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Operator's manual

BR-100+

180 0081 00

Litho'd in Canada

FOREWORD

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The operator's manual and guide to the safe driving of off-road tracked vehicles have been prepared to acquaint the owner and/or operator(s) of an industrial tracked vehicle with the various controls and instruments, inpection, maintenance and safe driving instructions. Each manual is indispensable for the proper use of the product, and should be kept with the vehicle at all times.

This manual uses the following symbols :

◆ **WARNING : Identifies an instruction which, if not followed, could cause personal injury.**

▼ **CAUTION : Denotes an instruction which, if not followed, could severely damage vehicle components.**

◯ NOTE : Indicates supplementary information needed to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use.

Most specifications are given in both metric and customary units. Where precise accuracy is not required, some conversions are rounded off for easier use.

SAFETY NOTICE

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Observe the Following Precautions:

- The vehicle must be operated only by a qualified operator.
- Visually inspect vehicle before operation.
- Maintain the vehicle in top mechanical condition.
- Do not operate the vehicle and the equipment beyond its rated capacity.
- Do not remove radiator cap when the engine is hot.
- Never perform lubrication, adjustments or repairs on a vehicle in operation.
- Fuel is flammable and explosive under certain conditions. Always manipulate in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. If fuel fumes are noticed while driving, the cause should be determined and corrected without delay.
- Clean and check operation of the lighting equipment.
- Maintain good visibility.
- The throttle mechanism must be checked for free movement before starting the engine.
- To minimize the risks and/or severity of injury in accidents or sudden stops, it is highly recommended that people riding in the vehicle be properly restrained at all times, using the seat belts provided.
- Correctly secure doors and windows when operating.
- Do not operate vehicle when bystanders are in the vicinity.
- Frequently, check the instrument panel. Do not operate vehicle if dials indicate malfunction.
- Never leave the engine running while unattended.
- Operate at moderate speed.
- Avoid abusive operation.
- Avoid or remove any obstacle in the vehicle path which may be hazardous to safe operation.
- Do not make sharp turns at high speed.
- While hauling equipment, remember to brake or turn slowly. "Jackknife" possibilities are always present.
- Drop-offs must be negociated slowly and approached from a standstill when possible.
- Bush or snow-covered terrain could conceal dangerous obstacles. Proceed slowly and with caution
- Never attempt "jumping" the vehicle over ditches, hill crests or drops-offs. Injury and/or mechanical damage may result.
- Never cross a frozen body of water unless absolutely sure the ice is thick enough to support the vehicle weight.
- Unless the vehicle can safely descend as well as ascend a slope, or an alternate descent path is known, do not attempt a climb.
- Small obstacles on steep slopes should always be considered a hazard.
- This vehicle is not designed to be driven or operated on black top, or other similar surfaces. On such surfaces abnormal and excessive wear of critical parts is inevitable.

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- Many government/private agencies publish instruction booklets pertaining to special offroad operations, including desert driving. Contact the local land governing office for publication lists.
- Only perform procedures as detailed in this manual. Unless otherwise specified, engine should be turned off for all lubrication and maintenance procedures.
- Should removal of a nylon lock nut be required when undergoing repairs/disassembly always replace by new ones. Tighten as specified.

PLEASE READ AND UNDERSTAND ALL WARNINGS AND CAUTIONS IN THIS MANUAL AND ON THE VEHICLE.

THIS MANUAL SHOULD ACCOMPANY THE VEHICLE AT TIME OF RESALE.

TABLE OF CONTENTS

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HOW TO IDENTIFY YOUR VEHICLE

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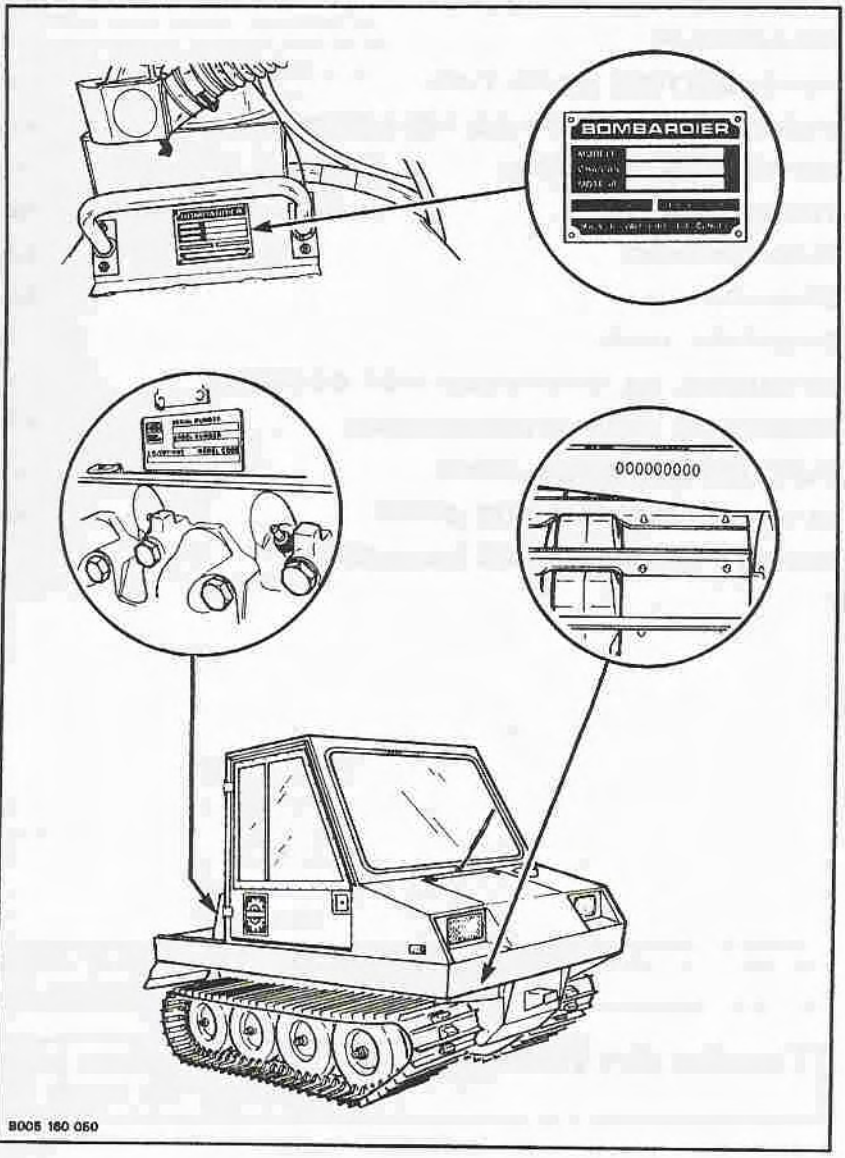
The main components of your vehicle (engine, body) are identified by different serial numbers. It may sometimes become necessary to locate these numbers for warranty purposes or to trace your vehicle in the event the vehicle is lost or stolen.

NOTE : It is strongly recommended that you take note of all the serial numbers on your vehicle and supply them to your insurance company.



TOOLS AND LITERATURE

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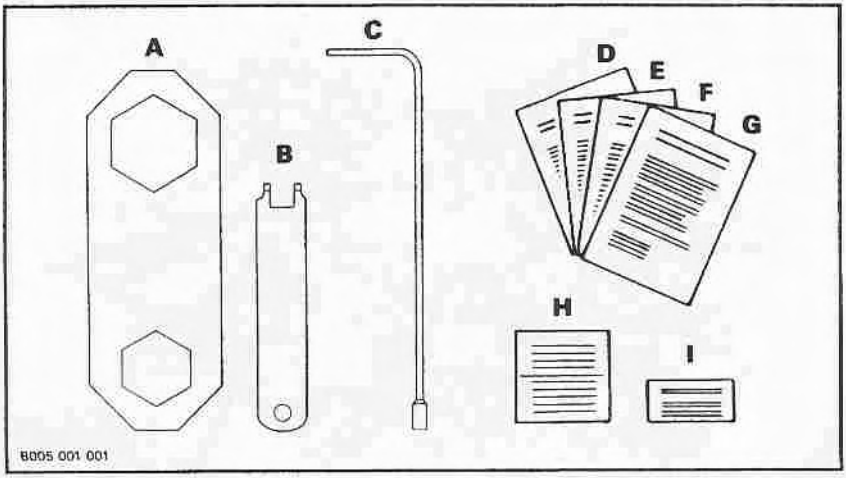
As standard equipment, each new vehicle is supplied with a basic tool kit and literature.



A) Hub cap wrench
B) Threaded bushing wrench
C) Hydraulic track tensioner bleeder
D) Operator's manual
E) Safe driving of off-road tracked vehicles
F) Parts Catalog
G) Ford literature
H) Ford warranty card
I) Bombardier warranty card

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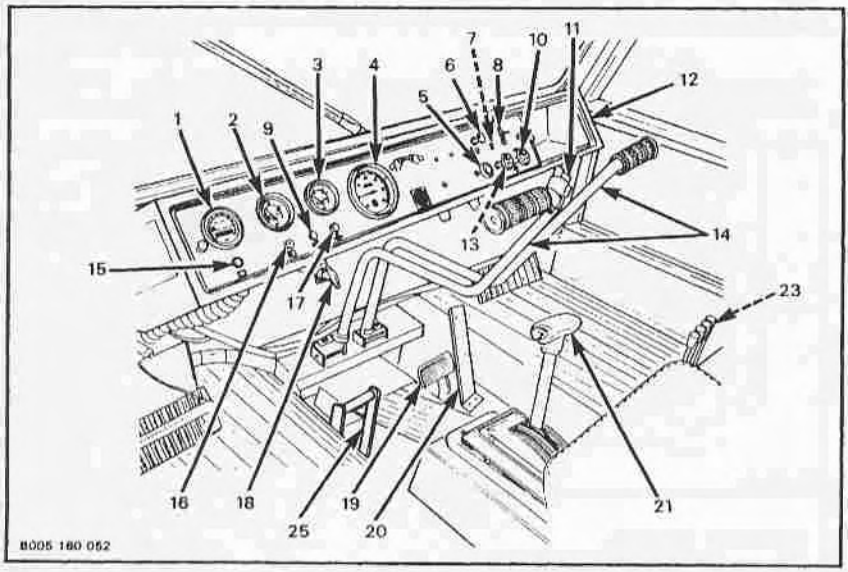
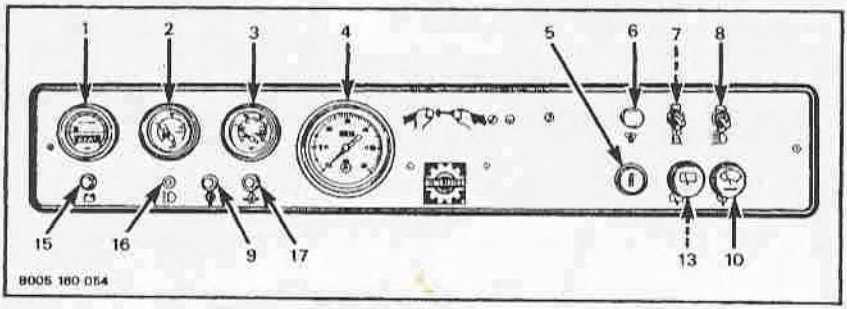
Controls/Instruments





