



Gillison's Variety
Fabrication, Inc.



Tier IV GVF 4000 Rough Terrain Forklift Owners Manual

Manual Part Number: GL 11498

**Model Number:
GVF 4000**

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INTRODUCTION

The information in this publication describes the safety requirements, operation, maintenance and servicing of the GVF/Gillison Forklift. Every effort has been made to provide correct and concise information to you, the operator, as available at the date of publication. Your GVF/Gillison dealer is available should items in this book or details of your machine not be understood.

This book is supplied with each machine to familiarize the operator with proper instructions needed for operation and maintenance. Studying and adhering to these instructions will insure optimum machine performance and longevity. A machine that is maintained properly and operated in the intended manner will provide greater dividends than one that is neglected and/or operated in a manner other than as intended. Design and servicing of this machine has been kept as simple as possible to permit maintenance operations to be carried out with tools normally available.

This book should be thoroughly read and understood prior to operation of this machine. Inexperienced operators should study contents of this publication and receive instruction from an experienced operator when possible. Your GVF/Gillison dealer can assist in areas concerning machine operation and provide details concerning safe operation. It is suggested that this booklet be kept readily accessible, preferably with the machine, for future reference if questions or concerns arise. If the original book should become lost or damaged, consult your GVF/Gillison dealer in regards to acquiring a replacement.

Customers are strongly advised to use an authorized GVF/Gillison dealer in connection with any service problems and adjustments that may occur.



CAUTION: READ THIS BOOK IN ITS ENTIRETY PRIOR TO OPERATING THE MACHINE. Use only parts from your GVF/Gillison dealer for repairs and/or replacement.



WARNING: The safe use and upkeep of industrial trucks are governed by regulations set by the Occupational Safety and Health Administration (OSHA), including regulations 1910.178, and by the American National Standards Institute (ANSI) Safety Standard for Powered Industrial Trucks, known as ANSI B56.1. When operating and maintaining industrial trucks with attachments, it's crucial to focus on specific sections outlined in these regulations. It's important to be well-versed in all aspects of these regulations for safe operation.



GVF 4000, Tier IV Rough Terrain Forklift



Location of Owner's Manual

SAFETY

INTRO TO SAFETY

The safety of the operator is one of the main concerns in designing a new piece of equipment. Designers build in as many safety features as possible. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions. To avoid personal injury, study the following precautions and insist those working with you or for you to follow them.

In order to provide a better view, certain photographs or illustrations in this manual may show an assembly with a safety shield removed. However, the equipment should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace shield prior to further operation.

SAFETY ALERT SYMBOL

FIG. 1: This is the safety alert symbol. It means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!** Look for it, both in this manual and on safety decals on the equipment. It will direct your attention to information that involves your safety and the safety of others.



FIG. 1

SIGNAL WORDS

FIG. 2: The words **DANGER**, **WARNING**, or **CAUTION** are used with the safety alert symbol. Learn to recognize these safety alerts, and follow the recommended precautions and safe practices.




-  **DANGER** indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.
-  **WARNING** indicates an imminently hazardous situation that, if not avoided, could result in death or serious injury.
-  **CAUTION** indicates an imminently hazardous situation that, if not avoided, may result in minor or moderate injury.



FIG. 2

Replace any **DANGER**, **WARNING**, **CAUTION** or instructional decal that is not readable or is missing. The locations and part numbers of these decals are identified later in this section of the manual.

GENERAL SAFETY RULES

FIG. 3: Always keep this manual with the machine.

This manual must be made available to the operator of the machine at all times. Special care must be taken to keep this manual safe from the weather and in readable condition.

Read this manual carefully and learn how to use the machine correctly.

Do not let anyone operate this machine without thorough instruction.

Beware of bystanders, particularly children! Always look around to make sure that everyone is clear before starting the engine or moving the machine. This is particularly important with higher noise levels as you may not hear people shouting.

FIG. 4: No passengers allowed. Do not carry passengers anywhere on the machine.

Dismount and park machine in the correct manner. When dismounting and/or leaving the operator's platform FOR ANY REASON always:

1. Shift to Neutral.
2. Come to a complete stop.
3. Lower forks completely.
4. Park on level ground.
5. Activate parking brake.
6. Shut off engine and remove key.



WARNING: An operator should not use alcohol or drugs which can affect their alertness or coordination. An operator on prescription or 'over the counter' drugs needs medical advice on whether or not he/she can properly operate equipment.

FIG. 5: Wear protective clothing. Do not wear loose clothing, as this may catch on moving parts of the machine causing injury.

Always wear protective clothing and appropriate safety equipment.

It is recommended that suitable protective hearing and safety glasses be worn.

Do not attempt to service machine, clear obstructions or unplug blockages with the engine running. Always shut off the engine first.

Keep all shields and guards in place.



Location of Owner's Manual

FIG. 3



FIG. 4



FIG. 5

FIG. 6: Additional equipment: A fire extinguisher and first aid kit should be carried with the machine or be kept readily available at all times.

Have emergency telephone numbers for immediate access.

GENERAL SAFETY WHILE OPERATING



CAUTION: READ THIS BOOK IN ITS ENTIRETY PRIOR TO OPERATING MACHINE.

Keep the machine properly maintained. Do not operate a machine when it is broken or has missing parts. Make sure that the maintenance procedures in this operator's manual are completed before using the machine.

Check all controls regularly and adjust where necessary.

Periodically check all nuts and bolts for tightness, especially wheel nuts.

Clear the area. Ensure that all bystanders, particularly children, are at a safe distance before starting the engine.



FIG. 7: Be aware of electrocution hazards. To prevent injury or death from electrocution:

Stay away from overhead power lines when operating forklift in raised position. This machine is not grounded. Electrocution can occur without direct contact.

Be observant of the operating area and terrain. Watch for holes, rocks or other hidden hazards. ALWAYS inspect area prior to operation.



FIG. 8: Be aware of side hill hazard. To prevent serious injury or death:

DO NOT operate near edge of banks. Setback distance from bank should equal or exceed the overall height of the bank.

DO NOT operate on steep slopes as overturning may result.

If necessary to cross a steep slope, avoid turning uphill. Slow down and make a wide turn. Travel directly up or down the slope, never cross it. Keep the heavy end of the machine on the uphill side.

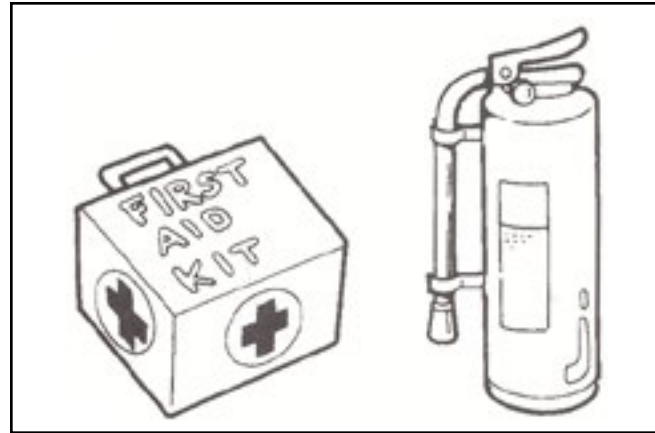


FIG. 6

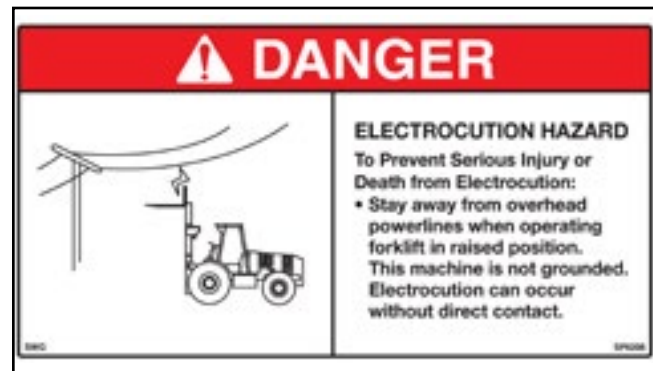


FIG. 7



FIG. 8

FIG. 9: Do not use starting fluid. Starting fluid must only be used when an ether-start aid is fitted as original equipment by the manufacturer or when installed by a dealer as an approved accessory.

The forklift is equipped with an intake heater. This must be removed prior to the use of starting fluid or ether aid.

Use of starting fluid on an engine equipped with an intake heater can result in severe engine damage.

Make sure there is plenty of ventilation. Never operate the engine in a closed building.

Always start and operate engine in a well-ventilated area.

If in an enclosed area, vent the exhaust to the outside.

Do not tamper with or modify the exhaust system with unapproved extensions.

SAFETY WHILE SERVICING THE MACHINE

Stop the machine. DO NOT service the machine while the engine is running or hot, or if the machine is in motion.

NOTE: When making major repairs or complicated adjustments, it is recommended that you consult your GVF/Gillison Dealer and have the work carried out by trained personnel.

The following precautions should be observed. These have been arranged by machine area or component.

Cooling System

FIG. 10: DO NOT remove the radiator cap (see 1) when the engine is running or hot.

DO NOT add coolant to the radiator while the engine is running.

Before removing the radiator cap, turn the cap slowly to relieve the pressure.

When adding coolant, make sure coolant being added is compatible and will mix with existing coolant.



FIG. 9

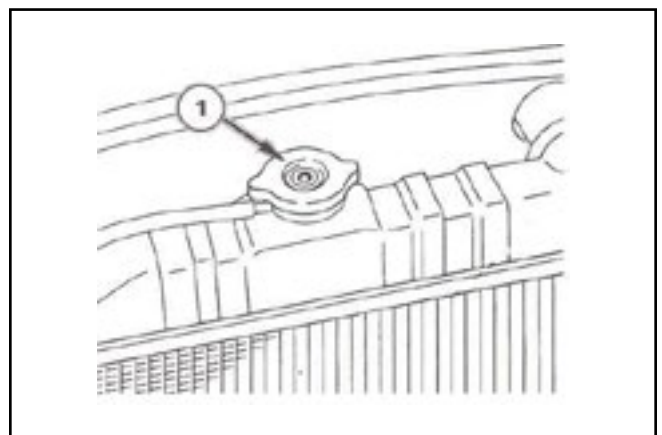
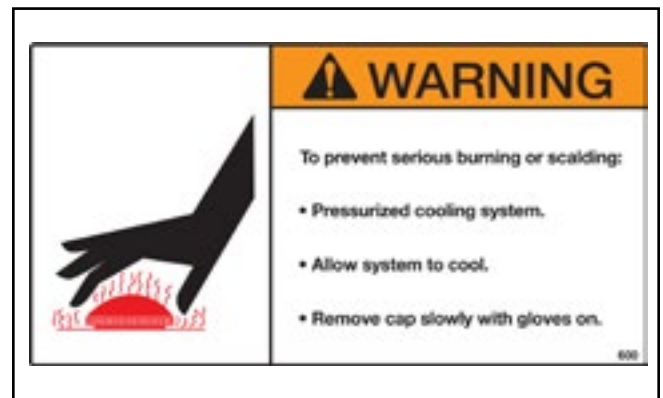


FIG. 10

Electrical System

FIG. 11: To prevent serious injury or death from exploding gases:



Do not work on batteries without proper instruction and training.

FIG. 12: Before making adjustments or servicing the electrical system, disconnect the battery negative (-) cable (see 1) first to prevent short circuits.

Keep sparks, flames and cigarettes away. Use a flashlight to check the battery electrolyte level if necessary.

Do not produce sparks with cable clamps when charging the battery or starting the machine engine with a slave (jumper) battery.

Batteries contain sulfuric acid electrolyte. Always wear protective clothing and eye protection when servicing.

In case of electrolyte contact, rinse area with plenty of water and seek medical attention.

Batteries produce explosive hydrogen gas when charged. Charge in area with adequate ventilation. Halt charging if battery temperature exceeds 52°.

Wash hands after handling battery.

Hydraulic System

FIG. 13: High pressure fluid hazard. To prevent serious injury or death:



Relieve pressure on system before repairing, adjusting or disconnecting.

Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.

Keep all components in good repair.

Ensure that all hydraulic connections are tight.

Relieve all pressures before disconnecting hoses or lines. Escaping oil under pressure can cause serious injury.

All fluids should be handled with care. If you are injured by or swallow any fluid, seek medical attention immediately and show the label on the product.

Fluid escaping from a very small hole can be almost invisible and can penetrate the skin causing serious injury. Keep hands and body away from pin holes and nozzles which eject fluids under high pressure. When



FIG. 11

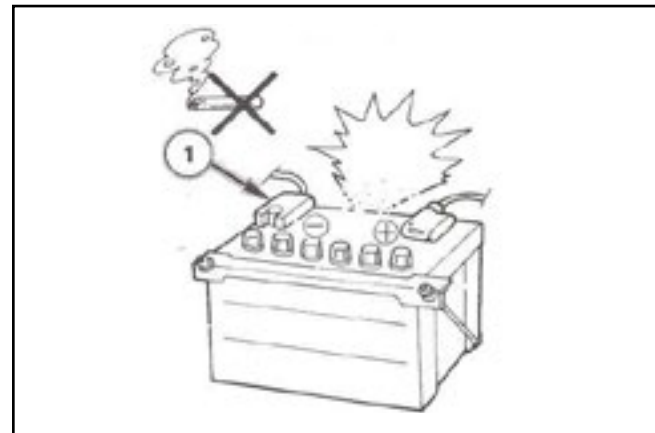


FIG. 12



FIG. 13

checking for leaks always use a piece of cardboard or wood. Never use your hands to find a pressure leak.

If ANY fluid is injected into the skin, it must be attended to by a doctor immediately.

Fuel System

FIG. 14: Diesel fuel is flammable and must be handled with care.

Never refuel or service the fuel system on the machine while smoking or when near open flames or sparks.

Never refuel the machine while the engine is running.

DO NOT use a fuel can unless necessary.

Always clean up any spilled fuel.

Fuel system components rely upon clean fuel for lubrication and optimum performance. Extreme care must be taken to prevent contamination from dirt and moisture so as to prevent damage to system.

Fuel injection system servicing must be referred to your GVF/Gillison Dealer. Unauthorized servicing may void all warranties.

Wheels and Tires

Do not attempt to service a tire unless you have the proper equipment and experience to perform the job. Have the work carried out by your GVF/Gillison Dealer or a qualified repair service.

The machine must be supported on suitable blocks or stands, NOT a hydraulic jack.

When seating tire beads onto rims, never exceed 2.4 bar (35 psi) or the maximum inflation pressure specified on the tire. Inflation beyond this maximum pressure may break the bead, or even the rim, with dangerous, explosive force.

When preparing a calcium chloride solution for fluid blasting the tires, NEVER pour water onto the calcium chloride. A chlorine gas can be generated which is poisonous and explosive. This can be avoided by slowly adding calcium chloride flakes to water and stirring until they are dissolved.

Wear suitable protective clothing, gloves and eye/face protection.

Replacement Parts

FIG. 15: Where replacement parts are necessary for periodic maintenance and servicing, replacement parts from GVF/Gillison's must be used to restore your equipment to original specifications.



FIG. 14



FIG. 15

GVF/Gillison's will not claim responsibility for installation of unapproved parts and/or accessories and damages as a result of their usage.

INSTRUCTION DECALS

FIG. 16: Location of all instruction decals are provided as a reference. Corresponding numbers show where decals belong on the machine. Replace any decals that are damaged, missing or are not readable. Consult your dealer.

Each decal below has its part number labeled below the decal.



Decal Locations

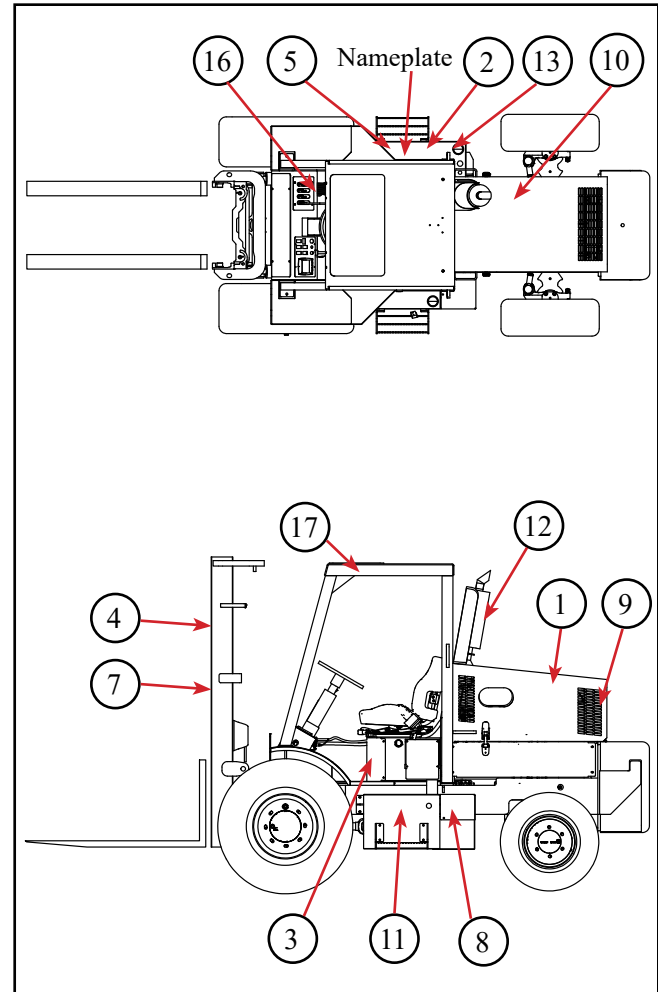


FIG. 16

WARNING

GVF Gillison's Safety
Gillison's, Inc.
3033 Bendix Hwy., Bensalem, PA 19016 215-882-5921
Fax 215-882-5637 www.gillisons.com 800-392-6059

Made In U.S.A.

IMPROPER OPERATION OR MAINTENANCE COULD RESULT IN INJURY OR DEATH. READ AND UNDERSTAND THE OPERATION AND MAINTENANCE MANUAL BEFORE OPERATING.	MODEL	SERIAL NO.	TYPE
	GVF 4000	GL-	DIESEL
	CAPACITY WITH MAST VERTICAL AND EQUIPPED AS SHOWN		
TIRE PRESS.	FRONT 35 PSI		
TIRE SIZE	14-17.5	10 PLY	
	28X8.5-15	6 PLY	
11 DEGREES MAX BACK TILT		MAST TYPE ES40	
DATE OF MANUFACTURE:			
DRIVE TREAD	IN 60	IN 24	IN 120
		IN 24	TRUCK WT. 9140
			CAPACITY 4000

TRUCK CONFORMS TO ASME B56.6

Nameplate - SP 6306

Includes important information such as: Warning, Model, Serial Number, Type, Tire Pressure & Size, Mast Type, Degrees Max Back Tilt, Date of Manufacture, Drive Tread, Truck Wt., Capacity

SERIAL NUMBER

Location of serial number is on the nameplate and is provided as a reference. See FIG. 16

SAFETY WHILE OPERATING



FIG.17 Review ENTIRE operator's manual before operating this machine.

Fasten seat belt securely before starting.

Keep both hands on controls at all times when operating this vehicle.

Carry load low.

Use low range for hillside or ramp operation.

Block elevated components before servicing equipment.

Do not leave machine with mast raised.

Do not allow riders.

Do not leave machine with engine running.



FIG. 17

Heed these safety rules:

Inspect the forklift each day.

Perform scheduled maintenance to ensure optimum performance.

Wear proper clothing and personal protective equipment:

- a. **No baggy clothing.**
- b. **Use eye protection.**
- c. **Use a hard hat.**

Fasten seat belt securely before starting the forklift.

When mounting and dismounting the forklift, use the steps and hand holds provided. Do not use steering wheel or controls.

Keep body, feet and hands inside the operators' platform when the forklift is running.

Do not operate the forklift under the influence of any kind of drugs or alcohol that impair judgment or performance.

Do not operate the forklift without overhead guard in place.

Lower forks completely to the ground when adjusting and when work is completed.

Do not allow anyone to stand under or work under raised forks.

Never raise persons with the forks.

Never leave forklift running unattended. Always set the parking brake, shift to Neutral, shut off engine and remove the key.

LOAD HANDLING SAFETY

Heed these safety rules:

When lifting or loading, tilt the mast back.

Use caution when tilting mast forward to ensure load does not shift off forks.

Never carry maximum rated load with center of load 24 inches above forks.

Avoid sudden starts and stops to prevent load from shifting.

Lift loads on level ground to prevent rollover.

Always watch for overhead obstructions when operating and lifting loads.

Do not exceed the lifting capacity of the forklift.

Always ensure forks of the proper capacity are used. Never interchange forks with forks of a different rating.

Do not add or subtract weight from the counterweight box.

RULES OF THE ROAD

Before operating your forklift on a public road, a number of precautions must be taken.

Familiarize yourself with, and obey, all

laws appropriate to your machine.

Disengage FWD.

Make sure any required clearance flags or hazard lights are in place and in working order.

Clean off all reflectors and road lights, front and rear, and be certain they are in working order.

Make sure machine is equipped with a slow moving vehicle sign (SMV) and other marking materials recommended for improved visibility unless prohibited by law. FIG. 18

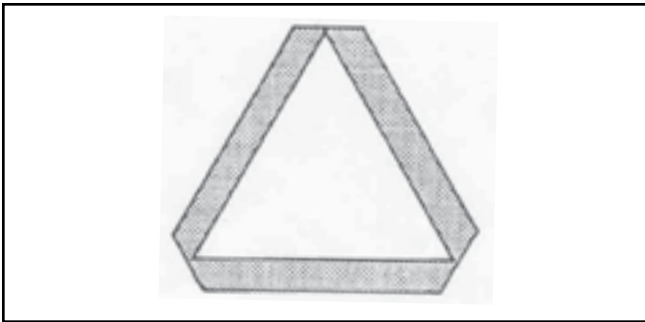


FIG.18

Know the route you will be traveling.

Use flashing lights when traveling on roads, day or night, unless prohibited by law.

Observe all local or national regulations regarding the road speed of your machine.

Use extreme caution when transporting on snow covered or slippery roads.

Wait for traffic to clear before entering a public road.

Beware of blind intersections. Slow down until you have a clear view.

DO NOT attempt to pass at any intersection.

Slow down for turns and curves.

Make wide, gentle turns.

Signal your intent to slow, stop or turn.

Shift to a lower gear before going up or down hills.

Keep machine in gear. DO NOT coast with the clutch disengaged or the transmission in neutral.

Stay out of the path of on coming traffic.

Drive defensively. Anticipate what other drivers might do.

Watch out for overhead obstructions.

MODIFICATIONS

Modification or alteration of the forklift shall be made only with prior written consent from GVF/Gillison's Variety Fabrication Inc.

Altering safety devices shall be prohibited.

RECORD RETENTION

The owner shall retain the following records for at least 3 years:

A. Purchase Information

B. Records of persons trained upon delivery of the GVF/Gillison Forklift

C. Written records of frequent inspections, maintenance performed and parts replaced

OWNERSHIP RECORDS

When a change of ownership of a GVF/Gillison Forklift occurs, it is the responsibility of the seller to notify GVF/Gillison's Variety Fabrication Inc. with the following information within 60 days of the sale:

A. Serial number of machine

B. Name & address of new owner

FORK SAFETY

Fork Inspection

Fork Inspection Log

Forks in use shall be inspected at intervals of not more than 12 months (for single shift operations) or whenever any defect or permanent deformation is detected. Certain applications will require more frequent inspections, and possibly non-destructive testing methods to check for cracks.



1. Inspect for surface cracks.

Pay special attention to the heel and welds attaching all mounting components to the fork blank. Forks with surface cracks shall not be returned to service.



2. Check for straightness of blade and shank.

The fork should be withdrawn from service if the deviation from straightness exceeds allowable "A" and "B" values.

Allowable "A" = (.005) x (S)

Allowable "B" = (.005) x (L)

Example: 48" or 1,219 mm long blade

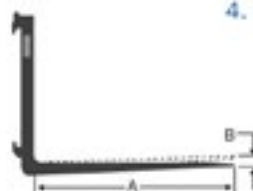
Allowable B = (.005) x (48") = .24"

or B = (.005) x (1,219) mm = 6.10 mm



3. Check for excessive fork angle.

When Y value exceeds 2 3/8" (60 mm) or 2 3/4" (70 mm) on fully tapered, the fork is rejected.



4. Check tip alignment.

When "A" is less than or equal to 42" (1,067 mm), then the maximum recommended difference in fork tip elevation is B = .25" (6.35 mm). If "A" is greater than 42" (1,067 mm), then the maximum recommended difference in fork tip elevation is B = .375" (9.53 mm).



5. Check for positioning lock damage.

Check the positioning lock and other fork retention devices to make sure they are in place and working.



6. Check for wear.

Set the top jaws of caliper by measuring the thickness of the shank. Position the bottom jaws over the flanks of the fork arm blade. If inside jaws of caliper hit fork, it is OK. If inside jaws of caliper pass over the fork arm, it must be taken out of service. Refer to clipboard.



7. Check fork marking.

If the fork identification marking is not clearly legible, it shall be renewed.

Lift Truck Serial # _____

	Inspection Date	Inspected By	Observations/Comments
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____

Fork Inspection Cont.

USER FORK WEAR STANDARDS

Reprinted from ASME/ANSI B56. 1-2000

6.2.8 Inspection and Repair of Forks in Service on Fork Lift Trucks

(a) Forks in use shall be inspected at intervals of not more than 12 months (for single shift operations) or whenever any defect or permanent deformation is detected. Several applications will require more frequent inspection.

(b) Individual and Load Rating of Forks. When forks are used in pairs (the normal arrangement), the rated capacity of each fork shall be at least half of the manufacturer's rated capacity of the truck, and at the rated load center distance shown on the lift truck nameplate.

6.2.8.1 Inspection. Fork inspections shall be carried out carefully by trained personnel with the aim of detecting any damage, failure, deformation, etc., which might impair safe use. Any fork which shows such a defect shall be withdrawn from service, and shall not be returned to service unless it has been satisfactorily repaired in accordance with para 6.2.8.2.

(a) **Surface Cracks.** The fork shall be thoroughly examined visually for cracks and if considered necessary, subjected to a non-destructive crack detection process, special attention being paid to the heel and welds attaching all mounting components to the fork blank. This inspection for cracks must also include any special mounting mechanisms of the fork blank to the fork carrier including bolt type mountings and forged upper mounting arrangements for hook or shaft type carriages. The forks shall not be returned to service if surface cracks are detected.

(b) **Straightness of Blade and Shank.** The straightness of the upper face of the blade and the front face of the shank shall be checked. If the deviation from straightness exceeds 0.5% of the length of the blade and/or the height of the shank, respectively, the fork shall not be returned to service until it has been repaired in accordance with para 6.2.8.2.

