SPECIFICATIONS

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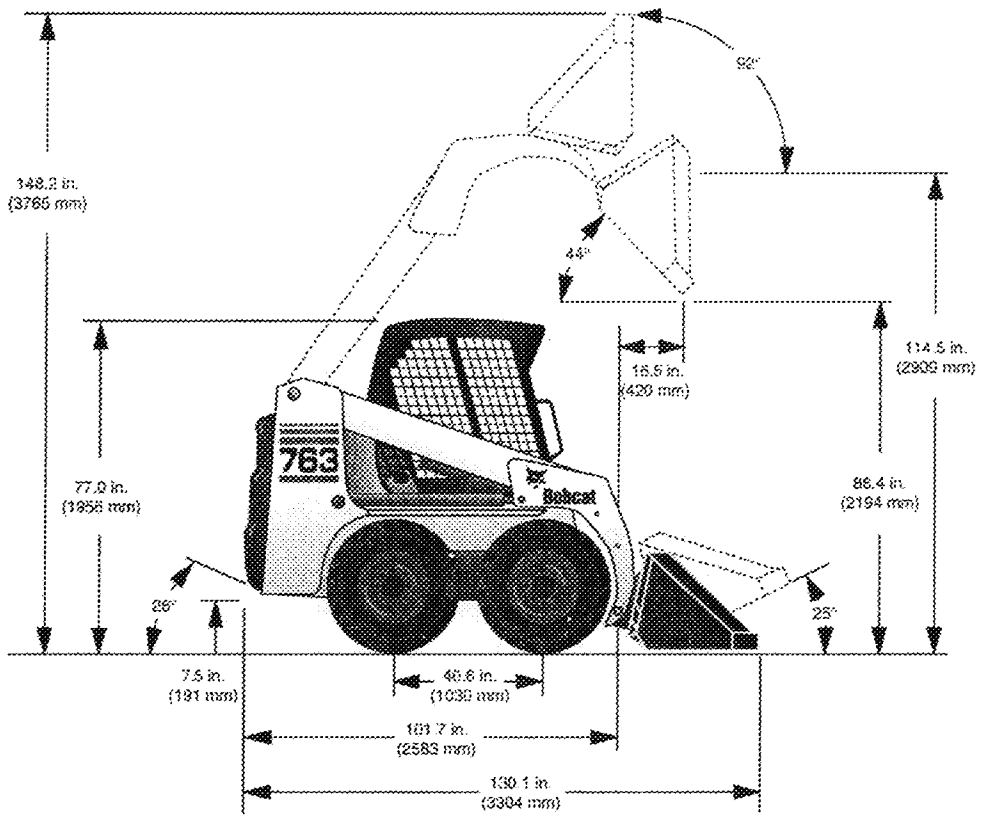
SPECIFICATION

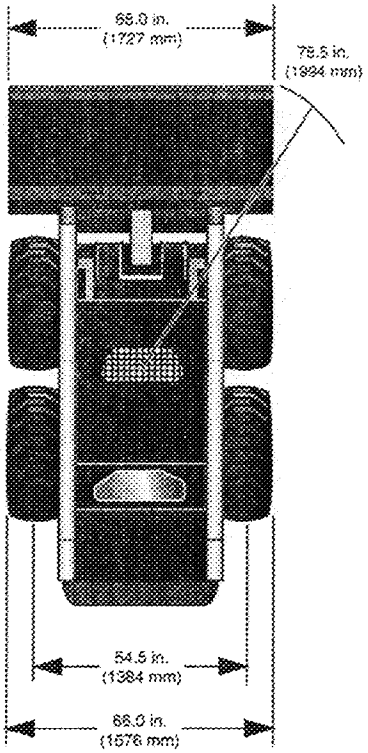
SPECIFICATIONS (CONT'D)

LOADER SPECIFICATIONS

Loader Dimensions

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





TIRE DESCRIPTION	"A"	"B"
10-16.5 Bobcat Heavy Duty	60.0" (1524mm)	48.5" (1232mm)
10-16.5 Bobcat Heavy Duty	66.0" (1676mm)	54.5" (1385mm)
31x15.5-15 Ultra Grip Lug Tread	66.0" (1676mm)	50.0" (1270mm)
6.5-16 Solid Tire	60.0" (1524mm)	60.0" (1524mm)
10-31 Bobcat Solid Tire	66.0" (1676mm)	61.0" (1549mm)
7.5-15 AirBoss Segmented	60.0" (1524mm)	56.25" (1429mm)
10-16.5 AirBoss Segmented	64.0" (1626mm)	59.0" (1499mm)

BUCKET WIDTH	"C"
62"	62.0" (1575mm)
68"	68.0" (1727mm)
74"	74.0" (1880mm)

* Recommended Pressure-Inflate tires to MAXIMUM pressure shown on the side wall of the tire. DO NOT mix brands of tires used on the same loader.

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.

LOADER SPECIFICATIONS (CONT'D)

Performance

Rated Operating Capacity (SAE)	1500 lbs. (680 kg.)
Tipping Load (SAE Rating)	3000 lbs. (1361 kg.)
Operating Weight	5368 lbs. (2435 kg.) (Later)
High Flow Option	5408 lbs. (2453 kg) (Earlier)
SAE Breakout Force-Lift	2800 lbf. (1270 kg)
-Tilt	3100 lbf. (1406 kg)
Axle Torque	4700 ft.-lbs. (6373 Nm)
Travel Speed	0-7.0 MPH (11,2 km/hr.)

