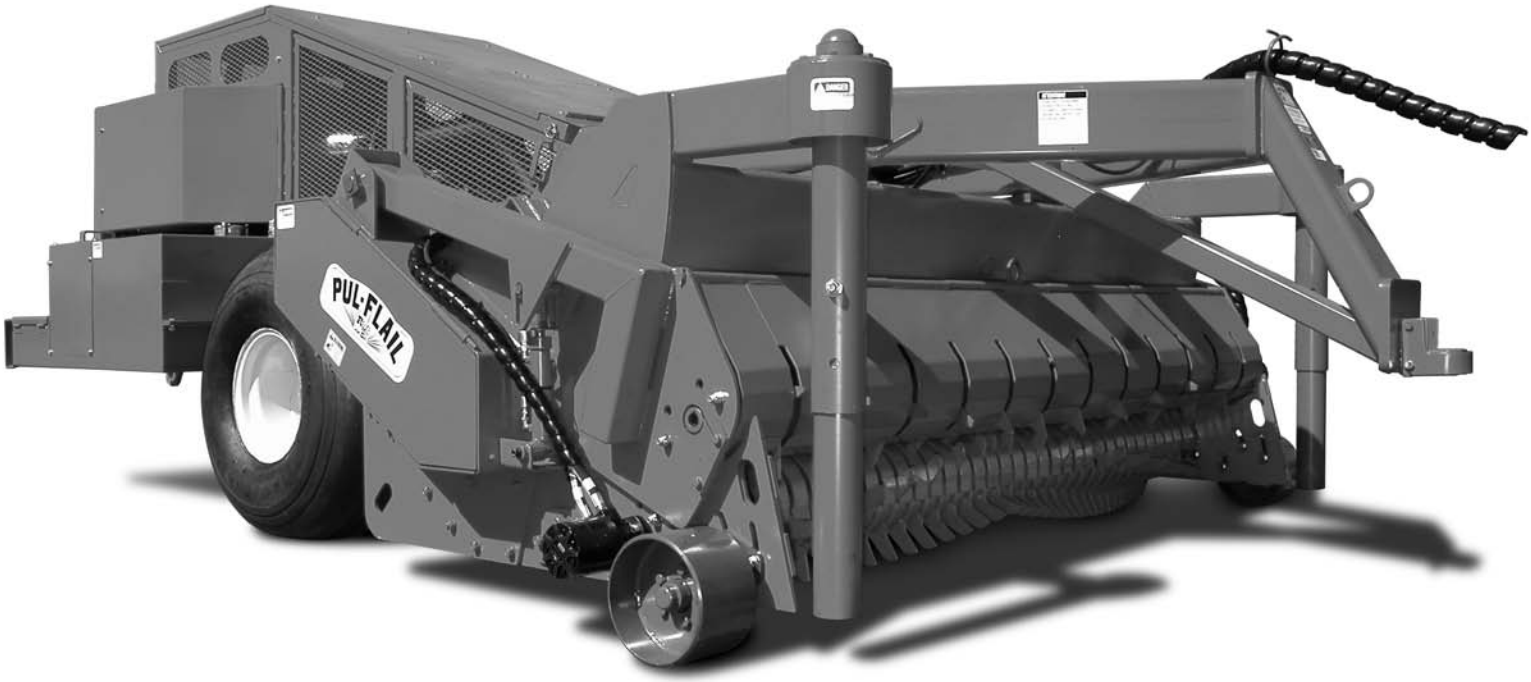



# ENGINE DRIVE SHREDDER

## READ THIS MANUAL BEFORE OPERATING

10.17.05

Rears Manufacturing Company Inc. Eugene, Oregon

800 547 8925

# Flail Safety: Operator Training

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator.

READ THE OPERATOR'S MANUAL

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

READ THE OPERATOR'S MANUAL

It has been said, *the best safety device is an informed, careful operator*. We ask you to be that kind of an operator. It is the operator's responsibility to read and understand all safety and operating instructions in the manual and to follow these. Accidents can be avoided.

READ THE OPERATOR'S MANUAL

Working with unfamiliar equipment can lead to careless injuries. *Read this manual and the manual for your tractor* before assembly or operation, to acquaint yourself with the machines. If this machine is used by any person other than the owner or is loaned or rented, it is the owner's responsibility to make certain that the operator has instruction for the safe and proper use of the machinery and that the operator reads and understands the operator's manuals.

Know your controls and how to stop the tractor, engine, and implement quickly in an emergency. Read this manual and the one provided with the tractor.

Train all new personnel and review instructions frequently with existing workers. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.

Do not allow children to operate this machine.

# Flail Safety: Preparation

Never operate the tractor and implement until you read and completely understand this manual, the tractor operator's manual, and each of the safety messages found on the safety decals on the tractor and the implement.

Personal protection equipment, including a hard hat, safety glasses, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintenance, repair, removal, or transport of this implement. Do not allow long hair, loose fitting clothing or jewellery to be around moving parts.

Tractors, with or without implements, can often be noisy enough to cause permanent, partial hearing loss. We recommend that you wear hearing protection on a full-time basis if the noise in the operator's position exceeds 80db. Long-term exposure to noise over 85db can cause severe hearing loss. Long-term exposure to noise over 90db may cause permanent, total hearing loss. **NOTE: Hearing loss from loud noise (from tractors, chain saws, radio earphones) is cumulative over a lifetime without hope of natural recovery.**

Operate the implement only with a tractor equipped with an approved Roll-Over-Protection-System (ROPS). Always wear your seat belt. Serious injury or even death could result from falling off a tractor– particularly during a turnover, when the operator could be pinned under the tractor.

Operate only in daylight or good artificial light.

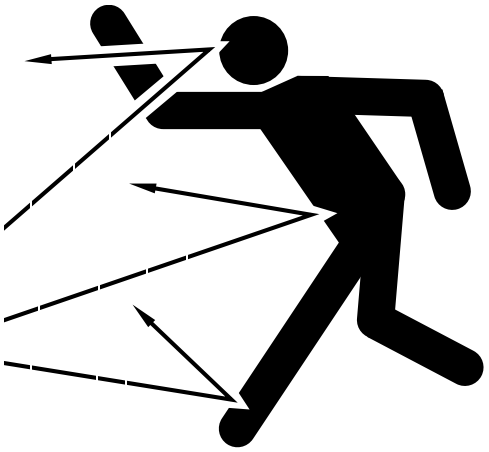
Ensure the implement is properly mounted and in good operating condition.

Safety shielding and safety decals must be properly installed and in good condition.

# Flail Safety: Operation

The use of this equipment is subject to certain hazards which cannot be protected against by mechanical means or product design. All operators of this equipment must read and understand this entire manual, paying particular attention to safety and operating instructions, prior to use. If there is something in this manual you do not understand, ask your supervisor, dealer, or call the manufacturer.

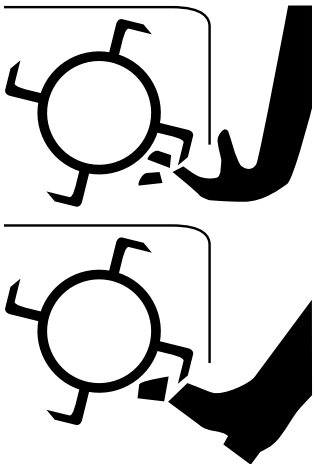
Most accidents occur because of neglect or carelessness. Keep all helpers and bystanders at least several hundred feet away from the operating implement. Only properly trained people should operate this machine. Keep children away at all times.



When the machine is operated in populated areas or in other areas where thrown objects could injure persons or property, standard equipment safety chain shielding (which is designed to reduce the possibility of thrown objects) must be installed. If the machine is not equipped with full chain shielding, **operation must be stopped when anyone comes within several hundred feet.**

The majority of accidents invlolve entanglement on a driveline, injury of bystanders by objects thrown by rotating blades, and operators being knocked off the tractor by low hanging limbs and run over by the mower. Accidents are most likely to occur with untrained operators or machines that are loaned or rented to someone who has not read the owner's manual and is not familiar with the mower.

Always stop the tractor, set the brake, shut off the engine, remove the ignition key, lower the implement to the ground and allow cutter blades to come to a complete stop before dismounting the tractor. **Never leave equipment unattended with the tractor running.**

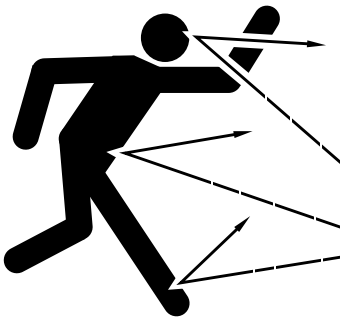


Never place hands or feet under the mower with tractor engine running or before you are sure all motion has stopped. Stay clear of all moving parts.

Do not reach or place yourself under equipment until it is blocked securely.

Take all possible precautions when leaving unit unattended: set parking brake, stop engine, and remove key from ignition.

Do not allow riders on the implement or tractor at any time. There is no safe place for any riders.



Do not operate unless all personnel, livestock, and pets are several hundred feet away to prevent injury by thrown objects. Never direct discharge toward anyone. Keep children away at all times.

Install and secure all guards and shields before starting or operating.

Keep hands, feet, hair, and clothing away from all moving parts.

Take care when operating tractor and implement under trees with low hanging limbs: the operator can be knocked off the tractor and run-over.

The rotating parts of this machine have been designed and tested for rugged use. However, they could fail upon impact with heavy, solid objects, such as steel guard rails and concrete abutments. Such impact could cause the broken object to be thrown outward at a very high velocity. To reduce the possibility of property damage, serious injury, or even death, never allow the cutting blades to contact such obstacles.

Frequently check blades. They should be free of nicks and cracks and securely fastened.

Pick up rocks and other debris before operating. Enter new areas carefully. Never assume an area is clear. **Always check.**

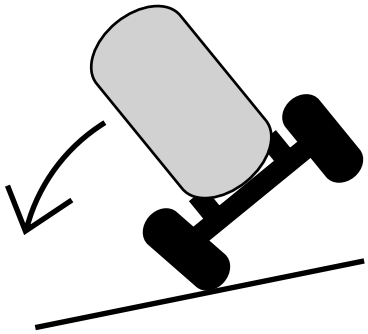
Stop mower and tractor immediately upon striking an obstruction. Turn off the tractor, remove the key, allow all moving parts to stop before leaving the tractor seat. Inspect and repair any damage before resuming operation.

Keep wood dust and debris cleared from engine compartment to minimize fire danger. The operator should always have a fire extinguisher immediately available.

The chain guards, bands, flaps, driveline shields, and gearbox shields should be used and maintained in good working condition. They should be inspected carefully, at least daily, for missing or broken cable, chain links, shields, or guards. Missing, broken or worn items must be replaced at once to reduce the possibility of injury from thrown objects or entanglement.

Stay alert for holes, rocks and roots in the terrain and other hidden hazards. Keep away from drop-offs.

Use extreme care and maintain minimum ground speed when transporting on hillside, over rough ground and when operating close to ditches or fences. Be careful when turning sharp corners.



Reduce speed on slopes and sharp turns to minimize tipping or loss of control. Be careful when changing directions on slopes. Do not start or stop suddenly on slopes. Avoid operation on steep slopes.

When using an implement, 20% of the combined tractor and implement weight (at a minimum!) must be on the tractor's front wheels. Without this weight, the tractor could tip over, causing personal injury or death. The weight may be attained with a front end loader, front wheel weights, ballast in the tires or front tractor weights. When attaining this minimum 20% front wheel weight, you must not exceed the ROPS weight rating. Weigh the tractor and the implement. Do not guess or estimate!

Inspect the entire machine periodically as indicated in the maintenance section of this manual. Look for loose fasteners, worn or broken parts, pinched hydraulic hoses, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order.

Be careful when operating the tractor and implement on uneven ground to avoid upsetting.

In extremely uneven terrain, front wheel weights, front tractor weights, and/or tire ballast should be used to improve stability.

Pass diagonally through sharp dips and avoid sharp drops to prevent *hanging up* the tractor and implement. Practice improves skills in maneuvering rough terrain.

Avoid sudden starts and stops while travelling up or downhill.

Always travel down slopes, never across the face. Avoid operation on steep slopes. Slow down on sharp turns and slopes to prevent tipping and/or loss of control.

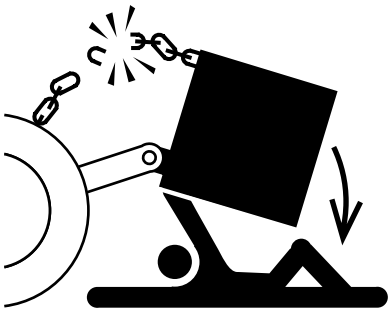
# Flail Safety: Maintenance

Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.

Follow good shop practice. Keep service area clean and dry. Be sure electrical outlets and tools are properly grounded. Use adequate light for the job at hand.

Make sure there is plenty of ventilation. Never operate gas/diesel engines in a closed building. The exhaust fumes may cause asphyxiation.

Before working on this machine shut off the engine, set the brakes and remove the key from the ignition.



Be certain all moving parts on tractor and implement have come to a complete stop before attempting to perform maintenance.

Never work under equipment unless it is blocked securely.

When performing any service or maintenance, always use personal protection devices such as eye, hand and hearing protection.

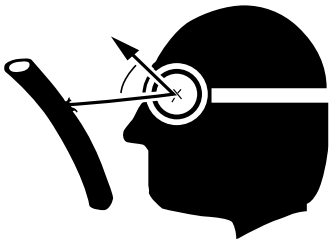
Frequently check mower blades. They should be free of nicks or cracks and securely fastened.

Periodically tighten all bolts, nuts and screws and check that all cotter pins are properly installed to insure unit is in a safe condition.

When completing a maintenance or service function, make sure all safety shields and devices are installed before placing the unit back in service.

Remove hydraulic pressure prior to doing any maintenance. Block the implement securely and turn off the engine.

Never use your hands or any part of your body to locate a hydraulic leak. Use a piece of cardboard or wood to pass along the hydraulic line and determine the location of any leak. Wear protective gloves and glasses. Hydraulic fluid escaping under pressure can penetrate the skin. Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. If injured by escaping hydraulic fluid, see a doctor at once. Gangrene and death can result. Without immediate medical treatment, serious infection and reactions can occur.



When disconnecting hydraulic lines, shut off supply: relieve all hydraulic pressure.

Before pressurizing system, inspect all components. Make sure fittings are tight and lines are not worn, kinked or damaged.

After servicing, be sure all tools, parts and service equipment are removed.

Do not allow grease or oil build up on any deck or platform.

Keep engine compartment clear of wood dust and debris to minimize fire danger.

Never replace hex bolts with less than grade 5 bolts unless otherwise specified, i.e. shear bolts. Refer to bolt torque chart for head identification markings.

Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. The manufacturer will not claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use.

If equipment has been altered in any way from the original design, the manufacturer does not accept any liability for injury or warranty.

A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this or any equipment.

# Flail Safety: Tires

Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.

Inflating or servicing tires can be dangerous. Whenever possible, trained personnel should be called to service and/or mount tires.

Always order and install tires and wheels with appropriate capacity to meet or exceed the anticipated weight to be placed on them.

# Flail Safety: Transport

Comply with state and local laws governing highway safety and movement of farm machinery on public roads.

The use of flashing amber lights is acceptable in most localities. However, some localities prohibit their use. Local laws should be checked for all highway lighting and marking requirements.

When driving the tractor and equipment on the road or highway under 20mph (32kph) at night or during the day, use flashing amber warning lights and a slow moving vehicle identification emblem (SMV).

Plan your route to avoid heavy traffic.

Always install transport locks, pins or brackets before transporting.

Do not drink and drive.

Watch out for traffic when operating near or crossing roadways.

When driving hills or curves, slow down and make gentle turns. Make certain that at least 20% of the total weight of tractor and implement is on the front wheels to maintain safe steerage. Slow down on rough or uneven surfaces.

Use extreme care and maintain minimum ground speed when transporting on hillsides, rough ground, or when travelling close to ditches and fences. Be careful when steering around sharp corners.

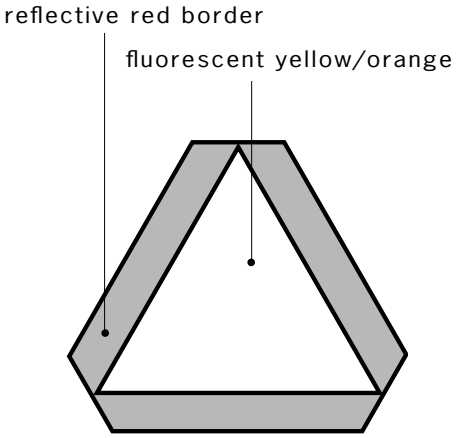
Never allow riders on either the tractor or implement. Falling off can kill.

Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.

Do not exceed 20mph (32kph). Reduce speed on rough roads and surfaces.

Use hardened hitch pins with retainers when attaching to pull-type machines.

Use a safety chain to prevent unexpected separation with pull-type models.




**slow moving vehicle emblem**

# Flail Safety: Storage

Do not work under an implement supported by a jack. Do not put any part of body under a raised implement unless it is blocked securely.

Store the implement away from activity.

Do not park equipment where it will be exposed to livestock. Damage to equipment or injury to livestock could result.

Do not permit children to play on or around the implement.

Make sure the parked unit is on a hard, level surface with all safety devices in place and in good working condition.

# Flail Safety: Safety Decals

This is the SAFETY-ALERT symbol. This symbol is used to visibly mark operating hazards. YOU MUST FOLLOW THE DIRECTIONS POSTED BESIDE THE SAFETY-ALERT SYMBOL TO AVOID BODILY INJURY OR DEATH. Before you operate any machinery, read the operator's manual. A copy of every SAFETY-ALERT decal on your implement is included in your operator's manual with a map of each decal on your implement. With your operator's manual in hand, walk around the implement: find, read, and UNDERSTAND every SAFETY-ALERT decal.

**EVERY OPERATOR OF THIS IMPLEMENT MUST DO THIS FOR THEIR OWN SAFETY.**

On Safety Decals, there is often a signal word: DANGER, WARNING, CAUTION. These signal words indicate the level of hazard or degree of seriousness for the described hazard on the decal.

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

**⚠ WARNING**

Indicates a potentially hazardous situation that, if not avoided, may result in death or serious injury.

**⚠ CAUTION**

Indicates an area of extreme danger- machine components and hazardous operations that, for functional purposes, cannot be guarded and, if not avoided, could result in death or serious injury.

**⚠ DANGER**

Warns the operator of potential machine damage if indicated procedure is not followed.

**IMPORTANT**

Keep safety decals clean and legible at all times and replace safety decals that are missing or have become illegible.

**decals won't help if you can't read them**

When parts that bear safety decals are replaced, the replacement parts must have a current safety decal. Safety decals are available from your dealer or direct from the manufacturer.

When applying a safety decal, be sure the application surface is clean (free of dirt and grease) and dry. The surface you are applying the decal to should be above 50°F (10°C).

**install the decal properly and they'll stick around**

**OPERATOR RESPONSIBILITIES**

MAINTAIN ALL FASTENERS FOR TIGHTNESS: WHEEL HUB BOLTS, AXLE CLAMPS, TANK MOUNTS, PUMP MOUNTING BOLTS, GEARBOX MOUNTING BOLTS, STRAINER MOUNTING BOLTS, ETC.

DAMAGE TO EQUIPMENT DUE TO LOOSE FASTENERS IN THE RESPONSIBILITY OF THE OPERATOR AND NOT COVERED BY WARRANTY.

10

**DANGER**

-ROTATING DRIVELINE-

KEEP ALL SHIELDS AND GUARDS SERVICED AND IN PLACE. INJURY OR DEATH CAN RESULT FROM WRAPPING OR ENTANGLEMENT.

KEEP ALL SHIELDS AND GUARDS SERVICED AND IN PLACE. INJURY OR DEATH CAN RESULT FROM WRAPPING OR ENTANGLEMENT.

Decal 89

89

**WARNING**

DO NOT OPEN ACCESS DOOR UNTIL MANDREL HAS STOPPED REVOLVING

Decal 94

94

**CAUTION**

1. Keep All Shields in Place.
2. Before Serving, Adjusting or Working on Machine: Disengage Power, Shut Off Engine and Make Sure All Moving Parts Have Stopped.
3. Do Not Stand Near Machine When in Operation.

Rear's Mfg. Co.
2140 Prairie Rd.
Eugene, OR 97402

11

**WARNING**

DO NOT USE THIS SHIELD AS A STEP OR A PLATFORM, SHIELD MAY BEND OR FEET MAY SLIP CAUSING SERIOUS INJURY

Decal 90

90

**DANGER**

KEEP CLEAR

DURING OPERATION

Decal 97

97

**WARNING**

HIGH-PRESSURE FLUID HAZARD

- Relieve pressure on system before repairing or adjusting.
- Wear proper hand & eye protection when searching for leaks,use wood or cardboard not hands.

FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH.

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**CAUTION**

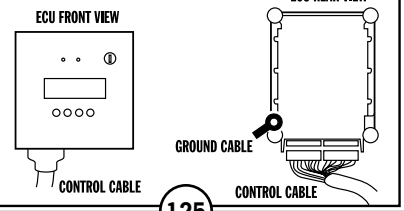
1. DO NOT allow anyone to operate flail without proper training in its safe operation.
2. KEEP CHILDREN AWAY AT ALL TIMES.
3. DO NOT operate above rated PTO speed.
4. NO RIDER AT ANY TIME.
5. NEVER MOW NEAR PROPLE.
6. BEFORE LEAVING TRACTOR SEAT for any reason or allow anyone to approach tractor, turn engine off and allow mandrel to fully stop.
7. NEVER OPERATE FLAIL without all shields and guards in place and in good repair.

Decal 98

98

**ATTENTION!**

DO NOT WELD ON MACHINE WITHOUT PROTECTING ECU! DISCONNECT COMPUTER PANEL GROUND AND CONTROL CABLES BEFORE WELDING.




125

**DANGER**

SHIELD MISSING

DO NOT OPERATE!

Decal 93

93

**WARNING**

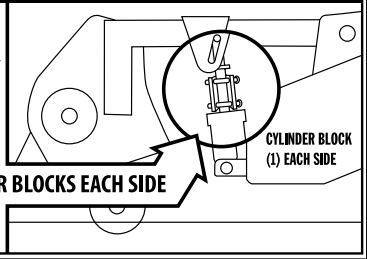
DO NOT PLACE ANY PART OF BODY UNDER RAISED IMPLEMENT.

102

**CAUTION!**

BEFORE ANY WORK ON ROTOR:

1. TURN OFF SHREDDER ENGINE & REMOVE KEY
2. BLOCK SHREDDER WHEELS
3. LOWER SHREDDER FLAIL HEAD TO GROUND
4. RAISE TOP FEED ROLL AND INSTALL CYLINDER BLOCKS EACH SIDE
5. TURN OFF TRACTOR

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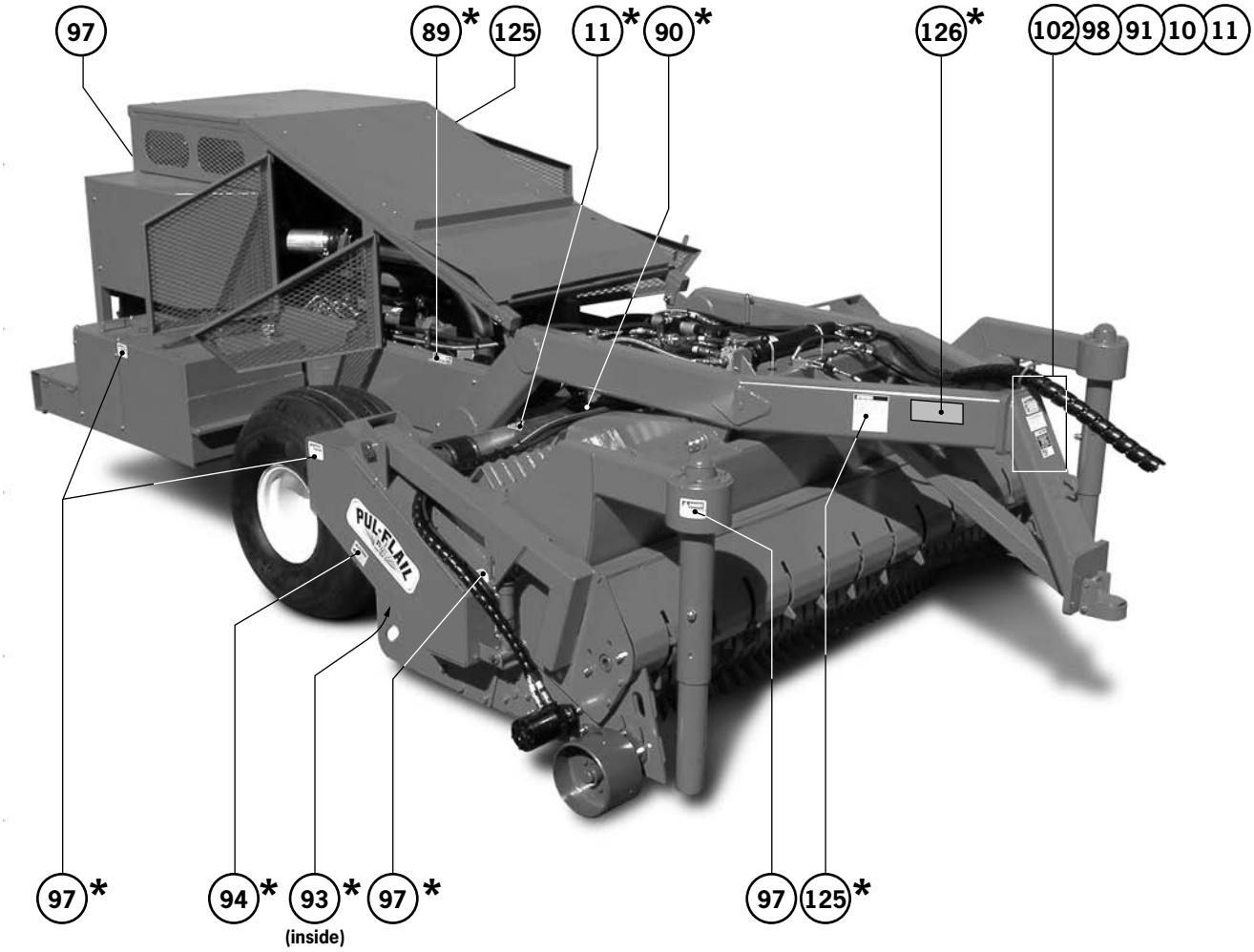
## Safety Decal Locations

For the safety of operators, maintenance workers, and bystanders, familiarize yourself with the safety decals on the chopper. Decals indicated on the illustration, below, are reproduced on the previous page.

Decal 93 can only be seen if a guard is removed.

Item numbers with a * can be found on both the left and right side of the machine.

Make certain all decals listed here are present on the shredder and in good condition. Replacement decals are available from your dealer or direct from Rears.



## Pre-operation check list

1. Top off the gearbox oil if needed. You will find instruction for how to check the oil level and a list of recommended lubricants included on the parts page for your gearbox model in this manual.
2. Check your drive belt tension. New belts will stretch and become slack much more quickly than belts that have been broken in. Check new belts frequently.
3. Properly lubricate all grease points.
4. Check all fasteners - tighten as required.
5. Inflate tires to 36psi. Check tire pressure frequently.

## Tractor Setup

1. **Tractor size:** 85hp 4x4 tractor recommended.
2. **Tire pressure:** inflate tractor tires as recommended in your tractor's operator manual.
3. **Front weights:** the tractor must have a full rack of front weights to keep adequate front wheel traction- when pulling the shredder up a hill or onto a trailer. When the 3-point is raised above the center of the axle at the end of a row or when loading onto a trailer, the pull from the shredder will tend to lift the tractor front end. In operating conditions with the 3-point lowered, the pull from the shredder will have little effect on front end loading (see table, right)
4. **Shielding:** to minimize brush dragging under the tractor, full tractor belly plates are strongly recommended. The tractor belly plate needs to extend beyond the tractor rear axle to overlap the shielding on the shredder arch. Any gaps in the shielding are potential catch points for brush and may keep brush from feeding properly.
5. **Wheel tread:** increase wheel tread to maintain tractor stability when working on inclines or rough ground. Refer to your tractor's operator manual for instruction.
6. **Brakes:** do not transport implements unless tractor brakes are in good condition.
7. **Hydraulics:** two sets of remotes are required to operate the lift axle and the upper feed roll independently.

   The hoses with *orange* ties are for the upper feed roll. *Purple* ties mark the axle lift hoses.

   A free flow case drain connection is also required to allow the upper feed roll to float correctly. The case drain hose on the shredder is supplied with a 1/4" male quick connetor. A mating 1/4" female connector, also supplied, should be attached to the tractor.

| Operating Conditions | Equivalent Tongue Weight @ 24" |
|---|---|
| 3pt lowered, field operation | 2700 lb |
| 3pt raised, flat field | 3200 lb |
| 3pt raised, hilly field | 3900 lb |
| 3pt raised, trailer loading with long ramps- 50% grade | 4300 lb |
| 3pt raised, trailer loading with short ramps- 67% grade | 4800 lb |

8. **Electrical:** all electric controls for the operation of the shredder run off the electrical system on the shredder. There is a 7-pin SAE J560 trailer plug for tail light operation. The plug conforms to the SAE J560 wiring standard:

| | |
|---|---|
| Terminal 1 | Ground |
| Terminal 3 | Left Turn Signal, Brakes |
| Terminal 5 | Right Turn Signal, Brakes |
| Terminal 6 | Tail Lights |

## Tractor Hook-Up

The supplied **3-point arch** is a tongue extension which connects to the standard tractor 3point. This extended pivot point allows the shredder to track better when turning at the row head. The added brush shield beneath the arch helps to better feed the machine.

1. **Connect 3-point arch to tractor:** Wrap lower, hinged brush pan chain around the tractor 3-point arm and attach chain to keyhole pad on pan: *fig ii*.

   The chain in the center of the brush pan is for arch storage and should be secured out of the way during operation.

   To minimize brush dragging under the tractor, full tractor belly plates are strongly recommended. The tractor belly plate needs to extend beyond the tractor rear axle to overlap the 3-point arch brush pan. Any gaps in the shielding are potential catch points for brush and may keep brush from feeding properly: *fig i*.

2. **Remove hitch jaw cross bolt** on shredder tongue: the lower bolt which pins the hitch jaw shut. Pivot the hitch jaw retainer band up so the jaws are free to move. With the band elevated, slide the bolt back into the band holes to keep the retainer band out of the way when hooking up: *fig iii*.

3. **Align hitch ball with hitch jaw:** back the tractor up with the hitch ball level with the hitch jaws. As the ball enters the jaws, the jaws will close around the ball. Back up until the jaws are fully closed.

4. **Lower retainer band over jaws** and re-insert cross bolt through jaws to keep them together.

5. **Loop safety chain** from the back of the 3-point arch through the eye on the shredder tongue. Fasten with supplied shackle: *fig iv*.

6. **Connect hydraulic hoses to tractor remotes:** hoses marked with orange ties control the upper feed roll lift. Hoses with purple ties actuate the axle pantograph. The line marked yellow is the case drain. The feed roll lift function (orange ties) will be used most frequently and should be easily accessible.

7. **Mount the shredder control box on the tractor.**

8. **Connect the trailer plug** to the tractor for the rear tail lights.

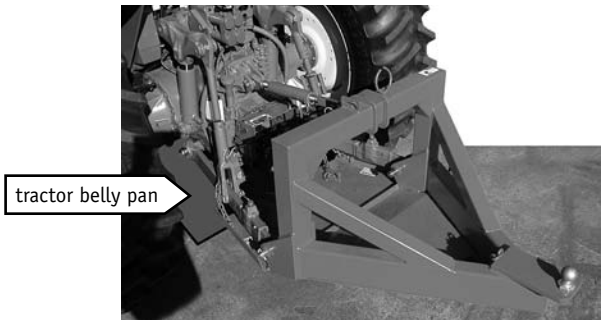



*fig i*.

*fig ii*.

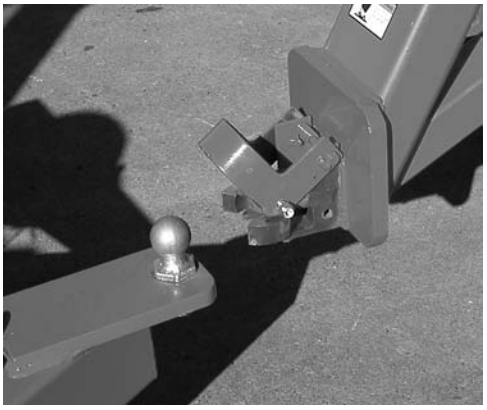


*fig iii*.

*fig iv*.