(c) **Fork Angle (Upper Face of Blade to Load of the Shank).** Any fork that has a deviation of greater than 3 deg. from the original specification shall not be returned to service. The rejected fork shall be reset and tested in accordance with para 6.2.8.2.

(d) **Difference in Height of Fork Tips.** The difference in height of one set of forks when mounted on the fork

carrier shall be checked. If the difference in tip heights exceeds 3% of the length of the blade, the set of forks shall not be returned to service until repaired in accordance with para 6.2.8.2.

(e) **Positioning Lock (Where Originally Provided).** It shall be confirmed that the positioning lock is in good repair and correct working order. If any fault is found, the fork shall be withdrawn from service until satisfactory repair has been effected.

(f) Wear

(1) **Fork Blade and Shank.** The fork blade and shank shall be thoroughly checked for wear, special attention being paid to the vicinity of the heel. If the thickness is reduced to 90% of the original thickness, the fork shall not be returned to service.

(2) **Fork Hooks (Where Originally Provided).** The support face of the top hook and the retaining faces of both hooks shall be checked for wear, crushing, and other local deformations. If these are apparent to such an extent that the clearance between the fork and the fork carrier becomes excessive, the fork shall not be returned to service until repaired in accordance with para 6.2.8.2.

(g) **Legibility of Marking (When Originally Provided).** If the fork marking in accordance with para 7.25.2 is not clearly legible, it shall be renewed. Marking shall be renewed per instructions from original supplier.

6.2.8.2. Repair and Testing

(a) **Repair.** Only the manufacturer of the fork or an expert of equal competence shall decide if a fork may be repaired for continual use, and the repairs shall only be carried out by such parties. It is not recommended that surface cracks or wear be repaired by welding. When repairs necessitating resetting are required, the fork shall subsequently be subjected to an appropriate heat treatment, as necessary.

Fork Inspection Poster

Fork Inspection

and guidelines

Check Locking Mechanism

Check Fork Marking

Check Hooks
1. Rise
2. Deformation
3. Crack in Welds

Check Angle

Check for Surface Cracks

Check Tip Alignment

Check Blade Straightness

50 mm/2"

New Fork

FORK ARM SHANK CROSS SECTION

Step 1. Set Callipers

Checking shank thickness: Set the top jaws by measuring the thickness of the shank. Ensure that the caliper is held square across the shank for an accurate reading. The caliper is now set to measure the fork arm blade.

OK - Less than 10% Wear

OK

Step 2. Check Blade Thickness

Checking blade thickness: Position the bottom jaws of the caliper over the flanks of the fork arm blade. If inside jaws of caliper hit fork it has less than 10% wear and can remain in service.

Note: Standard Cascade Kerbar calipers can be used on forks up to and including 65 mm (2 5/8") thick. They are NOT TO BE USED ON FULL OR CONE TAPERED FORKS where the upright thickness is greater than that of the blade. In these cases 10% reduction must be obtained by measurement. You will need to know the original fork blade thickness.

Replace Fork

REPLACE

Step 3. Replace if Necessary

If inside jaws of caliper pass over the fork arm it must be taken out of service. This represents 10% wear and 20% reduction in capacity. ASME B56.1 recommended practices advise that forks be withdrawn from service when the thickness of the blade has worn by 10%.

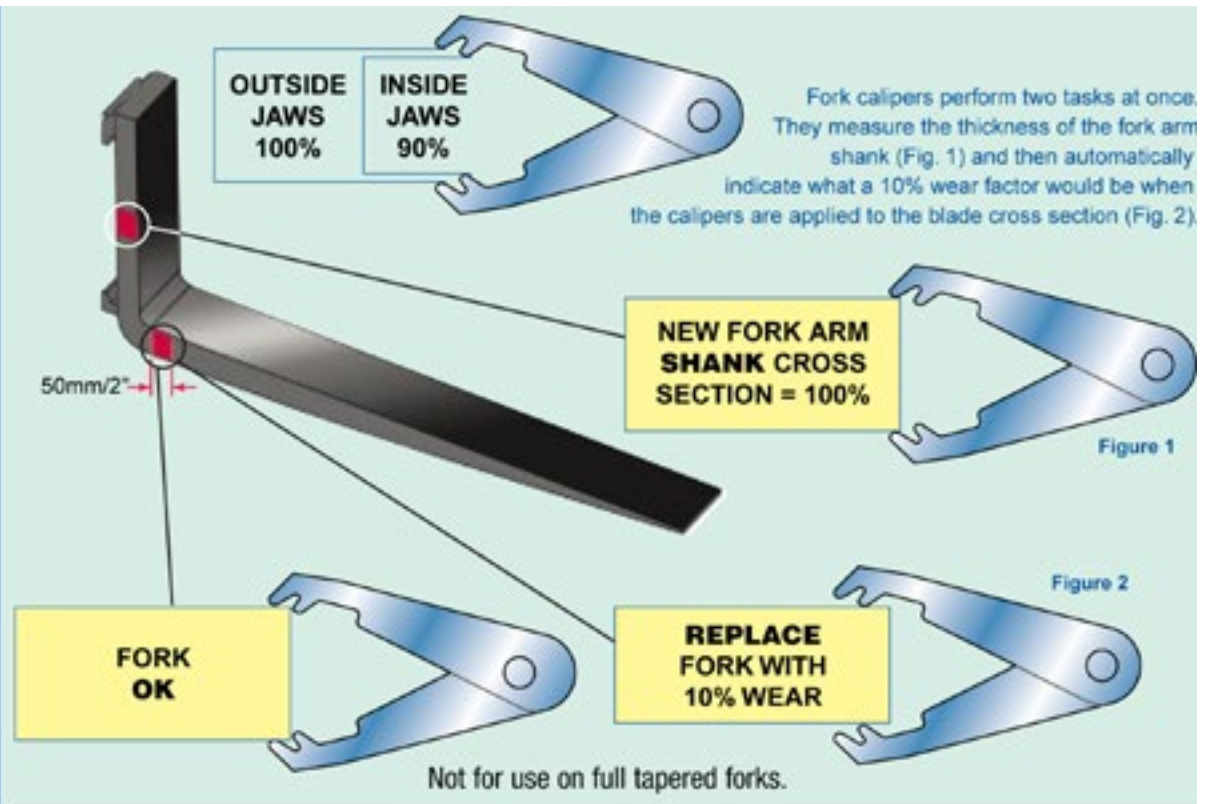
Fork Use Guidelines:
Use your forks correctly:

1. Inspect forks regularly and use Cascade Kerbar Inspection log.
2. Make sure capacity never or exceeds truck rating and load weight.
3. Obtain written approval from fork manufacturer prior to making fork modifications.
4. Determine fork wear cycle and replacement schedule for your operation. Use of larger forks in demanding applications will extend fork life.
5. All locating pins must be in place at all times. Forks must be properly seated on the carriage and the pins fully located in the slot before use.

What not to do:

1. Do not overload beyond the rated capacity.
2. Do not change fork from one lift truck to another without knowing capacities of each.
3. Do not use a fork in an application for which it is not designed.
4. Do not add a fork extension longer than 150% of the supporting fork's length.
5. Do not try to repair or modify forks in the field, especially by welding. Improper welding destroys heat treat properties and makes the forks brittle.
6. Do not carry full or partial loads on one fork.
7. Do not apply sideways pressure to forks, commonly called "side loading", as they are designed for vertical loading only.

Fork Maintenance



Lift truck forks: maintenance and inspection.

Lift truck forks are often mistreated and forgotten. As insubstantial as they seem, neglecting forks could make them dangerous. There is barely a word about forks mentioned in most operator training manuals or instructed courses. Lift truck technicians may ignore them completely. Yet, forks carry larger loads than almost any lifting device but there are no mandatory requirements for maintenance or inspection.

You can find thousands of extra parts for lift trucks in some fleet repair shops, but you'll seldom see spare forks. Even when all the trucks on the fleet are the same, fleet maintenance managers rarely order spare forks. Forks last a long time if treated properly, but they can deceive by looking as good from most viewing angles when they are worn as when they are new.

It's true that most forks are customized to the truck by model and capacity: they are big and heavy and thought of as indestructible. But forks can be abused or ruined in the course of daily work.

Here are some examples of ways that forks can be damaged:

- Forks can be overloaded either by picking up a load too far out on the forks, or simply by picking up loads heavier than the truck rating.
- Maintenance shops may bend forks back into shape, weld on them, or drill holes through them. Lift truck users can add attachments to the truck that stress the forks. Drum clamps and portable booms can be supported on the

forks—but what is contained in the drum or on the boom hook makes the safety difference.

- Forks are often used to open rail car doors and break loads out or away from other loads. They are also used to pick up capacity loads not seated against the fork shank and to pick up off-balanced loads far from the side of the truck. The fork tips are sometimes inserted under other fork trucks to lift them during maintenance operations.
- Lift trucks may collide with building columns and walls, and though the forks show no discernible bend, they may be damaged beyond safety.
- Any time excessive heat is applied to any part of a fork—during repair, for instance—hidden damage may occur.

The fork itself is a concern but so are the hooks that secure them to the lift carriage.

DESIGNED TO TAKE A BEATING

Forks for counterbalanced and straddle lift trucks are not just bent bars of steel. The manufacturing process is careful and precise with many checks and inspections critical to their safety. Some factors essential to fork manufacture include the steel, the bend and thickness of the heel, the welding of the hooks that hold them on the carriage, and the heat treatment of the finished product.

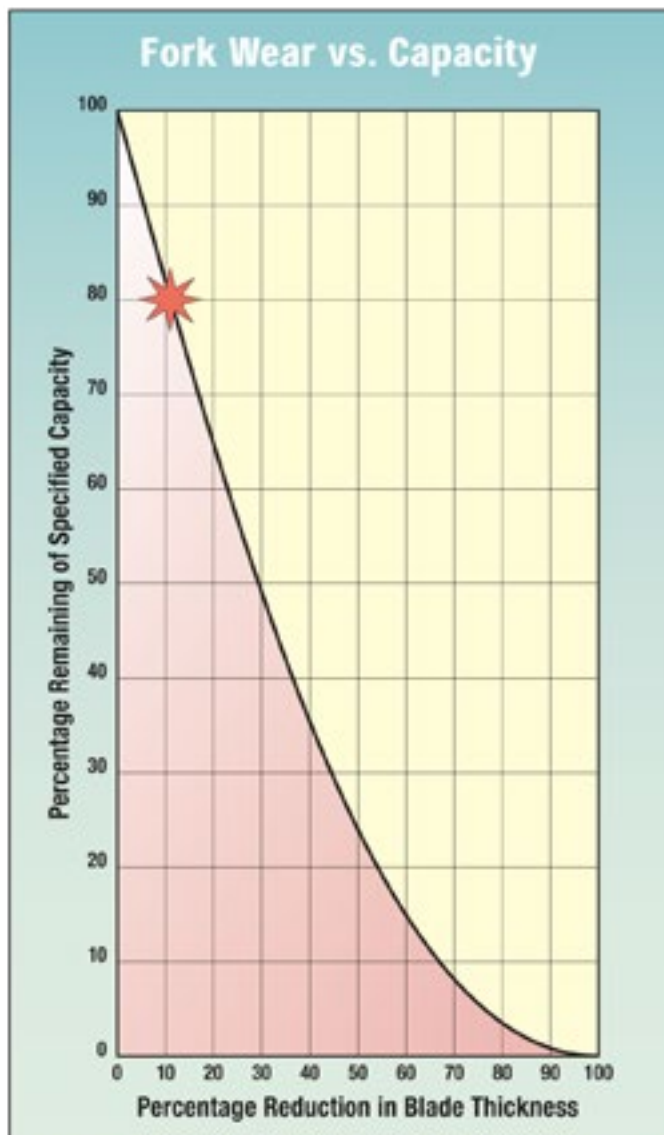
A 10% reduction in blade thickness results in a 20% reduction of capacity.

Fork Maintenance Cont.

FORKS ARE A WEARING PART

Finished forks are usually painted red, yellow or black when the truck is new. The paint is quickly scrapped off once the truck is put into service. The top paint is abraded by the pallet or load and the bottom is worn mostly by contact with the floor.

Lift truck operators are taught to keep their forks low and parallel with the travel surface when traveling empty and tilted back when carrying a load. But some operators go to extremes and travel with the heel of the fork riding on the floor. This practice wears the heel or the bottom surface of the fork and reduces the capacity of the fork.



This chart shows how fork wear reduces truck capacity. ANSI standards require that each fork be rated at least half the capacity of the truck at the rated load center distance as shown on the truck nameplate.

Once in service, the bottom of forks may wear badly. This wear may not be noticed, but the consequences are. There are ASME/ANSI specifications for User Fork Wear Standards. They are part of the B56 standards by which lift trucks are manufactured and tested. Few operators or fleet managers know of the standards or understand that forks must be inspected.

While the Industrial Truck Association (ITA) recommends that forks be withdrawn from service when fork blade thickness has been reduced by 10%, few users understand that a 10% reduction in blade thickness results in a capacity reduction of 20%. This means that the safety factor for a pair of forks has also been reduced by 20%.

Measuring fork wear is not intuitive. You should make it a part of maintenance or inspection routines.

HERE'S HOW FORKS ARE INSPECTED

Forks should be inspected at least once a year (single-shift operation, and more frequently in severe applications) for wear and distortion. The best method is to use a fork caliper, which is a type of adjustable go/no-go gauge.

Each fork consists of two sections: the shank, which is the vertical part attached to the carriage, and the blade, which is the portion that picks up the load.

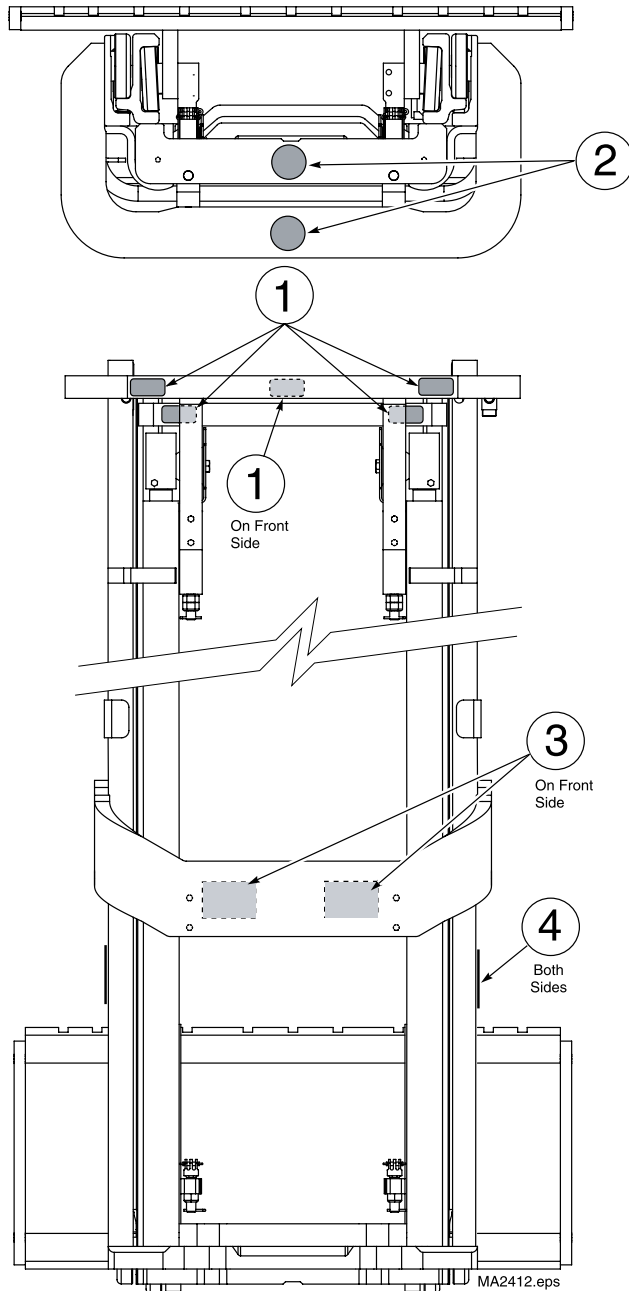
The caliper is first set using the shank of the fork on which there is little or no wear. (See the illustration.) Then that dimension is used to check the shank back near the heel of the blade. The four contact points of the special fork caliper automatically measure the wear on the blade.

Wear is checked by first measuring the thickness of the vertical shank portion of the fork because this part wears little. The interior part of the caliper has two additional points that automatically show a 10% reduction of the shank thickness. These points are slid over the fork blade. If the caliper slides down the blade to the heel, the fork is worn beyond safety and usefulness. It should be replaced. The accompanying chart shows the reduction in capacity as the forks wear.

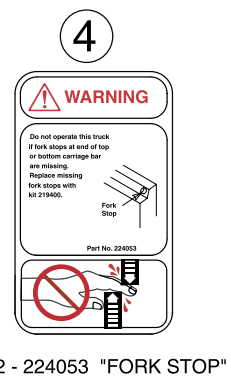
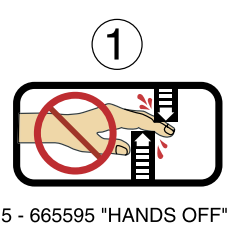
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FORKLIFT MAST SAFETY

Refer to the following illustrations for mast safety:



Safety Decals



CONTROLS**INSTRUMENT PANEL DIAGRAM**

SEE FIG. 19

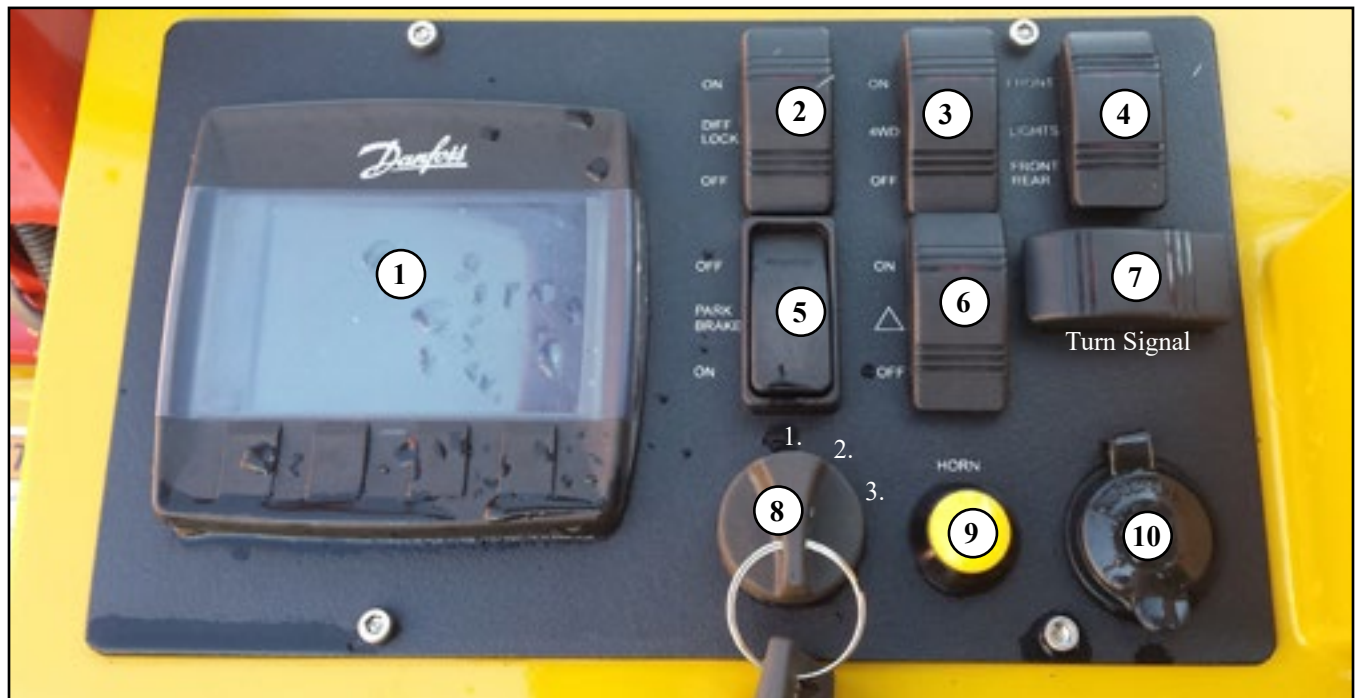


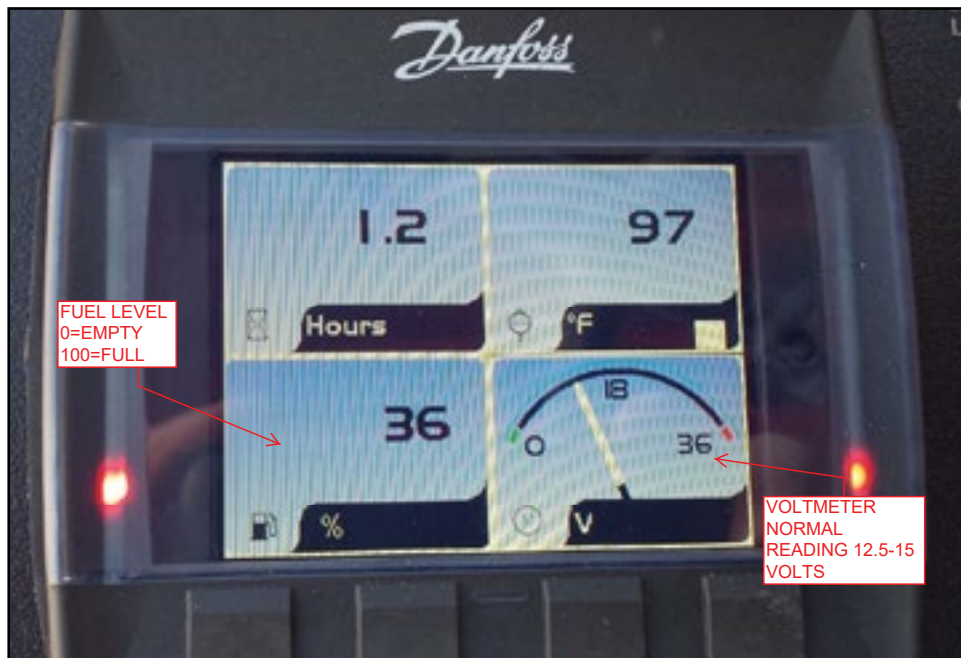
FIG. 19

- | | |
|---|--|
| 1. Display - see detailed instructions after this page. | 6. Warning Lights ON/OFF |
| 2. Diff Lock ON/OFF | 7. Turn Signal - Left & Right |
| 3. 4 Wheel Drive ON/OFF | 8. Ignition - |
| 4. Lights ON/OFF | 1. OFF Position - Engine shut off |
| 1. Front Lights ON - Push Ahead | 2. RUN Position - power supplied to all circuits |
| 2. Front & Rear Lights ON - Push Down | 3. START Position - starter activated, spring loaded |
| 3. Lights OFF - Center Position | 9. Horn |
| 5. Parking Brake ON/OFF | 10. 12 V Power Source |

DISPLAY SCREEN INFORMATION



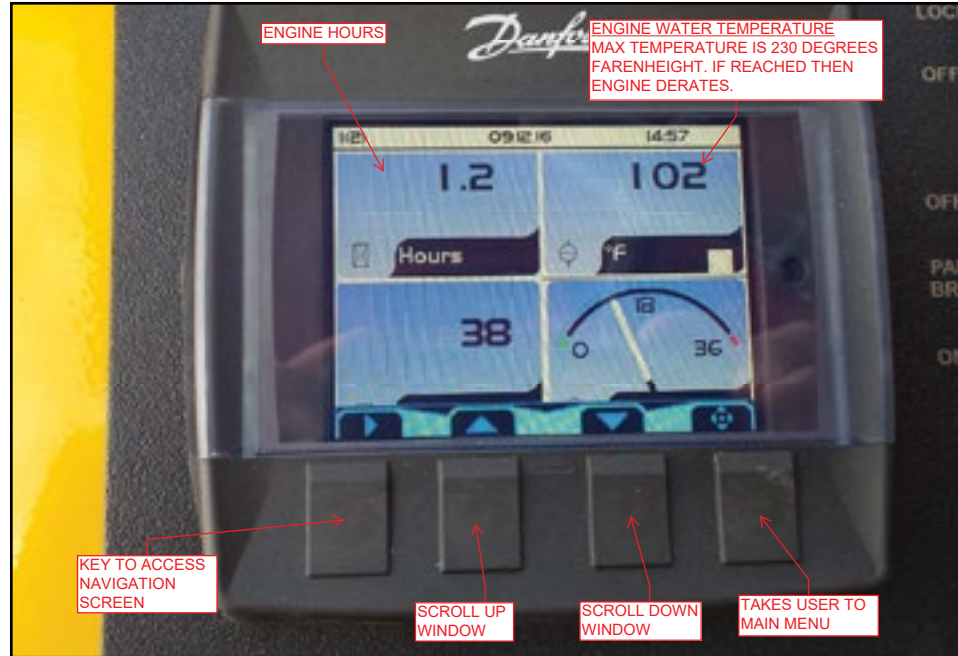
1. Start Up Screen



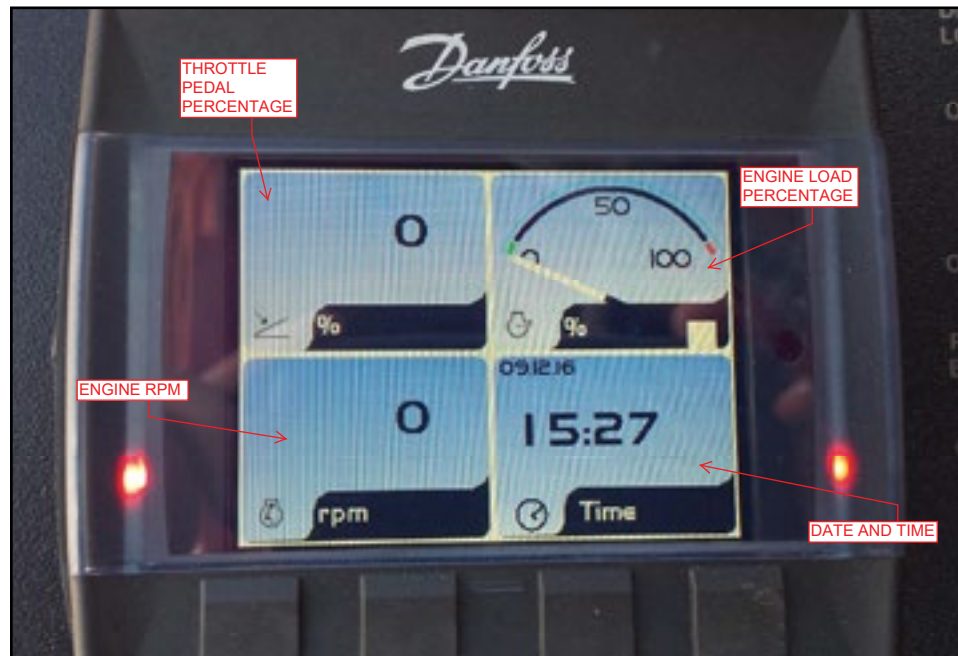
FUEL LEVEL
0=EMPTY
100=FULL

VOLTMETER
NORMAL
READING 12.5-15
VOLTS

2. Main Screen - shows engine hours, engine temperature, fuel level and engine volts.



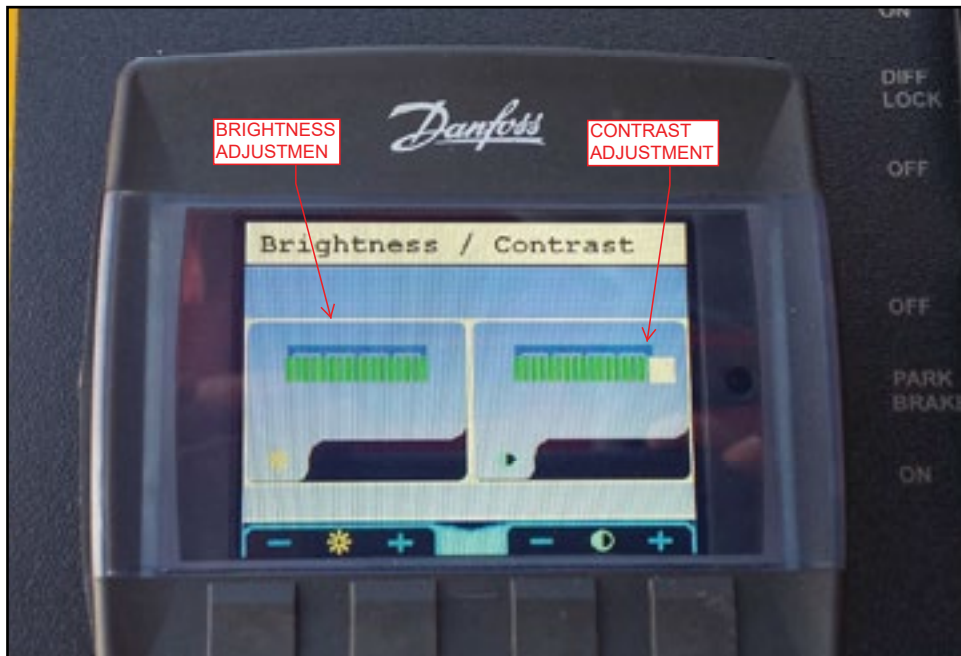
3. Push key on far left 2 times and navigation arrows will appear. Use center keys to scroll thru screens. Key on far right will take user to set up screens.



