WSM

WORKSHOP MANUAL
TRACTOR

M108S Low Profile

Kubota

KiSC issued 09, 2020 A

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GENERAL

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1. SAFETY FIRST

⚠ 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 try to repair or use this unit.**

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

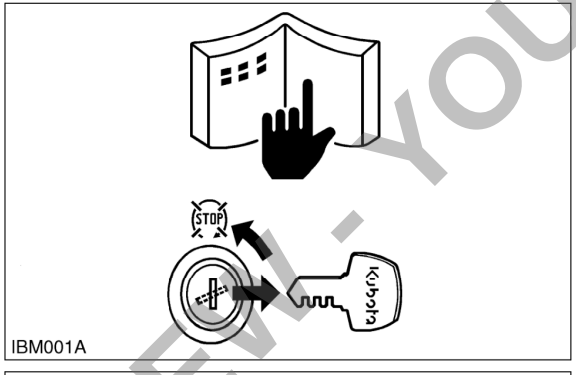
⚠ WARNING
- **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION
- **Indicates a potentially hazardous situation which, if not avoided, could 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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IBM001A


IBM002A

BEFORE YOU START SERVICE

- 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 stable and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, then remove the key.
- Disconnect the battery negative cable.
- Hang a **"DO NOT OPERATE"** tag in the operator station.

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START SAFELY

- Do not do the procedures below when you start the engine.
  - short across starter terminals
  - bypass the safety start switch
- Do not alter or remove any part of machine safety system.
- Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Do not start the engine when you stay on the ground. Start the engine only from operator's seat.

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3. SPECIFICATIONS

Model			M108S 4WD
Engine	Model		V3800-CR-TI
	Type		Direct Injection, liquid cooled 4 cylinder diesel
	No. of cylinder		4
	Total displacement		3769 cm^3 (230.0 cu.in.)
	Bore and stroke		100 × 120 mm (3.9 × 4.7 in.)
	Rated revolution		2600 min^{-1} (rpm)
	Low idling revolution		800 to 850 min^{-1} (rpm)
	Net power *1		80.6 kW (108 HP)* / 2600 min^{-1} (rpm)
	PTO power *1 (factory observed)		71.6 kW (96 HP)*1 / 2600 min^{-1} (rpm)
	Maximum torque		366.4 N·m (37.4 kgf·m, 270.3 lbf·ft) / 1400 to 1600 min^{-1} (rpm)
	Battery capacity		12 V, RC: 160 min, CCA 900 A
	Fuel tank capacity		175 L (46.2 U.S.gals, 38.5 Imp.gals)
	Engine oil capacity		10.7 L (11.3 U.S.qts, 9.4 Imp.qts)
	Coolant capacity		9.6 L (10.1 U.S.qts, 8.4 Imp.qts)
Dimensions	Overall length		4145 mm (163.2 in.)
	Overall width (Minimum tread)		2120 mm (83.5 in.)
	Overall height		2270 mm (89.4 in.)
	Wheel base		2435 mm (95.9 in.)
	Tread	Front	1530 mm (60.2 in.)
		Rear	1620 to 2000 mm (63.8 to 78.7 in.)
	Minimum ground clearance		310 mm (12.2 in.) (drawbar bracket)
Weight			2960 kg (6526 lbs)
Traveling system	Standard tire size	Front	9.5-20
		Rear	16.9-24
	Clutch		Hydraulic wet disks
	Steering		Hydraulic power steering
	Braking system		Hydraulic wet disks
	Differential		Bevel gears with differential lock (front and rear)
Hydraulic unit	Hydraulic control system		Position, draft (top link sensing) and mix control
	Pump capacity		65.0 L/min. (17.2 U.S.gals/min., 14.3 Imp.gals/min.)
	3-point hitch		Category 2
	Max. lifting force	At lifting point *2	2500 kg (5512 lbs), 3200 kg (7055 lbs) with / assist cylinder (option)
		24 in. behind lifting point *2	2100 kg (4630 lbs), 2750 kg (6063 lbs) with / assist cylinder (option)
	Remote hydraulic control		2 standard (3rd and flow control valve optional)
	System pressure		19.6 MPa (200 kgf/cm^2, 2847 psi)
	Traction system		Swinging drawbar, adjustable in direction
PTO	Live PTO (Independent)	Direction of turning	Clockwise, viewed from tractor rear
		PTO/Engine speed	6 spline: 540 min^{-1} (rpm) at 2205 engine min^{-1}(rpm) 21 spline: 1000 min^{-1} (rpm) at 2210 engine min^{-1}(rpm) (if equipped)

■ **NOTE**
- **The company reserves the right to change the specifications without notice.**
- ***1 Manufacture's estimate.**
- ***2 At lower link end with links horizontal.**

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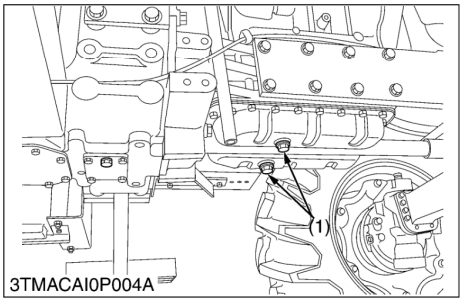
1. TROUBLESHOOTING

