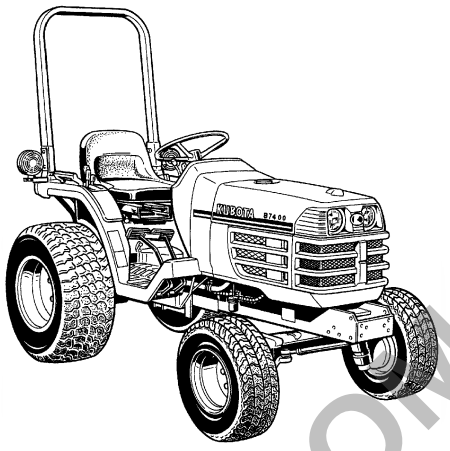
WSM

(B7400 · B7500)



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SAFETY INSTRUCTIONS
SPECIFICATIONS
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SERVICING
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SERVICING
9 ELECTRICAL SYSTEM
MECHANISM
SERVICING

NOTE: · Please click the item to which you want to refer. When returning the index, click the arrow ◀ on the tool bar which introduces to the first page.
· The code No. of these Workshop Manuals is as follows.
WSM for North America:No.97897-12490

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September 2000

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GENERAL

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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.**

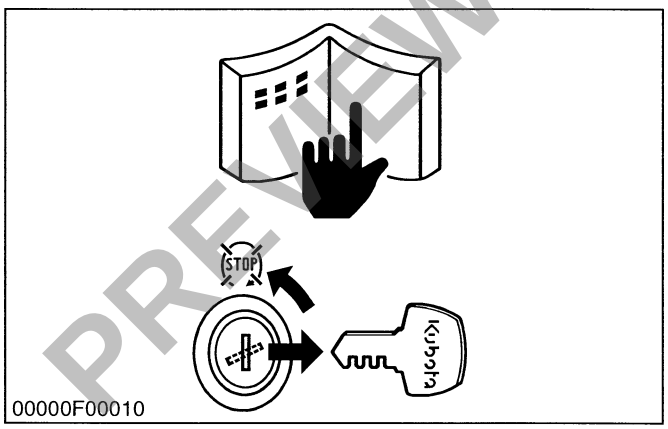
⚠ **WARNING : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ **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.**

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BEFORE SERVICING AND REPAIRING

(1) Read all instructions and safety instructions in this manual and on your machine safety decals.
(2) Clean the work area and machine.
(3) Park the machine on a firm and level ground, and set the parking brake.
(4) Lower the implement to the ground.
(5) Stop the engine, and remove the key.
(6) Disconnect the battery negative cable.
(7) Hang a **"DO NOT OPERATE"** tag in operator station.

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SPECIFICATIONS

Model			B7400HSD	B7500HSD	B7500D
PTO power			9.3 kW (12.5 HP)*	11.9 kW (16.0 HP)*	12.7 kW (17.0 HP)*
Engine	Maker		KUBOTA		
	Model		D722-E-D16	D1005-E-D16	
	Type		Indirect Injection. Vertical, water-cooled, 4-cycle diesel		
	Number of cylinders		3		
	Bore and stroke		67 × 68 mm (2.64 × 2.68 in.)	76 × 73.6 mm (2.99 × 2.90 in.)	
	Total displacement		719 cm^3 (43.9 cu.in.)	1001 cm^3 (61.1 cu.in.)	
	Engine net power (DIN)		11.9 kW (16.0 HP)*	15.7 kW (21.0 HP)*	
	Rated revolution (min^{-1})		2900 rpm	2600 rpm	
	Maximum torque		45 N·m (33 ft-lbs)	59 N·m (44 ft-lbs)	
	Battery		12 V, RC : 71 min, CCA : 390 A	12 V, RC : 79 min, CCA : 433 A	
	Starting system		Electric starting with cell starter 12 V, 1.4 kW		
	Lubricating system		Forced lubrication by trochoidal pump		
	Cooling system		Pressurized radiator, forced circulation with water pump		
	Fuel		Diesel fuel No. 2-D [above –10 °C (14 °F)], Diesel fuel No. 1 [below –10 °C (14 °F)]		
Capacities	Fuel tank		13 L (3.4 U.S.gals, 2.9 Imp.gals)	19 L (5.0 U.S.gals, 4.2 Imp.gals)	
	Engine crankcase (with filter)		2.4 L (2.5 U.S.qts, 2.1 Imp.qts)	3.0 L (3.2 U.S.qts, 2.6 Imp.qts)	
	Engine coolant		2.7 L (2.9 U.S.qts, 2.4 Imp.qts)	3.8 L (4.0 U.S.qts, 3.3 Imp.qts)	
	Transmission case		Front : 1.2 L (0.3 U.S.gals., 0.26 Imp.gals.) Rear : 11.2 L (2.96 U.S.gals. 2.46 Imp.gals.)	12.5 L (3.3 U.S.gals. 2.75 Imp.gals.)	11.5 L (3.04 U.S.gals. 2.53 Imp.gals.)
	Front axle case		3.2 L (3.4 U.S.qts, 2.8 Imp.qts)		
Dimensions	Overall length (without 3P)		2280 mm (89.8 in.)	2300 mm (90.6 in.)	
	Overall width		989 mm (38.9 in.)	1077 mm (42.4 in.)	
	Overall height (with ROPS)		1915 mm (75.4 in.)	1940 mm (76.4 in.)	
	Overall height (top of steering wheel)		1245 mm (49.0 in.)	1325 mm (52.2 in.)	
	Wheel base		1500 mm (59.0 in.)		
	Minimum ground clearance		295 mm (11.6 in.)	305 mm (12.0 in.)	
	Tread	Front	800 mm (31.5 in.)		
		Rear	778 to 948 mm (30.6 to 37.3 in.)	836 to 1006 mm (32.9 to 39.6 in.)	
Weight (with ROPS)			585 kg (1290 lbs)	620 kg (1367 lbs)	600 kg (1323 lbs)
Clutch			Dry single plate		
Travelling system	Tires	Front	6-12		
		Rear	8.3-16	9.5-16	
	Steering		Manual steering	Integral type power steering	
	Transmission		Main-hydrostatic transmission, high-Low gear shift (2 forward, 2 reverse)		Gear shift, 6 forward, 2 reverse
	Brake		Wet disk type		
	Min. turning radius (with brake)		2.0 m (6.6 feet)		
	Differential		Bevel gear		

Note : * Manufacture's estimate the company reserves the right to change the specifications without notice.