## Shredder Set-Up

There are two basic adjustments on the machine: **gauge wheel height** and the **side roller length.**

1. **Set gauge wheel height:** the gauge wheels are typically set to where the feed rolls just skim the ground. The gauge wheels are intended to be a safety stop, protecting the lower feed roll fingers in uneven terrain. The gauge wheels in normal operation should float over the terrain, suspended from the tractor 3-point.

   The wheels are adjusted by loosening all the mount plate bolts, sliding the wheel to the desired height, and tightening all fasteners: *fig i*.

2. **Adjust side roller length:** the side rolls are set so the bottom of the lower pipe just clears the ground during operation. Align holes on the inner pipe with those on the outer pipe to select from a range of side roll lengths: *fig ii*. If necessary, cut the inner pipe to the desired length.

   The bottom hole on the outer pipe is to allow the inner pipes to act as jackstands when working on the machine.

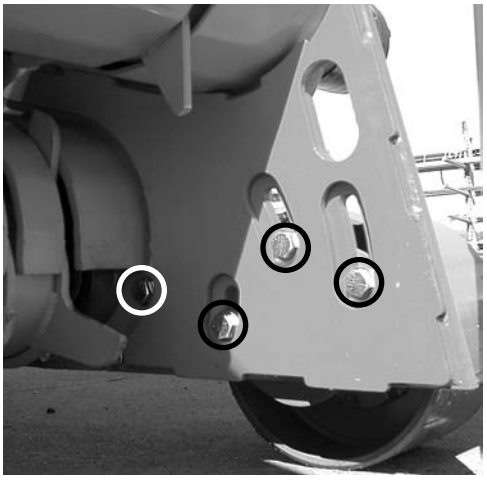


*fig i.*

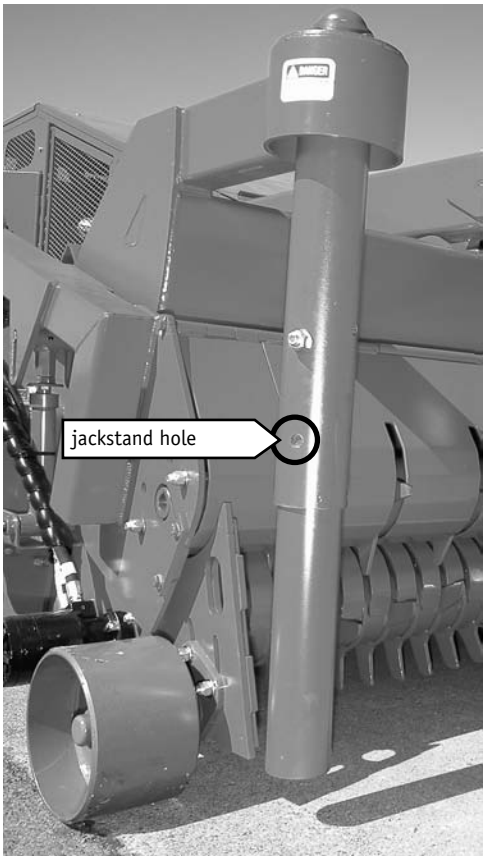



*fig ii.*

## Engine Operation

The control at the rear of the shredder, *fig i*, monitors the engine operating conditions to minimize the risk of engine failure due to overheating, low oil pressure, excessive temperatures, etc. The panel displays the engine coolant temperature, operating speed, oil pressure, fuel tank level, and total hours while the engine is running. The panel will also display error messages for engine problems if they arise. This control has an engine protection program that will reverse feed rolls if lugged down below 1400 rpm.

An **overload condition** will occur if the engine lugs down below 1400 rpm for 30 seconds. The control will reduce the engine speed to idle, 800 rpm, and disengage the clutch (see CAUTION, below). An overload lamp on the control handset, *fig ii*, will light if this occurs.

*NOTE: the overload lamp will also light during shut down because of the sudden speed change- this is normal.*

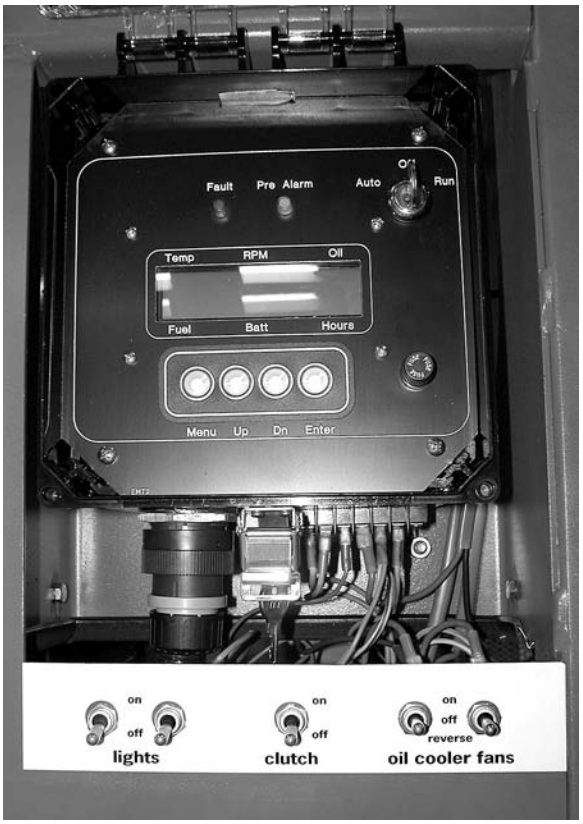



*fig i.*

## CAUTION! ⚠

**If the engine overload lamp lights during operation, immediately switch OFF the clutch** at the handset or the control panel. If you do not switch the clutch OFF, the clutch will attempt to re-engage every 30 seconds.

The overload cause should be cleared from the machine (*see Shredder Operation: Rotor Jams*). After 30 seconds the shredder can be brought back to operating speed. If the engine fails to reach the minimum operating speed within 30 seconds, the engine will kick down to idle again and cannot be brought back up to speed for another 30 seconds.

If the clutch cannot engage after 4 tries (overload due to a jammed rotor) the system will prevent additional attempts for 5 minutes, allowing the clutch to cool.

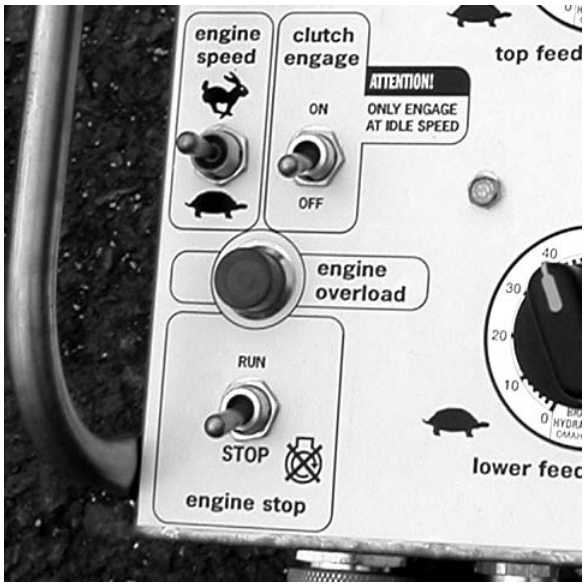



*fig ii.*

## IMPORTANT!

**DO NOT attempt to bypass the 5 minute clutch cooling period.** Mechanical damage can occur if the clutch is not allowed to cool. If the clutch fails to engage 4 times DO NOT shut down the engine until the 5 minute cool off period is complete.

To prevent overload conditions, listen for shredder engine lugging during operation: be aware of shred material load. If you hear the engine laboring, slow your ground speed and allow the material to clear- reverse feed rolls if needed to relieve engine load.

## Engine Operation: Starting

1. **Make certain the rotor cavity is clear of material.**
2. Turn Key to **RUN** on **control panel**, *fig i*.
3. The display will power up and should read:
   **Press & Hold ENTER to Crank.**
   If there is no power at the panel, the handset *engine stop* switch, *fig ii*, may be in the **STOP** position.
4. There is a **clutch engage** switch, *fig ii*, on the handset and below the control panel, *fig i*. One of these switches must be OFF to start unit.
5. Press **ENTER** on the control panel. The engine will start and run at idle speed, 800 rpm.
6. Turn on BOTH **cooler** fans, *fig. i*.
7. After 30 seconds, the clutch can be engaged. Turn ON **handset and control panel clutch switches** to engage clutch. **Both must be ON** to engage the clutch.

   There is a delay when engaging the clutch. The control will cycle 3 times to bring the rotor up to speed.

   If the hydraulic pressure in the clutch circuit is below 200psi, the engine will not run above idle speed. *A pressure gauge is located on top of the clutch housing.*

## Engine Operation: Stopping

Reduce engine speed to idle. Let idle for at least **two minutes** to allow components to cool. At the control panel turn the key to *OFF* or at the handset, flip the engine stop switch to *STOP*.

**If the engine overload lamp is lit, switch the clutch OFF immediately at the handset or control panel before shutting down the machine.**

If the engine is overloaded and you have not shut OFF the clutch, the system will try to re-engage the clutch every 30 seconds, overheating the clutch. After 4 clutch engagement cycles have failed, the clutch will need a cooling period before shutdown: allow the engine to idle for 5 minutes before shut-down.

If you are stopping to clear a rotor overload, please see the following section, *Shredder Operation: Rotor Jams.*

**Operating, handset control:**

**Engine speed** is controlled by the *engine speed* control switch on the handset, *fig ii*. To run the engine at operating speed, 2000 rpm, push the toggle switch to *rabbit*. To reduce speed to idle, push the toggle to *turtle*.

**Engine shutoff** flip the *engine stop* switch to **STOP**.

**Operating, ECU panel control:**

**Engine speed** is controlled by the *UP* and *DN* buttons on the panel, *fig i*. To run the engine at operating speed, 2000 rpm, push the *UP* button. To reduce speed to idle, push the *DN* button.

**Engine shutoff** turn the key to **OFF**.

## Shredder Operation

1. **Make certain rotor cavity is clear of material.**
2. Lower shredder axle to minimum height.
2. Lower upper feed roll.
3. Lower tractor 3-point so the gauge wheels on the shredder just clear the ground.
4. Engage clutch.
5. Bring shredder engine up to operating speed.
6. Turn on feed rolls.
7. Begin driving into brush.

**Turning at row end:** lift the tractor 3-point so the gauge wheels clear the ground. Keep the feed rolls running and the shredder engine at full operating speed. With the 3-point arch installed, the shredder will track behind the tractor.

**For best material feeding** stack brush across the row, perpendicular to the direction of travel. Larger pieces of wood (greater than 3" dia.) tend to feed better if in line with the direction of travel. Brush piles should be no wider than 8'. Freshly pruned wood shreds more easily than wood that has had time to dry. Dried brush can take 2-3 times more horsepower to shred.

**Feed roll speed** will depend on brush load, ground conditions, and ground speed. The lower feed rolls have a 2-speed valve mounted on the right/front corner of the shredder frame, *fig i*. Run the valve in low speed (valve handle up) for most shredding. For light brush conditions and higher ground speeds, run the valve in high speed (valve handle down). Adjust speed for the upper and lower feed rolls independently at the handset.

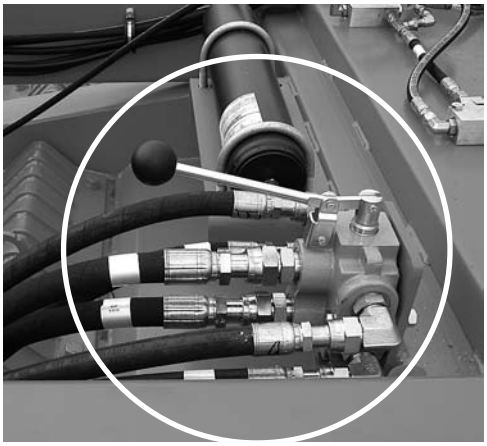


*fig i*.

**Feed roll jams:** brush blockages in the feed rolls can be backed out by hitting the *feed roll reverse button*. Sometimes the brush can be forced into the shredder by lifting the upper feed roll and lowering it back down.

**Rotor jams:** An **overload condition** will occur if the engine lugs down below 1400 rpm for 30 seconds. The control will reduce the engine speed to idle, 800 rpm. An overload lamp on the control handset, fig ii, will light if this occurs.

*NOTE: the overload lamp will also light during shut down because of the sudden speed change- this is normal.*

To prevent overload conditions, listen for shredder engine lugging during operation: be aware of shred material load. If you hear the engine laboring, slow your ground speed and allow the material to clear- reverse feed rolls if needed to relieve engine load. Reduce the frequency of engine rpm kick-downs and engine restarts to insure long clutch life.

**If the engine overload lamp lights, switch off the clutch to prevent overheating-** Switch the clutch ON when the blockage is cleared. See previous *Engine Operation* section for more clutch information.

If the engine overloads and idles the rotor, the feed rolls reverse to back out material. The upper feed roll may have to be raised to allow all the brush to clear. Once clear, the rotor can be restarted. If a jam still persists in the rotor, the engine will overload when starting up.

If the rotor jam persists, shut off the engine and remove the key.

## DO NOT CLEAR THE JAM BY HAND WITH THE ENGINE RUNNING!

Lower the flail head to the ground and block the shredder wheels.

Raise the top feed roll and install the cylinder blocks on each side (illustrated, right). The cylinder blocks are stored in the fender toolbox behind the battery cabinet when delivered from the factory.

Turn off the tractor and clear the rotor jam.

Once the jam is clear you may remove the cylinder locks, lower the top feed roll and start up the engine.

**Machine Vibration:** Uneven blade wear or blade damage can unbalance rotor and cause harmful machine vibration. If extreme vibration develops, shut down the machine and examine rotor for damage.

## KEEP YOUR DRIVE CLUTCH HEALTHY

***...prevent overload conditions***, listen for shredder engine lugging during operation: be aware of shred material load. If you hear the engine laboring, slow your ground speed and allow the material to clear- reverse feed rolls if needed to relieve engine load. Reduce the frequency of engine rpm kick-downs and engine restarts to insure long clutch life.

## PREVENT MACHINE DAMAGE

***...shut down machine immediately when vibration develops.***

## PREVENT WOOD DUST FIRES

***...keep the engine compartment clear of wood dust & debris.***

***...provide the operator with a fire extinguisher.***

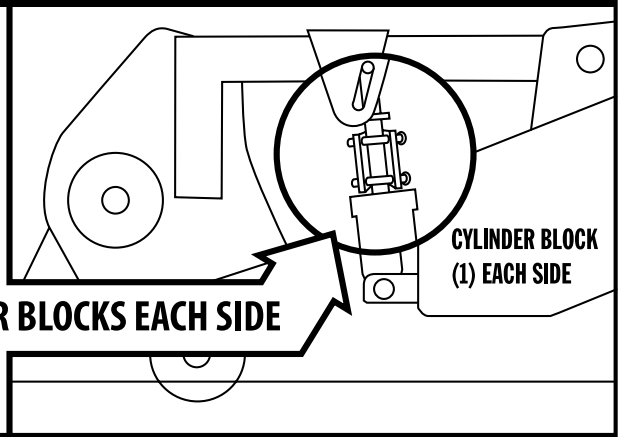
## KEEP YOUR OPERATORS SAFE

***...do not clear rotor jams by hand with the engine running!***

# ⚠ CAUTION!

## BEFORE ANY WORK ON ROTOR:

1. TURN OFF SHREDDER ENGINE & REMOVE KEY
2. BLOCK SHREDDER WHEELS
3. LOWER SHREDDER FLAIL HEAD TO GROUND
4. RAISE TOP FEED ROLL AND INSTALL CYLINDER BLOCKS EACH SIDE
5. TURN OFF TRACTOR



## Maintenance specifications & measures

| | | | |
|---|---|---|---|
| **Flail Belt** | 6/5VX800 | | |
| **Oil Filter** | RE57394 | | |
| **Engine Oil** | See Deere Engine Manual | 28.5L/30.1QT | New units change break-in oil at 100HR |
| **Primary Fuel Filter** | RE522687 | | |
| **Final Fuel Filter** | RE522688 | | |
| **Hydraulic Filter** | Zinga ZEE-304-10 (New units change filter at 100HR) | | |
| **Hydraulic Oil** | Tractor hydraulic fluid | 48GAL, dipstick in reservoir cap | |
| **Engine Coolant** | See Deere Engine Manual | 41.5QT | |
| **Fuel** | Diesel | 125GAL | |
| **Air Filter, Primary** | Donaldson P181041 | | |
| **Air Filter, Safety** | Donaldson P119370 | | |
| **Gearbox Oil** | Schaeffer's #167 Moly Synthetic SAE75W140 | 150OZ | |
| **Accumulator** | Charge with Nitrogen @250PSI | | |
| **Tire Pressure** | 36PSI | | |
| **Battery** | 8D ORM 850 | | |
| **Belt, Fan & Alternator** | R135593 (John Deere); 8PK1760 (generic) | | |
| **Clutch Filter** | Zinga ZHE-10L (New units change filter at 100HR) | | |