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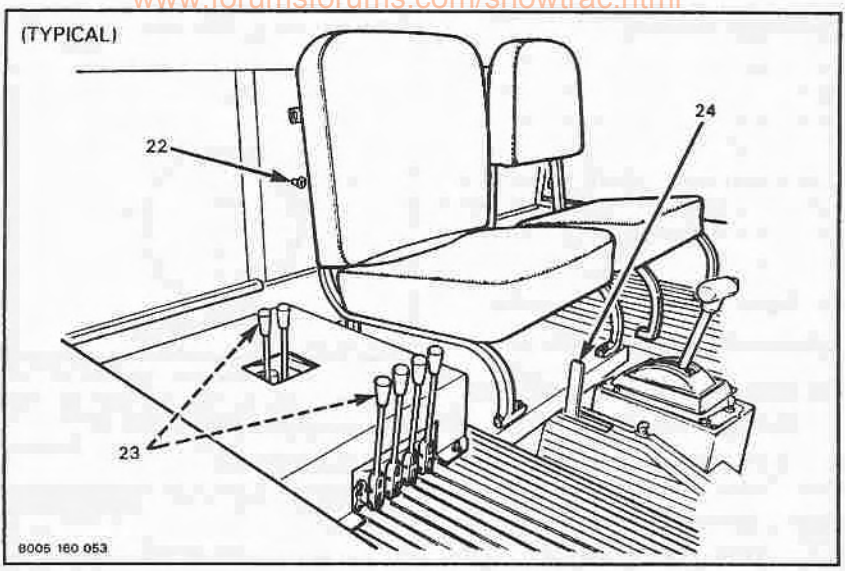

NOTE : Dotted line indicates optional equipment.

1. Hour Meter
2. Fuel Level Indicator
3. Coolant Temperature Gauge
4. RPM Indicator
5. Starting Switch
6. Heater/Defroster Fan Switch
7. Revolving Light Switch
8. Light Switch
9. High Temperature Transmission Indicator
10. Front Wiper Control Knob
11. Dimmer Switch
12. Glove Compartment
13. Rear Wiper Control Knob
14. Steering Levers
15. Alternator Warning Light
16. High Beam Indicator Light
17. Oil Pressure Warning Light
18. Hood Catch Release Handle
19. Emergency/Parking Brake Pedal and Parking Brake Lever
20. Throttle Pedal
21. Gear Selector Lever
22. Choke Control Knob
23. Hydraulic System Control Levers
24. Parking Brake Lever
25. Footrest

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1) Hour Meter

Indicates the total number of engine operating hours. It begins to operate as soon as the starting switch is in "run" position.

This instrument can be used as an indication for maintenance of vehicle as per maintenance schedule in this manual.

2) Fuel Level Indicator

Indicates fuel level in tank.

3) Coolant Temperature Gauge

Indicates engine coolant temperature. Check frequently.

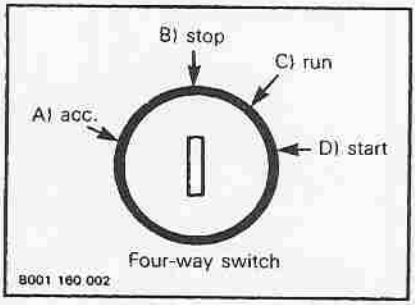
▼ CAUTION : If temperature exceeds 104°C (220°F), let the liquid cool down before operating the vehicle or stop the engine and consult a mechanic.

4) RPM Indicator

This instrument indicates in revolutions per minute the speed of the engine.

▼ CAUTION : In no case should the engine speed exceed 4500 RPM.

5) Starting Switch



Key may be turned to any of the following positions :

A) ACCESSORIES

Supplies the main lighting system.

B) STOP

Stops the engine and cuts off supply power to the vehicle.

C) RUN

Supplies power to the vehicle, engine keeps on running at this position.

D) START

When the engine must be started ; turn the key two steps from the STOP position and maintain this position. Once the engine has started, turn key immediately to RUN position.

▼ CAUTION : Never hold the key in START position once the engine is running because the starter could be damaged.

▼ CAUTION : Do not operate the starter for more than 15 seconds at a time to avoid overheating it.

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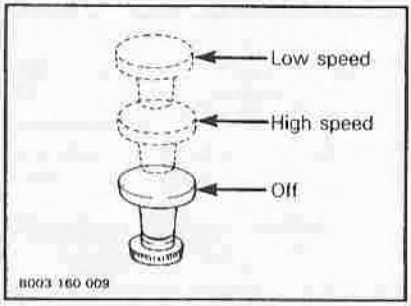
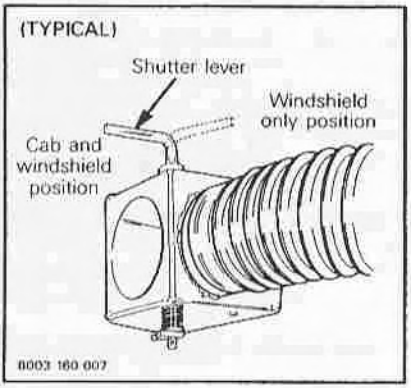
6) Heater/Defroster Fan Switch

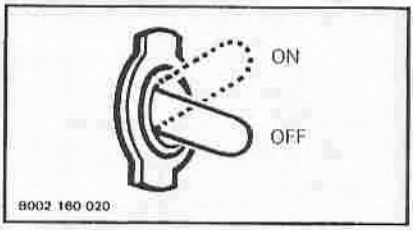


Controls the heater/defroster fan speed.



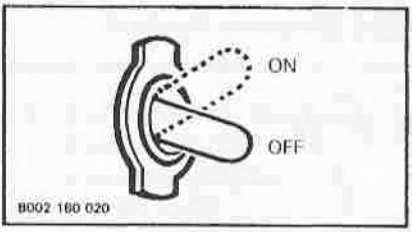
NOTE : A manually-operated shutter located over the left footrest can be activated to send hot air to the cab and/or the windshield.

7) Revolving Light Switch (optional)



Controls the rooftop-mounted revolving light.

8) Light Switch



Controls the lighting system.

9) High Transmission Temperature Indicator

This light will turn on if automatic transmission fluid overheats.

CAUTION : Should it go on during normal driving operations, STOP engine and check cause of overheating.

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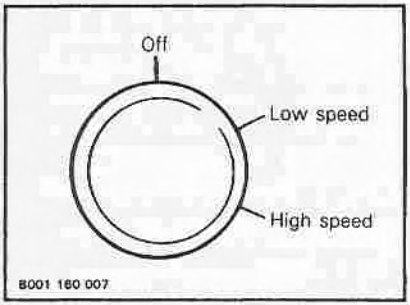
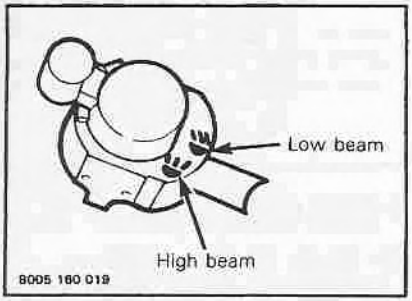
10) Front Wiper Control Knob



Controls the front wiper speed.

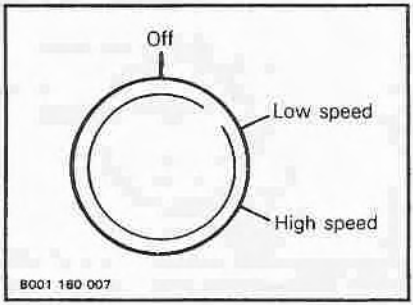
11) Dimmer Switch



The dimmer switch, located on left steering lever, allows selection of high or low headlamp beam. To select high or low beam flick switch.

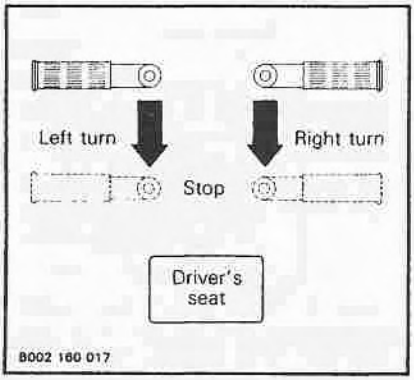
12) Glove Compartment

13) Rear Wiper Control Knob (if applicable)



Controls the rear wiper speed.

14) Steering Levers



To steer the vehicle in a give direction, pull the lever corresponding to that direction.

To brake, pull simultaneaously both steering levers.

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15) Alternator Warning Light

This light will turn on whenever the alternator is not charging.

▼ CAUTION : Should it go on during normal driving operations, stop the engine and check for a slipping or broken driven belt, or faulty alternator.

16) High Beam Indicator Light

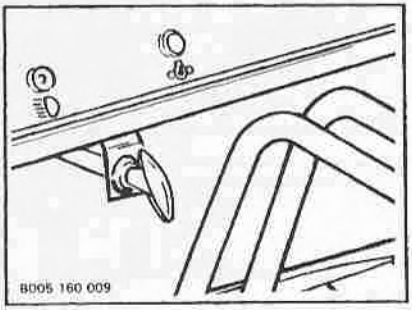
Lights up when headlamps are on high beam position.

17) Oil Pressure Warning Light

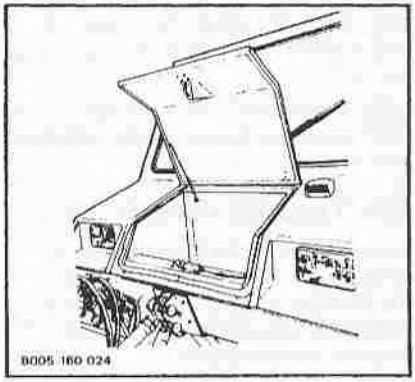
This light will turn on whenever the oil pressure drops below normal. Should it go on during normal driving operations, the engine should be stopper immediately. Find the cause of the low oil pressure and bring remedy.

▼ CAUTION : Extensive damage may result if the engine is operated with no oil pressure or abnormally low oil pressure.

18) Hood Catch Release Handle



Pull handle to release the front hood catch.

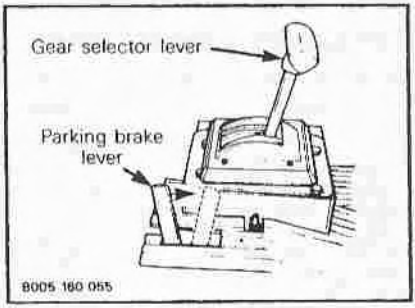


The front hood gives access to storage compartment.

19) Emergency/Parking Brake Pedal and Parking Brake Lever

The parking brake pedal acts on a disc type brake, mounted on differential input shaft.

