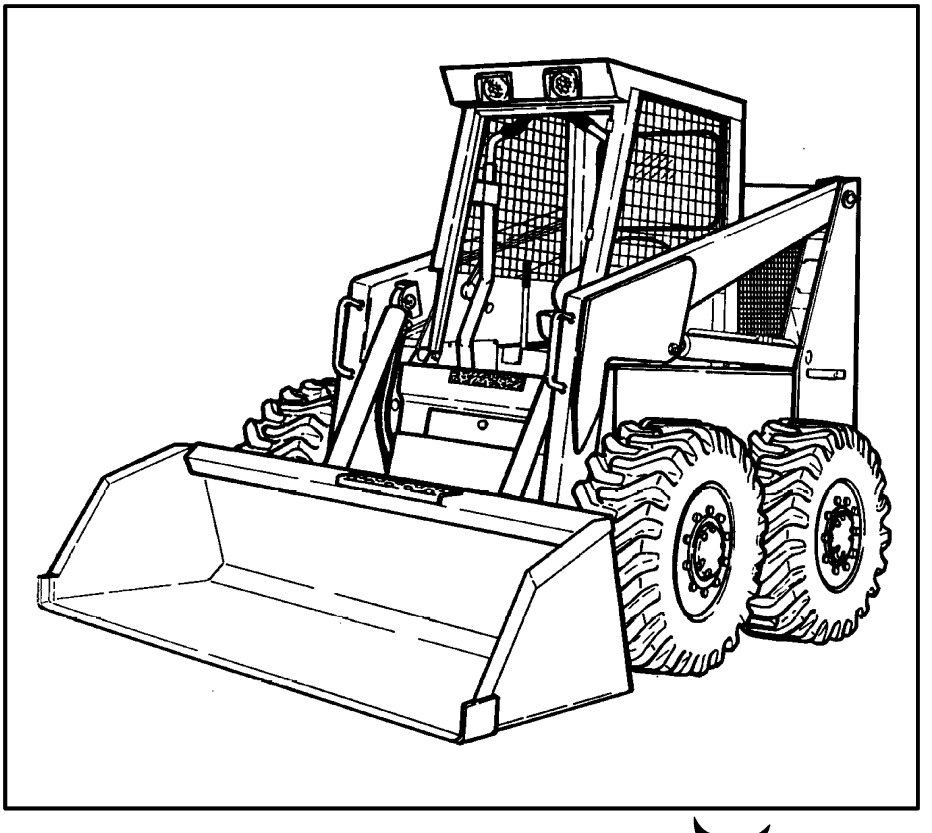
980

Service Manual



MELROE
INGERSOLL-RAND

6570341 (2–87)

Printed in U.S.A.

bobcat®

MAINTENANCE SAFETY

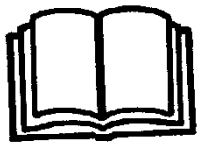
WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0903

Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

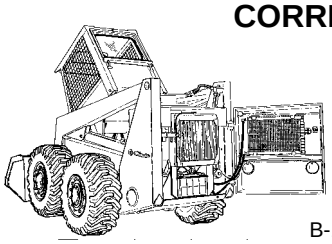
CORRECT



B-10731a

Never service the Bobcat Skid-Steer Loader without instructions.

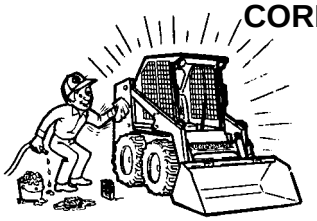
CORRECT



B-11103

Use the correct procedure to lift or lower operator cab.

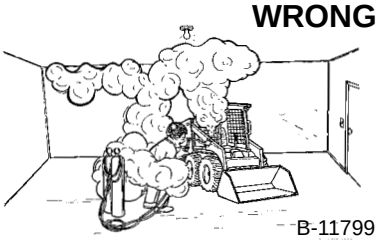
CORRECT



B-7469

Cleaning and maintenance are required daily.

WRONG



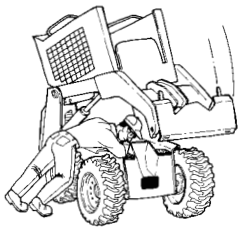
B-11799

Have good ventilation when welding or grinding painted parts.

Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.

Avoid exhaust fume leaks which can kill without warning. Exhaust system must be tightly sealed.

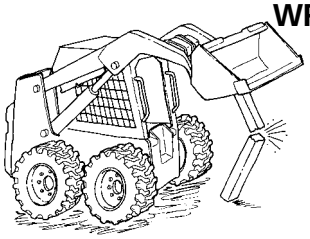
WRONG



B-15231

Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop. Do not go under lift arms when raised unless supported by an approved lift arm support device. Replace it if damaged.

WRONG

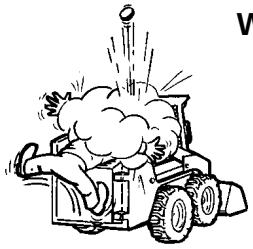


B-15280

Never work on loader with lift arms up unless lift arms are held by an approved lift arm support device. Replace if damaged.

Never modify equipment or add attachments not approved by Bobcat Company.

WRONG



B-6590

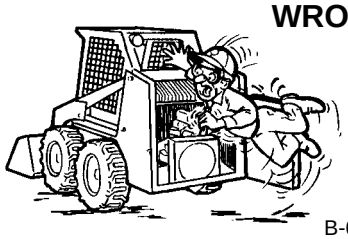
Stop, cool and clean engine of flammable materials before checking fluids.

Never service or adjust loader with the engine running unless instructed to do so in the manual.

Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.

Never fill fuel tank with engine running, while smoking or when near open flame.

WRONG



B-6580

Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.

Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protection approved for type of welding.

Keep rear door closed except for service. Close and latch door before operating the loader.

WRONG

B-6589

Lead-acid batteries produce flammable and explosive gases.

Keep arcs, sparks, flames and lighted tobacco away from batteries.

Batteries contain acid which burns eyes or skin on contact. Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL. Always use genuine Bobcat replacement parts.** The Service Safety Training Course is available from your Bobcat dealer.

MSW02-0805

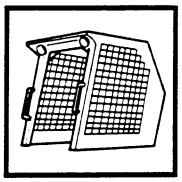
CONTENTS

FOREWORD

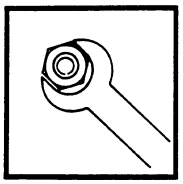
This manual is for the Bobcat loader mechanic. It provides necessary servicing and adjustment procedures for the Bobcat loader and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

A general inspection of the following items must be made after the loader has had service or repair:

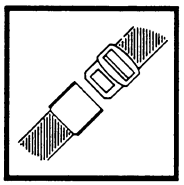
1. Check that the ROPS/FOPS (Including sidescreens) is in good condition and is not modified.



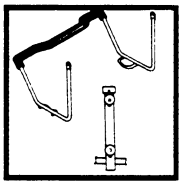
2. Check that ROPS mounting hardware is tightened and is Melroe approved.



3. The seat belt must be correctly installed, functional and in good condition.

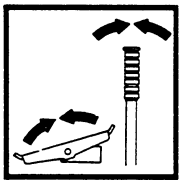


4. The seat bar and pedal interlocks must be correctly adjusted, clean and lubricated.



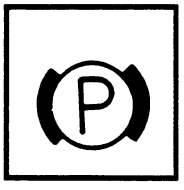
5. Machine signs must be legible and in the correct location.

6. Steering levers and foot pedals must return to neutral.

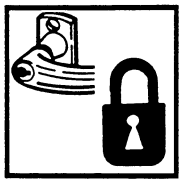


7. Check for correct function of the work lights.

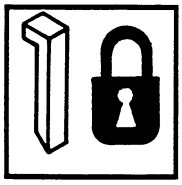
8. The parking brake must function correctly.



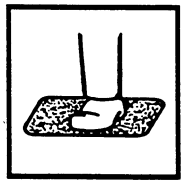
9. Enclosure door latches must open and close freely.



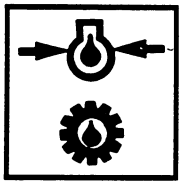
10. Bob-Tach wedges and linkages must function correctly and be in good condition.



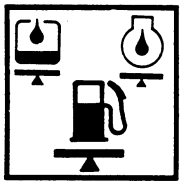
11. Safety treads must be in good condition.



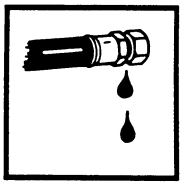
12. Check for correct function of indicator lamps (Optional on some models).



