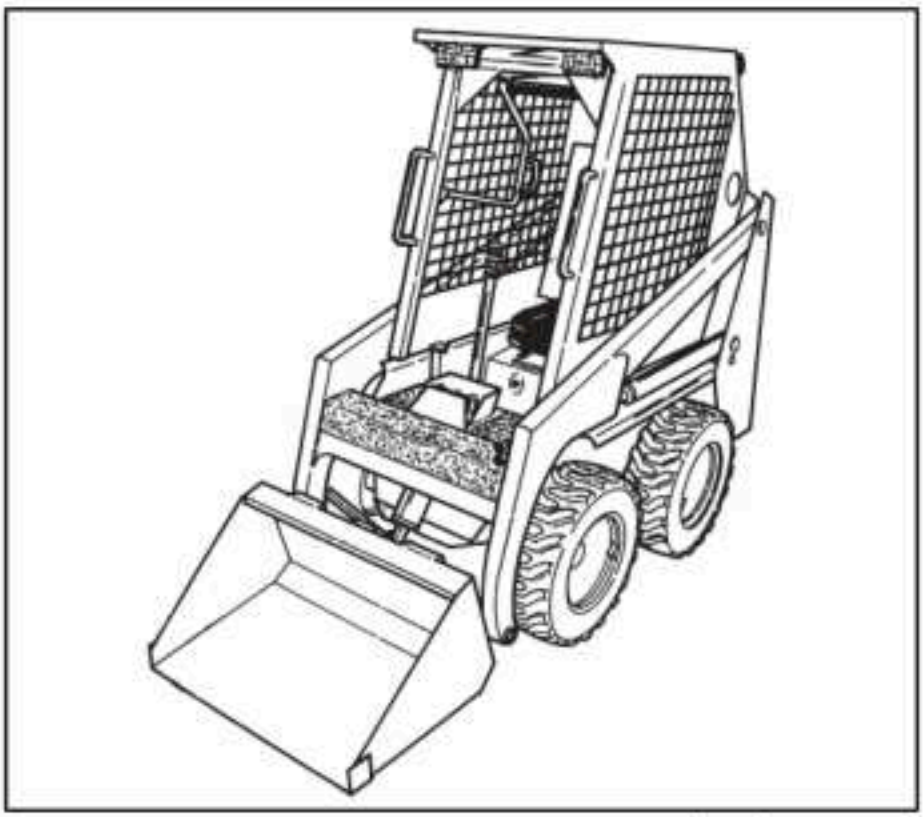
440B

Service Manual



MELROE
INGERSOLL-RAND

6570160(1-87)

Printed in U.S.A.

bobcat

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FOREWORD

This manual gives the owner/operator necessary operating, servicing and adjustment of the Bobcat loader and overhaul instructions of the drive system, loader hydraulic/hydrostatic system and general main frame parts.

Refer to the Operator's Manual for operating instructions (Starting Procedure, Daily Checks, Bucket Operation, etc.)

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

1. Check hydraulic fluid level, engine oil level and fuel supply.
2. Inspect for any sign of fuel, oil or hydraulic fluid leaks.
3. Lubricate the loader.
4. Check the condition of the battery and cables.
5. Inspect air cleaner for damage or leaks. Check element and replace as needed.
6. Check electrical charging system.
7. Check tires for wear and pressure.
8. Inspect Operator Cab, Seat Belt, Seat Bar, Safety Treads, Lights, Horn, Safety Signs (Decals), Brake etc.
9. Inspect for loose or broken parts or connections.
10. Operate the loader and check all functions.
11. Inform the Owner/Operator of any items that need service.

