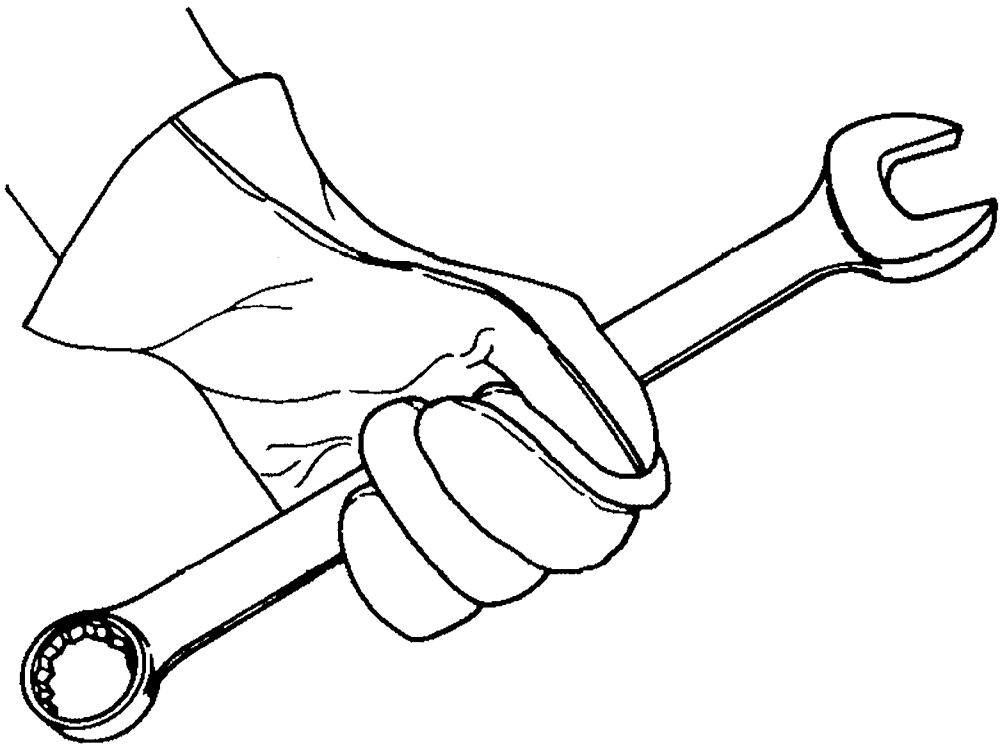
bobcat®

1600

SERVICE MANUAL



MELROE
INGERSOLL-RAND

bobcat®

6566906 (8–87)

Printed in U.S.A.

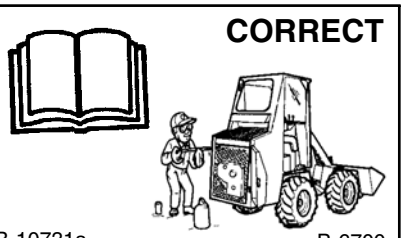
MAINTENANCE SAFETY

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 B-6700

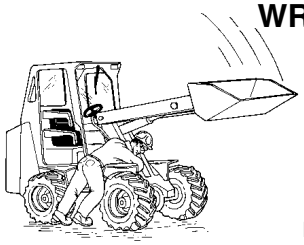
- **Never service the Bobcat Loader without instructions. See Service Manual.**
- **Check engine and hydraulic fluids daily.**
- **Use recommended fluids.**

CORRECT

B-6699

- **Cleaning and maintenance are required daily.**

WRONG



B-15547

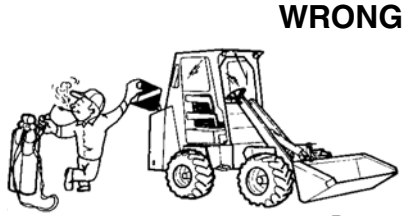
- **Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop. Do not go under lift arms when raised unless supported by an approved lift arm support device. Replace it if damaged.**

WRONG

B-6688

- **Always connect steering frame lock before working on the loader.**

WRONG



B-6672

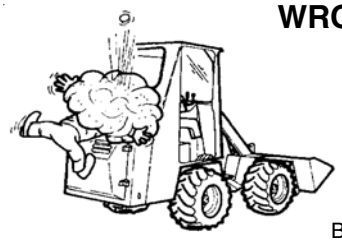
- **Do not fill the fuel tank with engine running, while smoking or when near an open flame.**

WRONG

B-6673

- **Never work on loader with lift arms up unless lift arms are held by an approved lift arm support device.**
- **Never modify equipment or add attachments not approved by Bobcat Company.**

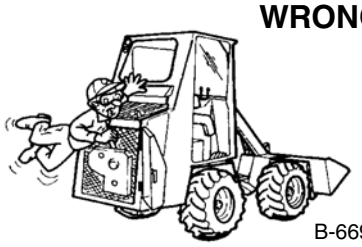
WRONG



B-6697

- **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.**

WRONG



B-6698

- **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.

MSW04-0805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CONTENTS


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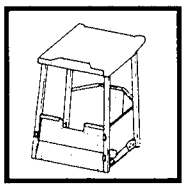
FOREWORD

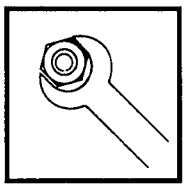
This manual is for the Bobcat loader mechanic. It provides necessary servicing and adjustment procedures for the Bobcat loader and its component parts and systems. Refer to the Operation & Maintanence Manual for operating instructions, starting procedure, daily checks, etc.

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

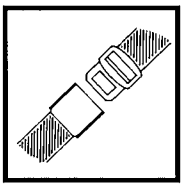
1. Check that the ROPS/FOPS is in good condition and is not modified.



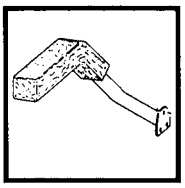
2. Check that ROPS mounting hardware is tightened and is Melroe approved.



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

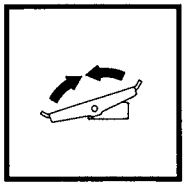


4. The operator restraint arm must function correctly.



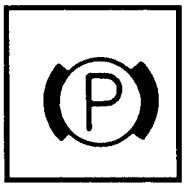
5. Machine signs must be legible and in the correct location.

6. Foot pedal must return to neutral.

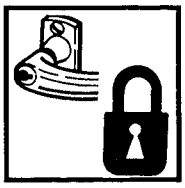


7. Check for correct function of the work lights.

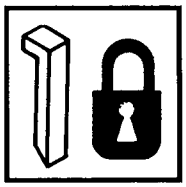
8. The parking brake must function correctly.



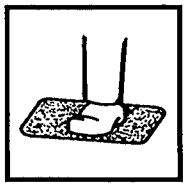
9. Enclosure door latches must open and close freely.



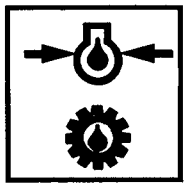
10. Bob-Tach wedges and linkages must function correctly and be in good condition.



