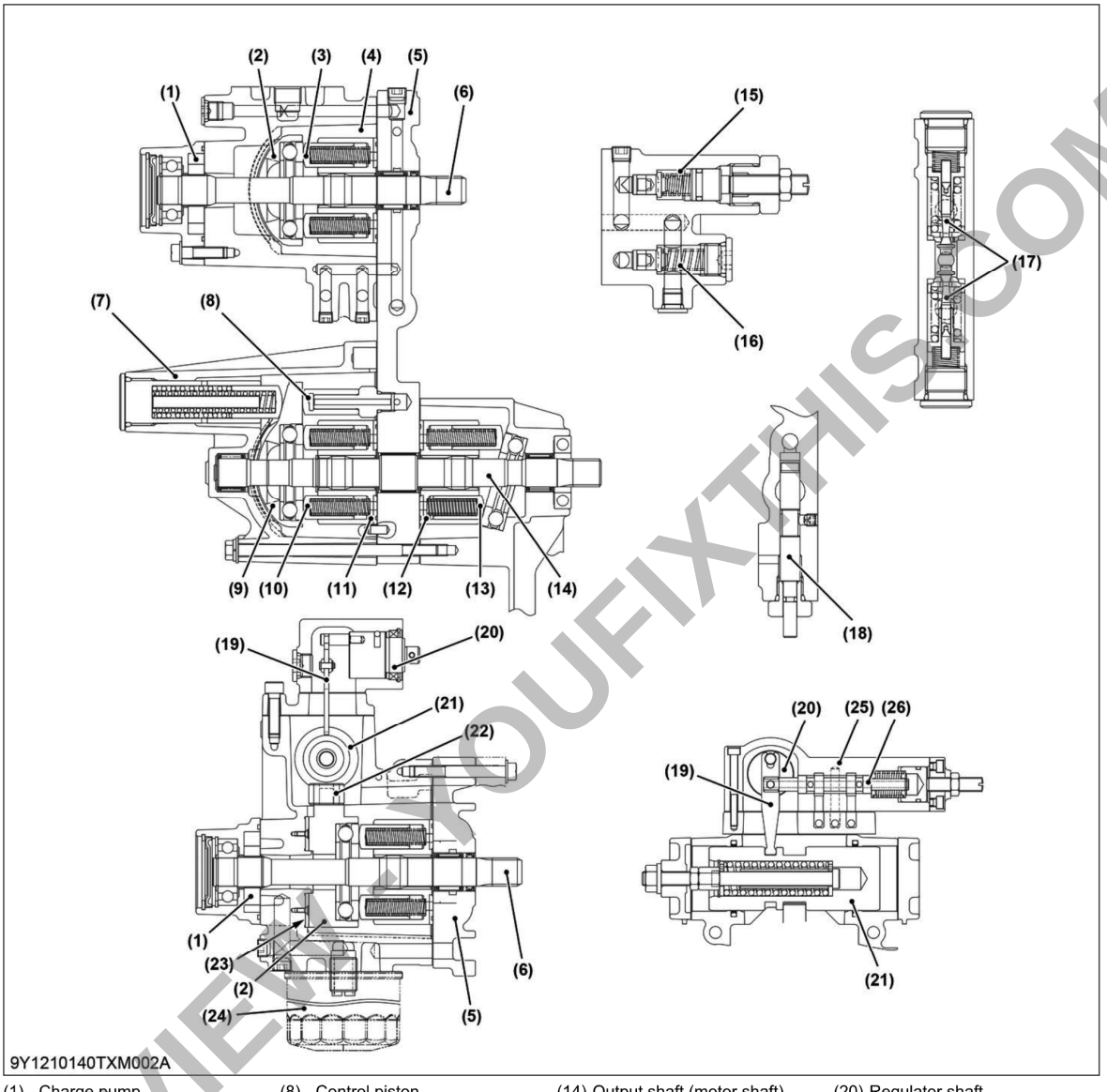


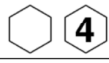
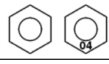
(1) Charge pump
(2) Variable swash plate
(3) Piston
(4) Cylinder block (pump)
(5) Port block cover
(6) Input shaft (pump shaft)
(7) Assist motor cover
(8) Control piston
(9) Variable swash plate (assist motor)
(10) Piston
(11) Cylinder block (assist motor)
(12) Cylinder block (motor)
(13) Piston
(14) Output shaft (motor shaft)
(15) Charge relief valve
(16) Anti-cavitation valve
(17) Check and high pressure relief valve
(18) Bypass spool
(19) Feedback lever
(20) Regulator shaft
(21) Servo piston
(22) Guide
(23) Cradle bearing
(24) HST oil filter
(25) Regulator valve assembly
(26) Regulator spool

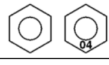
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TIGHTENING TORQUES

