Service Manual

(00 series - Chassis)

KUKJE MACHINERY CO., LTD

CONTENTS 1. (GENERAL)

1. ABOUT WARRANTY

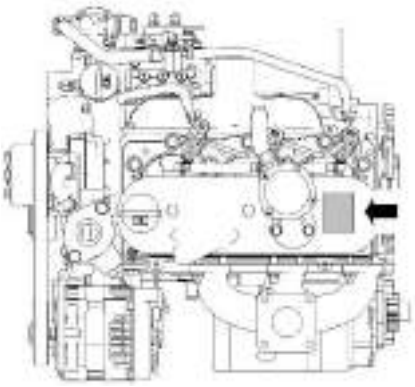
***. WARRANTY**

You will need the "Warranty Registration" when your tractor requires warranty service. Read it and keep in a safe place.

< Information you will need when contacting the dealer for service >

- **Type of model and machine s/n number.**
- **In case of engine, the engine s/n number.**
- **Circumstances of breakdown.**
  (What kind of work, gear position, etc)
- **Amount of work done.**
  (Square footage or number of hours)
- **Other information in as much detail as possible surrounding the circumstanced of the breakdown.**

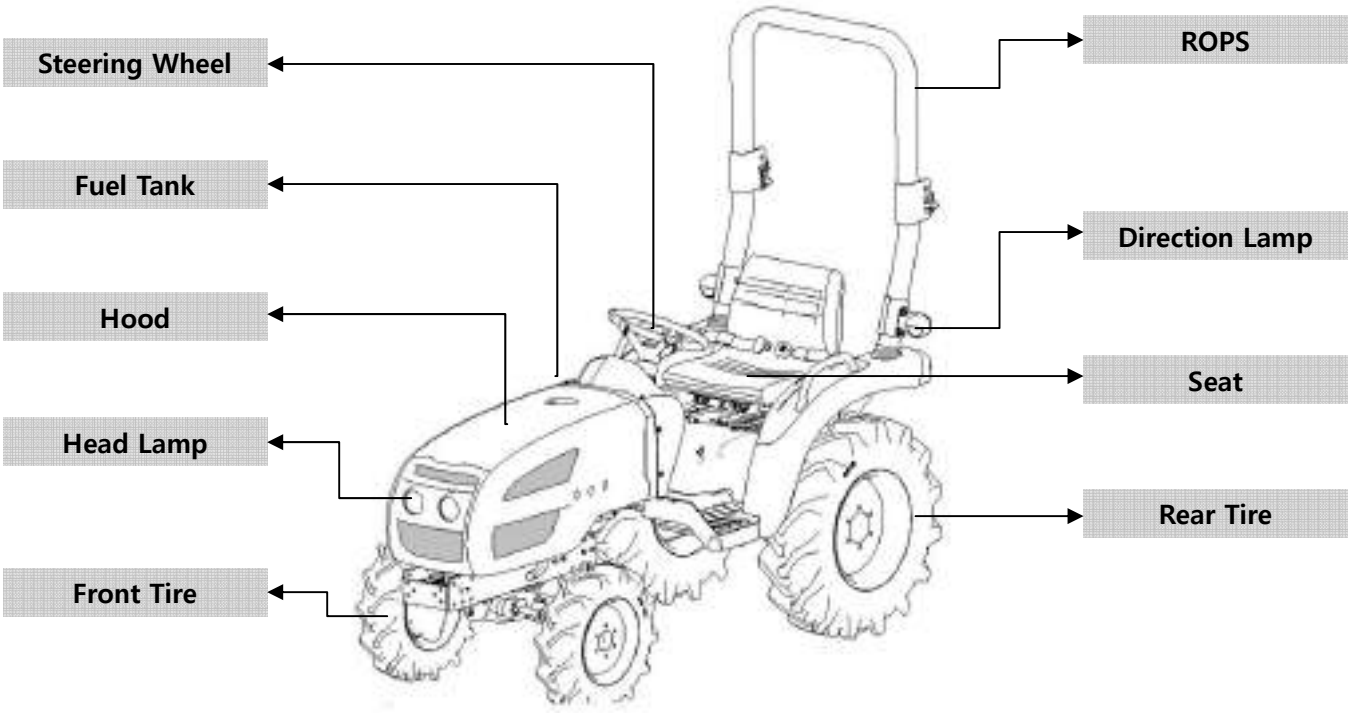
Chassis S/N

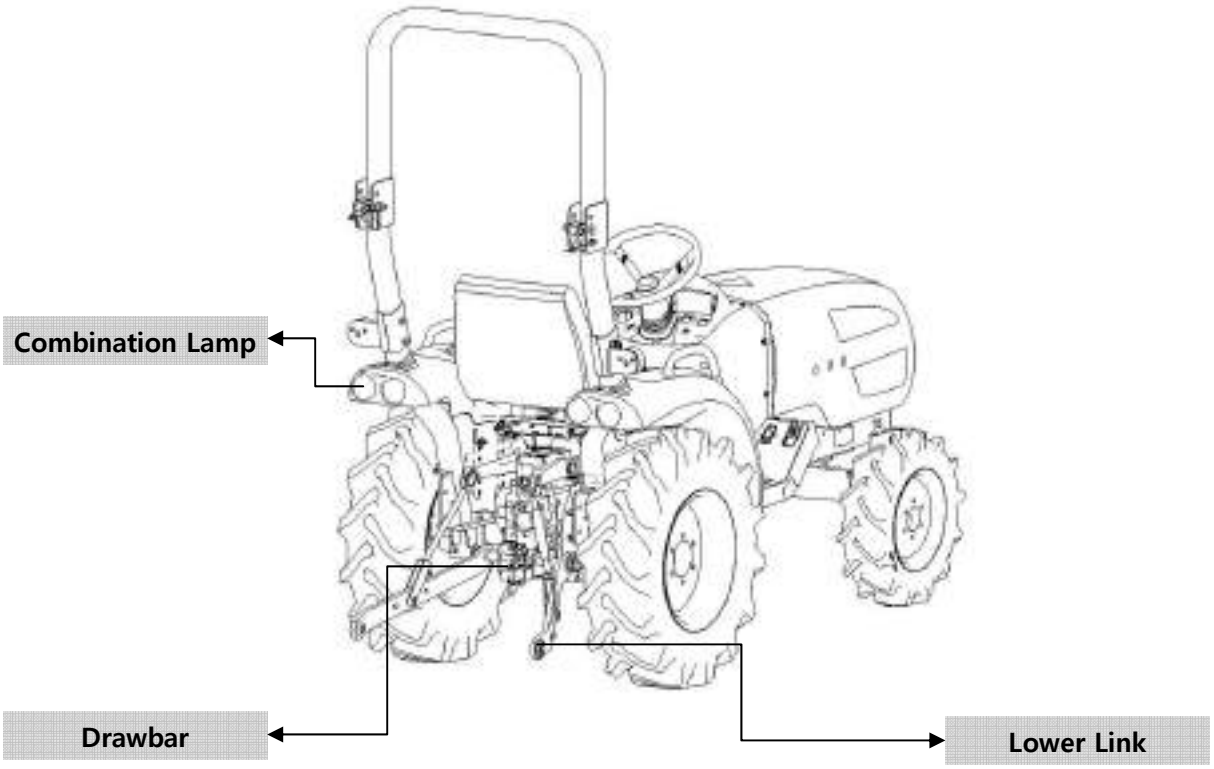


Engine S/N

2. OVERVIEW OF THE TRACTOR

<1> OVERVIEW

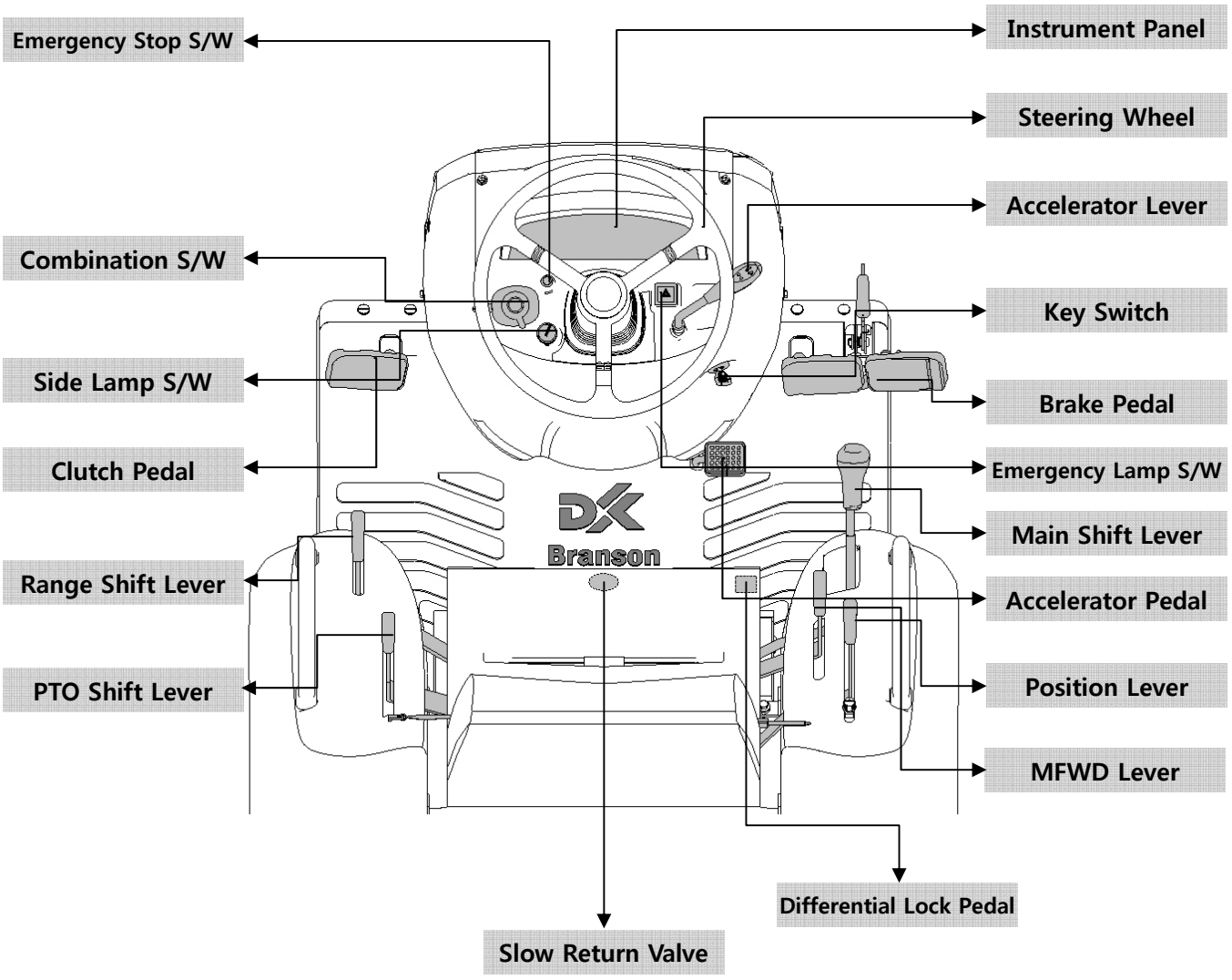




2. OVERVIEW OF THE TRACTOR

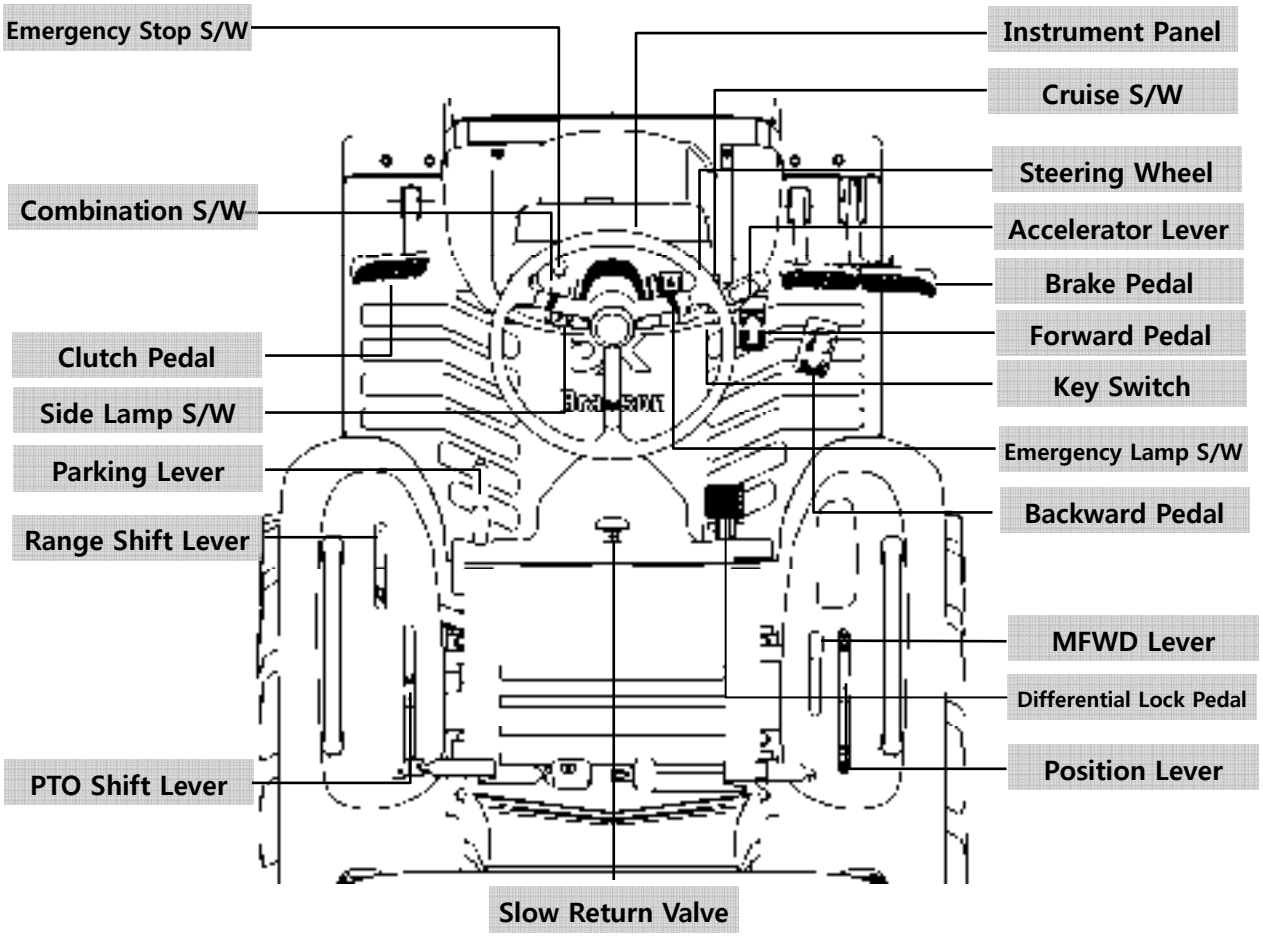
<2> OPERATION PART

1) Manual transmission



2. OVERVIEW OF THE TRACTOR

2) HST transmission



3. LOCATION OF SAFETY DECALS

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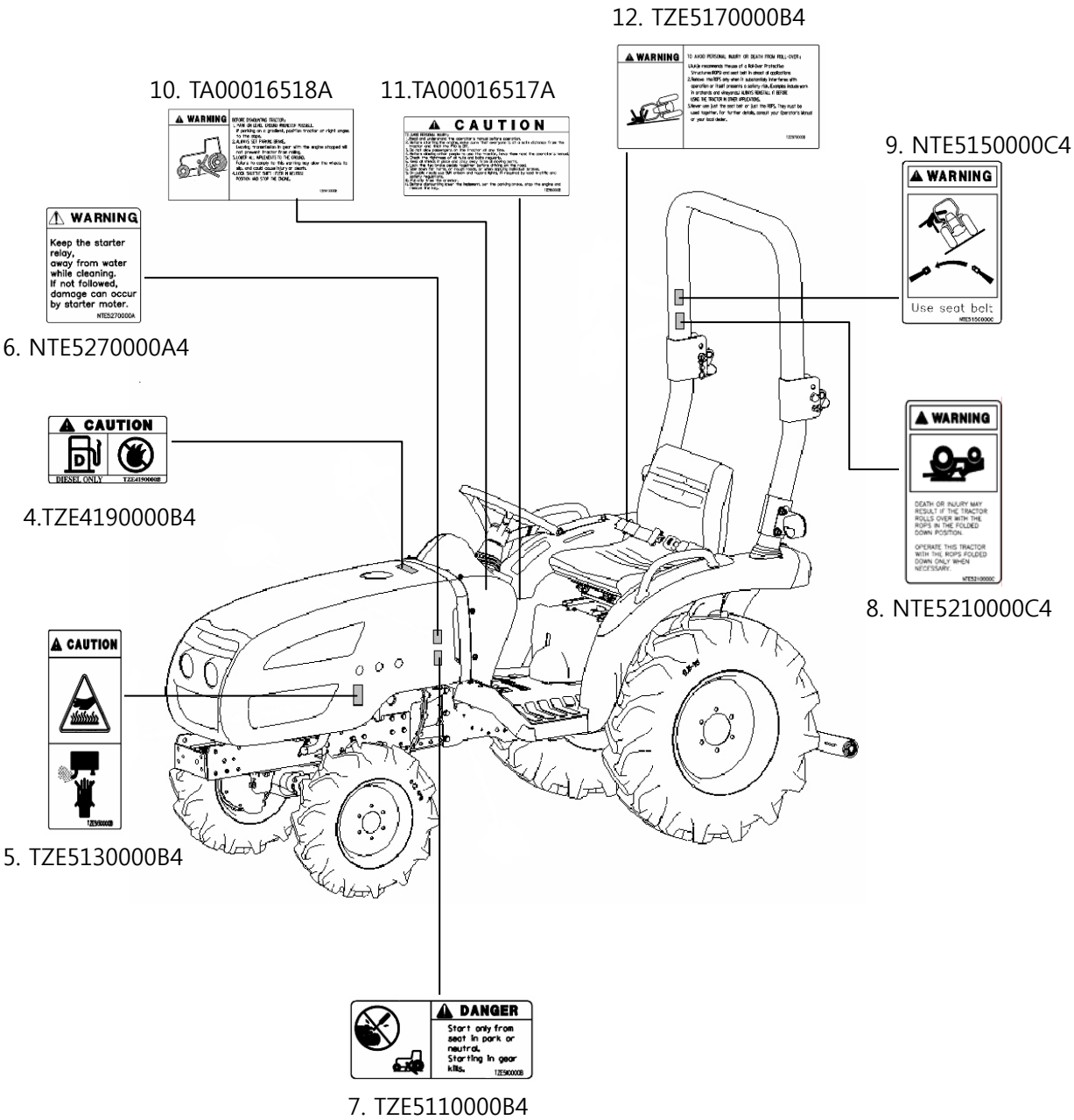
Safety decals are provided to ensure safe operation.

Keep the safety decals clean at all times and protect them from damage.

In case of loss or damage, replace with a new decal.



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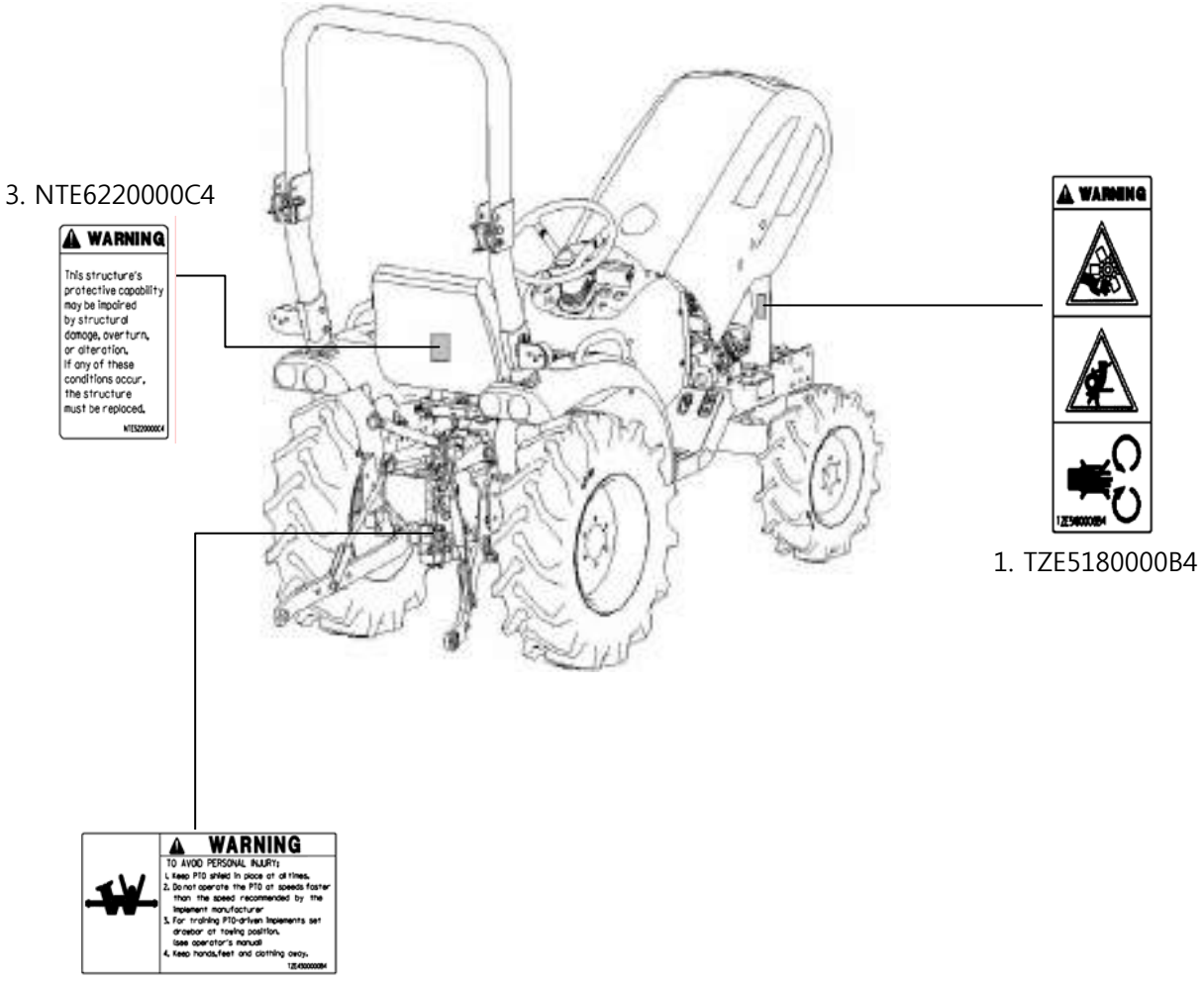


No	Part code	Part description
1	TZE5180000B4	LABEL, FAN WARNING
2	TZE4300000B4	LABEL, PTO CAUTION
3	NTE5220000C4	LABEL, SAFETY
4	TZE4190000B4	LABEL, FILLER CAUTION

No	Part code	Part description
7	TZE5110000B4	LABEL, START CAUTION
8	NTE5210000C4	LABEL, PTO
9	NTE5150000C4	LABEL, DRAWBAR
10	TA00016518A	LABEL, SAFETY

5	TZE5130000B4	LABEL, MUFFLER	11	TA0016517A	LABEL, SAFETY
6	NTE5270000A4	LABEL, START CAUTION	12	TZE5170000B4	LABEL, ROPS WARNING

4. SPECIFICATIONS

<1> SPECIFICATION

Items	Unit	Manual transmission			HST transmission	
		2100	2400	2800	2400h	2800h
Drive System		4 Wheel Drive				
Main Dimensions						
Overall Length	in	106 (2692mm)				
Overall Width	in	44.3 (1124mm)				
Overall Height	in	87.2 (2216mm)				
Wheel Base	in	59.1 (1502mm)				
Front Tread	in	33.6 (853mm)				
Rear Tread	in	34.6 (880mm)				
Ground Clearance	in	12.4 (315mm)				
Weight	lbs.	1785 (810kg)	1805 (819kg)	1807 (820kg)	1805 (819kg)	1807 (820kg)
Engine		Vertical 4 cycle. Water cooled, Diesel				
Model						
Combustion System		Swirl Chamber				
Aspiration		N/A		Turbo Charger	N/A	Turbo Charger
Engine Horsepower (2600 rpm)	HP	20.5	24.0	28.0	24.0	28.0
No. of Cylinders		3				
Bore x Stroke	mm	74 X 82	78 X 82	78 X 82	78 X 82	
Displacement	cc	1058	1175	1175	1175	
Compression Ratio		21.5:1	21:1		21:1	
Fuel Consumption	gal/hp.hr	0.067 (210 g/hp.hr)				

Type of Air Cleaner		Dry, element
Fuel Tank Capacity	gal	6.08 (23L)

4. SPECIFICATION

Items	Unit	Manual transmission			HST transmission	
		2100	2400	2800	2400h	2800h
Battery	Volt	12				
Steering		Hydrostatic				
Clutch		Dry, single stage				
Brake		Wet disc				
Transmission						
Gear Shifting (F x R)		6F x 2R			Hydrostatic, high low gear shift	
Tires (Agricultural)		Turf and Industrial tires Available				
Front		6 - 12				
Rear		9.5 - 16				
Rear PTO		6 spline shaft				
Type		Live				
Speed		540 rpm, 960 rpm, 2500rpm(mid) @2600 engine rpm				
MID PTO		14 spline shaft				
Type		Live				
Speed		2500 rpm @ 2600 engine rpm				
Hydraulic System		Control / Position				
3 point hitch		Category I				
Lift capacity at lift point	lbs	1433 (650kg)				
Pump Capacity	gal/min	7.7 (29.0L/min)				

4. SPECIFICATIONS

<2> TRAVELING SPEED

LEVEL		SHIFTING		MODEL	
		MAIN	RANGE	Manual transmission	HST transmission
				2100, 2400, 2800	2400h,2800h
Forward	1	1	L	0.7(1.1Km/h)	3.9(6.2Km/h)
	2	2	L	1.1(1.8Km/h)	
	3	3	L	2.1(3.3Km/h)	
	4	1	H	2.7(4.4Km/h)	9.6(15.5Km/h)
	5	2	H	4.8(7.8Km/h)	
	6	3	H	8.8(14.1Km/h)	
Reverse	1	R	L	0.8(1.3Km/h)	2.3(3.7Km/h)
	2	R	H	3.4(5.5Km/h)	5.8(9.3Km/h)

◎ Rated Engine rpm: 2600 rpm
Tire: agri 9.5-16 (423mm)

※ **This specification will be changed without prior notice for improvement of quality**

※ **Theory speeds figured by rated engine rpm (mile/hr)**

5. PERIODIC MAINTENANCE SCHEDULE

< SCHEDULE >

Running hours / Check items	50	100	150	200	250	300	350	400	450	500	550	600	
Engine oil	R	R		R		R		R		R		R	
Transmission fluid	R	○	○	○	○	R	○	○	○	○	○	R	
Front axle fluid	R	○	○	○	○	R	○	○	○	○	○	R	
Engine oil filter	R					R						R	
Transmission fluid filter	R					R						R	
Radiator cleaning	At the time the coolant is replaced												
Fuel oil filter and element		○		○		R		○		○		R	
Coolant	Check before every use (Replace every year)												
Air cleaner element	○	○	○	○	○	○	○	○	○	R	○	○	
Fan and radiator cleaning	○	○	○	○	○	○	○	○	○	○	○	○	
Battery solution	Replace every two years												
Battery (specific gravity)		○		○		○		○		○		○	
Fuel pipe and connection	○	○	○	○	○	○	○	○	○	○	○	○	
Steering wheel hose	○	○	○	○	○	○	○	○	○	○	○	○	
Radiator hose													
Hydraulic fluid hose													
Fuel hose, electric cables													
Electric cables	○	○	○	○	○	○	○	○	○	○	○	○	
Greasing	○	○	○	○	○	○	○	○	○	○	○	○	
Tightening handles		○		○		○		○		○		○	
Tightening bolts	○	○		○		○		○		○		○	
Cooling fan belt	○	○		○		○		○		○		○	
Engine breed pipe	○	○		○		○		○		○		○	
Engine crankcase cleaning						○						○	
Intake/Exhaust gas valves												○	
Fuel injection valve												○	
Generator motor	○	○				○				○			
Hydraulic system	○	○				○				○			

※ Inspection should be done every 50 hours. If the tractor is not used much, inspect every year.

※ Replace parts every two years regardless of running hours.

※ Replace the steering wheel hose every two years.

6. OIL, GREASE, ANTI-FREEZE, FUEL AND COOLANT CHART

<1> OIL, GREASE AND ANTI-FREEZE

Type / Item	Type	Remarks
Fuel	Diesel(KS # 2)	Summer: S , Winter : W
Engine oil	SAE 10W-40	CG Above
Grease	NO.2 of KSM2130	Multi purpose
Anti - Freeze	International genuine product	No.2 of KSM 2142,permanent type
Transmission, Steering, Front axle fluid	Branson origin oil	-Texaco TDH oil, 1893 -Chevron Tractor HYD Fluid

Note) Use winter diesel when temperature is below 50'F.

<2> FUEL, OIL AND COOLANT

Model / Type		Manual Transmission		
		2100	**2400**	**2800**
Fuel		6.08 gal (23L)	6.08 gal (23L)	6.08 gal (23L)
Coolant	**Radiator**	1.00 gal (3.8L)	1.00 gal (3.8L)	1.00 gal (3.8L)
	Sub tank	0.21 gal (0.8L)	0.21 gal (0.8L)	0.21 gal (0.8L)
Engine oil		0.79 gal (3L)	0.79 gal (3L)	0.79 gal (3L)
Transmission oil		3.43 gal (13L)	3.43 gal (13L)	3.43 gal (13L)
Front axle oil		0.79 gal (3.0L)	0.79 gal (3.0L)	0.79 gal (3.0L)

Model / Type		HST Transmission	
		2400h	**2800h**
Fuel		6.08 gal (23L)	6.08 gal (23L)
Coolant	**Radiator**	1.00 gal (3.8L)	1.00 gal (3.8L)
	Sub tank	0.21 gal (0.8L)	0.21 gal (0.8L)
Engine oil		0.79 gal (3L)	0.79 gal (3L)
Transmission oil		3.96 gal (15L)	3.96 gal (15L)

Front axle oil	0.79 gal (3.0L)	0.79 gal (3.0L)

7. CHECK AND MAINTENANCE

CAUTION

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

<1> DAILY CHECK

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

< Checking >

▶ Check areas where previous trouble was experienced.

▶ Walk around the tractor.

1. Check the tire pressure, and check for wear and damage.
2. Check for oil and water leaks.
3. Check the engine oil level.
4. Check the transmission fluid level.
5. Check the coolant level.
6. Check the condition of seat belt and ROPS attaching hardware.
7. Check and clean the radiator screen and grill.
8. Check that the bolts and nuts of the tires are tight.
9. Check the number plate or SMV emblem for damage and clean, replace as necessary of equipped.
10. Care of danger, warning, and caution labels.
11. Clean around the exhaust manifold and the muffler of the engine.

▶ While sitting in the operator's seat.

1. Check the HST pedal, brake pedal and clutch pedal.
2. Check the parking brake.
3. Check the steering wheel.

▶ Turning the key switch.

1. Check the performance of the instrument panel lights.
2. Check the head lights, tail 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 gas.
3. Check the brakes for proper operation.

7. DISASSEMBLING AND SERVICING

<2> CHECK POINTS OF INITIAL 50 HOURS

< Changing engine oil >

CAUTION

- ▶ Be sure to stop the engine.
- ▶ Allow engine to cool down sufficiently, oil can be hot and can burn.

1. Place an oil pan underneath the engine.
2. To drain the used oil, remove the drain plug(1) at the bottom of the engine and drain the oil completely.
3. Screw in the drain plug(1).
4. Fill with the new oil up to the upper notch on the dipstick.

◈ **Important**

- ➢ Never mix two different types of oil.

Engine oil capacity	2100 2400(h) 2800(h)	3.0 L 3.17 U.S.qts 0.79 gal

***. PART NAME**

1) Drain plug
2) Oil inlet
3) Dipstick

7. DISASSEMBLING AND SERVICING

< Replacing engine oil filter cartridge >

CAUTION

- ▶ Be sure to stop the engine before changing oil filter cartridge.

1. Remove the oil filter cartridge with the filter wrench.
2. Apply a slight coat of oil onto the cartridge gasket.
3. To install the new cartridge, screw it in by hand. Over tightening may cause deformation of rubber gasket.
4. After the new cartridge has been replaced, the engine oil normally decrease a little. Thus see that the engine oil does not leak through the seal and be sure to read the oil level on the dipstick. Then, replenish the engine oil up to the specified level.

◈ **Important**

- ➢ To prevent serious damage to the engine, replacement element must be highly efficient. Use only a Branson genuine filter.

***. PART NAME**

1) Engine oil filter

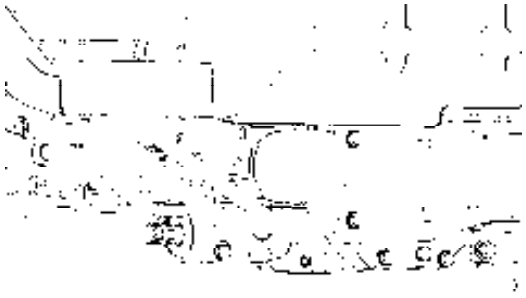
7. DISASSEMBLING AND SERVICING

< Changing transmission fluid >

CAUTION

- ▶ Be sure to stop the engine before checking and changing the transmission fluid.

1. Place an oil pan under the tractor.
2. Remove the drain plugs(1) at the bottom of the rear axle cases, transmission case and front transmission case.
3. Drain the transmission fluid.
4. After draining, screw in the four drain plugs.
5. Fill new oil from filling port after removing the filling plug(2), up to the upper notch on the dipstick.
6. After running the engine for a few minuets, stop it and check the oil level again, if low, add oil to proper level.



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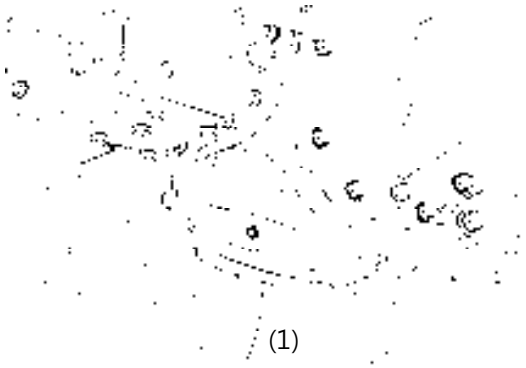


(1)

◈ **Important**

- ➢ Use only multi-grade transmission oil. Use of other oils may damage the transmission of hydraulic system.
- ➢ Never work the tractor immediately after changing the transmission oil. Keep the engine at medium speed for a few minutes to prevents damage to the transmission.

(1)

Transmission fluid capacity	2100 2400 2800	Front case	3L (0.79gal)
		Rear case	13L (3.43gal)
	2400h 2800h	Front case	3L (0.79gal)
		Rear case	15L (3.96gal)

(3)

***. PART NAME**

1) Drain plug 2) Filling plug

3) Dipstick

7. DISASSEMBLING AND SERVICING

< Replacing hydraulic oil filter cartridge >

CAUTION

▶ Be sure to stop the engine before changing the oil filters.

1. Drain the transmission fluid.
2. Remove the oil filter cartridge by using a filter wrench.
3. Apply a slight coat of oil onto the cartridge gasket.
4. To install the new cartridge, screw it in by hand. Over tightening may cause deformation of rubber gasket.
5. After the new cartridge has been replaced, the transmission fluid level will normally decrease slightly. Make sure that the transmission fluid does not leak through the seal. Check the fluid level.

◈ **Important**

➢ To prevent serious damage to the hydraulic system. Use only a genuine Branson filter.

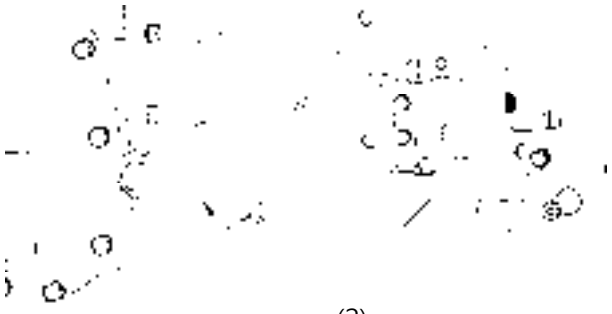
< Cleaning transmission oil strainer (HST) >

1. Clean the strainer with nonflammable solvent.

▶ **NOTE**

1) When changing the transmission fluid, disassemble and rinse the strainer with nonflammable solvent to completely clean off filings. When reassembling, be careful not to damage the parts.
2) Since the fine filings in the oil could impair the component parts of the hydraulic system which is precision built to withstand high pressure, the suction line end is provided with an oil strainer.
3) Please do the replacing, of the oil filter cartridge and the cleaning oil strainer at the same time. And when replacing, reinstall the oil strainer first.

(1)



(2)

***. PART NAME**

1) Hydraulic oil filter (HST) 2) Hydraulic oil filter

7. DISASSEMBLING AND SERVICING

< Checking clutch pedal free travel >

CAUTION

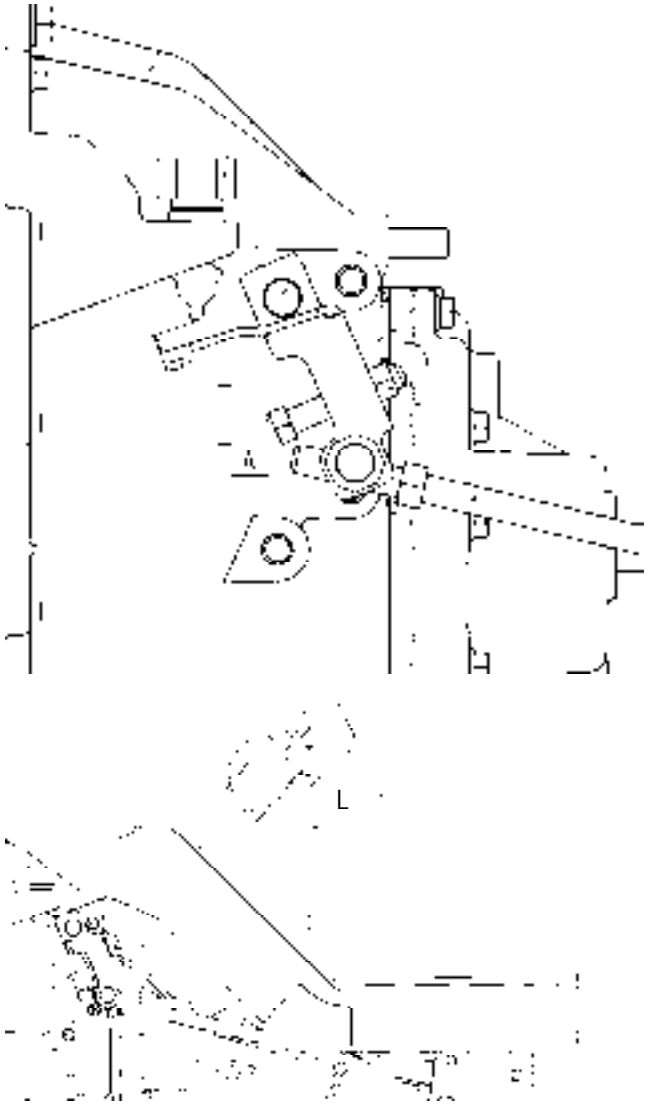
- When checking, park the tractor on flat ground, apply the parking brake, stop the engine and remove the key.

1. Slightly depress the clutch pedal and measure stroke "A" at top of stopper bolt(1).
2. If the measurement is not within the factory specifications, loosen the lock nut and adjust the clutch pedal rod(2) length.
3. After adjusting it, measure total stroke "B" between stopper bolt(1) and clutch housing(4).
4. If the measurement is not within the factory specifications, adjust it with the clutch pedal stopper bolt(1).
5. And at the same time, adjust the clearance "C" between safety switch(5) and clutch rod(6).

▶ **NOTE**

1) After adjustment, secure the stopper bolt with the lock nut(3).

Clutch pedal free travel on stopper bolt stroke "A"	Factory spec.	7.0 to 9.0 mm 0.28 to 0.35 in.
Reference : Clutch pedal free travel "L" on top of clutch pedal.		25.0 to 35.0 mm 0.98 to 1.38 in.
Clearance "B"	Factory spec.	1.5 to 2.0 mm 0.06 to 0.08 in.



***. PART NAME**

1) Stopper bolt
2) Clutch pedal rod
3) Lock nut for stopper bolt
4) Clutch housing
5) Satety switch
6) Clutch rod

7. DISASSEMBLING AND SERVICING

<3> CHECK POINTS OF EVERY 50 HOURS

< Checking engine start system >

CAUTION

- ▶ Do not allow anyone near the tractor while testing.
- ▶ If the tractor does not pass the test do not operate the tractor.

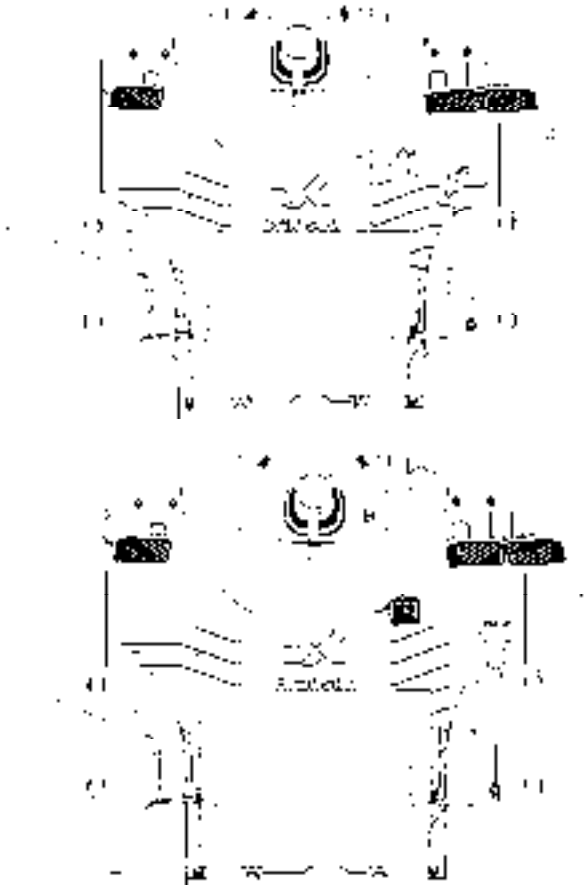
▷ **Preparation before testing**

1. Sit on operator's seat.
2. Set the parking brake and stop the engine.
3. HST type
   -. Shift the range gear shift lever to "Neutral" position.
   -. Place the speed control pedal in "Neutral" position.

   Manual transmission type
   -. Shift the main gear shift lever in "Neutral" position.
4. Shift the PTO gear shift lever to "Neutral" position.
5. Fully depress the clutch pedal.

▷ **Test 1 : Safety switch for clutch pedal**

1. Place the speed control pedal in "Neutral" position for a HST type or shift the main gear shift lever for a Manual transmission type to "Neutral" position.
2. Release the clutch pedal.
3. Turn the key to "Start" position.
4. The engine must not crank.



***. PART NAME**

1) Clutch pedal
2) Range shift
3) PTO gear shift
4) Speed control pedal
5) Main gear shift

7. DISASSEMBLING AND SERVICING

▷ **Test 2 : Safety switch for HST of main gear**

1. Fully depress the clutch pedal.
2. Depress the speed control pedal HST type or shift the main gear shift lever Manual transmission type to "Desired" position.
3. Turn the key to "Start" position.
4. The engine must not crank.

▷ **Test 3 : Safety switch for PTO**

1. Fully depress the clutch pedal.
2. Place the speed control pedal in "Neutral" position HST type or shift the main gear shift lever Manual transmission type to "Neutral" position.
3. Shift the PTO gear shift lever to "On"(Engaged) position.
4. Turn the key to "Start" position.
5. The engine must mot crank.

▷ **Test 4 : Seat switch**

1. Sit on operator's seat.
2. Start the engine.
3. Fully depress the clutch pedal.
4. Shift the PTO gear shift lever to "On"(Engaged) position.
5. Stand up. (Do not get off the machine.)
6. The engine must shut off after approximately 1 second.
7. If it does not stop, consult your local Branson Dealer for this service.

▶ **NOTE**

1) If the engine cranks during nay of these tests, adjust or replace the required safety switch.

< Greasing >

1. Apply the grease to the following position as figures.

***. PART NAME**

1) Grease fitting(HST pedal)
2) Battery terminals
3) Grease fitting (Lifting rod RH)
4) Grease fitting (Top link)
5) Front axle tie rod

7. DISASSEMBLING AND SERVICING

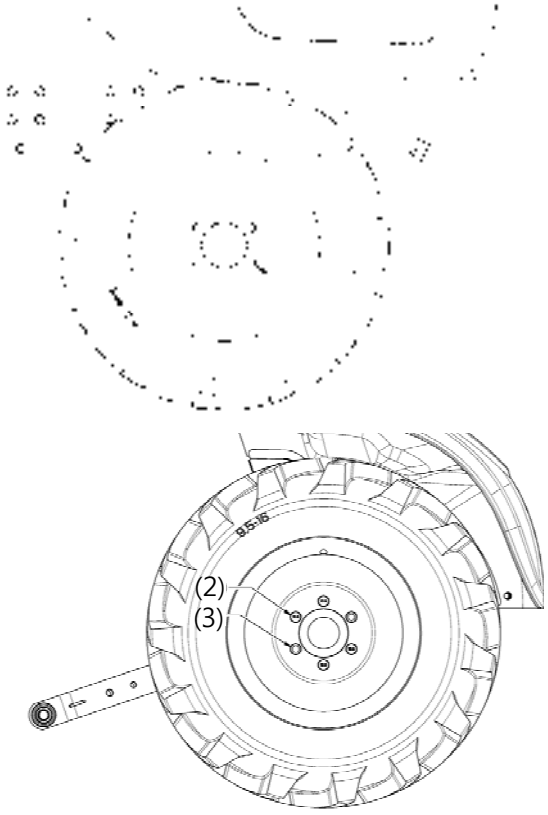
< Checking wheel mounting screws and nuts tightening torque >

CAUTION

- Never operate tractor with a loose rim, wheel, or axle.
- Any time bolts and nuts are loosened, retighten to specified torque.
- Check all bolts and nuts frequently and keep them tight.