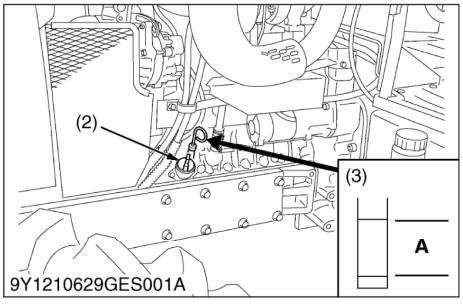
Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Engine Does Not Start	1. No fuel	Fill fuel	G-8
	2. Air in the fuel system	Vent air	G-38
	3. Water in the fuel system	Change fuel and repair or replace fuel system	G-8, G-28
	4. Fuel pipe clogged	Clean	G-30
	5. Fuel filter clogged	Replace	G-28
	6. Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	G-8
	7. Fuel with low cetane number	Use specified fuel	G-8
	8. Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S29
	9. Injection nozzle clogged	Replace	1-S29
	10. Injection pump malfunctioning	Replace	1-S24
	11. Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	–
	12. Compression leak from cylinder	Replace head gasket, tighten cylinder head screw and nozzle holder	1-S11, 1-S29, 1-S33
	13. Improper valve timing	Correct or replace timing gear	1-S36
	14. Piston ring and cylinder worn	Correct or replace	1-S40
	15. Excessive valve clearance	Adjust	1-S12
(Starter Does Not Run)	1. Battery discharged	Charge	9-S10
	2. Starter malfunctioning	Repair or replace	9-S16
	3. Key switch malfunctioning	Replace	9-S12
	4. Wiring disconnected	Connect	–
Engine Revolution Is Not Smooth	1. Fuel filter clogged or dirty	Replace	G-28
	2. Air cleaner clogged	Clean or replace	G-26
	3. Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S24
	4. Injection pump malfunctioning	Replace	1-S24
	5. Injection nozzle stuck or clogged	Replace	1-S29
	6. Bearing worn out	Replace	–
	7. Turbocharger shaft bent	Replace the turbocharger assembly	1-S22
	8. Turbocharger fin or other part damaged due to foreign matters	Replace the turbocharger assembly	1-S22

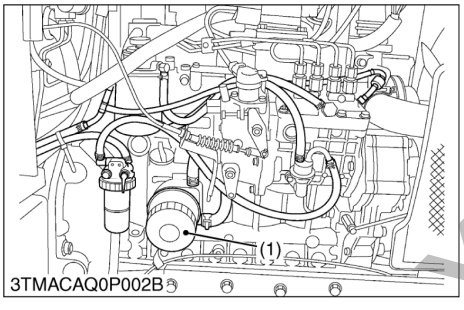
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[2] CHECK POINTS OF INITIAL 50 HOURS







Changing Engine Oil

WARNING
- **Before changing oil, be sure to stop the engine.**
- **Allow engine to cool down sufficiently, oil can be hot and can burn.**

1. To drain the used oil, remove the drain plugs (1) at the bottom of the engine and drain the oil completely into the oil pan. All the used oil can be drained out easily when the engine is still warm.
2. After draining reinstall the drain plugs (1).
3. Fill with the new oil up to the upper notch on the dipstick. (Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8.)

Engine Oil	Capacity	10.7 L 11.3 U.S.qts 9.4 Imp.qts

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

A: Oil level is acceptable within this range.

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Replacing Engine Oil Filter

WARNING
- **Be sure to stop the engine before changing oil filter cartridge.**
- **Allow engine to cool down sufficiently, oil can be hot and can burn.**

1. Remove the oil filter (1).
2. Put a film of clean engine oil on rubber seal of new filter.
3. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
4. After the new filter has been replaced, the engine oil normally decreases a little. Make sure that the engine oil does not leak through the seal and be sure to check the oil level on the dipstick. Then, fill the engine oil up to the prescribed level.

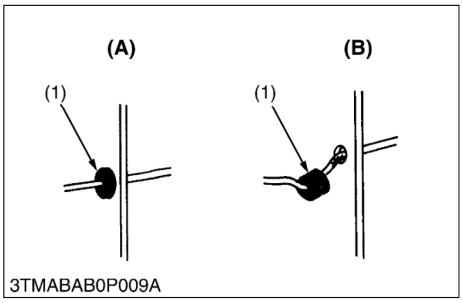
■ **IMPORTANT**
- **To prevent serious damage to the engine, use only a KUBOTA genuine filter.**

(1) Engine Oil Filter

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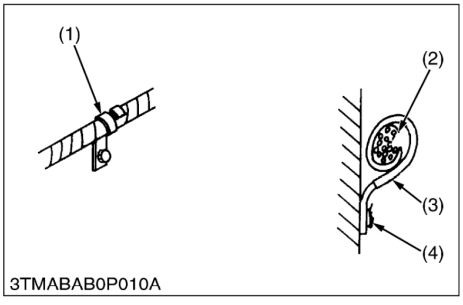


- Securely insert grommet.