1. General use screws, bolts and nuts

Indication on top of bolt	 No-grade or 4T					
Indication on top of nut	 No-grade or 4T					
Material of opponent part	Ordinariness			Aluminum		
Unit	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
M8	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14
M10	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25
M12	63 to 72	6.4 to 7.4	47 to 53	–	–	–
M14	108 to 125	11.0 to 12.8	79.6 to 92.5	–	–	–
M16	167 to 191	17.0 to 19.5	123 to 141	–	–	–
M18	246 to 284	25.0 to 29.0	181 to 209	–	–	–
M20	334 to 392	34.0 to 40.0	246 to 289	–	–	–

Indication on top of bolt	 7T					
Indication on top of nut	 No-grade or 4T					
Material of opponent part	Ordinariness			Aluminum		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	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
M8	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15
M10	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32
M12	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53
M14	124 to 147	12.6 to 15.0	91.2 to 108	–	–	–
M16	197 to 225	20.0 to 23.0	145 to 166	–	–	–
M18	275 to 318	28.0 to 32.5	203 to 235	–	–	–
M20	368 to 431	37.5 to 44.0	272 to 318	–	–	–

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Symptom	Probable cause and checking procedure	Solution	Reference page
Water mixed into oil	3. Bowl-shaped plug of the cylinder head and crankcase is damaged	Replace plug	–
	4. Cylinder head cracked	Replace cylinder head	4-53
Low oil pressure	1. Engine oil insufficient	Fill oil to specified level	3-5
	2. Excessive oil clearance of each metal	Replace worn parts	4-70 4-70
	3. Relief valve damaged	Repair or replace relief valve	4-56
	4. Oil pump damaged	Repair or replace oil pump	4-56
Fuel tank damage	1. Fuel hose blocked	Check and/or replace fuel hose	3-27
	2. Check valve damaged	Replace check valve	–
	3. Carbon canister damaged	Replace the carbon canister	–

Electronic control fuel injection

Symptom	Number of flashing (diagnostic lamp)	Target part/items	Probable cause and checking procedure	Solution	Reference page
Engine trouble, unable to start	1	Injector	1. Disconnected injector harness	Check the injector harness connector	10-38
			2. Damaged injector	Check the injector	
			3. Damaged injector harness	Check the injector harness	
	4	Fuel pump	1. Disconnected fuel pump harness	Check the fuel pump harness connector	10-40
			2. Damaged fuel pump	Check the fuel pump	
			3. Damaged fuel pump harness	Check the fuel pump harness	
	8	Crank sensor	1. Disconnected crank sensor harness	Check the crank sensor harness connector	10-41
			2. Damaged crank sensor	Check the crank sensor	
			3. Damaged crank sensor harness	Check the crank sensor harness	

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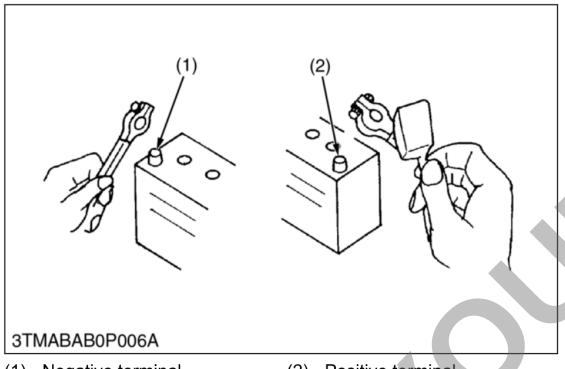
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HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING

■ IMPORTANT

- **Check electrical wiring for damage and loosened connection every year. To this end, educate the customer to do his or her own check and at the same time recommend the dealer to perform periodic check for a fee.**
- **Do not try to modify or remodel any electrical parts and wiring.**
- **When removing the battery cables, disconnect the negative cable first. When installing the battery cables, connect the positive cable first.**



(1) Negative terminal (2) Positive terminal

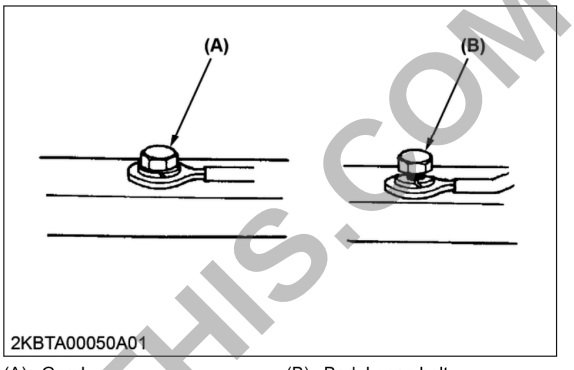
To ensure safety and prevent damage to the machine and surrounding equipment, heed the following precautions in handling electrical parts and wiring.

1. Handling wire harness

⚠ CAUTION

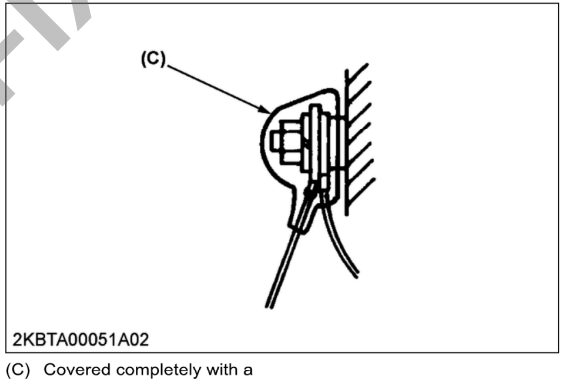
- **Do not let an unprotected wire harness to come in contact with other components.**
- **Do not clamp the wire harness to fuel hoses.**
- **If the wire harness is damaged, replace it immediately with a new one.**
- **Do not alter the electrical device and wire harness.**

- Tighten the electrical terminals securely.