13. Check hydraulic fluid level, engine oil level and fuel supply.

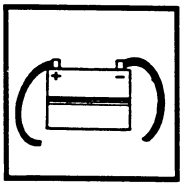


14. Inspect for fuel, oil or hydraulic fluid leaks.

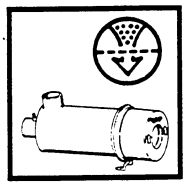


15. Lubricate the loader.

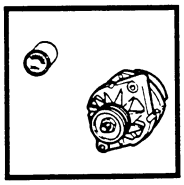
16. Check the condition of the battery and cables.



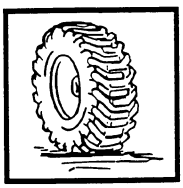
17. Inspect the air cleaner for damage or leaks. Check the condition of the element.



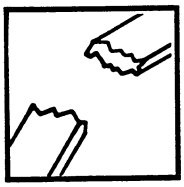
18. Check the electrical charging system.



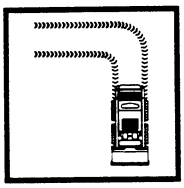
19. Check tires for wear and pressure.



20. Inspect for loose or broken parts or connections.



21. Operate the loader and check all functions.



22. Check for any field modifications not completed.

Recommend to the owner that all necessary corrections be made before the machine is returned to service.

I. SAFETY INSTRUCTIONS

A. SAFETY IS YOUR RESPONSIBILITY

The Bobcat loader is a highly maneuverable and compact machine. In operation, it is rugged and useful under a wide variety of conditions. This presents an operator with hazards which are common for off highway, rough terrain applications but are not unique for use of the Bobcat loader. The Bobcat has an internal combustion engine with resultant heat and exhaust. All exhaust gases can kill so the Bobcat loader must be used with adequate ventilation. The Bobcat loader must not be used in an area with explosive dusts or gases or where the engine exhaust can contact flammable material.

The dealer recommends the capabilities and restrictions of the Bobcat loader and attachments for each application. The dealer demonstrates the safe operation of the Bobcat loader according to the manufacturer's instructional materials which are also available to all operator's. The dealer can also identify unsafe modifications or use of unapproved attachments. The attachments are designed for rated capacity and secure fastening to the Bobcat loader. The user must check with the dealer or manufacture's literature to identify safe loads of materials of specified densities.

The following publications provide information on the safe use of the Bobcat loader:

1. The Delivery Report is used to check whether complete instructions have been given to the new owner.
2. The Operator's Manual delivered with each Bobcat loader gives operating information as well as routine maintenance.
3. Every Bobcat loader has machine signs (or decals) which instruct on safe care and operation. The complete signs and their location are shown in the Operator's Manual. All signs are available from your Bobcat dealer.
4. The Service and Parts Manuals are available from your Bobcat dealer for use by mechanics to do shop-type service and repair work.
5. The Bobcat loader has a plastic Operator Handbook fastened to the operator cab. It has brief instructions always available to the operator.
6. The FIEI Manual gives general safety information.

B. BEFORE OPERATING THE BOBCAT LOADER

⚠ WARNING

Operators must have instructions before operating Bobcat loader. Untrained operators can cause injury or death.

The Operator's Manual was written to give the owner/operator instructions on the safe operation and maintenance of the Bobcat loader. READ AND UNDERSTAND THE OPERATOR'S MANUAL BEFORE OPERATING YOUR BOBCAT LOADER. If you have any questions, see your local Bobcat dealer.

The Bobcat loader must be in good operating condition.

Check all of the items on the Service Schedule under the 8-10 hour column.

⚠ WARNING

For your safety, warnings are on the Bobcat loader and in the manual. Failure to obey warnings can cause injury or death.

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the Bobcat loader.

C. SAFE OPERATION NEEDS A QUALIFIED OPERATOR

A QUALIFIED OPERATOR* MUST DO THE FOLLOWING:

1. UNDERSTAND THE WRITTEN INSTRUCTIONS, RULES AND REGULATIONS

   a. The written instructions from Melroe Company include the delivery report, Bobcat loader operator's manual, FIEI manual, and machine signs (decals).

   b. Check the rules and regulations for your location. The rules may include an employer's work safety requirements. Regulations may identify a hazard such as utility supply line.

2. HAVE TRAINING WITH ACTUAL OPERATION

   a. Operator training must consist of a demonstration and verbal instruction. This training is given by the Bobcat dealer before the Bobcat loader is delivered.

   b. The new operator should start in an area without bystanders and use all the controls until he can control the Bobcat loader at full use under the conditions of his work area.

3. KNOW THE WORK CONDITIONS

   a. For each material to be handled, the operator must know how to avoid exceeding the rated operating capacity of the Bobcat loader. For example he must know whether he can safely take a full load or part load of a bucket.

   b. The operator must know any prohibited uses or work areas for the Bobcat loader. For example, he needs to know about excessive slopes.

* For an operator to be qualified, he must not use drugs or alcoholic drinks which change his alertness or coordination while working. An operator who is taking prescription drugs must get medical advice on whether or not he can safely operate a machine.

II. FIRE PREVENTION

The Bobcat loader has several components which are at high temperature under normal operating conditions. The primary source of high temperature is the engine and exhaust system. The electrical system, if damaged or incorrectly maintained, can be a source of arcs or sparks. These conditions make is necessary to avoid applications where explosive dust or gases can be ignited by arcs, sparks or heat.

Flammable debris (leaves, straw, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it will increase the condition for fire hazard. The Bobcat loader must be cleaned as often as necessary to avoid this accumulation. Flammable debris in the engine compartment is a fire hazard when the Bobcat loader is parked with a hot engine. The muffler is designed to control the emission of hot particles from the engine and exhaust system, but the muffler and the exhaust gases are still hot.

1. Do not use the Bobcat loader in applications where explosive dust or gases can be ignited by arcs, sparks, hot components or exhaust gases.

2. The operator cab, engine compartment and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazard and overheating.

3. Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part.

4. Check for damage and leakage at all the fuel, oil and hydraulic tubes, hoses and fittings. Tighten or replace any that show leakage. Always clean fluid spills.

5. Use ether or starting fluids only when approved by the engine manufacturer. Do not use ether or starting fluids on any engine that has glow plugs. These starting aids can explode and injure bystanders.

6. Always clean the Bobcat loader before doing any welding. Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near the Bobcat loader when welding.

7. Stop the engine and let it cool before adding fuel. No Smoking.

8. Use the procedure in Operator's Manual for connecting and charging batteries.

III. SERIAL NUMBER LOCATIONS

Always use the serial number when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

LOADER SERIAL NUMBER

The Bobcat loader serial number plate location is inside front of the left upright, below the lift arm [A].

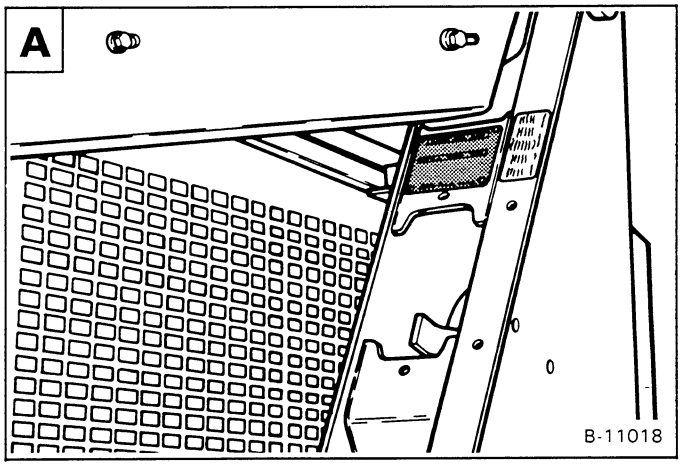
XXXX M XXXXX

- XXXX — Model, Engine Version
- M — Factory Use Only
- XXXXX — Production Sequence Series

ENGINE SERIAL NUMBER LOCATION

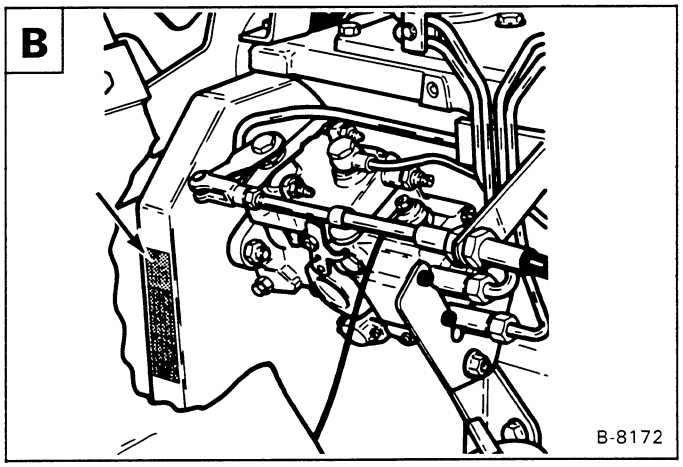
The engine serial number is located on the right side of the engine block [B].

