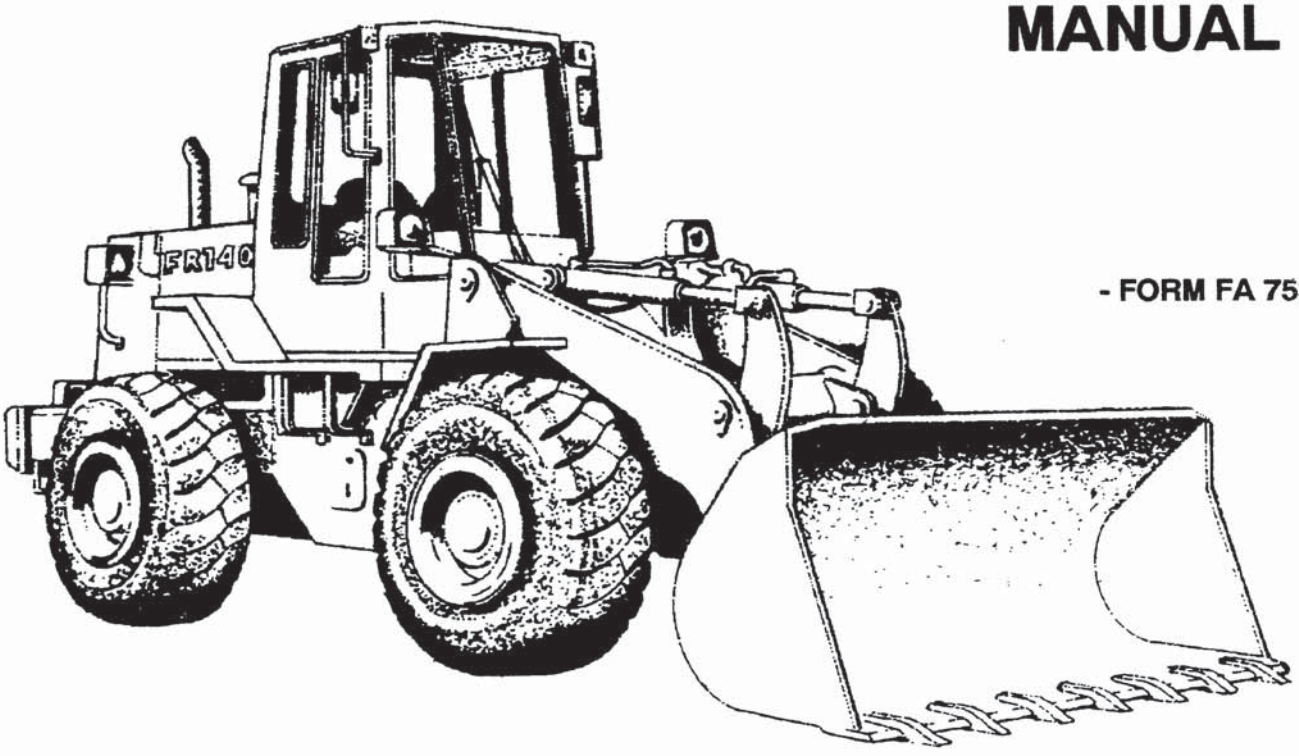
FIATALLIS®

FR 140

WHEEL LOADER

SERVICE SPECIFICATION MANUAL



- FORM FA 75314894

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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SERVICE SPECIFICATION MANUAL

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 optional items . These changes may affect procedures outlined in this manual. If variances are observed, verify the information through your Dealer.

MACHINE-FRAME Nº [ ]

1st EDITION - FORM FA 75314894

(JULY 1993)

PRINTED IN BRAZIL

TECHNICAL ASSISTANCE

Many equipment owners employ Dealer's 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 excellent service.

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

FIATALLIS TECHNICAL ASSISTANCE DEPARTMENT

Av. Gal. David Sarnoff, 2237
32.210-900 - Contagem - Minas Gerais
Brazil
Phone : (0055-31) 329-3246 or 329-3247
Telex : 0055-31-1130 FIATBR
Fax : (0055-31) 329-3420

SPARE PARTS

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

(A) Machine serial number
(B) Engine type and serial number
(C) Part number

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

FIATALLIS SPARE PARTS DEPARTMENT

Av. Gal. David Sarnoff, 2237
32.210-900 - Contagem - Minas Gerais
Brazil
Phone : (0055-31) 329-3383/ 329-3380
Telex : 0055-31-3067 FIATBR
Fax : (0055-31) 329-3386

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SYMBOLS

MAIN SYMBOLS USED IN THIS MANUAL

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	**DON'T SMOKE**
	**PARKING BRAKE**
	**MOTOR OIL**
	**HYDRAULIC SYSTEM**
	**BATTERY**
	**FAN**
	**DIRECTION OF OPERATION**
	**AXLES**
	**ELECTRICAL SYSTEM**
	**LUBRICANT OIL**
	**LUBRICANT GREASE**
	**SUMMARY OF THE MAIN SECTIONS OF THIS MANUAL**

	**AIR PRESSURE**
	**TRANSMISSION OIL FILTER**
	**TRANSMISSION OIL TEMPERATURE**
	**TRANSMISSION OIL PRESSURE**
	**MOTOR OIL PRESSURE**
	**WATER TEMPERATURE**
	**HOURMETER**
	**TRANSMISSION**
	**OPERATOR'S SEAT ADJUSTMENT**
	**LIGHTS**
	**MOTOR**
	**TECHNICAL ASSISTANCE**
	**SPARE PARTS**
	**DANGER (Your life is involved)**

