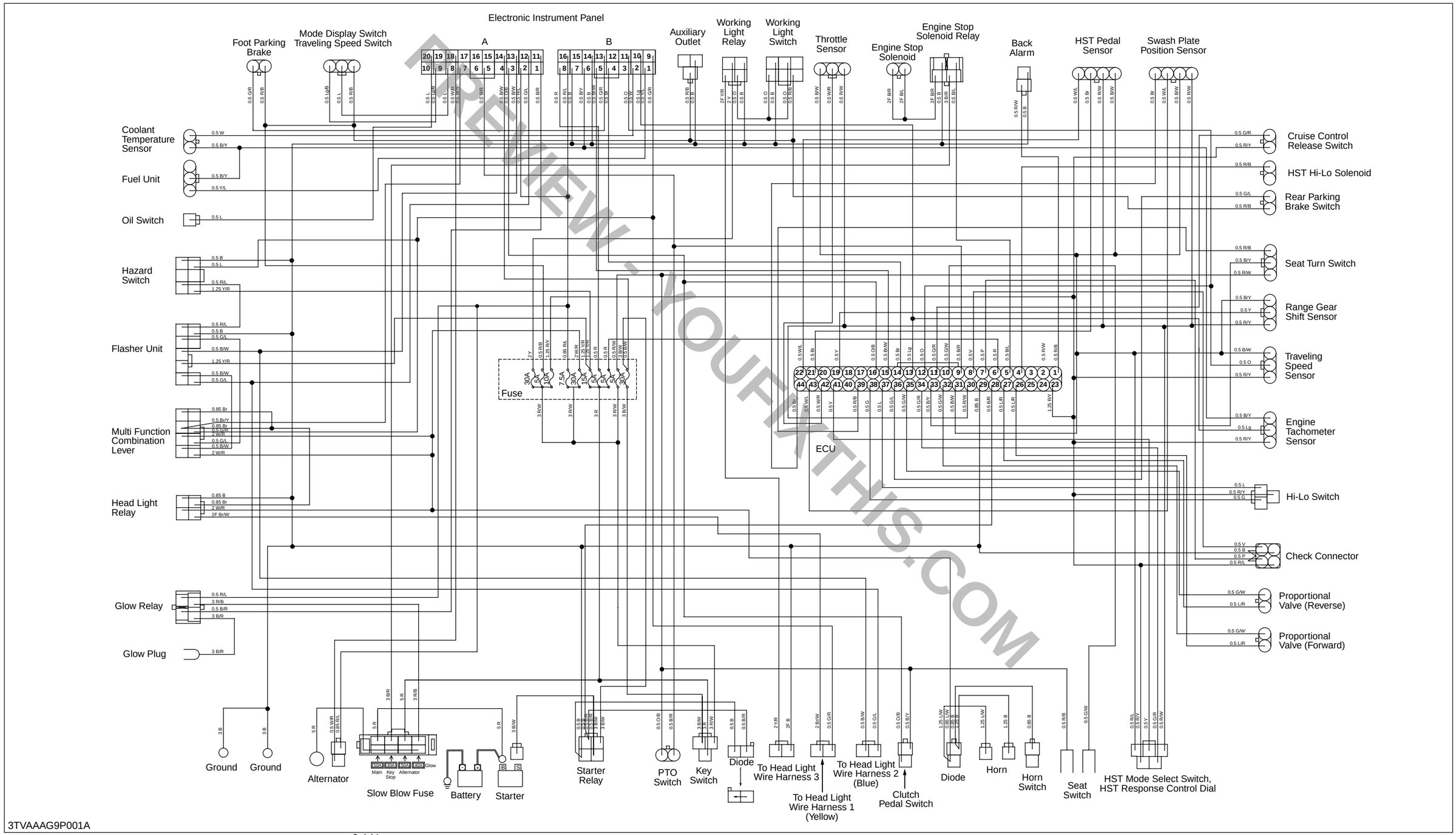
1. WIRING DIAGRAM

[1] DIAGRAM

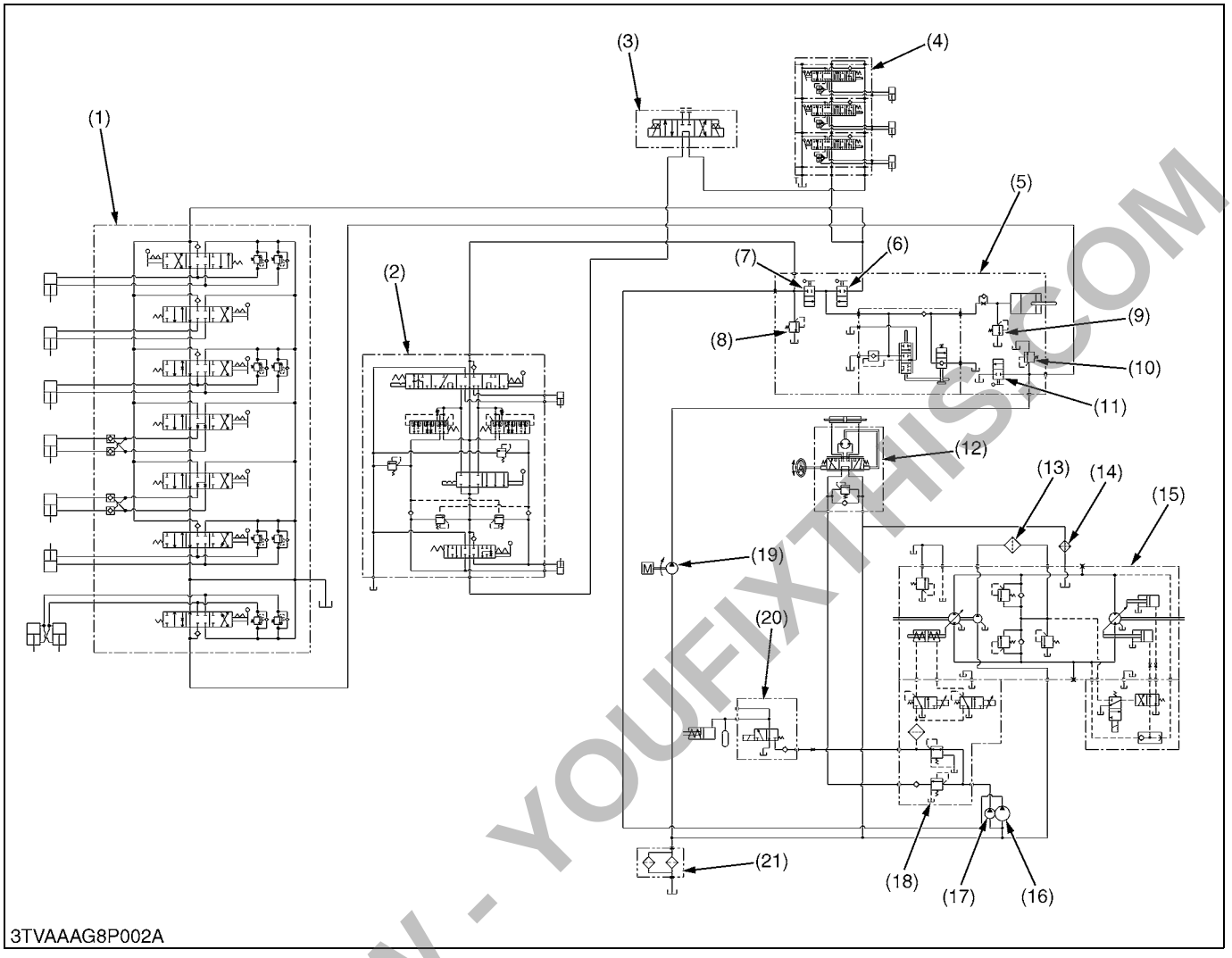
(1) Main Harness



3TVAAAG9P001A

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2. HYDRAULIC CIRCUIT



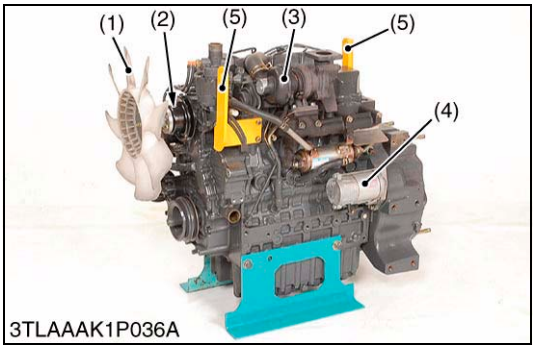
(1) Backhoe Control Valve
(2) Front Loader Control Valve
(3) 3rd Function Solenoid Valve (If equipped)
(4) Auxiliary Control Valve (Option)
(5) Position Control Valve
(6) Directional Valve 2 (for 3P Hitch)
(7) Directional Valve 1
(8) Main Relief Valve
(9) Cylinder Safety Valve
(10) Swing Relief Valve
(11) Directional Valve 3 (for Swing)
(12) Power Steering Controller
(13) HST Oil Filter
(14) Oil Cooler
(15) Hydrostatic Transmission (HST)
(16) Hydraulic Pump 1 (for Main)
(17) Hydraulic Pump 3 (for Power Steering, PTO)
(18) Regulating Valve
(19) Hydraulic Pump 2 (for Swing)
(20) PTO Clutch Valve
(21) Oil Filter

