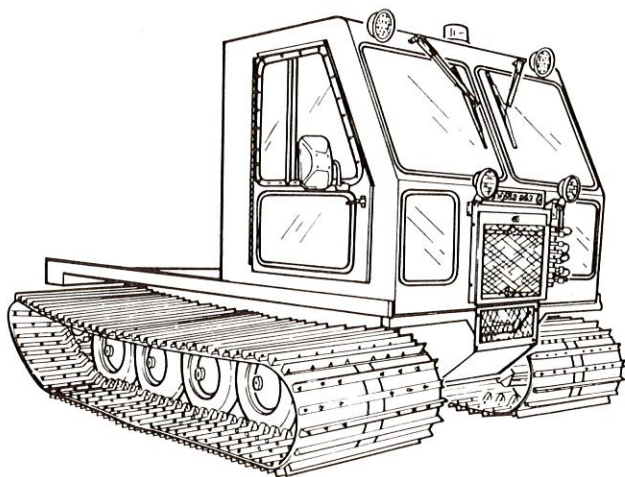
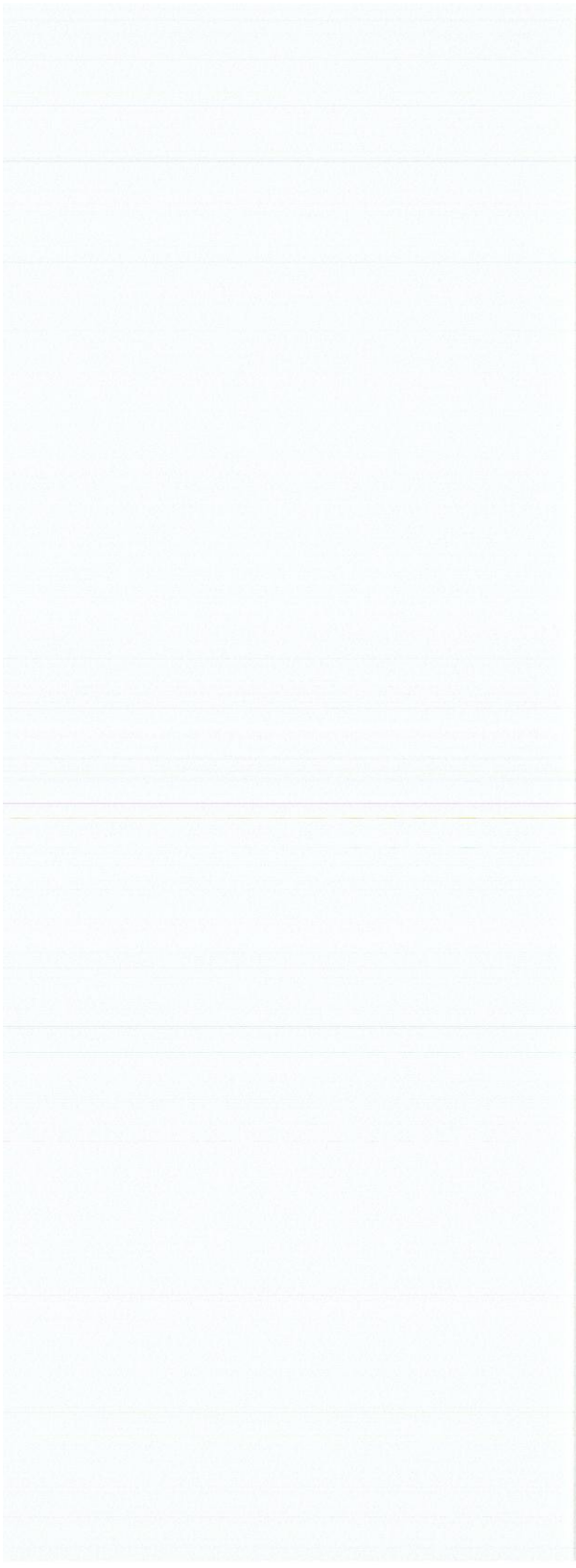




# Operator's manual SKIDOZER SV-252 G







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*Muskeg (carrier)	*TF-20
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*B-15 (skidder)	*TF-160
*B-15 (logger)	*TF-240
*B-20 (transporter)	*TF-300TT
*B-10 (transporter)	*TF-305
*B-8 (transporter)	*TF-360
*Skidozer 302 HD	*TF-600
	*TF-900

## FOREWORD

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The operator's manual has been prepared to acquaint the owner and/or operator(s) of an industrial tracked vehicle with the various controls and instruments, inspections, maintenance and safe driving instructions. Each 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.

Most specifications are given in both metric and customary units. Where precise accuracy is not required, some conversions are rounded to even numbers 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 the 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 the 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 a good visibility.
- The throttle mechanism must be checked for free movement before starting the engine.
- Seat and seat belt must be adjusted so the operator may reach the controls easily.
- 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 when dials indicate malfunction.
- Never leave the engine running while unattended.
- Operate at moderate speed.
- Avoid abusive operation.
- Avoid or remove any obstacle that may cause harm.
- Do not make sharp turns at high speed.
- While hauling equipment, remember to brake or turn slowly. "Jack-knife" possibilities are always present.
- Drop-offs must be negotiated 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 drop-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.
  - Many government/private agencies publish instruction booklets pertaining to special off-road operations, including desert driving. Contact the local land governing office for publication lists.
  - Only perform procedures as detailed in this manual. Unless other-wise 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 with a new one. Tighten as specified.

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

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**THIS MANUAL SHOULD REMAIN WITH THE VEHICLE AT TIME OF RESALE.**

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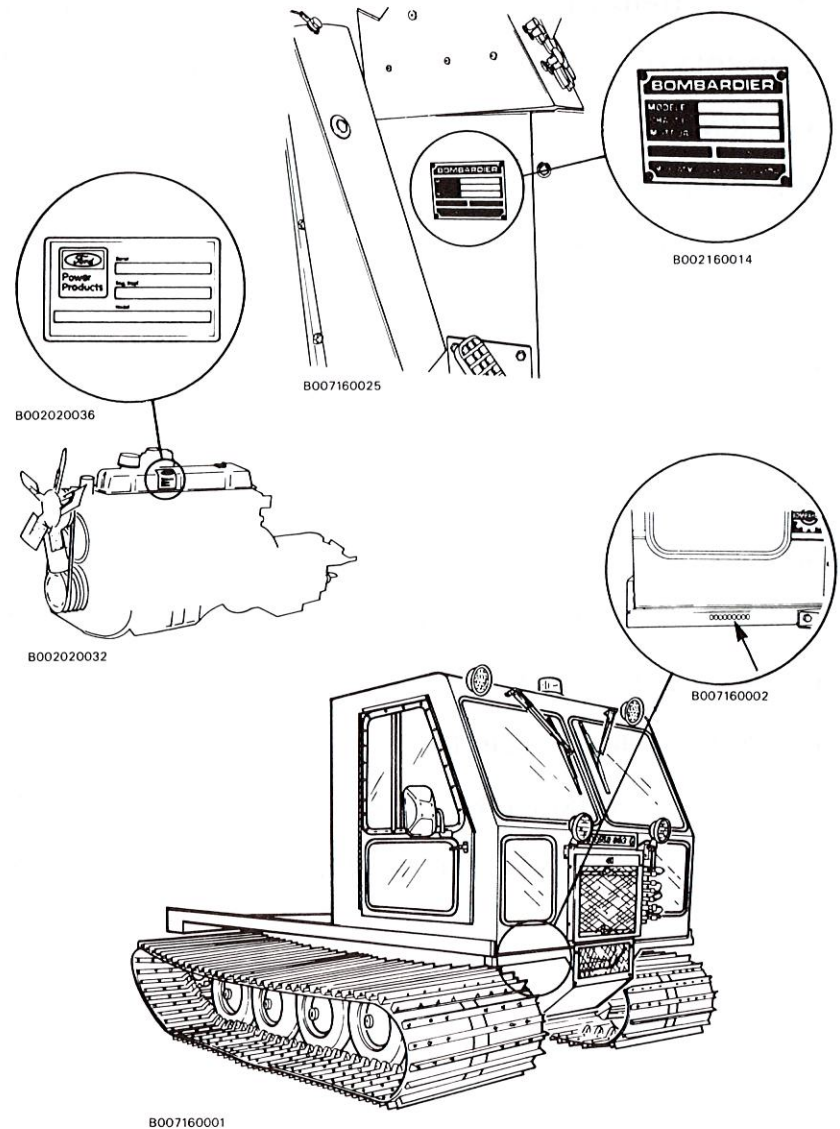
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## HOW TO IDENTIFY YOUR VEHICLE

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

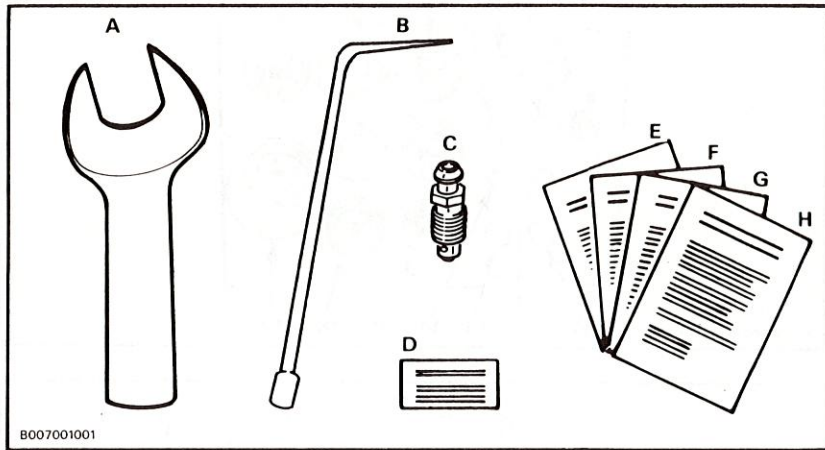
○ **NOTE:** It is strongly recommended that you take note of all the serial numbers on your vehicle and supply them to your insurance company. It will surely help in the event the vehicle is lost or stolen.