◆ WARNING : It should be used only in case of emmergency when sudden stopping is absolutely necessary.



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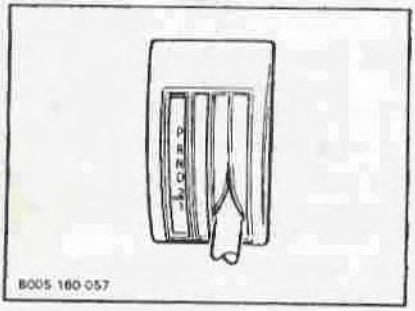
To apply parking brake, depress the emergency/parking brake pedal and push the parking brake lever foreward then release pedal. Depress pedal and release to disengage parking brake.

◆ WARNING : Always apply the parking brake when leaving the vehicle.

20) Throttle Pedal

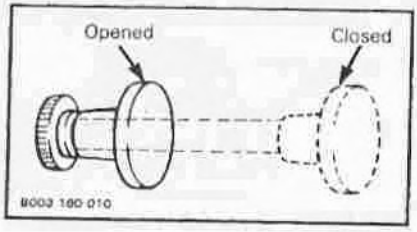
The engine speed increases as a function of the pressure applied on the throttle pedal. Once the pedal is released, the engine automatically returns to idle speed.

21) Gear Selector Lever



The BR-100+ vehicle uses a three speed automatic transmission.

22) Choke Control Knob

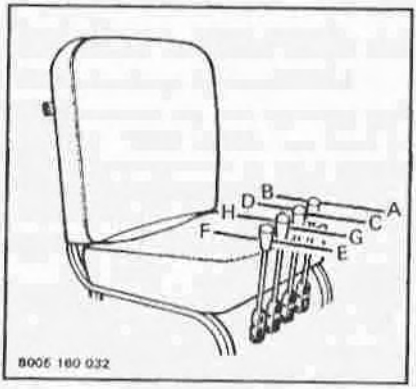


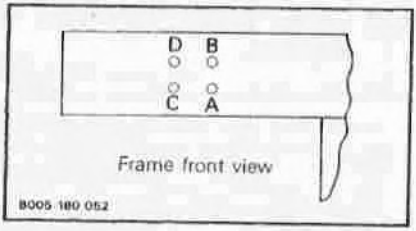
Located on the right side behind the driver's seat, the choke controls the opening and closing of the choke butterfly valve on the carburetor.

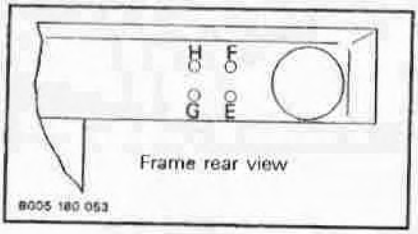
23) Hydraulic System Control Levers

Moving a lever in a given position will provide oil pressure and/or flow at the corresponding outlet.

Vehicles equipped with four front and four rear hydraulic couplings.







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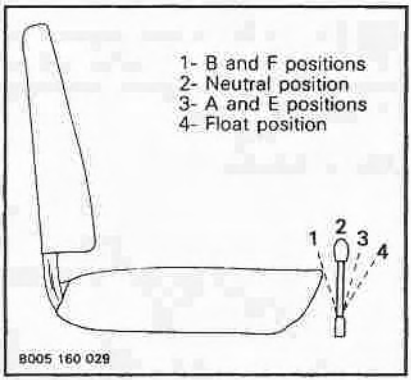
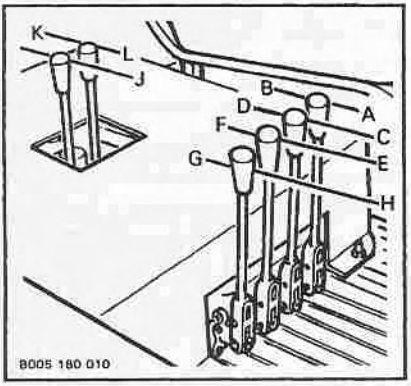
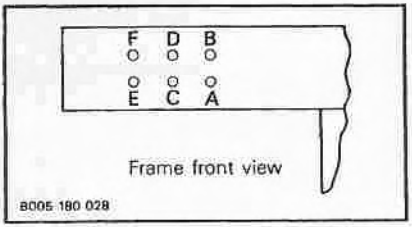
Float position is immediately past positions A and E.

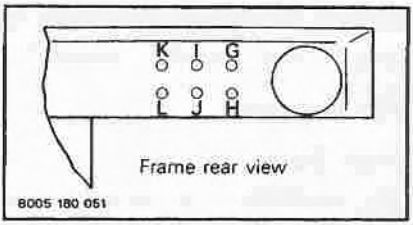


NOTE : When not engaged in float position, the levers normally return to neutral position.

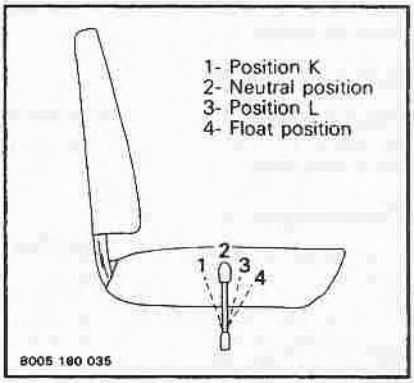
Vehicles equipped with six front and six rear hydraulic couplings

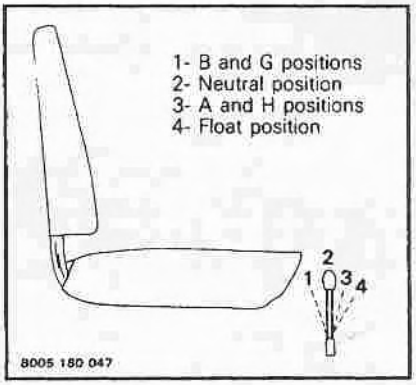






Float position is immediately past positions A, H and L.





NOTE : When not engaged in float position the lever normally returns to neutral position.

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24) Parking Brake Lever

Refer to item 19 in this section.

25) Footrest

Seat Belts

◆ WARNING : To minimize the risks and/or severity of injury in accidents or sudden stops, it is highly recommended that people riding in the vehicle be properly restrained at all times, using the seat belts provided.

Driver's Seat

Tilting the driver's seat forward gives access to the differential oil filter and the transmission.

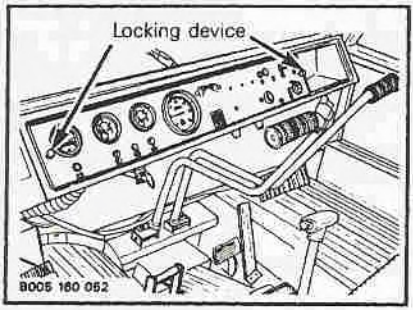
Passenger Seat(s)

The passenger seats are installed on each side of the driver's seat.

◯ NOTE : Vehicles equipped with six hydraulic control levers have only one passenger seat.

Fuse Panel

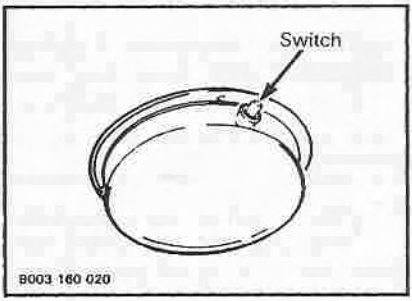
The fuse panel is located behind the instrument panel.



To remove instrument panel ; push and turn locking device a quarter turn.

▼ CAUTION : Never replace a fuse with one of higher rating. Severe electrical system damage will occur.

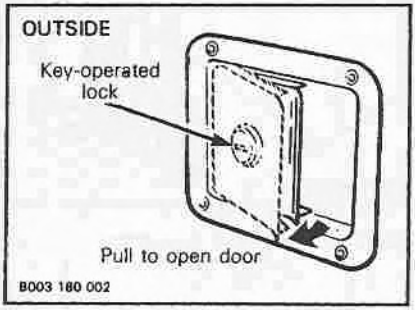
Dome Lamp



Press swicth to turn on dome lamp, press again to turn off.

◯ NOTE : The dome lamp can be turned on regardless of ignition key position.

Door Handles



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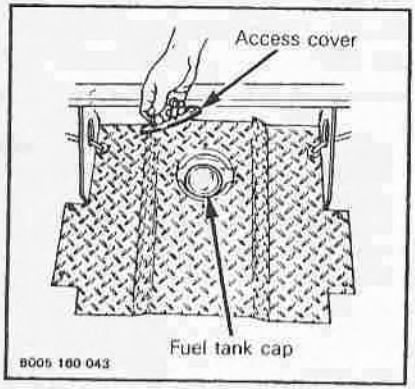
Fuel Tank Cap



To gain access to the fuel tank cap, remove the access cover which is located behind the engine hood.

▼ CAUTION : Fill the tank at the end of each day of operation to help prevent moisture accumulation and freezing of the fuel system.

◆ WARNING : Fuel is flammable and explosive under certain conditions. Always manipulate in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity.

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Break-in Period

A break-in period is recommended before running the vehicle under full load. Recommended break-in period is 25 operating hours. During this time, do not operate the engine at high no load speeds and/or under overload. To facilitate break-in, avoid prolonged periods of engine idling. Check instrument panel frequently.

If coolant temperature rises above specifications (see controls/instruments section), reduce engine load or stop the engine.

If low oil pressure indicator or high transmission temperature indicator lights up, (see controls/instruments section) IMMEDIATELY stop engine.

Find the cause of the problem and correct it before restarting the engine.

25-Hour Inspection

As with any precision piece of mechanical equipment, we suggest, after the first 25 hours of operation, that the vehicle be checked by a trained mechanic.

The inspection is at the expense of the vehicle owner.

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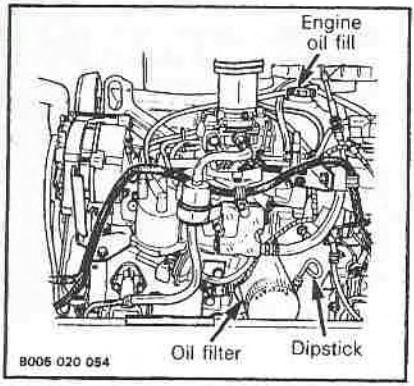
Care should always be taken to ensure that the vehicle is in good mechanical condition before operating it. Regular preventative maintenance and "pre-operation inspection" by each working shift will extend vehicle life and save on costly down-time. Special attention should be given to the following items :

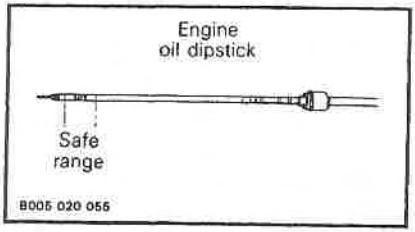
Before Starting the Engine

▼CAUTION : All liquid levels must be checked with the vehicle on a flat and level surface.

