⚠ SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and decals 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.**

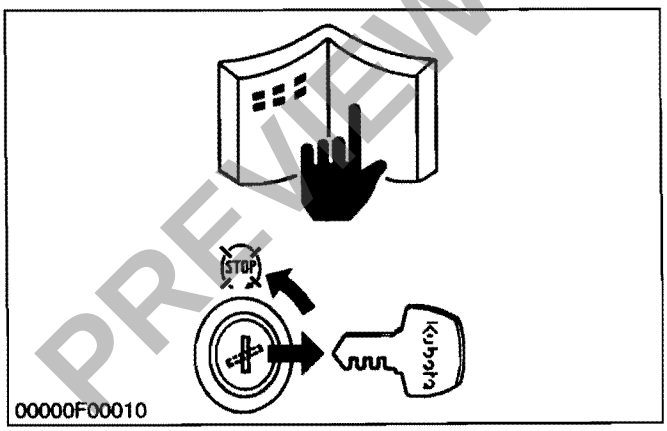
⚠ **WARNING**: **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ **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.**

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BEFORE SERVICING AND REPAIRING

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

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GENERAL

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SPECIFICATIONS

Model			M110		M120	
			2WD	4WD	2WD	4WD
PTO power (Factory observed)			65.6 kW (88 HP, 2400 rpm)		73 kW (98 HP, 2400 rpm)	
Engine	Model		F5802-TEI		F5802-TE	
	Type		Direct injection, W / wastegate turbocharger, water-cooled 4 cycle diesel			
	Number of cylinders		5			
	Total displacement		5832 cm^3 (355.9 cu.in.)			
	Bore and stroke		109 × 125 mm (4.3 × 4.9 in.)			
	Engine rated output		82.06 kW (110 HP)		89.52 kW (120 HP)	
	Rated revolution		2400 rpm			
	Maximum torque		422 N·m (43.0 kgf·m, 311.2 ft-lbs)/ 1200 rpm		461 N·m (47.0 kgf·m, 339.9 ft-lbs)/ 1200 rpm	
	Battery		12V 170F51 YUASA			
	Fuel		Diesel fuel No.1-D [below −10 °C (14 °F)] Diesel fuel No. 2-D [above −10 °C (14 °F)]			
	Fuel tank capacity		150 L (39.7 U.S.gal., 33 Imp.gal.)		200 L (52.9 U.S.gal., 44 Imp.gal.)	
	Engine crankcase capacity		20.8 L (22.0 U.S.qts., 18.3 Imp.qts.)			
	Engine coolant capacity		13 L (3.4 U.S.qts., 2.86 Imp.qts.)			
Dimensions	Overall length		4097 mm (161.3 in.)	4223 mm (166.3 in.)	4238 mm (166.9 in.)	4365 mm (171.9 in.)
	Overall width (Minimum tread)		2181 mm (85.9 in.)		2195 mm (86.4 in.)	
	Overall height (with ROPS)		2685 mm (105.7 in.)		2725 mm (107.3 in.)	
	Wheel base		2495 mm (98.2 in.)	2510 mm (98.8 in.)	2635 mm (103.7 in.)	2690 mm (105.9 in.)
	Tread	Front	1520 to 2120 mm (59.8 to 83.5 in.)	1520 mm (59.8 in.) 1620 mm (63.8 in.)	1520 to 2120 mm (59.8 to 83.5 in.)	1640 mm (64.6 in.) 1740 mm (68.5 in.)
		Rear	1520 to 2020 mm (59.8 to 79.5 in.)		1550 to 2110 mm (61.0 to 83.1 in.)	
	Minimum ground clearance		510 mm (20.1 in.)	590 mm (23.2 in.)	560 mm (22.0 in.)	615 mm (24.2 in.)
Weight (Std.)			3900 kg (8598 lbs)	4200 kg (9259 lbs)	4100 kg (9040 lbs)	4400 kg (9700 lbs)
Travelling system	Standard tire size	Front	10.0-16	13.6-24	11.0-16	14.9-24
		Rear	18.4R-34		18.4R-38	
	Clutch		Multiple wet disc, electronic hydraulically operated			
	Steering		Full hydrostatic power steering			
	Transmission		Power shift, electronic shuttle, 16F / 16R (with creep speed 24F / 24R)			
	Brake	Travelling	Wet type, multiple discs (hydraulic)			
		Parking	Wet discs (mechanical)			
	Differential		Bevel gears (with differential lock (hydraulic))			
Hydraulic system	Hydraulic control system		Electronic draft control			
	Pump-up capacity		78 L (20.6 U.S.gal., 17.2 Imp.gal.)/min.			
	Three point hitch		Category II			
	Max. *1 lifting force (Full Stroke)	At lifting points *2 kg	2635 kg (5809 lbs) / *3 4860 kg (10715 lbs)			
		At 610 mm (24 in.) behind lifting point	2360 kg (5203 lbs) / *3 4345 kg (9579 lbs)			
	System pressure		19.12 to 19.61 MPa (195 to 200 kgf/cm^2, 2773 to 2845 psi)			

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[5] LUBRICANTS, FUEL AND COOLING WATER

	Place		Capacity		Lubricants, fuel and cooling water
			M-110	M-120	
1	Fuel		150 L 39.6 U.S.gals. 33 Imp.gals.	200 L 52.8 U.S.gals. 44 Imp.gals.	No. 2-D diesel fuel No. 1-D diesel fuel it temperature is below – 10 °C (14 °F)
2	Coolant	Engine block radiator	13.0 L 13.7 U.S.qts. 11.4 Imp.qts.		Fresh clean water with anti-freeze
		Reserve tank	1.5 L 1.6 U.S.qts. 1.3 Imp.qts.		
3	Engine crankscase with filter		20.8 L 22.0 U.S.qts. 18.3 Imp.qts.		• Engine oil : API Service Classification CD Below – 23 °C (– 10 °F) ····· SAE5W or 5W-30 – 23 to 0 °C (– 10 to 32 °F) ····· SAE 10W or 10W – 30 0 to 25 °C (32 to 77 °F) ····· SAE20 or 10W-30 Above 25 °C (77 °F) ····· SAE30 or 10W-30
4	Transmission case		55 L 58.1 U.S.qts. 48.4 Imp.qts.	58 L 61.3 U.S.qts. 51.0 Imp.qts.	KUBOTA UDT or SUPER UDT fluid*
5	Front axle differential case		7 L 7.4 U.S.qts. 6.2 Imp.qts.	12 L 12.7 U.S.qts. 10.6 Imp.qts.	KUBOTA UDT or SUPER UDT fluid* or SAE80, SAE90 gear oil
6	Front axle gear case for each side		3.5 L 3.7 U.S.qts. 3.1 Imp.qts	4.6 L 4.9 U.S.qts. 4.0 Imp.qts	
7	Brake oil		0.3 L 0.3 U.S.qts. 0.3 Imp.qts		KUBOTA UDT or SUPER UDT fluid* or Turbine oil 32 (See below) { regular type, multipurpose straight mineral oil Mobil DTE Oil #32 TEXACO Regal Oil #32 CHEVRON-GST Oil #32 TERESSO Oil #32 } Never use automotive brake oil.
8	Washer liquid		1.3 L 1.4 U.S.qts. 1.1 Imp.qts.		Automobil washer liquid

* KUBOTA original transmission hydraulic fluid.

