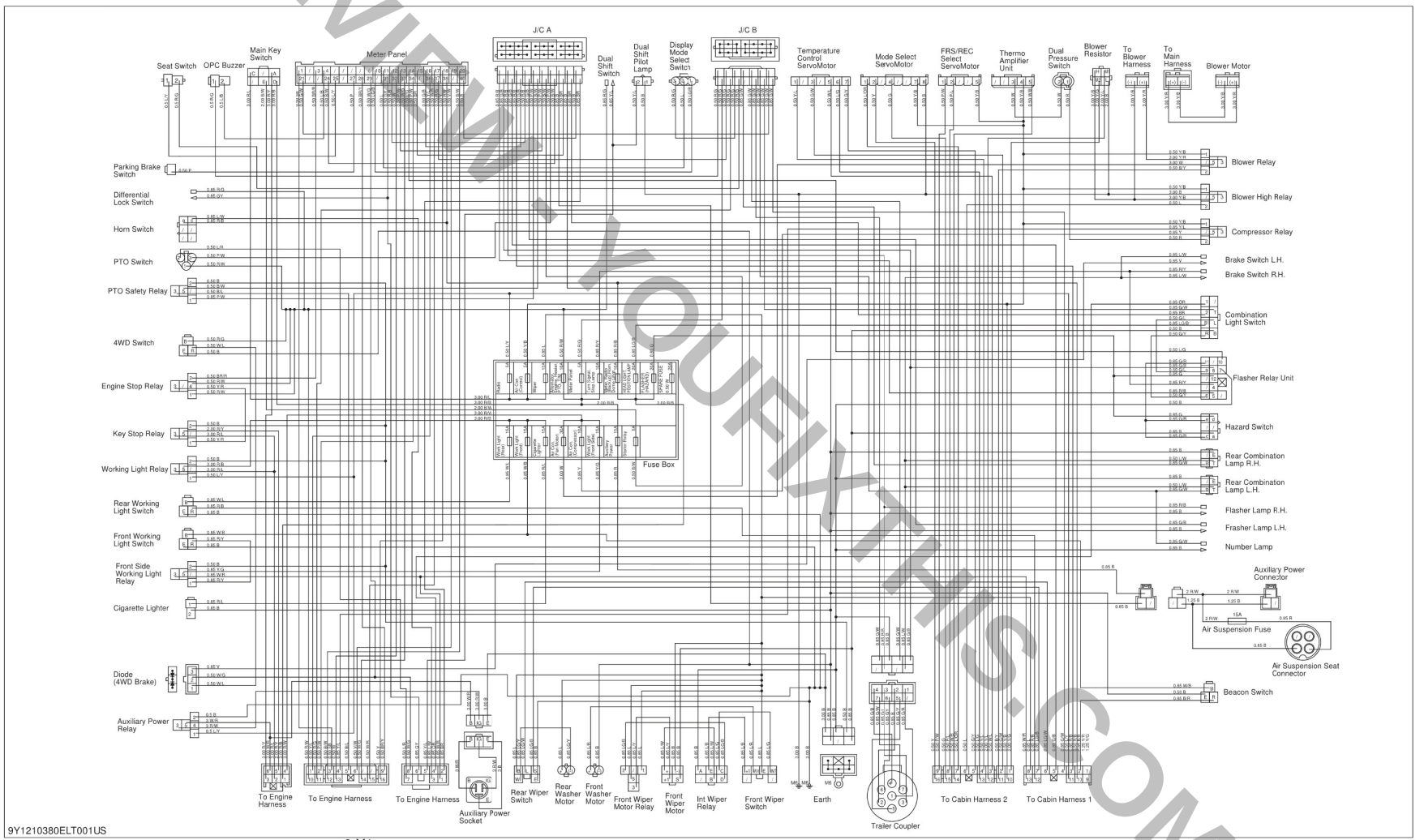
1. WIRING DIAGRAM

[1] MAIN HARNESS

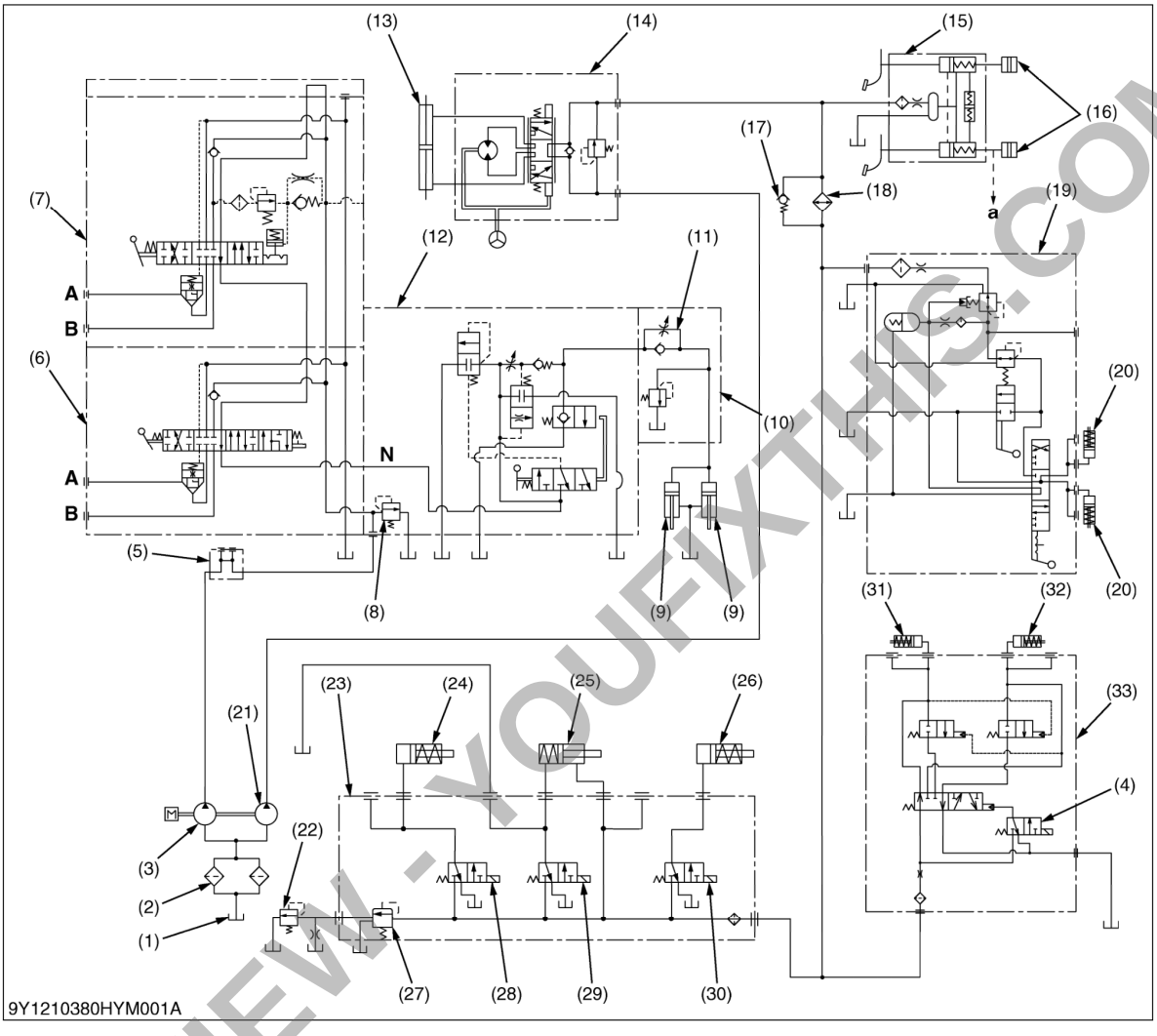


9Y1210380ELT001US

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2. HYDRAULIC CIRCUIT

[1] TOTAL HYDRAULIC CIRCUIT



(1) Oil Tank (Transmission Case)
(2) Hydraulic Oil Filter Cartridge
(3) Hydraulic Pump (for 3-point)
(4) Solenoid Valve (Dual Speed)
(5) Hydraulic Outlet
(6) Auxiliary Control Valve (FD)
(7) Auxiliary Control Valve (SCD)
(8) Relief Valve for 3-point
(9) Exterior Hydraulic Cylinder
(10) Cylinder Safety Valve
(11) Lowering Speed Adjusting Valve
(12) Control Valve (for 3-point)
(13) Steering Cylinder
(14) Power Steering Controller
(15) Brake Master Cylinder
(16) Brake Piston
(17) Oil Cooler Check Valve
(18) Oil Cooler
(19) Shuttle Valve
(20) Shuttle Clutch Pack
(21) Hydraulic Pump (Power Steering and System Line)
(22) Relief Valve (for Lubricating Line)
(23) Solenoid Valve Assembly
(24) PTO Clutch Pack
(25) 4WD Clutch Pack
(26) Rear Differential Lock Piston
(27) Relief Valve (for System)
(28) Solenoid Valve (PTO)
(29) Solenoid Valve (4WD)
(30) Solenoid Valve (Rear Differential Lock)
(31) Clutch Pack (Hi)
(32) Clutch Pack (Lo)
(33) Hi-Lo Dual Speed Valve

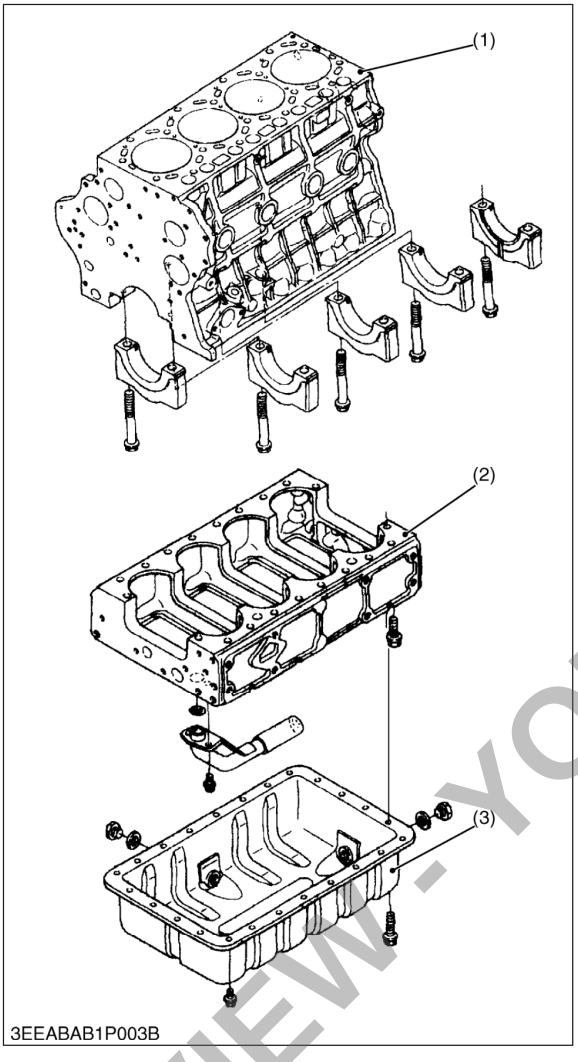
A : To Implement Cylinder
B : To Implement Cylinder
N : N Port

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2. ENGINE BODY

[1] CYLINDER BLOCK



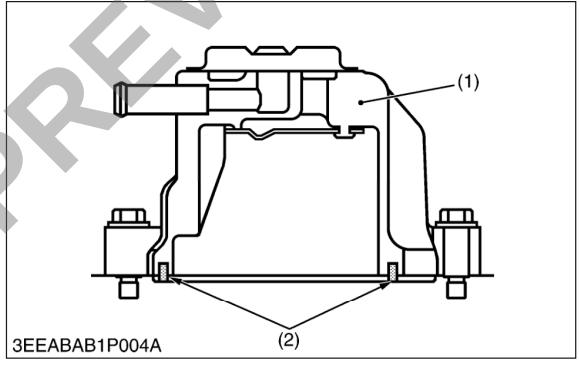
This engine employs separate type crankcases - the crankcase 1 (1) with combustion part and the crankcase 2 (2) which supports the crankcase 1(1) and reduces noise.

Since it is a hanger type, you can easily assemble / disassemble it. The cylinder is a linerless type which enables good cooling operation, less strain and good abrasion resistance.

(1) Crankcase 1
(2) Crankcase 2
(3) Oil Pan

W1013119

[2] HALF-FLOATING HEAD COVER



The rubber packing is fitted in to maintain the head cover 0.5 mm (0.02 in.) or so off the cylinder head. This arrangement helps reduce noise coming from the cylinder head.

(1) Cylinder Head Cover
(2) Rubber Packing

W1013327

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5. TIGHTENING TORQUES

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

[1] GENERAL USE SCREWS, BOLTS AND NUTS

Indication on top of bolt	⬡ 4 No-grade or 4T						⑦ 7T						⑨ 9T		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit / Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6 (6 mm, 0.24 in.)	7.84 to 9.31	0.80 to 0.95	5.79 to 6.87	7.84 to 8.83	0.80 to 0.90	5.79 to 6.51	9.81 to 11.2	1.00 to 1.15	7.24 to 8.32	7.84 to 8.83	0.80 to 0.90	5.79 to 6.51	12.3 to 14.2	1.25 to 1.45	9.05 to 10.5