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Farmboy
Service Manual

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7 ENGINE SERVICE

TROUBLESHOOTING

The following troubleshooting chart is provided for 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
Slow cranking speed.	1, 2, 3, 4, 45, 46
Engine will not start.	5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 19, 27, 28, 29, 30, 45, 46
Difficult to stop.	5, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 21, 26, 27, 28, 29, 30
No power from the engine.	7, 8, 9, 10, 11, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27, 28, 29, 45, 46
Engine is mis–firing.	7, 8, 9, 10, 14, 16, 17, 22, 23, 25, 26, 27, 28, 29, 30
Too much fuel consumption.	7, 11, 14, 17, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30
Black exhaust.	7, 11, 14, 16, 17, 19, 21, 24, 25, 26, 28, 30
Low oil pressure.	4, 32, 33, 34, 35, 37, 43
Engine knocking.	9, 16, 23, 25, 26, 28, 30, 32, 38, 44
Engine running rough.	7, 8, 9, 10, 11, 14, 15, 17, 18, 20, 23, 25, 26, 27, 30, 38, 44
Vibration.	14, 15, 17, 20, 22, 23, 26, 27, 30, 38, 40
High oil pressure.	4, 36
Overheating.	11, 16, 21, 38, 39
Too much crankcase pressure.	22, 28, 30, 41
Poor compression.	16, 22, 25, 26, 28, 29, 30, 31
Start and stop.	10, 11, 14

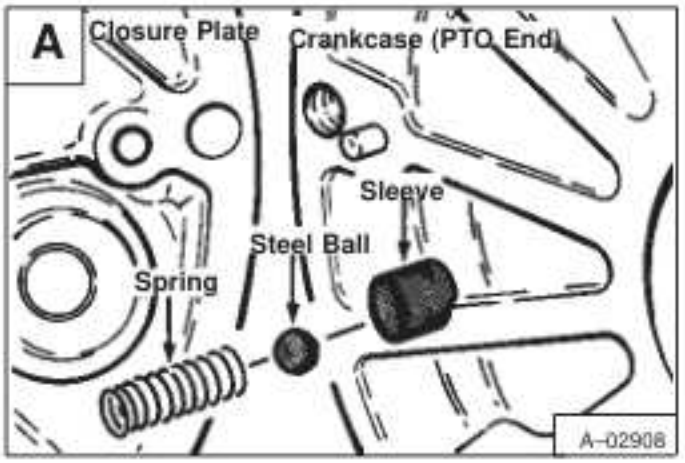
DESCRIPTION OF THE CAUSE	
1. Battery capacity low.	24. Governor adjustment not correct.
2. Bad electrical connections.	25. Incorrect valve tappet adjustment.
3. Faulty starter motor.	26. Sticking valves.
4. Incorrect grade of oil.	27. Spark plug gap not correct.
5. Low cranking speed.	28. Worn cylinder bores.
6. Fuel tank empty.	29. Worn valves and seats.
7. Ignition system has damage.	30. Broken, worn or sticking piston rings.
8. Plugged fuel lift pump.	31. Worn valve stems or guides.
9. Faulty fuel lift pump.	32. Worn or damaged bearings.
10. Plugged fuel filter.	33. Not enough oil in pan.
11. Restriction in the air cleaner.	34. Oil pump worn.
12. Wrong starting procedure.	35. Pressure relief valve is open.
13. Choke not completely closed.	36. Pressure relief valve is closed.
14. Choke not completely open.	37. Broken relief valve spring.
15. Carburetor is dirty or has a defect.	38. Piston seizure.
16. Incorrect valve timing.	39. Damaged fan.
17. Poor compression.	40. Faulty engine mounting.
18. Plugged fuel tank vent.	41. Plugged breather pipe.
19. Dirt or water in the fuel.	42. Valve stem seals damaged.
20. Sticking or restricted throttle.	43. Plugged oil pump strainer.
21. Exhaust pipe restriction.	44. Broken valve spring.
22. Cylinder head gasket leaking.	45. Auxiliary hydraulics engaged (Optional).
23. Overheating.	46. Hydrostatic drive not in neutral.

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Check the free length of the spring for the oil pump relief valve.

The length must be 0.94" ± 0.010" (23,9 mm ± ×0,254 mm). Replace the spring if the free length is not within specifications.

Install the steel sleeve, ball and spring into the machined hole in the PTO side of the crankcase **[A]**.

