WSM

WORKSHOP MANUAL

TRACTOR,FRONT LOADER, BACKHOE,ROTARY MOWER

BX24,LA240,BT601,RCK54, RCK54P,RCK60B

Kubota

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KiSC issued 12, 2006 A

GENERAL

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels 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.

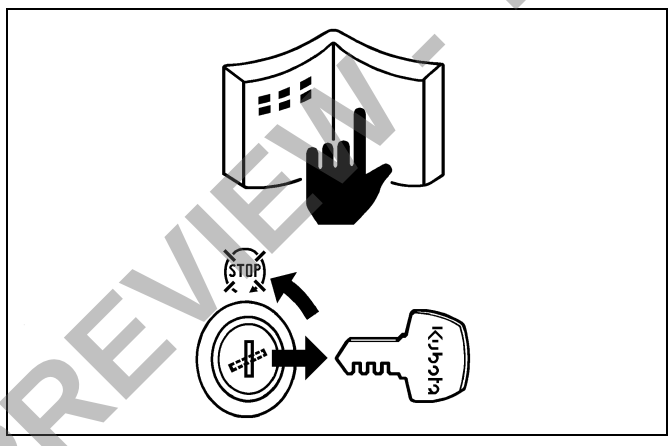
DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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.



BEFORE SERVICING AND REPAIRING

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

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SPECIFICATIONS

Model			BX24
PTO power			13.2 kW (17.7 HP)*
Engine	Maker		KUBOTA
	Model		D902-E2-BX-2
	Type		Indirect Injection, vertical, water-cooled, 4-cycle diesel
	Number of cylinders		3
	Bore and stroke		72 × 73.6 mm (2.83 × 2.90 in.)
	Total displacement		898 cm^3 (54.8 cu.in.)
	Engine gross power		17.1 kW (23.0 HP)
	Rated revolution		3200min^{-1} (rpm)
	Maximum torque		56.1 N·m (5.7 kgf·m, 41.4 ft-lbs)
	Battery		12 V, CCA : 535 A, RC : 80 min.
	Fuel		Diesel fuel No. 2-D [above –10 °C (14 °F)], Diesel fuel No. 1 [below –10 °C (14 °F)]
Capacities	Fuel tank		25 L (6.6 U.S.gals, 5.5 Imp.gals)
	Engine crankcase (with filter)		3.1 L (3.3 U.S.qts., 2.73 Imp.qts)
	Engine coolant		2.7 L (2.8 U.S.qts., 2.4 Imp.qts)
	Recovery tank		0.4 L (0.4 U.S.qts, 0.4 Imp.qts)
	Transmission case		11.6 L (3.1 U.S.gals, 2.6 Imp.gals)
Dimensions	Overall length (without 3P)		2170 mm (85.4 in.)
	Overall length (with 3P)		2490 mm (98.0 in.)
	Overall width		1145 mm (45.1 in.)
	Overall height	(with ROPS)	2140 mm (84.3 in.)
		(with Folded ROPS)	1610 mm (63.4 in.)
		(Top of steering wheel)	1255 mm (49.4 in.)
	Wheel base		1400 mm (55.1 in.)
	Min. ground clearance		175 mm (6.9 in.)
	Tread	Front	910 mm (35.8 in.)
		Rear	820 mm (32.2 in.)
Weight (with ROPS)			690 kg (1520 lbs)
Clutch			N / A
Travelling system	Tires	Front	18 × 8.50 – 10 (Turf, Bar, Ind.)
		Rear	26 × 12.00 – 12 (Turf, Bar, Ind.)
	Steering		Hydrostatic power steering
	Transmission		Main : Hydrostatic transmission, High-Low gear shift (2 forward and 2 reverse)
	Brake		Wet disk type
	Min. turning radius (without brake)		2.3 m (7.5 feet)
Hydraulic unit	Hydraulic control system		Directional control, auto-return lever system
	Pump capacity		23.5 L/min. (6.2 U.S.gals./min., 5.2 Imp.gals./min.)
	Three point hitch		SAE Category I
	Max. lift force	At lift points	5390 N (550 kg, 1210 lbs)
		24 in. behind points	3040 N (310 kg, 680 lbs)
PTO	Rear	PTO Shaft	SAE 1-3/8, 6 splines
		Revolution	1 speed (540 min^{-1} (rpm) at 3142 engine min^{-1} (rpm))
	Mid	PTO Shaft	USA No.5 (KUBOTA 10-tooth) involute spline
		Revolution	1 speed (2500 min^{-1} (rpm) at 3043 engine min^{-1} (rpm))

NOTE: * Manufacture's estimate. The company reserves the right to change the specifications without notice.
**See and check IMPLEMENT LIMITATIONS.

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4. LUBRICANTS FUEL AND COOLANT

No.	Place	Capacity	Lubricants, fuel and coolant
		BX24	
1	Fuel tank	25.0 L 6.6 U.S.gals 5.5 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	3.1 L 3.3 U.S.qts 2.7 Imp.qts	Fresh clean water with anti-freeze
3	Engine crankcase	3.1 L 3.3 U.S.qts 2.7 Imp.qts	Engine oil : API Service CD, CE or CF 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	11.6 L 3.1 U.S.gals 2.6 Imp.gals	KUBOTA SUPER UDT fluid*
5	Front axle case	4.7 L 5.0 U.S.qts 4.1 Imp.qts	KUBOTA SUPER UDT fluid or SAE80, SAE90 gear oil

Greasing				
	Place	**No. of greasing point**	**Capacity**	**Type of grease**
6	Battery terminal	2	Moderate amount	Multipurpose type Grease NLGI-2 or NLGI-1 (GC-LG)
7	Speed control pedal	1	Until grease overflows	

* KUBOTA original transmission hydraulic fluid.