(1) Grommet

(A) Correct
(B) Incorrect

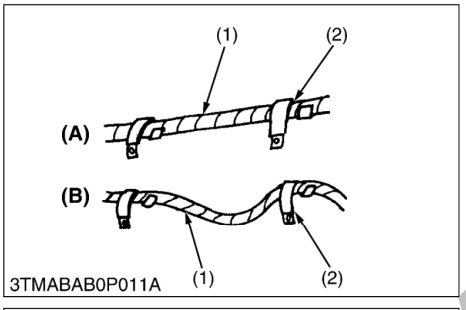
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- Securely clamp, being careful not to damage wiring.

(1) Clamp
(Wind Clamp Spirally)
(2) Wire Harness
(3) Clamp
(4) Welding Dent

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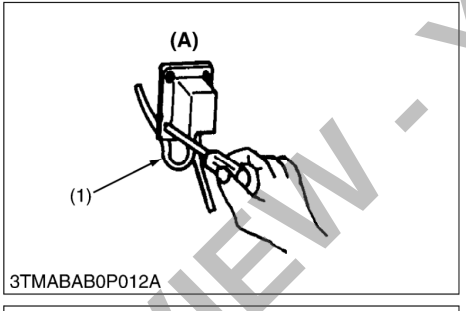


- Clamp wiring so that there is no twist, unnecessary sag, or excessive tension, except for movable part, where sag be required.

(1) Wiring
(2) Clamp

(A) Correct
(B) Incorrect

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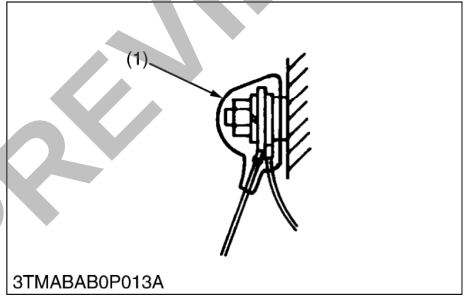


- In installing a part, be careful not to get wiring caught by it.

(1) Wiring

(A) Incorrect

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- After installing wiring, check protection of terminals and clamped condition of wiring.

(1) Cover
(Securely Install Cover)

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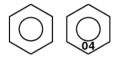
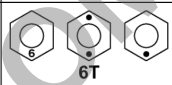
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5. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLTS AND NUTS

Tighten screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual according to the table below.

Indication on top of bolt	 No-grade or 4T						 7T						 9T		
Indication on top of nut	 No-grade or 4T												 6T		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15	30 to 34	3.0 to 3.5	22 to 25
M10	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32	61 to 70	6.2 to 7.2	45 to 52
M12	63 to 72	6.4 to 7.4	47 to 53	–	–	–	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53	103 to 117	10.5 to 12.0	76.0 to 86.7
M14	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	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	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	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	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	12 to 15	1.2 to 1.6	8.7 to 11	8.9 to 11	0.90 to 1.2	6.5 to 8.6
M10	25 to 31	2.5 to 3.2	18 to 23	20 to 25	2.0 to 2.6	15 to 18
M12	30 to 49	3.0 to 5.0	22 to 36	31	3.2	23
M14	62 to 73	6.3 to 7.5	46 to 54	–	–	–
M16	98.1 to 112	10.0 to 11.5	72.4 to 83.1	–	–	–
M18	172 to 201	17.5 to 20.5	127 to 148	–	–	–

