WSM

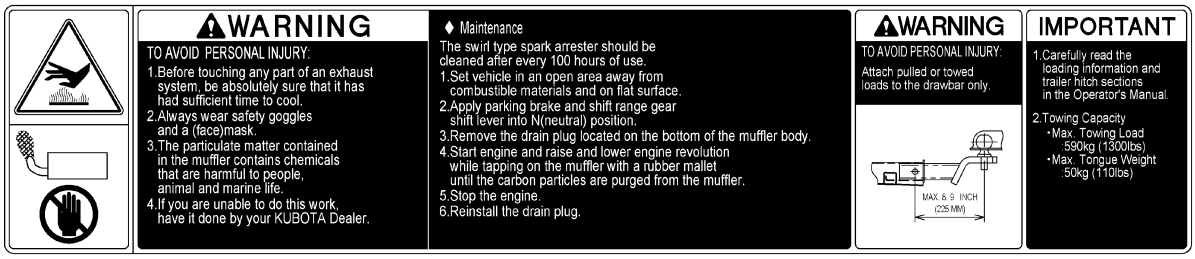
WORKSHOP MANUAL
UTILITY VEHICLE

RTV-X1100C

Kubota

KiSC issued 12, 2013 A

(1) Part No. K7591-6545-2



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(2) Part No. K7591-6547-1

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(3) Part No. K7591-6533-1

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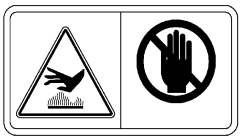
(4) Part No. K7591-6548-1



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(5) Part No. K7591-6532-1

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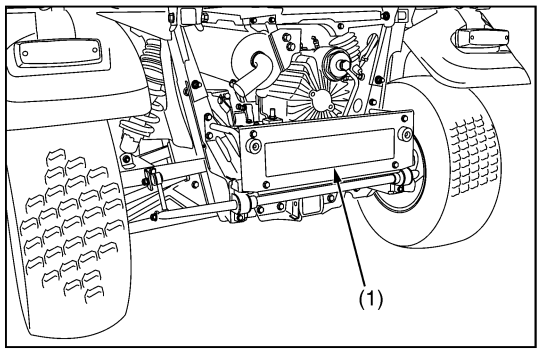

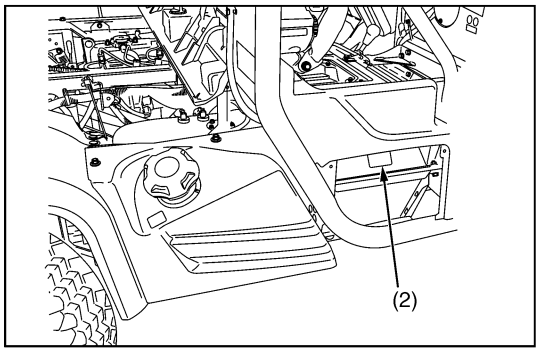

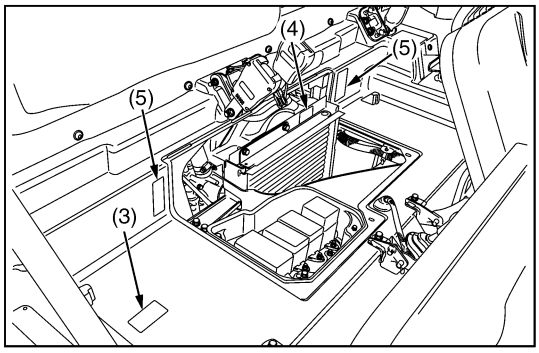

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CARE OF DANGER, WARNING AND CAUTION LABELS

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replace component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

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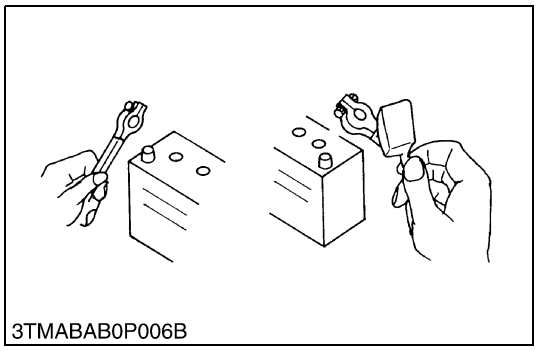
[2] BATTERY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- Be careful not to confuse positive and negative terminal posts.
- When you remove battery cables, disconnect negative cable first. When you install battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After you connect cables to battery terminal posts, apply high temperature grease to them and securely install terminal covers on them.
- Do not allow dirt and dust to collect on battery.

CAUTION
- **Be careful not to let battery liquid spill on your skin and clothes. If contaminated, wash it off with water immediately.**
- **Before you recharge the battery, remove it from the machine.**
- **Before you recharge, remove cell caps.**
- **Recharge in a well-ventilated place where there is no open flame nearby, as hydrogen gas and oxygen are formed.**

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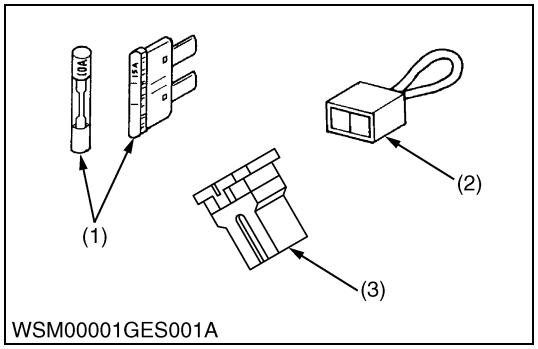
[3] FUSE



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- Use fuses with specified capacity.
  Neither too large nor small capacity fuse is acceptable.
- Never use steel nor copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine which is not provided with reserve power supply.
- Do not install accessories if fuse capacity of reserve power supply is exceeded.

(1) Fuse
(2) Fusible Link
(3) Slow Blow Fuse

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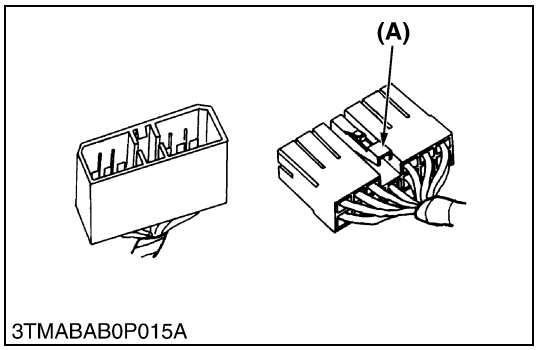
[4] CONNECTOR



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- For connector with lock, push lock to separate.

(A) Push

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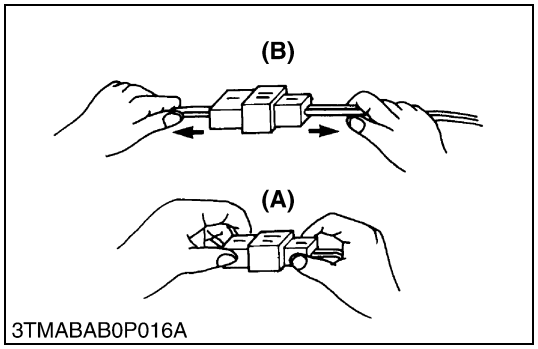

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- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct **(B) Incorrect**

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6. MAINTENANCE CHECK LIST

WARNING

To avoid serious injury and vehicle damage:

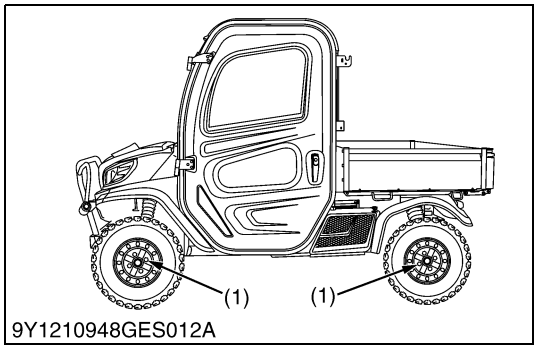
- **Be sure you have sufficient knowledge, experience, the proper replacement parts and tools before you attempt any vehicle maintenance task.**

SERVICE INTERVALS

■ **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 battery condition by reading the indicator annually.**
- **The items listed below (@marked) are registered as emission related critical parts by KUBOTA in the U.S.EPA non road emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the below instruction. Please see Warranty Statement in detail.**

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 hrs	G-30		
2	Greasing	Apply	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hrs	G-31		
3	Engine oil	Change	★			☆				☆				☆			every 200 hrs	G-39		
4	Muffler [Spark arrester]	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-33		
5	Wheel fastener torque	Check	★	☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-33		
6	Battery condition	Check		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-34	*4	
7	Alternator belt	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-36		
8	VHT neutral spring	Check		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-36		
9	VHT pressure release	Check		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-36		
10	Toe-in	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-37		
11	Fuel filter element	Check		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-37		
		Replace										☆					every 500 hrs	G-51		@
12	Fuel line	Check		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-37		@
		Replace															every 2 years	G-52	*3	
13	Air cleaner element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 hrs	G-38	*1	@
		Replace															every 1 year	G-51	*2	
14	Engine oil filter	Replace	★			☆				☆				☆			every 200 hrs	G-39		
15	Transmission oil filter (VHT) (Yellow color)	Replace	★			☆				☆				☆			every 200 hrs	G-40		
16	Transmission oil filter (Suction) (Black color)	Replace	★			☆				☆				☆			every 200 hrs	G-40		
17	Brake pedal	Check	★			☆				☆				☆			every 200 hrs	G-41		*4
18	Parking brake	Adjust	★			☆				☆				☆			every 200 hrs	G-41		



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Checking Wheel Fastener Torque

WARNING

To avoid serious injury:

- **Never operate vehicle with a loose wheel bolts.**
- **Any time bolts are loosened, retighten to the specified torque.**
- **Check all bolts frequently and keep them tight.**

Check wheel bolts regularly especially when new. If they are loose, tighten them as follows.

Tightening torque	Aluminum wheel mounting bolt	90 to 110 N·m 9.2 to 11.2 kgf·m 66.4 to 81.1 lbf·ft
	Steel wheel mounting bolt and nut	108 to 130 N·m 11.1 to 13.2 kgf·m 79.7 to 95.8 lbf·ft

(1) Wheel Mounting Bolts

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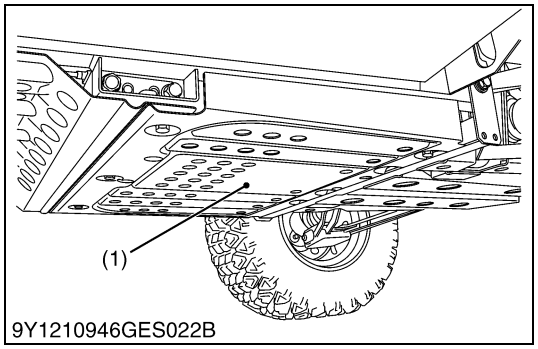

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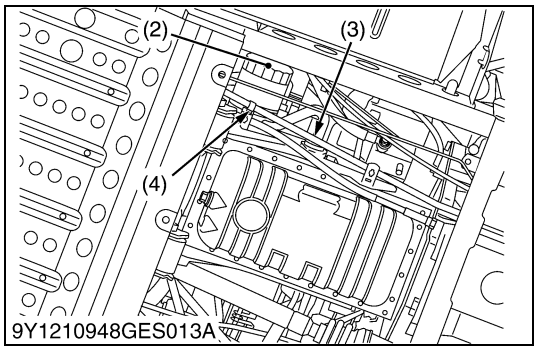

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Replacing Engine Oil Filter

WARNING

To avoid serious injury:

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

1. Park the vehicle on a flat surface.
2. Stop the engine.
3. Remove the rear skid plate.
4. Remove the oil filter.
5. Put a film of clean engine oil on the rubber seal of the new filter.
6. Tighten the filter quickly until it contacts the mounting surface. Tighten the filter by hand an additional 1/2 turn only.
7. 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, replenish the engine oil up to the prescribed level.

■ **IMPORTANT**

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

(1) Rear Skid Plate
(2) Engine Oil Filter
(3) Parking Cable
(4) Clamp

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(Continued)

Battery Type	Volts (V)	Reserve Capacity (min)	Cold Cranking Amps	Capacity at 20 hrs (A. H.)	Normal Charging Rate (A)
624FMF	12	120	650	58	17.4

(For non-accessible maintenance-free type batteries.)

Maintenance-free, non-accessible batteries are designed to eliminate the need to add water. Yet the volume of electrolyte above plates may eventually become depleted due to abnormal conditions such as high heat or improper regulator setting. Use a voltmeter to check the state of charge. (See reference chart below to determine if charging is necessary.)

Battery voltage	Reference state of charge
12.6	100 % (Full charge)
12.4	75 %
12.2	50 %
12.0	25 %
11.8	0 %

■ **Battery Charging**

DANGER

To avoid serious injury or death:

- **When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.**

WARNING

To avoid serious injury:

- **When disconnecting the cable from the battery, start with the negative terminal first. When connecting the cable to the battery, start with the positive terminal first.**
- **Never check battery charge by placing a metal object across the posts.**
  Use a voltmeter or hydrometer.

1. Park the vehicle on a flat surface.
2. Stop the engine.
3. Remove the battery cover.
4. To slow charge the battery, connect the battery positive terminal to the charger positive terminal and the negative to the negative, then recharge in the standard fashion.
5. A boost charge is only for emergencies. It will partially charge the battery at a high rate and in a short time. When using a boost-charged battery, it is necessary to recharge the battery as early as possible. Failure to do this will shorten the battery's service life.
6. When exchanging an old battery for a new one, use battery of equal specification shown in table 1.

■ **Direction for Storage**

1. When storing the vehicle for a long period, remove the battery from vehicle, adjust the electrolyte to the proper level (refillable type only) and store in a dry place out of direct sunlight.
2. The battery self-discharges while it is stored. Recharge it once every 3 months in hot seasons and once every 6 months in cold seasons.

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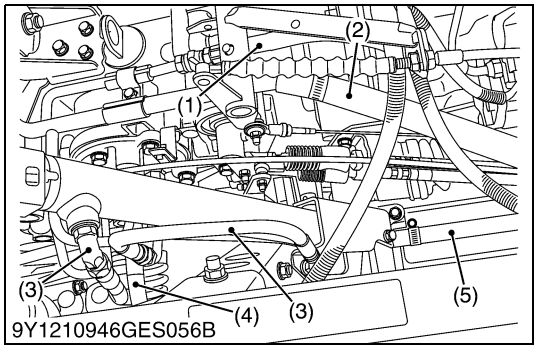

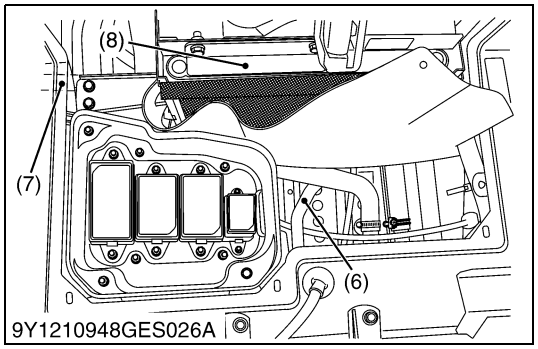

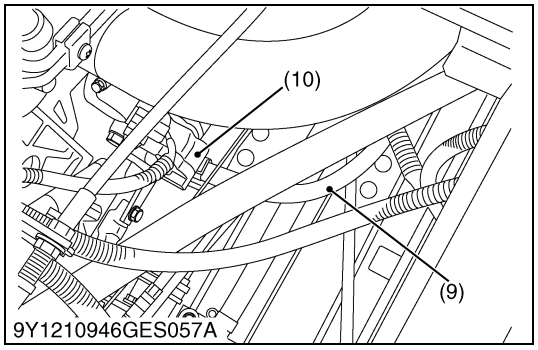

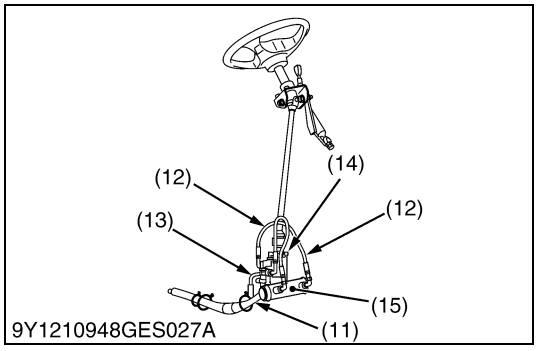

Checking Hydraulic Oil Line

1. Check to see if the hoses and hose clamps are tight and not damaged.
2. If hoses and clamps are found to be worn or damaged, replace or repair them at once.

(1) Hydraulic Pump → Control Valve
(2) HST→ Oil Tank
(3) Control Valve ←→ Lift Cylinder
(4) Control Valve → Power Steering Unit
(5) Oil Tank → HST
(6) Power Steering Unit → Oil Cooler
(7) Oil Cooler → Oil Tank
(8) Oil Cooler
(9) Oil Tank → Hydraulic Pump
(10) Hydraulic Pump
(11) Power Steering Hose (Power Steering Unit → Oil Cooler)
(12) Power Steering Hose (Power Steering Unit ←→ Power Steering Cylinder)
(13) Power Steering Hose
(With Hydraulic Dump: Power Steering Unit ← Control Valve,
Without Hydraulic Dump: Power Steering Unit ← Hydraulic Pump)
(14) Power Steering Unit
(15) Power Steering Cylinder

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(Continued)

5. Adding the LLC
   (1) Add only water if the coolant level reduces in the cooling system by evaporation.
   (2) If there is a mixture leak, add the LLC of the same manufacturer and type in the mixing ratio 50 %.
   * Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
6. When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anti-corrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
7. Kubota's genuine long-life coolant has a service life of 2 years. Be sure to change the coolant every 2 years.