Controls

Vehicle Steering	Direction and speed controlled by two hand levers.
Loader Hydraulics	
Lift and Tilt	Controlled by separate foot pedals or optional hand controls.
Front Auxiliary (Std.)	Controlled by electrical switch on RH steering lever.
Rear Auxiliary (Optional)	Controlled by electrical switch on LH steering lever.
Engine	Hand lever throttle: Key-Type starter switch and shutdown.
Starting Aid	Glow Plug-Automatically activated by Std. or Deluxe instrumentation.
Service Brake	Two independent hydrostatic systems controlled by two hand operated steering levers.
Secondary Brake	One of the hydrostatic transmissions
Parking Brake	(Earlier) Foot operated pedal (Later) Push button

Engine

Make/Model	KUBOTA/V2203EB
Fuel/Cooling	Diesel/Liquid
Horsepower (SAE)	**GROSS:** 50 HP (37 kW) **Net:** 46 HP (34 kW)
Torque @ 1600 RPM (SAE)	**GROSS:** 114 ft.-lbs. (154 Nm) **Net:** 107 ft.-lbs. (145 Nm)
Number of Cylinders	Four
Displacement	134.0 cu. in. (2195 cm^3)
Bore/Stroke	3.43/3.64 (87.0/92.4)
Lubrication	Pressure System W/Filter
Crankcase Ventilation	Open
Air Cleaner	Dry replaceable cartridge w/safety element
Ignition	Diesel-Compression
Maximum Governed RPM	2800 RPM
High Idle RPM	2860-3000
Low Idle RPM	1125-1175

LOADER SPECIFICATIONS (CONT'D)

Hydraulic System

Pump	Engine driven, Gear type
Pump Capacity-Primary (S/N 512264899 & Below)	15.6 GPM (59 L/min.) @ High Idle
Pump Capacity-Primary (S/N 512264900 & Above)	16.7 GPM (63 L/min.) @ High Idle
High Flow Option	25.8 GPM (38 L/min.) @ High Idle (Earlier)
System Relief at Quick Couplers	3000-3100 PSI (20684,3-21373,8 kPa)
Filter	Full flow replaceable, No. 3 micron synthetic media element
Hydraulic Cylinders	Doubleacting;
	Tilt cylinder has cushioning feature on dump & rollback
Bore Diameter:	
Lift Cylinder (2)	2.25 (57,2)
Tilt Cylinder (1)	3.50 (88,9)
Rod Diameter:	
Lift Cylinder (2)	1.50 (38,1)
Tilt Cylinder (1)	1.50 (38,1)
Stroke:	
Lift Cylinder (2)	27.90 (708,7)
Tilt Cylinder (1)	14.50 (368,3)
Control Valve	3-spool, open center type w/float detent on lift and electrically controlled auxiliary spool.
Fluid Lines	SAE standard tubes, hoses & fittings
Fluid Type	Bobcat Fluid (P/N 6563328); If fluid is not available, use 10W-30/10W-40 Class SE motor oil for temperature above 0°F (-18°C) 5W-30 Motor oil for temperatures below 0°F (-18°C)
Hydraulic Function Time	
Raise Lift Arms	3.67 Seconds
Lower Lift Arms	2.10 Seconds
Bucket Dump	2.42 Seconds
Bucket Rollback	2.00 Seconds

LOADER SPECIFICATIONS (CONT'D)

Electrical

Alternator	Belt Driven 55 amp (Earlier) 90 amp (Later), open
Battery	12 volt, 600 cold cranking amps. @ 0°F.(-18°C); 115 minute reserve capacity at 25 amps.
Starter (Later)	12 volt, Gear Reduction Type; 3.62 HP (2,7 kW)
Starter (Earlier)	12 volt, Gear Reduction Type;3.89 HP (2,9 kW)
Instrumentation	Gauges: Hourmeter, Fuel, Engine Temperature.Warning Lights: Air Filter Restriction Indicator, Engine Coolant Temperature,Engine Oil Pressure, Engine Shutdown Fuel Level,General Warning, Hydraulic Filter, Hydraulic Oil Temperature, Hydrostatic Charge Pressure, Seat Belt & System Voltage. Indicators: Attachment Control Device, Two-Speed High Range BICS Functions, & Glow Plugs. Optional Deluxe Instrumentation: * Same gauges and warning lights as standard instrumentation. *Additional bar-type gauges for: Engine Oil Pressure, System Voltage, Hydrostatic Charge Pressure and Hydraulic Oil Temperature. *Additional Features Incl.: Keyless Start with password capability, Digital Clock, Attachments, Attachments Information, Digital Tachometer, High Flow & Two-Speed Lockouts, Multi-Language Display, Help Screens, Diagnostic Capability & Engine/Hydraulic Systems Shutdown Function.

