TABLE OF CONTENTS

CHAPTER 1 SAFETY FIRST

CHAPTER 2 GENERAL

CHAPTER 3 ENGINE

CHAPTER 4 TRANSMISSION

CHAPTER 5 REAR AXLE

CHAPTER 6 BRAKE

CHAPTER 7 FRONT AXLE

CHAPTER 8 STEERING SYSTEM

CHAPTER 9 HYDRAULIC SYSTEM

CHAPTER 10 ELECTRIC SYSTEM & CALIBRATION

CHAPTER 11 CABIN

CHAPTER 12 AIR CONDITIONER & HEATER

CHAPTER 13 INDEX

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KIOTI

DX7510/9010/100 **SAFETY FIRST** CHAPTER 1

TABLE OF CONTENTS

1. FOR SAFETY 1-2

1.1 Alert symbols..... 1-2

2. SAFETY TIPS..... 1-3

2.1 Safety gear..... 1-3

2.2 Work place 1-3

2.2.1 Ventilating system..... 1-3

2.2.2 Safe working place 1-3

2.2.3 Illumination 1-3

2.2.4 Safety equipment..... 1-3

2.2.5 Clean working area..... 1-3

2.3 Safety instructions when preparing tractor 1-4

2.4 Avoid fires..... 1-4

2.5 Cautions when handling the battery..... 1-5

2.6 Cautions for high pressure hoses 1-5

2.7 Use of appropriate tools and equipment 1-6

2.8 Handling of hazardous materials..... 1-6

2.9 Handling of rotating blade, shaft and driving belt..... 1-7

2.10 Prevention of scald..... 1-7

2.11 Disposal of environmental waste 1-8

2.12 Cautions when handling tires 1-8

3. SAFETY DECALS..... 1-9

3.1 Location of decals 1-9

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4. SPECIFICATIONS

Model			DX7510(AU)	DX9010(AU)	DX100(AU)	DX7510(EU)	DX9010(EU)
Engine	Model		1104C - 44	1104C-44TT	1104C-44TTT	1104D-44T	1104D-44TT
	Max. power	HP(kw)/rpm	72.4 (54) / 2,200	89.2 (66.5) / 2,200	99.2 (74) / 2,200	74.4 (55.5) / 2,200	91.2 (68) / 2,200
	Type		Upright, 4-cylinder, watercooled 4-cycle, direct injection type, diesel	Upright, 4-cylinder, watercooled 4-cycle, direct injection type, turbo diesel			
	Number of cylinders		4				
	Bore and stroke	mm (in.)	105 x 127 (4.134 x 5.000)				
	Displacement	cc(cu in.)	4,400 (268.5)	4,400 (268.5)(turbo)			
	Rated revolution (rpm)		2,200				
	Injection timing		ATDC 0°				
	Injection sequence from flywheel		1 - 3 - 4 - 2 (1: Closest to cooling fan)				
	Compression ratio		19.3 : 1	17.5 : 1		18.2:1	
Capacity	Fuel tank	U.S.gal (ℓ)	125 (33.0)				
	Engine crankcase	U.S.gal (ℓ)	10.5 (2.77)				
	Engine coolant	U.S.gal (ℓ)	13.9 (3.67)				
	Transmission case	U.S.gal (ℓ)	80 (21.1)				
	Front axle support	U.S.gal (ℓ)	4.5 (1.2)				
	Front axle case	U.S.gal (ℓ)	LH: 2.2 (0.58), RH: 2.2 (0.58)				
Drive train	Tire size	Front	12.4 - 24, 8 PR				
		Rear	18.4 - 30, 8 PR	18.4 - 34, 8PR		18.4 - 30, 8 PR	
	Clutch		Wet type, multiple plates				
	Transmission	Shuttle	Power shuttle				
		Main	4-gear, synchromesh				
		Range	4-gear, constant mesh				
		Speeds	F16 x R16				
	Brake	Driving	Wet multi discs with brake fluid				
		Parking	Wet multi discs				
		capacity U.S.gal (ℓ/min)	0.47 (0.12), mineral				
Hydraulic system	Hydraulic lift control		Position, Draft and Mixed control				
	Steering		Hydrostatic power steering				
	Pump capacity U.S.gal (ℓ/min)	Main	48.4 (12.8)				
		Steering	35.2 (9.3)				
	3-point hitch		Cat.II				
	Max. lifting capacity	kg (lb)	1,940(4,277)				
	Number of attachable auxiliary hydraulic valves		2				
PTO	Type		Independent/Ground, Independent with hydraulic multi disc clutch				
	PTO shaft		SAE 1-3 / 8, 6 splines				
	Rotation speed (PTO rpm/ Engine rpm)	1st (rpm)	539/2,200, 540/2,204				
		2nd (rpm)	1,073/2,200, 1,000/2,050				
Min. turning radius (when not braked)		mm (in.)	4,400 (173.2)				
Weight (excluding ballast weight)		kg (lb)	3,500 (7,716)	3,630 (8,003)		3,500 (7,716)	3,630 (8,003)

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7. MAINTENANCE

7.1 MAINTENANCE SCHEDULE CHART

No.	Item \ Maintenance interval		Run hour								Run age		Remarks	
			50	100	200	400	600	800	1500	3000	1 year	2 years		
1	Engine oil	Change	⦿	●										
2	Engine oil filter	Replace	⦿		●									
3	Transmission oil filter	Replace	⦿		●									
4	HST oil filter	Replace	⦿		●									
5	Transmission fluid	Change				●								
6	Front axle oil	Change	⦿			●								
7	Front axle pivot	Adjust					●							
8	Engine start system	Check	●											
9	Greasing	Apply	●											
10	Wheel bolt torque	Check	●											
11	Battery condition	Check		●									*3	
12	Air cleaner element	Clean		●									*1	#
		Replace									●		*2	
13	Fuel filter element	Replace			●									#
14	Fan belt	Adjust		●									*3	
15	Clutch pedal free play	Adjust	⦿	●										
16	Brake pedal free play	Adjust		●										
17	Radiator hose and clamp	Check			●									
		Replace										●		
18	Power steering hose and oil line	Check			●									
		Replace										●		
19	Fuel line	Check		●										#
		Replace										●		
20	Intake air hose	Check			●									
		Replace										●	*3	
21	Toe-in	Adjust			●									
22	Engine valve clearance	Adjust						●						
23	Fuel injection nozzle injection pressure	Check							●					#
24	Injection pump	Check								●				#
25	Cooling system	Clean										●		
26	Coolant	Replace										●		

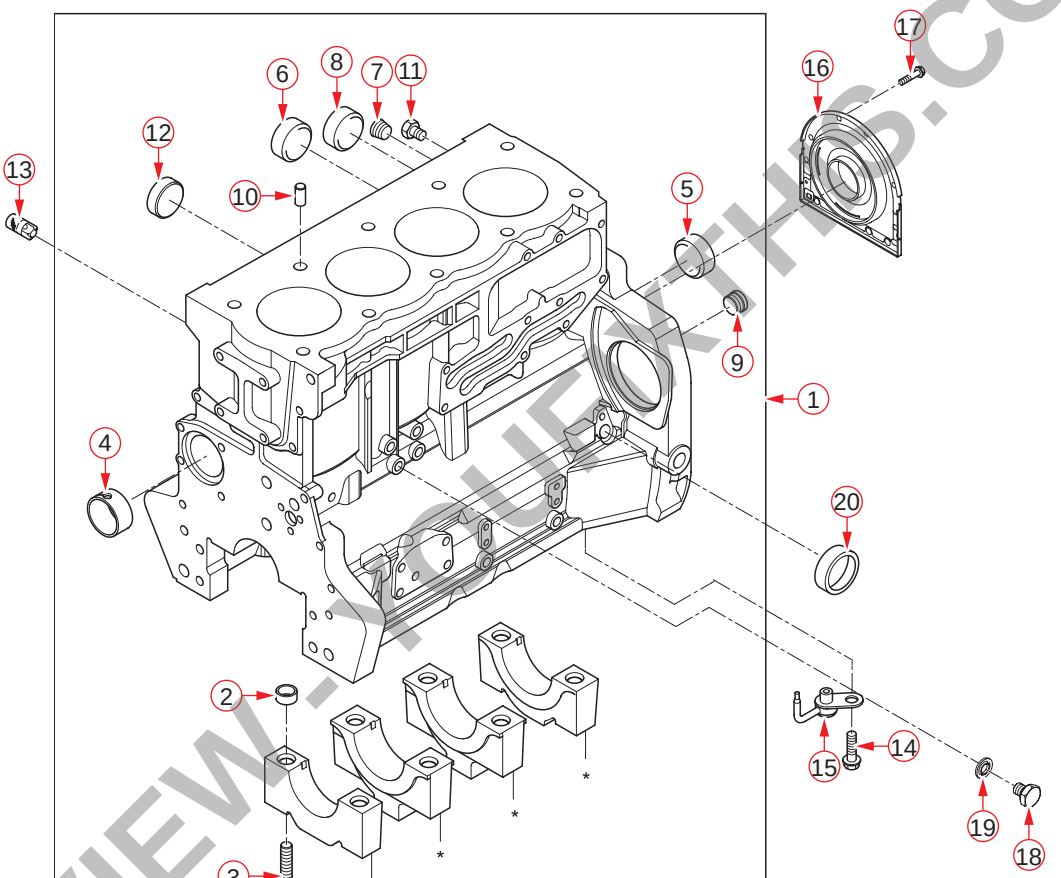
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5. EXPLODED VIEW

REMARK

The manufacturing parts are subject to change without notice. Therefore, check the parts catalog or electronic manual for latest information.

