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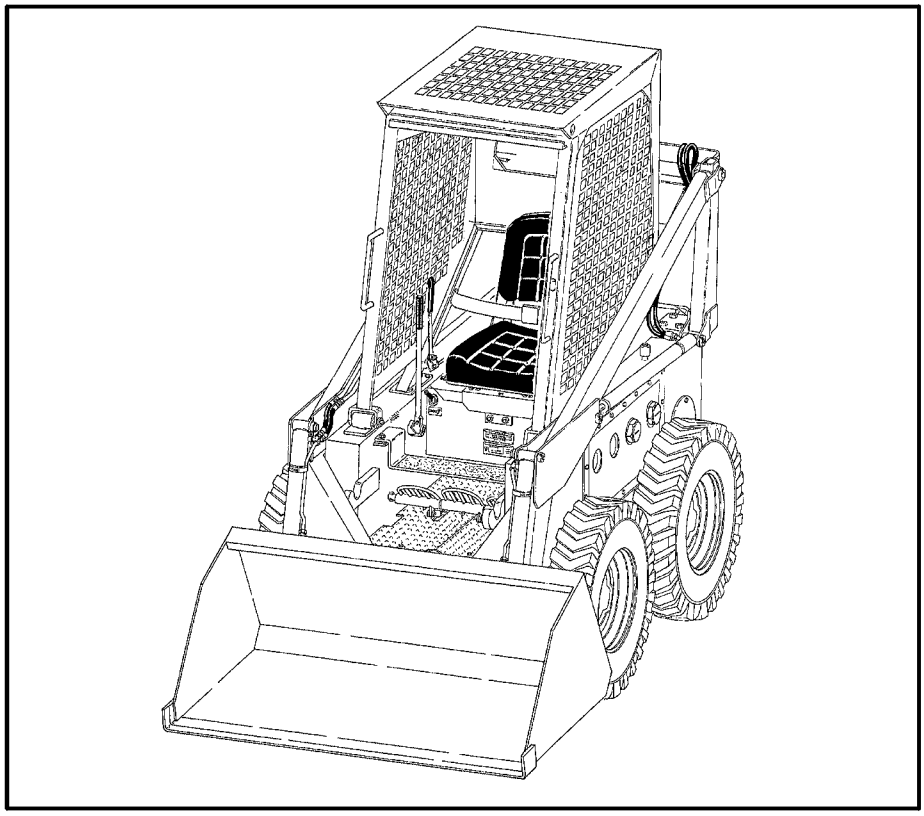
Operation & Maintenance Manual



MELROE
INGERSOLL-RAND

bobcat®

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Pushing toe of right pedal will tilt the bucket, or attachment, forward or down - pushing heel will roll back the bucket.

NOTE: **Pushing toe of left pedal to full down position will lock the lift arms in "float" position. This allows the bucket or other attachment to follow (or "float") over the contour of the ground.**

AUXILIARY HYDRAULICS (Necessary for Some Attachments) are controlled by the center pedal. Push pedal down to actuate - pushing the pedal in the opposite direction will reverse the action. This control pedal may be in locked in continuous run position by pushing the toe to full down position.

PRE-START CHECK

Before operating your Bobcat, make the following inspection. It is good practice to do this daily or at the start of each shift and when performing routine servicing. Make repairs or adjustments immediately to eliminate the resultant possibility of more costly repairs. (For Servicing Information, See Preventative Maintenance Schedule and Service Sections of this Manual.)

1. Check condition indicator on the air cleaner and replace element if red ring appears in viewing window (Figure 11).

   Check container and hoses for damage or leaks and clamps for tightness.

2. Check engine oil and hydraulic fluid levels, add if necessary.

3. Check fuel and battery electrolyte levels.

4. Lubricate loader. Check tires for damage and proper pressures.

5. Make a visual inspection of entire machine, checking for loose parts, connections, and signs of fuel, engine oil or hydraulic fluid leaks.

