WSM

WORKSHOP MANUAL
TRACTOR

L3010,L3410,L3710,L4310

Kubota

KiSC issued 07, 2020 A

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⚠ SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and decals on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.
It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

⚠ **DANGER** : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ **WARNING** : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION** : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

■ **IMPORTANT** : Indicates that equipment or property damage could result if instructions are not followed.

■ **NOTE** : Gives helpful information.

SAFETY SERVICING AND REPAIRING

(1) Before working on the machine :
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement or mower to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery's ground cable.
- Clean the work area and machine.

(2) Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
(3) Do not wear a necktie, scarf, necklace, loose or bulky clothing when you work near machine tools or moving parts.
(4) Use tools appropriate to the work. Makeshift tools, parts, and procedures will not make good repairs.
(5) When servicing is performed together by two or more persons, take care to perform all work safely.
(6) Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.

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SPECIFICATIONS

Model			L3010-ROPS
			4WD
Maximum PTO power			19.1 kW (25.5 HP)*
Engine NET power			22.6 kW (30.4 HP)*
Engine	Model		D1503-L-A
	Type		Indirect injection, Vertical, Water-Cooled, 4-cycle diesel engine
	Number of cylinders		3
	Bore and stroke		83 x 92.4 mm (3.3 x 3.6 in.)
	Total displacement		1499 cm^3 (91.5 cu.in.)
	Rated revolution		45.0 r/s (2700 rpm)
	Combustion chamber		Spherical type (E-TVCS)
	Fuel injection pump		Bosch type mini pump (PFR3M)
	Governor		Centrifugal ball mechanical governor
	Injection nozzle		Throttle type
	Injection timing		Before T.D.C. 0.314 rad (18°)
	Injection order		1-2-3
	Injection pressure		13.73 MPa (140 kgf/cm^2, 1991 psi)
	Compression ratio		23 : 1
	Lubricating system		Forced lubrication by trochoidal pump
	Cooling system		Pressurized radiator, Forced circulation with water pump
	Starting system		Electric starting with cell starter 12 V, 1.2 kW
	Alternator		12 V, 480 W (40 AMPS)
	Battery		12V, RC : 123 min, CCA : 490- Cold cranking Amps at –18 °C (– 0.4 °F)
	Fuel		Diesel fuel No. 1 [below – 10 °C (14 °F)] Diesel fuel No. 2 [above – 10 °C (14 °F)]
	Lubricating oil		CC or CD (API grade)
	Weight (Dry)		176 kg (388 lbs)
Capacities	Fuel tank		35.0 ℓ (9.2 U.S.gals., 7.7 Imp.gals.)
	Engine crankcase		5.5 ℓ (5.8 U.S.qts., 4.8 Imp.qts.)
	Engine coolant		7.0 ℓ (7.4 U.S.qts., 6.2 Imp.qts.)
	Transmission case		39.0 ℓ (10.3 U.S.gals., 8.6 Imp.gals.)
	Front axle case		5.5 ℓ (5.8 U.S.qts., 4.8 Imp.qts.)
Dimensions with Std. tires)	Overall length (without 3P)		2820 mm (111.0 in.)
	Overall length (with 3P)		3060 mm (120.5 in.)
	Overall width (minimum tread)		1410 mm (55.5 in.)
	Overall height (Top of ROPS)		2090 mm (82.3 in.)
	Overall height (Top of steering wheel)		1515 mm (59.6 in.)
	Wheel base		1670 mm (65.7 in.)
	Min. ground clearance (Under transmission)		325 mm (12.8 in.)
	Tread	Front mm (in.)	1105 (43.5)
		Rear mm (in.)	1120 (44.1), 1220 (48.0), 1305 (51.4), 1405 (55.3)

Note : * Manufacturer's estimate

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[1] WIRING DIAGRAM

- **Main Switch**

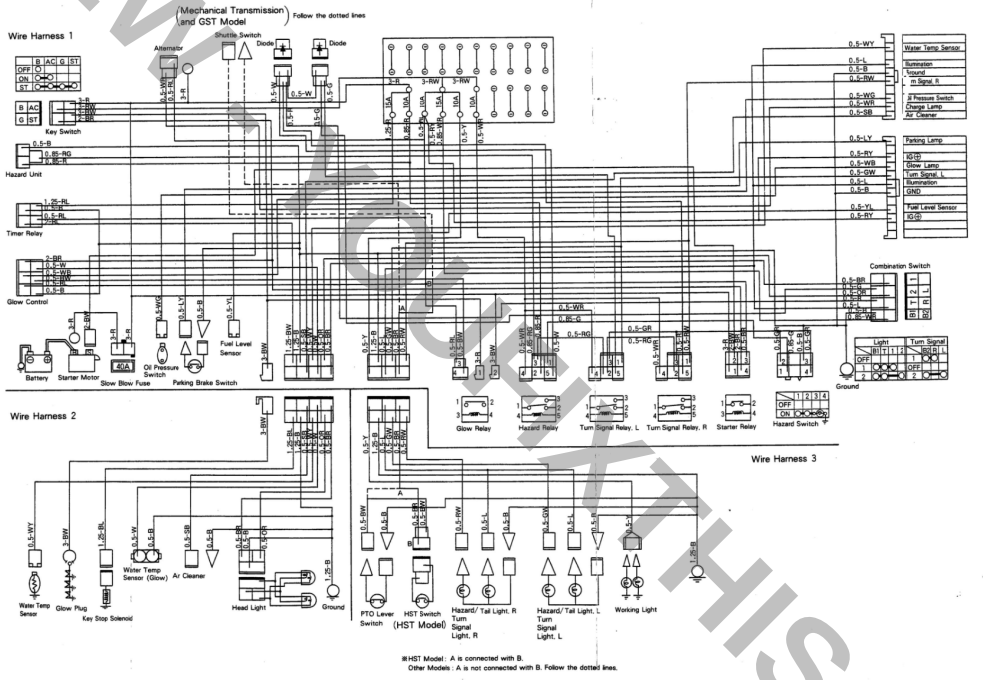
Key Position \ Terminal	B	AC	G	ST
OFF	●			
ON	●	●		
START	●	●	●	●

- **Combination Switch**

	Head Light Switch				Hazard Light Switch			
	B1	T	1	2		B2	R	L
OFF	●				OFF	●		
HIGH	●	●	●		ON	●	●	
LOW	●	●		●				

