURATECH**

## **INDUSTRIAL GRINDER OPERATORS MANUAL & PARTS BOOK**

### **HD-13**



## WARRANTY

Duratech Industries International Inc. warrants to the original purchaser for 6 months from purchase date that this product will be free from defects in material and workmanship when used as intended and under normal maintenance and operating conditions. This warranty is limited to the replacement of any defective part or parts returned to our factory in Jamestown, N.D., within thirty (30) days of failure.

This warranty shall become void if in DuraTech Industries International, Inc.'s., judgment the machine has been subject to misuse, negligence, alterations, damaged by accident or lack of required normal maintenance, or if the product has been used for a purpose for which it was not designed.

All claims for warranty must be made through the dealer which originally sold the product and all warranty adjustments must be made through same.

This warranty does not apply to tires or bearings or any other trade accessories not manufactured by DuraTech Industries International Inc.. Buyer must rely solely on the existing warranty, if any, of these respective manufacturers.

DuraTech Industries International Inc., shall **not** be held liable for damages of any kind, direct, contingent, or consequential to property under this warranty. DuraTech Industries International Inc., cannot be held liable for any damages resulting from causes beyond its control. DuraTech Industries International Inc., shall **not** be held liable under this warranty for rental costs or any expense or loss for labor or supplies.

DuraTech Industries International Inc., reserves the right to make changes in material and/or designs of this product at any time without notice.

This warranty is void if DuraTech Industries International Inc. does not receive a valid warranty registration card at its office in Jamestown, N.D., within 14 days from date of original purchase.

All other warranties made with respect to this product, either expressed or implied, are hereby disclaimed by DuraTech Industries International Inc.

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# INTRODUCTION

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**READ THIS MANUAL CAREFULLY TO LEARN HOW TO OPERATE AND SERVICE YOUR MACHINE CORRECTLY. FAILURE TO DO SO COULD RESULT IN EQUIPMENT DAMAGE AND MAY VOID THE WARRANTY.**

The purpose of this owners manual is to familiarize the owners and operators with the HD-13 and to explain routine maintenance and adjustments for most efficient operation of your HD-13 tub grinder. Included is a troubleshooting section which may help in case of problems in the field. Any information not covered in this manual may be obtained through your dealer.

When reference is made to the front, rear, left, and right of the machine, the reference is always made viewing the conveyor end of the machine looking towards the hitch.

Always have your serial number and model number of your machine when referencing parts and communicating with dealers and service people.

Model Number **HD-13**

Serial Number \_\_\_\_\_

The HD-13 grinder is designed to grind wood waste and other materials including:

- Green waste
- Construction and Demolition debris
- Tree branches, trunks, and root ball
- Compostables
- Mulch

## SHIPPING AND DELIVERY INSTRUCTIONS

**PRE-DELIVERY DEALER CHECKLIST:** Check off each item as it is found satisfactory or after the correction has been made.

- ◇ Check machine for shipping damage or shortages.
  - ◇ Grinder has been properly assembled.
  - ◇ Tires are inflated to proper pressure.
  - ◇ Wheel bolts are tightened to 150 ft-lbs.
  - ◇ Grinder has been properly lubricated. Page 21.
  - ◇ Hydraulic connections do not leak.
  - ◇ Grinder responds correctly to controls. Electronic governor working properly.
  - ◇ Hydraulic oil level is correct.
  - ◇ Scratches are all painted.
  - ◇ All shields are in place and decals are readable.
  - ◇ Check hammer arrangement and for proper clearance hammer to screen.
  - ◇ Check-out machine for any excessive vibration with rotor at proper rpm..
  - ◇ Check tub carrier rollers and pressure rollers for proper alignment.
  - ◇ Check tub drive chain for proper operation in sequence with tub teeth.
- This grinder has been pre-run and to the best of my knowledge is ready to deliver to the customer.
- Date delivered: \_\_\_\_\_
- Signature: \_\_\_\_\_

**DELIVERY CHECKLIST:** Review the operators manual with the customer and explain the following:

- ◇ Duratech Industries International, Inc. warranty
- ◇ Safe operation and service. Page 7-10.
- ◇ Grinder controls and operation. Page 11.
- ◇ Importance of correct hydraulic level. Page 4&21.
- ◇ Daily and periodic lubrication and maintenance. Page 21.
- ◇ Duratech Industries International parts and service
- ◇ Advise the customer not to operate machine with any shields or guards removed.
- ◇ Electronic Governor operation. Page 14-20.
- ◇ Record serial number on Introduction page of this manual.
- ◇ Encourage the customer to read the Operations Manual
- ◇ Give the customer the Operations Manual

## SHIPPING AND DELIVERY INSTRUCTIONS

**NOTE:** All machines have been pre-run at the factory to assure all functions are performing correctly. The hydraulic reservoir contains approximately 165 gallons of hydraulic oil. The oil level should be up to the oil level decal on the front of the hydraulic tank. Verify that the hydraulic oil level is correct. Add if necessary.

**CAUTION:** Lack of proper oil level in the reservoir tank will cause system to heat under continuous running. (Recommend Mobil 423 or similarly rated hydraulic oil.)

**SPECIFICATIONS****HD-13**

Weight (with Loader) .....	76,000 lbs.
Transport Width .....	11'4" (136")
Loading Height .....	10'6" (126")
Transport Length .....	51'4" (616") with folded conveyor
Axles .....	(3) - 20,000 lb. axles
Tires .....	(12) - 255 x 70R x 22.5 120 psi
Brakes .....	Air brakes
Weight on Hitch Point .....	26,000 lbs.
Fuel Capacity .....	300 U.S. gallons
Hydraulic Oil Capacity .....	165 U.S. gallons with 35 gallon airspace
Lights .....	Clearance, directional, and tail lights.
Grapple Loader Boom .....	23' reach with standard boom

**TUB FEATURES**

Tub Width .....	13"
Depth .....	60"
Tub Diameter at base .....	10'
Tub Wall .....	3/8" thick
Tub Floor .....	1/2" thick T-1 steel
Tub Drive .....	Double hydraulic orbit motor direct drive chain
Service Access .....	90° hydraulic tilting tub
Discharge Conveyor .....	26'6" (l) x 30" (w) x 6" (d), hydraulic end driven cleated belt
Belly Conveyor .....	36" wide hydraulic end driven cleated belt
Tub Speed Sensor .....	Electronic self-governing
Safety Switches .....	Safety shutdown

**Continued on next page**

## SPECIFICATIONS CONT.

### HAMMERMILL

Hammer Size .....	1-1/4" x 4" A.B. hardened swing hammers 1-3/4" thick fixed hammer with weld on hardened tip
Rotor - Shaft diameter .....	6 in. stress proof steel
Rotor Length .....	56"
Rotor Plates .....	19" diameter x 1-7/8" thick
Feed Opening .....	23-1/2" x 56-3/4"
Screen Area .....	3400 sq. in.
Screens .....	Split screens 1" thick- avail. in various sizes
Hammer Rods .....	1-1/2" Dia. case hardened rods
Bearings .....	4-7/16" oil bath pillow block bearings
Hammermill Drive .....	Direct drive with torque limiter
Standard Engine .....	3412 Caterpillar (650HP) with 18" metallic 3-plate clutch.

#### ***AVAILABLE OPTIONS FOR DURATECH MODEL HD-13 TUB GRINDER :***

- 7000 series grapple loader
- Radio Remote tub start-stop-reverse
- Narrowed tub sides for transport
- Magnetic roller with aluminum deflector
- Vandalism protection package
- Continuous rotation grapple bucket
- 27' Extend-a-boom for grapple loader.
- AC and heat in cab of loader.
- Engine block heater
- Operating guages in loader cab.
- Additional options available on request.



# SAFETY INSTRUCTIONS

**THIS GRINDER IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN AS EXPLAINED IN THE OPERATOR'S MANUAL, ADVERTISING MATERIALS, AND OTHER PERTINENT WRITTEN MATERIAL PREPARED BY DURATECH INDUSTRIES INTERNATIONAL, INC.**

**WARNING: FAILURE TO COMPLY WITH SAFETY INSTRUCTIONS COULD RESULT IN PERSONAL INJURY OR DEATH.**

**WARNING: BEFORE OPERATING YOUR GRINDER, CAREFULLY READ AND FOLLOW INSTRUCTIONS GIVEN BELOW AND CONTAINED ELSEWHERE IN THIS MANUAL.**

## SAFETY DECALS

The safety decals located on your machine contain important and useful information that will help you operate your equipment safely. To assure that all decals remain in place and in good condition, follow the instructions below:

1. Keep decals clean. Use soap and water-not mineral spirits, adhesive cleaners or similar cleaners that will damage the decal.
2. Replace all damaged or missing decals. When attaching decals, surface temperature of the machine must be at least 40 degrees F. The surface must also be clean and dry.
3. When replacing a machine component to which a decal is attached, be sure to also replace the decal.
4. Replacement decals can be purchased from your Duratech Industries International dealer.

## BEFORE OPERATING

1. Read and follow all instructions contained in:
  - Operators Manual
  - Decals placed on machine
2. Allow only responsible, properly instructed individuals to operate your machine.
3. Make sure the machine is in good operating condition and that all protective shields are in place and in proper working order. Replace damaged shields before operating.
4. Be sure all bystanders and other workers are clear before starting engine and grinder.
5. Make no modifications to the machine unless specifically recommended or requested by Duratech Industries International Inc.
6. Check periodically for breaks or unusual wear and make necessary repairs.
7. Be sure the unit is securely attached to semi-tractor during grinder operation and road transport.

# SAFETY INSTRUCTIONS

## DURING OPERATION

1. Enforce the following safety precautions to prevent serious personal injury or death due to accidental contact with grinder.
  - Everyone must be kept clear of work area except an operator properly located at the controls.
  - Disengage PTO and make sure everyone is clear of machine before starting engine.
  - Never work on or near grinder unless normal shutdown procedure has been followed and all motion has stopped.
  - An approved hard hat must be worn by all personnel within a 500 ft. radius of the operating machine.
2. Keep hands, feet, and clothing away from power driven parts.
3. Never leave controls unattended while engine is running. Shutdown engine when leaving the operator control areas.
4. Keep shields in place and in good condition.
5. Watch out for and avoid any object that might interfere with the proper operation of the machine.
6. Loose clothing, necklaces, and similar items are more easily caught in moving parts. Avoid the use of these items and keep long hair confined.

## NORMAL SHUTDOWN PROCEDURE

For your safety and the safety of others, you must use the following normal shut-down procedure before leaving the controls unattended for any reason, including servicing, cleaning, or inspecting. A variation of the following procedure may be used if so instructed within this manual or if an extreme emergency requires it.

1. Grind out as much material as possible from the tub. Stop tub rotation. Lower the loader cab.
2. Disengage rotor clutch.
3. Stop discharge conveyors.
4. After the rotor has stopped completely, the material remaining in the tub may be dumped by tilting the tub platform. Make certain that all personnel are clear of the area before performing this operation. Long material in the tub can tumble a great distance before coming to rest after being dumped from the tub.
5. If the tub is to remain in the tilted position, make certain it is fully raised and insert the hydraulic cylinder block. If the tub is to be lowered again, do so at this time.
6. Park the grapple loader.
7. Shut engine down. Switch the master control power switch to off. Turn off the power disconnect switch and remove key. Tag the switch to prevent other personnel from accidentally starting the machine during servicing.

## EMERGENCY SHUTDOWN PROCEDURE

1. If time allows, lower the cab to transport position.
2. Press emergency stop button to shutdown engine and all functions.

## **PRE-STARTING INSPECTION INSTRUCTION**

To insure long life and economical operation. Learn how to operate machine and how to use controls properly. Thoroughly instruct operator in maintenance and operation of machine. There is no substitute for a sound preventative maintenance program and a well trained operator. Prior to starting the grinder make a visual inspection of the machine. This can be done as the lubrication is being carried out. Any items that are worn, broken, missing or needing adjustment must be serviced accordingly before operating the grinder.

**WARNING:** Before inspecting the machine, use the normal shut-down procedure found on page 7.

## **PRE-OPERATING CHECKS**

Before operating the Tub Grinder, follow these instructions:

1. Read and have a thorough understanding of the operator's manual.
2. Learn how to operate and how to use controls properly. Do Not let anyone operate without instruction.
3. Know the machine's safety features and understand the safety precautions.
4. Be sure all lubrication has been carried out as recommended. **See lubrication chart.**
5. Give the machine a "once-over" for any loose bolts. Make sure machine is properly adjusted.
6. Check hydraulic oil level.
7. Check hydraulic components for leaks or damage.

**WARNING:** Hydraulic fluid escaping under pressure can be almost invisible and can have sufficient force to penetrate the skin. When searching for suspected leaks,

use a piece of wood or cardboard rather than your hands. If injured, seek medical attention immediately to prevent serious infection or reaction.

8. Visually examine rotor to see if any parts have excessive wear. These parts include shaft, plates, rods, hammers and moveable plate.
9. Check screens, screen hold downs, for wear and tightness.
10. Check installation and condition of hammers.
11. Visually examine rotor bearings and mounting bolts. Verify correct oil level in the rotor bearings.
12. Check all bearings for wear.
13. Make sure all shields and guards are in place.
14. Check lug nuts for tightness.
15. Check condition of tire rims.
16. Check tires for proper air pressure.
17. Chains and belts for proper tension and condition.
18. Condition of decals.
19. When preparing to grind, always place the machine on level ground.
20. Start the machine and check the tub direction, speed control governor for proper operation.
21. In cold weather, allow five minutes for the machine to warm up before grinding.
22. Watch for unusual or excessive vibration. If any occur, immediately shut off the power. Check to see what is wrong and correct it before starting the grinder again.

**CAUTION:** The kinetic energy in the rotor causes it to rotate long after the engine has been disengaged. Before performing any maintenance on the machine or getting into the tub, be sure rotor and all moving parts have come to a complete stop.

# BEFORE OPERATING

## CHOOSING PROPER SCREEN

All DuraTech Industries International Inc. grinders have a split screen design. The coarseness of the material to be ground is determined by the hole size in the screens. The larger the hole the coarser the grind. If a combination is used, the smallest hole should be placed on the left hand side of the rotor box where the material enters the rotor.

A variety of screen sizes are available through your DuraTech dealer.

As a general guide, the following screen sizes are recommended:

General use	4" x 7" or 6" x 9"
	Demolition screen.
Brush	4" round
Mulch	Open "Window Frame"
Compost	2" round

*CAUTION: Keep all foreign objects out of the tub and away from the rotor. Foreign objects thrown from machine may result in personal injury or damage to the machine.*

## INSTALLING A SCREEN

**CAUTION:** Follow normal shutdown procedure to tilt the tub prior to performing any service work in the rotor area.

1. Screens may be lifted from the machine with the grapple loader or other suitable hoist or lifting device. Securely attach screen to lifting device with a sturdy chain or nylon sling. Screens can weigh over 500 lbs. each but stuck screens can require forces many times this to lift them free of the grinder.
2. Use only pry bars to guide the screens in and out of the machine. The screens are very heavy and you could be easily injured if the screen moves suddenly or is inadvertently dropped.
3. Make sure material is clear from screen track.
4. Install the new screen using the lifting device and pry bars as explained above.

## INTRODUCTION

The engine is direct coupled to the rotor so the engine speed is equal to the rotor speed. The recommended engine / rotor speed is between 1700 and 2000 rpm. Use the lower end of the recommended range to improve the aggressiveness of the rotor and to improve fuel efficiency. If the engine is loaded heavily, increase the rpm.

The Electronic Governor controls the tub speed / feed rate to keep the engine at its peak operating range. The operator is able to select the operating range on the electronic governor control so when the feed of material lugs the engine, the Electronic Governor will reduce or stop the feed. The Electronic Governor maintains the rotor at a high enough rpm for the engine to recover automatically when a slug of material is encountered. The Electronic Governor may require adjustment when changing operating speed as described in the previous paragraph.

## GRINDING

- Insert the key in battery disconnect switch.
- Release engine shutdown pushbutton.
- Start the engine and set throttle at 1000 rpm.
- Allow the engine to warm up for a few minutes.
- Move retractable ladder to outer position.
- Raise discharge conveyor slightly to take weight off conveyor latch.
- Push conveyor latch lever rearwards and upwards to unlatch the discharge conveyor.
- Unfold the discharge conveyor and set to desired height.
- Enter the grapple loader cab.
- Lower both loader stabilizer legs onto firm ground.
- Raise the grapple loader cab then raise the loader boom from the tub floor.
- Swing the loader to the right of the operator seated in the cab.
- Park the bucket of the loader on the ground.
- Lower the cab and exit using care not to move any loader controls.
- Flip the **master control power switch** (found on the electric panel on the left hand side of the engine) to on.
- Push the **conveyor run switch** to the **run** position. The switch will return to neutral but the conveyor run circuit is still engaged as long as the pilot light is on. (The **conveyor run switch** is found on the electric panel on the left hand side of the engine and also in the grapple loader cab. Use the most convenient switch.)
- Engage the **rotor clutch**. Pull firmly on lever when engaging clutch, then release to allow engine to recover. Repeat until clutch can be fully engaged without stalling engine (Usually on the third try). Do not allow clutch to slip excessively.
- Throttle engine to desired operating speed between 1700 and 2000 rpm.
- Enter the grapple loader cab.  
Raise the cab fully.

Materials to be ground should be placed directly into the tub. The best method for filling the tub is:

- Fill the tub about half full of unground materials before starting tub rotation.
- Start tub rotation in the forward direction by switching the **electronic governor switch** to **on** and pushing the **tub switch** to the forward position and releasing the switch. The switch will return to neutral but the tub circuit is still engaged as long as the pilot light is on. (The **tub switch** is found on the electric panel on the left hand side of the engine and also in the grapple loader cab. Use the most convenient switch.)
- As materials are ground away, place additional materials in the tub to prevent or reduce geysering material.
- The grapple loader may be used to actively rearrange material and force feed the grinding rotor.

## SHUTDOWN

- Grind out as much material as possible from the tub.
- Stop tub rotation by bumping tub switch into reverse position. The tub rotation pilot light should go out.
- Switch the **electronic governor** to **off**.
- Swing the grapple loader to the right of the operator seated in the cab.
- Park the grapple loader bucket on the ground.
- Lower the cab and exit using care not to move any loader controls.
- Disengage the rotor clutch.
- Stop discharge conveyors by pushing the **conveyor run switch** down and releasing the switch.
- After the rotor has stopped completely, the material remaining in the tub may be dumped by tilting the tub platform. Make certain that all personnel are clear of the area before performing this operation. Long material in the tub can tumble a great distance before coming to rest after being dumped from the tub
- Return tub platform to full down position.
- Fold the discharge conveyor.
- Enter the grapple loader cab and raise the cab.
- Raise the boom and open the grapple bucket.
- Turn the bucket so the widest direction is across the width of the tub floor.
- Lower the bucket to the tub floor and place it as near to the rear of the tub as possible. Allow the weight of the boom to rest on the tub floor.
- Lower the cab fully.
- Raise the stabilizer legs fully.
- Exit the cab using care not to move any loader controls.
- Move the retractable ladder in towards the machine.
- Shut down engine by pushing the red engine shutdown button on the engine panel. Switch off engine ignition switch. Switch off master control power and battery disconnect switch.

- Remove key from battery disconnect switch.

## LODGED MATERIAL

Occasionally materials may lodge against the side of the tub and not feed down to the rotor. If this occurs, reverse the tub direction briefly and then start the tub in a clockwise direction again. The tub rotation can be reversed by pushing and holding the **tub switch** in the reverse position. This practice normally dislodges any materials.

**DANGER:** Never attempt to dislodge material inside the tub by physically entering the tub when the machine is in operation. WHEN THE MACHINE IS IN OPERATION, STAY OUT OF THE TUB!

## FOREIGN MATERIAL

Foreign material, such as tramp metal, in the rotor area can cause severe damage to hammers, screens, hammer rods, and other parts and may cause extensive part failures.

**NOTE:** A fire extinguisher should be handy at all times due to the possibility of sparks from engine exhaust or hammers hitting a foreign object.

## CLUTCH

**IMPORTANT:** Read and have a thorough understanding of the Rockford clutch operator's manual, and specification plate found on clutch housing.

**IMPORTANT:** **DO NOT** engage clutch at high engine rpm. Before starting engine, cylinder box should be cleared of all material. Set engine at approximately 1000 rpm. Pull firmly on lever when engaging clutch, then release to allow engine to recover. Repeat until clutch

can be fully engaged without stalling engine (Usually on the third try). Do not allow clutch to slip excessively. Check periodically for proper adjustment according to spec. plate on clutch housing.

## ADJUSTMENT

CLUTCH - if the clutch slips, overheats, or the clutch operating lever jumps out, the clutch must be adjusted. To adjust the clutch, follow instructions on clutch access cover.

A new clutch generally requires several adjustments until the friction surfaces are worn in. Do not let a clutch slip as this will glaze the friction plates and may ruin them.

**CLUTCH DAMAGE DUE TO EXCESSIVE SLIPPAGE WILL NOT BE COVERED BY WARRANTY.**

## TRANSPORTING

1. Grind out as much material as possible from the tub. Stop tub rotation. Lower the loader cab to transport position.
2. Disengage rotor clutch.
3. Stop discharge conveyors.
4. After the rotor has stopped completely, the material remaining in the tub may be dumped by tilting the tub platform. Make certain that all personnel are clear of the area before performing this operation. Long material in the tub can tumble a great distance before coming to rest after being dumped from the tub

5. Return tub platform to full down position.
6. Be sure any loose parts (replacement hammers and screens, etc.) are securely fastened down.
7. Fold the conveyor to transport position.
8. Park the grapple loader in transport position. Lower the cab fully. Raise the loader stabilizer legs. Retract the ladder into transport position.
9. Shut engine down. Switch the master control power switch to off. Turn off the power disconnect switch and remove key.
10. Hitch grinder to a towing vehicle with adequate load carrying and braking capacity. Only CDL qualified personnel should hitch this machine to a semi-tractor.
11. Be certain that the grapple loader stabilizer legs and the landing gear are raised prior to moving the machine.
12. Check the turning clearance between the grinder and the towing vehicle.
13. Oversize restrictions do apply to the HD-13 grinder so special permitting will be required to move on public roadways.

# ELECTRONIC GOVERNOR OPERATION

## INTRODUCTION

The Model RCB93 Electronic Governor automatically controls the feed rate to keep the engine its optimum power zone. ("engine mode") When the load on the grinding rotor begins to lug the engine, the governor automatically reduces tub rotation speed in proportion to the load. The result is nearly a constant load on the engine, which will maximize grinding efficiency.

The RCB93 Electronic governor will also perform as a simple tub speed control. ("tub" mode) In this mode the tub speed is constant and it will not change to match varying load conditions.

When the electronic governor is switched to the engine mode, it is monitoring the rotation speed of the engine. The hydraulic flow to the tub drive mechanism is regulated proportionally to the engine speed. When the engine begins to lug down, the hydraulic oil flow is reduced which in turn slows down the tub rotation. With proper calibration, the engine will only lug down to its optimum horsepower RPM and the tub rotation will be varied proportionally to keep the engine at this RPM.

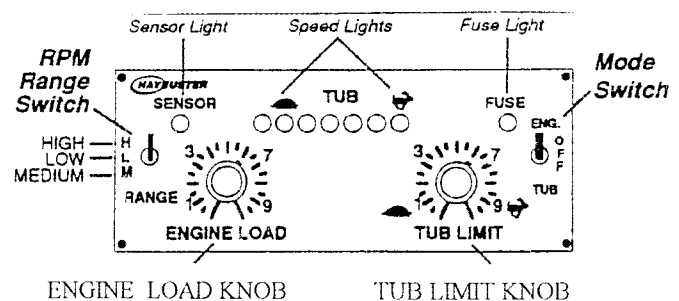
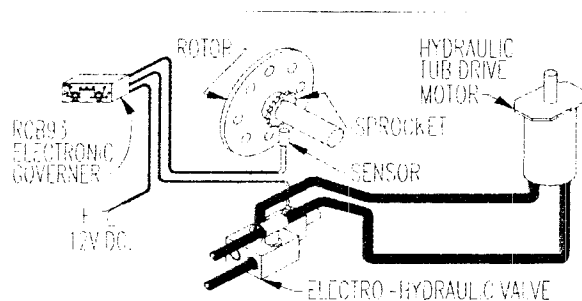
## CALIBRATION

1. Begin calibration procedure with grinder completely shutdown. Place the MODE switch in the OFF position and the RANGE switch in the M position. Rotate the TUB LIMIT KNOB fully clockwise toward the rabbit position. Turn the ENGINE LOAD KNOB clockwise until it is pointing to the number 9 position.
2. Verify that tub rotation switch is off. Inspect machine to verify that all personnel are clear of machinery.
3. Start engine and run the grinder at about 1/2 throttle to allow the hydraulic system to warm up before calibrating the RCB93 Electronic Governor.
4. When the system has reached operating temperature, throttle the engine to 1000-1200 RPM. Engage the conveyor drive then the tub drive and throttle up to

1800 RPM. Switch the MODE switch to ENG position. The FUSE light and the SENSOR light should come on. The tub should not be rotating at this time. If it is rotating, then switch the range switch to H or HIGH position.

5. Slowly rotate the ENGINE LOAD KNOB counter-clockwise until the tub just begins to move. The tub should begin to rotate before you have turned the ENGINE LOAD KNOB counterclockwise to the number 5. If it does not begin to rotate, then switch the RANGE switch to L or LOW position. The Electronic Governor is properly calibrated when the ENGINE LOAD KNOB is positioned somewhere between 5 & 9 and the tub is just beginning to creep.

## TYPICAL ELECTRONIC GOVERNOR SYSTEM



EXPLANATION OF FRONT PANEL



# ELECTRONIC GOVERNOR OPERATION

**“FUSE” LIGHT** - This is **on** whenever the electronic governor is receiving power.

**“SENSOR” LIGHT** - This light is **on** whenever the electronic governor is receiving enough input signal from the sensor.