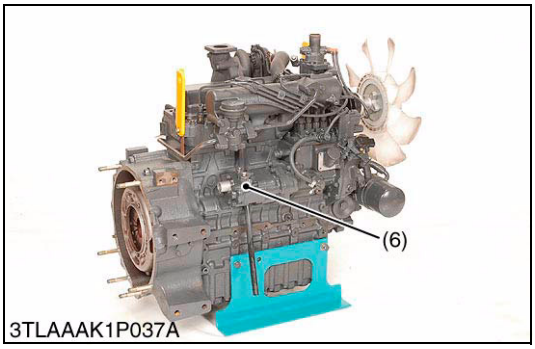
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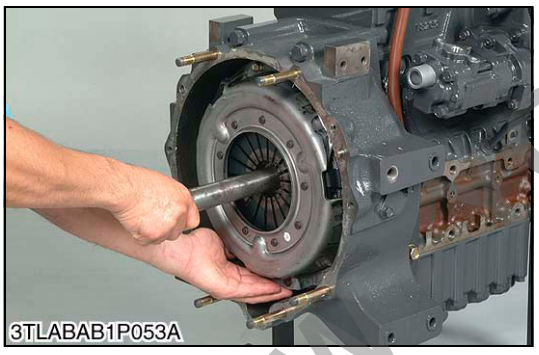
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[3] DISASSEMBLING AND ASSEMBLING

(1) Outer Parts







Outer Parts of Engine

1. Remove the cooling fan (1) and fan pulley (2).
2. Remove the turbo charger (3).
3. Remove the starter motor (4).
4. Remove the hydraulic pump (6) with pump holder.

(When reassembling)

- Be sure to adjust the fan belt tension. (Refer to "[4] CHECK POINTS OF EVERY 100 HOURS" at "G. GENERAL" section.)

(1) Cooling Fan
(2) Fan Pulley
(3) Turbo Charger
(4) Starter Motor
(5) Engine Hock
(6) Hydraulic Pump

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Clutch Assembly

1. Remove the clutch from the flywheel.

(When reassembling)

- Direct the shorter end of the clutch disc boss toward the flywheel.
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the splines of clutch disc boss.
- Install the pressure plate, nothing the position of straight pins.

■ **IMPORTANT**

- **Align the center of disc and flywheel by inserting the clutch center tool. (Refer to "8. SPECIAL TOOLS" at "G. GENERAL" section.)**

■ **NOTE**

- **Do not allow grease and oil on the clutch disc facing.**

Tightening torque	Clutch mounting screws	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

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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

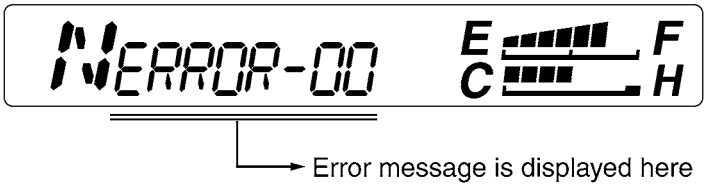
Material of opponent part	Ordinariness			Aluminum		
Unit / Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8 (8 mm, 0.31 in.)	11.8 to 15.6	1.2 to 1.6	8.68 to 11.5	8.82 to 11.8	0.90 to 1.2	6.51 to 8.67
M10 (10 mm, 0.39 in.)	24.6 to 31.3	2.5 to 3.2	18.1 to 23.1	19.7 to 25.4	2.0 to 2.6	14.5 to 18.8
M12 (12 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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■ Error Display for HST Model



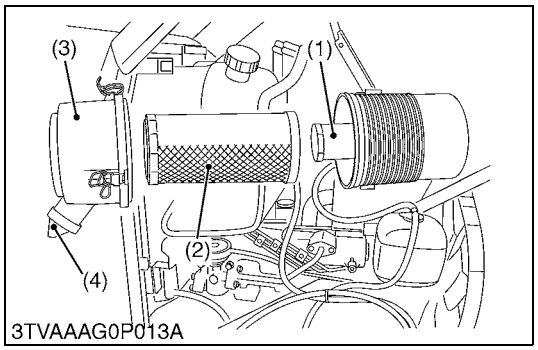
Display on LCD Screen	Trouble Item	Probable Cause	Solution	Reference Page
ERROR-00	Electronic instrument panel memory device has failed	• Electronic instrument panel memory device failure	• Replace the electronic instrument panel	9-S16
ERROR-20	Communication error between ECU and electronic instrument panel	• Fuse blown out • Communication line between ECU and electronic instrument panel is broken or short-circuited • No signals from ECU for longer than 5 seconds (error cleared if signal sent and received later) • ECU defective	• Check the fuse • Check ECU connector • Check the communication line between ECU and electronic instrument panel at ECU connector • Replace ECU	9-S26 9-S31 9-S33 9-S14
ERROR-30	ECU memory device has failed	• ECU memory device failure	• Replace ECU	9-S14
ERROR-40	Input voltage to sensor from ECU is failed	• Sensor input voltage drop below 2.6 V for 0.1 second or more • Ground wire of lever sensor short-circuited	• Check the ground cable • Check the input voltage at ECU connector • Check the sensor connector	9-S27 9-S33 9-S33
ERROR-80 -SUB--NG	Range gear shift sensor failed	• Sensor output terminal is out of adjustment • Sensor output wire terminal broken or short-circuited • Input line broken • Sensor defective	• Terminal motion is possible • Check the sensor connector • Check the sensor voltage by Test mode (Mode **A**) • Check the sensor wire connector (voltage) or check sensor resistance • Replace the sensor	– – 9-S17 9-S34 –

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[3] CHECK POINTS OF EVERY 100 HOURS



Cleaning Air Cleaner Primary Element

1. Detach the rubber band, open the hood and remove the air cleaner cover and the primary element.
2. Clean the primary element.
   - When dry dust adheres to the element, blow compressed air from the inside, turning the element. Pressure of compressed air must be under 205 kPa (2.1 kgf/cm^2, 30 psi).
   - When carbon or oil adheres to the element, soak the element in detergent for 15 minutes then wash it several times in water, rinse with clean water and dry it naturally. After element is fully dried, inspect inside of the element with a light and check if it is damaged or not.
3. Replace air cleaner primary element:
   Once yearly or after every sixth cleaning, whichever comes first.

■ **NOTE**
- **Check to see if the evacuator valve is blocked with dust.**

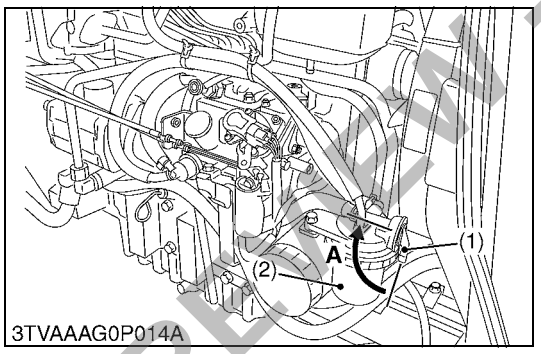
■ **IMPORTANT**
- **The air cleaner uses a dry element, never apply oil.**
- **Do not run the engine with filter element removed.**
- **Be sure to refit the cover with the arrow ↑ (on the rear of cover) upright. If the cover is improperly fitted, evacuator valve will not function and dust will adhere to the element.**
- **Do not touch the secondary element except in cases where replacing is required.**

■ **Evacuator Valve**

Open the evacuator valve (4) once a week under ordinary conditions or daily when used in a dusty place to get rid of large particles of dust and dirt.

(1) Secondary (Safety) Element
(2) Primary Element
(3) Cover
(4) Evacuator Valve

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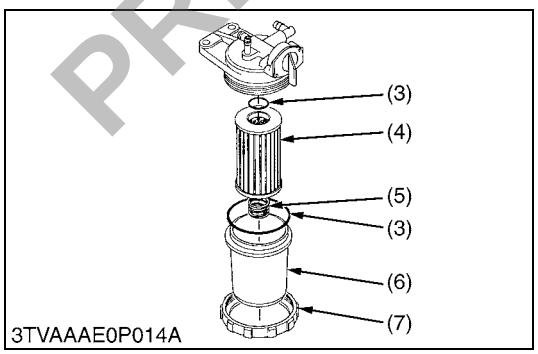


Cleaning Fuel Filter

This job should not be done in the field, but in a clean place.