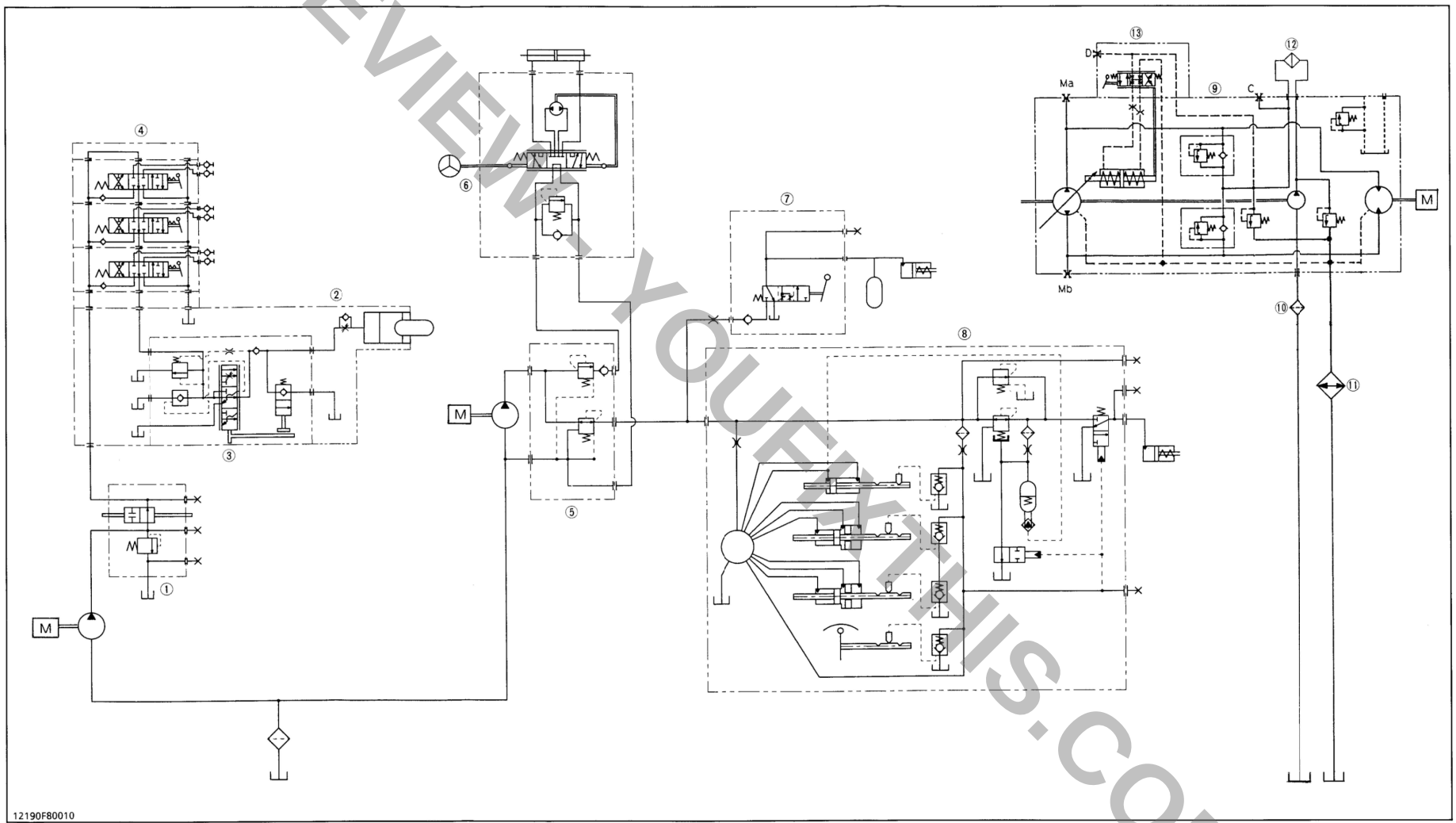
- **Color of Wiring**

W — White	WR — White / Red
R — Red	WY — White / Yellow
L — Blue	RW — Red / White
Y — Yellow	RL — Red / Blue
B — Black	RY — Red / Yellow
G — Green	BW — Black / White
Br — Brown	BL — Black / Blue
Or — Orange	BR — Black / Red
SB — Sky Blue	LY — Blue / Yellow
WG — White / Green	YG — Yellow / Green
WB — White / Black	



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[1] HYDRAULIC CIRCUIT

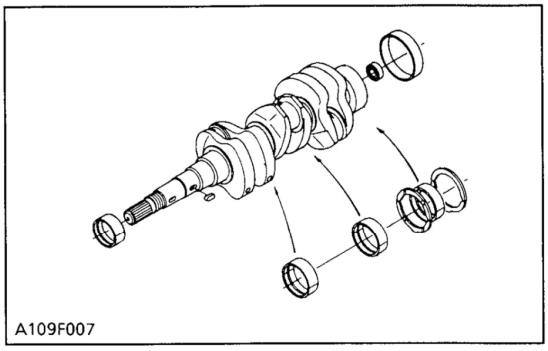


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(1) Front Hydraulic Block
(2) Hydraulic Cylinder Block
(3) Position Control Valve
(4) Auxiliary Control Valves
(5) Regulator Valve (Refer to **3 TRANSMISSION**)
(6) Power Steering Controller (Refer to **7 STEERING**)
(7) Independent PTO Valve (Refer to **3 TRANSMISSION**)
(8) GST Valve (Refer to **3 TRANSMISSION**)
(9) HST (HST MODEL)
(10) Strainer
(11) Oil Cooler
(12) HST Oil Filter
(13) Regulator

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(3) Crankshaft


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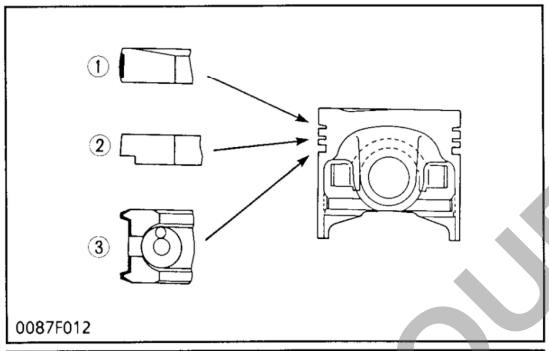
The crankshaft with the connecting rod converts the reciprocating motion of the piston into the rotating motion.

The crankshaft is made of tough special alloy steel, and the journals, pins and oil seal sliding portions are induction hardened to increase the hardness for higher wear resistance.

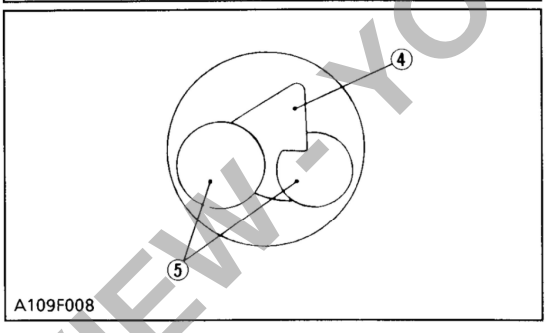
The front journal is supported by a solid type bearing, the intermediate journal by a split type, and the rear journal by a split type with thrust bearings.

The crankshaft is provided with an oil gallery, through which engine oil is fed to the crank pin portion, and lubricates it.

(4) Piston and Piston Rings



0087F012



A109F008

The piston has a slightly oval shape when cold (in consideration of thermal expansion) and a concave head.

Three rings are installed in grooves in the piston.

The top ring (1) is a keystone type, which can stand against heavy loads, and the barrel face on the ring fits well to the cylinder wall.

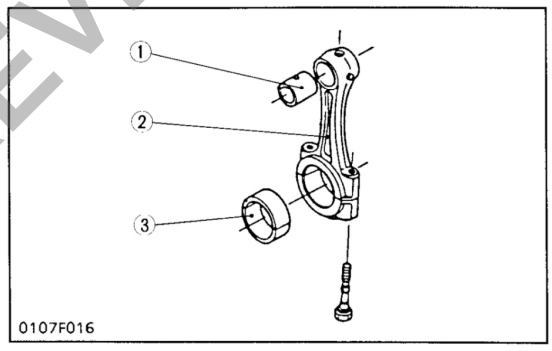
The second ring (2) is an undercut type, which effectively prevents the oil from being carried up.

The oil ring (3) has chamfered contact faces and an expander ring, which increase the pressure of the oil ring against the cylinder wall.

Several grooves are cut on the topland to help heat dissipate and to prevent scuffing.

(1) Top Ring
(2) Second Ring
(3) Oil Ring
(4) Depression
(5) Valve Recess

(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

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[6] TIGHTENING TORQUES (GENERAL USE SCREWS, BOLTS AND NUTS)

Screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual should be tightened according to the table below.