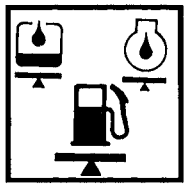
11. Safety treads must be in good condition.



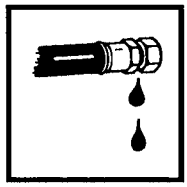
12. Check for correct function of indicator lamps.



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

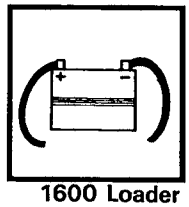


14. Inspect for fuel, oil or hydraulic fluid leaks.

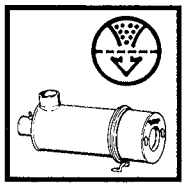


15. Lubricate the loader.

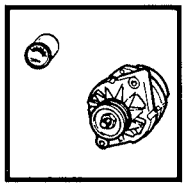
16. Check the condition of the battery and cables.



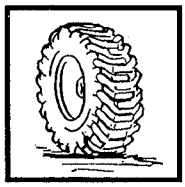
17. Inspect the air cleaner for damage or leaks. Check the condition of the element.



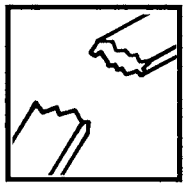
18. Check the electrical charging system.



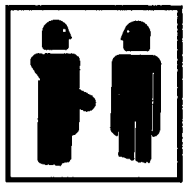
19. Check tires for wear and pressure.



20. Inspect for loose or broken parts or connections.



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



SAFETY INSTRUCTIONS

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read Operation & Maintenance 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–2003–1289

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

1. The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine is in safe operating condition.
2. The Operation & Maintenance Manual delivered with the loader gives operating information as well as routine maintenance and service procedures. It is a part of the loader and must stay with the machine when it is sold.
3. The loader has machine signs (decals) which instruct on the safe care and operation. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from Bobcat loader dealers.
4. The FIEI Manual delivered with the loader gives general safety information.
5. The Service Manual and Parts Manual are available from Bobcat loader dealers for use by mechanics to do shop–type service and repair work.

⚠WARNING

Warnings on the machine and in the manuals are for your safety. Failure to obey warnings can cause injury or death.

W–2044–1285

IMPORTANT

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

I–2019–0284

Safety Alert Symbol: This Safety Symbol is used for important safety messages. When you see this symbol follow the safety message to avoid personal injury or death.

- Wear tight fitting clothing and any other required safety apparel when operating or servicing the loader.
- Wear safety glasses when maintaining or servicing the loader.
- Exhaust gases can kill, vent engine exhaust outdoors.
- Know where fire extinguishers and first aid kits are located and how to use them.
- Do not run the Bobcat loader where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.
- Check fuel and hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Tighten or replace any parts that show leakage. Always clean fluid spills. Do not use gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.
- Clean the loader before doing any welding. Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near the loader when welding.
- Have good ventilation when welding or grinding painted parts. Wear a dust mask when grinding painted parts. Toxic dust and gas can be produced.
- Stop the engine and let it cool before adding fuel. No smoking!
- Use the preocedure in this manual for connecting battery.
- Use the procedure in this manual for cleaning the spark arrestor muffler after each 100 hours of operation.

SERIAL NUMBER LOCATIONS

Always use the serial number of the loader 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 loader serial number plate is located on the inside of the left upright, above the grill **[A]**.

Explanation of loader Serial Number:

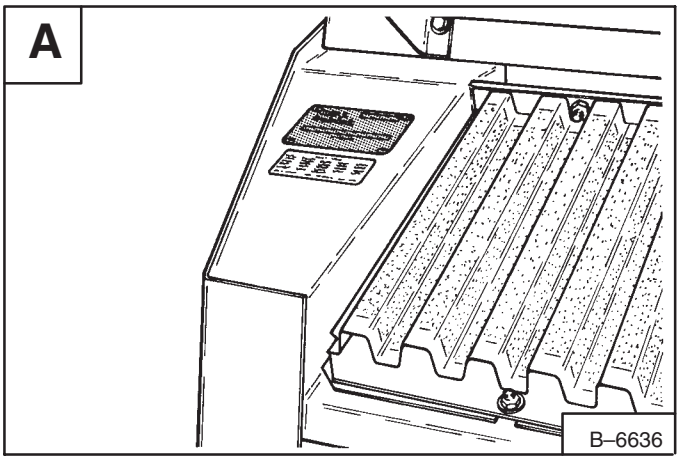
XXXX XXXXX

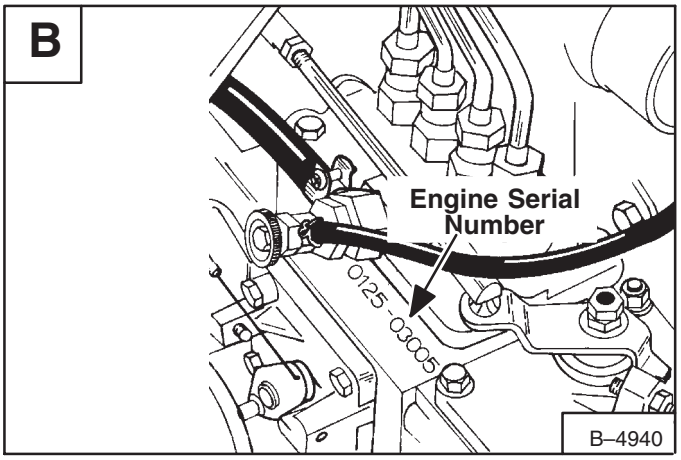
Module 2. – Production Sequence (Series)

Module 1. – Model/Engine Combination

1. The four digit Model/Engine Combination Module number identifies the model number and engine combination. This number (in parenthesis beside the model number) is used in the Operation & Maintenance Manual to more easily identify the standard, optional and field accessory equipment included or available for each specific model.