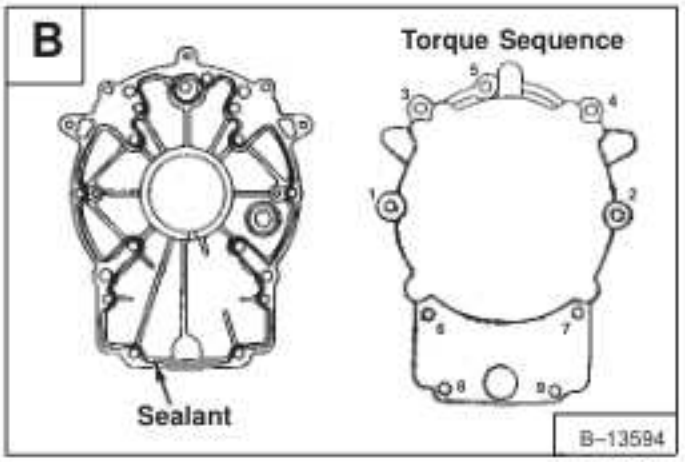


NOTE: Later production models use silicone sealant as a gasket between the closure plate and crankcase. Therefore, closure plates designed for use with gaskets cannot be installed using sealant; closure plates designed for use with sealant cannot be installed using a gasket.

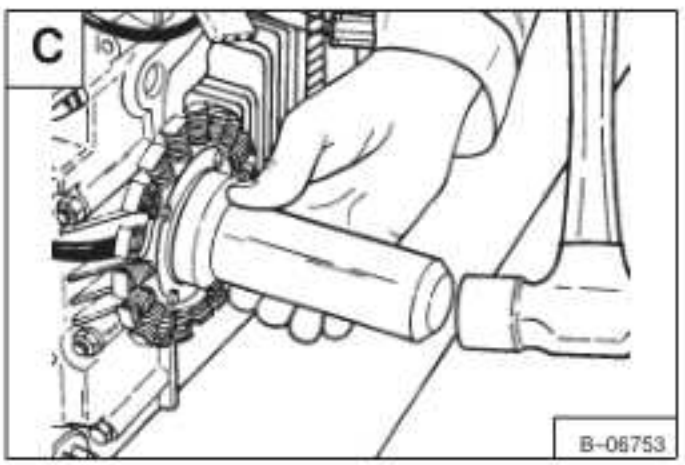
When installing a closure plate with gasket, always use a new gasket.

When installing a closure plate using sealant apply 1/16" (1,6 mm) bead of sealant as shown in figure **[B]**.

Install the closure plate and tighten the bolts in the correct sequence to 150 in.–lbs. (17 Nm) torque **[B]**.



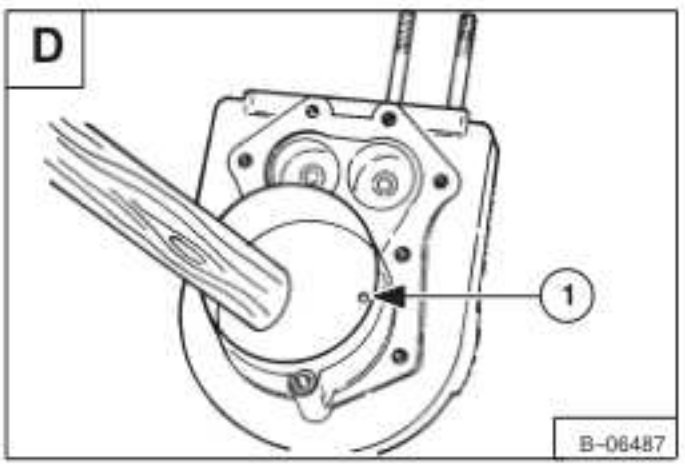
Use the seal driver (MEL–1208) and adapter (MEL–1210) and install the seal in the flywheel end of the engine to a depth of 5/32" (3,97 mm) **[C]**.



Install the rings on the piston. Move the rings on the pistons so the end gaps are not in alignment with each other.

Using a ring compressor, install the pistons into the cylinder bore **[D]**.

The mark (Item 1) on the top of the piston must be toward the drive end of the crankcase **[D]**.



