WORKSHOP MANUAL

TRACTOR

B1550・B1550HST
B1750・B1750HST
B2150・B2150HST

Kubota

TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of KUBOTA Tractors B1550, B1750, B2150, B1550HST, B1750HST and B2150HST. It is divided into two parts, "Mechanism" and "Disassembling and Servicing"

■ **Mechanism**

Information on the construction and function are included for each tractor section. This part should be understood before proceeding with trouble-shooting, disassembling and servicing.

■ **Servicing**

Under the heading "General" comes general precautions, check and maintenance and special tools. For each section, there are troubleshooting, servicing specification lists, checking and adjusting, disassembling and assembling, and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information, illustrations and specifications contained in this manual are based on the latest production information available at the time of publication.

The right is reserved to make changes in all information at any time without notice.

Aug. '88

SPECIFICATIONS

Model			B1550 2WD				B1550 4WD		
Engine gross power			12.7 kW (17 HP)*						
PTO power			10.5 kW (14 HP)*						
Engine	Model		D850-5B						
	Type		Vertical, water-cooled, 4-cycle diesel						
	No. of cylinders		3						
	Bore and stroke		72 mm x 70 mm (2.8 in. x 2.7 in.)						
	Total displacement		855 cm³ (52.2 cu.in.)						
	Rated revolution		43.3 r/s (2600 rpm)						
	Fuel		Diesel fuel No.2-D [No. 1 diesel fuel if temperature is below–10°C (14°F)]						
	Starter		Electric starter with battery and glow plug, 12V, 0.8 kW						
	Lubrication		Forced lubrication by trochoidal pump						
	Cooling		Water with pressurized radiator						
	Battery		12V (45 AH)						
Capacities	Fuel tank		18 ℓ (4.8 U.S. gals)						
	Engine crankcase		3.1 ℓ (3.3 U.S. qts)						
	Engine coolant		2.9 ℓ (3.1 U.S. qts)						
	Transmission case		12 ℓ (12.7 U.S. qts)						
	Steering gear box		0.2 ℓ (0.2U.S. qts)						
	Front axle diff. case		—				0.5 ℓ (0.5 U.S. qts) Bi-speed Turn: 2.5 ℓ (2.6 U.S. qts)		
	Front axle gear case		—				0.15 ℓ (0.16 U.S. qts)		
Tires		Front	Farm 4.50-10	Farm 5.00-10	Turf 18x9.50-8	Turf 18x9.50-8	Farm 6-12B	Turf 20.5x8.00-10	Turf 20.5x8.00-10
		Rear	7-16	8-16	29x12.00-15	31x13.5-15**	8-16	29x12.00-15	31x13.5-15**
Dimensions	Overall length	mm (in.)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)
	Overall width	mm (in.)	910 (35.8) 960 (37.8) 1080 (42.5)	990 (39.0) 1110 (43.7)	1140 (44.9)	1240 (48.8)	980 (38.6) 1110 (43.7)	1140 (44.9)	1240 (48.8)
	Overall height with ROPS	mm (in.)	1875 (73.7)	1900 (74.8)	1880 (74.1)	1890 (74.4)	1900 (74.8)	1880 (74.1)	1890 (74.4)
	Wheelbace	mm (in.)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)
	Min. ground clearance	mm (in.)	230 (9.1)	255 (10.0)	240 (9.4)	250 (9.8)	240 (9.4)	215 (8.5)	215 (8.5)
	Treads Front	mm (in.)	710 (28.0)	710 (28.0)	850 (33.5)	850 (33.5)	795 (31.3)	825 (32.5)	895 (35.2)
	Treads Rear	mm (in.)	740 (29.1) 790 (31.1) 910 (35.8)	790 (31.1) 910 (35.8)	840 (33.1)	895 (35.2)	790 (31.1) 910 (35.8)	840 (33.1)	895 (35.2)
Weight (with ROPS)		kg (lbs)	545 (1202)	555 (1224)	565 (1246)	570 (1257)	610 (1345)	615 (1356)	630 (1389)
			Transmission case rear (rear PTO), Transmission case bottom (mid PTO) and engine front (front PTO)						
PTO shaft	Rear PTO		SAE 1-3/8 (with over running clutch) 2 speeds (9.0 and 15.5 r/s at 41.3 engine r/s) (540 and 924 rpm at 2476 engine rpm)						
	Mid PTO		USA No.5 (KUBOTA 10 tooth) Involute spline 1 speeds (40.3 r/s at 41.3 engine r/s) (2416 rpm at 2476 engine rpm)						
Clutch			Dry single plate						
Steering			Recirculating ball type manual steering or integral type power steering (if equipped)						
Transmission			Gear shift, 6 forward and 2 reverse						
Min. turning radius		m (ft)	2.0 (6.6)				2.1 (6.9)		
Brake			Internal expanding type, right and left independent with interlocking device						
Differential			Bevel gear						

Note: * Manufacture's estimate
** Bar Tire (if equipped)

B1550HST 2WD				B1550HST 4WD		
12.7 kW (17 HP)*						
9.3 kW (12.5 HP)*						
D850-5B						
Vertical, water-cooled, 4-cycle diesel						
3						
72 mm x 70 mm (2.8 in. x 2.7 in.)						
855 cm³ (52.2 cu.in.)						
43.3 r/s (2600 rpm)						
Diesel fuel No.2-D [No. 1 diesel fuel if temperature is below−10°C (14°F)]						
Electric starter with battery and glow plug, 12V, 0.8 kW						
Forced lubrication by trochoidal pump						
Water with pressurized radiator						
12V (45 AH)						
18 ℓ (4.8 U.S. gals)						
3.1 ℓ (3.3 U.S. qts)						
2.9 ℓ (3.1 U.S. qts)						
13.5 ℓ (14.3 U.S. qts)						
0.2 ℓ (0.2U.S. qts)						
—				0.5 ℓ (0.5 U.S. qts) Bi-speed Turn: 2.5 ℓ (2.6 U.S. qts)		
—				0.15 ℓ (0.16 U.S. qts)		
Farm 4.50-10	Farm 5.00-10	Turf 18x9.50-8	Turf 18x9.50-8	Farm 6-12B	Turf 20.5x8.00-10	Turf 20.5x8.00-10
7-16	8-16	29x12.00-15	31x13.5-15**	8-16	29x12.00-15	31x13.5-15**
2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)
910 (35.8) 960 (37.8) 1080 (42.5)	990 (39.0) 1110 (43.7)	1140 (44.9)	1240 (48.8)	980 (38.6) 1110 (43.7)	1140 (44.9)	1240 (48.8)
1875 (73.7)	1900 (74.8)	1880 (74.1)	1890 (74.4)	1900 (74.8)	1880 (74.1)	1890 (74.4)
1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)
230 (9.1)	255 (10.0)	240 (9.4)	250 (9.8)	240 (9.4)	215 (8.5)	215 (8.5)
710 (28.0)	710 (28.0)	850 (33.5)	850 (33.5)	795 (31.3)	825 (32.5)	895 (35.2)
790 (31.1) 910 (35.8)	790 (31.1) 910 (35.8)	840 (33.1)	895 (35.2)	790 (31.1) 910 (35.8)	840 (33.1)	895 (35.2)
560 (1235)	570 (1257)	580 (1279)	570 (1257)	625 (1387)	630 (1389)	630 (1389)
Transmission case rear (rear PTO), Transmission case bottom (mid PTO) and engine front (front PTO)						
SAE 1-3/8 2 speeds (9.0 and 14.3 r/s at 41.9 engine r/s) (540 and 858 rpm at 2517 engine rpm)						
USA No.5 (KUBOTA 10 tooth) Involute spline 1 speeds (40.9 r/s at 41.9 engine r/s) (2455 rpm at 2517 engine rpm)						
Dry single plate						
Recirculating ball type manual steering or integral type power steering (if equipped)						
Main-hydrostatic transmission, High-Low gear shift (2 forward, 2 reverse)						
2.1 (6.9)				2.3 (7.5)		
Internal expanding type, right and left independent with interlocking device						
Bevel gear						

Note: * Manufacture's estimate
** Bar Tire (if equipped)

SPECIFICATIONS (Continued)

Model			B1750 2WD				B1750 4WD			
Engine gross power			14.9 kW (20 HP)*							
PTO power			12.3 kW (16.5 HP)*							
Engine	Model		D950-5B							
	Type		Vertical, water-cooled, 4-cycle diesel							
	No. of cylinders		3							
	Bore and stroke		75 mm x 70 mm (3.0 in. x 2.8 in.)							
	Total displacement		927 cm³ (56.6 cu.in.)							
	Rated revolution		43.3 r/s (2600 rpm)							
	Fuel		Diesel fuel No.2-D [No. 1 diesel fuel if temperature is below–10°C (14°F)]							
	Starter		Electric starter with battery and glow plug, 12V, 0.8 kW							
	Lubrication		Forced lubrication by trochoidal pump							
	Cooling		Water with pressurized radiator							
	Battery		12V (45 AH)							
Capacities	Fuel tank		18 ℓ (4.8 U.S. gals)							
	Engine crankcase		3.1 ℓ (3.3 U.S. qts)							
	Engine coolant		3.5 ℓ (3.7 U.S. qts)							
	Transmission case		12 ℓ (12.7 U.S. qts)							
	Steering gear box		0.2 ℓ (0.2U.S. qts)							
	Front axle diff. case		—				1.5 ℓ (1.6 U.S. qts) Bi-speed Turn: 2.5 ℓ (2.6 U.S. qts)			
	Front axle gear case		—				0.5 ℓ (0.5 U.S. qts)			
Tires		Front	Farm 5.00-10	Farm 5.00-10	Turf 18x9.50-8	Turf 18x9.50-8	Farm 6-12B	Farm 6-12	Turf 20.5x8.00-10	Turf 20.5x8.00-10
		Rear	8-16	9.5-16	29x12.00-15	31x13.5-15**	8-16	9.5-16	29x12.00-15	31x13.5-15**
Dimensions	Overall length	mm (in.)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)
	Overall width	mm (in.)	990 (39.0) 1110 (43.7)	1045 (41.1) 1095 (43.1) 1145 (45.1) 1265 (49.8)	1140 (44.9)	1240 (48.8)	1050 (41.3) 1110 (43.7)	1045 (41.1) 1095 (43.1) 1145 (45.1) 1265 (49.8)	1140 (44.9)	1240 (48.8)
	Overall height with ROPS	mm (in.)	1900 (74.8)	1925 (75.8)	1880 (74.1)	1890 (74.4)	1900 (74.8)	1925 (75.8)	1880 (74.1)	1890 (74.4)
	Wheelbase	mm (in.)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)
	Min. ground clearance	mm (in.)	255 (10.0)	285 (101.2)	240 (9.4)	250 (9.8)	240 (9.4)	255 (10.0)	215 (8.5)	215 (8.5)
	Treads Front	mm (in.)	710 (28.0)	710 (28.0)	850 (33.5)	850 (33.5)	860 (33.9)	860 (33.9)	895 (35.2)	895 (35.2)
	Treads Rear	mm (in.)	790 (31.1) 910 (40.0)	795 (31.3) 845 (33.3) 895 (35.2) 1015 (40.0)	840 (33.1)	895 (35.2)	790 (31.1) 910 (35.8)	795 (31.3) 845 (33.3) 895 (35.2) 1015 (40.0)	840 (33.1)	895 (35.2)
Weight (with ROPS)		kg (lbs)	555 (1224)	570 (1257)	565 (1246)	570 (1257)	620 (1367)	630 (1384)	625 (1378)	630 (1389)
			Transmission case rear (rear PTO), Transmission case bottom (mid PTO) and engine front (front PTO)							
PTO shaft	Rear PTO		SAE 1-3/8 (with over running clutch) 2 speeds (9.0 and 15.5 r/s at 41.3 engine r/s) (540 and 924 rpm at 2476 engine rpm)							
	Mid PTO		USA No.5 (KUBOTA 10 tooth) Involute spline 1 speeds (40.3 r/s at 41.3 engine r/s) (2416 rpm at 2476 engine rpm)							
Clutch			Dry single plate							
Steering			Recirculating ball type manual steering or integral type power steering (if equipped)							
Transmission			Gear shift, 6 forward and 2 reverse							
Min. turning radius		m (ft)	2.0 (6.6)				2.0 (6.6)			
Brake			Internal expanding type, right and left independent with interlocking device							
Differential			Bevel gear							