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5. 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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6. MAINTENANCE CHECK LIST

No.	Item \ Period		Service Interval																		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 oil filter	Replace	★					☆						☆											G-13
4	Transmission fluid	Change	★					☆						☆											G-13
5	Transmission strainer	Clean						☆						☆											G-24
6	Front axle case oil	Change						☆						☆											G-24
7	Front axle pivot	Adjust								☆								☆							G-25
8	Engine start system	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-14
9	Greasing	–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-15
10	Wheel bolt torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆							G-15
11	Battery condition	Check		☆		☆		☆		☆		☆		☆		☆		☆					*4		G-16
12	Air cleaner element	Clean		☆		☆		☆		☆		☆		☆		☆		☆					*1	@	G-18
		Replace																			☆		*2		G-18
13	Fuel filter element	Check		☆		☆		☆		☆		☆		☆		☆		☆						@	G-19
		Replace										☆													G-19
14	Fan belt	Adjust		☆		☆		☆		☆		☆		☆		☆		☆							G-20
15	HST neutral spring	Adjust		☆		☆		☆		☆		☆		☆		☆		☆							G-21
16	Brake	Adjust		☆		☆		☆		☆		☆		☆		☆		☆							G-22
17	Radiator hose and clamp	Check				☆				☆				☆				☆							G-22
		Replace																				☆			G-22
18	Power steering oil line	Check				☆				☆				☆				☆							G-23
		Replace																				☆			G-23
19	Fuel line	Check		☆		☆		☆		☆		☆		☆		☆		☆						@	G-19
		Replace																				☆			G-19
20	Intake air line	Check				☆				☆				☆				☆						@	G-23
		Replace																				☆	*3		G-23
21	Toe-in	Adjust				☆				☆				☆				☆							G-23
22	Engine valve clearance	Adjust																☆							1-S13
23	Fuel injection nozzle injection pressure	Check																	☆	☆				@	1-S20
24	Injection pump	Check																		☆				@	1-S19
25	Cooling system	Flush																				☆			G-27
26	Coolant	Change																				☆			G-27
27	Fuel system	Bleed																			Service as required				G-30
28	Fuse	Replace																							G-31
29	Light bulb	Replace																							G-31

■ IMPORTANT

- **The jobs indicated by ★ must be done after the first 50 hours of operation.**
- ***1 : Air cleaner should be cleaned more often in dusty conditions than in normal conditions.**
- ***2 : Every year or every 6 times of cleaning.**
- ***3 : Replace only if necessary.**
- ***4 : When the battery is used for less than 100 hours per year, check the fluid level annually.**
- **The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S.EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.**
  Please see the Warranty Statement in detail.

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7. CHECK AND MAINTENANCE

CAUTION

- **Be sure to check and service the tractor on a level surface with the engine shut off and the parking brake "ON" and implement lowered to the ground.**

[1] DAILY CHECK

To prevent trouble from occurring, it is important to know the condition of the tractor. Check the following items before starting.

■ **Walk Around Inspection**

Look around the under the tractor for such items as loose bolts, trash build-up, oil or coolant leaks, broken or worn parts.

