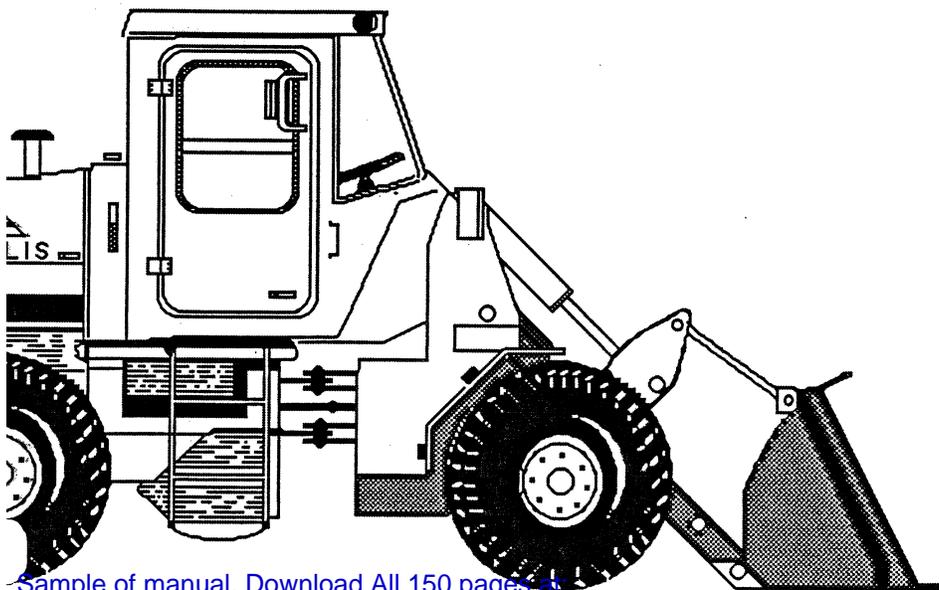


# FR35

wheel loader

## SERVICE INFORMATION MANUAL



FORM 73148882  
6-86

## 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.

## COPYRIGHT BY FIATALLIS

All rights reserved. Reproduction of text and illustrations in whole or in part, is strictly prohibited.

# FR35

wheel loader

## Service information manual

S/N 62L00101-UP

S/N 46U00301-UP

Form 73148882 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.



## 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.

This manual may not be reprinted or reproduced, either in whole or in part, without written permission of *Fiatallis* ®.

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.

# 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, dropoff, 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 dropoffs 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.

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 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.

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.

# SAFETY RULES

## 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** machine before mounting. Sound horn. Obey flagman. 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 loadability 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 drawbars, 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 OPERATORS COMPARTMENTS 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 lower 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 elements 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.

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 as 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 breakover 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 dropoffs, in congested areas or on ice or slippery surfaces.

# SAFETY RULES

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 dropoffs.

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 hillside proceed slowly. Never turn sharply uphill or downhill.

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 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 an 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 overhead 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 brushpiles, logs or rocks. DO NOT DRIVE THE MACHINE ONTO BRUSHPILES, LOGS, LARGE ROCKS or other surface irregularities that break traction with the ground especially when on slopes or near dropoffs.

Avoid operating equipment too close to an overhang or highwall either above or below the machine. Be on the lookout for caving edges, falling objects and slides. Beware of concealment by brush and undergrowth 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 for approaching traffic.

Move the machine away from pits, trenches, overhangs and overhead 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.

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, 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 Manuals. 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.

# SAFETY RULES

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, hands, and fingers 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, fingers, feet 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.

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 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 the Operation and Maintenance Instruction Manual or Service Manuals 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 makeshift 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 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.

## SAFETY RULES

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.

# TABLE OF CONTENTS

<b>TOPICS</b>	<b>SUBGROUP</b>	<b>ILLUSTRATION NUMBERS</b>
MACHINE ORIENTATION	AO	001 - 015
ENGINE REBUILD (8285)	A1	016 - 210
TRANSMISSION REMOVAL	B2	211 - 224
TRANSMISSION OVERHAUL	B2	225 - 302
TRANSMISSION SCHEMATIC	B2	303 - 309
TRANSMISSION TESTING	B2	310 - 314
AXLE OVERHAUL	B4	315 - 349
WHEELEND OVERHAUL	B4	350 - 362
ARTICULATION JOINT	D1	363 - 372
STEERING SYSTEM	D2	373 - 392
IMPLEMENT HYDRAULIC SYSTEM	E3	393 - 414
AIR SYSTEM	G1	415 - 439



## A0001 FR35 3/4 VIEW

THE FR35 WHEEL LOADER IS A LOADER IN THE 5.35 CU.M (7 CU.YD.) CLASS. BUCKET SIZES RANGE FROM 4.6 CU.M (6 CU.YD.), 5.97 CU.M (6.5 CU.YD.) AND 5.35 CU.M (7 CU.YD.). LOGGING FORKS ARE AVAILABLE WHERE NEEDED. THE MACHINE WEIGHS 31,638 KG (69,749 LBS) WHEN EQUIPPED WITH A 5.35 CU.M (7 CU.YD.) BUCKET AND THE MACHINE FULL OF FUEL.

=====

**▲ WARNING** - THIS SYMBOL IS YOUR SAFETY ALERT SIGN. IT MEANS "ATTENTION!" "BECOME ALERT!" "YOUR SAFETY IS INVOLVED."



## A0002 FR35

THE FR35 CAN HAVE ONE OF TWO ENGINES. IT CAN HAVE A FIAT 8285 ENGINE OR A CUMMINS KTA 19C; THE NEW NAME FOR THE KT1150C. THE MAIN FRAME IS NOT CHANGED BETWEEN THE TWO ENGINES EXCEPT FOR THE ENGINE, MOUNTS. THERE IS SOME CHANGE OVER BETWEEN THE ENGINE AND TRANSMISSION MATING.

=====

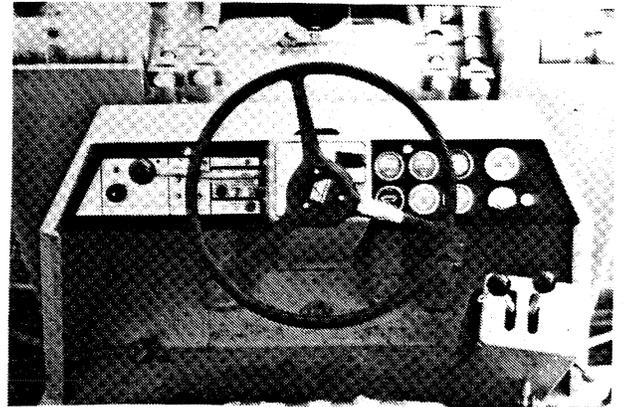
**▲ WARNING** - NEVER ATTEMPT TO OPERATE MACHINE OR ATTACHMENT EXCEPT WHEN SEATED IN THE OPERATOR'S SEAT. KEEP HEAD, BODY, LIMBS, HANDS AND FEET INSIDE THE OPERATOR'S COMPARTMENT, TO REDUCE EXPOSURE TO HAZARDS OUTSIDE THE OPERATOR'S COMPARTMENT.



## A0003 OPERATORS COMPARTMENT

1 OF 2

THE TRANSMISSION SHIFT LEVER IS TO THE LEFT OF THE STEERING WHEEL. THE INSTRUMENT PANEL IS BELOW THE STEERING WHEEL. THE IMPLEMENT CONTROL LEVERS ARE TO THE EXTREME RIGHT. THE BUCKET LEVER IS TO THE LEFT. WHILE THE BOOM IS TO THE RIGHT. THE ACCELERATOR IS THE EXTREME RIGHT PEDAL. THE TWO BRAKE PEDALS ARE INDEPENDENT. THE LEFT PEDAL OPERATES THE CLUTCH CUTOFF VALVE IN ADDITION TO THE WHEEL BRAKES. THE AIR HORN BUTTON IS IN THE CENTER



## A0003A CONT'D

2 OF 2

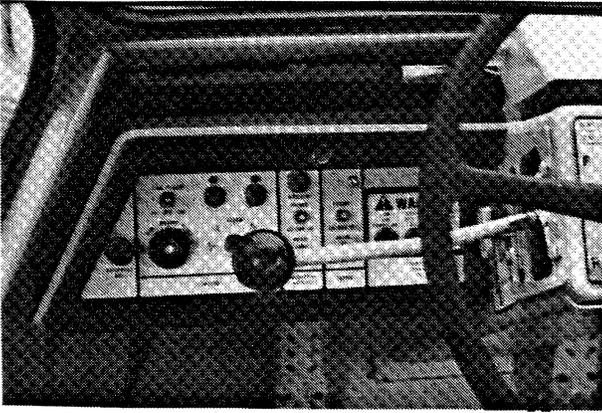
BETWEEN THE BRAKE PEDALS. THE PARKING BRAKE SWITCH AND FUEL SHUT-OFF LEVER IS ON THE RIGHT ARM CONSOLE.

=====

**▲ WARNING** - AN EMERGENCY ESCAPE EXIT IS PROVIDED. READ INSTRUCTION CAREFULLY.

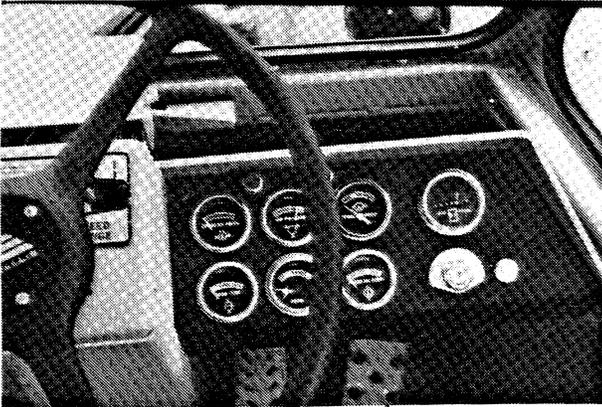
## A0004 LEFT INSTRUMENT PANEL

THE LEFT SIDE OF THE INSTRUMENT PANEL CONTAINS FROM FAR LEFT: STARTING AID BLANK OR BUTTON, CAB FLOOD LIGHT TOGGLE SWITCH, LIGHT SWITCH, TURN SIGNAL INDICATORS, FLASHER SWITCH, FRONT AND REAR WASHER SWITCHES, FRONT AND REAR DEFOG SWITCHES, LOW AIR PRESSURE LIGHT, BRAKE SYSTEM FAULT LIGHT, EMERGENCY STEERING ACTIVATED LIGHT AND PARKING BRAKE ON LIGHT. A CIRCUIT BREAKER STRIP IS LOCATED ON THE BOTTOM REAR EDGE OF THE PANEL.