■ **NOTE**
- **The above data represent industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.**

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[14] CHECK POINT OF EVERY 4 YEARS

Replacing Brake Hose

1. See page G-47.

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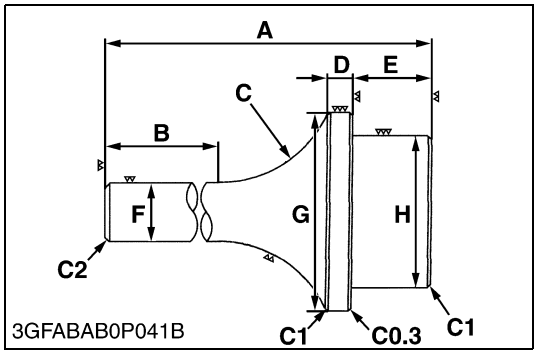

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Crankshaft Bearing 1 Replacing Tool

Application

- Use to press out and press fit the crankshaft bearing 1.

[Press Out]

A	135 mm (5.31 in.)
B	72 mm (2.8 in.)
C	40 mm radius (1.6 in. radius)
D	10 mm (0.39 in.)
E	24 mm (0.94 in.)
F	20 mm dia. (0.79 in. dia.)
G	51.20 to 51.40 mm dia. (2.016 to 2.023 in. dia.)
H	47.30 to 47.50 mm dia. (1.863 to 1.870 in. dia.)
C1	Chamfer 1.0 mm (0.039 in.)
C2	Chamfer 2.0 mm (0.079 in.)
C0.3	Chamfer 0.30 mm (0.012 in.)

[Press Fit]

A	135 mm (5.31 in.)
B	72 mm (2.8 in.)
C	40 mm radius (1.6 in. radius)
D	10 mm (0.39 in.)
E	24 mm (0.94 in.)
F	20 mm dia. (0.79 in. dia.)
G	68 mm dia. (2.7 in. dia.)
H	47.30 to 47.50 mm dia. (1.863 to 1.870 in. dia.)
C1	Chamfer 1.0 mm (0.039 in.)
C2	Chamfer 2.0 mm (0.079 in.)
C0.3	Chamfer 0.30 mm (0.012 in.)

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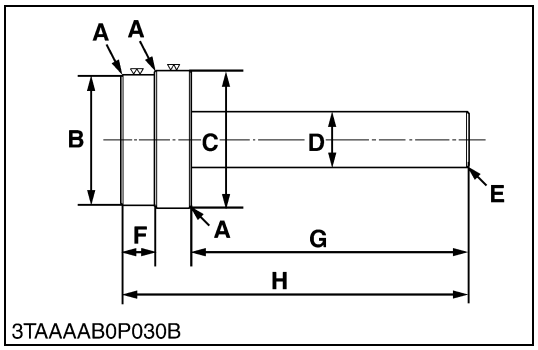

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Governor Gear Holder Bushing Replacing Tool

Application

- Use to press out and to press fit the governor gear holder bushing.

A	C1: Chamfer 1.0 mm (0.039 in.)
B	73.90 to 74.00 mm dia. (2.910 to 2.913 in. dia.)
C	69.80 to 69.90 mm dia. (2.748 to 2.751 in. dia.)
D	30 mm dia. (1.2 in. dia.)
E	C2: Chamfer 2.0 mm (0.079 in.)
F	18 mm (0.71 in.)
G	150 mm (5.91 in.)
H	188 mm (7.40 in.)

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[3] VEHICLE LIMITATIONS

The KUBOTA Vehicle has been thoroughly tested for proper performance with implements sold or approved by KUBOTA. Use with implements which are not sold or approved by KUBOTA and which exceed the maximum specifications listed below, or which are otherwise unfit for use with the KUBOTA Vehicle may result in malfunctions or failures of the vehicle, damage to other property and injury to the operator or others. [Any malfunctions or failures of the vehicle resulting from use with improper implements are not covered by the warranty.]

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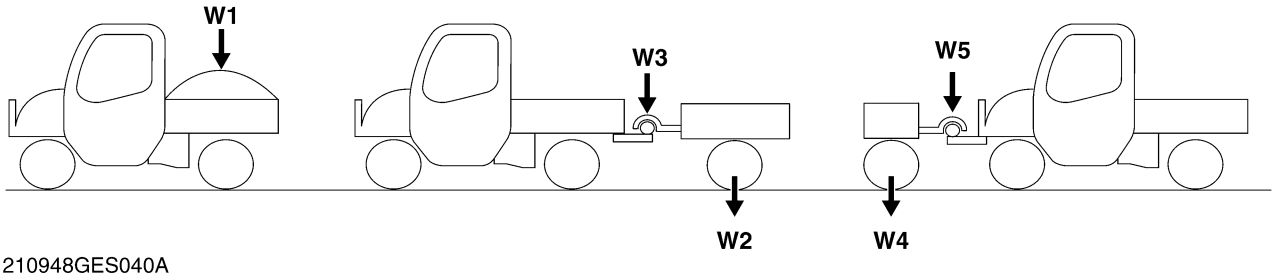
Cargo bed	Rear trailer hitch		Front trailer hitch	
Max. Cargo loading weight **W1** should not exceed "CBC" and "PCL". PCL (Permissible Cargo load) is determined by the following calculus equation. PCL = PC - (operator + passenger + option + accessory + cabin) weight CBC (Cargo bed capacity): 500 kg (1100 lbs) PC: Payload Capacity option: option accessory: accessory	Max. rolling weight **W2**	Max. tongue weight **W3**	Max. rolling weight **W4**	Max. tongue weight **W5**
	590 kg (1300 lbs)	50 kg (110 lbs)	295 kg (650 lbs)	50 kg (110 lbs)



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[Payload Capacity (PC)]

Model	RTV-X1100C
Payload capacity	739 kg (1629 lbs)
Rolling weight	Trailer weight + Trailer load

■ **NOTE**

- **Above mentioned specifications are based on level ground condition.**

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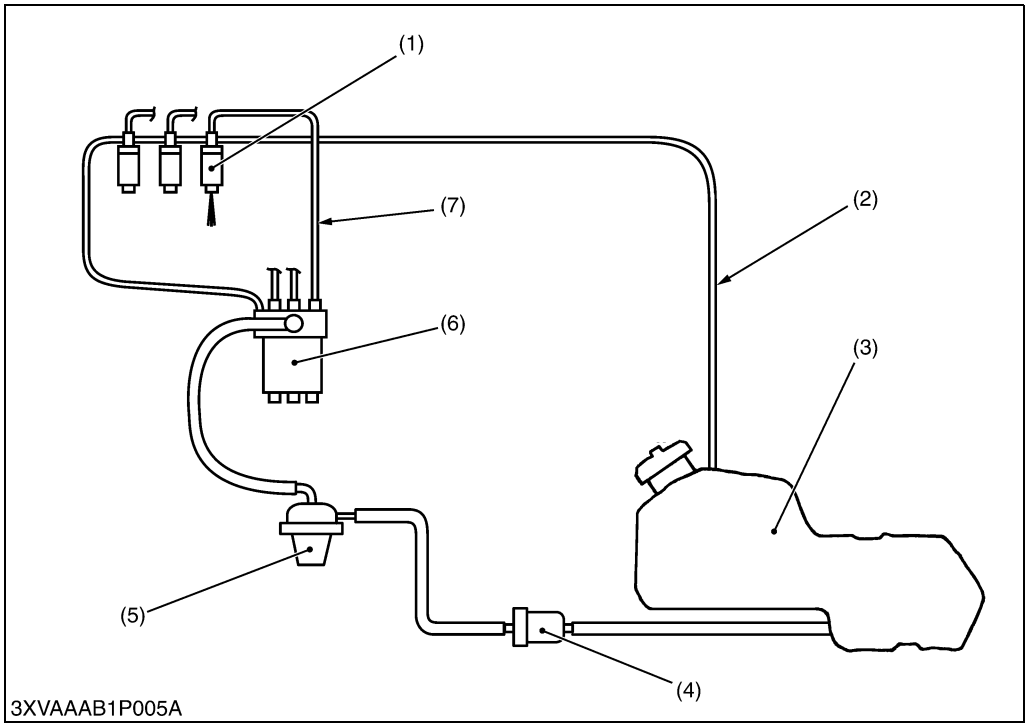
4. FUEL SYSTEM



(1) Injection Nozzle
(2) Fuel Overflow Pipe
(3) Fuel Tank
(4) Fuel Filter
(5) Fuel Feed Pump
(6) Injection Pump
(7) Injection Pipe

Fuel from the fuel tank (3) passes through the fuel filter (5), and then enters the injection pump (8) after impurities such as dirt, water, etc. are removed.

The fuel pressurized by the injection pump to the opening pressure (13.73 to 14.71 MPa, 140 to 150 kgf/cm^2, 1990 to 2133 psi), of the injection nozzle (1) is injected into the combustion chamber.

Part of the fuel fed to the injection nozzle (1) lubricates the moving parts of the needle valve inside the nozzle, then returns to the fuel tank through the fuel overflow pipe (2) from the upper part of the nozzle holder.

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3. TIGHTNING TORQUES

[1] GENERAL

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-12.)

Item	N·m	kgf·m	lbf·ft
Oil pressure switch	15 to 19	1.5 to 2.0	11 to 14
Nozzle holder	35 to 39	3.5 to 4.0	26 to 28
Overflow pipe retaining nut	35 to 39	3.5 to 4.0	26 to 28
Nozzle holder assembly	49 to 68	5.0 to 7.0	37 to 50
Seat stay mounting screw	23.6 to 27.4	2.40 to 2.80	17.4 to 20.2
Rear aluminum wheel mounting bolt	90 to 110	9.2 to 11.2	66.4 to 81.1
Rear steel wheel mounting bolt and nut	108 to 130	11.1 to 13.2	79.7 to 95.8
Mission frame mounting bolt and nut	77.5 to 90.2	7.90 to 9.20	57.2 to 66.5

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[2] ENGINE BODY

■ **NOTE**

- **For "*" marked screws, bolts and nuts on the table, apply engine oil to their threads and seats before tightening.**
- **The letter "M" in Size × Pitch means that the screw, bolt or nut dimension stands for metric. The size is the nominal outside diameter in mm of the threads. The pitch is the nominal in mm between two threads.**

Item	Dimension × Pitch	N·m	kgf·m	lbf·ft
Cylinder head cover screw	M7 × 1.0	7 to 8	0.7 to 0.9	5 to 6
Injection pipe retaining nut	M12 × 1.5	25 to 34	2.5 to 3.5	18 to 25
Glow plug	M8 × 1.0	7.9 to 14	0.80 to 1.5	5.8 to 10
*Rocker arm bracket nut	M7 × 1.0	22 to 26	2.2 to 2.7	16 to 19
Cylinder head screw	M10 × 1.25	64 to 68	6.5 to 7.0	47 to 50
*Fan drive pulley screw	M14 × 1.5	236 to 245	24.0 to 25.0	174 to 180
*Connecting rod screw	M8 × 1.0	42 to 46	4.2 to 4.7	31 to 33
*Flywheel screw	M10 × 1.25	54 to 58	5.5 to 6.0	40 to 43
Bearing case cover mounting screw	M6 × 1.0	10.8 to 12.2	1.10 to 1.25	7.96 to 9.04
*Main bearing case screw 2	M9 × 1.25	49 to 53	5.0 to 5.5	37 to 39
*Main bearing case screw 1	M8 × 1.25	30 to 34	3.0 to 3.5	22 to 25

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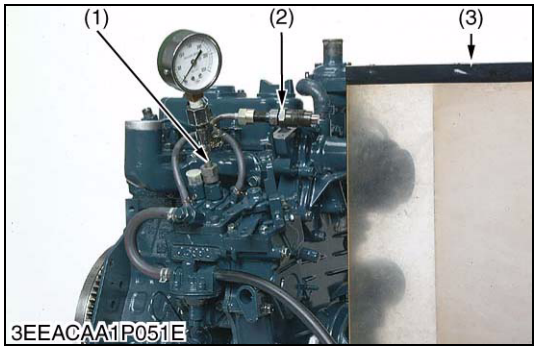

Fuel Tightness of Pump Element

1. Remove the engine stop solenoid.
2. Remove the injection pipes and glow plugs.
3. Install the injection pump pressure tester to the injection pump.
4. Install the injection nozzle (2) jetted with the proper injection pressure to the injection pump pressure tester (1). (Refer to the photo.)
5. Set the speed control lever to the maximum speed position.
6. Run the starter to increase the pressure.
7. If the pressure can not reach the allowable limit, replace the pump with new one or repair with a KUBOTA-authorized pump service shop.

Fuel tightness of pump element	Allowable limit	13.73 MPa 140.0 kgf/cm^2 1991 psi

■ **NOTE**

- **Never try to disassemble the injection pump assembly. For repairs, you are strongly requested to contact a KUBOTA-authorized pump service shop.**

(1) Injection Pump Pressure Tester (3) Protection Cover for Jetted Fuel
(2) Injection Nozzle

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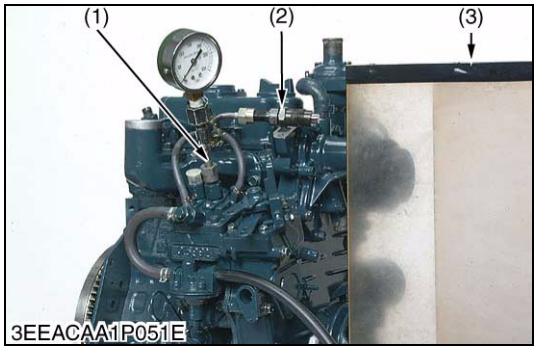

Fuel Tightness of Delivery Valve

1. Remove the engine stop solenoid.
2. Remove the injection pipes and glow plugs.
3. Set a pressure tester to the fuel injection pump.
4. Install the injection nozzle (2) jetted with the proper injection pressure to the injection pump pressure tester (1).
5. Run the starter to increase the pressure.
6. Stop the starter when the fuel jets from the injection nozzle. After that, turn the flywheel by hands and raise the pressure to approx. 13.73 MPa (140.0 kgf/cm^2, 1991 psi).
7. Now turn the flywheel back about half a turn (to keep the plunger free). Keep the flywheel at this position and clock the time taken for the pressure to drop from 13.73 to 12.75 MPa (from 140.0 to 130.0 kgf/cm^2, from 1991 to 1849 psi).
8. Measure the time needed to decrease the pressure from 13.73 to 12.75 MPa (from 140.0 to 130.0 kgf/cm^2, from 1991 to 1849 psi).
9. If the measurement is less than allowable limit, replace the pump with new one or repair with a KUBOTA-authorized pump service shop.

Fuel tightness of delivery valve	Factory specification	10 seconds 13.73 → 12.75 MPa 140.0 → 130.0 kgf/cm^2 1991 → 1849 psi
	Allowable limit	5 seconds 13.73 → 12.75 MPa 140.0 → 130.0 kgf/cm^2 1991 → 1849 psi

■ **NOTE**

- **Never try to disassemble the injection pump assembly. For repairs, you are strongly requested to contact a KUBOTA-authorized pump service shop.**

(1) Injection Pump Pressure Tester (3) Protection Cover for Jetted Fuel
(2) Injection Nozzle

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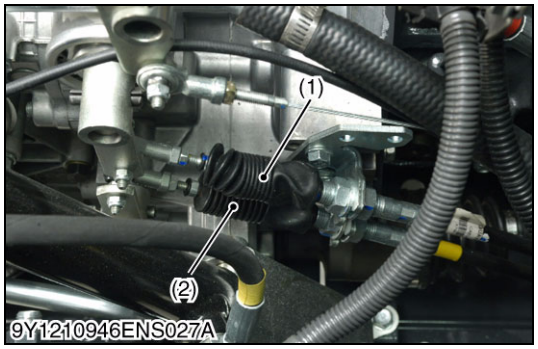

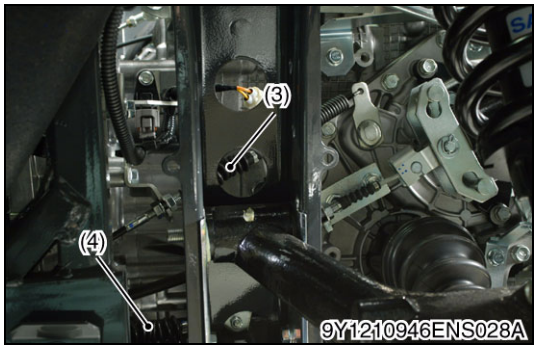

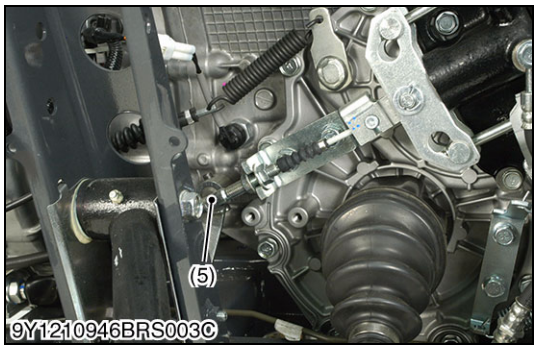

Cables

1. Disconnect the hydraulic lift cable (1).
2. Disconnect the 4WD shift cable (2).
3. Disconnect the differential lock cable (3).
4. Disconnect the range gear shift cable (4).
5. Disconnect the parking brake cable (5).