SYMBOLS

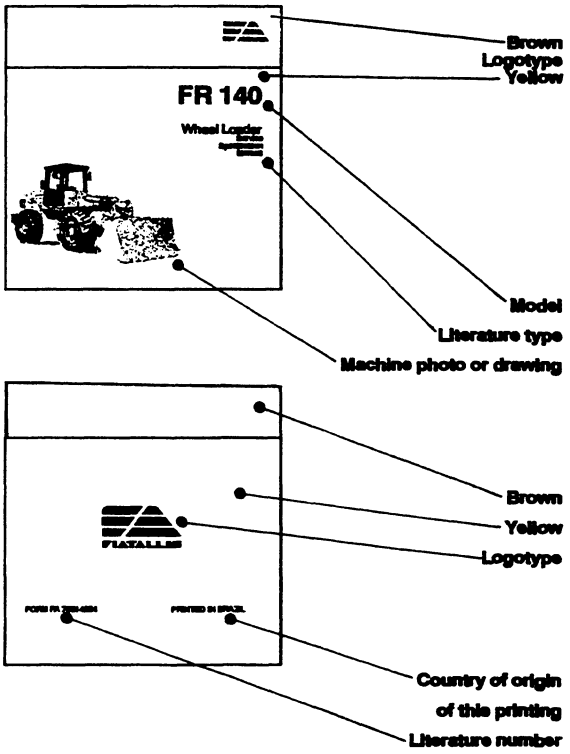
MAIN SYMBOLS USED IN THIS MANUAL

	**SOUND SIGNALS**
	**SPEED (Slow)** **SPEED (Fast)**
	**BUCKET SWINGING**
	**LIFTING AND LOWERING OF THE ARM**
	**WORKING LIGHTS**
	**SAFETY GLASSES (OR GOGGLES)**
	**ASBESTOS (Parts containing ASBESTOS)**
	**TIRES (Pressure)**
	**MAINTENANCE**

IDENTIFICATION OF **FIATALLIS** TECHNICAL LITERATURE (TECHNICAL PUBLICATIONS)

The Operation and Maintenance Manual is a technical publication of **FIATALLIS**, whose intention is to give support in the machine operation.

Read carefully all this manual for better familiarization with the machine.



SAFETY RULES

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

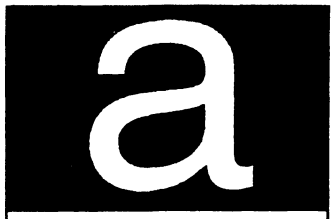
Read and heed all safety instructions carrying the signal words **WARNING** and **DANGER.**

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

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.

Most accidents are caused by failure of some individual to follow simple and fundamental safety rules or precaution. For this reason MOST ACCIDENTS CAN BE PREVENTED by recognizing the real cause and doing something about it before accident occurs. Regardless of the care used in the design and construction of any type of equipment there are many conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

SAFETY RULES



WARNING
CONTAINS
ASBESTOS

Breathing asbestos dust is dangerous to health.

Follow safety regulations.

WARNING

Some components fitted to your vehicle such as gaskets, brake linings, clutch discs, may contain asbestos.

Inhaling asbestos powder is dangerous to health. The following precautions must be observed when working on components containing asbestos:

- Work in open air or in a well ventilated area.
- Asbestos powder found on the vehicle or produced during operations on the vehicle should be eliminated using extraction methods and not blown or brushed.
- The powder residues must be completely dampened, placed in a sealed container and marked to make sure they are safely eliminated.
- If the components containing asbestos require cutting, drilling or grinding, the part should be dampened first and only manually operated tools should be used or with the motor running at low speed.

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 borders and lettering for **DANGER** points.

This machine and its attachments are to be operated only by a qualified operator stationed at the operator's control either seated or standing as conditions require.

Keep head, body, limbs, hands and feet inside operator's compartment.

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

Remember the rule of the road :

Obey all traffic regulations

Use extra care at all intersections and rail crossings.

Stop and look both ways at all railway crossings.

Do not park in traffic areas

When traffic backs up, pull to side of road and allow vehicles to pass safely.

Use hand signals or turn signals, if so equipped, when turning.

Always check work area for dangerous features. The following are examples of dangerous areas: slopes, overhangs, timber, demolitions, fire, high walls, drop-offs, back-fills, rough terrain, ditches, ridges, excavations, heavy traffic, 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 handholds 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.

Keep your windshield clear for maximum visibility - use wipers. Be alert for snow covered obstructions.

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 shutdown procedures of the Operation 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.

SAFETY RULES

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 designated 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 specially 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 regulations. **DO NOT** operate machine without a Roll Over Protective Structure (ROPS).

Seat belts are required with Roll Over Protective Structures or Roll Protection Cabs by Local or National regulations. Keep the safety belts 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 manufacturer at all times. **DO NOT** adjust machine with engine running except as specified.

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

When machine is equipped with hydraulic brakes, be sure brake fluid is maintained at level specified in 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 disable machine, use trailer or low boy truck if available. If towing is necessary, provide warning signals as required by local rules and regulations and follows Operation and Maintenance Instruction Manual recommendations. Load and unload on a level area that gives full support to the trailer wheels. Use ramps to 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.

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 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 a cool, well-ventilated place secure from non authorized 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 and safety glasses when handling.

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

Use care if you must transport (haul) a fully inflated tire.

Remove front wheel lean shipping anchor bolt before operating machine.

OPERATION

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of machine. Where adjustable steering wheel is provided, adjust for best operating position.

SAFETY RULES

DO NOT START OR OPERATE AN UNSAFE MACHINE. Before working the machine, be sure that any unsafe condition has been satisfactorily remedied. Check brakes and steering and attachment controls before moving. Advise the pro-per maintenance authority of any malfunction 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.

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** machine before mounting. Sound horn. Obey flagon, safety signals and signs.

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.

Check condition of tie rod ends and other steering linkage at the beginning of each shift.

Inspect wheel fasteners and/or rim lugs for looseness before each shift. Tighten if required according to Operation and Maintenance Instruction Manual.

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.

Stop at appropriate intervals to inspect the machine and allow tires to cool. Air pressure will rise during operation. **DO NOT REDUCE THE PRESSURE.** Excess speed or dragging brakes can cause tires to heat up. Reduce travel speed, not tire pressure. Check brakes.

When tire chains are used be sure locks are properly secure. Be sure chains are properly maintained.

If tires are run flat, allow to cool before parking in a closed area.

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, 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 kinked chain or cable due to the high stresses and possibility of failure of 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 OPERATORS COMPARTMENT OF MACHINES ARE GUARDED AGAINST POTENTIAL CABLE OR CHAIN BACKLASH.**

Engage transmission for start-up only when engine is at low idle. Do not shift between forward and reverse while machine is moving. Shift up or down only one range at a time when machine speed approximates next range speed.