1. Check wheel bolts and nuts regularly especially when new. If there are loosened, tighten as follows.

Tightening torque	Front wheel mounting bolt	77 to 90 Nm 7.9 to 9.2 kgfm 57.2 to 66.5 ft-lbs
	Rear wheel mounting Nut / bolt	108 to 125 Nm 11.0 to 12.8 kgfm 80 to 93 ft-lbs



***. PART NAME**

1) Front wheel mounting bolt
2) Rear wheel mounting bolt
3) Rear wheel mounting nut

<4> CHECK POINTS OF EVERY 100 HOURS

< Changing engine oil >

-. Reference the page. 14.

< Checking clutch pedal free travel >

-. Reference the page. 18.

< Checking battery condition >

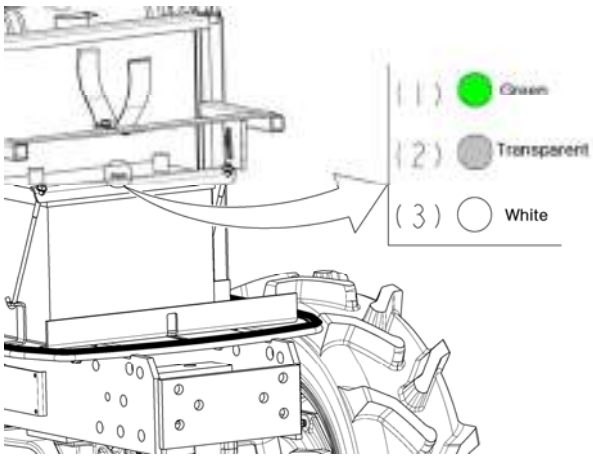
CAUTION

- Never remove the vent plugs while the engine is running.

7. DISASSEMBLING AND SERVICING

- Keep electrolyte away from eyes, hands and clothes. If you are spattered with it, wash it away completely with water immediately and get medical attention.
- Wear eye protection and rubber gloves when working around battery.

1. Mishandling the battery shortens the service life and adds to maintenance costs.
2. The original battery is a maintenance free type, but stills needs some servicing. If the battery is weak, the engine is difficult to start and the lights become dim. It is important check the battery periodically.



***. PART NAME**

1) Good
2) Charge
3) Change

< Battery charging >

CAUTION

- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.
- When charging battery, remove battery vent plugs.
- When disconnecting the cable from the battery, start with the negative terminal first. When connecting the cable to the battery, start with the positive terminal first.
- Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

7. DISASSEMBLING AND SERVICING

1. Make sure each electrolyte level is to the bottom of vent wells, if necessary add distilled water in a well-ventilated area.
2. The water in the electrolyte evaporates during recharging. Liquid shortage damages the battery. Excessive liquid spills over and damages the tractor body.
3. To slow charge the battery, connect the battery positive terminal to the charger positive terminal and the negative to the negative, then recharge in the standard fashion.
4. A boost charge is only for emergencies. It will partially charges the battery at a high rate and in a short time. When using a boost-charged battery, it is necessary to recharge the battery as early as possible. Failure to do this will shorten the battery's service life.
5. When the specific gravity of electrolyte become between 1.27 and 1.29 charge has completed.
6. When exchanging an old battery for a new one, use battery of equal specification.

◆ **Direction for storage**

1. When storing the tractor for long periods of time, remove the battery from tractor, adjust the electrolyte to the proper level and store in a dry place out of direct sunlight.
2. The battery self-discharges while it is stored. Recharge it once every three months in hot seasons and once every six months in cold seasons.

Battery Type	Volts (V)	Capacity at 5H.R (A.H.)	Reserve Capacity (min.)	Cold Cranking Amps	Normal Charging Rate(A)
BX50S	12	40	90	480	4.5

7. DISASSEMBLING AND SERVICING

< Cleaning air cleaner element >

1. Remove the air cleaner cover(1) and primary element(2).
2. Cleaning the primary element :

▷ When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 205kPa (2.1 kgf/㎠, 30 psi).

▷ When carbon or oil adheres to the element, soak the element in detergent for 15 minutes then wash it several times in water, rinse with clean water and dry it naturally. After the element is fully dried, inspect inside of the element with a light and check if it is damaged or not.

3. When to replace the air cleaner primary element(2) : Once a year or after every six times of cleaning, whichever comes first.

◈ **Important**

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

◆ **Evacuator valve**

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

***. PART NAME**

1) Cover
2) Primary element
3) Evacuator valve

7. DISASSEMBLING AND SERVICING

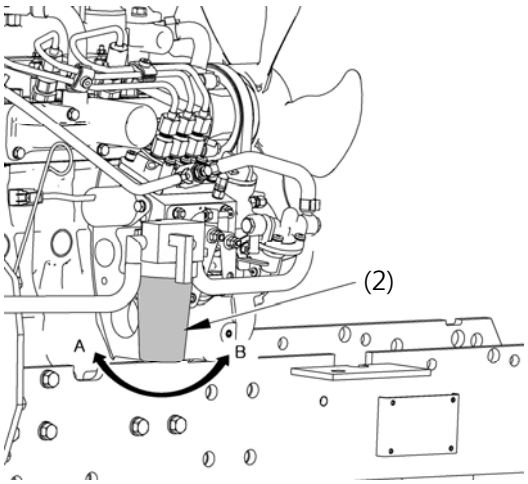
< Cleaning fuel filter >

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

1. Loosen and remove the fuel filter bowl(2), and rinse the inside with kerosene.
2. Take out the filter element(4) and dip it in the kerosene to rinse.
3. After cleaning, reassemble the fuel filter, keeping out dust and dirt.
4. Bleed the fuel system.

▶ **NOTE**

1) When the fuel filter bowl has been removed, fuel stops flowing from the fuel tank. If the fuel tank is almost full, however, the fuel will flow back from the fuel return pipe to the fuel filter. Before checking the above, mark sure the fuel tank is less than half-full.



***. PART NAME**

1) Filter bracket
2) Fuel filter bowl
3) O-ring
4) Filter element
5) O-ring
A) Loosen
B) Tighten

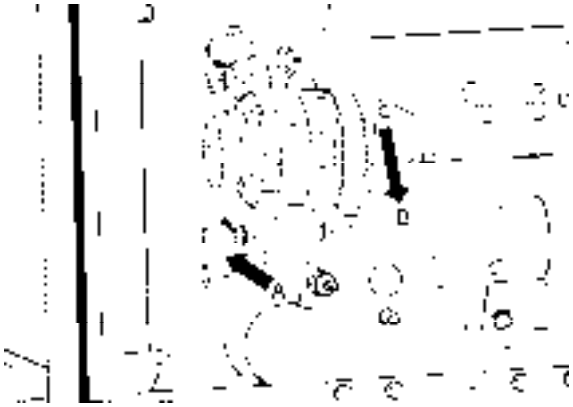
< Checking fan belt tension >

CAUTION

▶ Be sure to stop engine before checking belt tension.

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to the belt between pulleys.
3. If the tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

Fan belt tension	Factory spec.	A deflection of between 7 to 9mm (0.28 to 0.34 in.) when the belt is pressed in the middle of the span.



***. PART NAME**

1) Adjusting screw
2) Tension bolt
A) Check the belt tension
B) To tighten

7. DISASSEMBLING AND SERVICING

< Adjusting brake pedal free travel >

CAUTION

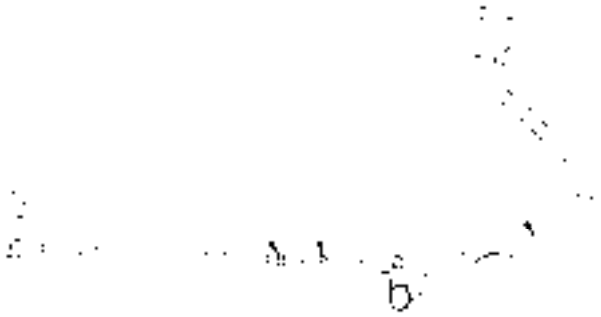
- ▶ Stop the engine and chock the wheels before checking the brake pedal.
- ▶ The difference between the right and left pedal free travel must be less than 4.0 mm (0.16 in.).

1. Release the parking brake.
2. Slightly depress the brake pedals and measure the free travel at the top of the pedal stroke.
3. If the measurement is not within the factory specifications, loosen the lock nut and turn the turnbuckle to adjust the brake rod length.
4. Retighten the lock nut securely.
5. Keep the free travel in the right and left brake pedals equal.

Brake pedal free travel (L)	Factory spec.	30 to 40 mm 1.18 to 1.57 in.

▶ **NOTE**

1) After checking brake pedal free travel, be sure to engage the parking brake lever fully and check to see that the brake pedals are securely locked.



***. PART NAME**

1) Brake pedal
2) Turnbuckle
3) Lock nut

L : Free travel

7. DISASSEMBLING AND SERVICING

< Checking fuel line >

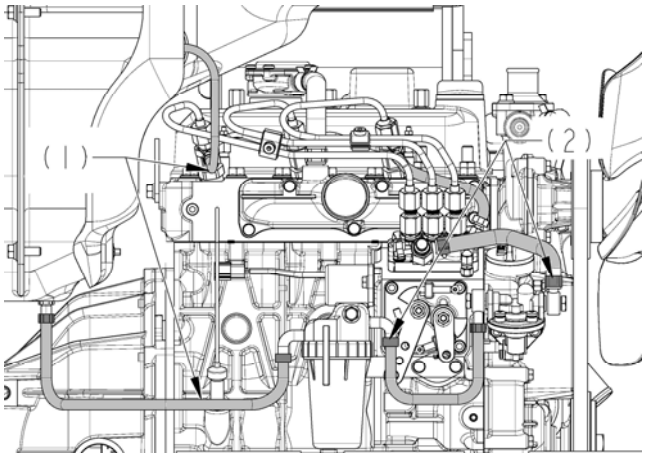
CAUTION

- ▶ Stop the engine when attempting the check and change prescribed below.
- ▶ Remember to check the fuel line periodically. The fuel line is subject to wear and aging, fuel may leak out onto the running engine, causing a fire.

1. Check to see that all line and hose clamps are tight and not damaged.
2. If hoses and clamps are found worn or damaged, replace or repair them at once.
3. The fuel line is made of rubber and ages regardless of period of service. Replace the fuel pipe together with the clamp every two years and securely tighten.
4. However if the fuel pipe and clamp are found damaged or deteriorated earlier than two years, then change or repair.
5. After the fuel line and clamp have been changed, bleed the fuel system.

◈ **Important**

- ➢ When the fuel line is disconnected for change, close both ends of the fuel line with a piece of clean cloth of paper to prevent dust and dirt from entering. Entrance of dust and dirt causes malfunction of the fuel injection pump. In addition, particular care must be taken not to admit dust and dirt into the fuel pump.



***. PART NAME**

1) Fuel hoses 2) Hose clamps

7. DISASSEMBLING AND SERVICING

<5> CHECK POINTS OF EVERY 200 HOURS

< Replacing engine oil filter cartridge >

-. Reference the page 15.

< Checking intake air line >

1. Check to see that hoses and hose clamps are tight and not damaged.
2. If hoses and clamps are found worn or damaged, replace or repair them at once.

< Checking radiator hose and hose clamp >

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

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

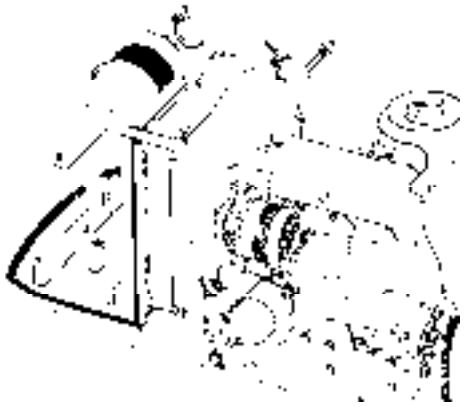
◆ **Precaution at overheating**

Take the following actions in the event the coolant temperature is near or more than the boiling point, which is called "Overheating".

1. Stop the machine operation in a safe place and keep the engine unloaded idling.
2. Don't stop the engine suddenly, but stop it after about 5 minutes of unloaded idling.
3. Keep yourself well away from the machine for another 10 minutes or while the steam has blown out.
4. Checking that there gets on danger such as burn, get rid of the causes of overheating according to the manual and start again the engine.

***. PART NAME**

1) Hose 2) Hose clamps



***. PART NAME**

1) Hose 2) Clamp

7. DISASSEMBLING AND SERVICING

<6> CHECK POINTS OF EVERY 300 HOURS

< Changing transmission fluid >

-. Reference the page 16.

< Cleaning transmission oil strainer >

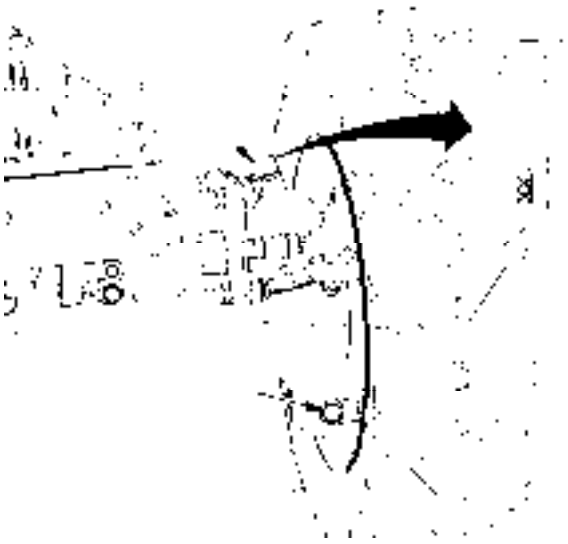
-. Reference the page 17.

< Replace hydraulic oil filter cartridge >

-. Reference the page 17.

< Changing front axle case oil >

1. Place the oil pans underneath the front axle case.
2. Remove the both right and left hand side drain plugs(2) and filling plug(1) to drain the oil.
3. After draining, reinstall the drain plugs(2).
4. Fill with new oil up to the upper notch on the dipstick.



***. PART NAME**

1) Filling plug with dipstick 2) Drain plug

A) Oil level is acceptable within this range

◈ **Important**

- After ten minutes, check the oil level again, add oil to proper level.
- Use Branson genuine fluid.

Front axle case oil capacity	2100 2400(h) 2800(h)	3.0 L 3.17 U.S.qts 0.79 gal

7. DISASSEMBLING AND SERVICING

<7> CHECK POINTS OF EVERY 400 HOURS

< Front axle rocking force >

1. Jack up the front side of tractor.
2. Set a spring balance to the front axle flange.
3. Measure the front axle rocking force.
4. If the measurement is not within the factory specifications, adjust by the adjusting screw(1).
5. Tighten the lock nut(2) firmly.

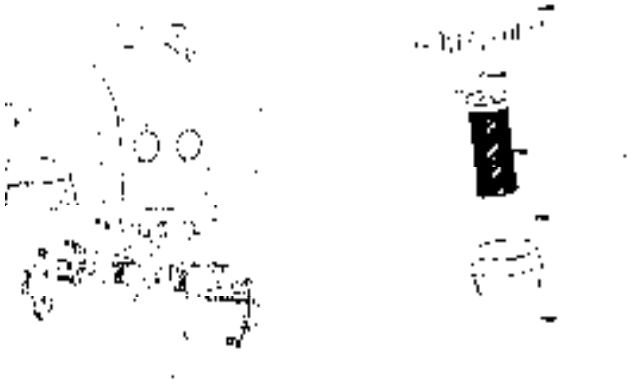
Front axle rocking force	Factory spec.	49.0 to 98.1 N 5.0 to 10.0 kgf 11.0 to 22.1 lbs

***. PART NAME**

1) Adjusting screw 2) Lock nut

< Replace fuel filter element >

1. The fuel filter element should be replaced every 400 hours.



***. PART NAME**

1) Filter bracket 2) Fuel filter bowl
3) O-ring 4) Filter element
5) O-ring

<8> CHECK POINTS OF EVERY 800 HOURS

< Checking valve clearance >

-. Reference the engine service manual.

<9> CHECK POINTS OF EVERY 1500 HOURS

< Checking fuel injection nozzle injection pressure >

-. Reference the engine service manual.

<10> CHECK POINTS OF EVERY 3000 HOURS

< Checking injection pump >

-. Reference the engine service manual.

<11> CHECK POINTS OF 1 YEAR

< Replace air cleaner primary element and secondary element >

-. Reference the page 24.

7. DISASSEMBLING AND SERVICING

<12> CHECK POINTS OF 2 YEARS

< Replacing radiator hose (Water pipes) >

1. Replace the hoses and clamps.

-. Reference the page 28.

< Replacing fuel hose >

1. Replace the fuel hoses and clamps.

-. Reference the page 27.

< Replacing intake air line >

1. Replace the hoses and clamps, if necessary.

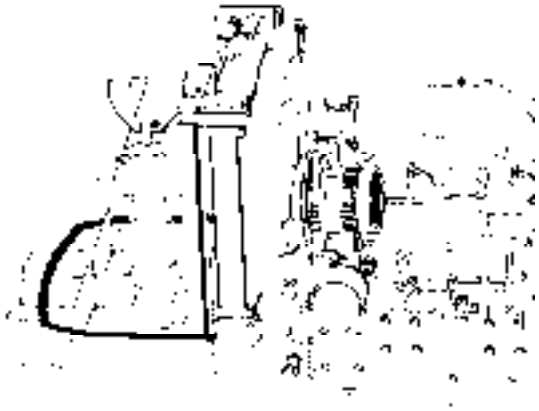
-. Reference the page 28.

< Flush cooling system and changing coolant >

CAUTION

▶ Do not remove the radiator cap when the engine is hot. Then loosen cap slightly to the stop to relieve any excess pressure before removing cap completely.

1. Stop the engine and let cool down.
2. To drain the coolant, open the radiator drain cock, and remove radiator cap. The radiator cap must be removed to completely drain the coolant.
3. After all coolant is drained, close the drain plug.
4. Fill with clean water and cooling system cleaner.
5. Follow directions of the cleaner instruction.
6. After flushing, fill with clean water and anti-freeze until the coolant level is just below the port.
7. Start and operate the engine for few minutes.
8. Stop the engine. Check coolant level and add coolant if necessary.
9. Install the radiator cap securely.



***. PART NAME**

1) Radiator cap
2) Recovery tank
3) Drain cock

7. DISASSEMBLING AND SERVICING

◈ **Important**

- Do not start the engine without coolant.
- Use clean, fresh water and anti-freeze to fill the radiator.
- When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%.
- Securely tighten radiator cap. If the cap is loosen or improperly fitted, water may leak out and the engine could overheat.

Coolant capacity(with recovery tank)	2100 2400(h) 2800(h)	3.8 L 4.0 U.S.qts 1.0 gal

< Flush cooling system and changing coolant (Continued) >

◆ **Anti-freeze**

If it freezes, cooling water can damage the cylinders and radiator. When it may be necessary the ambient temperature falls below 0℃(32℉) to remove coolant water after operating or to add anti-freeze to it.

1. There are two types of anti-freeze available; use the permanent type for this engine.
2. Before adding anti-freeze for the first time, clean the radiator interior by pouring fresh water and draining it a few times.
3. The procedure for mixing the water and anti-freeze differs according to the make of the anti-freeze and the ambient temperature.

7. DISASSEMBLING AND SERVICING

4. Mix the anti-freeze with water, and then fill in to the radiator.

Vol % Anti-freeze	Freezing point		Boiling point	
	℃	℉	℃	℉
40	-24	-12	106	222
50	-37	-34	108	226

* At 760 mmHg pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

▶ **NOTE**

1) The above data represents industry standards that necessitate the minimum glycol content in the concentrated anti-freeze.
2) When the coolant level drops due to evaporation, add water only. In the case of leakage, add anti-freeze and water in the specified mixing ratio.
3) Anti-freeze absorbs moisture. Keep unused anti-freeze in a tightly sealed container.
4) Do not use radiator cleaning agent when anti-freeze had been added to the coolant. (Anti-freeze contains an anti-corrosive agent, which will react with the radiator cleaning agent forming sludge which will affect the engine parts.)

7. DISASSEMBLING AND SERVICING

<13> OTHERS

< Bleeding fuel system >

Air must removed :

1. When the fuel filter or lines are removed.
2. When tank is completely empty.
3. After the tractor has not been used for a long period of time.

Bleeding procedure is as follows :

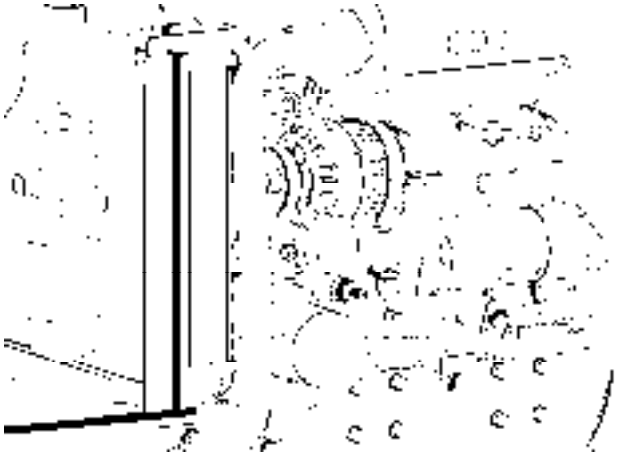
1. Fill the fuel tank with fuel.
2. Start the engine and run for about 30 second, and then stop the engine.

< Replacing fuse >

1. The tractor electrical system is protected from potential damage by fuses. A blown fuse indicates that there is an overload or short somewhere in the electrical system.
2. If any of the fuses should blow, replace with a new one of the same capacity.

◈ **Important**

- Before replacing a blown fuse, determine why the fuse blew and make any necessary repairs. Failure to follow this procedure may result in serious damage to the tractor electrical system.



***. PART NAME**

A) Fuse box B) Main fuse

< Replacing light bulb >

1. Head light

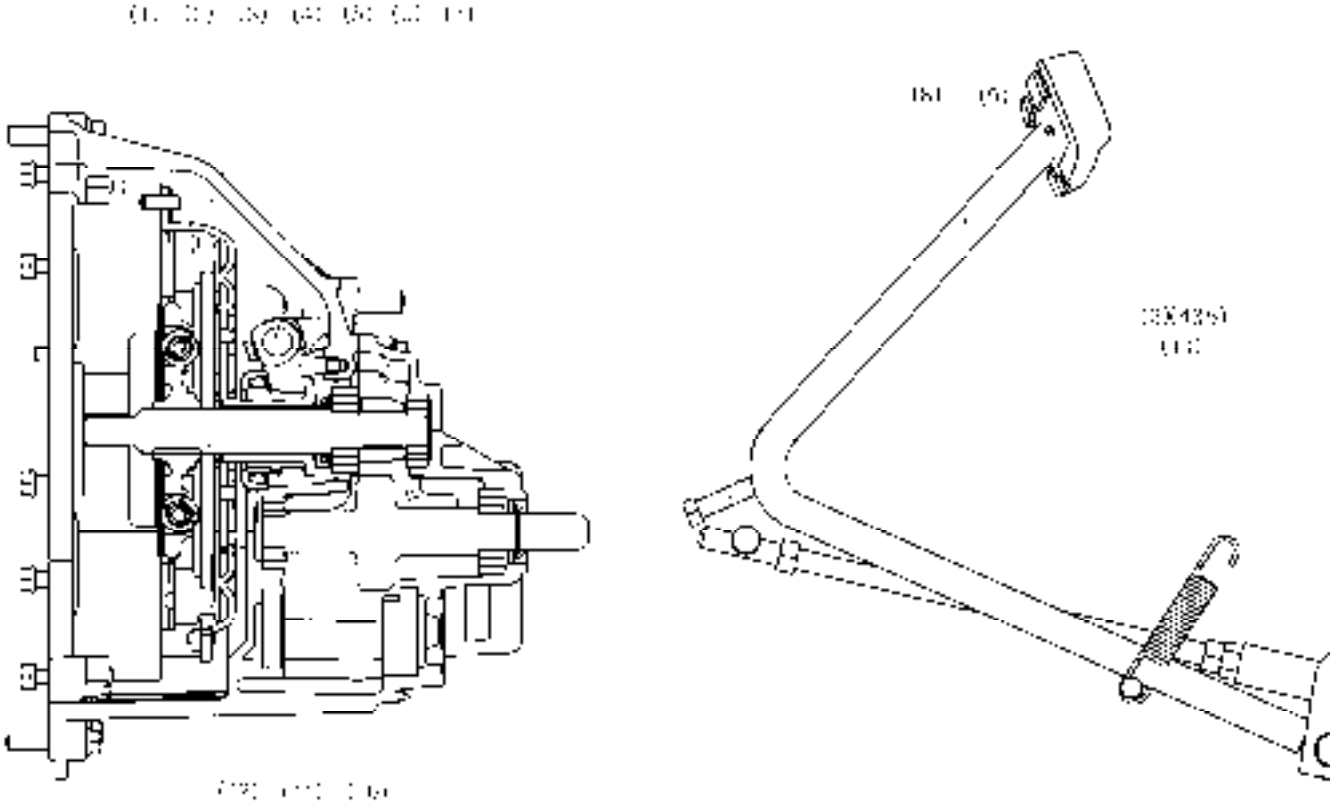
   Take the bulb out of the light body and replace with a new one.
2. Other lights

   Detach the lens and replace the bulb.

Light	Capacity
Head light	55W
Tail light	10W
Turn signal / Hazard light	21W / 21W
Instrument panel light	1.7W
Hazard light switch indicator	0.6W

CONTENTS 2. (CLUTCH)

1. LINKAGE MECHANISM



1) Engine Flywheel
2) Clutch Disc
3) Clutch Cover
4) Pressure Plate
5) Diaphragm Spring
6) Clutch Rod
7) Clutch Release Fork
8) Clutch Adjusting Bolt
9) Clutch Pedal
10) Clutch Release Hub
11) Clutch Release Bearing
12) Clutch Shaft
13) Pressure Plate Assembly

Engine torque is transmitted to the pressure plate assembly(13) via the flywheel(1) which is connected to the engine crankshaft. Therefore, the clutch cover constantly runs with the engine. The clutch disc(2) is located between the flywheel(1) and the pressure plate(4) in the pressure plate assembly. Torque is transmitted to the clutch disc(2) by the pressure created by the diaphragm spring(5) installed in the pressure plate assembly. Then, the torque is transmitted to the transmission via the clutch shaft(12).

When the clutch pedal(9) is depressed, the clutch release hub(10) and the clutch release bearing(11) move towards the flywheel and push the fingers of the diaphragm spring(5). In other words, this movement pulls the pressure plate(4) up and disengages the clutch.

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Clutch Pedal	(Reference) On Clutch Pedal	20.0 to 30.0 mm 0.8 to 1.2 in.	-
Clutch pedal stopper bolt	Clearance "A" between Stopper Bolt and Clutch Housing	7.0 to 9.0 mm 0.28 to 0.35 in.	-
Safety switch setting position	Clearance "B" of Safety Switch when Clutch Pedal Released	1.5 to 2.5 mm 0.059 to 0.098 in.	-
Clutch disc	Disc Surface to Rivet Top (Depth)	-	0.3 mm 0.012 in.
Clutch disc boss to gear shaft	Backlash (Displacement Around Disc Edge)	-	2.0 mm 0.079 in.
Pressure plate	Flatness	-	0.2 mm 0.008 in.

3. TIGHTENING TORQUES

Tightening torque of screws, bolts and nuts on the table below are especially specified.

Item	N·m	kgf·m	ft-lbs
Steering wheel mounting nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Delivery pipe nut for HST	34.3 to 39.2	3.5 to 4.0	25 to 28
Oil cooler pipe nut	50.0 to 57.9	5.1 to 5.9	36.9 to 42.8
Delivery pipe nut for power steering	64.7 to 75.5	6.6 to 7.7	47.9 to 55.3
Clutch housing and engine mounting screw (M8)	25.5 to 27.5	2.4 to 2.8	17.4 to 20.2
Clutch housing and engine mounting screw (M10)	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Clutch cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.2

4. CHECKING, DISASSEMBLEING AND SERVICING

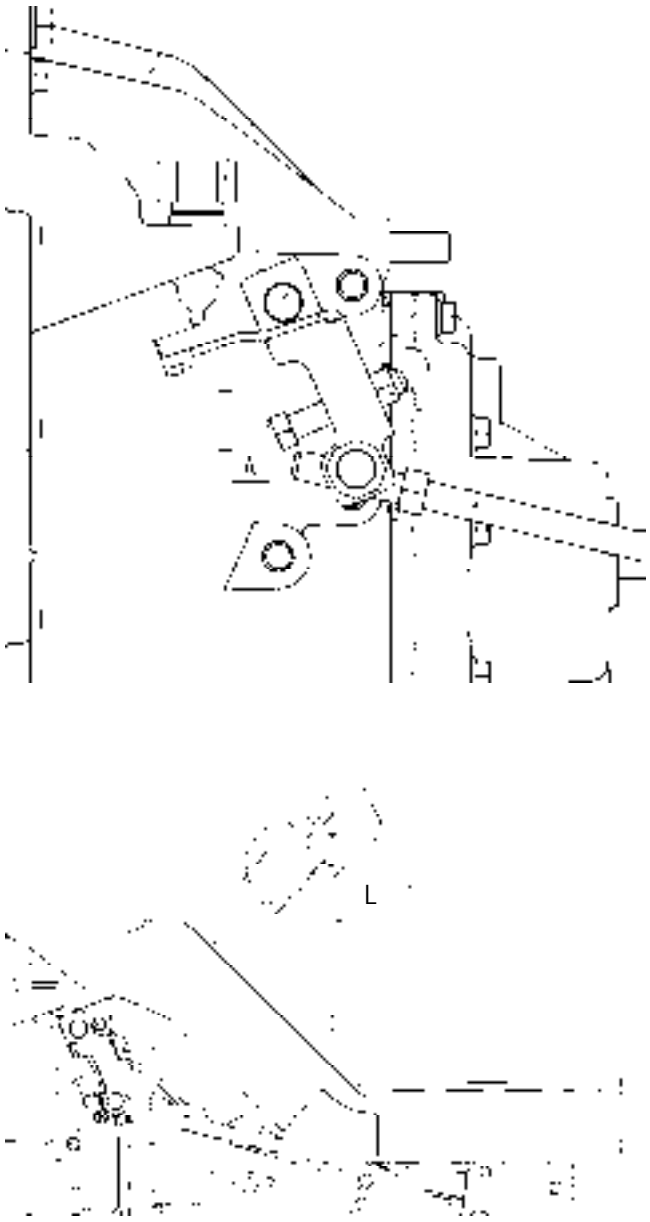
<1> CHECKING AND ADJUSTING

< Checking clutch pedal free travel >

CAUTION

When checking, park the tractor on flat ground, apply the parking brake, stop the engine and remove the key.

1. After adjusting it, measure total stroke **"A"** between stopper bolt(1) and clutch housing(4).
2. If the measurement is not within the factory specifications, adjust it with the clutch pedal stopper bolt(1).
3. And at same the time, adjust the clearance **"B"** between safety switch(5) and clutch rod(6).



▶ **NOTE**

1) After adjustment, secure the stopper bolt with the lock nut(3).

Clutch pedal free travel **"L"** on top of clutch pedal.		25 to 35 mm 0.98 to 1.38 in.
Clutch pedal total stroke **"A"**	Factory spec.	7.0 to 9.0 mm 0.31 to 0.35 in.
Clearance **"B"**	Factory spec.	1.5 to 2.5 mm 0.06 to 0.08 in.

***. PART NAME**

1) Stopper bolt
2) Clutch pedal rod
3) Lock nut for stopper bolt
4) Clutch housing
5) Safety switch
6) Clutch rod

4. CHECKING, DISASSEMBLEING AND SERVICING

<2> PREPARATION

1) Separating Engine From Clutch Housing.

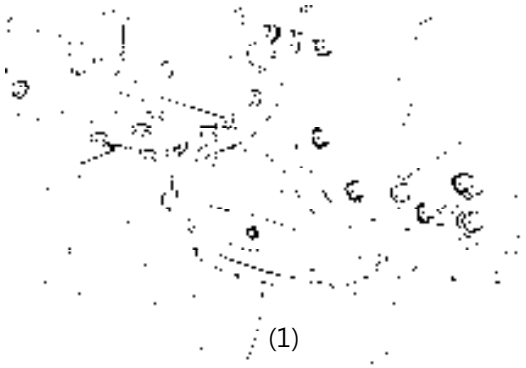
< Draining transmission fluid >

1. Place and oil pan underneath the transmission case, and remove the drain plugs(1).
2. Drain the transmission fluid.
3. Reinstall the drain plug.

(1)

▷ Refilling

- ✓ Fill new oil from filling port after removing the filling plug(2) up to the upper notch on the dipstick(3).
- ✓ After running the engine for a few minutes, stop it and check the oil level again, if low, add oil to the proper level.



(1)

◈ Important

- ➢ Use only multi-grade transmission oil. Use of other oils may damage the transmission or hydraulic system.
- ➢ Never work the tractor immediately after changing the transmission oil. Keep the engine at medium speed for a few minutes to prevent damage to the transmission.
- ➢ Do not mix different brands of oil together.

(1)

Transmission fluid Capacity	2100	13.00 L
	2400	3.43 U.S.gals
	2800	2.90 Imp.gals
	2100h	15.00 L
	2400h	3.96 U.S.gals
	2800h	3.30 Imp.gals

(2)

(3)

***. PART NAME**

1) Drain plug

2) Filling plug

3) Dipstick

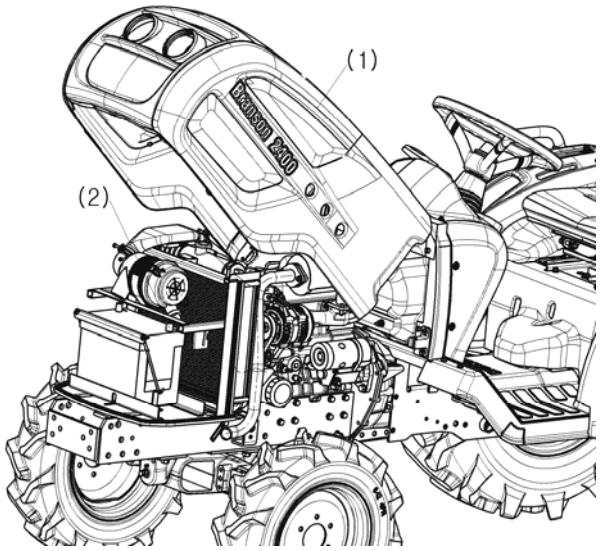
4. CHECKING, DISASSEMBLING AND SERVICING

< Hood and battery cord >

1. Open the hood(1).
2. Disconnect the battery grounding cord(2).
3. Disconnect the head light connectors and remove the hood(1).

▶ **NOTE**

1) When disconnecting the battery cords, disconnect the grounding cord first. When connecting the battery cords, connect the positive cord first.



***. PART NAME**

1) Hood
2) Battery grounding cord

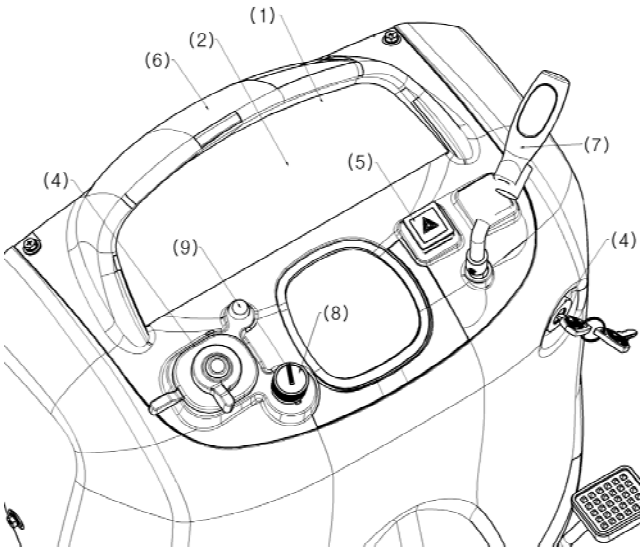
< Steering wheel >

1. Remove the steering wheel cap.
2. Remove the steering wheel mounting nut and remove the steering wheel with a steering wheel puller.

Tightening Torque	Steering wheel mounting nut	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.1 to 41.2 ft-lbs

< Meter panel and panel under cover >

1. Tap out the spring pin and remove the hand accelerator lever(7).
2. Remove the panel under cover(6).
3. Open the meter panel(1) and disconnect the meter panel connector(2).
4. Disconnect the combination switch connector(3), main switch connector(4), hazard switch connector(5), light switch(8) and emergency stop switch(9). And then remove the meter panel.



***. PART NAME**

1) Meter panel
2) Meter panel connector
3) Combination switch connector
4) Main switch connector
5) Hazard switch connector
6) panel under cover
7) Hand accelerator lever
8) light switch
9) Emergency stop switch

4. CHECKING, DISASSEMBLING AND SERVICING

< Fuel tank >

1. Disconnect the fuel house(1) at the fuel filter side, then drain fuel completely.
2. Disconnect the hazard unit, controller, starter relay and regulator connectors and remove the lead wire for fuel gauge.
3. Disconnect the overflow hoses(5) of fuel line.
4. Loosen the steering bracket(7).
5. Remove the tank frame(2) with fuel tank(3).
6. Remove the battery.
7. Disconnect the hydraulic pipes(6) and remove the battery stay with oil cooler(4).

▶ **NOTE**

1) For fastening hydraulic pipe nut, use two wrenches. Hold the fitting with a wrench, turn the pipe nut with another wrench to avoid damage at fitting installed part.

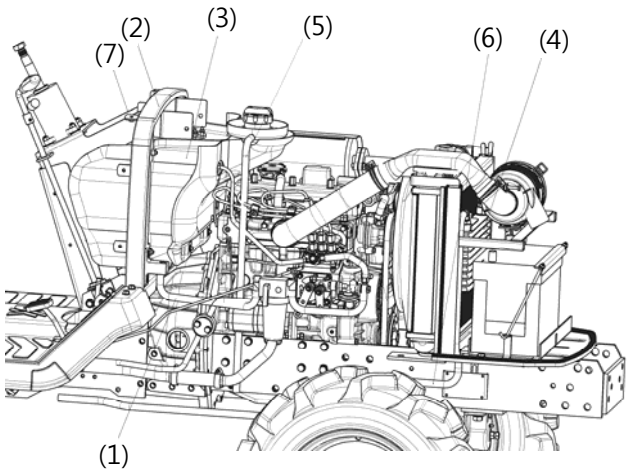
Tightening Torque	Delivery pipe nut for HST	34.3 to 39.2 Nm 3.5 to 4.0 kgfm 25.3 to 28.9 ft-lbs
	Oil cooler pipe nut	50.0 to 57.9 Nm 5.1 to 5.9 kgfm 36.9 to 42.8 ft-lbs
	Delivery pipe nut for power steering	64.7 to 75.5 Nm 6.6 to 7.7 kgfm 47.9 to 55.3 ft-lbs

< Propeller shaft cover and coupling >

1. Loosen the clamp and slide the propeller shaft cover(1) to the rear.
2. Tap out the spring pin(2) and then slide the coupling(3) to the rear.

▷ **Reassembling**

Apply grease to the spline of the propeller shaft and coupling.



***. PART NAME**

1) Fuel hose
2) Fuel tank frame
3) Fuel tank
4) Oil cooler
5) Overflow hose
6) Hydraulic hose
7) Steering bracket

***. PART NAME**

1) Propeller shaft cover
2) Spring pin
3) Coupling

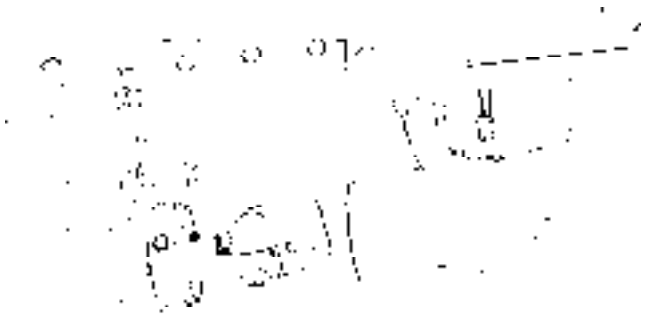
4. CHECKING, DISASSEMBLEING AND SERVICING

< Universal joint and bearing holder >

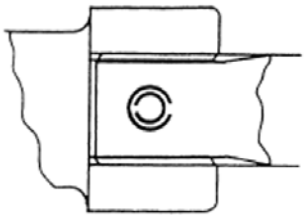
1. Loosen the clamp and slide the universal joint cover(1) to the rear.
2. Remove the bearing holder(4) with the propeller shaft and universal joint.
3. Tap out the spring pins(3) and then slide the universal joint(2) to the rear.

▷ **Reassembling**

- ✓ Apply grease to the spline of the propeller shaft and universal joint.
- ✓ When inserting the spring pins(3), face their splits in the direction parallel to the universal joint as shown in the figure.
- ✓ Assemble the universal joint cover(1) so that the water drain hole may become downward.
- ✓ Arrange the position of the clamp at side as shown in the figure.



(4) (3) (2) (1)

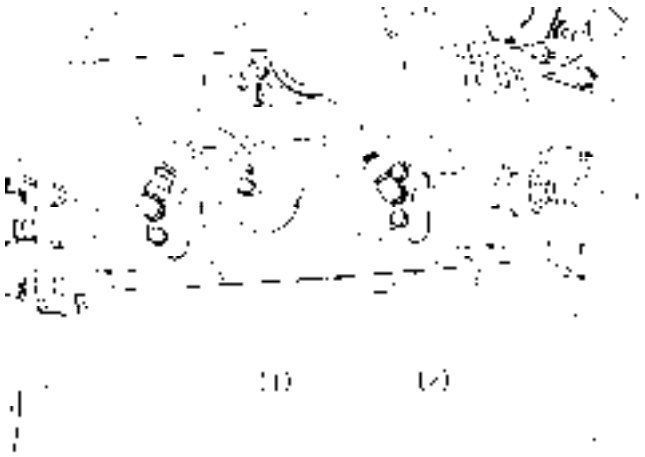


***. PART NAME**

1) Universal joint cover
2) Universal joint
3) Spring pin
4) Bearing holder

< Hydraulic hose >

1. Remove the hydraulic hose(1) from the front cylinder assy(2).



***. PART NAME**

1) Hydraulic hose 2) Front cylinder assy

4. CHECKING, DISASSEMBLING AND SERVICING

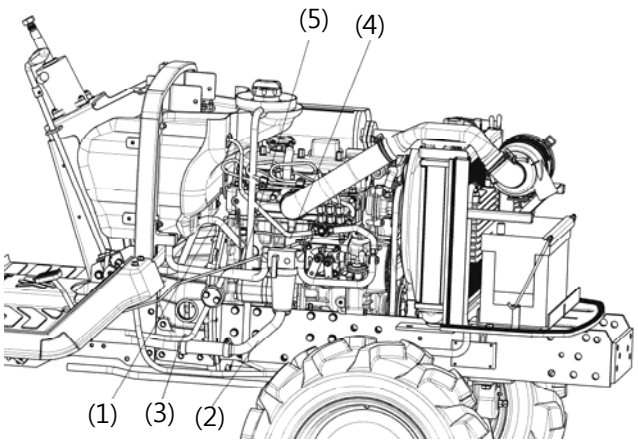
< Separating the engine from clutch housing >

1. Disconnect the connector for the engine stop solenoid(4)
2. Disconnect the three point hitch delivery pipe(3), suction house(2) and PST delivery pipe(1).
3. Disconnect the glow plug lead wire and thermo sensor lead wire. And then disconnect the connector for dynamo and starter motor lead wire.
4. Disconnect the accelerator rod(5).
5. Place the jack under the center frame.
6. Hoist the engine by the chain at the engine hook.
7. Remove the engine mounting screws and separate the engine from the clutch housing.

▷ **Reassembling**

✓ Apply liquid gasket to join face of the engine and clutch housing.

Tightening Torque	Engine mounting screw	M8	17.7 to 26.6 Nm 1.8 to 2.1 kgfm 13.0 to 15.2 ft-lbs
		M10	48.1 to 55.8 Nm 4.9 to 5.7 kgfm 35.5 to 41.2 ft-lbs



***. PART NAME**

1) Power steering delivery pipe
2) Suction hose
3) Delivery pipe
4) Engine stop solenoid
5) Accelerator rod

4. CHECKING, DISASSEMBLEING AND SERVICING

<3> DISASSEMBLING AND ASSEMBLING

< Separating the clutch assembly >

1. Remove the clutch assembly(2) from the flywheel.

▷ **Reassembling**

- ✓ Direct the shorter end of the clutch disc boss toward the flywheel.
- ✓ Apply molybdenum disulphide to the spline of clutch disc boss.
- ✓ Install the pressure plate, noting the position of straight pins.

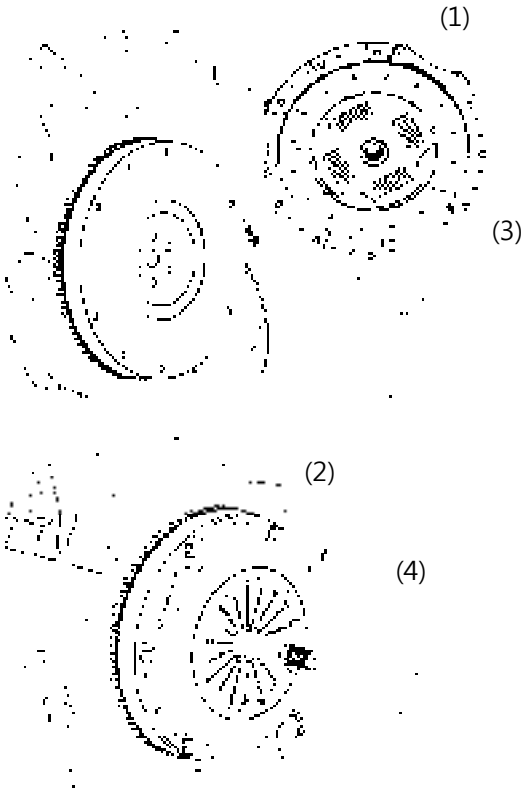
◈ **Important**

- ➢ Align the center of clutch disc and flywheel by inserting the clutch center tool.