(A) Good (B) Bad: Loose bolt

- Check the electrical terminal protection and clamping conditions before connecting the battery cable.



(C) Covered completely with a protection cover

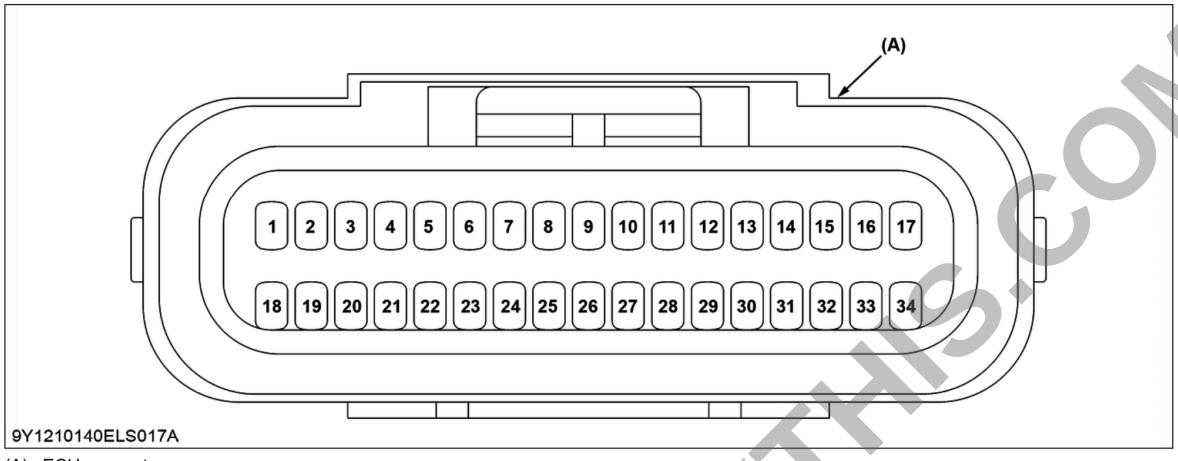
- Keep the wire harness away from hazardous positions such as rotating parts or high-temperature sections.

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4.11 EFI system

4.11.1 Checking ECU harness connector



(A) ECU connector

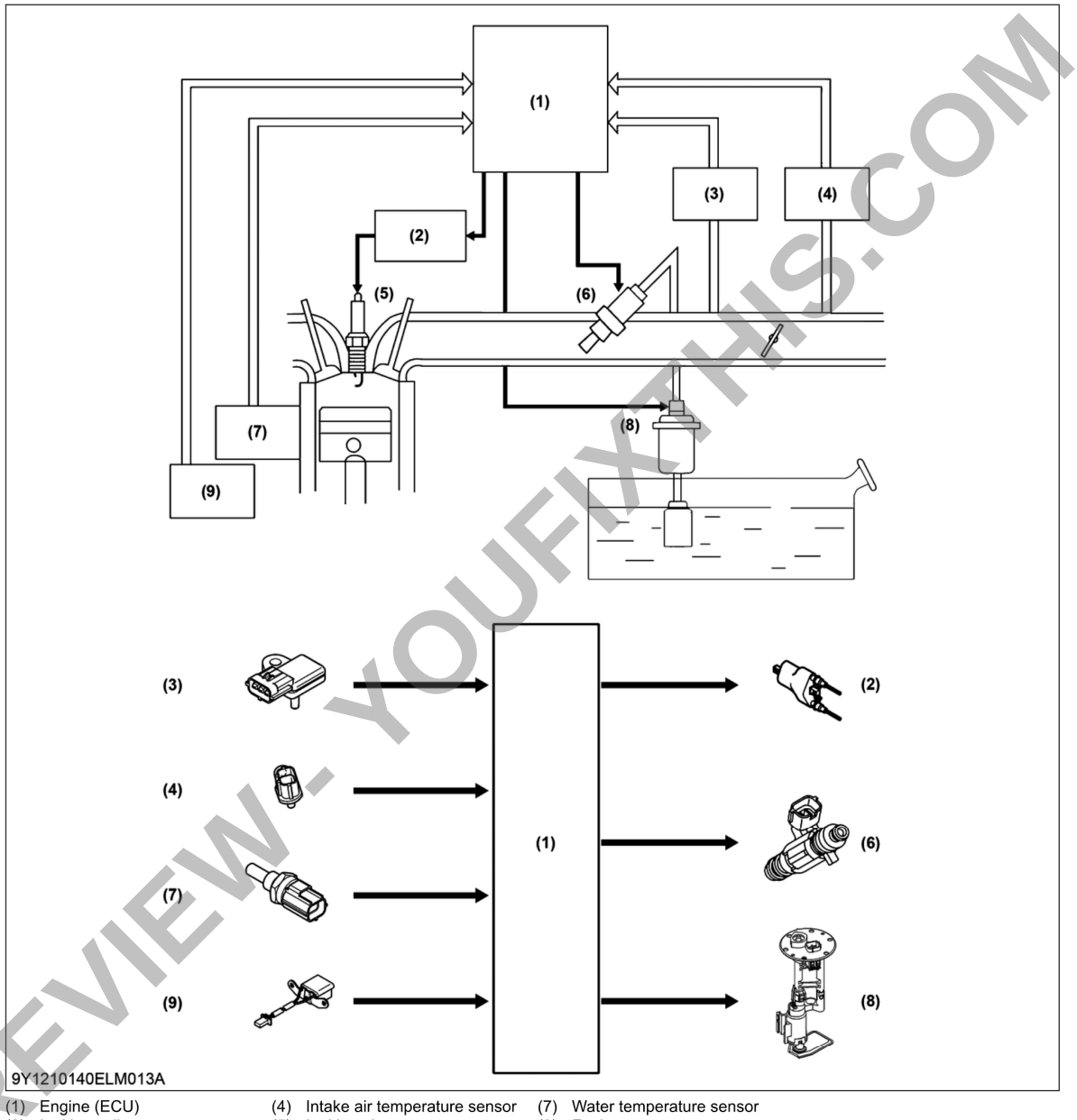
No.	Color of wiring	Terminal name
1	White / blue	Ignition coil 1
2	–	–
3	–	–
4	Black	GND (battery ground)
5	Blue / red	Output terminal for fuel pump
6	Pink / white	Output terminal for relay
7	Light green / red	Output terminal for engine diagnostic light
8	–	–
9	Pink	+ 12 V (power source from battery)
10	Orange	+ 5 V (power source for sensor)
11	Blue	Input terminal for air temperature sensor
12	White	Input terminal for air pressure sensor
13	–	–
14	–	–
15	–	–
16	Black / white	Crank sensor (+)
17	Red / white	Crank sensor (-)
18	Red / yellow	Injector
19	–	–
20	–	–
21	Black	GND (battery ground)
22	White / yellow	Output terminal for water temperature sensor
23	–	–
24	–	–