**“SENSOR” LIGHTS** - These lights indicate how fast your tub should be turning based on the output signal that the electronic governor is sending to the electro-hydraulic valve. When the first light (furthest to the left) turns **on**, the electronic governor is sending approximately **3 volts** to the electro-hydraulic valve (6 volts on 24-volt system). The tub should begin to rotate slowly when the first or second light turns **on**. Each additional “speed” light represents **one additional volt** being sent to the electro-hydraulic valve. (2 volts on 24 volt system) with a corresponding increase in tub rotation speed. The last light (furthest to the right, under the rabbit symbol) will be **on** when a **9 volt** signal is sent to the electro-hydraulic valve. (18 volts on the 24 volt system) which will rotate the tub at the maximum speed. During operation, in the **ENGINE MODE**, these lights will move back and forth automatically between the turtle and rabbit symbols as the tub speed increases and decreases.

**“RANGE” SWITCH (HI, MEDIUM, & LOW)** - This switch is used only when in the **ENGINE MODE**. This switch is a coarse adjustment which tells the electronic governor what RPM range your engine will be operating in (typically medium). Use the **“ENGINE LOAD KNOB”** as a fine adjustment for the **RANGE** switch.

**“MODE” SWITCH - ENGINE MODE** places a near constant load on the engine based on the settings of the **“ENGINE LOAD KNOB”** and **“TUB LIMIT KNOB”**, **TUB MODE** rotates the tub at a constant speed based only on the setting of the **“TUB LIMIT KNOB”**. The Electronic Governing function will not operate in the **“TUB”** mode.

**“ENGINE LOAD KNOB”** - This single turn knob is used only in **ENGINE MODE**. Turning this knob to the **right** (to a **higher number** setting) will allow the engine to operate at a **higher RPM**, decreasing the

load on the engine. Turning the knob to the **left** (to a **lower number** setting) will **lug** the engine to a **lower RPM**, which **increases** the load on the engine.

**“TUB LIMIT KNOB”** - This single turn knob can be used in either the **ENGINE MODE** or **TUB MODE**. This dial sets the **maximum** tub speed. In **ENGINE MODE** the tub speed will be governed from the maximum speed set by the **“TUB LIMIT KNOB”** down to zero tub RPM. In the **TUB MODE** the **“THE LIMIT KNOB”** will set a **constant** tub rotation speed with **no** governing control. The **“TUB LIMIT KNOB”** will be most useful during **tough grinding conditions** when you don't want the tub to rotate at full speed if the grinding load temporarily becomes light. The closer the knob is set to turtle, or 1, the slower the maximum speed of rotation will be. The closer the knob is set to the rabbit, or 9, the tub rotation speed will not be limited at all.

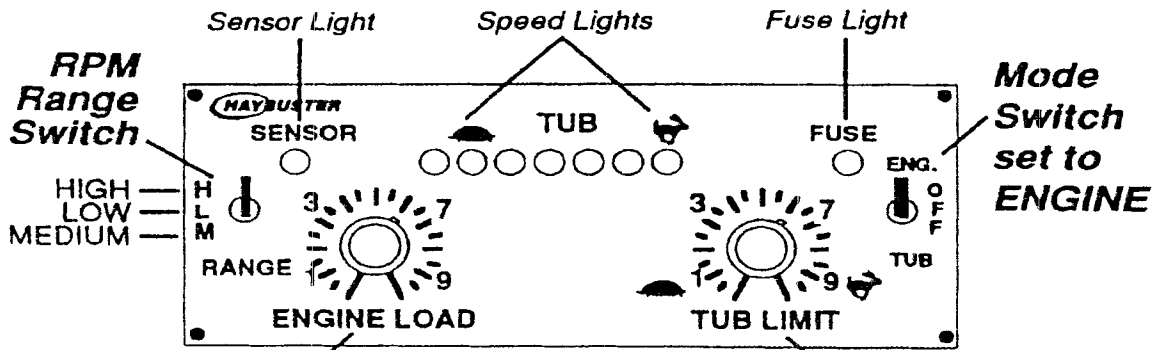
## TUB LIMIT ADJUSTMENT

If you wish to limit the maximum rotation speed of the tub, the adjustment can be made at this time, or at any time during the grinding operation by following this procedure. This function is most useful when grinding in tough conditions when you don't want the tub to turn full speed if the load happens to temporarily become light. Switch the **“MODE”** switch to **“TUB”** position. Turn the **“TUB LIMIT KNOB”** counter-clockwise to reduce the maximum rotating speed of the tub. Observe the **“SPEED”** lights to get an indication of the tub speed. If all of the lights are **on** the tub maximum rotation speed will not be limited at all. If only the first light is **on** the maximum tub rotation speed will be very slow. Choose the speed that you find desirable. This setting will be the maximum speed that the tub will turn. When the **“MODE”** switch is returned to the **“ENG.”** position, the Electronic Governor will adjust tub speed slower if required but the tub will not rotate faster than the maximum setting determined by the **“TUB LIMIT KNOB”**. Switch the **“MODE”** switch back to **“ENG.”** position to begin grinding.

# ELECTRONIC GOVERNOR OPERATION

The grinder may be operated in the "TUB" mode if desired but the Electronic Governor will not control the load on the engine. Only the maximum rotation speed of the tub will be controlled in this mode.

## ENGINE MODE

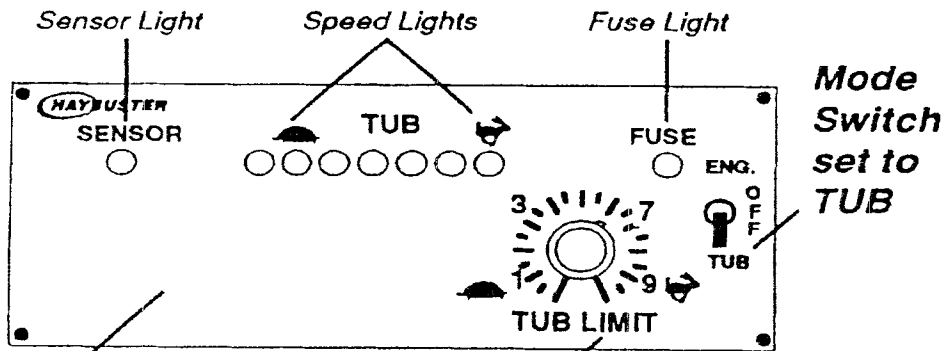


Use Engine Load dial as a fine adjustment for the RPM Range switch. Sets load desired on engine.

Use Tub Limit to set maximum tub speed. Best use is for tough grinding. No tub limiting when set to '9'.

**HINT:** Easiest way to set maximum tub RPM for engine mode of operation is to switch to tub mode prior to engaging rotors and set tub speed limit dial for a specific speed lamp(s) to be on. then switch to engine mode and engage clutch to start rotor.

## TUB MODE



Engine Load dial and RPM Range switch have no effect in Tub mode.

Tub will operate at full speed in Tub Mode unless it is limited with this dial. Closer to '1' will set maximum speed to slow. Closer to '9' will set a fast maximum speed. No limiting when dial is set full clock-wise (at '9').

MODE	USED FOR
ENGINE	Sets Max. tub RPM at one engine RPM. Tub RPM will increase and decrease as engine RPM increases and decreases.
TUB	Fixed tub RPM. Tub RPM limited only by Tub Limit Dial. Tub does not stop until the operator switches tub off or engine is stalled.

# ELECTRONIC GOVERNOR TROUBLESHOOTING

## TROUBLESHOOTING THE ELECTRONIC GOVERNOR SYSTEM

These are some simple procedures to follow in the event that problems occur with your Electronic Governor System. If the problems remain after following these procedures, follow the directions under **MANUAL OVERRIDE**, and see your dealer as soon as possible. PTO, hammer and plate damage may result if governor is not working.

**"FUSE"** light - This light is **on** whenever the Electronic Governor is receiving power. If this light fails to go on and the tub will not turn, check fuse, battery connections, and wiring harness. If the **"FUSE"** light is **on**, the wiring harness is functioning correctly between the battery and the electronic governor.

**"SENSOR"** light - This light is **on** whenever the Electronic Governor is receiving an adequate input signal from the sensor. If this light fails to go on and the tub will not turn, check sensor gap spacing, sensor connections, and wiring harness. If the **"SENSOR"** light is **on**, the wiring harness is functioning correctly between the sensor and the electronic governor.

**"SENSOR GAP SPACING"** - The sensor is found near the front grinding rotor bearing. A sprocket is located on the rotor shaft in front of the front bearing. There should be a **3/32" gap** (the thickness of a nickel) between the end of the sensor and the tips of the sprocket teeth. The sensor must not come in contact with the sprocket teeth. Any contact between the sensor and the rotating sprocket will destroy the sensor.

**"SPEED" LIGHTS** - These lights indicate how fast your tub should be turning based on the output signal that the electronic governor is sending to the electro-hydraulic valve. When the first light (furthest to the left) turns **on**, the electronic governor is sending approximately **3 volts** to the electro-hydraulic valve (6 volts on a 24-volt system.). The tub should begin to rotate slowly when the first or second light turns **on**.

Each additional "speed" light represents **one** additional **volt** being sent to the electro-hydraulic valve. (2 volts on a 24 volt system) with a corresponding increase in tub rotation speed. The last light (furthest to the right, under the rabbit symbol) will be **on** when a **9 volt** signal is sent to the electro-hydraulic valve. (18 volts on a 24 volt system) which will rotate the tub at the maximum speed. During operation in the **ENGINE MODE**, these lights will move back and forth automatically between the turtle and rabbit symbols as the tub speed increases and decreases.

To test the output voltage to the electro-hydraulic valve, shut down entire machine including switching the **"MODE"** switch on the electronic governor to **"OFF"**. Disconnect the wiring harness from the electro-hydraulic valve and route the leads so you can easily connect a voltmeter to them. Switch the voltmeter to read 12 volts DC current. Connect the red lead of the voltmeter to the red lead on the wiring harness. Connect the black lead on the voltmeter to the black lead on the wiring harness. Switch the electronic governor to **"TUB"** position. Turn the **"TUB LIMIT KNOB"** counter-clockwise until the left hand **"SPEED"** light is **on**. (The light nearest the turtle symbol.) The voltmeter should read approximately 3 volts (6 volts on a 24 volt system). Turn the **"TUB LIMIT KNOB"** clockwise until the center **"SPEED"** light is **on**. The voltmeter should read approximately 6 volts (12 volts on a 24 volt system). Turn the **"TUB LIMIT KNOB"** clockwise until the 7th light just turns **on**. The voltmeter should read approximately 9 volts (18 volts on 24 volt system). The voltage readings are not critical but the fact that the readings increase as the **"TUB LIMIT KNOB"** is turned clockwise is important. The RCB93 Electronic Governor is working correctly if you get readings similar to those shown. The wiring harness to the electro-hydraulic valve is functioning correctly if you are able to obtain readings at the valve end of the harness.

If no readings are obtainable at the valve end of the harness, switch the electronic governor **"MODE" SWITCH TO "OFF"**. Disconnect the wiring harness from the rear of the electronic governor. Refer to the diagram of the wiring harness connector below. Check **pin D**

# ELECTRONIC GOVERNOR TROUBLESHOOTING

and the red valve lead on the harness for continuity. Also check pin E and the black valve lead for continuity. If there is no continuity in either one of the leads the wiring harness must be replaced. If you have continuity in both valve leads, the valve leads in the wiring on the wiring harness connector and reconnect the wiring harness to the electronic governor. Check again for voltage at the valve leads as described above. If no voltage is present at the end of the valve leads the RCB93 Electronic Governor is faulty

## ELECTRO-HYDRAULIC VALVE ADJUSTMENT

Locate the teardrop shaped cover on the right hand side of the machine just below the tub drive and open the cover. Remove the rubber end cap from the end of the valve coil to find a jam nut and an adjusting stud with a screwdriver slot. Disconnect the wiring harness from the coil. Loosen the jam nut. Start the engine and engage the tub drive in the forward direction. Throttle the engine up to 2000 RPM.

**IMPORTANT:** *Stay clear of all moving parts while adjusting the "ELECTRO-HYDRAULIC VALVE". The tub will be rotating during this adjustment.*

If the tub is not rotating, turn the adjusting stud clockwise until the tub begins to rotate. When the tub begins to rotate, turn the adjusting stud counter-clockwise until the tub just stops. (If the adjusting stud comes all the way out and the tub is still rotating, then the valve is faulty.) Lock the adjusting stud with the jam nut and replace the rubber cap. Shut down the entire machine. Reconnect the wiring harness to the valve coil.

## ELECTRO-HYDRAULIC VALVE COIL TEST

This test requires an accurate ohm meter. Disconnect the wiring harness leads at the valve coil. Set the meter to read ohms( $\Omega$ ). Place one test lead from the meter on each of the two electrical connectors of the valve coil. The readings should be from 8-14 ohms. If the reading is not in that range, replace the coil.

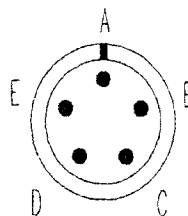
## MANUAL OVERRIDE

**NOTE:** If there is an electrical failure with your machine you may still be able to grind. Switch the RCB93 Electronic Governor to "OFF". Locate the teardrop shaped cover on the right hand side of the machine just below the tub drive and open the cover. Remove the rubber end cap and loosen the jam nut on the electro-hydraulic valve. Start the machine and engage the tub drive as previously described.

Turn the adjusting stud clockwise until the tub rotates at the desired speed. Lock the jam nut on the adjusting stud and replace the rubber end cap on the valve coil. The valve will function only as a manual flow control when it is adjusted in the manner. The grinder will now operate as it would if the RCB93 Electronic Governor were switched to the "TUB" mode. There will be **NO** automatic tub control!

Contact your dealer for further repairs or replacement parts as soon as practical. When the problems are corrected, loosen the jam nut on the electro-hydraulic valve and turn the adjusting stud counter-clockwise until the tub stops. Tighten the jam nut and replace the rubber end cap. Close the teardrop shaped cover.

VIEW OF WIRING HARNESS CONNECTOR  
LOOKING DIRECTLY AT CONNECTOR.



- A - 12 VOLTS DC
- B - GROUND
- C - DIGITAL SENSOR SIGNAL
- D - (+) TO VALVE
- E - (-) TO VALVE

## ELECTRONIC GOVERNOR VOLT-OHM READINGS 12VDC SYSTEM

WIRE HARNESS CONNECTOR	ENGINE	IGNITION SWITCH	READING	INCORRECT READING INDICATES	CHECK IF INCORRECT READING
Valve terminals, system in Manual (Wires attached)	Not Running	ON	13 volts DC	Defective wiring, control box	Wires to valve
Valve terminals, system in Auto (Wires attached)	Running 1500 to 2550 rpm	ON	1-10 volts DC varies with rpm	Defective wiring, control box	Wires to valve
Valve terminals, (Wires removed)	Not Running	OFF	9.6 ohms	Defective valve	
Pin A to B	Not Running	ON	13 volts DC	13 volts not at control box, no ground	Wires to tractor
Pin A to Ground	Not Running	ON	13 volts DC	13 volts power not reaching box	Wires to tractor
Pin B to Ground	Not Running	OFF	Less than 5 ohms	Black wire not grounded	Ground Wire
Pin D to E	Not Running	OFF	9.6 ohms	Valve wiring or valve defective	Wires to valve, valve
Pin D to Ground	Not Running	OFF	Infinite ohms	Valve wiring or valve defective	White wire to valve, valve
Pin E to Ground	Not Running	OFF	Infinite ohms	Valve wiring or valve defective	Blue or black wire to valve

# TROUBLE SHOOTING

## ELECTRONIC GOVERNOR VOLT-OHM READINGS 24VDC SYSTEM

WIRE HARNESS CONNECTOR	ENGINE	IGNITION SWITCH	READING	INCORRECT READING INDICATES	CHECK IF INCORRECT READING
Valve terminals, system in Manual (Wires attached)	Not Running	ON	25 volts DC	Defective wiring, control box	Wires to valve
Valve terminals, system in Auto (Wires attached)	Running 1500 to 2550 rpm	ON	2-20 volts DC varies with rpm	Defective wiring, control box	Wires to valve
Valve terminals, (Wires removed)	Not Running	OFF	9.6 ohms	Defective valve	
Pin A to B	Not Running	ON	25 volts DC	voltage not at control box, no ground	Wires to tractor
Pin A to Ground	Not Running	ON	25 volts DC	25 volts power not reaching box	Wires to tractor
Pin B to Ground	Not Running	OFF	Less than 5 ohms	Black wire not grounded	Ground Wire
Pin D to E	Not Running	OFF	9.6 ohms	Valve wiring or valve defective	Wires to valve, valve
Pin D to Ground	Not Running	OFF	Infinite ohms	Valve wiring or valve defective	White wire to valve, valve
Pin E to Ground	Not Running	OFF	Infinite ohms	Valve wiring or valve defective	Blue or black wire to valve

**CAUTION:** Always follow normal shutdown procedure before adjusting or lubricating.

**Hydraulic oil reservoir capacity:**

165 U.S. gallons.

Hydraulic oil filters should be changed after the first 10 hours of operation. Change hydraulic oil and filters after the first 100 hours of operation. Thereafter, change hydraulic oil filters every 500 hours and change hydraulic and filters at least every 1000 hours of operation.

Observe the hydraulic oil frequently. If the oil develops a burnt odor or appearance, a "dirty" appearance, or a "milky" appearance, it should be changed at the earliest possible opportunity. If these conditions occur frequently between scheduled oil and filter changes the maintenance schedule should be altered to a more frequent schedule.

**BEARING LUBRICATION**

Bearings operating in the presence of dust and water should contain as much grease as speed

will permit, since a full bearing with a slight leakage is the best protection against entrance of foreign material. In the higher speed ranges, too much grease will cause overheating.

When grinder is operated during cold weather, all lubrication should be performed after bearings are at operating temperatures.

Any bearing operated at high speed and operating at abnormal bearing temperature may indicate faulty lubrication. Normal bearing temperatures may range from "cool to warm to the touch". Unusually high temperatures "too hot to touch for more than a couple of seconds" accompanied by excessive leakage of grease at the seals, indicates too much grease. High temperatures with no grease showing at the seals, particularly if the bearing seems noisy, usually indicates too little grease. Normal temperature and a slight showing of grease at the seals indicate proper lubrication.

The following chart is a general guide for relubrication. Certain conditions may require more frequent lubrication periods as dictated by experience.

## LUBRICATION CHART

REF. NO.	LOCATION	NUMBER OF ZERKS	FREQUENCY	
1.	Tub Drive Shaft Bearings	2	40 hrs.	*
2.	Tub Drive Pivot Points	2	40 hrs.	
3.	Tub Rollers Bearings	16	40 hrs.	*
4.	Tub Chain Idler Bearings	0	Non-relubable	
5.	Rotor Input Shaft	3	40 hrs.	
6.	Discharge Conveyor Bearings	4	40 hrs.	*
7.	Discharge Conveyor Pivot points	2	40 hrs.	
8.	Belly Conveyor Bearings	4	40 hrs	*
9.	Tub Pressure Rollers Bearings	0	Non-reclubable	
10.	Rotor Bearings	Oil Bath	Check level daily	
11.	Roller Chains		Oil Daily in Dusty Conditions	
12.	Grapple Loader Pump Drive	4	40 hrs.	*

\* Refer to bearing lubrication section for the following.

## **IMPORTANT SAFETY INSTRUCTIONS READ ALL INSTRUCTION**

**CAUTION: If arc welding is to be done, always ground rotor to frame of machine to prevent arcing in rotor bearings.**

## **SERVICE AND MAINTENANCE**

1. Before working on or near grinder for any reason, including servicing, inspecting or unclogging machine:
  - a. Disengage rotor clutch.
  - b. Be certain that parking brakes are set.
  - c. Shut off grinder engine and remove key. Place a warning lockout tag near the switch to prevent other personnel from inadvertently starting the equipment while service is being performed.
  - d. Do not begin any service procedures until all machine movement has ceased.
2. When replacing any part on your grinder, be sure to use only DuraTech Industries International authorized parts.
3. Relieve all pressure in the hydraulic system before disconnecting the hydraulic lines or performing other work on the hydraulic system. Make sure all connections are tight and the hoses and lines are in good condition before applying pressure to the system.
4. Hydraulic fluid escaping under pressure can be invisible and have enough force to penetrate the skin. When searching for a suspect leak, use a piece of wood or cardboard rather than your hands. If injured, seek medical attention immediately to prevent serious infection or reaction.
5. Visually examine to see if any internal parts show excessive wear. Repair or replace needed parts. These parts should include rotor plates and holes in the plates that support the hammer rods. Enlarged holes can cause hammer rods to break. Also check rods, rod locking and retaining devices, hammers, screens, screen tracks and hold downs, main shaft, lid locking devices, hinges or anything else that could wear and perhaps fail if not properly maintained, and cause damage to the rotor and/or personnel. Bearing alignment should also be checked along with mounting bolts to insure a firm foundation and reduced vibration.
6. Check for loose or worn chains and loose or worn sprockets.
7. Keep sprockets and pulleys aligned.
8. Inspect rotor and all rotating parts for material buildup. Clean as necessary.
9. If machine is going to set for an extended period of time, tub floor should be cleaned and repainted to prevent rust and sticking problems at start up time.
10. The proper tire pressure is 120 psi.
11. The wheel bearing lube level should be checked monthly. Use 80W-90 Hypoid gear oil. Proper level is marked on the transparent hub cap. Change lube annually.
12. Tighten wheel lug nuts to 450-500 Lb.-Ft..



**HAMMERS:** Because of the high capacity of this machine, the hammers will wear and must be considered expendable. To maximize hammer life and even out the wear over the entire hammer, it is suggested that the hammers be rotated periodically within the rotor.

**CAUTION:** Keep all foreign objects out of the tub and away from the rotor. Foreign objects may result in personal injury or damage to the machine.

**JACOBS HAMMERS** are designed for grindable organic materials to produce mulch, compost, and related products. They are not designed to grind or crush, on a primary basis, hard materials such as coal or minerals. Metals, rock, or other similar materials which could cause parts to fail, should never be allowed to enter the rotor. **JACOBS HAMMERS** have been designed and manufactured to provide the best compromise between hardness for good wearing qualities and strength for dependability and resistance to breakage. Any alteration of the hammer by heating, grinding, resurfacing or any other process, other than instructed by DuraTech or Jacobs, can change the mechanical properties of the hammer and make it unsuitable or dangerous to use.

## **HAMMER AND SCREEN CONDITION**

Rotor hammers and screens are the heart of the machine. If cutting edges of the hammers become rounded, hammers should be replaced, rotated, or rebuilt to expose new cutting edges. Badly worn hammers should be replaced.

Fixed hammers with the weld-on replaceable tips must be rebuilt by a qualified welder who has been trained in the proper rebuild procedure by a representative of DuraTech or Jacobs.

Screens have two cutting edges. When hole cutting edges become rounded, screen can be swapped from side to side exposing new cutting edges.

The results of badly worn hammers and screens is loss of capacity, and added horse power requirements.

**HAMMER RODS:** Hammer rods are manufactured with a tough core and a hardened exterior case. This is a carefully balanced combination to provide long wear and toughness to reduce breakage. Hammer rods should be considered expendable and will need to be replaced occasionally.

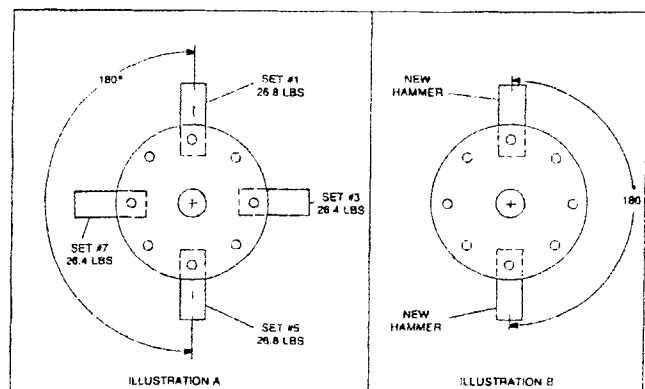
## HAMMER REPLACEMENT

When installing or changing hammers, be sure to follow directions on the installation spacers diagram carefully. Misplacement could cause excessive vibration. We recommend that hammers be balanced in sets according to the rod on which they are to be installed. Sets of equal weight should be installed 180 degrees apart (See illustration A.) When replacing a worn or broken hammer with a new hammer always install a second new hammer 180 degrees from the first (See illustration B.)

1. Grind out as much material as possible from the tub. Stop tub rotation. Lower the loader cab to transport position.
2. Disengage rotor clutch.
3. Stop discharge conveyors.
4. After the rotor has stopped completely, the material remaining in the tub may be dumped by tilting the tub platform. Make certain that all personnel are clear of the area before performing this operation. Long material in the tub can tumble a great distance before coming to rest after being dumped from the tub.
5. Make certain the tub platform is fully raised and insert the hydraulic cylinder block.
6. Park the grapple loader and raise stabilizer legs.
7. Shut engine down. Switch the master control power switch to off. Turn off the power disconnect switch and remove key.

**CAUTION:** Shut off engine and remove key. Tag the switch with a warning to prevent other personnel from inadvertently starting the machine while service work is being performed.

8. Loosen two bolts at rear of rotor which holds the hammer rod retainer plate in place.
9. Rotate retainer plate counter clockwise to align holes allowing hammer rods to be removed through rear of rotor.
10. Remove one row of hammers and replace, taking note as to where any spacers are located.
11. After all hammers have been replaced, reassemble retainer plate and rear cylinder bearing cover.
12. When starting the rotor after installing a new set of hammer or turning corners, watch for unusual or excessive vibration. If any occurs, immediately shut off the rotor. Check to see what is wrong and correct it before starting the rotor again.



## CONVEYOR BELTS:

Discharge conveyor upper and lower roller are adjustable to allow for belt stretch. If conveyor belt slows down or stops during operation, tighten adjusting bolts equally to keep belt centered on rollers. Belt tightness should be judged based on slippage.

**CAUTION: Do not overtighten conveyor belts.**

## ADJUSTING CONVEYOR BELT TRACKING:

**IF BELT IS RUNNING TO THE RIGHT SIDE:** Adjust the bearing mount to increase tension on the right hand side until belt centers on roller.

**IF BELT IS RUNNING TO THE LEFT SIDE:** Adjust the bearing mount to increase tension on the left hand side until belt centers on roller.

The drive roller and the idler roller at the opposite end of the belt may both require adjustment. (Do not adjust small carrier rollers to correct belt tracking. The carrier rollers need to be square with conveyor frame and no further adjustment should be required.)