(When reassembling)

- Adjust the length of hydraulic lift cable. (See page 7-S5.)
- Adjust the length of 4WD shift cable. (See page 2-S14.)
- Adjust the length of differential lock cable. (See page 2-S15.)
- Adjust the length of range gear shift cable. (See page 2-S13.)
- Adjust the length of parking brake cable. (See page 4-S7.)

(1) Hydraulic Lift Cable
(2) 4WD Shift Cable
(3) Differential Lock Cable
(4) Range Gear Shift Cable
(5) Parking Brake Cable

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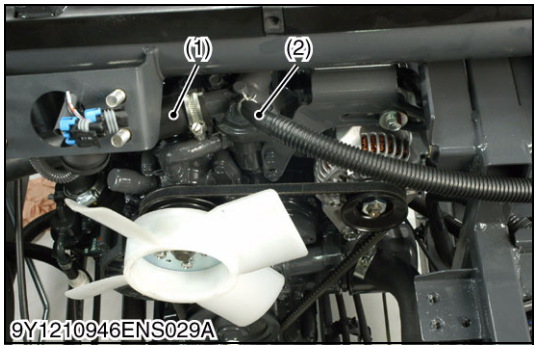

Radiator Hose

1. Disconnect the radiator hose (1).
2. Disconnect the breather hose (2).

(1) Radiator Hose
(2) Breather Hose

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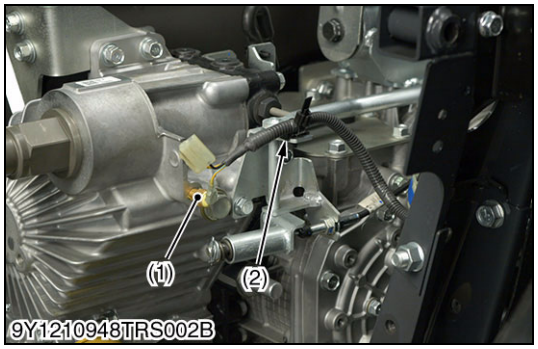

Unload Cable Linkage

1. Disconnect the oil temperature switch connector (1).
2. Remove the unload cable linkage (2) with unload cable.

(When reassembling)

- Adjust the unload cable. (See page 2-S16.)

(1) Oil Temperature Switch Connector
(2) Unload Cable Linkage

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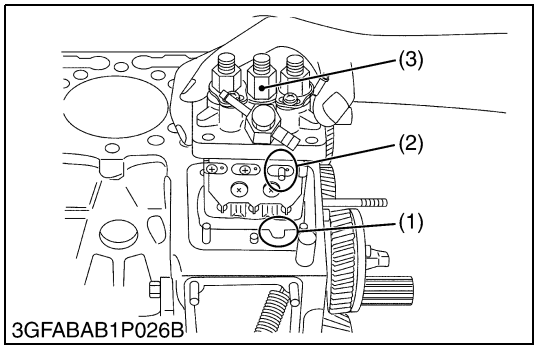

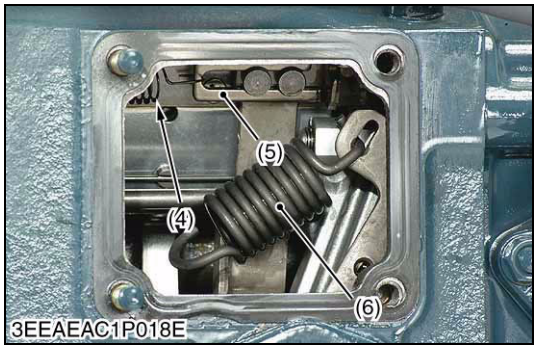

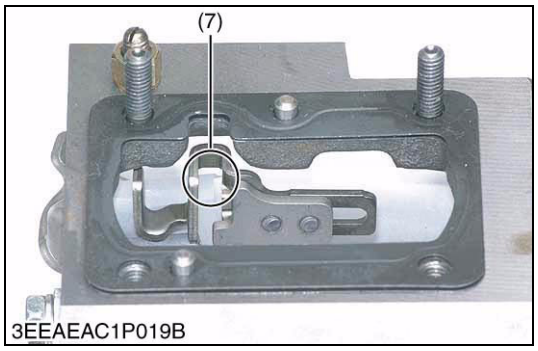

Injection Pump

1. Disconnect the start spring (4) on the thrust lever side (5).
2. Align the control rack pin (2) with the notch (1) on the crankcase, and remove the injection pump (3).
3. Remove the injection pump shims.
4. In principle, the injection pump should not be disassembled.

(When reassembling)

- When installing the injection pump, insert the control rack pin (2) firmly into the groove (7) of the thrust lever of fork lever.

■ **NOTE**

- **Addition or reduction of shim (0.05 mm, 0.0020 in.) delays or advances the injection timing by approx. 0.0087 rad (0.5 °).**
- **In disassembling and replacing, be sure to use the same number or new gasket shims with the same thickness.**

(1) Notch
(2) Control Rack Pin
(3) Injection Pump
(4) Start Spring
(5) Thrust Lever
(6) Governor Spring
(7) Groove

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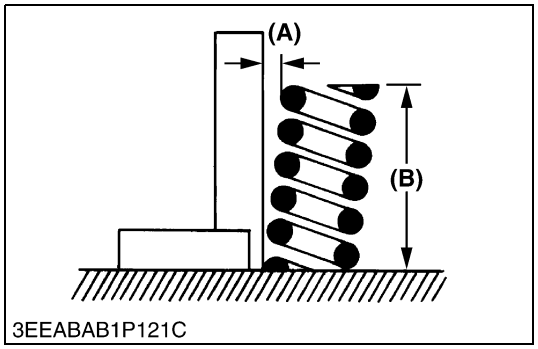

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Free Length and Tilt of Valve Spring

1. Measure the free length **(B)** of valve spring with vernier calipers. If the measurement is less than the allowable limit, replace it.
2. Put the valve spring on a surface plate, place a square on the side of the valve spring.
3. Check to see if the entire side is in contact with the square. Rotate the valve spring and measure the maximum tilt **(A)**. If the measurement exceeds the allowable limit, replace it.
4. Check the entire surface of the valve spring for scratches. If there is any problem, replace it.

Tilt **(A)**	Allowable limit	1.0 mm 0.039 in.

Free length **(B)**	Factory specification	37.0 to 37.5 mm 1.46 to 1.47 in.
	Allowable limit	36.5 mm 1.44 in.

(A) Tilt **(B) Free Length**

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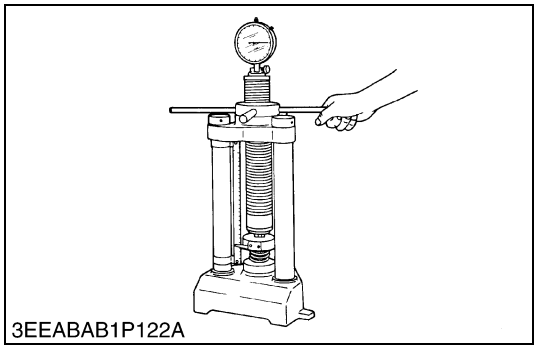
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Valve Spring Setting Load

1. Place the valve spring on a tester and compress it to the same length it is actually compressed in the engine.
2. Read the compression load on the gauge.
3. If the measurement is less than the allowable limit, replace it.

Setting load / Setting length	Factory specification	117.4 N / 31.0 mm 11.97 kgf / 31.0 mm 26.39 lbf / 1.22 in.
	Allowable limit	100.0 N / 31.0 mm 10.20 kgf / 31.0 mm 22.48 lbf / 1.22 in.

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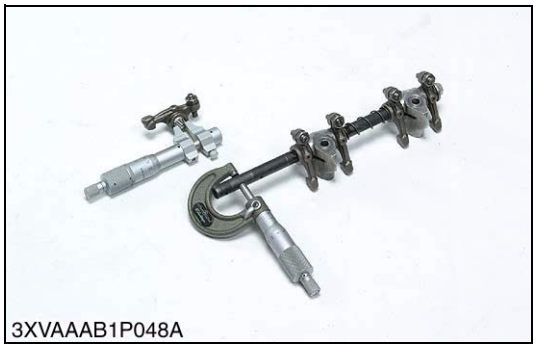
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Oil Clearance between Rocker Arm and Rocker Arm Shaft

1. Measure the rocker arm shaft O.D. with an outside micrometer.
2. Measure the rocker arm I.D. with an inside micrometer, and then calculate the oil clearance.
3. If the oil clearance exceeds the allowable limit, replace the rocker arm and measure the oil clearance again. If it still exceeds the allowable limit, replace also the rocker arm shaft.

Oil clearance between rocker arm and rocker arm shaft	Factory specification	0.016 to 0.045 mm 0.00063 to 0.0017 in.
	Allowable limit	0.10 mm 0.0039 in.

Rocker arm shaft O.D.	Factory specification	11.973 to 11.984 mm 0.47138 to 0.47181 in.
Rocker arm I.D.	Factory specification	12.000 to 12.018 mm 0.47244 to 0.47314 in.

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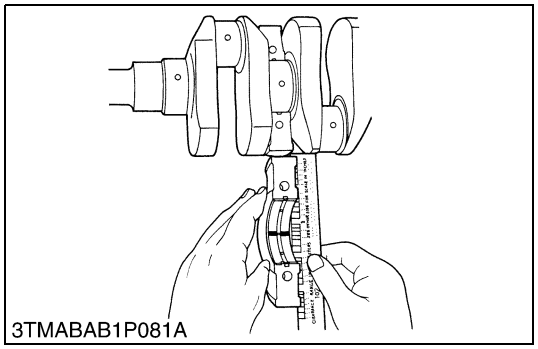
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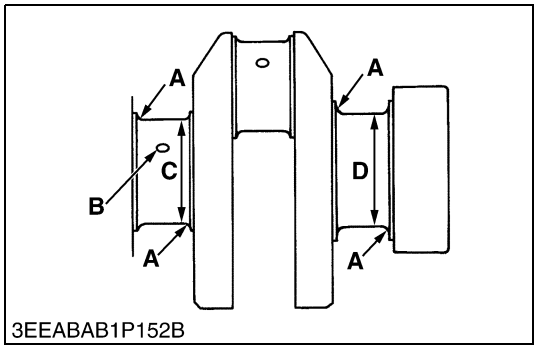

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Oil Clearance between Crankshaft Journal and Crankshaft Bearing 2 (Crankshaft Bearing 3)

1. Put a strip of plastigage on the center of the journal.
2. Install the bearing case and tighten the baring case screws 1 to the specified torque, and remove the bearing case again.
3. Measure the amount of the flattening with the scale and get the oil clearance.
4. If the clearance exceeds the allowable limit, replace the crankshaft bearing 2 (1) and crankshaft bearing (3).
5. If the same size bearing is useless because of the crankshaft journal wear, replace it with an undersize one referring to the table and figure.

■ **NOTE**

- **Be sure not to move the crankshaft while the bearing case screws are tightened.**

Oil clearance between crankshaft journal and crankshaft bearing 2	Factory specification	0.034 to 0.095 mm 0.0014 to 0.0037 in.
	Allowable limit	0.20 mm 0.0079 in.

Crankshaft journal O.D. (Intermediate)	Factory specification	47.934 to 47.950 mm 1.8872 to 1.8877 in.
Crankshaft bearing 2 I.D.	Factory specification	47.984 to 48.029 mm 1.8892 to 1.8908 in.

Oil clearance between crankshaft journal and crankshaft bearing 3	Factory specification	0.0340 to 0.103 mm 0.00134 to 0.00405 in.
	Allowable limit	0.20 mm 0.0079 in.

Crankshaft journal O.D. (Flywheel side)	Factory specification	51.921 to 51.940 mm 2.0442 to 2.0448 in.
Crankshaft bearing 3 I.D.	Factory specification	51.974 to 52.024 mm 2.0463 to 2.0481 in.

(Reference)

- Undersize dimensions of crankshaft journal

Undersize	**0.20 mm 0.0079 in.**	**0.40 mm 0.016 in.**
Dimension **A**	2.3 to 2.7 mm radius 0.091 to 0.10 in. radius	2.3 to 2.7 mm radius 0.091 to 0.10 in. radius
*Dimension **B**	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief
Dimension **C**	47.734 to 47.750 mm dia. 1.8793 to 1.8799 in. dia.	47.534 to 47.550 mm dia. 1.8715 to 1.8720 in. dia.
Dimension **D**	51.721 to 51.740 mm dia. 2.0362 to 2.0370 in. dia.	51.521 to 51.540 mm dia. 2.0284 to 2.0291 in. dia.
The crank pin must be fine-finished to higher than Rmax = 0.8S *Holes to be de-burred and edges rounded with 1.0 to 1.5 mm (0.040 to 0.059 in.) relief.		

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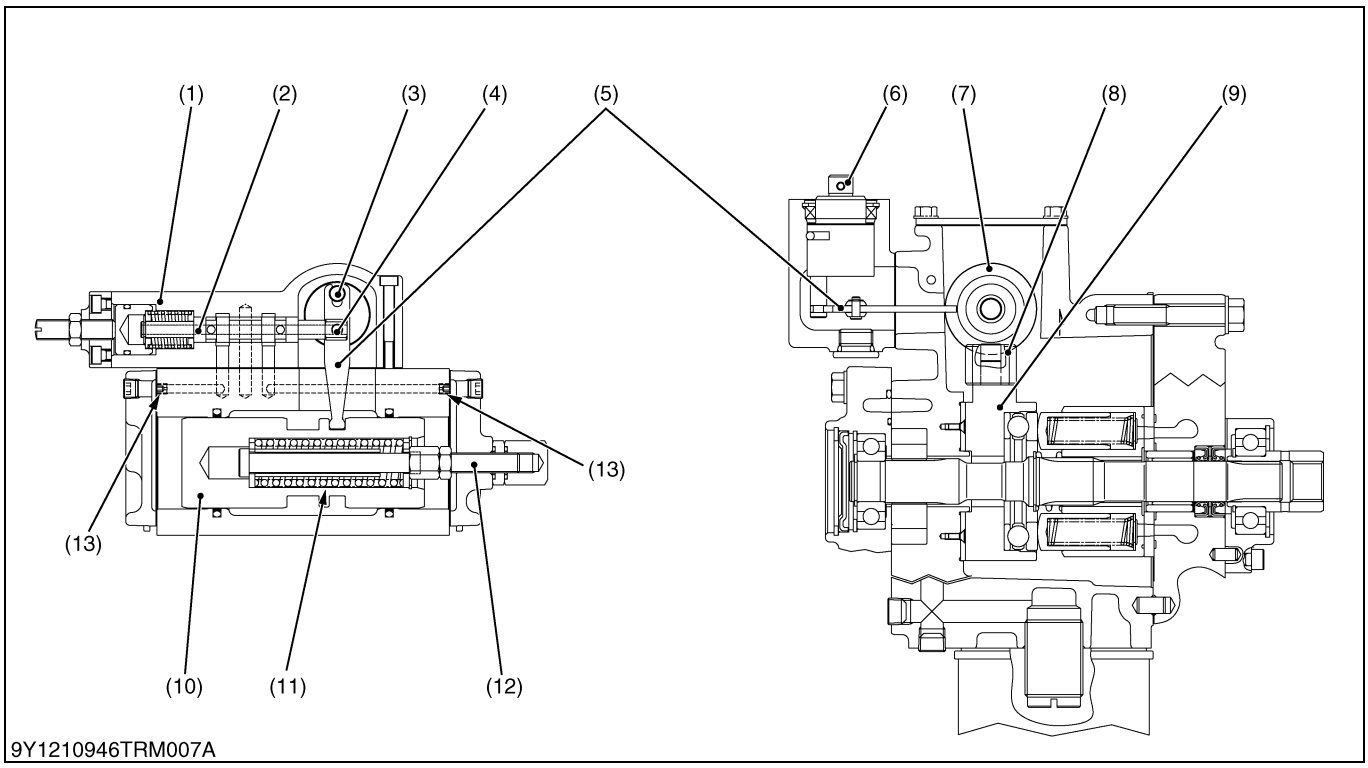
(3) Function of Components

[A] Servomechanism



(1) Regulator Valve Assembly
(2) Regulator Spool
(3) Pin A (Fixed with Regulator Shaft)
(4) Pin B (Fixed with Spool)
(5) Feedback Lever
(6) Regulator Shaft
(7) Servo Piston
(8) Guide (for Variable Swashplate)
(9) Variable Swashplate (Pump)
(10) Servo Piston
(11) Servo Spring
(12) Piston Adjusting Screw
(13) Orifice

The servomechanism consists of the following. The regulator valve assembly (1) is connected to the pedal through cable and linkages, and controls the flow of oil to the servo piston (10) by the pedal operation.