A



B-11018

B

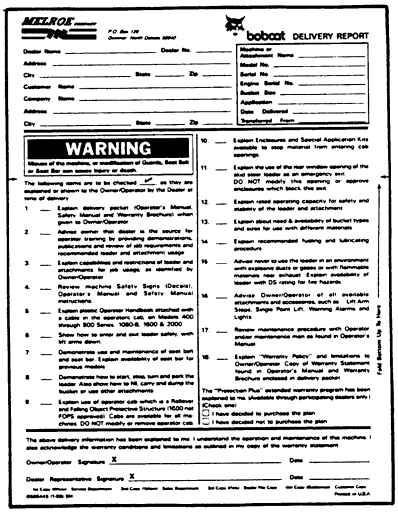


B-8172

IV. DELIVERY REPORT

The Delivery Report must be filled out by the dealer and signed by the owner or operator when the Bobcat loader is delivered [C]. An explanation of the form must be given to the owner. Make sure it is filled out completely.

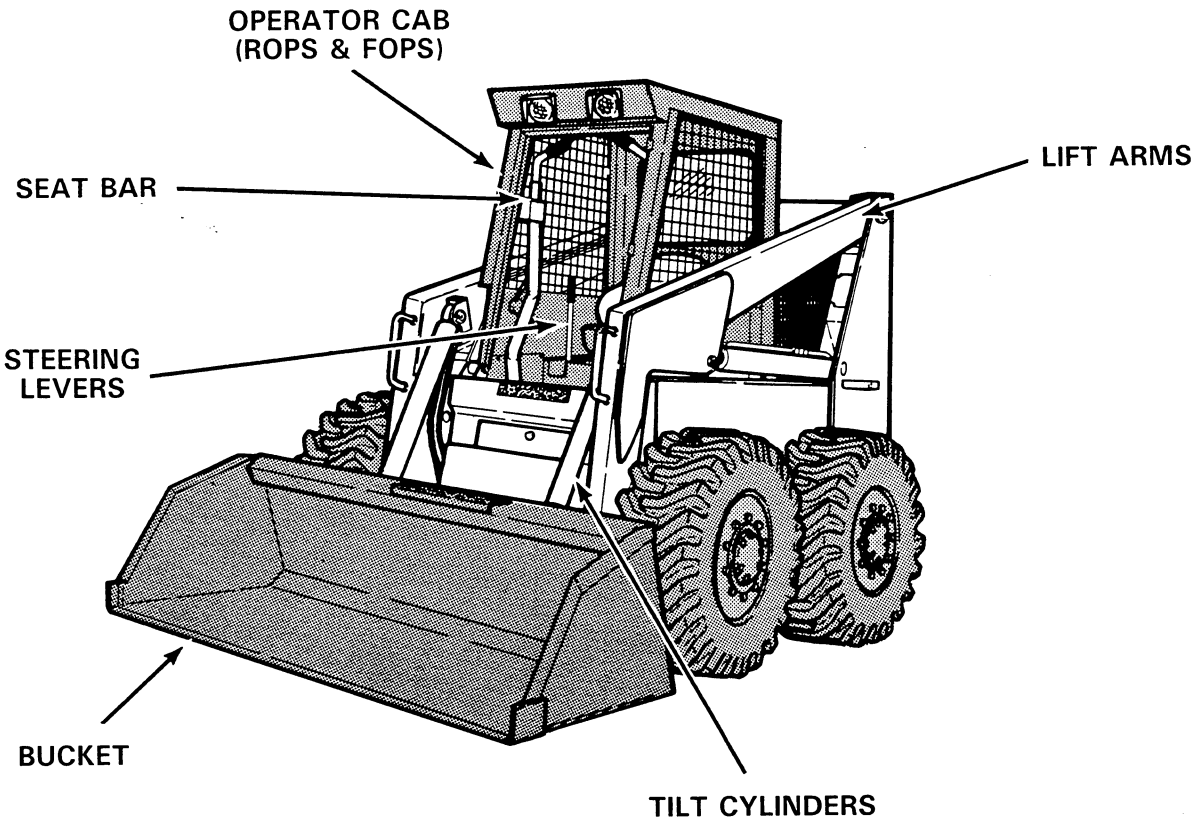
C

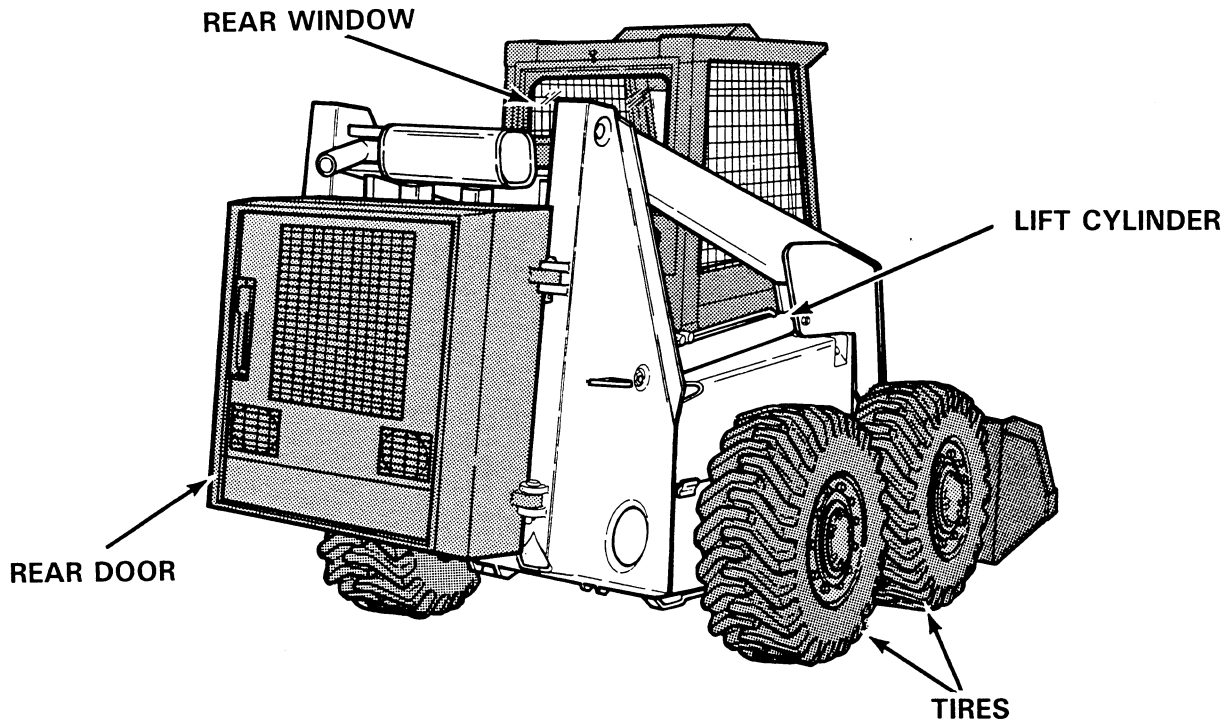


MELROE bobcat DELIVERY REPORT

WARNING

V. BOBCAT LOADER IDENTIFICATION





B-10992
B-10993

TIRES – Standard tires are shown. Other tires are available.
BUCKET – Several different buckets and other attachments are available for the loader.
ROPS, FOPS – Roll-Over Protective Structure, Falling Object Protective Structure.

SERVICE SCHEDULE

The service schedule is a guide for correct maintenance of the Bobcat loader that must be done regularly. Always use these service intervals unless very hot, cold, dusty or corrosive operating conditions make it necessary to increase the frequency of service. Failure to do so will cause damage to the loader or the engine.

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read Operator's Manual, Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repair or service. Failure to follow instructions can cause injury or death.

