SPECIFICATIONS

Revised Sept. 90

741, 742, 743 & 743DS Bobcat Loader
Service Manual

SPECIFICATIONS (741)

⚠ 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–2003–0797

741 DEUTZ

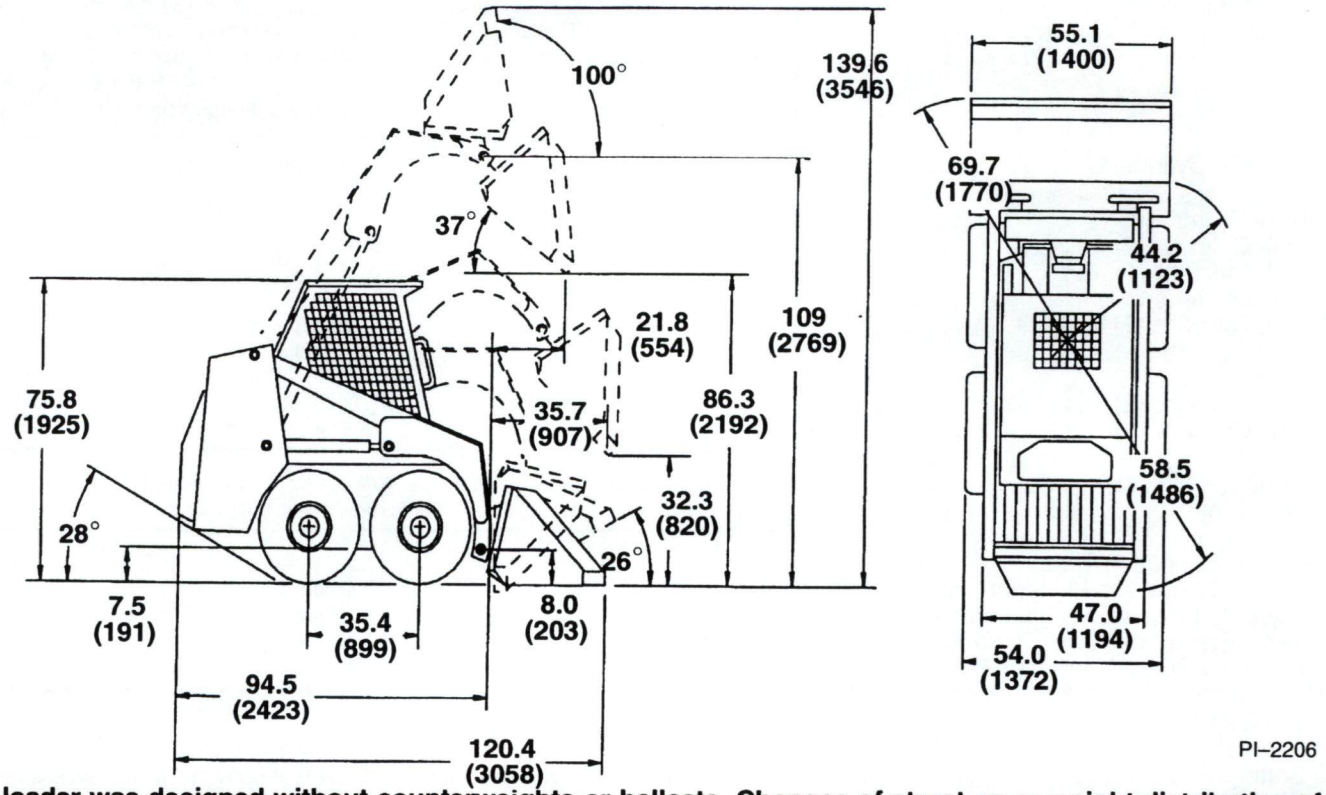
Revised Sept. 90

741, 742, 743 & 743DS Bobcat Loader
Service Manual

LOADER SPECIFICATIONS

741 Deutz

- Dimensions are given for loader equipped with standard tires and dirt bucket. Dimensions may vary with other types. All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specifications conform to SAE standards and are subject to change without notice.



PI–2206

This loader was designed without counterweights or ballasts. Changes of structure or weight distribution of the loader can cause changes in control and steering response and can cause failure of the loader parts.

OPERATIONS & PERFORMANCE	741
Weights	
Operating Weight	4730 lbs. (2145 kg)
Rated Operating Capacity	1300 lbs. (590 kg)
Tipping Load	2600 lbs. (1180 kg)
Travel Speed	0.0 to 6.0 MPH (9,7 km/hr.)
Controls	
Vehicle	Direction & speed controlled by two hand levers.
Loader Function	Lift & Tilt Function: Controlled by separate foot pedals. Front Auxiliary Function: Controlled by the right steering lever. Rear auxiliary function controlled by the left steering lever.
Engine	Hand lever throttle & key–type starter switch;
Main Drive	Hydrostatic
Parking Brake	Mechanical disc, foot operated pedal
ENGINE	
Make	Deutz
Model	F2L511
Fuel	Diesel
Horsepower	29.7 HP (22,1 kW)
Maximum Governed RPM	2800 RPM
Torque	64.9 ft.–lbs. (88 Nm) @ 2000 RPM
Number of Cylinders	Two
Bore/Stroke	3.937 (100)/4.14 (105,2)
Displacement	101 cu.–in. (1655 cm^3)
Cooling System	Air
Lubrication	Pressure System W/Filter
Crankcase Ventilation	Open
Air Cleaner	Dry replaceable paper cartridge (With safety element–Diesel Only)
Ignition	Compression – Diesel
Compression (Max.)	N/A
(Min.)	N/A

LOADER SPECIFICATIONS (Cont'd)	741
HYDRAULIC SYSTEM	
Hydraulic Pump	Engine driven vane type
Pump Capacity	11 GPM (42 L/min.) @ 2850 RPM
System Relief Pressure	2200–2400 PSI (15169–16548) PSI @ Quick Couplers
Filter	Replaceable #3 micron paper element in charge line
Type of Fluid	Use Melroe hydraulic/hydrostatic transmission fluid (P/N 6563328). If this fluid is not available, use 10W–30 or 10W–40 SAE motor oil. Use Class SE of SF motor oil (5W–30 at temperatures below 10°F [23°C]).
Hydraulic Cylinders	Doubleacting
Bore Diameter:	
Lift Cylinder (2)	2.00 (51)
Tilt Cylinder (1)	3.25 (83)
Rod Diameter:	
Lift Cylinder (2)	1.25 (32)
Tilt Cylinder (1)	1.50 (32)
Stroke:	
Lift Cylinder (2)	25.00 (635)
Tilt Cylinder (1)	14.5 (368)
Control Valve	4–spool, open center type, W/float detent on lift, detent on auxiliary
Fluid Lines	SAE standard full flow tubes, hoses & fittings
Hydraulic Function Time:	
Raise Lift Arms to Maximum Height	3.5 Seconds
Lower Lift Arms from Maximum Height	2.7 Seconds
Move Bucket to Dump Position	2.7 Seconds
Move Bucket to Retracted Position	2.3 Seconds
ELECTRICAL	
Alternator	Belt drive, 55 amps. Open (18 amp. enclosed – 743 DS)
Battery	12 volt, 625 cold crank amps. @ 0°F (–17.8°C) 170 min. reserve capacity
Starter	12 volt, gear drive
DRIVE SYSTEM	
Transmission	Tandem hydro. pumps driving 2 fully reversing hydro. motors
Final Drive	Gear reduction & #80 HS roller chain & sprockets in sealed chaincase with oil lubrication
Total Engine to Wheel Reduction	40:1
CAPACITIES	
Cooling System	Air Cooled
Fuel	13 gals. (49 L)
Engine Oil W/Filter	4 qts. (3,8 L)
Hydraulic/Hydrostatic System	6 gals. (22,7 L) (Includes 3.5 gals [13,2 L] in reservoir)
Chaincase Reservoir	32 qts. (30,3 L)
TIRES	
Standard	7:00 x 15, 6–Ply Rating, Nylon W/Bar Lug Tread
MACHINE WEIGHT (without attachment)	
Shipping	4240 lbs. (1923 kg)
Floor Pressure	See Floor Pressure chart in the Engineering Data Section

ENGINE SPECIFICATIONS

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Displacemnt	101 cu.in (1650 cm^3)
Bore	3.937 (100 mm)
Stroke	4.134 (105 mm)
Firing Order	2 – 1
Oil capacity W/Filter	1 gallon (3,79 liters)
Compression Pressure	426–455 PSI (29–31)

NOTE: The cylinders must be within 35 PSI (241 kPa) of each other.

Fuel System

Pressure of Fuel Lift Pump	4–5 PSI (0,28–0,35 bar)
Make of Fuel Injection Pump	Bosch
Make of Fuel Injection Nozzle	Bosch DLLA 149 s 774
Release Pressure of Injection Nozzle (New)	2604–2720 PSI (180–188 bar)
(Used)	2532–2648 (175–183 bar)
Injection Timing (Start of Injection)	25° B.T.D.C. capillary tube
Distance from Injection Pump Mounting Flange to Camshaft Base Circle (Including gasket and shims)	3.2519–3.2559 (82,6–82,7 mm)

Governor, Front Cover and Throttle

Distance from Governor Bearing Cup to Engine Block	3.370–3.374 (85,6–85,7 mm)
End Play in Throttle Shaft	.008–0.43 (0,2–1,1 mm)
Engine High Idle Speed (2950–3000 RPM)	2800 RPM (Under full load)
Engine Low Idle Speed	1050–1150 RPM

Cylinder Head and Valves

I.D. of Valve Guides	.3149–.3156 (8,0–8,015 mm)
I.D. of Bore for Exhaust Valve Seat	1.576 (40,0–40,025)
I.D. of Bore for Intake Valve Seat	1.791–1.792 (45,5–45,525)
Valve Seat Width, Inlet	.059–.0826 (1,5–2,1)
Valve Seat Width, Exhaust	.059–.0826 (1,5–2,1)
Valve Seat Angle, Exhaust and Intake	45°
Valve Stem Diameter, Intake	.3128–.3134 (7,945–7,960)
Valve Stem Diameter, Exhaust	.3118–3.126 (7,92–7,94)
Maximum Distance Valves may be Recessed into Head	.232 (5,9 mm)
MaximumClearance, Cold, Intake and Exhaust	.006 (0,15 mm)
Minimum Free Length of Valve Springs	2.32 (59 mm)
Length of Head Bolts	7.40–7.42 (188–188,5 mm)

Cylinder, Piston and Connecting Rod

Cylinder Bore (Standard)	3.937–3.9378 (100,000–100,022 mm)
Maximum Wear Limit	.012 (0,3 mm)
Piston Diameter (Standard)	3.9354–3.9358 (99,96–99,969)
Piston Diameter (1st oversize)	3.9551–3.9554 (100,461–100,469 mm)
Piston Diameter (2nd oversize)	3.9748–3.9752 (100,960–100,969 mm)
Wrist Pin Bore	1.3781–1.3783 (35,004–35,010)
Wrist Pin Diameter	1.3777–1.3780 (354,994–35,000)
Piston Ring Side Clearance, Top Compresstion Ring	.0041–.0057 (0,105–0,145 mm)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Cylinders

Piston Ring Side Clearance, Oil Ring	.0015–.0028 (0,040–0,072 mm)
Compression Ring End Gap (Normal)	.0138–.0216 (0,35–0,55 mm)
Slotted Oil Control Ring End Gap (Normal)	.0098–.0157 (0,25–0,40 mm)
Maximum Ring End Gap (All) (Wear Limit)	.079 (2,0 mm)
Piston Crown Clearance (Measure with Lead Wire)	.039–.047 (1,0–1,2)

NOTE: The cylinders must be within 35 PSI (241 kPa) of each other.

