WSM

WORKSHOP MANUAL
TRACTOR

L3130,L3430,L3830,
L4630,L5030

Kubota

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KiSC issued 02, 2007 A

GENERAL

CONTENTS

1. TRACTOR IDENTIFICATION G-1
2. GENERAL PRECAUTIONS G-2
3. HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING .. G-3
   [1] WIRING G-3
   [2] BATTERY G-5
   [3] FUSE G-5
   [4] CONNECTOR G-5
   [5] HANDLING OF CIRCUIT TESTER G-6
4. LUBRICANTS, FUEL AND COOLANT G-7
5. TIGHTENING TORQUES G-10
   [1] GENERAL USE SCREWS, BOLTS AND NUTS G-10
6. MAINTENANCE G-11
7. CHECK AND MAINTENANCE G-14
   [1] DAILY CHECK G-14
   [2] CHECK POINTS OF INITIAL 50 HOURS G-15
   [3] CHECK POINTS OF EVERY 50 HOURS G-19
   [4] CHECK POINTS OF EVERY 100 HOURS G-22
   [5] CHECK POINTS OF EVERY 200 HOURS G-27
   [6] CHECK POINTS OF EVERY 400 HOURS G-31
   [7] CHECK POINTS OF EVERY 600 HOURS G-31
   [8] CHECK POINTS OF EVERY 800 HOURS G-31
   [9] CHECK POINTS OF EVERY 1 YEAR G-32
   [10] CHECK POINTS OF EVERY 2 YEARS G-32
   [11] OTHERS G-34
8. SPECIAL TOOLS G-39
   [1] SPECIAL TOOLS FOR ENGINE G-39
   [2] SPECIAL TOOLS FOR TRACTOR G-47
9. TIRES G-55
   [1] TIRE PRESSURE G-55
   [2] TREADS ADJUSTMENT G-56
      (1) Front Wheels G-56
      (2) Rear Wheels G-56
   [3] TIRE LIQUID INJECTION G-58

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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.

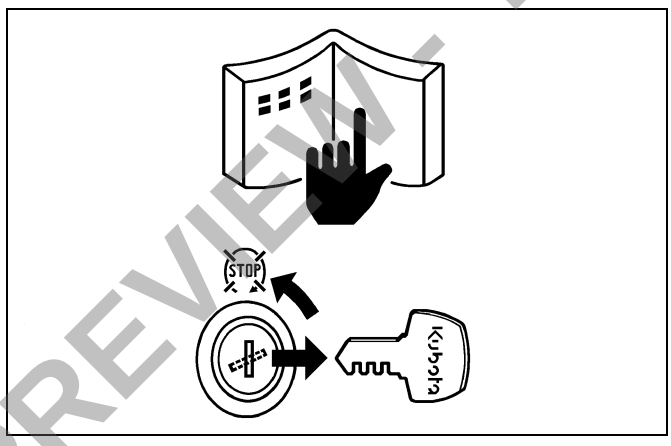
DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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

ROPS Type

Model			L3130	L3430
			Manual Transmission	
Engine	Model		D1503-MA-E-GST-EU	D1703-MA-E-GST-EU
	Type		Indirect injection vertical, water-cooled, 4-cycle diesel	
	Number of cylinders		3	
	Total displacement		1.499 L (91.5 cu.in.)	1.647 L (100.5 cu.in.)
	Bore and stroke		83 × 92.4 mm (3.3 × 3.6 in.)	87 × 92.4 mm (3.4 × 3.6 in.)
	Net power		23.1 kW (31.0 HP)*	25.1 kW (33.6 HP)*
	PTO power (factory observe)		19.0 kW (25.8 HP)* / 2700 min^{-1} (rpm)	21.3 kW (29.0 HP)* / 2700 min^{-1} (rpm)
	Maximum torque		102.9 N·m (10.5 kgf·m, 75.9 ft-lbs)	108.3 N·m (11.05 kgf·m, 79.9 ft-lbs)
	Battery capacity		12 V, RC : 123 min, CCA : 490 A	
	Fuel		Diesel fuel No. 1 [below –10 °C (14 °F], Diesel fuel No. 2-D [above –10 °C (14 °F)]	
Capacities	Fuel tank		40 L (10.6 U.S.gals, 8.8 Imp.gals)	
	Engine crankcase (with filter)		5.7 L (6.0 U.S.qts, 5.0 Imp.qts)	
	Engine coolant		6.0 L (6.3 U.S.qts, 5.3 Imp.qts)	
	Transmission case		42 L (11.1 U.S.gals, 9.2 Imp.gals)	
Dimensions	Overall length (without 3P)		3025 mm (119.1 in.)	3015 mm (118.7 in.)
	Overall width (min. tread)		1430 mm (56.3 in.)	
	Overall height (with ROPS)		2255 mm (88.8 in.)	2415 mm (95.1 in.)
	Wheel base		1805 mm (71.1 in.)	
	Min. ground clearance		370 mm (14.6 in.)	
	Tread	Front	1150 mm (45.3 in.)	
		Rear	1110 mm (43.7 in.), 1205 mm (47.4 in.), 1300 mm (51.2 in.), 1385 mm (54.5 in.)	
Weight (with ROPS)			1480 kg (3265 lbs)	1460 kg (3220 lbs)
Travelling system	Standard tire size	Front	7-16	
		Rear	12.4-24	
	Clutch		Dry type single stage	
	Steering		Hydrostatic power steering	
	Transmission		F8, R8 fully synchronized main and shuttle transmission (with creep speed model : F16, R16 fully synchronized main and shuttle transmission)	
	Braking system		Wet disk type	
	Min. turning radius (with brake)		2.7 m (8.9 feet)	
Hydraulic system	Hydraulic control system		Position control	
	Pump capacity		31.5 L (8.3 U.S.gals, 6.9 Imp.gals) / min.	
	Three point hitch		SAE Category 1	
	Max. lift force	At lift points	1700 kg (3750 lbs)	
		24 in. behind lift points	1200 kg (2650 lbs)	
	System pressure		17.7 MPa (180 kgf/cm^2, 2560 psi)	
PTO	Rear PTO		SAE 1-3/8, 6 splines	
	PTO / Engine speed		540 min^{-1} (rpm) / 2550 min^{-1} (rpm), 750 min^{-1} (rpm) / 2250 min^{-1} (rpm)	

Note : * Manufacture's estimate

The company reserves the right to change the specifications without notice.

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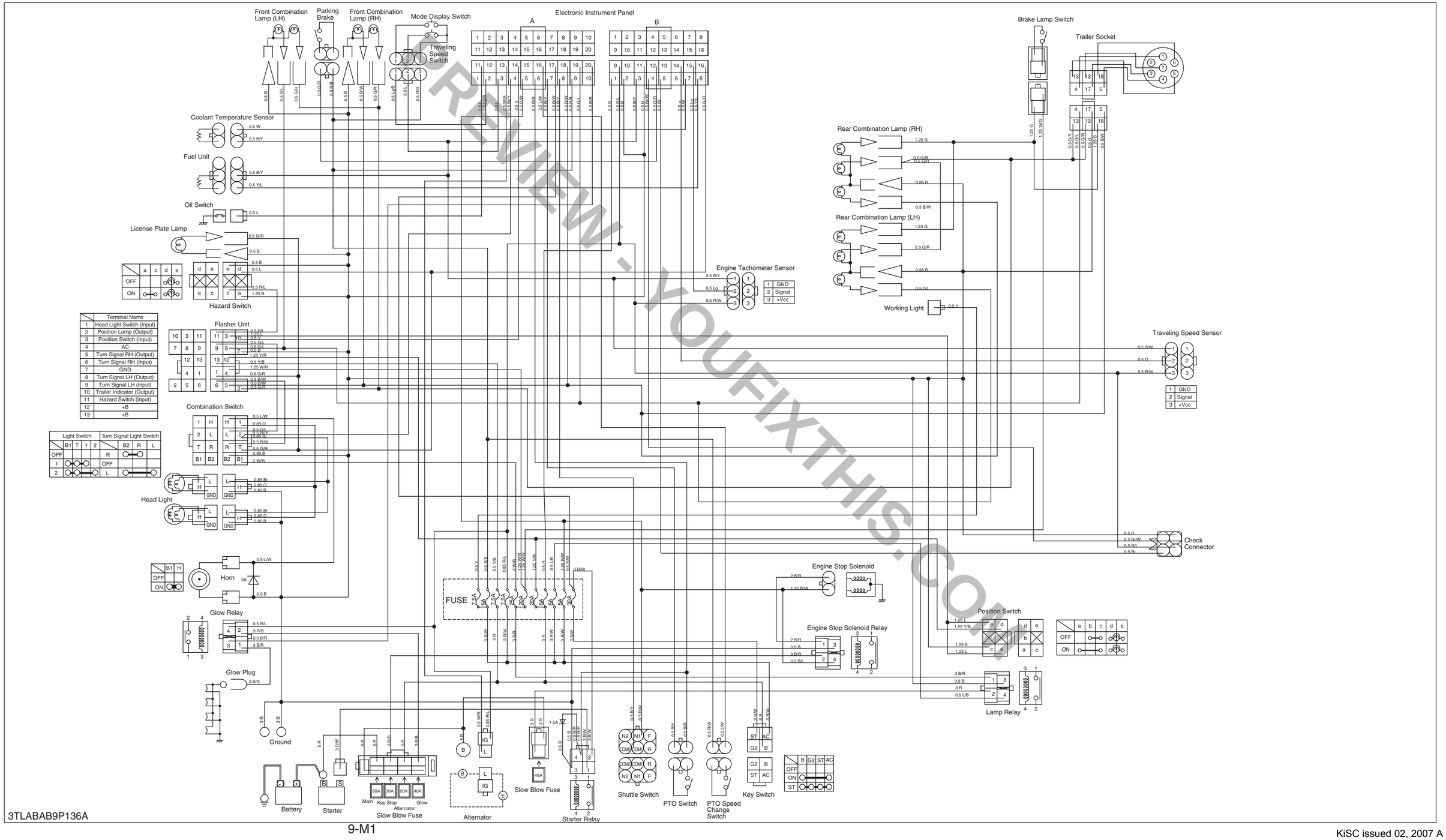
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1. WIRING DIAGRAM