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.0 to 15.2	16.7 to 19.6	1.7 to 2.0	12.3 to 14.5	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.2 to 45.0	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.1 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5	60.8 to 70.5	6.2 to 7.2	44.9 to 52.1
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	–	–	–	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	103 to 117	10.5 to 12.0	76.0 to 86.8
M14 (14 mm, 0.55 in.)	108 to 125	11.0 to 12.8	79.6 to 92.5	–	–	–	124 to 147	12.6 to 15.0	91.2 to 108	–	–	–	167 to 196	17.0 to 20.0	123 to 144
M16 (16 mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141	–	–	–	196 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 303	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	245 to 284	25.0 to 29.0	181 to 210	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	343 to 401	35.0 to 41.0	254 to 297
M20 (20 mm, 0.79 in.)	334 to 392	34.0 to 40.0	246 to 289	–	–	–	368 to 431	37.5 to 44.0	272 to 318	–	–	–	490 to 568	50.0 to 58.0	362 to 420

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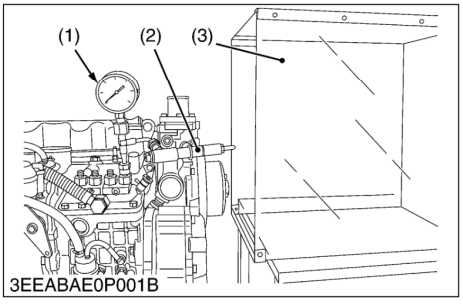
[2] STUD BOLTS

Material of opponent part	Ordinariness			Aluminum		
Unit / Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8 (8 mm, 0.31 in.)	11.8 to 15.6	1.2 to 1.6	8.68 to 11.5	8.82 to 11.8	0.90 to 1.2	6.51 to 8.67
M10 (10 mm, 0.39 in.)	24.6 to 31.3	2.5 to 3.2	18.1 to 23.1	19.7 to 25.4	2.0 to 2.6	14.5 to 18.8
M12 (12 mm, 0.47 in.)	29.5 to 49.0	3.0 to 5.0	21.7 to 36.1	31.4	3.2	23.1
M14 (14 mm, 0.55 in.)	62 to 73.5	6.3 to 7.5	45.6 to 54	–	–	–
M16 (16 mm, 0.63 in.)	98.1 to 112.8	10.0 to 11.5	72.3 to 83.2	–	–	–
M18 (18 mm, 0.71 in.)	172 to 201.1	17.5 to 20.5	126.5 to 148.2	–	–	–

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Fuel Tightness of Pump Element

1. Remove the engine stop solenoid.
2. Remove the injection pipes.
3. Install the injection pump pressure tester (refer to “8. SPECIAL TOOLS” at “G. GENERAL” section) to the injection pump.
4. Install the injection nozzle (2) jetted with the proper injection pressure to the injection pump pressure tester (1). (Refer to the figure.)
5. Set the speed control lever to the maximum speed position.
6. Run the starter to increase the pressure.
7. If the pressure can not reach the allowable limit, replace the pump with new one or repair with a Kubota-authorized pump service shop.