Note: * Manufacture's estimate
** Bar Tire (if equipped)

B1750HST 2WD				B1750HST 4WD			
14.9 kW (20 HP)*							
11.2 kW (15.5 HP)*							
D950-5B							
Vertical, water-cooled, 4-cycle diesel							
3							
75 mm x 70 mm (3.0 in. x 2.8 in.)							
927 cm3 (56.6 cu.in.)							
43.3 r/s (2600 rpm)							
Diesel fuel No.2-D [(No. 1 diesel fuel if termperature is below−10°C (14°F)]							
Electric starter with battery and glow plug, 12V, 0.8 kW							
Forced lubrication by trochoidal pump							
Water with pressurized radiator							
12V (45 AH)							
18 ℓ (4.8 U.S. gals)							
3.1 ℓ (3.3 U.S. qts)							
3.5 ℓ (3.7 U.S. qts)							
13.5 ℓ (14.3 U.S. qts)							
0.2 ℓ (0.2U.S. qts)							
—				1.5 ℓ (1.6 U.S. qts) Bi-speed Turn: 2.5 ℓ (2.6 U.S. qts)			
—				0.5 ℓ (0.5 U.S. qts)			
Farm 5.00-10	Farm 5.00-10	Turf 18x9.50-8	Turf 18x9.50-8	Farm 6-12B	Farm 6-12	Turf 20.5x8.00-10	Turf 20.5x8.00-10
8-16	9.5-16	29x12.00-15	31x13.5-15**	8-16	9.5-16	29x12.00-15	31x13.5-15**
2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)	2565 (101.0)
990 (39.0) 1110 (43.7)	1045 (41.1) 1095 (43.1) 1145 (45.1) 1265 (49.8)	1140 (44.9)	1240 (48.8)	1050 (41.3) 1110 (43.7)	1045 (41.1) 1095 (43.1) 1145 (45.1) 1265 (49.8)	1140 (44.9)	1240 (48.8)
1900 (74.8)	1925 (75.8)	1880 (74.1)	1890 (74.4)	1900 (74.8)	1925 (75.8)	1880 (74.1)	1890 (74.4)
1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)	1470 (57.9)
255 (10.0)	285 (101.2)	240 (9.4)	250 (9.8)	240 (9.4)	255 (10.0)	215 (8.5)	215 (8.5)
710 (28.0)	710 (28.0)	850 (33.5)	850 (33.5)	860 (33.9)	860 (33.9)	895 (35.2)	895 (35.2)
790 (31.1) 910 (40.0)	795 (31.3) 845 (33.3) 895 (35.2) 1015 (40.0)	840 (33.1)	895 (35.2)	790 (31.1) 910 (35.8)	795 (31.3) 845 (33.3) 895 (35.2) 1015 (40.0)	840 (33.1)	895 (35.2)
575 (1268)	585 (1290)	580 (1279)	585 (1240)	635 (1400)	645 (1422)	640 (1411)	645 (1422)
Transmission case rear (rear PTO), Transmission case bottom (mid PTO) and engine front (front PTO)							
SAE 1-3/8 2 speeds (9.0 and 14.3 r/s at 41.9 engine r/s) (540 and 858 rpm at 2517 engine rpm)							
USA No.5 (KUBOTA 10 tooth) Involute spline 1 speeds (40.9 r/s at 41.9 engine r/s) (2455 rpm at 2517 engine rpm)							
Dry single plate							
Recirculating ball type manual steering or integral type power steering (if equipped)							
Main-hydrostatic transmission, High-Low gear shift (2 forward, 2 reverse)							
2.1 (6.9)				2.2 (7.2)			
Internal expanding type, right and left independent with interlocking device							
Bevel gear							

Note: * Manufacture's estimate
** Bar Tire (if equipped)

SPECIFICATIONS (Continued)

Model			B2150 2WD			B2150 4WD		
Engine gross power			17.9 kW (24 HP)*					
PTO power			14.9 kW (20 HP)*					
Engine	Model		V1200-5B					
	Type		Vertical, water-cooled, 4-cycle diesel					
	No. of cylinders		4					
	Bore and stroke		75 mm x 70 mm (3.0 in. x 2.8 in.)					
	Total displacement		1237 cm³ (75.4 cu.in.)					
	Rated revolution		43.3 r/s (2600 rpm)					
	Fuel		Diesel fuel No.2-D [No. 1 diesel fuel if temperature is below–10°C (14°F)]					
	Starter		Electric starter with battery and glow plug, 12V, 1.0 kW					
	Lubrication		Forced lubrication by trochoidal pump					
	Cooling		Water with pressurized radiator					
	Battery		12V (65 AH)					
Capacities	Fuel tank		28 ℓ (7.4 U.S. gals)					
	Engine crankcase		4.2 ℓ (4.4 U.S. qts)					
	Engine coolant		3.9 ℓ (4.1 U.S. qts)					
	Transmission case		18 ℓ (19 U.S. qts)					
	Steering gear box		0.2 ℓ (0.2U.S. qts)					
	Front axle diff. case		—			1.5 ℓ (1.6 U.S. qts)		
	Front axle gear case		—			0.5 ℓ (0.5 U.S. qts)		
Tires		Front	Farm 4.00-12	Farm 6.50-10	Turf 23x8.50-12	Farm 6-12	Farm 6-12	Turf 24x8.50-12
		Rear	8.3-24	12.4-16	13.6-16	12.4-16	8.3-24	13.6-16
Dimensions	Overall length	mm (in.)	2780 (109.4)	2780 (109.4)	2780 (109.4)	2780 (109.4)	2780 (109.4)	2780 (109.4)
	Overall width	mm (in.)	1095 (43.1) 1135 (44.7)	1365 (53.7)	1405 (55.3)	1365 (53.7)	1095 (43.1) 1135 (44.7)	1405 (55.3)
	Overall height with ROPS	mm (in.)	1950 (76.8)	1940 (76.4)	1960 (77.2)	1940 (76.4)	1950 (76.8)	1960 (77.2)
	Wheelbase	mm (in.)	1600 (63)	1600 (63)	1600 (63)	1600 (63)	1600 (63)	1600 (63)
	Min. ground clearance	mm (in.)	235 (9.3)	235 (9.3)	235 (9.3)	235 (9.3)	235 (9.3)	235 (9.3)
	Treads Front	mm (in.)	830 (32.7)	905 (35.6)	900 (35.4)	900 (35.4)	900 (35.4)	935 (36.8)
	Treads Rear	mm (in.)	890 (35.0) 930 (36.6)	1050 (41.3)	1050 (41.3)	1050 (41.3)	890 (35.0) 930 (36.6)	1050 (41.3)
Weight (with ROPS)		kg (lbs)	760 (1674)	777 (1711)	783 (1725)	830 (1828)	828 (1824)	840 (1850)
			Transmission case rear (rear PTO), Transmission case bottom (mid PTO) and engine front (front PTO)					
PTO shaft	Rear PTO		SAE 1-3/8 (with over running clutch) 2 speeds (9.0 and 12.6 r/s at 41.1 engine r/s) (540 and 755 rpm at 2467 engine rpm)					
	Mid PTO		USA No.5 (KUBOTA 10 tooth) Involute spline 2 speeds (28.4 r/s at 39.7r/s at 41.1 engine r/s) (1701 rpm at 2379rpm at 2467 engine rpm)					
Clutch			Dry two plates (live PTO)					
Steering			Recirculating ball type manual steering or integral type power steering (if equipped)					
Transmission			Gear shift, 9 forward and 3 reverse					
Min. turning radius		m (ft)	2.4 (7.9)			2.8 (9.2)		
Brake			Internal expanding type, right and left independent with interlocking device					
Differential			Bevel gear					

Note: * Manufacture's estimate)

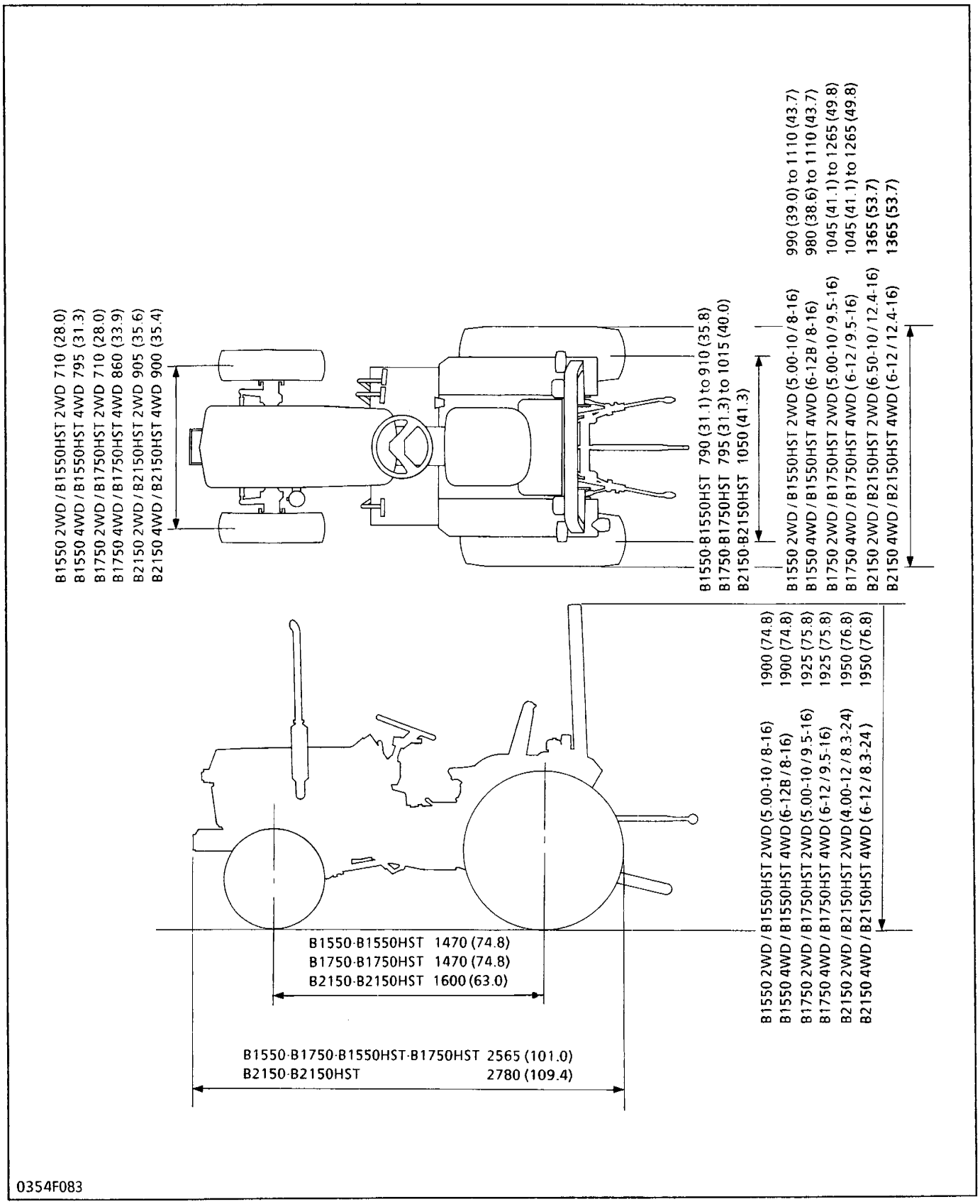
B2150HST 2WD			B2150HST 4WD		
17.9 kW (24 HP)*					
13.4 kW (18 HP)*					
V1200-5B					
Vertical, water-cooled, 4-cycle diesel					
4					
75 mm x 70 mm (3.0 in. x 2.8 in.)					
1237 cm³ (75.4 cu.in.)					
43.3 r/s (2600 rpm)					
Diesel fuel No.2-D [No. 1 diesel fuel if temperature is below-10°C (14°F)]					
Electric starter with battery and glow plug, 12V, 1.0 kW					
Forced lubrication by trochoidal pump					
Water with pressurized radiator					
12V (65 AH)					
28 ℓ (7.4 U.S. gals)					
4.2 ℓ (4.4 U.S. qts)					
3.9 ℓ (4.1 U.S. qts)					
18 ℓ (19 U.S. qts)					
0.2 ℓ (0.2U.S. qts)					
—			1.5 ℓ (1.6 U.S. qts)		
—			0.5 ℓ (0.5 U.S. qts)		
Farm 4.00-12	Farm 6.50-10	Turf 23x8.50-12	Farm 6-12	Farm 6-12	Turf 24x8.50-12
8.3-24	12.4-16	13.6-16	12.4-16	8 3-24	13.6-16
2780 (109.4)	2780 (109.4)	2780 (109.4)	2780 (109.4)	2780 (109.4)	2780 (109.4)
1095 (43.1) 1135 (44.7)	1365 (53.7)	1405 (55.3)	1365 (53.7)	1095 (43.1) 1135 (44.7)	1405 (55.3)
1950 (76.8)	1940 (76.4)	1960 (77.2)	1940 (76.4)	1950 (76.8)	1960 (77.2)
1600 (63)	1600 (63)	1600 (63)	1600 (63)	1600 (63)	1600 (63)
235 (9.3)	235 (9.3)	235 (9.3)	235 (9.3)	235 (9.3)	235 (9.3)
830 (32.7)	905 (35.6)	900 (35.4)	900 (35.4)	900 (35.4)	935 (36.8)
890 (35.0) 930 (36.6)	1050 (41.3)	1050 (41.3)	1050 (41.3)	890 (35.0) 930 (36.6)	1050 (41.3)
765 (1685)	782 (1722)	788 (1736)	835 (1839)	833 (1835)	845 (1861)
Transmission case rear (rear PTO), Transmission case bottom (mid PTO) and engine front (front PTO)					
SAE 1-3/8 2 speeds (9.0 and 12.5 r/s at 40.1 engine r/s) (540 and 748 rpm at 2408 engine rpm)					
USA No.5 (KUBOTA 10 tooth) Involute spline 2 speeds (28.4 r/s at 39.3r/s at 40.1 engine r/s) (1701 rpm at 2355rpm at 2408 engine rpm)					
Dry single plate (live PTO)					
Recirculating ball type manual steering or integral type power steering (if equipped)					
Main-hydrostatic transmission; range-gear shift, (3 forward and 3 reverse)					
2.4 (7.9)			2.8 (9.2)		
Internal expanding type, right and left independent with interlocking device					
Bevel gear					