[1] MANUAL TRANSMISSION MODEL

(1) ROPS Type

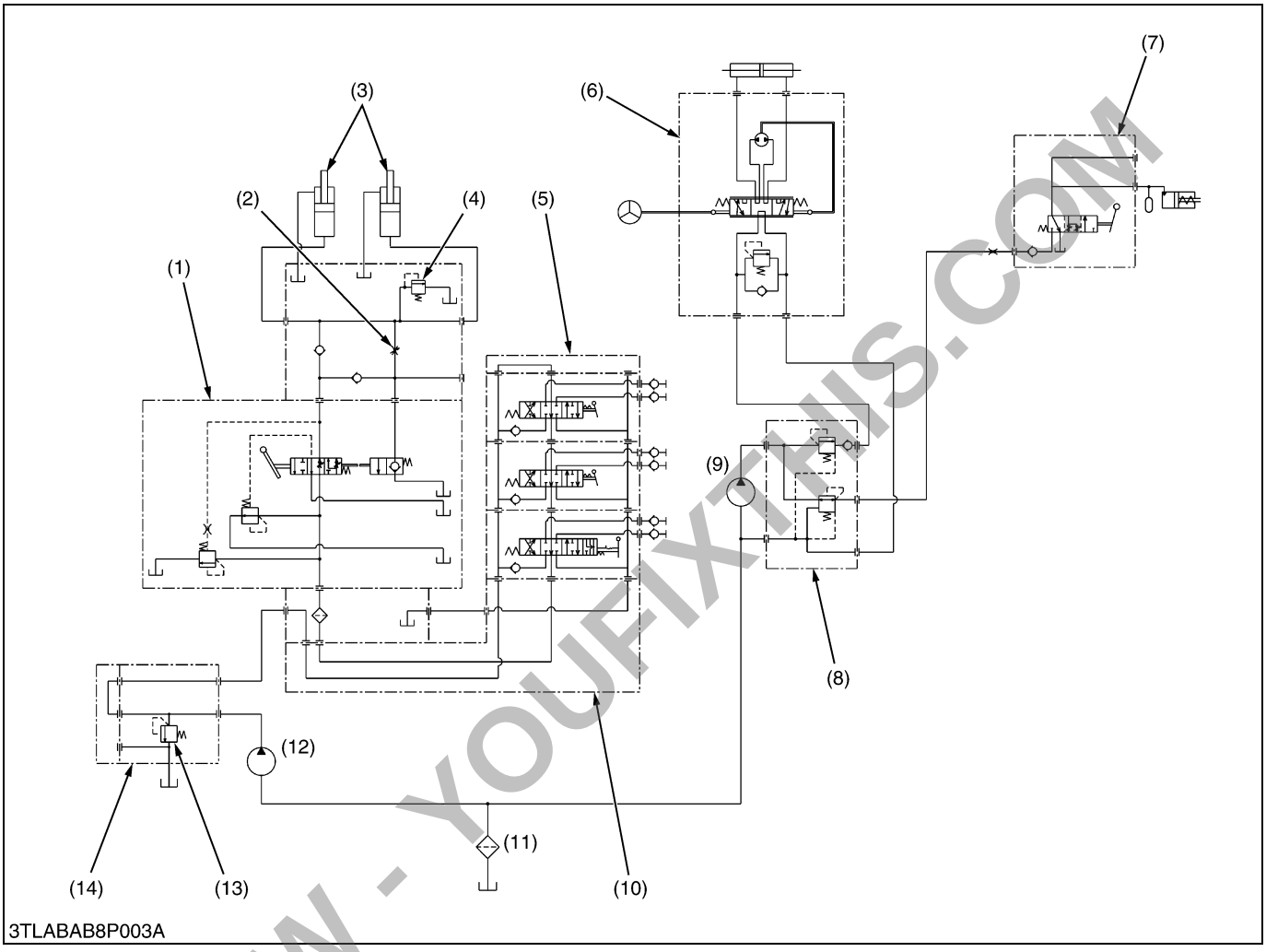


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2. HYDRAULIC CIRCUIT

[1] MANUAL TRANSMISSION



(1) Position Control Valve
(2) Lowering Speed Adjusting Valve
(3) Hydraulic Cylinder
(4) Cylinder Safety Valve
(5) Auxiliary Control Valve
(6) Power Steering Controller (Refer to STEERING Section)
(7) PTO Clutch Valve (Refer to TRANSMISSION Section)
(8) Regulator Valve (Refer to TRANSMISSION Section)
(9) Hydraulic Pump 2
(10) Rear Hydraulic Block
(11) Oil Filter
(12) Hydraulic Pump 1
(13) Relief Valve
(14) Front Hydraulic Block

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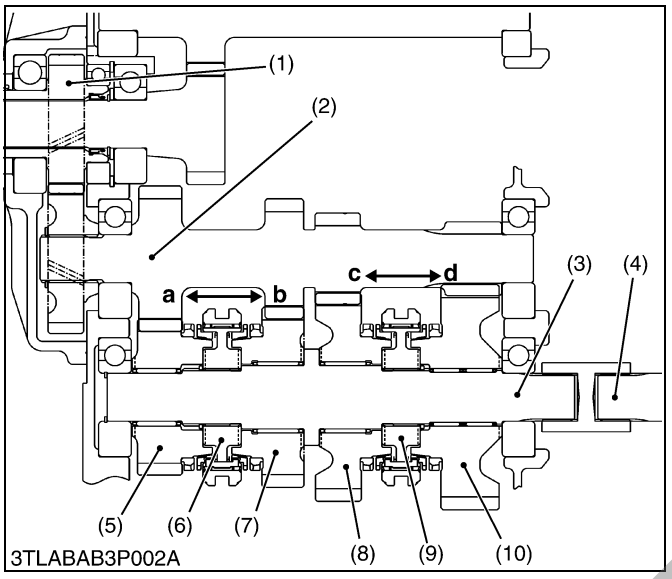
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[2] POWER TRAIN FOR TRAVELING GEAR

The transmission consists of a series of gears and shafts as shown in previous page.

The traveling system consists of main gear shift section, shuttle shift section, range gear shift section and front wheel drive section.

(1) Main Gear Shift Section



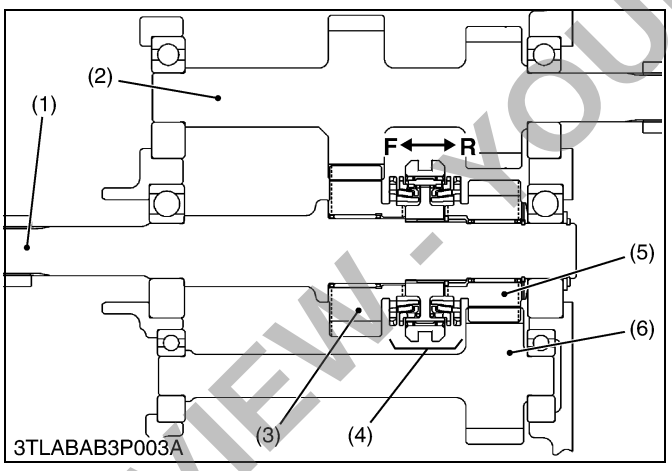
The main gear shift section is located in the clutch housing, and it uses a synchromesh.