W-2003-1285

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	10	50	100	200	600	1000
Engine Oil	Check & add oil as needed.	■					
Engine Coolant System	Check level & add coolant as needed.	■					
Air Cleaner Indicator	Replace filter when red ring shows in window.	■					
Fuel Water Trap	Remove water & sediment as needed.	■					
Loader Pivot Areas	Add grease to the fittings	■					
Tires	Check for damage & add air as needed.	■					
Hydraulic Reservoir Fluid	Check fluid level & add fluid as needed.	■					
General	Check for damage, leaks, loose or broken parts.	■					
Safety Treads, Safety Signs, Seat Belt	Check for damage & replace if damaged or missing.	■					
Seat Bar	Check for proper function, adjust as needed.		■				
Wheel Nuts	*Check torque & tighten to 240-300 ft.-lbs. (325-407 Nm) torque.		■				
Battery & Cables	Check battery water level & add as needed. Clean cable ends & cover with grease.		■				
Steering Levers & Foot Pedals	Lubricate with grease.		■				
Final Drive Chaincase	Check fluid level & add as needed.			■			
Engine Oil	Change oil & replace filter.			■			
Planetary Axles	Check fluid level & add as needed.			■			
Axle Housing Nuts	Check & tighten to correct torque.			■			
Final Drive Chain	Check tension & adjust as needed.			■			
Primary (10 Micron) Hydraulic Filter	Replace filter element. Replace more often if red ring shows in window.				■		
Secondary Hyd. Filters	Replace the two filters.				■		
Clutch Shaft Pivot	Add grease to the fitting.					■	
Fuel Filters	Replace filter elements & remove air from the system.					■	
Coolant System	Check anti-freeze concentration. Protect to -34°F (-37°C) year around.					■	
Crankcase Vent Tube	Remove & clean.					■	
Reduction Gearcase	Check level & add oil as needed.					■	
Hydraulic Reservoir	Pull skid plate. Remove oil plug to remove condensation. Add fluid as needed.						■
Coolant System	Remove the coolant. Clean & fill with clean coolant.						■
Reduction Gearcase	Remove oil & fill to check plug level.						■
Final Drive Chaincase	Remove oil & fill to check plug level.						■
100 Mesh Screen	Clean the screen.						■
Hydraulic Fluid	Remove fluid & fill to check plug level.						■
Fuel Strainer	Remove the strainer & clean.						■
In-Line Fuel Filter	Replace the filter.						■

*** Check the wheel nut torque every 8 hours for the first 24 hours of operation.**

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read Operator's Manual, Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Failure to follow instructions can cause injury or death.

W-2003-1285

A

B-7023

LIFTING AND BLOCKING THE BOBCAT LOADER

Procedure

Always park the loader on a level surface.

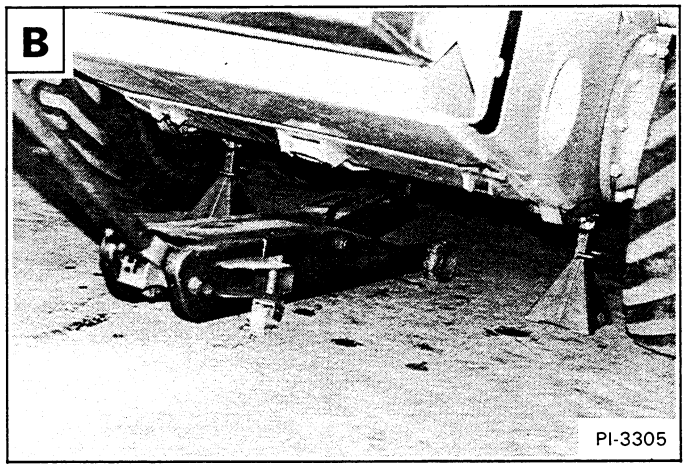
⚠ WARNING

Put jackstands under the front and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

NOTE: Make sure the jackstands that are used to support the loader are rated for the load capacity of the loader weight (See Specifications, Section 8).

Put the floor jack under the rear of the loader. Lift the loader and install the jackstands [B].

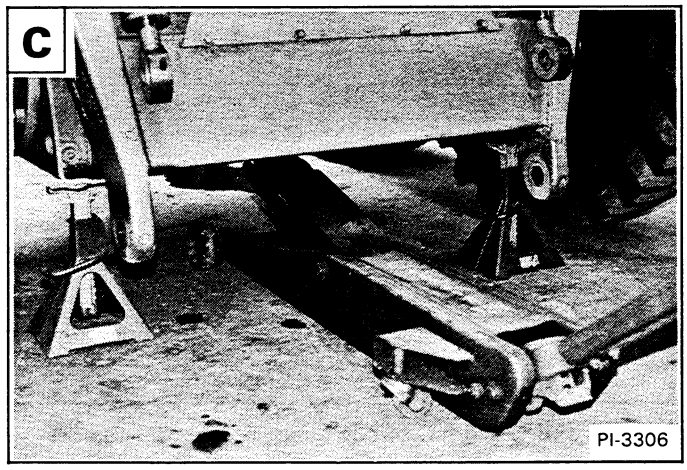
B



PI-3305

Put the floor jack under the front of the loader. Lift the front of the loader and put jackstands under the loader frame [C].

C



PI-3306

TRANSPORTING THE BOBCAT LOADER

Procedure

⚠ WARNING

Steel loading ramps are needed to support the weight of the machine when loading onto a transport vehicle. Wood ramps may break and cause personal injury.

W-2058-1086

NOTE: Make sure the rated load capacity of the transport vehicle is adquated for the loader weight (See Specifications in Section 8.)

A loader with an empty bucket or no attachment must be loaded backwards onto the transport vehicle [A].

Use the following procedure to fasten the Bobcat loader to the transport vehicle:

1. Lower the bucket or attachment to the floor. Stop the engine.
2. Engage the Brake/Clutch pedal.
3. Install chains at the front and rear of the loader to prevent it from moving during sudden stops or when going up or down slopes.

TOWING THE BOBCAT LOADER

Procedure

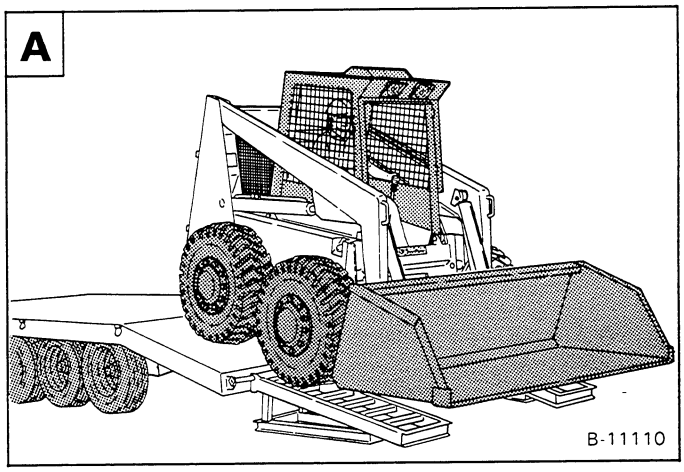
IMPORTANT

Never attempt to start the engine by pushing or pulling. Hydrostatic pumps and motors will be damaged.

I-2001-1285

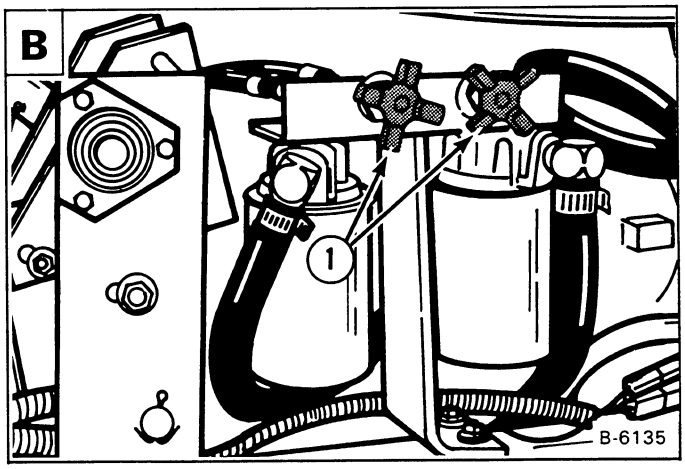
A loader that will not start or has transmission problems may be moved for a short distance (50 yards) if necessary. Tow valves (Item 1) are located on the top of the left side tank under the fender [B]. Open the tow valves before moving the loader.

NOTE: Close the tow valves after servicing. The loader will not operate with the valves open.



IMPORTANT

Do not push or pull the loader at more than 2 MPH (3,2 km/hr.) or for a distance of more than 50 yards (46 m).



LIFT ARM STOP

Procedure

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by a lift arm stop. Failure to use an approved lift arm stop can allow the lift arms or attachment to fall.

W-2059-0986

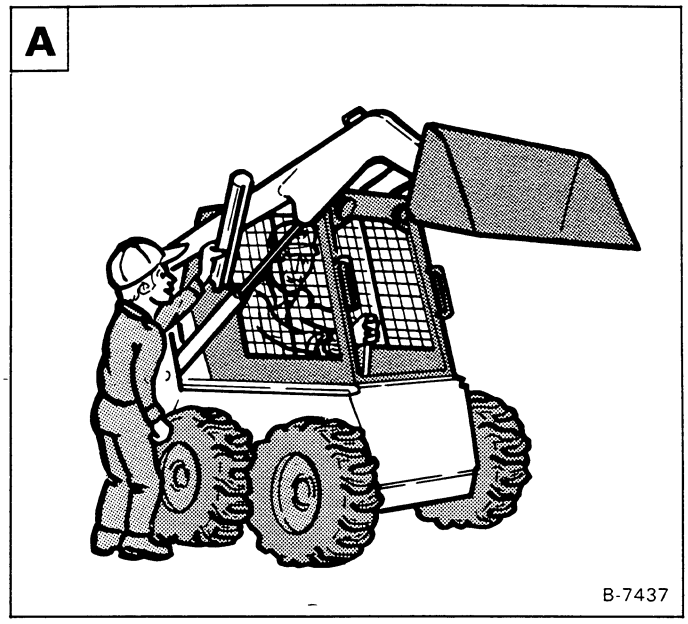
NOTE: Lift arm stops are available from your Bobcat dealer.