5.1 E010 CYLINDER BLOCK



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COMPONENTS

(1) Cylinder block kit
(2) Cap, bearing
(3) Cap, bearing
(4) Cap, bearing
(5) Cap, bearing
(6) Washer
(7) Bolt
(8) Bushing, camshaft
(9) Plug
(10) Plug
(11) Plug
(12) Plug
(13) Plug
(14) Pin
(15) Plug
(16) Plug
(17) Plug
(18) Bolt
(19) Piston cooling jet
(20) Housing ass'y
(21) Bolt
(22) Screw
(23) Plug, core
(24) Bracket
(25) Bolt
(26) Nut
(27) Bolt
(28) Washer, plain

4. TROUBLESHOOTING

Symptom	Causes	Remedy
Engine Does Not Start	• No fuel	Add fuel
	• Air in fuel system	Bleed air
	• Water in fuel system	Change fuel and repair or flush fuel system
	• Clogged fuel pipe	Clean
	• Clogged fuel filter	Clean or replace
	• Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil
	• Fuel with low cetane number	Use the specified fuel
	• Fuel leak due to loose injection pipe mounting nut	Tighten nut
	• Incorrect injection timing	Adjust
	• Worn fuel camshaft	Replace
	• Clogged injection nozzle	Clean or replace
	• Defective fuel injection pump	Repair or replace
	• Defective fuel transfer pump	Repair or replace
	• Seizure of transfer pump, defective piston, cylinder bore or bearing	Repair or replace
	• Compression leak from cylinder	Replace head gasket, tighten cylinder head screws, glow plug and nozzle holder
	• Improper valve seating, damaged valve spring, valve seized	Repair or replace
	• Improper valve timing	Correct or replace timing gear
	• Worn piston ring and bore	Repair or replace
	• Excessive valve clearance	Adjust
Start motor Does Not Run	• Discharged battery	Charge
	• Defective start motor	Repair or replace
	• Defective key switch	Repair or replace
	• Disconnected wiring	Connect
Engine Running is Not Smooth	• Clogged or dirty fuel filter	Clean or replace
	• Clogged air cleaner	Clean or replace
	• Fuel leak due to loose injection pipe mounting nut	Tighten nut
	• Defective fuel injection pump	Repair or replace
	• Incorrect nozzle opening pressure	Adjust or replace
	• Seized or clogged nozzle	Repair or replace
	• Clogged fuel overflow pipe	Clean or replace
Either White or Blue Exhaust Smoke is Produced	• Excessive engine oil	Reduce to the specified level
	• Worn piston ring and bore or seized piston ring	Repair or replace
	• Incorrect injection timing	Adjust
	• Insufficient compression pressure	Adjust valve clearance
Either Black or Dark Gray Exhaust Smoke is Produced	• Overheat or overload	Reduce load
	• Low grade fuel used	Use the specified fuel
	• Clogged fuel filter	Clean or replace
	• Clogged air cleaner	Clean or replace
Insufficient Output	• Incorrect injection timing	Adjust
	• Seized engine components	Repair or replace
	• Uneven fuel injection	Repair or replace the fuel injection pump
	• Insufficient nozzle injection	Repair or replace the nozzle
	• Compression pressure leak	Replace head gasket, check tightness of cylinder head screws and nuts, glow plug and nozzle holder

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If the starting motor does not crank or cranks slow, perform the following procedure:

1. Measure the voltage of the battery.

   Measure the voltage across the battery posts with the multimeter when you are cranking the engine or attempting to crank the engine. Do not measure the voltage across the cable post clamps.

   a. If the voltage is equal or greater than the voltage in Table 7, then go to Step 2.

   b. The battery voltage is less than the voltage in Table 7.

   A low charge in a battery can be caused by several conditions.

   - Deterioration of the battery
   - A shorted starting motor
   - A faulty alternator
   - Loose drive belts
   - Current leakage in another part of the electrical system

2. Measure the current that is sent to the starting motor solenoid from the positive post of the battery.

NOTE

If the following conditions exist, do not perform the test in Step 2 because the starting motor has a problem.

- The voltage at the battery post is within 2 volts of the lowest value in the applicable temperature range of Table 7.
- The large starting motor cables get hot.

Use a suitable ammeter in order to measure the current. Place the jaws of the ammeter around the cable that is connected to the “bat” terminal. Refer to the Specifications Module, “Starting Motor” for the maximum current that is allowed for no load conditions.

The current and the voltages that are specified in the Specifications Module are measured at a temperature of 27°C (80°F). When the temperature is below 27°C (80°F), the voltage will be lower through the starting motor. When the temperature is below 27°C (80°F), the current through the starting motor will be higher. If the current is too great, a problem exists in the starting motor. Repair the problem or replace the starting motor.

If the current is within the specification, proceed to Step 3.

3. Measure the voltage of the starting motor.

   a. Use the multimeter in order to measure the voltage of the starting motor, when you are cranking or attempting to crank the engine.

   b. If the voltage is equal or greater than the voltage that is given in Table 7, then the battery and the starting motor cable that goes to the starting motor are within specifications. Go to Step 5.

   c. The starting motor voltage is less than the voltage specified in Table 7. The voltage drop between the battery and the starting motor is too great. Go to Step 4.

4. Measure the voltage.

   a. Measure the voltage drops in the cranking circuits with the multimeter. Compare the results with the voltage drops which are allowed in Table 8.

   b. Voltage drops are equal to the voltage drops that are given in Table 8 or the voltage drops are less than the voltage drops that are given in Table 8. Go to Step 5 in order to check the engine.

   c. The voltage drops are greater than the voltage drops that are given in Table 8. The faulty component should be repaired or replaced.

5. Rotate the crankshaft by hand in order to ensure that the crankshaft is not stuck. Check the oil viscosity and any external loads that could affect the engine rotation.

   a. If the crankshaft is stuck or difficult to turn, repair the engine.

   b. If the engine is not difficult to turn, go to Step 6.

6. Attempt to crank the starting motor.

   a. The starting motor cranks slowly.

   Remove the starting motor for repair or replacement.

   b. The starting motor does not crank.

   Check for the blocked engagement of the pinion gear and flywheel ring gear.

NOTE

Blocked engagement and open solenoid contacts will give the same electrical symptoms.

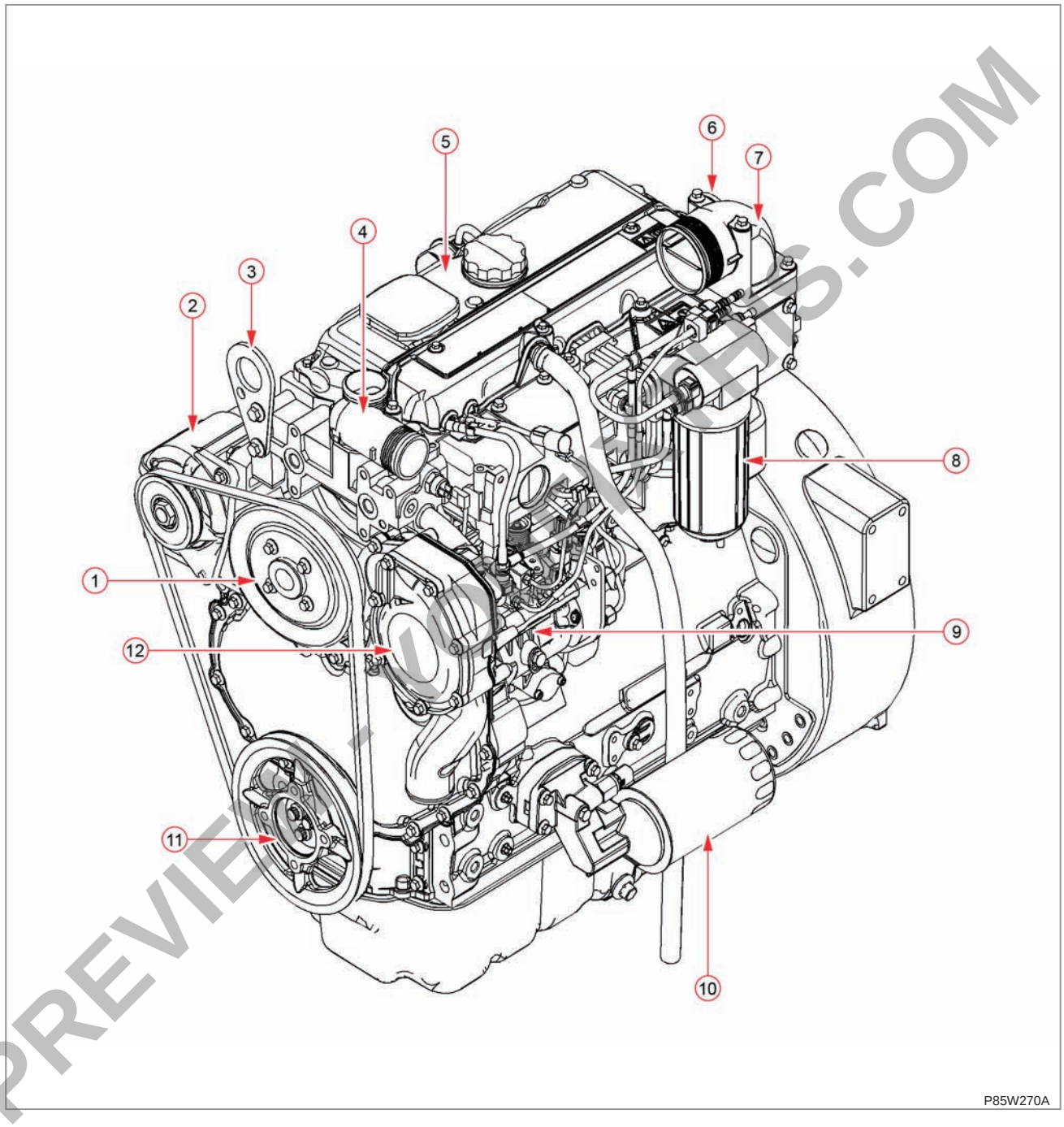
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1.3 PRODUCT INFORMATION SECTION