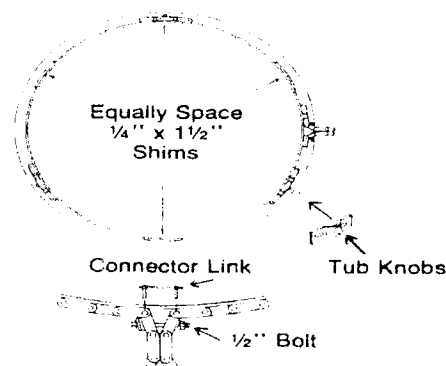
## TUB CHAIN DRIVE:

Tub drive chain is equipped with spring tensioned idlers. Due to normal wear the tub drive chain may tend to climb on driving teeth of tub. If this should occur, the chain should be sized to fit the tub, and the tub teeth adjusted for proper spacing in the chain.

Step 1 (sizing the chain). Remove tub drive chain from the drive sprocket. Loosen tub teeth and wrap the chain around tub. (Do not run the chain around tightener idlers or drive sprocket.) Using  $\frac{1}{2}$ " bolt inserted through the chain links, draw chain together

so center to center measurement on link pins matches pins on connector link. If the distance is less or greater than the connector link, shims must be added. Equally space shims of the same thickness and length under chain until proper distance is obtained. Do not add shims under tub teeth. (See illustration.)

Step 2. Adjust tub teeth so all four sets of teeth contact chain link on the same side of the teeth. Tighten bolts holding teeth in place and return chain to working position.



## ROTOR BEARING INSPECTION

Inspect shaft. Insure that the shaft is smooth, straight, clean and within commercial tolerances.

Inspect bearing. Do not allow bearing to be exposed to any dirt or moisture. Do not remove slushing compound as it acts as both a protectant and lubricant and is also compatible with standard greases.

## ROTOR BEARING INSTALLATION

**WARNING:** To ensure that drive is not unexpectedly started, turn off and lock out or tag power sources before proceeding. Failure to observe these precautions could result in bodily injury.

**NOTE:** Housing caps and bases are not interchangeable, they must be matched with mating half. Install non-expansion bearing first.

## ROTOR BEARING INSTALLATION

-CONTINUED.

1. Apply a light coating of oil or other rust inhibitor to the adapter area of the shaft.
2. **Measure the internal clearance of the bearing before mounting.** Place the bearing in an upright position. Seat the inner ring and roller elements by pressing down firmly on the inner ring bore while rotating the inner ring a few times. Position the roller assemblies so that a roller is at the top most position on both sides. Using a feeler gauge measure the clearance for both sides by inserting as far as possible and sliding over top of roller. Write down the measured clearance for use in step 3 E. **NOTE:** Do not rotate bearing when moving feeler guage between roller and outer ring.
3. Install the bearing parts in the following sequence. **NOTE:** bearing can only be correctly installed one way, refer to **Figure 1** on page --
  - A. **V-ring Seal:** Slide one of the V-ring seals onto the shaft. **making sure lip is toward the bearing.** Set aside until step 11. **NOTE: Do not install V-ring seal on seal until housing cap has been set in place and tightened.**
  - B. **Seal Ring:** install a seal ring on shaft with the largest O.D. toward bearing.
  - C. **Adapter:** slide adapter onto the shaft. threaded end outboard to the approximate location of the bearing. Apply light coating of oil to sleeve O.D. **Do not use grease.**
  - D. **Bearing:** make sure that the internal clearance has been written down. Install bearing on adapter sleeve. large end of tapered bore first. Locate bearing in proper position on shaft. Before

tightening refer to **Figure 1** and Table 3 on page 29.

E. **Lockwasher and Locknut:** install the lockwasher on the adapter with inner prong located in the slot and toward the bearing. Install lock nut, chamfered face toward bearing.

4" to 10-1/2" shaft: tighten locknut by hand followed by light tapping on a bar inserted in notches on O.D. of locknut until snug against bearing. Tighten all MICROMOUNT® screws evenly in sequence, and in small increments (10° to 15° turns) until clearance is **reduced**. Loosen all screws until they are snug at large end if nut. Screws have been staked at factory to prevent removal, however, restake if necessary. Tighten locknut until it is tight against bearing. (Use drift pin and hammer. Do not overtighten.)

Find a lockwasher tab that aligns with a locknut slot and bend tab into slot. It slot is past tab then tighten, not loosen, lock-nut to meet a washer tab.

**Table 1 - Internal Clearance Reduction**

Shaft Diameter	Reduction in Internal Clearance
4-7/16"	0.0025 to 0.0035 in.

F. **Seal Ring:** install a second seal ring with large O.D. toward locknut.

G. **V-Ring Seal:** Slide second V-ring onto the shaft, again making certain lip is toward bearing. **Note: Do not install V-ring seal on seal ring until housing has been set in place and tightened.** See Step 11.

4. Remove any paint, dirt or burrs from the mating surfaces of the housing halves. Thoroughly clean seal groves on both sides. Set lower half of housing on base with all four cap bolts in place and apply oil to the bearing seats. Apply grease to the seal grooves in the lower housing.

Be sure the housing is positioned as shown in Figure 1 view relative to adapter nut.

5. Apply lubricant to the bearings and seal rings. The lubricant should be smeared between the rolling elements. Use Mobil SHC-626 or similar oil for bearing lubricant. **Do not use detergent motor oil!**
6. Place shaft with bearing into lower half while carefully guiding the seal rings into the housing grooves.
7. **Bolt lower half of the non-expansion bearing housing to the base.** Move shaft endwise so that stabilizing ring can be inserted between the bearing outer ring and the lower half shoulder on same side as the locknut. Make all other bearings on same shaft expansion by centering in the middle of their housing seat. Bolt expansion housings to base. **Note: Only one bearing per shaft is non-expansion, other bearings should be expansion.**

**Table 2 - Recommended Torque Values**

Shaft Size	Housing Cap Bolt Size	Recommended Torque Value (ft.-lbs.)
4-7/16"	5/8-11	80-100

8. When closed end is required, the end plug supplied should be fit into the center seal ring groove of the housing.
9. Lubricate the bearing seal grooves in the housing cap and place over the bearing after wiping the mating surfaces. The two dowel pins will align the cap with the lower housing half. **NOTE:** Each cap nuts be matched with its mating lower half, as these parts are not interchangeable.

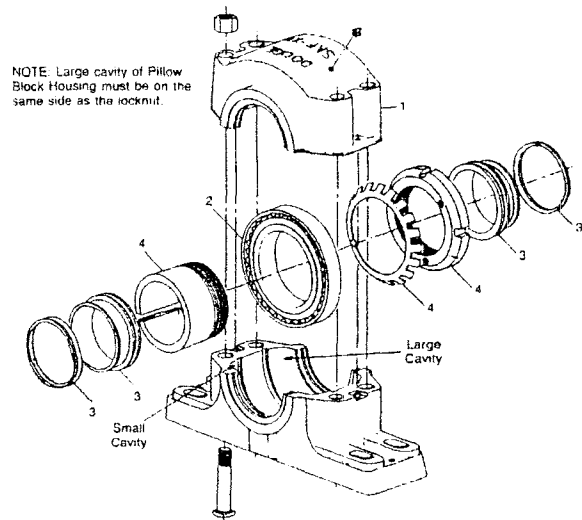
10. Tighten cap bolts and nuts to the recommended torque in Table 2.
11. Assure that there is seal running clearance then install V-ring seals onto the seal rings **and coat V-ring seals with grease.**
12. Misalignment of pillow blocks nuts not exceed 1/2°.

**Table 3 - Bearing to Housing Offset s''**

**Dimension Expansion brg. located at center of expansion.**

Size	Non-exp.	Exp.
4-7/16"	41/64"	29/64"

One Spacer On Each Side of Bearing



**Figure 1**

# MAINTENANCE

## MAINTENANCE

**Warning:** To insure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

Remove housing cap in order to inspect bearing and lubricant. Before reassembly it is important that the V-ring seals be removed. This will ensure that seal lip will not be damaged while setting cap in place. Reassembly per installation steps 9 thru 11 above.

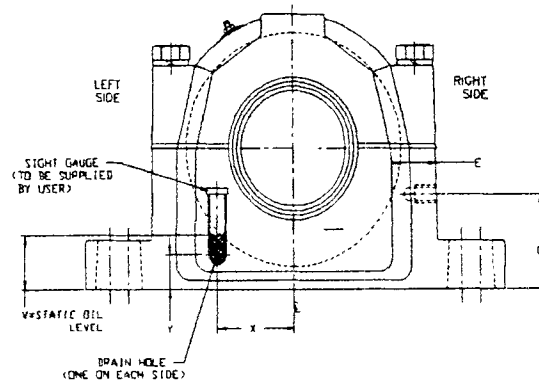


Figure 2

**Seal Replacement:** When removing bearing it is recommended that V-ring seals and seal rings be replaced.

### 4-7/16" BEARING LUBRICATION

Use Mobil SHC-626 oil, or similar. **Do Not Use Detergent Motor Oil.**

Static oil level should bring oil to centerline of bottom roller. Oil level in sight glass should be 2-11/32" above base housing. Dimension "W" on Figure 2.

**BRAKE COMPONENT LUBRICATION**

A schedule for the periodic lubrication of brake components should be established by the operator on the basis of past experience and severity of operation.

**GUIDELINES**

- For camshaft roller journals Lubricate with high temperature anti-seize grease.
- For anchor pins: lubricate with high temperature anti-seize grease.
- For manual slack adjusters: lubricate with NLGI Grade 2.
- For automatic slack adjusters: Lubricate with ASA manufacturers recommended lubricant.

**FREQUENCY OF SERVICE**

Camshaft roller journals, anchor pins, slack adjusters every 25,000 to 30,000 miles or every six months depending on severity of service. (For off highway use: service every 4 months depending on severity of service.)

**CAUTION:** Care Must be exercised when lubricating the camshaft bushings and anchor pins. Over lubrication could cause lubrication saturation of brake linings and a possible safety problem.

**NOTE:** Reline shoes replace with new shoe and lining assemblies when the linings are grease saturated.

**SUGGESTED PREVENTATIVE MAINTENANCE**

- Every 1,000 miles: Check oil level in wheel hub and inspect wheel for leaks.
- Every 15,000 miles: Check brake adjustment. Repack wheel bearings (grease application).

- Every 25,000 to 30,000 miles: Check lining wear and estimate reline time. Inspect camshaft, camshaft spider bushing and camshaft support bracket bushing for any signs of wear. Lubricate brake actuating components.

Every 100,000 miles, once a year, or at brake reline: Replace wheel bearing lubricating oil (if applicable). Check brake air chambers and slack adjusters. Inspect brake rollers, roller shafts, anchor pins and bushings and replace if necessary.

**RECOMMENDED BRAKE ASSEMBLY/DISASSEMBLY PROCEDURE 16-1/2" X 7 BRAKES**

1. Release brake and back off slack adjuster.
2. Remove slack adjuster lock ring and slack adjuster.
3. Remove brake drum (if outboard mount). Remove hub and drum assembly (if inboard mount).
4. Disengage the roller retainers from the rollers.
5. Press down on the bottom brake shoe and remove the lower cam roller. Lift the top shoe and take out the top cam roller.
6. Lift out the shoe retractor spring, which is now free of tension.
7. Swing the lower shoe back approximately 180° to relieve the tension on the shoe keeper springs. Remove the springs and slip the shoes off the anchor pins.
8. Remove camshaft lock ring, spacer washer(s) and camshaft.
9. After removing the shoes, completely inspect all brake components, servicing as necessary.

## REASSEMBLY

1. Install new anchor pin bushings, camshaft bushings and camshaft seals into the spider.

**CAUTION:** When installing camshaft seals, the seal on the slack adjuster side is installed with seal facing into spider. This allows grease to purge outside the brake assembly when greasing the camshaft bushing. It also aids to avoid damage of the seal lip when camshaft is installed.

2. Install cam roller, retainer clip and retractor spring retainers onto the brake shoes.
3. Install 1.8: thick camshaft washer onto the camshaft.
4. Install the camshaft into the spider. Install spacer washer and lock ring retainer on camshaft before sliding the camshaft through the camshaft support bracket. Install the slack adjuster, washer, and lock ring retainer.
5. Install the brake keeper springs onto the shoes. Install shoes onto the spider by placing shoes in place on the anchor pins, then wrap the two shoes into place about the spider.
6. Install the shoe retractor spring onto the shoes.
7. Connect slack adjuster to brake chamber pushrod.
8. Adjust brakes as outlined in brake adjustment procedures.



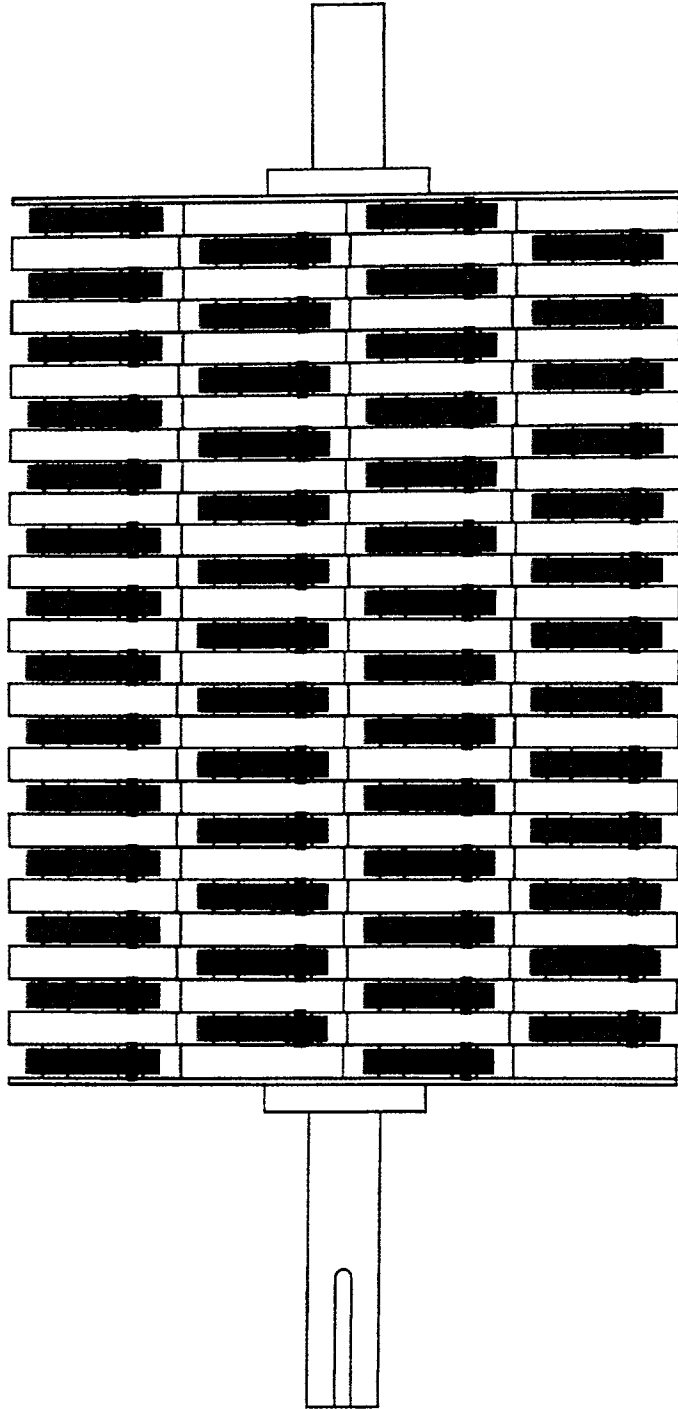
**AXLE FASTENER SPECIFICATIONS**

<b>Part Name</b>	<b>Model</b>	<b>Size &amp; Thread</b>	<b>Grade</b>	<b>Torque</b>
Spindle Nut Inner (larger)	D2000 D2200	2-5/8 - 16	5	Refer to Bearing adjustment Section
Outer(smaller)	D2500	2-5/8 - 16	5	250-300 lb.-ft
Grease Zerk	Cam bushing Spider	1/4 - 28 UNF 1/8 - 27 NPT	2 2	5-15 Lb. - In. 5 - 8 LB. - Ft.
Cam Brackets	All Models	1/4 - 20	2	3 - 4 Lb. - Ft.
Air Chamber Mounting Nuts	All Models	5/8 - 11	5	Hex Nut 85-95 Lb. - Ft. Locknut 120-140 Lb. - Ft.
Anchor Pin Clamp Bolt	12-1/4" Dia. Air Brakes	7/16 - 20	5	60 - 70 Lb. - Ft.
Dust Shield Mounting	16-1/2" Dia. Air Brakes with Tapped Spiders	5/16 - 18	5	10 - 15 Lb. - Ft.
Hub Cap	All Models	5/16 - 18	5	10 - 15 Lb. - Ft.
Drum Mounting Screw Backnut	12-1/4" Dia. 16-1/2" Dia.	5/8 - 18 3/4 - 16	5 5	160 - 180 Lb. - Ft. 175 - 200 Lb. - Ft.
Wheel Nut Inner	10 on 11-1/4	3/4 - 10	5 or 8 (Steel Wheels) 8 (Aluminum Wheels)	450 - 500 Lb. - Ft.
Wheel Nut Outer	10 on 8-3/4	1-1/8 - 1	5	450 - 500 Lb. - Ft.
Rim Mounting	Demountable Rim Type	3/4 - 10	5	190 - 210 Lb. - Ft.

**NOTE: ALL FASTENER PARTS MUST BE CLEAN AND DRY!**

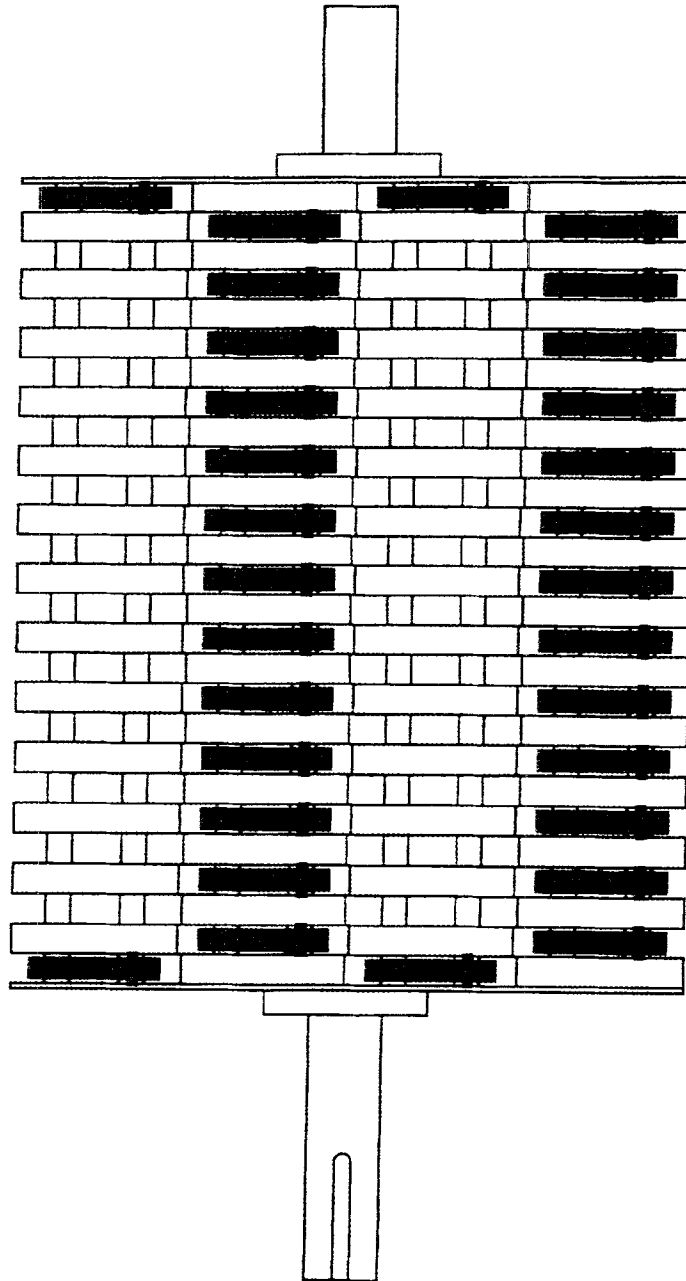
**HD-13 HAMMER PATTERN**

**FULL SET OF HAMMERS**



**HD-13 HAMMER PATTERN**

**"HALF" SET OF HAMMERS**



# TROUBLE SHOOTING

PROBLEM	CAUSE	REMEDY
1. No grinding capacity	<ol style="list-style-type: none"> <li>1. Screen plugged</li> <li>2. Badly worn screens and/or hammers</li> <li>3. Materials too light or fluffy</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean holes in screen</li> <li>2. Replace or turn worn parts</li> <li>3. Mix with heavier material</li> <li>4. Use larger screen</li> <li>5. Use grapple loader to force feed material.</li> </ol>
2. Tub slows down or turns slowly	<ol style="list-style-type: none"> <li>1. Governor not adjusted properly</li> <li>2. Electronic governor system problems.</li> <li>3. Low hydraulic pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. See <b>Electronic Governor adjustment</b></li> <li>2. See <b>Electronic Governor troubleshooting.</b></li> <li>3. Internal leakage or wear in orbit motor or pump. Faulty relief valve.</li> </ol>
3. Excessive vibration	<ol style="list-style-type: none"> <li>1. Broken hammer</li> <li>2. Defective cylinder bearing</li> <li>3. Misaligned or worn driveline</li> <li>4. Foreign material wrapped in cylinder</li> <li>5. Incorrect hammer pattern</li> </ol>	<ol style="list-style-type: none"> <li>1. See <b>Hammer replacement</b></li> <li>2. Replace bearing</li> <li>3. Replace worn part or complete driveline</li> <li>4. Remove material</li> <li>5. See <b>Hammer replacement</b></li> </ol>
4. Engine loses excessive RPM's before tub stops	<ol style="list-style-type: none"> <li>1. Governor not adjusted properly</li> </ol>	<ol style="list-style-type: none"> <li>1. See <b>Governor Adjustments</b></li> </ol>
5. If tub runs with control box switch off. Disconnect wires at valve.		
A. If tub stops	<ol style="list-style-type: none"> <li>1. Control box is out of adjustment</li> <li>2. Control box is faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. See Electronic governor adjustments.</li> <li>2. Replace control box</li> </ol>
B. If tub keeps turning	<ol style="list-style-type: none"> <li>1. Valve override screw is adjusted in too far.</li> <li>2. Valve is faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust override screw. See Electronic governor adjustments.</li> <li>2. Replace valve</li> </ol>
6. If tub stalls	<ol style="list-style-type: none"> <li>1. Tub hydraulic system, pressure relief valve set too low.</li> <li>2. Tub overloaded due to wet, tough grinding material</li> <li>3. Too much material in tub</li> <li>4. Tub binding</li> <li>5. Hydraulic oil too hot causing electronic governor valve to bind.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust to 2,500 PSI max.</li> <li>2. Reduce amount of material in tub or shift hydraulic tub drive to low range.</li> <li>3. Reduce amount of material in tub</li> <li>4. Remove material buildup between tub and platform framework.</li> <li>5. Reduce load on hyd. system or stop and allow oil to cool.</li> </ol>
7. If oil overheats	<ol style="list-style-type: none"> <li>1. Pressure relief valve in control valve set too low</li> <li>2. Tub overloaded</li> <li>3. Worn pump, control valve, hyd. motors, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust to 2,500 Psi max.</li> <li>2. Reduce amount of material in tub</li> <li>3. Rebuild or replace hyd. components as necessary</li> </ol>



**HD-13**  
**INDUSTRIAL**  
**GRINDER**

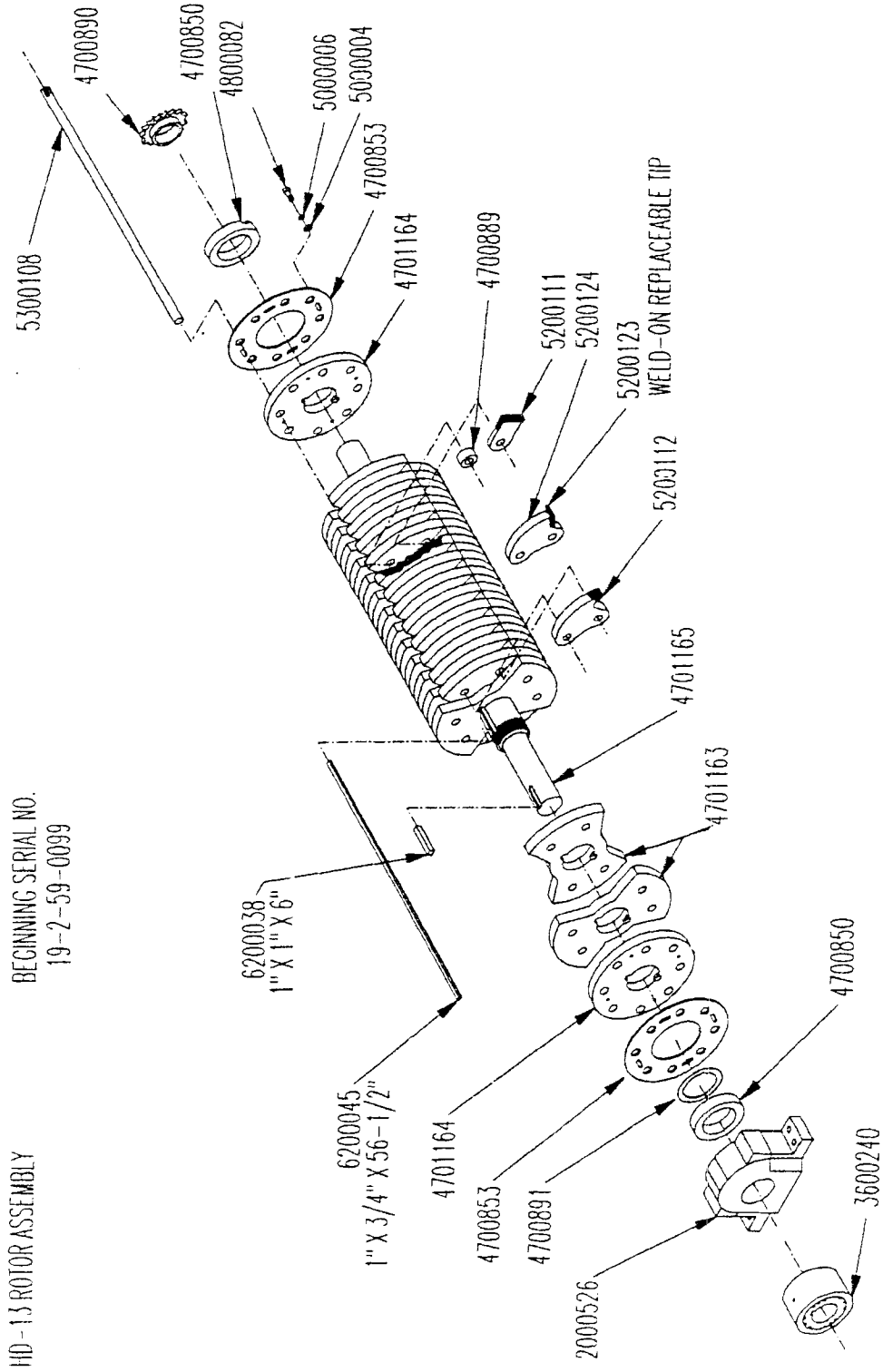
**PARTS BOOK**

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# ROTOR ASSEMBLY

Beginning S/N 19-2-59-0099



BEGINNING SERIAL NO.  
19-2-59-0099

HD-13 ROTOR ASSEMBLY

**ROTOR ASSEMBLY**

Beginning S/N 19-2-59-0099

<u>ITEM</u>	<u>PART NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701356	1	RTRASSY\87-1/2X19\CONTCT
1	2000526	2	BRG\PB\4-7/16-DODGE\F-XT
2	3600240	1	CYLINDER .DRIVE HUB
3	4700850	2	CYLLINDER NUT
4	4700853	2	19" MOVABLE PLATE
5	4700889	54	SPACER\3x1-1/2x1-3/4
6	4700890	1	SPKT\SNSR\80b20
7	4700891	1	WASH\THRUST\6"IDx8"OD
8	4701163	27	PL\RTR\6x1.884x2CONTCT
9	4701164	2	PL\RTR\6x1-1/2x19\END\TAPPED
10	4701165	1	SHFT\RTR\6x87-1/2\4-7/16\BRG
11	4800082	8	BOLT\HEX\1/2x1-1/2
12	5000004	8	WASH\FLAT\1/2
13	5000006	8	WASH\LOCK\1/2
14	5200111	54	HD 13 SWING HAMMER
15	5200112	54	HARD FIXED HAMMER
16	5200123	54	HD 13 HAMMER INSERT ONLY
17	5200124	54	HD 13 FIXED HAMMER BASE
18	5300108	8	HAMMER ROD\1.5" x 56"
19	6200038	1	KEY\SQ\1x1x6
20	6200045	1	KEY\RECT\1x3/4x56-1/2\RTR