Always stop the machine and drop engine speed to low idle before shifting between forward and reverse.

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

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

When scarifying across slopes, keep blade crossways and low to provide protection against tipping.

Never travel with a scarifier without raising it to its full height. Lower to ground when parked.

SAFETY RULES

Do not work your machine at the edge of ditches or banks. Extend the blade to move the material near edges.

Use extra care when using down pressure on the blade when working on hills, banks, or slopes.

Be alert for immovable objects when blading. Stop and back away or steer around such objects as rocks, stumps, bridge abutments and guard rails. Watch out for manhole covers and openings.

When roading the machine always position the blade within wheel width and raised as high as possible.

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

Make certain all lights work properly, dim front lights for on-coming traffic. When stopping at night pull off road, set out flares and deflectors.

When ditching or grading with overhanging ledges or trees or other such overhead objects, operate with the blade in and off-set position to keep operator farther away from obstructions.

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

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

Maintain clear vision of all areas of travel or work. Keep cab windows clean and repaired.

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

Pass only when absolutely necessary. Be alert to dangerous ground and visibility conditions and other machines and vehicles in the area before attempting to pass. Be alert for the possibility of hidden personnel.

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 lose 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 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.

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

In steep downhill operation, do not allow engine to overspeed. Select proper gear before starting downgrade.

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

The grade of the 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 an uncontrolled machine choose gear speed before proceeding down grade that will hold machine to proper speeds for conditions.

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.

If parking in traffic lanes cannot be avoided, provide appropriate flags, barriers, flares and

SAFETY RULES

warning signals as required. Also provide advance warning signals in the traffic lane for approaching traffic.

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 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 neat the attachment is clear. Lower the attachment slowly. **DO NOT USE** float position to lower hydraulic equipment.

Always before leaving the operator's seat and after making certain all people are clear of the machine, slowly lower attachments or tools flat to the ground in a positive ground support position. Move any multipurpose tool to positive closed position. Return 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) switch. Consult Operation and Maintenance Instruction Manual.

MAINTENANCE

Do not perform any work on equipment that is not authorized. Follow the Maintenance and 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 requirements.

Never lubricate, service or adjust a machine with the engine running, except as called in the Operation and Maintenance Instruction Manuals.

Do not wear loose clothing or jewelry near moving parts.

Do not run the engine when refueling and use care if engine is hot due to 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 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 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 the 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.

If movement of attachment by means of the machine's hydraulic system is required for service or maintenance, do not raise or lower attachments from any position other than when seated in operator's seat. Before starting machine or moving any attachment or tool, 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.

SAFETY RULES

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

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

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 posts. Keep sparks or open flame way 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 sparks.

Rust inhibitors are volatile and flammable. Prepare parts in well ventilated place. Keep open flame away. **DO NOT SMOKE.** Store container 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 rags - they are fire hazard. Store in a closed metal container.

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.

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.

Fuel escaping under pressure from a very small hole can almost be invisible and can have sufficient force to penetrate skin. Use a piece of cardboard 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 Operation and Maintenance Instruction and Service Manual for guidance.

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

Stand to one side when changing inflation of tires.

Never inflate tires with flammable gases. Explosion and personal injury could result.

When servicing tires block the machine in front and back of wheels. After jacking up, place blocking under machine to protect from falling according to Local and National requirements .

Deflate tires before removing objects from tread.

Never cut or weld on the rim of an inflated tire. Inflate a spare tire only enough to keep rim parts in place - a fully inflated tire might fly apart when it is not instaled on a machine.

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.

SAFETY RULES

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

Brake housing has heavy spring compressed inside. Always follow procedures recommended in Moldboard Service Manual when removing, disassembling or assembling this housing.

Always block all wheels, front and back, before bleeding or disconnecting any brake system lines and cylinders. See Operation and Maintenance Instruction 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 and National requirements .

When work is required under or between components, blocks with an external support capable of holding the components in place according to Local and National requirements .

Always block with external support any linkage or part on machined that requires work under the raised linkage, parts, or machine per Local and 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 can not be reached from the ground, use a ladder or a step platform that meets Local or National requirements to reach the service point. If such ladders or platforms are not available, use the machine handholds 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.

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 2.1 Kg/cm^2 (30 psi) according to Local or National requirements .

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

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 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.

