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SAFETY FIRST

1. 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 try 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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SPECIFICATIONS

1. Wheel model

1.1 Specification table (ROPS model)

Model			M5N-091	M5N-111
			4WD	
Engine	Model		V3800-TIEF4	
	Type		Direct injection, water-cooled 4 cycle diesel, common rail system, turbocharger, intercooler	
	Number of cylinders		4	
	Total displacement		3769 cm^3 (230 cu.in.)	
	Bore and stroke		100 × 120 mm (3.9 × 4.7 in.)	
	Rated revolution		2400 min^{-1} (rpm)	
	Low idling revolution		800 to 850 min^{-1} (rpm)	
	Rated engine HP (97/68/EC)		69.1 kW (92.6 HP)	78.8 kW (105.7 HP)
	Net power*1		64.7 kW (8 P)	74.4 kW (99.8 HP)
	PTO power*1 (Factory observed)		[without DS] 58.1 kW (78 HP) [with DS] 55.9 kW (75 HP)	[without DS] 67.9 kW (91 HP) [with DS] 65.6 kW (88 HP)
	Maximum torque		307 N·m (31.3 kgf·m, 226 lbf·ft) / 1500 min^{-1} (rpm)	345 N·m (35.2 kgf·m, 254 lbf·ft) / 1500 min^{-1} (rpm)
	Battery capacity		12 V, RC: 160 min, CCA 900 A	
	Fuel tank capacity		76 L (20.1 U.S.gals, 16.7 Imp.gals)	
	Engine oil capacity		10.7 L (11.3 U.S.qts, 9.4 Imp.qts)	
	Coolant capacity		10.0 L (10.6 U.S.qts, 8.8 Imp.qts)	
	DEF/AdBlue® capacity		12.3 L (3.2 U.S.gals, 2.7 Imp.gals)	
Dimensions	Overall length		3950 mm (155.5 in.)	
	Overall width (Minimum tread)		1360 mm (53.5 in.)	
	Overall height		2529 mm (99.6 in.)	
	Wheel base		2130 mm (83.9 in.)	
	Tread	Front	1100 mm (43.3 in.)	
		Rear	945 to 1385 mm (37.2 to 54.5 in.)	
	Minimum ground clearance		290 mm (11.4 in.) (Drawbar bracket)	
Weight			2430 kg (5357 lbs)	
Traveling system	Standard tire size	Front tires	8-16	
		Rear tires*2	12.4-24	
	Clutch		Multiple wet disc, electronic hydraulically operated	
	Steering		Hydraulic power steering	
	Braking system		Hydraulically operated wet disc	
	Differential		Bevel gears with differential lock (Rear)	
Hydraulic unit	Hydraulic control system		Position, draft (top link sensing) and mix control	
	Pump capacity		63.3 L (16.7 U.S.gals, 13.9 Imp.gals) / min	
	3-point hitch		Category 2	

(Continued)

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LUBRICANTS, FUEL AND COOLANT

1. Wheel model

1.1 Lubricants, fuel and coolant

No.	Locations	Capacities		Lubricants	
		M5N-091	M5N-111		
1	Fuel	76 L 20.1 U.S.gals 17 Imp.gals		No. 2-D S15 diesel fuel No. 1-D S15 diesel fuel if temperature is below -10 °C (14 °F)	
2	DEF/AdBlue®	12.3 L 3.2 U.S.gals 2.71 Imp.gals			
3	Coolant	10 L 11 U.S.qts 8.8 Imp.qts		Fresh clean soft water with anti-freeze	
	Recovery tank	1.0 L 1.1 U.S.qts 0.88 Imp.qts			
4	Washer liquid	2 L 2.1 U.S.qts 1.8 Imp.qts		Automobile washer liquid	
5	Engine crankcase (with filter)	10.7 L 11.3 U.S.qts 9.41 Imp.qts		**Engine oil:** API Service Classification	CJ-4 [DPF type engine]
				Above 25 °C (77 °F)	SAE30, SAE10W-30 or 15W-40
				-10 to 25 °C (14 to 77 °F)	SAE10W-30 or 15W-40
				Below -10 °C (14 °F)	SAE10W-30
6	Transmission case	52 L 54.9 U.S.qts 45.8 Imp.qts		KUBOTA SUPER UDT2 fluid*	
7	Front differential case oil [4WD]	5 L 5.3 U.S.qts 4.4 Imp.qts		KUBOTA SUPER UDT2 fluid* or SAE 80 - SAE 90 gear oil	
8	Front axle gear case oil [4WD]	3 L 3.2 U.S.qts 2.6 Imp.qts			
9	**Greasing**	**No. of greasing points**		**Capacity**	**Type of grease**
	Top link	2		Until grease overflows.	Multipurpose grease NLGI-2 or NLGI-1 (GC-LB)
	Top link bracket	2			
	Lift rod	2			
	Hydraulic lift cylinder pin	4			
	Front axle gear case support [4WD]	2			
	Front axle support	2			

(Continued)

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MAINTENANCE

1. Service intervals

1.1 Wheel model

1.1.1 Service intervals

	Interval	Items		Reference page		
A	Initial 50 Hr	Engine oil	Change	2-43		
		Engine oil filter	Replace	2-44		
B	Every 50 Hr	Engine start system	Check	2-44		
		Wheel bolt torque	Check	2-45		
		Tie-rod dust cover	Check	2-46		
C	Every 100 Hr	Greasing	—	2-46		
		Air cleaner primary element	Clean	2-47	*1	
		Fan belt	Adjust	2-48		
		Brake pedal	Adjust	2-48		
		Parking brake	Check	2-50		
		Battery condition	Check	2-50	*6	
		Air conditioner drive belt	Adjust	2-51		
D	Every 200 Hr	Toe-in	Adjust	2-51		
		Fuel tank water	Drain	2-52		
		Inner air filter	Clean	2-52		
		Fresh air filter	Clean	2-53		
E	Every 400 Hr	Water separator	Clean	2-53		
		Fuel solenoid pump	Clean	2-54		
F	Every 500 Hr	Engine oil	Change	2-54		
		Engine oil filter	Replace	2-44		
		Fuel filter	Replace	2-55		
		Hydraulic oil filter	Replace	2-56		
		Lift cylinder hose	Check	2-56	*5	
		Power steering oil line	Check	2-57	*5	
		Radiator hose and clamp	Check	2-57	*5	
		Fuel line	Check	2-58	*5	
		Intake air line	Check	2-58	*5	
		Brake hose	Check	2-59		
		Air conditioner pipes and hoses	Check	2-59	*5	
G	Every 600 Hr	Front axle pivot	Adjust	2-59		
H	Every 1000 Hr	Transmission fluid	Change	2-59		
		Front differential case oil	Change	2-60		

(Continued)

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TIGHTENING TORQUES

1. General use screws, bolts and nuts

Indication on top of bolt				4 No-grade or 4T		
Indication on top of nut				04 No-grade or 4T		
Material of opponent part	Ordinariness			Aluminum		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5
M8	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14
M10	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25
M12	63 to 72	6.4 to 7.4	47 to 53	–	–	–
M14	108 to 125	11.0 to 12.8	79.6 to 92.5	–	–	–
M16	167 to 191	17.0 to 19.5	123 to 141	–	–	–
M18	246 to 284	25.0 to 29.0	181 to 209	–	–	–
M20	334 to 392	34.0 to 40.0	246 to 289	–	–	–

Indication on top of bolt				7 7T		
Indication on top of nut				04 No-grade or 4T		
Material of opponent part	Ordinariness			Aluminum		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5
M8	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15
M10	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32
M12	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53
M14	124 to 147	12.6 to 15.0	91.2 to 108	–	–	–
M16	197 to 225	20.0 to 23.0	145 to 166	–	–	–
M18	275 to 318	28.0 to 32.5	203 to 235	–	–	–
M20	368 to 431	37.5 to 44.0	272 to 318	–	–	–

