

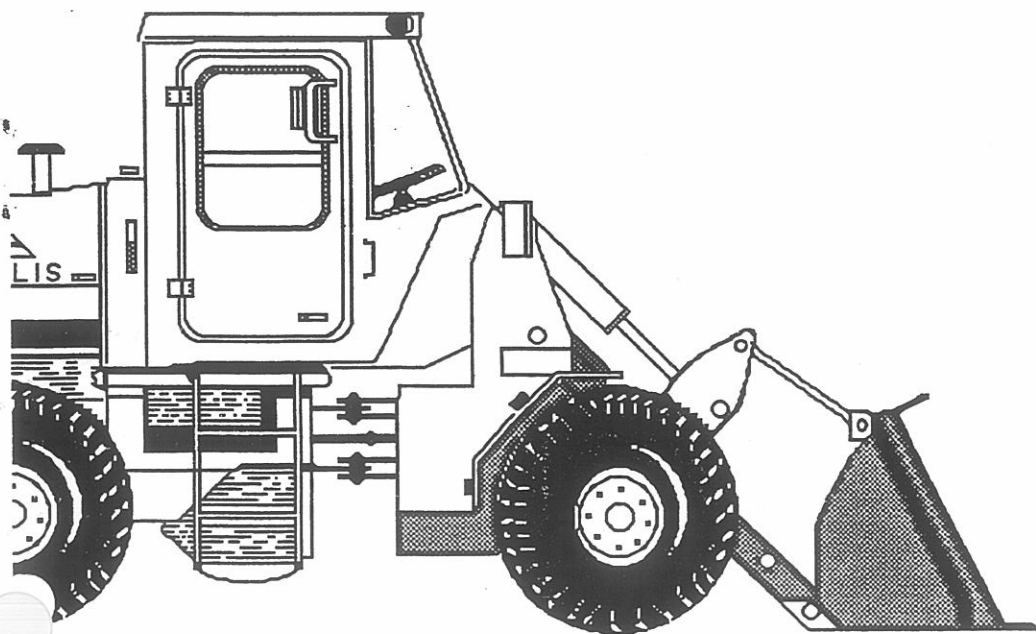


FR10B

wheel loader

S/N 610101 AND UP

OPERATION AND MAINTENANCE INSTRUCTION MANUAL



Form 73151983 English
9-92

Reprinted

AVOID ACCIDENTS

Most accidents, whether they occur in industry, on the farm, at home or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason MOST ACCIDENTS CAN BE PREVENTED by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment there are conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

A careful operator is the best insurance against an accident.
The complete observance of one simple rule would prevent many
thousand serious injuries each year.
That rule is:

Never attempt to clean, oil or adjust a machine while it is in motion.

WARNING

On machines having hydraulically, mechanically, and/or cable controlled equipment (such as shovels, loaders, dozers, scrapers, etc.) be certain the equipment is lowered to the ground before servicing, adjusting and/or repairing. If it is necessary to have the hydraulically, mechanically, and/or cable controlled equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the hydraulic lift cylinders, cable and/or mechanical devices used for controlling the equipment.

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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FR10B

wheel loader

operation and maintenance instruction manual

S/N R10B - 2T * 610101

Form 73151983 English



WARNING

STUDY THE OPERATION AND MAINTENANCE
INSTRUCTION MANUAL THROUGH BEFORE STARTING,
OPERATING, MAINTAINING, FUELING OR SERVICING
THIS MACHINE.



The Operation and Maintenance Instruction Manual provides the instructions and procedures for starting, operating, maintaining, fueling, shutdown and servicing that are necessary for properly conducting the procedures for overhaul of the related components outlined in this Service Manual.



This symbol is your safety alert sign. It MEANS ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.



Read and heed all safety instructions carrying the signal words WARNING and DANGER.



Machine mounted safety signs have been color coded yellow with black borders and lettering for warning and red with white borders and lettering for danger points.

SAFETY RULES

GENERAL

Study the Operation and Maintenance Instruction Manual before starting, operating, maintaining, fueling, or servicing machine.

Read and heed all machine-mounted safety signs before starting, operating, maintaining, fueling or servicing machine.

Machine-mounted safety signs have been color coded yellow with black border and lettering for **WARNING** and red with white border and lettering for **DANGER** points.

Never attempt to operate the machine or its tools from any position other than seated in the operator's seat. Keep head, body, limbs, hands and feet inside operator's compartment at all times to reduce exposure to hazards outside the operator's compartment.

Do not allow unauthorized personnel to operate service or maintain this machine.

Always check work area for dangerous features. The following are examples of dangerous work areas: slopes, overhangs, timber, demolitions, fire, high walls, drop off, backfills, rough terrain, ditches, ridges, excavations, heavy traffic, crowded parking, crowded maintenance and closed areas. Use extreme care when in areas such as these.

An operator must know the machine's capabilities. When working on slopes or near drop offs be alert to avoid loose or soft conditions that could cause sudden tipping or loss of control.

Do not jump on or off machine. Keep two hands and one foot, or two feet and one hand, in contact with steps grab rails and handles at all times.

Do not use controls or hoses as hand holds when climbing on or off machine. Hoses and controls are movable and do not provide a solid support. Controls also may be inadvertently moved causing accidental machine or equipment movement.

Keep operator's compartment, stepping points, grab-rails and handles clear of foreign objects, oil, grease, mud or snow accumulation to minimize the danger of slipping or stumbling. Clean mud or grease from shoes before attempting to mount or operate the machine.

Be careful of slippery conditions on stepping points, hand rails, and on the ground. Wear safety boots or shoes that have a high slip resistant sole material.

For your personal protection. Do not attempt to climb on or off machine while machine is in motion.

Never leave the machine unattended with the engine running.

Always lock up machine when leaving it unattended. Return keys to authorized security. Heed all shut down procedures of the Operation and Maintenance Instruction Manual. Always set the parking brake when leaving the machine for any reason.

Do not wear rings, wrist watches, jewelry, loose or hanging apparel, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can catch on moving parts. Wear proper safety equipment as authorized for the job. Examples: hard hats, safety shoes, heavy gloves, ear protectors, safety glasses or goggles, reflector vests, or respirators. Consult your employer for specific safety equipment requirements.

Do not carry loose objects in pockets that might fall unnoticed into open compartments. Do not use machine to carry loose objects by means other than attachments for carrying such objects.

DO NOT CARRY RIDERS unless the machine is equipped for carrying people to reduce personal exposure to being thrown off.

Do not operate machinery in a condition of extreme fatigue or illness. Be especially careful towards the end of the shift.

Roll Over Protective Structures are required on wheel loaders, dozer tractors, track type loaders, graders and scrapers by local or national requirements. **DO NOT** operate this machine without a Roll Over Protective Structure.

Do not operate a machine without a falling object protective structure (FOPS).

Do not operate this machine without a rear canopy screen when machine is equipped with rear mounted towing winch.

Seat belts are required to be provided with roll over protective structures or roll protection cabs by local or national regulations. Keep the safety belt fastened around you during operation.

Where noise exposure exceeds 90 dBA for 8 hours, wear authorized ear protective equipment per local or national requirements that apply.

Keep clutches and brakes on machine and attachments such as power control units, winches and master clutches adjusted according to Operation and Maintenance Instruction Manuals of the manufacturers at all times. **DO NOT** adjust machine with engine running except as specified.

Do not operate a machine with brakes out of adjustment. See the Operation and Maintenance Instruction Manual.

Move carefully when under, in or near machine or implements. Wear required protective equipment, such as hard hat, safety glasses, safety shoes, ear protectors.

To move a disabled machine, use a trailer or low boy truck if available. If towing is necessary, provide warning signals as required by local rules and regulations and follow Operation and Maintenance Instruction Manual recommendations. Load and unload on a level area that gives full support to the trailer wheels. Use ramps of adequate strength, low angle and proper height. Keep trailer bed clean of clay, oil and all materials that become slippery. Tie machine down securely to truck or trailer bed and block tracks (or wheels) as required by the carrier.

SAFETY RULES

To prevent entrapment in cabs or mounted enclosures, observe and know the mechanics of alternate exit routes.

On machines equipped with suction radiator fans, be sure to periodically check all engine exhaust parts for leaks as exhaust gases are dangerous to the operator. Keep a vent open to outside air at all times when operating within a closed cab.

STARTING FLUID IS FLAMMABLE. Follow the recommendations as outlined in the Operation and Maintenance Instruction Manual and as marked on the containers. Store containers in cool, well-ventilated place secure from unauthorized personnel. **DO NOT PUNCTURE OR BURN CONTAINERS.**

Follow the recommendations of the manufacturer for storage and disposal.

Wire rope develops steel slivers. Use authorized protective equipment such as heavy gloves, safety glasses when handling.

OPERATION

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

DO NOT START OR OPERATE AN UNSAFE MACHINE. Before working the machine, be sure that any unsafe condition has been satisfactorily remedied. Check brakes, steering and attachment controls before moving. Advise the proper maintenance authority of any malfunctioning part or system. Be sure all protective guards or panels are in place, and all safety devices provided are in place and in good operating condition.

Check instruments at start-up and frequently during operation.

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

Be sure exposed personnel in the area of operation are clear of the machine before moving the machine or its attachments. **WALK COMPLETELY AROUND** the machine before mounting. Sound horn. Obey flag man, safety signals and signs.

Know the principles of cross steering of crawler tractors. Read section in Operation and Maintenance Instruction Manual on cross steering.

Keep engine exhaust system and exhaust manifolds clear of combustible material. Equip machine with screens and guards when working under conditions of flying combustible material.

If engine has a tendency to stall for any reason under load or idle, report this for adjustment to a proper maintenance authority immediately. Do not continue to operate machine until condition has been corrected.

Never use bucket as a man-lift.

Use recommended bucket for machine and material load ability and heaping characteristics of material, terrain, and other pertinent job conditions.

Avoid abrupt starts and stops when transporting a loaded bucket.

Inspect your seat belt webbing and hardware at least twice a year for signs of fraying, wear or other weakness that could lead to failure.

Use only designated towing or pulling attachment points. Use care in making attachment. Be sure pins and locks as provided are secure before pulling. Stay clear of draw bars, cables or chains under load.

When pulling or towing through a cable or chain, do not start suddenly at full throttle. Take up slack carefully. Guard against kinking chains or cables. Inspect carefully for flaws before using. Do not pull through a kinked chain or cable due to the high stresses and possibility of failure of the kinked area. Always wear heavy gloves when handling chain or cable.

Be sure cables are anchored and the anchor point is strong enough to handle the expected load. Keep exposed personnel clear of anchor point and cable or chain. **DO NOT PULL OR TOW UNLESS OPERATOR'S COMPARTMENT OF MACHINES INVOLVED ARE PROPERLY GUARDED AGAINST POTENTIAL CABLE OR CHAIN BACKLASH.**

During operation always carry ripper in full raised position when not in use and lowered to ground when parked.

When counterweights have been provided, do not work machine if they have been removed unless their equivalent weight has been replaced. See the Operation and Maintenance Instruction Manual.

When operating a machine know what clearances will be encountered, overhead doors, wires, pipes, aisles, roadways; also the weight limitations of ground, floor, and ramps.

Know bridge and culvert load limits and do not exceed them. Know machine's height, width, and weight. Use a signal person when clearance is close.

Be sure that the exact location of gas lines, utility lines, sewers, overhead and buried power lines, and other obstructions or hazards are known. Such locations should be precisely marked by the proper authorities to reduce the risk of accidents. Obtain shut-down or relocation of any such facilities before starting work, if necessary.

Be certain to comply with all local, state, and federal regulations regarding working in the vicinity of power lines.

When roading find out what conditions are likely to be met - clearances, congestion, type of surface, etc. Be aware of fog, smoke or dust element that obscure visibility.

When backing, always look to where the machine is to be moved. Be alert to the position of exposed personnel. **DO NOT OPERATE** if exposed personnel enter the immediate work area.

SAFETY RULES

Never travel a machine on a job site, in a congested area, or around people without a signal person to guide the operator.

In darkness, check area of operation carefully before moving in with machine. Use all lights provided. Do not move into area of restricted visibility.

Maintain clear vision of all areas of travel or work. Keep cab windows clean and repaired. Carry blade low for maximum visibility while traveling. Obtain and use fan blast deflectors where tractors are used a pusher tractors in tandem.

Transport a loaded bucket with the bucket as far tipped back and in as low a position as possible for maximum visibility, stability, and safest transport of the machine. Carry it at a proper speed for the load and ground conditions.

Carry the bucket low when traveling with a load.

Maintain a safe distance from other machines. Provide sufficient clearance for ground and visibility conditions. Yield right-of-way to loaded machines.

Avoid going over obstacles such as rough terrain, rocks, logs, curbs, ditches ridges, and railroad tracks whenever possible. When obstructions must be crossed, do so with extreme care at an angle if possible. Reduce speed - down-shift. Ease up to the break over point - pass the balance point slowly on the obstruction and ease down on the other side.

Cross gullies or ditches at an angle with reduced speed after insuring ground conditions will permit a safe traverse.

Be alert to soft ground conditions close to newly constructed walls. The fill material and weight of machine may cause the wall to collapse under the machine.

Operate at speeds slow enough to insure complete control at all times. Travel slowly over rough ground, on slopes or near drop offs, in congested areas or on ice or slippery surfaces.

Be alert to avoid changes in traction conditions that could cause loss of control. **DO NOT** drive on ice or frozen ground conditions when working the machine on steep slopes or near drop offs.

Keep the machine well back from the edge of an excavation.

Be especially careful when traveling up or down slopes. Position the bucket in such a way as to provide a possible anchorage on the ground in case of a slide.

When proceeding across a hill side proceed slowly. Never turn sharply up hill or down hill.

Avoid side hill travel whenever possible. Drive up and down the slope. Should the machine start slipping sideways on a grade, turn it immediately downhill.

In steep down hill operation, do not allow engine to over speed. Select proper gear before starting down grade.

There is no substitute for good judgement when working on slopes.

The grade of slope you should attempt will be limited by such factors as condition of the ground, load being handled, the type of machine, speed of machine and visibility.

NEVER COAST the machine down grades and slopes with the transmission in neutral on power shift machines, or clutch disengaged on manually shifted machines.

To reduce the danger of uncontrolled machine, choose a gear speed before proceeding down grade that will hold machine to proper speeds for conditions.

Operating in virgin rough terrain that includes previously mentioned hazards is called pioneering. Be sure you know how this is done. Danger from falling branches and upturning roots is acute in these areas.

When pushing over trees, the machine must be equipped with proper over head guarding. Never allow a machine to climb up on the root structure particularly while the tree is being felled. Use extreme care when pushing over any tree with dead branches.

Avoid brush piles, logs or rocks. **DO NOT DRIVE THE MACHINE ONTO BRUSH PILES, LOGS, LARGE ROCKS** or other surface irregularities that break traction with the ground especially when on slopes or near drop offs.

Avoid operating equipment too close to an over hang or high wall either above or below the machine. Be on the look out for caving edges, falling objects and slides. Beware of concealment by brush and under growth of these dangers.

Park in a non-operating and non-traffic area or as instructed. Park on firm level ground if possible. Where not possible, position machine at a right angle to the slope, making sure there is no danger of uncontrolled sliding movement. Set the parking brake.

Never park on an incline without carefully blocking the machine to prevent movement.

If parking in traffic lanes cannot be avoided, provide appropriate flags, barriers, flares and warning signals as required. Also provide advance warning signals in the traffic lane of approaching traffic.

Move the machine away from pits, trenches, overhangs and over head power lines before shutting down for the day.

When stopping operation of the machine for any reason, always return the transmission or hydrostatic drive control to neutral and engage the control lock to secure the machine for a safe start up. Set parking brake, if so equipped.

Never lower attachments or tools from any position other than seated in operator's seat. Sound the horn. Make sure the area near the attachment is clear. Lower the attachment slowly. **DO NOT USE** float position to lower hydraulic equipment.

SAFETY RULES

Always before leaving the operator's seat and after making certain all people are clear of the machine, slowly lower the attachments or tools flat to the ground in a positive ground support position. Move any multi purpose tool to positive closed position. Return the controls to hold. Place transmission control in neutral and move engine controls to off position. Engage all control locks, set parking brake, and open and lock the master (key, if so equipped) switch. Consult Operation and Maintenance Instruction Manual.

Always follow the shut down instructions as outlined in the Operation and Maintenance Instruction Manual.

MAINTENANCE

Do not perform any work on equipment that is not authorized. Follow the Maintenance or Service Manual procedures.

Machine should not be serviced with anyone in the operator's seat unless they are qualified to operate the machine and are assisting in the servicing.

Shut off engine and disengage the Power Take Off lever if so equipped before attempting adjustments or service.

Always turn the master switch (key switch if so equipped) to the OFF position before cleaning, repairing, or servicing and when parking machine to forestall unintended or unauthorized starting.

Disconnect batteries and TAG all controls according to local or national requirements to warn that work is in progress. Block the machine and all attachments that must be raised per local or national requirements.

Never lubricate, service or adjust a machine with the engine running, except as called for in the Operation and Maintenance Instruction Manual. Do not wear loose clothing or jewelry near moving parts.

Do not run engine when refueling and use care if engine is hot due to the increased possibility of a fire if fuel is spilled.

Do not smoke or permit any open flame or spark near when refueling, or handling highly flammable materials.

Always place the fuel nozzle against the side of the filler opening before starting and during fuel flow. To reduce the chance of a static electricity spark, keep contact until after fuel flow is shut off.

Do not adjust engine fuel pump when the machine is in motion.

Never attempt to check or adjust fan belts when engine is running.

When making equipment checks that require running of the engine, have an operator in the operator's seat at all times with the mechanic in sight. Place the transmission in neutral and set the brakes and lock. **KEEP HANDS AND CLOTHING AWAY FROM MOVING PARTS.**

Avoid running engine with open unprotected air inlets. If such running is unavoidable for service reasons, place protective screens over all inlet openings before servicing engine.

Do not place head, body, limbs, feet, fingers, or hands near rotating fan or belts. Be especially alert around a pusher fan.

Keep head, body, limbs, feet, fingers, or hands away from bucket, blade or ripper when in raised position.

If movement of an attachment by means of machine's hydraulic system or winches is required for service or maintenance, do not raise or lower attachments from any position other than when seated in the operator's seat. Before starting machine or moving attachments or tools, set brakes, sound horn and call for an all clear. Raise attachments slowly.

Never place head, body, limbs, feet, fingers, or hands into an exposed portion between uncontrolled or unguarded scissor points of machine without first providing secure blocking.

Never align holes with fingers or hands - Use the proper aligning tool.

Disconnect batteries before working on electrical system or repair work of any kind.

Check for fuel or battery electrolyte leaks before starting service or maintenance work. Eliminate leaks before proceeding.

BATTERY GAS IS HIGHLY FLAMMABLE Leave battery box open to improve ventilation when charging batteries. Never check charge by placing metal objects across the posts. Keep sparks or open flame away from batteries. Do not smoke near battery to guard against the possibility of an accidental explosion.

Do not charge batteries in a closed area. Provide proper ventilation to guard against an accidental explosion from an accumulation of explosive gases given off in the charging process.

Be sure to connect the booster cables to the proper terminals (+ to +) and (- to -) at both ends. Avoid shorting clamps. Follow the Operation and Maintenance Instruction Manual procedure.

Due to the presence of flammable fluid, never check or fill fuel tanks, storage batteries or use starter fluid near lighted smoking materials or open flame or sparks.

Rust inhibitors are volatile and flammable. Prepare parts in well ventilated place. Keep open flame away - **DO NOT SMOKE**. Store containers in a cool well ventilated place secured against unauthorized personnel.

Do not use an open flame as a light source to look for leaks or for inspection anywhere on the machine.

DO NOT pile oily or greasy rags - they are a fire hazard. Store in a closed metal container.

SAFETY RULES

Never use gasoline or solvent or other flammable fluid to clean parts. Use authorized commercial, non-flammable, non-toxic solvents.

Never place gasoline or diesel fuel in an open pan.

Shut off engine and be sure all pressure in system has been relieved before removing panels, housings, covers, and caps. See Operation and Maintenance Instruction Manual.

Do not remove hoses or check valves in the hydraulic system without first removing load and relieving pressure on the supporting cylinders. Turn radiator cap slowly to relieve pressure before removing. Add coolant only with engine stopped or idling if hot. See Operation and Maintenance Instruction Manual.

Fluid escaping under pressure from a very small hole can almost be invisible and can have sufficient force to penetrate the skin. Use a piece of card board or wood to search for suspected pressure leaks. **DO NOT USE HANDS.** If injured by escaping fluid, see a doctor at once. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

Never use any gas other than dry nitrogen to charge accumulators. See Operation and Maintenance Instruction Manual.

When making pressure checks use the correct gauge for expected pressure. See the Operation and Maintenance Instruction Manual or Service Manual for guidance.

For field service, move machine to level ground if possible and block machine. If work is absolutely necessary on an incline, block machine and its attachments securely. Move the machine to level ground as soon as possible.

Brakes are inoperative when manually released for servicing. Provision must be made to maintain control of the machine by blocking or other means.

Block all wheels before bleeding or disconnecting any brake system lines and cylinders.

Never use make shift jacks when adjusting track tension. Follow the Undercarriage Service Manual.

Know your jacking equipment and its capacity. Be sure the jacking point used on the machine is appropriate for the load to be applied. Be sure the support of the jack at the machine and under the jack is appropriate and stable. Any equipment up on a jack is dangerous. Transfer load to appropriate blocking as a safety measure before proceeding with service or maintenance work according to local or national requirements.

Always block with external support any linkage or part on machine that requires work under the raised linkage, parts, or machine per local or national requirements. Never allow anyone to walk under or be near unblocked raised equipment. Avoid working or walking under raised blocked equipment unless you are assured of your safety.

When servicing or maintenance requires access to areas that cannot be reached from the ground, use a ladder or step platform that meets local or national requirements to reach the service point. If such ladders or platforms are not available, use the machine hand holds and steps as provided. Perform all service or maintenance carefully.

Shop or field service platforms and ladders used to maintain or service machinery should be constructed and maintained according to local or national requirements.

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.

In lifting and handling heavy parts, slings must be of adequate strength for the purpose intended and must be in good condition.

Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorized protective equipment such as safety glasses, heavy gloves, safety shoes.

When using compressed air for cleaning parts use safety glasses with side shields or goggles. Limit the pressure to 207 kPa (30 psi) according to local or national requirements.

Wear welders protective equipment such as dark safety glasses, helmets, protective clothing, gloves and safety shoes when welding or burning. Wear dark safety glasses near welding. **DO NOT LOOK AT ARC WITHOUT PROPER EYE PROTECTION.**

Replace seat belts every two years on open canopy units and every three years on machines with cabs or at change of ownership.

Wear proper protective equipment such as safety goggles or safety glasses with side shields, hard hat, safety shoes, heavy gloves when metal or other particles are apt to fly or fall.

Use only grounded auxiliary power source for heaters, chargers, pumps and similar equipment to reduce the hazards of electrical shock.

Keep maintenance area **CLEAN** and **DRY**. Remove water or oil slicks immediately.

Remove sharp edges and burrs from reworked parts.

Be sure all mechanics tools are in good condition. **DO NOT** use tools with mushroomed heads. Always wear safety glasses with side shields.

Do not strike hardened steel parts with anything other than a soft iron or non-ferrous hammer.

Do not rush. Walk, do not run.

Know and use the hand signals used on particular jobs and know who has the responsibility for signaling.

SAFETY RULES

Face the access system when climbing up and down.

Apply the parking device and place the transmission in neutral before starting the machine.

Do not bypass the starter safety switch. Repair the starter safety controls if they malfunction.

Fasten seat belt before operating.

Steering should be checked to both right and left. Brakes should be tested against engine power. Clutch and transmission controls should be moved through or to neutral positions to assure disengagement. Operate all controls to insure proper operation. If any malfunctions are found, park machine, shut off engine, report and repair before using machine.

If the power steering or the engine ceases operating, stop the machine motion as quickly as possible. Lower equipment, set parking device and keep machine securely parked until the malfunction is corrected or the machine can be safely towed. Never lift loads in excess of capacity.

Should the machine become stuck or frozen to the ground, back out to avoid roll over.

Know and understand the job site traffic flow patterns.

Keep the machine in the same gear going down hill as used for going up hill.

When roading a machine, know and use the signaling devices required on the machine. Provide an escort for roading where required.

Always use the recommended transport devices when roading the machine.

Do not attempt repairs unless proper training has been provided.

Use extreme caution when removing radiator caps, drain plugs, grease fittings or pressure taps. Park the machine and let it cool down before opening a pressurized compartment.

Release all pressure before working on systems which have an accumulator.

When necessary to tow the machine, do not exceed the recommended towing speed, be sure the towing machine has sufficient braking capacity to stop the towed load. If the towed machine cannot be braked, a tow bar must be used or two towing machines must be used - one in front pulling and one in the rear to retard. Avoid towing over long distances.

Observe proper maintenance and repair of all pivot pins, hydraulic cylinders, hoses, snap rings and main attaching bolts.

Always keep the brakes and steering systems in good operating condition.

Replace all missing, illegible or damaged safety signs. Keep all safety signs clean.

Do not fill the fuel tank to capacity. Allow room for expansion.

Wipe up spilled fuel immediately.

Always tighten the fuel tank cap securely. Should the fuel cap be lost, replace it only with the original manufacturers approved cap. Use of a non-approved cap may result in over-pressurization of the tank.

Never drive the machine near open fires.

Use the correct fuel grade for the operating season.

MACHINE THEFT AND VANDALISM

ACTIONS TO DISCOURAGE THEFT AND VANDALISM

Immediately upon receipt of a new machine, record the serial numbers of the machine and of all major components and attachments. Keep this list up-to-date as components are replaced or exchanged on the machine. File these numbers in a safe location for fast retrieval.

Report all model, machine and component serial numbers to the insurance company at the time of purchase. If the numbers are noted on the insurance policy, make certain that the numbers are correct.

Remove keys from unattended machines.

Attach, secure, and lock all anti-vandalism and anti-theft devices on the machine.

Lock doors of cabs when not in use.

Immobilize machine by lowering the blade, bucket, or boom to the ground, removing the battery or removing a critical electrical or starting system component.

Discourage the thief! Inspect the gates and fences of the machinery storage yard or construction site. If possible, keep machines in well-lighted areas. Ask the law enforcement agency having local jurisdiction to make frequent checks around the storage or work sites, especially at night, during weekends or on holidays.

Establish liaison with neighbors and ask them to watch equipment left at job sites and report suspicious activities to the applicable law enforcement agency.

Make frequent inventories of machines to promptly detect losses and vandalism.

ACTIONS TO AID IN RECOVERY OF STOLEN MACHINES

Take photographs of the machine for identification purposes.

In the event of theft, immediately notify the law enforcement agency having jurisdiction. Provide the investigating officer with brand name, type of equipment, and serial numbers of the machine and of major attachments and components. It is helpful to show the investigating officer an Operator's Manual, photographs, and advertising to familiarize him with the appearance of the machine.