Note: * Manufacture's estimate

DIMENSION

Maximum dimension is shown against farm tire variation.

Unit: mm (in.)



M MECHANISM

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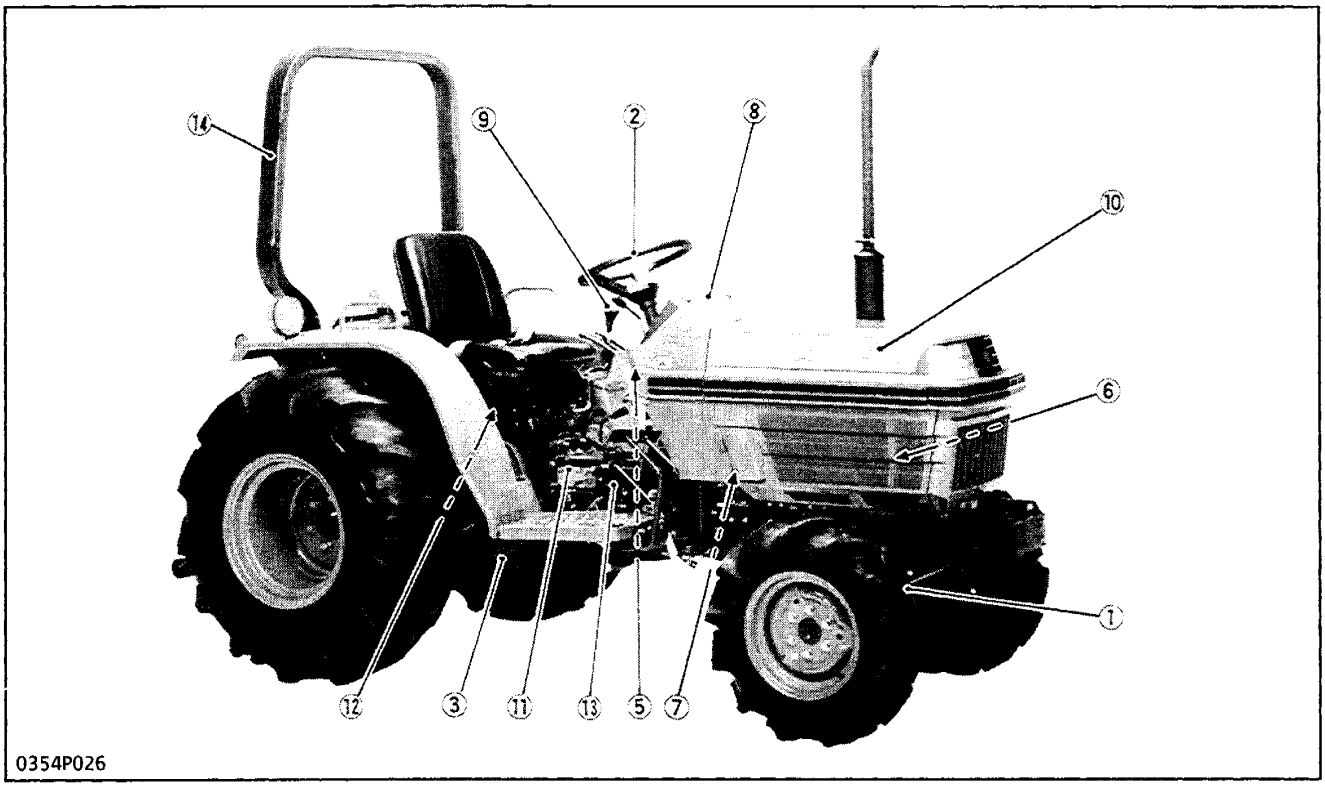
F FEATURES



0354P026

(1) Bi-speed Turn (If equipped)

(Small turning radius)

(2) Integral Power Steering (If equipped)

(3) Standard Mid PTO

(4) Simultaneous Mounting of Both the Mid Mount Mower and Front Loader

(Loader is fully-compatible with the mower)

(5) Engine Key Shut-Off System

(Engine key switch)

(6) Reverse Fan Blade for Cooling

(Forward air flow keeps away dust and fumes)

(7) Large Hydraulic Pump

(8) Combination Panel of Easy Checker

(Indicators for charging system, engine oil pressure and glow plug, fuel gauge and coolant temperature gauge)

(9) Main Shift Lever Located in the Left Side of Transmission

(10) New Design (Familiar with L-series)

(11) Variation of Transmission

(Mechanical Transmission and Hydrostatic Transmission for all models)

(12) Position Control Valve

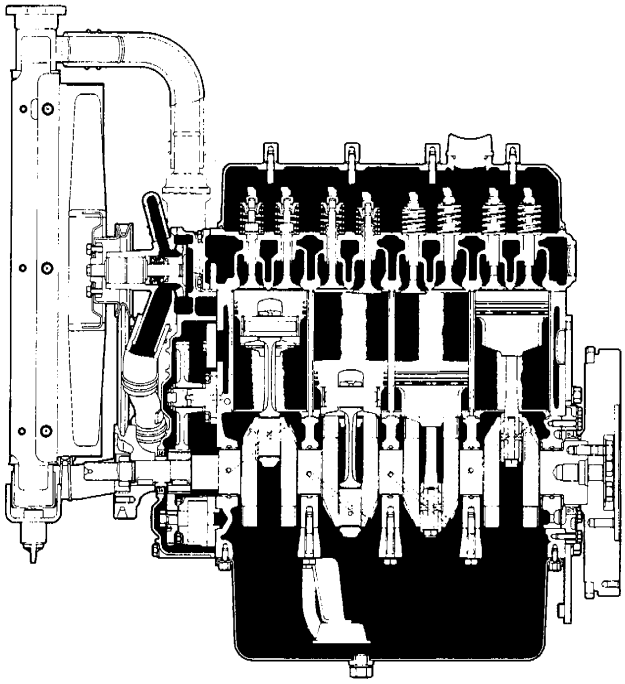
(Shockless mechanism for smooth and comfortable operation)

(13) Hydraulic Block Type Outlet

(Outlet has the flow priority valve for power steering)

(14) ROPS

1 ENGINE



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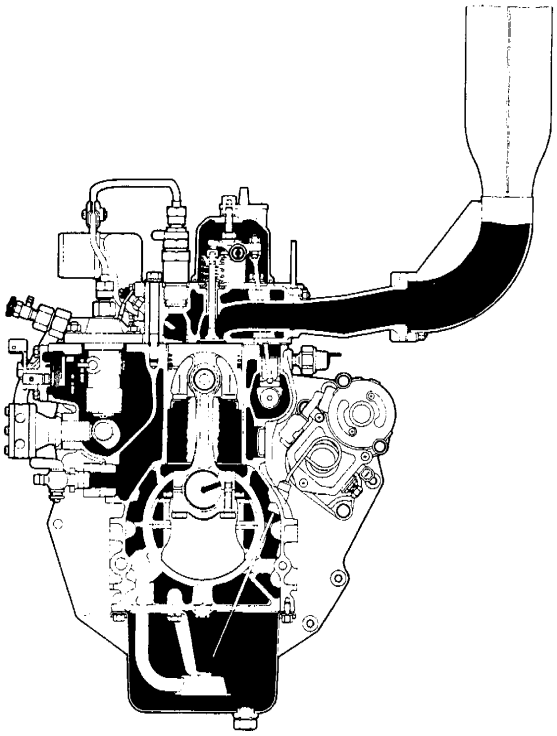


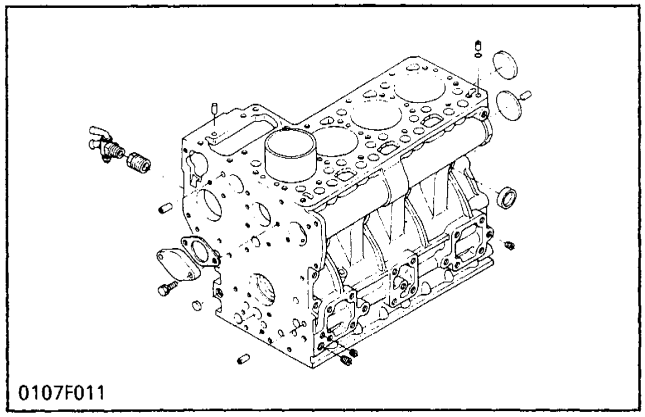
0107F010

The D850-5B, D950-5B and V1200-5B are vertical, water-cooled, 4-cycle diesel engine.

This is incorporated KUBOTA's foremost technologies. With KUBOTA's spherical combustion chamber, well-known Bosch K type injection pump and the well-balanced designs, they give greater power, low fuel consumption, little vibration and quiet operation.