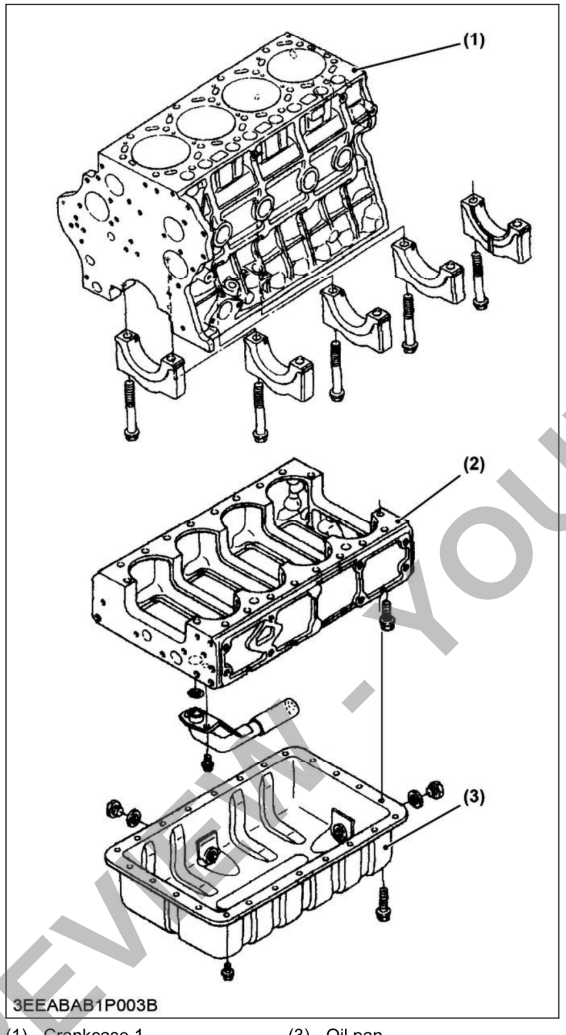
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MECHANISM

1. Engine

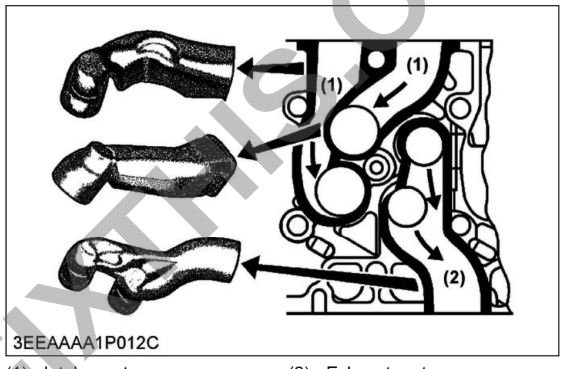
1.1 Feature of cylinder block



(1) Crankcase 1
(2) Crankcase 2
(3) Oil pan

The engine uses a split crankcase to produce greater durability and operate more quietly; the crankcase is split into two parts, crankcase 1 (1), which houses the parts for combustion and crankcase 2 (2), which completes crankcase 1 and produces low-noise.
It uses a hanger type of crankshaft support which allows for easy dis/assembly and the lining of the cylinder is a linerless type, which offers good cooling performance and excellent resistance to wear as it is little affected by distortion.

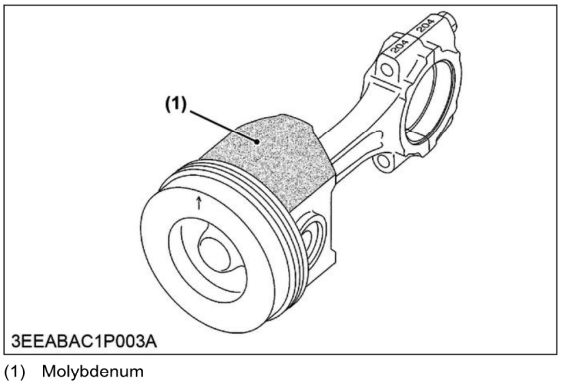
1.2 Feature of cylinder head



(1) Intake port
(2) Exhaust port

We have improved the helical shaped 2-valve, 2-stage ports in order to generate an ideal swirl and intake air inertia at the intake port and to gain a greater amount of air for the air/fuel mixture.

1.3 Feature of piston



(1) Molybdenum

The piston skirt has a disulfide molybdenum coating (1), to improve the fit of the piston with the cylinder and to prevent scorching.

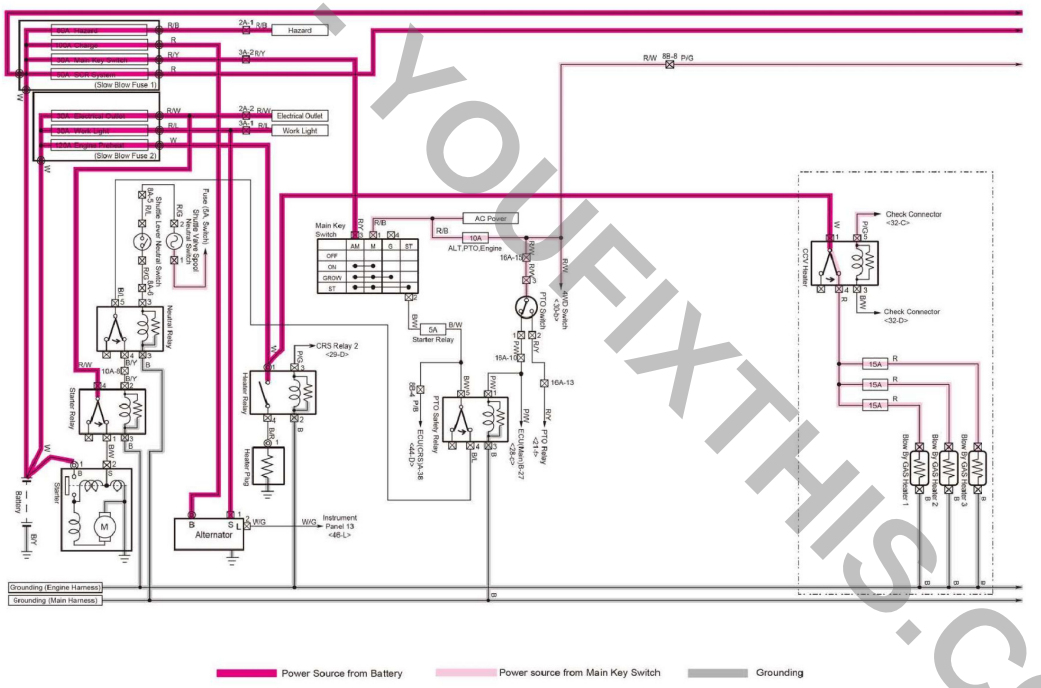
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MECHANISM