Engine Oil Level

To gain access to dipstick, raise engine hood.



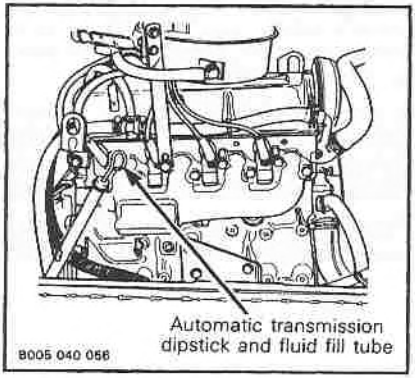


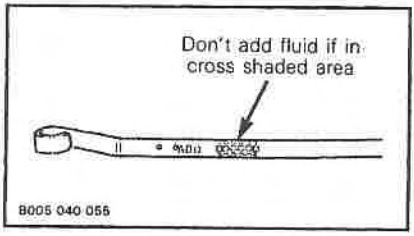
Oil Level should always be within safe range on dipstick.

▼CAUTION : Using inferior or incorrect oil type will handicap the engine. Use only specified quality lubricants at the recommended intervals (see "Specifications" section).

Transmission Oil Level

To gain access, to dipstick, raise hood.





The oil level must always be within the safe range.

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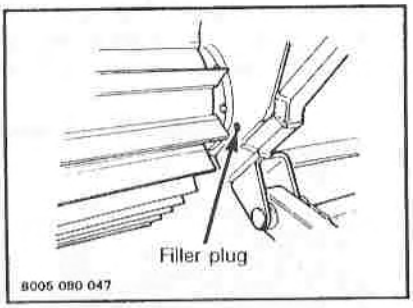
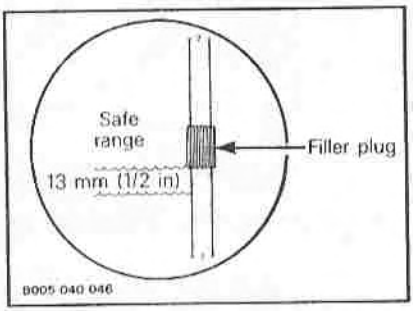
Differential Oil Level

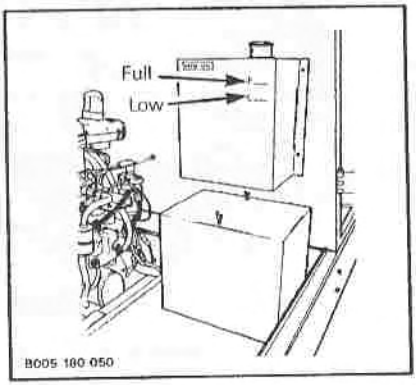




The oil level must always be within the safe range.

Hydraulic Oil Level

Hydraulic oil tank is located behing cab.

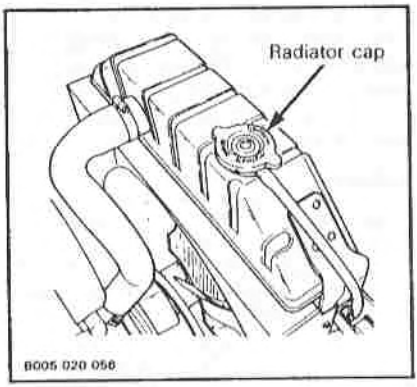


At room temperature (21°C (70°F approx.)), the oil level should reach line "F" on the tank.

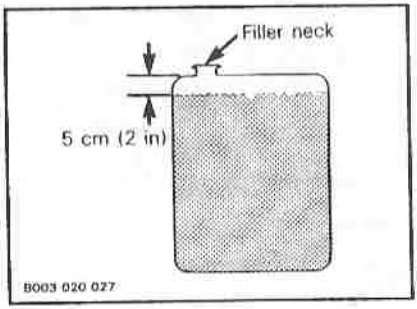
CAUTION : Avoid oil contamination (see "Hydraulic oil contamination control" section).

Coolant Level

Raise engine hood to gain access to radiator cap.



Always check coolant level when engine is cold.



Coolant level must 5 cm (2 in) below bottom of filler neck.

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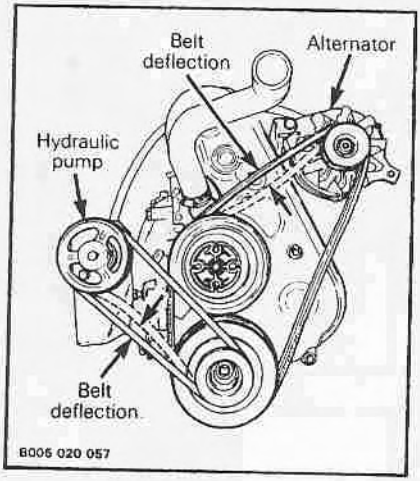
WARNING : If radiator cap must be removed when engine is hot, place a cloth over the cap and open slowly to release pressure. Loss of fluid and severe burns could occur if this notice is disregarded.

Antifreeze : ethylene glycol
Antifreeze/water mixture : 50/50

CAUTION : Coolant leakage on radiator may indicate that cap does not properly pressurize radiator or a cracked radiator. Ensure to correct the problem(s) before operating vehicle, otherwise engine overheating will occur.

V-Belts

Check V-belt tension as follows :

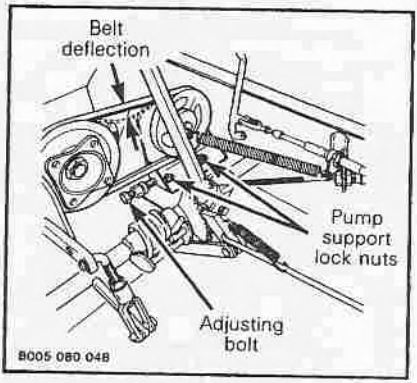


FAN/ALTERNATOR

Deflection must equal 12.7 mm (1/2 in) when a force of 4.5 kg (10 lbf) is applied midway between the water pump and the alternator pulleys.

HYDRAULIC PUMP

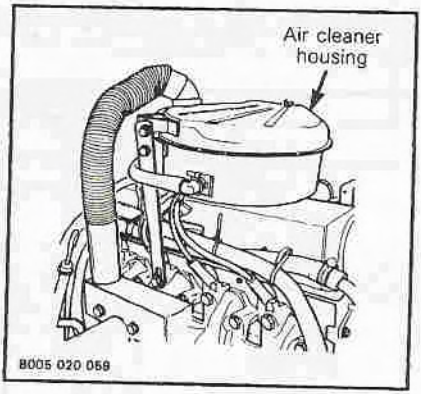
Deflection must equal 7.9 mm (5/16 in) when a force of 3.2 Kg (7 lbf) is applied midway between the two pulleys.



DIFFERENTIAL OIL COOLING PUMP

Deflection must equal 3.2 mm (1/8 in) when a force of 2.3 kg (5 lbf) is applied midway between the two pulleys.

Air Cleaner



Service air filter regularly.

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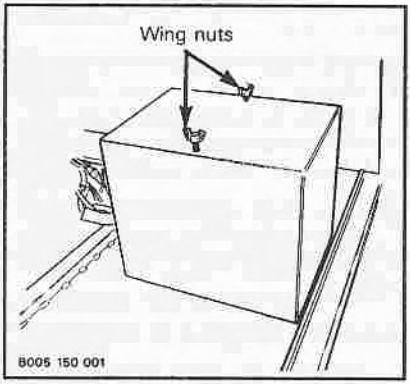
Battery

To gain access to the battery ; remove battery box cover.



Check electrolyte level in each cell. Add distilled water if necessary.

▼ **CAUTION : Do not overfill.**

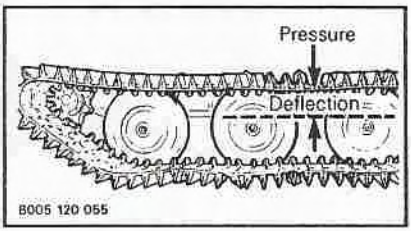
◆ **WARNING : Batteries give off explosive fumes. Avoid smoking. Prevent electrolyte from coming into contact with skin.**

Tracks

Check for any loose bolts and tighten if necessary.

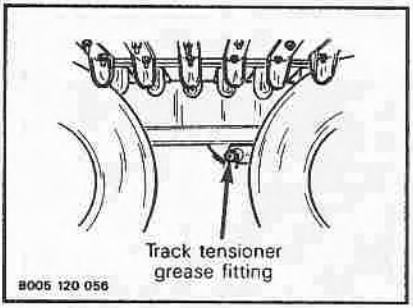
Recommended torque : 20-27 N•m (15-20 lbf•ft).

Replace any damaged crosslinks.



Check track tension as follows :

With a pressure of 68 kg (150 lb) applied to outer belt, at center of track, the deflection should be approximately 6.7 cm (2-5/8 in) for a 71.1 cm (28 in) wide track and 7.6 cm (3 in) for a 81.3 cm (32 in) wide track.



Tracks are adjusted by means of hydraulic track tensioners located between the two rear wheels. To tighten tracks, inject grease through grease fitting on track tensioner. To loosen tracks, bleed track tensioner by means of the bleeder tool.

▼ **CAUTION : This releases grease through grease fitting.**

Sprockets

Check for worn and/or damaged teeth and if retaining bolts are tight.

Suspension

Check the condition of suspension arms and flexitor shells.

Propeller Shaft

Periodically grease through grease fitting.

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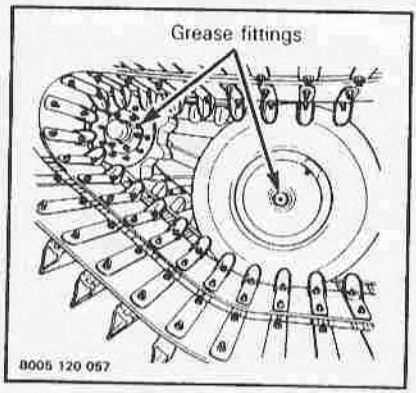
Tire Air Pressure

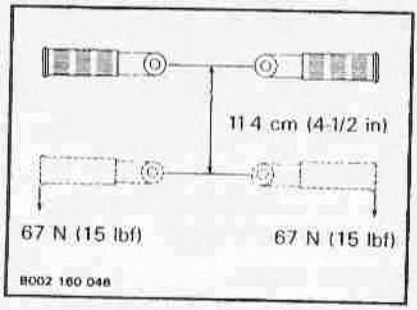
Recommended pressure :
483-552 kPa (70-80 PSI).

Wheel and Sprocket Bearings Lubrication



Periodically grease through grease fittings.

Steering Levers



Both steering levers should have a travel of approximately 11.4 cm (4-1/2 in) when a force of 67 N (15 lbf) is applied at each handle.

NOTE : Apply a few drops of oil on steering lever pivots.

Lighting System

Check operation.

Wiper

Check operation.

CAUTION : Be sure the windshield wiper is free before turning on. A wiper frozen to the windshield can cause overheating and failure of wiper motor.