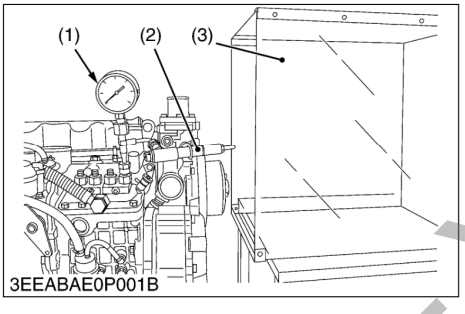
Fuel tightness of pump element	Allowable limit	18.63 MPa 190.0 kgf/cm^2 2702 psi

■ **NOTE**

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

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

W1017430



Fuel Tightness of Delivery Valve

1. Remove the engine stop solenoid.
2. Remove the injection pipes.
3. Set a pressure tester (refer to “8. SPECIAL TOOLS” at “G. GENERAL” section) to the fuel injection pump.
4. Install the injection nozzle (2) jetted with the proper injection pressure to the injection pump pressure tester (1).
5. Run the starter to increase the pressure.
6. Stop the starter when the fuel jets from the injection nozzle. After that, turn the flywheel by the hand and raise the pressure to approx. 18.63 MPa (190 kgf/cm^2, 2702 psi).
7. Now turn the flywheel back about half a turn (to keep the plunger free). Maintain the flywheel at this position and clock the time taken for the pressure to drop from 18.63 to 17.65 MPa (from 190 to 180 kgf/cm^2, from 2702 to 2560 psi).
8. Measure the time needed to decrease the pressure from 18.63 to 17.65 MPa (from 190 to 180 kgf/cm^2, from 2702 to 2560 psi).
9. If the measurement is less than allowable limit, replace the pump with new one or repair with a Kubota-authorized pump service shop.

Fuel tightness of delivery valve	Factory specification	10 seconds 18.63 → 17.65 MPa 190.0 → 180.0 kgf/cm^2 2702 → 2560 psi
	Allowable limit	5 seconds 18.63 → 17.65 MPa 190.0 → 180.0 kgf/cm^2 2702 → 2560 psi

■ **NOTE**

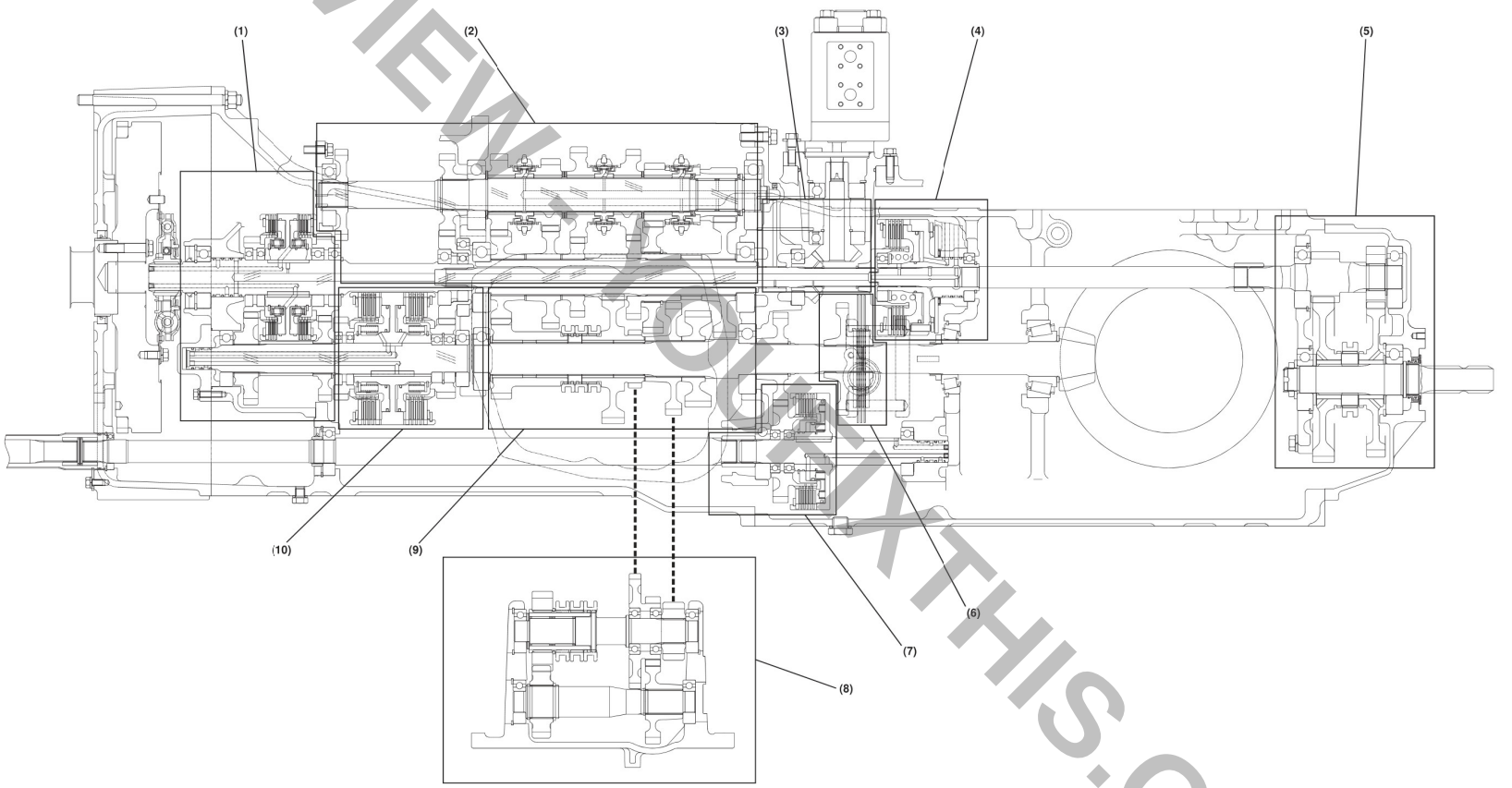
- **Never try to disassemble the injection pump assembly. For repairs, you are strongly requested to contact a Kubota-authorized pump service shop.**

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

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1. STRUCTURE



9Y1210380TRT001US

(1) HI-LO Dual Speed Section
(2) Main Gear Shift Section
(3) Hydraulic Pump Drive Section
(4) PTO Clutch Section
(5) PTO Gear Section (540/540E min^{-1} (rpm))
(6) Parking Brake Section
(7) Four Wheel Drive Clutch Section
(8) Creep Gear Section (Cassette Type)
(9) Auxiliary Gear Shift Section
(10) Hydraulic Shuttle Section

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Replenish fuel	G-10
	Air in the fuel system	Vent air	G-41
	Water in the fuel system	Change fuel and repair or replace fuel system	G-10, 31
	Fuel hose clogged	Clean or replace	G-28
	Fuel filter clogged	Replace	G-34
	Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	G-10
	Fuel with low cetane number	Use specified fuel	G-10
	Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S36
	Incorrect injection timing	Adjust	1-S19
	Fuel camshaft worn	Replace	
	Injection nozzle clogged	Repair or replace	1-S21, 36
	Injection pump malfunctioning	Repair or replace	1-S21, 49
	Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	–
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw and nozzle holder	1-S36, 37, 38, 39
	Improper valve timing	Correct or replace timing gear	1-S53
	Piston ring and cylinder worn	Replace	1-S70, 71, 75
	Excessive valve clearance	Adjust	1-S15
	Stop solenoid malfunctioning	Replace	9-S16
Starter Does Not Run	Battery discharged	Charge	9-S9
	Starter malfunctioning	Repair or replace	9-S15
	Key switch malfunctioning	Replace	9-S13
	Wiring disconnected	Connect	–