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[5] LUBRICANTS, FUEL AND COOLING WATER

	Place	Capacity			Lubricants, fuel and cooling water
		B7400HSD	B7500HSD	B7500D	
1	Fuel tank	13 L 3.4 U.S.gals. 2.9 Imp.gals.	19 L 5.0 U.S.gals. 4.2 Imp.gals.		No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below – 10 ˚C (14 ˚F)
2	Cooling system with recovery tank	2.7 L 2.9 U.S.qts. 2.4 Imp.qts.	3.8 L 4.0 U.S.qts. 3.3 Imp.qts.		Fresh clean water with anti-freeze
3	Engine crankcase	2.4 L 2.5 U.S.qts. 2.1 Imp.qts	3.0 L 3.2 U.S.qts. 2.6 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
4	Transmission case	Front case : 1.2 L 0.32 U.S.gals. 0.26 Imp.gals. Rear case : 11.2 L 2.96 U.S.gals. 2.46 Imp.gals.	12.5 L 3.3 U.S.gals 2.75 Imp.gals.	11.5 L 3.04 U.S.gals 2.53 Imp.gals.	KUBOTA SUPER UDT fluid *
5	Front axle case	3.2 L 3.4 U.S.qts. 2.8 Imp.qts			KUBOTA SUPER UDT fluid * or SAE80, 90 gear oil

Greasing

	Place	No. of greasing point	Capacity	Type of grease
6	Speed control pedal (HST pedal)	1	Until grease overflows	Multipurpose type grease
	Top link	1		
	Lift rod	1		
	Battery terminal	2	Moderate amount	

* KUBOTA original transmission hydraulic fluid.

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[7] MAINTENANCE

No.	Item		Period	Indication on hour meter																		After purchase		Important		Reference page
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	1500	3000	1 year	2 years			
1	Engine oil		Change	★	☆		☆		☆		☆		☆		☆		☆		☆							G-12
2	Engine oil filter		Replace	★			☆				☆				☆				☆							G-12
3	Transmission fluid		Change	★					☆						☆											G-13
4	Hydraulic oil filter (for HST)		Replace	★					☆						☆											G-14
5	Hydraulic oil filter		Replace	★					☆						☆											G-14
6	Transmission Oil strainer		Clean	★					☆						☆											G-14
7	Front axle case oil		Change						☆						☆											G-23
8	Front axle pivot		Adjust								☆								☆							G-24
9	Engine start system		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-17
10	Greasing		–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-16
11	Wheel bolt torque		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-18
12	Battery condition		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-18
13	Air cleaner element [Double type]	Primary element	Clean		☆		☆		☆		☆		☆		☆		☆		☆					*	@	G-20
			Replace																			☆		**		G-20
		Secondary element	Replace																			☆				G-20
14	Fuel filter element		Clean		☆		☆		☆		☆		☆		☆		☆		☆						@	G-20
			Replace								☆								☆							G-20
15	Fan belt		Adjust		☆		☆		☆		☆		☆		☆		☆		☆							G-21
16	Clutch		Adjust	★	☆		☆		☆		☆		☆		☆		☆		☆							G-15
17	Brake		Adjust		☆		☆		☆		☆		☆		☆		☆		☆							G-21
18	Fuel line		Check		☆		☆		☆		☆		☆		☆		☆		☆						@	G-22
			Replace																				☆			G-22
19	Intake air line		Check				☆				☆				☆				☆						@	G-23
			Replace																				☆	***		G-23
20	Radiator hose and clamp		Check				☆				☆				☆				☆							G-22
			Replace																				☆			G-22
21	Engine valve clearance		Adjust																☆							G-24
22	Cooling system		Flush																				☆			G-25
23	Coolant		Change																				☆			G-25
24	Fuel injection nozzle injection pressure		Check																	☆					@	G-24
25	Injection pump		Check																		☆				@	G-25

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[6] TIGHTENING TORQUES

(1) 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		
Unit / 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
M6 (6 mm, 0.24 in.)	7.85 to 9.31	0.80 to 0.95	5.79 to 6.87	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	16.7 to 19.6	1.7 to 2.0	12.3 to 14.4	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	29.5 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.3 to 45.1	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.2 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5	60.9 to 70.6	6.2 to 7.2	44.9 to 52.0
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5				77.5 to 90.2	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 86.7
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 (16 mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141				197 to 225	20.0 to 23.0	145 to 166				260 to 304	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	246 to 284	25.0 to 29.0	181 to 209				275 to 318	28.0 to 32.5	203 to 235				344 to 402	35.0 to 41.0	254 to 296
M20 (20 mm, 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				491 to 568	50.0 to 58.0	362 to 419

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(2) Stud Bolts

Material of opponent part	Ordinariness			Aluminum		
Unit / Diameter	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M8 (8 mm, 0.31 in.)	11.8 to 15.6	1.2 to 1.6	8.68 to 11.5	8.82 to 11.8	0.90 to 1.2	6.51 to 8.67
M10 (10 mm, 0.39 in.)	24.6 to 31.3	2.5 to 3.2	18.1 to 23.1	19.7 to 25.4	2.0 to 2.6	14.5 to 18.8
M12 (12 mm, 0.47 in.)	29.5 to 49.0	3.0 to 5.0	21.7 to 36.1	31.4	3.2	23.1