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6. MAINTENANCE

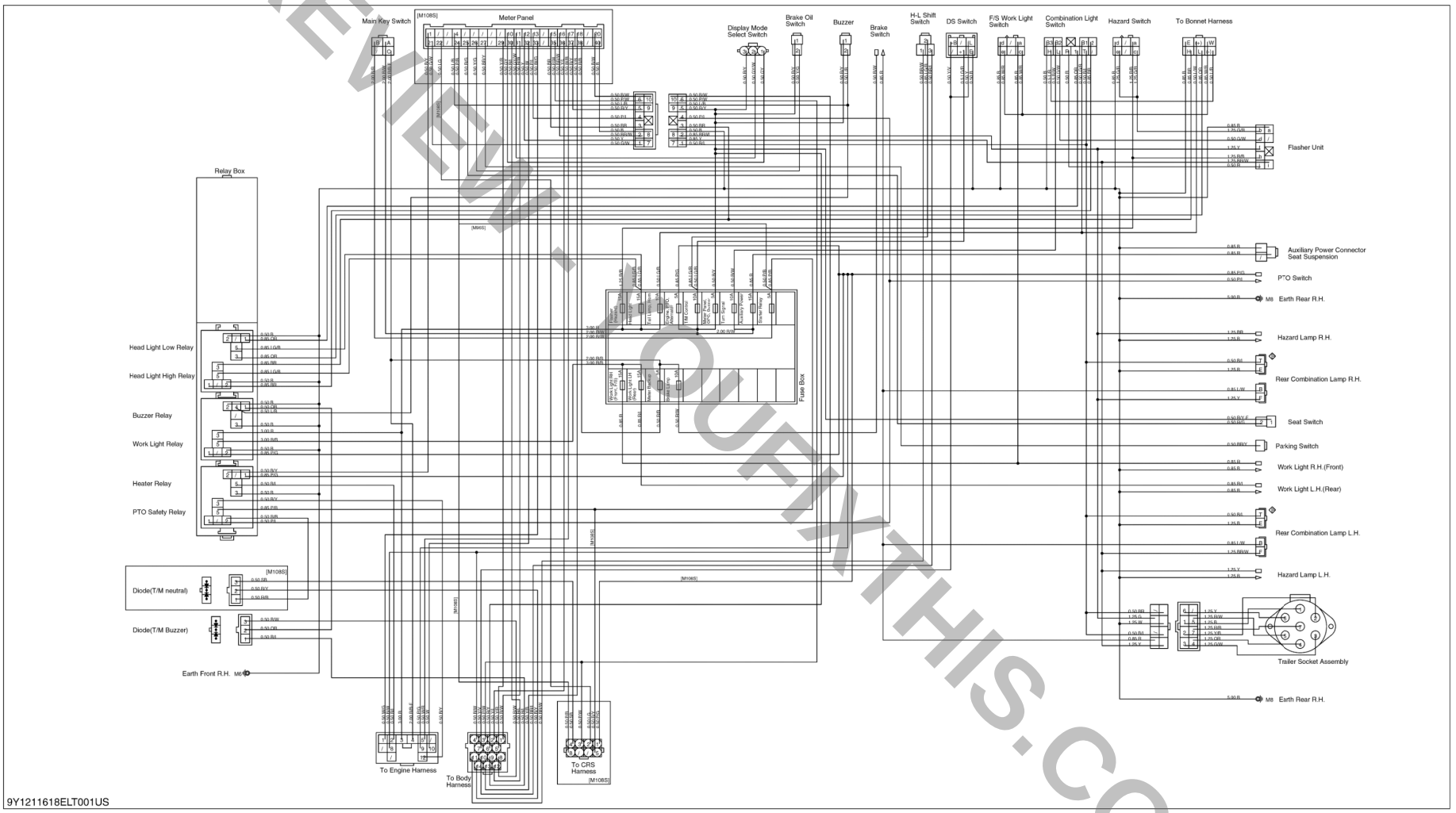
No.	Item			Service Interval														After since	Reference page	
				50	100	150	200	250	300	350	400	450	500	550	600	650	700			
1	Engine start system		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-19	
2	Wheel bolt torque		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-20	
3	Battery condition		Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-21	*2
4	Greasing		–		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-23	
5	Fan belt		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-24	
6	Brake pedal		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-24	
7	Parking brake lever		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-26	
8	Air cleaner element	Primary element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-26	*1
			Replace															every 1000 Hr or 1 year	G-33	*3
		Secondary element	Replace															every 1000 Hr or 1 year	G-33	*3
9	Toe-in		Adjust				☆				☆				☆			every 200 Hr	G-27	
10	Fuel tank water		Drain				☆				☆				☆			every 200 Hr	G-27	
11	Oil cooler line		Check				☆				☆				☆			every 200 Hr	G-27	
			Replace															every 2 years	G-37	
12	Water separator		Clean								☆							every 400 Hr	G-28	
13	Engine oil		Check	★									☆					every 500 Hr	G-18	
14	Engine oil filter		Replace	★									☆					every 500 Hr	G-18	
15	Fuel filter		Replace										☆					every 500 Hr	G-28	
16	Hydraulic oil filter		Replace										☆					every 500 Hr	G-29	
17	Radiator hose and clamp		Check										☆					every 500 Hr	G-29	
			Replace															every 4 years	G-37	
18	Fuel line		Check										☆					every 500 Hr	G-30	
			Replace															every 4 years	G-37	
19	Intake air line		Check										☆					every 500 Hr	G-30	
			Replace															every 4 years	G-37	
20	Power steering oil line		Check										☆					every 500 Hr	G-30	
			Replace															every 4 years	G-37	
21	King-pin pivot		Adjust												☆			every 600 Hr	G-31	