# TOOLS & LITERATURE \_\_\_\_\_

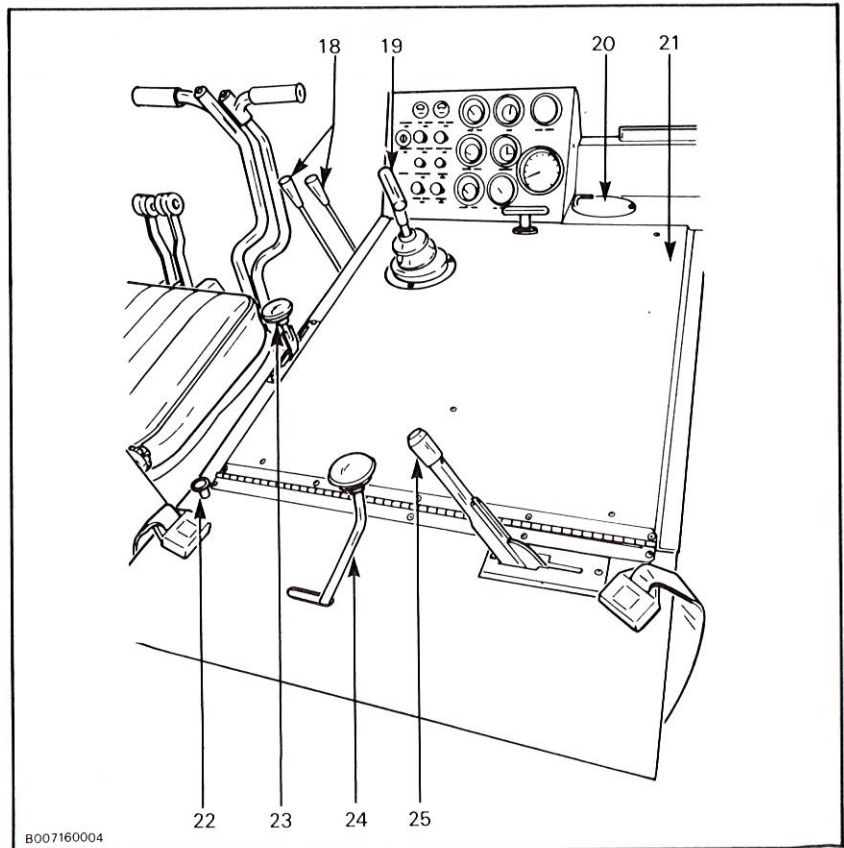
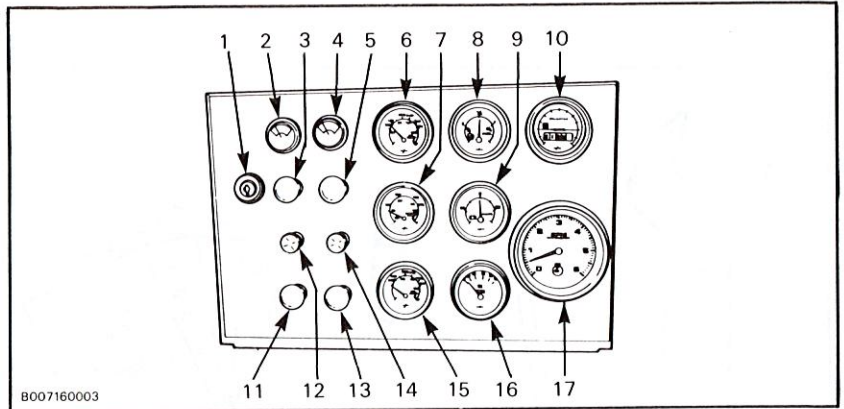
As standard equipment, each new vehicle is supplied with a basic tool kit and literature.



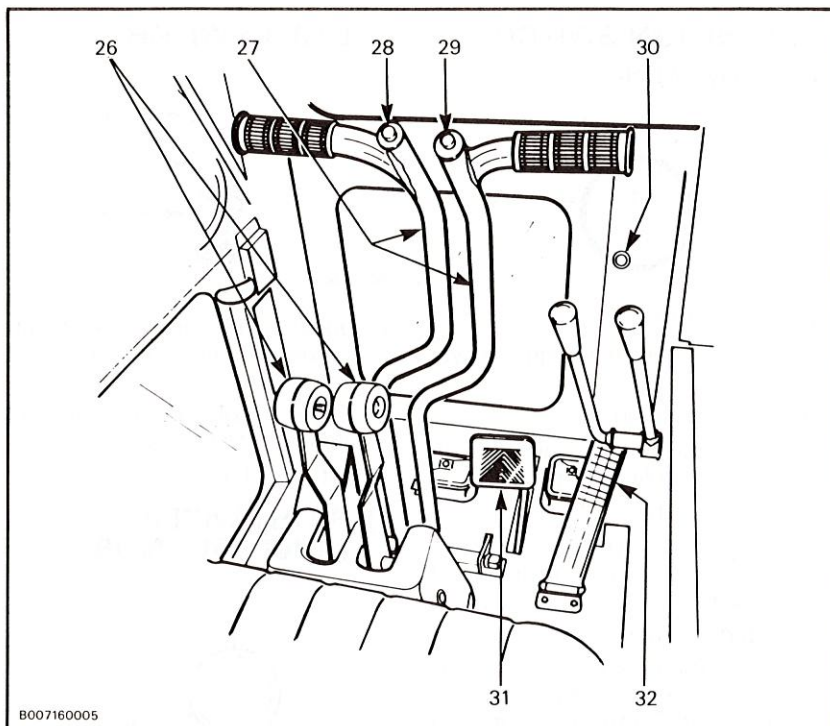
- A) Track adjuster wrench
- B) Hydraulic track tensioner bleeder
- C) Bleeder screw (spare part)
- D) Bombardier warranty card
- E) Ford literature
- F) Parts catalog
- G) Operator's manual
- H) Safe driving guide

# CONTROLS/INSTRUMENTS \_\_\_\_\_

## CONTROLS/INSTRUMENTS



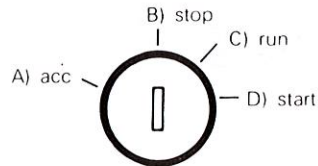




- |                                       |                                    |
|---------------------------------------|------------------------------------|
| 1-Ignition switch                     | 17-RPM indicator                   |
| 2-Left wiper control knob             | 18-Hydraulic control levers (rear) |
| 3-Light switch                        | 19-Hydraulic control lever (front) |
| 4-Right wiper control knob            | 20-Radiator cap access cover       |
| 5-Back-up light switch                | 21-Engine hood                     |
| 6-Differential oil temperature gauge  | 22-Choke control knob              |
| 7-Coolant temperature gauge           | 23-Gear shift lever                |
| 8-Fuel level indicator                | 24-Two speed gear box shift lever  |
| 9-Ammeter                             | 25-Parking brake                   |
| 10-Hour meter                         | 26-Power steering levers           |
| 11-Rear wiper control knob            | 27-Steering levers                 |
| 12-Right heater fan switch            | 28-Wiper single stroke switch      |
| 13-Top flasher switch                 | 29-Horn switch                     |
| 14-Left heater fan switch             | 30-Parking brake indicator light   |
| 15-Transmission oil temperature gauge | 31-Emergency brake                 |
| 16-Engine oil pressure gauge          | 32-Throttle pedal                  |

## 1) IGNITION SWITCH

### Four-way switch



B001160011

#### A) "Accessories" position

Supplies the main lighting system.

#### B) "Stop" position

Stops the engine and cuts off power supply to vehicle.

#### C) "Run" position

Supplies the whole vehicle and the engine keeps on running at this position.

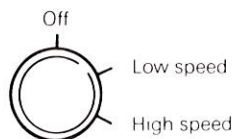
#### D) "Start" position

When the engine must be started, turn the key two (2) steps from the "stop" position and maintain this position. Once the engine has started, bring back the 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 fifteen (15) seconds at a time to avoid over-heating it.

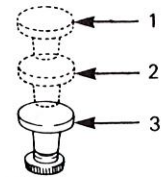
## 2) LEFT WIPER CONTROL KNOB



B003160013

Controls the left wiper speed.

## 3) LIGHT SWITCH



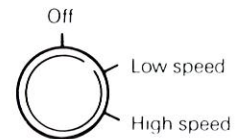
B0030160009

1) Upper headlamps, lower headlamps and tail light are lit at this position.

2) Upper headlamps and tail light are lit at this position.

3) "Off" position.

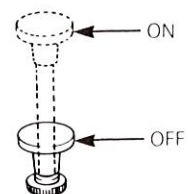
## 4) RIGHT WIPER CONTROL KNOB



B003160013

Controls the right wiper speed.

## 5) BACK-UP LIGHT SWITCH



B003160010

## 6) DIFFERENTIAL OIL TEMPERATURE GAUGE

Indicates the differential oil temperature. Maximum normal operating temperature is 93°C (200°F).

▼ **CAUTION:** As soon as the oil temperature exceeds 121°C (250°F), allow the oil to cool down before loading the vehicle, or stop the engine and consult a mechanic.

## 7) COOLANT TEMPERATURE GAUGE

Indicates the engine coolant temperature. It must be checked frequently. Normal operating temperature is 82°C (180°F).

▼ **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.

## 8) FUEL LEVEL INDICATOR

Indicates the fuel level contained in the tank.

## 9) AMMETER

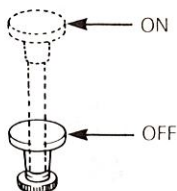
Indicates whether current is flowing into or out of the battery. A high charging rate is an indication that the battery is low and in need of a charge. When the battery is near full charge, the ammeter will show a low charging rate.

## 10) HOUR METER

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

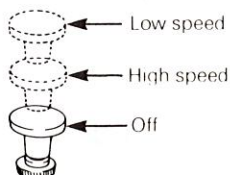
This instrument can be used as an indication for maintenance of the vehicle as per the maintenance schedule of this manual.

## 11) REAR WIPER CONTROL KNOB



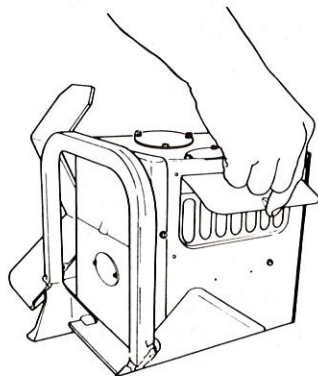
B003160010

## 12) RIGHT HEATER FAN SWITCH



B003160009

Controls the right heater fan speed.

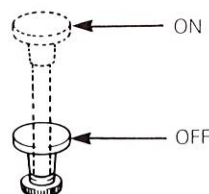


B007160006

○ **NOTE:** Three shutters can be activated manually to send hot air in any direction.