▶ **NOTE**

1) Do not allow grease and oil on the clutch disc facing.

Tightening Torque	Clutch mounting screw	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 20.2 ft-lbs



***. PART NAME**

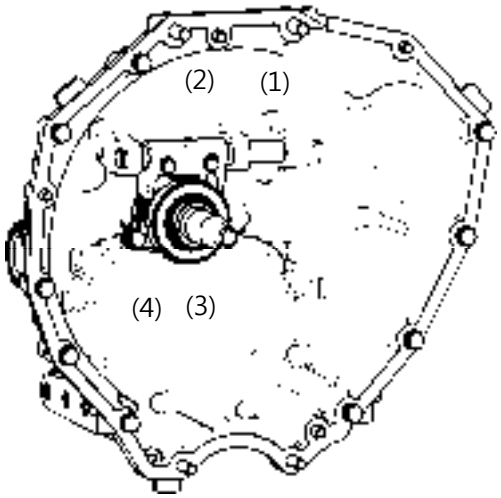
1) Clutch disc 2) Clutch assembly
3) Clutch cover 4) Clutch shaft

< Clutch rod and clutch release fork >

1. Remove the clutch pedal rod.
2. Remove the external snap ring at the end of clutch rod(1) and remove the clutch release fork(2) and release bearing(3) with release hub.

▷ **Reassembling**

- ✓ Set the clutch release fork and release hub with set spring(4) in the correct direction.



***. PART NAME**

1) Clutch rod
2) Clutch release fork
3) Release bearing 4) Set spring

4. CHECKING, DISASSEMBLEING AND SERVICING

<4>SERVICING

< Backlash between clutch disc and clutch shaft >

1. Mount the clutch disc onto the propeller shaft.
2. Hold the propeller shaft so that it does not rotate.
3. Slightly move the disc and measure the displacement around disc edge.
4. If the measurement exceeds the allowable limit, replace clutch disc.

Displacement around disc edge	Allowable limit	2.0 mm 0.079 in.

< Clutch disc wear >

1. Measure the depth from clutch disc surface to the top of rivet at least 10 point with a depth gauge.
2. If the depth is less than the allowable limit, replace the disc.
3. If oil is sticking to the clutch disc, or disc surface is carbonized, replace the clutch disc.

Disc surface to rivet top (Depth)	Allowable limit	0.3 mm 0.012 in.

< Clutch disc wear >

1. Place a straightedge on the pressure plate and measure clearance with a feeler gauge at several points.
2. If the clearance exceeds the allowable limit, replace it.
3. When the pressure plate is worn around its outside and its inside surface only is in contact with the straightedge, replace even if the clearance is within allowable limit.

Clearance between pressure plate and straightedge	Allowable limit	0.2 mm 0.008 in.

4. CHECKING, DISASSEMBLEING AND SERVICING

< Checking pressure plate and diaphragm >

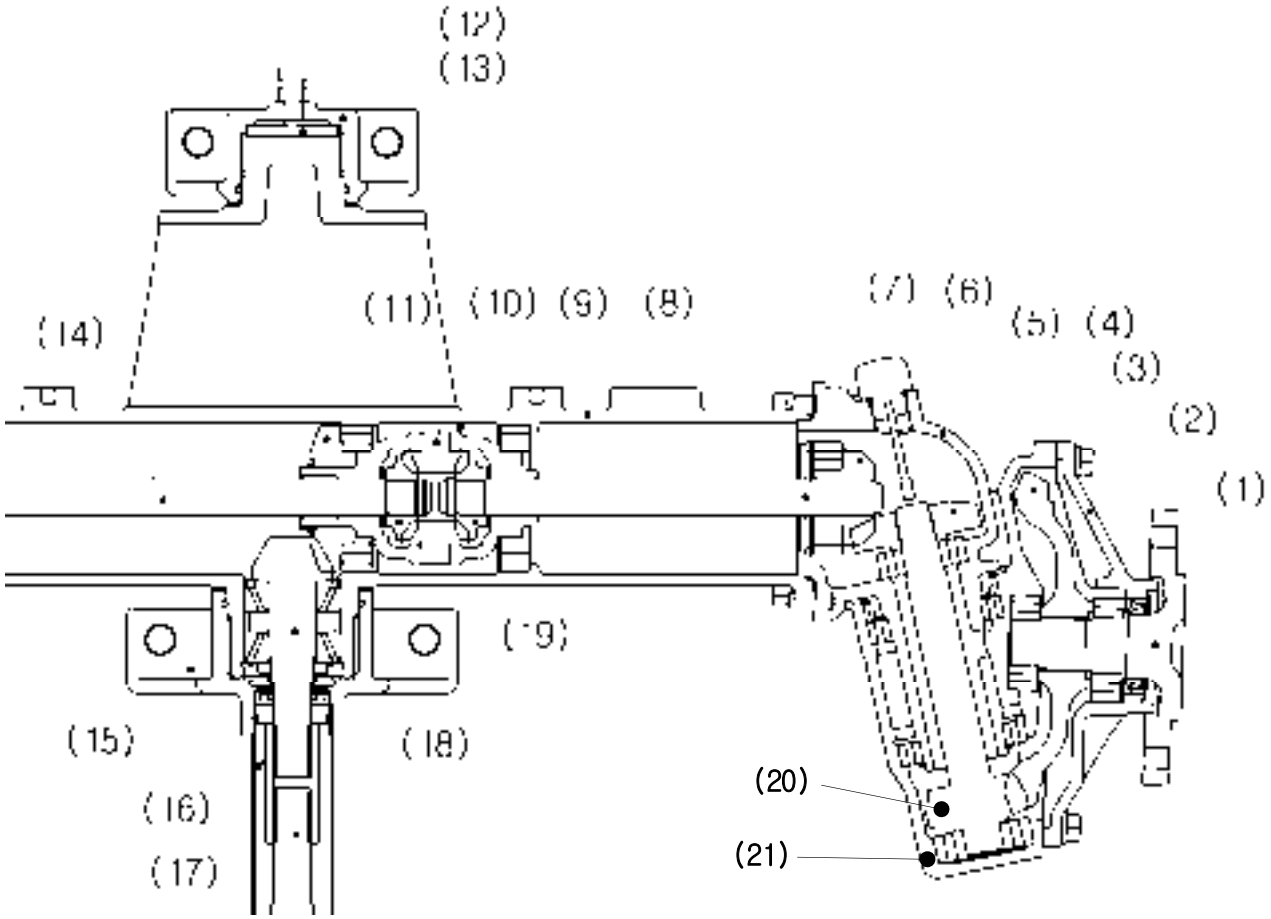
1. Check the pressure plate and if it is scratched on its surface, correct with sandpaper or replace it.
2. Check the diaphragm for crack and scratches. If defects are found, replace it.

< Checking clutch release bearing >

1. Check the clutch release bearing. If the surface is worn excessively, or abnormal sounds occur, replace it.

CONTENTS 3. (FRONT AXLE)

1. STRUCTURE



1) Axle
2) Axle Flange
3) Bevel Gear
4) Bevel Gear
5) Bevel Gear Case
6) Bevel Gear
7) Differential Yoke Shaft, LH
8) Front Axle Case
9) Differential Gear Assembly
10) Differential Pinion Gear
11) Spiral Bevel Gear
12) Collar
13) Front Axle Bracket, Front
14) Differential Yoke Shaft, RH
15) Front Axle Bracket, Rear
16) Coupling
17) Propeller Shaft
18) Spiral Bevel Pinion Shaft
19) Differential Side Gear
20) Bevel Gear Shaft
21) Bevel Gear Case

The front axle of the 4WD is constructed as shown above. Power is transmitted from the transmission case through the propeller shaft(17) to the spiral bevel pinion shaft(18), then to the spiral bevel gear(11) and to the differential side gear(19).

The power through the differential side gear is transmitted to the differential yoke shaft(7), (14), and to the bevel gear shaft(20) through the bevel gears(4), (6) in the bevel gear case(5).

The revolution is greatly reduced by the bevel gears(21), (3), then the power is transmitted to the axle(1).

The differential system allows each wheel to rotate at a different speed to make turning easier.

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Front wheel alignment	Toe-in	0.0 to 8.0 mm 0.0 to 0.315 in.	-
Front axle	Rocking force	49.0 to 98.1 N 5.0 to 10.0 kgf 11.0 to 22.1 lbs	-
Differential case to differential pinion	Clearance	0.032 to 0.068 mm 0.00126 to 0.00268 in.	0.2 mm 0.0079 in.
	Differential case(I.D.)	15.000 to 15.018 mm 0.59055 to 0.59126 in.	-
	Differential case(O.D.)	14.950 to 14.968 mm 0.5885 to 0.58929 in.	-
Spiral bevel pinion shaft	Turning torque	0.8 to 1.0 Nm 0.08 to 0.10 kgfm 0.59 to 0.73 ft-lbs	-
Spiral bevel pinion shaft to spiral bevel gear	Backlash	0.1 to 0.3 mm 0.004 to 0.012 in.	-
10T Bevel gear to 16T Bevel gear	Backlash	0.1 to 0.3 mm 0.004 to 0.012 in.	-
Front axle case boss to bracket bushing(Front)	Clearance	0.125 to 0.280 mm 0.0049 to 0.0110 in.	0.45 mm 0.018 in.
	Front axle case boss(O.D.)	49.950 to 49.975 mm 1.9665 to 1.9675 in.	-
	Bracket bushing(I.D.)	50.10 to 50.23 mm 1.9722 to 1.9774 in.	-
Front axle case boss to bracket bushing	Clearance	0.090 to 0.250 mm 0.0035 to 0.0098 in.	0.45 mm 0.018 in.
	Front axle case boss(O.D.)	64.94 to 64.97 mm 2.5567 to 2.5579 in.	-
	Bracket bushing(I.D.)	65.06 to 65.19 mm 2.5614 to 2.5665 in.	-

3. TIGHTENING TORQUES

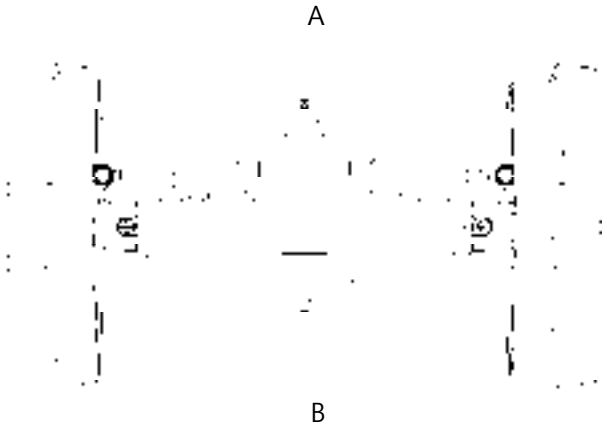
Item	N·m	kgf·m	ft-lbs
Drag link slotted nut	17.7 to 34.5	1.8 to 3.5	13.0 to 25.3
Front wheel bracket mounting screw	77.5 to 90.1	7.9 to 9.2	57.1 to 66.5
Front axle bracket mounting screw	124.0 to 147.0	12.6 to 15.0	91.0 to 108.0
Bevel gear case mounting screw	77.5 to 90.1	7.9 to 9.2	57.1 to 66.5
Knuckle arm mounting screw (M10)	48.0 to 56.0	4.9 to 5.7	35.5 to 41.2
Knuckle arm mounting screw (M12)	103.0 to 117.7	10.5 to 12.0	76.0 to 86.8
Axle flange mounting screw	48.1 to 55.9	4.9 to 5.7	35.5 to 41.2

4. CHECKING, DISASSEMBLING AND SERVICING

<1> CHECKING AND ADJUSTING

< Measuring toe-in >

1. Park the tractor on a flat surface.
2. Inflate the tires to the specified pressure.
3. Turn steering wheel so front wheels are in the straight ahead position.
4. Lower the implement, lock the parking brake and stop the engine.
5. Measure distance between tire beads at front of tire hub height.
6. Measure distance between tire beads at rear of tire hub height.
7. Front distance should be 0 to 8mm (0.0 to 0.315 in.) less than rear distance.
8. If the measurement is not within the factory specifications correct the length(B-A) of tire rod and correct toe-in to be in for factory spec.



(B-A) Length of tie rod

Toe-in(B-A)	Factory spec.	0.0 to 8.0 mm 0.0 to 0.315 in.

< Front axle rocking force >

1. Jack up the front side of tractor.
2. Set a spring balance to the front axle flange.
3. Measure the front axle rocking force.
4. If the measurement is not within the factory specifications, adjust with the adjusting screw(1).
5. Tighten the lock nut(2) firmly.

Front axle rocking force	Factory spec.	49.0 to 98.1 N 5.0 to 10.0 kgf 11.0 to 22.1 lbs

***. PART NAME**

1) Adjusting screw 2) Lock nut

4. CHECKING, DISASSEMBLING AND SERVICING

<2> DISASSEMBLING AND ASSEMBLING

1) Separating Front Axle

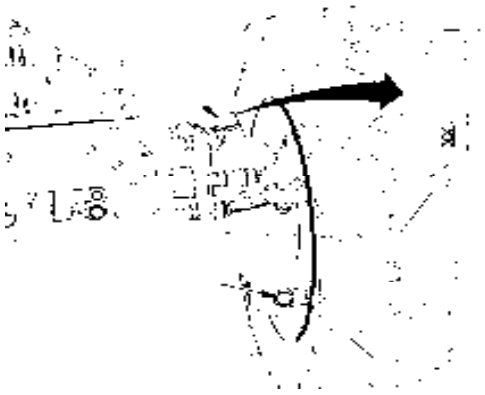
< Draining front axle case oil >

1. Place the oil pan underneath the front axle case.
2. Remove the both the right and left hand side drain plugs(2) and filling plug(1) to drain the oil.
3. After draining, reinstall the drain plugs(2).

▷ **Refilling**

✓ Fill with new oil up to the upper notch on the dipstick.

✓ After fifteen minutes, check the oil level again, add oil to proper level.



***. PART NAME**

1) Filling plug with dipstick 2) Drain plug

< Disconnecting propeller shaft >

1. Loosen the clamps and slide the propeller shaft cover(1) to the rear.
2. Tap out the spring pin(2) and slide the coupling(3) to the rear.

▷ **Reassembling**

✓ Apply grease to the spline of the propeller shaft.

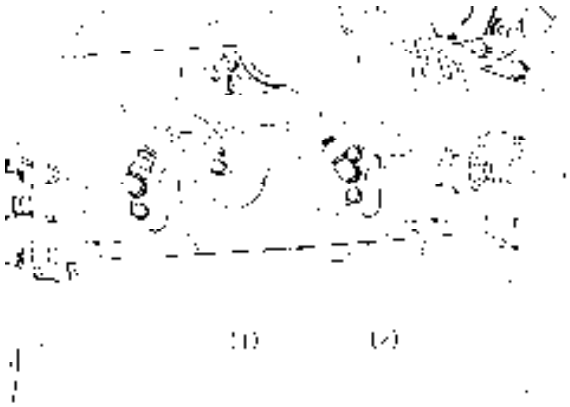
***. PART NAME**

1) Propeller shaft cover 2) Spring pin

3) Coupling

< Hydraulic hose >

1. Remove the hydraulic hose(1) from the front cylinder assy(2).



***. PART NAME**

1) Hydraulic hose 2) Front cylinder assy

4. CHECKING, DISASSEMBLING AND SERVICING

< Front axle assembly >

1. Lift up the front side of tractor and place the disassembling stand under the front axle frame.
2. Remove the front wheels.
3. Place the disassembling stand under the front axle.
4. Remove the front axle brackets (Front and rear) mounting screws.
5. Separate the front axle from the front axle frame.

▷ **Reassembling**

✓ After mounting the front axle assembly to the front axle frame, be sure to adjust the front axle rocking force.

Tightening torque	Front wheel mounting nut	77.5 to 90.1 Nm 7.9 to 9.2 kgfm 57.1 to 66.5 ft-lbs
	Front axle bracket mounting screw	124 to 147 Nm 12.6 to 15.0 kgfm 91 to 108 ft-lbs

4. CHECKING, DISASSEMBLING AND SERVICING

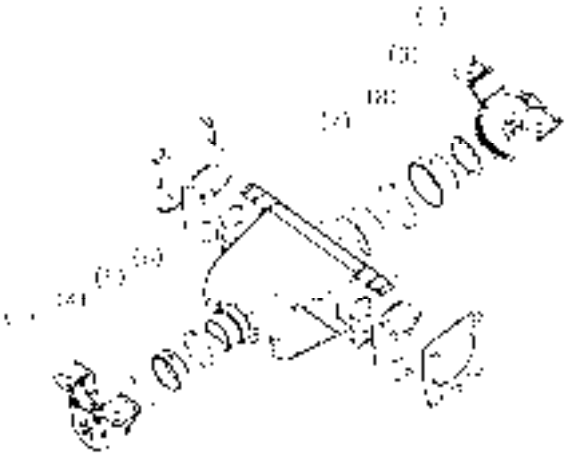
2) Disassembling Front Axle

< Tie-rod and axle bracket >

1. Remove the slotted nut and remove the tie-rod(3).
2. Remove the front axle brackets(1),(2).

▷ **Reassembling**

- ✓ Apply grease to the thrust collars(4),(9), o-ring(6),(7) and oil seal(10).
- ✓ After tightening the slotted nut to the specified torque, install the cotter pin as shown in the figure.

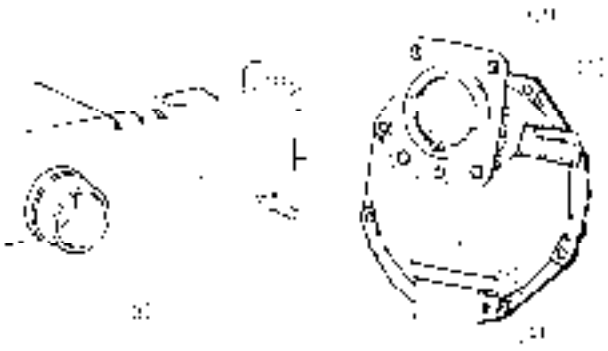


***. PART NAME**

1) Assy holder(F)	2) Assy holder(R)
3) Tie-rod	4) Thrust collar
5) Bushing	6) O-ring
7) O-ring	8) Bush
9) Thrust collar	10) Oil seal

< Bevel gear case and front gear case >

1. Remove the bevel gear case mounting screws.
2. Remove the bevel gear case(1) and front gear case(4) as a unit from the front axle case(3).



▷ **Reassembling**

- ✓ Apply grease to the O-ring(2) and take care not to damage it.
- ✓ Do not interchange right and left bevel gear case assemblies and right and left gear case assemblies.

Tightening torque	Bevel gear case mounting screw	77.5 to 90.1 Nm 7.9 to 9.2 kgfm 57.1 to 66.5 ft-lbs

***. PART NAME**

1) Bevel gear case	2) O-ring
3) Front axle case	4) Front gear case RH

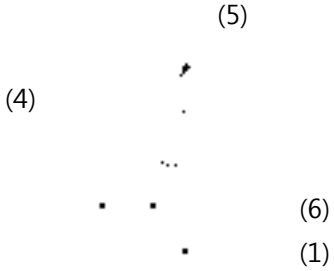
4. CHECKING, DISASSEMBLING AND SERVICING

< Front gear case >

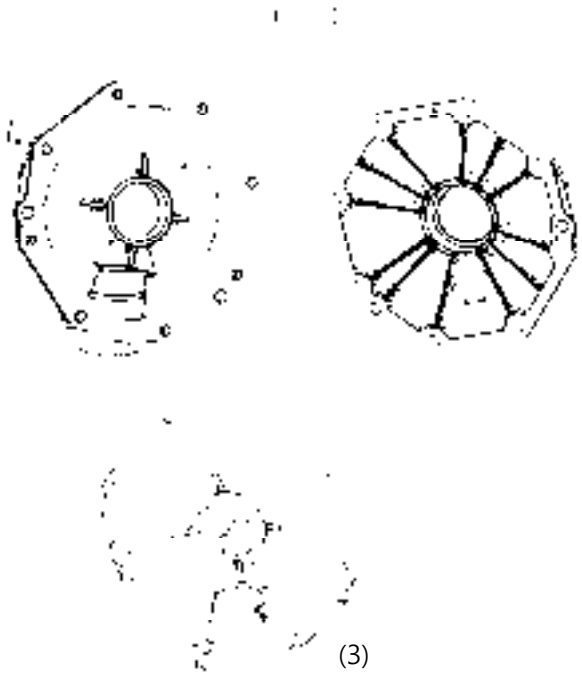
1. Remove the knuckle arm(Left side only).
2. Remove the axle flange(2).
3. Remove the external snap ring(3).
4. Remove the bevel gear case(4) from front gear case(1).
5. Remove the oil seal(5).
6. Remove the ball bearing(6).
7. Remove the internal snap ring(7) and remove the ball bearing(8).
8. Remove the bevel gear shaft(9) with ball bearing.

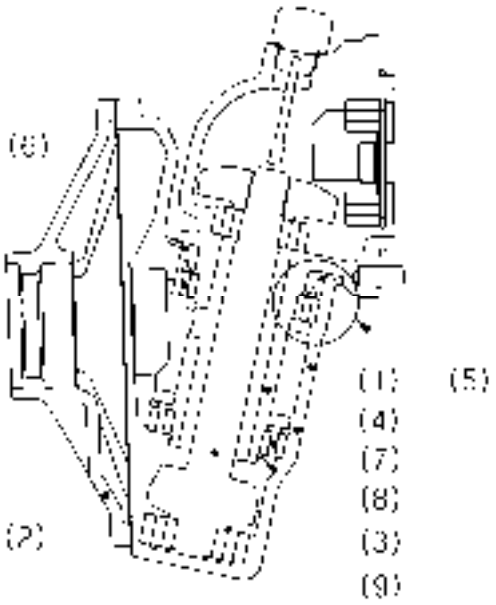
▷ **Reassembling**

- ✓ Apply liquid gasket to joint face of the axle flange(2) and front gear case(1) after removing the water, oil and stuck liquid gasket.
- ✓ Tighten the axle flange mounting screws and nuts diagonally in several steps.
- ✓ Install the oil seal(5) of bevel gear case, noting its direction as shown in the figure.



Tightening torque	Knuckle arm mounting screw	M10	48.0 to 56.0 Nm 4.9 to 5.7 kgfm 35.5 to 41.2 ft-lbs
		M12	103.0 to 117.7 Nm 10.5 to 12.0 kgfm 76.0 to 86.8 ft-lbs
	Axle flange mounting screw		48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.5 to 41.2 ft-lbs





***. PART NAME**

1) Front gear case
2) Cover gear case
3) External snap ring
4) Bevel gear case
5) Oil seal
6) Ball bearing
7) Internal snap ring
8) Ball bearing
9) Bevel gear shaft

4. CHECKING, DISASSEMBLING AND SERVICING

< Bevel gear case and front gear case >

1. Remove the internal snap ring(1).
2. Take out the bevel gears(4),(5) with ball bearings(3),(6) and shims(2).

▷ **Reassembling**

✓ Install the shims(2) to their original position.

▷ **Reference**

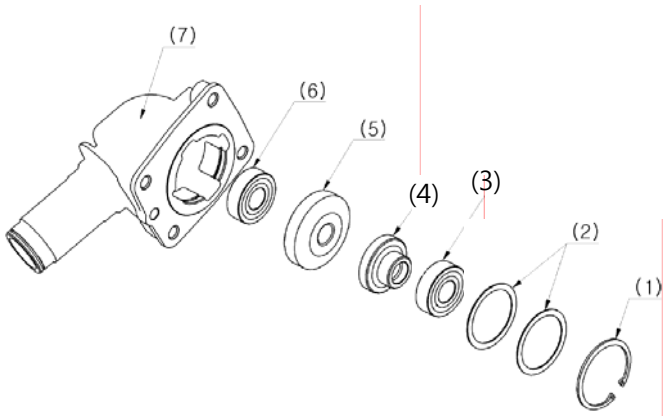
✓ Thickness of adjusting shims:

0.8mm (0.031in.)

1.0mm (0.039in.)

1.2mm (0.47in.)

1.4mm (0.055in.)



***. PART NAME**

1) Internal snap ring	2) Shim
3) Ball bearing	4) Bevel gear
5) Bevel gear	6) Ball bearing
7) Bevel gear case	

< Axle >

1. Remove the bearing(1).
2. Take out the bevel gear(2).
3. Take out the collar(3).
4. Tap out the axle(4).

▷ **Reassembling**

✓ Install the oil seal(7) of axle flange(6), noting its direction as shown in the figure.

✓ Install the shims(8),(9) to their original position.

▷ **Reference**

✓ Thickness of adjusting shims(8) :

0.8mm (0.031in)

1.0mm (0.039in.)

1.2mm (0.47in.)

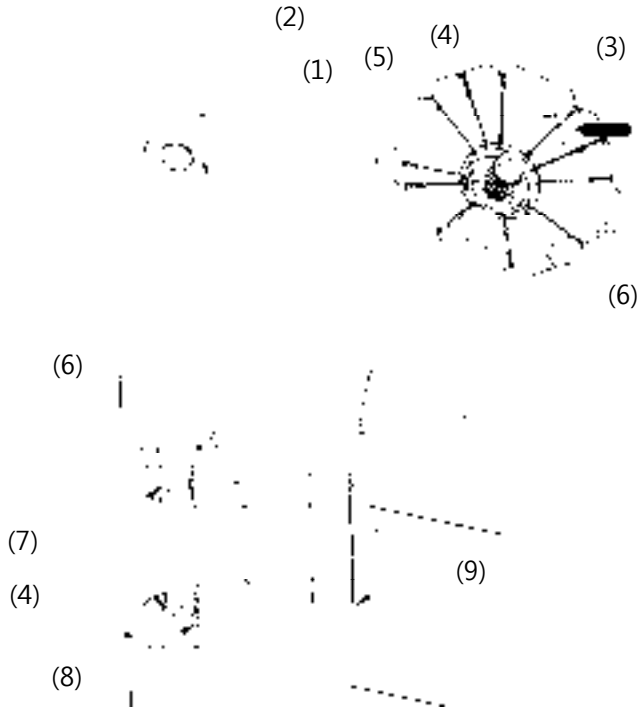
1.4mm (0.055in.)

✓ Thickness of adjusting shims(9) :

0.8mm (0.031in)

1.0mm (0.039in.)

1.2mm (0.47in.)



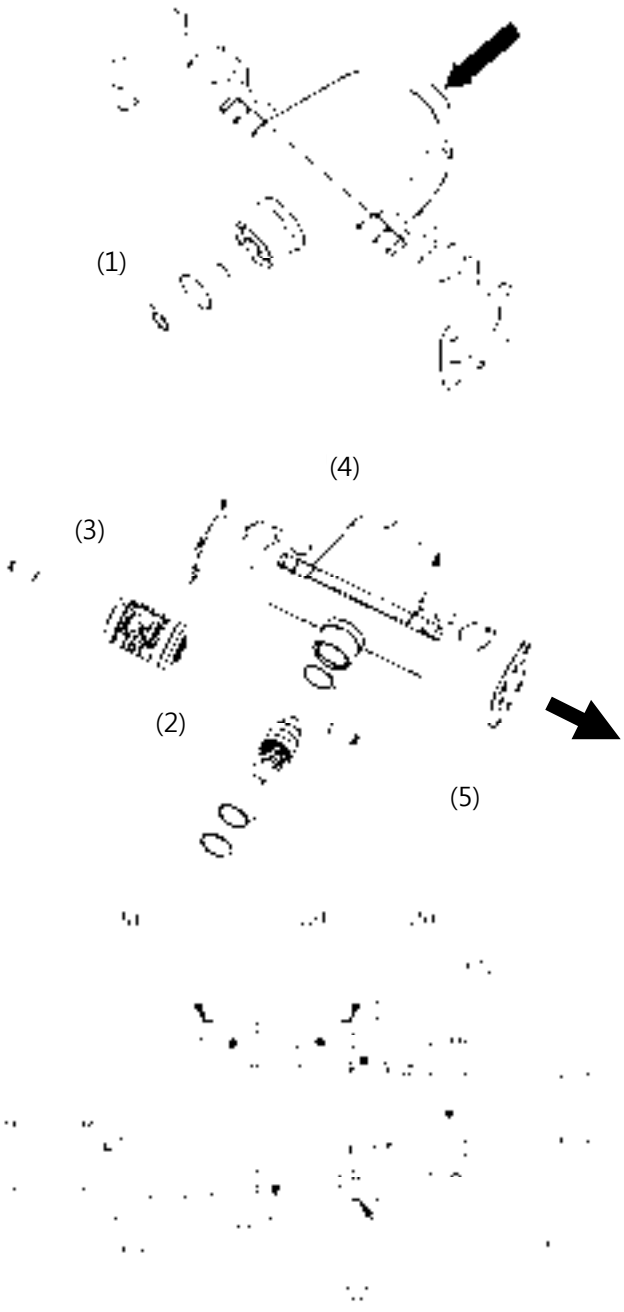
***. PART NAME**

1) Ball bearing	2) Bevel gear
3) Collar	4) Axle
5) Ball bearing	6) Axle flange
7) Oil seal	8) Shim
9) Shim	

4. CHECKING, DISASSEMBLING AND SERVICING

< Spiral bevel pinion shaft and differential gear assembly >

1. Remove the internal snap ring(1).
2. Tap put the spiral bevel pinion shaft(2) by the brass rod and hammer.
3. Take out the differential gear assembly(3) with differential yoke shafts, from right side of front axle case(4).
4. Remove the lock nut(7).
5. Remove the taper roller bearings(6).



▷ **Reassembling**

- ✓ Apply gear oil to the taper roller bearings(6) and install them correctly, nothing their direction.
- ✓ Replace the lock nut(7) with new ones.
- ✓ After tightening the lock nut(7).
- ✓ Install the adjusting collars(5) to their original position.

▷ **Reference**

- ✓ Thickness of adjusting collars :

  3.4mm (0.134in.)
  3.6mm (0.142in.)
  3.8mm (0.150in.)
  3.9mm (0.154in.)
  4.0mm (0.157in.)
  4.1mm (0.161in.)
  4.2mm (0.165in.)
  4.4mm (0.173in.)
  4.5mm (0.177in.)
  4.6mm (0.181in.)

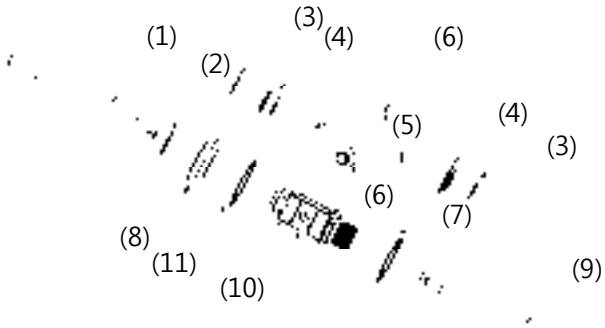
***. PART NAME**

1) Internal snap ring
2) Spiral bevel pinion shaft
3) Differential gear assembly
4) Front axle case
5) Adjusting collar
6) Taper roller bearing
7) Lock nut
8) Collar

4. CHECKING, DISASSEMBLING AND SERVICING

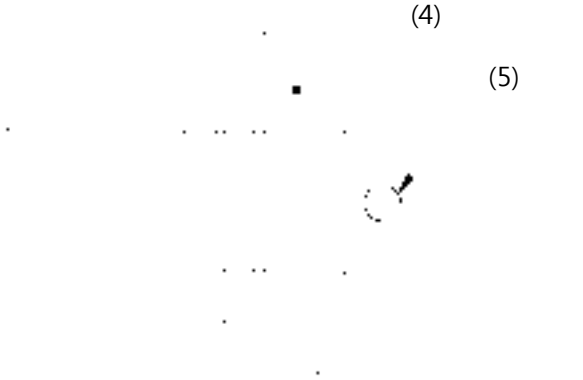
< Differential gear >

1. Tap out the spring pins(5) and remove the external snap ring(2), and then pull out both of the differential yoke shafts(1),(9).
2. Remove the differential side gears(4).
3. Remove the differential pinions(6).
4. Remove the spiral bevel gear(8), and bearings(7),(11).



▶ **NOTE**

1) Arrange the parts to their original position.



▷ **Reassembling**

- ✓ Apply molybdenum disulfide to the inner circumferential surface of the differential side gears(4) and differential pinions(6).
- ✓ Be sure to install the spring pins(5) as shown in the figure.

***. PART NAME**

1) Differential yoke shaft RH
2) External snap ring
3) Thrust collar
4) Differential side gear
5) Spring pin
6) Differential pinion
7) Ball bearing
8) Spiral bevel gear
9) Differential yoke shaft LH
10) Differential case
11) Ball bearing

<3> SERVICING

< Turning torque of spiral bevel pinion shaft >

1. Cramp the spiral bevel pinion shaft assembly to the vise and tighten the lock nut.
2. Measure the turning torque of bevel pinion shaft.
3. If the turning torque is not within the factory specifications, adjust with the lock nut.

Tightening torque	Factory spec.	0.8 to 1.0 Nm 0.08 to 0.10 kgfm 0.59 to 0.73 ft-lbs

▶ **NOTE**

1) After turning force adjustment, be sure tighten the lock nut.

4. CHECKING, DISASSEMBLING AND SERVICING

< Clearance between differential case and differential pinion >

1. Measure the differential pinion boss O.D. with an outside micrometer.
2. Measure the differential case bore I.D. with a cylinder gauge, calculate the clearance.
3. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential case and differential pinion	Factory spec.	0.032 to 0.068 mm 0.00126 to 0.00268 in.
	Allowable limit	0.2 mm 0.0079 in.

Differential case bore I.D.	Factory spec.	15.000 to 15.018 mm 0.59055 to 0.59126 in.
Differential pinion O.D.	Factory spec.	14.950 to 14.968 mm 0.58858 to 0.58929 in.

< Backlash between 10T bevel gear and 16T bevel gear >

1. Stick a strip of fuse to three sports on the 16T bevel gear(1) with grease.
2. Fix the front axle case, bevel gear case and front gear case.
3. Turn the axle.
4. Remove the bevel gear case from front axle case and measure the thickness of the fuses with an outside micrometer.
5. If the backlash is not with in the factory specifications, adjust with shim(3).

Backlash between 10T bevel gear and 16T bevel gear	Factory spec.	0.1 to 0.3 mm 0.2 0.004 to 0.012 in.

✓ Tooth contact : More than 35%

✓ Thickness of adjusting shims (3) :
0.8mm(0.031in.), 1.0mm(0.039in.),
1.2mm(0.047in.), 1.4mm(0.055in.)

***. PART NAME**

1) 16T Bevel gear 2) 10T Bevel gear
3) Shim

4. CHECKING, DISASSEMBLING AND SERVICING

< Turning torque of spiral bevel pinion shaft >

1. Install the spiral bevel pinion shaft assembly only to the front axle case.
2. Measure the turning torque of the spiral bevel pinion shaft.
3. If the turning torque is not with in the factory specifications, adjust with lock nut.

Turning torque of spiral bevel pinion shaft	Factory spec.	0.8 to 1.0 Nm 0.08 to 0.10 kgfm 0.59 to 0.74 ft-lbs

▶ **NOTE**

1) After turning torque adjustment, be sure tighten the lock nut.

***. PART NAME**

1) Collar 2) Lock nut

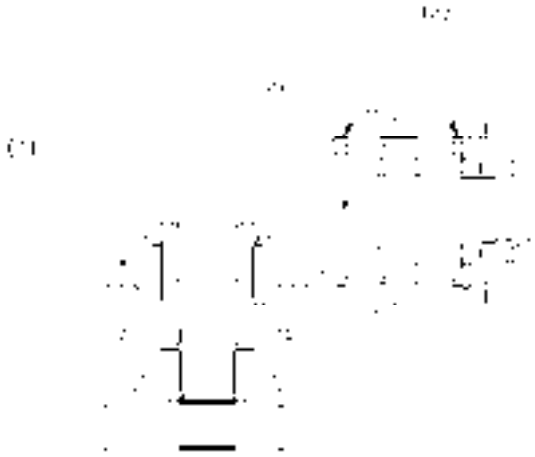
< Backlash between spiral bevel pinion shaft and spiral bevel gear >

1. Set a dia gauge(lever type) with its finger on the spline of spiral bevel pinion shaft.
2. Measure the backlash be moving the spiral bevel pinion shaft by hand lightly.
3. If the backlash is not within the factory specifications, select the adjusting collar(3).
4. Adjust the backlash properly by repeating the above procedures.

Backlash between spiral bevel pinion shaft and spiral bevel gear	Factory spec.	0.1 to 0.3 mm 0.004 to 0.012 in.

▷ **Reference**

✓ Above factory specification should be measured on the tooth of spiral bevel pinion. When measuring the backlash on the spline of its shaft, factory specification will be 0.0571 to 0.1714mm (0.00225 to 0.00675 in.)



✓ Thickness of adjusting collars :
3.4mm(0.134in.), 3.6mm(0.142in.)
3.8mm(0.150in.), 3.9mm(0.154in.)
4.0mm(0.157in.), 4.1mm(0.161in.)
4.2mm(0.165in.), 4.4mm(0.173in.)
4.5mm(0.177in.), 4.6mm(0.181in.)

***. PART NAME**

1) Spiral bevel gear 2) Spiral bevel pinion shaft
3) Adjusting collar

4. CHECKING, DISASSEMBLING AND SERVICING

< Clearance between front axle case bosses and bracket bushing >

1. Measure the front axle case bosses O.D. with an outside micrometer.
2. Measure the bracket bushing I.D. with a cylinder gauge, and calculate the clearance.
3. If the clearance exceeds the allowable limit replace the bracket bushing.
4. If the clearance still exceeds the allowable limit replace the front axle case.

Clearance between front axle case boss(front) and bracket bushing(front)	Factory spec.	0.125 to 0.280 mm 0.0049 to 0.0110 in.
	Allowable limit	0.45 mm 0.018 in.

Front axle case boss(front) O.D.	Factory spec.	49.950 to 49.975 mm 1.9665 to 1.9675 in.
Bracket bushing(front) I.D.	Factory spec.	50.10 to 50.23 mm 1.9722 to 1.9774 in.

Clearance between front axle case boss(rear) and bracket bushing(rear)	Factory spec.	0.090 to 0.250 mm 0.0035 to 0.0098 in.
	Allowable limit	0.45 mm 0.018 in.

Front axle case boss(rear) O.D.	Factory spec.	64.94 to 64.97 mm 2.5567 to 2.5579 in.
Bracket bushing(rear) I.D.	Factory spec.	65.06 to 65.19 mm 2.5614 to 2.5665 in.

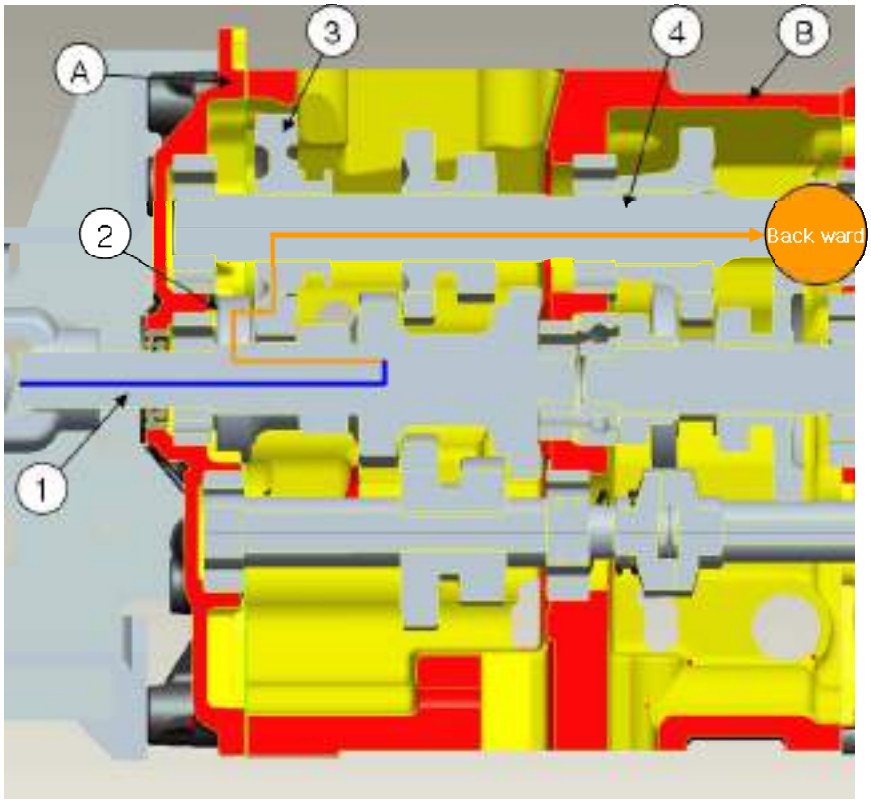
▶ **Press-fitting bushing**

- When replacing the bushing, press-fit it until bushing contact to inside to front axle bracket.

