WSM

WORKSHOP MANUAL
TRACTOR
L39

[TL1000 FRONT LOADER]
[BT1000 BACKHOE]

Kubota

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KiSC issued 04, 2006 A

GENERAL

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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.

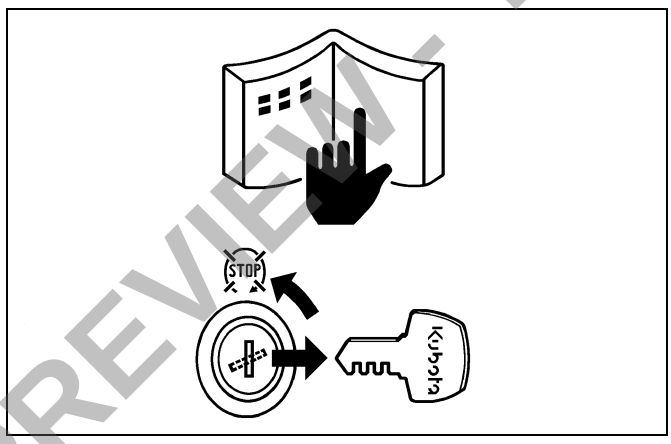
DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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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SPECIFICATIONS

Model			L39
Engine gross power			29.1 kW (39 HP)*
Engine net power			27.9 kW (37.4 HP)*
PTO power			22.7 kW (30.5 HP)*
Engine	Model		D1803-M-E2-TLB
	Type		Indirect injection vezrtical, water-cooled, 4-cycle diesel
	No. of cylinders		3
	Bore and stroke		87 × 102.4 mm (3.4 × 4.0 in.)
	Total displacement		1.826 L (111.4 cu. in.)
	Rated revolution		2700 min^{-1} (rpm)
	Fuel		Diesel fuel No. 1 [below –10 °C (14 °F)], Diesel fuel No. 2 [above –10 °C (14 °F)]
	Battery		12 V, RC: 90 min., CCA: 550A
Capacities	Fuel tank		40 L (10.6 U.S.gals, 8.80 Imp.gals.)
	Engine crankcase (with filter)		5.7 L (6.0 U.S.qts., 5.0 Imp.qts.)
	Engine coolant		7.5 L (7.9 U.S.qts., 6.6 Imp.qts.)
	Transmission case		43 L (11.4 U.S.gals, 9.5 Imp.gals.)
	Front axle case		6.5 L (6.9 U.S.qts., 5.7 Imp.qts.)
Tires		Front	27 × 10.5-15R4
		Rear	15-19.5R4
Dimensions	Overall length (without 3P)		2747 mm (108.18 in.)
	Overall width		1968 mm (66.9 in.)
	Overall height with ROPS and FOPS		2400 mm (94.5 in.)
	Wheel base		1750 mm (68.9 in.)
	Min. ground clearance		300 mm (11.8 in.) at transmission case
	Tread	Front	1165 mm (45.9 in.)
		Rear	1315 mm (51.8 in.)
Weight (with ROPS and FOPS, main frame)			1850 kg (4080 lbs)
PTO shaft			Transmission case rear
Rear PTO			SAE 1-3/8, 6-5 Spline
Clutch			Dry
Steering			Hydraulic power
Transmission			Glide shift transmission (12 forward and 8 reverse speeds)
Min. turning radius (without brake)			3.2 m (10.5 feet)
Brake			Multiple wet disks operated by two foot pedals which can be locked together
Differential			Bevel gear

NOTE: * Manufacture's estimate The company reserves the right to change the specifications without notice.
** without brake

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5. TIGHTENING TORQUES

Screws, bolts, nuts and hydraulic fittings whose tightening torques are not specified in this Workshop Manual should be tightened according to tables 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	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M6 (6 mm, 0.24 in.)	7.85 to 9.31	0.80 to 0.95	5.79 to 6.87	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	16.7 to 19.6	1.7 to 2.0	12.3 to 14.4	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	29.5 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.3 to 45.1	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.2 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5	60.9 to 70.6	6.2 to 7.2	44.9 to 52.0
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	–	–	–	77.5 to 90.2	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 86.7
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	–	–	–	197 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 304	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	246 to 284	25.0 to 29.0	181 to 209	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	344 to 402	35.0 to 41.0	254 to 296
M20 (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	–	–	–	491 to 568	50.0 to 58.0	362 to 419

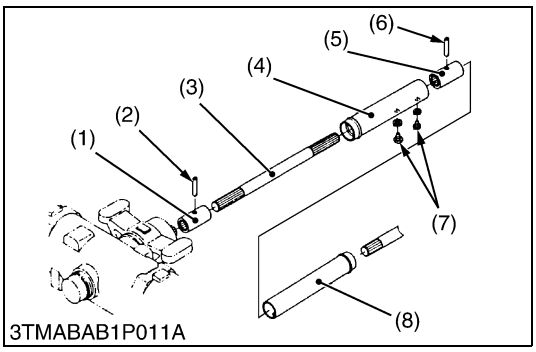
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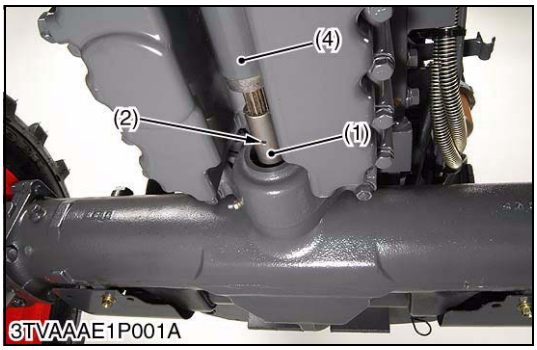
American standard cap screws with UNC or UNF threads				Metric cap screws			
Grade	SAE 5 or 8			Grade	Property class 8.8 (Approx. SAE grade 5)		
Unit / Size	N·m	kgf·m	ft-lbs	Unit / Size	N·m	kgf·m	ft-lbs
1/4	9.8 to 11.7	1.0 to 1.2	7.2 to 8.6	**M6**	9.8 to 11.2	1.0 to 1.1	7.2 to 8.3
5/16	19.0 to 23.1	1.9 to 2.4	14 to 17	**M8**	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2
3/8	33.9 to 40.7	3.5 to 4.2	25 to 30	**M10**	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
1/2	88.1 to 105.8	9.0 to 10.8	65 to 78	**M12**	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5
9/16	122.0 to 146.4	12.4 to 14.9	90 to 108	**M14**	124 to 147	12.6 to 15.0	91.2 to 108
5/8	176.3 to 211.5	18.0 to 21.6	130 to 156	**M16**	196 to 225	20.0 to 23.0	145 to 166
–	–	–	–	**M18**	275 to 318	28.0 to 32.5	203 to 235

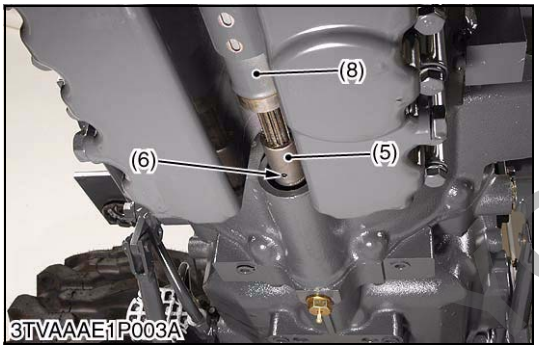
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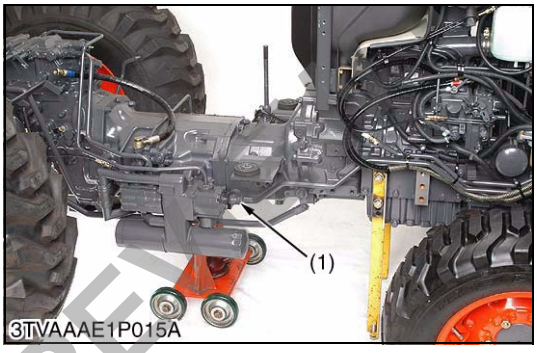
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Propeller Shaft

1. Slide the propeller shaft cover (4) and (8) after removing the screws (7).
2. Tap out the spring pins (2), (6) and the slide the coupling (1), (5) and then remove the propeller shaft with covers (4), (8).

(When reassembling)

- Apply grease to the splines of housing 1 (3).

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

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Separating Engine and Clutch Housing

1. Place the disassembling stand under the engine and clutch housing case.
2. Disconnect the oil cooler pipe (1).
3. Remove the engine and clutch housing mounting bolts and nuts.
4. Separate the engine and clutch housing while lifting up the tank frame.

(When reassembling)

- Apply grease to the spline of clutch shaft.
- Apply liquid gasket (Three Bond 1211 or equivalent) to joint face of the flywheel housing and clutch housing.