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4. LUBRICANTS, FUEL AND COOLANT

	Place	Capacity	Lubricants, fuel and coolant
		M9540	
1	Fuel tank	110 L 29.1 U.S.gals. 24.2 Imp.gals.	No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below −10 °C (14 °F)
2	Coolant	9.0 L 9.5 U.S.qts. 7.9 Imp.qts.	Fresh clean water with anti-freeze
	Recovery tank	1.0 L 1.1 U.S.qts. 0.9 Imp.qts.	
3	Washer liquid	1.3 L 1.4 U.S.qts. 1.1 Imp.qts.	Automobile washer liquid
4	Engine crankcase (with filter)	10.7 L 11.3 U.S.qts. 9.4 Imp.qts.	API Service Classification CF or CI-4 (External EGR type engine) Below 0 °C (32 °F) : SAE10W, 10W-30 or 15W-40 0 to 25 °C (32 to 77 °F): SAE20, 10W-30 or 15W-40 Above 25 °C (77 °F): SAE30, 10W-30 or 15W-40
5	Transmission case	60 L 63.4 U.S.qts. 52.8 Imp.qts.	KUBOTA UDT or SUPER UDT fluid*
6	Front differential case oil	6.0 L 6.3 U.S.qts. 5.3 Imp.qts.	KUBOTA UDT or SUPER UDT fluid* or SAE80, SAE90 gear oil
7	Front axle gear case oil (one side)	3.5 L 3.7 U.S.qts. 3.1 Imp.qts.	

* KUBOTA original transmission hydraulic fluid.

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6. MAINTENANCE

No.	Item			Indication on hour meter														Inter-val	Impor-tant		Refe-rence page
				50	100	150	200	250	300	350	400	450	500	550	600	650	700				
1	Engine start system		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-23
2	Wheel bolt torque		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-24
3	Battery condition		Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	*4		G-29
4	Greasing		–		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-25
5	Fan belt		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-28
6	Brake pedal		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-28
7	Air cleaner element [Double type]	Primary element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	*1		G-27
			Replace															every 1 year	*2		G-27
		Secondary element	Replace															every 1 year			G-27
8	Fuel line		Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-28
			Replace															every 2 years			G-28
9	Parking brake lever		Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-28
10	Gear locked parking lever		Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr			G-28
11	Toe-in		Adjust				☆				☆				☆			every 200 Hr			G-31
12	Fuel tank water		Drain				☆				☆				☆			every 200 Hr			G-31
13	Power steering oil line		Check				☆				☆				☆			every 200 Hr			G-30
			Replace															every 2 years			G-30
14	Radiator hose and clamp		Check				☆				☆				☆			every 200 Hr			G-30
			Replace															every 2 years			G-30
15	Intake air line		Check				☆				☆				☆			every 200 Hr			G-30
			Replace															every 2 years	*3		G-30
16	Engine oil		Change	★					☆						☆			every 300 Hr			G-19
17	Hydraulic oil filter		Replace	★					☆						☆			every 300 Hr			G-20

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.

It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

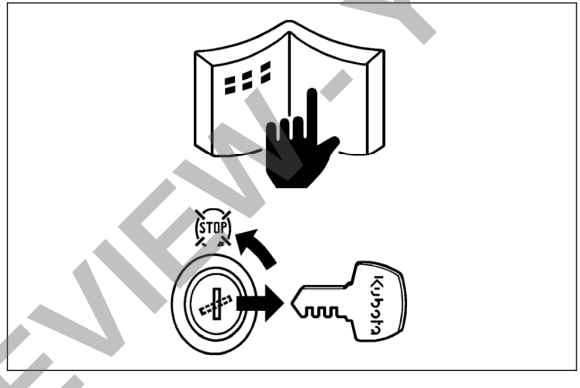
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

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

CAUTION : **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

■ **IMPORTANT** : **Indicates that equipment or property damage could result if instructions are not followed.**

■ **NOTE** : **Gives helpful information.**

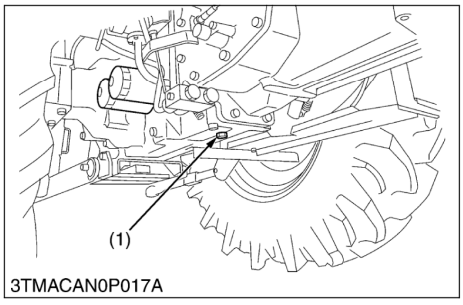


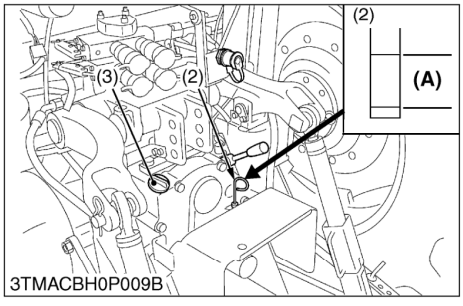
BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.
- Hang a "**DO NOT OPERATE**" tag in operator station.

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Changing Transmission Fluid

CAUTION

- **Allow engine to cool down sufficiently, oil can be hot and can burn.**

1. To drain the used oil, remove the drain plug (1) at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plug.
3. Fill with the new KUBOTA SUPER UDT fluid up to the upper notch on the dipstick (2).
4. (Refer to “4. LUBRICANTS, FUEL AND COOLANT” in this section.)
5. After running the engine for a few minutes, stop it and check the oil level again; add oil to prescribed level.

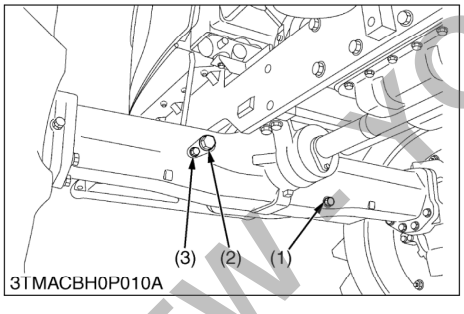
■ IMPORTANT

- **Do not operate the tractor immediately after changing the transmission fluid.**
  Run the engine at medium speed for a few minutes to prevent damage to the transmission.

Oil capacity	60 L 63.4 U.S.qts. 52.8 Imp.qts.

(1) Drain Plug
(2) Dipstick
(3) Oil Inlet
(A) Oil level is acceptable within the range.

W1022400



Changing Front Differential Case Oil

1. To drain the used oil, remove the drain and filling plug at the front differential case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plug (1).
3. Remove the oil level check plug (3).
4. Fill with the new oil up to the lower rim of check plug port (3). (Refer to “4. LUBRICANTS, FUEL AND COOLANT” in this section.)
5. After filling reinstall the filling plug and check plugs.

Oil capacity	6.0 L 6.3 U.S.qts. 5.3 Imp.qts.