# BELLY CONVEYOR COVER ASSEMBLY

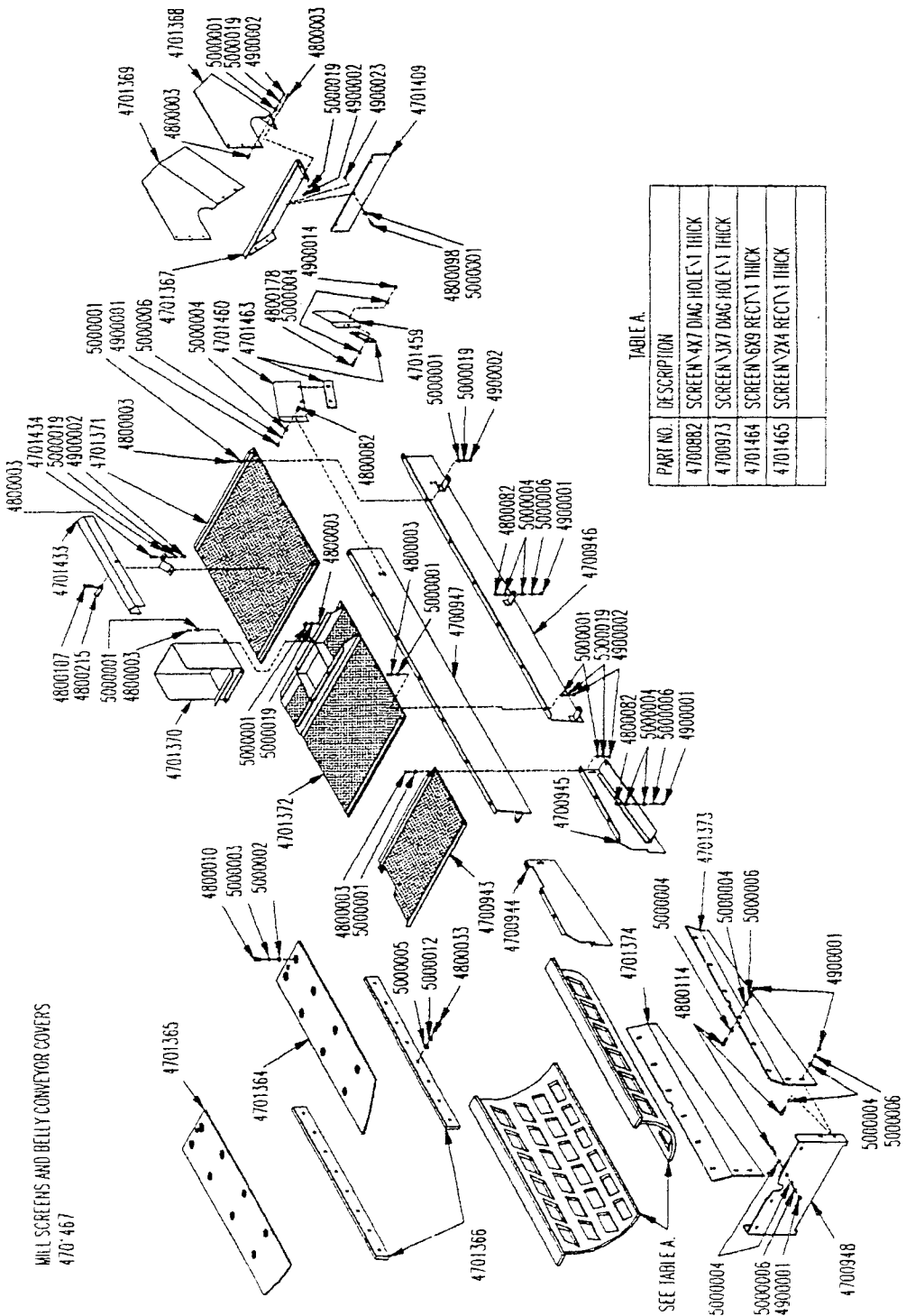


TABLE A.

PART NO.	DESCRIPTION
4700882	SCREEN\4X7 DIAG HOLE\1 THICK
4700973	SCREEN\3X7 DIAG HOLE\1 THICK
4701464	SCREEN\6X9 RECT\1 THICK
4701465	SCREEN\2X4 RECT\1 THICK

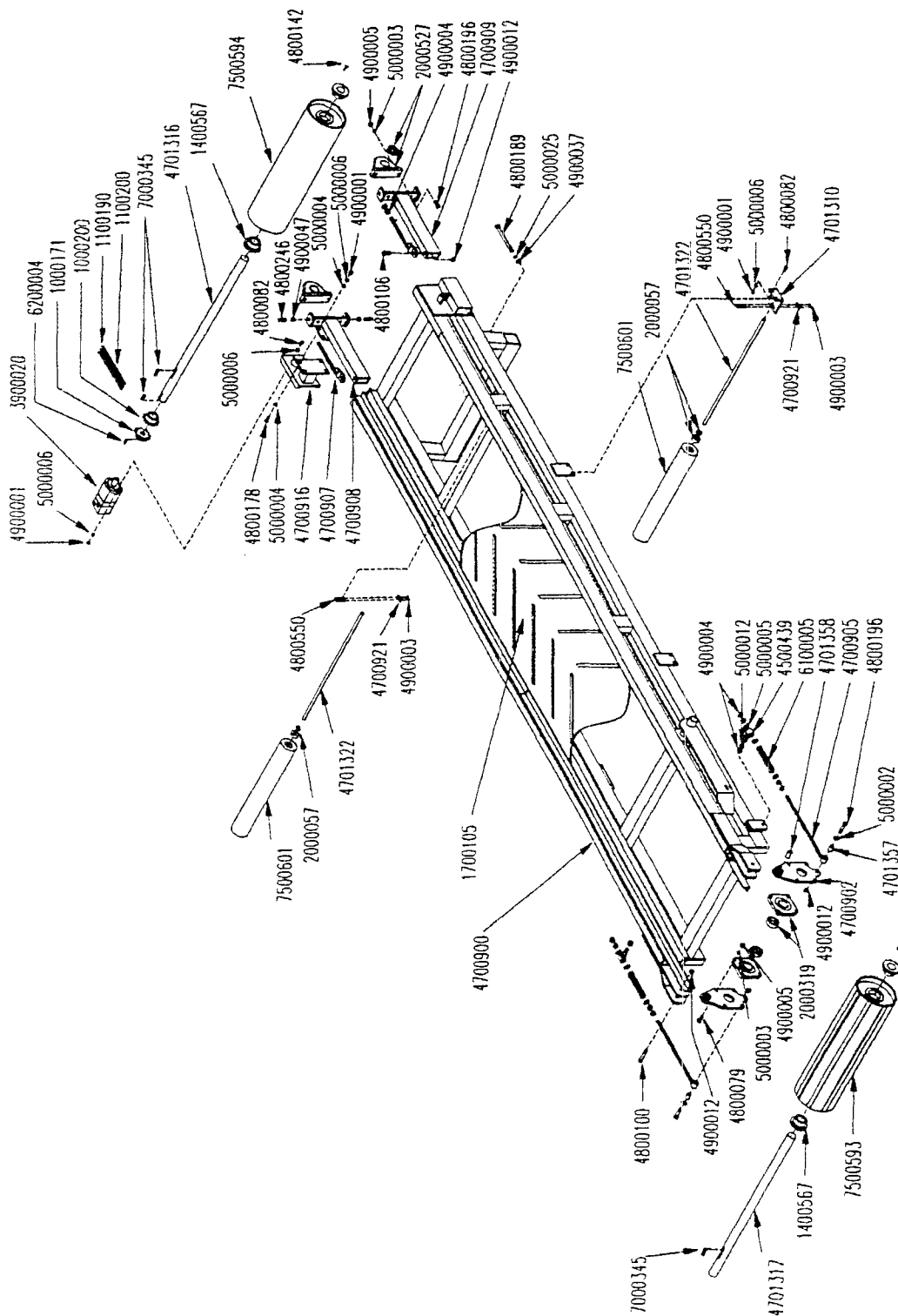
MILL SCREENS AND BELLY CONVEYOR COVERS  
470-467

SEE TABLE A.

# BELLY CONVEYOR COVER ASSEMBLY

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701467		CNVYR\BELLY\ASSY\COV\HD13
1	4700882	1	SCRN\4X7\HL\1
2	4700943	1	COV\CNVYR\22-1/2X39\FRNT\BELLY
3	4700944	1	GUIDE\CNVYR\32X13-3/4\RH\BELLY
4	4700945	1	GUIDE\CNVYR\32X13-3/4\LH\BELLY
5	4700946	1	GUIDE\CNVYR\105X9-1/2\LH\BELLY
6	4700947	1	GUIDE\CNVYR\105X9-1/2\RH\BELLY
7	4700948	1	GUIDE\CNVYR\35-1/4X16-3/8\FR\BELLY
8	4701364	1	COV\PLTFRM\59-1/4X15X3/4\LH
9	4701365	1	COV\PLTFRM\59-1/4X15X3/4\RH
10	4701366	2	SHIM\BREAKER\57-1/2X4-1/2X1
11	4701367	1	GUIDE\CNVYR\36-3/4X6X1-5/8\BTM
12	4701368	1	GUIDE\CNVYR\30X25-1/2\LH
13	4701369	1	GUIDE\CNVYR\30X25-1/2\RH
14	4701370	1	GUIDE\DISCH\18-3/4X13X12-1/4\TUB\CO
15	4701371	1	COV\CNVYR\45-3/4X39-3/8\RR\BELLY
16	4701372	1	COV\CNVYR\45-3/4X39-3/8\MID\BELLY
17	4701373	1	GUIDE\CNVYR\58X16-3/4\LH
18	4701374	1	GUIDE\CNVYR\58X16-3/4\RH
19	4701409	1	BELT\SEAL\3/8X6X29-1/2\CNVYR
20	4701433	1	CYL\STOP\35-1/2X2-1/2\ROD\TUB
21	4701434	1	BRKT\STOW\6-7/8X2-1/2X2\1/8\CYL\STP
22	4701459	1	GUIDE\CNVYR\12X9-1/2X76GA\LH
23	4701460	1	GUIDE\CNVYR\12X9-1/2X76GA\RH
24	4701463	2	BELT\SEAL\3/8X3X9\CNVYR\BELLY
25	4800003	32	BOLT\HEX\3/8X1
26	4800010	16	BOLT\HEX\5/8X2
27	4800033	1	BOLT\HEX\3/4X2
28	4800082	14	BOLT\HEX\1/2X1-1/2
29	4800098	3	BOLT\HEX\3/8X1-1/4
30	4800107	1	PIN\HAIR\1/8 (#9)
31	4800114	20	BOLT\HEX\1/2X2
32	4800178	4	BOLT\HEX\1/2X1-3/4
33	4800215	1	PIN\CLEVIS\3/4X4
34	4900001	34	NUT\HEX\1/2\NC
35	4900002	32	NUT\HEX\3/8\NC
36	4900014	4	NUT\TPLCK\1/2\NC
37	4900023	3	NUT\TPLCK\3/8\NC
38	5000001	53	WASH\FLAT\3/8
39	5000002	16	WASH\FLAT\5/8
40	5000003	16	WASH\LOCK\5/8
41	5000004	72	WASH\FLAT\1/2
42	5000005	16	WASH\FLAT\3/4
43	5000006	34	WASH\LOCK\1/2
44	5000012	16	WASH\LOCK\3/4
45	5000019	32	WASH\LOCK\3/8

# BELLY CONVEYOR ASSEMBLY



# BELLY CONVEYOR ASSEMBLY

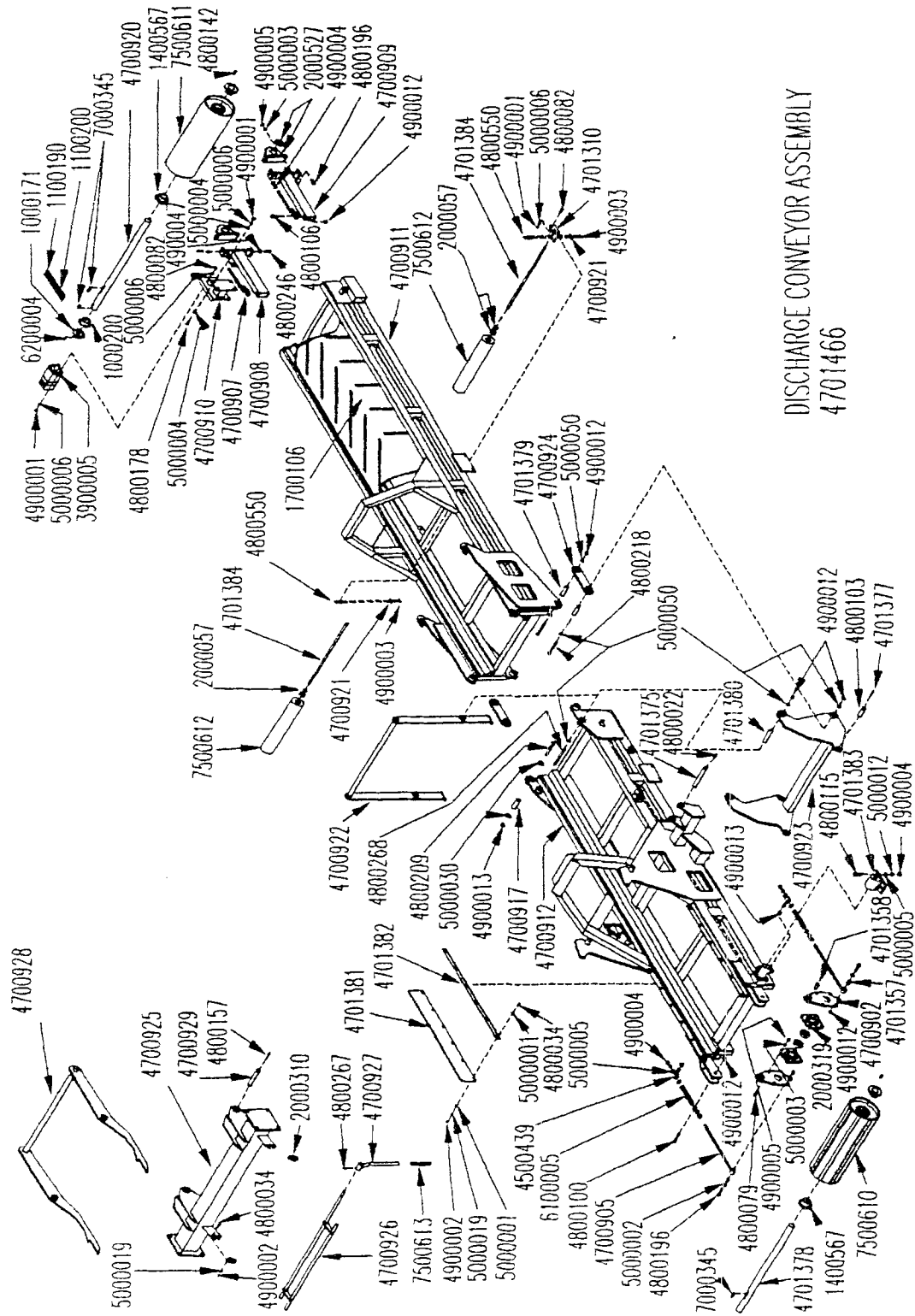
<u>ITEM</u>	<u>PART NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701363		CNVYR\ASSY\BELLY\HD-13
1	1000171	1	SPKT\80\14\1-1/4\5/16KW
2	1000200	1	SPKT\80\B\14\2-3/16\1/2KW
3	1100190	1	CHAIN\80DBL\CL
4	1100200	1	CHAIN\80DBL\13
5	1400567	4	BUSH\XT\B\2-3/16
6	1700105	1	BELT\CNVYR\36X461\24W\3/4
7	2000057	16	BRG\INS\3/4\CYL\W\COLLAR
8	2000319	2	BRG\FLG\2-3/16X4-BOLT
9	2000527	2	BRG\PB\2-3/16\PTC\PL211
10	3900020	1	MTR\HYD\11.9\2000\SAE:A\2BOLT\7/8FOR
11	4500439	2	BOLT\ADJ\ORBIT\MTR
12	4700900	1	CNVYR\BELLY
13	4700902	2	MNT\RLLR\IDLER\CNVYR
14	4700905	2	ROD\TNSNR\PULLY\DRIVE
15	4700907	2	ROD\TNSNR\PULLY\DRIVE CNVYR
16	4700908	1	MNT\BRG\TNSNR\CNVYR\RH
17	4700909	1	MNT\BRG\TNSNR\CNVYR\LH
18	4700916	1	BRKT\MTR\11X7X6\B\CNVYR
19	4700921	16	STRAP\CLAMP\RLLR\PULLEY
20	4701310	4	BRKT\RLLR\4-1/2X4X2-1/2
21	4701316	1	SHFT\RLLR\49-3/4X2-3/16P\CNVYR\DR
22	4701317	1	SHFT\RLLR\47-3/4X2-3/16D\CNVYR\IDLER
23	4701322	8	SHFT\RLLR\36-3/4X3/4D\CNVYR\IDLER
24	4701357	2	BUSH\SLV\1X1-5/16X0.640\CNVYR
25	4701358	2	BUSH\SLV\1X2X0.640\CNVYR
26	4800079	8	BOLT\HEX\5/8X2-1/2
27	4800082	10	BOLT\HEX\1/2X1-1/2
28	4800100	2	BOLT\HEX\5/8X4
29	4800106	2	BOLT\HEX\5/8X1-1/2
30	4800142	12	BOLT\HEX\3/8X1-3/4
31	4800178	4	BOLT\HEX\1/2X1-3/4
32	4800189	1	BOLT\HEX\1-1/8X9
33	4800196	6	BOLT\HEX\5/8X2-3/4
34	4800246	4	SCR\SET\ALN\5/8X3\NC
35	4800550	16	BOLT\U\16X3/4X3\NC
36	4900001	14	NUT\HEX\1/2\NC
37	4900003	32	NUT\HEX\5/16\NC
38	4900004	14	NUT\HEX\3/4\NC
39	4900005	12	NUT\HEX\5/8\NC
40	4900012	6	NUT\PLCK\5/8\NC
41	4900037	1	NUT\HEX\1-1/8\NC
42	4900047	4	NUT\JAM\5/8\NC
43	5000002	2	WASH\FLAT\5/8



**BELLY CONVEYOR ASSEMBLY CONT.**

44	5000003	12	WASHLOCK\5/8
45	5000004	10	WASHFLAT\1/2
46	5000005	4	WASHFLAT\3/4
47	5000006	14	WASHLOCK\1/2
48	5000012	2	WASHLOCK\3/4
49	5000025	1	WASHLOCK\1-1/8
50	6100005	4	DRIVE TABLE SPRING
51	6200004	1	KEYSQ\5/16X1-1/2
52	7000345	3	KEYSQ\1/2X2\CR
53	7500593	1	RLLR\WING\10X37\2-3/16B
54	7500594	1	RLLR\LAG\10X37\2-3/16B
55	7500601	8	RLLR\IDLER\4-1/2X30

# DISCHARGE CONVEYOR



DISCHARGE CONVEYOR ASSEMBLY  
4701466

# DISCHARGE CONVEYOR CONT.

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701466		CONVYR\DISCH\ASSY\HD13
1	1000171	1	SPKT\80\14\1-1/4\5/16KW
2	1000200	1	SPKT\80\B\14\2-3/16\1/2KW
3	1100190	1	CHAIN\80DBL\CL
4	1100200	1	CHAIN\80DBL\13
5	1400567	4	BUSH\XT2-3/16
6	1700106	1	BELT\CNVYR\30X667\24W\3/4
7	2000057	22	BRG\INS\3/4\CYL\W/COLLAR
8	2000310	2	BRG\FLG\CAST\1\2BOLT
9	2000319	2	BRG\FLG\2-3/16\4BOLT
10	2000527	2	BRG\PB\2-3/16\IPTC\PL211
11	3900005	1	MTR\HYD\18.7\2000\SAE:A\2BOLT\7/8FOR
12	4500439	2	ADJ BOLT\ORBIT MOTOR
13	4700902	2	MNT\RLLR\IDLER\CNVYR
14	4700905	1	ROD\TNSNR\PLLY\DR
15	4700907	2	ROD\TNSNR\PLLY\CNVYR
16	4700908	1	MNT\BRG\TNSNR\CNVYR\RH
17	4700909	1	MNT\BRG\TNSNR\CNVYR\LH
18	4700910	2	BRKT\MTR\11X7X6D\CNVYR
19	4700911	1	FRAME\CNVYR\164X39\DISSCH\UPPER
20	4700912	1	FRAME\CNVYR\151X39\DISCH\LOWER
21	4700917	2	BUSH\CNVYR\1-1/2X4-1/8X0.765\HINGE
22	4700920	1	SHFT\RLLR\43-3/4X2-3/16D\CNVYR:DR
23	4700921	22	SHIM\CLAMP\1/2X1X2\RLLR
24	4700922	1	BRKT\SUP\40X40X3\BELT\CNVYR
25	4700923	1	FRAME\CNVYR\42-1/2X24X19\FOLD\LINK
26	4700924	2	BRKT\CNVYR\14X3-1/2X1/2\FOLD\LINK
27	4700925	1	FRAME\CNVYR\62X24X9\TRNSPRT
28	4700926	1	BRKT\CNVYR\50X7\TRNSPRT\CAM
29	4700927	1	BRKT\LEVER\17-1/2X3\TRNSPRT\RELEASE
30	4700928	1	FRAME\CNVYR\42X47\TRNSPRT\LATCH
31	4700929	2	PIN\HDLSS\1X7\2HOLE\1/4\1\4FROM:END
32	4701310	4	BRKT\RLLR\4-1/2X4X2-1/2\CNVYR
33	4701357	2	BUSH\SLV\1X1-5/16X0.640\CNVYR
34	4701358	2	BUSH\SLV\1X2X0.640\CNVYR
35	4701375	2	PIN\HDLSS\1-1/4X9-1/4\1HOLE\1-3/8
36	4701377	2	PIN\HDLSS\1-1/4X4\2HOLE\9.32
37	4701378	1	SHFT\RLLR\38-1/2X2-3/16D\CNVYR\IDLER
38	4701379	4	BUSH\CNVYR\1-1/4X4X11/16ID\FOLD
39	4701380	2	BUSH\CNVYR\1-1/4X6X11/16ID\FOLD
40	4701381	2	BELT\3/8X6X45\CNVYR\SEAL
41	4701382	2	STRIP\3/16X1-1/2X45\CNVYR
42	4701383	2	BRKT\BUSH\8X4+5/8X4-1/4\CNVYR\HINGE
43	4701384	11	SHFT\RLLR\31X3\4D\CNVYR\IDLER
44	4800022	2	PIN\RLLR\3/8X2
45	4800034	16	BOLT\HEX\3/8X1-1/2