Report the theft to the insurance company. Provide the model and all serial numbers.

Report the model and serial numbers of the stolen machine to a dealer handling the respective line of equipment. Request that the dealer forward this same information to the equipment manufacturer.

Ask the dealer to post a description of the stolen machine, including serial numbers, and to inform his sales and service personnel.

FOREWORD

Always furnish serial number if making an inquiry to dealer or factory about this machine.

Many equipment owners employ the Dealer Service Department for all work other than routine lubrication and minor service. This practice is encouraged, as our Dealers are well informed and equipped to render efficient service by factory trained mechanics.

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Illustrations show standard and optional items.

IMPORTANT

The information in this manual was current at the time of publication. It is our policy to constantly improve our product and to make available additional items. These changes may affect procedures outlined in this manual. If variances are observed, verify the information through your Dealer.

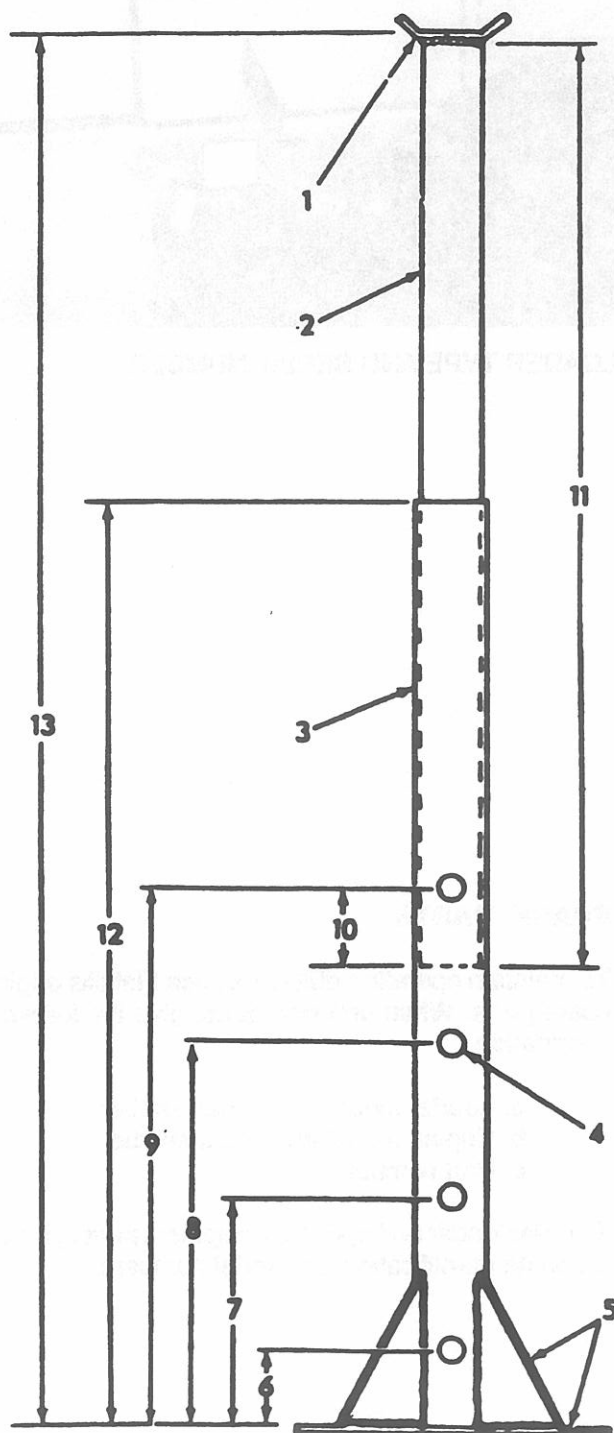
Fiatallis is not responsible for any liability arising from any damage resulting from defects caused by parts and/or components not approved by Fiatallis for use in maintaining and/or repairing products manufactured or merchandized by Fiatallis.

In any case, no warranty of any kind is made or shall be imposed with respect to products manufactured or merchandized by Fiatallis when failures are caused by the use of parts and/or components not approved by Fiatallis.

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If necessary to hold the boom in the raised position, use a boom stand (75300989) as shown below or fabricate a stand from the given dimensions.



1. Support, 8" x 8" (1/4" weld)
2. Steel pipe (O.D. 4.5")
(Wall 0.337" min)
3. Steel pipe (O.D. 5.5")
(Wall 0.375" min)
4. Holes, 1.56" dia. (use 1.5" x 6" pin)
(4 places in 5" pipe)
(1 place in 4" pipe)
5. Bottom plate, 24" x 24"
(thickness 0.375")
Vertical plates (4) 9" x 12"
(Thickness 0.375")
Weld (3/16") both sides of all four plates.
6. 6.0"
7. 18.0"
8. 30.0"
9. 42.0"
10. 6.0"
11. 72.0"
12. 72.0"
13. 108.0"

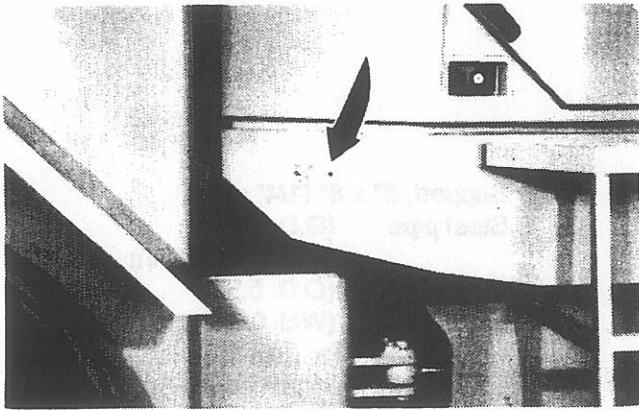
BOOM STAND

T-84262

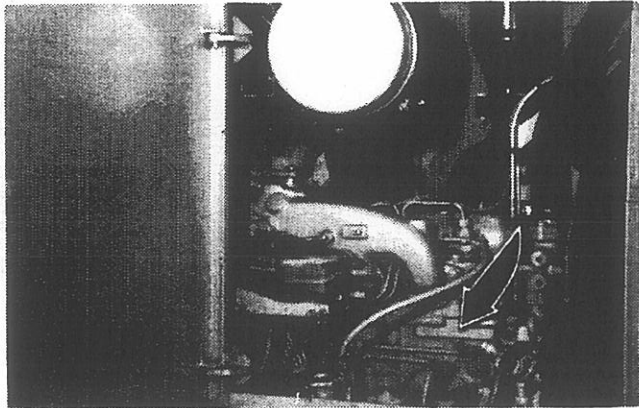
Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

MODEL IDENTIFICATION

T-85386

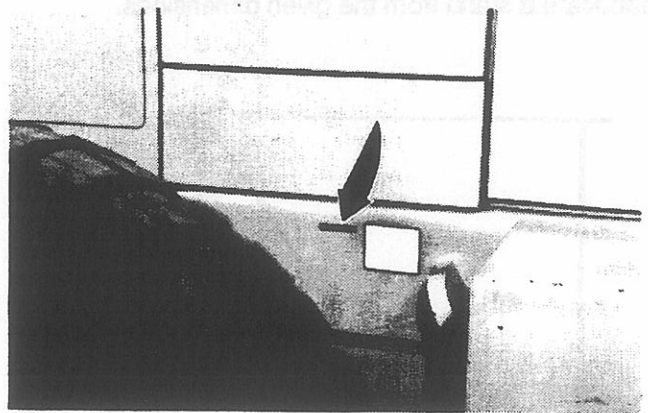


**LOADER AND ENGINE IDENTIFICATION DATA
PLATE**
T-85389



ENGINE TYPE AND SERIAL NUMBER

T-85388



LOADER TYPE AND SERIAL NUMBER

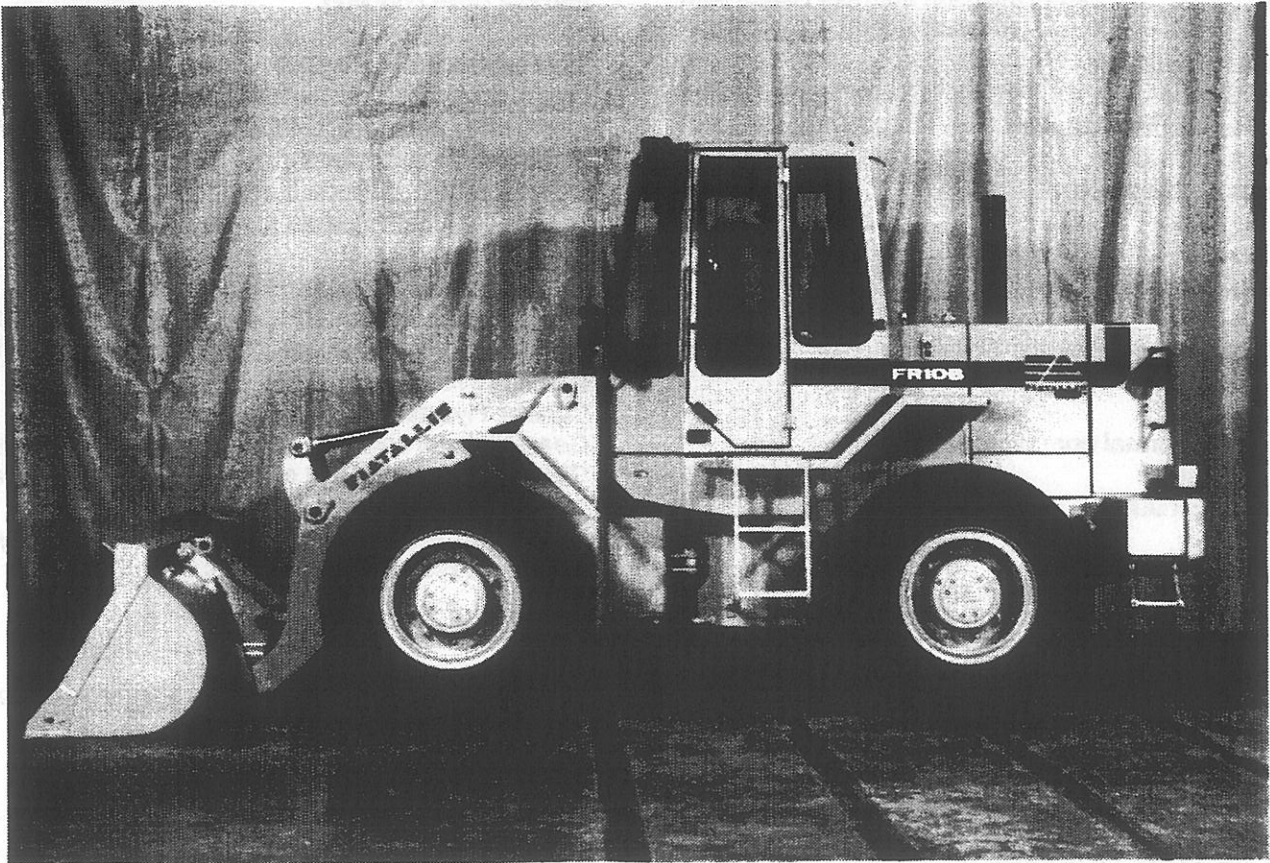
SPARE PARTS

To maintain operating efficiency, use Fiatallis original spare parts. When ordering parts, give the following information.

- a. Loader model and serial number
- b. Engine model and serial number
- c. Part number

To order loader and optional equipment parts, give appropriate identification and serial numbers.

MODEL IDENTIFICATION



WHEEL LOADER (Left Side)

T-85390

Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

SPECIFICATIONS

ENGINE

Make and Model FIAT 8065.05.290
Type Direct injection 4-stroke Diesel with
exhaust driven turbocharger
Number of cylinders 6
Bore x Stroke 104 x 115 mm (4.1 x 4.53 in)
Total Piston Displacement 5861 cc (358 in³)
Compression ratio 17 to 1
Governor speed rate 2500 RPM

ENGINE VALVES

Overhead Valve, Pushrod Operation
Valve clearance:

For normal operation:
- Intake 0.25 mm (0.010")
- Exhaust 0.35 mm (.014")

Fuel System

Feed pump, rotary distributor injection pump, integral
all-speed governor and automatic advance variator.
Disposable cartridge fuel filter.
Pump timing to engine:
5° B.T.D.C. in compression stroke(start of delivery).
Firing order 1-5-3-6-2-4
Fuel injectors: 3 orifice nozzles, release pressure 230
- 238 bar (3335 - 3450 psi)
Paper-cartridge dry air cleaner, with restriction warning
light in Data Monitor panel.

Lubrication System

Type: Force-feed by gear pump
Oil Filters: Disposable, paper-cartridge on delivery line.
Low oil pressure warning light in Data Monitor panel.

Cooling System

Coolant 50-50 water antifreeze mixture, force-circu-
lated by centrifugal pump.
Radiator: 5 tube row core.
Fan: 7 blade, pusher.
Coolant circulation between engine and radiator gov-
erned by thermostat.
Low coolant level warning light in Data Monitor panel.

DRIVE TRAIN

Engine-to-Converter
Flexible plate coupling.

Transmission-to-Axles
Direct drive at front, consisting of two U-joint drive
shafts with central bearing. The first shaft between
transmission and transfer is sliding; the second, be-
tween transfer and axle is rigid.
Double U-joint drive shaft at rear axle.

Converter/Transmission
Hydraulic torque converter with integral transmission.
Transmission: Powershift, 3 speeds forward and 3
speeds reverse.
Control: Hydraulic, acting on 5 clutches.
Gearshift lever safety lock in neutral (starter inhibited).
Oil cooling through heat exchanger with coolant recir-
culated from radiator.
Oil filtration: Full-flow filter on control pump delivery line
and metal strainer on suction intake.

BRAKE SYSTEM

Service: Disc, on all wheels. No adjustment needed
Control: Hydraulic, servo-assisted.

Circuit: Dual-split, independent front and rear.
Single pedal operation. Pedal will also operate trans-
mission neutralizer, if desired, after activation of switch
on instrument panel.

Parking: Drum brake on transmission output shaft,
which is spring applied and hydraulically released.
Control: Manual, by lever on left side of Operator's
seat.

Emergency: Through actuation of service brakes.

SPECIFICATIONS

AXLES

Front: rigid, full floating, complete with central bevel gear set, torque proportioning differential and planetary final drives in wheel hubs.

Rear: swinging, full floating, complete with central bevel gear set, torque proportioning differential and planetary final drives in wheel hubs.

Tires standard size 15.5x25 (PR12)

STEERING SYSTEM

Hydraulically controlled by steering wheel and assisted through a hydraulic gear pump on the transmission. Two, double-acting power cylinders.

As the steering wheel is turned, one cylinder exerts a contracting force and the other an extending force; this causes the loader to pivot (articulate) where the front and rear frame sections are joined. Optionally the machine may be fitted with a ground-operated emergency steering control.

LOADER FRAME

Articulated, consisting of front and rear sections coupled through ball joints. Both sections are made up of welded sheet steel box sections, carrying the different operational units.

IMPLEMENT HYDRAULIC SYSTEM

Oil tank located on the rear frame

Dual section gear supply pump: One section for steering control and one for implement control.

Oil filtering is assured by means of two full flow filters. One metal suction strainer in the suction side of the tank and a paper filter on the return side of the tank. This filter is protected by a by-pass valve in the event of restriction.

Filter restriction light in Data Monitor panel.

Two-spool, monoblock type main control valve incorporating the main relief valve, load check, anticavitation and relief valves. An optional 3rd spool is available for accessory implement(s).

Two hand levers controls:

-boom raise/lower and float

-bucket dump and roll back

A lock lever is provided to retain the implement controls lever in hold position to prevent accidental engagement.

Four hydraulic double acting cylinders operate the implement: two for the boom and two for the bucket rotation.

The bucket position indicator rod is adjustable. An electromagnetic type bucket positioner and boom kickout is standard equipment.

ELECTRICAL SYSTEM

24 Volts

Alternator

With incorporated electronic voltage regulator.

Battery

Maintenance free type

Two, 12V, series-connected.

Starter Motor

Automatic pinion engagement by solenoid.

CAB

ROPS cab for maximum protection of operator in case of rollover. The cab ensures interior comfort.

Weight and Speeds

Operating weight (standard tires and bucket, ROPS cab and operator) and fuel tank half full: 9850 kg (21670 lbs).

Max speeds

TIRE SIZE
15.5 x 25 L-2

(Forward)	
1st gear km/h (mph)	5.3 (3.3)
2nd gear km/h (mph)	11.7 (7.3)
3rd gear km/h (mph)	32.7 (20.3)
(Reverse)	
1st gear km/h (mph)	5.3 (3.3)
2nd gear km/h (mph)	11.7 (7.3)
3rd gear km/h (mph)	32.7 (20.3)

SPECIFICATIONS

Max speeds	TIRE SIZE
	17.5 x 25 L-2
(Forward)	
1st gear km/h (mph)	5.5 (3.4)
2nd gear km/h (mph)	12.2 (7.6)
3rd gear km/h (mph)	34 (21.1)

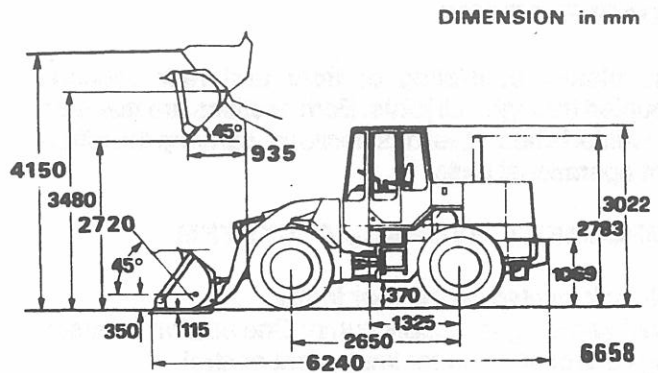
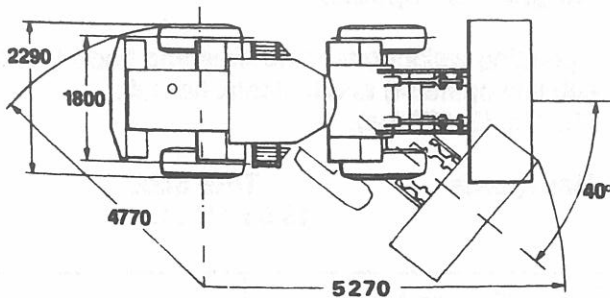
Inflate tires to manufacturer's specifications stamped on the side wall of the tire.

(Reverse)

1st gear km/h (mph)	5.5 (3.4)
2nd gear km/h (mph)	12.2 (7.6)
3rd gear km/h (mph)	34 (21.1)

ACCESSORY EQUIPMENT

Some of the equipment items described and illustrated are supplied to certain markets to meet specific requirements.



T-100082

PRELIMINARY INSTRUCTIONS AND BREAK-IN PERIOD

PRELIMINARY INSTRUCTIONS

On delivery of the machine, the Dealer Sales Organization will instruct the Buyer on the main operation and maintenance rules.

Here below is a check list of such instructions intended to show the Operator how to:

- Store fuel properly
- Bleed the fuel system
- Drain deposits accumulated in fuel tank
- Start and stop engine and machine
- Work safely during service operations
- Run-in machine
- Use the control levers
- Tire pressure
- Use carried equipment and its installation
- Lubricate properly and products needed
- Service the air cleaner
- Service the cooling system
- Service the hydraulic systems of converter-transmission, steering, attachment(s)



DANGER

Extinguish all smoking materials or open flames before checking and filling fuel tanks, changing filters and before opening sediment drain, due to the presence of flammable fluid.

The fuel tank should be filled with the specified grade of fuel. Use care to prevent entrance of dirt or foreign matter while filling the tank.

Check fluid levels in the following:

- Brakes
- Engine crankcase
- Axles
- Hydraulic systems of converter-transmission, steering and attachment(s)
- Engine cooling system

Lubricate all lube fittings.



WARNING

Do not run engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

Warn all people who may be servicing or working around machine before starting engine.

Never leave machine unattended with engine running.

The cooling system is filled at factory with a 50-50 mixture of water and permanent type (glycol base) antifreeze for protection down to -35° C (-31° F).

Operate controls and check for proper operation.

Stop engine and check hoses, lines and fittings for leakages. Tighten as necessary.



WARNING

DO NOT USE HANDS to search for pressure leaks. Fluid escaping under pressure can penetrate the skin.

BREAK-IN PERIOD



WARNING

Never lubricate, service or adjust with engine running except as called in the Operation and Maintenance Instruction or Service Manuals to keep from being caught in moving parts or by a moving machine.

A minimum break-in period of 50 hours is required.
Proceed as follows:

- Before driving away after starting from cold, warmup engine at idle speed for a few minutes.
- Avoid prolonged full power operation or extended idling.
- Inspect the machine frequently, making sure there are no oil or coolant leaks.

During the initial period of machine operation, in addition to the routine maintenance described in the relevant section, you are advised to carry out the following supplementary servicing operations that later may be omitted or adjusted to longer intervals.

Within the first 50 hours:

Change engine oil and associated filter.

Within the first 100 hours:

Clean fuel pump filter.
Change fuel filter.
Change converter/transmission oil and associated filter.
Change the hydraulic system oil return filter.

Within the first 300 hours:

Check fuel system and engine valve clearance.
Change oil in differentials and planetary wheel ends.
Conduct regular 250 hour maintenance.

All the above recommendations apply also to newly overhauled machines.



WARNING

Never lubricate, service or adjust with engine running except as called for in the Operation and Maintenance Instruction or Service Manuals to keep from being caught in moving parts or by a moving machine.



DANGER

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing

OPERATION

CONTROLS AND INSTRUMENTS

T-85391

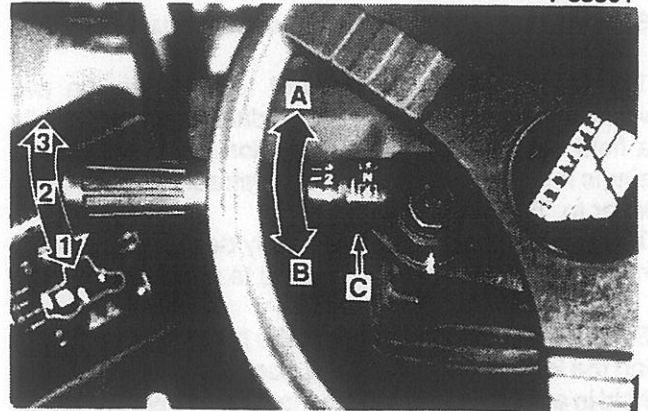
Gearshift Lever (Speeds and Travel Direction)

Gear selection and travel direction positions are shown in the illustration. When pulled down, knob C releases the transmission control; when pulled up, while lever is in neutral position, it prevents lever forward/reverse selection (locked). Rotation of the lever provides speed selection.

Gearshifting positions

(Speeds and Travel direction)

- A. Forward
- B. Reverse
- C. Lock knob

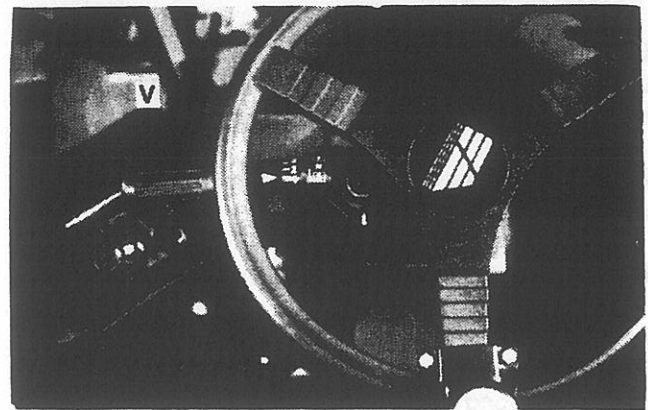


T-85394

Steering Wheel

Machine steers by actuation of two double acting hydraulic cylinders. As the steering wheel is turned, one cylinder exerts a contracting force and the other an extending force, causing the front section to pivot left or right about the central articulation pin.

Steering wheel (V)



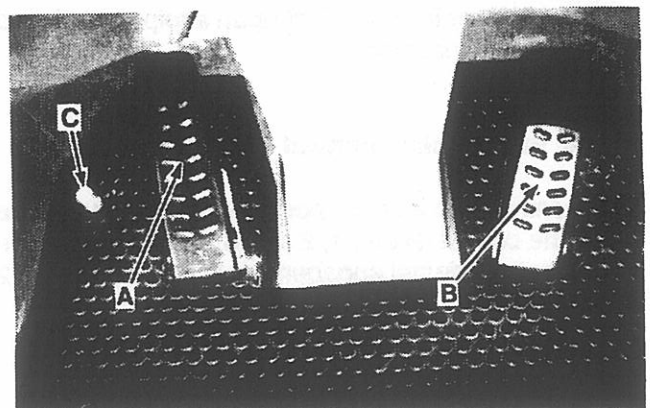
Foot Controls

- A. Brake
- B. Accelerator
- C. Horn button

IMPORTANT - Do not attempt to slow down machine on steep downgrades by using the brakes only. Instead, downshift and feather the brakes. Anticipate grades before starting down. Select the proper gear range to maintain control. Avoid repeated light application (pumping) of the brake pedal.

The left pedal A applies the machine brakes, with or without simultaneous disengagement of the transmission (See INSTRUMENTATION). The right pedal B controls engine speed (accelerator) while button C is the horn switch.

T-85393



OPERATION

Single Control Lever Standard Equipment

The boom and bucket control lever comes in two versions; the single lever is standard equipment while a field installed dual lever is optional. By shifting the single lever 1 to "A" the bucket is retracted. Shifting the lever to "B" dumps the bucket.

The bucket can be stopped in any desired position by releasing the lever which returns to position "N".

Shifting the lever to "L" raises the boom while positioning the lever at "H" lowers the boom. The boom can be held in any position by releasing the lever which returns to "N".

Shifting the lever to "A" or "M" places the lever in a detent and the lever will stay in position until the bucket or boom kickout forces the lever out of detent.

Placing the lever in "F" provides floating of the boom over the ground contour.

Dual Control Lever Optional Equipment

Lever 1 operates the bucket. Position "A" dumps the bucket while position "B" retracts the bucket. The bucket can be stopped in any position by shifting the lever to "N".

Lever 2 controls the boom. If the lever is placed at "S", the boom raises. Position "H" lowers the boom. If the lever is placed at "F" the boom floats over the ground contours.

The bucket retract and boom raise are both detented, and the lever is held in position by the control valve.

Optional hydraulic function control lever

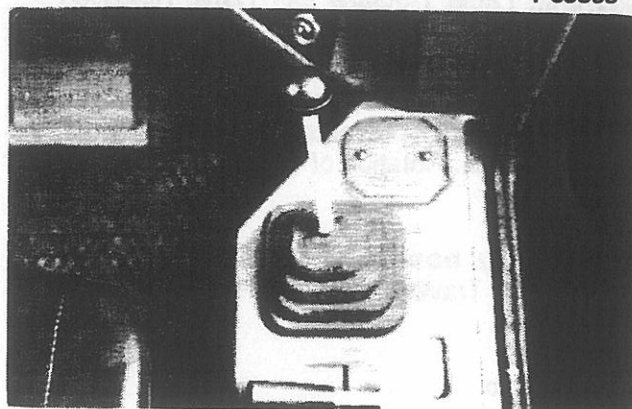
The functions of an optional third spool are controlled by lever 3 supplied as optional equipment. Function of the control lever is dependant upon equipment placed onto the base machine.