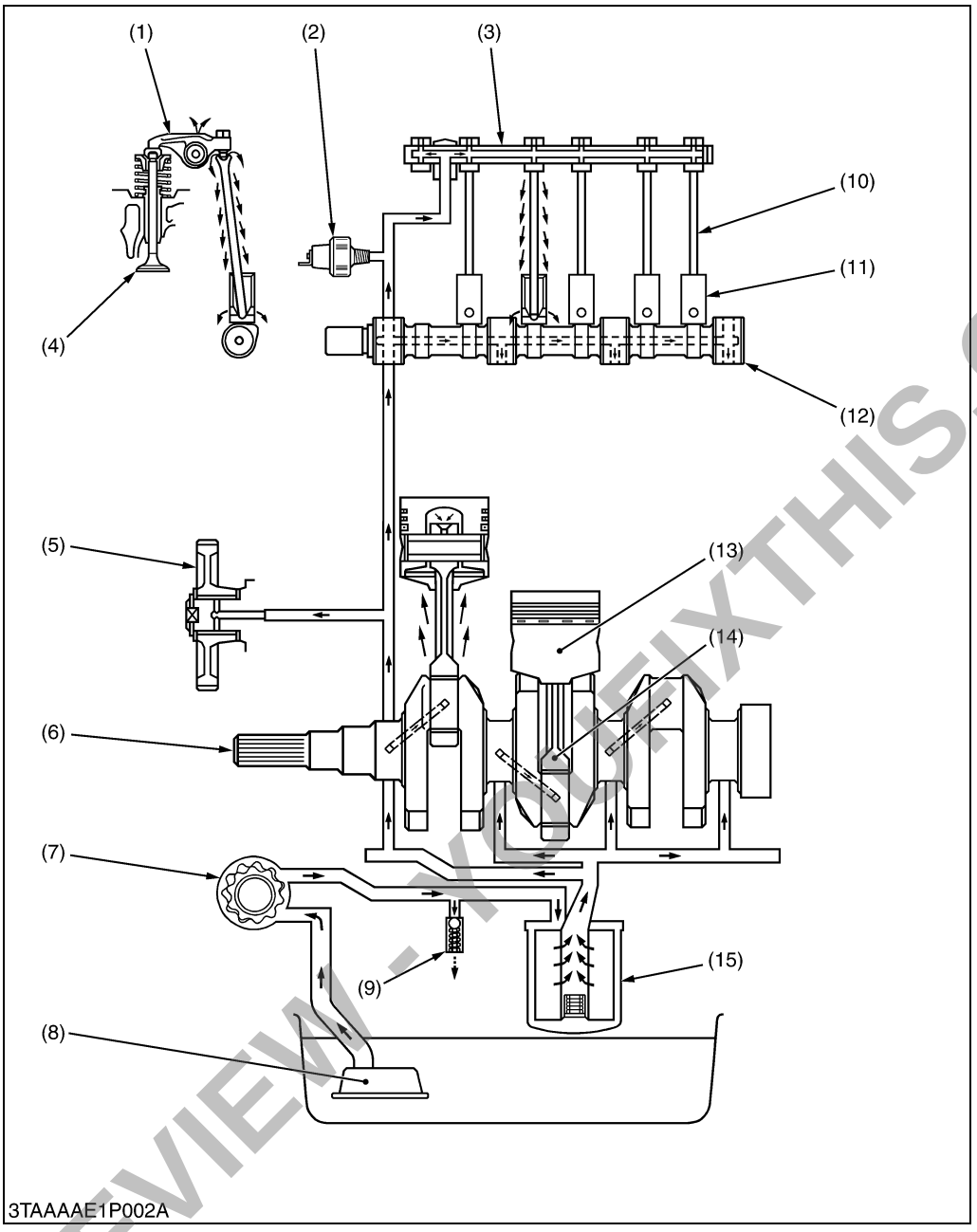
Checking

1. Checking and refueling.
2. Check the engine oil level.
3. Check the transmission fluid level.
4. Check the coolant level.
5. Clean panel and radiator screen.
6. Check the brake pedal.
7. Check the gauge, the meters and easy checkers.
8. Check the head light, the hazard light etc..
9. Check and clean the electrical wiring and the battery cables.
10. Check the seat belt and ROPS.

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1. LUBRICATING SYSTEM



3TAAAAE1P002A

(1) Rocker Arm
(2) Oil Pressure Switch
(3) Rocker Arm Shaft
(4) Valve
(5) Idle Gear
(6) Crankshaft
(7) Oil Pump
(8) Oil Strainer
(9) Relief Valve
(10) Push Rod
(11) Tappet
(12) Camshaft
(13) Piston
(14) Connecting Rod
(15) Oil Filter Cartridge

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This engine's lubricating system consists of oil strainer (8), oil pump (7), relief valve (9), oil filter cartridge (15) and oil pressure switch (2).

The oil pump sucks lubricating oil from the oil pan through the oil strainer and the oil flows down to the filter cartridge, where it is further filtered. Then the oil is forced to crankshaft (6), connecting rods (14), idle gear (5), camshaft (12) and rocker arm shaft (3) to lubricate each part.

Some part of oil, splashed by the crankshaft or leaking and dropping from gaps of each part, lubricates these parts: piston (13), cylinders, small ends or connecting rods, tappets (11), push rods (10), inlet and exhaust valves (4) and timing gears.

