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 (0.2 U.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)

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■ Hydraulic System

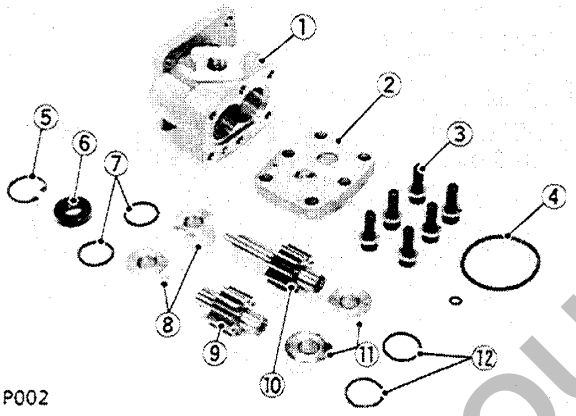
The hydraulic system of these tractors are composed of a hydraulic pump (2), hydraulic block type outlet (4) control valve (8), hydraulic cylinder (9), hydraulic oil filters (6), (10) hydrostatic transmission (only for HST type), oil cooler (only for HST type) and other components shown in the figures.

This system has the following functions.

1. Position control of the rear implement connected to the 3-point hitch.
2. Hydraulic power takes off from the hydraulic block type outlet to operate the power steering (optional) and implements such as a front loader, front blade and etc.

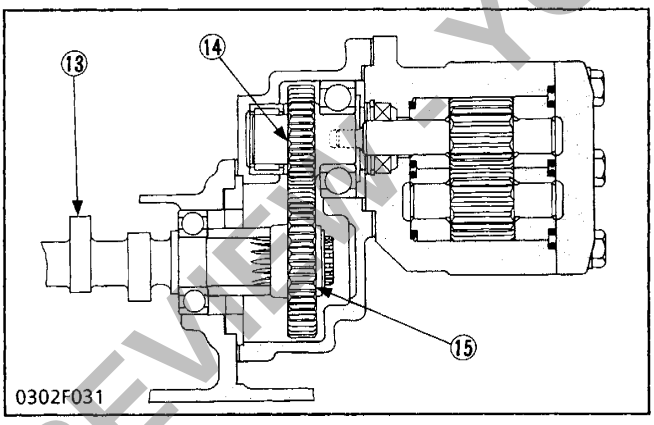
- Oil is supplied by a hydraulic pump (2) connected to the engine. When an engine is started, a hydraulic pump (2) starts running, sucks oil from a transmission case and oil cooler (1) (only for HST). Oil is forced out to a control valve (8) through a hydraulic block type outlet (4) by a pump. This oil is sent to either hydraulic cylinder (9) or hydrostatic transmission. Only oil from a cylinder returns to a transmission case.
- Hydraulic power can be taken out easily through a hydraulic block type outlet to operate an optional power steering (3) or a hydraulic actuator of implements.

[1] HYDRAULIC PUMP



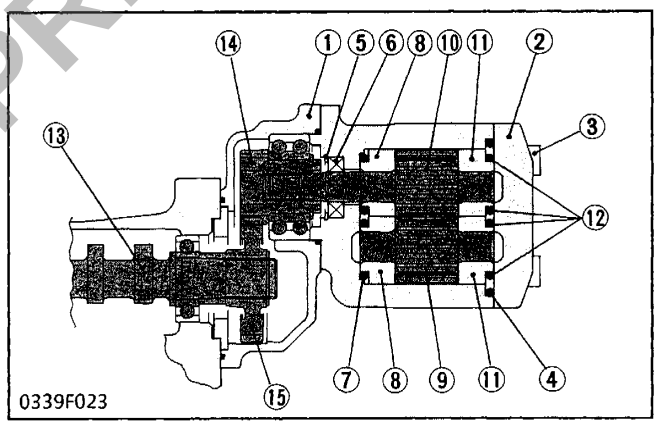
C021P002

[B1550·B1750·B1550HST·B1750HST]



0302F031

[B2150·B2150HST]



0339F023

The hydraulic pump is composed of the casing (1), end cover (2), bushing (8), (11), and two spur gears (drive gear (10) and driven gear (9)) that are in mesh.

Hydraulic pump is driven by the fuel camshaft (13) through the gears (14), (15).

Maximum displacement is as follows.

[B1550·B1750·B1550HST·B1750HST]

Displacement	Engine speed	Condition
21 ℓ/min. 5.5 U.S. GPM 4.6 Imp. GPM	At 2600 rpm	13.2 MPa 135 kg/cm² 1920 psi

[B2150·B2150HST]

Displacement	Engine speed	Condition
28.0 ℓ/min. 7.4 U.S. GPM 6.2 Imp. GPM	At 2600 rpm	13.2 MPa 135 kg/cm² 1920 psi

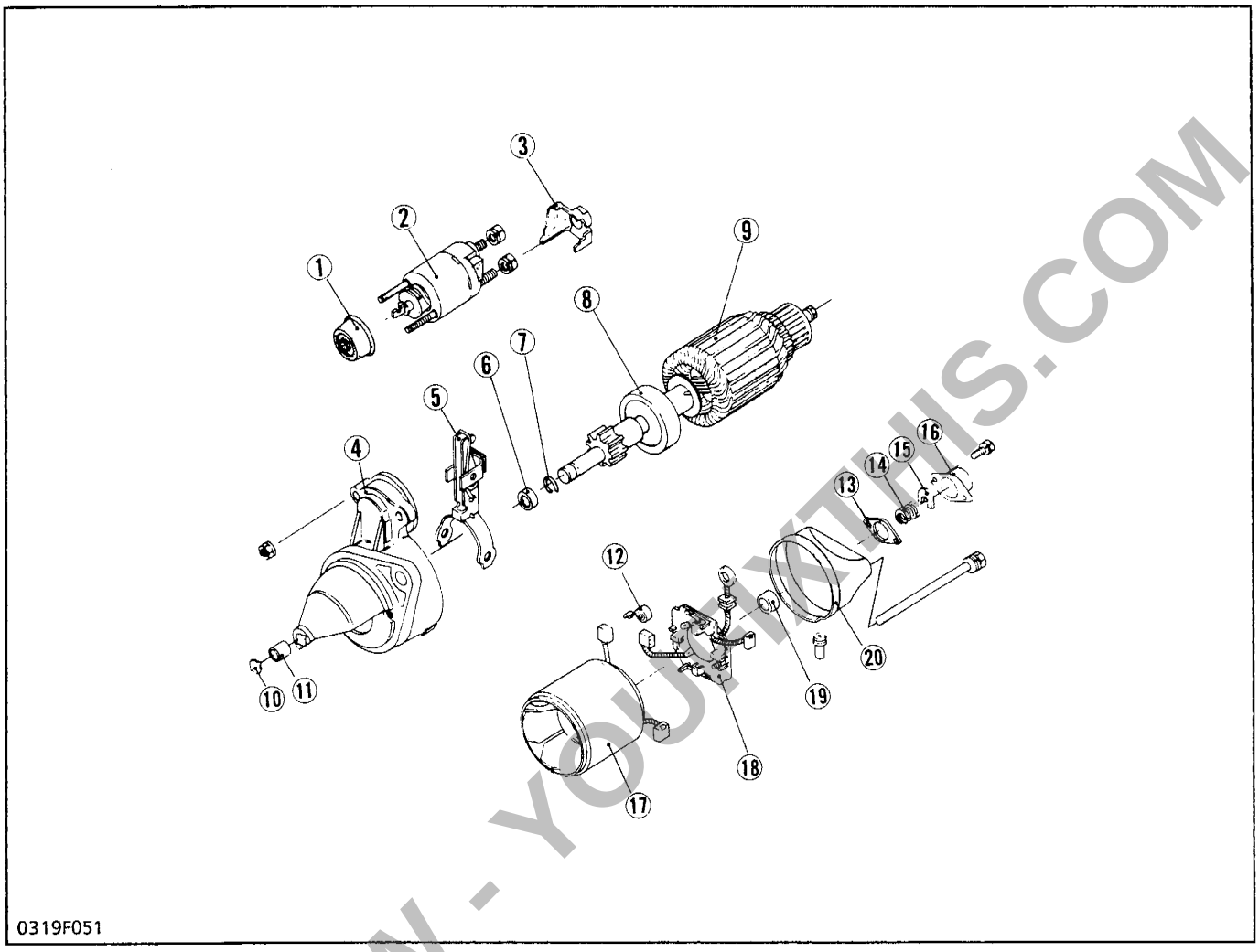
(1) Casing
(2) End Cover
(3) Screws
(4) O-ring
(5) Internal Snap Ring
(6) Oil Seal
(7) O-ring
(8) Bushing
(9) Driven Gear
(10) Drive Gear
(11) Bushing
(12) O-ring
(13) Fuel Camshaft
(14) 20T Gear (B1550·B1750·B1550HST·B1750HST) 15T (B2150·B2150HST)
(15) 27T Gear (B1550·B1750·B1550HST·B1750HST) 29T Gear (B2150·B2150HST)

This pump is a pressure loading type in which uses a bushing working against the gears to increase pump efficiency. A small amount of pressure oil is fed to outside of the bushings, pressing them against the gears and forming a tighter seal against leakage.