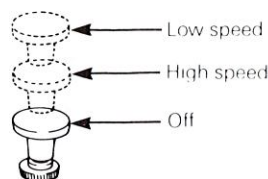


### 13) TOP FLASHER SWITCH



B003160010

### 14) LEFT HEATER FAN SWITCH



B007160009

Controls the left heater fan speed.

### 15) TRANSMISSION OIL TEMPERATURE GAUGE

Indicates the transmission oil temperature. Maximum normal operating temperature is 93°C (200°F).

▼ **CAUTION:** As soon as the oil temperature exceeds 121°C (250°F), allow the oil to cool down before loading the vehicle, or stop the engine and consult a mechanic.

### 16) ENGINE OIL PRESSURE GAUGE

Indicates the engine oil pressure. Normal operating oil pressure is 2.8 - 4.1 bars (40 - 60 PSI) at 2000 RPM.

▼ **CAUTION:** Never run the engine when oil pressure is below 1.4 bar (20 PSI) at idle speed, as this will cause severe damage to the engine.

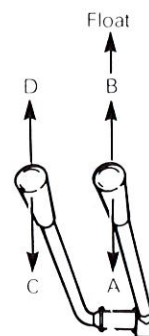
### 17) RPM INDICATOR

This instrument indicates in RPM the operating speed of the engine.

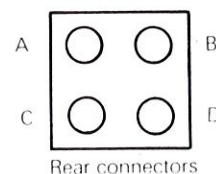
▼ **CAUTION:** In no case the engine speed should exceed 3600 RPM.

### 18) HYDRAULIC CONTROL LEVERS (REAR)

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



B007160007



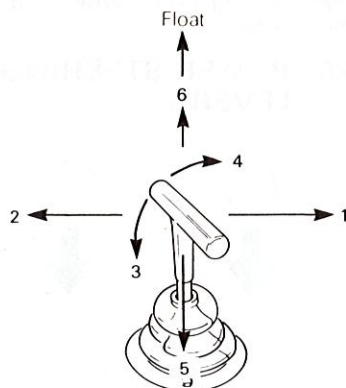
B007160008

Further than position "B" is float position.

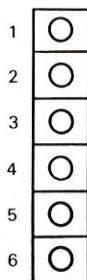
○ **NOTE:** When not engaged in float position, the lever normally return to neutral position.

## 19) HYDRAULIC CONTROL LEVER (FRONT)

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



B007160009



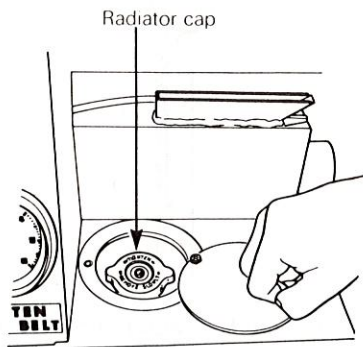
Front connectors

B007160010

Further than position "6" is float position.

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

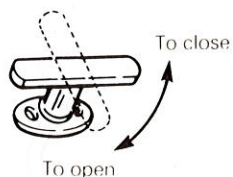
## 20) RADIATOR CAP ACCESS COVER



B007160011

Gives access to the radiator cap.

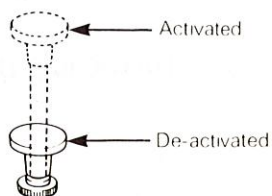
## 21) ENGINE HOOD



B003160001

Allows access to the engine and its components.

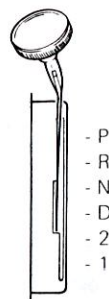
## 22) CHOKE CONTROL KNOB



B003160010

Controls the opening and closing of the choke to the carburetor.

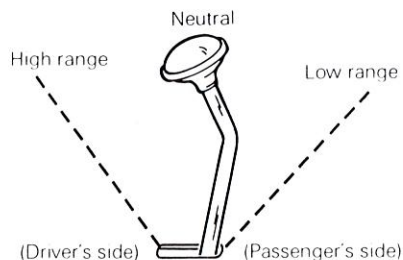
## 23) GEAR SHIFT LEVER



B007160012

The Ford C-6 automatic transmission has six (6) positions of the gear shift lever (for gear shift lever operation, refer to "Driving instructions" section).

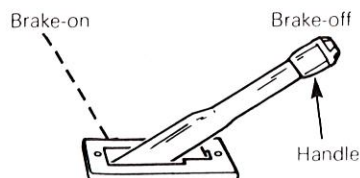
## 24) TWO SPEED GEAR BOX SHIFT LEVER



B007160013

The two speed gear box has three (3) positions of the shift lever (for shift lever operation, refer to "driving instructions" section).

## 25) PARKING BRAKE

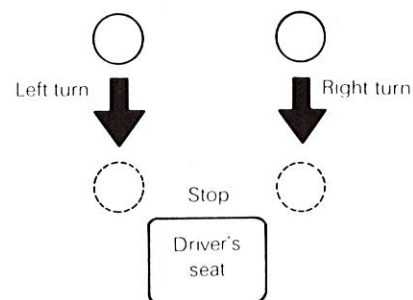


B007160014

This brake works with a disc. Brake tension can be adjusted by turning the handle in one direction or the other. Turn clockwise to increase tension and counter-clockwise to reduce it.

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

## 26) POWER STEERING LEVERS



B003160003

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

To brake, simultaneously pull both steering levers.

**WARNING:** Power steering is more positive than standard steering and provides better response with less effort. For this reason power steering should be used with caution, especially when driving near maximum speed or on icy surfaces to prevent sudden turns, which could result in side-slippage and loss of control.



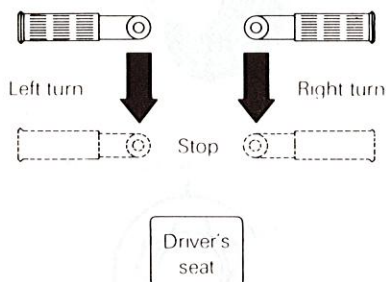


B007160015

**NOTE:** For ease of access to the driver's seat, the power steering levers can be pushed down.

## 27) STEERING LEVERS

Steering levers allow driving and braking of the vehicle.



B002160015

To steer the vehicle in a given direction, pull the lever of that corresponding direction.

To brake, simultaneously pull both steering levers.

## 28) WIPER SINGLE STROKE SWITCH

For a single stroke of the front left wiper, momentarily push on the knob located on top of the left steering lever.

## 29) HORN SWITCH

To activate the horn, push on the knob located on top of the right steering lever.

## 30) PARKING BRAKE INDICATOR LIGHT

Lights when the parking brake is activated.

**CAUTION:** Do not attempt to set the vehicle in motion while the parking brake is applied.

## 31) EMERGENCY BRAKE

This brake works with the same disc as per the parking brake.

## 32) 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 comes back to idle.

**CAUTION:** Throttle mechanism must be checked for free movement before starting the engine.

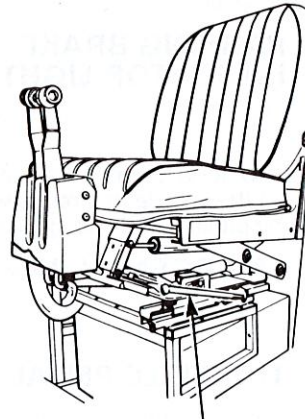
## SEAT BELTS

**WARNING:** The seat belt must be adjusted so the operator may reach controls easily.

**WARNING:** To help lessen the chance 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.

## DRIVER'S SEAT

BACK AND FORTH  
ADJUSTMENT

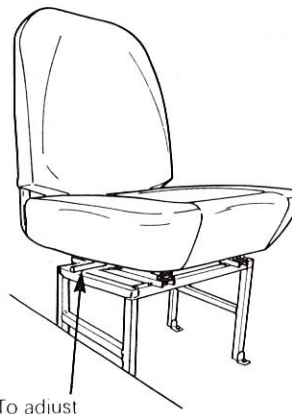


B007160016

◆ **WARNING:** The seat must be adjusted so the operator may reach controls easily.

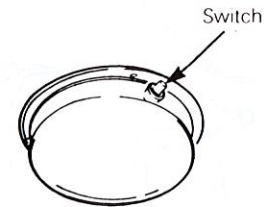
## PASSENGER SEAT

BACK AND FORTH  
ADJUSTMENT



B007160017

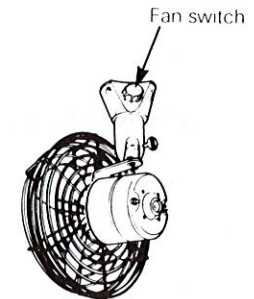
## DOME LAMP



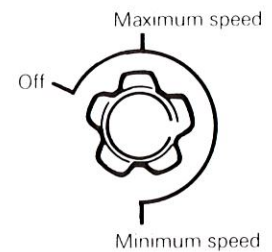
B003160020

Press switch to turn on dome lamp, press again to turn it off.

## FAN



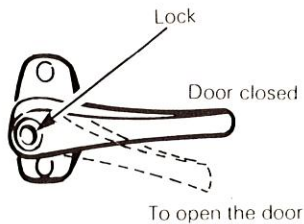
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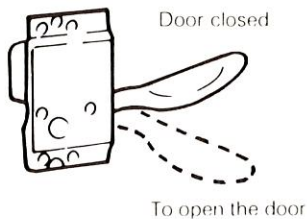
## DOOR HANDLES

### OUTSIDE

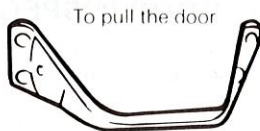


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### INSIDE

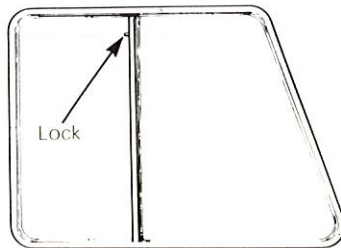


B002160027



B003160021

## SIDE WINDOWS

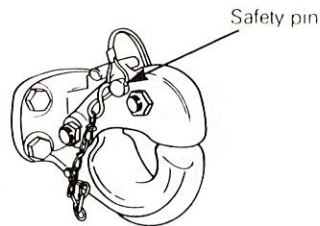


To open To close

B002160016

Before opening or closing the window, unlock it by pulling the lock downwards.

