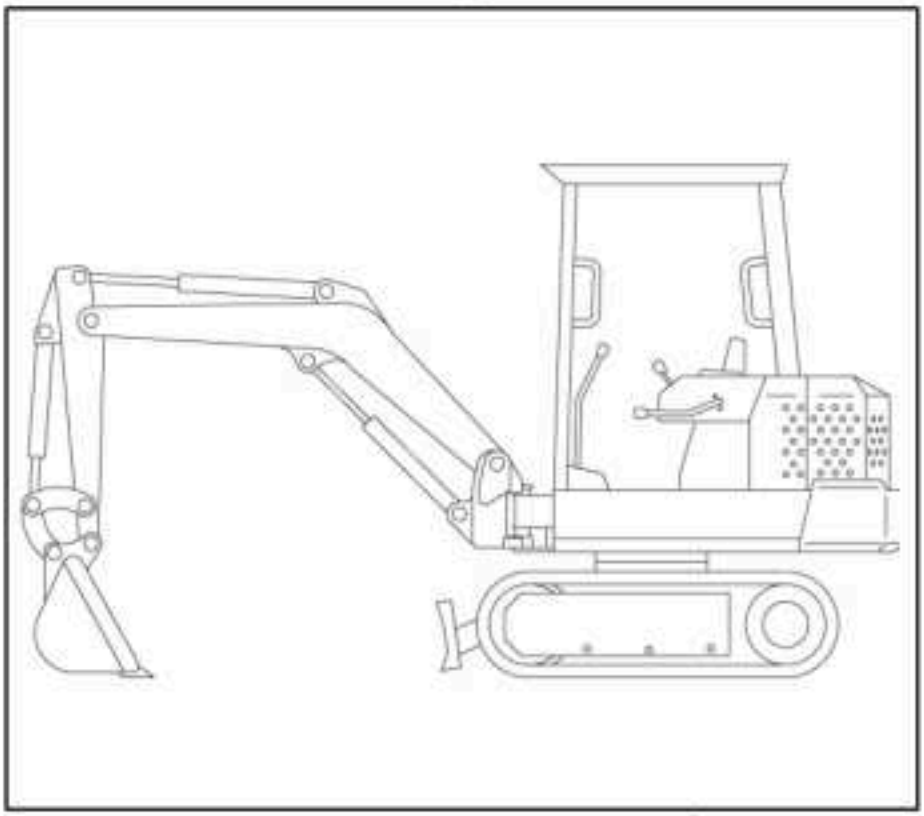
X 231

Excavator

Service Manual

(S/N 508911999 & Below)



MELROE
INGERSOLL-RAND

6720496 (4–90)

Printed in U.S.A.

bobcat

© Melroe Company 1990

MidWestTech | Bobcat X325 Excavator Service Manual | Publication 6720496_4_90 Order the manual at mid-west-tech.com >

CONTENTS

SAFETY INSTRUCTIONS v
SERIAL NUMBER LOCATIONS vi
DELIVERY REPORT vi
HYDRAULIC EXCAVATOR IDENTIFICATION vii
PREVENTIVE MAINTENANCE 1–1
HYDRAULIC SYSTEM 2–1
DRIVE SYSTEM 3–1
UPPER WORKS & SWING SECTION 4–1
MAIN FRAME & TRACKS 5–1
ELECTRICAL SYSTEM 6–1
ENGINE SERVICE 7–1
TECHNICAL DATA 8–1

MidWestTech | Bobcat X325 Excavator Service Manual | Publication 6720496_4_90

Order the manual at mid-west-tech.com >

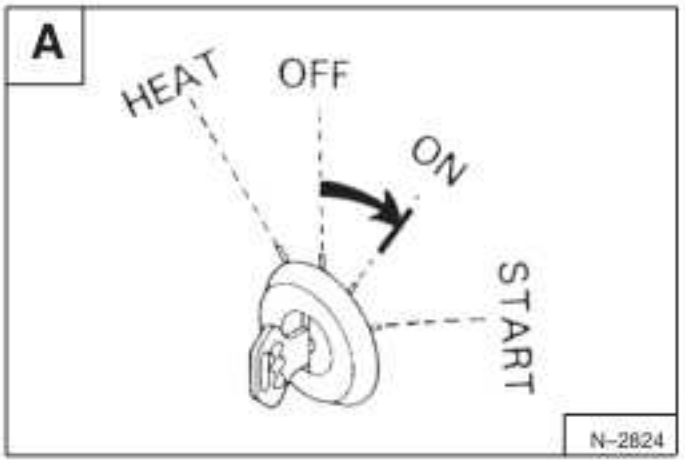
DISPLAY MODULE

Testing and Trouble Shooting

Initial test (with Display Module installed in the Excavator.)