Power which is transmitted from the engine to the gear shaft (1) via the clutch is changed in four ways by operating the main shift lever to shift the shifters, and transmits to the counter shaft (3).

(1) Gear Shaft (Input)
(2) Main Shaft
(3) Counter Shaft
(4) Shuttle Shaft
(5) Gear for 4th
(6) Synchromesh Gears (3rd and 4th)
(7) Gear for 3rd
(8) Gear for 2nd
(9) Synchromesh Gears (1st and 2nd)
(10) Gear for 1st
a : 4th Speed
b : 3rd Speed
c : 2nd Speed
d : 1st Speed

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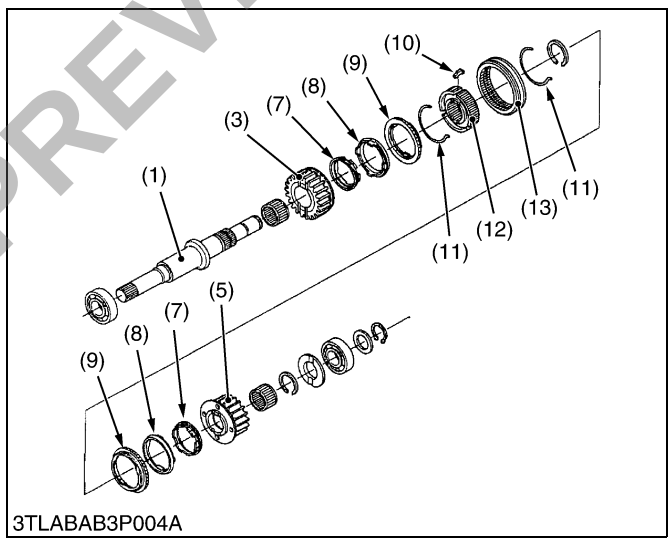
(2) Shuttle Shift Section



The shuttle shift section is located in the mid case, and it uses a double cone type synchromesh. It allows the operator to change forward and reverse for each speed from the first to eight with single shift lever.

The double cone type synchromesh is characterized by its light operating force and durability because it engages with the gear in reverse rotation when the speed is changed from forward to reverse position or vice versa.

Two synchronizing rings (7), (9) are installed on one side, and the center ring (8) is provided between the synchronizing rings. This construction doubles the ground contact area of the synchronizer rings (7), (9) and improves the durability as compared with the ordinary key type synchromesh.



(1) Shuttle Shaft (Connected to Counter Shaft)
(2) Shuttle Gear Shaft (Connected to Range Gear Shaft)
(3) Gear for Forward
(4) Double Cone Type Synchromesh
(5) Gear for Reverse
(6) Reverse Gear Shaft
(7) Outer Synchronizer Ring
(8) Center Ring
(9) Inner Synchronizer Ring
(10) Synchronizer Key
(11) Synchronizer Spring
(12) Hub
(13) Shifter
F : Forward
R : Reverse

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5. TIGHTENING TORQUES

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

[1] GENERAL USE SCREWS, BOLTS AND NUTS

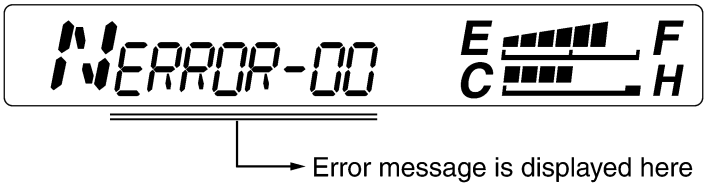
Indication on top of bolt	⬡ 4 **No-grade or 4T**						⬡ 7 **7T**						⬡ 9 **9T**		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit / **Diameter**	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	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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■ Error Display

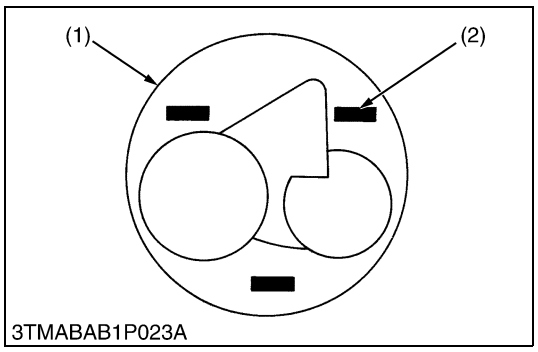


Display on LCD Screen	Trouble Item (Affected Model)	Probable Cause	Solution	Reference Page
ERROR-00	IntelliPanel memory device has failed (All model)	• IntelliPanel memory device failure	• Replace IntelliPanel	9-S23
ERROR- 10 **Selected Travel Speed Is Not Displayed on LCD**	HST range gear shift lever sensor failure (HST model)	• Lever sensor output terminal is out of adjustment • Lever sensor wire connector is broken or short-circuited • Lever sensor defective **NOTE:** **ERROR-10 : is not automatically displayed in the LCD, but it is memorized in the IntelliPanel as error information**	• Check lever sensor wire connector • Check sensor voltage by Test mode (**Mode A**) • Check sensor voltage by connector • Check sensor resistance • Replace lever sensor	9-S24 9-S13 9-S24 9-S26 9-S26
ERROR-20	Wrong setting of IntelliPanel (Manual Transmission and HST model)	• GST specified IntelliPanel installed wrong on HST or Manual transmission model	• Input appropriate transmission model by Transmission model Input Mode (**Mode I**)	9-S19
	Communication error between ECU and IntelliPanel (GST model)	• Fuse blown out • Communication line between ECU and IntelliPanel is broken or short-circuited • No signals from ECU for longer than 5 seconds (error cleared if signal sent and received later) • ECU defective	• Check fuse • Check ECU connector • Check communication line between ECU and IntelliPanel at ECU connector • Replace ECU	9-S27 9-S27 9-S31 9-S28
ERROR-30	ECU memory device has failed (GST model)	• ECU memory device failure	• Replace ECU	9-S28

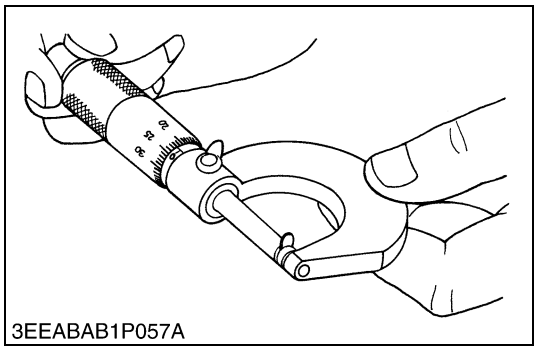
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3TMABAB1P023A


3EEABAB1P057A

Top Clearance

1. Remove the cylinder head.
2. Move the piston up and stick a strip of fuse on the piston head at three position with grease.
3. Lower the piston and install the cylinder head. (Use a new cylinder head gasket and tighten with a specified tightening torque.)
4. Turn the flywheel until the piston passes through the T.D.C..
5. Remove the cylinder head and measure the thickness of the fuses.
6. If the measurement is not within the factory specifications, check the oil clearances between the crankpin and bearing and between the piston pin and bushing.

Top clearance	Factory spec.	0.55 to 0.70 mm 0.0217 to 0.0276 in.

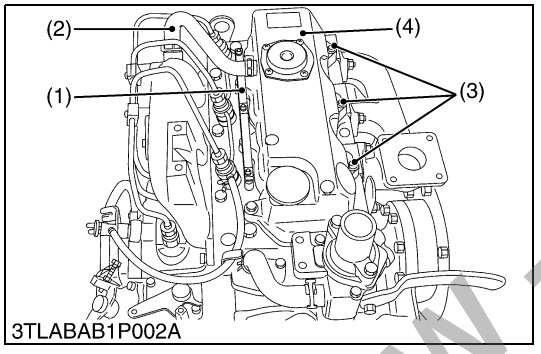
Tightening torque	Cylinder head screws	93.1 to 98.0 N·m 9.5 to 10.0 kgf·m 68.7 to 72.3 ft-lbs

(1) Piston (2) Fuse

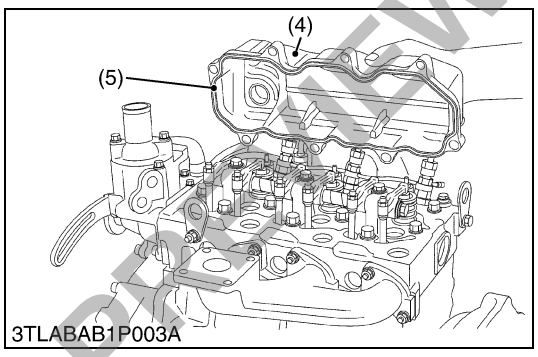
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(2) Disassembling and Assembling

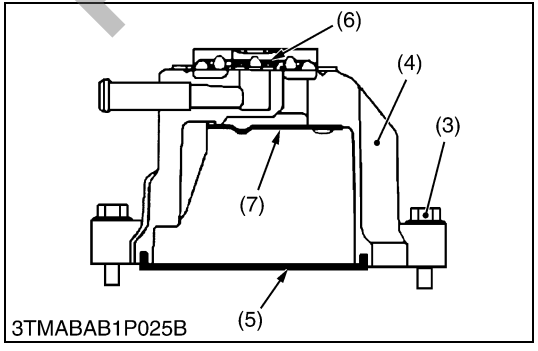
(A) Cylinder Head and Valves



3TLABAB1P002A



3TLABAB1P003A



3TMABAB1P025B

Cylinder Head Cover

1. Remove the lead (1).
2. Remove the breather hose (2).
3. Remove the head cover screws (3).
4. Remove the cylinder head cover (4).