1. Close the fuel filter cock (1).
2. Unscrew the screw ring and remove the fuel filter bowl (2), and rinse the inside with kerosene.
3. Take out the filter element (4) and dip it in the kerosene to rinse.
4. After cleaning, reassemble the fuel filter, keeping out dust and dirt.
5. Bleed the fuel system. (Refer to "[14] OTHERS" in this section.)

■ **IMPORTANT**
- **If dust and dirt enters the fuel system, the fuel pump and injection nozzles are subject to premature wear. To prevent this, be sure to clean the fuel filter and element bowl periodically.**



(1) Fuel Cock
(2) Fuel Filter Bowl
(3) O-ring
(4) Filter Element
(5) Spring
(6) Filter Bowl
(7) Screw Ring

A : Close

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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-36
	Water in the fuel system	Change fuel and repair or replace fuel system	–
	Fuel pipe clogged	Clean	–
	Fuel filter clogged	Change	G-20
	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-S29
	Incorrect injection timing	Adjust	1-S16
	Fuel camshaft worn	Replace	1-S38
	Injection nozzle clogged	Clean	–
	Injection pump malfunctioning	Repair or replace	1-S33
	Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	1-S37, S40, S43
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S30, S31
	Improper valve timing	Correct or replace timing gear	1-S37
	Piston ring and cylinder worn	Replace	1-S55
	Excessive valve clearance	Adjust	1-S12
Starter Does Not Run	Battery discharged	Charge	G-23
	Starter malfunctioning	Repair or replace	9-S61
	Main switch malfunctioning	Repair or replace	9-S41
	Safety switches improperly adjusted or defective	Repair or replace	9-S42, S43
	Starter relay defective	Replace	9-S45
	Wiring disconnected	Connect	–
	Electronic instrument panel connector disconnected	Connect	–
Engine Revolution Is Not Smooth	Fuel filter clogged or dirty	Change	G-20
	Air cleaner clogged	Clean or change	G-32
	Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S29
	Injection pump malfunctioning	Repair or replace	1-S33
	Incorrect nozzle injection pressure	Adjust	1-S19
	Injection nozzle stuck or clogged	Repair or replace	1-S30
	Governor malfunctioning	Repair	–

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SPECIFICATIONS OF THE TRACTOR

Model			M59
Engine	Model		V2403-M-TE3-TLB1
	Type		Indirect injection vertical, water-cooled, 4-cycle diesel
	No. of cylinders		4
	Bore and stroke		87 × 102.4 mm (3.4 × 4.0 in.)
	Engine gross power		44.0 kW (59 HP)
	PTO power (factory observed)		34.3 kW (46 HP)
	Net power		42.5 kW (57 HP) *
	Total displacement		2.434 L (148.5 cu. in.)
	Rated revolution		2700 min^{-1} (rpm)
	Battery		12 V, RC: 110 min., CCA: 650A
Capacities	Fuel tank		55 L (14.6 U.S.gals, 12.1 Imp.gals)
	Engine crankcase (with filter)		9.4 L (9.9 U.S.qts, 8.3 Imp.qts)
	Engine coolant		6.5 L (6.9 U.S.qts, 5.7 Imp.qts)
	Transmission case		46 L (12.2 U.S.gals, 10.1 Imp.gals)
	Front axle case		12.5 L (13.2 U.S.qts, 11.0 Imp.qts)
Tires		Front	10-16.5R4
		Rear	17.5L-24R4
Dimensions	Overall length (without 3P, with front guard)		3128 mm (123.1 in.)
	Overall width		2154 mm (84.8 in.)
	Overall height with ROPS and FOPS		2594 mm (102.1 in.)
	Wheel base		2050 mm (80.71 in.)
	Min. ground clearance		350 mm (13.8 in.) at transmission case
	Tread	Front	1140 mm (56.7 in.)
		Rear	1462 mm (57.6 in.)
Weight (with ROPS and FOPS, main frame)			2230 kg (4916 lbs)
PTO shaft			Transmission case rear
Rear PTO			SAE 1-3/8, 6 Spline
Clutch			Dry
Steering			Hydraulic power
Transmission			Hydraulic transmission (3 speeds)
Min. turning radius			3.3 m (10.8 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.
** with brake

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6. MAINTENANCE

No.	Item			Indication on hour meter									Since then	Important		Reference page
				50	100	150	200	250	300	350	400	450				
1	Engine oil		Change	★			☆				☆		every 200 Hr			G-25
2	Engine oil filter		Replace	★			☆				☆		every 200 Hr			G-25
3	Transmission oil filter [HST]		Replace	★			☆				☆		every 200 Hr			G-26
4	Hydraulic oil filter		Replace	★			☆				☆		every 200 Hr			G-30
5	Transmission fluid		Change								☆		every 400 Hr			G-30
6	Front axle case oil		Change								☆		every 400 Hr			G-31
7	Front axle pivot		Adjust										every 600 Hr			G-31
8	Greasing		–	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-17
9	Oiling		–	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-17
10	Engine start system		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-18
11	Wheel bolt torque		Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-19
12	Battery condition		Check		☆		☆		☆		☆		every 100 Hr	*4		G-23
13	Air cleaner element [Double type]	Primary element	Clean		☆		☆		☆		☆		every 100 Hr	*1	@	G-20
			Replace										every 1 year	*2		G-32
		Secondary element	Replace										every 1 year			G-32
14	Fuel filter element		Clean		☆		☆		☆		☆		every 100 Hr		@	G-20
			Replace								☆		every 400 Hr			G-30
15	Fan belt		Adjust		☆		☆		☆		☆		every 100 Hr			G-21
16	Clutch		Adjust	★	☆		☆		☆		☆		every 100 Hr			G-21
17	Brake		Adjust		☆		☆		☆		☆		every 100 Hr			G-22
18	Radiator hose and clamp		Check				☆				☆		every 200 Hr			G-26
			Replace										every 2 year			G-35
19	Oil cooler line / Power steering oil line		Check				☆				☆		every 200 Hr			G-27
			Replace										every 2 year			G-35
20	Fuel line		Check		☆		☆		☆		☆		every 100 Hr		@	G-21
			Replace										every 2 year	*3		G-35
21	Toe-in		Adjust				☆				☆		every 200 Hr			G-28
22	Intake air line		Check				☆				☆		every 200 Hr		@	G-27
			Replace										every 2 year	*3		G-35
23	Engine valve clearance		Adjust										every 800 Hr			G-32
24	Fuel injection nozzle injection pressure		Check										every 1500 Hr		@	G-32
25	Injection pump		Check										every 3000 Hr		@	G-32
26	Turbo charger		Check										every 3000 Hr		@	G-32
27	Cooling system		Flush										every 2 year			G-33, 35
28	Coolant		Change										every 2 year			G-33
29	Fuel system		Bleed										Service as required			G-36
30	Clutch housing water		Drain													G-36
31	Fuse		Replace													G-37
32	Light bulb		Replace													G-37
33	Spark arrest muffler		Clean					☆					every 250 Hr			G-29

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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.

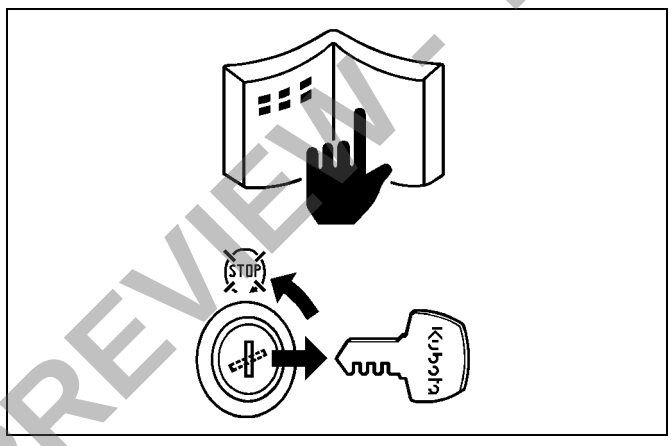
DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

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.

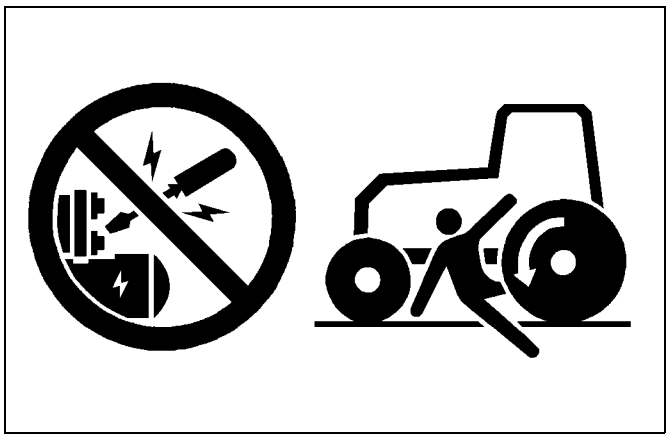


BEFORE SERVICING AND REPAIRING

- 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.