(Continued)

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4. Fuel system

4.1 Structure of electronic fuel injection system



(1) Engine (ECU)
(2) Ignition coil
(3) Intake air pressure sensor
(4) Intake air temperature sensor
(5) Ignition plug
(6) Injector
(7) Water temperature sensor
(8) Fuel pump
(9) Crank sensor (pulsar coil)

The electronic fuel injection (EFI) engine is an engine that prepares a fuel-air mixture by fuel injection through the injectors without using carburetors.
The EFI makes the engine operate at the optimum conditions by controlling fuel injection and ignition timing by electronic control unit (ECU) in response to the detected engine conditions by signals of each sensor.
By this method, the maintenance performance has improved because of no occurrence of clogging, with fuel decay that often occurs in the carburetor systems.

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SERVICING

1. Troubleshooting for engine

Engine body

Symptom	Probable cause and checking procedure	Solution	Reference page
Starter does not operate	1. Insufficient battery capacity	Charge or replace	3-16
	2. Damaged or disconnected wiring	Check wiring	—
	3. Damaged main switch	Replace main switch	10-23
	4. Damaged starter or contactor	Replace starter	10-44
Engine does not start	1. Empty fuel tank	Fill with fuel	3-7
	2. Clogged air cleaner	Clean or replace air filter	3-14
	3. Clogged fuel filter	Replace fuel filter	—
	4. Damaged fuel pump	Replace fuel pump	10-40
	5. Spark plug electrodes are wet with fuel	Dry electrode and restart, being careful not to close throttle valve excessively.	3-22
	6. No spark from spark plug	Solution order 1. Check wire harness connector	—
		2. Check and/or replace ignition coil	10-42
	7. Weak spark from spark plug	Solution order 1. Check wire harness connector	—
		2. Check and/or replace ignition coil	10-42
	8. Insufficient compression	Solution order 1. Check valve clearance	4-31
		2. Check degree of contact of intake and exhaust valves with their seat.	4-50
		3. Check the tightening torque on cylinder head screws.	4-53
		4. Check the wear of piston ring, piston and cylinder.	4-58
Improper low-speed running and idling	1. Improper spark plug	Replace spark plug	10-25
	2. Damaged ignition coil	Replace ignition coil	10-42
	3. Damaged throttle body	Replace throttle body	4-50

(Continued)