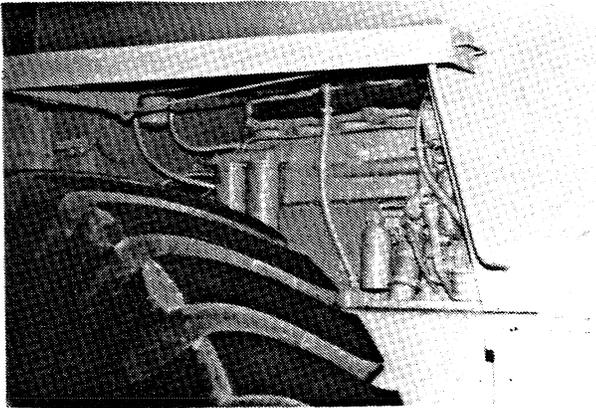


## A0005 RIGHT INSTRUMENT PANEL

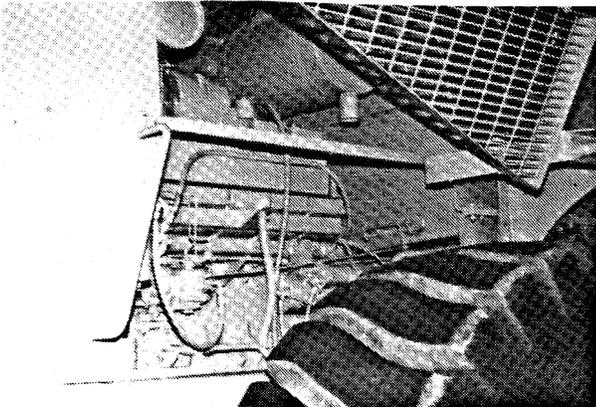
THE RIGHT SIDE OF THE INSTRUMENT PANEL CONTAINS FROM FAR RIGHT: PLUG, KEY SWITCH, HOUR METER, TRANSMISSION PRESSURE GAUGE, TRANSMISSION OIL TEMPERATURE LIGHT, AIR PRESSURE GAUGE, VOLTMETER, WATER TEMPERATURE GAUGE AND ENGINE OIL PRESSURE GAUGE. AT THE TOP OF EACH INSTRUMENT PANEL ARE PANEL LIGHTS SO THE INSTRUMENTS CAN BE READ AT NIGHT.



## A0006 LEFT ENGINE COMPARTMENT (CUMMINS)



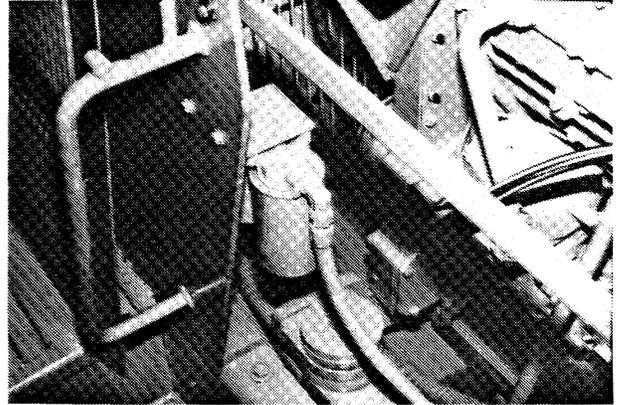
## A0007 RIGHT ENGINE COMPARTMENT (CUMMINS)



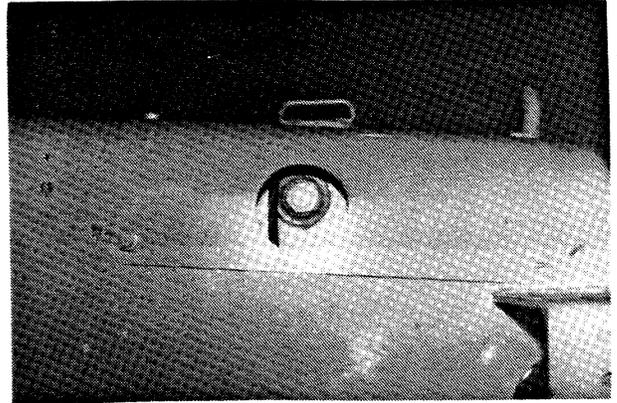
FR35

ORIENTATION

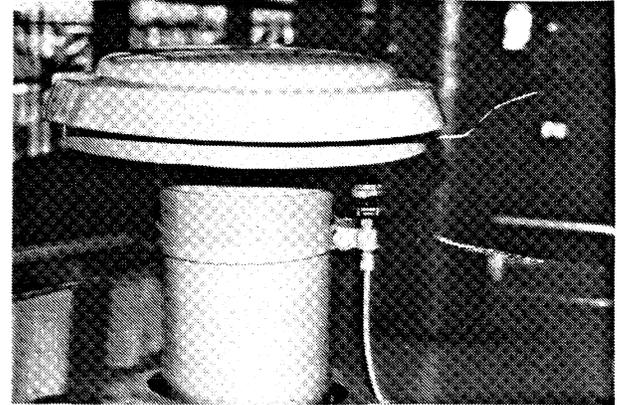
A0008 FUEL FILTER LOCATION (CUMMINS)



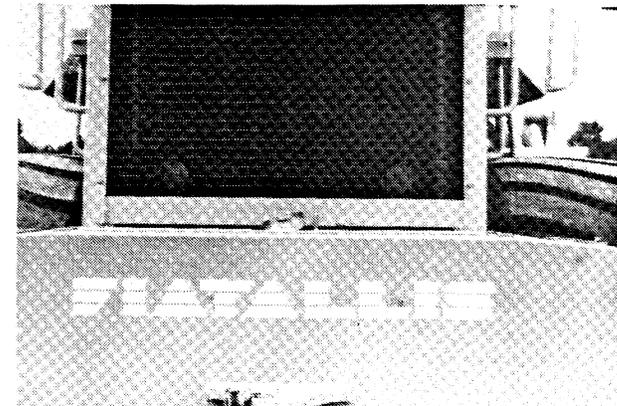
A0009 RADIATOR



A0010 AIR CLEANER



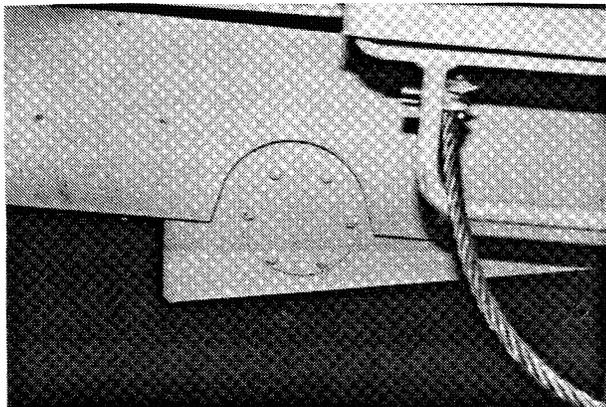
A0011 FUEL TANK



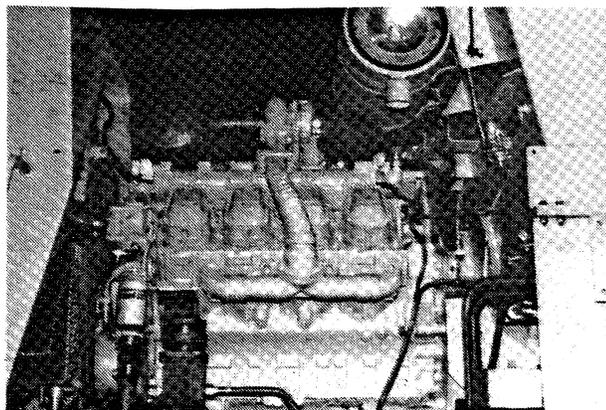
FR35

ORIENTATION

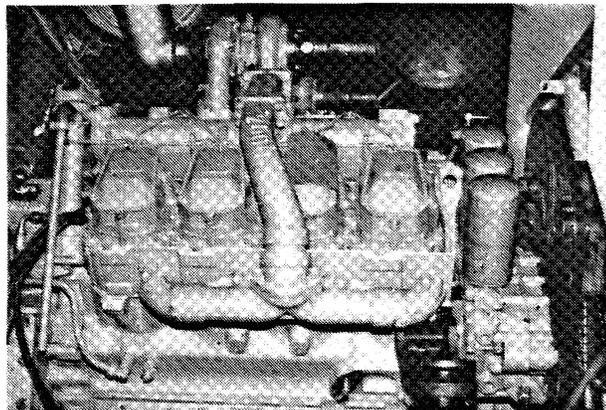
A0012 FUEL TANK CLEANOUT



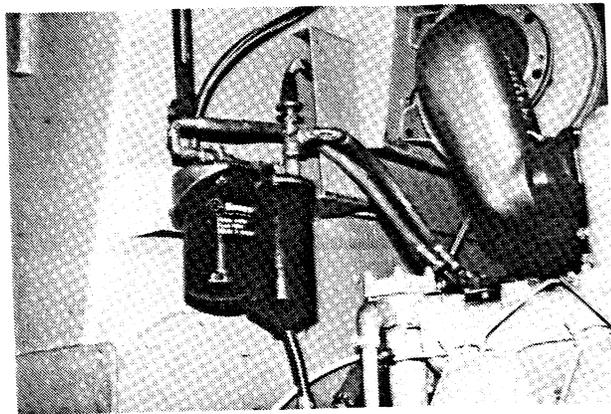
A0013 LEFT SIDE FIAT



A0014 RIGHT SIDE (FIAT)



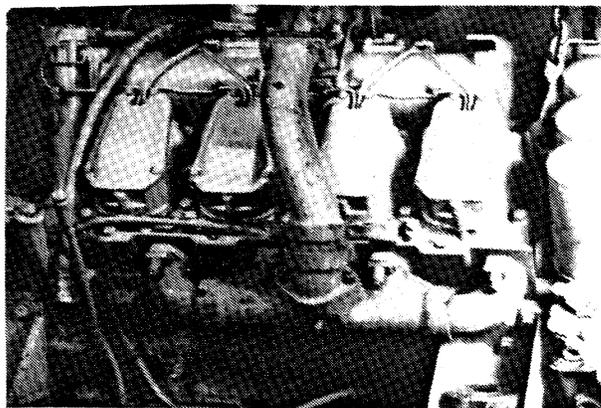
A0015 FUEL FILTER LOCATION (FIAT)



## A1016 8285 ON HOOK

PRIOR TO DISASSEMBLING THE ENGINE, STEAM CLEAN THE ENGINE. THE ENGINE WEIGHS 1374 KG (3000 LBS). USE CARE WHEN LIFTING ENGINE. USE THE LIFTING EYES PROVIDED. USE A SPREADER BAR OR 3 POINT LIFTING BAR TO PREVENT DAMAGE TO COOLING SYSTEM.