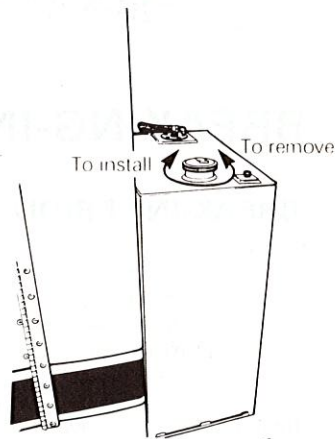
## HITCH



B003160012

**WARNING:** When towing, always ensure to lock the hook attachment using the applicable safety pin.

## FUEL TANK CAP



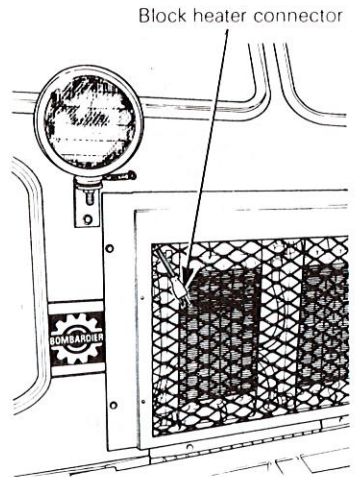
B007160020

**CAUTION:** Fill the tank at the end of each day of operation to help prevent moisture from collecting and freezing in 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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## BLOCK HEATER



B007160021

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## BREAKING-IN

### BREAK-IN PERIOD

A break-in period is recommended before running the vehicle at full load. Recommended break-in period is twenty-five (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. Frequently check the instrument panel.

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

Also if the engine oil pressure gauge indicates a low oil pressure (see controls/instruments section), stop the engine.

Always find what causes the problem and remedy it before starting the engine.

### 25 - HOUR INSPECTION

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

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**The inspection is at the expense of the vehicle owner.**

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# PRE-OPERATION INSPECTION

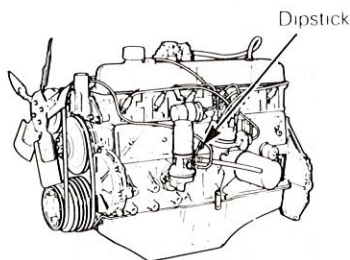
Care should always be taken to assure that the vehicle is in good mechanical condition before operating it. Regular preventative maintenance and "pre-operation inspection" by each working shift will extend vehicle life and save on costly down-time. Special attention should be given to the following items:

**CAUTION:** All liquid levels must be checked when the vehicle is on a flat and level surface.

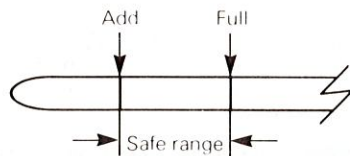
## BEFORE STARTING THE ENGINE

### Engine oil level

To gain access to the dipstick, raise the engine hood.



B002020001



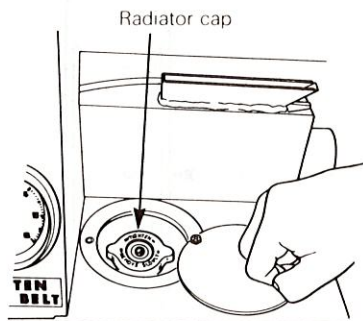
B002020003

The oil level should always be within the safe range of the dipstick.

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

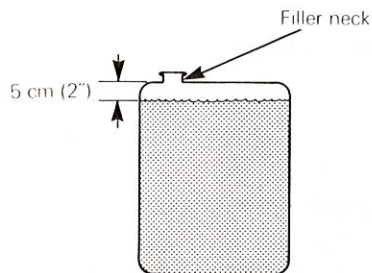
### Coolant level

**WARNING:** Always check the coolant level when the engine is cold.



B007160011

— To reach the radiator cap, open the access cover.



B003020002

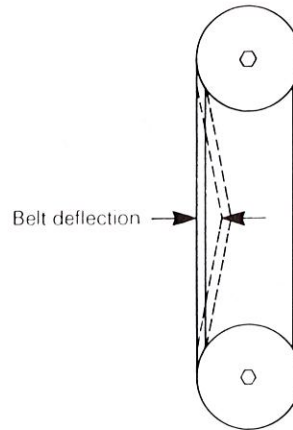
The coolant level must be 5 cm (2") from filler neck.

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

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

## V-belts

Check V-belts tension as follows:



B002020033

FAN: (1 BELT)

Deflection must equal 9.5 mm (3/8") when a force of 2.3 kg (5 lbf) is applied midway between the two pulleys.

ALTERNATOR: (1 BELT)

Deflection must equal 4.8 mm (3/16") when a force of 2.3 kg (5 lbf) is applied midway between the water pump and the alternator pulleys.

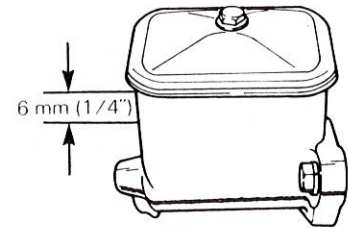
HYDRAULIC PUMP: (2 BELTS)

Deflection must equal 9.5 mm (3/8") when a force of 2.3 kg (5 lbf) is applied midway between the two pulleys.

DIFFERENTIAL OIL COOLING PUMP: (1 BELT)

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

## Master cylinder oil levels



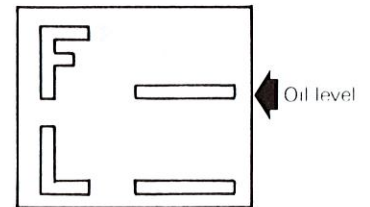
B003030001

The oil level must be at least 6 mm (1/4") below the reservoir edge.

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

## Hydraulic oil level

The hydraulic reservoir is located under the driver's seat.



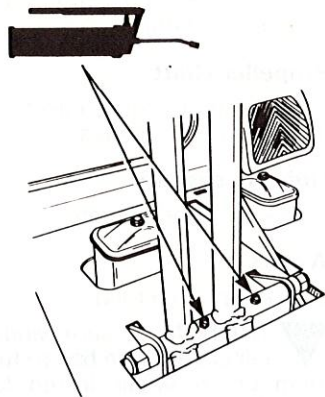
B004020001

At room temperature (21°C (70°F) approx.) oil should reach level "F" on the tank, 5cm (2") below the top of the tank.

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



## Steering lever pivot



B007140001

Using a grease gun, lubricate pivot sparingly.

## Battery

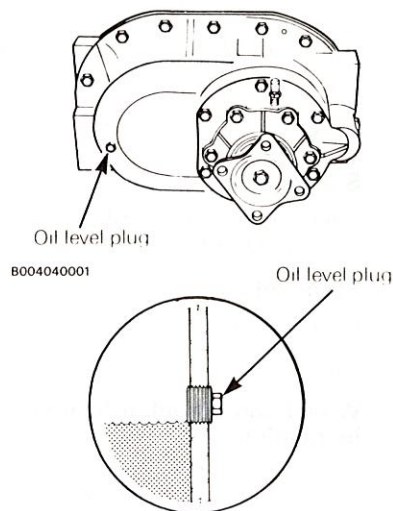
The battery is located outside, behind the cab, on vehicles equipped with a two-man cab, under the rear seat on vehicles equipped with a six-man cab, and under the passenger seat on vehicles equipped with a full length cab.

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

**CAUTION:** Do not fill excessively.

**WARNING:** Batteries give off explosive fumes. Do not smoke. Prevent electrolyte from coming in contact with the skin.

## Two speed gearbox oil level

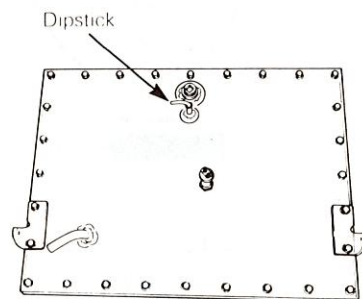


B004040001

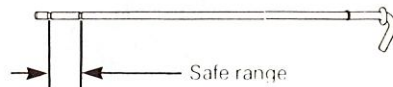
B004040002

The oil level must reach the oil level hole.

## Differential oil level



B004080001



B004080002

The oil level must always be within the safe range of the dipstick.

### Tracks

Replace any damaged crosslink. Check for any loose bolt and tighten to 27-34 N•m (20-25 lbf•ft).

Check track tension and adjust if necessary (see "maintenance" section).

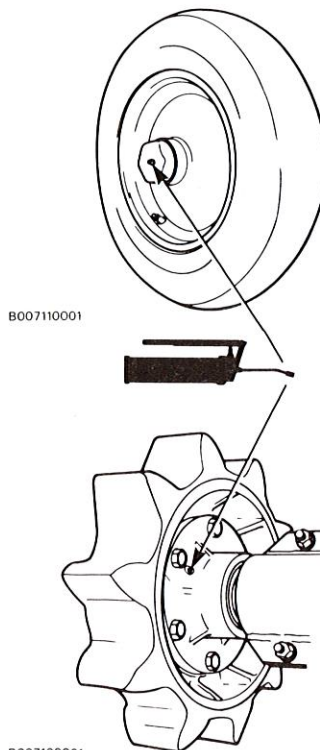
### Suspension

Check the condition of suspension arms and flexitor shells.

### Sprockets

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

### Wheel and sprocket bearing lubrication



Using a grease gun, inject grease through grease fittings.

### Tire air pressure

Recommended pressure: 620-690 kPa (90-100 PSI).

### Propeller shaft

Using a grease gun, inject grease through grease fittings.

### Lighting system

Check for good operation of lights.

### Wipers

Check wiper operation.

▼ **CAUTION:** Be sure windshield wipers are free before turning them on. A wiper frozen to the windshield can cause overheating and failure of wiper motor.

▼ **CAUTION:** Avoid running the wipers when the windshield is dry, or wiper blade and/or arm is damaged.

### ONCE THE ENGINE IS STARTED

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

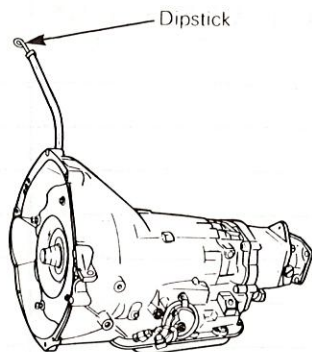
### Instrument panel

▼ **CAUTION:** Frequently check the instrument panel. Do not operate when dials indicate malfunction.

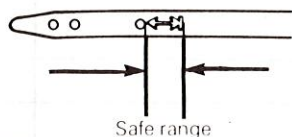
### Transmission oil level

Raise the engine hood to gain access to the dipstick.

With the engine idling and the parking brake on, move the gear shift lever momentarily to each position, ending in the park ("P") position.