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(1) Starter

[B1550·B1750·B1550HST·B1750HST]



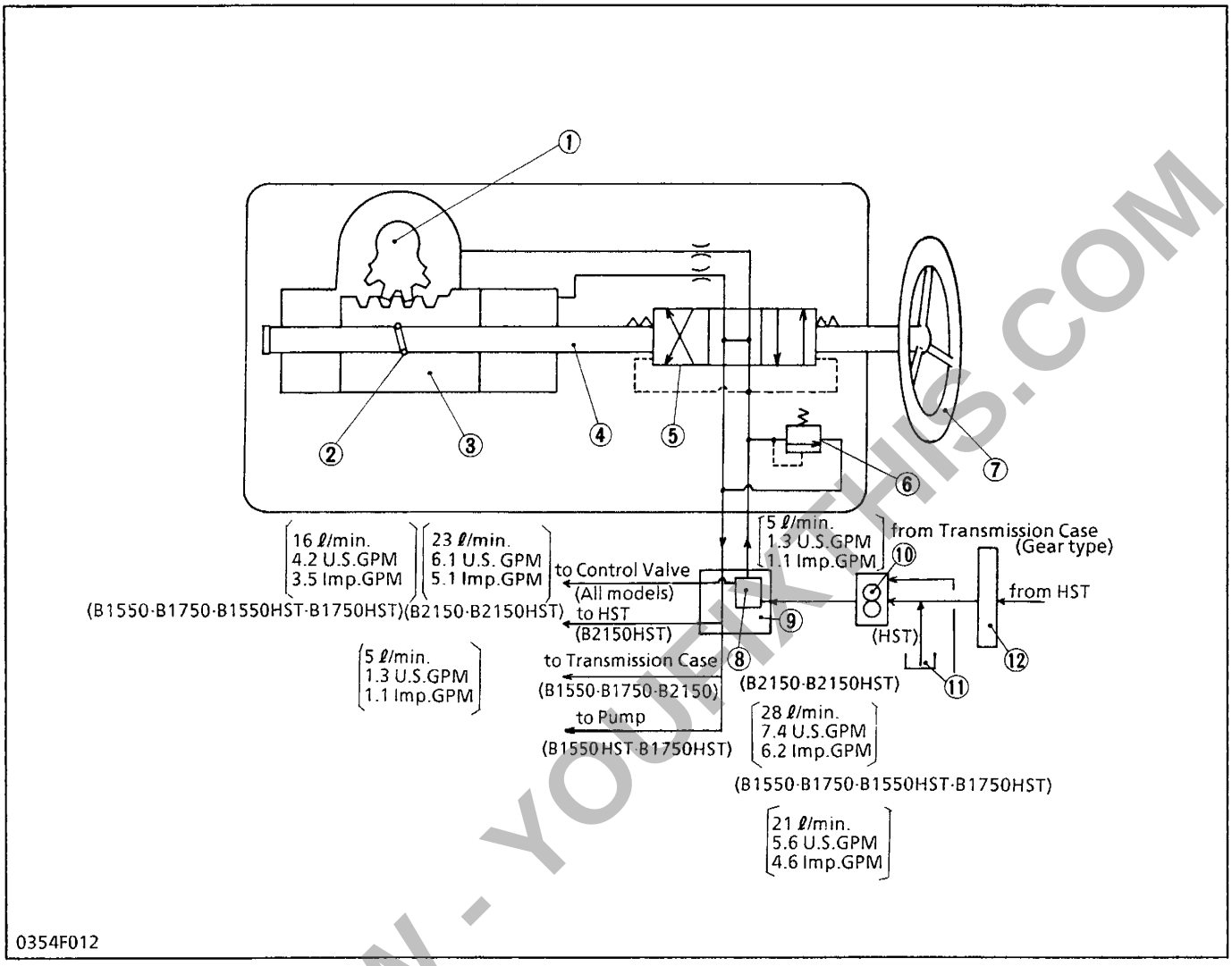
(1) Cover
(2) Magnet Switch
(3) Cord Cover
(4) Drive End Frame
(5) Drive Lever
(6) Bushing
(7) Snap Pin
(8) Overrunning Clutch
(9) Armature
(10) Cover
(11) Bushing
(12) Brush Spring
(13) Gasket
(14) Brake Spring
(15) Brake Shoe
(16) End Frame Cap
(17) Yoke
(18) Brush Holder
(19) Bushing
(20) End Frame

The starter is composed of a starting motor and a magnet switch.

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[2] POWER STEERING



(1) Sector Gear Shaft
(2) Balls
(3) Ball Nut
(4) Worm Shaft
(5) Sliding Valve
(6) Relief Valve
(7) Steering Wheel
(8) Flow Priority Valve
(9) Hydraulic Block Type Outlet
(10) Pump
(11) Transmission Case
(12) Cooler

All models are available to be equipped with integral type power steering that of sliding valve with centering spring type.

Flow priority valve (8) divides the oil fed to hydraulic block type outlet (9) into two directions. One is the control flow to power steering (constantly **5 ℓ/min., 1.3 U.S.GPM, 1.1 Imp.GPM** at any engine speed). And the other is excessive flow to control valve.

The mechanical gear section shown in the next page operates in the same way as ordinary manual steering systems. However, with power steering, the worm shaft (4) is supported only by the centering springs (14).

When the worm thrust force (turning force of the ball screw section) exceeds centering spring setting load, the worm shaft (4) axially shifts by a specified displacement (Stroke: about 0.4 mm (0.016 in.)). When a load is applied to tires and worm thrust force required for operation is greater than the centering spring setting load, turning the steering wheel does not rotate the sector gear shaft (1), but rather axially moves the worm shaft (4). The valve spool (21), fixed on the worm shaft (4) by the nut (23), changes the condition of the three-position, four-way open center (all ports open) valve (5) by sliding in the valve housing (22), to generate pressure as required.

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[2] GENERAL PRECAUTIONS S.G-1
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[7] CHECK AND MAINTENANCE
(1) Check Point of Initial 50 Hours S.G-6
(2) Check Point of Initial 100 Hours S.G-8
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(11) Check Point of Every 800 Hours S.G-19
(12) Check Point of Daily S.G-19
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(14) Original Charge of Dry Type Battery S.G-21
[8] SPECIAL TOOLS
(1) Special Tools for Engine S.G-22
(2) Special Tools for Tractor S.G-28

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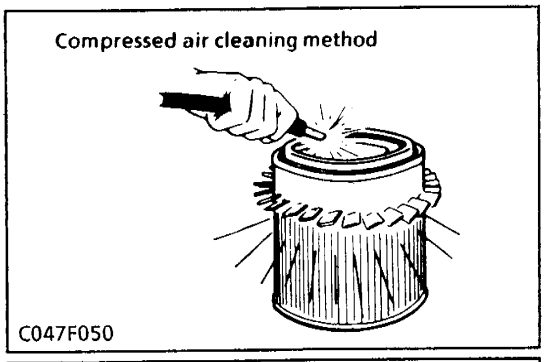
[6] MAINTENANCE CHECK LIST

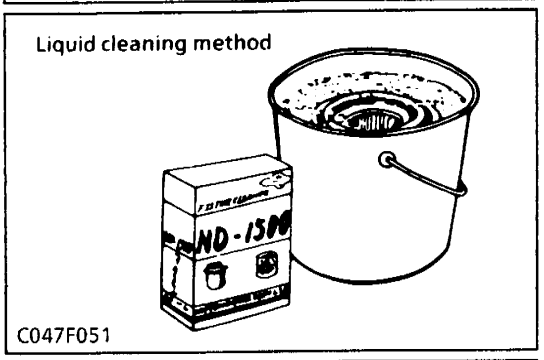
Frequency of Checks	Check Points	Reference Pages
Initial operation (initial 50 hours)	During this period, pay special attention to the following. (1) After the initial 50 hours of use, change engine oil and engine oil filter cartridge and check fan drive belt tension. Replace transmission oil filter cartridge for HST. (2) After the initial 100 hours of use, change transmission fluid and clean transmission strainer.	S.G-6, 7, 8 S.G-8
Every 100 hours	Change engine oil. Clean fuel filter. Clean air cleaner element. Lubricate the following points. King pins, pedal shaft, center pin, clutch release hub, speed control pedal shaft for HST Check clutch pedal play range. Check brake pedal play range. Check steering wheel play range. Check battery electrolyte level. Check fuel line.	S.G-6 S.G-9 S.G-9, 10 S.G-11 S.G-11 S.G-12 S.G-12 S.G-13 S.G-14
Every 200 hours	Replace engine oil filter cartridge. Check radiator hose and hose clamp. Check fan drive belt tension.	S.G-6 S.G-14 S.G-7, 15
Every 300 hours	Change transmission fluid. Replace transmission oil filter cartridge for HST Change front axle differential case oil. Change steering gear box oil. Change front axle gear case (right and left) oil. Clean transmission strainer.	S.G-8, 15 S.G-7, 15 S.G-15 S.G-15 S.G-16 S.G-8, 16
Every 400 hours	Replace fuel filter.	S.G-9, 16
Every 600 hours every year or every 6 times of cleaning	Replace air cleaner element.	S.G-9, 10, 16
Every one to two months	Recharge battery if necessary.	S.G-17
Every year	Change anti-freeze and coolant Clean radiator.	S.G-17 S.G-18
Every 2 years	Replace battery, if necessary. Replace radiator hose, if necessary. Replace fuel line, if necessary. Replace hydraulic hose, if necessary	S.G-13, 18 S.G-14, 18 S.G-14, 18 S.G-19
Every 800 hours	Check valve clearance.	S.G-19
Daily	Check radiator screen. Check oil cooler exterior. (Only for B1550HST, B1750HST, B2150HST) Check coolant level. Check oil and fuel level. Check tire pressure.	S.G-18, 19 S.G-19 S.G-19 S.G-19 S.G-19

