WSM

WORKSHOP MANUAL
TRACTOR

ME8200DTN
(SUPPLEMENT)

Kubota

KiSC issued 04, 2006 A

TO THE READER

Use this workshop manual together with workshop manual for ME8200 · ME9000.

In this manual, the main additional function and altered position of ME8200DTN tractor from ME8200 tractor is explained separately in two items, "Mechanism" and "Servicing" for each section.

As for the items which are not explained in this manual, refer to ME8200 · ME9000 workshop manual.

■ Mechanism

Information on the construction and function are included for ME8200DTN tractor. This part should be understood before proceeding with troubleshooting, disassembling and servicing.

■ Servicing

For ME8200DTN tractor, there are troubleshooting, servicing specification lists, checking and adjusting, disassembling and assembling, and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

The right is reserved to make changes in all information at any time without notice.

July 2003

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol" is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

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

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

CAUTION
- **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

IMPORTANT
- **Indicates that equipment or property damage could result if instructions are not followed.**

NOTE
- **Gives helpful information.**

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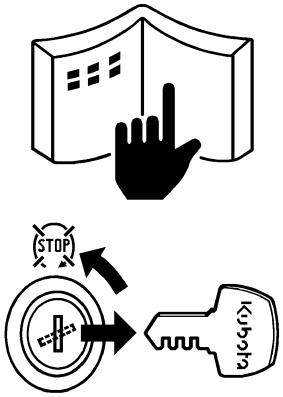

BEFORE SERVICING AND REPAIRING

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

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SAFETY STARTING

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

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SAFETY WORKING

- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
- Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.

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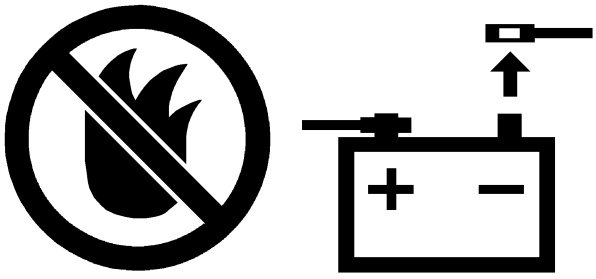

AVOID FIRES

- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.

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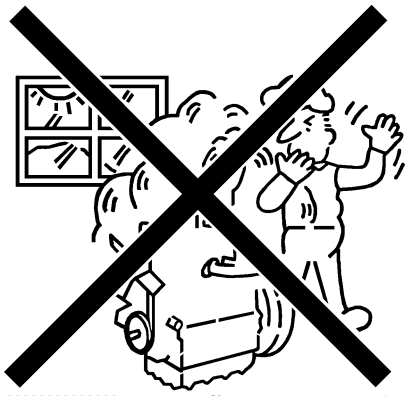

VENTILATE WORK AREA

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

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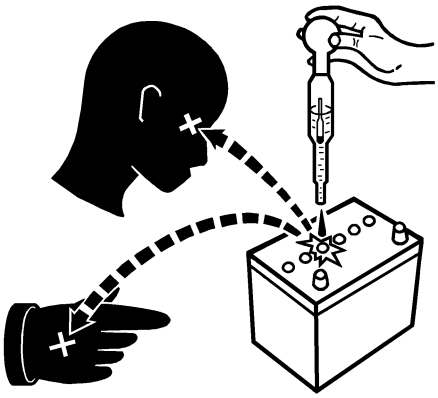

PREVENT ACID BURNS

- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.

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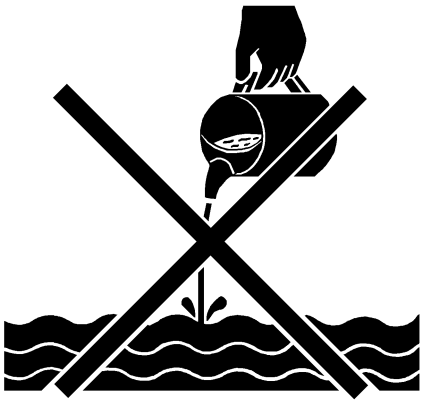

DISPOSE OF FLUIDS PROPERLY

- Do not pour fluids into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, electrolyte and other harmful waste.

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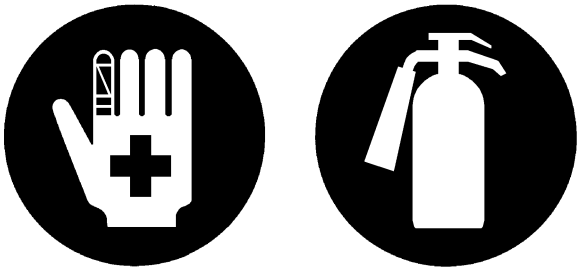

PREPARE FOR EMERGENCIES

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

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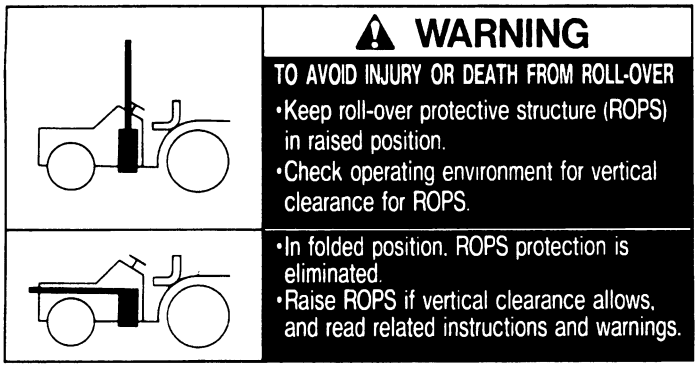
SAFETY DECALS

The following safety decals are installed on the machine.

If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.

(1) Part No. TA046-4932-1

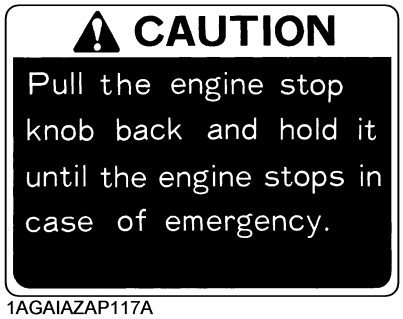


1AGAOAJAP062A

(2) Part No. 3F240-4905-2

1AGAOAJAP063A

(3) Part No. 35080-6528-2



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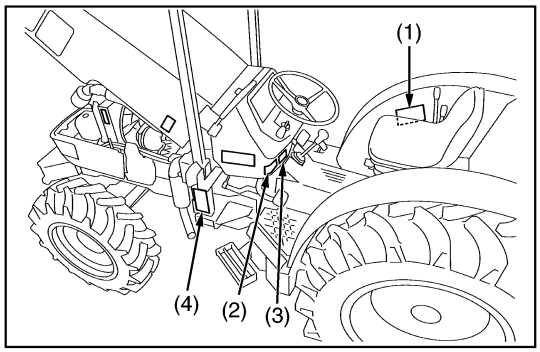

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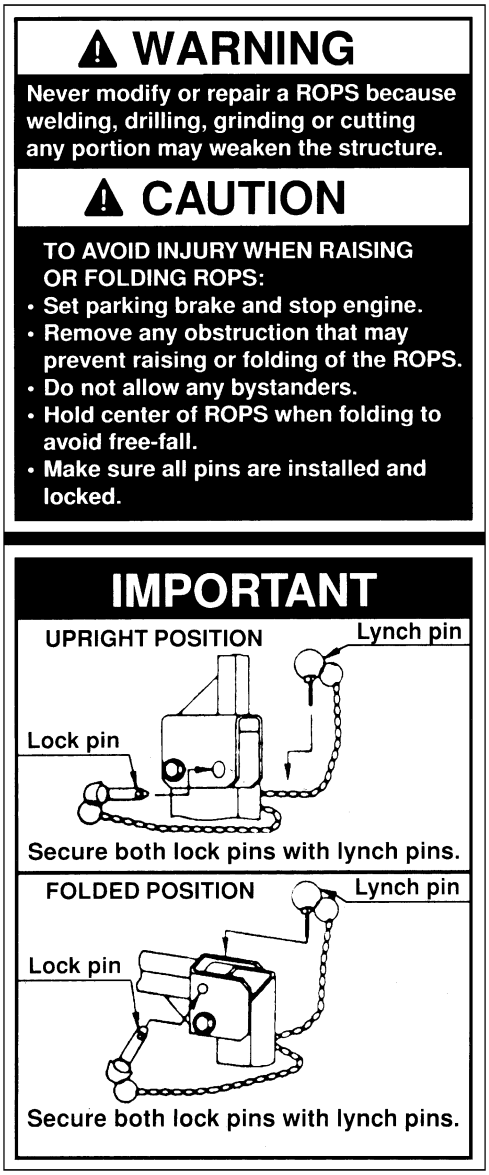
(4) Part No. 3A431-9849-2



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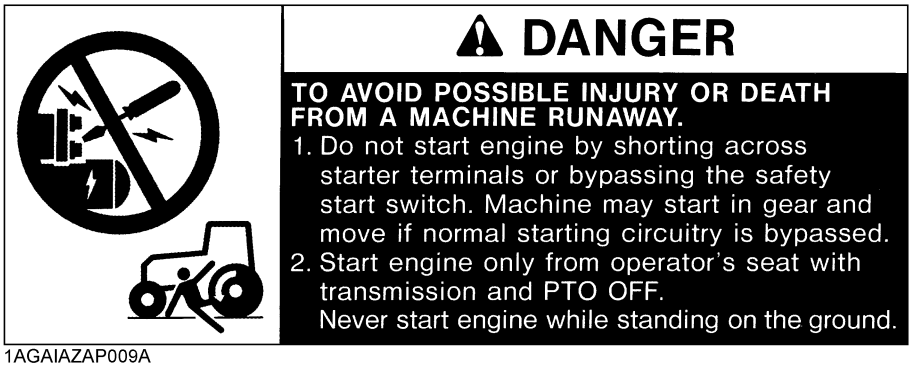
(1) Part No. TA040-4965-2



1AGAIAZAP009A

(2) Part No. 32751-4958-1
Stay clear of engine fan and fanbelt.

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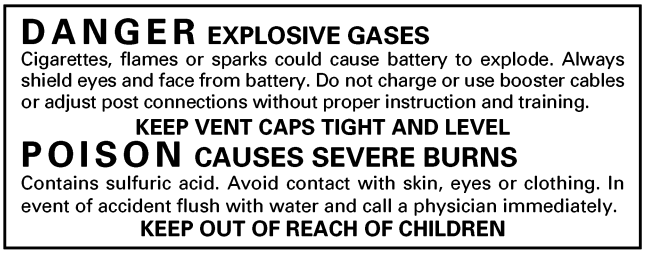
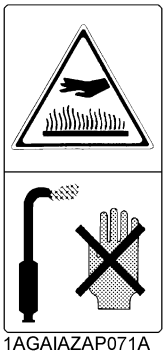
(3) Part No. 6C040-5559-1



1AGAIAZAP120A

(4) Part No. 32310-4958-1
Do not touch hot surface like muffler, etc.



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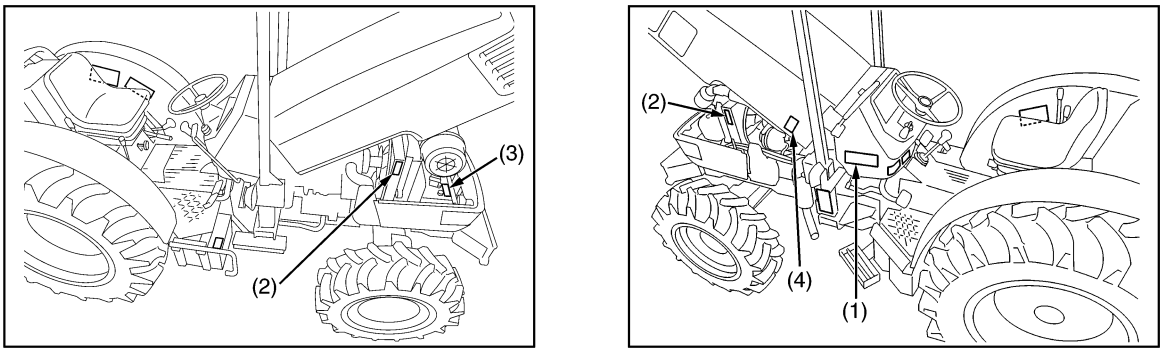

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(1) Part No. 35260-3491-4

⚠ CAUTION

TO AVOID PERSONAL INJURY:

1. Read and understand the operator's manual before operation.
2. Before starting the engine, make sure that everyone is at a safe distance from the tractor and that the PTO is OFF.
3. Do not allow passengers on the tractor at any time.
4. Before allowing other people to use the tractor, have them read the operator's manual.
5. Check the tightness of all nuts and bolts regularly.
6. Keep all shields in place and stay away from all moving parts.
7. Lock the two brake pedals together before driving on the road.
8. Slow down for turns, or rough roads, or when applying individual brakes.
9. On public roads use SMV emblem and hazard lights, if required by local traffic and safety regulations.
10. Pull only from the drawbar.
11. Before dismounting, lower the implement to the ground, set the parking brake, stop the engine and remove the key.
12. Securely support tractor and implements before working underneath.

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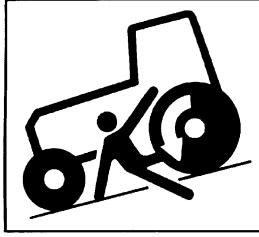
(2) Part No. 3A481-9890-1

⚠ WARNING



TO AVOID THE POSSIBILITY OF MACHINE RUNAWAY BEFORE DISMOUNTING TRACTOR:

1. ALWAYS SET PARKING BRAKE.
When engine is stopped, parking brake operates with rear wheels only regardless of front axle engagement.

2. PARK ON LEVEL GROUND WHENEVER POSSIBLE.
If parking on a slope, position tractor across the slope. If that is not possible, choke wheels securely.

3. LOWER ALL IMPLEMENTS TO THE GROUND.

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(3) Part No. 3A481-9852-1

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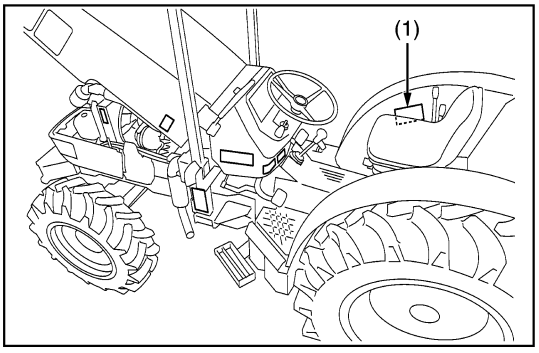

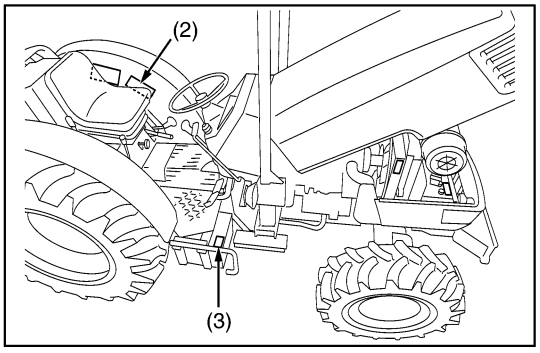

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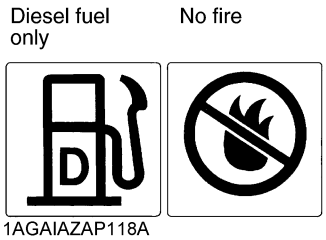
(1) Part No. 3A481-9853-1



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(2) Part No. TA040-4935-1

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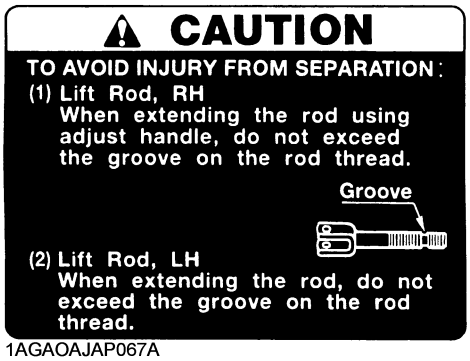
(3) Part No. 3A431-9827-2



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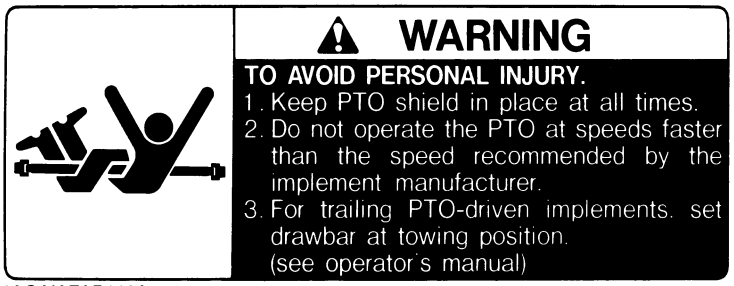
(4) Part No. TA040-4959-3



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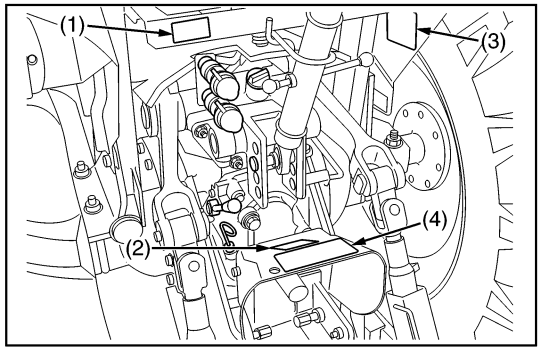

CARE OF DANGER, WARNING AND CAUTION LABELS

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your KUBOTA distributor.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

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SPECIFICATIONS

Model			ME8200DTN
Engine	Model		V3300-TE
	Type		Vertical, water-cooled, 4-cycle diesel engine
	No. of cylinder		4
	Total displacement		3318 cm^3 (202.5 cu.in.)
	Bore and stroke		98 x 110 mm (3.9 x 4.3 in.)
	Net power		61.2 kW (82 HP)*
	PTO power (factory observed)		54.5 kW (73 HP)* / 2600 min^{-1} (rpm)
	Maximum torque		285 N·m (29.1 kgf·m, 210.2 ft-lbs) / 1300 to 1500 min^{-1} (rpm)
	Battery		12 V, CCA : 799 A
	Fuel		Diesel fuel No.1[below -10 ℃ (14 ℉), Diesel fuel No.2-D [above -10 ℃(14 ℉)]
	Fuel tank		60 L (15.9 U.S.gals, 13.2 lmp.gals)
	Engine crankcase		10.7 L (11.3 U.S.qts, 9.4 lmp.qts)
	Engine coolant		9.0 L (9.5 U.S.qts, 7.9 lmp.qts)
Dimensions	Overall length		3590 mm (141.3 in.)
	Overall width (Minimum tread)		1430 mm (56.3 in.)
	Overall height		1510 mm (59.4 in.) (at rear ROPS)
	Wheel base		2000 mm (78.7 in.)
	Tread	Front	1120 to 1160 mm (44.1 to 45.7 in.)
		Rear	1465 mm (57.7 in.)
	Minimum ground clearance		375 mm (14.8 in.) (Parking Brake Shaft)
Weight			2135 kg (4708 lbs)
Traveling system	Standard tire size	Front	280 / 70R18
		Rear	380 / 70R28
	Clutch		Single dry plate
	Steering		Full hydraulic power steering
	Transmission		Fully synchronized main and shuttle transmission, 12F / 12R
	Brake	Travelling	Wet type multiple discs (mechanical)
		Parking	Connected with the travelling brake
	Differential		Bevel gears with differential lock (Rear)
Hydraulic system	Hydraulic control system		Position, draft and mix control
	Pump capacity		41.6 L/min. (44.0 U.S.gals/min., 36.6 lmp.gals/min.)
	Three point hitch		Category I (Category 2 Link End)
	Max. lifting force	At lifting point	1900 kg (4190 lbs) at lower link end with link horizontal
		24 in. behind lifting point	1500 kg (3308 lbs) at 610 mm (24 in.) behind lifting point
	System pressure		19.1 MPa (195 kgf/cm^2, 2773 psi)
PTO system	Independent clutch		Wet type, multiple discs
	Live PTO	Direction of turning	Clockwise, viewed from tractor rear
		PTO speed	540 min^{-1} (rpm) at 2160 engine min^{-1} (rpm), 540E min^{-1} (rpm) at 1828 engine min^{-1} (rpm)
Traction system			Fixed drawbar, adjustable back and forth

NOTE: *Manufacture's estimate. The company reserves the right to change the specifications without notice.

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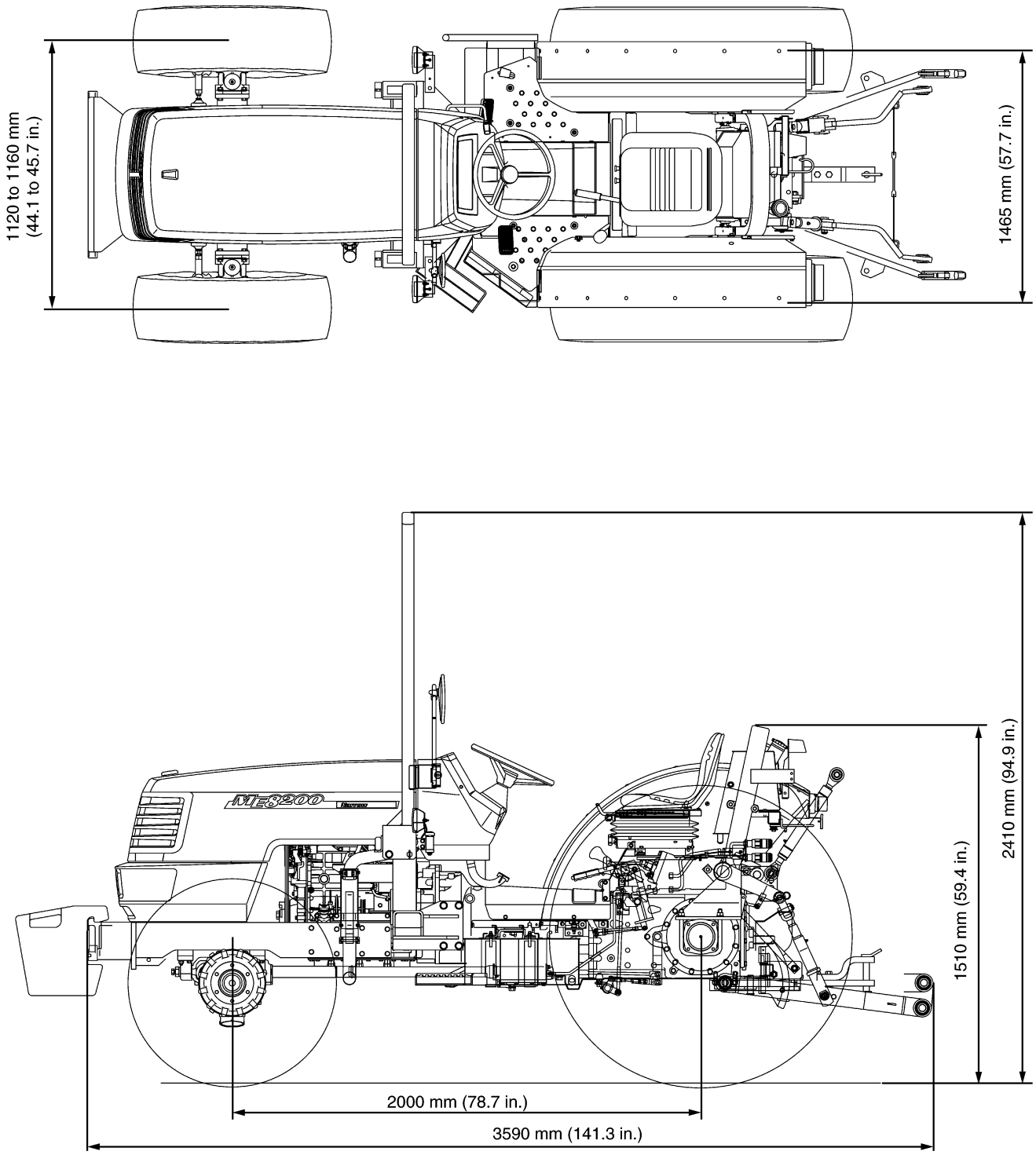
DIMENSIONS



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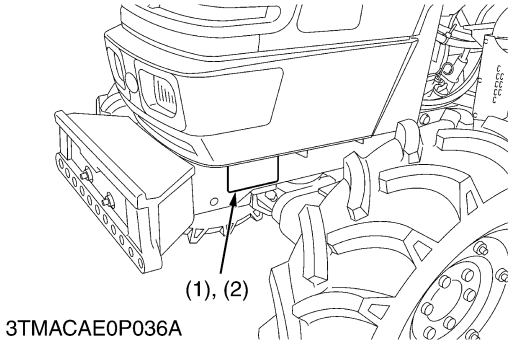
NG GENERAL

CONTENTS

1. TRACTOR IDENTIFICATION



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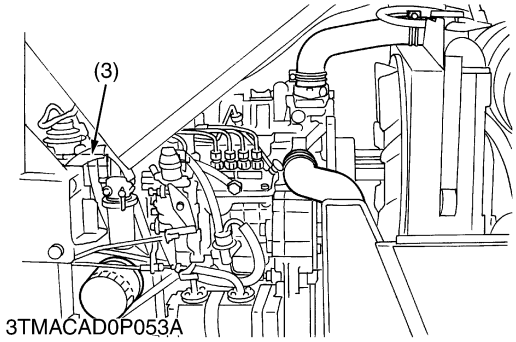

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When contacting your local KUBOTA distributor, always specify engine serial number, tractor serial number and hour meter reading.

(1) Tractor Identification Plate
(2) Tractor Serial Number
(3) Engine Serial Number

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2. LUBRICANTS, FUEL AND COOLANT

	Place		Capacity	Lubricants, fuel and coolant
1	Fuel tank		60 L 15.9 U.S.gals 13.2 lmp.gals	No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below -10 °C (14 °F)
2	Coolant	Engine block radiator	9.0 L 9.5 U.S.qts 7.9 lmp.qts	Fresh clean water with anti-freeze
		Reserve tank	1.0 L 1.1 U.S.qts 0.9 lmp.qts	
3	Engine crankcase		10.7 L 11.3 U.S.qts 9.4 lmp.qts	Engine oil: API service classification CD, CE or CF Below 0 °C (32 °F) : SAE10W, 10W-30 or 10W-40 0 to 25 °C (32 to 77 °F) : SAE20, 10W-30 or 10W-40 Above 25 °C (77 °F) : SAE30, 10W-30 or 10W-40
4	Transmission case		33 L 34.9 U.S.qts 29.0 lmp.qts	KUBOTA SUPER UDT fluid*
5	Front axle case oil		6.0 L 6.3 U.S.qts 5.3 lmp.qts	KUBOTA SUPER UDT fluid or SAE80, 90 gear oil

*KUBOTA original transmission hydraulic fluid.