NOTE: If the display module has been removed from the excavator. (See the gauge test information on Pages 6–20 thru 6–24.)

Turn the ignition key to the ON position (do not start the engine) **[A]**. The following display module conditions will exist.



Engine temperature bar graph will illuminate at the current engine temperature. If the engine temperature is below the minimum normal operating temperature warning light will blink on and off **[B]**.

Fuel level bar graph will illuminate at the full **F** setting. At ten second intervals, the fuel level bar graph will drop one bar at a time until the actual fuel level in the tank is reached. If the fuel level is in the empty **E** range on the bar graph the low fuel warning light will blink on and off **[B]**.

Engine oil pressure warning light will blink on and off continuously **[B]**.

Voltage charging light will blink on and off continuously **[B]**.

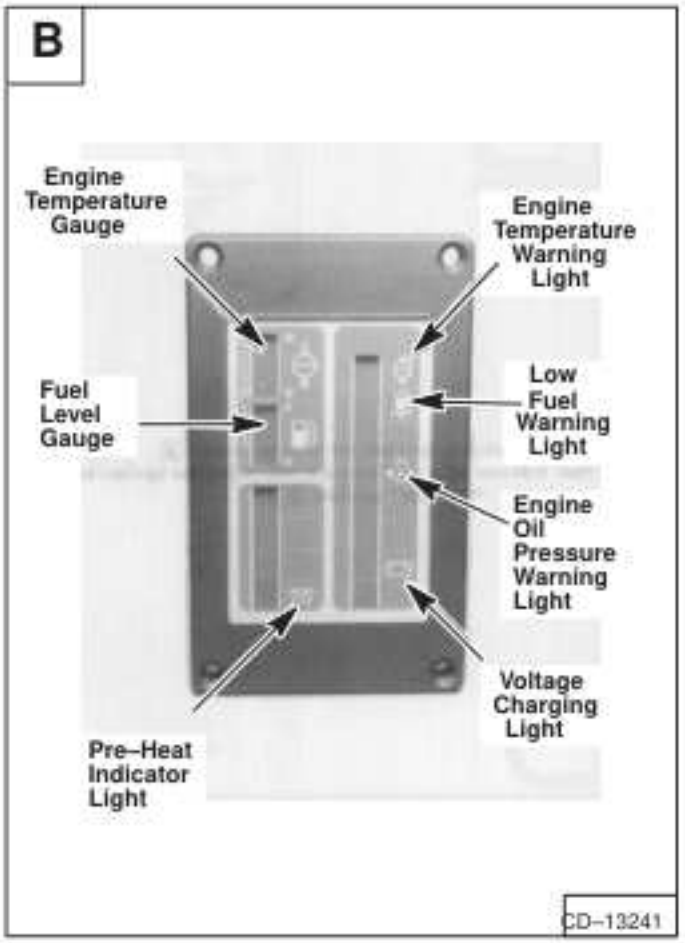
Pre heat indicator light will not be illuminated. The pre–heat indicator light will illuminate only when the ignition key is turned to the heat position **[A]**.

Start the excavator **[A]**.

With the excavator started, the display module will perform an internal module check. This will last for three seconds and the following display module conditions will exist.

Engine temperature bar graph will illuminate at the current engine temperature. The engine temperature warning light will blink on and off for three seconds. After the three second check, if the engine temperature is below the minimum normal operating temperature (122°F–50°C), the engine warning light will continue to blink on and off until the engine reaches the normal operating temperature and the second bar graph illuminates.