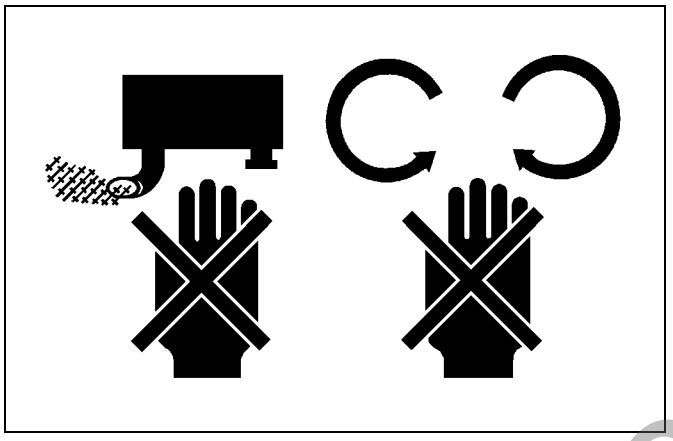
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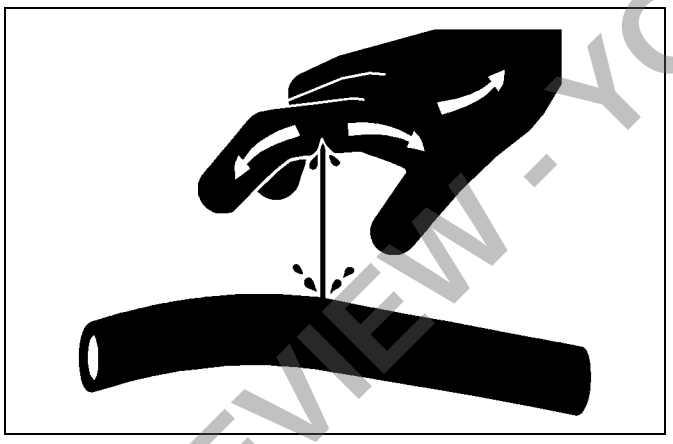
SAFETY STARTING

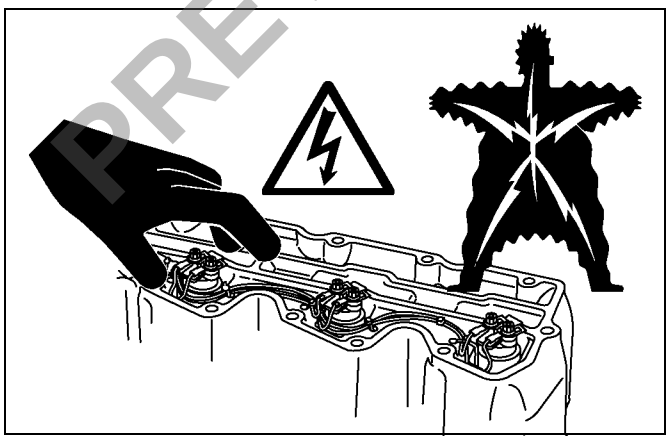
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine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



SAFETY WORKING

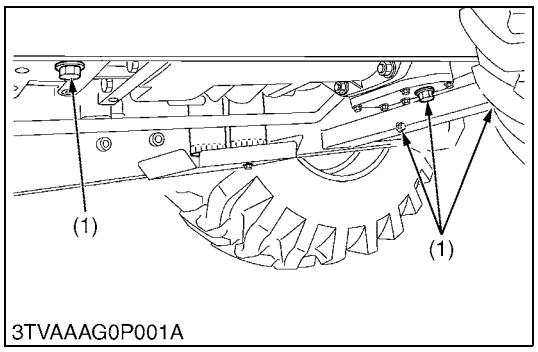
- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing 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.
- Do not open high-pressure fuel system.
  High-pressure fluid remaining in fuel lines can cause serious injury. Do not disconnect or attempt repair fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with high pressure common rail fuel system.
- High voltage exceeding 100 V is generated in the ECU, and is applied to the injector.
  Pay sufficient caution to electric shock when performing work activities.

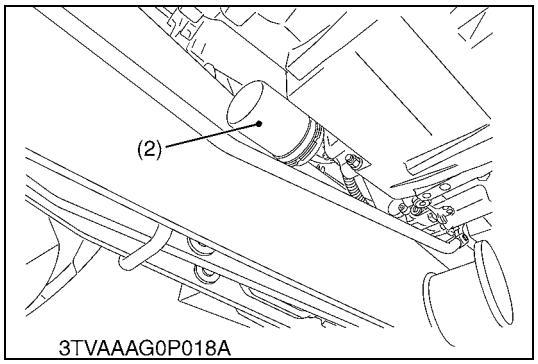


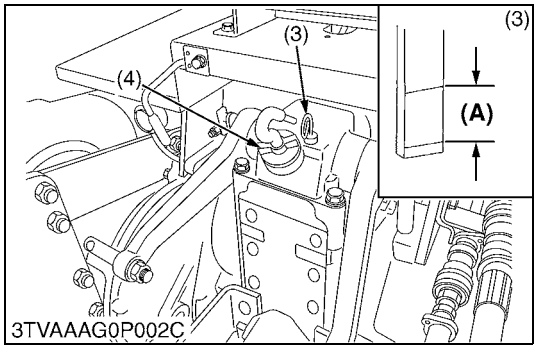


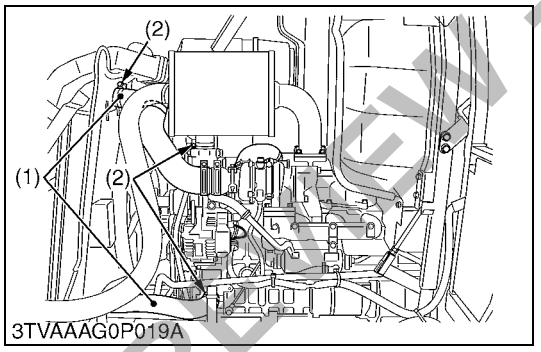
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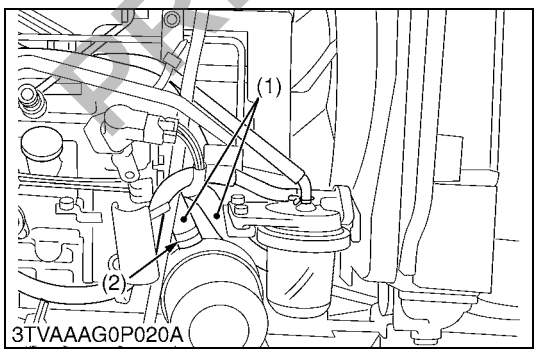
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Replacing Transmission Oil Filter (HST)

CAUTION

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

1. Remove the drain plugs at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plugs.
3. Remove the oil filter.
4. Put a film of clean transmission oil on the rubber seal of the new filter.
5. Quickly tighten the filter until it contacts the mounting surface, then, with a filter wrench, tighten it an additional 1/2 turn only.
6. After the new filters have been replaced, fill the transmission oil up to the upper notch on the dipstick.
7. After running the engine for a few minutes, stop the engine and check the oil level again, add oil to the prescribed level.
8. Make sure that the transmission fluid does not leak past the seal on the filter.

■ **IMPORTANT**

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

(1) Drain Plug
(2) Transmission Oil FIlter (HST)
(3) Dipstick
(4) Oil Inlet
(A) Oil level is acceptable within this range.

W1036617

Checking Radiator Hose and Clamp

Check to see if radiator hoses are properly fixed every 200 hours of operation or six months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten bands securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.
   Replace hoses and hose clamps every 2 years or earlier if checked and found that hoses are swollen, hardened or cracked.

■ **Precaution at Overheating**

Take the following actions in the event the coolant temperature is nearly or more than the boiling point, what is called **“Overheating”**.

1. Park the tractor in a safe place and keep the engine unloaded idling.
2. Don’t stop the engine suddenly, but stop it after about 5 minutes of unloaded idling.
3. Keep yourself well away from the machine for further 10 minutes or while the steam blown out.
4. Checking that there are no dangers such as burns. Get rid of the causes of overheating refer to “1. TROUBLESHOOTING” at “1. ENGINE” section.