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Greasing				
	Place	No. of greasing point	Capacity	Type of grease
6	Front wheel case support	2	Until grease overflow	Multipurpose type grease
	Front axle support	2		
	Top link	2		
	Top link bracket	2		
	Lift rod	2		
	Parking brake lever shaft	1		
	Battery terminal	2	Moderate amount	

■ **NOTE**

- **Engine Oil : Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperature as shown above.**
  Do not mix different brands together.
- **Transmission Oil : The oil used to lubricate the transmission is also used as hydraulic fluid. To insure proper operation of the hydraulic system and complete lubrication of the transmission, it is important that a multi-grade transmission fluid be used in this system. We recommend the use of KUBOTA SUPER UDT fluid for optimum protection and performance.**
  Do not mix different brands together.
- **Indicated capacity of water and oil are manufacture's estimate.**

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3. MAINTENANCE

No.	Item \ Period		Indication on hour meter										Important	Reference page
			50	100	150	200	250	300	350	400	450	500		
1	Engine oil	Change	★			☆				☆				G-15
2	Engine oil filter	Replace	★							☆				G-16
3	Transmission fluid	Change	★											NG-8
4	Clutch pedal	Adjust	★	☆		☆		☆		☆		☆		NG-8
5	Hydraulic oil filter	Replace	★					☆						NG-7
6	Front axle case oil	Change	★											NG-8
7	Water separator	Clean	★							☆				G-18
8	Engine start system	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆		NG-9
9	Wheel nut torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆		NG-9
10	Greasing	-		☆		☆		☆		☆		☆		NG-10
11	Battery condition	Check		☆		☆		☆		☆		☆		G-19
12	Air cleaner element (Double type) Primary element	Clean		☆		☆		☆		☆		☆	*1	G-20
		Replace											*2	G-29
	Secondary	Replace											*2	G-29
13	Fan belt	Adjust		☆		☆		☆		☆		☆		G-21
14	Brake pedal	Adjust		☆		☆		☆		☆		☆		NG-11
15	Fuel line	Check		☆		☆		☆		☆		☆		G-21
		Replace												G-32
16	Power steering oil line	Check				☆				☆				G-24
		Replace												G-32
17	Radiator hose and clamp	Check				☆				☆				G-24
		Replace												G-32
18	Toe-in	Adjust				☆				☆				G-25
19	Intake air line	Check				☆				☆				—
		Replace											*3	—
20	Fuel filter	Replace								☆				G-27
21	Front axle pivot	Adjust												G-28
22	Engine valve clearance	Adjust												1-S23
23	Fuel injection nozzle	Check												1-S71
24	Injection pump	Check												1-S70
25	Cooling system	Flush												G-31
26	Coolant	Change												G-30
27	Fuel system	Bleed	Service as required											G-33
28	Clutch housing water	Drain												NG-11
29	Fuse	Replace												NG-12
30	Light bulb	Replace												G-37

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No.	Item / Period			Indication on hour meter								After purchase		Important	Reference page
				550	600	650	700	750	800	1500	3000	1 year	2 years		
1	Engine oil		Change		☆				☆						G-15
2	Engine oil filter		Replace						☆						G-16
3	Transmission fluid		Change		☆										NG-8
4	Clutch pedal		Adjust		☆		☆		☆						NG-8
5	Hydraulic oil filter		Replace		☆										NG-7
6	Front axle case oil		Change		☆										NG-8
7	Water separator		Clean						☆						G-18
8	Engine start system		Check	☆	☆	☆	☆	☆	☆						NG-9
9	Wheel nut torque		Check	☆	☆	☆	☆	☆	☆						NG-9
10	Greasing		-		☆		☆		☆						NG-10
11	Battery condition		Check		☆		☆		☆						G-19
12	Air cleaner element (Double type)	Primary element	Clean		☆		☆		☆					*1	G-20
			Replace									☆		*2	G-29
		Secondary	Replace									☆			G-29
13	Fan belt		Adjust		☆		☆		☆						G-21
14	Brake pedal		Adjust		☆		☆		☆						NG-11
15	Fuel line		Check		☆		☆		☆						G-21
			Replace										☆		G-32
16	Power steering oil line		Check		☆				☆						G-24
			Replace										☆		G-32
17	Radiator hose and clamp		Check		☆				☆						G-24
			Replace										☆		G-32
18	Toe-in		Adjust		☆				☆						G-25
19	Intake air line		Check		☆				☆						—
			Replace										☆	*3	—
20	Fuel filter		Replace						☆						G-27
21	Front axle pivot		Adjust		☆										G-28
22	Engine valve clearance		Adjust						☆						1-S23
23	Fuel injection nozzle		Check							☆					1-S71
24	Injection pump		Check								☆				1-S70
25	Cooling system		Flush										☆		G-31
26	Coolant		Change										☆		G-30
27	Fuel system		Bleed	Service as required											G-33
28	Clutch housing water		Drain												NG-11
29	Fuse		Replace												NG-12
30	Light bulb		Replace												G-37

■ IMPORTANT

- **The jobs indicated by ★ must be done after the first 50 hours of operation.**
- ***1 : Air cleaner should be cleaned more often in dusty conditions than in normal conditions.**
- ***2 : Every year or every 6 times of cleaning.**
- ***3 :Replace only if necessary.**

0000003596E

4. CHECK AND MAINTENANCE

CAUTION

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

0000000633E

[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 leak.
3. Check the engine oil level.
4. Check the transmission fluid level.
5. Check the coolant level.
6. Check the water separator.
7. Check air cleaner evacuator valve (when used in a dusty place).
8. Check the condition of seat belt and ROPS attaching hardware.
9. Check and clean the radiator screen and grill.
10. Check the dust and chaff accumulated between the battery and radiator.
11. Check the nuts of tires are tight.
12. Check the number plate or SMV emblem for damage and replace as necessary if equipped.
13. Care of danger, warning and caution labels.
14. Clean around the exhaust manifold and the muffler of the engine.

- While sitting in the operator's seat.

1. Check the throttle pedal, brake pedal and clutch pedal.
2. Check the throttle lever and shuttle lever.
3. Check the parking brake.
4. Check the steering wheel.

- Turning the key switch.

1. Check the performance of the easy checker lights.
2. Check the head lights, turn signal lights, hazard lights and other light equipment. Clean if necessary.
3. Check the performance of the meters and gauges.
4. Check the amount of fuel by fuel gauge.

- 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.

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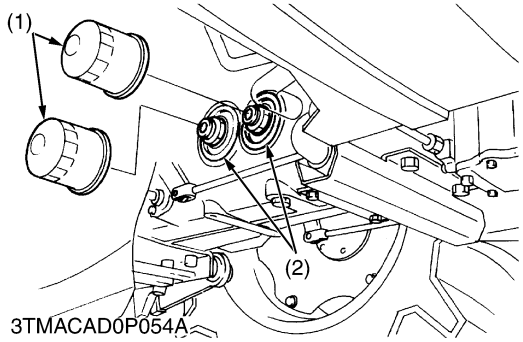
[2] CHECK POINTS OF INITIAL 50 HOURS



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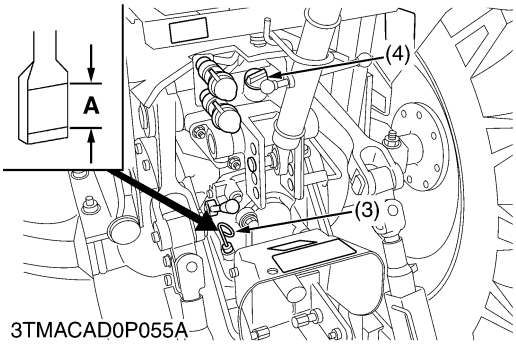

3TMACAD0P055A

Replacing Hydraulic Oil Filter

CAUTION

- **Allow engine to cool down sufficiently, oil can be hot and can burn.**

1. Remove the drain plug at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plug.
3. Remove the two oil filters (1).
4. Clean off metal fillings with clean rags at the magnetic filters (2).
5. Put a film of clean transmission fluid on rubber seal of new filters.
6. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand and additional 1/2 turn only.
7. After the new filter has been replaced, fill with the oil up to the upper notch on the dipstick (3).
8. After running the engine for a few minutes, stop it and check the oil level again, add oil to the prescribed level.
9. Make sure that the transmission fluid doesn't leak through the seal.

IMPORTANT

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

(1) Hydraulic Oil Filter
(2) Magnetic Filter (Clean off Metal Fillings)
(3) Dipstick
(4) Oil Filling Plug

A : Oil level is acceptable within this range.

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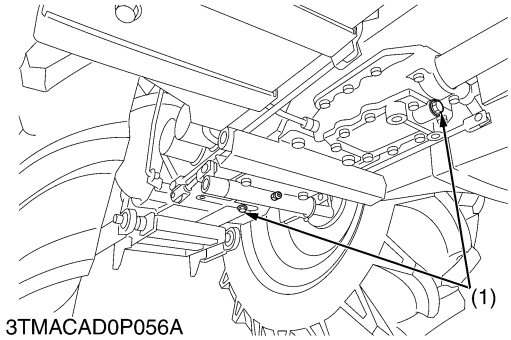

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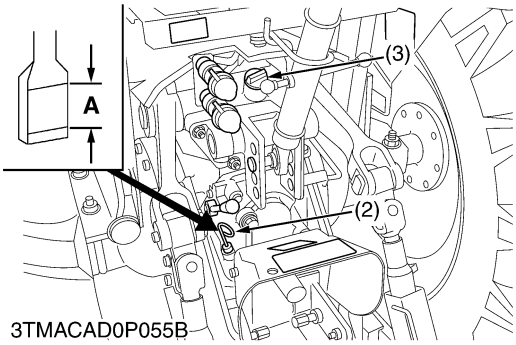

3TMACAD0P055B

Changing Transmission Fluid

CAUTION

- **Allow engine to cool down sufficiently, oil can be hot and can burn.**

1. To drain the used oil, remove the drain plug (1) at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plug.
3. Fill with the new KUBOTA SUPER UDT fluid up to the upper notch on the dipstick (2).
   Refer to **"LUBRICANTS, FUEL AND COOLANT"**. (See page NG-2.)
4. After running the engine for a few minutes, stop it and check the oil level again; add oil to prescribed level.

Transmission fluid	Capacity	33.0 L 34.9 U.S.qts 29.0 Imp.qts

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

A : Oil level is acceptable within the range.

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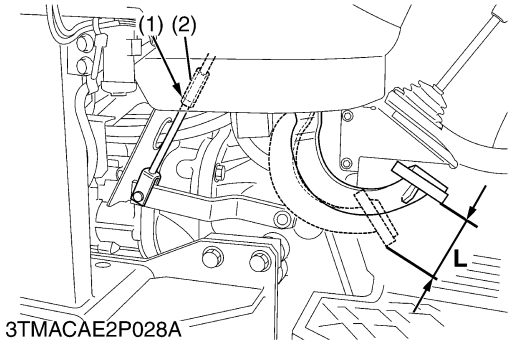

3TMACAE2P028A

Adjusting Clutch Pedal

1. Stop the engine and remove the key.
2. Slightly depress the clutch pedal and measure free travel (**L**) at top of pedal.
3. If adjustment is needed, loosen the lock nut (1), and turn the turnbuckle (2) to adjust the clutch rod length.
4. Retighten the lock nut (1).

Clutch pedal free travel (**L**) on the pedal	Factory spec.	35 to 45 mm 1.4 to 1.8 in.

(1) Lock Nut (2) Turnbuckle

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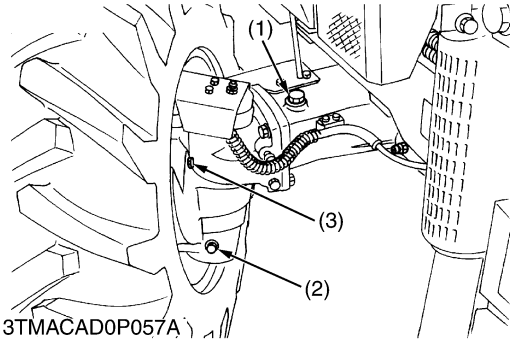


3TMACAD0P057A

Changing Front Axle Case Oil

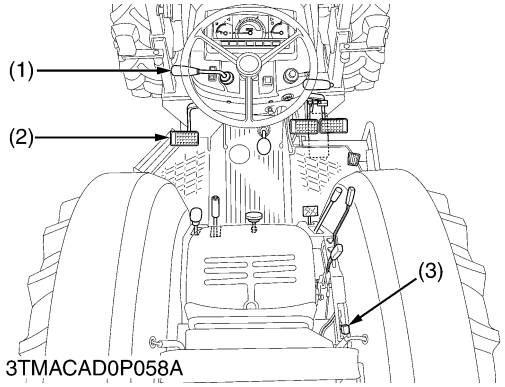
1. To drain the used oil, remove the right and left drain plugs (2) and filling plug (1) at the front axle gear case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plugs (2).
3. Remove the right and left breather plugs (3).
4. Fill with the new oil.
   Refer to **"LUBRICANTS, FUEL AND COOLANT"**. (See page NG-2.)
5. After filling reinstall the filling plug (1) and breather plugs (3).

Front Axle Case Oil	Capacity	6.0 L 6.3 U.S.qts 5.3 Imp.qts

(1) Filling Plug (2) Drain Plug
(3) Breather Plug

0000003600E

[3] CHECK POINTS OF EVERY 50 HOURS



3TMACAD0P058A

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. Place all shift lever and hydraulic levers in the **"NEUTRAL"**.
2. Set the parking brake and stop the engine.

■ **Test 1 : Switch for the shuttle shift lever.**

1. Sit on operator's seat.
2. Shift the shuttle shift lever to the forward or reverse position.
3. Depress the clutch pedal fully.
4. Disengage the PTO clutch control lever.
5. Pull out the engine emergency stop knob and turn the key to **"START"** position.
6. The engine must not crank.
7. If it cranks, inspect the safety switch.

■ **Test 2 : Switch for the PTO clutch control lever.**

1. Sit on operator's seat.
2. Engage the PTO clutch control lever.
3. Depress the clutch pedal fully.
4. Shift the shuttle shift lever to the neutral position.
5. Pull out the engine emergency stop knob and turn the key to **"START"** position.
6. The engine must not crank.
7. If it cranks, inspect the safety switch.

(1) Shuttle Shift Lever
(2) Clutch Pedal
(3) PTO Clutch Lever

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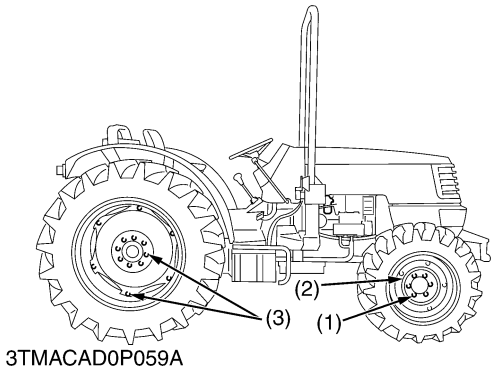


3TMACAD0P059A

Checking Wheel Mounting 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.**

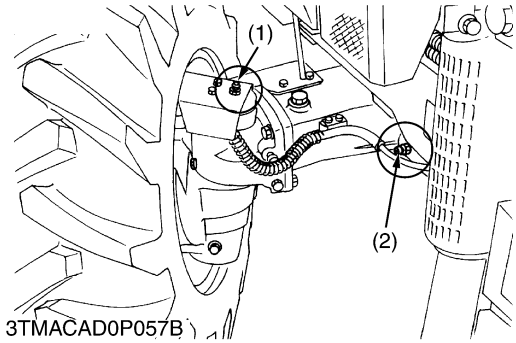
1. Check the wheel mounting nuts regularly especially when new. If there are loosened, tighten as follows.

Tightening torque	Front wheel mounting nut	166.7 to 196.1 N·m 17.0 to 20.0 kgf·m 122.9 to 144.6 ft-lbs
	Front disc mounting nut	260 to 304 N·m 26.5 to 31.0 kgf·m 192 to 224 ft-lbs
	Rear wheel mounting nut and rear disc mounting nut	260 to 304 N·m 26.5 to 31.0 kgf·m 192 to 224 ft-lbs

(1) Front Wheel Mounting Nut
(2) Front Disc Mounting Nut
(3) Rear Wheel Mounting Nut and Rear Disc Mounting Nut

0000003602E

[4] CHECK POINTS OF EVERY 100 HOURS



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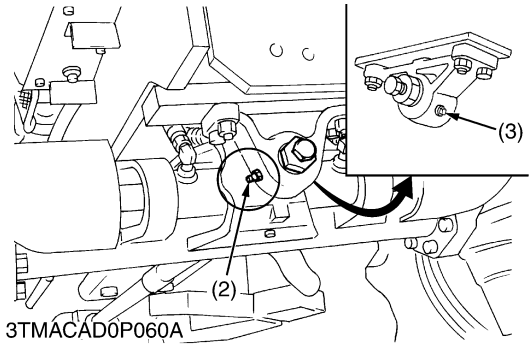

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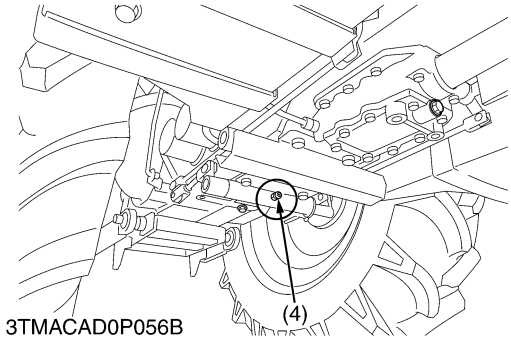

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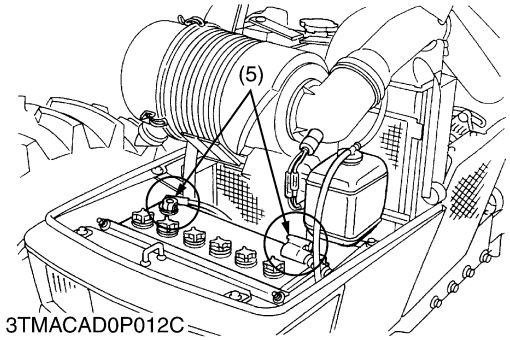

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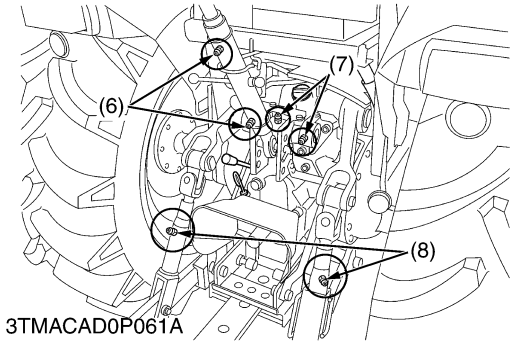

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Lubricating Grease Fittings

1. Apply a small amount of multipurpose grease to following points every 100 hours :
2. If you operated the machine in extremely wet and muddy condition, lubricate grease fittings more often.

(1) Grease Fitting (Front Wheel Case Support) (RH, LH)
(2) Grease Fitting (Front Axle Support)
(3) Breather Plug
(4) Grease Fitting (Parking Brake Lever Shaft)
(5) Battery Terminal
(6) Grease Fitting (Top Link)
(7) Grease Fitting (Top Link Bracket)
(8) Grease Fitting (Lifting Rod)

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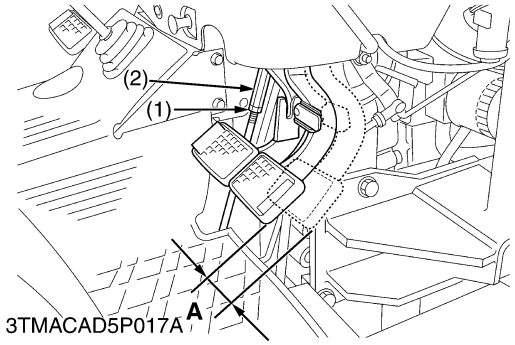

Checking Brake Pedal

CAUTION

- **Stop the engine and remove the key, then choke the wheel before checking brake pedal.**

1. Release the parking brake.
2. Slightly depress the brake pedals and measure free travel **(A)** at top of pedal stroke.
3. If the measurement is not within the factory specifications, loosen the lock nut (1) and turn the turnbuckle (2) to adjust the rod length within acceptable limits.

Brake pedal free travel **(A)**	Factory spec.	40 to 45 mm 1.6 to 1.8 in.

IMPORTANT

- **Keep the free travel in the right and left brake pedals equal.**

(1) Lock Nut (2) Turnbuckle

0000003604E

[5] CHECK POINTS OF EVERY 300 HOURS

Replacing Hydraulic Oil Filter

1. See page NG-7.

0000003605E

[6] CHECK POINTS OF EVERY 600 HOURS

Changing Transmission Fluid

1. See page NG-8.

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Changing Front Axle Case Oil

1. See page NG-8.

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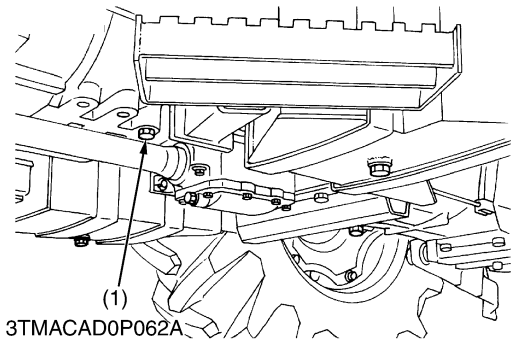
[7] OTHERS

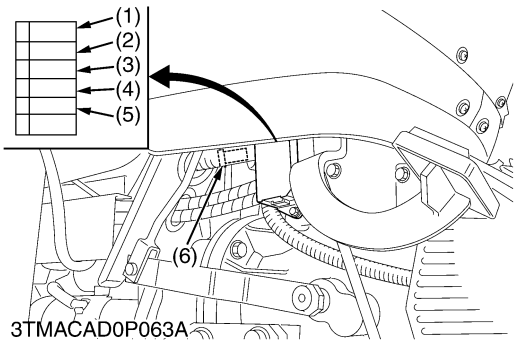


Draining Clutch Housing Water

1. The tractor is equipped with drain plug (1) under the clutch housing.
2. After operating in rain, snow or tractor has been washed, water may get into the clutch housing.
3. Remove the drain plug (1) and drain the water, then install the plug (1) again.

(1) Drain Plug (Water)

0000002309E



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. Refer to troubleshooting section of this manual for specific information dealing with electrical problems.**

Fuse No.	Capacity (A)	Protected circuit
1	20	Main key
2	15	Head light
3	15	Parking, Flasher (Hazard)
4	10	Work light
5	10	4WD / Bi-speed turn
6	50 Slow blow fuse	Check circuit against wrong battery connection.

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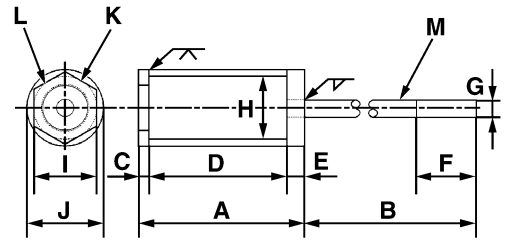
5. SPECIAL TOOLS

[1] SPECIAL TOOL FOR TRACTOR



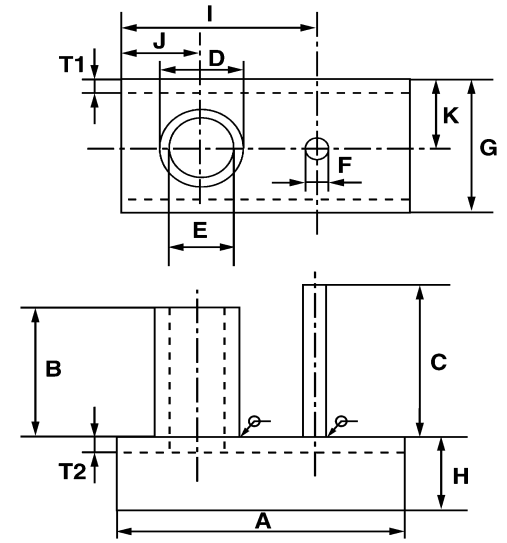
3TMABAB0P084A

Pinion Shaft Remover

Application :Use for removing a pinion shaft.

A	106 mm (4.17 in.)
B	350 mm (13.078 in.)
C	6 mm (0.24 in.)
D	90 mm (3.54 in.)
E	10 mm (0.39 in.)
F	40 mm (1.57 in.)
G	10 mm (0.39 in.)
H	35.6 mm (1.40 in.)
I	36 mm (1.42 in.)
J	41.6 mm (1.64 in.)
K	Part code No. 3A201-4130 nut
L	M27 x 1.5
M	M10 x 1.25

0000003112E



3TMACAB0P044A

Shuttle Case Assembling Stand

Application :Use for assembling the shuttle case.

A	300 mm (11.81 in.)
B	175 mm (6.89 in.)
C	195 mm (7.68 in.)
D	85 mm dia. (3.35 in. dia)
E	75 mm dia. (2.95 in. dia.)
F	21 mm dia. (0.83 in. dia.)
G	150 mm (5.91 in.)
H	75 mm (2.95 in.)
I	220 mm (8.665 in.)
J	80 mm (3.15 in.)
K	75 mm (2.95 in.)
T1	15 mm (0.59 in.)
T2	15 mm (0.59 in.)

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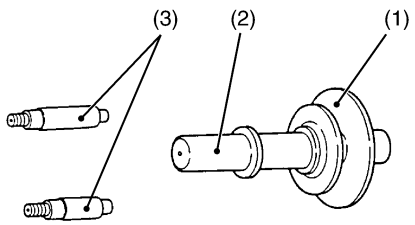


3TMACAB0P037A

Clutch Tool B

Code No : 07916-53041

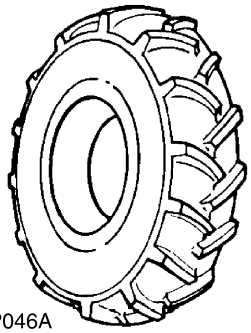
Application : Use for mounting the clutch to the flywheel.

(1) Gauge Ring
(2) Center Bar
(3) Centering Guide

0000003634E

6. TIRES

[1] TYPE OF TIRES



3TMACAB0P046A

The following tires can be mounted on models ME8200DTN.

■ IMPORTANT

- **Do not use tires larger than specified.**

Type of Tire	Front	Rear
Farm Tire	280 / 70R18	380 / 70R28
	280 / 70R18	360 / 70R28
	250 / 80 - 18	380 / 70R28
	250 / 80 - 16	380 / 70R24

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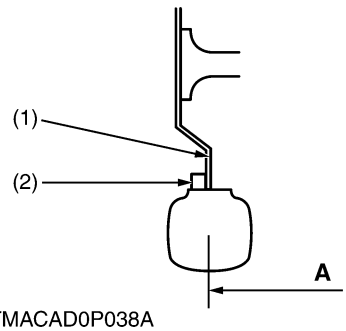
[2] TREAD ADJUSTMENT

(1) Front Wheel

Front tread width can not be adjusted.



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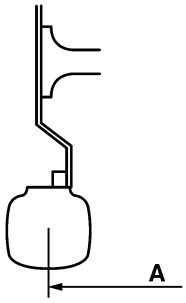

3TMACAD0P039A

250 / 80 - 16	—	1185 mm (46.65 in.)
280 / 70R18	1170 mm (46.06 in.)	—
250 / 80 - 18	1170 mm (46.06 in.)	—

(1) Front Wheel Disc (2) Front Wheel Rim **(A) Tread**

0000003611E

(2) Rear Wheels

Rear tread width can be adjusted as shown with the standard equipped tires.
To change the tread width

1. Remove the wheel rim and / or disk mounting bolts.
2. Change the position of the rim and / or disk (right and left) to the desired position, and tighten the bolts.

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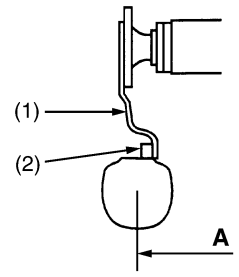
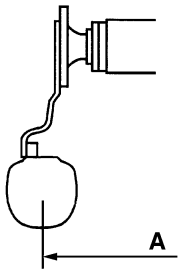
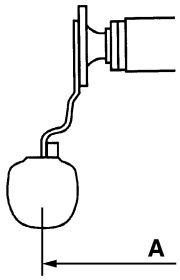
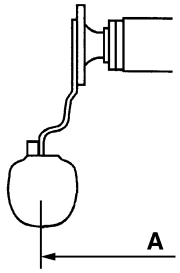
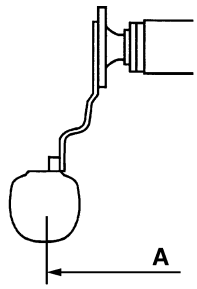
CAUTION

- **When working on slopes or working with trailer, set the wheel tread as wide as practical for the job for maximum stability.**

IMPORTANT

- **Always attach tires as shown in the drawings above.**
- **If not attached as illustrated, transmission parts may be damaged.**
- **Do not use tires larger than specified.**
- **When re-fitting or adjusting a wheel, tighten the nuts to the following torques then recheck after driving the tractor 200 m (200 yards) and thereafter daily check service.**

 3TMACAD0P064A		 3TMACAD0P042A	 3TMACAD0P044A	 3TMACAD0P043A	 3TMACAE0P030A
360 / 70R28	—	1150 mm (45.3 in.)	1265 mm (49.8 in.)	1355 mm (53.3 in.)	—
380 / 70R28	—	1150 mm (45.3 in.)	1265 mm (49.8 in.)	1355 mm (53.3 in.)	—
380 / 70R24	1050 mm (41.3 in.)	1155 mm (45.5 in.)	1265 mm (49.8 in.)	1345 mm (53.0 in.)	1450 mm (57.1 in.)

