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Challenger®

660B / 670B
Rotary Combine

SERVICE MANUAL
79032966 A Rev.

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01 - General Information

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SAFETY

SAFETY ALERT SYMBOL

FIG. 1: This is the safety alert symbol. This symbol stands for ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! Look for this symbol, both in this manual and on safety decals on the combine. This symbol will direct you to information that includes your personal safety and the personal safety of others.

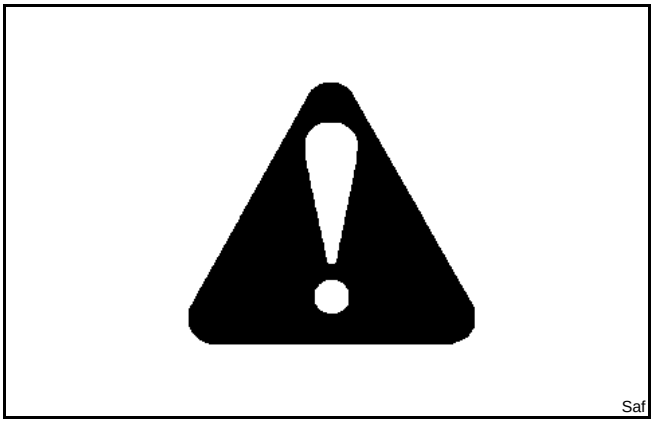

FIG. 1

SIGNAL WORDS

FIG. 2: The words **DANGER, WARNING, or CAUTION** are used with the safety alert symbol. Learn to know these safety alert symbols, and follow the given recommendations, precautions, and safe procedures.

DANGER: Indicates an immediate hazardous situation that, if not avoided, will result in DEATH OR VERY SERIOUS INJURY.

WARNING: Indicates a potentially hazardous situation that, if not avoided, can result in DEATH OR SERIOUS INJURY.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, can result in a MINOR INJURY.

Replace any **DANGER, WARNING, CAUTION,** or instruction decal that can not be read or is missing. The location and part number of these decals is shown later in this section of the manual.

IMPORTANT: The word IMPORTANT is used to show special instructions or procedures which, if not followed can result in damage to, or destruction of the machine, process, or the surroundings.

NOTE: The word NOTE is used to indicate points of special interest for more efficient and easier repair or operation.

FIG. 2

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FIG. 3: Read and understand this manual and the manual for all attachments before operating the combine.

Learn how to operate the combine and how to use the controls properly.

Do not operate the combine without instruction and training.

For your personal safety and the personal safety of others, follow all safety precautions and instructions found in the manual and on decals fastened to the combine and the attachments.

Personal injury or death can result if these precautions are not followed.

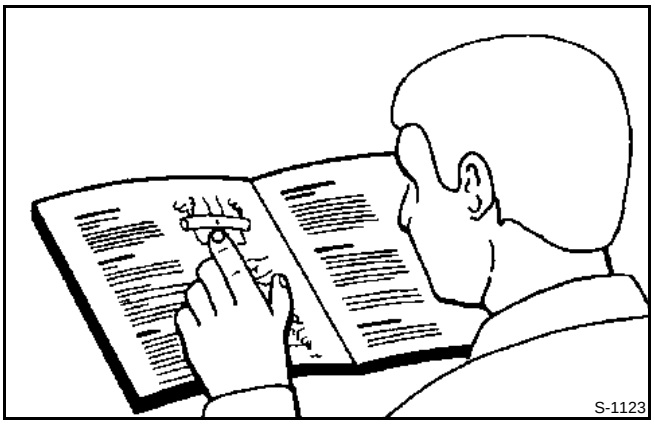

FIG. 3

FIG. 4: Be prepared for an emergency. Always carry one or more suitable fire extinguishers - ABC rating, dry chemical, 2.2 kg (5 lb). Check fire extinguishers regularly to make sure extinguishers are properly charged and in operating condition.

Mounting a fire extinguisher near the cab and a fire extinguisher near the engine compartment is a recommendation.

To reduce the risk of fire, frequently remove crop material from the combine and engine platform and check for components becoming too hot.

Keep a first aid kit close for treatment of minor cuts and scratches.

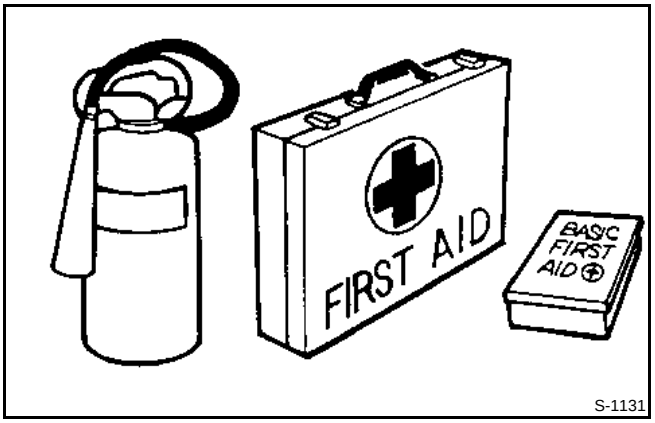

FIG. 4

FIG. 5: Wear close fitting clothing and personal protection equipment correct for operating or doing lubrication and maintenance on the combine. Tie up long hair to prevent the hair from becoming entangled in the moving parts.

WARNING: An operator must not use alcohol or drugs which can affect alertness or coordination. An operator taking prescription or over the counter drugs needs medical advice on whether or not the operator can properly operate machines.

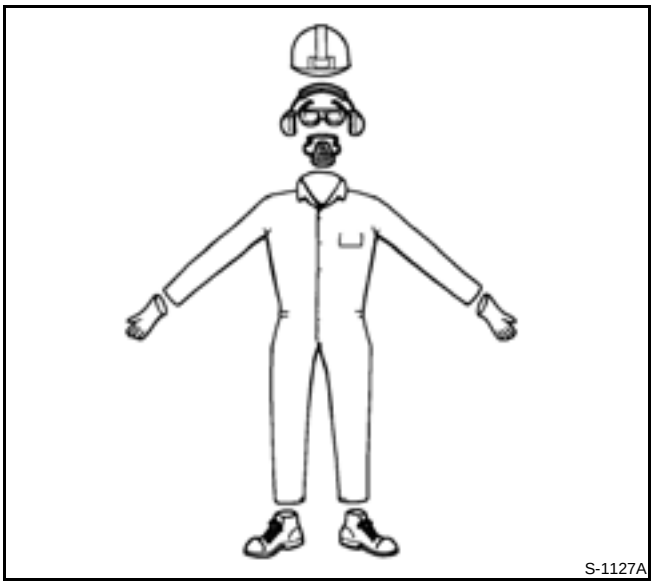

FIG. 5

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FIG. 6: Face the ladder and use the handrails when getting on or off the combine.

FIG. 6

FIG. 7: Never operate the engine in a closed building unless exhaust is vented outside.

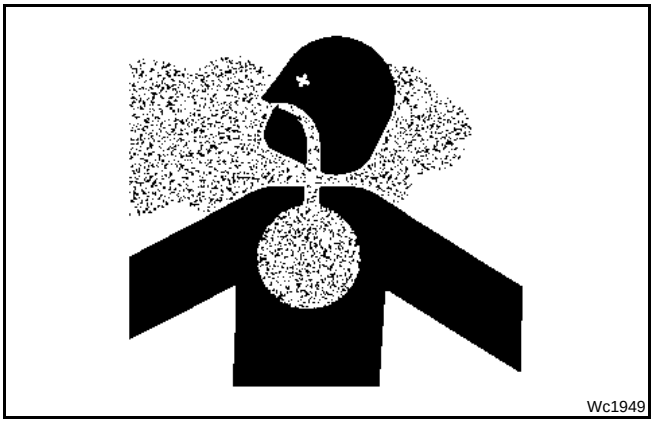

FIG. 7

FIG. 8: Make sure that all shields, guards, and access doors are in location and properly closed before starting the engine.

Start the engine from the operator seat only. Be sure that the transmission is in neutral and the header, separator, and unloader clutches are disengaged.

Be sure that every person is clear of the combine before starting the engine.

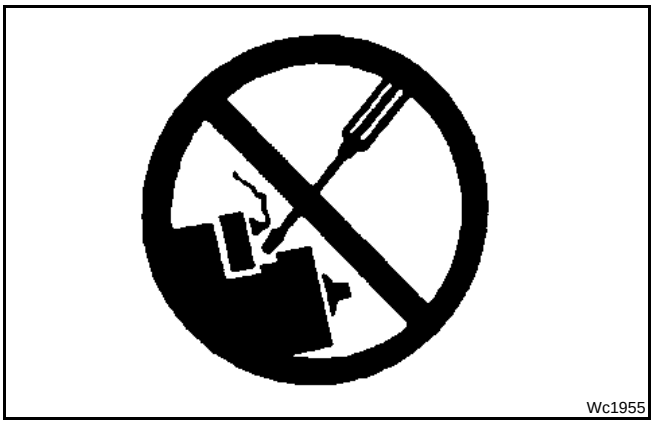

FIG. 8

FIG. 9: Always wear the seat belt when the combine is moving. If another person is riding in the instructor seat that person must wear the seat belt. Seat belts must be worn fitted snugly around the hips and not twisted.

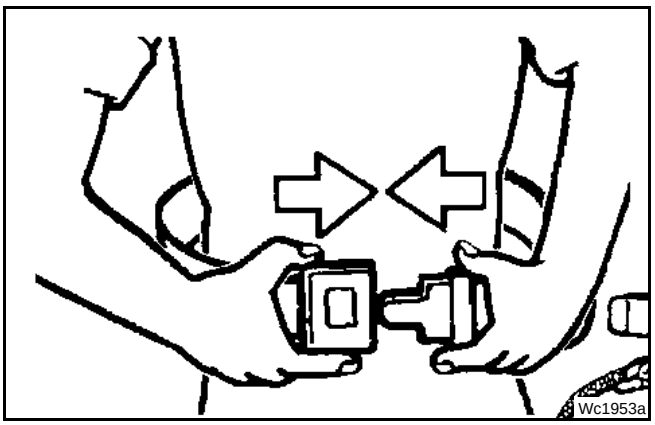

FIG. 9

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FIG. 10: Never permit any person to be on any part of the combine or the attachments except in the operator seat or the instructor seat when the engine is running.

Do not get on or off the combine while the combine is moving.

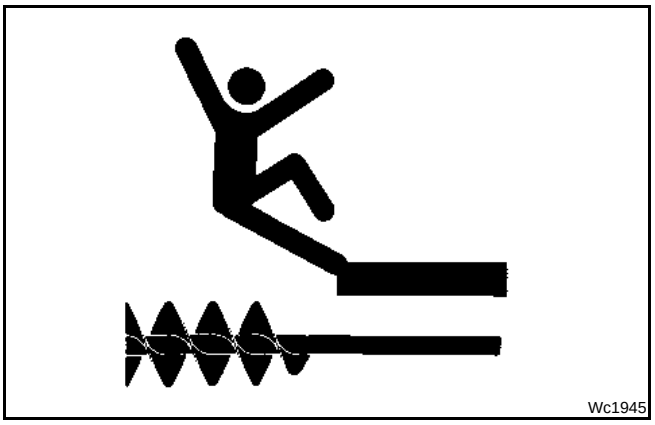

FIG. 10

FIG. 11: Prevent contact with electrical power lines. Always put the grain tank unloader tube in the transport position and lower radio antenna before moving the combine near electrical wires. Contact with electrical power lines can cause electrical shock, very serious injury, or death.

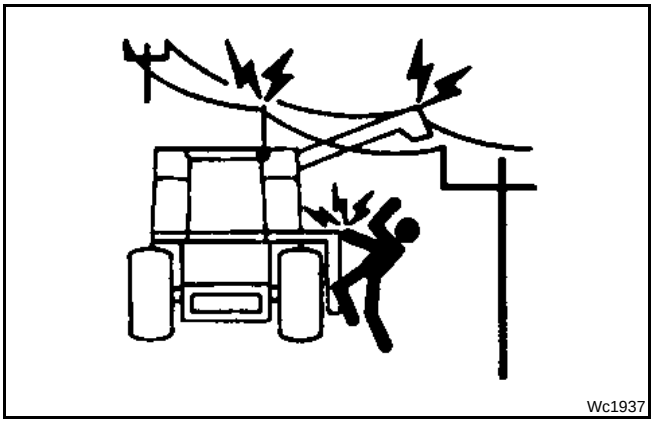

FIG. 11

FIG. 12: Use extra caution and reduce speed when operating on hill sides, near ditches or embankments especially with a full grain tank to prevent an over turn of the combine. Travel speed must be such that the machine has complete control and stability at all times. Shift to a lower gear before going down a steep hill.

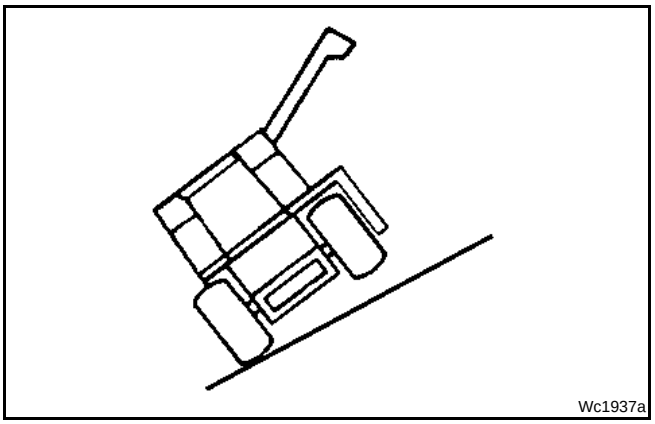

FIG. 12

FIG. 13: Always turn off the engine, shift the transmission to neutral, set parking brake, and remove the start key before leaving the operator seat or before permitting a person to inspect, clean, lubricate, adjust, or repair any part of the combine or the attachments. Unless specifically given instruction different in this manual. Never leave the operator seat as long as the engine is operating.

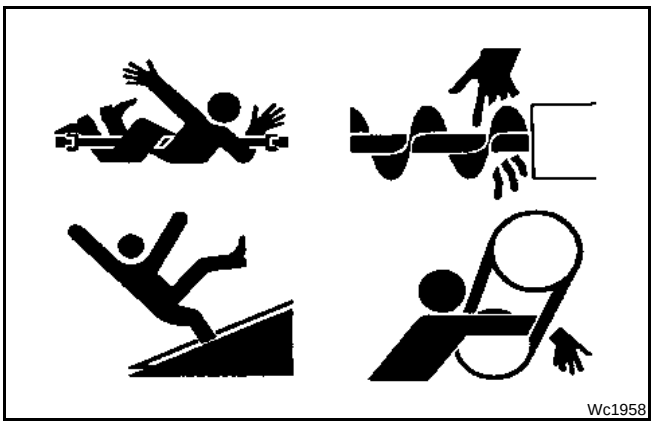

FIG. 13

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FIG. 14: Never work under the header or feeder house, unless the stop is properly engaged on the header lift cylinder, the engine is stopped, the parking brake is set, and the start key is removed from the start switch.

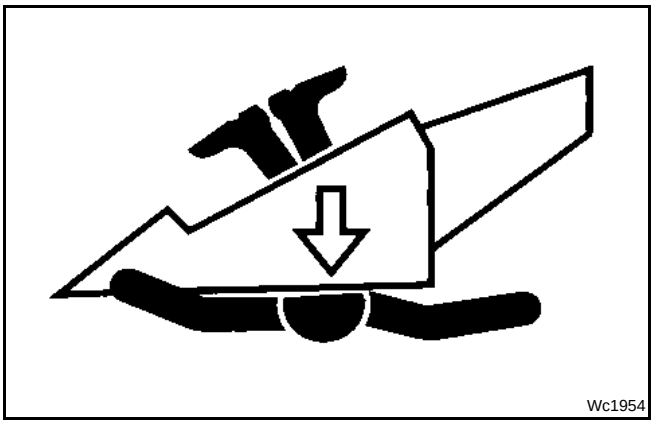

FIG. 14

FIG. 15: Fluid under high pressure can be almost invisible but can go into the skin causing serious injury.

See a doctor immediately if you sustain an injury from escaping fluids. Fluid injected into the skin must be surgically removed within a few hours or gangrene can result.

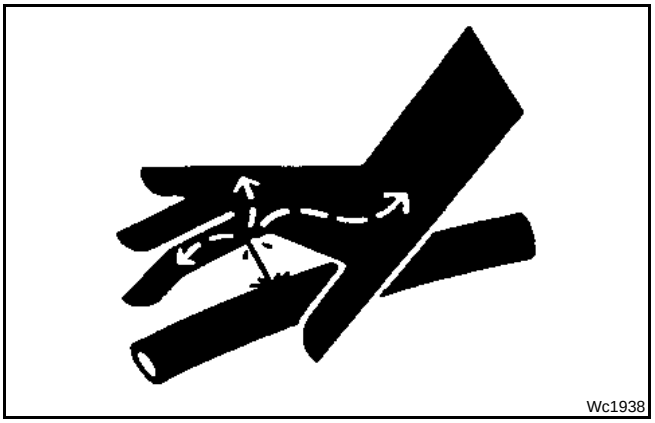

FIG. 15

FIG. 16: Use a piece of cardboard or wood to search for possible leaks. Never use your hands.

Relieve pressure from the hydraulic and fuel injection systems by lowering raised equipment, shutting off accumulator valve, and turning off the engine before loosening any part of the systems. Tighten all connections securely before applying pressure.

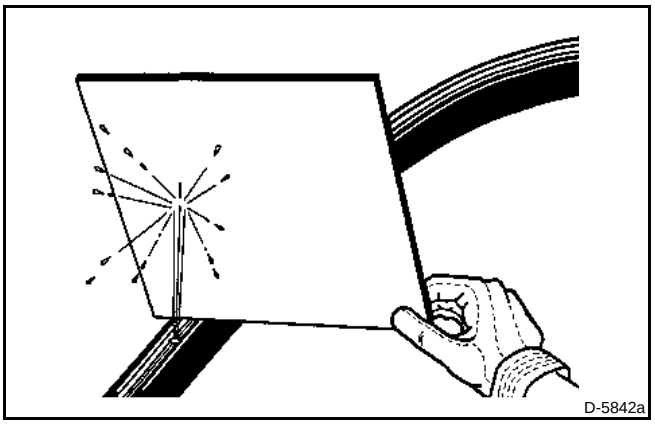

FIG. 16

FIG. 17: The surfaces in and around the engine compartment will be hot if the engine has been running, even for a short time.

Always permit parts that contain hot fluid to cool before handling or disconnecting.

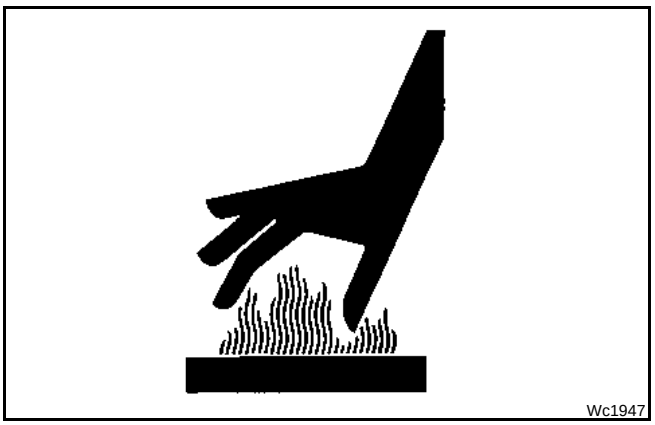

FIG. 17

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FIG. 18: Do not remove radiator cap if engine is hot. Only remove the cap when the cap is cool enough to touch with bare hands. Loosen cap slowly to first notch to relieve pressure, then remove cap.

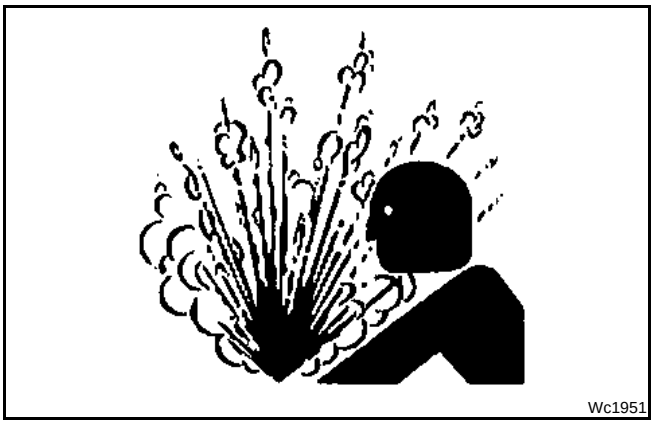

FIG. 18

FIG. 19: Remove any spilled oil, antifreeze, or fuel immediately from operator ladder and platform and other access areas.

Keep all access areas clean and free of obstructions.

FIG. 19

FIG. 20: Never permit any flame cutting, welding, or arc welding to be done on or near the sound proofing upholstery used in the cab. This material is flame resistant to normal exposure to cigarettes or other smoking material. But will ignite and sustain combustion when exposed to the heat of gas or electrical welding. The build up of chaff and crop debris in the engine compartment, on the engine, and near moving parts is a fire hazard. Check and clean these areas frequently.