Indication on top of bolt	⬡ 4 No-grade or 4T						⬡ 7 7T						⬡ 9 9T		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Diameter	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M 6 (6 mm, 0.24 in.)	7.84 to 9.31	0.80 to 0.95	5.79 to 6.87	7.84 to 8.83	0.80 to 0.90	5.79 to 6.51	9.80 to 11.2	1.00 to 1.15	7.24 to 8.32	7.84 to 8.83	0.80 to 0.90	5.79 to 6.51	12.3 to 14.2	1.25 to 1.45	9.05 to 10.5
M 8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.0 to 15.2	16.7 to 19.6	1.7 to 2.0	12.3 to 14.5	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.2 to 45.0	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.1 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5	60.8 to 70.5	6.2 to 7.2	44.9 to 52.1
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5				77.5 to 90.1	7.9 to 9.2	57.2 to 66.5	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	103 to 117	10.5 to 12.0	76.0 to 86.8
M14 (14 mm, 0.55 in.)	108 to 125	11.0 to 12.8	79.6 to 92.5				124 to 147	12.6 to 15.0	91.2 to 108				167 to 196	17.0 to 20.0	123 to 144
M16 (16mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141				196 to 225	20.0 to 23.0	145 to 166				260 to 303	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	245 to 284	25.0 to 29.0	181 to 210				275 to 318	28.0 to 32.5	203 to 235				343 to 401	35.0 to 41.0	254 to 297
M20 (20mm, 0.79 in.)	334 to 392	34.0 to 40.0	246 to 289				368 to 431	37.5 to 44.0	272 to 318				490 to 568	50.0 to 58.0	362 to 420

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TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No fuel	Replenish fuel	–
	• Air in the fuel system	Bleed	G-24
	• Water in the fuel system	Change fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Change	G-20
	• Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil	G-8
	• Fuel with low cetane number	Use the specified fuel	G-8
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S17
	• Incorrect injection timing	Adjust	1-S45
	• Fuel camshaft worn	Replace	1-S28
	• Injection nozzle clogged	Clean	1-S46, S47
	• Injection pump malfunctioning	Repair or replace	1-S26, S47
	• Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	–
	• Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S15
	• Improper valve timing	Correct or replace timing gear	1-S28
	• Piston ring and cylinder worn	Replace	1-S36, S41
	• Excessive valve clearance	Adjust	1-S16
Starter Does Not Run	• Battery discharged	Charge	9-S7
	• Starter malfunctioning	Repair or replace	9-S11 to S14
	• Main switch malfunctioning	Repair or replace	9-S8, S9
	• Shuttle limit switch or PTO limit switch improperly adjusted or defective	Repair ro replace	9-S9
	• Starter relay defective	Replace	9-S9
	• Wiring disconnected	Connect	9-M1, M2
Engine Revolution Is Not Smooth	• Fuel filter clogged or dirty	Change	G-20
	• Air cleaner clogged	Clean or change	G-17
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S17
	• Injection pump malfunctioning	Repair or replace	1-S26, S47
	• Incorrect nozzle injection pressure	Adjust	1-S46
	• Injection nozzle stuck or clogged	Repair or replace	1-S17, S47
	• Governor malfunctioning	Repair	1-S26, S28
Either White or Blue Exhaust Gas Is Observed	• Excessive engine oil	Reduce to the specified level	1-S10
	• Piston ring and cylinder worn or stuck	Repair or replace	1-S36, S41
	• Incorrect injection timing	Adjust	1-S45
	• Deficient compression	Adjust top clearance	1-S15
Either Black or Dark Gray Exhaust Gas Is Observed	• Overload	Lessen the load	–
	• Low grade fuel used	Use the specified fuel	G-8
	• Fuel filter clogged	Change	G-20
	• Air cleaner clogged	Clean or change	G-17
	• Deficient nozzle injection	Repair or replace the nozzle	1-S17, S47

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[7] MAINTENANCE CHECK LIST

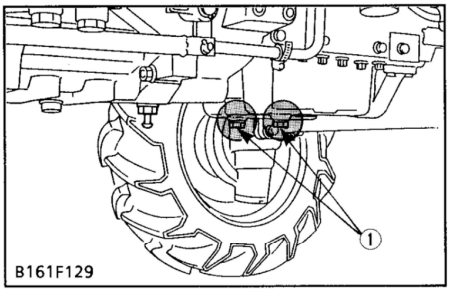
No.	Check point	Indication on hour meter (Change or check every interval shown below)															After purchase		Reference page
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	1 year	2 years	
1	Greasing	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			G-14
2	Engine starting system checking	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			G-15
3	Wheel bolt torque checking	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			G-16
4	Battery condition checking		○		○		○		○		○		○		○		○			G-15
5	Engine oil changing	◎	○		○		○		○		○		○		○		○			G-12
6	Air cleaner element cleaning ★		○		○		○		○		○		○		○		○			G-17
7	Fuel filter element cleaning		○		○		○		○		○		○		○		○			G-17
8	Fan belt tension adjustment		○		○		○		○		○		○		○		○			G-18
9	Clutch pedal free travel adjustment	◎	○		○		○		○		○		○		○		○			G-18
10	Brake pedal free travel adjustment		○		○		○		○		○		○		○		○			G-18
11	Engine oil filter cartridge replacement	◎			○				○				○				○			G-12
12	Hydraulic oil filter cartridge replacement	◎			○				○				○				○			G-12
13	Radiator hose and clamp checking				○				○				○				○			G-19
14	Power steering oil line checking				○				○				○				○			G-19
15	Fuel line checking				○				○				○				○			G-20
16	Toe-in adjustment				○				○				○				○			G-19
17	Transmission fluid changing	◎							○								○			G-13
18	Front axle case oil changing	◎							○								○			G-13
19	Front axle pivot adjustment	◎											○							G-14
20	Fuel filter element replacement								○								○			G-20
21	Greasing (2WD front wheel hub)								○								○			G-20
22	Engine valve clearance adjustment																○			G-21
23	Air cleaner element replacement																	○		G-22
24	Radiator hose and clamp replacement																		○	G-22
25	Power steering oil line replacement																		○	G-22
26	Fuel line replacement																		○	G-23

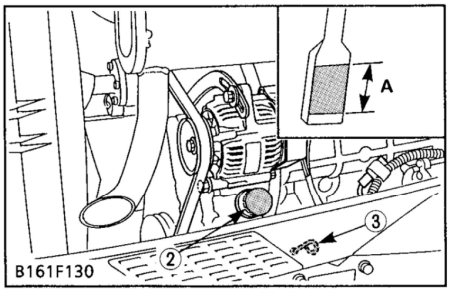
Note : The jobs indicated by ◎ must be done by all means 50 hours after the break-in respectively.
The jobs indicated by ☆ service as required.
★ Air cleaner should be cleaned more often in dusty conditions than in normal conditions.

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(2) Check Points of Initial 50 Hours





Changing Engine Oil

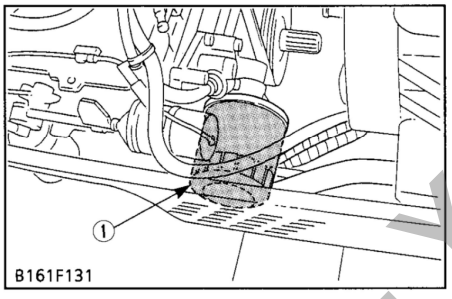
1. Start and warm up the engine for approx. 5 minutes.
2. Place an oil pan underneath the engine.
3. To drain the used oil, remove the drain plugs (1) at the bottom of the engine and drain the oil completely.
4. Screw in the drain plug.
5. Fill new oil up to upper line on the dipstick.

■ IMPORTANT

- **When using an oil of different manufacture or viscosity from the previous one, remove all of the old oil. Never mix two different types of oil.**
- **Use the proper SAE Engine Oil according to ambient temperatures. Refer to "LUBRICANTS, FUEL AND COOLING WATER". (See page G-8.)**

[A] Oil level is acceptable within this range.

(1) Drain Plug
(2) Oil Inlet Plug
(3) Dipstick



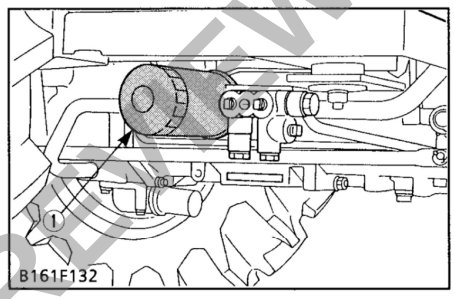
(1) Engine Oil Filter Cartridge

Replacing Engine Oil Filter Cartridge

1. Remove the engine oil filter cartridge (1).
2. When installing, apply the clean engine oil slightly to the rubber gasket.
3. Tighten the filter cartridge (1) quickly until it contacts the mounting surface. Tighten filter cartridge (1) by hand an additional 1/2 turn only.
4. After the new cartridge has been replaced the engine oil level normally decreases a little. Add engine oil to proper level. Check for oil leaks around filter gasket.