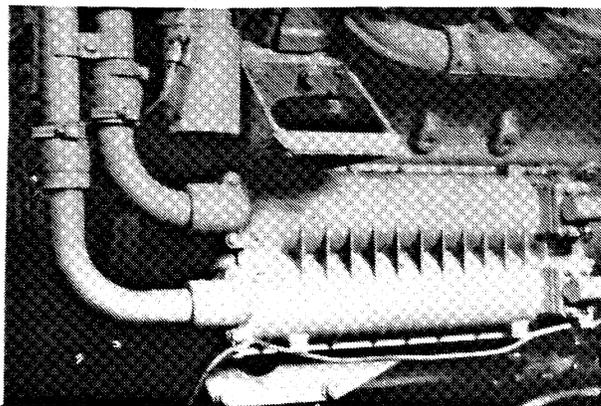
**⚠ WARNING** - =====  
LIFT AND HANDLE ALL HEAVY PARTS WITH A LIFTING DEVICE OF PROPER CAPACITY. BE SURE PARTS ARE SUPPORTED BY PROPER SLINGS AND HOOKS. USE LIFTING EYES IF PROVIDED. WATCH OUT FOR PEOPLE IN THE VICINITY.



A1

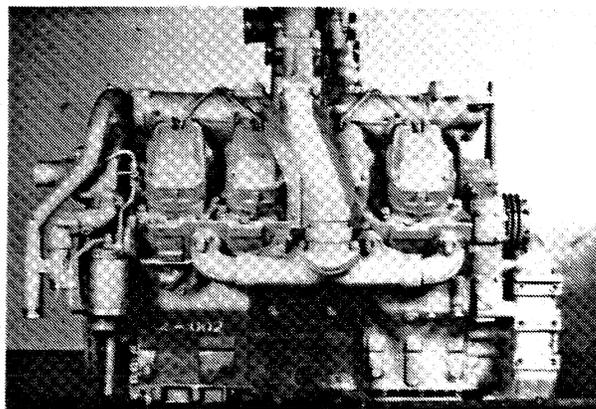
## A1017 8285 SIDE VIEW

THERE ARE TWO TAPPED HOLES ON EACH SIDE OF THE ENGINE. USE THESE HOLES TO MOUNT THE 8285 IN A SUITABLE TEARDOWN STAND. THE TRANSMISSION HEAT EXCHANGER MUST BE REMOVED TO GAIN ACCESS TO ONE SET OF TAPPED HOLES. THE HEAT EXCHANGER IS HELD IN PLACE BY AN ADAPTER PLATE. TWO OF THE ADAPTER PLATE'S CAPSCREWS ARE BEHIND THE HEAT EXCHANGER.



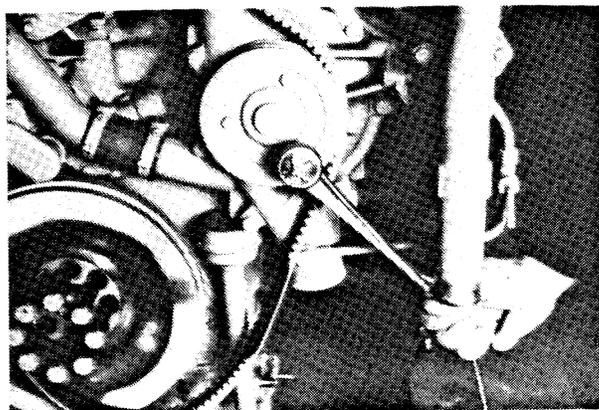
## A1018 8285 IN STAND

PLACE 8285 IN ENGINE FRAME.

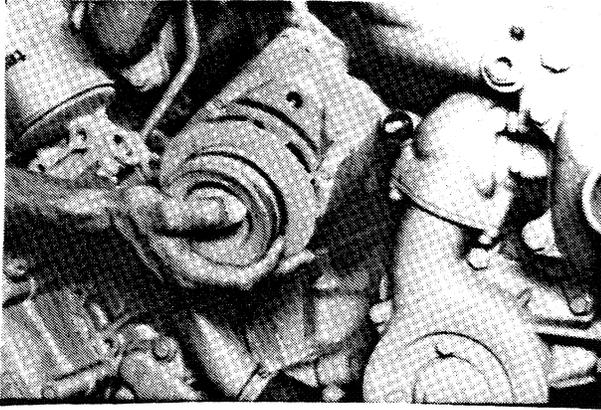


## A1019 WATER PUMP PULLEY

LOOSEN WATER PUMP PULLEY AT THIS TIME. REMOVE ALL BELTS FROM THE ENGINE.



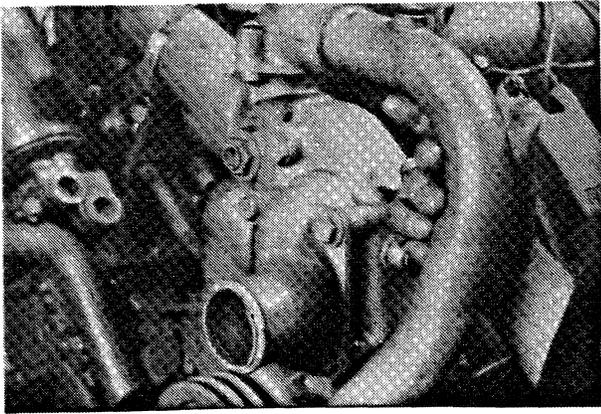
A1



FR35 ENGINE REBUILD

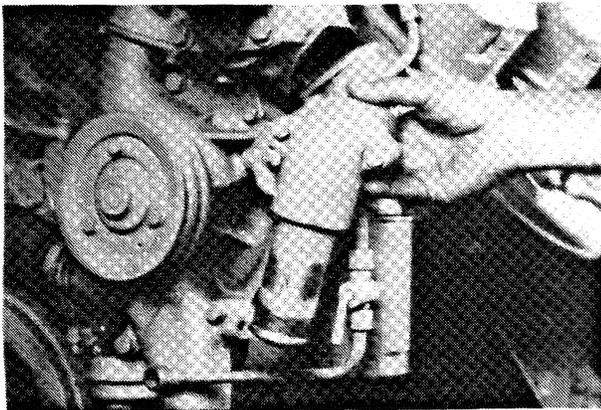
A1020 ALTERNATOR

THE ALTERNATOR (20SI DELCO REMY) IS LOCATED ON THE TOP FRONT OF THE ENGINE. THE ALTERNATOR BELT TENSION IS ADJUSTED BY A SCREW ON THE TOP OF THE ENGINE. THE ALTERNATOR IS HELD IN POSITION BY A LONG BOLT.



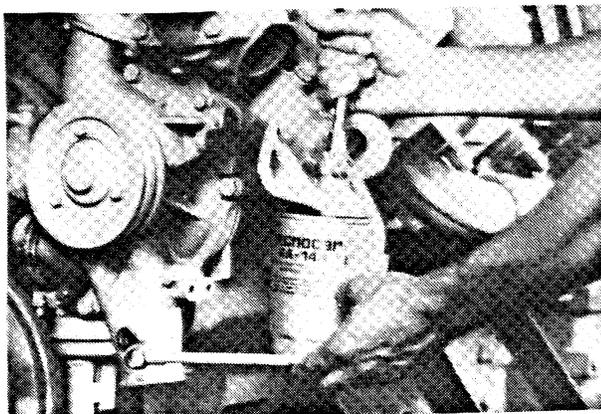
A1021 HEAT EXCHANGER TUBE

REMOVE THE TRANSMISSION HEAT EXCHANGER TUBE. THE WATER PUMP AND TUBES CAN BE REMOVED AS AN ASSEMBLY IF DESIRED.



A1022 RADIATOR TUBE

THE RADIATOR TUBE IS REMOVED.



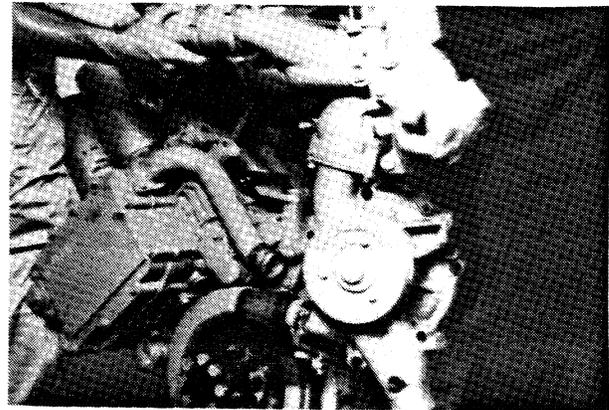
A1023 COOLANT CONDITIONER

THE COOLANT CONDITIONER AND TUBES CAN BE REMOVED. THE CONDITIONER IS MOUNTED ON STUDS. AFTER REBUILD A NEW CONDITIONER MUST BE USED. THIS CONDITIONER RECEIVES ONLY A SMALL AMOUNT OF COOLANT EACH TIME THE COOLANT IS CIRCULATED. THE CONDITIONER FILTERS AND CONDITIONS THE COOLANT TO PREVENT ELECTROLYSIS.

FR35 ENGINE REBUILD

A1024 WATER PUMP

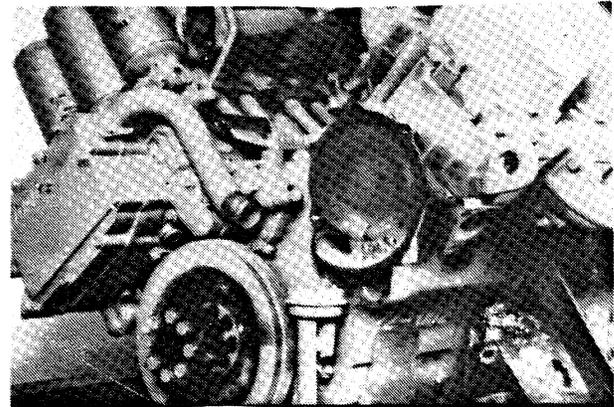
THE WATER PUMP IS REMOVED AS A UNIT.