CAUTION : Avoid running the wiper when the windshield is dry. Wiper blade and/or arm may be damaged.

Once the Engine is Started

NOTE : To start the engine, refer to "Starting and stopping procedure" section.

Instrument Panel

CAUTION : Check instruments and indicators on instrument panel frequently. Do not operate vehicle if dials indicate malfunction.

Emergency/Parking Brake

To check operation, see "Controls/instruments" section.

WARNING : Ensure brake functions properly before operating vehicle.

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Oil, Fuel, Coolant and Exhaust Leak

▼CAUTION : Make sure all leaks are taken care of before operating vehicle.

Engine Idle Speed and Max. RPM

Idle : 600-650 RPM in Drive
Maximum allowable RPM :
4500 RPM

Hose and Piping

▼CAUTION : Make sure any leak, crack, wear or tear is corrected before operating vehicle.

Heater

See "Controls/Instrument" section.

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Pre-Operation Inspection Check List	✓
Before Starting the Engine	
Engine oil level	
Transmission fluid level	
Differential oil level	
Hydraulic oil level	
Coolant level	
V-belt	
Air cleaner	
Battery	
Tracks	
Sprockets	
Suspension	
Propeller shaft	
Tire air pressure	
Wheel and sprocket bearings lubrication	
Steering levers	
Lighting system	
Wiper	
Once the Engine is Started	
Instrument panel	
Emergency/parking brake	
Oil, fuel, coolant and exhaust leaks	
Engine idle speed and max. RPM	
Hose and piping	
Heater	

▼ CAUTION : Any mechanical problem must be corrected before operating the vehicle.

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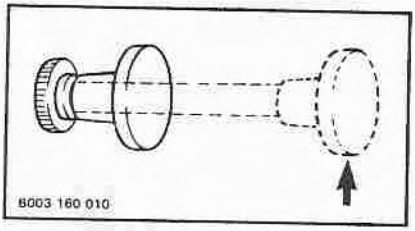
Starting the Engine

◆ WARNING : All internal combustion engines give off various fumes and gases while running. Do not start or run engine in a closed or poorly ventilated building where exhaust gases can accumulate.

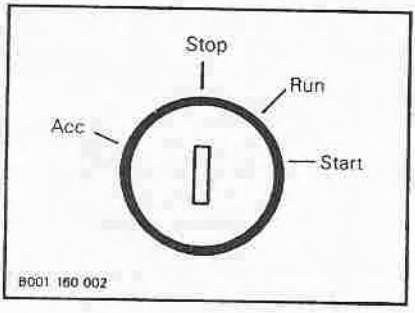
◆ WARNING : Before starting engine, make sure parking brake is applied and throttle pedal and steering levers are free. Gear selector lever must be in Park or Neutral.

Engine Cold



Pull the choke control knob completely.

Apply light pressure on throttle pedal.



Turn ignition key to START position.

▼ CAUTION : Return key to RUN position and release throttle pedal immediately after engine starts.

▼ CAUTION : Holding key in START position after engine has started will damage starter mechanism.

▼ CAUTION : Do not operate starter for more than 15 seconds at a time. If engine does not start the first time, wait 15 seconds before trying again. If it does not start after four attempts, consult a mechanic.

◯ NOTE : Choke must be released gradually while engine warms up.

When Engine is Warmed up

The procedure is basically the same as when engine is cold except that choke control knob is not used.

▼ CAUTION : Using choke when engine is warm is useless and may cause damage

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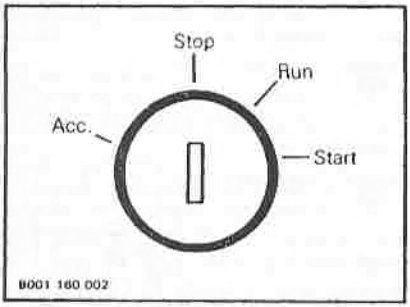
Stopping the Engine



To stop the engine ; turn ignition key to STOP position.

▼ CAUTION : Before stopping the engine, let it idle for a few minutes to allow gradual and uniform cooling. Engine and lubricant life will be shortened if engine is not properly cooled before stopping it.

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Setting the Vehicle in Motion

Start engine.

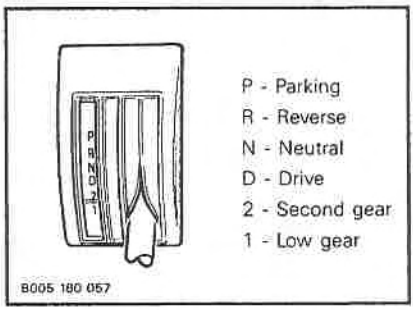
▼ **CAUTION : Before running vehicle, allow engine to reach a minimum of 60°C (140°F).**

Apply brakes and select Reverse or Drive. Release brakes and gradually accelerate vehicle using throttle pedal.

▼ **CAUTION : Vehicle must be stopped completely before selecting Reverse.**

Transmission

The automatic transmission selector lever has six positions :

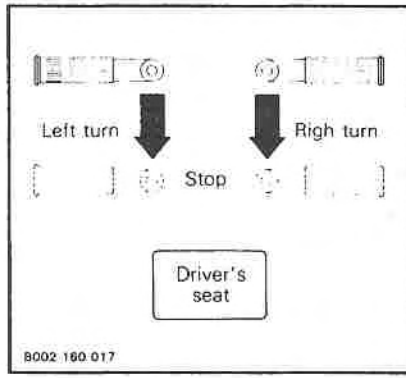


Under normal driving conditions ; select Drive. Vehicle will start in Low gear and upshift to Second and high gear automatically, as speed increases. At Drive position, transmission will automatically downshift as load increases. However, should transmission downshift and upshift constantly from Drive to Second gear, position 2 should be manually selected. The same goes for frequent downshifting and upshifting from Second to First gear, in this case select position 1. Low gear may also be used to increase engine braking, when descending steep hills.

▼ **CAUTION : When descending steep hills in low gear keep engine from overrevving by lightly applying brakes.**

◯ **NOTE :** In position 2, vehicle will start in Second gear and there will be no upshifting or downshifting.

Driving Instruction



Steering is by means of the steering levers. Pulling on one lever applies the corresponding brake band on one drum of the differential. This slows the axle gear on that side and increases the speed of the axle gear on the other side. One track running faster than the other makes the vehicle turn. This type of differential, provides traction to both tracks, even when turning.

When braking, pull both steering levers simultaneously.

◆ **WARNING : Never brake suddenly, specially when going downhill. Harsh operation at high speeds will cause unnecessary jars to the vehicle and may cause loss of control.**

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◆ WARNING : The emergency brake should be used only in case of emergency when sudden stopping is absolutely necessary.

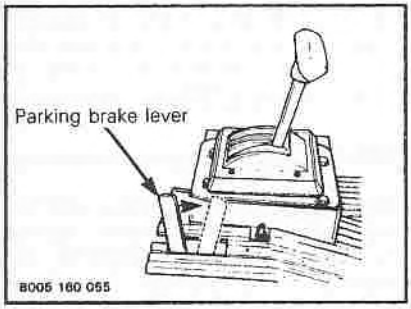
▼ CAUTION : Release steering levers completely when not used for steering or braking. Dragging the bands will cause differential overheating and unnecessary wear.

Stopping and Parking

Stopping

To stop the vehicle, pull both steering levers simultaneously.

Parking



To apply parking brake, press emergency / parking brake pedal, push the parking brake lever foreward then release pedal. Press and release brake pedal to disengage parking brake.

◆ WARNING : Do not park a vehicle on a slope where it could start to roll or slide. Always check emercency brake system before operating vehicle. Never leave a vehicle without setting parking brake.

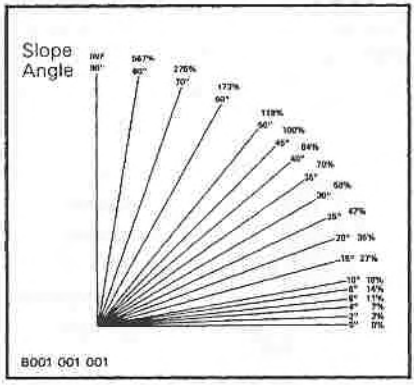
Maximum Gradeability (at maximum rated load)

Uphill : up to 75 %
Downhill : up to 75 %
Sidehill : up to 50 %

◯ NOTE : Load must be everly distributed on vehicle.

Slope Conversion Chart

It is a general trade practice to discuss slope angularity in terms of percentage. The following chart converts slope percentage into degrees of angle.



◆ WARNING : These limits are determined with the vehicle stationary, on a firm and flat surface. The extent to which they can be approached in pratice will depend on the expertise of the operator his familiarity with the vehicle and load.

With a tracked vehicle the following can occur when moving uphill or downhill.

When the center of gravity of the vehicle passes beyond an imaginary line drawn vertically from the furthermost point of support of the tracks, the vehicle will tip-over.

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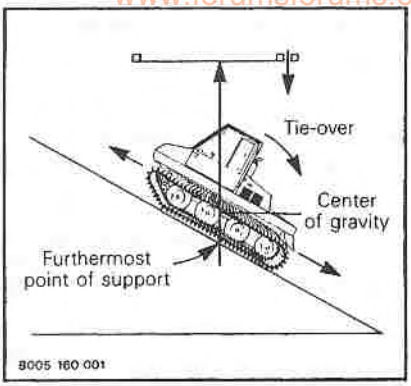
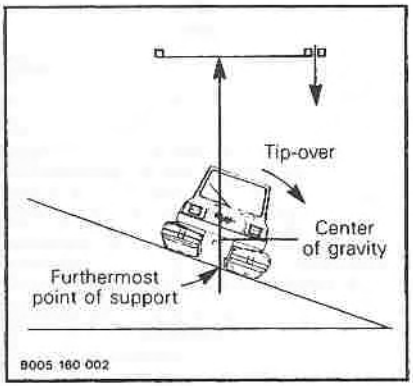
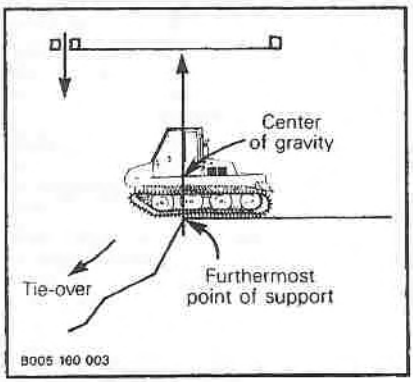


This could compare to the action of a seesaw with the vertical line forming the center or pivot of the seesaw. When more weight is placed on one side than the other, the seesaw will move in that direction.

While these limits can be determined with accuracy under ideal conditions, the skill and ability of the operator as well as the loading of the vehicle and actual terrain conditions, constantly influence and change these limits during vehicle operation.

Therefore, one must evaluate every situation carefully and as a seperate case. Never assume vehicle can traverse a certain piece of terrain because it has passed there previously, or because another vehicle has passed before it, or because the terrain appears to be within the known performance limits of the vehicle. Moreover, under actual operating conditions, the slope of the terrain is constantly changing and sudden local variations may result in slopes which exceed operational limits, even though slope of the terrain is within safe operational limits.