(1) Rear Wheel Disc (2) Rear Wheel Rim **(A) Tread**

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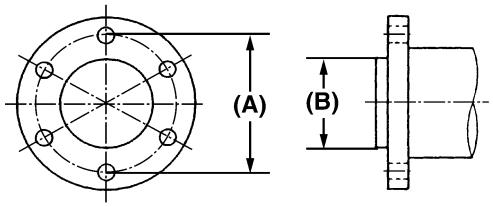
[3] WHEEL HUB



3TMABAB0P102A

	Front wheel hub	Rear wheel hub
Screw circle diameter **(A)**	152.4 mm (6 in.)	203.2 mm (8 in.)
Number of screws	6	8
Screws	M14 x P1.5	M16 x P1.5
Hub pilot diameter **(B)**	117.4 mm (4.62 in.)	152.4 mm (6 in.)

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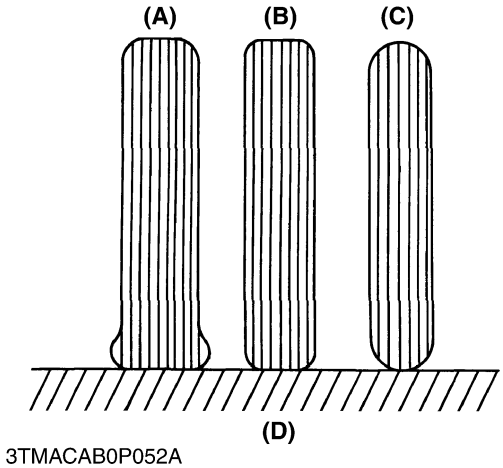
[4] TIRE PRESSURE



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Through the tire pressure is factory-set to the prescribed level, it naturally drops slowly in the course of time. Thus, check it every day and inflate as necessary.

To inflate the wheel tires, use an air compressor or hand pump.

■ **Recommended Inflation Pressure**

- Maintain the pressure shown below for normal use.

Combination		Tire sizes	Inflation pressure
1	Front	280 / 70 R18	160 kPa (1.6 kgf/cm^2)
	Rear	380 / 70 R28	120 kPa (1.2 kgf/cm^2)
2	Front	280 / 70 R18	160 kPa (1.6 kgf/cm^2)
	Rear	360 / 70 R28	140 kPa (1.4 kgf/cm^2)
3	Front	250 / 80 - 18	250 kPa (2.5 kgf/cm^2)
	Rear	380 / 70 R28	120 kPa (1.2 kgf/cm^2)
4	Front	250 / 8 - 16	250 kPa (2.5 kgf/cm^2)
	Rear	380 / 70 R24	120 kPa (1.2 kgf/cm^2)

■ **NOTE**

- **Maintain the maximum pressure in front tires, if using a front loader of when equipped with lots of front weight.**

(A) Insufficient **(C) Excessive**
(B) Standard **(D) Ground**

0000003614E

[5] TIRE LIQUID INJECTION

Injection

Weight of calcium chloride solution filling 75 % of full capacity of a tire.

Tire sizes	380 / 70R24	360 / 70R28	380 / 70RE28
Slush free at -24 ℃(-11 ℉) Solid at -46 ℃ (-51 ℉) [Approx. 1.6 kg (3.5 lbs) $CaCl_2$ per 4 L (1 gal) of water]	176 kg (388 lbs)	165 kg (364 lbs)	194 kg (428 lbs)

■ IMPORTANT

- **Do not fill the front tires with liquid.**

■ NOTE

- **Refer to ME8200, ME9000 Workshop Manual for liquid and injection method.**

0000003615E

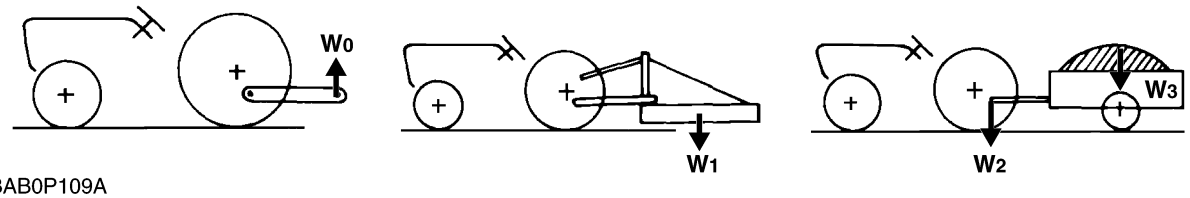
7. IMPLEMENT LIMITATIONS

The KUBOTA Tractor has been thoroughly tested for proper performance with implements sold or approved by KUBOTA. Use with implements which are not sold or approved by KUBOTA and which exceed the maximum specifications listed below, or which are otherwise unfit for use with the KUBOTA Tractor may result in malfunctions or failures of the tractor, damage to other property and injury to the operator or others. [Any malfunctions or failures of the tractor resulting from use with improper implements are not covered by the warranty.]

Tread (max. width)		Lower link end max. loading weight W0
Front	Rear	
1110 mm (43.7 in.)	1440 mm (56.7 in.)	1900 kg (4190 lbs)

Actual figures			
Implement weight W1 and / or size	Max. Hitch Load W2	Trailer loading weight W3 Max. capacity	
As in the following list (Shown on the next page)	800 kg (1764 lbs)	2500 kg (5513 lbs) without trailer brake	5000 kg (11025 lbs) with trailer brake

Lower link end max. loading weight.....W0
Implement weight.....The implement's weight which can be put on the lower link : W1
Max. drawbar load.....W2
Trailer loading weight.....The max. loading weight for trailer (without trailer's weight) : W3



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■ **NOTE**
- **Implement size may vary depending on soil operating conditions.**

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No.	Implement		Remarks		Limitation
1	Trailer		Max. Load Capacity		5000 kg (11025 lbs)
			Max. Drawbar Load		800 kg (1764 lbs)
2	Mower	Rotary-Cutter	Max. Cutting Width		2130 mm (84 in.)
			Max. Weight		540 kg (1190 lbs)
		Flail Mower (Heavy)	Max. Cutting Width		3050 mm (81 in.)
			Max. Weight		800 kg (1760 lbs)
		Sickle Bar	Max. Cutting Width		2130 mm (84 in.)
3	Sprayer		Max. Tank-capacity	Mid	680 L (200 U.S.gals 170 Imp.gals)
				Rear 3P	680 L (200 U.S.gals 170 Imp.gals)
				Drawbar	4000 L (1200 U.S.gals 990 Imp.gals)
4	Rotary Tiller		Max. Tilling Width		2130 mm (84 in.)
			Max. Weight		800 kg (1760 lbs)
5	Bottom Plow		Max. Size		14 in. x 3 16 in. x 2 18 in. x 1
			Max. Weight		450 kg (1000 lbs)
6	Disc-harrow	3P Type	Max. Size		18 in. x 24
			Max. Harrowing Width		2130 mm (84 in.)
			Max. Weight		450 kg (1000 lbs)
		Drawbar Type	Max. Harrowing Width		2750 mm (108 in.)
7	Disc Plow		Max. Size		24 in. x 3, 26 in. x 2
			Max. Weight		450 kg (1000 lbs)
8	Sub Soiler		Numbers of Cultivating Tines		2
			Cultivating Depth		400 mm (16 in.)
9	Cultivator		Max. Width		3660 mm (144 in.)
			Number of Rows		4
			Max. Weight		450 kg (1000 lbs)

■ NOTE

- **Implement size may very depending on soil operating conditions.**
  *** Must remove front weight with this implement.**

0000003617E

N1 ENGINE

CONTENTS

1. TIGHTENING TORQUES

Tightening torques of screws and nuts on the table below are especially specified.
(For general use screws and nuts : See page G-10.)

Item	N·m	kgf·m	ft-lbs
ROPS frame	196.1 to 225.6	20.0 to 23.0	144.7 to 166.4
Foldable ROPS	29.4 to 49.0	3.0 to 5.0	21.7 to 36.2
Power steering hoses retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Front axle support mounting screw	167 to 196	17.0 to 20.0	123 to 144
Starter's terminal **B** mounting nut	8.8 to 11.8	0.9 to 1.2	6.5 to 8.7
Bonnet support mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Support frame mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Engine and clutch housing mounting screw, nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5

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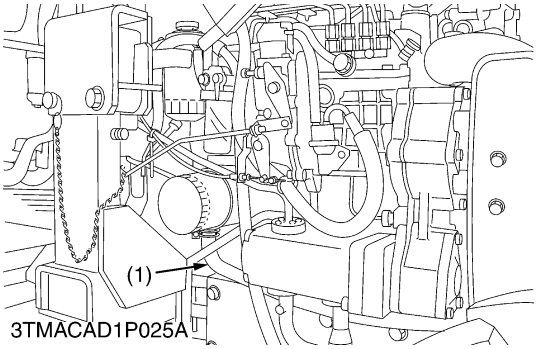
2. CHECKING, DISASSEMBLING AND ASSEMBLING

[1] SEPARATING ENGINE FROM TRACTOR



Draining Coolant

CAUTION

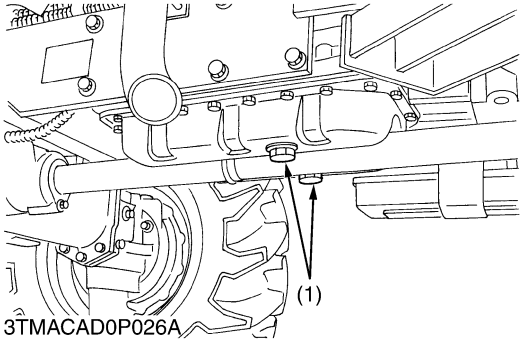
- **Never remove the radiator cap until coolant temperature is well below its boiling point. Then loosen cap slightly to the stop to relieve any excess pressure before removing cap completely.**

1. Stop the engine and let cool down.
2. Remove the radiator hose (1) from the engine side to drain the coolant.
3. Remove the radiator cap to completely drain the coolant.
4. After all coolant is drained, reinstall the radiator hose.

Coolant	Capacity	9.0 L 9.5 U.S.qts 7.9 Imp.qts

(1) Radiator Hose

0000002033E



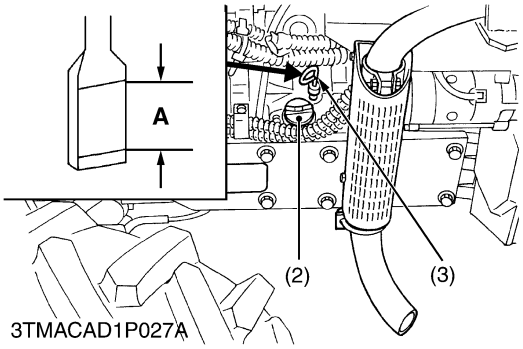
Draining Engine Oil

1. Start and warm up the engine for approx. 5 minutes.
2. Place an oil pan underneath the engine.
3. Remove the drain plugs (1) to drain oil.
4. After draining, screw in the drain plugs (1).

(When reassembling)

- Fill the engine oil up to the upper line on the dipstick (3).

Engine Oil	Capacity	10.7 L 11.3 U.S.qts 9.4 Imp.qts



IMPORTANT

- **Never mix two different type of oil.**
- **Use the proper SAE Engine Oil according to ambient temperature.**
  Refer to "LUBRICANTS, FUEL AND COOLANT". (See page NG-2.)

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

(A) Oil level is acceptable within this range.

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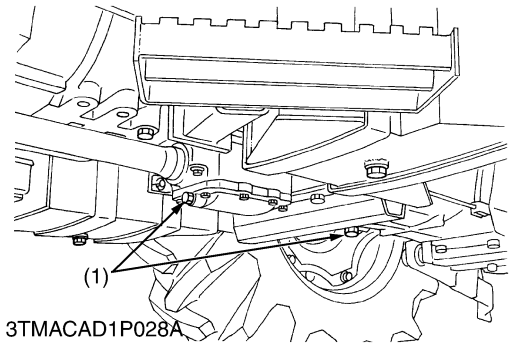


Draining Transmission Fluid

1. Place oil pans underneath the transmission case.
2. Remove the drain plugs (1).
3. Drain the transmission fluid.
4. Reinstall the drain plugs (1).

(When reassembling)

- Fill up from filling port after removing the filling plug until reaching the dipstick.
- After running the engine for few minutes, stop it and check the fluid level again, add the fluid to prescribed level if it is not correct level.

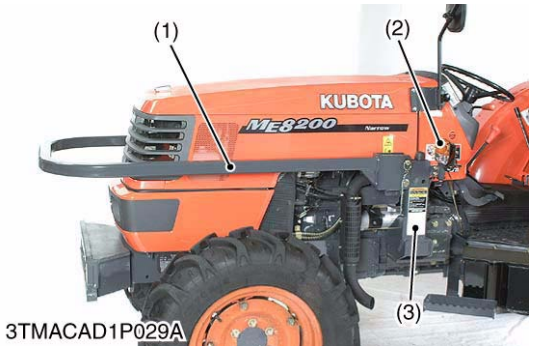
Transmission fluid	Capacity	33.0 L 34.88 U.S.qts 29.04 Imp.qts

■ IMPORTANT

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system.**
- **Refer to "LUBRICANTS, FUEL AND COOLANT" (See page NG-2.)**
- **Do not mix different brands fluid together.**

(1) Drain Plug

0000003403E



Foldable ROPS

1. Disconnect the **2P** connector from the front combination lamp (2).
2. Remove the foldable ROPS (1).
3. Remove the ROPS frame right and left (3).

(When reassembling)

Tightening torque	ROPS frame (L and R)	193.1 to 225.6 N·m 20.0 to 23.0 kgf·m 144.7 to 166.4 ft-lbs
	Foldable ROPS	29.4 to 49.0 N·m 3.0 to 5.0 kgf·m 21.7 to 36.7 ft-lbs

(1) Foldable ROPS
(2) Front Combination Lamp
(3) ROPS Frame

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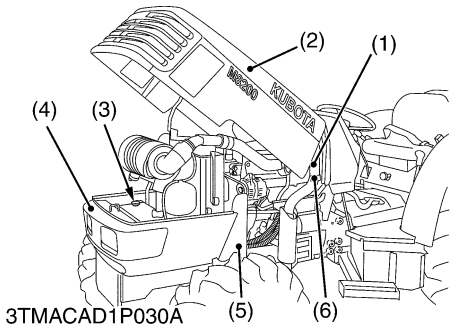

Bonnet and Covers

1. Remove the exhaust pipe (1).
2. Remove the bonnet (2).
3. Disconnect the battery's cable.
4. Disconnect the head light **3P** connectors.
5. Remove the front lower cover (4) and side cover (5).
6. Remove the bonnet stay (6).

(1) Exhaust Pipe
(2) Bonnet
(3) Battery
(4) Front Lower Cover
(5) Side Cover
(6) Bonnet Stay

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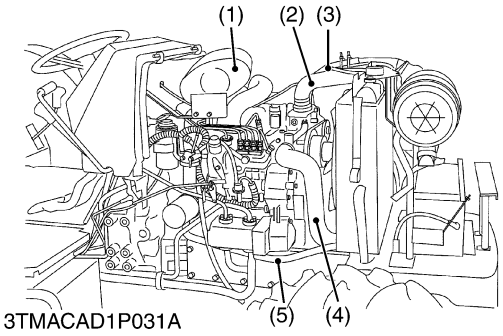

3TMACAD1P031A

Radiator Hoses and Air Cleaner Hoses

1. Disconnect the radiator hoses (2) and (4) from engine side.
2. Disconnect the air cleaner hose (3) from the intake manifold.
3. Disconnect the radiator hose (5).
4. Remove the delivery pipe clamp.
5. Remove the muffler (1).

(1) Muffler
(2) Radiator Hose
(3) Air Cleaner Hose
(4) Radiator Hose
(5) Radiator Hose

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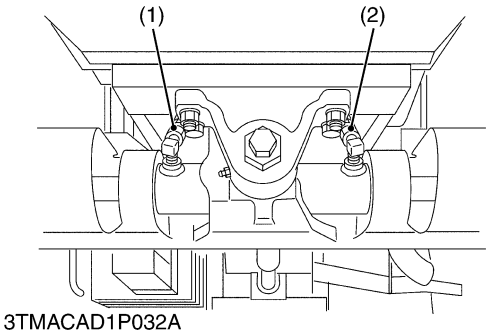


3TMACAD1P032A

Power Steering Hoses

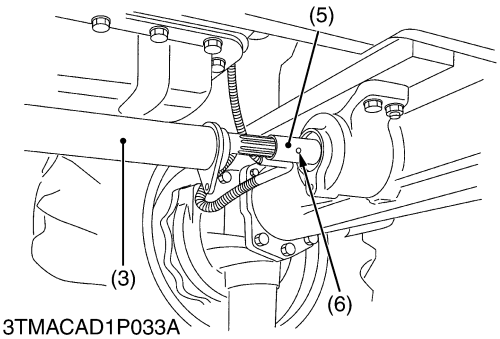
1. Disconnect the power steering hoses (1), (2).

(When reassembling)

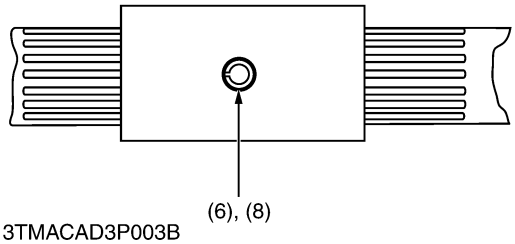
Tightening torque	Power steering hose retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 ft-lbs

(1) Power Steering Hose
(2) Power Steering Hose

0000003407E



3TMACAD1P033A



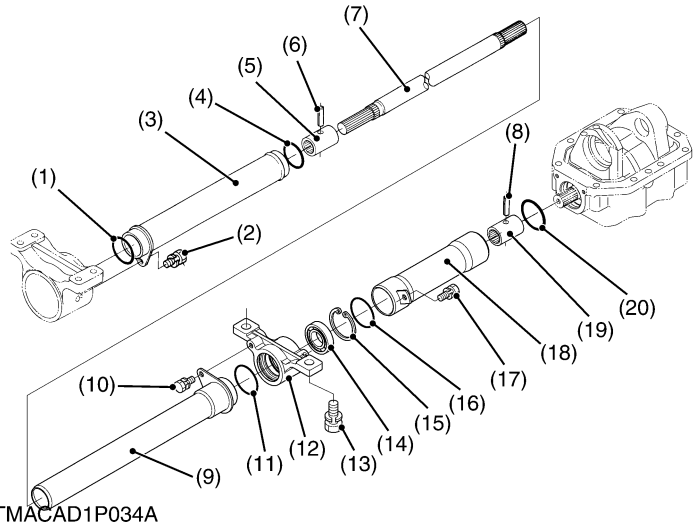
3TMACAD3P003B

Propeller Shaft

1. Slide the propeller shaft covers (3), (18) after removing the screw (2), (13).
2. Tap out the spring pins (6), (8) and then slide the couplings (5), (19) to the front and rear to take out the propeller shaft (7).

(When reassembling)

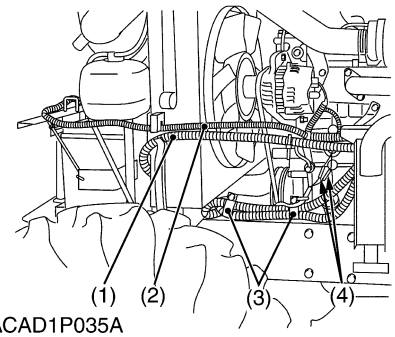
- Apply grease to the O-rings, propeller shaft and pinion shaft.
- Tap in the spring pins (6), (8) as shown in figure.



3TMACAD1P034A

(1)	O-ring	(11)	O-ring
(2)	Screw	(12)	Cover Bracket
(3)	Front Shaft Cover	(13)	Screw
(4)	O-ring	(14)	Bearing
(5)	Coupling	(15)	Internal Snap Ring
(6)	Spring Pin	(16)	O-ring
(7)	Propeller Shaft	(17)	Screw
(8)	Spring Pin	(18)	Rear Shaft Cover
(9)	Middle Shaft Cover	(19)	Coupling
(10)	Screw	(20)	O-ring

0000003408E



3TMACAD1P035A

Wiring Harness L.H.

1. Disconnect the battery positive cable (1).
2. Disconnect the head light cable (2) and 4WD / Bi-speed turn connectors (4).
3. Remove the hose clamps (3).

(1)	Battery Positive Cable	(3)	Hose Clamp
(2)	Head Light Cable	(4)	4WD / Bi-speed Turn Connector

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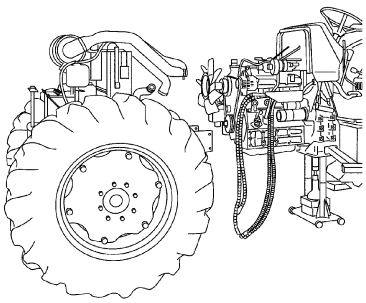

3TMACAB1P010A

Front Axle Support as a Unit

1. Check the front axle and clutch housing case are securely mounted on the disassembling stands.
2. Separate the front axle support as a unit after removing the front axle support mounting screws.

(When reassembling)

Tightening torque	Front axle support mounting screw (M14, UBS)	167 to 196 N·m 17.0 to 20.0 kgf·m 123 to 144 ft-lbs

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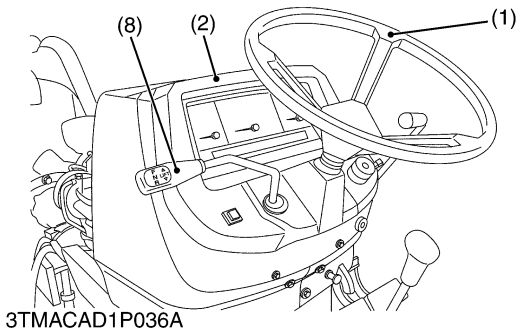
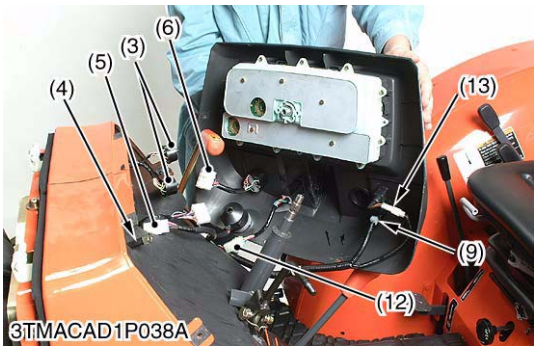


3TMACAD1P036A

Steering Wheel, Meter Panel and Rear Bonnet

1. Remove the steering wheel (1) with a steering wheel puller (Code No. 07916-51090).
2. Remove the shuttle lever grip (8).
3. Remove the meter panel mounting screws and open the meter panel (2).
4. Disconnect the two connectors (3) and meter cable (4).
5. Disconnect the main switch connector (5) and combination switch connector (6).
6. Disconnect the hazard switch connector (9), 4WD / Bi-speed switch connector (12) and 4WD indicator connector (13).
7. Disconnect the engine stop cable (7) at the engine side.
8. Remove the rear bonnet (10) and lower cover (11).



3TMACAD1P038A

(1) Steering Wheel
(2) Meter Panel
(3) Connector
(4) Meter Cable
(5) Main Switch Connector
(6) Combination Switch Connector
(7) Engine Stop Cable
(8) Shuttle Lever Grip
(9) Hazard Switch Connector
(10) Rear Bonnet
(11) Lower Cover
(12) 4WD / Bi-speed Switch Connector
(13) 4WD Indicator Connector

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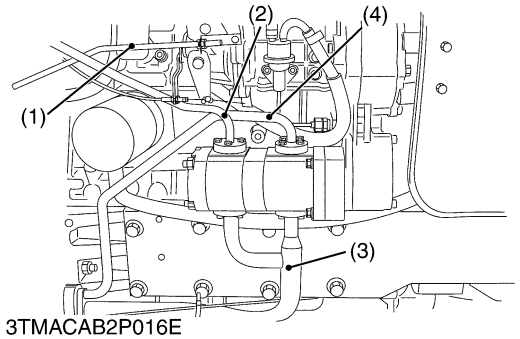
3TMACAD1P039A

Piping for 3-Point Hydraulic System

1. Remove the accelerator rod (1).
2. Remove the suction pipe (3).
3. Remove the delivery pipe (4) for 3-point hydraulic system.
4. Remove the delivery pipe (2) for power steering.



3TMACAB2P016E

(1) Accelerator Rod
(2) Delivery Pipe
(3) Suction Pipe
(4) Delivery Pipe

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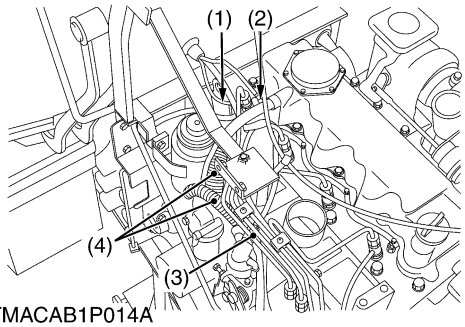

3TMACAB1P014A

Wiring Harness R.H. and Fuel Pipes

1. Disconnect the **3P** connector for solenoid valve (3).
2. Disconnect the wiring lead (2) from the glow plug.
3. Disconnect the coolant thermo sensor **1P** connector (1).
4. Remove the fuel pipes (4).

(1) Coolant Thermo Sensor **1P** Connector
(2) Wiring Lead for Glow Plug
(3) **3P** Connector for Solenoid Valve
(4) Fuel Pipe

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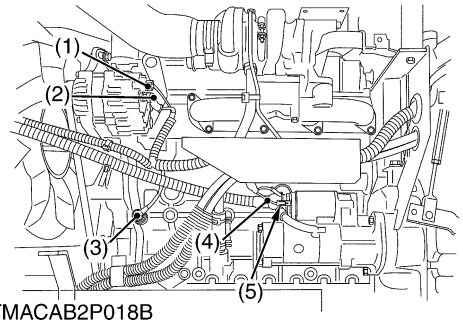

3TMACAB2P018B

Wiring Harness L.H.

1. Disconnect the alternator **2P** connector (1) and **B** terminal (2).
2. Disconnect the starter motor **C** terminal (5) and **B** terminal (4).
3. Disconnect the engine oil pressure switch terminal (3).

Tightening torque	Starter's terminal **B** mounting nut	8.8 to 11.8 N·m 0.9 to 1.2 kgf·m 6.5 to 8.7 ft-lbs

(1) Alternator **2P** Connector
(2) Alternator **B** Terminal
(3) Engine Oil Pressure Switch Terminal
(4) Starter Motor **B** Terminal
(5) Starter Motor **C** Terminal

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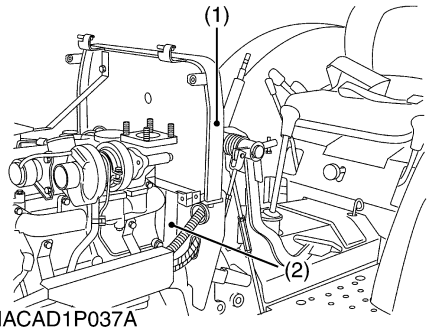

3TMACAD1P037A

Bonnet Support

1. Remove the bonnet support (1).
2. Remove the support frame (2).

(When reassembling)

Tightening torque	Bonnet support mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs
	Support frame mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1) Bonnet Support
(2) Support Frame

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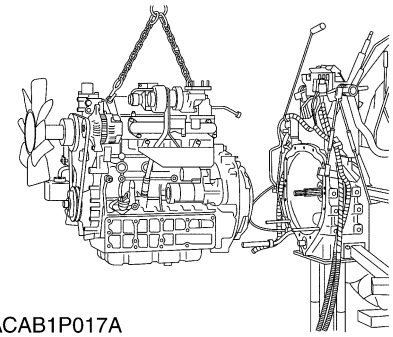
3TMACAB1P017A

Separating Engine from Clutch Housing

1. Hoist the engine by the hoist and chain.
2. Remove the engine mounting screws and nuts, and separate the engine from the clutch housing.