A1

A1025 BACK HALF OF PUMP HOUSING

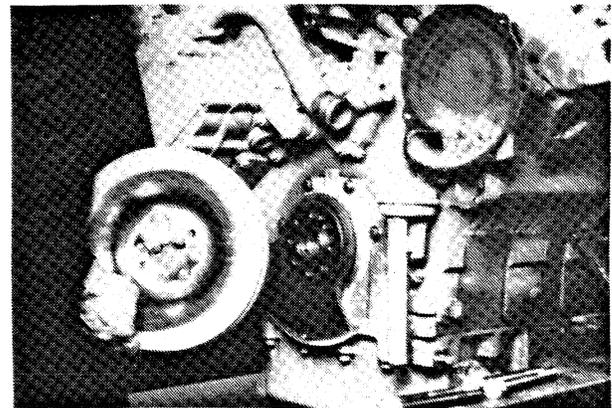
THE REAR HALF OF THE PUMP MAY STAY ON THE BLOCK. IT IS HELD IN PLACE ONLY BY A GASKET. NO SCREWS HOLD THE HOUSING TO THE BLOCK.



A1026 PULLEY AND DAMPER

1 OF 2

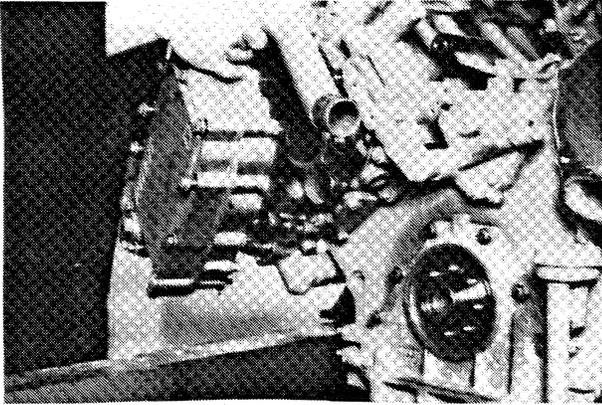
THE PULLEY, DAMPER, AND WEIGHT ARE BOLTED TO THE FRONT OF THE CRANKSHAFT. THE PULLEY HAS MULTIPLE SHEAVES. THE VIBRATION DAMPER IS RUBBER BONDED. THERE ARE NO TIMING MARKS ON THE DAMPER. REPLACE THE DAMPER IF THE CRANKSHAFT HAS RECEIVED HIGH IMPACT LOADING OR THE CRANKSHAFT IS REPLACED. THE WEIGHT BEHIND THE DAMPER IS DOWELED TO THE CRANKSHAFT. THIS WEIGHT BALANCES LOAD CAUSED BY THE FLYWHEEL. THE WEIGHT IS ORDERED SEPARATE FROM THE



A1026A CONT'D

2 OF 2

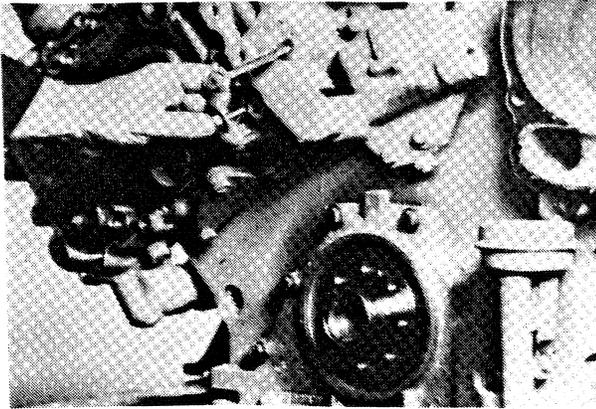
FLYWHEEL. THE WEIGHT MUST BE ON THE CRANKSHAFT OR THE CRANKSHAFT WILL NOT BE BALANCED FOR ITS NORMAL LOADING CHARACTERISTICS.



## FR35 ENGINE REBUILD

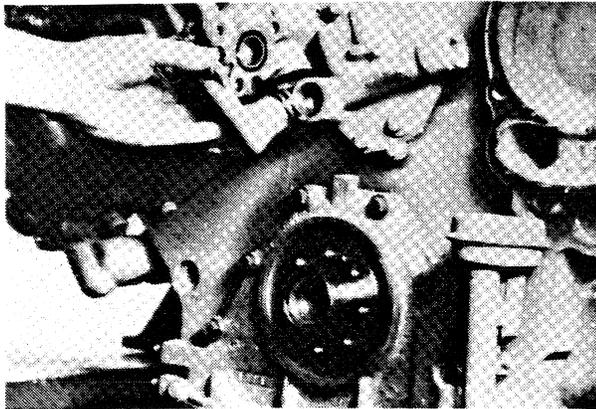
## A1027 ENGINE HEAT EXCHANGER

THE ENGINE HEAT EXCHANGER IS MOUNTED IN FRONT OF THE FILTER BASE. O-RINGS SEAL THE BASE TO THE HEAT EXCHANGER.



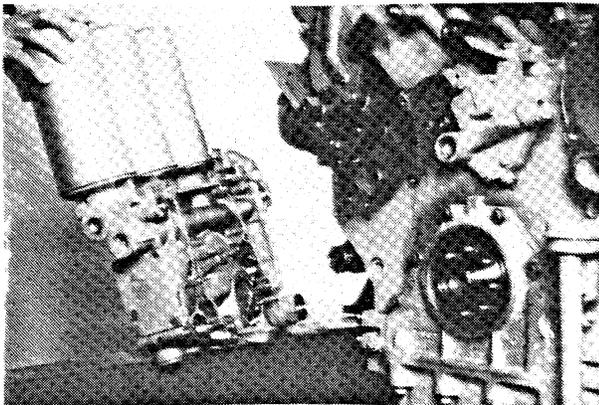
## A1028 JUMPER TUBE CONNECTING OIL GALLERIES

WHEN REMOVING THE FILTER BASE, ONE CAPSCREW IN THE OIL GALLERY JUMPER TUBE ATTACHES THE BASE TO THE BLOCK. IF THIS CAPSCREW IS NOT REMOVED, DAMAGE COULD OCCUR TO THE ALUMINUM FILTER BASE IF IT IS FORCIBLY REMOVED.



## A1029 JUMPER TUBE

THE JUMPER TUBE IS SEALED BY MEANS OF O-RINGS

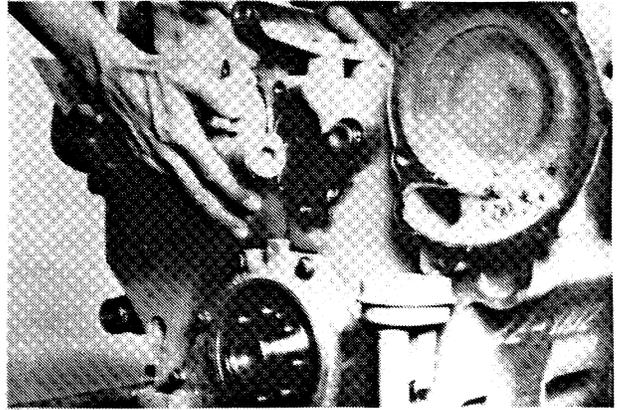


## A1030 OIL FILTER BASE

THE OIL FILTER BASE HOLDS THE THREE SPIN-ON OIL FILTERS. ALSO INCORPORATED IN THE FILTER BASE IS THE HEAT EXCHANGER COLD OIL RELIEF VALVE AND THE MAIN PRESSURE REGULATING VALVE. THE FILTER BASE IS SEALED TO THE BLOCK BY O-RINGS. THE SMALL YELLOW TUBE RETURNS OIL TO SUMP. THE LARGE HOLE IS FOR COOLANT TO GET INTO THE BLOCK. THE HOLE JUST ABOVE THE COOLANT HOLE IS THE OIL INLET. THE HOLE CLOSEST TO THE VIEWER DIRECTS OIL TO THE GALLERIES.

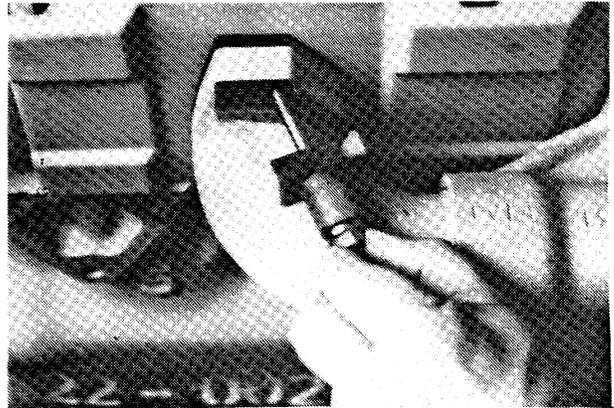
## A1031 CAMSHAFT COVER

THE CAMSHAFT COVER IS SEALED BY O-RINGS. THIS COVER ALSO SERVES AS THE JUMPER TUBE FOR THE LEFT OIL GALLERY.



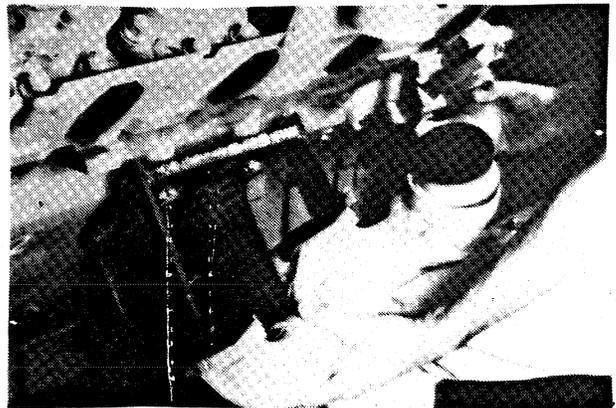
## A1032 EXHAUST MANIFOLD CAPSCREWS

THE EXHAUST MANIFOLD CAPSCREWS ARE NECKED DOWN. THE EXHAUST MANIFOLD IS NOT TO BE USED FOR ALIGNMENT PURPOSES AS IT CONSISTS OF THREE PIECES.