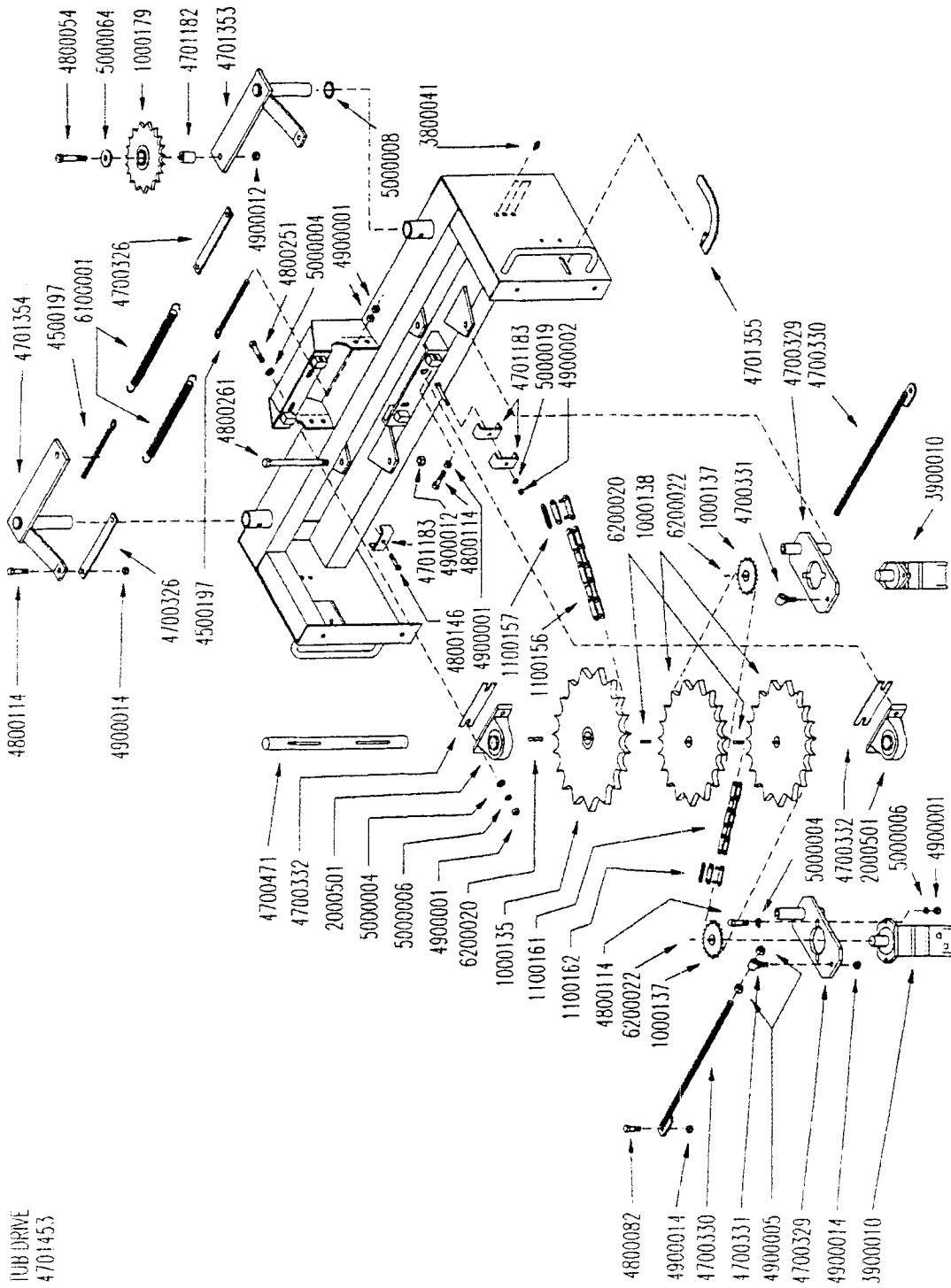




## DISCHARGE CONVEYOR CONT.

46	4800079	8	BOLT\HEX\5/8X2-1/2
47	4800082	10	BOLT\HEX\1/2X1-1/2
48	4800100	2	BOLT\HEX\5/8X4
49	4800103	4	PIN\COT\1/4X2
50	4800106	2	BOLT\HEX\5/8X1-1/2
51	4800115	4	BOLT\HEX\3/4X2-1/2
52	4800157	4	PIN\COT\3/16X2
53	4800178	4	BOLT\HEX\1/2X1-3/4
54	4800196	6	BOLT\HEX\5/8X2-3/4
55	4800209	2	BOLT\HEX\3/4X5-1/2
56	4800218	4	BOLT\HEX\5/8X5-1/2
57	4800246	4	SCR\SET\ALN\5/8X3\NC
58	4800267	1	PIN\RLLD\1/4X1-3/4
59	4800268	2	BOLT\HEX\5/8X7-1/2
60	4800550	22	BOLT\U\5/16X3/4X3\NC
61	4900001	14	NUT\HEX\1/2\NC
62	4900002	16	NUT\HEX\3/8\NC
63	4900003	44	NUT\HEX\5/16\NC
64	4900004	16	NUT\HEX\3/4\NC
65	4900005	12	NUT\HEX\5/8\NC
66	4900012	10	NUT\TPLCK\5/8\NC
67	4900013	4	NUT\TPLCK\3/4\NC
68	4900047	4	NUT\JAM\5/8\NC
69	5000001	24	WASH\FLAT\3/8
70	5000002	2	WASH\FLAT\5/8
71	5000003	12	WASH\LOCK\5/8
72	5000004	8	WASH\FLAT\1/2
73	5000005	4	WASH\FLAT\3/4
74	5000006	7	WASH\LOCK\1/2
75	5000012	4	WASH\LOCK\3/4
76	5000019	14	WASH\LOCK\3/8
77	5000030	4	WASH\2"ODX\3/4IDX\1/4THICK
78	5000050	12	2"ODX.681IDX\1/4"THICK
79	6100005	4	DRIVE TABLE SPRING
80	6200004	1	KEY\SQ\5/16X1-1/2
81	7000345	3	HEY\SQ\1/2X2\CR
82	7500610	1	RLLR\WING\10X31\2-3/16B
83	7500611	1	RLLR\LAG\10X31\2-3/16B
84	7500612	11	RLLR\IDLER\4-1/2X24
85	7500613	1	GRIP\LEVER\1X4-3/4\FOAM\VINYL

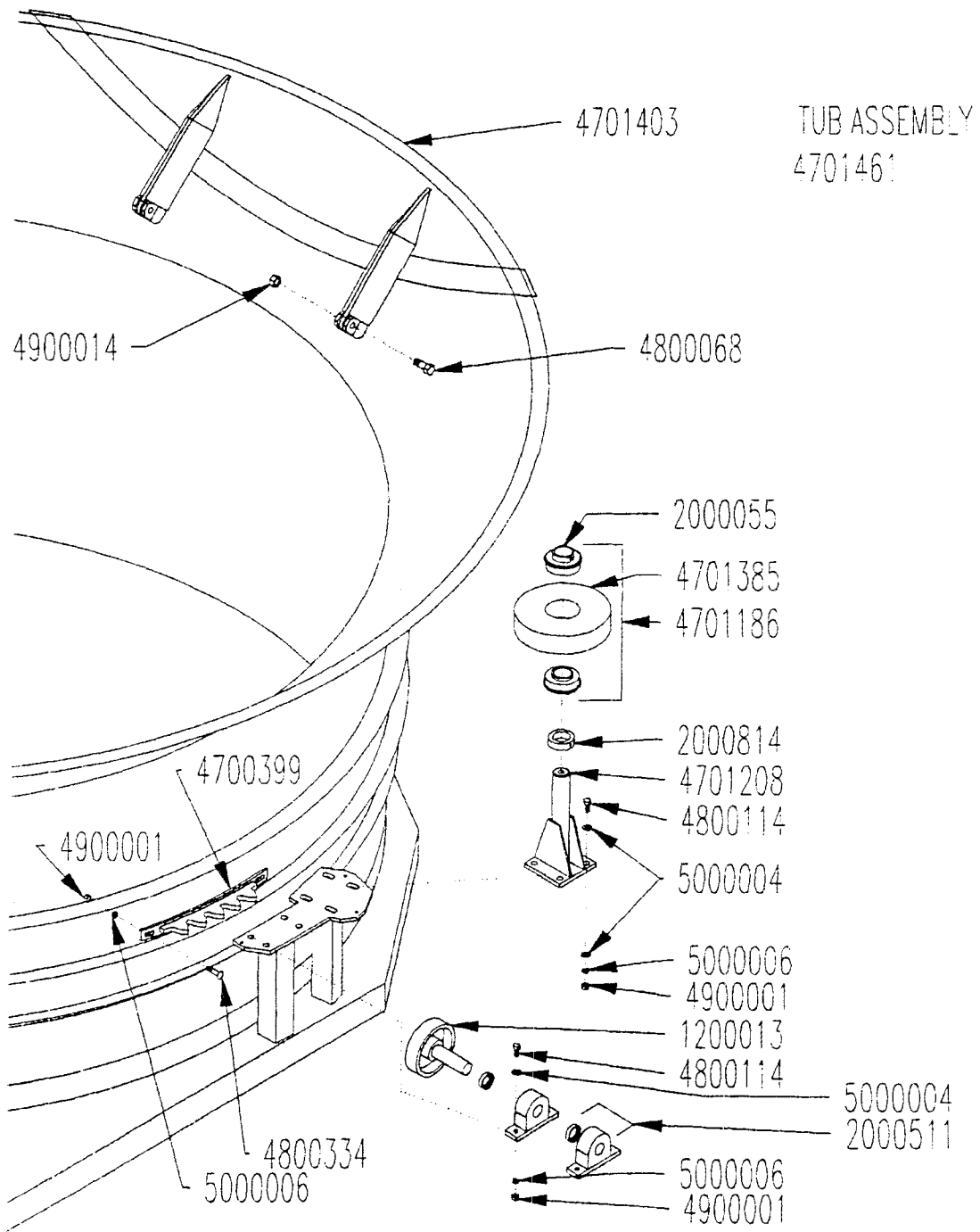
# TUB DRIVE



TUB DRIVE  
4701453

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701453		TUB\DR\ASSY\HD-13
1	1000135	1	SPKT\100\B\1-1/2\3/8KW
2	1000137	2	SPKT\80\10\1-1/4\5/16KW
3	1000138	2	SPKT\80\30\1-1/2\3/8KW
4	1000179	2	SPKT\100\19\PL:W\BRGS
5	1100156	1	CHAIN\2100H\159
6	1100157	1	CHAIN\2100H\CL
7	1100161	2	CHAIN\80H\41
8	1100162	2	CHAIN\80H\CL
9	2000501	2	BRG\PB\1-1/2\2BOLT
10	3800041	6	FTG\LUB\1/8MPXZRK\ADPT
11	3900010	2	MTR\HYD\24\2000\SAE:A\2BOLT\7/8FOR
12	4500197	2	BOLT\TENSION\SPRING
13	4700326	2	SPRING LINK
14	4700329	2	BRKT\TGHTR\CHAIN
15	4700330	2	BOLT\TIGHTENER\ORBIT\MTR
16	4700331	2	BRKT\BOLT\TIGHTENER
17	4700332	4	SHIM
18	4700471	1	TUB DR. SHAFT 1.5X20.75
19	4701182	2	BUSH\SPKT\1-3/4X1-1/4\TNS
20	4701183	3	CLAMP\HYD\3-1/4X1-1/2\2X
21	4701353	1	BRKT\PLTDR\13-7\8X11X8\LH\TNSNR
22	4701354	1	BRKT\PLTDR\13-7\8X11X8\RHTNSNR
23	4701355	1	BRKT\HYD\7-1/2X6X1/2\LVR
24	4800054	2	BOLT\HEX\5/8X3-1/2
25	4800082	2	BOLT\HEX\1/2X1-1/2
26	4800114	8	BOLT\HEX\1/2X2
27	4800146	1	BOLT\HEX\3/8X2
28	4800251	4	BOLT\HEX\1/2X2-1/4\NC
29	4800261	2	BOLT\HEX\5/8X8-1/2
30	4900001	14	NUT\HEX\1/2\NC
31	4900002	1	NUT\HEX\3/8\NC
32	4900005	4	NUT\HEX\5/8\NC
33	4900012	4	NUT\TPLCK\5/8\NC
34	4900014	6	NUT\TPLCK\1/2\NC
35	5000004	12	WASH\FLAT\1/2
36	5000006	8	WASH\LOCK\1/2
37	5000008	6	WASH\1-1/2 MACH:BUSH (NR)
38	5000019	2	WASH\LOCK\3/8
39	5000064	2	2"ODX11/16IDX1/4 THICK
40	6100001	2	SPRING .156OT 63/64OD\3LIH
41	6200020	3	KEY\SQ\3/8X2-1/4\HARDENED
42	6200022	2	KEY\SQ\5/16X1-1/2\HARDENED

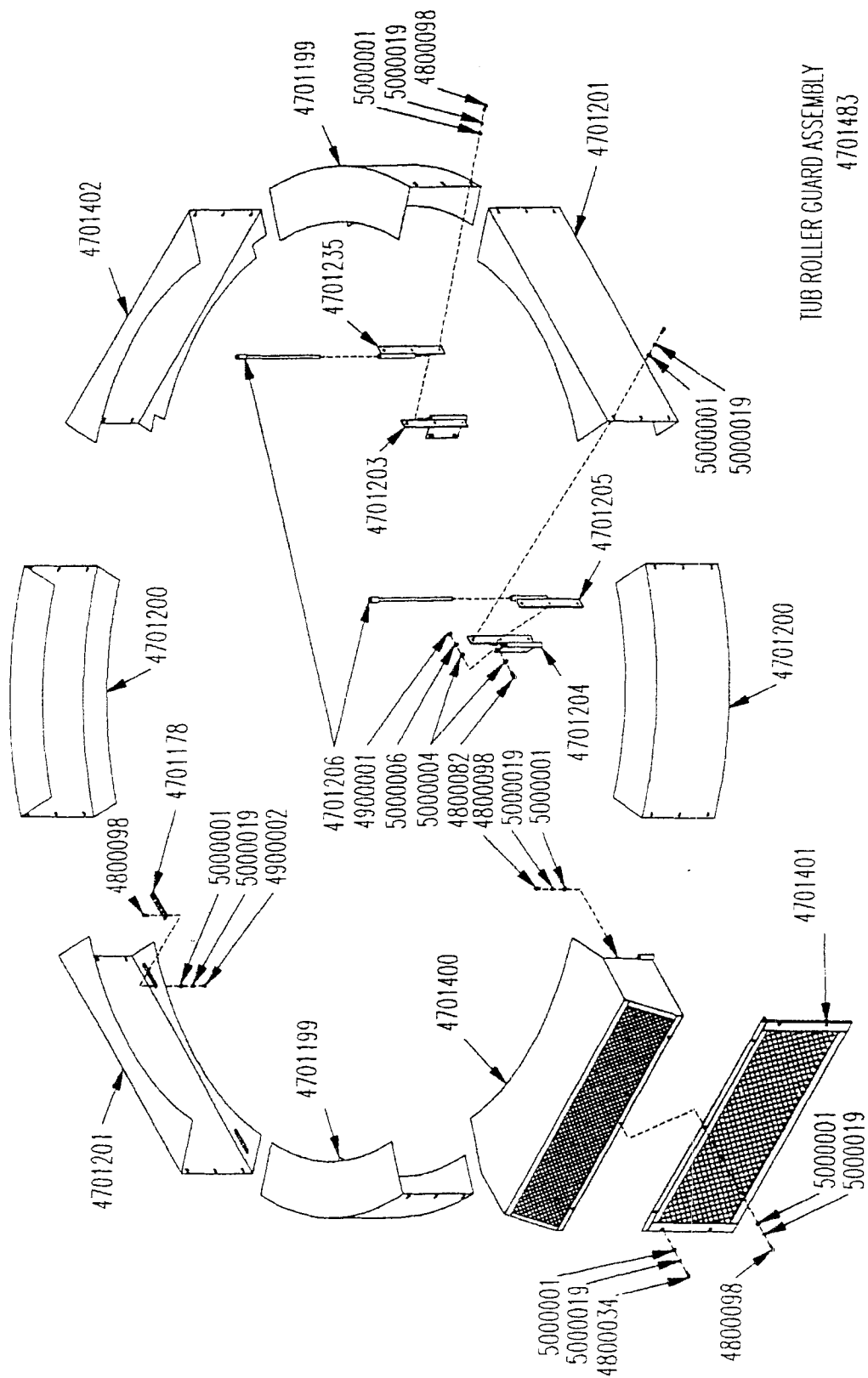
# TUB ROLLER ASSEMBLY



# TUB ROLLER ASSEMBLY

ITEM	PART NO	QUANTITY	DESCRIPTION
	4701461		TUB\RLLR\ASSY\HD13
1	1200013	8	RLLR\TUB\1-1/2\W/O FLG
2	2000511	16	BRG\PB\1-1/2\2BOLT\MALL
3	2000814	4	CLLR\SHFT\2
4	4700399	4	TUB DRIVE TEETH
5	4701186	4	RLLR\PRSSR\11X4\TUB\W/BRG
6	4701208	4	BRKT\13-1/4X6X6\STND\PRSSR
7	4701403	2	TUB\FLARE\78X21\FOLD
8	4800068	4	BOLT\HEX\1/2X3
9	4800114	48	BOLT\HEX\1/2X2
10	4800334	8	BOLT\CRG\1/2X2\NC
11	4900001	56	NUT\HEX\1/2\NC
12	4900014	4	NUT\TPLCK\1/2\NC
13	5000004	64	WASH\FLAT\1/2
14	5000006	56	WASH\LOCK\1/2

# TUB ROLLER GUARD ASSEMBLY

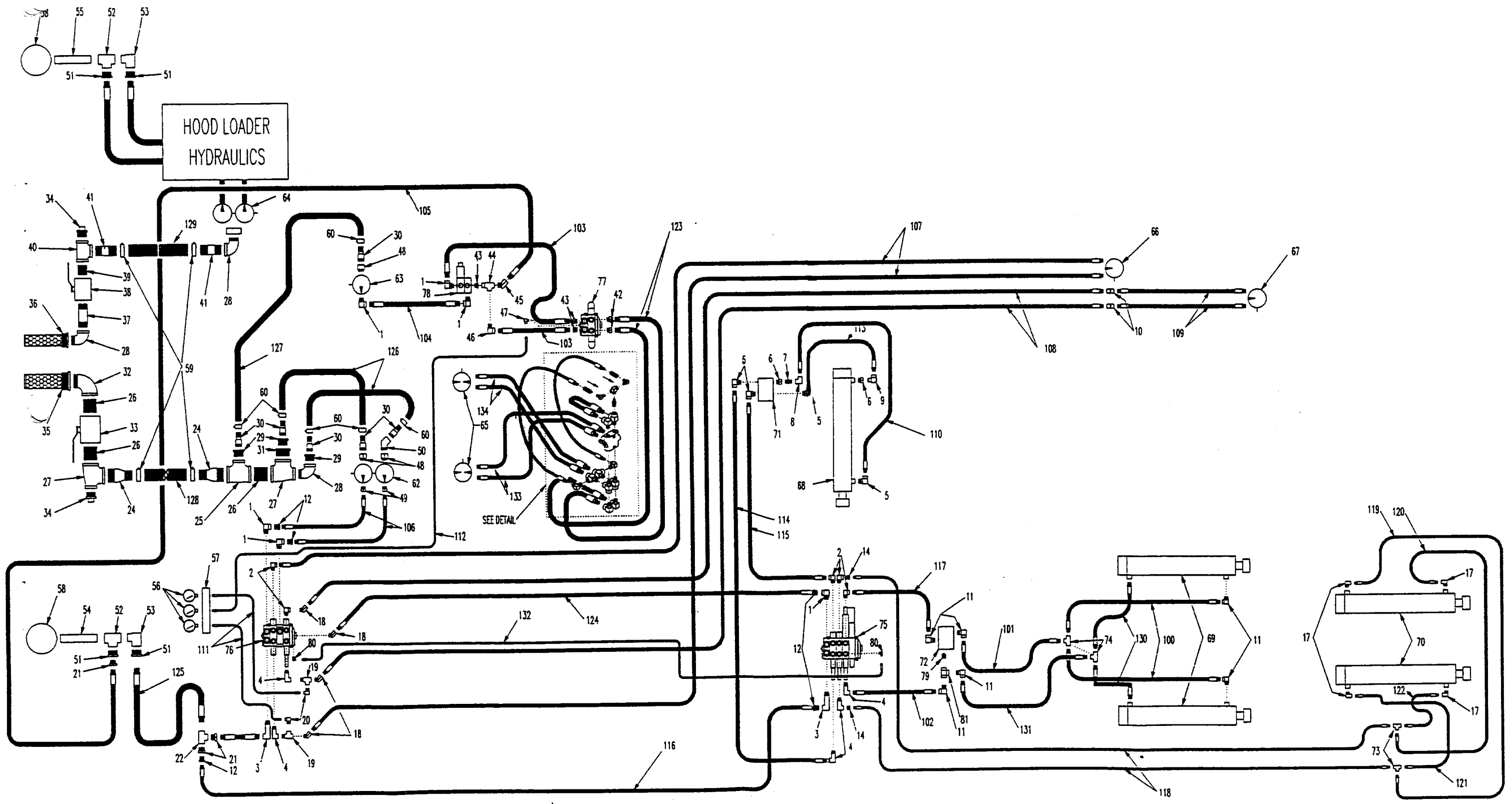


# TUB ROLLER GUARD ASSEMBLY

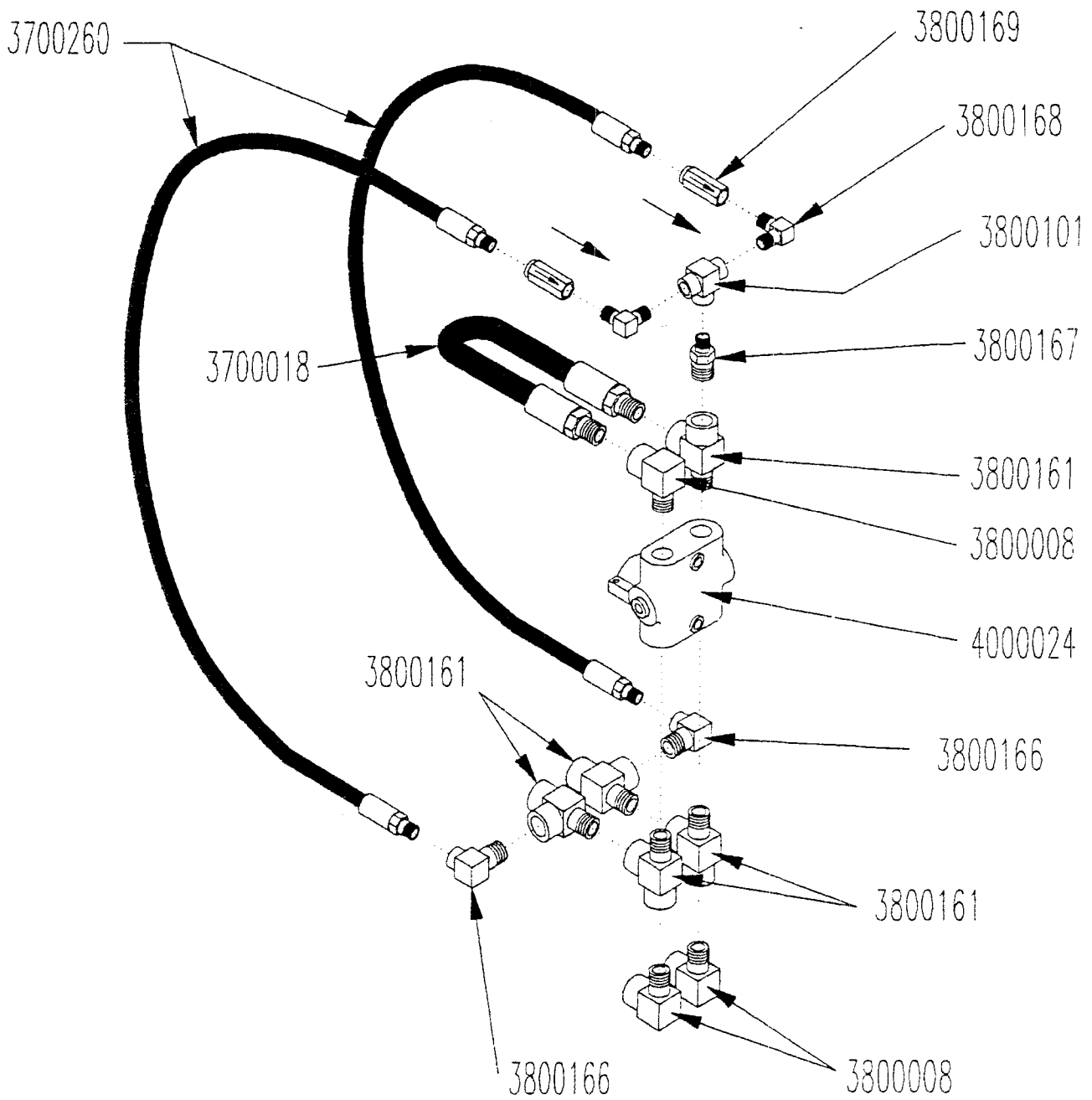
<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701483		GUARD\RLLR\HD13\ASSY
1	4701178	4	BRKT\MNFLD\7-1/8X1-1/4X
2	4701199	2	GUARD\RLLR\LH\48X14-3/4X
3	4701200	2	GUARD\RLLR\RH\48X14-3/4X
4	4701201	2	GUARD\RLLR\61X18X10-3/8\
5	4701203	3	BRKT\GUARD\17X5-3/4X3\LH
6	4900083	12	NUT\INSRT\3/8\LONG\>
7	4701204	3	BRKT\GUARD\17X5-3/4X3\RH
8	4701205	4	BRKT\GUARD\17X3X1\RH\RLLR
9	4701206	8	PIN\GUARD\21X1X5/8IA\
10	4701235	4	BRKT\GUARD\17X3X1\LH\RLLR
11	4701400	1	GUARD\CHAIN\61X18X28\TUB>
12	4701401	1	GUARD\CHAIN\59X22-1/2\>
13	4701402	1	GUARD\CHAIN\61X18X410-1/4>
14	4800034	4	BOLT\HEX\3/8X1-1/2
15	4800082	12	BOLT\HEX\1/2X1-1/2
16	4800098	53	BOLT\HEX\3/8X1-1/4
17	4900001	12	NUT\HEX\1/2\NC
18	4900002	8	NUT\HEX\3/8\NC
19	5000001	57	WASH\FLAT\3/8
20	5000004	24	WASH\FLAT\1/2
21	5000006	12	WASH=LOCK\1/2
22	5000019	59	WASH\LOCK\3/8