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1. TROUBLESHOOTING

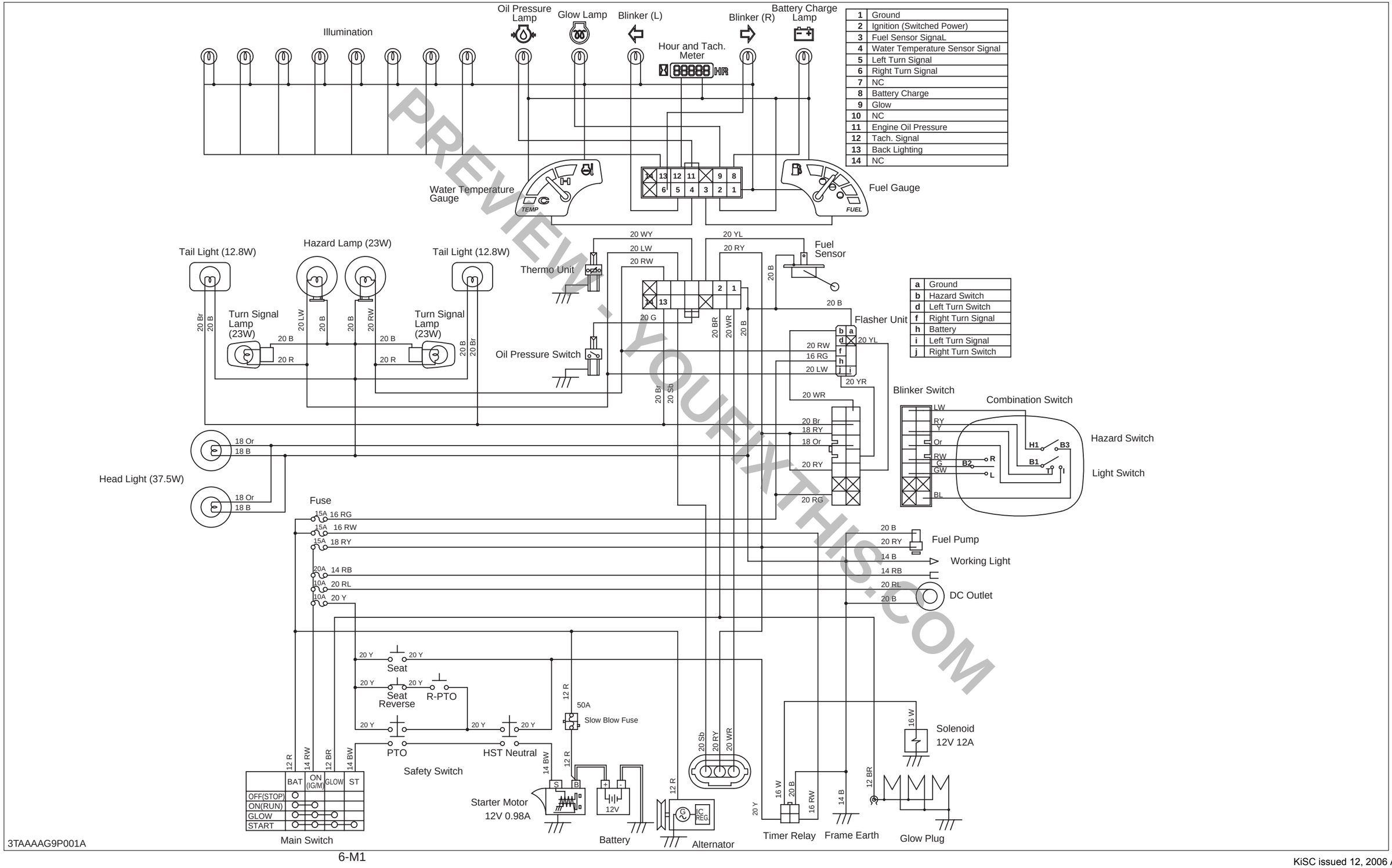
Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Replenish fuel	G-7
	Air in the fuel system	Bleed	G-30
	Water in the fuel system	Change fuel and repair or replace fuel system	–
	Fuel pipe clogged	Clean	G-25
	Fuel filter clogged	Change	G-25
	Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	G-7
	Fuel with low cetane number	Use specified fuel	G-7
	Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S25
	Incorrect injection timing	Adjust	1-S17
	Fuel camshaft worn	Replace	1-S35
	Injection nozzle clogged	Clean or replace	1-S26
	Injection pump malfunctioning	Replace	1-S30
	Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	1-S34
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S26, S27
	Improper valve timing	Correct or replace timing gear	1-S34
	Piston ring and cylinder worn	Replace	1-S35 to S37
	Excessive valve clearance	Adjust	1-S13
Starter Does Not Run	Battery discharged	Charge	G-17
	Starter malfunctioning	Repair or replace	6-S27
	Main switch malfunctioning	Repair or replace	6-S9
	Safety switches malfunctioning	Adjust or replace	6-S8, S9
	Wiring disconnected	Connect	–
Engine Revolution Is Not Smooth	Fuel filter clogged or dirty	Replace	G-19
	Air cleaner clogged	Clean or replace	G-18
	Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S26
	Injection pump malfunctioning	Replace	1-S30
	Incorrect nozzle injection pressure	Adjust	1-S20
	Injection nozzle stuck or clogged	Repair or replace	1-S26
	Governor malfunctioning	Repair	1-S30

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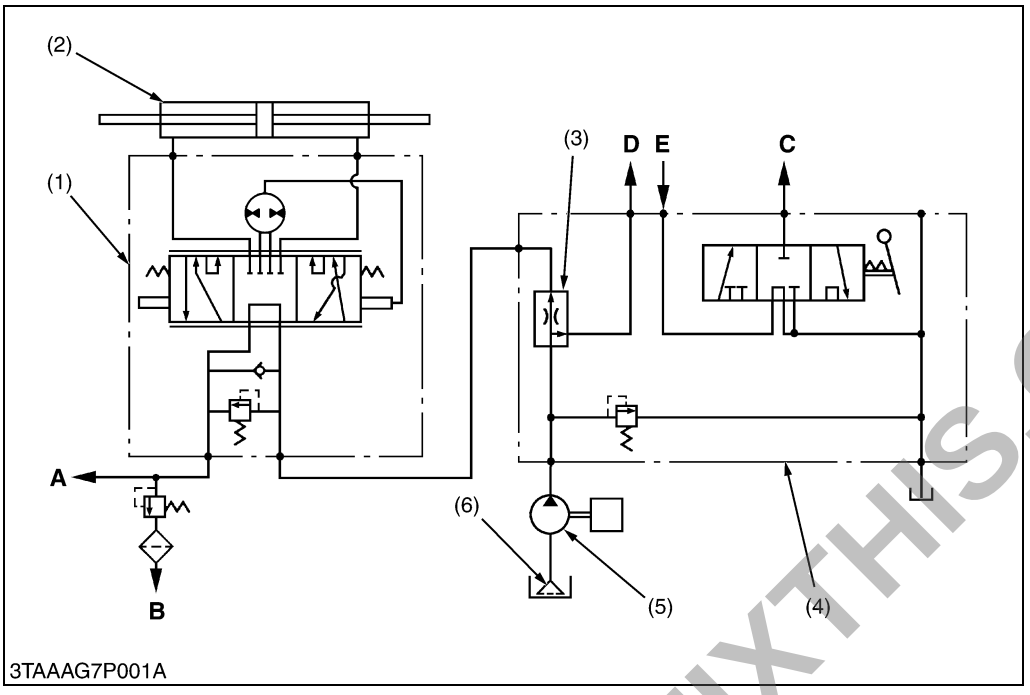
1. WIRING DIAGRAM (TYPE 1 : WITHOUT OPC TIMER)



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1. HYDRAULIC CIRCUIT



(1) Steering Controller
(2) Steering Cylinder
(3) Flow Priority Valve
(4) Hydraulic Control Valve Assembly
(5) Hydraulic Pump
(6) Oil Strainer

A : To PTO Clutch Valve
B : To HST
C : To Hydraulic Cylinder
D : To Implement
E : From Implement

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This model is provided with a full hydrostatic power steering.