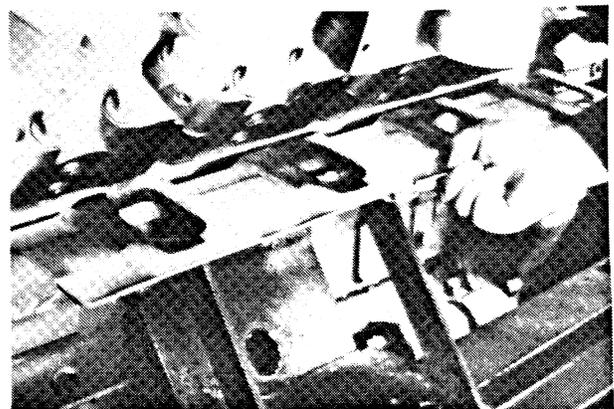
## A1033 EXHAUST MANIFOLD REMOVAL

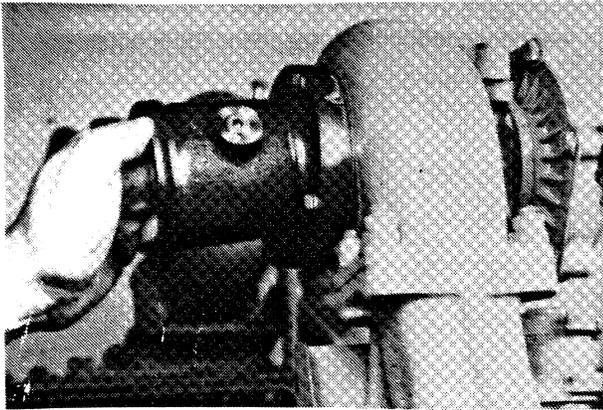
THE EXHAUST MANIFOLD IS REMOVED PRIOR TO REMOVAL OF THE TURBOCHARGER. THE MANIFOLD ADAPTER IS SEALED BY A SPIRAL STEEL RING.



## A1034 EXHAUST MANIFOLD GASKET

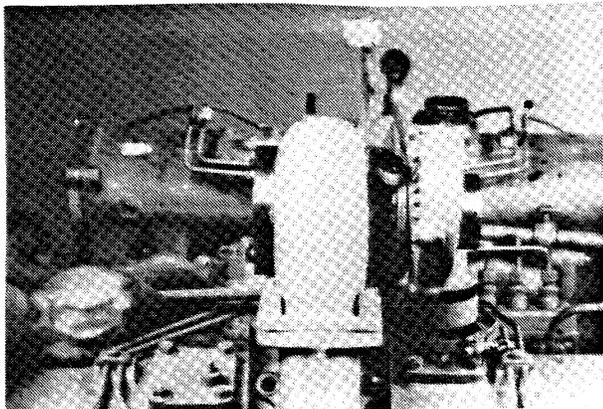
THE EXHAUST MANIFOLD GASKETS ARE STAMPED STEEL. THE GASKET ALSO HOLDS THE HEAT SHIELD IN POSITION.





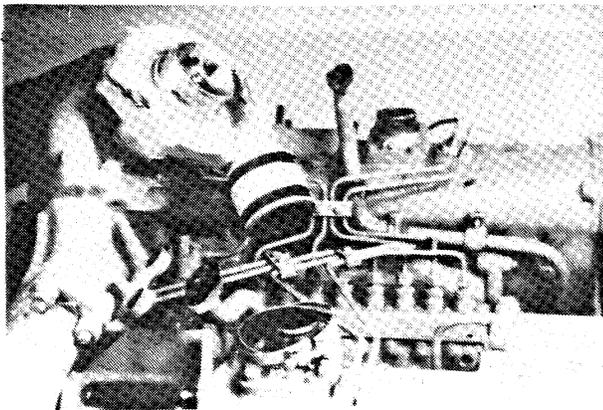
## A1036 TURBOCHARGER TO MUFFLER ADAPTER

THE TURBOCHARGER TO MUFFLER ADAPTER IS SEALED WITH A SPIRAL STEEL RING. THE ADAPTER HAS A PLUGGED HOLE WHICH IS USED TO CHECK EXHAUST MANIFOLD TEMPERATURE.



## A1037 TURBOCHARGER OIL INLET LINE

THE TURBOCHARGER OIL INLET LINE MUST BE REMOVED PRIOR TO REMOVAL OF THE TURBOCHARGER. ONE END OF THE TUBE HAS A GASKET WHILE THE OPPOSITE END HAS A BANJO FITTING. COPPER GASKETS SEAL THIS OPPOSITE END.

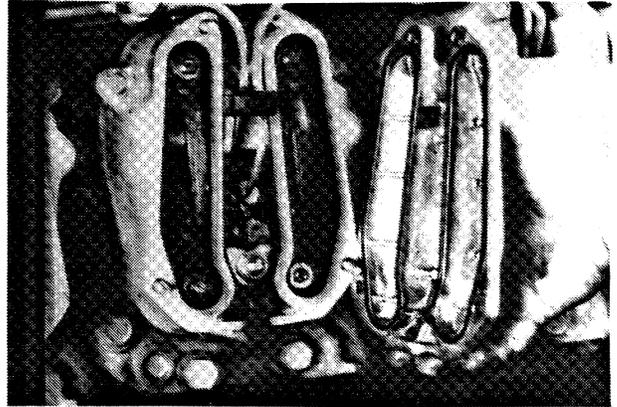


## A1038 TURBOCHARGER

THE TURBOCHARGER IS AN AIRESEARCH TO4B. THE TURBOCHARGER IS MOUNTED TO THE INTAKE MANIFOLD BY FOUR STUDS. RESILIENT FIBER WASHERS PREVENT DAMAGE TO THE AIR INTAKE MANIFOLD. ON THE ADAPTER BETWEEN THE TURBOCHARGER AND INTAKE MANIFOLD IS FOUND A PLUG WHERE INTAKE MANIFOLD PRESSURE CAN BE OBSERVED.

## A1039 ROCKER COVER

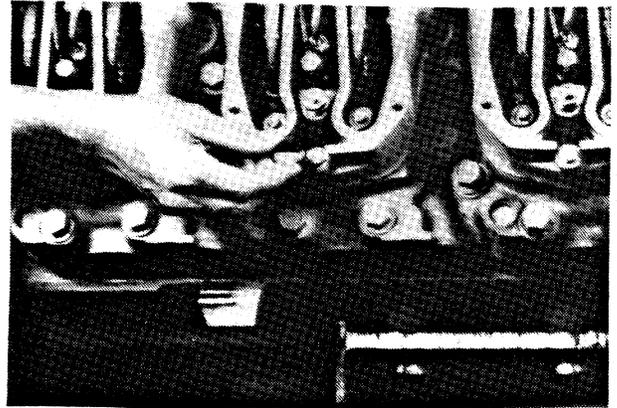
THE ROCKER COVER SEALS THE ROCKER COVER BOX BY MEANS OF THE TWO O-RINGS. THE AREA WHERE THE FUEL LINES ENTER THE BOX IS ALSO SEALED. THE COVER COMPRESSES THE SEAL TO TIGHTEN IT AGAINST THE BOX AND LINES.



A1

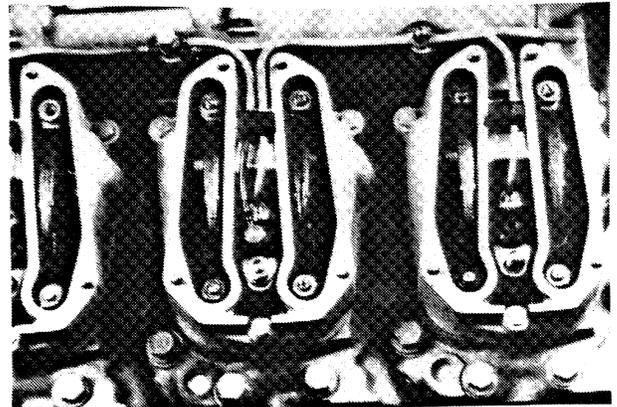
## A1040 CAPSCREW SEAL

THE FUEL INJECTION AREA CAPSCREW IS SEALED BY A RUBBER PLUG. THIS PREVENTS TRASH BUILDUP AROUND THE FUEL INJECTION NOZZLE.



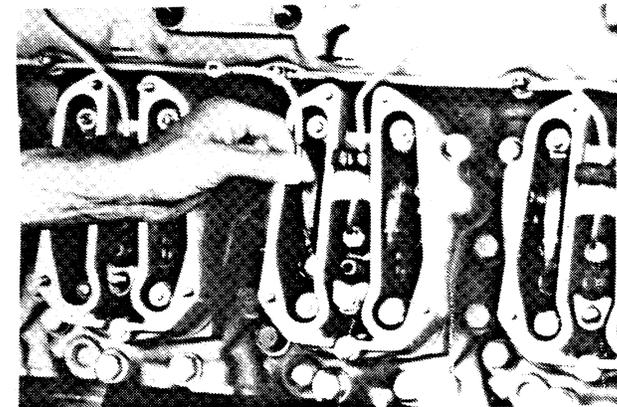
## A1041 ROCKER BOX

ADJUSTMENT OF THE VALVES CAN ONLY BE ACCOMPLISHED AFTER REMOVING THE ROCKER BOX. THE FUEL RETURN LINES ARE CONNECTED TO A LINE WHICH RETURNS TO TANK. THE FITTINGS ARE CAPPED. THE SEAL RINGS HAVE A RUBBER GROMMET FITTED AROUND STEEL WASHERS. THE FUEL INJECTION NOZZLE IS HELD IN PLACE BY A STUD, WASHERS, AND HOLDER. ONE OF THE WASHERS ARE BEVELED TO FIT INTO THE HOLDER, WHILE THE OTHER IS FLAT.

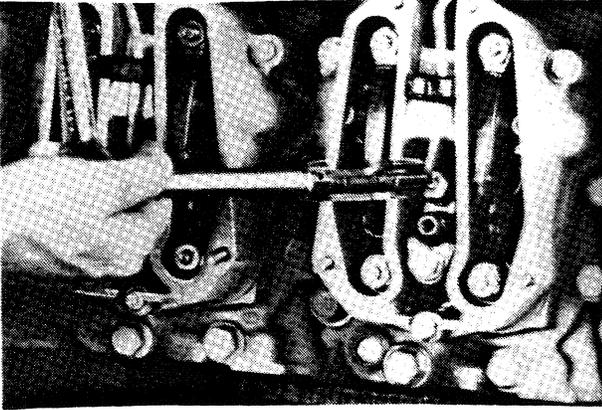


## A1042 FUEL RETURN LINES

THE FUEL RETURN LINES ARE NYLON. THE FITTINGS ARE BANJO.