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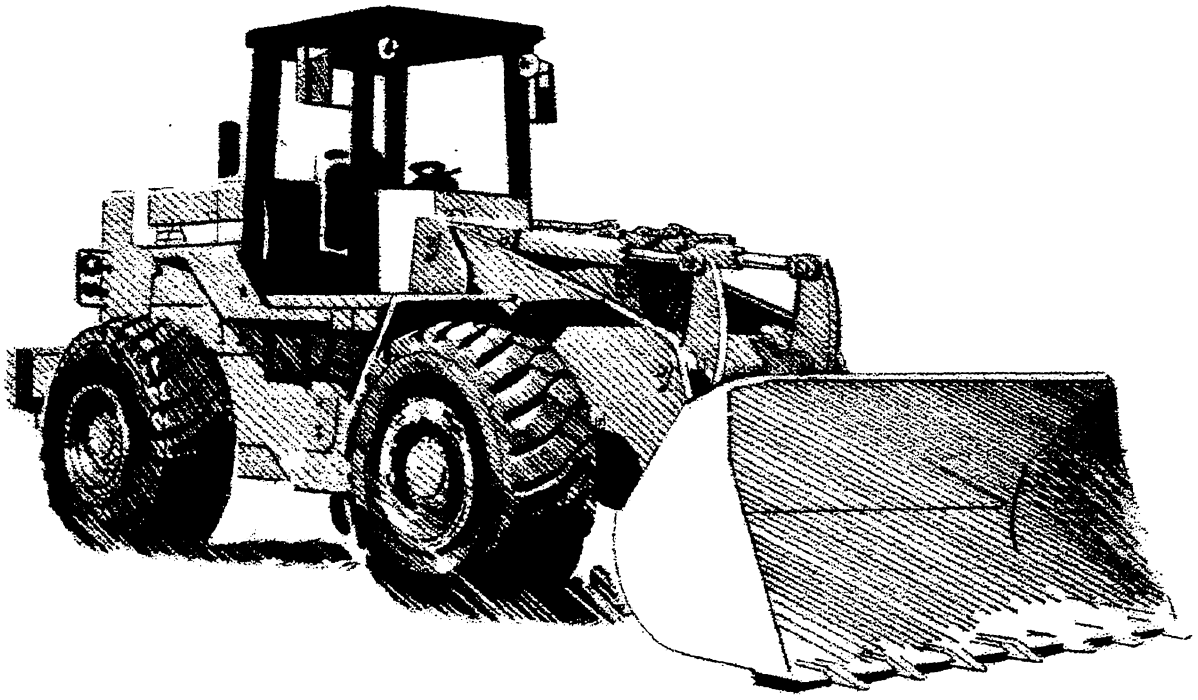
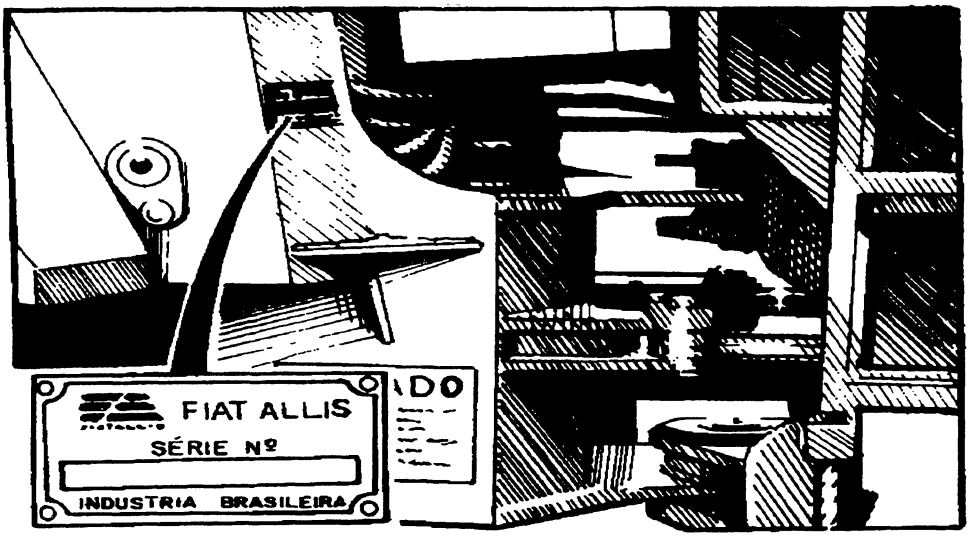
WHEEL LOADER

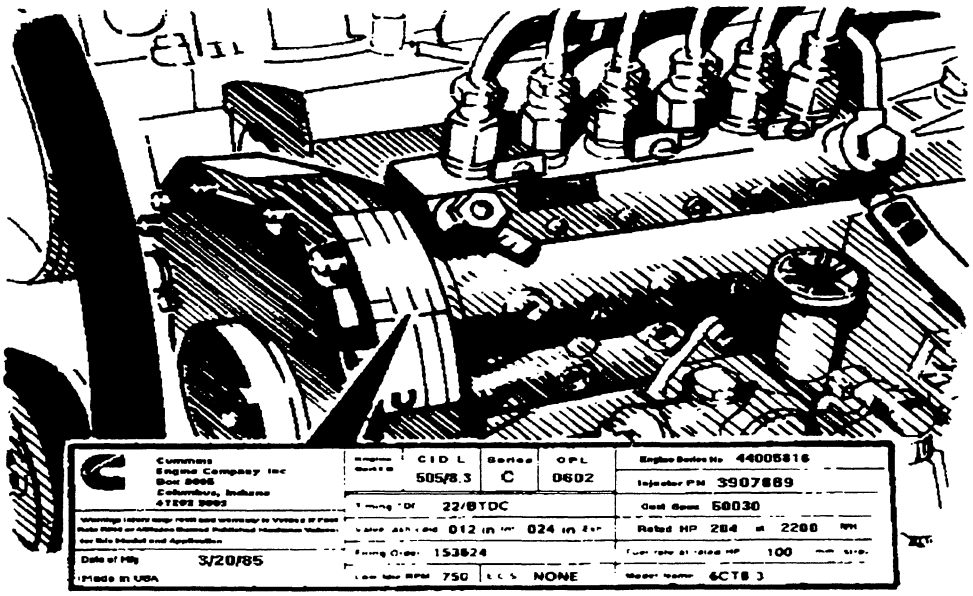


THE SAFETY OF THE OPERATOR AND OF THE PERSONS PRESENT NEAR THE MACHINE DEPENDS ON THE PRUDENCE OF THE MACHINE UTILIZATION. THE OPERATOR NEEDS TO KNOW THE FUNCTION AND LOCATION OF EACH COMMAND. EVERY MACHINE HAS ITS LIMITATIONS. BEFORE OPERATING IT, THE OPERATOR MUST BE VERY FAMILIAR WITH THE MACHINE'S CAPABILITIES AND PERFORMANCE OF THE BRAKE, STEERING AND CONTROL SYSTEMS.