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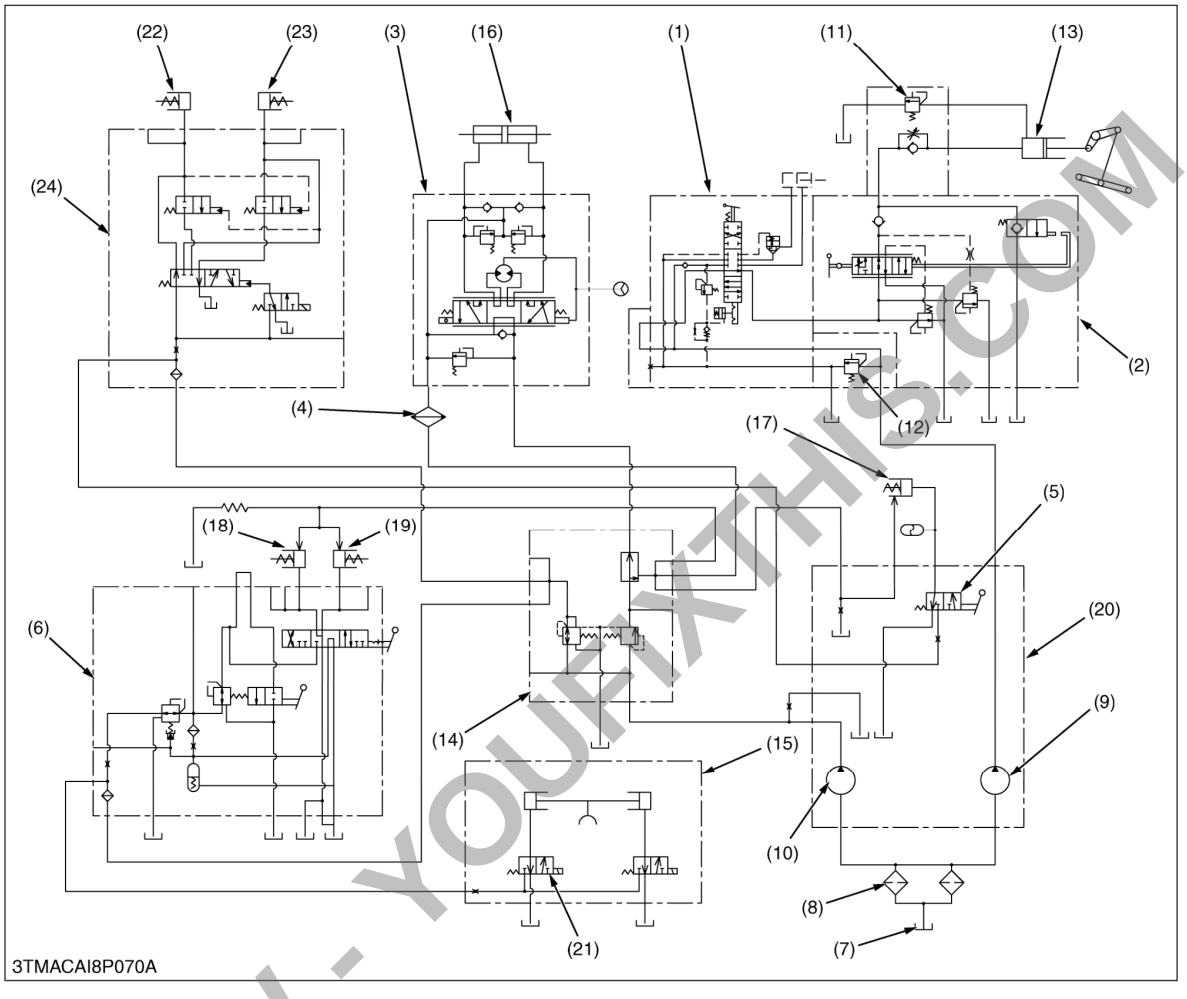
1. WIRING DIAGRAM

[1] MAIN HARNESS



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2. HYDRAULIC CIRCUIT



(1) Auxiliary Control Valve
(2) Control Valve for 3P
(3) Power Steering Controller
(4) Oil Cooler
(5) PTO Valve
(6) Shuttle Valve
(7) Oil Tank (Transmission Case)
(8) Hydraulic Oil Filter Cartridge
(9) Hydraulic Pump (for 3P)
(10) Hydraulic Pump (PTO Clutch, Shuttle Clutch, Swing Shift, Dual Speed)
(11) Cylinder Safety Valve
(12) Relief Valve for 3P
(13) Hydraulic Cylinder
(14) Regulator Valve
(15) Swing Shift
(16) Steering Cylinder
(17) PTO Clutch
(18) Shuttle Clutch **R**
(19) Shuttle Clutch **F**
(20) Pump Base
(21) Solenoid Valve
(22) Dual Speed Clutch **HI** (DS Model Only)
(23) Dual Speed Clutch **LO** (DS Model Only)
(24) Dual Speed Valve (DS Model Only)