Tightening torque	Engine and clutch housing mounting bolt	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
	Engine and clutch housing mounting nut	103.0 to 117.7 N·m 10.5 to 12.0 kgf·m 75.9 to 86.8 ft-lbs
	Engine and clutch housing mounting stud bolt	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

(1) Oil Cooler Pipe

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No fuel	Replenish fuel	G-9
	• Air in the fuel system	Bleed	G-32
	• Water in the fuel system	Change fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Change	G-27
	• Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil	G-9
	• Fuel with low cetane number	Use the specified fuel	G-9
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S19
	• Incorrect injection timing	Adjust	1-S52
	• Fuel camshaft worn	Replace	1-S26
	• Injection nozzle clogged	Clean or replace	–
	• Injection pump malfunctioning	Repair or replace	1-S22
	• Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	1-S26, S28, S31
	• Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S20
	• Improper valve timing	Correct or replace timing gear	1-S26
	• Piston ring and cylinder worn	Replace	1-S38
	• Excessive valve clearance	Adjust	1-S17
	• Stop solenoid malfunctioning	Replace	9-S38
	• OPC timer defective	Replace	9-S35
	• Safety switch defective (PTO switch, seat turn switch, shuttle lever switch)	Replace	9-S35
Starter Does Not Run	• Battery discharged	Charge	G-22
	• Starter malfunctioning	Repair or replace	9-S40
	• Main switch malfunctioning	Repair or replace	9-S32
	• Safety switches improperly adjusted or defective	Repair or replace	9-S33
	• Starter relay defective	Replace	9-S37
	• Wiring disconnected	Connect	–
	• Electronic instrument panel connector disconnected	Connect	–
Engine Revolution Is Not Smooth	• Fuel filter clogged or dirty	Change	G-27
	• Air cleaner clogged	Clean or change	G-18
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S19
	• Injection pump malfunctioning	Repair or replace	1-S22
	• Incorrect nozzle injection pressure	Adjust	1-S53
	• Injection nozzle stuck or clogged	Repair or replace	1-S19
	• Governor malfunctioning	Repair	–

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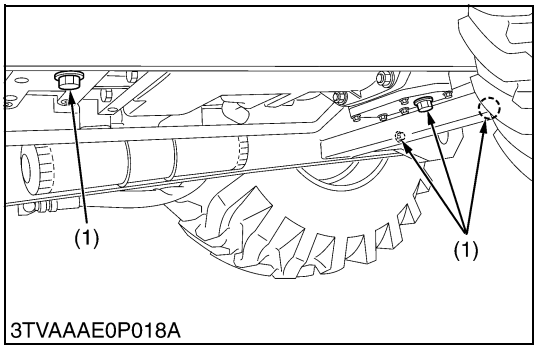
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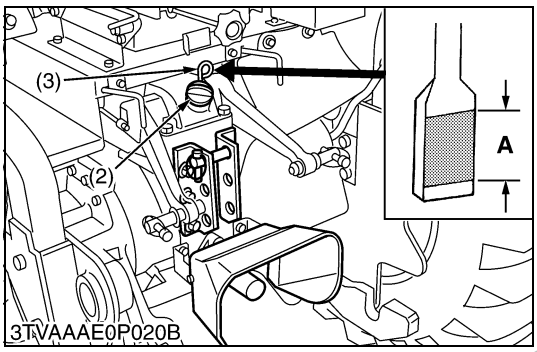
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4. CHECKING, DISASSEMBLING AND SERVICING

- Procedure of disassembling the front loader and the tractor frame from the tractor is written in “PREPARATION” section.

[1] SEPARATING ENGINE FROM TRACTOR





Draining the Transmission Fluid

CAUTION

- **Allow engine to cool down sufficiently, oil can be not and can burn.**

1. Place oil pans underneath the transmission case.
2. Remove the drain plugs (1).
3. Drain the transmission fluid.
4. Reinstall the drain plugs (1).

(When refilling)

- Fill up from filling port after removing the filling plug (2) until reaching the upper notch on the dipstick (3).
- After running the engine for few minutes, stop it and check the oil level again, add the fluid to prescribed level if it is not correct level.

Transmission fluid capacity	43 L 11.4 U.S.gals. 9.5 Imp.gals.

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system.**
  Refer to “LUBRICANTS, FUEL AND COOLANT”. (See page G-9.)
- **Do not mix different brands of fluid together.**
- **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.

(1) Drain Plugs
(2) Filling Plug
(3) Dipstick

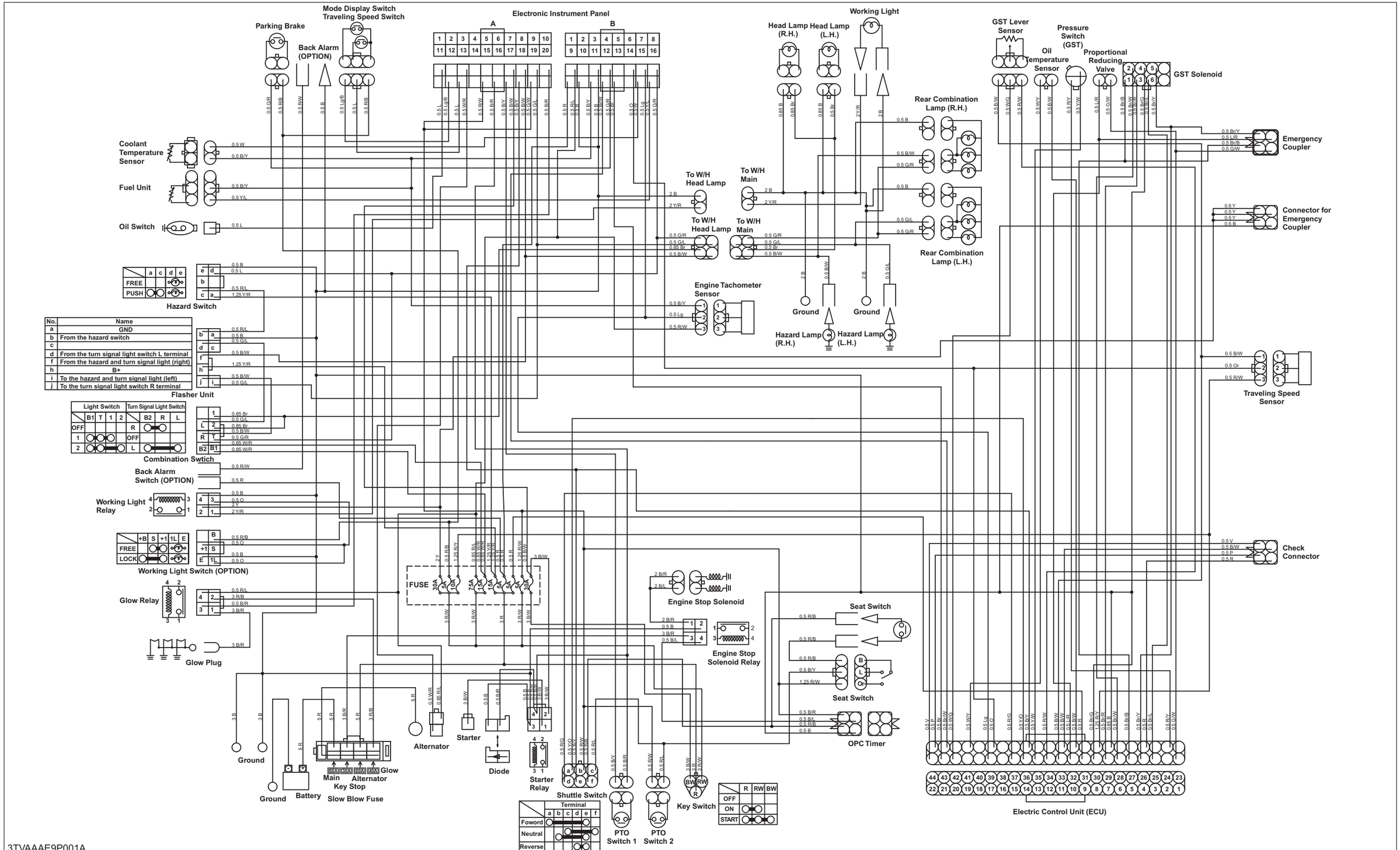
A : Oil level is acceptable within this range.

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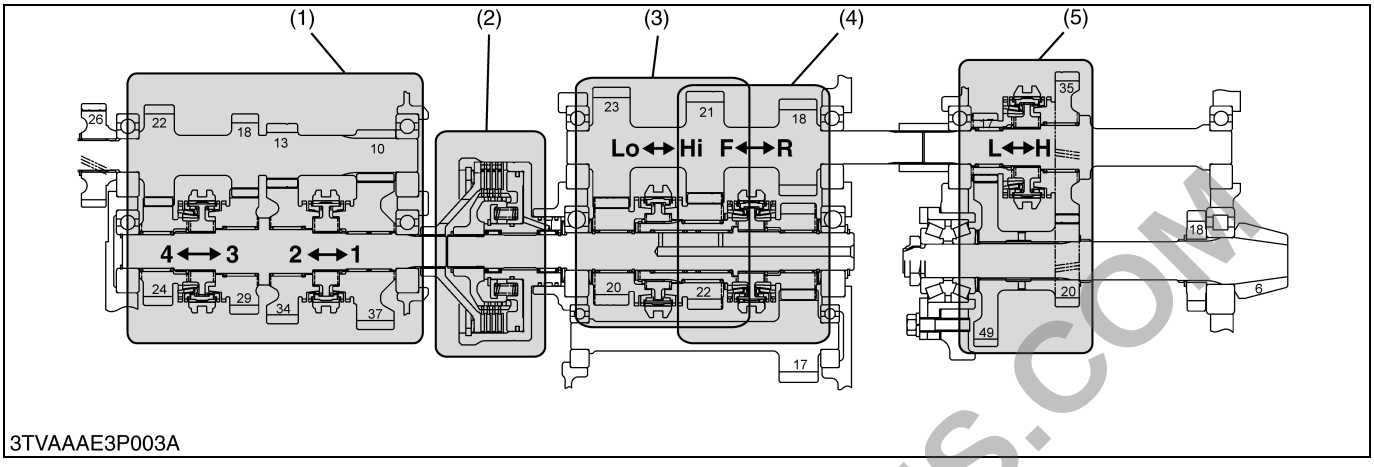
[1] DIAGRAM



No.	Name
a	GND
b	From the hazard switch
c	
d	From the turn signal light switch L terminal
f	From the hazard and turn signal light (right)
h	B+
i	To the hazard and turn signal light (left)
j	To the turn signal light switch R terminal

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3. POWER TRAIN



(1) Main Shift Section
(2) GST Clutch Pack
(3) Main-range Shift Section
(4) Shuttle Shift Section
(5) Sub-range Shift Section

The transmission is composed of the fully synchronized gear shifting and the hydraulic clutch as shown above figure. And the double cone type synchromesh is adapted on the 4th speed side of main shift section (1), shuttle shift section (4) and L speed side of sub-range shift section (5).