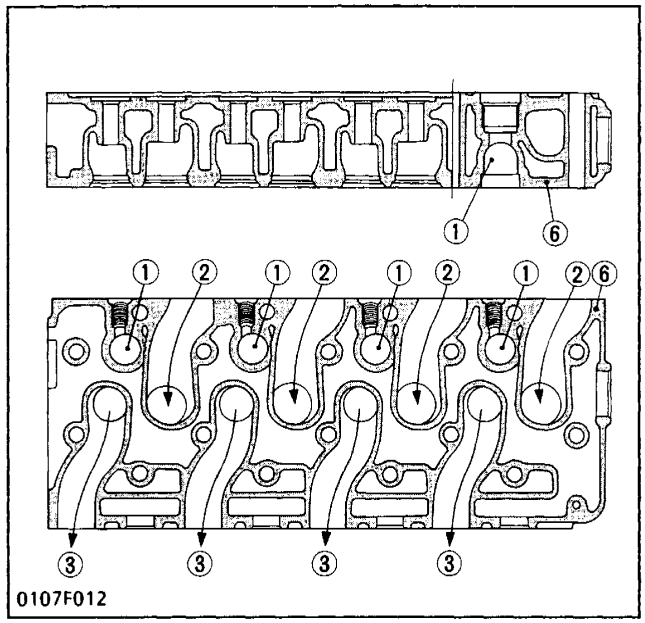
[1] ENGINE BODY

(1) Cylinder Block


0107F011

The engine has a high durability tunnel-type cylinder in which the crankshaft bearing part is constructed in a body. Furthermore, dry-type cylinder liners, being pressure-fitted into cylinders, allow effective cooling, less distortion, and greater wear-resistance. The noise level is reduced to a minimum because each cylinder has its own chamber.

(2) Cylinder Head



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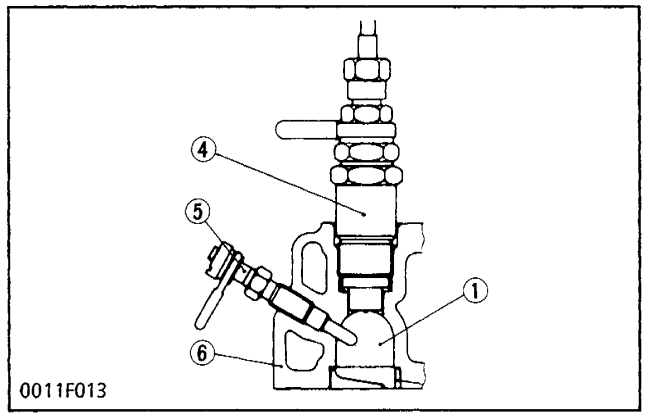


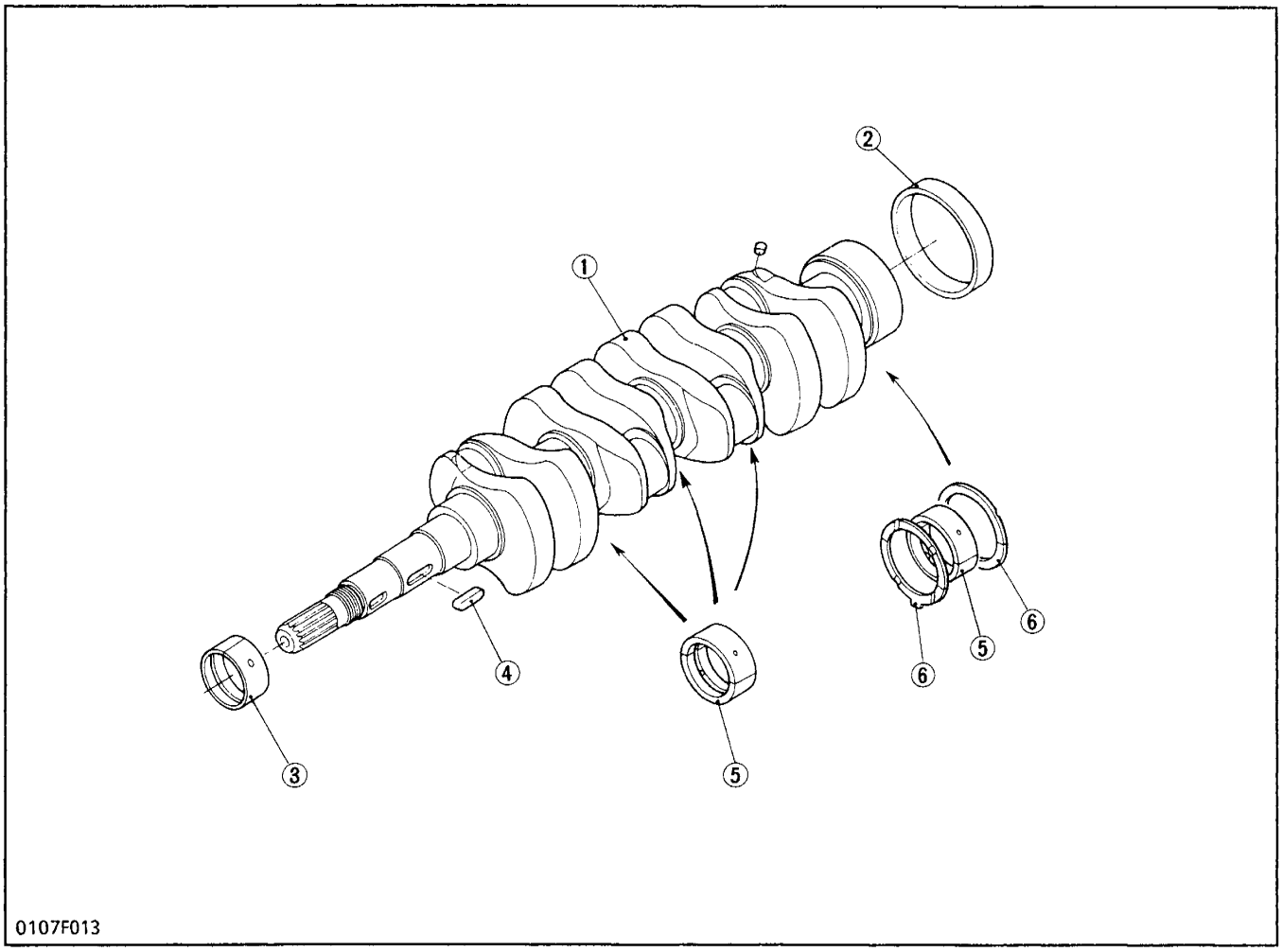
0011F013

(1) Combustion Chamber
(2) Suction
(3) Exhaust
(4) Nozzle Assembly
(5) Glow Plug
(6) Cylinder Head

The cross-flow type inlet/exhaust ports in this engine have their openings at both sides of the cylinder head. Because overlaps of inlet/exhaust ports are smaller than in ports of other types which have openings on one side, the suction air can be protected from being heated and expanded by heated exhaust air. The cool, high density suction air has high volume efficiency and raises the power of the engine. Furthermore, distortion of the cylinder head by heated exhaust air is reduced because suction ports are arranged alternately. The combustion chamber is of KUBOTA's exclusive spherical combustion chamber type. Suction air is whirled to be mixed effectively with fuel, prompting combustion and reducing fuel consumption.

In the combustion chamber are installed throttle type injection nozzle and rapid heating sheathed type glow plug. This glow plug assures easier than ever engine starts even at -15°C (5°F).

(3) Crankshaft



0107F013

(1) Crankshaft
(2) Crankshaft Sleeve
(3) Crankshaft Bearing **1**
(4) Feather Key
(5) Crankshaft Bearing **2**
(6) Thrust Bearing

The crankshaft (1) is driven by the pistons and connecting rods, and translates its reciprocating movement into a circular movement. It also drives the oil pump, camshaft and fuel camshaft.

The counterweights, which are cast together with the crankshaft, prevent a large force of inertia from partially working on the crankshaft, consequently reducing the wear of the crankshaft bearings and lessening the temperature rise of the lubricating oil.

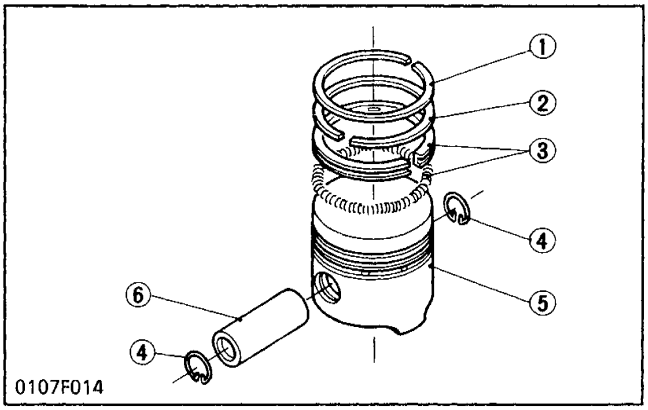
Crankshaft journals, crankpins and oil seal sliding section are induction-hardened to increase wear resistance.

Crankshaft journals are supported by the main bearing cases in which a bearing is used.

Crankshaft bearing **1** (3) at the front end is a solid type bushing and the four bearings **2** (5) behind are split type. Thrust bearings (6) are mounted on both sides of the main bearing case at the flywheel side.

Crankshaft bearings and thrust bearings are plated with a special alloy to raise wear resistance quality. Furthermore the crankshaft, crankshaft bearings and main bearing cases have oil holes.

(4) Piston and Piston Ring



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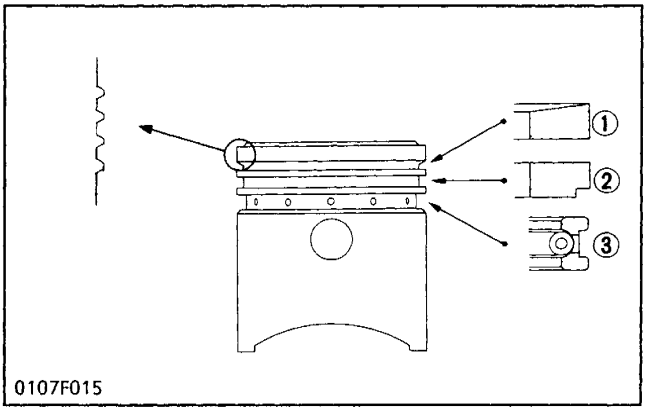

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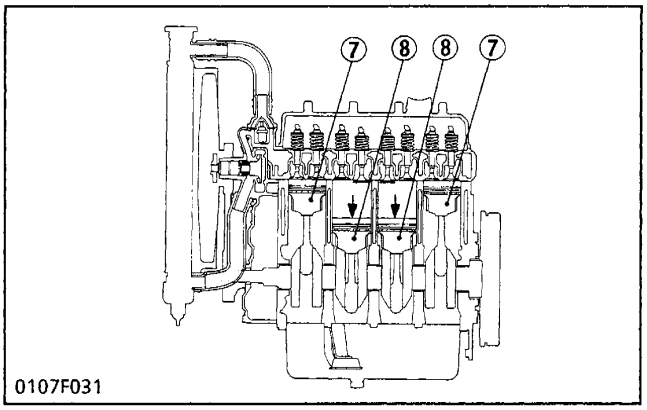


0107F031

Piston circumference has a special elliptic shape in consideration of expansion due to explosion heat. Piston head is flatformed. Grooves are cut round the top section of the piston. These grooves help to dissipate heat and prevent scuffing. Piston (5) is made of special aluminum alloy of low thermal expansion and high temperature resistance.

Compression ring **1** (1) is of the key stone type which can stand against heavy load, and the sliding surface to the cylinder wall is shaped into barrel face which is well fitted to the wall and plated with hard chrome.

Compression ring **2** (2) is of the under-cut type which is effective to prevent oil rising.

Oil ring (3) is effective to scrape oil because it is closely fitted to the cylinder wall by a coil expander and the upper and lower ends of its sliding surface are cut diagonally to raise face pressure to the cylinder walls.

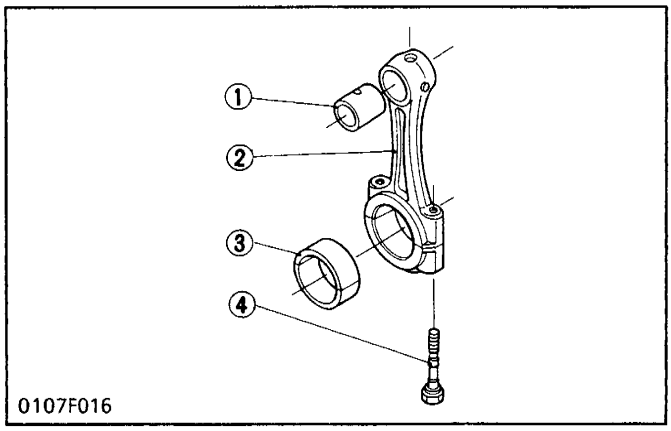
Some scraped oil is forced into the inside of piston through the oil escape holes of rings and piston. The oil ring is plated with hard chrome to increase wear resistance quality.