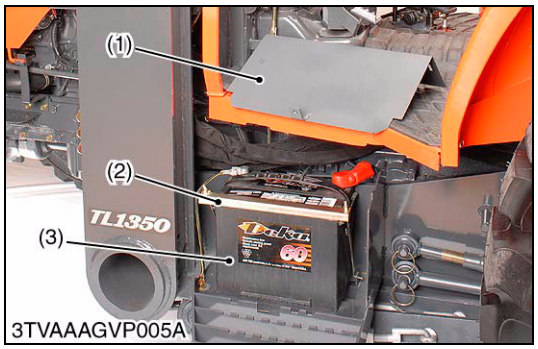
(1) Radiator Hose
(2) Clamp Band

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(2) Separating Canopy



Battery

1. Remove the battery cover (1).
2. Disconnect the battery cables.
3. Remove the battery stay (2).
4. Remove the battery (3).

■ **NOTE**

- **When disconnecting the battery cord first, when connecting, positive cord first.**

(1) Battery Cover
(2) Battery Stay
(3) Battery

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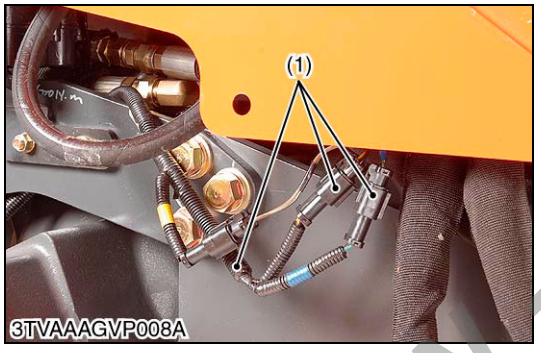


Rear Wheel

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

(1) Rear Wheel

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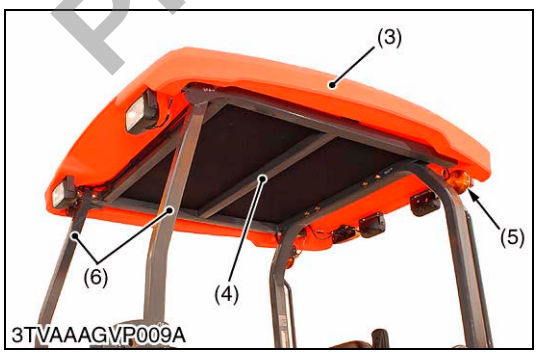
Canopy Assembly and Front Frame

1. Disconnect the connectors (1).
2. Disconnect the hazard light connectors (5).
3. Remove the auxiliary control valve stay (2) (if equipped).
4. Remove the canopy (3) with wiring harness.
5. Remove the upper frame mounting bolts and nuts, then remove the upper frame (4).
6. Remove the front frames (6).

(1) Connector
(2) Auxiliary Control Valve Stay (If equipped)
(3) Canopy
(4) Upper Frame
(5) Hazard Light
(6) Front Frame

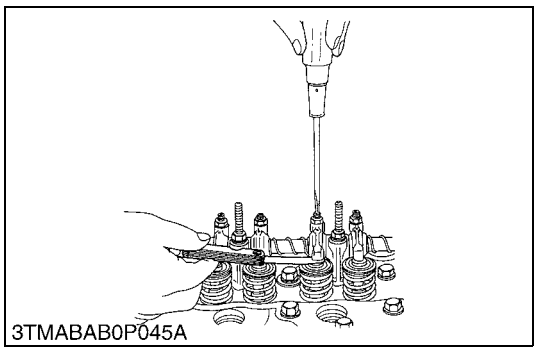
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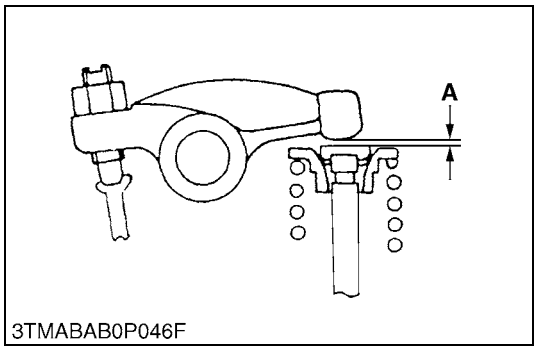




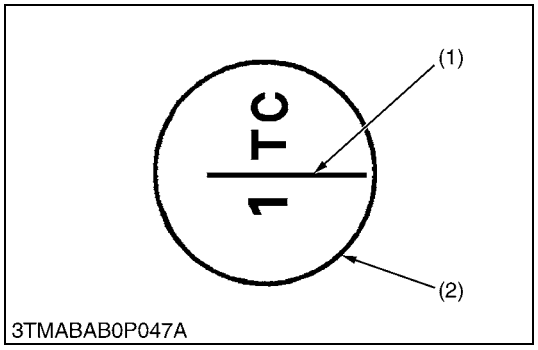
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3TMABAB0P047A

Valve Clearance

■ **IMPORTANT**

- **Valve clearance must be checked and adjusted when engine is cold.**

1. Remove the head cover, the glow plugs and the timing window cover on the clutch housing.
2. Align the **"1TC"** mark line (1) on the flywheel and center of timing window (2) so that the No. 1 piston comes to the compression top dead center.
3. Check the following valve clearance marked with "☆" using a feeler gauge.
4. If the clearance is not within the factory specifications, adjust the valve clearance with the adjusting screw.
5. Finally turn the flywheel 6.28 rad (360 °) and align the "1TC" mark line (1) and the center of timing window (2). Adjust all the other valve clearance as required.

Valve clearance	Factory spec.	0.18 to 0.22 mm 0.0071 to 0.0087 in.

■ **NOTE**

- **The "1TC" mark line (1) on the flywheel is just for No. 1 cylinder. There is no "TC" marking for the other cylinders.**
- **No. 1 piston comes to the T.D.C. position when the "1TC" mark line is aligned with center of timing window on clutch-housing. Turn the flywheel 0.26 rad (15 °) clockwise and counterclockwise to see if the piston is at the compression top dead center or the overlap position. Now referring to the table below, readjust the valve clearance (A). (The piston is at the compression top dead center when both the IN. and EX. valves do not move; it is at the overlap position when both the valves move.)**
- **After turning the flywheel counterclockwise twice or three times, recheck the valve clearance (A), firmly tighten the lock nut of the adjusting screw.**

Number of cylinders valve arrangement / Adjustable cylinder location of piston		V2403-M-T	
		IN.	EX.
When No. 1 piston comes to compression top dead center	No. 1	☆	☆
	No. 2	☆	
	No. 3		☆
	No. 4		
When No. 1 piston comes to overlap position	No. 1		
	No. 2		☆
	No. 3	☆	
	No. 4	☆	☆

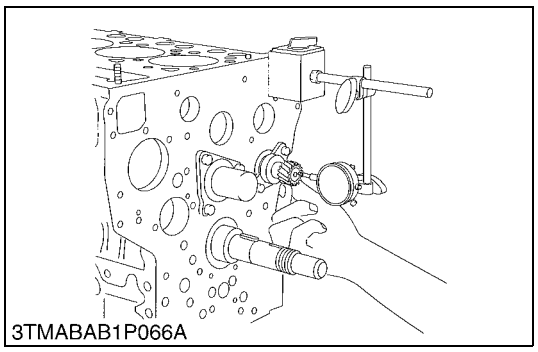
(1) "1TC" Mark Line
(2) Timing Window

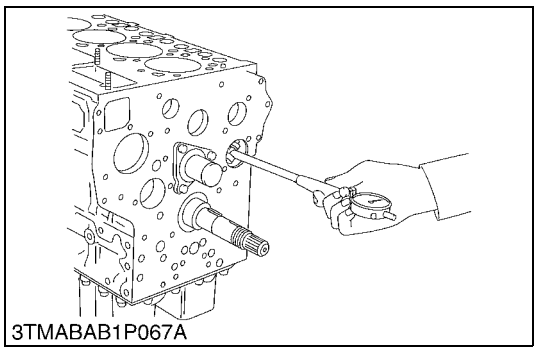
A : Valve Clearance

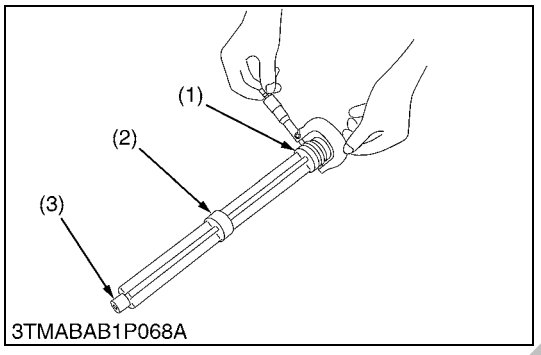
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Balancer Shaft Side Clearance

1. Set a dial indicator with tip on the balancer shaft.
2. Measure the side clearance by moving the balancer shaft to the front and rear.
3. If the measurement exceeds the allowable limit, replace the balancer shaft.