(When reassembling)

- Check to see if the cylinder head cover gasket is not defective.

Tightening torque	Cylinder head cover screw	6.9 to 11.3 N·m 0.7 to 1.15 kgf·m 5.1 to 8.32 ft-lbs

(1) Lead
(2) Breather Hose
(3) Head Cover Screw
(4) Cylinder Head Cover
(5) Cylinder Head Cover Gasket
(6) Breather Valve
(7) Plate

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No fuel	Replenish fuel	G-7, 8
	• Air in the fuel system	Bleed	G-34
	• Water in the fuel system	Change fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Change	G-31
	• Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil	G-7, 8
	• Fuel with low cetane number	Use the specified fuel	G-7, 8
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S29
	• Incorrect injection timing	Adjust	1-S64
	• Fuel camshaft worn	Replace	1-S37
	• Injection nozzle clogged	Clean	–
	• Injection pump malfunctioning	Repair or replace	1-S32
	• Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	1-S37, S39, S42
	• Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S29, S30
	• Improper valve timing	Correct or replace timing gear	1-S36
	• Piston ring and cylinder worn	Replace	1-S39
	• Excessive valve clearance	Adjust	1-S27
Starter Does Not Run	• Battery discharged	Charge	G-25
	• Starter malfunctioning	Repair or replace	9-S41
	• Main switch malfunctioning	Repair or replace	9-S33, 34
	• Safety switches improperly adjusted or defective	Repair or replace	9-S35
	• Starter relay defective	Replace	9-S37
	• Wiring disconnected	Connect	–
	• Electronic instrument panel connector disconnected	Connect	–
Engine Revolution Is Not Smooth	• Fuel filter clogged or dirty	Change	G-31
	• Air cleaner clogged	Clean or change	G-22
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S29
	• Injection pump malfunctioning	Repair or replace	1-S32
	• Incorrect nozzle injection pressure	Adjust	1-S65
	• Injection nozzle stuck or clogged	Repair or replace	1-S29
	• Governor malfunctioning	Repair	–
Either White or Blue Exhaust Gas Is Observe	• Excessive engine oil	Reduce to the specified level	G-7, 8
	• Piston ring and cylinder worn or stuck	Repair or replace	1-S40
	• Incorrect injection timing	Adjust	1-S64
	• Deficient compression	Adjust top clearance	1-S28

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2. SERVICING SPECIFICATIONS

ENGINE BODY

Item		Factory Specification	Allowable Limit
Cylinder Head Surface	Flatness	–	0.05 mm / 500 mm 0.0020 in. / 19.69 in.
Compression Pressure (When Cranking with Starting Motor)		3.53 to 4.02 MPa / 290 min^{-1} (rpm) 36 to 41 kgf/cm^2 / 290 min^{-1} (rpm) 512 to 583 psi / 290 min^{-1} (rpm)	2.55 MPa / 290 min^{-1} (rpm) 26 kgf/cm^2 / 290 min^{-1} (rpm) 370 psi / 290 min^{-1} (rpm)
Difference among Cylinders		–	10 % or less
Top Clearance		0.55 to 0.70 mm 0.0217 to 0.0276 in.	–
Valve Clearance (When Cold)		0.18 to 0.22 mm 0.0071 to 0.0087 in.	–
Valve Seat	Width (Intake)	2.12 mm 0.0835 in.	–
	Width (Exhaust)	2.12 mm 0.0835 in.	–
Valve Seat	Angle (Intake)	1.047 rad 60 °	–
	Angle (Exhaust)	0.785 rad 45 °	–
Valve Face	Angle (Intake)	1.047 rad 60 °	–
	Angle (Exhaust)	0.785 rad 45 °	–
Valve Stem to Valve Guide	Clearance	0.040 to 0.070 mm 0.00157 to 0.00276 in.	0.1 mm 0.0039 in.
Valve Stem	O.D.	7.960 to 7.975 mm 0.31339 to 0.31398 in.	–
Valve Guide	I.D.	8.015 to 8.030 mm 0.31555 to 0.31614 in.	–
Valve Recessing	Protrusion	0.05 mm 0.0020 in.	–
	Recessing	0.15 mm 0.0059 in.	0.4 mm 0.0157 in.

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4. LUBRICANTS, FUEL AND COOLANT

	Place	Capacity			Lubricants, fuel and coolant
		L3130	L3430	L3830	
1	Fuel tank	40 L 10.6 U.S.gals 8.8 Imp.gals			No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below –10 °C (14 °F)
2	Cooling system (ROPS Type)	6.0 L 6.3 U.S.qts 5.3 Imp.qts		7.5 L 7.9 U.S.qts 6.6 Imp.qts	Fresh clean water with anti-freeze
	Cooling system (CABIN Type)	–		8.7 L 9.2 U.S.qts 7.7 Imp.qts	
3	Engine crankcase (with filter)	5.7 L 6.0 U.S.qts 5.0 Imp.qts		6.7 L 7.1 U.S.qts 5.9 Imp.qts	Engine oil : API service classification CD, CE or CF Above 25 °C : SAE30, (77 °F) 10W-30 or 10W-40 0 to 25 °C : SAE20, (32 to 77 °F) 10W-30 or 10W-40 Below 0 °C : SAE10W, (32 °F) 10W-30 or 10W-40
4	Transmission case	42 L 11.1 U.S.gals 9.2 Imp.gals		43 L 11.4 U.S.gals 9.5 Imp.gals	KUBOTA UDT or SUPER UDT fluid*
5	Front axle case	6.5 L 6.9 U.S.qts 5.7 Imp.qts			KUBOTA UDT or SUPER UDT fluid* or SAE80, 90 gear oil

Greasing

	Place	No. of greasing point	Capacity	Type of grease
6	Front axle support	2	Until grease overflows	Multipurpose type grease
	Top link	2		
	Top link bracket (if equipped)	2 (with draft control)		
	Lift rod	1		
	Lift cylinder	4		
	Battery terminal	2	Moderate amount	
	Throttle cable	Oiling		Engine oil

* KUBOTA original transmission hydraulic fluid.

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6. MAINTENANCE

No.	Item / Period			Indication on hour meter										Important	Reference page
				50	100	150	200	250	300	350	400	450	500		
1	Brake		Adjust	★	☆		☆		☆		☆		☆		G-18
2	Engine oil		Change	★	☆		☆		☆		☆		☆		G-15
3	Engine oil filter		Replace	★			☆				☆				G-15
4	Hydraulic oil filter		Replace	★			☆				☆				G-16
5	Transmission fluid		Change	★							☆				G-17
6	Front axle case oil		Change	★							☆				G-18
7	Engine start system		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆		G-20, 21
8	Wheel bolt torque		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆		G-21
9	Greasing		–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆		G-19
10	Battery condition		Check		☆		☆		☆		☆		☆	*5	G-25
11	Air cleaner element [Double type]	Primary element	Clean		☆		☆		☆		☆		☆	*1	G-22
			Replace											*2	G-32
		Secondary element	Replace												G-32
12	Clutch		Adjust		☆		☆		☆		☆		☆		G-24
13	Parking brake (cable)		Adjust		☆		☆		☆		☆		☆		G-27
			Replace												G-27
14	Fuel filter element		Clean		☆		☆		☆		☆		☆		G-23
			Replace								☆				G-31
15	Fan belt		Adjust		☆		☆		☆		☆		☆		G-23
16	Fuel line		Check		☆		☆		☆		☆		☆		G-24
			Replace												G-32
17	Transmission oil filter [HST]		Replace				☆				☆				G-16
18	HST oil line [HST]		Check				☆				☆				G-29
			Replace											*3	G-32
19	Radiator hose and clamp		Check				☆				☆				G-27
			Replace												G-32
20	Power steering oil line		Check				☆				☆				G-29
			Replace												G-32
21	Toe-in		Adjust				☆				☆				G-28
22	Front axle pivot		Adjust					☆							G-31
23	Engine valve clearance		Adjust						☆					*4	1-S27
24	Cooling system		Flush										☆		G-33
25	Coolant		Change										☆		G-33
26	Fuel system		Bleed												G-34
27	Clutch housing water		Drain												G-35
28	Fuse		Replace												G-36
29	Light bulb		Replace												G-37