As for the speed changing, only by operating the GST lever, the shifter of the gear changing is moved by hydraulic operation which is electrically controlled. And as for each gear changing, each shift is moved according to the shift pattern input to the electric control unit (ECU). The shift pattern is shown in the table below.

(Forward shift pattern)

Lever Location at Lever Guide	1	2	3	4	5	6	7	8	9	10	11	12
Display on LCD	1	2	3	4	5	6	7	8	9	10	11	12
(1) Main Shift	1	2	3		4		1		2		3	4
(3) Main-range Shift	Hi		Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi		
(5) Sub-range Shift	L						H					

(Reverse shift pattern)

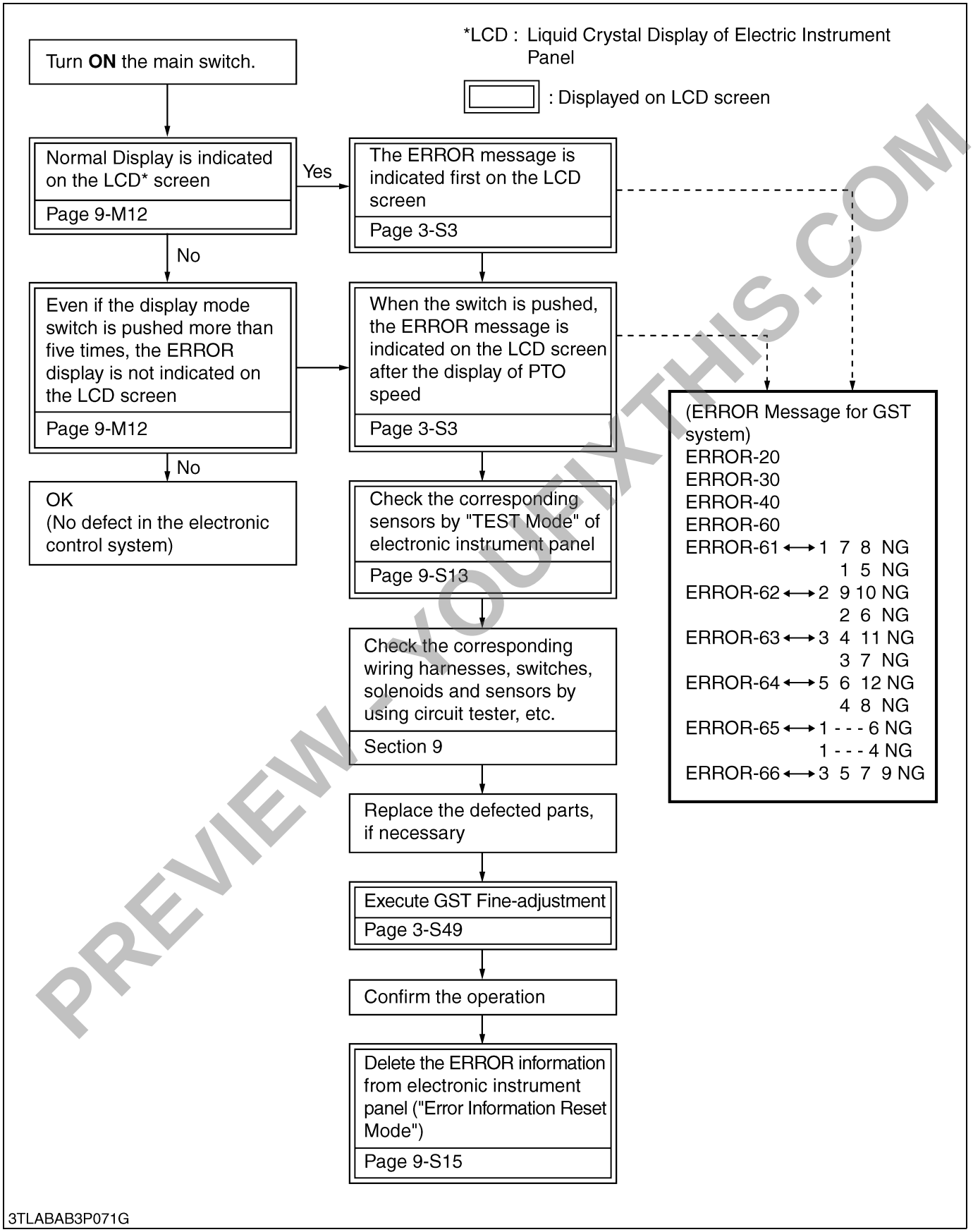
Lever Location at Lever Guide	1	2	3	4	5	6	7	8	9	10	11	12
Display on LCD	1	2	3		4		5		6		7	8
(1) Main Shift	1	2	3		4		1		2		3	4
(5) Sub-range Shift	L						H					

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[2] GST SYSTEM

■ Electrical Diagnosis by Electronic Instrument Panel (IntelliPanel)



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4. CHECKING DISASSEMBLING AND ASSEMBLING

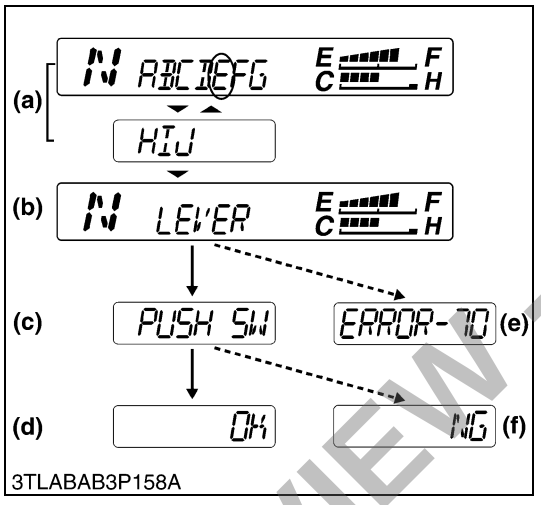
[1] CHECKING AND ADJUSTING

(1) Electrical Adjusting [GST Fine-adjustment with Electronic Instrument Panel (IntelliPanel)]

■ **NOTE**

- **Before executing the following fine-adjustment, refer to "Testing, Setting and Adjusting by Electronic Instrument Panel" of an Electrical System. (Refer to page 9-S12.)**
  The fine-adjustment function is a function to update the data of the memory device in the ECU when a sensor, a valve, and an electronic instrument panel which relates to the GST system are repaired or are re-installed. There are three kinds of fine-adjustment functions in the GST system.





GST Lever Sensor Fine-adjustment
(Setting the GST lever's neutral position with its sensor)

■ **IMPORTANT**

- **As for this fine-adjustment, be sure to set it correctly because the set state becomes the standard of the control thereafter.**

■ **NOTE**

- **When the GST lever sensor, the ECU or the electronic instrument panel is replaced, this adjustment is required.**

1. Set the GST shift lever to **Neutral** position.
2. Push down both the display mode switch (2) and the travel speed switch (3) at once, continue holding switches, and then turn the main switch to **ON** position.
3. The **"Mode Selection Display" (a)** is indicated on the LCD (1). And release the switches.
4. Press the display mode switch (2) to move the flashing part, and flash the **"E"**.
5. Hold down the display mode switch (2) for more then 2 seconds at this condition, and the buzzer rings and Mode **E** is selected.
6. **"LEVER"** is displayed **(b)** and **"PUSH SW"** is displayed **(c)** for five seconds.
7. Hold down the display mode switch for more than 2 seconds. (This preserve the adjusted value to the ECU.)
8. **"OK"** is displayed **(d)** on LCD screen to tell that preserving to ECU has been made correctly. Turn off the main switch to end the mode.
9. If "**NG"** is displayed **(f)**, it means the preserving has not been made correctly (4). Turn off the main switch and repeat the procedure.
10. If **"LEVER"** is displayed **(b)** first and then **"ERROR-70"** shows up **(e)**, it means the lever sensor voltage is out of specification. In this case;
    - Check to see that GST lever is at the **Neutral** position.
    - Check the lever sensor voltage in the Test Mode (Mode **"A"**) (see page 9-S13). If out of specification, replace the sensor itself.

