WSM

WORKSHOP MANUAL
TRACTOR

M100X,M110X,M126X,M135X

Kubota

KiSC issued 04, 2009 A

(1) Part No. 3F240-9836-2

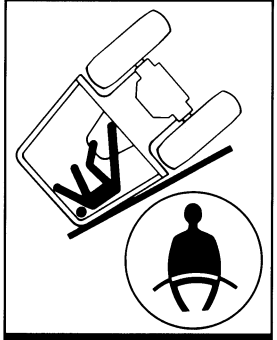
⚠CAUTION

TO AVOID PERSONAL INJURY:

1. Read and understand the operator's manual before operation.
2. Before starting the engine, make sure that everyone is at a safe distance from tractor and the PTO is off.
3. Do not allow passengers on the tractor at any time.
4. Before allowing other people to use the tractor, have them read the operator's manual.
5. Check the tightness of nuts and bolts regularly.
6. Keep all shields in place and stay away from all moving parts.
7. Lock the two brake pedals together before driving on the road.
8. Slow down for turns, or rough roads, or when applying individual brakes.
9. On public roads use SMV emblem and hazard lights, if required by local traffic and safety regulations.
10. Pull only from the drawbar.
11. Before dismounting, lower the implement to the ground, set the parking brake, stop the engine and remove the key.
12. Securely support tractor and implements before working underneath.

(2) Part No. TA040-4902-1

⚠ WARNING



TO AVOID INJURY OR DEATH FROM ROLL-OVER:

Always use seat belt when driving.

(3) Part No. 3F240-9821-1

⚠WARNING

TO AVOID MACHINE RUNAWAY DUE TO 4WD BRAKING SYSTEM:

Do not run engine with only rear wheels off ground.

(4) Part No. 6C300-4744-1

⚠WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation.
A spark arrester may be required.
The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

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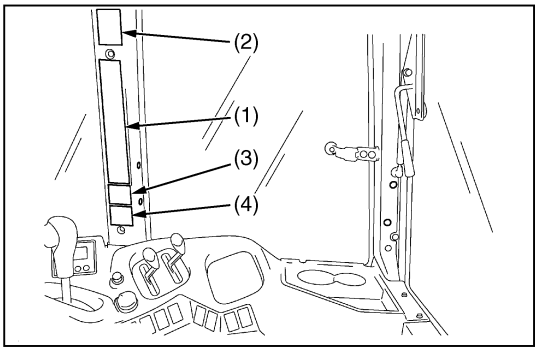

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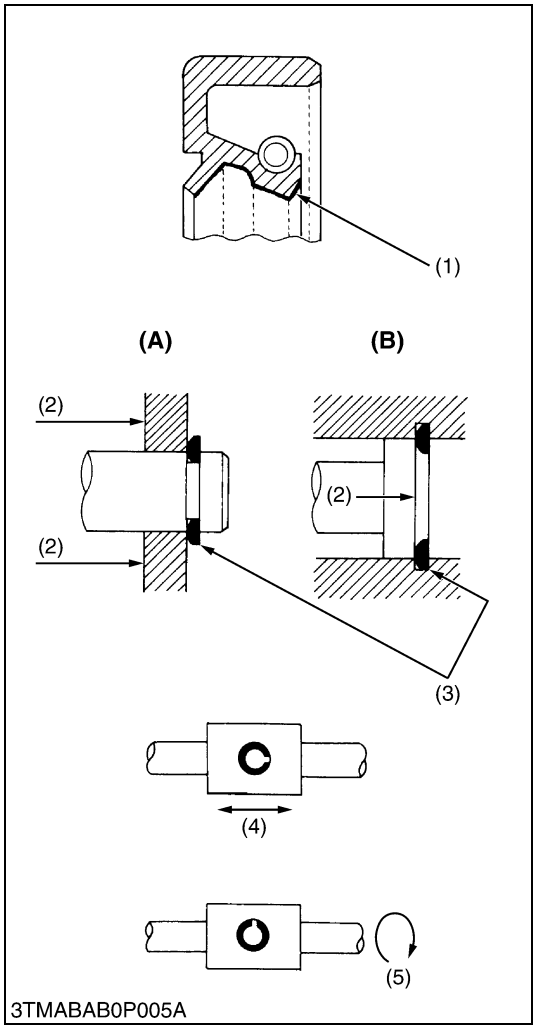
2. GENERAL PRECAUTIONS



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- When you disassemble, carefully put the parts in a clean area to make it easy to find the parts. You must install the screws, bolts and nuts in their initial position to prevent the reassembly errors.
- When it is necessary to use special tools, use KUBOTA special tools. Refer to the drawings when you make special tools that you do not use frequently.
- Before you disassemble or repair machine, make sure that you always disconnect the ground cable from the battery first.
- Remove oil and dirt from parts before you measure.
- Use only KUBOTA genuine parts for replacement to keep the machine performance and to make sure of safety.
- You must replace the gaskets and O-rings when you assemble again. Apply grease (1) to new O-rings or oil seals before you assemble.
- When you assemble the external or internal snap rings, make sure that the sharp edge (3) faces against the direction from which force (2) is applied.
- When inserting spring pins, their splits must face the direction from which a force is applied. See the figure left side.
- To prevent damage to the hydraulic system, use only specified fluid or equivalent.

(1) Grease
(2) Force
(3) Sharp Edge
(4) Axial Force
(5) Rotating Movement

(A) External Snap Ring
(B) Internal Snap Ring

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[3] HYDRAULIC FITTINGS

(1) Hydraulic Hose Fittings

Hose size	Thread side	Tightening torque		
		N·m	kfg·m	lbf·ft
02	1/8	13.8 to 15.6	1.40 to 1.60	10.2 to 11.5
03	1/4	22.6 to 27.4	2.30 to 2.80	16.7 to 20.2
04				
05	3/8	45.2 to 52.9	4.60 to 5.40	33.3 to 39.0
06				

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(2) Hydraulic Pipe Cap Nuts

Pipe size	Tightening torque		
	N·m	kfg·m	lbf·ft
ϕ4 × t1.0	19.7 to 29.4	2.00 to 3.00	14.5 to 21.6
ϕ6 × t1.0	24.6 to 34.3	2.50 to 3.50	18.1 to 25.3
ϕ8 × t1.0	29.5 to 39.2	3.00 to 4.00	21.7 to 28.9
ϕ10 × t1.0	39.3 to 49.0	4.00 to 5.00	29.0 to 36.1
ϕ12 × t1.5	49.1 to 68.6	5.00 to 7.00	36.2 to 50.6
ϕ15 × t1.6	108 to 117	11.0 to 12.0	79.6 to 86.7
ϕ18 × t1.6	108 to 117	11.0 to 12.0	79.6 to 86.7

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(3) Adaptors, Elbows and Nuts

Item	Thread side	Tightening torque		
		N·m	kfg·m	lbf·ft
POA-PF (Nipple with O-ring)	PF 1/8	45 to 53	4.5 to 5.5	33 to 39
	PF 1/4	74 to 83	7.5 to 8.5	55 to 61
	PF 3/8	93 to 102	9.5 to 10.5	68.8 to 75.9
	PF 1/2	113 to 122	11.5 to 12.5	83.2 to 90.4
POB-PF (Elbow with O-ring and no nut)	PF 1/8	23 to 26	2.3 to 2.7	17 to 19
	PF 1/4	36 to 43	3.6 to 4.4	26 to 31
	PF 3/8	54 to 63	5.5 to 6.5	40 to 47
	PF 1/2	73 to 83	7.4 to 8.5	54 to 61
Adaptor (NPT)	PF 1/8	10 to 14	1.0 to 1.5	7.3 to 10
	PF 1/4	30 to 34	3.0 to 3.5	22 to 25
	PF 3/8	49 to 68	5.0 to 7.0	37 to 50
	PF 1/2	69 to 88	7.0 to 9.0	51 to 65

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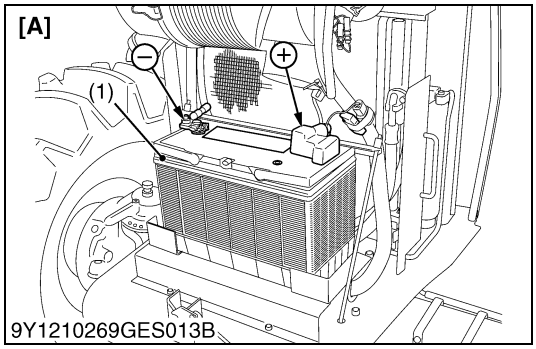

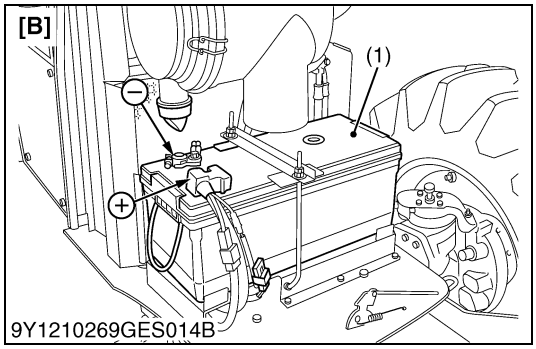

Battery Charging

CAUTION

- **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.**
- **When charging battery, ensure the vent caps are securely in place (if equipped).**
- **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. 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.
2. 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.
3. The battery is charged if the indicator display turns green from black.
4. When exchanging an old battery into new one, use battery of equal specification shown in table.

Table

Battery type	Volts (V)	Capacity at 5H.R (A.H)	Reserve capacity (min.)	Cold Cranking Amps (SAE)	Normal Charging Rate (A)
GP31 (105E41R)	12	85.3	160	900	11
180G51	12	160	300	1090	11

(1) Battery

[A] M100X, M110X
[B] M126X, M135X

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Direction for Storage

1. When storing the tractor for long periods of time, remove the batter from tractor, adjust the electrolyte to the proper level and store in a dry place out of direct sunlight.
2. The battery self-discharges while it is stored.
   Recharge it once every three months in hot seasons and once every six months in cold seasons.

■ **NOTE**

- **In checking and refilling the battery, be careful not to spill battery fluid. Split battery fluid may affect the engine controller (ECU) located below the battery, resulting in damage.**

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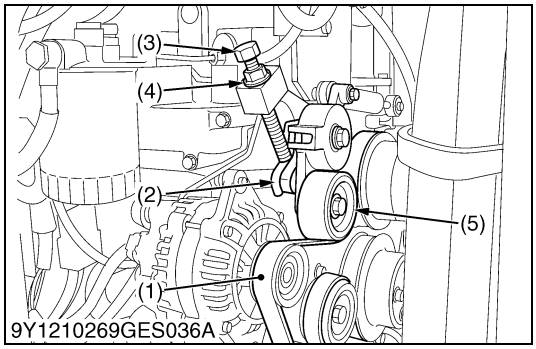

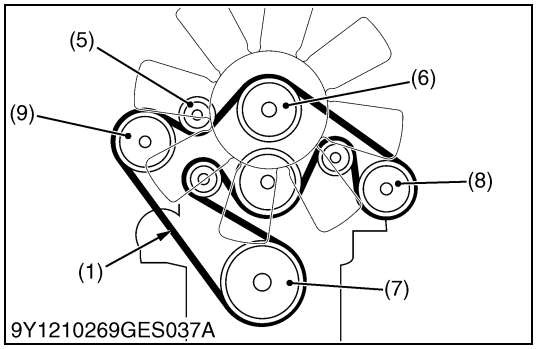

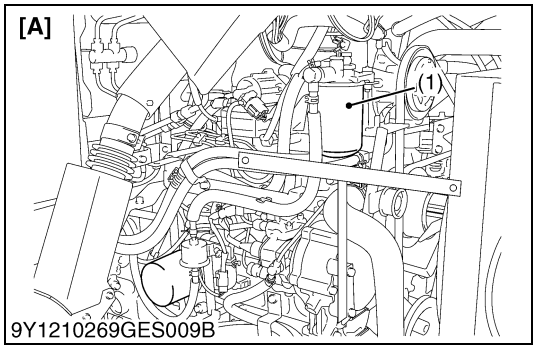

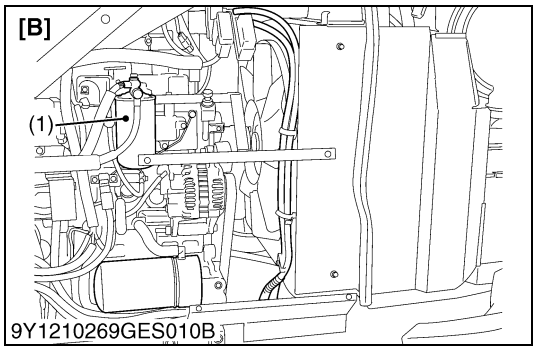

Replacing the Belt (If Necessary) (M126X, M135X)

1. Loosen the lock nut first and then fully loosen the tension belt.
2. Lift the tension pulley and remove the belt.
3. Fit the new belt.
4. Tighten the tension bolt until the tension spring end comes in close contact with the engine body. Finally tighten up the lock nut.

Tightening torque	Tension bolt	Below 15 N·m 1.53 kgf·m 11.1 lbf·ft
	Lock nut	123.6 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108.4 lbf·ft

(1) Belt
(2) Tension Spring End
(3) Tension Bolt
(4) Lock Nut
(5) Self-tension Pulley
(6) Fan Pulley
(7) Drive Pulley
(8) Air-conditioner compressor
(9) Alternator

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Replacing Fuel Filter

1. Remove the fuel filter.
2. Put a film of clean fuel on rubber seal of new filter.
3. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
4. Bleed the fuel system.
   (Refer to "Bleeding Fuel System".)

(1) Fuel Filter

[A] M100X, M110X
[B] M126X, M135X

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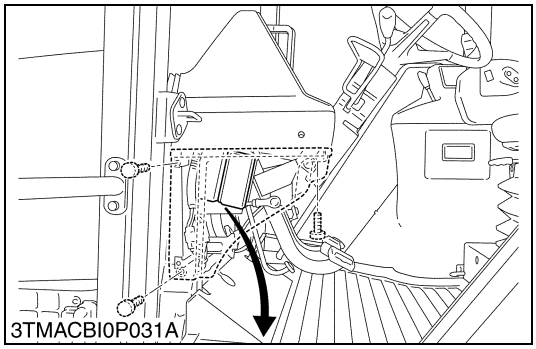
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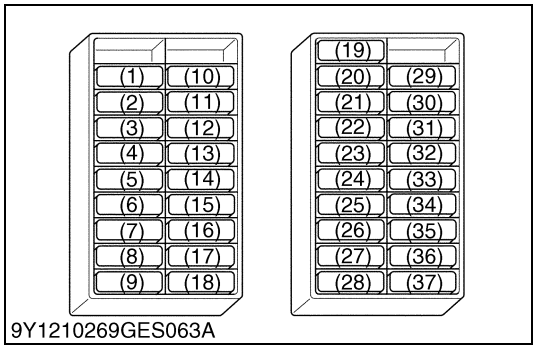

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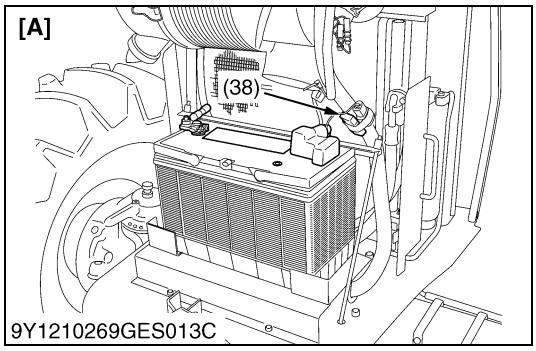

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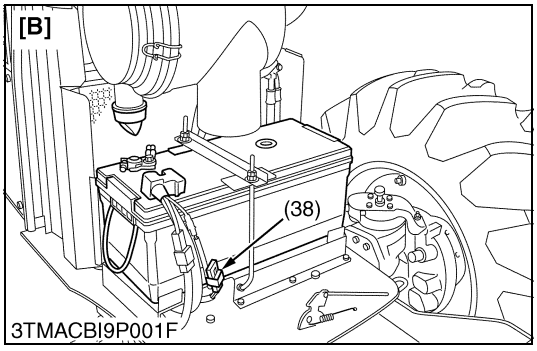

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Replacing Fuse

1. The tractor electrical system is protected from potential damage by fuses.
2. A blown fuse indicates that there is an overload or short somewhere in the electrical system.
3. If any of the fuses should blow, replace with a new one of the same capacity.

■ **IMPORTANT**

- **Before replacing a blown fuse, determine why the fuse blew and make any necessary repairs. Failure to follow this procedure may result in serious damage to the tractor electrical system.**

[A] M100X, M110X **[B] M126X, M135X**

(To be continued)

(Continued)

A	65 mm dia. (2.559 in. dia.)	**Z**	4.000 to 4.018 mm dia., 6 mm depth (0.1575 to 0.1582 in. dia., 0.236 in. depth)
B	54.8 to 54.9 mm dia. (2.158 to 2.161 in.)	**a**	2 × 8 mm dia. (2 × 0.315 in. dia.)
C	1.5 mm (0.0591 in.)	**b**	35 mm dia. (1.378 in. dia.)
D	0.523 rad (30 °)	**c**	9 mm (0.354 in.)
E	1.2 mm (0.0472 in.)	**d**	16.06 mm (0.0323 in.)
F	20 mm (0.7874 in.)	**e**	5 mm (0.197 in.)
G	85 mm (3.346 in.)	**f**	5 mm (0.197 in.)
H	34.9 to 35.0 mm dia. (1.3741 to 1.3779 in. dia.)	**g**	18.2 mm (0.7165 in.)
I	120 mm (4.724 in.)	**h**	4.99 mm (0.1965 in.)
J	157.5 mm (6.201 in.)	**i**	34.43 mm (1.3565 in.)
K	8 mm (0.315 in.)	**j**	25.26 mm (0.9945 in.)
L	29.5 mm (1.161 in.)	**k**	5 mm (0.197 in.)
M	1.5 mm (0.0591 in.)	**l**	9.5 mm (0.3740 in.)
N	15.86 to 16.26 mm (0.6244 to 0.6401 in.)	**m**	11 mm (0.4331 in.)
O	2 × 8.2 mm dia. (2 × 0.323 in. dia.)	**n**	5 mm (0.197 in.)
P	34.23 to 34.63 mm dia. (1.348 to 1.363 in. dia.)	**o**	16 mm (0.6299 in.)
Q	25.06 to 25.46 mm (0.9867 to 1.002 in.)	**p**	26 mm (1.024 in.)
R	28.19 to 28.59 mm (1.110 to 1.125 in.)	**q**	28.39 mm (1.1177 in.)
S	18.2 mm (0.7165 in.)	**r**	35 mm (1.378 in.)
T	16 mm (0.6299 in.)	**s**	48.5 mm (1.9094 in.)
U	29.3 to 29.4 mm (1.154 to 1.157 in.)	**t**	48.5 mm (1.9094 in.)
V	9.5 mm (0.3740 in.)	**u**	27 mm (1.063 in.)
W	4.99 mm (0.1965 in.)	**v**	5 mm (0.197 in.)
X	48.5 mm (1.9094 in.)	**C0.3**	Chamfer 0.3 mm (0.012 in.)
Y	48.5 mm (1.9094 in.)	**C1**	Chamfer 1.0 mm (0.0394 in.)

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■ **NOTE**

- **Special tools for R134a refrigerant air conditioning system introduced below are available from DENSO CO. LTD.**

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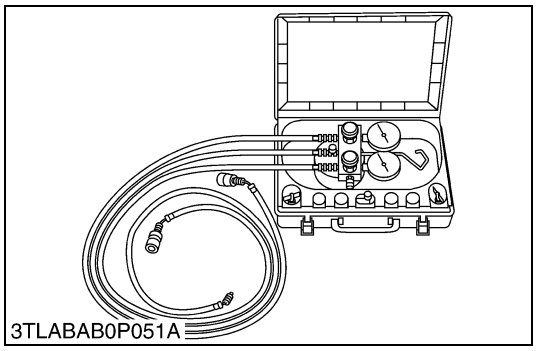
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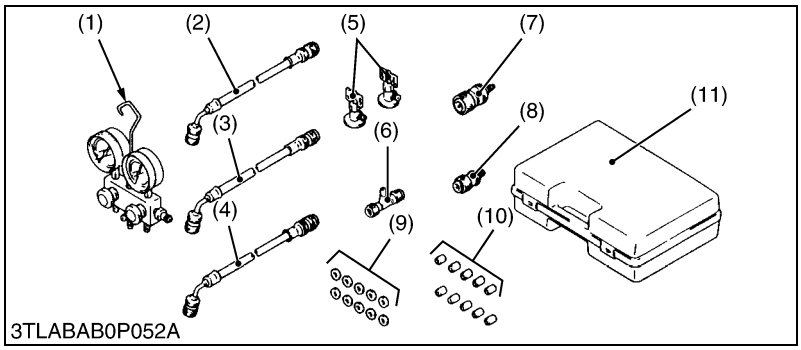
Air Conditioner Service Tool

Code No.

- DENSO 95048-00061

Application

- Use for charging, testing or discharging the air conditioning system.



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(1) Manifold Gauge Assembly (95048-10090)
(2) Charging Hose (Red : HI) (95948-10270)
(3) Charging Hose (Blue : LO) (95948-10280)
(4) Charging Hose (Green) (95948-10260)
(5) Can Tap Valve (95048-10150)
(6) T Joint (95048-10160)
(7) Quick Coupler (HI) (95048-10130)
(8) Quick Coupler (LO) (95048-10140)
(9) Service Valve Packing (95906-10310)
(10) Charging Hose Packing (95906-10300)
(11) Tool Case (95949-10610)

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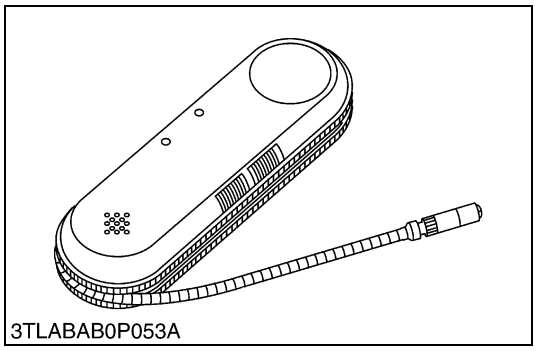
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Electric Gas Leak Tester

Code No.

- DENSO 95146-00060

Application

- Use for gas leak testing the air conditioning system.

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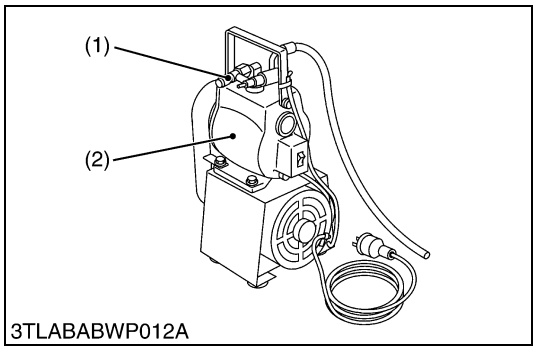

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Vacuum Pump

Code No.

- DENSO 95046-00040 (AC220V)
- DENSO 95046-00050 (AC240V)

Application

- Use for evacuating the air conditioning system.