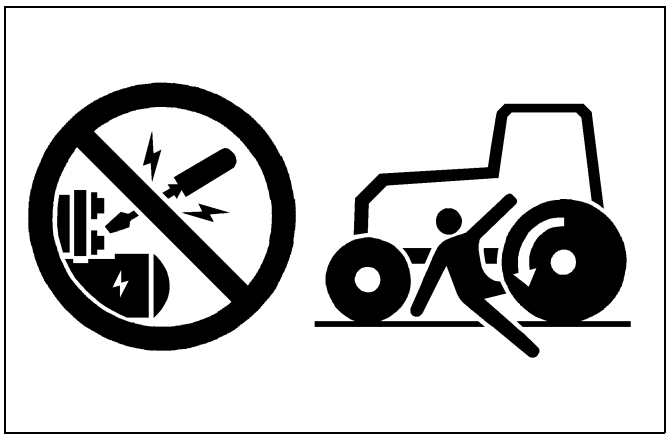
■ IMPORTANT

- **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 : Consult your local KUBOTA distributor for this service.**
- ***5 : When the battery is used for less than 100 hours per year, check the battery condition by reading the indication 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.**

W10357690

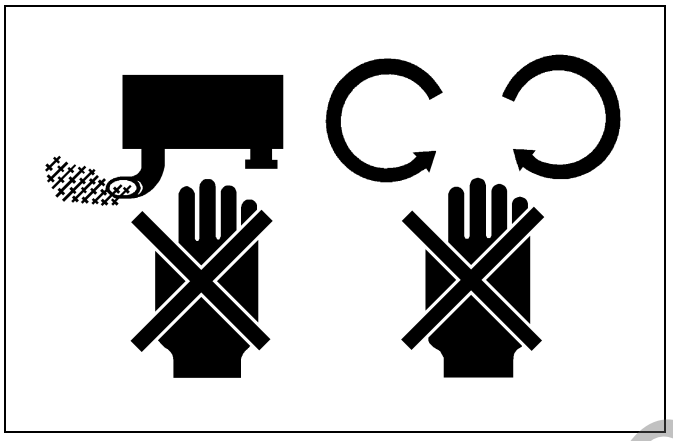
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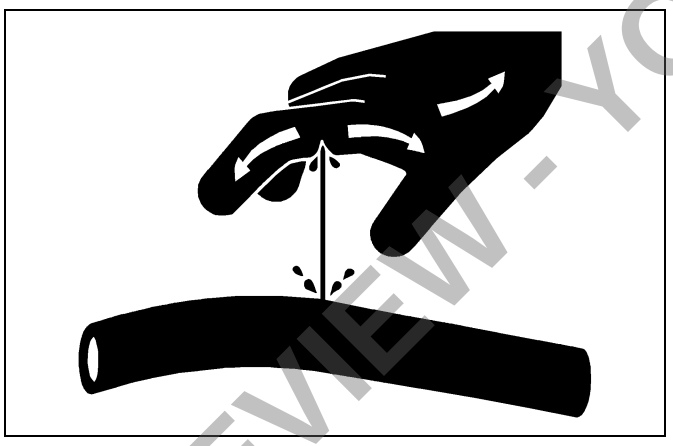
SAFETY STARTING

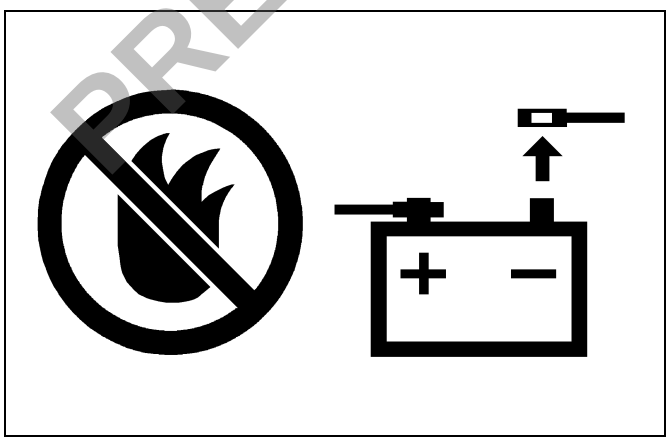
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine 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

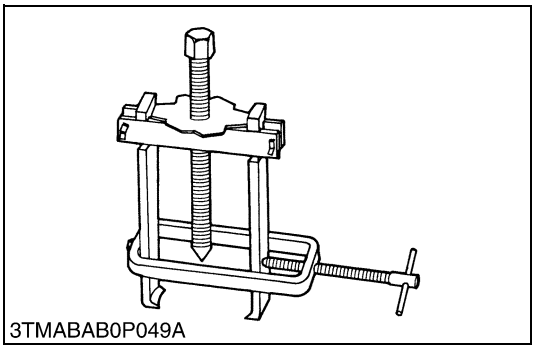
- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open 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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8. SPECIAL TOOLS

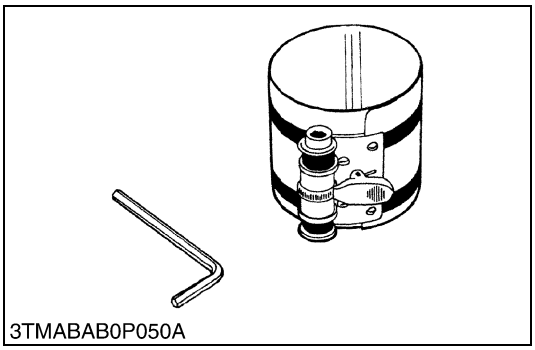
[1] SPECIAL TOOLS FOR ENGINE


3TMABAB0P049A

Special Use Puller Set

Code No.: 07916-09032
Application: Use exclusively for pulling out bearing, gears and other parts with ease.

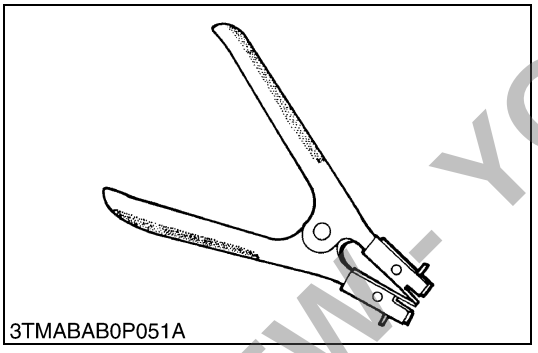
W10240500


3TMABAB0P050A

Piston Ring Compressor

Code No.: 07909-32111
Application: Use exclusively for pushing in the piston with piston rings into the cylinder.

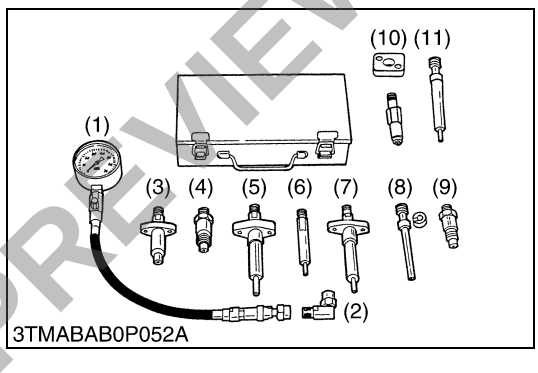
W10241000


3TMABAB0P051A

Piston Ring Tool

Code No.: 07909-32121
Application: Use exclusively for removing or installing the piston ring with ease.

W10241500



3TMABAB0P052A

Diesel Engine Compression Tester

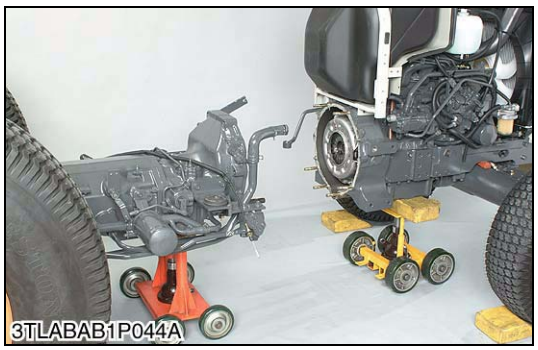
Code No.: 07909-30208 (Assembly) 07909-31251 (G)
07909-30934 (A to F) 07909-31271 (I)
07909-31211 (E and F) 07909-31281 (J)
07909-31231 (H)
Application: Use to measure diesel engine compression and diagnostics of need for major overhaul.