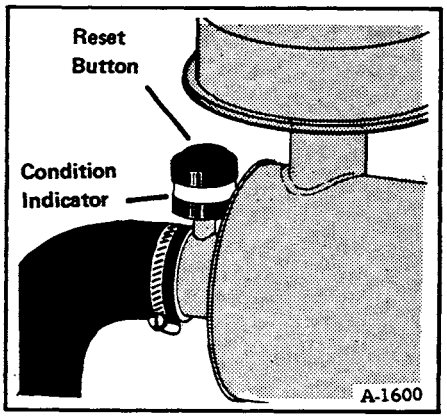

Fig. 11 Condition Indicator

STARTING PROCEDURE (All Loader Models)

1. Adjust the seat so all controls may be actuated comfortably. This will help prevent operator fatigue.

2. Fasten the seat belt for effective control of the machine, as well as your safety.

3. Place the directional control levers and hydraulic control pedals in neutral. The variable speed lever should be pulled back to low position.

NOTE: **To make starting easier, the variable speed lever should be placed in "Low" position before stopping engine.**

GASOLINE, LP GAS AND DIESEL MODELS

1. Set the throttle control to 1/4 open on gasoline models and full closed position on LP gas models. (Be certain LP fuel tank valve is open.) On Diesel models, open throttle to 1/2 position.

2. It may be necessary to choke gasoline and LP gas engines dependant on ambient temperature. On Petter Diesel models, actuate stop-run control by pulling knob full out and then pushing it back in.

3. Turn the ignition/start switch and crank engine. If the engine fails to start after 15 seconds of cranking, stop and wait 60 seconds before reattempting. If engine fails to start after several repeated attempts, turn switch off and troubleshoot (See Trouble-shooting Section of this Manual).

4. After the engine starts, immediately check instrumentation. If indicator lights remain on, shut down immediately and troubleshoot.

5. Allow the engine to warm-up for 5 - 10 minutes before applying a full load.

NOTE: **In cold weather, exercise hydraulics by raising lift arms, tilting bucket and actuating the variable speed control several times.**

SERVICE SCHEDULE (Cont'd)

Model				Item	Service Required	Hours							
M-500, M-610	M-600 Deutz	M-600 Petter	M-600 Electric			8-10	16-20	40-50	80-100	200	300	500	1000
■	■	■		Engine Shroud*	Remove to clean engine cooling fins.						■		
■	■	■	■	Drive Belt and Sheaves	Check for tension, alignment and wear.						■		
■	■	■		Starting Motor	Remove, clean and service.						■		
	■			Crankcase Breather	Change copper mesh element.							■	
■	■	■	■	Hydraulic, Transmission Sump	Drain condensation. Check level. Add as required. Use ATF type A or Dexron .							■	
■	■	■	■	Hydraulic, Transmission Sump	Change Oil. Use ATF type A or Dexron . Approximately 18 gallons are required.								■
		■		Engine Fuel Filter	Clean or replace element.								■
		■		Engine Cylinders	Remove carbon from combustion chambers.								■
			■	Motor Bearings	Lubricate. For interval, follow instruction plate on motor or every 12 months.								

* On fertilizer, grain or other extremely dusty operations, clean more often as required.

** Change oil every 25 hours in Kohler engines used where temperatures exceed 90°.

*** Adjust, if necessary, after first 5 hours and check daily if solid type tires are used.

DESCRIPTION OF HYDRAULIC CIRCUIT

This machine is equipped with full-flow, positive-pressure lubrication to the clutches and drive mechaniam. The oil is drawn from the reservoir through a filter into the hydraulic pump. The pump forces it through the control valves and clutches, back into the reservoir. This occurs as long as the hydraulic controls are in neutral.

When a control is actuated, the oil is diverted into one end of the selected cylinders. Oil flows from the other end of the cylinders back to the valve bank, through the clutches and into the reservoir. When the valve is returned to neutral, oil is trapped in the cylinder, holding the load in place, and the fluid again passes from the pump, through the valves and clutches and back to the reservoir.