■ IMPORTANT

- **Note that the piston 2's (8) in the No.2 and No.3 cylinders have different profile from the pistons (7) in the No.1 and No.4 cylinders.**
  The piston 2 (8) is marked "2" on the head. Be sure to install the pistons (7) (8) to each original cylinders.

(1) Compression Ring **1**
(2) Compression Ring **2**
(3) Oil Ring
(4) Piston Pin Snap Ring
(5) Piston
(6) Piston Pin
(7) Piston
(8) Piston **2**

(5) Connecting Rod

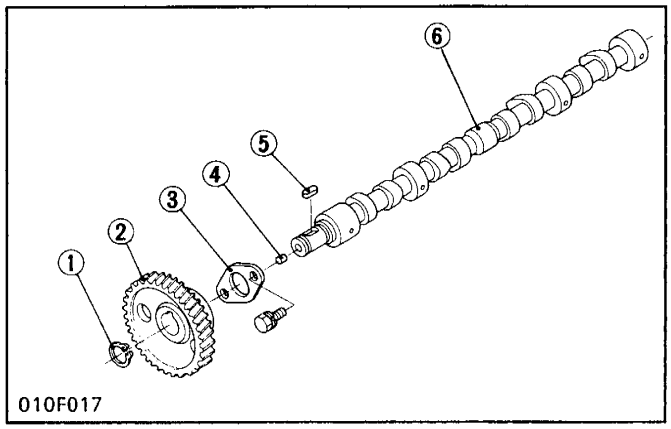


0107F016

Connecting rod (2) is used to connect the piston with the crankshaft. The big end of the connecting rod has a crank pin bearing (3) (split type) and the small end has a small end bushing (1) (solid type).

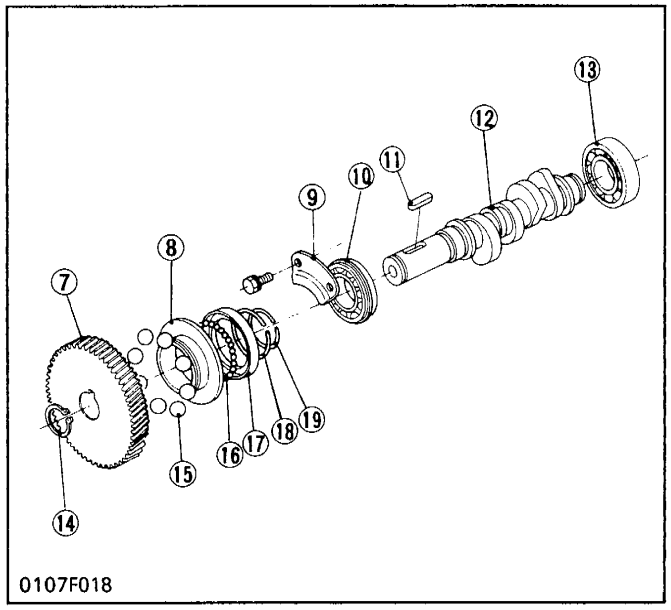
(1) Small End Bushing
(2) Connecting Rod
(3) Crank Pin Bearing
(4) Connecting Rod Screw

(6) Camshaft and Fuel Camshaft



010F017

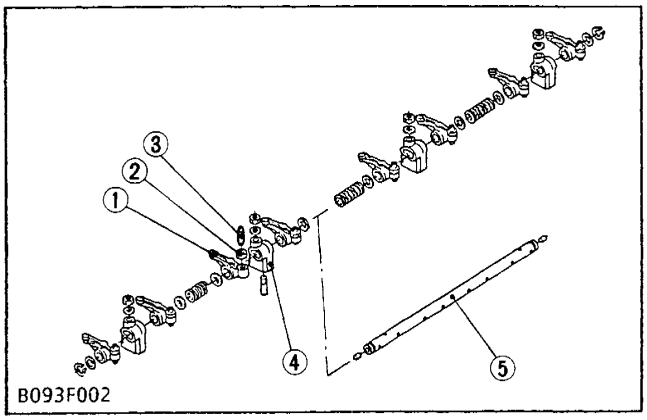
The camshaft (6) is made of special cast iron and the journal and cam sections are chilled to resist wear. The journal sections are force-lubricated. The fuel camshaft (12) controls the reciprocating movement of the injection pump, and is equipped with a ball to control the governor. The fuel camshaft is made of carbon steel and the cam sections are quenched and tempered to provide greater wear resistance.



0107F018

(1) External Snap Ring
(2) Cam Gear
(3) Camshaft Stopper
(4) Plug
(5) Feather Key
(6) Camshaft
(7) Injection Pump Gear
(8) Governor Sleeve
(9) Fuel Camshaft Stopper
(10) Ball Bearing
(11) Feather Key
(12) Fuel Camshaft
(13) Ball Bearing
(14) External Snap Ring
(15) Steel Ball
(16) Steel Ball
(17) Ball Case
(18) Ball Case Snap Ring
(19) Governor Sleeve Snap Ring

(7) Rocker Arm Assembly

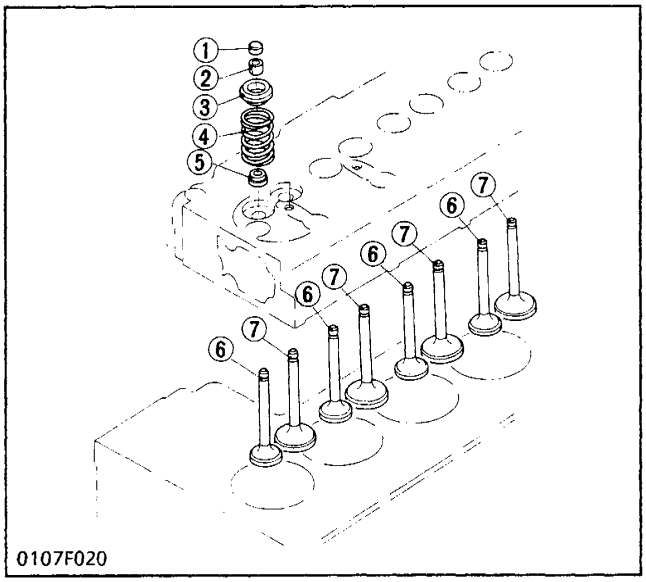


The rocker arm assembly includes the rocker arms (1), rocker arm brackets (4) and rocker arm shaft (5) and converts the reciprocating movement of the push rods to an open/close movement of the inlet and exhaust valves.

Lubricating oil is pressurized through the bracket to the rocker arm shaft, which serves as a fulcrum so that the rocker arm and the entire system are lubricated sufficiently

(1) Rocker Arm
(2) Lock Nut
(3) Adjusting Screw
(4) Rocker Arm Bracket
(5) Rocker Arm Shaft

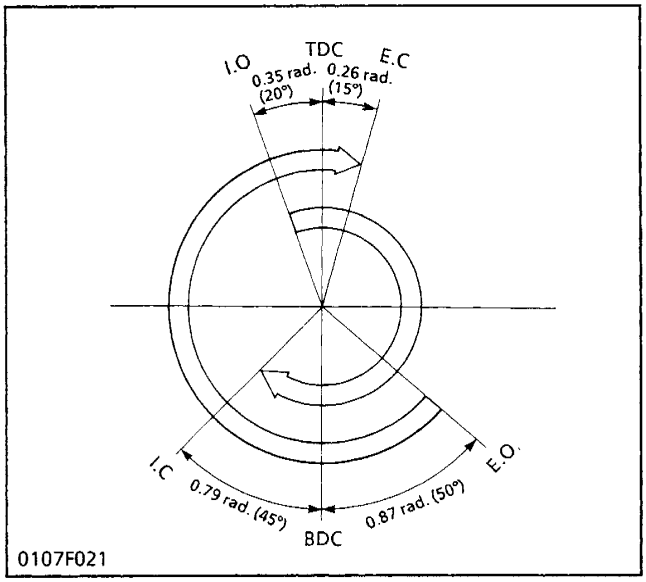
(8) Inlet and Exhaust Valves



The inlet and exhaust valves (7), (6) and their guides are different from each other. Other parts, such as valve springs (4), valve spring retainers (3), valve spring collets (2), valve stem seals (5), and valve caps (1) are the same for both the inlet and exhaust valves. All contact or sliding parts are quenched and tempered to resist wear.

(1) Valve Cap
(2) Valve Spring Collet
(3) Valve Spring Retainer
(4) Valve Spring
(5) Valve Stem Seal
(6) Exhaust Valve
(7) Inlet Valve

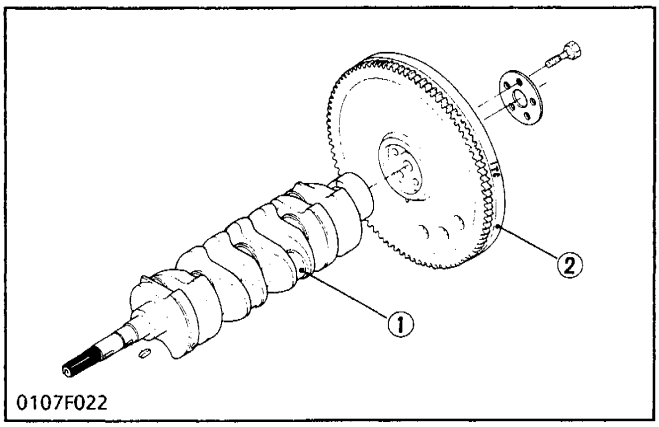
(9) Valve Timing



The valve opening and closing timing is extremely important for effectively intaking air into the cylinder and sufficiently exhaust gas. An appropriate timing can be obtained by aligning the alignment marks on the crank gear and cam gear.

Inlet valve open (I.O)	0.35 rad. (20°) before T.D.C.
Inlet valve close (I.C)	0.79 rad. (45°) after B.D.C.
Exhaust valve open (E.O)	0.87 rad. (50°) before B.D.C.
Exhaust valve close (E.C)	0.26 rad. (15°) after T.D.C.

(10) Flywheel



0107F022

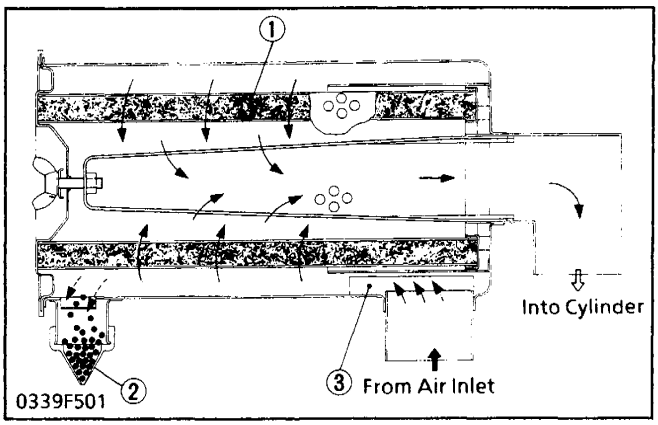
The flywheel is connected with the crankshaft, it stores the rotating force in the combustion stroke as inertial energy to rotate the crankshaft smoothly.

The flywheel periphery is provided with marks showing fuel injection timing and top dead center.

The flywheel and crankshaft can be fixed to each other at a certain point according to the arrangement of flywheel mounting screw hole.