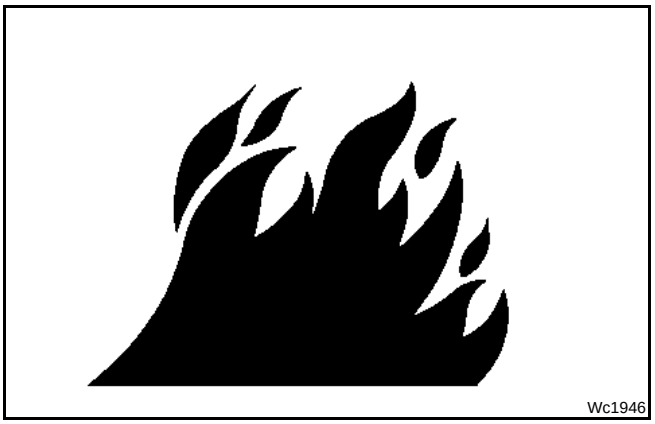

FIG. 20

FIG. 21: Always stop the combine engine before fueling. Do not smoke while fueling.

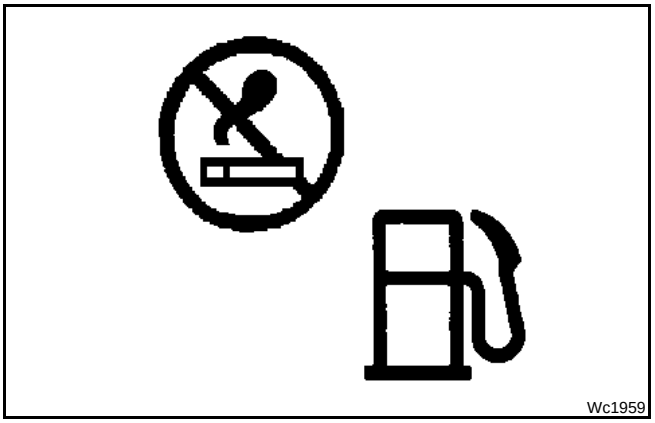

FIG. 21

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FIG. 22: Electrical storage batteries give off highly flammable hydrogen gas. Keep smoking material, open flame, or electrical sparks away from the battery. Do not lay tools or other conductive materials on the battery.

Be careful when connecting booster cables to combine batteries. Electrical component damage or battery explosion can result if booster cables are not installed correctly.

Do not charge a frozen battery as the battery can explode. Warm battery to 16 degree C (60 degree F).

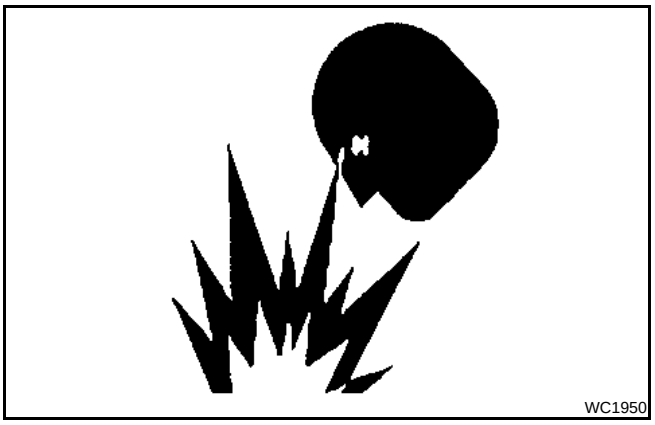

FIG. 22

FIG. 23: Fluid in electrical storage batteries contains sulfuric acid. Avoid all contact of fluid with eyes, skin, or clothing. If contact does occur, flush off immediately with large amounts of water.

WARNING: In order to provide a better view, certain photographs and illustrations in this manual may show an assembly with the shield removed. Do not operate combine unless all shields are in place. Replace shields immediately upon completion of inspection, repairs, cleaning or adjustments and before operation begins or resumes.

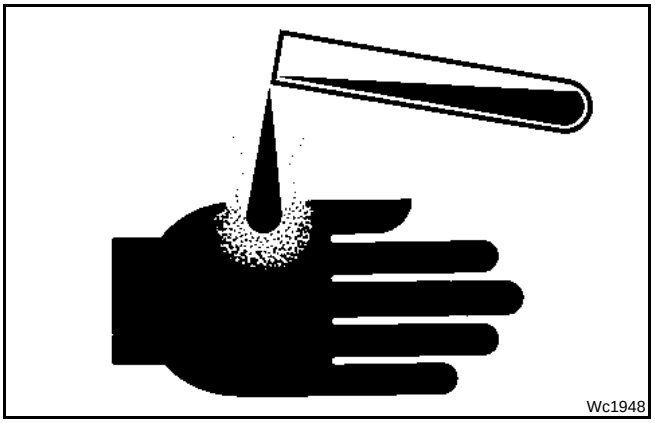

FIG. 23

SHIELDS AND LATCHES

FIG. 24: To operate the shield latches, twist the latch handle (1) counter-clockwise and pull out on the shield.

The left-hand shield latch is located in the middle of the lower section of the left-hand shield.

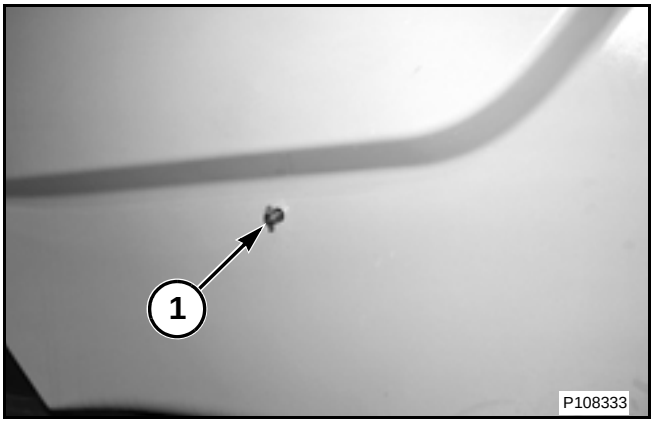

FIG. 24

FIG. 25: The right-hand side of the combine has three shields.

The front right-hand shield latch (1) is located in the middle of the lower section of the right-hand shield (2).

The middle right-hand shield latch (3) is located in the front section of the right-hand, middle shield (4).

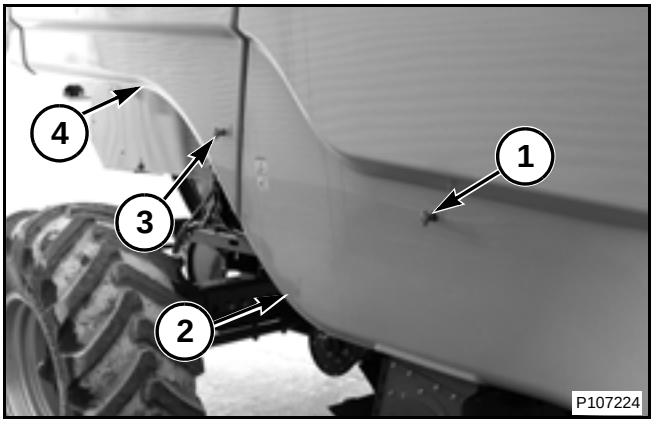

FIG. 25

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FIG. 26: The engine platform ladder shield latch (1) is located in the rear section of the shield (2).

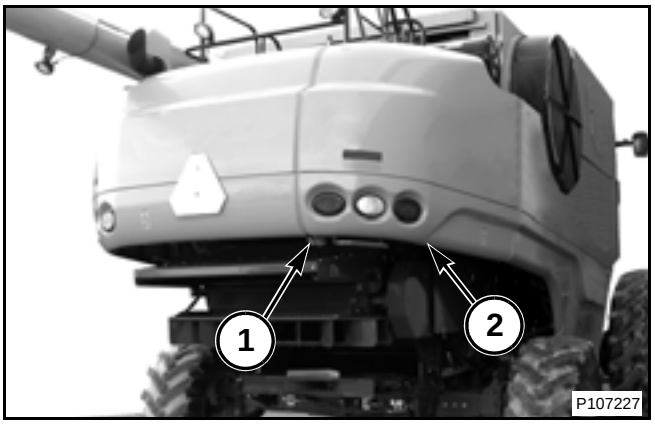

FIG. 26

HEADER LIFT CYLINDER STOP

A header lift cylinder stop is provided on the left-hand header lift hydraulic cylinder.

FIG. 27: Header lift cylinder stop (1) in the disengaged position.

FIG. 27

FIG. 28: Header lift cylinder stop (1) in the engaged position.

Properly engage the header lift cylinder stop as shown before going under the header or feeder house for any reason.

To engage the header lift cylinder stop:

1. Raise the feeder house until the cylinder rod is fully extended to allow engagement of the header lift cylinder stop.
2. Release the hook and lower the header lift cylinder stop onto the cylinder rod.
3. Lower feeder house until the header lift cylinder stop contacts the end of the cylinder.

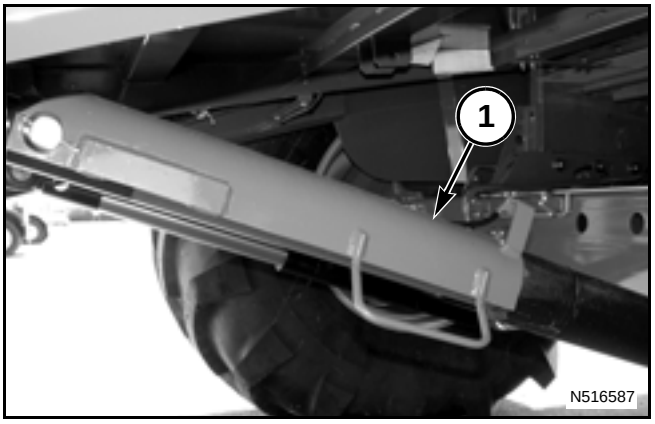

FIG. 28

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REAR HOOK

FIG. 29: The rear hook (1) is located in the center of the combine on the rear axle.

Use the rear hook (1) as a point on the combine to fasten a suitable chain to aid in pulling the combine out of the mud when the combine is stuck and not able to drive out.

- Do not go past the breaking strength of the chain.
- Do not use ropes or tow straps.
- Do not use the hook to pull a trailer.
- Do not use the hook to transport the combine on the road.

WARNING: Do not use a rope or strap to pull the combine out of the mud. Energy stored in these devices can cause serious personal injury if the device should break.

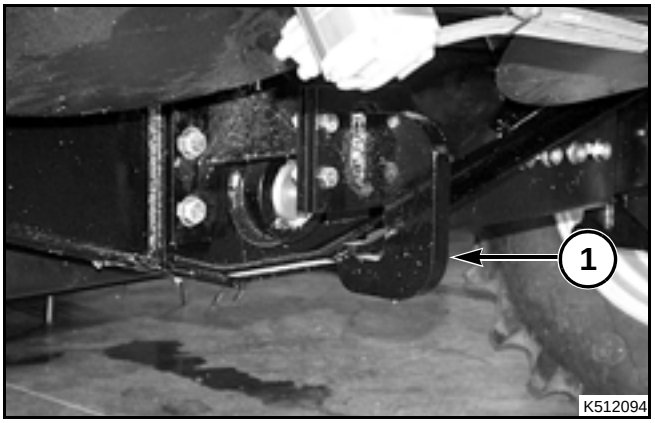

FIG. 29

TRAVEL ON PUBLIC ROADS

FIG. 30: Consult your local law enforcement agency for local regulations regarding movement of farm equipment on public roads.

Use headlights, flashing warning lights, taillights and turn signals, day and night, unless prohibited by local law. Make sure lights, reflectors and SMV emblem are installed, in good condition and wiped clean.

Lock brake pedals together with the locking strap so that both front wheel brakes will be applied simultaneously.

Be aware of other traffic on the road. Keep well over to your own side of the road and pull over, whenever possible, to let faster traffic pass.

Adjust travel speed to maintain control at all times. Never allow combine to coast down hills.

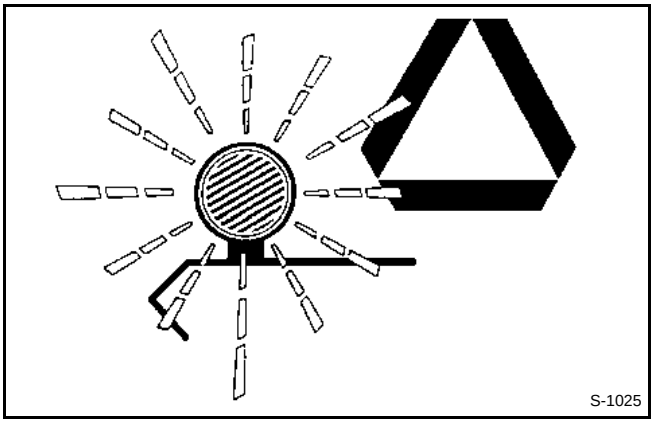

FIG. 30

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NOTES

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GENERAL INFORMATION

MACHINE MAIN COMPONENTS

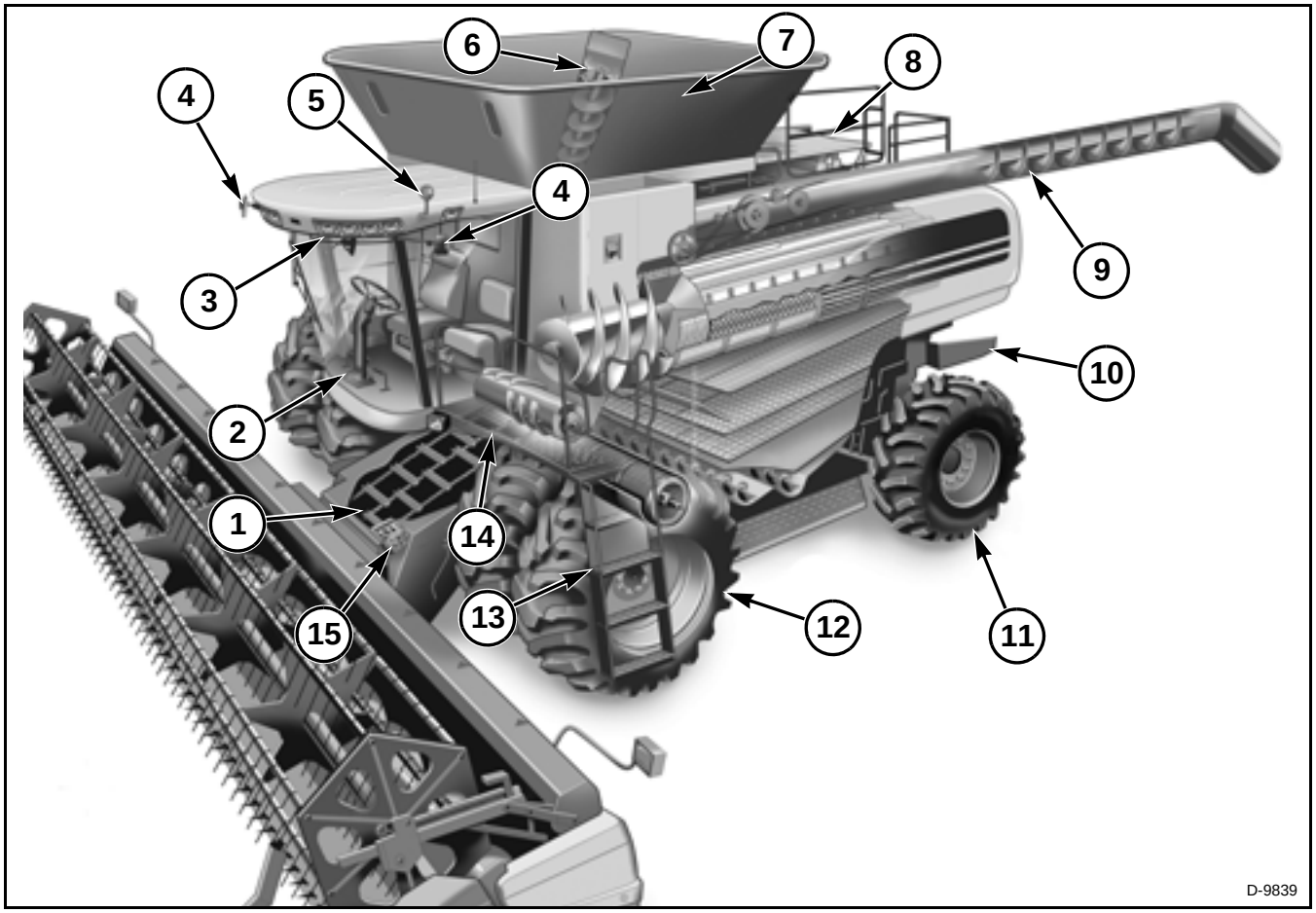

FIG. 31

Some of the main components of the combine are as follows:

1. Feeder
2. Operator Cab
3. Roof Lamps
4. Rear View Mirrors
5. Beacon Lamp
6. Grain Tank Loading Auger
7. Grain Tank
8. Engine Compartment
9. Grain Tank Unloading Auger
10. Straw Chopper
11. Steering Axle
12. Drive Axle
13. Operator Platform Ladder
14. Operator Platform
15. Single Point Header Connection

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HOW A COMBINE WORKS

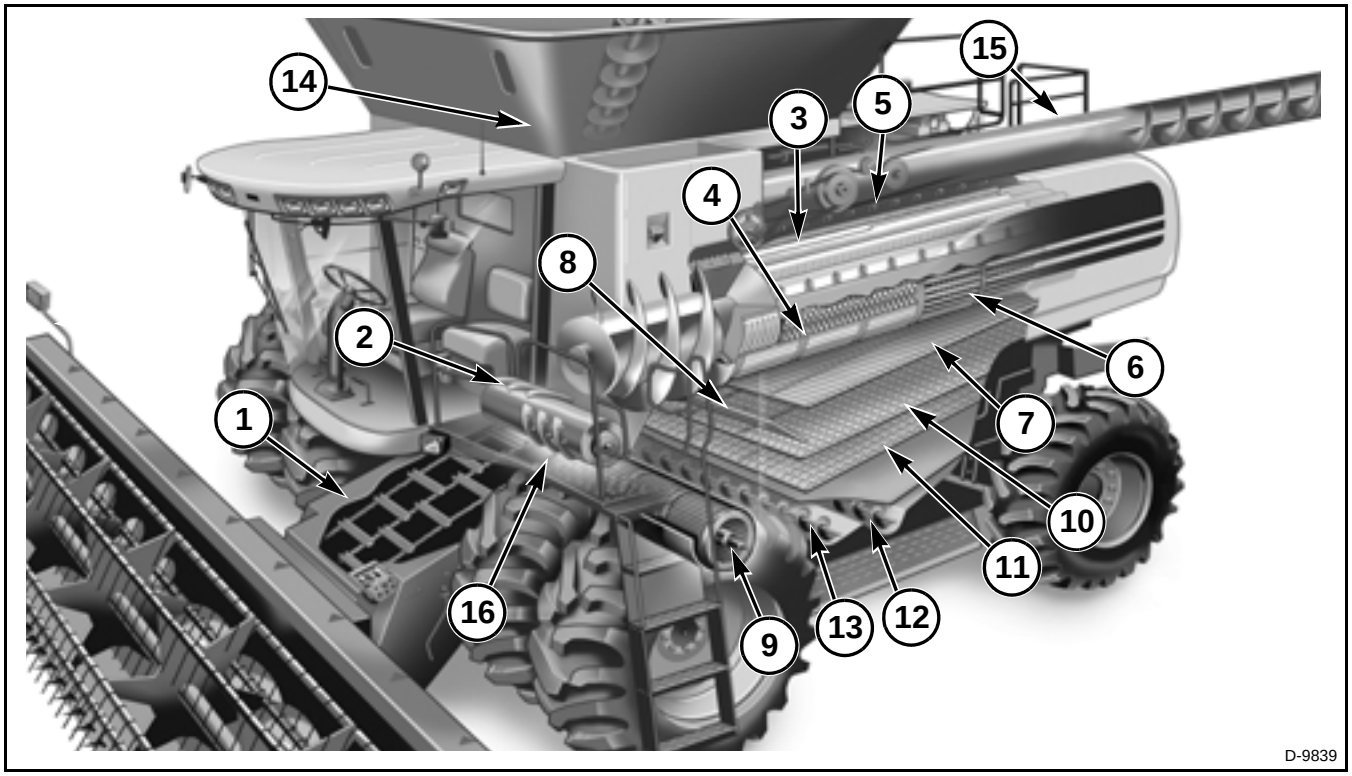

FIG. 32

FIG. 32: Four functions are done in the overall harvesting operation of a combine. These are:

- Cutting and Feeding
- Threshing
- Separating
- Cleaning

Cutting and Feeding

The crop is gathered by a header which is supported by a feeder housing.

The grain header uses a reel to direct the crop into the header auger after the crop is cut by the knife and the header auger conveys the crop into the feeder (1).

When a pickup header is used, the crop, already cut and laying in a swath, is lifted by a pickup and fed to the header auger where the retractable fingers move the crop into the feeder.

The feeder elevator transports the crop to the front of the accelerator beater (2) which moves the crop to the rotor inlet area and the rotor (3). The feed beater also guides rocks and other foreign objects into the stone trap (16) located forward and below the beater.