4. Continue to page through screens for additional information.



5. Push key on the far left once to get contrast adjustment option to appear. Press that key to get contrast adjustment to appear.



6. Use - or + keys to adjust brightness and contrast.

DISPLAYSCREEN-POPUPWARNINGLIGHTS

SEE FIG. 20

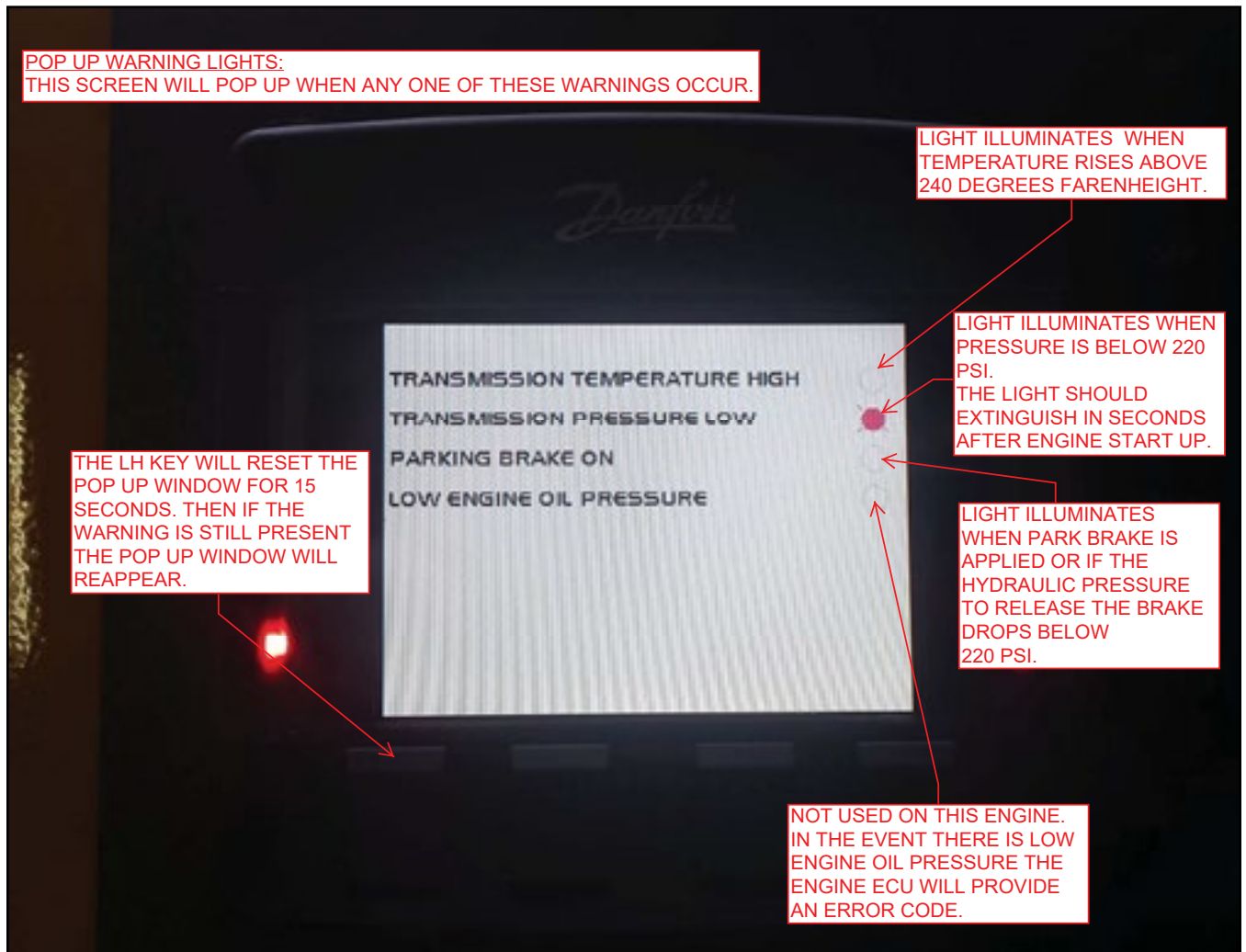
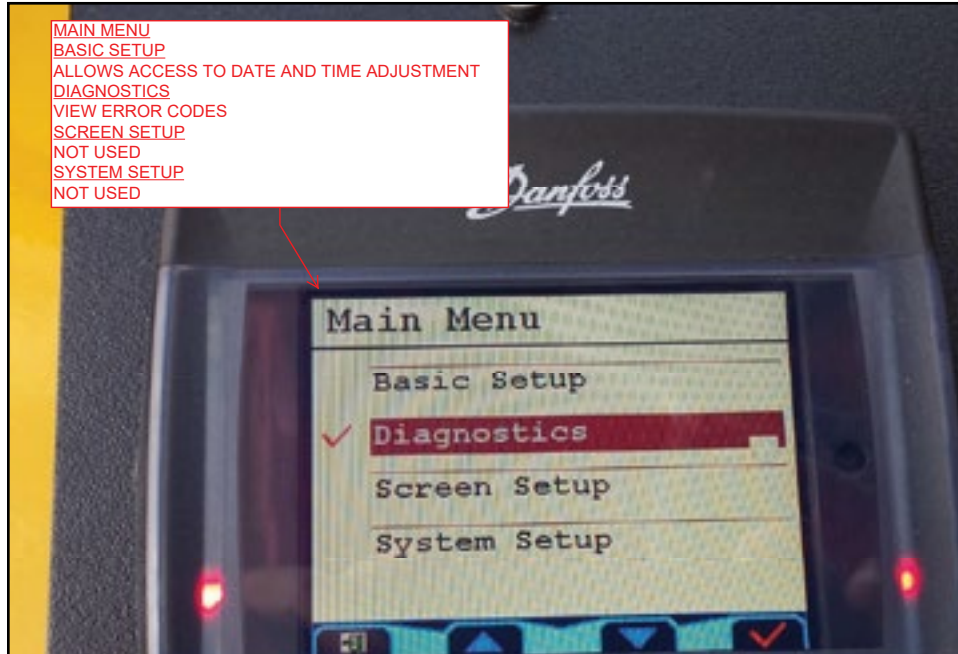


FIG. 20



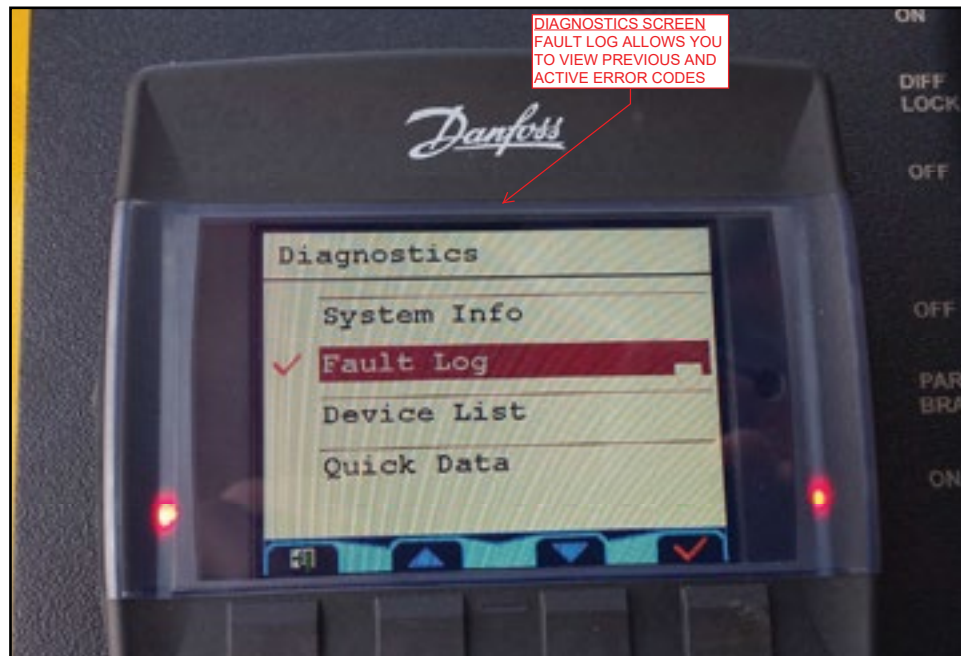
7. Main Menu



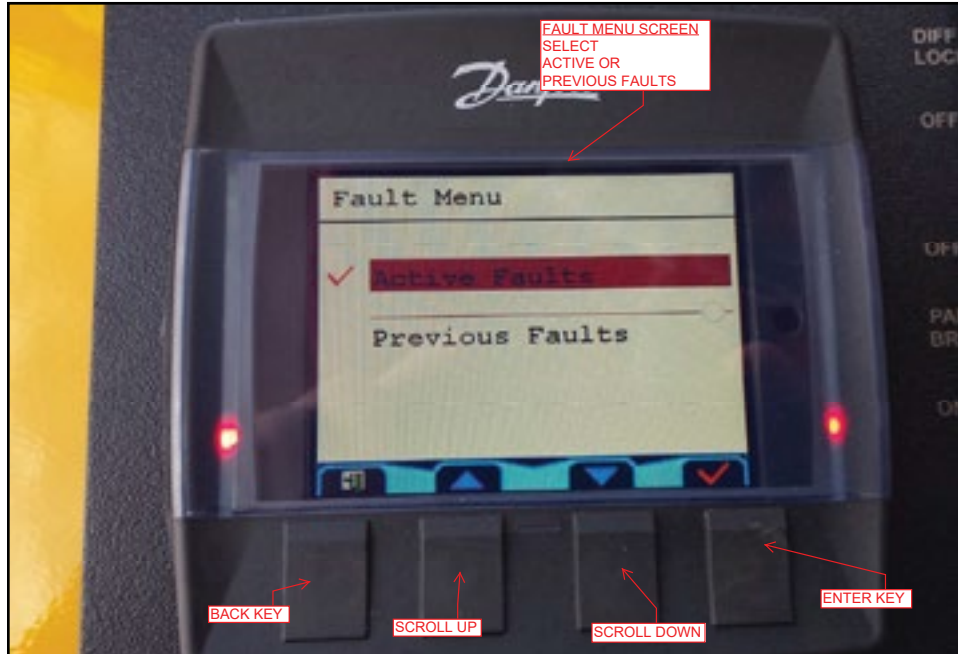
8. Basic Setup is where time and date can be set.



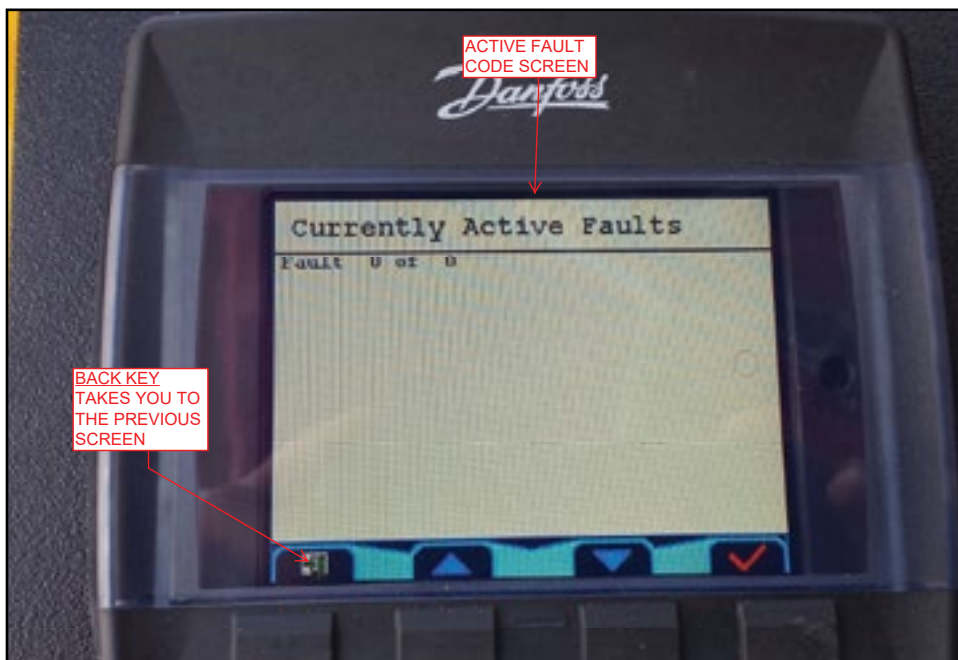
9. Time and date set - under Basic Setup



10. Fault Log under the Diagnostics Screen is where previous and active error codes can be viewed. To see the list of engine error codes see Troubleshooting under the OPERATION section of this manual.



11. Under the Fault Menu screen is where you can choose to see either Active Faults or Previous Faults.



12. The Currently Active Faults screen will show faults or errors that the machine is currently experiencing. To see the list of engine error codes see Troubleshooting under the OPERATION section of this manual.

VARIOUS CONTROLS OF THE FORKLIFT

1. Forward, Neutral & Reverse Lever

2. Rotate Knob for Shifting Speeds

3. Neutral Lock

SEE FIG. 21

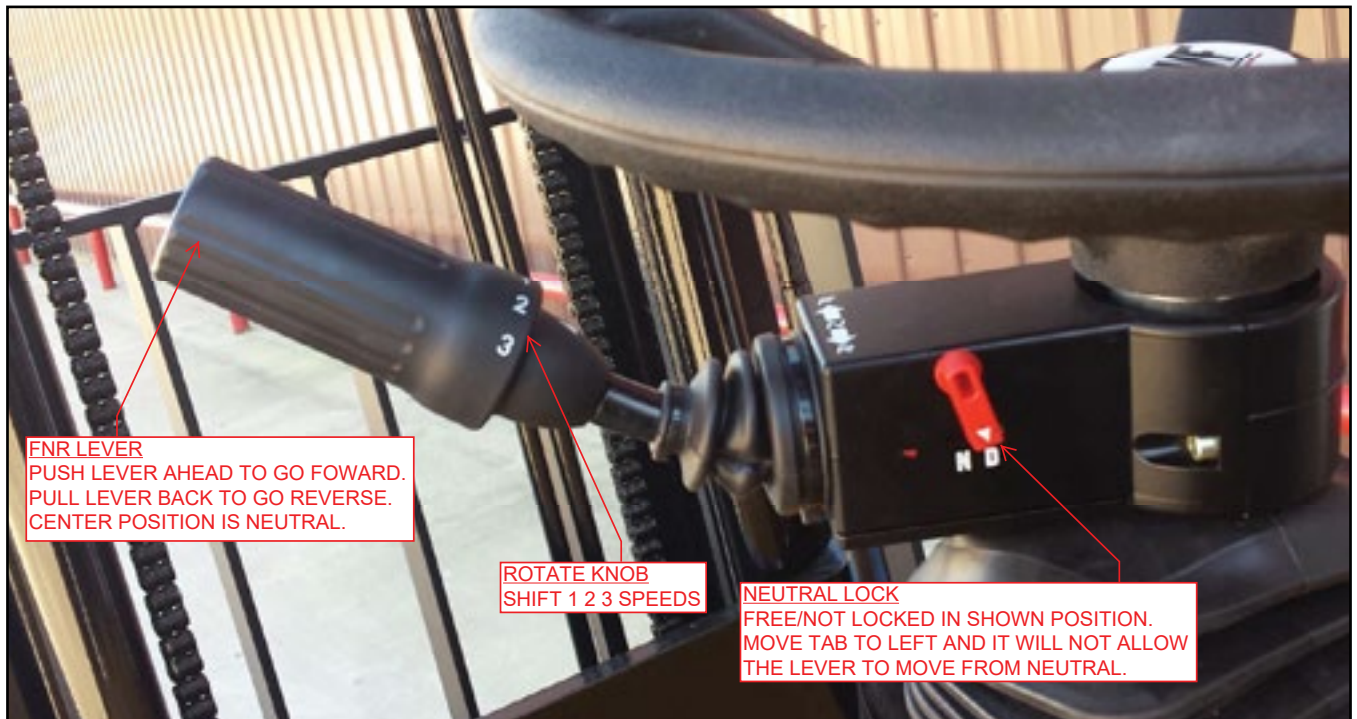


FIG. 21

4. Steering Wheel Adjustment

5. Mast Controls

SEE FIG. 22



FIG. 22

6) Brakes and Throttle Pedals

7) Brake Pedal Locking Pin

SEE FIG. 23



FIG. 23

8) Seat Slide Adjustment

9) Seat Suspension Adjustment Knob

10) Seat Belt

SEE FIG. 24



FIG. 24

11) Transmission Brake Switch

12) 12 Volt Power Supply

SEE FIG. 25

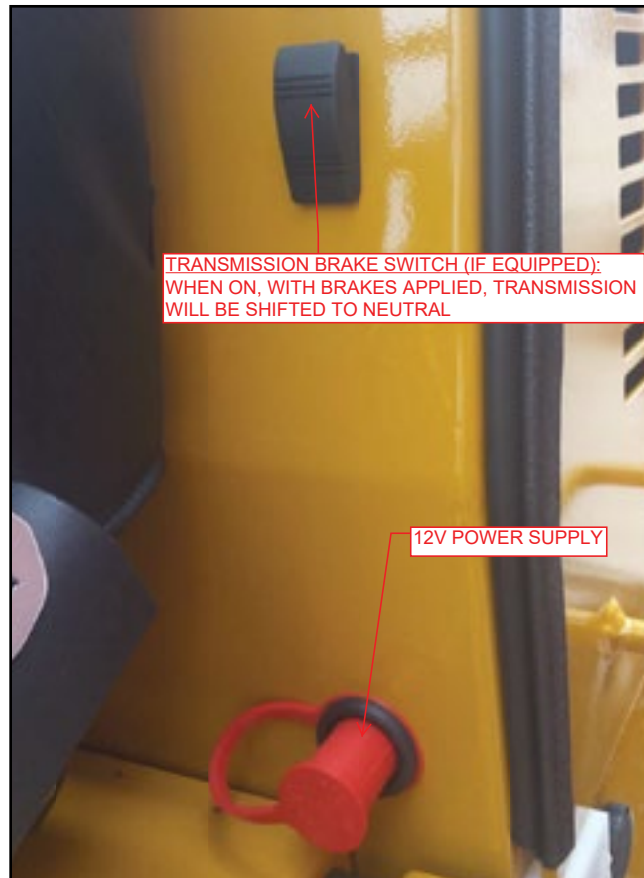


FIG. 25

OPERATION

(Read and get familiar with the CONTROLS section first.)

PRE START UP

Check engine oil, transmission, hydraulic oil and radiator fluid level.

Do a walk around inspection.

STARTING THE ENGINE

Make sure parking brake is on.

Safety belt is fastened and secure.

FNR switch is in Neutral position.

Turn ignition switch clockwise to run position then further to start.

NOTE: Max crank time = 30 seconds

Observe indicator lights and gauges to ensure everything is operating correctly.

Transmission pressure, and engine oil pressure lights go out within 15 seconds.

Engine temperature must be above 160° F before operation.

COLD WEATHER STARTING

WARNING: Do not use ether. FIG. 9



FIG. 9

- Turn key to run position.
- Crank over until engine is running.

FORKLIFT SHUTDOWN

(read CONTROLS section first)

1. Reduce engine speed to idle. Make sure forklift has come to a complete stop.
2. Move FNR switch to Neutral.

3. Apply parking brake.

4. Lower forks to ground.

5. Allow engine to cool down for about 1 minute.

6. Turn key to Off position and remove.

7. Release all hydraulic pressure by operating mast control levers.

OPERATING THE GVF FORKLIFT

Learn about all controls, have knowledge of the machine and its workings, and read this manual before operating the forklift machine.

1. Make sure no obstructions are in the way.
2. Release parking brake. FIG.29
3. Raise the mast until forks are a safe distance from the ground.



Always carry loads low to ground to prevent roll over and avoid overhead obstructions.

5. Select Forward or Reverse on FNR selector. FIG. 26



FIG. 26

In Reverse, make sure back up alarm is functioning.

Check operation of brakes.

Use throttle pedal to increase engine speed and forklift speed.

Use horn when going in blind spots. FIG. 29

Always use Warning flashers when operating around hazards including roads. FIG. 29

Turn signals - Use on road right of ways to indicate direction turning. FIG. 19

Lights FIG. 29 - Never use rear work lights when operating on the highway.

6. Mast Operation - see FIG. 27 & 28

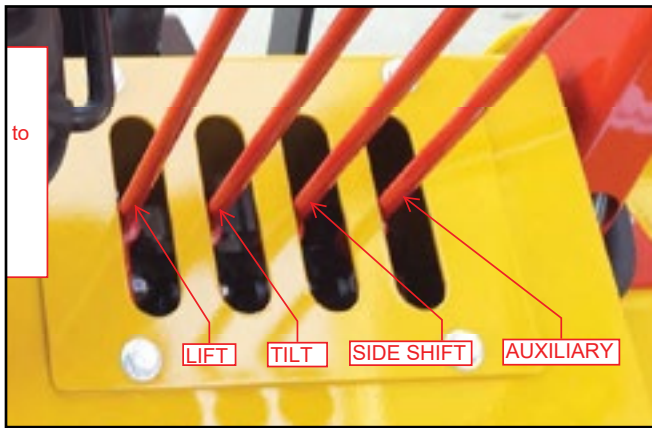


FIG. 27

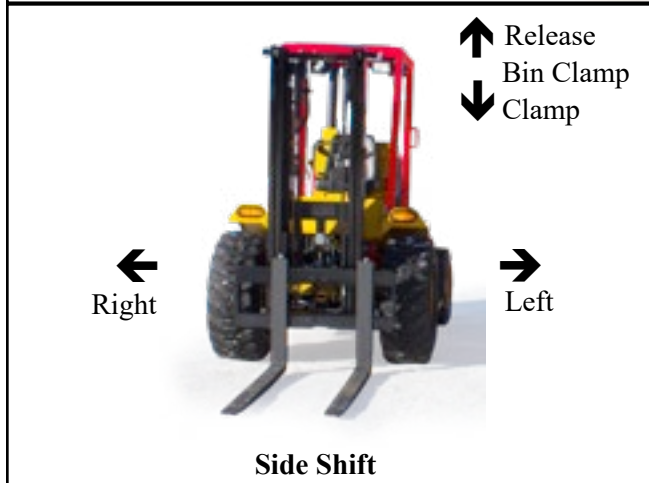
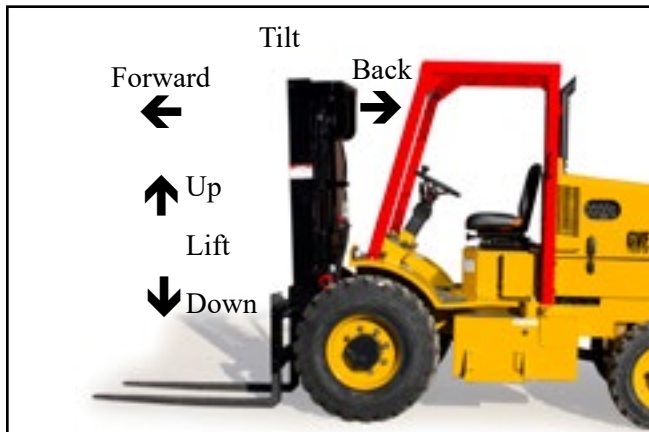


FIG. 28



FIG. 29

8. Emergency Parking Brake Release

See FIG. 30 for instruction on emergency release of the parking brake.



ALWAYS block wheels to prevent forklift from moving prior to releasing brakes.