(1) Drain Plug
(2) Filling Port
(3) Check Plug

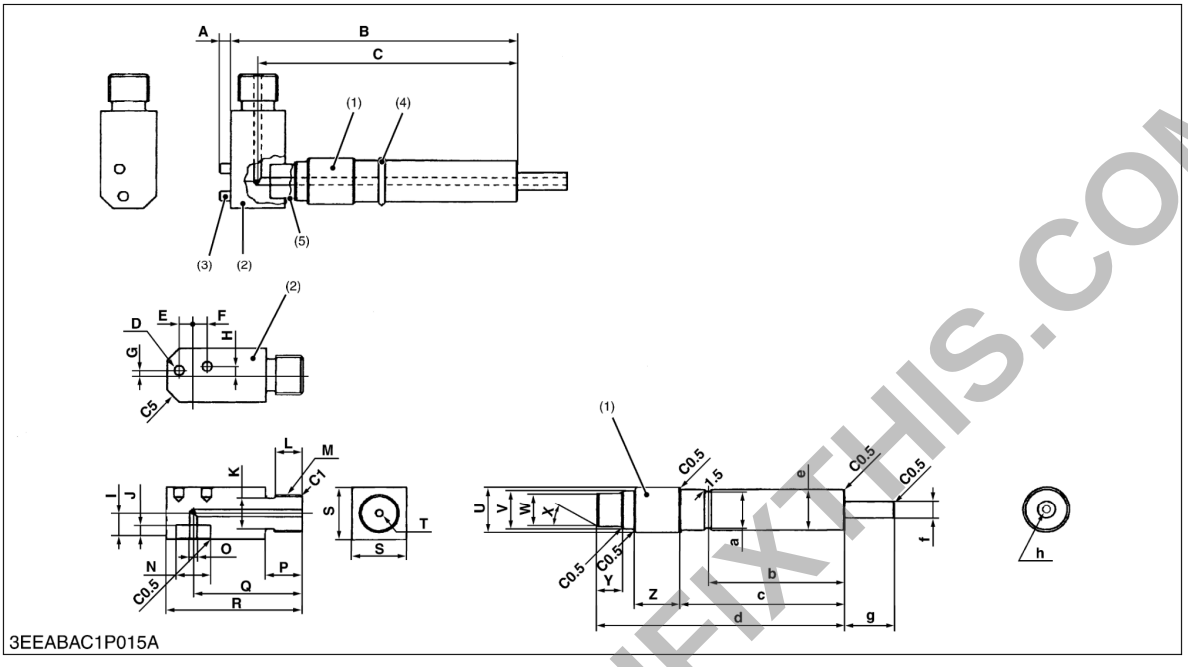
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Nozzle Adaptor for Measuring Cylinder Compression Pressure

Application: Use for measuring diesel engine compression pressure.



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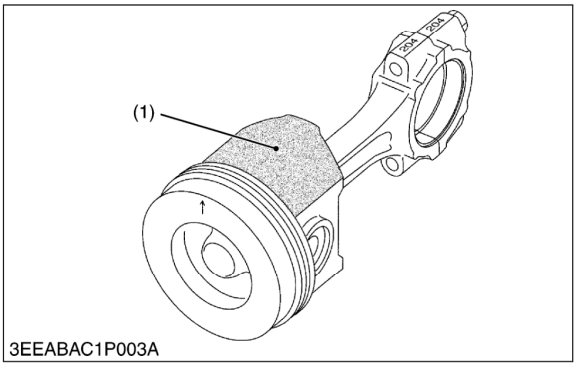
A	5 mm (0.1969 in.)	**T**	3 mm dia., 44.5 to 45 mm depth (0.1181 in. dia., 1.7520 to 1.7717 in. depth)
B	115.9 to 116.1 mm (4.5630 to 4.5709 in.)		
C	105 mm (4.1339 in.)	**U**	19 mm dia. (0.7480 in. dia.)
D	4 mm dia., 4 mm depth (0.1575 in dia., 0.1575 in. depth)	**V**	16 mm dia. (0.6299 in. dia.)
E	6 mm (0.2362 in.)	**W**	14 mm dia. (0.5512 in. dia.)
F	5.3 mm (0.2087 in.)	**X**	0.524 rad. (30°)
G	1.9 mm (0.0748 in.)	**Y**	10 mm (0.3937 in.)
H	3.5 mm (0.1378 in.)	**Z**	19 mm (0.7480 in.)
I	11.6 to 12.1 mm (0.4567 to 0.4764 in.)	**a**	14.94 to 15 mm dia. (0.5882 to 0.5906 in. dia.)
J	6 to 6.1 mm (0.2362 to 0.2402 in.)	**b**	55 mm (2.1654 in.)
K	13 mm dia. (0.5118 in. dia.)	**c**	66 mm (2.5984 in.)
L	11 mm (0.4331 in.)	**d**	100 to 100.1 mm (3.9370 to 3.9409 in.)
M	5/8-18UNF-2B	**e**	16.89 to 17 mm dia. (0.6650 to 0.6693 in. dia.)
N	14.0 to 14.011 mm dia. (0.5512 to 0.5516 in. dia.)	**f**	7.1 to 7.2 mm dia. (0.2795 to 0.2835 in. dia.)
O	3 mm dia. (0.1181 in. dia.)	**g**	20.3 to 20.5 mm (0.7992 to 0.8071 in.)
P	15 mm (0.5906 in.)	**h**	3 mm dia. (0.1181 in. dia.)
Q	44 mm (1.7323 in.)	**C0.5**	Chamfer 0.5 mm (Chamfer 0.0197 in.)
R	55 mm (2.1654 in.)	**C1**	Chamfer 1 mm (Chamfer 0.0394 in.)
S	22 mm (0.8661 in.)	**C5**	Chamfer 5 mm (Chamfer 0.1969 in.)

(1) Material SS400
(2) Material S43C-D
(3) Pin 05012-00408
(4) O-ring 04811-00150
(5) Arc welding

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[5] PISTON



3EEABAC1P003A

Piston's skirt is coated with molybdenum disulfide★, which reduces the piston slap noise and thus the entire operating noise.

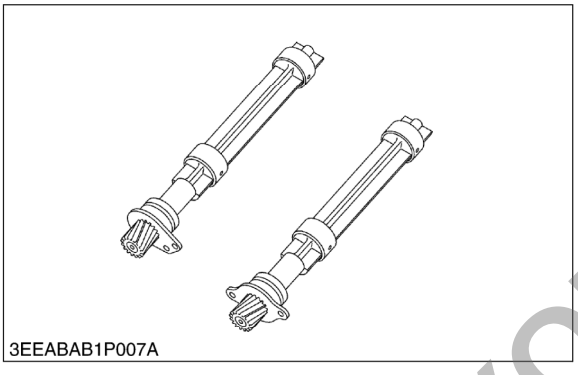
★Molybdenum disulfide (MoS_2)

The molybdenum disulfied serves as a solid lubricant, like a Graphite or Teflon. This material helps resist metal wears even with little lube oil.

(1) Molybdenum Disulfide

W1015665

[6] BUILT-IN DYNAMIC BALANCER


3EEABAB1P007A

Engine are sure to vibrate by piston's reciprocation. Theoretically, three-cylinder engines are much less prone to cause vibration than four-cylinder ones (second inertia, etc.). However, any engine has many moving parts in addition to its pistons and cannot be completely free from vibration.

The four cylinder engine is fitted with balance weight on crankcase to absorb the second inertia mentioned above and reduce vibration.

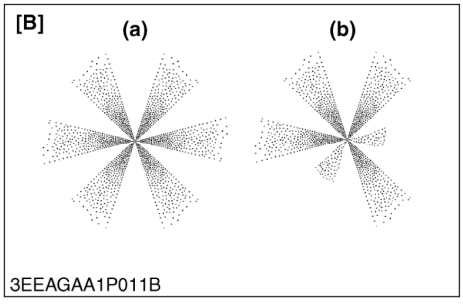
W1013617

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CAUTION

- **Check the nozzle injection pressure and condition after confirming that there is nobody standing in the direction the fume goes.**
- **If the fume from the nozzle directly contacts the human body, cells may be destroyed and blood poisoning may be caused.**



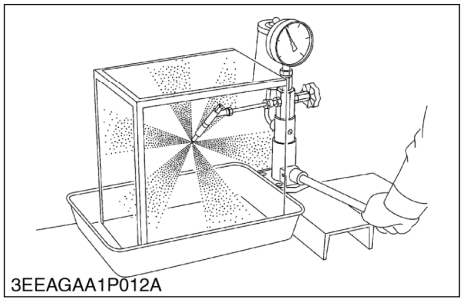
3EEAGAA1P011B

Nozzle Spraying Condition

1. Set the injection nozzle to a nozzle tester, and check the nozzle spraying condition.
2. If the spraying condition is defective, replace the injection nozzle assembly or repair at Denso service shop.