(When reassembling)

- Apply molybdenum disulphide (Three Bond 1901 or equivalent) to the splines of clutch disc boss.
- Apply liquid gasket (Three Bond 1141, 1211 or equivalent) to joint face of the engine and clutch housing.

Tightening torque	Engine and clutch housing mounting screw, nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

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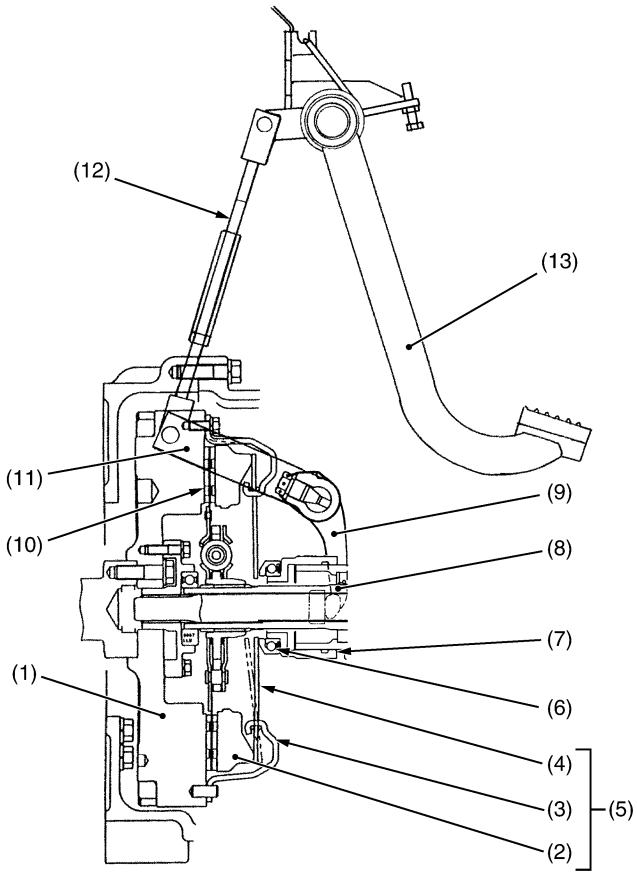
N2 CLUTCH

CONTENTS

1. TRAVELLING CLUTCH



3TMACAA2P001A

This tractor is provided with dry type single plate clutch for travelling system.

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

0000003420E

CONTENTS

1. TROUBLESHOOTING

TRAVELLING CLUTCH

Symptom	Probable Cause	Solution	Reference Page
Clutch Drags	● Clutch pedal free travel excessive	Adjust	N2-S4
	● Dust on clutch disc generated from clutch disc facing	Remove rust	—
	● Release fork broken	Replace	N2-S9
	● Clutch disc or pressure plate warped	Replace	N2-S11
	● Wire ring of the pressure plate worn or broken	Replace (Pressure plate assembly)	N2-S11
Clutch Slips	● Clutch pedal free travel too small	Adjust	N2-S4
	● Clutch disc excessively worn	Replace	N2-S10
	● Grease or oil on clutch disc facing	Replace	N2-S10
	● Clutch disc or pressure plate warped	Replace	N2-S11
	● Diaphragm spring weaken or broken	Replace	N2-S11
	● Wire ring of the pressure plate worn or broken	Replace (Pressure plate assembly)	N2-S11
Chattering	● Grease or oil on clutch disc facing	Replace	N2-S10
	● Clutch disc or pressure plate warped	Replace	N2-S11
	● Clutch disc boss spline worn or rusted	Replace or remove rust	N2-S10
	● Pressure plate or flywheel face cracked or scored	Replace	N2-S11
	● Clutch disc boss spline and gear shaft spline worn	Replace	N2-S10
	● Diaphragm spring strength uneven or diaphragm spring broken	Replace	N2-S11
Rattle During Running	● Clutch disc boss spline worn	Replace	N2-S10
	● Release bearing worn or sticking	Replace	N2-S10
Clutch Squeaks	● Release bearing sticking or dry	Replace or lubricate	N2-S10
	● Clutch disc excessively worn	Replace	N2-S10
Vibration	● Clutch disc rivet worn or broken	Replace	N2-S10
	● Clutch parts broken	Replace	—

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2. SERVICING SPECIFICATIONS

TRAVELLING CLUTCH

Item		Factory Specification	Allowable Limit
Clutch Pedal	Free Travel	35 to 45 mm 1.4 to 1.8 in.	—
Clutch Pedal Stopper Bolt	Height	18 to 20 mm 0.70 to 0.79 in.	—
Clutch Pedal Shaft to Clutch Pedal Bushing	Clearance	0.025 to 0.185 mm 0.00098 to 0.00728 in.	1.00 mm 0.0394 in.
	Clutch Pedal Shaft (O.D.)	27.900 to 27.975 mm 1.09842 to 1.10138 in.	—
	Clutch Pedal Bushing (I.D.)	28.000 to 28.085 mm 1.10236 to 1.10571 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.
Diaphragm Spring	Mutual Difference	—	0.5 mm 0.020 in.

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3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See page G-10.)

Item	N·m	kgf·m	ft-lbs
ROPS frame (L and R)	196.1 to 225.6	20.0 to 23.0	144.7 to 166.4
Foldable ROPS	29.4 to 49.0	3.0 to 5.0	21.7 to 36.2
Power steering hose retaining nut	24.5 to 29.4	2.5 to 3.0	18.7 to 21.7
Starter's terminal B mounting nut	8.8 to 11.8	0.9 to 1.2	6.5 to 8.7
Bonnet support mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Support frame mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Engine and clutch housing mounting screw, nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Engine and clutch housing mounting stud bolt	38.2 to 45.1	3.9 to 4.6	28.2 to 33.3
Clutch mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Release fork setting screw	166.7 to 186.3	17.0 to 19.0	123.0 to 137.4

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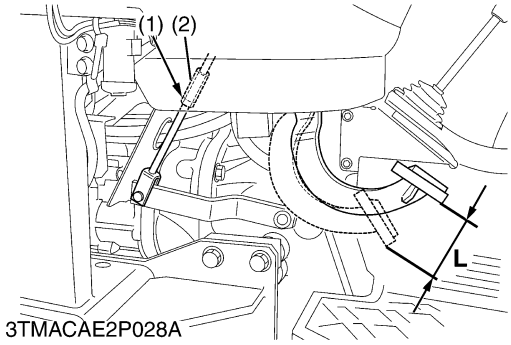
4. CHECKING, DISASSEMBLING AND SERVICING

[1] TRAVELLING CLUTCH

(1) Checking and Adjusting



3TMACAE2P028A

Clutch Pedal Free Travel

1. Stop the engine and remove the key.
2. Slightly depress the clutch pedal and measure free travel (**L**) at the top of pedal stroke.
3. If adjustment is needed, loosen the lock nut (1), and turn the turnbuckle (2) to adjust the clutch rod length.
4. Retighten the lock nut (1).

Clutch pedal free travel (**L**) on the pedal	Factory spec.	35 to 45 mm 1.4 to 1.8 in.

(1) Lock Nut (2) Turnbuckle

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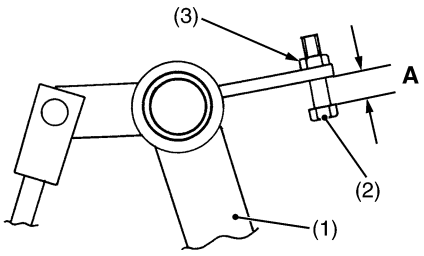

3TMACAB2P013B

Clutch Pedal Stopper Bolt

1. Measure the height (**A**) of stopper bolt (2).
2. If the measurement is not within the factory specifications, adjust it.
3. After adjustment, tighten the lock nut (3) firmly.

Height (**A**) of clutch pedal stopper bolt	Factory spec.	18 to 20 mm 0.70 to 0.79 in.

(1) Clutch Pedal (3) Lock Nut
(2) Stopper Bolt

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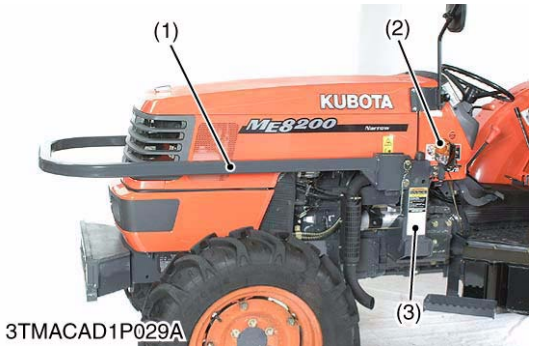
(2) Disassembling and Assembling

(A) Separating Engine from Clutch Housing Case



3TMACAD1P029A

Foldable ROPS

1. Disconnect the **2P** connector from the front combination lamp (2).
2. Remove the foldable ROPS (1).
3. Remove the ROPS frame right and left (3).

(When reassembling)

Tightening torque	ROPS frame (L and R)	193.1 to 225.6 N·m 20.0 to 23.0 kgf·m 144.7 to 166.4 ft-lbs
	Foldable ROPS	29.4 to 49.0 N·m 3.0 to 5.0 kgf·m 21.7 to 36.7 ft-lbs

(1) Foldable ROPS (3) ROPS Frame
(2) Front Combination Lamp

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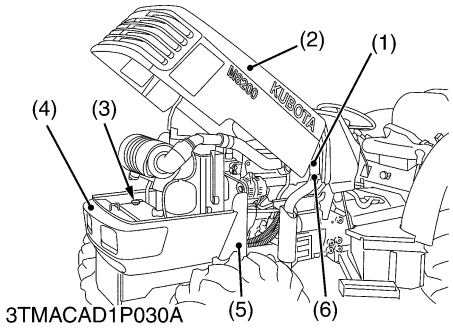


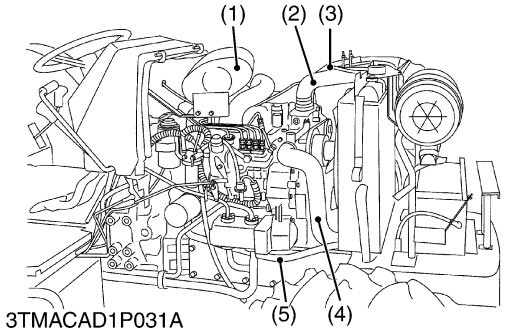
3TMACAD1P030A

Bonnet and Covers

1. Remove the exhaust pipe (1).
2. Remove the bonnet (2).
3. Disconnect the battery's cable.
4. Disconnect the head light **3P** connectors.
5. Remove the front lower cover (4) and side cover (5).
6. Remove the bonnet stay (6).

(1) Exhaust Pipe
(2) Bonnet
(3) Battery
(4) Front Lower Cover
(5) Side Cover
(6) Bonnet Stay

0000003405E



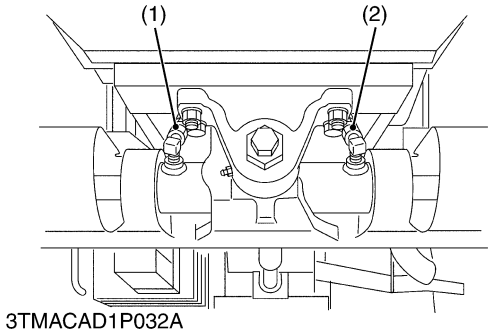
3TMACAD1P031A

Radiator Hoses and Air Cleaner Hoses

1. Disconnect the radiator hoses (2) and (4) from engine side.
2. Disconnect the air cleaner hose (3) from the intake manifold.
3. Disconnect the radiator hose (5).
4. Remove the delivery pipe clamp.
5. Remove the muffler (1).

(1) Muffler
(2) Radiator Hose
(3) Air Cleaner Hose
(4) Radiator Hose
(5) Radiator Hose

0000003406E



3TMACAD1P032A

Power Steering Hoses

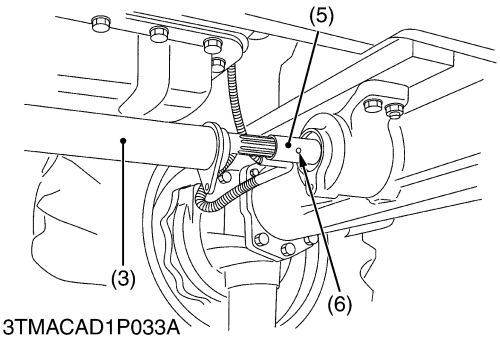
1. Disconnect the power steering hoses (1), (2).

(When reassembling)

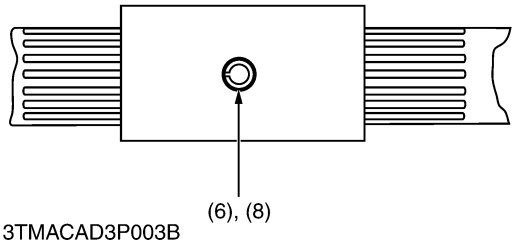
Tightening torque	Power steering hose retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 ft-lbs

(1) Power Steering Hose
(2) Power Steering Hose

0000003407E



3TMACAD1P033A



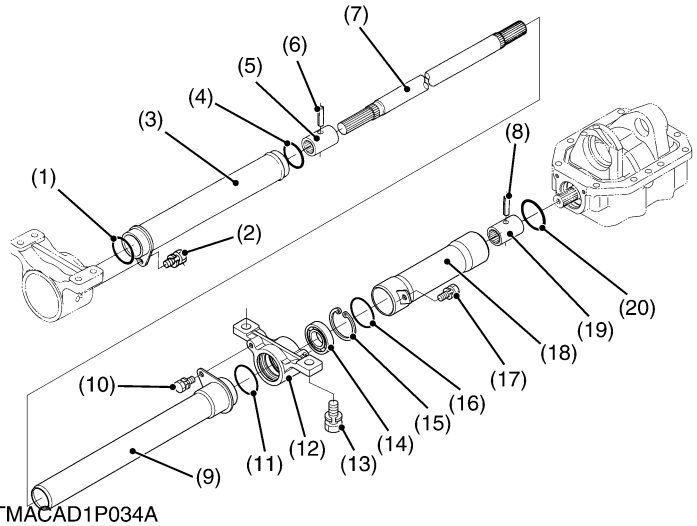
3TMACAD3P003B

Propeller Shaft

1. Slide the propeller shaft covers (3), (18) after removing the screw (2), (13).
2. Tap out the spring pins (6), (8) and then slide the couplings (5), (19) to the front and rear to take out the propeller shaft (7).

(When reassembling)

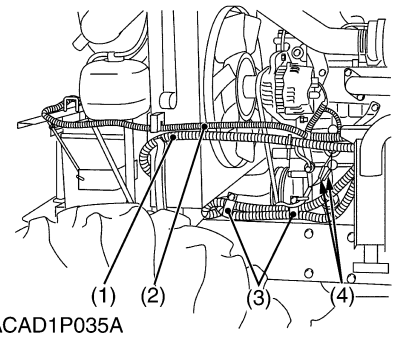
- Apply grease to the O-rings, propeller shaft and pinion shaft.
- Tap in the spring pins (6), (8) as shown in figure.



3TMACAD1P034A

(1)	O-ring	(11)	O-ring
(2)	Screw	(12)	Cover Bracket
(3)	Front Shaft Cover	(13)	Screw
(4)	O-ring	(14)	Bearing
(5)	Coupling	(15)	Internal Snap Ring
(6)	Spring Pin	(16)	O-ring
(7)	Propeller Shaft	(17)	Screw
(8)	Spring Pin	(18)	Rear Shaft Cover
(9)	Middle Shaft Cover	(19)	Coupling
(10)	Screw	(20)	O-ring

0000003408E



3TMACAD1P035A

Wiring Harness L.H.

1. Disconnect the battery positive cable (1).
2. Disconnect the head light cable (2) and 4WD / Bi-speed turn connectors (4).
3. Remove the hose clamps (3).

(1)	Battery Positive Cable	(3)	Hose Clamp
(2)	Head Light Cable	(4)	4WD / Bi-speed Turn Connector

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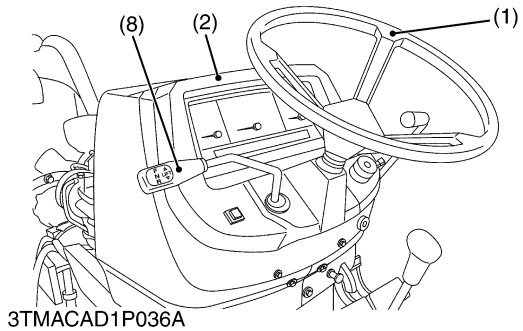
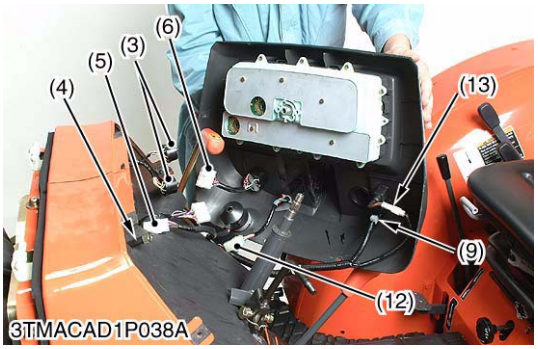


3TMACAD1P036A



3TMACAD1P038A

3TMACAD1P039A

Steering Wheel, Meter Panel and Rear Bonnet

1. Remove the steering wheel (1) with a steering wheel puller (Code No. 07916-51090).
2. Remove the shuttle lever grip (8).
3. Remove the meter panel mounting screws and open the meter panel (2).
4. Disconnect the two connectors (3) and meter cable (4).
5. Disconnect the main switch connector (5) and combination switch connector (6).
6. Disconnect the hazard switch connector (9), 4WD / Bi-speed switch connector (12) and 4WD indicator connector (13).
7. Disconnect the engine stop cable (7) at the engine side.
8. Remove the rear bonnet (10) and lower cover (11).

(1) Steering Wheel
(2) Meter Panel
(3) Connector
(4) Meter Cable
(5) Main Switch Connector
(6) Combination Switch Connector
(7) Engine Stop Cable
(8) Shuttle Lever Grip
(9) Hazard Switch Connector
(10) Rear Bonnet
(11) Lower Cover
(12) 4WD / Bi-speed Switch Connector
(13) 4WD Indicator Connector

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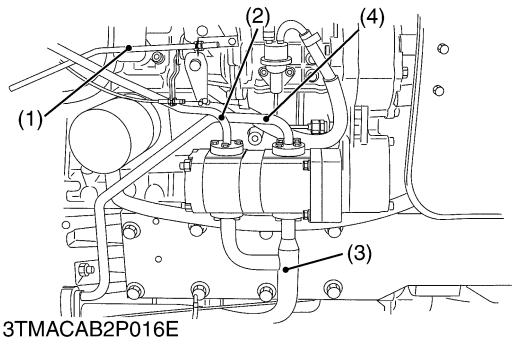

3TMACAB2P016E

Piping for 3-Point Hydraulic System

1. Remove the accelerator rod (1).
2. Remove the suction pipe (3).
3. Remove the delivery pipe (4) for 3-point hydraulic system.
4. Remove the delivery pipe (2) for power steering.

(1) Accelerator Rod
(2) Delivery Pipe
(3) Suction Pipe
(4) Delivery Pipe

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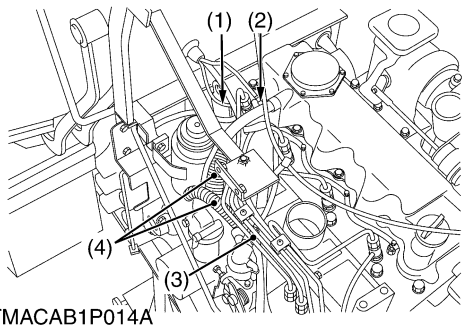

3TMACAB1P014A

Wiring Harness R.H. and Fuel Pipes

1. Disconnect the **3P** connector for solenoid valve (3).
2. Disconnect the wiring lead (2) from the glow plug.
3. Disconnect the coolant thermo sensor **1P** connector (1).
4. Remove the fuel pipes (4).

(1) Coolant Thermo Sensor **1P** Connector
(2) Wiring Lead for Glow Plug
(3) **3P** Connector for Solenoid Valve
(4) Fuel Pipe

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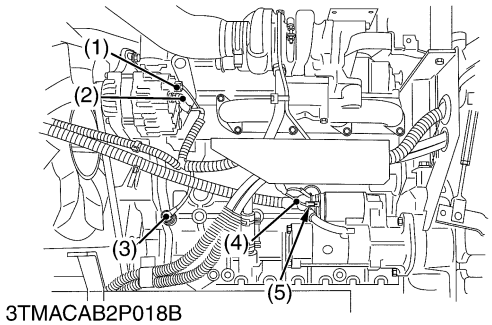

3TMACAB2P018B

Wiring Harness L.H.

1. Disconnect the alternator **2P** connector (1) and **B** terminal (2).
2. Disconnect the starter motor **C** terminal (5) and **B** terminal (4).
3. Disconnect the engine oil pressure switch terminal (3).

Tightening torque	Starter's terminal **B** mounting nut	8.8 to 11.8 N·m 0.9 to 1.2 kgf·m 6.5 to 8.7 ft-lbs

(1) Alternator **2P** Connector
(2) Alternator **B** Terminal
(3) Engine Oil Pressure Switch Terminal
(4) Starter Motor **B** Terminal
(5) Starter Motor **C** Terminal

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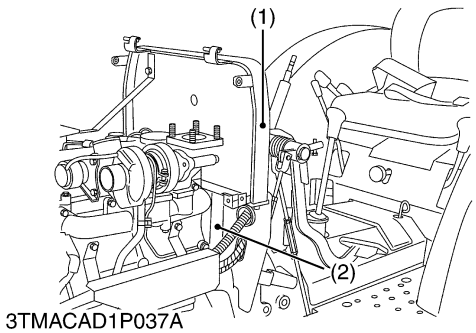

3TMACAD1P037A

Bonnet Support

1. Remove the bonnet support (1).
2. Remove the support frame (2).

(When reassembling)

Tightening torque	Bonnet support mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs
	Support frame mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1) Bonnet Support
(2) Support Frame

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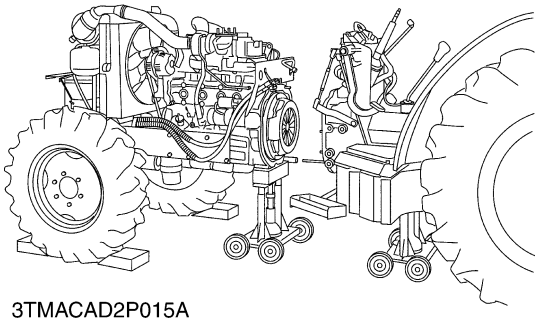
3TMACAD2P015A

Separating Engine from Clutch Housing

1. Hoist the engine by the hoist and chain.
2. Remove the engine mounting screws and nuts, and separate the engine from the clutch housing.

(When reassembling)

- Apply molybdenum disulphide (Three Bond 1901 or equivalent) to the splines of clutch disc boss.
- Apply liquid gasket (Three Bond 1141, 1211 or equivalent) to joint face of the engine and clutch housing.

Tightening torque	Engine and clutch housing mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
	Engine and clutch housing mounting stud bolt	38.2 to 45.1 N·m 3.9 to 4.6 kgf·m 28.2 to 33.3 ft-lbs

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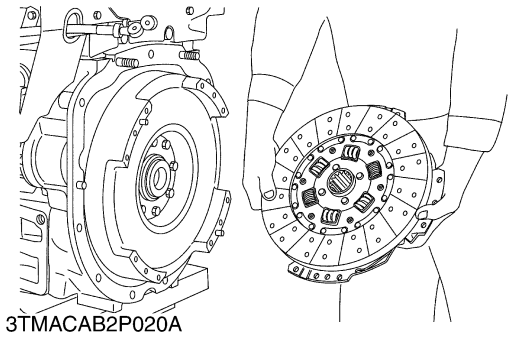
(B) Separating Clutch Assembly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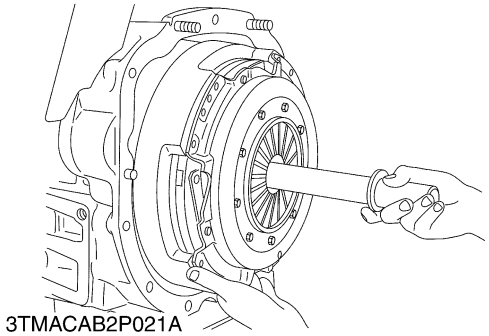
3TMACAB2P021A

Separating the Clutch Assembling

1. Remove the clutch from the flywheel.

(When reassembling)

- Direct the shorter end of the clutch disc boss toward the flywheel.
- Apply molybdenum disulphide (Three Bond 1901 or equivalent) to the splines of clutch disc boss.
- Install the pressure plate, noting the position of straight pins.

■ IMPORTANT

- **Align the center of disc and flywheel by inserting the clutch center tool. (See page NG-13.)**

■ NOTE

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

Tightening torque	Clutch mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

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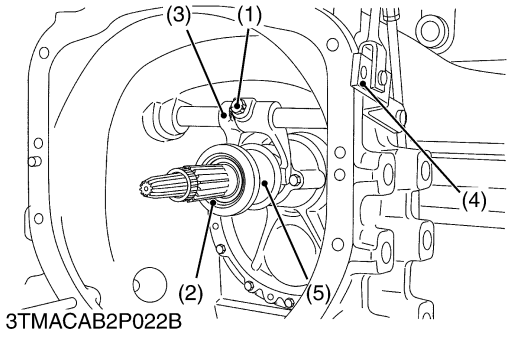

3TMACAB2P022B

Release Holder and Clutch Lever

1. Draw out the clutch release holder (5) and the release bearing (2) as a unit.
2. Remove the release fork setting screws (1).
3. Draw out the clutch lever (4) to remove the release fork (3).

(When reassembling)

- Make sure the direction of the release fork (3) is correct.
- Inject grease to the release holder (5).
- Apply grease to the bushing and clutch lever.
- After tightening the release fork setting screw to the specified torque, insert a wire through the hole on the setting screw head and bind with release fork together.

Tightening torque	Release fork setting screw	166.7 to 186.3 N·m 17.0 to 19.0 kgf·m 123.0 to 137.4 ft-lbs

(1) Setting Screw
(2) Release Bearing
(3) Release Fork
(4) Clutch Lever
(5) Release Holder

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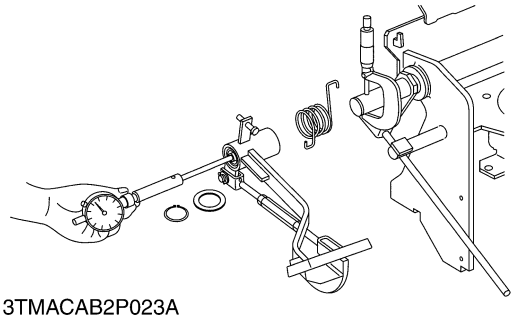
(3) Servicing



3TMACAB2P023A

Clearance between Clutch Pedal Shaft and Pedal Bushing

1. Measure the clutch pedal shaft O.D. with an outside micrometer.
2. Measure the clutch pedal bushing I.D. with a cylinder gauge.
3. Calculate the clearance.
4. If the clearance exceeds the allowable limit, replace the bushing.

Clearance between clutch pedal shaft and pedal bushing	Factory spec.	0.025 to 0.185 mm 0.00098 to 0.00728 in.
	Allowable limit	1.00 mm 0.0394 in.