I.D. of Bore in Connecting Rod for Wrist Pin Busing	1.4961–1.4967 (38,000–38,016)
I.D. of Wrist Pin Bushing (Installed)	1.379–1.3811 (35,036–35,080)
I.D. of Bore in connecting Rod for Connecting Rod Bearing	2.244–2.254 (57,0–57,019 mm)
Connecting Rod Bearing Clearance	.002–0043 (0,05–0,108 mm)
Connecting Rod Bearing Clearance (Maximum)	.012 (0,3)
Connecting Rod Bearing Side Clearance (End Play)	.007–.011 (0,170–0,271)
Connecting Rod Bearing Side Clearance (Maximum)	.0236 (0,6 mm)

Camshaft, Crankshaft, Bearings

Camshaft End Play	.010–.024 (0,25–0,6 mm)
I.D. of Camshaft Bushing	1.8902–1.8922 (48,01–48,064)
Diameter of Crankpin, Standard	2.046–2.0468 (51,971–51,990)
Diameter of Crankpin, 1st Undersize	2.0263–3.0371 (51,471–51,490)
Diameter of Crankpin, 2nd Undersize	2.0066–2.0075 (50,971–50,990)
Diameter of Crankpin, 3rd Undersize	1.987–1.9877 (50,471–50,490)
Width of Crankpin	1.338–1.3401 (34,000–34,039)
Diameter of Crankshaft Main Journals, Standard	2.5185–2.5193 (63,971–63,99)
Diameter of Crankshaft Main Journals, 1st Undersize	2.4888–2.4996 (63,471–63,490)
Diameter of Crankshaft Main Journals, 2nd Undersize	2.4791–2.4799 (62,971–62,990)
Diameter of Crankshaft Main Journals, 3rd Undersize	2.4595–2.4602 (62,471–62,4900)
Crankshaft Center Journal, Standard	2.3611–2.3618 (59,971–59,990)
Crankshaft Center Journal, 1st Undersize	2.3414–2.3421 (59,471–59,490)
Crankshaft Center Journal, 2nd Undersize	2.3217–2.3224 (58,971–58,990)
Crankshaft Center Journal, 3rd Undersize	2.302–2.3028 (58,471–58,490)
Maximum Out–of–Round Tolerance of Journals	.00275 (0,07)
End Play of Crankshaft	.0078–.0157 (0,2–0,4)
Hardness of Journals (Minimum)	50 HRC
Hardness of Journals (Normal)	55–61 HRC

Lubrication System

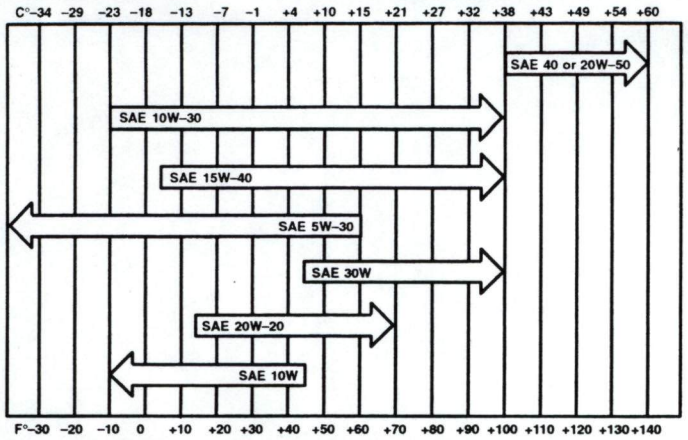
Oil Pressure Minimum at Low Idle	7.25 PSI (0,5 bar)
Oil Pressure Minimum at 2500 RPM	60–75 PSI (4–5 bar)
End Clearance in Oil Pump Gear	.004 (,1 mm)

Check oil level every 8 hours of operation. (Check oil every 4 hours on new engine during the first 50 hours of operation.)

Oil level must be between the *add* and *full* marks on the dipstick. Use a good quality detergent motor oil that meets the correct API service classification CC or CD.

Use oil of the correct SAE viscosity for expected temperature conditions.

RECOMMENDED SAE VISCOSITY NUMBER (LUBRICATION OILS FOR ENGINE CRANKCASE)



TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE (DIESEL: USE API CLASSIFICATION CC or CD)

IMPORTANT

Never overfill the engine crankcase with oil.

I–2125–0597

Engine Fastener Torque (Deutz Engine)

ITEM	PRELOADING	TIGHTENING	TOTAL
Cylinder Head Bolts	22 ft.–lbs. (30 Nm)	45° 45° 45° 30°	165°
Cylinder Head Brass Plug	59 ft.–lbs (80 Nm)	– – –	–
Injector Hold–Down	18–22 ft.–lbs. (25–30 Nm)	– – –	–
Connecting Rod	22 ft.–lbs. (30 Nm)	30° 30° 30°	90°
Main Bearing Support Bracket Bolt (1 Only)	22 ft.–lbs. (30 Nm)	60° – –	60°
Main Bearing Bolts	22 ft.–lbs. (30 Nm)	30° 30° –	60°
Blower Mounting Bolts	22 ft.–lbs. (30 Nm)	60° – –	60°
V–Belt Pulley	22 ft.–lbs. (30 Nm)	90° – –	90°
Intake Manifold	11 ft.–lbs. (15 Nm)	– – –	11 ft.–lbs. (15 Nm)
Crankshaft Gear	22 ft.–lbs. (30 Nm)	30° 30° –	60°
Oil Suction Pipe	—	37 ft.–lbs. (50 Nm)	37 ft.–lbs. (50 Nm)
Flywheel	22 ft.–lbs. (30 Nm)	60° 60° –	120°
Rocker Arm Nuts	—	– – –	20 ft.–lbs. (28 Nm)
Counter Balance Weights	22 ft.–lbs. (30 Nm)	30° 30° –	60°
Anti–Fatigue Bolt For Cooling Blower	26 ft.–lbs. (35 Nm)	– – –	–

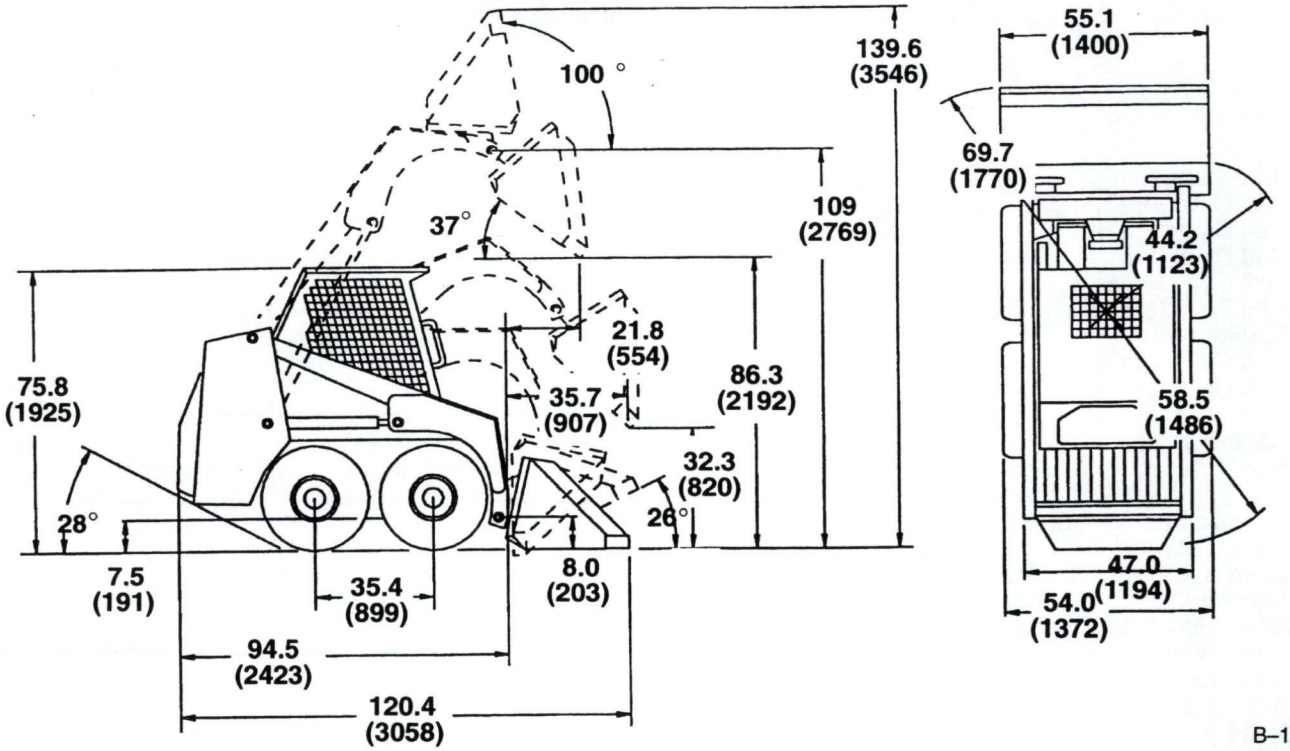

bobcat

741, 742, 743 & 743DS Bobcat Loader
Service Manual

LOADER SPECIFICATIONS

742

- Dimensions are given for loader equipped with standard tires and dirt bucket. Dimensions may vary with other types. All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specifications conform to SAE standards and are subject to change without notice.



B–12596

This loader was designed without counterweights or ballasts. Changes of structure or weight distribution of the loader can cause changes in control and steering response and can cause failure of the loader parts.