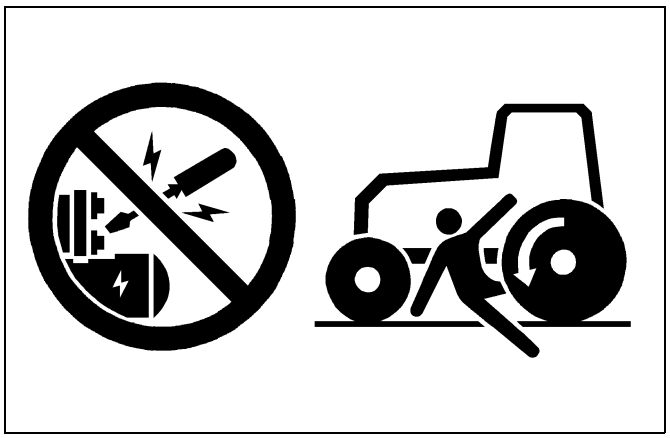
In the full hydrostatic power steering, the steering controller is connected to the steering cylinder with only the hydraulic piping. Accordingly, it does not have mechanical transmitting parts such as steering gear, pitman arm, drag link, etc.. Therefore, it is simple in construction. This steering system consists of the oil strainer (6), hydraulic pump (5), flow priority valve (3), steering controller (1), steering cylinder (2), etc..

Flow priority valve (3) which located in the hydraulic control valve assembly (4) divides the oil into two direction. One is the control flow to power steering (constantly 9.5 L/min., 2.5 U.S.gals./min., 2.1 Imp.gals./min.), and the other is excessive flow to control valve of implement lift control.

By operating the power steering body, the required amount of oil is fed to the steering cylinder (2).

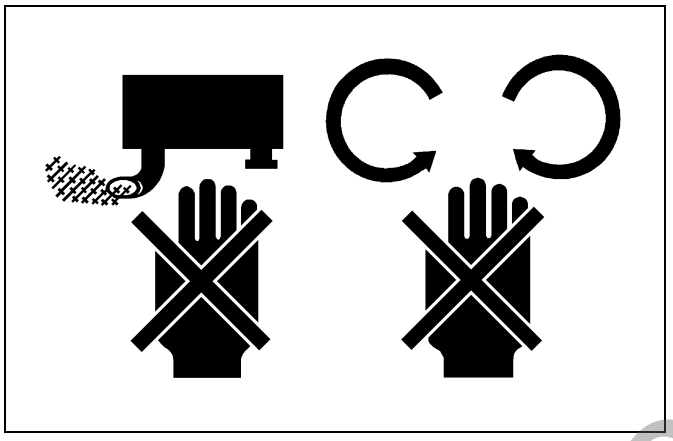
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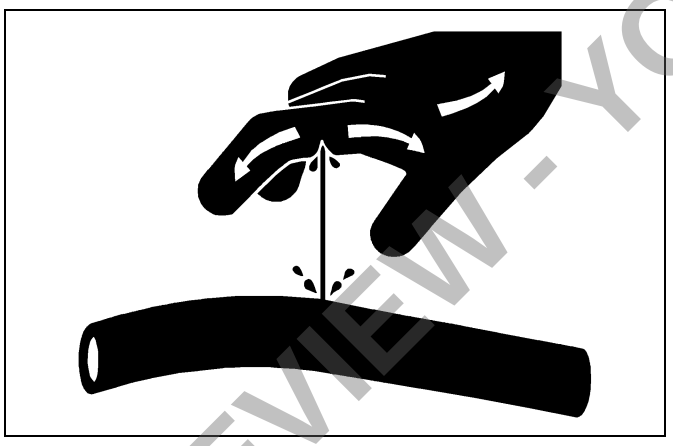
SAFETY STARTING

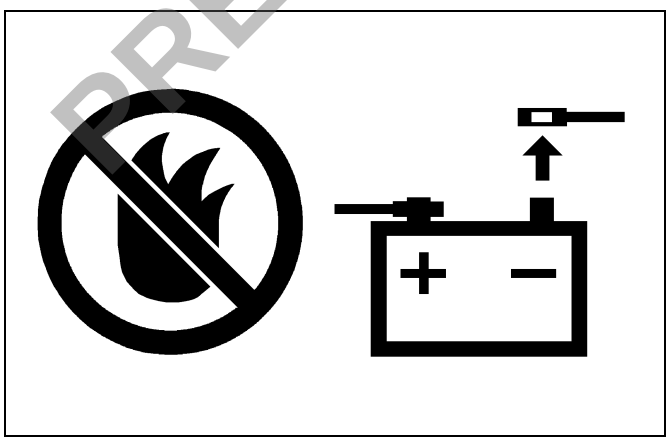
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine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



SAFETY WORKING

- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- 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.
- 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.