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[7] MAINTENANCE

No.	Item	Period	Indication on hour meter															Since then every		Reference page
			50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800			
1	Engine oil	Change	★					☆						☆					300 Hr		G-15
2	Engine oil filter	Replace	★											☆					600 Hr		G-16
3	Fuel filter	Replace								☆								☆	400 Hr	@	G-29
4	Transmission fluid	Change	★											☆					600 Hr		G-17
5	Front differential case oil	Change	★											☆					600 Hr		G-18
6	Front axle gear case oil	Change	★											☆					600 Hr		G-18
7	Hydraulic oil filter (Suction side)	Replace	★			☆				☆				☆				☆	200 Hr		G-16
8	Hydraulic oil filter (Return side)	Replace	★			☆				☆				☆				☆	200 Hr		G-17
9	Engine start system	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	50 Hr		G-19
10	Wheel bolt torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	50 Hr		G-20
11	Wire harness, battery cable	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	50 Hr		–
12	Battery condition	Check		☆		☆		☆		☆		☆		☆		☆		☆	100 Hr		G-20
13	Greasing			☆		☆		☆		☆		☆		☆		☆		☆	100 Hr		G-25
14	Fan belt	Adjust		☆		☆		☆		☆		☆		☆		☆		☆	100 Hr		G-22
15	Brake pedal	Adjust		☆		☆		☆		☆		☆		☆		☆		☆	100 Hr		G-23
16	Parking brake lever	Adjust		☆		☆		☆		☆		☆		☆		☆		☆	100 Hr		G-24
17	Fuel line	Check		☆		☆		☆		☆		☆		☆		☆		☆	100 Hr	@	G-24
		Replace																	2 years		G-24
18	Air cleaner element [Double type]	Primary element: Clean		☆		☆		☆		☆		☆		☆		☆		☆	100 Hr *	@	G-22
		Primary element: Replace																	1 year **		G-22
		Secondary element: Replace																	1 year		G-22
19	Toe-in	Adjust				☆				☆				☆				☆	200 Hr		G-26
20	Power steering oil line	Check				☆				☆				☆				☆	200 Hr		G-27
		Replace																	2 years ***		G-27
21	Radiator hose and clamp	Check				☆				☆				☆				☆	200 Hr		G-27
		Replace																	2 years ***		G-27
23	Fuel tank water	Drain				☆				☆				☆				☆	200 Hr		G-27
24	Brake oil	Change												☆					600 Hr		G-30
25	Front axle pivot	Adjust												☆					600 Hr		G-30
26	Engine valve clearance	Adjust																☆	800 Hr		G-31
27	Intake air line	Check				☆				☆				☆				☆	200 Hr	@	G-28
		Replace																	2 years ***		G-28
28	Greasing (2WD front wheel hub)									☆									400 Hr		G-29
29	Fuel injection nozzle injection pressure	Check																	1500 Hr	@	1-S51
30	Turbo charger	Check																	3000 Hr	@	1-S52
31	Injection pump	Check																	3000 Hr	@	1-S29
32	Fuel injection timer	Check																	3000 Hr	@	1-S29
33	Intake air heater	Check																	3000 Hr	@	9-S14
34	Cooling system	Flush																	2 years		G-33, 34
35	Coolant	Change																	2 years		G-33, 34

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[6] TIGHTENING TORQUES

(1) General Use Screws, Bolts and Nuts

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

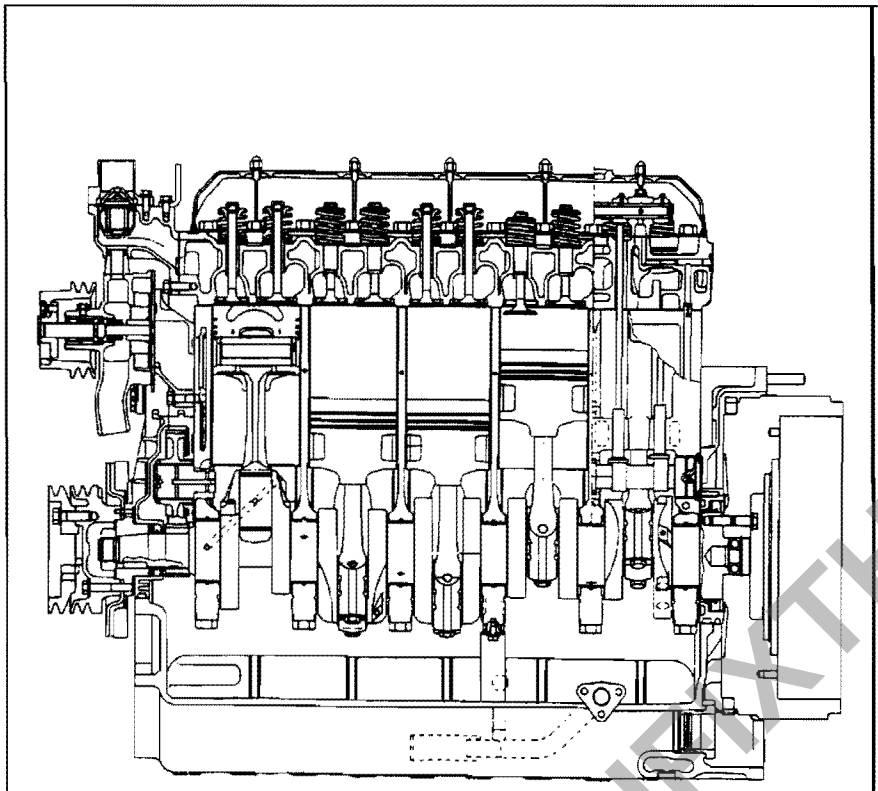
Indication on top of bolt	⬡ ④ No-grade or 4T						⑦ 7T						⑨ 9T		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Diameter	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M6 (6 mm, 0.24 in.)	7.84 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	9.80 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

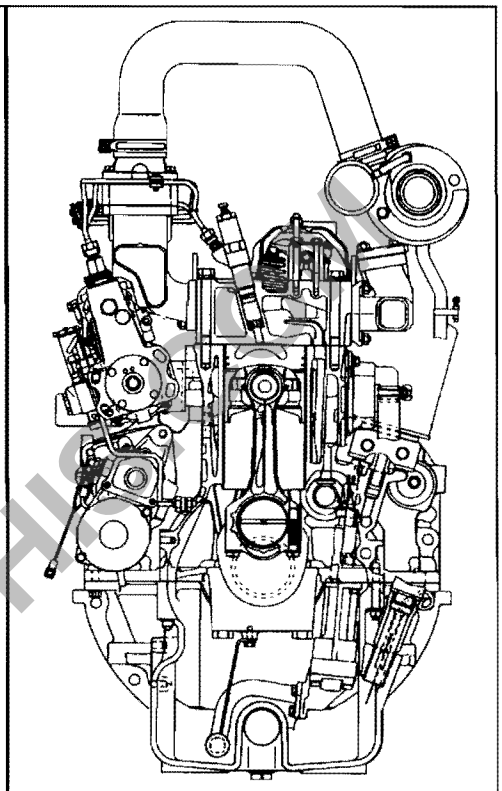
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[1] FEATURES


12260F10520


12260F10530

The F5802-TE1 and F5802-TE are vertical, water-cooled, 4-cycle diesel engines. In these engines are incorporated Kubota's most advanced technologies.

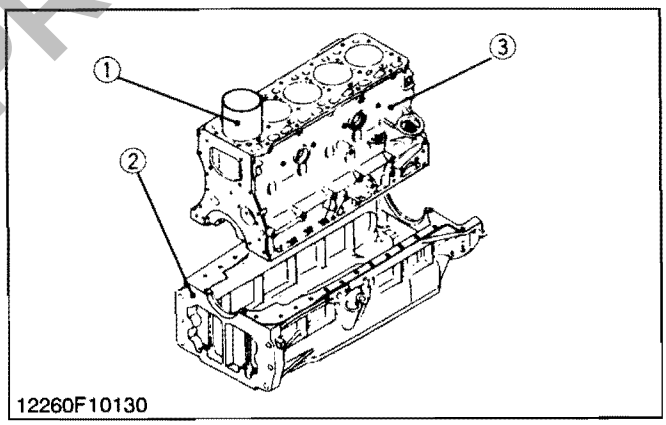
In particular, these engines meet the current US Environmental Protection Agency regulations for the purpose of preserving the earth's environment. Here are the key features.

1. The reentrant type combustion chamber improves the burning efficiency to satisfy the emission control requirements. The exhaust gas generated during operation can be rendered invisible.
2. A large mechanical timer optimizes the dynamic injection time to achieve better fuel economy and cleaner exhaust.
3. The series PE-AD high-pressure injection pump is durable and easy to maintain.
4. The suction port is designed to give optimum swirling for uniform air mixture.
5. The PTC intake heater upgrades the starting performance in cold regions.

12260M10010

[2] ENGINE BODY

(1) Cylinder Block



12260F10130

The cylinder block is made of cast iron, containing dry liners.

The crankshaft is supported by the crankshaft bearings and the bearing cases.

Furthermore, dry-type cylinder liners pressed into the cylinders allow effective cooling, less distortion and greater wear-resistance.

(1) Cylinder Liner
(2) Oil Pan
(3) Crank Case

12260M10020

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TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No fuel	Replenish fuel	–
	• Air in the fuel system	Vent air	–
	• Water in the fuel system	Change fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Clean or change	–
	• Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	–
	• Fuel with low cetane number	Use specified fuel	–
	• Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	–
	• Incorrect injection timing	Adjust	1-S30
	• Injection nozzle clogged	Clean	1-S50, S51
	• Injection pump malfunctioning	Repair or replace	–
	• Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	–
	• Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S18
	• Improper valve timing	Correct or replace timing gear	1-S32
	• Piston ring and cylinder worn	Replace	1-S37, S46
	• Excessive valve clearance	Adjust	1-S20
(Starter Does Not Run)	• Battery discharged	Charge	–
	• Starter malfunctioning	Repair or replace	9-S8, S9
	• Key switch malfunctioning	Repair or replace	–
	• Wiring disconnected	Connect	–
Engine Revolution Is Not Smooth	• Fuel filter clogged or dirty	Clean or change	–
	• Air cleaner clogged	Clean or change	–
	• Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	–
	• Injection pump malfunctioning	Repair or replace	–
	• Incorrect nozzle opening pressure	Adjust	1-S50, S51
	• Injection nozzle stuck or clogged	Repair or replace	1-S50, S51
	• Bearing worn out	Replace the turbocharger assembly	–
	• Shaft bent		1-S53
	• Fin or other part damaged due to foreign matters		1-S53

12260S10010

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[8] CHECK AND MAINTENANCE

⚠ CAUTION

- **Be sure to check and service the tractor on a flat place with engine shut off, the parking brake on and chock the wheels.**

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(1) Daily Check

To prevent trouble from occurring, it is important to know the condition of the tractor. Check the following items before starting.