Drive System

Main Drive	Hydrostatic 4 wheel drive
Transmission	Infintely variable tandem hydrostatic piston pumps, driving 2 fully reversing hydrostatic motors.
Final Drive	#80 HS endless roller chain & sprockets in sealed chaincase with oil lubrication.
Total Engine to Wheel	
Reduction	33:1
Axle Size	2.00 (50,8)
Wheel Bolts	(8) 9/16"

Capacities

Cooling System W/Heater	9.8 qts. (9,3 L)
W/O Heater	9.2 qts. (8,7 L)
Fuel	14.0 gals. (53,0 L)
Engine Oil W/Filter	7.5 qts. (7,1 L)
Hydraulic Reservoir (S/N 512264899 & Below)	24.0 qts. (23,0 L)
Hydraulic Reservoir (S/N 512264900 & Above)	14.0 qts. (13,2 L)
Hydraulic/Hydrostatic System	
W/Hydraulic Reservoir (S/N 512264899 & Below)	8.5 gals. (32,2 L)
W/Hydraulic Reservoir (S/N 512264900 & Above)	6.0 gals. (22,7 L)
Chaincase Reservoir	9.0 gals. (34,0 L)

LOADER SPECIFICATIONS (CONT'D)

Tires

Flotation	10-16.5, 8 ply rating
Terra Grip	31x15.5-15, 8 ply rating
Solid	6.50-16
Recommended Pressure	Inflate tires to MAXIMUM pressure shown on the side wall of the tire. DO NOTmix brands of tires used on the same loader.

Bobcat®

ENGINE SPECIFICATIONS

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

Fuel Injection Nozzles

Opening Pressure	1991-2133 PSI (13721-14707 kPa)
Fuel Tightness Nozzle Seat	Dry Nozzle at 1849 PSI (12749 kPa)

Fuel Injection Pump

Fuel Tightness Plunger	10 sec: initial pressure 2133-1990 PSI (14707-13721 kPa)
Limit Permitted	5 seconds
Injection Timing	17-19 degrees B.T.D.C.
High Idle	2860-3000 RPM
Low Idle	1125-1175 RPM

Cylinder Head

Cylinder Head Surface Distortion	0.002 (0,05) Max.
Thickness of Gasket (Used)	0.0453-0.0492 (1,15-1,25)
(New)	0.0512-0.0551 (1,3-1,4)
Top Clearance (Piston to Head)	0.022-0.028 (0,55-0,70)
Compression	412-469 PSI (2840-3234 kPa)
Allowable Limit	370 PSI (2350 kPa)
Difference Between Cylinders	10%

Valves

Valve Seat Width (Intake & Exhaust)	0.084 (2,12)
Valve Seat Angle	Intake 60 degrees, exhaust 45 degrees
O.D. of Valve Stems	0.3134-0.3142 (7,96-7,98)
I.D. of Valve Guides	0.3156-0.3161 (8,016-8,03)
Clearance Between Valve Stem & Guide	0.0016-0.0026 (0,04-0,07)
Allowable Limit	0.004 (0,1)
Valve Clearance (Cold)	0.0071-0.0087 (0,18-0,22)
Valve Recessing (Protrusion)	0.002 (0,05)
(Recess)	0.006 (0,15)

Valve Springs

Free Length	1.642-1.661 (41,7-42,2)
Allowable Limit	1.622 (41,2)
Fitted Length	1.378 (35,0)
Compress to Fitted Length	26.4 lbs. (117,4 N)
Allowable Limit	22.5 lbs. (100,0 N)

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

Valve Timing

Intake Valve (Open)	12 degrees B.T.D.C.
(Close)	36 degrees A.B.D.C.
Exhaust Valve (Open)	60 degrees B.B.D.C.
(Close)	12 degrees A.T.D.C.

Rocker Arms

O.D. of Rocker Arm Shaft	0.5501-0.5506 (13,973-13984)
I.D. of Rocker Arm Bushings	0.5512-0.5519 (14-14,018)
Clearance Between Rocker Arm & Bushing	0.0006-0.0015 (0,016-0,038)
Allowable Limit	0.006 (0,15)

Camshaft

Journal O.D.	1.5722-1.5728 (39.934-39,95)
Bearing I.D.	1.5748-1.5758 (40,0-40,025)
Oil Clearance	0.002-0.0036 (0,05-0,091)
Allowable Limit	0.006 (0,15)
Alignment Allowable Limit	0.0004 (0,01)
Cam Lobe Height	1.318 (33,47)
Allowable Limit	1.316 (33,42)
End Clearance	0.0028-0.0087 (0,07-0,22)
Allowable Limit	0.012 (0,3)

Tappet

Clearance Between Tappet & Guide	0.0008-0.0024 (0,02-0,061)
Tappet O.D.	0.9433-0.9441 (23,959-23,98)
Tappet Guide I.D.	0.9449-0.9457 (24,0-24,021)

Cylinders

Cylinder Bore I.D.	3.4252-3.4261 (87,00-87,022)
Allowable Limit	+0.0059 (+0.15)

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

Piston Rings

Ring Gap (Top & 2nd Ring)	0.0118-0.0177 (0,3-0,45)
Limit Permitted	0.0492 (1,25)
Ring Gap (Oil Ring)	.0098-.0177 (0,25-0,45)
Limit Permitted	0.0492 (1,25)
Side Clearance of Ring Groove:	
Top Ring	.0037-.0047 (0,094-0,12)
Second Ring	0.0037-0.0047 (0,094-0,12)
Oil Ring	0.0008-0.002 (0,02-0,051)

Pistons

Piston Pin Bore	0.9843-0.9847 (25,002-25,013)
Allowable Limit	0.9862 (25,05)