The servo piston moved by hydraulic force, is connected to the pump cylinder variable swashplate (9). Therefore, a tilt angle of swashplate is varied by servo piston movement.

The regulator and the servo piston are connected with feedback lever (5), and the movement of the piston is restricted according to the amount of depressing of the pedal.

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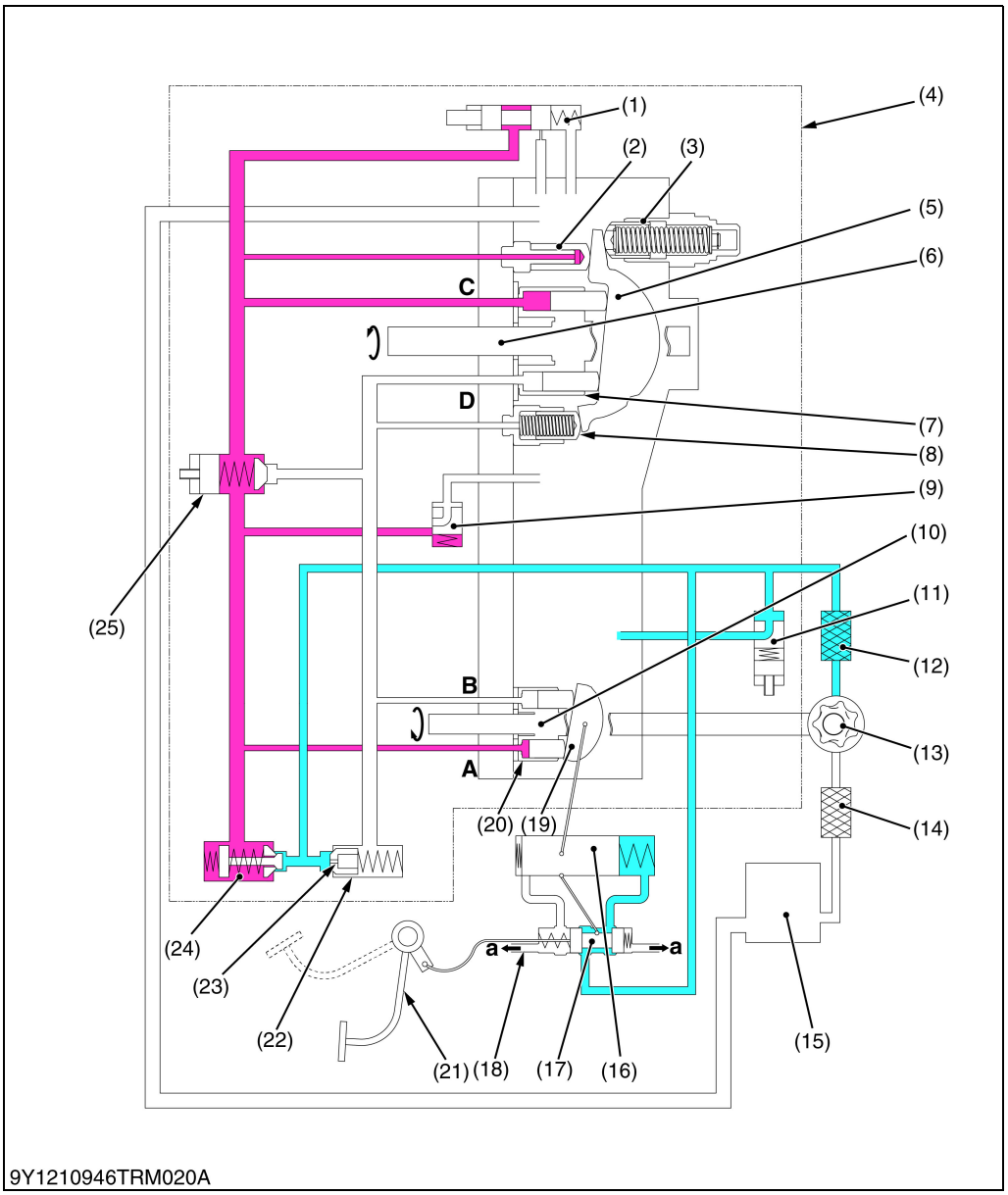
[C] Low Load When Speed Control Pedal Is Pressed



9Y1210946TRM020A

(1) Unload Valve
(2) Control Piston 1
(3) Control Piston 2
(4) HST Housing
(5) Variable Swashplate (Motor)
(6) Output Shaft
(7) Cylinder Block (Stationary Motor)
(8) Control Piston 3
(9) Anti-cavitation Valve
(10) Input Shaft
(11) Charge Relief Valve
(12) Oil Filter
(13) Charge Pump
(14) Oil Filter Cartridge (Suction)
(15) Oil Tank
(16) Servo Piston
(17) Regulator Valve Spool
(18) Regulator Valve
(19) Variable Swashplate (HST Pump)
(20) Cylinder Block
(21) Speed Control Pedal
(22) Check Valve
(23) Orifice
(24) Check And High Pressure Relief Valve (Forward)
(25) High Pressure Relief Valve (Dynamic Brake)
a: To HST Housing
A: A Port
B: B Port
C: C Port
D: D Port

The diagram shows the motion of the regulator valve spool (17) when the speed control pedal (21) is pressed all the way down.

The servo piston (16) tilts the variable swashplate (19) on the pump side to the maximum position.

The pump cylinder block (20) is driven by the input shaft and high pressure oil is discharged from port **A**.

High pressure oil that is discharged from port **A** of the pump flows along the circuit to port **C** on the motor side.

The oil discharged from the pump side does not have sufficient pressure to cause the variable swashplate (5) on the motor side to tilt.

Therefore, the cylinder block (7) on the motor rotates in the position shown on the diagram and transfers power to the output shaft (6).

Thereafter, low pressure oil discharged from the cylinder block (7) on the motor returns from port **C** to port **B**.

9Y1210946TRM0020US0

Symptom	Probable Cause	Solution	Reference Page
Loss of Power	Oil level is low	Check oil level or fill oil to proper level	G-19
	Control linkage or cable damaged (speed control cable)	Repair linkage	2-S31
	Charge pressure is too low	Solution order 1. Replace oil filter cartridge	G-26
		2. Check charge pressure	2-S6
		3. Inspect or flush charge relief valve	2-S50
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	2-S50
	Component parts damaged	Replace hydrostatic transmission assembly	2-S17
	Unload cable problem	Solution order 1. Adjust the cable	2-S16
		2. Replace	2-S20
Transmission Oil Over Heats	Low transmission oil level	Fill transmission oil level up to proper level	G-19
	Radiator and oil cooler net clogged clean radiator net	Excessive machine load Reduce machine load	G-20, G-21
	Improper charge pressure	Solution order 1. Check high relief pressure	2-S7
		2. Replace transmission oil filter cartridge	G-26
		3. Replace check and high pressure relief valve	2-S50
		4. Inspect and replace charge relief valve	2-S50
Machine Will Not Stop in Neutral Position	Control linkage is out of adjustment or sticking	Repair or replace linkage	2-S29, 2-S32
		Adjust neutral position	2-S9
System Operates in One Direction Only	Control linkage damaged	Repair or replace linkage	2-S31
	Check and high pressure relief valve damaged	Replace check and high pressure relief valve	2-S50

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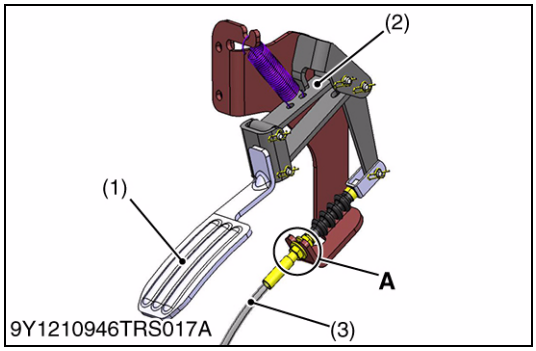

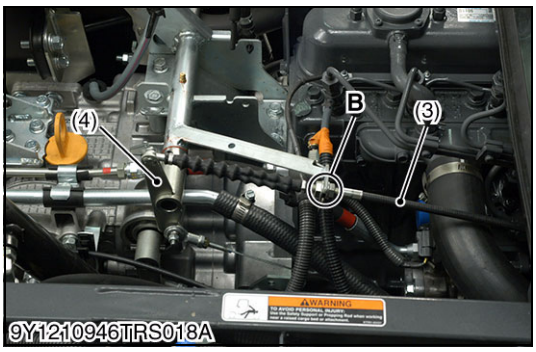

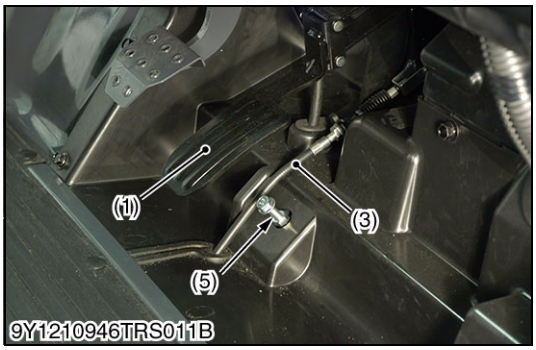

Checking Speed Control Pedal Stroke (Adjustment of the Speed Control Pedal Cable)

CAUTION

- **When checking, park the machine on flat ground, apply the parking brake.**
- **Work by two people when you checking and adjusting speed control pedal stroke.**

1. Mount the speed control pedal cable (3) on the bracket (2) and adjust until the speed control pedal (1) is in contact with the bracket (2).
2. Set the stopper bolt to a position where it is in contact with the speed control pedal (1) with the speed control pedal (1) pushed all the way down.
3. Then, loosen the stopper bolt (5) a half turn and fix in place with a lock nut.
4. Start the engine and check engine speed.
5. If the engine speed is outside of factory specifications, adjust the speed using the HST control rod and the engine cable.

NOTE

- **Speed control pedal cable (3) adjustment is performed through adjustment of the HST control rod and engine cable.**

Condition

- Engine speed:
  1400 min^{-1} (rpm)
- Engine maximum speed:
  3070 to 3170 min^{-1} (rpm)

(1) Speed Control Pedal
(2) Bracket
(3) Speed Control Pedal Cable
(4) HST Linkage
(5) Stopper Bolt

A: Center of thread
B: Adjust the nuts.

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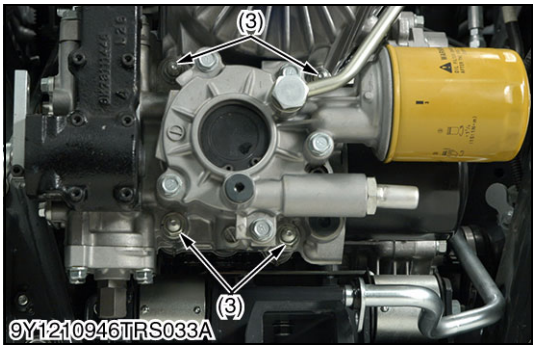

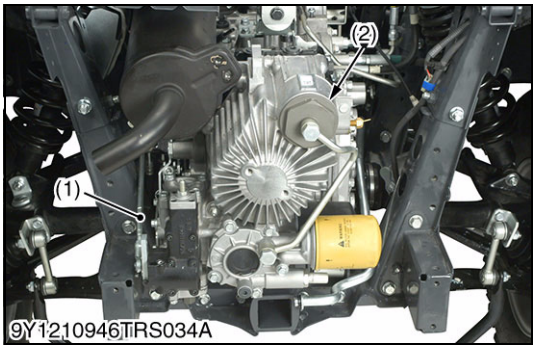

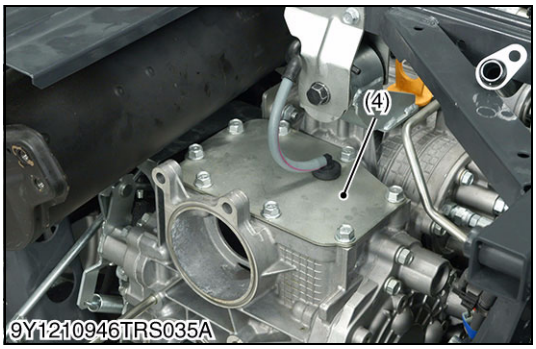

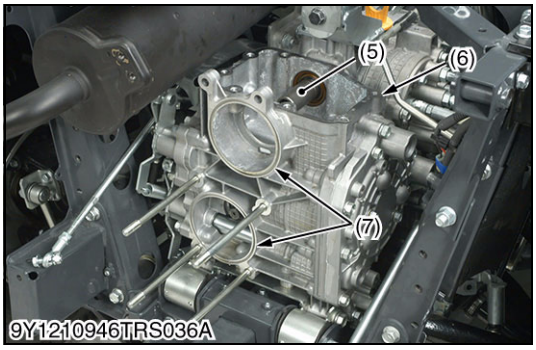

HST Assembly

1. Disconnect the HST control rod (1).
2. Remove the HST mounting nuts (3).
3. Remove the HST assembly (2).

(When reassembling)

- Remove the upper cover (4).
- Be sure not to damage the O-ring (7).
- Align the HST output shaft and spline of coupling (5).
- Replace the upper cover gasket (6) with new one.

Tightening torque	HST assembly mounting nut	39 to 44 N·m 4.0 to 4.4 kgf·m 29 to 32 lbf·ft

(1) HST Control Rod
(2) HST Assembly
(3) HST Mounting Nut
(4) Upper Cover
(5) Coupling
(6) Gasket
(7) O-ring

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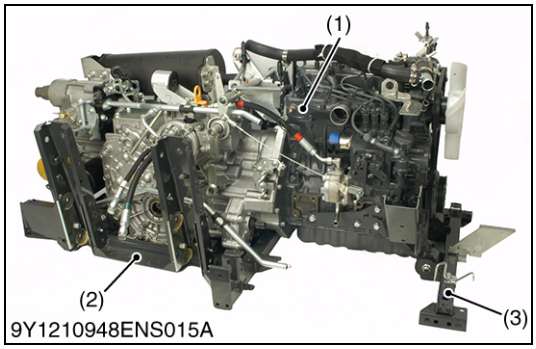

Mission Frame

1. Lift the transmission and engine one piece assembly (1) with mission frame (2) and engine frame (3).
2. Remove the mission frame (2).

(1) Transmission and Engine One Piece Assembly
(2) Mission Frame
(3) Engine Frame

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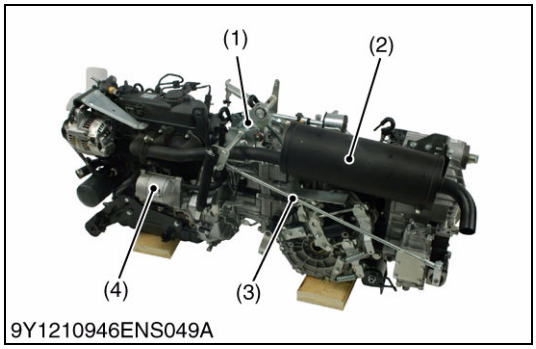
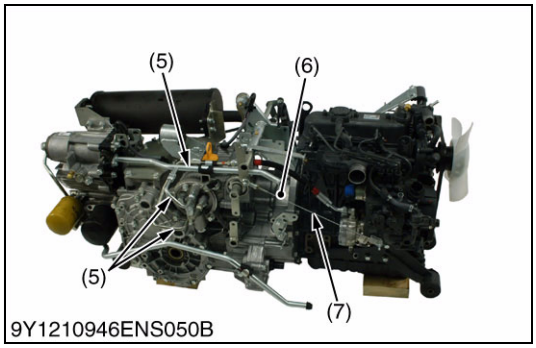
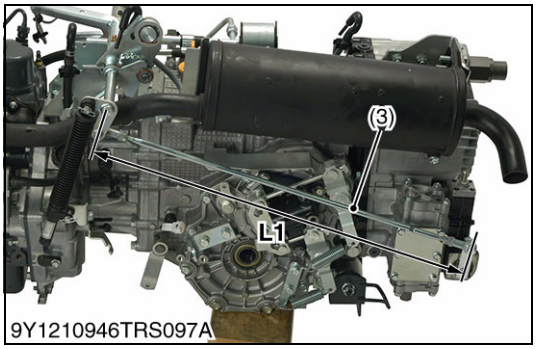
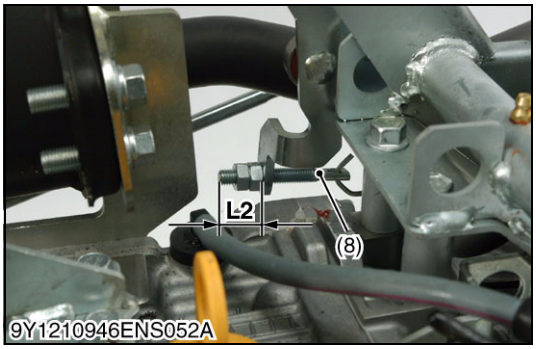
[3] SEPARATING TRANSMISSION AND ENGINE









Linkage, Muffler, Starter and Hydraulic Pipe

1. Remove the HST rod (3).
2. Remove the engine cable (7).
3. Remove the HST linkage (1).
4. Remove the muffler (2).
5. Remove the starter (4).
6. Remove the hydraulic hose (6) and hydraulic pipes (5).

(When reassembling)

- Adjust the length the HST rod (3).
- Replace the muffler gasket with new one.