(1) Crankshaft
(2) Flywheel

(11) Air Cleaner

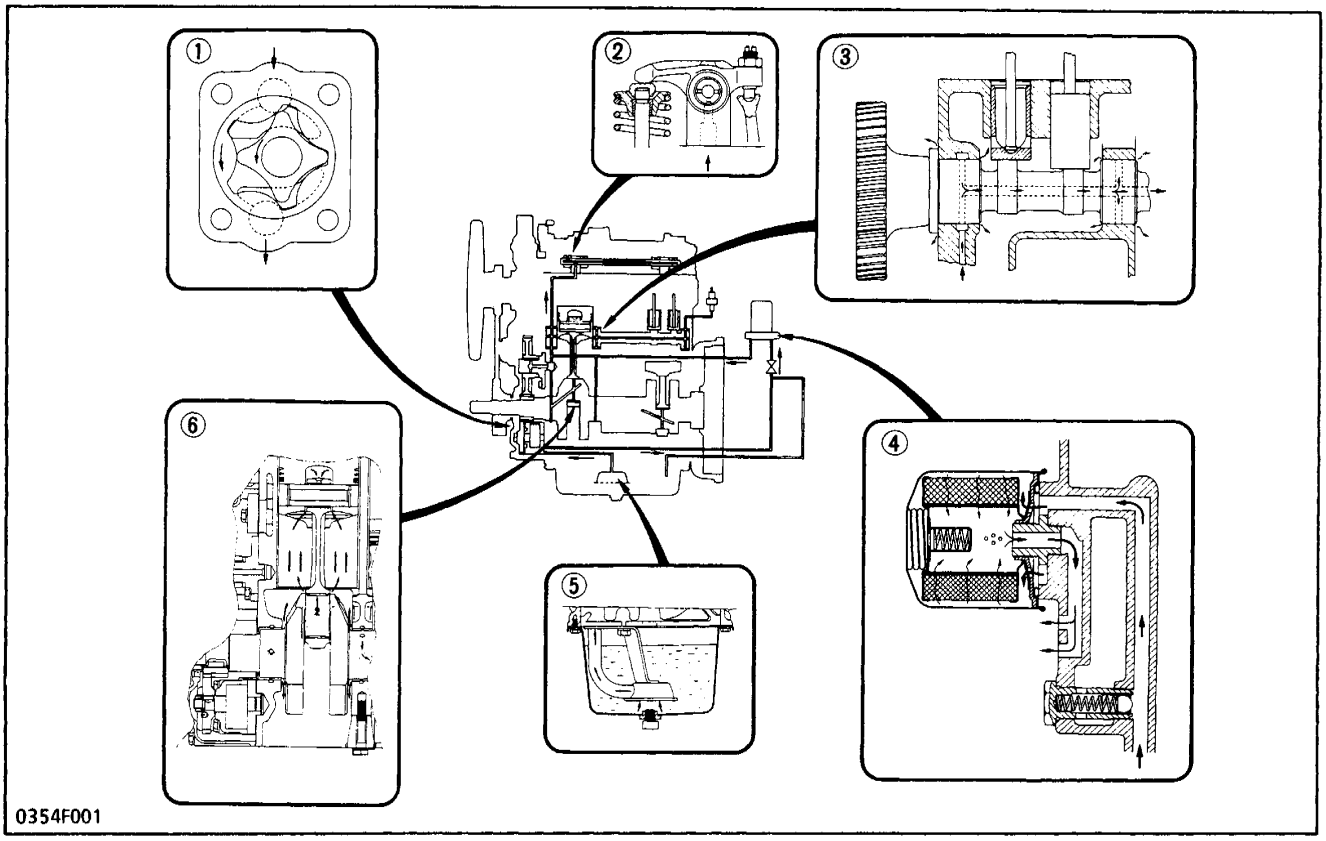


0339F501

The air cleaner is of a dry type with evacuator valve for easy maintenance. Sucked air is caused to flow in a whirling way with air guide (3). As a result, heavier dust particles circulate around the circumference and accumulate in the evacuator valve (2). Minute dust, while circulating in the air flow, is absorbed by the element (1) and thus prevented from entering the engine.

(1) Air Cleaner Element
(2) Evacuator Valve
(3) Air Guide

[2] LUBRICATING SYSTEM



(1) Oil Pump
(2) Rocker Arm and Rocker Arm Shaft
(3) Camshaft
(4) Oil Filter Cartridge and Relief Valve
(5) Oil Strainer
(6) Crankshaft and Piston

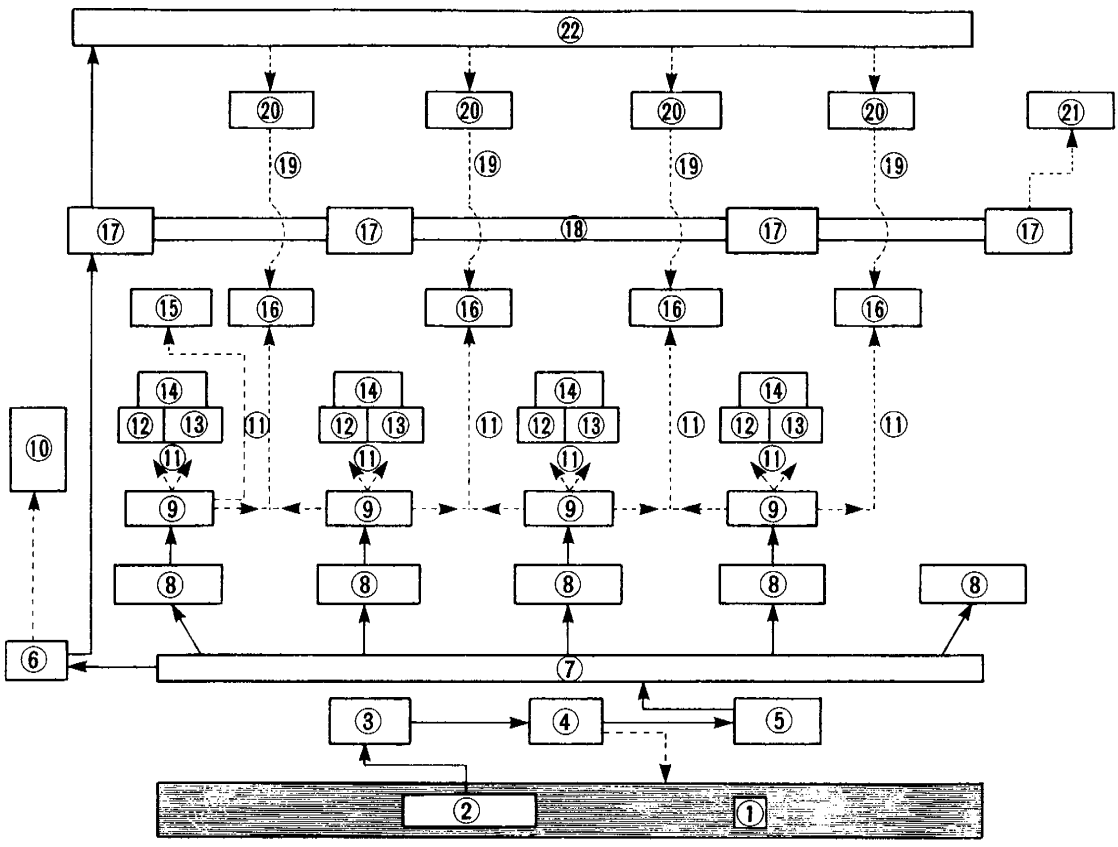
This engine lubricating system consists of oil strainer, oil pump, relief valve, oil filter cartridge and oil switch.

The oil pump sucks lubricating oil from the oil pan through the oil strainer and the oil flows down to the filter cartridge, where it is further filtered.

Then the oil is force-fed to crankshaft, connecting rods, idle gear, camshaft and rocker arm shaft to lubricate each part.

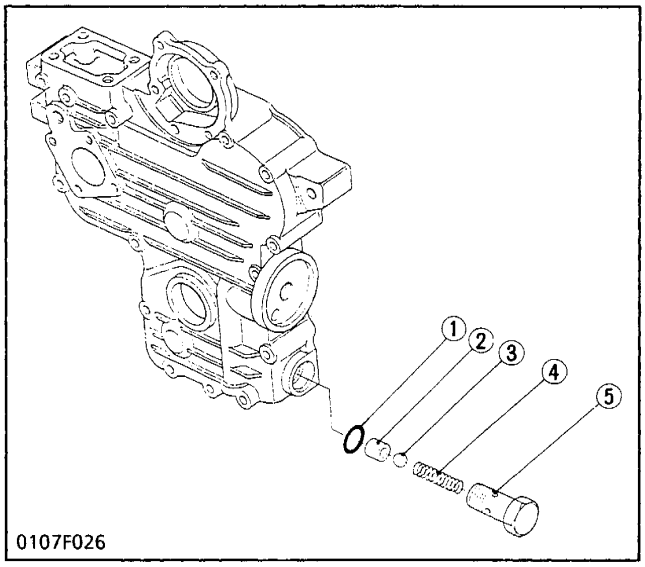
Some part of oil, splashed by the crankshaft or leaking and dropping from gaps of each part, lubricates these parts: pistons, cylinders, small ends of connecting rods, tappets, push rods, inlet and exhaust valves and timing gears.

■ Engine Oil Flow



(1) Oil Pan
(2) Oil Strainer
(3) Oil Pump
(4) Relief Valve
(5) Oil Filter Cartridge
(6) Idle Gear
(7) Main Oil Gallery
(8) Main Bearing
(9) Big End
(10) Timing Gear
(11) Splash
(12) Bore
(13) Small End
(14) Piston
(15) Fuel Camshaft
(16) Tappets
(17) Camshaft Bearing
(18) Camshaft
(19) Drain
(20) Rocker Arm
(21) Oil Switch
(22) Rocker Arm Shaft

(1) Relief Valve



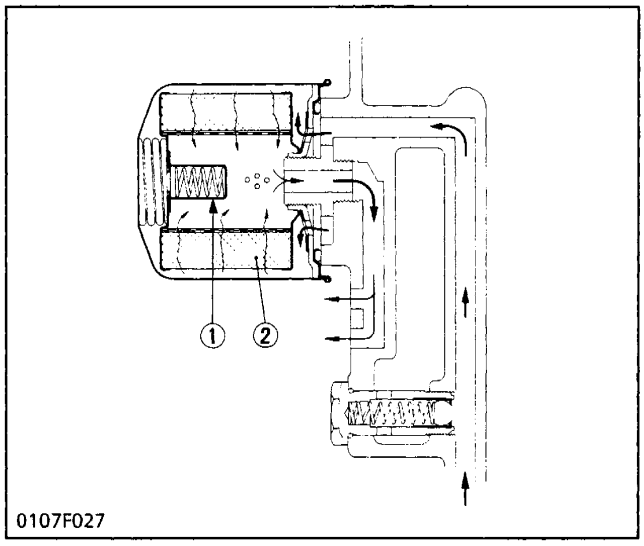
0107F026

The relief valve prevents damage to the lubricating system due to high oil pressure. This relief valve is a ball type direct acting relief valve, and is best suited for low pressures. When oil pressure exceeds the upper limit, the ball (3) is pushed back by the pressure oil and the oil escapes.