When a cylinder reaches the limit of its stroke, or when an attempt is made to lift more than the machine's rated capacity, a relief valve allows the oil to by-pass the over-loaded circuit and return to the reservoir. This valve should be set between 1700 and 1750 PSI at full engine RPM.

Figure 53 shows the hydraulic fluid flow of the M-610 Bobcat.

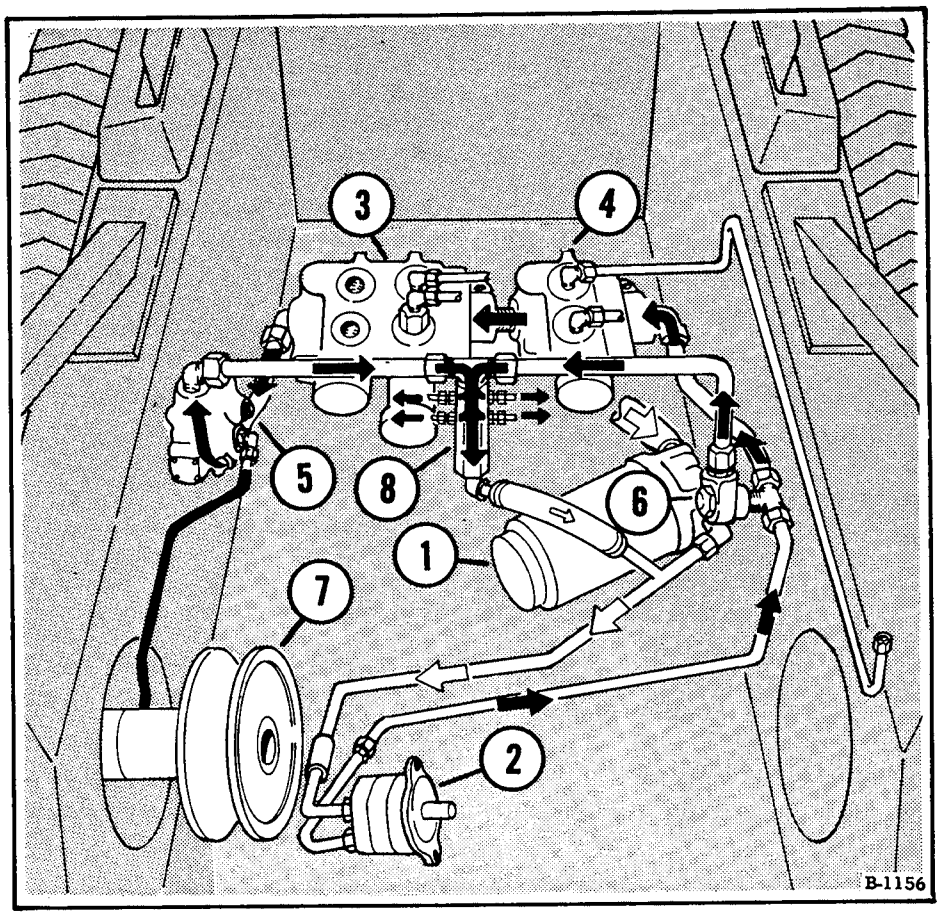

Fig. 53 Typical Hydraulic Flow Diagram

Fluid is drawn from the reservoir, through the hydraulic fluid filter (Item 1) by the hydraulic pump (Item 2). The pump delivers fluid to the control valves (Items 3, 4 & 5). The main relief valve (Item 6) is a diversion valve set to open when a control valve is actuated and the corresponding cylinders reach the end of their stroke, or when you attempt to lift a load greater than the machine's capacity. When you move the variable speed control lever forward, oil is diverted by the variable speed control valve (Item 5) to the variable speed cylinder (Item 7). This moves the drive sheaves together, giving you a faster ground speed. Pulling the lever back decreases ground speed. A restrictor in the clutch lubrication manifold (Item 8) maintains a constant pressure of 20 PSI to the drive clutches. The small arrows show fluid flow through tube lines (not shown) to the clutch pins.