(1) HST Linkage
(2) Muffler
(3) HST Rod
(4) Starter
(5) Hydraulic Pipe
(6) Hydraulic Hose
(7) Engine Cable
(8) Tension Bolt

(Reference)
L1: 620 mm (24.4 in.)
L2: 20 mm (0.79 in.)

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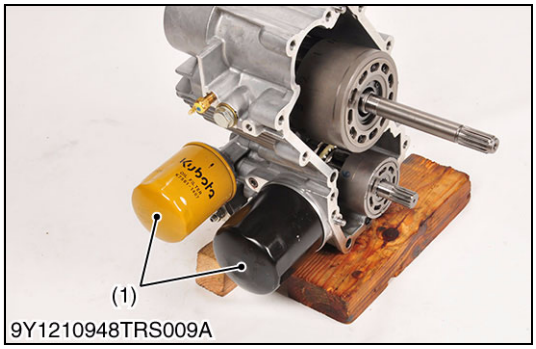

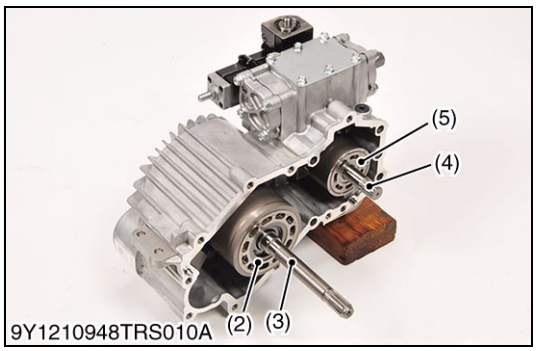

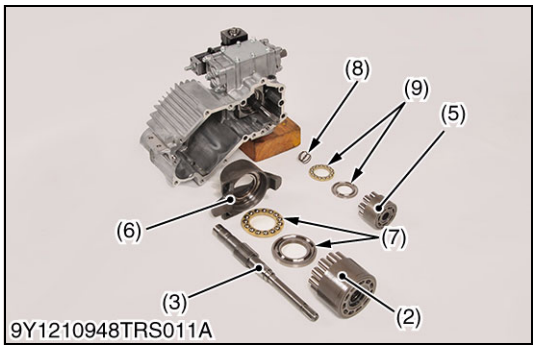

Cylinder Block

1. Remove the filters (1).
2. Remove the motor cylinder block (2) with motor shaft (3).
3. Remove the pump cylinder block (5).

(1) Filter
(2) Cylinder Block (Motor)
(3) Motor Shaft
(4) Pump Shaft
(5) Cylinder Block (Pump)
(6) Swashplate
(7) Thrust Bearing
(8) Spring
(9) Thrust Bearing

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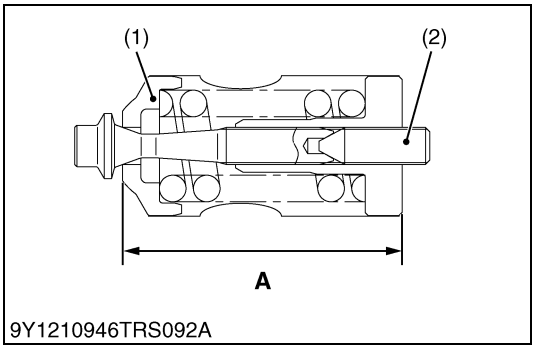

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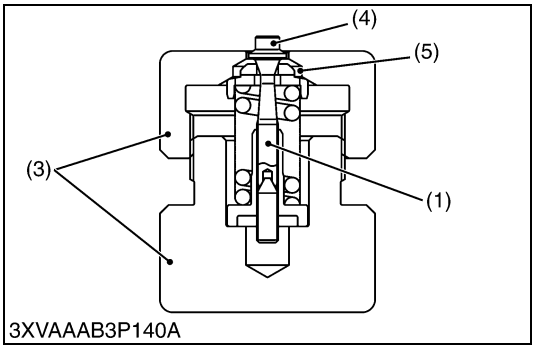

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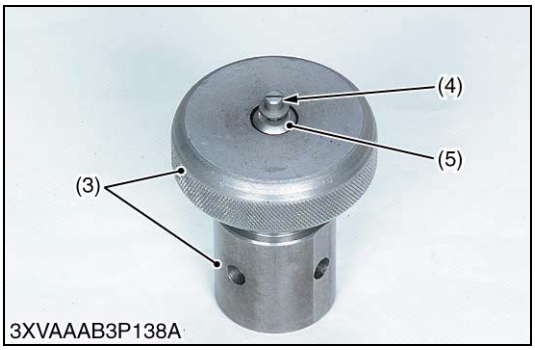

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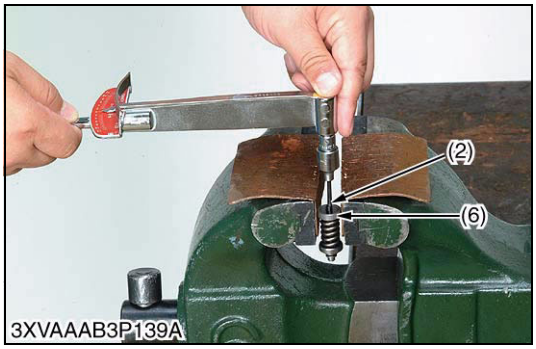

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Readjustment of Relief Valve (When the HST does not work due to its loose hexagon socket head screw)

■ **IMPORTANT**
- **The KUBOTA does not recommend the readjustment of relief valve. And KUBOTA will recommend the exchange with genuine parts.**
- **As the HST may be damaged if the pressure is set to higher by mistake, be careful when adjusting it.**

■ **NOTE**
- **The relief pressure is set in between (Forward: 25.5 to 26.5 MPa (260 to 270 kgf/cm^2, 3700 to 3840 psi), Reverse: 16.5 to 17.5 MPa (169 to 178 kgf/cm^2, 2400 to 2530 psi)) when shipped from the factory. But, for the purpose of after-sales services, as it is impossible to reset the pressure precisely as set in the factory, its setting range is defined as a slightly wider range between (Forward: 22.6 to 26.5 MPa (231 to 270 kgf/cm^2, 3280 to 3840 psi, Reverse: 15.3 to 17.5 MPa (156 to 178 kgf/cm^2, 2220 to 2530 psi)).**

1. Measure the pre-adjustment distance **"A"**.
2. Compress the spring of the relief valve with a relief valve assembling tool (3).
3. Then, find the distance **"A"** by turning the poppet (4) with a screwdriver.
   Reference: The distance **"A"** changes by about 0.50 mm (0.020 in.) per one turn of the poppet (4).
4. Repeat the same operation a few times to find the distance **"A"** as it is difficult to acquire at the first time.
5. After finding the distance **"A"**, hold the setscrew (6) to a vice and fasten the hexagon socket head screw (2) with specified torque.
   On this occasion, use a copper plate, etc. for the vice jaws not to damage the setscrew (6).
6. Install the relief valve in the HST.
7. Check the relief pressure as indicated in checking section. The distance **"A"** is for refresh only. Make sure to check the relief pressure after readjustment.
8. If the relief pressure does not fall within the readjustment pressure range, repeat the processes of the above item 1 onward.
   Reference: The pressure changes by 1.47 MPa (15 kgf/cm^2, 213.3 psi) per 0.1 mm (0.0039 in.) in distance **"A"**.

Tightening torque	Hex. socket head screw	2.5 to 3.0 N·m 0.26 to 0.30 kgf·m 1.9 to 2.2 lbf·ft

Relief valve readjusting pressure	Traveling	24.5 to 27.5 MPa 250 to 280 kgf/cm^2 3560 to 3980 psi

Distance **"A"**	Reference value	Traveling	38.60 to 38.70 mm 1.520 to 1.523 in.

(1) Relief Valve Assembly
(2) Hexagon Socket Head Screw
(3) Relief Valve Assembling Tool
(4) Poppet
(5) Valve Seat
(6) Setscrew

9Y1210948TRS0023US0

(2) Rear Shock Absorber

Rear Wheel

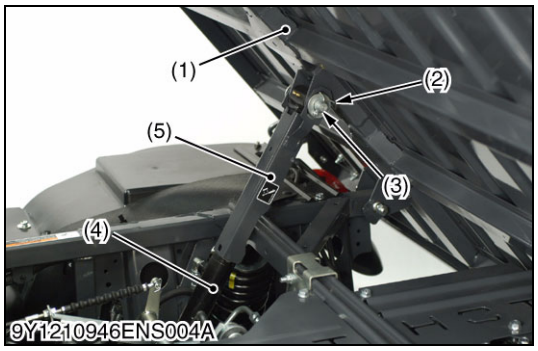
1. Jack up the rear end after placing a wooden block under the bottom plate of the transmission frame.
2. Remove the rear wheels.

(When reassembling)

Tightening torque	Rear aluminum wheel mounting bolt	90 to 110 N·m 9.2 to 11.2 kgf·m 66.4 to 81.1 lbf·ft
	Rear steel wheel mounting bolt and nut	108 to 130 N·m 11.1 to 13.2 kgf·m 79.7 to 95.8 lbf·ft

(1) Rear Wheel

9Y1210946ENS0029US0

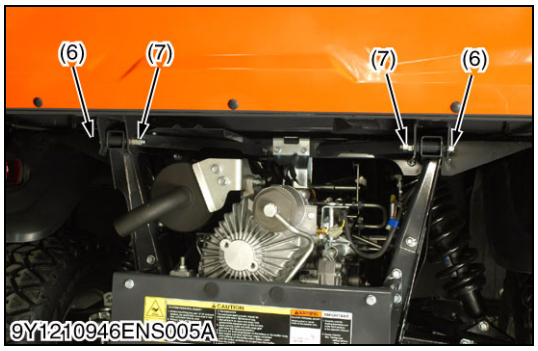


Cargo Bed

1. Lift up the cargo bed (1) and support it so that the hydraulic cylinder (4) should not drop. (If hydraulic cylinder equipped.)
2. Remove the cotter pin (2) clevis pin (3) and cylinder lock (5). (If hydraulic cylinder equipped.)
3. Loosen the lock nuts (7) and remove the bolts (6).
4. Remove the cargo bed (1).

(When reassembling)

- Be sure that the split pin is bent to both sides.



(1) Cargo Bed
(2) Cotter Pin
(3) Clevis Pin
(4) Hydraulic Cylinder
(5) Cylinder Lock
(6) Bolt
(7) Lock Nut

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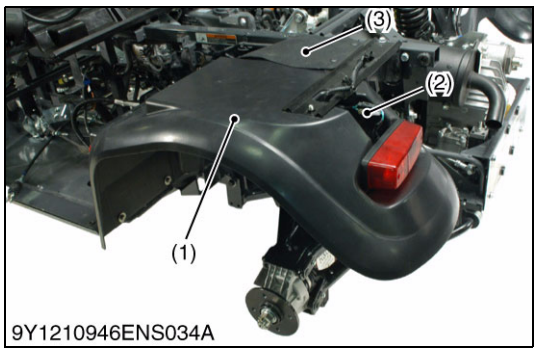

Fender

1. Disconnect the rear lamp connectors (2).
2. Remove the mud guard rivets.
3. Remove the rear fenders (1).

(1) Rear Fender
(2) Rear Lamp Connector
(3) Mud Guard

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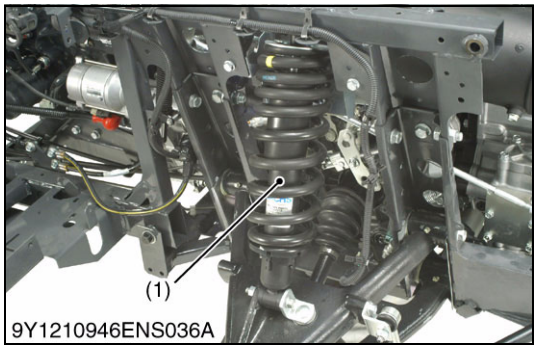


Rear Shock Absorber

1. Jack up the rear drive shaft.
2. Remove the rear shock absorber (1).

(When reassembling)

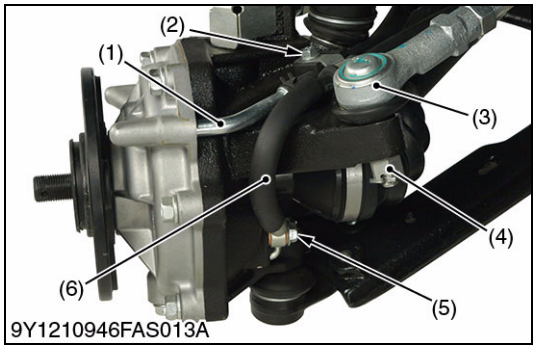
- Apply grease (Shell Godus S5 T100 or equivalent) to the rear shock absorber bushing before inserting collar.

(1) Rear Shock Absorber

9Y1210946ENS0042US0

SERVICING

CONTENTS



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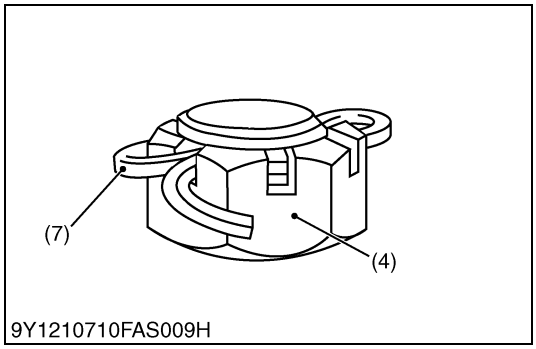

9Y1210710FAS009H

Tie-rod End, Brake Hose and Breather Hose

CAUTION

- **When the brake hose is removed, the brake fluid come out. Be careful not to stain other hoses or rubber boot with the brake fluid.**
  Brake fluid stains should be washed and wiped off immediately. Likewise, the brake fluid on the tools should be wiped off immediately.

1. Remove the clamp (2).
2. Remove the eye joint bolt (5) for brake hose (6) and drain the brake fluid.
3. Remove the breather pipe (1).
4. Remove the cotter pin (7) and remove the tie-rod end slotted nut (4).

(When resembling)

- Replace the copper washers with new ones.
- Bleed air of the brake line after break hoses reassembled.
- Tighten the slotted nut to 50.0 N·m (5.10 kgf·m, 36.9 lbf·ft). If the slot and pin hole do not meet, tighten the nut until they do meet, and install cotter pin.

Tightening torque	Tie-rod end slotted nut	50.0 to 55.0 N·m 5.10 to 5.60 kgf·m 36.9 to 40.5 lbf·ft
	Brake hose eye joint bolt (M10)	22.6 to 26.8 N·m 2.31 to 2.73 kgf·m 16.7 to 19.7 lbf·ft

(1) Breather Pipe
(2) Clamp
(3) Tie-rod End
(4) Tie-rod Slotted Nut
(5) Eye Joint Bolt
(6) Brake Hose
(7) Cotter Pin

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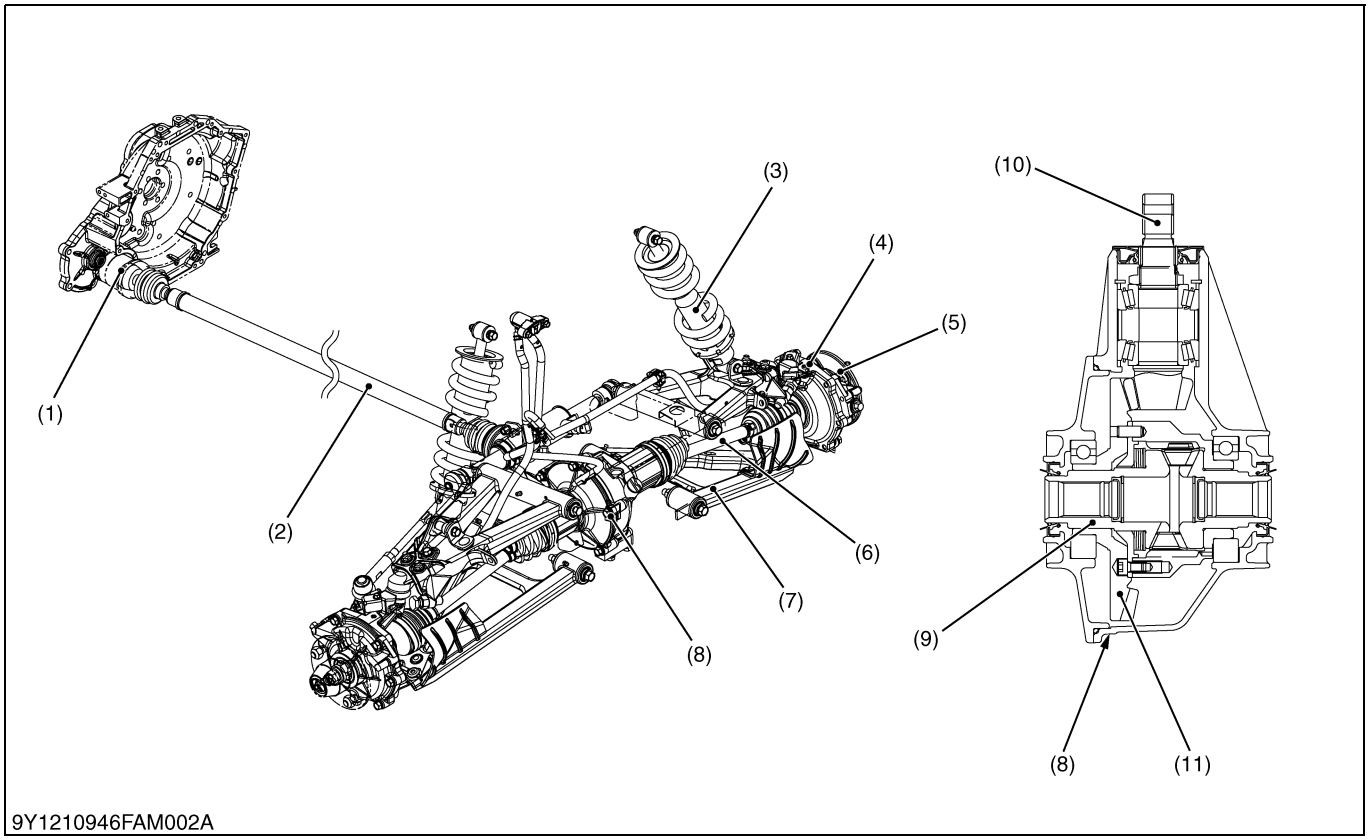
1. STRUCTURE
[1] FRONT AXLE



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(1) Transmission Output Shaft
(2) Propeller Shaft
(3) Strut
(4) Knuckle
(5) Front Axle
(6) Constant Velocity (CV) Joint
(7) Lower Arm
(8) Front Case
(9) Face Cam
(10) Bevel Gear Shaft (8T)
(11) Bevel Gear (35T)

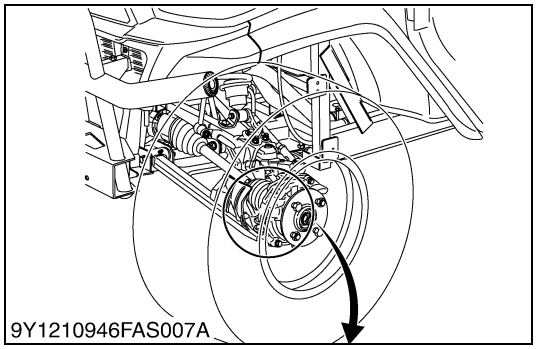
The front axle consists mainly of knuckles (right and left), front case and CV (constant velocity) joint. (See the above illustration.)