- Check areas where previous trouble was experienced.
- Walk around the tractor.

1) Check the tire pressure, and check wear and damage.
2) Check the bolts and nuts of the tires are tight.
3) Check water separator.
4) Check for oil and water leaks.
5) Check the engine oil level.
6) Check the transmission fluid level.
7) Check the brake oil level.
8) Check and clean the radiator screen and grille.
9) Check and clean the precleaner if equipped.
10) Check the evacuator valve.
11) Check the number plate or SMV emblem for damage and cleaner replace as necessary if equipped.
12) Care of danger, warning and caution labels.
13) Clean around the exhaust manifold and the muffler of the engine.
14) Check and clean head lights, tail lights, flasher lights and hazard lights.

- While sitting in the operator's seat.

1) Check the throttle pedal, brake pedals.
2) Check the parking brake.
3) Check the steering wheel.

- Turning the key switch.

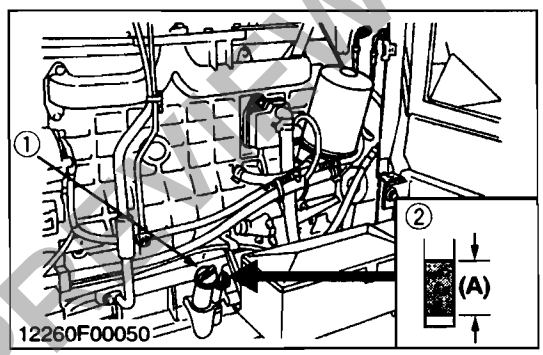
1) Check the performance of the Easy Checker lights.
2) Check head lights, tail lights, flasher lights and hazard lights.
   Clean if necessary.
3) Check the performance of the meters and gauges.

- Starting the engine.

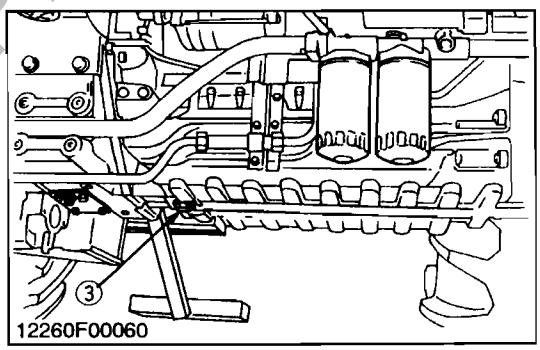
1) Check to see that the lights on the Easy Checker go off.
2) Check the color of the exhaust.
3) Check the brakes for proper operation.

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(2) Check Points of Initial 50 Hours



12260F00050



12260F00060

Changing Engine Oil

⚠ CAUTION

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

1. To drain the used oil, remove the drain plug at the bottom of the engine and drain the oil completely into the oil pan.
   All the used oil can be drained out easily when the engine is still warm.
2. After draining reinstall the drain plug.
3. Fill with the new oil up to the upper notch on the dipstick.
   Refer to **"LUBRICANTS, FUEL AND COOLING WATER"**. (See page G-9.)

Oil capacity with filter	20.8 L 22.0 U.S.qts. 18.3 Imp.qts.

(1) Oil Inlet
(2) Dipstick
(3) Drain Plug

(A) Oil level is acceptable within this range.

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SERVICING SPECIFICATIONS

PISTON · PISTON RING

Item	Factory Specification	Allowable Limit
Piston Pin Bore I.D.	34.993 to 35.000 mm 1.3776 to 1.3780 in.	35.04 mm 1.3795 in.
Fitting between Piston Pin-hole and Pin	0.003 to 0.017 mm 0.00012 to 0.00067 in.	–
Clearance between Ring Groove and Ring		
Top Ring	0.09 to 0.141 mm 0.00354 to 0.00555 in.	0.20 mm 0.0079 in.
Second Ring	0.05 to 0.082 mm 0.00197 to 0.00323 in.	0.15 mm 0.0059 in.
Oil Ring	0.03 to 0.07 mm 0.00118 to 0.00276 in.	0.15 mm 0.0059 in.
Piston Ring Groove Width		
Top Ring	2.582 to 2.62 mm 0.1016 to 0.1031 in.	–
Second Ring	2.54 to 2.56 mm 0.1000 to 0.1008 in.	–
Oil Ring	4.02 to 4.04 mm 0.1583 to 0.1590 in.	–
Piston Ring Width		
Top Ring	2.479 to 2.492 mm 0.09764 to 0.0981 in.	–
Second Ring	2.478 to 2.49 mm 0.0976 to 0.0980 in.	–
Oil Ring	3.97 to 3.99 mm 0.1563 to 0.1571 in.	–
Ring Gap		
Top Ring	0.30 to 0.45 mm 0.0118 to 0.0177 in.	1.14 mm 0.059 in.
Second Ring	0.30 to 0.45 mm 0.0118 to 0.0177 in.	1.14 mm 0.059 in.
Oil Ring	0.20 to 0.40 mm 0.0079 to 0.0157 in.	0.9 mm 0.059 in.
Oversize of Piston and Rings	+ 0.5 mm + 0.019 in.	–