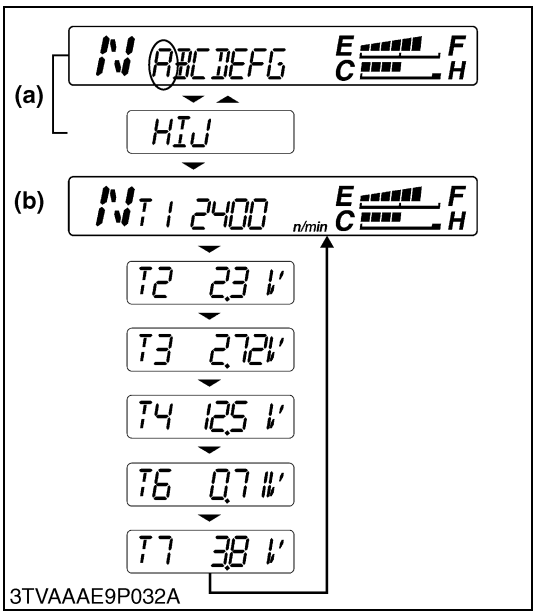
(1) Liquid Crystal Display (LCD)
(2) Display Mode Switch
(3) Travel Speed Switch

(a) Mode Selection Display
(b) Information Display
(c) Adjusting Display
(d) Correct Preserving Display
(e) Error Display
(f) Incorrect Preserving Display

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■ **Test Mode (Mode "A")**

1. While holding down the both switches at once, turn the main switch to **ON** or **START** position.
2. Select the mode **"A"**.
3. **"T1"** is displayed **(b)**.
4. Each time the display mode switch is pressed, the symbol changes from **"T1"** to **"T7"** with the buzzer sound.
5. Turn off the main switch to end the test mode.

(a) Mode Selection Display **(b) Testing Display**

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Symbol	Contents	Condition	Value (unit)
T1	Engine revolution	Idling to Max.	700 to Max. (n/min.)
T2	Coolant temperature sensor voltage	–20 → 60 → 100 °C (–4 → 140 → 212 °F)	4.76 to 4.81 → 2.80 to 3.0 → 0.77 to 0.83 (V)
T3	Fuel sensor voltage	F to E	Below 0.31 to above 3.24 (V)
T4	Battery Voltage		More than 12 (V)
T6	GST shift lever sensor voltage	N → 8^{th} → 12^{th}	0.41 to 1.01 → 2.77 to 3.37 → 3.91 to 4.51 (V)
T7	Oil temperature sensor voltage	–20 → 60 → 100 °C (–4 → 140 → 212 °F)	4.46 to 4.57 → 1.71 to 1.91 → 0.34 to 0.38 (V)

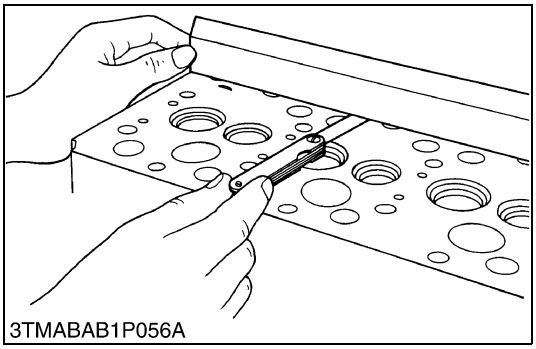
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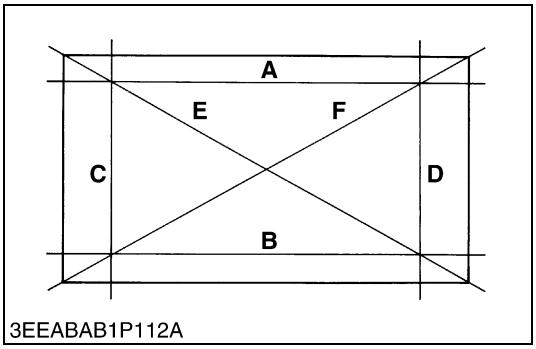
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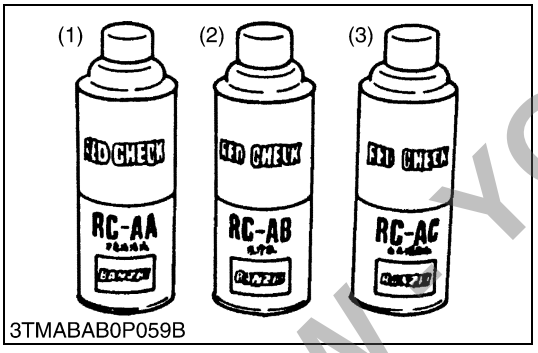
(3) Servicing

(A) Cylinder Head and Valves

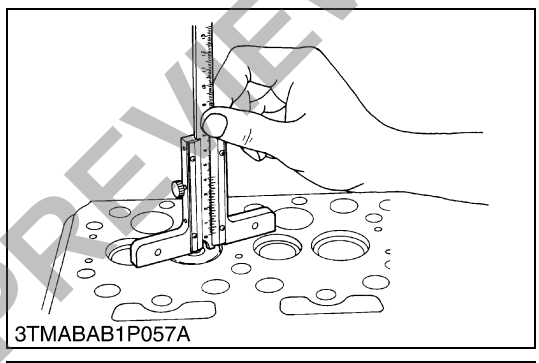

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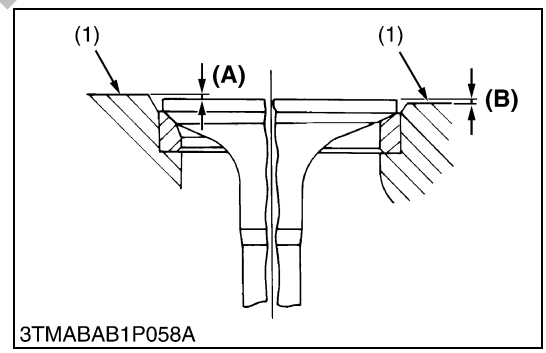


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Cylinder Head Surface Flatness

1. Clean the cylinder head surface.
2. Place a straightedge on the cylinder head's four sides (**A**), (**B**). (**C**) and (**D**) and two diagonals (**E**) and (**F**) as shown in the figure. Measure the clearance with a feeler gauge.
3. If the measurement exceeds the allowable limit, correct it with a surface grinder.

■ **IMPORTANT**
- **Do not place the straightedge on the combustion chamber.**
- **Be sure to check the valve recessing after correcting.**

Cylinder head surface flatness	Factory spec.	0.05 mm / 500 mm 0.0020 in. / 19.69 in.

W1027737

Cylinder Head Flaw

1. Prepare an air spray red check (Code No. 07909-31371).
2. Clean the surface of the cylinder head with detergent (2).
3. Spray the cylinder head surface with the read permeative liquid (1). Leave it five to ten minutes after spraying.
4. Wash away the read permeative liquid on the cylinder head surface with the detergent (2).
5. Spray the cylinder head surface with white developer (3).
6. If flawed, it can be identified as red marks.

(1) Red Permeative Liquid
(2) Detergent
(3) White Developer

W1076542

Valve Recessing

1. Clean the cylinder head surface, valve face and valve seat.
2. Insert the valve into the valve guide.
3. Measure the valve recessing with a depth gauge.
4. If the measurement exceeds the allowable limit, replace the valve.
5. If it still exceeds the allowable limit after replacing the valve, replace the cylinder head.

Valve recessing	Factory spec.	0.05 (protrusion) to 0.15 (recessing) mm 0.0020 (protrusion) to 0.0059 (recessing) in.
	Allowable limit	0.40 (recessing) mm 0.0157 (recessing) in.

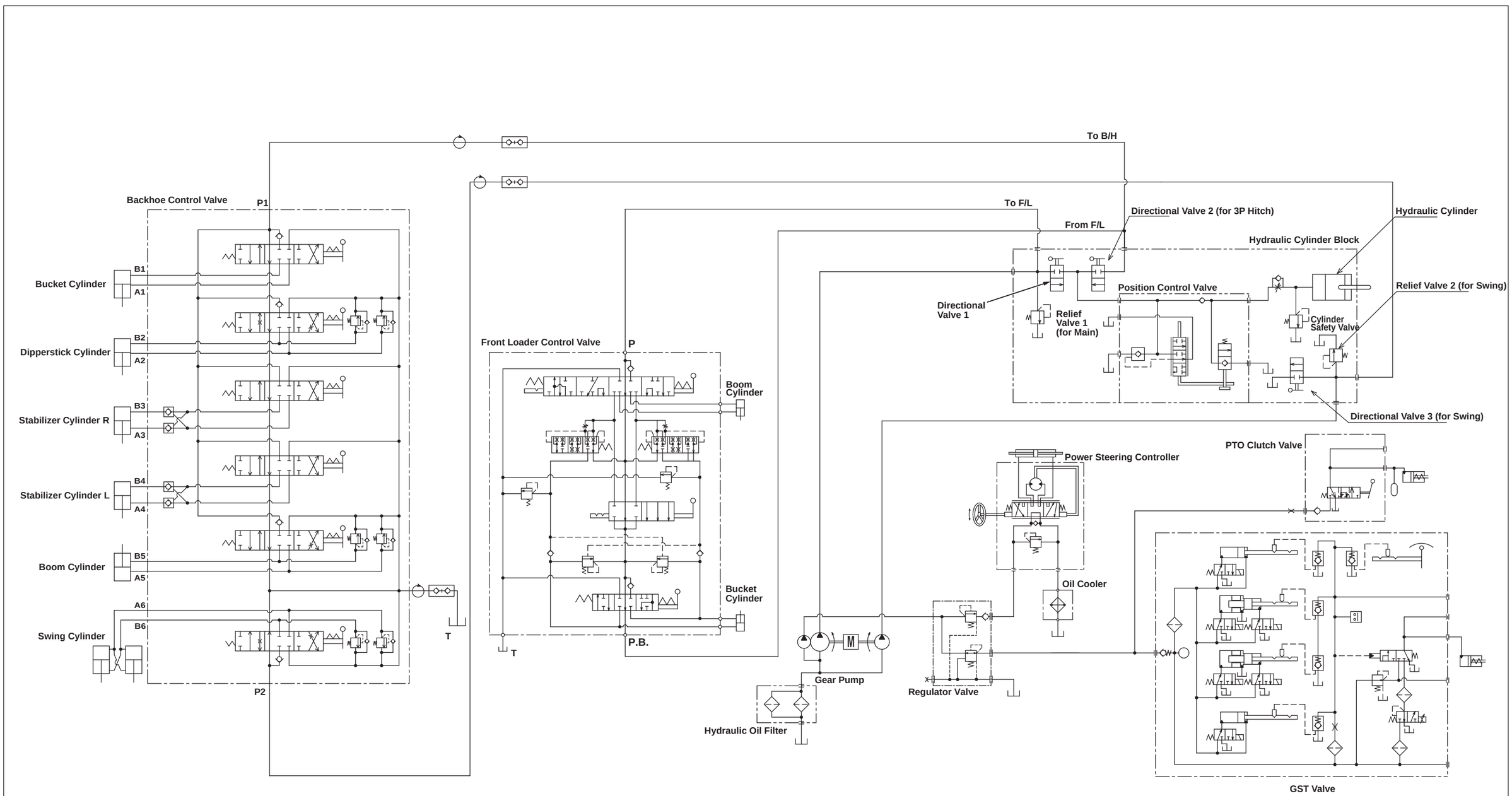
(1) Cylinder Head Surface
(A) Recessing
(B) Protrusion