IDENTIFICATION



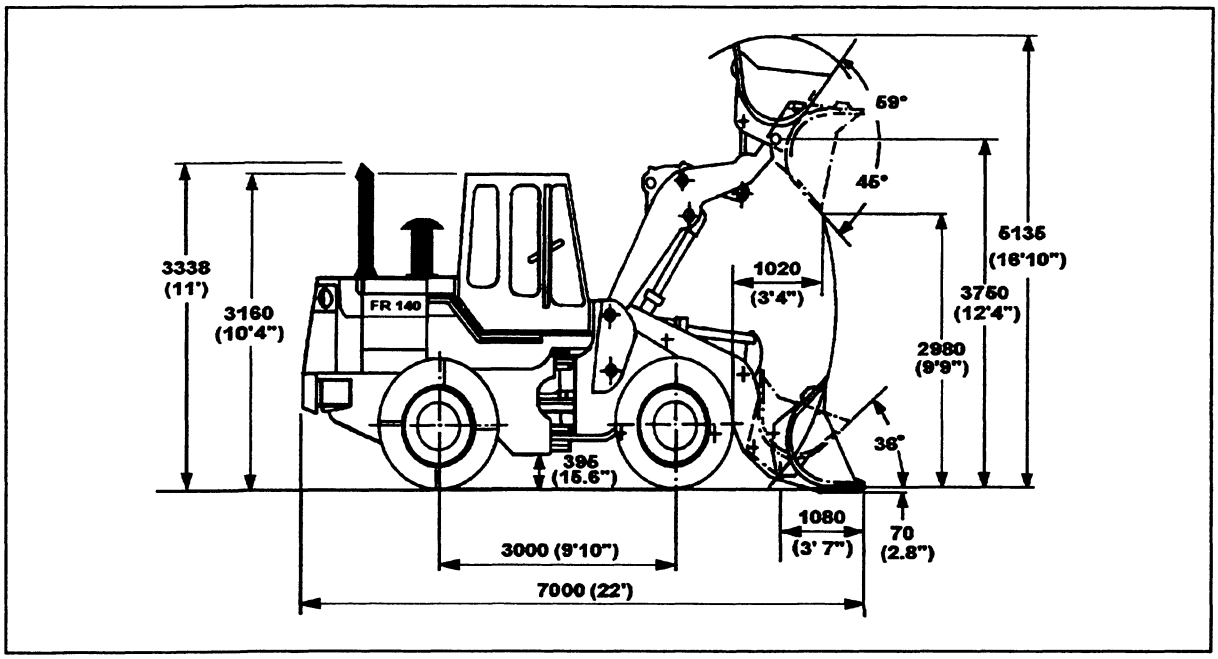
WHEEL LOADER SERIAL NUMBER

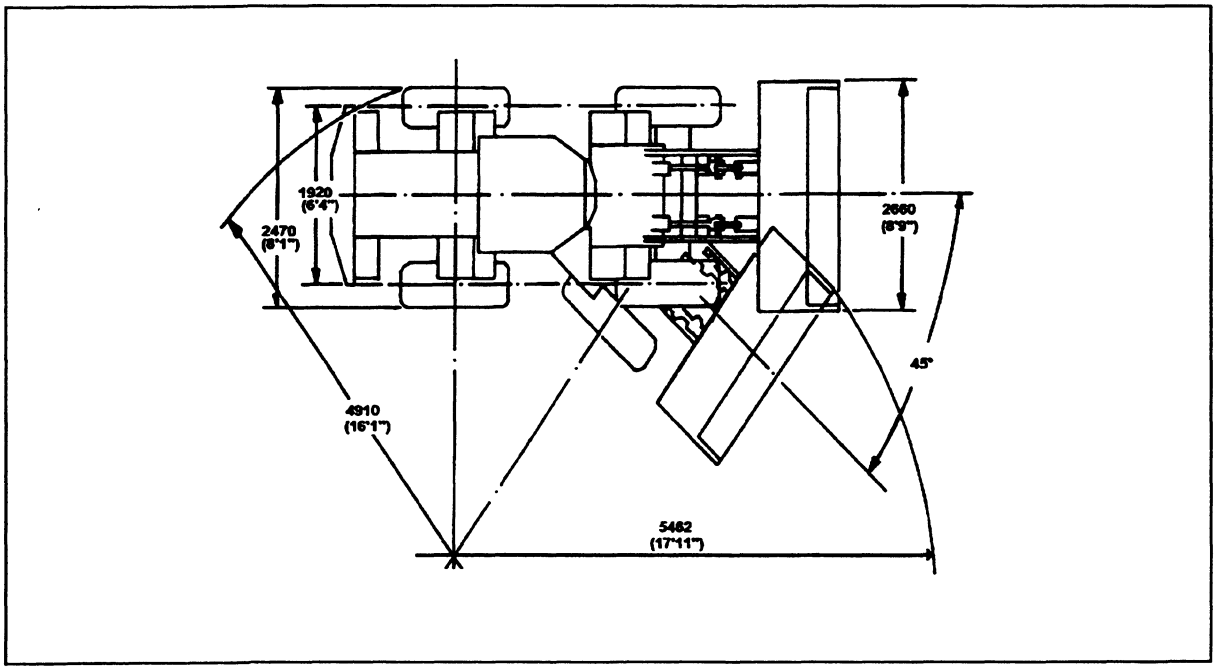


ENGINE SERIAL NUMBER

DIMENSIONS

GENERAL DIMENSIONS





DIMENSIONS IN mm

SPECIFICATIONS

1.1 MODEL IDENTIFICATION

FR 140 . . . . . (WHEEL LOADER)

1.2 ENGINE

Make . . . . . Cummins
Model . . . . . 6 CT 8.3
Type:Diesel, in line, vertical, 4 stroke , direct injection, turbocharged, open combustion chamber, water cooled.
Number of cylinders 6
Bore . . . . . 114 mm (4.5 in)
Stroke . . . . . 135 mm (5.3 in)
Total displacement . . . . . 8.270 cm^3 (505 in^3)

Net flywheel power
- (DIN 6270) . . . . . 163 CV (120 kW)
- (SAE J1349) . . . . . 160 HP (120 kW)

Maximum torque (at 1.500 rpm) . . . . . 651 Nm
. . . . . 480 lb.ft
Governed speed . . . . . 2.200 RPM
Fuel Injection Pump . . . . . Robert Bosch
Low Idle . . . . . 700 - 900 RPM
High Idle . . . . . 2372 - 2460 RPM
Compression Ratio 17.3:1

Valve Clearance :
- Intake (engine cold) . . . . . 0.30 mm
- Exhaust (engine cold) . . . . . 0.61 mm

Fuel Injection Timing . . . . . 22° before TDC

1.2.1 LUBRICATION

Type . . . . . full pressure, full flow
Pump type . . . . . gear pump
Filter: . . . . . replaceable micro filter

1.2.3 INJECTION SYSTEM

Fuel pump . . . . . Robert Bosch
Firing order 1-5-3-6-2-4
Valve opening pressure . . . . . 1.5 Bar
Fuel injectors release pressure . 206 to 213 Bar

1.2.4 FAN

Model 3914268
Type . . . . . blower
Diameter . . . . . 26"
Number of blades 6

1.2.5 RADIATOR

Type . . . Soldered construction, brass tube and cooper fin core
Cap release pressure . . . . . 0.49 Bar

1.2.6 AIR FILTER

Make . . . . . Donaldson
Type: Pre filter, dry, aspirated with secondary element

1.2.7 OIL FILTER

Type . . . . . Single replaceable element

1.2.8 FUEL FILTERS

Two cartridges in series.