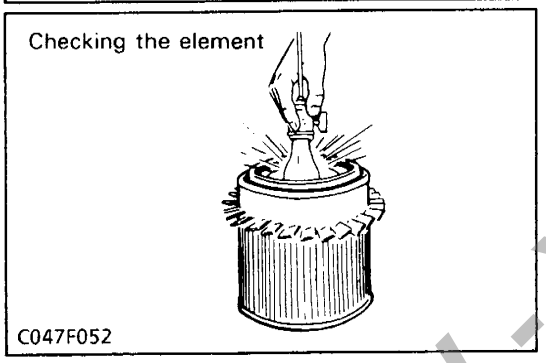
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(Every 100 Hours)







Cleaning Air Cleaner Element

1. To clean the element, use clean dry compressed air on the inside of the element. Air pressure at the nozzle must not exceed 205 kPa (2.1 kgf/cm^2, 30 psi).
   Maintain reasonable distance between the nozzle and the filter.
2. To wash the element, use KUBOTA Filter cleaner, Donaldson ND-1500 Filter Cleaner or equivalent, which is especially effective on oily and soot-laden filters.
   To use: Dissolve KUBOTA Filter Cleaner in a concentrated solution of cold water. When granules are thoroughly mixed, add water to make a solution equivalent to 15 g KUBOTA Filter Cleaner for each 1ℓ (1 quart) of water. (2 oz KUBOTA Filter Cleaner for each 1 gallon of water.)
   Allow element to soak 15 minutes. Then agitate element to dislodge loosened dust-rinse in clear water-allow element to dry.

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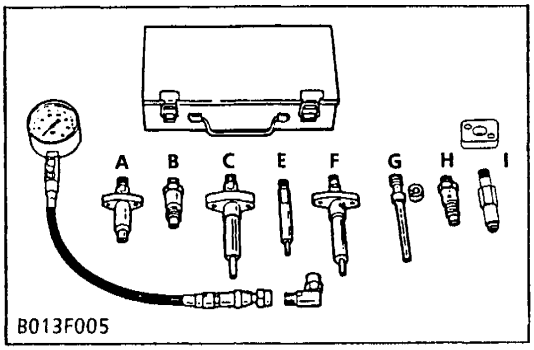
SPECIFICATIONS

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)

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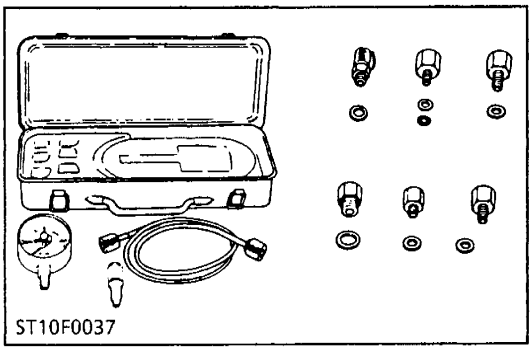
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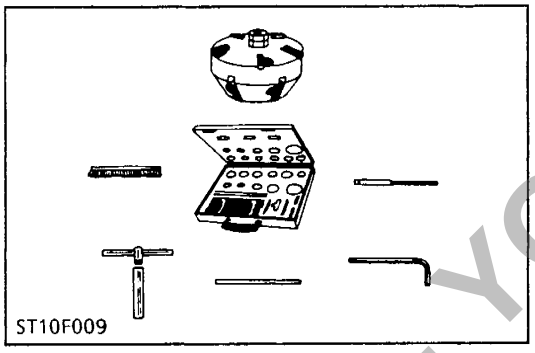
Diesel Engine Compression Tester (Including Adaptor G)

Code No.: 07909-30207 (Assembly)
07909-30934(A to F)
07909-31211 (E and F)
07909-31251 (G)
07909-31231 (H)
07909-31271 (I)
Application: Use for measuring diesel engine compression pressure.


ST10F0037

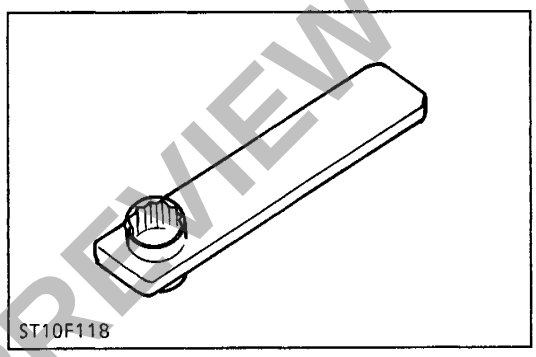
Oil Pressure Tester

Code No.: 07916-32032
Application: Use to measure lubricating, for all kinds of diesel engines.


ST10F009

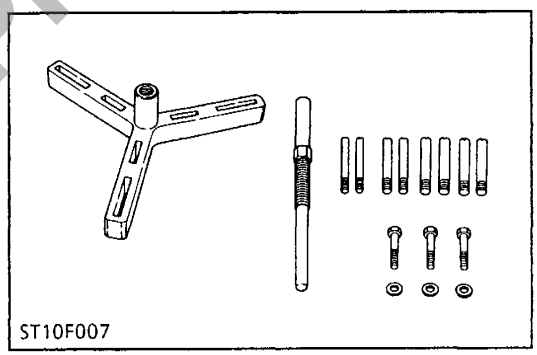
Valve Seat Cutter

Code No.: 07909-33102
Application: Use to reseat valves.
Angle: 0.785 rad. (45°)
0.262 rad. (15°)
Diameter: 28.6 mm (1.126 in)
31.6 mm (1.244 in)
35.0 mm (1.378 in)
38.0 mm (1.496 in)
41.3 mm (1.626 in)
50.8 mm (2.000 in)


ST10F118

Socket Wrench 29

Code No.: 07916-31841
Application: Use to take off and to fix the crankshaft nut of diesel engine.


ST10F007

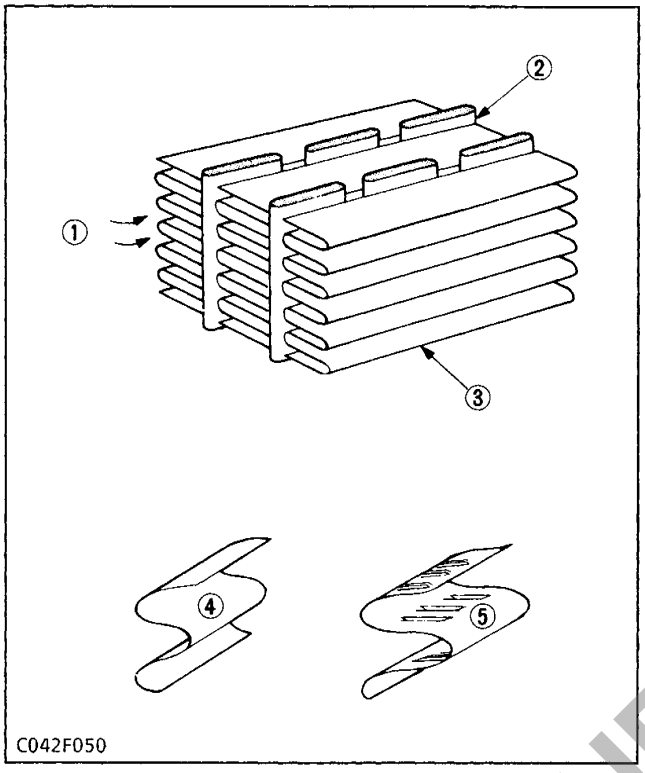
Flywheel Puller (For vertical type diesel engines)

Code No.: 07916-32011
Application: Use exclusively to take off the flywheel of all vertical type diesel engines safely and easily.