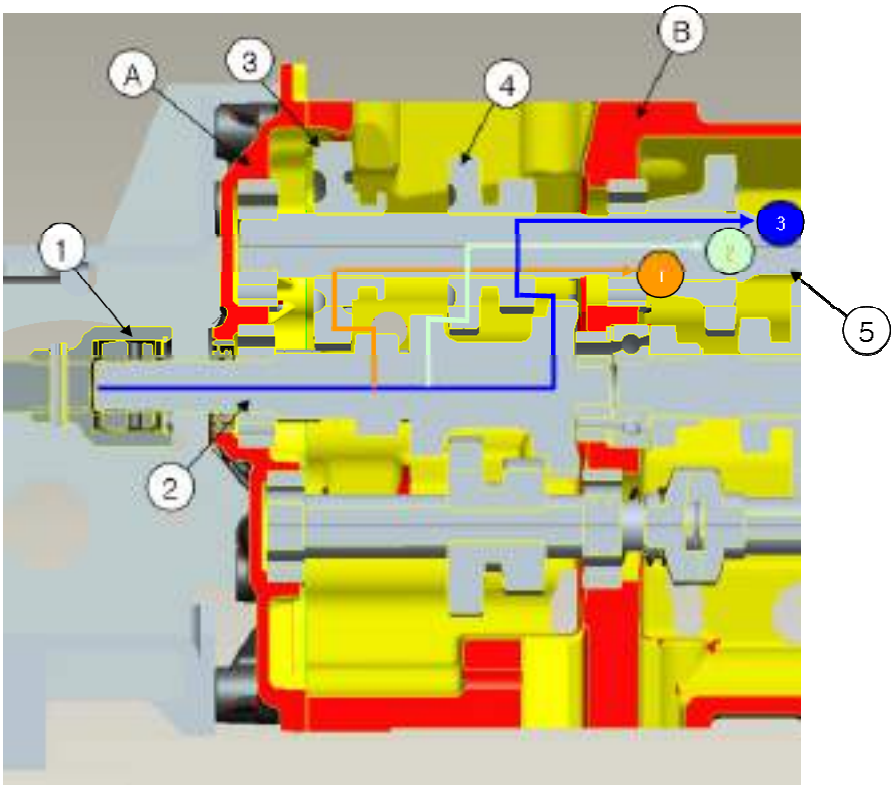
CONTENTS 4. (TRANSMISSION)

1. POWER TRAIN FOR TRAVELING SYSTEM

<1> MAIN GEAR SHAFT SECTION (MANUAL TRANSMISSION TYPE)



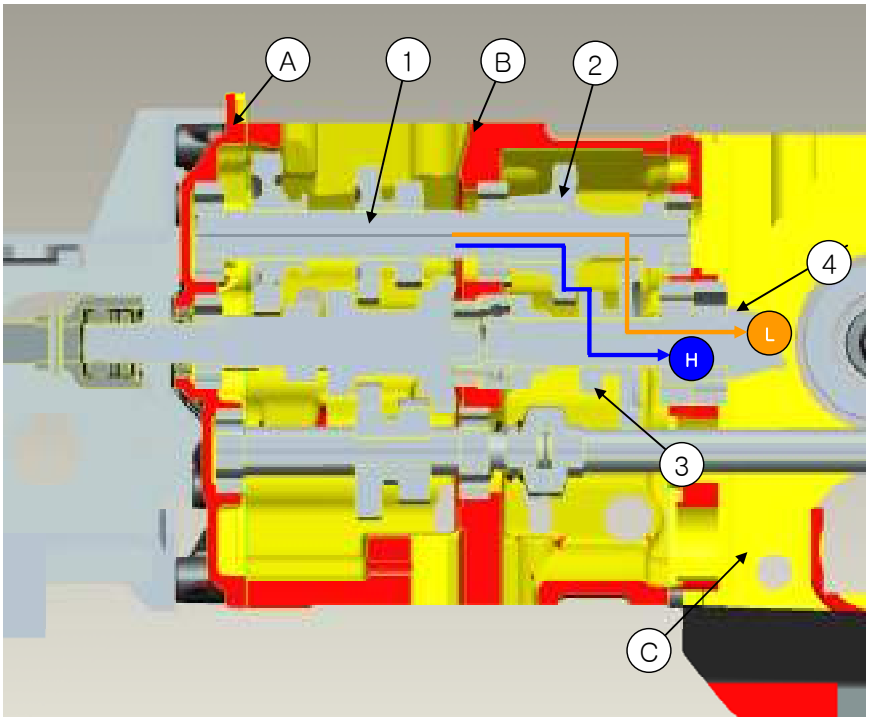
1) Gear shaft
2) Gear reverse
3) Gear
4) Gear shaft
A : Front cover
B : Transmission case



1) Ball joint shaft
2) Gear shaft
3) Gear shaft
4) Gear
5) Gear shaft

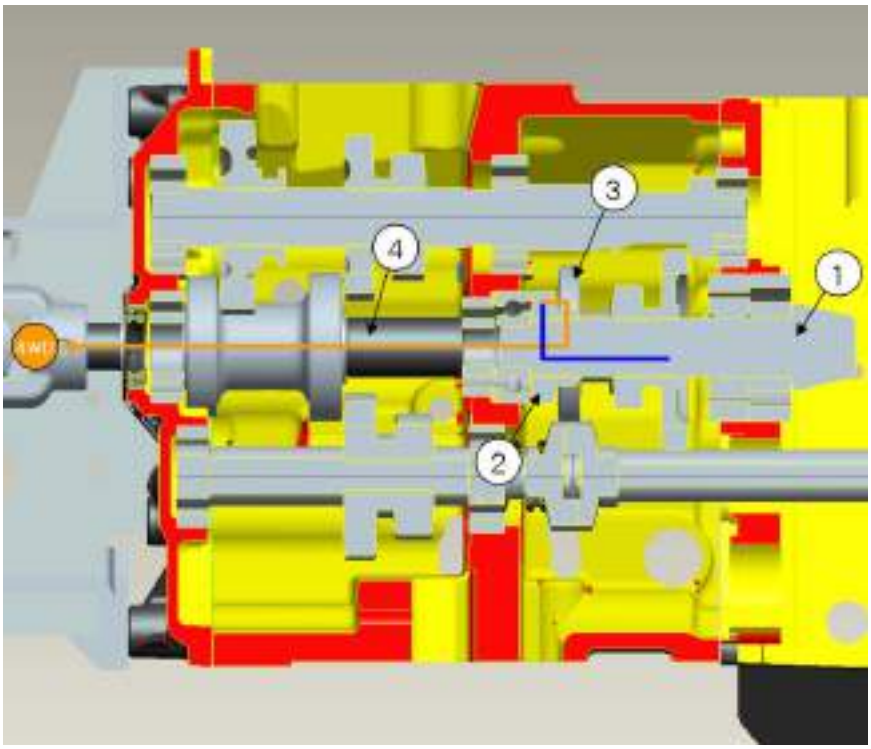
1. POWER TRAIN FOR TRAVELING SYSTEM

<2> HI-LO GEAR SHIFT SECTION



1) Gear shaft
2) 19T gear
3) 13T, 32T gear
4) Counter shaft
5) Front cover
A : Front cover
B : Transmission case
C : Diff. gear case

<3> FRONT WHEEL DRIVE SECTION

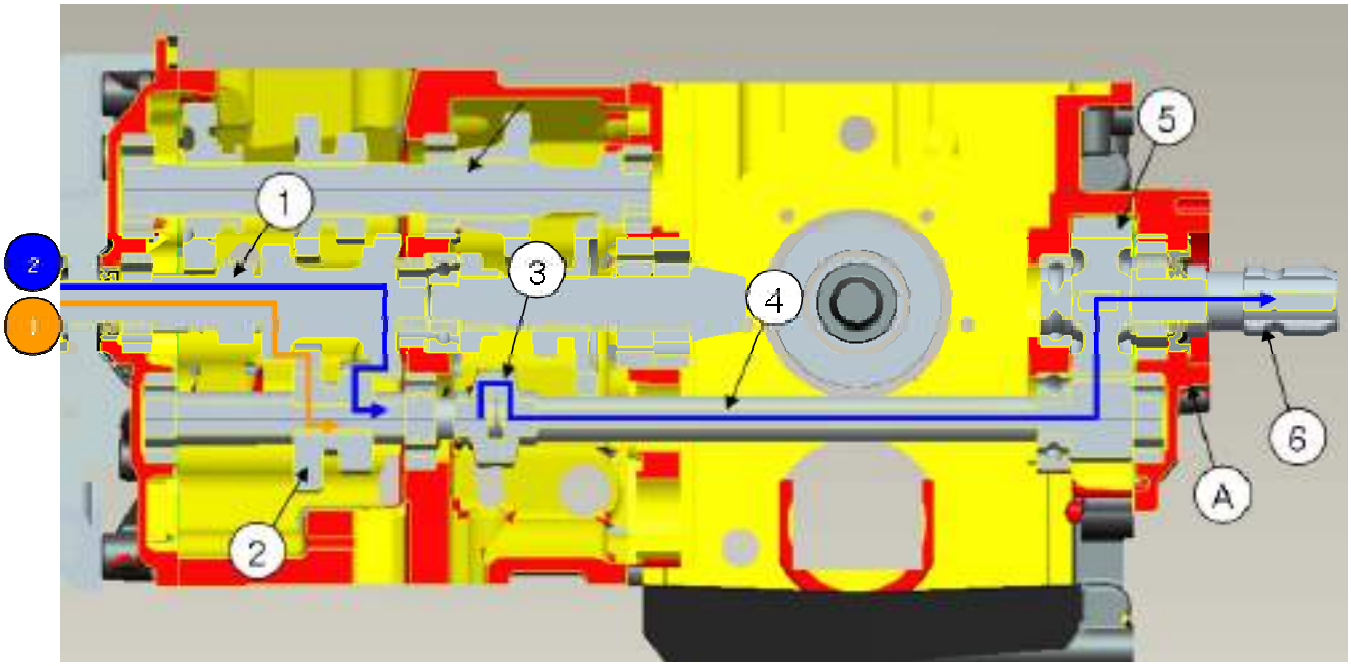


1) Counter Shaft
2) 4wd gear
3) 4wd gear
4) Front wheel drive shaft

2. POWER TRAIN FOR PTO GEAR

<1> REAR PTO SHIFT SECTION

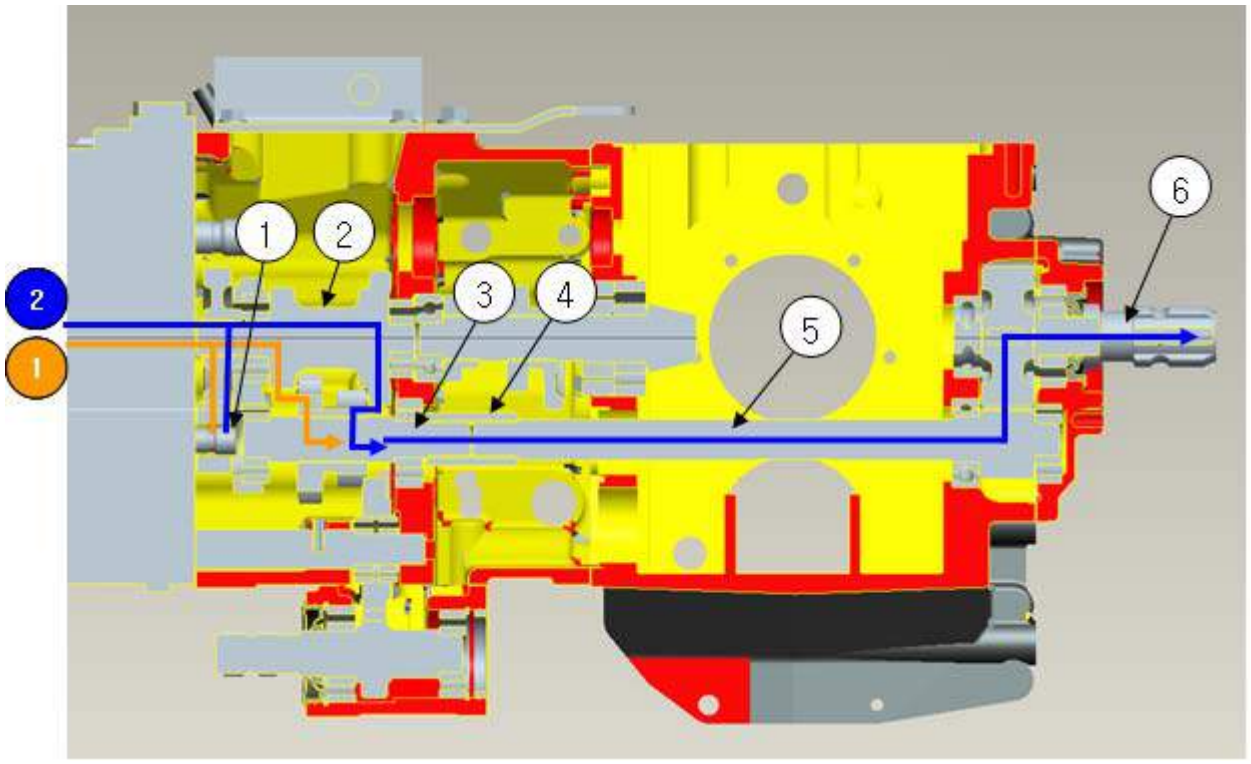
1) Manual Transmission Type



1) Gear shaft
2) Gear
3) Cam, one way clutch
4) Gear shaft
5) Gear
A : Rear cover
① : Low (540 rpm)
② : High (960 / 2500rpm)

2. POWER TRAIN FOR PTO GEAR

2) HST Type



1) HST pump shaft
2) Gear shaft
3) Shaft
4) Coupling
5) Gear shaft
6) Shaft PTO
① : Low (540 rpm)
② : High (960 / 2500 rpm)

3. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Check and high pressure relief valve	Setting pressure (Relief valve)	30.9 to 31.9 MPa 315.0 to 325.0 kgf/㎠ 4480 to 4622 psi	-
Charge relief valve	Setting pressure	392.0 to 490.0 MPa 4.0 to 5.0 kgf/㎠ 56.9 to 71.1 psi	-
Shift fork to shift gear groove	Clearance	0.10 to 0.35 mm 0.004 to 0.014 in.	0.50 mm 0.020 in.
16T-20T Gear to front wheel drive shaft	Clearance	0.027 to 0.067 mm 0.0011 to 0.0025 in.	0.10 mm 0.0039 in.
	Front wheel drive shaft (O.D.)	21.967 to 21.980 mm 0.8648 to 0.8654 in.	-
	16T-20T Gear (I.D.)	28.007 to 28.021 mm 1.1024 to 1.1032 in.	-
	Needle (O.D.)	2.996 to 3.000 mm 0.1179 to 0.1181 in.	-
11T Gear, 0ne-way clutch cam and Mid-PTO shaft	Clearance	0.020 to 0.026 mm 0.0008 to 0.0010 in.	0.10 mm 0.0039 in.
	Mid-PTO shaft (O.D.)	19.989 to 20.000 mm 0.7869 to 0.7874 in.	-
	11T Gear and one-way clutch (I.D.)	24.007 to 24.020 mm 0.9452 to 0.9457 in.	-
	Needle (O.D.)	1.997 to 2.000 mm 0.0786 to 0.0787 in.	-
Spiral bevel pinion	Side clearance	Less than 0.15 mm Less than 0.0059 in.	-
Spiral bevel pinion to spiral bevel gear	Backlash	0.10 to 0.30 mm 0.0039 to 0.012 in.	0.4 mm 0.016 in.
	Adjusting shim (Thickness)	0.2 mm, 0.008 in.	-
		0.5 mm, 0.020 in.	-

3. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Differential pinion to differential side gear	Backlash	0.1 to 0.3 mm 0.004 to 0.012 in.	0.4 mm 0.016 in.
	Adjusting shim (Thickness)	0.8 mm, 0.0315 in.	-
		1.0 mm, 0.0394 in.	-
		1.2 mm, 0.0472 in.	-
Differential case to differential side gear	Clearance	0.025 to 0.066 mm 0.0016 to 0.0029 in.	0.30 mm 0.0118 in.
	Differential case (I.D.)	32.000 to 32.025 mm 1.2598 to 1.2608 in.	-
	Spiral bevel gear (I.D.)	32.000 to 32.025 mm 1.2598 to 1.2608 in.	-
	Differential side gear (O.D.)	31.959 to 31.975 mm 1.2598 to 1.2608 in.	-
Differential pinion shaft to differential pinion	Clearance	0.016 to 0.045 mm 0.0006 to 0.0018 in.	0.30 mm 0.0118 in.
	Differential pinion shaft (O.D.)	15.982 to 16.0 mm 0.6292 to 0.6299 in.	-
	Differential pinion (I.D.)	16.000 to 16.018 mm 0.6299 to 0.6306 in.	-

4. TIGHTENING TORQUES

Tightening torque of screws, bolts and nuts on the table below are especially specified.

Item	N·m	kgf·m	ft-lbs
Rear wheel bolt and nut	108.0 to 125.0	11.0 to 12.7	79.0 to 92.2
3-Point hitch shaft setting screw	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5
3-Point hitch shaft setting screw lock nut	43.0 to 47.0	4.4 to 4.8	31.7 to 35.4
Drawbar frame mounting screw	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
ROPS frame and frame top connecting bolt and nut	274.6 to 318.7	28.0 to 32.5	202.5 to 235.1
ROPS connecting plate mounting screw	123.6 to 147.0	12.6 to 15.0	91.1 to 108.5
ROPS frame mounting screw	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5
Steering wheel mounting nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Delivery pipe nut for HST	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Oil cooler pipe nut	50.0 to 57.9	5.1 to 5.9	36.9 to 42.8
Delivery pipe nut for power steering	64.7 to 75.5	6.6 to 7.7	47.9 to 55.3
Power steering assembly mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Clutch housing and engines mounting screw (M8)	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Clutch housing and engines mounting screw (M10)	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Clutch housing and center frame mounting screw and nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Clutch housing rear cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Speed control rod screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
3-Point hitch delivery pipe joint bolt	34.3 to 39.2	3.5 to 4.0	25.1 to 28.7
HST (Transmission case) and center frame mounting screw and nut	77.5 to 90.2	7.9 to 9.4	57.1 to 66.5
Spring holder mounting screw	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5
Connecting plate mounting screw	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5
Top link bracket mounting screw	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5
Hydraulic cylinder mounting screw and nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2

4. TIGHTENING TORQUES

Item	N·m	kgf·m	ft-lbs
Rear axle case mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Transmission case mounting screw and nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Mid-PTO case mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Mid-PTO rear cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Front case mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Main shift cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Neutral adjuster lock screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Neutral hold mounting screw	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2
Change pump mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Center section mounting hex. socket screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Check and high pressure relief valve plug	118.0 to 147.0	12.0 to 15.0	86.8 to 108.5
Neutral valve cap screw	58.8 to 68.6	6.0 to 7.0	43.4 to 50.6
Bearing holder mounting screw	50.0 to 55.0	5.1 to 5.6	36.9 to 40.1
Rear PTO cover mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Differential gears bearing holder mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Spiral bevel gear UBS screw	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3

5. CHECKING, DISASSEMBLING AND SERVICING

<1> CHECKING AND ADJUSTING

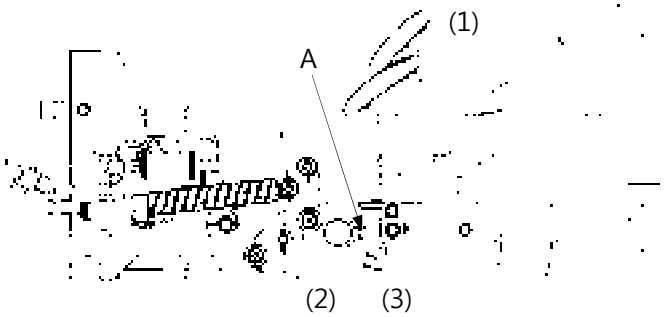
< Adjusting maximum speed (HST Type) >

1. Depress the speed control pedal(1) all the way and measure the tractor speed.
2. If the measurement is not within factory specification, loosen the lock nut(3) and adjust with bolt(2).

Maximum speed with AG tire (at 2600 rpm)	2100h 2400h 2800h	Forward	15.5 to 17.0 km/h 9.6 to 10.6 mph
		Reverse	9.3 to 10.0 km/h 5.8 to 6.2 mph

▷ **Reference**

✓ Length "A" : 15 to 17 mm (0.59 to 0.67 in.)

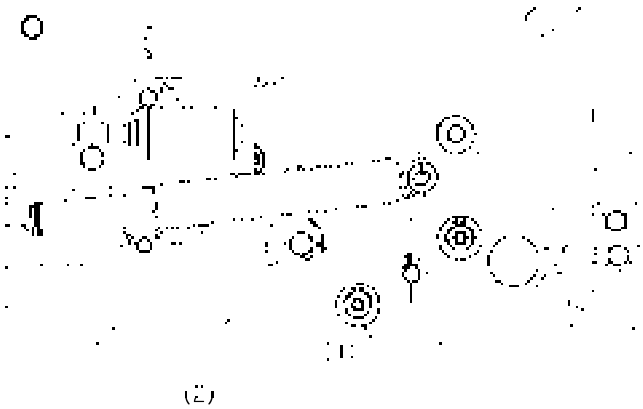


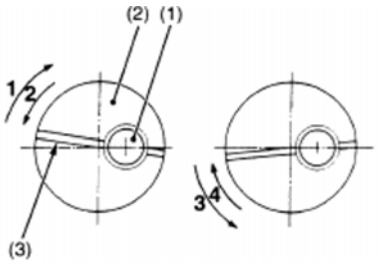
***. PART NAME**

1) Speed control pedal (HST pedal)
2) Adjusting bolt
3) Lock nut

< Adjusting neutral (HST Type) >

1. Disengage the front wheel drive lever. (Drive only rear wheels.)
2. Lift the rear of the tractor so that the rear wheels are off the ground and run the engine at low idling and drive only rear wheels.
3. Slightly loosen the neutral adjuster setting screw(1).
4. Rotate the neutral adjuster(2) clockwise so the rear wheels turn reverse.
5. Then rotate it counterclockwise until wheels stop completely.
6. Put a mark on the center frame aligning the groove(3) on neutral adjuster.
7. Rotate the neutral adjuster(2) counterclockwise so the rear wheels turn forward.
8. Then rotate it clockwise until wheels stop completely.
9. Put a mark on the center frame aligning the grove(3) on neutral adjuster.
10. Hold the neutral adjuster so its groove is at the middle of the marks and tighten the setting screw(1).





***. PART NAME**

1) Neutral adjuster setting screw
2) Neutral adjuster
3) Groove

5. CHECKING, DISASSEMBLING AND SERVICING

▶ **NOTE**

1) When the wheels tend to turn forward, rotate neutral adjuster clockwise.
2) When the wheels tend to turn reverse, rotate neutral adjuster counterclockwise.

< Charge relief pressure and high relief pressure >

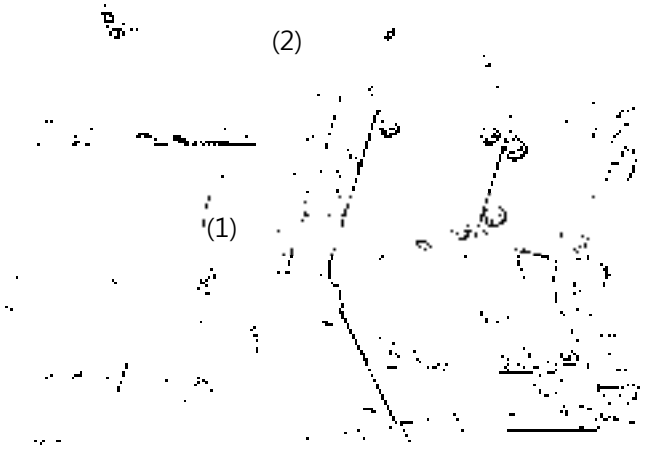
CAUTION

When checking, park the tractor on flat ground and fully engage the parking brake.

1. Remove the lowering speed adjusting knob and dipstick, then remove the seat under cover.
2. Assemble the HST adaptor (Tool for pressure test) and threaded joint with O-ring and back up ring.

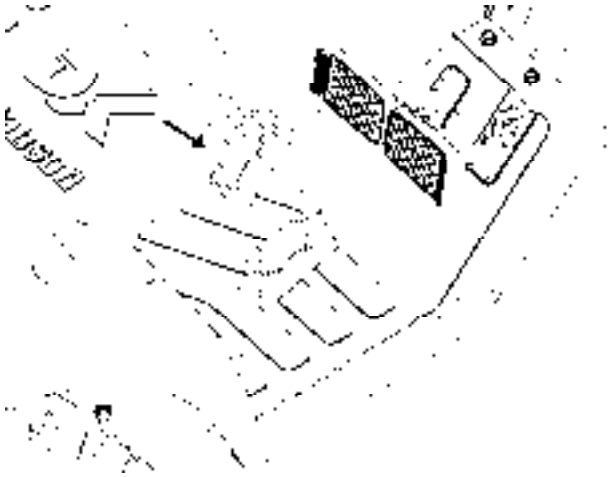
◎ **Charge relief pressure**

1. Remove the neutral valve assembly one side (forward(1) or reverse(2)) then install the assembled HST adaptor (Tool for pressure test) to its neutral valve port.
2. Install the cable and low pressure gauge to HST adaptor (Tool for pressure test).
3. Change the range gear shift lever to **Low** position.
4. Start the engine and run it at the maximum speed.
5. Read the low pressure gauge to measure the charge relief pressure.
6. If the measurement is not the same as the factory specification, check the charge relief valve and related hydraulic components.



***. PART NAME**

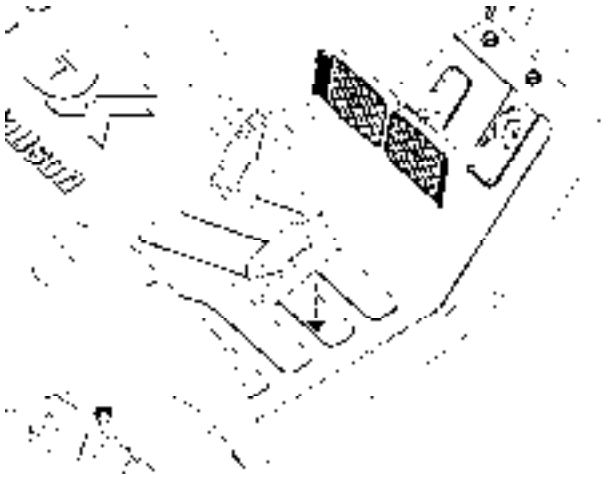
1) Neutral valve (Forward)
2) Neutral valve (Reverse)



5. CHECKING, DISASSEMBLING AND SERVICING

◎ High relief pressure

1. Remove the neutral valve assembly forward(1), then install the assembled HST adaptor (Tool for pressure test) to its neutral valve port.
2. Install the cable and high pressure gauge to HST adaptor (Tool for pressure test).
3. Change the range gear shift lever to High position.
4. Start the engine and run it at the maximum speed.
5. Depress the speed control pedal forward and read the high pressure gauge to measure the forward high relief pressure.
6. Stop the engine. Change the installation of HST adaptor (Tool for pressure test) and pressure gauge from forward neutral valve port to reverse.
7. Start engine and repeat above method(4 and 5) to measure the reverse high relief pressure.
8. If the measurement is not same as factory specification, check the high pressure relief valve and related hydraulic components.



Charge relief pressure	Factory spec. (Oil temperature at 50℃, 122°F)	392.0 to 490.0 kPa 4.0 to 5.0 kgf/㎠ 56.9 to 71.1 psi
High relief pressure	Factory spec. (Oil temperature at 50℃, 122°F)	30.9 to 31.9 kPa 315.0 to 325 kgf/㎠ 4480 to 4622 psi

Tightening Torque	Neural valve cap screw	58.8 to 68.6 kPa 6.0 to 7.0 kgf/㎠ 43.4 to 50.6 psi

◈ Important

- Measure quickly so that the high pressure relief valve is not be in operation more than 10 seconds.

▶ NOTE

1. High pressure gauge is 40 ㎫ (400 kgf/㎠, 5800 psi) full scale.
2. Low pressure gauge is 2 ㎫ (20 kgf/㎠, 290 psi) full scale.
3. When reinstalling the neutral valve, take care not to damage the O-ring.

5. CHECKING, DISASSEMBLING AND SERVICING

< Neutral valve actuation test >

WARNING

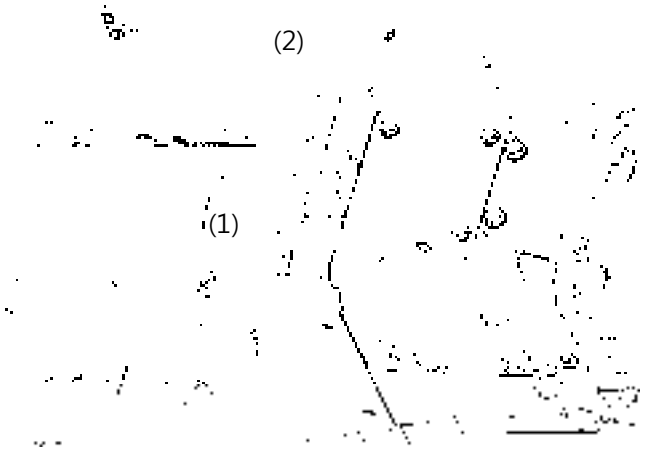
To avoid personal injury :

Do not operate if tractor moves on level ground with foot off speed control pedal.

CAUTION

When checking, park the tractor on flat ground, apply the parking brake.

1. Disengage the front wheel drive lever.
2. Disconnect the brake rod or one side.
3. Lift the rear of tractor, one side.
4. Set the engine speed to 1500 rpm.
5. Shift the range gear shift lever to High position.
6. Move the HST pedal from the forward to the neutral position make sure that the tire comes to a stop. Check the same way for the movement from rearward to the neutral potion. In this time, make sure that the neutral range of HST.
7. If the tire fail to stop or neutral range is, check the each neutral valve.



***. PART NAME**

1) Neutral valve (Forward)
2) Neutral valve (Reverse)

5. CHECKING, DISASSEMBLING AND SERVICING

<2> PREPARATION

1) Separating Housing

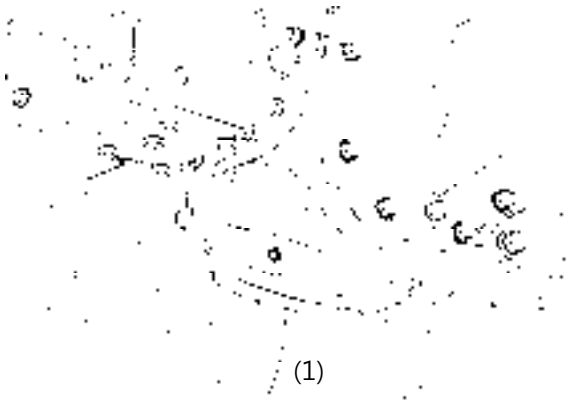
< Draining transmission fluid >

1. Place an oil pan underneath the transmission case, and remove the drain plugs(1).
2. Drain the transmission fluid.
3. Reinstall the drain plug.

(1)

▷ Refilling

- ✓ Fill new oil from filling port after removing the filling plug(2) up to the upper notch on the dipstick(3).
- ✓ After running the engine for few minutes, stop it and check the oil level again, if low, add oil to proper level.



(1)

◈ Important

- ✓ Use only multi-grade transmission oil. Use of other oils may damage the transmission or hydraulic system.
- ✓ Never work the tractor immediately after changing the transmission oil. Keep the engine at medium speed for a few minutes to prevent damage to the transmission.
- ✓ Do not mix different brands oil together.

Transmission Fluid capacity	2100 2400 2800	Front Case	3.0 L 0.79 U.S.gals 0.66 Imp.gals
		Rear case	13.0 L 3.43 U.S.gals 2.86 Imp.gals
	HST	Rear case	15.0 L 3.96 U.S.gals 3.3 Imp.gals

(1)

(3)

(2)

***. PART NAME**

1) Drain plug 2) Filling plug

3) Dipstick

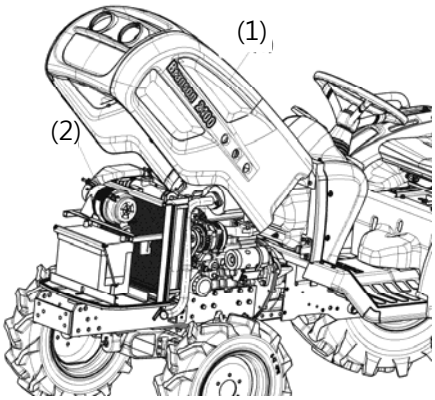
5. CHECKING, DISASSEMBLING AND SERVICING

< Hood, side cover and battery cord >

1. Open the hood(1) and remove.
2. Disconnect the battery grounding cable(2).
3. Disconnect the head light connectors and remove the hood(1).

▶ **NOTE**

1) When disconnecting the battery cables, disconnect the grounding cable(-) first.
2) When connecting, positive cable(+) first.



***. PART NAME**

1) Hood
2) Battery grounding cord

< Steering wheel >

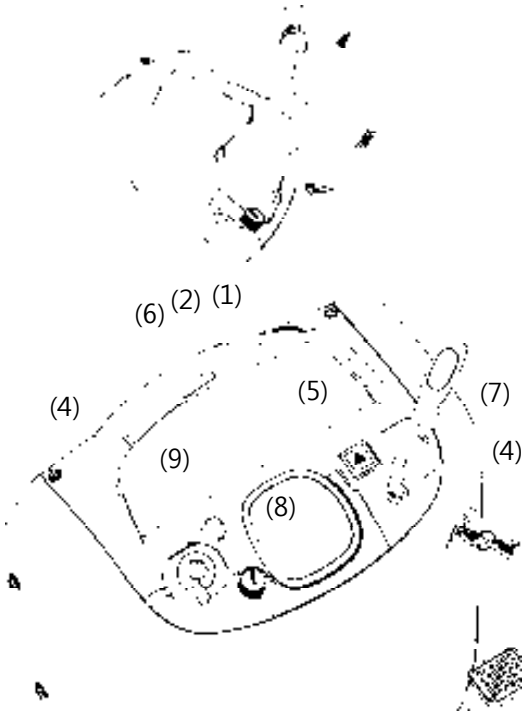
1. Remove the steering wheel cap.
2. Remove the steering wheel mounting nut and remove the steering wheel.

▷ **Reassembling**

Tightening torque	Steering wheel mounting nut	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs

< Meter panel and panel under cover >

1. Tap out the spring pin and remove the hand accelerator lever(7).
2. Remove the panel under cover(6).
3. Open the meter panel(1) and disconnect the meter panel connector(2).
4. Disconnect the combination switch connector(3), main switch connector(4) and hazard switch connector(5).



***. PART NAME**

1) Meter panel
2) Meter panel connector
3) Combination switch connector
4) Main switch connector
5) Hazard switch connector
6) Panel under cover
7) Hand accelerator lever
8) Light switch
9) Emergency stop S/W

5. CHECKING, DISASSEMBLING AND SERVICING

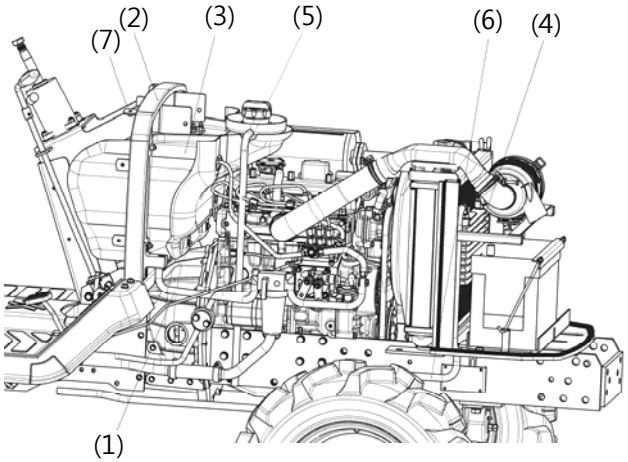
< Fuel tank >

1. Disconnect the fuel hose(1) at the fuel filter side, then drain fuel completely.
2. Disconnect the hazard unit, controller, starter relay and regulator connectors and remove the cable wire for fuel gauge.
3. Disconnect the overflow house(5) of fuel line.
4. Loosen the steering bracket(7).
5. Remove the tank frame(2) with fuel tank(3).
6. Remove the battery.
7. Disconnect the hydraulic hose(6) and remove the battery stay with oil cooler(4).

▶ **NOTE**

1. For fastening hydraulic pipe nut, use two wrenches. Hold the fitting with a wrench, turn the pipe nut with another wrench to avoid damage at fitting installed part.

Tightening torque	Delivery pipe nut for HST	34.3 to 39.2 Nm 3.5 to 4.0 kgfm 25.3 to 28.9 ft-lbs
	Oil cooler pipe nut	50.0 to 57.9 Nm 5.1 to 5.9 kgfm 36.9 to 42.8 ft-lbs
	Delivery pipe nut for power steering	64.7 to 75.5 Nm 6.6 to 7.7 kgfm 47.9 to 55.3 ft-lbs



***. PART NAME**

1) Fuel hose
2) Fuel tank frame
3) Fuel tank
4) Oil cooler
5) Overflow hose
6) Hydraulic hose
7) Steering bracket

< Propeller shaft cover and coupling >

1. Loosen the clamp and slide the propeller shaft cover(1) to the rear.
2. Tap out the spring pin(2) and then slide the coupling(3) to the rear.

▷ **Reassembling**

✓ Apply grease to the spline of the propeller shaft and coupling.

***. PART NAME**

1) Propeller shaft cover
2) Spring pin
3) Coupling

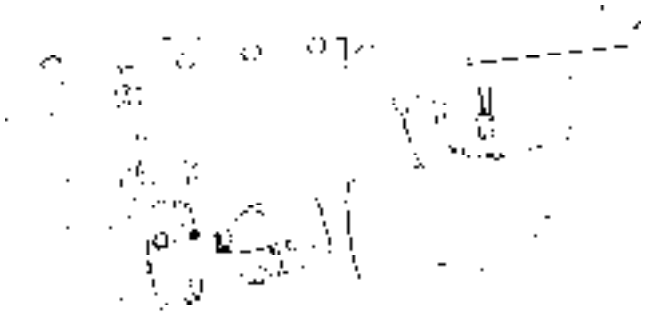
5. CHECKING, DISASSEMBLING AND SERVICING

< Universal joint and bearing holder >

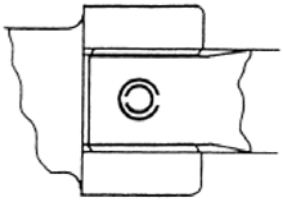
1. Loosen the clamp and slide the universal joint cover(1) to the rear.
2. Remove the bearing holder(4) with propeller shaft and universal joint.
3. Tap out the spring pins(2) and then slide the universal joint(3) to the rear.

▷ **Reassembling**

- ✓ Apply grease to the spline of the propeller shaft and universal joint.
- ✓ When inserting the spring pins(2), face their splits in the direction parallel to the universal joint as shown in the figure.
- ✓ Assemble the universal joint cover(1) so that the water drain hole may become downward.
- ✓ Arrange the position of the clamp at side as shown in figure.



(4) (2) (3) (1)



***. PART NAME**

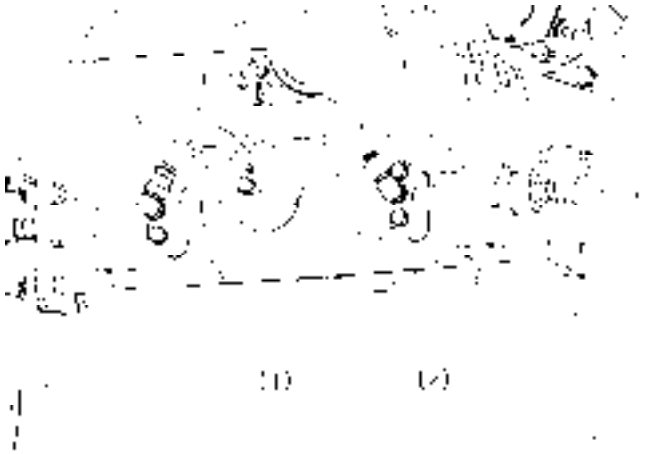
1) Universal joint cover 2) Spring pin
3) Universal joint 4) Bearing holder

< Hydraulic hose >

1. Remove the hydraulic hose(1) from the front cylinder assy(2).

***. PART NAME**

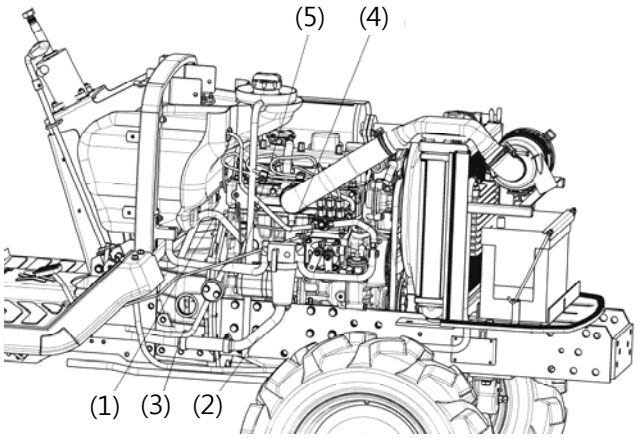
1) Hydraulic hose 2) Front cylinder assy



5. CHECKING, DISASSEMBLING AND SERVICING

< Steering assembly >

1. Remove the seat under cover, rubber mat and side step LH.
2. Disconnect the accelerator rod(4).
3. Disconnect the speed set rod(5) and parking brake rod(2).
4. Remove the power steering delivery pipe(3) and disconnect the power steering return pipe(6).
5. Remove the power steering assembly from the center frame.



▶ **NOTE**

1) For fastening hydraulic pipe nut, use two wrenches. Hold the fitting with a wrench, turn the pipe nut with another wrench to avoid damage at fitting installed part.

Tightening torque	Delivery pipe nut for power steering	64.7 to 75.5 Nm 6.6 to 7.7 kgfm 47.9 to 55.3 ft-lbs
	Power steering assembly mounting screw	77.5 to 90.1 Nm 7.9 to 9.2 kgfm 57.2 to 66.5 ft-lbs

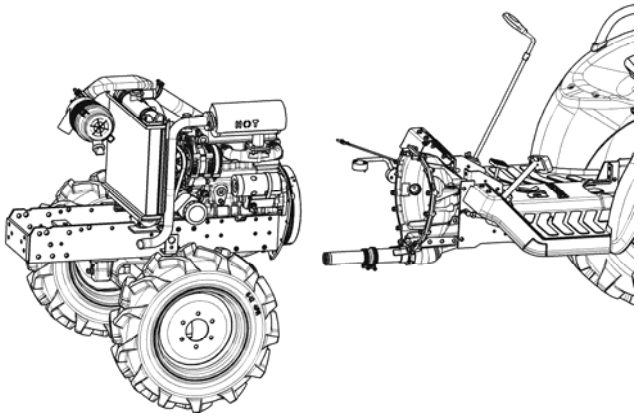
***. PART NAME**

1) Power steering delivery pipe
2) Parking brake rod
3) Accelerator rod
4) Speed set rod
5) Power steering return pipe

5. CHECKING, DISASSEMBLING AND SERVICING

< Separating the engine from clutch housing >

1. Disconnect the three point hitch delivery pipe and suction hose.
2. Disconnect the glow plug lead wire and heat sensor lead for alternator connector and starter motor cable.
3. Place the jack under the center frame.
4. Hoist the engine by the chain at the engine hook.
5. Remove the engine mounting screws and separate the engine from the clutch housing.



▷ **Reassembling**

✓ Apply liquid gasket to joint face of the engine and clutch housing.

Tightening torque	Engine mounting screw	M8	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 20.3 ft-lbs
		M10	48.1 to 55.8 Nm 4.9 to 5.7 kgfm 35.5 to 41.2 ft-lbs

< Separating clutch housing >

1. Remove the clutch pedal rod(1).
2. Loosen the clamp and disconnect connecting hose(2).
3. Separate the clutch housing from center frame.
4. Remove the hydraulic pipe(3).

(1) (2)

▷ **Reassembling**

✓ Apply grease to the spline of propeller shaft and ball joint.

Tightening torque	Clutch housing mounting screw and nut	77.5 to 90.2 Nm 7.9 to 9.2 kgfm 57.1 to 66.5 ft-lbs

(3) (2)

***. PART NAME**

1) Clutch pedal rod 2) Connecting hose
3) Hydraulic pipe

5. CHECKING, DISASSEMBLING AND SERVICING

2) Separating Center Frame and Transmission Case

< Draining transmission fluid >

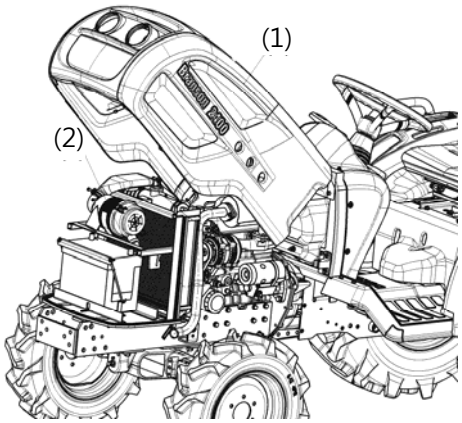
-. Reference the page 76.

< Battery connector >

1. Open the hood(1).
2. Disconnect the battery ground cord(2).
3. Disconnect the head light connectors and remove the hood(1).

▶ **NOTE**

1) When disconnecting the battery cords, disconnect the grounding cord first. When connecting, the positive cord first.

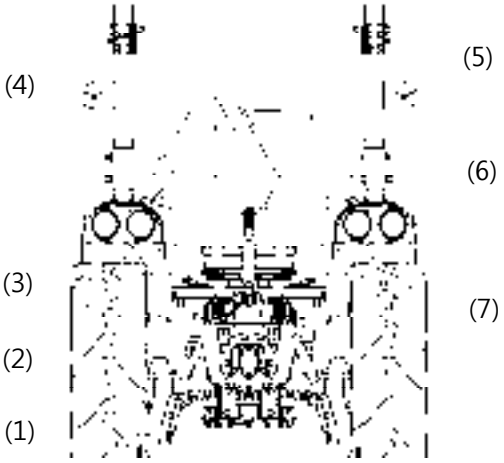


***. PART NAME**

1) Hood
2) Battery cord

< Roll-Over protective structures (ROPS) and 3 Point hitch >

1. Disconnect the wire harness and remove the tail lamps(6).
2. Remove the hazard lamps(5).
3. Remove the ROPS frame top mounting bolts and nuts and remove the ROPS frame top(4).
4. Remove the lower link(1) and the collar from the 3-point hitch shaft(2).
5. Remove the ROPS frames(3) and 3-point hitch shaft(2).



***. PART NAME**

1) Lower link
2) 3-Point hitch shaft
3) ROPS frame
4) ROPS frame, Top
5) Direction lamp
6) Tail lamp
7) PTO shaft cover

Tightening torque	Connecting plate mounting screw	123.6 to 147.0 Nm 12.6 to 15.0 kgfm 91.1 to 108.5 ft-lbs
	ROPS frame and frame top mounting bolt and nut	274.6 to 318.7 Nm 28.0 to 32.5 kgfm 202.5 to 235.1 ft-lbs
	ROPS frame mounting screw	77.5 to 90.1 Nm 7.9 to 9.2 kgfm 57.2 to 66.5 ft-lbs

Tightening torque	3-Point hitch shaft setting screw	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 20.3 ft-lbs
	3-Point hitch shaft setting screw lock nut	43.0 to 47.0 Nm 4.4 to 4.8 kgfm 31.7 to 35.4 ft-lbs

5. CHECKING, DISASSEMBLING AND SERVICING

< Seat, panel, step, rear wheel and others >

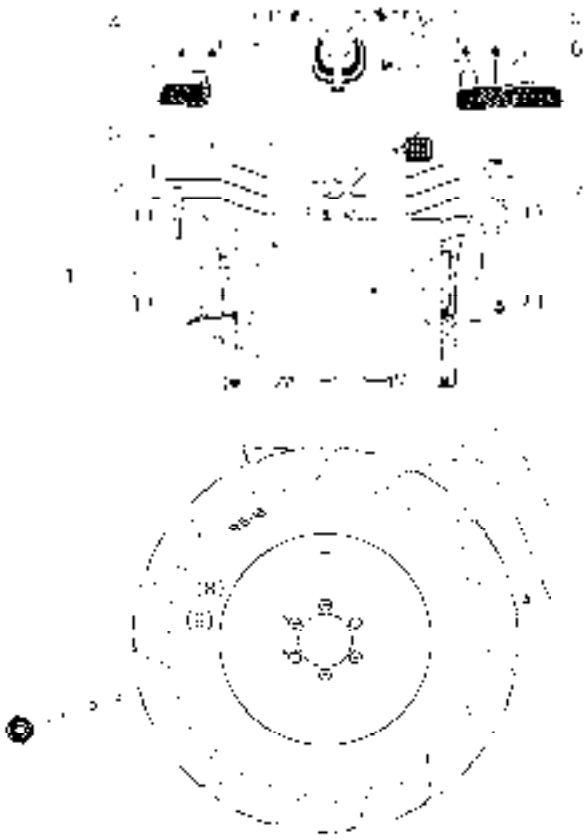
1. Remove the seat(2), seat under cover and rubber mat(3).
2. Remove the tool box(7).
3. Disconnect the 2P connectors from the seat switches, and then remove the seat stay(1).
4. Remove the steering wheel(4), panel(5) and panel under cover(6). (Reference the page 77.)
5. Remove the fuel tank frame set screws and fuel tank stay.
6. Disconnect the springs and rods from steps, and then, remove the steps while lifting the fuel tank frame.
7. Place the jack under the transmission case and remove the rear wheels, and then support the both rear axles by stands.

◈ **Important**

- When refitting or adjusting a wheel, tighten the bolts to the following torques then recheck after driving the tractor 200m (200yards) and there after daily check service.

▷ **Reassembling**

Tightening torque	Rear wheel bolt and nut	108.0 to 125.0 Nm 11.0 to 12.7 kgfm 79.0 to 92.2 ft-lbs



***. PART NAME**

1) Seat stay
2) Seat
3) Rubber mat
4) Steering wheel
5) Meter panel
6) Panel under cover
7) Tool box
8) Bolt
9) Nut

< Shaft levers and fenders >

1. Remove the all lever grips.
2. Remove the lever guide LH(3) and remove the fender LH.
3. Remove the main shift lever(2) and remove the lever guide RH (Manual transmission type only).
4. Remove the hydraulic control lever(1) and remove the fender RH.

***. PART NAME**

1) Hydraulic control lever
2) Main shift lever
3) Lever guide LH

5. CHECKING, DISASSEMBLING AND SERVICING

< Propeller shaft cover and coupling >

-. Reference the page 78.

< Universal joint and bearing holder >

-. Reference the page 79.