If the engine temperature at start up is above the minimum operating temperature, the warning light will not blink on and off.



MidWestTech | Bobcat X325 Excavator Service Manual | Publication 6720496_4_90
Order the manual at mid-west-tech.com >

Servicing the Crankshaft

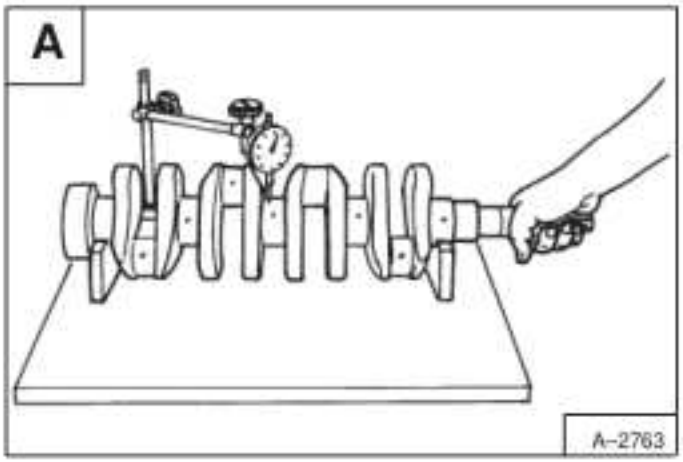
NOTE: If a new crankshaft is used, be sure the plugs that come with the crankshaft are installed in the crankshaft or engine damage will occur.

Put the crankshaft on v–blocks.

Put a dial indicator on the center journal and turn the crankshaft slowly **[A]**.

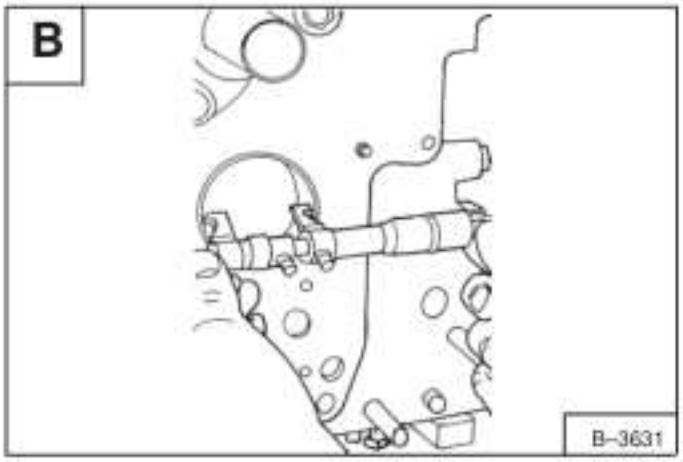
The specifications are 0.0008 (0,02 mm).

The wear limit is 0.0031 (0,08 mm).



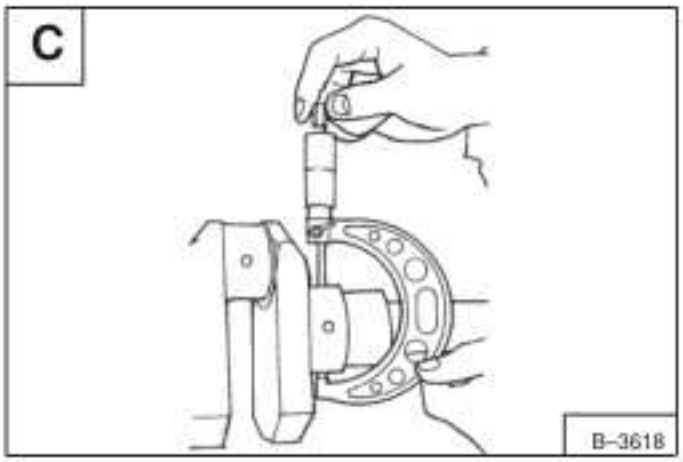
Check the inside diameter of the crankshaft bearing in the engine block **[B]**.

The specification is 2.0465–2.0488 (51,980–52,039 mm). The wear limit is 0.0079 (0,2 mm).