(a) Good **(b) Bad**

W10371670


3EEAGAA1P012A

Checking Nozzle Injection Pressure

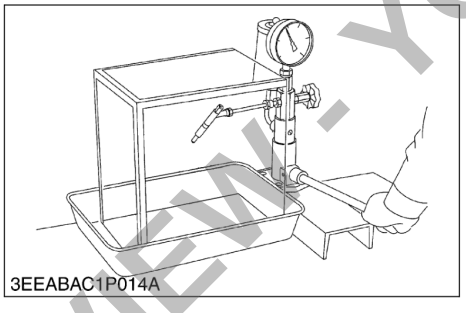
1. Set the injection nozzle to the nozzle tester.
2. Slowly move the tester handle to measure the pressure at which fuel begins jetting out from the nozzle.
3. If the measurement is not within the factory specifications, replace the injection nozzle assembly or repair at Denso service shop.

■ **NOTE**

- **Injection nozzle gasket must be replaced when the injection nozzle is removed for checking.**

Injection pressure	Factory specification	1st stage	18.63 to 19.61 MPa 190.0 to 200.0 kgf/cm^2 2702 to 2845 psi

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Valve Seat Tightness

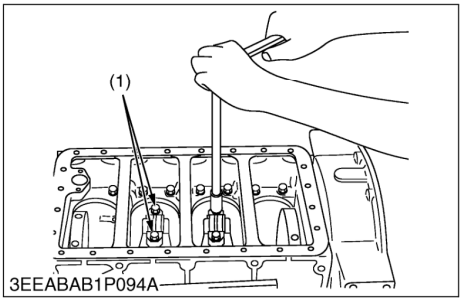
1. Set the injection nozzle to a nozzle tester.
2. Raise the fuel pressure, and keep at 16.67 MPa (170 kgf/cm^2, 2418 psi) for 10 seconds.
3. If any fuel leak is found, replace the injection nozzle assembly or repair at Denso service shop.

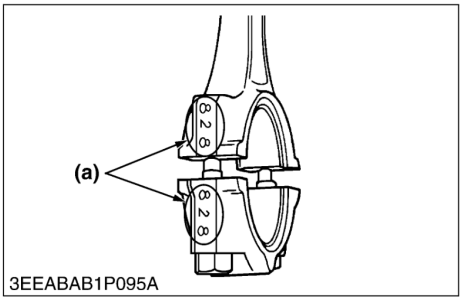
Valve seat tightness	Factory specification	No fuel leak at 16.67 MPa 170.0 kgf/cm^2 2418 psi

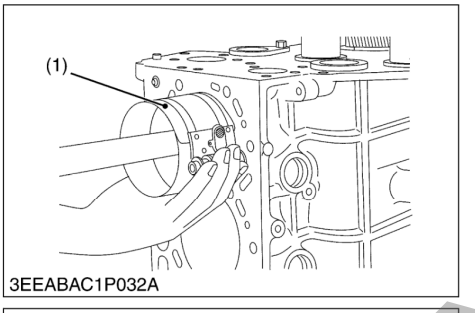
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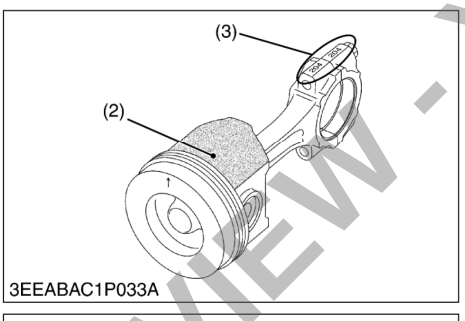
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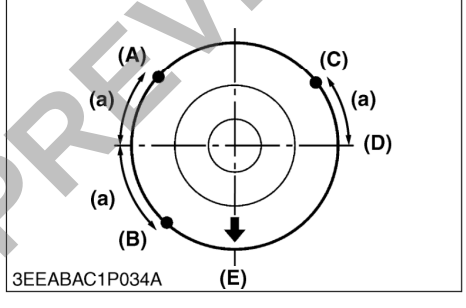
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Connecting Rod Cap

1. Remove the connecting rod screws (1) from connecting rod cap.
2. Remove the connecting rod caps.

(When reassembling)

- Align the marks **(a)** with each other. (Face the marks toward the injection pump.)
- Apply engine oil to the connecting rod screws and lightly screw it in by hand, then tighten it to the specified torque.
  If the connecting rod screw won't be screwed in smoothly, clean the threads.
  If the connecting rod screw is still hard to screw in, replace it.
- When using the existing crank pin metal again, put tally marks on the crank pin metal and the connecting rod in order to keep their positioning.
- Fit the crank pin metal in place : its centrally groove side toward the connecting rod, and the non-grooved side toward the cap.

Tightening torque	Connecting rod screw	79 to 83 N·m 8.0 to 8.5 kgf·m 58 to 61 lbf·ft

(1) Connecting Rod Screw **(a) Mark**

W1058252

Piston

1. Completely clean carbon in the cylinders.
2. Turn the flywheel and set a piston to the top dead center.
3. Pull out the piston upward by lightly tapping it from the bottom of the crankcase with the grip of a hammer.

(When reassembling)

- Before inserting the piston into the cylinder, apply enough engine oil to the cylinder.
- When inserting the piston into the cylinder, face the mark (3) on the connecting rod to the injection pump.

■ **IMPORTANT**

- **Do not change the combination of cylinder and piston. Make sure of the position of each piston by marking. For example, mark "1" on the No. 1 position.**
- **When inserting the piston into the cylinder, place the gap of each piston ring like the figure.**
- **Carefully insert the pistons using a piston ring compressor (1). Otherwise, their chrome-plated section of piston rings may be scratched, causing trouble inside the liner.**
- **When inserting the piston in place, be careful not to get the molybdenum disulfide coating torn off its skirt. This coating is useful in minimizing the clearance with the cylinder liner. Just after the piston pin has been press-fitted, in particular, the piston is still hot and the coating is easy to peel off. Wait until the piston cools down.**

(1) Piston Ring Compressor
(2) Molybdenum Disulfide Coating in piston skirt
(3) Mark
(a) 0.79 rad (45 °)
(A) Top Ring Gap
(B) Second Ring Gap
(C) Oil Ring Gap
(D) Piston Pin Hole
(E) Injection Pump Side

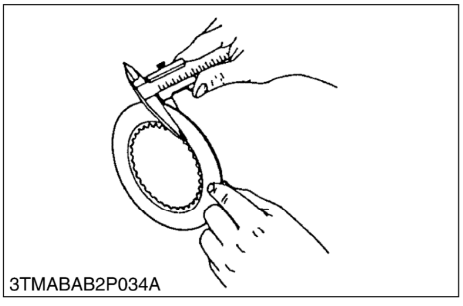
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6. SERVICING

[1] PTO CLUTCH PACK

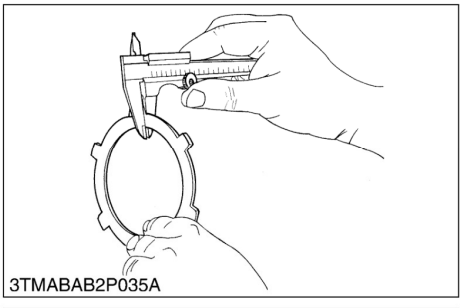

3TMABAB2P034A

PTO Clutch Disc Wear

1. Measure the thickness of PTO clutch disc with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

Thickness of PTO clutch disc	Factory specification	2.5 to 2.7 mm 0.098 to 0.106 in.
	Allowable limit	2.1 mm 0.083 in.