Threshing and Separating

The rotor does four functions as the crop moves in rotary motion from front to rear:

- Intake
- Threshing
- Separating
- Discharge

The auger flighting in the intake area starts the crop on a spiral route around the rotor and moves the crop to the threshing area.

Threshing and initial separation are done in the threshing zone as a result of relationship between the rotating cylinder bars and the stationary open grate concave (4). Contact with the helical guide vanes (5) causes the material to move rearward and in a circular route, letting the material pass over the concave several times.

Remaining separation occurs in the separating section. Centrifugal force carries the grain and chaff through the grate (6) while the straw moves rearward in the rotor cage. Again, the spiral motion of the crop lets the crop pass over the separating grates several times.

Cylinder bars on the rotating rotor hold the crop against the grates until the crop reaches the end. Paddles then bat the material into a discharge chute where the crop is moved to a straw spreader, chopper, or discharged directly to the ground.

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Grain, chaff, and unthreshed heads which penetrated the separator grates are carried to the cleaning shoe by the separator return pan (7).

Cleaning

The material is moved from the front of the separator return pan onto a short cascade pan (8) which in turn moves the mixture across a fingered comb and into the front of the chaffer sieve.

The cleaning fan (9) provides air to keep the chaff in suspension during the cleaning process in the shoe.

The air blast passing through the reciprocating adjustable chaffer (10) separates and blows the chaff out of the combine. The grain and tailings drop through to the cleaning sieve.

The adjustable cleaning sieve (11) does the final cleaning. The clean grain falls through the sieve into the clean grain auger trough. The tailings, chaff and other material continue to the end of the sieve and into the return auger trough (12) for reprocessing.

The grain elevator paddle chain conveys the clean grain from the clean grain auger (13) to the grain tank filling auger and into the grain tank (14). The return elevator carries the tailings back to the rotor intake for threshing and processing.

The grain in the grain tank is unloaded into a truck or trailer through the unloading auger (15).

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COMBINE IDENTIFICATION

Your combine is identified by serial numbers which are important if you require service or repair parts.

Record the serial numbers from the serial plate on your combine in the spaces provided for easy reference.

Machine Model Number: _____

Machine Serial Number: _____

Engine Serial Number: _____

Transmission Serial Number: _____

Final Drive Serial Number: _____

Date of Delivery: _____

Dealer Name and Address:

_____

_____

_____

Dealer Telephone Number: _____

Dealer Fax Number: _____

NOTE: References to left-hand and right-hand, used in this manual, refer to position when seated in operator seat and facing forward

Machine Serial Number

FIG. 33: The machine serial number plate is located on the combine left-hand side frame at the rear corner.

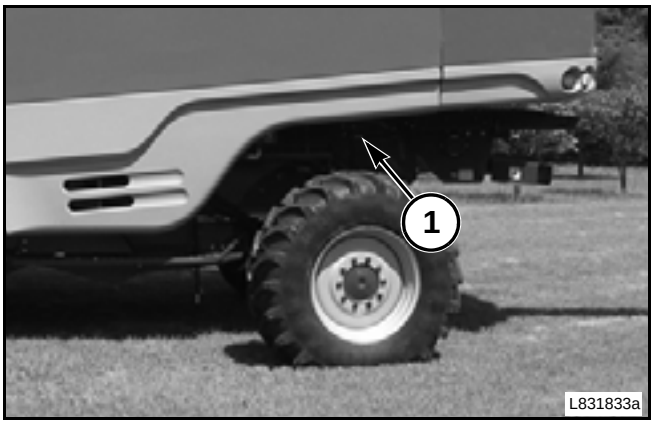

FIG. 33

Engine Serial Number

FIG. 34: The engine serial number is located on the engine serial number plate (1). The serial number plate is located on the left rear of the engine block near the starter.

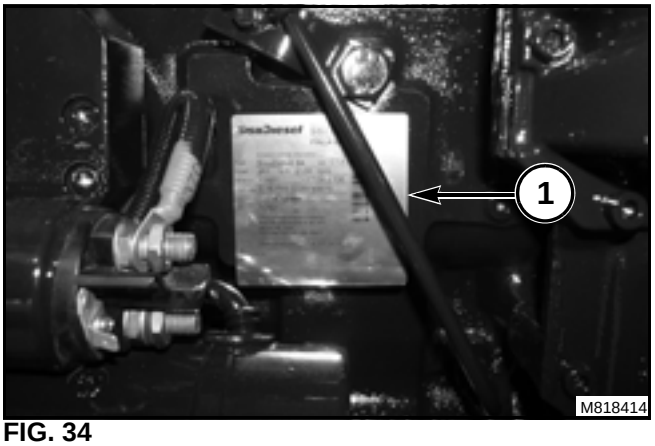

FIG. 34

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Fuel Injection Pump Dataplate

FIG. 35: The fuel injection pump dataplate (1) is located on the back of the injection pump.

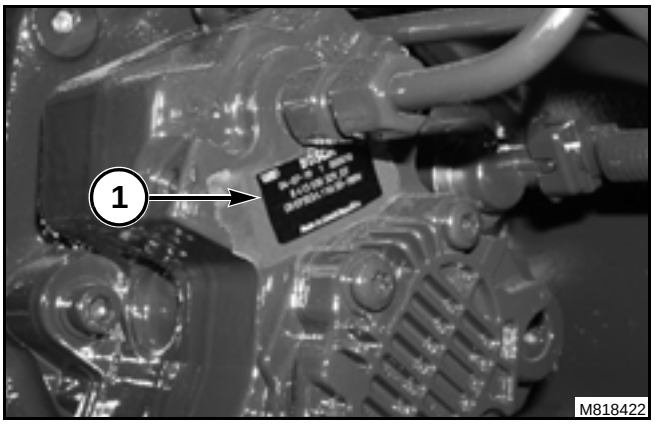

FIG. 35

ECM Dataplate

FIG. 36: The Electronic Control Module (ECM) dataplate (1) shows important information about the ECM and how the ECM is programmed. The dataplate is located on the ECM right of the ECM connectors under a protective cover.

The following information is found on the ECM dataplate:

- ECM part number (PN)
- ECM serial number (SN)
- ECM date code (DC)
- Engine serial number (ESN)
- ECM code showing the software number that indicates how the ECM is programmed.

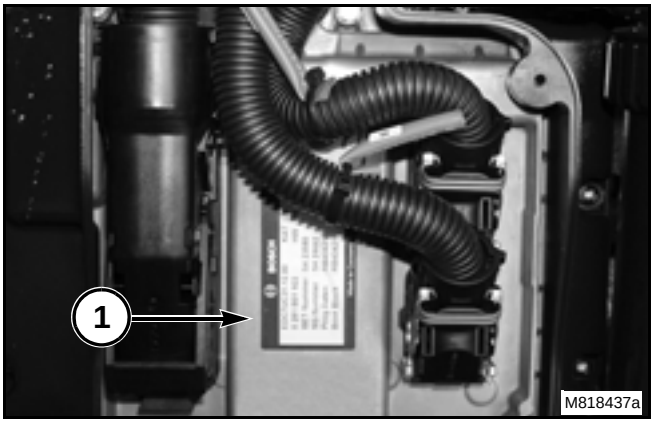

FIG. 36

Transmission Serial Number

FIG. 37: The transmission serial number is stamped on the serial number plate that is fastened to the left hand side of the transmission housing at location (1).

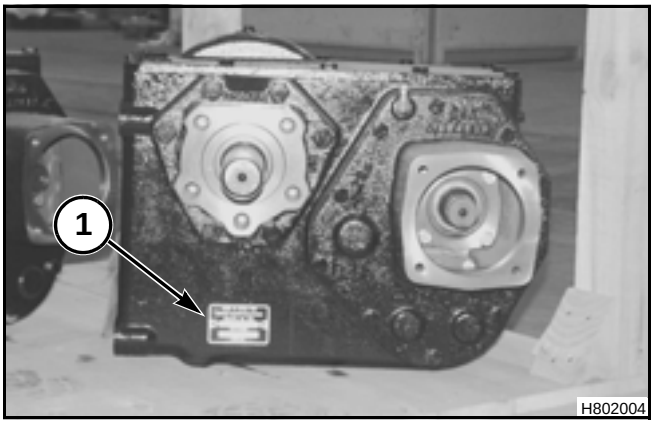

FIG. 37

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Final Drive Serial Number

FIG. 38: The final drive serial number is stamped on the plate that is on the inner half of the final drive housing at location (1).

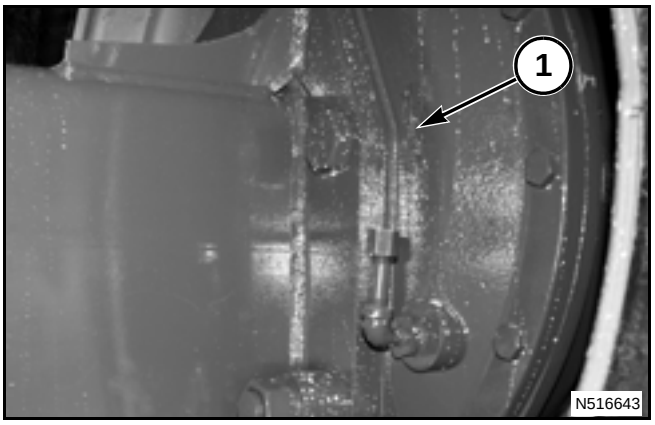

FIG. 38

HEADERS

The combine is equipped with a quick attach feeder for fast and easy hook up of headers. The quick attach characteristics permits for easier service, transport, and storage of both the header and the combine.

The combine can be equipped with the following type of headers:

- Rigid Grain Headers
- Flexible Cutterbar Headers
- Pickup Headers
- Corn Headers
- Stripper Headers
- Draper Headers

NOTE: Refer to the operator manual, supplied with the header, for installation and operation information.

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LUBRICATION AND MAINTENANCE

For efficient and low cost operation of any machine proper lubrication and maintenance is needed. Follow the instructions in this section of the manual (and on the lubrication decals and charts located on the right and left side frames of the machine) to make sure the combine is lubricated at regular service intervals.

NOTE: Refer to the combine Operator's manual for lubrication and maintenance instructions for the particular year model combine.

CAUTION: Always raise the header and engage the header lift cylinder stop, lower the reel, turn off the engine, and remove the ignition key before performing any lubrication or maintenance functions on the combine.

LUBRICANTS

Use quality oils and greases and make sure to use the proper lubricant for the job. Refer to Specifications section for specific lubricant requirements.

SERVICE PROCEDURES

Keep lubricants in clean, covered containers. Clean funnels, measures, and other handling equipment before and after use. Clean fittings, plug openings, and other lubrication points before servicing. Inspect and clean plugs and other detachable fittings before installing.

SERVICE PERIODS

Frequency requirements, listed in Lubrication and Maintenance charts, are based on normal operating conditions. If combine is being operated under extreme weather or dust conditions, lubricate more often. Change engine oil filter every oil change regardless of how short time interval has been between oil changes.

NOTE: Monitor the engine hour meter to insure that all maintenance intervals are met.

WARNING: Lower header or feeder to ground or raise and engage header lift cylinder stop. Stop combine engine and remove start key before performing any lubrication or maintenance function.

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LUBRICATION AND MAINTENANCE

New Machine Lubrication and Maintenance		
Component	**Action Required**	**General Information**
Bolts (attaching wheels, final drives, front and rear axles, feeder elevator brackets, straw chopper hammers and beater bearing housings)	Check torque	Refer to appropriate sections of manual.
Brake Fluid Level	Check fluid level, with combine parked on level ground, and fill if necessary	Fluid level to be 6 mm (1/4 in) from top. Refer to the Specifications section for the correct brake fluid.
Drive Chains and belts	Check tension and alignment	Refer to the Adjustment section.
Engine Air Cleaner	Check and tighten all connections	
Feeder Reverser	Check fluid level	Recommended change period - Initial fill only.
Rear (steering) wheels	Check toe in	Set toe-in to 6 mm (0.25 in). Refer to appropriate section of manual.

Lubrication and Maintenance		
10 Hour or Daily Lubrication		
Component	**Action Required**	**General Information**
Cleaning Fan Drive Pulley (Sliding Half)	Lubricate one fitting	At inner pulley hub.
Feeder House Pivot Bushing	Lubricate two fittings	On each side of the front frame cross-member under the cab.
Beater to Feeder House Jack Shaft Idler	Lubricate one fitting	On right-hand side of the feeder house
Variable Speed Corn Header Drive Sheave (if equipped)	Lubricate two fittings	On right-hand side of feeder house on v/s drive sheave.
Drive Chains	Oil drive chains (oil more often when operating in extremely dusty conditions)	Refer to Roller Chains in this section.

10 Hour or Daily Maintenance		
Component	**Action Required**	**General Information**
Air Conditioning Condenser	Check coil for chaff and dust accumulation. Clean as necessary	Condenser located in front of radiator.
Drive Chains and Belts	Conduct general inspection of all drive chains and belts.	Refer to this section.
Engine Air Intake Screen and Aspirated Pre-cleaner	Check clamps on ends of aspirated tube.	
Engine Compartment	Check for accumulation of chaff, leaves, trash, etc. Clean as necessary	Chaff, leaves and trash, which are allowed to accumulate can create a fire hazard.
Engine Oil Level	Check oil level and fill if necessary.	Refer to the Specifications section for the correct oil.
Hydraulic Reservoir Oil Level	Check hydraulic oil level.	Refer to the Specifications section for the correct oil.

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10 Hour or Daily Maintenance		
Component	**Action Required**	**General Information**
Hydrostatic Rotor/Propulsion Pump Drive Belt	Check tension and adjust as required.	Especially important when operating on hilly terrain to assure engine braking assistance.
Radiator Coolant	Check level of coolant in radiator coolant recovery tank, with combine parked on level ground, and add coolant if necessary	Use solution of 50% water and 50% diesel type low silicant antifreeze. Do not use Organic Acid type antifreeze.
Radiator Core and Rotary Screen Air Intake	Check to ensure screen and radiator core are clear of chaff and dust	Check twice daily in extremely dusty conditions. Check that screen is free to turn before starting engine.
Separator Pan (Operating in mud and/or snow conditions)	Check for buildup of material	Clean as necessary through side access doors.
Shoe Grain Pan	Check for build-up of material.	
Transverse Fan	Check for build up of dirt and trash	
Wheel Hardware	Check torque every 10 hours or until the wheel hardware remains tight	Refer to the Specifications section for the correct wheel hardware torque specification.

50 Hour or Weekly Lubrication		
Component	**Action Required**	**General Information**
Clean Grain Elevator Drive Idler Pivot	Lubricate one fitting	At pivot on left-hand side.
Pitman Drive Idler Pivot	Lubricate one fitting	At pivot on left-hand side.
Rotor Gearbox Shaft Spline	Lubricate one fitting	Below battery disconnect switch.
Cleaning Fan Drive Idler Pivot	Lubricate one fitting	In grease bank on the front of the clean grain elevator.
Front Rotor Bearing	Lubricate one fitting	In grease bank on the front of the clean grain elevator.
Return Elevator Countershaft Drive Idler Pivot	Lubricate one fitting	In grease bank on the front of the clean grain elevator.
Straw Chopper/Spreader Primary Drive Idler	Lubricate one fitting	In grease bank on the front of the clean grain elevator.
Straw Chopper/Spreader Secondary Drive Idler	Lubricate one fitting	In grease bank on the front of the clean grain elevator.
Auger Pivot Tube	Lubricate one fitting	In the front left-hand side grease bank.
Front Beater Drive Idler	Lubricate one fitting	In the front left-hand side grease bank.
Unloader Drive Idler	Lubricate one fitting	In the front left-hand side grease bank.
Main Countershaft Drive Idler	Lubricate one fitting	In the rear left-hand side grease bank.
Propulsion Pump Drive Idler	Lubricate one fitting	In the rear left-hand side grease bank.
Rotor/Propulsion Pump Drive Idler	Lubricate one fitting	In the rear left-hand side grease bank.
Pivot Drive Idler Hub	Lubricate one fitting	On the left-hand side of feeder housing.

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50 Hour or Weekly Lubrication		
Component	**Action Required**	**General Information**
Fixed Speed Header Drive Idler Pivot	Lubricate one fitting	On the right-hand side of the feeder house.
Standard Adjustable Rear Axle	Lubricate thirteen fittings	Center pivot - Below battery disconnect switch - One fitting. King pins - four fittings. Tie-rod sockets - four fittings. Steering rod - two fittings. Spindal Housing - two fittings.
Adjustable Rear Wheel Assist Axle	Lubricate eleven fittings	Center pivot - In rear left-hand side grease bank - one fitting. King pins - eight fittings. Tie-rod sockets - two fittings.

50 Hour or Weekly Maintenance		
Component	**Action Required**	**General Information**
Air Cleaner (Engine)	Check hose connections for tightness.	Clean or replace main element when indicated by monitor light.
Air Conditioner - Compressor Clutch Belt Evaporator Coil	Check tension, inspect and clean evaporator filter and coil if necessary.	Adjust as required. Raise top air conditioning unit to gain access.
Batteries	Clean off top of batteries and check for tight cable connections	Located at left hand side frame.
Cab Recirculation Filter	Remove grille and clean	Located inside cab under right hand console.
Concave	Check positioning and leveling of concave	
Cab Air Filter	Remove element from air conditioning unit and clean	May require more frequent cleaning in extremely dusty conditions.
Shaker Shoe Chaffer and Sieve	Remove any accumulated straw, cobs, etc.	Check chaffer and sieve retaining bolts
Drive Chains and Belts	Check tension. Replace or adjust as necessary	
Elevators-Clean Grain and Returns	Check tension of conveyor chains	Refer to appropriate section of manual.
Engine Belts	Check condition of belts and replace if needed.	Refer to appropriate section manual.
Engine Speed	Check speed	Use digital tachometer in cab for routine check.
Feeder Chain	Check tension of conveyor chain	Do not over tension.
Hydrostatic Oil Cooler	Check core for chaff and fiber. Clean as required.	

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50 Hour or Weekly Maintenance		
Component	**Action Required**	**General Information**
Hydraulic Reservoir Filler Cap	Remove and clean	Use kerosene or suitable solvent.
Hydraulic System	Check for leaks	
Hydrostatic Rotor/Propulsion Pump Drive Belt	Check tension and adjust	Refer to appropriate section of manual
Hydrostatic Propulsion Drive Pump Control	Check adjustment	Refer to appropriate section of manual.
Main Countershaft Drive Belt	Check tension and adjust	Refer to this section of manual.
Straw Chopper or Spreader Drive	Check belt tension and adjust	
Tire Pressure	Check and inflate as needed	Refer to Specifications section of manual.
Unloader Drive Belt	Check disengagement and adjust belt guides as necessary	
Primary Engine Fuel Filter	Drain any accumulated water from fuel filter	Place cloth or container under filter to catch any fluids before opening drain valve.
Linkages and Clevises	Oil lightly	
Air Conditioning Air Filter and Secondary Filter	Remove element from top of cab and A/C unit on bottom of cab and clean	
Engine Oil and Filter (Change after the first 50 hours, and every 250 hours thereafter.)	Drain crankcase, install new filters. Fill crankcase to correct level with new oil of type recommended.	
Hydrostatic Oil Filter (Change after the first 50 hours of operation and every 250 hours thereafter.)	Replace filter elements.	
Pitman Driven Sheave	Check torque after the first 50 hours of operation and every 250 hours thereafter.	Refer to the Specifications section for the correct torque specification.
Pitman Drive Hub	Check torque after the first 50 hours of operation and every 250 hours thereafter.	Refer to the Specifications section for the correct torque specification.
Shaker Arm Bolt	Check torque after the first 50 hours of operation and every 250 hours thereafter.	Refer to the Specifications section for the correct torque specification.
Hydraulic Reservoir Breather Filter	Change after the first 50 hours of operation and every season thereafter.	Refer to the Specifications section for the correct torque specification.

100 Hour Lubrication		
Component	**Action Required**	**General Information**
Lateral Tilt Pivot Pin (if equipped)	Lubricate one fitting.	At bottom center of lateral tilt frame.
Lateral Tilt Rollers, if equipped	Lubricate two fittings.	On each end of lateral tilt frame.
Axle Couplers	Lubricate four fittings	On each inner and outer coupler, both sides.
Return Elevator Drive Sheave and Slip Clutch	Lubricate three fittings	Below grain tank on right-hand side.

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100 Hour Lubrication		
Component	**Action Required**	**General Information**
Grain Tank Unloader Joint	Lubricate one fitting	Below right-hand side of grain tank to the front.
Grain Tank Cross Auger Shaft	Lubricate two fittings	On the right-hand and left-hand ends of the grain tank cross auger shaft.
Angled Auger Drive Sprocket	Lubricate one fitting	Right-hand side of grain tank on the angled auger drive sprocket.
Rotary Screen Drive Idler	Lubricate one fitting.	Fitting inside rotary screen.

100 Hour Maintenance		
Component	**Action Required**	**General Information**
Wheel Hardware	Check torque every 10 hours or until the wheel hardware remains tight	Refer to the Specifications section for the correct wheel hardware torque specification.