Boom and Bucket control safety lock lever

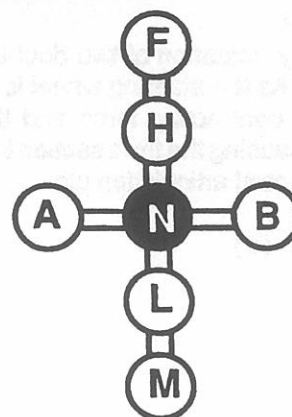
The control lock lever, 4, positioned as in the figure holds the control levers, 1, 2 and 3, in neutral position to prevent accidental engagement of the controls, 1, 2 and 3.

To unlock the control levers, move lever 4 rearward.

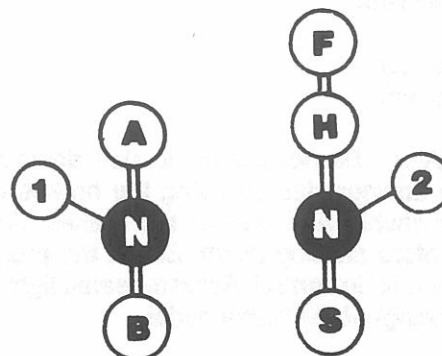
T-85395



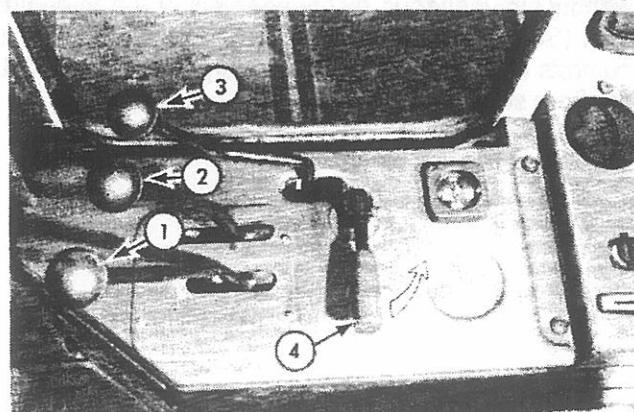
T-100098



T-100079



T-91468



OPERATION

T-85395

Single Control Lever Standard Equipment

The boom and bucket control lever comes in two versions; the single lever is standard equipment while a field installed dual lever is optional. By shifting the single lever 1 to "A" the bucket is retracted. Shifting the lever to "B" dumps the bucket.

The bucket can be stopped in any desired position by releasing the lever which returns to position "N".

Shifting the lever to "L" raises the boom while positioning the lever at "H" lowers the boom. The boom can be held in any position by releasing the lever which returns to "N".

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Dual Control Lever Optional Equipment

Lever 1 operates the bucket. Position "A" dumps the bucket while position "B" retracts the bucket. The bucket can be stopped in any position by shifting the lever to "N".

Lever 2 controls the boom. If the lever is placed at "S", the boom raises. Position "H" lowers the boom. If the lever is placed at "F" the boom floats over the ground contours.

The bucket retract and boom raise are both detented, and the lever is held in position by the control valve.

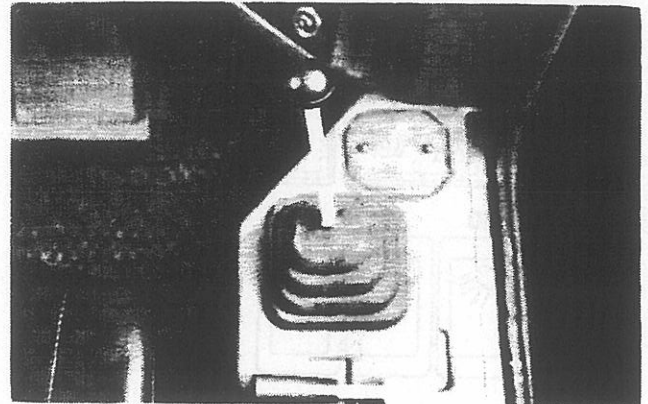
Optional hydraulic function control lever

The functions of an optional third spool are controlled by lever 3 supplied as optional equipment. Function of the control lever is dependant upon equipment placed onto the base machine.

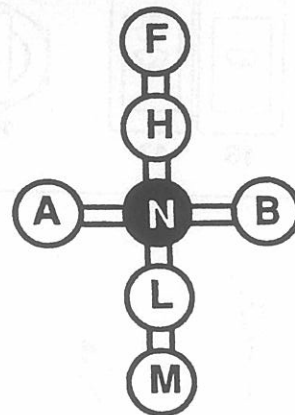
Boom and Bucket control safety lock lever

The control lock lever, 4, positioned as in the figure holds the control levers, 1, 2 and 3, in neutral position to prevent accidental engagement of the controls, 1, 2 and 3.

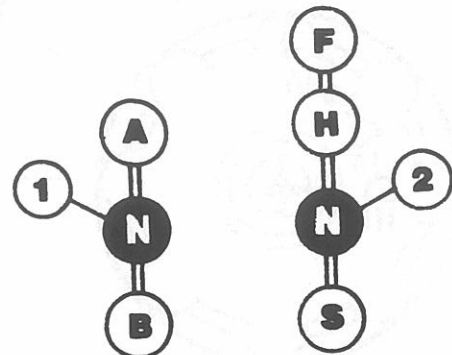
To unlock the control levers, move lever 4 rearward.



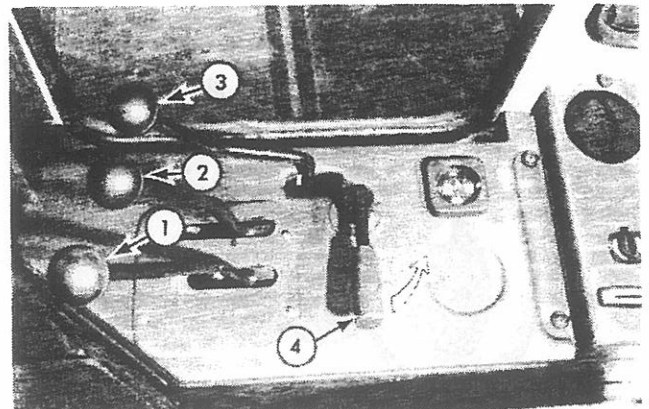
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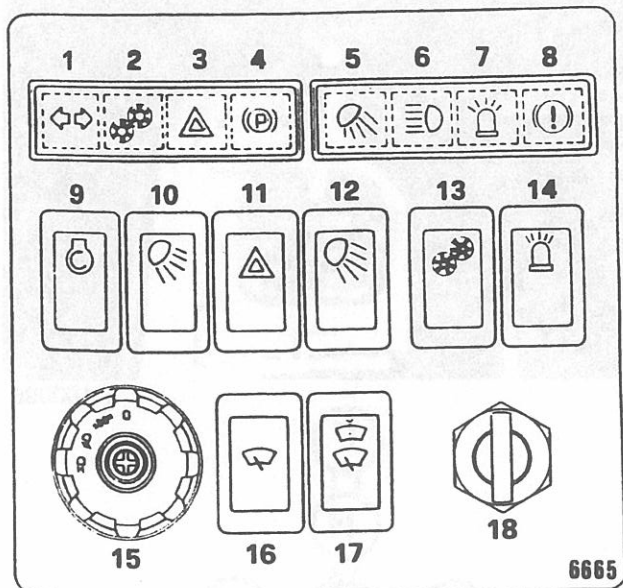
T-100079



T-91468



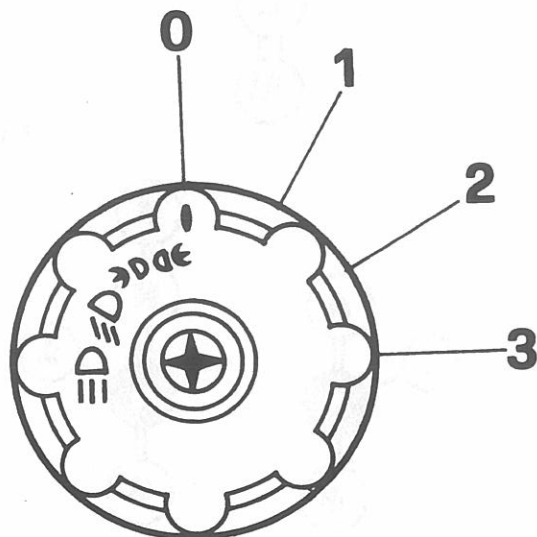
OPERATION



Switches and warning indicators

1. Turn signal indicator (*)
2. Transmission neutralizer indicator
3. Hazard warning lights indicator (*)
4. Parking lights indicator
5. Road traffic lights
6. Rear work light indicator
7. Revolving beacon indicator (*)
8. Emergency steering light (German market only)
9. Cold starting aid switch (8)
10. Rear work lights switch
11. Hazard warning lights switch (*)
12. Front work lights switch
13. Transmission neutralizer switch
14. Revolving beacon switch (*)
15. Light switch
16. 2-speed windshield wiper switch
17. Back window wiper/washer switch
18. Engine starting/stopping switch

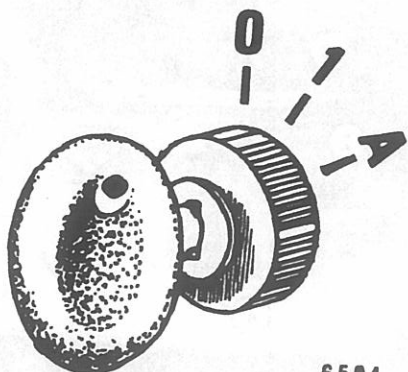
(*) Optional



17 Lighting switch

Switch positions are illustrated below

- Position 0 - OFF
- Position 1 - Front lights energized
- Position 2 - Low beam and rear tail light
- Position 3 - High beam and rear tail light



18 Engine starting/stopping switch

Turn key as follows for operation:

- Position 0 - OFF
- Position 1 - Electric system energized (except engine starting)

Position A **Press IN** and turn key clockwise to start engine (when released, key snaps back automatically to position 1).

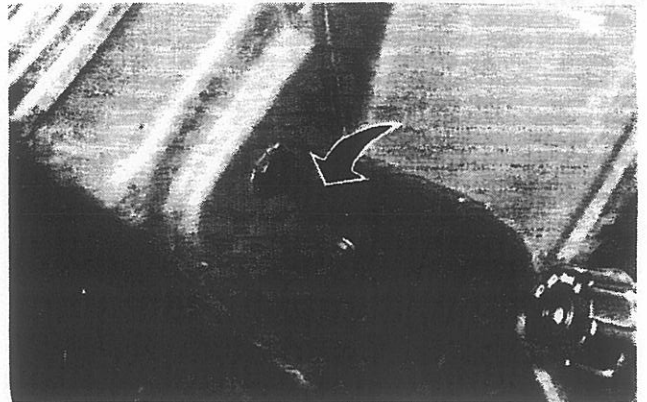
Important - Switch activation is possible only when master switch key is turned ON.

NOTE: Key may be removed from switch only when set in position 0.

OPERATION

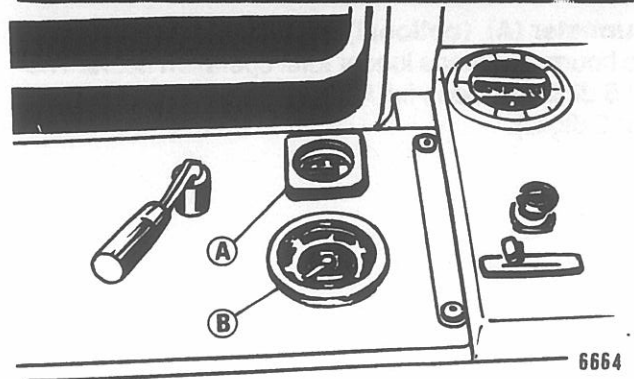
T-91496

Turn signal switch (optional)



Hourmeter (A) (optional)

The hourmeter reads loader total operation hours. The first 5 digits provides full hours and one-tenths of hour (last 2 digits).



Electronic speedometer (B) (optional)

Parking brake lever

- A. Applied
- B. Released

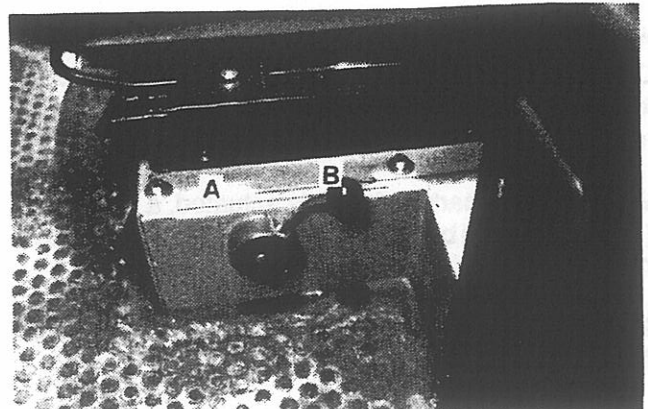
Parking Brake

Operates on transmission output shaft. To apply rotate lever forward to position A. To release rotate lever back to position B.

Whenever the parking brake is actuated, a signal light (#4 page 10) will be lighted and the transmission will be neutralized.

If the parking brake warning light stays on, depress the foot brake pedal until the light goes out.

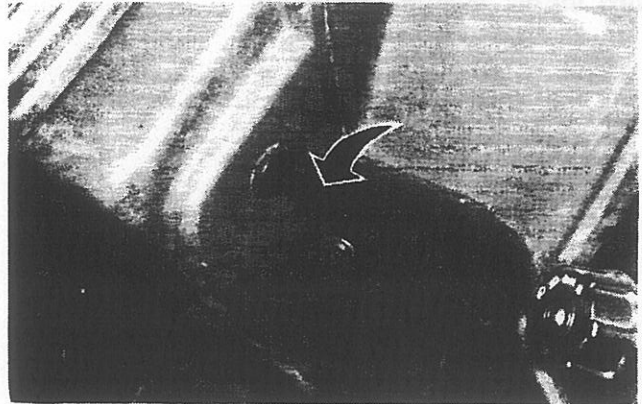
T-91470



OPERATION

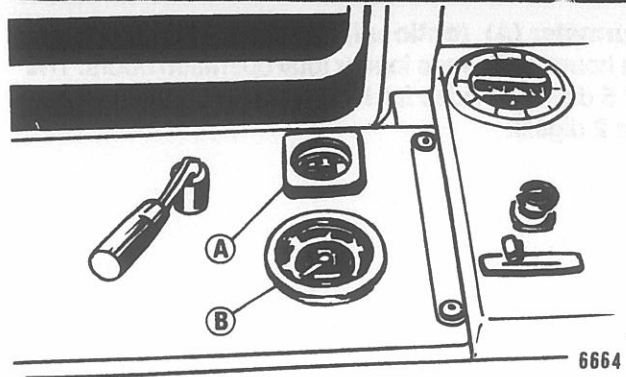
T-91496

Turn signal switch (optional)



Hourmeter (A) (optional)

The hourmeter reads loader total operation hours. The first 5 digits provides full hours and one-tenths of hour (last 2 digits).



Electronic speedometer (B) (optional)

Parking brake lever

- A. Applied
- B. Released

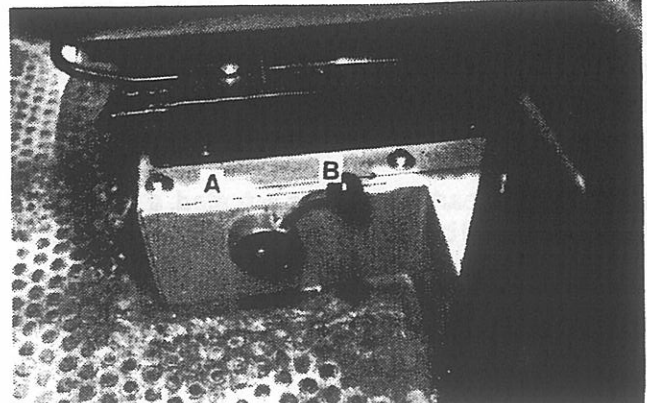
Parking Brake

Operates on transmission output shaft. To apply rotate lever forward to position A. To release rotate lever back to position B.

Whenever the parking brake is actuated, a signal light (#4 page 10) will be lighted and the transmission will be neutralized.

If the parking brake warning light stays on, depress the foot brake pedal until the light goes out.

T-91470



ELECTRONIC DATA MONITOR PANEL - EDM

Units prior to S/N 610580

If Electronic Data Monitor lights during operation, shut down machine using safe practices.

The Electronic Data Monitor is similar to warning indicator lights on an automobile which signal low engine pressure, hot coolant and low battery charge. There is a signal device to sense the individual circuit just like on an automobile. The Electronic Data Monitor used on the FR10B monitors various systems within the powertrain, brakes and implement systems. The Data Monitor is non-serviceable replaceable panel made up of a circuit board and light emitting diodes (L.E.D.). The function of the data monitor is to check certain fluid levels and assist the operator in diagnosing problems which may occur while the machine is operating. If a pressure or temperature malfunction occurs in the tested system, the monitor will sense the malfunction and signal the operator by means of a light and buzzer.

Systems monitored prior to start up, only.

1. Transmission oil level
2. Engine oil level
3. Engine coolant level

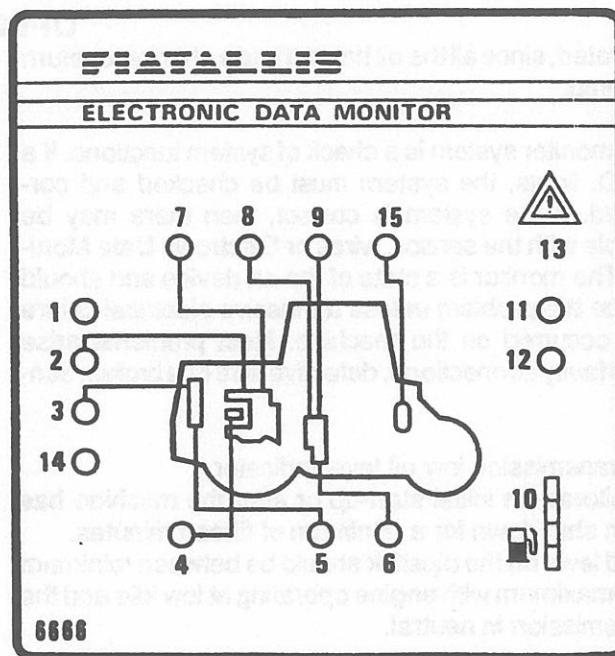
Systems monitored while the engine is running.

4. Alternator output
5. Coolant maximum temperature
6. Converter oil maximum temperature
7. Engine lubrication pressure
8. Transmission shift pressure
9. Transmission lubrication pressure
10. Fuel level
11. Air cleaner filter restriction
12. Implement oil filter restriction
14. Brake fluid minimum level
15. Brake system low pressure

The monitor is self diagnosing in that each time the machine's electrical system is energized a series of tests are performed on the monitor.

As the operator turns on the master switch and the instrument panel key switch to the first position, the monitor's warning lights begin to flash for approximately five seconds. The operator should note whether all lights are flashing. If all the lights flash, the monitor lights are operating properly.

During the flash test, the Electronic data monitor is checking the fluid levels. If a level is below the minimum, the light will remain on after the test period as well as the general malfunction light and buzzer.



If the operator does not start the engine within 10-15 seconds after the Monitor check, various lights will come on and the buzzer will sound. This is normal as the monitor is checking system pressures and finding them low or non-existent. The following lights will be lighted.

Alternator output
Engine lubrication pressure
Transmission shift pressure
Transmission lubrication pressure
Brake fluid pressure

Once the operator starts the engine, all lights should go out on the monitor providing there are no system malfunctions.

If a level is noted as being low and then filled while the engine is running, which is contrary to safe practices as stated in the Operation and Instruction Maintenance Manual, the monitor light will stay lighted until the engine is shut down and the key turned to the Monitor check position.

The transmission oil level is lower once the engine starts. The converter empties itself in about fifteen minutes when the machine is shut down, and the oil flows into the transmission sump. As the engine is started, the converter fills. If the operator would shut down the machine and then turn on the key, transmission oil level would not be monitored for fifteen minutes because an electric timer within the test circuit. This is the only circuit that has this function.

If the engine is switched off and immediately (within 15 seconds) restarted, the engine low oil level light may be

OPERATION

activated, since all the oil has not had a chance to return to sump.

The monitor system is a check of system functions. If a L.E.D. lights, the system must be checked and corrected. If the system is correct, then there may be trouble with the sensor, wires or Electronic Data Monitor. The monitor is a state of the art device and should not be the problem unless a massive electrical failure has occurred on the machine. Most problems arise from faulty connections, defective wire or a broken sensor.

1. Transmission low oil level indicator.

Monitored on initial start-up or after the machine has been shut down for a minimum of fifteen minutes.

Fluid level on the dipstick should be between minimum and maximum with engine operating at low idle and the transmission in neutral.

2. Engine low oil level indicator.

Monitored on initial start-up.

Oil level should be between add and full on the dipstick when the engine is shut off.

3. Low coolant level indicator.

Monitored on initial start-up.



DANGER

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing.

Coolant level in the radiator should reach up to filler neck brim.

The cooling system must contain an anti-freeze mixture offering the protection adequate for the lowest expected temperatures.

4. Alternator output indicator

If this light stays ON while engine is running, it indicates some fault in the alternator charging system. Should the cause not be detected, seek the help of skilled servicemen.

5. Coolant high temperature indicator

This light turns ON to warn that coolant is overheating, possible causes are:

- Low coolant level in radiator.
- Dirt or debris caked outside radiator core (eliminate, with cold engine, using compressed air or water jet).
- Deposits in cooling circuit (flush engine).
- Fan belt slippage (adjust tension)

- Faulty thermostat (check and, if necessary, replace).
- Excessive converter/transmission oil temperature caused by misuse of machine.

6. Converter/Transmission oil high temperature indicator.

This light turns ON to warn of overheating which may be caused by:

- Restricted oil suction screen.
- Prolonged machine operation under excessively demanding service conditions.
- Transmission fluid control system faults.

The overheating of oil should be avoided as this condition affects the oil properties which, in turn, may be detrimental to proper operation.

When oil overheats, the machine shall be used only for the shortest possible time providing the coolant circulating in the radiator does not in turn overheat. Should excessive heating persist, downshift into a lower range.

Should this prove ineffective and oil does not cool, idle the engine for a short time and then switch off. Immediately check for causes of high temperature and take the necessary action after consulting your local service organization.

IMPORTANT: To obtain maximum possible performance from your converter, it is necessary to use the correct transmission range for the type of work being done.

7. Engine lube oil low pressure indicator.

This light turns ON to warn that oil pressure is inadequate. Possible causes are:

- Restricted oil filter
- Oil viscosity incorrect for climate conditions
- Lubrication circuit faults

If after having made the necessary checks and taken the necessary actions, the trouble persists, contact your local service organization.

8. Converter/Transmission fluid low shift pressure indicator.

This light turns ON to warn that transmission clutch pressure is inadequate. Possible causes are:

- Oil viscosity incorrect for climate conditions
- Fluid circuit faults
- It is normal for the light to blink between shifts at low engine speeds.

If after having made the necessary checks and taken the necessary actions, the trouble persists, contact your local service organization.

OPERATION

9. Converter/Transmission lube oil low pressure indicator.

This light turns ON to warn that lube oil pressure is inadequate. Possible causes are:

- Converter internal leakage
- Aeration of transmission fluid

10. Fuel level gauge

The completely lighted green bar indicates a full tank. When level drops down to reserve limit, the last segment LED turns red.

When tank needs refueling, use clean decanted fuel and a pump with strainer for its transfer from the deposit reservoir to machine. It is advisable to top up with fuel at the end of the working shift so as to prevent overnight stopover condensation. Do not run the tank dry. This would allow air to enter the fuel system after which fuel system bleeding would become necessary.

11. Air cleaner restriction indicator.

When this light turns ON steadily it warns that air cleaner cartridges are clogged and need cleaning or replacement.

12. Hydraulic control system oil filter restriction indicator.

When this light turns ON steadily it warns that the implement filter is clogged and needs replacement.

13. General malfunction indicator

It warns the Operator both audibly (buzzer) and visually (flashing light) that a faulty condition is being signalled by one or more indicators: 5,6,7,8,9,14 and 15.

When this light turns ON proceed as follows:

- Stop machine and turn engine OFF
- Disconnect electrical system by master switch
- Eliminate the cause of trouble

14. Brake fluid low level indicator

When this light turns ON steadily it warns that the brake fluid level is low and must be replenished for safe operating of the machine.

15. Brake fluid low pressure indicator.

When this light turns ON steadily it warns that the brake system hydraulic pressure is inadequate. Safe stopping of the machine can be done, if the operator immediately comes to a full stop.

Know the position and functions of the controls. Under-

Fluid Level Checks



WARNING

Extinguish all smoking materials, or open flames before checking and filling fuel tanks, changing filters and before opening sediment drain due to the presence of flammable fluid.

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing.

Never refill tank while engine is running.

Do not use matches, lighters or torches as a light source near flammables.

The object of the Electronic Data Monitor level checking feature is to eliminate the manual daily check; thereby saving time. However, if desired, levels can be checked as described in periodic services.

OPERATION

ELECTRONIC DATA MONITOR PANEL - EDM (Effective with S/N 610580)

If Electronic Data Monitor lights during operation, shut down machine using safe practices.

The Electronic Data Monitor is similar to warning indicator lights on an automobile which signal low engine pressure, hot coolant and low battery charge. There is a signal device to sense the individual circuit just like on an automobile. The Electronic Data Monitor used on the FR10B monitors various systems within the powertrain, brakes and implement systems. The Data Monitor is non-serviceable replaceable panel made up of a circuit board and light emitting diodes (L.E.D.). The function of the data monitor is to check certain fluid levels and assist the operator in diagnosing problems which may occur while the machine is operating. If a pressure or temperature malfunction occurs in the tested system, the monitor will sense the malfunction and signal the operator by means of a light and buzzer.

Systems monitored prior to start up, only.