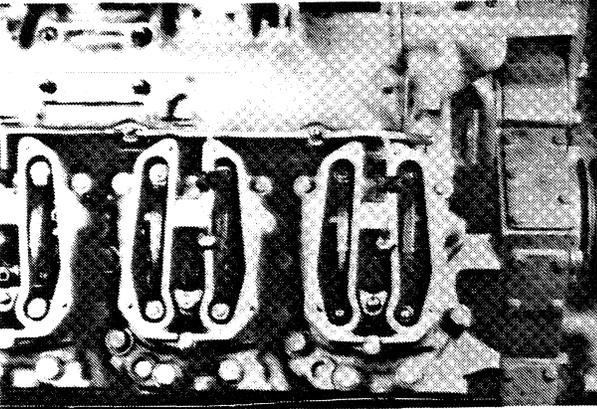
A1



## FR35 ENGINE REBUILD

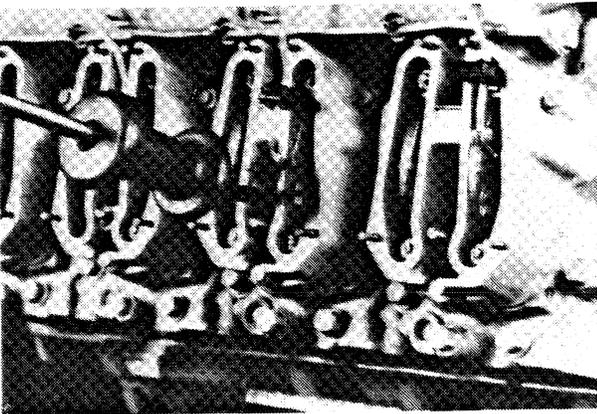
### A1043 FUEL INJECTION LINE SOCKET

THE FUEL LINE NUTS ARE 17 MM. THE LINE WRENCH IS A SPECIAL TOOL PART NUMBER 75300238. THE FUEL LINE MUST BE REMOVED FROM THE PUMP ALSO.



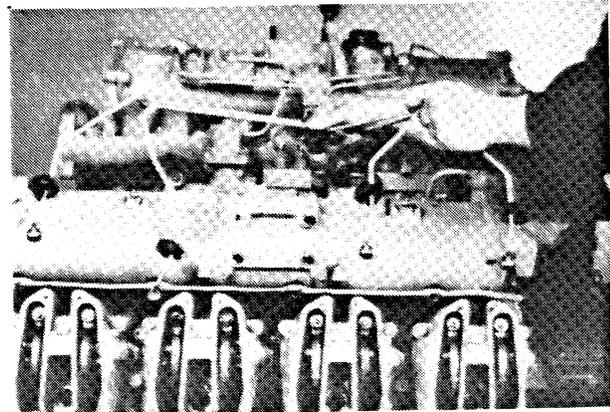
### A1044 FUEL LINES

THE FUEL LINES ARE ATTACHED TO THE AIR INTAKE MANIFOLD FOR STABILITY. THE LINES ARE INSERTED INTO A NYLON KEEPER TO PREVENT VIBRATION DAMAGE.



### A1045 NOZZLE REMOVAL

A SLIDE HAMMER MAY NEED TO BE USED TO REMOVE THE FUEL INJECTION NOZZLE. AN ADAPTER P/N 75300415 IS USED WITH THE HAMMER.

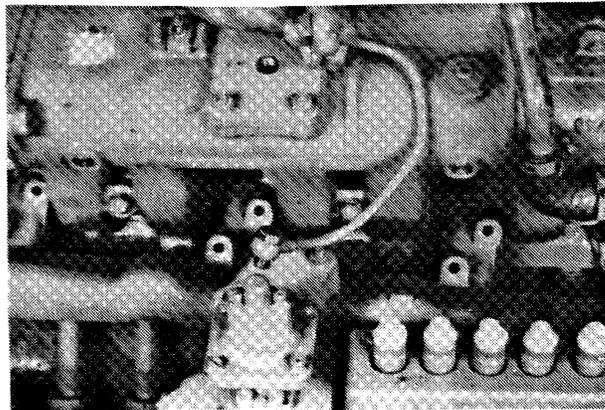


### A1046 FUEL LINE REMOVAL

REMOVE FUEL LINES. WHEN NEW FUEL LINES ARE PURCHASED, THEY ARE NOT BENT TO SHAPE. THEY MUST BE BENT USING THE CORRECT SIZE TUBE BENDER.

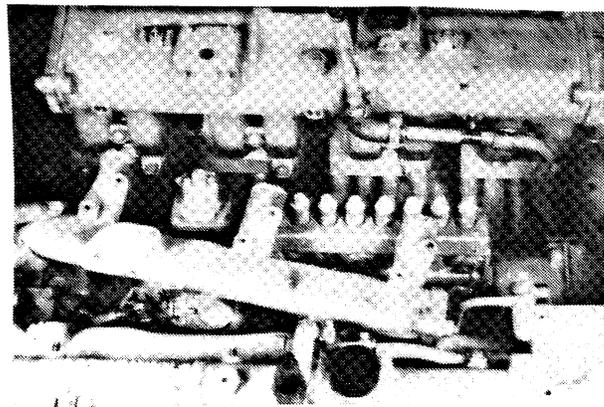
## A1047 ANEROID LINE

REMOVE THE ANEROID LINE FROM THE FUEL PUMP GOVERNOR AND THE AIR INTAKE MANIFOLD. THE BANJO FITTINGS HAVE COPPER SEALS. THE TUBE IS STEEL.



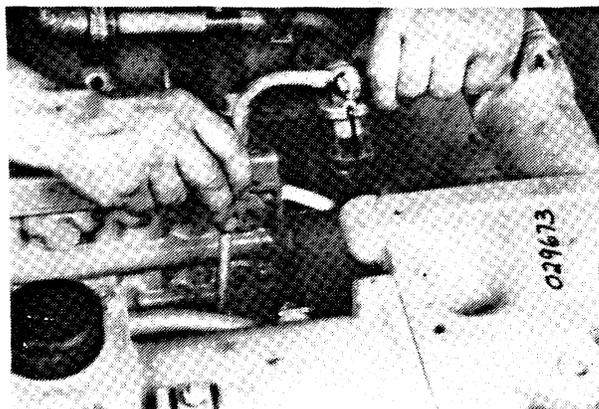
## A1048 WATER MANIFOLD

THE WATER MANIFOLDS ARE ATTACHED TO EACH HEAD. THE MANIFOLDS ARE ALUMINUM.



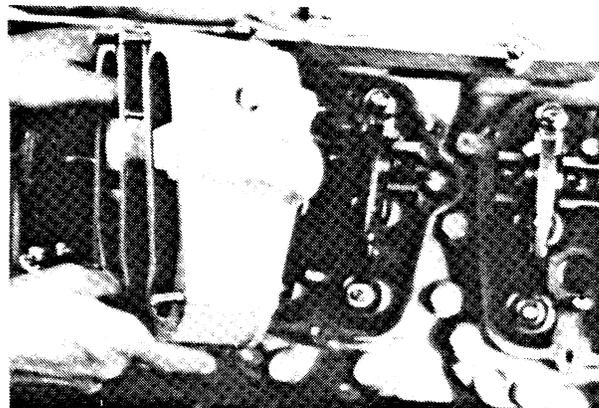
## A1049 FUEL SEDIMENT BOWL

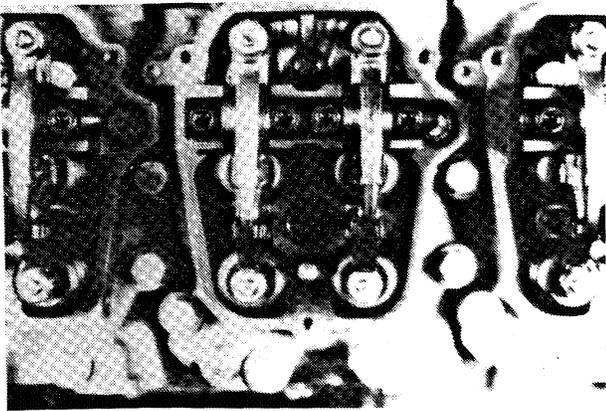
THE FUEL SEDIMENT BOWL IS REMOTE MOUNTED TO THE AIR INTAKE MANIFOLD. THE GLASS BOWL ALLOWS VIEWING OF THE AMOUNT OF SEDIMENT IN THE FUEL. THIS BOWL SHOULD BE CLEANED AT THIS TIME.



## A1050 ROCKER BOX REMOVED

THE ROCKER ARM BOX IS SEALED TO THE HEAD BY AN O-RING. WITH THE BOX REMOVED THE VALVES CAN BE ADJUSTED.



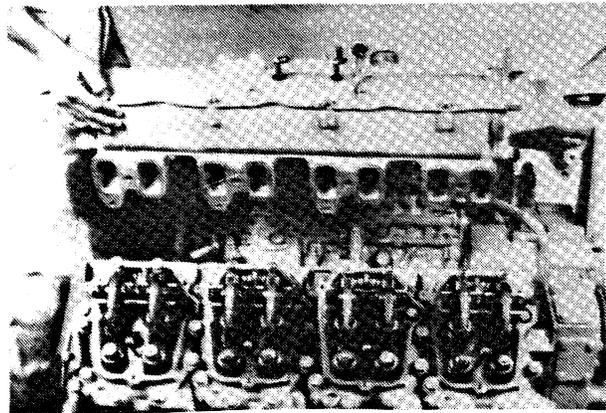
**A1**

FR35

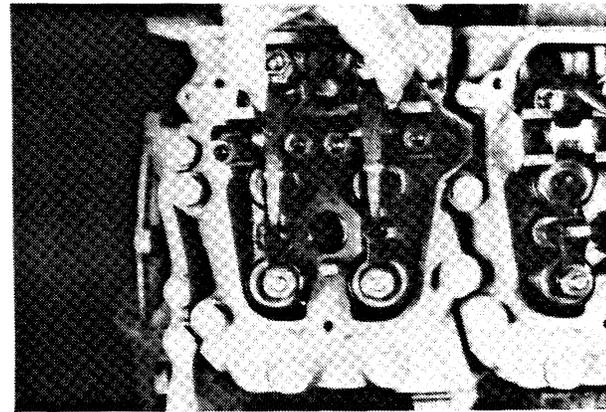
ENGINE REBUILD

**A1051 ROCKER ARM**

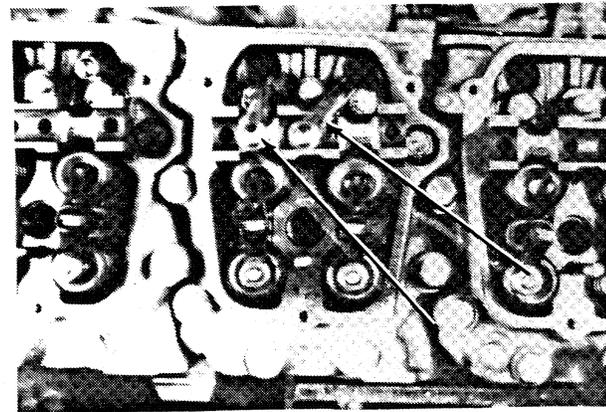
THE ROCKER ASSEMBLY SUPPORT IS HELD IN PLACE BY FIVE CAPSCREWS. FOUR OF THE CAPSCREWS ALSO ATTACH THE ROCKER SHAFT TO THE SUPPORT. THERE ARE TWO ADJUSTMENTS FOR THE INTAKE AND EXHAUST VALVES. ONE ADJUSTMENT IS FOR THE VALVE BRIDGES WHILE THE OTHER ADJUSTMENT ADJUSTS THE VALVE LASH.