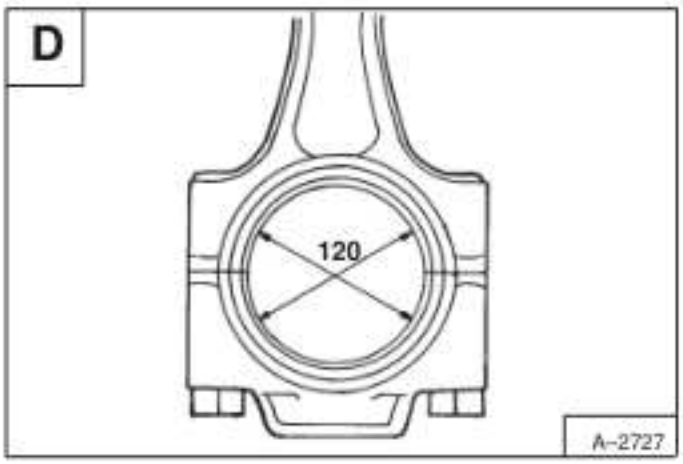
Check the outside diameter of the #1 crankshaft journal **[C]**.

The specification is 2.0441–2.0449 (51,921–51,940 mm). The wear limit is 0.0079 (0,2 mm).



Check the connecting rod bearings **[D]**.

The specifications are 1.7327–1.7343 (44,010–44,052 mm). The wear limit is 0.0079 (0,2 mm).



MidWestTech | Bobcat X325 Excavator Service Manual | Publication 6720496_4_90
Order the manual at mid-west-tech.com >

HYDRAULIC SYSTEM OPERATION

To Be Used With

HYDRAULIC FLOW CHART

For Model

231 EXCAVATOR (STANDARD)

Chart # 6720426 (Printed July 1991)

CHART LEGEND

1. **HYDRAULIC PUMP** Triple Section - Gear Pump: 2 x 9.4 GPM (35,75 L/min.) Joystick Control = 4.6 GPM (17,5 L/min.)
2. **SUPPLY MANIFOLD**
3. **HYDRAULIC FILTER ELEMENT**
4. **LOCKING LEVER VALVE**
5. **LOCKING LEVER RELIEF VALVE (Console Down)** . 355 PSI (2447 kPa)
6. **RETURN BLOCK**
7. **DIVERTER VALVE**
8. **ELECTRIC SOLENOID**
9. **DIVERTER RELIEF VALVES** 2500 PSI (17235 kPa)
   (2) S/N 11118 & Below
   (1) S/N 11119 & Above
10. **BRAKE VALVE**
11. **RIGHT SIDE TRAVEL MOTOR**
12. **LEFT SIDE TRAVEL MOTOR**
13. **SWIVEL JOINT**
14. **SWING MOTOR,** Port Relief Valves (2) 1885 PSI (12995 kPa)
15. **BRAKE VALVE**
16. **BLADE CYLINDER**
17. **JOYSTICK CONTROLS**
18. **FRONT AUXILIARY HYDRAULICS**
19. **BUCKET CYLINDER**
20. **DIPPERSTICK CYLINDER**
21. **BOOM CYLINDER**
22. **AUXILIARY MANIFOLD**
23. **HYDRAULIC CONTROL VALVE** 9 Sections
24. **MAIN RELIEF VALVES (2)** . . 2550 PSI (17580 kPa) + or — 75 PSI
25. **PORT RELIEF VALVES** . . . . . 2986 PSI (20585 kPa)
26. **BOOM CYLINDER RELIEF VALVE (Rod End)** . . . . **3480 PSI (23991 kPa)**
27. **BLADE RELIEF VALVE** . . . . . 1422 PSI (9803 kPa)
28. **BOOM SWING CYLINDER**
29. **HYDRAULIC OIL COOLER**
30. **HYDRAULIC RESERVOIR** . 18.25 Gals. (69 L) (Tank Capacity)
31. **SUCTION SCREEN**
32. **HYDRAULIC FILTER ELEMENT** 10 Micron
33. **SWING CYLINDER LOCK VALVE**

MidWestTech | Bobcat X325 Excavator Service Manual | Publication 6720496_4_90 Order the manual at mid-west-tech.com >