Connecting Rod

Piston Pin O.D.	0.9843-0.9848 (25,002-25,011)
Small End Bushing I.D.	0.9852-0.9858 (25,025-25,04)
Clearance Between Piston Pin & Small End Bushing	0.0006-0.0015 (0,014-0,038)
Allowable Limit	0.0059 (0,15)
Connecting Rod Alignment Allowable Limit	0.002 (0,05)

Oil Pump

Oil Pressure Rated RPM	43-64 PSI (294,2-441 kPa)
Limit Permitted	36 PSI (248 kPa)
Idle Speed	14 PSI (98 kPa)
Limit Permitted	7 PSI (49 kPa)
Clearance Between Inner Rotor & Outer Rotor	0.0039-0.0063 (0,1-0,16)
Outer Rotor & Pump Body	0.0043-0.0075 (0,11-0,19)
End Clearance Between Inner Rotor & Cover	0.0041-0.0059 (0,105-0,15)

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

Crankshaft

Crankshaft Alignment Limit Permitted	0.00079 (0,02)
Oil Clearance Between Journal & Bearing #1	0.0016-0.0046 (0,04-0,117)
Limit Permitted	0.0079 (0,2)
Journal O.D. #1	2.0441-2.0449 (51,921-51,94)
Bearing I.D. #1	2.0465-2.0488 (51,98-52,04)
Oil Clearance Between Journal & Bearing #2	0.0016-0.0041 (0,04-0,104)
Limit Permitted	0.0079 (0,2)
Journal O.D. #2	2.0441-2.0449 (51,92-51,94)
Bearing I.D. #2	2.0465-2.0482 (51,98-52,02)
Oil Clearance Between Crank Pin & Bearing	0.0009-0.0034 (0,023-0,086)
Limit Permitted	0.008 (0,2)
Crank Pin O.D.	1.8488-1.8494 (46,96-46,97)
Crank Pin Bearing I.D.	1.8504-1.8522 (47,0-47,046)
Crankshaft Side Clearance	0.0059-0.0122 (0,15-0,31)
Limit Permitted	0.0197 (0,5)

Timing Gear

Timing Gear Backlash:	
Crank Gear-Idle Gear	0.0016-0.0044 (0,042-0,112)
Idle Gear-Cam Gear	0.0016-0.0045 (0,042-0,115)
Idle Gear-Injection Pump Gear	0.0016-0.0045 (0,042-0,115)
Idle Gear-Oil Pump Gear	0.0016-0.0043 (0,042-0,109)
Limit Permitted	0.006(0,15)
Clearance Between Idle Gear Shaft & Idle Gear Bushing	0.001-0.0026 (0,025-0,066)
Limit Permitted	0.004 (0,10)
Idle Gear Side Clearance Idler Gear	0.008-0.020 (0,2-0,51)

Thermostat

Valve Opening Temperature	157-163°F (70-73°C)
Valve Fully Open	185°F (85°C)

Crankshaft Re-Grind Data

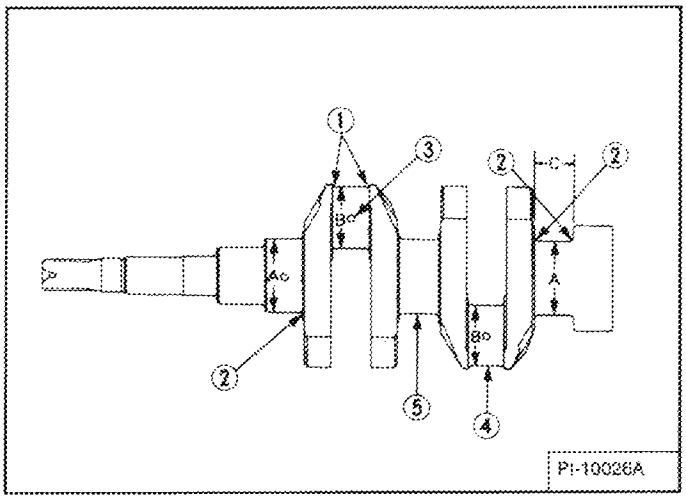
If the standard size bearing cannot be employed due to excessive wear of the crank pin and crank journal use undersize or oversize bearings.

For undersize or oversize bearing use, follow the precautions noted below.

Grind the crankpin and journal with a wheel which has specified round corner and width without shoulder **[Figure SPEC-20-1]**.

1. 0.1299-0.1457" (3,3-3,7 mm)
2. 0.1102-0.1260" (2,8-3,2 mm)
3. Be sure to chamfer the oil hole circumference to 0.040-0.06" (1,0-1,5 mm) radius width and oil stone.
4. The crankpin must be fine finished to higher than (0,4-5).
5. The crank journal must be fine-finished to higher than (0,4-5).
6. The crank journal side surface must be fine-finished to higher than (1,6-5).