(1) Gauge
(2) **L** Joint
(3) Adaptor **A**
(4) Adaptor **B**
(5) Adaptor **C**
(6) Adaptor **E**
(7) Adaptor **F**
(8) Adaptor **G**
(9) Adaptor **H**
(10) Adaptor **I**
(11) Adaptor **J**

W10242000

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Separating Engine and Clutch Housing

1. Place the disassembling stand under the engine and clutch housing case.
2. Remove the fuel tank support mounting screws.
3. Remove the engine and clutch housing mounting screws and nuts.
4. Separate the engine and clutch housing while lifting up the tank frame.

(When reassembling)

- Apply grease to the spline of clutch shaft.
- Apply liquid gasket (Three Bond 1211 or equivalent) to joint face of the flywheel housing and clutch housing.

Tightening torque	Engine and clutch housing mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
	Engine and clutch housing mounting stud bolt	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

W1021830

(2) Removing Clutch Assembly





Clutch Assembly

1. Remove the clutch from the flywheel.

(When reassembling)

- Direct the shorter end of the clutch disc boss toward the flywheel.
- Apply molybdenum disulphide (Three Bond 1901 or equivalent) to the splines of clutch disc boss.
- Install the pressure plate, noting the position of straight pins.

■ **IMPORTANT**

- **Align the center of disc and flywheel by inserting the clutch center tool. (See page G-47.)**

■ **NOTE**

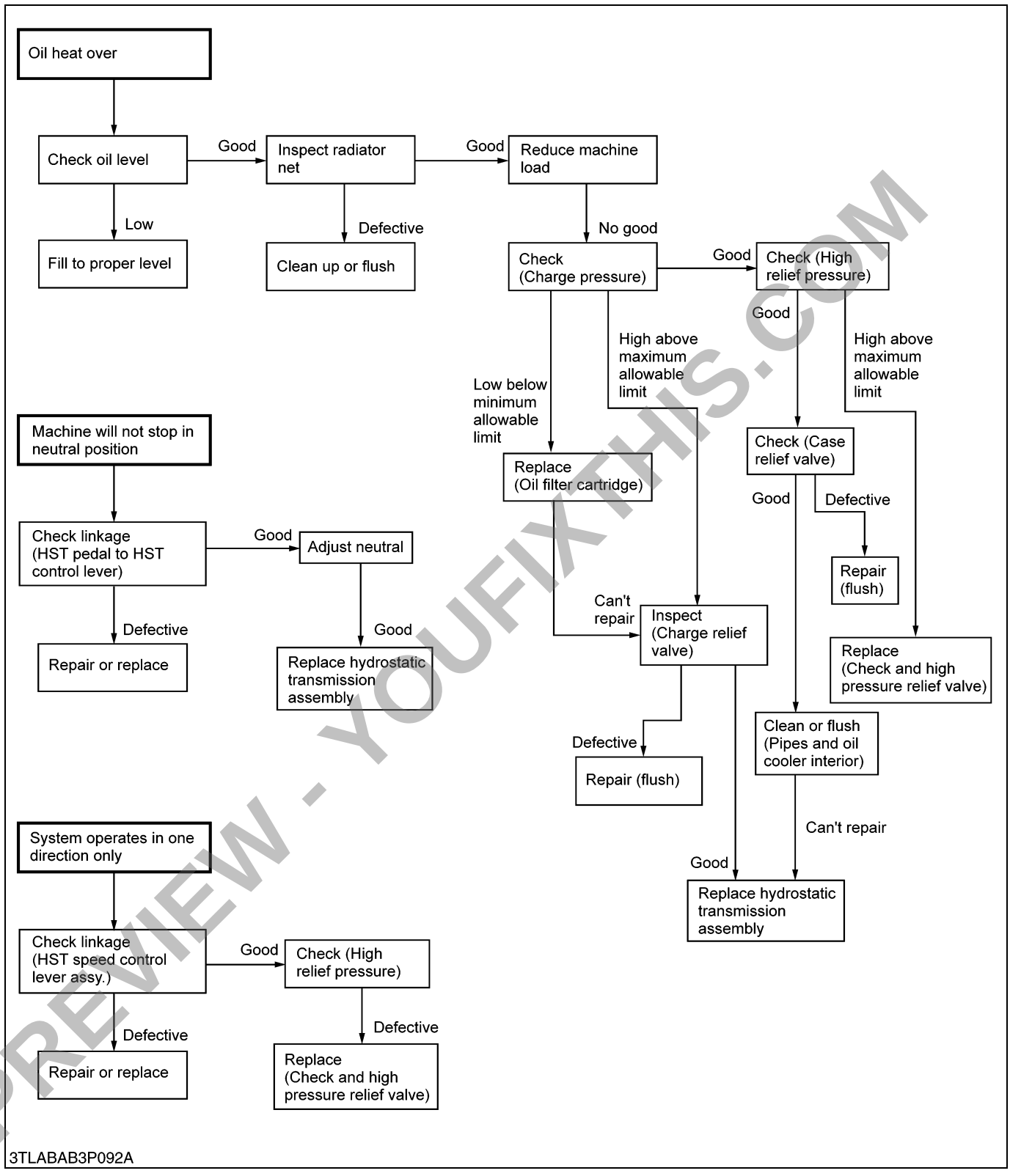
- **Do not allow grease and oil on the clutch disc facing.**

Tightening torque	Clutch mounting screws	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.5 to 20.3 ft-lbs

W1019957

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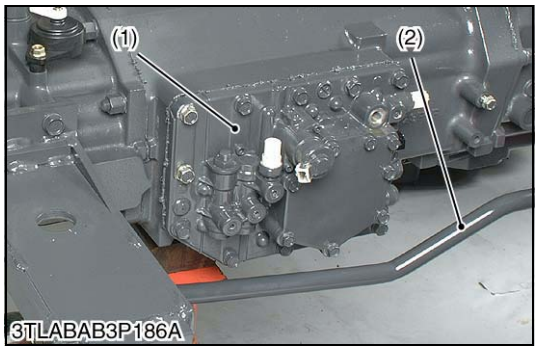
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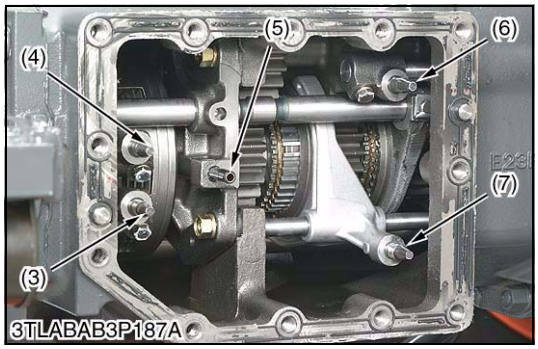
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(B) Mid Case

■ **NOTE**

- **For the disassembling procedure from "Draining the Transmission Fluid" to "Propeller Shaft", refer to page 3-S55 to 3-S60.**





GST Valve Assembly

1. Disconnect the brake rods (2).
2. Remove the GST valve (1) with using two jack bolts.
3. Remove the shift pin (3), (4) and (6).

■ **NOTE**

- **Do not fall down the shuttle check pin while disassembling.**

(When reassembling)

- Place the 1-2 (3) and 3-4 shift pins (4) at **neutral** position, sub-range shift pin (7) at **Hi** position (rearward) and main range shift pin (6) at **L** position (forward), and then assemble the GST valve.
- Be sure to match the each shift pin and shift piston.
- Install the GST valve (1) by hand, and then tighten the screws. Do not use the hummer.
- Apply liquid gasket (Three Bond 1208D or equivalent) to joint face of the GST valve assembly.
- Replace the pipe (5) with new one, if damaged.

Tightening torque	GST valve mounting screws	42.2 to 48.1 N·m 4.3 to 4.9 kgf·m 31.1 to 35.4 ft-lbs
	Shift pin mounting screw	12.7 to 14.7 N·m 1.3 to 1.5 kgf·m 9.4 to 10.8 ft-lbs

(1) GST Valve
(2) Brake Rod
(3) 1-2 Shift Pin
(4) 3-4 Shift Pin
(5) Pipe
(6) Main Range Shift Pin
(7) Sub-range Shift Pin

W1050592



Separating Mid Case and Transmission Case

1. Separate the mid case and transmission case after removing their mounting screws.

(When reassembling)

- Confirm to insert the PTO shaft to PTO clutch firmly, turning the PTO shaft.
- Apply liquid gasket (Three Bond 1208D or equivalent) to joint face of the mid case and transmission case.