Clutch pedal shaft O.D.	Factory spec.	27.900 to 27.975 mm 1.09842 to 1.10138 in.
Clutch pedal bushing I.D.	Factory spec.	28.000 to 28.085 mm 1.10236 to 1.10571 in.

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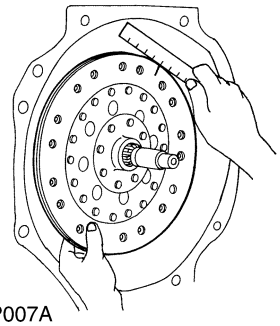

3TMABAB2P007A

Backlash between Clutch Disc Boss and Shaft

1. Mount the clutch disc to the gear shaft.
2. Hold the shaft so that it does not turn.
3. Rotate disc lightly and measure the displacement around the disc edge.
4. If the measurement exceeds the allowable limit, replace the clutch disc.

Displacement around disc edge	Allowable limit	2.0 mm 0.079 in.

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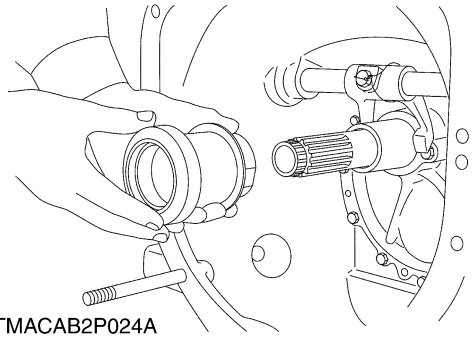

3TMACAB2P024A

Release Bearing

1. Check for abnormal wear on contact surface.
2. Rotate bearing outer race, while applying pressure to it.
3. If the bearing rotation is rough or noisy, replace the release bearing.

■ NOTE

- **Do not depress bearing outer race, when replacing release bearing.**
- **Do not wash the release bearing with a cleaning solvent.**

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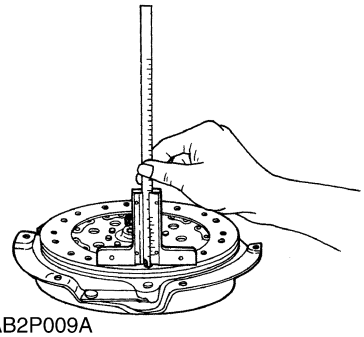

3TMABAB2P009A

Clutch Disc Wear

1. Measure the depth from clutch disc surface to the top of rivet at least 10 points with a depth gauge.
2. If the depth is less than the allowable limit, replace the disc.
3. If oil is sticking to clutch disc, or disc surface is carbonized, replace the clutch disc.
   In this case, inspect transmission gear shaft oil seal, engine rear oil seal and other points for oil leakage.

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

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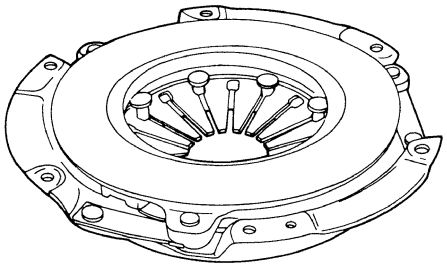

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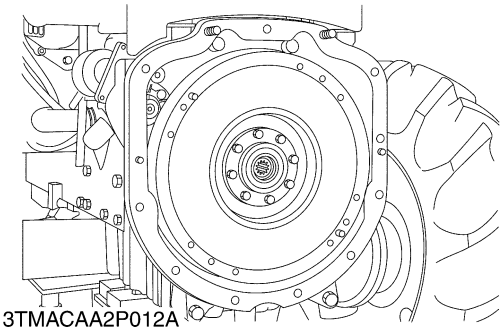

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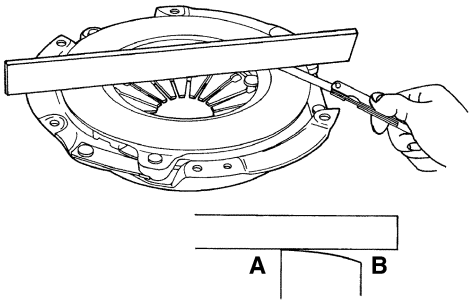

3TMABAB2P012A

Checking Pressure Plate Assembly and Flywheel

1. Wash the disassembling parts except clutch disc with a suitable cleaning solvent to remove dirt and grease before making inspection and adjustment.
2. Inspect the friction surface of pressure plate and flywheel for scoring or roughness.
   -Slight roughness may be smoothed by using fine emery cloth.
   -If these parts have deep scores or grooves on their surface, they should be replaced.
3. Inspect the surface of diaphragm spring for wear.
   If excessive wear is found, replace the clutch cover assembly.
4. Inspect thrust rings (wire ring) for wear or damage.
   As these parts are invisible from outside, shake pressure plate assembly up and down to listen for chattering noise, or lightly hammer on rivets for a slightly cracked noise. Any of these noises indicates need of replace as a complete assembly.

Diaphragm spring mutual difference	Allowable limit	0.5 mm 0.020 in.

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Pressure Plate Flatness

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 the allowable limit.

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

A : Inside **B : Outside**

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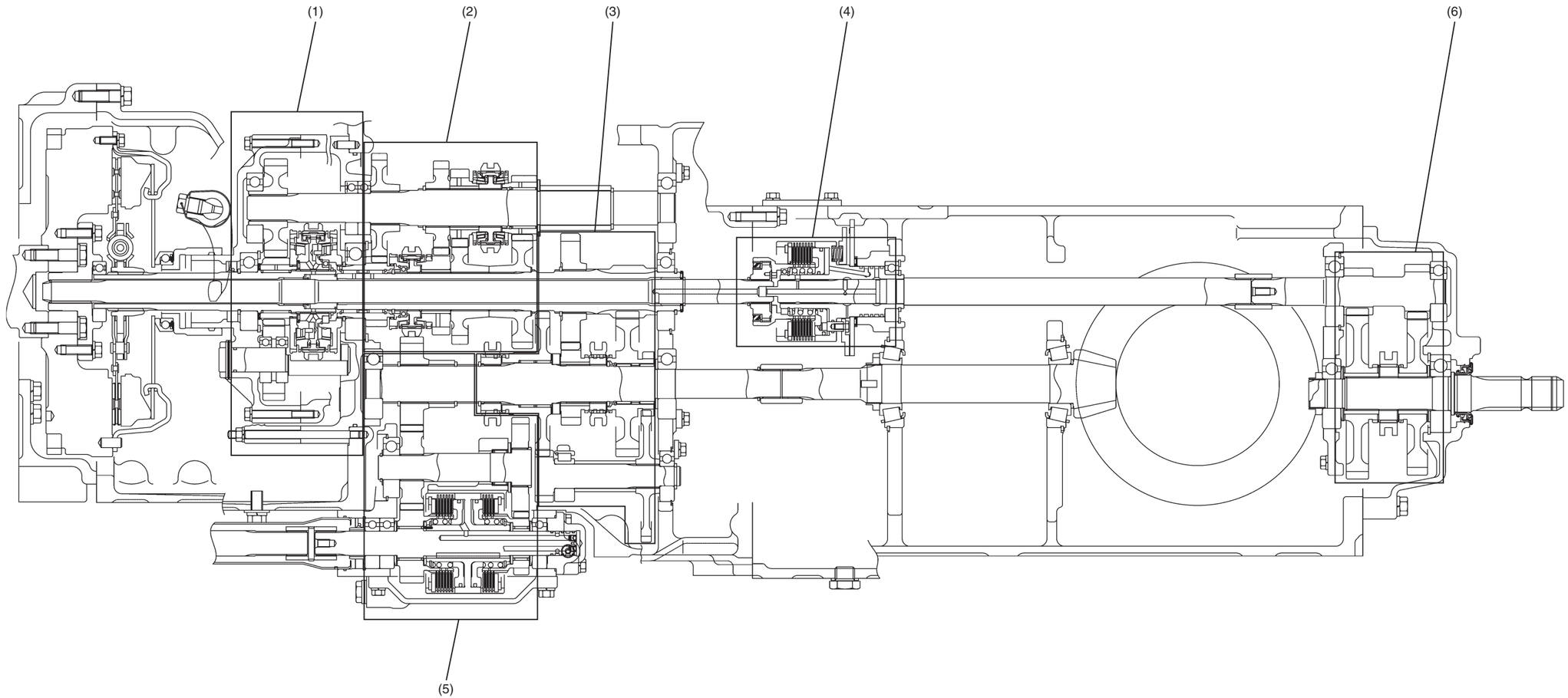
N3 TRANSMISSION

CONTENTS

1. TRANSMISSION

[1] MECHANISM

(1) Structure

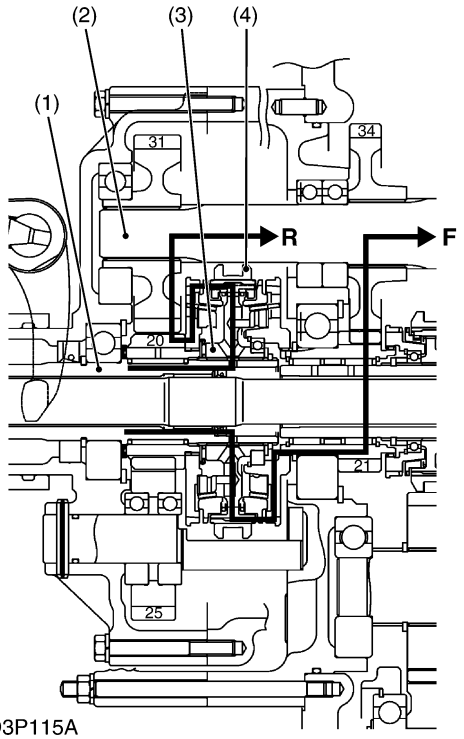


3TMACAD3P114A

(1) Shuttle Shift Section (Forward-Reverse)
(2) Main Gear Shift Section
(3) Auxiliary Gear Shift Section
(4) PTO Clutch Section
(5) 4WD / Bi-speed Turn Section
(6) PTO Gear Shift Section

2. POWER TRAIN FOR TRAVELLING GEAR

[1] SHUTTLE SHIFT SECTION



3TMACAD3P115A

(1) Input Shaft
(2) 1st Shaft
(3) Hub
(4) Shifter

F : Forward
R : Reverse

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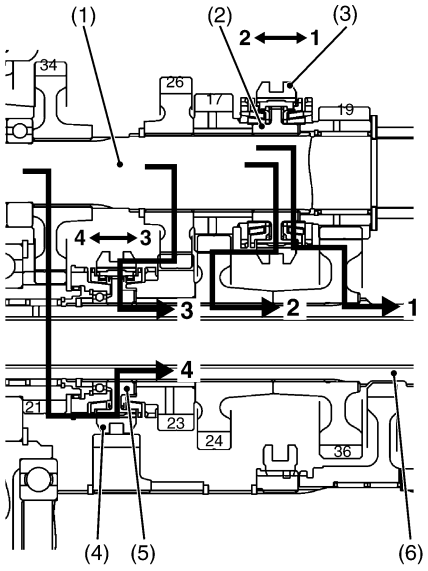
[2] MAIN GEAR SHIFT SECTION



3TMACAD3P116A

(1) 1st Shaft
(2) Hub
(3) Shifter
(4) Shifter
(5) Hub
(6) 2nd Shaft

1 : 1st Speed
2 : 2nd Speed
3 : 3rd Speed
4 : 4th Speed

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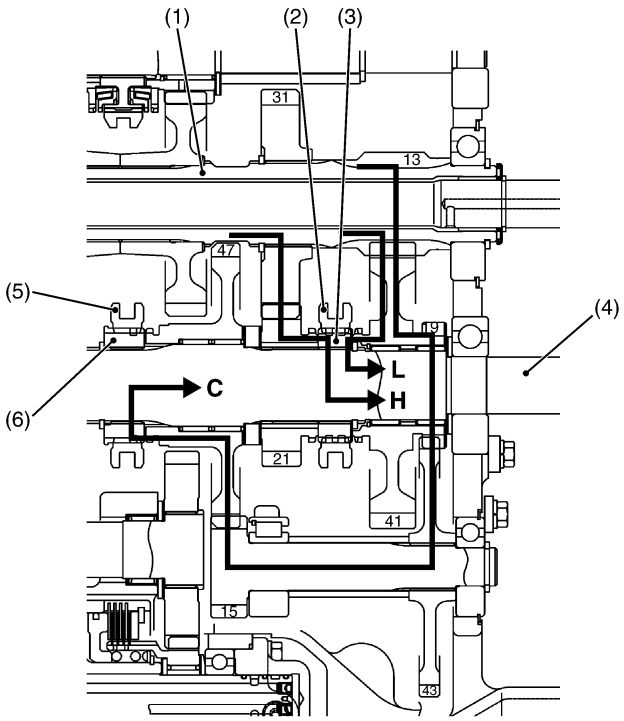
[3] AUXILIARY GEAR SHIFT SECTION



3TMACAD3P117A

(1) 2nd Shaft
(2) Shifter
(3) Hub
(4) 3rd Shaft
(5) Shifter
(6) Hub

H : High
L : Low
C : Creep

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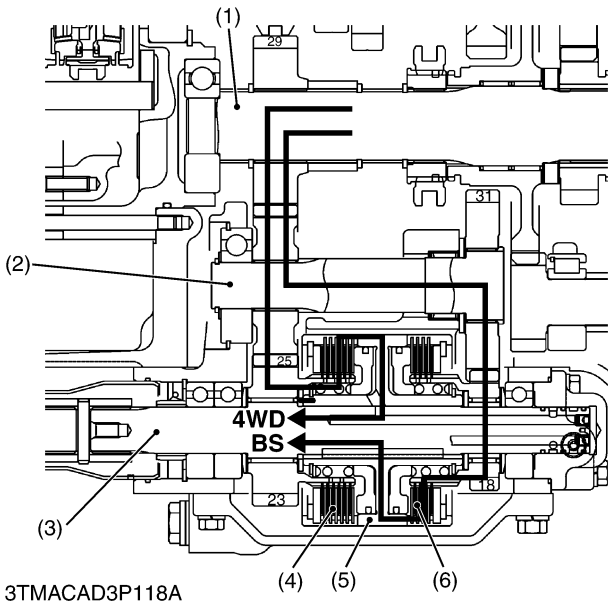
[4] 4WD / BI-SPEED TURN SECTION



3TMACAD3P118A

■ **4 Wheel Drive**

When the 4WD / bi-speed button is pushed once, the power transmission becomes four wheel drive.

■ **Bi-speed Turn Drive**

When the 4WD / bi-speed button is pushed twice, the power transmission becomes either of four wheel drive or bi-speed turn drive by the angle of the front wheel.

The turning angle inspection switch is installed on the left side front wheel case. This switch perceives the angle of the front wheel, and it becomes bi-speed turn drive in 34 degrees or more.

■ **2 Wheel Drive**

When the 4WD / bi-speed button is not pushed, the hydraulic clutch does not engage and the power transmission becomes 2 wheel drive.

■ **NOTE**

- **As for the turning angle inspection switch, refer to "6. FRONT AXLE" section of Tractor Mechanism Workshop Manual (Code No. 97897-18200).**
- **Refer to "8. HYDRAULIC SYSTEM" section for the 4WD / bi-speed valve.**

(1) 3rd Shaft
(2) Idle Shaft
(3) Propeller Shaft
(4) Clutch Disc and Plate (4WD)
(5) Clutch Body
(6) Clutch Disc and Plate (BS)

4WD : Four Wheel Drive
BS : Bi-speed Turn Drive

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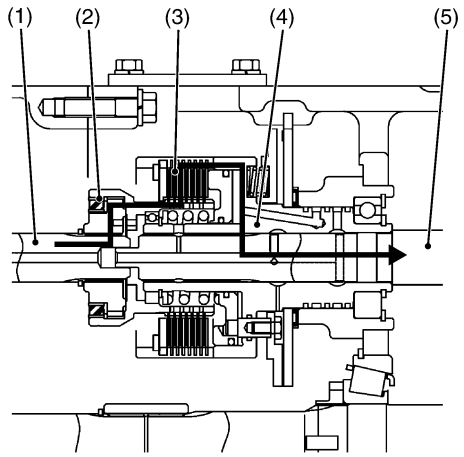
3. POWER TRAIN FOR PTO SYSTEM

[1] PTO CLUTCH SECTION



3TMACAD3P119A

(1) PTO Propeller Shaft 1
(2) Hub
(3) Clutch Disc and Plate
(4) Clutch Body
(5) PTO Propeller Shaft 2

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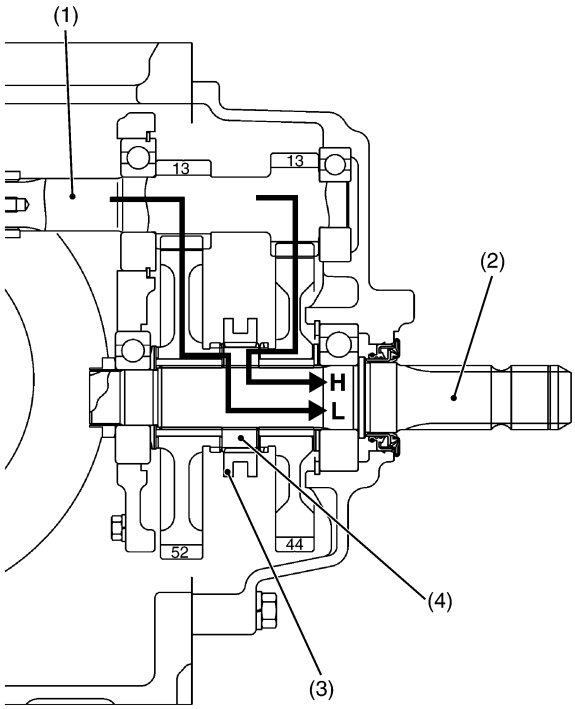
[2] PTO GEAR SHIFT SECTION



3TMACAD3P120A

(1) PTO Gear Shaft
(2) PTO Shaft
(3) Shifter
(4) Hub

H : High (540E)
L : Low (540)

0000003452E

CONTENTS

1. TROUBLESHOOTING

4WD / Bi-SPEED TURN CLUTCH

Symptom	Probable Cause	Solution	Reference Page
4WD / Bi-speed Turn Clutch Slip	● Operating pressure is low (Same as PTO clutch)	Adjust	8-S8
	● Clutch disc or drive plate excessively worn	Replace	N3-S25
	● Deformation of piston or drive plate	Replace	N3-S25
4WD / Bi-speed Turn Shaft Does Not Rotate	● 4WD / Bi-speed turn clutch malfunctioning	Repair or replace	N3-S24
	● 4WD / Bi-speed turn propeller shaft coupling disengaged	Engage	N3-S22
4WD / Bi-speed Turn Clutch Operating Pressure is Low	● Transmission oil improper or insufficient	Replenish or change	NG-2
4WD / Bi-speed Turn Clutch Drags	● Deformation of drive plate or clutch disc	Replace	N3-S25

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2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Main Speed Change Rod 1	Length	145 mm 5.71 in.	—
Main Speed Change Rod 2	Length	61 mm 2.40 in.	—
Shuttle Rod	Length	Approx. 160 mm 6.3 in.	—
4WD / Bi-speed Turn Clutch Disc	Thickness	1.70 to 1.90 mm 0.067 to 0.075 in.	1.55 mm 0.061 in.
4WD / Bi-speed Turn Drive Plate	Thickness	1.15 to 1.25 mm 0.045 to 0.049 in.	1.10 mm 0.043 in.
4WD / Bi-speed Turn Piston	Flatness	—	0.15 mm 0.006 in.
4WD / Bi-speed Turn Drive Plate	Flatness	—	0.30 mm 0.012 in.
Spiral Bevel Pinion Shaft	Turning Torque	2.94 to 3.42 N·m 0.30 to 0.35 kgf·m 2.17 to 2.53 ft-lbs	—
Spiral Bevel Pinion Shaft and Differential Assembly	Turning Torque	4.22 to 5.88 N·m 0.43 to 0.60 kgf·m 3.11 to 4.34 ft-lbs	—
Spiral Bevel Pinion Shaft to Differential Assembly	Backlash	0.20 to 0.30 mm 0.0079 to 0.0118 in.	0.40 mm 0.016 in.
Differential Case Bore (Differential Case Cover Bore) to Differential Side Gear Boss	Clearance	0.050 to 0.151 mm 0.00197 to 0.00594 in.	0.35 mm 0.014 in.
	Differential Case Bore (I.D.)	40.500 to 40.550 mm 1.59449 to 1.59646 in.	—
	Differential Case Cover Bore (I.D.)	40.500 to 40.550 mm 1.59449 to 1.59646 in.	—
	Differential Side Gear Boss (O.D.)	40.388 to 40.450 mm 1.59008 to 1.59252 in.	—
Differential Pinion Shaft to Differential Pinion	Clearance	0.060 to 0.102 mm 0.00236 to 0.00402 in.	0.25 mm 0.0098 in.
	Differential Pinion Shaft (O.D.)	19.959 to 19.980 mm 0.78579 to 0.78661 in.	—
	Differential Pinion (I.D.)	20.040 to 20.061 mm 0.78898 to 0.78980 in.	—
Differential Pinion to Differential Side Gear	Backlash	0.15 to 0.30 mm 0.0059 to 0.0118 in.	0.4 mm 0.016 in.

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3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See page G-10.)

Item	N·m	kgf·m	ft-lbs
ROPS frame (L and R)	196.1 to 225.6	20.0 to 23.0	144.7 to 166.4
Foldable ROPS	29.4 to 49.0	3.0 to 5.0	21.7 to 36.2
Power steering hose retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Starter's terminal B mounting nut	8.8 to 11.8	0.9 to 1.2	6.5 to 8.7
Bonnet support mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Support frame mounting screw	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Engine and clutch housing mounting screw, nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Engine and clutch housing mounting stud bolt	38.2 to 45.1	3.9 to 4.6	28.2 to 33.3
Cover mounting screw	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Rear wheel mounting nut	260 to 304	26.5 to 31.0	192 to 224
Rear ROPS mounting U-bolt	196 to 225	20 to 23	144.7 to 166.4
Step mounting screw	48.1 to 55.9	4.9 to 5.7	35.5 to 41.2
Clutch housing and transmission case mounting screw, nut M12, grade 11 nut	103.0 to 117.7	10.5 to 12.0	75.9 to 86.8
(Ditto) M12, grade 7 screw, nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
(Ditto) M10, grade 9 screw	60.8 to 70.6	6.2 to 7.2	44.8 to 52.1
Clutch housing and transmission case mounting stud bolt	38.2 to 45.1	3.9 to 4.6	28.2 to 33.3
Transmission upper cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Speed change cover mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Release fork setting screw	166.7 to 186.3	17.0 to 19.5	122.9 to 137.4
Shuttle case mounting screw M8, grade 7 screw	23.5 to 27.4	2.4 to 2.8	17.4 to 20.3
(Ditto) M8, grade 9 screw	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Rear axle case mounting screw and nut (M12 screw)	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
PTO shaft staking nut	225.5 to 264.8	23 to 27	166.4 to 195.3
PTO gear case assembly mounting screw	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
PTO gear case cover mounting screw and reamer screw	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Differential bearing support mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Differential case cover mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Spiral bevel gear UBS screw	70.6 to 90.2	7.2 to 9.2	52.1 to 86.5
PTO clutch valve mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
PTO clutch holder mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Spiral bevel pinion shaft staking nut	117.7 to 127.5	12 to 13	86.8 to 94.0

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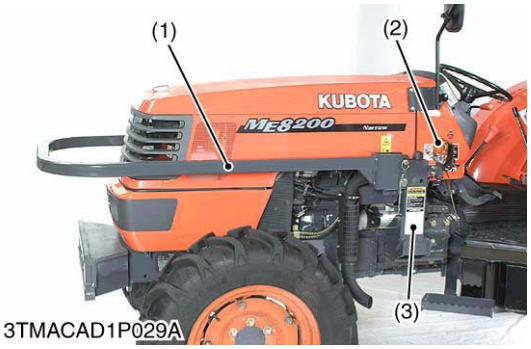
4. CHECKING, DISASSEMBLING AND SERVICING

[1] CLUTCH HOUSING CASE

(1) Disassembling and Assembling

(A) Separating Engine from Clutch Housing Case



Foldable ROPS

1. Disconnect the **2P** connector from the front combination lamp (2).
2. Remove the foldable ROPS (1).
3. Remove the ROPS frame right and left (3).

(When reassembling)

Tightening torque	ROPS frame (L and R)	193.1 to 225.6 N·m 20.0 to 23.0 kgf·m 144.7 to 166.4 ft-lbs
	Foldable ROPS	29.4 to 49.0 N·m 3.0 to 5.0 kgf·m 21.7 to 36.7 ft-lbs

(1) Foldable ROPS
(2) Front Combination Lamp
(3) ROPS Frame

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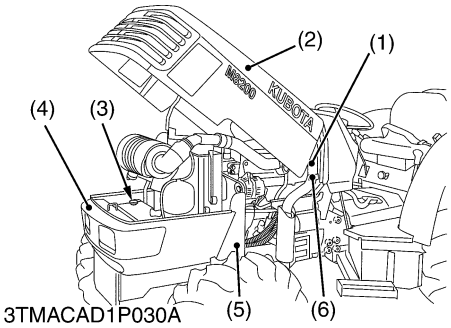

Bonnet and Covers

1. Remove the exhaust pipe (1).
2. Remove the bonnet (2).
3. Disconnect the battery's cable.
4. Disconnect the head light **3P** connectors.
5. Remove the front lower cover (4) and side cover (5).
6. Remove the bonnet stay (6).

(1) Exhaust Pipe
(2) Bonnet
(3) Battery
(4) Front Lower Cover
(5) Side Cover
(6) Bonnet Stay

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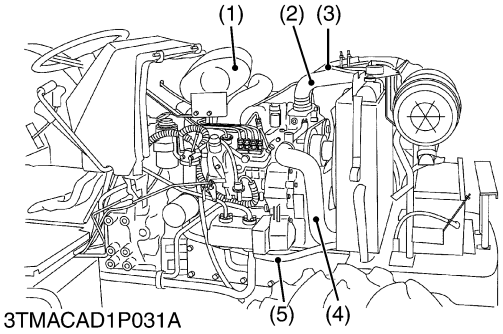

Radiator Hoses and Air Cleaner Hoses

1. Disconnect the radiator hoses (2) and (4) from engine side.
2. Disconnect the air cleaner hose (3) from the intake manifold.
3. Disconnect the radiator hose (5).
4. Remove the delivery pipe clamp.
5. Remove the muffler (1).