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G CONTENTS

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TROUBLESHOOTING

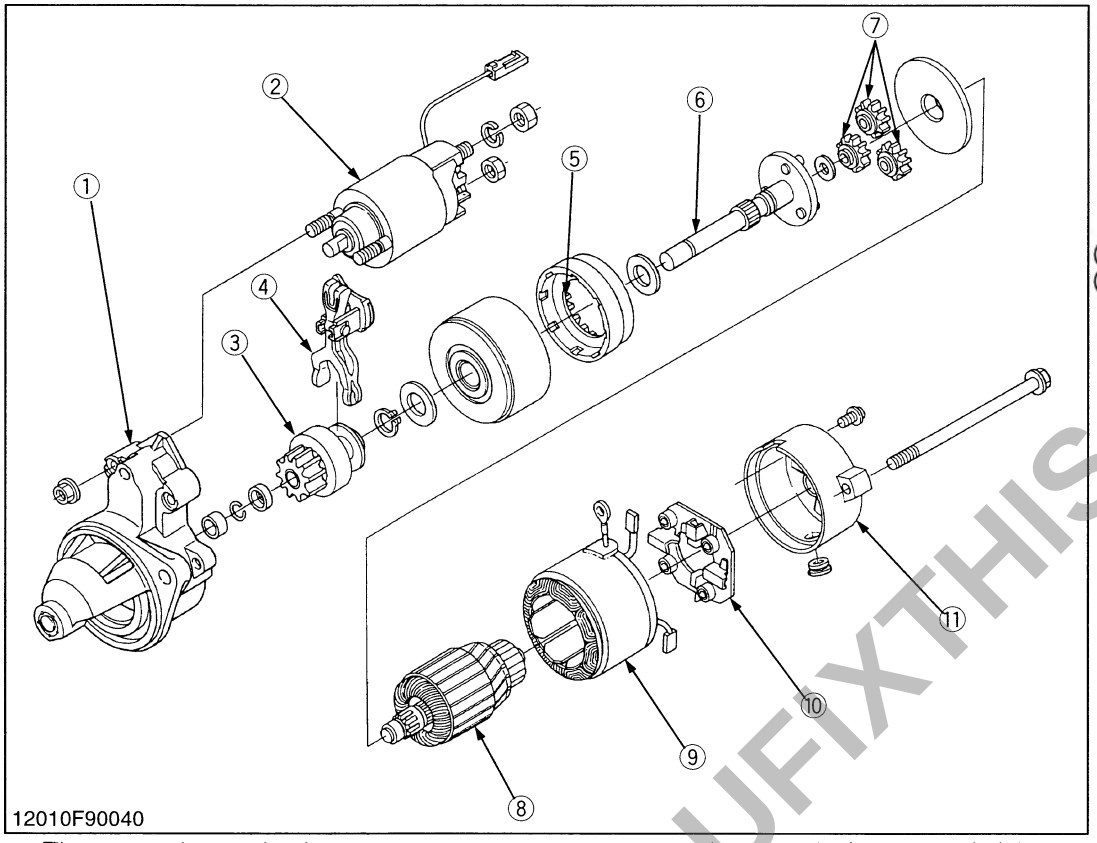
Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No fuel	Replenish fuel	–
	• Air in the fuel system	Bleed	G-26
	• Water in the fuel system	Change fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Change	G-20, G-24
	• Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	–
	• Fuel with low cetane number	Use specified fuel	–
	• Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S27
	• Incorrect injection timing	Adjust	1-S71
	• Fuel camshaft worn	Replace	1-S32, S34
	• Injection nozzle clogged	Clean	1-S74
	• Injection pump malfunctioning	Repair or replace	1-S30, S38
	• Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	1-S39, S41
	• Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S28, S29
	• Improper valve timing	Correct or replace timing gear	1-S31, S36
	• Piston ring and cylinder worn	Replace	1-S39
	• Excessive valve clearance	Adjust	1-S26
(Starter Does Not Run)	• Battery discharged	Charge	G-19
	• Starter malfunctioning	Repair or replace	9-S8
	• Main switch malfunctioning	Repair or replace	9-S7
	• Safety switches malfunctioning	Adjust or replace	9-S10
	• Wiring disconnected	Connect	–
Engine Revolution Is Not Smooth	• Fuel filter clogged or dirty	Change	G-20, G-24
	• Air cleaner clogged	Clean or replace	G-20
	• Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S27
	• Injection pump malfunctioning	Repair or replace	1-S30, S34
	• Incorrect nozzle injection pressure	Adjust	1-S73
	• Injection nozzle stuck or clogged	Repair or replace	1-S74
	• Governor malfunctioning	Repair	1-S32, S36
Either White or Blue Exhaust Gas Is Observed	• Excessive engine oil	Reduce to specified level	1-S17
	• Piston ring and cylinder worn or stuck	Repair or replace	1-S39
	• Incorrect injection timing	Adjust	1-S71
	• Deficient compression	Adjust top clearance	1-S25

12490S10010

1-S CONTENTS

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(1) Starter



(1) Housing
(2) Magnetic Switch
(3) Overrunning Clutch
(4) Drive Lever
(5) Internal Gear
(6) Gear Shaft
(7) Planetary Gear
(8) Armature Shaft
(9) Yoke
(10) Brush Holder
(11) Rear End Frame

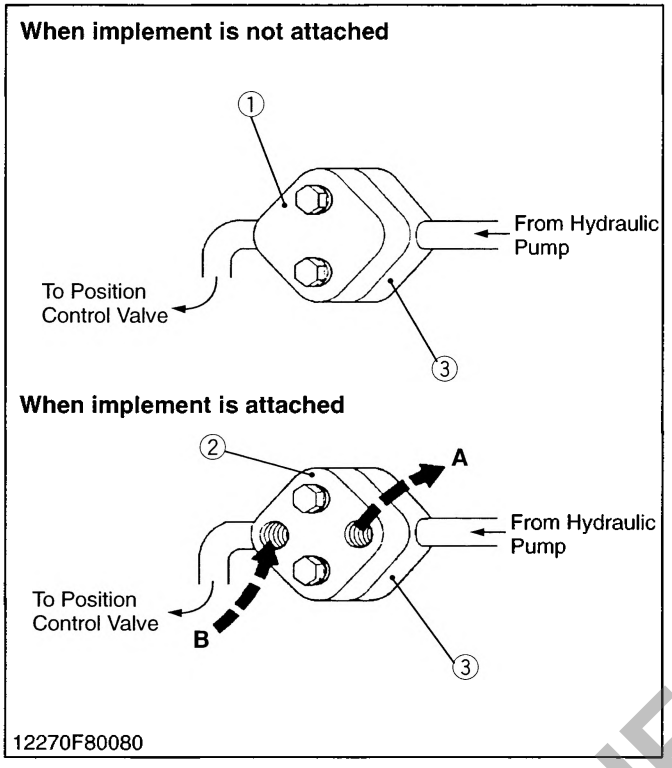
The starter is a reduction type. The reduction system is used planetary gears, and the speed of gear shaft (6) is reduced to approximately one fifth of the armature shaft (8).

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[3] HYDRAULIC BLOCK TYPE OUTLET



The hydraulic block type outlet is located at the right hand side of the engine.

This hydraulic block type outlet is provided to take power out from the tractor to operate the hydraulic cylinders on the implement, such as front end loader, front blade and so on.

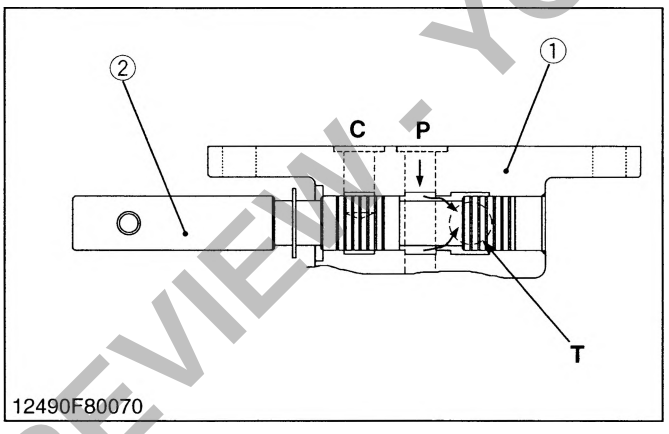
(1) Block Cover
(2) Block Outlet Cover (Option)
(3) Hydraulic Block

(A) To implement (Inlet)
Max. flow
B7400 : 14.6 L/min. (3.9 U.S.gal/min., 3.2 Imp.gal/min.)
B7500 : 16.6 L/min. (4.4 U.S.gal/min., 3.7 Imp.gal/min.)
No relief valve in the hydraulic block.
(B) From implement (Outlet)

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[4] CONTROL VALVE

This implement control valve is located under the hydraulic cylinder block.