1. Transmission oil level
2. Engine oil level
3. Engine coolant level

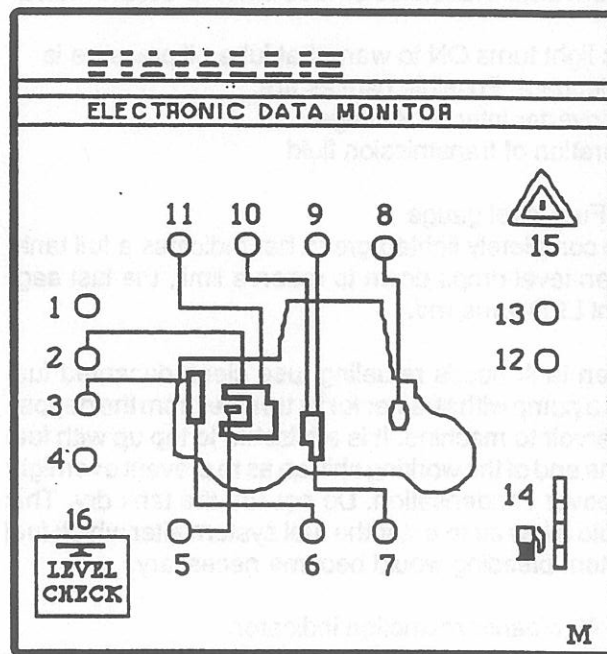
Systems monitored while the engine is running.

4. Brake fluid minimum level
5. Alternator output
6. Coolant maximum temperature
7. Converter oil maximum temperature
8. Brake system low pressure
9. Transmission lubrication pressure
10. Transmission shift pressure
11. Engine lubrication pressure
12. Implement oil filter restriction
13. Air cleaner filter restriction
14. Fuel level

The monitor is self diagnosing in that each time the machine's electrical system is energized a series of tests are performed on the monitor.

As the operator turns on the master switch and the instrument panel key switch to the first position, the monitor's warning lights begin to flash for approximately six - eight seconds. The operator should note whether all lights are flashing. If all the lights flash, the monitor lights are operating properly.

If during the flash test, the operator pushes down button 16, the Electronic Data Monitor is checking the fluid levels. If a level is below the minimum, the light will



remain on after the test period as well as the general malfunction light and buzzer.

If the operator does not push down on button 16, fluid levels are not checked.

If the operator does not start the engine within 10-15 seconds after the Monitor check, various lights will come on and the buzzer will sound. This is normal as the monitor is checking system pressures and finding them low or non-existent. The following lights will be lighted.

Alternator output
Engine lubrication pressure
Transmission shift pressure
Transmission lubrication pressure
Brake fluid pressure

Once the operator starts the engine, all lights should go out on the monitor, providing there are no system malfunctions.

If a level is noted as being low and then filled while the engine is running, **which is contrary to safe practices as stated in the Operation and Instruction Maintenance Manual**, the monitor light will stay lighted until the engine is shut down and the key turned to the Monitor check position.

OPERATION

The transmission oil level is lower once the engine starts. The converter empties itself in about fifteen minutes when the machine is shut down, and the oil flows into the transmission sump. As the engine is started, the converter fills. If the operator would shut down the machine and then turn on the key and check levels by depressing button 16, the transmission oil level may be activated since all of the oil has not flowed into the transmission sump.

If the engine is switched off and immediately (within 15 seconds) restarted, the engine low oil level light may be activated, since all the oil has not had a chance to return to sump.

For these reasons, do not push the button 16 to check levels, when the engine has been stopped for less than 20 minutes.

The monitor system is a check of system functions. If a L.E.D. lights, the system must be checked and corrected. If the system is correct, then there may be trouble with the sensor, wires or Electronic Data Monitor. The monitor is a state of the art device and should not be the problem unless a massive electrical failure has occurred on the machine. Most problems arise from faulty connections, defective wire or a broken sensor.

1. Transmission low oil level indicator.

Monitored on initial start-up or after the machine has been shut down for a minimum of twenty minutes. Fluid level on the dipstick should be between minimum and maximum with engine operating at low idle and the transmission in neutral.

2. Engine low oil level indicator.

Monitored on initial start-up.
Oil level should be between add and full on the dipstick when the engine is shut off.

3. Low coolant level indicator.

Monitored on initial start-up.



DANGER

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing.

Coolant level in the radiator should reach up to filler neck brim.

The cooling system must contain an anti-freeze mixture offering the protection adequate for the lowest expected temperatures.

4. Brake fluid low level indicator

When this light turns ON steadily it warns that the brake fluid level is low and must be replenished for safe operating of the machine. This function is always active when the engine is running.

5. Alternator output indicator

If this light stays ON while engine is running, it indicates some fault in the alternator charging system. Should the cause not be detected, seek the help of skilled servicemen.

6. Coolant high temperature indicator

This light turns ON to warn that coolant is overheating, possible causes are:

- Low coolant level in radiator.
- Dirt or debris caked outside radiator core (eliminate, with cold engine, using compressed air or water jet).
- Deposits in cooling circuit (flush engine).
- Fan belt slippage (adjust tension)
- Faulty thermostat (check and, if necessary, replace).
- Excessive converter/transmission oil temperature caused by misuse of machine.

7. Converter/Transmission oil high temperature indicator.

This light turns ON to warn of overheating which may be caused by:

- Restricted oil suction filter.
- Prolonged machine operation under excessively demanding service conditions.
- Transmission fluid control system faults.

The overheating of oil should be avoided as this condition affects the oil properties which, in turn, may be detrimental to proper operation.

When oil overheats, the machine shall be used only for the shortest possible time providing the coolant circulating in the radiator does not in turn overheat.

Should excessive heating persist, downshift into a lower range.

Should this prove ineffective and oil does not cool, idle the engine for a short time and then switch off. Immediately check for causes of high temperature and take the necessary action after consulting your local service organization.

IMPORTANT: To obtain maximum possible performance from your converter, it is necessary to use the correct transmission range for the type of work being done.

OPERATION

8. Brake fluid low pressure indicator.

When this light turns ON steadily it warns that the brake system hydraulic pressure is inadequate. Safe stopping of the machine can be done, if the operator immediately comes to a full stop.

9. Converter/Transmission lube oil low pressure indicator.

This light turns ON to warn that lube oil pressure is inadequate. Possible causes are:

- Clogged filters
- Converter internal leakage
- Aeration of transmission fluid
- Incorrect fluid viscosity

10. Converter/Transmission fluid low shift pressure indicator.

This light turns ON to warn that transmission clutch pressure is inadequate. Possible causes are:

- Oil viscosity incorrect for climate conditions
- Fluid circuit faults
- It is normal for the light to blink between shifts at low engine speeds.

If after having made the necessary checks and taken the necessary actions, the trouble persists, contact your local service organization.

11. Engine lube oil low pressure indicator.

This light turns ON to warn that oil pressure is inadequate. Possible causes are:

- Restricted oil filter
- Oil viscosity incorrect for climate conditions
- Lubrication circuit faults

If after having made the necessary checks and taken the necessary actions, the trouble persists, contact your local service organization.

12. Hydraulic control system oil filter restriction indicator.

When this light turns ON steadily it warns that the implement filter is clogged and needs replacement.

13. Air cleaner restriction indicator.

When this light turns ON steadily it warns that air cleaner cartridges are clogged and need cleaning or replacement.

14. Fuel level gauge

The completely lighted green bar indicates a full tank. When level drops down to reserve limit, the last segment LED turns red.

When tank needs refueling, use clean decanted fuel and a pump with strainer for its transfer from the deposit reservoir to machine. It is advisable to top up with fuel at the end of the working shift so as to prevent overnight

stopover condensation. Do not run the tank dry. This would allow air to enter the fuel system after which fuel system bleeding would become necessary.

The activation of the "reserve" LED does not activate simultaneously the red general malfunction indicator 15 and the buzzer.

15. General malfunction indicator

It warns the Operator both audibly (buzzer) and visually (flashing light) that a faulty condition is being signalled by one or more indicators: 6,7,8,9,10 and 11.

16. Levels (1,2,3) check button

The object of the Electronic Data Monitor level checking feature is to eliminate the manual daily check; thereby saving time. However, if desired, levels can be checked as described in periodic services.

REMARK - Check prior to start of work, with engine stopped for at least 20 minutes.

Checking should not be carried out with machine on a slope.

To check levels proceed as follows:

- Turn on the electrical system master switch.
- Turn on key switch to the first position.
- Wait 6 to 8 seconds; during this interval push button 16 down and check all monitor warning lights are flashing (warning light test). During this phase, the various levels are registered. Possible insufficient levels will be indicated on monitor at the end of the warning light test by the relevant warning signal.

CAUTION - Possible insufficient fluid levels, occurring during machine operation, will be indicated only after shut down and retesting.

IMPORTANT - If after pushing button 16, the level check light keeps on and the buzzer sounding, operate as follows:

- Check oil levels by means of dipstick.
- If level is regular, shut down engine and restart without pushing button 16.



WARNING

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing.

Never refill tank while engine is running.

Do not use matches, lighters or torches as a light source near flammables.

OPERATION

Electrical System Master Switch

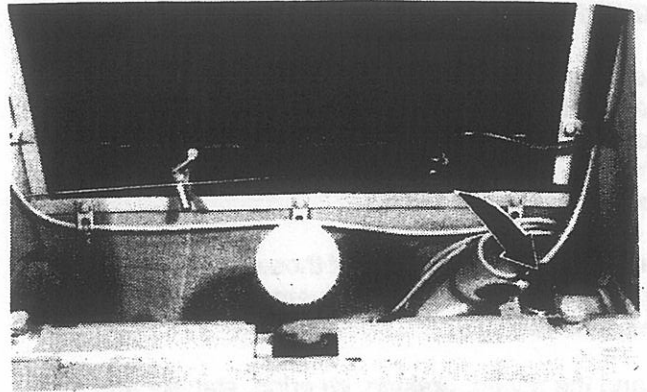
T-85397



WARNING

Always turn the master switch to the off position before cleaning, repairing, servicing or parking the machine to prevent injury.

The switch is located in front of the radiator grill. Unless the switch is ON the electric system is inoperative. Turn to off immediately after parking the machine at end of work. This will prevent machine abuse and misuse by unauthorized personnel. For access to the master switch, open the radiator grill.



Fuel Tank



WARNING

Extinguish all smoking materials and open flames before checking and filling fuel tank.

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing.

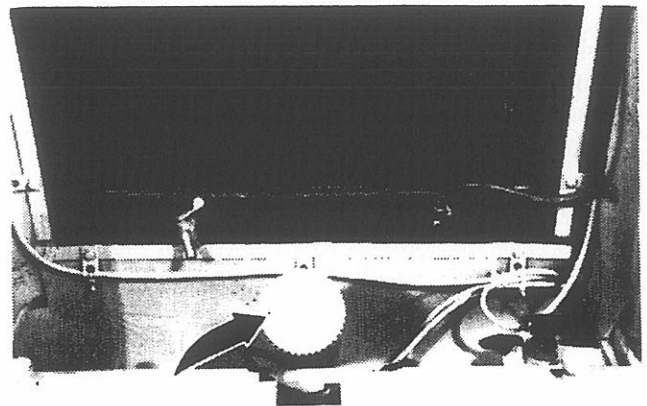
Never refill tank while engine is running.

Do not use matches, lighters or torches as a light source near flammables.

The filler cap is located at the rear of the unit in front of the radiator grill.

Always use fuel that has settled. When transferring fuel from the settling vessel to the machine tank, use a pump that has a fine mesh strainer.

It is recommended to fill the fuel tank at the end of each day's work (especially overnight): this will prevent condensation of moisture in the air. Do not allow tank to run dry: this would permit entry of air in the fuel system with consequent need for a bleeding operation.



T-85401

OPERATION

GENERAL INFORMATION

Before starting engine and/or placing loader in motion., be certain it has been properly prepared for use and has been properly serviced since last operating period. Refer to Preliminary Instructions and Break-in Period for detailed information.

Your safety and the safety of those around you depend upon your using care and judgement in the operation of this machine.

stand the speed, braking, steering, stability and local characteristics of the machine before starting to operate. If repairs have been made since last operating period, be sure all nuts and bolts affected by repairs have been tightened and all necessary adjustments made.

If unit is to be operated in cold climates, consult dealer for information regarding availability of special cold weather equipment.

OPERATOR'S SEAT ADJUSTMENTS



WARNING

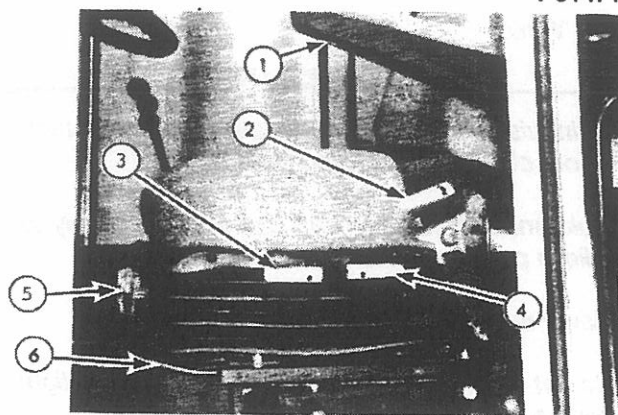
This machine and its attachments are to be operated only by a qualified operator seated in the operator's seat.

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

Replace seat belts every two years on open canopy units and every three years on machinery with cabs or at change of ownership.

The seat is provided with the necessary devices which allow adjustments of cushion in inclination and height, back rake and control reach distance. The operator may therefore choose the position which suits him best for operating.

T-91471



OPERATOR'S SEAT

1. Arm rest adjustment lever
2. Back rake adjustment lever
3. Reaching distance adjustment lever
3. Cushion inclination (front side) adjustment lever
4. Cushion inclination (rear side) adjustment lever
5. Turn to adjust for operator weight
6. Seat slide assembly lever

OPERATION

ENGINE STARTING



WARNING

Warn all people who may be servicing or working around machine before starting engine.

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

Observe all start up and shut down procedures and "WARNINGS" listed in the operation and maintenance manual.

Keep people clear of attachments and tools while in raised position to prevent possible injury.
Turn ON electrical master switch located in front of

the radiator grille.

Apply the parking brake.

Place gearshift selector lever in Neutral.

Place boom and bucket control levers in neutral (Hold) position and apply lock lever.

Turn key in starting switch 18 page 11 to position 1.
Wait five to seven seconds. During this interval, check that all Data Monitor panel indicators are flashing (lights efficiency test). During this stage all levels are memorized. Any inadequacies will be revealed by the associated lights that keep flashing after the test. Should the engine not be started within ten to fifteen seconds after the indicator test, the following tell-tales will turn ON: battery charge (4) low oil pressure (6, 7, 8, 9, 10 and 11 see page 16 - 17).

Note: Fluid levels in the transmission system will not be checked during the first fifteen minutes after the engine is stopped.

With the engine cold, depress the accelerator pedal fully; with the engine warm, push the pedal one quarter of the way to the floor.

Turn and **Push** key (18, page 10) to position 2.

Once the engine is started, release the key.

NOTE: If engine does not start, return key to OFF position before a re-start can be attempted. Do not use starter more than 30 seconds consecutively. Wait a few minutes before trying to start to allow starter motor to cool.

It is extremely important after starting to allow the engine to run for a few minutes without racing. This will permit the lube oil to warm up and circulate freely and reach parts needing lubrication most. This procedure is mandatory for cold weather starts.

If the engine was inactive for a long time or when starting the first time in low outdoor temperatures, unscrew priming pump knob and stroke as needed to circulate more fuel in the system.

The more frequent causes of starting failure may be: presence of air in the fuel system, low battery charge, faulty operation of the starter motor or faults in the electric system.

Engine Idling

Prolonged engine idling causes engine coolant operating temperature to fall below operating range. Since engine is started with electrical starter, there should be no reason for prolonged engine idling. Stop engine when prolonged idling period is expected.

OPERATION

COLD WEATHER AID

Ether injector system - optional equipment

The optional cold weather start feature is controlled by the operator when button 9 is depressed. The cold weather start feature only works upon a cold engine. If the button is depressed while the engine is operating, the cold start feature will not operate. As the button is depressed, a measured shot of ether is injected into the intake manifold.

Apply the engine starter and in the mean time push down on button 9. If the engine fails to start, repeat the procedure until the engine runs. Do not use the starter for more than thirty seconds consecutively. Wait a few minutes before trying to start to allow starter motor to cool.



DANGER

Starting fluid is flammable. Do not puncture or burn containers. Follow precautions printed on containers for storage and disposal.

Do not use starting fluid with electric air heater. Explosion and personal injury could result.

Cold weather starting aid recharging

The cold weather starting aid is located in the engine compartment on the left side of the machine.

To replace the starting fluid container proceed with directions stamped onto the container.

Place the cap on the aid system if no container is present.

OPERATION

Placing the Loader in Motion



WARNING

Study the operation and maintenance instruction manual thoroughly before starting, operating, maintaining, fueling, or servicing this machine.

This machine and its attachments are to be operated only by a qualified operator seated in the operator's seat.

Never attempt to operate machine or attachment except when seated in the operator's seat. Keep head, body, limbs, hands and feet inside the operator's compartment, to reduce exposure to hazards outside the operator's compartment.

Before starting the machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

Warn all people who may be servicing or working around machine before starting engine.

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

For emergency or other stops when engine is running, apply foot brakes as required.

Always return the transmission or hydrostatic drive control to neutral and engage the control lock when operation of the machine is stopped for any reason. Set the parking brake, if so equipped.

Always shut off engine when leaving operator's seat.

Raise attachment clear of ground.

Release the parking brake.

Move gearshift lever to required position for range and travel direction.

Satisfactory and efficient operation depends largely on the operator's judgement in selecting the proper transmission speed for the different types of operations where the loader will be used. Always operate loader in speed range that will permit the engine to operate at full governed speed. This will not only assure most power

from the engine, but will also allow engine to operate at its highest efficiency.

NOTE: In cold weather, before actually starting any work, drive the machine on a short run under no load to warm up the oil in the converter/transmission system.

During the first few minutes on the job do not operate the attachment(s) while engine is running at high speed.

Stopping the Loader



WARNING

Always lower attachment to ground when machine is not in use or when making repairs, adjustments, or servicing machine.

For emergency or other stops when engine is running, apply foot brakes as required.

To stop the loader, release the accelerator pedal and gently apply the brake until the loader comes to a complete stop. Shift into neutral and apply neutral lock.

Lower bucket to ground. Move boom/bucket control lock lever forward. Apply the parking brake.

Stopping the Engine



WARNING

Observe all start up and shut down procedures and "WARNINGS" listed in the operation and maintenance instruction manual.

Do not park on downgrades unless machine's wheels are chocked to prevent any movement.

The bucket or tool can be lowered in response to implement control lever movement with or without engine power.

Never leave the machine unattended with the engine running.

After any work period of the machine, and if engine temperature is high, do not stop the engine immediately but allow a few minutes idling with transmission shift lever in neutral so that both the engine and transmission will cool gradually and uniformly.

OPERATION

T-91476

Lower engine RPM to idle speed.

Decelerate the engine to idle speed. Turn lock switch key to OFF position 0. If the machine is to be parked unattended, the master switch should be turned to the OFF position and remove the key.

Attention: Do not turn engine off from high idle speed. To do so will cause turbocharger to rotate without lubrication.

Transporting



WARNING

Observe all start up and shut down procedures and "WARNINGS" listed in the operation and maintenance manual.

Use suitable vehicle of appropriate capacity.

Load and unload on a level area that gives full support under the wheels of the transporting vehicle. Use ramps of adequate strength, low angle and proper height. Use chock blocks on transport vehicle wheels, so it cannot move.

Keep bed of transporting vehicle clean of clay, oil and all materials that become slippery.

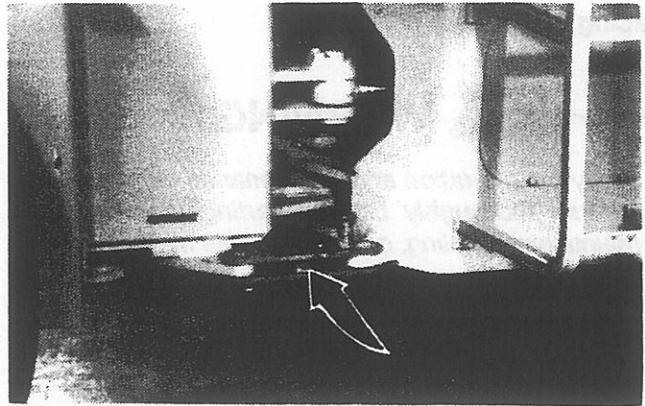
Use a signal person stationed in a place that provides full view of ramp, vehicle bed, machine and operator.

Raise implements just high enough for clearance.

Keep engine speed low so machine will creep onto bed of transporting vehicle. When loaded, lower all implements. Set parking brake. Heed all shutdown procedures. Tie machine securely to bed of transporting vehicle and block wheels as required by the carrier.

Attach steering frame lock as shown.

Immobilize the frame front and rear sections by applying the lock bar.



Roading



WARNING

Keep people clear of attachments and tools while in raised position to prevent possible injury.

Anticipate grades before starting down. Select the proper gear range to maintain control. Avoid applying brakes continuously on long grades. Avoid repeated light applications (pumping) of the brake pedal. "Never put transmission in neutral on downgrades."

Do not attempt to decelerate on grades by shifting. Decelerate and apply the foot brakes.

Check all fluid levels and tire pressure. Position implements within wheel width, raised high enough for clearance. Buckets must be empty. Make sure all lights work properly. Check with tire manufacturer for advice. Some tires and tread designs are not suitable for highway travel.

Know your stopping distance at any given speed. Regulate travel speed accordingly.

Obey all traffic regulations. If traffic backs up, pull to the side of the road and allow traffic to pass. Stop for 30 minutes after two hours of travel to allow tires to cool. Tire pressure will rise during operation; this is normal and must not be reduced. Monitor system indicators frequently to insure that all systems are functioning properly. Travel with a signal vehicle equipped with flashing lights and signs to adequately warn oncoming traffic. If a rhythmic bounce develops, slow down to stop it, then continue at a slower speed.

OPERATION

During transfers on roads open to normal traffic respect all highway code regulations.

NOTE: The rules quoted in this manual are subject to slight changes if so dictated by local traffic regulations in the different countries.

If the loader was to be towed or pushed (necessarily at REDUCED SPEED) with the drive line connected, the power flow from the loader wheels through the drive line and into the transmission and converter causes certain parts in the transmission and converter to rotate. Even though towing speed is slow, there is little or no lubrication to prevent damage due to friction and heat. Since the lubrication requirements of the transmission will not be fully satisfied while the loader is being towed or pushed, it is imperative that BOTH drive line shafts be disconnected when travel in excess of .8 km (.5 miles) is expected.

If the optional ground drive steering is on the machine, when towing, steering, although available, will be very sluggish because the ground drive pump (supplying hydraulic oil) is also turning slowly.

COLD WEATHER PRECAUTION



WARNING

Fluid under pressure. Turn cap or cover slowly to relieve pressure before removing or until pressure has been relieved as coolant may boil over and cause personal injury.

Use a permanent type (Glycol base) antifreeze solution. Use a 50% - 50% mixture of antifreeze and coolant to insure the cooling system will not freeze.

Use proper oil viscosity for temperature conditions as indicated in the fuel and lubricant specifications.

Preparation for Storage

If the unit is to be stored for winter or slack season it should be protected as follows:

- Clean the machine completely and lubricate all the parts provided with grease fittings.
- Check coolant freezing point and drain or replace if the lowest temperature expected is below coolant

freezing temperature.

- Change coolant if the coolant is dirty.
- Fill fuel tank to prevent rusting.
- Seal the fuel cap vent.
- Remove injection nozzles and inject some engine oil through the seats in the cylinder head after having brought each piston to bottom of stroke.
- Crank the engine a few times with the electric starter motor in order to spread a fine coat of oil on the cylinder walls. Install injection nozzles.
- If possible, take out the batteries and store in a place where there is no danger of freezing. Recharge once a month.

Store the machine in a protected area or otherwise cover it with a tarpaulin.

USING BATTERY BOOSTER TO START ENGINE



DANGER

Be sure to connect booster cables to the proper terminal (+ to +) and (- to -) at both ends. Avoid shorting cable clamps.

Flammable Vapors - Extinguish all smoking material and open flames before checking and filling batteries. Do not check battery by sparking.

Use only grounded auxiliary power for heaters, chargers, pumps and similar equipment to reduce the hazard of electrical shock.

Batteries contain sulfuric acid. Shield your eyes when working near the battery to protect against possible spilling of the acid solution. In case of acid contact with skin, eyes or clothing, FLUSH IMMEDIATELY WITH WATER FOR A MINIMUM OF FIFTEEN MINUTES. Get medical attention immediately.

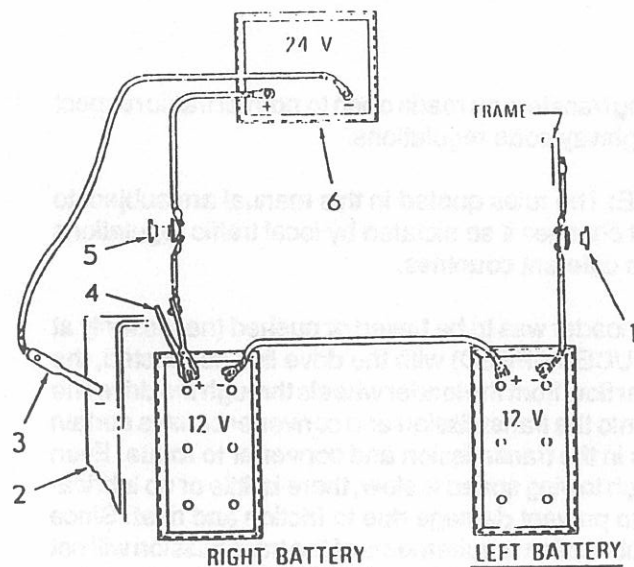
Use a 24 volt booster battery system or generator (5) with a switch (4) between the booster's positive (+) terminal and the machine's batteries. Make sure that cables and clamps are tightened and in good condition to prevent shorting or arcing.

- Place transmission control lever in neutral and apply the hand brake.
- Clamp the free end clamp of the positive (+) booster cable (3) to the positive (+) terminal of the right side battery.
- Connect the free end clamp (2) of the negative (-)

OPERATION

booster cable to the right side frame of the machine. The clamp must make contact with clean, bare metal.

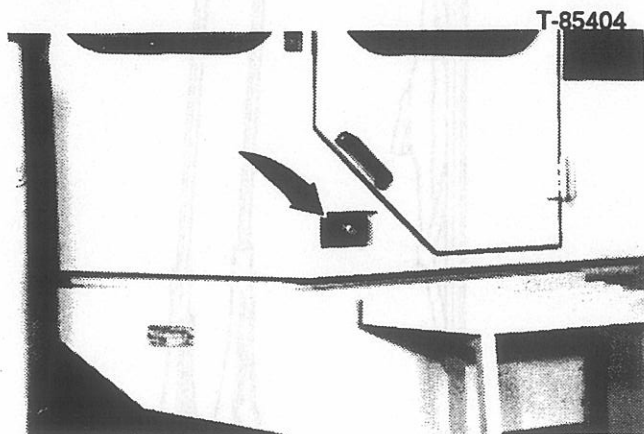
- Turn booster switch (4) to ON position.
- Start engine in normal manner observing all safety precautions as listed on page 17.
- After the engine has started, turn switch (4) to OFF.
- Remove negative (-) cable clamp (2) from frame.
- Remove positive (+) cable clamp (3) from positive (+) post of machine battery.