Side clearance of balancer shaft	Factory spec.	0.07 to 0.22 mm 0.0028 to 0.0086 in.
	Allowable limit	0.3 mm 0.012 in.

W1030111

Oil Clearance of Balancer Shaft Journal

1. Measure the balancer shaft journal O.D. with an outside micrometer.
2. Measure the cylinder block bore I.D. for balancer shaft with an inside micrometer or cylinder gauge.
3. If the clearance exceeds the allowable limit, replace the balancer shaft.

Oil clearance of balancer shaft journal 1	Factory spec.	0.030 to 0.111 mm 0.00119 to 0.00437 in.
	Allowable limit	0.20 mm 0.0079 in.
Balancer shaft journal 1 O.D.	Factory spec.	43.934 to 43.950 mm 1.7297 to 1.7303 in.
Balancer shaft bearing 1 I.D.	Factory spec.	43.980 to 44.045 mm 1.7315 to 1.7340 in.
Oil clearance of balancer shaft journal 2	Factory spec.	0.030 to 0.111 mm 0.00119 to 0.00437 in.
	Allowable limit	0.20 mm 0.0079 in.
Balancer shaft journal 2 O.D.	Factory spec.	41.934 to 41.950 mm 1.6510 to 1.6515 in.
Balancer shaft bearing 2 I.D.	Factory spec.	41.980 to 42.045 mm 1.6528 to 1.6553 in.
Oil clearance of balancer shaft journal 3	Factory spec.	0.020 to 0.094 mm 0.00079 to 0.0037 in.
	Allowable limit	0.20 mm 0.0079 in.
Balancer shaft journal 3 O.D.	Factory spec.	21.947 to 21.960 mm 0.86406 to 0.86456 in.
Balancer shaft bearing 3 I.D.	Factory spec.	21.980 to 22.041 mm 0.86536 to 0.86775 in.

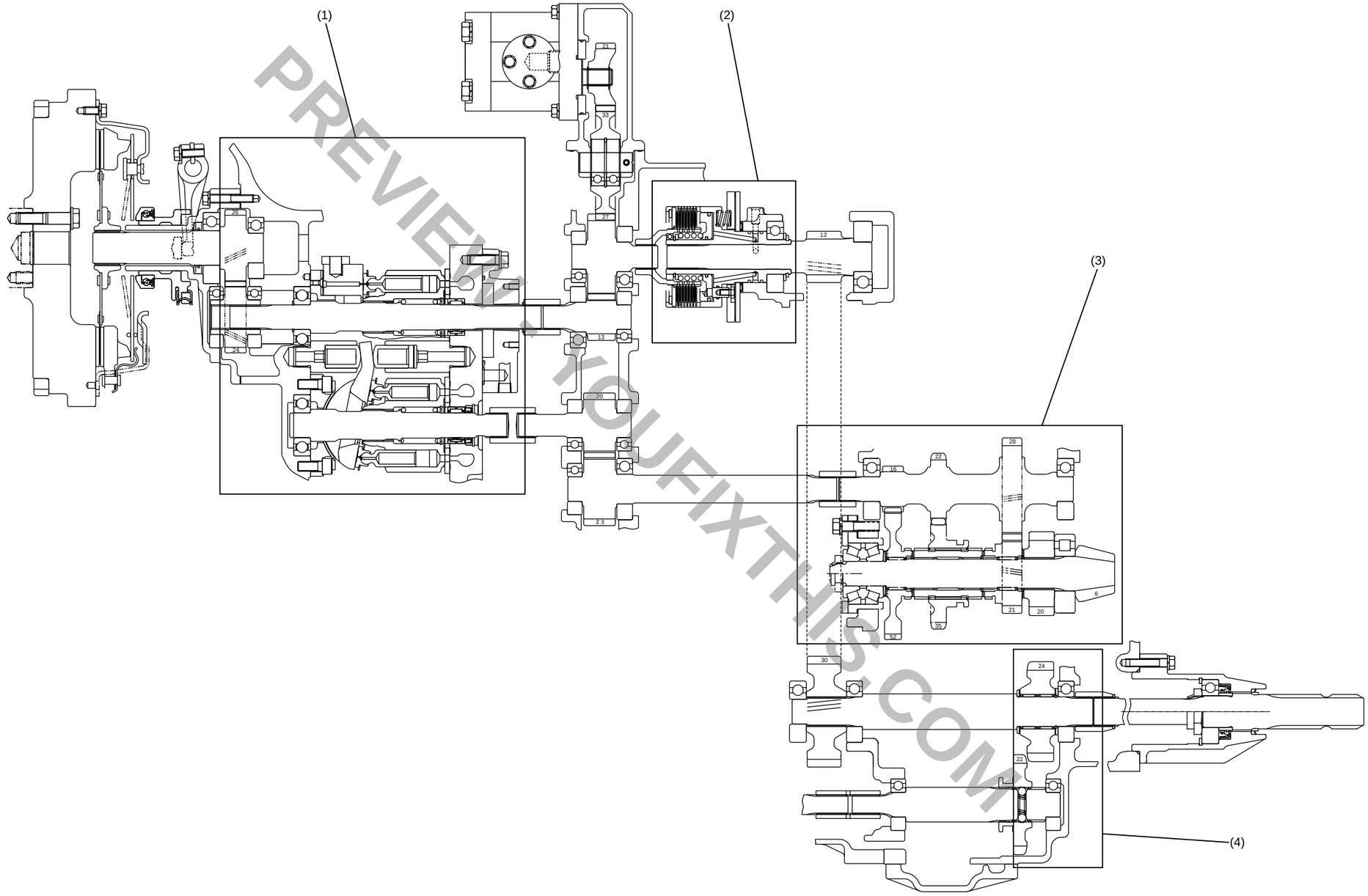
(1) Balancer Shaft Journal 1
(2) Balancer Shaft Journal 2
(3) Balancer Shaft Journal 3

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1. STRUCTURE

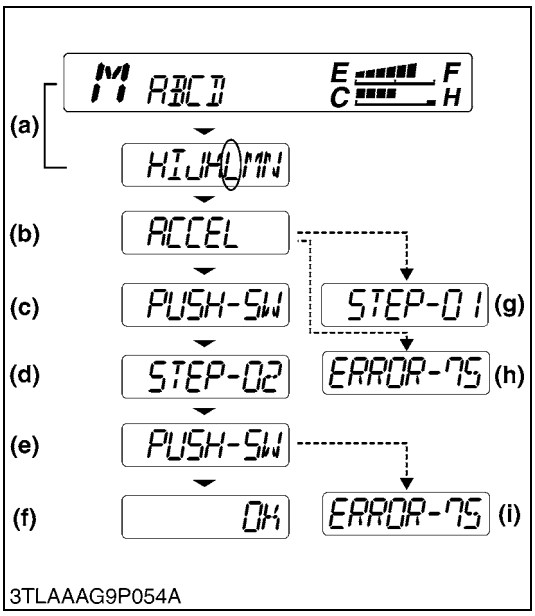


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(1) Hydraulic Transmission Section
(2) PTO Clutch Section
(3) Range Gear Shift Section
(4) Front Wheel Drive Shift Section

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Adjustment of throttle Sensor

■ **NOTE**
- **When the ECU or throttle sensor is replaced, this adjustment is required.**
- **Tractor Condition**
  Parking brake : Set the Apply the Parking Brake
  HST Pedal : Set the Neutral Position
  Range Gear Shift Lever : Set the Neutral Position
  HST Response Dial : Set the Center Detente Position

1. While holding down the both switches at once, start the engine at idling speed.
2. Select mode **"L"**.
3. Hold down the display mode switch for more than 2 seconds.
4. **ACCEL** is displayed **(b)** and release the switch.

■ **NOTE**
- **STEP-01 is displayed (g) : The engine revolution is not idling.**
- **ERROR-75 is displayed (h) indicated errors as follows.**
  - The accelerator lever is not in the position of idling.
  - The accelerator lever is out of position.

5. **PUSH-SW** is displayed **(c)** : Hold down the displayed mode switch for more than 2 seconds.
6. **STEP-02** is displayed **(d)** and release the switch. Set the "maximum speed" for accelerator lever
7. **PUSH-SW** is displayed **(e)** : Hold down the displayed mode switch for more than 2 seconds

■ **NOTE**
- **ERROR-75 (i) indicated errors as follows.**
  - The accelerator lever is not in the position of maximum.
  - The accelerator lever is out of position.

8. **OK** is displayed **(f)** : The setting has been preserved correctly to the ECU.
9. Turn off the key.