# HYDRAULIC ASSEMBLY



2 SPEED VALVE ASSEMBLY

# HYDRAULIC ASSEMBLY

<u>ITEM</u>	<u>PART NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701362		HYD\ASSY\HD-13
1	3800145	6	FTG\1-1/16MORX3/4FP\90D
2	3800269	5	FTG\7/8MORX1/2FP\90D\ST:EL
3	3800306	2	FTG\1-1/16MORX3/4FP\90D\LONG\ST:EL
4	3800299	5	FTG\7/8MORX1/2FP\90D\LONG\ST:EL
5	3800048	3	FTG\3/4MORX1/2FP\90D\ST:EL
6	3800171	2	FTG\3/4MORX1/2FP\ADPT
7	3800045	1	FTG\1/2MPX2\NPL
8	3800165	1	FTG\1/2FP\90D\EL
9	3800308	1	FTG\1/2MPX1/2FP\90D\SWIVEL\ST:EL
10	3800051	1	FTG\1/2FP\CPLG
11	3800008	8	FTG\1/2MPX1/2FP\90D\ST:EL
12	3800010	5	FTG\3/4MPX1/2FP\BUSH
14	3800007	2	FTG\1/2MPX3/8FP\BUSH
17	3800133	4	FTG\1/2MPX3/8FP\90D\ST:EL
18	3800028	4	FTG\1/2MPX1/2FP\45D\ST:EL
19	3800161	7	FTG\1/2FPX1/2MPX1/2FP\RUN:TEE
20	3800166	4	FTG\1/2MPX1/4FP\90D\ST:EL
21	3800131	3	FTG\1MPX3/4FP\BUSH\LW
22	3800152	1	FTG\1FPX1MPX1FP\RUN:TEE
24	3800313	2	FTG\3MPX2-1/2BARB\ADPT\LW
25	3800371	1	FTG\3FPX3FPX2FP\TEE\LW
26	3800372	3	FTG\3MP\CLS:NPL\LW
27	3800373	2	FTG\3FPX2FPX3FP\TEE\LW
28	3800374	3	FTG\2MPX2FP\90D\ST:EL\LW
29	3800375	3	FTG\2MPX1-1/4FP\BUSH\LW
30	3800315	5	FTG\1-1/4MPX1-1/4BARB\ADPT\LW
31	3800320	1	FTG\3MPX2FP\BUSH\LW
32	3800376	1	FTG\3MPX3FP\90D\ST:EL\LW
33	4000100	1	VALVE\BALL\3FP\1/4TURN\LW
34	3800377	2	FTG\2MP\PLUG\SQ\LW
35	4400024	1	FLTR\SCRN\4MPX3FP\100GPM\SCTN\SCRN\5100
36	4400025	1	FLTR\SCRN\3MPX2FP\50GPM\SCTN\SCRN\50
37	3800310	1	FTG\2MPX5-1/2\NPL\LW
38	4000101	1	VALVE\BALL\2FP\1/4TURN\LW
39	3800370	1	FTG\2MP\CLS:NPL\LW
40	3800369	1	FTG\2FP\TEE\LW
41	3800312	2	FTG\2-1/2BARBX2MP\ADPT\LW
42	3800368	2	FTG\7/8MORX3/4FP\ADPT
43	3800148	3	FTG\1-1/16MORX3/4FP\ADPT
44	3800261	1	FTG\3/4FPX3/4MPX3/4FP\RUN:TEE
45	3800038	1	FTG\3/4FP\45D\EL
46	3800035	1	FTG\3/4FP\90D\EL
47	3800054	1	FTG\1/4MPX1/4FP\90D\ST:EL
48	3800297	3	FTG\1-5/8MORX1-1/4FP\ADPT

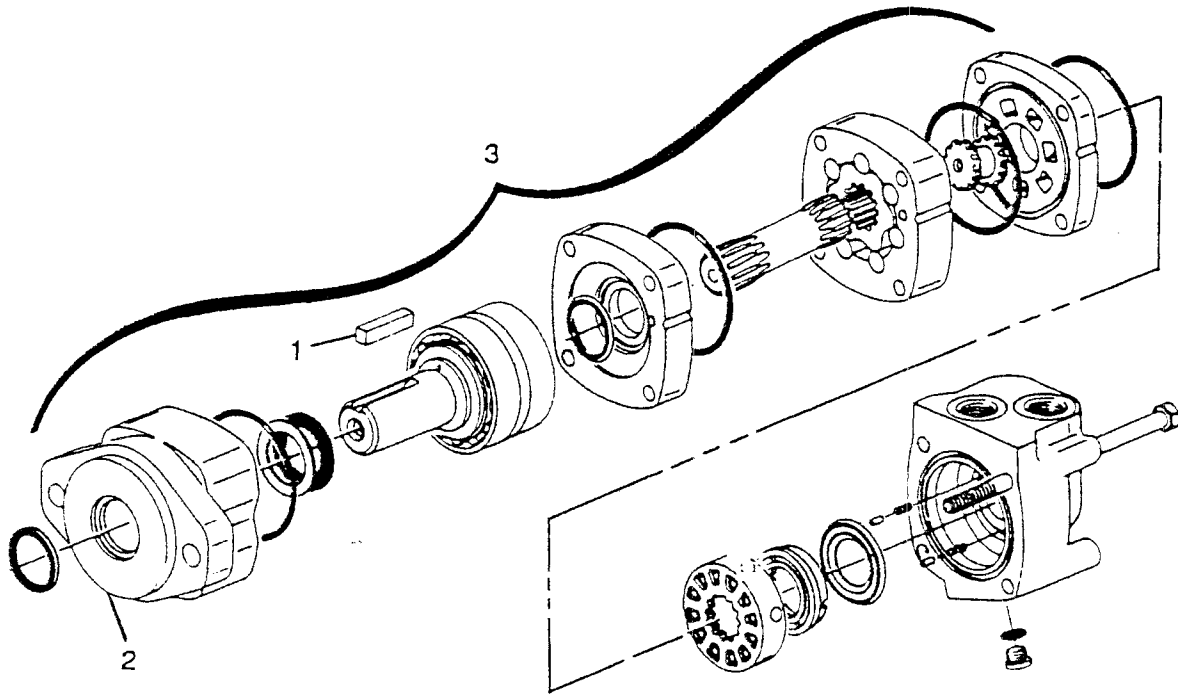
# HYDRAULIC ASSEMBLY

49	3800255	2	FTG\1-5/16MORX1/2FP\ADPT
50	3800292	1	FTG\1-1/4MPX1-1/4FP\45D\ST:EL
51	3800142	4	FTG\1-1/2MPX1FP\BUSH\LW
52	3800378	2	FTG\1-1/2FP\TEE
53	3800379	2	FTG\1-1/2MPX1-1/2FP\90D\ST:EL
54	3800357	1	FTG\1-1/2MPX44-1/2\NPL\LW
55	3800356	1	FTG\1-1/2MPX53\NPL\LW
56	3800154	3	GUAGE\3000PSI\1/4MP
57	4701359	1	GAGE\MANIFOLD
58	4400022	2	FLTR\COMPL\1-1/2FP\10MIC\INTAKE
59	3800364	4	CLAMP\HOSE\3\T-BOLT
60	3800363	6	CLAMP\HOSE\2\T-BOLT
62	42000 <del>39</del> 52	1	15/15 DBL PUMP-WEBSTER
63	4200039	1	PUMP\HYD\2.33\20GPM\EATON
65	3900010	2	MTR\HYD\24\2000\SAE:A\2BOLT\7/8FOR
66	3900020	1	MTR\HYD\11.9\2000\SAE:A\2BOLT\7/8FOR
67	3900005	1	MTR\HYD\18.7\2000\SAE:A\2BOLT\7/8FOR
68	4100158	1	CYL\HYD\5X36\2-1/2ROD\3/4FOR\PRLL\TUB:END
69	4100146	2	CYL\HYD\5X36\1-3/4\ROD\PERP\1/2FP
70	4100159	2	CYL\HYD\4X36\1-1/2\ROD\PRLL\1/2FP\CLEVIS
71	4000084	1	VALVE\HYD\30GPM\HOLD\DBL
72	4000083	1	VALVE\HYD\30GPM\HOLD\SGL
73	4701360	1	MAINFOLD\3/8"DBL\TEE:WELD
74	4701361	1	MAINFOLD\1/2"DBL\TEE:WELD
75	4000098	1	VALVE\HYD\20GPM\3SPL\24V\W/MAN:LVR
76	4000099	1	VALVE\HYD\20GPM\2SPL\24V\W/PWR:BYD
77	4000097	1	VALVE\HYD\20GPM\1SPL\24V\TUB
78	4300053	1	VALVE\SERVO\20GPM\24V
79	3800167	2	FTG\1/2MPX1/4MP\NPL
80	3800121	2	FTG\7/16MORX1/4FPS\90D\ST:EL
81	3800009	1	FTG\1/2FP\TEE
82	3800169	1	FTG\1/4FP\CV
83	3800168	1	FTG\1/4MP\90D\M:EL
84	3800101	1	FTG\1/4FP\TEE
85	4000024	1	VALVE\HYD\20GPM\SEL
100	3700180	2	HOSE\HYD\1/2X76\SW-SW
101	3700163	1	HOSE\HYD\1/2X55\SW-SW
102	3700124	1	HOSE\HYD\1/2X51\SW-SW
103	3700188	2	HOSE\HYD\3/4X36\SWSW
104	3700348	1	HOSE\HYD\3/4X132\SW-SW
105	3700349	1	HOSE\HYD\3/4X276\SW-SW
106	3700023	2	HOSE\HYD\1/2X96\SW-SW
107	3700350	2	HOSE\HYD\1/2X348\1/2MPS\7/8MOR
108	3700156	2	HOSE\HYD\1/2X336\SW-SW
109	3700351	2	HOSE\HYD\1/2X327\1/2MPS\7/8MOR
110	3700066	1	HOSE\HYD\1/2X64\SW-SW
111	3700260	4	HOSE\HYD\1/4X15\SW-SO
112	3700352	1	HOSE\HYD\1/4X96\SW-SW

## HYDRAULIC ASSEMBLY

113	3700353	1	HOSE\HYD\1/2X29\SW-SW
114	3700354	1	HOSE\HYD\1/2X428\SW-SW
115	3700355	1	HOSE\HYD\1/2X419\SW-SW
116	3700346	1	HOSE\HYD\1/2X287\SW-SW
117	3700028	1	HOSE\HYD\1/2X48\SW-SO
118	3700130	2	HOSE\HYD\3/8X160\SW-SW
119	3700356	1	HOSE\HYD\3/8X92\SW-SW
120	3700197	1	HOSE\HYD\3/8X75\SW-SW
121	3700357	1	HOSE\HYD\3/8X51\SW-SW
122	3700168	1	HOSE\HYD\3/8X30\SW-SO
123	3700358	2	HOSE\HYD\3/4X116\3/4MPSX\1/2MPS
124	3700131	1	HOSE\HYD\1/2X293\SW-SW
125	3700359	1	HOSE\HYD\1X168\SW-SW
126	3700360	2	HOSE\SCTN\1-1/4X79
127	3700361	1	HOSE\SCTN\1-1/4X68
128	3700362	1	HOSE\SCTN\2-1/2X45
129	3700363	1	HOSE\SCTN\2-1/2X144
130	3700071	2	HOSE\HYD\1/2X36\SW-SO
131	3700034	1	HOSE\HYD\1/2X60\SW-SW
132	3700278	1	HOSE\HYD\1/4X300\SW-SW
133	3700321	2	HOSE\HYD\1/2X56\SW\ORING
134	3700364	2	HOSE\HYD\1/2X44\1/2MPSX7/8MOR
135	3700018	1	HOSE\HYD\1/2X18\SW-SO

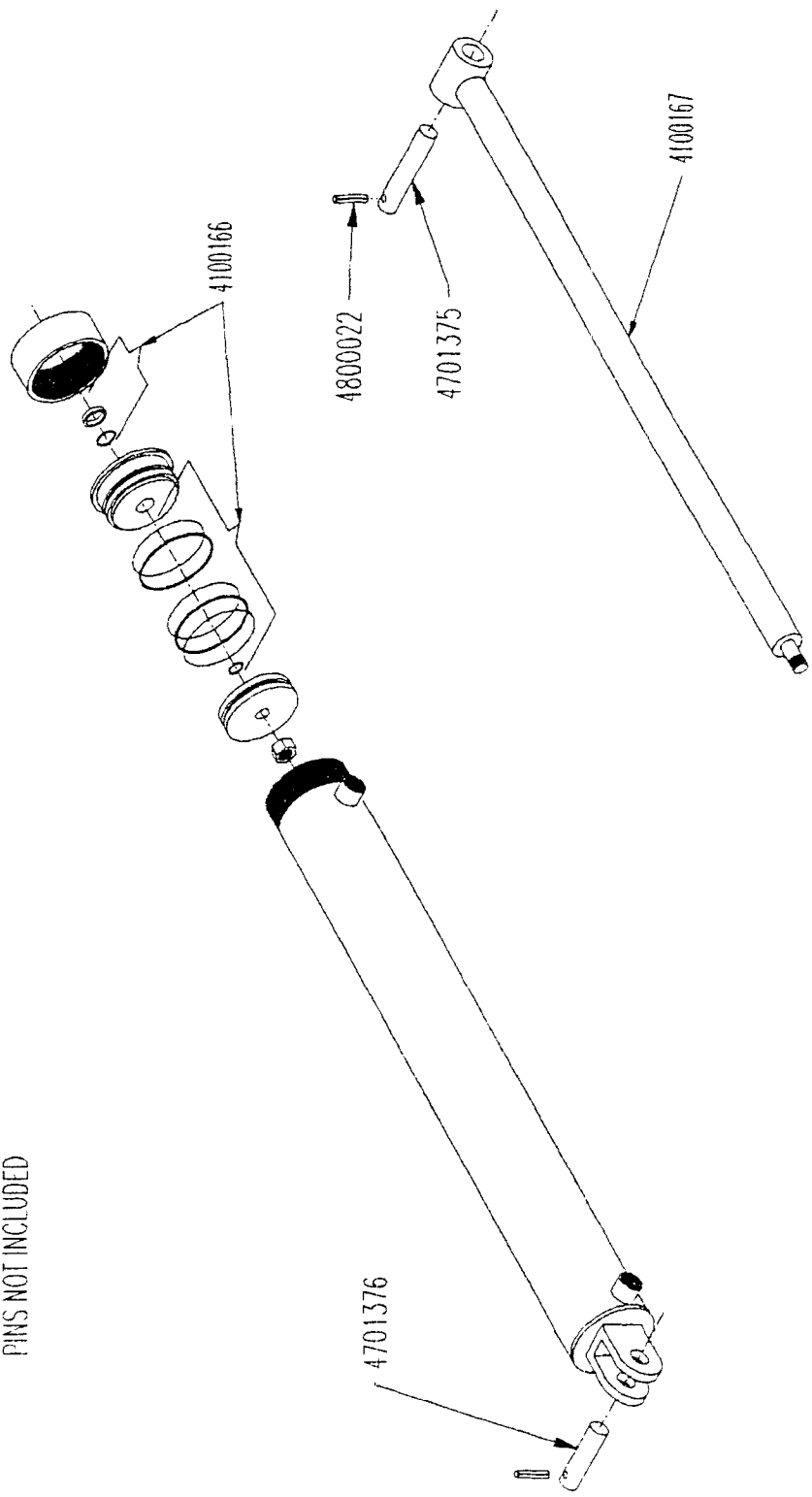
# ORBIT MOTORS



<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
<u>TUB DRIVE</u>			
1	6200004	2	5/16" X 1-1/2" KEY
2	3900011	2	MOUNTING FLANGE
3	3900010	2	COMPLETE M200 ORBIT MOTOR 24 CI
4	3200005	2	SEAL KIT
<u>DISCHARGE CONVEYOR</u>			
1	6200004	1	5/16" X 1-1/2" KEY
2	3900011	1	MOUNTING FLANGE
3	3900005	1	COMPLETE M2000 ORBIT MOTOR 18.7 CI
4	3200005	1	SEAL KIT
<u>BELLY CONVEYOR</u>			
1	6200004	1	5/16" X 1-1/2" KEY
2	3900011	1	MOUNTING FLANGE
3	3900020	1	COMPLETE M2000 ORBIT MOTOR 11.9 CI
4	3200005	1	SEAL KIT

# COMPLETE CYLINDER - 4100146

COMPLETE CYLINDER - 4100146  
PINS NOT INCLUDED

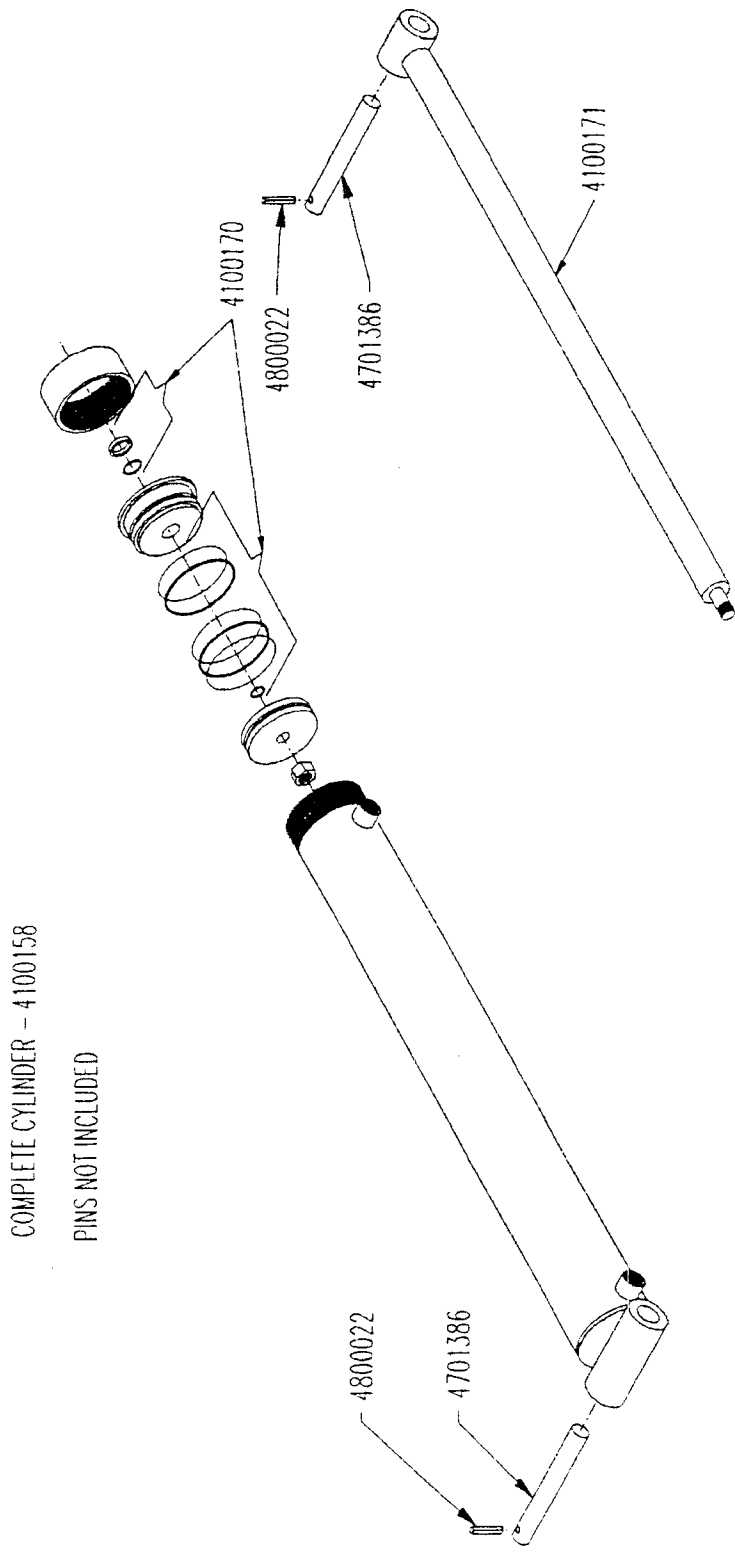




# COMPLETE CYLINDER - 4100146

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	4100166	1	CYL\HYD\SEAL:KIT\5X36\1-3/4\RAM
2	4100167	1	CYL\HYD\ROD\5X36\1-3/4\RAM
3	4701375	1	PIN\HDLSS\1-1/4X9-1/4\1HOLE\3/8
4	4701376	1	PIN\HDLSS\1-1/4X6-1/4\1HOLE\3/8
5	4800022	2	PIN\RLLD\3/8X2

# COMPLETE CYLINDER - 4100158



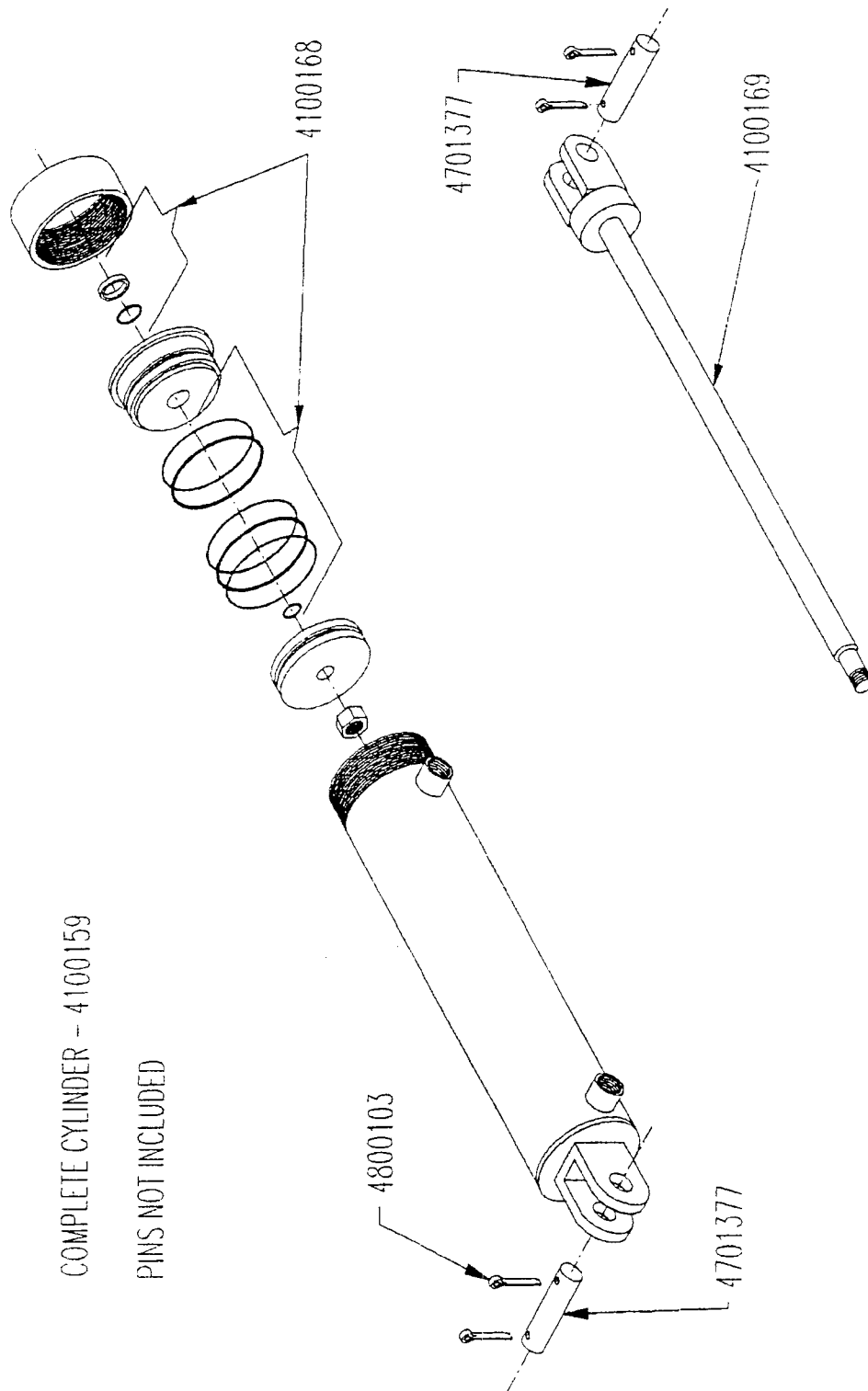
COMPLETE CYLINDER - 4100158  
PINS NOT INCLUDED

# COMPLETE CYLINDER - 4100158

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<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	4100170	1	CYL\HYD\SEAL:KIT\5X36\2-1/2\RAM
2	4100171	1	CYL\HYD\ROD\5X36\2-1/2\RAM
3	4701386	2	PIN\HDLSS\1-1/4X11-3/4\1HOLE\3/8
4	4800022	2	PIN\RLLD\3/8X2

# COMPLETE CYLINDER - 4100159



**COMPLETE CYLINDER - 4100159**

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<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
1	4100168	2	CYL\HYD\SEAL:KIT\4X36\1-1/2\RAM
2	4100169	1	CYL\HYD\ROD\4X36\1-1/2\RAM
3	4701377	2	PIN\HDLSS\1-1/4X4\2HOLE\9/32
4	4800103	4	PIN\COT\1/2X2

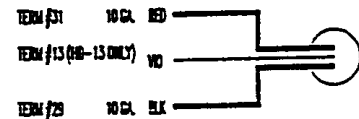


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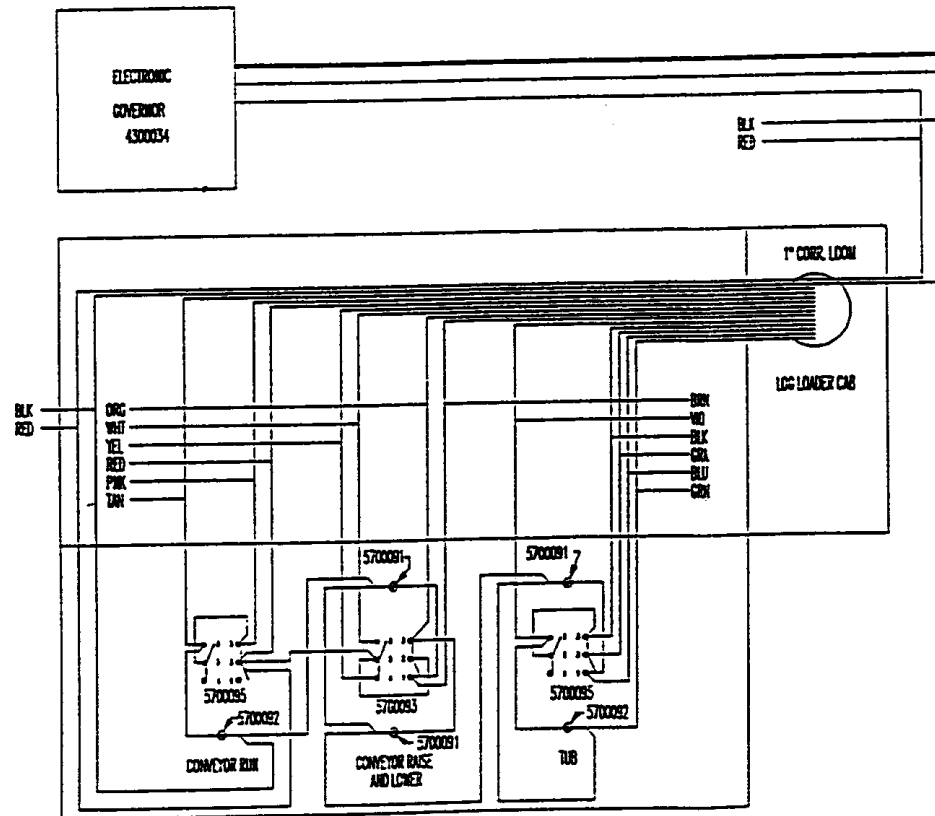
CONNECT TO T8-13 ON HD-13

CONNECT TO KEYSWITCH "START" TERMINAL ON HYDRAULIC ENGINE ON HD-14.