■ Neutral

Oil forced into the control valve (1) through **P** port and returns to the transmission case through **T** port.

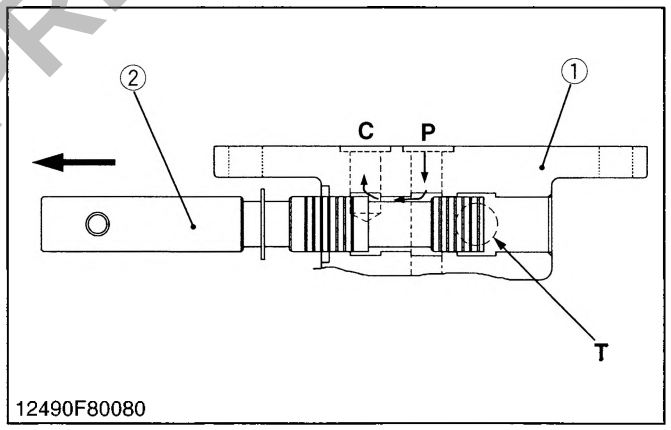
Also, **C** port is closed by spool (2), oil in the hydraulic cylinder does not flow to the transmission case.

Thus, the implement remains at its fixed position.

(1) Control Valve
(2) Spool

P : Pump Port
C : Cylinder Port
T : Tank Port

12490M80070



■ Lift

When the control lever is set to the "**LIFT**" position, the spool (2) is moved to the left.

The oil forced into the control valve (1) through **P** port flows to **C** port.

The oil pushes and flow into the hydraulic cylinder through the **C** port to lift the implement.

(1) Control Valve
(2) Spool

P : Pump Port
C : Cylinder Port
T : Tank Port

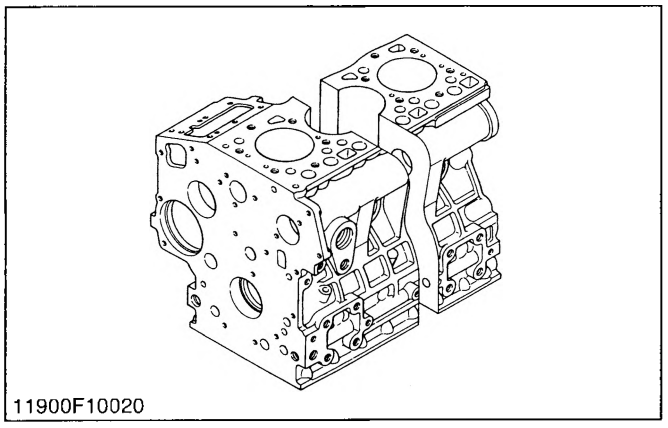
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8-M CONTENTS

[1] ENGINE BODY

(1) Cylinder Block


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The engine has a high durability tunnel-type cylinder block in which the crank bearing component is a constructed body.

Furthermore, liner less type, allow effective cooling, less distortion, and greater wear-resistance.

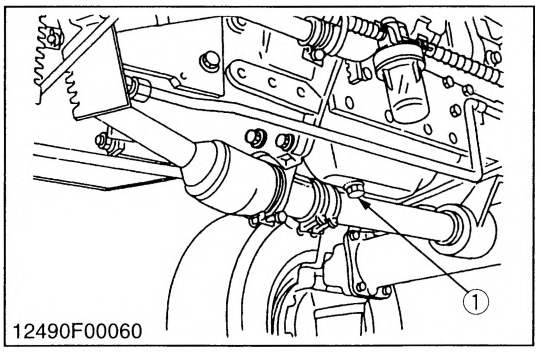
The noise level is reduced to a minimum because each cylinder has its own chamber.

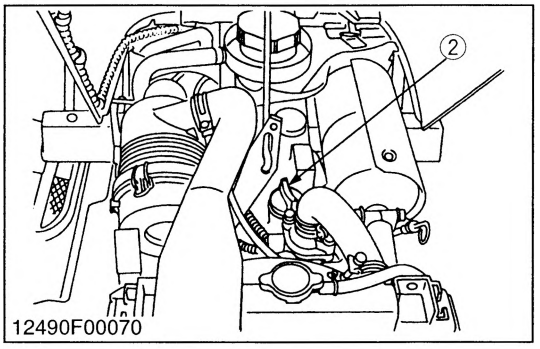
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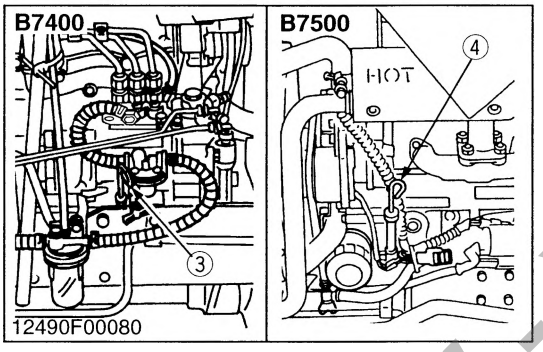
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(2) Check Points of Initial 50 Hours







Changing Engine Oil

CAUTION

- **Before changing oil, be sure to stop the engine.**

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 plug (1) at the bottom of the engine and drain the oil completely.
4. Screw in the drain plug (1).
5. Fill new oil up to upper line on the dipstick (3), (4).

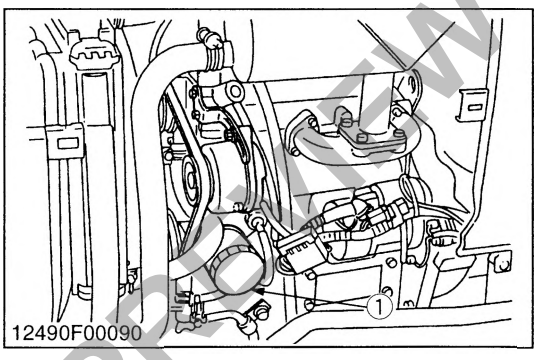
IMPORTANT

- **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.)**

Engine oil capacity	B7400	2.4 L 2.5 U.S.qts 2.1 Imp.qts
	B7500	3.0 L 3.2 U.S.qts 2.6 Imp.qts

(1) Drain Plug
(2) Oil Inlet
(3) Dipstick (B7400)
(4) Dipstick (B7500)

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Replacing Engine Oil Filter Cartridge

CAUTION

- **Be sure to stop the engine before changing oil filter cartridge.**

1. Remove the oil filter cartridge with the filter wrench.
2. Apply a slight coat of oil onto the cartridge gasket.
3. To install the new cartridge, screw it in by hand. Over tightening may cause deformation of rubber gasket.
4. After the new cartridge has been replaced, the engine oil normally decrease a little. Thus see that the engine oil does not leak through the seal and be sure to read the oil level on the dipstick. Then, replenish the engine oil up to the specified level.