TROUBLESHOOTING

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ENGINE AND TRANSMISSION:

See manufacturer's manual.

PROPELLER SHAFT:

Symptoms	Possible causes	What to do
Vibration or noise	1- Joints not aligned 2- Bent 3- Out of balance 4- Worn bearings and cross	Align Replace Correct or replace Replace

DIFFERENTIAL:

Noisy	1. Scored crown and pinion gears 2. Bearings worn or pitted 3. Improper adjustment of crown and pinion	Replace Replace Adjust
Excessive backlash	1. Worn gears 2. Worn carrier bearings 3. Worn U-joints	Replace Replace Replace
Oil leak	1. Faulty gaskets or seals	Replace

FINAL REDUCTION MECHANISM:

Noisy	1. Worn, pitted or chipped gears 2. Worn bearings	Replace gears Replace
Oil leak	1. Faulty gaskets or oil seals	Replace

STEERING:

Does not steer	1. Steering brake bands too loose 2. Faulty differential	Adjust Repair
Steers to one side only	1. Broken axle 2. Broken axle gear 3. Broken steering band	Replace Repair differential Replace
Veers to one side	1. Uneven track tension 2. Broken wheel bearings 3. Low tire pressure on 2 or 3 tires on same side 4. Faulty track belts	Adjust track tension Replace Correct Correct or replace

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Maintenance Schedule

C - Check
I - Inspect (adjust or correct of necessary)
L - Lubricate
R - Replace

Item	Every 10 hours or daily	Every 50 hours	Every 100 hours	Every 200 hours	Every 500 hours	Every 1000 hours
Engine oil and filter	C		R			
Fuel filter						R
Air cleaner		C	R (if needed)			R
V-belts		C				R
Coolant	C					R
Transmission fluid	C				R	
Differential oil and filter	C			R		
Hydraulic oil and filter	C					R
Suspension	C				I	
Battery		C				
Sprockets	C	I L				
Tracks	C	I				
Tires	C	I				
Brake				I		
Universal joints			L			
All linkages			L			
Wheel bearings		L				

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Minor Repairs

Removal of a Track

— Raise vehicle.

◆ **WARNING : Vehicle must be supported securely beneath frame.**

— Release track tension by bleeding hydraulic track tensioner.

— Bring track joint beneath rear wheel.

— Uncouple track by removing the two crosslinks located at belt joint.

— Pull track backward from underneath wheels.

◆ **WARNING : Proceed slowly and with extreme care.**

Installation of a Track

— Raise vehicle.

◆ **WARNING : Vehicle must be supported securely beneath frame.**

— Spread track under wheels.

— Adjust hydraulic track tensioner to its minimum length.

— Lower vehicle on track

— Place track over wheels and pull track forward.

— Remove three or four crosslinks from end of track which is located over sprocket.

— Join both track ends using two crosslinks.

— Install remaining crosslinks.

— Adjust tack tension.

Removal of a Drive Sprocket

— Raise vehicle.

◆ **WARNING : Vehicle must be supported securely beneath frame.**

— Release track tension by bleeding hydraulic track tensioner.

— Bring track joint under sprocket.

— Uncouple track by removing two crosslinks located at belt joint.

— Pull track backward to clear sprocket.

— Remove nuts holding the sprocket to hub and remove sprocket.

Installation of a Drive Sprocket

To install a drive sprocket, reverse the removal procedure.

Removal of a Tire

◯ NOTE : As the hub is an intergral part of wheel, the complete wheel assembly has to be removed from the wheel spindle.

— Raise vehicle.

◆ **WARNING : Vehicle must be supported securely beneath frame.**

— Release track tension by bleeding hydraulic track tensioner.

— Spread and hold apart top and bottom of track by means of a 70 cm (27 in) lever.

— Remove hub cap, cotter pin and spindle nut, and pull wheel out.

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NOTE : When removing a rear wheel, track must be uncoupled and pulled away.

CAUTION : Care should be taken to protect seals, and prevent dirt from entering wheel bearings.

Installation of a Tire

To install a tire, reverse removal procedure.

Removal of a Suspension Arm

— Remove tire, see above.

CAUTION : Suspension arm must be installed at the correct angle. Mark flexitor shaft where slot in suspension arm is located. New suspension arm should be installed in same location.

— Remove bolt that tightens suspension arm to flexitor shaft and pry suspension arm off flexitor shaft.

Installation of a Suspension Arm

To install a suspension arm, reverse the removal procedure paying attention to the following :

Each arm is identified with letter R or L. If arm stamped R is mounted in a trailing position, install it on right side of vehicle. If same arm is mounted, in a leading position, install it on left side of vehicle. Arms stamped L, reverse procedure.

CAUTION : Install suspension arm at correct angle.

STORAGE

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If vehicle is to remain idle for a prolonged period of time, certain precautions should be taken to protect it from corrossion and rust accumulation. The following storage procedure is recommended :

- Clean vehicle thoroughly.
- Make a thorough inspection and make all necessary repairs.
- Lubricate as per maintenance schedule.
- Prepare engine according to the instructions given in engine manufacturer's manual.
- Check oil in the differential. If close to a change period, drain and refill with new oil.
- Park vehicle on pavement if possible or on coarse gravel and in a dry place. If possible lift and block vehicle off ground to take weight off wheels and tracks.
- Release tension on both tracks.
- Release load on all hydraulic circuits by operating the valves and leaving the levers in "float" position.
- Remove battery and connect to a trickle charger or check and rechange monthly.
- If vehicle is not under shelter make sure drain plug in bottom of frame is removed, otherwise water will accumulate in frame and may find its way into differential.

SPECIFICATIONS

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ENGINE	
Make	Ford
Model	LSG-423 2.3 L (140 CID)
Type	Gasoline, in line
No of cylinders	4
Power at RPM (without fan)	58.9 kW (80 H.P.) @ 4000 RPM
Torque at RPM (without fan)	162 N•m (119 lbf•ft) @ 2800 RPM
Firing order	1-3-4-2
Stroboscopic timing at idle speed	10° BTDC
Ignition system	Solid state
Spark plug : - Make - Model - Spark plug gap	 Motorcraft AWSF-42 0.81-0.91 mm (0.032-0.036")
Oil filter	Full flow
Oil pressure : - Hot @ 2000 RPM	 276 kPa (40-60 PSI)
CARBURATION	
Make	Holley
Type	1940
Engine idle speed	600-650 RPM in Drive
Maximum allowable RPM	4500 RPM
Air filter type	Dry
COOLING SYSTEM	
Engine : - Type - Water/antifreeze mixture - Antifreeze - Thermostat - Radiator cap pressure	 Liquid/radiator/fan cooled 50/50 Ethylene glycol Opens at 88°C (190°F) 48.2 kPa (7 PSI)
Transmission : - Type	 Radiator/fan cooled
Differential : - Type	 Radiator/fan cooled
Fan : - Type - Drive	 Blowing V-belt

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POWER TRAIN	
Torque converter stall ratio	2.85 @ 1
Transmission : - Make - Model - Gear ratio	 Ford Automatic C-3 1st 2.41 @ 1 2nd 1.47 @ 1 3rd 1.00 @ 1 Rev. 2.11 @ 1
Differential : - Make - Model - Gear ratio	 Bombardier Planetary controlled 5.89 @ 1
Final drive gear ratio	1.52 @ 1
Propeller shaft : - Type - U-joint	 Spicer - 1310 series Spicer - 1310 series
Track : - Width - winter only - all year - Length - Cross link type 32" track 28" track - Number (for one track)	 81.3 cm (32") 71.1 cm (28") 6.12 m (241") Aluminium* Forged spring steel 77
Wheels : - Quantity - Tires - Dimensions - Ply rating	 8 Pneumatic 11.68 cm x 25.4 cm dia. (4.60" x 10") dia. 6
HYDRAULIC SYSTEM	
Hydraulic pump : - Make - Model - Type - Capacity - Oil pressure - Drive	 Webster 29YB series Gear 7.6 L (2 U.S. gal.)/min @ 1650 RPM @ 690 kPa (100 PSI) 13790 kPa (2000 PSI) V-belt
Control valves : - Make - Type	 Hydrocontrol 2, 4 or 6 spools

*Aluminum cross links should be used in winter only.

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ELECTRICAL SYSTEM	
Alternator : - Make - Output - Drive	 Motorcraft 60 A V-belt
Battery : - Type - Voltage x qty	 lead/acid 12 volts x 1
Starter : - Make - Rotation	 Motorcraft Clockwise
Voltage	12 volts
VEHICLE	
Frame material	Formed steel
Cab material	Steel
Length overall	315 cm (124")
Width overall : - with 32" track - with 28" track	 220 cm (86-5/8") 200 cm (78-3/4")
Height overall	200.7 cm (79")
Shipping weight	1500 kg (3300 lb)
Ground pressure (0-penetration) : - with 32" tracks - with 28" tracks	 4.3 kPa (0.62 PSI) 4.6 kPa (0.67 PSI)
Ground clearance	31.8 cm (12-1/2")
Load capacity	454 kg (1000 lb)
Maximum speed	22 km/h (13.5 MPH)
Gradeability (at maximum rated load) : - Uphill - Downhill - Sidehill	 Up to 75 % Up to 75 % Up to 50 %

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LIQUID TYPES AND CAPACITIES	
Engine cooling system - Antifreeze	11.5 L (3 U.S. gal) Ethylene glycol
Fuel tank - Fuel type	42 L (11.1 U.S. gal) Gasoline 83 M/91 R octane
Engine oil (with filter) - Oil type	9.5 L (9 U.S. qts.) SAE 20W40 above 32°C (90°F) SAE 10W30 between 32°C (90°F) and – 12°C (10°F) SAE 5W20* below – 12°C (10°F) API service CC/SE/SF
Transmission oil - Oil type	9 L (8.5 U.S. qts.) Dextron II
Differential oil - Oil type - Hydraulic oil type	8 L (7.5 U.S. qts.) Positraction GM 992 867 Dexron II ou Ford type F (M2C 33F)
Grease type	Grease resistant to water and which will remain fluid under cold temperatures.
BRAKE	
Service brake	Steering lever operated brake bands in differential (see "Driving instrutions" section)
Emergency/Parking brake	Foot-operated disc brake (see "Controls/instruments" section)

TORQUE SPECIFICATIONS		
Crosslink/track	5/16"-24 gr.8	20-27 N•m (15-20 lbf•ft)
U-bolt/drive axle housing	3/8"-24	38-47 N•m (28-35 lbf•ft)
Flexitor shell/frame	3/8"-24 gr.5	38-47 N•m (28-35 lbf•ft)
Suspension arm	1/2"-20 gr.8	129-163 N•m (95-120 lbf•ft)
Drive sprocket/hub	5/16"-24 gr.8	20-26 N•m (15-19 lbf•ft)
Flange companion/ pinion shaft (diff.)		107-203 N•m (125-150 lbf•ft)
Propeller shaft/ flange companion (diff.)	3/8"-24 gr.5	38-47 N•m (28-35 lbf•ft)
Rubber mount/ engine support	3/8"-16	38-47 N•m (28-35 lbf•ft)
Engine support/engine	5/16"-24 gr.5	14-18 N•m (10-13 lbf•ft)

*Not recommended for severe service - including high RPM operation.