AVOID FIRES

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

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LUBRICATING SYSTEM

Engine Oil Pressure	At Idle Speed	More than 49 kPa 0.5 kgf/cm^2 7 psi	–
	At Rated Speed	196 to 441 kPa 2.0 to 4.5 kgf/cm^2 28 to 64 psi	147 kPa 1.5 kgf/cm^2 21 psi
Relief Valve Spring	Free Length	32 mm 1.26 in.	28 mm 1.10 in.
Inner Rotor to Outer Rotor	Clearance	0.03 to 0.14 mm 0.0012 to 0.0055 in.	–
Outer Rotor to Pump Body	Clearance	0.07 to 0.15 mm 0.0028 to 0.0059 in.	–
Inner Rotor to Cover	Clearance	0.075 to 0.135 mm 0.00295 to 0.00531 in.	–

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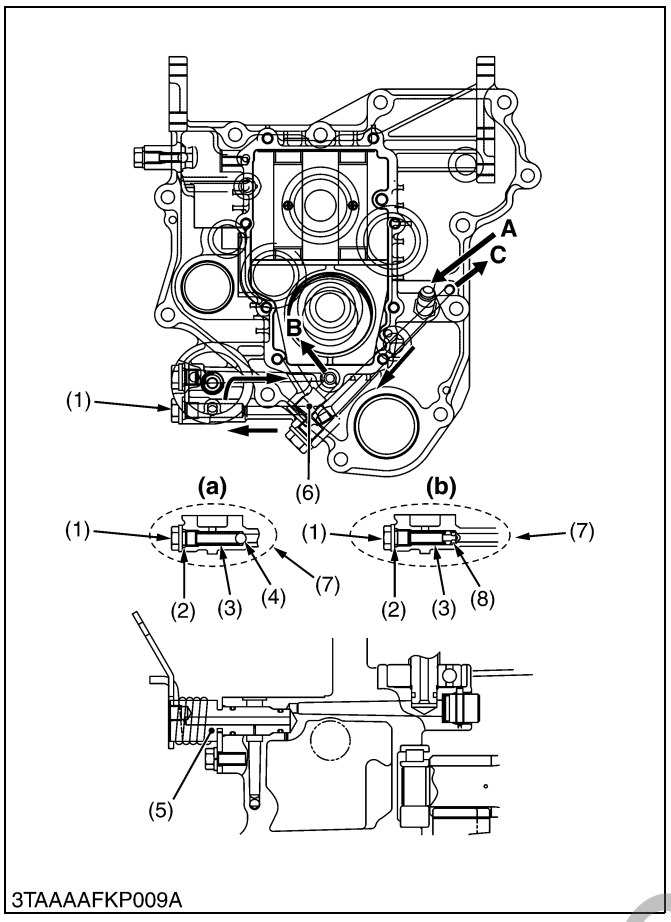
COOLING SYSTEM

Item		Factory Specification	Allowable Limit
Fan Belt	Tension	7.0 to 9.0 mm / 98 N 0.28 to 0.35 in. / 98 N (10 kgf, 22 lbs)	–
Radiator Cap	Pressure Falling Time	10 seconds or more 88 → 59 kPa 0.9 → 0.6 kgf/cm^2 13 → 9 psi	–
Radiator	Water Leakage Test Pressure	No leak at specified pressure 157 kPa 1.6 kgf/cm^2 23 psi	–
Thermostat	Valve Opening Temperature (At Beginning)	69.5 to 72.5 °C 157.1 to 162.5 °F	–
	Valve Opening Temperature (Opened Completely)	85 °C 185 °F	–

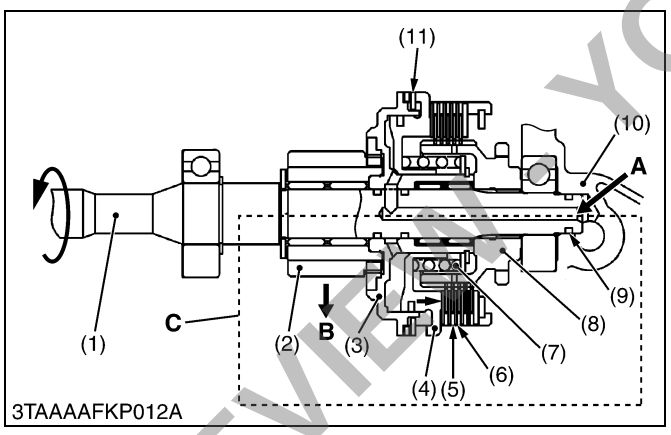
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3TAAAAFKP012A

■ PTO Clutch Relief Valve

The PTO clutch relief valve is provided to control the PTO operating pressure. When the oil pressure exceed the relief valve setting pressure, relief valve opens and the oil flows into PTO clutch and hydrostatic transmission.

(Reference)

- Relief valve setting pressure : 490 kPa
  5.0 kgf/cm^2
  71.2 psi

(1) Plug
(2) O-ring
(3) Spring
(4) Steel Ball
(5) PTO Clutch Valve
(6) HST Charge Relief Valve
(7) PTO Clutch Relief Valve
(8) Poppet

A : From Power Steering Controller
B : To Hydrostatic Transmission
C : To PTO Clutch Valve

(a) Old Type
(b) New Type

W1015382

■ PTO Clutch "Engaged"

The oil from power steering controller flows into the PTO clutch valve.