Tightening torque	Mid case and transmission case mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
	Mid case and transmission case mounting nut	102.9 to 117.6 N·m 10.5 to 12.0 kgf·m 75.9 to 86.8 ft-lbs
	Mid case and transmission case mounting stud bolt	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

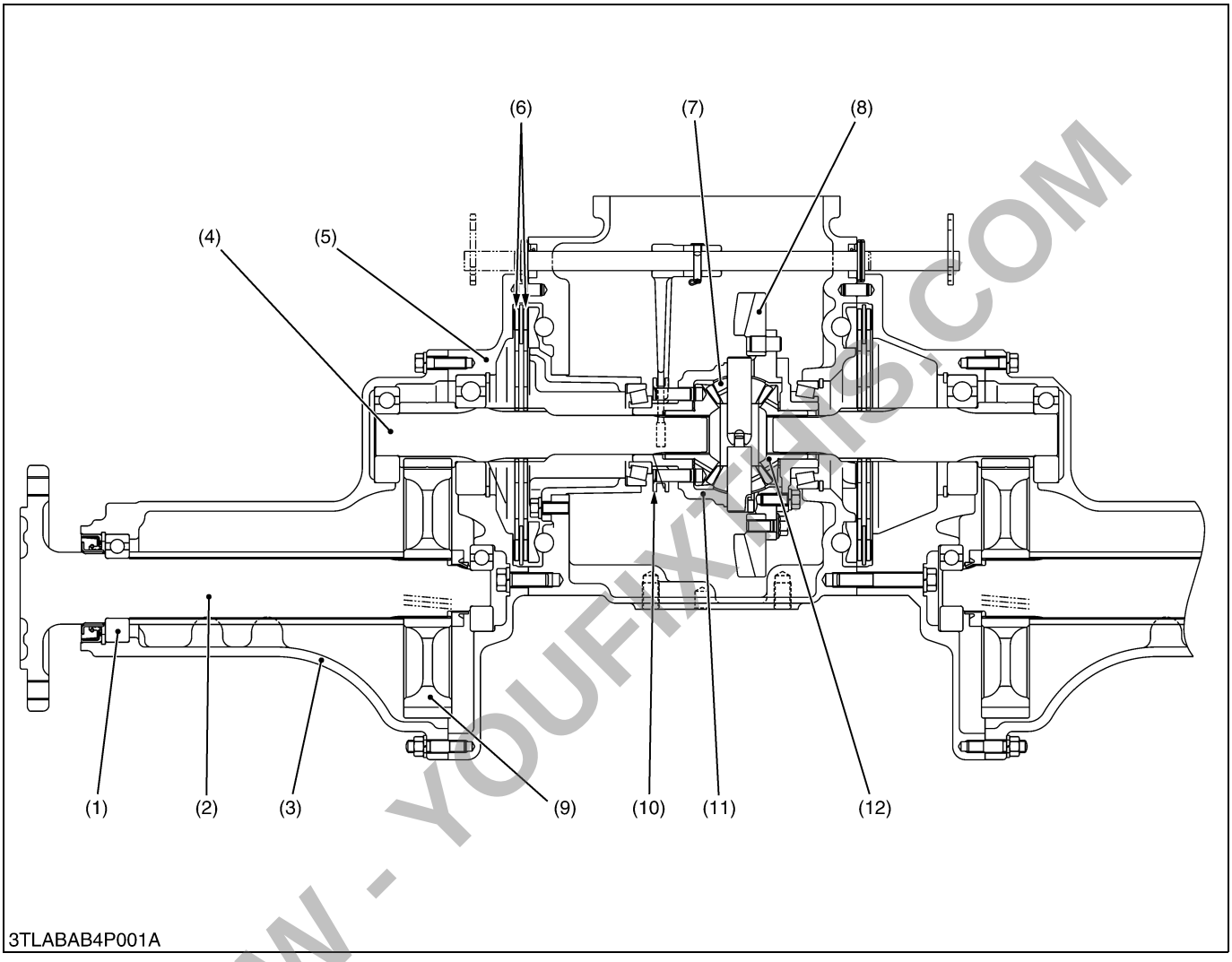
W1050879

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1. STRUCTURE

[L3130, L3430, L3830, L4630]



(1) Ball Bearing
(2) Rear Axle
(3) Rear Axle Case
(4) Differential Gear Shaft
(5) Brake Case
(6) Brake Disc
(7) Differential Pinion
(8) Ring Gear
(9) Final Gear
(10) Differential Lock Shifter
(11) Differential Case
(12) Differential Side Gear

The final gear (9) are final reduction mechanism which further reduces the speed of rotation. The direction of power transmitted is changed by the differential gear.

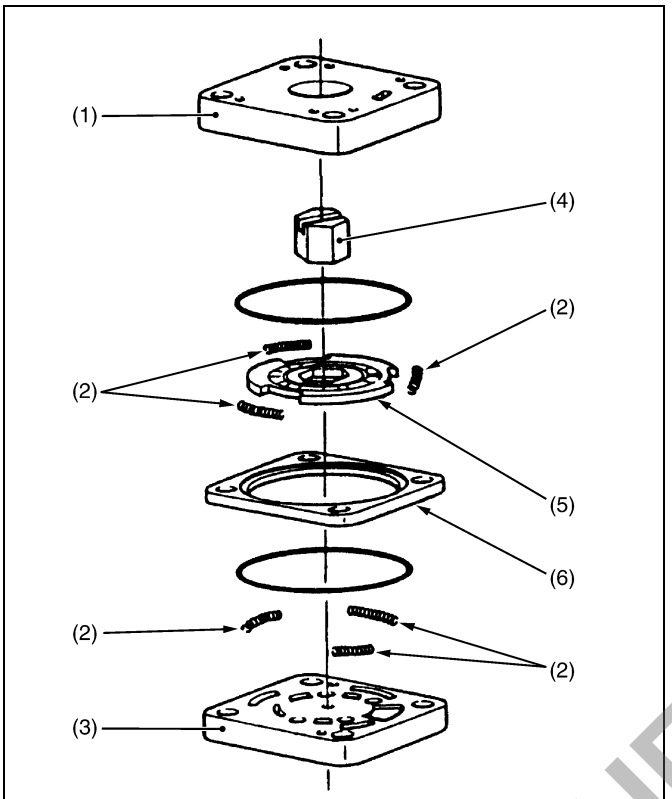
The rear axles (2) are the final transmission mechanism which transmit the power from the transmission to the rear wheels. The rotation speed is reduced by the final gears (9).

The rear axles are the semi-floating type with the ball bearing (1) between the rear axle (2) and rear axle case (3), which support the rear wheel load besides transmitting power to the rear wheel. The rear axles also support the weight of the tractor.

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[1] CONTROL VALVE



3TLABAB7P004A

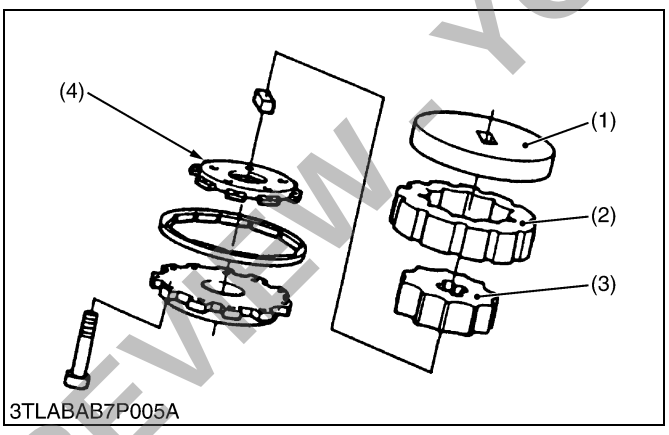
The control valve is a rotary plate type valve. When the steering wheel is not turned, the position of the valve plate (5) and the manifolds (1), (3) is kept neutral by the centering springs (2). This causes the forming of a **"Neutral"** oil circuit.

When the steering wheel is turned either clockwise or counterclockwise, the position of the valve plate (5) and manifolds (1), (3) changes against the centering spring. This allows the forming of a **"Right Turning"** or **"Left Turning"** oil circuit. At the same time, the gerotor rotates with the valve plate and sends the oil to the cylinder corresponding to the rotation of the steering wheel.