1.3.1 MODEL VIEWS

A. MODEL VIEW ILLUSTRATIONS

[1104 ENGINE MODEL VIEWS]



(1) Pulley
(2) Alternator
(3) Front Lifting Eye
(4) Water Outlet
(5) Valve Mechanism Cover
(6) Rear Lifting Eye
(7) Air Intake
(8) Secondary Fuel Filter
(9) Fuel Injection Pump
(10) Oil Filter
(11) Crankshaft Pulley
(12) Water Pump

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3. INSPECTION AND ADJUSTMENT

3.1 DIFFERENTIAL PINION AND SIDE GEAR


T85W609A

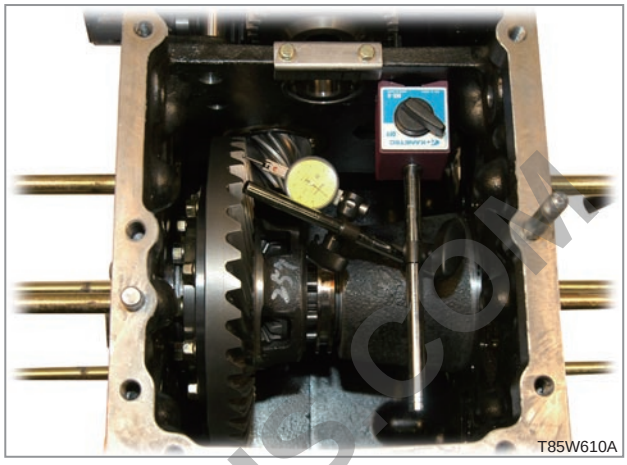
1. Set the lever type dial gauge perpendicular to the differential pinion teeth.
2. Hold the differential side gear and move the differential pinion to measure the backlash.
3. If the measured value is out of the allowable limit, adjust the backlash with the differential washer on the differential side gear.
   - Standard: 0.015 ~ 0.30 mm (0.001 ~ 0.012 in.)

IMPORTANT

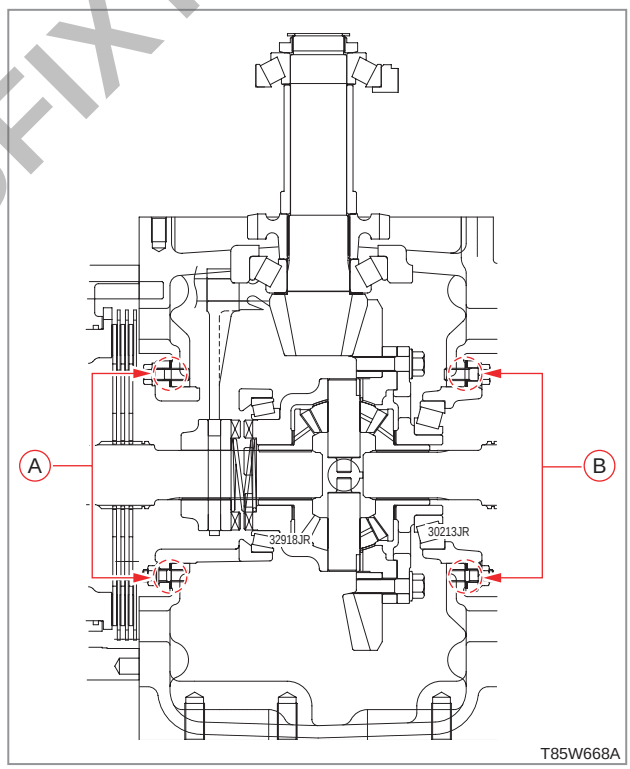
- **Replace the differential washer with another type when adjusting the backlash.**
- **Both differential washers should be equal in thickness.**

  [Size of differential washer: 1.5, 1.6, 1.7 mm (factory setting: 1.5 mm)]

3.2 SPIRAL BEVEL GEAR AND PINION GEAR


T85W610A

1. Measure the backlash at two locations by fixing the spiral bevel pinion and moving spiral bevel gear to the rotating direction.



T85W668A

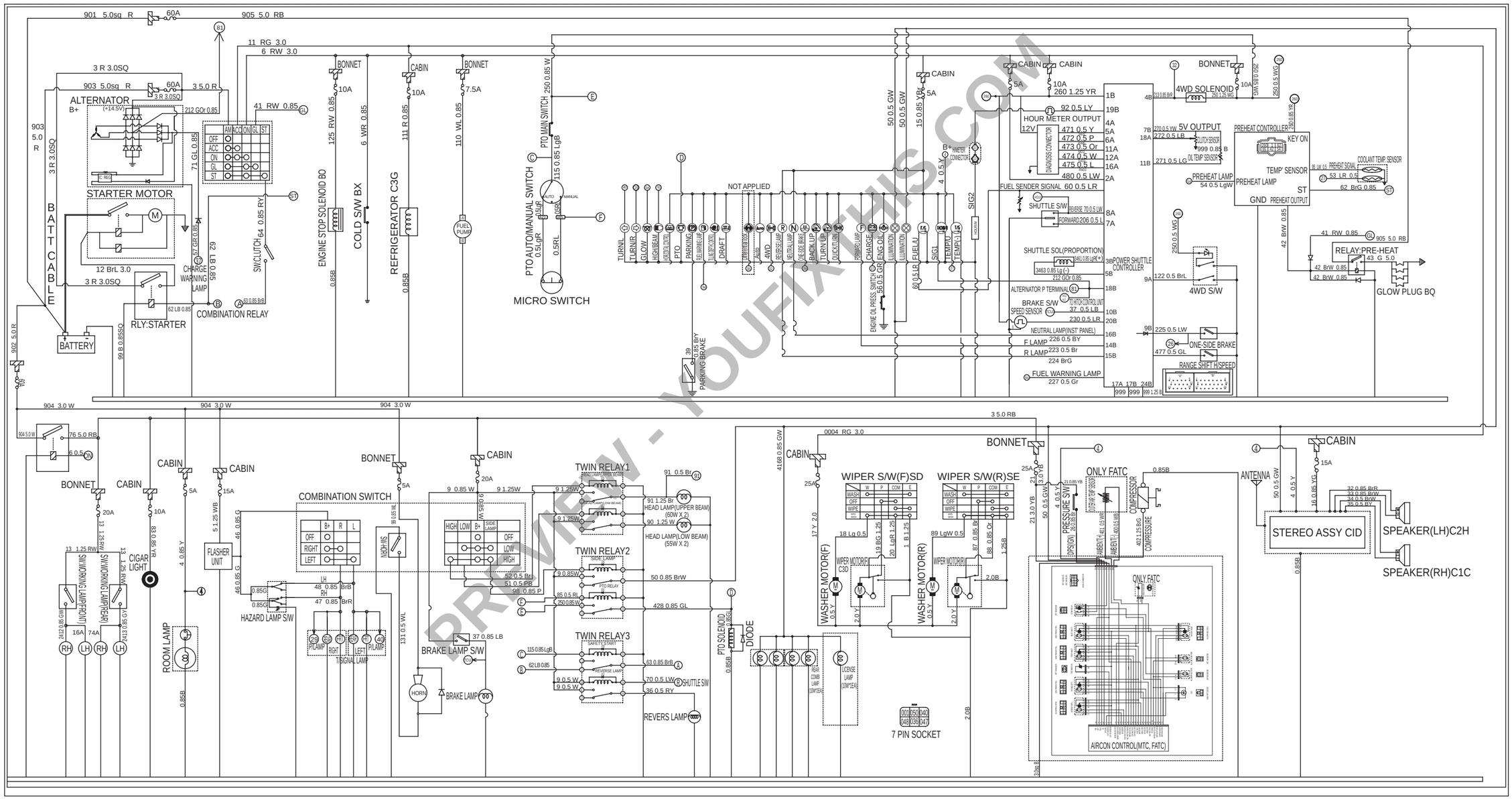
2. If the backlash is over the standard, move the shim (A) on the left side toward the shim (B) on the right side to adjust the backlash. If the backlash is below the standard, move the shim (B) on the right side toward the shim (A) on the left side to adjust the backlash.

   Standard value.....0.2 ~ 0.3 mm
   0.008 ~ 0.012 in.