When the PTO clutch lever is set at the **"Engaged"** position, the PTO clutch valve rotates. Oil flows from the oil line through transmission case to the PTO clutch pack.

Oil entering the clutch pack pushes the clutch piston (4) to engage the clutch pack. Power is transmitted from the HST pump shaft (1) through the PTO clutch to the clutch gear (2) and the PTO shafts.

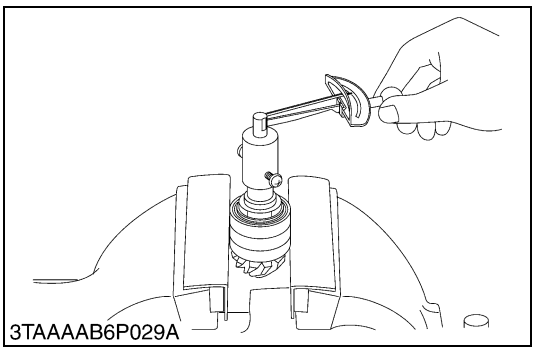
(1) HST Pump Shaft
(2) Clutch Gear
(3) Clutch Case
(4) Clutch Piston
(5) Clutch Plate
(6) Clutch Disc
(7) Spring
(8) Spline Boss
(9) O-ring
(10) Transaxle Case
(11) Brake Disc

A : From PTO Clutch Valve
B : Power to PTO Shaft
C : PTO Clutch "Engaged"

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Turning Torque of Bevel Pinion Shaft

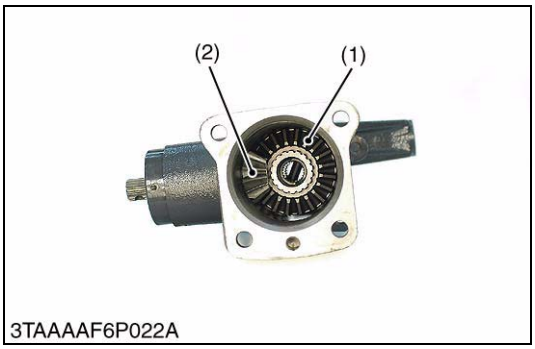
1. Cramp the spiral bevel pinion shaft assembly to the vise and tighten the staking nut.
2. Measure the turning torque of bevel pinion shaft.
3. If the turning torque is not within the factory specifications, adjust with the lock nut.

Turning torque	Factory spec.	0.8 to 1.0 N·m 0.08 to 0.10 kgf·m 0.59 to 0.73 ft-lbs

■ **NOTE**

- **After turning force adjustment, be sure to stake the lock nut.**

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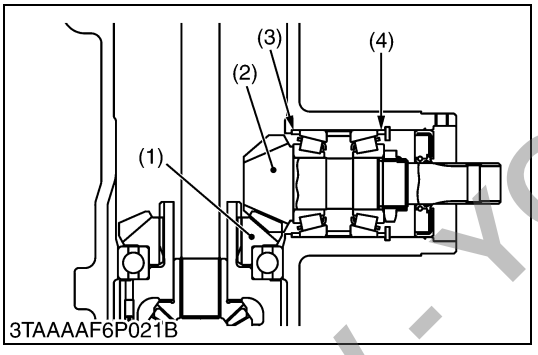


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Backlash between Bevel Pinion Shaft and Bevel Gear

1. Lay the solder (0.5 mm (0.020 in.) thickness) on the position where the tooth proper contact bevel pinion shaft.
2. Fix the bevel gear and rotate the bevel pinon shaft carefully.
3. Measure the backlash by thickness of the point where solder is the thinnest.
4. If the backlash is not within the factory specifications, change the adjusting collars (3), shims (4). For example change the adjusting shim (4) to 0.1 mm (0.004 in.) smaller size, and change the adjusting collar (3) to 0.1 mm (0.004 in.) larger size.
5. Adjust the backlash properly by repeating the above procedures.

Backlash between bevel pinion shaft and bevel gear	Factory spec.	0.1 to 0.3 mm 0.004 to 0.012 in.



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(Reference)

- Above factory specification should be measured on the tooth of bevel pinion. When measuring the backlash on the spline of its shaft, factory specification will be 0.0571 to 0.1714 mm (0.00225 to 0.00675 in.).
- Thickness of adjusting collars (3), (4) :

3.4 mm (0.134 in.)	4.1 mm (0.161 in.)
3.6 mm (0.142 in.)	4.2 mm (0.165 in.)
3.8 mm (0.150 in.)	4.4 mm (0.173 in.)
3.9 mm (0.154 in.)	4.5 mm (0.177 in.)
4.0 mm (0.157 in.)	4.6 mm (0.181 in.)