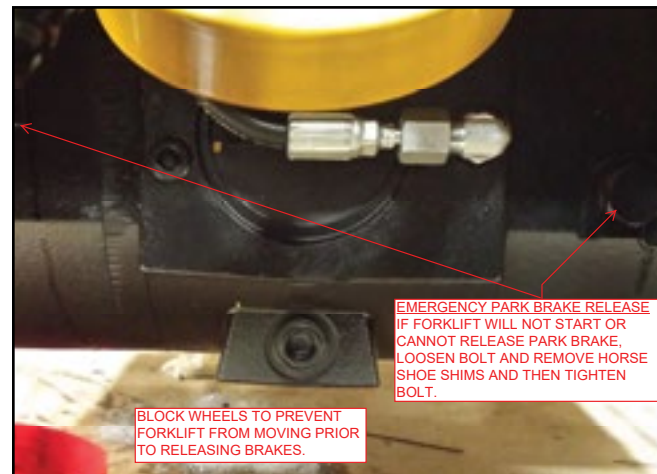


FIG. 30

7. Parking Brake Operation FIG. 29

Push switch ahead towards OFF. Green light will illuminate to release parking brake. To engage parking brake push switch towards ON. The parking brake is spring applied but hydraulically released. This means that the engine must be running to release the parking brake.

9. Four Wheel Drive Operation

On forklifts equipped with the four-wheel drive option, the four-wheel drive is engaged by switching the rocker switch. FIG. 29

The light will illuminate.

NOTE! Four-wheel drive can be selected while traveling straight.

NOTE! Front and rear wheels must be traveling at the same rate of speed while engaging and disengaging four-wheel drive. Example: forklift cannot be sitting stationary with front wheels spinning while attempting to engage four-wheel drive.

10. Fueling FIG. 31

1. Shut off engine.
2. Do NOT smoke while refueling.
3. Clean debris from around cap to prevent contamination.
4. Remove Cap.
5. Insert nozzle.
6. Fill.
7. Replace cap.



FIG. 31

TROUBLESHOOTING

The following is a list of engine error codes.

The standard list of diagnostics valid from RC3 software is reported in the following table:

N.	P code	Name	Description	Wired		CAN			
				MIL	SVS	RS	AW	SPN	FMI
1	P0563	VBBH	Vehicle system voltage too high (> 16 V)	1	1	1	1	168	3
2	P0562	VBBL	Vehicle system voltage too low (< 8 V)		1		1	168	4
3	P0643	VCC1H	Battery 5V reference 1 circuit high (5V power supply for sensor)	1		1		3509	3
4	P0642	VCC1L	Battery 5V reference 1 circuit low (5V power supply for sensor)	1		1		3509	4
5	P0653	VCC2H	Battery 5V reference 2 circuit high (5V power supply for sensor)	1		1		3510	3
6	P0652	VCC2L	Battery 5V reference 2 circuit low (5V power supply for sensor)	1		1		3510	4
7	P0118	THWH	Coolant temperature sensor signal too high		1		1	110	3
8	P0117	THWL	Coolant temperature sensor signal too low		1		1	110	4
9	P0116	THWP	Coolant temperature sensor performance invalid		1		1	110	2
10	P0113	THAH	Air temperature sensor signal too high		1		1	105	3
11	P0112	THAL	Air temperature sensor signal too low		1		1	105	4
12	P0183	THFH	Fuel temperature (w/pump) sensor signal too high		1		1	174	3
13	P0182	THFL	Fuel temperature (w/pump) sensor signal too low		1		1	174	4
14	P0191	PCP	C/Rail press. Sensor signal keeping the middle range		1		1	157	9
15	P0191	PCO	PC sensor offset diagnosis (drifted high or low)		1		1	157	2

Engine error codes continued.

16	P0191	PCONOX	PC sensor offset diagnosis for NOX requirement (drifted high or low)		1		1	157	14
17	P0191	PCOH	PC sensor high offset		1		1	157	20
18	P0193	PCH	C/Rail pressure sensor signal too high		1		1	157	3
19	P0192	PCL	C/Rail pressure sensor signal too low		1		1	157	4
20	P2229	PATMH	Atmosphere pressure sensor signal too high		1		1	108	3
21	P2228	PATML	Atmosphere pressure sensor signal too low		1		1	108	4
22	P0238	PIMH	Boost pressure sensor signal too high		1		1	102	3
23	P0237	PIML	Boost pressure sensor signal too low		1		1	102	4
24	P0236	PIMP1	Boost pressure sensor performance invalid		1		1	102	2
25	P0123	ACCP1H	Accelerator pedal sensor No.1 signal too high	1		1		91	3
26	P0122	ACCP1L	Accelerator pedal sensor No.1 signal too low	1		1		91	4
27	P0223	ACCP2H	Accelerator pedal sensor No.2 signal too high	1		1		29	3
28	P0222	ACCP2L	Accelerator pedal sensor No.2 signal too low	1		1		29	4
29	P0228	PTOPH	Accelerator pedal for ASC (PTO) sensor signal too high	1		1		28	3
30	P0227	PTOPL	Accelerator pedal for ASC (PTO) sensor signal too low	1		1		28	4
31	P0406	LEGRH	EGR (exhaust gas recirculation) lift sensor signal too High	1		1		2791	3
32	P0405	LEGRL	EGR (exhaust gas recirculation) lift sensor signal too low	1		1		2791	4
33	P0503	SPDH	Vehicle speed sensor frequency too high	1		1		84	8
34	P0502	SPDL	Vehicle speed sensor input open/ short	1		1		84	5
35	P0501	SPDSG	Vehicle speed sensor signal invalid	1		1		84	2
36	P0337	NENOP	Crank position (CKP) sensor no pulse	1		1		249	8
37	P0336	NEPUM	Crank position (CKP) sensor performance invalid	1		1		249	2
38	P0342	GNOP	Camshaft position (CMP) sensor no pulse	1		1		637	8
39	P0341	GPUM	Camshaft position (CMP) sensor performance invalid	1		1		637	2
40	P0385	NEGNON	Crank position and camshaft position sensor no pulse	1		1		190	9
41	P2148	BSTWV1	COM1 Injector drive system output short to BATT Injector1 or Injector3 (4cyl engine)/Injector2 (3cyl engine) output short to BATT	1		1		1397	3
42	P2147	GSTWV1	COM1 Injector drive system output short to GND Injector1 or Injector3 (4cyl engine)/Injector2 (3cyl engine) output short to GND	1		1		1397	4
43	P2146	NCCOM1	COM1 Injector drive system output open load both Injector1 and Injector4 (4cyl engine)/Injector2 (3cyl engine) open load	1		1		1397	5
44	P0201	NCTWV1	Injector1 output open load injector coil open	1		1		1393	5
45	P0205	NCTWV2	Injector3 output open load injector coil open	1		1		1394	5
46	P0203	NCTWV3	Injector4 (4cyl engine)/Injector2 (3cyl engine) output open load injector coil open	1		1		1395	5
47	P0206	NCTWV4	Injector2 (4cyl engine) output open load injector coil open	1		1		1396	5
48	P0611	LCHG	Capacitor charge-up circuit malfunction injector (insufficient charge) within ECU	1		1		167	31
49	P0200	OCHG	Capacitor charge-up circuit malfunction injector (excessive charge)	1		1		167	1
50	P0263	ANGSPD1	Engine angle speed error1 (Injector1)	1		1		1393	2
51	P0275	ANGSPD2	Engine angle speed error2 (Injector3)	1		1		1394	2
52	P0269	ANGSPD3	Engine angle speed error3 (Injector4 (4cyl engine)/Injector2 (3cyl engine))	1		1		1395	2
53	P0278	ANGSPD4	Engine angle speed error4 (Injector2)	1		1		1396	2
54	P1602	QRNOT	QR data is not written	1		1		2802	13
55	P0602	QRERR	QR data error		1		1	2802	11
56	P1601	ABNQR	QR definition error (definition concerning QR correction is not right)		1		1	2802	9
57	P0629	BSSCV	SCV(+) output short to BATT; SCV(-) output short to BATT	1		1		94	3
58	P0627	DRSCV	SCV(+) output open load/short to GND; SCV(-) output open load/short to GND; SCV coil open/short	1		1		94	6
59	P0088	PCEX3	C/Rail pressure exceeds hi upper limit3	1		1		157	0

Engine error codes continued.

60	P1220	PCOVR	C/Rail pressure control cannot achieve target fuel		1		1	157	31
61	P1221	PCUND	C/Rail pressure falls below the control limit of the target pressure		1		1	157	1
62	P2293	PCEX2	C/Rail pressure exceeds hi upper limit2	1		1		157	16
63	P1217	PCEX1	C/Rail pressure exceeds hi upper limit1	1		1		157	15
64	P1219	PLACT	P/L (pressure limiter) activated	1		1		156	14
65	P2269	WGTHR	Water in fuel filter failure		1		1	97	2
66	P1222	FIPRES1	Fuel filter diagnosis level 1		1		1	1382	16
67	P1223	FIPRES2	Fuel filter diagnosis level 2	1		1		1382	0
68	P0234	TBOPH	Boost pressure sensor exceeds upper limit	1		1		1127	0
69	P0299	TBOPL	Boost pressure sensor exceeds lower limit		1		1	1127	1
70	P0541	GRELGD	Glow relay output open load/short to GND		1		1	626	4
71	P0542	GRELB	Glow relay output short to BATT		1		1	626	3
72	P0615	STSWBT	Starter switch short to BATT	1		1		430	3
73	P0704	CLSW	Clutch switch circuit malfunction (manual transmission only)		1		1	598	2
74	P0850	NEUTSW	Neutral switch circuit malfunction (manual transmission only)		1		1	604	2
75	P0524	POILDN	Engine oil pressure low	1		1		100	1
76	P0217	THWOT	Coolant temperature exceeds upper limit	1		1		110	0
77	P0219	NEOR	Engine over speed condition	1		1		190	0
78	P0607	SCPU	CPU fault; watchdog IC fault	1		1		2802	31
79	P0606	MCPU	CPU fault; main CPU fault	1		1		2802	12
80	P0601	FROM	Check sum error - flash area	1		1		2802	14
81	U0101	CANOPENGENU	CAN bus-line open from general unit		1		1	1083	31
82	U0073	CANB1	CAN1 node error		1		1	1083	19
83	U1001	CANB2	CAN2 node error		1		1	1084	19
84	P0694	CFANLBT	Coolant fan low speed relay short to battery		1		1	1639	5
85	P0693	CFANLGD	Coolant fan low speed relay short to GND		1		1	1639	6
86	P0696	CFANHBT	Coolant fan high speed relay short to battery	1		1		1639	3
87	P0695	CFANHGD	Coolant fan high speed relay short to GND	1		1		1639	4
88	P0480	EFAN	Electric fan open load/short to GND/short to battery	1		1		1639	31
89	P2280	AFC	Air filter clogging error	1		1		107	2
90	P2280	PAFDFH	Air filter differential pressure sensor signal too high		1		1	107	3
91	P2280	PAFDL	Air filter differential pressure sensor signal too low		1		1	107	4
92	P0463	FLEVH	Fuel level sensor signal too high		1		1	96	3
93	P0462	FLEVL	Fuel level sensor signal too low		1		1	96	4
94	P0935	PHYDH	Hydraulic pressure sensor signal too high		1		1	1762	3
95	P0934	PHYDL	Hydraulic pressure sensor signal too low		1		1	1762	4
96	P1219	PLVHIRP	Multiple high rail pressure error/ Engine stall after PLV opening	1		1		156	2
97	P268B	IPMPSTDYNOT	Pump learning uncompleted		1		1	1349	2
98	P0404	EGRBM	EGR battery/motor failure (for CAN)	1		1		2791	14
99	P0400	EGRFPD	EGR feedback/position sensor/Dynamic range failure (for CAN)	1		1		27	7
100	U0411	EGRNTNR	EGR no transmission/not received failure (for CAN)	1		1		2791	2
101	P2425	EGRT	EGR valve temperature failure (for CAN)	1		1		2791	31
102	P0488	EGRVI	EGR valve stuck/initialization failure (for CAN)	1		1		2791	7
103	P2123	PTOP2H	Accelerator pedal for ASC (PTO) sensor 2 signal too high	1		1		28	20
104	P2122	PTOP2L	Accelerator pedal for ASC (PTO) sensor 2 signal too low	1		1		28	21
105	P0403	EGRCLEAN	EGR Cleaning failure (valve stuck open/poppet much lower than normal)		1		1	2791	13

Engine error codes continued.

106	U0107	TSC1TMERR	TSC1 Time out error	1		1		3349	9
107	U0408	TSC1RC	TSC1 Rolling count test	1		1		3349	10
108	U0408	TSC1CS	TSC1 Checksum test	1		1		3349	2
109	P0232	ELPUMPBT	Electric lift pump relay short to battery		1		1	4082	3
110	P0231	ELPUMPGD	Electric lift pump relay short to GND		1		1	4082	4
111	P0617	STARELBT	Starter relay short to battery	1		1		430	5
112	P0616	STARELGD	Starter relay short to GND	1		1		430	4
113	P0016	NEGUM*	Crankshaft and Camshaft synchronous error	1		1		190	2

* Available from RC4 software

A system action can be triggered as a consequence of each diagnostic:

- XQPTN2: Inhibition of Post Injection
- XQPTN1: Inhibition of Pilot/Post Injection
- XPCLMTLOW: Rail pressure lower limit
- XPCLMTLEV2: Rail pressure upper limit 2
- XPCLMTLEV1: Rail pressure upper limit 1
- XQLMTLEV3: Fuel quantity limit 3
- XQLMTLEV2: Fuel quantity limit 2
- XQLMTLEV1: Fuel quantity limit 1
- XACCLEV3: Accelerator limit 3
- XACCLEV2: Accelerator limit 2
- XACCLEV1: Accelerator limit 1
- XENSTRQLEV2: Engine stop with delay
- XENSTRQLEV1: Engine stop
- XSYSOP03: Inhibition of PTO control
- XEGRIH: Inhibition of EGR control
- XFCCBLMT: Inhibition of FCCB control

Default behavior in the following table (valid from RC3 software):

N.	Name	System Action														
		XQPTN2	XQPTN1	XPCLMTLOW	XPCLMTLEV2	XPCLMTLEV1	XQLMTLEV2	XQLMTLEV1	XACCLEV3	XACCLEV2	XACCLEV1	XENSTRQLEV2	XENSTRQLEV1	XSYSOP03	XEGRIH	XQLMTLEV3
1	VBBH						1			1				1		
2	VBBL		1**		1		1								1	
3	VCC1H		1**		1			1		1				1		
4	VCC1L		1**		1			1		1				1		
5	VCC2H							1		1					1	
6	VCC2L							1		1					1	
7	THWH		1**				1									
8	THWL		1**													
9	THWP		1**				1									
10	THAH						1							1		
11	THAL						1							1		

LUBRICATION & MAINTENANCE

Before performing any maintenance, service or work on this forklift you must read and familiarize yourself with the **SAFETY** section of this manual. Proper training and knowledge is also required before working on any equipment.

INSTRUCTIONS FOR PRESSURE WASHING

When pressure washing, protect and **DO NOT** direct the jet on the following components:

Alternator, Axle pivot pins, Radiator, Starter motor, Hydraulic oil cooler, Transmission oil cooler, Instrument panel, Electrical harness and connections, and Safety decals.

LUBRICATION & MAINTENANCE CHART

Item	Daily	As Needed	Weekly	Monthly	100 Hrs	250 Hrs	500 Hrs	1000 hrs	Reference Page
Grease All Grease Points					X				37, 38-42
Engine									
Engine	Refer to engine manual.								
Air Filter, Primary, for Tier IV Engine - GL 12265		X							37, 50
Air Filter, Safety, for Tier IV Engine - GL 12270		X							37, 50
Engine Coolant - change								X	37, 50
Engine Fluid Levels - check oil & coolant	X								49, 50
Engine Oil Filter - GL 13360					X Initially	X			49, 51-52
Engine Oil - change					X	X			37, 49, 51-52
Fuel Filter - GL 13355							X		49, 51
Axles									
Front Axle - check fluid levels				X					37, 60-62
Front Axle - change fluids					X Initially			X	37, 60-62
Front Axle - grease			X						37, 60-62
Rear Axle - check fluid levels				X					37, 63-65
Rear Axle - change fluids					X Initially			X	63-65
Rear Axle - grease			X						37, 63-65
Hydraulic									
Hydraulic Oil Change								X	37, 42-43
Hydraulic Oil Filter - GO 13656							X		43
Hydraulic Oil Level	X								42
Suction Strainer								X	
Mast & Forks									
Mast Chain Lubrication					X				66, 68
Mast Chain & Roller Inspection							X		66-69
Mast Inspection	X								66-69
Forks - examine	X								11 thru 15
Transmission									
Transmission Oil - change								X	37, 46-48
Transmission Oil Level - check			X						46-48
Transmission Oil Filter - GL 13380								X	46
Tires & Wheels									
Wheel Nut Torque					X		X		
Tire Pressure - 35 psi			X						

REFERENCE DOCUMENTS

GVF 4000 Forklift Owners Manual

Part Number: GL 11498

GVF 4000 Forklift Parts Manual

Part Number: GL 11499

Transmission Manuals

Service: TSM-0022

Parts: TPL-2370

Front Axle Manuals

Service: ASM-0127E

Parts:APL-4316

Rear Axle Manuals:

Service: ASM-0024E

Parts:APL-4315

Kohler Engine Manuals:

Operator's: KDI 1903M - KDI 2504M

Parts: ED795213

Service: MO KDI 1903_2504 TCR

FILTER PART NUMBERS

Engine Oil Filter

Part Number: GL 13360

Fuel Filter

Part Number: GL 13355

Transmission Oil Filter

Part Number: GL 13380

Hydraulic Oil Filter

Part Number: GO 13656

Tier IV Engine Air Filters:

Primary Filter

Part Number: GL 12265

Safety Filter

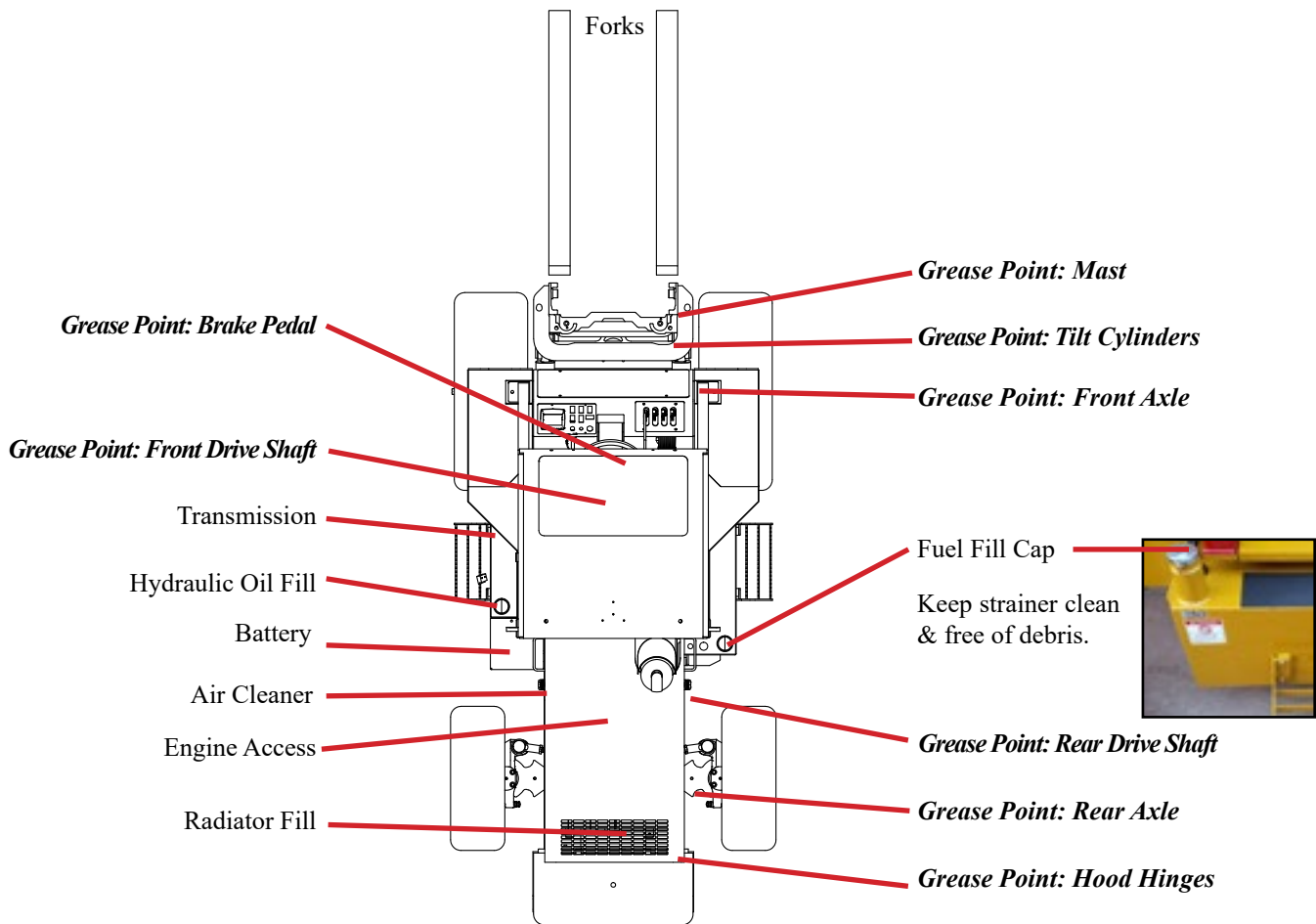
Part Number: GL 12270

RECOMMENDED FILL FOR OIL, FLUID AND GREASE:

TYPE	DESCRIPTION	QTY
Engine Oil	10W-30 OR 5W-40, CJ4	Tank Capacity: 3.04 gallons
Transmission Oil	SAE 30 Mobil trans HD series TO-4	Tank Capacity: 3.4 gallons
Front Axle	Mobile 424	
Rear Axle	Mobile 424	
Hydraulic Oil	AW46 Cam 2 Promax	Tank Capacity: 11 gallons
Coolant	Zerex HD Nitrite Free Valvoline	
Grease	Mobil Grease: CM-S: 40 degrees Fahrenheit and above CM-W: 40 degrees Fahrenheit and below	

GREASE POINT AND MAINTENANCE LOCATIONS DIAGRAM

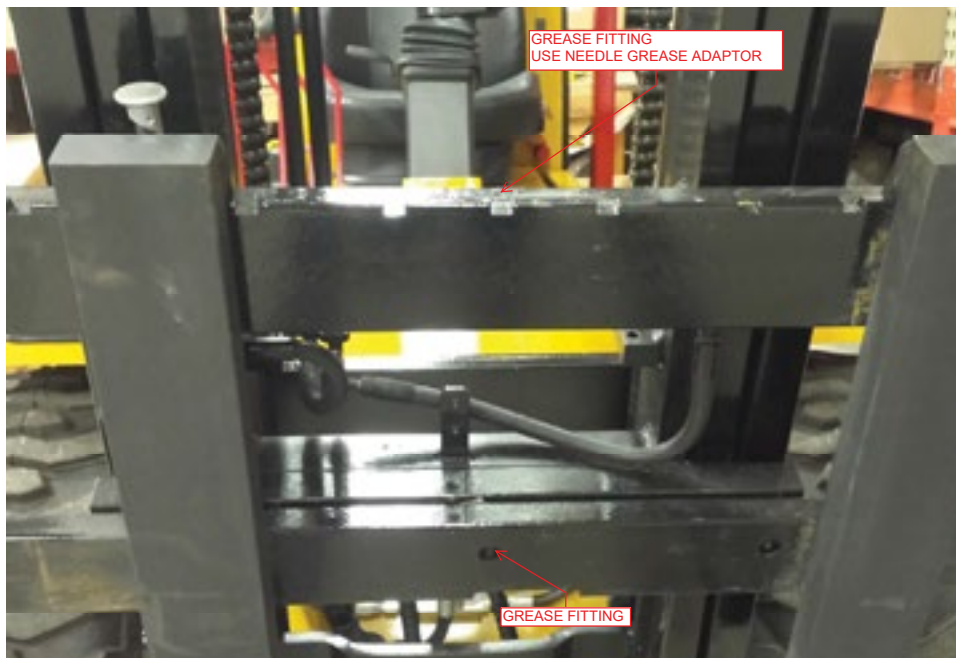
* First 100 hour initial service is to only be completed by your dealer.