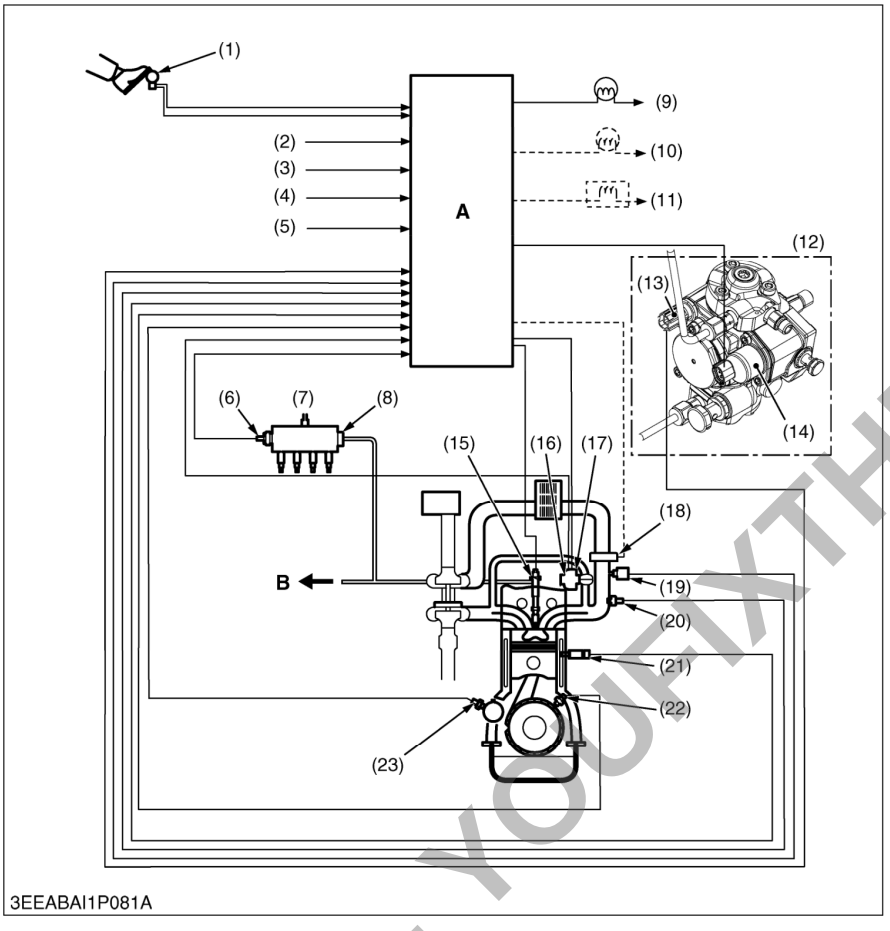
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[5] ENGINE CONTROL SYSTEM

(1) Engine Control System Diagram



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(1) Accelerator Position Sensor
(2) Key Switch ON Signal
(3) Starter Switch Signal
(4) Vehicle Speed Signal
(5) Neutral Switch Signal
(6) Rail Pressure Sensor
(7) Rail
(8) Pressure Limiter
(9) Engine Warning Light
(10) Glow Lamp
(11) Glow Relay
(12) Supply Pump
(13) Fuel Temperature Sensor
(14) Suction Control Valve
(15) Injector
(16) EGR Valve DC Motor
(17) EGR Valve Lift Sensor
(18) Intake Air Heater
(19) Intake Air Pressure Sensor
(20) Intake Air Temperature Sensor
(21) Coolant Temperature Sensor
(22) Crankshaft Position Sensor (Engine Speed Sensor)
(23) Camshaft Position Sensor (G Sensor)

A: Engine ECU
B: To Fuel Tank

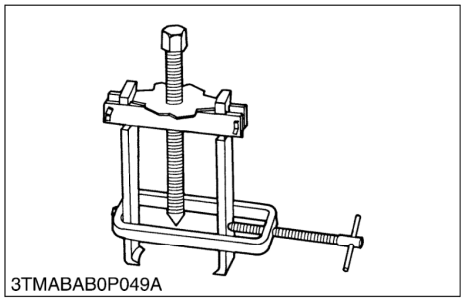
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8. SPECIAL TOOLS

[1] SPECIAL TOOLS FOR ENGINE

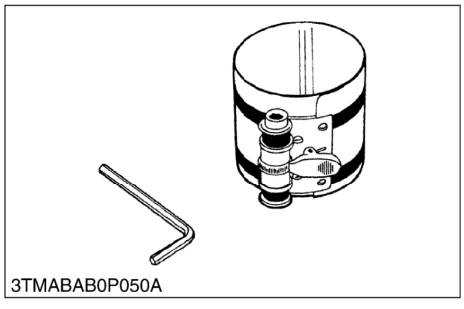

3TMABAB0P049A

Special Use Puller Set

Code No.
- 07916-09032

Application
- Use exclusively to pull out bearing, gears and other parts with ease.

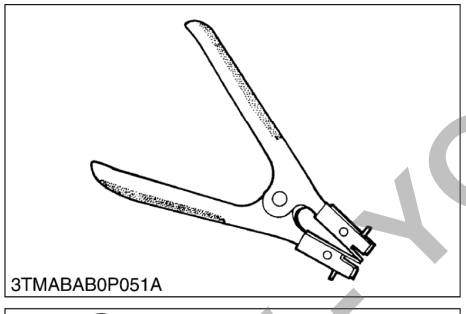
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3TMABAB0P050A

Piston Ring Compressor

Application
- Use exclusively to push in the piston with piston rings into the cylinder.

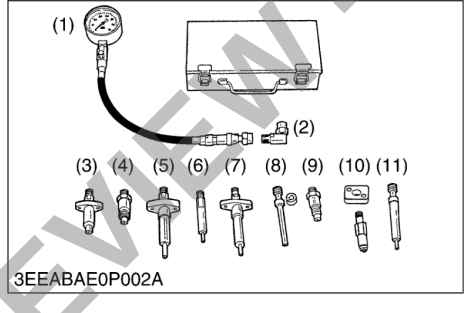
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3TMABAB0P051A

Piston Ring Tool

Application
- Use exclusively to remove or install the piston ring with ease.