2. The five digit Production Sequence Number identifies the order which the loader is produced.



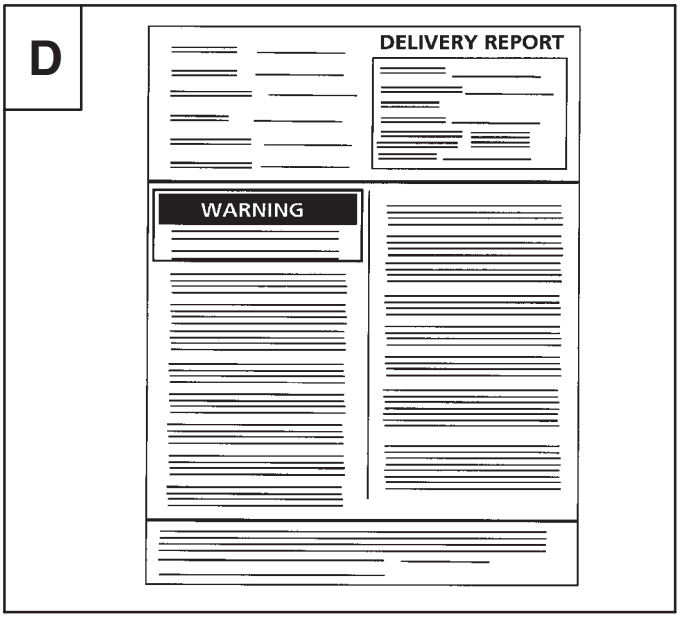


ENGINE SERIAL NUMBER

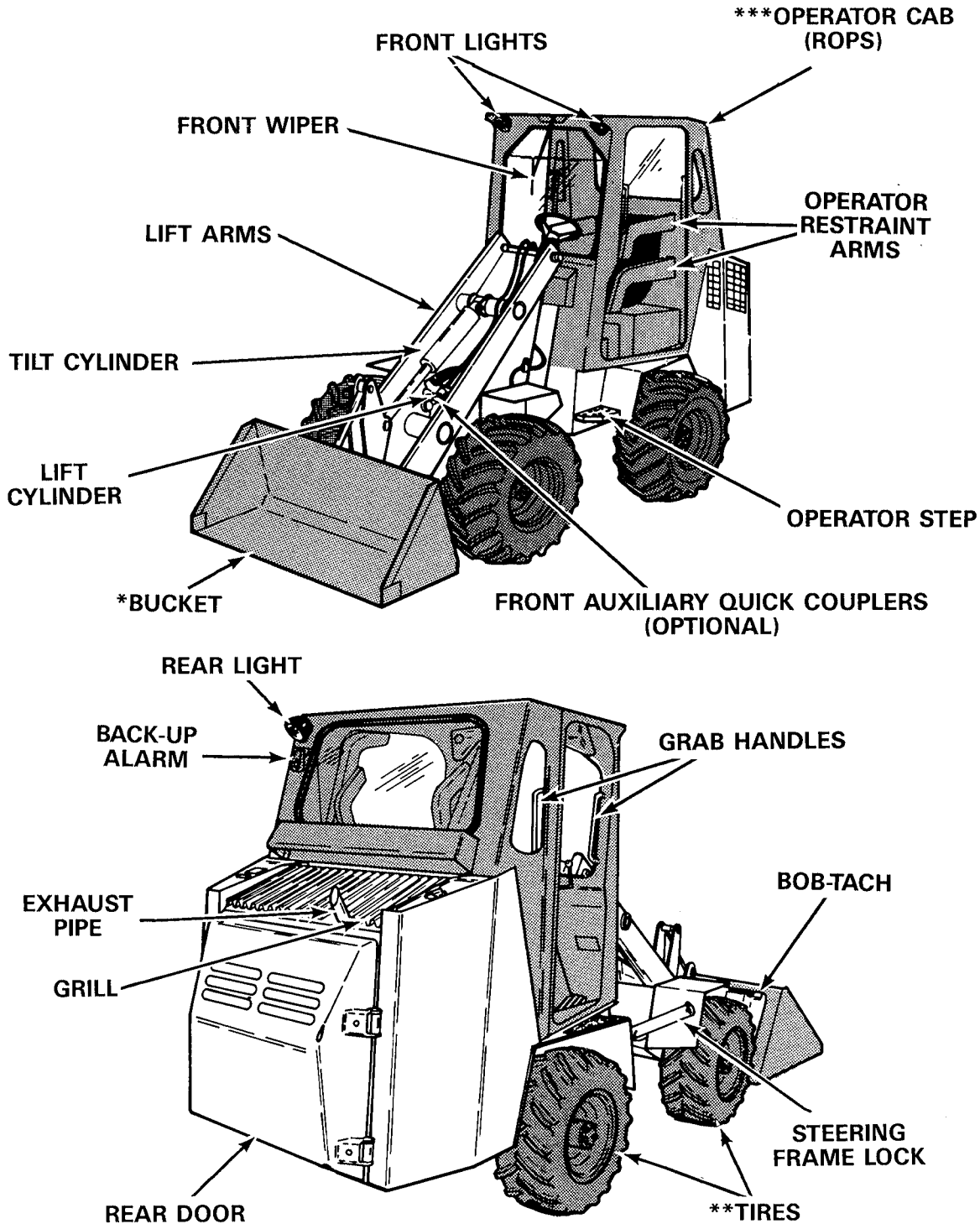
The serial number is above the starter on the engine block **[B]**.

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. An explanation of the form must be given to the owner. Make sure it is filled out completely **[C]**.



BOBCAT LOADER IDENTIFICATION



* BUCKET — Several different buckets and other attachments are available for the Bobcat loader.

** TIRES — Tires shown are optional flotation tires which are not standard for this loader.

*** ROPS — Roll Over Protective Structure.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SERVICE SCHEDULE

You must do maintenance work at regular intervals. Failure to do so will result in damage to the loader or the engine. The service schedule is a guide for correct maintenance of the Bobcat loader. Follow this service schedule as explained below unless it is to increase the frequency of intervals when the Bobcat is used in very hot, cold, dusty or corrosion conditions.

⚠ 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

SERVICE SCHEDULE		HOURS				
ITEM	SERVICE REQUIRED	8-10	50	100	250	1000
Engine Oil	Check the oil & add as needed.	■				
Air Cleaner Indicator	Replace the outer element when the red ring shows in the condition indicator window.	■				
Tires	Check tires for damage & correct pressure.	■				
Seat Belt & Restraint Arms	Check the condition of the seat belt & restraint arms for correct operation.	■				
Safety Signs (Decals)	Check for damaged decals. Replace any decals that are damaged or missing.	■				
Loader Pivot Points	Add lubricant to all fittings (See Operator's Manual).	■				
Hydraulic Fluid Reservoir	Check the fluid level & add fluid as needed.	■				
Engine Coolant System	Check level & add as needed. Remove any debris from the grill area.	■				
Wheel Nuts	*Tighten wheel nuts to 115 ft.lbs. (155 Nm) torque.		■			
Fuel Filter	Remove any trapped water.		■			
Battery & Cables	Check the battery water level & add as needed. Clean cable ends & cover with grease.		■			
Hyd. Control Levers	Check the levers for correct operation. Make repairs & adjust as needed.		■			
Bob-Tach	Check the locking levers & wedges for condition & correct operation.		■			
Brake	Check the brake for correct operation.		■			
Alternator Belt	Check condition & tension of belt.		■			
Engine Oil & Filter	Replace oil & filter.		■			
Spark Arrestor Muffler	Empty spark chamber.			■		
U-Joints (Drive Shaft)	Lubricate with the correct grease (See Operator's Manual).			■		
Hydraulic Filter	Replace the filter element.				■	
Fuel Filter	Replace the fuel filter element.				■	
Front & Rear Axle	Check oil level & add as needed.				■	
U-Joint (Eng. to Hydro. Pump)	Lubricate with the correct grease (See Operator's Manual).				■	
Hyd./Hydro. System	Replace the fluid & filter. Replace vent filter.					■

*** Check the wheel nuts 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 axles 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.

W-2017-0286

Put the floor jack under the rear of the loader [B].