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SPECIFICATIONS

1. Specification table

Model				RTV520	
				General purpose	Deluxe
Engine	Make			GZ520	
	Type			2 cylinders, 4-cycle, water cooled EFI, gasoline, OHC	
	Displacement		L (cu. in.)	0.514 (31.4)	
	Net power*1		kW (HP) / rpm	13.0 (17.4) / 3600	
Fuel capacity			L (U.S.gals.)	19.2 (5.1)	
Transmission				Continuously variable hydro transmission (VHT)	
Wheels, drive system				4, rear 2WD or 4WD	
Differential lock				Standard; hand operated with mechanical holder	
Gear selection				Hi - Lo range forward, neutral, reverse	
Brakes	Front / rear			Dry - disk brake	
	Parking brake			Rear wheel, hand lever	
Steering				Rack and Pinion	
Suspension	Front			Independent, MacPherson strut-type	
	Rear			Rigid axle, 5-link type	
Dimensions	Length		mm (in.)	2670 (105.1)	2825 (111.2)
	Width		mm (in.)	1390 (54.7)	
	Height, overall		mm (in.)	1880 (74)	
	Front tread centers		mm (in.)	1020 (40.2)	
	Rear tread centers		mm (in.)	1040 (41)	
	Wheelbase		mm (in.)	1800 (70.9)	
	Ground clearance	Front axle	mm (in.)	225 (8.9)	
		Rear axle	mm (in.)	170 (6.7)	
	Turning diameter		m (ft)	6.9 (22.6)	
Max. rolling weight (towing capacity)			kg (lbs.)	Rear: 530 (1168) Front: 250 (551)	
Payload capacity			kg (lbs.)	425 (937)	418 (922)
Weight			kg (lbs.)	625 (1378)	632 (1393)
Cargo bed	Width		mm (in.)	1033 (40.6)	
	Length		mm (in.)	854 (33.6)	
	Depth		mm (in.)	286 (11.3)	

(Continued)

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3. Shock absorbers

3.1 Rear shock absorber spring adjustment

⚠ WARNING

To avoid serious injury or death:

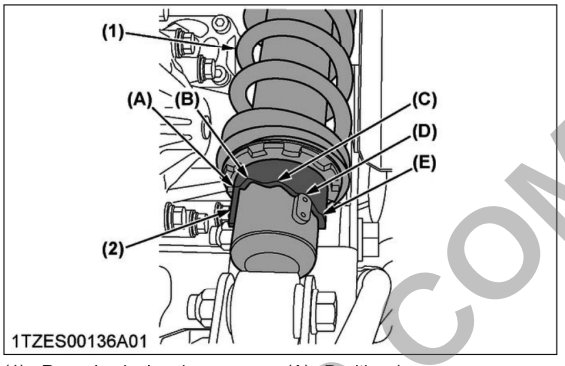
- **Be sure to work on a firm, flat and level surface with the engine shut off and parking brake *"ON"*.**
- **Support the vehicle securely on stands by a suitable jack before adjusting the rear shock absorber springs.**
- **Keep the position of the left and right rear shock absorber equal.**
  Uneven adjustment can cause poor handling and loss of control, which could lead to an accident.

The spring adjusting sleeves on the rear shock absorbers have 5 positions so that the springs can be adjusted for different riding and loading conditions.
For adjusting the rear shock absorber springs, lift up the vehicle and turn the spring adjusting sleeves on the shock absorbers to the desired position with the hook wrench.

Rear shock absorber position

Position	Spring	Feeling	Load
1	Stronger	Hard	Heavy
2	↑	↑	↑
3	I	I	I
4 (default)	↓	↓	↓
5	Weaker	Soft	Light

The rear shock absorber spring is adjusted to 4th position (default) in the following figure.



(1) Rear shock absorber
(2) Spring adjusting sleeve (turn here with a hook wrench.)
(A) Position 1
(B) Position 2
(C) Position 3
(D) Position 4
(E) Position 5

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Item	Service specification	Service limit
• Crankshaft journal O.D.	39.934 to 39.950 mm 1.5722 to 1.5728 in.	—
• Crankshaft metal I.D.	39.977 to 40.007 mm 1.5739 to 1.5750 in.	—
Cylinder I.D.	69.000 to 69.020 mm 2.7166 to 2.7173 in.	69.120 mm 2.7213 in.
0.25 Oversize cylinder I.D.	69.250 to 69.270 mm 2.7264 to 2.7271 in.	69.370 mm 2.7311 in.
0.50 Oversize cylinder I.D.	69.500 to 69.520 mm 2.7363 to 2.7370 in.	69.620 mm 2.7409 in.
Clearance between inner rotor and outer rotor	0.15 mm 0.0059 in.	0.20 mm 0.0079 in.
Clearance between outer rotor and pump body	0.0700 to 0.0730 mm 0.00276 to 0.00287 in.	0.25 mm 0.0098 in.
Clearance between inner rotor and cover	0.045 to 0.087 mm 0.0018 to 0.0034 in.	0.20 mm 0.0079 in.