1. Electrical circuit related chart and connectors

1.1 ROPS model

1.1.1 Starting system and charging system (ROPS model)

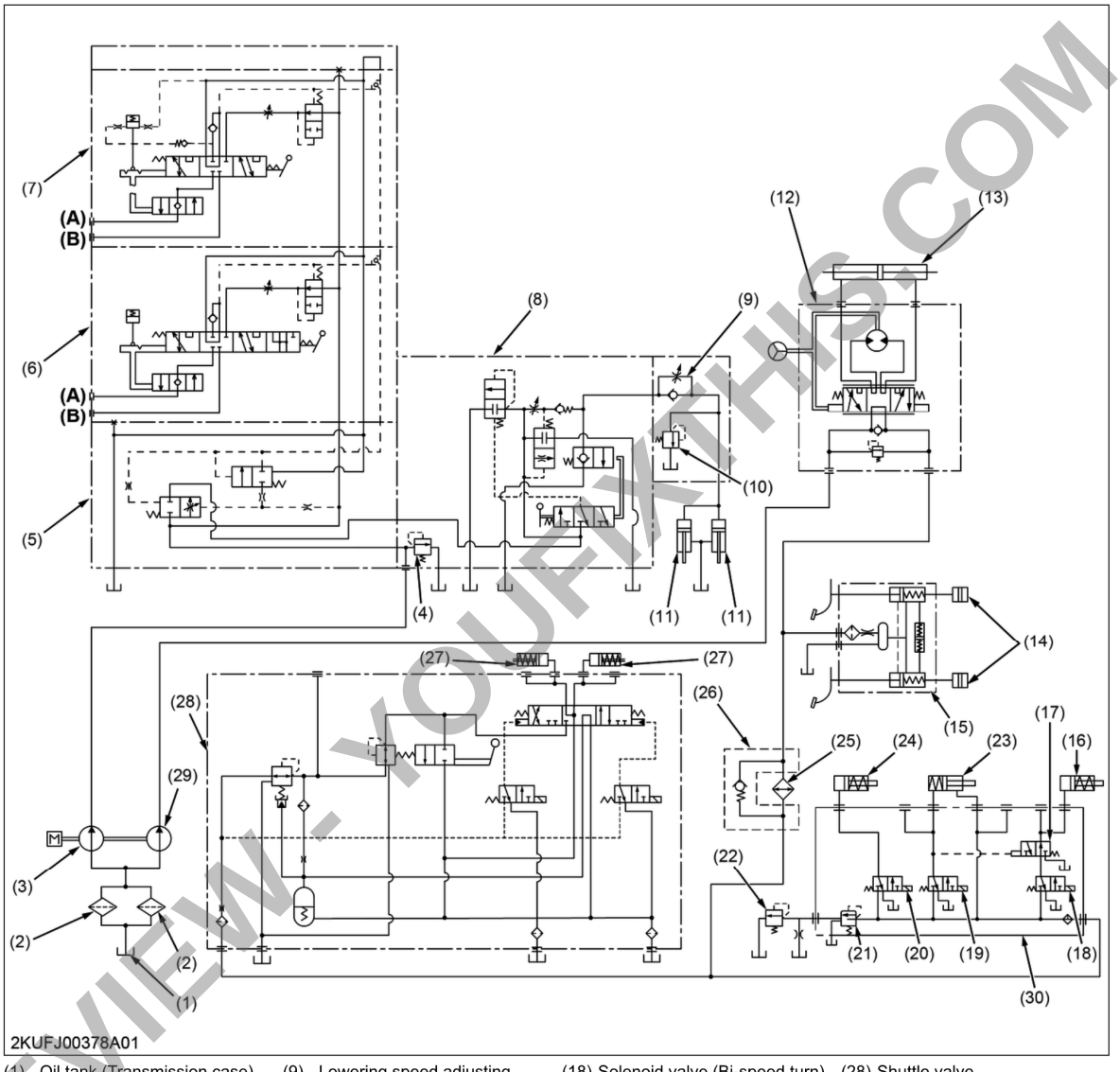


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3. Hydraulic circuit

3.1 Hydraulic circuit of F12/R12 speed transmission model



(1) Oil tank (Transmission case)
(2) Transmission oil filter
(3) Hydraulic pump (3-point hitch and auxiliary control valve)
(4) Relief valve (3-point hitch and auxiliary control valve)
(5) Inlet valve
(6) Auxiliary control valve (FD)
(7) Auxiliary control valve (SCD)
(8) Control valve (3-point hitch)
(9) Lowering speed adjusting valve
(10) Cylinder safety valve
(11) Exterior hydraulic cylinder
(12) Power steering controller
(13) Steering cylinder
(14) Brake piston
(15) Brake master cylinder
(16) Bi-speed turn clutch pack
(17) Priority valve
(18) Solenoid valve (Bi-speed turn)
(19) Solenoid valve (4WD)
(20) Solenoid valve (PTO)
(21) Relief valve for system
(22) Relief valve
(23) 4WD clutch pack
(24) PTO clutch pack
(25) Oil cooler
(26) Oil cooler check valve
(27) Shuttle clutch pack
(28) Shuttle valve
(29) Hydraulic pump (power steering, PTO clutch, 4WD clutch, Bi-speed turn clutch and shuttle clutch)
(30) Solenoid valve assembly
(A) To implement cylinder
(B) To implement cylinder

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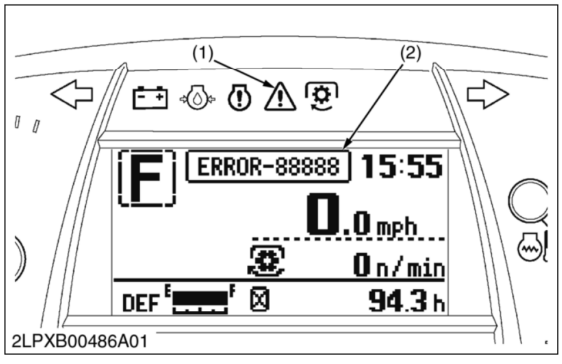
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4.1.7.2 ERROR mode of LCD monitor

■ IMPORTANT

- **This error codes are the error which corresponds to the tractor ECU. DTC codes are not displayed on the meter panel.**

If something is wrong with the power train, the master system warning indicator starts blinking and the error code shown below is displayed on the liquid crystal display, indicating the location of the trouble.



(1) Master system warning indicator (2) Error code

1. When the error code is displayed, do the decided procedures.
2. After doing the procedure, there is no error code on the meter panel.

Error code

Error code	Problem description	DTC set parameter	System reaction	Remark
ERROR-1	Acceleration sensor (main) trouble	Sensor voltage ≦ 0.2 V or 4.9 V ≦ sensor voltage	Engine idling	—
ERROR-2	Acceleration sensor (sub) trouble	Sensor voltage ≦ 0.2 V or 4.9 V ≦ sensor voltage	Engine idling	—
ERROR-3	Acceleration sensor main/sub phase shifting trouble	Sum of sensor voltage < 3.85 V or 6.14 V ≦ sum of sensor voltage	Engine idling	—
ERROR-4	Shuttle lever sensor (main) trouble	Sensor voltage ≦ 0.2 V or 4.9 V ≦ sensor voltage	Cannot drive	—
ERROR-5	Shuttle lever sensor (sub) trouble	Sensor voltage ≦ 0.2 V or 4.9 V ≦ sensor voltage	Cannot drive	—
ERROR-6	Shuttle sensor main/sub phase shifting trouble	Sum of sensor voltage < 3.85 V or 6.14 V ≦ sum of sensor voltage	Cannot drive	—
ERROR-7	Shuttle sensor signal trouble	Although shuttle lever sensor is F/R position, shuttle lever neutral switch is on.	Cannot drive	—
ERROR-8	Gear lock signal trouble	Open circuit or short circuit	—	—
ERROR-11	PTO relay trouble	Open circuit or short circuit	Unavailable PTO	—
ERROR-12	4-wheel-drive solenoid trouble	Open circuit or short circuit	Unavailable 4WD	—
ERROR-14	Shuttle forward solenoid trouble	Open circuit or short circuit	Cannot drive	—
ERROR-15	Shuttle reverse solenoid trouble	Open circuit or short circuit	Cannot drive	—
ERROR-21	Range gear shift (Hi) switch trouble	Switch status and estimate shift is different	Engine maximum speed is limited.	—

(Continued)

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SERVICING

1. Troubleshooting for engine

This troubleshooting shows only mechanical failures.

Symptom	Probable cause and checking procedure	Solution	Reference page
The engine does not start	1. No fuel	Fill up the fuel	—
	2. Air in the fuel system	Bleed the air	—
	3. Water in the fuel system	Change the fuel and repair or replace the fuel system	2-74
	4. The fuel pump is damaged	Replace	—
	5. The fuel hose is clogged	Clean or replace	2-74
	6. The fuel filter is clogged	Replace	2-55
	7. The viscosity of fuel at low temperature is too high	Replace the specified fuel	2-17 2-21
	8. The cetane number of fuel is low	Replace the specified fuel	2-17 2-21
	9. Fuel leakage because of loose injection pipe retaining nut	Tighten the retaining nut	3-88
	10. The injector is clogged	Replace	3-93
	11. The supply pump is damaged	Replace	3-99
	12. Seizure of the crankshaft, camshaft, piston or bearing	Repair or replace	—
	13. Compression leakage from the cylinder	Replace the head gasket Tighten the cylinder head screw	3-96 3-97
	14. Incorrect valve timing	Check the timing gear	3-103
	15. Piston ring and cylinder are worn out	Replace	3-106 3-107
	16. Incorrect valve clearance	Adjust valve clearance	2-62
The starter does not operate	1. Discharged battery	Charge or replace	—
	2. Starter is damaged	Repair or replace	10-92
	3. The key switch is damaged	Replace	—
	4. The connection of the wires is incorrect	Check or correct	—
The engine revolution is not smooth	1. The fuel filter is clogged	Replace	2-55
	2. The air cleaner is clogged	Clean or replace the air cleaner element	2-63

(Continued)

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RECORD OF REVISIONS

For pdf, use search function [Search word] to find all the revised locations.