## Lubrication schedule

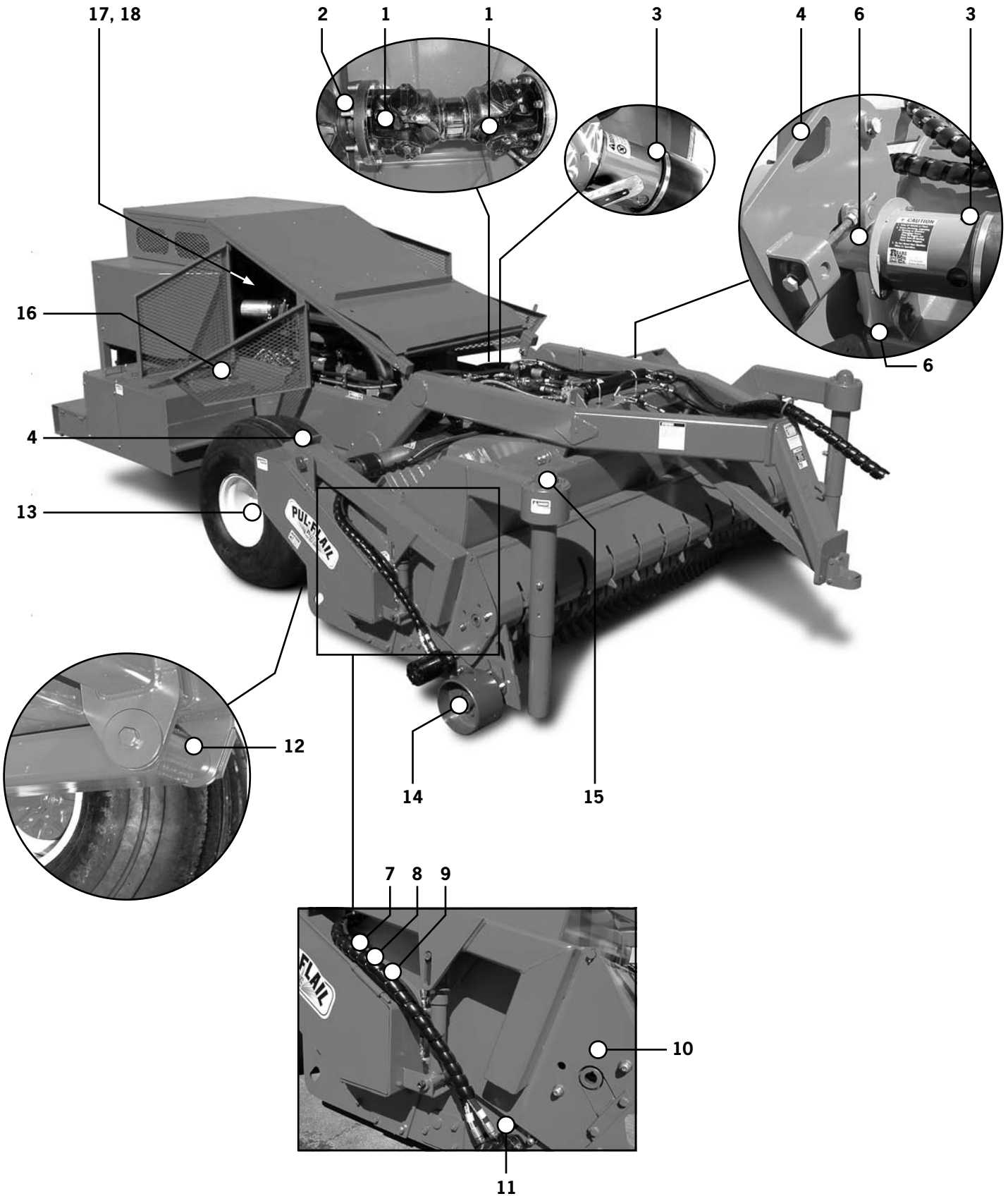
For first time use, grease all lube points as instructed on the lubrication schedule, below, EXCEPT the rotor bearings. The pre-lubricated rotor bearings are ready to operate as delivered and should be greased every eight hours of operation.

Lubrication points are illustrated on the facing page.

All lube points have been made accessible. Lubrication does not require disassembly.

Always use a Lithium base NLGI Grade 2 EP grease. We recommend Texaco Multifak EP2, Shell Alvania 2EP, and Mobil Mobilux EP2.

| pt. | | | hours | pumps |
|---|---|---|---|---|
| **1** | Driveline U-joint | Each cross on engine driveline | 16 | 2-4 |
| **2** | Driveline-gearbox adapter | Slip sleeve on gearbox | 16 | purge |
| **3** | Driveline U-joint | Crosses on each jackshaft driveline | 16 | 1-2 |
| **4** | Feed Roll Lift Arms | Access hole for pivot bearing on each arm | Weekly | Purge |
| **5** | Jackshaft Bearing | Point on each tensioner housing | 16 | 1-2 |
| **6** | Tensioner Pivot | Pivot on each tensioner housing | Monthly | Purge |
| **7** | Jackshaft Bearing | Topmost point on belt housing, each side | 16 | 1-2 |
| **8** | Rotor Bearing | Middle point on belt housing, each side | 8 | 20 |
| **9** | Rotor Labyrinth | Lowest point on belt housing, each side | 8 | 20 |
| **10** | Top Feed Roll | Access hole each end of feed roll | Daily | To Resist |
| **11** | Bottom Feed Roll | Access hole each end of feed roll | Daily | To Resist |
| **12** | Axle Pantograph Arm | Pivot bearing on each arm | Weekly | Purge |
| **13** | Wheel Hub | Grease point on outer hub housing | Monthly | Purge |
| **14** | Castor Hub | Repack annually | Annual | – |
| **15** | Side Roll Hub | Repack annually | Annual | – |
| **16** | Hydraulic oil tank | Check daily: use tractor hydraulic fluid | Daily | – |
| **17** | Engine oil reservoir | Check daily: see John Deere manual | Daily | – |
| **18** | Engine coolant tank | Check daily: see John Deere manual | Daily | – |


17, 18
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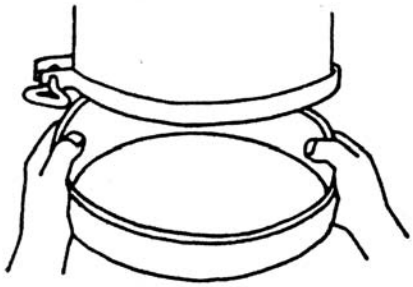
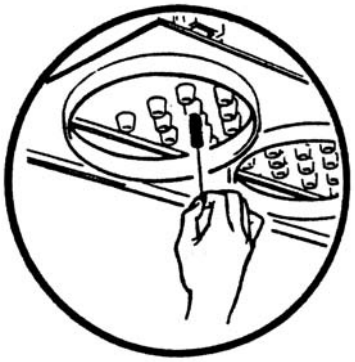
## STG G140076 air cleaner maintenance

1. **Check dust cup DAILY.** Dust cup should be dumped when 2/3 full. When re-installing the dust cup, be sure it seals 360° around the air cleaner body.



2. **Check tubes for plugging.** When the dust cap is removed, check the tubes for plugging. Generally the tubes are self-cleaning and need no service. Visual inspection is adequate: if the tubes carry light dust, remove it with a stiff brush. If heavy plugging with fibrous material is evident, remove the tube section and clean with compressed air or water no hotter than 160°F/72°C.

   **Never clean tubes with compressed air** unless both the primary and safety filters are installed in the air cleaner. **Never steam-clean tubes**.

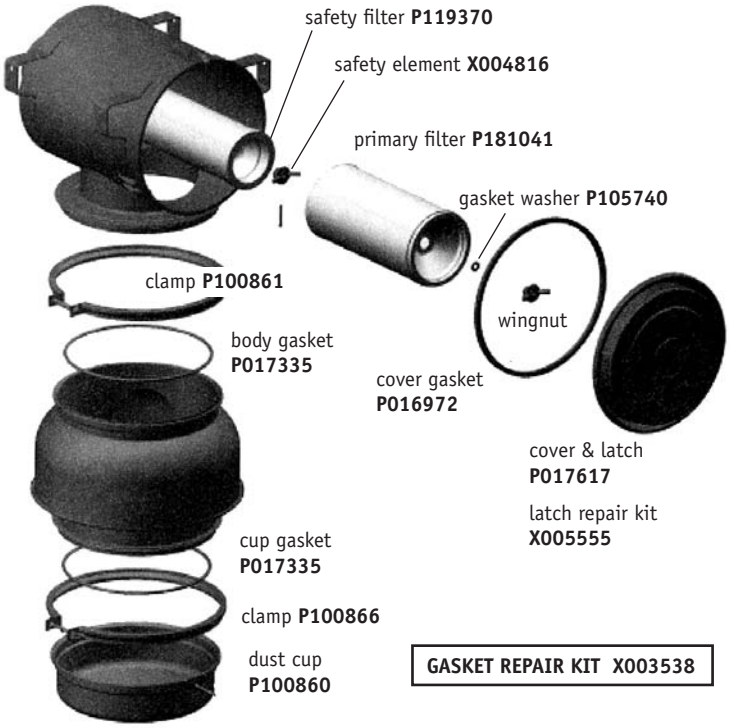


3. **CHECK AIR CLEANER message** on the engine control panel indicates a plugged filter. Loosen the wingnut behind the filter cover and remove the primary filter. Clean or replace the primary filter. If the filter is not going to be replaced immediately, cover the filter cavity with a cloth or replace the housing cover to prevent dirt from getting into the air system.

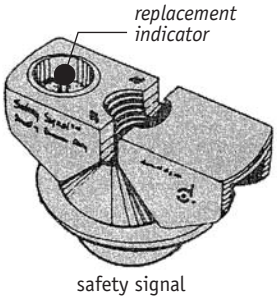
   The Safety Filter will need replacing less frequently. See safety filter instructions, *right*.

   Before installing a NEW filter, inspect it for shipping damage and gasket integrity. If there is damage, DO NOT install it.

4. **System check.** Inspect and tighten all air cleaner system connections. If there are holes or damage, replace immediately. Inspect all gaskets for worn spots or damage. Annual replacement of gaskets is recommended.

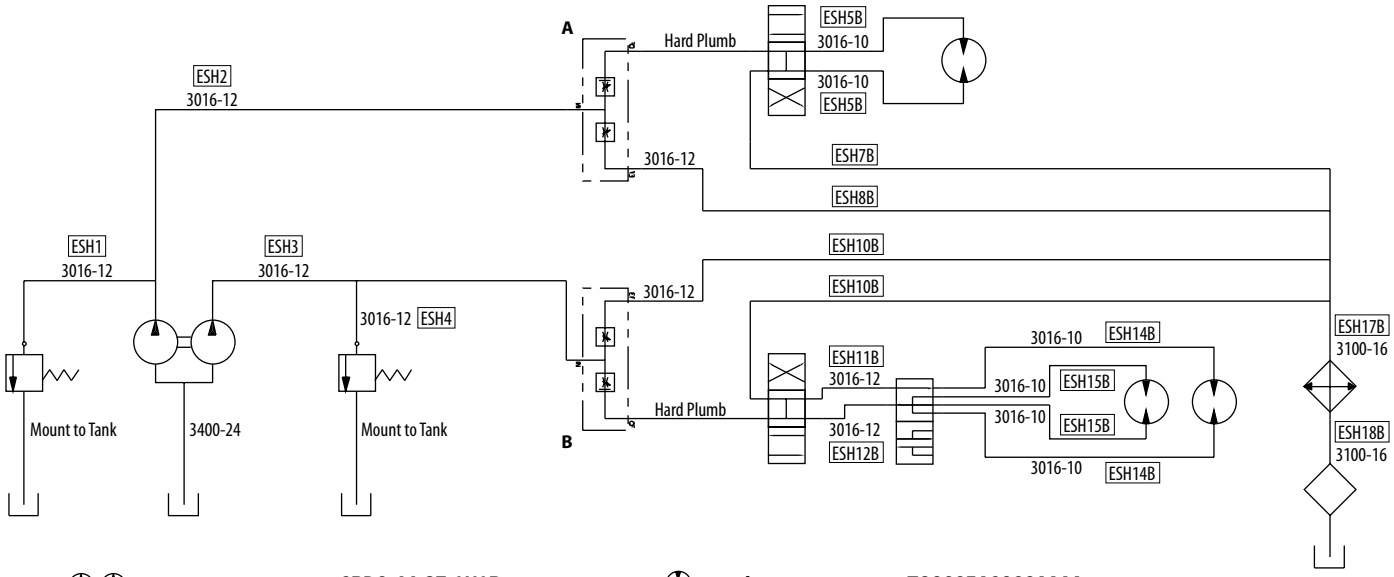



**GASKET REPAIR KIT X003538**




safety signal **X004816**

The **safety filter** protects your engine from accidental ingestion of dust during primary filter service. DO NOT clean and re-use safety filter. The **safety signal** indicator locks **RED** when the safety filter requires replacement. Reset safety signal after replacing.




| | | | | | |
|---|---|---|---|---|---|
| pump | | *SPD3-44-27-1H1R* | motors | | *TG0335AS030AAAA* |
| relief valve | | *RV-2H-3000* | cooler | | *ILLC01101U* |
| flow control | A | *EF-15-12* | return filter | | *EF-10-25-1* |
| | B | *EF-25-12* | element | | *EE-304-10* |
| directional control | | *D3W2CNKK* | | | |
| base | | *AD05HSPS12S* | | | |
| series/parallel | | *DS3B-4E* | | | |

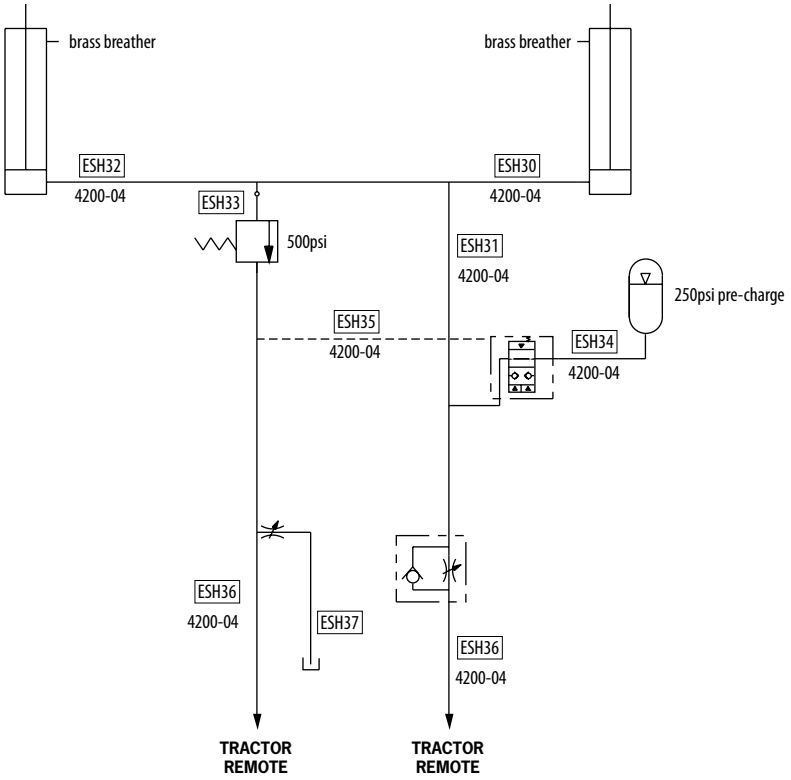
## Hydraulic hose list

| Part # | Description | Qty |
|---|---|---|
| ESH1 | 3016-10-KW-12OF90T-12OFS-11.0"HL | 1 |
| ESH2 | 3016-10-KW-12OFS-12OR-84.0"HL | 1 |
| ESH3 | 3016-10-KW-12OFS-12OR-78.0"HL | 1 |
| ESH4 | 3016-12-KW-12OF90T-12OFS-10.0"HL | 1 |
| ESH5B | 3016-10-KW-12OFS-10OFS-120.0"HL | 2 |
| ESH7B | 3016-12-KW-12OFS-12OF45T-18.5"HL | 1 |
| ESH8B | 3016-12-KW-12OFS-24.0"HL | 1 |
| ESH10B | 3016-12-KW-12OFS-20.5"HL | 2 |
| ESH11B | 3016-12-KW-12OR-12OFS-40.0"HL | 1 |
| ESH12B | 3016-12-KW-12OFS-40.0"HL | 1 |
| ESH14B | 3016-10-KW-10OFS-10OFS-138.0"HL | 2 |
| ESH15B | 3016-10-KW-10OFS-10OFS-106.0"HL | 2 |
| ESH17B | 3100-16-KW-16OF90T-16OFS-104.0"HL | 1 |
| ESH18B | 3100-16-KW-16OFS-16MS-94.0"HL | 1 |
| ESH20 | 4200-04-KW-4MP-34.0"HL | 1 |
| ESH21 | 4200-04-KW-4MP-26.0"HL | 1 |