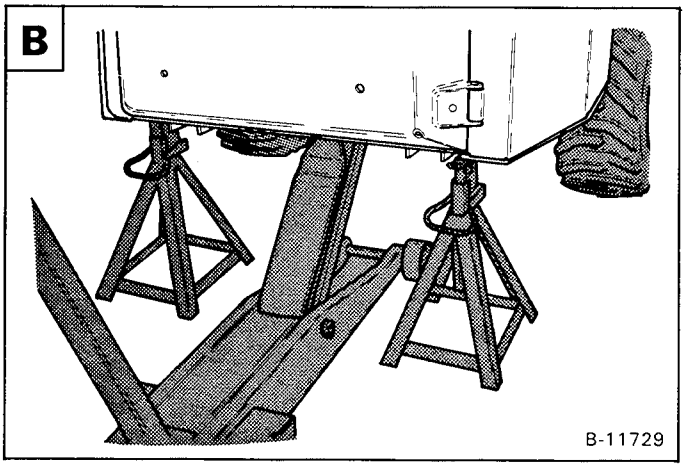
Lift the rear of the loader and install the heavy duty jackstands [B].

Put the floor jack under the front axle differential housing [C].

Lift the front of the loader and put the heavy duty jackstands under the axle housing [C].

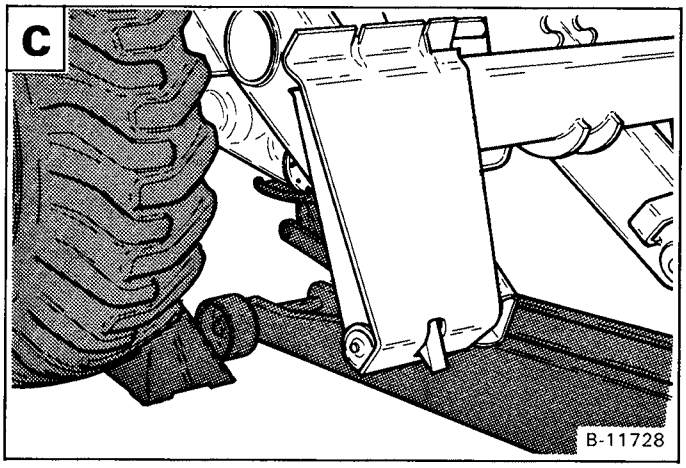
NOTE: Make sure the jackstands do not touch the tires.

B



B-11729

C



B-11728

LIFT ARM SUPPORT DEVICE

Procedure

⚠ WARNING

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

W-2059-0991

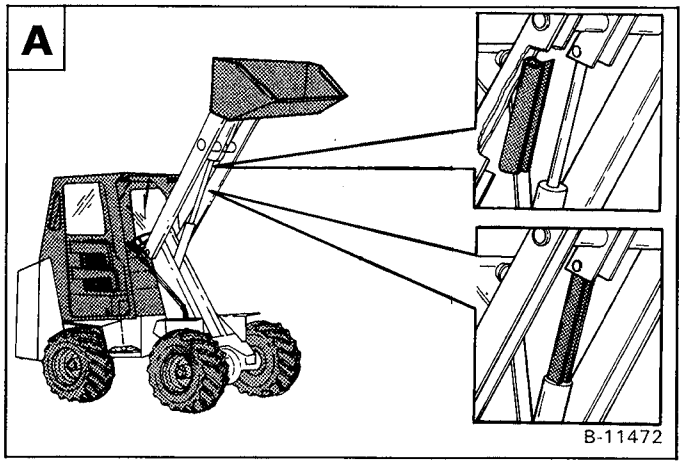
NOTE: Lift arm support device is available from your Bobcat dealer.

One person must stay in the operator's seat, with the seat belt fastened and operator restraint system lowered, while the other person installs the lift arm support device.

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

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

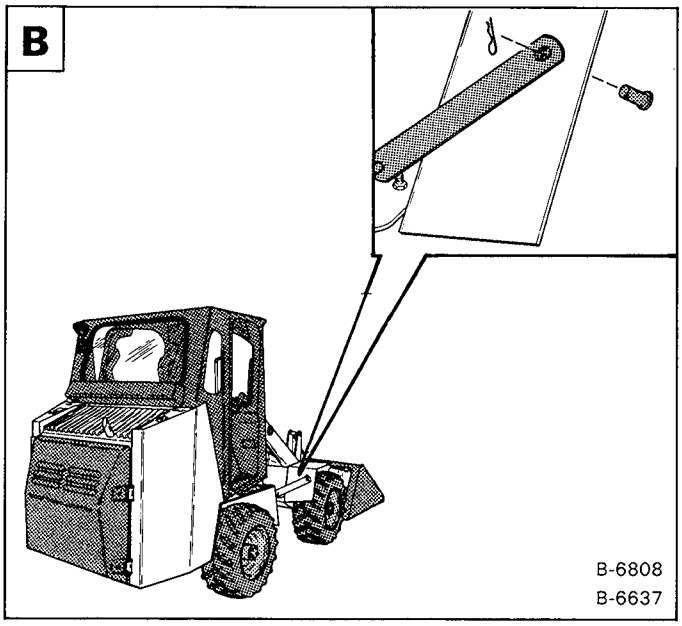
Lower the lift arms slowly until the support device is held between the lift arms and lift cylinder.



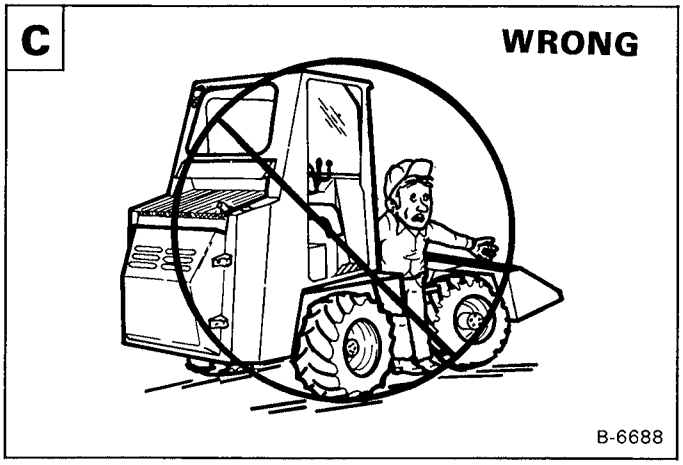
FRAME LOCK

Procedure

Before any service work is done on the Bobcat loader, always install the frame lock [B].



Never allow anyone in or near the pivot area unless the frame lock is installed [C].



TRANSPORTING THE BOBCAT LOADER

Procedure

⚠ WARNING

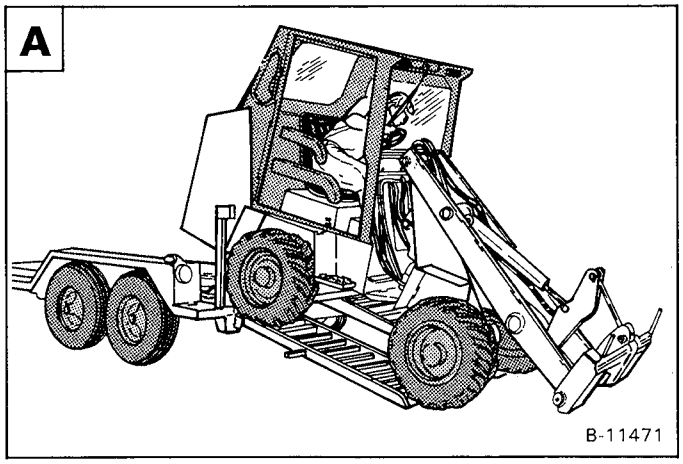
Steel loading ramps are needed to support the weight of the machine when loading onto a transport vehicle. Wood ramps may break and cause personal injury.