OPERATIONS & PERFORMANCE	742 (S/N 20001–22999)
Weights	
Operating Weight	4730 lbs. (2145 kg)
Rated Operating Capacity (Melroe)	1300 lbs. (590 kg)
Tipping Load (SAE)	2600 lbs. (1179 kg)
Travel Speed	0.0 to 06.0 MPH (9,7 km/hr.)
Controls	
Vehicle	Direction & speed controlled by two hand levers.
Loader Function	Lift & Tilt Function: Controlled by separate foot pedals. Front Auxiliary Function: Controlled by the right steering lever. Rear auxiliary function controlled by the left steering lever.
Engine	Hand lever throttle; pull cable choke; key–type starter switch;
Main Drive	Hydrostatic
Parking Brake	Mechanical disc, foot operated pedal
ENGINE	
Make	Ford
Model	1498
Fuel	Gas
Horsepower	34 HP (25,4 kW)
Maximum Governed RPM	2800 RPM
Torque	72.8 ft.–lbs. (98,7 Nm) @ 1600 RPM
Number of Cylinders	Four
Bore/Stroke	3.19 (81)/3.06 (77,6)
Displacement	98 cu. in. (1606 cm^3)
Cooling System	Liquid
Lubrication	Pressure System W/Filter
Crankcase Ventilation	Open
Air Cleaner	Dry replaceable paper cartridge (With safety element – Diesel Only)
Ignition	12 volt, battery ignition W/breaker points & coil
Compression (Max.)	N/A
(Min.)	N/A

LOADER SPECIFICATIONS (Cont'd)

	742 (S/N 20001–22999)
HYDRAULIC SYSTEM	
Hydraulic Pump	Engine driven vane type
Pump Capacity	11 GPM (42 L/min.) @ 2850 RPM
System Main Relief	2200–2400 PSI (15169–16548 kPa) @ Quick Couplers
Filter	Replaceable #3 micron paper element in charge line
Type of Fluid	Bobcat Fluid (P/N 6563328). If fluid is not available use 10W–30 or 10W–40 Class SE or SF Motor Oil for temperatures above 0°F (–18°C) & 5W–30 for temperatures below 10°F (–23°C)
Hydraulic Cylinders	Doubleacting
Bore Diameter:	
Lift Cylinder (2)	2.00 (51)
Tilt Cylinder (1)	3.25 (82,6)
Rod Diameter:	
Lift Cylinder (2)	1.25 (31,8)
Tilt Cylinder (1)	1.50 (38,1)
Stroke:	
Lift Cylinder (2)	25.00 (635)
Tilt Cylinder (1)	14.5 (368)
Control Valve	4–spool, open center type, W/float detent on lift, detent on auxiliary
Fluid Lines	SAE standard full flow tubes, hoses & fittings
Hydraulic Function Time:	
Raise Lift Arms to Maximum Height	3.5 Seconds
Lower Lift Arms from Maximum Height	2.7 Seconds
Move Bucket to Dump Position	2.7 Seconds
Move Bucket to Retracted Position	2.3 Seconds
ELECTRICAL	
Alternator	Belt drive, 55 amps. Open (18 amp. enclosed – 743DS)
Battery	12 volt, 435 cold crank amps. @ 0°F (–17.8°C) 125 min. reserve capacity
Starter	12 volt, gear drive
DRIVE SYSTEM	
Transmission	Tandem hydro. pumps driving 2 fully reversing hydro. motors
Final Drive	Gear reduction #80 HS roller chain & sprockets in sealed chaincase with oil lubrication
Total Engine to Wheel Reduction	40:1
CAPACITIES	
Cooling System	11 qts. (10,4 L)
Fuel	13 gals. (49 L)
Engine Oil W/Filter	4 qts. (3,8 L)
Hydraulic/Hydrostatic System	6 gals. (22,7 L) (Includes 3.5 gals [13,2 L] in reservoir)
Chaincase Reservoir	32 qts. (30,3 L)
TIRES	
Standard	7:00 x 15, 6 Ply Rating, Nylon W/Bar Lug Tread
MACHINE WEIGHT (without attachment)	
Shipping	4160 lbs. (1887 kg)
Floor Pressure	See Floor Pressure Chart in the Engineering Data Section

ENGINE SPECIFICATIONS, 742 (Ford)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Displacement	98 CID (1606 cc)
Bore	3.188 (80,98)
Stroke	3.056 (77,62)
Firing Order	1 – 2 – 4 – 3
Oil capacity W/Filter (Approx.)	3.5 Qt. (3,311 liters)
High Idle	2900–2975 RPM
Low Idle	850–950 RPM

Fuel Specifications

Always use clean fuel. Do not let the tank become empty.

Type of Fuel	Regular gasoline, 85–90 octane.

Fuel System

Float Level	1–1/8 – 1–3/16"
Pump Pressure	3.5–5.0 PSI (4,75–6,78 kPa)

Engine Oil

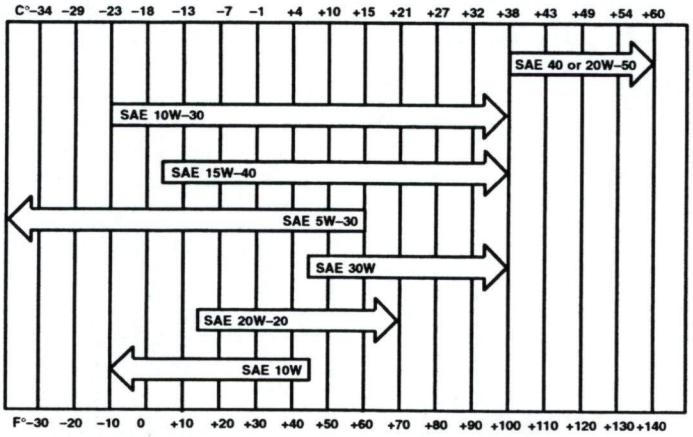
Specifications

Check oil level after every 8 hours of operation. (Check oil every 4 hours on new engine during the first 50 hours of operation.)

Oil level must be between the *add* and *full* mark on the dipstick. Use a good quality detergent motor oil that meets the correct API service classification SF or SE.

Use oil of correct SAE viscosity for expected temperature conditions.

RECOMMENDED SAE VISCOSITY NUMBER
(LUBRICATION OILS FOR ENGINE CRANKCASE)



TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE
(GASOLINE: USE API CLASSIFICATION SE or SF)

IMPORTANT

Never overfill the engine crankcase with oil.

I–2125–0597

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Lubrication System

Oil Pressure–Hot @ 2000 RPM	35–40 PSI (47,5–54,2 kPa)
Oil Pump–Rotor Assembly	
End Clearance	.001–.004 (0,025–0,102)
Outer Race to Housing clearance	.005–.0075 (0,13–0,195)
Clearance Between Inner & Outer Rotors	.006 (0,160)

Cylinder Heads

Gasket Surface Flatness per 12 inches (304,8)	.0015 (0,0375)
Valve Guide Bore Diameter	.3113–.3125 (7,907–7,938)
Valve Guide Replacement Busing Bore Diameter	.4383–.4391 (11,113–11,153)
Valve Seat Width – Intake	.0625 (1,59)
Exhaust	.0781 (1,98)
Valve Seat Angle	45°

Valve Mechanism

Lash Intake – (Cold)	.008–.010 (0,20–0,25)
Exhaust – (Cold)	.018–.020 (0,45–0,51)
Stem Diameter – Intake	.3098–.3105 (7,868–7,886)
Exhaust	.3098–.3096 (7,846–7,863)
Oversize .003 (0,076) Intake	.3128–.3135 (7,944–7,962)
Exhaust	.3110–.3126 (7,922–7,939)
Oversize .015 (0,38) Intake	.3248–.3255 (8,248–8,266)
Exhaust	.3239–.3246 (8,226–8,243)
Stem to Guide Clearance Intake	.0008–.0027 (0,020–0,068)
Exhaust	.0017–.0036 (0,043–0,091)
Length – All	4.345–4.365 (110,4–110,9)
Head Diameter	
Intake	1.559–1.550 (39,60–39,40)
Exhaust	1.340–1.330 (34,00–33,80)
Seat Angle	44–1/2°–45°
Face Runout–Wear Limit	.002 (0,05)
Spring Free Length	1.48 (37,6)
Spring Assembled Height	
Intake	Red, Yellow and Blue Stripe
Exhaust	White Stripe
Pad to Retainer	1.263 (32,8)
Spring Load at Assembled Height	44–49 lbs. (19,96–22,23 kg)
Push Rod Diameter	.250–.254 (6,35–6,45)
Length	7.59–7.62 (192,79–193,55)
Max Runout	.012 (0,300)
Tappet Length	1.85 (47,0)
Stem Diameter	.5120–.5122 (13,004–13,009)
Block Bore	.516–.517 (13,106–13,107)
Clearance to Block	.0005–.002 (0,013–0,05)
Rocker Shaft–Diameter	.623–.624 (15,83–15,85)
Rocker Bore	.625–.6265 (15,88–15,913)
Shaft Clearance in Rocker	.001–.0035 (0,03–0,089)
Rocker Arm Ratio	1.54:1

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Camshaft

Journal Diameter	1.5597–1.5605 (39,617–39,637)
Bearing I.D.	1.5615–1.5620 (39,662–39,675)
Length Front & Rear	2.26 (57,4)
Center	2.26 (57,4)
Clearance	.001–.0023 (0,025–0,058) wear limit .003 (0,076)
Bore for Bearing	1.6885–1.6895 (42,888–42,913)
Oversize Bearing O/S on OD Standard ID	.020 (0,513)
End Play	.0024–.075 (0,061–0,192)
Thrust Plate Thickness	.1755–.1775 (4,458–4,509)
Valve Timing –	
Inlet Opens – °BTDC	17–21
Inlet Closes – °ABDC	51–55
Exhaust Opens – °BBDC	51–70
Exhaust Closes – °ATDC	17–22
Inlet Cam Lift	0.2108–(5,3548) – 0.2356 (5,9851)
Exhaust Cam Lift	0.2176 (55,5276) – 0.2321 (5,8943)

Crankshaft

Main Bearing Journal Diameter	2.1253–2.1261 (53,983–54,003)
Main Bearing Clearance	.0005–.002 (0,013–0,051)
Rod Bearing Journal Diameter	1.9368–1.9376 (49,194–49,215)
Rod Bearing Clearance	.0005–.002 (0,013–0,051)
Main & rod Bearing Journal –	
Max. Taper	.003 (0,008)
Max. Out–of–Round	.0004 (0,010)
Crankshaft End Play	.003–.011 (0,08–0,28)
Bearing Wall Thickness–Standard	.0719–.0722 (1,788–1,796)
	For every .002 (0,051) undersized thickness add .001 (0,026) to standard thickness.
Thrust Washer	0.091–0.0093 (2,31–2,36) Std. 0.002 (0,0508)–0.005 (0,127) 0.007 (0,1778)–0.010 (0,254)

The crankshaft and cylinder block are color–coded for installation of the correct bearing AT THE FACTORY.