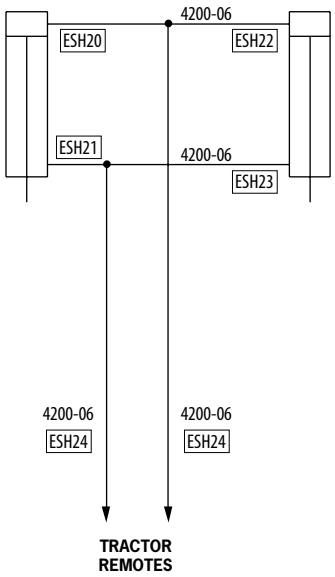
## Hydraulic fitting list

| Location | Part # | Description | Qty |
|---|---|---|---|
| Pump suction | 4603-24-24 | 45° -24HB x -24SAE | 1 |
| Tank suction | 4503-24-24 | 45° -24HB x -24MPT | 1 |
| Pump pressure outlet, small | OFS6801-12-12 | 90° -12SAE x -12OFS | 1 |
| Pump pressure outlet, large | OFS6801-12-16 | 90° -16SAE x -12OFS | 1 |
| Relief inlet | OFS2503-12-12 | 45° -12OFS x -12MPT | 2 |
| Pump pressure | OFS6602-12-12-12 | run tee -12OFS | 2 |
| Speed to directional valve | 12F5BU-S | ferulok -12SAE straight | 4 |
| Upper feed | OFS6801-12-12 | 90° -12SAE x -12OFS | 1 |
| Upper&Lower feed | OFS6400-12-12 | straight -12SAE x -12OFS | 1 |
| Directional valve return | OFS6802-12-12 | 45° -12SAE x -12OFS | 2 |
| Speed return | OFS6801-12-12 | 90° -12SAE x -12OFS | 2 |
| Selector RH & LH motor | OFS6801-10-10 | 90° -10SAE x -10OFS | 3 |
| Selector inlet | OFS6400-12-10 | straight -10SAE x -12OFS | 2 |
| Selector LH motor | 10F65OL | str -10SAE x -10OFSswivel | 1 |
| Return manifold | OFS6400-12-12 | straight -12SAE x -12OFS | 4 |
| Return manifold/retn filter | OFS6400-16-16 | straight -16SAE x -16OFS | 2 |
| Feed Cooler | OFS6801-16-16 | 90° -16SAE x -16OFS | 2 |
| Upper Feed motors | OFS6400-10-10 | straight -10SAE x -10OFS | 6 |
| Bottom Feed motors | OFS6802-10-10 | 45° -10SAE x -10OFS | 6 |

## Upper feed roll lift circuit: 1 1/2" x 6" cylinders




## Axle lift circuit: 3" x 8" cylinders




**pilot to close valve** ***LODC-XDN-ECI***

**accumulator** ***4.5AL-4***

**flow control valve** ***F400-S***

**relief valve** ***RDDA-LAN-FAI***

**needle valve** ***N400-S***

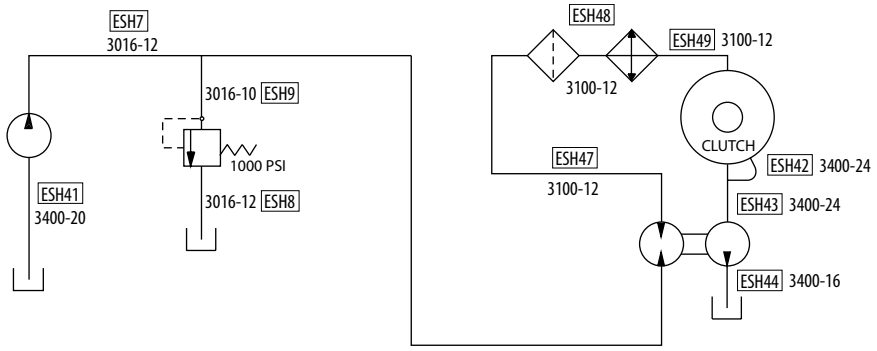
## Hydraulic hose list

| Part # | Description | Qty |
|---|---|---|
| ESH22 | 4200-04-KW-4MP-20.0"HL | 1 |
| ESH23 | 4200-04-KW-4MP-12.0"HL | 1 |
| ESH24 | 4200-04-KW-4MP-8MP-228.0"HL | 2 |
| ESH30 | 4200-04-KW-4MP-67.0"HL | 1 |
| ESH31 | 4200-04-KW-4MP-30.0"HL | 1 |
| ESH32 | 4200-04-KW-4MP-102.0"HL | 1 |
| ESH33 | 4200-04-KW-4MP-22.0"HL | 1 |
| ESH34 | 4200-04-KW-4MP-13.0"HL | 1 |
| ESH35 | 4200-04-KW-4MP-7.0"HL | 1 |
| ESH36 | 4200-04-KW-4MP-8MP-156.0"HL | 2 |
| ESH37 | 4200-04-KW-4MP-156.0"HL | 1 |

## Hydraulic fitting list

| Location | Part # | Description | Qty |
|---|---|---|---|
| Tractor hose ends | S71-4 | 1/2" QC tip | 4 |
| Lift cylinders | 6901-06-04 | 90° -6SAE x -4FPS | 7 |
| Feed lift cylinder | 6405-06-04 | straight -6SAE x -4FPT | 2 |
| Feed lift cylinder | PBG006A | 1/4" gearbox vent | 2 |
| Feed lift cylinder | SSSTL025 | 1/4" 90° street el | 2 |
| Feed lift | 6401-06-04 | -6SAE x -4MPT | 2 |
| Feed lift | 1601-04-04-04 | -4MPT x -4 tee | 2 |
| Feed lift | 1603-04-04-04 | -4 swivel tee | 4 |
| Feed lift | 5404-04-04 | -4 nipple | 2 |
| Feed lift | 1501-04-04 | 90° -4MPT x -4FPS | 1 |
| Feed lift | 1404-04-04 | straight -4MPT x -4FPS | 1 |
| Directional valve | 6409-04 | -4SAE plug | 4 |

## Clutch hydraulics



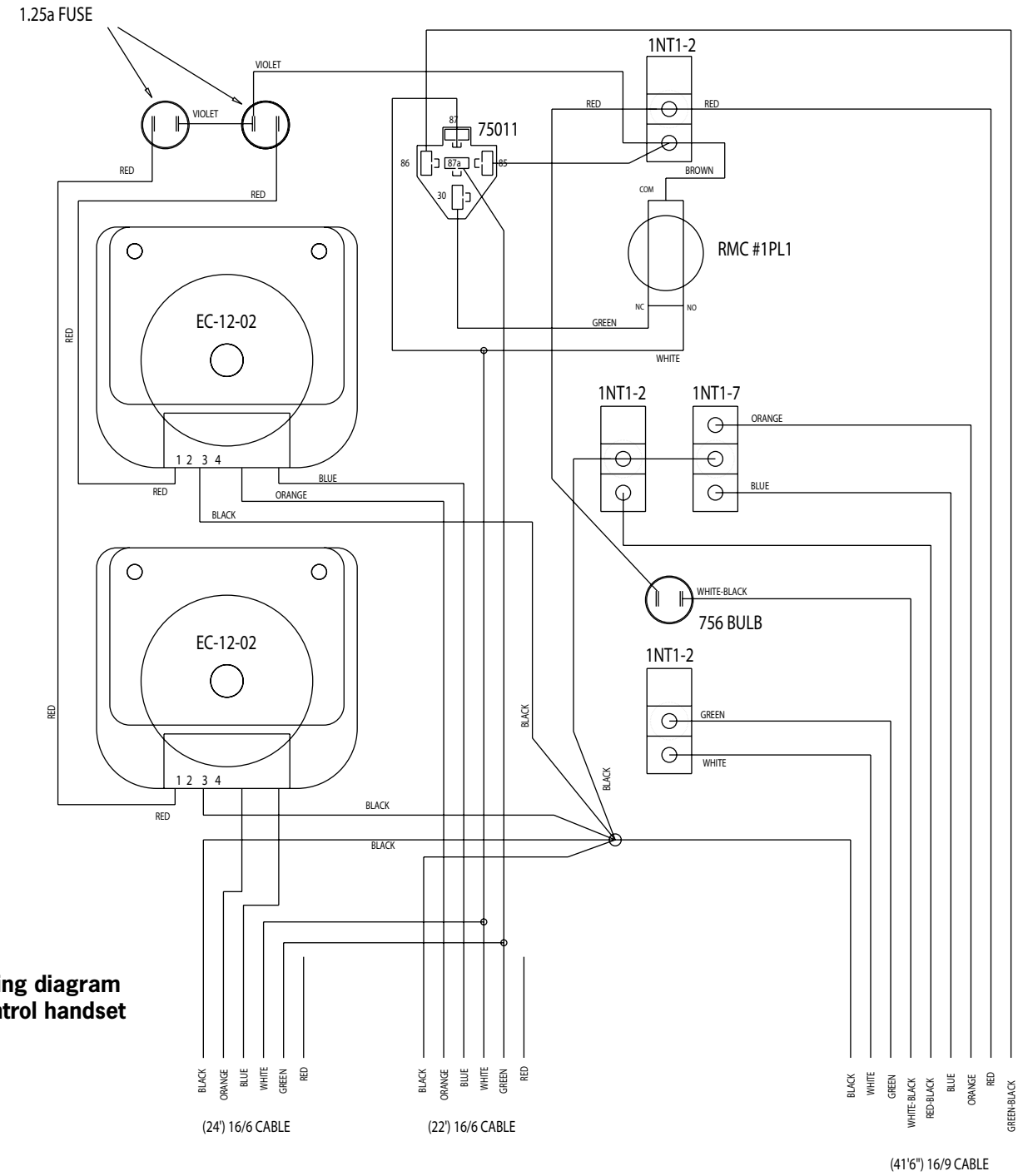

| | | | |
|---|---|---|---|
| **pump** | ***P16100AID5*** | **motors** | ***TG0335AS030AAAA*** |
| **relief valve** | ***RV3-16-S-12T-13/1000psi*** | **cooler** | ***ILLC01101U*** |
| **scavenge pump** | ***CHMSV1*** | **filter element** | ***HF-11-25-O-D-22 ZHE-10L*** |

## Hydraulic hose list

| Part # | Description | Qty |
|---|---|---|
| ESH7 | 3016-12-KW-12OFS-12OF45T-20.0"HL | 1 |
| ESH8 | 3016-12-KW-12OFS-12OF90T-17.0"HL | 1 |
| ESH9 | 3016-12-KW-12OFS-12OF45T-16.0"HL | 1 |
| ESH41 | 3400-20-18"HL | 1 |
| ESH42 | 3400-24-24"HL | 1 |
| ESH43 | 3400-24-17"HL | 1 |
| ESH44 | 3400-16-18"HL | 1 |
| ESH47 | 3100-12-KW-12OFS-28.0"HL | 1 |
| ESH48 | 3100-12-KW-12OFS-12OF90T-52"HL | 1 |
| ESH49 | 3100-12-KW-12OFS-12FJ-98.0"HL | 1 |

## Hydraulic fitting list

| Location | Part # | Description | Qty |
|---|---|---|---|
| Scavenge pump outlet | OFS6801-12-12 | 90° -12SAE x -12OFS | 1 |
| Scavenge pump outlet | OFS6602-12-12-12 | run tee -12OFS | 1 |
| Scavenge motor | OFS6400-12-10 | straight -10SAE x -12OFS | 2 |
| Clutch circuit relief valve | OFS6801-12-12 | 90° -12SAE x -12OFS | 1 |
| Clutch circuit relief valve | OFS6400-12-12 | straight -12SAE x -12OFS | 1 |
| Clutch circuit filter housing | OFS6801-12-12 | 90° -12SAE x -12OFS | 2 |
| Clutch circuit relief @ tank | OFS2404-12-12 | straight -12MPT x -12OFS | 1 |
| Scavenge cooler | OFS6801-12-16 | 90° -16SAE x -12OFS | 2 |
| Clutch upper drain | 4503-24-24 | 45° -24HB x -24MPT | 1 |




**wiring diagram**
**control handset**

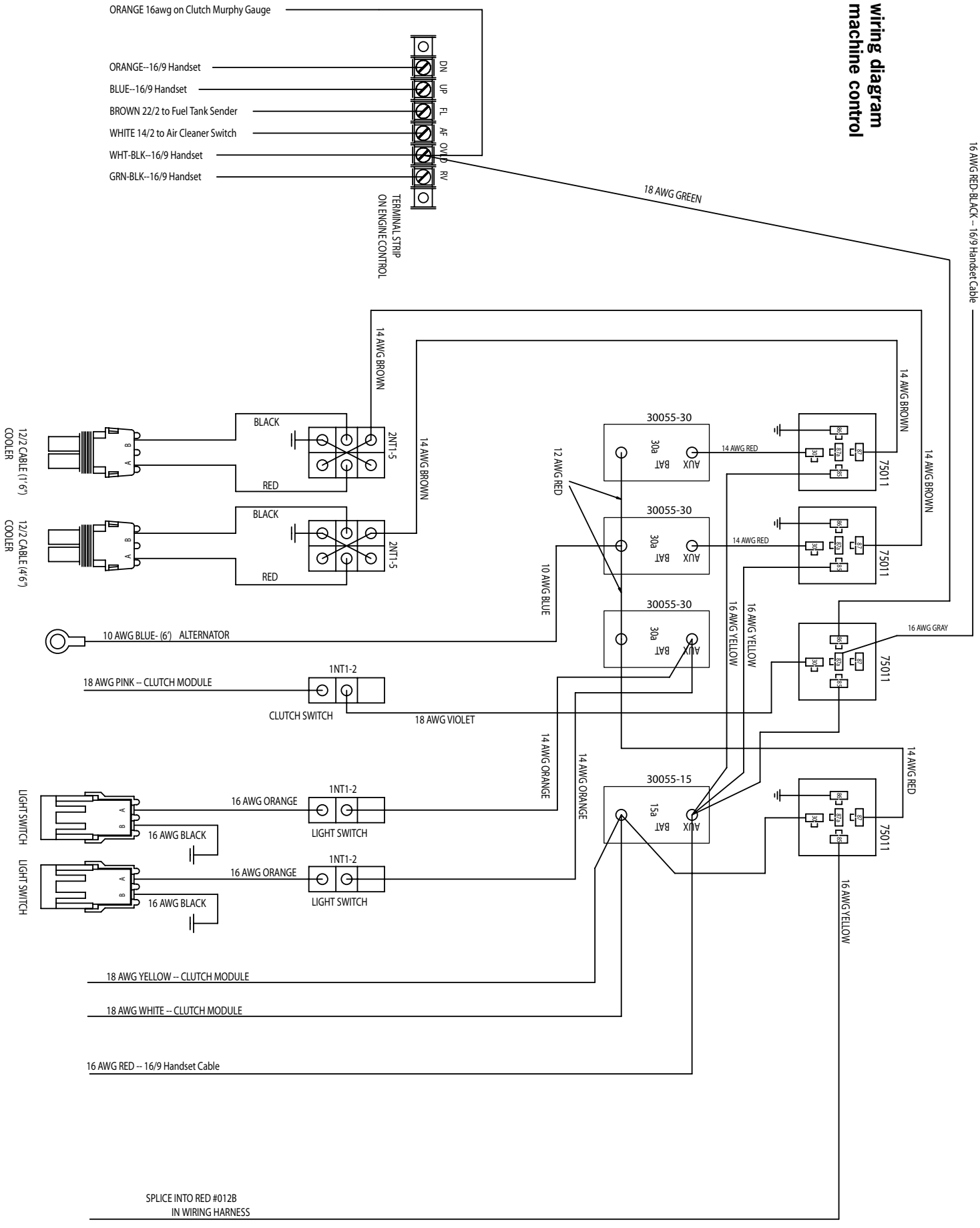
### 16/6 cable: valve cable

| | |
|---|---|
| **black** | **valve ground** |
| **orange** | **speed control** |
| **blue** | **speed control** |
| **white** | **solenoid B (front): reverse** |
| **green** | **solenoid A (rear): forward** |
| **red** | **n/a** |