GREASE POINT LOCATIONS

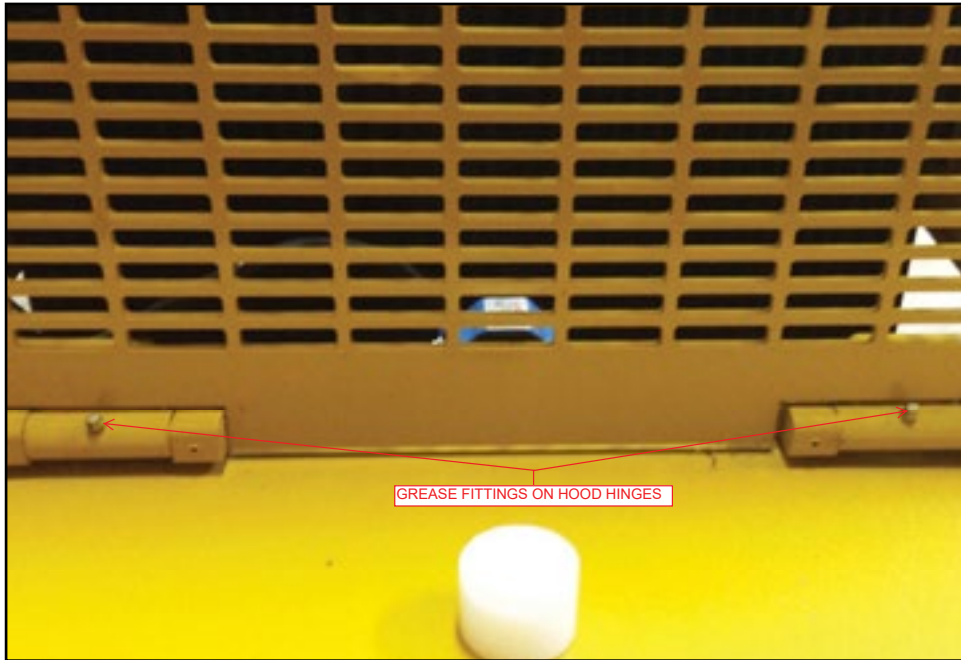


1. Mast Pivot - 1 point

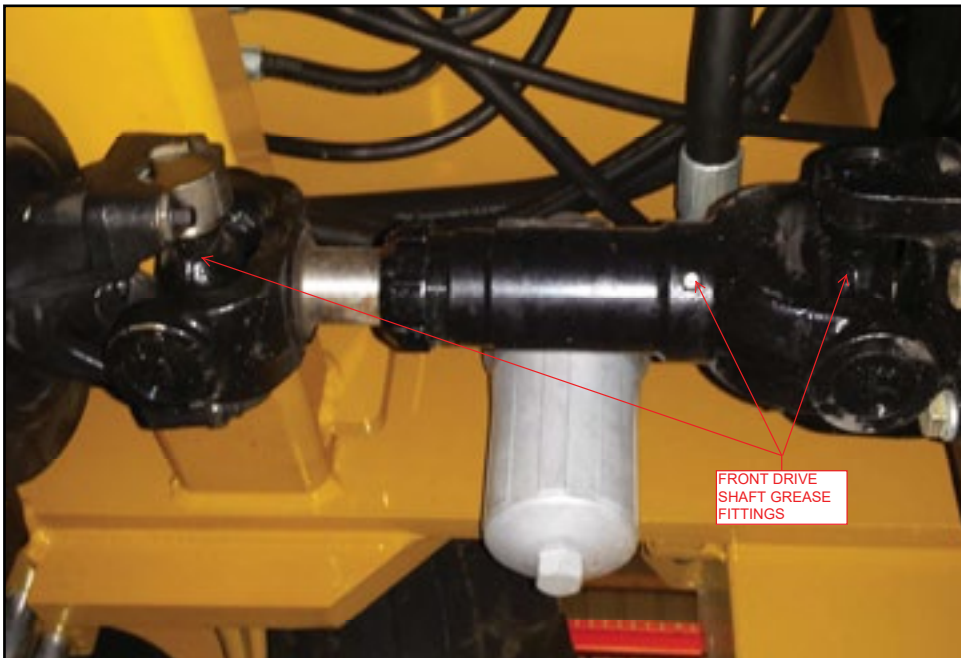


2. Mast - 2 points

Grease Point Locations Continued

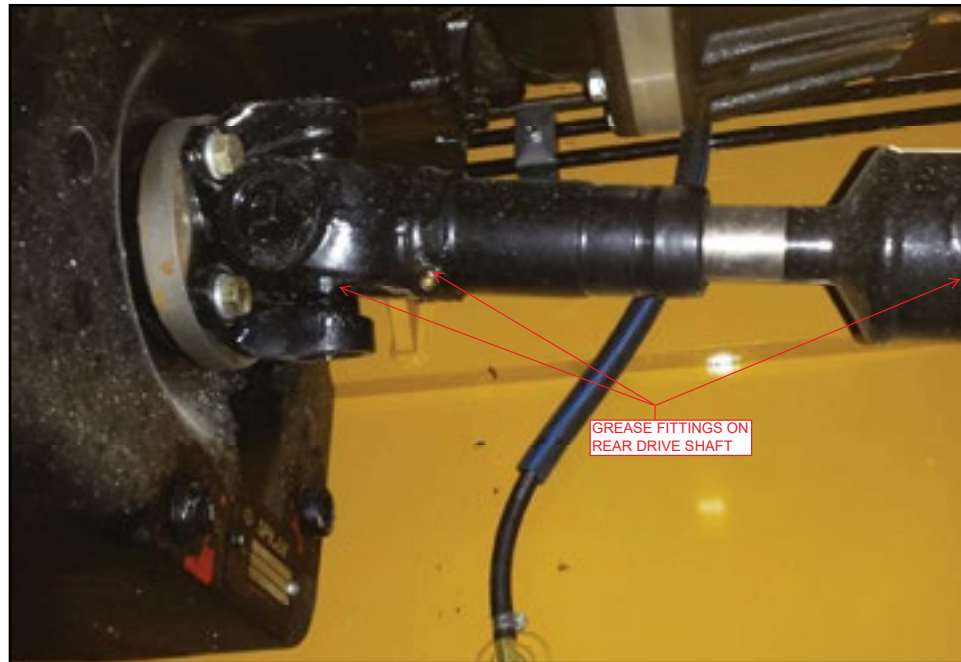


3. Hood Hinges - 2 points

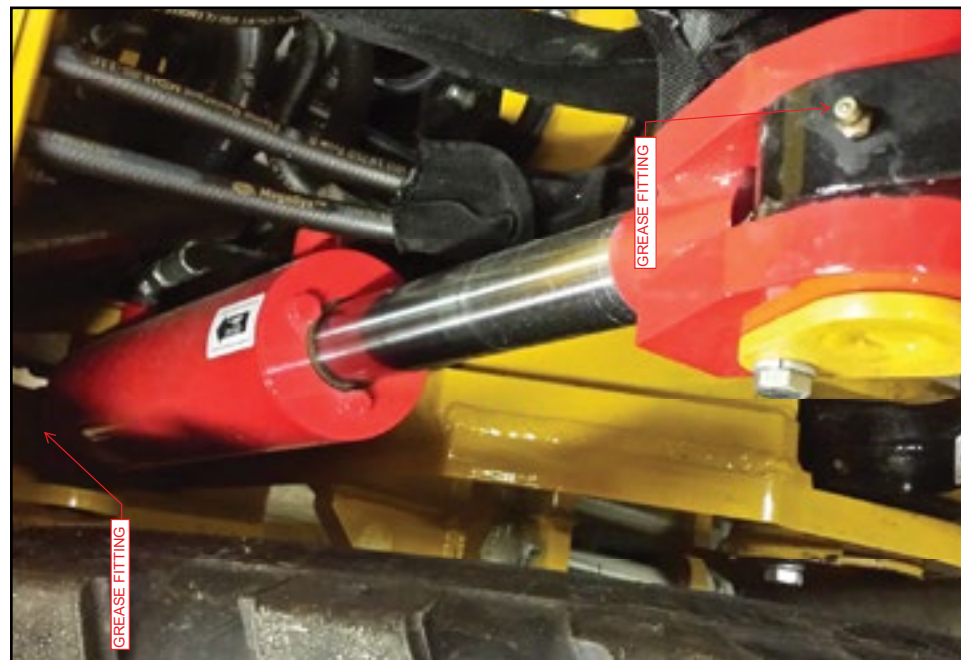


4. Front Drive Shaft - 3 points

Grease Point Locations Continued

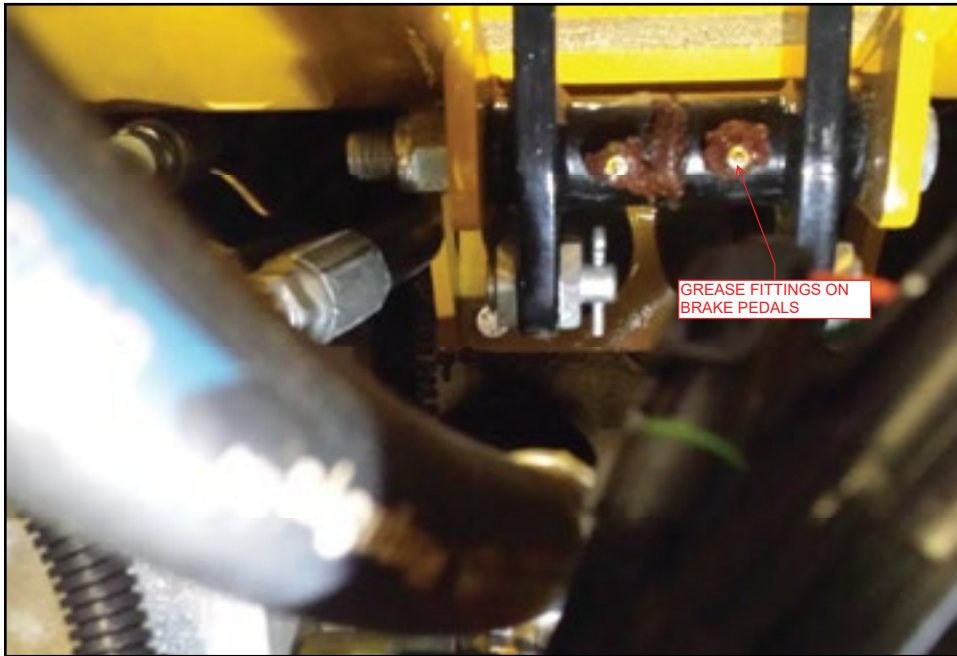


5. Rear Drive Shaft - 3 points



6. Tilt Cylinder - 2 points

Grease Point Locations Continued



7. Brake pedal - 2 points

HYDRAULIC SYSTEM

- 1. Hydraulic Oil Fill
- 2. Hydraulic Oil Sight Glass - check level
- 3. Hydraulic Oil Tank Drain Plug
- 4. Hydraulic Oil & Tank Specifications

SEE FIG. 32

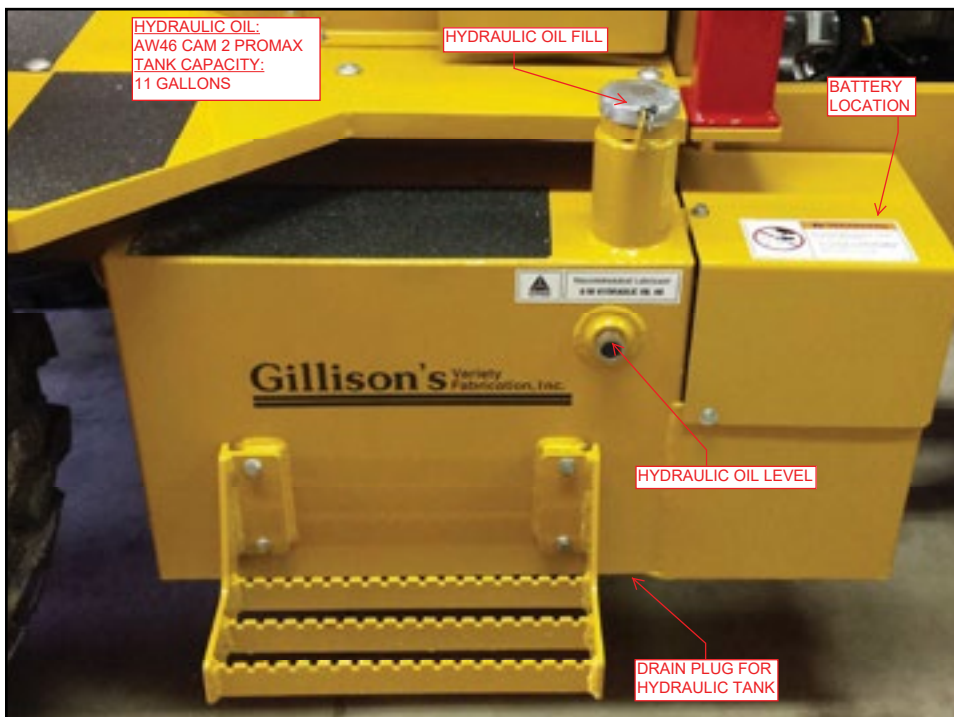


FIG. 32

4) Hydraulic Oil Filter Information

SEE FIG. 33

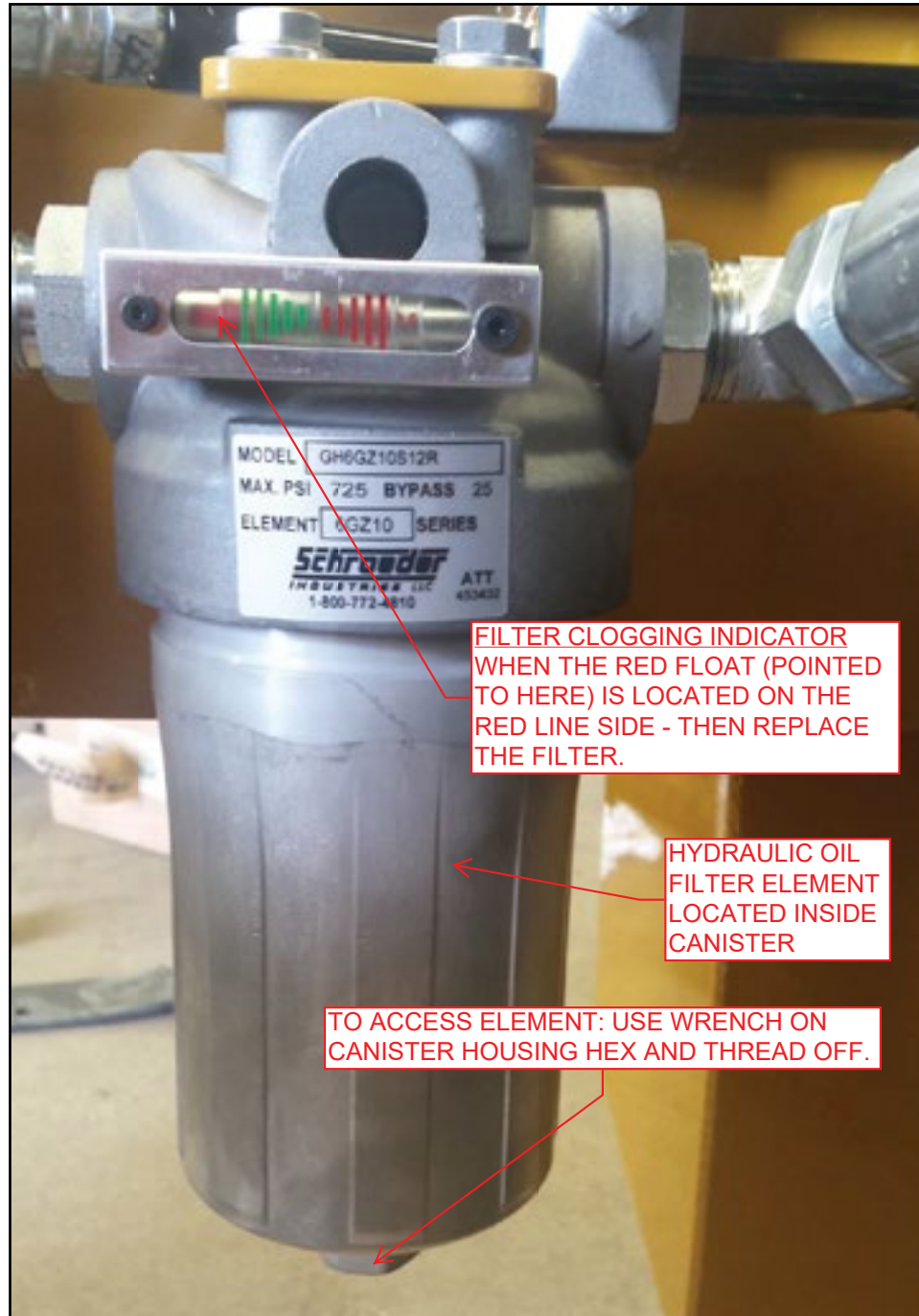
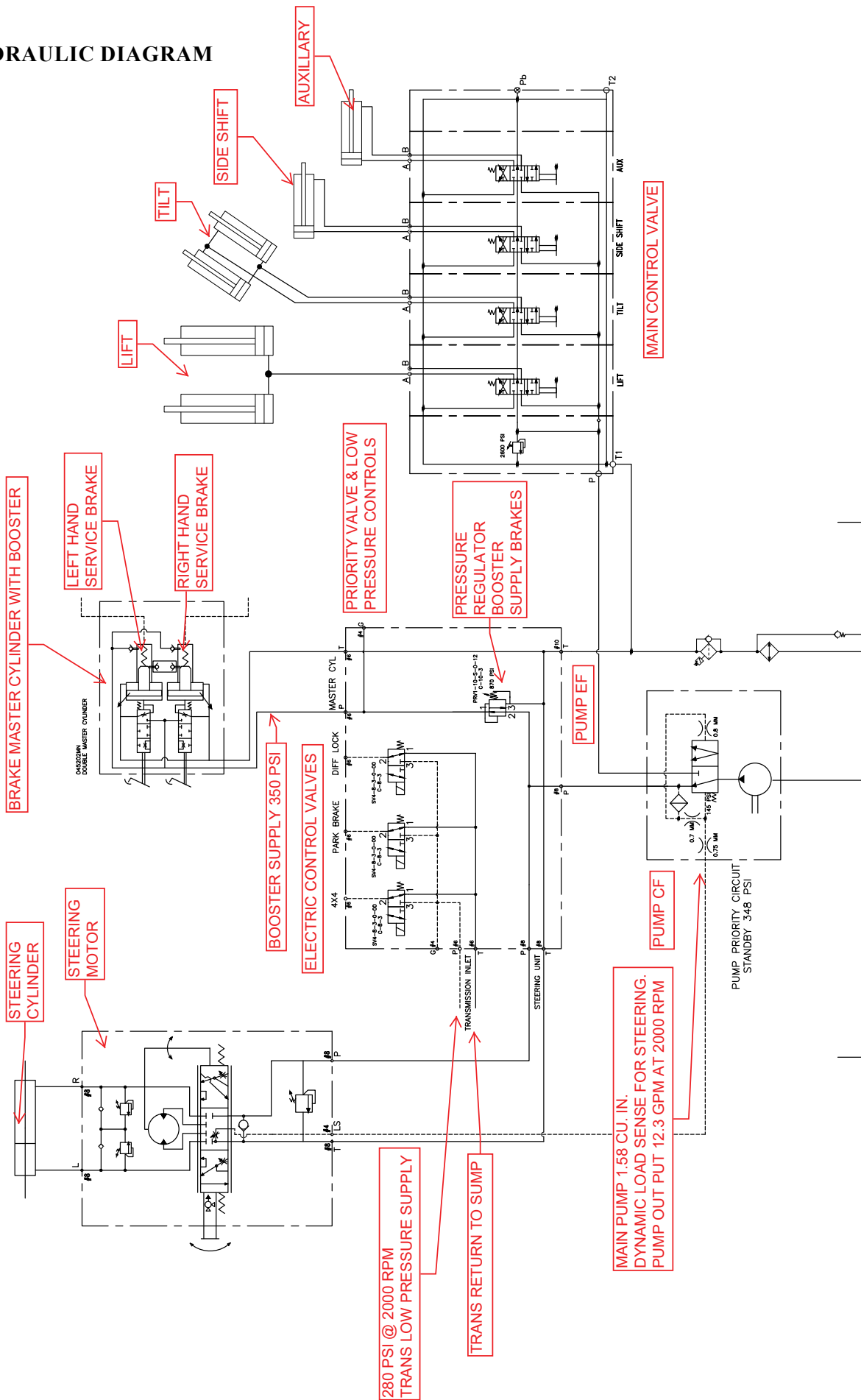


FIG. 33

HYDRAULIC DIAGRAM



HYDRAULIC SPECIFICATIONS

Pump

- 1.58 CI displacement
- 12.3 GPM @ 2000 RPM
- Stand by pressure 350 PSI
- CF supplies steering circuit first.
- EF supplies main control valve. When steering is not being used , control spool in pump shifts and supplies all of the pump flow to the EF.

Control Valve

- Open center
- Main relief 2600 PSI

Steering Motor

- Closed center with dynamic load sense.
- As steering wheel is turned, a load sensing signal is sent to the pump control to supply oil to the steering motor.
- Steering motor has port reliefs to limit pressure to the cylinder.

Priority Valve and Low Pressure Controls

Steering pressure is piped through the valve to supply a constant 350 PSI stand by pressure to the brake booster. The pressure regulator in the valve limits pressure to 350 PSI as steering pressure increases.

Low Pressure Electric Valves

Low pressure electric valves are supplied 280 PSI - low oil pressure from the transmission. The electric valves are 12V NO. When 12V is supplied, the valve closes and supplies oil to the circuit. When 12V is removed, the valve shuts off oil supply and drains the oil in the circuit to the sump.

TRANSMISSION

- 1. Transmission Oil Fill & Dipstick**
- 2. Transmission Oil Filter**
- 3. Transmission Oil & Tank Specifications**

SEE FIG. 34

- 4. Transmission Drain Plug**

SEE FIG. 35

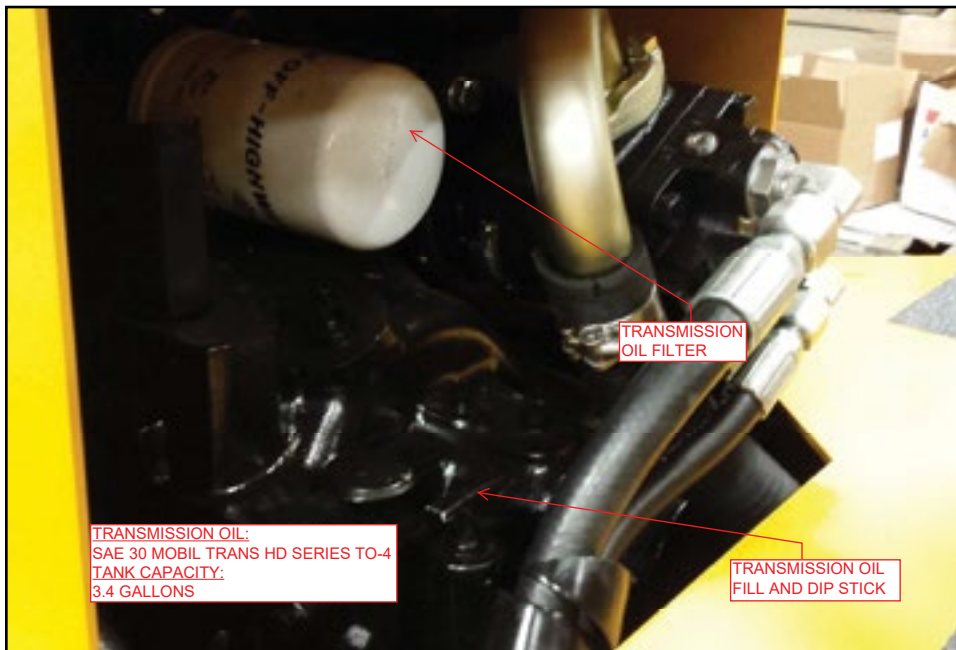


FIG. 34



FIG. 35

T120006SPDTRANSMISSIONMAINTENANCE

OIL SPECIFICATIONS

RECOMMENDED LUBRICANTS

CUSTOMER	OIL TYPE
CATERPILLAR	TO-4.
JOHN DEERE	J20 C. D.
MILITARY	MIL-PRF-2104G.
ALLISON	C-4.
DEXRON	II Equivalent - See note below.



DEXRON* II EQUIVALENT IS ACCEPTABLE; HOWEVER IT IS NOT COMPATIBLE WITH TORQUE CONVERTERS OR TRANSMISSIONS EQUIPPED WITH GRAPHITIC FRICTION MATERIAL CLUTCH PLATES.



DEXRON* III, ENGINE OIL OR GL-5 OILS ARE NOT RECOMMENDED.

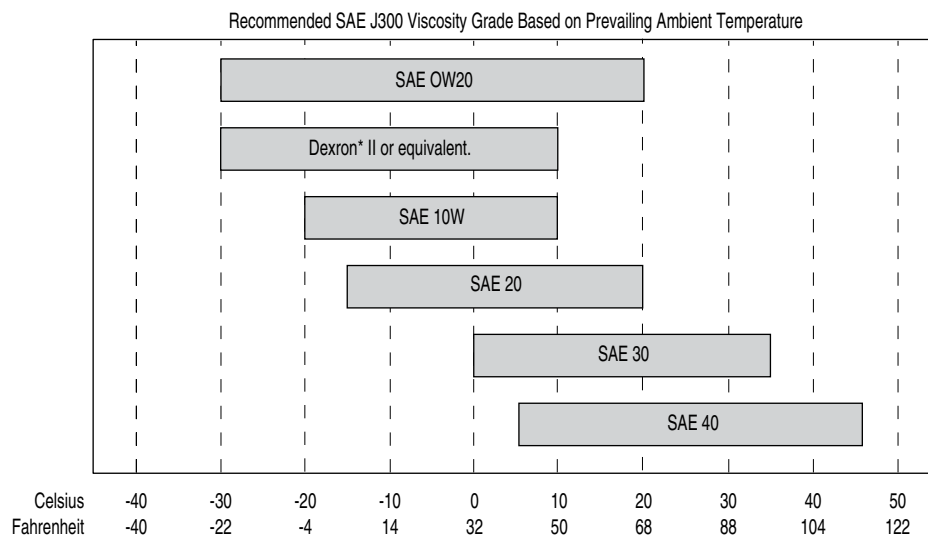
PREFERRED OIL VISCOSITY

It is recommended that the highest viscosity monograde lubricant available be used for the anticipated ambient temperature. Typically this will be a CAT TO-4 qualified lubricant. When large swings in ambient temperature are probable, J20 C, D multigrades are recommended. Multigrade lubricants should be applied at the lower viscosity rating for the prevailing ambient temperature, i.e. a 10W20 should be used where a 10W monograde is used. If a C-4 multigrade is used in stead of J20 lubricant it is recommended that the viscosity span no more than 10 points, i.e. 10W20.



SYNTHETIC LUBRICANTS ARE APPROVED IF QUALIFIED BY ONE OF THE ABOVE SPECIFICATIONS. OIL VISCOSITY GUIDELINES APPLY, BUT SYNTHETIC MULTIGRADES MAY SPAN MORE THAN 10 POINTS.

FOR FIRE RESISTANT FLUID RECOMMENDATIONS PLEASE CONTACT SPICER OFF-HIGHWAY PRODUCTS.



T 12000 - Maintenance Continued

VALID FOR: VDT12000 & T12000

NORMAL OIL CHANGE INTERVAL

Drain and refill system every 1000 hours for average environmental and duty cycle conditions. Severe or sustained high operating temperature or very dusty atmospheric conditions will result in accelerated deterioration or contamination. Judgement must be used to determine the required change intervals for extreme conditions.

EXTENDED OIL CHANGE INTERVAL

Extended oil service life may result when using synthetic fluids. Appropriate change intervals should be determined for each transmission by measuring oil oxidation and wear metals, over time, to determine a baseline. Wear metal analysis can provide useful information but a transmission should not be removed from service based solely on this analysis.

VALID FOR: T12000

SUMP PREHEATERS

Preheat the transmission fluid to the minimum temperature for the oil viscosity used before engine start up.

FILTERS

Service oil filters element every 1000 hours under normal environmental and duty cycle conditions.

*Dexron is a registered trademark of GENERAL MOTORS CORPORATION.

T12000 - 3, 4, 6 speed

MAINTENANCE INTERVALS

DAILY

Check oil level daily with engine running at idle (600 RPM) and oil at 82 - 93 °C (180-200 F).

Maintain oil level at full mark.

NORMAL DRAIN PERIOD

Normal drain period and oil filter element change are for average environment and duty cycle condition.

Severe or sustained high operating temperature or very dusty atmospheric conditions will cause accelerated deterioration and contamination.

For extreme conditions judgement must be used to determine the required change intervals.