(1) Adaptor (For 134a) (2) Vacuum Pump

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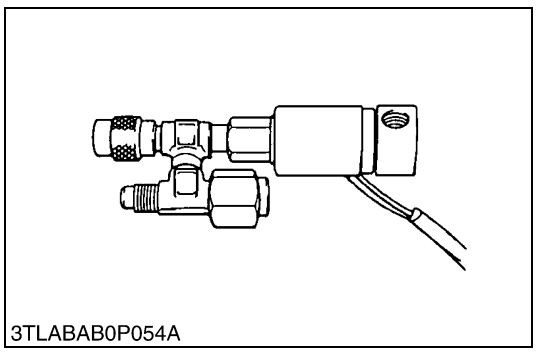
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Adaptor (For R134a)

Code No.

- DENSO 95048-10190 (AC220V)
- DENSO 95048-10200 (AC240V)

Application

- Use for evacuating the air conditioning system.

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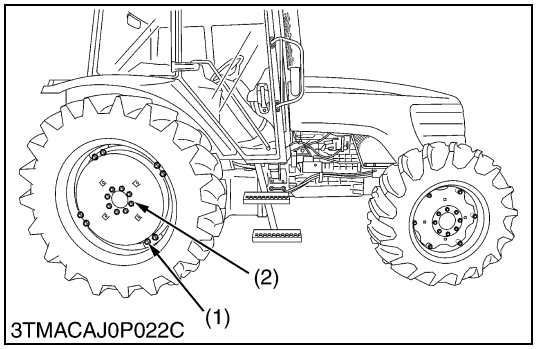
(2) Rear Wheel



Adjusting Rear Tread

Rear tread width can be adjusted as shown with the standard equipped tires.

To change the tread width.

1. Remove the wheel rim and / or disk mounting bolts.
2. Change the position of the rim and / or disk (right and left) to the desired position, and tighten the bolts.

■ **IMPORTANT**

- **Always attach tires as shown in the drawings.**
- **If not attached as illustrated, transmission parts may be damaged.**
- **When re-fitting or adjusting a wheel, tighten the bolts to the following torques then recheck after driving the tractor 200 m (200 yards) and thereafter according to service interval. Refer to "Check Wheel Mounting Nuts Tightening Torque" (See page G-20).**

(1) Rim Disk Nut (2) Wheel Nut

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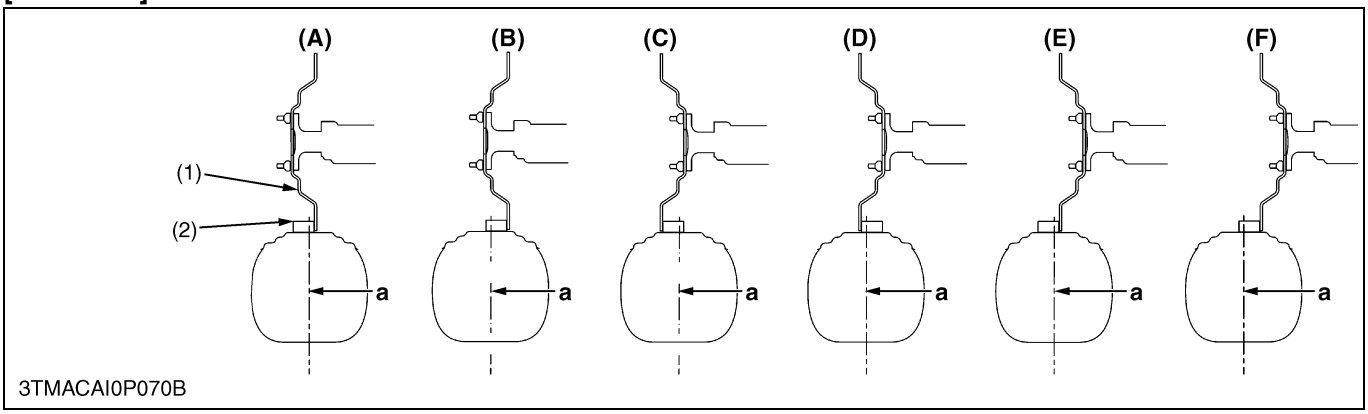
[Steel Disc]



Tread (a)	(A)	(B)	(C)	(D)	(E)	(F)
18.4R30	1500 mm 59.0 in.	1600 mm 63.0 in.	1705 mm 67.2 in.	1805 mm 71.1 in.	1905 mm 75.0 in.	2005 mm 79.0 in.
18.4R34						
18.4 – 34						
16.9 – 34						

(1) Rear Wheel Disc (2) Rear Wheel Rim **a : Tread**

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MECHANISM

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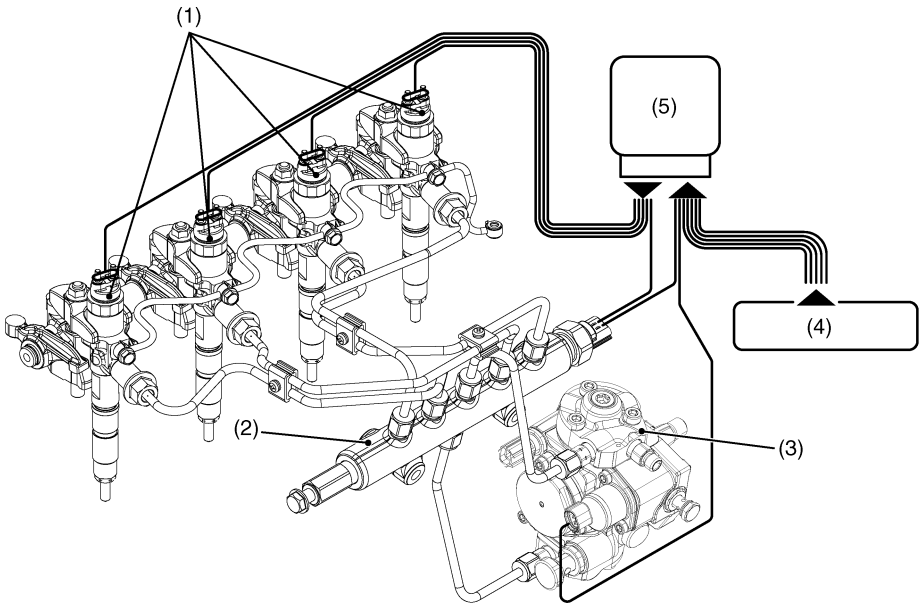
6. COMMON RAIL SYSTEM (CRS)

[1] GENERAL [V3800-CR-TI]



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(1) Injector
(2) Rail
(3) Supply Pump
(4) Sensors
(5) Engine ECU

The common rail system adopted for the V3800-CR-TI is the combustion system which always controls the combustion state in cylinders optimally, by storing ultra high pressure fuel in the rail and performing ultra high pressure injection by the diesel engine. It has excellent combustion efficiency and realizes clean exhaust gas as well as low fuel consumption. It comprises the supply pump, the rail, the injectors, and the sensors that detects its operating state.

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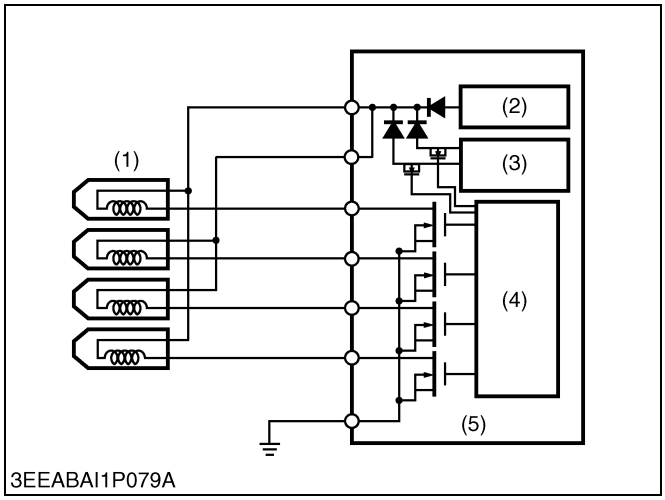

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Injector Actuation Circuit

In order to improve injector responsiveness, the actuation voltage has been changed to high voltage, speeding up both solenoid magnetization and the response of the TWV. The charge circuit in the engine ECU (5) raises each battery voltage to approximately 110 V, which is supplied to the injector (1) by signal from the engine ECU (5) to actuate the injector (1).

(1) Injector
(2) Constant Amperage Circuit
(3) High Voltage Generation Circuit
(4) Control Circuit
(5) Engine ECU

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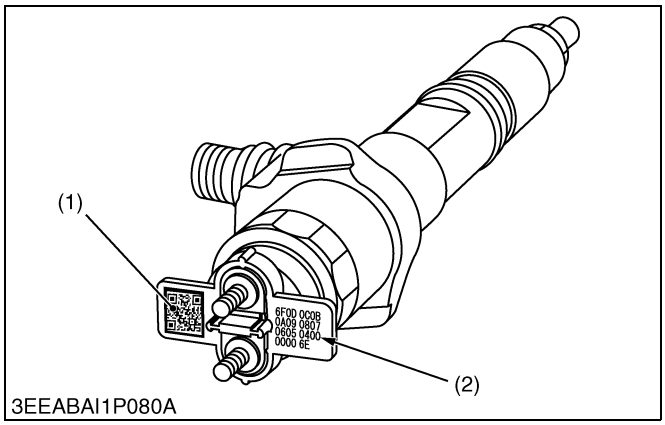

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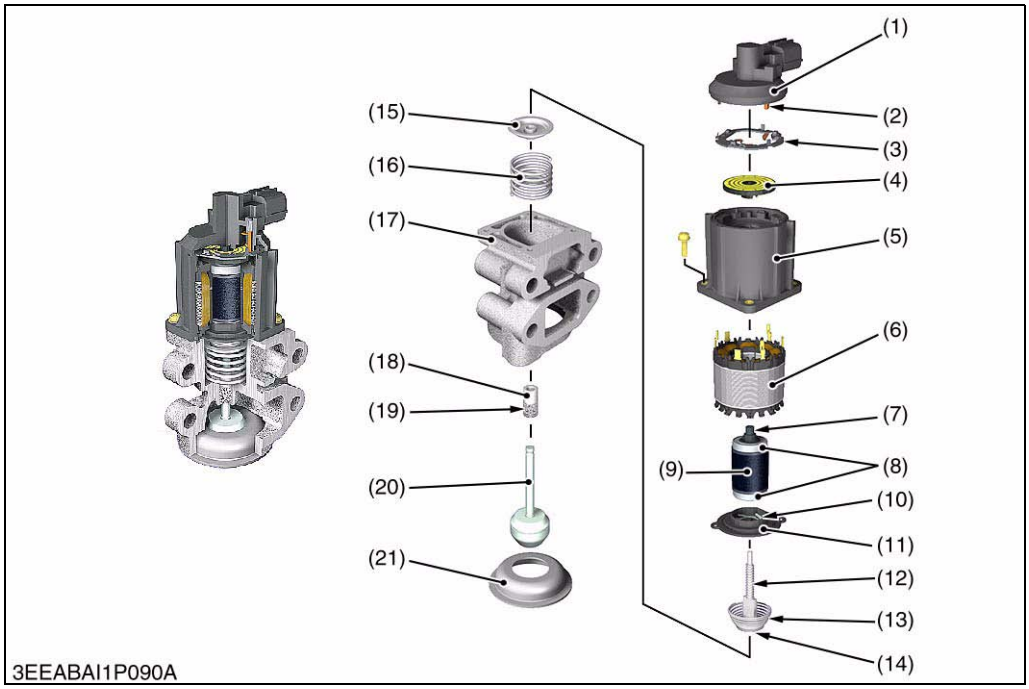
Injector with QR Codes

QR (Quick Response) codes have been adopted to enhance correction precision. The QR code (1), which contains the correction data of the injector, is written to the engine ECU. QR codes have resulted in a substantial increase in the number of fuel injection quantity correction points, greatly improving injection quantity precision. In addition to injection quantity correction data, the QR code (1) contains the part number and the product number, which can be read at extremely high speeds.

(1) QR Code
(2) ID Code

9Y1210269ENM0024US0

[2] EGR VALVE



3EEABAI1P090A

(1) Position Sensor
(2) Brush
(3) Circuit Sensor
(4) Commutator
(5) Motor Exterior
(6) Poki Poki Core
(7) Rotor
(8) Bearing
(9) Magnet
(10) Washer
(11) Boss
(12) Shaft
(13) Assist Spring
(14) Spring Holder
(15) Spring Holder
(16) Spring
(17) Housing
(18) Bush
(19) Filter
(20) Valve Assembly
(21) Valve Sheet

The motor incorporated in the EGR valve is a brush type DC motor (magnet rotating type brush motor) having the commutator which determines the power distribution pattern in accordance with rotation of the magnet, and is driven by switching over the conducting pattern of the coil that is arranged at the circumference. By adopting the DC motor, the rapid response and high driving force under the condition of large pressure difference is assured.

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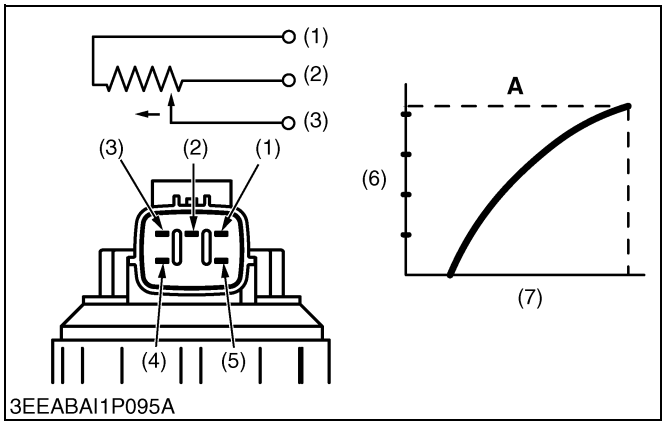

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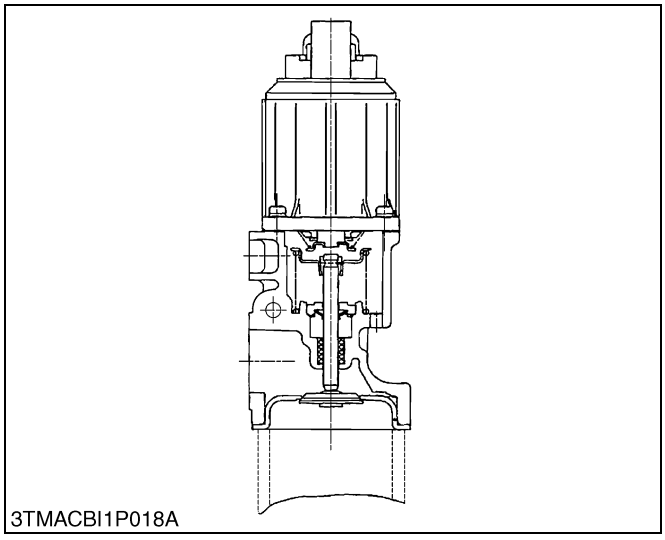
EGR Valve Lift Sensor

The opening position detecting method of this EGR valve is used for detecting the movement of the motor shaft by means of the contact-type position sensor. The motor shaft engages with the female screw inside the rotating magnet, and it performs amplification of motor torque and conversion to translation motion by means of the screw type speed reduction mechanism.

(1) Terminal Vcc
(2) Terminal GND
(3) Terminal Vout
(4) Terminal EGR DC Motor −
(5) Terminal EGR DC Motor +
(6) Exhaust Gas Flow
(7) Output Voltage

A : Exhaust Gas Flow-Output Voltage Characteristic
B : Stroke

9Y1210269ENM0036US0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LUBRICATING SYSTEM

Item		Factory Specification	Allowable Limit
Engine Oil Pressure	At Idle Speed	–	50 kPa 0.5 kgf/cm^2 7 psi
	At Rated Speed	200 to 390 kPa 2.0 to 4.0 kgf/cm^2 29 to 56 psi	150 kPa 1.5 kgf/cm^2 21 psi
Engine Oil Pressure Switch	Working Pressure	40 to 50 kPa 0.4 to 0.6 kgf/cm^2 6 to 8 psi	–
Inner Rotor to Outer Rotor	Clearance	0.040 to 0.016 mm 0.0016 to 0.0062 in.	0.3 mm 0.01 in.
Outer Rotor to Pump Body	Clearance	0.100 to 0.184 mm 0.00394 to 0.00724 in.	0.3 mm 0.01 in.
Inner Rotor to Cover	Clearance	0.025 to 0.075 mm 0.00099 to 0.0029 in.	0.225 mm 0.00886 in.
Relief Valve	Working Pressure	887 kPa 9.04 kgf/cm^2 129 psi	–

COOLING SYSTEM

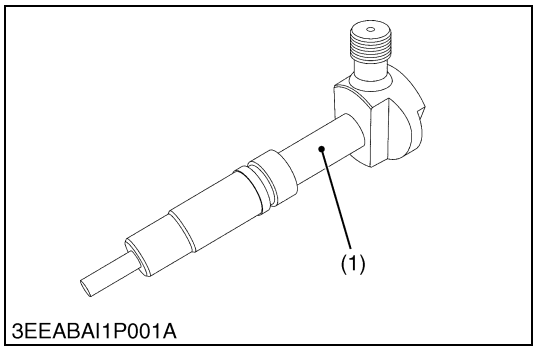
Item		Factory Specification	Allowable Limit
Thermostat	Valve Opening Temperature	74.5 to 78.5 °C 166.1 to 173.3 °F	–
	Valve Opening Temperature (Opened Completely)	90 °C 194 °F	–
Radiator	Water Tightness	Water tightness at specified pressure 140 kPa 1.4 kgf/cm^2 20 psi	–
Radiator Cap	Air Leakage	10 seconds or more 80 → 60 kPa 0.9 → 0.6 kgf/cm^2 10 → 9 psi)	–
Fan Belt	Tension	10 to 12 mm / 98 N 0.40 to 0.47 in. / 98 N (10 kgf, 22 lbf)	–

9Y1210269ENS0002US0

4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING

(1) Engine Body



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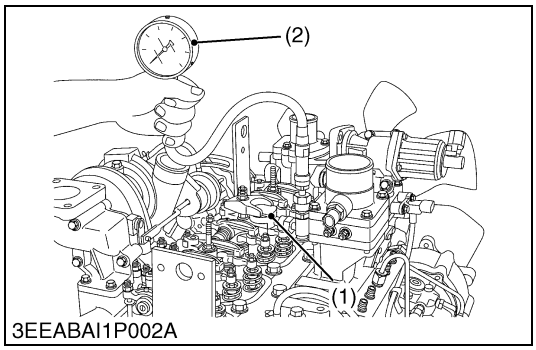

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Compression Pressure (V3800-CR-TI)

1. After warming up the engine, stop it and remove the air cleaner, the muffler, injection pipes, cylinder head covers, overflow pipe, all injectors and all injectors gaskets.
2. Install a compression tester (2) (Code No: 07909-30208) and injector adaptor (1) to injector hole. (Refer to "8. SPECIAL TOOLS" at "G. GENERAL" section.)
3. Run the engine at 200 min^{-1} (rpm) with the starter.
4. Read the maximum compression. Measure the compression more than twice.

■ **NOTE**

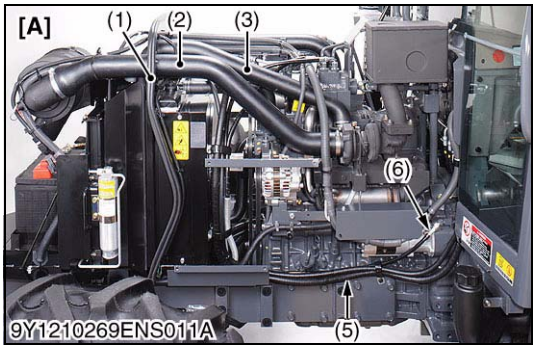
- **Check the compression with the specified valve clearance.**
- **Always use a fully charged battery for performing this test.**
- **Variances in cylinder compression values should be under 10 %.**

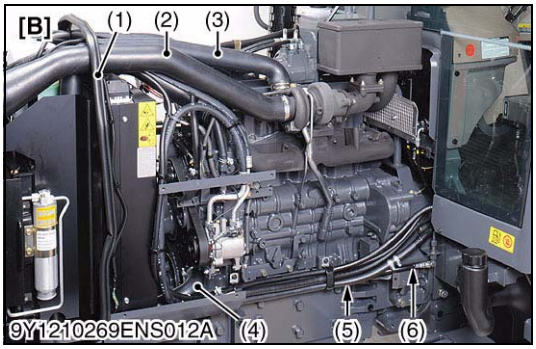
Compression pressure	Factory spec.	3.09 to 3.29 MPa / 200 min^{-1} (rpm) 31.5 to 33.5 kgf/cm^2 / 200 min^{-1} (rpm) 449 to 477 psi / 200 min^{-1} (rpm)
	Allowable limit	2.41 MPa / 200 min^{-1} (rpm) 24.6 kgf/cm^2/ 200 min^{-1} (rpm) 350 psi / 200 min^{-1} (rpm)

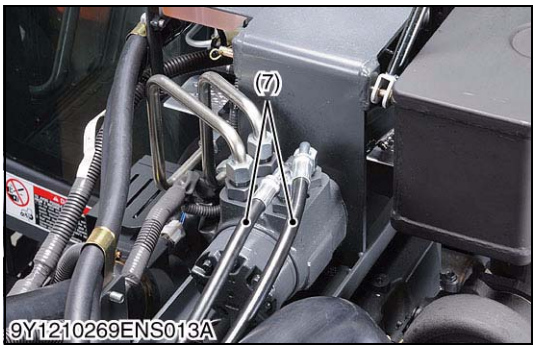
Tightening torque	Injector clamp nut	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Overflow pipe joint screw (M6 × 1.0)	9.81 to 11.2 N·m 1.00 to 1.15 kgf·m 7.24 to 8.31 lbf·ft
	Cylinder head cover 1 screw	6.87 to 11.2 N·m 0.700 to 1.15 kgf·m 5.07 to 8.31 lbf·ft
	Cylinder head cover 2 screw	9.81 to 11.2 N·m 1.00 to 1.15 kgf·m 7.24 to 8.31 lbf·ft
	Injection pipe retaining nut	23 to 36 N·m 2.3 to 3.7 kgf·m 17 to 26 lbf·ft

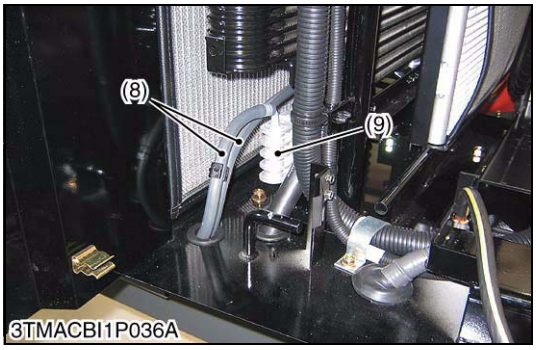
(1) Injector Adaptor (2) Compression Tester

9Y1210269ENS0104US0









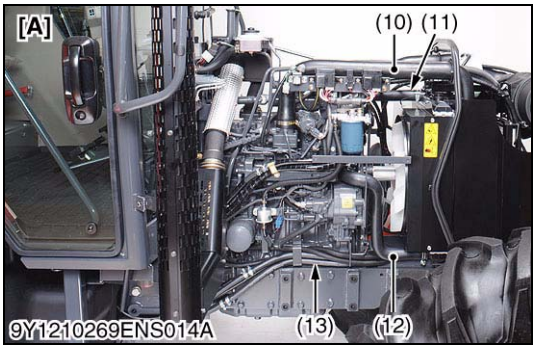
Hoses and Plate

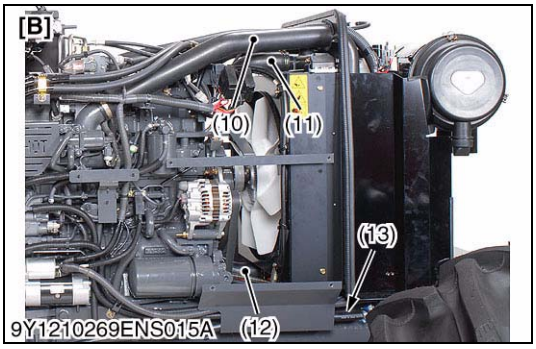
1. Remove the shield weather strip and plate (1).
2. Disconnect the air cleaner hoses (2), (3) from the turbocharger.
3. Disconnect the radiator hose (4).
4. Disconnect the oil cooler hose (5).
5. Disconnect the power steering hose (7).
6. Disconnect the fuel hose (8) from the fuel cooler (9).
7. Disconnect the differential lock hose (6).
8. Disconnect the radiator hose (11), (12) and oil cooler hose (13).
9. Disconnect the intercooler hose (10).