Last digit of the code No.	Month of revision	Main revised point and corrective measure [Search word]	Reference page
1	2016 10	M5N-091-PC model is added.	–
2	2017 06	• Due to add the information of ROPS model. • Due to correct error.	–
3	2019 01	• Wrong correction The procedure of disassembling and assembling of flywheel housing was corrected.	3-37 3-110 3-112
		• Wrong correction Checking procedure of the intake throttle valve was corrected.	10-134 10-134
4	2019 11	Changed the topic of "Removing control valve".	9-63
5	2020 07	Adding information how to handling DEF/AdBlue®.	2-21
		Adding information about outline of the SCR system	3-18
		Change the information about the DEF/AdBlue® fluid level warning indicator criteria. • Before: 15 % • Now: 40 %	3-26 10-27
		Adding information about DEF header unit replacing tool	2-149
		Adding information about how to replace engine parts.	3-132
		Change and adding some maintenance items about DEF/AdBlue®.	2-35 2-38 2-41 2-70 2-70
6	2020 12	Changing the topic of "Safety decals".	1-7
		Correction of dimensional error and tightening torque of supply pump gear mounting nut.	3-37 3-99
7	2021 12	The procedure of “Changing front axle gear case oil and front differential case oil” was corrected.	2-60 2-102

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3. Hydraulic fitting

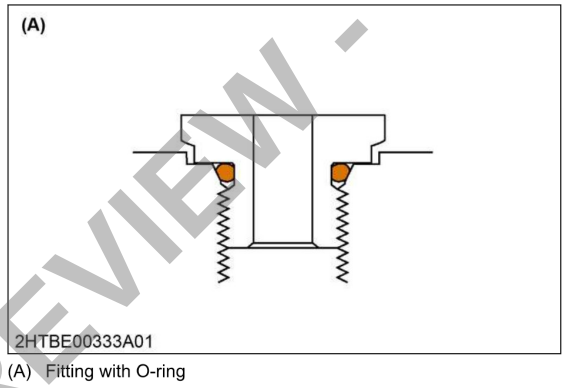
3.1 Hydraulic hose fittings

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

3.2 Hydraulic pipe cap nuts

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

3.3 Adapters, elbows and others

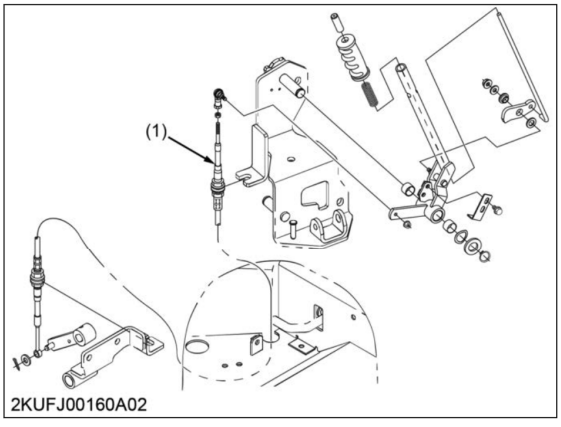


(A) Fitting with O-ring

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1. Remove parking brake cable (1).



(1) Parking brake cable

IMPORTANT

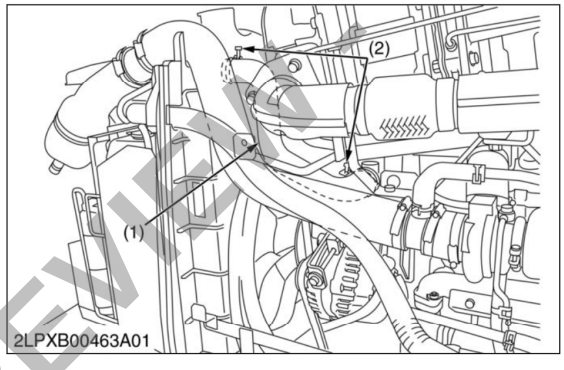
- **Be sure to adjust the parking brake cable after replacing the parking brake cable.**

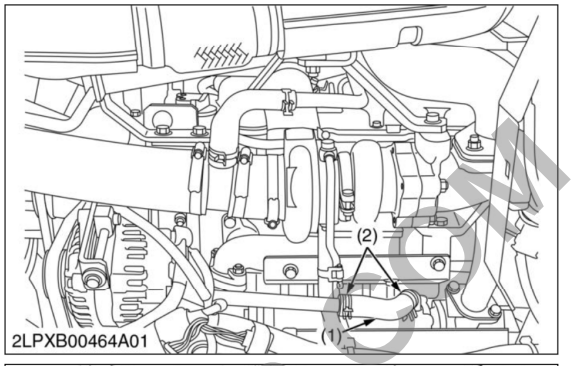
2.1.17 Check point of every 4 years

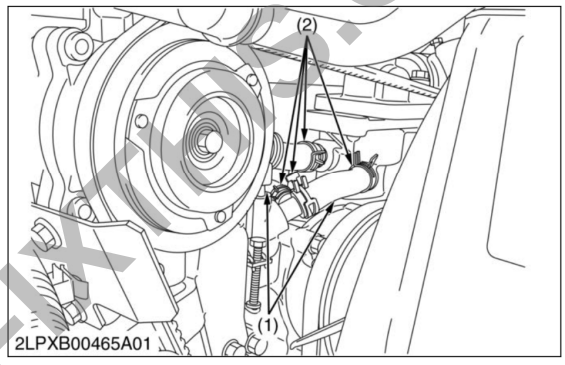
2.1.17.1 Replacing radiator hose (Water pipes)

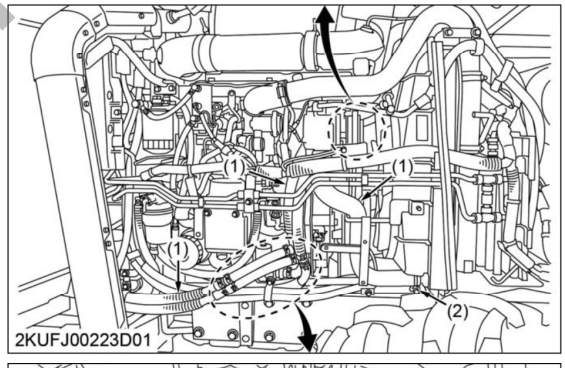
CAUTION

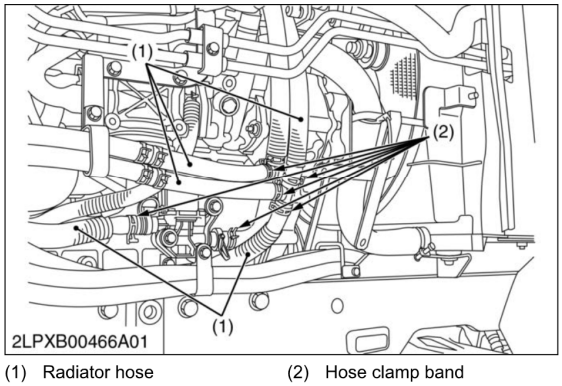
- **Do not remove the radiator cap when the engine is hot. Then loosen the cap slightly to release unwanted pressure before you remove the cap fully.**









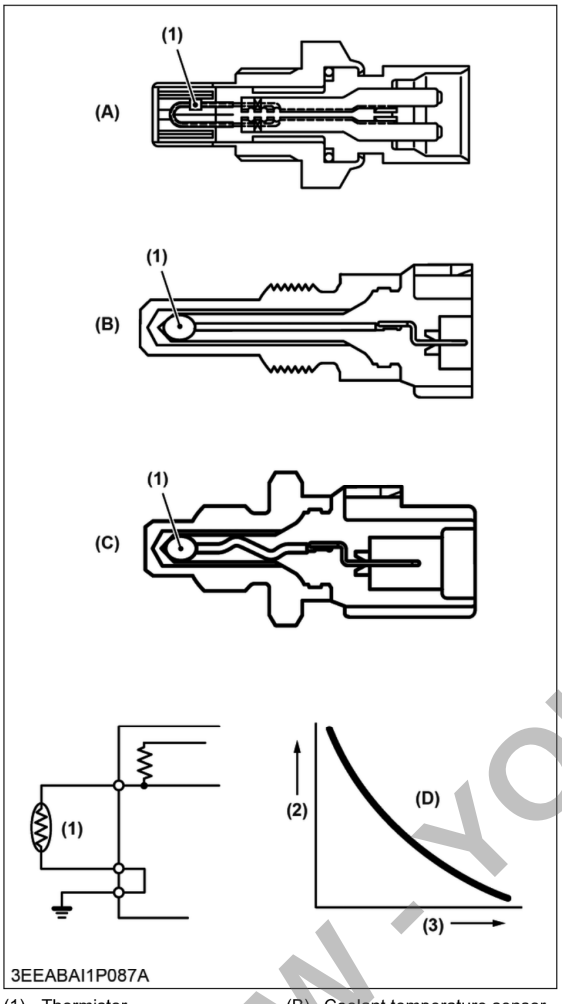


(1) Radiator hose (2) Hose clamp band

1. Drain the coolant.
2. Loosen the clamp bands (2).

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4.5.5 Function of temperature sensors



(1) Thermistor
(2) Resistance
(3) Temperature
(A) Intake air temperature sensor
(B) Coolant temperature sensor
(C) Fuel temperature sensor
(D) Thermistor temperature curve

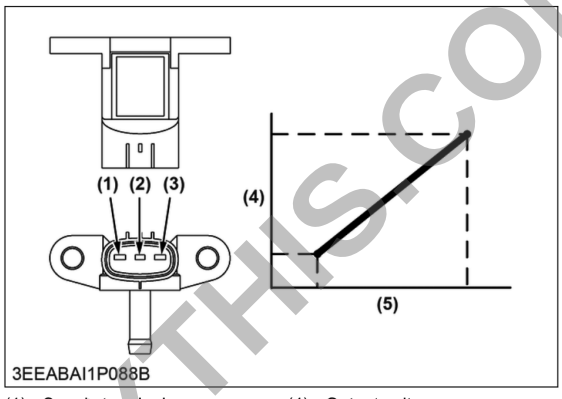
These sensors use thermistors to detect temperature.
A characteristic of thermistors is that their electrical resistance varies with temperature, and this characteristic is used by the different sensors to detect temperature via voltage.