W1076880

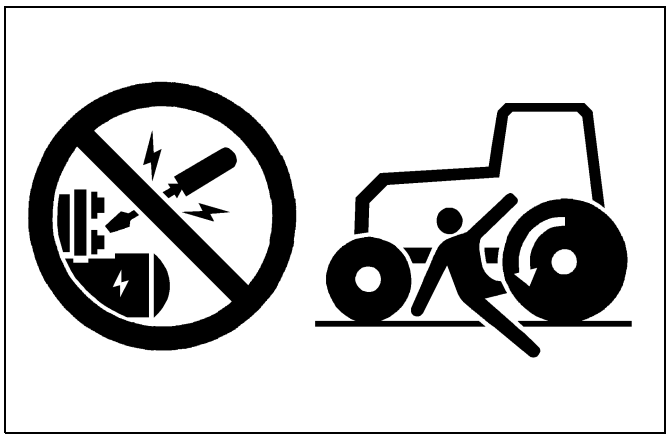
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2. HYDRAULIC CIRCUIT

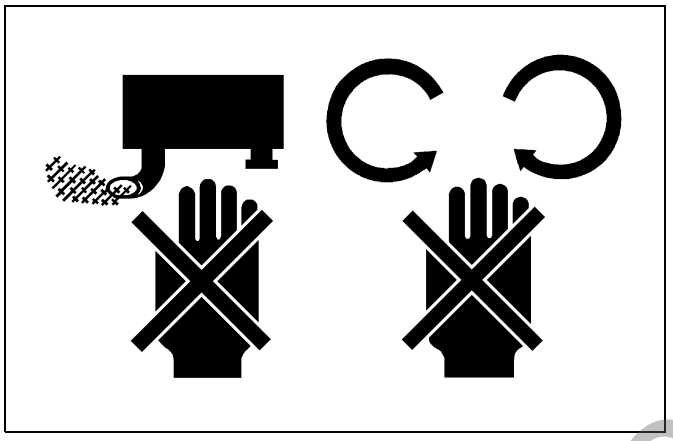


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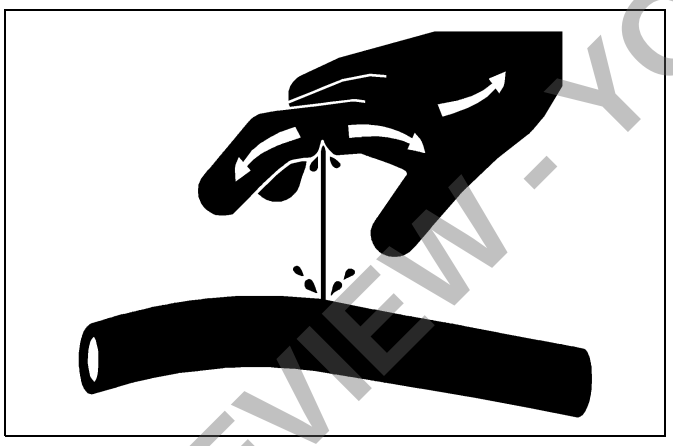
SAFETY STARTING

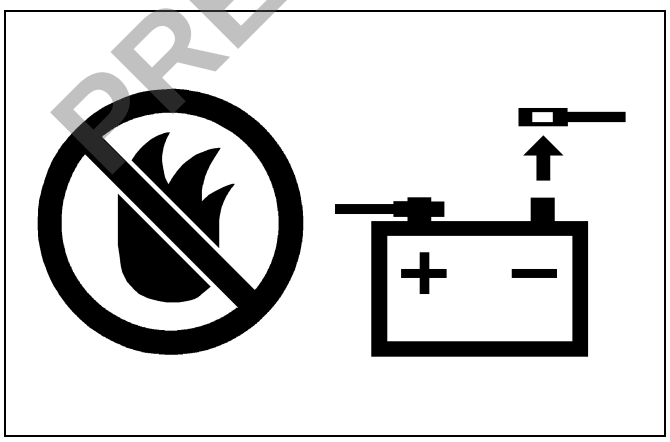
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine while standing on ground. Start the engine only from operator's seat.



SAFETY WORKING

- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
- Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.





AVOID FIRES

- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.

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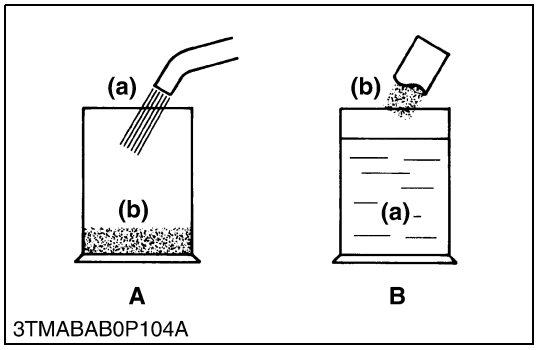
[3] TIRE LIQUID INJECTION

Auxiliary weights can be used to increase traction force for plowing in fields or clayey ground.

Another way is to inject water or another liquid, such as a calcium chloride solution in the tires. Water must not be used in winter since it freezes at 0 °C (32 °F). The calcium chloride solution will not freeze and moreover, affords higher effect than water since its specific gravity is higher than that of water by about 20 %. Below is an explanation of calcium chloride solution injection.

■ **IMPORTANT**

- **Do not fill the front tires with liquid.**



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Preparation of Calcium Chloride Solution

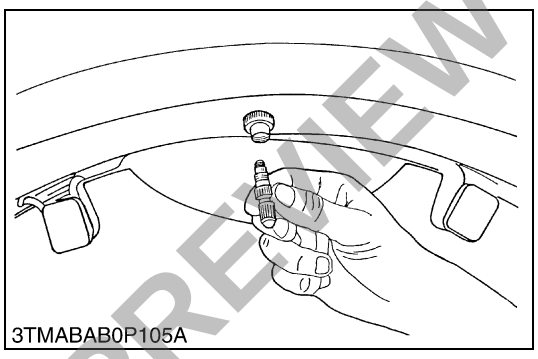
CAUTION

- **When making a calcium chloride solution, do not pour water over calcium chloride since this results in chemical reaction which will cause high temperature. Instead add a small amount of calcium chloride to the water at a time until the desired solution is achieved.**

Freezing temp.	Weight of $CaCl_2$ to be dissolved in 100 L (26.5 U.S.gals., 22.0 Imp.gals.) of water
–5 °C (23 °F)	12 kg (26.4 lbs)
–10 °C (14 °F)	21 kg (46.3 lbs)
–15 °C (5 °F)	28 kg (61.7 lbs)
–20 °C (–4 °F)	34 kg (75.0 lbs)
–25 °C (–13 °F)	40 kg (88.2 lbs)
–30 °C (–22 °F)	44 kg (97.0 lbs)
–35 °C (–31 °F)	49 kg (108 lbs)
–40 °C (–40 °F)	52 kg (114.6 lbs)
–45 °C (–49 °F)	56 kg (123.5 lbs)
–50 °C (–58 °F)	61 kg (134.5 lbs)

(a) Water
(b) $CaCl_2$ (Calcium Chloride)
A : Bad
B : Good

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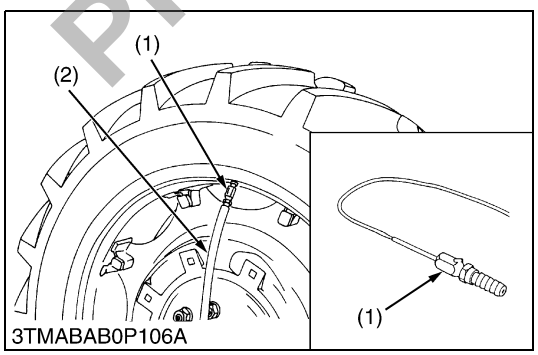

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Attaching Injector

1. Lift the rear tires off the ground.
2. Turn the tire so that the air valve is at the top.
3. Remove the air valve, and attach the injector. (Code No. 07916-52501)

(1) Injector
(2) Hose

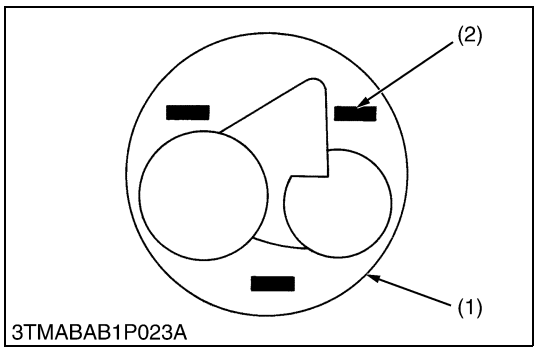
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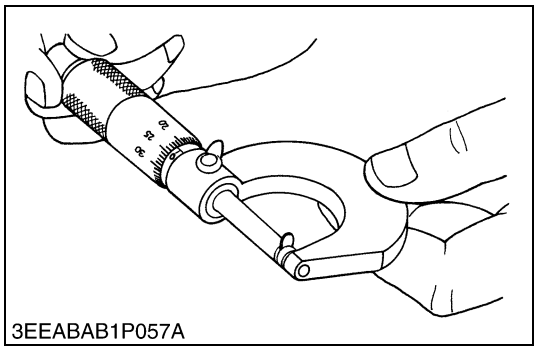
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Top Clearance

1. Remove the cylinder head.
2. Move the piston up and stick a strip of fuse on the piston head at three position with grease.
3. Lower the piston and install the cylinder head. (Use a new cylinder head gasket and tighten with a specified tightening torque.)
4. Turn the flywheel until the piston passes through the T.D.C..
5. Remove the cylinder head and measure the thickness of the fuses.
6. If the measurement is not within the factory specifications, check the oil clearances between the crankpin and bearing and between the piston pin and bushing.