Valve opening pressure at rated speed	441 to 490 kPa 4.5 to 5.0 kgf/cm² 64 to 71 psi

(1) O-ring
(2) Valve Seat
(3) Steel Ball
(4) Spring
(5) Relief Valve Body

(2) Oil Filter Cartridge



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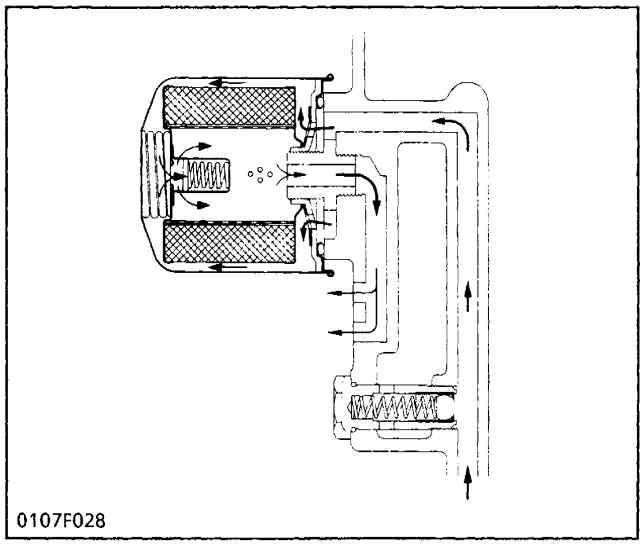
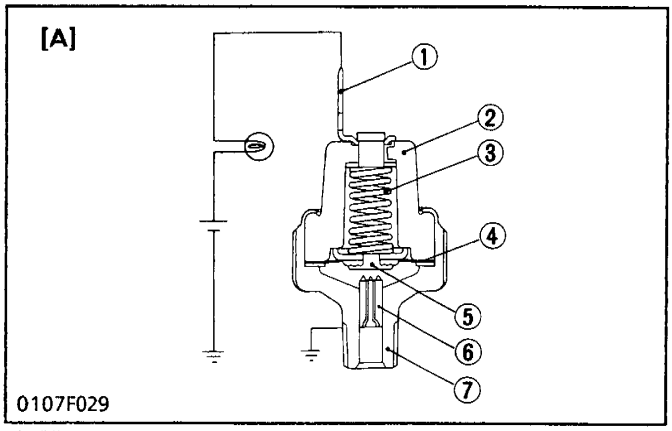

0107F028

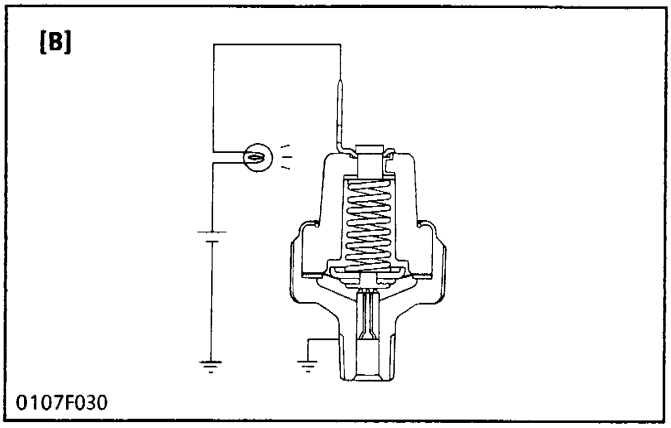
Impurities (various metallic chips, and dust, carbon, etc. in the sucked air) in engine oil can cause to wear and seize components as well as impairing the physical and chemical properties of the oil itself. Impurities contained in force-fed engine oil are absorbed on the filter paper for removal as they pass through the filter element (2).

When the filter element is clogged and the oil pressure in inlet line builds up by 98 kPa (1.0 kgf/cm², 14 psi) more than the outlet line, the bypass valve (1) opens and the oil flows from inlet to outlet bypassing the filter element.

(1) Bypass Valve
(2) Filter Element

(3) Oil Switch



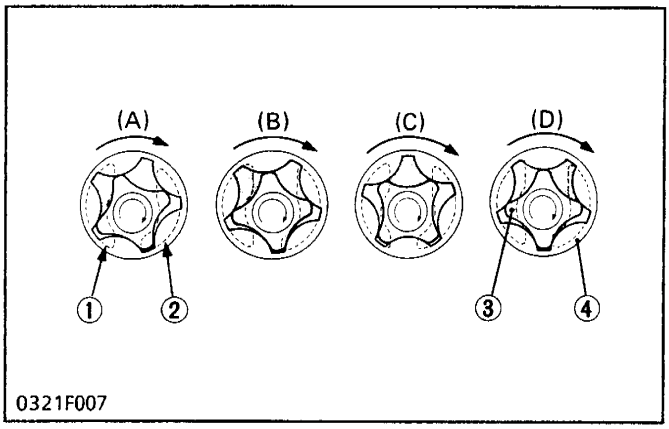


The oil switch is mounted on the crankcase, to warn the operator that the lubricating oil pressure is poor.

If the oil pressure falls below 49 kPa (0.5 kgf/cm^2, 7 psi), the oil warning lamp will light up, warning the operator. In this case, stop the engine immediately and check the cause of pressure drop.

[A] At Proper Oil Pressure
[B] At Oil Pressures of 49 kPa (0.5 kgf/cm^2, 7 psi) or Less
(1) Terminal
(2) Insulator
(3) Spring
(4) Rubber Gasket
(5) Contact Rivet
(6) Contact
(7) Oil Switch Body

(4) Oil Pump



(1) Inlet
(2) Outlet
(3) Inner Rotor
(4) Outer Rotor

The oil pump in this engine is a trochoid pump.

Inside the pump body, the 4 lobe inner rotor (3) is eccentrically engaged with the 5 lobe outer rotor (4).

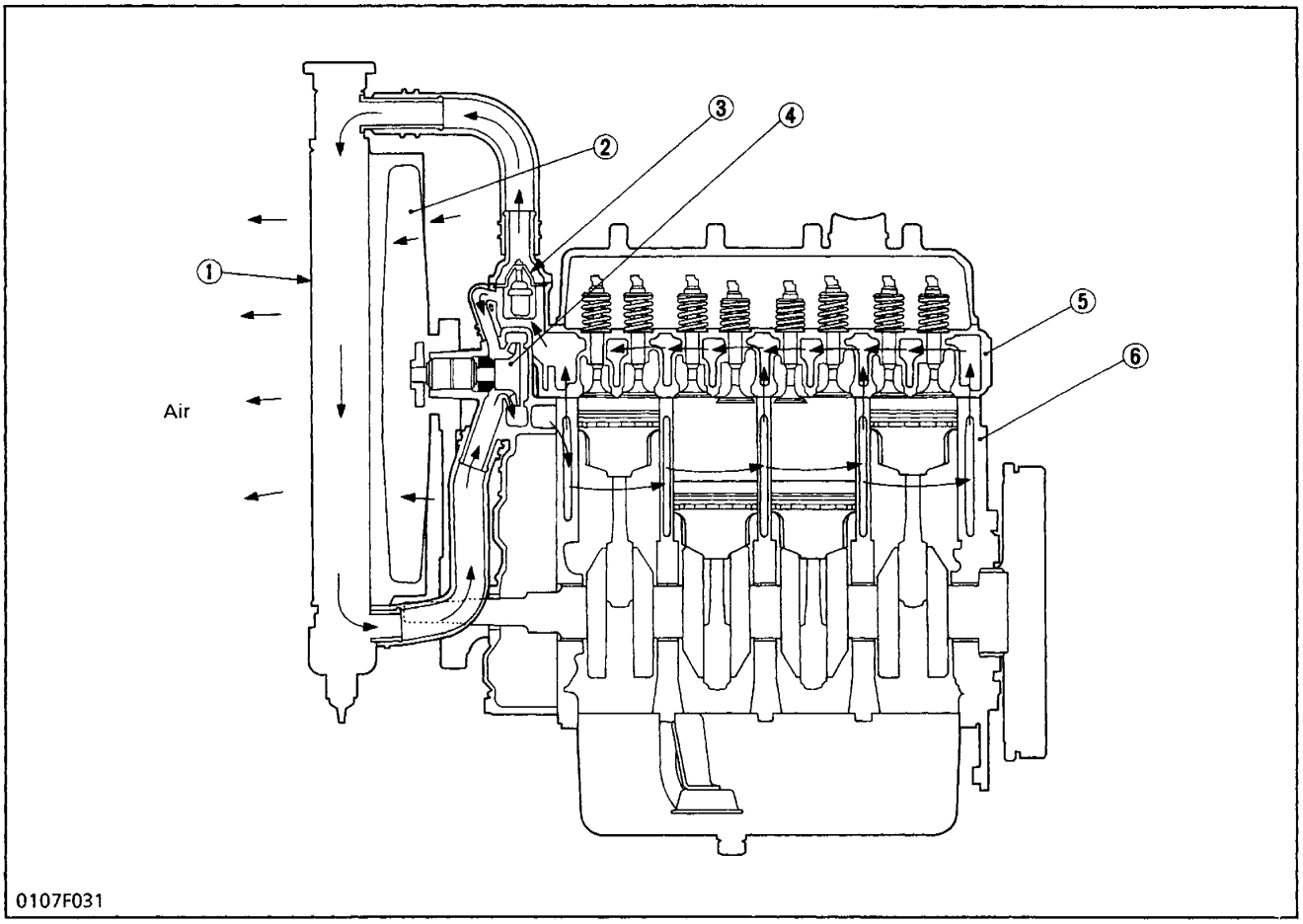
The inner rotor is driven by the crankshaft via gears, which in turn rotate the outer rotor.

When the inner rotor rotates, the outer rotor also rotates in the same direction.

The two rotors have differences in lobe number and center which generates space between lobes as shown in the figure. At position (A), there is little space between lobes in the inlet port. As the rotor rotates towards position (B), the space between the lobes becomes larger, creating a negative pressure which sucks in oil.

Outside the inlet port, as shown in position (C), the space between the lobes becomes gradually smaller, and oil pressure increases. At position (D), oil is discharged from the outlet port.

[3] COOLING SYSTEM



(1) Radiator
(2) Cooling Fan
(3) Thermostat
(4) Water Pump
(5) Cylinder Head
(6) Cylinder Block

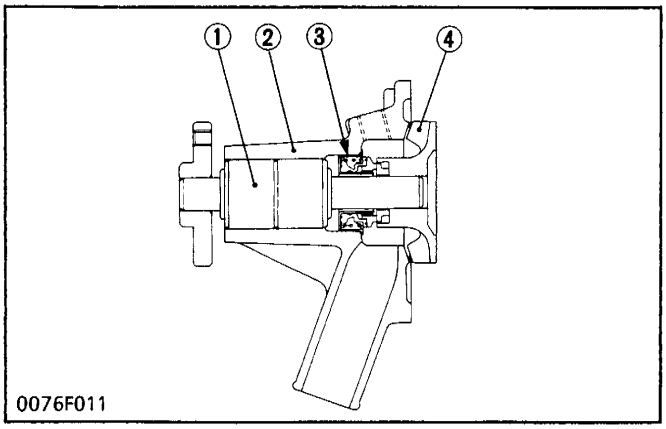
The cooling system consists of a radiator (1), centrifugal water pump (4), cooling fan (2) and thermostat (3).

The water is cooled through the radiator core, and the fan set behind the radiator blows cooling air through the core to improve cooling.

The water pump sucks the cooled water, forces it into the cylinder block and draws out the hot water.

Then the cooling is repeated. Furthermore, to control temperature of water, a thermostat is provided in the system.When the thermostat opens, the water moves directly to radiator, but when it closes, the water moves toward the water pump through the bypass between thermostat and water pump. The opening temperature of thermostat is approx. 82°C (180°F).

(1) Water Pump

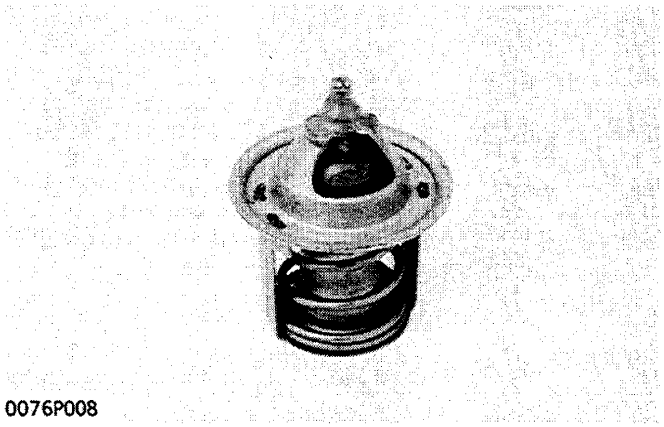


0076F011

The water pump is driven by the crankshaft via a V belt. Water cooled in the radiator is sucked into the water pump from its lower portion and is sent from the center of the water pump impeller (4) radially outward into the water jacket in the crankcase. The bearing unit (1) prevents cooling water from entering by a mechanical seal (3).