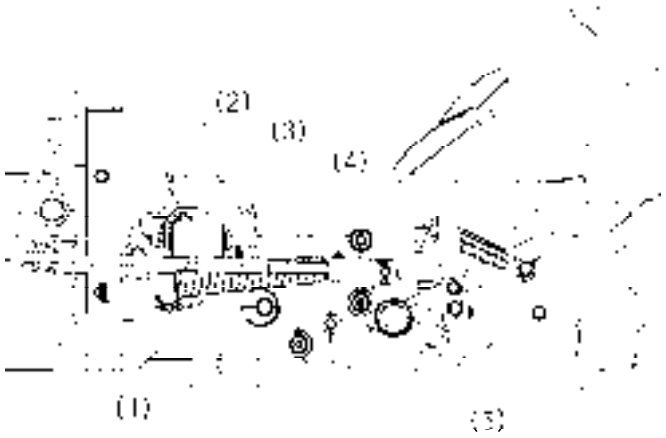
< HST Pedal >

1. Remove the brake rod RH(1).
2. Remove the damper(4) and speed control rod assembly(3).
3. Remove the HST pedal(5).
4. Remove the speed control rod screw(2) from the neutral holder.

▷ **Reassembling**

✓ Apply liquid lock to the speed control rod screw(2).

Tightening torque	Speed control rod screw	39.2 to 44.1 Nm 4.0 to 4.5 kgfm 28.9 to 32.5 ft-lbs



***. PART NAME**

1) Brake rod RH
2) Speed control rod screw
3) Speed control rod assembly
4) Damper
5) HST pedal

5. CHECKING, DISASSEMBLING AND SERVICING

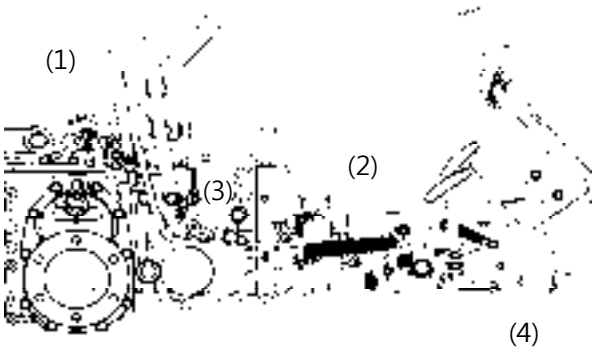
< Delivery pipes and HST safety switch holder >

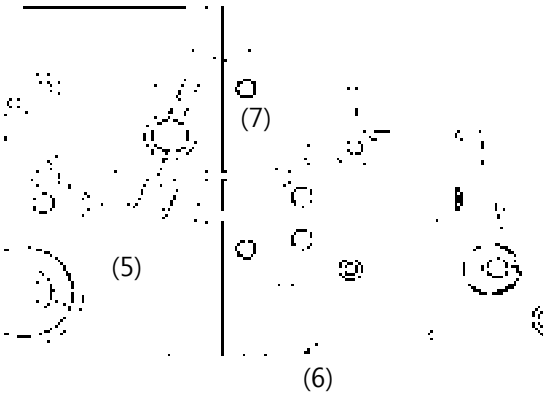
1. Remove the pipe clamps and delivery pipe joint bolt(1).
2. Disconnect the differential lock rod.
3. Remove the accelerator rod and pedal, and then remove the delivery pipe.
4. Remove the HST neutral bracket holder with neutral rod(2).
5. Disconnect the HST delivery pipe(4)

◈ **Important**

- When HST safety switch(5) has been removed, be sure to adjust the length A.
- Length A : 8 to 9 mm (0.31 to 0.35 in.)

Tightening torque	Joint bolt (3P delivery pipe)	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 20.3 ft-lbs
	HST delivery pipe nut	34.3 to 39.2 Nm 3.5 to 4.0 kgfm 25.1 to 28.7 ft-lbs





***. PART NAME**

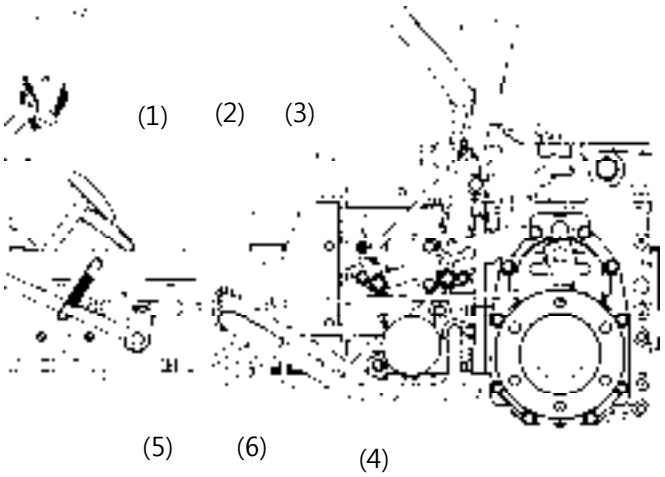
1) Pipe joint bolt
2) HST safety switch with neutral rod
3) 3P delivery pipe
4) HST delivery pipe
5) HST safety switch
6) Neutral rod
7) Neutral bracket

< Hydraulic pipes and others >

1. Remove the brake rod LH(1).
2. Remove the connecting pipe(2).
3. Remove the HST suction pipe(3). (HST type only)
4. Remove the hydraulic oil filter assembly(4) and pipe(5),(6). (HST type only)

***. PART NAME**

1) Brake rod LH
2) Connecting pipe
3) HST suction pipe
4) Hydraulic oil filter assembly
5) Return pipe (Oil cooler to filter)
6) Pipe (Filter to HST)



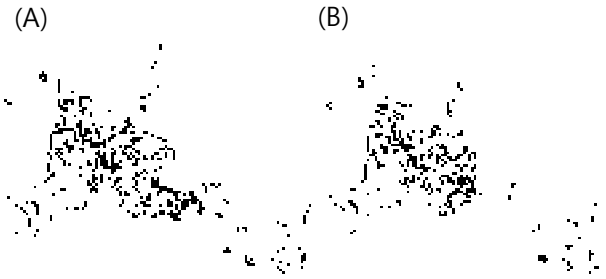
4. CHECKING, DISASSEMBLING AND SERVICING

< Separating transmission assembly >

1. Disconnect the suction pipe at the transmission case side.
2. Separate the transmission case from center frame.

▷ **Reassembling**

Tightening torque	HST and center frame mounting bolt	77.5 to 90.2 Nm 7.9 to 9.4 kgfm 57.1 to 66.5 ft-lbs



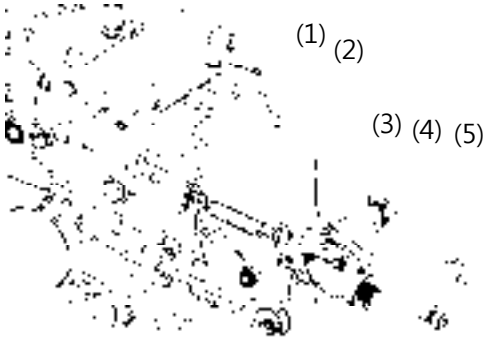
(A) HST Type

(B) Manual transmission type

3) Separating HST (HST Type)

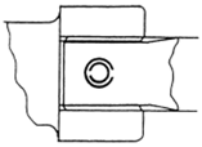
< Separating transmission case and hydrostatic transmission(HST) >

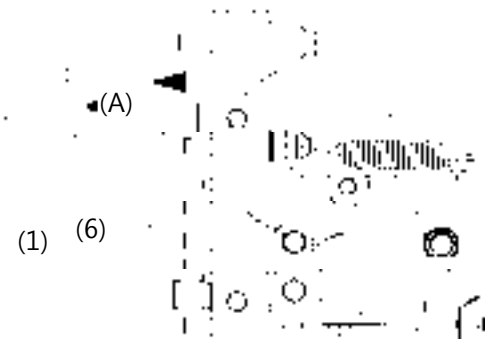
1. Tap out the spring pins and remove the universal joint(4) with front wheel drive propeller shaft(5).
2. Remove the HST delivery pipe(3).
3. Remove the neutral spring(2) and remove the spring holder(1).
4. Separate the HST from transmission case.



▷ **Reassembling**

- ✓ Apply gasket to joint face of the HST and transmission case.
- ✓ When inserting the spring pins, face their splits in the direction at a right angle to the universal joint and propeller shaft as shown in the figure.
- ✓ Apply grease to the spline of the HST pump shaft, front wheel propeller shaft, universal joint and ball coupling.





▶ **NOTE**

1) When reassembling the spring holder, spring hook(6) must be inside as shown in the figure.

Tightening torque	Spring holder mounting screw	39.2 to 44.1 Nm 4.0 to 4.5 kgfm 28.9 to 32.5 ft-lbs

***. PART NAME**

1) Spring holder
2) Neutral spring
3) HST Delivery pipe
4) Universal joint
5) Front wheel driver propeller
6) Spring hook
A) HST Case side

5. CHECKING, DISASSEMBLING AND SERVICING

<3> DISASSEMBLING AND ASSEMBLING

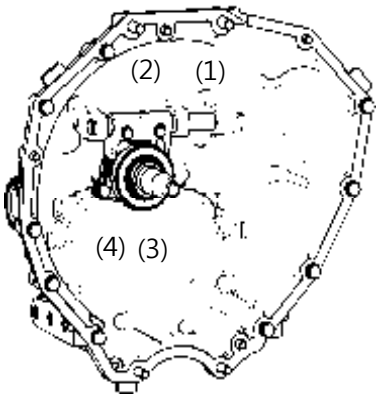
1) Disassembling Clutch Housing

< Clutch rod and clutch release fork >

1. Remove the external snap ring at the end of clutch rod.
2. Draw out the clutch rod(1) and remove the clutch release fork(2).
3. Take out the release hub with release bearing(3).

▷ **Reassembling**

✓ Set the clutch release fork and release hub with set spring(4) in the correct direction.



***. PART NAME**

1) Clutch rod
2) Clutch release fork
3) Release bearing
4) Set spring

< Clutch housing rear cover >

1. Remove the clutch housing rear cover(1).

▷ **Reassembling**

✓ Apply the gasket to the joint face of clutch housing and rear cover(1).

***. PART NAME**

1) Clutch housing rear cover

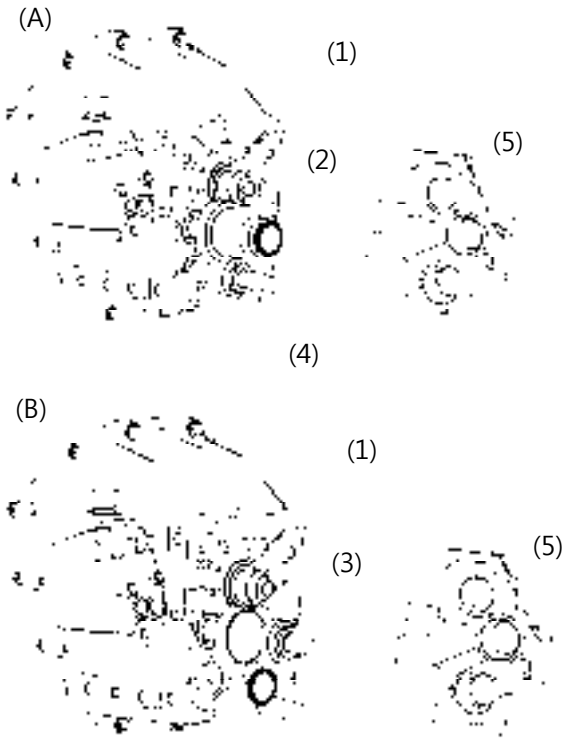
A) HST Type B) Manual transmission type

< Clutch shaft and others >

1. Pull out the clutch shaft assembly(1).
2. Pull out the 2nd gear shaft, front assembly(2) (HST Type).
3. Pull out the 2nd shaft, front assembly(3) (Manual transmission type).
4. Pull out the 3rd shaft, front assembly(4) (HST Type).

▷ **Reassembling**

✓ Apply small amount of the grease to the oil seal(5).



***. PART NAME**

1) Clutch shaft assembly
2) 2nd gear shaft, front assembly
3) 2nd shaft, front assembly 4) 3rd shaft, front assembly
5) Oil seal

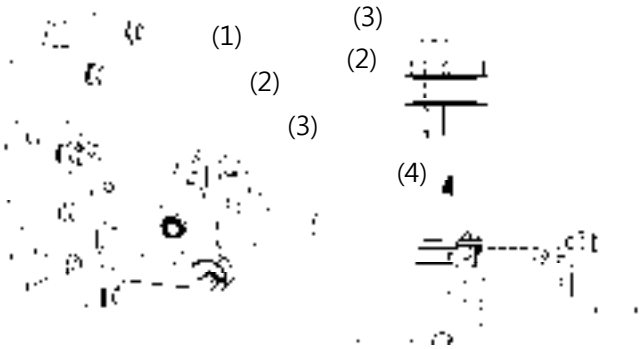
A) HST Type B) Manual transmission type

5. CHECKING, DISASSEMBLING AND SERVICING

2) Disassembling HST (HST Type)

< Neutral holder and neutral holder arm >

1. Place parting marks on the neutral adjuster(3) and the neutral holder arm(2).
2. Remove the neutral holder arm(2) with neutral adjuster(3).
3. Remove the screw and pull out the neutral holder(1).



▷ Reassembling

- ✓ Align the parting marks and install the neutral adjuster and the neutral holder arm.
- ✓ Be sure to install the spacer(4).

***. PART NAME**

1) Neutral holder
2) Neutral holder arm
3) Neutral adjuster
4) Spacer

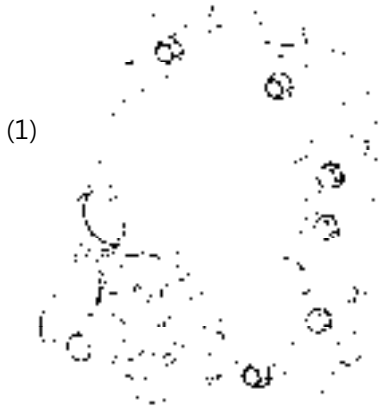
Tightening torque	Neutral adjuster lock screw	23.6 to 27.4 Nm 2.4 to 2.8 kgfm 17.4 to 20.3 ft-lbs
	Neutral holder mounting screw	23.6 to 27.4 Nm 2.4 to 2.8 kgfm 17.4 to 20.2 ft-lbs

< Charge pump >

1. Remove the charge pump mounting screws, and remove the charge pump assembly(1) from the HST housing.

▶ NOTE

1) Take care not to damage the O-ring.



Tightening torque	Charge pump mounting screw	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 20.3 ft-lbs

***. PART NAME**

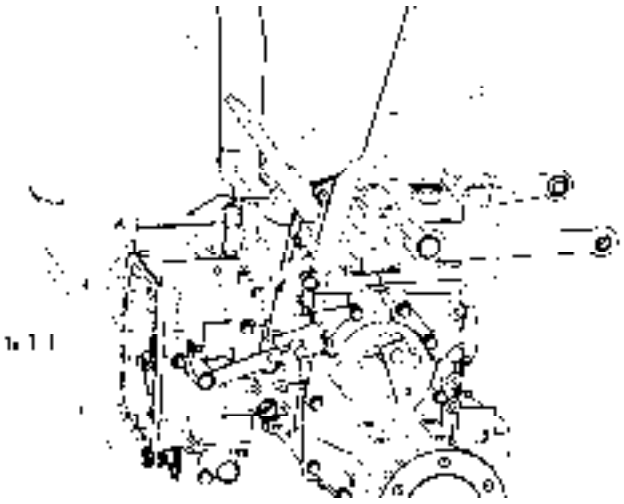
1) Charge pump assembly

5. CHECKING, DISASSEMBLING AND SERVICING

3) Disassembling Transmission Case (HST Type)

< Separating hydraulic cylinder, rear axle cases and others >

1. Remove the external snap ring and remove the PTO shift lever(7) and range gear shift lever(8).
2. Remove the front wheel driver lever(1).
3. Remove the differential lock pedal support(2).
4. Remove the top link bracket(3) and remove the hydraulic cylinder(4).
5. Remove the rear axle case(5) and drawbar frame(6).



▷ Reassembling

1. Apply gasket to joint face of the differential case to hydraulic cylinder and rear axle.

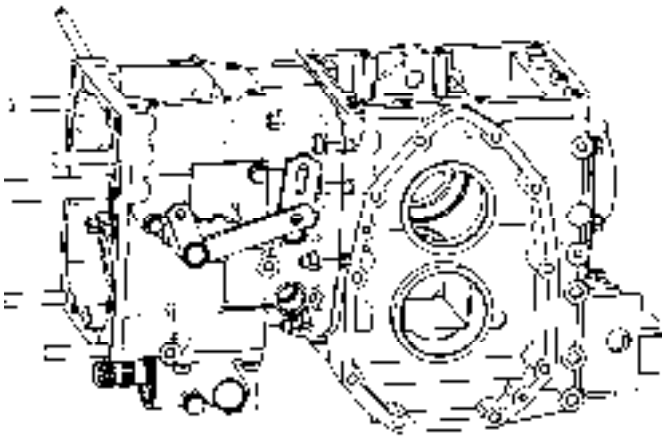
Tightening torque	Hydraulic cylinder mounting screw and nut	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs
	Rear axle case mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs

***. PART NAME**

1) Front wheel drive lever
2) Differential lock pedal support
3) Top link bracket
4) Hydraulic cylinder
5) Rear axle case
6) Drawbar frame
7) PTO shift lever
8) Range gear shift lever

< Separating mid-PTO case, transmission case and differential case >

1. Remove the mid-PTO case mounting screws and separate the mid-PTO case(3) and transmission case(1).
2. Remove the transmission case mounting screws and nuts and separate the differential case(2) and transmission case(1).



▷ Reassembling

✓ Apply gasket to joint face of the transmission case to differential case and mid-PTO case to transmission case.

Tightening torque	Transmission case mounting screw and nut	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 38.4 to 41.2 ft-lbs

***. PART NAME**

1) Transmission case
2) Differential case
3) Mid-PTO case

5. CHECKING, DISASSEMBLING AND SERVICING

< 4th Gear shaft and spiral bevel pinion shaft >

1. Remove the spiral bevel pinion shaft(3) with 15T-29T shifter gear(2), 13T gear(8) and shift fork(4).
2. Remove the 4th gear shaft(1) with 18T gear.

▷ **Reassembling**

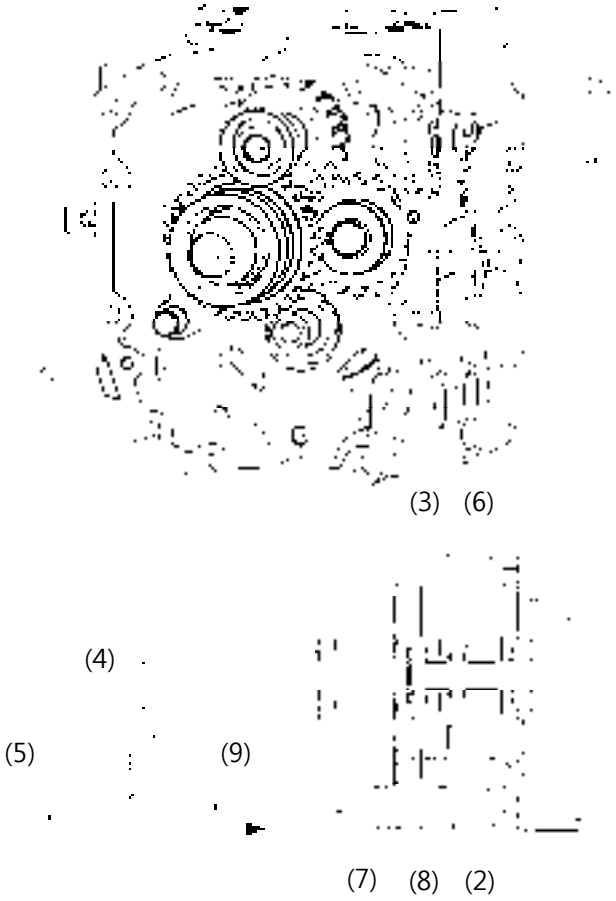
- ✓ When installing the spiral bevel pinion shaft, be sure to install the shims(7).
- ✓ Install the shift fork(4), so that the fork rod(9) of the shift rod(5) faces rearward.

◈ **Important**

- ➢ When disassembling the spiral bevel pinion shaft(3), be sure to replace the external snap ring(6) with new one.

***. PART NAME**

1) Gear shaft	2) Shifter gear
3) Spiral bevel pinion shaft	4) Shift fork
5) Shift fork rod	6) External snap ring
7) Shim	8) 13T gear
9) Fork rod	A) Rear



< Bearing holder >

1. Remove the external snap ring and remove the 27T gear(1).
2. Remove the bearing holder mounting screws and remove the bearing holder(2).

▷ **Reassembling**

Tightening torque	Bearing holder mounting screw	50 to 55 Nm 5.1 to 5.6 kgfm 36.9 to 40.1 ft-lbs

***. PART NAME**

1) 27T Gear
2) Bearing holder

5. CHECKING, DISASSEMBLING AND SERVICING

< 2nd Gear shaft and middle shaft >

1. Remove the 2nd gear shaft(1) with bearings.
2. Remove the 3rd shaft assembly(2) and shift fork(3) with shift rod.
3. Remove the middle shaft(4) and 19T gear with bearing.

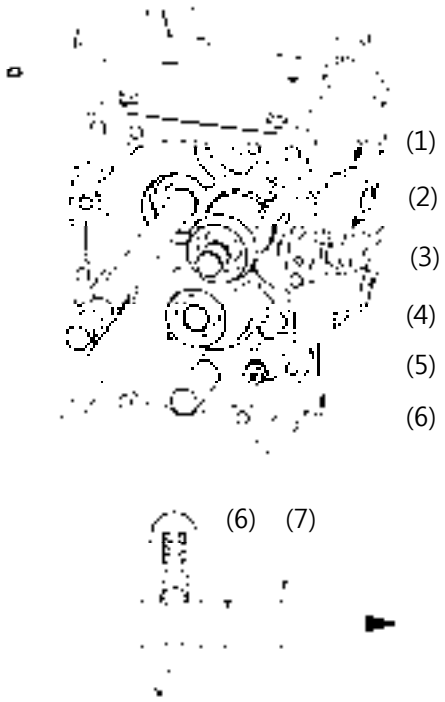
▷ **Reassembling**

✓ When assembling the 19T gear(5), face the chamber side to the front.

✓ Install the shift fork(3), so that the snap ring(7) of the shift rod(6) faces rearward.

***. PART NAME**

1) 2nd gear shaft	2) 3rd shifter assembly
3) Shaft fork	4) Middle shift
5) 19T Gear	6) Shift fork rod
7) External snap ring	A) Rear

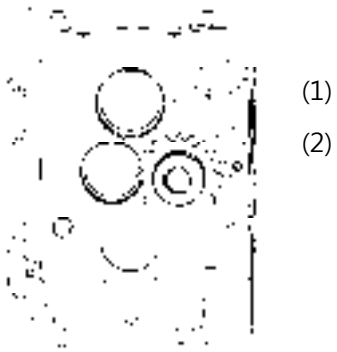


< Front wheel drive shaft >

1. Remove the external snap ring and remove the 20T shifter gear(1).
2. Draw out the front wheel drive shaft(2) to the front.

***. PART NAME**

1) 20T Shifter gear	2) Front wheel drive shaft



< Mid-PTO shaft >

1. Remove the oil seal(1) and internal snap ring(2).
2. Remove the mid-PTO shaft(3) with bearing(4).

▷ **Reassembling**

✓ Apply grease to lip and out of oil seal.

***. PART NAME**

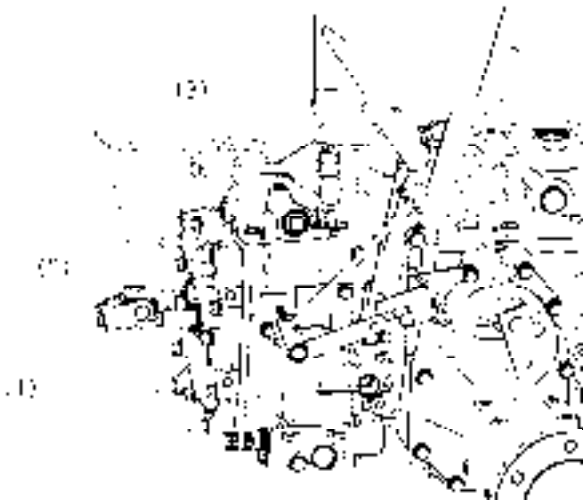
1) Oil seal	2) Internal snap ring
3) Mid-PTO Shaft	4) Bearing

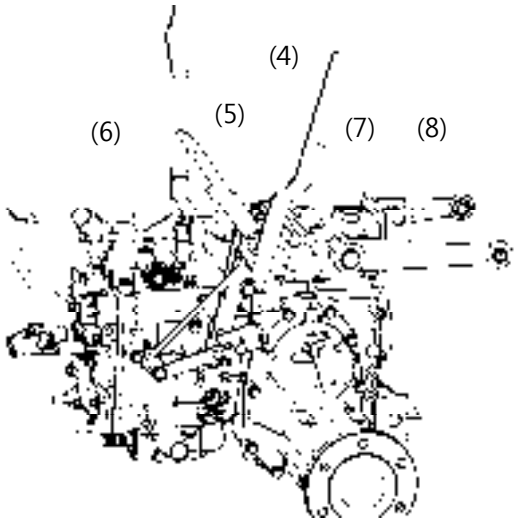
5. CHECKING, DISASSEMBLING AND SERVICING

4) Disassembling Transmission Case (Manual transmission Type)

< Separating hydraulic cylinder and main shift cover >

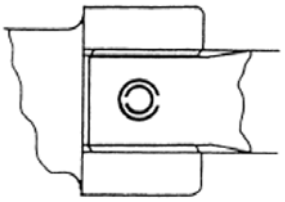
1. Remove the connecting pipe and propeller shaft.
2. Tap out the spring pins and remove the universal joint(2) with front wheel drive propeller shaft.
3. Remove the external snap ring and remove the PTO shift lever(4) with rod and range gear shift lever(5).
4. Remove the top link bracket(8).
5. Remove the connecting plate(6) and hydraulic cylinder mounting screws and remove the hydraulic cylinder assembly(7).
6. Remove the main shift cover mounting screws and remove the main shift cover(3) with differential lock pedal.





▷ **Reassembling**

- ✓ When inserting the spring pins, face their splits in the direction parallel to the universal joint as shown in the figure below.
- ✓ Apply gasket to joint face of the main shift cover to transmission case and differential case to the hydraulic cylinder.
- ✓ Apply grease to the spline of the front wheel drive propeller shaft, universal joint and ball coupling.
- ✓ Reinstall the connecting pipe with O-ring and back-up ring securely.



Tightening torque	Connecting plate mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs
	Top link bracket mounting screw	77.5 to 90.1 Nm 7.9 to 9.2 kgfm 57.2 to 66.5 ft-lbs
	Hydraulic cylinder mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs

Tightening torque	Main shift cover mounting screw	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 20.3 ft-lbs

***. PART NAME**

1) Front wheel drive propeller shaft
2) Universal joint
3) Main shift cover
4) PTO Shift lever
5) Range gear shift lever
6) Connecting plate
7) Hydraulic cylinder assembly
8) Top link bracket

5. CHECKING, DISASSEMBLING AND SERVICING

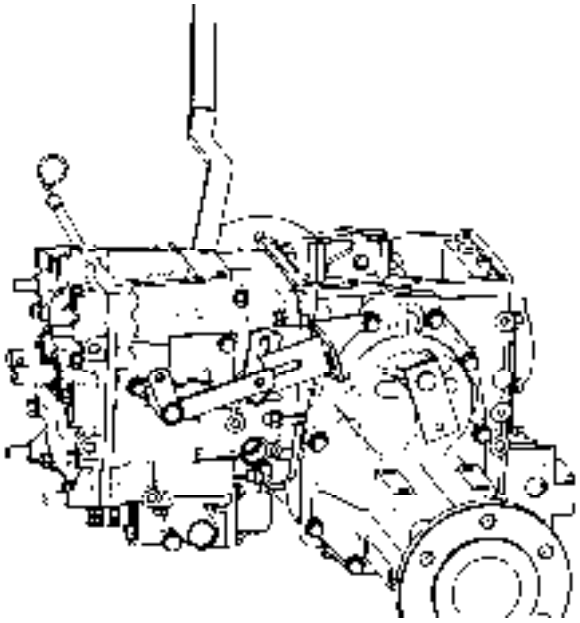
< Separating rear axle case, mid-PTO case, drawbar frame and transmission case >

1. Remove the front wheel drive lever(3).
2. Remove the rear axle cases(5) from differential case.
3. Remove the mid-PTO case(1) from transmission case.
4. Remove the drawbar frame(6).
5. Separate the transmission case(2) and differential case(4).

▷ **Reassembling**

✓ Apply gasket to the face of the rear axle cases, mid-PTO case and transmission case to differential case.

Tightening torque	Drawbar frame mounting screw	77.5 to 90.2 Nm 7.9 to 9.2 kgfm 57.1 to 66.5 ft-lbs
	Mid-PTO case mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs
	Transmission case mounting screw and nut	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs
	Rear axle case mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs



***. PART NAME**

1) Mid-PTO case
2) Transmission case
3) Front wheel drive lever
4) Differential case
5) Rear axle case
6) Drawbar frame

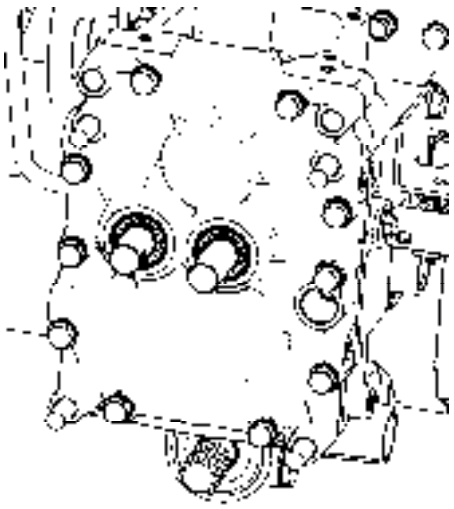
< Front cover >

1. Remove the front cover mounting screw and remove the front cover(1).

▷ **Reassembling**

✓ Apply liquid gasket to joint face of the front cover to transmission case.

Tightening torque	Front case mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs



***. PART NAME**

1) Front cover

5. CHECKING, DISASSEMBLING AND SERVICING

< 4th gear shaft >

1. Remove the bearing, 30T shifter gear and 13T-17T shifter gear.
2. Draw out the 4th gear shaft(1) with 19T gear rearward.

***. PART NAME**

1) 4th Gear shaft

< Spiral bevel pinion shaft and 20T shifter gear >

1. Remove the external snap ring(1) and one-way clutch cam(2).
2. Remove the spiral bevel pinion shaft(3) with 13T-32T shifter gear(4), 13T gear(5), and shift fork with shift rod.
3. Remove the external snap ring and remove the 20T shifter gear(6).

▷ **Reassembling**

✓ When installing the spiral bevel pinion shaft, be sure to install the shim(7).

***. PART NAME**

1) External snap ring
2) One-way clutch cam
3) Spiral bevel pinion shaft
4) 13T-32T Shifter gear
5) 13T Gear
6) 20T Shifter gear
7) Shim (1.8T)

< 2nd gear shaft and front wheel drive shaft >

1. Remove the 2nd gear shaft(1) with bearing.
2. Draw out the front wheel drive shaft(2) with 16T-20T gear(3).

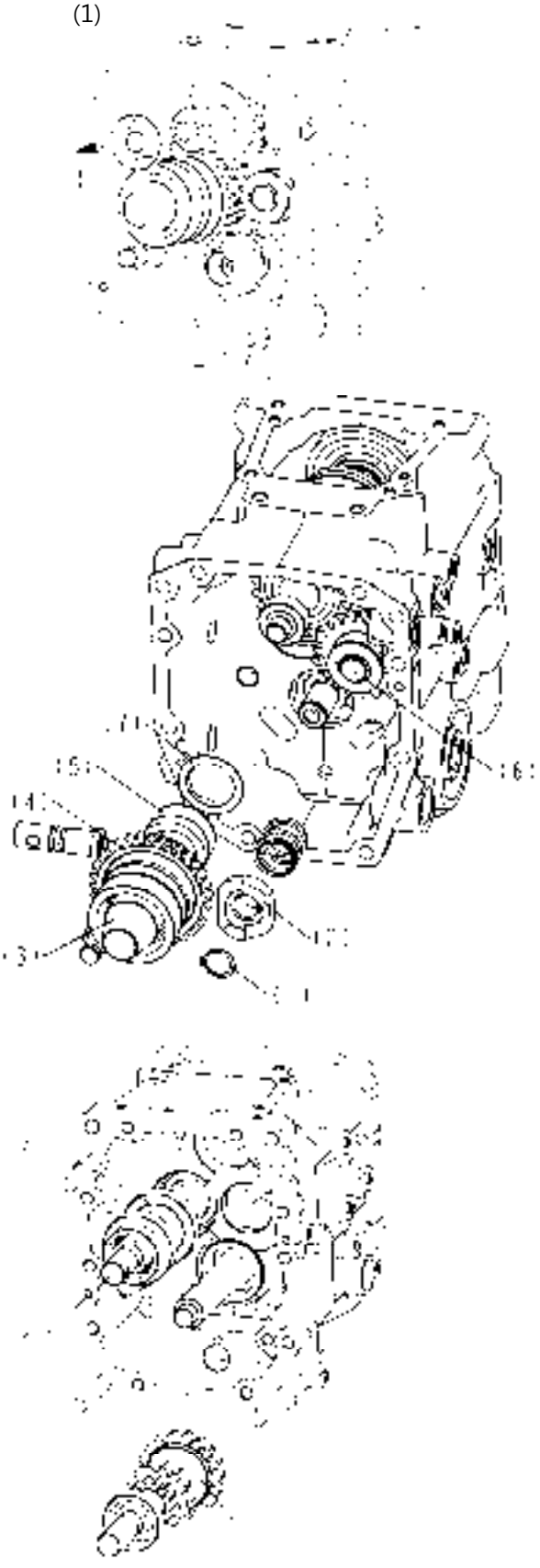
▷ **Reassembling**

✓ When installing the needle bearing into the 16T-20T gear, apply transmission oil to the needle bearings.

***. PART NAME**

1) 2nd Gear shaft
2) Front wheel drive shaft
3) 16T-20T Gear

(1)



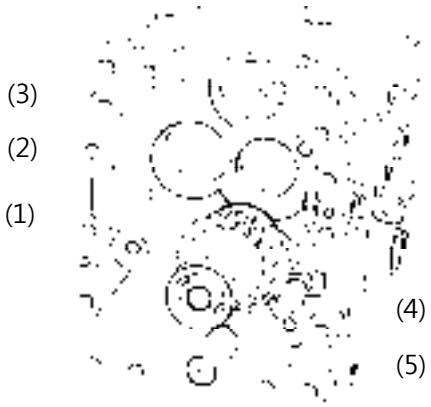
5. CHECKING, DISASSEMBLING AND SERVICING

< Middle shaft and 3rd shaft >

1. Tap out the middle shaft(1) and remove the 19T gear with bearing.
2. Draw out the 3rd shaft(2) with 13T-17T shifter gear(3) and shift fork(4) with shift rod.

▷ **Reassembling**

✓ Install the shift fork(4) and shift rod(5) as shown in the figure.



***. PART NAME**

1) Middle shaft
2) 3rd Shaft
3) 13T-17T Shifter gear
4) PTO Shifter fork
5) Shifter fork rod
A) Front
B) Rear

< Mid-PTO shaft and one-way clutch >

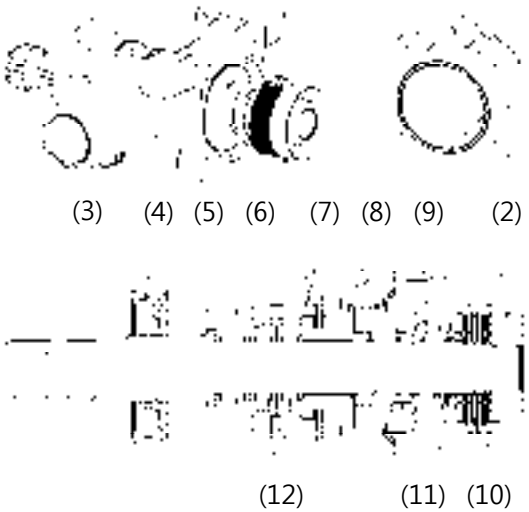
1. Remove the mid-PTO case rear cover mounting screws and separate the rear cover(1).
2. Remove the bearing(2) and remove the friction plates, brake discs(10) and spring(9).
3. Remove the external snap ring and remove the spring(11) and one-way clutch cam(8).
4. Remove the oil seal(4) and internal snap ring(5).
5. Remove the mid-PTO shaft(3) with bearing(13), 11T gear(6) and coupling(7).

▷ **Reassembling**

✓ Apply grease to lip and outer of oil seal.

✓ When installing the needle bearings(12) into the 11T gear and one-way clutch cam, apply transmission oil to the needle bearings.

✓ Install the longer needle bearing to front side.



Tightening torque	Mid-PTO rear cover mounting screw	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 27.3 ft-lbs

***. PART NAME**

1) Mid-PTO case rear cover
2) Bearing
3) Mid-PTO Shaft
4) Oil seal
5) Internal snap ring
6) 11T Gear
7) Coupling
8) One-way clutch cam
9) Spring
10) Friction plate and brake disc
11) Spring
12) Needle spring
13) Bearing

5. CHECKING, DISASSEMBLING AND SERVICING

< Main gear shift fork >

1. Remove the cotter pin(1) and remove the spring(2) and ball(3).
2. Draw out the shift rod(4) and remove the 1st-reverse gear shift fork(5).
3. Remove the 2nd-3rd gear shift fork(6), in the same way as the 1st-reverse shift fork removing procedure.
4. Take out the interlocker(7) and slide the shift arm stopper(8) and then remove the shift arm(9).
5. Remove the shift shaft(10).
6. When remove the differential lock pedal shaft(11) draw out the dowel pin(12) first.

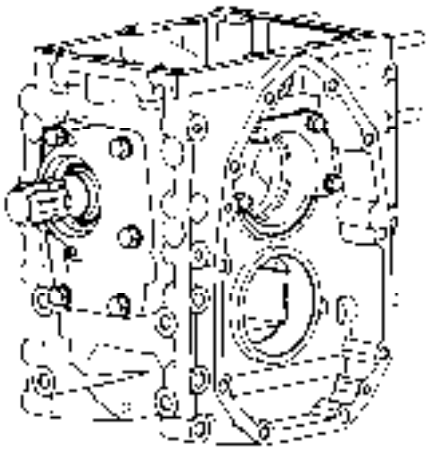
***. PART NAME**

1) Cotter pin	2) Spring
3) Ball	4) Shift rod
5) 1st-Reverse gear shift fork	6) 2nd-3rd Gear shift fork
7) Interlocker	8) Shift arm stopper
9) Shift arm	10) Shift shaft
11) Differential lock pedal shaft	
12) Dowel pin	

5) Disassembling Differential Gear Case

< PTO shaft >

1. Remove the PTO cover mounting screws and remove the PTO cover assembly.



▷ Reassembling

✓ Apply gasket to joint face of differential gear case and PTO cover.

Tightening torque	PTO cover mounting screw	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs

4. CHECKING, DISASSEMBLING AND SERVICING

< Differential gear assembly >

1. Remove the bearing holder mounting screws and remove the bearing holder(1).
2. Take out the differential gear assembly(3).

▷ **Reassembling**

✓ Install the differential gear assembly, noting the number of shims(2) in the differential case left side and bearing holder side.

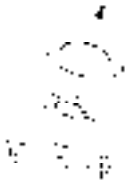
Tightening torque	Differential gears bearing holder mounting screw	23.5 to 27.5 Nm 2.4 to 2.8 kgfm 17.4 to 27.3 ft-lbs

***. PART NAME**

1) Bearing holder
2) Adjusting shim
3) Differential gear assembly

< Bearing >

1. Remove the right and left bearings from in the differential case.



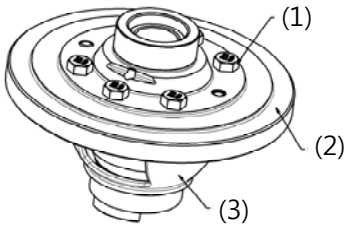
< Spiral bevel gear >

1. Remove the spiral bevel gear UBS screws(1).
2. Remove the spiral bevel gear(2) from differential case(3).

▷ **Reassembling**

✓ Apply liquid lock to the spiral bevel gear UBS screws.

Tightening torque	Spiral bevel gear UBS screw	29.4 to 34.3 Nm 3.0 to 3.5 kgfm 21.7 to 25.3 ft-lbs



***. PART NAME**

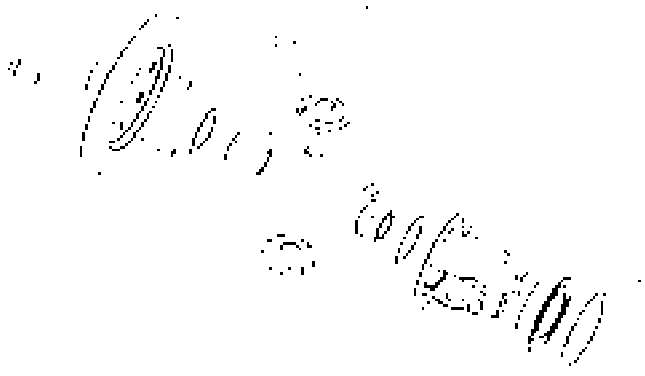
1) Spiral bevel gear UBS screw
2) Spiral bevel gear
3) Differential case

< Differential side gear and differential pinion >

1. Put parting marks on the differential pinion(1) and the differential side gear(2).
2. Tap out the dowel pin(3).
3. Remove the differential pinion shaft.
4. Remove the differential pinion(4), differential side gear(2) and shim(5).

▷ **Reassembling**

✓ Install the differential pinion and differential side gear, aligning the parting marks.



***. PART NAME**

1) Differential pinion
2) Differential side gear
3) Dowel pin
4) Differential pinion
5) Shim

5. CHECKING, DISASSEMBLING AND SERVICING

<4> SERVICING

1) Clutch Housing

< Checking bearing >

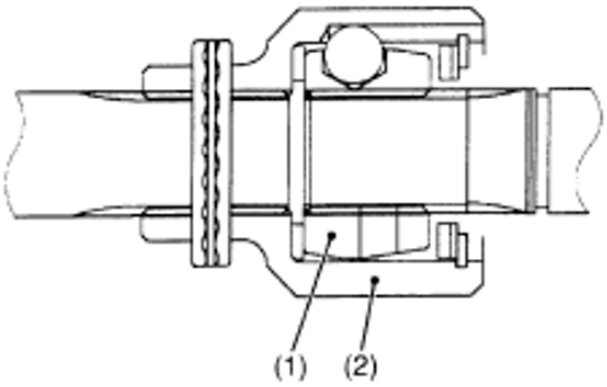
1. Hold the inner race, and push and pull the outer race in all directions to check for wear and roughness.
2. Apply transmission fluid to the bearing, and hold the inner race. Then turn the outer race to check rotation.
3. If there is any defect, replace it.

< Checking propeller shaft ball coupling >

1. Hold the ball coupling outer, and push and pull, and rotate the ball coupling inner in all directions to check for wear and roughness.
2. If there is any defect, replace it.

▷ **Reassembling**

- ✓ Apply grease to the inner parts of ball coupling and spline of ball coupling inner.
- ✓ When replacing the ball coupling assembly, install the ball coupling inner(1) with balls so that its ball position inside of ball coupling outer(2) as shown in the figure.



***. PART NAME**

1) Inner, Coupling
2) Outer, Coupling

5. CHECKING, DISASSEMBLING AND SERVICING

2) Transmission Case

< Checking bearing >

1. Hold the inner race, and push and pull the outer race in all directions to check for wear and roughness.
2. Apply transmission fluid to the bearing, and hold the inner race. Then, turn the outer race to check rotation.
3. If there is any defect, replace it.

< Clearance between shift fork and shift fork rod>

1. Insert the fork into the shift fork rod and measure the clearance with a feeler gauge.
2. If the clearance exceeds the allowable limit, replace it.

Clearance between shift fork and shift fork rod	Factory spec.	0.10 to 0.35 mm 0.004 to 0.014 in.
	Allowable limit	0.5 mm 0.020 in.

5. CHECKING, DISASSEMBLING AND SERVICING

< Clearance between gear and shaft >

1. Measure the gear I.D. with a cylinder gauge, and then shaft O.D. with an outside micrometer.
2. Measure the O.D. of two needles in the needle bearing with an outside micrometer.
3. Clearance is the difference between the gear I.D. and the sum of shaft O.D. and two needles O.D.
4. If the clearance exceeds the allowable limit, replace it.

Clearance between F.W.D. shaft and 16T-20T gear	Factory spec.	0.027 to 0.067 mm 0.0011 to 0.0025 in.
	Allowable limit	0.10 mm 0.0039 in.
F.W.D. shaft O.D.	Factory spec.	21.967 to 21.980 mm 0.8648 to 0.8654 in.
16T-20T gear I.D.	Factory spec.	28.007 to 28.021 mm 1.1024 to 1.1032 in.
Needle O.D.	Factory spec.	2.996 to 3.000 mm 0.1179 to 0.1181 in.

Clearance between 11T gear, one-way clutch cam and mid-PTO shaft	Factory spec.	0.020 to 0.026 mm 0.0008 to 0.0010 in.
	Allowable limit	0.10 mm 0.0039 in.
Mid-PTO shaft O.D.	Factory spec.	19.989 to 20.000 mm 0.7869 to 0.7874 in.
11T gear and one-way clutch I.D.	Factory spec.	24.007 to 24.020 mm 0.9452 to 0.9457 in.
Needle O.D.	Factory spec.	1.997 to 2.000 mm 0.0786 to 0.0787 in.

5. CHECKING, DISASSEMBLING AND SERVICING

3) Differential Gear

< Clearance between differential case and differential side gear >

1. Measure the differential side gear boss O.D. with an outside micrometer.
2. Measure the differential case I.D. and the spiral bevel gear I.D. with an inside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential case and differential side gear	Factory spec.	0.025 to 0.066 mm 0.0010 to 0.0026 in.
	Allowable limit	0.30 mm 0.0118 in.