1.3 TRANSMISSION

Make . . . . . Clark
Model . . . . . 13 HR 28.441 series 016154
Full power-shift, countershaft, 4 forward and 4 reverse speeds, hydraulically actuated. Electric operated by a single lever on steering column. Automatic transmission cut- off. Four wheel drive.

Speeds (forward & reverse)	km/h	mph
1st	6.4	4.0
2nd	12.2	7.6
3rd	24.0	14.9
4th	36.2	22.5

1.3.1 TORQUE CONVERTER

Type . . . . . single stage
Multiplication ratio 3.2:1

1.4 AXLES

Axles with hypoid gear and pinion.
Torque proportioning differentials, "Max trac ®" type.
Rear axle with vertical oscillation of 25° (420 mm/

SPECIFICATIONS

16.5" stroke). Planetary reductions at axles end.

Total reduction ratios:

Front axle . . . . . 1 : 21.097
Rear axle . . . . . 1 : 21.097
Make . . . . . *FIATGEOTECH (GRAZIANO)*

1.5SERVICE BRAKES

Four wheel caliper disc type and independent circuit in each axle. Pedal can actuate transmission neutralizer when braking after activation of switch on instrument panel.

Caliper hidr.(front axle) . . . 2 pistons per wheel
Make . . . . . BREMBO
Model . . . . . P2144 N/I
Type . . . . . disc

Disc dimensions
Diameter . . . . . 472 mm
Thickness . . . . . 15.9 - 16.5 mm
Pad area . . . . . 420 cm^2
Pad material :BERAL 3510 (non asbestos)

Caliper hidr.(rear axle) . . . . 1 piston per wheel
Make . . . . . BREMBO
Model P4 75/A
Type . . . . . disc

Disc dimensions
Diameter . . . . . 462 mm
Thickness . . . . . 22 mm
Pad area . . . . . 149 cm^2
Pad material :BERAL 3510 (non asbestos)

1.5.1 PARKING BRAKE

Mechanically actuated, installed on front axle transmission output shaft.

1.6STEERING SYSTEM

Hydraulically controlled by steering wheel and power assisted through a vane pump (also provides hydraulic system control).

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.

Hydrostatic unit . . . . . TRW HGB 24
Maximum pressure . . . . . 178 Bar
Displacement . . . . . 734.4(cm^3 rev)

Impeller thickness . . . . . 38.1 mm
Pump Minimum flow for 1RPS . . . 44.40 (LPM)
Steering pump type . . . . . vane

Cylinders . . . . . 02(two)
Bore and stroke . . 80 x 440 mm (3.1 x 17.3 in)
Prior flow . . . . . 57 l/min (15 gpm)
Maximum pressure . . . 130 kgf/cm^2 (1848 PSI)

Emergency steering (optional)

1.7 IMPLEMENT HYDRAULICS

Pressurized reservoir, electrically welded and chemically treated for total protection.

Hydraulic line provided with suction and return filter.

Reservoir filler neck provided with screen type filter.

Bucket and boom operated by a single lever. Boom kick-out and bucket automatic leveler are electromagnetic.

1.7.1 PUMP

Double stage vane pump, tandem assembled supplies hydraulic power for implement and steering system.

Make . . . . . VICKERS
Prior flow . . . . . 167 l/min (44 gpm)
Maximum pressure . . . 200 kgf/cm^2 (2843 PSI)

1.7.2 CONTROL VALVE

Three spool control valve with built-in relief and retaining valves.

Model . . . . . FIATALLIS
Type . . . . . DA 180/3 CMS

1.7.3 CYLINDERS

Boom cylinders
Bore and stroke . . 125 x 849 mm (4.9 x 33.4 in)
Bucket cylinders
("Z" linkage)
Bore and stroke . . 110 x 560 mm (4.3 x 22.1 in)

SPECIFICATIONS

1.7.4 IMPLEMENT RESPONSE TIME

Boom lift	6.8 s
Boom Lower	2.1 s
Bucket dump	1.1 s
Bucket retract	1.0 s

1.8 ELECTRIC SYSTEM

Operating voltage	24V
Capacity	142 Ah

1.8.1 ALTERNATOR

Make	Robert Bosch
Output	45 A

1.8.2 STARTER MOTOR

Make	Robert Bosch
Type	24 V
Power	5.5 Kw

1.8.3 BATTERIES

Quantity	2
Capacity	20h
Starting AMP	460 A
Charge duration	240 min
Make	Prestolite
Model	BSER 21-P

1.9 FRAME

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

2.0 WHEELS AND TIRES

Rims	17"

Tyres:-

20.5 x 25 - 12 PR tubeless, L3	Standard
17.5 x 25 - 12 PR, L2	Optional
17.5 x 25 - 16 PR, L3	Optional
20.5 x 25 - 16 PR, L3	Optional
20,5 x 25 - 16 PR, L5	Optional

2.1 CAPACITIES

	liters	U.S gallons
Cooling system	38.0	10.0
Carter	20.3	5.4
Fuel tank	200.0	52.8
Axles (front/rear, differential & wheels)	72.0	19.0
Converter and transmission	27.0	7.1
Hydraulic system	123.0	32.5

2.2ACCESSORY EQUIPMENT

Some of the equipment items described and illustrated are supplied to certain markets to meet specific requirements.
Other special devices and attachments are also available as optional equipment. Check with the Sales Organization.