IMPORTANT

- **To prevent serious damage to the engine, replacement element must be highly efficient. Use only a KUBOTA genuine filter or its equivalent.**

(1) Engine Oil Filter

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G CONTENTS

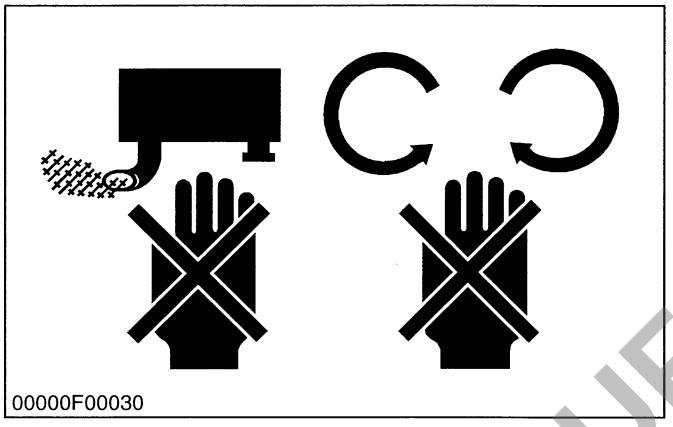
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SAFETY STARTING

(1) Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
(2) Do not alter or remove any part of machine safety system.
(3) Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
(4) Never start the engine while standing on ground. Start the engine only from operator's seat.

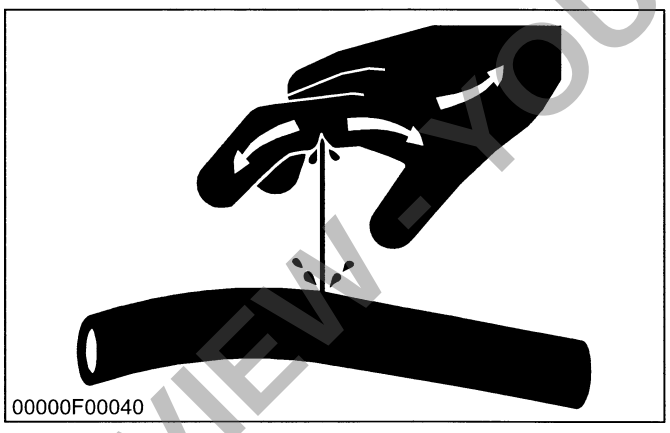
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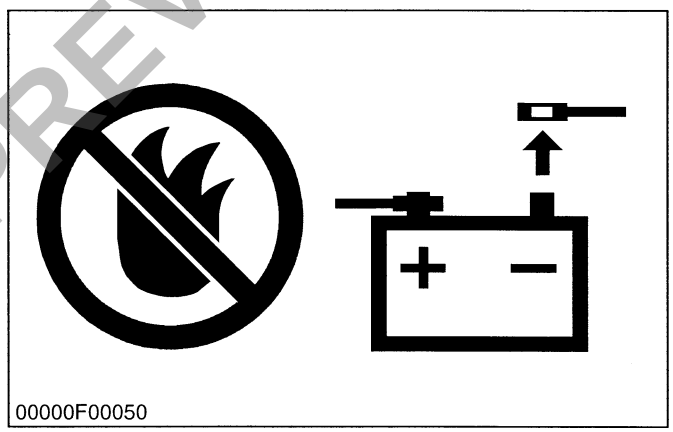

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SAFETY WORKING

(1) Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
(2) Wear close fitting clothing and safety equipment appropriate to the job.
(3) Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
(4) When servicing is performed together by two or more persons, take care to perform all work safely.
(5) Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
(6) Do not touch the rotating or hot parts while the engine is running.
(7) Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
(8) Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.

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AVOID FIRES

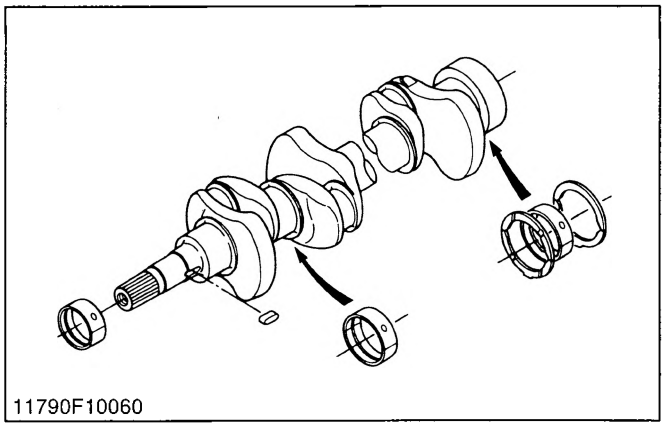
(1) Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
(2) To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
(3) Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
(4) Make sure that no fuel has been spilled on the engine.

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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.

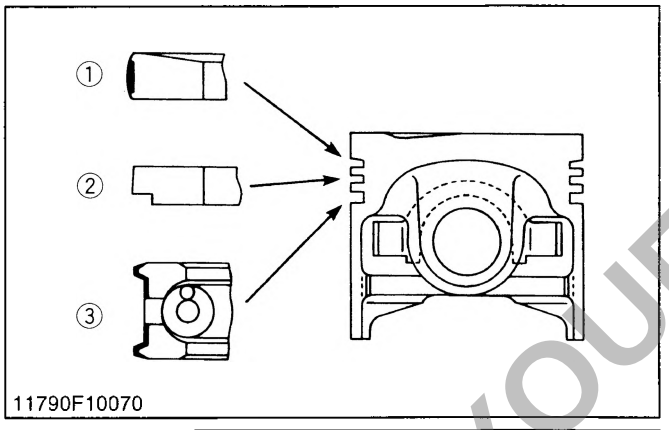
The crankshaft is made of tough special alloy steel, and the journals, pins and oil seal sliding portions are induction hardened to increase the hardness for higher wear resistance.

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.