(When reassembling)

- Be sure to connect the power steering hoses to original position.

Tightening torque	Power steering hose retaining nut	21.6 to 27.4 N·m 2.2 to 2.8 kgf·m 16.0 to 20.2 lbf·ft





(1) Plate
(2) Air Cleaner Hose
(3) Air Cleaner Hose
(4) Radiator Hose
(5) Oil Cooler Hose
(6) Front Differential Lock Hose
(7) Power Steering Hose
(8) Fuel Hose
(9) Fuel Cooler
(10) Intercooler Hose
(11) Radiator Hose
(12) Radiator Hose
(13) Oil Cooler Hose

[A] V3800-CR-TI
[B] V6108-CR-TI

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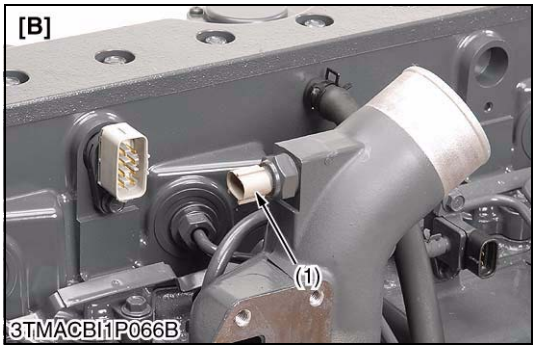

Intake Air Temperature Sensor

1. Remove the intake air temperature sensor (1).

(When reassembling)

- Replace the gasket with new one.

Tightening torque	Intake air temperature sensor	30 to 39 N·m 3.0 to 4.0 kgf·m 22 to 28 lbf·ft

(1) Intake Air Temperature Sensor

[A] V3800-CR-TI
[B] V6108-CR-TI

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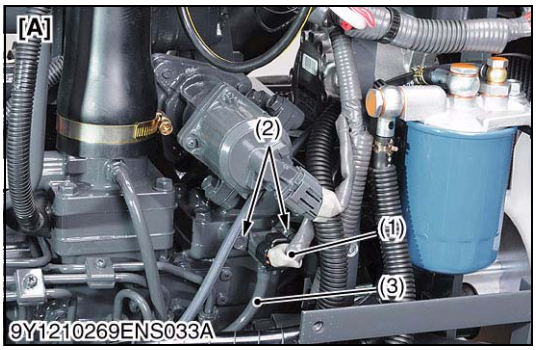
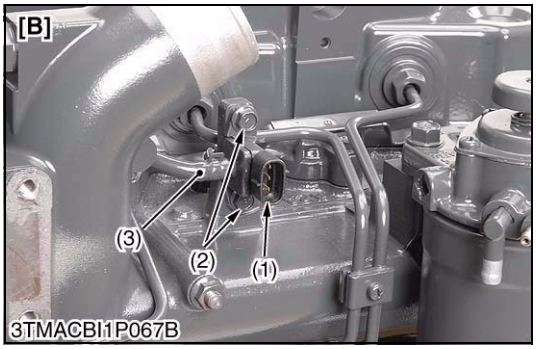




Intake Air Pressure Sensor

■ **IMPORTANT**

- **When you disconnect the intake air pressure hose from the intake air pressure sensor, be careful not to damage the intake air pressure sensor.**

1. Disconnect the intake air pressure hose (3) from the intake air pressure sensor (1).
2. Remove the intake air pressure sensor mounting screws (2).
3. Remove the intake air pressure sensor (1).

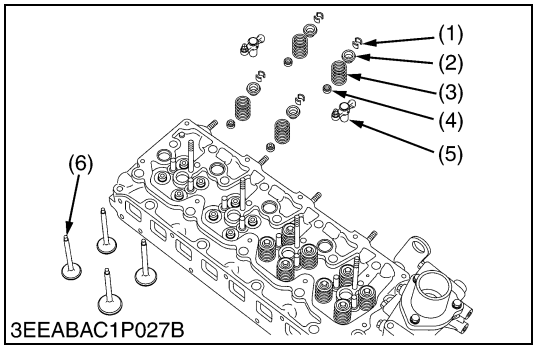
(When reassembling)

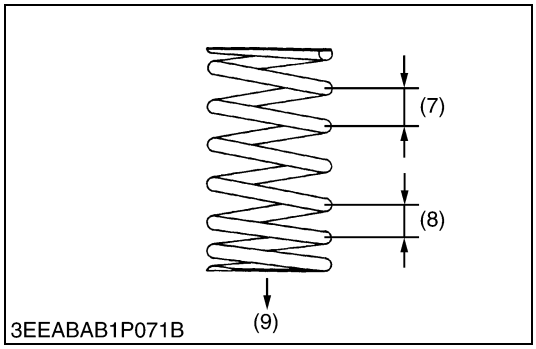
- If the intake air pressure hose is damage, replace the hose with new one.

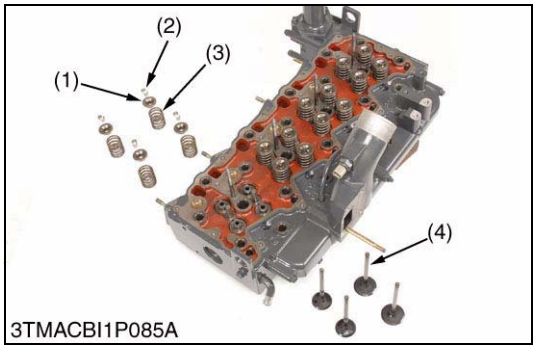
(1) Intake Air Pressure Sensor
(2) Intake Air Pressure Sensor Mounting Screw
(3) Intake Air Pressure Hose

[A] V3800-CR-TI
[B] V6108-CR-TI

9Y1210269ENS0037US0







Valve (V3800-CR-TI)

1. Remove the valve spring collets (1) after compressing the valve spring (3) with the valve spring retainer (2).

(When reassembling)

- Install the valve spring with its small-pitch end downward (at the head side).
- Wash the valve stem and valve guide hole, and apply engine oil sufficiently.
- After installing the valve spring collets, lightly tap the stem to assure proper fit with a plastic hammer.

(1) Valve Spring Collets
(2) Valve Spring Retainer
(3) Valve Spring
(4) Valve Stem Seal
(5) Arm Bridge
(6) Valve
(7) Large Pitch
(8) Smaller Pitch
(9) Install the spring with its smaller-pitch end downward (at the head side)

9Y1210269ENS0112US0

Valve (V6108-CR-TI)

1. Remove the valve spring collets (2) after compressing the valve spring (3) with the valve spring retainer (1).

(When reassembling)

- Install the valve spring with its small-pitch end downward (at the head side).
- Wash the valve stem and valve guide hole, and apply engine oil sufficiently.
- After installing the valve spring collets (2), lightly tap the stem to assure proper fit with a plastic hammer.

(1) Valve Spring Retainer
(2) Valve Spring Collets
(3) Valve Spring
(4) Valve

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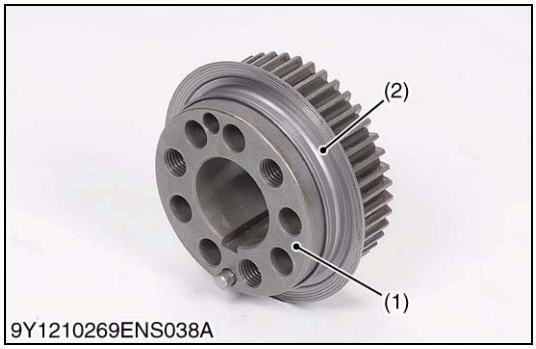
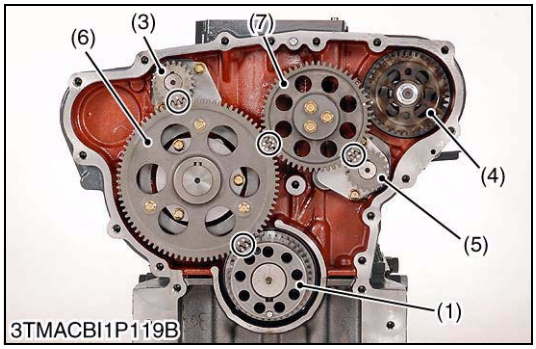
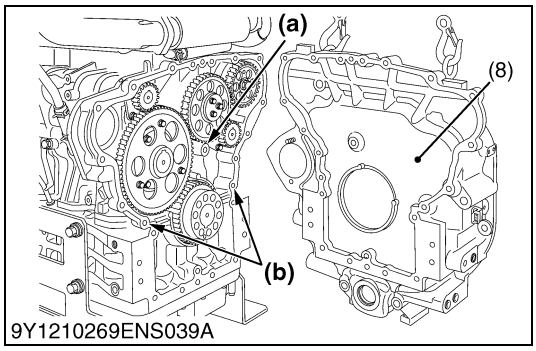






Replacing Oil Seal (V6108-CR-TI)

1. Remove the crankshaft gear (1) with the oil sling (2).
2. Remove the oil slinger (2) from the crankshaft gear (1).
3. Install the crankshaft gear (1) with screws.

■ **NOTE**

- **When installing the crankshaft gear (1), align all mating marks on each gear to assemble the timing gears, set the idle gear last.**
- **Be sure to confirm the No. 4 piston is at top dead center.**
- **Do not scratch marks on the crankshaft gear. Oil leakage will occur.**

4. Install the flywheel housing (8).

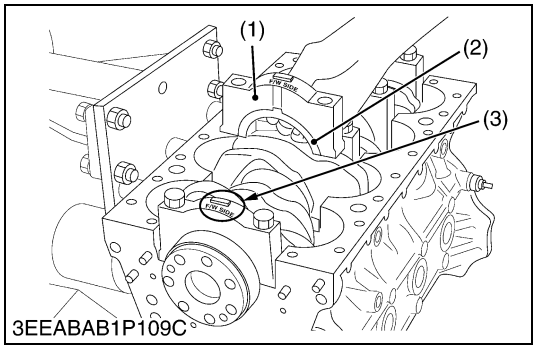
■ **NOTE**

- **Apply a liquid gasket (Three Bond 1217D) to the seam between crankshaft 1 and crankshaft 2.**
- **Assemble the adhesive-applied parts within ten minutes.**

(1) Crankshaft Gear
(2) Oil Sling
(3) Screw
(4) Supply Pump Gear
(5) Balancer Gear
(6) Cam Shaft
(7) Idle Gear
(8) Flywheel Housing

(a) Liquid Gasket
(b) Liquid Gasket

(To be continued)



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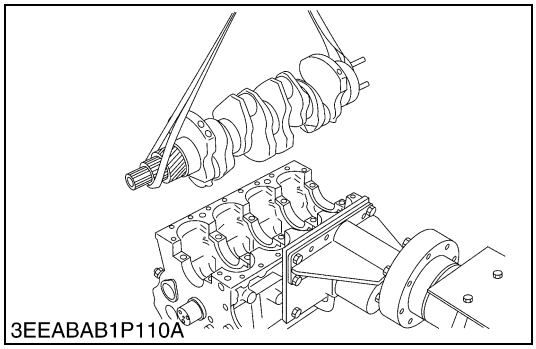
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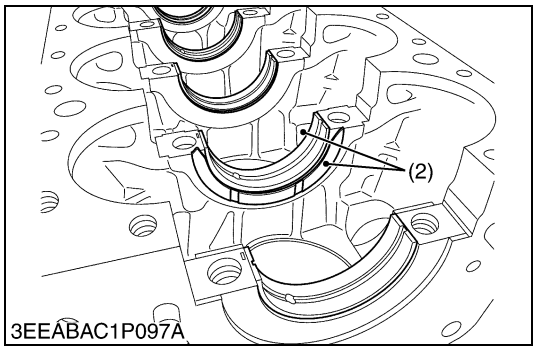

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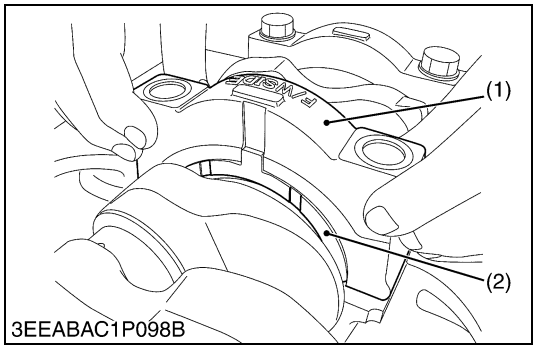

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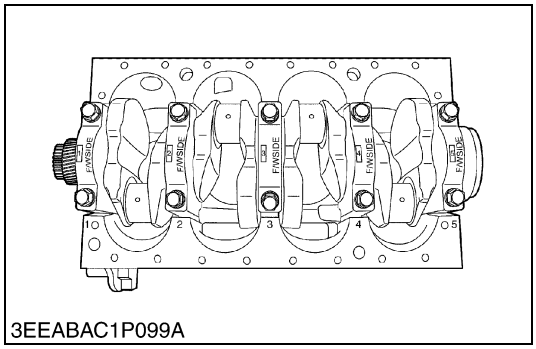
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Crankshaft (V3800-CR-TI)

1. Remove the main bearing case.
2. Remove the crankshaft.

(When reassembling)

- Reassemble the main bearing case having the same number as the one engraved on the crankcase, and set the casting mark "F / W SIDE" on the main bearing case facing towards the flywheel side.
- Reassemble the thrust bearing (2), with the oil groove facing outside, into both side of the fourth main bearing case (1).
- Apply oil to the bearing case screws and tighten them to the specified torque.

Tightening torque	Main bearing case screw	138 to 147 N·m 14.0 to 15.0 kgf·m 102 to 108 lbf·ft

(1) 4th Main Bearing Case
(2) Thrust Bearing
(3) F / W SIDE Mark

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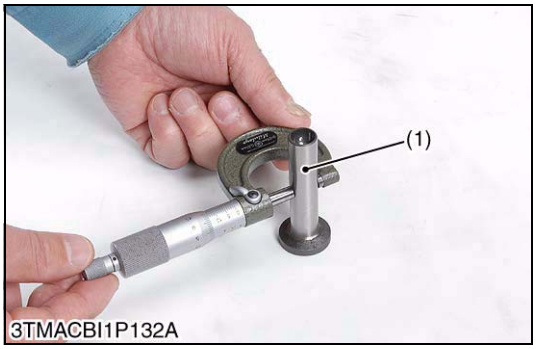


Oil Clearance between Tappet and Tappet Bore

1. Measure the tappet O.D. with an outside micrometer.
2. Measure the I.D. of the tappet bore at the most wear part with a small hole gauge.
3. If the oil clearance exceeds the allowable limit or the tappet is damaged, replace the tappet.

[V3800-CR-TI]

Oil clearance between tappet and tappet bore	Factory spec.	0.020 to 0.062 mm 0.00079 to 0.0024 in.
	Allowable limit	0.07 mm 0.003 in.

Tappet O.D.	Factory spec.	23.959 to 23.980 mm 0.94327 to 0.94409 in.
Tappet bore I.D.	Factory spec.	24.000 to 24.021 mm 0.94489 to 0.94570 in.

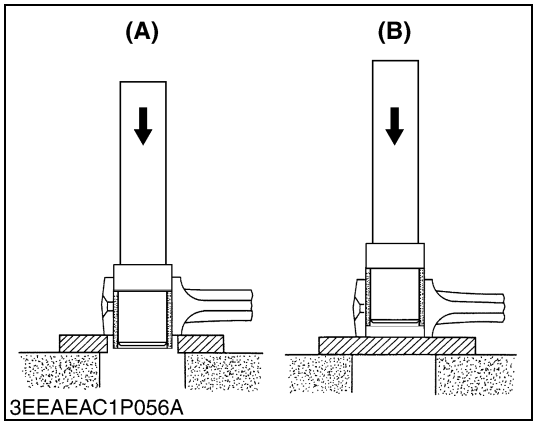
[V6108-CR-TI]

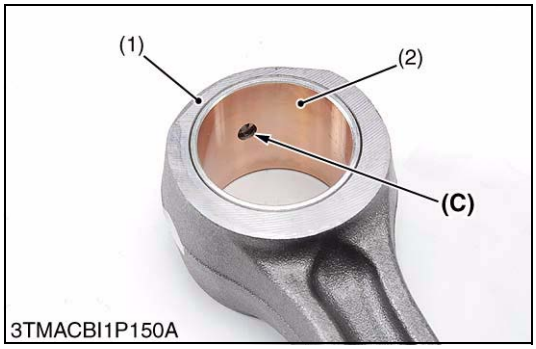
Oil clearance between tappet and tappet bore	Factory spec.	0.032 to 0.061 mm 0.0013 to 0.0024 in.
	Allowable limit	0.07 mm 0.003 in.

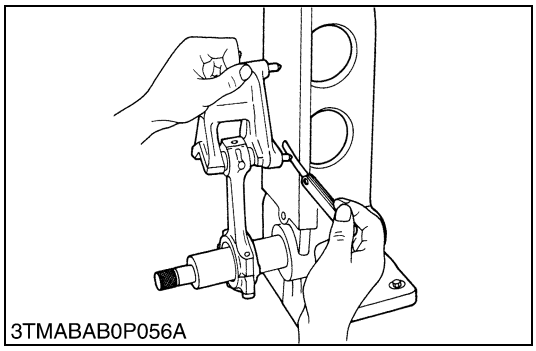
Tappet O.D.	Factory spec.	13.957 to 13.968 mm 0.54949 to 0.54992 in.
Tappet bore I.D.	Factory spec.	14.000 to 14.018 mm 0.55119 to 0.55188 in.

(1) Tappet

9Y1210269ENS0075US0







Replacing Small End Bushing

(When removing)

1. Press out the used bushing using a small end bushing replacing tool. (Refer to "8. SPECIAL TOOLS" at "GENERAL" section.)

(When installing)

1. Clean a new small end bushing and bore, and apply engine oil to them.
2. Press fit the bushing using the bushing replacing tool.

■ **IMPORTANT**

- **Be sure to align the oil hole of bushing and connecting rod.**

(1) Connecting Rod
(2) Bushing

(A) When Removing
(B) When Installing
(C) Oil Hole

9Y1210269ENS0090US0

Connecting Rod Alignment

■ **NOTE**

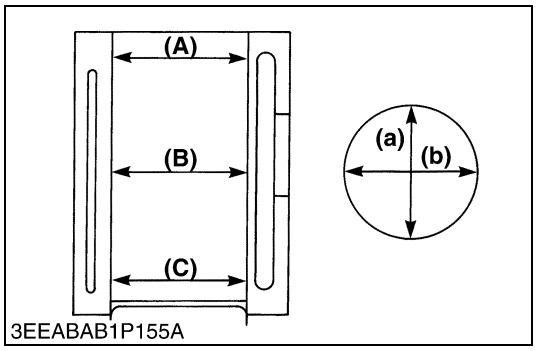
- **Since the I.D. of the connecting rod small end bushing is the basis of this check, check the bushing for wear beforehand.**

1. Remove the piston pin from the piston.
2. Install the piston pin in the connecting rod.
3. Install the connecting rod on the connecting rod alignment tool.
4. Put a gauge over the piston pin, and move it against the face plate.
5. If the gauge does not fit squarely against the face plate, measure the space between the pin of the gauge and the face plate.
6. If the measurement exceeds the allowable limit, replace the connecting rod.

Connecting rod alignment	Allowable limit	0.05 mm 0.0020 in.

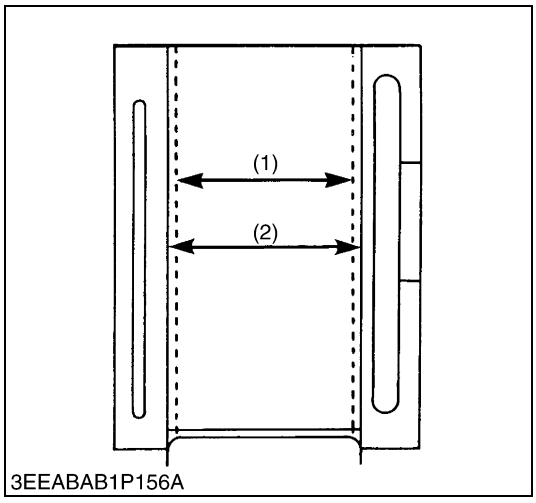
9Y1210269ENS0091US0

(5) Cylinder



(A) Top
(B) Middle
(C) Bottom (Skirt)
(a) Right-angled to piston pin
(b) Piston pin direction

9Y1210269ENS0098US0



Cylinder Wear

1. Measure the I.D. of the cylinder at the six positions (see figure) with a cylinder gauge to find the maximum and minimum I.D.'s.
2. Get the difference (Maximum wear) between the maximum and the minimum I.D.'s.
3. If the wear exceeds the allowable limit, bore and hone to the oversize dimension. (Refer to "Correcting Cylinder".)
4. Visually check the cylinder wall for scratches. If deep scratches are found, the cylinder should be bored. (Refer to "Correcting Cylinder".)

[V3800-CR-TI]

Cylinder Bore I.D.	Factory spec.	100.00 to 100.022 mm 3.93701 to 3.93787 in.
	Allowable limit	100.15 mm 3.9429 in.

[V6108-CR-TI]

Cylinder Bore I.D.	Factory spec.	118.000 to 118.035 mm 4.6456 to 4.6470 in.
	Allowable limit	118.15 mm 4.6516 in.

Correcting Cylinder (Oversize)

1. When the cylinder is worn beyond the allowable limit, bore and hone it to the specified dimension.

[V3800-CR-TI]

Cylinder I.D. (2)	Factory spec.	100.500 to 100.522 mm 3.95670 to 3.95755 in.
Maximum wear	Allowable limit	100.65 mm 3.9626 in.
Finishing	Hone to 1.2 to 3.0 µm Rz (48 to 110 µin. Rz)	

[V6108-CR-TI]

Cylinder I.D. (2)	Factory spec.	118.500 to 118.535 mm 4.6653 to 4.6667 in.
Maximum wear	Allowable limit	118.65 mm 4.6713 in.
Finishing	Hone to 2.2 to 3.0 µm Rz (0.000087 to 0.00012 in. Rz)	

2. Replace the piston and piston rings with oversize 0.5 mm (0.0197 in.) ones.

■ **NOTE**

- **When the oversize cylinder is worn beyond the allowable limit, replace the cylinder block with a new one.**

(1) Cylinder I.D. (Before Correction) (2) Oversize Cylinder I.D.