Lubricating system

Item	Service specification	Service limit
Engine oil pressure • At idle speed	50 kPa 0.51 kgf/cm^2 7.3 psi	—
• At rated speed	More than 200 to 390 kPa 2.04 to 3.97 kgf/cm^2 29.0 to 56.5 psi	190 kPa 1.94 kgf/cm^2 27.6 psi

Cooling system

Item	Service specification	Service limit
radiator cap air leakage • Specified pressure	88 kPa 0.90 kgf/cm^2 13 psi	—
• Pressure falling time	More than 10 seconds for specified pressure fall from 88 to 74 kPa 0.90 to 0.75 kgf/cm^2 13 to 11 psi	—
Radiator water leakage test pressure	180 kPa 1.84 kgf/cm^2 26.1 psi	—
Thermostat • Valve opening temperature (at beginning)	69.5 to 72.5 ℃ 157.1 to 162.5 ℉	—
• Valve opening temperature (opened completely)	85 ℃ 185 ℉	—

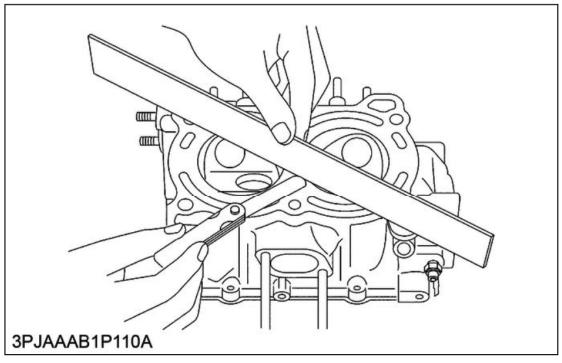
Fuel system

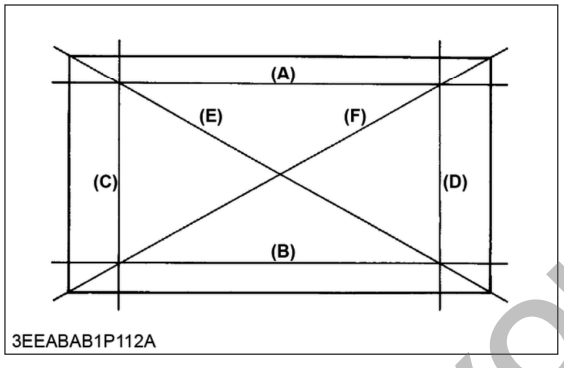
Item	Service specification	Service limit
Fuel pump • Pressure	Above 240 kPa 2.45 kgf/cm^2 34.8 psi	—

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2. Measure the six clearance points (A) to (F) as shown in the figure using a straight edge and a feeler gauge.


3PJAAAB1P110A



3EEABAB1P112A

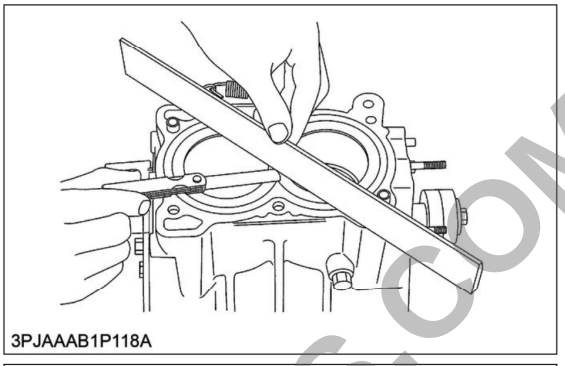
3. If the measurement exceeds the service limit, replace it.

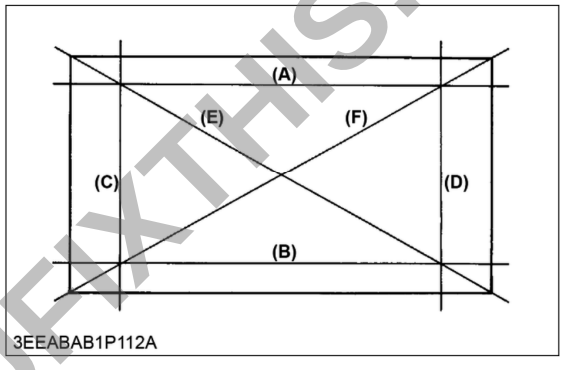
Cylinder head surface flatness	Service limit	0.05 mm 0.002 in.

6.2.2 Checking crankcase surface flatness

Tools required
- Feeler gauge

1. Clean the cylinder surface.
2. Measure the six clearance points (A) to (F) as shown in the figure using a straight edge and a feeler gauge.


3PJAAAB1P118A



3EEABAB1P112A

3. If the measurement exceeds the service limit, replace it.

Cylinder surface flatness	Service limit	0.05 mm 0.002 in.

6.2.3 Checking clearance between valve stem and valve guide

Tools required
- Outside micrometer
- Small hole gauge

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SERVICE INTERVALS

Extreme conditions:
- Frequent or prolonged operations in dusty environments
- Prolonged low speed operations
- Extended idle time
- Frequent short trips which do not let the engine warm up (especially in cold weather)

Gasoline engine emission related maintenance instructions:
- Non-warranty maintenance, repair or replacement of the emission control devices, and systems should be performed by a qualified repair establishment or individual which has the experience and equipment to perform such work. See the emissions warranty statement.
- To ensure the best quality and reliability, use new KUBOTA Genuine parts or their equivalents for repair and replacement, whenever you have maintenance done.