B002040001



B002040003

When the transmission oil is at normal operating temperature, the oil level must be within the safe range of the dipstick.

### Emergency brake

◆ **WARNING:** Ensure brake function properly before operating the vehicle.

### Oil, fuel, coolant and exhaust leak

▼ **CAUTION:** Ensure to correct any leakage before operating the vehicle.

### Engine idle speed and maximum RPM

Idle speed:  
600 RPM (transmission on "D").  
Maximum operating RPM:  
3600 RPM


### Hose and piping

▼ **CAUTION:** Ensure to correct any leakage, cracks, wear or tear before operating the vehicle.

### Heater

See "controls/instruments" section.

<b>PRE-OPERATION INSPECTION CHECK LIST</b>		<b>✓</b>
<b>Before starting the engine</b>		
Engine oil level		
Coolant level		
V-belts		
Master cylinder oil levels		
Hydraulic oil level		
Steering lever pivot		
Battery		
Two speed gearbox oil level		
Differential oil level		
Tracks		
Suspension		
Sprockets		
Wheel and sprocket bearing lubrication		
Tire air pressure		
Propeller shaft		
Lighting system		
Wipers		
<b>Once the engine is started</b>		
Instrument panel		
Transmission oil level		
Emergency brake		
Oil, fuel, coolant and exhaust leak		
Engine idle speed and maximum RPM		
Hose and piping		
Heater		

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



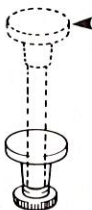
# STARTING AND STOPPING PROCEDURE

## STARTING THE ENGINE

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

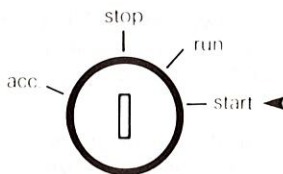
◆ **WARNING:** Before starting the engine, make sure that the parking brake is applied and that the throttle pedal is free. Also make sure that steering levers are free.

### Engine cold



B003160010

- Pull the choke control knob completely.
- Place the transmission lever on position "N" or "P".



B001160011

- Turn the ignition key to "start" position.

▼ **CAUTION:** Return the key to "run" position and release the throttle pedal immediately after the engine has started.

▼ **CAUTION:** Holding the key in "Start" position when engine has started will damage the starter mechanism.

▼ **CAUTION:** Do not operate the starter for more than fifteen (15) seconds at a time. Doing so may overheat the starter. If the engine does not start the first time, wait fifteen (15) seconds before trying again. If it does not start after four (4) attempts, consult a mechanic.

▼ **CAUTION:** Return the choke control knob to the half way position as soon as the engine begins to "hunt", due to an over rich mixture.

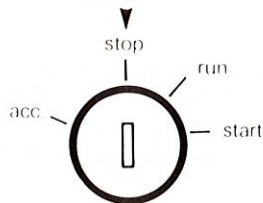
- De-activate the choke gradually while the engine warms.

### When engine is warm

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

▼ **CAUTION:** Using the choke when the engine is warm is useless and may even cause damage.

## STOPPING THE ENGINE



B001160011

To stop the engine, bring back the ignition key to "stop" position.

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

# DRIVING INSTRUCTIONS

## SETTING THE VEHICLE IN MOTION

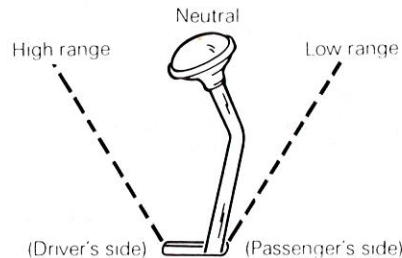
- Engage the two speed gear box in the desired ratio.
- Start the engine.

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

- Apply pressure on the brake pedal
- Engage the transmission.
- Release both, the parking brake and the brake pedal.

## GEAR SHIFTING

### Two speed gear box



B007160013

The two speed gear box has three (3) positions of the shift lever.

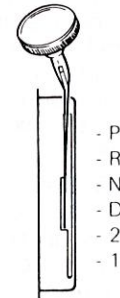
"HIGH RANGE" - This range is used when operating under normal conditions.

"NEUTRAL" - At this position, power cannot be transmitted to the differential.

"LOW RANGE" - This range is used when operating under adverse conditions.

▼ **CAUTION:** It is very important that the vehicle and the engine be stopped and the transmission set in "neutral" position before selecting high range or low range to avoid damage to the two speed gear box and/or transmission.

## Transmission



B007160012

The Ford C-6 automatic transmission has six (6) positions of the transmission lever:

"P" - Which is the park position.

"R" - Reverse.

"N" - Neutral.

"D" - Normal drive position where the vehicle starts in low gear and automatically upshifts to second and high gears as speed increases. In this position, the transmission will also downshift when the load increases sufficiently.

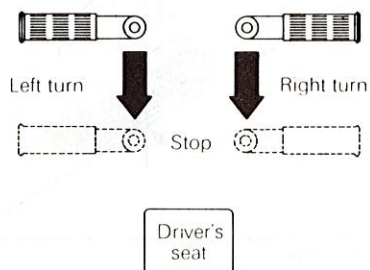
"2" - Second gear MANUAL; there is no upshift or down-shift.

"1" - Low gear MANUAL; this range is designed primarily for engine braking when coming down steep hills.

Normal operation is in the "D" driving range; however, should there be conditions where the transmission will downshift and upshift frequently from "D" to "2nd", then the "2" position should be used. Should frequent up and down shifting between 2nd and 1st occur while operating in "D", manually select "1" position to prevent transmission damage.



## DRIVING THE VEHICLE



B002160015

Steering is effected by means of the steering levers, through the planetary-type controlled differential. Pulling on one lever applies the brake on one drum of the differential. This slows down the axle gear of that side and increases proportionately the speed of the axle gear on the other side. One track running faster than the other makes the vehicle turn. With this type of differential, there is traction on both tracks, even when turning.

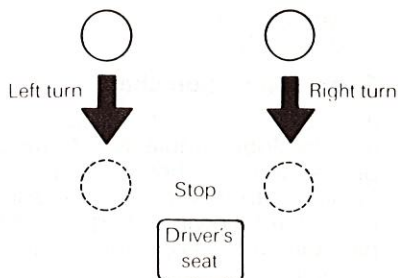
○ **NOTE:** The steering levers should be pulled sharply.

To slow down or to stop, pull simultaneously on both steering levers. Avoid stopping sharply.

◆ **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 in use for steering or braking. "Dragging" the bands will cause differential over heating and unnecessary wear of the bands.

## Power steering



B003160003

◆ **WARNING:** Power steering is more positive and provides better response with less effort. For this reason power steering should be used with caution, especially when driving near maximum speed or on icy surfaces to prevent sudden turns, which could result in side-slippage and loss of control.

## STOPPING AND PARKING

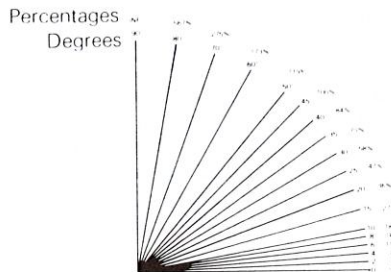
To stop the vehicle, pull gently both steering control levers simultaneously.

## GRADEABILITY

Uphill: 60%  
Downhill: 60%  
Sidehill: 35%

### Slope conversion chart

It is a general trade practice to discuss slope angularly in terms of percentage. For those who are not familiar with this form of measurement, the following chart converts percentage of slope into degrees of angle.

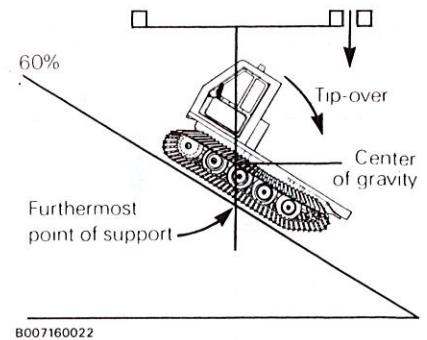


B001001001

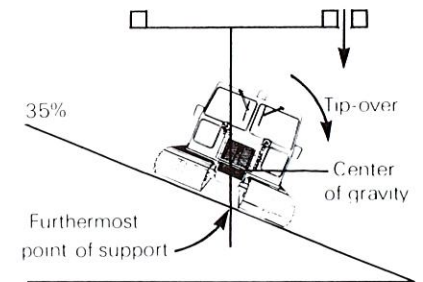
**WARNING:** These limits are determined with the vehicle stationary on a firm and flat surface and the extent to which they can be approached in practice will depend on the expertise of the operator and his familiarity with the vehicle.

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

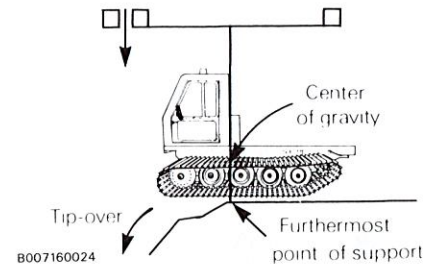
When the center of gravity of the vehicle passes beyond an imaginary line drawn vertically upwards from the furthestmost point of support of the tracks, the vehicle will tip-over or roll-over.



B007160022



B007160023



B007160024

This can be likened 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 on 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, the loading of the vehicle and actual terrain conditions, constantly influence and change these limits during operation of the vehicle.

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Therefore, one must evaluate every situation carefully and as a separate case. Never assume that the 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, although the overall slope of the terrain is within safe operational limits.