ROPS CAB

T-90579

All enclosing cab with Roll Over Protection System incorporated in roof. It is amply glazed and provides maximum operator comfort under whatever climatic condition.



T-85404

DOOR LATCH AND KEY

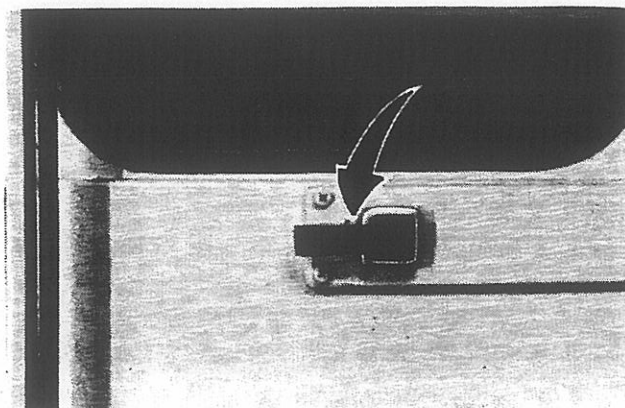
Entrance door is provided with key operated external lock. To open from outside, pull on lever with door unlocked.



T-85405

TO OPEN FROM INSIDE, PULL HANDLE UPWARD.

The cab door can be held open by means of a latch. The door can be released by means of the handle in the center of the door.



WARNING

Inspect your seat belt periodically for signs of fraying, wear or other weakness leading to failure.

The protection offered by the ROPS may be prejudiced by any damage or structural change.

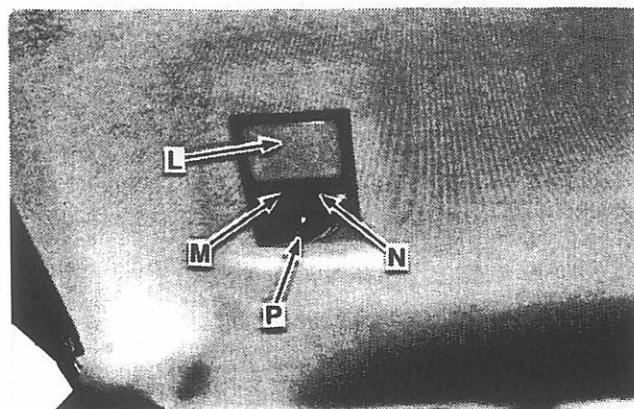
Interior lighting

The lamp unit is located on the ceiling.

Light L is turned ON and OFF by switch M.

Directional light P is turned ON and OFF by switch N.

T-90516

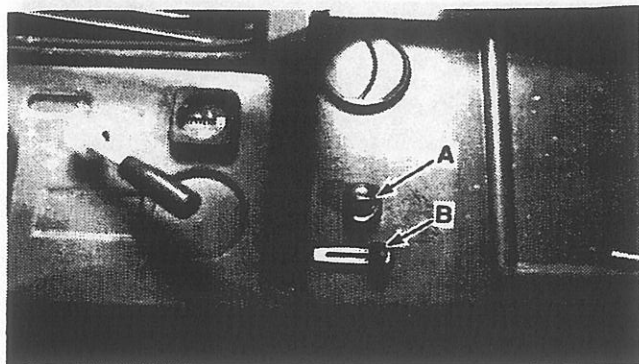


Heating and ventilation

By turning switch knob (A) in the arrow direction the fan is started and set at 3 different speeds.

Control (B) permits adjustment of the temperature of the air entering the cab through the specially provided diffuser outlets.

T85407



Blue area = Cold air

Red area = Heated air

Cab pressurization: close diffuser "C"

Cab air recirculation: open diffuser "C"

IMPORTANT: Temperature of heated air is highest when control (B) is at travel end and fan switch (A) set on III (high speed).

Demisting and defrosting

For fast action on windshield and back window proceed as follows:

- Set fan to top speed by switch (A).
- Move control (B) to the maximum heat position.
- Suitably adjust directional diffuser outlets in cab.

If windshield does not defrost or defog adequately, it may be necessary to partially close rear window outlets so that more air will be available to the front.



WARNING

If replacement of glass is necessary, be sure to use safety glass or equivalent.

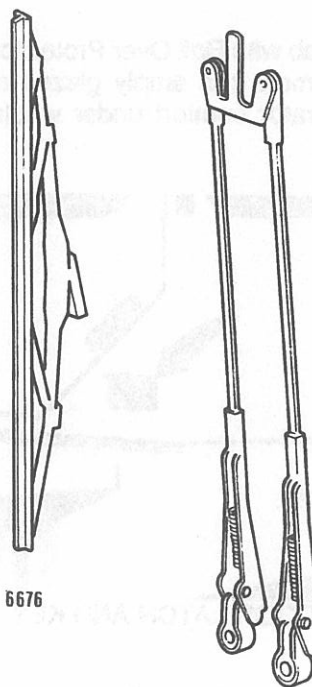
Do not strike glass to remove it from cab parts. Glass may shatter and cause personal injury.

Wiper

Should visibility be unsatisfactory as a result of faulty wiper blade operation, clean rubber blades using a specific detergent or alcohol. Should faulty operation persist after cleaning, change the blades. Proceed as follows:

- Tilt out complete arm from glass and extract the blades.

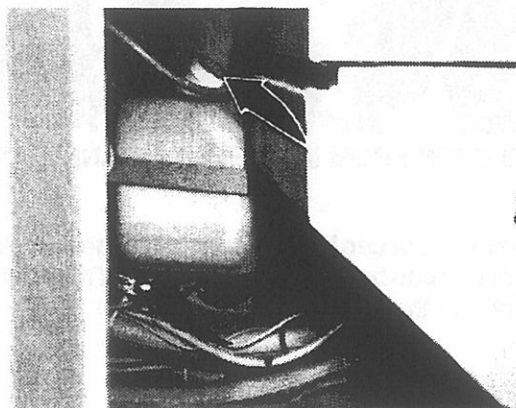
If machine is equipped with a washer, located in front frame at hitch area, check and if necessary, fill the detergent fluid in washer reservoir.



If spray pattern is defective, clean nozzle orifices with a needle. If necessary, re-adjust spray nozzle orientation so that the fluid will strike the windshield at top of the wiper sweep arc.

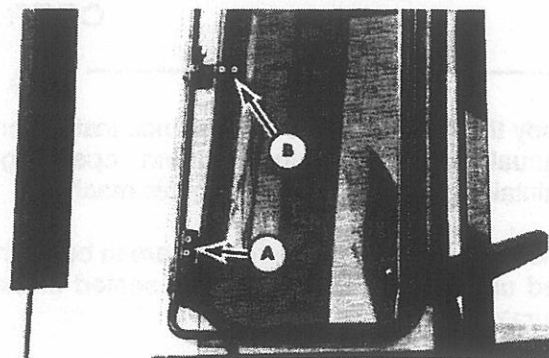
NOTE: Use a good commercial windshield solvent that is protected from freezing at the lowest climatic temperature for the area.

T-85408



An openable window is located on the right side of the cab. The window can be locked in the open or closed position by means of latches. This window also serves as an escape hatch in the event the door cannot be opened.

- A. Closed latch
- B. Held open latch.



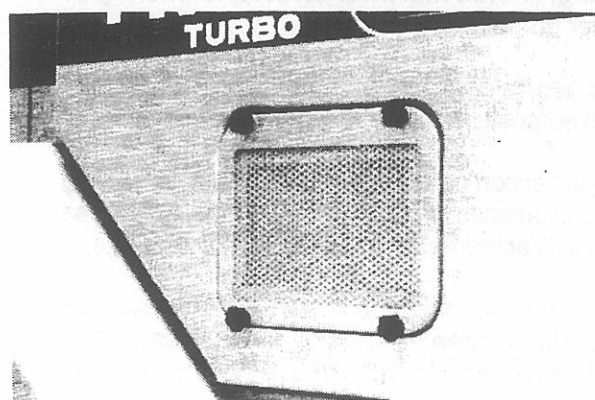
The cab intake air is filtered prior to entering the cab. Access to this filter is gained by removing the four capscrews from the panel on the right side of the cab. Cleaning of this filter is similar to the engine air intake filter. See the instructions, item 30, for cleaning.



WARNING

Wear safety glasses with side shields or goggles when using compressed air for cleaning to reduce the danger of personal injury from flying particles. Limit the pressure to 2.1 bar (30 psi) according to local or national requirements.

Never use gasoline solvent or other flammable fluids to clean element. Use authorized commercial, non-flammable, non-toxic solvents.



OPERATING WARNINGS



WARNING

Study the operation and maintenance instruction manual thoroughly before starting, operating, maintaining, fueling, or servicing this machine.

This machine and its attachments are to be operated only by a qualified operator seated in the operator's seat.

Machine-mounted safety signs have been color coded yellow with black border and lettering for warning, and red with white border and lettering for danger points.

Keep people clear of attachments and tools while in raised position to prevent possible injury.

The protection offered by the roll over and falling object protective structure may be impaired if it has been subjected to any modification or damage.

Before moving machine or attachments be sure people in the area are clear of the machine. Walk completely around machine before mounting. Sound horn.

Do not coast the machine at any time with transmission in neutral.

Do not start suddenly at full throttle against a tow cable or chain. Take up slack carefully.

Only designated towing or pulling attachment points are to be used for towing or pulling. Use care in making attachments. Be sure pins and locks, as provided, are secure before pulling.

Always check work area for dangerous features. The following are examples of dangerous work areas: slopes, overhangs, timber, demolitions, fire, high walls, drop-offs, backfills, rough terrain, ditches, ridges, excavations, heavy traffic, crowded park, parking crowded maintenance and closed areas. Use extreme care when in areas such as these.

Be on the lookout for caving edges, slides or falling objects. Beware of concealment by brush and undergrowth or other obstacles of these dangerous conditions.

For darkness operation, keep all machine mounted lights in operating condition. Report burned out lights and replace immediately.

Be sure exhaust system is free of leaks under the hood. When operating within a closed cab keep a vent to outside air open at all times.

Do not use float position to lower attachment.

Beware of raised bucket overloads and overhanging material or objects. Arrange your loads within the bucket.

Do not overload bucket.

Start and stop carefully when transporting a loaded bucket.

Always before leaving the operator's seat and after making certain all people are clear of the machine, slowly lower the attachments or tools flat to the ground in a positive ground support position. Move any multipurpose tool to positive closed position. Return the controls to hold. Place transmission control in neutral and move engine controls to off position. Engage all control locks, set parking brake, open and lock the master (key) switch. Consult operation and maintenance instruction manual.

Always lower attachment to ground when machine is not in use or when making repairs, adjustments, or servicing machine.

Always set parking brake when leaving the machine for any reason.

Transport a loaded bucket with the bucket as far tipped back and in as low a position as possible for maximum visibility and control of machine.

Keep loader wheels a safe distance from edge of drop-offs when dumping or pushing a load.

Always shut off engine when leaving operator's seat.

Never use the bucket as a man lift.

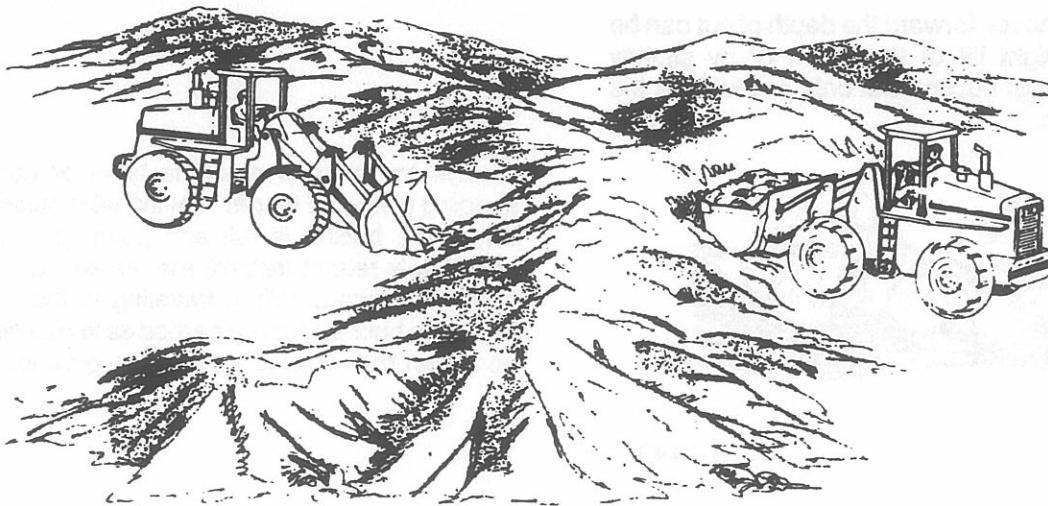
Obey flagman, safety signals and signs.

OPERATING TIPS

GENERAL

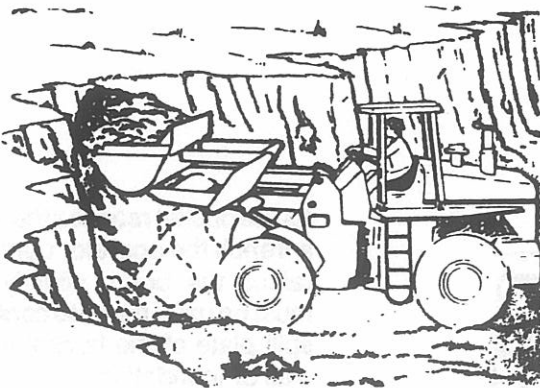
When the operator first gets on the loader, he must practice raising and lowering the boom. He must also practice dumping and retracting the bucket. This will enable the operator to get the feel of the controls and learn how they respond to the control lever positions. Keep in mind, when the levers are in the hold position, the boom becomes a rigid unit with the loader. The boom will follow any up and down movement of the loader. The operator can quickly determine the proper "digging" position (angle) of the bucket, by observing the bucket level indicator on the right dump cylinder. A hook, on the back of bucket, is intended for handling of a detached bucket - do not use this hook as a load attaching point.

BUCKET LOADING



T-74392

In loading from a bank or stockpile, position the bucket so the cutting edge is level with ground. The bucket must not be rolled back-thus riding the bucket on the heel wasting power and preventing the bucket from entering the bank or stockpile.



T-74395

Move the loader forward into the stockpile. Transmission lever must be in low forward range position, with boom and bucket control lever in hold position. As the cutting edge penetrates the material, raise boom by pulling control lever to raise position and slowly retract (return) bucket.

On complete entry of bucket into material, use control lever to achieve maximum break out force.

Completely retract (return) bucket and carry a maximum 0.6m(2') off the ground for maximum stability on long cycles.

The boom may be allowed to continue to raise when moving toward object to be loaded. This will reduce cycle time.

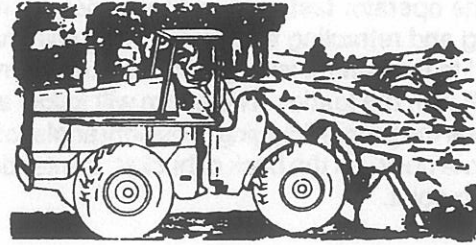
OPERATING TIPS

STRIPPING

A few minutes sizing up the job will be time well spent. Where the top soil is deep the operator must begin by cutting off a layer at a time. The depth of each cut is determined by the type of soil and size of bucket. Be sure to start each cut with the loader in a relatively level position.

To start the cut, place the bucket at an approximately 5° dump angle. With control lever in hold position, move loader forward. For hard to penetrate materials, increase bucket angle for deeper penetration.

As the machine moves forward the depth of cut can be adjusted by a slight lift of the boom or by slightly retracting (returning) bucket. Cut only as much as the loader will handle.



T-74396



T-74401

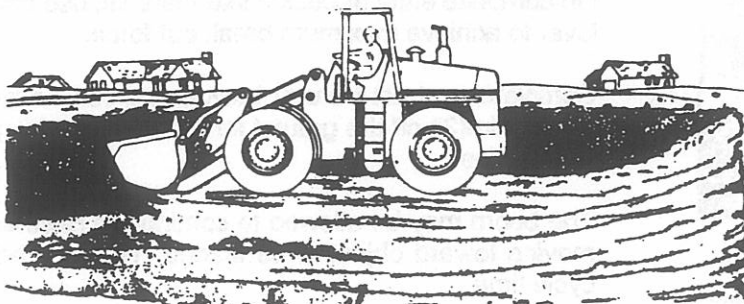
Always try to keep machine level or down grade, keeping weight of loader moving with bucket. When the bucket is full and pushing a good load, completely retract (return) the bucket back while still traveling forward. When traveling to the stockpile or truck, the bucket must be carried as low as possible but no higher than 0.6m(2') above the ground.

EXCAVATING

When excavating in most hard soils, bucket must be equipped with digging teeth.

When loading bucket, retract (return) the bucket completely back - taking advantage of maximum break out. The heel of the bucket and boom act as a pivot point for greater leverage.

It is most important to maintain the bottom of the excavation - always keep it level. The operator can travel in reverse up and out of excavation, keeping bucket low to the ground. This adds to the stability of the unit.



As the bucket reaches the edge of a trench the operator dumps and raises the boom slightly. Care must be used never to contact the spill plate of the bucket with the wall or foundation.

T-74397

OPERATING TIPS

GRADING

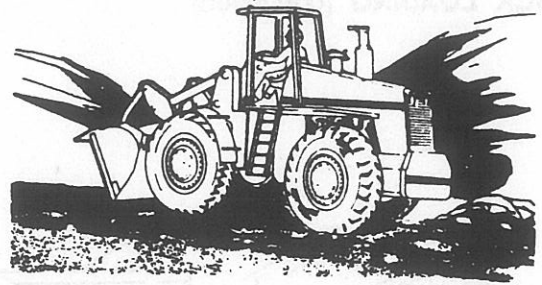
Partially dump bucket and set the cutting edge on a slight angle. Fill all low spots prior to starting the grading.

When grading, travel in a north-south direction, then in an east-west direction. After this has been accomplished, turn the loader in a 45° angle from the above direction and complete the grading.

It is good practice to retract (return) the bucket to the dig or carry position before raising the boom above the horizontal position.



T-74421



T-74419

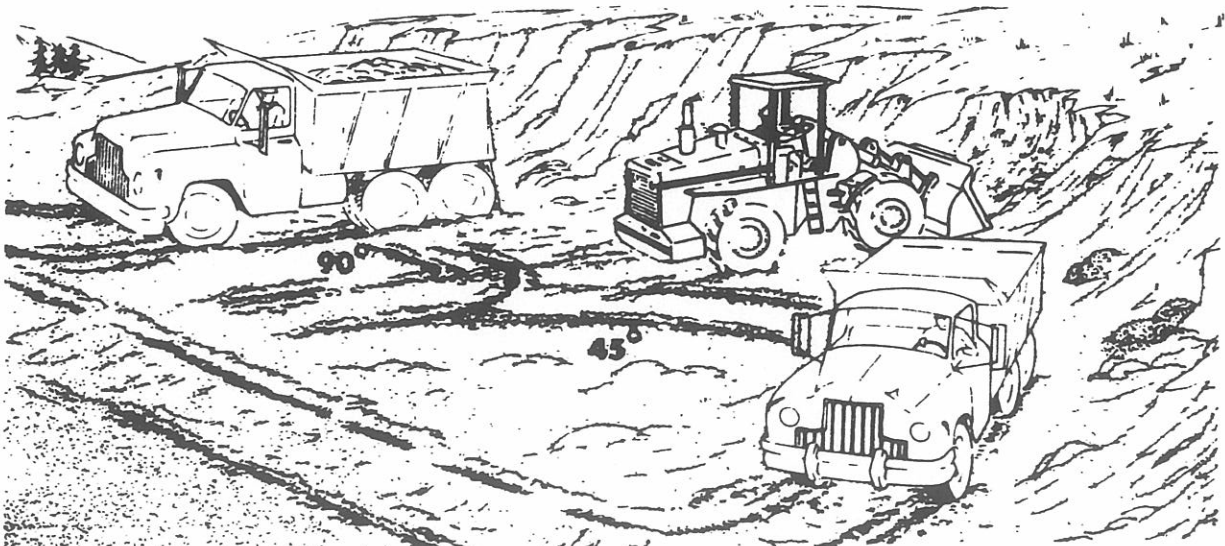
BACKFILLING

Backfilling is effectively accomplished when the bucket is positioned level with the ground, thus pushing a large amount of material toward the wall or foundation to be backfilled.

TRUCK LOADING

For the most efficient loading cycle during stockpile operation, position the truck perpendicular to the edge of the stockpile. Approach the stockpile with loader at 45° to the stockpile and the truck. When the edge of the loader bucket is approximately 3.0-3.7m (10-12') from the side of the truck, turn the loader into the stockpile and load the bucket.

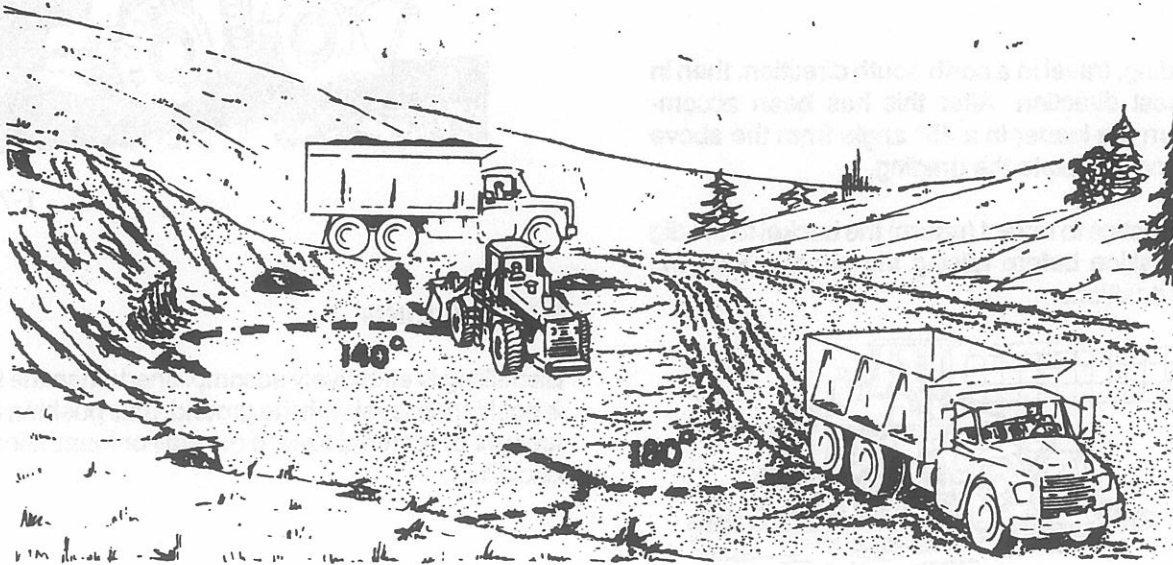
After loading the bucket, back the loader out of the stockpile at the same approximate angle of entry. When the point at which the loader was turned into the stockpile is reached, release the accelerator pedal, apply the brakes, shift to forward-low range position and depress the accelerator while turning the loader toward the truck. With practice, these motions will result in a smooth, efficient loading cycle.



T-74349

OPERATING TIPS

TRUCK LOADING (continued)



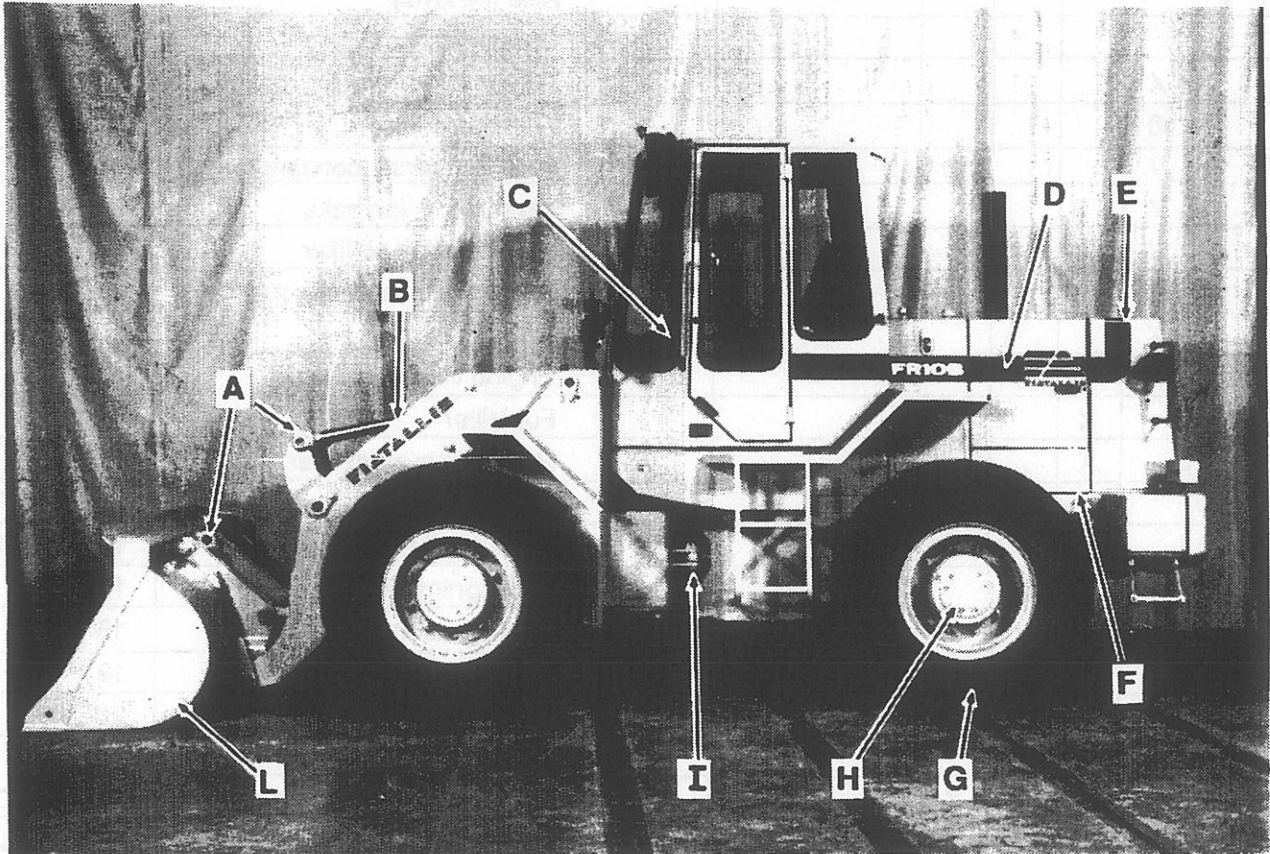
T-74348

Placement of both truck and loader are variable and must be adjusted to operating conditions. Conditions to be considered are weight of material, gradient of loading area, traction, etc. If the loader works too close to the truck it will be necessary to pause during each cycle for the bucket to clear the truck side. If the loader works too far from the truck the cycle will be excessively long.