9Y1210269ENS0099US0

1. TROUBLESHOOTING

MASTER CLUTCH (SHUTTLE CLUTCH)

Symptom	Probable Cause	Solution	Reference Page
Master Clutch Slip	Operating pressure is low	Adjust	8-S15
	Master clutch valve malfunctioning	Replace	2-S25
	Clutch disc or steel plate excessively worn	Replace	2-S25 2-S26
	Deformation of piston or steel plate	Replace	2-S25 2-S26
Master Clutch Operating Pressure Is Low	Transmission oil improper or insufficient	Replenish or change	G-8
	Regulator valve malfunctioning	Adjust or replace	8-S12
Master Clutch Drags	Return spring weaken or broken	Replace	2-S26
	Deformation of piston or steel plate	Replace	2-S26

PTO CLUTCH

Symptom	Probable Cause	Solution	Reference Page
PTO Clutch Slip	Operating pressure is low	Adjust	8-S13
	PTO clutch valve malfunctioning	Repair or replace	2-S24
	Clutch disc or steel plate excessively worn	Replace	2-S27
	Deformation of piston or return spring	Replace	2-S27
PTO Shaft Does Not Rotate	PTO clutch malfunctioning	Repair or replace	2-S23
	PTO propeller shaft coupling disengaged	Engage	–
	PTO clutch valve malfunctioning		2-S24
PTO Clutch Operating Pressure Is Low	Transmission oil improper or insufficient	Replenish or change	G-8
	Regulator valve malfunctioning	Adjust or replace	8-S12
PTO Clutch Drags	Brake plate excessively worn	Replace	2-S27
	Return spring weaken or broken	Replace	2-S27
	Deformation of plate or steel plate	Replace	2-S27

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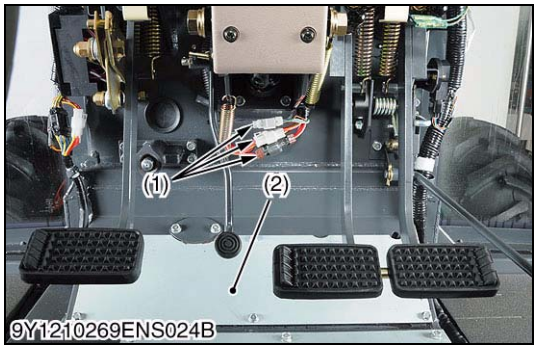

Wiring Harness Connector and Cover

1. Disconnect the engine wiring harness connectors (1).
2. Remove the floor mat and cover (2).

(1) Connector
(2) Cover

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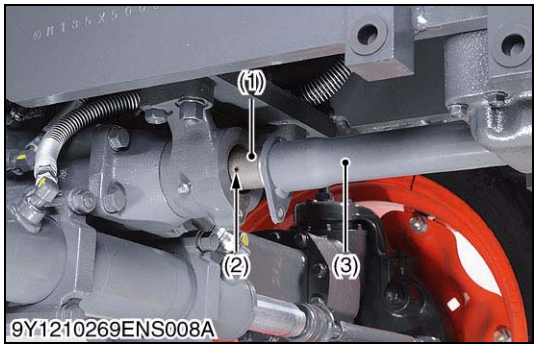

Propeller Shaft

1. Slide the propeller shaft cover (3) after removing the screw (5).
2. Tap out the spring pins (2) and then slide the coupling (1) to the rear.

(When reassembling)

- Apply grease to the splines of the propeller shaft (6) and pinion shaft.
- Tap in the spring pins (2) as shown in figure.

(1) Coupling
(2) Spring Pin
(3) Propeller Shaft Cover
(4) Spring Pin
(5) Screw
(6) Propeller Shaft
(7) Coupling

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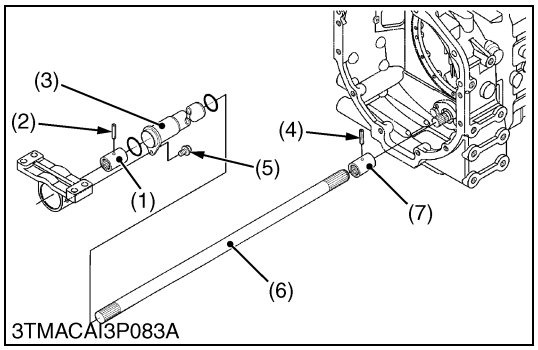

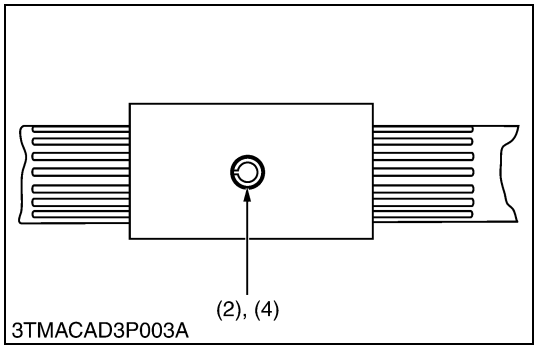

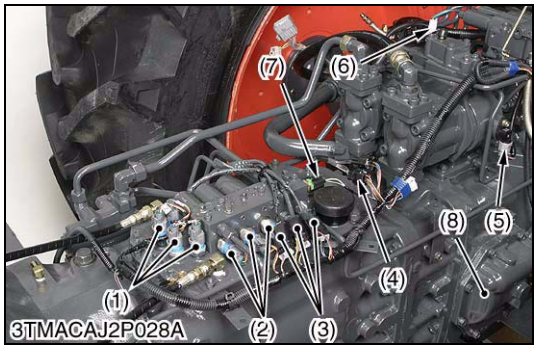

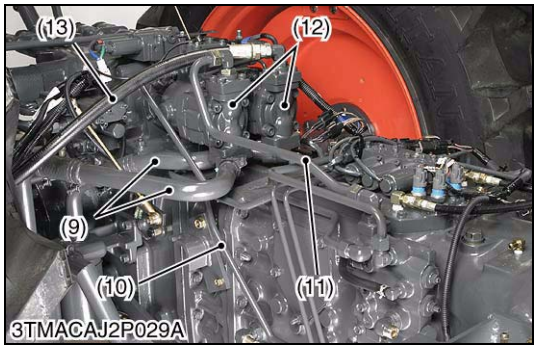

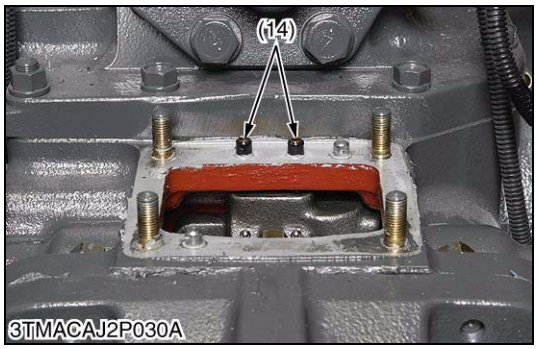

Connectors, Pipes and Hydraulic Pump

1. Disconnect the connectors (1), (2), (3), (4), (5), (6), (7).
2. Remove the creep case (8) from power shift valve assembly.
3. Remove the suction pipe (9).
4. Remove the delivery pipe (11) and return pipe (10).
5. Remove the delivery hose (13).
6. Remove the hydraulic pump assembly (12) with pump base.

(When reassembling)

- Replace the oil pipes (14) with new ones.
- Apply oil to the pipes.
- Apply liquid gasket (Three Bond 1208D, 1206D or equivalent) to joint face of the valve case and transmission case.

Tightening torque	3P delivery hose retaining nut	45.1 to 53.0 N·m 4.6 to 5.4 kgf·m 33.3 to 39.0 lbf·ft
	Power steering pump delivery pipe retaining nut	107.9 to 117.7 N·m 11.0 to 12.0 kgf·m 79.6 to 86.8 lbf·ft
	Return pipe retaining nut	49.0 to 68.6 N·m 5.0 to 7.0 kgf·m 36.1 to 50.6 lbf·ft
	Creep case mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 lbf·ft
	Hydraulic pump base mounting nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 lbf·ft

(1) Connector
(2) Connector
(3) Connector
(4) Connector
(5) Connector
(6) Connector
(7) Connector
(8) Creep Case
(9) Suction Pipe
(10) Return Pipe
(11) Delivery Pipe (Power Steering)
(12) Hydraulic Pump Assembly
(13) Delivery Hose
(14) Oil Pipe

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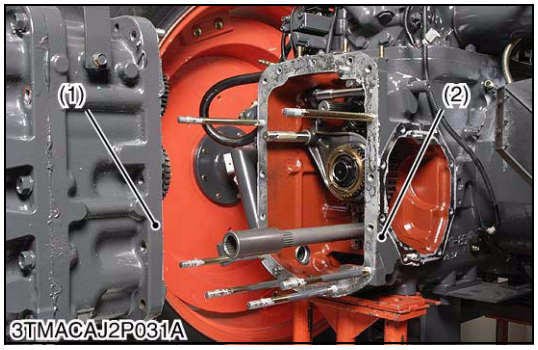

Separating Mid Case from Transmission Case

1. Place the disassembling stands under the clutch housing case and transmission case.
2. Remove the mid case mounting screws and nuts.
3. Separate the mid case (1) from transmission case (2).

(When reassembling)

- Apply liquid gasket (Three Bond 1208D, 1206D or equivalent) to joint face of mid case and transmission case.

Tightening torque	Mid case and transmission case mounting screw and nut	103.0 to 117.7 N·m 10.5 to 12.0 kgf·m 76.0 to 86.8 lbf·ft

(1) Mid Case
(2) Transmission Case

9Y1210269CLS0020US0

3 TRANSMISSION

Travelling Speed Sensor

This sensor is to detect the travelling speed and it is equipped on the left bottom side of differential case.

This sensor perceives tooth of the detection gear which is driven by drive gear on the 4WD shaft and emits pulse.

This pulse is sent to the electronic instrument panel and the travelling speed is calculated by the coefficient which is set according to the tire size.

The date of travelling speed is always sent to the MAIN ECU.

(1) Travelling Speed Sensor (2) Detection Gear

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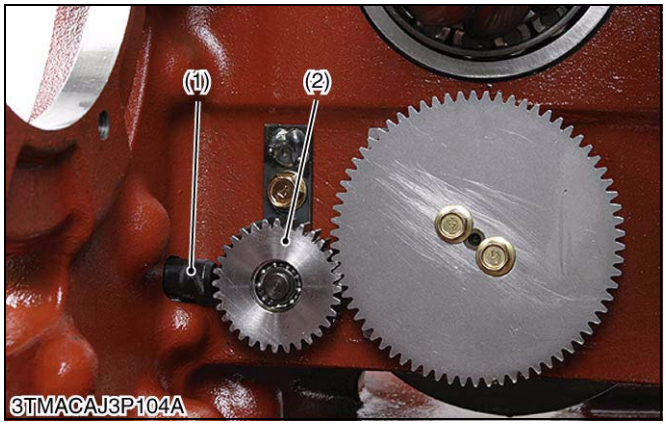

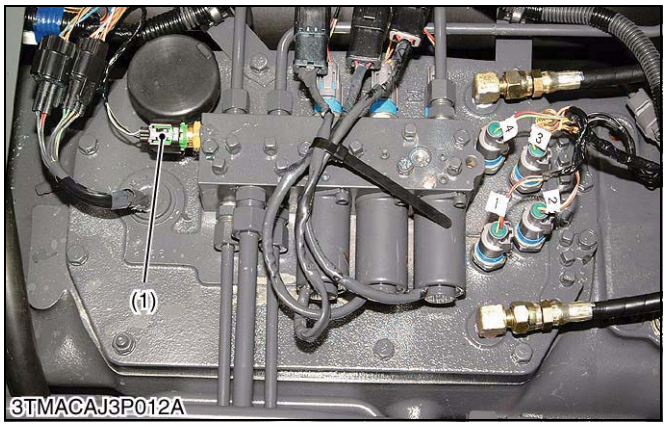

Hydraulic Oil Temperature Sensor

The oil temperature sensor detects a temperature of transmission fluid, and corrects operating time and current of the solenoid valve according to the temperature of transmission fluid.

This system makes engagement of master clutch smooth even if oil viscosity changes.

(1) Hydraulic Oil Temperature Sensor

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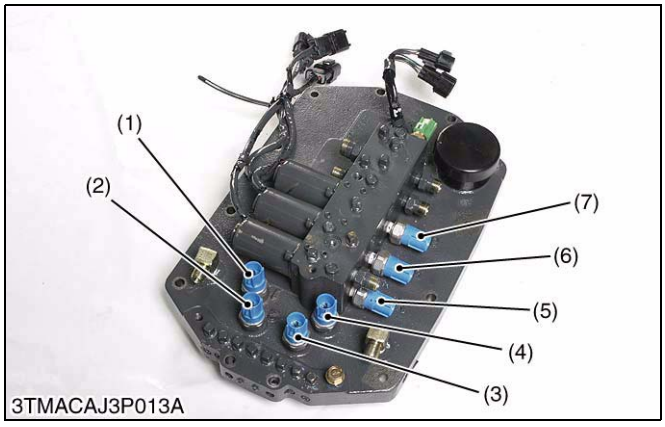

Pressure Switch

The pressure switch is to detect the operation of hydraulic clutches and is provide at the power shift valve. (7 pressure switch are provided.)

This switch is a **NO** (Normal Open) type switch which contact closes when the pressure is raised.

The contacts close at a pressure higher than 1.18 MPa (12 kgf/cm^2) and open at a pressure lower than 0.74 MPa (7.5 kgf/cm^2).

(1) For Main Shift **1**
(2) For Main Shift **2**
(3) For Main Shift **3**
(4) For Main Shift **4**
(5) For Master (**F-R**)
(6) For Main Shift **L**
(7) For Main Shift **H**

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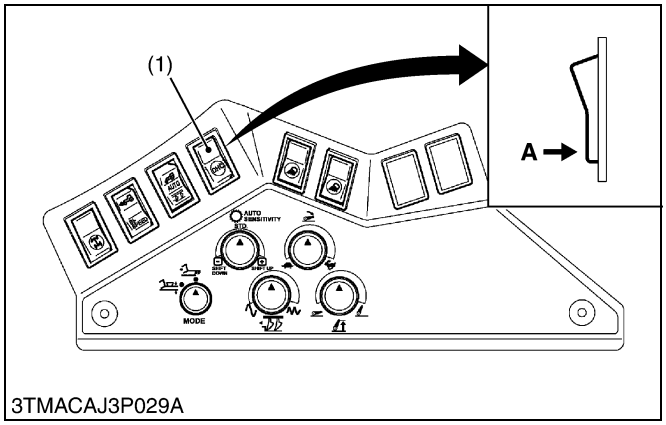
[4] OTHER CONTROL

(1) Down-hill Control



On this tractor, the engine load and other fluctuations are sensed and the speed is well controlled in response to the loads. Turn the DHC switch **"ON"** when using a traction PTO attachment (baler, etc.) on a slope. A well responsive speed control can be expected. In other applications, turn this switch **"OFF"**. Smooth speed change is available for comfortable ride.

(1) DHC Switch **A : Push to ON**

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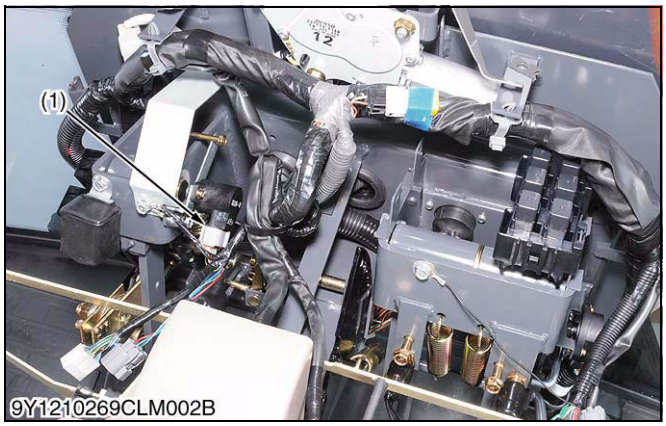
(2) Clutch Pedal Control



The position of clutch pedal is detected by clutch pedal sensor and the master clutch pressure is controlled by solenoid proportional reducing valve according to the position of clutch pedal. Thus, it can be operated with a feeling similar to that of ordinary mechanical clutch. Moreover, since the master clutch pressure boosting pattern is set for each of the speed change steps, it can be operated with a same feeling at any step.

Besides the clutch can be shifted also by operation of the clutch button of the power shift lever. In this case, the pressure of master clutch is also controlled (modulated) in the effect for smooth clutch engagement.

(1) Clutch Pedal Sensor

9Y1210269TRM0034US0

(3) Shuttle Control

The master (**F-R**) clutch is controlled to switch the forward / reverse operation by manipulating the shuttle lever. At this time, the forward / reverse operation can be switched smoothly by controlling (modulating) the pressure of the master clutch.

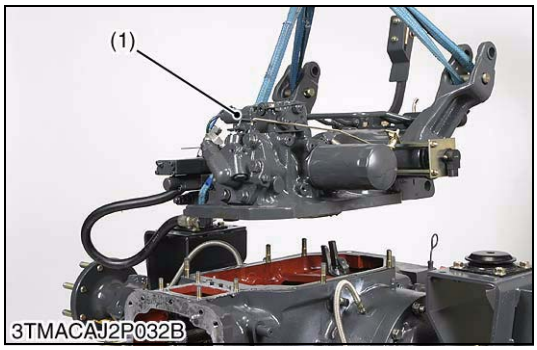
(1) Shuttle Lever

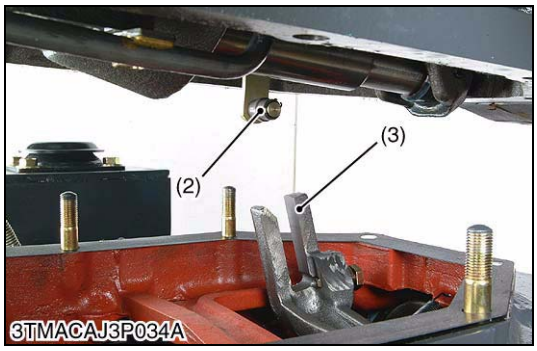
9Y1210269TRM0035US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Shift Fork and Shifter Groove	Clearance (M100X, M110X, M126X, M135X)	0.13 to 0.40 mm 0.0051 to 0.0157 in.	0.80 mm 0.031 in.
Internal Snap Ring and Pressure Plate (Main Shift Clutch 1st to 4th)	Clearance (M100X, M110X, M126X, M135X)	1.6 to 1.8 mm 0.063 to 0.071 in.	3.2 mm 0.126 in.
Internal Snap Ring and Pressure Plate (Main Shift Clutch **L** Range Side)	Clearance (M100X, M110X)	2.0 to 2.2 mm 0.079 to 0.087 in.	3.6 mm 0.142 in.
	Clearance (M126X, M135X)	2.6 to 2.8 mm 0.102 to 0.110 in.	4.2 mm 0.165 in.
Internal Snap Ring and Pressure Plate (Main Shift Clutch **H** Range Side)	Clearance (M100X, M110X)	1.6 to 1.9 mm 0.063 to 0.075 in.	3.3 mm 0.130 in.
	Clearance (M126X, M135X)	1.8 to 2.1 mm 0.071 to 0.083 in.	3.5 mm 0.138 in.
Clutch Disc [3F903-28501] (Main Shift Clutch 1st to 4th)	Thickness (M100X, M110X)	2.12 to 2.28 mm 0.083 to 0.090 in.	1.8 mm 0.071 in.
Clutch Disc [3F250-28501] (Main Shift Clutch 1st to 4th)	Thickness (M126X, M135X)	1.72 to 1.88 mm 0.068 to 0.074 in.	–
Clutch Disc [3F250-28501] (Main Shift Clutch **L** Range Side)	Thickness (M100X, M110X, M126X, M135X)	1.72 to 1.88 mm 0.068 to 0.074 in.	–
Clutch Disc [3F250-28501] (Main Shift Clutch **H** Range Side)	Thickness (M100X, M110X, M126X, M135X)	1.72 to 1.88 mm 0.068 to 0.074 in.	–
Clutch Disc [3F750-28501] (Main Shift Clutch **H** Range Side)	Thickness (M100X, M110X, M126X, M135X)	2.12 to 2.28 mm 0.083 to 0.090 in.	1.8 mm 0.71 in.
Drive Plate [3F750-24482] (Main Shift Clutch)	Thickness (M100X, M110X, M126X, M135X)	1.94 to 2.06 mm 0.076 to 0.081 in.	–
Drive Plate [3F750-23681] (Main Shift Clutch)	Thickness (M100X, M110X)	2.30 to 2.40 mm 0.091 to 0.094 in.	–
Drive Plate [3F903-24481] (Main Shift Clutch)	Thickness (M126X, M135X)	2.52 to 2.68 mm 0.099 to 0.105 in.	–
Pressure Plate [3F750-28561] (Main Shift Clutch 1st to 4th, **L-H**)	Thickness (M100X, M110X, M126X, M135X)	3.92 to 4.08 mm 0.154 to 0.161 in.	3.6 mm 0.142 in.
Internal Snap Ring and Pressure Plate (4WD/Bi-speed Clutch)	Clearance (M100X, M110X, M126X, M135X)	1.5 to 2.0 mm 0.059 to 0.079 in.	3.5 mm 0.138 in.
Drive Plate [3P220-24481] (Main Shift Clutch)	Thickness (M100X, M110X)	1.69 to 1.81 mm 0.067 to 0.071 in.	–
Drive Plate [3P220-24461] (Main Shift Clutch)	Thickness (M100X, M110X)	1.69 to 1.81 mm 0.067 to 0.071 in.	–
Drive Plate [33980-24461] (Main Shift Clutch)	Thickness (M126X, M135X)	1.15 to 1.25 mm 0.045 to 0.049 in.	–
Clutch Disc (4WD/Bi-speed Clutch)	Thickness (M100X, M110X, M126X, M135X)	2.12 to 2.3 mm 0.083 to 0.090 in.	1.8 mm 0.071 in.

(2) Separating Hydraulic Cylinder and Rear Axle from Transmission Case





Dismounting Hydraulic Cylinder Assembly

1. Remove the hydraulic cylinder assembly mounting screws and nuts.
   Support the hydraulic cylinder assembly (1) with nylon lift strap and hoist, and then remove it.
2. Dismount the hydraulic cylinder assembly from transmission case.

(When reassembling)

- Be sure to put roller (2) in to the groove of draft link 1 (3).
- Change the hydraulic cylinder gasket to new one.

Tightening torque	Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 lbf·ft

(1) Hydraulic Cylinder Assembly
(2) Roller
(3) Draft Link 1

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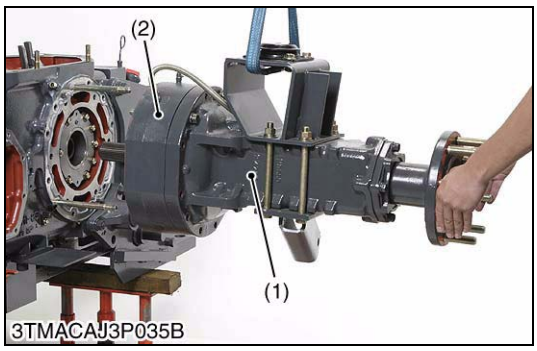

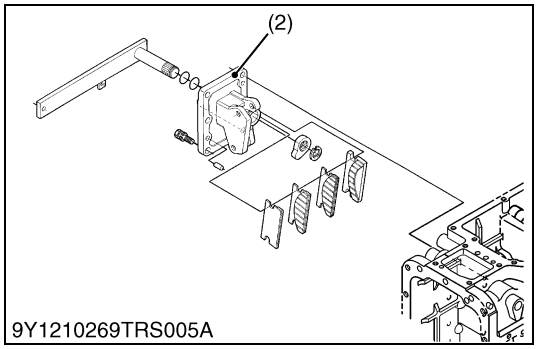

Rear Axle Case and Parking Brake Case

1. Remove the rear axle case mounting screws and nuts.
2. Support the rear axle case with nylon lift strap and hoist.
3. Separate the rear axle case (1) from transmission case.
4. Remove the parking brake case.