Figure SPEC-20-1



SIZE	CODE NO.	NAME OF BEARING	BEARING MARK	CRANKSHAFT PROCESSING DIM.	
-0.008" (0,2 mm)	17331-2391-1	Crankshaft Bearing 1 0.008" minus (0,2 minus)	020 US	A	2.0363-2.037" (51,721-51,74mm)
-0.008" (0,2 mm)	17331-2393-1	Crankshaft Bearing 2 0.008" minus (0,2 minus)	020 US		
-0.016" (0,4 mm)	17331-2392-1	Crankshaft Bearing 1 0.016" minus (0,4 minus)	040 US		2.0284-2.0291" (51.521-51.54mm)
-0.016" (0,4 mm)	17331-2394-1	Crankshaft Bearing 2 0.016" minus (0,4 minus)	040 US		
-0.008" (0,2 mm)	17331-2297-1	Crank Pin Bearing 0.008" minus (0,2 minus)	020 US	B	1.8409-1.8415" (46,759-46,775mm)
-0.016" (0,4 mm)	17331-2298-1	Crank Pin Bearing 0.016" minus (0,4 minus)	040 US		1.8330-1.8337" (46,559-46,575mm)
+0.008" (+0,2 mm)	15221-2395-1	Thrust Bearing 1-0.008"plus (0,2 mm plus)	020 OS	C	1.0315-1.0335" (26,20-26,25mm)
	19202-2397-1	Thrust Bearing 2-0.008"plus (0,2 mm plus)			
+0.016" (+0,4 mm)	15221-2396-1	Thrust Bearing 1-0.016"plus (0,4 mm plus)	040 OS		1.0394-1.0413" (26,40-26,45mm)
	19202-2398-1	Thrust Bearing 2-0.016"plus (0,4 mm plus)			

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TORQUE SPECIFICATIONS FOR BOLTS

Torque For General SAE 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	2000-2200 (2720-2980)	3450-3800 (4680-5150)
	1.750	2500-2750 (3390-3730)	4300-4900 (5830-6500)
	1.875	3150-3500 (4270-4750)	5500-6100 (5830-6500)
	2.000	3800-4200 (5150-5700)	6500-7200 (8800-9800)

TORQUE SPECIFICATIONS FOR BOLTS (CONT'D)

Torque For General Metric Bolts

THREAD NOM. DIA	PROPERTY CLASS					
	8.8		10.9		12.9	
..	NM	LBF-FT	NM	LBF-FT	NM	LBF-FT
M4	3,5-2,5	2.5-2.0	4,2-3,8	3.1-2.8	5,3-4,7	3.9-3.5
M5	6,5-5,5	5.0-4.0	8,4-7,6	6.2-5.6	9,5-8,5	7.0-6.2
M6	10,5-9,5	7.5-7.0	13,7-12,3	10.1-9.1	15,8-14,2	11.6-10.4
M7	17-15	12.5-11.0	22-20	16.2-14.7	26,3-23,7	19.5-17.5
M8	26-24	19-18	32,6-29,4	24.0-21.7	39-35	28.5-25.5
M10	47-43	35-32	63-57	46.5-42.0	79-71	58.5-52.5
M12	85-75	60-55	115-105	85-78	137-123	110-91
M14	140-125	100-90	180-160	133-118	210-190	155-140
M16	210-190	155-140	285-255	210-188	330-300	245-225
M18	290-260	215-190	385-345	285-255	460-420	340-310
M20	410-370	300-275	550-490	405-360	650-590	490-440
M22	550-500	400-370	740-760	545-560	880-800	650-590
M24	700-640	520-470	950-850	700-625	1120-1000	830-730
M27	1030-930	760-680	1370-1230	1000-900	1630-1470	1200-1100
M30	1400-1260	1030-930	1900-1700	1400-1250	2200-2000	1600-1500
M33	1900-1720	1400-1270	2500-2300	1850-1700	3100-2700	2300-2000
M36	2450-2200	1800-1620	3200-2900	2400-2200	3900-3500	3900-2600

NOTE: Use the torque value for the part having the lesser property class when a fastener and nut are used together but have a different property class.

Torque For Kubota 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	6-9 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 1.25	36-50 ft.-lbs. (49-68 Nm)	58-80 ft.-lbs. (79-108 Nm)	116-137 ft.-lbs. (157-186 Nm)

HYDRAULIC CONNECTION SPECIFICATIONS

O-ring Face Seal Connection

IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

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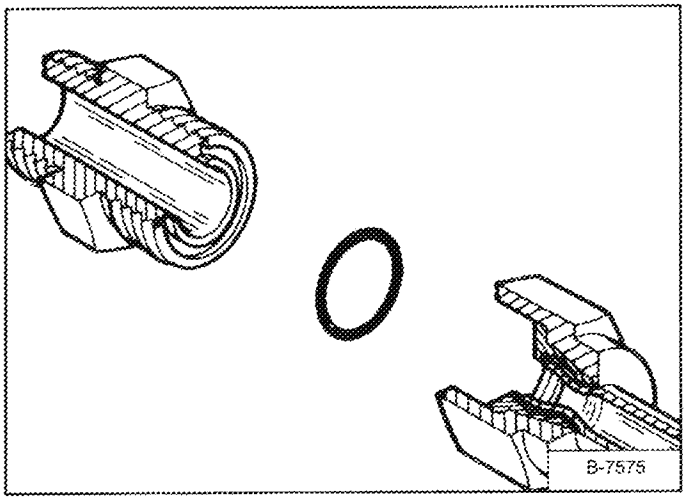
Figure SPEC-40-1