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2. CIRCUIT AND COMPONENT LOCATION

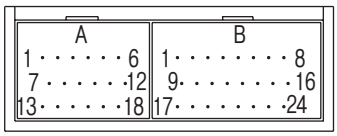
2.1 CIRCUIT DIAGRAM



A80W908A

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5.28.1 CONNECTOR PIN ARRANGEMENT



Connector specification : T & B 930730-42
(90˚ ANGLE, GOLD PLATE TERMINAL)

Connector ID	Pin No.	Function description
A	1	Brake (one side) switch
A	2	Fuse for blowing
A	3	Correction switch (INC)
A	4	5 V output (for flash)
A	5	RES terminal (flash)
A	6	RES terminal (flash)
A	7	Shuttle forward driving switch
A	8	Shuttle reverse driving switch
A	9	4WD switch
A	10	QT switch
A	11	MD2 terminal (flash)
A	12	TxD2 terminal (flash)
A	13	Spare
A	14	Front wheel steering angle (LH) detection switch
A	15	Range shift detection switch
A	16	RxD2 terminal (flash)
A	17	Ground
A	18	Clutch sensor input
B	1	12 V power input
B	2	Correction switch (DEC)
B	3	Shuttle solenoid output (+)
B	4	4WD solenoid output
B	5	Shuttle solenoid output (-)
B	6	QT solenoid output
B	7	5 V power output (for sensor)
B	8	Spare
B	9	Spare
B	10	Brake switch
B	11	Oil temperature sensor input
B	12	Fuel sender signal input
B	13	Spare
B	14	Front wheel lamp output
B	15	Rear wheel lamp output
B	16	Neutral lamp output
B	17	Low fuel level warning lamp
B	18	Alternator P terminal input
B	19	Hour meter signal output
B	20	Vehicle speed signal input
B	21	Spare
B	22	Spare
B	23	Spare
B	24	Ground

A40WB20B

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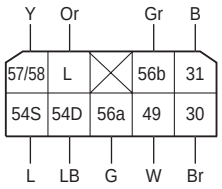
DIAGRAM FOR COMBINATION SWITCH CONNECTION

Combination switch connector side

TER. / POS.	49	31
FREE		
PUSH	●	●

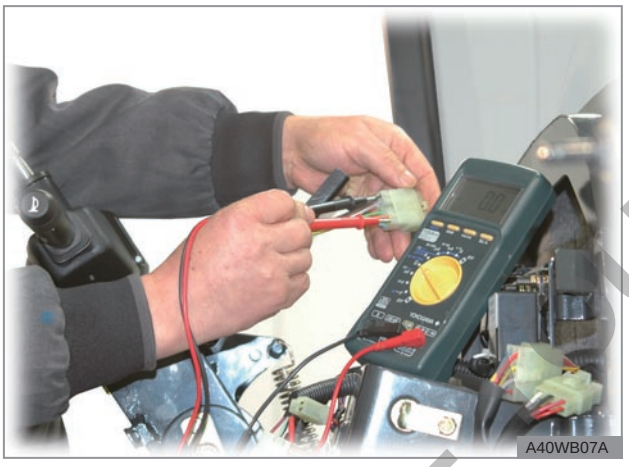
TER. / POS.	30	57/58	56b	56a
OFF				
1	○	○	○	
2	○	○		○

TER. / POS.	L	54D	54S
1	○	○	
OFF			
2	○		○



T85WB31A

TEST



A40WB07A

Range	Operation	Tester's measuring point		Result
		Red lead	Black lead	
Resistance	Moving lever to 1st position	Connector No. 30 (Br)	Connector No. 57/58 (Y)	Continuity
DC voltage		Connector No. 57/58 (Y)	Ground (B)	DC12 V
Resistance	Moving lever to 2nd position	Connector No. 30 (Br)	Connector No. 57/58 (Y)	Continuity
			Connector No. 56b (Gr)	Continuity
DC voltage		Connector No. 56b (Gr)	Ground (B)	DC11 V
Resistance	Operating headlamp switch for high beam	Connector No. 56a (G)	Connector No. 57/58 (Y)	Continuity
DC voltage			Connector No. 30 (Br)	DC11 V
Resistance	Pulling lever	Connector L (Or)	Connector No. 54S (L)	Continuity
DC voltage		Connector No. 54S (L)	Body ground (B)	DC8.7 V

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7. CALIBRATION, DIAGNOSIS AND UPGRADE

7.1 CALIBRATION

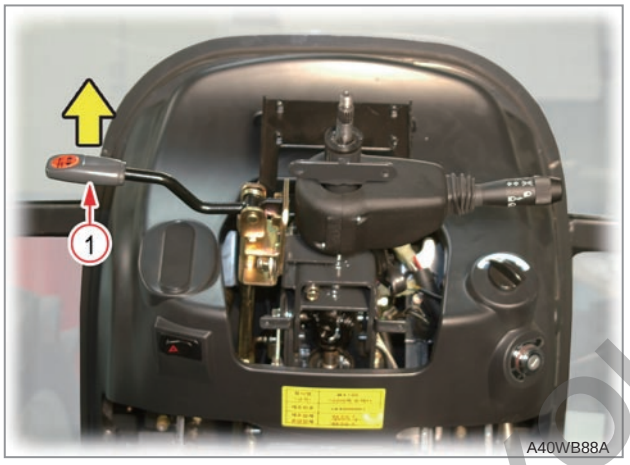
7.1.1 POWER SHUTTLE CALIBRATION

A. CLUTCH SENSOR POSITION SETUP

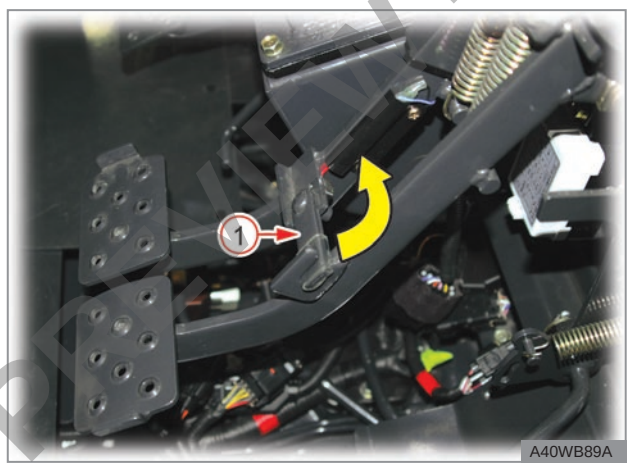
IMPORTANT

- **When the clutch pedal angle sensor is replaced or the power shuttle controller in the instrument panel is replaced, they should be calibrated.**

1. Park the tractor on level ground and turn the ignition switch to the “OFF” position.



2. Place the shuttle lever (1) to the forward driving position.



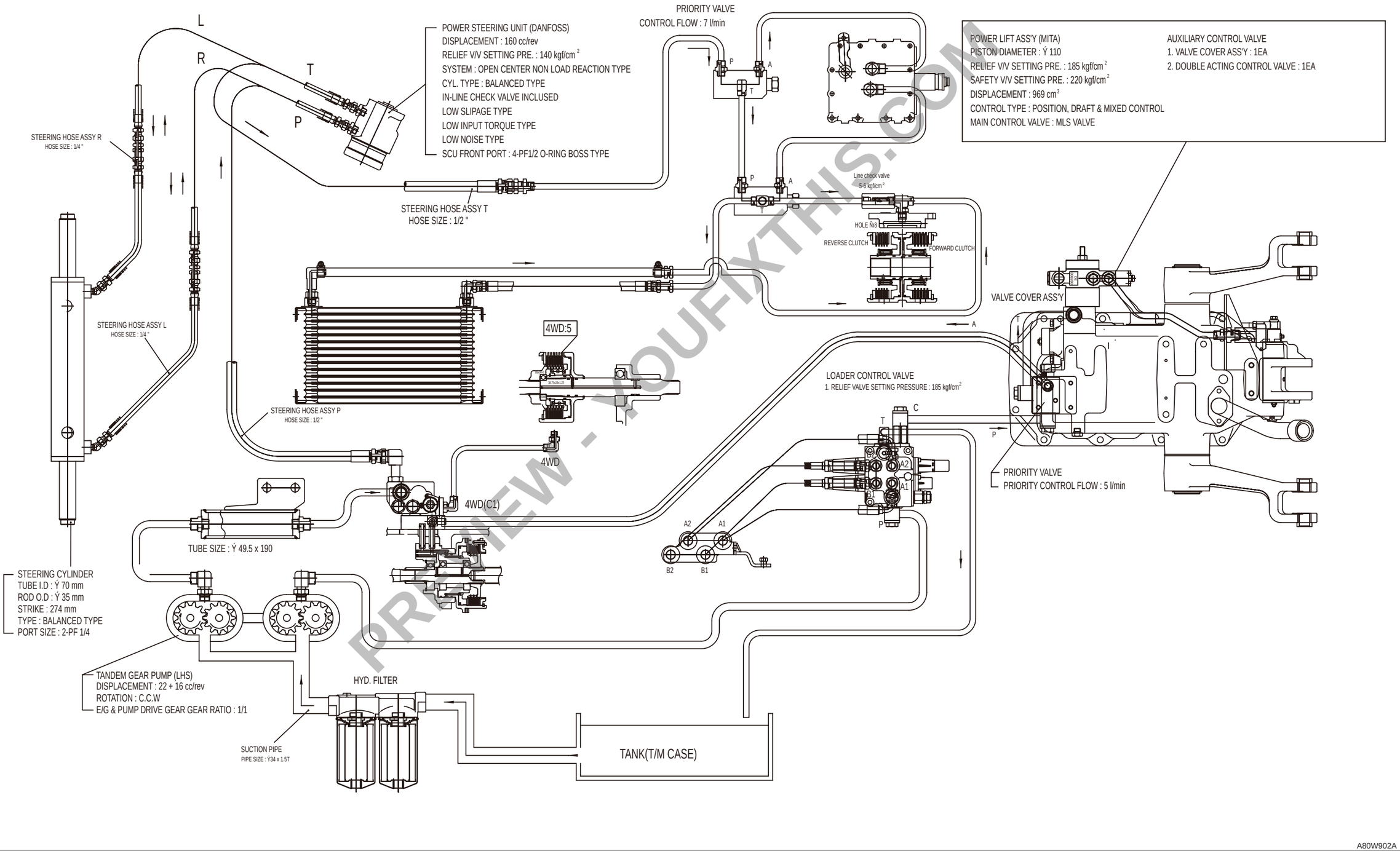
3. Undo the brake pedal engagement hook (1).