250 Hour Maintenance		
Component	**Action Required**	**General Information**
Engine Oil and Oil Filter (Change after first 50 hours and every 250 hours thereafter).	Drain crankcase, install new filters. Refill crankcase to correct level with new oil of type recommended.	Clearly indicate that the engine oil has been drained and the combine engine must not be started.
Transmission Housing	Check oil level and fill if necessary. Check breather.	Refer to the Specifications section for the correct oil.
Final drive Housings	Check oil level and fill if necessary. Check breather.	Refer to the specifications section for the correct oil.
Hydrostatic Oil Filter (Change after the first 50 hours and every 250 hours thereafter).	Replace filter element	
Pitman Driven Sheave	Check torque.	Refer to the Specifications section for the correct torque specification.
Pitman Drive Hub	Check torque.	Refer to the Specifications section for the correct torque specification.
Shaker Arm Bolt	Check torque.	Refer to the Specifications section for the correct torque specification.

500 Hours or Once a Season Lubrication		
Component	**Action Required**	**General Information**
Shaker Shoe Shaft Bearings	Lubricate two fittings	At each side of combine.
Transmission Shift Linkage	Lubricate one fitting	On right-hand side of transmission
Brake Pedal Shaft Bearings	Lubricate two fittings	Located under cab.

500 Hours or Once a Season Maintenance		
Component	**Action Required**	**General Information**
Brake Fluid	Check fluid level in auxiliary reservoir and fill as necessary.	Fluid level to be 6 mm (1/4 in) from top. Refer to the Specifications section for the correct brake fluid.

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500 Hours or Once a Season Maintenance		
Component	**Action Required**	**General Information**
Cleaning Fan Housing	Clean accumulated trash from top of housing.	
Engine Air Cleaner Elements	Replace inner and outer air cleaner elements.	Replace elements annually or when indicated by monitor. Outer element only can be cleaned.
Engine Fuel Filter	Remove and discard filters. Install new filter.	Do not prefill the secondary fuel filter prior to installation.
Final Drive Housings	Drain gear box, flush and fill to correct level with clean oil.	Refer to the Specifications section for the correct oil.
General	Inspect combine for worn, damaged, or broken parts. Torque all bolts.	Refer to the Specifications section for the correct torque specification.
Hydraulic Oil System	Drain oil, replace filter elements and breather. Remove and clean the hydraulic reservoir strainer and fill to correct level with clean oil.	Refer to the specifications section for the correct oil.
Hydraulic Reservoir Breather Filter	Change Breather Filter	
Roller Chains	Remove all chains. Clean, lubricate, drain and reinstall.	Clean in solvent to remove dirt. Soak in SAE 30 engine oil and allow to drain.
Rotor Gearbox	Change Oil.	Refer to the Specifications section for the correct oil.
Straw Chopper	Check knife wear and replace if necessary Install new blades 180 degrees from each other.	Replace hammers in sets of two to maintain chopper rotor balance.
Transmission Housing	Drain gearbox, flush and fill to correct level with clean oil.	Refer to the Specifications section for the correct oil.

1000 Hour Maintenance		
Component	**Action Required**	**General Information**
Engine Belt, Tensioner and Pulleys	Check belt for damage. Check tensioner and fan pulley bearings for excessive play and smooth operation	
Engine Valves	Check and adjust clearances	See Engine Operation and Maintenance Manual for specifications.
Radiator	Replace coolant and flush system	See Engine Operation and Maintenance Manuals for correct coolant mixture.

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LUBRICATION DETAILS

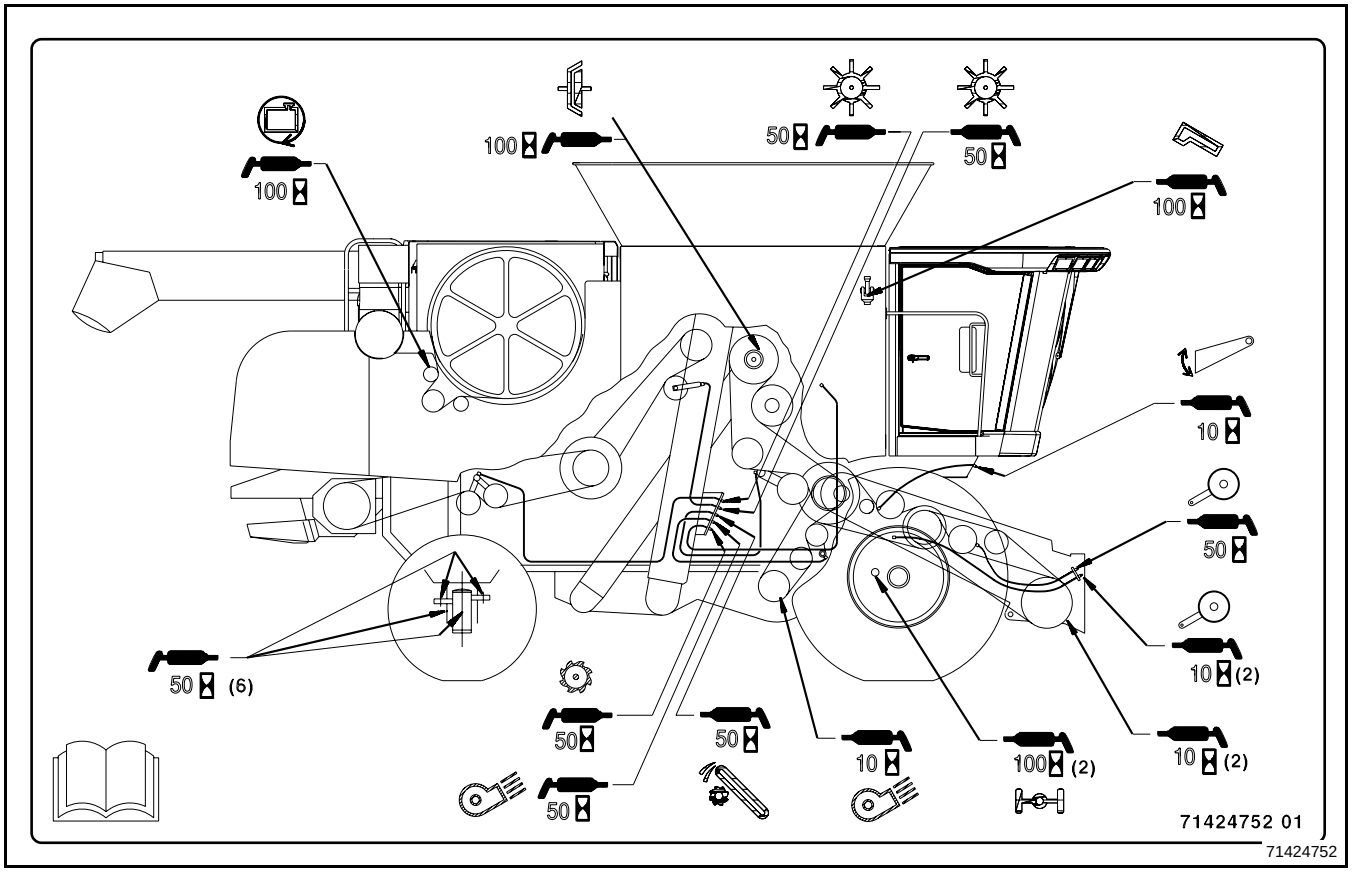

FIG. 39

FIG. 39: The efficient and economical operation of any machine depends on proper lubrication and maintenance at recommended intervals. Follow the instructions in this manual and on the lubrication charts, located on the right and left sides of the machine to assure timely lubrication.

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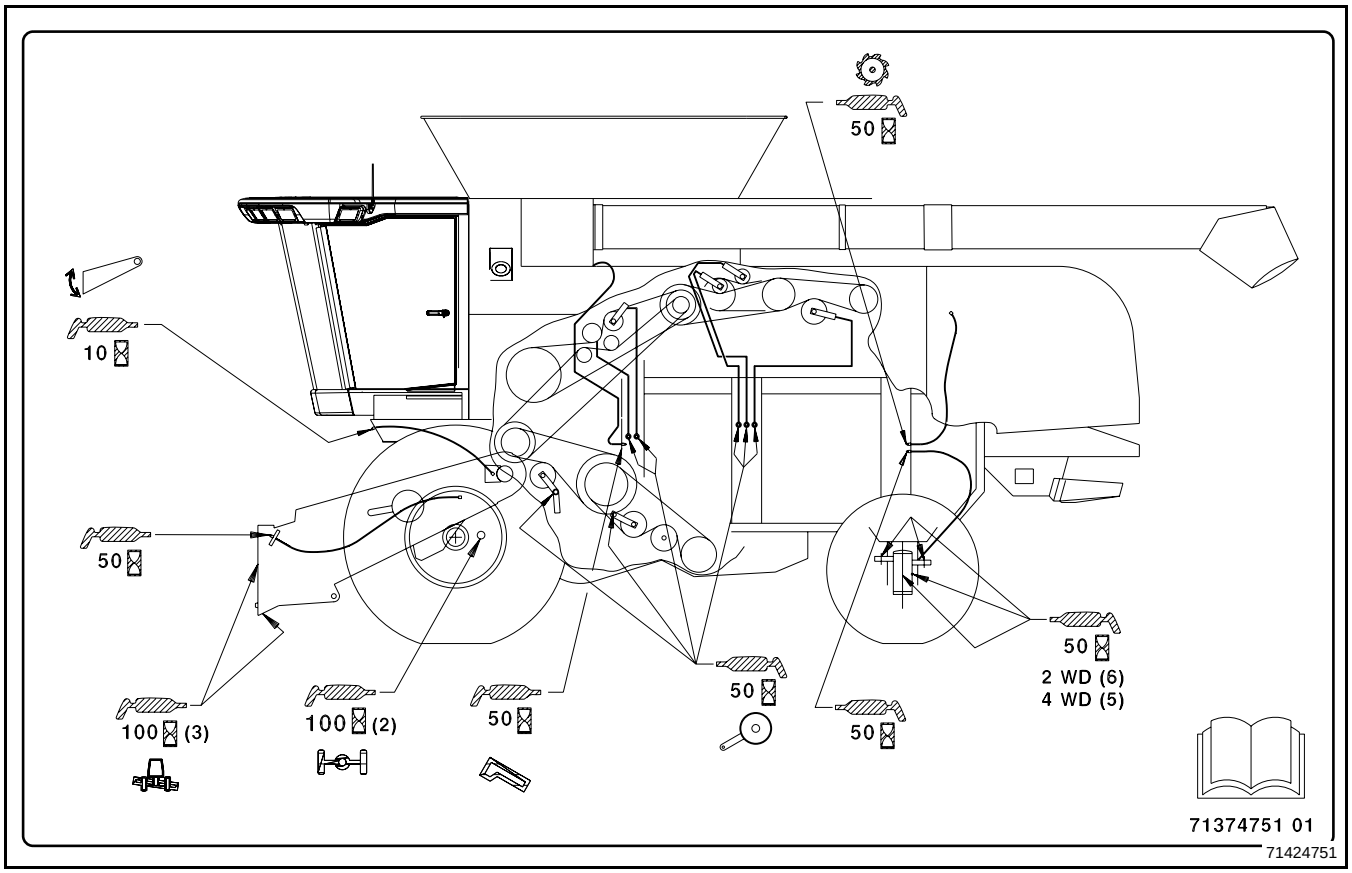

FIG. 40

FIG. 40: The efficient and economical operation of any machine depends on proper lubrication and maintenance at recommended intervals. Follow the instructions in this manual and on the lubrication charts, located on the right and left sides of the machine to assure timely lubrication.

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Front of Combine

FIG. 41: Main drive axle outer coupler (1). The right-hand is shown, the left-hand coupler is on the opposite side. One fitting each coupler (100 hours).

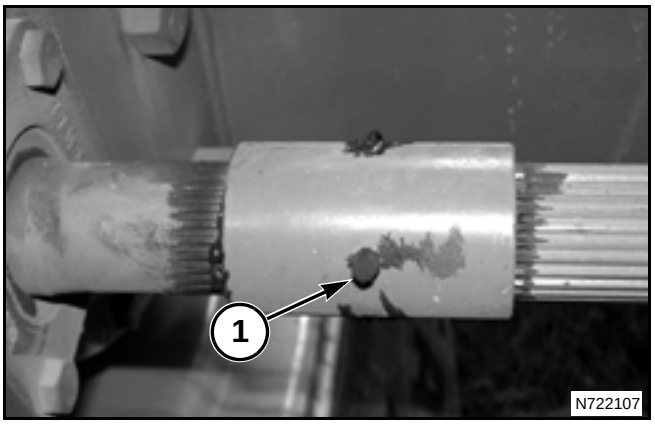

FIG. 41

FIG. 42: Front axle, inner driveshaft couplings.

One fitting (1) each side of transmission (100 hours).

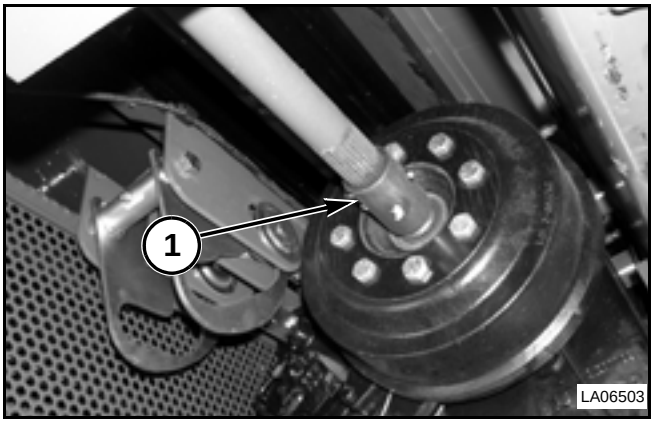

FIG. 42

FIG. 43: Feeder house pivot (1).

Two fittings (1),one each side (10 hours or daily).

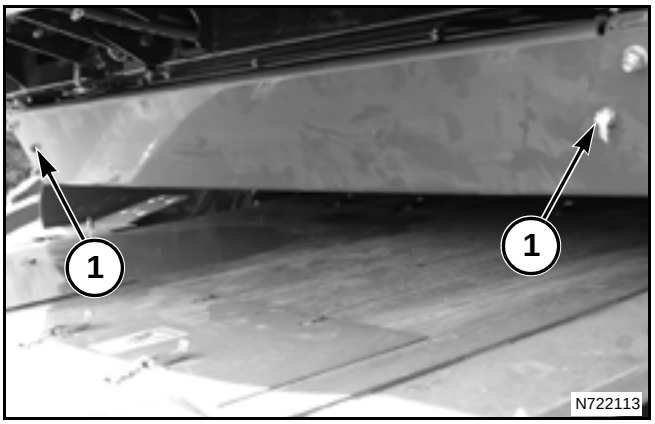

FIG. 43

FIG. 44: Front of feeder house, lateral tilt (if equipped).

Lateral tilt bearings - two fittings (1) (100 hours).

Lateral tilt pivot pin - one fitting (2) (100 hours).

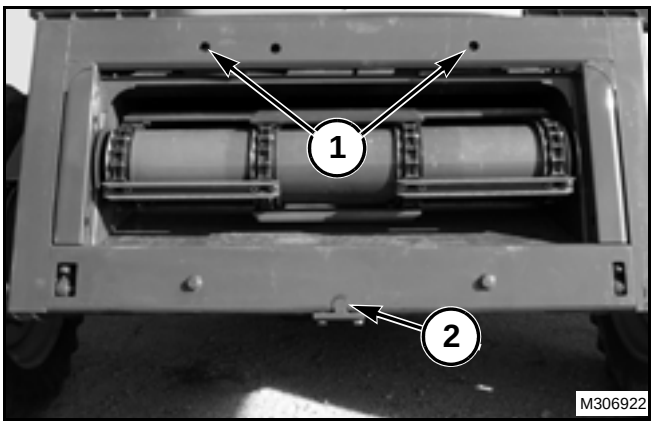

FIG. 44

https://truckmanualshub.com/

FIG. 45: Variable speed corn header drive sheave (if equipped).

Two fittings (1) (10 hours or daily).

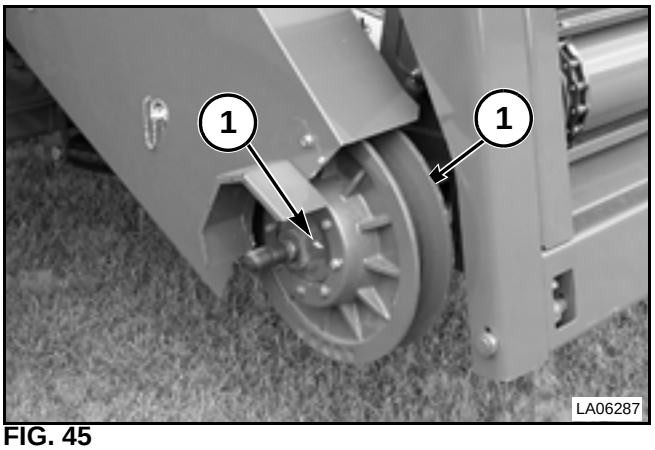

FIG. 45

FIG. 46: Left-hand side of feeder house.

Pivot drive idler hub - one fitting (1) (50 hours or weekly).

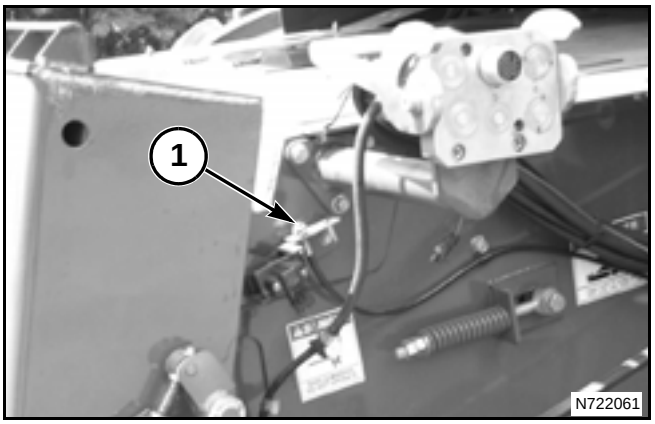

FIG. 46

FIG. 47: Right-hand side of feeder house.

Beater shaft to feeder house jack shaft idler (1) (10 hours or weekly).

Fixed speed header drive idler fitting (2) (50 hours or weekly).

NOTE: The fixed speed driven sheave is lubricated from the factory and does not require any added lubrication.

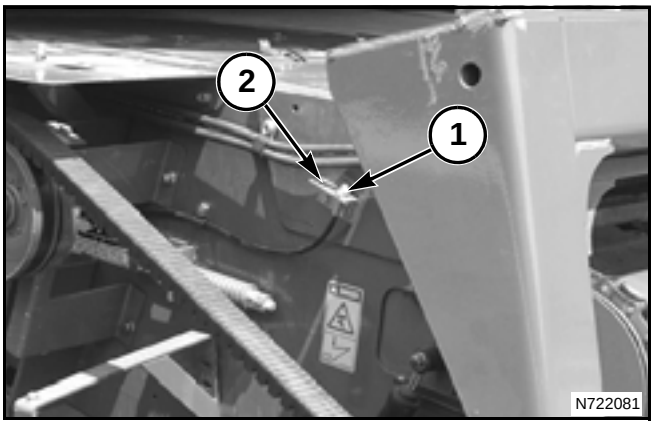

FIG. 47

FIG. 48: Under front of cab, brake pedals.

Two fittings (1) (500 hours).

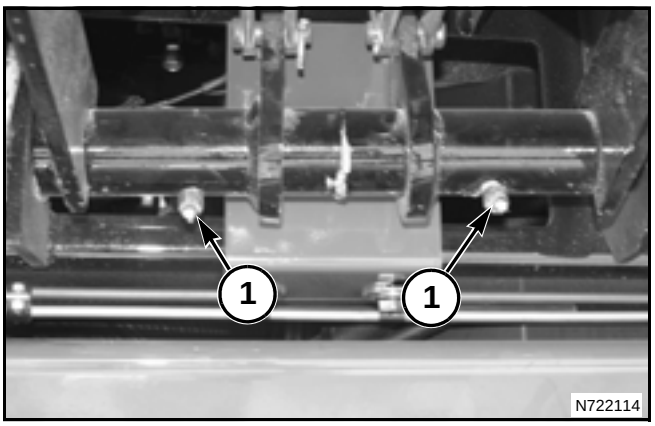

FIG. 48

https://truckmanualshub.com/

Left-hand Side

FIG. 49: Behind front axle.

Pitman Drive Idler Pivot (1) (50 hours or weekly).

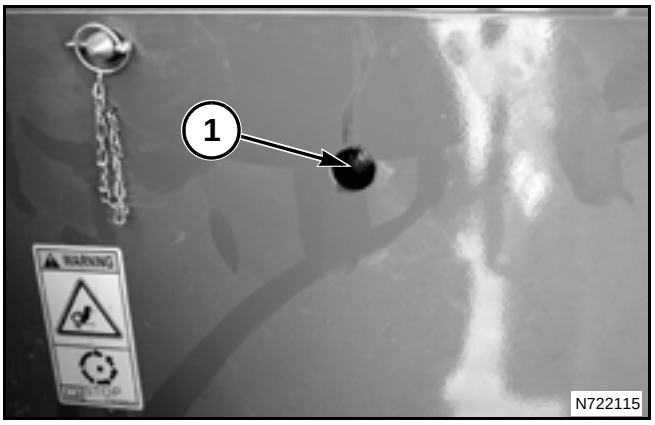

FIG. 49

FIG. 50: Above cleaning fan.