WALK AROUND INSPECTION

By quickly responding to initial trouble, required maintenance and downtimes will be reduced. It is wise to check the machine each day before beginning work, or to make a walkaround inspection at the completion of each day.

When working around or on the machine during servicing, be sure the machine's implement is placed on the ground and any hydraulic pressure relieved. Be sure the engine is shut off and the parking brake is applied.



WALK AROUND INSPECTION

T-85390

- | | |
|--|--|
| A. Check bucket linkage for wear or damage. | F. Check engine leaks |
| B. Check hydraulic system for leaks and damaged hoses. | G. Check tires for inflation, cuts and wear. |
| C. Check for loose items or broken gauges. | H. Check axle differential and planetary hubs for leaks. |
| D. Check air cleaner for dirt or damage. | I. Check steering cylinders and frame pivots. |
| E. Check coolant system for leaks and damaged hoses. | L. Check bucket for wear and damage. |

Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE GUIDE

SERVICE INTERVAL (hours)							DESCRIPTION OF SERVICE		TYPE (*)
50	100	250	500	1000	2000	as required			
+							Grease fittings	1	PGL
	V						Hydraulic system (oil level)	2	HO
	V						Axle (oil level)	3	MGO
	+						Grease fittings	4	PGL
		X					Engine oil (oil level)	5	EO
		Ø					Fuel pump filter	6	-
		V					Fuel tank (drain condensates)	7	-
		V					Alternator & fan belts	8	-
		X					Transmission oil filter	9	-
		Ø					Breathers, miscellaneous	10	-
		X					Engine oil filter	11	-
			V				Engine valve clearance	12	-
			X				Fuel filter	13	-
			X				Hydraulic system filter	14	-
			X				Transmission oil	15	TF
			+				Drive shaft fittings	16	PGL
			X				Pilot control filter	17	-
				V			Fuel injection nozzles	18	-
				V			Batteries	19	-
				V			Tire pressure	20	-
				Ø			Transmission strainer	21	-
					X		Hydraulic system (oil level)	22	HO
					X		Axle (oil level)	23	MGO
					X		Engine coolant	24	-
					X		Air filter	25	-
						V	Engine oil (oil level)	26	EO
						V	Transmission oil	27	TF
						V	Engine coolant	28	-
						as required	Fuel system - bleed	29	-
						Ø	Air filter	30	-
						as required	Brake pads wear	31	-
						V	Brake fluid reservoirs	32	BF
						as required	Brake fluid circuit - bleed	33	-
						X	Hydraulic system filter	34	-

(*) see inside back cover

X - replace

V - check

+ - Lubrication Ø - cleaning

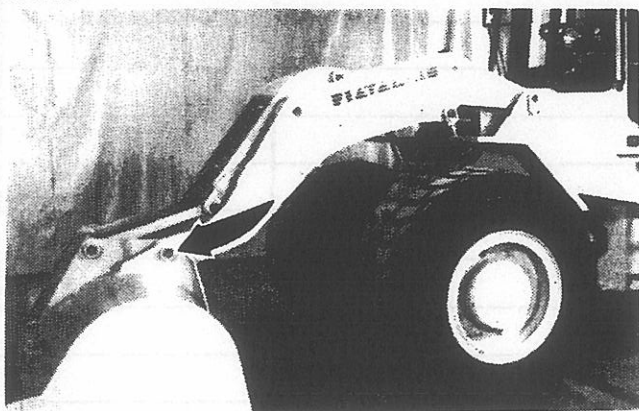
Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE

50 HOUR SERVICE

SERVICE POINTS	Replace	Lubricate	Clean	Check
Bucket Grease Fittings		+		

T-85410



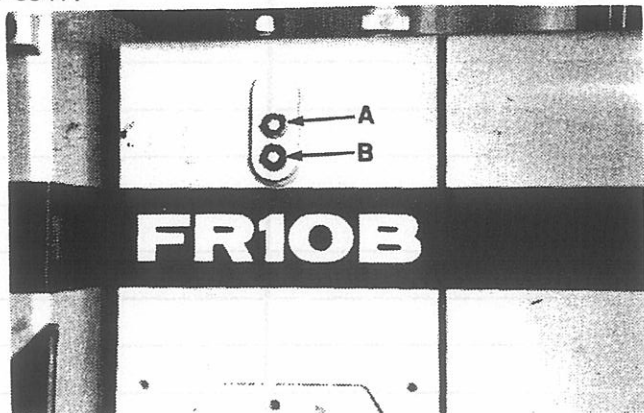
1. BUCKET LINKAGE ARTICULATIONS

Inject grease in the bucket lower articulation fittings. Prior to greasing, wipe all grease fittings with a clean rag.

100 HOUR SERVICE

SERVICE POINTS	Replace	Lubricate	Clean	Check
Hydraulic system (oil level)				V
Axle (oil level)				V
Miscellaneous grease fittings		+		

T-85411



2. STEERING & HYDRAULIC OIL TANK LEVEL

Check level through sight gauge on tank with machine on level ground with the bucket flat on the ground and any hydraulic pressure relieved. If below Minimum level B fill.

A. Maximum level

B. Minimum level



DANGER

Fluid under pressure - Turn cap or cover slowly to relieve pressure before removing.

Study **SAFETY RULES** in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE

3. AXLE OIL LEVEL - CHECK

Differentials

Check oil level through plug and fill if necessary until oil runs from plug opening.

Should level found be excessively low, check seals for good condition.

Wheel ends

Turn wheels until level plug on cover is located horizontally.

Check level through this same plug and fill if necessary.



WARNING

Do not allow unauthorized personnel to service or maintain this machine. Study the OPERATION AND MAINTENANCE INSTRUCTION MANUAL before starting, operating, maintaining, fueling, or servicing this machine.

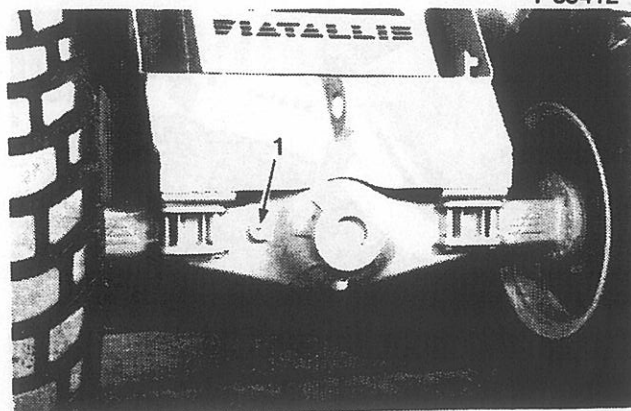
4. MISCELLANEOUS GREASE FITTINGS

Inject the specified grade of grease in the fittings shown

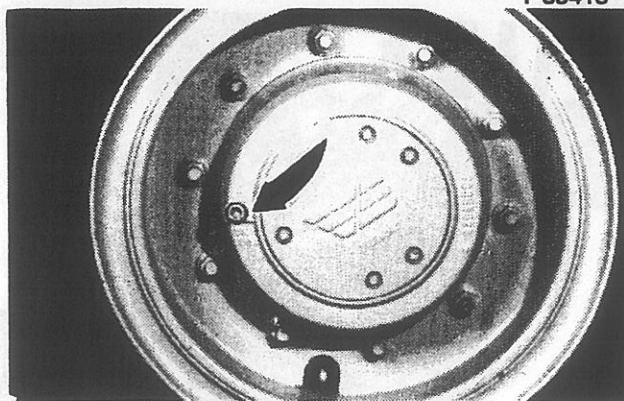
Front and rear frame section articulations as well as steering cylinder rod bushings. Lubricate drive shaft housing bearing.

Rear axle oscillation supports and steering cylinders (head end).

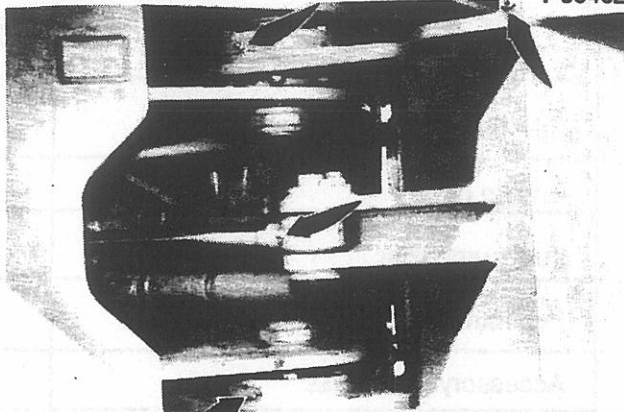
T-85412



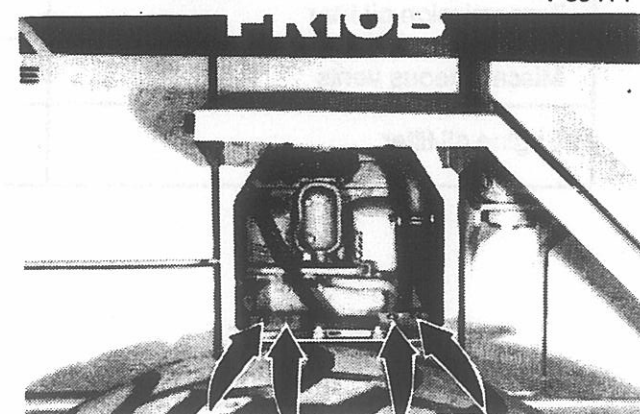
T-85413



T-90462

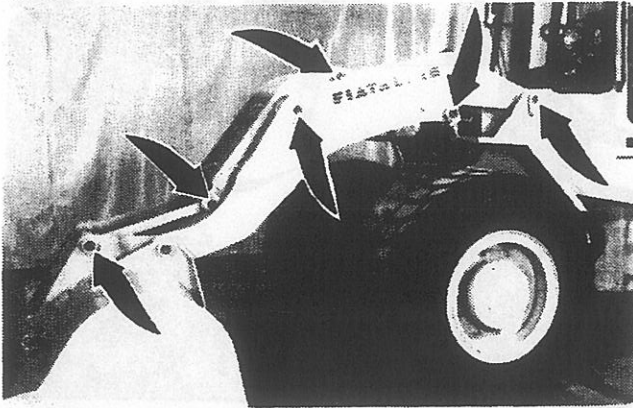


T-85414



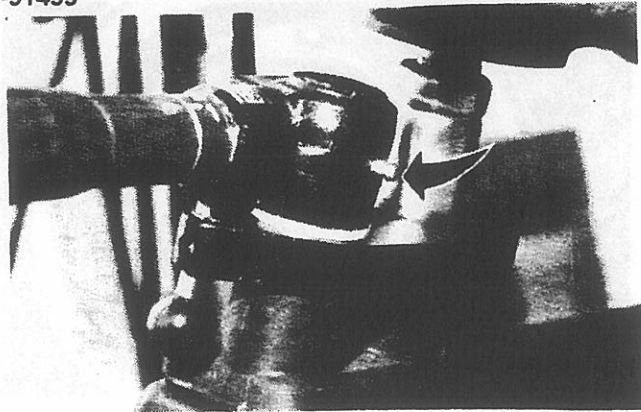
MAINTENANCE

T-85410



Boom and bucket linkage lubrication points.

T-91499



Steering shift linkage. Lubricate linkage sparingly.
Wipe any excess.

250 HOUR SERVICE

SERVICE POINTS	Replace	Lubricate	Clean	Check
Engine oil	X			
Fuel pump filter			Ø	
Fuel tank (Drain condensates)				V
Accessory drive belts				V
Transmission oil filter	X			
Miscellaneous vents			Ø	
Engine oil filter	X			

MAINTENANCE

5. ENGINE OIL - CHANGE



WARNING

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

Warn all people who may be servicing or working around machine before starting engine.

Drain oil through bottom cap. Remove filler plug to facilitate drainage. Use supporting wrench on drain tube to prevent damage to tube while loosening or tightening drain cap.

Refill as follows:

- Screw in the drain cap and pour in fresh oil through the filler up to the maximum level on dipstick.
- Run engine at idle.
- Stop engine and after a few minutes refill to Maximum level.

IMPORTANT: If the fuel used contains more than 1% sulphur, change oil at every 100 hours interval.

6. FUEL PUMP FILTER - CLEAN

Remove pump cover, take out gauze strainer. Clean and re-fit. Bleed the fuel system if needed.

7. FUEL TANK - DRAIN CONDENSATES

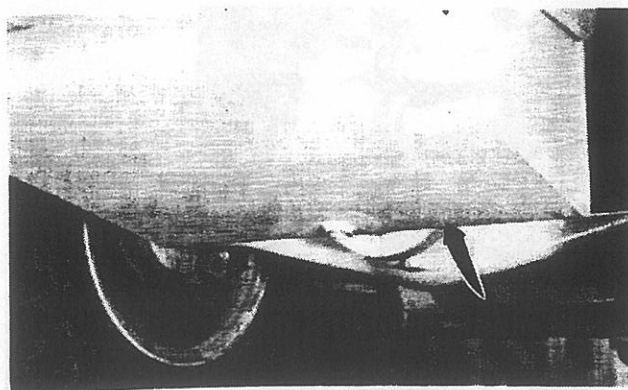


WARNING

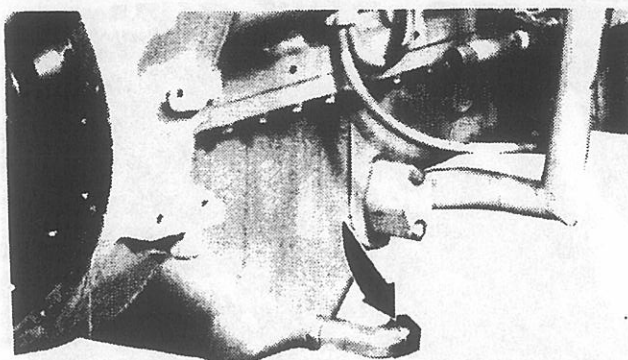
Extinguish all smoking materials, or open flames before checking and filling fuel tanks, changing filters and before opening sediment drain due to the presence of flammable fluid.

Unscrew drain plug and allow accumulated water and/or sediment deposits to flow out completely. Fit back and tighten the plug once clean fuel issues from the tank.

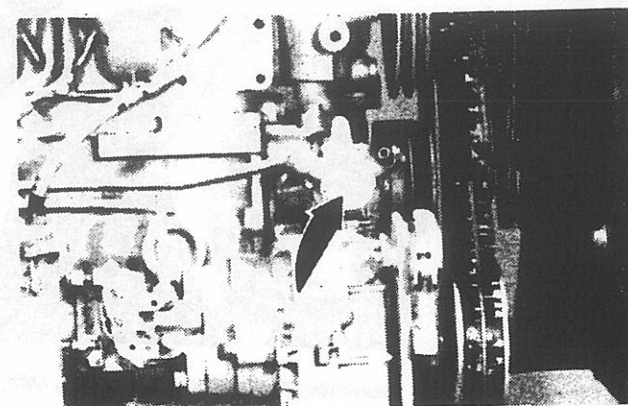
T-85418



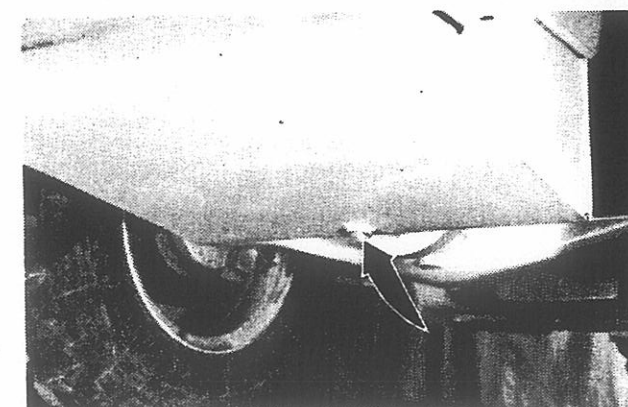
T-85437



T-85442

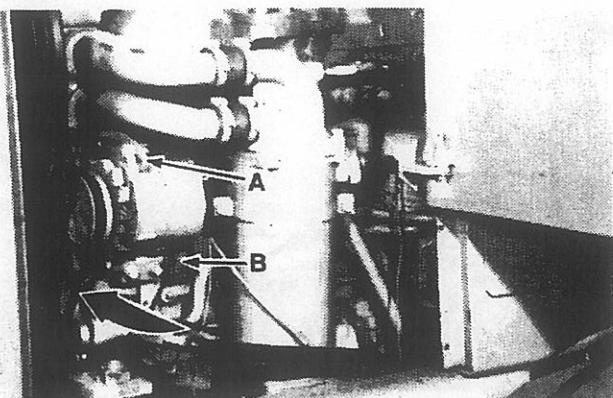


T-85418

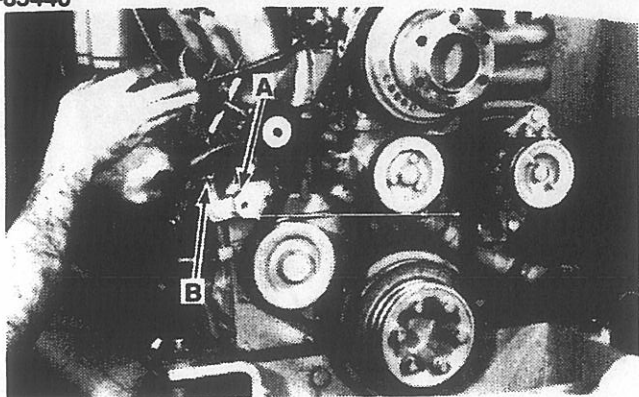


MAINTENANCE

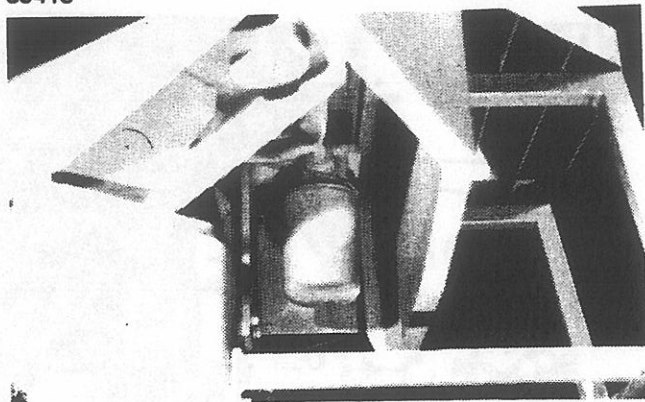
T-85417



T-85440



T-85415



8. ACCESSORY DRIVE BELTS TENSION - CHECK



WARNING

Keep clothing away from moving parts, and use care to prevent injury.

Do not place head, body, limbs, feet, or fingers or hands near rotating fan or belts. Be especially alert around a pusher fan.

Alternator Belt

Check that belt deflection is 10 mm (.4") under a 5 - 7 daN (37 - 44 lbs.) load in the arrowed area. To adjust, slacken nut (A) and pivot nut and shift alternator (B) as required.

Fan and Water Pump Belts

Check that belt deflection is 10 mm (.4") under a 5 - 7 daN (37 - 52 lbs.) load applied in the arrowed area. To adjust, loosen screws and pry the adjuster. Keep tension upon adjuster until capscrews are tightened.

9. TRANSMISSION OIL FILTER - CHANGE

Unscrew filter from base, discard. Lubricate filter oil seal with transmission fluid. Fit the new filter onto the base. Tighten by hand. Tighten the filter 1/2 to 3/4 turn after the filter seal contacts the base. After replacement, operate the machine for a few minutes and check for leaks.

10. MISCELLANEOUS VENTS - CLEAN



WARNING

Wear safety glasses with side shields or goggles when using compressed air for cleaning to reduce the danger of personal injury from flying particles. Limit the pressure to 2.1 bar (30 psi) according to local or national requirements.

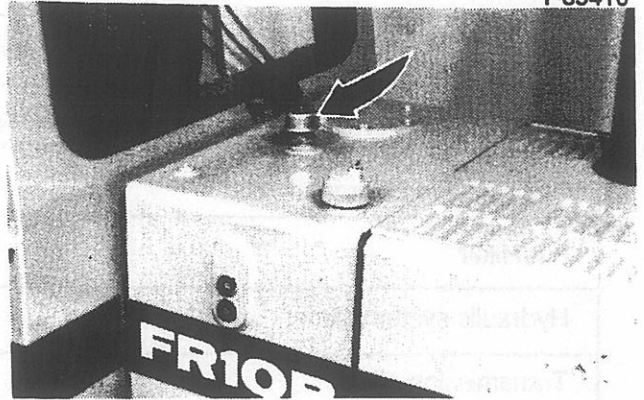
Never use gasoline solvent or other flammable fluids to clean element. Use authorized commercial, non-flammable, non-toxic solvents.

MAINTENANCE

T-85416

A. HYDRAULIC SYSTEM VALVE VENT - CLEAN

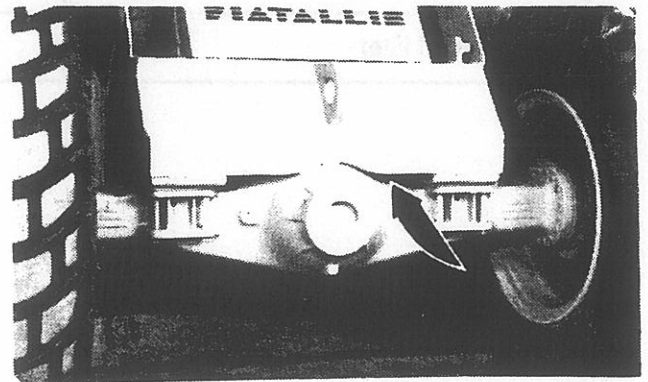
Back out the retaining screw, remove valve cover and filter. Wash filter using a commercial grade, non-flammable, non-toxic solvent. Allow to dry thoroughly. Install filter and cover. Fit and tighten screw.



T-85412

B. AXLE VENTS - CLEAN

Clean area around vents. Remove vents and clean in non-flammable, non-toxic solvent. Reinstall.



T-85419

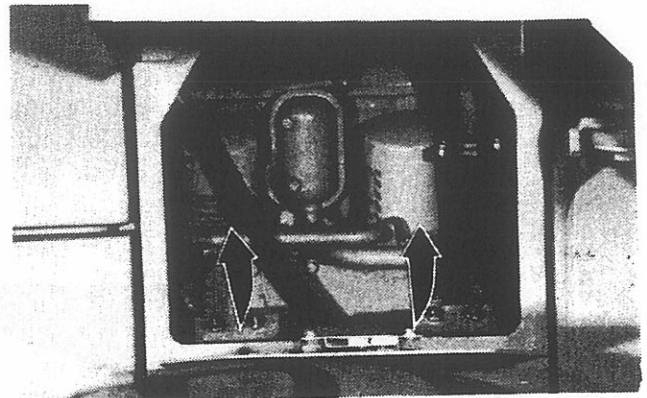
11. ENGINE OIL FILTERS - CHANGE

Replace these filters at every other engine oil change maximum. Filters may be replaced at every oil change if desired or operating conditions dictate.

Filter change must not be delayed beyond the recommended interval.

When restriction occurs, the oil circulating in the system is no longer filtered.

Unscrew filter from base, discard. Lubricate filter oil seal with engine oil. Fit the new filter onto the base. Tighten by hand. Tighten the filter 1/2 to 3/4 turn after the filter seal contacts the base. After replacement, check that the filter does not leak by operating the engine. If there is a leak, tighten the filter further.



WARNING

Do not allow unauthorized personnel to service or maintain this machine. Study the OPERATION AND MAINTENANCE INSTRUCTION MANUAL before starting, operating, maintaining, fueling, or servicing this machine.

Observe all start up and shut down procedures and WARNINGS listed in the Operation and Maintenance Instruction Manual.

Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE

500 HOUR SERVICE				
SERVICE POINTS	Replace	Lubricate	Clean	Check
Engine valve clearance				V
Fuel filter	X			
Hydraulic system filter	X			
Transmission oil	X			
Drive shaft fittings		+		
Pilot control filter	X			



12. ENGINE VALVES - ADJUST CLEARANCE

Have valve clearance checked by authorized Fiatallis Dealer. It shall be as specified below:

- Intake 0.25mm (.010")
- Exhaust 0.35mm (.014")

IMPORTANT: Clearance must check with engine cold

1. Lock nut wrench
2. Valve rocker screw wrench
3. Feeler gauge

MAINTENANCE

T-85422

13. FUEL FILTERS - CHANGE

WARNING

Extinguish all smoking materials, or open flames before checking and filling fuel tanks, changing filters and before opening sediment drain due to the presence of flammable fluid.

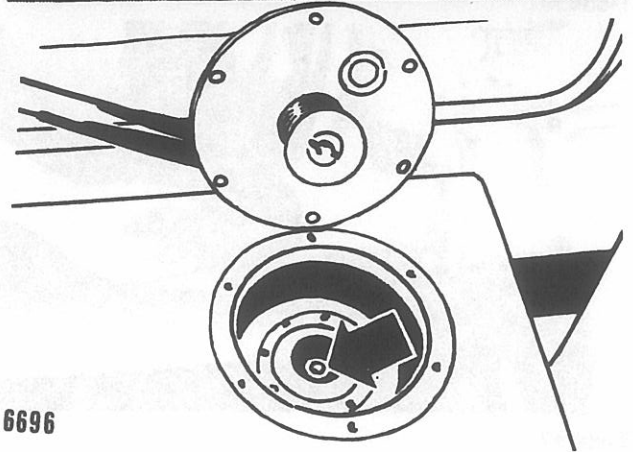
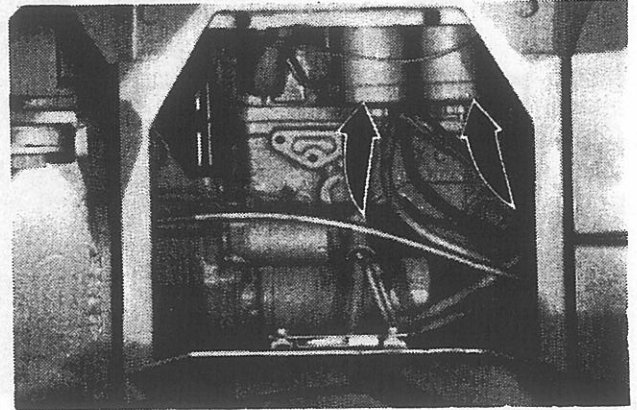
Change filter cartridges by unscrewing screw A. Filling the filter cartridge prior to installation reduces the amount of air entering the fuel system. After reinstalling the filters, bleed the system (see Periodic Services).

14. HYDRAULIC SYSTEM OIL FILTER - CHANGE

Clean the filter cover and surrounding areas. Remove cover.

Pull out filter.

Refit new filter and make sure the cover seal is in good condition.



6696

15. TRANSMISSION - CHANGE OIL

WARNING

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

Observe all start up and shut down procedures and "WARNINGS" listed in the operation and maintenance manual.