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440B/FB–3
Revision Number
13 January 1987
Date

SERVICE MANUAL REVISION

ROUTE TO ATTENTION	
PARTS MANAGER	☐
SERVICE MANAGER	☒
SALES MANAGER	☐

AFFECTING:

Product BOBCAT LOADER

Model Farmboy

Manual No. 6570160 (8–85)

NOTICE **Insert This Sheet With The Above Listed Manual For Future Reference.**

The following pages are a revision to the above Service Manual.

Take out existing pages and put in the new pages as listed below:

TAKE OUT	PUT IN
Cover–6570160 (8–85)	Cover–6570160 (1–87)
iii, iv (Revised Feb. 86)	iii (Revised Jan. 87), iv (Revised Jan. 87)
1–5, 1–6	1–5 (Revised Jan. 87), 1–6 (Revised Jan. 87)
HYDRAULIC/HYDROSTATIC FLOW CHART (Printed Aug. 85)	HYDRAULIC/HYDROSTATIC FLOW CHART (Printed Jan. 87)
LOADER WIRING DIAGRAM (Printed Aug. 85)	LOADER WIRING DIAGRAM (Printed Jan. 87)
8–1 (Added Feb. 86), 8–2 (Added Feb 86)	8–1 (Revised Jan. 87), 8–2 (Revised Jan. 87)

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OIL FLOW EXPLANATION

The fluid flows from the reservoir ❶ to the hydraulic pump ⓯ . "Case drain" fluid from the hydrostatic pumps ⓮ also supplies fluid to the hydraulic pump ⓯ .

The hydraulic pump ⓯ is a "gear type" pump and is driven by a shaft through the hydrostatic pumps ⓮ . The fluid from the hydraulic pump ⓯ goes to the control valve ❻ . The control valve ❻ has a pilot-operated main relief valve ❼ . When all three spools are in the neutral position, the fluid goes to the port block ⓭ . If one of the spools is activated, the fluid goes out the respective port and to either the base end or rod end of the hydraulic cylinder(s) ❹ ❺ . As the fluid goes into one end of the cylinder(s), return fluid comes back from the opposite end of the cylinder(s) and back to the control valve ❻ . When the cylinder(s) reaches the end of the stroke, the fluid flow stops and causes hydraulic pressure to increase. When the pressure reaches the setting of the main relief valve ❼ it opens and lets the fluid bypass the hydraulic circuit (internally). When this happens, there is no fluid to the down stream sections of the control ❽ . If the spool goes back to the neutral position, then there is fluid available for the other sections. Two sections of the control valve ❻ can be used at the same time if the main relief ❼ is not open.

The fluid goes through an orifice ⓬ and through the 10 micron filter ❾ and to the hydrostatic pumps ⓮ for charge supply fluid. The by-pass valve ⓫ will open during any of the following conditions: (a) during cold weather operation (when the fluid is cold), (b) if there is excessive flow from the cylinder(s) ❹ ❺ . and (c) will allow fluid flow when it cannot go through the filter element ❾ (plugged).

The normal flow of the fluid called "charge pressure" goes to the front and rear hydrostatic pumps ⓮ from the 10 micron filter ❾ . The charge relief valve ❿ regulates charge pressure. Excessive fluid will go back to the fluid reservoir ❶ .

When the fluid gets to the pumps ⓮ , it activates the replenishing valves. As the pressure increases the replenishing valves will open and let fluid into the pumps ⓮ and the motors ❷ for replenishing of fluid.

When the replenishing valves open and charge fluid goes into the pumps ⓮ , the flow becomes "drive loop fluid". When the steering levers are in the neutral position, the pumps ⓮ and motors ❷ are not working but do have charge pressure. When the steering levers are moved, the swashplates in the pumps ⓮ are angled and the fluid is pumped out of the pressure side of the pumps ⓮ to the motors ❷ . This fluid is called "drive pressure fluid". Drive pressure fluid is much higher than charge pressure fluid causing the replenishing valves to close to allow the flow of the fluid to go to the motors ❷ .