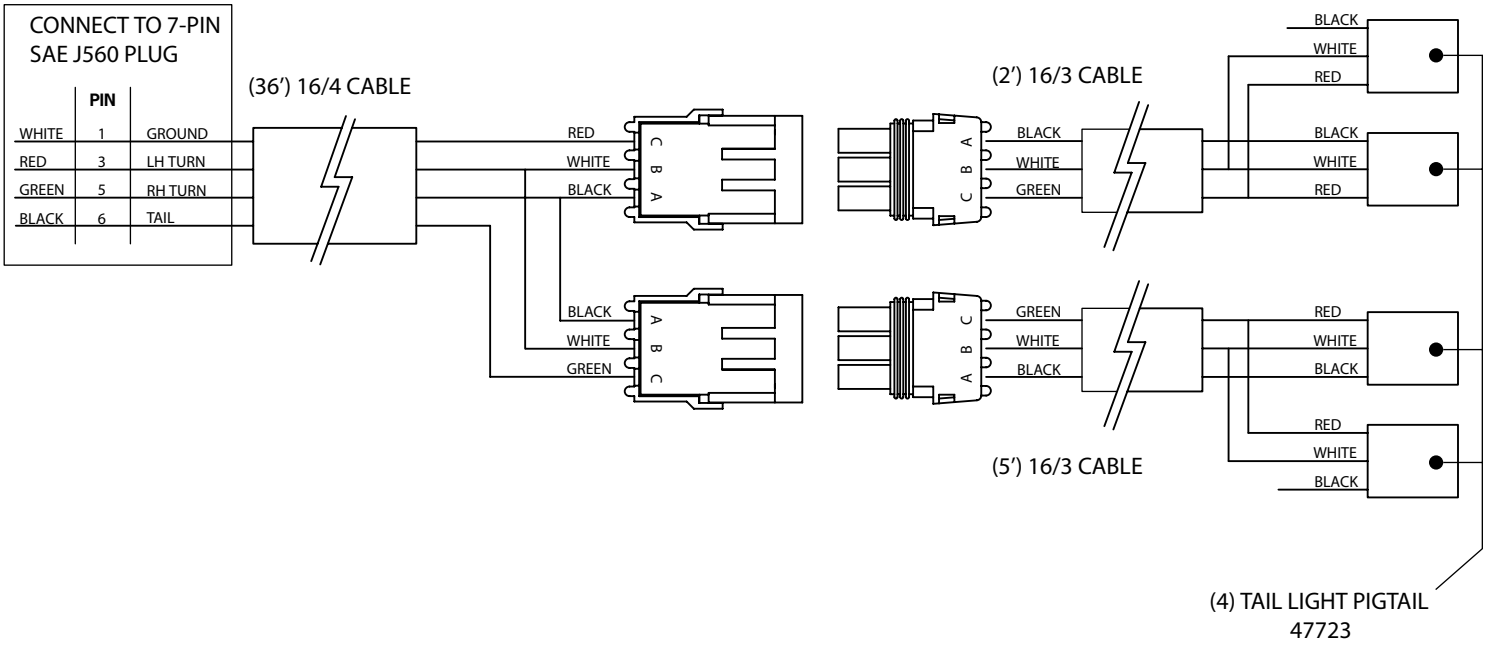
### 16/9 cable: control box cable

| | |
|---|---|
| **black** | **ground** |
| **white** | **engine stop (022d)** |
| **green** | **engine stop (032)** |
| **blue** | **engine speed increase** |
| **orange** | **engine speed decrease** |
| **white-black** | **overload indicator light** |
| **red** | **10A circuit breaker, ignition** |
| **red-black** | **clutch engage** |
| **green-black** | **feed reverse** |

## wiring diagram machine control



**wiring diagram**
**tail light harness**



## Drive belt stretching

Most belt damage occurs during the first hours of use. Check new belt tension after one hour of operation and make any required adjustments. Check the belt tension periodically during a new belt's first day of use. Belt tension should be checked daily as a part of your lubrication schedule.

Too little belt tension will cause belt and pulley wear. Too much tension will cause bearing wear.

To loosen or remove belts: back the jam nuts off the tensioner body and turn the threaded tension rod counter clockwise- this will move the drive pulleys closer together. To remove the belt, continue to turn the tension rod until the belt can be lifted off the pulleys.

To tighten belts: back the jam nuts off the tensioner body and turn the threaded tension rod clockwise to pull the drive pulleys apart. Tighten the tension rod until the belts are pulled to their proper tension, as described below. Tighten the jam nuts.

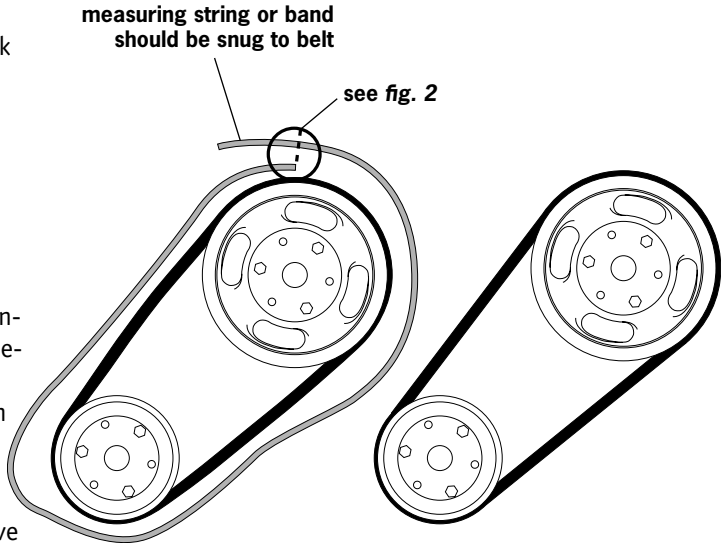



*fig. 1a: slack drive belt* *fig. 1b: drive belt with proper tension*

## Tensioning the drive belt

Slack off the tension on the drive belt until the drive belt is loose.

Wrap a non-elastic string or band around the outside of the drive belt (*fig. 1a*). Your measuring string or band should not stretch while measuring. The string should be in contact with the belt all the way around. For accurate measurement, as illustrated in *fig. 2*, the string should be aligned with the edge of the drive belt.

Mark the string where the end overlaps itself (*fig. 2*).

Mark your target tension stretch on the string: select your jackshaft pulley/rotor pulley/belt combination on *chart A*, right, and find your target stretch. Add a new line to your measuring string: from the overlap line marked on your measuring string, mark the target stretch distance on the string, see *fig. 2*.

Tighten the tension on the drivebelt until the string overlap reaches the target stretch line, see *fig. 3*.

Do not re-use the measuring string the next time you tension the drive belt. Each time you tension the drive belt, you must re-measure the slack belt length and re-mark the target stretch.

| jackshaft pulley | rotor pulley | belt size | target tension stretch |
|---|---|---|---|
| 9.75 | 9.75 | 800 | 1/2" - 3/4" |

*chart A*

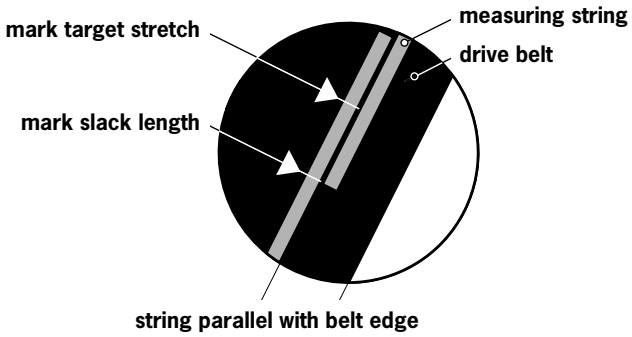



*fig. 2: mark slack belt length*

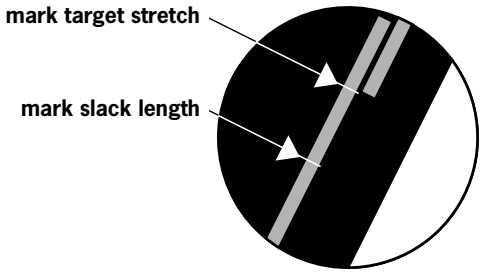



*fig. 3: pull belt to target stretch*

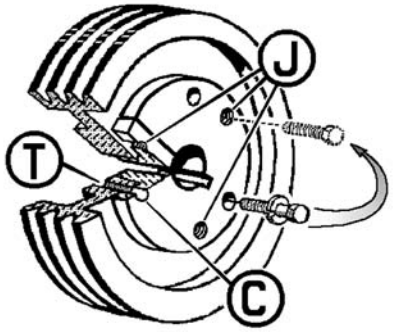
## QD bushing removal

1. Remove cap screws as illustrated, right, and insert them into the threaded jack-screw holes, **J**.

   **Do not use lubricants or anti-sieze compounds on threads or tapered surfaces.**

2. With all three screws inserted into the bushing jack-screw holes: tighten each screw in small, equal amounts; alternately and progressively (start with the screw furthest from the split in the bushing) until the tapered surfaces release.

   **Never use excessive or unequal pressure on the cap-screws. You may damage the bushing.**



**to remove bushing**

## QD bushing installation

1. The surfaces of the bushing tapered cone and the mating bore of the pulley must be clean and free of dirt, excess paint, metal chips, lubricant, etc.

2. On a clean work surface, line up the unthreaded holes of the bushing, **C**, as illustrated, with the threaded holes of the pulley, **T**. Insert cap screws with lock washers and tighten a few turns- engage only a few threads.

   **Do not use lubricants or anti-sieze compounds on threads or tapered surfaces.**

3. With the key in the drive shaft keyway, slide the loosely assembled unit onto the shaft and align the pulleys using a straight edge. Note for alignment: when tightening the cap screws the pulley will move, drawn to the bushing. The bushing will not move on the shaft when the cap screws are tightened.

4. Carefully tighten cap screws alternately and progressively to half the recommended torque (see chart, right).

   **Never use excessive or unequal pressure on the cap-screws. You may damage the bushing.**

5. Use a straight edge to check pulley alignment and pulley runout (wobble)- correct as needed.

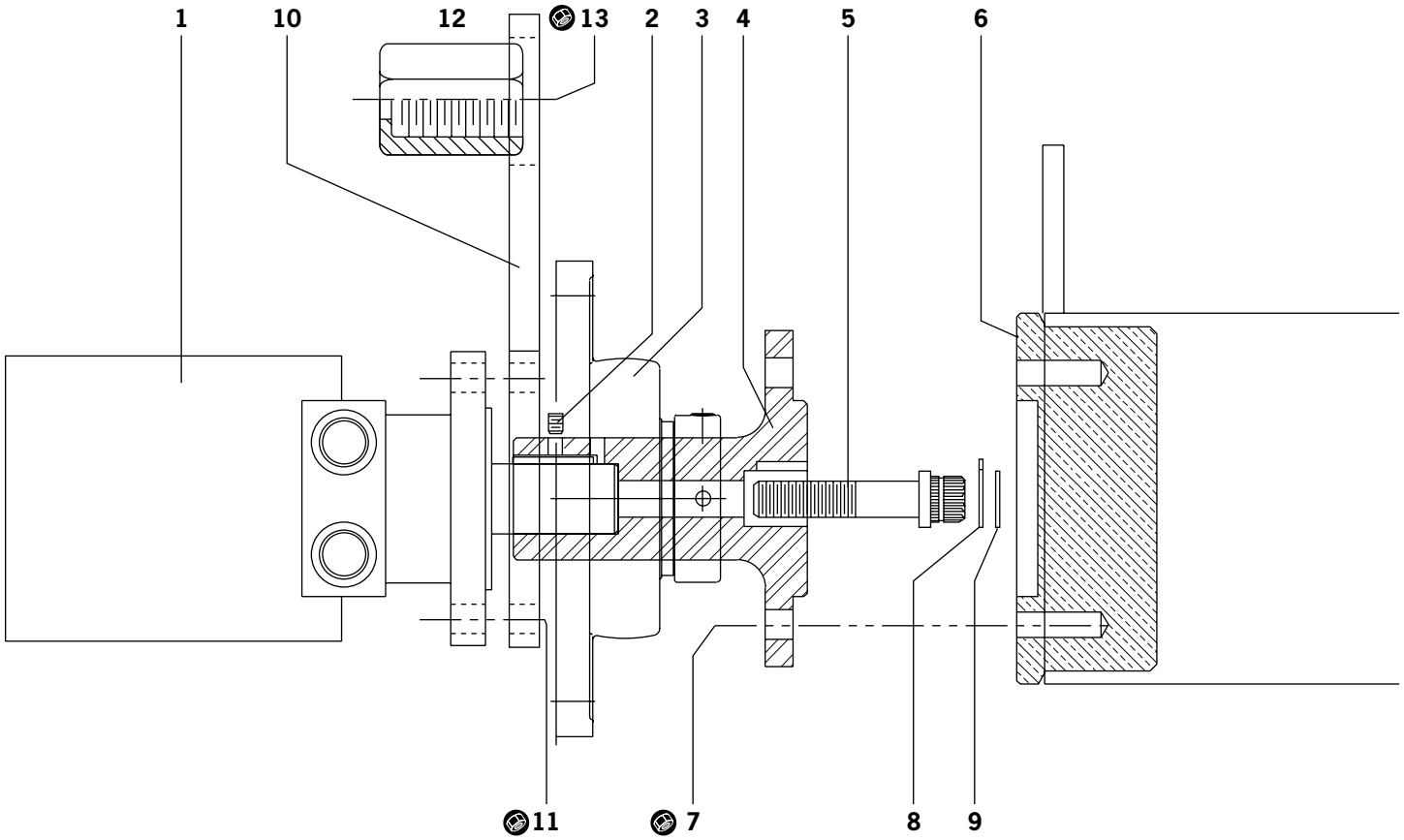
6. Continue careful alternate and progressive tightening of screws to recommended torque value (see chart, right). Properly installed assemblies will have a gap between the bushing flange and the face of the pulley.

7. Some assemblies have a set screw over the bushing key-way. If this applies to your model, tighten to secure the shaft key.

**Do not use lubricants or anti-sieze compounds on threads or tapered surfaces.**

**Never use excessive or unequal pressure on the cap-screws. You may damage the bushing.**

| | bushing size | cap screw | torque (ft.lbs.) |
|---|---|---|---|
| jackshaft | E | 1/2"- 13 thread | 40 |
| rotor | E | 1/2"- 13 thread | 40 |




## Feed roll assembly

Slide bearing **3** onto feed roll stub shaft **4**- do not tighten. Insert keyed motor drive shaft **1** into feed roll stub shaft as illustrated (if feed roll has no motor drive, skip ahead to stub shaft installation).

Prepare groovelock bolt **5** with Loctite primer and Loctite 2760 as per Loctite instructions. Thread groovelock bolt into motor shaft and tighten by hand. Back off to align tab on bolt retainer **8** with keyslot in rotor stub shaft **4**. Slide bolt retainer to shoulder of groovelock bolt and install snap-ring **9**.

Apply Loctite 2760 to threads of setscrew **2** and install.

Bolt the feed roll stub shaft **4** to the feed roll **5** using fastners **7**.

Slide the completed feed roll assembly into position using the provided access slot in the flail housing and bolt the bearing mount plates to the flail housing.

Tighten the bearing eccentric lock collar **3** in the direction of shaft rotation.