(1) Bearing Unit
(2) Water Pump Body
(3) Mechanical Seal
(4) Water Pump Impeller

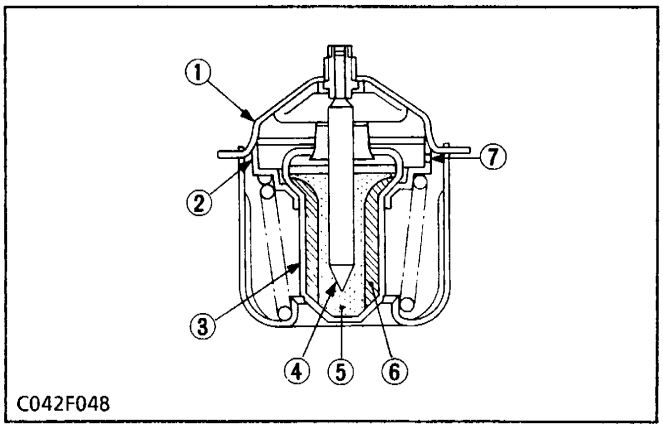
(2) Thermostat


0076P008

The thermostat maintains the cooling water at correct temperature. KUBOTA's engine uses a wax pellet type thermostat. Wax is enclosed in the pellet. The wax is solid at low temperatures, but turns liquid at high temperatures, expands and opens the valve.

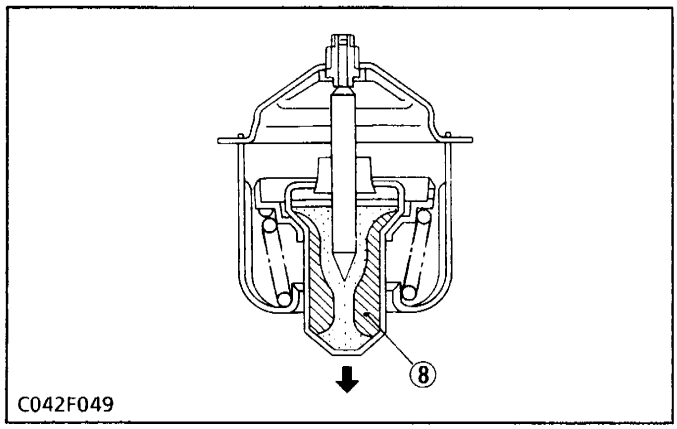
a) At low temperatures (lower than 82°C (180°F)).
As the thermostat is closed, cooling water circulates in the engine through the water return pipe without running to the radiator. Air in the water jacket escapes to the radiator side through leak hole (7) of the thermostat.

b) At high temperatures (higher than 82°C (180°F)).
When the temperature of cooling water exceeds 82°C (180°F), wax in the pellet turns liquid and expands. Because the spindle (4) is fixed, the pellet (3) is lowered, the valve (2) is separated from the seat (1), and then cooling water is sent to the radiator.



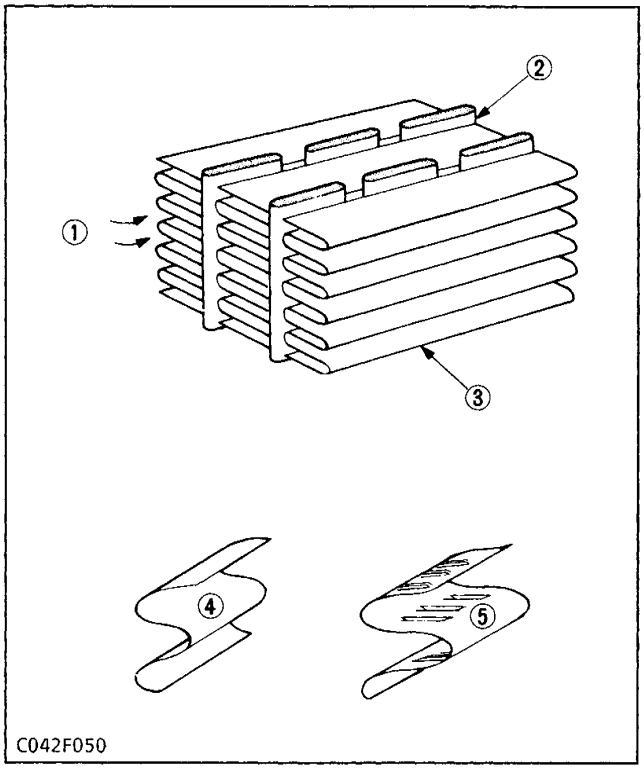
C042F048

(1) Seat
(2) Valve
(3) Pellet
(4) Spindle
(5) Synthetic Rubber
(6) Wax (solid)
(7) Leak Hole
(8) Wax (liquid)



C042F049

(3) Radiator

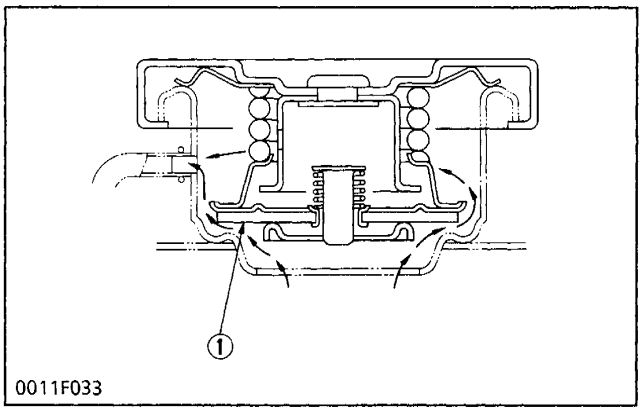


C042F050

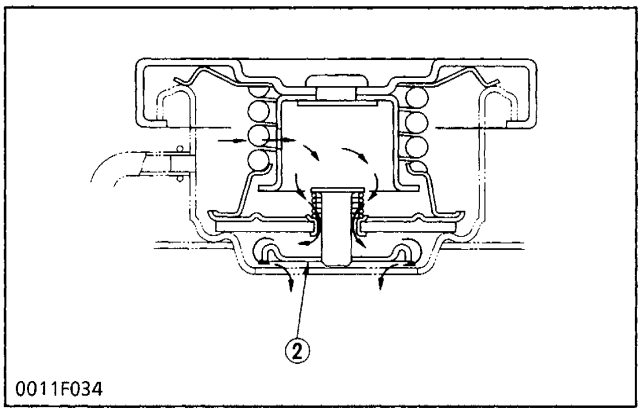
The radiator core consists of water carrying tubes and fins (3) at a right angle to the tubes (2). Heat of hot water in the tubes is radiated from the tube walls and fins. KUBOTA's engine uses corrugated fin type core which has a light weight and high heat transfer rate. Clogging is minimized by the louverless corrugated fins.

(1) Cooling Air
(2) Tube
(3) Fin
(4) Louverless Corrugated Fin
(5) Louvered Corrugated Fin

(4) Radiator Cap



0011F033



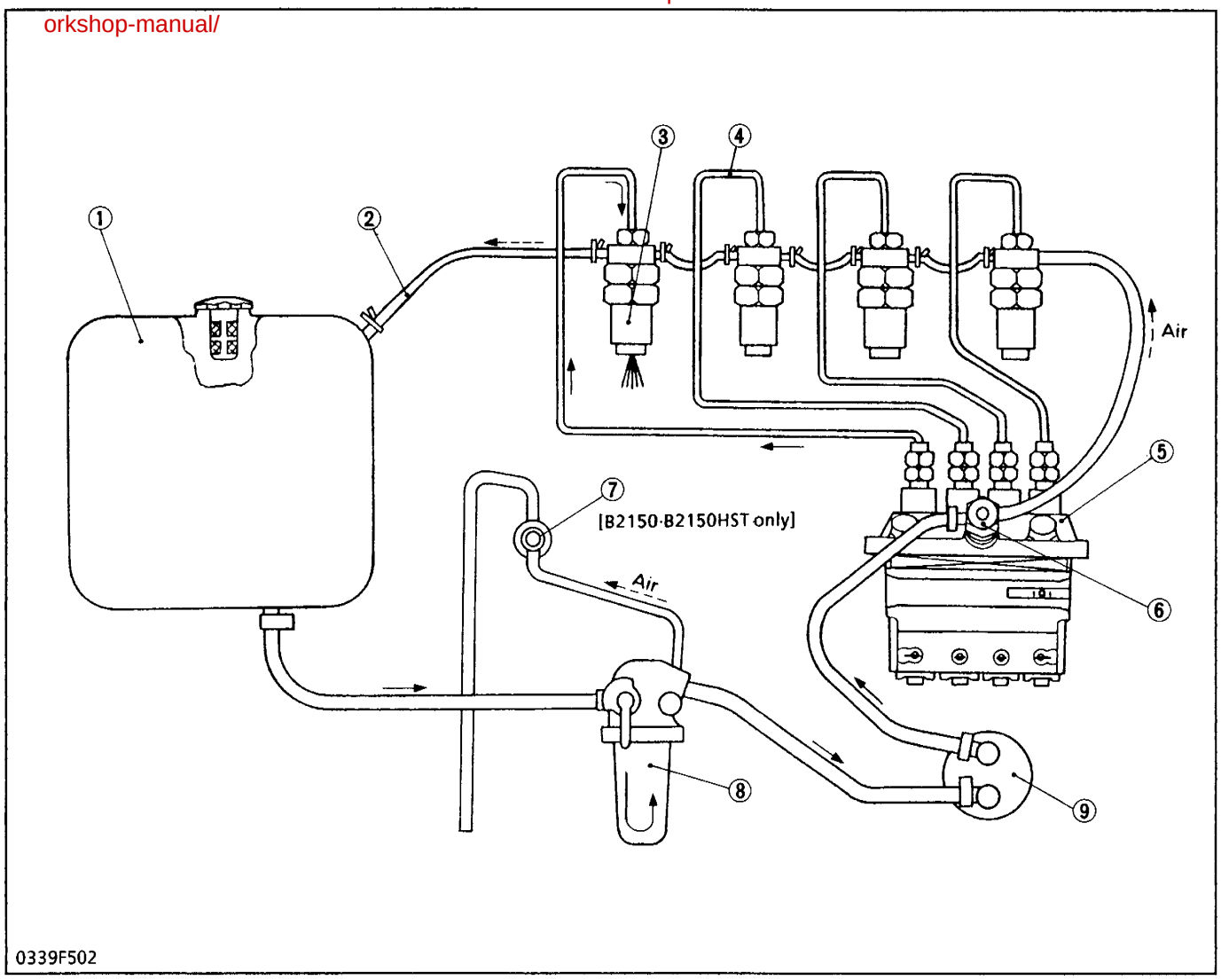
0011F034

The radiator cap is of the pressure type, which opens the pressure valve (1) to reduce internal pressure when internal pressure is increased beyond a certain point due to increase in water temperature. The normal valve actuating pressure of the radiator cap is 88 kPa (0.9 kgf/cm^2, 13 psi).

When water temperature is reduced (and its volume is reduced), pressure in the radiator becomes negative, and the vacuum valve (2) opens and introduces air into the radiator to prevent distortion of the radiator.

(1) Pressure Valve
(2) Vacuum Valve

[4] FUEL SYSTEM



(1) Fuel Tank
(2) Fuel Overflow Pipe
(3) Injection Nozzle
(4) Injection Pipe
(5) Injection Pump
(6) Air Vent Cock
(7) Air Vent Cock
(8) Fuel Filter
(9) Fuel Lift Pump

While the engine is running, fuel is fed from the fuel tank (1) through the fuel filter (8) to the fuel lift pump (9), which feeds fuel to the injection pump (5). The injection pump then feeds the fuel through the injection pipes (4), to the nozzles (3) which inject fuel to the cylinders for combustion. Any fuel leaking from nozzles is collected in the fuel overflow pipes (2) which drain into tank.

Air in the fuel system can be bled by loosening the air vent cock (6), (7) and by starting the engine.