Use a micrometer to measure the inside diameter and the outside diameter of the bearing surfaces so that correct replacement bearings can be ordered.

Connecting Rod

Piston Pin Busing I.D.	.8121–.8125 (20,627–20,638)
Connecting Rod Bearing Bore	2.0825–2.0830 (52,90–52,91)
Connecting Rod Length Center to Center	3.9265–4.9295 (125,133–125,209)
Side Clearance	.004–.010 (0,10–0,25)
Max. Twist or Bend	.004 (0,10)

Pin bushing and crankshaft bearing bore must be parallel and in the same vertical plane within the specified total difference at ends of 8 inch long bar measure 4 inches on each side of rod.

Piston

Diameter	3.1853–3.1877 (80,907–80,967)
Piston to Bore Clearance	.0016–.0025 (0,04064–0,06350)
	(Measure 90° to pin centerline and at bottom of pin)
	(Clearance 90° to pin centerline and at bottom of pin)
Clearance between Deck and Piston Crown at TDC	.025–.043 (0,63–1,09)

Piston Pin

Diameter	.8119–.8123 (20,622–20,632)
Interference Fit in Piston	.0001–.0003 (0,003–0,008)
Clearance in Rod Bushing	.0001–.0003 (0,003–0,008)

ENGINE SPECIFICATIONS, 742 (Ford) (Cont'd)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Piston Rings

Top Compression Ring Width	.615–.0625 (1,56–1,59)
Bottom Compression Ring Width	.077–.078 (0,003–0,008)
Top Clearance Ring Side Clearance	.0016–.0036 (0,041–0,091)
Bottom Compression Ring Side Clearance	.0016–.0036 (0,041–0,091)
Compression Ring side Clearance–Wear Limit	.006 (0,152)
Oil Ring Width	.155–.156 (3,94–3,96)
Oil Ring Side Clearance	.0018–.0038 (0,046–0,097)
Oil Ring side clearance–Wear Limit	.007 (0,178)
Top Compression Ring–Std. Bore – Ring Gap	.009–.014 (0,23–0,36)
Bottom Compression Ring – Std. Bore–Ring Gap	.009–.014 (0,23–0,36)
Oil Ring–Std. Bore–Ring Gap Width	.009–.014 (0,23–0,36)

Cylinder Block

Cylinder Bore Diameter	3.1869–3.1893 (80,948–81,008)
Cylinder bore Out–of–Round – Max.	.0015 (0,013)
Taper – Max.	.001 (0,025)
Tappet Bore Diameter	.516–.517 (13,11–13,13)
Main Bearing bore diameter	2.2710–2.2715 (57,683–57,696)
Height, Pan Surface to Deck	8.326–8.331 (211,48–211,61)
Gasket Surface Flatness in any 6 inches	.006 (0,152) Max. overall

Ignition System

Distributor Point Gap	.025 (0,64)
Dwell Angle (Under 700 RPM)	48° 52°
Fitting Order	1 – 2 – 4 – 3
Rotation	Counterclockwise
Initial Timing–BTC	12°
End Play	Preload
Spark Plug	AGR–22
Plug Gap	.026–.028 (0,66–0,71)
Coil–Primary Resistance (Ohms)	1.40–1.54 (75°F)
Secondary Resistance (Ohms)	7600–8800 (75°F)
Primary External Resistor (Ohms)	1.30–1.40 (75°F)
Condenser–(Mitco Farads)	0.21–0.25

DISTRIBUTOR ADVANCE CHARACTERISTICS

ENGINE RPM	CENTRIFUGAL PLUG INITIAL ADVANCE	CENTRIFUGAL PLUS VACUUM PLUS INITIAL ADVANCE (NO LOAD)
500	10–12°	28–36°
1000	10–12°	28–36°
1200	10–12°	28–39°
1400	11–17°	29–41°
1600	13–19°	31–43°
2000	18–24°	36–48°
2600	22–28°	40–52°

* All above values are readings as seen at crankshaft timing marks.

Starter

Solenoid Actuated Starter Motor			Starter Brushes		
Dia. In Inches (Metric)	Current Draw Under Normal Load (Amps.)	Normal Engine Cranking Speed (RPM) @ 70°F	No. Load (Amps.)	Wear Limit In Inches (Metric)	Spring Tension (Ounces Force)
3–1/2 (88.9)	135–250	140–180	65	5/16 (.8)	28

Engine Fastener Torque

Item	Ft.–Lbs.	Nm
Camshaft Sprocket to Camshaft Bolt	12–15	16–20
Camshaft Thrust Plate Bolt	2.5–3.5	3,4–4,7
Connecting Rod Bolts	30–35	41–47
Cylinder Head Bolts	Step 1–20–30	27–41
	Step 2–50–55	68–75
	Step 3–65–70	88–95
Crankshaft Pulley Bolt	24–48	33–38
Cylinder Front Cover bolts	5–7	7–9,5
Carburetor Attaching Nuts	12–15	16–20
Chain Tension Support to cylinder block	5–7	7–9.5
Distributor to Cylinder Block	5–7	7–9.5
Distributor Clamp	2–3	2,7–4,1
Exhaust Manifold to Cylinder Head Nuts	15–18	20–24
Separator Clamping Bolt	6–9	8–12
Flywheel to Crankshaft Bolts	45–50	62–67
Fuel Pump to Cylinder Block	12–15	16–20
Alternator Mounting to Cylinder Block Bolts	20–25	27–34
Intake Manifold to Cylinder Head Bolts	15–18	20–24
Main Bearing Cap Bolts	65–70	88–95
Oil Pump to cylinder Block	12–15	16–20
Oil Drain Plug	20–25	27–34
Oil Pan to Cylinder Block Bolts	6–8	8–11
Oil Pump Cover to Oil Pump Bolts	5–7	7–9,5
Rear Oil Seal Retainer to Cylinder Block	12–15	16–20
Rocker Cover to Cylinder Head Screws	2.5–3.5	3,4–4,7
Rocker Shaft Support Bolt	25–30	34–41
Spark Plug to Cylinder Head	22–28	30–38
Water Outlet Connection To Cylinder Head	12–15	16–20
Water Pump to Cylinder Block	5–7	7–9,5
Water Pump to Cylinder Block	12–15	16–20
Oil Filter	1/2 turn after gasket contacts surface	


bobcat®

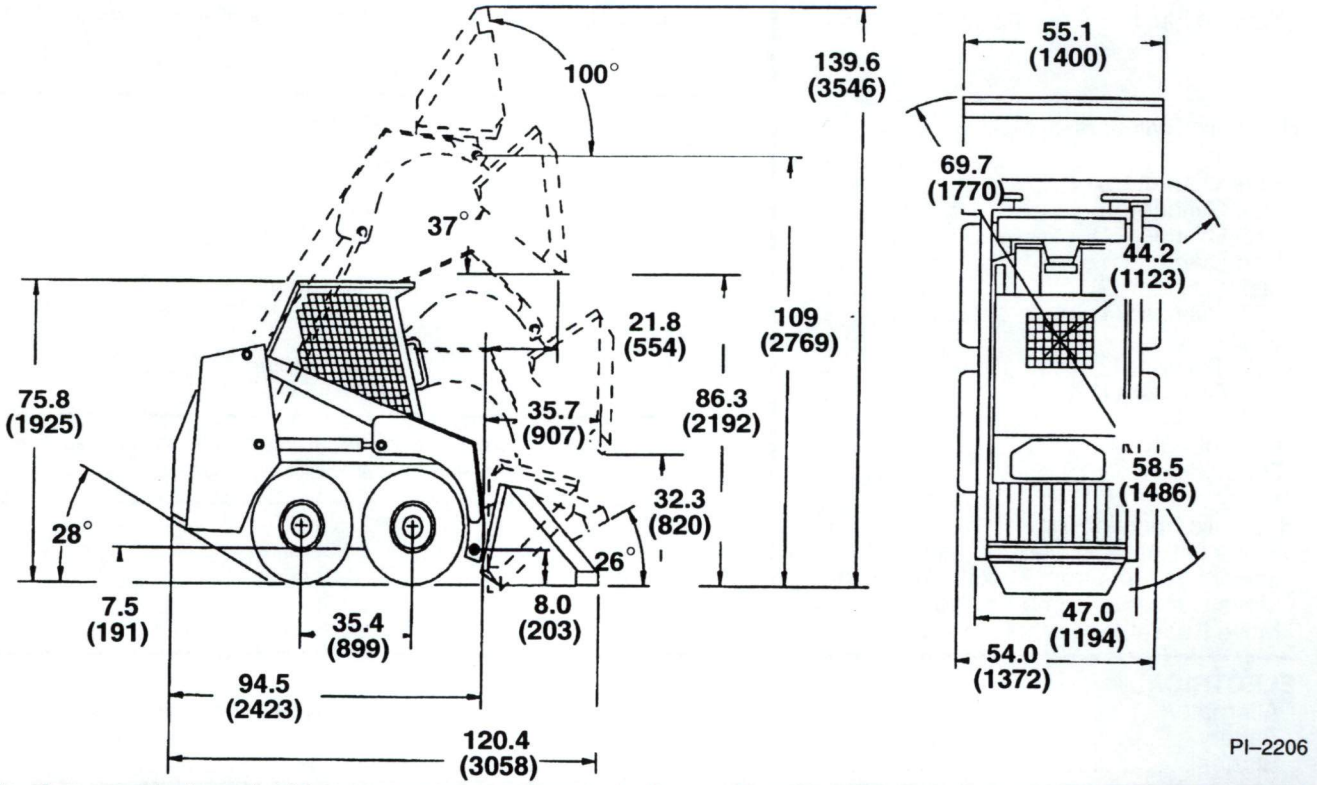
SPECIFICATIONS (742B)

741, 742, 743 & 743DS Bobcat Loader
Service Manual

LOADER SPECIFICATIONS

743 & 743DS

- Dimensions are given for loader equipped with standard tires and dirt bucket. Dimensions may vary with other types. All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specifications conform to SAE standards and are subject to change without notice.



PI–2206

This loader was designed without counterweights or ballasts. Changes of structure or weight distribution of the loader can cause changes in control and steering response and can cause failure of the loader parts.