(When reassembling)

- Apply liquid gasket (Three Bond 1206D or equivalent) to joint face of the rear axle case and transmission case, after eliminate the water, oil and stuck liquid gasket.
- Apply liquid gasket (Three Bond 1206D or equivalent) to joint face of parking brake case and transmission case.

Tightening torque	Rear axle case mounting screw	124 to 127 N·m 12.0 to 15.0 kgf·m 91.2 to 108.5 lbf·ft
	Parking brake case mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 lbf·ft

(1) Rear Axle Case
(2) Brake Case

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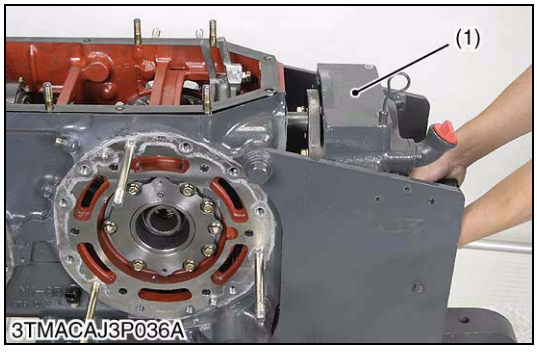
(3) Separating Rear PTO Case from Transmission Case



Rear PTO Case

1. Remove the rear PTO case mounting screws and then rear PTO case (1).

(When reassembling)

- Replace the rear cover gasket with new one.

Tightening torque	Rear cover mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 lbf·ft

(1) Rear PTO Case

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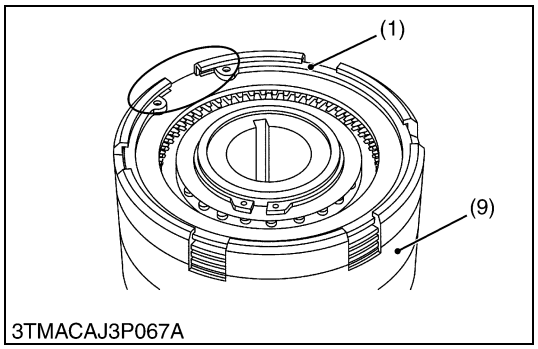

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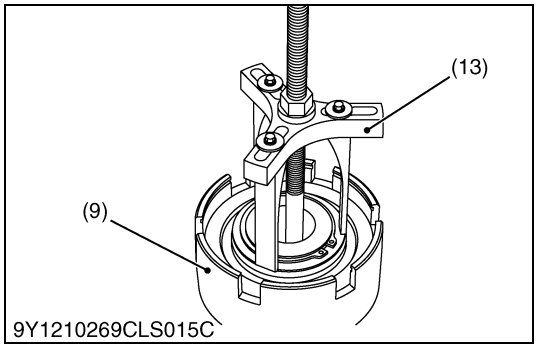

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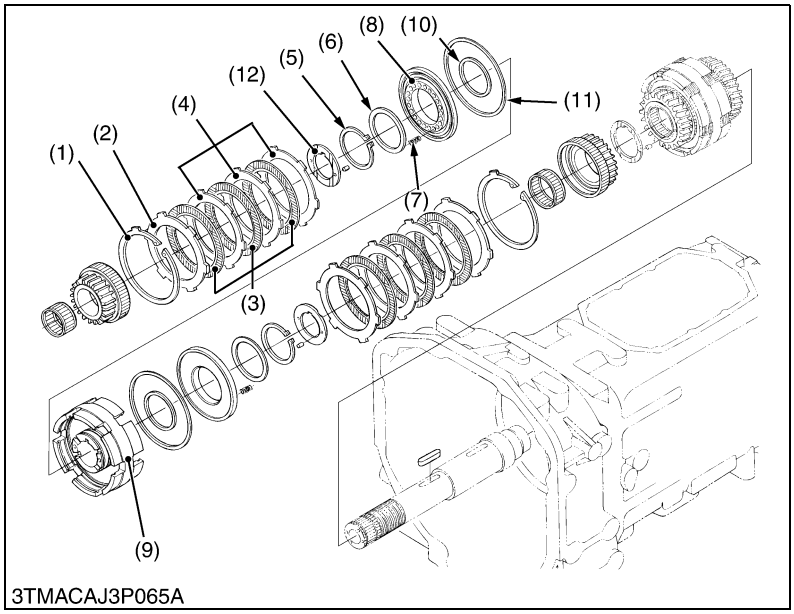
Clutch Assembly (1-2), (3-4)

1. Remove the internal snap ring (1).
2. Take out the pressure plate (2), clutch discs (3) and drive plates (4).
3. Remove the external snap ring (5) with using the hydraulic clutch spring compressor (13) (See page G-63).
4. Take out the piston (8) and D-ring by compression air.
5. Remove the parts for other side as above.

(When reassembling)

- Apply transmission fluid to D-ring (10) and square ring (11).
- Confirm the moving of the piston (8) smoothly when pressure air at 0.5 to 1.0 MPa (5 to 10 kgf/cm^2, 71 to 142 psi) is sent to clutch pack. (Refer to the photo left.)
- When install the internal snap ring (1) to the clutch body (9), align its split portion to the notched portion of clutch body.



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(1) Internal Snap Ring
(2) Pressure Plate
(3) Clutch Disc
(4) Drive Plate
(5) External Snap Ring
(6) Spring Guide
(7) Spring
(8) Piston
(9) Clutch Body
(10) D-ring
(11) Square Ring
(12) Thrust Collar
(13) Hydraulic Clutch Spring Compressor

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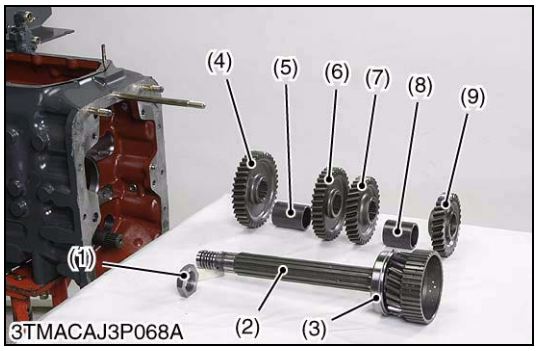

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Counter Shaft

1. Tap out the counter shaft (2).
2. Take out the 39T gear (4), 37T gear (6), 33T gear (7), 29T gear (9) and collar (5), (8).

(When reassembling)

- When reassembling the counter shaft, put on the 31T gear to 1st shaft rear before assembly the counter shaft completely.
- After assembling the 1st shaft, be sure to stake the staking nut. (See page 3-M10.)

(1) Staking Nut
(2) Counter Shaft
(3) Bearing
(4) 39T Gear
(5) Collar
(6) 37T Gear
(7) 33T Gear
(8) Collar
(9) 29T Gear

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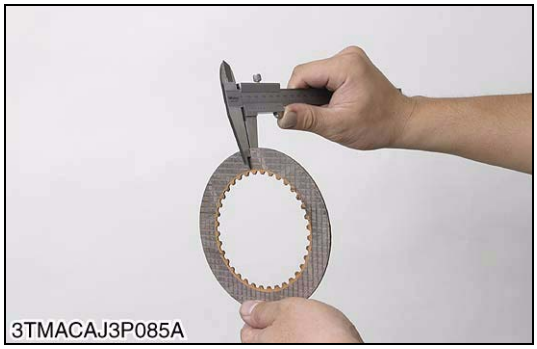
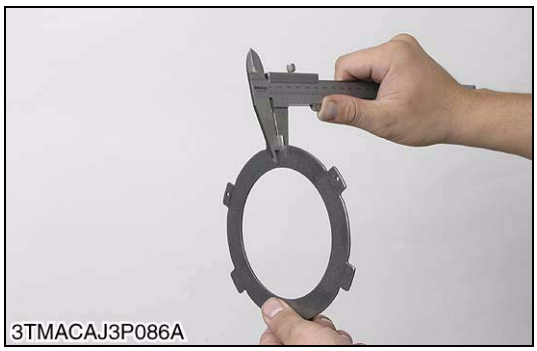




■ Main Shift Clutch (H Range Side)

Clearance between internal snap ring and pressure plate	Factory spec.	M100X M110X	1.6 to 1.9 mm 0.063 to 0.075 in.
		M126X M135X	1.8 to 2.1 mm 0.071 to 0.083 in.
	Allowable limit	M100X M110X	3.3 mm 0.130 in.
		M126X M135X	3.5 mm 0.138 in.

[M100X, M110X]

Item	Thickness	Number
Drive plate	1.4 mm (0.055 in.)	4
Clutch disc	1.8 mm (0.071 in.)	4
Pressure plate	4.0 mm (0.157 in.)	1
Piston	16.5 mm (0.650 in.)	1

[M126X, M135X]

Item	Thickness	Number
Drive plate	1.6 mm (0.063 in.)	5
Clutch disc	1.8 mm (0.071 in.)	5
Pressure plate	4.0 mm (0.157 in.)	1
Piston	10 mm (0.394 in.)	1

9Y1210269TRS0046US0

(Continued)

The rear axles are the final mechanisms which transmit power from the transmission to the rear wheels. Direction of power transmitted is changed at a right angle by the differential gear, and at the same time, speed is reduced. It is further reduced by the planetary gear to drive the rear axles.

The rear axles are semi-floating type with the ball bearing between the rear axle (1) and rear axle case (2), which support the rear wheel load as well as transmitting power to the rear wheel. They withstand all the forces caused by tire rotation and side skidding.

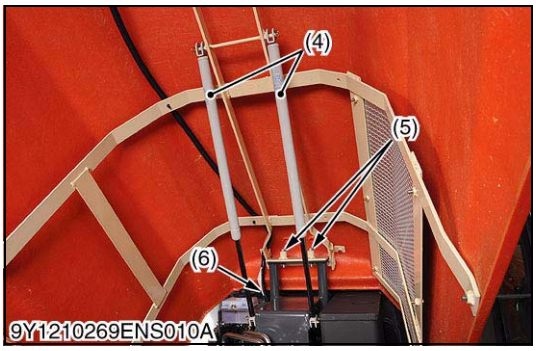
9Y1210269RAM0001US0

MECHANISM

CONTENTS

[2] DISASSEMBLING AND ASSEMBLING

(1) Master Cylinder and Equalizer



Muffler and Bonnet

1. Open the bonnet (1) and disconnect the battery (7) negative terminal.
2. Disconnect the **8P** connector (6) for head light.
3. Remove the damper (4) and bonnet bracket mounting screws (5).
4. Remove the bonnet (1).
5. Remove the side cover (3).
6. Remove the muffler (2).

(When reassembling)

■ **NOTE**

- **Be sure to insert the muffler by 42 mm (1.7 in.).**

Tightening torque	Muffler mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.2 lbf·ft

■ **IMPORTANT**

- **When disconnecting the battery cables, disconnect the grounding cable first. When connecting, positive cable first.**

(1) Bonnet
(2) Muffler
(3) Side Cover
(4) Damper
(5) Screw
(6) **8P** Connector
(7) Battery

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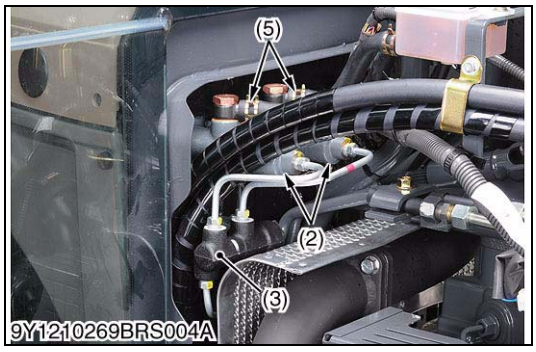
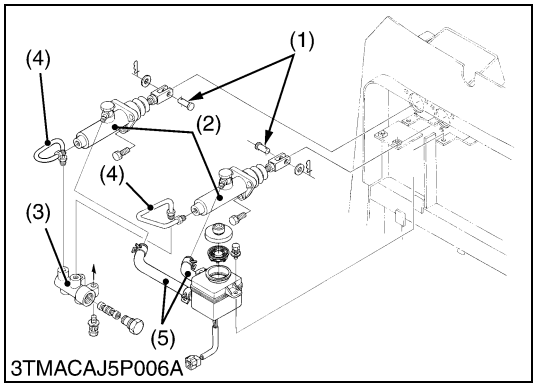




Master Cylinder and Equalizer

1. Disconnect the hoses (5).
2. Remove the clevis pin (1) from push rod end.
3. Remove the brake pipe (4).
4. Remove the master cylinder (2) and equalizer (3).

(When reassembling)

- Wash all parts with clean brake oil. (Refer to "4. LUBRICANTS, FUEL AND COOLANT" at "G. GENERAL" section.)
- Before assembling the cylinder cups and O-rings, immerse them in clean brake oil or apply silicon grease to them.
  Use only the brake oil or silicon grease, otherwise the cylinder cups may be deteriorated.
- It is recommended to replace the cylinder cups and gasket with new ones.
- Check the cylinder port for clogging, the inner surface of cylinder and piston sliding part for damage, wear and rust the spacer for breakage and deformation, the return spring for fatigue and rust.
  If any defect is found, replace it.

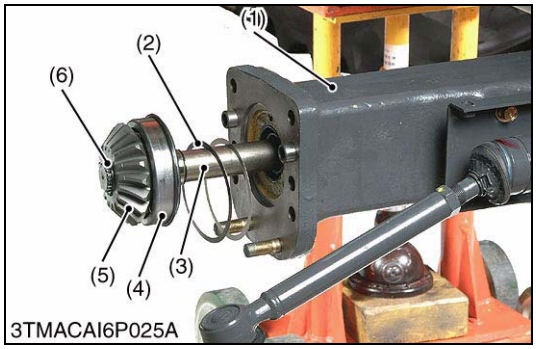
Tightening torque	Brake pipe nut	16.0 to 24.0 N·m 1.6 to 2.5 kgf·m 11.8 to 17.7 lbf·ft

(1) Clevis Pin
(2) Master Cylinder
(3) Equalizer
(4) Brake Pipe
(5) Hose

9Y1210269BRS0011US0

SERVICING

CONTENTS



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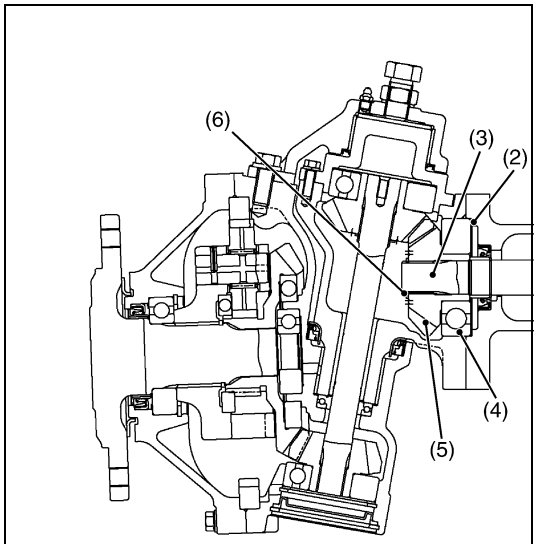

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Bevel Gear and Differential Yoke Shaft (M100X, M110X)

1. Remove the bevel gear (5), bearing (4) and differential yoke shaft (3) as a unit from the differential case (1).
2. Remove the external snap ring (6) and remove the bevel gear (5).

(When reassembling)

- Install the adjusting shims (2) correctly noting their location.
- Apply liquid gasket (Three Bond 1208D, 1206D or equivalent) to the front differential case (1).

(1) Differential Case
(2) Shim
(3) Yoke Shaft
(4) Bearing
(5) 19T Bevel Gear
(6) External Snap Ring

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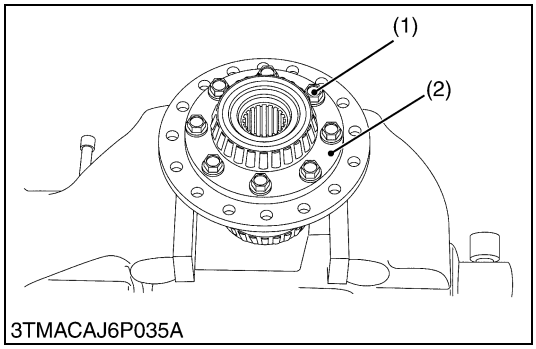

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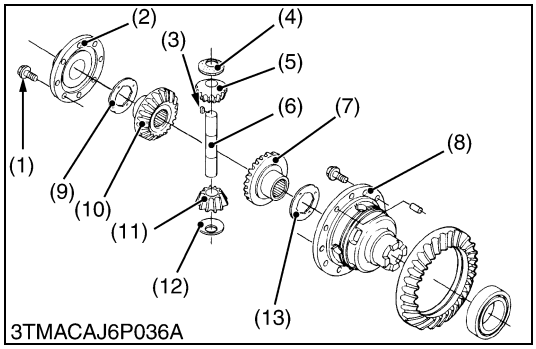

3TMACAJ6P036A

Differential Gear (M126X, M135X)

1. Remove the differential case cover mounting screws (1).
2. Remove the differential pinion shaft (6), and tap out the differential case cover (2) from the differential gear case (8) side.
3. Take out the differential side gear (10) and differential side gear washer (9).
4. Take out the differential pinions (5), (11) and differential pinion washer (4), (12).
5. Take out the differential side gear (7) and differential side gear washer (13).

■ **NOTE**

- **Arrange the parts to know their original position.**

(When reassembling)

- Install the parts to their original position.
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of the differential pinions and differential side gears.
- Lock the differential pinion shaft (6) by setting the key (3).
- Apply lock tight (Three Bond 1324B or equivalent) to the differential case cover mounting screws.

Tightening torque	Differential case cover mounting screw (M10-7T)	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Screw
(2) Differential Case Cover
(3) Key
(4) Differential Pinion Washer
(5) Differential Pinion
(6) Differential Pinion Shaft
(7) Differential Side Gear
(8) Differential Gear Case
(9) Differential Side Gear Washer
(10) Differential Side Gear
(11) Differential Pinion
(12) Differential Pinion Washer
(13) Differential Side Gear Washer

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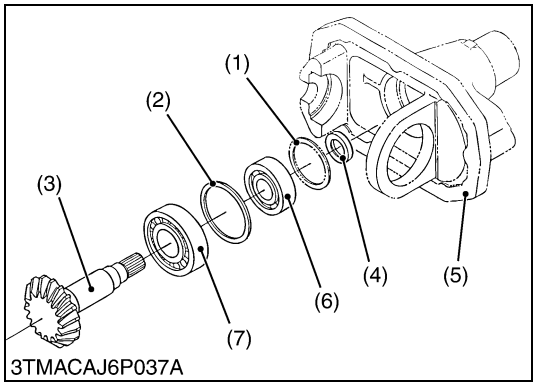

3TMACAJ6P037A

Spiral Bevel Pinion Shaft (M100X, M110X)

1. Pull out the spiral bevel pinion shaft (3) from the pinion bearing case (5).
2. Tap out the oil seal (4) from the case if necessary.

(When reassembling)

- Apply grease to the oil seal (4).
- Apply gear oil to the bearing.
- Be sure to direct the chamfer side of the shim to the pinion bearing case.
- Install the oil seal (4) to the pinion bearing case (5) so that its lip faces the inward.

(1) Shim
(2) Shim
(3) Spiral Bevel Pinion Shaft
(4) Oil Seal
(5) Pinion Bearing Case
(6) Bearing
(7) Bearing

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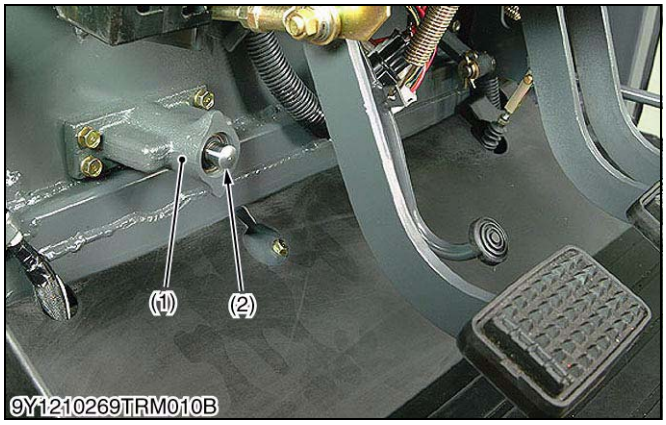
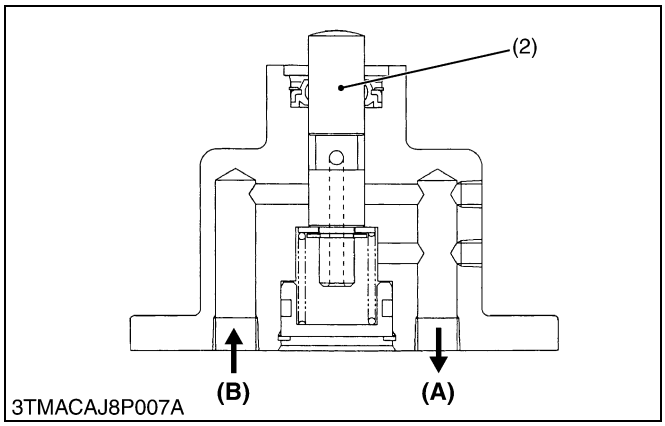
7 STEERING

8 HYDRAULIC SYSTEM

6. CLUTCH SAFETY VALVE





This valve works to lower the master clutch (**F**-**R**) pressure surely when the clutch pedal is depressed.

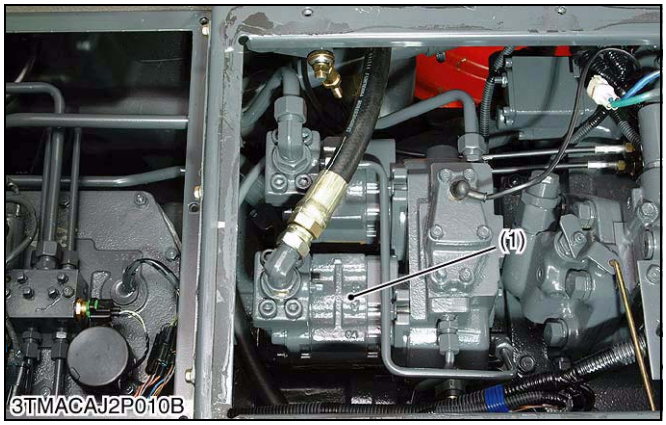
The figure shows the construction of the clutch safety valve. The master clutch (**F**-**R**) pressure is lowered mechanically by thrusting the spool end by the clutch pedal to relieve the pilot pressure directly into the transmission case.

(1) Clutch Safety Valve
(2) Spool

(A) To Transmission Case
(B) From Power Shift Valve

9Y1210269HYM0007US0

[3] HYDRAULIC COMPONENTS



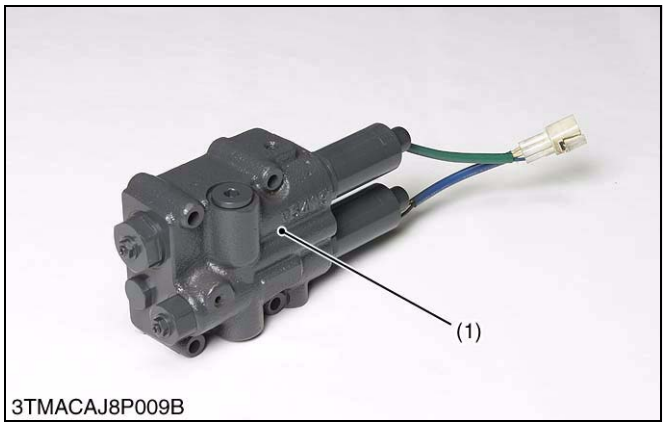
Hydraulic Pump

Hydraulic pump (1) is used for the 3-point hitch hydraulic system and auxiliary hydraulic control system.