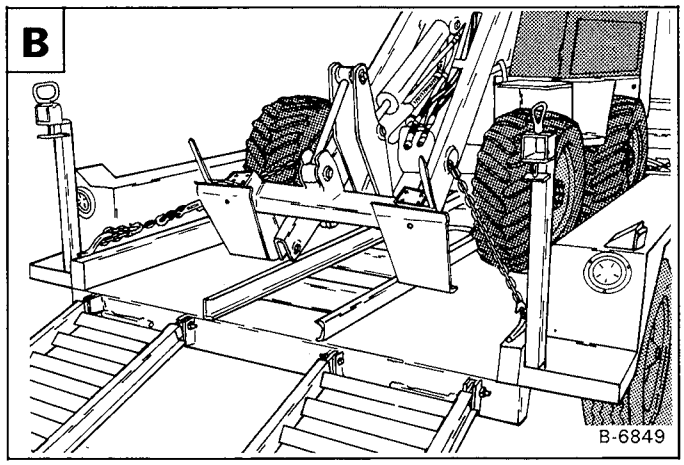
W-2058-0887

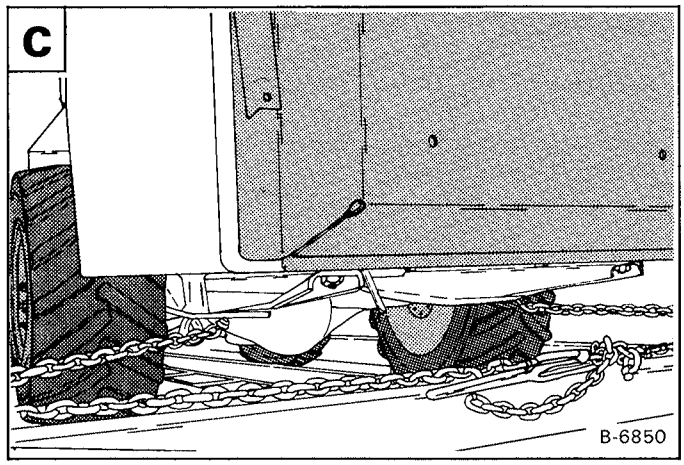
A loader with an empty bucket or no attachment must be loaded backwards onto the transport vehicle [A].

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. Install the steering frame lock (See Page 1—3).
3. Install chains to hold the loader in position during sudden stops or when going up or down slopes.
4. Put a chain through the tube on the lift arms [B]. Fasten the chain to both sides of the transport vehicle.
5. Fasten a chain to each frame mount under the rear of the loader and to the transport vehicle [C].
6. Use chain binders to tighten all the chains.





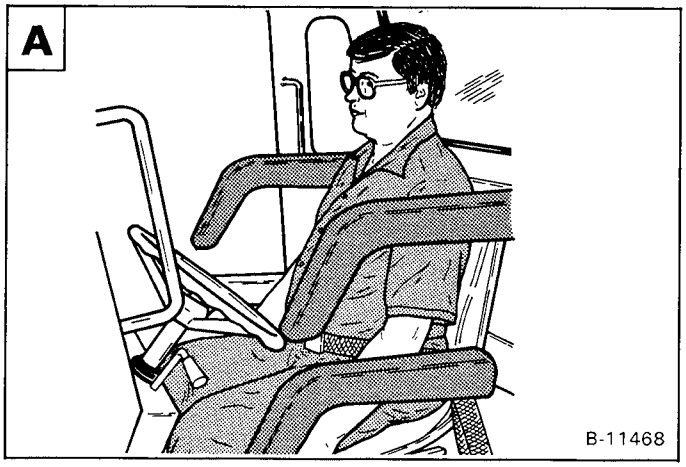


OPERATOR RESTRAINT SYSTEM

Description

The operator restraint system consists of pivoting restraint arms. The system is provided to give additional restraint to keep an operator within the safety zone of the operator cab [A].

The restraint arms are connected to the foot pedal interlock which will not allow the machine to be driven when the restraint arms are in the up position. Only when the operator is in the seat with seat belt buckled and with the restraint arms lowered can the loader be driven.



Inspection of the Operator Restraint System

To check the correct function do the following:

1. Sit in the operator seat and fasten the seat belt snugly.
2. Pull the restraint arms down and start the engine.

NOTE: The centering mechanism must be in neutral position before the starter will engage.

3. The loader may be driven forward or backward by toeing or heeling the foot pedal (the back-up alarm must sound when the loader is moved in the reverse direction).
4. With the engine running and loader not moving, raise the restraint arms. Try to operate the foot pedal in both directions. The loader must not move.
5. Stop the engine. Unfasten the seat belt.

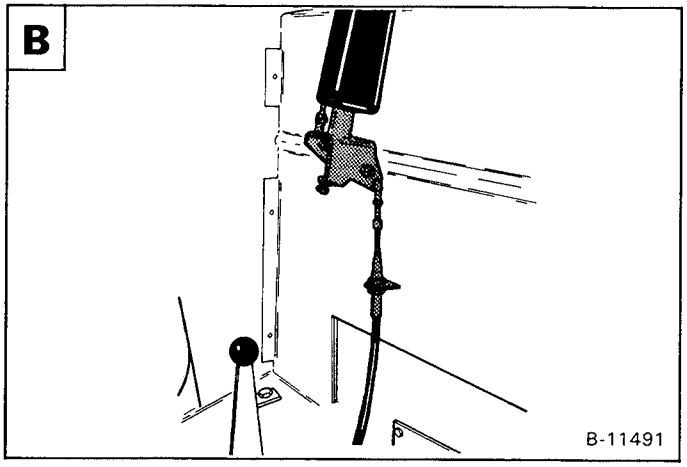
⚠ WARNING

AVOID INJURY OR DEATH

The operator restraint system must lock the foot pedal in neutral when the restraint arms are up. Service the system if pedal does not lock.

Servicing the Operator Restraint System

1. Clean any debris or dirt from moving parts [B].
2. Inspect the arms, linkage and interlock for correct operation. Make sure all bolts are tight.
3. If the restraint system does not function correctly when inspected, correct or adjust before operating the loader.



USING AN EXTRA BATTERY (JUMP STARTING)

Procedure

If it is necessary to use an extra battery to start the engine, use the following procedure:

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.

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 (Item 1) of the extra battery. Connect the other end of the same cable to the positive (+) terminal (Item 2) of the loader battery [A].
4. Connect the end of the second cable to the negative (−) terminal (Item 3) of the extra battery. Connect the other end of the same cable to the frame (Item 4) [A].