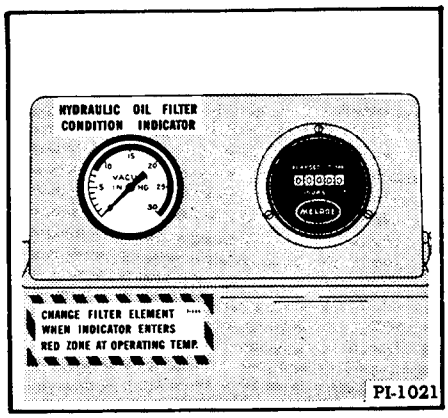

Fig. 54 Condition Indicator

OIL FILTRATION

The oil is always filtered before being circulated through the hydraulic system. The filter is equipped with a 33 micron paper element, which requires periodic changing.

The filter condition indicator is mounted in the right instrument panel (Figure 54); its dial is calibrated from "0 to 30". Beyond "7" is the danger zone, marked in red. When the indicator nears the danger zone, it is time to change the filter element. This may come early during the machine break-in period due to the normal wear-in of parts.

A replacement filter element is furnished free with every new Bobcat. The element in the filter should be discarded and replaced at the end of the initial 50 operating hours. Thereafter, replace the filter element whenever the condition indicator needle nears the Red Zone. When the gauge needle enters the Red Zone, oil can no longer pass through the filter element and a by-pass valve opens. This allows only partial filtration of oil or no filtration at all.

WARNING

The condition indicator should always read about "2" under normal operating conditions. The indicator may operate in the Red Zone for a short time after starting the machine in cold weather. If there is no reading, refer to the Troubleshooting Section of this manual.

ELECTRICAL SYSTEM

Gasoline, LP Gas and Diesel Bobcats are equipped with a 12 volt, negative ground alternator or generator charge system.

Figure 88 shows the typical wiring circuitry for the M-610 Bobcat. The electrical circuitry is protected by a 30 ampere fuse, located under the seat pan on the left side of the machine. A 25 ampere circuit breaker is also installed in the left hand instrument panel. This is an automatic reset breaker.

If a fuse blows or the circuit breaker opens, it is due to an overload in the electrical circuitry. The reason for the overload must be found and corrected before the loader can again be operated. Look for a bare wire or other short.

Service the electrical system as follows:

1. Check the battery electrolyte level and fill, as needed, with distilled water.

2. Check alternator or generator drive belt tension. It should have approximately 1/4" freeplay at the midway point.

3. Check battery cables for cleanliness and tightness. Remove acid corrosion with baking soda and water solution. Coat the terminals with grease.

4. Check all electrical wiring for worn insulation, pinched wires or loose wires.

See your Bobcat dealer for charging or other electrical system problems.