EVERY 1000 HOURS

Change oil filter element.

Drain and refill system as follows (Drain with oil at 65 - 93 °C (150 - 200 F)):

- 1 Drain transmission.
- 2 Remove and discard filter. Install new filter.
- 3 Refill transmission to FULL mark.
- 4 Run engine at 500 - 600 RPM to prime convertor and lines.
- 5 Recheck level with engine running at 500 - 600 RPM and add oil to bring level to FULL mark. When oil temperature is hot 82.2 - 93.3 °C (180- 200 F) make final oil level check and adjust if necessary to bring oil level to FULL mark.



NOTE: IT IS RECOMMENDED THAT OIL FILTER BE CHANGED AFTER 100 HOURS OF OPERATION ON NEW, REBUILT OR REPAIRED UNIT.

ENGINE

1. Engine Air Cleaner
2. Engine Oil Filter
3. Fuel Hand Pump
4. Fuel Filter
5. Radiator Cap
6. Engine Oil & Tank Specifications
7. Engine Oil Fill
8. Engine Oil Dip Stick
9. Engine Oil Drain Plug

This manual contains only basic information on the engine. For more information on the engine, please refer to the engine manual.

SEE FIG. 36

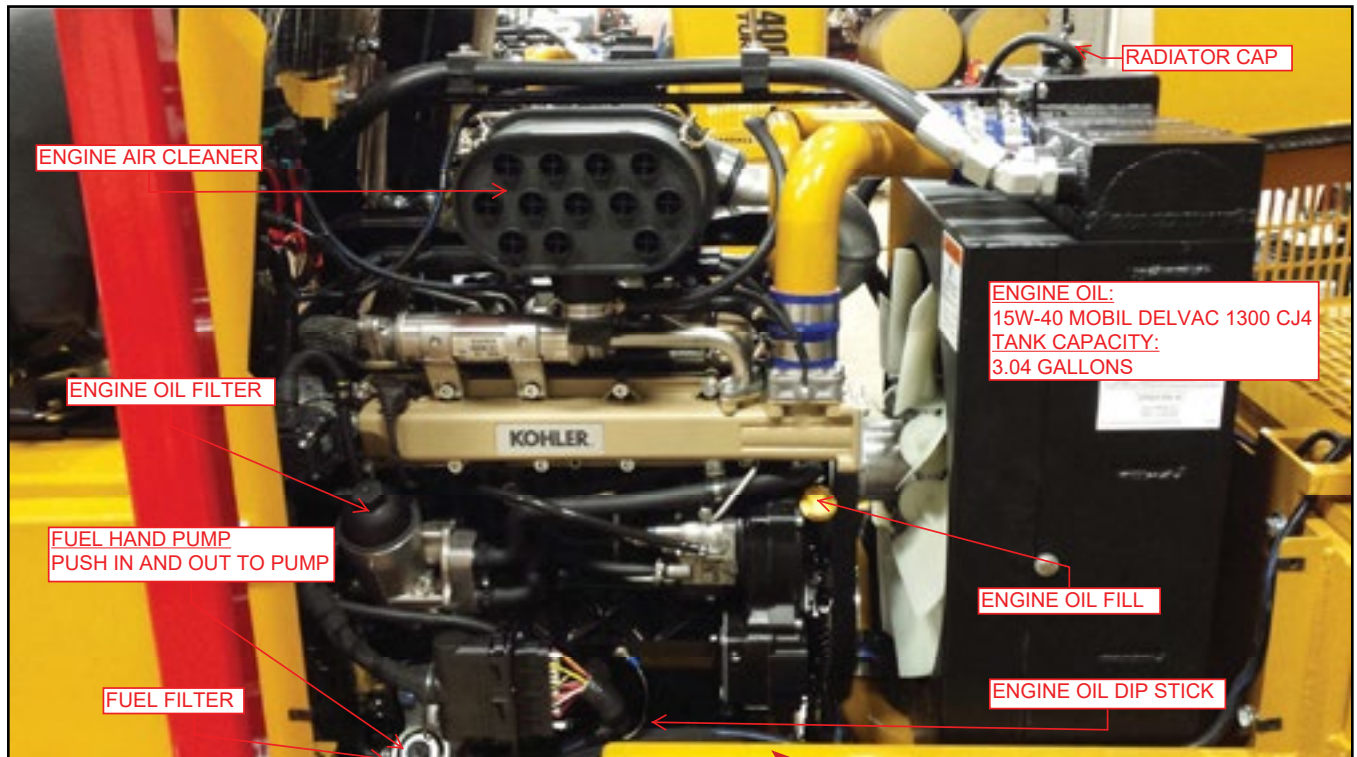


FIG. 36



Engine Continued

6. Fuse and Relay Locations

7. Engine Air Cleaner - also see diagram below

8. Muffler

9. Engine DOC

10. Hydraulic Oil cooler

11. Transmission Oil Cooler

12. Engine Charge Air Cooler

13. Engine Radiator

SEE FIG. 36 A

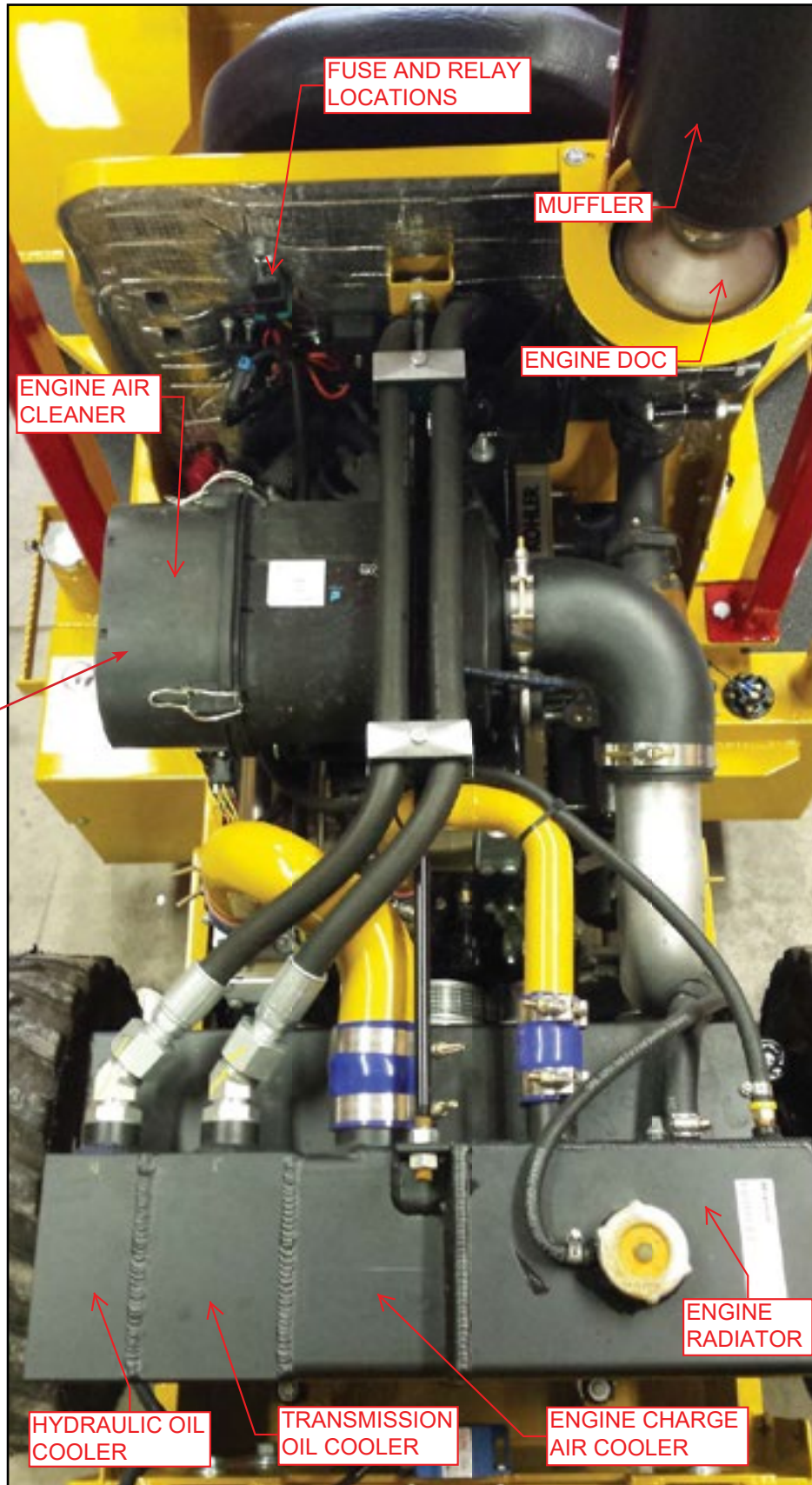
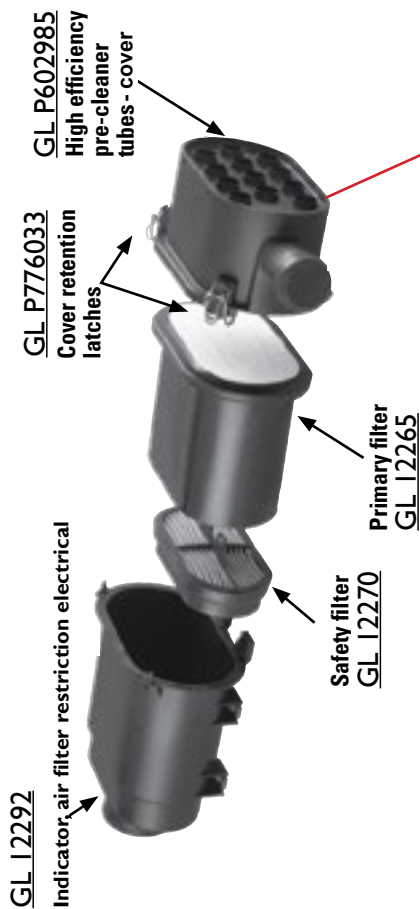


FIG. 36 A

Basic Engine Maintenance

KOHLER.**5.1 Useful information about maintenance**

- This chapter shows all operations described in the **Tab. 5.1** and **Tab. 5.2** that may be directly carried out by the user.
- Periodic inspection and maintenance operations must be carried out as indicated in this manual and are the responsibility of the user.
- Failure to comply with these service and maintenance intervals increases the risk of technical damage to the engine. Any non compliance makes the warranty become null and void.
- In order to prevent personal and property damage read carefully the instructions listed below before proceeding with any operation of the engine.

**Warning**

- Inspections must be made when the engine is off and cold.
- Place engine on level surface to ensure accurate measurement of oil level.
- Before starting, to avoid spillages of oil make sure that:
 - the oil dipstick is inserted correctly;
 - also check that:
 - oil drain plug and
 - oil filler cap are tightened firmly.

5.2 Periodic maintenance

The intervals of preventive maintenance in **Tab. 5.1** and **Tab. 5.2** refer to the engine operating under normal operating conditions with fuel and oil meeting the recommended specifications.

Tab. 5.1

CLEANING AND CHECKING						
OPERATION DESCRIPTION	PERIOD (HOURS)					PAR.
	10	250	500	1000	5000	
Engine oil level						5.3
Coolant level / Check of the radiator heat-exchanger surface ⁽¹⁾						5.8 5.6
External cartridge dry-type air filter ⁽²⁾						5.5
Radiator heat-exchange surface ⁽²⁾						5.6
Alternator belt tension ⁽³⁾						5.9
Rubber hose (intake air / coolant)						5.7
Fuel hose						--

Tab. 5.2

REPLACEMENT						
OPERATION DESCRIPTION	PERIOD (HOURS)					PAR.
	10	250	500	1000	5000	
Engine oil ⁽¹⁾						6.1
Oil filter cartridge ⁽¹⁾						6.3
Fuel filter cartridge ⁽¹⁾						6.4
Alternator belt ^{(3) (4)}						--
Coolant ⁽⁴⁾						--
Intake manifold hose (air filter - intake manifold) ⁽⁵⁾						--
Coolant hoses ⁽⁵⁾						--
Dry air cleaner external cartridge ⁽⁵⁾	After 6 checks with cleaning The replacement must be carried out by authorized KOHLER workshops					6.5
Fuel line hose	The replacement must be carried out by authorized KOHLER workshops					

(1) - In case of low use: 12 months.

(3) - In case of low use: 36 months.

EN

(2) - The period of time that must elapse before checking the filter element depends on the environment in which the engine operates. The air filter must be cleaned and replaced more frequently under very dusty conditions.

(4) - In case of low use: 24 months.

(5) - The replacement must be carried out by authorized KOHLER workshops.

Basic Engine Maintenance - Engine Oil

KOHLER.**5.3 Oil level check**

- 1 - Remove the oil dipstick **B** and check that the level is up to **MAX**.
- 2 - Pour in recommended oil until reaching the **MAX** level mark.
- 3 - Reinstall the oil dipstick **B** completely.
- 4 - Re-tighten the cap **A** and/or **C** (Fig. 5.2).

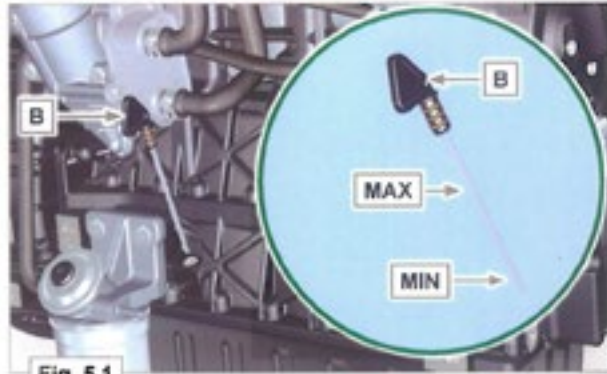


Fig. 5.1



Fig. 5.2

5.4 Oil dipstick on cylinder head

Fig. 5.3

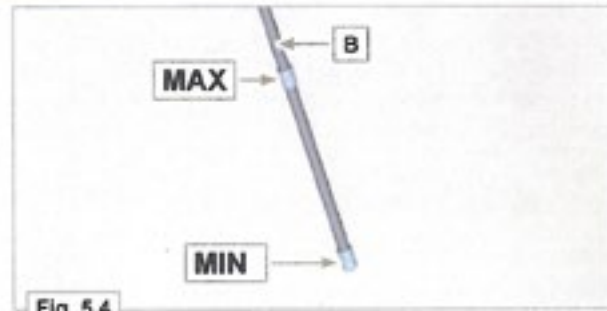


Fig. 5.4

ELECTRICAL

1. Battery

SEE FIG.32

2. Relays and Fuses

SEE FIG. 37

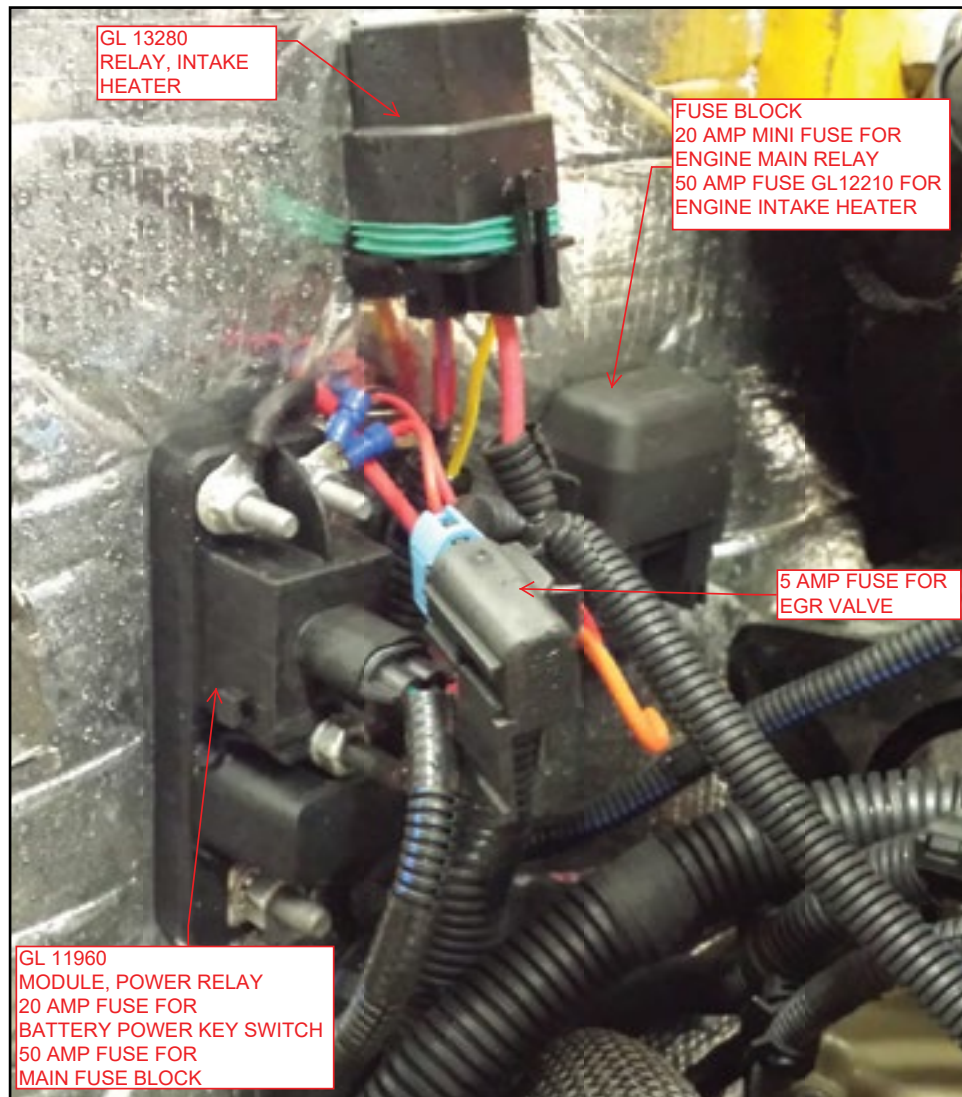


FIG. 37

3. Fuses

SEE FIG. 38

4. Main Fuse Block

SEE FIG. 39



FIG. 38

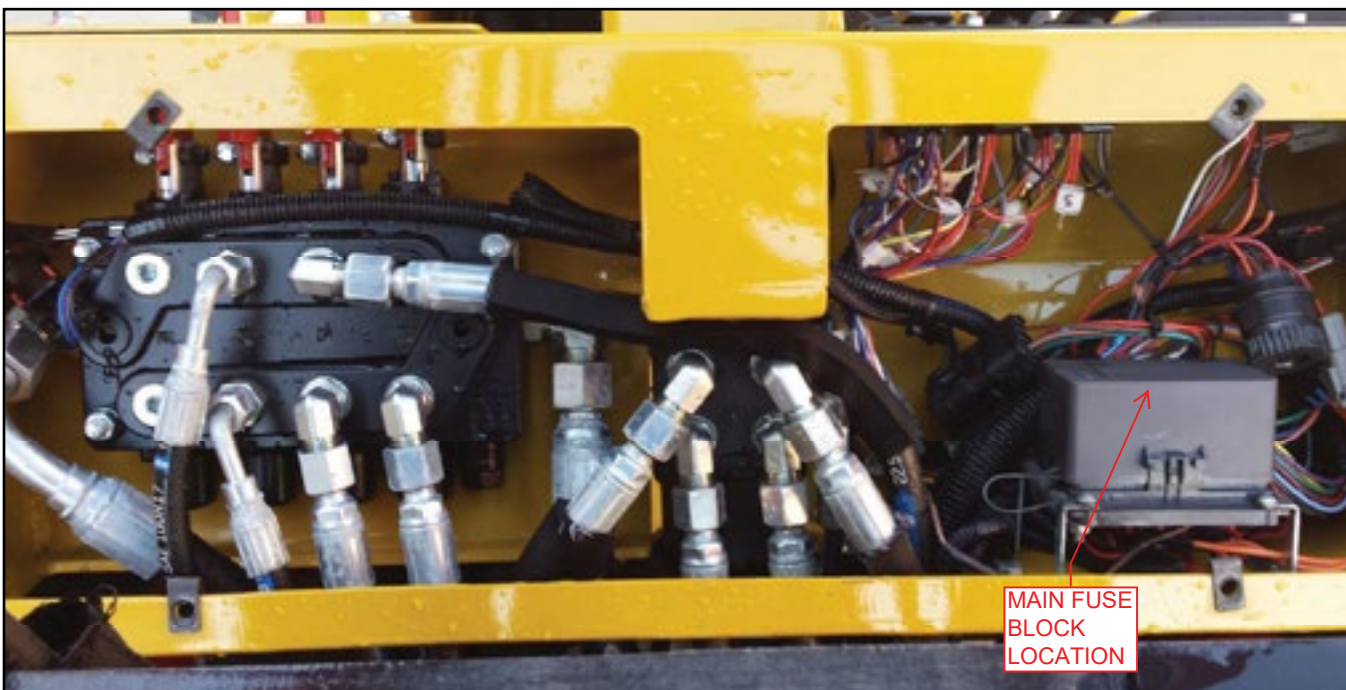
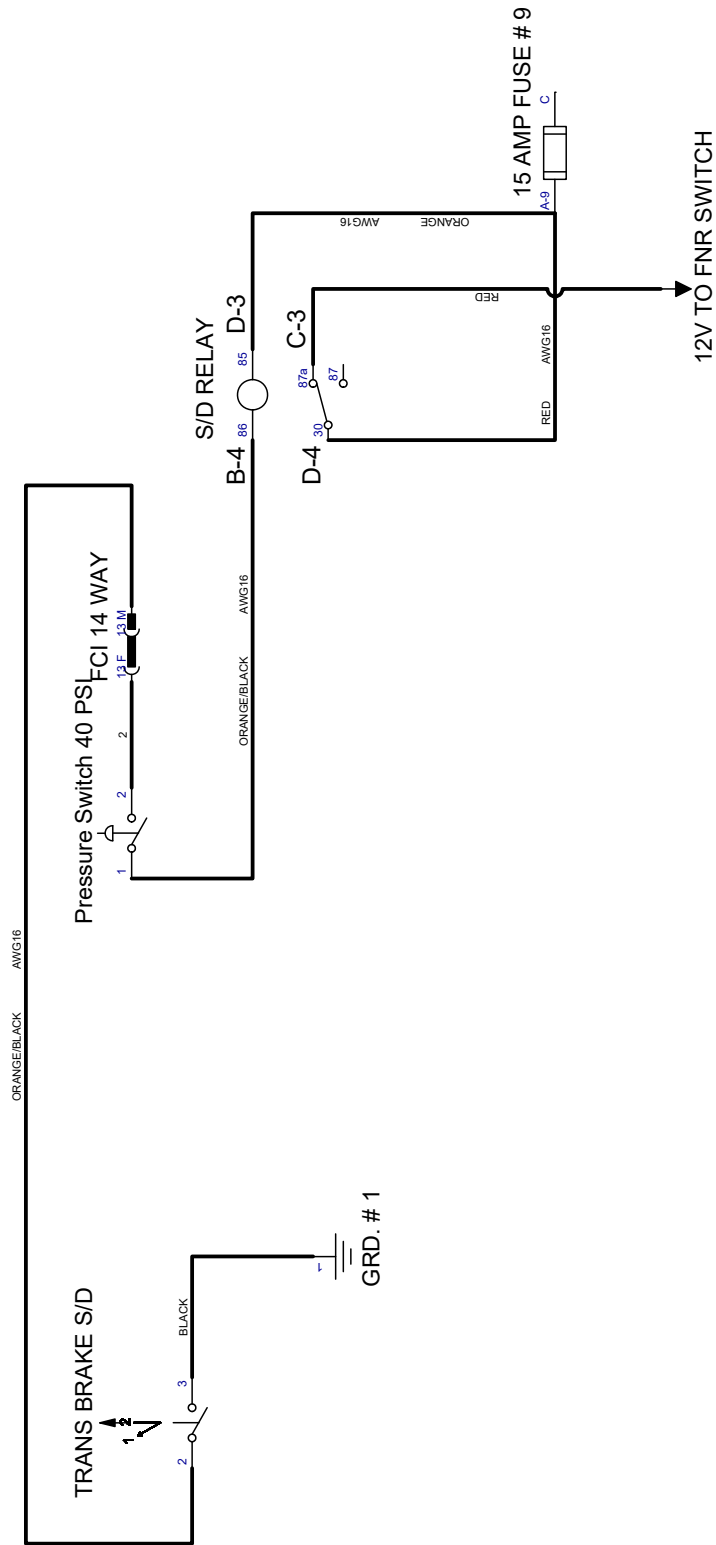
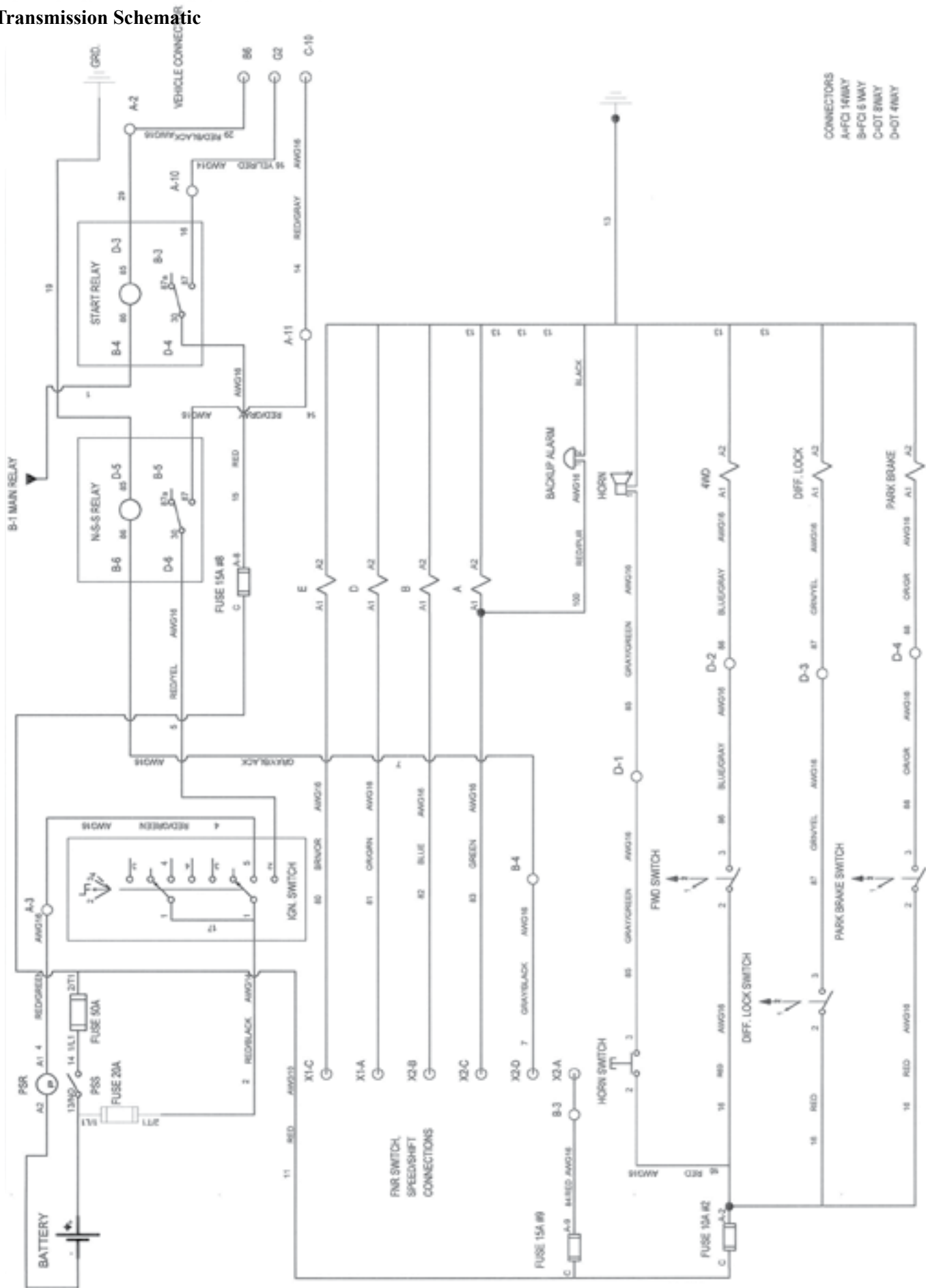