OPERATIONS & PERFORMANCE	743 & 743DS
Weights	
Operating Weight	4720 lbs. (2141 kg)
Rated Operating Capacity (Melroe)	1300 lbs. (590 kg)
Tipping Load (SAE)	2600 lbs. (1179 kg)
Travel Speed	0.0 to 6.0 MPH (9,7 km/hr.)
Controls	
Vehicle	Direction & speed controlled by two hand levers.
Loader Function	Lift & Tilt Function: Controlled by separate foot pedals. Front Auxiliary Function: Controlled by the right steering lever. Rear auxiliary function controlled by the left steering lever.
Engine	Hand lever throttle & key–type starter switch;
Main Drive	Hydrostatic
Parking Brake	Mechanical disc, foot operated pedal
ENGINE	
Make	Kubota
Model	V1702–BA
Fuel	Diesel
Horsepower	36 HP (26,8 kW)
Maximum Governed RPM	2800 RPM
Torque	80 ft.–lbs. (108 Nm) @ 1600 RPM
Number of Cylinders	Four
Bore/Stroke	3.23 (82)/3.23 (82)
Displacement	105.7 cu.–in. (1732 cm^3)
Cooling System	Liquid
Lubrication	Pressure System W/Filter
Crankcase Ventilation	Open
Air Cleaner	Dry replaceable paper cartridge (With safety element–Diesel Only)
Ignition	Compression – Diesel
Compression (Max.)	427–469 PSI (2944–3234 kPa)
(Min.)	320–352 PSI (2206–2427 kPa)

LOADER SPECIFICATIONS (Cont'd)

	743 & 743DS
HYDRAULIC SYSTEM	
Hydraulic Pump	Engine driven vane type
Pump Capacity	11 GPM (42 L/min.) @ 2850 RPM
System Main Relief	2200–2400 PSI (15169–16548 kPa) @ Quick Couplers
Filter	Replaceable #3 micron paper element in charge line
Type of Fluid	Bobcat Fluid (P/N 6563328). If fluid is not available use 10W–30 or 10W–40 Class SE or SF Motor Oil for temperatures above 0°F (–18°C) & 5W–30 for temperatures below 10°F (–23°C)
Hydraulic Cylinders	Doubleacting
Bore Diameter:	
Lift Cylinder (2)	2.00 (51)
Tilt Cylinder (1)	3.25 (82,6)
Rod Diameter:	
Lift Cylinder (2)	1.25 (31,8)
Tilt Cylinder (1)	1.50 (38,1)
Stroke:	
Lift Cylinder (2)	25.00 (635)
Tilt Cylinder (1)	14.5 (368)
Control Valve	4–spool, open center type, W/float detent on lift, detent on auxiliary
Fluid Lines	SAE standard full flow tubes, hoses & fittings
Hydraulic Function Time:	
Raise Lift Arms to Maximum Height	3.5 Seconds
Lower Lift Arms from Maximum Height	2.7 Seconds
Move Bucket to Dump Position	2.7 Seconds
Move Bucket to Retracted Position	2.3 Seconds
ELECTRICAL	
Alternator	Belt drive, 55 amps. Open (18 amp. enclosed – 743DS)
Battery	12 volt, 625 cold crank amps. @ 0°F (–17.8°C) 125 min. reserve capacity
Starter	12 volt, gear drive
DRIVE SYSTEM	
Transmission	Tandem hydro. pumps driving 2 fully reversing hydro. motors
Final Drive	Gear reduction #80 HS roller chain & sprockets in sealed chaincase with oil lubrication
Total Engine to Wheel Reduction	40:1
CAPACITIES	
Cooling System	13 qts. (12,3 L)
Fuel	13 gals. (49 L)
Engine Oil W/Filter	9 qts. (8,5 L)
Hydraulic/Hydrostatic System	6 gals. (22,7 L) (Includes 3.5 gals [13,2 L] in reservoir)
Chaincase Reservoir	32 qts. (30,3 L)
TIRES	
Standard	7:00 x 15,6 Ply Rating, Nylon W/Bar Lug Tread
MACHINE WEIGHT (without attachment)	
Shipping	4330 lbs. (1964 kg)
Floor Pressure	See Floor Pressure Chart in the Engineering Data Section

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Fuel Injection Nozzles

Opening Pressure	1990–2130 PSI (13721–14686 kPa)
Fuel Tightness Nozzle Seat	Dry Nozzle at 1848–1990 PSI (12742–13721 kPa)

Fuel Injection Pump

Fuel Tightness of Plunger	8 sec.: initial pressure from 8532–7110 PSI (58828–49023 kPa)
Limit Permitted	4 seconds or less
Fuel Tightness of Delivery Valve	10 sec.: initial pressure from 1422–71 PSI (9805–490 kPa)
Limit Permitted	5 seconds or less
Injection Timing	25–26 degrees before TDC
High Idle	2860–3000 RPM
Low Idle	700–1000 RPM

Cylinder Head

Cylinder Head Surface Distortion	0.002 (0,05)
Thickness of Gasket	0.057 (1,45)
Thickness of Gasket Shims	0.0059 or 0.0079 (0,15 or 0,2)
Top Clearance (Piston to Head)	0.0276–0.0354 (0,7–0,9)
Head Bolt Torque	
Flange Head Bolt	65–68 ft.–lbs. (88–92 Nm)
Bolt W/Washer	58–68 ft.–lbs. (79–83 Nm)
Maximum Allowable Milling	0.004 (0,1)

Valves

Valve Seat Width	0.0827 (2,1)
Valve Seat Angle	45 degrees
O.D. of Valve Stems (Intake and Exhaust)	0.3134–0.3140 (7,960–7,975)
I.D. of Valve Guides (Intake and Exhaust)	0.3156–0.3161 (8,015–8,030)
Clearance Between Valve Stem And Guide	0.0016 to 0.0028 (0,04–0,07)
Limit Permitted	0.0039 (0,1)
Depth of Valve	0.0433–0.0512 (1,1–1,3)
Valve Clearance (Cold) (Intake and Exhaust)	0.0071–0.0087 (0,18–0,22)

Valve Springs

Free Length	1.6417–1.6614 (41,7–42,2)
Fitting Length	1.3839 (35,15)
Load to Compressed to Fitted Length	26.5 lbs. (118 N)
Limit Permitted	22.5 lbs. (100 N)

Rocker Arms

O.D. of rocker Arm Shaft	0.5501–0.5506 (13,973–13,984)
I.D. of rocker Arm Bushings	0.5513–0.5529 (14,002–14,043)
Clearance Between Rocker Arm and Bushings	0.0004–0.0028 (0,01–0,07)
Limit Permitted	0.0059 (0,15)

Camshaft

O.D. of Camshaft Bearing Journal	1.5722–1.5728 (39,934–39,950)
I.D. of Camshaft Bearing	1.5748–1.5758 (40,0–40,025)
Clearance Between Camshaft Journal and Bearing	0.002–0.0036 (0,50–0,091)
Limit Permitted	0.0059 (0,15)
Alignment of Camshaft	0.0008 (0,02)
Cam Lobe Height (Intake and Exhaust)	1.3134 (33,36)
Limit Permitted	1.3114 (33,31)
Gear Clearance (Backlash)	0.0016–0.0045 (0,041–0,114)
Limit Permitted	0.0118 (0,3)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Cylinders

I.D. of Cylinder Liner (Std.)	3.2283–3.2291 (82,0–82,019)
Oversized Liner I.D. (After Reboring .020 O/S)	3.248–3.2489 (82,499–82,522)
Wear Limit	0.0059 (0,15)

Piston Rings

Ring Gap (Top and 2nd Ring)	0.0118–0.0177 (0,30–3,45)
Limit Permitted	0.0492 (1,25)
Ring Gap (Oil Ring)	0.0098–.0157 (0,25–0,40)
Limit Permitted	0.0492 (1,25)
Side Clearance of Ring Groove	
Top Ring	0 clearance
Second Ring	0.0037–0.0047 (0,093–0,120)
Oil Ring	0.0008–0.0020 (0,020–0,052)

Pistons

I.D. of Piston Bosses	0.9055–0.9060 (23–23,013)
Limit Permitted	0.9076 (23,053)
O.D. of Piston Pin	0.9056–0.9059 (23,002–23,011)
I.D. of connect Rod Busing (Small End, Fitted)	0.9065–0.9071 (23,025–23,04)
Clearance Between Piston Pin and Bushing	0.0006–0.0015 (0,015–0,038)
Service Replacement Part	0.0006–0.0026 (0,015–0,07)
Limit Permitted	.0059 (0,15)
Connecting Rod Alignment	0.0008 (0,02)
Limit Permitted	0.002 (0,05)
Connecting Rod Big End I.D.	(W/O Bearing) 1.850–1.851 (47,0–47,02)

Crankshaft

O.D. Main Bearing Journals	2.0441–2.0449 (51,92–51,94)
I.D. of Crankshaft Main Bearing (No. 1)	2.0465–2.0488 (51,98–52,039)
I.D. of Crankshaft Main Bearing (No. 2)	2.0465–2.0482 (51,98–52,025)
Clearance Between Crankshaft Journal and Bearing	0.0013–0.0042 (0,03–0,11)
Limit Permitted	0.0079 (0,2)
O.D. of Connecting Rod Journals	1.7307–1.7313 (43,959–43,975)
I.D. of Connecting Rod Bearings	1.737–1.7343 (44,01–44,052)
Clearance Between Connecting Rod Journal and Bearing	0.0014–0.0037 (0,035–0,093)
Limit Permitted	0.0079 (0,2)
End Play of Crankshaft	0.0059–0.08 (0,15–0,21)
Thrust Plate Thickness:	
Standard	0.091–0.093 (2,31–2,36)
Oversize	0.0935–0.0955 (2,37–2,43)
	0.096–0.098 (2,44–2,49)
	0.0985–0.1005 (2,50–2,55)
	0.101–0.103 (2,57–2,62)
Crankshaft Journal U/S (Dia.)	2.0363–2.037 (51,72–51,74)
	2.0284–2.0291 (51,52–51,54)

Oil Pump

Oil Pressure @ rated RPM	42–56 PSI (290–386 kPa)
Limit Permitted	36 PSI (248 kPa)
Rotor Lobe Clearance	0.0039–0.0063 (0,10–0,16)
Limit Permitted	0.0079 (0,20)
Clearance Between Outer Rotor And Pump Body	0.0043–0.0075 (0,11–0,19)
Limit Permitted	0.0098 (0,25)

Engine Oil

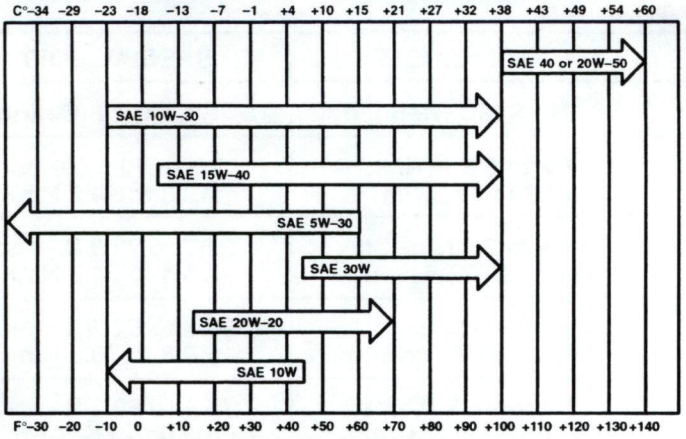
Specifications

Check oil level every 8 hours of operation. (Check oil every 4 hours on new engine during the first 50 hours of operation.)