# TROUBLE SHOOTING\_\_\_\_\_

## ENGINE AND TRANSMISSION

SEE MANUFACTURER'S MANUAL

### PROPELLER SHAFT

Trouble	Probable cause	Suggested remedy
Vibration or noise	1- Joints not aligned 2- Bent 3- Out of balance 4- Worn bearings and cross	Align Replace Correct or replace Replace

### TWO SPEED GEARBOX

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

### DIFFERENTIAL

Noisy	1- Scored crown and pinion gears 2- Bearing worn or pitted 3- Improper adjustment of crown and pinion	Replace Replace Adjust
Excessive Back Lash	1- Worn gears 2- Worn carrier bearings 3- Worn U-joints 4- Improper adjustment of crown and pinion	Replace Replace Replace Adjust
Oil Leaks	1- Faulty gaskets or seals	Replace



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## STEERING

<b>Does not steer</b>	1- Steering brake bands too loose 2- Faulty differential	Adjust Repair
<b>Steers to one side only</b>	1- Broken axle 2- Broken axle gear  3- Broken steering band	Replace Repair differential Replace
<b>Veers to one side</b>	1- Uneven track-tension 2- Broken wheel bearings 3- Faulty track belts	Adjust Replace Correct or replace

## HYDRAULIC SYSTEM

<b>No pressure</b>	1- Not enough hydraulic fluid 2- Pump inlet blocked 3- Broken drive belt 4- Dirt in relief valve	Replenish Clean Replace Clean
<b>Pressure too low</b>	1- Inlet strainer blocked 2- Defective or worn pump 3- Dirt in tank 4- Loose drive belt	Correct or replace Repair or replace Clean Adjust
<b>Leaking down</b>	1- Faulty control valve 2- Leak in hose or fitting 3- Leak in motor	Check spool return spring Correct or replace Repair or replace
<b>Cavitation</b>	1- Low fluid supply 2- Clogged oil strainer 3- Leak in intake 4- Too high RPM when fluid is cold	Fill to proper level Correct Repair Let engine warm up at idle speed
<b>Excessive Noise</b>	1- Air entering in pump intake line 2- Defective pump	Repair Repair or replace
<b>Air in system</b>	1- Loose pump inlet 2- Leaks in joints 3- Defective seals	Tighten Repair Replace
<b>Over-heating</b>	1- Low fluid supply 2- Faulty relief valve 3- Dirty fluid 4- Worn pump	Fill to proper level Adjust setting Change Repair or replace

# MAINTENANCE

## MAINTENANCE SCHEDULE


C- Check


I- Inspect (adjust or correct if necessary)

L- Lubricate

R- Replace

ITEM	Every 10 hours or daily	Every 50 hours	Every 100 hours	Every 200 hours	Every 600 hours	Every 1000 hours
Engine oil and filter	C		R			
Transmission oil		C			R	
Two speed gear box oil			C		R	
Differential oil and filter	C			R		
Wheels and sprockets	L					
U-joints			L			
Coolant	C					R
Hydraulic oil and filter		C				R
Fuel filter						R
Steering lever pivot			L			
Master cylinders		C				
Battery		C			I	
Sprockets	C	I				
Tires	C	I				
Suspension	C	I				
Tracks	C	I				
Air cleaner		C				R
Brake lining		I				
Brake caliper		IL				
Hitch			L			

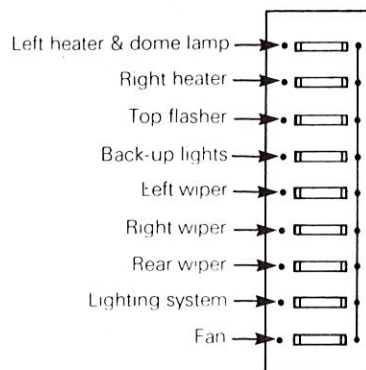
 **NOTE:** For liquid specifications, refer to "Specifications" section.

 **WARNING:** It is recommended that the service maintenance be performed by specialized mechanics. Engine should be turned "off" for all lubrication and maintenance procedures.

## MINOR REPAIRS

### Fuse replacement

- The fuse panel is located inside the instrument panel.



B007150001

▼ **CAUTION:** Never replace a fuse by a higher rated one or severe electrical system damages will occur.

### Track removal

- Bring the track joint in front of the front wheel.
- Release track tension by bleeding the hydraulic track tensioner.
- Uncouple the track by removing the three(3) crosslinks located at belt joints.
- Pull the track backwards.

### Track installation

- Adjust the track tensioner to its minimum length.
- Spread the track on the ground.
- Pull the vehicle onto the track.
- Bring the track over the wheels.
- Lap belts between both front wheels using an appropriate tool (P/N 629 0036 00).

- Install crosslinks.
- Adjust track tension.

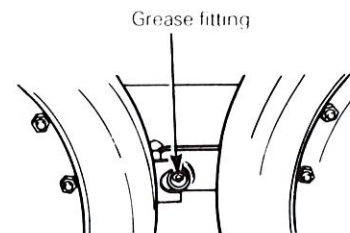
### Track tension adjustment

○ **NOTE:** Both tracks must be adjusted gradually from side to side to allow the adjuster frame to move evenly.

WITH NO LOAD ON THE VEHICLE:

- Pre adjust tracks mechanically by tightening the track adjuster nut (normally 9 cm (3 1/2")) from washer to end of rod).

▼ **CAUTION:** Never exceed 12.7 cm (5").



B007120001

- The tracks are adjusted by means of the hydraulic track-tensioners located between the two front wheels. To tighten the tracks, inject grease by means of a grease gun in the grease fitting of the track-tensioner. To loosen the tracks, bleed the track-tensioner by means of the bleeder tool which releases grease through the grease fitting.

▼ **CAUTION:** The track adjuster piston must not extend more than 7.6 cm (3") beyond the cylinder end.



## TRACK TENSION RECOMMENDATION:



B007120002

- On level ground, the crosslinks should not touch the rear wheel and barely touch the second last wheel.

## Sprocket removal

- Uncouple the track and spread it on the ground (see "track removal" item).
- Unbolt and remove the sprocket.

## Sprocket installation

To install a sprocket, reverse the removal procedure.

## Wheel removal

- Raise the vehicle.
- Release track tension by bleeding the hydraulic track tensioner.
- Spread and hold apart two sides of the track by means of a lever (wood block).
- Remove the hub cap, cotter pin and spindle nut, and pull the wheel out.

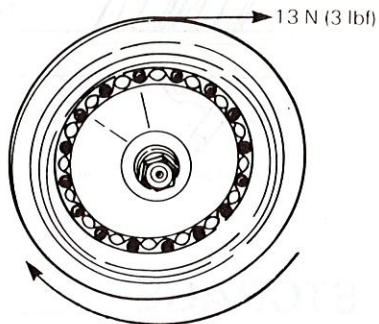
○ **NOTE:** When removing a first front wheel, the track must be uncoupled and pulled away from it.

▼ **CAUTION:** Care should be taken to protect the seal, and to prevent dirt penetration into the wheel bearings.

## Wheel installation

To install a wheel, reverse the removal procedure paying particular notice to the following:

▼ **CAUTION:** Care should be taken to protect the seal, and to prevent dirt penetration into the wheel bearings.



B002100001

- The bearing tension is correct when the wheel begins to rotate with a force of 13 N (3 lbf) applied outside diameter of tire.

## Suspension arm removal

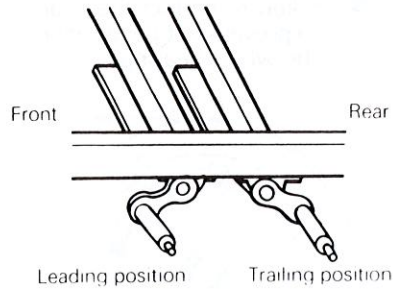
- Remove the wheel as per instructions for changing a wheel.

▼ **CAUTION:** Since the suspension arm must be installed at the correct angle, make a mark on the flexitor shaft, where the slot in the suspension arm is located. The slot in the new suspension arm should be at the same location.

- Remove the bolt that tightens the suspension arm to the flexitor shaft. Pry the suspension arm off the flexitor shaft.

### Suspension arm installation

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



B007100002

- Each arm is identified with the letter "R" or "L". If arm stamped "R" is mounted in a trailing position, it must be installed on the right side of the vehicle. If the same arm is mounted, in a leading position, it must be installed on the left side of the vehicle. For the arm stamped "L" inverse the procedure.

▼ **CAUTION:** Install the suspension arm at the correct angle.

## STORAGE

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

- Clean the vehicle thoroughly.
- Make a thorough inspection and make all the necessary repairs.
- Lubricate all points mentioned in the lubrication schedule.
- Prepare the engine according to the instructions given in the engine manufacturer's manual.
- Cover the exhaust pipe.
- Check the oil in the differential; if it is close to a change period, drain and refill with new oil.
- Park the vehicle on pavement if possible or on coarse gravel in a dry place. It would be preferable to lift it off the ground and block it to take the weight off the wheels and tracks.
- Release the tension on both tracks.
- Remove the battery and put it on a trickle charge or check and charge monthly.
- Release the load on all hydraulic circuits by operating the valves and leaving the levers in the "float" position.

# SPECIFICATIONS

## ENGINE

Make	Ford
Model	CSG-649-IV (4.9 L (300 cu in)
Type	Gasoline in line (valve in head)
No of cylinders	6
Power at RPM (without fan)	93 KW (124 BHP) @ 3600 RPM
Torque at RPM (without fan)	327 N•m (241 lb•ft) @ 2000 RPM
Firing order	1-5-3-6-2-4
Stroboscopic timing at RPM	6° BTDC @ 600 RPM
Breaker point:	
- Set adjustment	.61 - .66 mm (.024" - .026")
Spark plug:	
- Make	Autolite
- Model	BRF-31 (18 mm)
- Spark plug gap	.71 - .81 mm (.028" - .032")
Oil filter	Full-flow

## CARBURATION

Make	Holley
Model	1940
Engine idle speed	600 RPM (transmission on "D")
Maximum operating RPM	3600 RPM
Air filter:	
- Make	Fram
- Model	# CA-151-PL

## COOLING SYSTEM

Engine:	
- Type	Liquid/radiator/fan cooling
- Antifreeze/water mixture	60/40
- Antifreeze	Ethylene glycol
- Thermostat	71°C (160°F)
- Radiator cap pressure	96.5 kPa (14 PSI)
Transmission	Radiator/fan cooled
Differential	Radiator/fan cooled
Fan:	
- Type	Suction with viscous type clutch
- Drive	V-belt driven

## POWER TRAIN

### Transmission:

- Make	Ford
- Model	C-6
- Type	Automatic
- Gear ratio	1st 2.46 @ 1
	2nd 1.46 @ 1
	3rd 1.00 @ 1
	Rev. 2.18 @ 1

### Two speed gearbox:

- Make	Bombardier
- Gear ratio	Low range 3.40 @ 1
	High range 1.41 @ 1

### Differential:

- Make	Bombardier
- Type	Planetary controlled
- Ratio	5.83@1

### Propeller shaft:

- Type	Spicer 1350 series
- Length	968.4 mm (38 1/8")
- Diameter	76.2 mm (3") O.D.
- U-joint	Spicer 1350 series

### Wheels:

- Quantity	10
- Tire type	Pneumatic or solid
- Dimensions	11.43 x 30.48 cm (4.50" x 12")
- No. of plies (pneumatic)	8

### Track:

- Width	73.7 cm (29") or 104.1 cm (41")
- Length	719 cm (282.9")

### Track crosslink:

- Type	Heat treated alloy steel
- Quantity	73 (for one track)

## HYDRAULIC SYSTEM

### Hydraulic pump:

- Make	Vickers
- Model	VTM-42-60-75-20-MF-R1-14
- Type	Vane type
- Capacity	22.7L (5 imp. gal., 6 U.S. gal.)/min @ 1200 RPM
- Oil pressure	10343 kpa (1500 PSI)
- Drive	V-belt driven

### Directional control valve:

- Make	Bombardier and Gresen
- Type	2 or 5 spools actuated

### Differential oil pump:

- Make	Webster
- Model	29YB-012-2. L
- Capacity	5.7L (1.3 imp. gal., 1.5 U.S. gal.)/min. @ 1500 RPM
- Drive	V-belt driven



## ELECTRICAL SYSTEM

### Alternator:

- Make Motorola
- Model D3JL-10346-A
- Output 60 amp./12 volts
- Drive V-belt driven

### Voltage regulator

### Battery:

- Make Cegelec
- Model #24-50
- Type 12 volts

### Starter

Electric 12 volts

### Voltage

12 volts

### Fuse capacity

15 amp. and 30 amp.