Power is transmitted from the transmission output shaft (1) through the propeller shaft (2) to the bevel gear shaft. The power is further transmitted through the differential bevel gear and face cam (9) to the CV joint, and finally reaches the front axle in the knuckles. The knuckles and the front case are partitioned from each other. Which means each of the cases must be separately lubricated.

9Y1210946FAM0001US0

[2] PREPARATION

(1) Knuckle Case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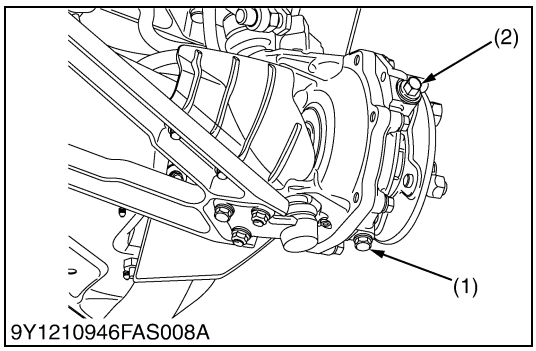

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Draining Knuckle Case Oil

1. Park the vehicle on a firm, flat, and level surface,
2. Remove the wheel.
3. To drain the used oil, remove the drain the filling plugs at the LH knuckle case and drain the oil completely into the oil pan.
4. After draining, reinstall the drain plug.
5. Use the same procedure to change the RH knuckle case oil.

Knuckle case oil	Reference capacity (one side)	0.25 L 0.26 U.S.qts 0.22 Imp.qts

(1) Drain Plug
(2) Filling Plug

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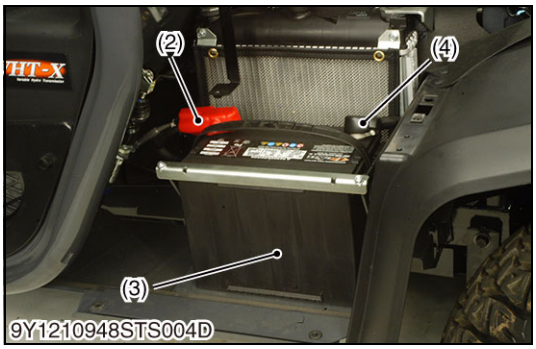

9Y1210948STS004D

Battery

CAUTION

- **When disconnecting the battery cables, disconnect the negative cable from the battery first. When connecting, connect the positive cable to the battery first.**

1. Remove the cover (1).
2. Disconnect the negative cable (4) from the battery.
3. Disconnect the positive cable (2) from the battery.

(1) Battery Cover
(2) Positive Cable
(3) Battery
(4) Negative Cable

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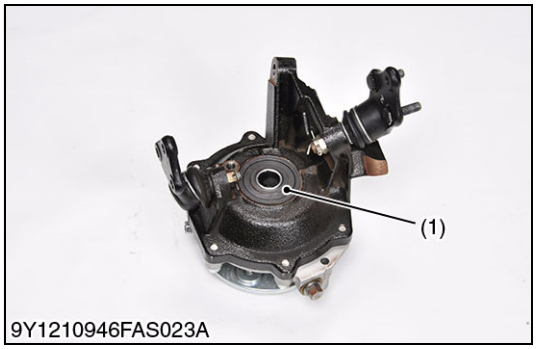
[3] DISASSEMBRING AND ASSEMBRING

(1) Knuckle Case



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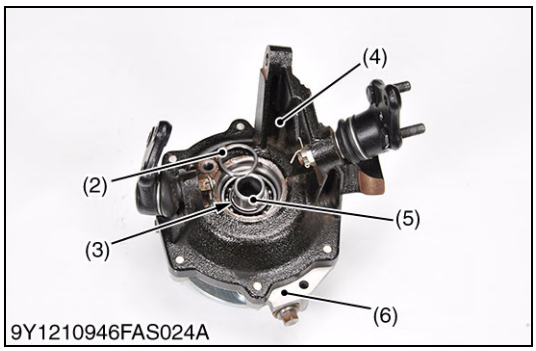

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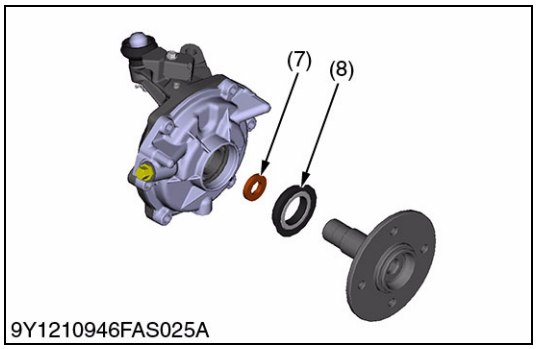

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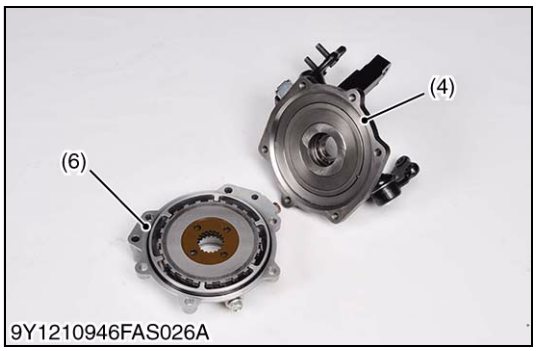

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Front Axle

1. Remove the oil seal (1).
2. Remove the snap ring collar (2) and remove the external snap ring (3).
3. Tap out the front axle (5) with plastic hammer.
4. Remove the knuckle case mounting screw.
5. Separate the knuckle case (4) and knuckle case cover (6).

(When reassembling)

- Be sure insert the external snap ring.
- Replace the oil seal with new one.
- Be careful not to damage the O-ring.
- Insert the bearing (7) and oil seal (8) first to the knuckle cover, and then install the knuckle case cover.

Tightening torque	Knuckle case cover mounting screw	48.1 to 55.9 N·m 4.91 to 5.70 kgf·m 35.5 to 41.2 lbf·ft

(1) Oil Seal
(2) Snap Ring Collar
(3) External Snap Ring
(4) Knuckle Case
(5) Front Axle
(6) Knuckle Case Cover
(7) Bearing
(8) Oil Seal

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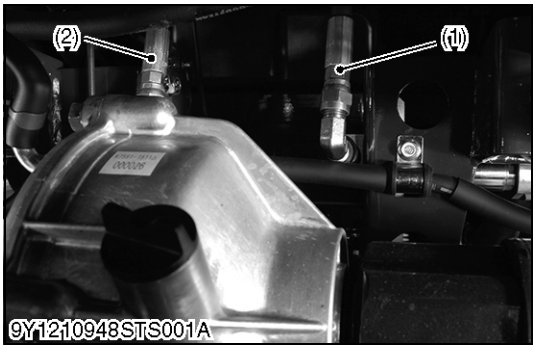
MECHANISM

CONTENTS

4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING



Relief Valve Operating Pressure

CAUTION

- **When checking, park the machine on flat ground, apply the parking brake.**
- **Set the range gear shift lever in NEUTRAL position.**
- **Work by two people when you measure pressure.**

NOTE

- **After set a pressure gauge, be sure to bleed air.**
- **Note that the pressure value changes by the pump action of the power steering controller when the steering operation is continued after the steering wheel is lightly locked and accurate relief valve pressure cannot be measured.**

1. Disconnect the cylinder hose LH (2) (or RH (1)) from power steering cylinder, and set a pressure gauge.
2. Start the engine and set at maximum speed.
3. Fully turn the steering wheel to the left (or right) to check the feeling which the steering wheel lightly locks. Read the relief valve operating pressure when the steering wheel to the above mentioned lock position.

(Reference)

- Hose and adaptor Tee, swivel (9/16-18).

Relief valve operating pressure	Factory specification	8.00 to 9.00 MPa 81.6 to 91.7 kgf/cm^2 1160 to 1300 psi

Condition

- Engine speed:
  3200 min^{-1} (rpm)
- Oil temperature:
  45 to 55 °C (113 to 131 °F)

(1) Cylinder Hose RH (2) Cylinder Hose LH

9Y1210948STS0004US0

MECHANISM

CONTENTS

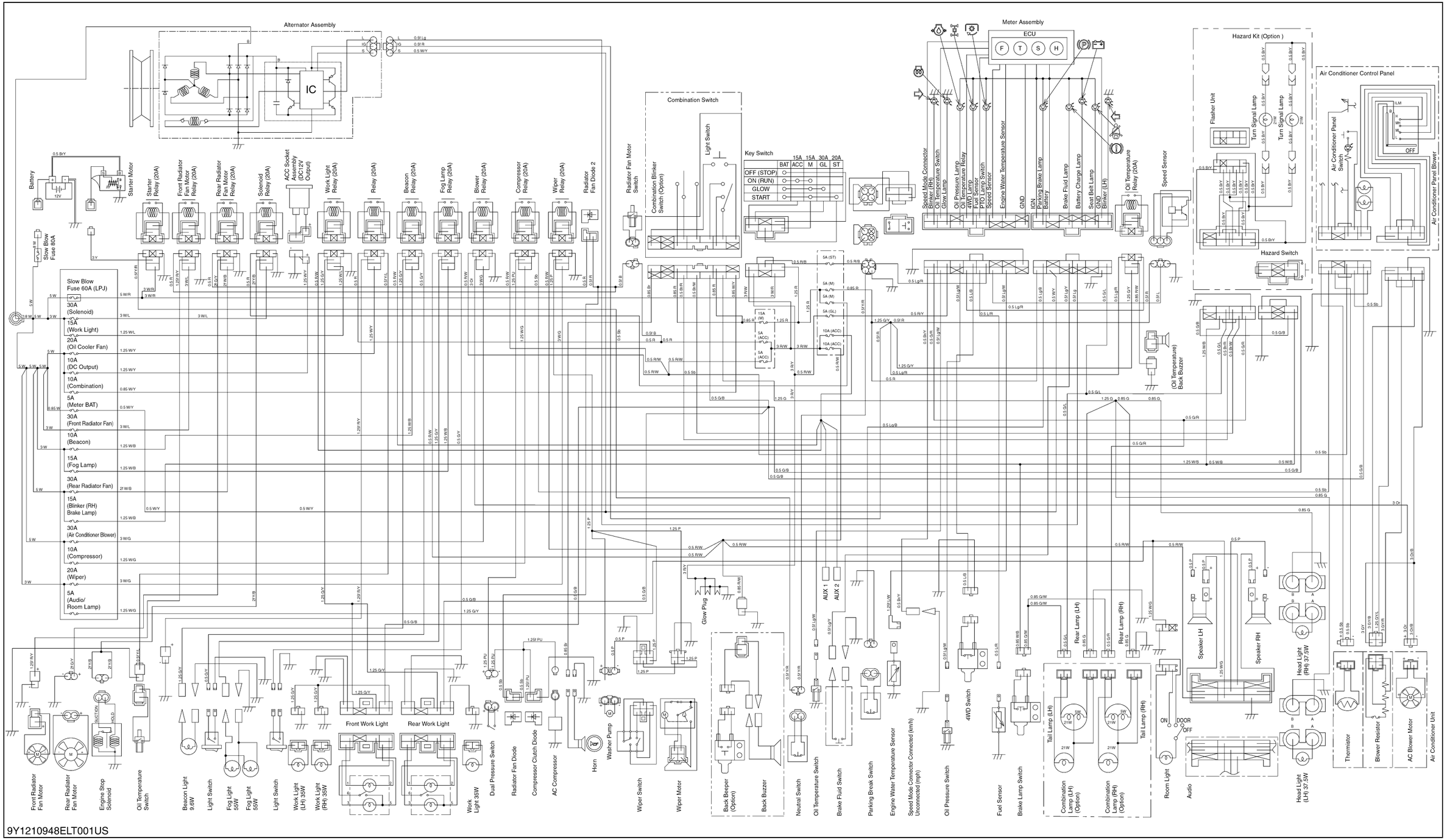
3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-12.)

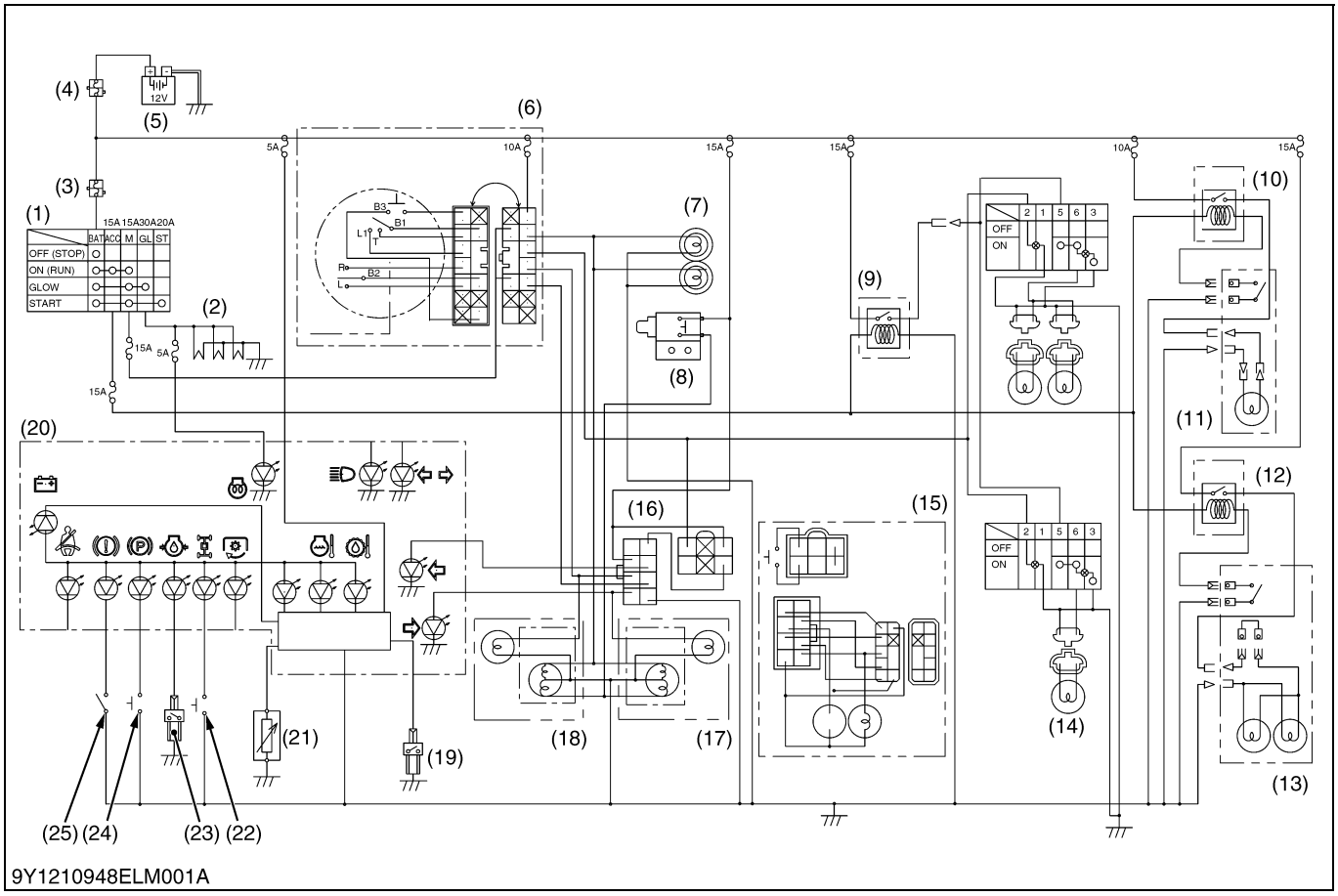
Item	N·m	kgf·m	lbf·ft
Hydraulic pump mounting torque	37.0 to 44.0	3.78 to 4.48	27.3 to 32.4
Hydraulic pump cover mounting screw	40 to 44	4.0 to 4.5	29 to 32
Hydraulic lift cylinder head	100 to 120	10.2 to 12.2	73.8 to 88.5
Hydraulic lift cylinder piston mounting nut	80.0 to 100	8.16 to 10.1	59.0 to 73.7
Relief valve plug	29.4 to 34.3	3.00 to 3.49	21.7 to 25.2
Control valve mounting screw	18 to 21	1.9 to 2.1	14 to 15
Check valve plug	19.6 to 24.5	2.00 to 2.49	14.5 to 18.0
Check valve seat	34 to 39	3.5 to 3.9	25 to 28

9Y1210948HYS0003US0

1. WIRING DIAGRAM



5. LIGHTING SYSTEM



9Y1210948ELM001A

(1) Key Switch
(2) Glow Plug
(3) Slow Blow Fuse (60A)
(4) Slow Blow Fuse (80A)
(5) Battery
(6) Light Switch
(7) Head Light (37.5W)
(8) Brake Lamp Switch
(9) Work Light Relay (Option)
(10) Beacon Lamp Relay
(11) Beacon Lamp (Option)
(12) Fog Lamp Relay
(13) Fog Lamp (Option)
(14) Work Light (35W)
(15) Hazard Kit (Option)
(16) Blinker
(17) Combination Lamp (RH) (Option)
(18) Combination Lamp (LH) (Option)
(19) Oil Temperature Switch
(20) Meter Panel
(21) Engine Water Temperature Sensor
(22) 4WD Switch
(23) Oil Pressure Switch
(24) Parking Brake Switch
(25) Brake Fluid SWitch

The lighting system consists of key switch, light switch, head lights, tail lights, etc.