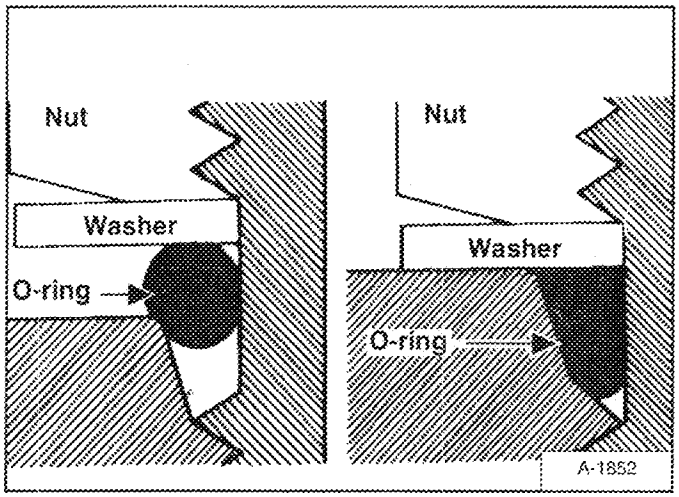
When the fitting is tightened, you can *feel* when the fitting is tight to eliminate leakage caused by under or over torqued fittings. Use vaseline petroleum jelly to hold the O-ring in position until the fittings are assembled **[Figure SPEC-40-1]**.

Figure SPEC- 40-2

O-ring Face Seal Tightening Torque		
Tubeline Outside Diameter	Thread Size	* TORQUE Ft.-lbs. (Nm)
1/4"	9/16" - 18	13 (18)
3/8"	11/16" - 16	22 (30)
1/2"	13/16" - 16	40 (54)
5/8"	1" - 14	60 (81)
3/4"	1-3/16" - 12	84 (114)
7/8"	1-3/16" - 12	98 (133)
1"	1-7/16" - 12	118 (160)
1-1/4"	1-11/16" - 12	154 (209)
1-1/2"	2" - 12	163 (221)

Straight Thread O-ring Fitting

Figure SPEC- 40-3



Lubricate the O-ring before installing the fitting. Loosen the jam nut and install the fitting. Tighten the jam nut until the washer is tight against the surface **[Figure SPEC- 40-3]**.

Tubelines And Hoses

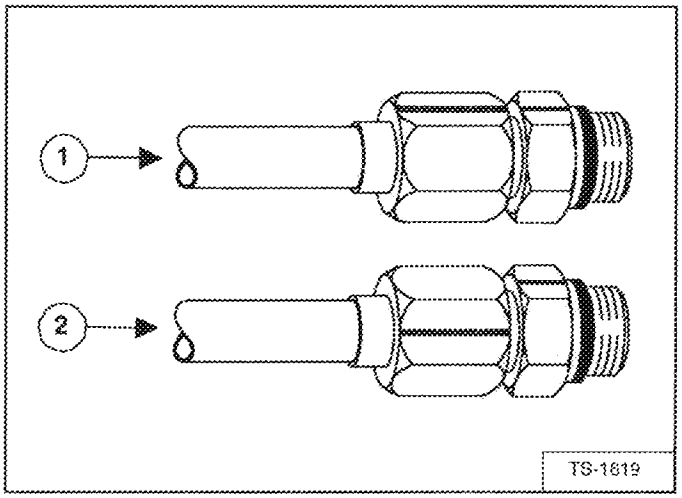
Replace any tubelines that are bent or flattened. They will restrict flow, which will slow hydraulic action and cause heat.

Replace hoses which show signs of wear, damage or weather cracked rubber.

Always use two wrenches when loosening and tightening hose or tubeline fittings.

Flare Fitting

Figure SPEC- 40-4



Use the following procedure to tighten the flare fitting:

Tighten the nut until it makes contact with the seat. Make a mark across the *flats* of both the male and female parts of the connection (Item 1) **[Figure SPEC- 40-4]**.

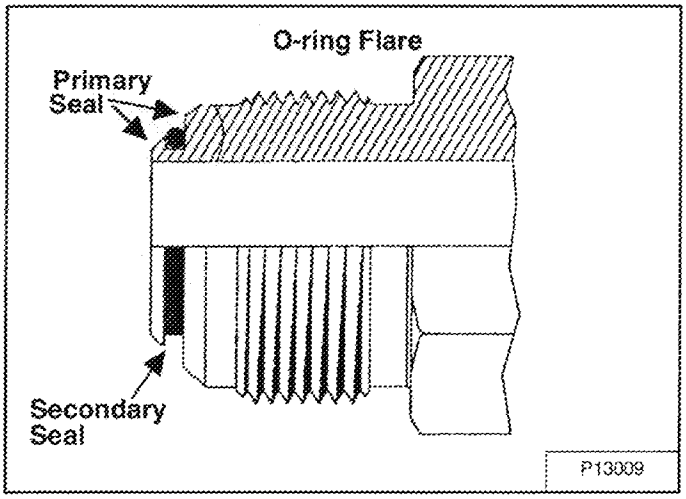
Use the chart below to find the correct tightness needed (Item 2) **[Figure SPEC- 40-4]**. If the fitting leaks after tightening, disconnect it and inspect the seat area for damage.