Oil level must be between the *add* and *full* marks on the dipstick. Use a good quality detergent motor oil that meets the correct API service classification. (See Chart on Page 8C–7.)

Use oil of the correct SAE viscosity for expected temperature conditions.

RECOMMENDED SAE VISCOSITY NUMBER (LUBRICATION OILS FOR ENGINE CRANKCASE)



TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE (DIESEL: USE API CLASSIFICATION CC or CD)

IMPORTANT

Never overfill the engine crankcase with oil.

I–2125–0597

ENGINE BOLT TORQUES

Bolt material grades are shown by numbers punched on the bolt heads.

Before tightening, check the numbers shown below:

NOTE: Special bolts are used where required. Please refer to Assembly Section for correct special bolt torque.

	Ft.–Lbs.	Nm
Fuel Injector Pump Mounting Bolts	17–20	23–27
Hydrostatic Pump Adapter Flange to Flywheel	15–17	23–27
Engine Mounting Bolts	65–70	88–95
Oil Pump to Block	5–6	6,8–8,1
Gearcase Cover Bolts	13–15	18–20
Flywheel Housing Cover	25–28	34–38
Hydrostatic Pump to Flywheel Cover	65–70	88–95
Nozzle Holder	22–36	30–49
Flywheel to Crankshaft	72–80	98–108
Pulley to Crankshaft	101–110	137–149
Water Pump Shaft Nut	50–57	68–78
Crankshaft Rear Cover	13–17	17–20
Valve Cover Nuts	5–6	6,8–8,1
Connecting Rod Caps	26–30	35–41
Bearing Case Bolt (1) Through Block	47–50	64–68
Bearing Case Halves Two Bolt Each	21–25	28–34
Camshaft Mounting Flange	13–15	18–20

Engine Bolt Torques (Cont'd)

BOLT TORQUES			
MATERIAL GRADE	STANDARD BOLT	SPECIAL BOLT	SPECIAL BOLT
NOMINAL DIAMETER	SS42, S20C	S43C, S48C (Refined)	SCR3, SCM3 (Refined)
M6	5.8 to 6.9 ft.–lbs. (7.8 to 9.3 Nm)	7.2 to 8.3 ft.–lbs. (9.8 to 11.3 Nm)	9.0 to 10.5 ft.–lbs. (12.3 to 14.2 Nm)
M8	13.0 to 15.2 ft.–lbs. (17.7 to 20.6 Nm)	17.4 to 20.3 ft.–lbs. (23.5 to 27.5 Nm)	21.7 to 25.3 ft.–lbs. (29.4 to 34.3 Nm)
M10	28.9 to 33.3 ft.–lbs. (39.2 to 45.1 Nm)	35.4 to 41.2 ft.–lbs. (48.0 to 56.3 Nm)	44.8 to 52.1 ft.–lbs. (60.8 to 70.6 Nm)
M12	46.3 to 53.5 ft.–lbs. (62.8 to 72.6 Nm)	57.1 to 66.5 ft.–lbs. (77.5 to 90.2 Nm)	75.9 to 86.8 ft.–lbs. (103.0 to 117.7 Nm)
M14	79.6 to 92.6 ft.–lbs. (107.9 to 125.5 Nm)	91.1 to 108.5 ft.–lbs. (123.6 to 147.1 Nm)	123.0 to 144.7 ft.–lbs. (166.7 to 196.1 Nm)
M16	123.0 to 141.0 ft.–lbs. (166.7 to 191.2 Nm)	144.7 to 166.4 ft.–lbs. (196.1 to 225.5 Nm)	191.7 to 224.2 ft.–lbs. (259.9 to 304.0 Nm)
M18	180.8 to 209.8 ft.–lbs. (245.2 to 284.4 Nm)	202.5 to 235.1 ft.–lbs. (274.6 to 318.7 Nm)	253.2 to 296.5 ft.–lbs. (343.2 to 402.0 Nm)
M20	245.9 to 289.3 ft.–lbs. 333.4 to 392.2 Nm)	271.2 to 318.2 ft.–lbs. (367.7 to 431.5 Nm)	361.6 to 419.5 ft.–lbs. (490.3 to 568.7 Nm)

SPECIFICATIONS (742 Mitsubishi)

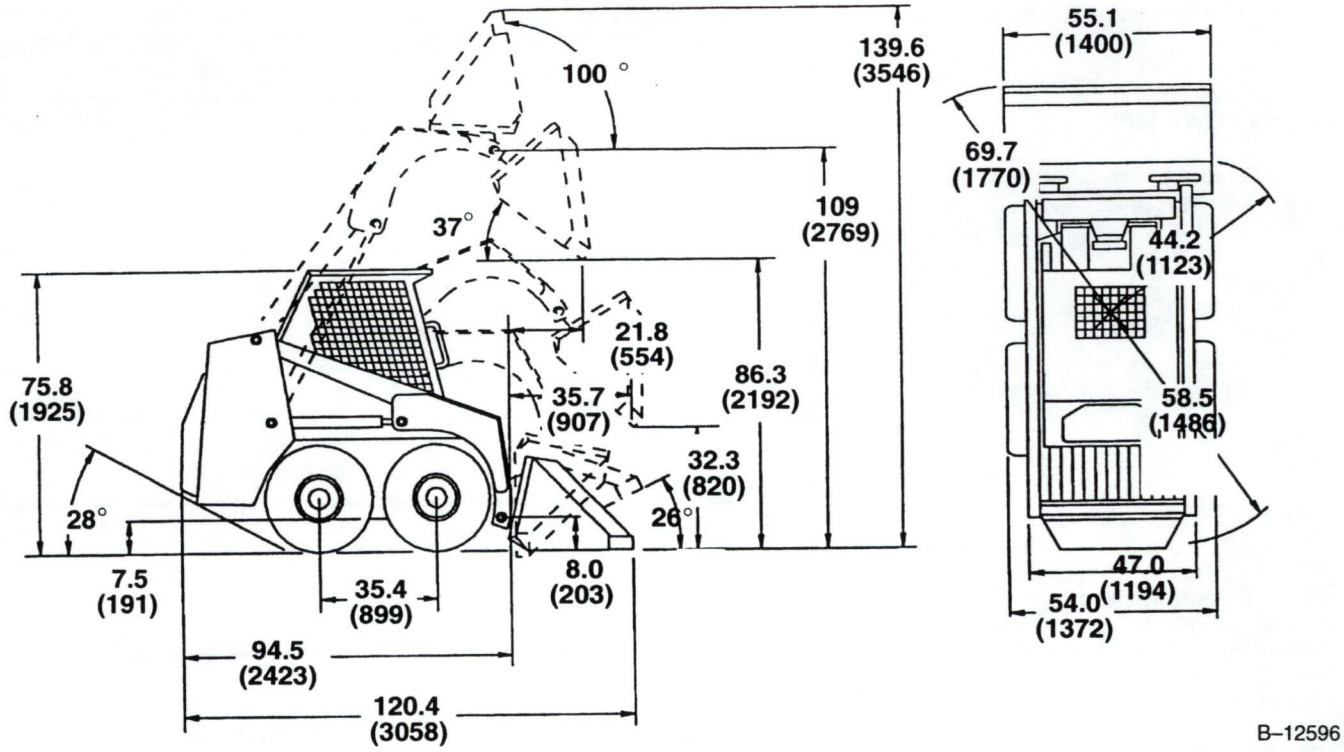
Revised Sept. 90

741, 742, 743 & 743DS Bobcat Loader
Service Manual

LOADER SPECIFICATIONS

742

- Dimensions are given for loader equipped with standard tires and dirt bucket. Dimensions may vary with other types. All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specifications conform to SAE standards and are subject to change without notice.



B–12596

This loader was designed without counterweights or ballasts. Changes of structure or weight distribution of the loader can cause changes in control and steering response and can cause failure of the loader parts.

OPERATIONS & PERFORMANCE	742 (S/N 23000 & Above)
Weights	
Operating Weight	4730 lbs. (2147 kg)
Rated Operating Capacity (Melroe)	1300 lbs. (590 kg)
Tipping Load (SAE)	2600 lbs. (1180 kg)
Travel Speed	infinitely varialbe 0 – 6.0 MPH (9,7 km/hr.)
Controls	
Vehicle	Direction & speed controlled by two hand levers.
Loader Function	Lift & Tilt Function: Controlled by separate foot pedals. Front Auxiliary Function: Controlled by the right steering lever.
Engine	Hand lever throttle & key–type starter switch;
Main Drive	Hydrostatic
Parking Brake	Mechanical disc, foot operated pedal
ENGINE	
Make	Mitsubishi
Model	4G32
Fuel	Gasoline, leaded or unleaded
Horsepower	35 HP (26,0 kW)
Maximum Governed RPM	2800 RPM
Torque	73 ft.–lbs. (99 Nm) Maximum @ 2000 RPM
Number of Cylinders	Four
Bore/Stroke	3.03/3.38(76,9/85,8)
Displacement	95.62 cu. in. (1567 cm^3)
Cooling System	Liquid
Lubrication	Full Pressure with full flow filter
Crankcase Ventilation	PVC
Air Cleaner	Dry replaceable paper cartridge
Ignition	12 volt, battery ignition W/breaker points & coil
High Idle	2900–2975 RPM
Low Idle	850–950 RPM

LOADER SPECIFICATIONS (Cont'd)