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(3) Radiator

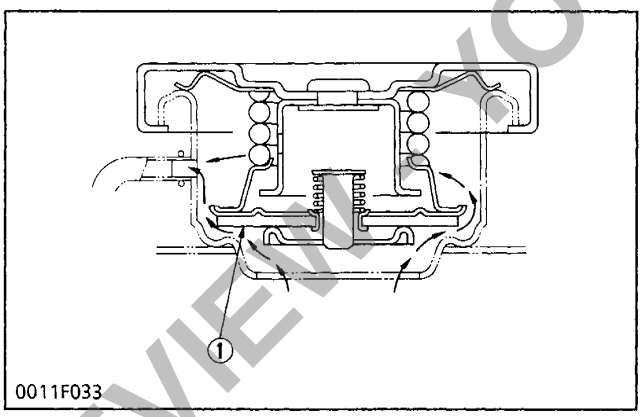


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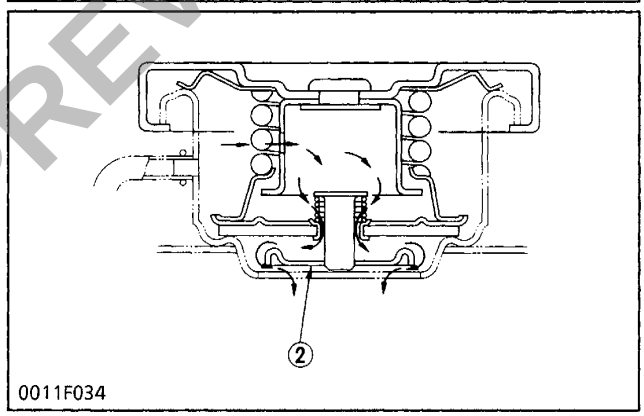
The radiator core consists of water carrying tubes and fins (3) at a right angle to the tubes (2). Heat of hot water in the tubes is radiated from the tube walls and fins. KUBOTA's engine uses corrugated fin type core which has a light weight and high heat transfer rate. Clogging is minimized by the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

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

(4) Radiator Cap



0011F033



0011F034

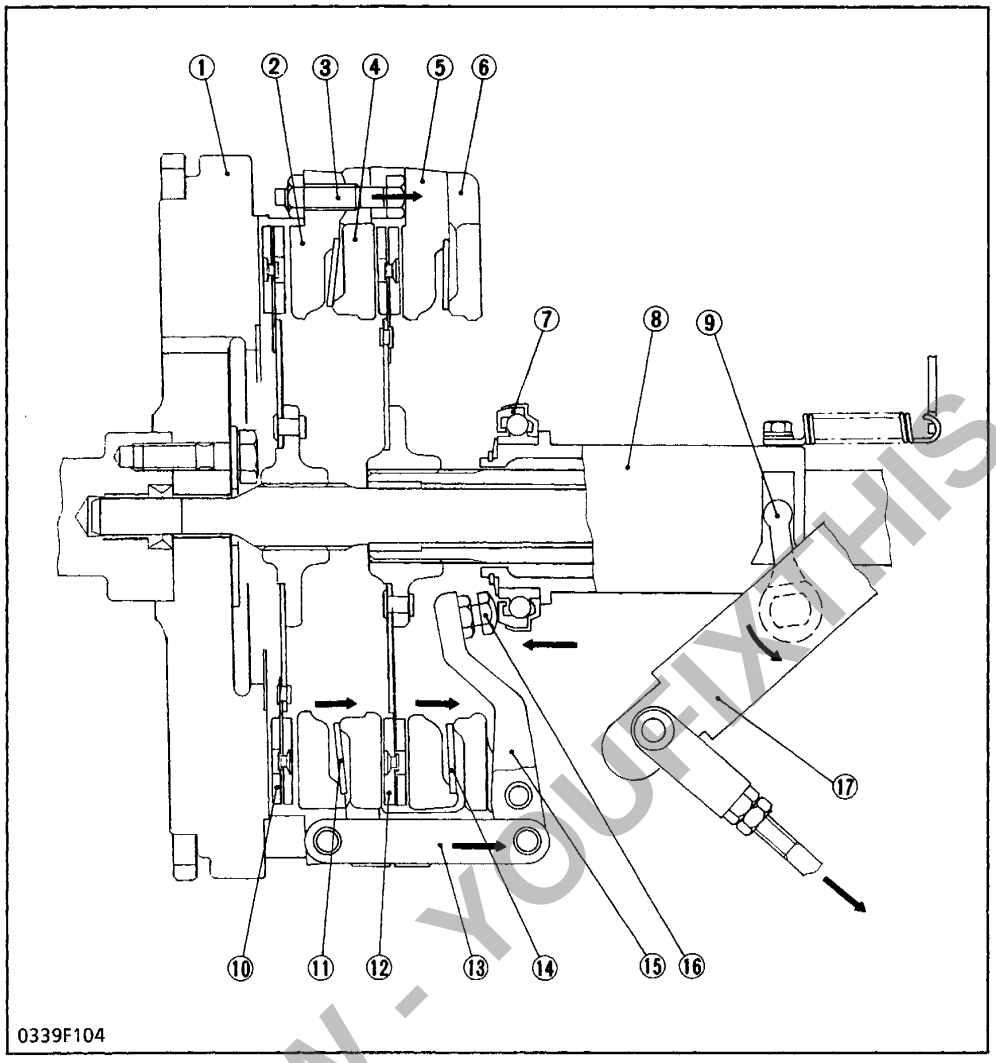
The radiator cap is of the pressure type, which opens the pressure valve (1) to reduce internal pressure when internal pressure is increased beyond a certain point due to increase in water temperature. The normal valve actuating pressure of the radiator cap is 88 kPa (0.9 kgf/cm^2, 13 psi).

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

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■ Travelling Clutch and PTO Clutch "Disengaged"



(1) Flywheel
(2) Pressure Plate (Travelling)
(3) Adjusting Screw
(4) Clutch Cover
(5) Pressure Plate (PTO)
(6) Clutch Cover
(7) Release Bearing
(8) Release Bearing Holder
(9) Release Fork
(10) Clutch Disc (Travelling)
(11) Belleville Spring
(12) Clutch Disc (PTO)
(13) Release Rod
(14) Belleville Spring
(15) Release Lever
(16) Adjusting Screw
(17) Clutch Rod

When the clutch pedal is depressed to the full stroke, the pressure plate (5) is pushed to the right by the adjusting screw (3).

This results in no friction among the clutch cover (4), clutch disc (12) and pressure plate (5).

The rotation of flywheel is not transmitted to the PTO system and travelling system.

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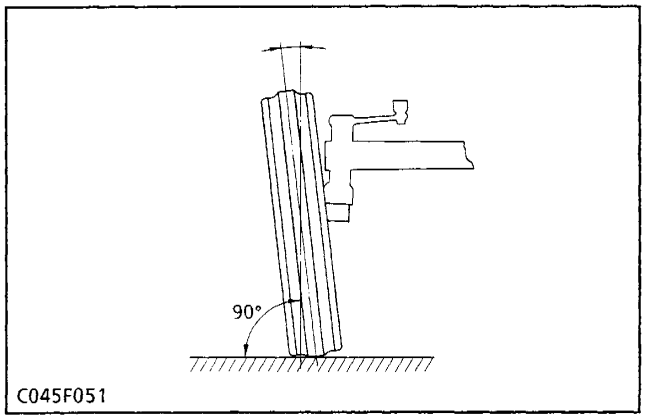
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6 FRONT AXLE

The front axle supports the front of tractor and facilitates steering. There are two kinds of front axles. The two-wheel drive axle has free-running front wheels and the four-wheel drive axle has powered front wheels.

[1] FRONT WHEEL ALIGNMENT

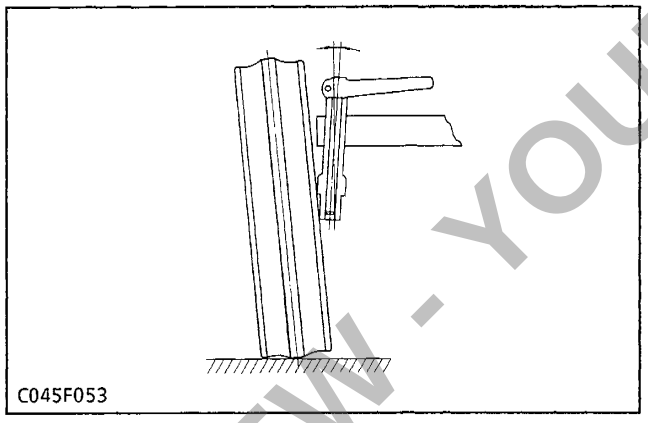
Front wheel alignment is a term given to mean four angle settings in three dimensions camber, kingpin inclination, toe-in and caster angle. These angle settings are made for the following purposes.



C045F051

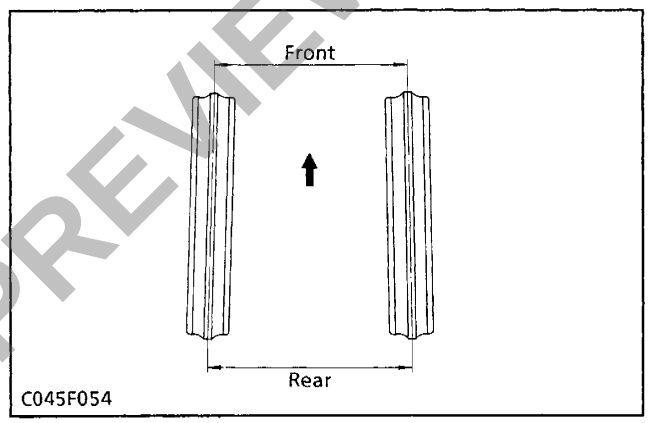
1) Camber

The front wheels are tilted from the vertical as viewed from the front, the wheels are farther apart at the top than at the bottom. This inclination is called camber. Camber reduces rolling resistance of the wheels, and also minimizes bending or twisting of the front axle.


C045F053

2) Kingpin Inclination

The kingpin is tilted from the vertical as viewed from the front. This inclination is called kingpin inclination. As with the camber, kingpin inclination reduces rolling resistance of the wheels, and prevents any shimmy motion of the steering wheel. It also reduces steering effort.