No.	Items		Indication of hour meter														After 700 hrs	Ref. Page	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700			
1	Greasing	Apply	•	•	•	•	•	•	•	•	•	•	•	•	•	•	every 50 hrs	3-12	
2	Engine start system	Check	•	•	•	•	•	•	•	•	•	•	•	•	•	•	every 50 hrs	3-13	
3	VHT neutral spring	Check		•		•		•		•		•		•		•	every 100 hrs	3-14	
4	Wheel bolt torque	Check	◎	•		•		•		•		•		•		•	every 100 hrs	3-14	*1
5	Air cleaner element	Clean		•		•		•		•		•		•		•	every 100 hrs	3-14	*2
		Replace															every 1000 hrs or 1 year	3-25	*3
6	Pre cleaner element	Clean		•		•		•		•		•		•		•	every 100 hrs	3-15	*2
		Replace															every 1000 hrs or 1 year	3-25	*3
7	Alternator drive belt	Adjust		•		•		•		•		•		•		•	every 100 hrs	3-15	
8	Carbon canister air filter	Check		•		•		•		•		•		•		•	every 100 hrs	3-16	*4
9	Battery condition	Check		•		•		•		•		•		•		•	every 100 hrs	3-16	*5
10	Toe-in	Adjust		•		•		•		•		•		•		•	every 100 hrs	3-17	
11	Spark arrester	Clean		•		•		•		•		•		•		•	every 100 hrs	3-18	
12	Parking brake lever	Adjust	◎			•				•				•			every 200 hrs	3-18	*1
13	Engine oil filter	Replace	◎			•				•				•			every 200 hrs	3-19	*1
14	Engine oil	Change	◎			•				•				•			every 200 hrs	3-19	*1 *6

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WSM

WORKSHOP MANUAL

UTILITY VEHICLE

RTV520

Kubota

KiSC issued 04, 2021 A

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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 assemble or use this unit.

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

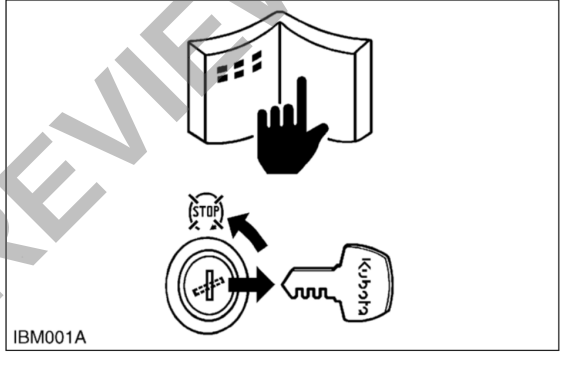
WARNING
- **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

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.**

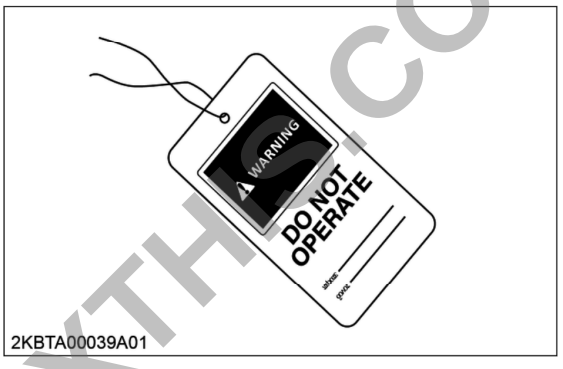
NOTE
- **Gives helpful information.**

1. Working precautions



IBM001A

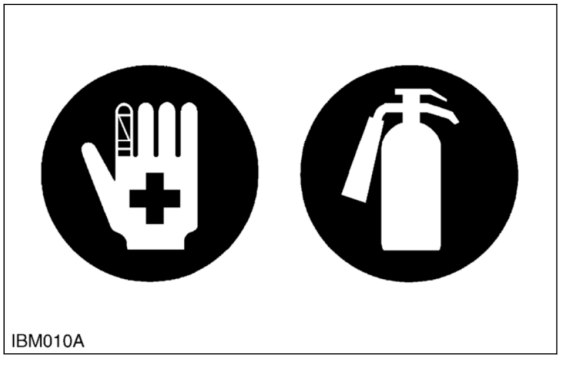
- Understand all safety instructions and safety labels in this manual.
- Park the machine on a stable and level ground then lower the attachment to check the machine safely.
- Stop the engine and remove the key when leaving the operator's seat for cleaning, maintenance, and servicing.



2KBTA00039A01

- Hang a DO NOT OPERATE tag near the operator's seat.
- Do not use worn or cracked tools. Use tools in a proper way with enough strength.
- In regards to the facility which is used in the workshop, follow each safety instruction.

2. Preparing for emergencies


IBM010A

- Keep a first aid kit and fire extinguisher ready at all times.
- Keep emergency numbers near your telephone at all times.