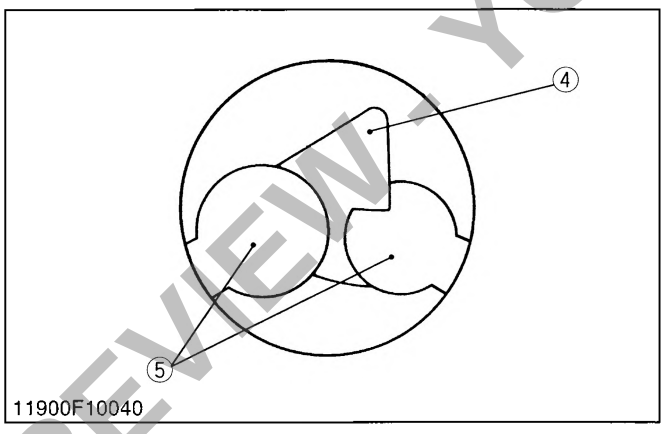
The crankshaft is provided with an oil gallery, through which engine oil is fed to the crankpin portion, and lubricates it.

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(4) Piston and Piston Rings



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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 top land to help heat dissipate and to prevent scuffing.

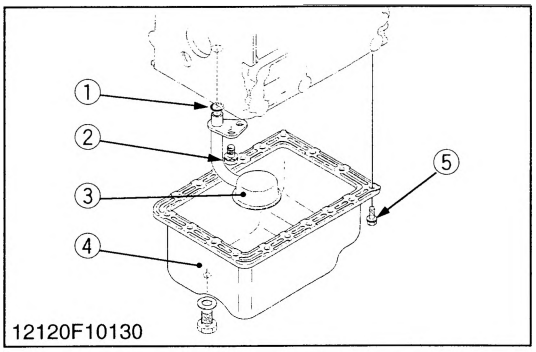
(1) Top Ring
(2) Second Ring
(3) Oil Ring
(4) Depression
(5) Valve Recess

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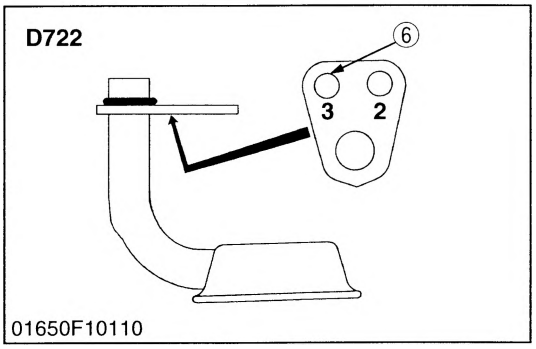
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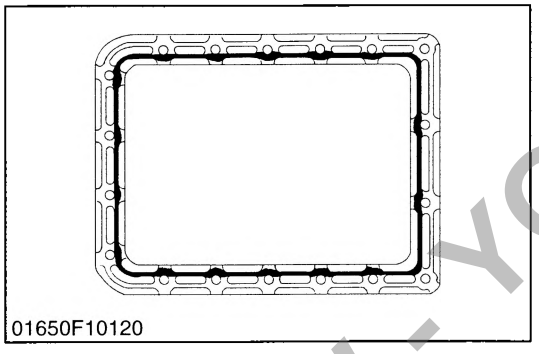
(3)Piston and Connecting Rod



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Oil Pan and Oil Strainer

1. Remove the oil pan mounting screws.
2. Remove the oil pan (4) by lightly tapping the rim of the pan with a wooden hammer.
3. Remove the oil strainer (3).

(When reassembling)

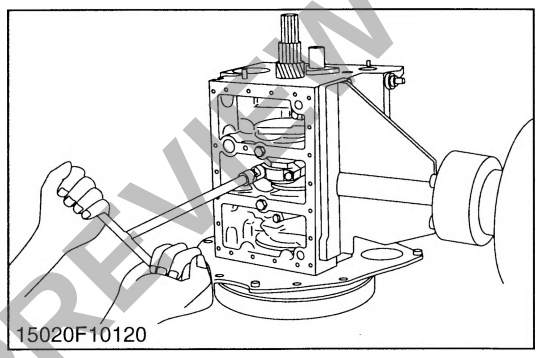
- After cleaning the oil strainer, check to see that the filter mesh in clean, and install it.
- Visually check the O-ring (1), apply engine oil, and install it.
- Securely fit the O-ring to the oil strainer.
- To avoid uneven tightening, tighten oil pan mounting screws in diagonal order from the center.
- Using the hole (6) numbered **"3"**, install the oil strainer by mounting screw. (D722 Only)

■ IMPORTANT

- **Scrape off the old adhesive completely. Wipe the sealing surface clean using waste cloth soaked with gasoline. Now apply new adhesive 3 to 5 mm (0.12 to 0.20 in.) thick all over the contact surface. Apply the adhesive also on the center of the flange as well as on the inner wall of each bolt hole.**
- **Cut the nozzle of the "fluid sealant" container at its second notch. Apply "fluid sealant" about 5 mm (0.20 in.) thick. Within 20 minutes after the application of fluid sealant, reassemble the components. Wait then for about 30 minutes, and pour oil in the crankcase.**

(1) O-ring
(2) Screw
(3) Oil Strainer
(4) Oil Pan
(5) Oil Pan Mounting Screws
(6) Hole

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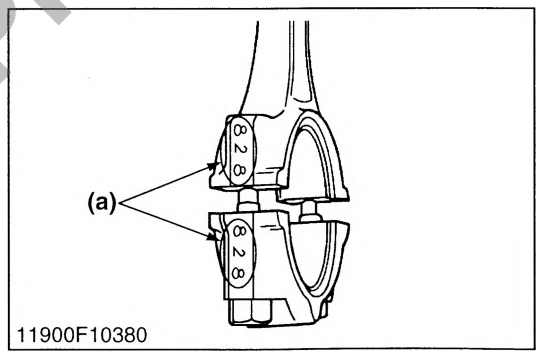
Connecting Rod Cap

1. Remove the connecting rod caps.

(When reassembling)

- Align the marks **(a)** with each other. (Face the marks toward the injection pump.)
- Apply engine oil to the connecting rod screws and lightly screw it in by hand, then tighten it to the specified torque.
  If the connecting rod screw won't be screwed in smoothly, clean the threads.
  If the connecting rod screw is still hard to screw in, replace it.