SERVICE AND LUBRICATION GUIDE

HOURS	SERVICE POINTS	*	Nº OF POINTS	LUBRICANT	APPROX. CAPACITY
10 Hours or daily	1- Engine oil 2- Radiator (coolant level) 3- Transmission oil	V V V		A - D	20.5 / (5.4 gal) 38.0 / (10.0 gal) 27.0 / (7.1 gal)
50 Hours	4- Fuel filter water separator 5- Grease fittings	V L		 E	
100 Hours or each 15 days	6- Hydraulic oil 7- Axles 8- Axles SMT 9- Grease fittings	V V V L		C B G E	123.0 / (32.5 gal)
250 Hours or monthly	10- Engine oil & oil filter 11- Fuel sediment bowl filter 12- Fuel filters 13- Fuel tank drain condens. 14- Batteries electrolyte level 15- Alternator and fan belts 16- Tires pressure 17- Breathers	R Cl R V V V V Cl		A - - - - - -	20.5 / (5.4 gal)
500 Hours or each 3 months	18- Engine coolant filter 19- Transm. oil filter 20- Hydr. syst. oil return filter 21- Hydr. syst. oil suction and filler filter 22- Brake oil filter 23- Brake pads 24- Drive shaft grease fittings 25- Fuel tank breather	R R R Cl R V L R		- - - - - E 	
750 Hours	26- Fuel injector calibration	V		-	
1000 Hours	27- Engine valves 28- Transmission oil 29- Transmission screen filter	V R Cl		- D -	27.0 / (7.1 gal)
2000 Hours or yearly	30- Air cleaner 31- Radiator coolant 32- Axles oil 33- Axles SMT oil 34- Hydraulic system oil	R R R R R		- - B G C	 38.0 / (10.0 gal) 58.0 / (15.3 gal) 58.0 / (15.3 gal) 123.0 / (32.5 gal)
As required	35- Engine oil 36- Air cleaner 37- Radiator fluid level 38- Transmission oil 39- Hydraulic system return oil filter 40- Tires pressure	V Cl V V V V		A - - D - -	20.5 / (5.4 gal) 38.0 / (10.0 gal) 27.0 / (7.1 gal)

* Symbols for service intervals ⇒ V= verify R= change L= lubricate Cl= clean

LUBRICANTS DESIGNATION

TYPE	USE	FIAT	INTERNATIONAL DESIGNATION	VISCOSITY	AMBIENT TEMPERATURE	
A	ENGINE	TUTELA URANIA	API CD or MIL-L-2104-D	15W-40 10W-30	-10° C to 50° C -25° C to 20° C	14°F to 122°F -13°F to 68°F
		-	ARTIC OIL	-	< -25° C	< -13°F
B	AXLES	TUTELA W90M-DA	MIL-L-2105-C	80W 90EP	-40° C to 50° C	-40°F to 122°F
C	HYDRAULIC SYSTEM	TUTELA GI/M	ATF TYPE A SUFFIX A or ALLISON C-3	10W	-25° C to 50° C	-13°F to 122°F
D	TRANSMISSION	TUTELA GI/M	ATF TYPE A SUFFIX A or ALLISON C-3	10W	-25° C to 50° C	-13°F to 122°F
E	GREASE FITTINGS	TUTELA G9	NLGI 2 LITHIUM SOAP BASE GREASE	-	-40° C to 50° C	-40°F to 122°F
F	BRAKE	TUTELA GI/M	ATF TYPE A SUFFIX A or ALLISON C-3	10W	-25° C to 50° C	-13°F to 122°F
G	AXLES SMT	TUTELA W90/LS	MIL-L-2105-C	80W 90LS	-40° C to 50° C	-40°F to 122°F

KEY TO TYPE AND GRADE OF LUBRICANTS

SYMBOL	LUBRICANT & PRODUCT	INTERNATIONAL DESIGNATION
EO	TUTELA URANIA	MIL- L 2104 / CLASS API CD SERVICE
TO	TUTELA GI / M	ATF TYPE A SUFFIX A or ALLISON C - 3 SAE 10W
HO	TUTELA IDRAULICAR AP51	MIL H 24459
PGL	TUTELA G9	NLGL 2
EPGL	TUTELA W 90 / M	MIL L 2105 B
HBF	TUTELA DOT3	SAE J 1703 / FMV SS-116
RGL	TUTELA AW90M	SAE 90 EP
WBG	TUTELA JOTA 1	NLG1

FUEL

Always use diesel fuel that meets ASTM grade n°2 - D requirements. Sulfur quantity should not exceed 0.5%. If this limit is exceeded reduce oil change intervals in 50%.

ENGINE

Oil viscosity depend upon the ambient temperature. Select engine oil according to the table on page (?)

Additives are not recommended

TRANSMISSION AND TORQUE CONVERTER

Use oils that meet or exceed the following requirements:

- Type C3 gear fluid.
- Viscosity SAE 10 W the whole year.

NOTE:- *If ambient temperature is lower than -23°C (-10°F) a heating device is required to increase the carter and external pipings temperature up to -23°C(-10°F).*

IMPLEMENTS, STEERING AND BRAKE HYDRAULICS.

Use oils that meet or exceed the following requirements:

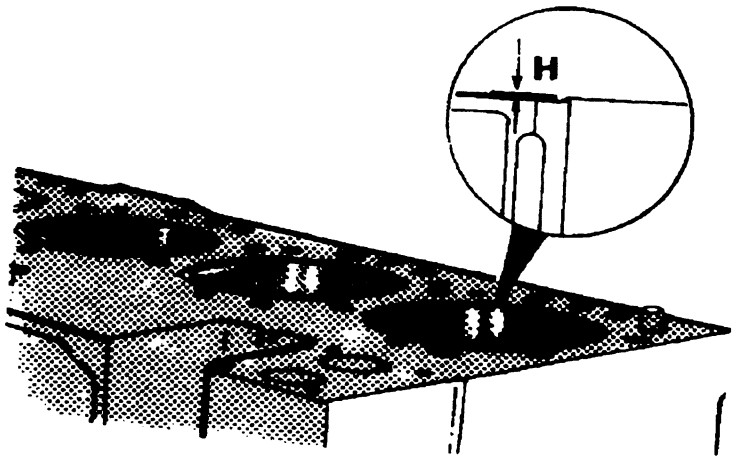
- hydraulic oil 20 W MIL H 24459.