NOTE: Do not connect directly to the negative (-) terminal of the loader battery because it can cause a spark and may cause the battery to explode.

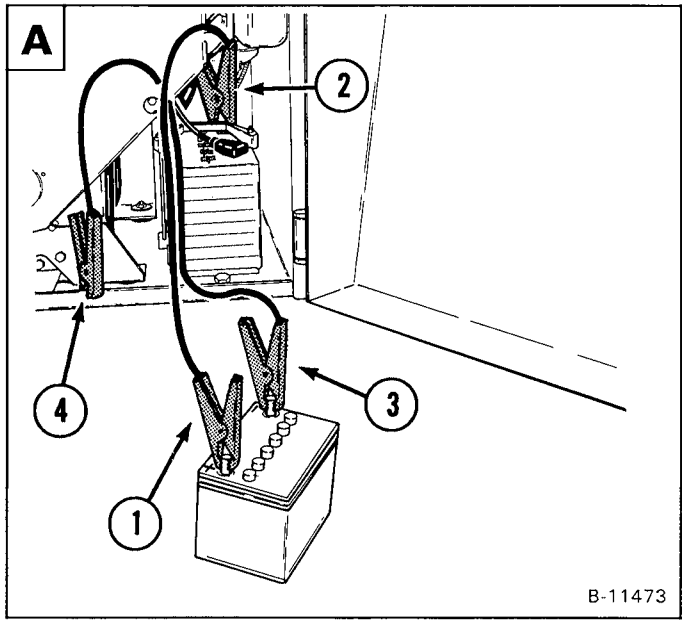
5. Keep the cables away from moving parts.
6. Start the engine (See the Operator's Manual "Cold Starting
7. After the engine is running. Remove the cable connected to the frame first.
8. Then remove the cable connected to the loader battery.

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

⚠ WARNING

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 SYSTEM

HYDRAULIC SYSTEM

2A HYDRAULIC SYSTEM

2B HYDRAULIC SYSTEM


bobcat

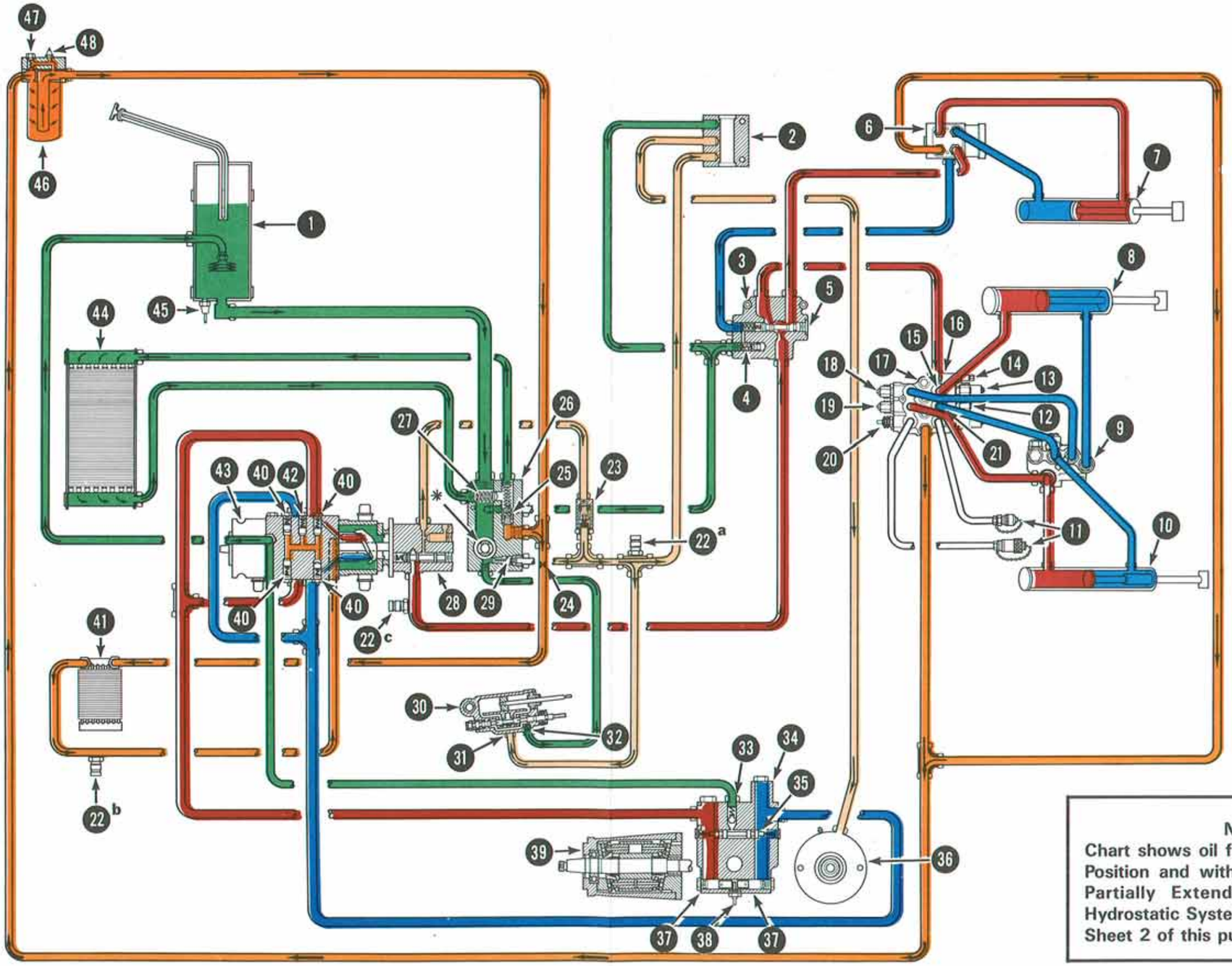
HYDRAULIC / HYDROSTATIC FLOW CHART

For Model

1600 (S/N 11001 THRU 11999)

Chart # 6566839 (Printed February 1986)

RED - - - - - - - High Pressure
BLUE - - - - - - Low Pressure
GREEN - - - - - Case Drain & Reservoir
ORANGE - - - - Charge Pressure
LT. ORANGE - Hydraulic Pump Charge



* Pump Inlet

E-1545

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.

Printed in U.S.A.