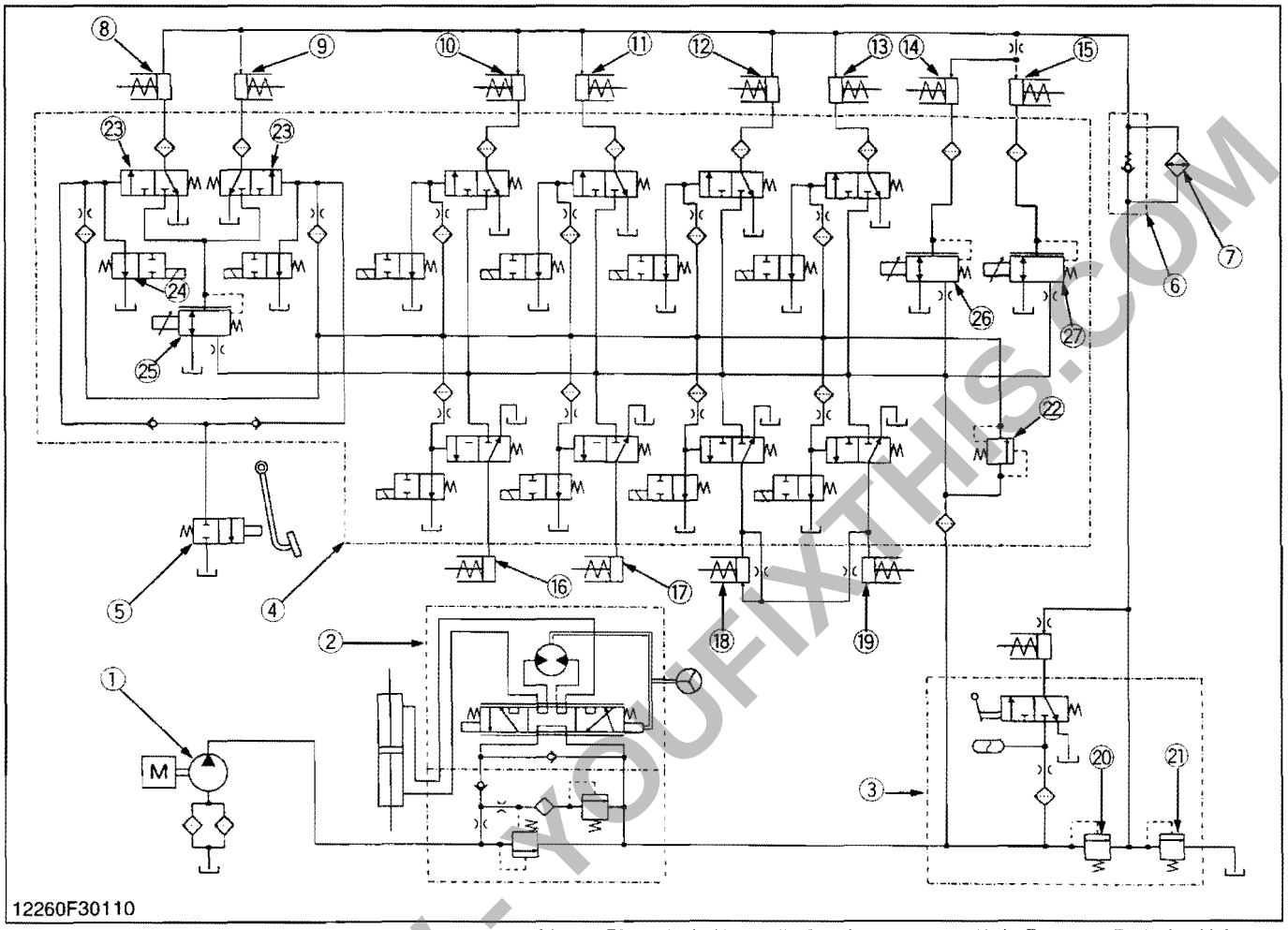
12260S10070

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[4] HYDRAULIC SYSTEM

(1) Hydraulic Circuit



(1) Hydraulic Oil Pump
- 2WD : Single Pump
- 4WD : Tandem Pump

(2) Steering Controller
(3) PTO Clutch Valve
(4) Power Shift Valve
(5) Safety Valve
(6) Check Valve
(7) Oil Cooler
(8) Hydraulic Clutch (Master **F**)
(9) Hydraulic Clutch (Master **R**)
(10) Hydraulic Clutch (Main Shift **1**)
(11) Hydraulic Clutch (Main Shift **2**)
(12) Hydraulic Clutch (Main Shift **3**)
(13) Hydraulic Clutch (Main Shift **4**)
(14) Hydraulic Clutch (Main Shift **L**)
(15) Hydraulic Clutch (Main Shift **H**)
(16) Hydraulic Clutch (Front Differential Lock)
(17) Hydraulic Clutch (Rear Differential Lock)
(18) Hydraulic Clutch (4WD)
(19) Hydraulic Clutch (Bi-speed Turn)
(20) Relief Valve (System Pressure)
(21) Relief Valve (Lubricating Oil Pressure)
(22) Pressure Reducing Valve (Pilot Pressure)
(23) Main Spool
(24) Solenoid **ON / OFF** Valve
(25) Solenoid Proportional Reducing Valve (**F-R**)
(26) Solenoid Proportional Reducing Valve (**L**)
(27) Solenoid Proportional Reducing Valve (**H**)

The figure above shows the oil pressure circuit diagram of power shift system.

The hydraulic oil coming out of the hydraulic oil pump (1) passes through the steering controller (2) and enters the PTO clutch valve (3). Here, its pressure is regulated to 2.01 to 2.30 MPa (20.5 to 23.5 kgf/cm^2, 291.5 to 333.5 psi) by means of the system pressure relief valve (20) and then it is sent to the power shift valve (4). In the power shift valve, the oil flow channel and the oil pressure are controlled by the main spool (23), solenoid **ON / OFF** valve (24) and solenoid operated proportional reducing valve (25) and sent to hydraulic clutches.

In the power shift valve, this value 2.01 to 2.30 MPa (20.5 to 23.5 kgf/cm2, 291.5 to 333.5 psi) is used as hydraulic clutch operating pressure. As the pilot pressure for operating main spools, this pressure is also used after having been reduced to 0.78 MPa (8 kgf/cm^2), 113.8 psi by the pressure reducing valve (22).

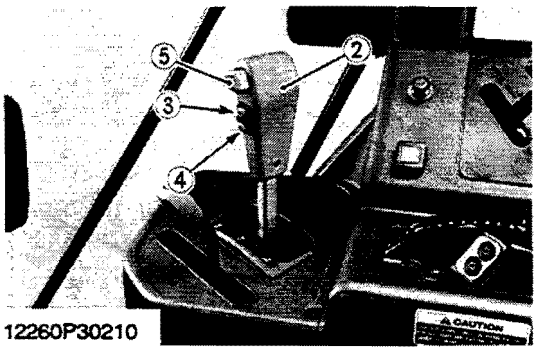
In the PTO clutch valve is provided a lubricating oil relief valve (21) to reduce the oil pressure to 0.2 to 1.18 MPa (2 to 12 kgf/cm^2, 28.4 to 170.7 psi) for lubrication of hydraulic clutches.

12260M30230

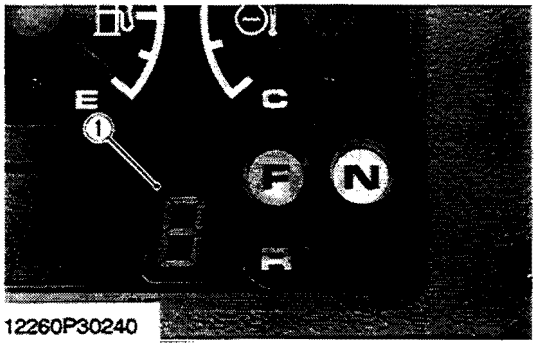
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[1]-2 ADJUSTMENT BY THE ADJUSTMENT (INITIAL SETTING)



12260P30210



12260P30240

(1) Speed Change Display
(2) Power Shift / Range Shift Lever
(3) Shift Up Button
(4) Shift Down Button
(5) Clutch Button

Adjustment (Initial Setting) Function

1. To make adjustment of this system by the adjustment (initial setting) function, take the procedure as follows. After starting the adjustment program, manipulate the shift button and the lever in the specified procedure and memorize initial setting values in the power shift control unit.
2. The mode selection can be made for either of individual adjustment (1 thru N) or all adjustment, the adjustment of a necessary part alone is also possible. (If the all adjustment mode is selected, adjustment is to be executed in the order of adjustment modes 1 thru N as shown belows.)

■ IMPORTANT

- **Be sure to carry out the following adjustments when the related sensors, solenoid valves or hydraulic clutch are disassembled or replaced.**

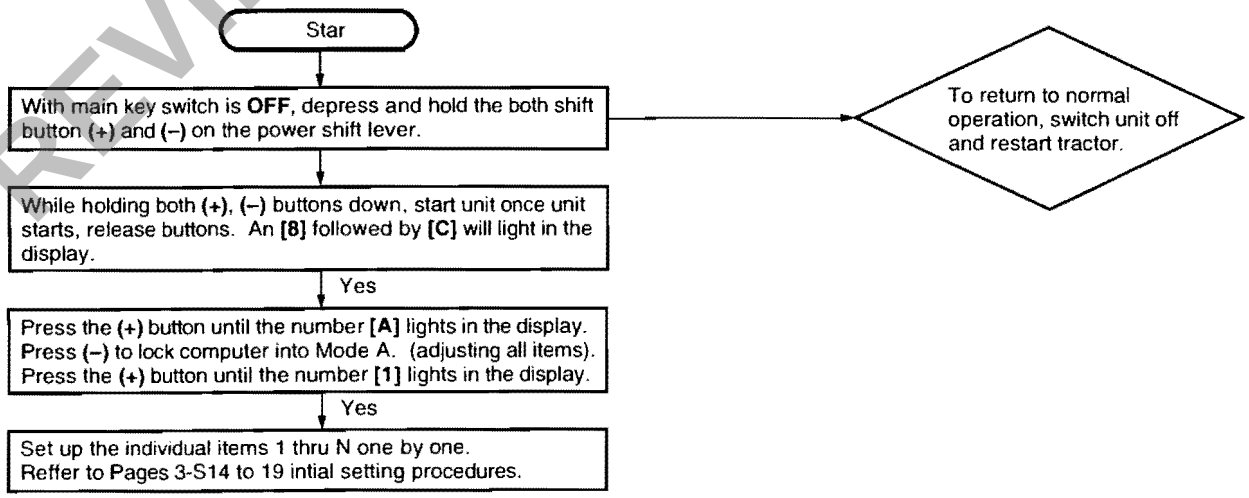
■ Adjustment (Initial Setting) Item

- The items of adjustment to be made by adjustment (initial setting) function of the micro-computer are the 8 items as shown below.