9Y1210948ELM0003US0

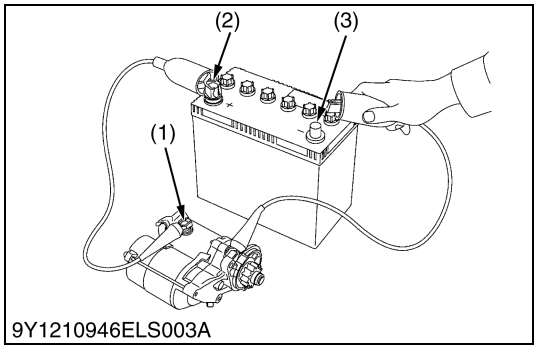
1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
All Electrical Equipments Does Not Operate	Battery discharged or damaged	Recharge or replace	G-34, 8-S8
	Battery positive cable disconnected or improperly connected	Repair or replace	8-S7
	Battery negative cable disconnected or improperly connected	Repair or replace	8-S7
	Slow blow fuse blown	Replace	G-58
Fuse Blown Frequently	Short-circuited	Repair or replace	G-56

BATTERY

Symptom	Probable Cause	Solution	Reference Page
Battery Discharges Too Quickly	Battery damaged	Replace	8-S8
	IC Regulator damaged	Replace	8-S28
	Wiring harness disconnected or improperly connected	Repair or replace	–
	Alternator fan belt slipping	Adjust tension	G-36

(3) Starter



9Y1210946ELS003A

Motor Test

CAUTION

- **Secure the starter to prevent it from jumping up and down while testing the motor.**

1. Disconnect the battery negative cable from the battery.
2. Disconnect the battery positive cable from the battery.
3. Disconnect the leads from the starter **B** terminal.
4. Remove the starter from the engine.
5. Connect a jumper lead from the starter **C** terminal (1) to the battery positive terminal (2).
6. Connect a jumper lead momentarily between the starter's body and the battery negative terminal (3).
7. If the motor does not run, starter is failure.
   Repair or replace the starter.

NOTE

- **B terminal: It is the terminal which connects the cable from the battery to the starter.**
- **C terminal: It is the terminal which connects the cable from the motor to the magnet switch.**

(1) **C** Terminal
(2) Positive Terminal
(3) Negative Terminal

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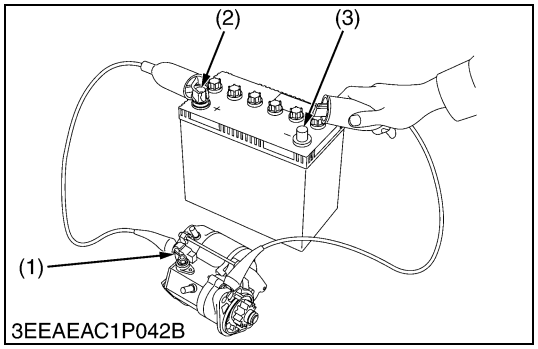

3EEAEAC1P042B

Magnetic Switch Test

1. Disconnect the battery negative cable from the battery.
2. Disconnect the battery positive cable from the battery.
3. Disconnect the leads from the starter **B** terminal.
4. Remove the starter from the engine.
5. Connect a jumper lead from the starter **S** terminal (1) to the battery positive terminal (2).
6. Connect a jumper lead momentarily between the starter's body and the battery negative terminal (3).
7. If the pinion gear does not pop out, the magnetic switch is failure.
   Repair or replace the starter.

NOTE

- **B terminal: It is the terminal which connects the cable from the battery to the starter.**
- **S terminal: It is the terminal which connects the cable from the starter switch to the magnet switch.**

(1) **S** Terminal
(2) Positive Terminal
(3) Negative Terminal

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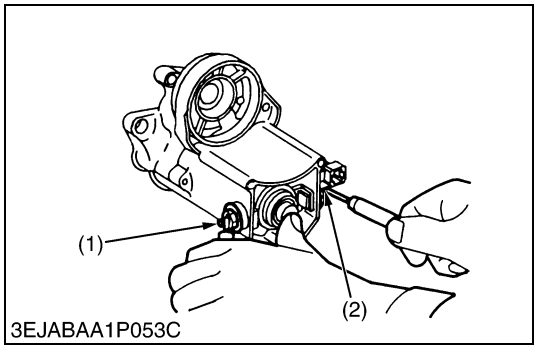

3EJABAA1P053C

Magnet Switch Continuity Test

1. Check the continuity across the **C** terminal (1) and the **B** terminal (2) with a circuit tester, pushing in the plunger.
2. If not continuous or if a certain value is indicated, replace the magnet switch.

(1) **C** Terminal
(2) **B** Terminal

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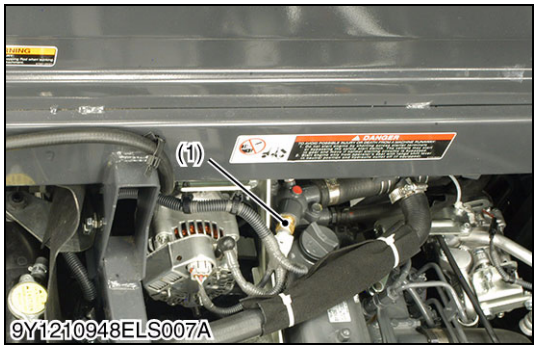

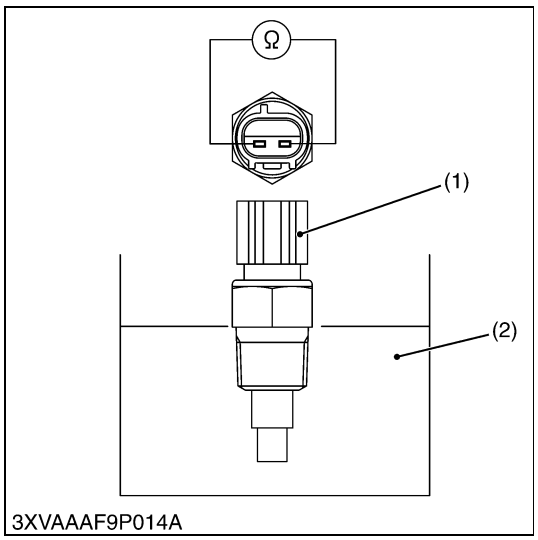

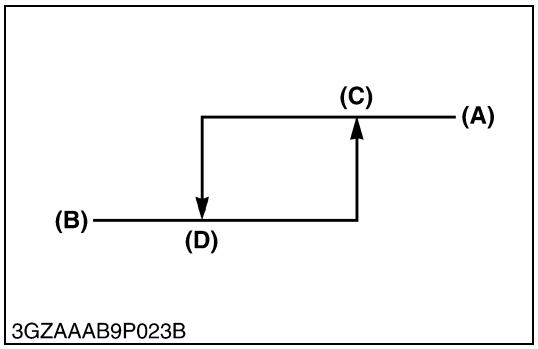

Radiator Fan Motor Switch

1. Measure the resistance with an ohmmeter across the switch terminals.
2. If infinity is not indicated when the coolant temperature is lower than 83 °C (181 °F), the switch is faulty.
3. If 0 ohms is not indicated when the coolant temperature is higher than 87 to 93 °C (189 to 199 °F), the switch is faulty.

Resistance	At coolant temperature lower than 83 °C (181 °F)	Infinity
	At coolant temperature more than 87 to 93 °C (189 to 199 °F)	Continuity

(1) Radiator Fan Motor Switch
(2) Coolant

(A) ON
(B) OFF
(C) 87 to 93 °C (189 to 199 °F)
(D) 83 °C (181 °F)

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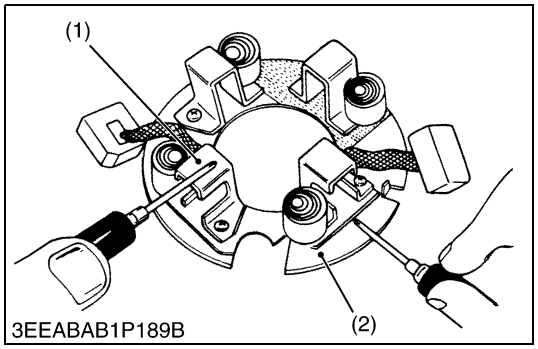

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Brush Holder

1. Check the continuity across the brush holder and the holder support with an ohmmeter.
2. If it conducts, replace the brush holder.

Resistance	Brush holder – Holder support	Infinity

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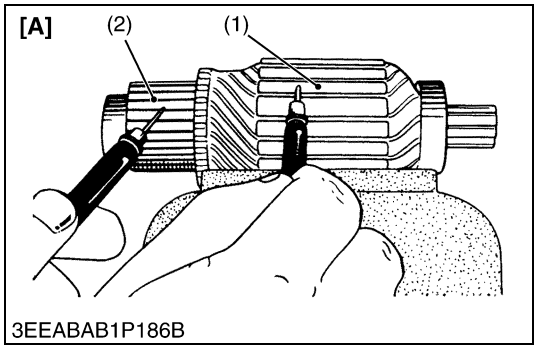

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Armature Coil

1. Check the continuity across the commutator and armature coil core with an ohmmeter. **[A]**
2. If it conducts, replace the armature.
3. Check the continuity across the segments of the commutator with an ohmmeter. **[B]**
4. If it does not conduct, replace the armature.

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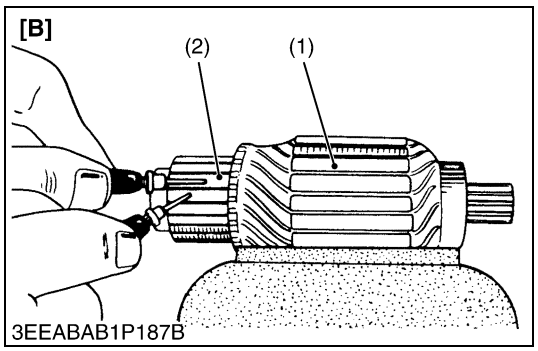

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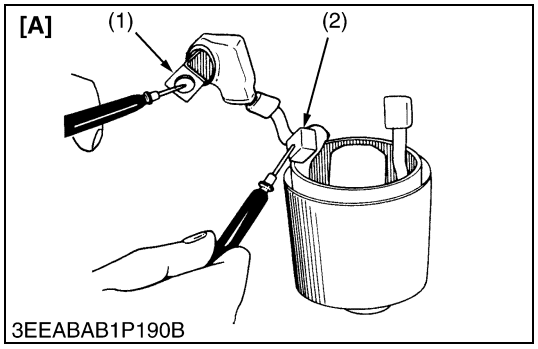

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Field Coil

1. Check the continuity across the lead (1) and brush (2) with an ohmmeter. **[A]**
2. If it does not conduct, replace the yoke assembly.
3. Check the continuity across the brush (2) and yoke (3) with an ohmmeter. **[B]**
4. If it conducts, replace the yoke assembly.

(1) Lead
(2) Brush
(3) Yoke

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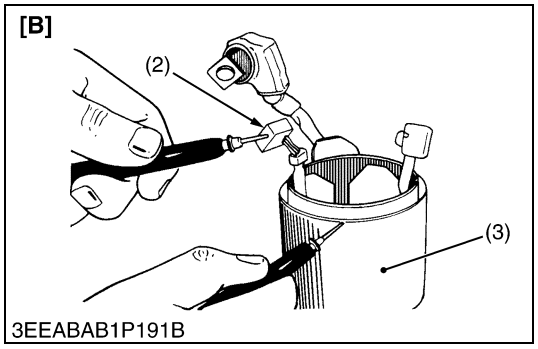

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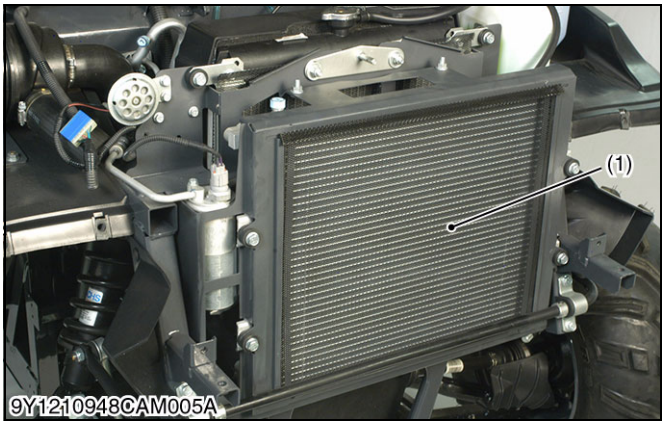
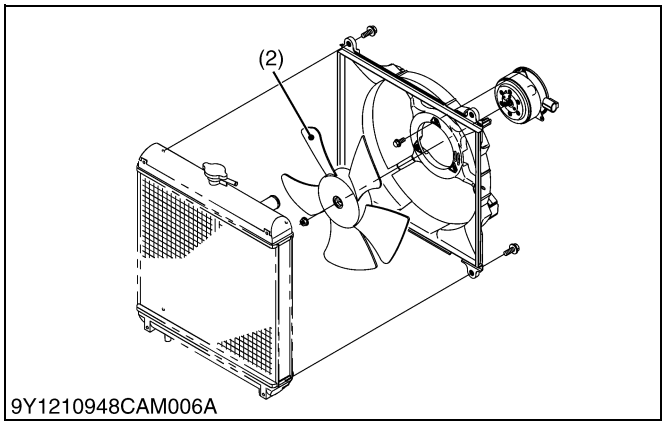
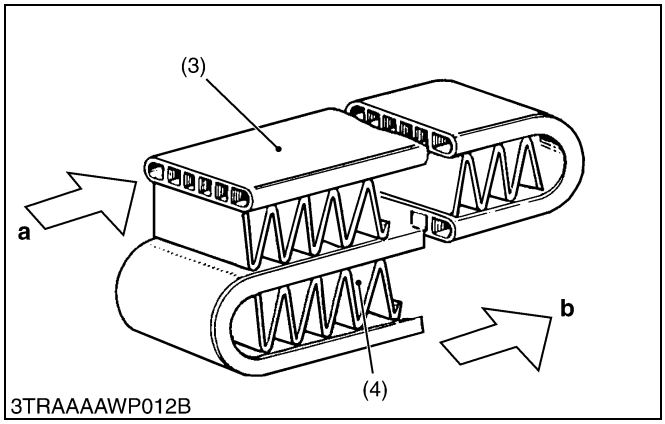
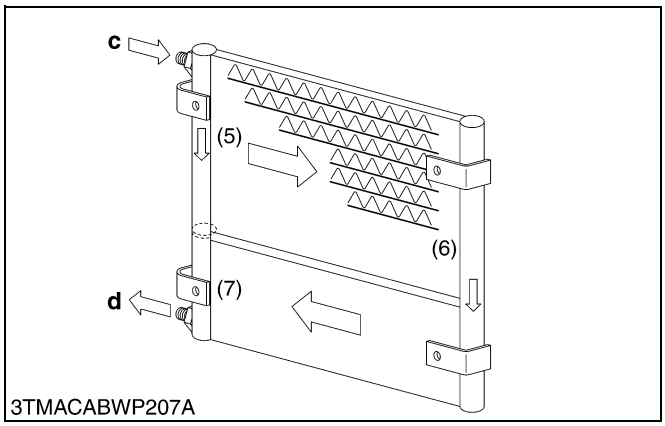
(2) Condenser









The condenser (1) is installed in the front side of the vehicle. The condenser equips with a fan (2) to enable forcible cooling.