(A) Intake air temperature sensor
The intake air temperature sensor (A) measures the intake temperature after it passes through the turbocharger.

(B) Coolant temperature sensor
The coolant temperature sensor (B) is mounted on the cylinder head and detects the temperature of the coolant.

(C) Fuel temperature sensor
The fuel temperature sensor (C) is mounted on the fuel intake side of the supply pump and detects the temperature of the fuel.

4.5.6 Function of boost sensor



(1) Supply terminal
(2) Output terminal
(3) Ground terminal
(4) Output voltage
(5) Intake air pressure

The boost sensor is a semiconductor pressure sensor and when there are changes in the pressure on the silicon element inside the sensor, its electrical resistance changes and this piezo resistance effect is used to detect pressure using voltage.
The boost sensor measures the intake air pressure after it passes through the turbocharger.

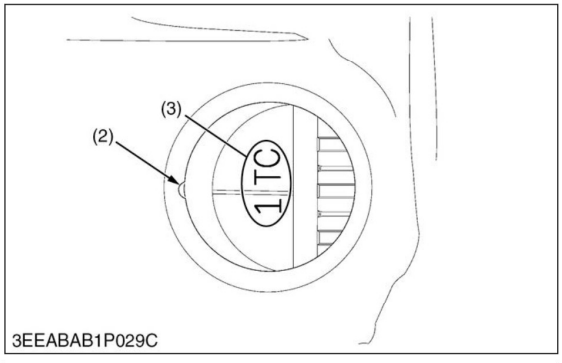
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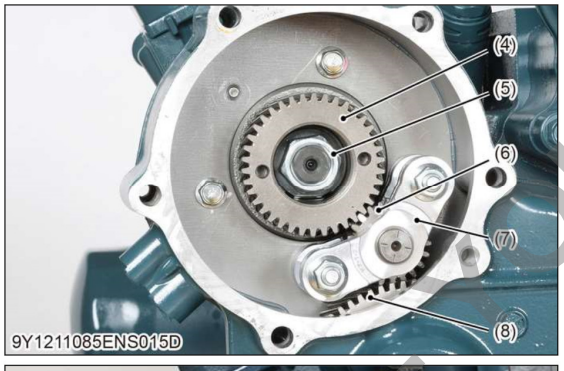
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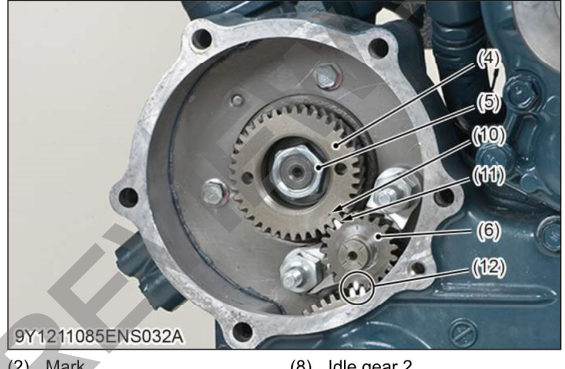
7. Make a temporary mark 1 (12) with a white paint marker pen on the tooth of idle gear 3 (6) and idle gear 2 (8) or idle gear 1 (9).

■ NOTE

- **This mark is extremely useful during reassembly of the supply pump gear and idle gear 3 (6) to get the timing right.**







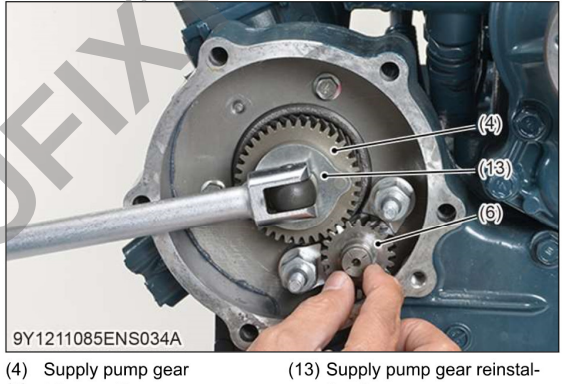
(2) Mark
(3) TC mark
(4) Supply pump gear
(5) Supply pump gear mounting nut
(6) Idle gear 3
(7) Idle gear 3 holder
(8) Idle gear 2
(9) Idle gear 1
(10) Timing mark
(11) Temporary mark
(12) Temporary mark 1

8. Set the supply pump gear reinstalling jig (13).



(13) Supply pump gear reinstalling jig

9. Turn the supply pump gear (4) clockwise and counterclockwise until being able to remove the idle gear 3 (6).
10. Remove the supply pump gear mounting nut (5).



(4) Supply pump gear
(6) Idle gear 3
(13) Supply pump gear reinstalling jig

11. Set the gear puller (14).



(14) Gear puller

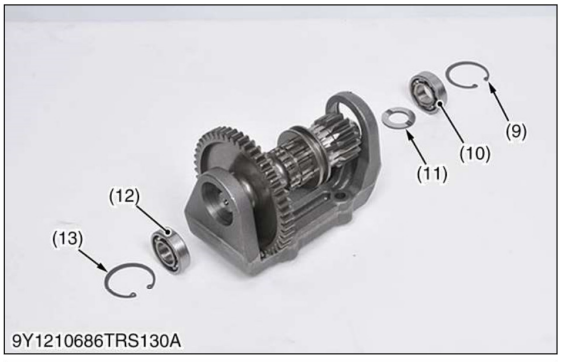
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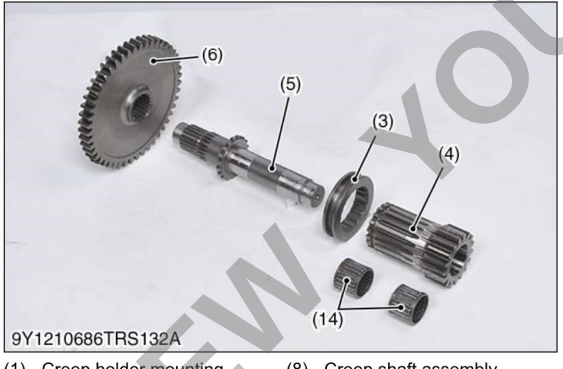
Item		Factory specification	Allowable limit
PTO piston	Flatness	—	0.15 mm 0.0059 in.
PTO steel plate	Flatness	—	0.30 mm 0.012 in.
PTO return spring	Free length	42.5 to 43.5 mm 1.68 to 1.71 in.	37.5 mm 1.48 in.
Seal ring	Thickness	2.4 to 2.5 mm 0.095 to 0.098 in.	2.0 mm 0.079 in.
Clutch disk	Thickness	2.1 to 2.3 mm 0.083 to 0.090 in.	1.9 mm 0.075 in.
Steel plate	Thickness	1.56 to 1.64 mm 0.0614 to 0.0646 in.	1.3 mm 0.051 in.
Pressure plate	Thickness	3.92 to 4.08 mm 0.155 to 0.160 in.	3.7 mm 0.15 in.
Piston	Flatness	—	0.15 mm 0.006 in.
Steel plate	Flatness	—	0.40 mm 0.016 in.
Pressure plate	Flatness	—	0.30 mm 0.012 in.
Seal ring	Thickness	2.39 to 2.44 mm 0.0941 to 0.0960 in.	2.0 mm 0.079 in.
18T bevel gear to 19T bevel gear	Backlash	0.15 to 0.30 mm 0.0059 to 0.011 in.	—
Spiral bevel pinion shaft only	Turning torque	3.2 to 3.6 N·m 0.32 to 0.37 kgf·m 2.4 to 2.6 lbf·ft	—
Spiral bevel gear to spiral bevel pinion shaft	Backlash	0.2 to 0.3 mm 0.008 to 0.01 in.	0.4 mm 0.02 in.
Differential case bore	I.D.	40.530 to 40.592 mm 1.5957 to 1.5981 in.	—
39T bevel gear bore	I.D.	40.54 to 40.58 mm 1.596 to 1.597 in.	—
Differential side gear boss	O.D.	40.411 to 40.450 mm 1.5910 to 1.5925 in.	—
Differential case bore to differential side gear boss	Clearance	0.0800 to 0.181 mm 0.00351 to 0.00712 in.	0.35 mm 0.014 in.
39T bevel gear bore to differential side gear boss	Clearance	0.0900 to 0.169 mm 0.00355 to 0.00665 in.	0.35 mm 0.014 in.
Differential pinion shaft	O.D.	20.060 to 20.081 mm 0.78977 to 0.79059 in.	—
Differential pinion	I.D.	19.959 to 19.980 mm 0.78579 to 0.78661 in.	—
Differential pinion shaft to differential pinion	Clearance	0.0800 to 0.122 mm 0.00315 to 0.00480 in.	0.25 mm 0.010 in.
Differential pinion to differential side gear	Backlash	0.15 to 0.30 mm 0.0059 to 0.011 in.	0.4 mm 0.02 in.
Differential lock shifter to differential case	Clearance	6.0 to 8.0 mm 0.236 to 0.315 in.	—