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HYDRAULIC / HYDROSTATIC FLOW CHART

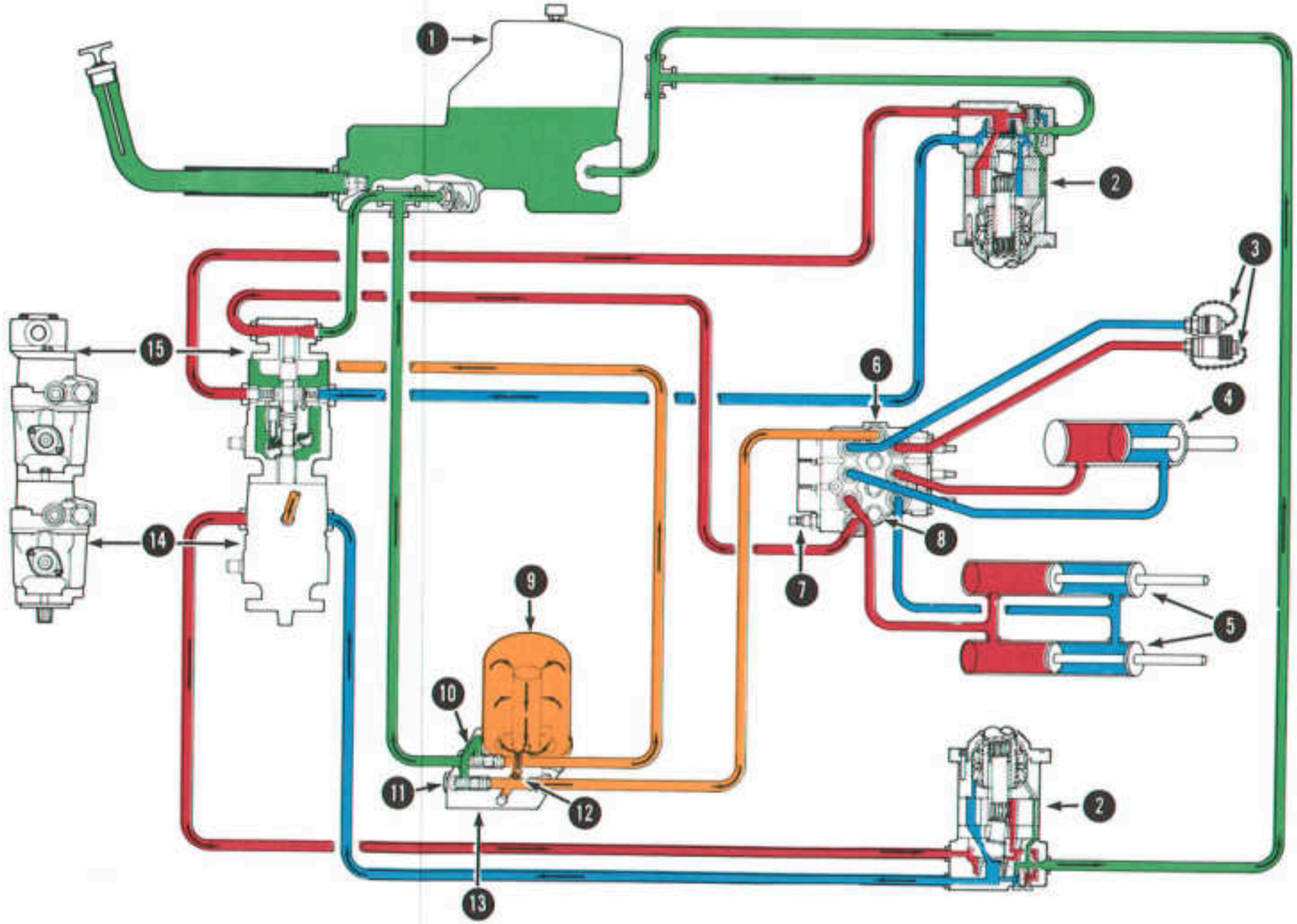
For Model

440B and Farmboy

Chart # 6570190 (Printed January 1987)

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.



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