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TRADEMARKS AND REGISTERED TRADEMARKS

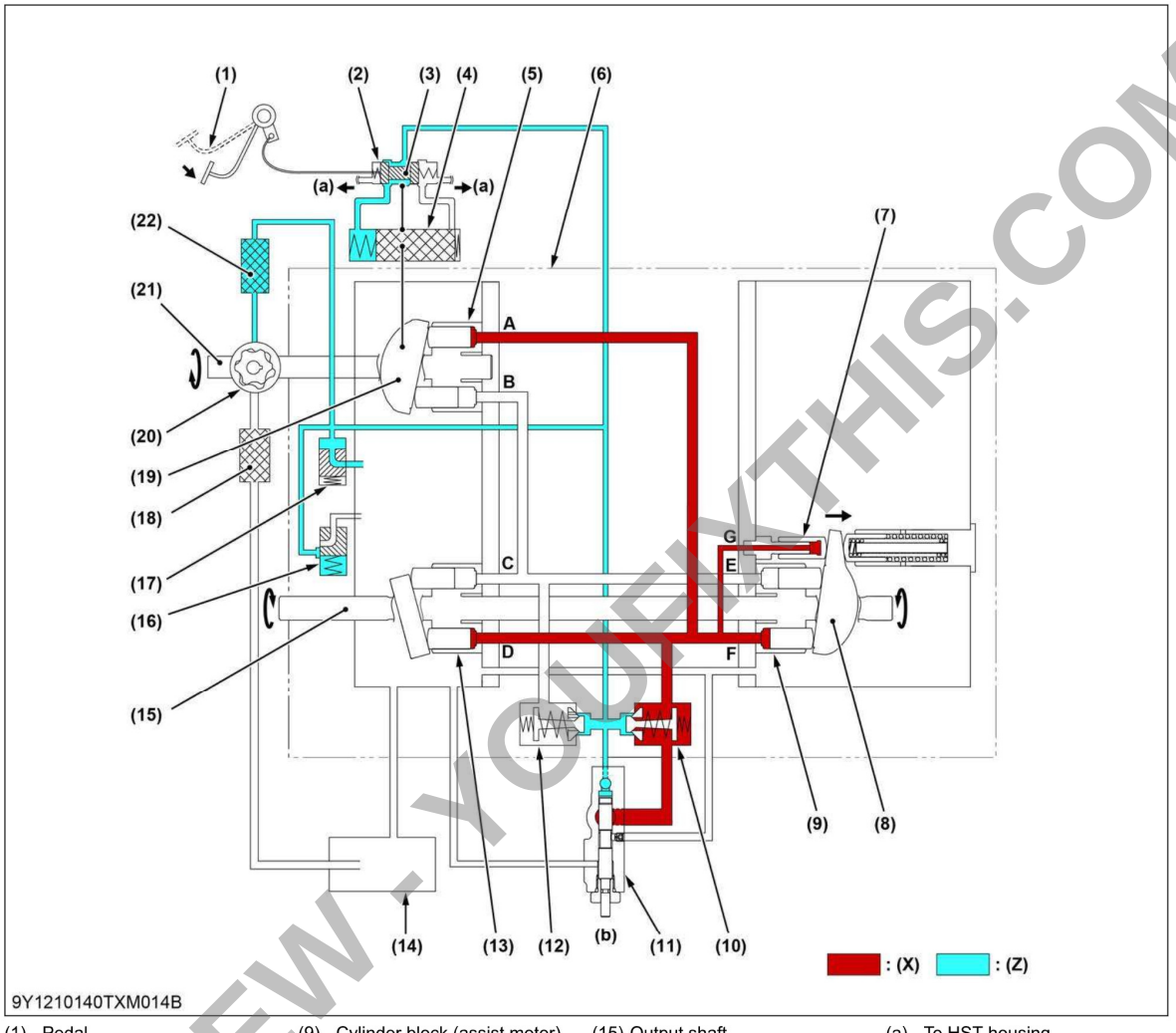
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2.1.2.4 Accelerator pedal depressed fully under light load and assist motor started up to maximum capacity



(1) Pedal
(2) Regulator valve assembly
(3) Regulator spool
(4) Servo piston
(5) Cylinder block
(6) HST housing
(7) Control piston
(8) Variable swash plate (assist motor)
(9) Cylinder block (assist motor)
(10) Check and high pressure relief valve (forward)
(11) Bypass valve
(12) Check and high pressure relief valve
(13) Cylinder block (stationary motor)
(14) Transmission case
(15) Output shaft
(16) Anti-cavitation valve
(17) Charge relief valve
(18) Oil filter (suction)
(19) Variable swash plate (HST pump)
(20) Charge pump
(21) Input shaft
(22) Oil filter
(a) To HST housing
(b) Connects with cable for brake pedal
(X) High pressure
(Z) Low pressure

The control lever is activated by the pedal (1) to switch the regulator valve (2) hydraulic circuit when the pedal is depressed fully. The servo piston (4) is then actuated to tilt the pump variable swash plate (19) to maximum.
The pump cylinder block (5) is driven by the input shaft (21) to put the oil under high pressure and to feed it at the highest rate out of the pump port A. The pressure-fed oil flows into the motor port D along the circuit. The pressure of the oil from the HST pump (19) and gets high enough to tilt the assist motor variable swash plate (8). The oil is fed to port F (branch flow) and port G. As a result, the output shaft (15) is driven by the stationary motor (13) and assist motor (8). The output shaft RPM drops in proportion to the tilt of the assist motor variable swash plate, whereas its torque increases.

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