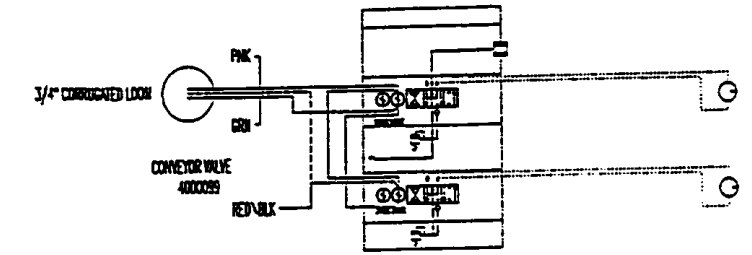
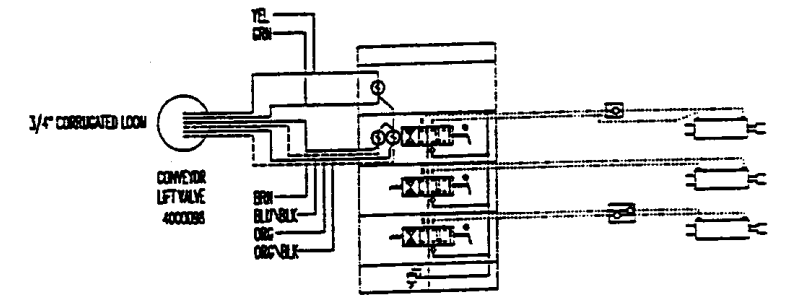
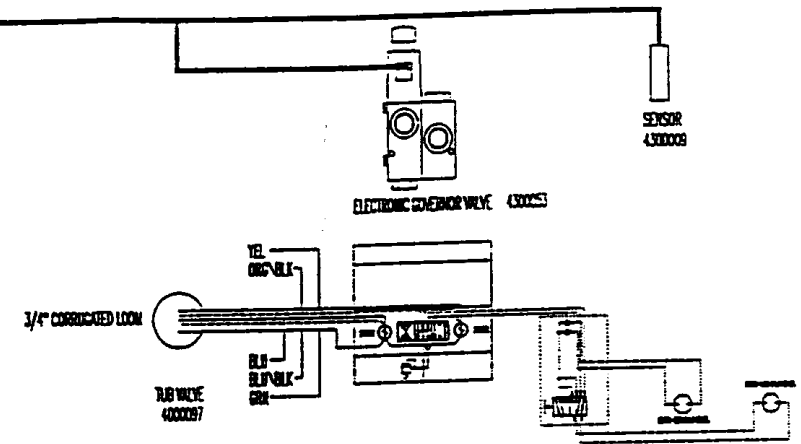
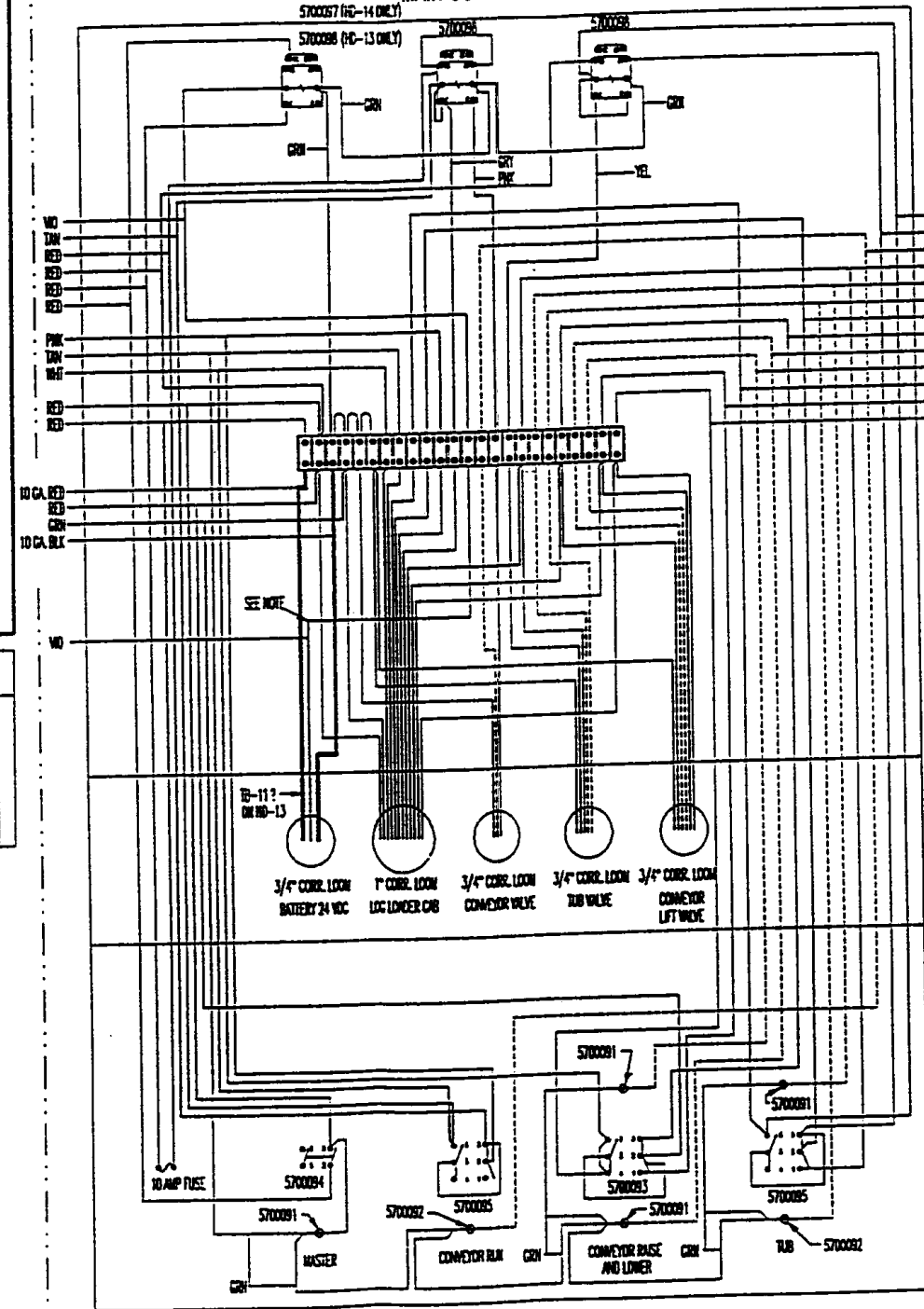
SENSOR LEADS AND VALVE LEADS SHOULD BE PULLED INTO LARGE CORRUGATED WIRE LOOM FROM CAB TO THE MAIN CONTROL BOX. DO NOT PULL INTO BOX, INSTEAD, PULL THE LEADS OUT OF THE LARGE CORRUGATED LOOM, JUST BELOW THE MAIN BOX. PLACE THE LEADS IN THE SMALL CORRUGATED LOOM AND FOLLOW TO THE TUB VALVE. AFTER THE TUB VALVE, PLACE THE LEAD TO THE SENSOR IN THE TRAY WITH THE HYDRAULIC HOSES AND EXIT THE TRAY WITH THE TUB VALVE CYLINDER HOSES.



CAB MOUNTED CONTROLS



MAIN CONTROL BOX

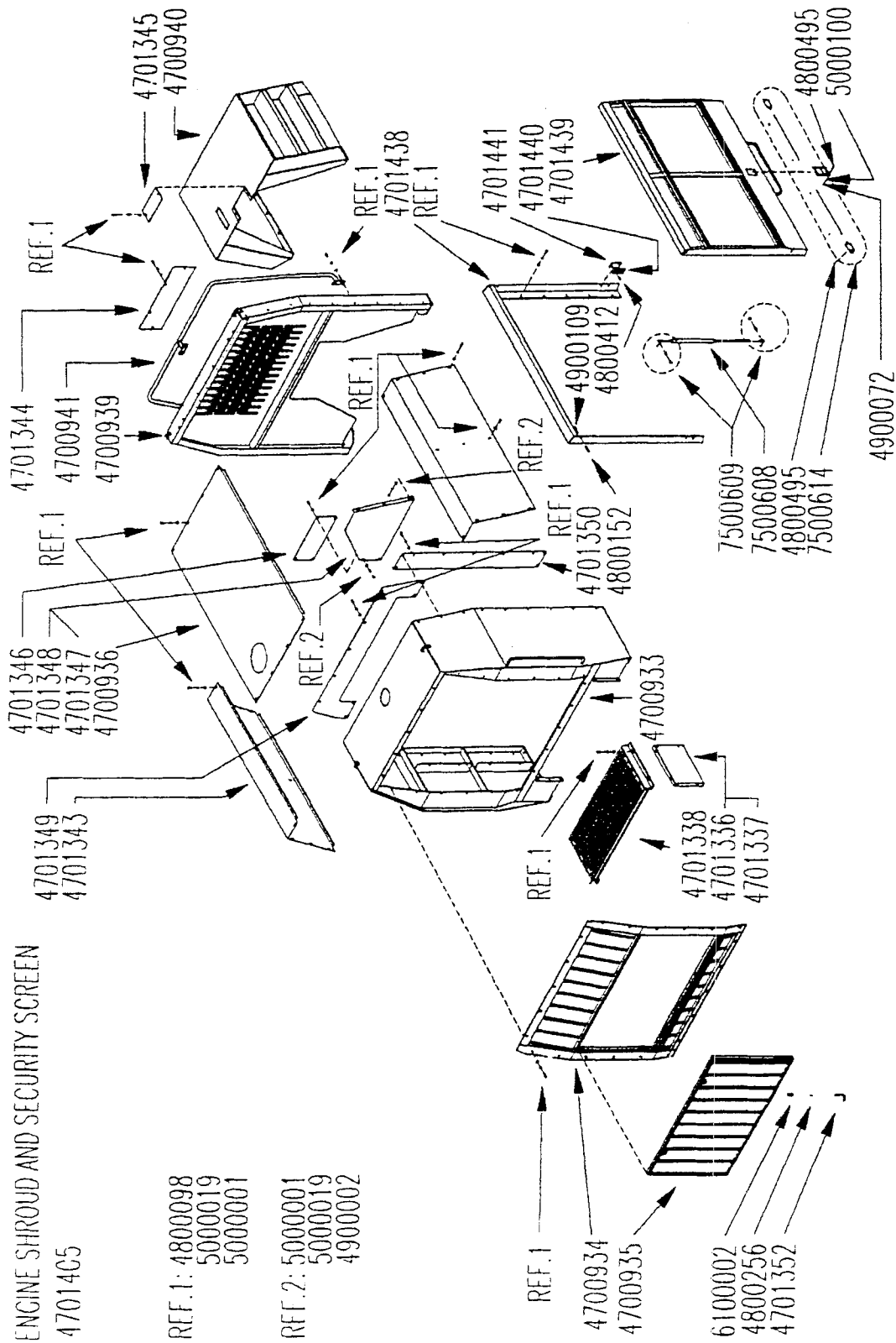


# CONTROL WIRING SCHEMATIC

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701473		WIRE\CNTRL\ASSYHD13
1	5700091	7	LAMP\LED\24VDC\RED
2	5700092	4	LAMP\LED\24VDC\GRN
3	5700093	2	SWITCH 8511K2 8501K32
4	5700094	1	SWITCH 8511K9 8501K9
5	5700095	4	SWITCH\8500K15 8501K15
6	5700098	3	RELAYDPDT\24VDC\30AMP



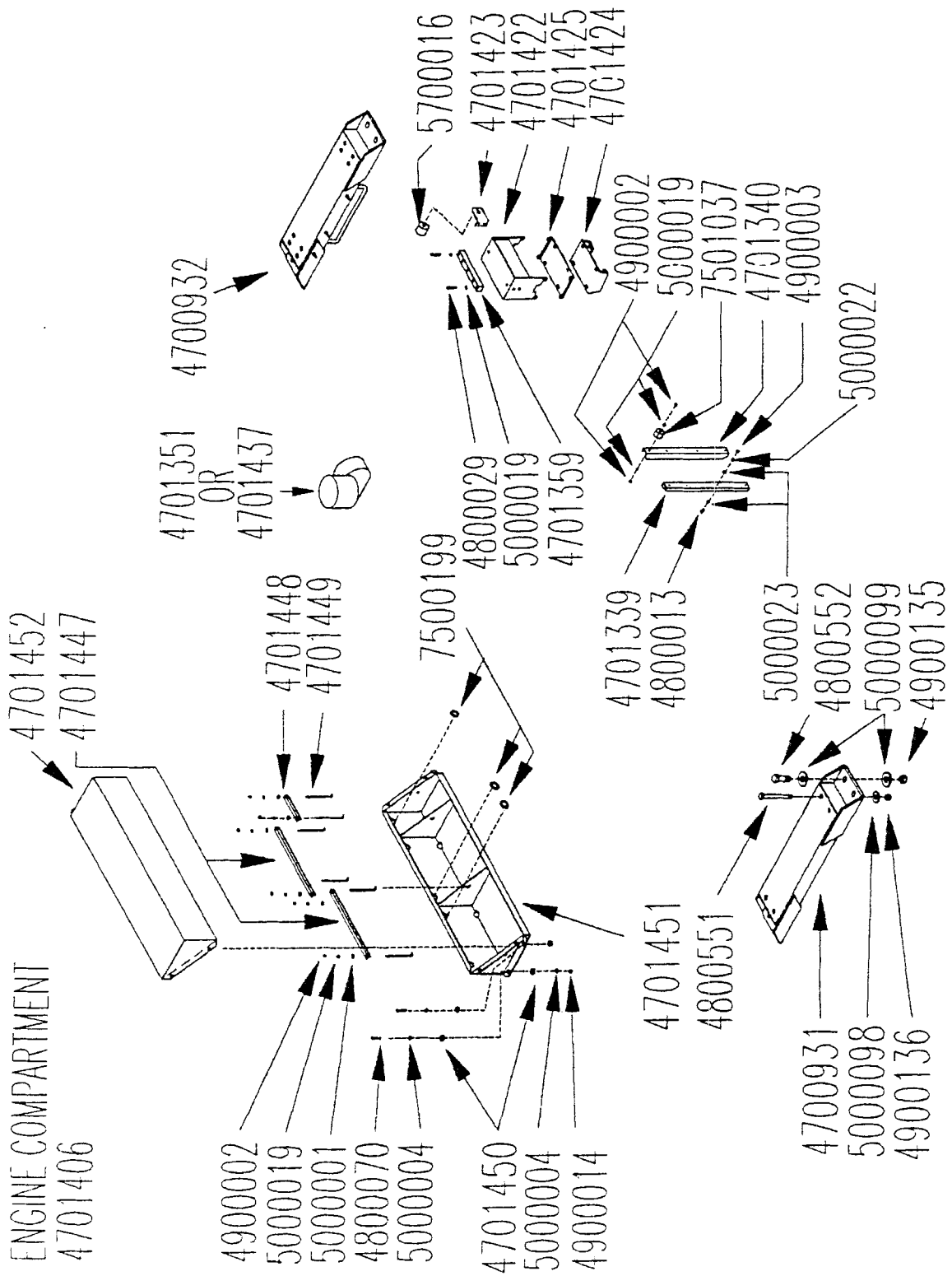
# SHROUDING AND SECURITY DOORS



# SHROUDING AND SECURITY DOORS

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701405		ENG\SHROUD\ASSY\HD13
1	4700933	1	ENCL\ENG\74X80X30\HD13
2	4700934	1	SCRN\RAD\67X64\MAIN
3	4700935	1	SCRN\RAD\55X31\RMVBL
4	4700936	1	ENCL\ENG\71X44\TOP
5	4700939	1	ENCL\ENG\74X80X5\REAR
6	4700940	1	WLKWY\DRLIN\50X35X35
7	4700941	1	RAIL\HAND\68X51\SHROUD
8	4701336	1	COV\PUMP\RH\19X12-1/2X1-1/2
9	4701337	1	COV\PUMP\RH\19X12-1/2X1-1/2
10	4701338	1	WLKWY\RAD\49-1/2X21-1/2.
11	4701343	2	GUARD\TR71X25X8-1/2\VNT
12	4701344	1	COV\PUMP\30-1/2X10X3/16
13	4701345	1	COV\CLUTCH\13-3/4x5-7/8x>
14	4701346	1	GUIDE\AIR\21X9X1/8\3412
15	4701347	1	GIDE\AIR\RH\28X23-1/4X1-1/2\3412:CAT
16	4701348	1	GUIDE\AIR\RH\28X23-1/4X1-1/3412:CAT
17	4701349	1	ENCL\RAD\67-1/2X17-1/8\>
18	4701350	2	ENCL\RAD\63X8X1\3412:CAT
19	4701352	2	PIN\LATCH\1/2X4X3\RAD\GRILL.
20	4701438	2	FRAME\DOOR\75X57\SECURITY
21	4701439	2	DOOR\SECURE\73-1/2X53-1/2
22	4701440	4	LATCH\STRIKE\4-1/2X2
23	4701441	4	LATCH\NUT\4-1/4X2
24	4800098	100	BOLT\HEX\3/8X1-1/4\NC
25	4800152	4	BOLT\HEX\3/8X4-1/2
26	4800256	2	PIN=RLLR\3/16X1-1/2
27	4800412	8	SCR\CSK\SLN\3/8X1-1/4\NC
28	4800495	24	SCR\RD\SLOT\#10X3/4\NC
29	4900002	26	NUT\HEX\3/8\NC
30	4900072	8	NUT\HEX\#10\NC
31	4900109	4	NUT\FLG\TPLCK\3/8\NC
32	5000001	126	WASH\FLAT\3/8
33	5000019	126	WASH\LOCK\3/8
34	5000100	8	WASH\FLAT\#10
35	6100002	2	.072X.687ODX2-1/8\SPR
36	7500608	4	SPRING\GAS\562#\1.1X15.75\34.65"OAL\ADJ
37	7500609	8	SPRING\GAS\M10\BALL\ASSY\STL
38	7500614	2	LATCH\PPDDL\6-1/2X4-1/4\W/CBL

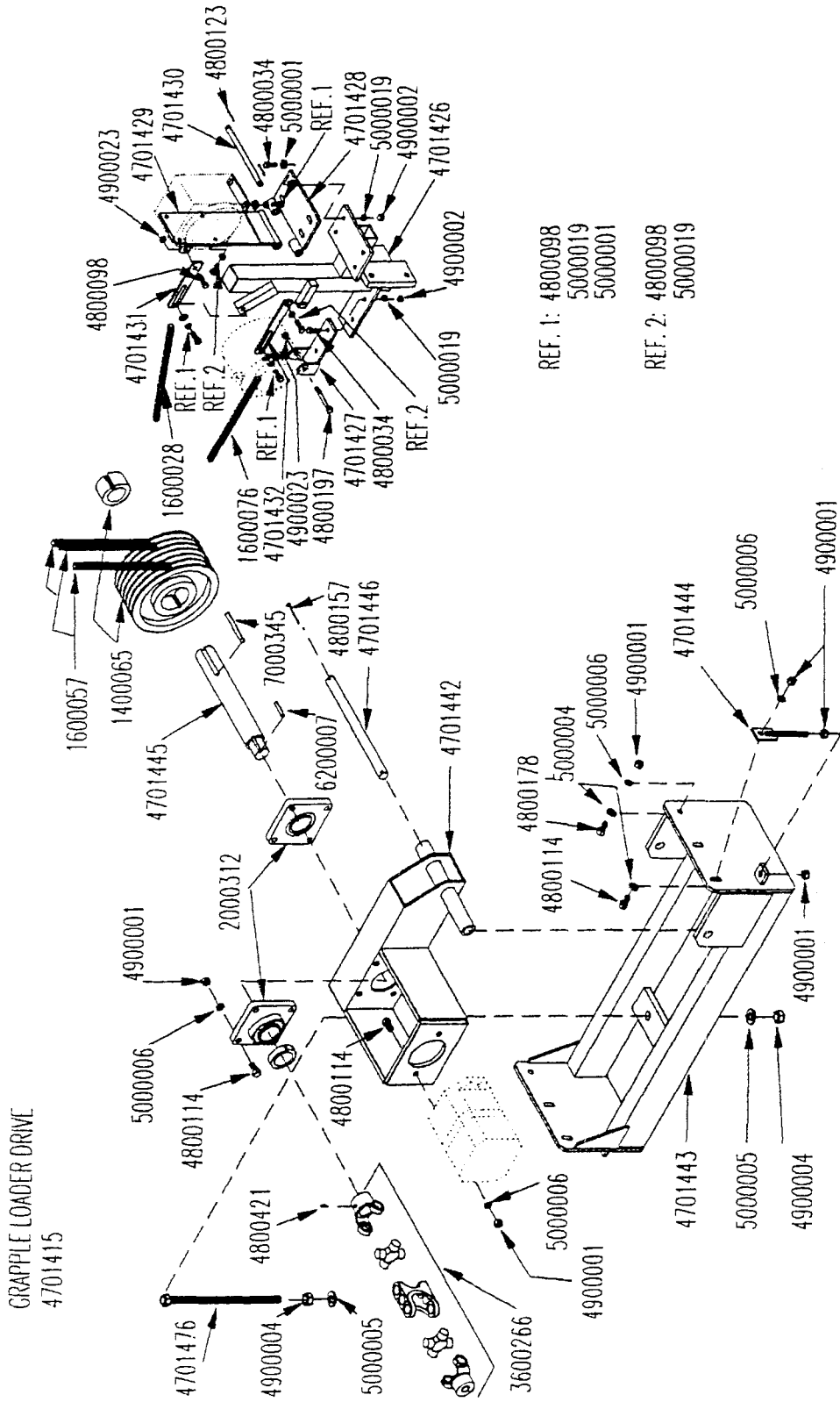
# ENGINE COMPARTMENT



# ENGINE COMPARTMENT

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701406		ENG\COMP\PARTS
1	4700931	1	BRKT\ENG\48-1/8X11X4-3/4\FRNT
2	4700932	1	BRKT\ENG\48-1/8X11X4-3/4\REAR
3	4701339	1	BRKT\ENCL\24X2X1-3/4\LH
4	4701340	1	BRKT\ENCL\24X2X1-3/4\RH
5	4701351	1	FTG\EXH\8\90D\3412\CAT
6	4701359	1	GAGE\MANIFOLD
7	4701422	1	COV\VALVE\13-5\8X9-5/8X6-7/8
8	4701423	1	BRKT\SWITCH\4-1/4X3-1/4
9	4701424	1	BRKT\VALVE\8-1/2x2-5/8x6-7/8
10	4701425	1	BRKT\VALVE\13-1/4x6-7/8\BASE
11	4701437	1	FTG\8\OFFSET\ELL\EXH
12	4701447	2	STRAP\BATT\22x1x1\HOLDOWN
13	4701448	1	STRAP\BATT\8x1x1\HOLDOWN
14	4701449	6	BOLT\1/3\8x8\NC\BATT
15	4701450	8	CUSHR\BBR\1-1/4Dx5/8\1/2ID
16	4701451	1	ENCL\BATT\57x11x12-1/2
17	4701452	1	COV\BATT\55-1/2x12-1/2x9-1/2
18	4800013	4	BOLT\HEX\5/16x1
19	4800029	2	BOLT\HEX\3/8X2-1/2
20	4800070	4	BOLT\HEX\1/2X2-1/2
21	4800551	12	BOLT\HEX\7/8XNC
22	4800552	8	BOLT\HEX\1-1/4X4-1/2\NC
23	4900002	14	NUT\HEX\3/8\NC
24	4900003	4	NUT\HEX\5/16\NC
25	4900014	4	NUT\PLCK\1/2\NC
26	4900017	4	NUT\HEX\5/16\NF
27	4900135	8	NUT\NYLCK\1-1/4\NC
28	4900136	12	NUT\NYLCK\7/8\NC
29	5000001	6	WASH\FLAT\3/8
30	5000004	8	WASH\FLAT\1/2
31	5000019	16	WASH\LOCK\3/8
32	5000022	4	WASH\LOCK\5/16
33	5000023	8	WASH\FLAT\5/16
34	5000098	12	WASH\FLAT\7/8
35	5000099	16	WASH\FLAT\1-1/4
36	5700016	1	BATTERY DISCONNECT SWITCH
37	7500199	3	GROMMET\1.5 IDX.25\2775
38	7501037	4	CUSHR\BBR\2-3/4X2\3/8\NC\M