NOTE:- *If ambient temperature is lower than -23°C (-10°F) a heating device is required to increase the hydraulic tank and external pipings temperature up to -23°C(-10°F).*

ENGINE

CYLINDER BLOCK

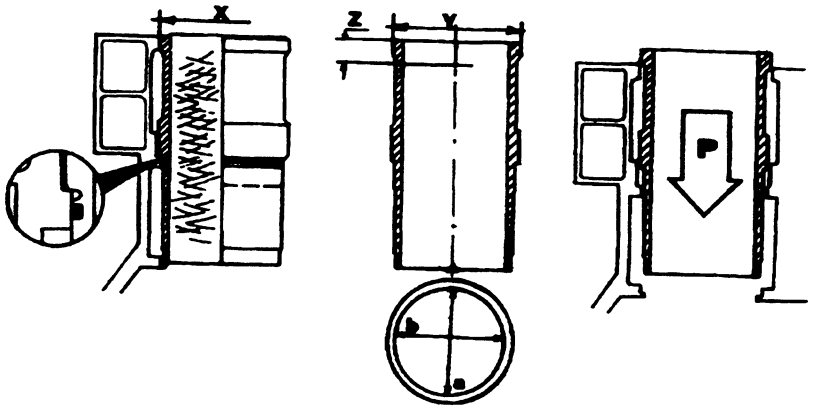
DIMENSIONS	mm	INCHES
Cylinder block upper liner bore I.D.	132.900 - 132.990	5.2323 - 5.2358
Cylinder liner protrusion	0.025 - 0.122	0.001 - 0.0048
Camshaft bore diameter w/o bushing	64.01	2.520
Camshaft bore diameter with bushing	60.12	2.367
Camshaft journal O.D.	59.962 - 60.013	2.361 - 2.363



Cylinder liner protrusion

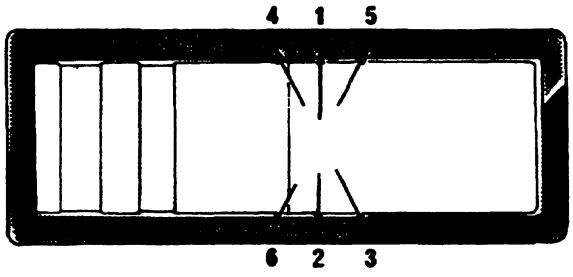
ENGINE

CYLINDER LINER DIMENSIONS AND RESPECTIVE BLOCK SEATS



DIMENSIONS	mm	Inches
Cylinder liner top press fit O.D (min)	132.938	5.2338
Cylinder liner top press fit O.D (max)	132.958	5.2346
Cylinder liner I.D. (max)	114.117	4.4928
Cylinder liner Out-of-round (max)	0.04	0.0016
Cylinder liner taper (max)	0.04	0.0016

OIL PAN MOUNTING CAPSCREWS

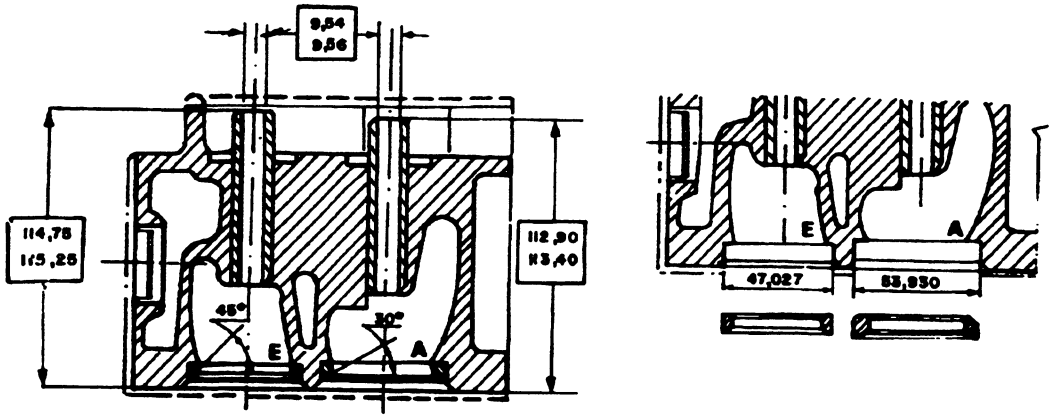


Tighten the capscrews in the sequence shown. Start at the center of oil pan and alternate toward both ends

Tightening torque : 2.4 DaNm (18 lb/ft)

ENGINE

STANDARD VALVE GUIDES AND SEATS DIMENSIONS ON CYLINDER HEAD



Valve clearance (nominal)

Intake	0.30 mm	0.012 in
Exhaust	0.61 mm	0.024 in

DIMENSIONS	mm	Inches
Cylinder head thickness (new)	115.75 - 116.25	4.557 - 4.557
Cylinder head thickness (machined-min)	114.75	4.518
Valve guide bore I.D.	15.931 - 15.971	0.6272 - 0.6288
Valve guide I.D.(installed)	9.539 - 9.559	0.3755 - 0.3763
Valve stem O.D.	9.460 - 9.500	0.372 - 0.374
Valve recess in cylinder head (intake and exhaust)	1.09 - 1.62	0.043 - 0.064
Injector nozzle tip protrusion	3.0 - 4.0	0.118 - 0.157

ENGINE

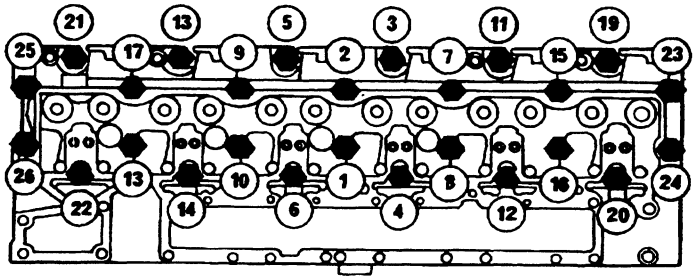
Valve insert bore I.D. (standard insert)

	mm	inches
Intake (max.)	53.930	(2.1231)
Exhaust (max.)	47.027	(1.8515)

Valve insert bore depth (standard insert)

	mm	inches
Intake (max.)	12.20	0.480
Exhaust (max.)	9.83	0.387

CYLINDER HEAD MOUNTING CAPSCREWS



NOTE:- *Tighten the capscrews in the sequence shown. Start at the center of the cylinder head and alternate toward both ends.*

Recommended tightening steps

Step 1: 4 DaNm	70 Ft-lb
Step 2: 15 DaNm	145 Ft-lb
Step 3: 22 DaNm	162 Ft-lb