## Feed roll parts quantities listed per asssembly

| No. | Part # | Description | Qty |
|---|---|---|---|
| 1 | TG0335AS030AAAA | hydraulic motor | 1 |
| 2 | 0310025SET | 5/16"-18UNC x 1/4" setscrew | 1 |
| 3 | TCJT-2-3/16 | bearing | 1 |
| 4 | ES1017 | feed roll stub shaft | 1 |
| 5 | ES1046 | 5/8"-18UNF x 3-1/2" groovelock bolt | 1 |
| 6 | ES1018 | upper feed roll | 1 |
| | ES1019 | lower feed roll | 1 |
| 7 | 0510150CH5 | 1/2"-20UNF x 1-1/2" gr5 bolt | 6 |
| | 05WS | 1/2" lock washer | 6 |
| 8 | (see No.5) | Groovelock keeper- included with No.5 | 1 |
| 9 | (see No.5) | Groovelock snap-ring- included with No.5 | 1 |
| 10 | ESIN1237 | Torque arm | 1 |
| 11 | 0500175AHS | 1/2"-13 x 1-3/4" flat head allen bolt | 2 |
| | 050NYS | 1/2"-13 nylock nut | 2 |
| 12 | ES1051 | Torque arm stop | 1 |
| 13 | 0870150CH5 | 7/8"-9 x 1-1/2" gr5 bolt | 1 |
| | 087WS | 7/8" lockwasher | 1 |

## Parts list: comer gearbox 1000 rpm

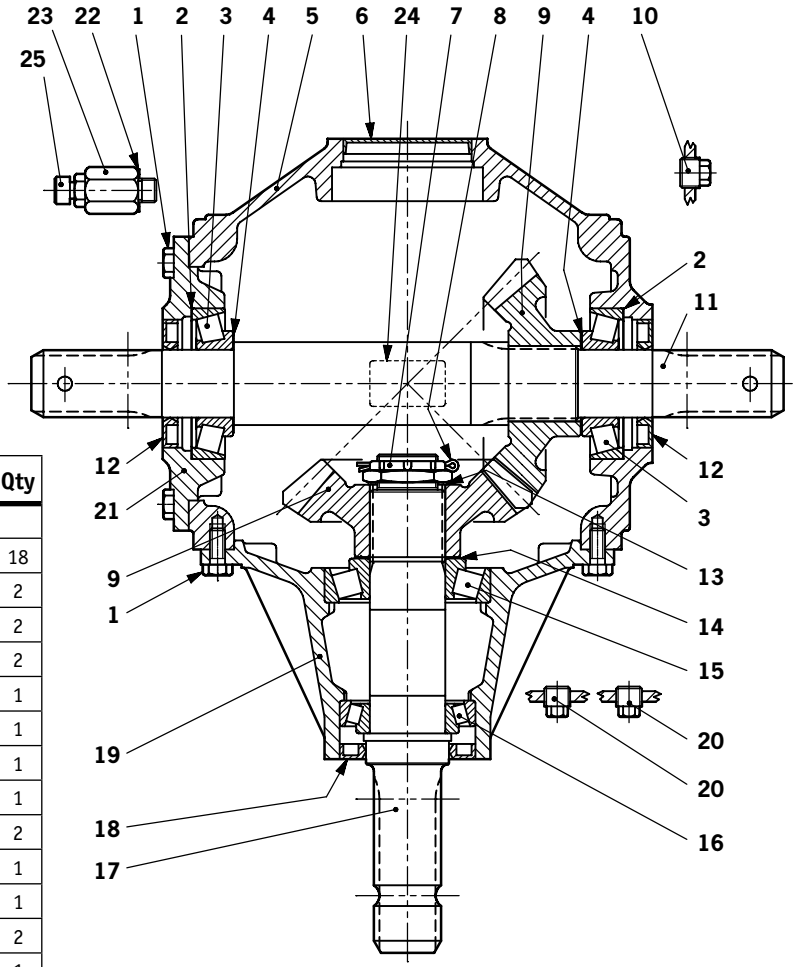
**ratio** 1:1

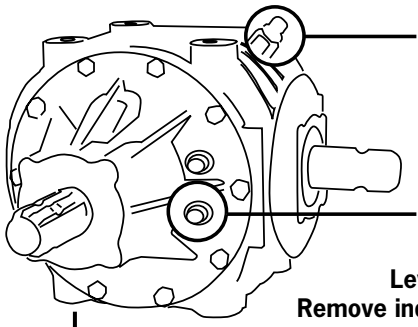
**input shaft** 1.75" 20 spline

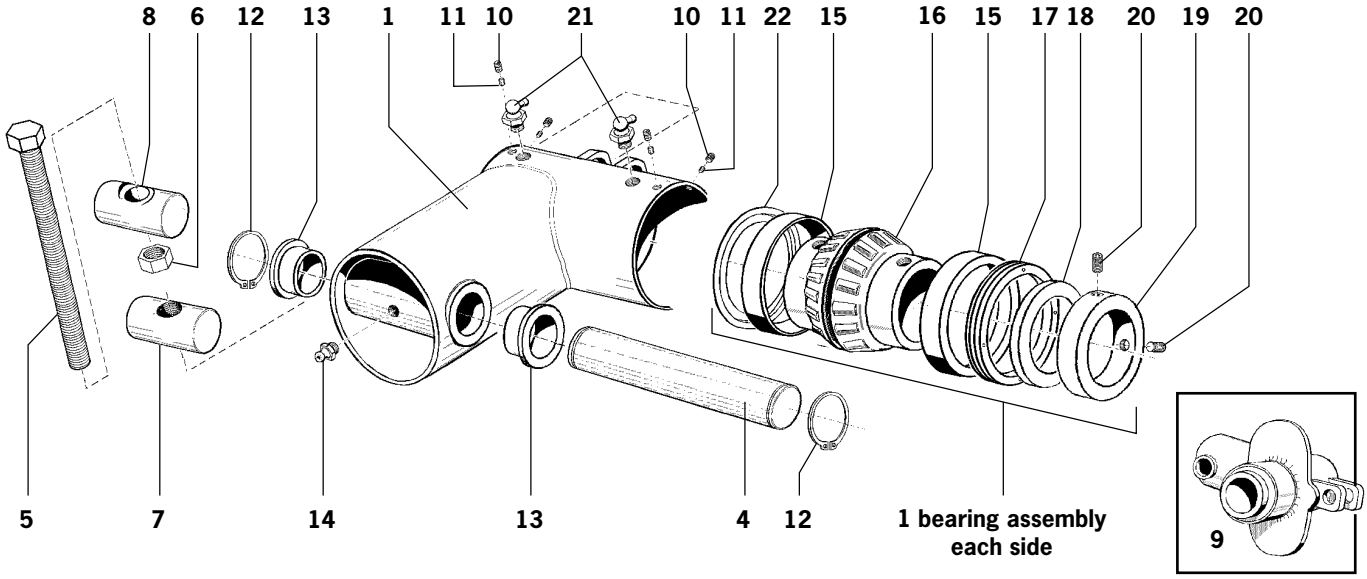
**output shaft** 1.75" 20 spline

**oil** Schaeffer's high temperature 169 moly synthetic gear lubricant SAE75W140. 150oz/4.4litre

| No. | Part # | Description | Qty |
|---|---|---|---|
| | FLGB85020 | 1000RPM Comer 1:1 gearbox | |
| 1 | 8.1.1.00061 | bolt M10x25 8,8 | 18 |
| 2 | 0.703.7500.00 | shim 99.7 | 2 |
| 3 | 8.0.9.00107 | bearing 30309 | 2 |
| 4 | 0.252.7500.00 | shim 65.3 | 2 |
| 5 | 0.301.0300.00 | casing | 1 |
| 6 | 0.121.7101.00 | cap | 1 |
| 7 | 0.132.7107.00 | nut M40 x 1.5 | 1 |
| 8 | 8.4.7.01112 | cotter pin B4 x 60 | 1 |
| 9 | 0.301.5003.00 | pinion Z20 M7 | 2 |
| 10 | 8.6.5.00203 | plug 1/2"GAS | 1 |
| 11 | 0.301.3013.00 | shaft 1-3/4" Z20 | 1 |
| 12 | 8.7.3.00331 | oil seal 45 x 85 x 10 | 2 |
| 13 | 0.244.7510.00 | shim 40.3 x 1.0 | 1 |
| 14 | 0.712.7500.00 | shim 70.3 | 1 |
| 15 | 8.0.9.00268 | bearing 30310 | 1 |
| 16 | 8.0.9.00469 | bearing 30210 | 1 |
| 17 | 0.301.2202.00 | shaft 1-3/4" Z20 | 1 |
| 18 | 8.7.3.01296 | oil seal 55 x 90 x 10 | 1 |
| 19 | 0.301.1300.00 | extension | 1 |
| 20 | 8.6.5.00006 | plug 3/8" GAS | 2 |
| 21 | 0.301.1302.00 | cover | 1 |
| 22 | 8.3.3.01114 | copper washer | 1 |
| 23 | 8.6.0.01113 | oil plug extension- not a dipstick | 1 |
| 24 | 0.124.7101.00 | plate | 1 |
| 25 | 8.6.7.00269 | oil filler plug | 1 |






## Parts list: belt tensioner assembly

| No. | Part # | | Description | Qty |
|---|---|---|---|---|
| | OMT200 | | tensioner assy *includes* • *parts* | |
| | OMT200KIT | | repair kit includes **X** parts | |
| 1 | | • | tensioner housing | 1 |
| 4 | | | mount pin | 1 |
| 5 | OMT118 | | tension bolt for flail chopper | 1 |
| 6 | 062NF | | 5/8"NC nut | 2 |
| 7 | OMT111 | | eyebolt pivot shaft | 1 |
| 8 | FLT111 | | threaded eyebolt pivot shaft | 1 |
| 9 | LCT125 | • | dust shield | 1 |
| 10 | 0250025K2ST | X | 1/4"-20 x 1/4" set screw | 4 |
| 11 | | X | nylon thread saver | 4 |

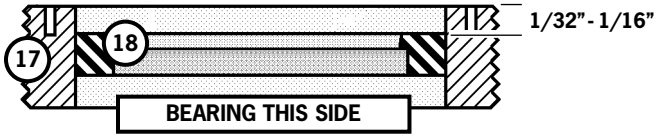
| No. | Part # | | Description | Qty |
|---|---|---|---|---|
| 12 | 7200-98 | X | snap ring | 2 |
| 13 | OMT122 | • X | cast iron bushing | 2 |
| 14 | Z1641B | • | grease zerk 1/4"-28 | 1 |
| 15 | 362 | • X | timken bearing cup | 4 |
| 16 | 367DE | • X | timken bearing cone | 2 |
| 17 | OMT104 | • X | bearing retainer | 2 |
| 18 | 23035 | • X | outer grease seal | 2 |
| 19 | OMT102 | • | bearing collar | 2 |
| 20 | 0370037K1NST | • | 3/8"-24 x 3/8" set screw | 4 |
| 21 | Z1688B | • | grease zerk 1/8"NPT | 2 |
| 22 | OMT103 | • X | inner grease retainer | 2 |

## Tensioner bearing removal

1. On a clean work surface, remove set screws **20** and set collar **19**. Loosen set screws **10**.
2. Using an adjustable spanner wrench, remove the bearing retainer **17**.
3. Clean and insert jackshaft.
4. Reinstall set collar **19** and firmly tighten set screws **20** to shaft through bearing holes. From the opposite end, press/drive the bearing cone **16** and extract outer bearing cup **15** from cavity. Remove components from the shaft.
5. Repeat steps 1-4 to remove opposing bearing assembly.
6. Use a drift with care to pull the grease retainer **22** and cup **15** from cavity.

## Tensioner bearing installation

1. Clean the tensioner housing **1** and insert the grease retainer **22**- the dished face of the retainer installs with the bevel at the same angle as the *inner* bearing cup **15**, see *fig.i*, next page. Press *inner* bearing cup **15** into the housing cavity.
2. Insert bearing cone **16** into the housing well greased. Press *outer* bearing cup **15** against bearing cone **16**.
3. Press seal **18** into retainer **17** as illustrated, below. The seal should be pressed in 1/32"-1/16" from the retainer's top face.




4. Screw threaded bearing/retainer assembly tight against the outer bearing cup **15**. Back off 1/8 turn.

**continued, next page**

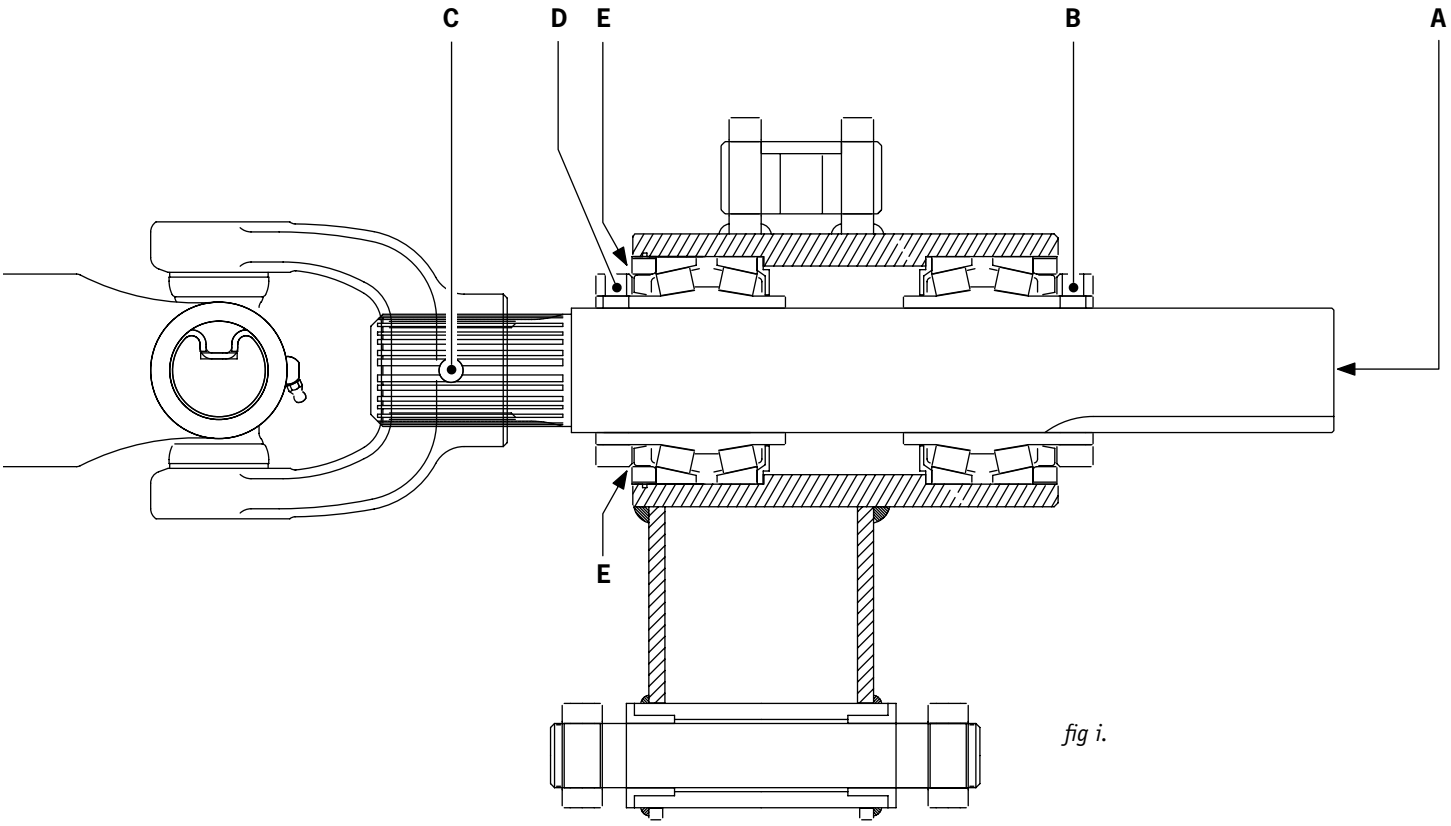



*fig i.*

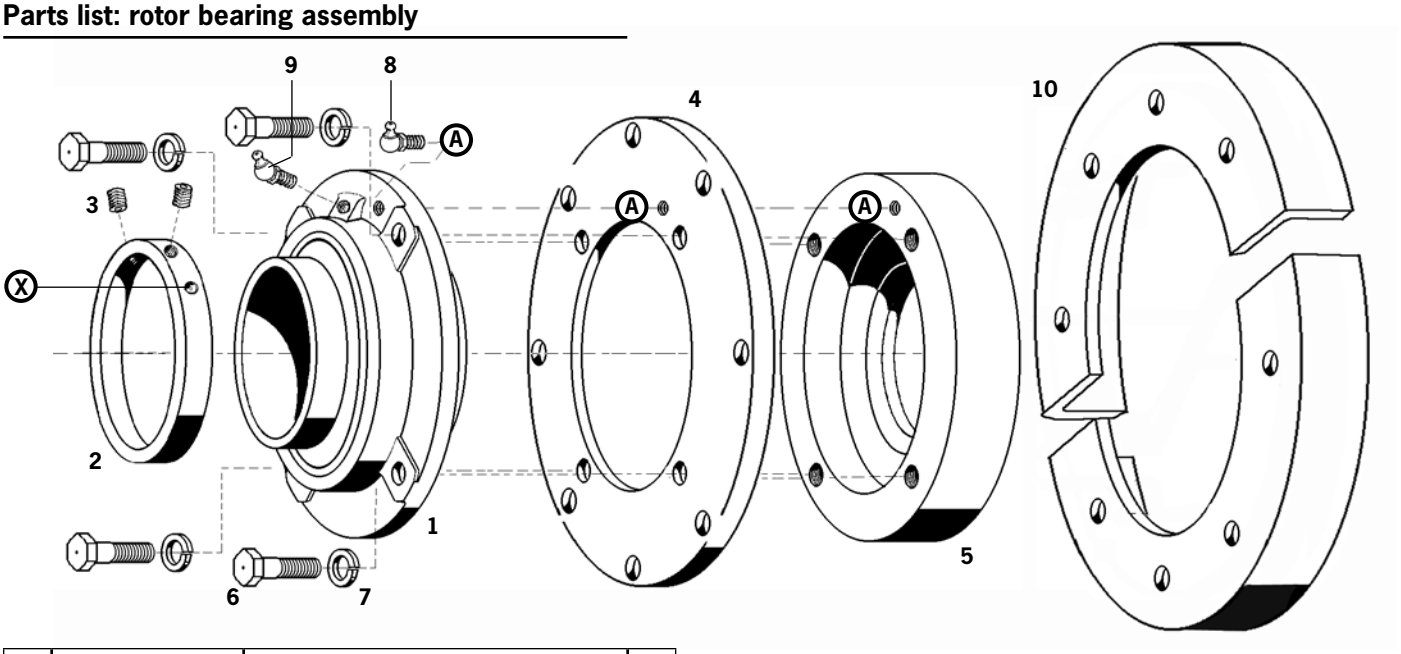
## Tensioner bearing installation, continued

5. Adjust tensioner bearings individually: Insert jackshaft and install collar **19** at either **B** or **D** in *fig i*, above. The set screw holes are drilled offset and the collar should be installed with the set screws closer to the bearing. Tighten setscrews **20**. Press/drive jackshaft from end opposite bearing to push bearing **15** against the retainer **17**. Target clearance is .004"-.005" end play: tighten **17** until correct.
6. Use *#242 Loctite* to install both set screws **10** and thread savers **11-** tightly securing the retainer **17** you just finished adjusting.
7. Loosen the setscrews **20** for the bearing adjusted in step **6** and repeat steps **5 & 6** to set end play in the opposing bearing.
8. Loosen the setscrews **20**. Move on to *Jackshaft Installation*.