## VEHICLE

### Frame material

Formed steel

### Cab material

Steel

### Overall length

404 cm (159")

### Overall width:

- With 73.7 cm (29") tracks 234 cm (92")
- With 104.1 cm (41") tracks 295 cm (116")

### Overall height:

- With 73.7 cm (29") tracks 225 cm (88 3/4")
- With 104.1 cm (41") tracks:

### With steel crosslinks

225 cm (88 3/4")

### With aluminum crosslinks

232 cm (91 1/4")

### Curb weight:

- With 73.7 cm (29") tracks 2722 kg (6000 lb)
- With 104.1 cm (41") tracks:

### With steel crosslinks

2939 kg (6480 lb)

### With aluminum crosslinks

3565 kg (7860 lb)

### Ground pressure (0-penetration):

- With 73.7 cm (29") tracks 8.1 kPa (1.18 PSI)
- With 104.1 cm (41") tracks:

### With steel crosslinks

5.8 kPa (0.84 PSI)

### With aluminum crosslinks

6.2 kPa (0.90 PSI)

### Ground clearance:

- With 73.7 cm (29") tracks 30.5 cm (12")
- With 104.1 cm (41") tracks:

### With steel crosslinks

30.5 cm (12")

### With aluminum crosslinks

36.8 cm (14 1/2")

### Load capacity

907 kg (2000 lb)

if without equipment

### Maximum speed

34.4 km/h (21.5 mph)

### Gradeability:

- Uphill 60 %
- Downhill 60 %
- Sidehill 35 %

## LIQUID TYPES AND CAPACITIES

Engine cooling system	20.34 L (4.5 imp. gal., 5.4 U.S. gal.) Ethylene glycol
- Antifreeze	
Fuel tank	73.26 L (16.1 imp. gal., 19.4 U.S. gal.) Gasoline 83m/91r octane
- Fuel type	
Engine oil (with filter)	7.57 L (6.7 imp. qts., 8 U.S. qts.) SAE 10W-30 or SAE 10W-40, API service SF/CD
- Oil type	
Transmission oil	13 L (11.4 imp. qts., 13.8 U.S. qts.) Dexron II
- Oil type	
Two speed gearbox oil	1.7 L (1.5 imp. qts., 1.8 U.S. qts.) Esso GX-75/80
- Oil type	
Differential oil	19.32 L (4.25 imp. gal., 5.1 U.S. gal.) Petro Canada Commercial Super HP 5W-30 SF/CD synthetic
- Oil type	
Power steering and hydraulic oil type	Petro Canada Commercial Super HP 5W-30 SF/CD synthetic Hydraulic oil SAE# J1703-Dot 3
Manual steering oil type	
Brake oil type	Extra heavy duty brake fluid SAE 70R3
Grease type	Multi-purpose high quality grease resistant to water and which will remains fluid under cold temperatures.

## BRAKE

Service brake	Steering levers deceleration (see "driving instructions" section)
Emergency brake	Foot-operated disc brake (see "controls/instruments" section)
Parking brake	Hand lever-operated disc brake (see "controls/instru- ments" section)

## TORQUE SPECIFICATIONS

Crosslink/track	27-34 N•m (20-25 lbf•ft)
Sprocket/hub	1/2"-20 gr.8 129-163 N•m (95-120 lbf•ft)
Flexitor shell/frame	1/2"-20 98-122 N•m (72-90 lbf•ft)
Engine support/engine	7/16"-14 gr.5 47-54 N•m (35-40 lbf•ft)
Engine support-engine/ supporting frame	9/16"-18 gr.5 130-160 N•m (96-118 lbf•ft)
Engine supporting frame/frame	3/8"-24 gr.8 54-68 N•m (40-50 lbf•ft)
Transmission support/ transmission	7/16"-14 gr.8 33-40 N•m (24-30 lbf•ft)
Transmission support-upper support/lower support	7/16"-14 gr.8 33-40 N•m (24-30 lbf•ft)
Transmission support/frame	1/2"-13 gr.5 82-102 N•m (60-75 lbf•ft)
Propeller shaft V-belt	3/8"-24 25-31 N•m (18-23 lbf•ft)
Two speed gearbox/support	1/2"-13 gr.5 37-44 N•m (27-32 lbf•ft)
Two speed gearbox-support/ frame	1/2"-20 gr.8 98-122 N•m (72-90 lbf•ft)
Rear differential support/ differential	1/2"-20 gr.5 82-102 N•m (60-75 lbf•ft)
Rear differential support/ frame	3/4"-16 gr.8 82-109 N•m (60-80 lbf•ft)
Front differential support/ differential	7/16"-14 gr.8 54-68 N•m (40-50 lbf•ft)
Front differential support/ frame	3/4"-16 gr.8 82-109 N•m (60-80 lbf•ft)

# HYDRAULIC OIL CONTAMINATION CONTROL

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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 of 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 waste, metal chips, water, wax lubricants, the wrong oil and particles which enter when equipment is opened for repair or at oil addition. Prevent their entry into systems as you escape the most numerous and damaging contaminants.

Contamination, regardless of its source, 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.

## 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.

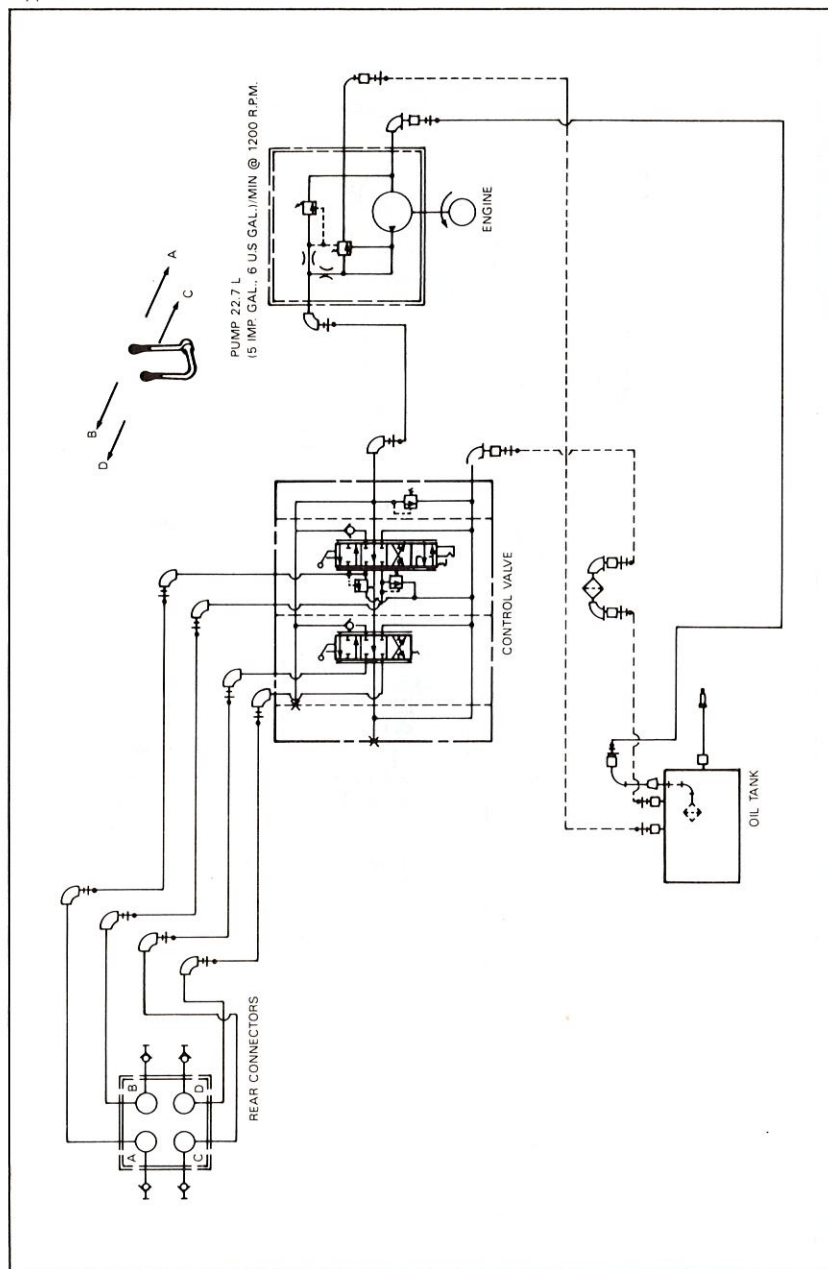
▼ **CAUTION:** Avoid oil contamination when checking or adding oil.