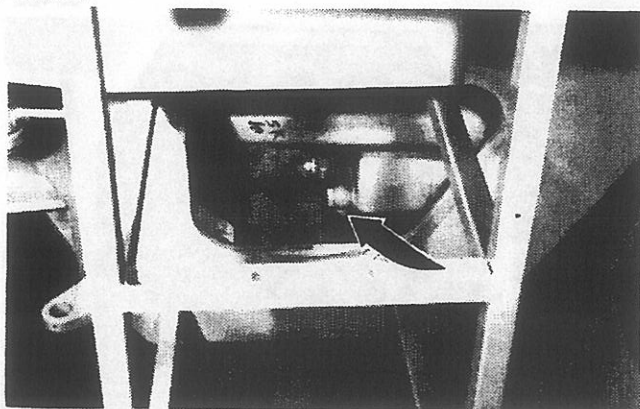
Keep people clear of attachments and tools while in raised position to prevent possible injury.

Warn all people who may be servicing or working around machine before starting engine.

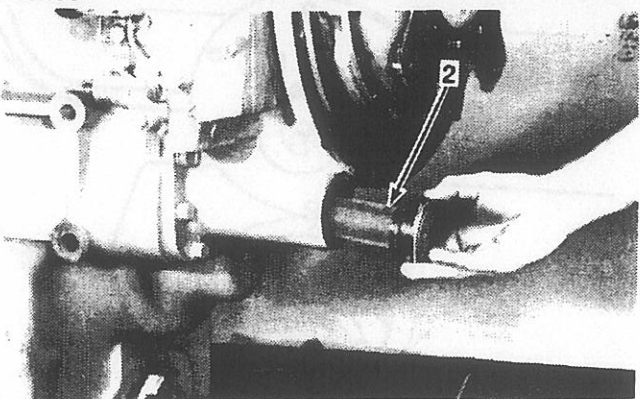
Do not run the engine or this machine in closed areas without proper ventilation to remove deadly exhaust gases.

MAINTENANCE

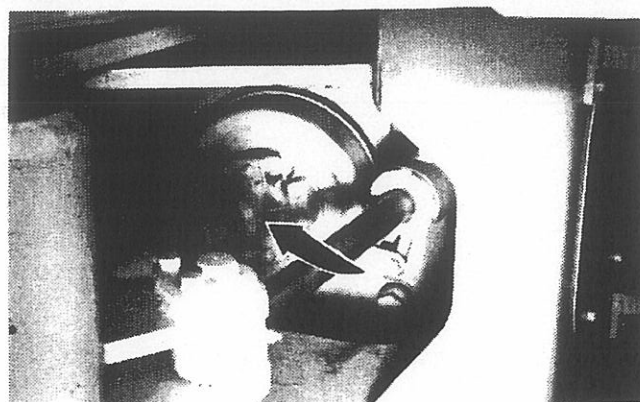
T-85420



T-85439



T-90517



Change oil as follows:

- Drain oil with engine warm through transmission housing lower drain plug after having first unscrewed the filler cap and removed the dipstick.
- Unscrew filter from base and change.
- Remove strainer (2) clean and change its seal and fit back in housing.
- Pour in fresh oil through filler neck up to the maximum mark on dipstick.
- Run engine a few minutes at half throttle.
- Lower engine speed to low idle and check level with engine still running.
- Should level be low, fill as required and check once more.

16. DRIVE SHAFT - LUBRICATE

Inject the specified grease in the fittings provided for support and spider lubrication.

IMPORTANT: The drive shaft support fitting is shown under Item 4.

17. PILOT CONTROL FILTER - REPLACE

(not applicable)

1000 HOUR SERVICE

SERVICE POINTS	Replace	Lubricate	Clean	Check
Fuel injection nozzles				V
Batteries				V
Tire pressure				V
Transmission oil strainer			Ø	

Study **SAFETY RULES** in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE

18. FUEL INJECTION NOZZLES - CHECK



WARNING

Keep hands away from nozzle tip when testing a nozzle. The finely atomized fuel is ejected with sufficient force to penetrate the skin and cause blood poisoning. Also, wear safety glasses with side shields or goggles when testing a nozzle.

Have the fuel injection settings checked by a specialized repair shop.

Specified pressure: 230 - 238 bar (3335 - 3450 psi).

T-85429

19. BATTERIES - CHECK

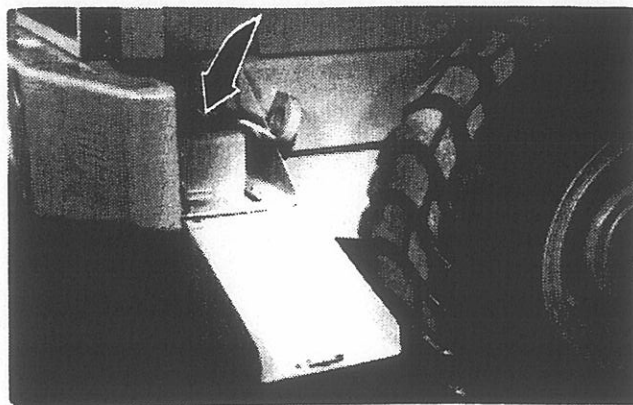


WARNING

Batteries contain "Sulfuric Acid". Shield your eyes when working near the battery to protect against possible spillage of the acid solution. In case of acid contact with skin, eyes, or clothing, "FLUSH IMMEDIATELY WITH WATER FOR A MINIMUM OF 15 MINUTES". Get medical attention immediately.

Be sure to connect booster cables for the proper terminal (+ to +) and (- to -) at both ends. Avoid shorting cable clamps.

Flammable vapors -extinguish all smoking materials or open flames before checking and filling batteries due to the presence of flammable gases. Do not check the battery by sparking.



To avoid running down the batteries, idle rather than shutoff the engine if machine is to stand for short stopovers.

Make sure that cable terminals are secure on battery posts and protect with a light coat of petroleum jelly. Always disconnect ground cable before touching the terminals.

Follow these rules to preserve full battery efficiency:

- When engine is inoperative, always set master switch to OFF position). This will prevent progressive battery discharge.
- Do not leave lights ON for extended periods when engine is OFF or idling.
- Keep battery clean, especially the top. Check that terminals and clamps are well clean and secure.

MAINTENANCE

- To reach the batteries, open the hatches on either side in front of the rear bumper.
- Batteries are of the maintenance free design. For this reason, normally no electrolyte fill is needed.
- However, in *exceptional cases*, if distilled water must be added, this can be done after removing cell caps. Be sure electrolyte level does not exceed the top reference mark.

IMPORTANT: To prevent possible electrical system damages:

- Never invert the battery cable connections (+ with +, - with -).
- Never allow engine to run when batteries are disconnected.

20. TIRE PRESSURE - CHECKUP



WARNING

Do not inflate tires with flammable gases or with air from systems utilizing alcohol injectors. Explosion and personal injury could result.

Be sure tires are properly inflated to the manufacturer's specified pressure. Inspect for damage periodically.

Stand to one side when changing inflation of tires.

Check tires only when the machine is empty and tires are cool to avoid over inflation. Do not use reworked wheel parts. Improper welding, heating or brazing weakens them and can cause damage.

Always use an inflation cage, safety cables or chains when removing tire lock rings or inflating deflated tires. Always deflate tires before removing lock rings according to local or national requirements.

Never begin to inflate a tapered bead tire unless bead seat band is securely in place over the lock ring.

INFLATE TIRES AS FOLLOWS:

	FRONT	REAR
BIAS PLY		
15.5-25	45 psi (3.1 bar)	25 psi (1.7 bar)
17.5-25	35 psi (2.4 bar)	25 psi (1.7 bar)
RADIAL		
15.5-25	45 psi (3.1 bar)	25 psi (1.7 bar)
17.5-25	30 psi (2.1 bar)	25 psi (1.7 bar)
20.5-25	30 psi (2.1 bar)	25 psi (1.7 bar)

Specified wheel nut tightening torque 58 daNm (420 lbs.ft).

MAINTENANCE

T-78899

Improper inflation is a large contributor to tire failure. Under inflation will cause damage to the cord body of the tire. The repeated excessive flexing of the sidewall area may eventually cause a series of breaks and separation in the cord fabric.

Over inflation must also be avoided. For maximum flotation in very soft footing, inflation may be decreased.

The recommended pressure is a "cold" pressure. If 24 hour operation does not permit checking inflation pressure on completely cooled tires, a correction factor can be determined by experiment.

Check as many times as possible when "cold" and again after two hours of operation. The average difference must be added to the recommended pressure when checking the tires during constant operation.

Continuous operation of equipment builds up heat and accompanying higher pressure in the tire. These normal increases are allowed for in the design of the tire.

21. TRANSMISSION OIL STRAINER - CLEAN

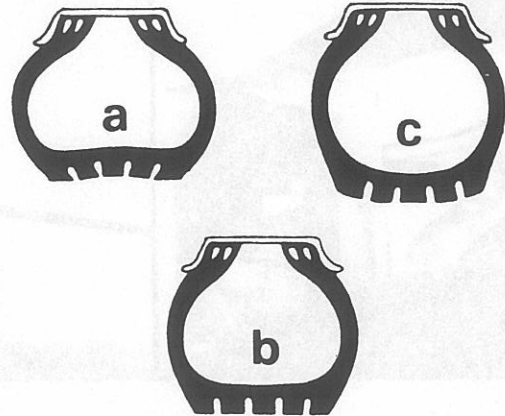
WARNING

Wear safety glasses with side shields or goggles when using compressed air for cleaning to reduce the danger of personal injury from flying particles. Limit the pressure to 2.1 bar (30 psi) according to local or national requirements.

Never use gasoline solvent or other flammable fluids to clean element. Use authorized commercial, non-flammable, non-toxic solvents.

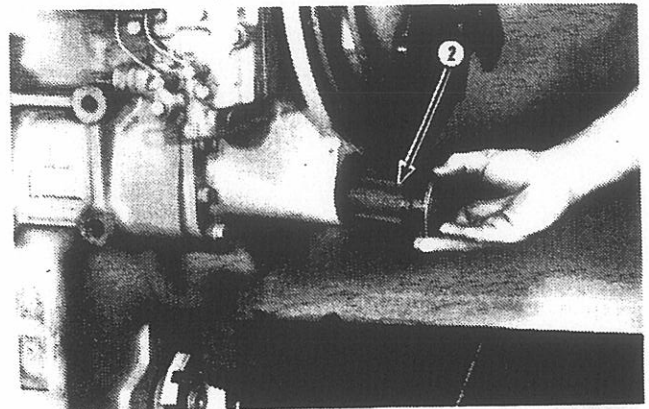
Clean strainer as follows:

- Drain oil
- Remove strainer (2), change its seal and fit into housing
- Refill to proper level with specified oil.



a. Under inflation
b. Correct inflation
c. Over inflation

T-85439



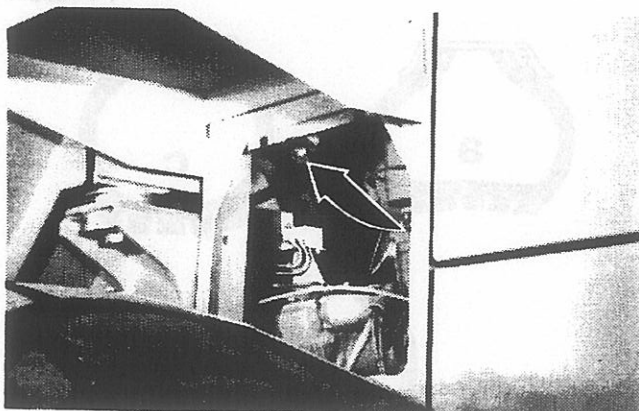
2000 HOUR SERVICE

SERVICE POINTS	Replace	Lubricate	Clean	Check
Hydraulic system oil	X			
Axle oil	X			
Engine coolant	X			
Air filter	X			

Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE

T-85424



22. HYDRAULIC SYSTEM - OIL DRAINAGE



DANGER

Boom in the air. Do not walk or work under the implement while it is in the air. Proceed with caution upon exiting and entering cab.

Keep people clear of attachments or tools while they are in raised position to prevent possible injury.

- Fully retract the bucket and raise boom to highest position.
- Stop engine.
- Unscrew filler cap on hydraulic tank and the drain cap to drain the oil tank.
- Dump bucket and lower boom to remove the oil from the cylinders.

Tank cleaning

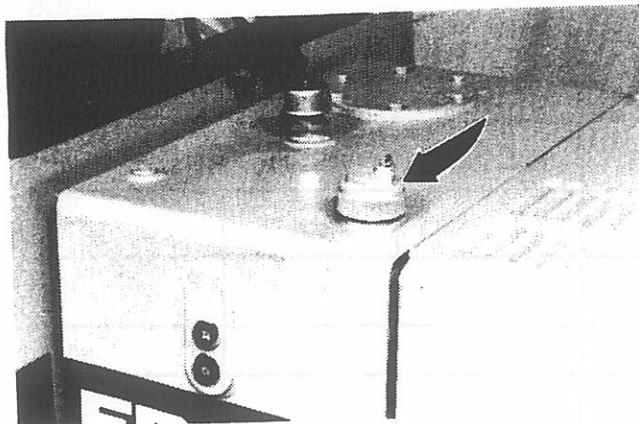
Remove the top inspection cover and clean sludge from the bottom of the tank.

Filter service

Clean the filter cover and surrounding areas. Remove the cover.

Unless the cartridge was changed shortly before as a result of the restriction indicator signaling the need, renew the filter (see Item 14).

T-85423



Oil Refills

Pour the specified type and amount of oil in the tank up to the maximum specified level, then tighten the filler cap.

Start engine and, after a few minutes, activate the implement controls to fill the cylinders and lines with oil.

With the bucket flat on the ground and the machine on level ground, check the level through the sight gauge. The bottom sight glass must be filled with oil.

MAINTENANCE

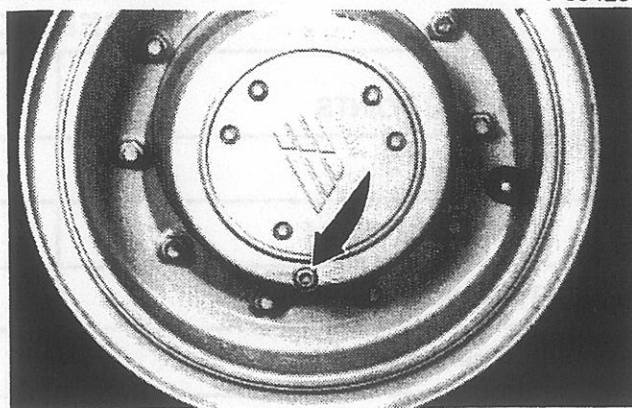
23. AXLES - CHANGE OIL



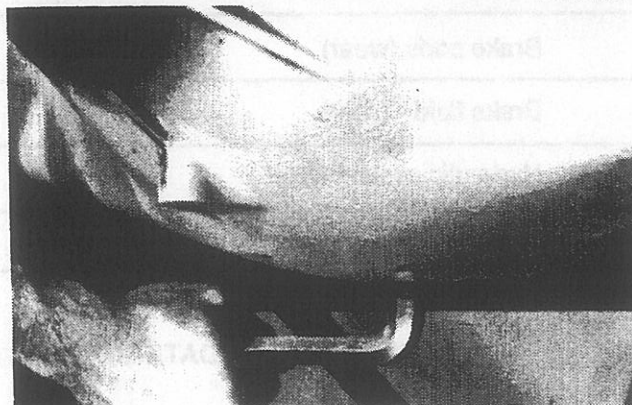
WARNING

Do not work under or near an unblocked or unsupported linkage, parts or machine.

Position loader on level area. Raise each axle so the wheels can be rotated. Locate each planetary drain plug at the bottom. Remove differential and planetary drain plugs. Allow the oil to drain. Install drain plug in the differential. Rotate wheel so that drain plug is at the top. Fill units with the recommended grade of lubricant, following the procedure described under Item 3. Constantly monitor the amount of oil being placed in the wheel end by rotating the wheel so that the fill plug is horizontal. When oil begins to flow from the horizontal plug, the wheel end is full. Install plugs. Fill differential and install fill plug.



T-85433



T-85505

24. ENGINE COOLANT - CHANGE

Park the machine on level ground.



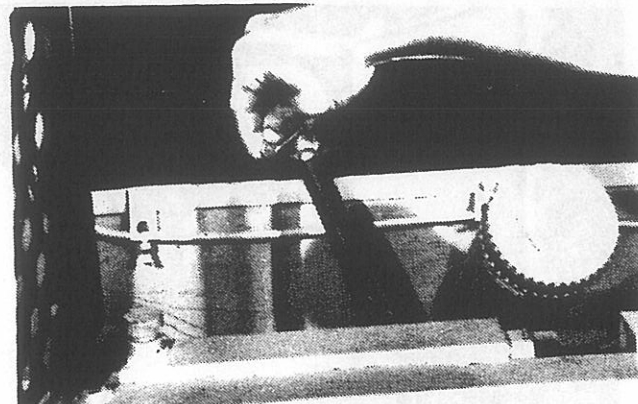
DANGER

Fluid under pressure. Turn cap slowly to relieve pressure before removing.

Drain the radiator by opening the drain cock.

NOTE: Shut off valve at heater lines and coolant filter should be open.

Close the drain cock. Refill cooling system with specified coolant to proper level.



25. AIR CLEANER FILTER - REPLACE

The air cleaner consists of two elements. The outer element needs cleaning every time the restriction indicator in the Data Monitor lights up.

The outer element must be replaced after every six cleaning intervals or after 1 year, whichever comes first.

The inner element is not cleanable and must be replaced after 1 year or whenever the air cleaner restriction indicator stays on after the outer element has been replaced.

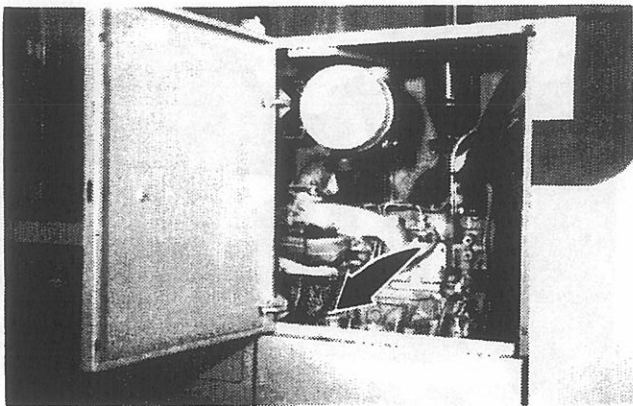
MAINTENANCE

PERIODIC SERVICE

SERVICE POINTS	Replace	Lubricate	Clean	Check
Engine oil				V
Fuel system - bleed				V
Transmission oil level				V
Engine coolant				V
Air filter			Ø	
Brake pads (wear)				V
Brake fluid - bleed				V
Hydraulic system filter	X			
Brake fluid reservoir				V

V When the indicator in DATA-MONITOR lights

T-85428



26. ENGINE OIL LEVEL - FILL

Engine oil needs topping whenever the indicator in Data Monitor panel lights up. Turn off the engine and check the oil level on the dipstick. If necessary, unscrew the filler cap and pour in oil up to the maximum mark on dipstick.

27. TRANSMISSION OIL LEVEL - FILL



WARNING

Observe all start up and shut down procedures and "WARNINGS" listed in the operation and maintenance manual.

Do not allow unauthorized personnel to service or maintain this machine. Study the OPERATION AND MAINTENANCE INSTRUCTION MANUAL before starting, operating, maintaining, fueling, or servicing this machine.

Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

MAINTENANCE

WARNING

Never attempt to operate machine or attachment except when seated in the operator's seat. Keep head, body, limbs, hands and feet inside the operator's compartment, to reduce exposure to hazards outside the operator's compartment.

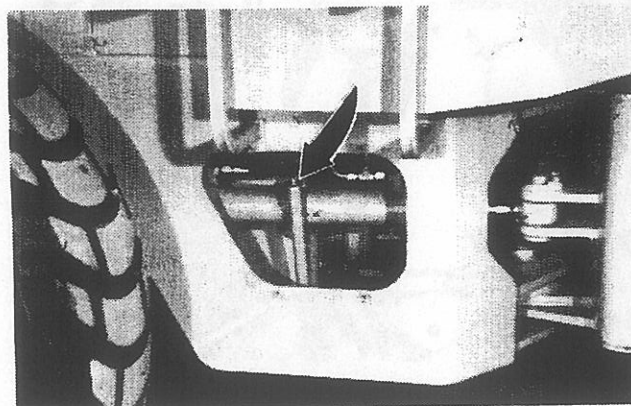
Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

Warn all people who may be servicing or working around machine before starting engine.

Transmission oil needs topping whenever the indicator in Data Monitor panel lights.

- Prior to starting, visually check that transmission has fluid.
- Fill the transmission with specified fluid so that the oil registers at the maximum cold level mark.
- Correct level is obtained with engine operative and idling, after a brief period of brisk acceleration.
- After the transmission has run and warmed, inspect the transmission level with the engine running, transmission locked in neutral and the parking brake applied.

T-85426



28. ENGINE COOLANT LEVEL - FILL

DANGER

Fluid under pressure-turn cap or cover slowly to relieve pressure before removing.

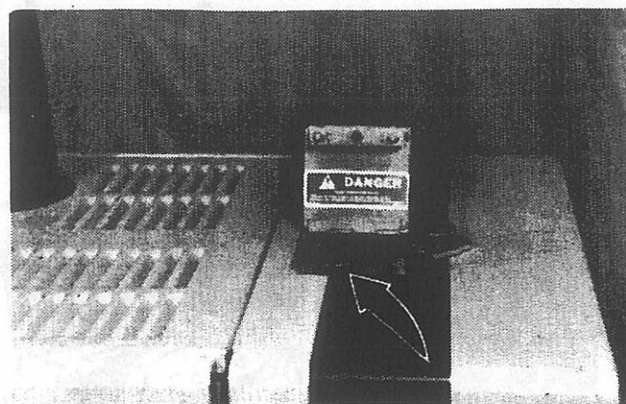
Engine coolant needs filling whenever the level indicator in the Data Monitor panel lights up. Proceed as follows:

- Allow engine to cool down.
- Slowly remove the radiator filler cap and fill to the bottom edge of filler neck.
- Screw on the cap, start engine and make sure the warning indicator switches OFF.

IMPORTANT: When topping coolant, remember that existing water/anti-freeze percentages in solution must be maintained.

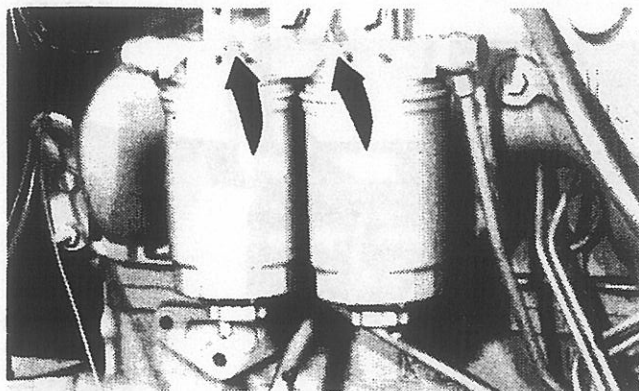
Need for frequent topping indicates some fault in the cooling system. Have the necessary checks made at a Fiatallis Service Center.

T-85427

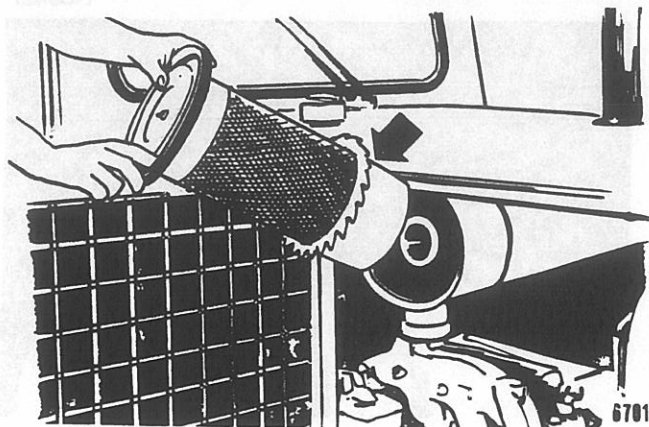
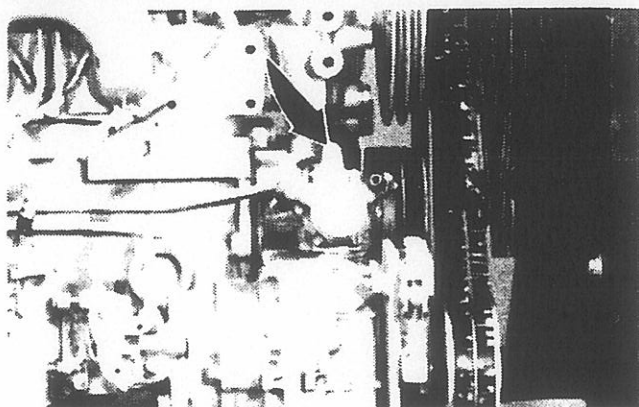


MAINTENANCE

T-85442



T-85435



29. FUEL SYSTEM - BLEED



DANGER

Extinguish all smoking materials, or open flames before checking and filling fuel tanks, changing filters and before opening sediment drain due to the presence of flammable fluid.

Air may enter the fuel system during prolonged periods of machine inactivity, when filters or lines are removed, or if the fuel tank is allowed to run dry.

Remember that air in the fuel system will make the engine difficult to start.

In such circumstances, first fill the tank and then bleed the system as follows:

- Hold pan under the filter.
- Loosen the fuel filter bleeder plugs about 2 turns and manually stroke the fuel pump priming lever. When fuel issues in a solid stream, without bubbles, tighten the plug.
- Stroke the pump about 10 times more.

30. AIR CLEANER FILTER - CLEAN

The air cleaner consists of two elements, one inner and one outer. The outer element needs servicing every time the restriction indicator in Data Monitor lights up.

IMPORTANT: Keep clean spare elements on hand to reduce machine down time. Recommended elements are available from Fiatallis.



DANGER

Wear safety glasses with side shields or goggles when using compressed air for cleaning to reduce the danger of personal injury from flying particles. Limit the pressure to 2.1 bar (30 psi) according to local or national requirements.

Never use gasoline solvent or other flammable fluids to clean element. Use authorized commercial, non-flammable, non-toxic solvents.

The outer element must be replaced after every 6 cleaning intervals, or at most, after 1 year, whichever occurs first, regardless of the number of times it was cleaned.

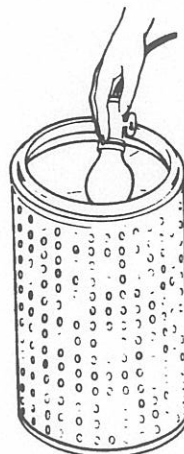
MAINTENANCE

The inner element, instead, is not cleanable and must be changed after 1 year's use or whenever the air cleaner restriction indicator turns and stays ON after outer element servicing.

For outer element cleaning proceed as follows:

Direct the air jet - dry and clean up and down the pleats (max. pressure 2 bar (30 psi) on the inside of the element until all dust is blown off.

After element has been cleaned and dried it must be inspected for ruptures or holes. Place bright light inside element and inspect from outside. Light will shine through any holes or tears making them plainly visible. If any holes are evident, a new element must be installed. Inspect element gasket for good condition. If any damage is apparent, replace. Clean inside of container and cover. Make sure the dust unloader valve at bottom of air cleaner is efficient at all times.