4. Turn the ignition switch to the "ON" position while pressing the "INC (+)" position of the calibration switch on the switch cover on the right side of the seat. When the "N" lamp blinks, the calibration mode is activated.
5. To set the displacement of the angle sensor, depress the clutch pedal fully and press and release the “DEC (-)” part of the calibration switch. Then, the “N” (neutral) lamp on the instrument cluster blinks once.
6. Release the clutch pedal completely, and press and release the “INC (+)” part of the calibration switch. Then, the “N” (neutral) lamp on the instrument cluster blinks once.
7. Turn the ignition switch to the “OFF” position to store the set values.

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2.2 HYDRAULIC SCHEMATIC



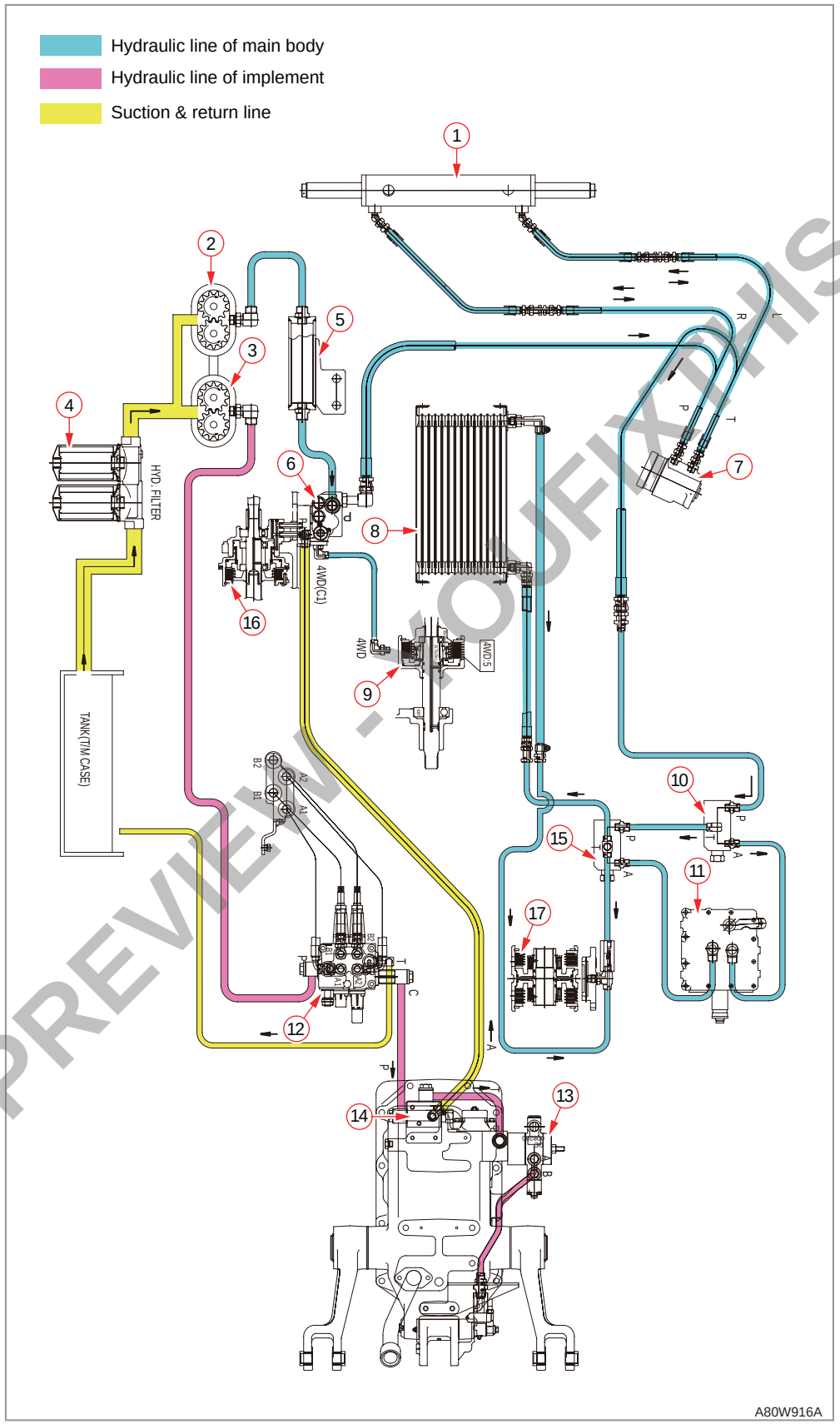
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2.4 OPERATING PRINCIPLE

This tractor has two gear pumps arranged in parallel and with different function, respectively. Therefore, the hydraulic circuit can be divided largely into two sections.

One section is the implement section that supplies hydraulic pressure related to the implement. The other section is the main section that is related to the main system of the tractor, such as the shuttle clutch, PTO and steering.

2.4.1 OPERATING DIAGRAM



COMPONENTS

(1) Steering cylinder
(2) Gear pump (No. 2)
(3) Gear pump (No. 1)
(4) Hydraulic filter
(5) Attenuator
(6) Modulator valve
(7) Power steering unit
(8) Oil cooler
(9) 4WD clutch
(10) Priority valve (7.0 LPM)
(11) Shuttle valve
(12) Joystick valve
(13) Double acting valve
(14) Priority valve (5.0 LPM)
(15) Priority valve (3.3 LPM)
(16) PTO clutch
(17) Shuttle clutch

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NUMBER

4WD drive shaft 4-66
4WD idle gear 4-98
4WD section 4-18
4WD solenoid 10-41

A

A/C & heater exploded view 12-39
T615A Air con, heater 12-39
T790A Air con 12-40
A/C filter replacement 12-42
Accessory drive - remove and install 3-246
Adjusting draft control lever 9-37
Adjusting operating force of control lever 9-37
Adjusting position control lever 9-36
Adjusting sensitivity of hydraulic lifting arm 9-38
Adjustment of front axle toe-in 8-14
Aftercooler core - clean/test 3-41
Aftercooler core - inspect 3-41
Air cleaner and inlet duct 3-180
Air condenser assembly 3-183
Air conditioner/heater 12-3
Air filter sensor 10-37
Air flow diagram 12-13
Air inlet and exhaust system 3-110
Air inlet and exhaust system 3-123
Air intrusion into cycle 12-34
Air source actuator 12-24
Air source actuator 12-52
Alert symbols 1-2
Allowable tolerance of free play between lh and rh brake pedals 6-10
Alternator - inspect 3-42
Alternator - install 3-302
Alternator - remove 3-302
Alternator belt - inspect/adjust/replace(poly v-belt) 3-42
Alternator 10-24
Alternator 3-102
American standard screws, bolts and nuts with unc or unf threads 2-23
Arrangement of main shift gear and rear axle gears 2-11
Avoid fires 1-4

B

Backlash for internal gear (ring gear) and planetary gear 5-10
Backlash of 18 bevel pinion shaft and 29 bevel gear 7-17
Balance valve disassembly and assembly 6-26
Balance(equalizer) valve 6-6
Balancer - install 3-271
Balancer - remove 3-269
Ballast 2-19
Basic engine 3-116
Basic engine 3-134
Battery - replace 3-42
Battery electrolyte level check 3-43
Battery or battery cable disconnect 3-43
Bearing clearance - check 3-297
Bearing 5-10
Bevel gear case 7-38
Bleeding brake fluid line 6-12
Bolts 2-24
Bonnet 3-172
Bonnet 4-41
Brake case removal and installation 6-15
Brake case 6-7
Brake exploded view 6-14
T235A Brake case 6-14
Brake lamp switch 6-11
Brake operating system 6-4
Brake pedal free play 6-10
Brake pedal removal and installation 6-23
Brake pressure test 6-13
Burn prevention 3-9

C

Cabin assembly 11-3
Cabin assembly 4-44
Cabin exploded view (T485A Fuel tank) 11-23
Cabin exploded view for exterior or interior components 11-3
T780A Cabin 11-3
T890A Fender 11-4
T850A Roof 11-5
Cabin exploded view 11-43

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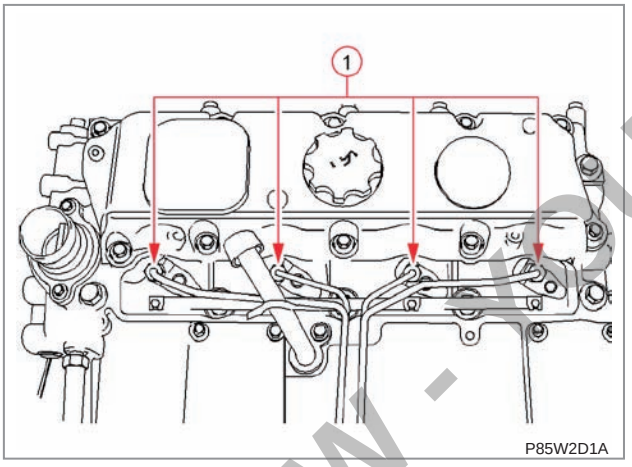
1.6.24 FUEL SYSTEM -PRIME

If air enters the fuel system, the air must be purged from the fuel system before the engine can be started. Air can enter the fuel system when the following events occur:

- The fuel tank is empty or the fuel tank has been partially drained.
- The low pressure fuel lines are disconnected.
- A leak exists in the low pressure fuel system.
- The fuel filter is replaced.
- A new injection pump is installed.

Use the following procedure in order to remove air from the fuel system:

1. Remove the cover for the fuel injectors. Refer to the Disassembly and Assembly Manual.
2. Turn the ignition key to the RUN position. Leave the ignition key in the RUN position for three minutes.
3. Turn the ignition key to the OFF position.