One person must stay in the operator's seat, with the seat belt fastened and the seat bar lowered, while another person installs the lift arm stop.

Start the engine and raise the lift arms all the way up.

Have a second person install the lift arm stop over the rod of one lift cylinder [A].

Lower the lift arms slowly until the stop is held between the lift arm and lift cylinder.

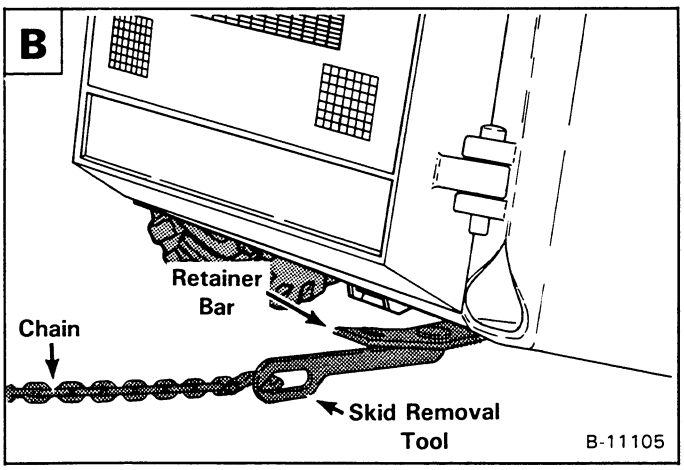


SKID PLATE

Removal and Installation

To open the skid plate and clean under the engine area, use the following procedure:

1. Remove the bolt from the retaining bar at the rear of the skid plate.
2. Install the removal tool on the skid plate [B].
3. Fasten a chain to the tool and fasten the other end to a solid support.
4. Slowly move the loader forward until the skid plate is fully open against the stop.
5. After cleaning or making repairs, close the skid plate by turning the loader around and slowly moving in the opposite direction until the skid plate is closed. Install the bolt and tighten.



⚠ WARNING

Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Melroe Company. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in injury or death.

W-2069-1285

Raising the Operator Cab

Lower the lift arms and put the bucket flat on the ground. Stop the engine. Engage the brake/clutch pedal. Open the rear door. Pull the side screens back [A].

Move the top engine cover backward far enough that the support angle on the rear of the cab will not hit the engine cover as the cab is being raised [B].

Remove the rear pins (Inset 1) from both sides of the operator cab [C].

Activate the tilt switch (Inset 2) and raise the operator cab [C].

NOTE: Make sure the steering levers are clear as the cab is being raised and that nothing is loose in the cab.

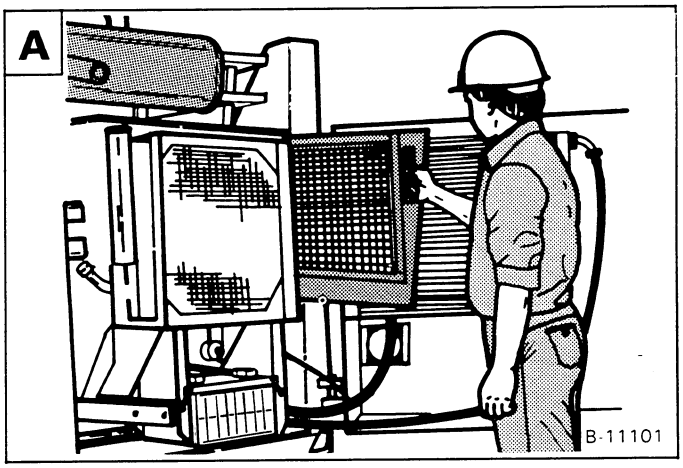
Pull the pin and install the safety support above the tilt cylinder rod [D]. Lower the operator cab until its weight is supported by the safety support.

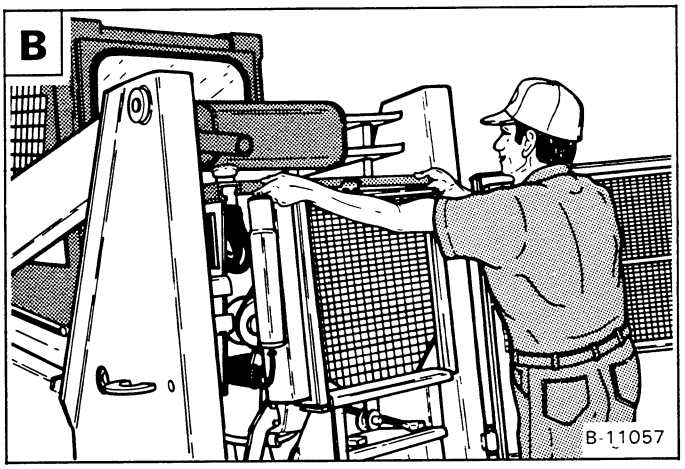
Lowering the Operator Cab

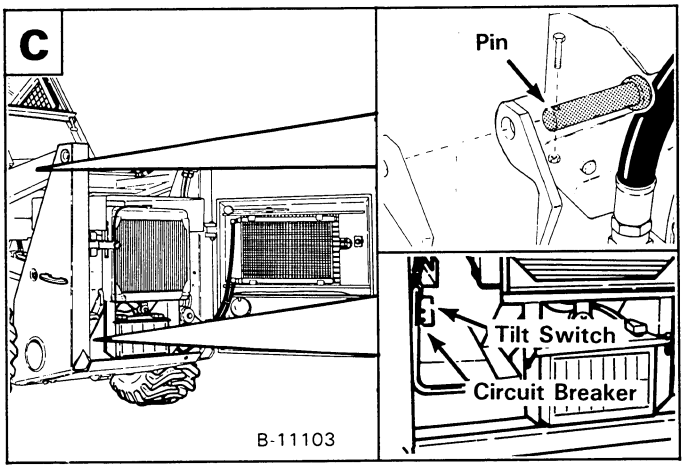
Raise the operator cab and remove the safety support from the tilt cylinder rod. Replace the pin to hold the safety support [D]. Activate the tilt switch (Inset 2) and lower the cab back into the operating position [C]. Make sure the engine cover clears. Install the pins (Inset 1) [C]. The pins must be in position before the loader is operated.

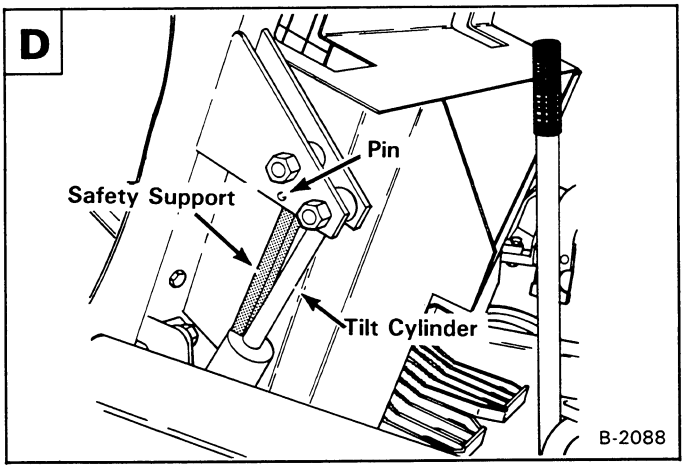
Push the side panels and engine cover back into position [A] [B].

Close the rear door.









SEAT BAR SYSTEM

Description

The seat bar system has a pivoting seat bar and has a spring loaded latch for the lift control pedal. The operator controls the use of the seat bar. The seat bar in the down position helps keep the operator in the seat and unlocks the lift pedal [A]. When the seat bar is up, the lift pedal is locked in neutral position.

Seat Bar Inspection

Sit in the seat and fasten the seat belt snugly. Engage the brake/clutch pedal. Pull the seat bar all the way down. Start the engine. Release the brake/clutch pedal.

Raise the lift arms until the bucket is about two feet (600 mm) off the ground. Raise the seat bar. Try to move the lift pedal. The pedal must be firmly locked in neutral position. There must be no motion on the lift arms when the pedal is pushed.

Pull the seat bar down, lower the lift arms fully and place the bucket flat on the ground.