WSM000001GEG0013US0



3EEABAE0P002A

Diesel Engine Compression Tester (for Injection Nozzle)

Code No.
- 07909-30208 (Assembly)
- 07909-31211 (**E** and **F**)
- 07909-31231 (**H**)
- 07909-31251 (**G**)
- 07909-31271 (**I**)
- 07909-31281 (**J**)

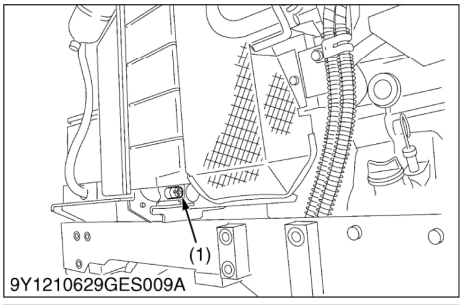
Application
- Use to measure diesel engine compression and diagnostics of need for major overhaul.

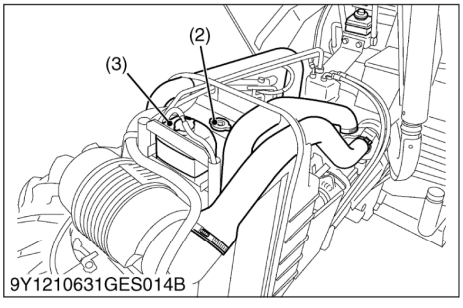
(1) Gauge
(2) **L** Joint
(3) Adaptor **A**
(4) Adaptor **B**
(5) Adaptor **C**
(6) Adaptor **E**
(7) Adaptor **F**
(8) Adaptor **G**
(9) Adaptor **H**
(10) Adaptor **I**
(11) Adaptor **J**

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[12] CHECK POINT OF EVERY 2000 HOURS OR 2 YEARS





Flush Cooling System and Changing Coolant

WARNING

- **Do not remove the radiator cap when the engine is hot. Then loosen cap slightly to the stop to relieve any excess pressure before removing cap completely.**

1. Stop the engine and let cool down.
2. To drain the coolant, open the radiator drain plug (1) and remove radiator cap (2). The radiator cap (2) must be removed to completely drain the coolant.
3. Fill with clean water and cooling system cleaner.
4. Follow directions of the cleaner instruction.
5. After flushing, fill with clean water and anti-freeze until the coolant level is just below the port.
6. Fill with clean water and anti-freeze up to the upper line of recovery tank (3).
7. Install the radiator cap (2) securely.
8. Start and operate the engine for a few minutes.
9. Stop the engine. Check coolant level and add coolant if necessary.

Coolant	Capacity	9.6 L 10.1 U.S.qts 8.4 Imp.qts

■ **IMPORTANT**

- **Do not start engine without coolant.**
- **Use clean, fresh water and anti-freeze to fill the radiator.**
- **When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50 %.**
- **Securely tighten radiator cap (2). If the cap is loose or improperly fitted, water may lead out and the engine could overheat.**

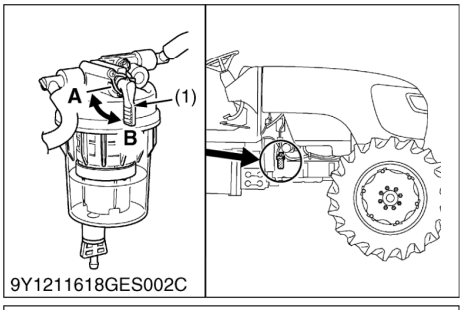
(1) Drain Plug
(2) Radiator Cap
(3) Recovery Tank

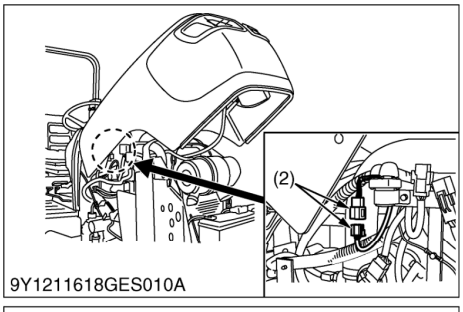
(To be continued)

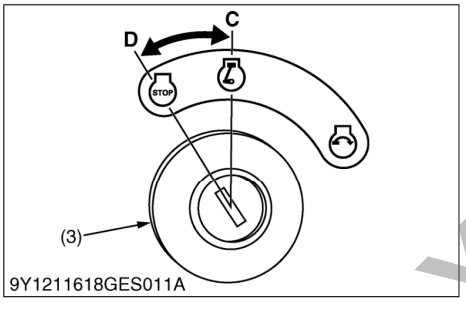
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[17] OTHERS







Bleeding Fuel System

Air must be removed:

1. When the fuel filter or lines are removed.
2. When water is drained from water separator.
3. When tank is completely empty.
4. After the tractor has not been used for a long period of time.