Mode	Item		Display
A	Adjusting all item	Individual items 1 thru N	**A**
1	Adjusting individual item	Clutch pedal sensor	**1**
2		Main shift clutch (1 thru 4, L and H)	**2**
3		Master clutch pack (F and R)	**3**
4		Throttle sensor	**4**
5		Solenoid proportional pressure reducing valve (master)	**5**
6		Solenoid proportional pressure reducing valve (main shift L)	**6**
7		Solenoid proportional pressure reducing valve (main shift H)	**7**
N		Setting model	**N**

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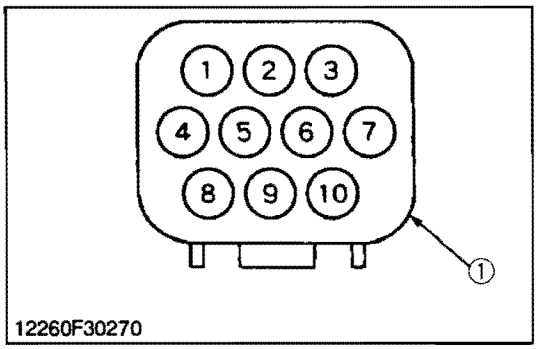
MODE A (ADJUSTING ALL ITEMS) INTIAL SETTING PROCEDURE



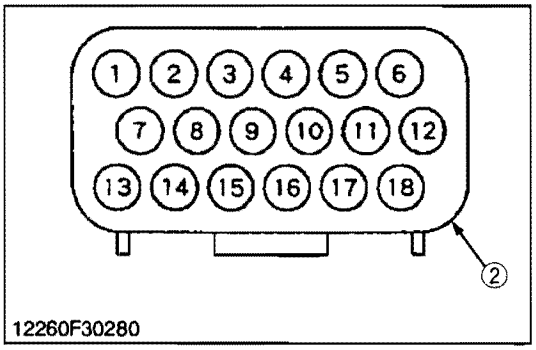
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12260F30270



12260F30280

Arrangement of Micro Computer Connector Pin

1) CNT-C

No.	Color of Wiring	Terminal Name
1	Orange / Blue	Solenoid proportional pressure reducing valve (master)
2	Brown / Blue	Solenoid proportional pressure reducing valve (main shift H)
3	Brown / Yellow	Solenoid proportional pressure reducing valve (main shift L)
4	Black	GND (Ground for load line)
5	Black / Blue	Solenoid proportional pressure reducing valve (main shift L)
6	Brown / Black	Solenoid ON-OFF valve (main shift 1)
7	Brown / Red	Solenoid ON-OFF valve (main shift 3)
8	Red / Green	+ 12 V (Load line power source)
9	Brown / White	Solenoid ON-OFF valve (main shift 2)
10	Brown / Green	Dolenoid ON-OFF valve (main shift 4)

2) CNT-D

No.	Color of Wiring	Terminal Name
1	Black / Pink	Solenoid proportional pressure reducing valve (master)
2	Purple / Black	Speed change display (d)
3	Pink / Black	Speed change display (a)
4	Purple / Red	Speed change display (f)
5	White / Yellow	Throttle sensor
6	Purple	For check
7	Black / Yellow	Solenoid proportional pressure reducing valve (main shift L)
8	Pink / White	Speed change display (b)
9	Purple / Yellow	Speed change display (g)
10	White / Black	Oil temperature sensor
11	Pink	For check
12	–	Blank
13	Light blue	Neutral lamp
14	Pink / Blue	Speed change display (c)
15	Light green / White	Buzzer
16	Purple / White	Speed change display (e)
17	White / Red	Clutch pedal sensor
18	–	Blank

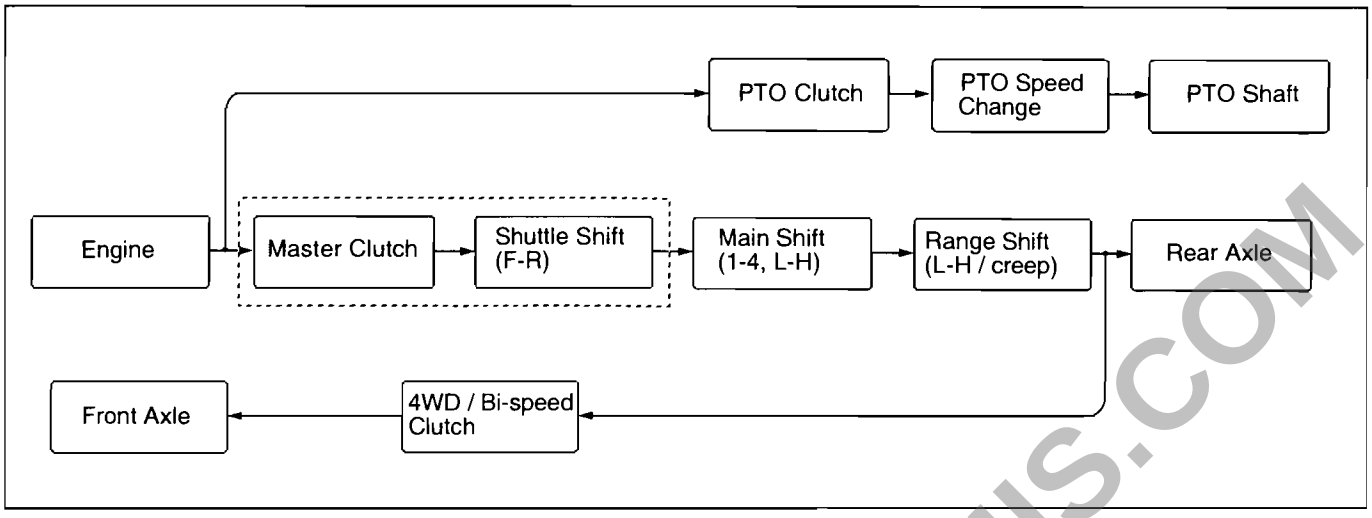
(1) CNT-C Connector (2) CNT-D Connector

12260S30920

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■ Power Train



12260M30040

[2] TRAVELLING SYSTEM

(1) Power Shift System

The transmission is microcomputer-controlled. The non-clutch system is provided with the power shift / range shift lever (Buttons in 8 speeds), gearshift lever (2 speeds; 3 speeds if equipped with creep control lever), and forward / reverse shuttle lever: 16 speeds (24 speeds) in total.

12260M30050

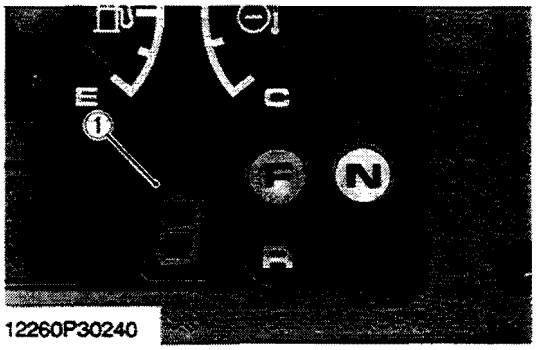
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TROUBLESHOOTING

[1] POWER SHIFT SYSTEM

[1]-1 SELF-DIAGNOSIS



12260P30240

(1) Speed-Change Display

Since the system is equipped with a self-diagnosis function which enables checking of actuators and sensors by simple operation, carry out self-diagnosis immediately when an trouble arises. Take appropriate measures based on the result of self-diagnosis.

The cause of trouble is indicated on this display depending on the cause of trouble. If any of the following indications appears on the speed change display, find out the cause of trouble by referring the indication.

Since the system is equipped with a self-diagnosis function which enables checking of actuators and sensors by simple operation, carry out self-diagnosis immediately when an trouble arises. Take appropriate measures based on the result of self-diagnosis.