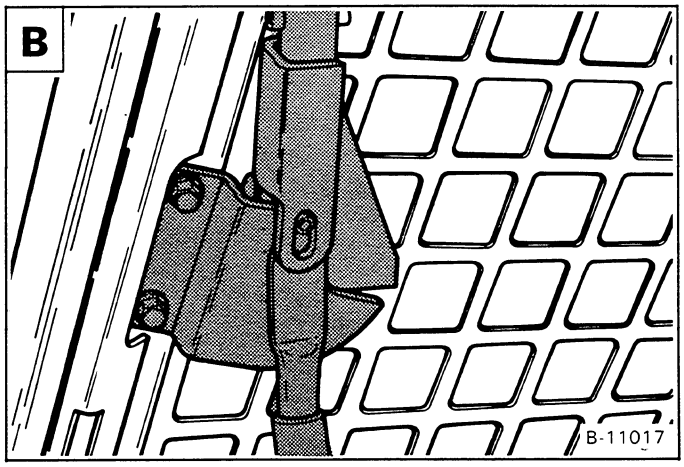
Stop the engine. Engage the brake/clutch pedal. Raise the seat bar and operate the lift pedal to be sure that the pedal is firmly locked in neutral position. Unfasten the seat belt.

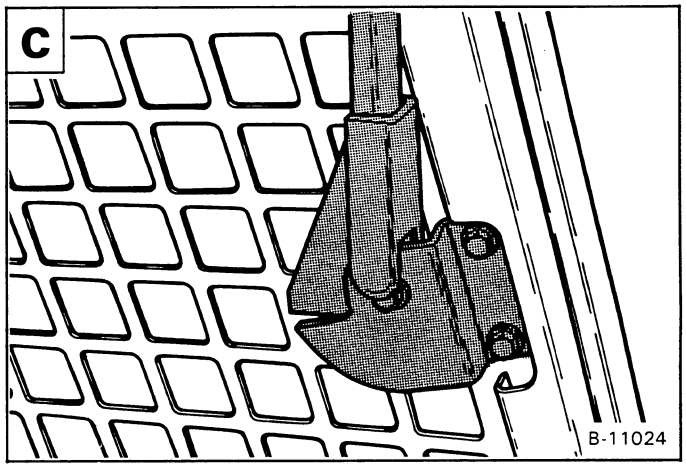
Seat Bar Maintenance

Clean any debris or dirt from moving parts [B] [C].

Inspect the linkage bolts and nuts for tightness. Use general purpose grease to lubricate the seat bar pivot points at each side of the cab.

If the seat bar system does not function correctly, check for free movement of each linkage part. Check for excessive wear. Adjust the pedal control linkage. Replace parts that are worn or damaged. Use only genuine Melroe replacement parts.





⚠ WARNING

AVOID INJURY OR DEATH

The seat bar system must lock the lift control pedal in neutral when the seat bar is up. Service the system if pedal does not lock correctly.

USING AN EXTRA BATTERY (JUMP STARTING)

Procedure

If it is necessary to use an extra battery to start the engine, be careful. This is a two person operation. There must be one person in the operator's seat and one person to connect and disconnect the battery cables.

Use the following procedure to connect the extra battery:

1. The key switch must be in the "OFF" position.
2. The extra battery must be of the same voltage as the loader battery.
3. Connect the end of the first cable to the positive (+) terminal of the extra battery. Connect the other end of the same cable to the positive (+) terminal of the loader battery [A].
4. Connect the end of the second cable to the negative (−) terminal of the extra battery. Connect the other end of the same cable to the loader frame [A].

NOTE: Do not connect directly to the negative (−) terminal of the loader battery. Connecting cable directly to the negative (−) terminal can cause a spark, causing the battery to explode.

5. Keep the cables away from the moving parts.
6. Start the engine (Also see Cold Starting Procedure in the Operator's Manual).
7. After the engine has started. Remove the cable connected to the loader frame first.
8. Remove the cable from the loader battery positive (+) terminal.

IMPORTANT

Damage to the alternator can occur if:

- **Engine is operated with battery cables disconnected.**
- **Battery cables are connected when using a fast charger or when welding on the loader (Remove both cables from the battery).**
- **Extra battery cables (booster cables) are connected wrong.**

I-2023-1285

⚠ WARNING

Keep arcs, sparks, flames and lighted tobacco away from batteries. When "jumping" from an extra battery make final connection (negative) at engine frame.

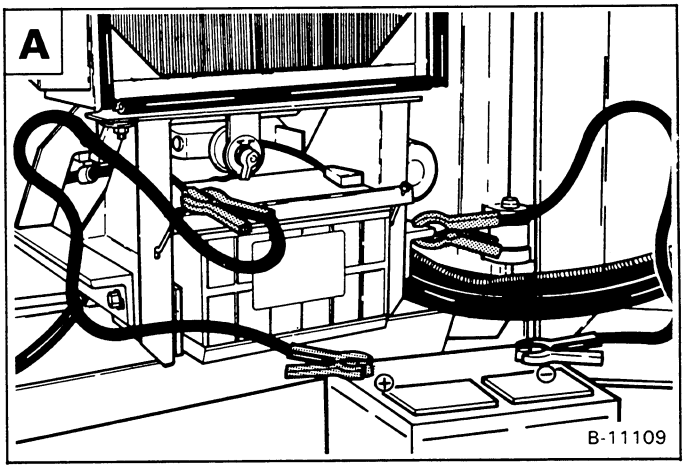
Do not jump start or charge a frozen battery. Warm battery to 60°F (16°C) before connecting to a charger. Unplug charger before connecting or disconnecting cables at battery. Battery gas can explode and cause serious injury.

W-2066-1285

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water for several minutes and get medical attention in case of eye contact.

W-2065-1286



HYDRAULIC / HYDROSTATIC FLOW CHART

For Model

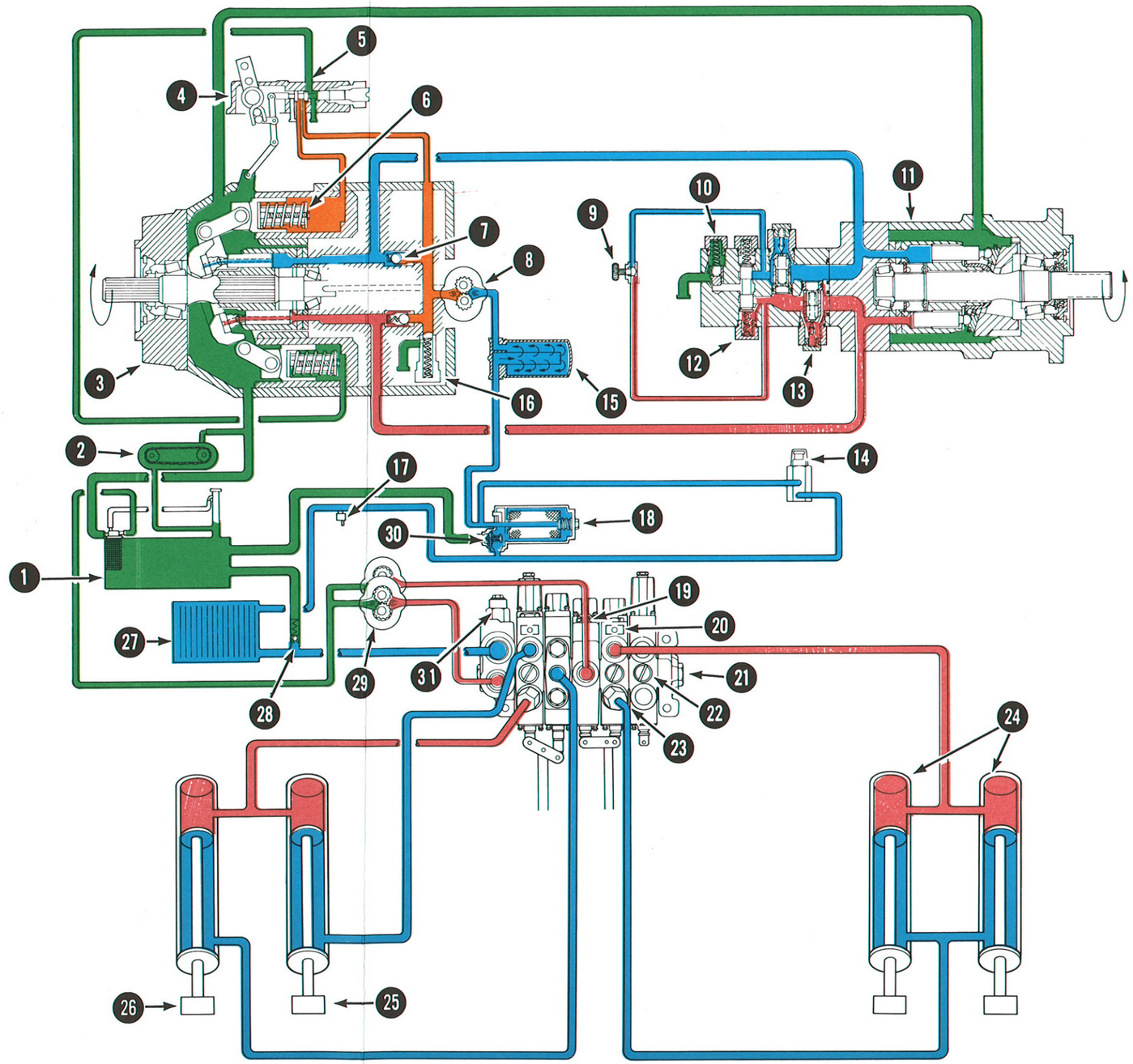
980

bobcat® Chart # 6570473 (Printed January 1987) (Revised April 1994)

RED - - - - - - - - High Pressure
BLUE - - - - - - - Low Pressure
GREEN - - - - - - Case Drain & Reservoir
ORANGE - - - - - Charge Pressure

NOTE
Chart shows oil flow in Forward Drive Position and with Hydraulic Cylinders Partially Extended. For Hydraulic/ Hydrostatic System Operation, refer to Sheet 2 of this publication.