(1) Isolation Manifold
(2) Centering Spring
(3) Port Manifold
(4) Hex. Drive Assembly
(5) Valve Plate
(6) Valve Ring

W1013040

[2] METERING DEVICE (GEROTOR)



3TLABAB7P005A

All oil directed from the hydraulic pump to the steering cylinder passes through the metering device (gerotor) on its way. This metering device is a trochoid pump. As the steering wheel is turned, the action is transmitted directly to stator (2) through drive plate (1). Thus, the gerotor sends the amount of oil corresponding to the turn of the steering wheel to the hydraulic cylinder, and the front wheels are moved through the angle corresponding to the turn of the steering wheel.

When the engine is not operating or the hydraulic pump fails. The gerotor serves as a manual pump, and thus the machine can be steered manually.

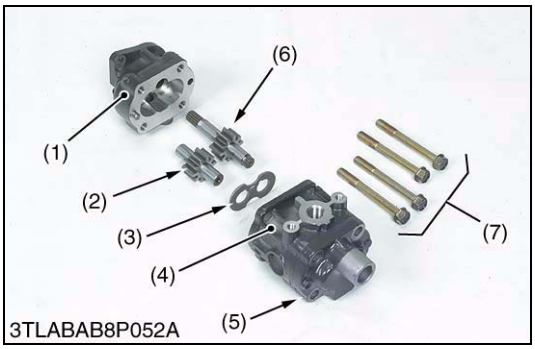
(1) Drive Plate
(2) Stator
(3) Rotor
(4) Commutator

W1013277

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(B) Disassembling Hydraulic Pump



Hydraulic Pump Assembly

1. Remove the pump cover mounting screws (7).
2. Remove the drive gear (6), driven gear (2) and side plate (3) from the casing.

(When reassembling)

- Take care not to damage the gasket.
- Align the hole of the pump cover (5) and casing 2 (4).
- Install the side plate, noting its location and direction.
- Install the gears, noting its direction.

Tightening torque	Pump cover mounting screw	39.2 to 44.1 N·m 4.0 to 4.5 kgf·m 28.9 to 32.5 ft-lbs

(1) Casing 1
(2) Driven Gear
(3) Side Plate
(4) Casing 2
(5) Pump Cover
(6) Drive Gear
(7) Screw

W10135590

Hydraulic Pump Running-In

After reassembly, perform break-in operation in the following manner, and check the pump for abnormality before use. If the pump temperature should rise noticeably during running-in, recheck should be performed.

1. Install the hydraulic pump to the tractor, and mount the suction pipe and delivery pipe securely.
2. Set the engine speed at 1300 to 1500 min^{-1} (rpm), and operate the hydraulic pump at no load for about 10 minutes.
3. Set the engine speed at 2000 to 2200 min^{-1} (rpm), and with the hydraulic pump applied with 2.94 MPa (30 kgf/cm^2, 427 psi) to 4.90 MPa (50 kgf/cm^2, 711 psi) pressure, operate it for approx. 15 minutes.
4. With the engine set to maximum speed, fully turn the steering wheel to the left or right, then actuate the relief valve five times for 25 seconds (one time 5 seconds).

W10145360

(3) Servicing



Housing Bore (Depth of Scratch)

1. Check for the scratch on the interior surface of the housing caused by the gear.
2. If the scratch reaches more than half the area of the interior surface of the housing, replace at pump assembly.
3. Measure the housing I.D. where the interior surface is not scratched, and measure the housing I.D. where the interior surface is scratched.
4. If the values obtained in the two determinations differ by more than the allowable limit, replace the hydraulic pump as a unit.

Depth of scratch	Allowable limit	0.09 mm 0.0035 in.

(Reference)

- Use a cylinder gauge to measure the housing I.D.

W10146490

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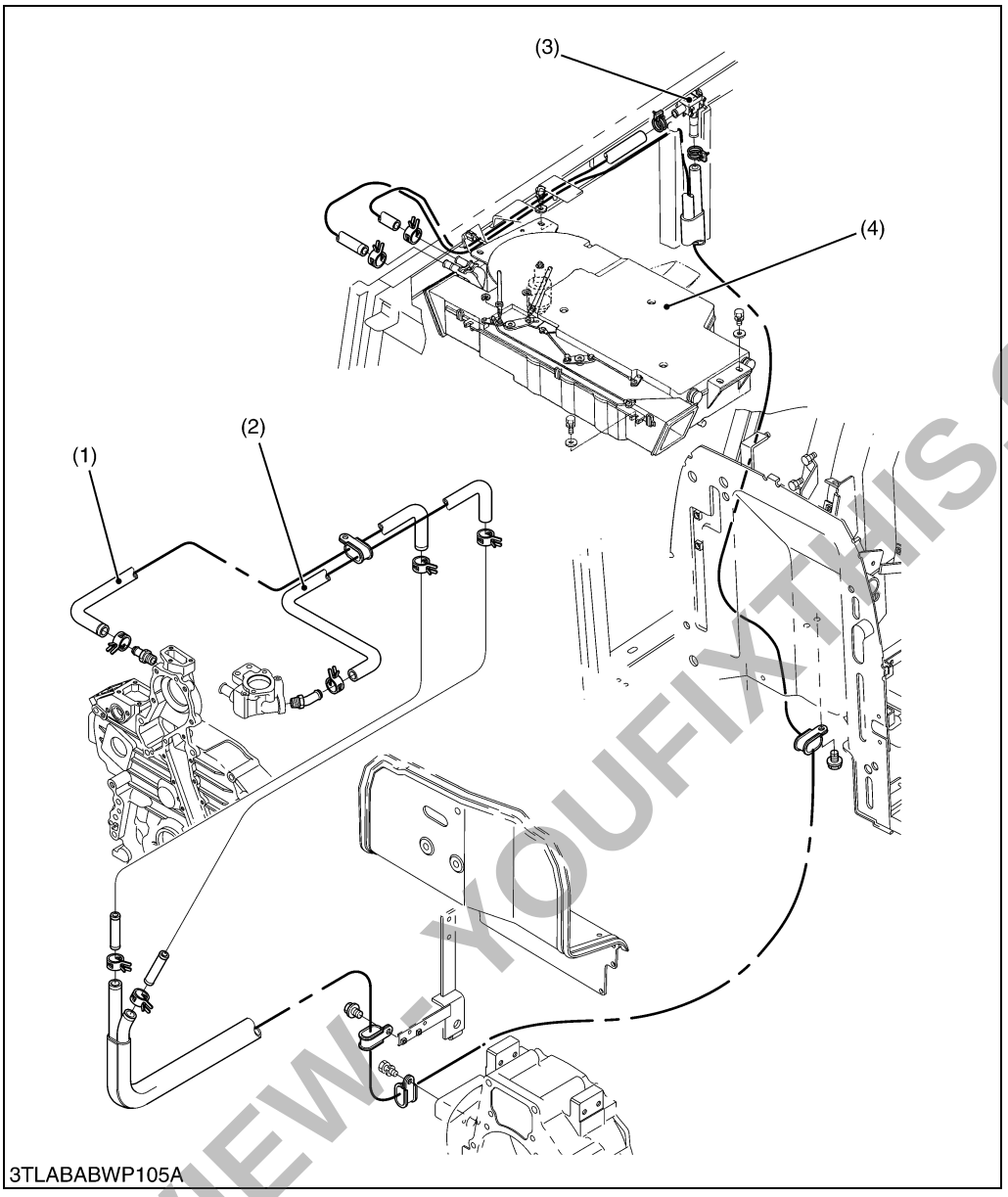
Display on LCD Screen	Trouble Item (Affected Model)	Probable Cause	Solution	Reference Page
ERROR-40	Input voltage to lever sensor from ECU is failed (GST model)	• Lever sensor input voltage drop below 2.6 V for 0.1 second or more • Ground wire of lever sensor short-circuited	• Check ground wire • Check input voltage at ECU connector • Check sensor connector	9-S27 9-S29 –
ERROR-50	GST lever sensor is failed (GST model)	• Lever sensor output terminal is out of adjustment • Lever sensor output wire terminal broken or short-circuited • Input line broken • Lever sensor defective	• It is possible to run at its selected speed position until engine is stopped. • Check sensor connector • Check sensor voltage by Test mode (Mode **A**) • Check lever sensor wire connector (voltage) or check sensor resistance • Replace lever sensor	– – 9-S13 9-S29, S31 9-M15
ERROR-60	Proportional reducing valve failure (GST model)	• Output voltage of proportional reducing valve terminal or return current is out of specification • Valve wire broken or short-circuited • Proportional reducing valve defective	• Check connector of proportional reducing valve • Check proportional reducing valve resistance at valve or ECU connector • Check grounding wire • Connect emergency connector and move	– 9-S30, S32 9-S27 9-M17

W1053954

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(2) Heater Model



(1) Heater Hose (From Cabin)
(2) Heater Hose (To Cabin)
(3) Water Valve
(4) Heater Unit

W1016479

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