(1) Bevel Gear
(2) Bevel Pinion Shaft
(3) Adjusting Collar
(4) Adjusting Collar

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LIGHTING SYSTEM (Continued)

Symptom	Probable Cause	Solution	Reference Page
Glow Lamp Does Not Light When Main Switch Is in Pre-heat Position	Battery discharged or defective	Recharge or Replace	G-17
	Slow blow fuse blown	Replace	G-31
	Wiring harness disconnected or improperly connected (between main switch **19** terminal and pre-heat indicator, between pre-heat indicator and glow plugs)	Repair or Replace	–
	Main switch defective	Replace	6-S8, S9
	Glow lamp defective	Replace	–
Oil Pressure Lamp Lights Up When Engine Is Running	Engine oil pressure too low	Repair engine	–
	Engine oil insufficient	Replenish	G-7
	Oil pressure switch defective	Replace	6-S24
	Short circuit between oil pressure switch lead and chassis	Repair	–
Oil Pressure Lamp Does Not Light When Main Switch Is Turned ON and Engine Is Not Running	Bulb blown	Replace	G-31
	Oil pressure switch defective	Replace	6-S24
	Wiring harness disconnected or improperly connected (between panel board and oil pressure switch)	Repair or Replace	–

W10135800

GAUGES

Fuel Warning Lamp Does Not Light	Fuel gauge defective	Replace	6-S24
	Fuel level sensor defective	Replace	6-S24
	Wiring harness disconnected or improperly connected (between fuel gauge and fuel level sensor)	Repair or Replace	–
Coolant Temperature Gauge Does Not Function	Coolant temperature gauge defective	Replace	6-S25
	Coolant temperature sensor defective	Replace	6-S25
	Wiring harness disconnected or improperly connected (between coolant temperature gauge and coolant temperature sensor)	Repair or Replace	–

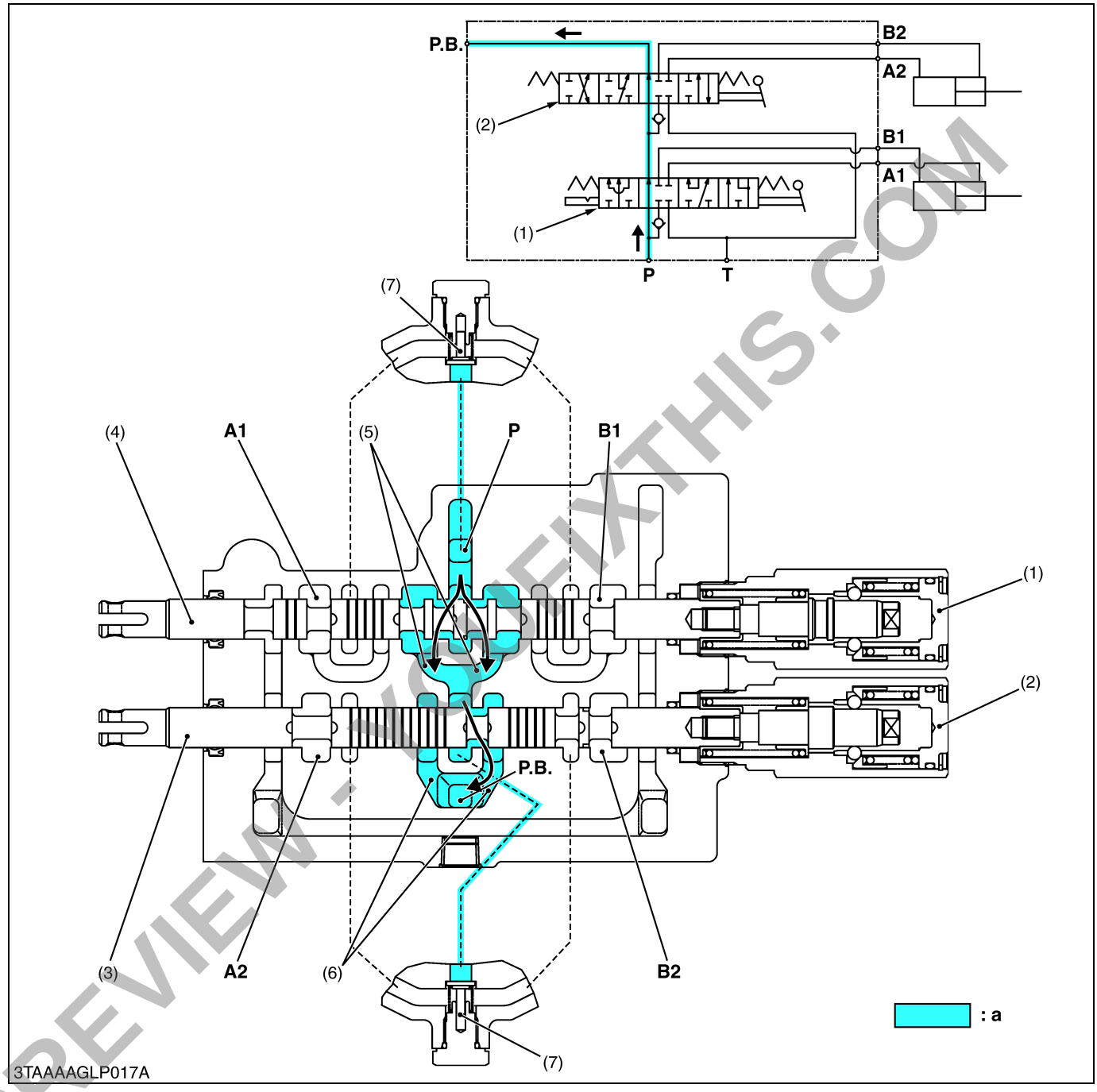
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[2] OPERATION

■ Neutral



(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) Spool
(5) **P.B.** Passage 1
(6) **P.B.** Passage 2
(7) Load Check Valve

T : T Port (To Tank)
P : P Port (From Pump)
A1 : A1 Port
A2 : A2 Port
B1 : B1 Port
B2 : B2 Port
P.B. :P.B. Port
a : Low Pressure

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