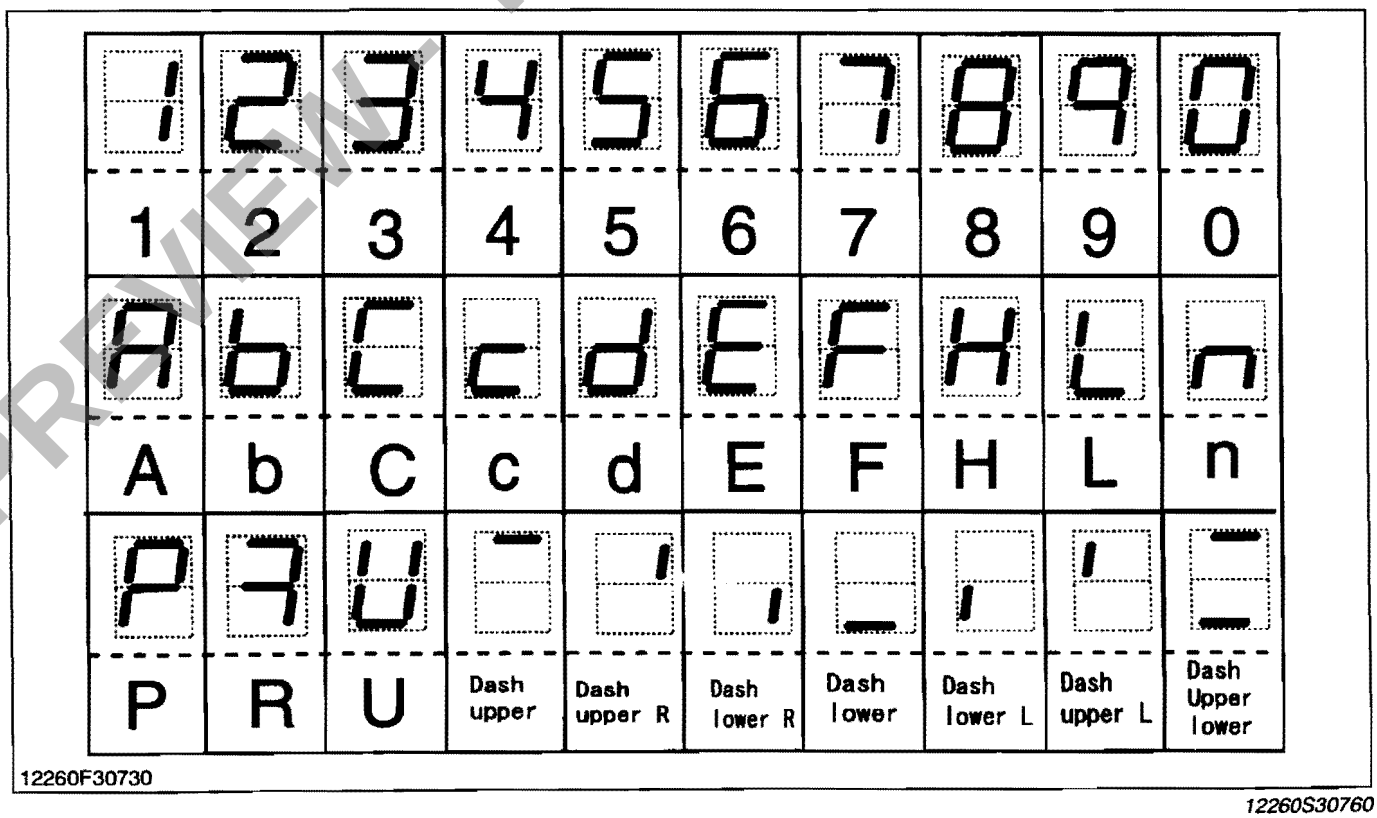
The cause of trouble is indicated on this display depending on the cause of trouble. If any of the following indications appears on the speed change display, find out the cause of trouble by referring the indication.

■ IMPORTANT

- **The trouble is judged attributable to any defective sensor or switch as the result of checking, be sure to check the wire harness extending to the defective sensor or switch for any wire breakage and check also the connection of connectors.**

■ NOTE

- **Refer to the comparison table for the character and sign to which select-speed display is displayed the explanation.**



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12260S30760

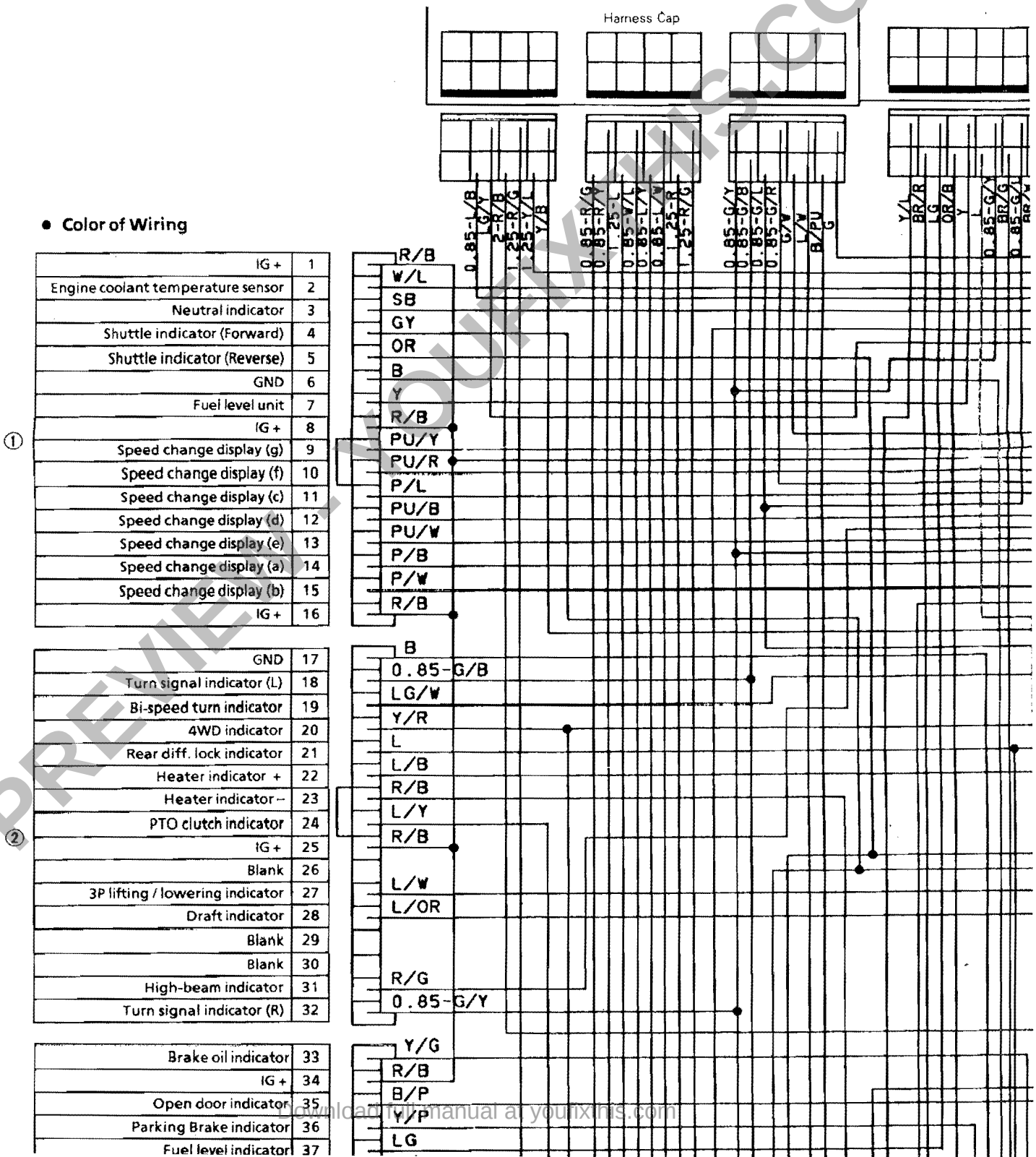
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(1) Wiring Diagram

- **Color of Wiring**

B ---------- Black	Lg ---------- Light Green	BY ---------- Black / Yellow	GY ---------- Green / Yellow
W ---------- White	WB ---------- White / Black	BrB ---------- Brown / Black	YR ---------- Yellow / Red
R ---------- Red	WR ---------- White / Red	RB ---------- Red / Black	YB ---------- Yellow / Black
G ---------- Green	WG ---------- White / Green	RW ---------- Red / White	YG ---------- Yellow / Green
Or ---------- Orange	BL ---------- Black / Blue	RY ---------- Red / Yellow	LW ---------- Blue / White
Y ---------- Yellow	BG ---------- Black / Green	GB ---------- Green / Black	LR ---------- Blue / Red
Br ---------- Brown	BR ---------- Black / Red	GW ---------- Green / White	OrW ---------- Orange / White
L ---------- Blue	BW ---------- Black / White	GR ---------- Green / Red	

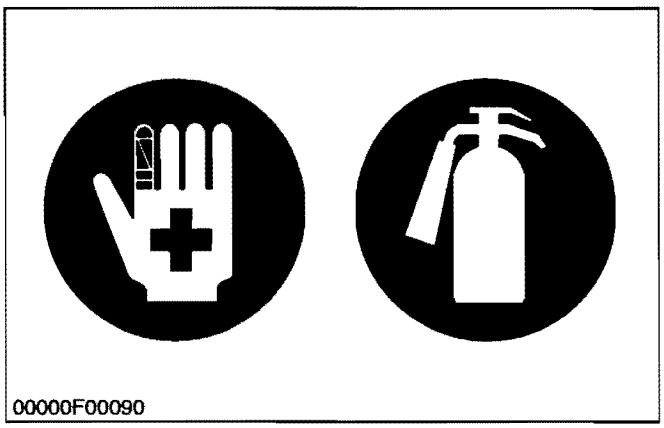


- **Color of Wiring**

	IG +	1
	Engine coolant temperature sensor	2
	Neutral indicator	3
	Shuttle indicator (Forward)	4
	Shuttle indicator (Reverse)	5
	GND	6
	Fuel level unit	7
	IG +	8
①	Speed change display (g)	9
	Speed change display (f)	10
	Speed change display (c)	11
	Speed change display (d)	12
	Speed change display (e)	13
	Speed change display (a)	14
	Speed change display (b)	15
	IG +	16
	GND	17
	Turn signal indicator (L)	18
	Bi-speed turn indicator	19
	4WD indicator	20
	Rear diff. lock indicator	21
	Heater indicator +	22
	Heater indicator –	23
	PTO clutch indicator	24
②	IG +	25
	Blank	26
	3P lifting / lowering indicator	27
	Draft indicator	28
	Blank	29
	Blank	30
	High-beam indicator	31
	Turn signal indicator (R)	32
	Brake oil indicator	33
	IG +	34
	Open door indicator	35
	Parking Brake indicator	36
	Fuel level indicator	37