HYDRAULIC / HYDROSTATIC SYSTEM OPERATION

To Be Used With

HYDRAULIC / HYDROSTATIC FLOW CHART

For Model

1600 (S/N 11001 THRU 11999)

Chart # 6566839 (Printed February 1986)

CHART LEGEND

1. **RESERVOIR,** Capacity: (Steel) 12 qts. (11,4 L.) System Capacity: (Nylon) 16 qts. (15,1 L)
2. **BRAKE VALVE**
3. **PRIORITY VALVE**
4. **STEERING RELIEF VALVE,** . 1800 PSI (12411 kPa)
5. **PRIORITY VALVE SHUTTLE**
6. **STEERING CONTROL VALVE**
7. **STEERING CYLINDER**
8. **LIFT CYLINDER**
9. **BUCKET POSITION VALVE**
10. **TILT CYLINDER**
11. **AUXILIARY LINES (OPT.)**
12. **PORT RELIEF,** Tilt Cylinder 3500 PSI (24132 kPa)
13. **PORT RELIEF,** Lift Cylinder 3500 PSI (24132 kPa)
14. **MAIN RELIEF VALVE,** 2200-2400 PSI (15169-16548 kPa) (Measured at Aux. Couplers)
15. **RESTRICTOR,** . 0.189" (4,8 mm) Dia.
16. **HYDRAULIC CONTROL VALVE**
17. **LOAD CHECK VALVES (3)**
18. **PORT RELIEF,** Lift Cylinder 1500 PSI (10343 kPa)
19. **PORT RELIEF,** Tilt Cylinder 1500 PSI (10343 kPa)
20. **PLUG**
21. **RESTRICTOR,** 0.156" (3,96 mm) Dia.
22a. **DIAGNOSTIC CHECK POINT** (Servo)
22b. **DIAGNOSTIC CHECK POINT** (Charge)
22c. **DIAGNOSTIC CHECK POINT** (Pump)
23. **FILTER** . . . . . Bronze, 25 Micron
24. **ORIFICE** . . . . 0.179" (4,55 mm) Dia.
25. **CHARGE PRESS. RELIEF,** 130 PSI (896 kPa)
26. **PORT BLOCK**
27. **COLD WEATHER BY-PASS** . . 120 PSI (827 kPa)
28. **HYDRAULIC PUMP (Vane)** . . 14 GPM (53 L/min.) @ 2800 RPM
29. **SERVO RELIEF VALVE** . 250-260 PSI (1723-1793 kPa)
30. **SERVO**
31. **ORIFICE** . . . . . (Bleed Hole)
32. **ORIFICE**. . . . . 0.07" (1,78 mm) Dia.
33. **CHARGE RELIEF VALVE** . . . . 75 PSI (517 kPa) @ 36 RPM (11,2 L)
34. **MANIFOLD BLOCK**
35. **SHUTTLE VALVE**
36. **BRAKE** . . . Release Pressure 190 PSI (1310 kPa)
37. **HIGH PRESS. RELIEF VALVES** 5000 PSI (34475 kPa)
38. **TOW VALVE**
39. **HYDROSTATIC MOTOR**
40. **REPLENISHING VALVES** 10 PSI (69 kPa)
41. **OIL COOLER**
42. **CHARGE RELIEF VALVE,** (Non-Functional)
43. **HYDROSTATIC PUMPS**
44. **OIL COOLER**
45. **TEMPERATURE SWITCH** 225-232°F. (105-111°C.)
46. **FILTER**
47. **FILTER BY-PASS** . . . 25 PSI (172 kPa)
48. **SWITCH,** Differential, 19 PSI (131 kPa)

OIL FLOW EXPLANATION

The fluid flows from the reservoir ❶ to the port block ㉖ . The return fluid from the oil cooler ㊹ , priority valve ❸ and cold weather by-pass valve ㉗ also joins the reservoir fluid and goes to the hydraulic pump ㉘ . "Case drain" fluid from the hydrostatic motor ㊴ and hydrostatic pump ㊸ flows back to the reservoir ❶ .

The hydraulic pump ㉘ is driven by a shaft through the hydrostatic pumps ㊸ . The fluid flows from one part of the flow divider in the hydraulic pump ㉘ through the bronze filter ㉓ against the servo relief valve ㉙ , to the brake valve ❷ and the servo control ㉚ . Fluid pressure in the valve ❷ disengages the brake ㊱ . The brake ㊱ is locked when the pedal is engaged or when the engine is stopped (no fluid pressure).

The steering control valve ❻ controls the steering cylinder ❼ . When the steering control valve ❻ is activated, the fluid goes to either the base or rod end of the steering cylinder ❼ . The return fluid from the opposite end of the steering cylinder goes to the steering control valve ❻ . A steering relief valve ❹ is located in the priority valve ❸ . The priority valve ❸ sends only as much fluid as is necessary to operate the steering control valve ❻ , then when there is enough fluid flow to operate the steering control valve ❻ the priority valve ❸ sends the excess fluid flow to the hydraulic control valve ⑯ . If the steering circuit is not used all of the flow is directed to the hydraulic control valve.

The hydraulic control valve ⑯ is a 3-spool, open center, closed port tandem type valve with an adjustable main relief valve ⑭ . When all three spools are in the neutral position, the fluid flows through the control valve ⑯ and joins the return fluid from the steering control valve ❻ . This fluid then goes through the #3 element filter ㊻ , against the charge relief ㉕ and through the orifice ㉔ . Part of the fluid goes over the charge relief ㉕ ; the extra fluid goes through the oil cooler ㊹ and to the port block ㉖ . The fluid which is not regulated by the charge relief ㉕ goes through the orifice ㉔ and then flows through the oil cooler ㊶ and to the hydrostatic pumps ㊸ for "charge pressure fluid".

If one of the spools is activated in the control valve ⑯ , the fluid goes out the respective port to either the base end or rod end of the cylinders ❽ ❿ or to the bucket position valve ❾ , return fluid comes from the cylinders ❽ ❿ or the bucket position valve ❾ back to the control valve ⑯ .

When the cylinders ❽ ❿ reach the end of the stroke, the fluid flow stops and causes the hydraulic pressure to increase. When the pressure reaches the setting of the main relief valve ⑭ , it will open and let the fluid by-pass the hydraulic circuit (internally) and go through the #3 element filter ㊻ , oil cooler ㊶ and back to the hydrostatic pumps ㊸ .

When the spool is in neutral position, there is fluid available for the other sections of the control valve (16) . Two sections of the control valve (16) can be used at the same time if the main relief valve (14) is not open.

Fluid from the steering control valve (6) and the hydraulic control valve (16) which goes through the #3 element filter (46) normally goes through the oil cooler (41) and to the hydrostatic pumps (43) , but as the pressure increases the charge relief valve (25) will open and put the excess fluid thru the cooler circuit.

The #3 element filter (46) is located in the engine compartment. There is a filter by-pass (47) and a pressure differential switch (48) located on the filter housing.

The hydrostatic system has a engine driven, variable displacement tandem pumps (43) which provides fluid flow to a fixed displacement motor (39) .

Engine RPM is adjustable by a throttle control and is constant. Loader speed and direction of travel is controlled by adjusting the amount and direction of fluid flow from the hydrostatic pumps (43) to the hydrostatic motor (39) . The fluid called "charge pressure fluid" in the center section of the hydrostatic pumps (43) is against four replenishing valves (40) . The replenishing valves (40) on the low (charge pressure) side of the pump will open and let fluid into the pumps for replenishing, lubrication and cooling. The hydrostatic pumps (43) do not need the full volume of fluid flow, so there is extra fluid. This extra fluid goes to the charge relief valve (25) . When the pressure reaches the setting of the charge relief valve (25) , the valve will open and let the extra fluid go to the oil cooler (24) and to the hydraulic pump (28) .