Top clearance	Factory spec.	0.55 to 0.70 mm 0.0217 to 0.0276 in.

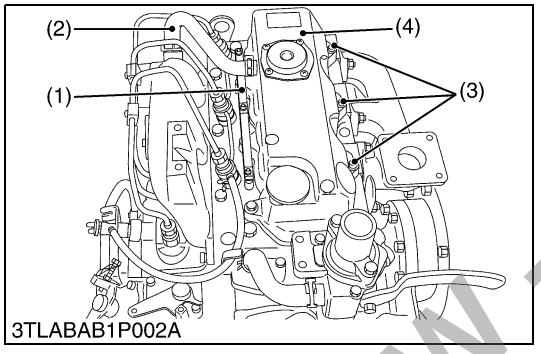
Tightening torque	Cylinder head screw	93.1 to 98.0 N·m 9.5 to 10.0 kgf·m 68.7 to 72.3 ft-lbs

(1) Piston (2) Fuse

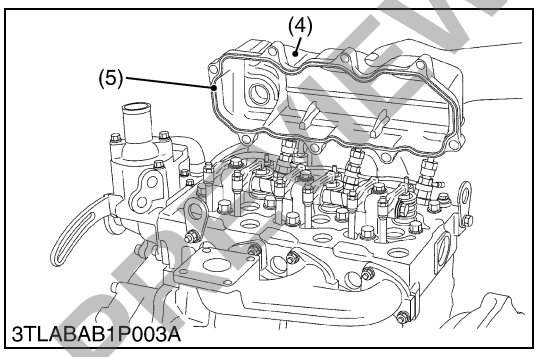
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(2) Disassembling and Assembling

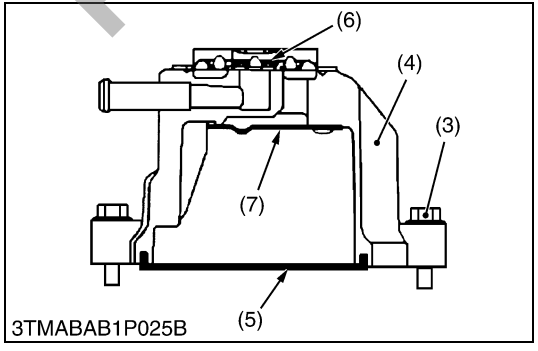
(A) Cylinder Head and Valves



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3TLABAB1P003A



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Cylinder Head Cover

1. Remove the lead (1).
2. Remove the breather hose (2).
3. Remove the head cover screws (3).
4. Remove the cylinder head cover (4).

(When reassembling)

- Check to see if the cylinder head cover gasket is not defective.

Tightening torque	Cylinder head cover screw	6.9 to 11.3 N·m 0.7 to 1.15 kgf·m 5.1 to 8.32 ft-lbs

(1) Lead
(2) Breather Hose
(3) Head Cover Screw
(4) Cylinder Head Cover
(5) Cylinder Head Cover Gasket
(6) Breather Valve
(7) Plate

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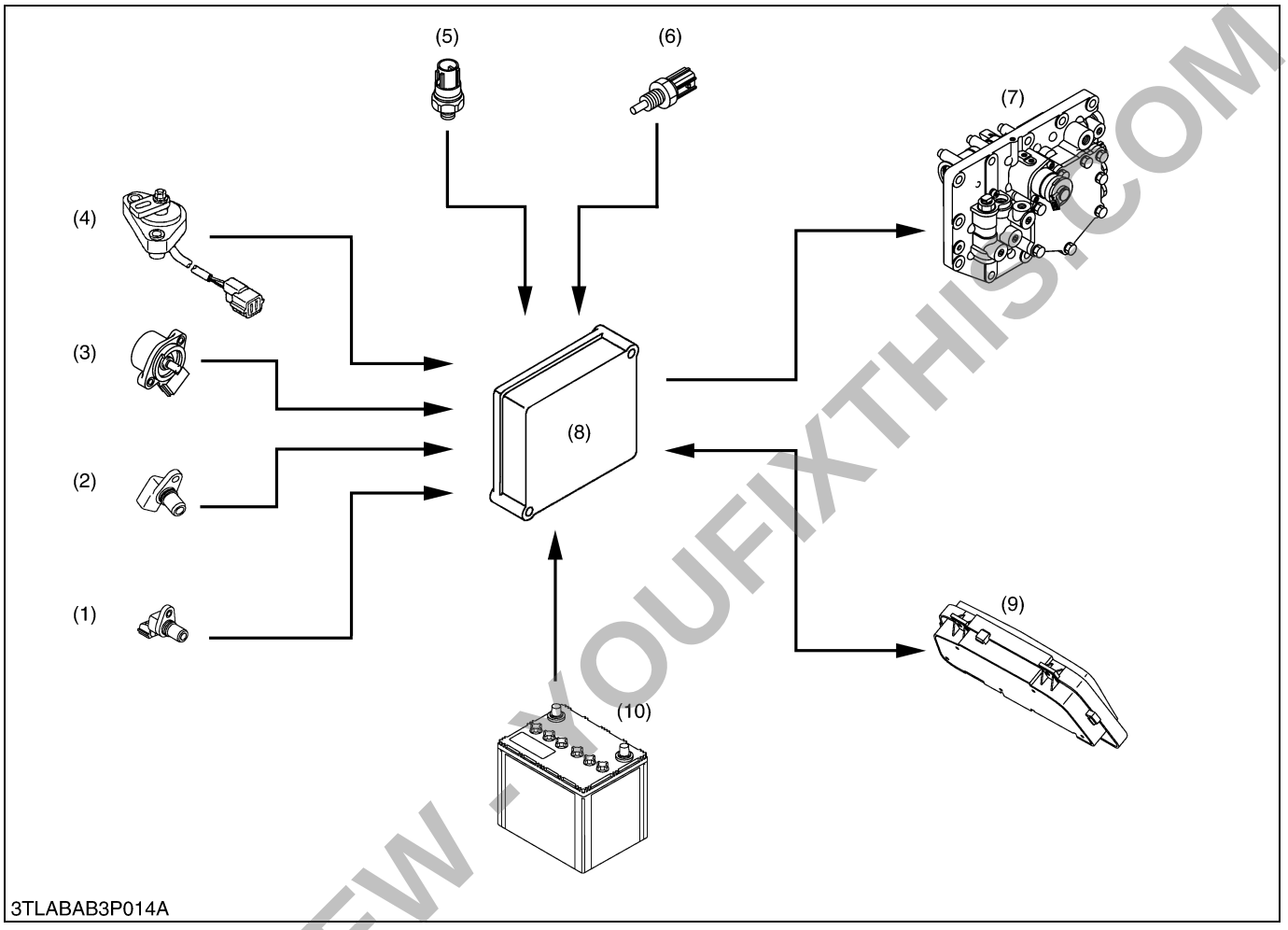
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4. ELECTRICAL CONTROL SYSTEM

■ **NOTE**

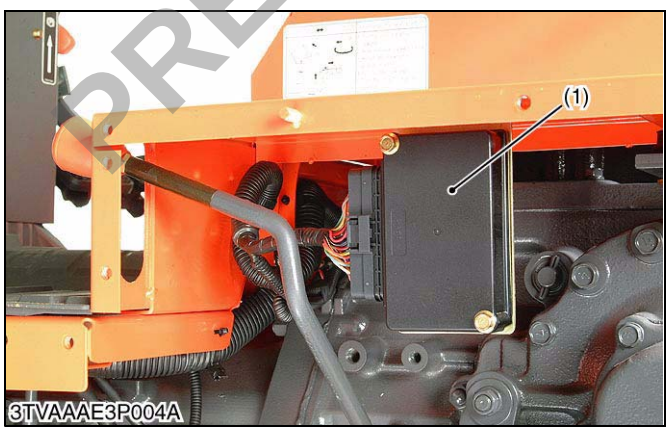
- **Only the electrical control system concerning the GST operation has been described in this section. Therefore, refer to "ELECTRICAL SYSTEM" section (Section 9) for a general electrical control system.**

[1] CONSTRUCTION AND FUNCTION COMPONENTS



(1) Traveling Speed Sensor
(2) Engine Tachometer Sensor
(3) GST Lever Sensor
(4) Shuttle Switch
(5) Pressure Switch
(6) Oil Temperature Sensor
(7) GST Valve (Solenoid Valve and Proportional Reducing Valve)
(8) Electric Control Unit (ECU)
(9) Electronic Instrument Panel
(10) Battery

The electric control of the GST system is composed by parts shown in the above figure.