■ **Bleeding procedure is as follows:**

1. Fill the fuel tank with fuel, and open the fuel shutoff-valve (1).
2. Disconnect the intake heater connector.
3. Turn ON and OFF the key switch repeatedly 10 times or so at the following intervals. This lets the air out of the fuel line.
   (1) Key switch ON time: 30 seconds
   (2) Key switch OFF time: 15 seconds
4. Set the hand throttle lever at the maximum speed position, turn the key switch to start the engine and then reset the throttle lever at the mid speed (around 1500 rpm) position.
   If engine doesn't start, try it several times at 30 second intervals.

■ **IMPORTANT**

- **Do not hold key switch at engine start position for more than 10 seconds continuously. If more engine cranking is needed, try again after 30 seconds.**

5. Accelerate the engine to remove the small portion of air left in the fuel system.
6. If air still remains and the engine stops, repeat the above steps.

(1) Fuel Shutoff-valve
(2) Connector
(3) Key Switch

A: Close
B: Open
C: ON
D: OFF

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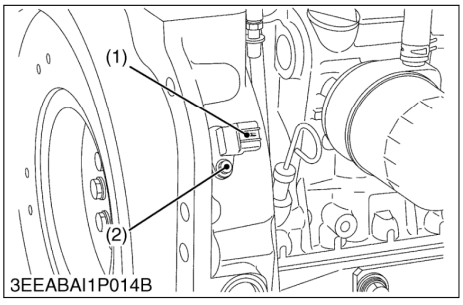
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I INFORMATION

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Crankshaft Position Sensor

1. Remove the crankshaft position sensor mounting screw (2).
2. Remove the crankshaft position sensor (1).

(When reassembling)

- Replace the O-ring with new one.

■ **IMPORTANT**

- **Do not reuse the crankshaft position sensor if you drop the sensor.**

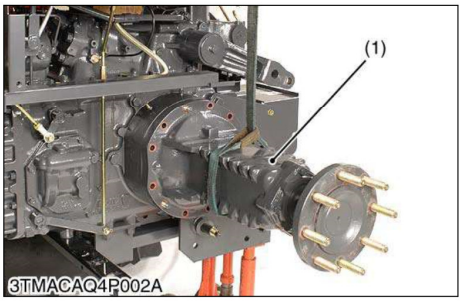
Tightening torque	Crankshaft position sensor mounting screw	4 to 6 N·m 0.4 to 0.6 kgf·m 3 to 4 lbf·ft

(1) Crankshaft Position Sensor
(2) Crankshaft Position Sensor Mounting Screw

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Rear Axle Case

1. Suspend the rear axle case.
2. Remove the rear axle case (1).

(When reassembling)

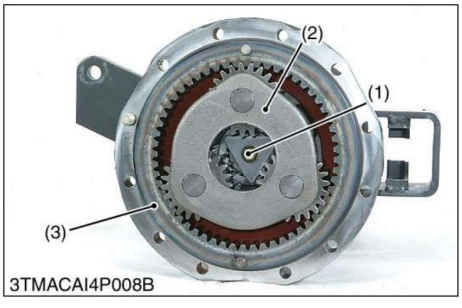
- Apply liquid gasket (Three Bond 1216, 1206D or equivalent) to the seam of brake case and transmission case.
- Apply grease to the O-ring.

Tightening torque	Rear axle case mounting screw and nut	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft

(1) Rear Axle Case

9Y1211618RAS0005US0

(2) Disassembling Rear Axle Case



Planetary Gear Support

1. Remove the planetary gear support mounting UBS screw (1).
2. Remove the planetary gear support (2).

(When reassembling)

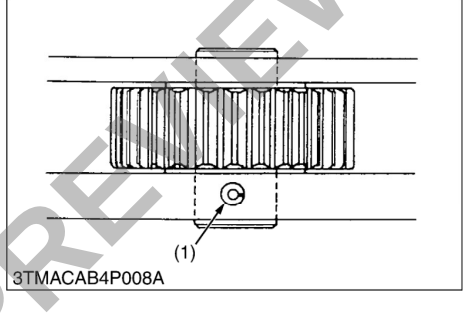
- Do not place your finger nearby the planetary gear.
- Be careful not to cut your finger by the edge of internal gear when setting the planetary gear assembly.

Tightening torque	Planetary gear support mounting UBS screw	90.0 to 104 N·m 9.18 to 10.6 kgf·m 66.4 to 76.7 lbf·ft

(1) Planetary Gear Support Mounting UBS Screw
(2) Planetary Gear Support
(3) Internal Gear

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Planetary Gear

1. Tap the spring pin (1) into the planetary gear shaft (3).
2. Draw out the planetary gear shaft (3), and remove the planetary gear (2).
3. Tap out the spring pin (1) from the planetary gear shaft (3).

(When reassembling)

- Apply transmission fluid to the inner surface of planetary gear (2) and bearing.
- Tap in the spring pin (1) as shown in figure.

(1) Spring Pin
(2) Planetary Gear
(3) Planetary Gear Shaft

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