W1024926


3TMABAB2P035A

PTO Steel Plate Wear

1. Measure the thickness of PTO steel plate with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

Thickness of PTO steel plate	Factory specification	1.93 to 2.07 mm 0.076 to 0.081 in.
	Allowable limit	1.80 mm 0.071 in.

W1025021

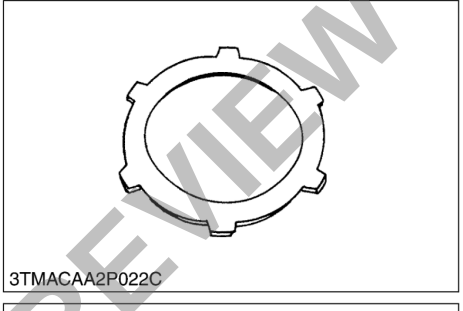

3TMACAN2P007A

Flatness of PTO Piston and PTO Steel Plate

1. Place the part on a surface plate.
2. Try to insert a feeler gauge (allowable limit size) underneath it at least four points.
3. If the gauge can be inserted, replace it.

Flatness of PTO piston	Allowable limit	0.15 mm 0.006 in.
Flatness of PTO steel plate	Allowable limit	0.30 mm 0.012 in.

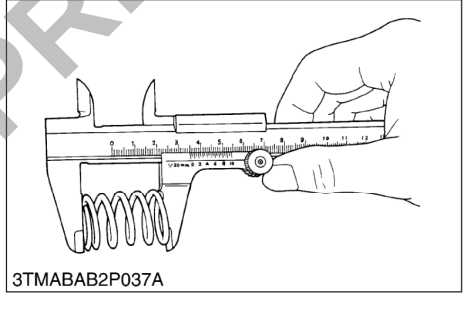
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3TMACAA2P022C

Plate

1. Check the contact surface to belleville washer (cupped spring washer).
2. If the back plate has deformed or is scratched and/or scared, replace it.

W1026255


3TMABAB2P037A

Piston Return Spring Free Length

1. Measure the free length of spring with vernier calipers.
2. If the measurement is less than the allowable limit, replace it.

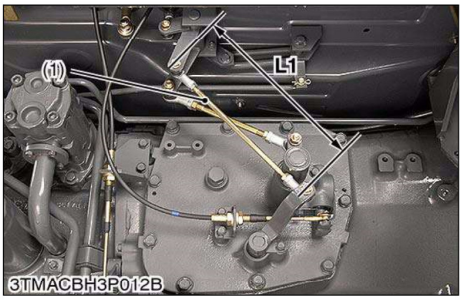
PTO return spring free length	Factory specification	46.0 mm 1.811 in.
	Allowable limit	37.5 mm 1.48 in.

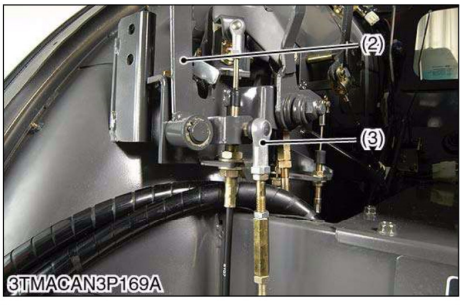
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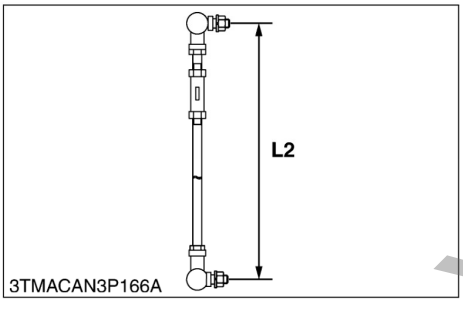
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(2) Range Gear Shift







Checking Function of Range Shift

1. Check the function of the range gear shift.
   - **Hi** and **Lo** position.
2. If feeling abnormal shifting, check the length of range gear shift rod 1 (3) and 2 (1).

Length of range gear shift rod 2 (**L1**)	Factory specification	279 mm 10.98 in.
Length of range gear shift rod 1 (**L2**)	Initial adjustment	368 mm 14.49 in.

(1) Range Gear Shift Rod 2
(2) Range Gear Shift Lever
(3) Range Gear Shift Rod 1

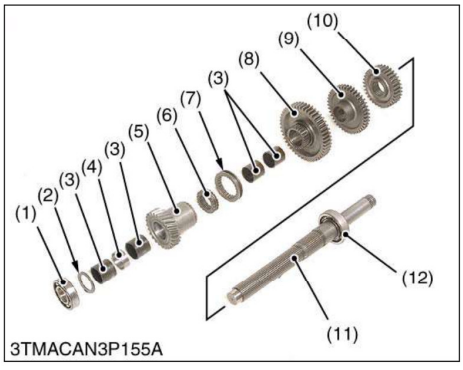
L1 :Range Gear Shift 1 Length
L2 :Range Gear Shift 2 Length

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(4) 3rd Shaft



3rd Shaft

1. Remove the bearing (1).
2. Remove the gears.

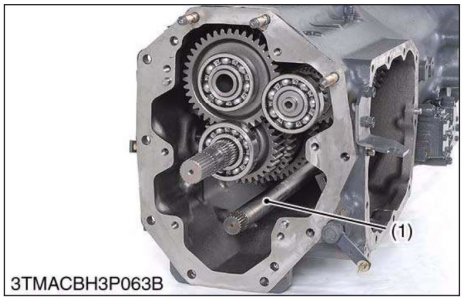
(When reassembling)

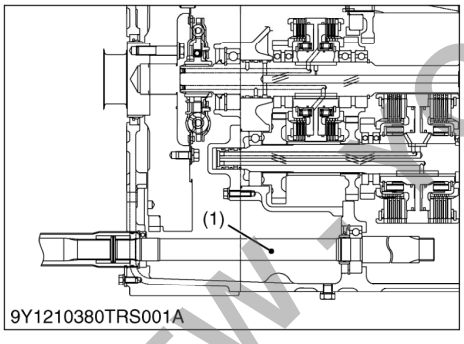
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner races (3).

(1) Bearing
(2) Thrust Collar
(3) Inner Race
(4) Collar
(5) 25T Gear
(6) Hub
(7) Shifter
(8) 46T Gear
(9) 40T Gear
(10) 33T Gear
(11) 3rd Shaft
(12) Bearing

W1093419

(5) DT Propeller Shaft





DT Propeller Shaft

1. Tap out the DT propeller shaft (1) to rearward.

(When reassembling)

- Apply grease to the oil seal.

■ **IMPORTANT**

- **The oil seal structure of the DT propeller shaft (1) is different according to the serial number of the unit. Be sure to attach appropriate parts.**
- **When replacing the oil seal without removing the DT propeller shaft (1), be sure to use "Fitting tool for oil seal of propeller shaft" to attach the oil seal appropriately.**

(1) DT Propeller Shaft

W1020906

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5 BRAKES

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3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : Refer to “5. TIGHTENING TORQUES” at “G. GENERAL” section.)