# HYDRAULIC DIAGRAMS

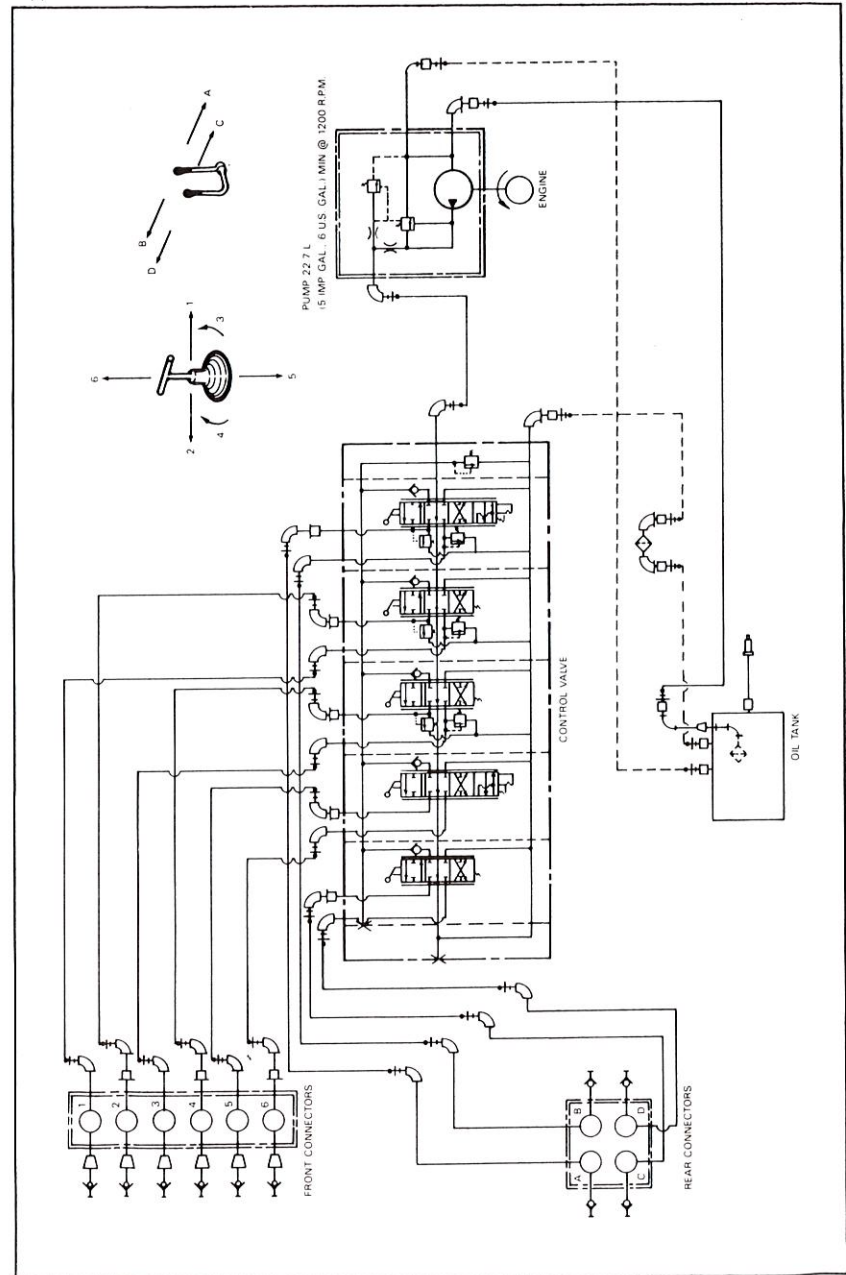
## WITH REAR CONNECTORS ONLY

Typical



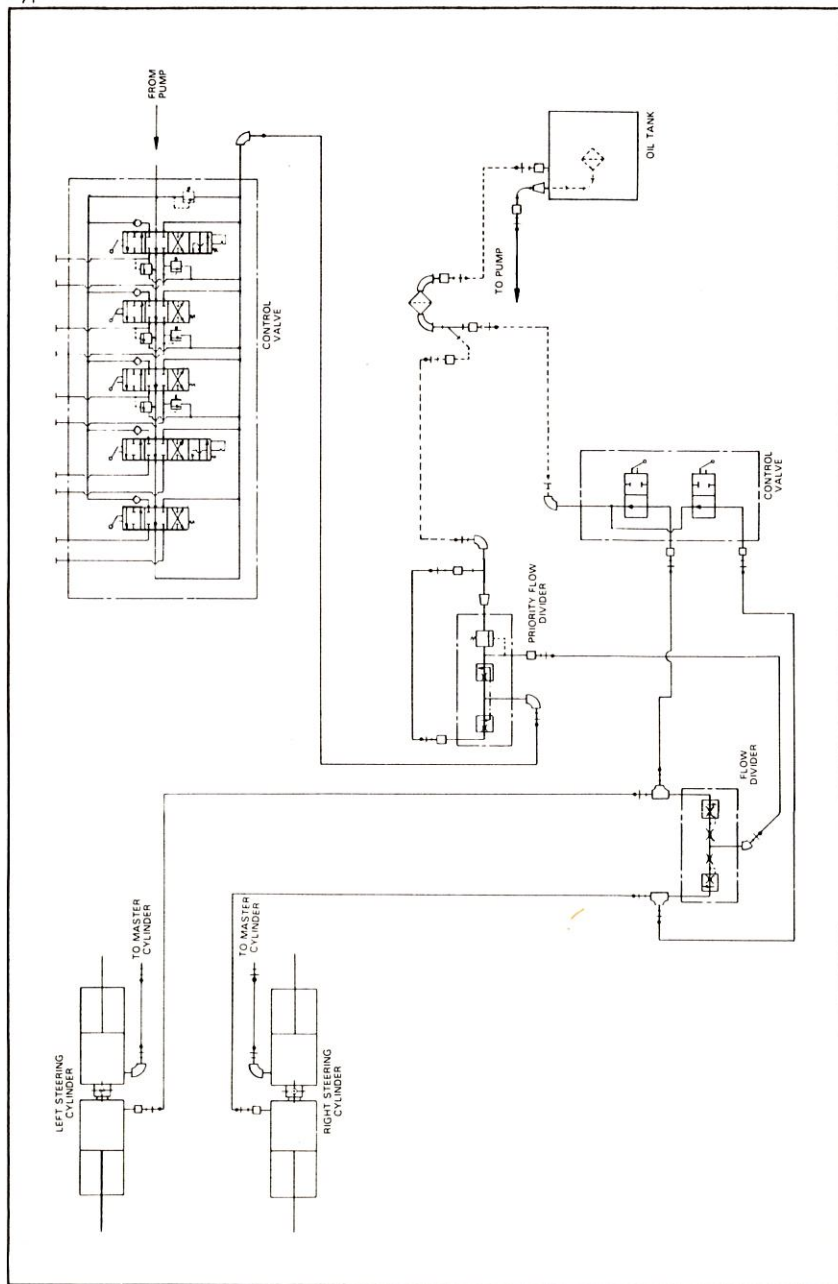
## WITH FRONT AND REAR CONNECTORS

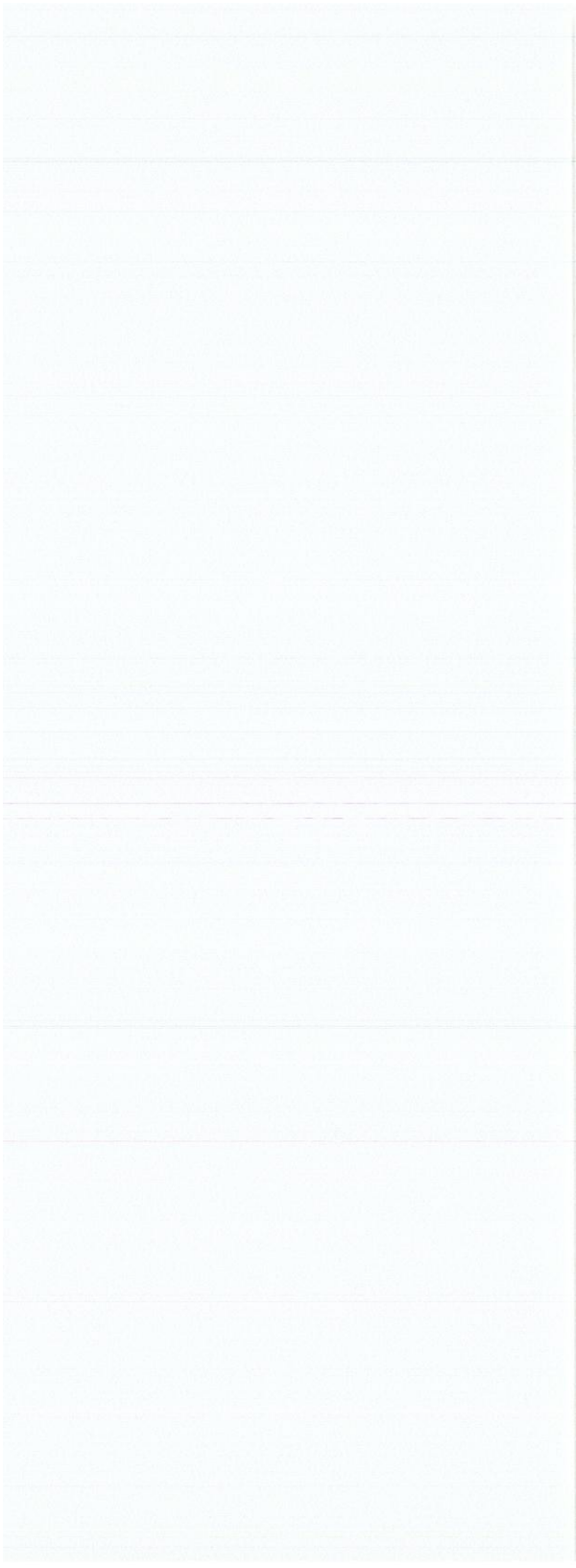
Typical



## POWER STEERING

Typical





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# ELEC DIAG



BK - I  
WH -  
RD -  
BL - E  
YL - Y  
PK - I

# SI\* METRIC INFORMATION GUIDE

## 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 of a	0.01
milli	m	one thousandth of a	0.001

## CONVERSION FACTORS

TO CONVERT	TO †	MULTIPLY BY
lbf•ft	lbf•in	12
imp. oz	U.S. oz	0.96
imp. gal.	U.S. gal.	1.2
in	mm	25.4
in	cm	2.54
ft	m	0.3
mph	km/h	1.61
in <sup>2</sup>	cm <sup>2</sup>	6.45
in <sup>3</sup>	cm <sup>3</sup>	16.39
imp. oz	ml	28.41
U.S. oz	ml	29.57
imp. gal.	l	4.55
U.S. gal.	l	3.79
oz	g	28.35
lb	kg	0.45
lbf	N	4.4
lbf•in	N•m	0.11
lbf•ft	N•m	1.36
psi	kPa	6.89
Fahrenheit	Celsius	(°F - 32) X 5/9
Celsius	Fahrenheit	(°C x 1.8) + 32

\* The international system of units (système international) abbreviates "SI" in all languages.

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