■ **Electric Control Unit (ECU)**

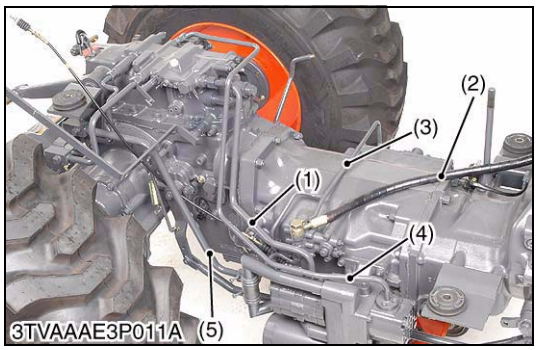
This unit incorporates an electronic circuit for various control of GST system and it is equipped on the left under of the platform.

The ECU processes and judges the input data from various switches and sensors and send the signal to various solenoid valves (solenoid valves and proportional reducing valve). At the same time, it also sends the communication data to display the selected-speed and several messages in electronic instrument panel.

(1) Electric Control Unit

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Hydraulic Pipes and Hose

1. Remove the power steering delivery hose (2).
2. Remove the swing delivery pipe 1 (4).
3. Remove the main delivery pipe (1).
4. Remove the PTO and GST delivery pipe (3).
5. Remove the return pipe (5).

(When reassembling)

Tightening torque	Power steering joint bolt	49.1 to 68.6 N·m 5.0 to 7.0 kgf·m 36.2 to 50.6 ft-lbs
	Swing delivery pipe and main delivery pipe mounting bolt	17.7 to 20.6 N·m 1.8 to 2.1 kgf·m 13.0 to 15.2 ft-lbs
	Swing delivery pipe retaining nut	49.1 to 68.6 N·m 5.0 to 7.0 kgf·m 36.2 to 50.6 ft-lbs
	Main delivery pipe retaining nut	107.9 to 117.6 N·m 11.0 to 12.0 kgf·m 79.6 to 86.7 ft-lbs
	PTO and GST delivery pipe joint bolt	34.4 to 39.2 N·m 3.5 to 4.0 kgf·m 25.4 to 28.9 ft-lbs
	Return pipe retaining nut	107.9 to 117.7 N·m 11.0 to 12.0 kgf·m 79.6 to 86.7 ft-lbs

(1) Main Delivery Pipe
(2) Power Steering Delivery Hose
(3) PTO and GST Delivery Pipe
(4) Swing Delivery Pipe
(5) Return Pipe

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Rear Wheel

1. Place disassembling stand under the transmission case, and support it with a jack.
2. Remove the rear wheels.
3. After removing the rear wheels, support it at both sides of rear axle by stands.

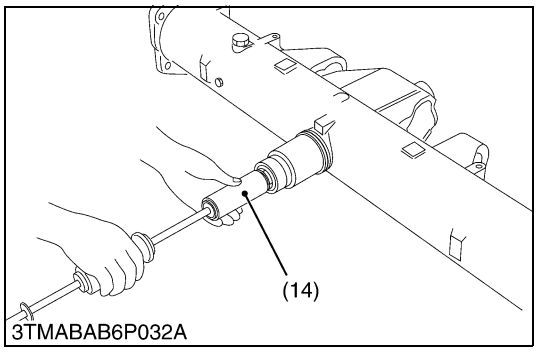
(When reassembling)

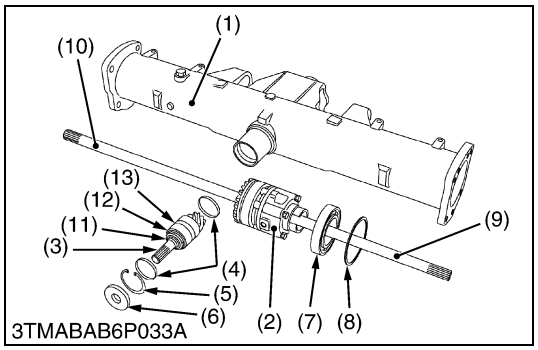
Tightening torque	Rear wheel mounting nut	260 N·m 27 kgf·m 192 ft-lbs

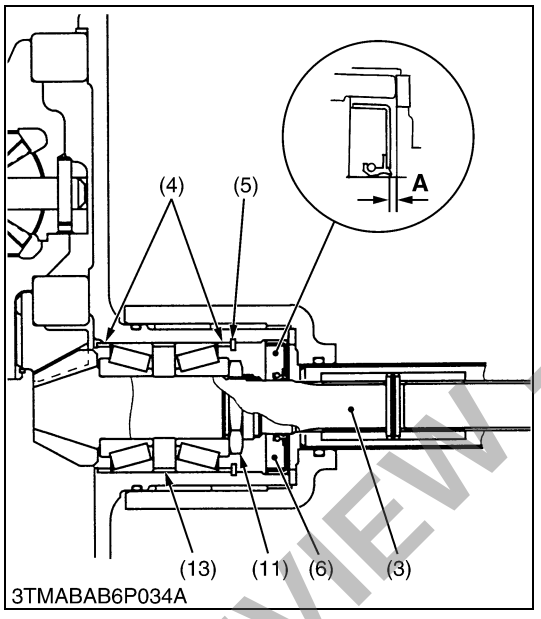
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Spiral Bevel Pinion Shaft and Differential Gear Assembly

1. Take out the differential yoke shaft (9), (10) both sides.
2. Remove the oil seal (6) and internal snap ring (5).
3. Remove the collar (4).
4. Remove the spiral bevel pinion shaft (3) by the pinion shaft remover (14).
5. Take out the differential gear assembly (2), ball bearing (7) and shim (8) from left side of front axle case (1).
6. Remove the stake of lock nut (11), and then remove the lock nut (11).
7. Remove the taper roller bearings (12).

(When reassembling)

- Replace the lock nut (11) and oil seal (6) with new ones.
- Apply grease to the oil seal (6).
- Install the shims and collars to their original position.
- Install the taper roller bearings correctly, noting their direction and apply gear oil to them.
- Tighten up the lock nut (11) until the turning force of the spiral bevel pinion shaft reaches the factory specification. (See page 6-S21.)
- When press-fitting an oil seal (6), observe the dimension **"A"** described in the figure.

■ **IMPORTANT**

- **After adjusting the turning torque stake the lock nut (11) firmly.**

Turning torque of spiral bevel pinion shaft	Factory spec.	0.98 to 1.18 N·m 0.10 to 0.12 kgf·m 0.72 to 0.89 ft-lbs

(1) Front Axle Case
(2) Differential Gear Assembly
(3) Spiral Bevel Pinion Shaft
(4) Adjusting Collar
(5) Internal Snap Ring
(6) Oil Seal
(7) Ball Bearing
(8) Shim
(9) Differential Yoke Shaft R.H.
(10) Differential Yoke Shaft L.H.
(11) Lock Nut
(12) Taper Roller Bearing
(13) Collar
(14) Pinion Shaft Remover

A : Dimension A : 0.5 to 1 mm (0.020 to 0.039 in.)

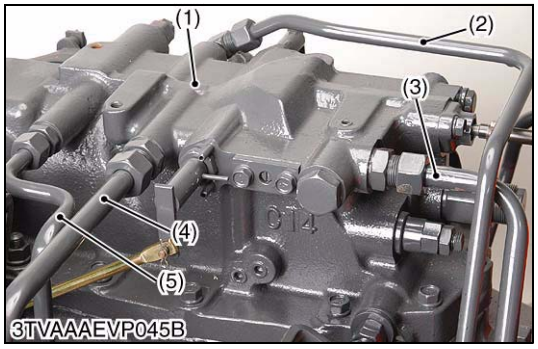
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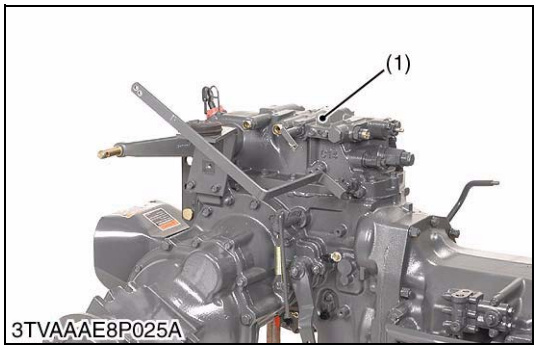
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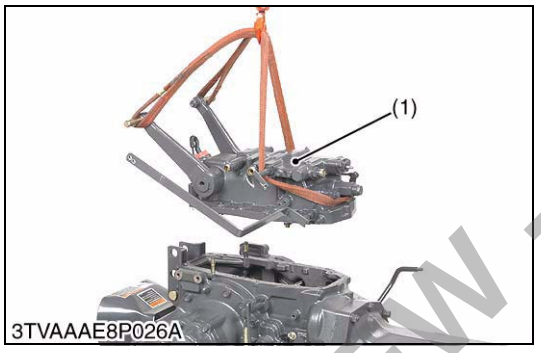
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(4) Hydraulic Cylinder

- Tractor already disassembled the front loader and the tractor frame is written first in this section.
- Procedure of disassembling the front loader and the tractor frame from the tractor is written in “PREPARATION” section.