FIG. 39

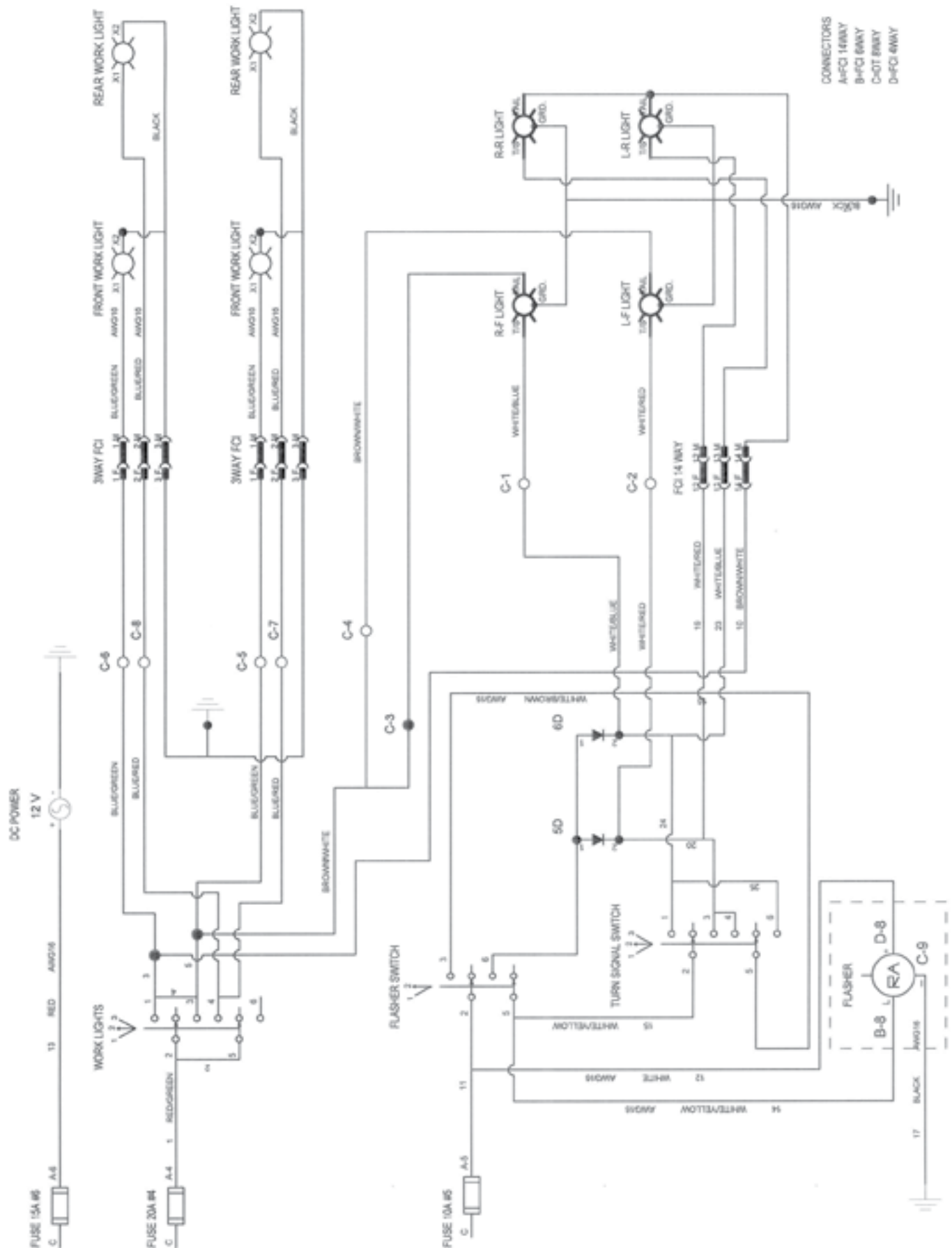
Trans Brake Electrical Circuit



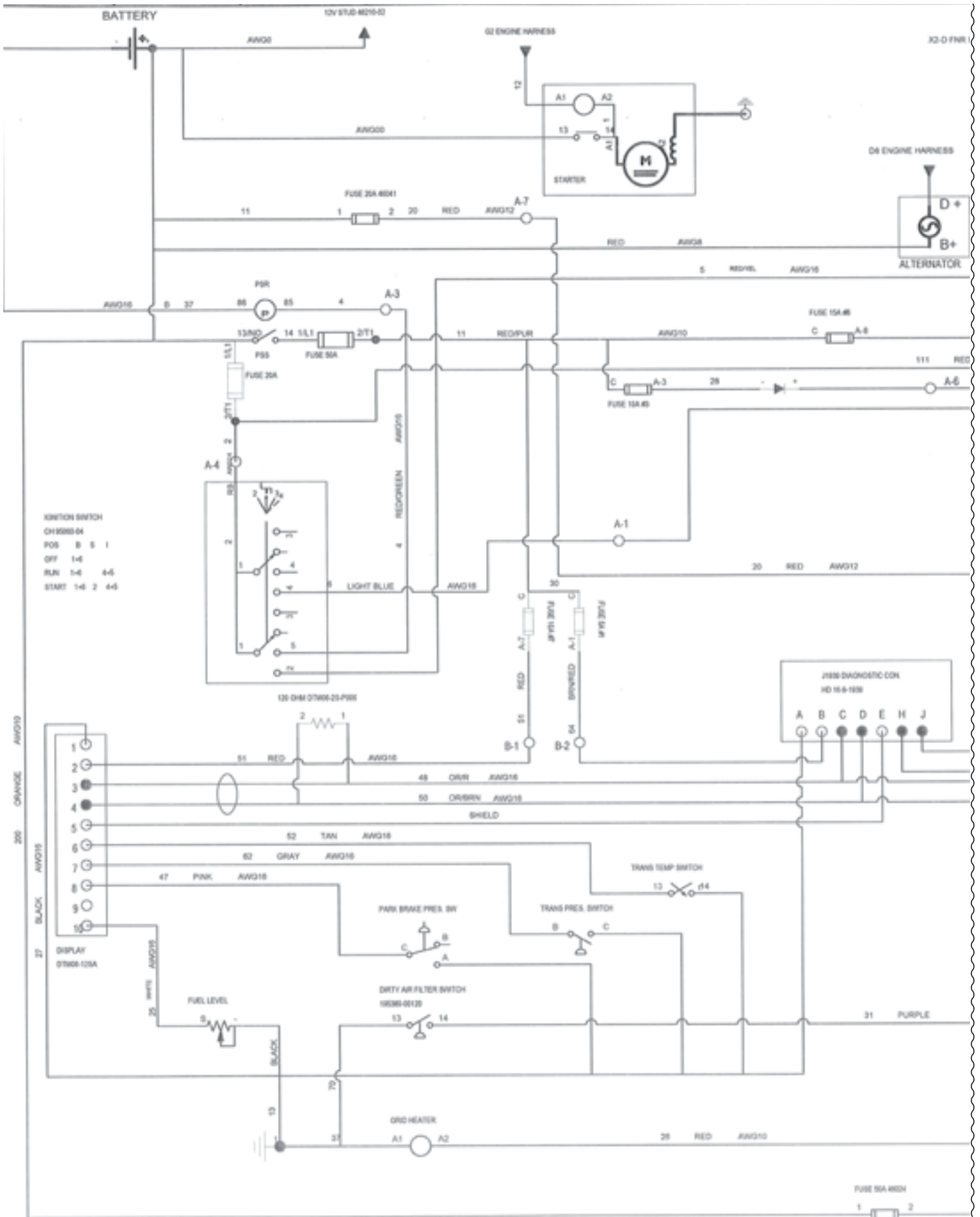
Transmission Schematic



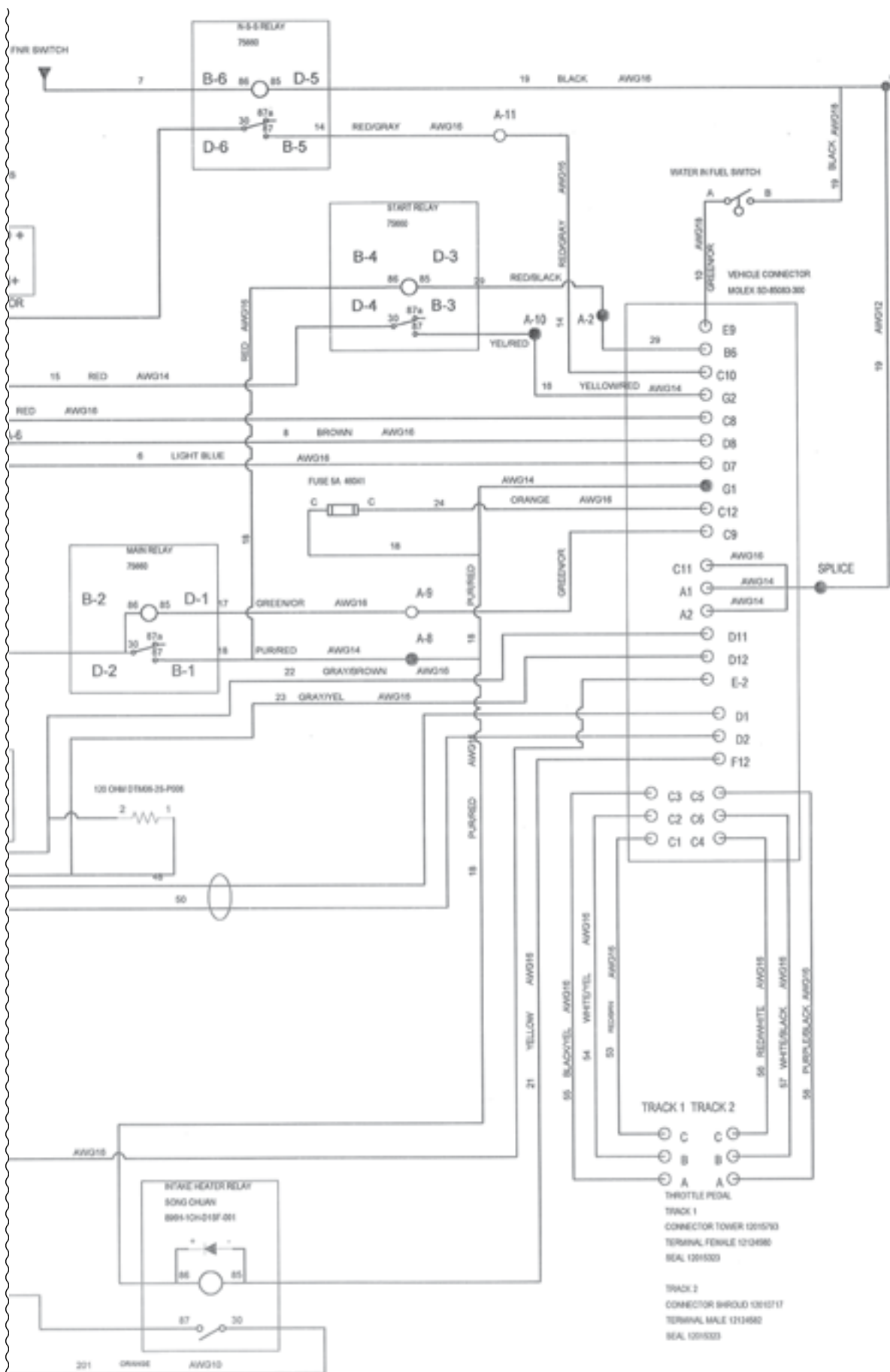
Lights Schematic



Power Supply Schematic



Power Supply Schematic Continued



- VEHICLE CONNECTOR
 MOLEX 87441 8543300
 E9-WATER IN FUEL
 C10-12V START INPUT ECU
 B-4-ECU START COMMAND GND
 G2-12V COMMAND STARTER MOTOR
 C8-12V POWER SUPPLY BATTERY
 C1-MAIN RELAY 12V POWER SUPPLY
 C10-ECR VALVE 12V POWER SUPPLY
 C8-MAIN RELAY COMMAND COIL
 D8-TO ALTERNATOR D- SIGNAL
 D10-IGNITION 12V KEYED POWER
 C11-ECR GROUND
 A10-GROUND
 A2-GROUND
 D1-CAN H
 D2-CAN L
 D11-ISO CAN L
 D12-ISO CAN H
 F10-GRD HEATER SIGNAL COIL
 E2-GRY AIR FILTER SWITCH

- THROTTLE PEDAL
 C1+ TRACK 1 5V SUPPLY
 C2-TRACK 1 SIGNAL
 C3-TRACK 1 GROUND
 C4-TRACK 2 5V SUPPLY
 C5-TRACK 2 SIGNAL
 C6-TRACK 2 GROUND

- DISPLAY DESCRIPTION
 F1+ GND
 F2+ 12V SUPPLY
 F3-CAN H
 F4-CAN L
 F5-SHIELD
 F6-TRANS TEMP
 F7-TRANS PRESS
 F8-PRM BRAKE
 F10-FUEL SENDER

- CONNECTORS
 A-FD 14 WAY
 B-FD 5 WAY
 C-DT 8 WAY
 D-DT 4 WAY

- MAN FUSE BOX
 A-1 5A DIAGNOSTIC CON
 A-2 15A FWD.DIFF. LOCK,HORN, PARK BRAKE
 A-3 15A ALTERNATOR DS
 A-4 25A LIGHTS
 A-5 15A FLASHERS
 A-6 15A 12V SOCKET
 A-7 15A ENGINE MONITOR
 A-8 15A START RELAY
 A-9 15A FNR SWITCH

- 25A MAIN RELAY ENGINE ECU MIN FUSE
 INLINE NEXT TO PRM ON TRENHILL
 5A C10 ECR VALVE MIN FUSE INLINE
 NEXT TO PRM ON TRENHILL
 50A PREHEAT MAIN FUSE INLINE
 ON TRENHILL

- NOTES
 1. TRANS. PARK BRAKE PRESSURE
 200 PSI ACTIVATION
 FNR BRAKE SPRING APPLIED HYDRAULIC RELEASE
 2. FUEL SENDER 140 OHMS EMPTY-33 OHMS FULL
 3. TRANSMISSION TEMP. SWITCH CLOSERS AT 200 F

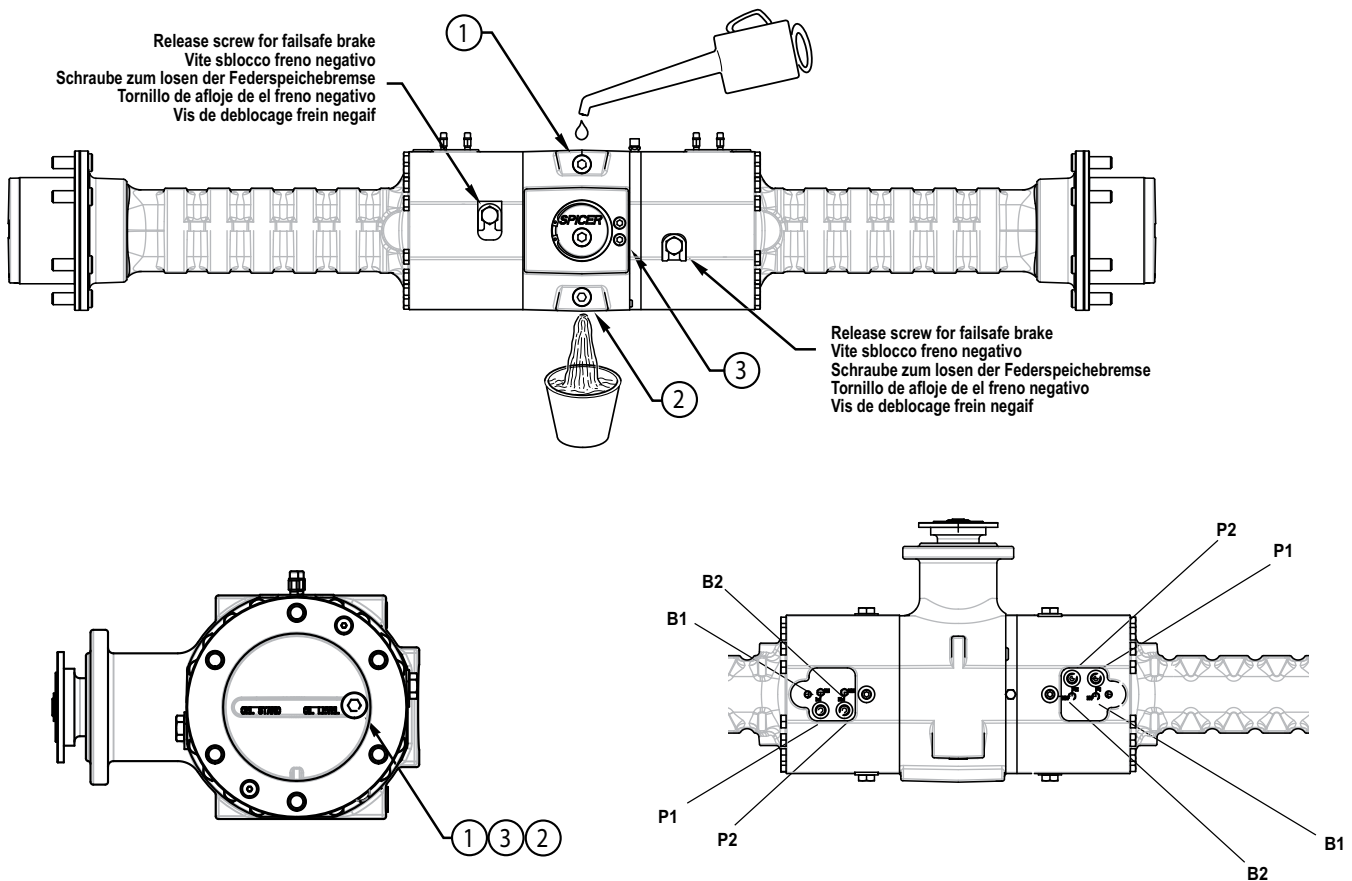
FRONT AXLE 111 DUAL BRAKE

Front Axle Maintenance

MAINTENANCE

MAINTENANCE

MAINTENANCE POINTS



1 - Oil filling plug

2 - Oil draining plug

3 - Check level plug

P1 - Connector for failsafe brake working pressure 15 - 30 Bar

P2 - Connector for hydraulic operated disk brakes oil immersed max 80 Bar

B1/B2 - Bleeding screw for brakes

Front Axle Maintenance Continued

OIL DRAINING MANDATORY PROCEDURE**OIL DRAINING MANDATORY PROCEDURE**** WARNING**

- Do not attempt any maintenance if the axle is hot (40-50°C / 104-122°F). Hot oil and components can cause personal injury. Avoid skin contact. Wear protective gloves and glasses.
- Make sure all fluids are contained during inspection, maintenance, tests, adjustment and repair of the product. Prepare a suitable container to collect the fluid before removing any component containing fluids. Dispose of all fluids following legal and local regulations.

CENTRAL HOUSING

Before draining oil it is mandatory to loosen the oil filling plug or the breather (if present), and wait until the internal pressure is completely released. Remove the oil draining plug and drain oil only when the pressure is completely released.

PLANETARY GEAR REDUCTION

Before draining oil it is mandatory to rotate the planetary gear reduction in order to move the oil plug in filling position, then loosen the oil plug and wait until the internal pressure is completely released. Remove the oil plug and drain oil only when the pressure is completely released.

Front Axle Maintenance Continued

MAINTENANCE INTERVALS

MAINTENANCE INTERVALS

OPERATION	COMPARTMENT	1ST CHANGE / CHECK (whs)	FREQUENCY (whs)	LUBRICANTS	REMARKS
Oil level check	All	10 whs	Monthly	For details see below	Clean carefully oil plug magnet
Oil Change	Differential	100 - 250 whs max. *	1000 whs	Central body standard bevel gears - UTTO (API GL4), or gear: J20/C, MF M1143, or gear: Mobile 424	If with limited slip differential, and/or wet brakes, use LS additivated oils. Clean carefully oil plug magnet. *Not needed if using Mobile 424
	Hub Reduction	100 - 250 whs max. *		Central body hypoid bevel gears - Mobile 424	Clean carefully oil plug magnet.
	Dropbox (if any)	100 - 250 whs max. *		UTTO (API GL4) J20/C; or gear: SAE80W/90 (API GL4 or GL5) Gears with wet discs clutch - ATF GM Dexron IIE, Dexron III Only gears - UTTO J20/C, or gear: SAE80W/90 (API GL4 or GL5)	Clean carefully oil plug magnet. * in accordance with Machine Service requirements
Adjustment	Negative brake (SAHR)	100 whs	Every 500 whs	For hydraulic actuations (brakes, SAHR, 100% diff. lock, etc.) use ATF oil e.g. GM Dexron IIE, Dexron III	Not applicable
	Service brake				DOT brake fluids oils are NOT compatible w/std oils
Tightening	Wheel nuts 250 lb. ft.	10 whs	Every 200 whs	No lubricant allowed	Check for any damage or corrosion of treads or mating surfaces
	King Pin Tapered Bearings	10 whs			Supply grease until clean grease is visible from outside.
Greasing	Seals	10 whs	Normal work - Weekly or Severe duty - Daily	NLG12 EP or NLG13 EP	Grease performance level acc. to: According to DIN 51825 level KP2K-30 (NLG12) or KP3K-20 (NLG13); ASTM D4950 NLG12 GC-LB
	King Pin Bushings	10 whs			
	Trunnion Bushings	10 whs			
		10 whs			

In case of severe duty, half oil change intervals must be applied.

In case of extreme environments, chatter noise, reduce oil change intervals accordingly.

In case of extremely low ambient temperatures (<20°C), use appropriate oils w/ low viscosity: UTTO J20/D (std Bevel Gears), SAE 75W/90 API GL5 LS (Hypoid Bevel Gears: models 192, 193, 194).

API GL5: Acc. To MIL L-2105-B

See PSB 00279 (latest update) for more info regarding lubricants and viscosity grades.

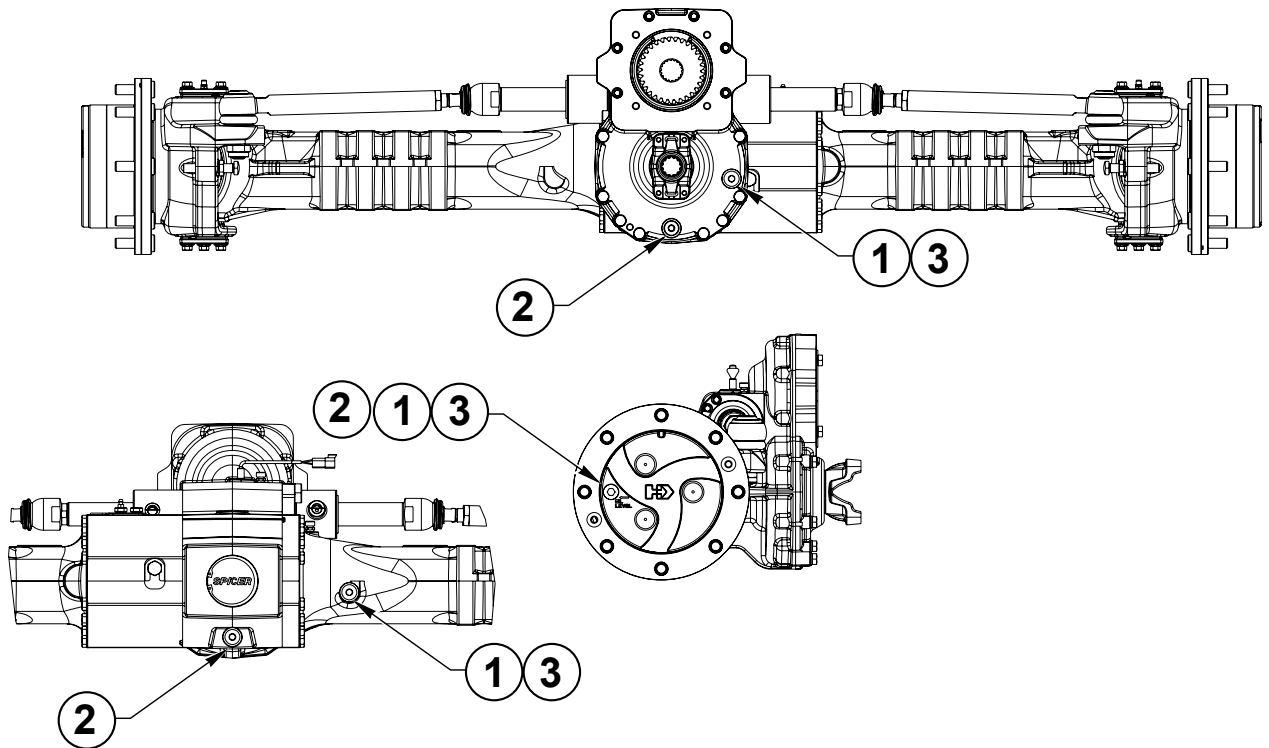
REAR AXLE 211

Rear Axle Maintenance

MAINTENANCE

MAINTENANCE

MAINTENANCE POINTS



- 1 - Oil fill plug
- 2 - Oil drain plug
- 3 - Check level plug

Rear Axle Maintenance Continued

OIL DRAINING MANDATORY PROCEDURE

OIL DRAINING MANDATORY PROCEDURE

WARNING

- Do not attempt any maintenance if the axle is hot (40-50°C / 104-122°F). Hot oil and components can cause personal injury. Avoid skin contact. Wear protective gloves and glasses.
- Make sure all fluids are contained during inspection, maintenance, tests, adjustment and repair of the product. Prepare a suitable container to collect the fluid before removing any component containing fluids. Dispose of all fluids following legal and local regulations.