(1) Muffler
(2) Radiator Hose
(3) Air Cleaner Hose
(4) Radiator Hose
(5) Radiator Hose

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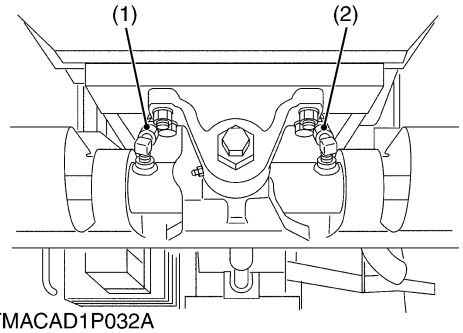

3TMACAD1P032A

Power Steering Hoses

1. Disconnect the power steering hoses (1), (2).

(When reassembling)

Tightening torque	Power steering hose retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 ft-lbs

(1) Power Steering Hose (2) Power Steering Hose

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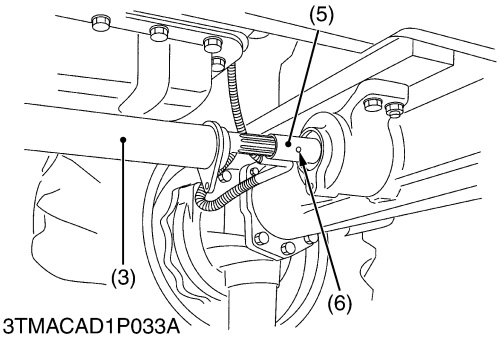


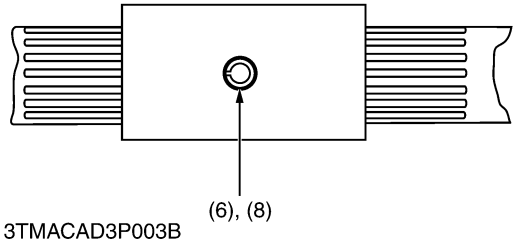
3TMACAD1P033A

Propeller Shaft

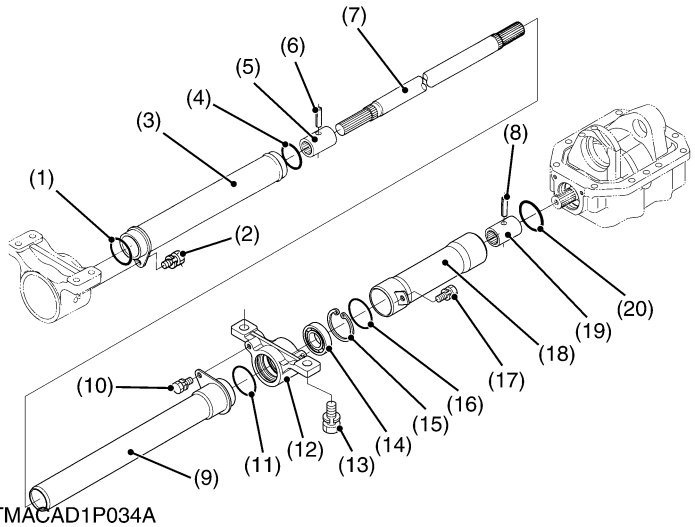
1. Slide the propeller shaft covers (3), (18) after removing the screw (2), (13).
2. Tap out the spring pins (6), (8) and then slide the couplings (5), (19) to the front and rear to take out the propeller shaft (7).

(When reassembling)

- Apply grease to the O-rings, propeller shaft and pinion shaft.
- Tap in the spring pins (6), (8) as shown in figure.



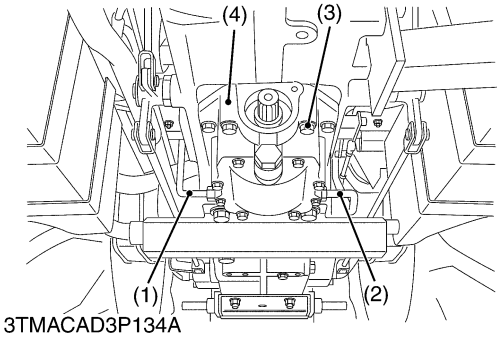
3TMACAD3P003B



3TMACAD1P034A

(1) O-ring
(2) Screw
(3) Front Shaft Cover
(4) O-ring
(5) Coupling
(6) Spring Pin
(7) Propeller Shaft
(8) Spring Pin
(9) Middle Shaft Cover
(10) Screw
(11) O-ring
(12) Cover Bracket
(13) Screw
(14) Bearing
(15) Internal Snap Ring
(16) O-ring
(17) Screw
(18) Rear Shaft Cover
(19) Coupling
(20) O-ring

0000003408E



3TMACAD3P134A

4WD / Bi-speed Turn Gear Case Assembly

1. Disconnect 4WD / Bi-speed turn pipes (1), (2).
2. Remove the 4WD / Bi-speed turn gear case mounting screw (3) and mounting nut.
3. Remove the 4WD / Bi-speed turn gear case assembly (4).

(1) Pipe
(2) Pipe
(3) Mounting Screw
(4) Gear Case Assembly

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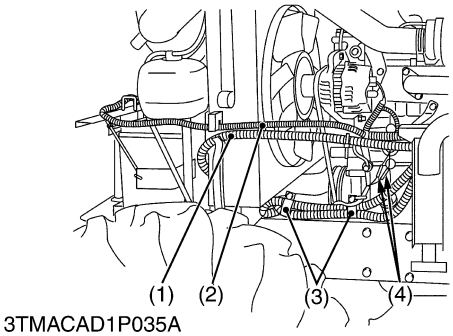

3TMACAD1P035A

Wiring Harness L.H.

1. Disconnect the battery positive cable (1).
2. Disconnect the head light cable (2) and 4WD / Bi-speed turn connectors (4).
3. Remove the hose clamps (3).

(1) Battery Positive Cable
(2) Head Light Cable
(3) Hose Clamp
(4) 4WD / Bi-speed Turn Connector

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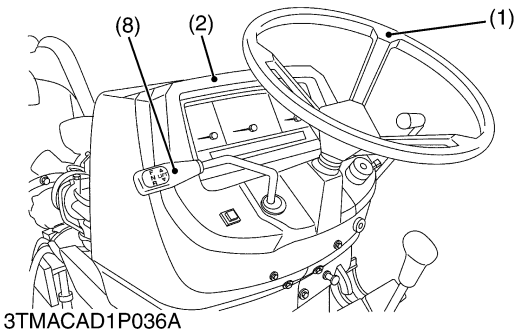

3TMACAD1P036A

Steering Wheel, Meter Panel and Rear Bonnet

1. Remove the steering wheel (1) with a steering wheel puller (Code No. 07916-51090).
2. Remove the shuttle lever grip (8).
3. Remove the meter panel mounting screws and open the meter panel (2).
4. Disconnect the two connectors (3) and meter cable (4).
5. Disconnect the main switch connector (5) and combination switch connector (6).
6. Disconnect the hazard switch connector (9), 4WD / Bi-speed switch connector (12) and 4WD indicator connector (13).
7. Disconnect the engine stop cable (7) at the engine side.
8. Remove the rear bonnet (10) and lower cover (11).

(1) Steering Wheel
(2) Meter Panel
(3) Connector
(4) Meter Cable
(5) Main Switch Connector
(6) Combination Switch Connector
(7) Engine Stop Cable
(8) Shuttle Lever Grip
(9) Hazard Switch Connector
(10) Rear Bonnet
(11) Lower Cover
(12) 4WD / Bi-speed Switch Connector
(13) 4WD Indicator Connector

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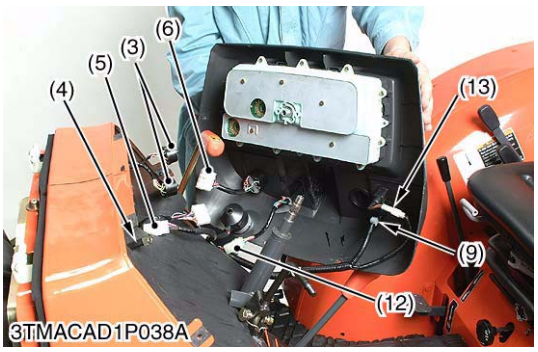
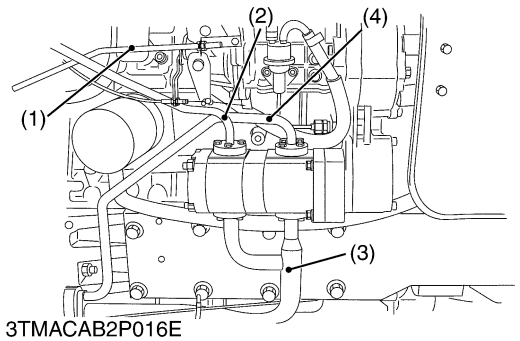


3TMACAD1P038A

3TMACAD1P039A



3TMACAB2P016E

Piping for 3-Point Hydraulic System

1. Remove the accelerator rod (1).
2. Remove the suction pipe (3).
3. Remove the delivery pipe (4) for 3-point hydraulic system.
4. Remove the delivery pipe (2) for power steering.

(1) Accelerator Rod
(2) Delivery Pipe
(3) Suction Pipe
(4) Delivery Pipe

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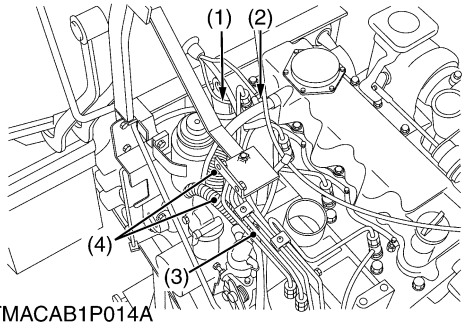

3TMACAB1P014A

Wiring Harness R.H. and Fuel Pipes

1. Disconnect the **3P** connector for solenoid valve (3).
2. Disconnect the wiring lead (2) from the glow plug.
3. Disconnect the coolant thermo sensor **1P** connector (1).
4. Remove the fuel pipes (4).

(1) Coolant Thermo Sensor **1P** Connector
(2) Wiring Lead for Glow Plug
(3) **3P** Connector for Solenoid Valve
(4) Fuel Pipe

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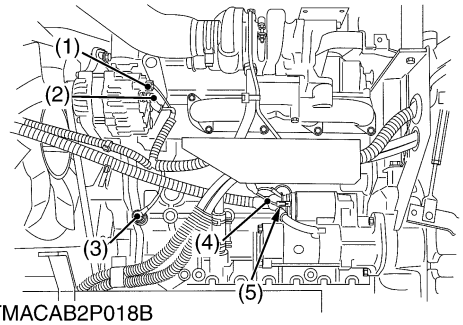

3TMACAB2P018B

Wiring Harness L.H.

1. Disconnect the alternator **2P** connector (1) and **B** terminal (2).
2. Disconnect the starter motor **C** terminal (5) and **B** terminal (4).
3. Disconnect the engine oil pressure switch terminal (3).

Tightening torque	Starter's terminal **B** mounting nut	8.8 to 11.8 N·m 0.9 to 1.2 kgf·m 6.5 to 8.7 ft-lbs

(1) Alternator **2P** Connector
(2) Alternator **B** Terminal
(3) Engine Oil Pressure Switch Terminal
(4) Starter Motor **B** Terminal
(5) Starter Motor **C** Terminal

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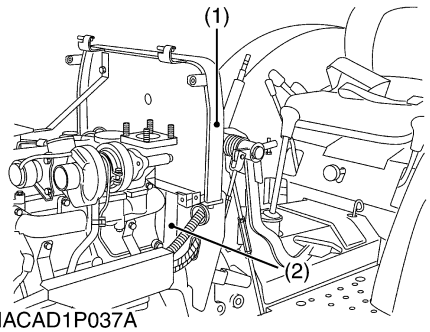

3TMACAD1P037A

Bonnet Support

1. Remove the bonnet support (1).
2. Remove the support frame (2).

(When reassembling)

Tightening torque	Bonnet support mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs
	Support frame mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1) Bonnet Support
(2) Support Frame

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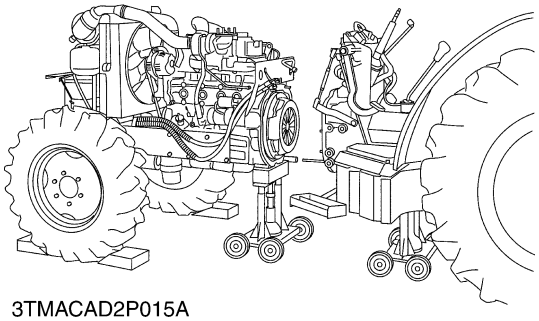

3TMACAD2P015A

Separating Engine from Clutch Housing

1. Hoist the engine by the hoist and chain.
2. Remove the engine mounting screws and nuts, and separate the engine from the clutch housing.

(When reassembling)

- Apply molybdenum disulphide (Three Bond 1901 or equivalent) to the splines of clutch disc boss.
- Apply liquid gasket (Three Bond 1141, 1211 or equivalent) to joint face of the engine and clutch housing.

Tightening torque	Engine and clutch housing mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
	Engine and clutch housing mounting stud bolt	38.2 to 45.1 N·m 3.9 to 4.6 kgf·m 28.2 to 33.3 ft-lbs

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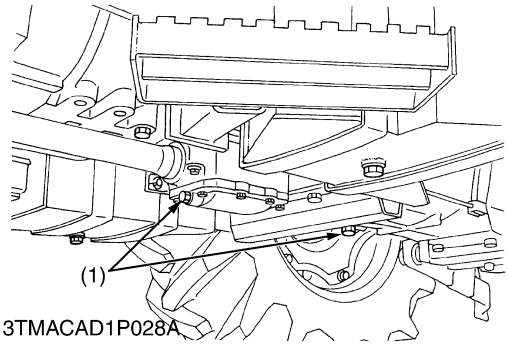
(B) Separating Clutch Housing Case and Transmission Case



3TMACAD1P028A

Draining Transmission Fluid

1. Place oil pans underneath the transmission case.
2. Remove the drain plugs (1).
3. Drain the transmission fluid.
4. Reinstall the drain plugs (1).

(When reassembling)

- Fill up from filling port after removing the filling plug until reaching the dipstick.
- After running the engine for few minutes, stop it and check the fluid level again, add the fluid to prescribed level if it is not correct level.

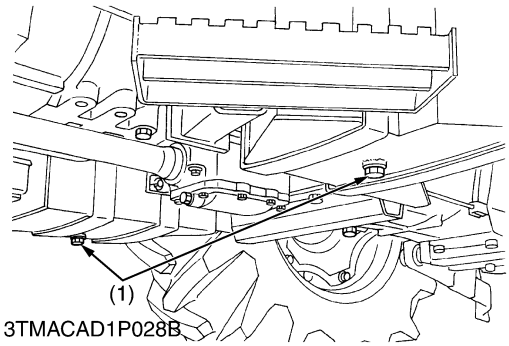
Transmission fluid	Capacity	33.0 L 34.88 U.S.qts 29.04 lmp.qts

■ IMPORTANT

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system.**
- **Refer to "LUBRICANTS, FUEL AND COOLANT" (See page NG-2.)**
- **Do not mix different brands fluid together.**

(1) Drain Plug

0000003403E



3TMACAD1P028B

Draining Fuel

1. Place oil pans under the fuel tank.
2. Remove the drain plugs (1).
3. Drain the fuel.
4. Reinstall the drain plugs (1).

Fuel	Capacity	60 L 15.9 U.S.gals 13.2 Imp.gals

(1) Drain Plug

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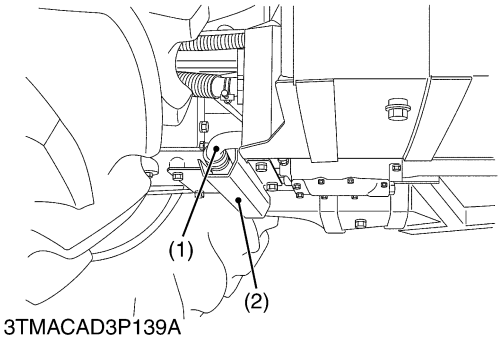

3TMACAD3P139A

Fuel Tank Connection Hose

1. Remove the cover (2).
2. Remove the connection hose (1).

Tightening torque	Cover mounting screw	77.5 to 90.1 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 ft-lbs

(1) Connection Hose (2) Cover

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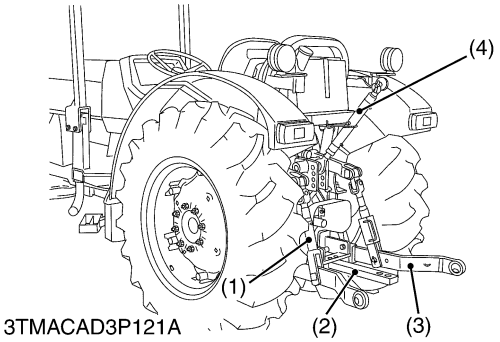

3TMACAD3P121A

Lift Rods and Lower Links

1. Remove the lift rods (1).
2. Remove the lower links (3).
3. Remove the drawbar (2).
4. Remove the top link (4).

(1) Lift Rod (3) Lower Link
(2) Drawbar (4) Top Link

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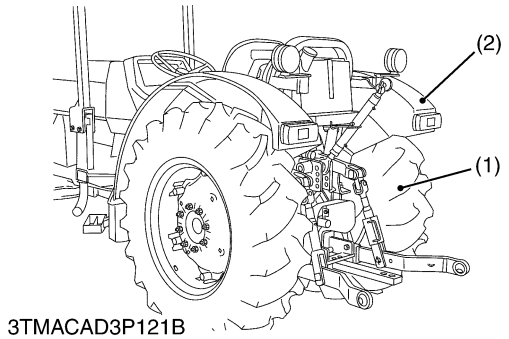
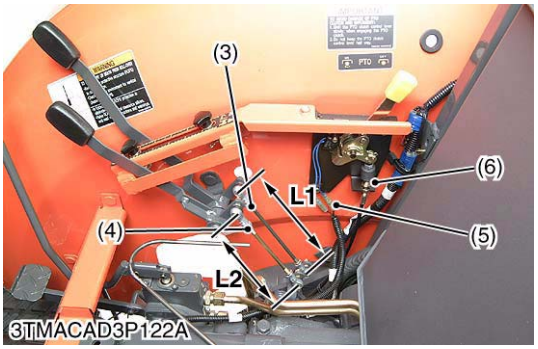
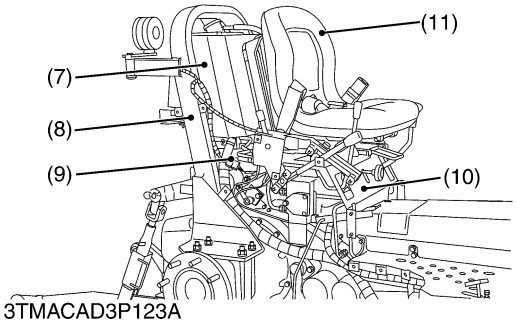


3TMACAD3P121B



3TMACAD3P122A



3TMACAD3P123A

Rear Wheel, Fender and ROPS

1. Remove the seat (11).
2. Check the transmission case are securely mounted on the disassembly stands.
3. Disconnect the connector (9) for hazard and tail lights.
4. Disconnect the connectors (5) for PTO safety switch.
5. Remove the rear wheels (1).
6. Disconnect the position rod (3) and draft rod (4).
7. Remove the PTO control wire (6).
8. Remove the fender (2) and center cover (10).
9. Remove the rear ROPS (8) with fuel tank (7).

(When reassembling)

Length of position rod (**L1**)	Factory spec.	206 mm 8.11 in.
Length of draft rod (**L2**)	Factory spec.	172 mm 6.77 in.

Tightening torque	Rear wheel mounting nut	260 to 304 N·m 26.5 to 31.0 kgf·m 192 to 224 ft-lbs
	Rear ROPS mounting U-bolt	196 to 225 N·m 20 to 23 kgf·m 144.7 to 166.4 ft-lbs

■ NOTE

- **Adjust the hydraulic control levers after reassembly when you remove the right fender and the lever guide.**

(1) Rear Wheel
(2) Fender
(3) Position Rod
(4) Draft Rod
(5) Connector
(6) PTO Control Wire
(7) Fuel Tank
(8) Rear ROPS
(9) Connector
(10) Center Cover
(11) Seat

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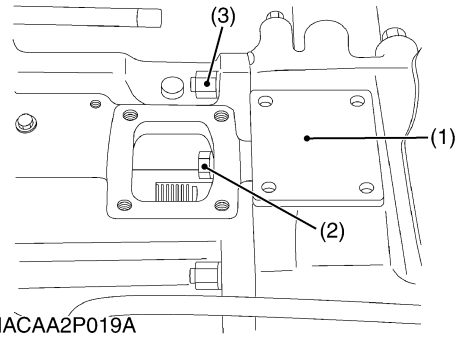
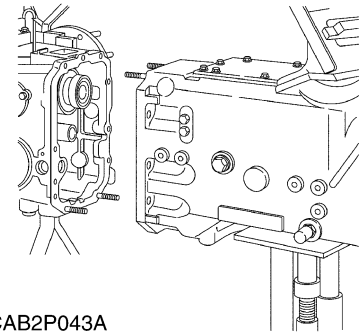


3TMACAA2P019A


3TMACAB2P043A

Separating Transmission Case

1. Remove the transmission upper cover (1).
2. Remove the transmission case mounting screws (2) and nut (3), and separate the transmission case from the clutch housing.

(When reassembling)

- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of the transmission case and clutch housing, transmission upper cover and transmission case.

Tightening torque	Transmission case and clutch housing mounting screw, nut	M12, grade 11 nut (3)	103.0 to 117.7 N·m 10.5 to 12.0 kgf·m 75.9 to 86.8 ft-lbs
		M12, grade 7 screw, nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
		M12, grade 9 screws (2)	60.8 to 70.6 N·m 6.2 to 7.2 kgf·m 44.8 to 52.1 ft-lbs
		Mounting stud bolt	38.2 to 45.1 N·m 3.9 to 4.6 kgf·m 28.2 to 33.3 ft-lbs
	Transmission upper cover mounting screw		23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

(1) Transmission Upper Cover
(2) Transmission Case Mounting Screw
(3) Transmission Case Mounting Nut

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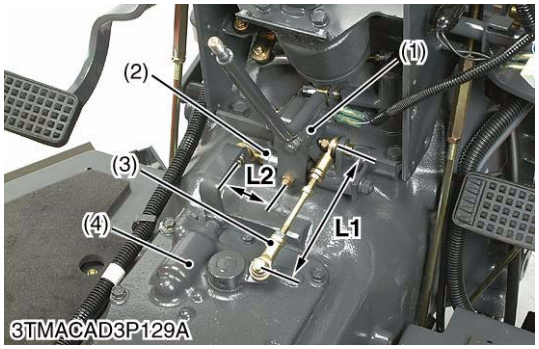
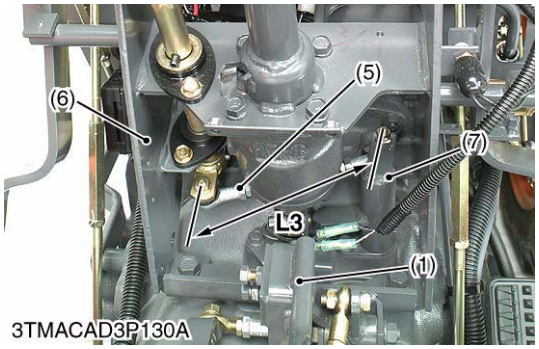
(C) Disassembling Clutch Housing





Pedal Frame

1. Disconnect the main speed change rod 1 (3) and 2 (2).
2. Disconnect the shuttle rod (5).
3. Remove the mounting screws and remove the pedal frame (6) with the main speed change lever assembly (1) and steering controller.
4. Remove the mounting screw and remove the shuttle lever (7).

(When reassembling)

- Adjust the length of shuttle rod (5), main speed change rod 1 (3) and 2 (2).
- After adjusting the rod length, execute the following "Adjusting the stopper bolts".

Length of main speed change rod 1 (**L1**)	Factory spec.	145 mm 5.71 in.
Length of main speed change rod 2 (**L2**)	Factory spec.	61 mm 2.40 in.
Length of shuttle rod (**L3**)	Factory spec.	Approx. 160 mm 6.3 in.

(1) Main Speed Change Lever Assembly
(2) Main Speed Change Rod 2
(3) Main Speed Change Rod 1
(4) Speed Change Cover
(5) Shuttle Rod
(6) Pedal Frame
(7) Shuttle Lever

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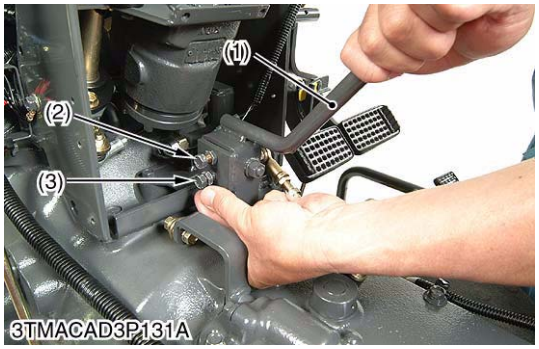

(Adjusting the stopper bolts)

1. Loosen the stopper bolts (2), (3) fully.
2. Shift the main speed change lever (1) fully left, and maintain it.
3. Screw in the lower stopper bolt (3) fully with the lever (1) shifted left. (Refer to the photograph.)
4. Screw in the lower stopper bolt (3) one half turn more, and tighten the lock nut.
5. Shift the main speed change lever (1) fully right, and adjust the upper stopper bolt (2) according to the same procedure.

(1) Main Speed Change Lever
(2) Stopper Bolt
(3) Stopper Bolt

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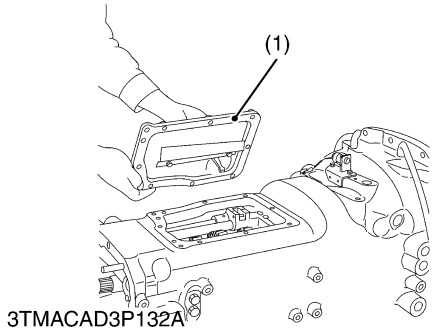


3TMACAD3P132A

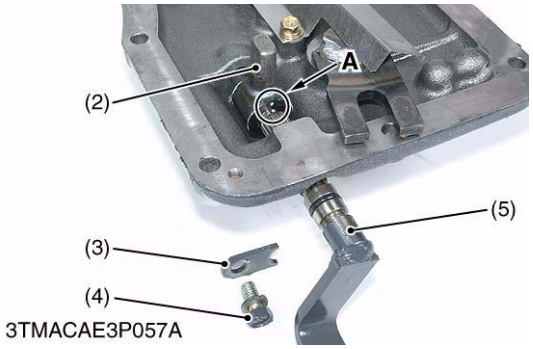
Speed Change Cover

1. Remove the speed change cover (1).

(When reassembling)

- When reassembling the speed change cover (1), set the shifter and fork in neutral position.
- Apply liquid gasket (Three Bond 1216 or equivalent) to seam of speed change cover and clutch housing.
- Install the main shift cam (2) to main shift shaft (5), aligning the marks **A** on them.

Tightening torque	Speed change cover mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs



3TMACAE3P057A

(1) Speed Change Cover
(2) Main Shift Cam
(3) Main Shift Shaft Stopper
(4) Screw
(5) Main Shift Shaft
A : Aligning Mark

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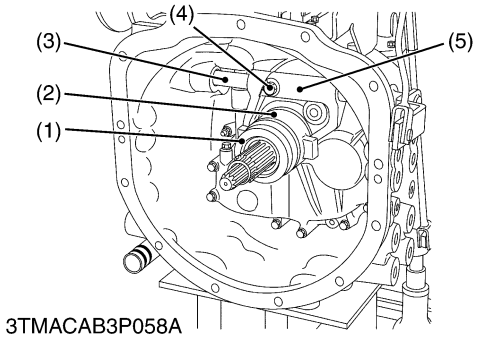

3TMACAB3P058A

Clutch Release Bearing

1. Draw out the release bearing (1) and the release hub (2) together.
2. Remove the release fork setting screw (4).
3. Draw out the control shaft (3) to take out the release fork (5).

(When reassembling)

- After tightening the release fork setting screw to the specified torque, insert a wire through the holes of the setting screw head and release fork.
- Apply grease to the sliding surface of the clutch release hub.
- Apply grease to the bushing of control shaft.

Tightening torque	Release fork setting screw	166.7 to 186.3 N·m 17.0 to 19.5 kgf·m 122.9 to 137.4 ft-lbs

(1) Release Bearing
(2) Release Hub
(3) Control Shaft
(4) Release Fork Setting Screw
(5) Release Fork

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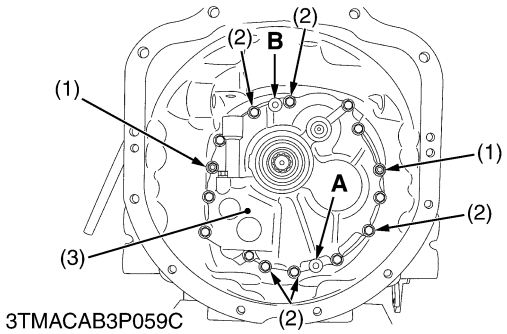

Shuttle Case Assembly

1. Loosen only two nuts (1) and five screws (2) and remove the shuttle case assembly (3) by screwing M8 x Pitch 1.25 screws into holes **A** and **B**.