They are pressure loading type gear pumps with high volumetric efficiency. Pump is driven by the transmission gear

(1) Hydraulic Pump (for 3P)

9Y1210269HYM0022US0



Control Valve

The solenoid proportional control valve is used to regulate the oil flow rate in proportion to the electric current. When the solenoid is energized, its current activates the main spool proportionally, which controls the oil flowing into the hydraulic cylinder.

(1) Control Valve

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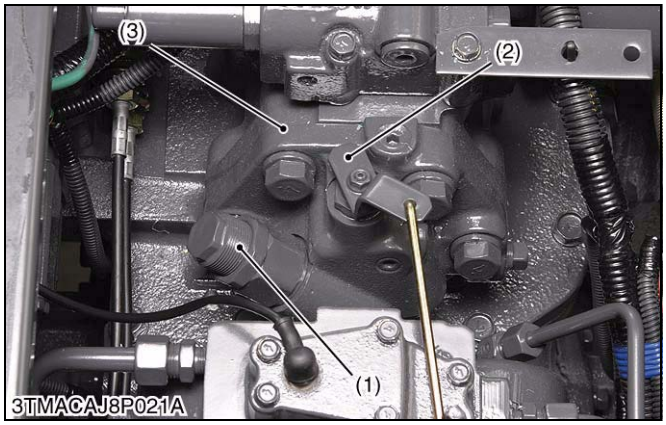


Cylinder Safety Valve and 3-Point Hitch Lowering Lock Valve

The cylinder safety valve is located on the cylinder cover of the three point hydraulic system. These tractors use a direct acting relief valve, which is suitable for low volume and less frequent operations.

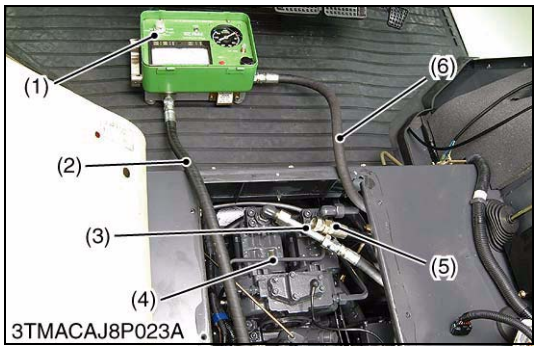
This valve has a fast response, makes it ideal for relieving shock pressure caused by heavy implement bounce and thereby reducing the possibility of damage to three point hydraulic system components.

The lowering lock valve switchable between **LOCK** (**STOP**) and **RELEASE** (**SLOW** ↔ **FAST)** for the 3-point link. The lowering speed of an attachment can be adjusted with the lowering speed adjustment dial on the hydraulic control panel

(1) Cylinder Safety Valve
(2) 3-Point Hitch Lowering Valve
(3) Hydraulic Cylinder Body

9Y1210269HYM0024US0

(2) Hydraulic Pump for 3-Point Hitch



Hydraulic Flow Test

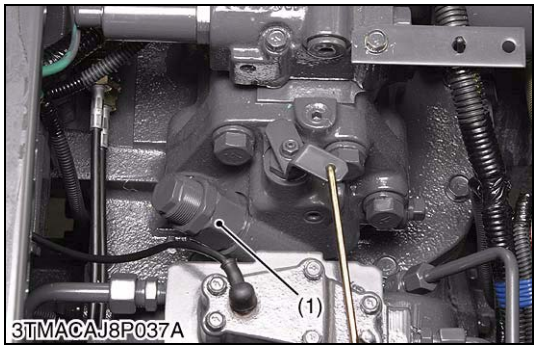
■ **IMPORTANT**

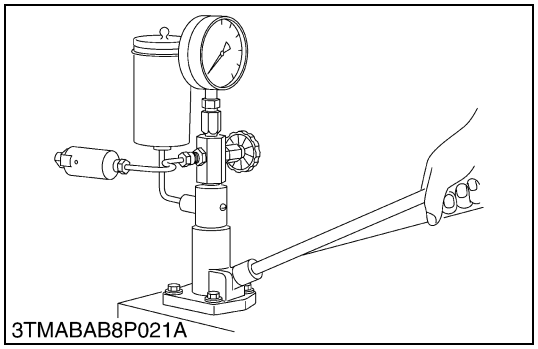
- **When using flowmeter other than KUBOTA specified flowmeter, be sure to use the instructions with the flowmeter.**
- **Do not close the flowmeter loading valve completely, before testing, because it has no relief valve.**

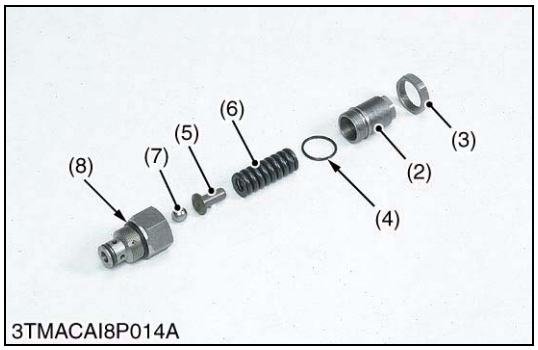
1. Remove the floor mat and inspection plate under the mat.
2. Remove the delivery hose (5).
3. Install the adaptor **64** (3) (see page G-58) to the pump discharge port.
4. Connect the hydraulic test hose (6) to the hydraulic pump (4) and flowmeter inlet port.
5. Connect the other hydraulic test hose (2) to the flowmeter outlet port and put the end of the hose into the transmission case oil port.
6. Open the flowmeter loading valve completely. (Turn counterclockwise.)
7. Start the engine and set the engine speed at 2000 to 2200 min^{-1} (rpm).
8. Slowly close the loading valve to generate pressure approx. 9.8 MPa (100 kgf/cm^2, 1422 psi). Hold in this condition until oil temperature reaches approx. 50 °C (122 °F).
9. Open the loading valve completely.
10. Set the engine speed. (Refer to **Condition**.)
11. Read and note the pump delivery at no pressure.
12. Slowly close the loading valve to increase rated pressure. (Refer to **Condition**.) As the load is increased, engine speed drops, therefore, reset the engine speed.
13. Read and note the pump delivery at rated pressure.
14. Open the loading valve completely and stop the engine.
15. If the pump delivery does not reach the allowable limit, check the pump suction line, oil filter or hydraulic pump.

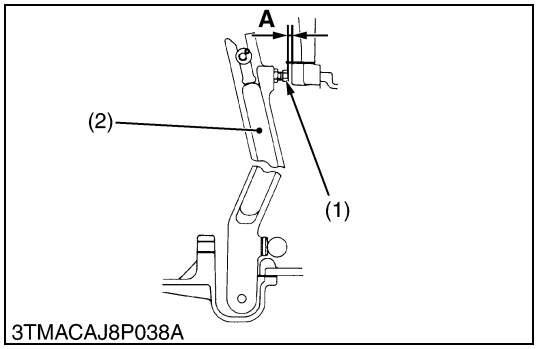
(1) Flowmeter
(2) Hydraulic Test Hose
(3) Adaptor **64**
(4) Hydraulic Pump (for 3-Point Hitch)
(5) Delivery Hose
(6) Hydraulic Test Hose

(To be continued)









Safety Valve Setting Pressure Test Using Injection Nozzle Tester

1. Remove the cylinder safety valve assembly (1).
2. Attach the cylinder safety valve to an injection nozzle tester with a safety valve setting adaptor. (See page G-48.)
3. Measure the operating pressure of the cylinder safety valve.
4. If the operating pressure is not within the factory specifications, adjust by turning the adjusting screw (2).
5. After adjustment, tighten the lock nut (3) firmly.

Cylinder safety valve operating pressure	Factory spec.	23.1 to 24.5 MPa 235 to 250 kgf/cm^2 3342 to 3556 psi

■ **NOTE**

- **Use specified transmission fluid (see page G-8) to test the operating pressure of the cylinder safety valve.**

(1) Safety Valve Assembly
(2) Adjusting Screw
(3) Lock Nut
(4) O-ring
(5) Seat
(6) Spring
(7) Ball
(8) Housing

9Y1210269HYS0015US0

Adjusting Restricted Bolt of Link 1

1. Measure the clearance **"A"** between the restricted bolt head (1) and the inner wall of transmission case.
2. If the clearance is not equal to the factory specification, adjust the restricted bolt (1).
3. After adjusting the restricted bolt (1), secure it with the lock nut.

Clearance **"A"** between restricted bolt head and inner wall of transmission case	Factory spec.	11.5 to 12.5 mm 0.45 to 0.49 in.

(1) Restricted Bolt
(2) Link 1

A : Clearance

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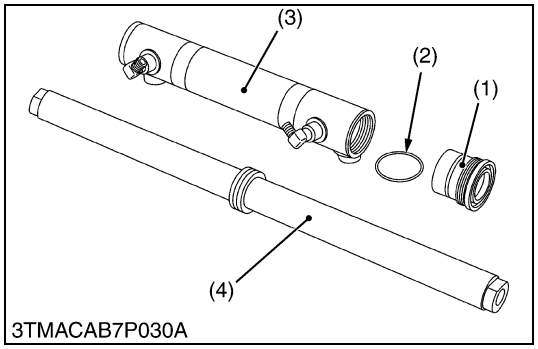
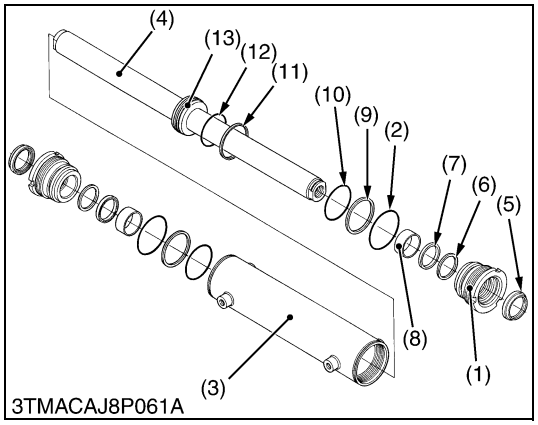
(5) Power Steering Cylinder





Disassembling Steering Cylinder

1. Carefully clamp the cylinder in a vise.
2. Remove the guide assembly (1) and draw out the piston rod (4).

(When reassembling)

- Apply transmission fluid to the oil seal and O-ring.
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) on the screw of guide when tighten it.
- After tightening the guide assembly to the specified torque, stake the cylinder firmly.

Tightening torque	Guide assembly	294 to 470 N·m 30.0 to 48.0 kgf·m 217 to 347 lbf·ft

(1) Guide Assembly
(2) O-ring
(3) Cylinder
(4) Piston Rod
(5) Wiper Ring
(6) Backup Ring
(7) U-ring
(8) Bush
(9) Backup Ring
(10) O-ring
(11) Seal
(12) O-ring
(13) Piston

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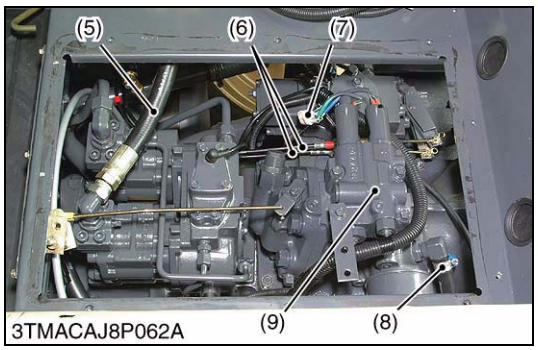
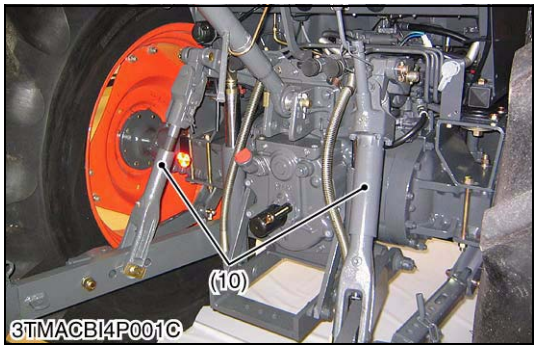
(6) 3-Point Hitch Cylinder Assembly





Preparation

1. Remove the side cover (4) and disconnect the **2P** connectors and **10P** connector which has come from seat and arm rest.
2. Remove the seat (1) and 3-point hitch lowering lever (11).
3. Remove the cover (3), mat (2) and plate under the mat (2).
4. Remove the delivery hose (5) and return hose (8).
5. Remove the delivery hose (5) and disconnect the connector (7) for 3-point hitch control valve (9).
6. Disconnect the connector for lift arm sensor and draft sensor.
7. Remove the lift rods (10).

(When reassembling)

Tightening torque	3-point hitch delivery hose	45.1 to 53.0 N·m 4.6 to 5.4 kgf·m 33.3 to 39.1 lbf·ft

(1) Seat
(2) Mat
(3) Cover
(4) Side Cover
(5) Delivery Hose
(6) Remote Cable
(7) Connector
(8) Return Hose
(9) Control Valve
(10) Lift Rod
(11) 3-Point Hitch Lowering Lever

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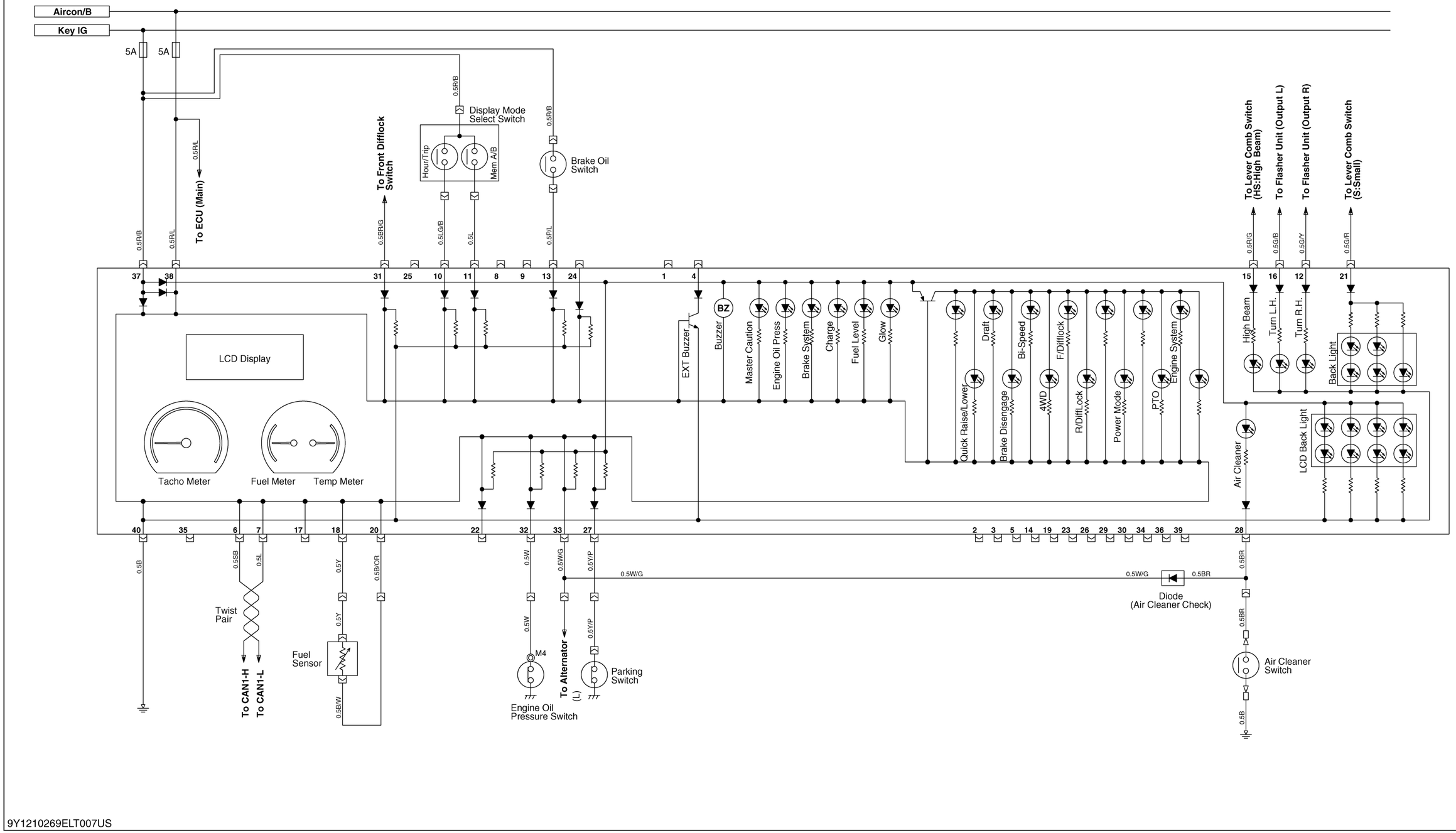
9 ELECTRICAL SYSTEM

[7] INSTRUMENT PANEL SYSTEM



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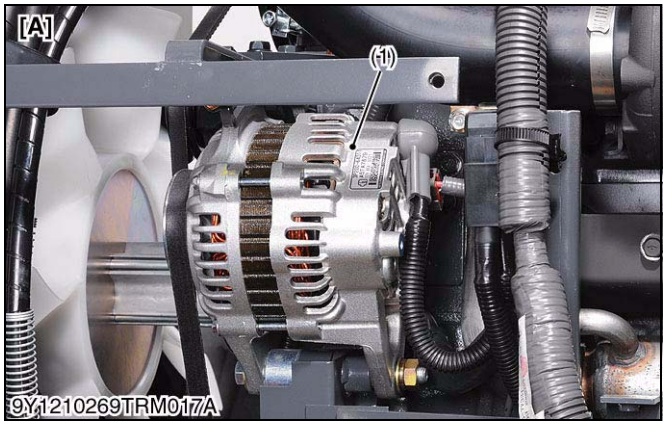

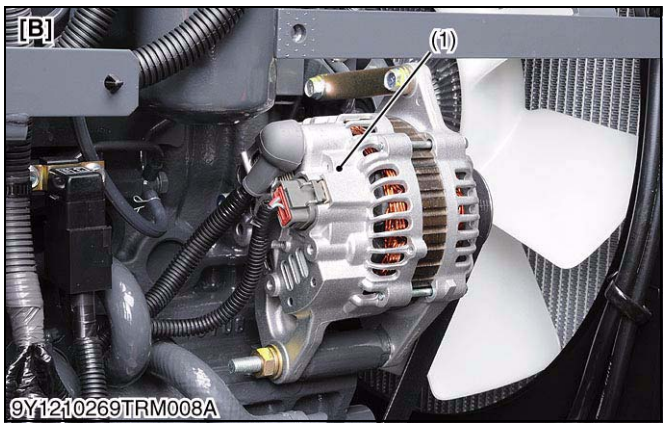

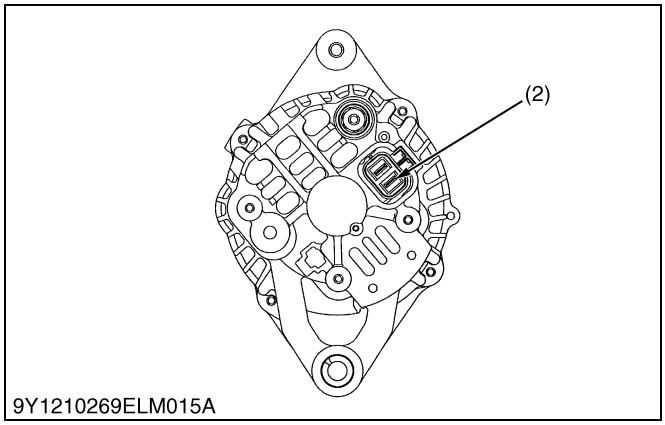

Alternator (L Terminal)

The power system shift detects the rotation of an engine by both engine speed sensor and alternator **L** terminal current which power generation of alternator after engine starts.

Even if the engine speed sensor is faulty, the **L** terminal voltage of the alternator allows detecting rotations on the engine, making operation of power shift possible.

(1) Alternator
(2) Alternator **L** Terminal

[A] M100X, M110X
[B] M126X, M135X

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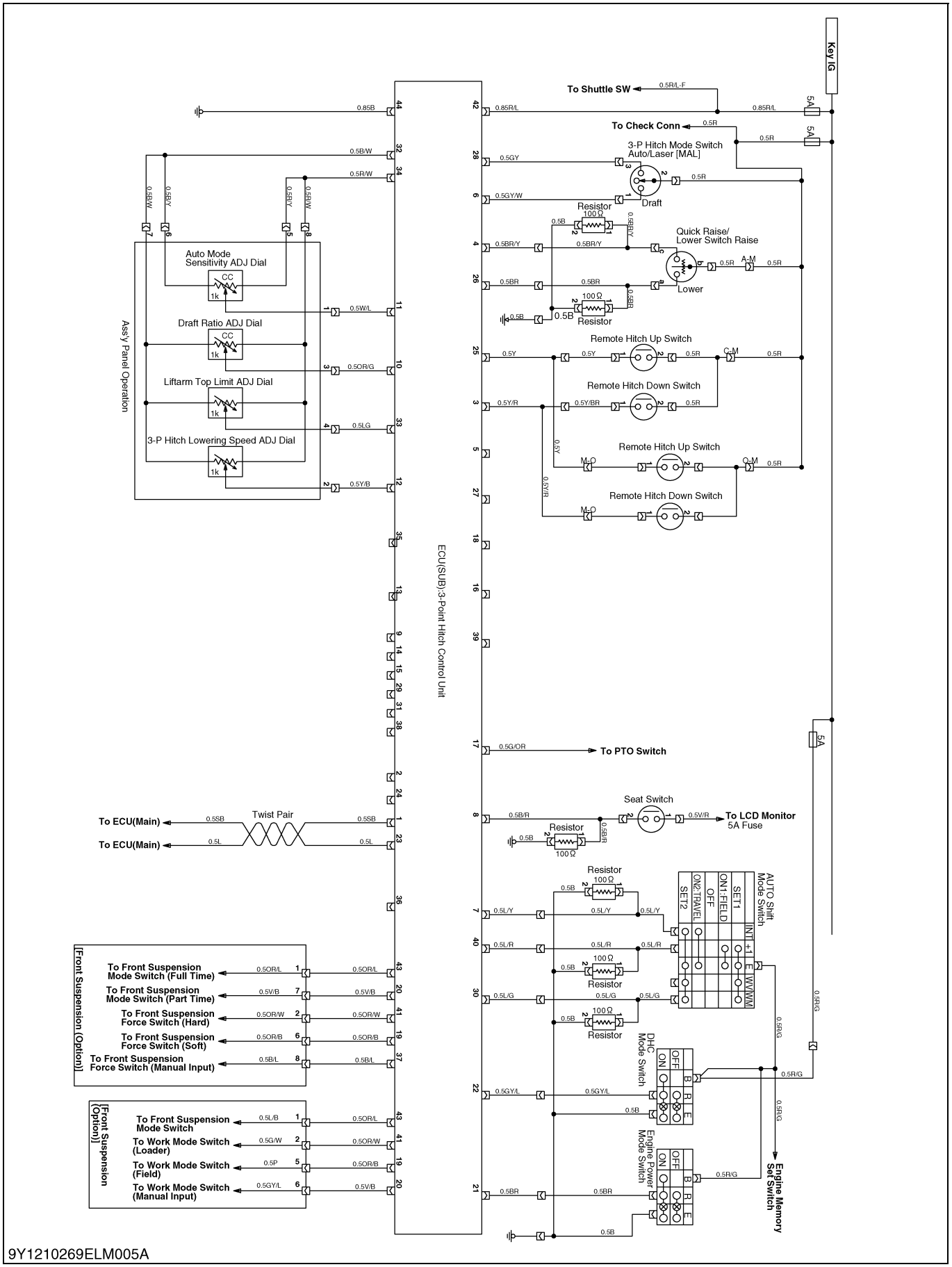
[2] ELECTRICAL CIRCUIT (3-POINT HITCH)



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SERVICING

CONTENTS

4. CHECKING, DISASSEMBLING AND SERVICING

[1] OUTLINE FOR METHOD OF SELF DIAGNOSIS, FINE ADJUSTING AND EASY CHECKING

(1) Information for Menu and Model

This tractor is equipped with the three menus, **"SHI"**, **"HIT"** and **"CHK"**. (See the table below.)
The menu **"SHI"** relates to "Power Shift System". The menu **"SHI"** consists of 11 mode items.
The menu **"HIT"** relates to "3-Point Hitch System". The menu **"HIT"** consists of 4 mode items.
The menu **"CHK"** relates to "Power Shift System" and "3-Point Hitch System". The menu **"CHK"** consists of 4 mode items.