C045F054

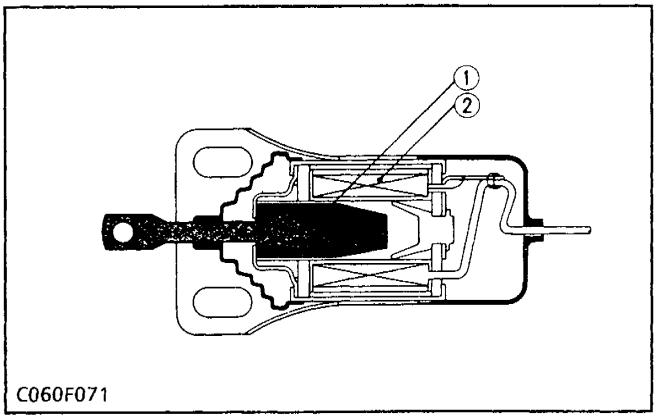
3) Toe-in

Viewing the front wheels from above reveals that the distance between the front wheels is less at the front than at the rear. This turning in of the front wheels is called toe-in. The front wheels tend to roll outward due to the camber, but toe-in offsets this and ensures parallel rolling of the front wheel. Another purpose of toe-in is to prevent excessive and uneven wear of tires.

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(2) Fuel Cut Off Solenoid



C060F071

Flowing of the battery current into the coil (2) while the timer relay contact point is closed attracts the plunger (1) to actuate the stop lever of the injection pump. When the battery current stops, the plunger is returned to the original position by the spring.

(1) Plunger (2) Coil

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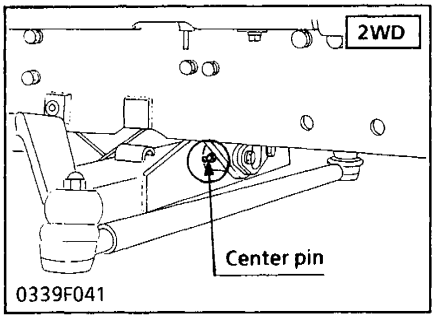
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(Every 100 Hours)

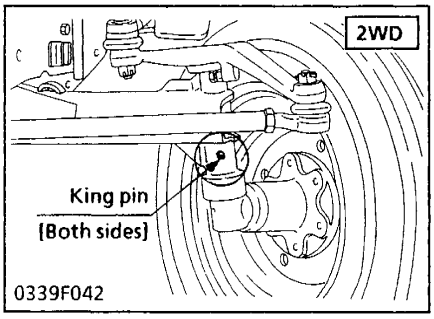
Greasing the Following Points

- Apply a small amount of grease to following points.

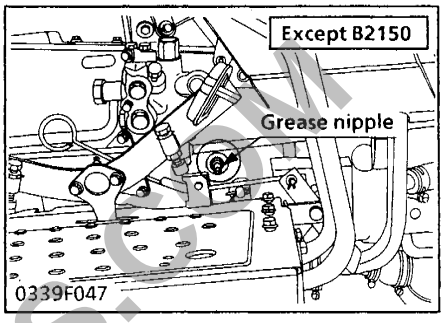
Center Pin



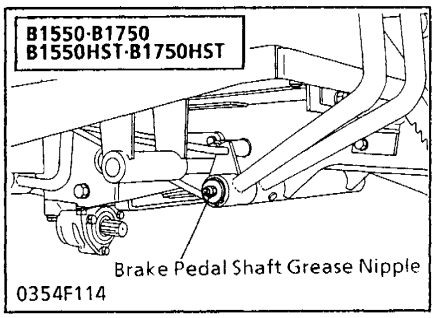
King Pins

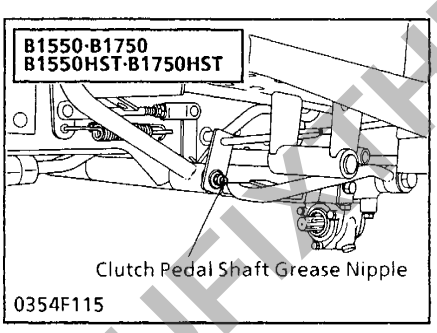


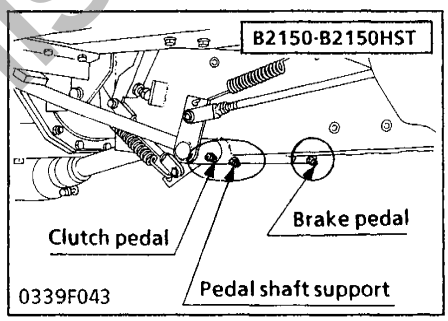
Clutch Release Hub



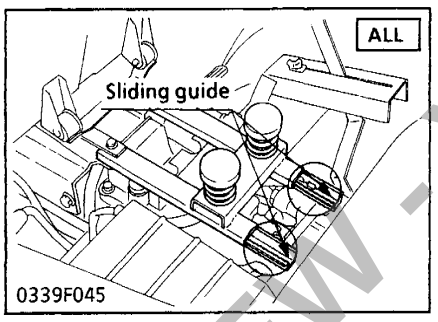
Pedal Shafts



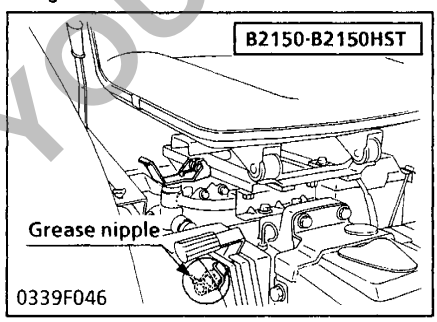




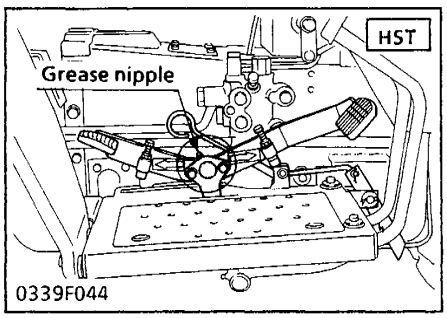
Seat Adjuster

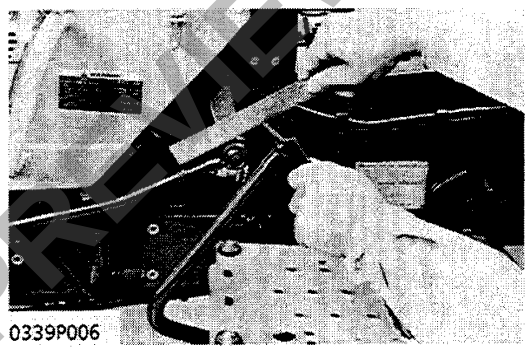


Range selector lever



Speed Control Pedal Shaft



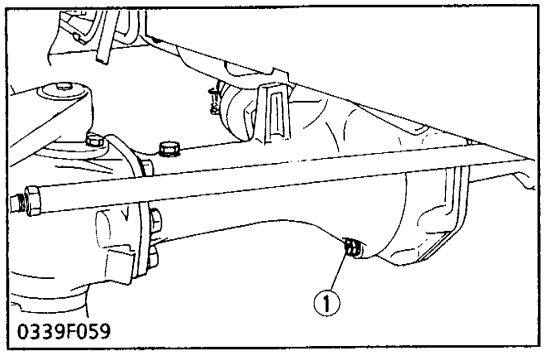


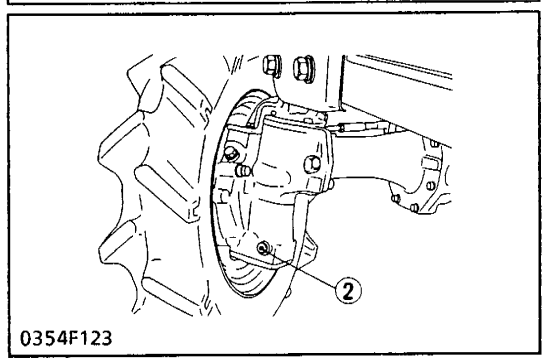
Checking Clutch Pedal Play

1. Depress the clutch pedal by hand, and measure the amount of pedal movement.
2. If the measurement is not within the factory specifications, adjust the play by changing the length of rod (1).
3. After adjusting it, be sure to keep the following distance for stopper bolt.
4. After adjusting them, try to start engine. If no start, check the safety switch setting position.

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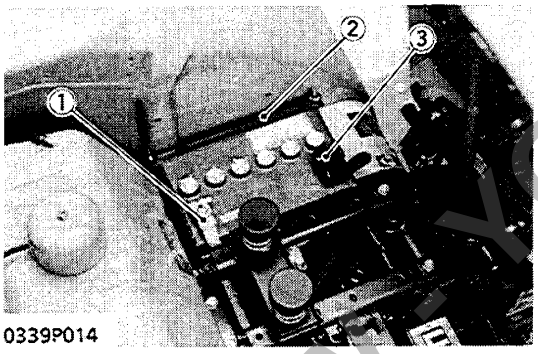
Draining Oil from Front Axle (4WD)

1. Remove the drain plug (1) to drain oil from the front axle differential case.
2. Remove the drain plugs (2) to drain oil from the right and left axle gear cases.