Separating Cylinder Assembly

1. Remove the main delivery pipe (3) and the swing delivery pipe 1 (2).
2. Remove the main delivery pipe 2 (4) and the swing delivery pipe 2 (5)
3. Remove the hydraulic cylinder assembly mounting screwsand nuts.
4. Support the hydraulic cylinder assembly with nylon life strap and hoist and then remove it.

(When reassembling)

- Apply liquid gasket (Three Bond 1206B, 1208D equivalent) to joint face of the hydraulic cylinder assembly and transmission case after eliminate the water, oil and stuck liquid gasket.

Tightening torque	Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

■ **NOTE**

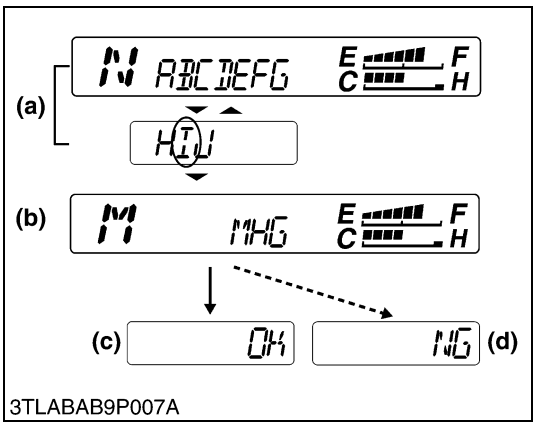
- **Reassemble the hydraulic cylinder assembly to the tractor, be sure to adjust the position control feedback rod.**

(1) Hydraulic Cylinder Assembly
(2) Swing Delivery Pipe 1
(3) Main Delivery Pipe 1
(4) Main Delivery Pipe 2
(5) Swing Delivery Pipe 2

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■ **Transmission Model Input Mode (Mode "I")**
(Input the transmission model into electronic instrument panel)

■ **NOTE**
- **When the electronic instrument panel is replaced, this operation is required.**
- **On the HST models, the range gear shift lever sensor must be adjusted at the same time.**

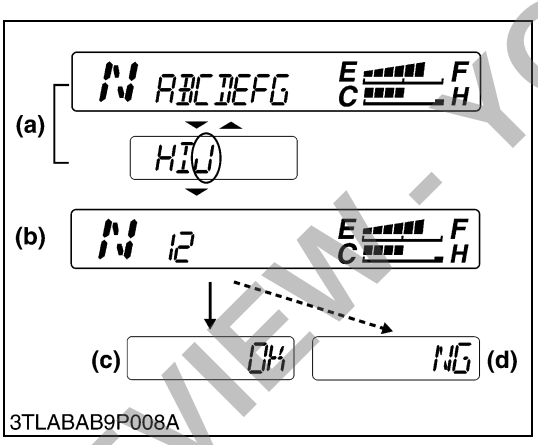
1. While holding down the both switches at once, turn on the main switch.
2. Select mode **"I"**.
3. **"MHG"** is displayed **(b)**, and the existing symbol setting is flashing.

(Reference)
- **"M"** : Manual Transmission Model
  "G" : GST Model
  "H" : HST Model

4. To change the setting, select **"G"**, and input to the electronic instrument panel. Each time display mode switch is pressed, the flashing symbol shifts. And then, hold down switch for more than 2 seconds with the symbol flashing.
5. **"OK"** is displayed **(c)** : The tractor model has been input correctly.
6. If **"NG"** is displayed **(d)** : The tractor model has not been input correctly. Repeat the procedure.

(a) Mode Selection Display
(b) Input Display
(c) Correct Preserving Display
(d) Incorrect Preserving Display

W1014885



3TLABAB9P008A

■ **Speed Unit Selection Mode (Mode "J")**
(Input the traveling speed unit to the electronic instrument panel)

1. While holding down the both switches at once, turn on the main switch.
2. Select mode **"J"**.
3. **"12"** is displayed **(b)**, and existing number is flashing.

(Reference)
- **"1"** : Traveling speed unit is **"mph"**
  "2" : Traveling speed unit is **"km/h"**

4. To change the setting, select an appropriate number, and input to the electronic instrument panel. Each time display mode switch is pressed, the flashing number shifts. And then, hold down switch for more than 2 seconds with the number flashing.
5. **"OK"** is displayed **(c)** : The code number has been input correctly.
6. **"NG"** is displayed **(d)** : The code number has not been input correctly. Repeat the procedure.

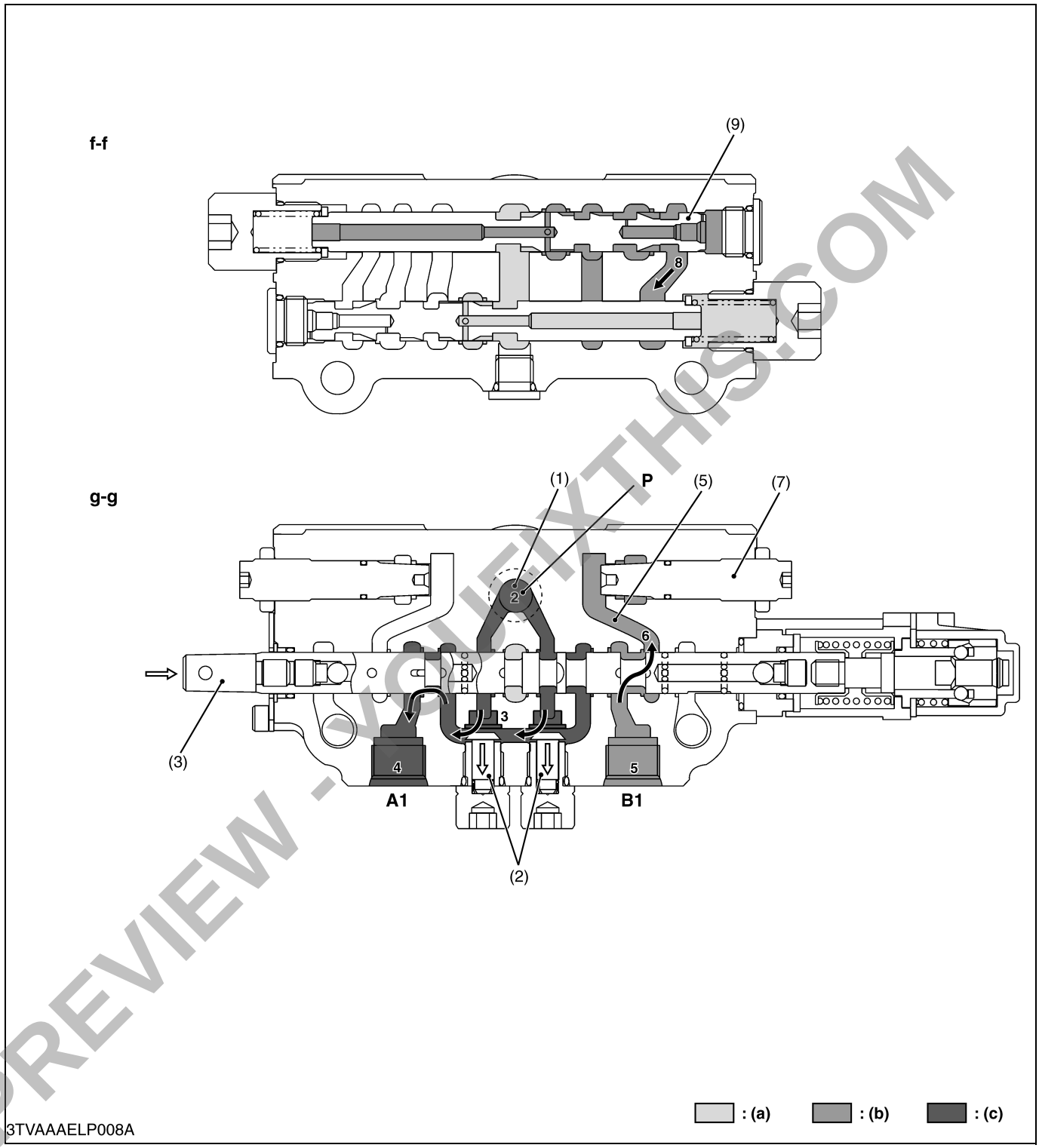
(a) Mode Selection Display
(b) Input Display
(c) Correct Preserving Display
(d) Incorrect Preserving Display

W1015386

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■ Self-leveling on Boom Raising (Figure 4)



(1) **P** Port
(2) Load Check Valve
(3) Boom Spool
(5) Passage **A**
(7) Raising Adjuster
(9) Raising Divider Spool

P : P Port (Pump Port)

A1 : A1 Port (Connected Boom Bottom Cylinder)
B1 :B1 Port (Connected Boom Rod Cylinder)

f-f : Divider Section
g-g :Boom Section
(a) Low Pressure
(b) Middle Pressure
(c) High Pressure

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(4) Part No. 75597-7517-2

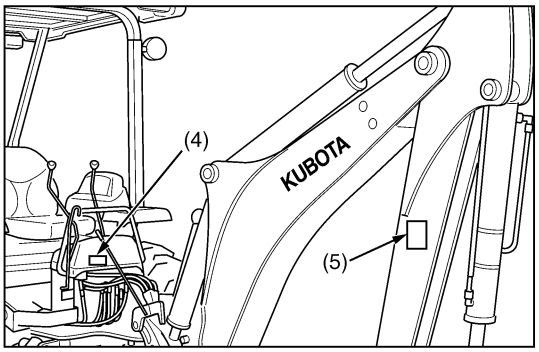


1AJAAADAP0520

(5) Part No. 75595-7517-2



1AJAAADAP0490



CARE OF DANGER, WARNING AND CAUTION LABELS

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

3TVAAAECP008A

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