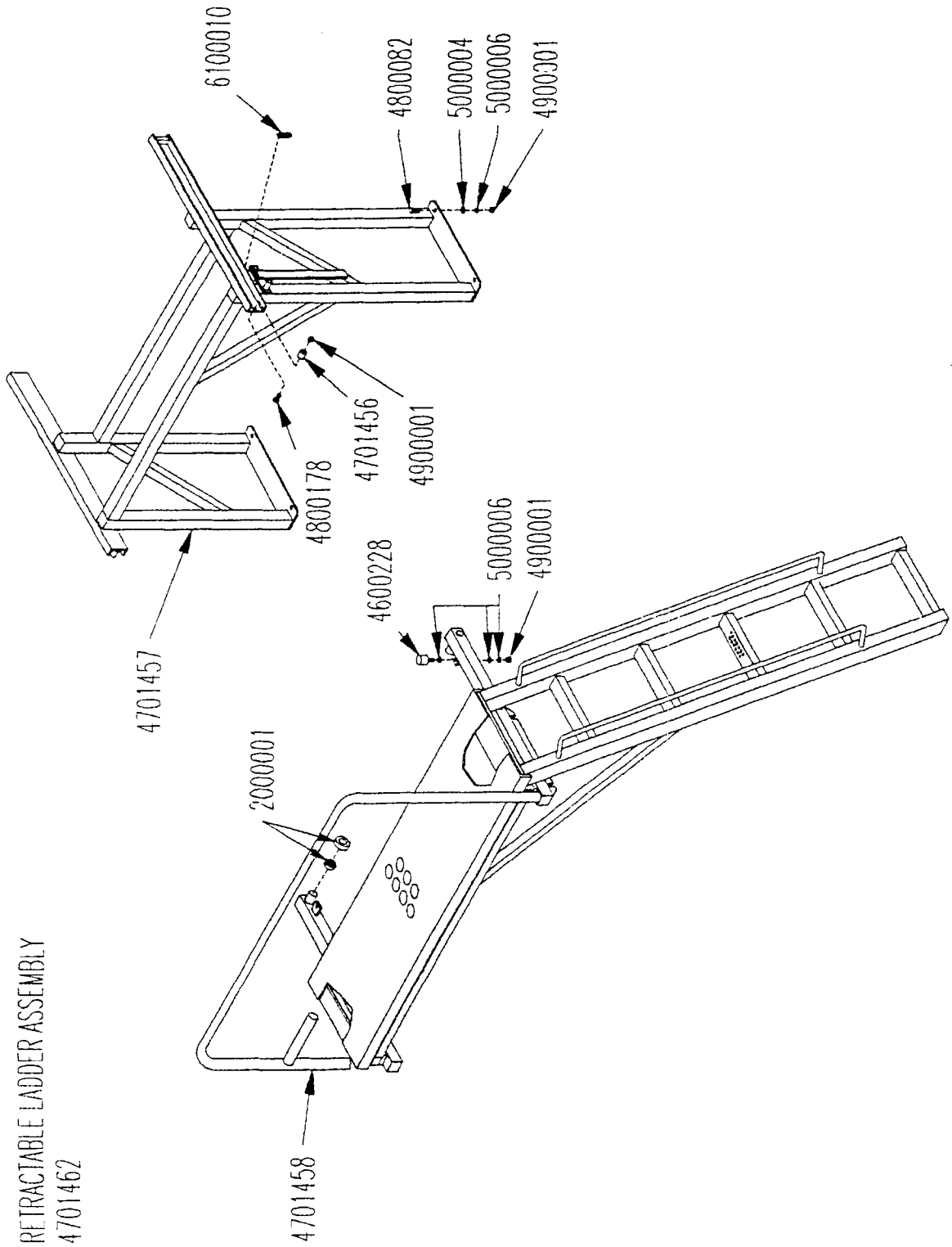
# GRAPPLE LOADER DRIVE



## GRAPPLE LOADER DRIVE

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701415		DRLIN\ASSY\PUMP\LOADER
1	1400065	1	SHVE\B-6\9.4\W\BUSH\2
2	1600028	1	V-BELT\B\79
3	1600057	3	V-BELT\BX\56
4	1600076	1	V-BELT\A\41
5	2000312	2	BRG\FLG\CAST\2\4BOLT
6	3600266	1	DRLIN\IND\1310\6\HOOD\PUMP\DR
7	4701426	1	BRKT\1\C\21-1/4X14-1/8X8\3412
8	4701427	1	BRKT\ALT\6X2-1/2X2-1/8
9	4701428	1	BRKT\A\C\7-1/2X5\BASE
10	4701429	1	BRKT\A\C\4-1/2X13-1/2\CMP
11	4701430	1	PINHDLSS\1/2X8-1/2\2HOLE
12	4701431	1	STRAP\A\C\1/4X1-1/4X6-1/2
13	4701432	1	STRAP\ALT\1/5X1X7-3/4\ADJ
14	4701442	1	BRKT\PUMP\22X14-3/4X6\LOADER
15	4701443	1	FRAME\PUMP\40-3/4x12-1/2X11\LOADER
16	4701444	2	BOLT\ADJ\1/2x6-1/2\PUMP\TNSN
17	4701445	1	SHFT\PUMP\2x14-1/4\LOADER
18	4701446	1	PINHDLSS\1X14\2HOLE\3/16
19	4701476	1	BOLT\ADJ\3/4X9-1/2\WLDD:NUT
20	4800034	6	BOLT\HEX\3/8X1-1/2
21	4800098	3	BOLT\HEX\3/8X1-1/4\NC
22	4800114	14	BOLT\HEX\1/5X2
23	4800123	2	PIN\COT\1/8X1-1/2
24	4800157	2	PIN=COT\3/16X2
25	4800178	2	BOLT\HEX\1/2X1-3/4
26	4800197	1	BOLT\HEX\3/8X3-1/2
27	4800421	1	SCR\SET\ALN\5/16X3/8\NC
28	4900001	20	NUT\HEX\1/2\NC
29	4900002	6	NUT\HEX\3/8\NC
30	4900004	2	NUT\HEX\3/4\NC
31	4900023	2	NUT\TPLCK\3/8\NC
32	5000001	6	WASH\FLAT\3/8
33	5000004	6	WASH\FLAT\1/2
34	5000005	2	WASH\FLAT\3/4
35	5000006	16	WASH\LOCK\1/2
36	5000019	10	WASH\LOCK\3/8
37	6200007	1	KEY\SQ\3/8X1-1/2
38	7000345	1	KEY\SQ\1/2X2\CR

# RETRACTABLE LADDER

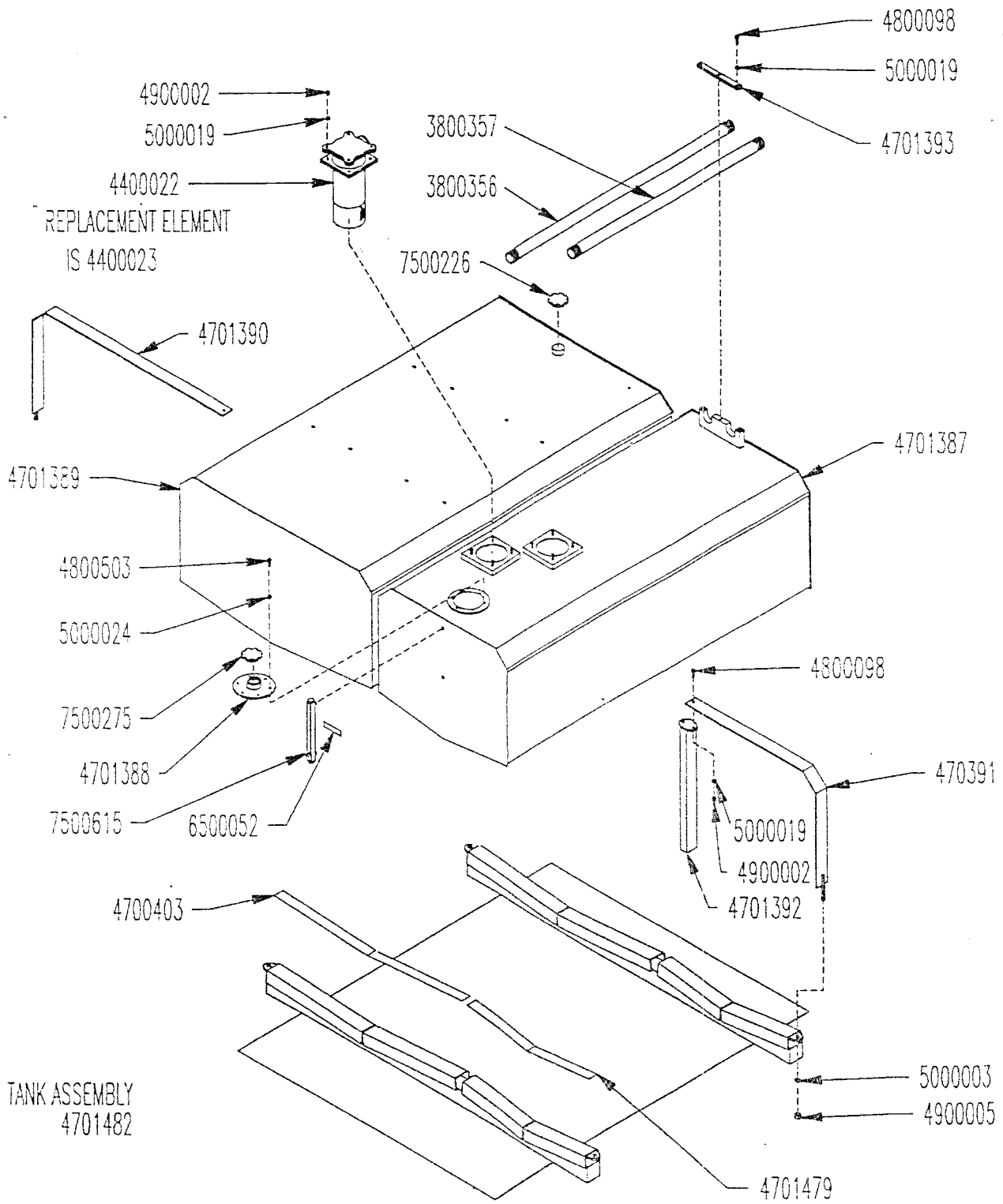


# RETRACTABLE LADDER

<u>ITEM</u>	<u>PART NO.</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701462		LDDR\TRCT\ASSY\HD13
1	2000001	4	1-1/4" W/COLLAR INSERT TYPE
2	4600228	4	CAM FOLLOWER BRG CF\1-3/8
3	4701456	2	BUSH\STOP\1X1-1/2X1\LDDR\RETR
4	4701457	1	FRAME\LDDR\51X38X44\BASE
5	47014581	1	FRAME\LDDR\93X34X92\TRCT
6	4800082	4	BOLT\HEX\1/2X1-1/2
7	4800178	2	BOLT\HEX\1/2X1-3/4
8	4900001	6	NUT\HEX\1/2\NC
9	5000004	4	WASH\FLAT\1/2
10	5000006	16	WASH\LOCK\1/2
11	6100010	1	SPRING\TENSION



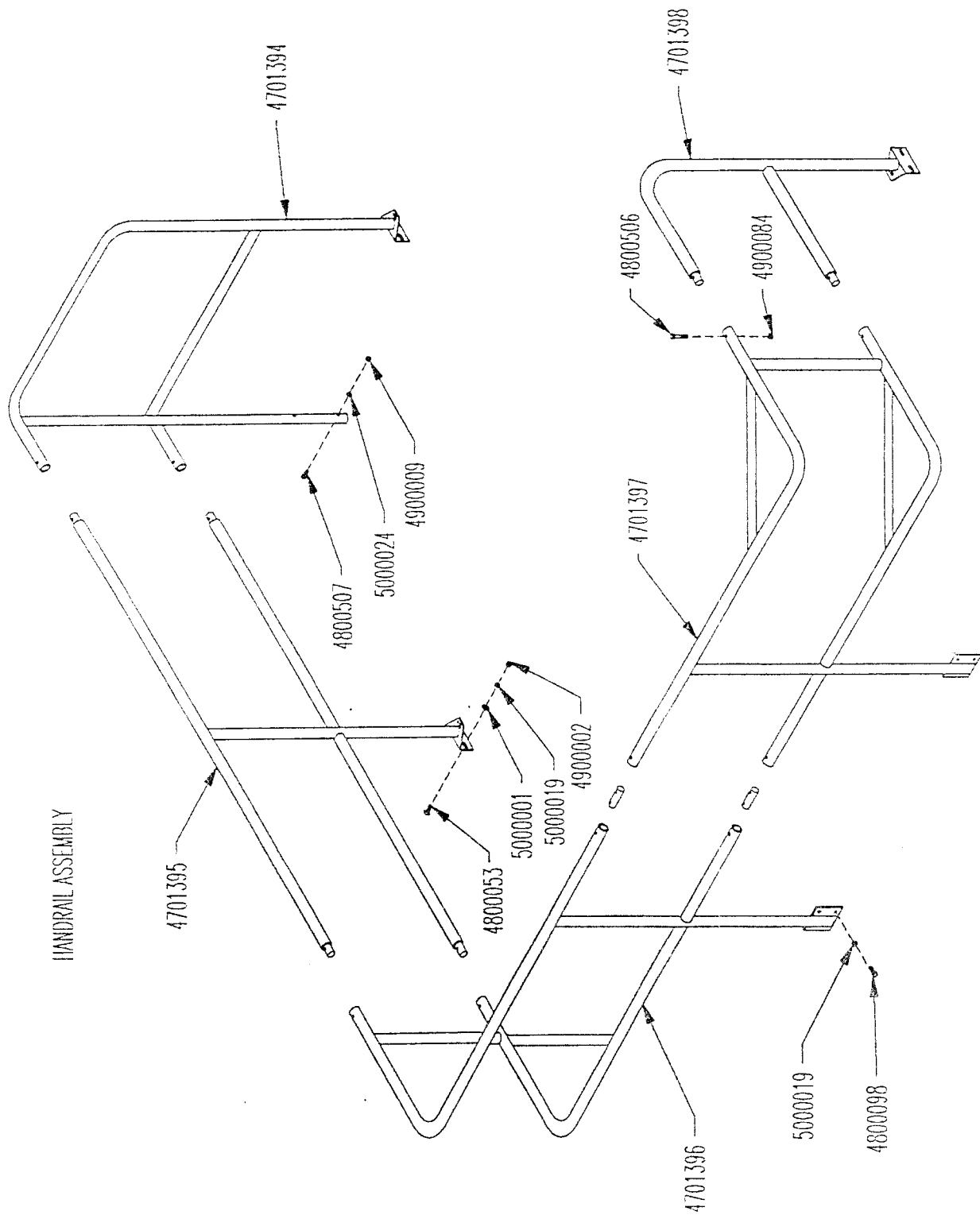
# OIL AND FUEL TANK ASSEMBLY



# OIL AND FUEL TANK ASSEMBLY

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701482		TANK\OIL & FUEL\HD13\ASSY
1	3800356	1	FTG\1-1/2MPX53\NPL\LW
2	3800357	1	FTG\1-1/2MPX44-1/2\NPL\LW
3	4400022	2	FLTR\COMPL\1-1/2FP\10MIC\NTAKE
4	4700403	2	TANK CUSHION
5	4701387	1	TANK\HYD\72-1/2X30-1/2X24-1/2
6	4701388	1	COV\TANK\7X1/4\HYD
7	4701389	1	TANK\FUEL\72-1/2X44-1/2X24-1/2
8	4701390	2	STRAP\TANK\45X24X2-1/2\FUEL
9	4701391	2	STRAP\TANK\30-1/2X2+X2-1/2\HYD
10	4701392	2	BRKT\TANK\24-3/4X2-1/2X3-1/2\STRAP\MOUNT
11	4701393	1	STRAP\TANK\9-1/2X1X1/2\PIPE
12	4701479	2	BELT\1/4x2x30\CUSH\TANK
13	4800098	7	BOLT\HEX\3/8x1-1/4
14	4800503	6	BOLT\HEX\1/4x5/8\NC
15	4900002	12	NUT\HEX\3/8\NC
16	4900005	4	NUT\HEX\5/8\NC
17	5000003	4	WASH\LOCK\5/8
18	5000019	15	WASH\LOCK\3/8
19	5000024	6	WASH\LOCK\1/4
20	6500052	1	DECAL\INFO\OIL\LEVEL
21	7500226	1	FUEL CAP
22	7500275	1	OIL TANK CAP\VENTED
23	7500615	1	GUAGE\HYD\10\W\TERM

# FRONT HANDRAIL ASSEMBLY

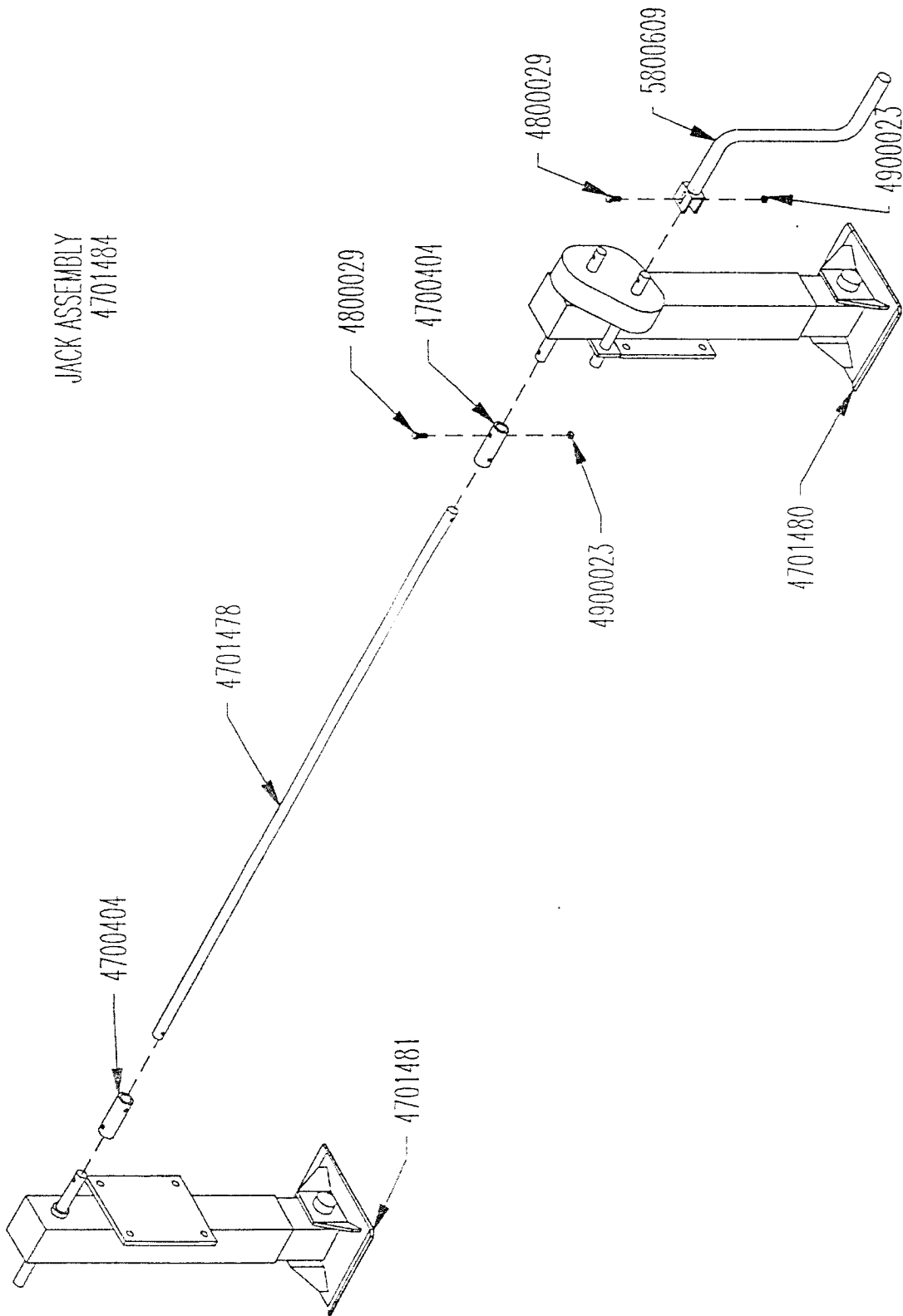


HANDRAIL ASSEMBLY

# FRONT HANDRAIL ASSEMBLY

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701485		HNDRL\FRONT\HD13\ASSY
1	4701394	1	RAIL\HAND\76X45\RH\HD13
2	4701395	1	RAIL\HAND\78X4X\FRNT\HD13
3	4701396	1	RAIL\HAND\57X25X44\LH
4	4701397	1	RAIL\HAND\57X25X44\RH
5	4701398	1	RAIL\HAND\44x20x1/2\LH
6	4701477	2	PIN\HDLSS\1X3\2HOLE\5/16
7	4800053	9	BOLT\HEX\3/8X1\NC
8	4800098	8	BOLT\HEX\3/8X1-1/4
9	4800506	10	BOLT\HEX\1/4X1-3/4\NC
10	4800507	2	BOLT\HEX\1/4X2-1/4\NC
11	4900002	9	NUT\HEX\3/8\NC
12	4900009	2	NUT\HEX\1/4\NC
13	4900084	10	NUT\TPLCK\1/4\NC
14	5000001	9	WASH\FLAT\3/8
15	5000019	17	WASH\LOCK\3/8
16	5000024	2	WASH\LOCK\1/4

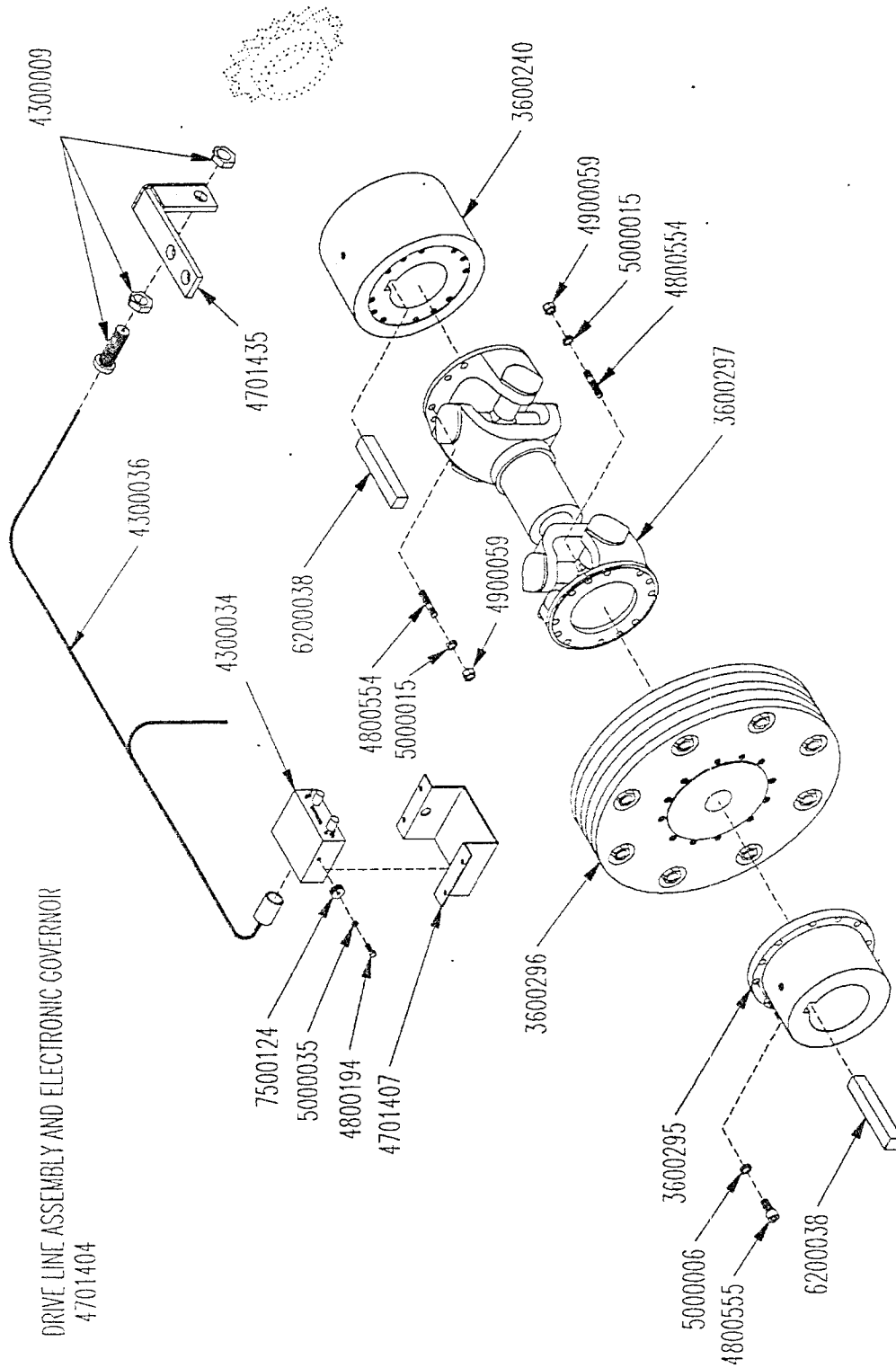
# JACK FRAME ASSEMBLY



## JACK FRAME ASSEMBLY

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701484		JACK\FRAME\HD13\ASSY
1	4700404	2	CROSS\SHAFT;COUPLER
2	4701478	1	SHFT\JACK\1X68-7/16\2HOLE>
3	4701480	1	JACK\25000\2SPEED
4	4701481	1	JACK\25000\1SPEED
5	4800029	5	BOLT\HEX\3/8X2-1/2
6	4900023	5	NUT\TPLCK\3/8\NC
7	5800609	1	HANDLE\JACK\25000\LG

# DRIVELINE ASSEMBLY AND ELECTRONIC GOVERNOR



DRIVE LINE ASSEMBLY AND ELECTRONIC GOVERNOR  
4701404

# DRIVELINE ASSEMBLY AND ELECTRONIC GOVERNOR

<u>ITEM</u>	<u>PART NO</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
	4701404		DRLIN\ASSY\HD13
1	3600240	1	HUB\ROTOR\4-7/16
2	3600295	1	HUB\FLG\4-1/2\TORQLMTR
3	3600296	1	CLTCH\TORQLIM\650HP
4	3600297	1	DRLIN\MND\1810\20-1/2
5	4300009	1	MAGNETIC SENSOR
6	4300034	1	NEW STYLE CONTROL BOX RCB93
7	4300036	1	WIRE\HARN\EXT
8	4701407	1	BRKT\GOV\7-1/2X5X3\CAB
9	4701435	1	BRKT\SNSR\9X5X2\RTR
10	4800194	2	SCR\FLG\1/4X3/4
11	4800554	24	BOLT\STUD\7/16X2-1/4\NF
12	4900059	24	NUT\HEX\7/16\NF
13	5000006	12	WASH\LOCK\1/2
14	5000015	24	WASH\LOCK\7/16
15	5000035	2	WASH\FLAT
16	6200038	2	KEY\SQ\1X1X6
7	7500124	2	GROMMET\RUBBER\2757