Shaker Shoe Shaft left-hand bearing (1) (500 hours).

Clean Grain Elevator Drive Idler Pivot (2) (50 hours or weekly).

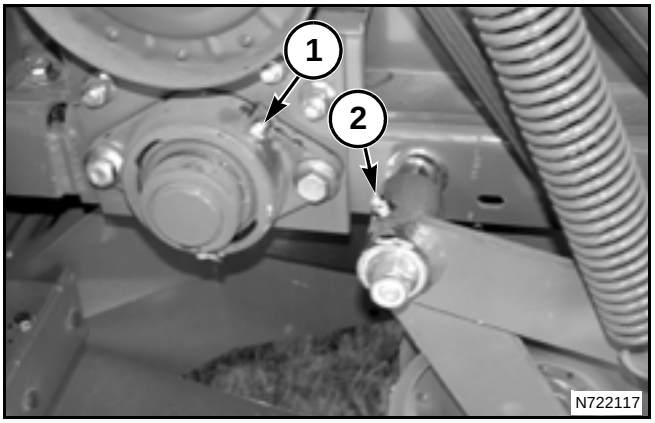

FIG. 50

FIG. 51: Front left side grease bank.

Unloader Drive Idler (1) (50 hours or weekly).

Front Beater Drive Idler (2) (50 hours or weekly).

Auger Pivot Tube (3) (50 hours or weekly).

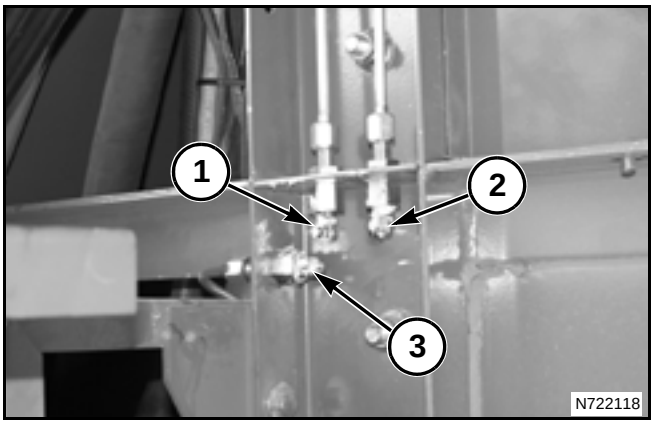

FIG. 51

FIG. 52: Rear left side grease bank.

Main Countershaft Drive Idler (1) (50 hours or weekly).

Rotor/Propulsion Pump Drive Idler (2) (50 hours or weekly).

Propulsion Pump Drive Idler (3) (50 hours or weekly).

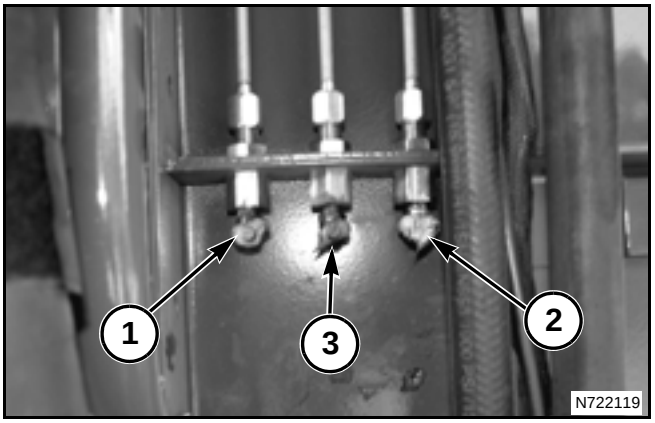

FIG. 52

https://truckmanualshub.com/

FIG. 53: Left-hand side of combine next to the battery tray.

Rotor gear box fitting (1) (50 hours or weekly).

Center Pivot (2) (50 hours or weekly).

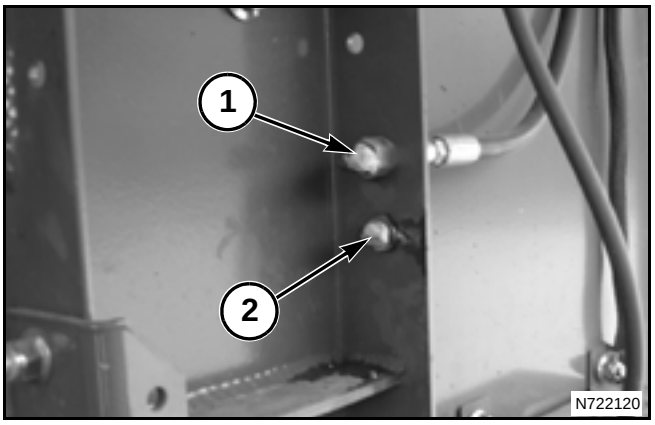

FIG. 53

FIG. 54: Left-hand side of combine next grain tank.

Cross auger shaft (1) (100 hours).

NOTE: If cross auger shear bolt fails, lubricate the cross auger shaft after replacement of the shear bolt.

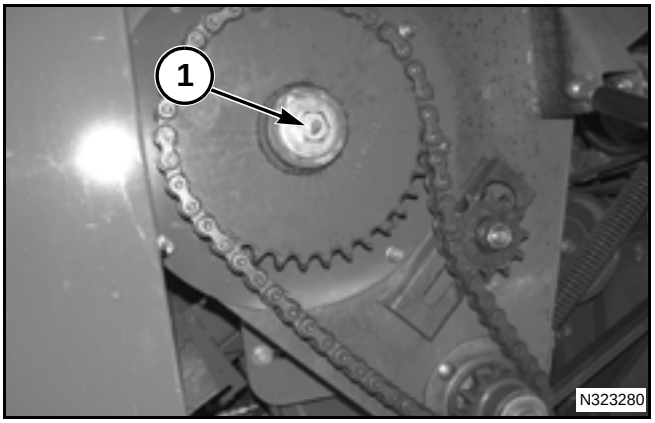

FIG. 54

https://truckmanualshub.com/

Right-hand Side

FIG. 55: Transmission shift linkage (1).

One fitting (500 hours).

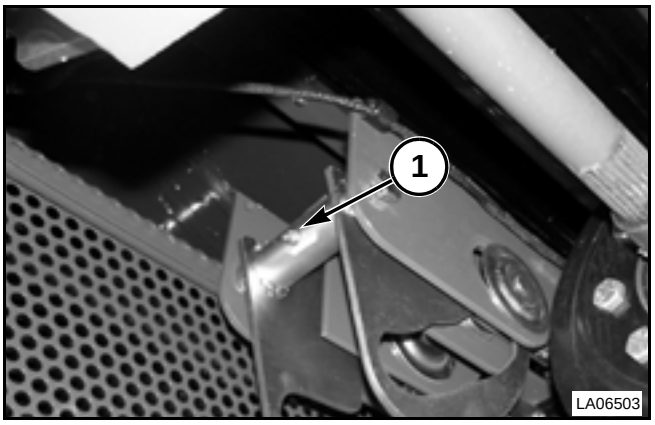

FIG. 55

FIG. 56: Grease bank in front of the clean grain elevator

Straw Chopper/Spreader Secondary Drive Idler Pivot (1) (50 hours or weekly).

Straw Chopper/Spreader Primary Drive Idler Pivot (2) (50 hours or weekly).

Return Elevator Drive Idler Pivot (3) (50 hours or weekly).

Cleaning Fan Drive Idler Pivot (4) (50 hours or weekly).

Front Rotor Bearing (5). Grease sparingly at (50 hours, or weekly).

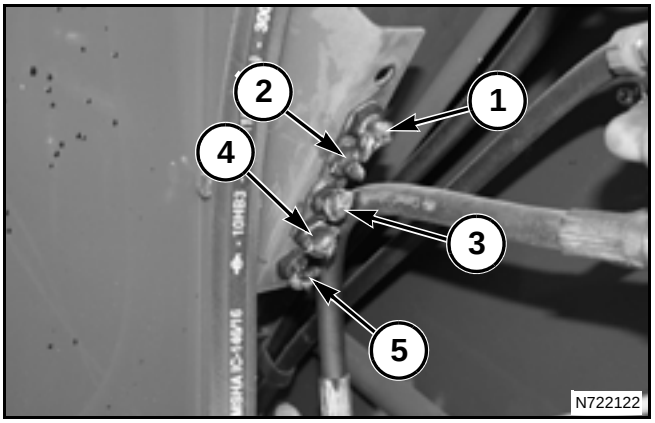

FIG. 56

FIG. 57: Below grain tank.

Return elevator drive slip clutch, two fittings (1) (100 hours).

Return elevator conveyor drive sheave fitting (2) (100 hours).

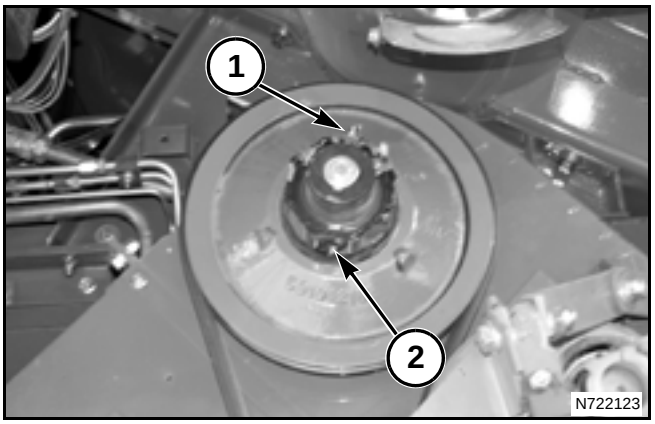

FIG. 57

FIG. 58: Behind cleaning fan.

Shaker Shoe Shaft Right Bearing (1) (500 hours).

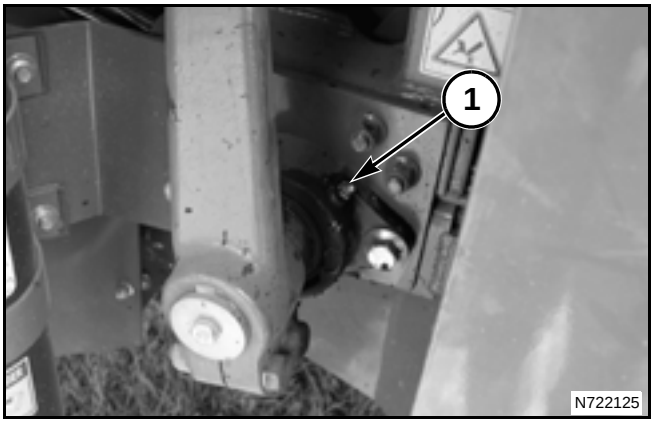

FIG. 58

https://truckmanualshub.com/

FIG. 59: On cleaning fan shaft.

Cleaning Fan Driven Pulley Inner Sliding Sheave Hub (1) (10 hours or daily). Do not get grease on belt.

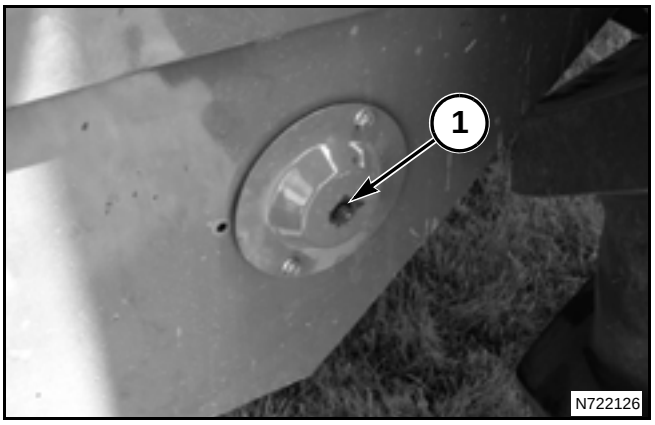

FIG. 59

FIG. 60: Inside of rotary screen door.

Rotary screen drive idler pivot (1) (100 hours).

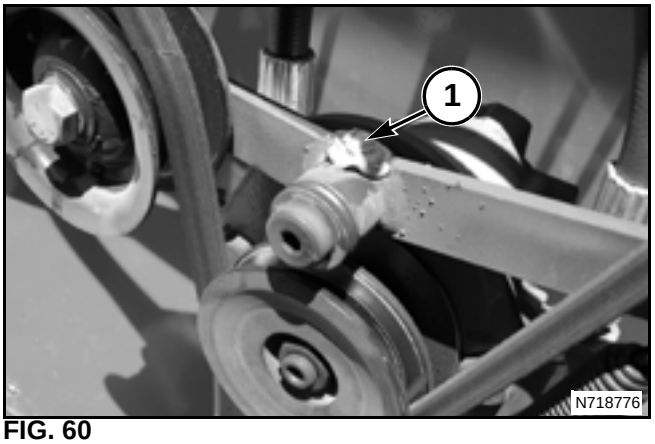

FIG. 60

FIG. 61: Below right side of grain tank to the front.

Grain Tank unloader joint (1) (100 hours)

Cross auger shaft (2) (100 hours)

NOTE: If cross auger shear bolt fails, lubricate the cross auger shaft after replacement of the shear bolt.

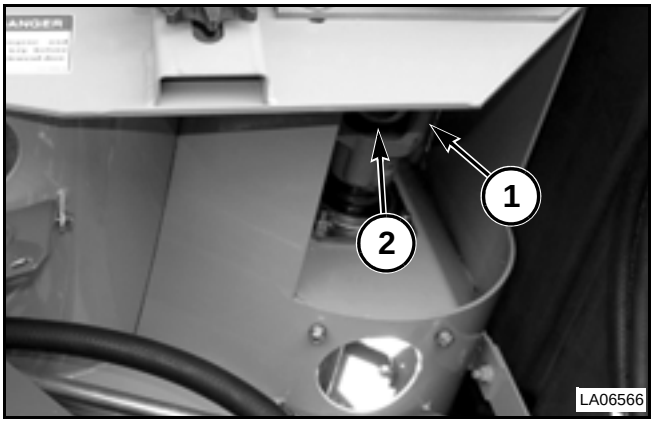

FIG. 61

FIG. 62: Right side of grain tank on the angled auger drive sprocket.

Sprocket bushing (1) (100 hours)

NOTE: If angled auger shear bolt fails, lubricate the angled auger sprocket bushing after replacement of the shear bolt.

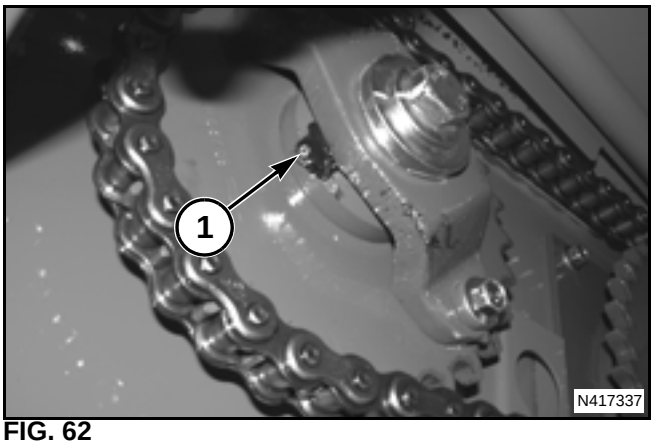

FIG. 62

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Rear Axle

FIG. 63: Standard Adjustable Steering Axle

King Pins (1) two fittings, one each side (50 hours or weekly).

Steering rod (2), two fittings, one each side (50 hours or weekly).

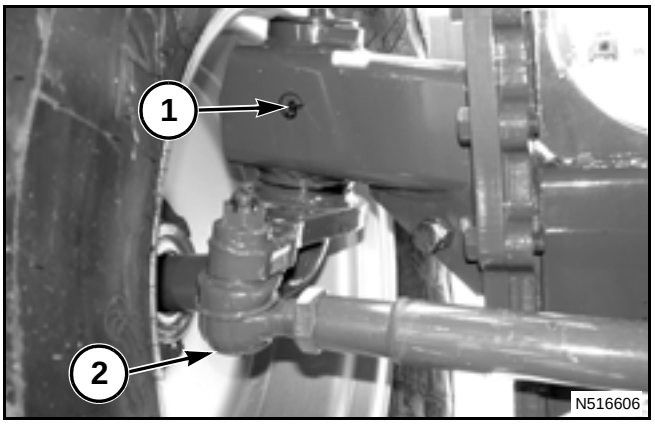

FIG. 63

FIG. 64: Single Speed Rear Wheel Assist Axle

King Pins (1) eight fittings, four each side (50 hours or weekly).

Tie-rod Sockets (2) two fittings, one each side (50 hours or weekly).

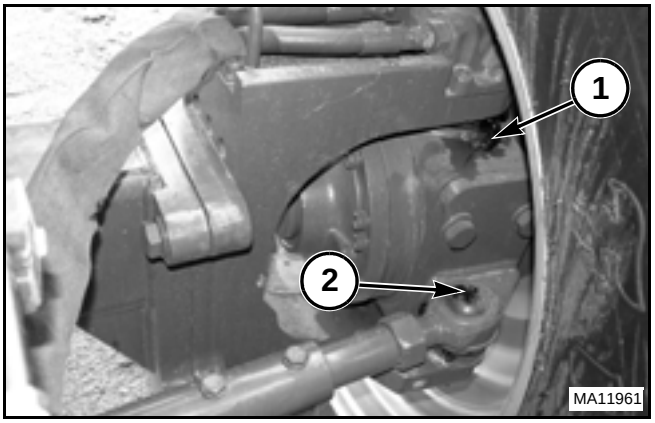

FIG. 64

FIGS. 65–66: Two Speed Rear Wheel Assist Axle

King Pins (1) two fittings on each side, four fittings total (50 hours or weekly).

Steering link (2) two fittings, one each side (50 hours or weekly).

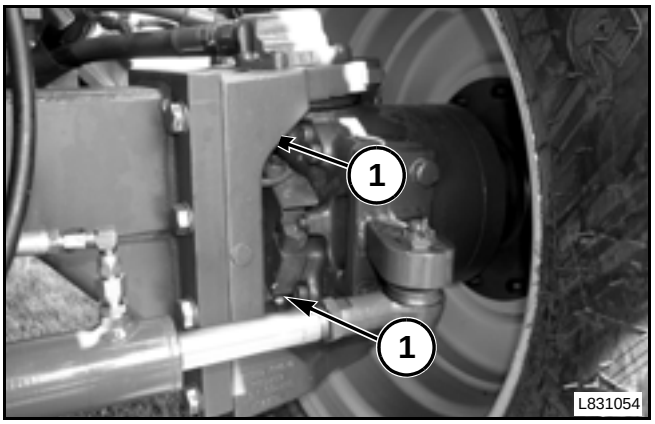

FIG. 65

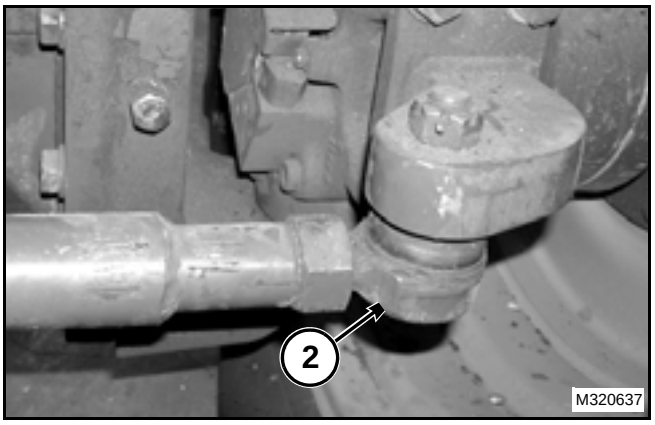

FIG. 66

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AUTO LUBE

FIG. 67: The optional Auto Lube system lubricates certain components automatically.

The following components are not lubricated automatically:

- Variable speed drive (If equipped)
- Cleaning fan fitting
- Pitman arm fitting
- Inner and outer axle couplers
- Transmission linkages
- Clean grain elevator head
- Clean elevator torque limiter
- Return elevator drive slip clutch

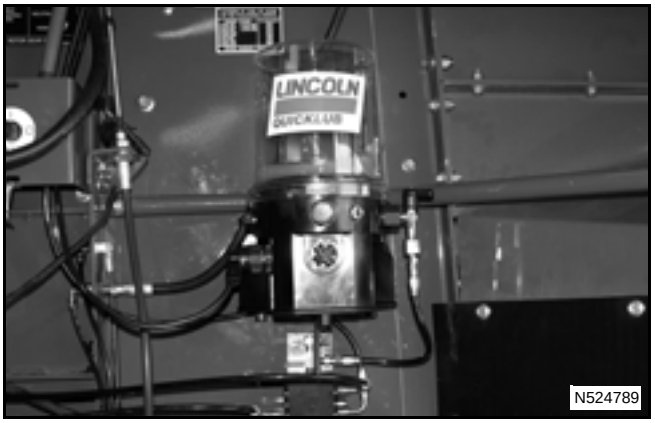

FIG. 67

FIG. 68: The auto lube system consists of a pump unit (1), a primary distribution block (2), and multiple secondary distribution blocks. The primary distribution block is connected to each of the secondary distribution blocks with separate lube lines.