## Jackshaft installation

1. Insert jackshaft from the belt housing end **A**, *fig i*. Slide shaft through tensioner housing and install jackshaft driveline yoke onto shaft. Drive rollpin to secure yoke to shaft at **C**.
2. Tighten both collar setscrews at **B** to secure bearing to jackshaft.
3. Thread both collar setscrews at **D** through collar and into inner bearing race BUT DO NOT TIGHTEN against jackshaft.
4. Bearing setting. Press jackshaft at **A** while simultaneously prying collar at points **E** away from tensioner housing. Hold this force on the bearing/jackshaft assembly as you lock setscrews onto shaft at **D**.
5. Check shaft end play. Target clearance is .004"-.005" end play: repeat step 4 until target clearance is secured. If target clearance cannot be attained, return to the *Tensioner Bearing Installation* section, step **5**, and check the end play of tensioner bearings individually. Adjust bearings as needed, then restart the *Jackshaft Installation* procedure.

## Parts list: rotor bearing assembly




| No. | Part # | Description | Qty |
|---|---|---|---|
| – | FLMB500C | complete outer rotor bearing assembly | |
| 1 | FLMB500 | double row spherical roller bearing | 1 |
| 2 | LC13 | eccentric lock collar | 1 |
| 3 | 0440075FHAS | 7/16" x 3/4" NF allen head screw | 2 |
| 4 | FLMB5121-8 | adapter plate | 1 |
| 5 | FLCB512 | grease labyrinth | 1 |
| 6 | 0510175CH5 | 1/2" x 1-3/4"NF gr5 bolt | 4 |
| 7 | 050WS | 1/2" lock washer | 4 |
| 8 | Z1613B | grease zerk 90° 1/8"NPT | 1 |
| 9 | Z1688B | grease zerk 45° 1/8"NPT | 1 |
| 10 | | anti-wrap plate half *not included in assy* | 2 |

## Rotor bearing lubrication

The pre-lubricated rotor bearings are ready to operate as delivered and should be greased (20 pumps) every 8 hours of operation as per the lubrication schedule on page 7. Pump slowly. Excess grease is purged through a vented seal on the back of the assembly.

The bearings can not be over-greased. Always use a lithium base NLGI grade 2 EP grease. We recommend Texaco Multifak EP2, Shell Alvania 2EP, and Mobilux EP2.

## Outer rotor bearing removal

To prevent damage to the rotor anti-wraps, the rotors must each be supported with a jack prior to bearing removal.

For ease of removal, the rotor shaft must be clean and smooth. File or sand burrs or gouges.

To prevent damage to seals from wiggling the assembly off the shaft, grip opposite sides of the mount plate and exert equal force.

## Outer rotor bearing installation

1. Clean all bearing mount surfaces- thoroughly clean the shafting of all dirt, rough spots and burrs. This area must be smooth. Apply a light coat of oil or grease to mating surfaces.

2. Make certain to align the grease holes **A** in the bearing **1**, adapter plate **4**, and grease labyrinth **5** when assembling the complete bearing.

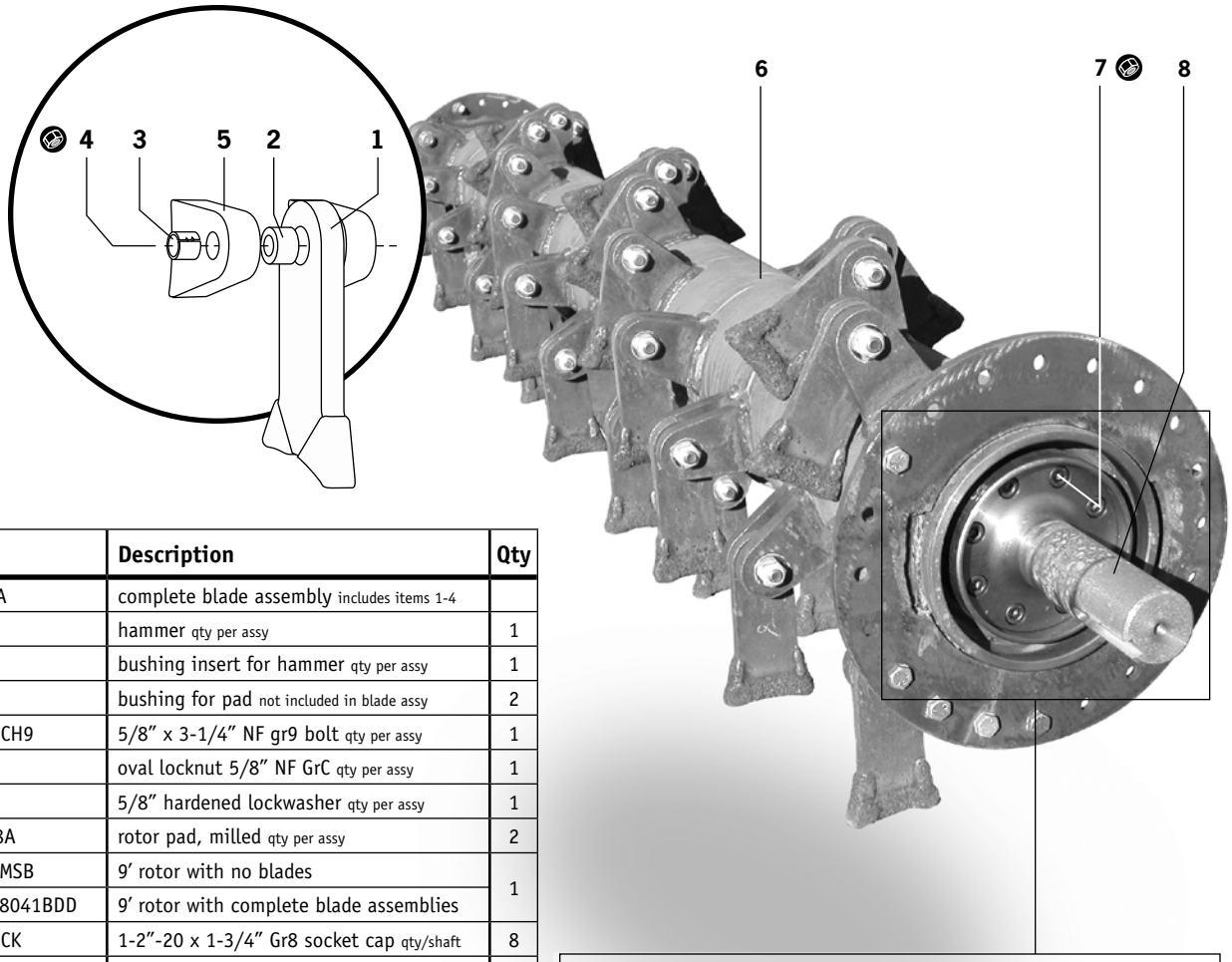
3. Slide entire bearing assembly onto the rotor shaft. *DO NOT hammer on the bearing!* If fit is snug, use emery cloth to smooth rough spots on shaft.

   To prevent damage to seals from wiggling the assembly onto the shaft, grip opposite sides of the mount plate and exert equal force.

4. Use original bolts or equivalent to mount the bearing assembly to the flail housing and rotor anti-wraps. Mount bearing so grease fittings are easily accessible. Fasten tightly. Check that the rotor spins freely- any friction will damage the bearing assembly.

   Mount bolts must be tight before proceeding to step 5.

5. Tighten the eccentric lock **2** by hand *in the direction of shaft rotation*. With the lock hand tight, insert a driving tool into hole **X** and tap tool a few times to secure the collar. Tighten allen head screws **3**. Check that the rotor spins freely- any friction will damage the bearing assembly.




| No. | Part # | Description | Qty |
|---|---|---|---|
| – | FL8041TA | complete blade assembly includes items 1-4 | |
| 1 | FL8041T | hammer qty per assy | 1 |
| 2 | FL8042 | bushing insert for hammer qty per assy | 1 |
| 3 | OM989L | bushing for pad not included in blade assy | 2 |
| 4 | 0630325CH9 | 5/8" x 3-1/4" NF gr9 bolt qty per assy | 1 |
| | 063TLZ | oval locknut 5/8" NF GrC qty per assy | 1 |
| | | 5/8" hardened lockwasher qty per assy | 1 |
| 5 | OMIN908A | rotor pad, milled qty per assy | 2 |
| 6 | ES19809MSB | 9' rotor with no blades | 1 |
| | ES198098041BDD | 9' rotor with complete blade assemblies | |
| 7 | 0510175CK | 1-2"-20 x 1-3/4" Gr8 socket cap qty/shaft | 8 |
| | 050WHC | 1/2" high collar lockwasher qty/shaft | 8 |
| 8 | FL500 | 2-7/16" drive shaft | 2 |

## Blade replacement

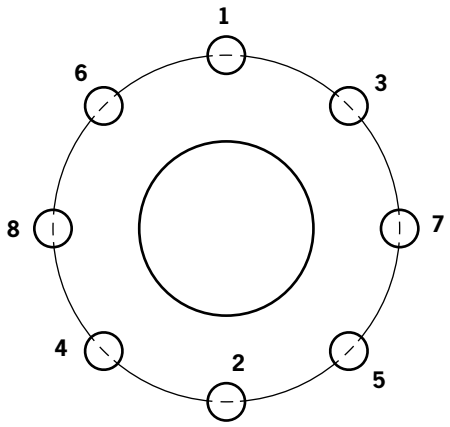
1. Bolt only the bushing **2** between rotor pads using bolt assembly **4**.
2. Torque to 113 ft-lbs. Verify that pads clamp bushing and prevent it from turning. If bushing is not clamped in place, remove fasteners and heat/straighten bent rotor pad.
3. If pads clamp bushing properly, remove bushing and slide it into hammer **1**. Bolt the hammer/bushing assembly to rotor pads using fasteners **4**.
   Torque to 113 ft-lbs.

## Rotor pad replacement

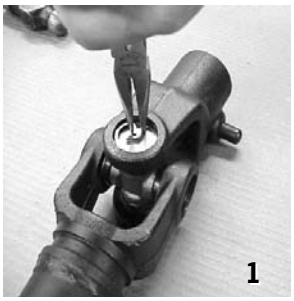
1. Damaged or missing rotor pads can be replaced. Contact Rears Mfg. Co. for welding instructions: 800.547.8925.
2. Welding on the rotor drum will change the rotor shape and can cause machine vibration. Rotors should be balanced after pad replacement.

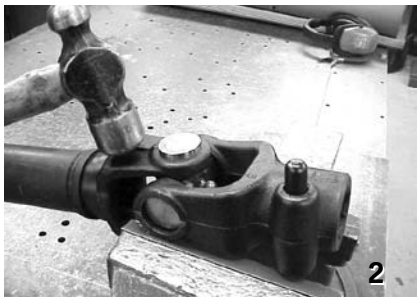
## Stub shaft installation

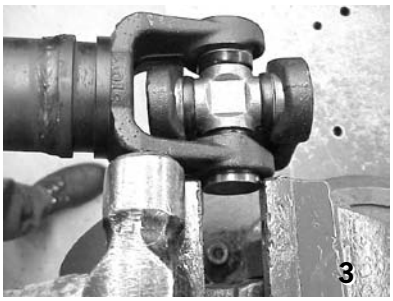
1. Clean both mount surfaces.
2. Apply *Locktite 2760* to bolts **7**.
3. Place shaft **8** on mount and finger-tighten all bolts.
4. Torque bolts in sequence, illustrated below, to 20 ft-lbs.
5. Torque bolts in sequence to 50 ft-lbs.
6. Torque bolts in sequence to 90 ft-lbs

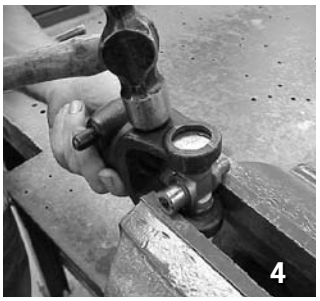



*rotor torque pattern*




## universal joint disassembly

Remove all (4) snap rings in cross assembly **1**.

Position joint in loose vice **2**. Strike top arm of unsupported yoke to drive the top cup up. Repeat on the opposite side.

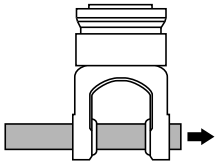
Grip loosened cup in vice **3** and strike yoke arm to drive yoke off cup. Repeat on opposite cup.

Support cross in loose vice **4** and strike yoke arm to drive the top cup up. Repeat on opposite side.

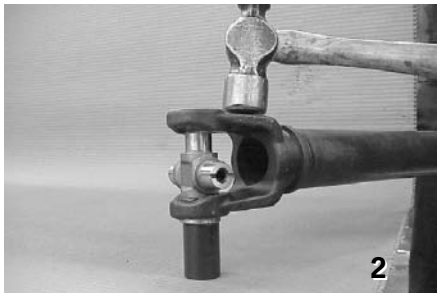
Repeat step **3** to remove the remaining two cups.

*Note*: Yoke arms must be true. If a yoke arm is *sprung* by striking with excessive force, the cross will bind in operation.

*True yoke test*- slide a machined rod (a few thousandths under cup diameter) through the yoke arms. The yoke must be replaced if the yoke won't slide completely onto the rod.



| | |
|---|---|
| *55 series rod diameter* | *1.530"* |
| *35 series rod diameter* | *1.247* |






## universal joint reassembly

Clean bearings **1** before assembling cross. Cups should be free from dirt- and be certain the seal from the previous cross does not remain in the cup. Smear grease in the clean bearing.

Make certain all needle bearings are seated properly.

Clean bearing seat in yoke arms. Check for burrs (in new yokes also). File out any burrs: bearing seat should be smooth and clean.

Yoke arms must be true (see *true yoke test*, above).
If a yoke arm is *sprung* by striking with excessive force, the cross will bind in operation.

Where a *spacer* is required, select a diameter that evenly distributes force around the outer edge of the bearing cup. Choosing a spacer of insufficient diameter or using no spacer at all will drive the bearings unevenly and cause the joint to bind in operation.

You should assemble the joint in a clean area.

Insert the cup and cross **2** and drive in with a spacer.

Insert snap ring **3**.

Insert second cup **4** and hold cross in place to drive on cup. Drive cup down with spacer and insert snap ring.

To loosen cross, strike yoke arm **5** and check cross for free rotation.

Position second yoke on cross **6** and repeat steps **2** to **5**.

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