(a) Mode Selection Display
(b) Information Display
(c) Setting Display-1
(d) Adjusting Display-1
(e) Setting Display-2
(f) Correct Preserving Display
(g) Error Display-1
(h) Error Display-2
(i) Error Display-3

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5 BRAKES

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MECHANISM

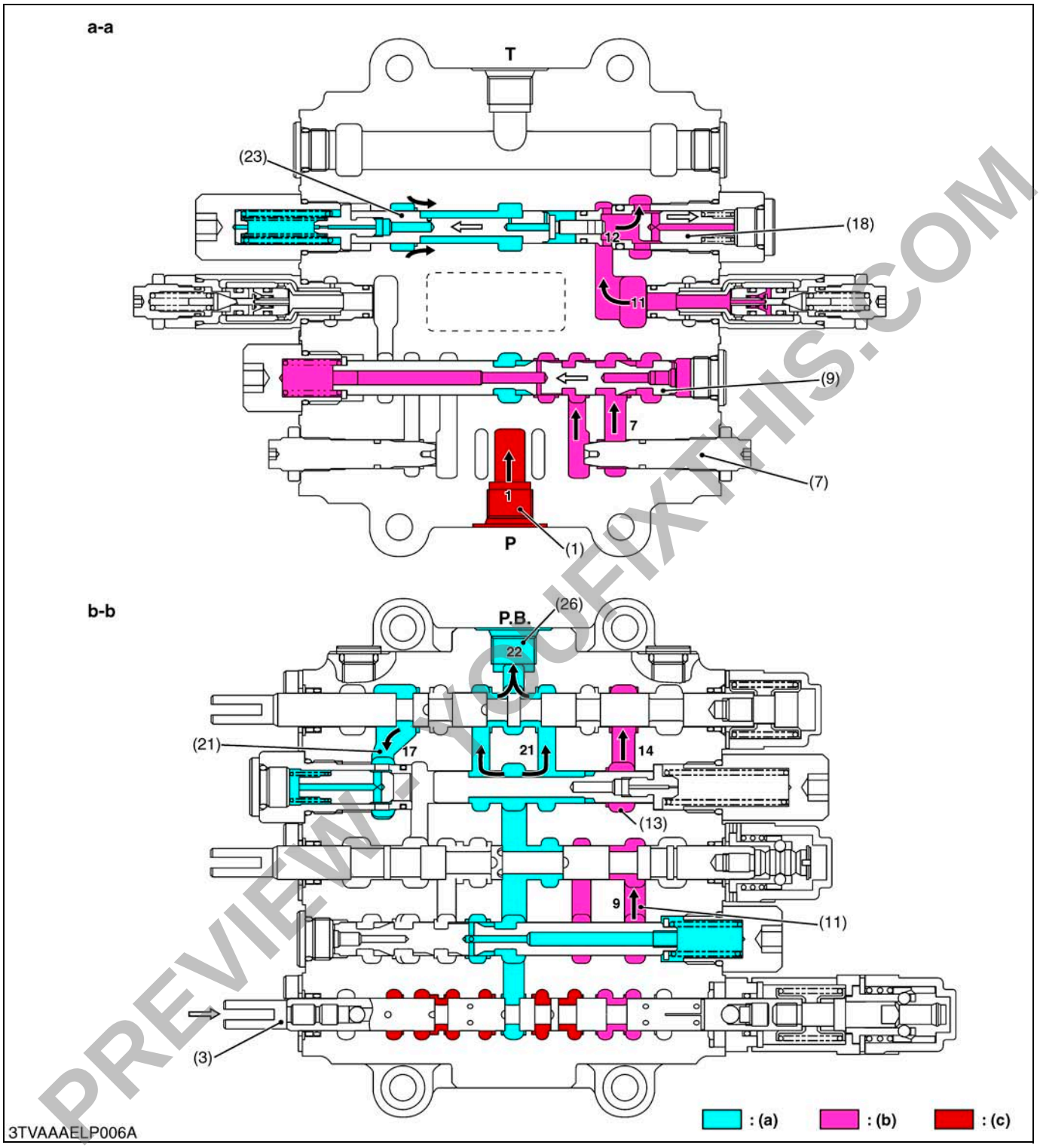
CONTENTS

1. STRUCTURE 7-M1
2. HYDRAULIC CIRCUIT 7-M2

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■ Self-leveling on Boom Raising (Figure 2)



(1) **P** Port
(3) Boom Spool
(7) Raising Adjuster
(9) Raising Divider Spool
(11) Passage **C**
(13) Raising Overload Relief Valve
(18) Check Valve
(21) Passage **H**
(23) Raising Sequence Spool
(26) **P.B.** Port

P : P Port (Pump Port)
P.B. :P.B. Port (Power Beyond Port)
T : T Port (Tank Port)

a-a :Section a-a
b-b :Section b-b
(a) Low Pressure
(b) Mid Pressure
(c) High Pressure

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2. SERVICING SPECIFICATIONS

CONTROL LINKAGE

Item		Factory Specification	Allowable Limit
Position Control Lever	Operating Force (at Position Control Lever Grip)	17.6 to 58.8 N 2.0 to 6.0 kgf 4.4 to 13.2 lbf	–
Lift Arm	Free Play	25 to 40 mm 0.99 to 1.5 in.	–

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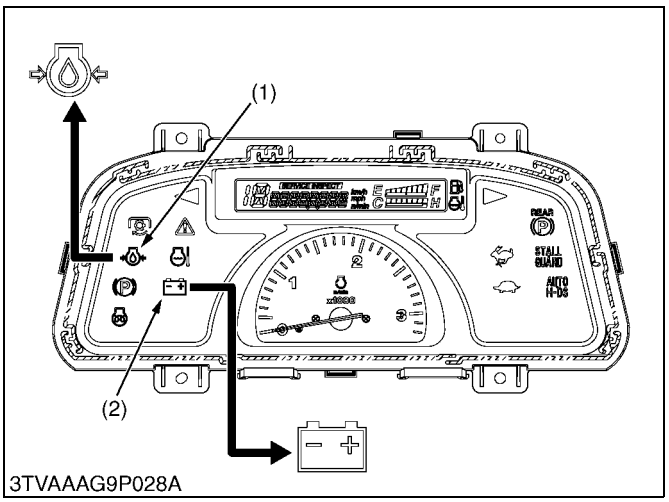
HYDRAULIC CYLINDER

Cylinder Bore	I.D.	90.000 to 90.050 mm 3.5433 to 3.5452 in.	90.150 mm 3.5492 in.
Hydraulic Arm Shaft to Bushing	Clearance (Right)	0.125 to 0.270 mm 0.00492 to 0.0106 in.	0.50 mm 0.020 in.
	Clearance (Left)	0.125 to 0.220 mm 0.00493 to 0.00866 in.	0.50 mm 0.020 in.
Hydraulic Arm Shaft	O.D. (Right)	44.920 to 44.950 mm 1.7685 to 1.7696 in.	–
	O.D. (Left)	39.920 to 39.950 mm 1.5717 to 1.5728 in.	–
Bushing	I.D. (Right)	45.075 to 45.150 mm 1.7746 to 1.7775 in.	–
	I.D. (Left)	40.075 to 40.140 mm 1.5778 to 1.5803 in.	–
Press-fit Location of Bushing	Reference Value **A**	21.5 to 22.5 mm 0.847 to 0.885 in.	–
	Reference Value **B**	24.5 to 25.5 mm 0.965 to 1.00 in.	
Cylinder Safety Valve	Operating Pressure	19.7 to 22.5 MPa 200 to 230 kgf/cm^2 2850 to 3270 psi	–

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■ **Engine Oil Pressure and Electric Charging Warning**

If the engine oil pressure goes below the 49 kPa (0.5 kgf/cm^2, 7.1 psi), the warning lamp (1) will come on. If this should happen during operation, and it does not go off when the engine is accelerated to more than 700 min^{-1} (rpm), check level of engine oil.

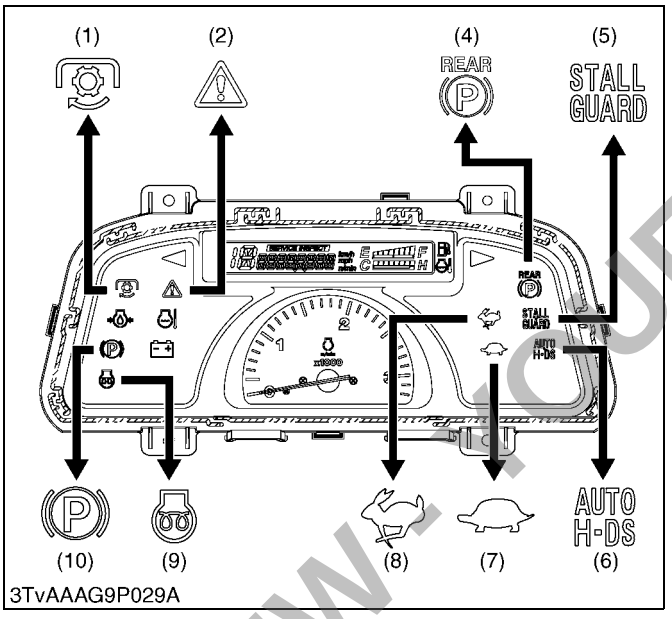
If the alternator is not charging the battery, warning lamp (2) will come on. If this should happen during operation, check the charging system.