The secondary distribution blocks are connected to each component with lube lines and fittings. The number of lube lines is dependant on the location of the distribution block.

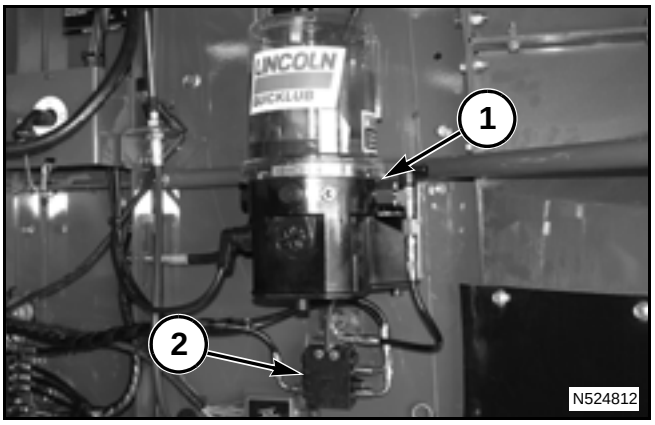

FIG. 68

FIG. 69: The grease reservoir (1) is located above the pump unit. When the pump unit is activated a stir paddle inside the reservoir prevents air pockets from developing in the grease and draws grease towards the pump unit.

Fill the auto lube reservoir periodically as needed with the recommended grease.

Fill the reservoir using the grease fitting (2) located on the pump unit and a hand operated grease pump.

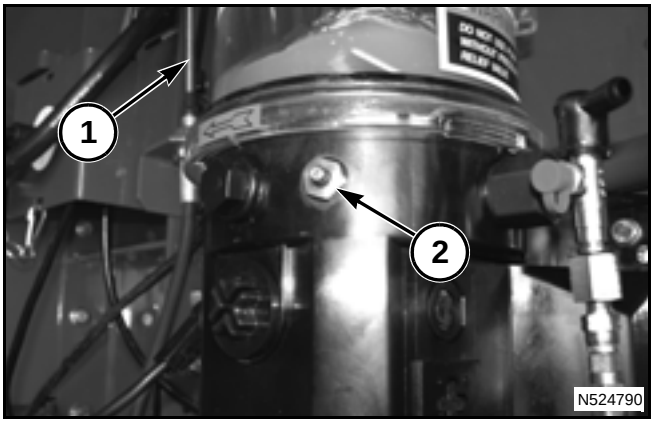

FIG. 69

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Auto Lube Intervals

FIG. 70: The amount of time between the auto lube system lubricates and the amount of time the system lubricates can be adjusted.

To adjust the time remove the sealing plug (1) from the pump housing by turning counterclockwise. Below the sealing plug is the on time rotary switch, the off time rotary switch, and the manual lube switch.

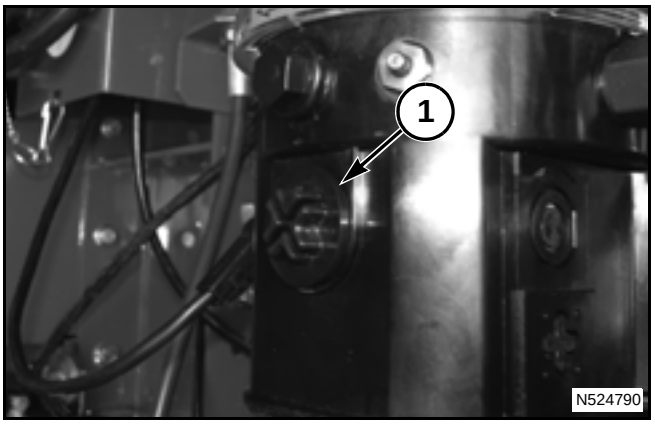

FIG. 70

FIG. 71: The on time rotary switch (1) controls the length of time the auto lube system lubricates components. The on time rotary switch adjusts the on time in two minute increments.

The off time rotary switch (2) controls the length of time between the auto lube system lubricates components. The off time rotary switch adjusts the off time in one hour increments.

The manual lube switch (3) when pressed for two seconds manually lubricates components and resets the timing sequence of the auto lube system.

IMPORTANT: Do not use the zero position located on the on time or off time rotary switches.

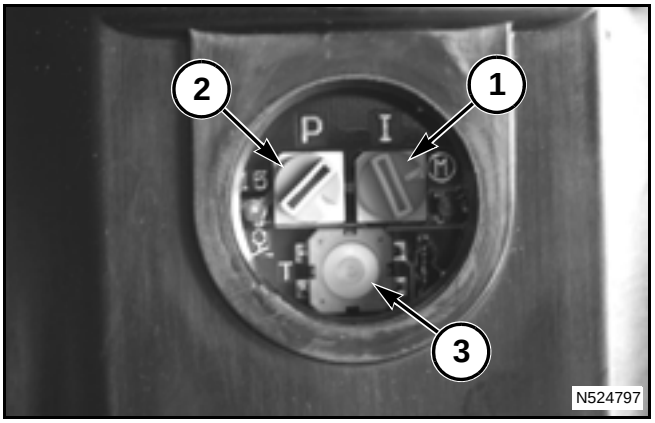

FIG. 71

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FIG. 72: To adjust the times, rotate either of the rotary switches (1) until the notch in the switch is over the desired time. The recommended settings for the auto lube system is two minutes of on time every 6 hours. Use the following tables to adjust the times.

After the desired intervals are set, install the sealing plug in the pump housing.

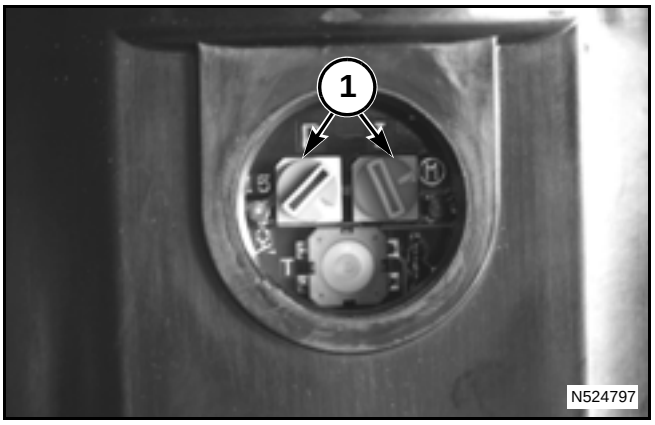

FIG. 72

Auto Lube Interval Settings Table

Off Time Rotary Switch Setting	Interval Between Lube Cycles	On Time Rotary Switch Setting	Pump will run for:
0	will not run	0	will not run
1	1 hour	1	2 minutes
2	2 hours	2*	4 minutes
3	3 hours	3	6 minutes
4	4 hours	4	8 minutes
5	5 hours	5	10 minutes
6*	6 hours	6	12 minutes
7	7 hours	7	14 minutes
8	8 hours	8	16 minutes
9	9 hours	9	18 minutes
A	10 hours	A	20 minutes
B	11 hours	B	22 minutes
C	12 hours	C	24 minutes
D	13 hours	D	26 minutes
E	14 hours	E	28 minutes
F	15 hours	F	30 minutes

***** Recommended Setting

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Auto Lube Diagnosis

FIG. 73: To check for proper operation of the auto lube system, check for movement of the plunger (1) in each of the distribution blocks (2) of the auto lube system. The plunger will slowly move in and out with each pump of the auto lube system.

If the plunger is not moving, check for broken or disconnected line between the main distribution block and the distribution block in question or air in the lube lines.

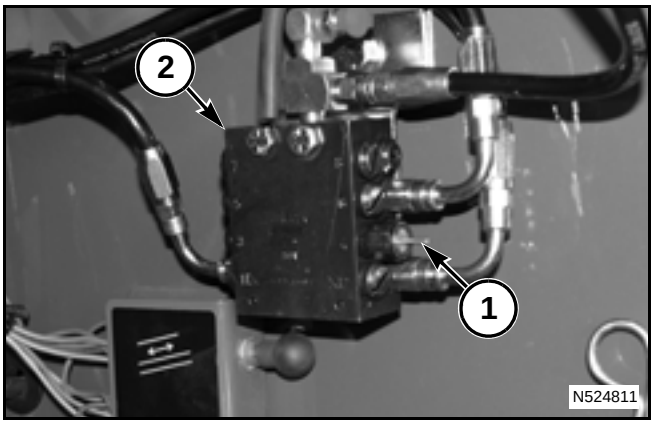

FIG. 73

FIG. 74: When the combine is running, the battery LED (1) under the sealing plug must be illuminated for the auto lube to operate. If the LED is not on then the system is not receiving battery voltage.

The motor LED (2) will light when the auto lube pump is activated. If the LED is on and the pump is not operating then there is an internal electrical failure inside the system pump.

Contact your dealer for repair.

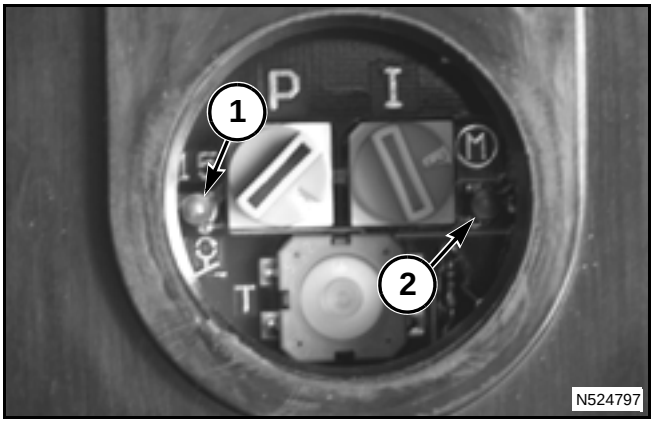

FIG. 74

FIG. 75: In the event of a pump failure, each distribution block is equipped with a grease fitting (1) to manually lubricate components.

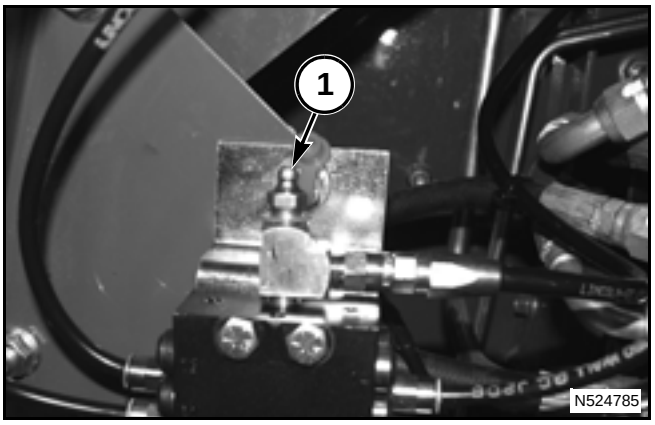

FIG. 75

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ENGINE

WARNING: The engine and surrounding parts will be hot enough to cause burns if the engine has been run recently. Allow enough time for the engine and surrounding parts to cool prior to inspecting or servicing the engine.

IMPORTANT: The engine parts are of metric dimensions. Be sure that hardware from the engine is replaced in the proper locations.

When replacing hardware, always use hardware of the same measurements and strength. Hardware sizes or threads that are not correct can result in engine damage.

Type of Engine Oil

Lubricating oils must meet the demanding standards for a turbocharged after cooled engine. The use of quality lubricating oils along with timely oil and filter changes will maintain engine durability and performance standards.

Only use oil to American Petroleum Institute (API) performance classification of CI4.

IMPORTANT: Do not use an oil with an API performance classification lower than CI4.

A limit of 1% by weight sulfated ash content is recommended to control oil consumption and valve/piston deposits. Sulfated ash content must never exceed 1.85% by weight.

IMPORTANT: Non-detergent or straight mineral type motor oils must not be used.

Viscosity

FIG. 76: Use a multi-viscosity 15W-40 heavy-duty engine oil under most harvesting conditions. 10W-30 low viscosity oil may be used to improve starting and provide startup lubrication at ambient temperatures below -5 degrees C (23 degrees F). Continued use of low viscosity oils can decrease engine life due to wear.

Check engine oil level after every 10 hours of operation.

(A) - SAE 10W-30

(B) - SAE 15W-40

(C) - Ambient Air Temperature

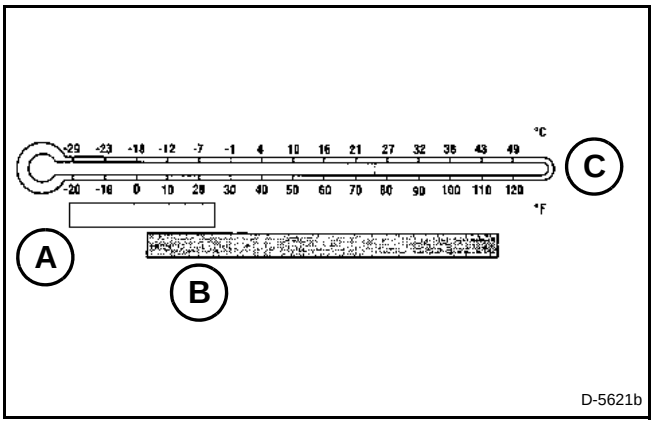

FIG. 76

Oil Additives

Quality oils contain the necessary additives to provide adequate lubrication and long engine life. The use of performance additives is not recommended.

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Checking Oil Level

FIG. 77: The dipstick (1) is located next to the engine oil filter (2).

With the combine sitting on level ground, check oil level every 10 hours of operation and replenish if necessary to maintain the correct level on the dipstick (1).

Check oil level before starting engine. If engine has been in operation, allow sufficient time for oil to drain into pan before checking oil level.

NOTE: Insert dipstick securely.

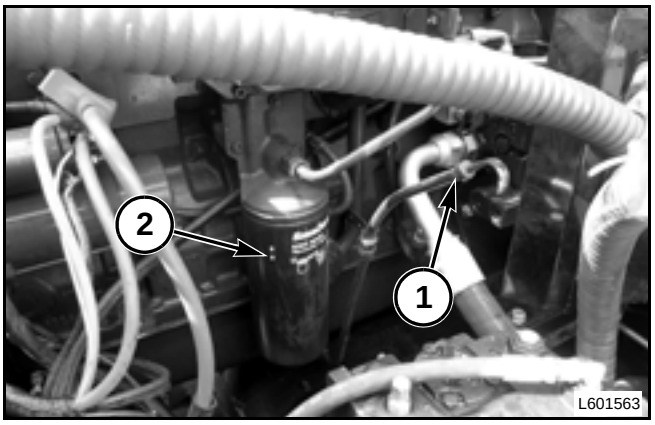

FIG. 77

Changing Engine Oil and Filters

The engine oil and both filters must be changed after the first 50 hours of operation, then every 250 hours. If the combine operates under heavy loads and extremely dusty conditions, then the oil and filters must be changed at 125 hours. Always replace both the element filter and centrifugal filter during every oil change.

FIG. 78: Engine oil drain hose (1) is located at the left-hand rear of combine just in front of the rear axle.

While engine is warm, remove drain hose plug and drain crankcase.

Replace drain hose plug.

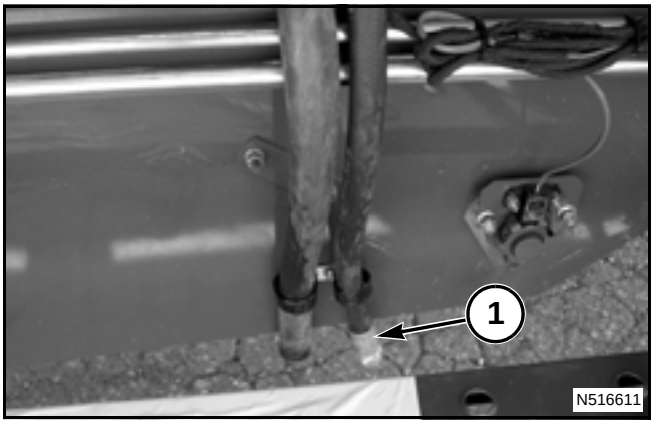

FIG. 78

FIG. 79: Replace the centrifugal filter canister located in the centrifugal filter housing (1). The centrifugal filter housing is located on the forward side of the engine, next to the fuel filters (2).

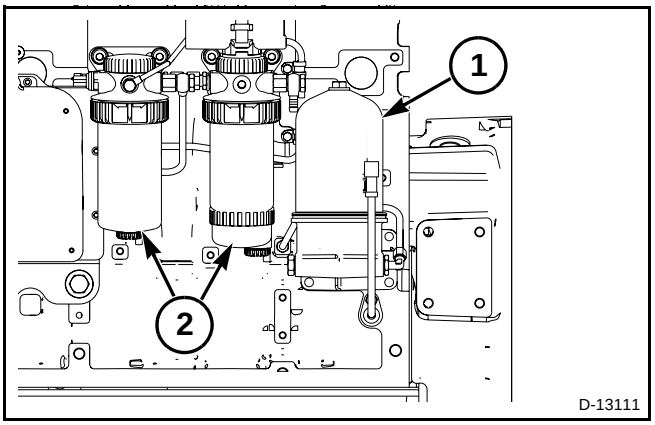

FIG. 79

https://truckmanualshub.com/

FIG. 80: Remove the centrifugal filter (1) cover by loosening the retainer on top of the cover.

Remove the filter canister (2) and the seal ring (3) from the centrifugal filter head (4).

Using clean engine lubricating oil, lightly oil the seal ring and install the ring on the filter head.

Install new filter canister on the filter head.

Install the centrifugal cover on the filter head.

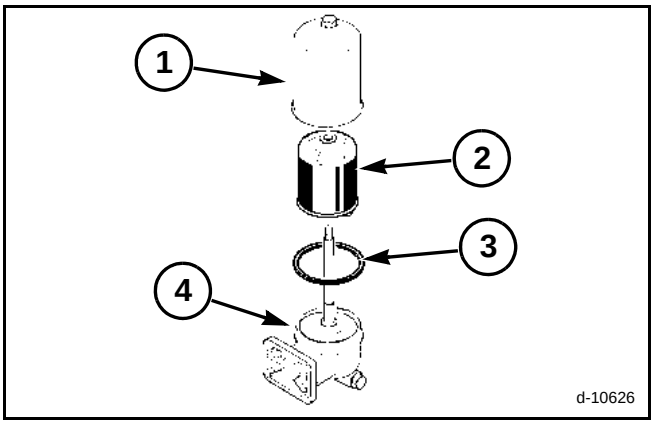

FIG. 80

FIG. 81: Clean around filter head (1), unscrew filter element (2) and discard. Check that threaded adapter is secure in filter head and clean gasket surface in head.

Prime the new element with clean engine lubricating oil by pouring oil slowly into central threaded orifice, allowing time for oil to fill bowl through filter element.

Using clean engine lubricating oil, lightly oil top seal of replacement element.

Screw replacement element into filter head until element seal just touches head and then tighten by hand one half turn.

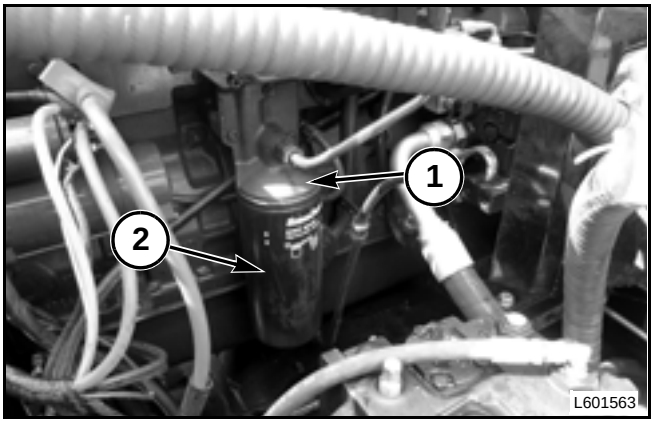

FIG. 81

FIG. 82: Remove the filler cap (1) and fill crankcase through filler cap hole in valve cover to correct level with recommended oil.

Run engine and check for leaks.

IMPORTANT: Do not run engine above idling speed until oil pressure has built up.

Check oil level after running engine and add as required to bring oil to correct level.

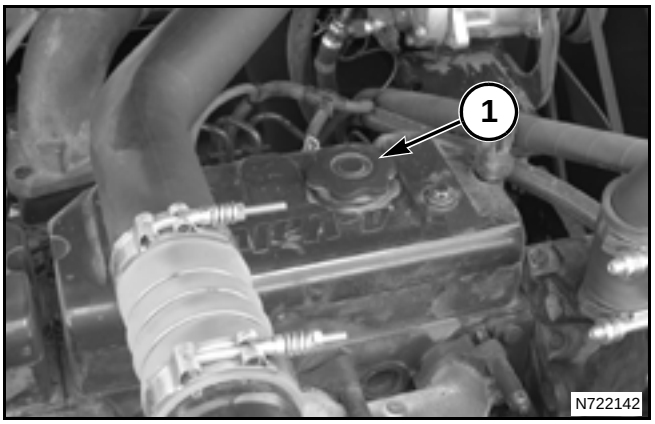

FIG. 82

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ROTOR GEARBOX

FIG. 83: The rotor gearbox (1) is located at the rear of the combine.