**A1052 AIR INTAKE MANIFOLD**

THE AIR INTAKE MANIFOLD CAN BE REMOVED FROM THE HEADS. ALUMINUM COATED GASKETS SEAL ANY AIR LEAKS. WHEN REMOVING THE MANIFOLDS, IT IS SUGGESTED THAT THE REAR CROSS OVER TUBE BE REMOVED FROM THE MANIFOLD. THE JUNCTION OF THE TWO MANIFOLDS HAS STUD CONNECTIONS. IT IS DIFFICULT TO LIFT THE MANIFOLD AND TO PULL IT OFF THE STUDS.

**A1053 ROCKER REMOVAL**

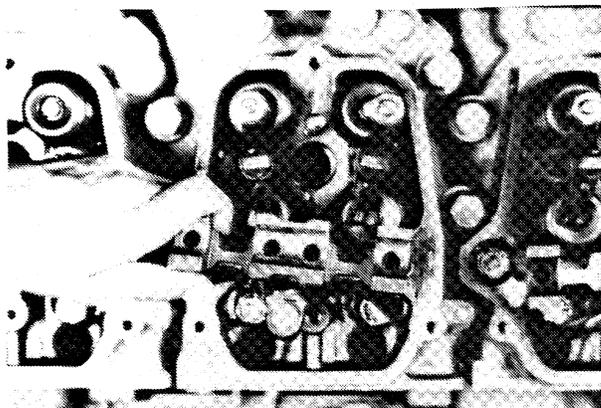
WHEN THE CAPSCREWS ARE REMOVED, THE SHAFT AND SUPPORT CAN BE LIFTED OFF THE HEAD.

**A1054 PUSH RODS**

THE PUSH RODS EXTEND ABOVE THE HEAD TO THE ROCKER ASSEMBLY. THE RODS ARE SOLID AND HAVE A CUP ON THE END WHICH FITS AROUND THE ROCKER. THE OPPOSITE END IS SPHERICAL IN SHAPE.

## A1055 ROCKER SHAFT SUPPORT

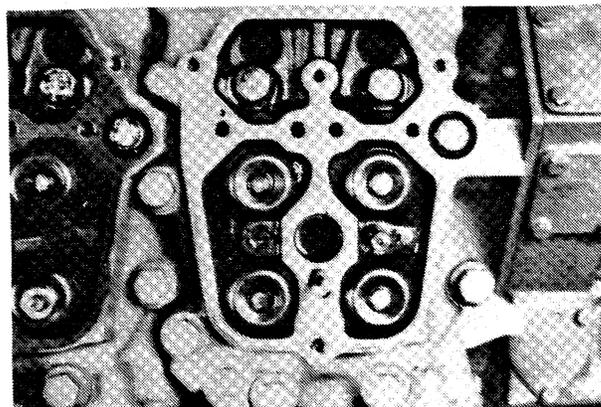
THE SUPPORT HAS A DRILLING IN THE FAR LEFT CAPSCREW HOLE. THIS DRILLING DIRECTS OIL TO THE ROCKER SHAFT. THE SHAFT ONLY HAS ONE DRILLING TO ACCEPT THIS LUBRICATING OIL, AND CARE MUST BE USED UPON REASSEMBLY THAT THE OIL HOLES ALIGN.



A1

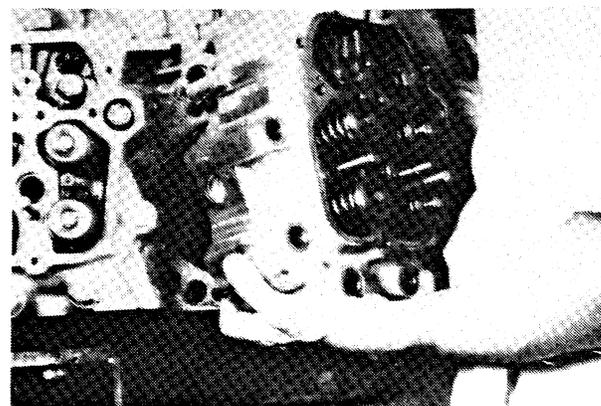
## A1056 VALVE BRIDGE STUDS

THE VALVE BRIDGES SIT UPON THE PINS. THE PINS ARE PRESSED INTO THE HEAD. WHEN REMOVING THE PINS, DO NOT DEFORM THE HOLE IN THE HEAD.



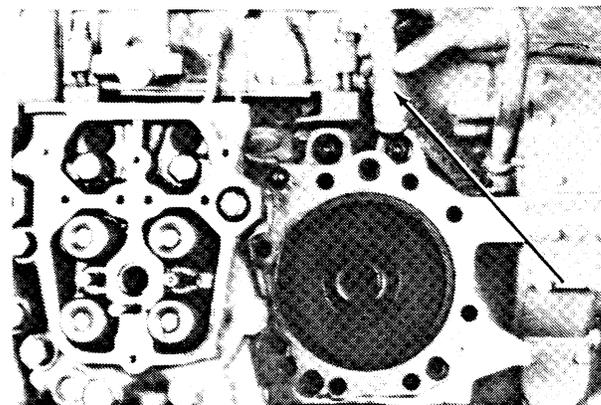
## A1057 HEAD REMOVAL

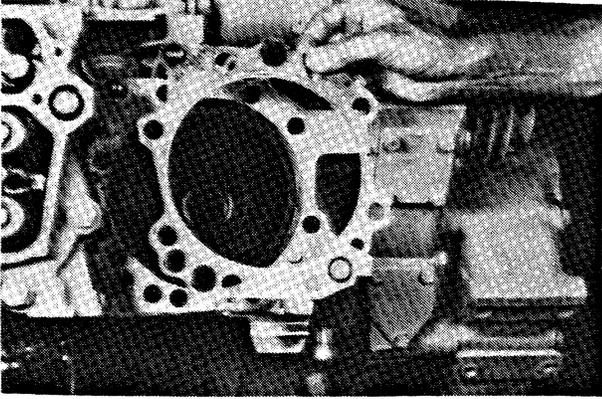
A THREE QUARTER INCH DRIVE SOCKET P/N 75300824 MUST BE USED TO REMOVE THE HEAD CAPSCREWS. THE HEADS ARE INDIVIDUAL AND CAN BE INTERCHANGED ON THE BLOCK.



## A1058 PUSH ROD TUBE

THE PUSH ROD FITS INSIDE A TUBE WHOSE ENDS ARE PLEATED TO ALLOW A TIGHT SEAL BETWEEN THE HEAD AND THE BLOCK. THE TUBES ARE REUSABLE, BUT EXAMINE THEM FOR CRACKS OR OTHER DAMAGE PRIOR TO REINSTALLATION. ON EACH END OF THE TUBE IS AN O-RING SEAL. THESE SEALS MUST BE REPLACED ANYTIME THE HEAD COMES OFF THE BLOCK.



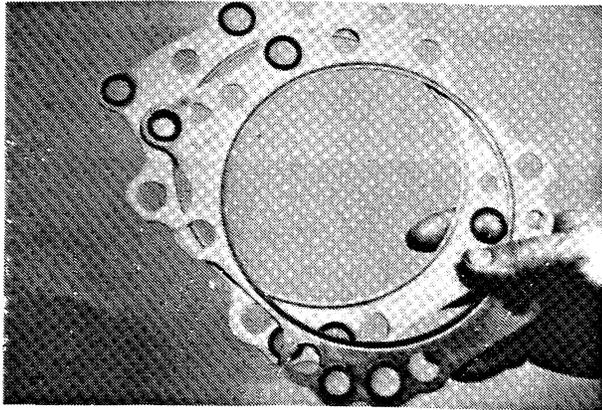
**A1**

FR35

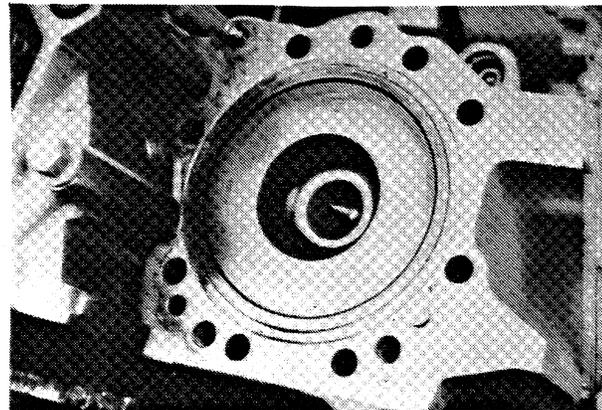
ENGINE REBUILD

**A1059 HEAD GASKET AND TOP DECK**

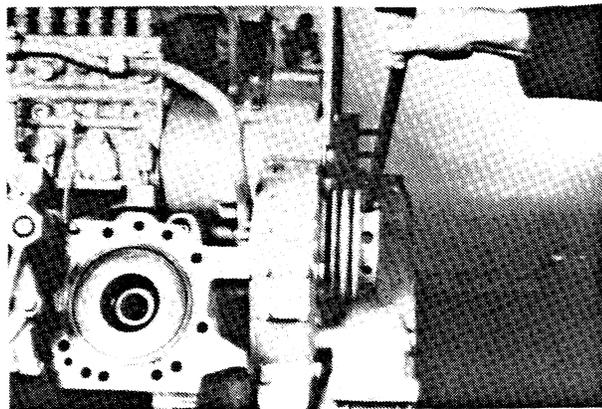
THE HEAD GASKET IS A STEEL ALLOY GASKET. IT IS NOT CEMENTED TO THE TOP DECK OF THE BLOCK UPON REASSEMBLY. A DOWEL AT THE BOTTOM RIGHT IS USED FOR HEAD POSITIONING. THERE IS ONE OTHER DOWEL WHICH IS DRILLED FOR OIL LUBRICATION. RETURN OIL FROM THE HEAD PASSES THROUGH THE GASKET AT THE BOTTOM LEFT. COOLANT ALSO PASSES THROUGH THE GASKET. AT EACH OF THESE PASSAGES, THERE ARE RUBBER SEALS TO PREVENT LEAKAGE.