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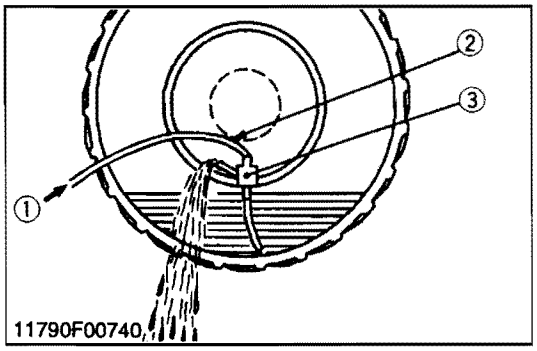
PREPARE FOR EMERGENCIES

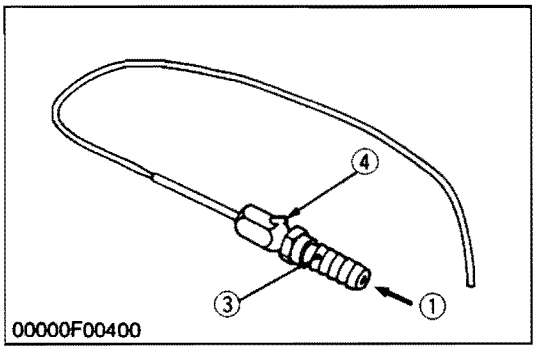
(1) Keep a first aid kit and fire extinguisher handy at all times.
(2) Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

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Draining Water or Solution

1. Lift the rear tires off the ground.
2. Turn the tire so that the air valve is at the bottom.
3. Remove the air valve, and drain liquid (liquid can only be drained to the level of the valve and liquid under that level remains inside).
4. To drain liquid completely, use the injector (3), and direct compressed air (1) into the tire to force out the liquid through the injector's vent (4).

(1) Compressed Air
(2) Hose
(3) Injector
(4) Vent

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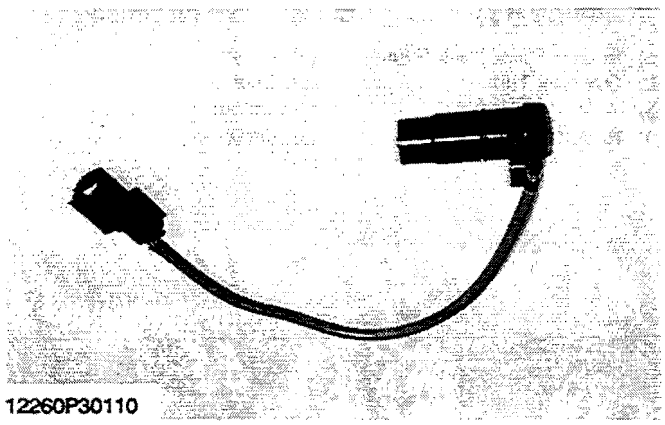


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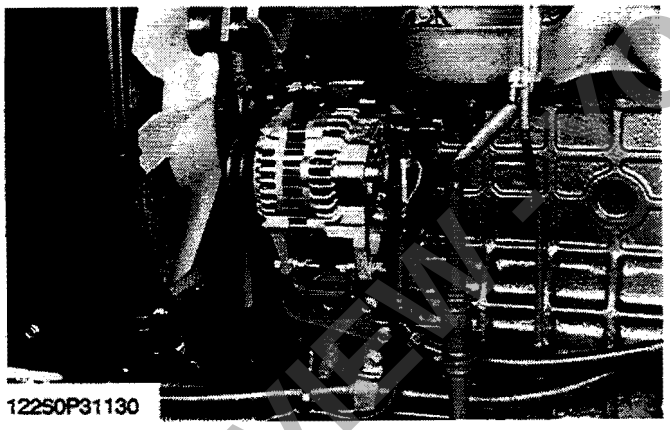
12260P30110

12260M30200

Alternator (L-Terminal Output)

In power shift system, engine rotation is detected not only by the engine tachometer sensor but also by the alternator L-terminal so that least necessary control can be taken even when the engine tachometer sensor falls in trouble.

(1) L-terminal



12250P31130

12260M30210

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12260P30910

Power Shift Valve Assembly

1. Remove the power shift valve assembly mounting screws and nuts.
2. Remove the power shift valve assembly (1).

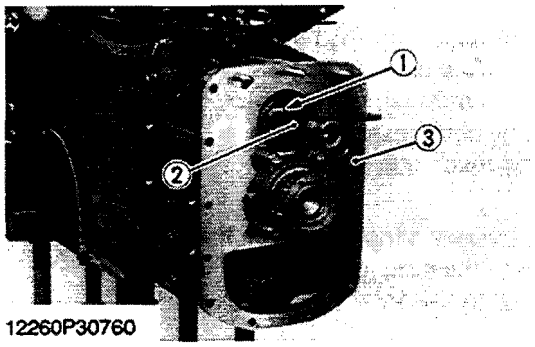
(When reassembling)

- Never use liquid gasket to joint face of clutch housing and power shift valve assembly.
- When reassembling the power shift valve assembly, be sure to change the O-ring and apply transmission oil to O-ring.

Tightening torque	Power shift valve mounting screw and nut	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 ft-lbs

(1) Power Shift Valve Assembly

12260S30300



12260P30760

Mid Case (M-120 Only)

1. Remove the internal snap ring (1) and pull out the PTO propeller shaft (2) to the rear.
2. Remove the mid case mounting screws.
3. Remove the mid case (3).

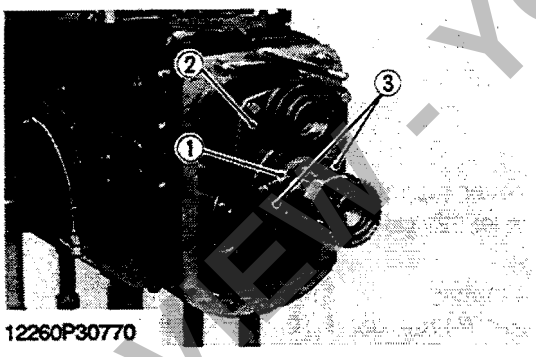
(When reassembling)

- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of mid case and clutch housing.

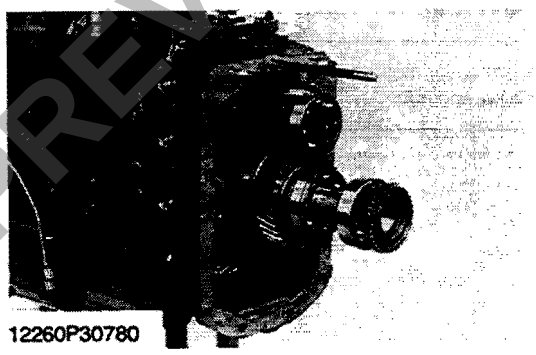
Tightening torque	Mid case mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57 to 66.5 ft-lbs

(1) Internal Snap Ring
(2) PTO Propeller Shaft
(3) Mid Case

12260S30310



12260P30770


12260P30780

Rear Bearing Support

1. Remove the bearing retainer (3).
2. Remove the external snap ring (1).
3. Remove the rear bearing support mounting screws and remove the rear bearing support (2).

(When reassembling)

- After mounting the rear bearing support, be sure return to normal position the external snap rings (1).

Tightening torque	Rear bearing support mounting screw	7T screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
		UBS screw	126 to 147 N·m 13.0 to 15.0 kgf·m 94.0 to 108 ft-lbs

(1) External Snap Ring
(2) Rear Bearing Support
(3) Bearing Retainer

12260S30320

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SERVICING

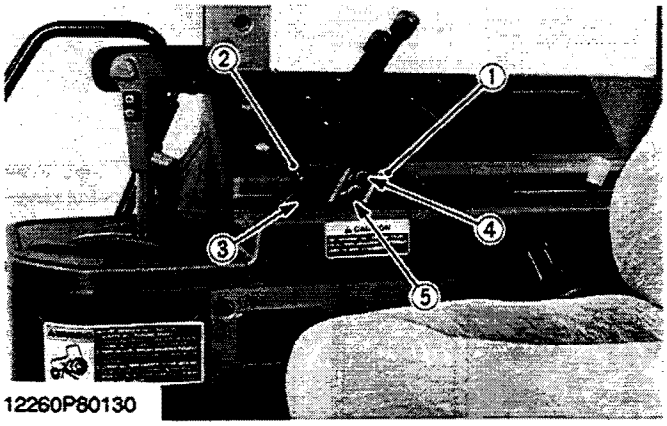
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(3) Control Outline



12260P80130



12260P00120

■ Draft Control

An attachment is moved up and down automatically according to the traction force. In this way, a constant traction load that is preset with the hydrualic control lever is maintained. The draft ratio adjustment dial, on the other hand, is used to adjust the attachment's movement with the changing traction force.