Every 500 hours or annually, change gearbox oil.

Drain oil using the drain plug (2).

Check oil level using plug (3).

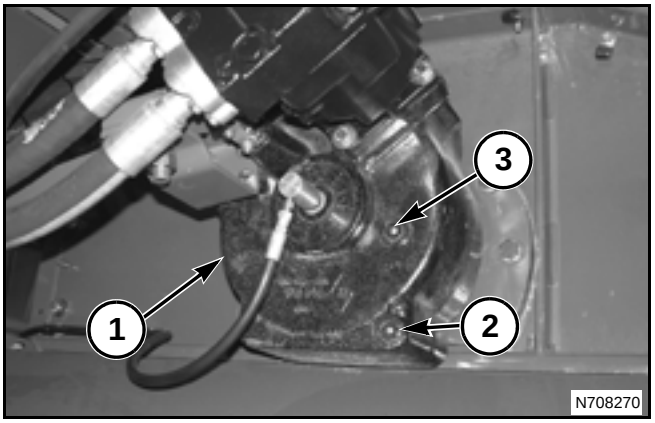

FIG. 83

TRANSMISSION

Checking and Changing Lubricant

FIG. 84: Check oil level in the transmission housing and check breather every 250 hours. Clean the dirt from around the oil fill plug (1) and remove the plug to check the oil level. The level must be maintained up to the bottom of the oil fill plug hole.

The transmission has a screen and a magnet to trap metal particles. Drain transmission, disassemble and clean screen and magnet every 500 hours or once each season.

Remove the bottom screen and position out of the way. Loosen both ends of the oil suction line (2) and remove from the drain plug (3). Remove the bolt and retaining clip (4) and then pull the drain plug and screen straight out.

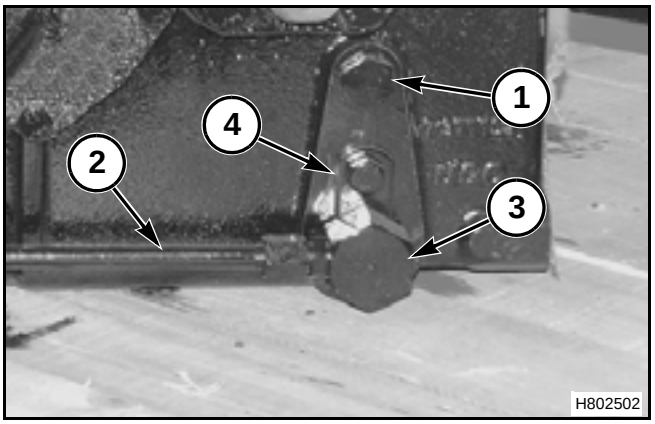

FIG. 84

FIG. 85: Remove the screen (1) from the drain plug (2) and remove the magnet (3) from inside the drain plug. Thoroughly clean the screen, magnet, and inside of the drain plug with a suitable solvent. Dry with compressed air.

Inspect the O-ring and the screen for damage and replace if necessary.

Install the magnet in the drain plug. Install the screen in the drain plug.

Coat the O-ring and smooth sealing surface of the drain plug with transmission fluid and then carefully insert into the transmission drain hole.

NOTE: To prevent damaging the O-ring, hold the retaining clip in the slot in the drain plug to keep from pushing the plug and screen assembly to far into the transmission.

Install the bolt in the retaining clip and tighten. Install the oil suction line. Fill the transmission until the level is up to the fill plug hole. Install the fill plug and check for oil leaks.

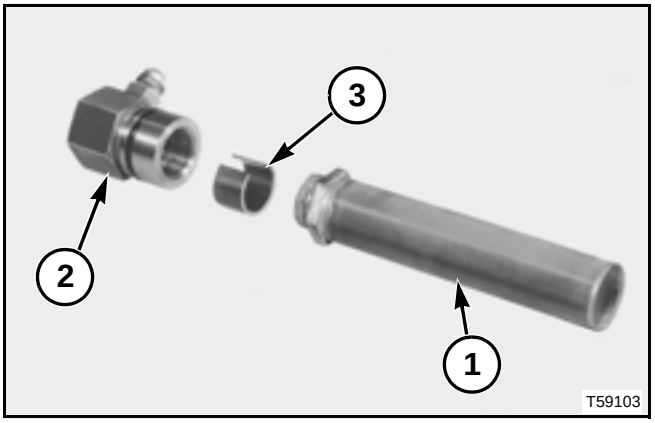

FIG. 85

https://truckmanualshub.com/

BRAKES

Check fluid level every 500 hours or once a season and fill as necessary.

Master Cylinder Oil Reservoir

FIG. 86: Check fluid level every 500 hours or once a season and fill as necessary.

The master cylinder oil reservoir (1) is located behind the washer fluid reservoir (2), behind on access door on the right-hand cab platform.

Before adjusting the brake engagement, check the level of fluid in reservoir, and fill as necessary.

NOTE: If brake pedal action is spongy when pedal is applied, bleed the brake line(s).

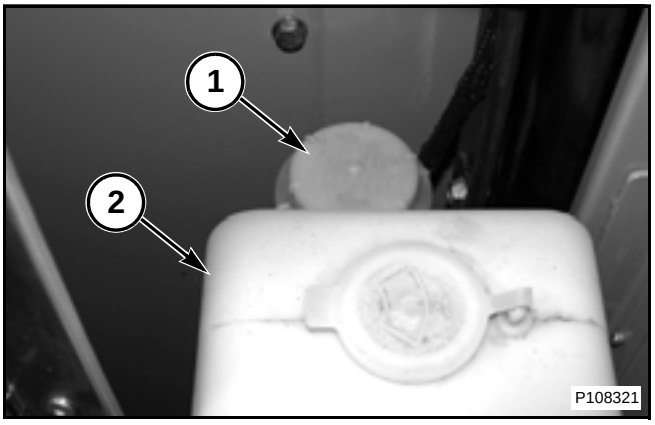

FIG. 86

Bleeding Brake System

Operating the brakes with a low fluid level in the reservoir allows air to enter the lines causing pedal action to become spongy. Bleed the brakes if this condition occurs.

NOTE: While completing the following procedures, the brake fluid level must be maintained in the master cylinder

FIG. 87: Open the bleed screw (1) on the left-hand side of the master cylinder while pushing both pedals down. Close the screw on the up stroke. Repeat this procedure for both brake pedals until a stream of brake fluid is released from the brake bleed screw that does not contain any air bubbles.

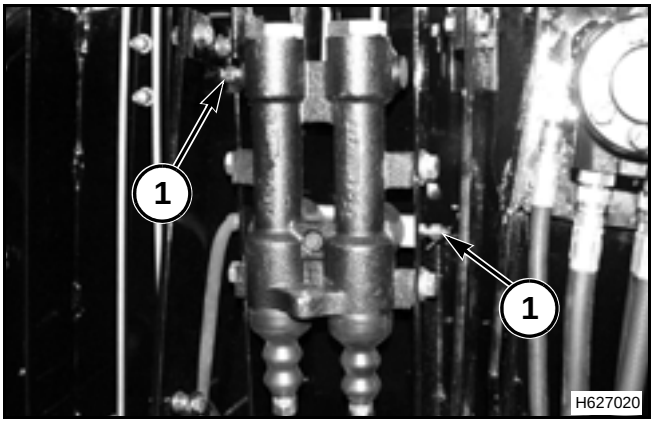

FIG. 87

FIG. 88: Lock the brake pedals together and rapidly pump the brake pedals several times. Then, hold the pedals in a depressed (down) position while a second person opens the bleed screw (1) on the left-hand wheel cylinder allowing fluid and air to escape. As soon as the pedals have reached the full down position, immediately close the bleed screw before allowing the brake pedals to return to the up position.

Repeat until a solid stream of brake fluid is released from the bleed screw that does not contain any air bubbles.

Repeat this procedure for right-hand brake caliper.

Brake pedal action must be firm, not spongy. Repeat above procedures if necessary.

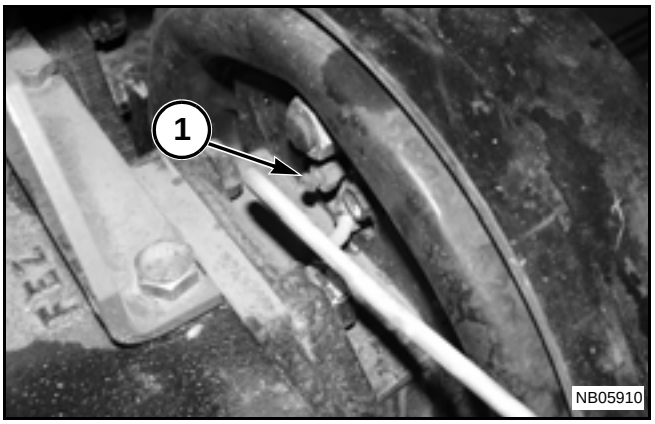

FIG. 88

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Check and add brake fluid to reservoir.

WARNING: Incomplete bleeding and allowing air to remain in the system will lead to poor braking performance and possible loss of braking capability.

FINAL DRIVE

Combines are equipped with a heavy-duty front axle. The heavy-duty final drives use a bull gear and pinion.

FIG. 89: Maintain oil level within 12.0 mm (0.5 in) of the top edge of the cap (1) in both final drive housings.

Check the oil level and breather every 250 hours of operation.

Change the oil every 500 hours or once a season.

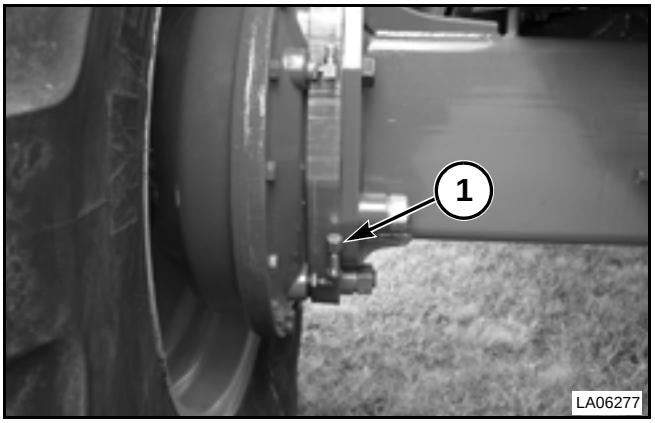

FIG. 89

https://truckmanualshub.com/

TIRES AND WHEELS

Tire Pressure

Tire pressures for both front and rear tires must be checked every 50 hours of operation or weekly. See the Specifications section for the correct tire pressure.

NOTE: The combine is shipped from the factory with tires over inflated. Pressures must be checked and adjusted before operating the combine in the field.

NOTE: Combines can be shipped with special 16.9 x 34 shipping tires and wheels for clearance requirements. Do not install the header, or move the base combine on these shipping tires more than necessary to unload the combine from the truck.

After unloaded, replace the shipping tires and wheels with the operating tires and wheel ordered with the combine.

NOTE: The above combinations are based on correct tire loadings as listed in ASAE Standard S385-4.

Dual Tires

If Dual Tires are used, the following conditions must be met:

- Base tires must be mounted in 3.05 m (120 in) tread position. Dual tire tread must not exceed 4.57 m (180 in).
- Base tires must carry the correct operating pressure per the tire pressure chart in the Specifications section.

NOTE: A special ladder deck extension will be required if duals are installed.

Maintenance of Tires

To reduce amount of wear, and extend the life of the tires, the correct pressures must be maintained and checked at regular intervals.

When combine is going to be out of use for an extended period, or is being stored, block both sides of axles to take weight off tires.

If oils or solvents are spilled on a tire, clean immediately. Never park or stop the combine with tires standing in an area of wet oil.

If possible, park combine where tires will be shaded from direct sun. This is important if combine is parked for extended periods, or is being stored.

If mounting tubeless tires, make sure the flange and bead area of the tire and rim are free from dirt, rust or old rubber. The rim must be smooth and clean. Any areas of rust must be cleaned and painted with a rust inhibiting type paint.

WARNING: Failure to follow correct procedures when mounting a tire on a wheel or rim can cause tire to explode which can result in serious injury or death. Do not mount a tire unless you have the proper equipment and experience to complete the job. A qualified tire repair service dealer has the proper equipment.

Never exceed 241 kPa (35 psi) or the maximum inflation pressures specified by tire manufacturers for mounting tires. Inflation beyond this maximum pressure can break the bead, or even the rim, with dangerous explosive force. If both beads are not seated when maximum recommended pressure is reached, deflate, reposition tire, lubricate bead and inflate tire.

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Removing Wheel from Combine

WARNING: Before removing the wheel from the combine stop the engine, set the parking brake, remove the ignition key and take the ignition key with you.

Do not remove or install tires without the proper tools. Attempting removal or installation without the proper tools can result in serious injury.

Removal of the tire from the rim and mounting the tire on the rim must be done by a trained tire technician.

FIG. 90: When removing the wheel from the combine, park the combine on level ground with the parking brake engaged. Installed wheel chocks (1) in front of and behind the opposite wheel.

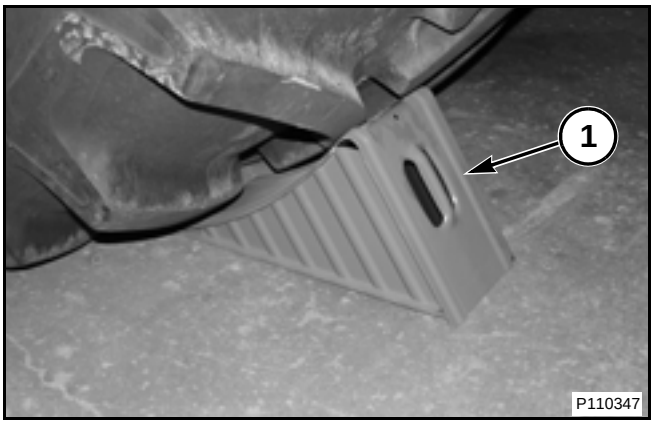

FIG. 90

FIG. 91: Place a jack under the same side of the axle as the tire that is to be removed.

WARNING: When lifting the combine, use a jack able to support the weight of the combine.

Raise the combine so the tire is off of the ground.

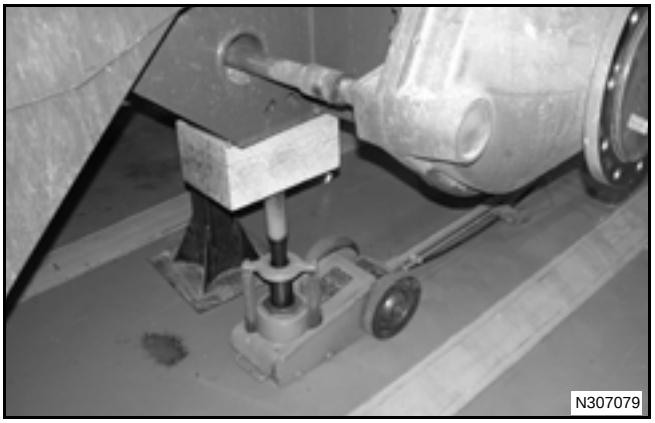

FIG. 91

FIG. 92: Place a suitable jack stand (1) below the axle and adjust the jack stand to the axle. Lower the combine until the weight of the combine is supported by the jack stand.

NOTE: Be sure the tire is still off of the ground.

WARNING: When supporting the combine, use solid blocks or steel supports. Do not use concrete blocks to support combine.

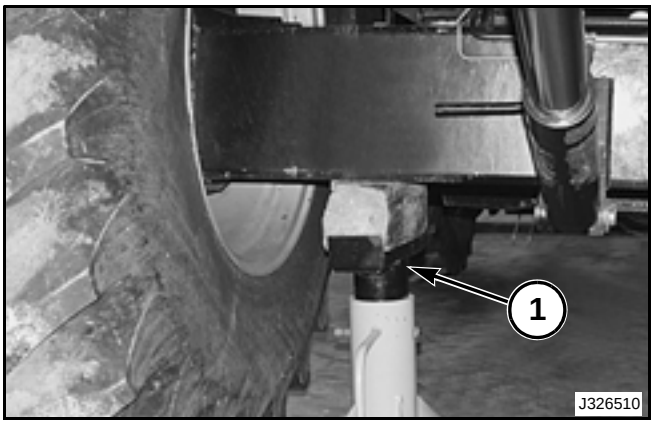

FIG. 92

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FIG. 93: Secure the tire to be removed using a tire dolly or hoist. Remove the nuts or capscrews securing the wheel to the axle or final drive.

WARNING: Do not hit the tire or rim with a hammer. The rapid release of tire pressure can result in serious injury.

Remove the wheel and tire from the combine using the wheel dolly or hoist.

Do not unseat beads of an inflated tire. Deflate tire completely before servicing.

Do not inflate tire that has been run flat or seriously under inflated without removing and checking for tire and rim damage.

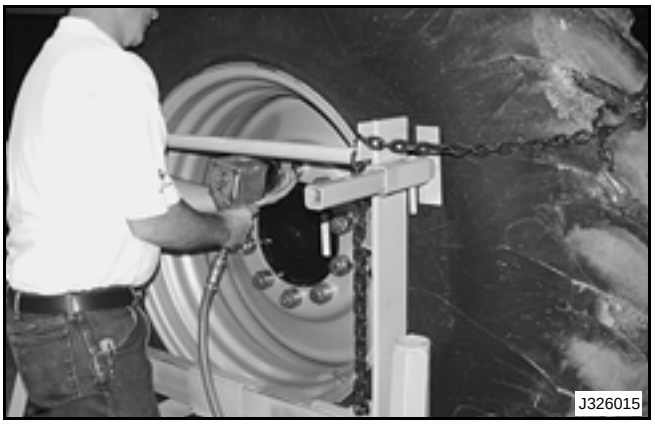

FIG. 93

Wheel Installation

FIG. 94: The discs are offset in the wheel rim.

To set front wheels in the OUT field position, mount the wheel with the larger offset to outside.

To set front wheels in the IN field position, mount the wheel with the smaller offset to the outside.

See the Specifications section for the correct wheel lug nut and bolt torque.

After operating for one hour, check the torque on all lug nuts and bolts. Check again at ten hours of operation, making sure the nuts and bolts have held the above torque settings. After the first ten hours, check the lug nuts and bolts every 100 hours of operation.

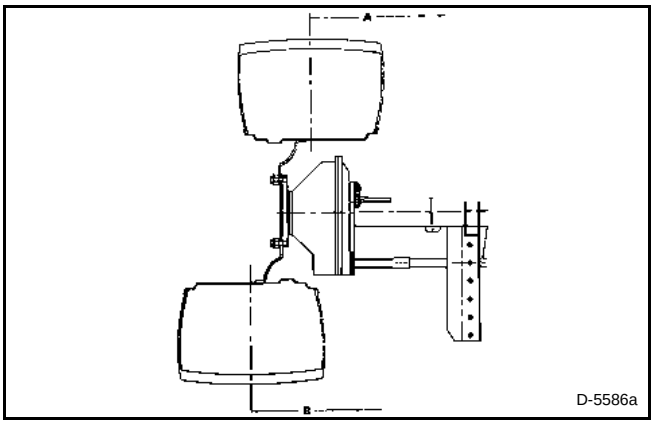

FIG. 94

FIG. 95: When reversing the wheels make sure that there is enough clearance between the valve stem and the final drive housing to prevent the valve stems from being damaged.

If there is not enough clearance, or operating in conditions where the ground is too soft, remove the two plugs that were shipped in the envelope under the instructor seat. Inflate a tire slightly over the normal pressure and remove the valve stem. Quickly insert and tighten the plug (1) instead of the stem. Repeat the procedure on the other wheel.

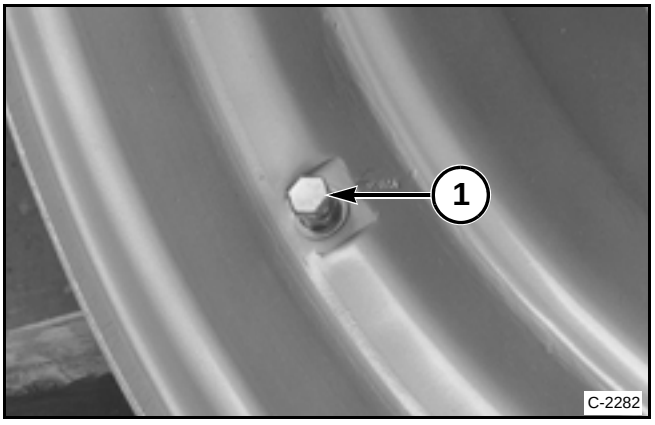

FIG. 95

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Tire Dimensions

Front Wheel Tread (Center to Center of Tire)

Shipping Wheels - 2.74 m (108 in)

Standard (800/65 R32 tires), Operating Position (Wheels IN) - 3.12 m (123 in)

Standard (800/65 R32), Operating Position (Wheels OUT) - 3.76 m (148 in)

NOTE: Combines can be shipped with special 16.9 x 34 shipping tires and wheels for clearance requirements. Do not install the header, or move the base combine on these shipping tires more than necessary to unload the combine from the truck.