■ IMPORTANT

- **To prevent serious damage to the engine, replacement oil filter cartridge must be highly efficient. Use only a genuine KUBOTA filter.**



(1) Hydraulic Oil Filter Cartridge

Replacing Hydraulic Oil Filter Cartridge

1. Remove the hydraulic oil filter cartridge (1).
2. When installing, apply the clean transmission oil slightly to the rubber gasket.
3. Tighten the hydraulic oil filter cartridge (1) quickly until it contacts the mounting surface. Tighten hydraulic oil filter cartridge (1) by hand an additional 1/2 turn only.
4. After the new cartridge has been replaced, the transmission fluid level normally decreases a little. Add KUBOTA SUPER UDT fluid to proper level. Check for oil leaks around filter gasket.

■ IMPORTANT

- **To prevent serious damage to the hydraulic system, replacement oil filter cartridge must be highly efficient. Use only a genuine KUBOTA filter.**

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[5] LUBRICANTS, FUEL AND COOLING WATER

Place	Capacity				Lubricants, fuel and cooling water	
	L3010	L3410	L3710	L4310		
Fuel tank	35 ℓ 9.2 U.S.gals. 7.7 Imp. gals.				No.2-D diesel fuel No.1-D diesel fuel if temperature is below – 10 °C (14 °F)	
Cooling system	7.0 ℓ 7.4 U.S.qts. 6.2 Imp.qts.		7.5 ℓ 7.9 U.S.qts. 6.6 Imp.qts.		Fresh clean water with anti-freeze	
Engine crankcase	5.5 ℓ 5.8 U.S.qts. 4.8 Imp.qts.		7.6 ℓ 8.0 U.S.qts. 7.0 Imp.qts.		Engine oil : API Service CC or CD Below 0 °C (32 °F) ····· SAE10W, 10W-30 or 10W-40 0 to 25 °C (32 to 77 °F) ····· SAE20, 10W-30 or 10W-40 Above 25 °C (77 °F) ····· SAE30, 10W-30 or 10W-40	
Transmission case	39 ℓ 41.2 U.S.qts. 34.3 Imp.qts.				KUBOTA SUPER UDT fluid *	
Front axle case [4WD]	5.5 ℓ 5.8 U.S.qts. 4.8 Imp.qts.				KUBOTA SUPER UDT fluid * or SAE 80, 90 gear oil	
Greasing						
Front wheel hub [2WD]	Until grease overflows				2 points	Bearing grease
Knuckle shaft [2WD]					2 points	SAE multi-purpose type grease
Top link					1 or 2 points	
Top link bracket (with draft control)					2 points	
Lift rod					1 point	
Power steering cylinder					1 point	
Battery terminal	Moderate amount				2 points	

* : KUBOTA original transmission hydraulic fluid

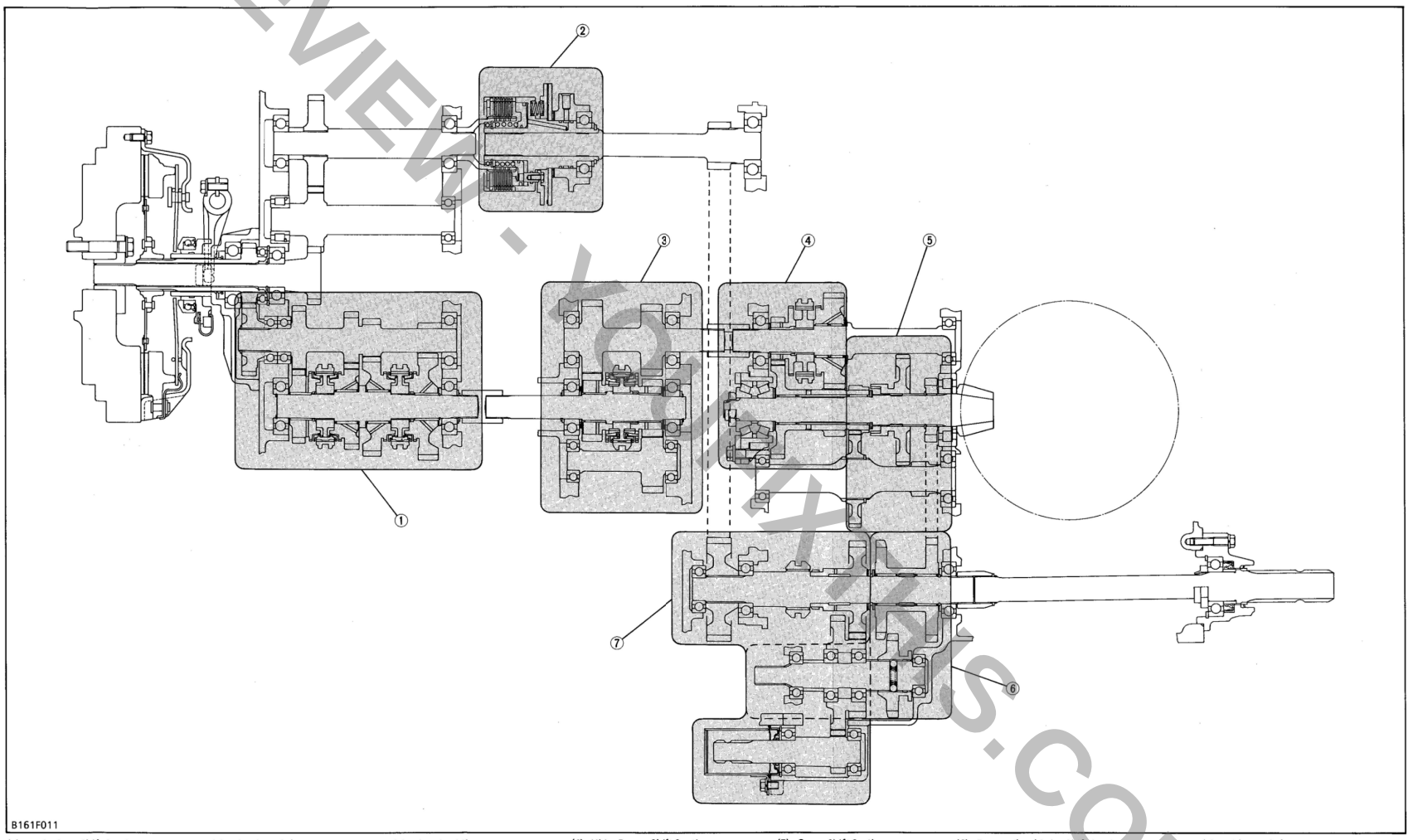
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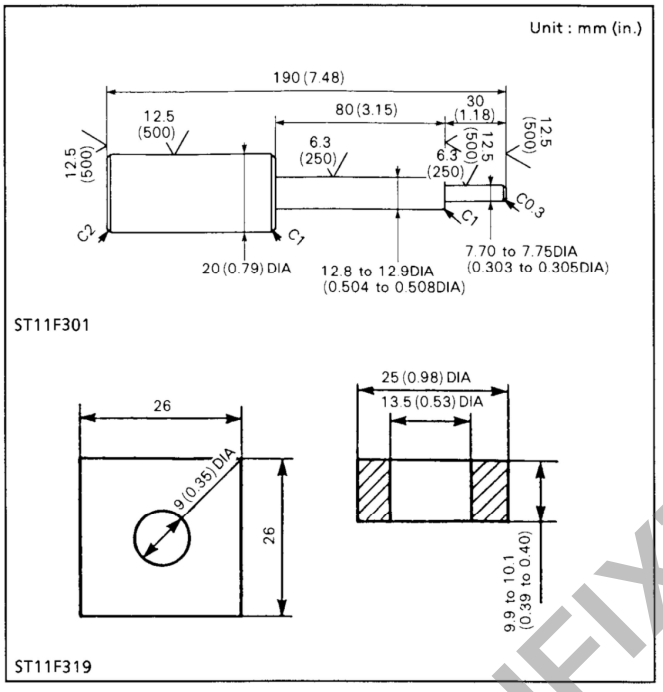
[1] STRUCTURE