Differential Filter Foam SP1654A

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Contamination Control

Contaminated fluid leads to leakage and eventual component failure. Hydraulic system contamination is produced by three major sources:

A) Built-in contaminants;

B) System-generated contaminants;

C) Externally-introduced contaminants.

A) Built-in contaminants include: core sand, drawing compounds, metal chips from threaded fittings, paint flakes, pipe scale, rust preventatives, sealants and weld spatter. These are unavoidable, but usually are easily controlled by filter system.

B) System-generated contaminants include carbon and varnish from overheated oil, fiber particles from filters and metal particles scraped off moving surfaces in pumps, valves and cylinders, as well as particles from elastomeric seals and persistent emulsions. These tend to cause little trouble in conventional hydraulic systems but their small size makes them difficult to remove.

C) Externally-introduced contaminants include airborne metal flakes, dust, bacteria, bearing grease, cutting oil, dirt, lint from rags and water, wax lubricants, wrong oil and particles which enter when equipment is opened for repair or oil addition. Prevent their entry into systems and you escape the most numerous and damaging contaminants.

Contamination, regardless of its sources, can largely be controlled by these precautions:

Make sure removable reservoir cover fits well, is gasketed and tightly bolted.

Seal all clearance holes to prevent dust suction by reservoir and drain line.

Leakage Reduction

Uncontrolled leakage creates safety hazards, increases cleaning costs and requires more make up oil and the labor to add it. Static joint leakage occurs at tube fittings and connections, pipe threads and joints, and at flexible hose couplings. Other sites include cylinder heads, valve caps, manifold joints, filter and pump. These leaks are caused by unsuitable joints, incomplete joining, faulty pipe and hose layout which is prone to vibration, strain and damage caused by the water hammer effect. Effective control of static joint leakage involves regular inspection and correction of faulty joints. Leakage from moving parts is found at cylinder piston and rod seals, valve stems, and pump or motor shaft seals.

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Preventive Maintenance

▼ CAUTION : Only maintenance personnel trained on hydraulic equipment should work on it.

Controlling hydraulic system reliability depends on concerned operators and well-trained maintenance personnel. If operators are taught to shut off equipment when a hose or hydraulic line breaks, or leaks, pump and fluid are saved and downtime is reduced.

▼ CAUTION : Avoid oil contamination when checking or adding oil.

HYDRAULIC SCHEMATIC DIAGRAM

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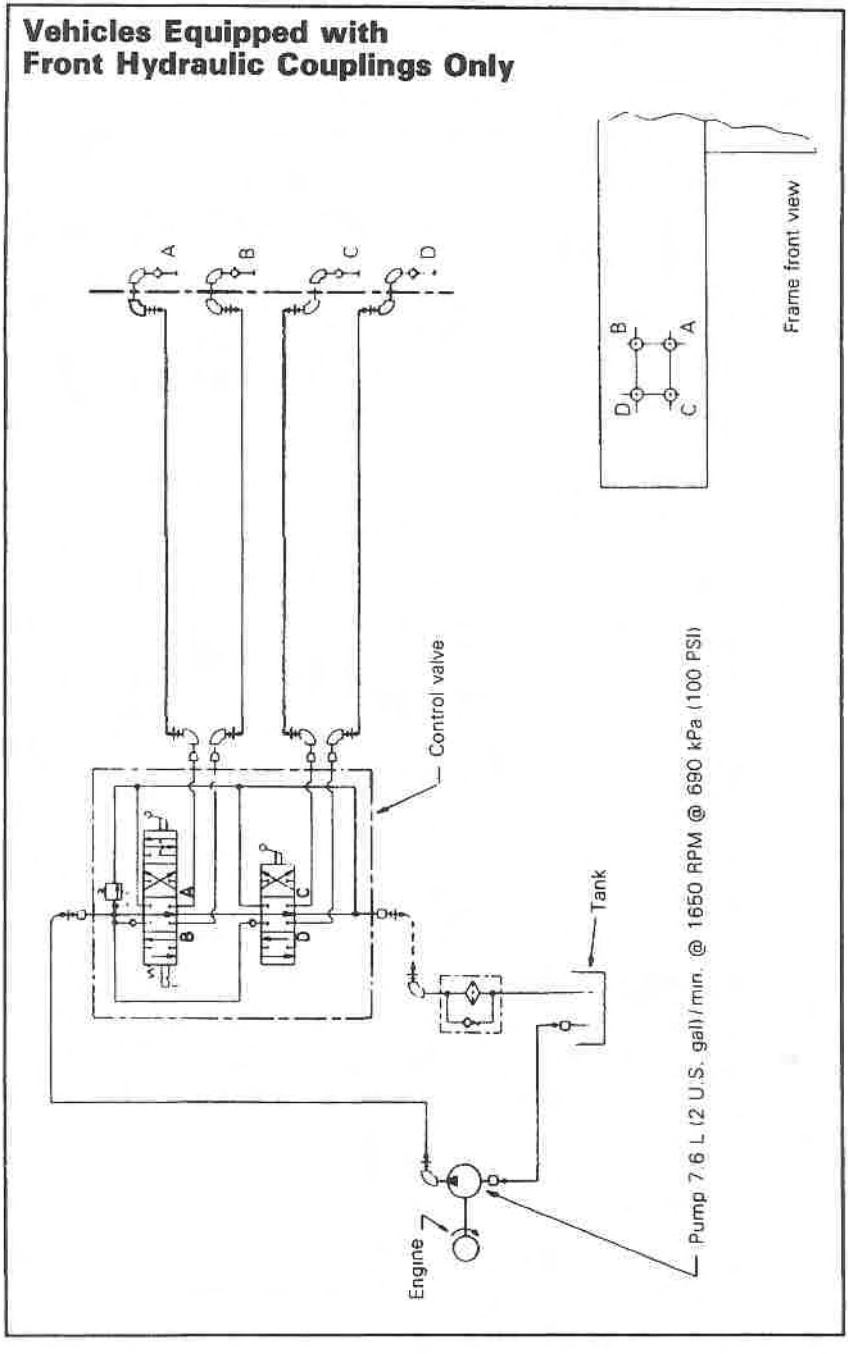
Vehicles Equipped with Front Hydraulic Couplings Only



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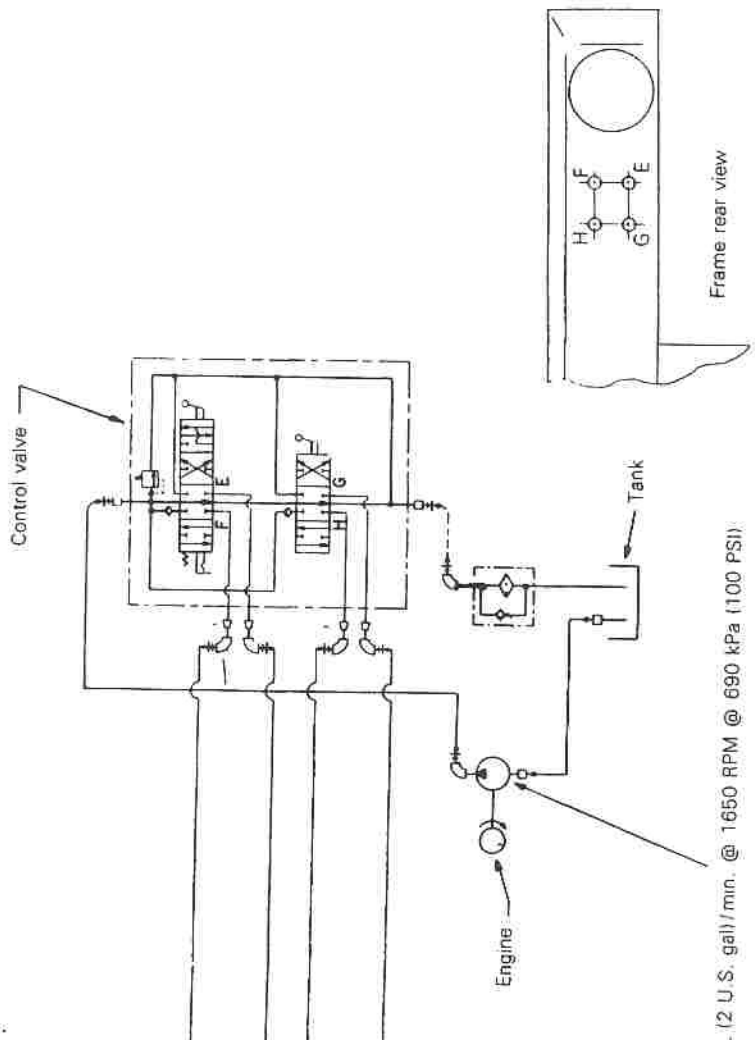
Vehicles Equipped with Rear Hydraulic Couplings Only