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(1) Creep holder mounting screw
(2) Creep holder
(3) Shifter
(4) 17T gear
(5) Creep shaft
(6) 48T gear
(7) Shift cover
(8) Creep shaft assembly
(9) Internal circlip 1
(10) Bearing 1
(11) Thrust collar
(12) Bearing 2
(13) Internal circlip 2
(14) Needle bearing

1. Remove the creep holder mounting screw (1) and the creep gear assembly.
2. Remove the internal circlips (9), (13) and the bearings (10), (12).
3. Slide the creep shaft (5) with 17T gear (4) to the side of 48T gear (6) and then remove the creep shaft with 17T gear (4) from the creep holder (2).
4. Disassemble the creep shaft with 17T gear (4).

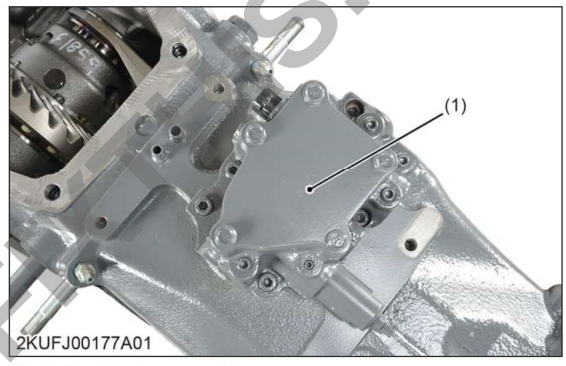
(When reassembling)
- Apply oil to needle bearings (14) and thrust collar (11).
- Replace the internal circlip (9), (13) with new one.

5.1.11 Disassembling transmission case

5.1.11.1 Removing solenoid valve assembly

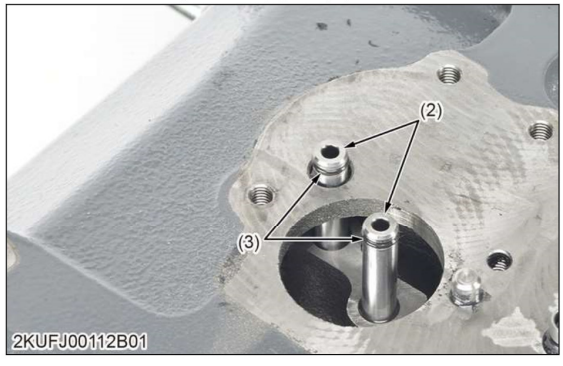
5.1.11.1.1 Removing solenoid valve and hydraulic pipe

1. Remove the solenoid valve assembly (1).



(1) Solenoid valve assembly

2. Remove the hydraulic pipes (2) for PTO clutch.



(When reassembling)
- Apply transmission fluid to O-ring (3).

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RELATED PAGE

2.15 Hydraulic clutch spring compressor on page 2-154

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- **Fill equalizer and master cylinder with transmission fluid when overhauling the master cylinder assembly.**

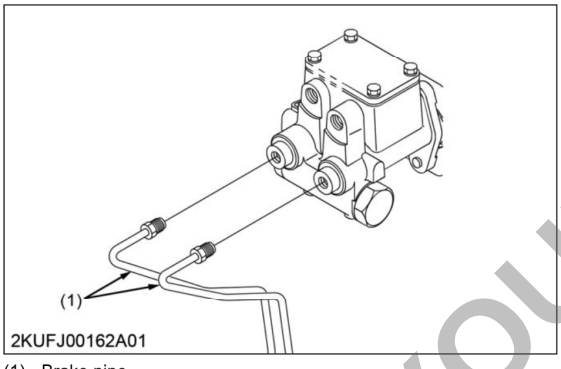
■ NOTE

- **While bleeding, operate the engine at low speed to keep enough oil in the master cylinder assembly.**

(Reference: Importance of bleeding)

- If air mixes in the brake hydraulic circuit, poor or no braking force is obtained due to air being compressed when the brake pedal is depressed. Whenever the hydraulic brake system is disassembled, be sure to bleed after reassembling.

1. Disconnect the brake pipes (1) from the master cylinder.



(1) Brake pipe

2. Move the brake pedal up and down by hand, closing the master cylinder outlet by a finger when raising the pedal and releasing the finger when lowering the pedal.
   Repeat this operation several times. (Prepare the oil can.)
3. After bleeding the master cylinder, install the front brake pipes.
4. After installing the vinyl pipe (2) to the bleeder, loosen the bleeder by turning it twice.



(2) Vinyl pipe

5. Move the brake pedal up and down.
   Repeat this motion until air bubble in brake oil disappears.

(When reassembling)

- After bleeding, tighten the bleeders firmly.
- Tighten the brake pipe retaining nut and the bleeder to the specified tightening torque.

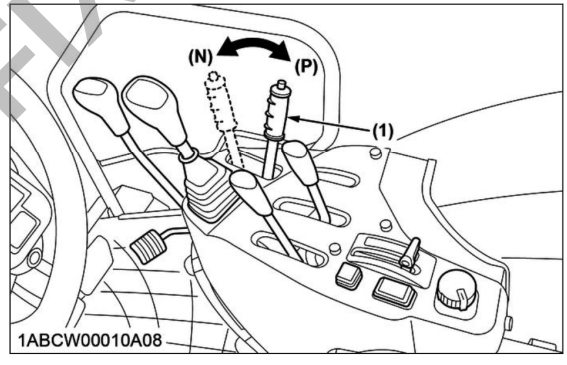
Tightening torque	Brake pipe retaining nut	20 to 28 N·m 2.1 to 2.8 kgf·m 15 to 20 lbf·ft
	Bleeder	6.5 to 6.9 N·m 0.66 to 0.70 kgf·m 4.8 to 5.0 lbf·ft

4.1.2 Parking brake

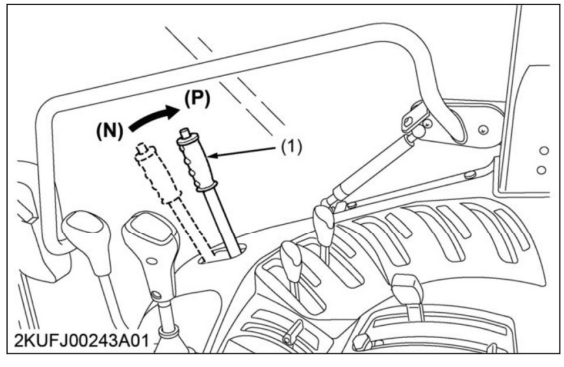
4.1.2.1 Checking gear locked parking brake lever

1. Check the gear locked parking brake lever (1) shifts to (P) position.

ROPS model



Cabin model



(1) Gear locked parking brake lever
(N) At parking brake "OFF" (Neutral position)
(P) At parking brake "ON"

2. If shifting is not smooth, adjust the gear locked parking brake lever (1).

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Fuel tank	Capacity	76 L 20 U.S.gals 17 Imp.gals

RELATED PAGE
1.1 Lubricants, fuel and coolant on page 2-17

4.2.1.2.1.1.3 Draining coolant

WARNING

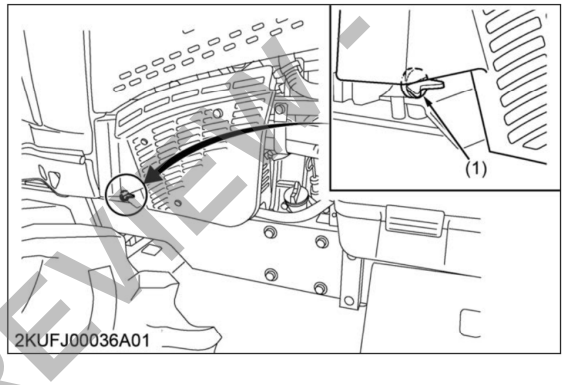
To avoid personal injury:

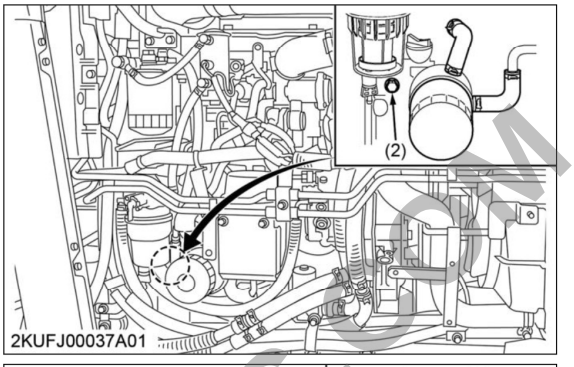
- **Do not remove radiator cap while coolant is hot. When cool, slowly rotate cap to the first stop and allow sufficient time for excess pressure to escape before removing the cap completely.**

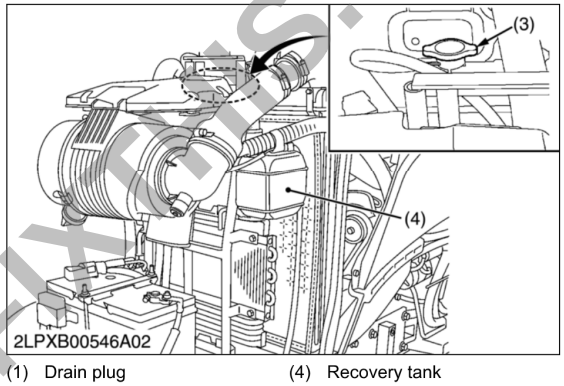
IMPORTANT

- **Do not start engine without coolant.**
- **Use clean, fresh soft water and anti-freeze to fill the radiator and recovery tank.**
- **When mixing the anti-freeze with water, the anti-freeze mixing ratio is 50%.**
- **Tighten radiator cap securely. If the cap is loose or improperly fitted, water may leak out and the engine could overheat.**

1. Stop the engine and let the engine cool down.
2. To drain the coolant, open the radiator drain plug (1), remove the drain plug and remove radiator cap (2). The radiator cap must be removed to completely drain the coolant.







(1) Drain plug
(2) Drain plug
(3) Radiator cap
(4) Recovery tank

3. After all coolant is drained, reinstall the drain plug (1).
4. Fill with coolant up to the **[FULL]** mark of recovery tank (3).

Coolant capacity	Radiator	10 L 11 U.S.qts 8.8 Imp.qts
	Recovery tank	1.0 L 1.1 U.S.qts 0.88 Imp.qts

5. Start and operate the engine for a few minutes.
6. Stop the engine, remove the key and let cool.
7. Check coolant level of recovery tank (3) and add coolant if necessary.
8. Properly dispose of used coolant.

RELATED PAGE
1.1 Lubricants, fuel and coolant on page 2-17

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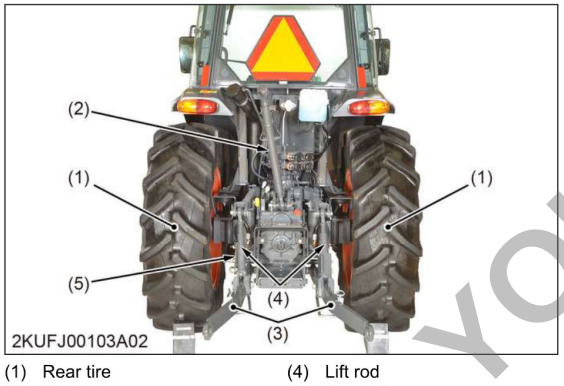
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Tightening torque	Top cover mounting screw (M14, 9T)	167 to 196 N·m 17.1 to 19.9 kgf·m 124 to 144 lbf·ft
	Top cover mounting nut (M14, 7T)	124 to 147 N·m 13.0 to 14.9 kgf·m 93.7 to 108 lbf·ft

5.2.2 Cabin model

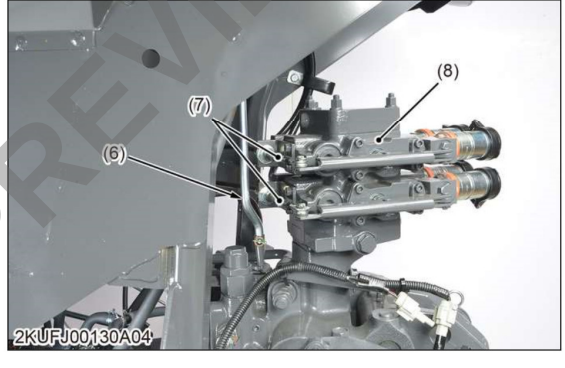
5.2.2.1 Preparing 1 for removing top cover (Cabin model)

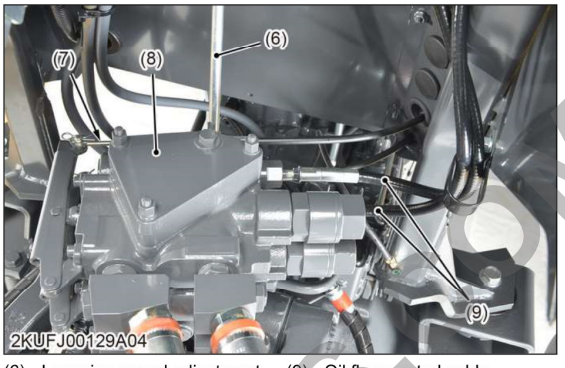
1. Park the tractor on a flat place.
2. Set the disassemble stand under the transmission and remove rear tires (1).
3. Remove the top link (2).
4. Remove both sides of brackets (5) to remove the lower links (3).
5. Remove the lower links (3) with lift rods (4).



(1) Rear tire
(2) Top link
(3) Lower link
(4) Lift rod
(5) Bracket

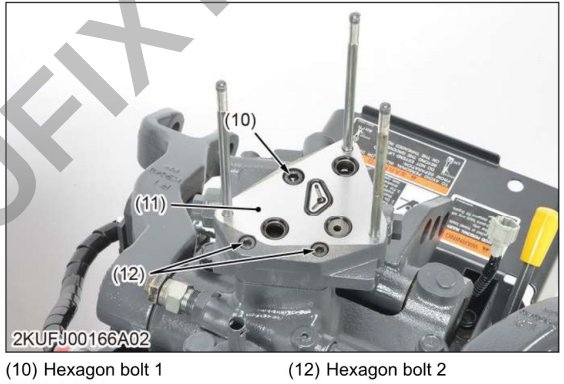
6. Disconnect the lowering speed adjustment shaft (6).
7. Disconnect the wire (7) for auxiliary control valve.
8. Disconnect the cable (9) for flow control of auxiliary control valve.
9. Remove the auxiliary control valve assembly (8).





(6) Lowering speed adjustment shaft
(7) Wire
(8) Auxiliary control valve assembly
(9) Oil flow control cable

10. Remove the hexagon bolts1 (10) and 2 (12).
11. Remove the inlet valve (11).



(10) Hexagon bolt 1
(11) Inlet valve
(12) Hexagon bolt 2

(When reassembling)

- Be sure to adjust the wire (7) of auxiliary control valve assembly (8).
- Be sure to adjust the oil flow control cable (9) of auxiliary control valve assembly (8).
- Be sure to fit the O-ring for auxiliary control valve.
- Tighten the inlet valve mounting hexagon bolt 1 (10) and 2 (12) to the specified tightening torque.
- Tighten the auxiliary control valve mounting nut (11) to the specified tightening torque.

Tightening torque	Inlet valve mounting hexagon bolt1 (M10, 7T)	48.1 to 55.9 N·m 4.91 to 5.70 kgf·m 35.5 to 41.2 lbf·ft
	Inlet valve mounting hexagon and 2 (M8, 7T)	23.5 to 27.5 N·m 2.40 to 2.80 kgf·m 17.4 to 20.2 lbf·ft
	Auxiliary control valve mounting nut	48.1 to 55.9 N·m 4.91 to 5.70 kgf·m 35.5 to 41.2 lbf·ft

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4.1.4 Mode [SEL]

4.1.4.1 Selecting tractor model "SEL-1"

Select the item number **[SEL-1]**.