■ Position Control

The hydraulic control lever is used to hold the attachment in any level.

■ 3-point hitch lowering lock function

The lowering lock mechanism is activated if the lower link is in a position different from the hydraulic control lever setting and any of the following actions is made.

- Getting the engine started.
- Operating the remote hitch Up / Down switch.
- Operating the mode selector switch.

■ 3-point Hitch Quick Raise / Lower Control

Just a touch on the switch enables moving up and down the attachment. The attachment can come down to the bottom limit preset with the hydraulic control lever and go up to the top limit preset with the lift arm top limit

(1) Contron Panel
(2) Hydraulic Control Lever
(3) Mode Selector Switch
(4) 3-point Quick Raise Switch
(5) 3-point Quick Lower Switch
(6) Remote Hitch Up / Down Switch

12260M80040

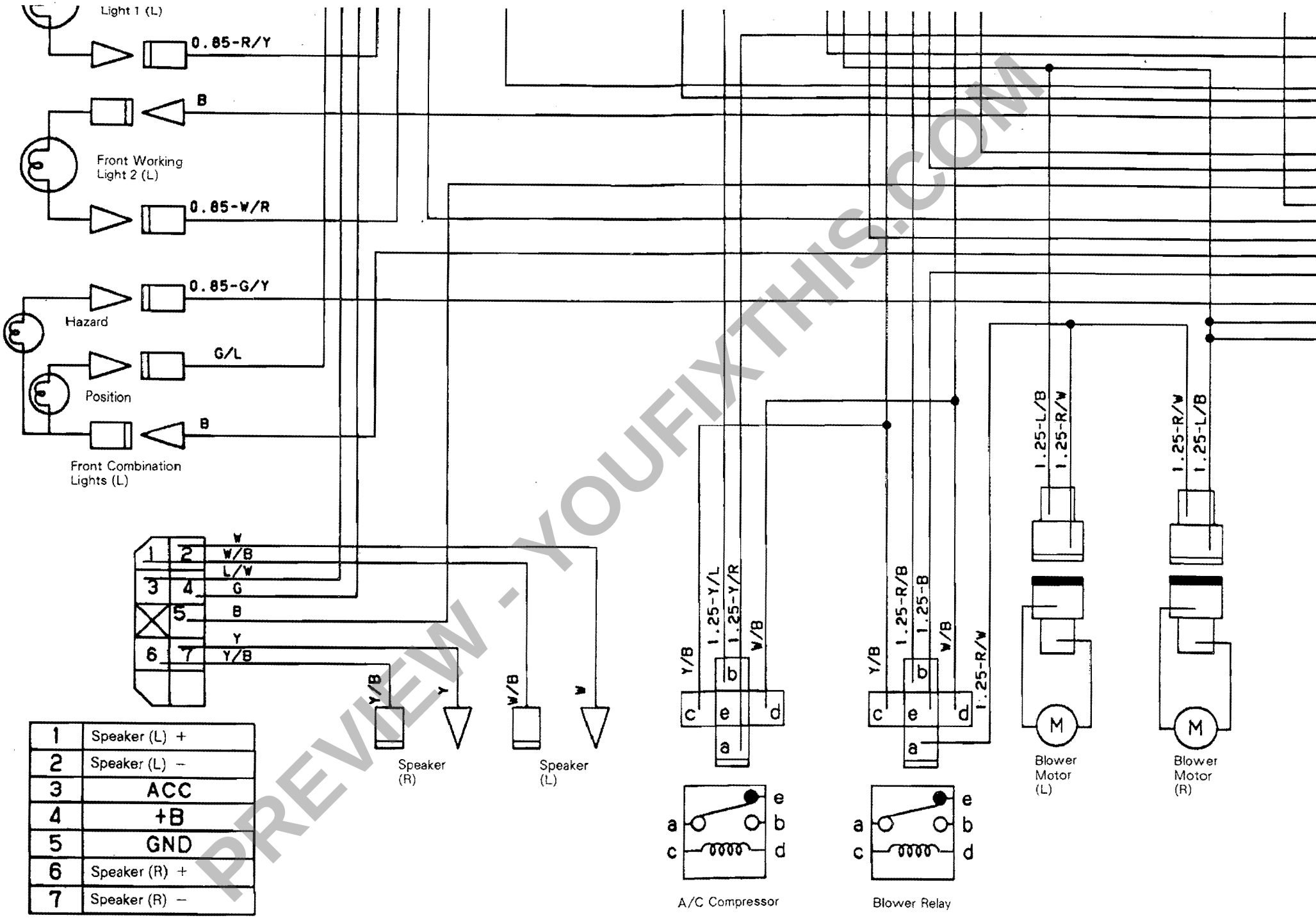
The basic control functions, auxiliary control functions listed below are standard equipment.

- Forced Floating Control
- Lift arm Top Limit Control
- Attachment Lowering Speed Adjustment Control
- Shockless Control
- Fine Adjustment Control
- Fail-safe Control

12260M80050

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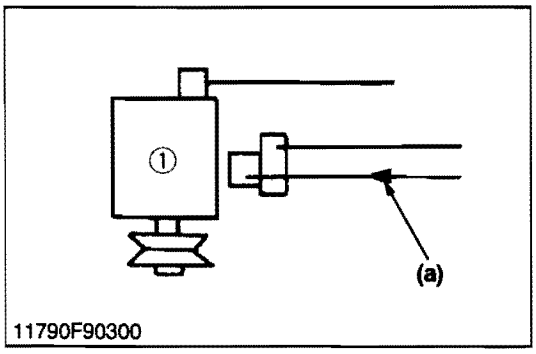
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1	Speaker (L) +
2	Speaker (L) −
3	ACC
4	+B
5	GND
6	Speaker (R) +
7	Speaker (R) −

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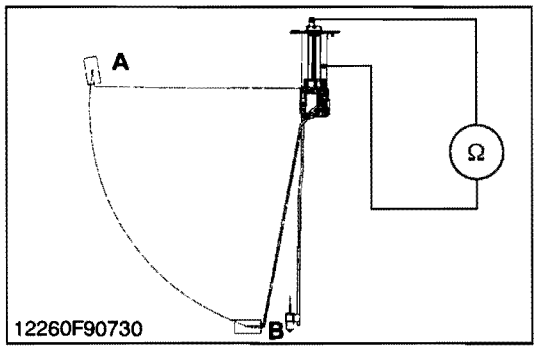
Charging Circuit (Panel Board and Wiring Harness)

1. Disconnect the **2P** connector from the alternator after turning the main switch **OFF**.
2. Turn the main switch **ON** and connect a jumper lead from the wiring harness connector terminal (**WG**) to the chassis.
3. If the charge lamp does not light, the panel board circuit, alternator, wiring harness, or fuse is fault.

(1) Alternator **(a) From Charge Lamp**

12260S90800

[7] GAUGES
CHECKING



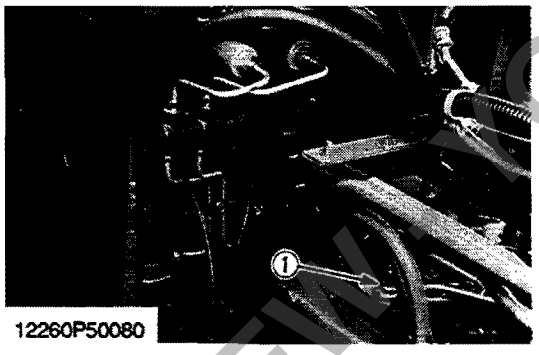
12260F90730

Fuel Level Sensor Continuity

1. Remove the fuel level sensor from the fuel tank.
2. Measure the resistance with an ohmmeter across the sensor terminal (**Y**) and its body.
3. If the measurement are not indicated, the sensor is faulty.

Resistance (Sensor terminal - Its body)	Factory spec.	Float at uppermost position **A**	1 to 5 ohms
		Float at lowermost position **B**	108 to 112 ohms

12260S90810



12260P50080

Coolant Temperature Sensor Continuity

1. Measure the resistance with an ohmmeter across the sensor terminal and the chassis.
2. If the measurement is not indicated, the sensor is faulty.

Resistance (Sensor terminal - Chassis)	Factory spec.	Approx. 16 ohms at 120 °C (248 °F) Approx. 50 ohms at 80 °C (176 °F) Approx. 149 ohms at 50 °C (122 °F)

(1) Coolant Temperature Sensor

12260S90820

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