[L3710 4WD, INDEPENDENT PTO, CREEPING SPEED]



(1) Main Gear Shift Section (2) Clutch Pack for PTO (3) Shuttle Shift Section (4) Hi-Lo Range Shift Section (5) Creep Shift Section (6) Front Wheel Drive Shift Section (7) Mid PTO Shift Section

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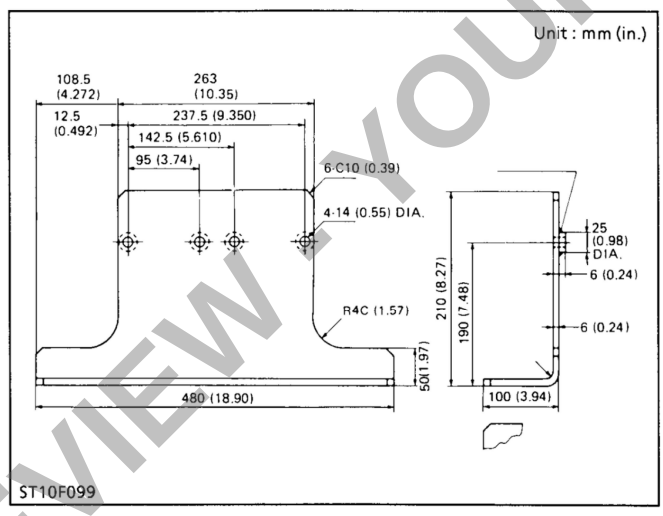


Valve Guide Replacing Tool

Application : Use to press out and press fit the valve guide.

■ **NOTE**

- **This special tool is not provided, so make it referring to the figure.**



Engine Stand

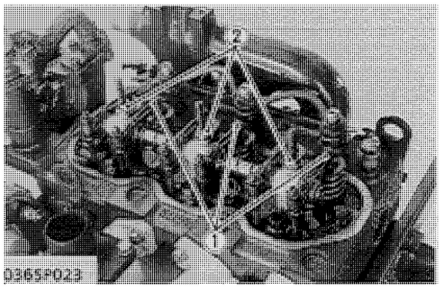
Application : Use to support engine.

■ **NOTE**

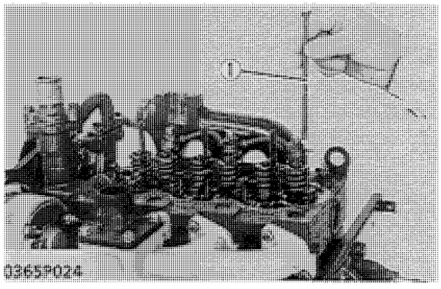
- **This special tool is not provided, so make it referring to the figure.**

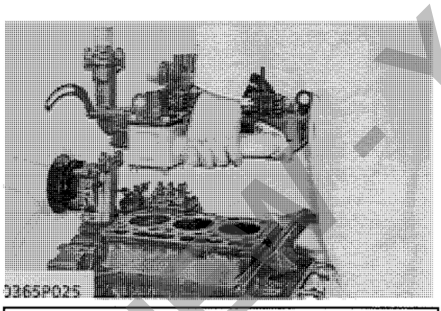
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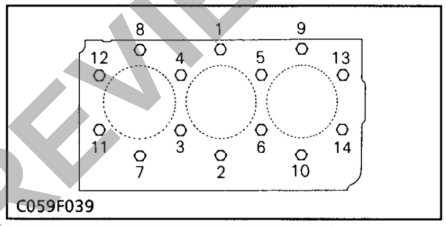
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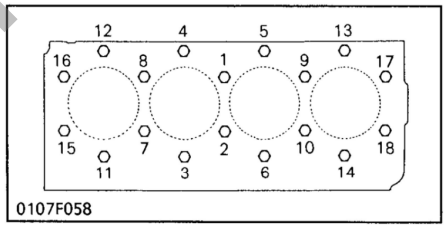


(1) Rocker Arms (2) Rocker Arm Bracket Nuts









Rocker Arm

1. Remove the rocker arm bracket nuts (2).
2. Detach the whole rocker arm (1).

(When reassembling)

- Always adjust the valve clearance.
- Before installing the rocker arm bracket, check to see if there are any metallic particles on the surface on which the assembly is mounted.

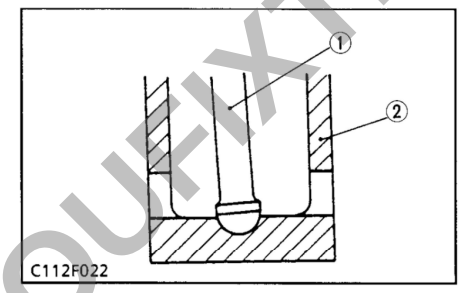
Tightening torque	Rocker arm bracket nuts	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

Push Rods

1. Remove the push rods (1).

(When reassembling)

- When putting the push rods onto the tappets, check to see if their ends are properly engaged with the grooves.



(1) Push Rods
(2) Tappet

Cylinder Head

1. Remove the fourteen cylinder head screws.
2. Lift up the cylinder head to detach.

(When reassembling)

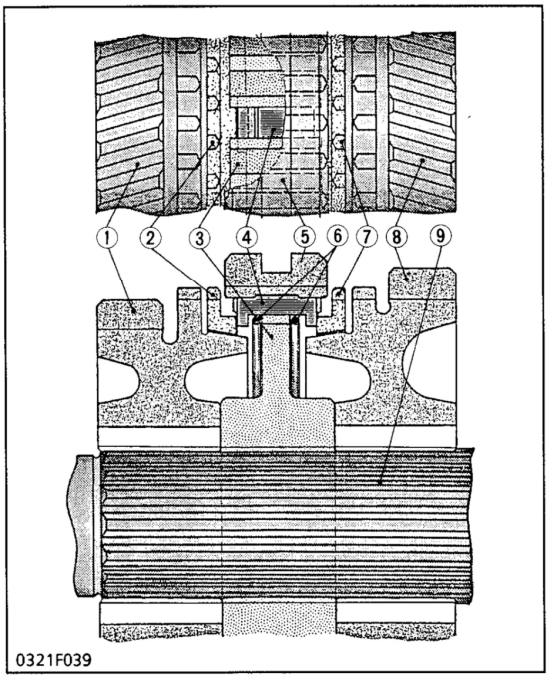
- Tighten the cylinder head screws after applying sufficient oil.
- Tighten the cylinder head screws in diagonal sequence starting from the center. (Refer to figure left.)
  Tighten them uniformly, or the head may deform in the long run.

■ IMPORTANT

- **When overhauling the engine, replace the gasket with a new one without confusing its front and back.**
  Retighten the cylinder head screws after running the engine for 30 minutes.

Tightening torque	Cylinder head screws	93.1 to 98.0 N·m 9.5 to 10.0 kgf·m 68.7 to 72.3 ft-lbs

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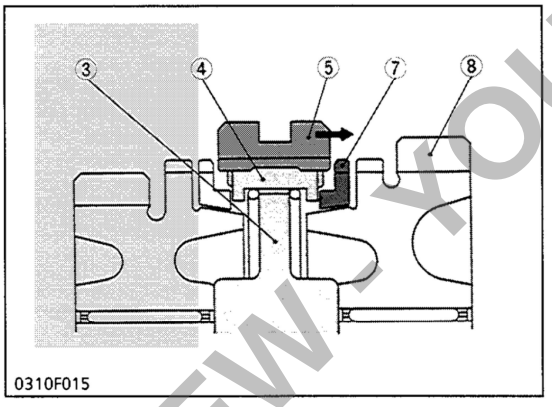


0321F039

■ Block-type Synchromesh Mechanism (For Main Gear Shift, Hi-Lo Range Shift Section)

The hub (3) is splined to the counter shaft (9) and the shifter (5) is mounted on the hub (3). The two synchronizer springs (6) hold the synchronizer keys (4) out against the shifter (5). The bronze synchronizer rings (2), (7) each has three slots into which the ends of the synchronizer keys (4) fit. The inner surfaces of the synchronizer rings (2), (7) are cone-shaped and match the conical shape of the gear (1), (8) shoulders which they contact. These cone-shaped surfaces provide the frictional force to synchronize the speed of the first shaft with the gears (1), (8).