	742 (S/N 23000 & Above)
HYDRAULIC SYSTEM	
Hydraulic Pump	Engine driven vane type
Pump Capacity	11 GPM (42 L/min.) @ 2850 RPM
System Main Relief	2200–2400 PSI (15169–16548 kPa) @ Quick Couplers
Filter	Replaceable #3 micron paper element in charge line
Type of Fluid	Bobcat Fluid (P/N 6563328). If fluid is not available use 10W–30 or 10W–40 Class SE or SF Motor Oil for temperatures above 0°F (–18°C) & 5W–30 for temperatures below 10°F (–23°C)
Hydraulic Cylinders	Doubleacting
Bore Diameter:	
Lift Cylinder (2)	2.00 (51)
Tilt Cylinder (1)	3.25 (82,6)
Rod Diameter:	
Lift Cylinder (2)	1.25 (31,8)
Tilt Cylinder (1)	1.50 (38,1)
Stroke:	
Lift Cylinder (2)	25.00 (635)
Tilt Cylinder (1)	14.5 (368)
Control Valve	4–spool, open center type, W/float detent on lift, detent on auxiliary
Fluid Lines	SAE standard full flow tubes, hoses & fittings
Hydraulic Function Time:	
Raise Lift Arms to Maximum Height	3.5 Seconds
Lower Lift Arms from Maximum Height	2.7 Seconds
Move Bucket to Dump Position	2.7 Seconds
Move Bucket to Retracted Position	2.3 Seconds
ELECTRICAL	
Alternator	Belt drive, 55 amps, open
Battery	12 volt, 435 cold crank amps. @ 0°F (–17.8°C) 125 min. reserve capacity
Starter	12 volt
DRIVE SYSTEM	
Transmission	Tandem hydro. pumps driving 2 fully reversing hydro. motors
Final Drive	Gear reduction #80 HS roller chain & sprockets in sealed chaincase with oil lubrication
CAPACITIES	
Cooling System	11 qts. (10,4 L)
Fuel	13 gals. (49 L)
Engine Oil W/Filter	4 qts. (3,8 L)
Hydraulic/Hydrostatic System	6 gals. (22,7 L) (Includes 3.5 gals [13,2 L] in reservoir)
Chaincase Reservoir	32 qts. (30,3 L)
TIRES	
Standard	7:00 x 15, 6–Ply Rating
Pressure	45–50 PSI (310–345 kPa)
Flotation	10 x 16.5, 6 Ply Rating
Pressure	30–35 PSI (207–241 kPa)

ENGINE SPECIFICATIONS

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

General

Compression PSI @ 250 RPM	150 PSI (1034 kPa)
Difference between Cylinders	Within 10%
Ignition Timing (BTDC–with Vacuum Line Off)	5° @ 700–750 RPM

Cylinder Head

Flatness of Head	0.002 (0,05) or less
Flatness of Manifold Mounting Surface Service Limit	0.012 (0,3)
Oversize Valve Seat Hole	
Intake 0.012 (0,3) O.S.	1.547–1.548 (39,300–39,325)
0.024 (0,6) O.S.	1.559–1.560 (39,600–39,625)
Exhaust 0.012 (0,3) O.S.	1.350–1.351 (34,300–34,325)
0.24 (0,6) O.S.	1.362–1.363 (34,600–34,625)
Camshaft cap to Camshaft Clearance	0.002–0.004 (0,05–0,9)
Service Limit	0.006 (0,15)
Valve Guide Hole Oversize (Both Intake & Exhaust)	
0.002 (0,05) O.S.	0.5138–0.5145 (13,05–13,068)
0.010 (0,25) O.S.	0.5216–0.5224 (13,25–13,268)
0.020 (0,50) O.S.	0.5315–0.5322 (13,50–13,518)
Valve Seat Contact Width	0.035–0.051 (0,9–1,3)
Valve Seat Angle	45°

Cylinder Block

Flatness of Cylinder Block	0.002 (0,05) or less
Cylinder Bore	3.0276 (76,90)
Wear Limit	0.008" (0,20)
Service Limit (Maximum Oversize)	+0.047 (+1,2)
Cylindrical Within Bore	0.0004 (0,01) or less
Cylinder to Piston Clearance	0.0008–0.0016 (0,02–0,04)

Piston

Piston O.D. @ Skirt	3.0276 (76,90)
Piston Pin Hole I.D.	0.748 (19,0)
Piston O.S.	0.010 (0,25); 0.020 (0,50); 0.030 (0,75); 0.039 (1,0)
Piston Ring to Groove Clearance	
Compression No. 1	0.0011–0.0027 (0,3–0,07)
Service Limit	0.006 (0,15)
Compression No. 2	0.0008–0.0024 (0,02–0,06)
Service Limit	0.006 (0,15)
Compression Ring Gap	0.0098–0.0177 (0,25–0,45)
Service Limit	0.039 (1,0)
Oil Ring Gap	0.0008–0.028 (0,2–0,7)
Service Limit	0.039 (1,0)
Piston Ring O.S.	0.010 (0,25); 0.020 (0,50); 0.030 (0,75); 0.039 (1,0)

Piston Pin

Piston Pin O.D.	0.748 (19,)
Piston to Piston Pin Clearance	0.00004–0.0005 (0,001–0,013)
Service Limit	0.0011 (0,03)
Interference to Connecting Rod:	
Press Fit Load (Normal Temp.)	1101–3304 lbs. (500–1500 kg)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Connecting Rod

Bend or Twist of Rod	0.0011 (0,03) or less
End Play of Big End	0.0039–0.010 (0,1–0,25)
Rod Bearing Oil Clearance	0.00055–0.0025 (0,014–0,064)
Rod Bearing U.S.	0.010 (0,25); 0.020 (0,50); 0.030 (0,75); 0.039 (1,0)

Crankshaft

Crankshaft Journal Oil Clearance	0.0006–0.0028 (0,015–0,07)
Service Limit	0.006 (0,15)
Crank Pin Oil Clearance	0.0004–0.0025 (0,01–0,064)
Service Limit	0.004 (0,10)
Crankshaft Bearing U.S.	0.010 (0,25); 0.020 (0,50); 0.030 (0,075)
Crankshaft Journal O.D. (Std.)	2.244 (57,0)
Service Limit	–0.035 (–0,9)
Journal Undersize Machining Size:	
0.010 (0,25) U.S.	2.2337–2.2343 (56,735–56,750)
0.020 (0,50) U.S.	2.2238–2.2244 (56,485–56,500)
0.030 (0,75) U.S.	2.21140–2.2146 (56,235–56,250)
Crank Pin O.D. (Std.)	1.772 (45,0)
Service Limit	–0.035 (–0,9)
Pin Undersize Machining Size:	
0.010 (0,25) U.S.	1.7612–7.7618 (44,734–44,750)
0.020 (0,50) U.S.	1.7514–1.7520 (44,485–44,500)
0.030 (0,75) U.S.	1.7415–1.7421 (44,234–44,250)
Bend of Crankshaft	0.0012 (0,03) or less
Cylindrical Within Journal & Pin	0.0002 (0,005) or less
Crankshaft End Play	0.0002–0.0069 (0,05–0,175)
Service Limit	0.010 (0,25)

Flywheel

Flywheel Run–Out	0.005 (0,13) or less
Service Limit	0.009 (0,2)

Camshaft

Journal O.D.	1.3386 (34,0)
Service Limit	–0.006 (–0,15)
Cylindrical Within Journal	0.00004 (0,001)
Service Limit	–0.006 (–0,15)
Bend	0.0008 (0,02) or less
Height of Cam Lobe	1.4331 (36,4)
Service Limit	–0.020 (–0,5)
Fuel Pump Drive Lobe	1.575 (40,0)
Service Limit	–0.020 (–0,5)
Camshaft End Play	0.0002–0.0069 (0,05–0,175)
Service Limit	0.012 (0,3)

Valve Train

Valve Stem O.D.:	
Intake	0.315 (8,0)
Service Limit	–0.004 (–0,10)
Exhaust	0.315 (8,0)
Service Limit	–0.006 (–0,15)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Valve Train (Cont'd)

Overall Length:	
Intake	4.071 (103,4)
Exhaust	3.937 (100)
Thickness of Head:	
Intake	0.059 (1,5)
Service Limit	–0.020 (0,5)
Exhaust	0.059 (1,5)
Service Limit	–0.020 (–0,5)
Clearance to Guide:	
Intake	0.0010–0.0023 (0,025–0,058)
Service Limit	0.004 (0,1)
Exhaust	0.0020–0.0034 (0,05–0,085)
Service Limit	0.006 (0,15)
Valve Clearance:	
Cold	
Intake	0.003 (0,08)
Exhaust	0.007 (0,18)
Hot:	
Intake	0.006 (0,15)
Exhaust	0.010 (0,25)

Valve Guide

Valve Guide O.D.	0.512 (13,0)
Valve Guide I.D.:	
Intake	0.315–0.317 (8,0–8,05)
Service Limit	–0.004 (–0,10)
Exhaust	0.315–0.317 (8,0–8,05)
Service Limit	–0.006 (–0,15)
Valve Guide Installed Length	0.539–0.563 (13,7–14,3)
Valve Guide O.S.	0.010 (0,05); 0.020 (0,25); 0.030 (0,50)
Valve Seat Ring O.S.:	
Intake	
0.012 (0,3) O.S.	1.547 (39,3)
0.024 (0,6) O.S.	1.559 (39,6)
Exhaust	
0.012 (0,3) O.S.	1.350 (34,3)
0.024 (0,6) O.S.	1.362 (34,6)
Height of Ring:	
0.012 (0,3) O.S.	0.291–0.299 (7,4–7,6)
0.024 (0,6) O.S.	0.303–0.311 (7,7–7,9)

Valve Spring

Color Code BLUE:	
New Free Length	1.811 (46,0)
Service Limit	–0.039 (–1,0)
New Pre–load	82 lbs. @ 1.469 (365 N @ 37,3)
Use Pre–load	83 lbs. @ 1.106 (414 N @ 28,1)
Inclination	1.5°
Service Limit	3°

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Rocker Arm And Shaft

L.H. Rocker Shaft:	
O.D. x Length	0.744 x 14.035 (18,9 x 356,5)
R.H. RockerShaft:	
O.D. x Length	0.744 x 14.035 (18,9 x 350,5)
Bend	0.020 (0,05) or less
Rocker Arm I.D.	0.744 (18,9)
Arm to Shaft Clearance	0.0005–0.0017 (0,012–0,043)
Rocker Shaft Spring:	
Free Length	2.098 (53,3)
Preload	3.7 lbs. @ 1.396 (1,7 kg @ 35,5)

Oil Pump

Relief Valve Opening Pressure	57–71 lbs. (26–32 kg
Outer to Inner Rotor Clearance	0.0016–0.004 (0,04–0,12)
Service Limit	0.010 (0,25)
Pump Body to Outer Rotor Clearance	0.0039–0.006 (0,10–0,16)
Service Limit	0.012 (0,3)
Rotor Side Clearance	0.0023–0.005 (0,06–0,12)
Service Limit	0.008 (0,2)
Relief Spring:	
Free Length	1.850 (47,0)
Preload	16 lbs. @ 1.398 (71 N @ 35,5)

Fuel Pump

Delivery	2.11 qts. (2 L) @ 5000 RPM
Closed Delivery Pressure	3.7–5 PSI (25,5–34,5 kPa)

Carburetor

Idle RPM	700–750 RPM
Type	Downdraft
Model	28–32DIDSA
Main Jet Diameter	0.037 (0,95)
Main Air Jet Diameter	0.035 (0,9)
Pilot Jet Diameter	0.022 (0,55)
Pilot Air Jet Diameter	0.062 (1,6)
Enrichment Jet Diameter	0.023 (0,6)
Needle Valve Seat Diameter	0.078 (2,0)
Fast Idle Opening	18°
Idle Compensator–Fully Open Temperature	131–158°F. (55–70° C.)