HYDRAULIC FLOW CHART

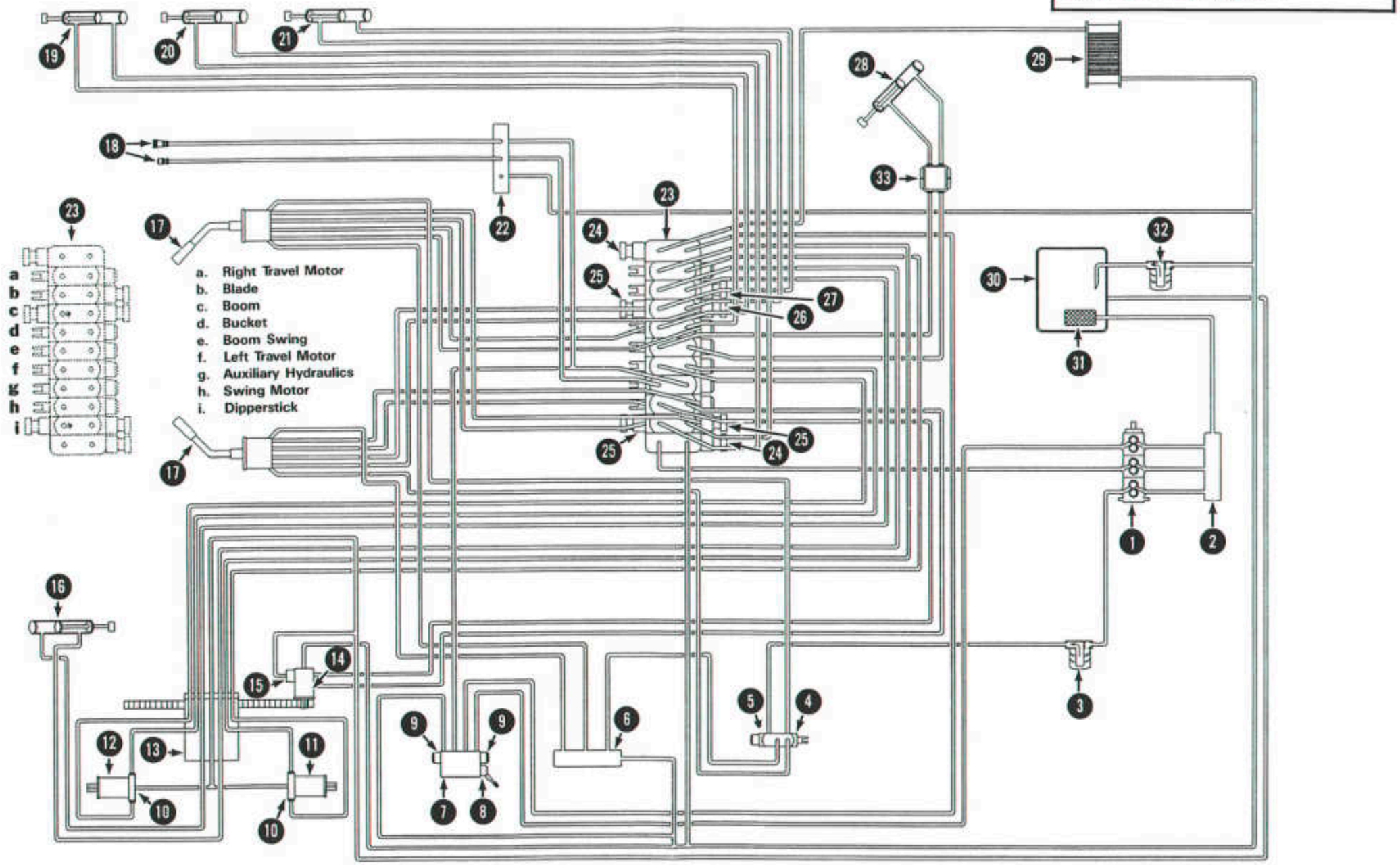
For Model

231 EXCAVATOR (STANDARD)

Chart #6720426 (Printed July 1991)

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.



MC-1347

MidWestTech | Bobcat X325 Excavator Service Manual | Publication 6720496_4_90 Order the manual at mid-west-tech.com >