Tightening torque	Shuttle case assembly screw, nut	M8, grade 7 nut	23.5 to 27.4 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs
		M8, grade 9 screw	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 ft-lbs

(1) Nut
(2) Screw
(3) Shuttle Case Assembly

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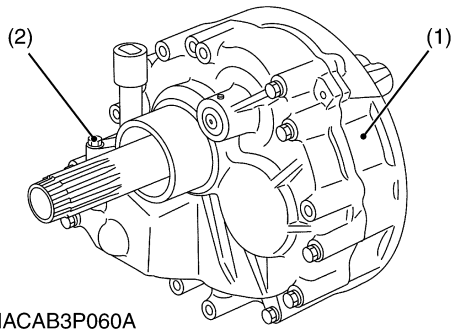
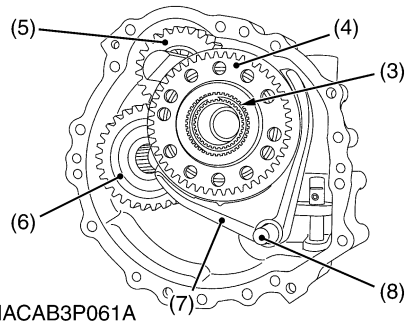


3TMACAB3P060A



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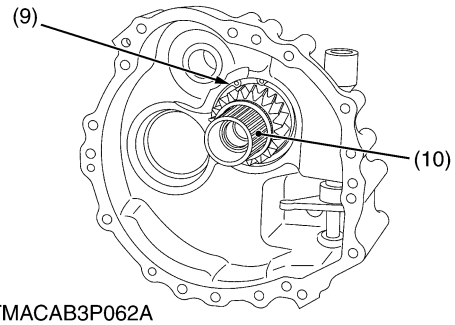

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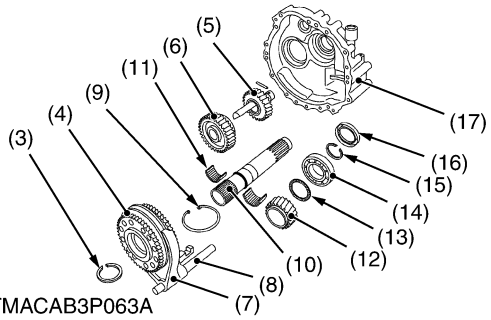

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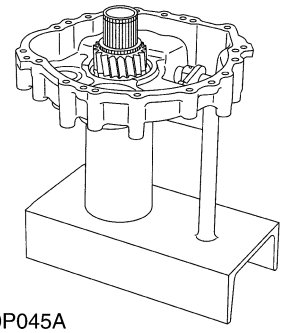
3TMACAB0P045A

Disassembling Shuttle Case Assembly

1. Remove the grade 9 screws.
2. Remove the shuttle case 2 (1).
3. Remove the screw (2).
4. Remove the external snap ring (3).
5. Remove the synchronizer assembly (4) with shifter (7) and shift rod (8).
6. Remove the 25T gear (5) and 31T gear (6).
7. Remove the internal snap ring (9).
8. Tap out the input shaft (10) with bearing.

(When reassembling)

- Take care of direction of the oil seal.
- Apply grease to the oil seal and bushing.
- Take care of the position of needle bearing.
- Apply transmission fluid to the bearing.
- Use the shuttle case assembling stand (see page NG-13).

■ NOTE

- **After the reassembly, check the operation.**

Tightening torque	Shuttle case assembly screw, nut (M8, grade 9)	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 ft-lbs

(1) Shuttle Case 2
(2) Screw
(3) External Snap Ring
(4) Synchronizer Assembly
(5) 25T Gear
(6) 31T Gear
(7) Shifter
(8) Shift Rod
(9) Internal Snap Ring
(10) Input Shaft
(11) Needle Bearing
(12) 20T Gear
(13) Thrust Collar
(14) Bearing
(15) External Snap Ring
(16) Oil Seal
(17) Shuttle Case 1

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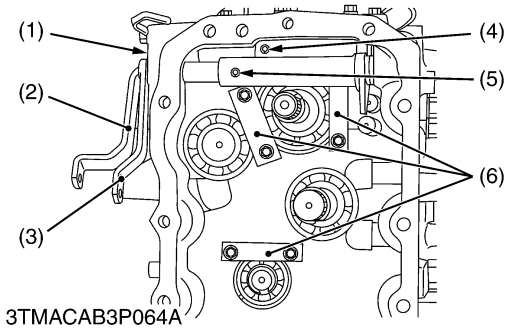

3TMACAB3P064A

Shift Levers and Bearing Retainer

1. Remove the shift lever stopper (1).
2. Tap out the spring pin (4) from Creep shift lever (2).
3. Draw out the Creep shift lever (2).
4. Tap out the spring pin (5) from Hi-Low shift lever (3).
5. Draw out the Hi-Low shift lever (3).
6. Remove the bearing retainers (6).

(When reassembling)

- Apply grease to the O-ring.

Tightening torque	Bearing retainer mounting screw	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 ft-lbs

(1) Stopper
(2) Shift Lever (Creep)
(3) Shift Lever (Hi-Low)
(4) Spring Pin
(5) Spring Pin
(6) Bearing Retainer

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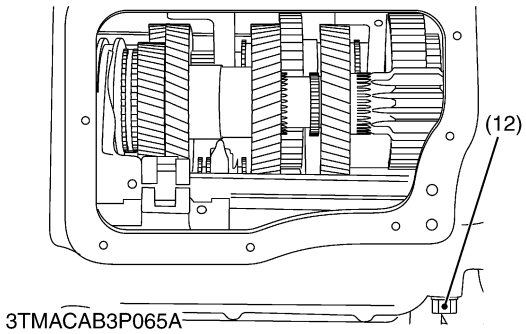

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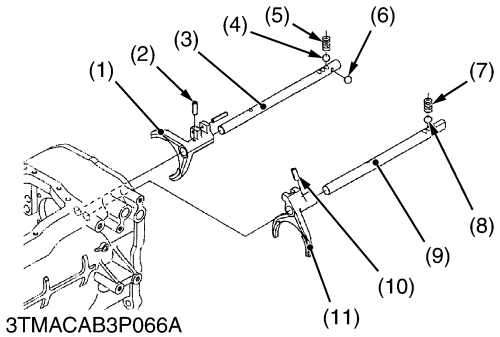

3TMACAB3P066A

Shift Rods and Forks (1-2), (3-4)

1. Remove the lock screw (12), and take out the springs (5), (7) and balls (4), (8).
2. Tap out the spring pins (2), (10) from shift forks (1) and (11).
3. Draw out the shift rod (3) and (9).
4. Take out the shift forks (1) and (11).

(When reassembling)

- Apply grease to the ball and spring.
- Take care of installing the inter-locking ball (6).
- Apply liquid lock (Three Bond 1372 or equivalent) to the lock screws (12).

(1) Shift Fork (1-2)
(2) Spring Pin
(3) Shift Fork Rod (1-2)
(4) Ball
(5) Spring
(6) Inter-locking Ball
(7) Spring
(8) Ball
(9) Shift Fork Rod (3-4)
(10) Spring Pin
(11) Shift Fork (3-4)
(12) Lock Screw

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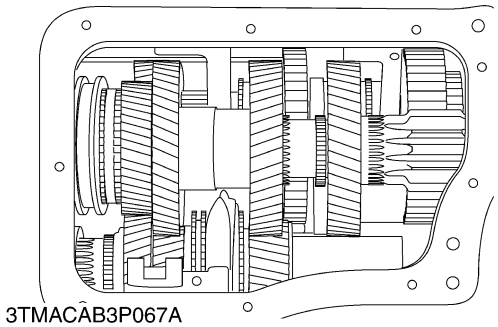
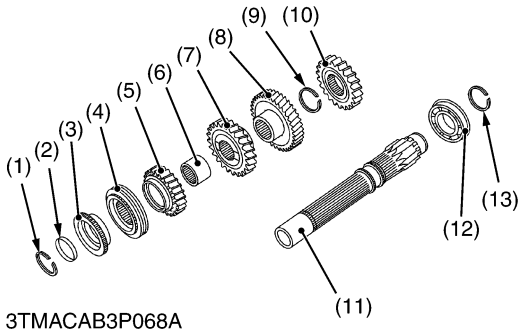

3TMACAB3P067A

2nd Shaft

1. Remove the external snap ring (1).
2. Tap out the 2nd shaft (11) to the rear.
3. Remove the external snap ring (9) with tap out the 2nd shaft (11) to the rear.

(When reassembling)

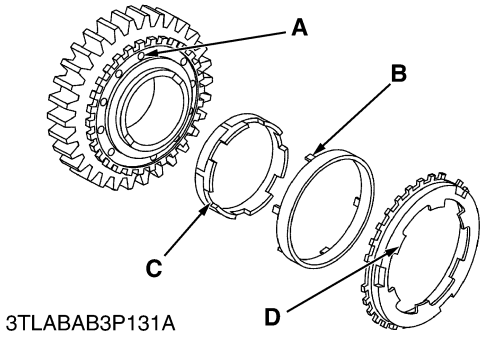
- Install the protrusion portion **(B)** of the center rings to the holes **(A)** of the gear firmly. (Refer to the figure left.)
- Install the protrusion portion **(D)** of the outer synchronizer rings to the grooves **(C)** of the inner synchronizer rings. (Refer to the figure left.)
- Install the synchronizer keys in the key groove of the outer synchronizer rings firmly.



3TMACAB3P068A

(1) External Snap Ring
(2) Collar
(3) Holder
(4) Synchronizer
(5) 23T Gear
(6) Inner Ring
(7) 24T Gear
(8) 36T Gear
(9) External Snap Ring
(10) 29T Gear
(11) 2nd Shaft
(12) Bearing
(13) External Snap Ring

(A) Holes of the gear
(B) Protrusion portions of the center ring
(C) Grooves of the inner synchronizer ring
(D) Protrusion portion of the outer synchronizer ring



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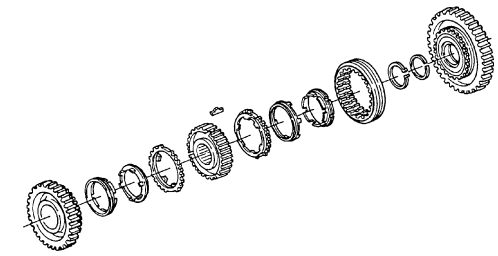
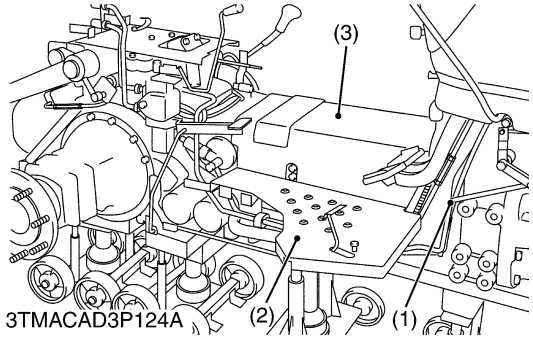

3TMACAB3P051B

Steps and Clutch Housing Cover

1. Remove the floor mat.
2. Disconnect the foot accelerator rod (1).
3. Remove the steps (2).
4. Remove the clutch housing cover (3).

Tightening torque	Step mounting screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs



3TMACAD3P124A

(1) Foot Accelerator Rod
(2) Step
(3) Clutch Housing Cover

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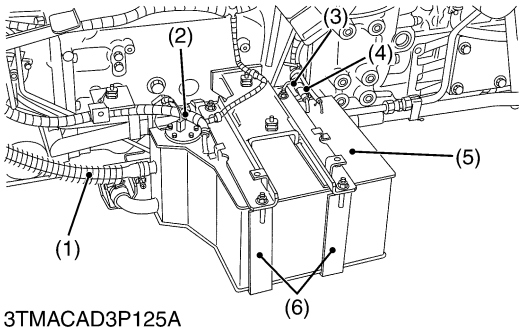

3TMACAD3P125A

Fuel Tanks

1. Remove the fuel hoses (1), (2), (3) and (4).
2. Remove the tank bands (6).
3. Remove the fuel tank (5).

(1) Fuel Hose 1
(2) Fuel Hose 2
(3) Fuel Hose 3
(4) Fuel Hose 4
(5) Fuel Tank
(6) Tank Band

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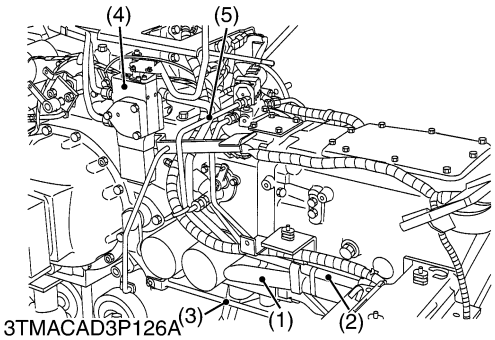

3TMACAD3P126A

Hydraulic Pipes, Brake Rods and Auxiliary Control Valve

1. Remove the suction pipe (1).
2. Remove the delivery pipe (2) for three point hydraulic system.
3. Remove the brake rods (3).
4. Remove the auxiliary control valve (4).
5. Remove the 4WD / Bi-speed turn pipe (5).

(1) Suction Pipe
(2) Delivery Pipe
(3) Brake Rod
(4) Auxiliary Control Valve
(5) 4WD / Bi-speed Turn Pipe

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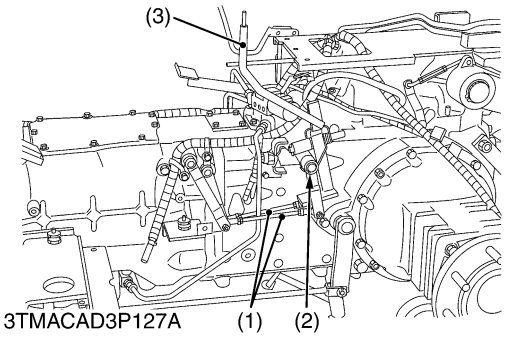

3TMACAD3P127A

Auxiliary Shift Lever

1. Disconnect the shift rods (1).
2. Remove the external snap ring (2).
3. Take out the shift lever assembly (3).

(When reassembling)

- Be sure to adjust the shift rod length.

Shift rod length	Reference value	**L1**	Approx. 208 mm 8.19 in.
		L2	Approx. 208 mm 8.19 in.

(1) Shift Rod
(2) External Snap Ring
(3) Shift Lever

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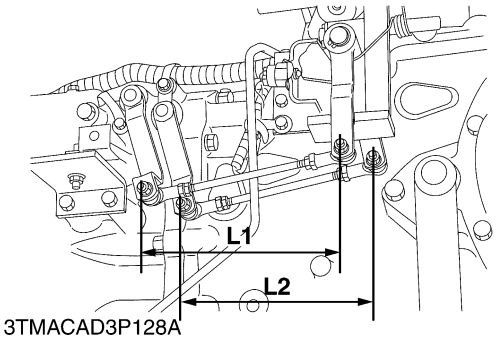

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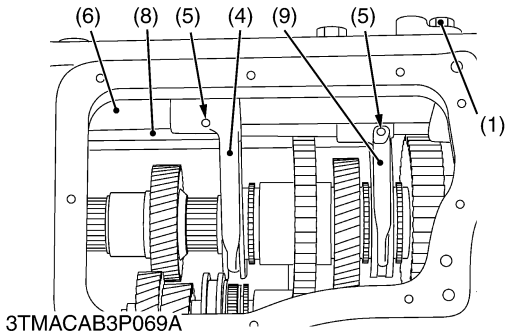

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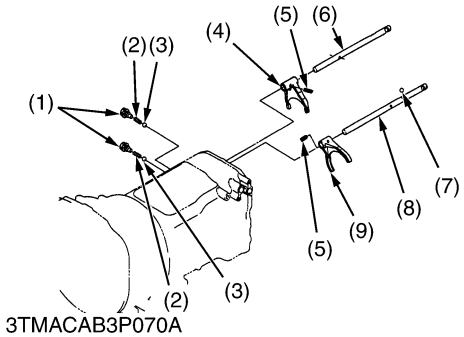

3TMACAB3P070A

Shift Fork H-L, C and Shift Fork Rod H-L, C

1. Remove the lock screws (1) and take out the springs (2) and balls (3).
2. Tap out the spring pin (5).
3. Draw out the shift rod (6) and (8).
4. Take out the shift fork (4) and shift fork (9).

(When reassembling)

- Apply grease to the ball and spring.
- Take care of installing the inter-locking ball (7).
- Apply liquid lock (Three Bond 1372 or equivalent) to the lock screws (1).

(1) Lock Screw
(2) Spring
(3) Ball
(4) Shift Fork (Creep)
(5) Spring Pin
(6) Shift Rod (Creep)
(7) Inter-locking Ball
(8) Shift Rod (Hi-Low)
(9) Shift Fork (Hi-Low)

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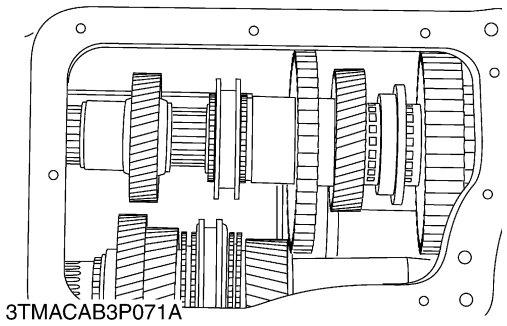
3TMACAB3P071A

1st Shaft

1. Tap out the 1st shaft to the front with gears.

(1) Ball Bearing
(2) 34T Gear
(3) External Snap Ring
(4) 25T Gear
(5) Inner Ring
(6) 17T Gear
(7) Synchronizer
(8) Ball Bearing
(9) External Snap Ring
(10) Collar
(11) Thrust Collar
(12) Needle Bearing
(13) 19T Gear
(14) 1st Shaft

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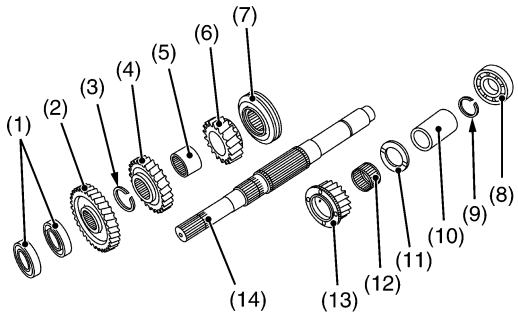

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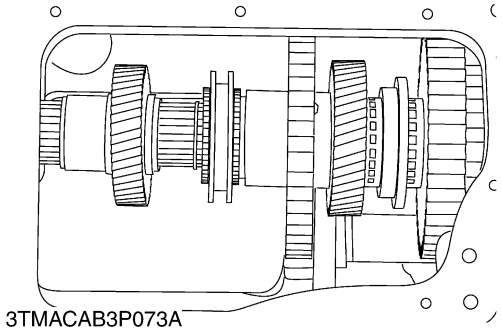
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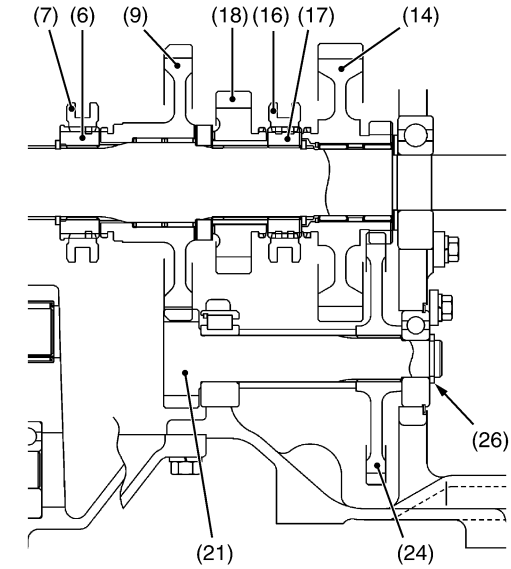

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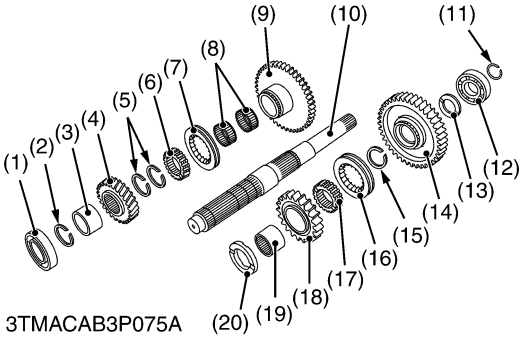

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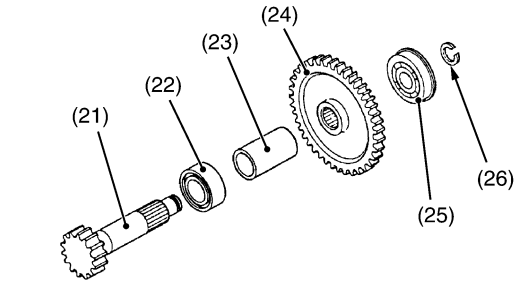

3TMACAB3P076A

Creep Gear and 3rd Shaft

1. Tap out the 3rd shaft (10) with gears to the front.
2. Remove the external snap ring (26).
3. Tap out the 14T gear shaft (21).
4. Take out the 43T gear (24) and collar (23).

(1) Ball Bearing
(2) External Snap Ring
(3) Collar
(4) 26T Gear
(5) External Snap Ring
(6) Hub
(7) Shifter
(8) Needle Bearing
(9) 47T Gear
(10) 3rd Shaft
(11) External Snap Ring
(12) Ball Bearing
(13) Thrust Collar
(14) 41T-19T Gear
(15) External Snap Ring
(16) Shifter
(17) Hub
(18) 21T Gear
(19) Inner Ring
(20) Spacer
(21) 15T Gear Shaft
(22) Ball Bearing
(23) Collar
(24) 43T Gear
(25) Ball Bearing
(26) External Snap Ring

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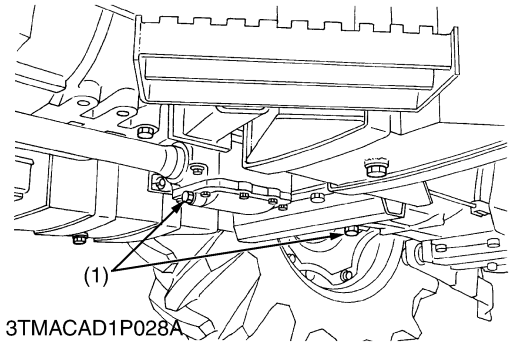
(D) Separating 4WD / Bi-speed Turn Clutch Assembly



Draining Transmission Fluid

1. Place oil pans underneath the transmission case.
2. Remove the drain plugs (1).
3. Drain the transmission fluid.
4. Reinstall the drain plugs (1).

(When reassembling)

- Fill up from filling port after removing the filling plug until reaching the dipstick.
- After running the engine for few minutes, stop it and check the fluid level again, add the fluid to prescribed level if it is not correct level.

Transmission fluid	Capacity	33.0 L 34.88 U.S.qts 29.04 Imp.qts

■ IMPORTANT

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system.**
- **Refer to "LUBRICANTS, FUEL AND COOLANT" (See page NG-2.)**
- **Do not mix different brands fluid together.**

(1) Drain Plug

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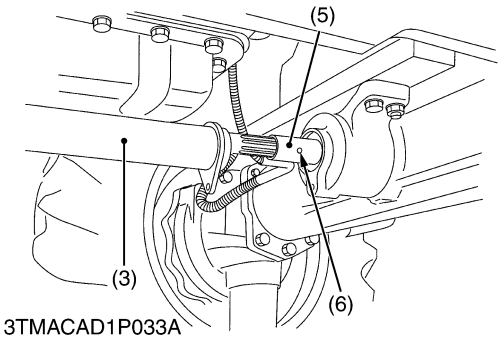

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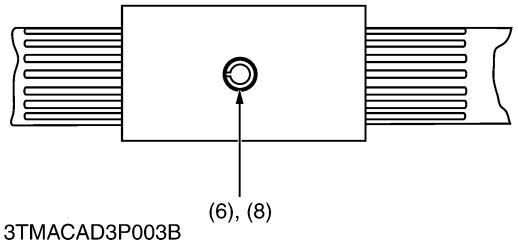


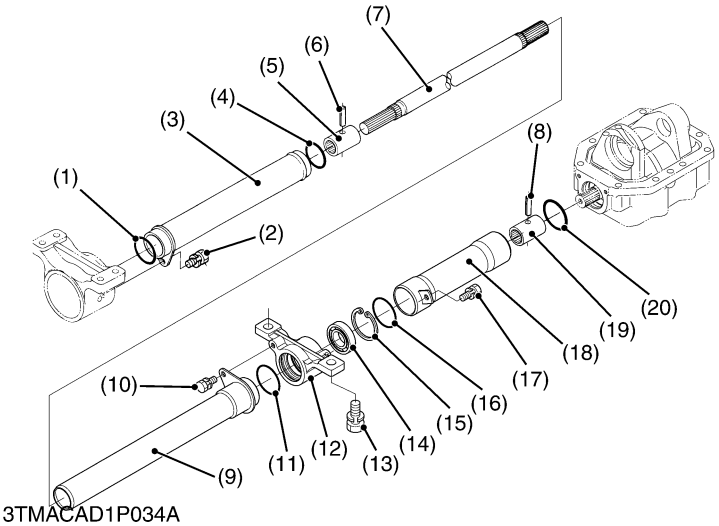
3TMACAD3P003B

Propeller Shaft

1. Slide the propeller shaft covers (3), (18) after removing the screw (2), (13).
2. Tap out the spring pins (6), (8) and then slide the couplings (5), (19) to the front and rear to take out the propeller shaft (7).

(When reassembling)

- Apply grease to the O-rings, propeller shaft and pinion shaft.
- Tap in the spring pins (6), (8) as shown in figure.



3TMACAD1P034A

(1)	O-ring	(11)	O-ring
(2)	Screw	(12)	Cover Bracket
(3)	Front Shaft Cover	(13)	Screw
(4)	O-ring	(14)	Bearing
(5)	Coupling	(15)	Internal Snap Ring
(6)	Spring Pin	(16)	O-ring
(7)	Propeller Shaft	(17)	Screw
(8)	Spring Pin	(18)	Rear Shaft Cover
(9)	Middle Shaft Cover	(19)	Coupling
(10)	Screw	(20)	O-ring

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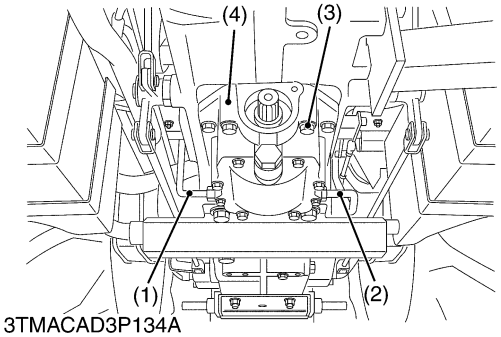

3TMACAD3P134A

4WD / Bi-speed Turn Gear Case Assembly

1. Disconnect 4WD / Bi-speed turn pipes (1), (2).
2. Remove the 4WD / Bi-speed turn gear case mounting screw (3) and mounting nut.
3. Remove the 4WD / Bi-speed turn gear case assembly (4).