NOTE

Damage to the fuel injection pump, to the battery, and to the starting motor can occur if the starting motor is used excessively to purge the air from the fuel system.

4. **Loosen the flare nuts (1) for the high pressure fuel lines on all of the fuel injectors.**

NOTICE

Do not crank the engine continuously for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

5. Observe the connection at the flare nut. Operate the starting motor and crank the engine until the uel is free of air.
6. Tighten the flare nuts (1) to a torque of 30 N·m (22 lb ft).
7. The engine is now ready to start. Operate the engine at low idle for a minimum of five minutes immediately after air has been removed from the fuel system.

NOTE

Running the engine for this period of time will help ensure that the pump is completely free of air.

1.6.25 FUEL SYSTEM PRIMARY FILTER/WATER SEPARATOR - DRAIN

WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE

The water separator is not a filter. The water separator separates water from the fuel. The engine should never be allowed to run with the water separator more than half full. Engine damage may result.

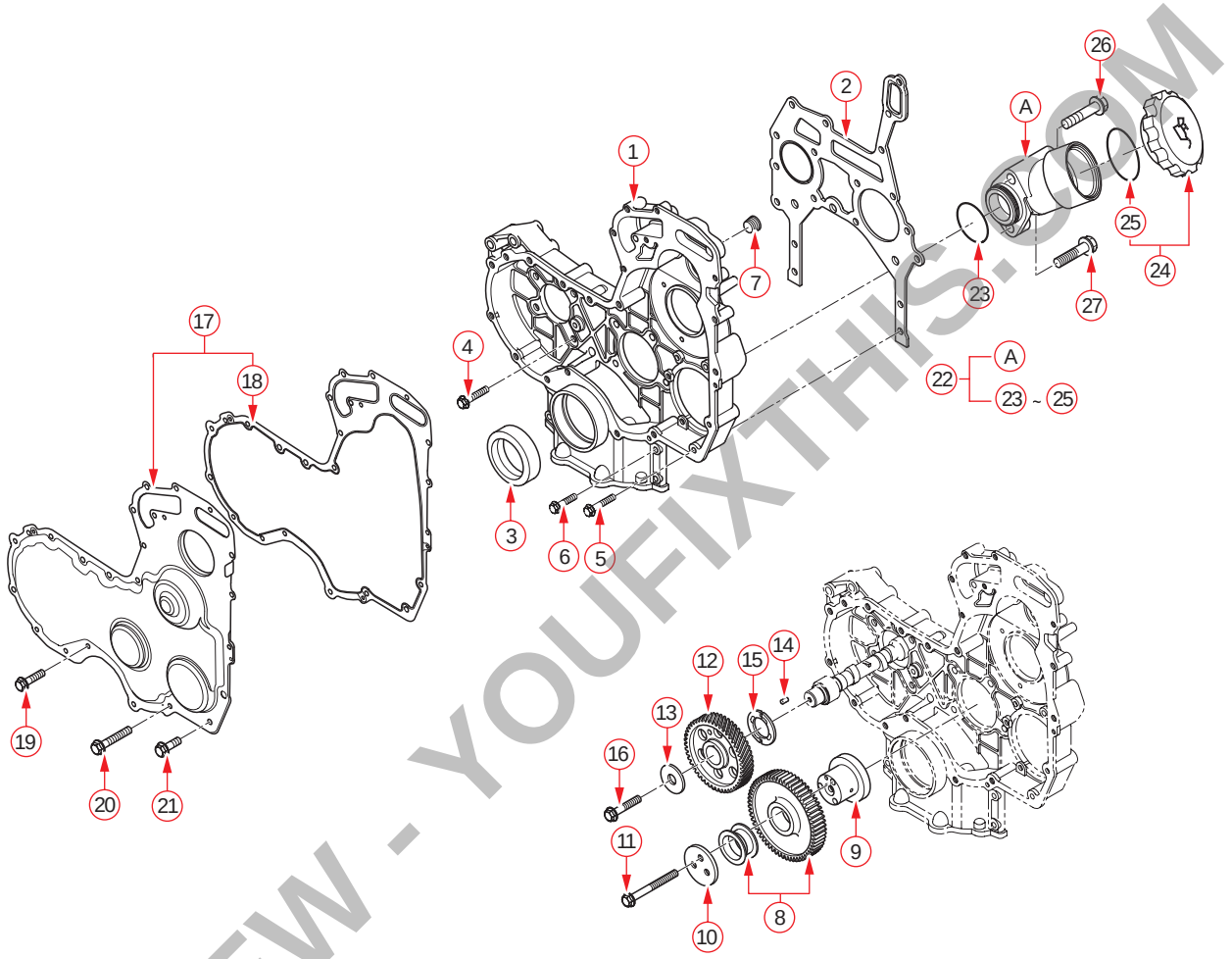
NOTICE

The water separator is under suction during normal engine operation. Ensure that the drain valve is tightened securely to help prevent air fromentering the fuel system.

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5.5 E050 TIMING CASE

TIER3



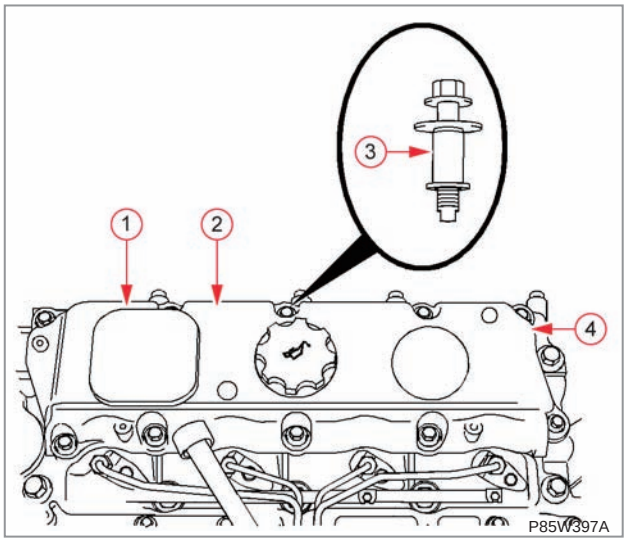
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COMPONENTS

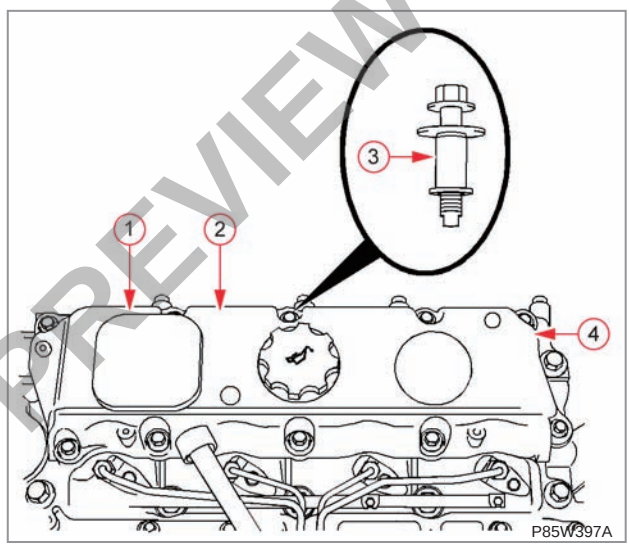
(1) Timing case
(2) Gasket - timing case
(3) Front oil seal
(4) Bolt
(5) Bolt
(6) Bolt
(7) Plug
(8) Idel gear
(9) Hub
(10) Plate
(11) Bolt
(12) Gear, camshaft
(13) Washer
(14) Pin
(15) Thrust washer
(16) Bolt
(17) Timinggear cover
(18) Gasket, cover
(19) Bolt
(20) Bolt
(21) Bolt
(22) Lub.oil filler
(23) O-ring
(24) Cap
(25) O-ring
(26) Bolt
(27) Bolt

1. If the engine is equipped with a cover for the fuel injectors, remove the cover for the fuel injectors. Refer to Disassembly and Assembly, “Fuel Injector Cover - Remove and Install”.
2. If the engine is equipped with a heat shield, remove the heat shield.

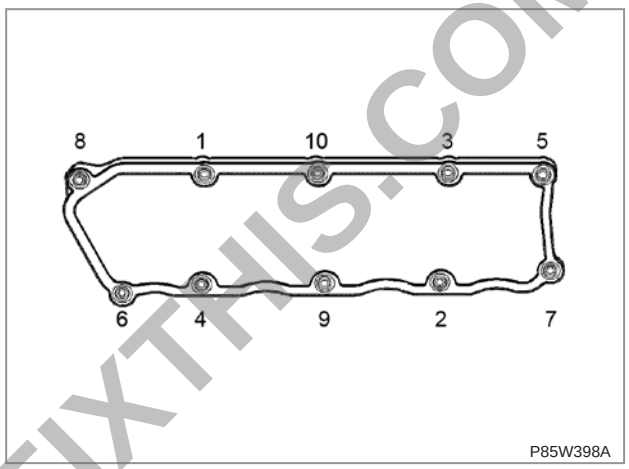


3. Remove breather tube (2) from valve mechanism cover (1). Refer to Disassembly and Assembly, “Crankcase Breather - Remove and Install”.
4. Loosen captive bolts (3). Remove valve mechanism cover (1).
5. Remove captive bolts (3) and remove joint (4) (not shown) from valve mechanism cover (1).