ROPS model



(1) Mode selector switch (2) Select switch

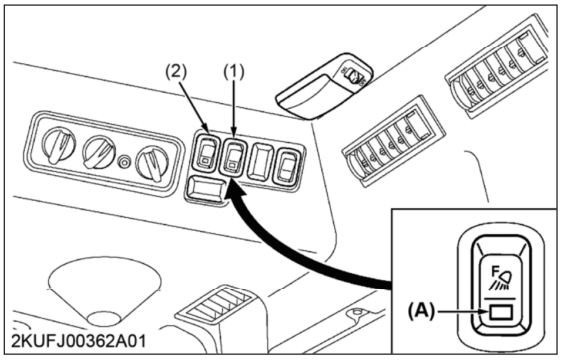
Cabin model

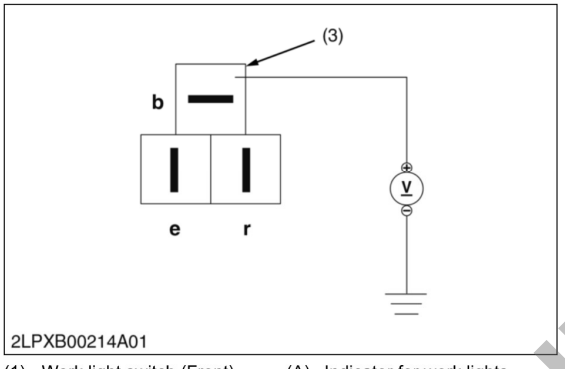


(1) Mode selector switch (2) Select switch

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(1) Work light switch (Front)
(2) Work light switch (Rear)
(3) 3P connector (Wire harness side)
(A) Indicator for work lights

1. Turn the main switch to on position.
2. Measure the voltage with a voltmeter across the terminal b and chassis.

Voltage	Terminal b - Chassis	Approximately battery voltage

3. If the voltage differs from the battery voltage, the wiring harness or fuse is damaged.

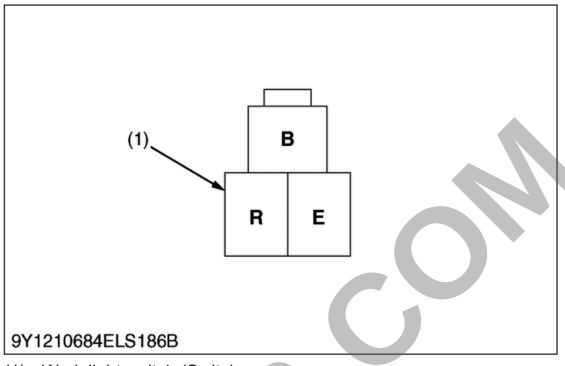
4.10.6.2 Checking work light switch (Cabin model)

1. Check the continuity across the terminals shown table below.

Position		Terminal		
		B	R	E
Work light switch	OFF		●	●
	ON	●	●	●

2LPXB00541A01

2. If the continuity specified below is not indicated, the switch is damaged.

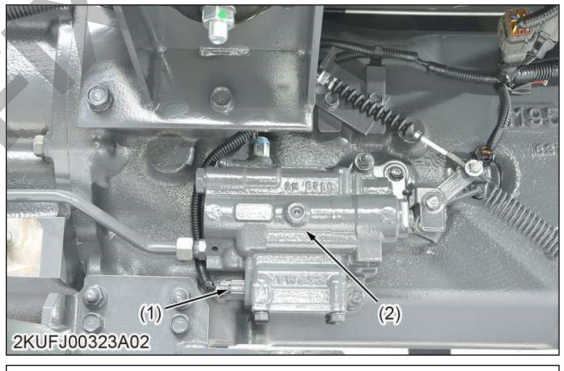


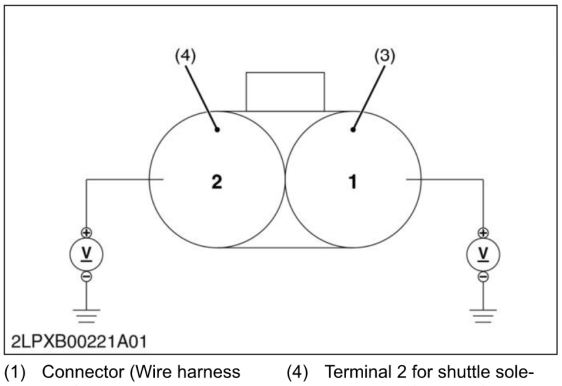
(1) Work light switch (Switch side)

4.11 Solenoid valve

4.11.1 Shuttle valve

4.11.1.1 Checking connector voltage for shuttle solenoid valve





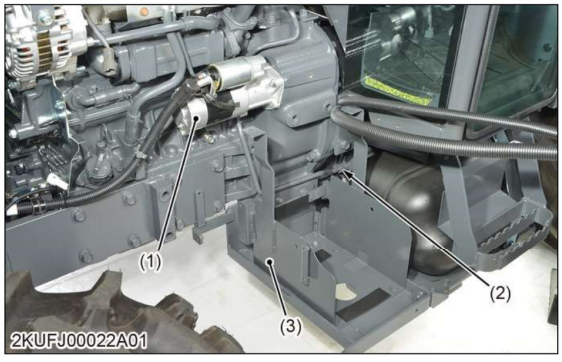
(1) Connector (Wire harness side)
(2) Shuttle valve assembly
(3) Terminal 1 for shuttle solenoid valve (Reverse)
(4) Terminal 2 for shuttle solenoid valve (Forward)

1. Remove the connector (1).
2. Turn on the main switch and shift the shuttle lever to Forward or Reverse position.

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3. Remove the clamp (4) and shuttle valve pipe (2).





(1) Starter motor
(2) Shuttle valve pipe
(3) DEF tank support
(4) Clamp

(When reassembling)

Tightening torque	Shuttle valve pipe retaining nut	49.1 to 68.6 N·m 5.00 to 7.00 kgf·m 36.2 to 50.6 lbf·ft

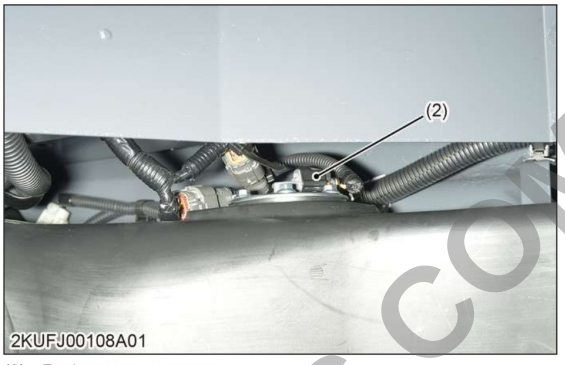
6.2.1.1.5.16 Removing fuel tank L.H.

1. Remove the step (1).



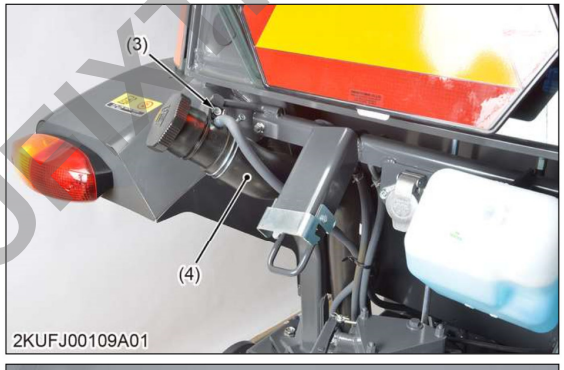
(1) Step

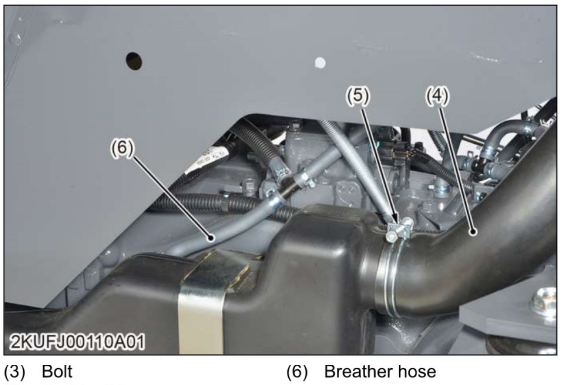
2. Disconnect the fuel sensor connector (2).



(2) Fuel sensor connector

3. Disconnect the breather hose (6).
4. Loosen the hose band (5).
5. Remove the bolt (3) of fuel tank hose (4).
6. Remove the fuel tank hose (4).





(3) Bolt
(4) Fuel tank hose
(5) Hose band
(6) Breather hose

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