A foot pedal controls the speed and the direction of the loader's travel. Speed is controlled by adjusting the amount of fluid that goes to the hydrostatic motor (39) . The direction is controlled by changing the direction of fluid flow to the hydrostatic motor (39) . The foot pedal is mechanically connected to a servo control cylinder (30) which controls the amount and the direction of fluid flow from the hydrostatic pumps (43) by adjusting the angle of the swashplates in the pumps (43) . There is a servo relief valve (29) in the port block (26) , to control the pressure from the hydraulic pump (28) to the servo control (30) .

The two hydrostatic pumps (43) are activated in forward direction together as one unit. In reverse, only one pump is used. When the foot pedal is in neutral position, the pumps (43) and motor (39) are not working, but do have charge pressure.

When the swashplates are angled and the fluid is forced out of the pressure side of the hydrostatic pumps (43) . This fluid is called "drive pressure fluid". Drive pressure fluid is much higher than charge pressure fluid which causes the replenishing valves (40) to close allowing

the flow of fluid to go to the hydrostatic motor ㊴ . The manifold block ㉞ on the hydrostatic motor ㊴ contains a stroked charge relief valve ㉝ which allows extra flow of fluid for cooling in forward and reverse direction. There is also a shuttle valve ㉟ which moves, depending on the travel direction of the loader, and allows fluid to the stroked charge relief valve ㉝ which allows fluid to return to the reservoir ❶ .

When the loader is driven into a pile of dirt with the bucket down there is resistance causing high drive pressure in the drive loop. There are two high pressure drive relief valves ㊲ in the manifold block ㉞ . These relief valves ㊲ relieve the high pressure in the drive loop to protect the hydrostatic system.

There is tow valve ㊳ located in the manifold block ㉞ . When the loader is unable to move with its own drive system, the tow valve ㊳ may be turned to push the high pressure relief valves ㊲ off their seats so the loader can be moved for a short distance at a low speed. If the engine is not running, the brake is engaged (locked) and the loader can not be moved.

BUCKET POSITIONING VALVE

When the lift arms are raised, the return oil from the rod end of the lift cylinders ❽ goes to the flow divider in the bucket positioning valve ❾ . The flow divider allows only a metered amount of oil to go to the base end of the cylinder ❿ . The remaining oil goes to the control valve ⓯ (rod end port of the lift cylinder ❽).

Before the oil will enter the base end of the tilt cylinder ❿ , the pressure will increase until it opens an unloading valve (in the bucket positioning valve ❾) which allows oil to flow from the rod end of the tilt cylinder ❿ . This oil returns to the control valve ⓰ (rod end of the lift cylinder).

If the bucket is tilted all the way out, the tilt cylinder ❿ base end) will not accept any oil and the pressure will increase until it opens the port relief valve ⓳ and that oil is returned to the hydraulic system.

HYDRAULIC / HYDROSTATIC FLOW CHART

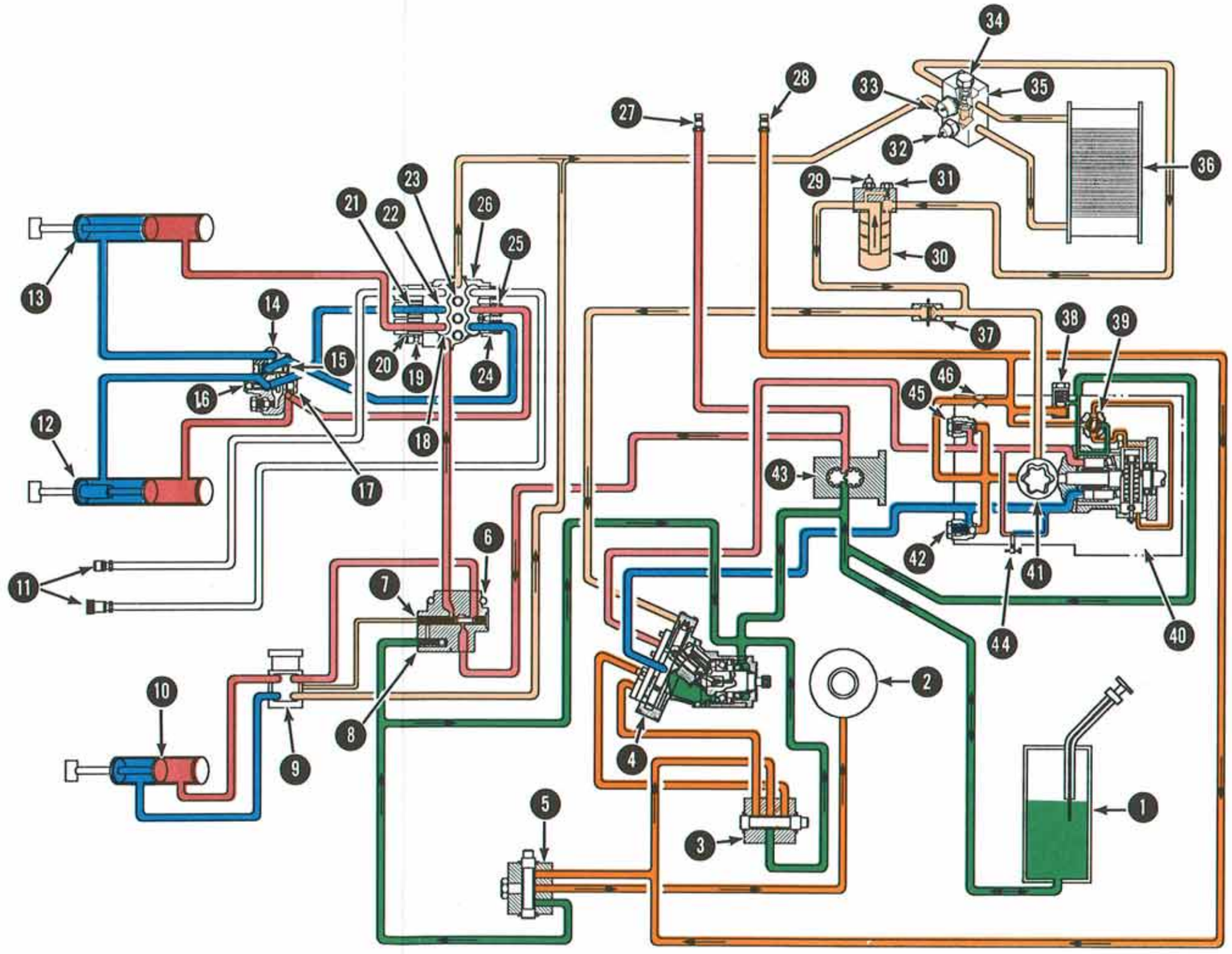
For Model

1600 (With S/N 12001 Thru 12026)

Chart # 6570591 (Printed November 1990)

RED - - - - - - - High Pressure
BLUE - - - - - - Low Pressure
GREEN - - - - - Case Drain & Reservoir
ORANGE - - - - Charge Pressure
LT. ORANGE - Hydraulic Pump Charge

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.



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