CENTRAL HOUSING

Before draining oil it is mandatory to loosen the oil filling plug or the breather (if present), and wait until the internal pressure is completely released. Remove the oil draining plug and drain oil only when the pressure is completely released.

PLANETARY GEAR REDUCTION

Before draining oil it is mandatory to rotate the planetary gear reduction in order to move the oil plug in filling position, then loosen the oil plug and wait until the internal pressure is completely released. Remove the oil plug and drain oil only when the pressure is completely released.

Rear Axle Maintenance Continued

MAINTENANCE INTERVALS

MAINTENANCE INTERVALS

OPERATION	COMPARTMENT	1ST CHANGE / CHECK (whs)	FREQUENCY (whs)	LUBRICANTS	REMARKS
Oil level check	All	10 whs	Monthly	For details see below	Clean carefully oil plug magnet
Oil Change	Differential	100 - 250 whs max. *	1000 whs	Central body standard bevel gears - UTTO (API GL4), or gear: J20/C, MF M1143, or gear: Mobile 424	If with limited slip differential, and/or wet brakes, use LS additivated oils. Clean carefully oil plug magnet. * Not needed if using Mobile 424
	Hub Reduction	100 - 250 whs max. *		Central body hypoid bevel gears - Mobile 424	
	Dropbox (if any)	100 - 250 whs max. *		UTTO (API GL4) J20/C; or gear: SAE80W/90 (API GL4 or GL5)	
Adjustment	Negative brake (SAHR)	100 whs	Every 500 whs	Gears with wet discs clutch - ATF GM Dexron IIE, Dexron III	Clean carefully oil plug magnet. * in accordance with Machine Service requirements
	Service brake	100 whs		Only gears - UTTO J20/C, or gear: SAE80W/90 (API GL4 or GL5)	
Tightening	Wheel nuts 250 lb. ft.	10 whs	Every 200 whs	For hydraulic actuations (brakes, SAHR, 100% diff. lock, etc.) use ATF oil e.g. GM Dexron IIE, Dexron III	Not applicable DOT brake fluids oils are NOT compatible w/std oils
	King Pin Tapered Bearings	10 whs		No lubricant allowed	
Greasing	Seals	10 whs	Normal work - Weekly or Severe duty - Daily	NLGI2 EP or NLGI3 EP	Supply grease until clean grease is visible from outside. Grease performance level acc. to: According to DIN 51825 level KP2K-30 (NLGI2) or KP3K-20 (NLGI3); ASTM D4950 NLGI2 GC-LB
	King Pin Bushings	10 whs			
	Trunnion Bushings	10 whs			
		10 whs			

In case of severe duty, half oil change intervals must be applied.

In case of extreme environments, chatter noise, reduce oil change intervals accordingly.

In case of extremely low ambient temperatures (<-20°C), use appropriate oils w/ low viscosity: UTTO J20/D (std Bevel Gears), SAE 75W/90 API GL5 LS (Hypoid Bevel Gears: models 192, 193, 194).

API GL5: Acc. To MIL L-2105-B

See PSB 00279 (latest update) for more info regarding lubricants and viscosity grades.

MAST MAINTENANCE

Periodic Maintenance

For proper operation and an extended service life, your Lift Tek Mast should be inspected and serviced regularly as part of your normal lift truck maintenance schedule according to the following outlines and ANSI B56.1 procedures. The recommended intervals are for masts operating under normal conditions. If the mast is operating in severe conditions or corrosive atmospheres, the inspections should be performed more frequently.



WARNING: Never work on the mast with a load on the forks or attachment, in the raised position without supports or while anyone is near the lift truck control handles per ANSI B56.1

Daily Inspection

Perform the following at the beginning of each work shift:

1. Extend the carriage a few inches off the ground and make sure the chains are under equal tension. Refer to Section 5.6-3 for chain adjustment.
2. Extend the mast to its fullest height to make sure the mast rails and carriage extend freely without binding.
3. While the mast is extended, inspect the upright rails for proper lubrication. See Figures 7c. & 7b.
4. Make sure the internal reeving hoses (if equipped) travel evenly in the hose guides. Adjust the hose ends if required. Tighten the fittings making sure they do not twist.

100 Hour Inspection

After each 100 hours of lift truck operation, and in addition to the daily inspection:

1. Inspect and lubricate the full length of the chains with SAE 40 wt. oil or Bowman Heavy Load Red Grease.
- CAUTION:** The chains must be coated with a film of lubricant at all times.

500 Hour Inspection

After each 500 hours of lift truck operation, and in addition to the Daily and 100 Hour Inspection:

1. Each pair of load rollers on the uprights and carriage should be shimmed so that a total side to side clearance no greater than 1/16 in. (1.5 mm) occurs at the tightest point throughout the travel of the member. Pry between the upright and load roller so that the opposite load roller is tight against the upright. Measure the clearance for the pair of rollers at XXX shown. See Figure 14.
2. Check the chains for wear and stretch. Refer to Section 5.6-1 for complete chain inspection.

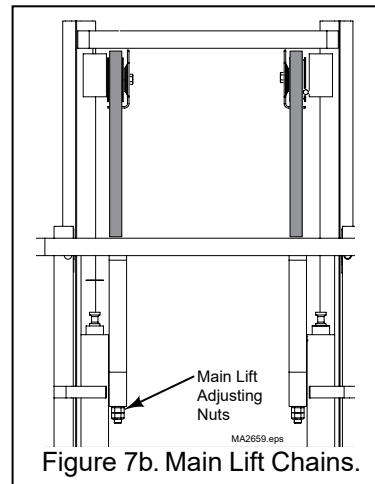


Figure 7b. Main Lift Chains.

Upright Rail Lubrication

Lubricate the full length of each upright rail with chassis lube or Kendall SR-12X as shown in Figure 7c.

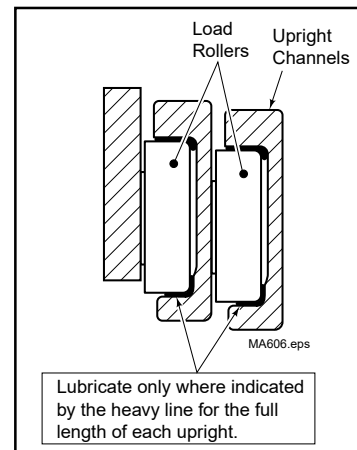


Figure 7c. Channel lubrication.

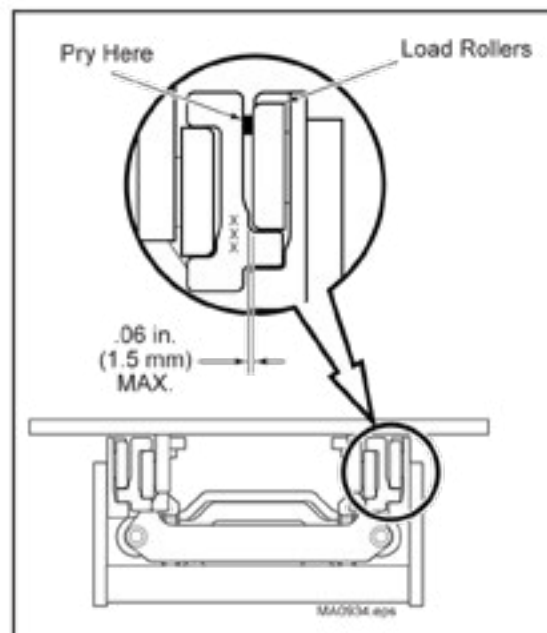


Figure 14. Load Roller Clearances.

Mast maintenance cont.

Carriage Inspection

1. Inspect the rollers for excessive wear or damage. Rollers with visible flat spots or cracks should be replaced.
2. Inspect the roller bearings by turning the rollers on their shafts. Rollers with roughness or noticeable restrictions to turning should be replaced.
3. Inspect all welds between the carriage side plates and the carriage fork bars. If any welds are cracked, replace the carriage.
4. Inspect the roller stub shafts. If they are damaged or if there are cracks at the base of the stub shafts, the carriage must be replaced or repaired. Contact Lift Tek for repair procedures.

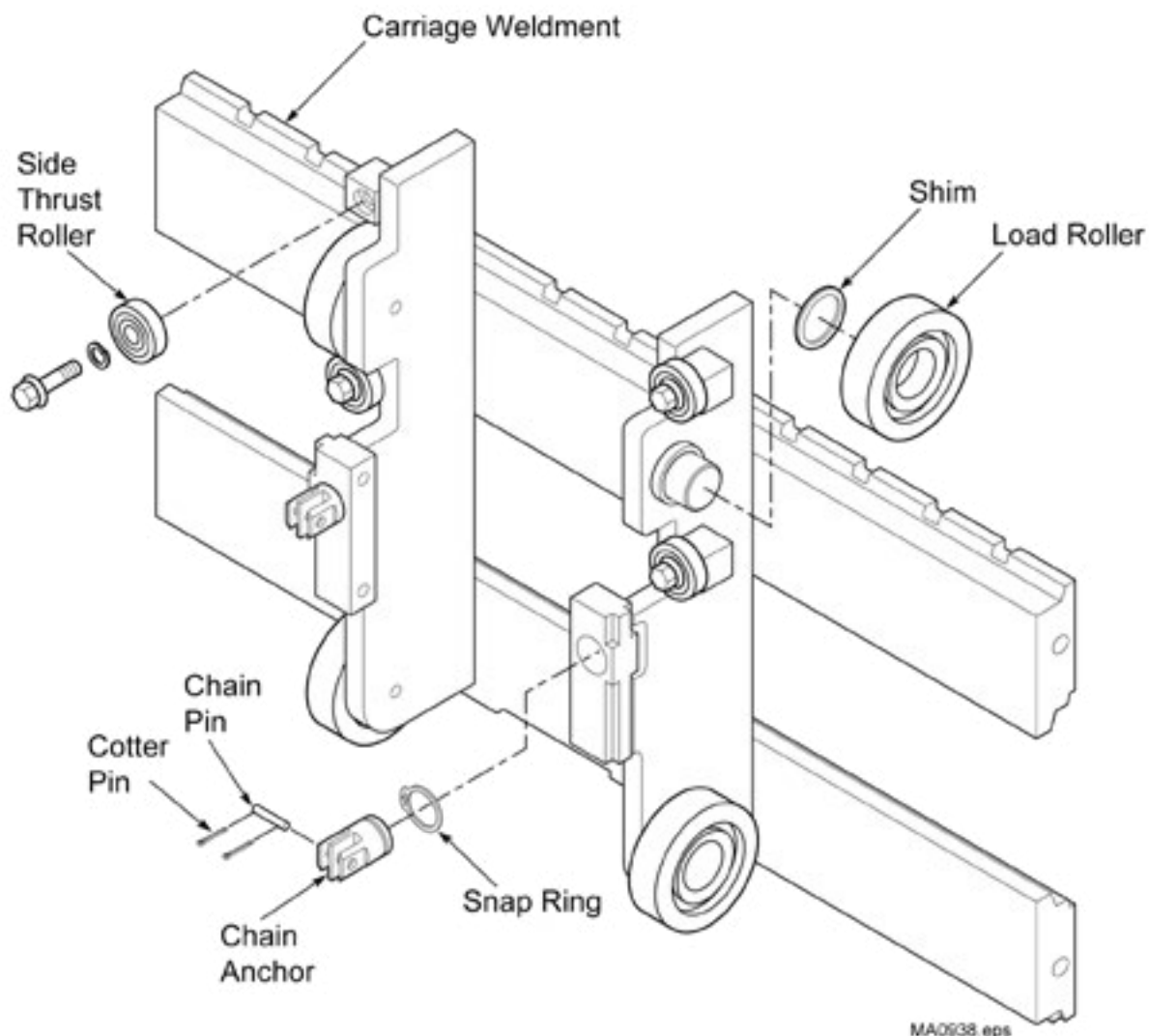


Figure 30. Carriage Service.

Mast maintenance cont.

Chains

Inspection and Tension

Each pair of chains has been factory-lubricated using heat and pressure to force the lubricant thoroughly into the chain links. Avoid removal or contamination of this factory applied lubricant. **Do not wash, sand blast, etch, steam clean, or paint the chains on initial mast installation.**

The chains must be adjusted with equal tension to ensure proper load distribution and mast operation. To determine equal tension, extend the unloaded mast to put the chains under tension. Press the center of a strand of chain with your thumb, then press at the same place on the other chain of the pair. Each chain in a pair should have equal "give". If tension is not equal, adjust the chains as described in **Chain Adjustment**.

Inspect the chains. If inspection reveals that one strand of a pair of chains requires replacement, **both** strands of the pair should be replaced.

*Check for rust and corrosion.

*Check for cracked side plates. If you find cracked side plates, replace **both** strands of chain.

*Check for tight joints. If tight joints are caused by rust or corrosion, loosen them with SAE 40 wt. oil or penetrating oil. If they cannot be loosened, or if the tight joints are caused by bent pins or plates or by peened plate edge, replace **both** strands of the chain.

*Check for protruding or turned pins. Replace **both** strands of the chain.

*Check for chain side wear. If pins and outside plates show signs of wear, check for misalignment of sheaves, anchors or other components. Correct the misalignment. If wear is excessive, replace **both** strands of chain.

*Check for worn, broken or misaligned chain anchors. Replace or adjust as required.

*Lubricate the full length of the chains with SAE 40 wt. oil or Bowman Heavy Load Red Grease.

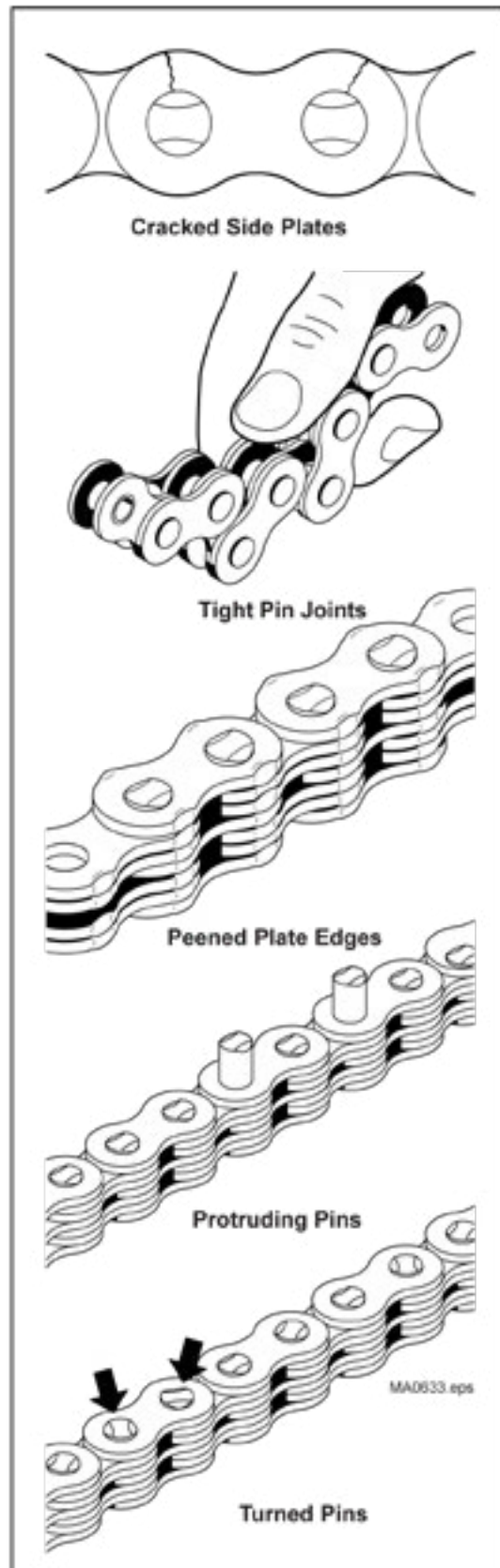


Figure 42.Chain Inspection.

Mast maintenance cont.

Measuring Chain Stretch

Regular inspection and lubrication of the chains will increase their service life and reduce downtime.

If the chains stretch beyond the recommended amount, they should be replaced in pairs. Chain stretch can be measured with chain wear scale. Measure the chains according to the instructions printed on the chain wear scale, without a load on the carriage.

*To check the free lift chains, raise the carriage 1 ft. (30 cm) off the ground to put tension on the chains.

*To check the main lift chains, raise the mast until the inner upright starts to extend putting tension on the chains.

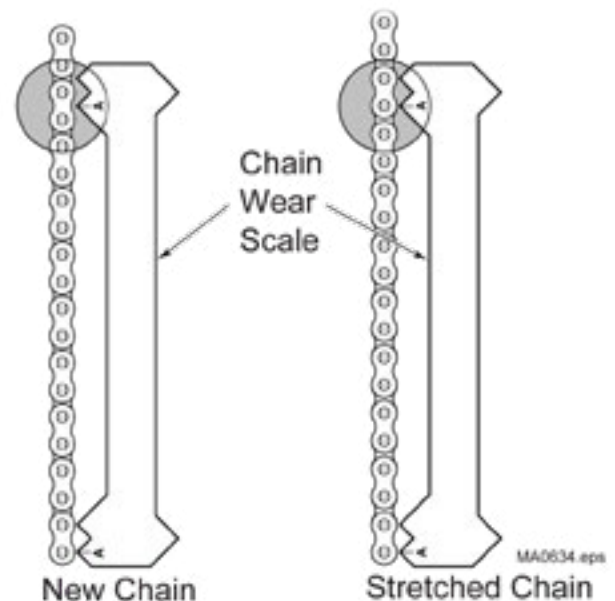


Figure 43. Measuring Chain Stretch.

Main Lift Chain Adjustment

The main lift chains should be adjusted so that when the unloaded mast is fully lowered, the uprights are positioned as shown in figure 44.

1. Adjust one chain to achieve the correct upright position when fully lowered. See Figure 45.
2. Adjust the other chain to achieve equal chain tension. Tighten the nuts together to a torque of 50-70 ft.-lbs. (98-96 Nm).
3. Raise and lower the mast several times to confirm the adjustments.

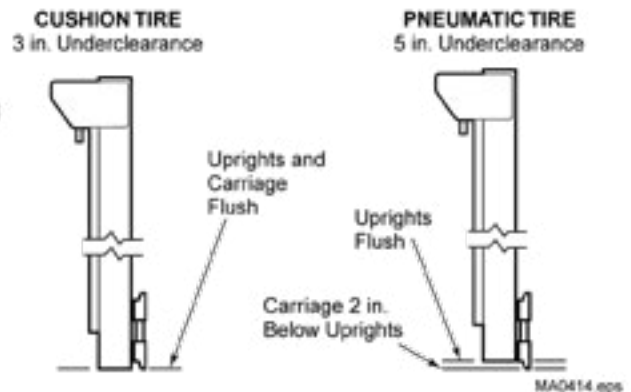


Figure 44. Upright and Carriage Position.

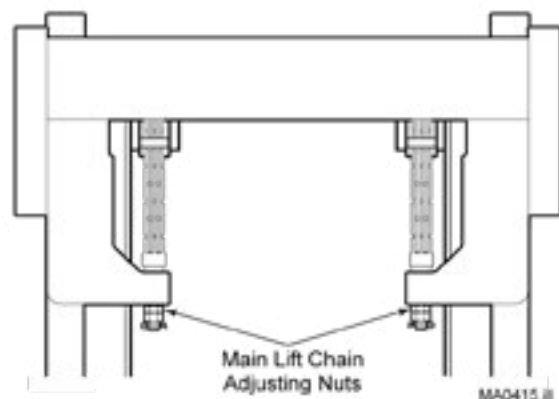


Figure 45. Main Lift Chains.

WARRANTY**KOHLER ENGINE WARRANTY****KOHLER.****WARRANTY INTERNATIONAL****3 YEAR LIMITED WARRANTY - KOHLER DIESEL ENGINES**

Kohler Co. warrants to the original retail consumer that each new Diesel engine will be free from manufacturing defects in materials or workmanship in normal service for the applicable coverage period set forth below beginning on the date of purchase; provided the engine is operated and maintained in accordance with Kohler Co.'s instructions and manuals. If no hour meter is installed as original equipment then 4 hours of use per day and 5 days per week will be used to calculate hours used.

ENGINE SERIES	WARRANTY PERIOD	OPERATING HOURS	WARRANTY COVERAGE
Diesel (Non-KDI)	3 Years	0 – 2,000	100% Parts & Labor
KDI	3 Years	0 – 2,000	100% Parts & Labor
		2,001 – 6,000	Major Components Only *

* Major component defects are failures related to a crankcase casting, cylinder head casting, crankshaft, crankshaft pulley, camshaft, connecting rod, flywheel, and oil pump.

Kohler Co.'s obligation under this warranty is expressly limited, at its option, to an appropriate adjustment, repair or replacement of such part or parts as found to be defective following an inspection by Kohler Co. or an authorized service facility designated by Kohler Co.

EXCLUSIONS

The following items are not covered by this warranty.

- Damage caused by: (i) an accident or casualty; (ii) unreasonable use or neglect; (iii) normal wear; (iv) premature wear from improper maintenance; (v) improper storage; (vi) old or contaminated fuel left within the fuel system, which includes but is not limited to tanks, fuel lines, or fuel injection components.
- Failures caused by: (i) faulty repairs made by any party other than Kohler Co. or an authorized service facility designated by Kohler Co.; (ii) use of non-Kohler replacement service parts; or (iii) an act beyond the control of Kohler Co., which includes but is not limited to theft, vandalism, fire, lightning, earthquake, windstorm, hail, volcanic eruption, flood or tornado.
- Transportation charges in connection with the repair or replacement of defective parts.
- Engine accessories such as fuel tanks, clutches, transmissions, power drive assemblies, and batteries, unless supplied or installed by Kohler Co.
- Rental of equipment during performance of warranty repairs.
- Fuel, lubricating oil, air filters, oil filters, or coolant/antifreeze

IMPLIED OR STATUTORY WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. KOHLER CO. MAKES NO OTHER EXPRESS WARRANTY, NOR IS ANYONE AUTHORIZED TO MAKE ANY ON KOHLER CO.'S BEHALF. KOHLER CO. AND/OR THE SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND.

Some states or countries do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country (www.KohlerEngines.com), or state to state within U.S.A.

TO OBTAIN WARRANTY SERVICE

Original retail purchaser must bring the engine to an authorized service facility designated by Kohler Co. found by visiting www.KohlerEngines.com or telephone 1-800-544-2444 (U.S.A. and Canada).

ENGINE DIVISION, Kohler Co., Kohler Wisconsin

Kohler Engine Warranty continued

KOHLER.**WARRANTY NORMS EPA****KOHLER CO.****CALIFORNIA AND FEDERAL EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS**

The California Air Resources Board, U.S. Environmental Protection Agency ("EPA") and Kohler Co. are pleased to explain the emission control system warranty on your MY2014-2016 engine. In California ("the State") and US EPA regulated applications, new heavy-duty off-road engines must be designed, built and equipped to meet the State's and U.S EPA's stringent anti-smog standards. Kohler Co. must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, Kohler Co. will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE

The MY2014-2016 heavy-duty off-road engines are warranted for the periods listed below. If any emission-related part on your engine is defective, the part will be repaired or replaced by Kohler Co.

MY2014-2016 KD, KDW AND ALL TPEM ENGINES	
ENGINE POWER	DURATION
kW < 19 (hp < 25)	3 years or 2,000 hours
kW ≥ 19 (hp ≥ 25)	5 years or 3,000 hours

MY2014-2016 KDI ENGINES	
ENGINE POWER	DURATION
kW < 19 (hp < 25)	3 years or 6,000 hours
kW ≥ 19 (hp ≥ 25)	5 years or 6,000 hours

OWNER'S WARRANTY RESPONSIBILITIES

- As the off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Kohler Co. recommends that you retain all receipts covering maintenance on your off-road engine, but Kohler Co. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the off-road engine owner, you should however be aware that Kohler Co. may deny you warranty coverage if your off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- Your engine is designed to operate on diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.
- You are responsible for initiating the warranty process. The ARB suggests that you present your off-road engine to a Kohler Co. dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact Kohler Co., by visiting www.KohlerEngines.com or telephone 1-800-544-2444 (U.S.A. and Canada).

GVF WARRANTY

Gillison's Variety Fabrication, Inc. (GVF) will replace or repair at GVF option, any GVF manufactured item that is, in the opinion of GVF, defective in material or workmanship for a period of 1 year or 1,000 hours, whichever comes first, from the date of purchase, and is returned to the GVF plant or service center at the expense of the customer. This warranty is made expressly in lieu of all other warranties expressed or implied. **The Warranty Registration card must be completed in full and returned to GVF within thirty (30) days of date of delivery to qualify for this warranty.**

This warranty shall not apply to any machine/product that has been subject to misuse, negligence or accident. In the event of a defect in material or workmanship, GVF's sole responsibility is to the repair or replacement of the defective part and are not responsible for lost time or any other expenses incurred due to lost time.

All OEM items such as Tires, Batteries, Engines and Hydraulic components are warranted by the original equipment manufacturer. GVF controls the installation of these products but not the manufacture; therefore, GVF warranty applies to the proper installation but not the OEM component itself.

Retail Customer, Owner and/or Operator Responsibility: It is the Retail Customer's and/or Owner's and/or Operator's responsibility to read the Owner/Operator Manual in order to operate, lubricate, maintain, and store the machine/product in accordance with all instructions and safety procedures. Failure of these persons to read the Owner/Operator Manual is misuse of this equipment. It is the Retail Customer's and/or Owner's and/or Operator's responsibility to inspect the machine/product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is the Retail Customer's and/or Owner's and/or Operator's responsibility to deliver the machine/product to the authorized GVF dealer, from whom they purchased it, for service or replacement of defective parts, which are covered by warranty. Repairs to be submitted for warranty consideration must be made within 45 days of failure. The Retail Customer and/or Owner is responsible for any cost incurred by the Dealer for traveling to or hauling of the machine/product for the purpose of performing a warranty obligation or inspection.