Differential case I.D.	Factory spec.	32.000 to 32.025 mm 1.2598 to 1.2608 in.
Spiral bevel gear I.D.	Factory spec.	32.000 to 32.025 mm 1.2598 to 1.2608 in.
Differential side gear O.D.	Factory spec.	31.959 to 31.975 mm 1.2582 to 1.2589 in.

5. CHECKING, DISASSEMBLING AND SERVICING

< Clearance between differential pinion shaft and differential pinion >

1. Measure the differential pinion shaft O.D. with an outside micrometer.
2. Measure the differential pinion I.D. with an inside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential pinion shaft and differential pinion	Factory spec.	0.016 to 0.045 mm 0.0006 to 0.0018 in.
	Allowable limit	0.30 mm 0.0118 in.

Differential pinion I.D.	Factory spec.	16.000 to 16.018 mm 0.6299 to 0.6306 in.
Differential pinion shaft O.D.	Allowable limit	15.973 to 15.984 mm 0.6289 to 0.6293 in.

< Backlash between differential pinion and differential side gear >

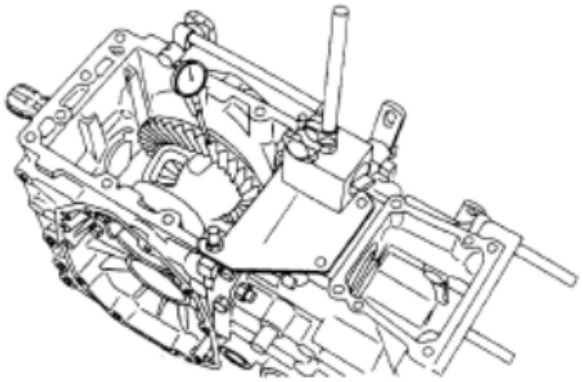
1. Secure the differential case with a vise.
2. Set the dial indicator(lever type) with its finger in the tooth of the differential side gear.
3. Press differential pinion and side gear against the differential case.
4. Hold the differential pinion and move the differential side gear to measure the backlash.
5. If the backlash exceeds the allowable limit, adjust with differential side gear shims.

Backlash between differential pinion and differential side gear	Factory spec.	0.1 to 0.3 mm 0.004 to 0.012 in.
	Allowable limit	0.4 mm 0.016 in.

#. Thickness of shims : 0.8mm(0.0315 in.),
1.0mm(0.0394 in.), 1.2mm(0.0472 in.)

5. CHECKING, DISASSEMBLING AND SERVICING

< Backlash between spiral bevel pinion and spiral bevel gear >



1. Set the dial indicator(lever type) with its finger on the end of spiral bevel pinion(4).
2. Move the spiral bevel pinion back and forth to each end and measure the side clearance.
3. If the side clearance exceeds the factory specifications, adjust with the shims(3) at front end of the spiral bevel pinion.
4. Set the dial indicator(lever type) with its finger on the tooth surface of the bevel gear.
5. Measure the backlash by fixing the spiral bevel pinion(4) and moving bevel gear(2) by hand.
6. If the backlash exceeds the factory specifications, adjust with the shims(1),(5) at bearing holder(6) and differential case.
7. Adjust the backlash properly by repeating the above procedures.

Side clearance of spiral bevel pinion	Factory spec.	Less than 0.15 mm 0.0059 in.
Backlash between spiral bevel pinion and spiral bevel gear	Factory spec.	0.1 too 0.3 mm 0.004 to 0.012 in.
	Allowable limit	0.4 mm 0.016 in.

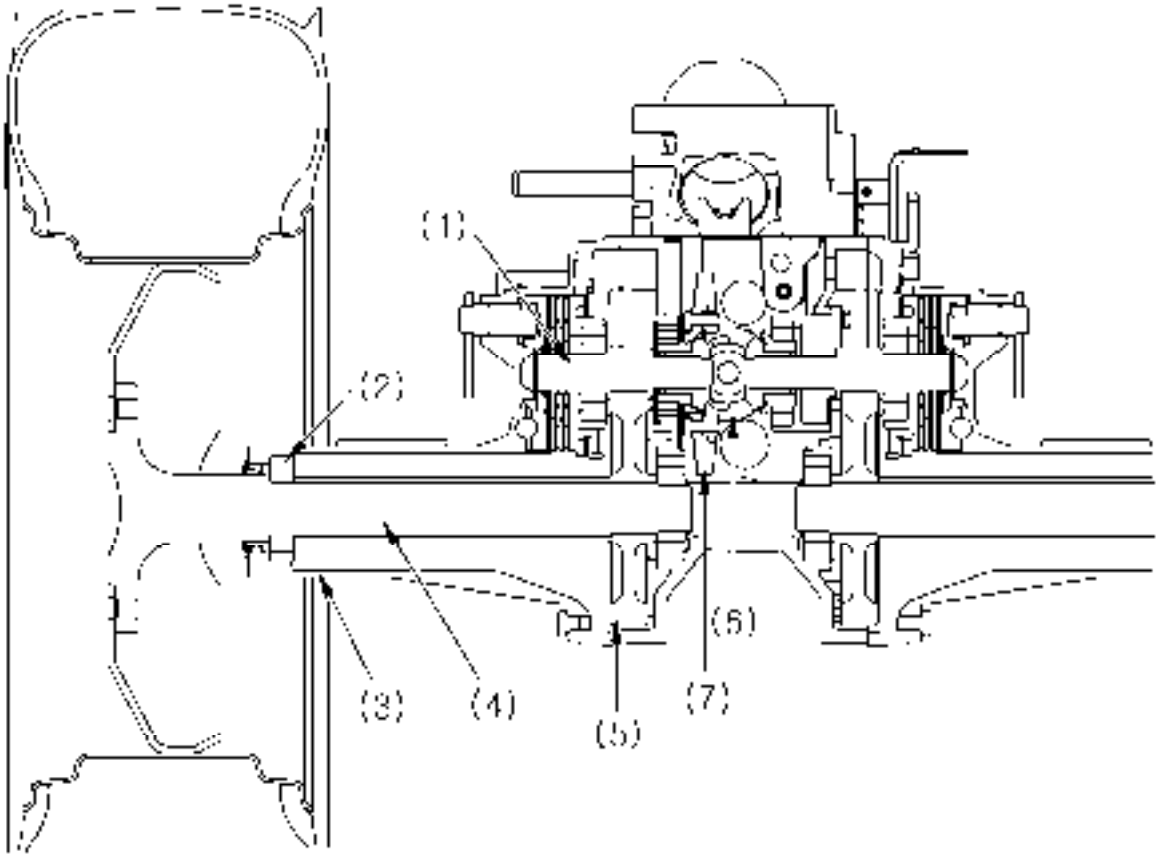
▷ **Reference**

✓ Thickness of shims(1), (5)
=> 0.2mm(0.008in.), 0.5mm(0.020in.)

✓ Thickness of shims(3)
=>0.2mm(0.008in.), 1.8mm(0.071in.),
1.4mm(0.055in.)

CONTENTS 5. (REAR AXLE)

1. STRUCTURE



1) Differential Gear Shaft
2) Ball Bearing
3) Rear Axle Case
4) Rear Axle
5) Spur Gear
6) Differential Gear
7) Spiral Bevel Gear

The rear axles are the rigid type with ball bearings(2) between the rear axle(4) and the rear axle case(3), which supports the rear wheel load as well as transmitting power to the rear wheels.

The differential gears(6) automatically control the revolution of the right and left wheels when the rear wheels encounter unequal resistance during turning.

2. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.

Item	N·m	kgf·m	ft-lbs
Rear wheel bolt and nut	108.0 to 125.0	11.0 to 12.7	79.0 to 92.2
Rear axle case mounting screw	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5

3. DISASSEMBLING AND SERVICING

<1> DISASSEMBLING AND ASSEMBLING

1) Separating Rear Axle Case

< Draining transmission fluid >

1. Place an oil pan underneath the transmission case, and remove the drain plugs(1).
2. Drain the transmission fluid.
3. Reinstall the drain plug.

▷ **Refilling**

- ✓ Fill new oil into filling port after removing the filling plug(2) up to the upper notch on the dipstick(3).
- ✓ After running the engine for few minutes, stop it and check the oil lever again. If low, add oil to proper level.

◈ **Important**

- ✓ Use only multi-grade transmission oil. Use of other oils may damage the transmission or hydraulic system.
- ✓ Never work the tractor immediately after changing the transmission oil. Keep the engine at medium speed for a few minutes to prevent damage to the transmission.
- ✓ Do not mix different brands oil together.

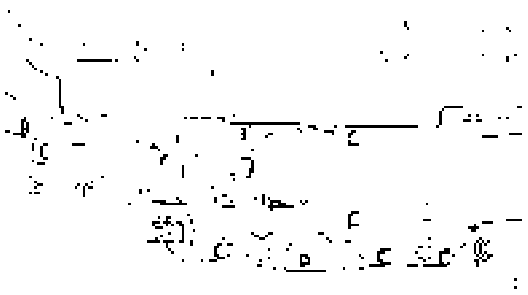
Transmission fluid capacity	2100 2400 2800	Front case	3.0 L 0.79 U.S.gals 0.66 Imp.fals
		Rear case	13.0 L 3.43 U.S.gals 2.86 Imp.gals
	HST	Rear case	15.0 L 3.96 U.S.gals 3.30 Imp.gals

***. PART NAME**

1) Drain plug 2) Filling cap

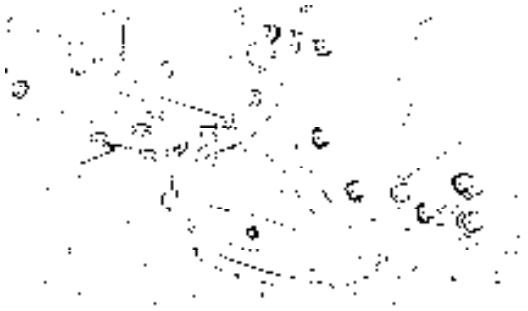
3) Dipstick A) Proper oil lever

<Branson 2100, 2400(hst), 2800(hst)>



(1)

<Branson 2100, 2400, 2800 Euro>



(1)

(1)

(2)

(3)

3. DISASSEMBLING AND SERVICING

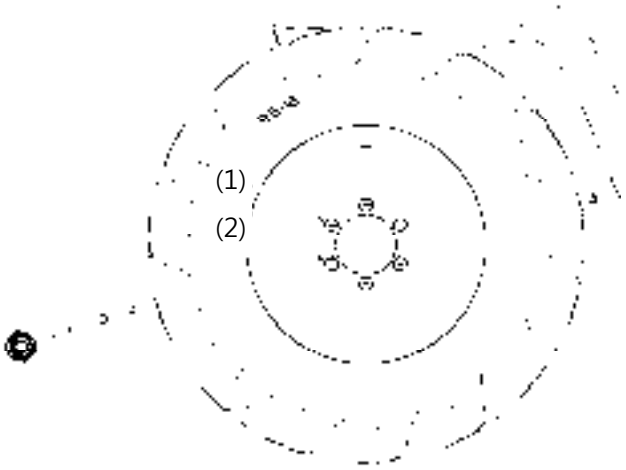
< Rear wheel >

1. Place a jack under the transmission case.
2. Loosen the rear wheel bolt(1) and nut(2).
3. Take out the rear wheel.

◈ **Important**

✓ When re-fitting or adjusting a wheel, tighten the bolts to the following torques and then recheck them after driving the tractor approximately 200m (200 yards).

Tightening torque	Rear wheel bolt and nut	108 to 125 Nm 11.0 to 12.7 kgfm 79 to 92.2 ft-lbs



***. PART NAME**

1) Bolt 2) Nut

< Rear axel case >

1. Remove the brake rod(1).
2. Disconnect the differential lock rod(2) at the pedal side.
3. Remove the rear axle case mounting screws and nuts then separate the rear axle case(3) from the differential case.

▷ **Reassembling**

✓ Apply gasket to joint face of the rear axle case and differential gear case after removing the water, oil and stuck gasket.

Tightening torque	Rear axle case mounting screw	48.1 to 55.8 Nm 4.9 to 5.7 kgfm 35.5 to 41.2 ft-lbs

***. PART NAME**

1) Brake rod 2) Differential lock rod

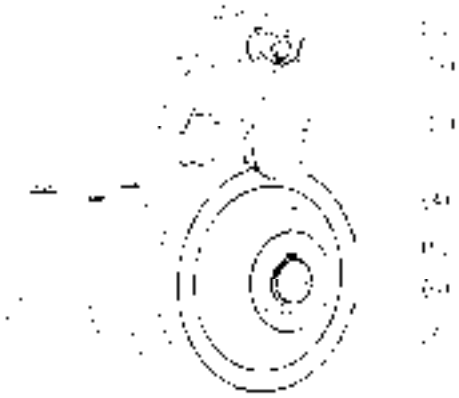
3) Rear axle case

3. DISASSEMBLING AND SERVICING

2) Disassembling Rear Axle Case

< Differential lock shift fork, differential lock clutch(Right side only), 57T gear and rear axle >

1. Remove the spring(1).
2. Draw out the differential lock shift fork(2) and differential lock clutch(3).
3. Remove the external snap ring(6) and remove the bearing(5).
4. Draw out the 57T gear(4) from the rear axle(7).
5. Tap out the rear axle(7) to the outside of the rear axle case.

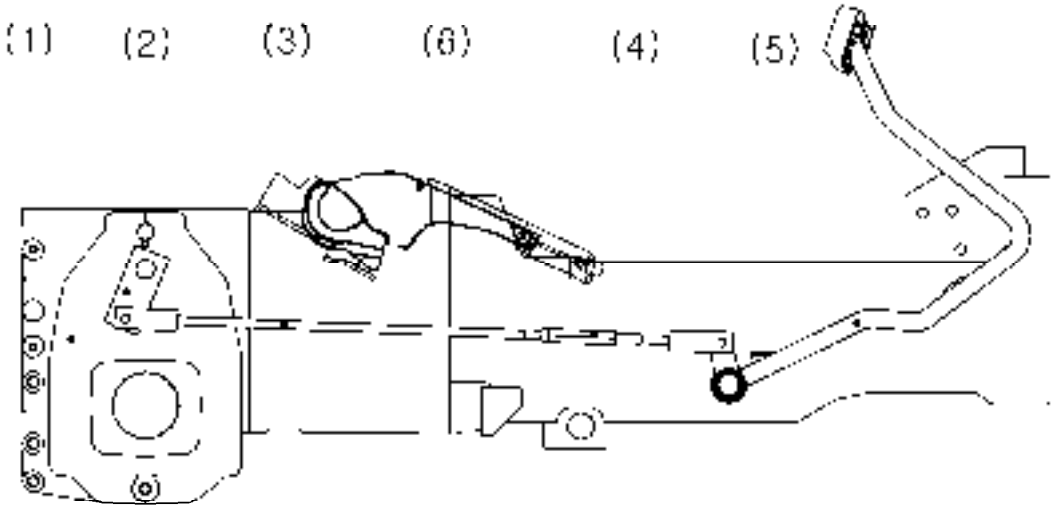


***. PART NAME**

1) Spring
2) Differential lock shift fork
3) Differential lock clutch
4) 57T Gear
5) Bearing
6) External snap ring
7) Rear axle

CONTENTS 6. (BRAKE)

1. LINKAGE

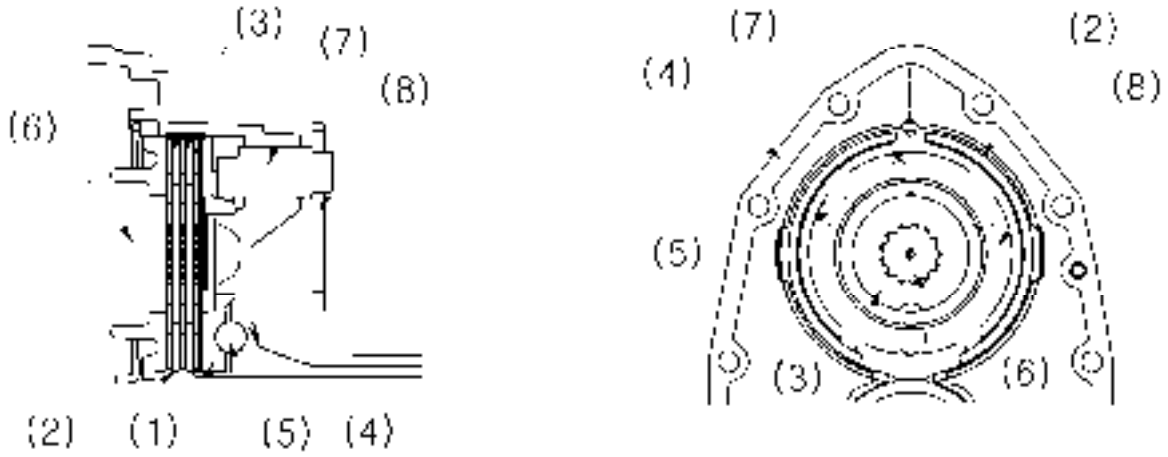


1) Rear Axle Case
2) Brake Cam Lever
3) Brake Rod
4) Turnbuckle
5) Brake Pedal
6) Side Brake Lever

Independent mechanical wet disc brakes are used for the right and left brakes. They are operated by the brake pedals through the mechanical linkages and provide stable braking and require little adjustment.

The parking brake is a mechanical type which is designed to actuate the traveling brakes through the linkages. Pulling the parking brake lever(6) results in the same state as the obtained when the brake pedals are pressed.

2. OPERATION



1) Cam Plate
2) Friction Plate
3) Brake Disc
4) Rear Axle Case
5) Steel Ball
6) Brake Shaft (Differential gear shaft)
7) Brake Cam
8) Brake Cam Lever

The brake body is incorporated in the rear axle case(4) filled with transmission oil and is designed to brake when the brake disc(3) splinted with the differential gear shaft(6) is pressed against the cam plate(1) by means of the cam mechanism incorporating steel balls(5).

For greater braking force, two brake discs are provided at the right and left sides respectively, and the friction plate(2) fixed to the rear axle case is arranged between the brake discs.

◈ During Braking

When the brake pedal is pressed, the linkage causes the brake cam lever(8) and brake cam(7) to turn into the direction of the arrow shown in the above figure.

Therefore, the cam plate(1) also moves in the direction of arrow. At this time, since the cam plate(1) rides on the steel balls(5) set in the grooves of the rear axle case to press the brake disc(3), the differential gear shaft(6) is braked by the frictional force generated by the cam plate(1) and brake disc(3).

3. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Brake Pedal	Free travel	30.0 to 40.0 mm 1.18 to 1.57 in.	-
Pedal Shaft to Center Frame	Clearance	0.0 to 0.165 mm 0.0 to 0.00649 in.	1.0 mm 0.0039 in.
	Pedal Shaft(O.D.)	24.967 to 25.030 mm 0.98295 to 0.98543 in.	-
	Bush(I.D.)	25.03 to 25.081 mm 0.98543 to 0.98744 in.	-
Cam Plate and Bearing Holder	Flatness	-	0.3 mm 0.012 in.
Cam Plate and Ball	Height	22.89 to 22.99 mm 0.9012 to 0.9051 in.	22.40 mm 0.8819 in.
Brake Disc	Thickness	3.3 to 3.5 mm 0.130 to 0.138 in.	3.0 mm 0.118 in.
Friction Plate	Thickness	3.14 to 3.96 mm 0.124 to 0.128 in.	2.74 mm 0.108 in.

4. TIGHTENING TORQUES

Item	N·m	kgf·m	ft-lbs
Rear wheel bolt and nut	108.0 to 125.0	11.0 to 12.7	79.0 to 92.2
Rear axle case mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2

5. CHECKING, DISASSEMBLING AND SERVICING

<1> CHECKING AND ADJUSTING

< Adjusting brake pedal free travel >

CAUTION

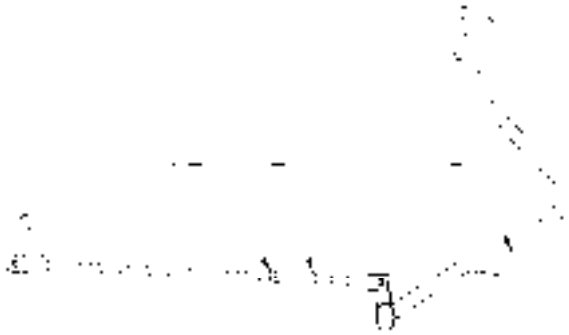
- Stop the engine and check the wheels before checking brake pedal.
- The difference between the right and left pedal free travel must be less than 4.0mm

1. Release the parking brake.
2. Slightly depress the brake pedals and measure free travel at top of pedal stroke.
3. If the measurement is not within the factory specifications, loosen the lock nut and turn the turnbuckle to adjust the brake rod length.
4. Retighten the lock nut securely.
5. Keep the free travel in the right and left brake pedals equal.

Brake pedal free travel	Factory spec.	30.0 to 40.0 mm 1.18 to 1.57 in.

▶ **NOTE**

1) After checking brake pedal free travel, be sure to engage the parking brake lever fully and check to see that the brake pedals are securely locked.



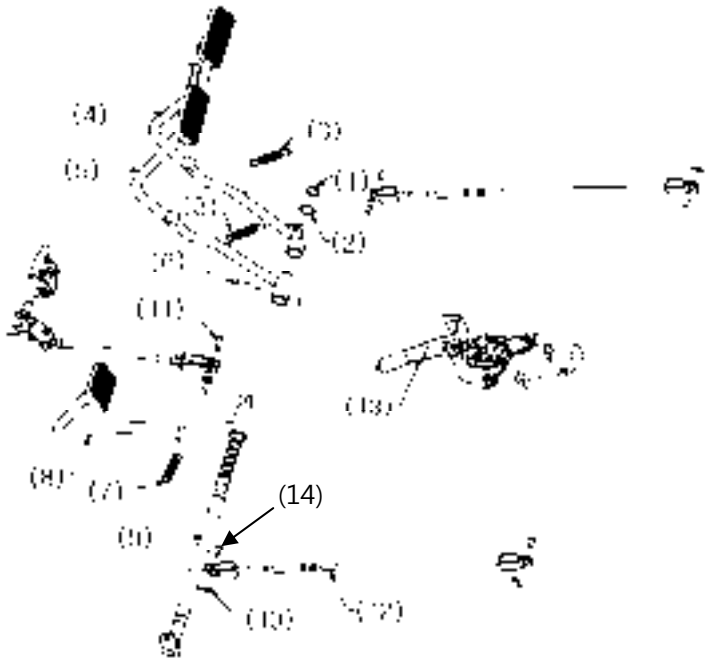
***. PART NAME**

1) Brake pedal
2) Turnbuckle
3) Lock nut
L) Free travel

5. CHECKING, DISASSEMBLING AND SERVICING

<2> DISASSEMBLING AND ASSEMBLING

1) Brake Pedal



1. Remove the spring lock pin(10), pin fastener(14) of brake rod(12) and pull out the brake rod(12).
2. Remove the return spring(3),(7).
3. Remove the external snap ring(1) at the end of the brake pedal shaft(9).
4. Remove the pin fastener(6) of the brake pedal LH(5)
5. Remove the pin fastener(11) of the clutch pedal(8).
6. Pull the right and left brake pedals from the brake pedal shaft(9).
7. Tap out the brake pedal shaft(9) to the left, and remove it with the clutch pedal(8).

▷ **Reassembling**

✓ Apply grease to the brake pedal shaft.

✓ When inserting the pin fastener, face its split in the direction at right angle to the brake pedal shaft.

***. PART NAME**

1) External snap ring	2) Collar
3) Return spring	4) Brake pedal RH
5) Brake pedal LH	6) Pin fastener
7) Return spring	8) Clutch pedal
9) Brake pedal shaft	10) Spring lock pin
11) Pin fastener	12) Brake rod
13) Parking brake lever	14) Pin fastener

5. CHECKING, DISASSEMBLING AND SERVICING

2) Separating Rear Axle Case

< Draining transmission fluid >

1. Place an oil pan underneath the transmission case, and remove the drain plugs(1).
2. Drain the transmission fluid.
3. Reinstall the drain plug.

▷ **Refilling**

- ✓ Fill new oil into filling port after removing the filling plug(2) up to the upper notch on the dipstick(3).
- ✓ After running the engine for few minutes, stop it and check the oil level again, if low, add oil to proper level.

◈ **Important**

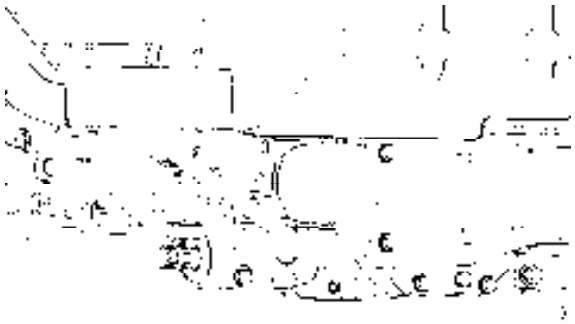
- ➢ Use only multi-grade transmission oil. Use of other oils may damage the transmission or hydraulic system.
- ➢ Never work the tractor immediately after changing the transmission oil. Keep the engine at medium speed for a few minutes to prevent damage to the transmission.
- ➢ Do not mix different brands oil together.

Transmission fluid capacity	2100 2400 2800	Front case	3.0 L 0.79 U.S.gals 0.66 Imp.gals
		Rear case	13.0 L 3.43 U.S.gals 2.86 Imp.gals
	HST	Rear case	15.0 L 3.96 U.S.gals 3.3 Imp.gals

***. PART NAME**

1) Drain plug 2) Filling cap

3) Dipstick



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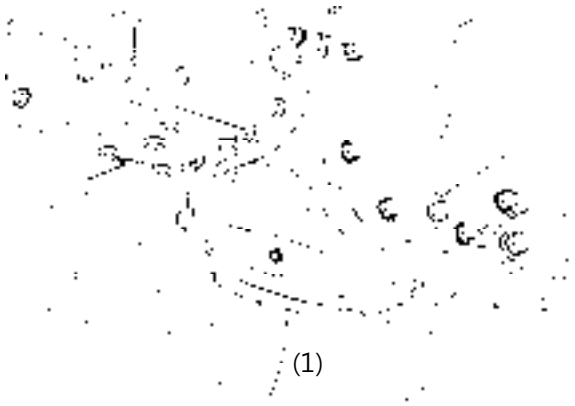
<Branson 2100, 2400, 2800 Euro>



(1)

(1)

(2)

(3)

5. CHECKING, DISASSEMBLING AND SERVICING

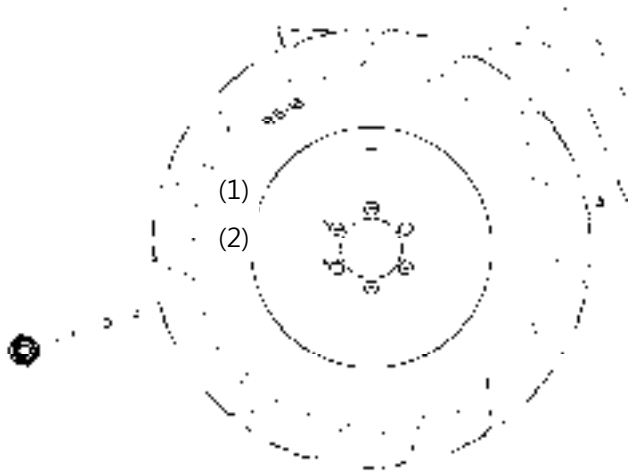
< Rear wheel >

1. Place a jack under the transmission case.
2. Loosen the rear wheel bolt(1) and nut(2).
3. Take out the rear wheel.

◈ **Important**

➢ When re-fitting or adjusting a wheel, tighten the bolts to the following torques and then recheck them after driving the tractor approximately 200m (200 yards).

Tightening torque	Rear wheel cotter setting bolt and nut	108 to 125 Nm 11.0 to 12.7 kgfm 79.0 to 92.2 ft-lbs



***. PART NAME**

1) Bolt 2) Nut

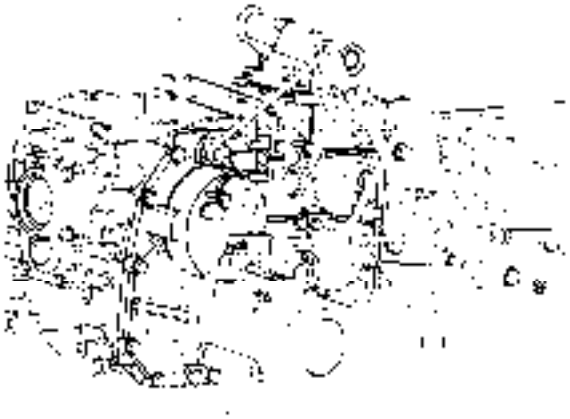
< Rear axle case >

1. Remove the brake rod(1).
2. Disconnect the differential lock rod(2) at the pedal side.
3. Remove the rear axle case mounting screws and nuts and separate the rear axle case(3) from the differential case.

▷ **Reassembling**

✓ Apply gasket to joint face of the rear axle case and differential gear case after removing the water, oil and stuck gasket.

Tightening torque	Rear axle case mounting screw	48.1 to 55.8 Nm 4.9 to 5.7 kgfm 35.5 to 41.2 ft-lbs



***. PART NAME**

1) Brake rod 2) Differential lock rod

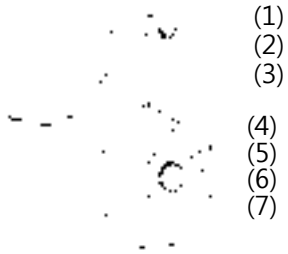
3) Rear axle case

5. CHECKING, DISASSEMBLING AND SERVICING

3) Disassembling Rear Axle Case

< Differential lock shift fork, differential lock clutch, 57T gear and rear axle >

1. Remove the spring(1).
2. Draw out the differential lock shift fork(2) and differential lock clutch(3)
3. Remove the external snap ring(6) and remove the bearing(5).
4. Draw out the 57T gear(4) from the rear axle(7).
5. Tap out the rear axle(7) to the outside of the axle case.



***. PART NAME**

1) Spring
2) Differential lock shift fork
3) Differential lock clutch
4) 57T Gear
5) Bearing
6) External snap ring
7) Rear axle

< Brake assembly >

1. Remove the internal snap ring(1).
2. Remove the brake shaft(2) with brake discs.

▷ **Reassembling**

✓ When installing the internal snap ring(1) to rear axle case(3) follow direction as shown in the figure.

✓ When installing the bearing holder(4) to the rear axle case(3), do not forget to install the straight pin(5).

***. PART NAME**

1) Internal snap ring
2) Brake shaft
3) Rear axle case
4) Bearing holder
5) Straight pin

< Brake discs and friction plate >

1. Remove the external snap ring(1), and remove the brake discs and friction plate.

▷ **Reference**

1. Remove the cam plate and balls.
2. Remove the external snap ring and pull out the brake cam lever.

▷ **Reassembling**

✓ Install the brake discs with their holes(2) align at less than 1/3 of the total hole area.

***. PART NAME**

1) External snap ring
2) Hole

5. CHECKING, DISASSEMBLING AND SERVICING

<3> SERVICING

< Clearance between brake pedal shaft and center frame bush >

1. Measure the brake pedal shaft O.D. with an outside micrometer.
2. Measure the bush(3) I.D. with a cylinder gauge.
3. If the clearance exceeds the allowable limit, replace it.

Clearance between brake pedal shaft and center frame bush	Factory spec.	0.0 to 0.165 mm 0.0 to 0.00649 in.
	Allowable limit	1.0 mm 0.0039 in.

Brake pedal shaft O.D.	Factory spec.	24.067 to 25.030 mm 0.98295 to 0.98543 in.
Center frame bush I.D.	Factory spec.	25.030 to 25.081 mm 0.98543 to 0.98744 in.

***. PART NAME**

1) Brake pedal shaft
2) Center frame
3) Bush
A) Bush I.D.
B) Brake pedal shaft O.D.

< Brake cam lever movement >

1. Move the brake cam lever by hand to check the movement.
2. If the movement is heavy, refine the brake cam with sand-paper.

< Cam plate flatness and bearing holder wear >

1. Place a straightedge of 150mm(5.91 in.) or more in length on the contacting surface of the cam plate and the bearing holder.
2. Inspect the friction surface of the cam plate and the bearing holder with the straightedge, and determine if a 0.30mm(0.0118 in.) feeler gauge will fit on the part of wear.
3. If it will fit, resurface.

5. CHECKING, DISASSEMBLING AND SERVICING

< Height of cam plate and ball >

1. Measure the dimensions of the cam plate with the ball installed.
2. If the measurement is less than the allowable limit, replace the cam plate and ball.
3. Inspect the ball holes of cam plate for uneven wear.
4. If it is found to be uneven, replace it.

Height of cam plate and ball	Factory spec.	22.89 to 22.99 mm 0.9012 to 0.9051 in.
	Allowable limit	22.40 mm 0.8819 in.

< Brake cam lever movement >

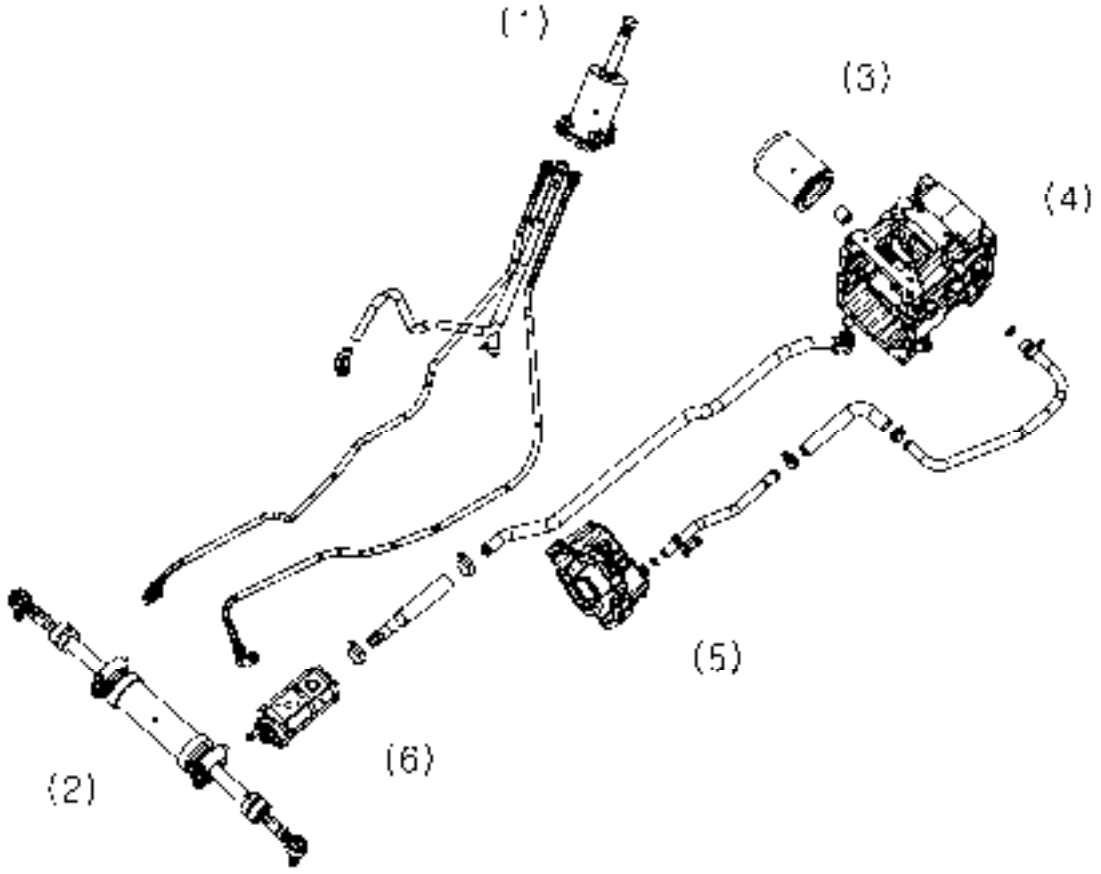
1. Measure the brake disc thickness and the friction plate thickness with an outside micrometer.
2. If the thickness is less than the allowable limit, replace it.

Brake disc thickness	Factory spec.	3.3 to 3.5 mm 0.130 to 0.138 in.
	Allowable limit	3.0 mm 0.118 in.

Friction plate thickness	Factory spec.	3.14 to 3.26 mm 0.124 to 0.123 in.
	Allowable limit	2.74 mm 0.108 in.

CONTENTS 7. (STEERING)

1. STRUCTURE



1) PST Valve
2) PST cylinder / Tie Rod
3) Oil Filter
4) Transmission Case
5) Clutch Housing cover (Front Transmission)
6) Hydraulic pump

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Steering wheel	Turning torque	0.8 to 1.4 Nm 0.08 to 0.14 kgfm 0.59 to 1.03 ft-lbs	-

3. TIGHTENING TORQUES

Item	N·m	kgf·m	ft-lbs
(Power steering type)			
Steering wheel mounting nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Delivery pipe nut for HST	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Oil cooler pipe nut	50.0 to 57.9	5.1 to 5.9	36.9 to 42.8
Delivery pipe nut for power steering	64.7 to 77.5	6.6 to 7.7	47.9 to 55.3
Power steering assembly mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2

4. CHECKING, DISASSEMBLING AND SERVICING

<1> DISASSEMBLING AND ASSEMBLING

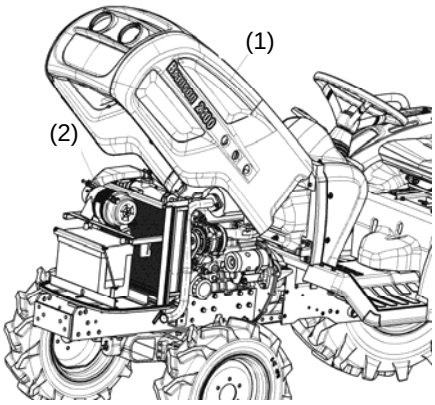
1) Separating power steering assembly

< Hood, side cover and battery cord >

1. Open the hood(1).
2. Disconnect the battery grounding cord(2).
3. Disconnect the head light connectors and remove the hood(1).

▶ **NOTE**

1) When disconnecting the battery cords, disconnect the grounding cord first. When connecting, positive cord first.



***. PART NAME**

1) Hood 2) Battery

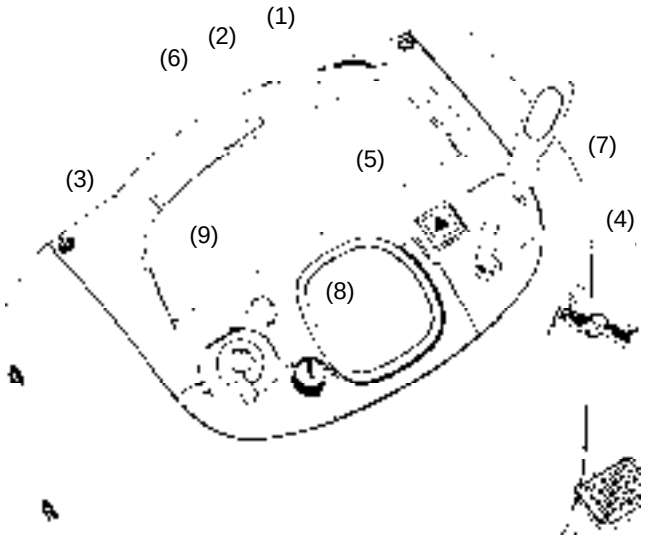
< Steering wheel >

1. Remove the steering wheel cap.
2. Remove the steering wheel mounting nut and remove the steering wheel with a steering wheel puller.

Tightening torque	Steering wheel mounting nut	48.1 to 55.9 Nm 4.9 to 5.7 kgfm 35.4 to 41.2 ft-lbs

< Meter panel and panel under cover >

1. Tap out the spring pin and remove the hand accelerator lever(7).
2. Remove the panel under cover(6).
3. Open the meter panel(1) and disconnect the meter panel connector(2).
4. Disconnect the combination switch connector(3), main switch connector(4) and hazard switch connector(5).



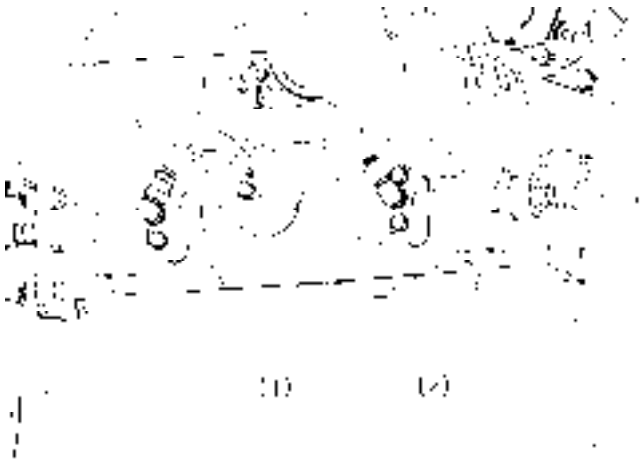
***. PART NAME**

1) Meter panel 2) Meter panel connector
3) Combination switch connector
4) Main switch connector
5) Hazard switch connector
6) Panel under cover 7) Hand accelerator lever
8) Light switch 9) Emergency stop switch

4. CHECKING, DISASSEMBLING AND SERVICING

< Hydraulic hose >

1. Remove the hydraulic hose(1) from the front cylinder assy(2).



***. PART NAME**

1) Hydraulic hose 2) Front cylinder assy

< Step >

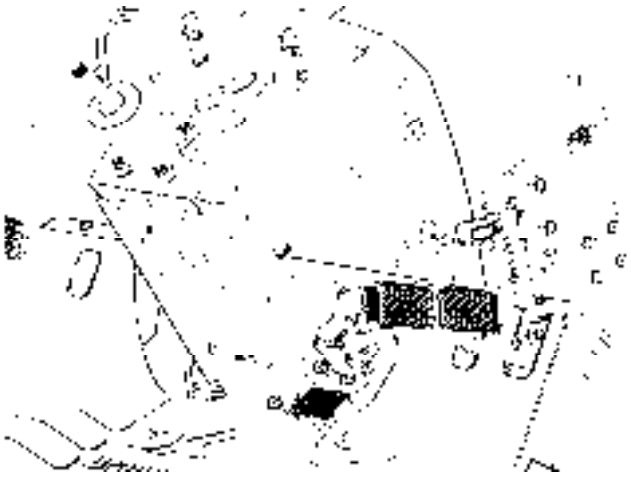
1. Remove the lowering speed adjusting knob(3).
2. Remove the seat under cover(1).
3. Remove the rubber mat(2).
4. Remove the clutch spring.
5. Remove the fuel tank frame set screws and fuel tank stay.
6. Remove the left hand step(4) while lifting the fuel tank frame.

***. PART NAME**

1) Seat under cover 2) Rubber mat
3) Lowering speed adjusting knob
4) Step(LH)

< Steering gear box assembly >

1. Remove the parking brake lever(1) and speed control set lever(2).
2. Remove the steering gear box assembly(3) from the center frame.



***. PART NAME**

1) Parking brake lever 2) Speed control set lever
3) Steering support assy

4. CHECKING, DISASSEMBLING AND SERVICING

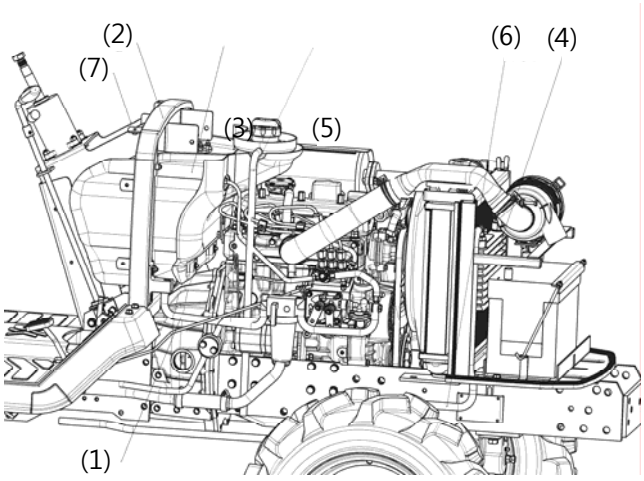
< Fuel tank >

1. Disconnect the fuel hose(1) at the fuel filter side, then drain fuel completely.
2. Remove the steering bracket stay(7).
3. Disconnect the hazard unit, controller, starter relay and regulator connectors and remove the cable for fuel gauge.
4. Disconnect the overflow hoses(5) of fuel line.
5. Remove the tank frame(2) with fuel tank(3).
6. Remove the battery.
7. Disconnect the hydraulic hose(6) and remove the battery stay with oil cooler(4).

▶ **NOTE**

1) For fastening hydraulic pipe nut, use two wrenches. Hold the fitting with a wrench, turn the pipe nut with another wrench to avoid damage at fittings.

Tightening torque	Delivery pipe nut for HST	34.3 to 39.2 Nm 3.5 to 4.0 kgfm 25.3 to 28.9 ft-lbs
	Oil cooler pipe nut	50.0 to 57.9 Nm 5.1 to 5.9 kgfm 36.9 to 42.8 ft-lbs
	Delivery pipe nut for power steering	64.7 to 75.5 Nm 6.6 to 7.7 kgfm 47.9 to 55.3 ft-lbs



***. PART NAME**

1) Fuel hose
2) Fuel tank frame
3) Fuel tank
4) Oil cooler
5) Overflow hose
6) Hydraulic hose
7) Steering bracket

4. CHECKING, DISASSEMBLING AND SERVICING

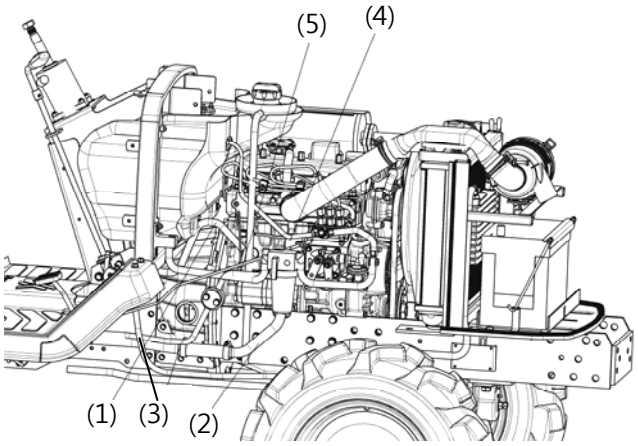
< Steering assembly >

1. Remove the seat under cover, rubber mat and side step LH.
2. Disconnect the accelerator rod(4).
3. Disconnect the power steering delivery pipe(1).
4. Remove the power steering delivery pipe(3) and disconnect the power steering return pipe.
5. Remove the power steering assembly from the center frame.