Place	Model	Capacity	Lubricants
Front axle diff. case	B2150 B2150HST	1.5 ℓ 1.6 U.S. qts. 1.3 Imp. qts.	Gear oil SAE 80 or SAE 90
Front axle gear case		0.5 ℓ x 2 0.5. U.S. qts. x 2 0.44 Imp. qts. x 2	

(1) Drain Plug (2) Drain Plug

[2] SEPARATING FRONT AXLE FROM ENGINE



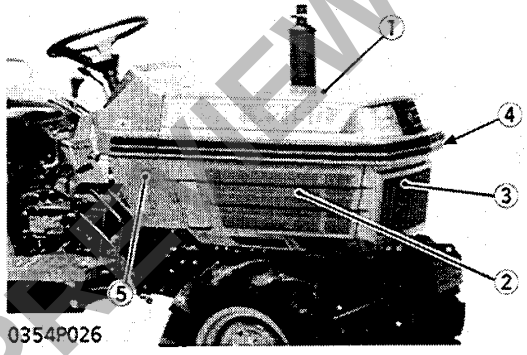
Battery

1. Remove the battery cover, and disconnect the battery cables.
2. Remove the battery support (2), and remove the battery.

■ **NOTE**

- **Disconnect the ground terminal cable (–) (1) first for disconnection, and connect the positive terminal cable (+) (3) first for reassembly.**

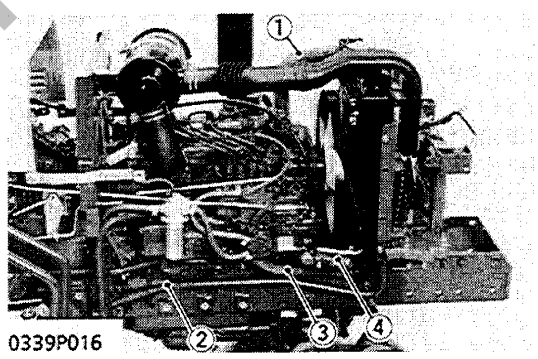
(1) Ground Terminal Cable (3) Positive Terminal Cable
(2) Battery Support



Hood and Skirts

1. Open the hood (1) from the front and remove the B-shape pins and hood link for keeping it open. And remove the hood (1).
2. Remove the right and left skirts (2), (4) with auxiliary skirt (LH). (After removing screws and sliding a little skirts forward, remove them.)
3. Remove the front skirt (3) by removing screws.
4. Remove both sides of dust cover (5) by removing screws.

(1) Hood (4) Left Skirt
(2) Right Skirt (5) Dust Cover
(3) Front Skirt



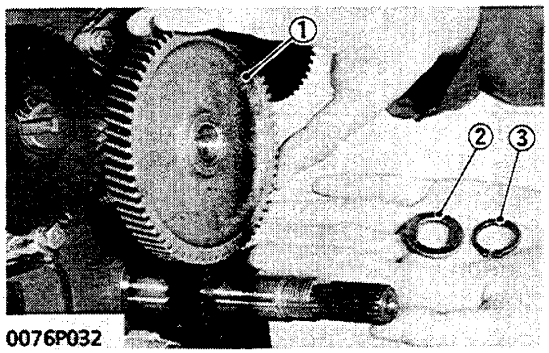
Radiator Hoses and Delivery Pipe

1. Loosen the clamps, and disconnect radiator hoses (1), (3) from radiator.
2. Loosen the clamps of delivery pipe (2) and radiator hose (4) from oil cooler. (HST type)

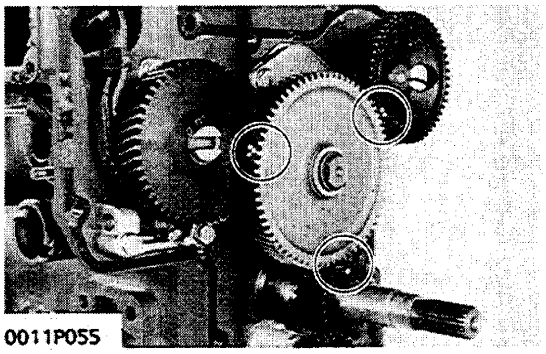
(1) Radiator Hose (3) Radiator Hose
(2) Delivery Pipe (4) Radiator Hose

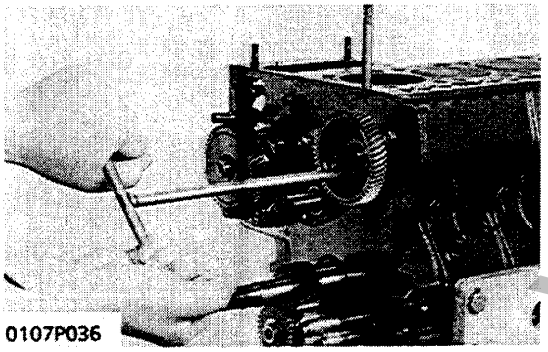
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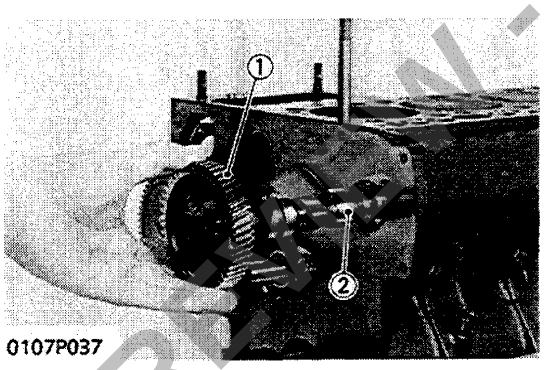
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0076P032


0011P055


0107P036



0107P037

Idle Gear

1. Remove the external snap ring (3).
2. Remove the idle collar **2** (2) and idle gear (1).
3. Remove the idle gear collar **1**.

(When reassembling)

Tightening torque	Idle gear shaft mounting screw	9.8 to 11.3 N·m 1.00 to 1.15 kgf·m 7.2 to 8.3 ft-lbs

■ IMPORTANT

- **When installing the idle gear, be sure to align the alignment marks on gears.**
  Idle gear and crank gear (Alignment mark ".")
  Idle gear and camshaft gear (Alignment mark "..")
  Idle gear and injection pump gear (Alignment mark ".·.")

(1) Idle Gear
(2) Idle Collar **2**
(3) External Snap Ring

Camshaft Stopper Mounting Screw

1. Align the round hole of the cam gear with the camshaft stopper mounting screw position.
2. Remove the camshaft stopper mounting screws.

Cam Gear and Camshaft

1. Remove the cam gear (1) and camshaft (2).

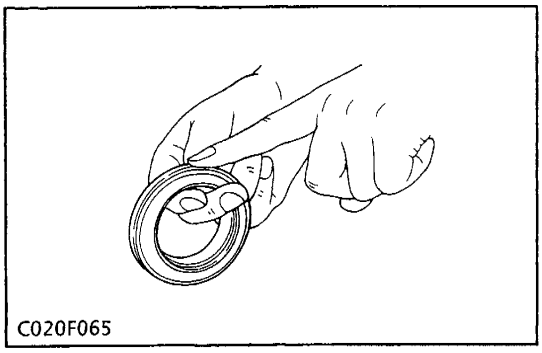
(When reassembling)

- Apply engine oil thinly to the camshaft before installation.

(1) Cam Gear
(2) Camshaft

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C020F065

Checking Clutch Release Bearing

1. Check the clutch release bearing. If surface is worn excessively, or abnormal sounds occur, replace it.

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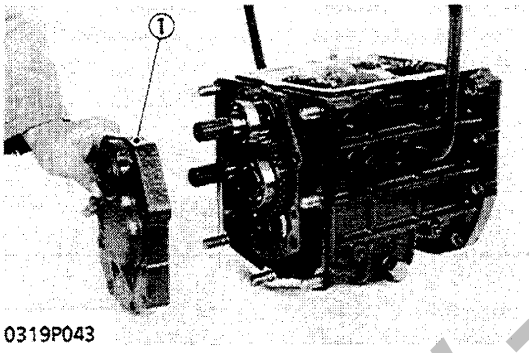
Clearance between 21T, 17T Gear and 3rd Shaft

1. Measure the 21T, 17T gear I.D. with an inside micrometer, and then 3rd shaft O.D. with an outside micrometer.
2. Measure the O.D. of two needles on the needle bearing with an outside micrometer.
3. Clearance is the difference between the gear I.D. and the sum of shaft O.D. and two needles O.D.
4. If the clearance exceeds the allowable limit, replace.

Clearance between 21T, 17T gear and 3rd shaft	Factory spec.	0.007 to 0.053 mm 0.0003 to 0.0021 in.
	Allowable limit	0.1 mm 0.039 in.
3rd shaft O.D.	Factory spec.	24.987 to 25.000 mm 0.9837 to 0.9843 in.
21T, 17T gear I.D.	Factory spec.	29.007 to 29.028 mm 1.1420 to 1.1428 in.
Needle O.D.	Factory spec.	1.997to 2.000 mm 0.0786 to 0.0787 in.