(1) Gear
(2) Synchronizer Ring
(3) Hub
(4) Synchronizer Key
(5) Shifter
(6) Synchronizer Spring
(7) Synchronizer Ring
(8) Gear
(9) Counter Shaft



0310F015

■ First Stage

An effort to place the main gear shift lever to the 3rd or 4th speed causes the shifter (5) and synchronizer keys (4) to move slightly. Then, the end surface of the synchronizer key (4) presses the synchronizer ring (7) against the cone-shaped portion of the gear (8). The frictional force generated at the cone-shaped portion rotates the synchronizer ring (7), synchronizer keys (4) and hub (3) which is splined to the counter shaft.

(3) Hub
(4) Synchronizer Key
(5) Shifter
(7) Synchronizer Ring
(8) Gear

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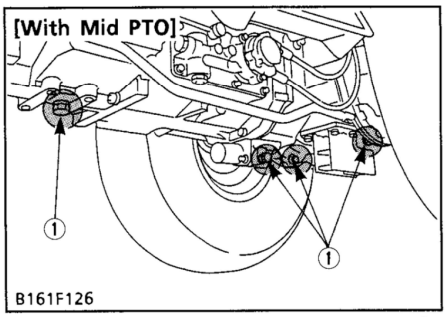
General Page 156

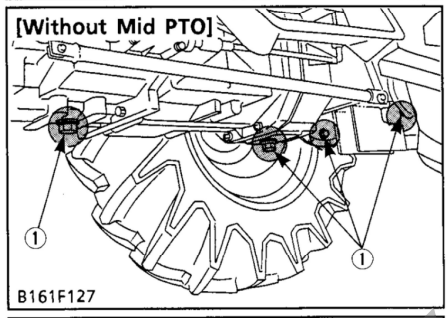
DISASSEMBLING AND ASSEMBLING

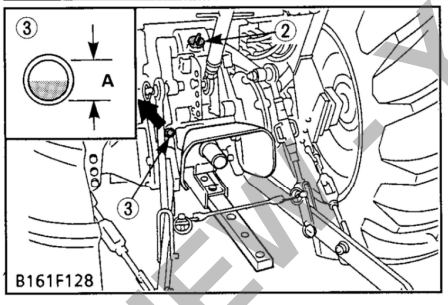
■ **NOTE**

- **If the tractors are cabin specifications, refer to section 10 CABIN [1] SEPARATING CABIN FROM TRACTOR BODY. (See page 10-S20.)**

(1) Draining the Transmission Fluid







Draining the Transmission Fluid

1. Place oil pans underneath the transmission case.
2. Remove the four drain plugs (1).
3. Drain the transmission fluid.
4. Reinstall the four drain plugs (1).

(When refilling)

- Fill up from filling port after removing the filling plug (2) until reaching the gauge (3).
- After running the engine for few minutes, stop it and check the oil level again, add the fluid to prescribed level if it is not correct level.

Capacity	Transmission fluid	39.0 ℓ 41.2 U.S.qts. 34.3 Imp.qts.

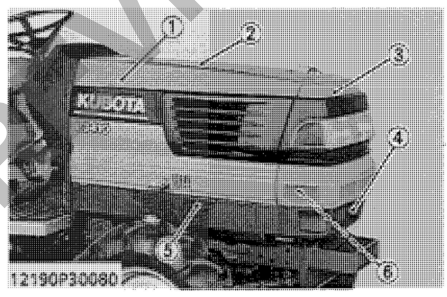
■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "LUBRICANTS, FUEL AND COOLING WATER". (See page G-8.)**
- **Do not mix different blands fluid together.**

[A] Oil level is acceptable within this range.

(1) Drain Plug
(2) Filling Plug
(3) Gauge

(2) Separating Panel Frame Assembly



Preparation 1

1. Open the front mask (3) and disconnect the battery negative cable (6).
2. Remove the right and left side covers (1).
3. Remove the front mask (3).
4. Remove the front grille (4).
5. Remove the right and left side skirts (5).
6. Remove the bonnet (2).

(1) Side Cover RH, LH
(2) Bonnet
(3) Front Mask
(4) Front Grille
(5) Side Skirt RH, LH
(6) Battery Negative Cable

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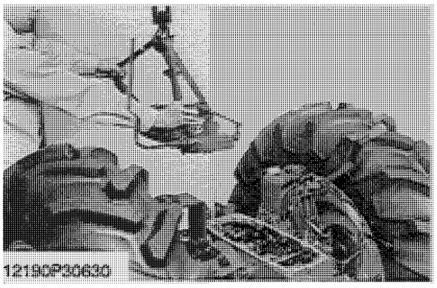
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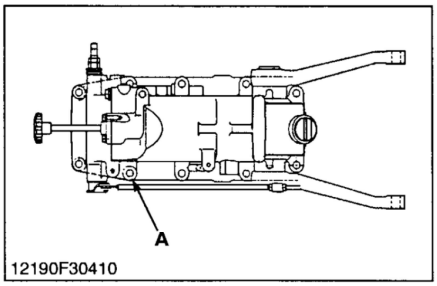
3-2 TRANSMISSION (HST MODEL)

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12190P30630



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Hydraulic Cylinder Assembly

1. Remove the wiring harness.
2. Disconnect the draft control rod from the top link bracket. (If equipped.)
3. Loosen and remove the hydraulic cylinder assembly mounting screws and nut.
4. Support the hydraulic cylinder assembly with nylon lift strap and hoist, and then take out it.

(When reassembling)

- Apply liquid gasket (Three Bond 1208D or equivalent) to joint face of the hydraulic cylinder assembly and transmission case after eliminating the water, oil and stuck liquid gasket.
- When replacing the hydraulic cylinder assembly mounting stud bolts, apply liquid lock (Three Bond 1372 or equivalent) to **"A"** portion of the stud bolt.

Tightening torque	Hydraulic cylinder assembly mounting stud bolt	34.3 to 49.0 N·m 3.5 to 5.0 kgf·m 25.3 to 362 ft-lbs
	Hydraulic cylinder assembly mounting screw and nut	77.4 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

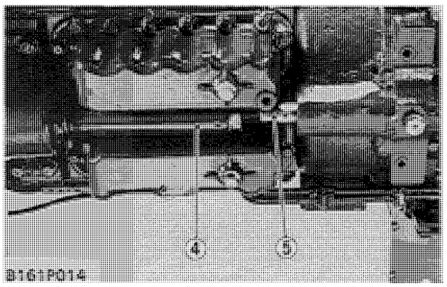
■ NOTE

- **Reassemble the hydraulic cylinder assembly to the tractor, be sure to adjust the position control feedback rod and draft control rod (if equipped). (See page 8-S9, S10.)**

12190S30570

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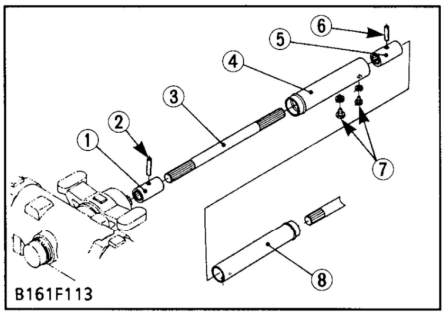
Propeller Shaft [4WD Type Only]

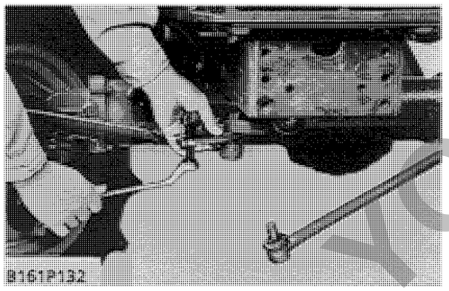
1. Slide the propeller shaft cover (4), (8) after removing the screws (7).
2. Tap out the spring pin (6), and then slide the coupling (5) to the front.