Tightening torque	Connecting rod screw	D722	26.5 to 30.4 N·m 2.7 to 3.1 kgf·m 19.5 to 22.4 ft-lbs
		D1005	41.2 to 46.1 N·m 4.2 to 4.7 kgf·m 30.3 to 33.9 ft-lbs



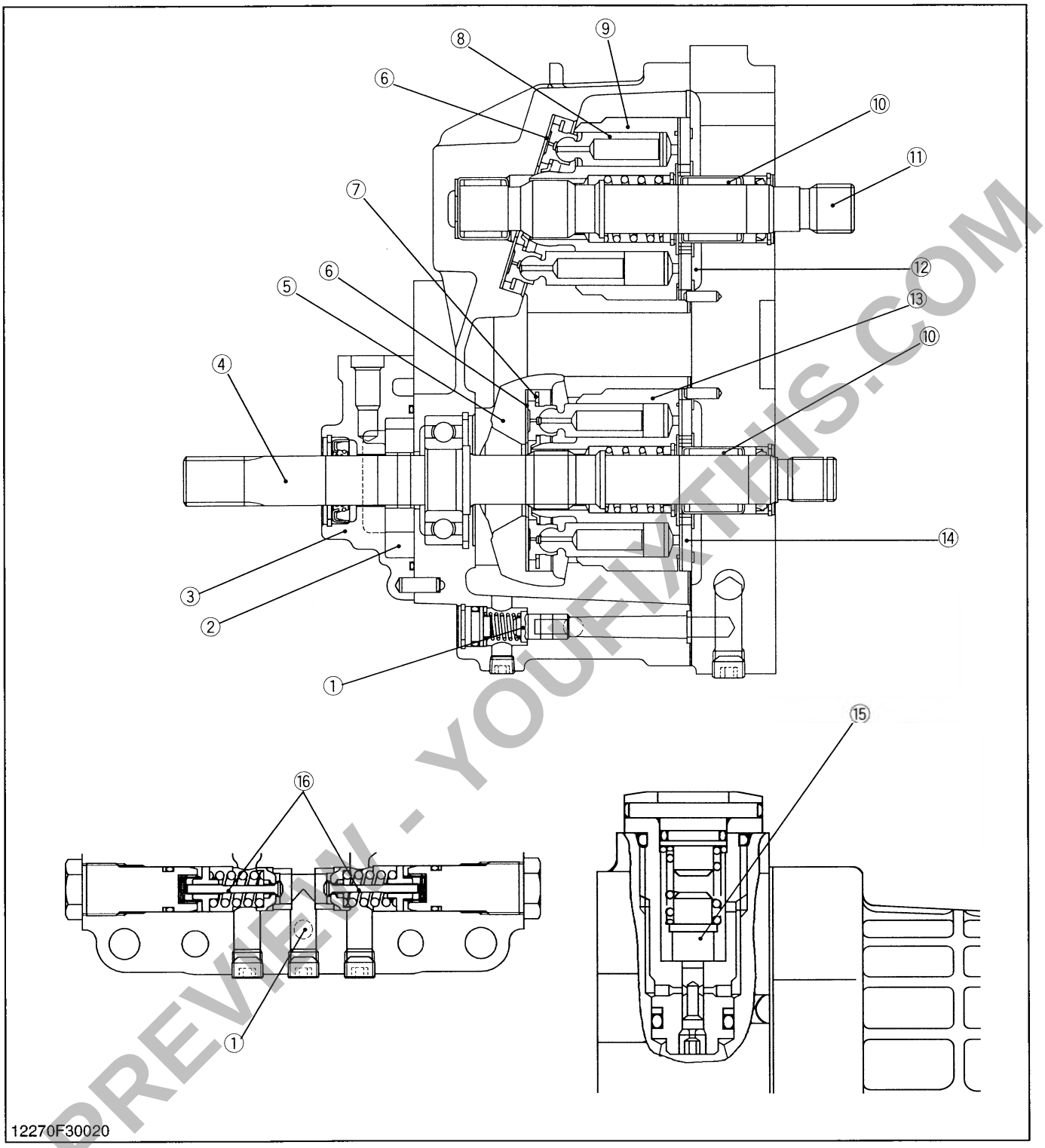
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(a) Mark

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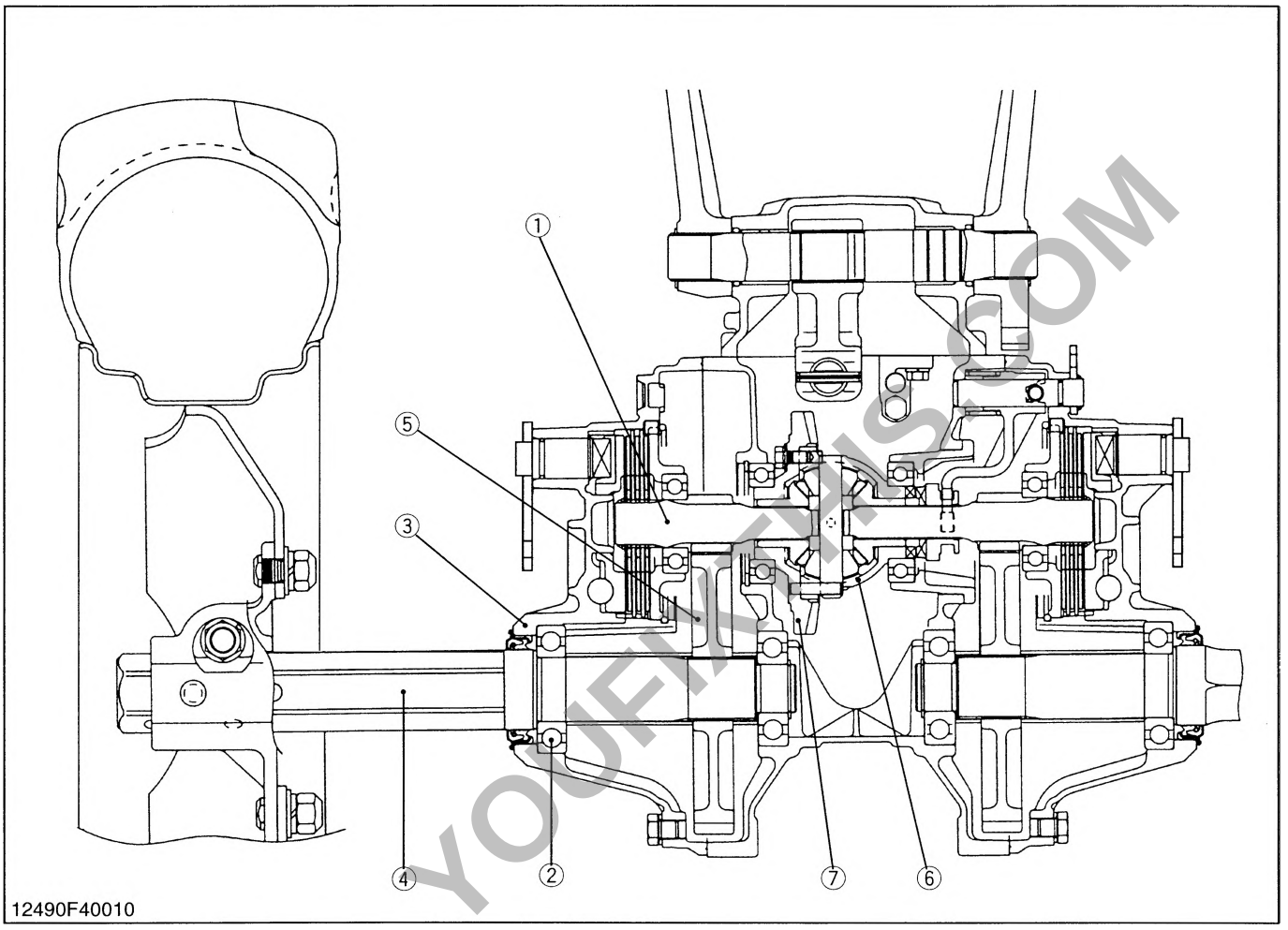
(1) Charge Relief Valve
(2) Charge Pump
(3) Charge Pump Case
(4) Pump Shaft
(5) Variable Swashplate
(6) Thrust Collar
(7) Retainer Plate
(8) Piston
(9) Cylinder Block (Motor)
(10) Needle Bearing
(11) Motor Shaft
(12) Valve Plate (Motor)
(13) Cylinder Block (Pump)
(14) Valve Plate (Pump)
(15) Neutral Valve
(16) Check and High Pressure Relief Valve