Water Pump

Type	Centrifugal, Impeller Type
Belt Tension	0.276–0.394 @ 22 lbs. (7–10 @ 10 kg)

Thermostat

Type	Wax Type
Valve Cracking Temperature	180° F. (82° C.)
Valve Lift & Temperature	0.31 (8,0) @ 203° F. (95° C.)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Starter

Type	12 Volt
Direction of Rotation	Clockwise

Alternator

Output voltage	45 Amps. @ 2600 RPM

Distributor

Timing (With Vacuum Line Off)	5° BTDC @ 700–750 RPM
Direction of Rotation	Clockwise
Ignition Firing Order	1–3–4–2
Centrifugal Spark Advance:	
Beginning	0° @ 1000 RPM
End	10° @ 2500 RPM
Vacuum Spark Advance:	
Beginning	0° @ 0.36 in. of mercury
Middle	9° @ 9.84 in. of mercury
End	13° @ 15.8 in. of mercury
Point Gap	0.018–0.021 (0,44–0,55)
Dwell Angle	52° + 3°
Condenser Capacity	22 uF

Spark Plugs

Plug Gap	0.028–0.031 (0,7–0,8)

Engine Torque	Ft.–Lbs.	Nm
Cylinder Head Bolts (Cold)	51–54	69–73
(Hot)	58–61	79–83
Rocker cover Mounting Bolts	4–5	5–6
Intake & Exhaust Manifold Mounting Nuts	11–14	15–19
Camshaft Bearing Cap Mounting Bolts (M8)	14–15	17–20
(M6)	7–9	9–12
Camshaft Sprocket Mounting Bolt	36–43	49–58
Crankshaft Main Bearing Cap Bolts	36–40	49–54
Connecting Rod Cap Bolts	23–25	31–34
Crankshaft Pulley Bolt	80–94	113–122
Flywheel Bolts	55–60	75–81
Oil Pan Mounting Bolts	4–6	5–8
Oil Pan Drain Plug	36–43	49–58
Oil Pressure Switch	11–16	15–22
Oil Filter	8–9	11–12
Oil Pump Sprocket Nut	25–29	34–39
Spark Plugs	18–22	24–30
Alternator Support Nut	7–9	9–12
Alternator Brace Bolt	7–9	9–12
Starter Mounting Bolts	16–23	22–31
Crankshaft Pulley Bolts	7.5–8.5	10–11
Belt Tensioner Mounting Nut	16–21	22–29
Front Case Bolts	11–13	15–17
Oil Screen Mounting Nuts	13–18	18–24
Oil Pump Mounting Bolts	11–13	15–17
Distributor Holding Nut	15–21	20–29


bobcat

741, 742, 743 & 743DS Bobcat Loader
Service Manual

HYDRAULIC/HYDROSTATIC FLUID SPECIFICATIONS

Use Melroe hydraulic/hydrostatic transmission fluid (P/N 6563328). If this fluid is not available, use 10W–30 or 10W–40 SAE Motor Oil.

Use Class SE or SF motor oil (5W–30 at temperatures below 10°F (23°C)).

DO NOT use automatic transmission fluids in this loader or permanent damage to the transmission will result.

Where temperatures below zero are common, loaders must be kept in a warm building. Extra warm–up time must be used each time the loader is started during cold temperature conditions. Cold fluid will not flow easily and it makes action of the hydraulic function slower. Loss of fluid flow to the hydrostatic transmission pump (indicated by TRANS light ON) will cause transmission damage in less than 60 seconds time.

IMPORTANT

When the temperature is below –20°F (–30°C), hydrostatic oil must be warmed before starting. The hydrostatic system will not get enough oil at low temperatures and will be damaged. Park the machine in an area where the temperature will be above 0°F (–18°C) if possible.

I–2007–1285

DECIMAL AND MILLIMETER EQUIVALENTS

FRACTIONS	DECIMALS	MM
1/64	0.015625	0.397
1/32	0.03125	0.794
3/64	0.046875	1.191
1/16	0.0625	1.588
5/64	0.078125	1.984
3/32	0.09375	2.381
7/64	0.109375	2.778
1/8	0.1250	3.175
9/64	0.140625	3.572
5/32	0.15625	3.969
11/64	0.171875	4.366
3/16	0.1876	4.762
13/64	0.203125	5.159
7/32	0.21875	5.556
15/64	0.234375	5.953
1/4	0.2500	6.350
17/64	0.265625	6.747
9/32	0.28125	7.144
19/64	0.296875	7.541
5/16	0.3125	7.938
21/64	0.328125	8.334
11/32	0.34375	8.731
23/64	0.359375	9.128
3/8	0.3750	9.525
25/64	0.390625	9.922
13/32	0.40625	10.319
27/64	0.421875	10.716
7/16	0.4375	11.112
29/64	0.453125	11.509
15/32	0.46875	11.906
31/64	0.484375	12.303
1/2	0.5000	12.700

1 mm = 0.03937"

FRACTIONS	DECIMALS	MM
33/64	0.515625	13.097
17/32	0.53125	13.494
35/64	0.546875	13.891
9/16	0.5625	14.288
37/64	0.578125	14.684
19/32	0.59375	15.081
39/64	0.609375	15.478
5/8	0.6250	15.875
41/64	0.640625	16.272
21/32	0.65625	16.669
43/64	0.671875	17.066
11/16	0.6875	17.462
45/64	0.703125	17.859
23/32	0.71875	18.256
47/64	0.734375	18.653
3/4	0.7500	19.050
49/64	0.765625	19.447
25/32	0.78125	19.844
51/64	0.796875	20.241
13/16	0.8125	20.638
53/64	0.828125	21.034
27/32	0.84375	21.431
55/64	0.859375	21.828
7/8	0.8750	22.225
57/64	0.890625	22.622
29/32	0.90625	23.019
59/64	0.921875	23.416
15/16	0.9375	23.812
61/64	0.953125	24.209
31/32	0.96875	24.606
63/64	0.984375	25.003
1	1.000	25.400

0.001" = 0.0254 mm

U.S. TO METRIC CONVERSION

	TO CONVERT	INTO	MULTIPLY BY
LINEAR MEASUREMENT	Miles	Kilometers	1.609
	Yards	Meters	0.9144
	Feet	Meters	0.3048
	Feet	Centimeters	30.48
	Inches	Meters	0.0254
	Inches	Centimeters	2.54
	Inches	Millimeters	25.4
AREA	Square Miles	Square Kilometers	2.59
	Square Feet	Square Meters	0.0929
	Square Inches	Square Centimeters	6.452
	Acre	Hectare	0.4047
VOLUME	Cubic Yards	Cubic Meters	0.7646
	Cubic Feet	Cubic Meters	0.02832
	Cubic Inches	Cubic Centimeters	16.39
WEIGHT	Tons (Short)	Metric Tons	0.9078
	Pounds	Kilograms	0.4536
	Ounces (Avdp.)	Grams	28.3495
PRESSURE	Pounds/Sq. In.	Kilopascal	6.895
WORK	Foot–Pounds	Newton–Meter	1.356
LIQUID VOLUME	Quarts	Liters	0.9463
	Gallons	Liters	3.785
LIQUID FLOW	Gallons/Minute	Liters/Minute	3.785
TEMPERATURE	Fahrenheit	Celsius	1.Subtract 32° 2. Multiply by 5/9

TORQUE FOR GENERAL METRIC BOLTS

Thread Size (Dia. x Pitch)	Material		
	Head Mark 4	Head Mark 7	Head Mark 10
M 5 x 0,8		3–4 ft.–lbs. (4–5 Nm)	
M 6 x 1,0		6–7 ft.–lbs. (8–9 Nm)	6–9 ft.–lbs. (8–12 Nm)
M 8 x 1,25	6–6 ft.–lbs. (8–12 Nm)	11–16 ft.–lbs. (15–22 Nm)	18–25 ft.–lbs. (24–34 Nm)
M 10 x 1,25	13–18 ft.–lbs. (18–24 Nm)	22–30 ft.–lbs. (30–41 Nm)	36–50 ft.lbs. 49–68 Nm)
M 12 x 1,25	22–30 ft.–lbs. (30–41 Nm)	40–54 ft.–lbs. (54–73 Nm)	69–87 ft.–lbs. (94–118 Nm)
M 14 x 1,5	36–50 ft.–lbs. (49–68 Nm)	58–80 ft.–lbs. (79–108 Nm)	116–137 ft.–lbs. (157–186 Nm)

STANDARD TORQUE SPECIFICATIONS FOR BOLTS

The following table shows standard torque specifications for bolts with zinc phosphate coating. Bolts purchased from Melroe that have zinc phosphate coating are specified by the letter **H** following the part number.

	THREAD SIZE	SAE GRADE 5	SAE GRADE 8
INCH. LBS. (Nm)	.250	80–90 (9,0–10,2)	110–120 (12,4–13,6)
	.3125	180–200 (20,3–22,6)	215–240 24,2–27,1)
FOOT LBS. (Nm)	.375	25–28 (34–38)	35–40 (47–54)
	.4375	40–45 (54–61)	60–65 (81–88)
	.500	65–70 (88–95)	90–100 (122–136)
	.5625	90–100 (122–136)	125–140 (170–190)
	.625	125–140 (170–190)	175–190 (240–260)
	.750	220–245 (300–330)	300–330 (410–450)
	.875	330–360 (450–490)	475–525 (645–710)
	1.000	475–525 (645–710)	725–800 (985–1085)
	1.125	650–720 (880–975)	1050–1175 (1425–1600)
	1.250	900–1000 (1200–1360)	1475–1625 (2000–2200)
	1.375	1200–1350 (1630–1830)	2000–2200 (2720–2980)
	1.500	1500–1650 (2040–2240)	2600–2850 (3530–3870)
	1.625	2000–2800 (2720–2980)	3450–3800 (4680–5150)
	1.750	2500–2750 (3390–3730)	4300–4800 (5830–6500)
	1.875	3150–3500 (4270–4750)	5500–6100 (7450–8300)
	2.000	3800–4200 (5150–5700)	6500–7200 (8800–9800)