Rear Wheel Tread (Center to Center of Tire)

Standard Axle (480 R30), Operating Position (Axle OUT) - 3.20 m (126 in)

WARNING: Always reduce speed when turning and use extreme caution when operating on hillsides.

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DRIVE BELTS

Banded Drive Belt

FIG. 96: A banded drive belt is made of two or more V-belts (of a standard cross section size) banded together at the top with a tie band (1). The seperate V-belts and the tie band are vulcanized together to form a multiple strand banded belt.

The cross section and spacing of the seperate strands are such that the banded belt operates on standard sheaves.

The tie band clears the top of the sheaves so that each belt strand has full wedging capacity in the sheave grooves, just as a single belt. The banded belt operates at the same tension as seperate matched belts on an regular multiple strand V-belt drive.

Most V-belt drives operate without any problem, requiring only regular maintenance. There are times where forces acting on the drive can cause seperate belts to whip, turn over, or come off the sheaves. The banded belt was designed to correct these belt stability problems which are most frequently caused by intermittent or shock loading of the drive.

Banded belts have standard dimensions and cross section sizes and are made to order, with the number of strands being determined by the power needs of the drive. Spacing between the strands of the belt are the same as the Rubber Manufacturers Association (RMA) standard spacing for multiple groove sheaves.

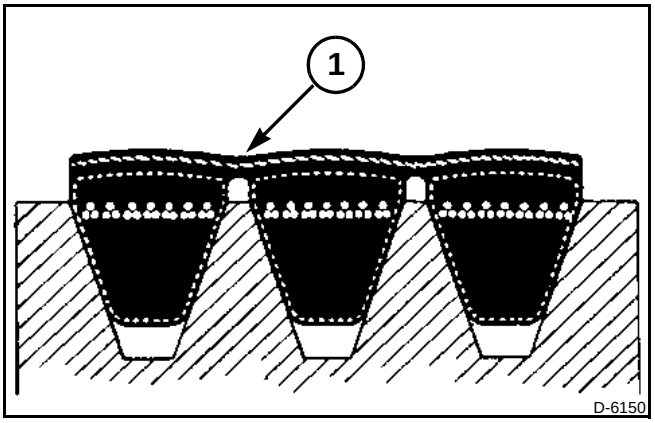

FIG. 96

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Maintenance of Belts

FIG. 97: Cross sections of some of the belts used on the combine are shown.

A drive inspection must be done every one to two weeks.

Check belts frequently for excessive wear, tearing, breaking, increasing, and unraveling.

Belt tensions are controlled with spring loaded idlers on most drives on the combine. Over tightening puts too much strain on the belt and too much loading on the shafts and bearings.

Look and listen for any not normal vibration or sound while watching the drive in operation. A drive kept in good condition will operate smoothly with little noise.

Inspect guards for looseness or damage. Keep all guards free from debris, dust, or grime deposit on either the inside or the outside of the guard. Deposits of material on guards operate as insulation causing drives to run hotter.

Belts that are running hot, running in a hot environment, or from slipping will harden and form cracks from the bottom of the belt up.

An internal temperature increase of 10 degrees C (18 degrees F) can cut belt life in half.

Inspect for oil or grease leaking on the drive. This can indicate over lubricated bearings or a fluid leak. If this material gets on rubber belts, the belts can increase in size and become distorted, causing an early belt failure.

Belts must be replaced if there are signs of cracking, fraying, or not normal wear.

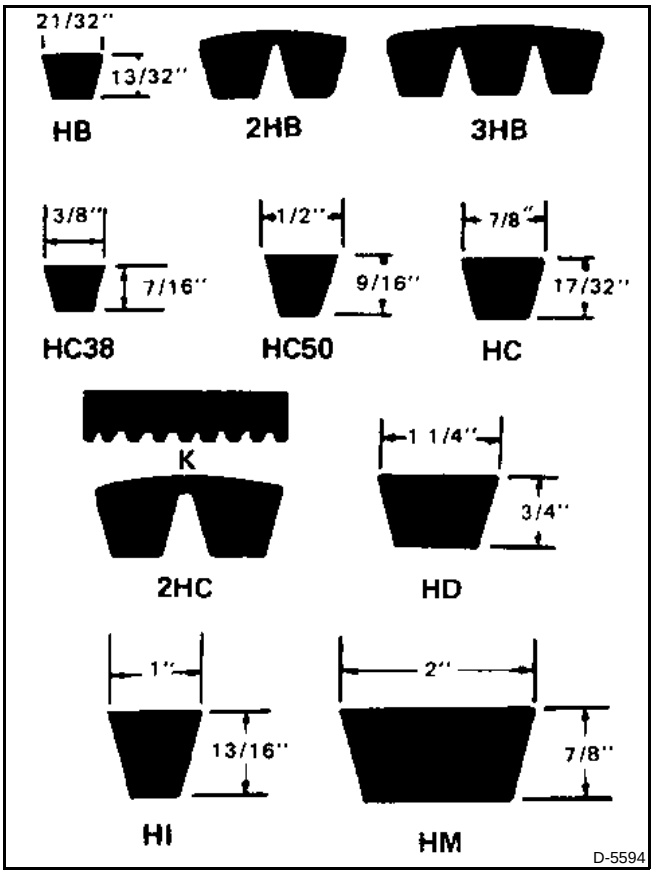

FIG. 97

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Belt Changing Guides

Removal

FIG. 98: Before Removing or Installing any drive belts.

Lower the header to the ground.

Remove the starter key.

Engage the parking brake.

Disconnect the battery at battery switch.

Raise or remove shields or guards and locate the guards away from the drive so that the guards do not cause problems with working on the drive.

Loosen tensioner until the belt is slack and can be removed without prying. Never pry off a belt, as the sheave can be damaged. Prying off belts also adds risk of injury.

Inspect the old belt for any not normal wear. Excessive or not normal wear can indicate problems with the drive or past maintenance procedures. Refer to the Belt Problem and Wear Guide.

Inspect the sheaves for not normal or excessive wear, damage, distortion, and pitting. If surfaces show pitting or excessive wear, the sheave must be replaced.

Check the sheaves for deposits of dirt and dust in the bottom of the grooves. Clean sheaves with a damp cloth. Do not sand or scrape the grooves to remove debris.

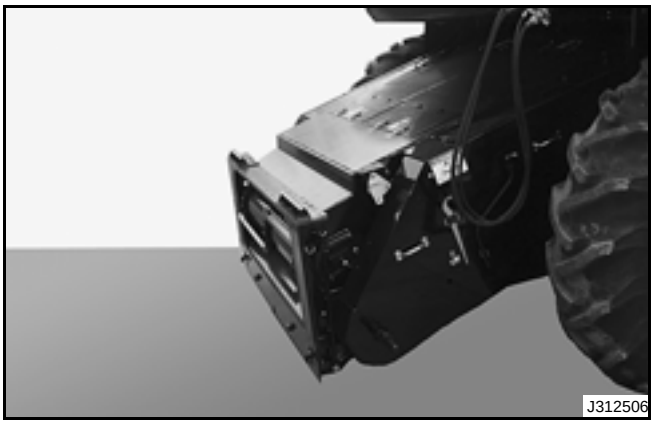

FIG. 98

Installation

Check the sheave alignment. For long belt life the sheaves must be aligned properly.

FIG. 99: Order a new belt by the part number, not by measuring the old belt.

Time must be taken to make sure the selection of the proper size belts for the different sheaves is correct.

(A) Indicates the wrong belt installed.

(B) Indicates the correct belt installed.

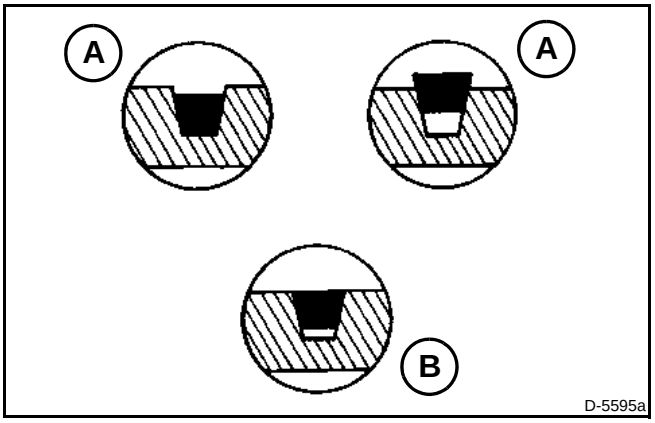

FIG. 99

https://truckmanualshub.com/

FIG. 100: Replace all belts on multiple belt drives. Never replace a single belt or part of a multiple belt drive. If a new belt is used with old belts, the load will not be divided evenly between the belts. Mixing new and old belts can lead to early belt failure and not even sheave wear.

(A) Indicates a new belt position.

(B) Indicates a used belt position.

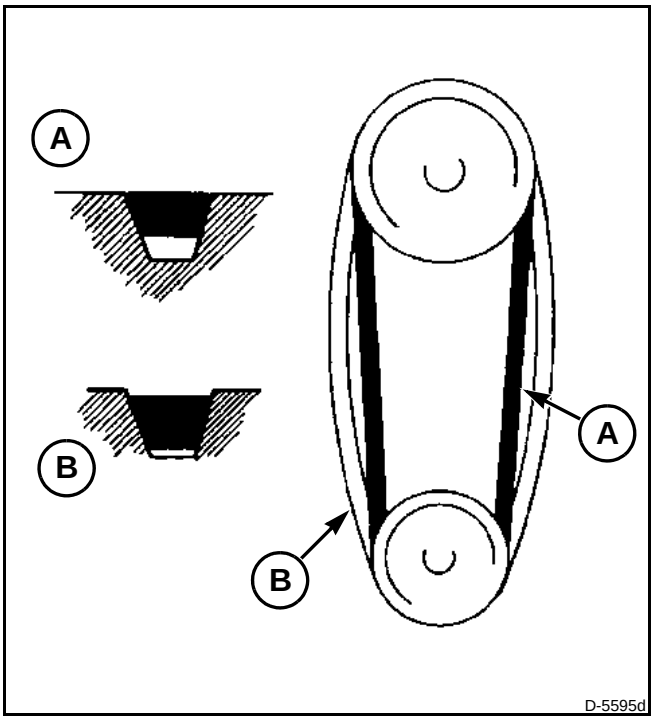

FIG. 100

FIG. 101: When replacing a belt, never force a belt over the rim of a pulley. Do not pry or use force to install the belt (A). This can break the cords in the belt. Loosen all the tensioners before installing the new belt. If the belt still can not be easily installed, run the belt over the rim while rotating the pulley (B).

Tension the belts making sure the belts are at the correct tension. More belts are damaged by not enough tension than by too much tension. But, do not over tension the belt as this damages the belt tensile members and puts an additional load on the shafts and bearings.

Rotate the belt drive three revolutions. Check the belt tension and adjust as necessary.

Check the drive alignment and adjust as necessary.

Install the guards or shields.

Start the drive, looking and listening for any not normal noise or vibration. If possible, stop the drive and check the bearings and sheaves for excessive heat. If the bearings and sheaves are too hot the belt tension can be too high or the bearings are not properly lubricated or failing. Temperature can be checked with an infrared pyrometer.

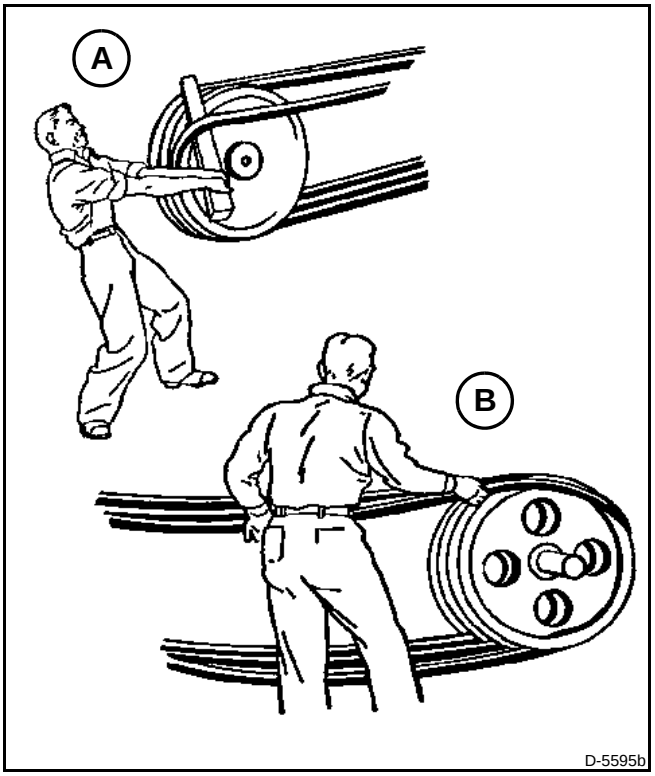

FIG. 101

https://truckmanualshub.com/

Belt Sheave Alignment

FIG. 102: Check the sheave and shaft alignment. Running the belts with the sheaves out of alignment will cause severe side wear.

Not aligned belt drives will be noisier than properly aligned drives since interference is at the belts enter point into the sheave.

To check the alignment use a long straight edge (1) made of wood, metal, or any rigid material. Line the straight edge along the outside face of both sheaves. If the drive is properly aligned, the straight edge will contact each sheave evenly. The straight edge must touch the two outer edges of each sheave for a total of four points of contact.

Shafts not in alignment (C) will show up as a gap (2) between the outside face of the sheave and the straight edge.

Check for tilting or shafts not aligned by using a bubble level. For proper alignment, the bubble must be in the same position as measured on each shaft.

Not aligned correctly Parallel (A).

Not aligned correctly Angular (B).

Rotate the drive and look for excessive sheave movement. If excessive sheave movement is seen inspect sheave and shaft. If no problem can be seen, remove and install sheave. Not correctly mounted sheaves or out of round sheaves are some times the root of vibration or more severe problems. A dial indicator can be used to measure side to side sheave movement or diameter vibration by holding the dial indicator up to the sheave sidewall or top of the belt inside the pulley groove.

IMPORTANT: Always turn off the machine before using the dial indicator. Rotate the drive by hand to make your measurements.

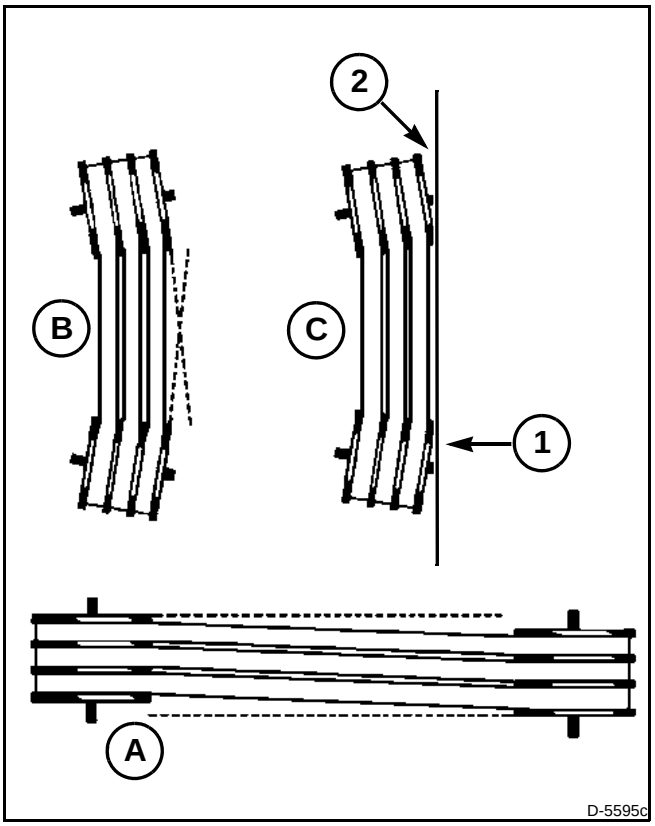

FIG. 102

Belt Run In Procedure

A run in procedure is needed for all belt drives so that the best belt life can be reached.

A run in procedure is made of starting the drive and operating the drive under full load for up to 24 hours. After the belts have run-in, stop the drive and check the belt tension.

Running the belts under full load for an extended period of time will seat the belts into the sheave grooves.

Belt tension will drop after the first run-in and seating procedure. This is normal. Adjust the belt tension as necessary.

Since tension in belts will drop after the first run-in and seating procedure, failure to check and tension the belt will result in low belt tension and belt slippage. This slippage will result in early belt failure.

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Belt Troubleshooting

When troubleshooting a belt drive problem, stand back and watch the drive while the drive is in operation and when drive is not. Is there a warm rubber smell? Is the belt moving around the drive in a normal way? Are there chirping, squealing, or grinding noises? Is there a deposit of dust or debris under the drive which will cause problems with the belts?

When the belt drive makes excessive noise, the belt is frequently blamed. To find the problem spray the belt with soapy water while the drive is running. If the noise goes away, or decreases, the belt is part of the problem. If the noise is still present, the problem can be caused by other drive components.

NOTE: Do not use belt conditioner or dressing on the belts.

Not correctly tightened belt drives can make noise.

Belt Problem and Wear Guide

The following charts show some of the more common types of drive belt failures and possible causes for each failure.

When problem solving a drive belt failure, determine which problem or SYMPTOM / OBSERVATION shows the failure that is occurring. Then find the POSSIBLE CAUSES and take action as shown under the CORRECTIONS / REMEDY column.

TABLE 1 Short Belt Life and Early Belt Failure

Symptom / Observation	Possible Causes	Corrections / Remedy
Rapid belt failure, when no reason can be seen.	Belt tensile member broken or damaged from not correct installation.	Properly install a new original equipment belt and adjust belt tension and idler spring.
	Worn driver or driven sheave grooves (check with groove gauge).	Replace worn sheaves. Properly install a new original equipment belt and adjust belt tension and idler spring.
	Driver or driven sheave center distances vary during operation.	Check for failed bearings and loose bearing housing mounting hardware and repair as required. Properly install a new original equipment belt and adjust belt tension and idler spring.

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TABLE 2 Belt Extended Beyond Idler or Sheave Take Up

Symptom / Observation	Possible Causes	Corrections / Remedy
Idler spring can not be adjusted to properly tension drive belt.	Belt extended and worn.	Properly install a new original equipment belt and adjust belt tension and idler spring.
	Belt tensile member broken.	Properly install a new original equipment belt and adjust belt tension and idler spring.
	Belt over loaded.	Reduce load on belt. Properly install a new original equipment belt and adjust belt tension and idler spring.
Belt strands not equal.	Sheaves not aligned (not equal work done by each belt strand).	Align the sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt tensile members broken or damaged from not correct installation.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Trash or debris fell into the sheave grooves.	Clean trash or debris from the sheave grooves. Correct the cause of trash or debris entering the sheave grooves and make sure all the protective shields are installed. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Belt strand lengths not matched.	Properly install a new original equipment belt and adjust the belt tension and idler spring.

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TABLE 3 Belt Turns Over in Sheaves

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt turns over in sheaves and runs or can turn over and come off sheaves when no reason can be seen.	Excessive lateral belt movement.	Properly adjust belt tension.
	Trash or debris fell into sheave grooves.	Clean trash and debris from sheave grooves. Correct the cause of trash and debris entering the grooves. Make sure all protective shields are installed.
	Sheaves not aligned.	Align driver, driven, and idler sheaves. Check alignment with drive loaded and unloaded. Properly adjust belt tension.
	Worn sheave grooves (check with groove gauge).	Replace worn sheaves. Properly install a new original equipment belt and adjust belt tension and idler spring.
	Belt tensile members broken or damaged from not correct installation (belt forced onto sheaves).	Properly install a new original equipment belt and adjust belt tension and idler spring.
	Intermittent or shock loading of drive belt.	Correct the cause of intermittent and shock loading of drive belt.
	Belt strand lengths are not equal (multiple strand or power band belts).	Properly install a new original equipment belts and adjust belt tension and idler spring.

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TABLE 4 Drive Belt Makes Noise

Symptom / Observation	Possible Causes	Corrections / Remedy
Belt makes noise.	Belt slippage.	Properly adjust belt tension.
	Belt or sheaves contaminated with oil, grease, or chemicals.	Repair cause of oil, grease, or chemicals. Clean belt and sheave grooves with a degreasing solvent that is not flammable or toxic, then wash the belts with a soap and water solution. Properly adjust belt tension.
Belt makes a slapping sound.	Belt tension too loose.	Properly adjust belt tension.
	Belt strand lengths are not equal.	Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Driver and driven sheaves not aligned.	Align sheaves and check alignment with sheaves loaded and unloaded. Properly adjust belt tension.
	Idler sheave not aligned.	Align sheaves and check alignment with sheaves loaded and unloaded. Properly adjust belt tension.
Belt makes a rubbing sound.	Belt rubbing on some obstruction.	Remove obstruction and align drive to give needed clearance.
Belt makes an not normal or loud noise.	Belt profile does not equal sheave groove profile.	Replace worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Worn sheave grooves (check with groove gauge).	Replace worn sheaves. Properly install a new original equipment belt and adjust the belt tension and idler spring.
	Trash or debris fell into sheave grooves.	Clean trash and debris from the sheave grooves. Correct the cause of trash and debris entering the sheave grooves and make sure all the protective shields are installed.
Drive makes a grinding sound.	Damaged or failed shaft bearings.	Replace damaged or failed bearings as required.

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