Flare Fitting Tightening Torque		
Tubeline Outside Diameter	**Thread Size**	**TORQUE Ft.-Lbs. (Nm)**
1/4"	7/16" - 20	13 (18)
5/16"	1/2" - 20	17 (23)
3/8"	9/16" - 18	22 (30)
1/2"	3/4" - 16	40 (54)
5/8"	7/8" - 14	60 (54)
3/4"	1-1/16" - 12	84 (114)
7/8"	1-3/16" - 12	98 (133)
1"	1-5/16" - 12	118 (160)
1-1/4"	1-5/8" - 12	154 (209)
1-1/2"	1-7/8" - 12	163 (221)
2"	2-1/2" - 12	252 (342)

HYDRAULIC CONNECTION SPECIFICATIONS (CONT'D)

O-ring Flare Fitting

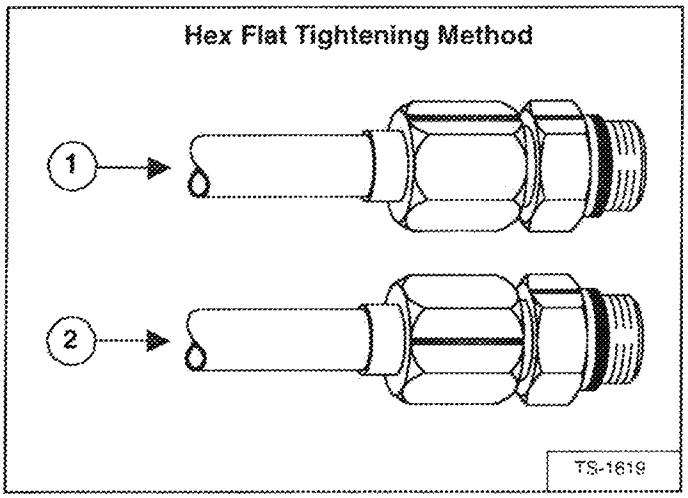
Figure SPEC- 40-5



The flare is the primary seal, the O-ring is the secondary seal and helps absorb vibration and pressure pulses at the connection **[Figure SPEC- 40-5]**.

If necessary, the O-ring-flare fitting can be used without an O-ring.

Figure SPEC-40-6



Use the following procedure to tighten the O-ring flare fitting.

Tighten the nut until it contacts with the seat. Make a mark across the flats of both the male and female parts of the connection (Item 1) **[Figure SPEC-40-6]**.

Use the chart below to find the correct tightness needed (Item 2) **[Figure SPEC-40-6]**. If the fitting leaks after tightening, disconnect it and inspect the seat area for damage.

O-Ring Flare Fitting (Cont'd)

O-Ring Flare Fitting Tightening Torque		
Tubeline Outside Diameter	Thread Size	*TORQUE Ft.-Lbs. (Nm)
1/4"	7/16" - 20	13 (18)
5/16"	1/2" - 20	17 (23)
3/8"	9/16" - 18	22 (30)
1/2"	3/4" - 16	40 (54)
5/8"	7/8" - 14	60 (54)
3/4"	1-1/16" - 12	84 (114)
7/8"	1-3/16" - 12	98 (133)
1"	1-5/16" - 12	118 (160)
1-1/4"	1-5/8" - 12	154 (209)
1-1/2"	1-7/8" - 12	163 (221)
2"	2-1/2" - 12	252 (342)

*If a torque wrench is used to tighten a new fitting to a used hose/tubeline.

*If a torque wrench is used to tighten a used fitting to a new hose/tubeline.

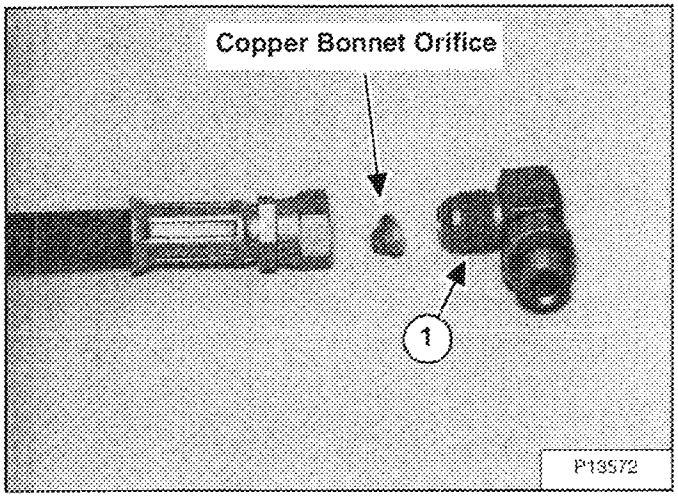
*If a torque wrench is used to tighten a new fitting to a new hose/tubeline.

**If using the hex flat tightening method to tighten a new fitting to a new hose/tubeline.

**If using the hex flat tightening method to tighten a new fitting to a used hose/tubeline.

***If using the hex flat tightening method to tighten a used fitting to a new hose/tubeline.

Figure SPEC- 40-7



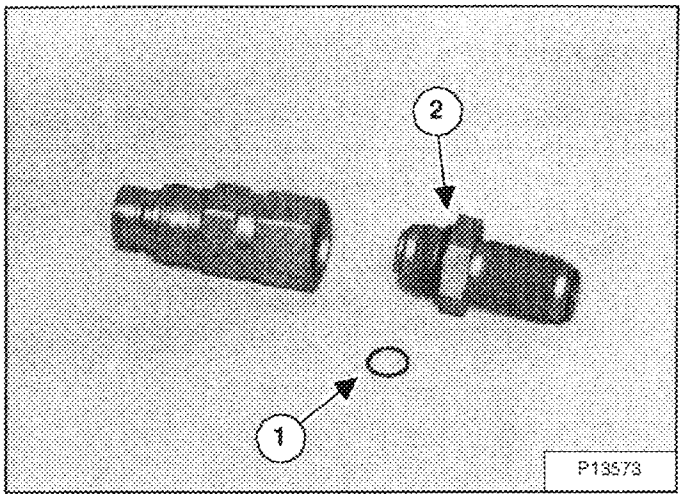
NOTE: O-ring flare fittings are not recommended in all applications. Use the standard flare fittings in these applications.