6564

31. BRAKE PADS WEAR - CHECK

Check pad facing thickness. If the friction material (S) is less than 3 mm (.112"), change the pads. In extremely dusty environments and when abrasive materials are present, shorten the replacement interval.

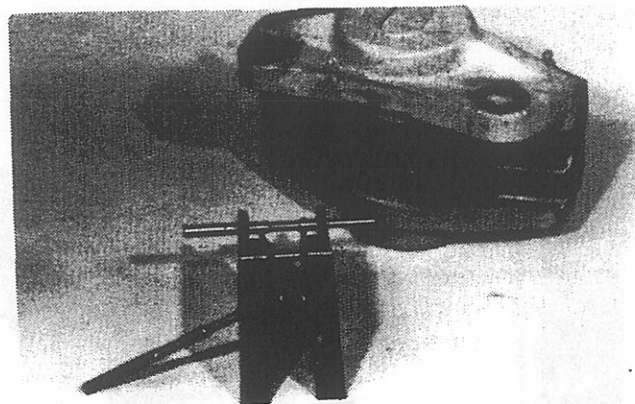
32. BRAKE FLUID RESERVOIRS - FILL



DANGER

Brake fluid reservoirs must be filled to the proper level. Fill with specified fluid.

The hydraulic portion of the brake system needs a solid column of brake fluid, free of air bubbles if it is to function properly. If air is present in the hydraulic fluid, compression of the air bubbles may nullify effective stroking of the brake actuating piston and will make the brakes ineffective. Possible personal injury or property damage could result.



T-85441

MAINTENANCE



WARNING

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

*Observe all start up and shut down procedures and **'WARNINGS'** listed in the operation and maintenance instruction manual.*

Keep people clear of attachments and tools while in raised position to prevent possible injury.

Warn all people who may be servicing or working around machine before starting engine.

Do not run the engine or this machine in closed areas without proper ventilation to remove deadly exhaust gases.

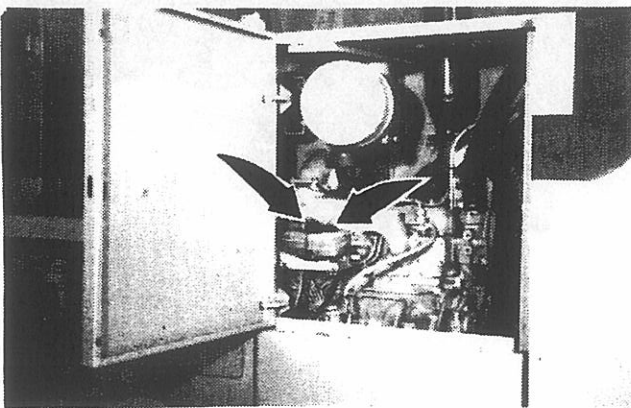
*This symbol is your safety alert sign. It means **"ATTENTION!" "BECOME ALERT!" "YOUR SAFETY IS INVOLVED"**.*

*Read and heed all safety instructions carrying the signal words **"Warning and Danger"**.*

Never attempt to operate machine or attachment except when seated in the operator's seat. Keep head, body, limbs, hands and feet inside the operator's compartment, to reduce exposure to hazards outside the operator's compartment.



T-85428



Brake system fluid needs filling whenever the warning indicator in Data Monitor panel lights up.

Unscrew caps and fill with fluid of the recommended grade.

Normally, a sudden drop in the fluid level may be the result of some leak in the brake control circuit. Have the hydraulic system checked by a Fiatallis Service Center.

If the fluid level drop is constant and very slow, it is advisable to check brake pads for wear before filling the system.

MAINTENANCE

33. BRAKE FLUID CIRCUIT - BLEED



WARNING

Extinguish all smoking materials, or open flames before checking and filling fuel tanks, changing filters and before opening sediment drain due to the presence of flammable fluid.

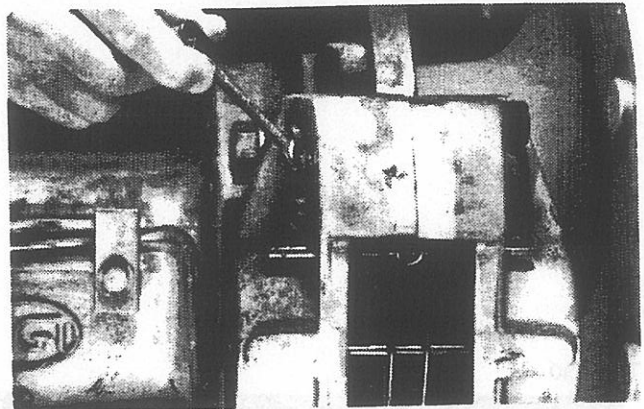
Should it become necessary to bleed the circuit as a result of loose fittings, cylinder leakage or low fluid levels, proceed as follows:

NOTE: Bleeding cannot be performed single-handed unless a pressure bleeder is available. Acquire assistance.

- With engine idling, slacken bleed screw on brake caliper while assistant holds down the brake pedal.
- Tighten the bleed screw before releasing the pedal.
- Repeat as many times as needed to expel all air.
- Proceed in the same manner on the other calipers.

NOTE: Remember that with engine OFF only a few brake applications are possible. Brake effectiveness may be restored only if engine is started again. After bleeding, clean area of brake fluid.

T-89168



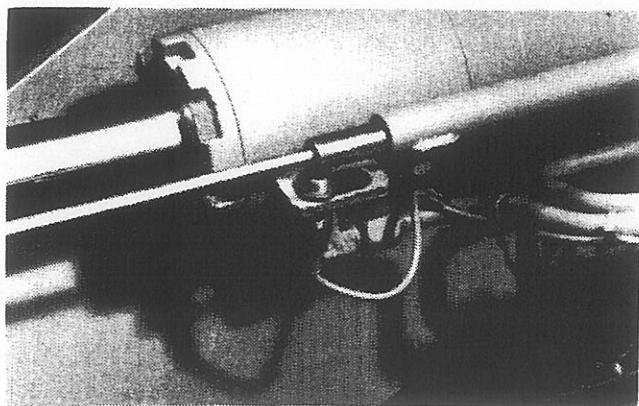
34. HYDRAULIC SYSTEM OIL FILTER - CHANGE

Clean the filter cover and surrounding areas. Remove cover.

Pull out filter.

Install new filter and make sure cover seal is in good condition. Install cover.

T-85431



AUTOMATIC BUCKET LEVELER ADJUSTMENT

WARNING

Do not work under or near unblocked or unsupported linkage, parts or machine.

Warn all people who may be servicing or working around machine before starting engine.

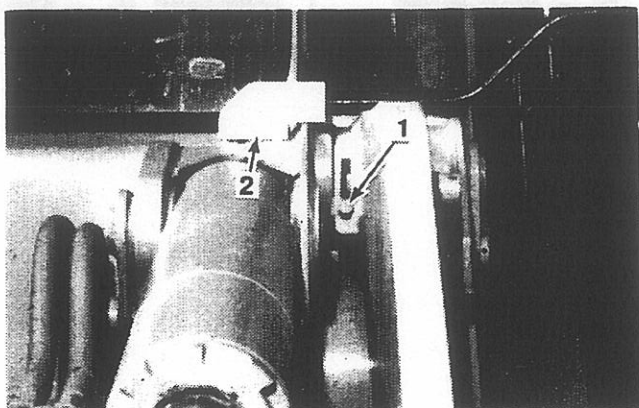
Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

The automatic bucket leveler allows the operator to adjust control so the bucket will return to the digging position automatically after the bucket is dumped.

ADJUSTMENT OF BUCKET POSITION

1. Position bucket on ground at desired digging angle. Stop the engine.
2. Loosen magnetic probe jam nut.
3. Slide probe along the cut-out tab until the probe is in line with the leading edge of the large portion of the stroke indicator rod.
4. Tighten jam nut.
5. Start the engine and operate the bucket leveler through a complete cycle to insure accurate adjustment.

T-85430



AUTOMATIC BOOM KICK-OUT ADJUSTMENT

The automatic boom kick-out allows the operator to adjust the control so the boom will stop at a pre-determined height automatically.

WARNING

Do not work under or near unblocked or unsupported linkage, parts or machine.

Warn all people who may be servicing or working around machine before starting engine.

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.

ADJUSTMENT OF BOOM POSITION

1. Position boom at desired height. Stop engine.
2. Loosen block cap screw (1).
3. Slide block along groove until the block's leading edge is in line with the magnetic probe (2).
4. Tighten cap screw.
5. Start engine and operate boom kick-out through several cycles to insure accurate adjustment.

FUEL, LUBRICANT SPECIFICATIONS AND CAPACITIES

FUEL

The fuel to be used must meet the American Society for Testing and Material (ASTM) grade No. 2-D type T-T specifications for diesel fuel. The sulphur content must not exceed 1/2 of 1%. If sulphur content exceeds 1/2 of 1%, oil change intervals must be closer in order to compensate for the excessive sulphur.

COOLANT

The cooling system is filled at the factory with a 50/50 mixture of water and permanent type (glycol base) antifreeze. Always test cooling system solution and add a compatible antifreeze if necessary.

NOTE: The above antifreeze solution is necessary for water pump lubrication (soluble oils are not recommended).

SYMBOL EO - ENGINE CRANKCASE

The following information is relative to engines used in Fiatallis machines.

1. The primary criterion for selecting an oil viscosity is the lowest ambient temperature at start-up.

Change to a lower viscosity oil when the temperature reaches the lower end of the ranges as shown on the charts.

2. For maximum engine protection, use only the engine oil filters as specified in the parts catalog for the engine in your machine.
3. Use only oil which conforms to American Petroleum Institute (API) classification CD, or United States Military Specification MIL-L-2104D.
4. Sulfated ash content should not exceed 1.85%.
5. Synthetic oils may be used provided they meet the specified API service categories or MIL specifications, and viscosity grades.

AMBIENT TEMPERATURE		
C°	F°	SAE VISCOSITY GRADE
-10 and above -25 to 20 Below -25	14 and above -13 to 68 Below -13	15W-40 10W-30
ALTERNATE		
10 and above 0 to 35 -10 to 10 -25 to 0	50 and above 32 to 95 14 to 50 -13 to 32	40 30 20, 20W or 20W-20 10W

Below -25°C(-13°F), a means of warming the engine and batteries is recommended to obtain satisfactory starting and prevent damage to the engine and starter.

FUEL, LUBRICANT SPECIFICATIONS AND CAPACITIES

SYMBOL TF - TRANSMISSION, TORQUE CONVERTER

Use oils meeting or exceeding one of the following specifications:

- a. ATF type A - Suffix A
- b. C-3 Transmission Fluid

AMBIENT TEMPERATURE	VISCOSITY:
Below 0°C (32°F) Above 0°C(32°F)	SAE 10W SAE 10W-30

If temperature is below -23°C (-10°F), auxiliary preheat will be required to raise the temperature in the sump and external circuits to at least -23°C (-10°F).

SYMBOL HO - IMPLEMENT HYDRAULIC

Use oils meeting or exceeding one of the following specifications:

- a. MIL-L-2104C, API CD
- b. TO-2 Qualified, API CD
- c. C-3 (transmission fluid)
- d. MIL-L-46152

AMBIENT TEMPERATURE	VISCOSITY:
Above 38°C(100°C) Below 38°C(100°F)	SAE 20-20W SAE 10W

CAPACITIES

	LIT	U. S. (GAL)
FUEL	170	44.9
COOLANT	28	7.4
ENGINE OIL	12.5	3.3
TRANSMISSION	19	5
AXLES	22.5	5.9
IMPLEMENT	60	15.8
BRAKES	1	0.26

SYMBOL MGO - DIFFERENTIAL AND PLANETARY HUBS

Use gear lubricant meeting or exceeding one of the following specifications:

- a. MIL-L-2105C(GL-5)
Viscosity: SAE 80W/90EP year around.
- b. MIL-L-2105B(GL-4)
Viscosity: SAE 90 EP or 85/140 EP year around

SYMBOL PGL - PRESSURE GUN LUBRICANT

Use N.L.G.I. # 2 Lithium soap base grease.

SYMBOL BF - BRAKE FLUID

Use good grade of heavy duty hydraulic brake fluid meeting SAE Standard J 1703.

FUSES

Access to fuses is gained by opening the cover on the left console adjacent to the operator's left arm.

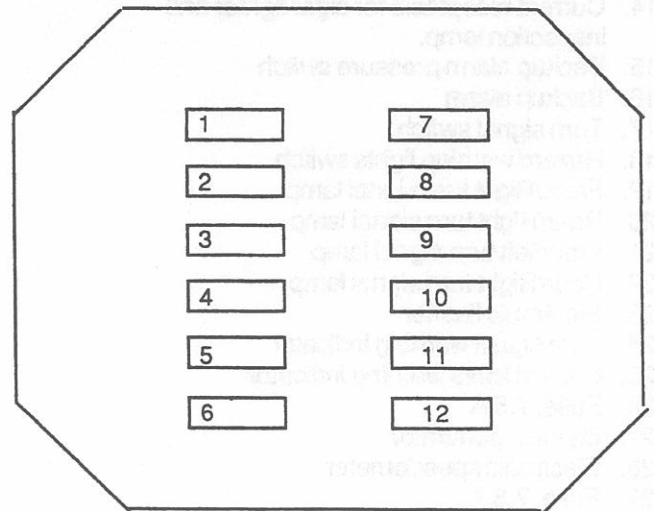
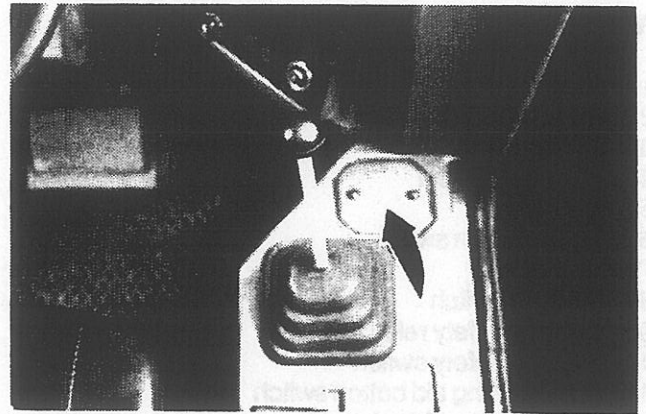
Circuits

1. Windshield wiper motor
2. Boom kickout and bucket leveler
3. Horn, backup alarm, current receptacle and portable inspection lamp
4. Turn signal, hazard warning indicators, front and rear turn signal lamps
5. Front/right and rear/left position lamps, speedometer light indicator and cigar lighter
6. Headlamp low beams
7. Headlamp high beams and indicator
8. Front/left and rear/right position lamps, rear work lights and indicator, license plate light
9. Revolving beacon and indicator, indicator, ceiling lamp and reading spot light
10. Electronic speedometer
11. Stop lights, transmission neutralizer solenoid and indicator
12. Rear window wiper motor and washer pump

Circuits without protection

- Alternator
- Starter motor circuit
- Cold starting
- Fuel shutoff
- Head light indicator

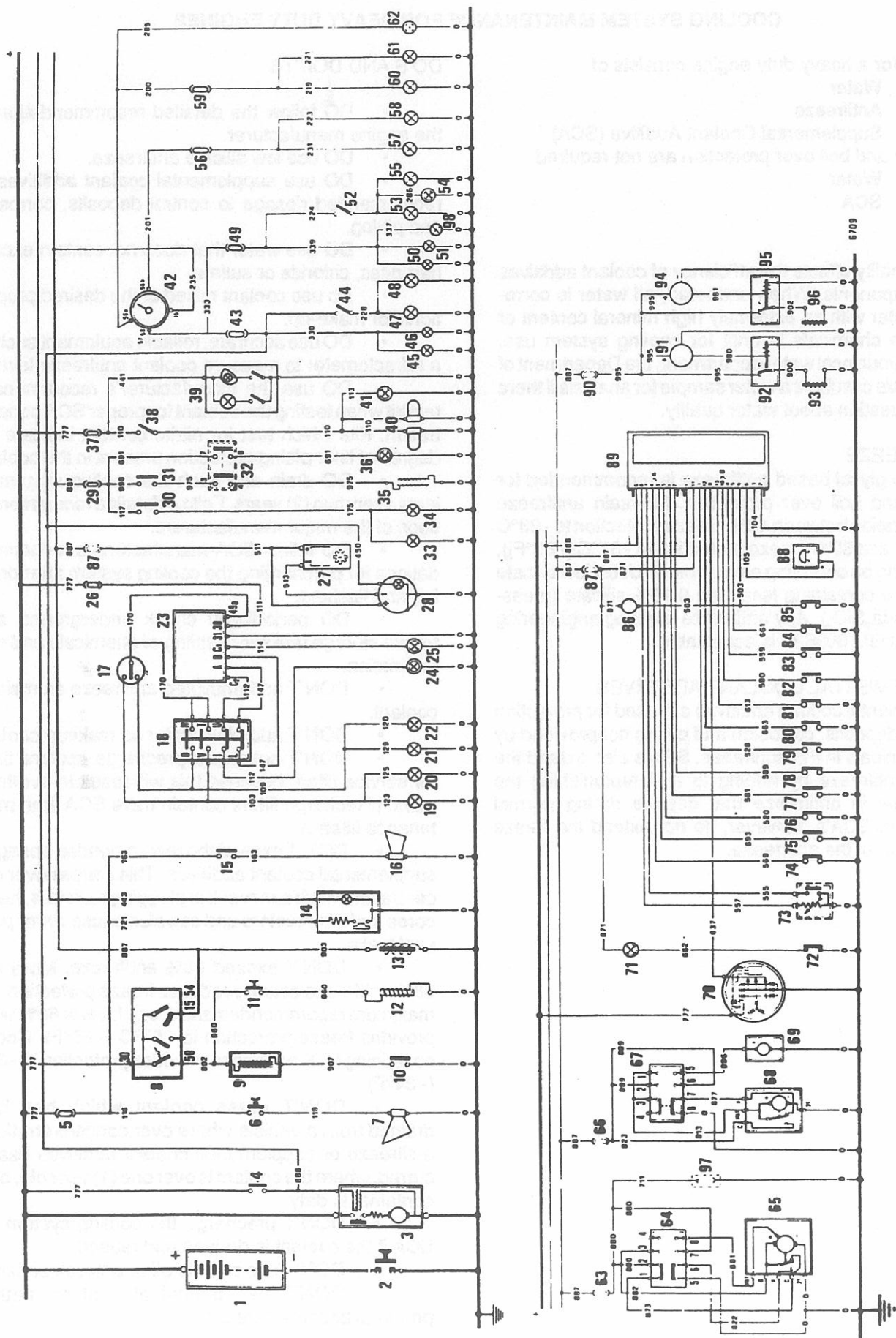
All circuits are protected by 7.5 amp fuses with the exceptions of number 3 which uses a 15 amp fuse and number 10 which uses a 4 amp fuse.



ELECTRICAL SYSTEM

WIRING DIAGRAM

1. Battery
2. Master switch (battery disconnect)
3. Starter motor
4. Starter solenoid
5. 15A fuse
6. Pedal button switch
7. Horn
8. Starting switch
9. Starting safety relay
10. Starting safety switch
11. Cold starting aid button switch
12. Cold starting aid solenoid
13. Engine stopping control solenoid
14. Current receptacle for cigar lighter and inspection lamp.
15. Backup alarm pressure switch
16. Backup alarm
17. Turn signal switch
18. Hazard warning lights switch
19. Front/Right turn signal lamp
20. Rear/Right turn signal lamp
21. Front/Left turn signal lamp
22. Rear/Right turn signal lamp
23. Electronic flasher
24. Turn signal warning indicator
25. Hazard lights warning indicator
26. Fuse, 7.5 A
27. Impulse generator
28. Electronic speedometer
29. Fuse, 7.5 A
30. Stop lights switch
31. Transmission neutralizer switch
32. Transmission neutralizer control energizing switch
33. Left tail lamp - Stop light
34. Right tail lamp - Stop light
35. Transmission neutralizer solenoid
36. Transmission neutralizer warning indicator
37. Fuse, 7.5 A
38. Revolving beacon switch
39. Ceiling lamp unit
40. Revolving beacons
41. Revolving beacon warning indicator
42. Lighting switch
43. Fuse, 7.5 A
44. Cab front work lights switch
45. Front/Right position light
46. Rear/Left position light
47. Cab front/Right work light
48. Cab front/Left work light
49. Fuse, 7.5 A
50. Front/Left position light
51. Rear/Right position light
52. Rear work lights switch
53. Rear/Left work light
54. Rear work lights warning indicator
55. Rear/Right work light
56. Fuse, 7.5 A
57. Left headlamp - low beam
58. Right headlamp - low beam
59. Fuse, 7.5 A
60. Left headlamp - high beam
61. Right headlamp - high beam
62. High beams warning indicator
63. Fuse, 7.5 A
64. Windshield 2 speed wiper switch
65. 2 speed windshield wiper motor
66. Fuse, 7.5 A
67. Back window wiper/washer switch
68. Back window 1 speed wiper motor
69. Windshield/Back window washer pump
70. Alternator with incorporated [orated regulator
71. Hand brake warning indicator
72. Hand brake pressure switch
73. Fuel level warning sensor
74. Engine oil level warning sensor
75. Transmission lube oil low pressure warning sensor
76. Engine coolant level warning sensor
77. Transmission fluid low pressure warning sensor
78. Transmission fluid level warning sensor
79. Engine coolant high temperature warning sensor
80. Air cleaner restriction warning sensor
81. Brake fluid low pressure warning sensor
82. Equipment hydraulic oil filter restriction sensor
83. Transmission high temperature warning sensor
84. Brake fluid level warning sensor
85. Engine oil/Hourmeter control low pressure sensor
86. Quartz hourmeter
87. Fuse, 4 A
88. Buzzer
89. Electronic Data Monitor
90. Fuse, 7.5 A
91. Bucket max height release switch
92. Relay
93. Bucket max height release solenoid
94. Overstroke sensor switch
95. Relay
96. Bucket leveler solenoid
97. Solenoid circuit energizing control
98. License plate light



Study SAFETY RULES in the front of this manual thoroughly for the protection of machine and safety of personnel.

COOLING SYSTEM MAINTENANCE FOR HEAVY DUTY ENGINES

Coolant for a heavy duty engine consists of

- Water
- Antifreeze
- Supplemental Coolant Additive (SCA)

If freeze and boil over protection are not required

- Water
- SCA

WATER

Water quality affects the efficiency of coolant additives and components. When untreated, all water is corrosive. Water with an extremely high mineral content or corrosive chemicals is unfit for cooling system use. Contact your local water department, the Department of Agriculture or submit a water sample for analysis if there is any question about water quality.

ANTIFREEZE

Ethylene glycol based antifreeze is recommended for freeze and boil over protection. Maintain antifreeze concentration between 40% (freeze protection to -23°C [-10°F]) and 60% (freeze protection to -57°C [-65°F]), depending on operating environment. Use a low silicate antifreeze containing less than 0.10% silicate (measured as Na_2SiO_3). Any antifreeze meeting engineering standard GM 6038-M is acceptable.

SUPPLEMENTAL COOLANT ADDITIVES

Supplemental coolant additives are used for protection against deposits, corrosion and pitting not provided by the chemicals in the antifreeze. SCA's also extend the life of antifreeze by adding to and replenishing the chemicals in antifreeze that deplete during normal operation. SCA's, however, do not extend the freeze protection of the antifreeze.

DO'S AND DON'TS

- DO follow the detailed recommendation of the engine manufacturer.
- DO use low silicate antifreeze.
- DO use supplemental coolant additives at recommended dosage to control deposits, corrosion and pitting.
- DO use water that does not contain excess hardness, chloride or sulfate.
- DO use coolant mixed at the desired proportions for make-up.
- DO use accurate, reliable equipment such as a refractometer to measure coolant antifreeze levels.
- DO use the manufacturer's recommended test kit when testing the coolant for proper SCA concentration. Kits which test for nitrite content indicate the degree of liner pitting protection present in the coolant.
- DO drain and flush the cooling system as least every two (2) years. Follow detailed recommendations of the major manufacturers.
- DO follow SCA manufacturer's recommendations for precharging the cooling system after draining and flushing.
- DO periodically check underground antifreeze storage tanks for settling of chemicals and contamination.
- DON'T add undiluted antifreeze as makeup coolant.
- DON'T add plain water as makeup coolant.
- DON'T substitute precharge coolant filters for service filters because this will result in overtreatment. (Precharge filters contain more SCA than maintenance filters.)
- DON'T exceed the recommended dosage of supplemental coolant additives. This causes over concentration which can result in plugging radiators, heater cores and aftercoolers and can also cause water pump seal leaks.
- DON'T exceed 68% antifreeze. More than 68% antifreeze actually reduces freeze protection. The maximum recommended antifreeze level is 60% which provides freeze protection to -57°C (-65°F). Coolant containing 50% antifreeze provides protection to -36°C (-34°F).
- DON'T reuse coolant which has been drained from a vehicle where over concentration of antifreeze or supplemental coolant additives has occurred, where the coolant is over one (1) year old, or the container is dirty.
- DON'T precharge the cooling system with SCA if the coolant is drained and reused.
- DON'T use soluble oil or antileak additives.
- DON'T use methyl alcohol or methoxy propanol based antifreezes.

FLUID CAPACITIES FR10B

ITEM	QUANTITY	FIAT PRODUCT		REFILL (International Classification)
	Liters	Trade Name	Designation	
Cooling system	28	PARAFLU	PARAFLU 11	50-50 mixture of water and reputable, high quality (*) <u>commerical permanent fluid.</u>
Fuel tank	170	-	-	Diesel Fuel ASTM 2-D Grade TT of reputable quality and Make.
Engine	12.5	AMBRA SUPER	AMBRA SUPER	Engine oil to MIL-L-2104 C or API Service CD
Front axle Rear axle	22.5 22.5	TUTELA	W90/M-DA	Oil for mechanical drives MIL-L-2105 C or API Service GL5
Brake hydraulic circuit	1	TUTELA	DOT 3	Brake fluid SAE J 1703 N.H.T.S.A. 116 DOT 3
Transmission	19	TUTELA	GI/M(*)	ATF Type A - Suffix A or C-3 <u>Transmission fluid</u>
Implement hydraulic system	60	IRAULICAR/AP	IDRAULICAR/ AP 31 and 51	Hydraulic oil to MIL-H-24459 or DIN 51524/51525
Grease fittings	-	TUTELA	G9	Lithium-calcium base grease, water/high-temperature/ high-load resistant - N.L.G.I. No. 2 consistency

Oil quantities indicated are for periodical changes as detailed in the drainage and refill instructions for each item, as applicable.

(*) Use mixtures providing adequate oxidation, foaming, corrosion, scaling and freezing protection down to -35°C (-31°F).

SAE VISCOSITY TO OUTDOOR TEMPERATURE RELATIONSHIP FOR OIL GRADE SELECTION