12270M30010

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[1] FEATURES



(1) Differential Gear Shaft
(2) Ball Bearing
(3) Rear Axle Case
(4) Rear Axle
(5) Spur Gear
(6) Differential Gear
(7) Spiral Bevel Gear

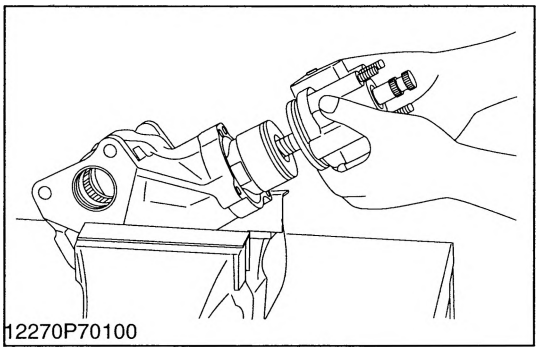
The rear axles are the semifloating type with ball bearings (2) between the rear axle (4) and the rear axle case (3), which supports the rear wheel load as well as transmitting power to the rear wheels.

The differential gears (6) automatically controls the revolution of right and left wheels when the rear wheels encounter unequal road resistance during turning.

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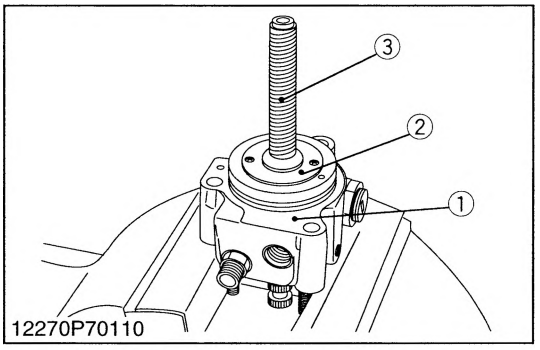
Valve Assembly and Rack (Piston)

1. Remove the valve housing mounting hex. head screws.
2. Draw out the valve assembly and rack (piston) as a unit.

(When reassembling)

Tightening torque	Valve housing mounting hex. head screw	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

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(1) Valve Housing
(2) Plug
(3) Worm Shaft

Valve Assembly

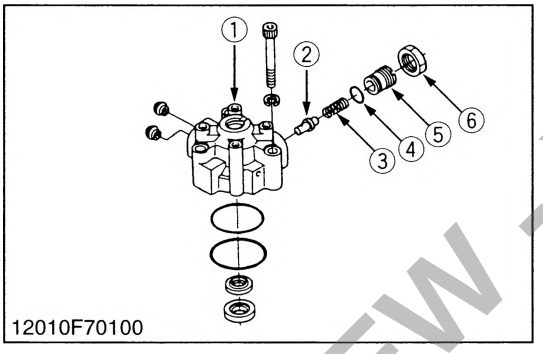
1. Remove the plug (2).
2. Pull out the worm shaft (3) with sleeve and stub shaft from valve housing (1).

(When reassembling)

- When tighten the plug, use the PS plug wrench (Refer to G-38).
- Be sure to tighten the plug to specified torque and staking the plug (2).
  If the plug is tightened to excessive torque, it may cause damage to the thrust races and thrust bearings.

Tightening torque	Plug	8.8 to 10.8 N·m 0.9 to 1.1 kgf·m 6.5 to 8.0 ft-lbs

12490S70290



12010F70100

(1) Valve Housing
(2) Relief Valve Poppet
(3) Relief Spring
(4) O-ring
(5) Adjusting Screw
(6) Lock Nut

Disassembling Valve Housing

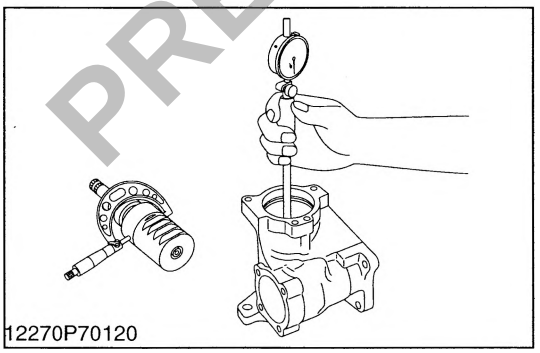
■ IMPORTANT

- **Do not disassemble the relief valve needlessly, since it has been factory-adjusted.**
- **If the relief valve is disassembled, replace the adjusting screw with new one, and after reassembly, be sure to adjust the setting pressure, then stake the adjusting screw with a punch.**

Tightening torque	Relief pressure adjusting screw lock nut	49.1 to 78.5 N·m 5.0 to 8.0 kgf·m 36.2 to 57.8 ft-lbs

12270S70220

SERVICING


12270P70120

Clearance between Steering Gear Box and Rack (Piston)

1. Measure the steering gear box cylinder I.D. with a cylinder gauge.
2. Measure the rack (piston) O.D. with an outside micrometer, and calculate this clearance.
3. If the clearance exceeds the allowable limit, replace the steering gear box or rack (piston) assembly.

Clearance between steering gear box and rack (piston)	Factory spec.	0.030 to 0.079 mm 0.0012 to 0.0031 in.
	Allowable limit	0.14 mm 0.0055 in.

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