[4] TRANSMISSION CASE (B1550-B1750)

DISASSEMBLING AND ASSEMBLING



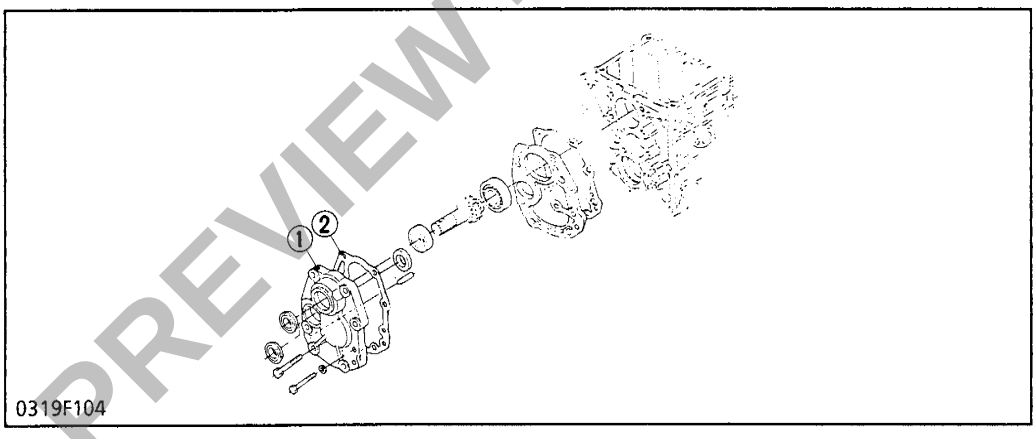
0319P043

Shaft Cover 1

1. Remove the shaft cover 1 (1).

(When reassembling)

- Be sure to replace the gasket (2) with a new one.



0319F104

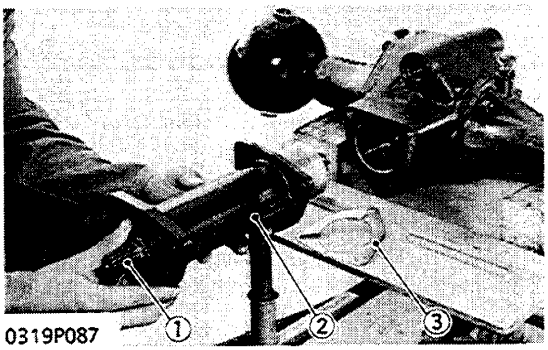
(1) Shaft Cover
(2) Gasket

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(1) Spiral Bevel Pinion Shaft (3) Shim
(2) Spacer

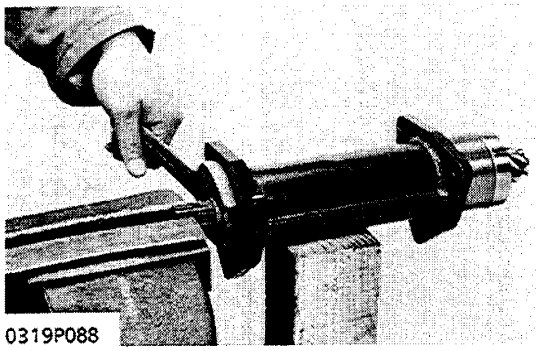
Joint Case and Spacer

1. Remove the joint case.
2. Tap out the spring pin, and remove the joint assembly from the spiral bevel pinion shaft.
3. Remove the spacer mounting screw.
4. Remove the spacer (2) with the spiral bevel pinion shaft (1).

(When reassembling)

- Apply liquid gasket (Three Bond 1102 or equivalent) to both sides of a new gasket.
- Use care not to damage the O-ring on the spacer.
- Install the spacer to the front axle arm, noting the number of shims between them and the assembling direction of shim (3).

Tightening torque	Spacer mounting screw	18.6 to 32.3 N·m 1.9 to 3.3 kgf·m 13.7 to 23.9 ft-lbs N·m

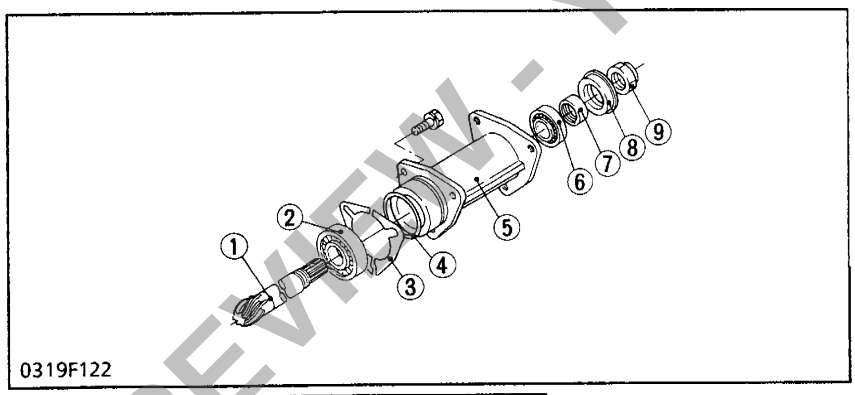


Spiral Bevel Pinion Shaft

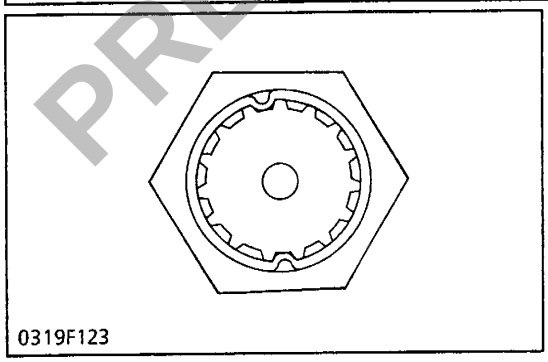
1. Secure the spiral bevel pinion shaft (1) in a vise.
2. Remove the stake of the staking nut and remove the staking nut (9).
3. Tap out the spiral bevel pinion shaft.

(When reassembling)

- Use care not to damage the oil seal (8).
- Replace the staking nut with a new one, and be sure to adjust the turning torque of spiral bevel pinion shaft. (Refer to page S.6-23)
- Stake the staking nut after performing adjustment, as shown in the figure.



(1) Spiral Bevel Pinion Shaft
(2) Taper Roller Bearing
(3) Shim
(4) O-ring
(5) Spacer
(6) Taper Roller Bearing
(7) Bushing
(8) Oil Seal
(9) Staking Nut



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SERVICING SPECIFICATIONS

MANUAL STEERING TYPE

[B1550·B1750·B1550HST·B1750HST]

Item		Factory Specification	Allowable Limit
Steering Wheel	Play	5 to 30 mm 0.2 to 1.2 in.	–
Ball Nut Assembly	Axial Play	–	0.2 mm 0.008 in.
Steering Shaft	Turning Torque (with Seal and Sector Shaft, w/o Bushing)	0.441 to 0.981 N·m 0.045 to 0.100 kgf·m 0.325 to 0.723 ft-lbs	–
	Turning Torque (w/o Bushing, Seal and Sector Shaft)	0.245 to 0.490 N.m 0.025 to 0.050 kgf·m 0.181 to 0.362 ft-lbs	–
Adjusting Shim	Thickness	0.05 mm, 0.0020 in. 0.08 mm, 0.0031 in. 0.10 mm, 0.0039 in. 0.20 mm, 0.0079 in.	–

[B2150·B2150HST]

Steering Wheel	Play	5 to 30 mm 0.2 to 1.2 in.	–
Ball Nut Assembly	Axial Play	–	0.2 mm 0.008 in.
Steering Shaft	Turning Torque (with Bushing, Seal and Sector Shaft	Less than 1.72 N·m 0.175 kgf·m 1.27 ft-lbs	–
	Turning Torque (w/o Bushing, Seal and Sector Shaft)	0.25 to 0.54 N·m 0.025 to 0.055 kgf·m 0.181 to 0.398 ft-lbs	–

POWER STEERING TYPE

[B1550·B1750·B1550HST·B1750HST]

Steering Wheel	Play	Less than 30 mm 1.2 in.	–
	Operation Force Condition: • Engine Speed Approx. 2600 rpm	Less than 5.9 N 0.6 kgf. 1.3 lbs.	–
Relief Valve	Setting Pressure Condition: • Engine Speed: Approx. 2600 rpm • Oil Temperature: 40° to 50° 104° to 122°F	10.30 to 11.28 MPa 105 to 115 kgf/cm^2 1493 to 1636 psi	–

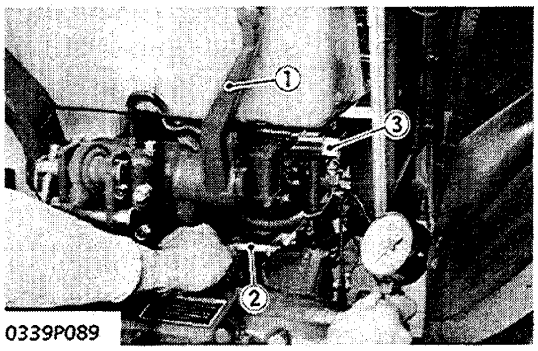
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[2] CONTROL VALVE

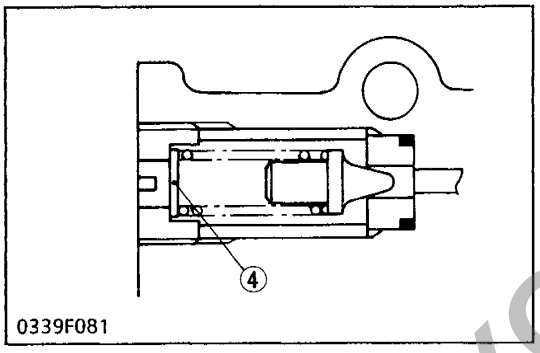
The control valve of B2150 is the same as that of B9200. The control valve of others is based on this.