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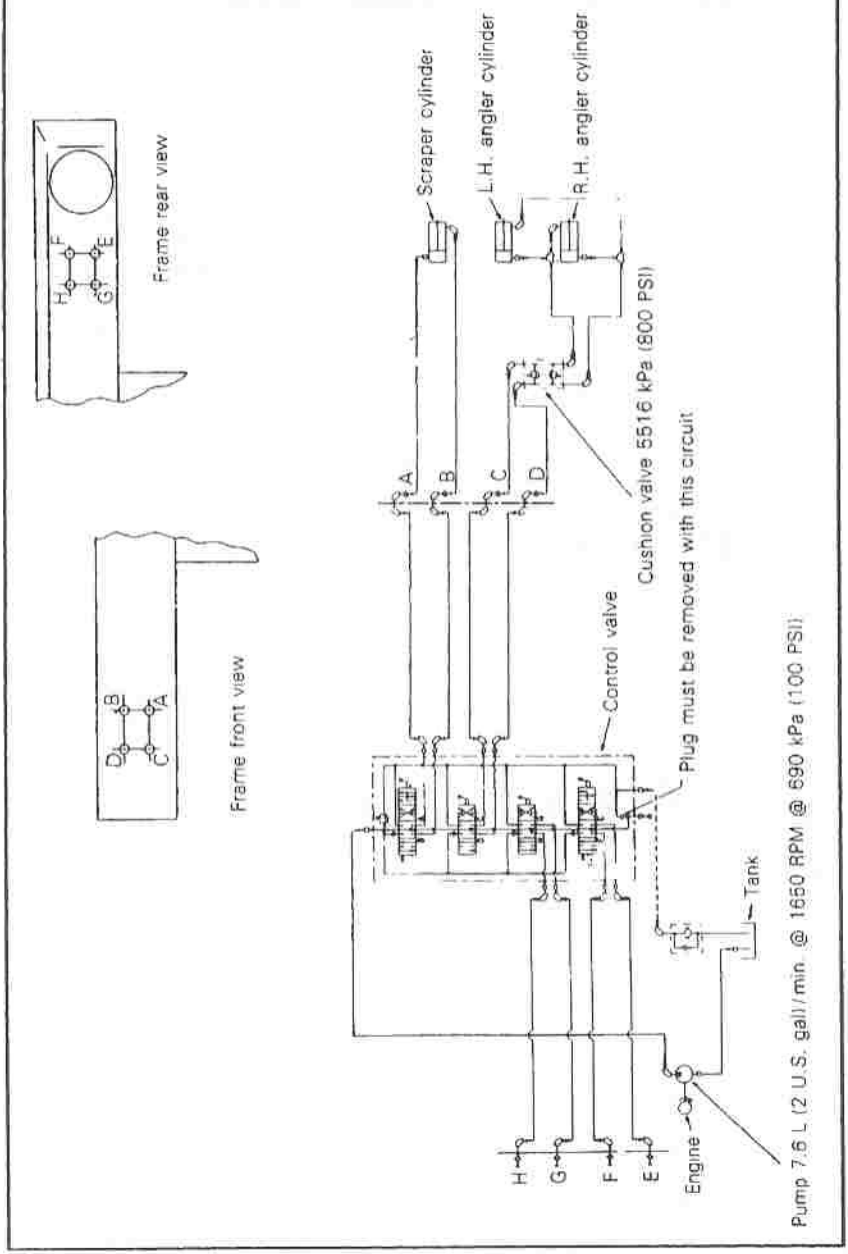
Vehicles Equipped with Four Front and Four Rear Hydraulic Couplings



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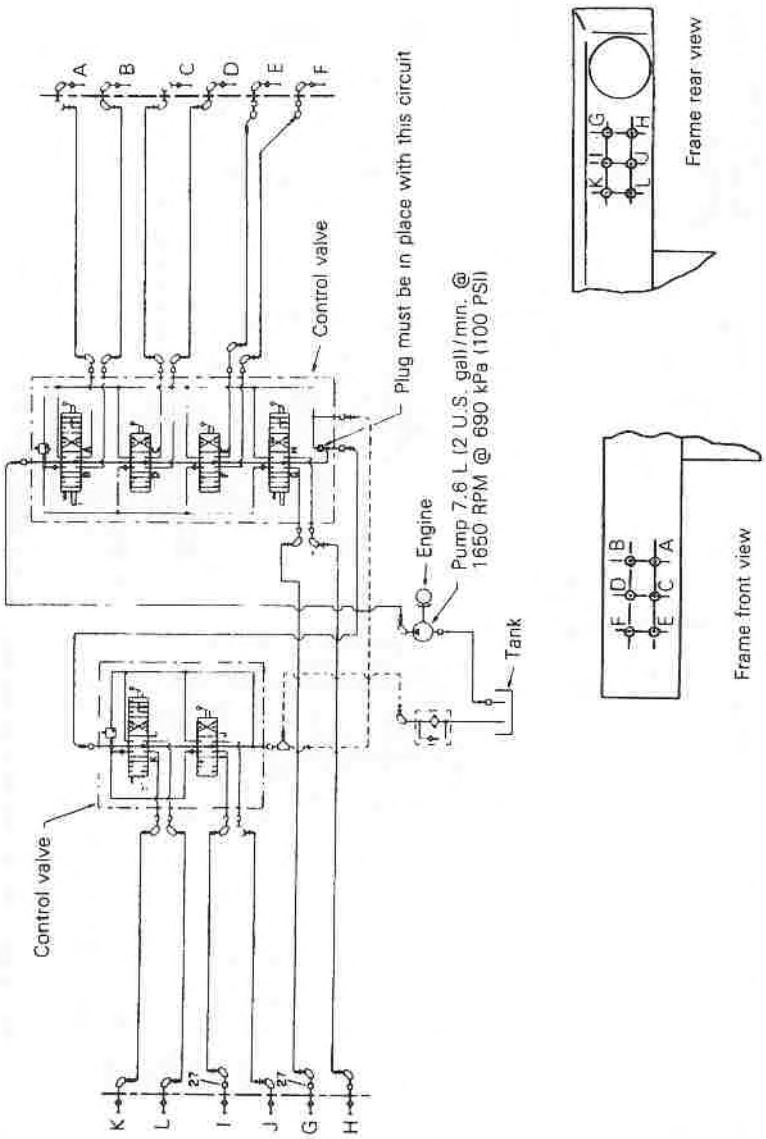
Vehicles Equipped with Six Front and Six Rear Hydraulic Couplings



ELECTRIC WIRING DIAGRAM

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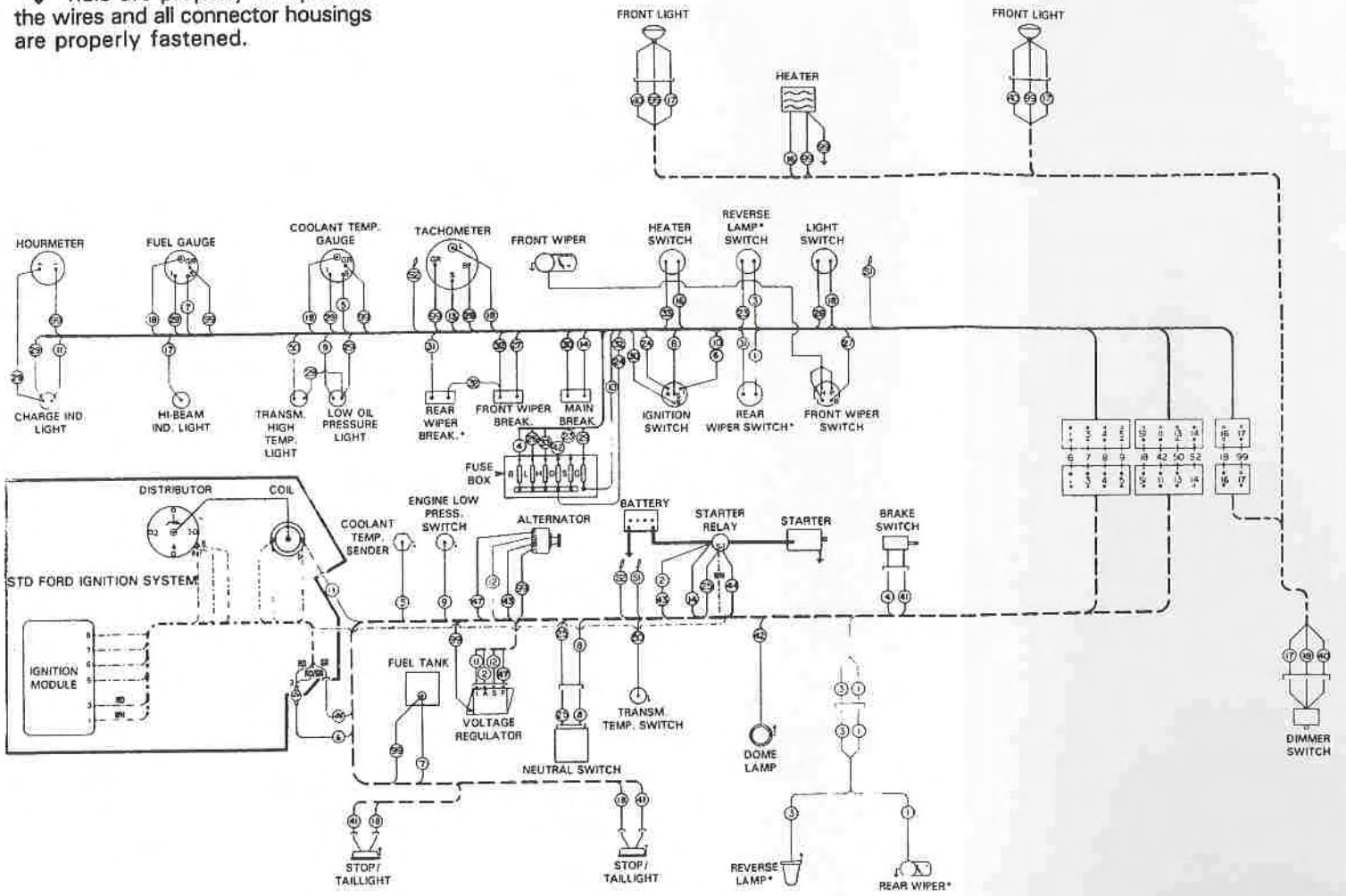
◆ WARNING : Ensure all terminals are properly crimped on the wires and all connector housings are properly fastened.



CAB HARNESS

DASH HARNESS

ENGINE HARNESS

ENGINE MAIN HARNESS
FOR THIS SECTION SEE "2.3 LITRE ENGINE, FORD MAINTENANCE BOOK"

COLOR CODES	
WH	WHITE
RD	RED
GR	GREEN
BR	BROWN

FUSE BOX

B = BRAKE (15 A)
L = LIGHT (15 A)
H = HEATER (15 A)
D = DOME (15 A)
S = SPARE (15 A)
G = GAUGES (15 A)

ABBREVIATIONS

TEMP.	TEMPERATURE
PRESS.	PRESSURE
TRANSM.	TRANSMISSION
BREAK.	BREAKER
IND.	INDICATOR
*	OPTIONAL

SI* METRIC INFORMATION GUIDE

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BASE UNITS

DESCRIPTION	UNIT	SYMBOL
length	meter	m
mass	kilogram	kg
force	Newton	N
liquid	liter	L
temperature	celsius	°C
pressure	kilopascal	kPa
torque	Newton meter	N•m
speed	kilometer per hour	km/h

PREFIXES

PREFIX	SYMBOL	MEANING	VALUE
kilo	k	one thousand	1000
centi	c	one hundredth	0.01
milli	m	one thousandth	0.001
micro	μ	one millionth	0.000001

CONVERSION FACTORS

TO CONVERT	TO †	MULTIPLY BY
in	mm	25.4
in	cm	2.54
in^2	cm^2	6.45
in^3	cm^3	16.39
ft	m	0.3
oz	g	28.35
lb	kg	0.45
lbf	N	4.4
lbf•**in**	N•m	0.11
lbf•ft	N•m	1.36
lbf•ft	lbf•**in**	12
PSI	kPa	6.89
imp. oz	U.S. oz	0.96
imp. oz	mL	28.41
imp. gal	U.S. gal	1.2
imp. gal	L	4.55
U.S. oz	mL	29.57
U.S. gal	L	3.79
MPH	km/h	1.61
Fahrenheit	Celsius	(°F − 32) / 1.8
Celsius	Fahrenheit	(°C x 1.8) + 32

* The international system of units abbreviates "SI" in all languages.

† To obtain the reserse sequence, divide by the given factor. To convert "mm" to "in", divide by 25.4.