▶ **NOTE**

1) For fastening hydraulic pipe nut, use two wrenches. Hold the fitting with a wrench, turn the pipe nut with another wrench to avoid damage at fitting installed part.

Tightening torque	Delivery pipe nut for power steering	64.7 to 75.5 Nm 6.6 to 7.7 kgfm 47.9 to 55.3 ft-lbs
	Power steering assembly mounting screw	77.5 to 90.1 Nm 7.9 to 9.2 kgfm 57.2 to 66.5 ft-lbs



***. PART NAME**

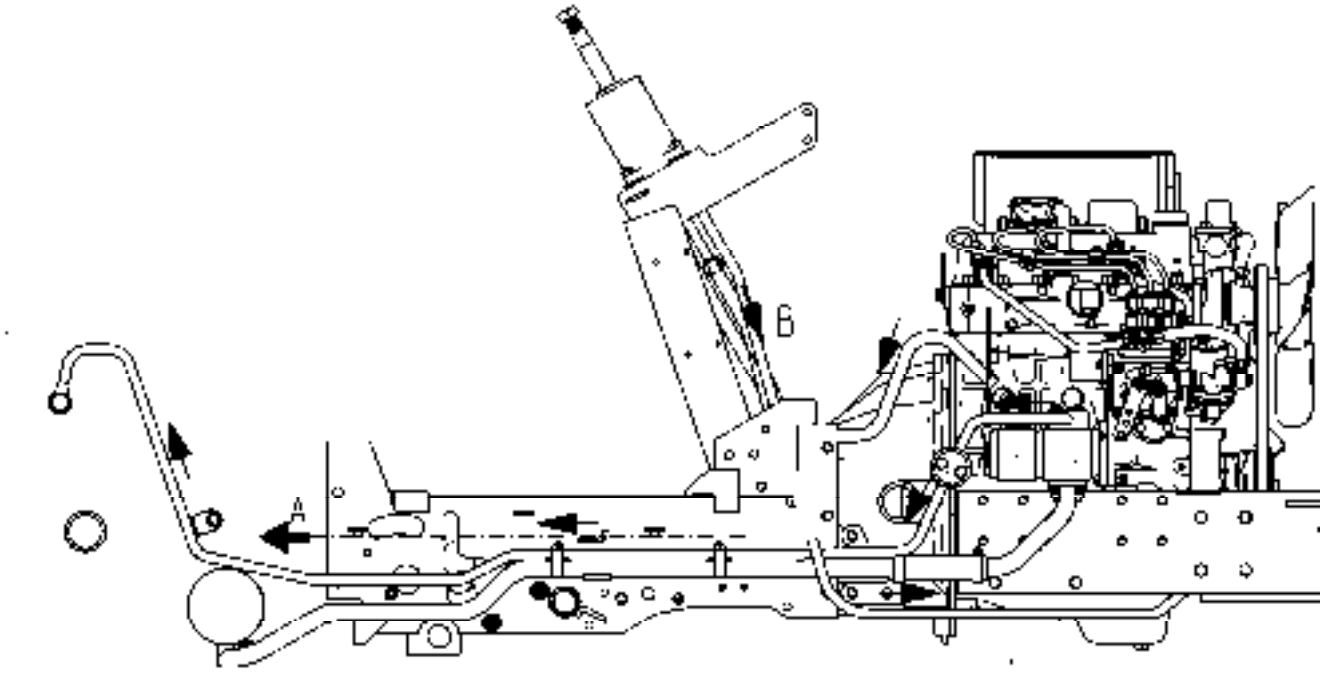
1) Power steering delivery pipe
2) Suction pipe
3) Power steering delivery pipe
4) Fuel return hose
5) Accelerator rod

CONTENTS 8. (HYDRAULIC SYSTEM)

1. STRUCTURE

<1> HYDRAULIC CIRCUIT

1) Manual Transmission, Power Steering, Control valve

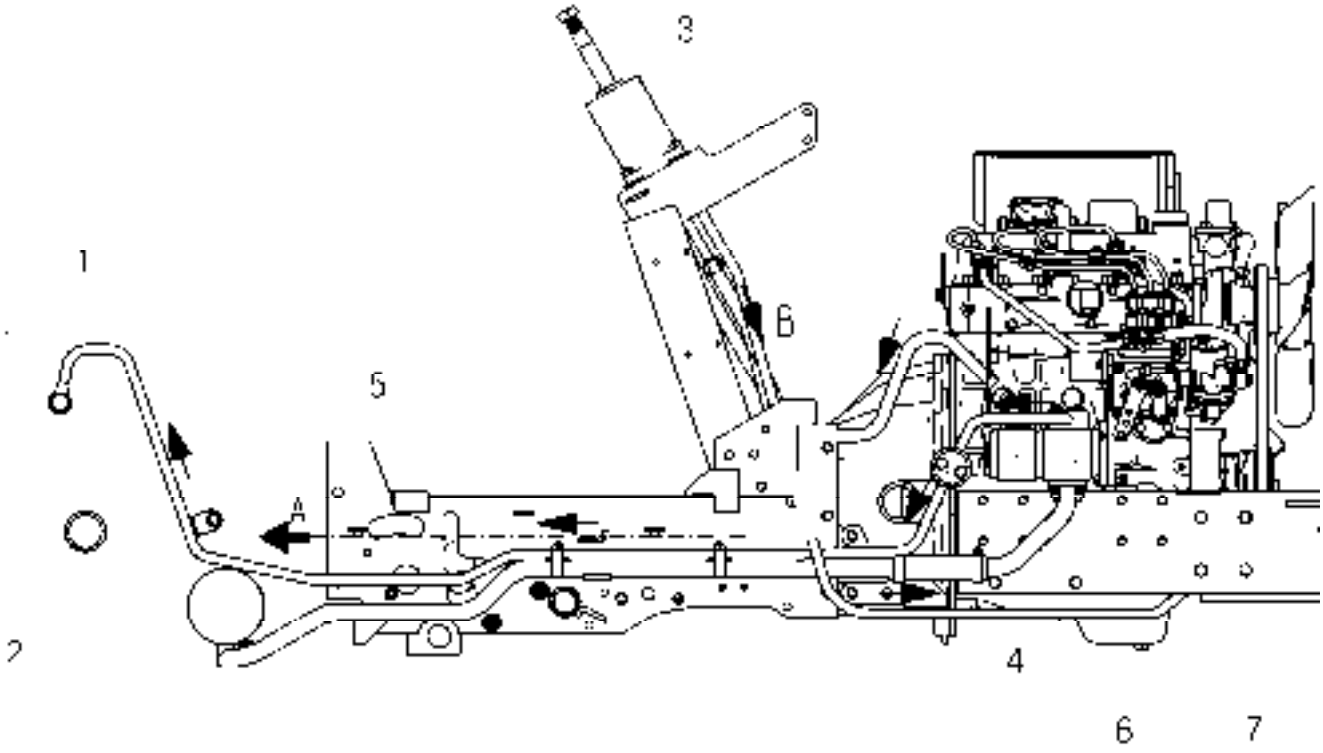


1) Hydraulic control valve
2) Oil filter
3) Power steering (Controller)
4) Hydraulic pump (for 3-point hitch)
5) Hydraulic pump (for power steering)
6) Hydraulic block type outlet
7) Relief valve
8) Hydraulic cylinder
9) Lowering speed adjusting valve

A : To transmission case
B : To clutch housing (Front transmission)

1. STRUCTURE

2) HST Transmission, Power Steering, Position Control Valve



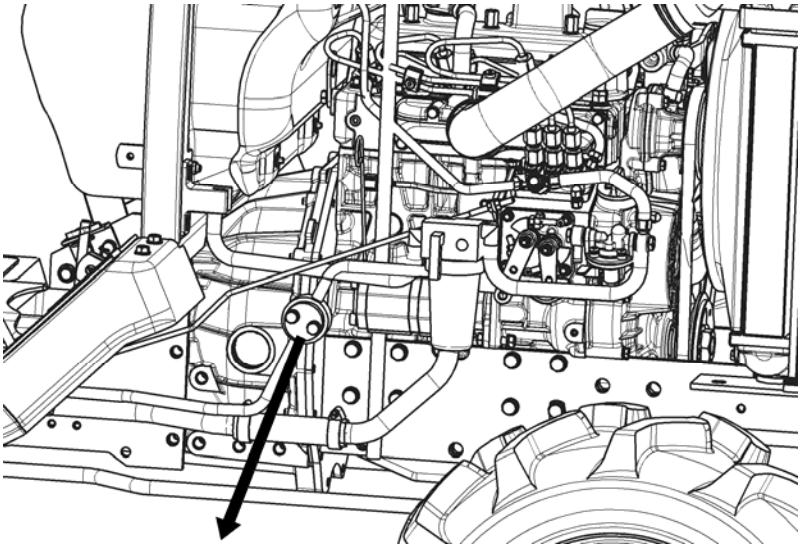
1) Position control valve
2) Rear hydraulic outlet
3) Power steering (Controller)
4) Hydraulic block type outlet
5) Oil filter
6) Hydraulic pump (for power steering)
7) Hydraulic pump (for 3-point hitch)
8) Hydraulic cylinder
9) Lowering speed adjusting valve
10) Relief valve

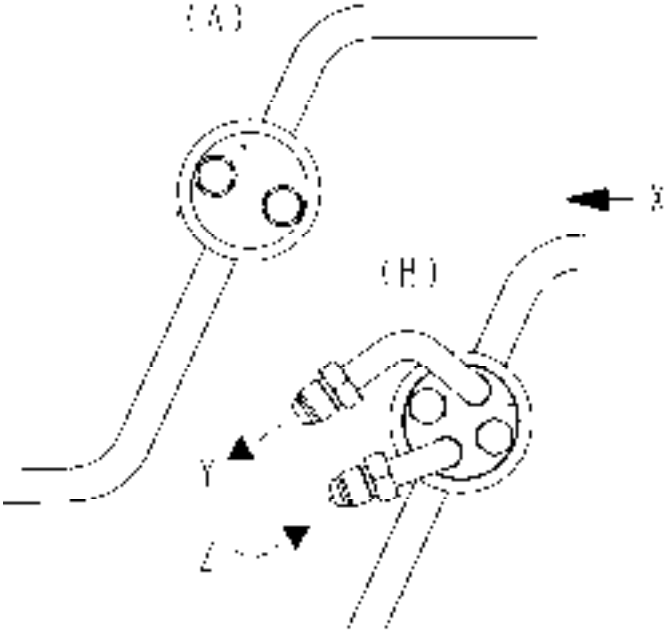
A : To transmission case
B : To clutch housing (Front transmission)

1. STRUCTURE

<2> AUXILIARY HYDRAULICS

1) Hydraulic Block Type Outlet





***. PART NAME**

1) Block cover
2) Block outlet cover (option)
3) Outlet 4) Inlet
5) Hydraulic block

(A) : When implement is not attached

(B) : When implement is attached

X : From gear pump

Y : To implement inlet

Max. flow : 17.1L/min (4.5 U.S.gals/min)

No relief valve in the hydraulic block

Z : From implement outlet

The hydraulic block type outlet is located at the right hand side of the engine.

This hydraulic block type outlet is provided to take power out from the tractor to operate the hydraulic cylinders on the implement, such as front end loader, front blade and so on.

2. SERVICING SPECIFICATIONS

<1> POWER STEERING

Item		Factory Specification	Allowable Limit
Steering Wheel	<Operation Force Condition> Engine Speed : Approx. 2600 rpm, Oil Temperature : 45 to 55℃ (133 to 131℉)	Less than 10.0 N 1.2 kgf 2.2 lbs	-
Rack(Piston) Assembly	Axial Play	0.0 to 0.02 mm 0.0 to 0.00079 in.	0.004 mm 0.00157 in.
Valve Housing to Sleeve	Clearance	0.17 to 0.28 mm 0.0067 to 0.0110 in.	0.40 mm 0.0157 in.
	Sleeve (O.D.)	35.77 to 35.83 mm 1.4083 to 1.4106 in.	-
	Valve Housing (I.D.)	36.00 to 36.05 mm 1.4173 to 1.4193 in.	-
Sectorial Gear Shaft to Rack(Piston)	Backlash Deflection measured at pitman arm end	Less than 0.30 mm 0.0118 in.	-

2. SERVICING SPECIFICATIONS

<2> HYDRAULIC PUMP FOR POWER STEERING

Item		Factory Specification	Allowable Limit
Pump Delivery	At no pressure	11.9 L/min. 3.2 U.S.gal/min. 2.6 lmp.gal/min.	-
	11.3 to 12.3 ㎫ 115.0 to 125.0 kgf/㎠ 1,636.0 to 1,778.0 psi	10.9 L/min. 2.9 U.S.gal/min. 2.4 lmp.gal/min.	-
Gear to Casting	Clearance	-	0.15 mm 0.0059 in.
Gear Shaft to Bushing	Clearance	0.020 to 0.091 mm 0.0008 to 0.0036 in.	0.12 mm 0.0047 in.
	Gear Shaft (I.D.)	14.970 to 14.980 mm 0.5894 to 0.5898 in.	-
	Bushing (O.D.)	15.000 to 15.061 mm 0.5906 to 0.5930 in.	-

2. SERVICING SPECIFICATIONS

<3> HYDRAULIC PUMP FOR THREE POINT HYDRAULIC SYSTEM

Item		Factory Specification	Allowable Limit
Pump Delivery	At no pressure	17.1 L/min. 4.5 U.S.gal/min. 3.8 lmp.gal/min.	-
	At 13.7 ㎫ 140.0 kgf/㎠ 1,991.0 psi	15.6 L/min. 4.1 U.S.gal/min. 3.4 lmp.gal/min.	-
Gear to Casting	Clearance	-	0.15 mm 0.0059 in.
Gear Shaft to Bushing	Clearance	0.020 to 0.091 mm 0.0008 to 0.0036 in.	0.12 mm 0.0047 in.
	Gear Shaft (I.D.)	14.970 to 14.980 mm 0.5894 to 0.5898 in.	-
	Bushing (O.D.)	15.000 to 15.061 mm 0.5906 to 0.5930 in.	-

2. SERVICING SPECIFICATIONS

<4> THREE POINT HYDRAULIC SYSTEM

Item		Factory Specification	Allowable Limit
Relief Valve	Setting pressure	13.7 to 13.7 ㎫ 135 to 140 kgf/㎠ 1,920.0 to 1,991.0 psi	0.30 mm 0.0118 in.
Lift Arm	Clearance	5.0 to 15.0 mm 0.20 to 0.59 in.	-
Hydraulic Cylinder	I.D.	70.05 to 70.10 mm 2.7579 to 2.7598 in.	70.15 mm 2.7618 in.
Hydraulic Arm Shaft to Bushing	Clearance	0.020 to 0.110 mm 0.0008 to 0.0043 in.	0.30 mm 0.0118 in.
	Hydraulic Arm Shaft, Right (O.D.)	37.925 to 37.950 mm 1.4931 to 1.4941 in.	-
	Hydraulic Arm Shaft, Left (O.D.)	33.925 to 33.950 mm 1.3356 to 1.3366 in.	-
	Bushing, Right (I.D.)	37.970 to 38.035 mm 1.4949 to 1.4974 in.	-
	Bushing, Left (I.D.)	33.970 to 34.035 mm 1.3374 to 1.3400 in.	-

3. TIGHTENING TORQUES

Item	N·m	kgf·m	ft-lbs
(Power Steering Body)			
Steering column mounting screw	48.1	4.9	35.4
Valve housing mounting hex. Head screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Delivery pipe nut for power steering	65.0 to 75.0	6.6 to 7.7	47.9 to 55.3
(Hydraulic Pump)			
Cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
(Hydraulic Cylinder)			
Connecting plate mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Hydraulic cylinder mounting screw and nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Delivery pipe joint bolt	33.3 to 38.2	3.4 to 3.9	24.6 to 28.2
Control valve mounting screw	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2
Relief valve plug	49.0 to 68.6	5.0 to 7.0	36.2 to 50.6

4. CHECKING, DISASSEMBLING AND SERVICING

<1> CHECKING AND ADJUSTING

1) Power Steering System

< Steering wheel operating force >

1. Park the tractor on flat concrete place.
2. Start the engine. After warming up, set the engine speed at approx. 2600 rpm.
3. Set a spring balance to the steering wheel to measure the operating force.
4. If the measurement exceeds the factory specification, check the suction line, delivery line, and the performance of hydraulic pump. And then, check the power steering assembly.

Steering wheel operating force	Factory spec.	Less than 10N 1.2 kgf 2.2 lbs

▷ **Condition**

- ✓ Engine speed : Approx. 2600rpm
- ✓ Oil temperature : 45 to 55℃, 113 to 131℉
- ✓ Tractor by itself. (Without any implement and weight)

4. CHECKING, DISASSEMBLING AND SERVICING

2) Hydraulic Pump for Power Steering

< Flowmeter connecting and test preparation >

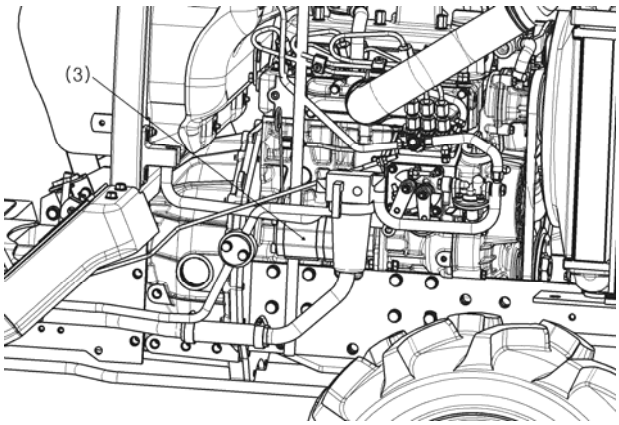
◈ Important

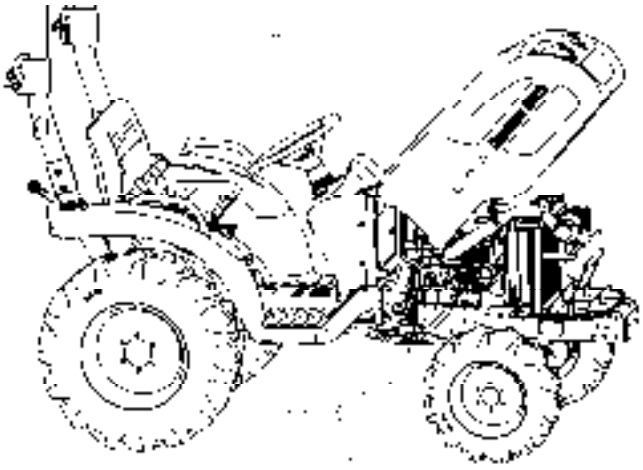
- ➢ When using a flowmeter other than Branson specified flowmeter, be sure to use the instructions with that flowmeter.
- ➢ In this hook-up, there is no relief valve. Therefore while testing, do not close the flowmeter loading valve completely.

1) Remove the steering wheel, meter panel and panel under cover.
2) Remove the power steering delivery pipe.
3) Set the adaptor(2) to the hydraulic pump(3).
4) Connect the hydraulic test hose(4) to the adaptor and flowmeter inlet port.
5) Connect the another hydraulic test hose(4) to flowmeter outlet port and transmission oil filling port.
6) Open the flowmeter loading valve completely. (Turn counterclockwise)
7) Start the engine and set the engine speed at 2600 rpm.
8) Slowly close the loading valve to generate the pressure approx. 12.3㎫ (125kgf/㎠, 1778psi).
9) Hold in this condition until oil temperature reaches approx. 50℃ (122°F).

▷ Reference

✓ Adapter is included in the adaptor set.





***. PART NAME**

1) Hydraulic test hose
2) Adaptor
3) Hydraulic pump
4) Hydraulic test hose

4. CHECKING, DISASSEMBLING AND SERVICING

< Pump test >

▶ **NOTE**

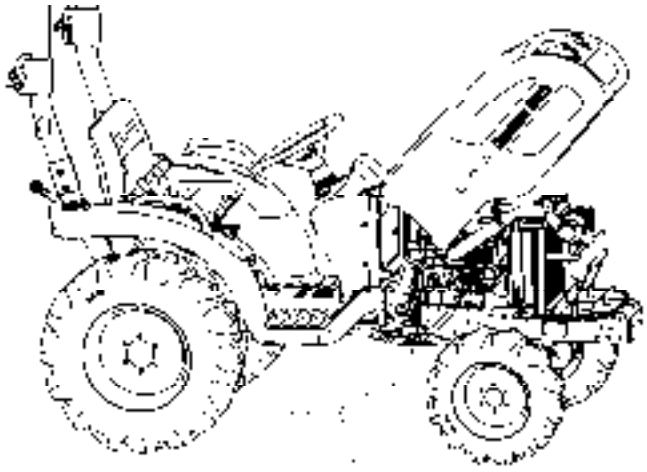
1) Before pump testing, perform the flowmeter connecting and test preparation.

1. Open the loading valve completely.
2. Start the engine and set at approx. 2600rpm.
3. Read and note the pump delivery at no pressure.
4. Slowly close the loading valve to increase pressure approx. 12.7㎫ (130kgf/㎠, 1,849psi).
5. Read and note the pump flow at rated pressure.
6. Open the loading valve and stop the engine.

Hydraulic pump delivery at no pressure	Factory spec.	Above 11.9 L/min. 3.2 U.S.gal/min. 2.6 Imp.gal/min.
Hydraulic pump delivery at rated pressure	Factory spec.	Above 10.9 L/min. 2.9 U.S.gal/min. 2.4 Imp.gal/min.

▷ **Condition**

- ✓ Engine speed : Approx. 2600rpm
- ✓ Rated pressure : 12.3㎫, 125kgf/㎠, 1,778psi
- ✓ Oil temperature : 50℃, 122°F



***. PART NAME**

1) Hydraulic test hose 2) Adaptor

4. CHECKING, DISASSEMBLING AND SERVICING

3) Hydraulic Pump for Three Point Hydraulic System

< Flometer connection and test preparation >

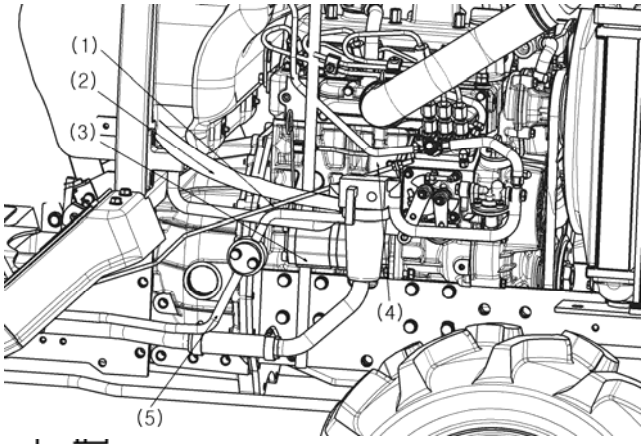
◈ Important

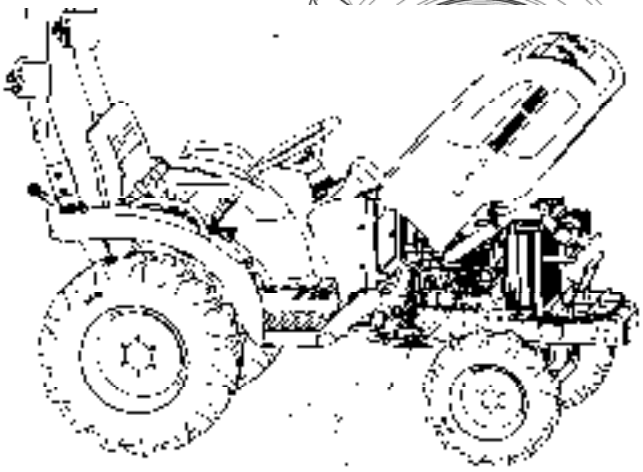
- When using a flowmeter other than a Branson specified flometer, be sure to use the instructions with that flowmeter.
- In this hook-up, there is no relief valve. Therefore while testing, do not close the flowmeter loading valve completely.

1. Open the hood, then remove the hood and disconnect the battery grounding cord.
2. Remove the accelerator rod(1).
3. Remove the fuel filter retaining nut.
4. Disconnect the hydraulic delivery pipe(5).
5. Install the adaptor(7) to the hydraulic pump(3).
6. Reinstall the engine stop solenoid(4).
7. Reinstall the accelerator rod(1).
8. Connect the hydraulic test hose(6) to the adapter61 and flowmeter inlet port.
9. Connect the another hydraulic test hose(8) to flowmeter outlet port and transmission oil filling port.
10. Open the flowmeter loading valve completely. (Turn counterclockwise)
11. Start the engine and set the engine speed at 2600rpm.
12. Slowly close the loading valve to generate the pressure approx. 13.7㎫ (140kgf/㎠, 1991psi).
13. Hold in this condition until oil temperature reaches approx. 50℃ (122°F).

▷ Reference

✓ Adapter is included in the adapter set.





***. PART NAME**

1) Accelerator rod
2) Power steering delivery pipe
3) Hydraulic pump
4) Engine stop solenoid
5) Hydraulic delivery pipe
6) Hydraulic test hose
7) Adapter
8) Hydraulic test hose

4. CHECKING, DISASSEMBLING AND SERVICING

4) Three Point Hydraulic System

< Relief valve setting pressure >

1. Remove the seat under cover.
2. Remove the plug from front of hydraulic cylinder body.
3. Install the adapter. Then connect the cable and pressure gauge to adapter.
4. Remove the feedback rod lock nut and spring.
5. Start the engine and set at maximum speed.
6. Move the hydraulic control lever all way up to operate the relief valve and read the gauge.
7. If the pressure is not within the factory specifications, adjust relief valve with the adjusting shims.
8. After checking the pressure, reinstall the spring and feedback rod lock nut.

Relief valve setting pressure	Factory spec.	13.2 to 13.7 ㎫ 135 to 140 kgf/㎠ 1,920 to 1,991 psi

▷ **Condition**

- ✓ Engine speed : Maximum
- ✓ Oil temperature : 45 to 55℃, 113 to 131℉

▷ **Reference**

- ✓ Thickness of shims(2)
  - 0.1 mm (0.0039 in.)
  - 0.2 mm (0.0079 in.)
  - 0.4 mm (0.0157 in.)

4. CHECKING, DISASSEMBLING AND SERVICING

< Lift arm free play >

1. Set the hydraulic control lever to the lowest position.
2. Start the engine, and set at the idling speed.
3. Move the hydraulic control lever to lift position until the lift arm moves to the uppermost position.
4. Move the lift arm to the upper end by hand and measure the free play.
5. If the measurement is not within the factory specifications, adjust the free play by changing the set position of feedback rod lock nut.

Lift arm free play	Factory spec.	5.0 to 15.0 mm 0.20 to 0.59 in.

4. CHECKING, DISASSEMBLING AND SERVICING

<2> DISASSEMBLING AND ASSEMBLING

1) Power Steering Body

< Steering column >

1. Turn the steering shaft several times to drain oil.
2. Loose the steering column mounting screws, and remove the steering column with steering shaft and universal joint.

▷ **Reassembling**

✓ Apply liquid lock to the steering column mounting screw.

Tightening torque	Steering column mounting screw	48.1 Nm 4.9 kgfm 35.4 ft-lbs

***. PART NAME**

1) Steering column

< Valve assembly >

1. Remove the valve housing mounting hex. Head screws.
2. Draw out the valve assembly.

▷ **Reassembling**

Tightening torque	Valve housing mounting hex. head screw.	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

4. CHECKING, DISASSEMBLING AND SERVICING

2) Hydraulic Pump for Power Steering

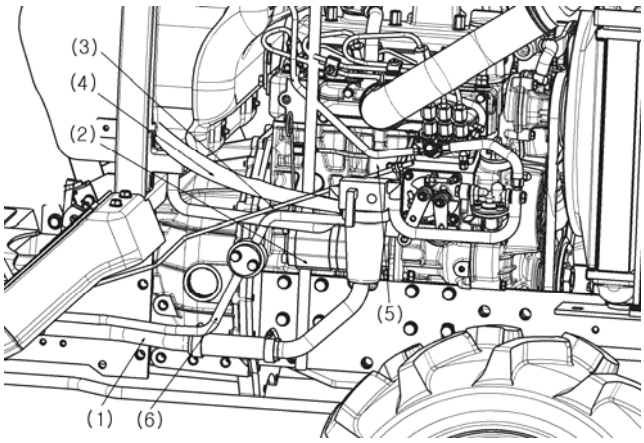
< Removing hydraulic pump >

1. Open the hood then remove the hood and disconnect the battery grounding cord.
2. Disconnect the accelerator rod(3).
3. Disconnect the power steering delivery hose(4) and 3-point hitch delivery pipe(6).
4. Disconnect the suction hose(1) and remove the hydraulic pump(2).

▶ **NOTE**

1) For fastening the hydraulic pipe nut, use two wrenches. Hold the fitting with a wrench, turn the pipe nut with another wrench to avoid damage at fitting installed part.

Tightening torque	Delivery pipe nut for power steering	65 to 75 N·m 6.6 to 7.7 kgf·m 47.9to55.3ft-lbs



***. PART NAME**

1) Suction hose
2) Hydraulic pump
3) Accelerator rod
4) Power steering delivery hose
5) Engine stop solenoid
6) 3-Point hitch delivery pipe

4. CHECKING, DISASSEMBLING AND SERVICING

3) Hydraulic Cylinder and Control Valve

< Seat and seat stay >

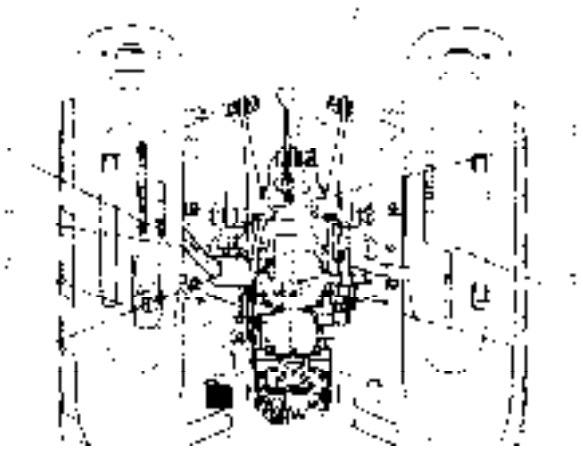
1. Remove the seat.
2. Remove the lowering speed adjusting knob and dipstick, then remove the seat under cover.
3. Remove the tool box(3).
4. Disconnect the 2P connectors from the seat switches, and then remove the seat stray(1).
5. Disconnect the wiring harness.

***. PART NAME**

1) Seat stay
2) Seat
3) Tool box

< Hydraulic cylinder assembly >

1. Remove the top link and disconnect the lift rods.
2. Remove the all lever grip and remove the both lever guides(2),(8).
3. Disconnect the differential lock rod(1) and remove the hydraulic control lever(3).
4. Disconnect the delivery pipe for 3point hitch(4).
5. Remove the top link bracket(6) and connecting plate mounting screws.
6. Remove the hydraulic cylinder assembly(5) with connecting plate.



***. PART NAME**

1) Differential lock rod
2) Lever guide RH
3) Hydraulic control lever
4) Delivery pipe
5) Hydraulic cylinder
6) Top link bracket
7) Connecting plate
8) Lever guide LH

▷ Reassembling

✓ Apply liquid gasket to joint face of the differential case and the hydraulic cylinder.

Tightening torque	Connecting plate Mounting screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs
	Hydraulic cylinder mounting screw and nut	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs
	Delivery pipe joint bolt	33.3 to 38.2 N·m 3.4 to 3.9 kgf·m 24.6to28.2ft-lbs

4. CHECKING, DISASSEMBLING AND SERVICING

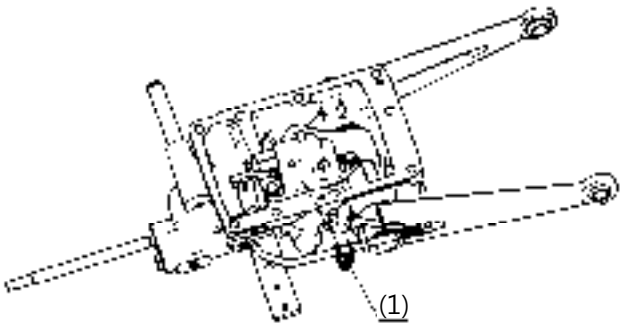
< Control valve >

1. Remove the control valve mounting screws, and remove the control valve(1).

▷ **Reassembling**

✓ Take care not to damage the O-ring.

Tightening torque	Cover mounting screw	23.6 to 27.4 N·m 2.4 to 2.8 kgf·m 17.4 to 20.2 ft-lbs



***. PART NAME**

1) Control valve

< Lift arm, hydraulic arm shaft and hydraulic arm>

1. Remove the feedback rod lock nuts(5) and spring(6).
2. Remove the lift arm LH(1).
3. Remove the hydraulic arm shaft(3) and lift arm RH(2) as a unit.

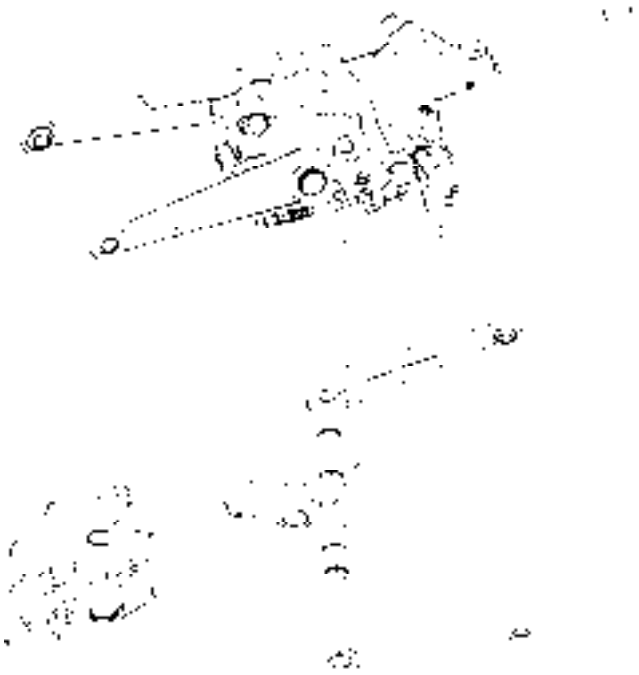
▷ **Reassembling**

✓ Align the alignment marks(7) of the hydraulic arm and hydraulic arm shaft.

✓ Align the alignment marks(7) of the lift arm LH and hydraulic arm shaft.

✓ Apply grease to the right and left bushings and O-rings.

✓ Take care not to damage the O-rings.



***. PART NAME**

1) Lift arm LH
2) Lift arm RH
3) Hydraulic arm shaft
4) Feedback rod
5) Lock nut
6) Spring
7) Alignment mark

4. CHECKING, DISASSEMBLING AND SERVICING

< Hydraulic piston >

1. Inject the compressed air into the hydraulic cylinder, and take out the hydraulic piston.

▷ **Reassembling**

- ✓ Take care not to damage the O-ring and backup ring.
- ✓ Apply transmission fluid to the O-ring.
- ✓ Replace the O-ring if it is defective, worn or scratched, which may case oil leakage.

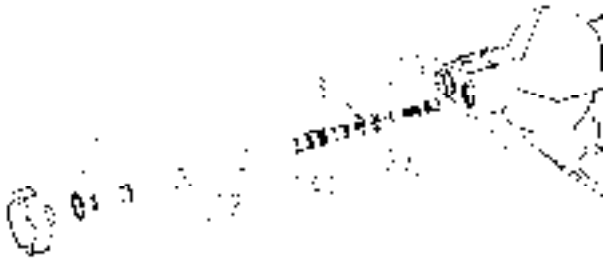
< Lowering speed adjusting valve >

1. Remove the internal snap ring(1) and pull out the lowering speed adjusting valve with shaft(2).
2. Draw out the ball(5) and spring(6).

▷ **Reassembling**

- ✓ Take care not to damage the O-rings.

***. PART NAME**



1) Internal snap ring
2) Lowering speed adjusting valve with shaft
3) Stopper
4) O-ring
5) Ball
6) Spring
7) Collar

4) Hydraulic Cylinder

< Separating hydraulic cylinder assembly >

-. Reference the page 89.

< Position control valve >

1. Remove the position control valve mounting screws, and remove the position control valve.

▷ **Reassembling**

- ✓ Take care not to damage the O-rings.

Tightening torque	Position control valve mounting screws	23.6 to 27.4 N·m 2.4 to 2.8 kgf·m 17.4 to 20.2 ft-lbs

4. CHECKING, DISASSEMBLING AND SERVICING

< Lift arm, hydraulic arm shaft and hydraulic arm>

1. Remove the external snap ring, and remove the lift arm LH.
2. Draw out the hydraulic arm shaft and lift arm RH as a unit.

▷ **Reassembling**

- ✓ Align the alignment marks of the hydraulic arm and hydraulic arm shaft.
- ✓ Align the alignment marks of the lift arm LH and hydraulic arm shaft.
- ✓ Apply grease to the right and left bushing and O-rings.
- ✓ Take care not to damage the O-rings.

< Hydraulic piston >

1. Inject the compressed air into the hydraulic cylinder, and take out the hydraulic piston.

▷ **Reassembling**

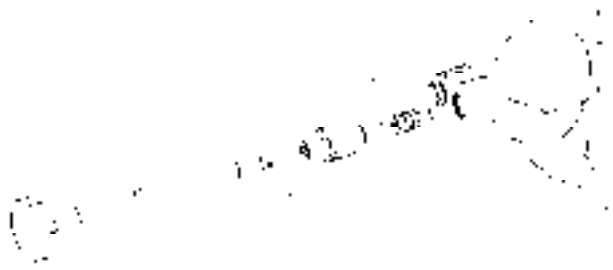
- ✓ Take care no to damage the O-ring and backup ring.
- ✓ Apply transmission fluid to the O-ring.
- ✓ Replace the O-ring if it is defective, worn or scratched, which may cause oil leakage.

< Lowering speed adjusting valve >

1. Remove the lowering speed adjusting valve body(2) with the lowering speed adjusting shaft(1).
2. Draw out the poppet(3).

▷ **Reassembling**

- ✓ Take care not to damage the O-rings.



***. PART NAME**

1) Lowering speed adjusting shaft
2) Lowering speed adjusting valve body
3) Poppet

4. CHECKING, DISASSEMBLING AND SERVICING

< Relief valve >

1. Remove the plug(1), and draw out the o-ring(2), spring(3), poppet(4) and the valve seat(5).

▷ **Reassembling**

✓ Take care not to damage the O-rings.

Tightening torque	Relief valve plug	49.0 to 68.6 N·m 5.0 to 7.0 kgf·m 36.2 to 50.6 ft-lbs

***. PART NAME**

1) Plug
2) O-ring
3) Spring
4) Poppet
5) Valve seat
6) Packing

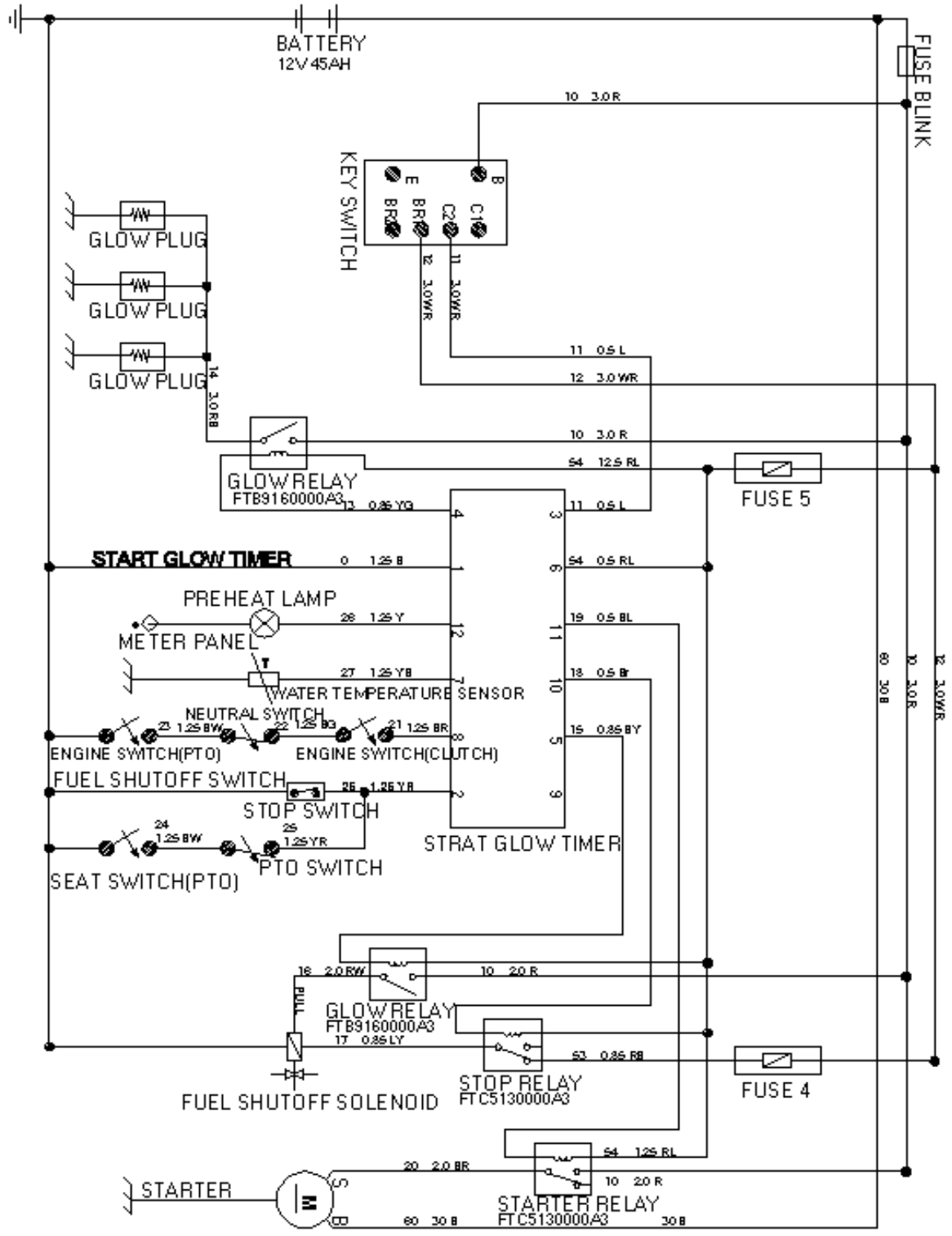
CONTENTS 9. (ELECTRIC SYSTEM)

1. WIRE COLOR ABBREVIATIONS

W ..... White	WR ..... White/Red	LW ..... Blue/White
R ..... Red	WY ..... White/Yellow	LG ..... Blue/Green
L ..... Blue	WL ..... White/Blue	LR ..... Blue/Red
Y ..... Yellow	RW ..... Red/White	LB ..... Blue/Black
B ..... Black	RL ..... Red/Blue	LOr ..... Blue/Orange
G ..... Green	RY ..... Red/Yellow	YG ..... Yellow/Green
P ..... Pink	RB ..... Red/Black	YR ..... Yellow/Red
Lg ..... Light Green	RG ..... Red/Green	YB ..... Yellow/Blue
Br ..... Brown	BW ..... Black/White	YL ..... Yellow/Blue
Or ..... Orange	BL ..... Black/Blue	GR ..... Green/Red
Sb ..... Sky Blue	BR ..... Black/Red	GW ..... Green/White
WG ..... White/Green	BY ..... Black/Yellow	LgY ..... Light Green/Yellow
WB ..... White/Black	LY ..... Blue/Yellow	LgB ..... Light Green/Blue

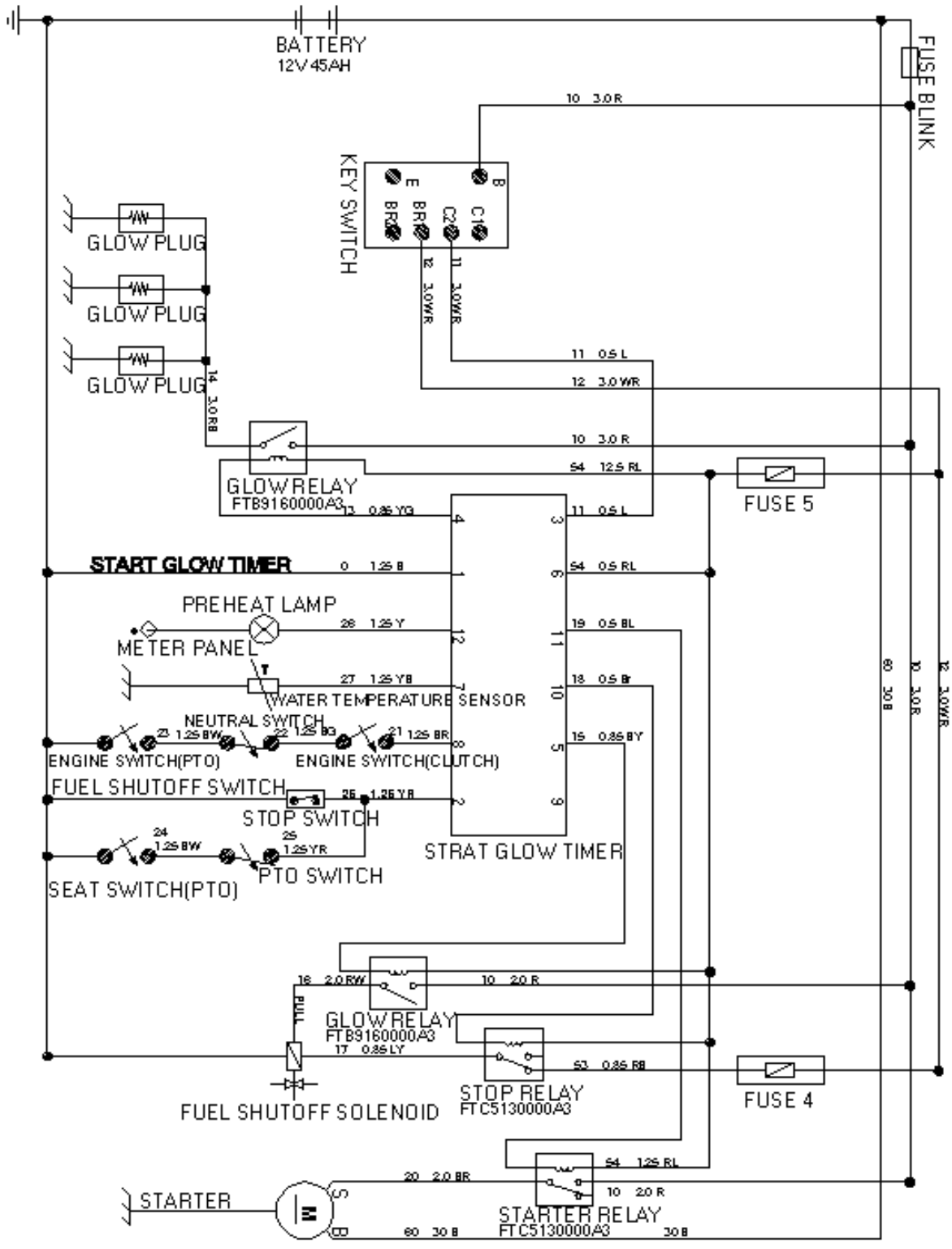
2. WIRING DIAGRAM

<1> MANUAL TRANSMISSION



2. WIRING DIAGRAM

<2> HST TRANSMISSION



3. STARTING & STOPPING SYSTEM

<2> Components

1. Seat Switch

This switch is located under the seat. When Sitting on the seat, the seat switch (1) is pushed in and electrical circuit is closed. When the seat is vacant, this switch is not pushed and electric is opened.