Do not use a O-ring flare fitting when a copper bonnet orifice is used. When tightened the connection at the bonnet may distort the flare face and prevent it from sealing.

Use a standard flare fitting (item 1) **[Figure SPEC- 40-7]** as shown.

When a O-ring flare fitting is used as a straight thread port adapter the O-ring flare face is not used to seal. The O-ring may come off the fitting and enter the system.

Figure SPEC- 40-8

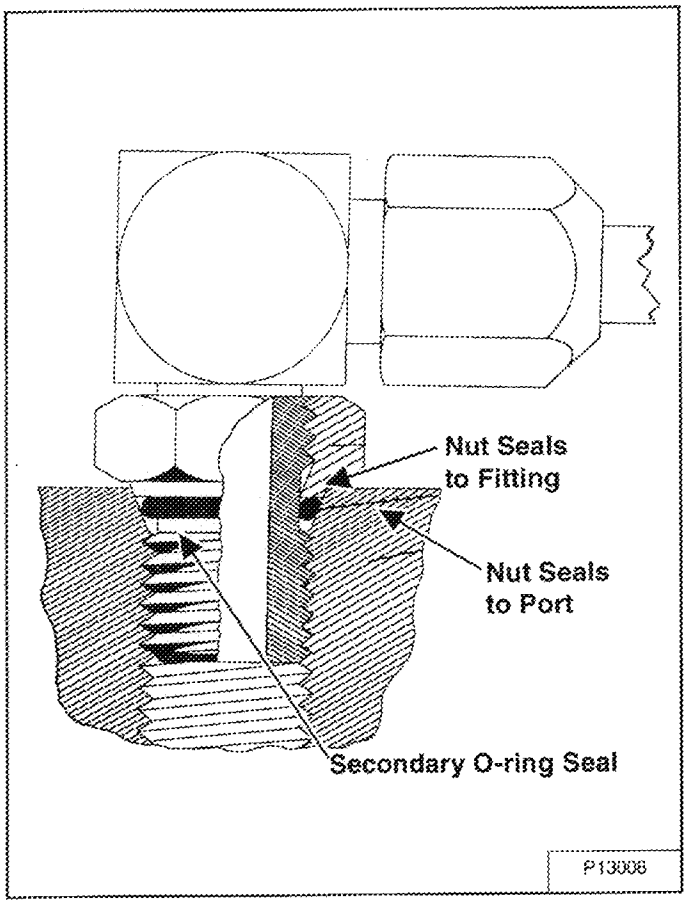


Always remove the O-ring (Item 1) from the flare face as shown.[Figure SPEC- 40-8]

An O-ring (Item 2) **[Figure SPEC- 40-8]** is added to the flat boss of the fitting to seal the connection in this application.

Port Seal Fitting

Figure SPEC- 40-9



The nut is the primary seal, the O-ring is the secondary seal and helps absorb vibration and pressure pulses at the connection **[Figure SPEC- 40-9]**.

The hex portion of the nut does not contact the surface of the component when the nut is tight.

Port Seal and O-ring Boss Tightening Torque	
Thread Size	**Torque Ft.-Lbs. (Nm)**
7/16"	13 (18)
9/16" - 18	22 (30)
3/4" - 16	40 (54)
7/8" - 14	60 (81)
1-1/16" - 12	84 (114)
1-3/16" - 12	98 (133)
1-5-16" - 12	118 (160)
1-7/16" - 12	154 (209)
1-58" - 12	163 (221)

Use the following procedure to tighten the port seal fitting:

Port seal and nut, washer and O-ring (O-ring Boss) fittings use the same tightening torque valve chart.

If a torque wrench cannot be used, use the following method.

Tighten the nut until it just makes metal to metal contact, you can feel the resistance.

Tighten the nut with a wrench no more than one hex flat maximum.

Do not over tighten the port seal fitting.

NOTE: If a torque wrench cannot be used, use the hex flat tightening method as an approximate guideline.

NOTE: Port seal fittings are not recommended in all applications. Use O-ring boss fittings in these applications.

Bobcat®

HYDRAULIC/HYDROSTATIC FLUID SPECIFICATIONS

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 (5W-30 for 0°F [-18°C] and Below).

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

⚠ WARNING

Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

W-2072-0496

When temperatures below zero degree F (-18°C) are common, the loader 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) can cause transmission damage in less than 60 seconds.

⚠ WARNING

During cold weather 32° F (0° C) and below, do not operate machine until the engine has run for at least five (5) minutes at less than half throttle. This warm-up period is necessary for foot pedal operation and safe stopping. Do not operate controls during warm-up period. When temperatures are below -20° F (-30° C), the hydrostatic system will not get enough oil at low temperatures. Park the machine in an area where the temperature will be above 0° F (-18° C), if possible.

W-2027-1285

Bobcat®

CONVERSIONS

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
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

1 mm = 0.03937"

0.001 = 0.0254 mm

CONVERSIONS (CONT'D)

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