B. INSTALLATION PROCEDURE



1. Thoroughly clean valve mechanism cover (1). Ensure that the groove for the joint in the valve mechanism cover is clean and dry. Ensure that the mating surface on the cylinder head is clean and dry.
2. Check the condition of captive bolts (3). If necessary, replace the captive bolts.
3. Install a new joint (4) to valve mechanism cover (1). Ensure that the joint is seated correctly in the groove in the valve mechanism cover.
4. Install captive bolts (3) to valve mechanism cover (1).
5. Position valve mechanism cover (1) onto the cylinder head.



6. Tighten the captive bolts for the valve mechanism cover in the sequence that is shown in Illustration 139. Tighten the captive bolts to a torque of 9 N·m (80 lb in).
7. Install breather tube (3) to valve mechanism cover (1). Refer to Disassembly and Assembly, “Crankcase Breather - Remove and Install”.
8. If the engine is equipped with a heat shield, install the heat shield.
9. If the engine is equipped with a cover for the fuel injectors, install the cover for the fuel injectors. Refer to Disassembly and Assembly, “Fuel Injector Cover - Remove and Install”.

6.2.43 ROCKER SHAFT AND PUSHROD - REMOVE

A. REMOVAL PROCEDURE

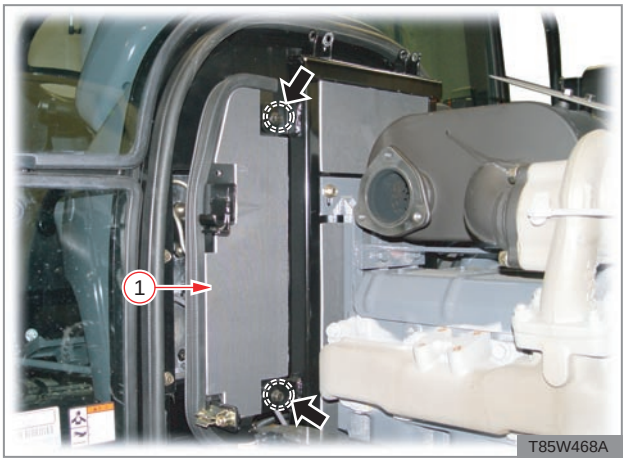
Required Tools

Tool	Part Number	Part Description	Qty
A	-	E10 Torx Socket	1
B	27610227	Rocker Assembly Tool	4

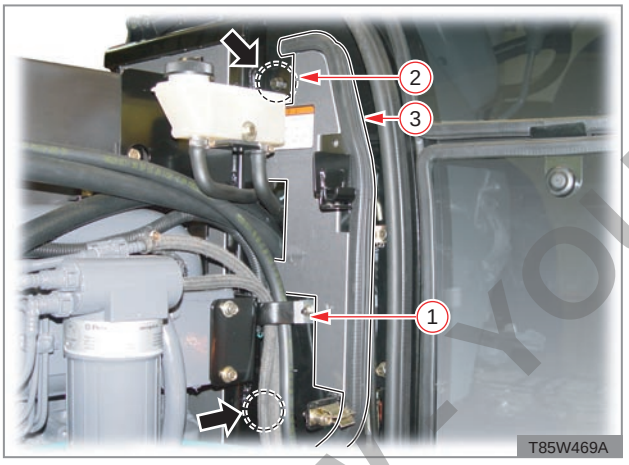
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5.6 SHIELD PLATE

A. REMOVAL



1. Unscrew two mounting bolts (upper and lower, 12 mm) on the left of the shield plate and remove the shield plate (1).



2. Undo the mounting clip (1) of the cable and the hose attached to the shield plate (RH) and separate the cable from the hose. Then, unscrew two shield plate mounting bolts (2) (12 mm) and separate the shield plate (3) (LH).
3. With the shield plate separated, remove it by removing the fuse box.

B. INSTALLATION

1. Install the exterior fuse box to the shield plate (RH).
2. Install the shield plate (RH) to the bonnet support.
3. Install the shield plate (LH) to the bonnet support.

5.7 REAR TIRES

A. REMOVAL



1. Park the tractor on level ground, apply the parking brake and chock front tires.
2. Install a jack under the hitch which is installed under the transmission case.
3. Unscrew the nuts and remove the rear tires.
4. Unscrew the nuts (1) from the rim and disc and remove the disc (to adjust wheel width).
5. Install the safety jacks under the both sides of the rear axle case if necessary.

B. INSTALLATION

1. Install the disc to the rim while keeping the specified tire tread, referring to section "8. Tire" in chapter "General" in this manual.

   Rim bolt ..... 274.5 ~ 333.4 Nm
   28 ~ 34 kgf-m
   202.5 ~ 245.9 lb-ft

2. Install the rear tires to the axle.

   Wheel nut ..... 274.5 ~ 318.7 Nm
   28 ~ 32.5 kgf-m
   202.5 ~ 235.0 lb-ft

3. Remove the jacks.

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⚠ CAUTION FOR BRAKE FLUID

- **Replenish the tank with brake fluid since the brake fluid level drops during work. Also, make sure to release the brake pedal slowly after depressing it.**
- **Tighten the bleeder valve while depressing the brake pedal.**
- **After completing the bleeding work, tighten the bleeder valve and check that the brake fluid level is at the upper limit.**
- **Clean the area around the brake fluid cap before removing the cap. Also, make sure that water or dust does not get into the fluid.**
- **The brake fluid in the reservoir tank should be added through the strainer.**
- **If the vegetable oil-based brake fluid is mixed, the seal is damaged and the brake may not operate properly.**
- **Never mix two different types of oil. Otherwise, chemical reaction occurs and the fluid's boiling point drops significantly. Even though there is no chemical reaction, the boiling point drops which causes vapor in the fluid pipe and therefore interference with the fluid flow.**
- **When adding the brake fluid, make sure that only the genuine brake fluid is used and it is not contaminated by foreign material.**
- **Make sure that water is not mixed into the fluid. Otherwise, the boiling point drops which causes vapor in the fluid pipe and therefore interference with the fluid flow.**

⚠ WARNING

The DAEDONG genuine brake fluid is mineral oil-based fluid. Never use vegetable oil-based fluid for automobile.

4.6 BRAKE PRESSURE TEST

1. Remove the bleeder of the brake case and set the manometer (50 kgf/cm^2).
2. Depress the brake pedal and install the pedal fixing plate between the pedal and pedal stopper. Then, set the pressure to approx. 30 ~ 33 kgf/cm^2.
3. Read the pressure value after 1 minute. This value is the reference (P) for the test.
4. Read the pressure value (P1) in 5 minutes after reading the reference value (P). Then, check if the difference between P and P1 (pressure drop) is within (P × 0.1) kgf/cm^2.
5. If the pressure drops excessively, install the manometer to the outlet of the balance valve (rear of the brake pipe) and the outlet of the master cylinder (front of brake pipe) separately to check the malfunction.

⚠ CAUTION

- **If there is air in the master cylinder, brake pipe or brake case, bleed the corresponding component.**
- **Initially set pressure: Reference → P = 30 ~ 33 kgf/cm^2**
- **Pressure after 1 min.: Reference → P = approx. 30 kgf/cm^2**
- **Pressure drop after 5 min.: Allowable limit → Within P1 = P × 0.1 kgf/cm^2**

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TABLE OF CONTENTS

5.3 T233A Hyd. Control system 9-42
5.4 T234A Top link bracket 9-43
5.5 T360A Joystick valve 9-44
5.6 T360B Joystick valve module 9-45
5.7 T380A Oil cooler 9-46
5.8 T2451A Shuttle valve 9-47
5.9 T2452A Modulate valve 9-48
5.10 T2453AShuttle valve 9-49
5.11 T2461ADistributing valve 9-50