CHECKING AND ADJUSTING



0339P089

(1) Lift Arm RH
(2) Feedback Holder
(3) Adaptor E (Screw Size PS 3/8") (Included in the tester)



0339F081

(4) Shim (Refer to (12) of Fig. 0339F024 in S.8-13)

Relief Valve Setting Pressure

1. Remove the feedback holder (2) from the lift arm (1).
2. Remove the joint bolt connecting the pipe and control valve. And install the adaptor **E** instead of the joint bolt. Then set the relief valve setting pressure tester **(Code No.: 07916-50045)**.
3. Start the engine, warm it up, and then set the engine speed at the **2600 rpm.**
4. Move the control lever to the "Lift" position, pull the feedback holder (2) to operate the relief valve and read the pressure gauge.
5. If the pressure is not within the factory specifications, adjust with the shim(4).
   For disassembling, see page S.8-15.

Relief valve setting pressure	Allowable limit	B1550·B1750 B1550HST B1750HST	12.7 to 13.7 MPa 130 to 140 kgf/cm² 1849 to 1991 psi
		B2150 B2150HST	13.2 to 13.7 MPa 135 to 140 kgf/cm² 1920 to 1991 psi

(Reference)

- The relief pressure can be increased by adding shim (4) and decreased by removing shim (4).

Shim Code No.	Thickness	Pressure Variance
67156-3668-0	0.2 mm	690 kPa 7 kgf/cm² 100 psi
67156-3666-0	0.3 mm	980 kPa 10 kgf/cm² 142 psi
67156-3667-0	0.8 mm	2.65 MPa 27 kgf/cm² 384 psi

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[4] CHARGING SYSTEM (Alternator type for Canada)

CHECKING

Alternator

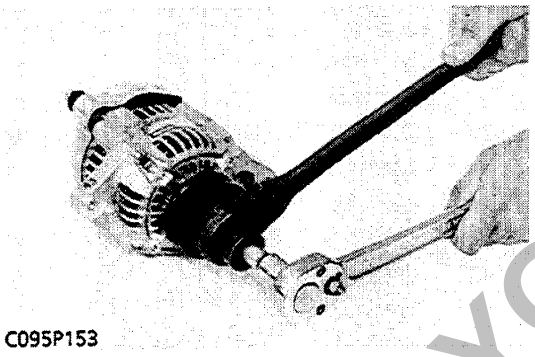
1) Connector Voltage

1. Disconnect the alternator lead and **2P** connector from the alternator after turning the main switch off.
2. Measure the voltage across the lead (Red) and the chassis.
3. Turn the main switch to **ON** position and measure the voltage across the **2P** connector **2** terminal (RY) and the chassis.
4. If the battery voltage is not indicated, check the main switch or wiring harness.

Voltage	Across connector terminal and chassis	Battery voltage

(Continued to page S.9-30)

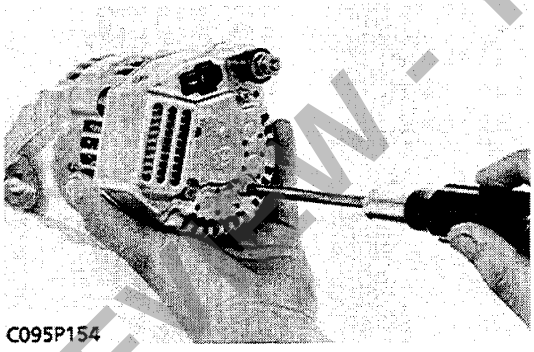
DISASSEMBLING AND ASSEMBLING



C095P153

Pulley

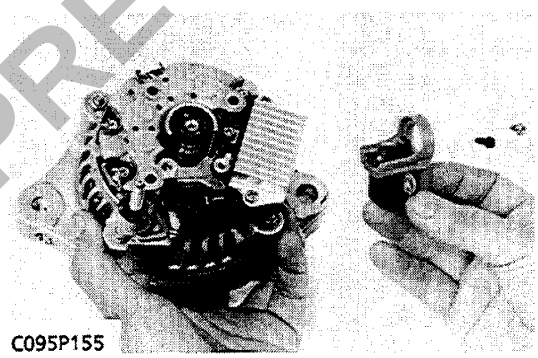
1. Secure the hexagonal end of the pulley shaft with a double-ended ratcher wrench as shown in the photo, loosen the nut with a socket wrench and remove it.



C095P154

Rear End Cover

1. Unscrew three rear end cover screws and the terminal **"B"** nut and remove the rear end cover.



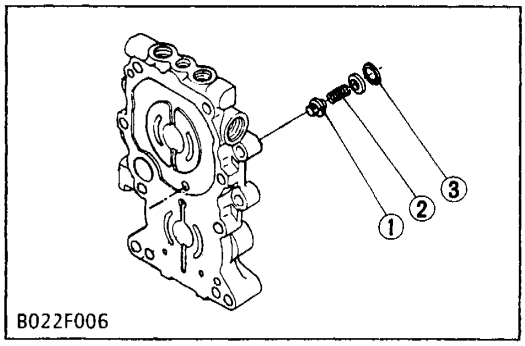
C095P155

Brush Holder

1. Unscrew two screws holding the brush holder and remove the brush holder.

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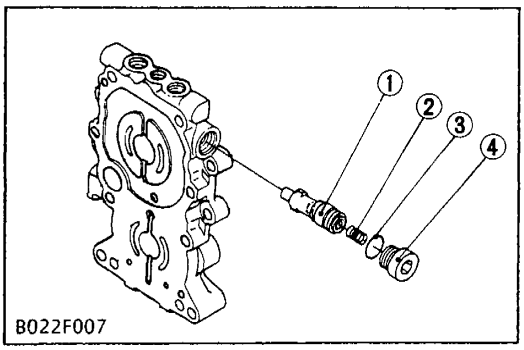
B022F006

Case Relief Valve

1. Check the valve and the spring for excessive wear and breakage.
2. If worn or broken, replace.

Length of valve spring	Factory spec.	23.0 mm, 0.906 in. (free)
		15.0 mm, 0.591 in. (load 29.4 N, 3.00 kgf, 6.62 lbs)

(1) Case Relief Valve
(2) Spring
(3) Internal Snap Ring



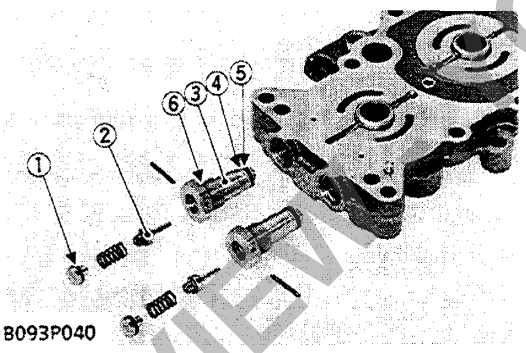
B022F007

(1) Valve
(2) Spring
(3) O-ring
(4) Cap Nut

Check and High Pressure Relief Valve

1. Check the valve (1) for scratches and damage.
2. Check the valve seat in the port block for damage.
3. Check the spring (2) for breakage and wear.
4. If anything unusual, replace the check and high pressure relief valve complete assembly.

Length of valve spring	Factory spec.	18.2 mm, 0.717 in. (free)
		14.5 mm, 0.571 in. (load 3.43 N, 0.35 kgf, 0.77 lbs)
Length of valve spring	Factory spec.	12.4 mm, 0.488 in. (free)
		10.5 mm, 0.413 in. (load 41.87 N, 4.27 kgf, 9.41 lbs)
Tightening torque	Cap nut	53.9 to 63.7 N·m 5.5 to 6.5 kgf·m 39.8 to 47.0 ft-lbs



B093P040

(1) O-ring
(2) Neutral Valve
(3) Valve Body
(4) Backup Ring
(5) O-ring
(6) O-ring

Neutral Valve

1. Remove the valve assembly and disassemble it.
2. Check the neutral valve (2) for their free movement on or in the valve body (3).
3. If the valve surface is scored, replace.
4. Check the holes of the valve body (3) and the neutral valve (2) for clogging.
5. If clogged, open hole with compressed air.
6. Check the O-rings (1), (5) and the backup ring (4) for scratches and damage.
7. Check the springs for breakage and wear.
8. If anything unusual, replace.

Length of valve spring	Factory spec.	18.4 mm, 0.7244 in. (free)
		13.9 mm, 0.5472 in. (load 43.2 N, 4.4 kgf, 9.7 lbs)

■ **NOTE**

- **When reassembling, replace the O-ring and the backup rings.**

Tightening torque	Valve body to case	53.9 to 63.7 N·m 5.5 to 6.5 kgf·m 39.8 to 47.0 ft-lbs

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