NOTE
Refer to Chart # 6570281 for machines equipped with optional Bucket Positioning Valve. Reference ''A'' and ''B'' indicate location of hydraulic circuitry connection.



Printed in U.S.A.

HYDRAULIC / HYDROSTATIC SYSTEM OPERATION

To Be Used With

HYDRAULIC / HYDROSTATIC FLOW CHART

For Model

980

Chart # 6570473 (Printed January 1987) (Revised April 1994)

CHART LEGEND

1. **FLUID RESERVOIR**
2. **TRANSFER CASE**
3. **HYDROSTATIC PUMP,** Variable
4. **DISPLACEMENT CONTROL VALVE**
5. **ORIFICE**
6. **SERVO CONTROL CYLINDER**
7. **CHARGE CHECK VALVE**
8. **CHARGE PUMP**
9. **TOW VALVE**
10. **STROKED CHARGE RELIEF VALVE,** 160-180 PSI (1103-1241 kPa)
11. **HYDROSTATIC MOTOR,** fixed
12. **SHUTTLE VALVE**
13. **HIGH PRESSURE RELIEF VALVE,** 4000 PSI (27580 kPa)
14. **CONDITION INDICATOR,** hydraulic filter
15. **SECONDARY FILTER,** . . . . . 10 Micron
16. **NEUTRAL CHARGE RELIEF VALVE,** 190-210 PSI (1310-1448 kPa)
17. **TEMPERATURE SWITCH,** 225°F (108°C)
18. **FILTER** . . . . . 10 Micron
19. **RELIEF VALVE** . . . . . 2300 ± 50 PSI (15858 ± 344 kPa)
20. **ANTI-CAVITATION VALVE (2)**
21. **CONTROL VALVE**
22. **LOAD CHECK VALVES (3)**
23. **RESTRICTOR VALVE (2)**
24. **TILT CYLINDERS**
25. **LEFT HAND LIFT CYLINDER**
26. **RIGHT HAND LIFT CYLINDER**
27. **OIL COOLER**
28. **OIL COOLER BY-PASS,** 35 PSI (240 kPa)
29. **HYDRAULIC PUMP (Tandem),** 12 GPM (45,4 L/min.) & 24 GPM (90,8 L/min.)
30. **FILTER BY-PASS,** 36 PSI (248 kPa)
31. **MAIN RELIEF VALVE,** .2250 ± 50 PSI (15513 ± 344 kPa)

FLUID FLOW EXPLANATION

The fluid moves through the 100 mesh screen in the reservoir (1) through the hose to the hydraulic pump (29) . The tandem hydraulic pump (29) forces the fluid out two hoses to the hydraulic control valve (21) . The tandem hydraulic pump (29) has two sections, the large section of the pump is a 24 GPM (90,8 L/min.) and the small section of the pump is a 12 GPM (45,4 L/min.).

From the 24 GPM (90,8 L/min.) section of the hydraulic pump (29) fluid flows into the end plate inlet of the hydraulic control valve (21) to supply fluid for the lift section and the self-leveling section of the control valve. The fluid flows into the mid-inlet section (the volume control section) of the control valve (21) . If the mid-inlet section is in the neutral position the 24 GPM (90,8 L/min.) fluid is ported to the return side of the control valve (21) . If the mid-inlet section is in the ''engaged'' it will combine the 24 GPM (90,8 L/min.) and the 12 GPM (45,4 L/min.) fluid to give a flow of 36 GPM (136,3 L/min.) for a fast tilt or roll back and full flow of fluid to the auxiliary function.

Because there are two separate hydraulic pump flows (29) , there are also two relief valves (19) (31) . In the end plate of the control valve (21) there is a pilot operated relief valve (31) for the protection of the 24 GPM (90,8 L/min.) hydraulic pump section (29) . On the mid-inlet section there is a relief valve (19) for the protection of the 12 GPM (45,4 L/min.) hydraulic pump section (29) .

The lift section of the control valve (21) has ''detent'' for the ''float'' position. The normal IN-OUT position of the spool is spring loaded to return the lift section spool to the neutral position. The lift section also has a restrictor valve (20) which goes to the base end of the lift cylinders (25) (26) and tilt cylinders (24) . The restrictor valve (20) puts a restriction on the fluid which is returning to the lift on tilt section when the lift arms are being lowered or the bucket is rolled back.

Each section in the control valve (21) ; lift and tilt also have a load check (22) used for holding a load when the spool is first moved and until the hydraulic pump (29) fluid pressure can over come cylinder pressure (load). Both flows of the hydraulic pump (29) return to the same passages (internally) in the control valve (21) and are coming out of the control valve (21) with a 36 GPM (136,3 L/min.) flow at full RPM.

The 36 GPM (136,3 L/min.) fluid from the control valve (21) flows into the oil cooler (27) . The oil cooler (27) has a by-pass valve (28) which allows fluid flow to go back to the fluid reservoir (1) . From the oil cooler (27) the fluid flows to the inlet side of the filter (18) . The 10 micron filter (18) has a two-way filter by-pass (30) which allows excess fluid flow not being used in normal condition by hydrostatic pumps (3) to go back to the reservoir (1) , also this by-pass (30) will allow fluid flow from the reservoir (1) to the hydrostatic pumps (3) in case there is a loss of the normal supply of fluid from the oil cooler (27) . There are two lines leading into the condition indicator (14) which senses pressure differential on both sides of the filter and shows if the 10 micron filter (18) is plugged. The fluid flow to the secondary 10 micron filters (15) have no by-pass relief valves built in.

NOTE: The temperature switch (17) is located in the filter head (18) and not in the tubelines between the oil cooler (27) and the filter (18), as shown.

The charge pump (8) in the hydrostatic pumps (3) is a ''gear type'' pump with a neutral charge relief valve (16) built into it that returns fluid to the case of the hydrostatic pump (3). Fluid flows out of the charge pump (8) through the charge check valves (7) to supply the hydrostatic pumps (3) and the hydrostatic motors (11) with charge fluid.

There are two hydrostatic pumps (3) and two hydrostatic motors (11). One hydrostatic pump (3) and one motor (11) work together as a pair to drive on one side of the loader. The other pump and motor work as a pair to drive the opposite side of the loader.

Charge fluid is also supplied to the displacement control valves (4). The fluid flow from the displacement control valves (4) goes to the servo control cylinders (6) which angles the swashplates in the hydrostatic pumps (3) when the steering levers are moved. The spool in the displacement control valve (4) is connected to the steering levers by a mechanical linkage and when the steering levers are moved the fluid is ported to either servo control cylinder (6) depending on which direction the loader will be moving.

Once the swashplate is angled in the hydrostatic pump (3) it forces fluid out of the pump for the ''drive pressure'' fluid. The drive pressure fluid closes the charge check valve (7) to prevent leakage of the drive pressure fluid into the low or charge pressure side of the drive loop.