2. Neutral Switch

This switch is located on the transmission case upper cover. When the main speed change lever is not in neutral, this switch is pushed in and electrical circuits are opened.

3. Rear PTO Switch

This switch is under the PTO gear shitf lever. When the PTO gear shitf lever is in neutral, this switch is pushed in and electric circuit is closed.

4. Clutch Pedal Switch

This switch detects when the clutch is being depressed. When the clutch pedal is depressed and the clutch disengaged, this switch is pushed in and electric circuit is closed.

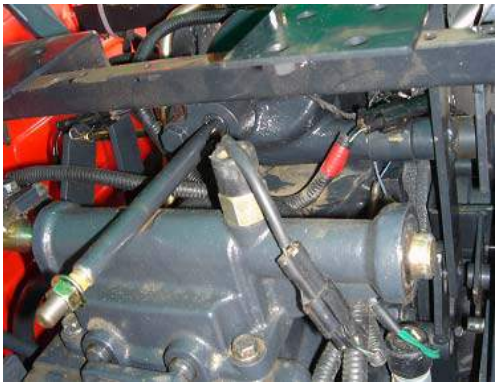
3. STARTING & STOPPING SYSTEM

5. Start Glow Timer(Engine Control Unit)

The start glow timer is located inside of the dashboard.

6. Neutral Switch (Manual Transmission)

This switch is equipped only with manual transmission type, and located on the transmission case upper cover. When the main speed change lever is not in neutral, this switch is pushed in and electric circuit is opend.



7. HST Pedal Switch (HST Transmision)

This switch is equipped only on HST units. When the PTO pedal is in neutral, this switch is pushed in and the electric circuit is closed.

8. Rear PTO Switch and Mid PTO Switch

These switches are located near the PTO gear shift lever. When the PTO gear shift lever is in neutral, the rear PTO switch is pushed in and the electric circuit is closed.

On the other hand, the Mid PTO switch is to detect the PTO gear shitf lever in 2nd PTO speed

3. STARTING & STOPPING SYSTEM

position (Mid PTO position). When the PTO gear shift lever is shifted to 2nd PTO speed position (Mid PTO position), this switch is pushed in and electric circuit is opened.
The Mid PTO switch is equipped Mid PTO type.

<2> Engine Starting Conditions

When the following conditions become complete, electric current (12V) reaches starter **S** terminal through operator presence controller from main switch **50** terminal, and the engine can be started.

	Clutch Pedal Switch (Pedal depressed :ON) (Pedal free : OFF)	**Rear PTO Switch** (Neutral : ON) (Engaged : OFF)	**Neutral Switch** (Neutral : ON) (Engaged : OFF)	**HST Pedal Switch** (Neutral : ON) (others : OFF)
Manual Transmission	ON	ON	ON	-
HST Transmission	ON	ON	-	ON

<4> Automatic Engine Stop

Engine can be shut off under the following conditions since these conditions cause key stop relay to operate and it controls fuel cut solenoid.

Condition	**Seat s/w** (Occupied : On) (Vacant : OFF)	**Main Gear s/w** or **HST Pedal s/w** (Neutral : ON) (Others : OFF)	**Mid PTO s/w** (Neutral : ON) (Engage : OFF)	**Rear PTO s/w** (Neutral : ON) (engage : OFF)
1	OFF	OFF	ON/OFF	ON/OFF
2	OFF	ON	OFF	ON/OFF
3	OFF	ON	ON	OFF

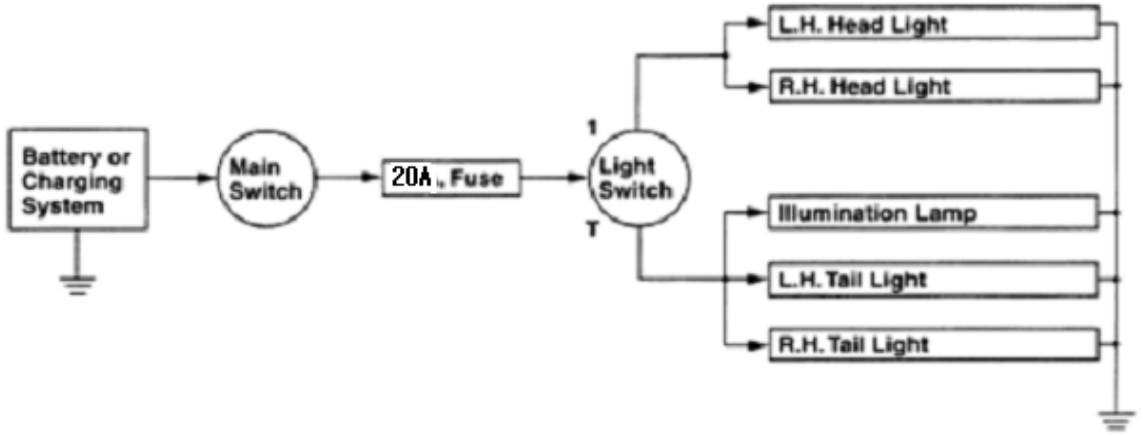
<Note>

When the Mid PTO is not engaged and the seat is tilted, the engine does not stop even if rear PTO is engaged.

4. LIGHTING SYSTEM

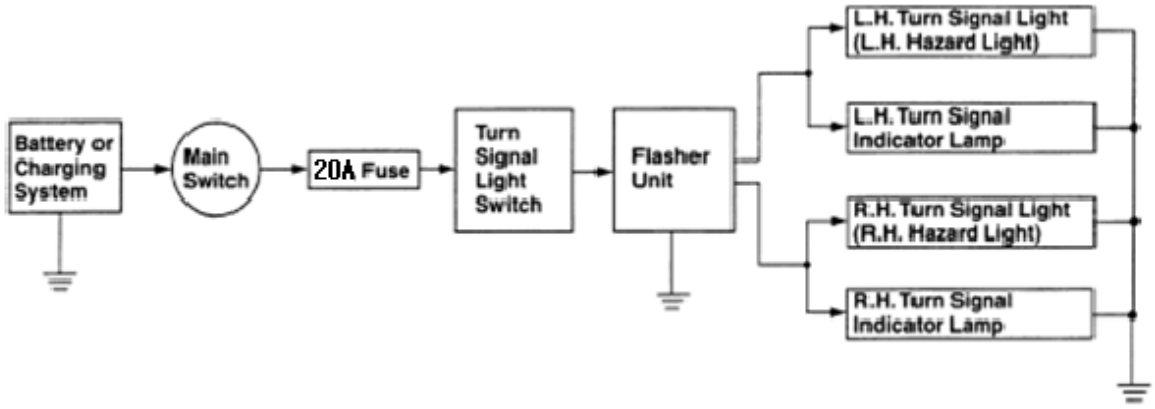
The lighting system consists of the combination switch (light switch and hazard), head lights, tail lights, hazard lights, etc.

<1> Head Light



The light switch, which forms a combination switch with the turn signal light switch, has two positions OFF and ON. Current passes through the light circuit as shown in the figure above.

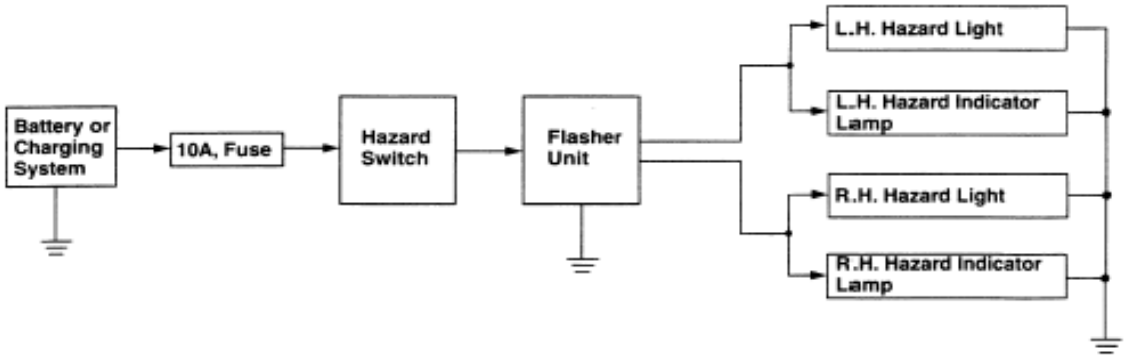
<2> Turn Signal Light



The turn signal light which, forms a combination switch with the light switch. This switch has three positions: **OFF**, **1.**, **2.**. When using turn signal light switch, only one side blinks while the other stay on. The operation of the turn signal light switch is given top priority when the hazard switch and the turn signal light switch are turned on at the same time.

4. LIGHTING SYSTEM

<3> Hazard Light



The Hazard switch has two positions; **ON** and **OFF**. The hazard light is operative when the key switch is in either the ON or OFF positions.

5. INSTRUMENT PANNEL

To check the conditions of your tractor before and during operation, refer to the indication items below.

<1> Indication Items

1 Charge Lamp

When the charging system is not functioning properly, this lamp illuminates.

2. Pre-heat Indicator Lamp

When the key switch is in the **"Pre-heat"** position, the pre-heat indicator lamp illuminates.

3. Oil Pressure Lamp

When the engine oil pressure is low, this lamp illuminates.

<2> Engine Oil Pressure Alarm

When the engine oil pressure has dropped, the engine oil pressure switch is activated to let the current flow from the main switch and to light up the lamp.

6. OTHERS

Refer to Workshop manual for Diesel Engine Mechanism and Tractor Mechanism as following terms.

[1] ENGINE STARTING SYSTEM AND STOPPING SYSTEM

(1) Main Switch : [Type 1] in Workshop Manual for Tractor Mechanism.

(2) Starter Motor(MT) : [Electromagnetic Drive Type] in Workshop Manual for Engine Mechanism.

(3) Starter Motor(HST) : [Planetary Gear Reduction Type] in Workshop Manual for Engine Mechanism.

(4) Starter Relay(MT) : Workshop Manual for Tractor Mechanism.

(5) Glow Plug :[Quick Glow System] in Workshop Manual for Engine Mechanism.

(6) Key Stop Relay(HST) : This part is the same as the above-mentioned "(4) Starter Relay".

(7) Engine Stop Solenoid(MT) : [Energized-to-stop] in Workshop Manual for Engine Mechanism.

(8) Engine Stop Solenoid(HST) : [Energized-to-run Type] in Workshop Manual for Engine Mechanism.

[2] CHARGING SYSTEM

(1) AC dynamo : Workshop Manual for Engine Mechanism.

(2) Regulator : [Regulator for AC dynamo] in Workshop Manual for Engine Mechanism.

[3] LIGHTING SYSTEM

(1) Combination Switch : [Type1] in Workshop Manual for Tractor Mechanism.

(2) Hazard Switch : Workshop Manual for Tractor Mechanism.

[4] EASY CHECKER

(1) Engine Oil Pressure Switch : [Type1] in Workshop Manual for Tractor Mechanism.

[5] GAUGES

(1) Fuel Level Sensor : [Type1] in Workshop Manual for Tractor mechanism.

(2) Coolant Temperature Sensor : Refer to Workshop Manual for Tractor Mechanism.

7. TROUBLE SHOOTING

Symptom	Probable Cause	Solution	Reference
All Electrical Equipments Do Not Operate	Battery discharged or defective	Recharge or Replace	
	Battery positive cable disconnected or improperly connected	Repair or Replace	
	Battery negative cable disconnected or improperly connected	Repair or Replace	
	Slow blow fuse blown	Replace	
Fuse Blown Frequently	Short-circuited	Repair or Replace	

BATTERY

Symptom	Probable Cause	Solution	Reference
Battery Discharges Too Quickly	Battery defective	Recharge or Replace	
	Dynamo defective	Repair or Replace	
	Regulator defective	Replace	
	Wiring harness disconnected or improperly connected (between battery positive terminal and regulator B terminal)	Repair or Replace	
	Cooling fan belt slipping	Adjust tension	

7. TROUBLE SHOOTING

STARTING SYSTEM

Symptom	Probable Cause	Solution	Reference
Starter Motor Does Not Operate	Battery discharged or defective	Recharge or Replace	
	Slow blow fuse blown	Repair or Replace	
	Safety switch improperly adjusted or defective	Repair or replace	
	Wiring harness disconnected or improperly connected (between main switch 50 terminal and operator presence controller, between main switch 50 terminal and starter relay, between safety switches and operator presence controller, between battery positive terminal and starter motor)	Repair or Replace	
	Operator presence controller defective	Replace	
	Starter relay defective	Replace	
	Starter motor defective	Repair or Replace	
	Main switch defective	Replace	
Pre-heat indicator Lamp Does Not Light When Main Switch is in Pre-heat Position	Battery discharged or defective	Recharge or replace	
	Slow blow fuse blown	Replace	
	Wiring harness disconnected or improperly connected (between main switch 19 terminal and pre-heat indicator, between pre-heat indicator and glow plugs)	Repair or Replace	
	Main switch defective	Replace	
	Pre-heat indicator defective	Replace	

7. TROUBLE SHOOTING

AUTOMATIC ENGINE STOP

Symptom	Probable Cause	Solution	Reference
Engine Does Not Stop When Main Switch Is Turned OFF	Solenoid fuse blown (10A)	Replace	
	Key stop timer defective	Replace	
	Key stop relay defective	Replace	
	Engine stop solenoid defective	Replace	
	Operator presence controller defective	Replace	
	Wiring harness disconnected or improperly connected (between key stop timer and key stop solenoid, between key stop timer and safety switches, between key stop timer and battery positive terminal)	Repair or Replace	
	Wiring harness disconnected or improperly connected (between operator presence controller and key stop relay, between key stop relay and batter positive terminal)	Repair or Replace	
Engine Does Not Stop When Automatic Engine Stop Conditions Become Complete	Solenoid fuse blown (10A)	Replace	
	Engine stop solenoid defective	Replace	
	Key stop relay defective	Replace	
	Seat switch 1 defective	Adjust or Replace	
	Safety switch (main gear 1 or main gear 2 or HST) defective	Adjust or Replace	
	Safety switch (rear PTO or mid PTO) defective	Adjust or Replace	
	Key stop timer defective	Replace	
	Engine stop solenoid defective	Replace	
	Operator presence controller defective	Replace	
	Wiring harness disconnected or improperly connected (between key stop timer and key stop solenoid, between key stop timer and safety switches, between key stop timer and battery positive terminal)	Repair or Replace	
	Wiring harness disconnected or improperly connected (between operator presence controller and key stop relay, between key stop relay and engine stop solenoid, between key stop relay and battery positive terminal	Repair or Replace	

7. TROUBLE SHOOTING

CHARGING SYSTEM

Symptom	Probable Cause	Solution	Reference
Charging Lamp Does Not Light When Main Switch Is Turned ON	Fuse blown(10A)	Replace	
	Wiring harness disconnected or improperly connected (between main switch AC terminal and panel board, between panel board and dynamo)	Repair or Replace	
	Dynamo defective	Repair or Replace	
	Regulator defective	Replace	
Charging Lamp Does Not Go Off When Engine Is Running	Wiring harness disconnected or improperly connected (between main switch 30 terminal and alternator, between panel board and dynamo)	Repair or Replace	
	Dynamo defective	Repair or Replace	
	Regulator defective	Replace	

LIGHTING SYSTEM

Symptom	Probable Cause	Solution	Reference
Head light Does Not Light	Fuse blown(20A)	Replace	
	Bulb Blown	Replace	
	Wiring harness disconnected or improperly connected (between main switch AC terminal and combination switch B1 terminal, between combination switch 1 terminal and headlight	Repair or Replace	
Tail Light Does Not light	Fuse blown(20A)	Replace	
	Bulb blown	Replace	
	Wiring harness disconnected or improperly connected (between main switch AC terminal and combination switch B1 terminal, between combination switch T terminal and tail light)	Repair or Replace	
Illumination Light Does Not Light	Fuse blown(10A)	Replace	
	Bulb blown	Replace	
	Wiring harness disconnected or improperly connected (between main switch AC terminal and combination switch B1 terminal, between combination switch T terminal and panel board)	Repair or Replace	

7. TROUBLE SHOOTING

Symptom	Probable Cause	Solution	Reference
Hazard Light Does Not Light	Fuse blown(10A)	Replace	
	Bulb blown	Replace	
	Wiring harness disconnected or improperly connected	Repair or Replace	
	Flasher unit defective	Replace	
	Hazard switch defective	Replace	
Hazard Indicator Lamp Does Not Light	Bulb blown	Replace	
	Wiring harness disconnected or improperly connected	Replace	
Hazard Light Does Not Flicker	Flasher unit defective	Repair or Replace	
Turn Signal Light Does Not Light	Fuse blown(20A)	Replace	
	Bulb blown	Replace	
	Wiring harness disconnected or improperly connected	Repair or Replace	
	Flasher unit defective	Replace	
	Combination switch defective	Replace	
Wiring harness disconnected or improperly	Bulb blown	Replace	
	Wiring harness disconnected or improperly connected (between combination switch R or L terminal and panel board)	Repair or Replace	
Turn Signal Light Does Not Flicker	Flasher unit defective	Replace	
	Combination switch defective	Replace	

7. TROUBLE SHOOTING

INSTRUMENT PANNEL

Symptom	Probable Cause	Solution	Reference
Oil Pressure Lamp Lights Up When Engine Is Running	Engine oil pressure too low	Repair engine	
	Engine oil insufficient	Replenish	
	Oil pressure switch defective	Replace	
	Short circuit between oil pressure switch lead and chassis	Replace	
	Circuit in panel board defective	Replace	
Oil Pressure Lamp Does Not Light When Main Switch Is Turned On and Engine Is Not Running	Bulb blown	Replace	
	Oil pressure switch defective	Replace	
	Wiring harness disconnected or improperly connected (between panel board and oil pressure switch)	Repair or Replace	
	Circuit in panel board defective	Replace	

GAUGES

Symptom	Probable Cause	Solution	Reference
Fuel Gauge Does Not Function	Fuel gauge defective	Repair	
	Fuel level sensor defective	Replace	
	Wiring harness disconnected or improperly connected (between panel board and fuel level sensor)	Repair or Replace	
	Circuit in panel board defective	Replace	
Coolant Temperature Gauge Does Not Function	Coolant temperature gauge defective	Replace	
	Coolant temperature sensor defective	Replace	
	Wiring harness disconnected or improperly connected (between panel board and coolant temperature sensor)	Repair or Replace	
	Circuit in panel board defective	Replace	

8. CHECKING DISASSEMBLING AND SERVICING

『CAUTION』

- ✓ **To avoid accidental short circuit, be sure to attach the positive cable to the positive terminal before the negative cable is attached to the negative terminal.**
- ✓ **Never remove the battery cap while the engine is running.**
- ✓ **Keep electrolyte away from eyes, hands and clothes. If you are spattered with it, wash it away completely with water immediately.**
- ✓ **Keep open sparks and flames away from the battery at all times. Hydrogen gas mixed with oxygen becomes very explosive.**

◆ **IMPORTANT**

- ✓ **If the machine is to be operated for a short time without battery (using a slave battery for starting), use additional current (lights) while engine is running and insulate terminal of battery. If this advice is disregarded, damage to alternator and regulator may result.**

[1] CHECKING AND ADJUSTING

(1) Battery

Battery Voltage

1. Stop the engine and turn the main switch off.

2. Connect the COM (-) lead of the voltmeter to the battery's negative terminal post and the (+) lead to the positive terminal post, and measure the battery voltage.

3. If the battery voltage is less than the factory specification, check the battery specific gravity and recharge the battery.

Battery voltage	Factory spec.	More than 12V

8. CHECKING DISASSEMBLING AND SERVICING

(2) Main Switch(Key Switch)

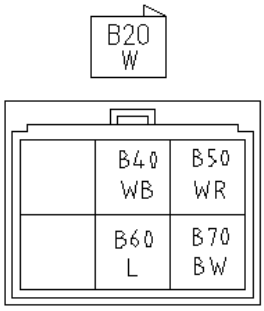
Main Switch

1. Remove the panel board
2. Disconnect the 4P connector and remove the main switch
3. Perform the following checks.

Connector Voltage

1. Measure the voltage with a voltmeter across the connector 30 terminal and chassis.
2. If the voltage differs from the battery voltage (11 to 14 V), the wiring harness is faulty.

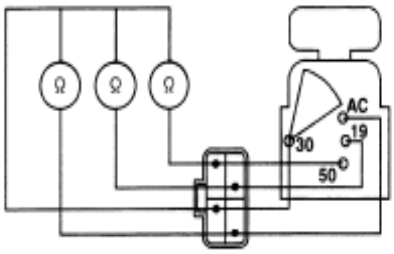
Voltage	Connector 30 terminal - Chassis	Approx. battery voltage

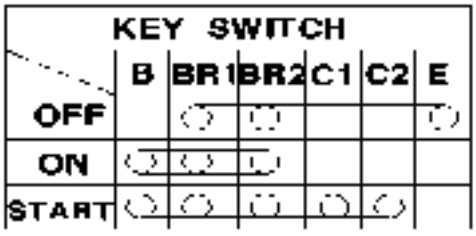


Main Switch Continuity

1) Main Switch Key at OFF Position

1. Set the main switch to OFF position.
2. Measure the resistance with an ohmmeter across the 30 terminal and the AC terminal,30 terminal and 50 terminal, 30 terminal and 19 terminal.
3. If infinity is not indicated, the contacts of the main switch are faulty.

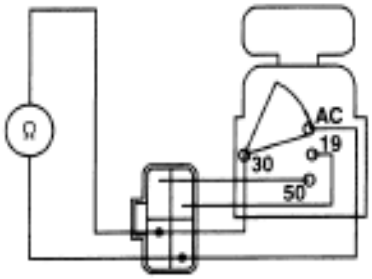




8. CHECKING DISASSEMBLING AND SERVICING

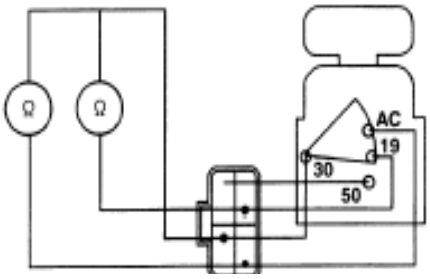
2) Main Switch Key at On Position

1. Set the main switch to ON position.
2. Measure the resistance with an ohmmeter across the 30 terminal and the AC terminal.
3. If 0 Ω is not indicated, the 30 – AC contact of the main switch are faulty.



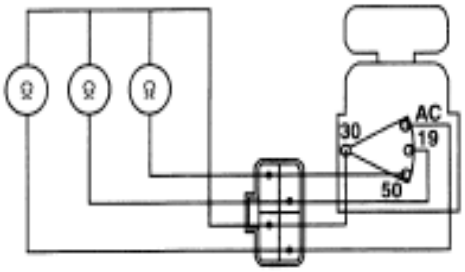
3) Main Switch Key at PREHEAT Position

1. Set and hold the main switch key at the PREHEAT position.
2. Measure the resistance with an ohmmeter across the 30 terminal and the 19 terminal, and measure the resistance across the 30 terminal and the AC terminal.



4) Main Switch Key at START Position

1. Set and hold the main switch key at the START position.
2. Measure the resistance with an ohmmeter across the 30 terminal and the 19 terminal, across the 30 terminal and the 50terminal, and across the 30 terminal and the AC terminal.
3. If 0 Ω is not indicated, these contacts of the main switch are faulty.

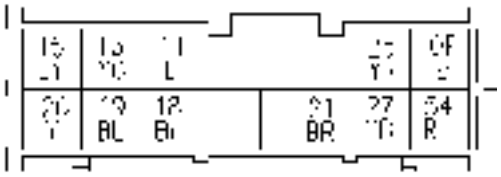


8. CHECKING DISASSEMBLING AND SERVICING

(3) Engine Control Unit

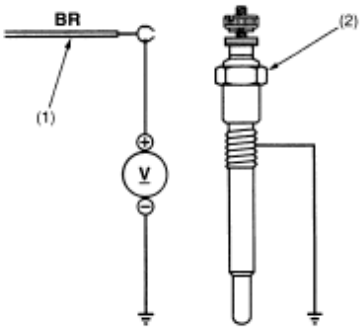
Engine Control Unit

1. Open the panel board and remove the relay.
2. Apply battery voltage across 2 terminal and 4 terminal, and check for continuity across 1 terminal and 3 terminal.
3. If 0 Ω is not indicated, renew the starter relay.



(4) Glow Plug

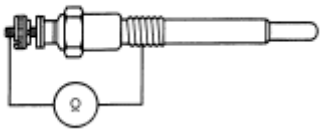
Lead Terminal Voltage



1. Disconnect the wiring lead (1) from the glow plug (2) after turning the main switch off.
2. Turn the main switch key to the "PREHEAT" position, and measure the voltage between the lead terminal and the chassis.
3. Turn the main switch key to the "START" position, and measure the voltage with a voltmeter between the lead terminal and the chassis.
4. If the voltage at either position differs from the battery voltage, the wiring harness or main switch is faulty.

Voltage(Lead terminal – Chassis)	Main switch key at "PREHEAT"	Approx. battery voltage
	Main switch key at "START"	Approx. battery voltage

Glow Plug Continuity



1. Disconnect the leads from the glow plugs.
2. Measure the resistance with an ohmmeter between the glow plug terminal and chassis.
3. If 0 Ω is indicated, the screw at the tip of the glow plug and the housing are short-circuited.
4. If the factory specification is not indicated, the glow plug is faulty.

Glow plug resistance	Factory spec.	Approx. 0.9 Ω

8. CHECKING DISASSEMBLING AND SERVICING

(5) Safety Switches

Safety Switch Continuity

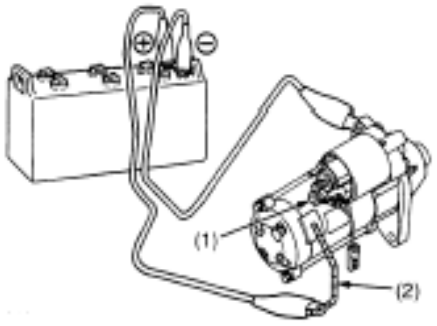
1. Disconnect the safety switch leads.
2. Connect the circuit tester to the safety switch leads.
3. Measure the resistance between leads.
4. If the safety switch is defective, replace it.

Safety Switch	State	Resistance	Remarks
Clutch pedal switch (1)	Clutch pedal depressed (pushed in)	0 Ω	
	Clutch pedal released	Infinity	
Rear PTO switch (2)	PTO gear shift lever in neutral (pushed in)	0 Ω	
	PTO gear shift lever engaged (1st or 2nd speed)	Infinity	
Mid PTO switch (3)	PTO gear shift lever in neutral or 1st speed	0 Ω	
	PTO gear shift lever in 2nd speed (mid PTO) (pushed in)	Infinity	
Neutral Switch(4)	Main speed change lever in neutral	0 Ω	
	Main speed change lever engaged (pushed in)	Infinity	
HST pedal switch (5)	HST pedal in neutral (pushed in)	0 Ω	
	HST pedal in forward or reverse	Infinity	
Seat switch (6)	Operator on the seat	0 Ω	
	Others	Infinity	

8. CHECKING DISASSEMBLING AND SERVICING

(6) Starter

Motor Test

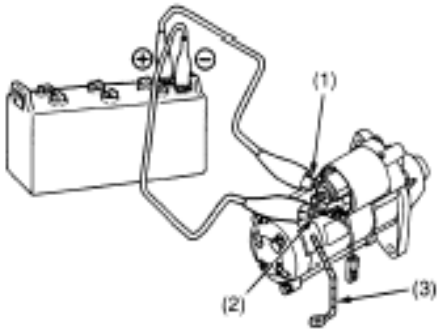


『**CAUTION**』

Secure the starter to prevent it from jumping up and down while testing the motor.

1. Disconnect the battery negative cable from the battery.
2. Disconnect the battery positive cable and the leads form the starter M terminal.
3. Remove the starter from the engine,.
4. Disconnect the connecting lead (2) from the starter C terminal (1).
5. Connect a jumper lead from the connecting lead (2) to the battery positive terminal post.
6. Connect a jumper lead momentarily between the starter motor housing and the battery negative terminal post.
7. If the motor does not run, check the motor.

Magnetic Switch Test



1. Disconnect the battery negative cable from the battery.
2. Disconnect the battery positive cable and the leads from the starter M terminal.
3. Remove the starter from the engine.
4. Disconnect the connecting lead (3) from the starter C terminal (2).
5. Connect a jumper lead from the starter S terminal (1) to the battery positive terminal post.
6. Connect a jumper lead momentarily between the starter C terminal (2) and the battery negative terminal post.
7. If the pinion gear does not pop out, check the magnetic switch.

Note

This test should be carried out for a short time, about 3 to 5 seconds.

(7) Start Glow Timer

Start Glow Timer

1. Check the "Engine Starting Conditions" and Automatic Engine Stop Conditions"
2. If the tractor does not operate appropriately, checkall parts according to the "1.TOUBLESHOOTING" section.
3. If all parts except the controller (1) is not defective, replace the controller (1).

8. CHECKING DISASSEMBLING AND SERVICING

(8) Combination Switch

Combination Switch

1. Remove the meter panel, and disconnect the combination switch connector.
2. Remove the combination switch (1) and perform the following checks 1) to 6).

1) Connector Voltage

1. Measure the voltage with a voltmeter across the connector B1 terminal and chassis when the main switch is "ON" position.
2. If the voltage differs from the battery voltage, the wiring harness and main switch is faulty.

Voltage	Main switch at "**ON**" position	B! terminal – Chassis	Battery voltage

2) Head Light Switch Continuity when Setting Switch at OFF Position

1. Set the light switch to the OFF position.
2. Measure the resistance with an ohmmeter across the B1 terminal to the T terminal, the B1 terminal to the terminal 1.
3. If infinity is not indicated, the head light switch is faulty.

Resistance (Switch at OFF position	B1 terminal – T terminal	Infinity
	B1 terminal – 1 terminal	

3) Head Light Switch Continuity when Setting Switch at On Position

1. Set the light switch to the ON position.
2. Measure the resistance with an ohmmeter across the B1 terminal to the T terminal and the B1 terminal to the terminal 1.
3. If 0 Ω is not indicated, the head light switch is faulty.

Resistance (Switch at ON position)	B1 terminal –T terminal	0 Ω
	B1 terminal –1 terminal	

8. CHECKING DISASSEMBLING AND SERVICING

4) Turn Signal Light Switch Continuity When Setting Switch Knob OFF Position

1. Set the hazard switch knob to the OFF position.
2. Measure the resistance with an ohmmeter across the B2 terminal and L terminal, and across B2 terminal and R terminal.
3. If infinity is not indicated, the combination switch is faulty.

Resistance (Switch knob at OFF position)	B2 terminal – L terminal	Infinity
	B2 terminal – R terminal	

5) Turn Signal Light Switch Continuity When Setting Switch Knob at 1 Position

1. Set the hazard switch knob to the 1 position.
2. Measure the resistance with an ohmmeter across the B2 terminal and R terminal.
3. If 0 Ω is not indicated, the combination switch is faulty.

Resistance (Switch knob at 1 position)	B2 terminal – R terminal	0 Ω
	B2 terminal – L terminal	Infinity

6) Turn Signal Light switch Continuity when Setting Switch Knob at Position

1. Set Measure the resistance with an ohmmeter across the B2 terminal and L terminal.
2. Measure the resistance with an ohmmeter across the B2 terminal and L terminal.
3. If 0 Ω is not indicated, the combination switch is faulty.

8. CHECKING DISASSEMBLING AND SERVICING

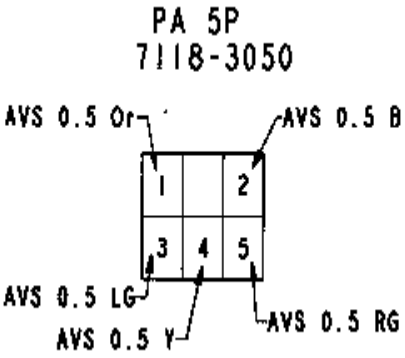
(9) Hazard Switch

Hazard Switch

1. Remove the meter panel and disconnecting the 4P connector from hazard switch after disconnect the battery negative code.
2. Remove the hazard switch.
3. Perform the following.

Connector Voltage

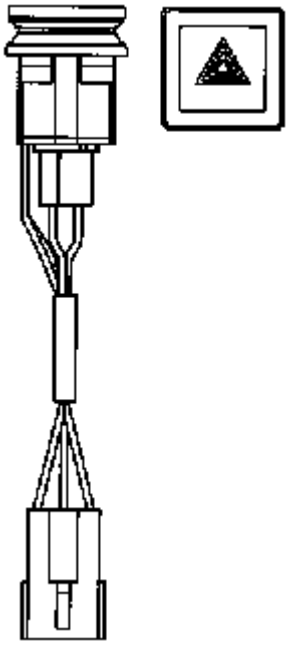
1. Connect the battery negative code, then measure the voltage with a voltmeter across the **a** terminal and chassis.
2. If the voltage differs from the battery voltage, the wiring harness is faulty.



Voltage	**a** terminal – Chassis	Approx. battery voltage

Hazard Switch Continuity

1. Measure the resistance with ohmmeter across the **a** terminal and **c** terminal, and across the **d** terminal and **e** terminal.
2. If the measurement is not as followed below, the hazard switch or the bulb is faulty.
   (1) Hazard Switch
   (2) Bulb



	Y	LG	Or	RG	B
FREE		○—○	○—○	○—○	
LOCK	○—		○—	○—	○

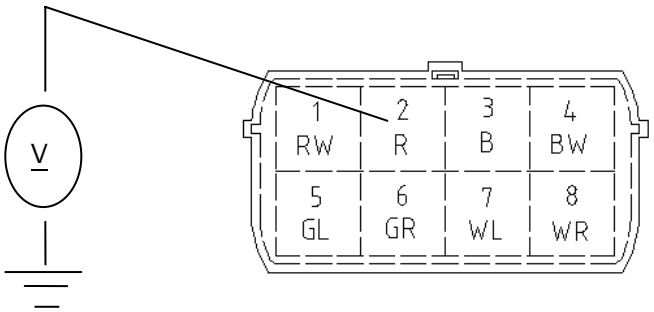
8. CHECKING DISASSEMBLING AND SERVICING

(10) Flasher Unit

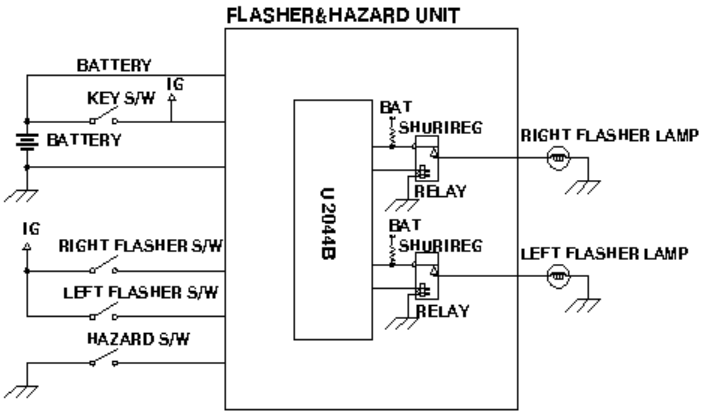
Flasher Unit connector Voltage

1. Remove the instrument panel.
2. Disconnect the connector (2) from the flasher unit (1).
3. Measure the voltage with a voltmeter across the **h** terminal and chassis.
4. If the voltage differ from the battery voltage, the wiring harness is faulty.

Voltage	**2** terminal – Chassis	Approx. battery voltage



Flasher Unit Actuation Test



1. Set the hazard switch to the ON position, and make sure the hazard light gives 60 to 85 flashes for a minute.
2. With the main switch and the hazard switch at the ON positions, respectively, move the turn signal switch to the left. Make sure that the right-hand light stays on and the left - hand light gives flashes earlier (by about 20 flashes) than when the hazard lamp is activated. Then move the turn signal switch to the right and make sure the corresponding actions take place.
3. Now set the main switch to the ON position and move the turn signal switch alone. Make sure the same action as above result.

8. CHECKING DISASSEMBLING AND SERVICING

(11) Instrument Pannel

Easy Checker

1. Remove the panel board and disconnect the connector from it.
2. Turn the main switch on.
3. Measure the voltage with a voltmeter across the terminal (Red/Yellow) and the earth terminal (Black).
4. If the voltage differs from the battery voltage, the wiring harness fuses and main switch should be checked.

Charging Circuit (Panel Board and Wiring Harness)

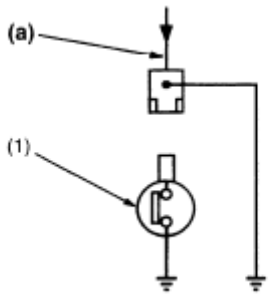
1. Remove the panel board from tractor.
2. Disconnect the 6P connector from the regulator after turning the main switch off.
3. Turn the main switch on and connect a jumper lead from the wiring harness connector terminal (Black) to the chassis.
4. If the charge lamp does not light, the panel board circuit, regulator, wiring harness, or fuse is fault.

(1)Regulator (a) From charge Lamp

Engine Oil Pressure Switch Panel Board and Wiring Harness

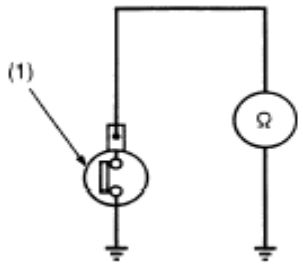
1. Disconnect the lead from the engine oil pressure switch after turning the main switch OFF.
2. Turn the main switch ON and connect a jumper lead from the lead to the chassis.
3. If the engine oil pressure indicator lamp does not light, the panel board circuit or the wiring harness is faulty.

(1) Engine Oil Pressure Switch (a) From Oil Pressure Lamp



8. CHECKING DISASSEMBLING AND SERVICING

Engine Oil Pressure Switch Continuity

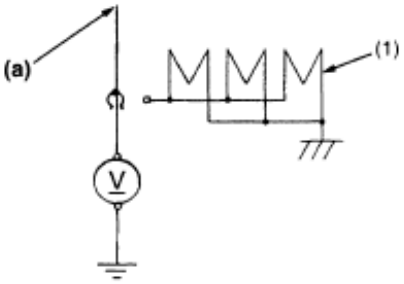


1. Measure the resistance with an ohmmeter across the switch terminal and the chassis.
2. If 0 Ω is not indicated in the normal state, the switch is faulty.
3. If infinity is not indicated at pressure over 4.9kPa (0.5kgf/cm^2, 7psi), the switch is faulty.

resistance (Switch	In normal state	0 Ω
	At pressure over approx. 4.9kPa (0.5kgf/cm^2, 7psi)	Infinity

(1) Engine Oil Pressure Switch

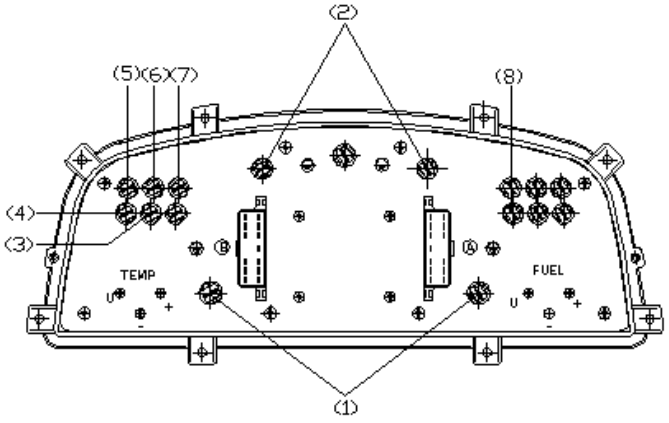
Glow Plug



1. Disconnect the lead from the glow plug.
2. Connect the tester positive cable to the glow plug lead and negative one to the chassis.
3. Measure its voltage with a voltmeter, after turning the main switch to the preheating or starting position.
4. If its voltage is not approximately the battery one, check the main switch or wiring harness.

(1) Glow Plug (a) From Main Switch 19 And Pre-heat Indicator Lamp

Monitor Lamp (for Charge, Engine Oil Pressure, Pre-heat, Illumination and Hazard)



1. After removing the panel board from tractor, remove the plate behind the panel.
2. Remove the each lamp.
3. Measure the lamp resistance.
4 If it is infinity, replace the lamp with new one.

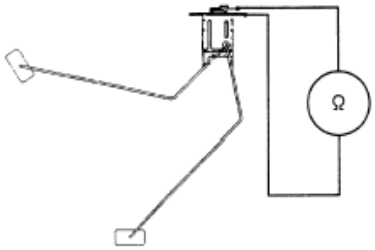
Lamp spec.	All lamp	12V, 1.4W

(1) Illumination (5) Head Light
(2) Hazard (6) Pre-heat
(3) Charge (7) Water-sep
(4) Engine oil Pressure (8) PTO

8. CHECKING DISASSEMBLING AND SERVICING

(12) Gauges

Fuel Level Sensor

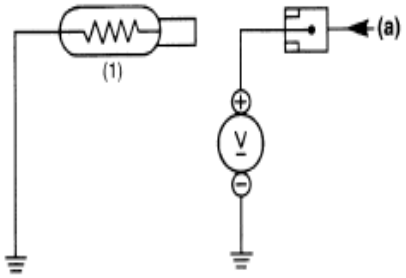


1) Sensor Continuity

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

Resistance (Sensor terminal	Reference value	Float at upper-most position	1 to 5 Ω
		Float at lower-most position	103 to 117 Ω

Coolant Temperature Sensor

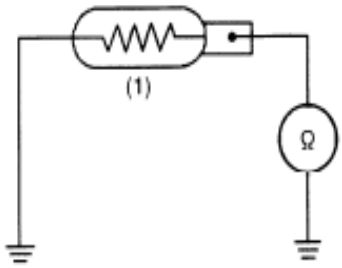


1) Lead Terminal Voltage

1. Disconnect the lead from the coolant temperature sensor after turning the main switch off.
2. Turn the main switch on and measure the voltage with a voltmeter across the lead terminal and the chassis. If the voltage differs from the battery voltage, the wiring harness fuse or coolant temperature gauge is faulty.

Voltage	Lead Terminal – Chassis	Approx. battery voltage

2) Sensor continuity



1. Measure the resistances with an ohmmeter across the sensor terminal and the chassis.
2. If the reference value is not indicated, the sensor is faulty.

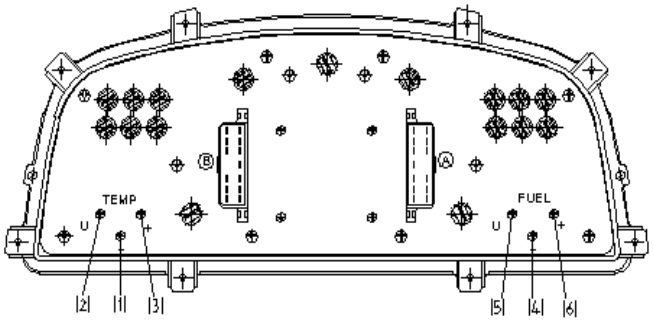
Resistance (sensor terminal–Chassis)	Reference value	Approx. 12.2Ω at 130℃(266℉) Approx. 23.6Ω at 105℃(221℉) Approx. 51.9Ω at 80℃(176℉) Approx. 153.9Ω at 50℃(266℉)

(1) Coolant Temperature (a) From Temperature Gauge

8. CHECKING DISASSEMBLING AND SERVICING

Fuel Gauge and Coolant Temperature Gauge Continuity

1. Remove the panel board from the tractor.
2. Check the continuity with an ohmmeter across the **U** terminal(2) and **+** terminal(3) and across the **U** terminal(2) and **-** terminal(1).
3. If infinity is indicated, the coolant temperature is faulty.



4. Check the continuity with an ohmmeter across the **U** terminal(5) and **+** terminal(6) and across the **U** terminal(5) and - terminal(4).
5. If infinity is indicated, the fuel gauge is faulty.

(1) **-** terminal(Temperature)
(2) **U** terminal(Temperature)
(3) **+** terminal(Temperature)
(4) **-** terminal(Fuel)
(5) **U** terminal(Fuel)
(6) **+** terminal(Fuel)