(When reassembling)

- Apply grease to the splines of the propeller shaft.

(1) Coupling
(2) Spring Pin
(3) Propeller Shaft
(4) Propeller Shaft Cover
(5) Coupling
(6) Spring Pin
(7) Screws
(8) Propeller Shaft Cover



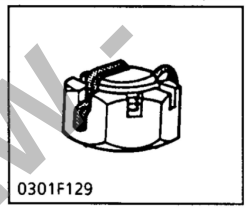


Bumper and Tie-rods

1. Remove the bumper.
2. Remove the tie-rods with the tie-rod end lifter.
   In this case, take special care not to damage the tie-rod end nut (slotted nut). (It is preferable to replace it with an unrequired nut.)
3. Reinstall the bumper.

(When reassembling)

Tightening torque	Tie-rod end nut	2WD	49.0 to 68.6 N·m 5.0 to 7.0 kgf·m 36.2 to 50.6 ft-lbs
		4WD	39.2 to 45.1 N·m 4.0 to 4.6 kgf·m 28.9 to 33.3 ft-lbs
	Tie-rod clamp screw and nut		39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.1 ft-lbs



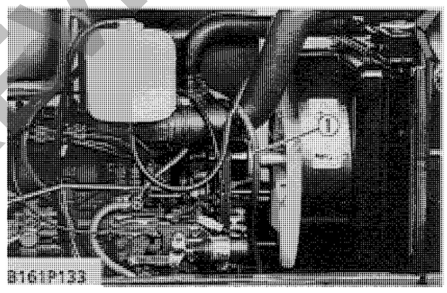
■ IMPORTANT

- **After tightening the tie-rod end nut to the specified torque, install a cotter pin as shown in the figure left.**

Breather Pipe [4WD Type Only]

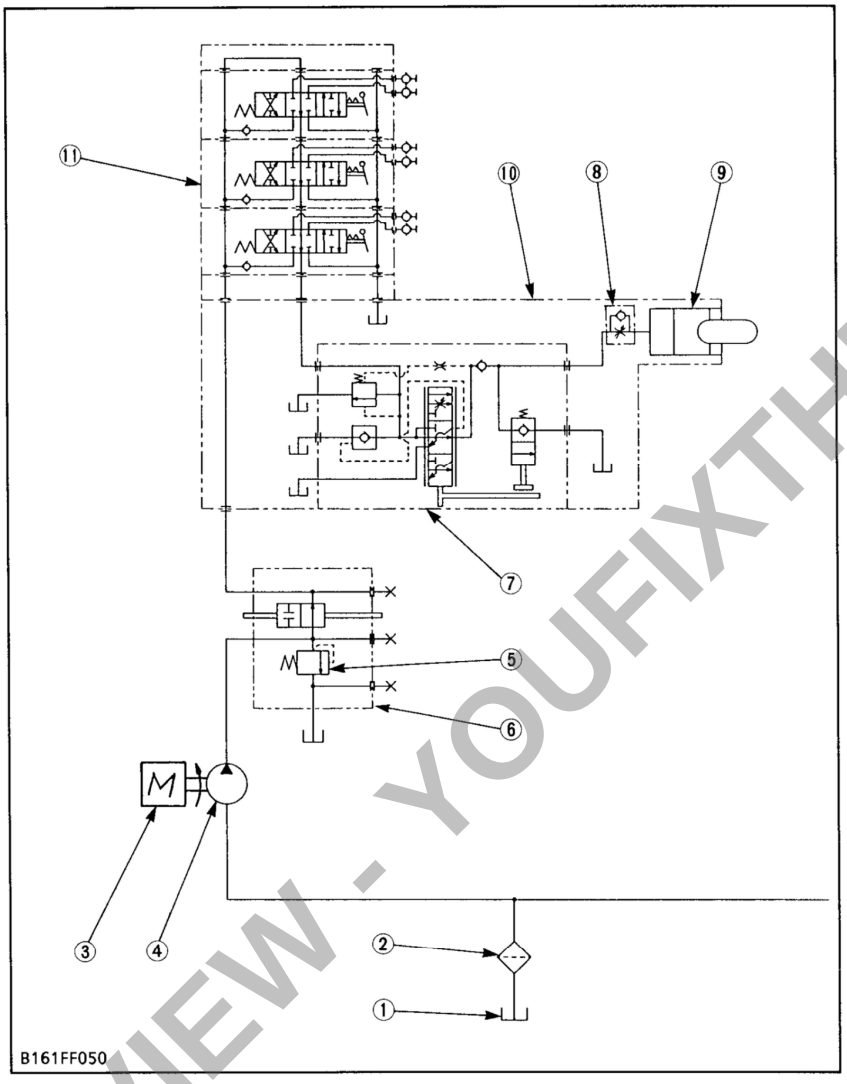
1. Remove the breather pipe (1) clamp.

(1) Breather Pipe



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[3] HYDRAULIC CIRCUIT FOR THREE POINT HYDRAULIC SYSTEM



(1) Oil Tank (Transmission Case)
(2) Hydraulic Oil Filter Cartridge
(3) Engine
(4) Three Point System Hydraulic Pump
(5) Relief Valve
(6) Front Hydraulic Block
(7) Position Control Valve
(8) Lowering Speed Adjusting Valve
(9) Hydraulic Cylinder
(10) Hydraulic Cylinder Block
(11) Auxiliary Control Valve

■ Hydraulic Oil Flow

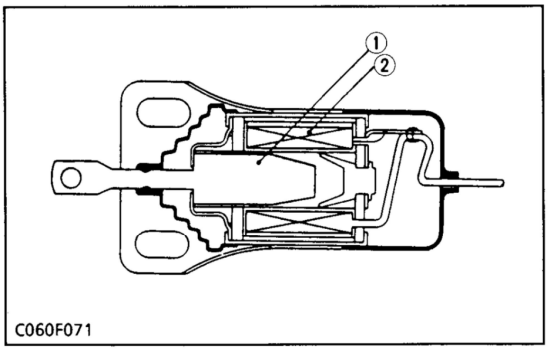
1. When the engine (3) is started, the hydraulic pump (4) is rotated to draw oil from the transmission case (1) through the suction pipe. Supplied oil is filtered by the hydraulic oil filter cartridge (2).
2. Filtered oil is forced out by the hydraulic pump to the front hydraulic block (6). When a front end loader is equipped with the tractor, oil pressure is taken from the front hydraulic block (6), and the return oil from the front end loader flows back to this front hydraulic block (6), to be returned into the oil hydraulic circuit.
3. After that oil into the position control valve (7) through the delivery pipe.
4. The position control valve (7) switches the oil flow, and oil is channeled to the hydraulic cylinder (9) for the three-point hydraulic system or returned to the oil tank (transmission case) (1).

- The hydraulic system has a relief valve (5) which restricts the maximum pressure in the circuit.
- When hydraulic power is taken out to use a hydraulically-operated implement, implement's cylinders can be actuated by operating the double-acting auxiliary control valve (11).