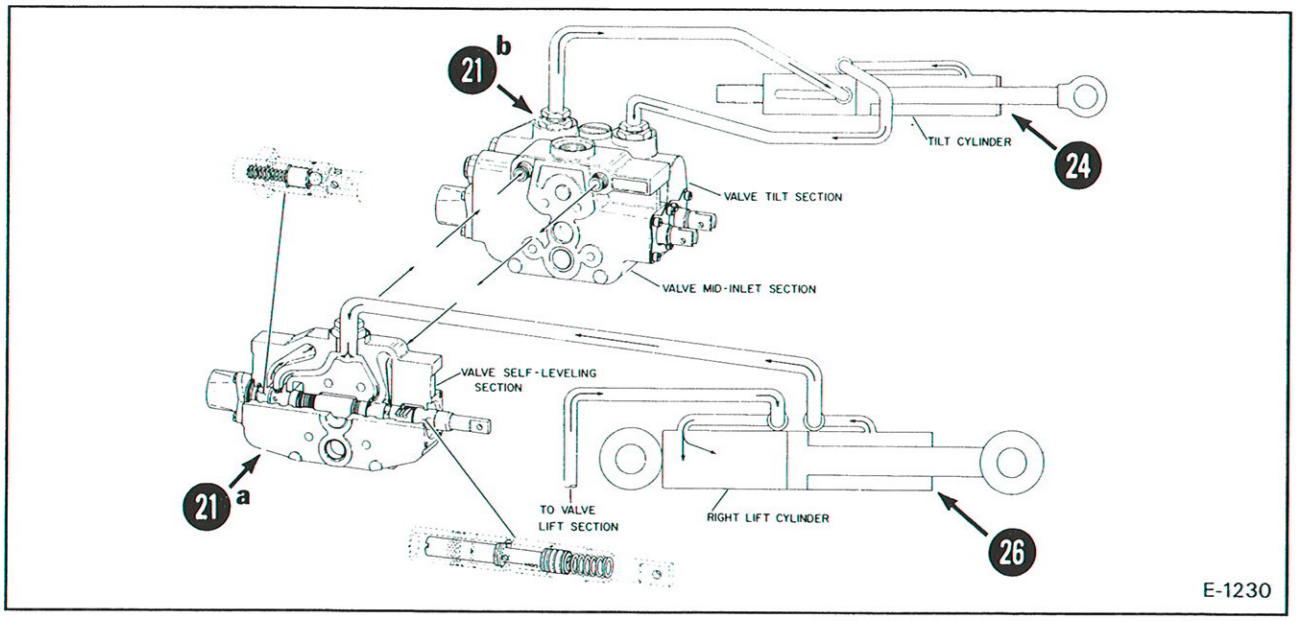
The drive pressure fluid is forced to the hydrostatic motor (11) where the rotating group is being turned by the high pressure fluid. This high pressure fluid in the rotating group is also ported to the shuttle valve (12). The drive pressure fluid forces the shuttle valve (12) to move allowing low pressure fluid (charge side) of the drive loop to open the stroked charge relief valve (10). The stroked charge relief valve (10) setting is lower than the neutral charge relief valve (16). The stroke charge relief valve (10) opens which allows charge fluid to flow to the motor case drain for cooling.

To protect the hydrostatic pump (3) and the hydrostatic motors (11), there are two high pressure relief valves (13). These high pressure relief valves (13) protect the drive loop from high pressure in either direction.

Fluid flows pass the neutral charge relief valve (16) or stroked charge relief valve (10) joins the case drain fluid and is ported to the reservoir (1). Case drain fluid goes pass the ''tee'' fitting and some of the fluid is ported to the transfer case (2) through an orifice in the inlet port of the transfer case (2). The fluid used to lubricate the transfer case (2) is ported to the filler neck of the fluid reservoir (1).

IMPORTANT

The tow valves (9) are to be used only when the loader will not operate and in need of service. DO NOT move the loader at more than 2 MPH or for a distance more than 50 yards or damage can result to the hydrostatic system.



The control valve (21) has a self-leveling section. With the self-leveling section (21) **a** in the neutral position the section is just a return channel for the rod end fluid of the right hand lift cylinder (26) . When the self-leveling section (21) **a** is ''engaged'', the rod end fluid from the right hand cylinder only is directed through a small passage (internally) to the tilt section (21) **b** and to the base end of the tilt cylinders (24) for the self-level function. The return fluid from the tilt cylinders (24) goes into another small passage (internally) in the tilt section (21) **b** and is ported back to the self-leveling section (21)**a** and to the return fluid passage of the control valve (21) . The tilt section (21) **b** of the control valve (21) is a spring loaded spool with a function to tilt or roll back the bucket and is returned to the neutral position by the spring.

The return fluid from the right lift cylinder (26) is against the 500 PSI (3488 kPa) relief and will by-pass the positioning fluid if the bucket is fully rolled out and the lift arms are still moving up with self-level engaged.

The rod end fluid from the tilt cylinders (24) is against the 150 PSI (1034 kPa) relief which is metering the fluid for the self-level action.

If the self-leveling action does not work correctly, check the springs on the end of the self-leveling spool to see they are not broken and see that the metering spool is not sticking.

2 HYDRAULIC SYSTEM

TROUBLESHOOTING

The following troubleshooting chart is provided as an assistance in locating and correcting problems which are most common. Many of the recommended procedures must be done by authorized Bobcat Service Personnel only.

PROBLEM	CAUSE
The hydraulic system will not operate.	1, 2, 3, 4, 5, 6, 7, 8
Slow hydraulic system action.	3, 5, 6, 7, 8, 9, 10, 11
Hydraulic action is not smooth.	3, 7, 9, 10, 11
Lift arms go up slowly at full engine RPM.	3, 5, 8, 9, 10, 11, 12, 13
The lift arms or bucket will move with the pedal in neutral position.	11,14
The lift arms come down with pedal in neutral.	11, 13, 15, 16, 17
The bucket does not self-level.	18, 19

KEY TO CORRECT THE CAUSE

1. Clutch is not engaged.
2. Clutch is damaged.
3. The fluid level is not correct.
4. The pedal linkage is disconnected.
5. The hydraulic pump has
6. 100 mesh screen is plugged.
7. Fluid is cold.
8. The relief valves have a defect.
9. The main relief valves are not at the correct pressure.
10. Suction leak at the inlet side of the hydraulic pump.
11. The pedal linkage is not adjusted correctly.
12. Using the loader for more than rated capacity.
13. Internal leak in the lift cylinder(s).
14. The spool in the valve section is not centering or centering spring is broken.
15. External leak at the lift cylinder(s).
16. Port relief seal is leaking.
17. Load check has a defect in the valve section.
18. Check the flow divider.
19. Check the unloading spool.

Suggest:

If the above button click is invalid.

Please download this document

first, and then click the above link

to download the complete manual.

Thank you so much for reading

IMPORTANT

When making repairs on hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0284

Flare Connections

Use the following procedure to tighten the flare fitting:

Tighten the nut until it makes contact with the seat.

Make a mark across the "flats" of both the male and female parts of the connection [A].

Use the chart to find the correct tightness needed [B].

If the fitting leaks after tightening, disconnect it and inspect the seat area for damage.

Straight Thread O-ring Fitting

When installing this fitting, the O-ring must be first lubricated. Loosen the jam nut, install the fitting into place, then tighten the jam nut. Tighten the jam nut until it and the washer are tight against the surface [C].

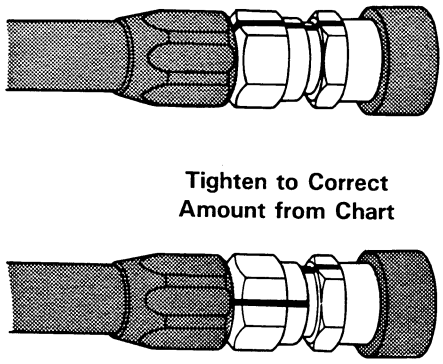
Tubelines and Hoses

Make replacement of tubelines which are bent or have become flat. There will be restriction of fluid flow, which will give a slow hydraulic action and cause heat.

Make replacement of hoses which show signs of wear, damage or weather cracked rubber.

When installing tubelines or hoses, make sure you use two wrenches when loosening and tightening them.

A

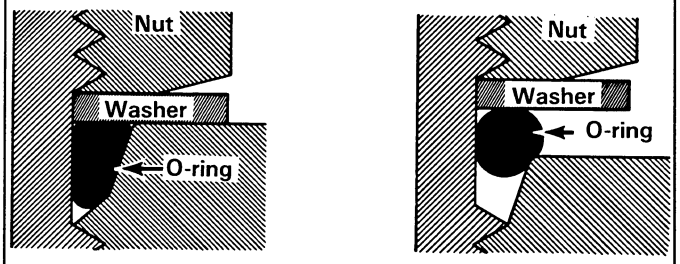


A-1897

B

Wrench Size	Tube Size Outside Dia.	Thread Size	Rotate No. of Hex Flats
5/8"	5/16"	1/2" - 20	2-1/2
11/16"	3/8"	9/16" - 18	2
7/8"	1/2"	3/4" - 16	2
1"	5/8"	7/8" - 14	1-1/2 - 2
1-1/4"	3/4"	1-1/16" - 12	1
1-3/8"	1"	1-5/16" - 12	3/4 - 1
2"	1-1/4"	1-5/8" - 12	3/4 - 1
2-1/4"	1-1/2"	1-7/8" - 12	1/2 - 3/4

C



A-1852