The condenser is used for the purpose of cooling and robbing the heat from the refrigerant gas, which has been compressed by the compressor into high temperature, high pressure gas, so as to change this gas into liquid refrigerant.

The heat given off by the gaseous refrigerant in the condenser is the sum of the heat absorbed at the evaporator and the heat of work required by the compressor to compress the refrigerant. The greater the amount of heat give off in the condenser, the greater will be the cooling effect attainable by the evaporator.

(1) Condenser
(2) Fan
(3) Tube
(4) Fin
(5) Vapor
(6) Liquefying
(7) Liquefied

a: Gaseous Refrigerant
b: Liquid Refrigerant
c: Heated Vapor from Compressor (70 °C, 158 °F)
d: Cooled Liquid to Receiver (50 °C, 122 °F)

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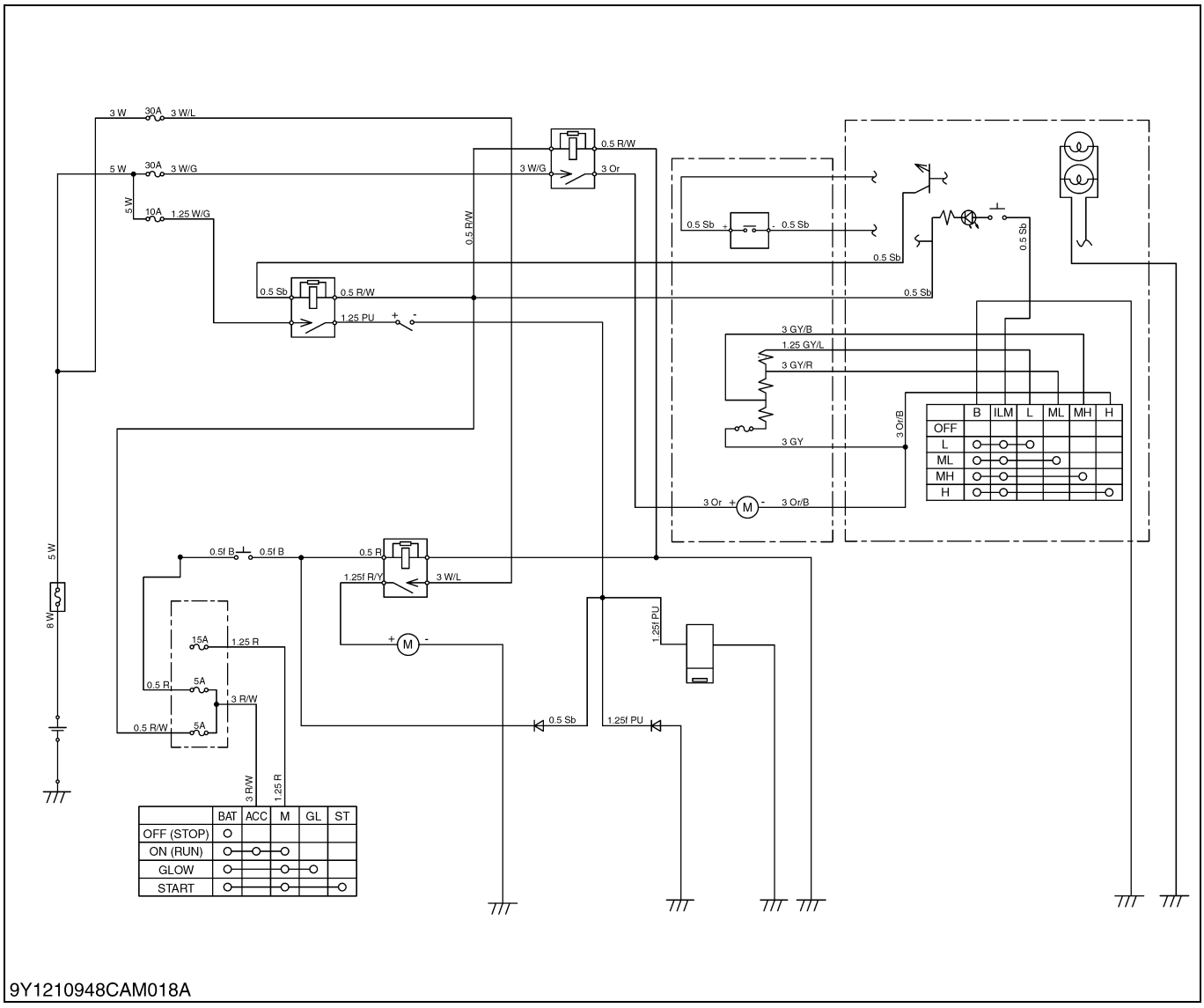
[6] ELECTRICAL SYSTEM
(1) Electrical Circuit



9Y1210948CAM018A

(1) Battery
(2) Key Switch
(3) Slow Blow Fuse (80A)
(4) Fuse (30A)
(5) Fuse (30A)
(6) Fuse (10A)
(7) Fuse (15A)
(8) Fuse (5A)
(9) Fuse (5A)
(10) Radiator Fan Motor Switch
(11) Compressor Relay
(12) Dual Pressure Switch
(13) Radiator Fan Motor Relay
(14) Radiator Fan Motor
(15) Blower Relay
(16) Radiator Fan Diode
(17) Compressor Clutch Diode
(18) Air Conditioner Compressor
(19) Air Conditioner Unit
(20) Thermistor
(21) Blower Resister
(22) Air Conditioner Blower Motor
(23) Air Conditioner Control Panel
(24) Air Conditioner Panel Switch
(25) Air Conditioner Panel Blower

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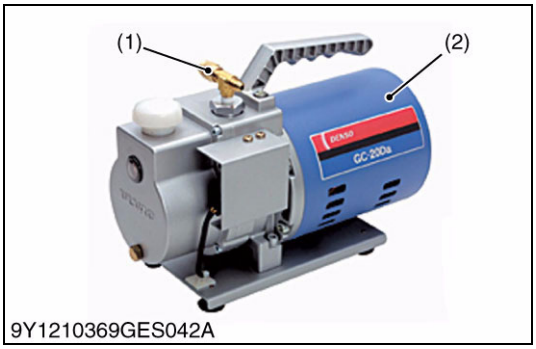
(3) Vacuum Pump Adaptor



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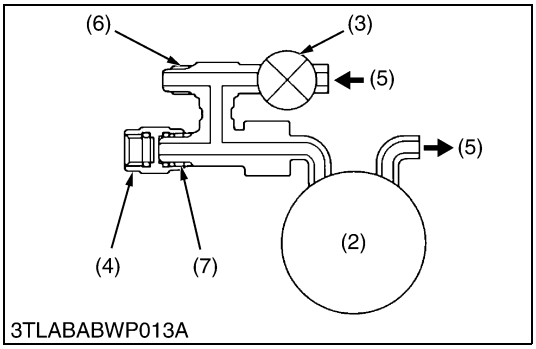

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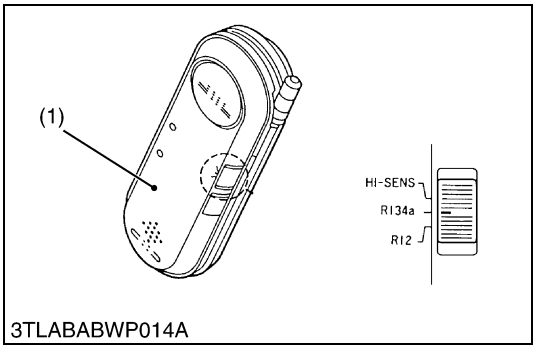
Objective of the Vacuum Pump Adaptor

1. After vacuum has been created in the air conditioning cycle, when the vacuum pump is stopped, since there is vacuum in hoses within the gauge manifold, the vacuum pump oil flows back into the charging hose. If the refrigerant is refilled with the system still in this state, the vacuum pump oil left in the charging hose enters the air conditioner cycle together with the refrigerant.
   Vacuum pump adaptor with a solenoid valve is used to prevent this back-flow of oil from the vacuum pump. The role of the solenoid valve is that when the current passes through the solenoid valve, the valve closes to keep out the outside air and allow the vacuum to build up, but when the current stops, the valve opens to allow in air and end the vacuum.
2. Attaching this adaptor to the R12 vacuum pump currently being used allows the pump to be used with both R134a and R12.

(1) Vacuum Pump Adaptor
(2) Vacuum Pump
(3) Magnetic Valve
(4) Blind Cap
(5) Air
(6) For R134a
(7) For R12

9Y1210948CAS0011US0

(4) Electric Gas Leak Tester



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The current R12 gas leak tester has poor sensitivity for R134a and cannot be used. Therefore, a new electric gas leak tester with greater sensitivity has been designed and can be used with both R134a and R12.

(Reference)

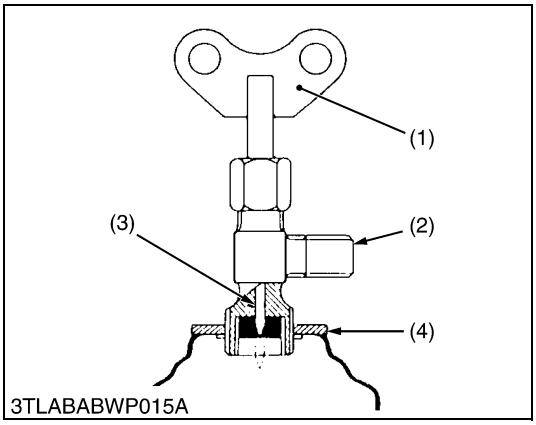
Leak tester with halide torch

- Since the reaction with chlorine within the refrigerant is used to detect gas leaks, R134a, which contains no chlorine, cannot be detected.

(1) Electric Gas Leak Tester

9Y1210948CAS0012US0

(5) Can Tap Valve



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The can tap valve that is used to charge the refrigerant into the air conditioning system, should be used as follows:

1. Before putting the can tap valve on the refrigerant container, turn the handle (1) counterclockwise till the valve needle is fully retracted.
2. Turn the plate nut (disc) (4) counterclockwise till it reaches its highest position, then screw down the can tap valve into the sealed tap.
3. Turn the place nut clockwise fully, and fix the center charging hose to the valve.
4. Tighten the place nut firmly by hand.
5. Turn the handle (1) clockwise, thus making a hole in the sealed tap.
6. To charge the refrigerant into the system, turn the handle (1) counterclockwise. To stop charging, turn it clockwise.

(1) Butterfly Handle
(2) Connection
(3) Needle
(4) Disc

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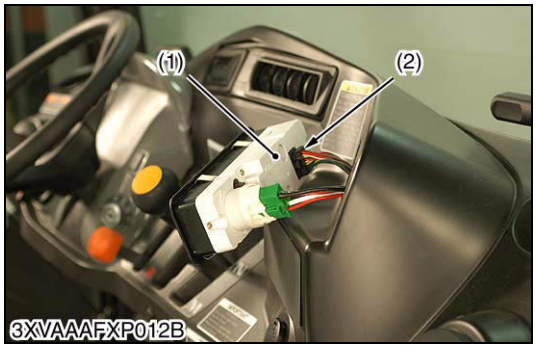

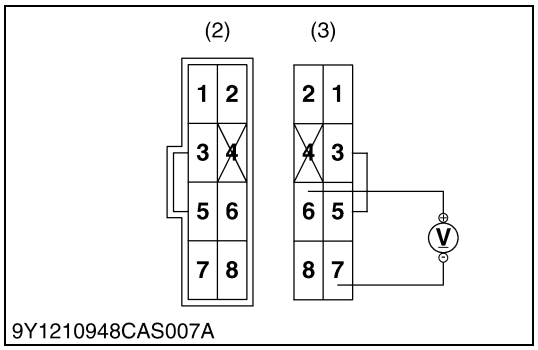

(3) Blower Motor

Connector Voltage

1. Disconnect the **8P** connector (2) from control panel switch.
2. Turn the main switch to **ON** position.
3. Measure the voltage with a voltmeter across the terminal **6** and terminal **7**.
4. If the voltage differs from the battery voltage, the wiring harness, air conditioner relay or fuse is faulty.

Voltage	Terminal **7** – Terminal **6**	Approx. battery voltage

(1) Control Panel
(2) **8P** Connector (Switch Side)
(3) **8P** Connector (Wire Harness Side)

9Y1210948CAS0033US0

Blower Motor Test

CAUTION

- **Do not touch the rotating blower fan.**

1. Turn the main switch to **OFF** position.
2. Turn the main switch to **ON** position
3. Turn the blower switch (1) to **1** position.
4. If the blower motor does not run, check it.
5. Next, turn the blower switch (1) from **1** to **4** position sequentially.
6. At this time, make sure the rotational speed of blower fan increase sequentially.
7. If the rotational speed of blower fan does not change by position of blower switch, check the blower resister.

(1) Blower Switch

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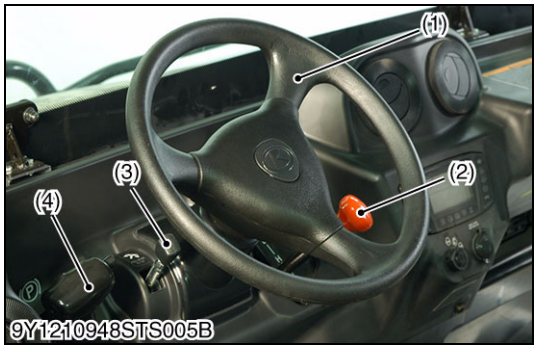

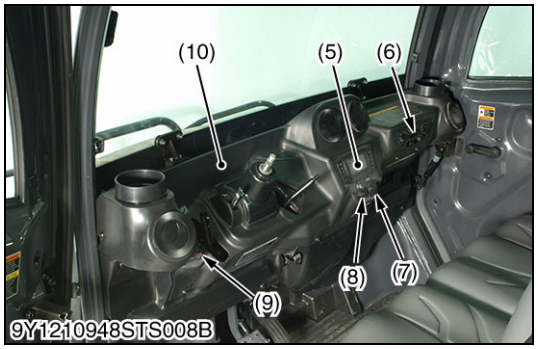

Control Panel

1. Remove the steering wheel (1).
2. Remove the shift lever grip (2), tilt lever grip (3), and the parking brake lever (4).
3. Disconnect the head light switch (9), meter assembly (5), starter switch (8), and ACC socket (7).
4. Disconnect the air conditioner control panel (6) from the panel (10).
5. Remove the panel (10).

(When reassembling)

- Connect the each cable set the below position.
  Made switch: Face position
  Blower switch: 0 position
  Temperature control dial: Coolest position
  Recirculation/Flash air selection lever: Recirculation position

Tightening torque	Steering wheel mounting nut	29 to 49 N·m 3.0 to 4.9 kgf·m 22 to 36 lbf·ft

(1) Steering Wheel
(2) Shift Lever Grip
(3) Tilt Lever Grip
(4) Parking Brake Lever
(5) Meter Assembly
(6) Air Conditioner Control Panel
(7) ACC Socket
(8) Starter Switch
(9) Head Light Switch
(10) Panel

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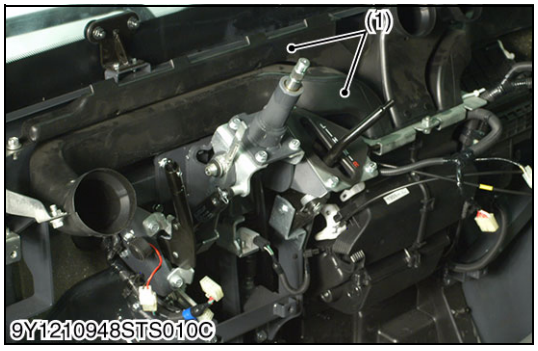

Air Duct

1. Remove the air ducts (1).

(1) Air Duct

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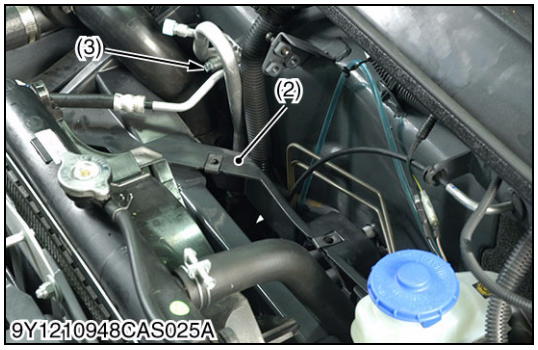

Radiator Cover

1. Remove the radiator upper cover (1).
2. Remove the radiator lower cover (2).
3. Remove the hose joint (3).

(When reassembling)

- Apply the compressor oil (SP10 or equivalent) to the O-ring and be careful not to damage them.

Tightening torque	Air conditioner hose joint mounting screw	8.00 to 12.0 N·m 0.816 to 1.22 kgf·m 5.90 to 8.85 lbf·ft

(1) Upper Cover
(2) Lower Cover
(3) Hose Joint

9Y1210948CAS0046US0