NOTE: **Do not overtighten the battery holding clamp or the battery may crack.**

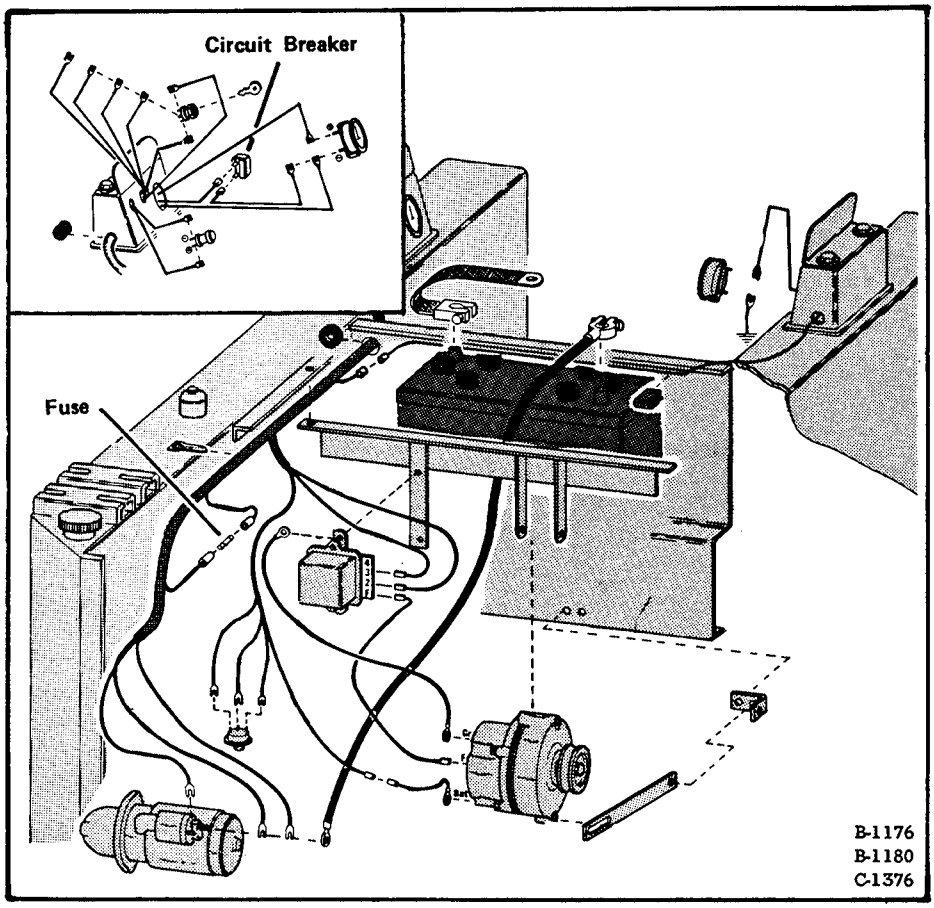

Fig. 88 Typical Electrical Diagram

DRIVE PROBLEM	CAUSE	CORRECTION D/S INDICATES DEALER SERVICE	REF. PAGE
Excessive chain wear (Cont'd)	Chains are too tight.	Adjust to proper tension.	19
	Using wrong type chain.	Use only recommended chain.	D/S
	Interference between chains.	Check for interference whenever tightening the drive chains.	D/S
	Using too much counterweight.	Reduce counterweight.	6
	The lower jackshaft sprocket is misaligned, causing the intermediate chain to interfere with the final drive chain.	Whenever the final drive chains are being tightened, the rear of the large sprocket should be held away from the gearcase sidewall with a bar. After tightening turn the sprocket through a full revolution to check for chain interference.	18
Loud growling noise in the drive system. (Machine is standing still with the engine running).	The clutch drive chain is too tight.	Loosen, and retighten only hand tight.	19
	Chains are misaligned and interfering with other chains or sprockets.	Retighten all the drive chains, then turn the drive through a full revolution to check for interference.	19
(Machine is in motion)	The intermediate chain is too tight.	Loosen, then tighten to proper tension.	20
	The intermediate chain is too loose, causing the inside clutch sprocket (reverse drive clutch) to slip on the chain.	Tighten to proper tension.	20
	The lower jackshaft sprocket is loose, causing growling in one direction of travel.	Retighten or replace.	D/S
The gearcase cover is difficult to install.	The self-aligning (large hex) nuts are not turned with a flat on top.	Turn the self-aligning nuts to obtain a flat on top. The holding bar on the gearcase cover must rest on these flats.	16
	The clutch drive chain is too tight, drawing the clutch pins together.	Adjust for 1/8" deflection at slight finger pressure.	19
	The intermediate chain is too tight.	Loose and retighten to proper tension, 1/8" deflection at slight finger pressure.	20
Oil leakage past the clutch pin caps.	The cap is loose.	Tighten.	17
	The quad ring seals are not properly seated in their grooves in the caps.	Replace the quad ring seals and place them carefully in their grooves in the caps. Spread a little oil around the quad ring seals before replacing the caps.	17
	The quad ring seals are cracked or broken.		
Excessive rear tire wear.	Loading the bucket with the front wheels off the ground.	Load only with all four wheels on the ground to prevent excessive load and wear on the rear wheels and tires.	15

MAJOR PARTS IDENTIFICATION