Item	N·m	kgf·m	lbf·ft
Tie-rod end lock nut	167.7 to 196.1	17.1 to 20.0	123.7 to 144.7
Front axle rocking force adjusting lock nut	98.1 to 147.1	10.0 to 15.0	72.3 to 108.5
Power steering hose retaining nut	22.6 to 27.5	2.3 to 2.8	16.6 to 20.3
Bracket mounting nut	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5
Bracket mounting screw	166.7 to 196.1	17.0 to 20.0	123.0 to 144.7
Front wheel mounting nut (M16)	259 to 304	26.5 to 31.0	191.7 to 224.2
Tie-rod end slotted nut	156.9 to 176.5	16.0 to 18.0	115.7 to 130.2
Tie-rod joint lock nut	166.7 to 196.1	17.0 to 20.0	123.0 to 144.7
Knuckle arm mounting screw (M12)	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Bevel gear case mounting screw (M16, 9T)	259.9 to 304.0	26.5 to 31.0	191.7 to 224.2
Front wheel case support mounting screw (M16, 9T)	259.9 to 304.0	26.5 to 31.0	191.7 to 224.2
Front wheel case cover mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Front wheel mounting stud bolt (M16)	130.4 to 152.0	13.3 to 15.5	96.2 to 112.1
Differential case cover mounting screw (M8, USB)	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3

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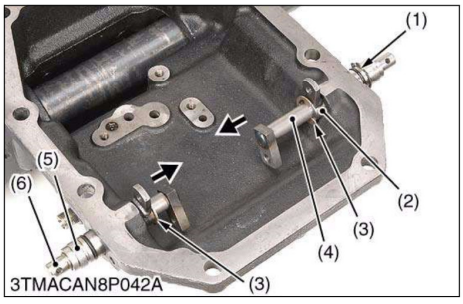
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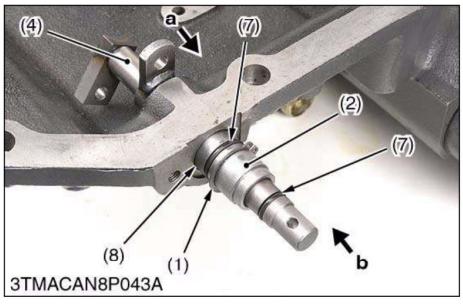
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8 HYDRAUILC SYSTEM

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Position and Draft Control Shaft and Position and Draft Feedback Shaft

1. Remove the position and draft feedback rod (6) and (5).
2. Remove the external circlip (1) then draw out the position and draft control shaft (4) and (2).
3. Remove the E-shaped stopper (3) then remove the position feedback shaft (6) from draft feedback shaft (5) and remove the position control shaft (4) from draft control shaft (2).

(When reassembling)

- Remove the O-ring (7) from position control shaft.
  - Insert the position control shaft and draft control shaft to the body until the both O-ring grooves comes out.
  - Apply grease to the O-ring then assemble the O-ring from outside.
  - Fix the external circlip the draft control shaft then push back the position control shaft with draft control shaft.
  - Fix the E-shaped clip.
- The feedback side same as control side.

(1) External Circlip
(2) Draft Control Shaft
(3) E-shaped Stopper
(4) Position Control Shaft
(5) Draft Feedback Shaft
(6) Position Feedback Shaft
(7) O-ring
(8) Chamfer

a : To Fix O-rings
b : To Assemble Shafts

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4WD

Symptom	Probable Cause	Solution	Reference Page
Front Wheel Does Not Drive When 4WD Switch is Turned ON	4WD switch or wiring harness is defective	Replace	9-S30
	4WD solenoid valve defective	Replace	9-S39
Front Wheel Drive Not Be Cancelled	4WD switch or wiring harness is defective	Repair or replace	9-S30
	4WD solenoid valve defective	Replace	9-S39

W1013718

GAUGES

Fuel Gauge Does Not Function	Fuel level sensor defective	Replace	9-S29
	Wiring harness disconnected or improperly connected (between meter panel and fuel unit)	Repair or replace	–
	Circuit in meter panel defective	Replace	–
Coolant Temperature Gauge Does Not Function	Coolant temperature gauge defective	Replace	9-S23
	Coolant temperature sensor defective	Replace	9-S25
	Wiring harness disconnected or improperly connected (between meter panel and coolant temperature sensor)	Repair or replace	–
	Circuit in meter panel defective	Replace	–

W1011980

LCD MONITOR

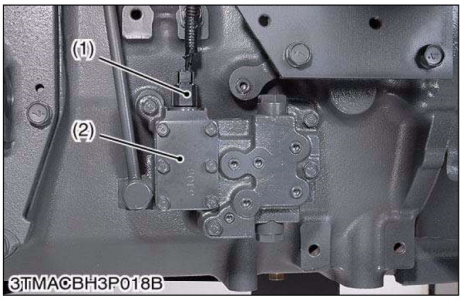
Nothing is Displayed in LCD	Battery discharged or defective (Battery voltage is below 10 V)	Recharge or replace	9-S9
	Slow blow fuse blown	Replace	9-S11
	Meter panel connector disconnect	Connect	9-S23
	Meter panel defective	Replace	9-S23
Indication on LCD Does Not Change When Pushing the Display Mode Switch	Display mode select switch defective	Replace	9-S25
	Wiring harness disconnected	Repair	–
Traveling Speed is Not Indicating	Wiring harness disconnected	Repair	–
	Traveling speed sensor defective	Replace	9-S29
PTO Speed in Not Indicating	Wiring harness disconnected	Repair	–
	Engine tachometer sensor defective	Replace	9-S29

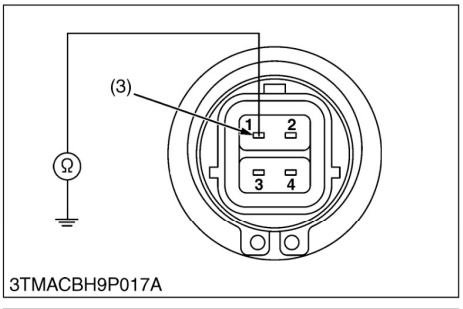
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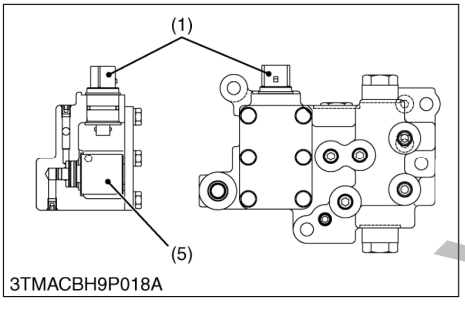
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(2) Hi-Lo Dual Speed







Solenoid Valves

1) Connector Voltage

1. Remove the connector (1).
2. Turn on the dual speed switch at **Lo** position.
3. Measure the voltage across the each terminal and chassis.
4. If the voltage differs from battery voltage, the wiring harness, fuse or main switch is faulty.

Voltage	Each terminal – Chassis	Approx. battery voltage

2) Solenoid Valve

1. Disconnect the wire harness connector (1).
2. Measure the resistance with an ohmmeter across the each terminal **1** on the connector (1) and chassis.
3. If infinity is indicated, the solenoid valve is faulty.

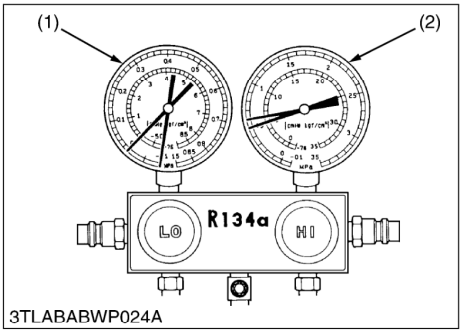
Resistance	Solenoid valve **1** terminal to chassis	10 to 12 Ω

(1) Connector
(2) Dual Speed Solenoid Valve Assembly
(3) Terminal **1** for Dual Speed Solenoid Valve
(5) 4WD Solenoid Valve
(6) PTO Solenoid Valve

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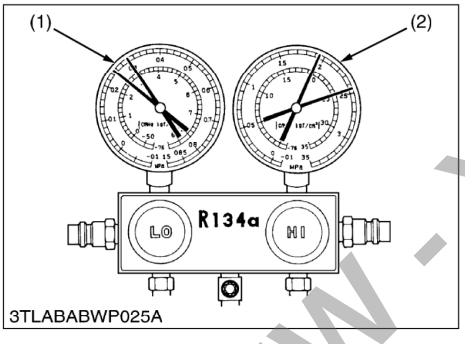
3TLABABWP024A

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)
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. (Refer to "(3) Charging the Refrigerant" in this section.)
   - If caused by gas leakage in heat sensitizing tube, replace the expansion valve.

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

W1017346



3TLABABWP025A

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 to 4 kgf/cm^2, 42.7 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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