At above-mentioned the warning lamp's lighting, and it informs warning.

(1) Engine Oil Pressure Warning Lamp (2) Electric Charging Warning Lamp

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(5) Lamp Control



In this electronic instrument panel, the control of various monitor lamps shown in figure are equipped in addition to warning lamps.

(1) Rear PTO Lamp

If the PTO shift lever is **"ON"** position, PTO switch is turned on, and monitor lamp will come on.

(2) Warning Lamp

If the error below are indicated, the warning lamp will blink.

ERROR-00	ERROR-80	ERROR-84	ERROR-91
ERROR-20	ERROR-81	ERROR-85	ERROR-92
ERROR-30	ERROR-82	ERROR-87	ERROR-93
ERROR-40	ERROR-83	ERROR-90	ERROR-94

(3) High Beam Indicator Lamp

If the head light switch is turned to High beam position, the indicator lamp comes on.

(4) Rear Parking Brake Lamp

If the rear parking brake is applied, rear parking brake switch is turned on and monitor lamp will come on.

(5), (6) Stall Guard Lamp Auto H-DS Lamp

If the HST mode select switch is pushed, and stall guard lamp and Auto H-DS lamp will come.

(7) H-DS Low Range Speed Lamp

If the H-DS lever is pushed down, the H-DS low speed lamp will come on.

(8) H-DS High Range Speed Lamp

If the H-DS lever is pushed up, the H-DS high speed range lamp will come on.

(9) Glow Indicator Lamp

If the main switch is turned to **"ON"** position, the glow indicator lamp comes on, and goes off automatically when preheating is completed.

(10) Foot Parking Brake Lamp

If the foot parking brake is applied, foot parking brake switch is turned on and monitor lamp will come on.

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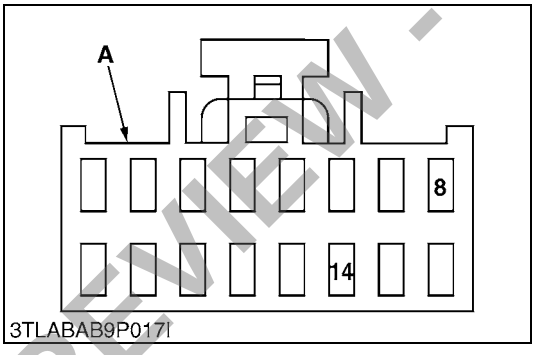
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Disconnecting Electronic Instrument Panel Connector

1. Remove the panel cover (1).
2. Disconnect the panel connectors (3), (4).
3. Remove the electronic instrument panel (2).

■ **NOTE**

- **When replacing the electronic instrument panel, be sure to adjust the mode “I” first.**
  Then adjust to mode “B”, “C” and mode “J”.

(1) Panel Cover
(2) Electronic Instrument Panel (IntelliPanel)
(3) Connector **B** (**16P**)
(4) Connector **A** (**20P**)

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Connector Voltage

■ **Main Voltage**

1. Measure the voltage between the terminal **8** (+) and terminal **14** (–).
2. If the voltage differs from the battery voltage (11 to 14 V), the wiring harness or battery is faulty.

Voltage	Terminal **8** to **14**	Approx. battery voltage

(1) Connector **B** (**16P**)

A : Connector B (16P) of Wire Harness Side

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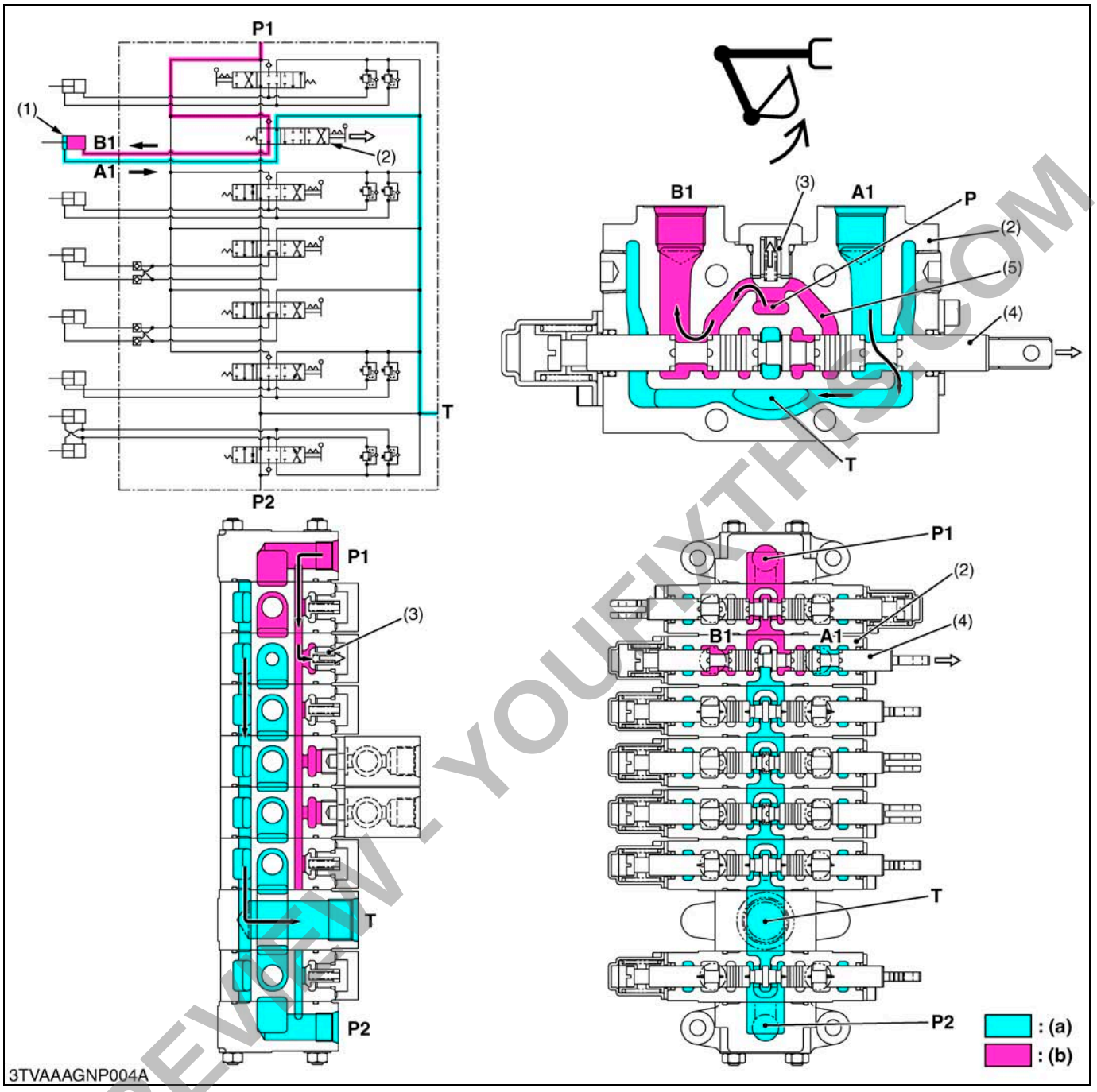
2. FRONT LOADER CONTROL VALVE

- Refer to the “HYDRAULIC SYSTEM” section.

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■ Bucket (Roll-back)



(1) Bucket Cylinder
(2) Bucket Control Valve
(3) Load Check Valve
(4) Spool
(5) Bridge Passage

P1, P2 :P Port
T : T Port

A1 : A1 Port
(From Bucket Cylinder)
B1 : B1 Port
(To Bucket Cylinder)
(a) Low Pressure
(b) High Pressure

1. When the dipperstick and bucket lever is moved to the left to set to the **"ROLL-BACK"** position, the spool (4) of the bucket control valve (2) moves to the right, which forms oil passage between bridge passage (5) and **B1** port, and between **A1** port and **T** port.
2. The pressure-fed oil from the **P** port opens the load check valve (3) and flows to **B1** port to extend the bucket cylinder (1).
3. Return oil from the bucket cylinder (1) returns to the transmission case through the **A1** port, low pressure passage and **T** port.

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