**A1060 HEAD GASKETS**

THERE ARE TWO DIFFERENT HEAD GASKETS WHICH ARE USED ON FACTORY BUILT ENGINES. THERE IS ONLY ONE SIZE OF GASKET FOR SERVICE REPLACEMENT. DO NOT WORRY ABOUT ONE GASKET BEING THICKER THAN THE OTHER. FIATALLIS SERVICE PARTS MEETS TOLERANCE RANGES.

**A1061 PISTON CROWN**

THE 8285 USES AN OPEN COMBUSTION CHAMBER. THE COMBUSTION CHAMBER IS CENTERED IN THE PISTON.

**A1062 TIMING ENGINE**

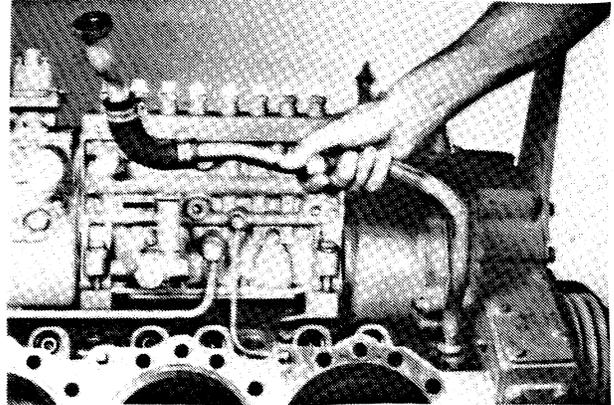
PRIOR TO FUEL PUMP REMOVAL, BAR THE ENGINE SO THAT NUMBER 8 CYLINDER IS ON ITS COMPRESSION STROKE. THIS AIDS IN TIMING THE FUEL PUMP TO THE ENGINE UPON REBUILD. TO INSURE THAT NUMBER 8 CYLINDER IS ON ITS COMPRESSION STROKE, ITS COMPANION CYLINDER'S (2) INTAKE VALVE IS JUST BEGINNING TO OPEN. THE PULLEY DRIVES THE AIR CONDITIONER COMPRESSOR.

FR35

ENGINE REBUILD

A1063 TURBOCHARGER SUMP HOSE

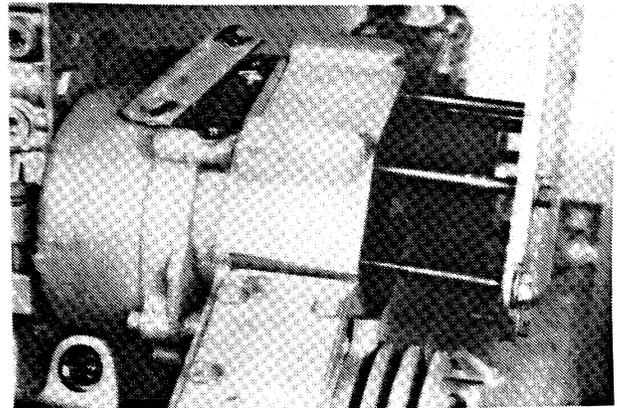
REMOVE THE TWO TURBOCHARGER LUBE LINES. BOTH ENDS OF THE TUBE ARE FLANGE TYPE AND ARE SEALED WITH A GASKET.



A1

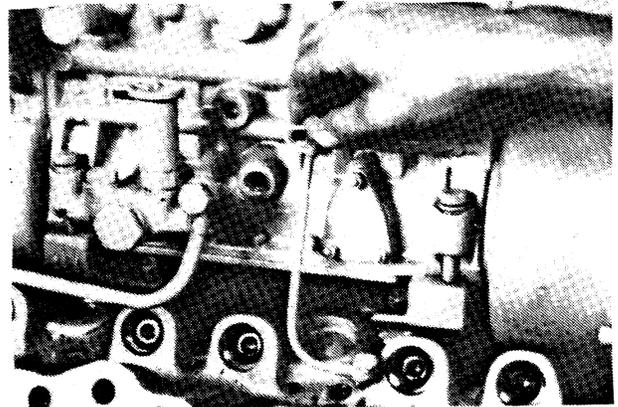
A1064 REAR LIFTING BRACKET

TO REMOVE THE FUEL PUMP AND VARIATOR FROM THE ENGINE, THE LIFTING BRACKET MUST BE REMOVED. THERE IS ALSO AN ALLEN HEAD CAPSCREW WHICH GOES FROM THE VARIATOR TO THE REAR HOUSING.



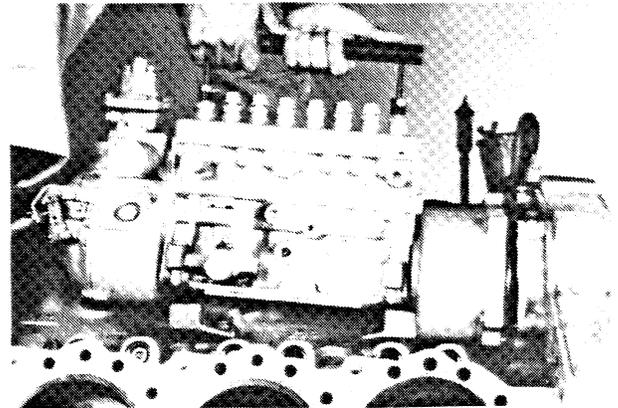
A1065 FUEL PUMP LUBE LINES

REMOVE THE LUBRICATION LINES FROM THE FUEL PUMP AND THE ENGINE BLOCK. ALSO NOTE THAT THE FUEL PUMP IS HELD FIXED TO THE BLOCK BY FOUR CAPSCREWS AND A SADDLE.

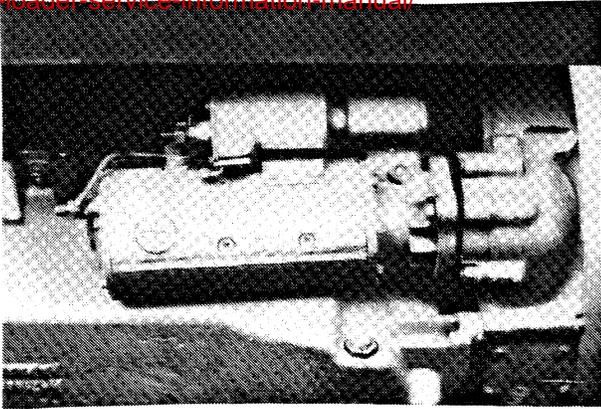


A1066 FUEL PUMP REMOVAL

TO REMOVE THIS FUEL PUMP FROM THE ENGINE, THERE IS A TOOL P/N 75294449. THIS TOOL GIVES A HANDLE TO POSITION THE FUEL PUMP. THIS TOOL IS ESPECIALLY USEFUL WHEN ALL THE MANIFOLDS ARE IN PLACE.

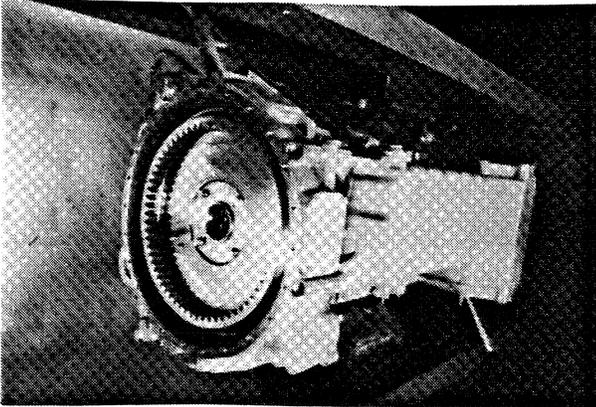


A1



A1067 CRANKING MOTOR

THE CRANKING MOTOR IS MOUNTED TO THE ENGINE BY MEANS OF AN ADAPTER RING.

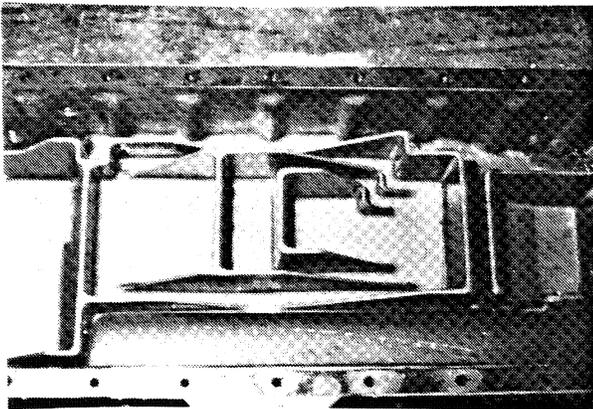


A1068 OIL PAN

THE OIL PAN IS HELD IN PLACE BY SEVERAL ALLEN HEAD CAPSCREWS. TWO LONG CAPSCREWS ATTACH THE FLYWHEEL HOUSING TO THE PAN.

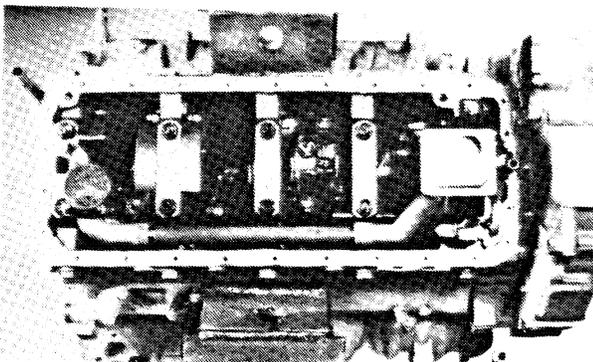
=====

**⚠ WARNING** - 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.



A1069 OIL PAN BAFFLES

THE OIL PAN IS BAFFLED TO REDUCE OIL REQUIREMENTS. THE BAFFLES PREVENT OIL FROM TRANSFERRING FROM REAR TO FRONT. THERE IS A DRAIN HOLE AT EACH END OF THE PAN. THE OIL PAN IS CAST ALUMINUM.



A1070 OIL PUMP IN ENGINE

THE OIL PUMP HAS A SCAVENGING SECTION AND A MAIN SUPPLY SECTION. THE OIL PUMP, AS ALL THE GEAR DRIVEN MEMBERS, IS DRIVEN OFF THE REAR OF THE ENGINE.