Menu	Menu's main purpose	Mode	Mode Items	Remarks
SHI	POWER SHIFT SYSTEM • Self diagnosis • Fine Adjusting	SHI-1	C	Self-diagnosis for power shift system
			A	Fine-Adjusting all items for power shift system
			1	Fine-Adjusting clutch pedal sensor
			2	Fine-Adjusting main shift clutch (1 thru 4, L and H)
			3	Fine-Adjusting master clutch (F and R)
			4	Fine-Adjusting throttle sensor
			5	Fine-Adjusting solenoid propositional pressure reducing valve (Master)
			6	Fine-Adjusting solenoid propositional pressure reducing valve (Main shift L)
			7	Fine-Adjusting solenoid propositional pressure reducing valve (Main shift H)
			N	Setting tractor model
			P	Power shift/range shift lever (Neutral setting)
HIT	3 POINT HITCH SYSTEM • Self diagnosis • Fine Adjusting	HIT-1		Self-diagnosis for 3-Point Hitch System
		HIT-2		Fine-adjusting for 3-Point Hitch System
		HIT-3		Setting number of assist cylinder
CHK	EASY CHECKING	CHK-1		Checking sensors and dials output voltage
		CHK-2		Checking the career of the break down
		CHK-3		Checking the master clutch protected frequency
		CHK-4		Clearing the career of the break down

9Y1210269ELS0163US0

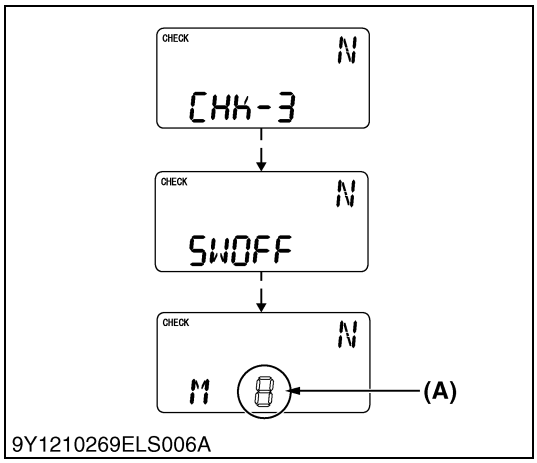
(3) Checking the Master Clutch Protected Frequency

Procedure 1 : Setting Menu

1. Set the menu item **"CHK"**.
   Refer to the "(2) Information for Setting menu and Mode at [1] OUTLINE FOR METHOD OF SELF DIAGNOSIS, FINE-ADJUSTING AND EASY CHECKING ".
2. Set the mode item **"CHK-3"**.
   Refer to the "(2) Information for Setting menu and Mode at [1] OUTLINE FOR METHOD OF SELF DIAGNOSIS, FINE-ADJUSTING AND EASY CHECKING ".

(1) Display Switch
(2) Engine RPM Dual Memory A/B Indicator Switch

9Y1210269ELS0173US0



Procedure 2 : Checking Display

1. Check the display.
2. Turn off the main key switch.

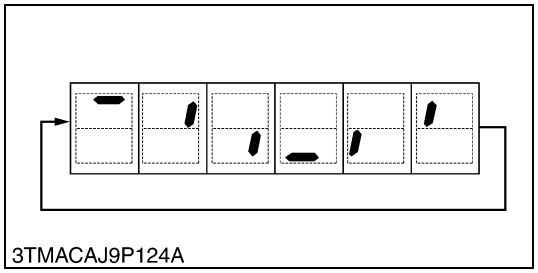
■ **IMPORTANT**

- **If equipped, the master clutch may be replaced.**
- **After replacing the master clutch, do not forget to clear the career of breakdown.**
  Refer to the same section, "(4) Clearing the Career of Breakdown".

(1) Display Switch
(2) Engine RPM Dual Memory A/B Indicator Switch
(A) The frequency of protecting the master clutch

9Y1210269ELS0174US0


3TMACAJ9P007B


3TMACAJ9P124A

Step 9 : Testing Solenoid Valve, Pressure Switches and Shuttle Rotation Sensor

1. Press the shift-up button (+).

■ **NOTE**
- **If "F" is blinking in the display, shift the shuttle lever to forward position.**

2. Since the self-diagnostic program has been initiated, a series of dashes will flash around the outer sides of the panel display as figure left.
- **Confirming of diagnosis result.**

3. Press the shift-up button (+) while **"U"** is blinking.
4. Press the shift-up button (+), **"0"** followed by **"0"** will light.
5. **"U"** will starts to blink, press the shift-up button (+), **"1"** followed by **"1"** will light.
6. Check from **1** to **8** according to the same procedure.

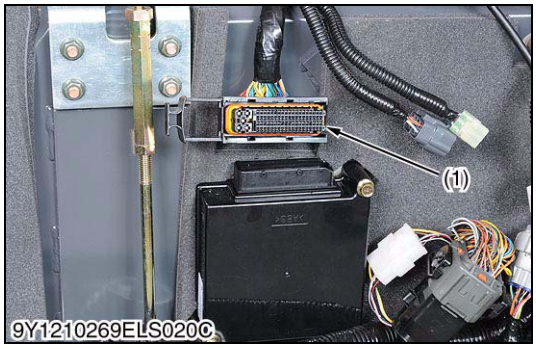
Diagnosis code		Result of diagnosis	
Display	**Solenoid**	**Display**	**Pressure switch**
0	All OFF	**0**	All OFF
1	Main shift **1**	**1**	Main shift **1**
2	Main shift **2**	**2**	Main shift **2**
3	Main shift **3**	**3**	Main shift **3**
4	Main shift **4**	**4**	Main shift **4**
5	Main shift **L**	**5**	Main shift **L**
6	Main shift **H**	**6**	Main shift **H**
7	Master (**F**-**R**)	**7**	Master (**F**-**R**)
8	Short circuit	**0** to **7** (**0** : normal)	
9	Disconnection	**0** to **7** (**0** : normal)	

■ **NOTE**
- **If "E" is blinking, there is a malfunction of the shuttle rotation sensor.**

7. **"U"** will be blinking.
8. Press the shift-up button (+).
9. **"8"** followed by **"0"** and **"C"** will light.
10. To regain normal operation of the unit, turn the main switch off and restart the engine.

9Y1210269ELS0031US0

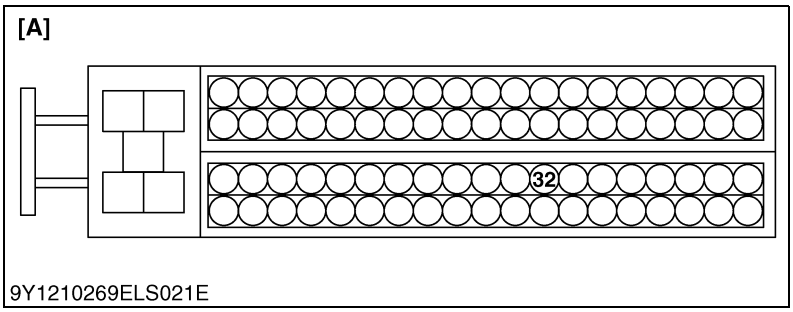
(6) Checking Power Shift/Range Shift Lever Sensor



Sensor Output Voltage

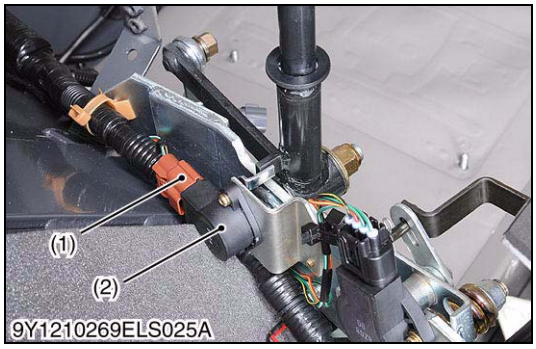
1. Remove the **CNT-A** connector (1).
2. Turn **ON** the main switch.
3. Check the voltage between terminal of the wire harness side which are shown in the table below and chassis.

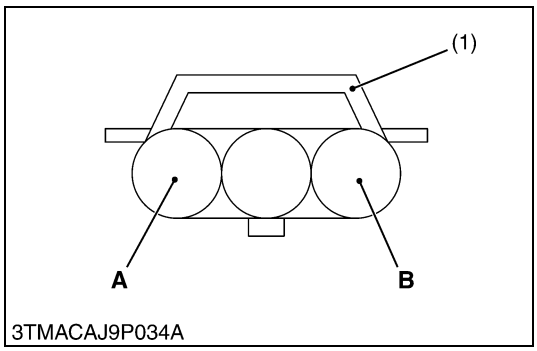
Item	Terminal No.	Wiring color	Position	Approx. Voltage (V)
Power Shift/Range Shift Lever Sensor	**A32**	W/V	L	1.0
			N	2.5
			H	4.0



(1) **CNT-A** Connector **[A] CNT-A**

9Y1210269ELS0041US0





Sensor Input Voltage

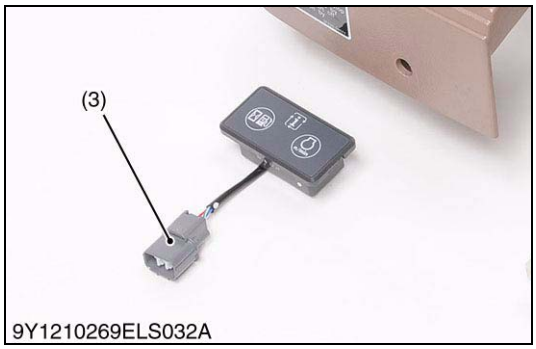
1. Remove the connector (1) for power shift/range shift lever sensor.
2. Turn **ON** the main switch.
3. Check the voltage between terminal **A** (+) and terminal **B** (−) of the wire harness side.

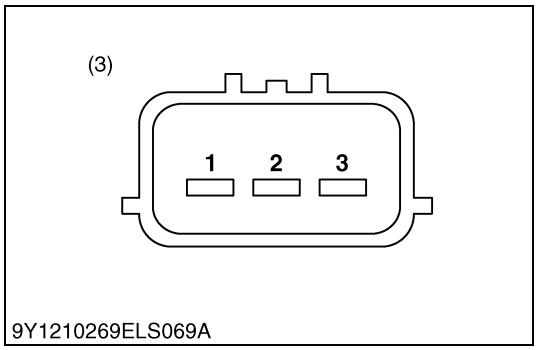
Item	Terminal	Wiring color	Voltage (V)
Power Shift/Range Shift Lever Sensor	Terminal **A** – Terminal **B**	R/Y – B/Y	5

(1) Power Shift/Range Shift Lever Sensor Connector
(2) Power Shift/Range Shift Lever Sensor

A : Terminal A
B : Terminal B

9Y1210269ELS0042US0





Display Switch and Engine RPM Dual Memory Indicator Switch

1. Check the continuity through the switch with an ohmmeter.
2. If continuity specified below is not indicated, the switch is faulty.

Position		Terminal		
		1	2	3
Display switch / Engine RPM dual memory indicator switch	Display switch (ON)	●		●
	OFF			
	Engine RPM dual memory indicator switch (ON)		●	●

9Y1210269ELS068A

(1) Display Switch
(2) Engine RPM Dual Memory Indicator Switch
(3) Connector (Switch)

1 : Terminal 1
2 : Terminal 2
3 : Terminal 3

9Y1210269ELS0059US0

(Continued)

6. Maintain the engine rpm at idle. Shift the shuttle lever into forward and shift the power shift lever into **High** position.

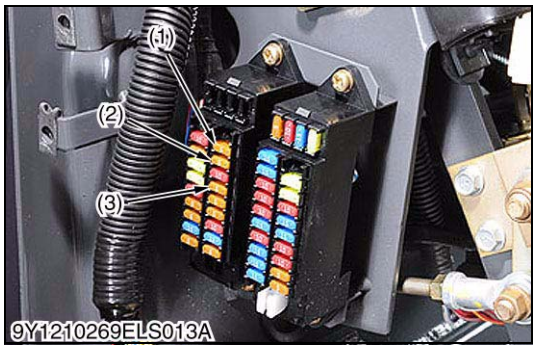
■ **NOTE**
- **If "P" is blinking in the panel display, the power shift lever is in the wrong position.**
- **If "F" is blinking in the panel display, the shuttle shift lever is in the wrong position.**
- **If dash "=" is blinking in the panel display, engine rpm is over 750.**

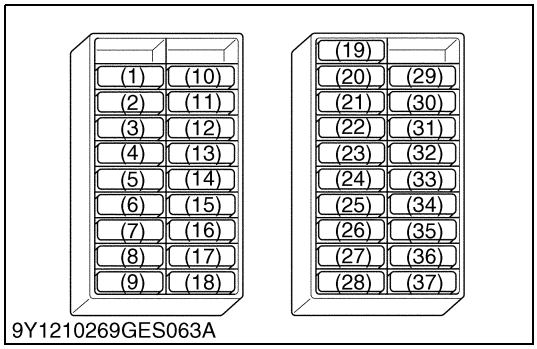
7. Press the shift-up button (+) on the power shift lever.
8. **"C"** for mode **"5"**, **"L"** for mode **"6"**, **"H"** for mode **"7"** followed by a series of dashes and beeps will light around the outer edge of the display depending on the mode selected.
9. After a moment tractor will begin to move forward.
   At this time (when tractor starts to move), press the shift-down button (−).
10. When the programming is completed, an **"8"** will light in the panel display and the **"8"** should change to **"C"**.
11. Power shift lever back to **Neutral** and to turn off the main key switch.

■ **NOTE**
- **If "E" lights in the panel display, carry out procedure again.**

9Y1210269ELS0067US0

(2) Checking Fuse and Grounding Wire





Fuses

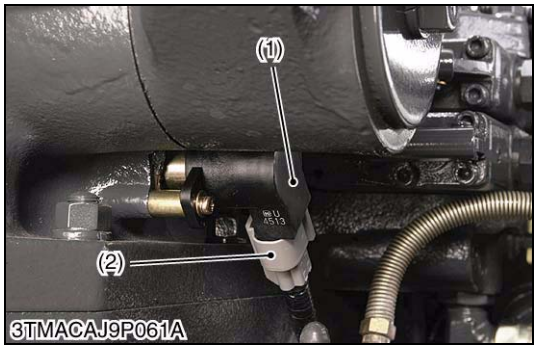
1. Remove the left lower rear bonnet.
2. Check the fuses 5 A for circuit line (1) and 10 A for load line (2) related to power shift inside the fuse box and the fuse 5 A of the meter panel (3).
3. If any of the fuses is blown, replace it with the one having same capacity.

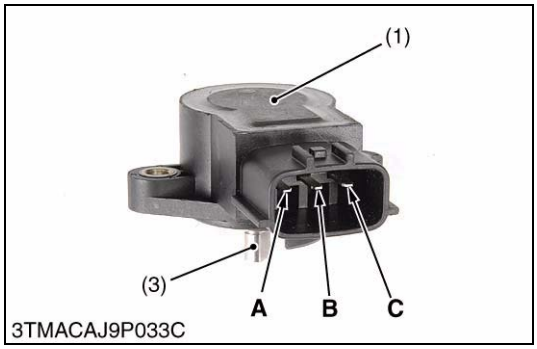
■ **IMPORTANT**

- **If a fuse is blown, check the cause and be sure to replace it with the one having same capacity.**

(1) Fuse (5 A) Power Source for Circuit Line
(2) Fuse (10 A) Power Source for Load Line
(3) Meter Panel Fuse (10 A)

(To be continued)





Draft Sensor

1. Disconnect the connector (2) and remove the draft sensor (1).
2. Measure the resistance between terminal **A** and **C**.
3. Then, check resistance between terminal **A** and **B** while slowly turning the sensor shaft.
4. It is OK if the resistance value approximates to the value shown in the table below.

(Reference)

- The change of resistance can be checking easily when an analog tester is employed.

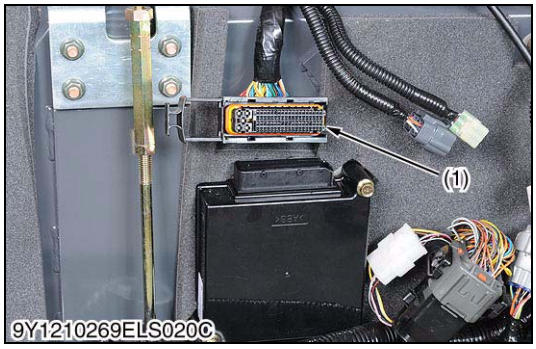
Resistance	Terminal **A** – Terminal **C**	1.6 to 2.4 kΩ
	Terminal **A** – Terminal **B**	Resistance is normal if smoothly changing

(1) Draft Sensor
(2) Connector
(3) Sensor Shaft

A : Terminal A
B : Terminal B
C : Terminal C

9Y1210269ELS0091US0

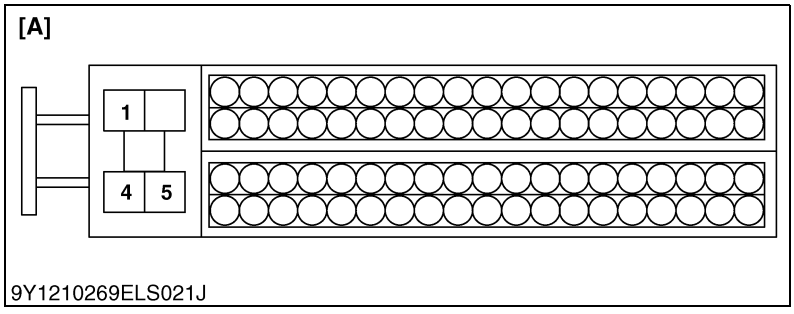
(7) Checking 3-point Hitch Solenoid Valve



Solenoid Resistance

1. Remove the **CNT-A** connector (1).
2. Check the resistance between the terminal **A4** (G/Y) and terminal **A1** (B) of the wire harness side.
3. Measure the resistance between the terminal **A5** (L/Y) and the terminal **A1** (B) of the wire harness side.

Item	Terminal No.	Wiring color	Resistance
3-point Hitch Solenoid Valve (Up)	**A4 – A1**	G/Y - B	3 to 5 Ω
3-point Hitch Solenoid Valve (Down)	**A5 – A1**	L/Y - B	

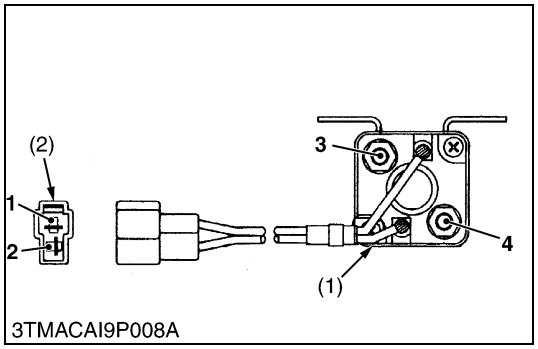


(1) **CNT-A** Connector

[A] CNT-A

9Y1210269ELS0092US0

(5) Heater Relay and Heater Relay 2 (M100X, M110X)



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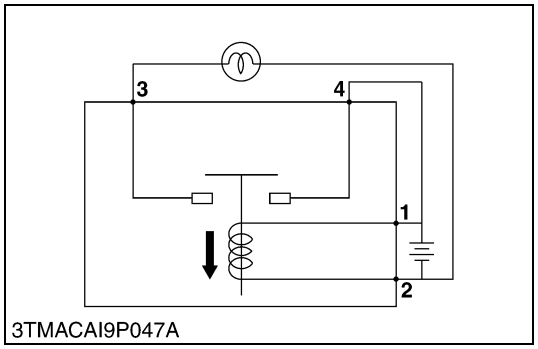

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Checking Heater Relay

1. Remove the air heater relay (1).
2. Apply battery voltage across the terminal **1** and **2**, check continuity across terminal **3** and terminal **4** as shown in figure.
3. If continuity is not established across terminal **3** and terminal **4**, air heater relay is faulty.

(1) Air Heater Relay
(2) Relay Connector

1 : Terminal 1
2 : Terminal 2
3 : Terminal 3
4 : Terminal 4

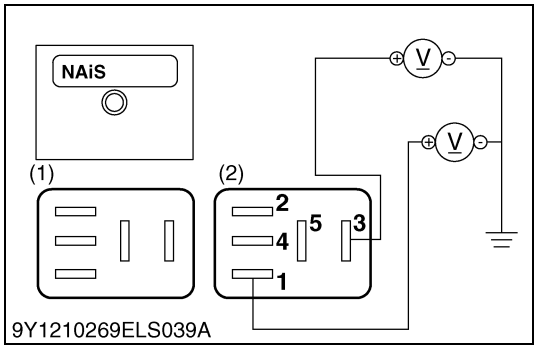
9Y1210269ELS0178US0

9Y1210269ELS040A

Connector Voltage of Heater Relay 2

1. Disconnect the heater relay 2 (1) from connector after turning the main key switch off and disconnect the connector from coolant temperature gauge.
2. Measure the voltage with a voltmeter across the connector terminal **3** and chassis.
3. Turn the main switch on, and measure the voltage across the connector terminal **1** and chassis while 15 seconds from main key switch turned **ON** position.
4. If these voltages differs from the battery voltage, the wiring harness or main switch is faulty.