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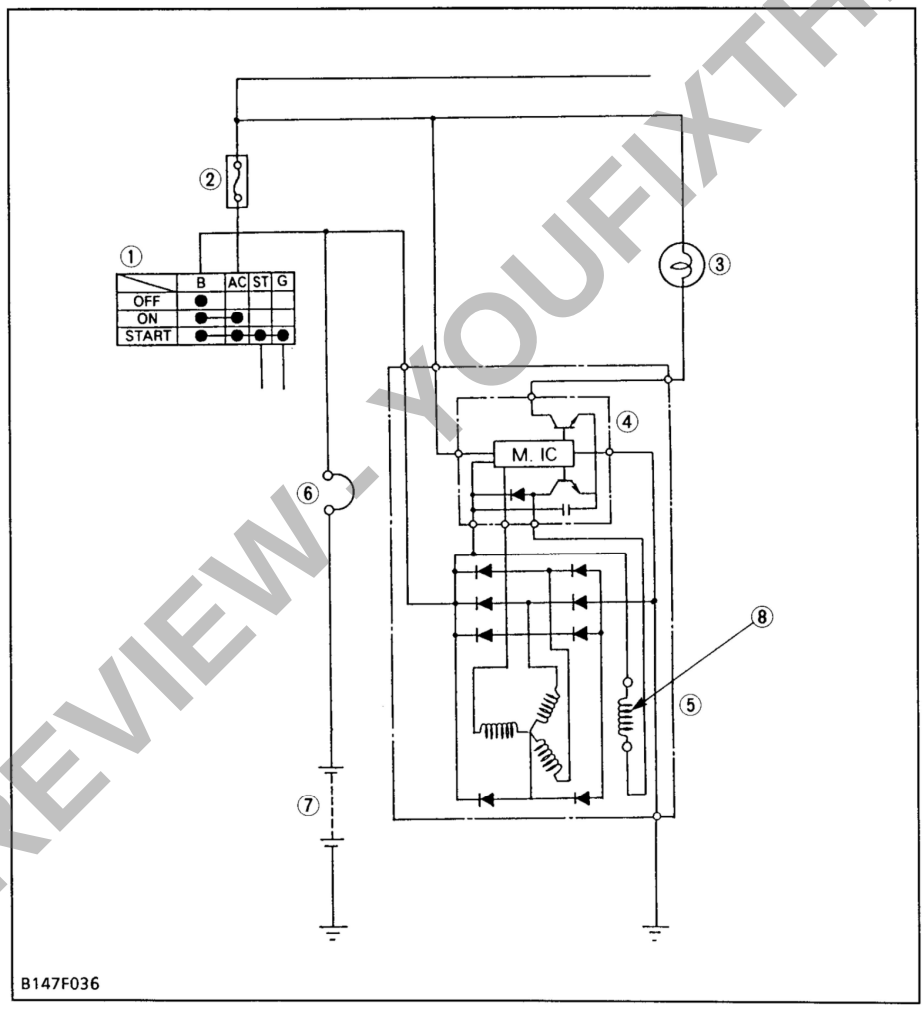
(2) Fuel Cut Off Solenoid



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

[5] CHARGING SYSTEM



(1) Main Switch
(2) Fuse
(3) Charge Lamp
(4) IC Regulator
(5) Alternator
(6) Slow Blow Fuse
(7) Battery
(8) Rotor Coil

The charging system supplies electric power for various electrical devices and also charges the battery while the engine runs.
This alternator has IC regulator.

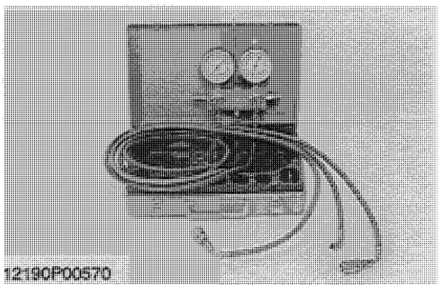
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[4] SPECIAL TOOLS

■ **NOTE**

- **Special tools for R134a refrigerant air conditioning system introduced below are available from NIPPONDENSO CO. LTD.**

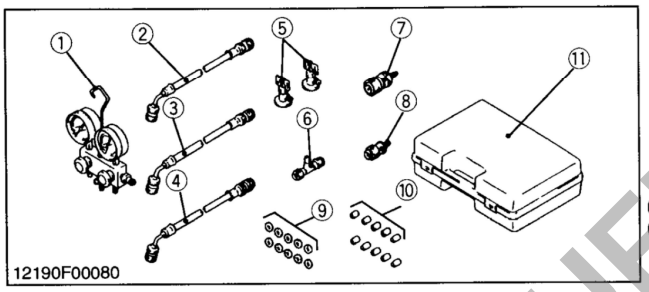
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Air Conditioner Service Tool

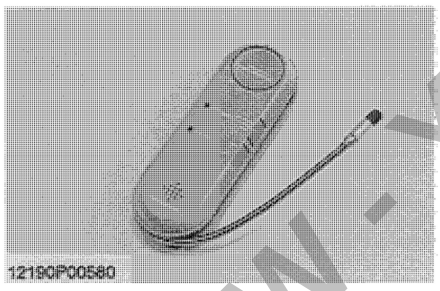
Code No: NIPPONDENSO 95048-00061

Application: Use for charging, testing or discharging the air conditioning system.



(1)	Manifold Gauge Assembly	95048-10090
(2)	Charging Hose (Red : HI)	95948-10270
(3)	Charging Hose (Blue : LO)	95948-10280
(4)	Charging Hose (Green)	95948-10260
(5)	Can Tap Valve	95048-10150
(6)	T Joint	95048-10160
(7)	Quick Coupler (HI)	95048-10130
(8)	Quick Coupler (LO)	95048-10140
(9)	Service Valve Packing	95906-10310
(10)	Charging Hose Packing	95906-10300
(11)	Tool Case	95949-10610

12190G00150

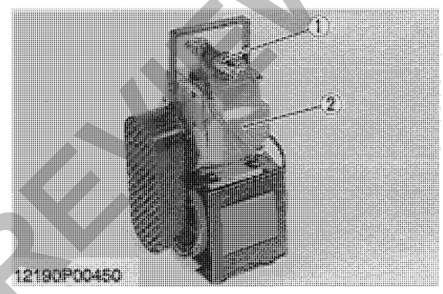


Electric Gas Leak Tester

Code No: NIPPONDENSO 95146-00060

Application: Use for gas leak testing the air conditioning system.

12190G00160



Vacuum Pump

Code No: NIPPONDENSO 95046-00040 (AC220V)
95046-00050 (AC240V)

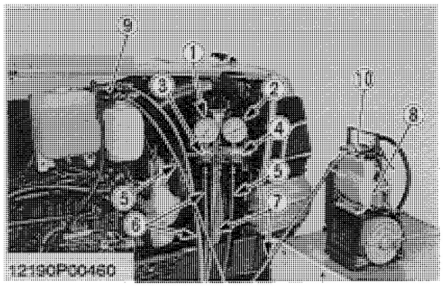
Application: Use for evacuating the air conditioning system.

(1) Adaptor (For 134a) (2) Vacuum Pump

12190G00170

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Evacuating the System

1. Discharge refrigerant from the system by R134a refrigerant recovery and recycling machine. (Refer to **"Discharging the system"**.)
2. Connect the charging hose (5) (red) to the **HI** pressure side charging valve and connect the charging hose (6) (blue) to the **LO** pressure side charging valve.
3. Connect the center charging hose (7) (green) to a vacuum pump inlet.
4. Open both valves (3), (4) of manifold gauge fully. Then run the vacuum pump (8) to evacuate the refrigerant cycle. (For approx. **15 minutes**.)
5. When **LO** pressure gauge (1) reading is more than **750mmHg** (**299 in.Hg**), stop the vacuum pump (8) and close both valves (3), (4) of manifold gauge fully.
6. Wait for over **5 minutes** with the **HI** and **LO** pressure side valves (4), (3) of gauge manifold closed, and then check that gauge indicator does not return to **0**.
7. If the gauge indicator is going to approach to **0**, check whether there is a leaking point and repair if it is, and then evacuate it again.

(1) **LO** Pressure Gauge
(2) **HI** Pressure Gauge
(3) **LO** Pressure Side Valve (Close)
(4) **HI** Pressure Side Valve (Open)
(5) Red Hose
(6) Blue Hose
(7) Green Hose
(8) Vacuum Pump (Running)
(9) Compressor
(10) Vacuum Pump Adaptor

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