6. SERVICING 9-51

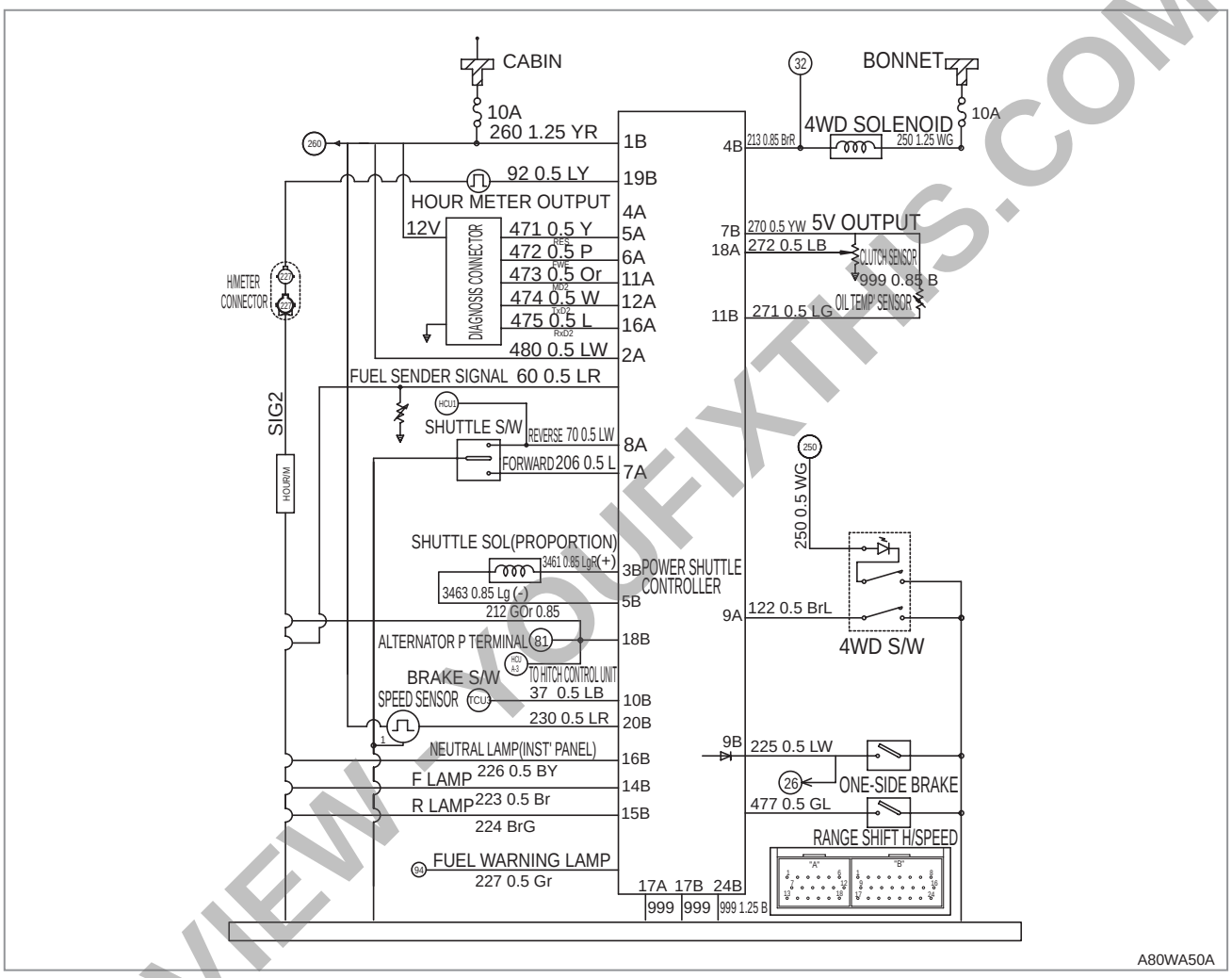
6.1 Hydraulic filter 9-51
6.2 Gear pump 9-51
6.3 Joystick valve 9-55
6.4 Double acting valve 9-60
6.5 Mls(mita load sensing) valve 9-63
6.6 Mls valve overhaul 9-65
6.6.1 Disassembly and assembly of mls components 9-65
6.7 Hydraulic lift cylinder 9-69
6.8 Priority valve (7 lpm: flow control valve) ... 9-79
6.9 Removal and installation of modulator (PTO, 4WD) valve 9-81

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4.8 POWER SHUTTLE CONTROLLER OPERATION

Major functions of the power shuttle controller are as follows:

1) Operates the power shuttle.
2) Supports the power shuttle calibration.
3) Operates 4WD
4) Supports the port for a diagnostic device.
5) Operates the hourmeter.
6) Operates the fuel gauge and fuel level warning lamp.
7) Sends signals for the neutral/ forward/reverse gear indicators on the instrument cluster.



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1) Controlling power shuttle

The power shuttle controller collects and processes various information, such as the transmission fluid temperature, clutch pedal angle, shuttle selector switch, alternator P terminal signal and range shift high-speed signal, to send optimal output signals to the shuttle solenoid in order to achieve optimal starting performance (clutch disengagement) proper for external environment, internal conditions and demand from a driver.

The clutch sensor and transmission fluid sensor in the upper right section of the circuit diagram use 5 V power from the shuttle controller for their operation. Then, the clutch pedal angle and fluid temperature signals are collected by the controller to be used as basic information to determine the operating condition for the shuttle solenoid. For example, when the fluid temperature is low, the solenoid is operated faster to compensate the starting delay due to the fluid viscosity.

The shuttle selector switch in the left middle section of the circuit diagram sends a signal to the controller according to the position of the shuttle lever (neutral/forward/reverse). Then, the controller outputs a signal to the shuttle solenoid based on this information and displays this shift information on the instrument cluster.

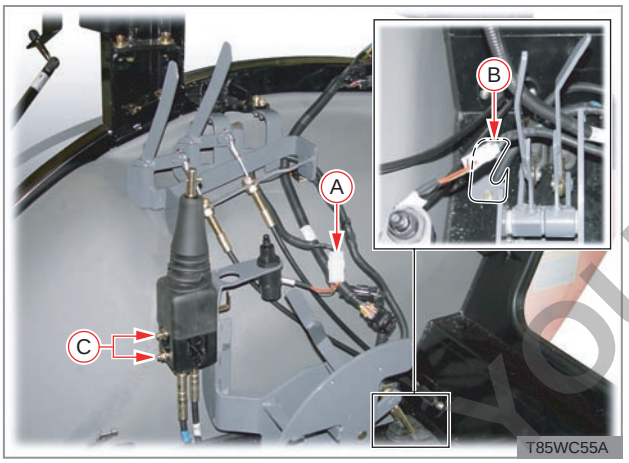
The vehicle speed information signal is also used as basic information to control the operation characteristics of the shuttle solenoid. For example, when the vehicle speed is high, the shuttle solenoid operation is delayed to reduce shift shock occurred by rapid clutch engagement.

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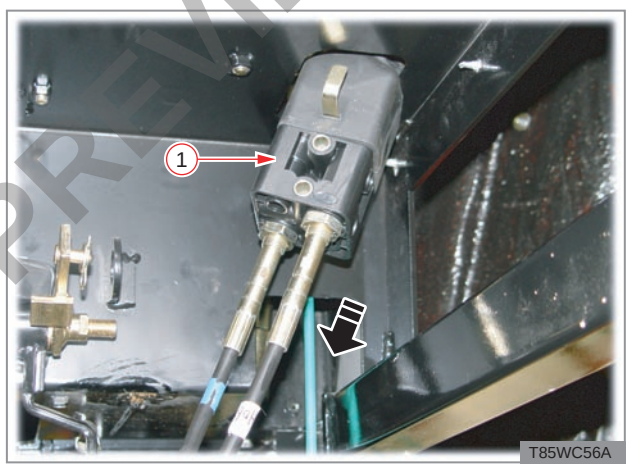
1.3.5 REMOVAL AND INSTALLATION OF COMPONENTS IN INNER SECTION



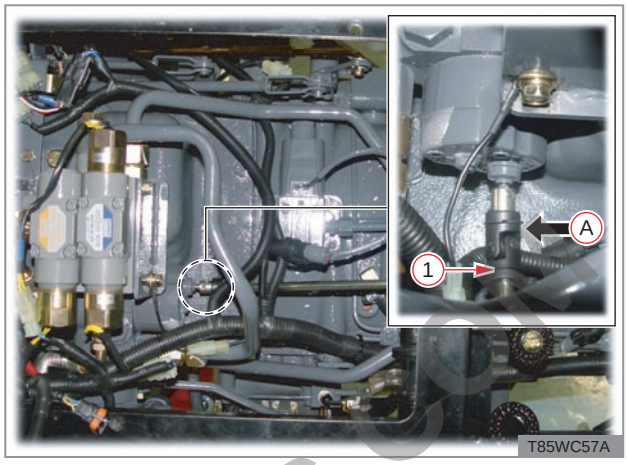
1. Remove the seat (1) and the right panel (2) from the cabin.



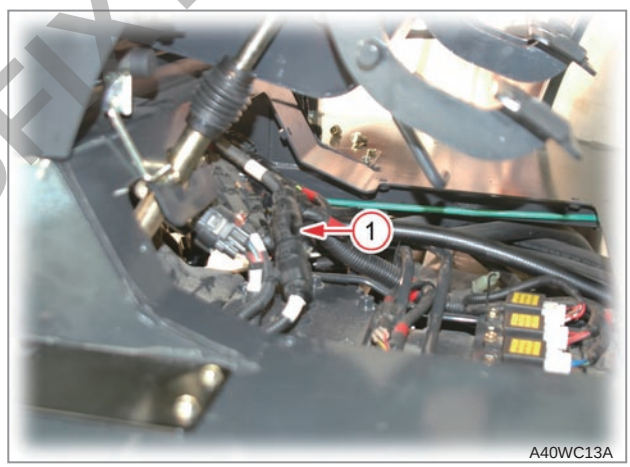
2. Disconnect the PTO switch connector (A) and remove the cabin cable mounting bracket (mounting bolt: 10 mm x 2 EA) (B).
3. Remove two mounting nuts (10 mm) (C) from the joystick lever.



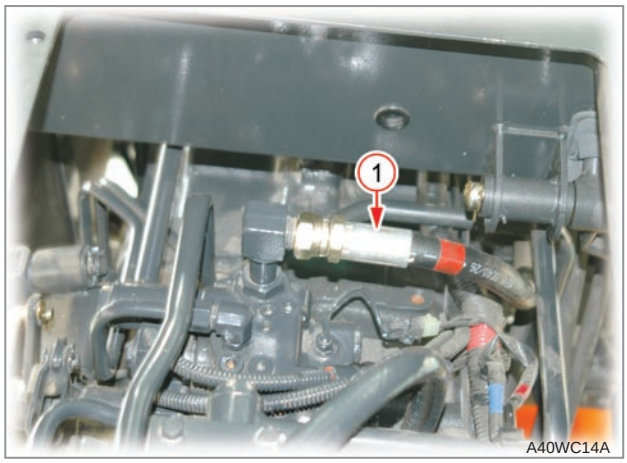
4. Remove the joystick lever (1) by pulling it down under the cabin.



5. Remove the repair window under the seat. Disconnect the MLS valve link (1) at MLS valve connection (A).
   - The MLS valve link (lowering speed control lever) should be pulled to the inside of the cabin.



6. Remove the floor mat and sponge. Then, remove the maintenance plate.
7. Disconnect seven main cable connectors (1).



8. Dissconnect the hydraulic hose(1) from modulator valve to the steering unit which is under the repair window.

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