Voltage	Across terminal **1** – chassis	Approx. battery voltage
	Across terminal **3** – chassis	Approx. battery voltage

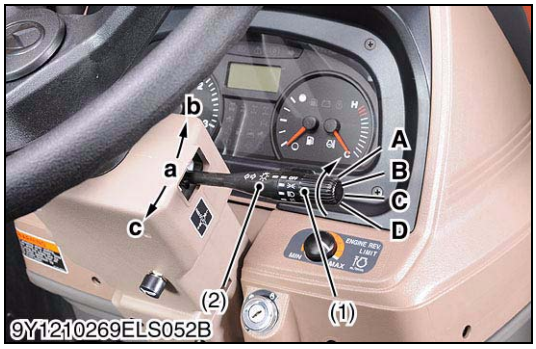


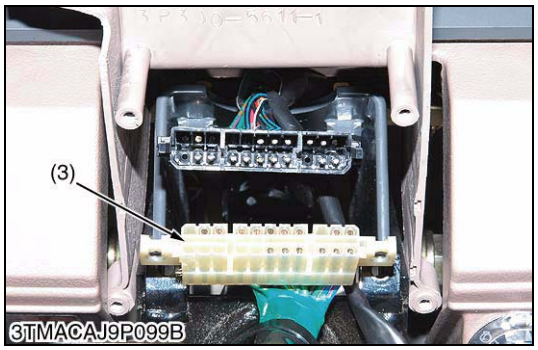
9Y1210269ELS039A

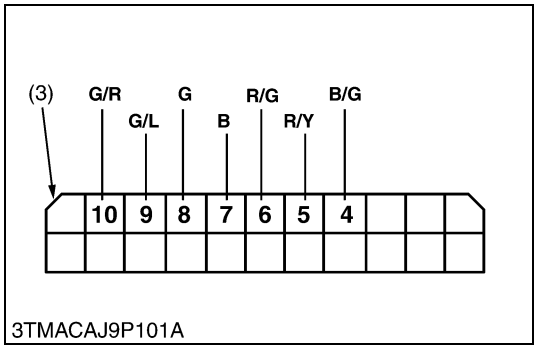
(1) Heater Relay 2
(2) A/C Relay Connector (Wiring Harness Side)

1 : Terminal 1
2 : Terminal 2
3 : Terminal 3
4 : Terminal 4
5 : Terminal 5

9Y1210269ELS0179US0







Checking Light Switch and Dimmer Switch

1. Test the continuity through the switch with an ohmmeter.

Light and parking Switch	Dimmer and passing switch	4 (HI)	5 (HM)	6 (HS)	7 (EZ)	8 (TB)	9 (LP)	10 (S)	Resistance
OFF "**A**"	Passing	●	●		●				Continuity exists
	Lower								
	Upper								
Small 1 "**B**"	Passing	●	●		●	●	●	●	
	Lower					●	●	●	
	Upper					●	●	●	
Head light 2 "**C**"	Passing	●	●		●	●	●	●	
	Lower	●		●	●	●	●	●	
	Upper	●	●		●	●	●	●	
Parking light 3 "**D**"	Passing	●	●		●	●	●		
	Lower					●	●		
	Upper					●	●		

9Y1210269ELS074A

(1) Dimmer Switch
(2) Light Switch
(3) Combination Switch Connector (Switch Side)

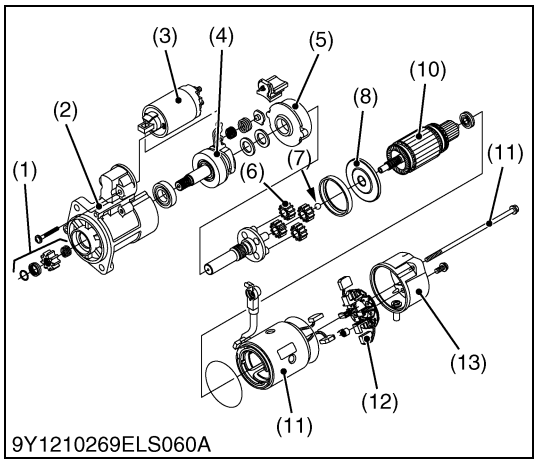
a : Lower (Low Beam)
b : Passing (Flashing)
c : Upper (High Beam)

A : OFF
B : Small 1
C : Head Light 2
D : Tail Light

9Y1210269ELS0124US0

[6] DISASSEMBLING AND ASSEMBLING

(1) Starter Motor



9Y1210269ELS060A

Disassembling Motor

1. Disconnect the solenoid switch (3).
2. Remove the 2 through screws (9) and the 2 brush holder lock screws. Take out the rear end frame (13) and the brush holder (12).
3. Disconnect the armature (10) and the yoke (11). Remove also the ball (7) from the tip of the armature.
4. Remove the set of packing (8), the 4 planetary gears and another packing.
5. Take out the shaft assembly. Take note of the position of the lever.

■ **IMPORTANT**

- **Before disconnecting the yoke, put tally marks on the yoke and the front bracket.**
- **Take note of the positions of the set of packing and the setup bolt.**
- **Apply grease to the gears, bearings, shaft's sliding part and ball.**

■ **NOTE**

- **Do not damage to the brush and commutator.**

(When reassembling)

- Apply grease (DENSO CO.No. 50 or equivalent) to the parts indicated in the figure.

(1) Gear
(2) Front Bracket
(3) Solenoid Switch
(4) Overrunning Clutch
(5) Internal Gear
(6) Planetary Gear
(7) Ball
(8) Set of Packing
(9) Through Screw
(10) Armature
(11) Yoke
(12) Brush Holder
(13) Rear End Frame

9Y1210269ELS0142US0

(Continued)

The machine is equipped with a thin large-capacity air conditioner with outside air intake. The air through the inside air filter (10) as well as the outside air filter (9) and the inner roof (12) reaches the air conditioner unit (7). The air is then cooled and dehumidified by this unit.

The resulting air is heated to a comfortable level. In this way, the air being blown via the blow port can be kept at comfortable temperature and humidity.

The front air outlet (5) can be opened and closed using the center knob of each port. The side air outlet (6) are opened and closed using the mode lever on the control unit (4). With these ports open or closed, you can feel your head cool and your feet warm.

Capacity (Cooling)	Factory spec.	3.38 kW
Capacity (Warming)	Factory spec.	4.54 kW
Kinds of refrigerant (Charge amount)	Factory spec.	R134a 0.90 to 1.00 kg 1.98 to 2.20 lbs
Pressure sensor (Low)	Factory spec.	0.196 MPa 2.0 kgf/cm^2 28.4 psi
Pressure sensor (High)	Factory spec.	3.14 MPa 32.0 kgf/cm^2 455 psi

9Y1210269CAM0001US0

■ **NOTE**

- **As for the mechanism and function of each component part, refer to Workshop Manual of "MECHANISM".**

■ **Compressor Oil**

The compressor oil dissolves in the refrigerant, circulates through the air-conditioning cycle, and functions to lubricate the compressor. But the conventional compressor oil for R12 doesn't dissolve in R134a, so it doesn't circulate through the cycle, and the lifespan of the compressor is considerably shortened.

It is still essential to ensure that the correct refrigerant oil is used. R12 systems were lubricated with mineral oil, which is totally unsuitable for R134a systems. The letter require PAG oil, which mixes very well with the refrigerant and provides ideal lubrication throughout the system.

Model	Quantity (Total)	Brand Name
M100X M110X	100 to 120 cc 0.106 to 0.127 U.S.qts 0.088 to 0.106 Imp.qts	ND-OIL 8 <PAG* oil>
M126X M135X	50 to 70cc 0.053 to 0.073 U.S.qts 0.044 to 0.061 Imp.qts	ND-OIL 8 <PAG* oil>

*PAG : Polyalkyleneglycol (Synthetic oil)

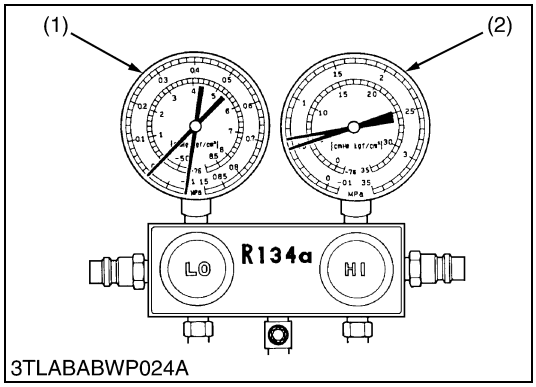
9Y1210269CAM0002US0

3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See "5. TIGHTENING TORQUES" in "G. GENERAL" section.)

Item	N·m	kgf·m	lbf·ft
Low pressure pipe mounting screw	7.85 to 11.7	0.8 to 1.2	5.79 to 8.67
Clutch safety valve hose retaining nut	22.6 to 26.4	2.3 to 2.7	16.7 to 19.5
Brake hose retaining nut	21.6 to 27.4	2.2 to 2.8	16.0 to 20.2
Cabin mounting screw and nut	68.7 to 88.2	7.0 to 9.0	50.7 to 65.0
High pressure pipe and low pressure pipe mounting screw	7.85 to 11.7	0.8 to 1.2	5.79 to 8.67
Compressor mounting screw	24.5 to 29.4	2.5 to 3.0	18.1 to 21.6
Magnetic clutch mounting screw	15.0 to 21.0	1.5 to 2.1	11.1 to 15.5
A/C unit mounting screw (M8)	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2
Low pressure pipe retaining nut	29.5 to 34.3	3.0 to 3.5	21.7 to 25.3
High pressure pipe retaining nut	11.8 to 14.7	1.2 to 1.5	8.08 to 10.8
Low pressure pipe mounting screw (compressor side)	7.85 to 11.7	0.8 to 1.2	5.79 to 8.67
High pressure pipe 1 mounting screw (compressor side)	7.85 to 11.7	0.8 to 1.2	5.79 to 8.67
High pressure pipe 1 retaining nut (compressor side)	19.7 to 24.5	2.0 to 2.5	14.5 to 18.0
High pressure pipe 2 retaining nut (receiver side)	11.8 to 14.7	1.2 to 1.5	8.68 to 10.8
High pressure pipe 2 retaining nut	11.8 to 14.7	1.2 to 1.5	8.68 to 10.8
Low pressure pipe retaining nut	29.5 to 34.3	3.0 to 3.5	21.7 to 25.3
Wiper arm mounting nut (front wiper)	6.4 to 9.3	0.65 to 0.95	4.7 to 6.8
Wiper arm mounting nut (rear wiper)	7.8 to 9.3	0.80 to 0.95	5.80 to 6.80
Wiper motor mounting screw	7.8 to 9.3	0.80 to 0.95	5.80 to 6.80

9Y1210269CAS0003US0



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Refrigerant Fails to Circulate

1. Symptoms seen in refrigerating cycle
   – **LO** pressure side (1) pressure is **vacuum** and, **HI** pressure side (2) is **low** pressure.
   LO pressure side (1) : Vacuum
   HI pressure side (2) :
   0.49 to 0.59 MPa (5 to 6 kgf/cm^2, 71.2 to 85.3 psi)
   – Frost or dew formed on piping at front and rear sides of expansion valve or receiver.
2. Probable cause
   – Refrigerant flow obstructed by moisture or dirt in the refrigerating cycle freezing or sticking on the expansion valve orifice.
3. Solution
   Allow to stand for same time and then resume operation to decide whether the plugging is due to moisture or dirt.
   – If caused by moisture, correct by referring to instructions in previous.
   – If caused by dirt, remove the expansion valve and blow out the dirt with compressed air.
   – If unable to remove the dirt, replace the expansion valve.
   Replace the receiver. Evacuate and charge in proper amount of new refrigerant. (See "DISCHARGING, EVACUATING AND CHARGING" in this section.)
   – If caused by gas leakage in heat sensitizing tube, replace the expansion valve.

(1) **LO** Pressure Side (2) **HI** Pressure Side

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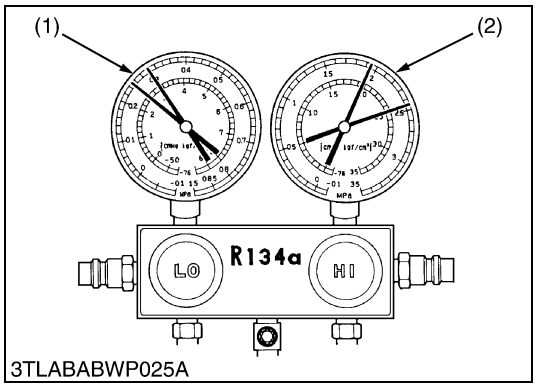

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Expansion Valve Opens Too Far or Improper Installation of Heat Sensitizing Tube

1. Symptoms seen in refrigerating cycle
   – Both **LO** and **HI** pressure side (1), (2) pressures too high.
   LO pressure side (1) :
   0.29 to 0.39 MPa (3.0 to 4.0 kgf/cm^2, 42.71 to 56.9 psi)
   HI pressure side (2) :
   1.96 to 2.45 MPa (20 to 25 kgf/cm^2, 284.5 to 355.6 psi)
   – Frost or heavy dew on low pressure side piping.
2. Probable cause
   – Expansion valve trouble or heat sensitizing tube improperly installed.
   – Flow adjustment not properly done.
3. Solution
   – Check installed condition of heat sensitizing tube.
   – If installation of heat sensitizing tube is correct, replace the expansion valve.

(1) **LO** Pressure Side (2) **HI** Pressure Side

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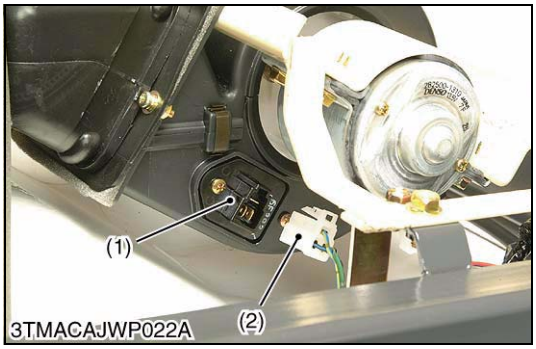
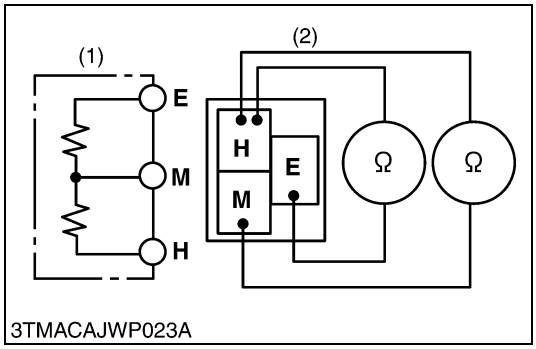
(4) Blower Resistor





Blower Resistor Checking

1. Remove the outer roof.
2. Disconnect the **3P** connector (2) for A/C blower resistor (1).
3. Measure the resistance with an ohmmeter across the terminal **M** and terminal **H**, and across the terminal **E** and terminal **H**.
4. If the factory specifications are not indicated, A/C blower resistor is faulty.

Resistance	Factory spec.	Terminal **M** – Terminal **H**	Approx. 0.4 Ω
		Terminal **E** – Terminal **H**	Approx. 0.8 Ω

(1) A/C Blower Resistor
(2) A/C Blower Resistor Connector

H : Terminal H
M : Terminal M
E : Terminal E

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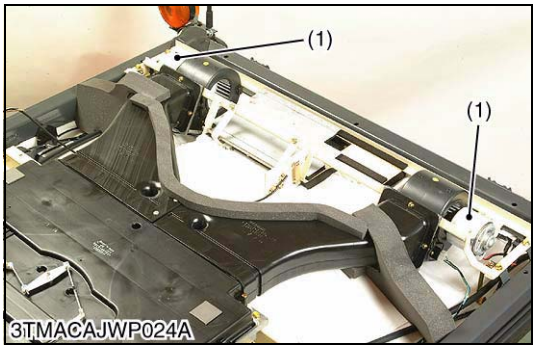
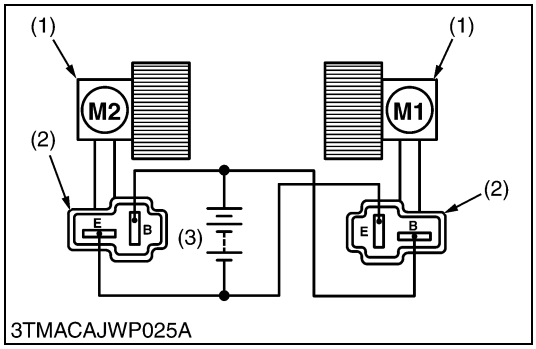
(5) Blower Motor





Blower Motor Test

1. Remove the outer roof.
2. Turn the blower motor (1) by hand and check whether it turns smoothly.
3. Disconnect the connector (2) of blower motor (1).
4. Connect a jumper lead from battery (3) positive terminal to connector terminal **B**.
5. Connect a jumper lead from battery negative terminal to connector terminal **E** momentarily.
6. If the blower motor does not run, check the motor.

(1) Blower Motor
(2) Blower Motor Connector
(3) Battery (12 V)

E : Terminal E
B : Terminal B

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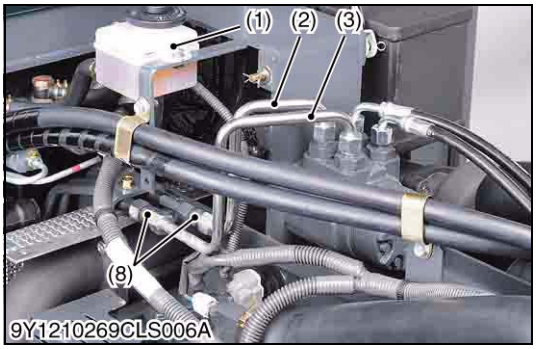

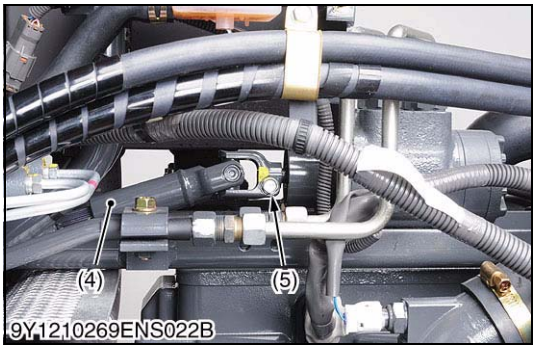

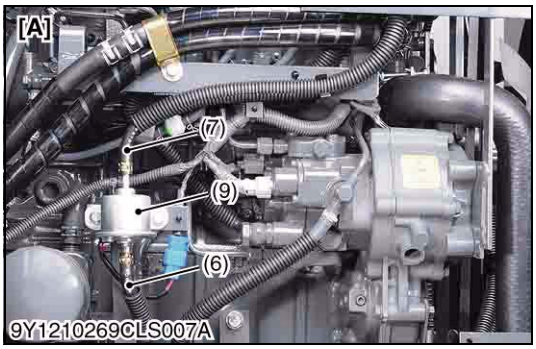

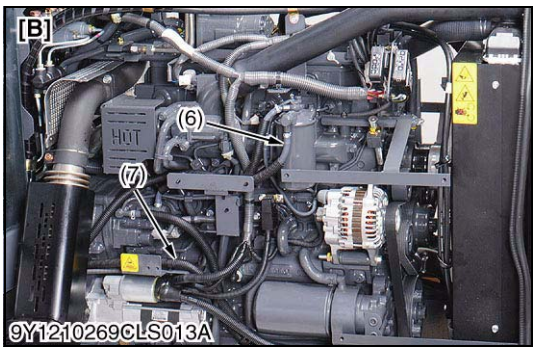

Hoses, Pipes, Steering Joint Shaft and Brake Oil Tank

1. Remove the brake oil tank mounting screws.
2. Remove the steering joint shaft mounting screw (5) and joint shaft (4).
3. Disconnect the pipes (2), (3) from the joint (8).
4. Remove the fuel hoses (6), (7).

(1) Brake Oil Tank
(2) Pipe
(3) Pipe
(4) Joint Shaft
(5) Steering Joint Mounting Screw
(6) Fuel Hose
(7) Fuel Hose
(8) Joint
(9) Fuel Pump

[A] M100X, M110X
[B] M126X, M135X

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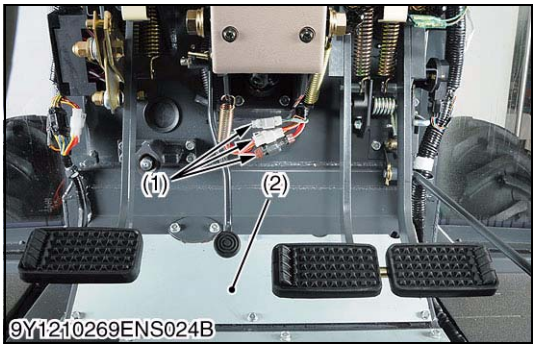

Wiring Harness Connector and Cover

1. Disconnect the engine wiring harness connectors (1).
2. Remove the floor mat and cover (2).

(1) Connector
(2) Cover

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(6) Cabin Windshields

Preparation

1. Prepare the followings.
   – Cutter knife (1 piece)
   – Scraper (1 piece)
   – Gun for coating (1 piece)
   – Sika Tack-Ultrafast or equivalent
   – Gummed tape
   – Sika-Activator
   – Sika primer 209
   – Shin Etsu silicon KE45

■ **NOTE**
- **Sika product are made by Sika Corporation.**
- **Shin Etsu silicon KE45 is made by Shin Etsu Polymer Corporation.**
- **These materials can't be provided by KUBOTA Corporation.**
- **Therefore, please find the local made equivalent materials in your country and use them when you need.**
- **Do not repaint even if painting peels off.**

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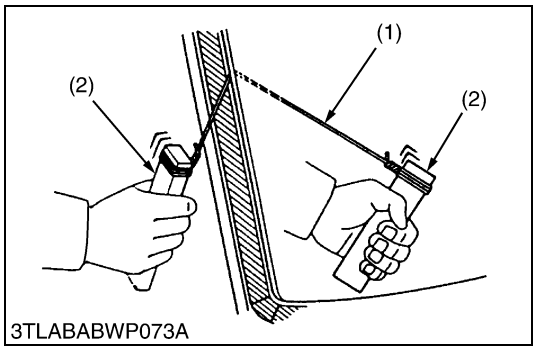

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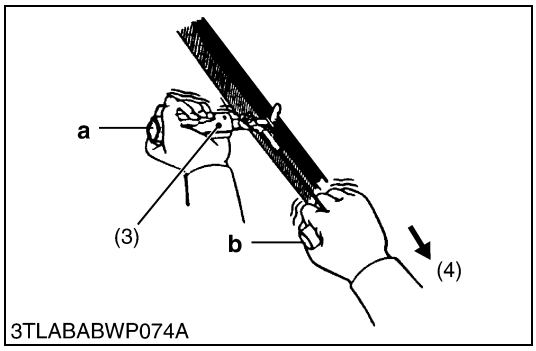

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Before Replacing Windshields (1)

[In case of using piano wire (When glass is clacked)]
1. Thread the piano wire from the inside of cabin. Tie its both ends to a wooden blocks or the like. (See the left figure.)
2. Pull the piano wire inward/outward alternately to cut the adhered part.

■ **NOTE**
- **Do not let the piano wire make sliding contact with the edge of glass plate forcibly.**

[In case of using cutter knife (When glass is totally crushed finely)]
1. Insert the knife (3) into the adhered part.
2. Keep the edge of knife blade square to the glass edge at the part **"a"**. Slide the knife blade along the glass surface and the edge. Pull the part **"b"** in the direction parallel to the glass edge to cut them off.

■ **NOTE**
- **Find a wider gap between the glass and body.**
- **Take care of handling the cutter knife not to damage your hand.**

(1) Piano Wire
(2) Wood Peace
(3) Cutter Knife
(4) Pulling

9Y1210269CAS0069US0

Before Replacing Windshields (2)

1. When the Sika Tack-Ultrafast or equivalent attached to the cabin frame and the glass are reused, remove the bond clearly.
2. Clean the frame surface with Sika-cleaner No. 1.

■ **NOTE**
- **Remove the bond completely.**

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