(1)	Pipe	(3)	Mounting Screw
(2)	Pipe	(4)	Gear Case Assembly

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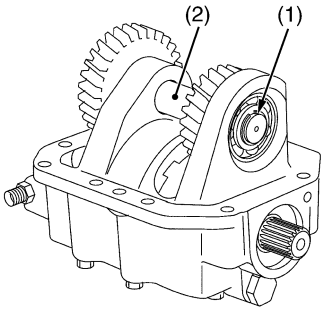

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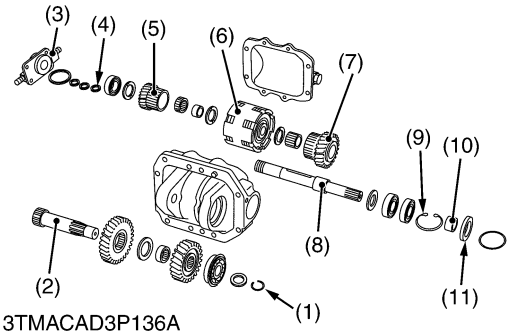

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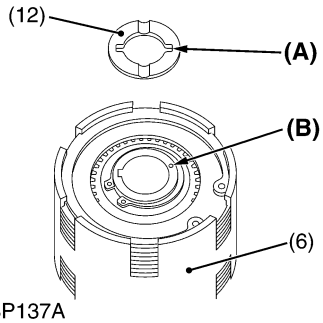

3TMACAD3P137A

4WD / Bi-speed Turn Clutch

1. Remove the external snap ring (1).
2. Tap out the idle shaft (2) to rear side.
3. Remove the gear case side cover (3).
4. Remove the seal ring (4).
5. Remove the oil seal (11).
6. Remove the internal snap ring (9).
7. Tap out the propeller shaft (8) to front side.
8. Remove the 23T gear (7) and 18T gear (5).

■NOTE

- **Take care not to damage the sleeve (10) when remove the oil seal (11).**

(When reassembling)

- When reassembling the thrust collar, align the groove (A) of the thrust collar (12) to the spring pin (B) on the clutch body (6).

(1)	External Snap Ring	(9)	Internal Snap Ring
(2)	Idle Shaft	(10)	Sleeve
(3)	Gear Case Side Cover	(11)	Oil Seal
(4)	Seal Ring	(12)	Thrust Collar
(5)	18T Gear		
(6)	Clutch Body	**(A)**	**Groove**
(7)	23T Gear	**(B)**	**Spring Pin**
(8)	Propeller Shaft		

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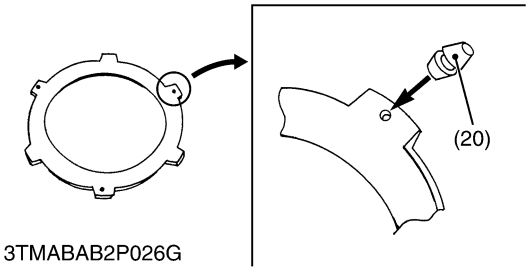
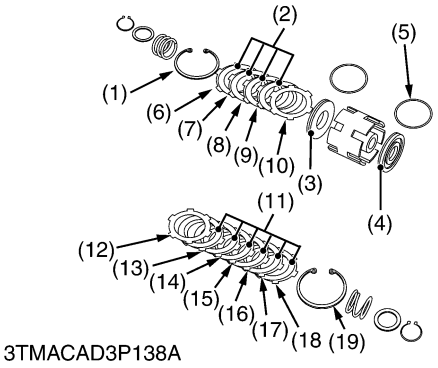


3TMABAB2P026G



3TMACAD3P138A

Disassembling Clutch

1. Remove the internal snap ring (1), and then take out the clutch discs (2), the pressure plate (6), and the drive plate (7), (8), (9) and (10).
2. Remove the piston (3) and O-ring (5) by compression air.
3. Remove the parts for other side as above.

(When reassembling)

- Install the clutch discs (2) and drive plate (7), (8), (9) and (10) mutually.
- When installing the internal snap ring (1), (19) to the clutch body, align its split portion to the notched portion clutch body.
- Apply enough transmission fluid to the discs (2), (11).
- Do not confuse the two types drive plate : The drive plates with the plug rubbers (20) are (7), (9) and without plug rubbers (20) are (8) and (10).
- Do not confuse the pressure plate (6), (18) and drive plates. The pressure plate (6), (18) is thicker than the drive plates.
- Confirm the moving of the piston (3), (4) smoothly when pressure air at 0.5 to 1.0 MPa (5 to 10 kgf/cm^2, 71 to 142 psi) is sent to clutch pack.

(1)	Internal Snap Ring	(11)	Clutch Disc
(2)	Clutch Disc	(12)	Drive Plate
(3)	Piston	(13)	Drive Plate
(4)	Piston	(14)	Drive Plate
(5)	O-ring	(15)	Drive Plate
(6)	Drive Plate	(16)	Drive Plate
(7)	Drive Plate	(17)	Drive Plate
(8)	Drive Plate	(18)	Drive Plate
(9)	Drive Plate	(19)	Internal Snap Ring
(10)	Drive Plate	(20)	Plug Rubber

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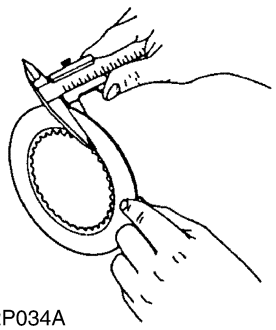
(2) Servicing



3TMABAB2P034A

4WD / Bi-speed Turn Clutch Disc Wear

1. Measure the thickness of clutch disc with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

Thickness of clutch disc	Factory spec.	1.70 to 1.90 mm 0.067 to 0.075 in.
	Allowable limit	1.55 mm 0.061 in.

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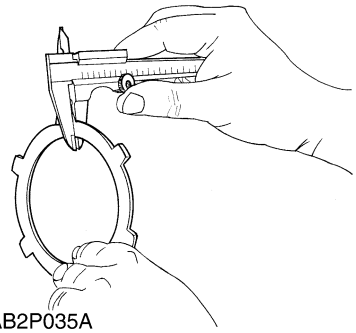

3TMABAB2P035A

4WD / Bi-speed Turn Drive Plate Wear

1. Measure the thickness of drive plate with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

Thickness of drive plate	Factory spec.	1.15 to 1.25 mm 0.045 to 0.049 in.
	Allowable limit	1.10 mm 0.043 in.

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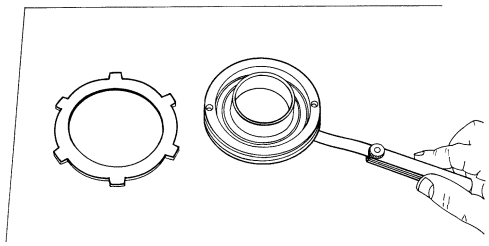

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Flatness of 4WD / Bi-speed Turn Piston and 4WD / Bi-speed Turn Drive Plate

1. Place the part on a surface plate.
2. Check it unable to insert a feeler gauge (allowable limit size) underneath it at least four points.
3. If the feeler gauge can be inserted, replace it.

Flatness of 4WD / Bi-speed turn piston	Allowable limit	0.15 mm 0.006 in.
Flatness of 4WD / Bi-speed turn drive plate	Allowable limit	0.30 mm 0.012 in.

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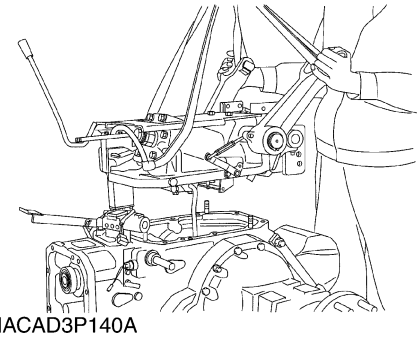
[2] TRANSMISSION CASE

(1) Disassembling and Assembling

(A) Disassembling Transmission Case



3TMACAD3P140A

Hydraulic Cylinder Assembly

1. Remove the lift rods from lift arms.
2. Remove the hydraulic cylinder assembly mounting screws and nuts.
3. Support the hydraulic cylinder assembly with nylon lift strap and hoist, and then remove it.

(When reassembling)

- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of the hydraulic cylinder assembly and transmission case after eliminate the water, oil and stuck liquid gasket.

■ NOTE

- **Reassemble the hydraulic cylinder assembly to the tractor, be sure to adjust the position control feedback rod and draft control rod.**

Tightening torque	Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

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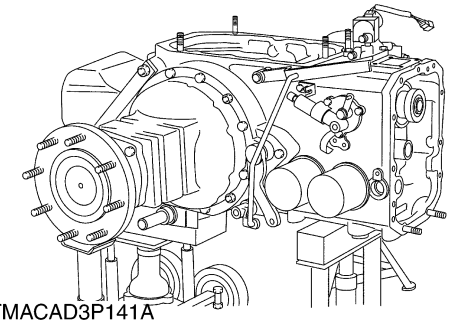

3TMACAD3P141A

Rear Axle L.H.

1. Remove the rear axle case mounting screws and nuts.
2. Support the rear axle assembly with nylon lift strap and hoist, and then remove it.

(When reassembling)

- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of the rear axle case and transmission case, after eliminate the water, oil and stuck liquid gasket.

Tightening torque	Rear axle case mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

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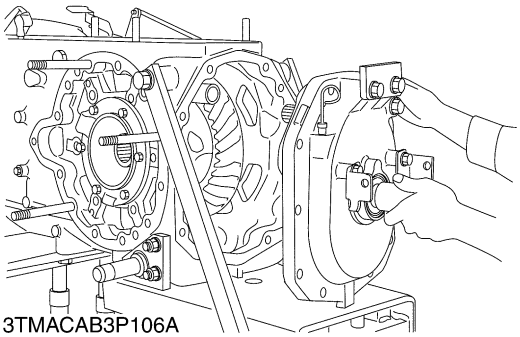

3TMACAB3P106A

PTO Gear Case Assembly

1. Remove the PTO gear case and PTO drive shaft as a unit.

(When reassembling)

- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of the PTO gear case and transmission case.

Tightening torque	PTO gear case assembly mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

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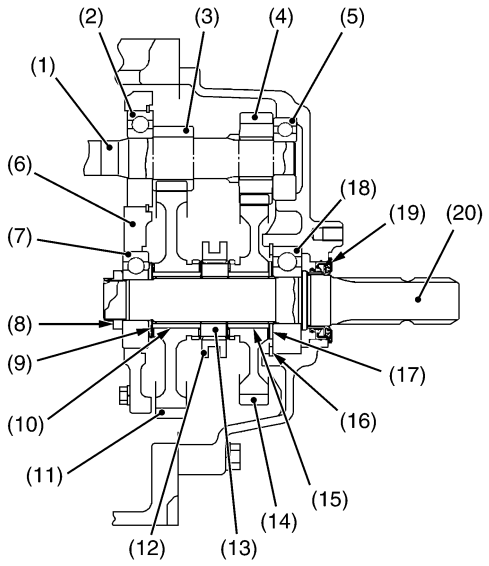

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Disassembling PTO Gear Case

1. Remove the PTO case cover mounting screws and then remove the PTO gear case cover (6).
2. Remove the stake of the staking nut (8), and then remove it.
3. Remove the bearing (7) by using the bearing puller.
4. Tap out the PTO shaft to the rear side.
5. Remove the gears (11), (14), thrust collars (9), (17), inner rings (10), (15), hub (13) and shifter (12).
6. Pull out the PTO drive shaft (1) as a unit.
7. Remove the PTO shift fork parts and PTO shift lever parts.

(When reassembling)

- Reinstall the reamer screw at correct position to mount the PTO cover case.
- Direct the grooves of thrust collars (9), (17) to the inner rings (10), (15) sides.
- Replace the PTO shaft staking nut (8) with new one, and stake it firmly after tightening.
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner rings (10) and (15).
- Apply grease to the oil seal (19) and O-ring.

Tightening torque	PTO shaft staking nut	225.6 to 264.8 N·m 23 to 27 kgf·m 166.4 to 195.3 ft-lbs
	PTO gear case cover mounting screws and reamer screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

(1) PTO Drive Shaft
(2) Ball Bearing
(3) Gear
(4) Gear
(5) Ball Bearing
(6) PTO Gear Case Cover
(7) Ball Bearing
(8) Stake Nut
(9) Thrust Collar
(10) Inner Ring
(11) Gear
(12) Shifter
(13) Hub
(14) Gear
(15) Inner Ring
(16) Internal Snap Ring
(17) Thrust Collar
(18) Ball Bearing
(19) Oil Seal
(20) PTO Shaft

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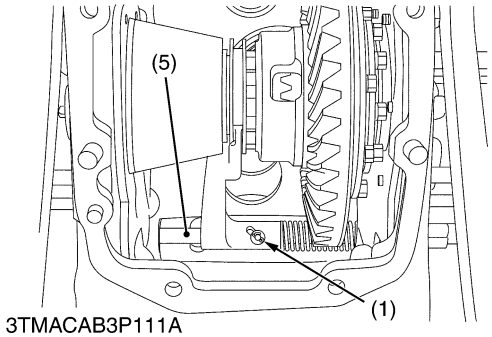

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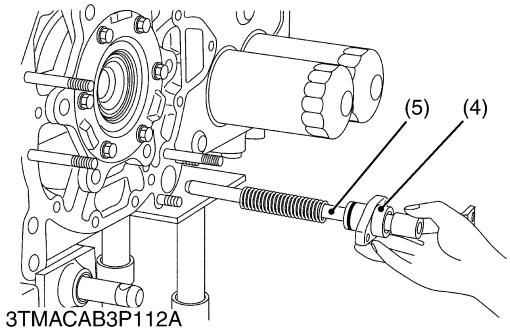

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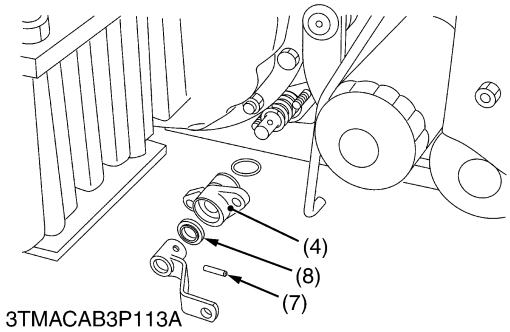


3TMACAB3P113A

Differential Lock Fork

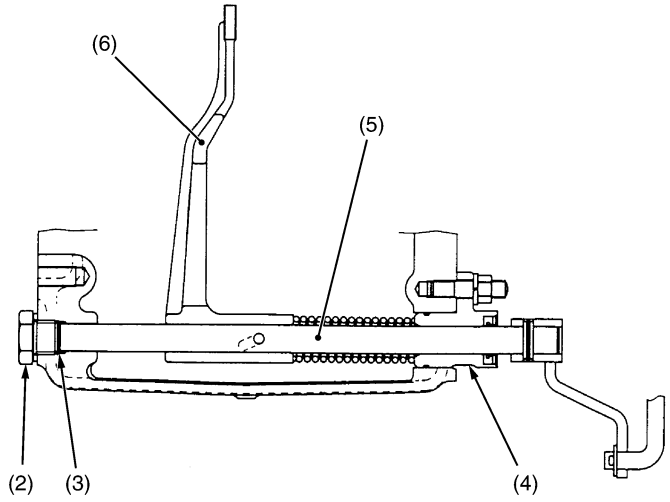
1. Remove the clevis pin (1).
2. Remove the plug (2) and take out the adjusting shims (3).
3. Remove the spring holder (4) mounting nuts.
4. Tap out the differential lock shaft (5) with the spring holder (4).

■ NOTE

- **Taking out the differential lock fork (6), after removing the differential assembly.**
- **When replacing the oil seal only, tap out the differential lock lever spring pin (7), then remove the spring holder (4) and replace the oil seal (8).**

(When reassembling)

- Apply grease or oil to the oil seal and O-ring.



3TMACAB3P114A

(1) Clevis Pin
(2) Plug
(3) Adjusting Shim
(4) Spring Holder
(5) Differential Lock Shaft
(6) Differential Lock Fork
(7) Spring Pin
(8) Oil Seal

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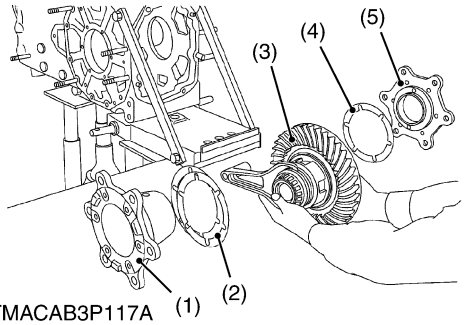

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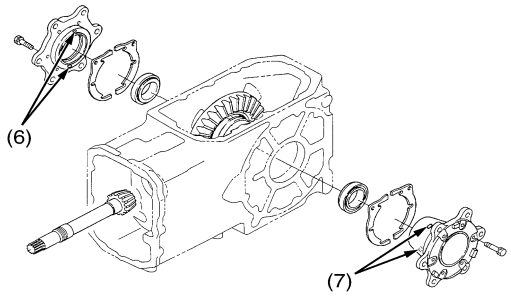

3TMACAB3P118A

Differential Gear Assembly

1. Remove the differential support (1), (5), noting the number of left and right shims (2), (4).
2. Take out the differential gear assembly (3) from transmission case.

(When reassembling)

- Be sure to adjust the turning torque of spiral bevel pinion shaft and differential assembly combined. (See page N3-S33.)
- Be sure to adjust the backlash and tooth contact between the spiral bevel gear and spiral bevel pinion shaft. (See page N3-S34.)
- When installing the differential support to the transmission, be sure to reassemble it as shown in the figure.

Tightening torque	Differential bearing support mounting screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs

(1) Differential Support
(2) Shim
(3) Differential Gear Assembly
(4) Shim
(5) Differential Support
(6) Oil Hole
(7) Oil Hole

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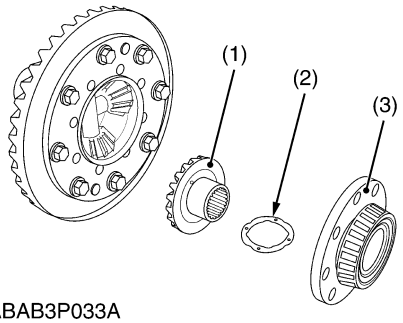

3TMABAB3P033A

Differential Case Cover and Differential Side Gear

1. Remove the differential case cover (3).
2. Remove the differential side gear (1) and differential side gear washer (2).

(When reassembling)

- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of the differential side gear boss.

Tightening torque	Differential case cover mounting screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs

(1) Differential Side Gear
(2) Differential Side Gear Washer
(3) Differential Case Cover

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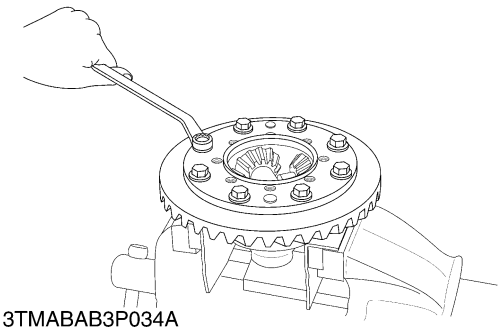
3TMABAB3P034A

Spiral Bevel Gear

1. Remove the spiral bevel gear.

(When reassembling)

- Check the spiral bevel gear for wear or damage. If it is no longer serviceable, replace it. Then, also replace the spiral bevel pinion shaft.
- Apply liquid lock (Three Bond 1372 or equivalent) to the spiral bevel gear UBS screws.

Tightening torque	Spiral bevel gear UBS screw	70.6 to 90.2 N·m 7.2 to 9.2 kgf·m 52.1 to 86.5 ft-lbs

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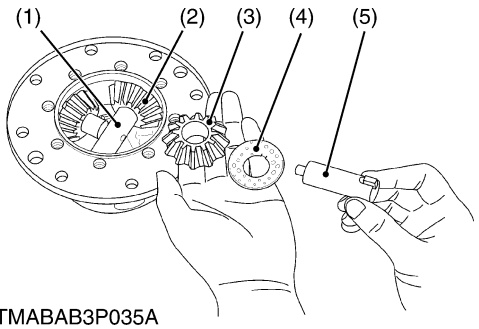

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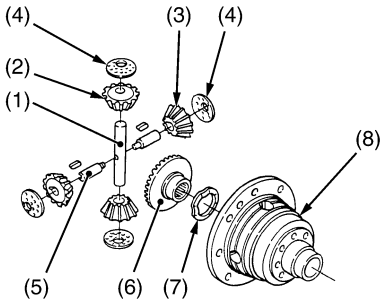

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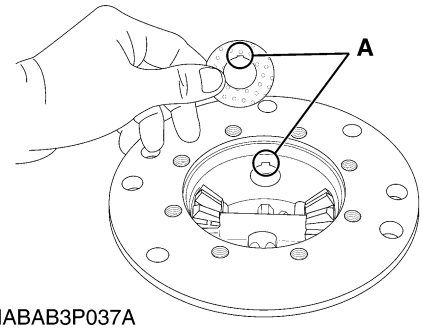

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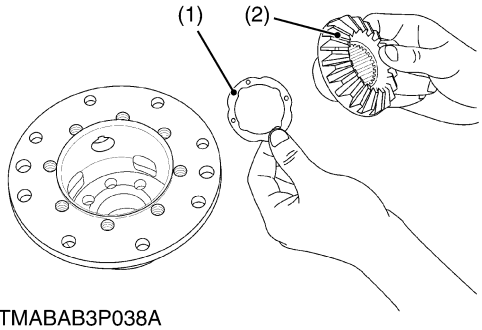

3TMABAB3P038A

Differential Pinion Shaft and Differential Pinion

1. Draw out the differential pinion shaft 2 (5), and take out the differential pinion (3) and differential pinion washer (4).
2. Draw out the differential pinion shaft (1), and take out the differential pinion (2) and differential pinion washer.

■ NOTE

- **Arrange the parts to know their original position.**

(When reassembling)

- Check the differential pinions (2) and (3), and pinion shaft (1) and (5) for excessive wear. If these parts are damaged or excessively worn, replace their parts they are in mesh with, or they sliding on.
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of the differential pinions.
- Install the parts to their original position.
- Install the differential pinion washer (4), noting its groove position.

(1) Differential Pinion Shaft
(2) Differential Pinion
(3) Differential Pinion
(4) Differential Pinion Washer
(5) Differential Pinion Shaft 2
(6) Differential Side Gear
(7) Differential Side Gear Washer
(8) Differential Case
A : Fit Groove

0000001943E

Differential Side Gear

1. Take out the differential side gear (2) and differential side gear washer (1).

(When reassembling)

- Check the thrust and bearing surface of both differential side gears (2). If they are worn or damaged, bores in the differential case may also be damaged. Be sure to replace their parts.

(1) Differential Side Gear Washer
(2) Differential Side Gear

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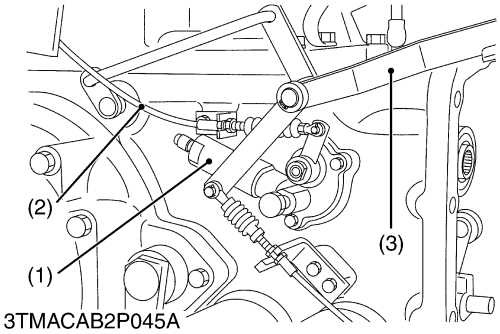

3TMACAB2P045A

PTO Clutch Valve

1. Remove the differential lock pedal (3).
2. Disconnect the PTO clutch valve cable (2).
3. Remove the PTO clutch valve (1).

(When reassembling)

- Apply transmission fluid to O-ring.
- Remove the two hydraulic pipes from the PTO clutch holder.
- Insert both the hydraulic pipes into the PTO clutch valve holes down to the bottom.
- Now while aligning the hydraulic pipe ends with the PTO clutch holder holes, assemble the PTO clutch valve (1) to the transmission case.

Tightening torque	PTO clutch valve mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

(1) PTO Clutch Valve
(2) PTO Clutch Valve Cable
(3) Differential Lock Pedal

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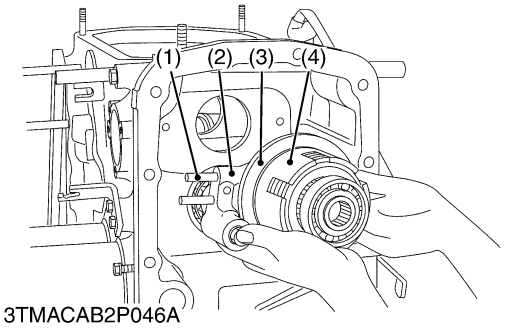


3TMACAB2P046A

PTO Clutch and Holder

1. Remove the PTO clutch holder mounting screws.
2. Remove the PTO clutch (4) with holder.

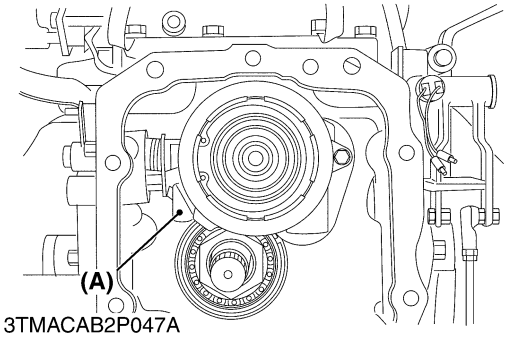
(When reassembling)

- Apply transmission fluid to O-ring.
- Take care not to damage the oil pipes (1).

Tightening torque	PTO clutch holder mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

■ IMPORTANT

- **When reassembling the PTO clutch assembly, direct the projection part of brake plate (A) as a figure.**
- **After assembling the PTO clutch assembly, be sure to check the piston operation by air-blowing.**



3TMACAB2P047A

(1) Oil Pipe
(2) Holder
(3) Brake Plate
(4) PTO Clutch Pack

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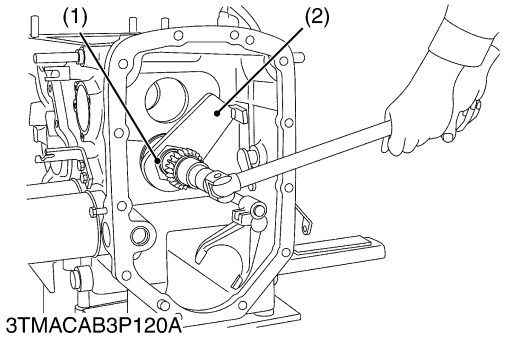

3TMACAB3P120A

Spiral Bevel Pinion Shaft

1. Remove the stake of staking nut (1).
2. Set the staking nut locking wrench (2).
3. Set the spiral bevel pinion shaft turning wrench.
4. Turn the spiral bevel pinion shaft turning wrench to the counterclockwise, then remove it.
5. Tap out the shaft to the rear.

(When reassembling)

- Replace the staking nut with a new one, and be sure to adjust the turning torque of spiral bevel pinion shaft only. (See page N3-S32.)
- Stake the staking nut after installing the differential assembly.

Tightening torque	Spiral bevel pinion shaft staking nut	117.7 to 127.5 N·m 12 to 13 kgf·m 86.8 to 94.0 ft-lbs

(1) Staking Nut (2) Locking Wrench

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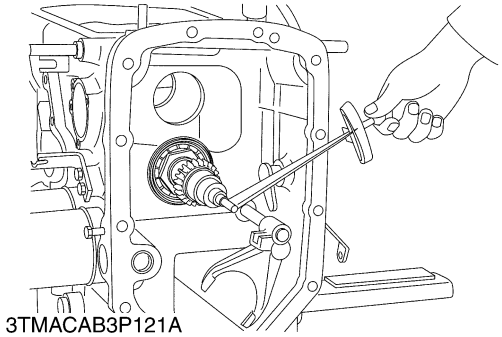
(2) Servicing


3TMACAB3P121A

Turning Torque of Spiral Bevel Pinion Shaft Only

1. Reassemble the spiral bevel pinion shaft and tighten the staking nut (2) with locking wrench and turning wrench.
2. After striking the bevel pinion shaft to the front and rear, retighten the staking nut (2) to specified torque.
3. Measure the turning torque of spiral bevel pinion shaft.
4. If the measurement is not within the factory specifications, adjust the tightening torque of staking nut (2).

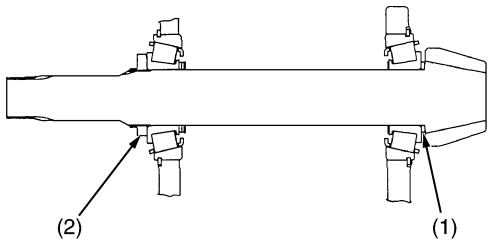
Turning torque	Factory spec.	2.94 to 3.42 N·m 0.30 to 0.35 kgf·m 2.17 to 2.53 ft-lbs

(When reassembling)

Tightening torque	Staking nut (2)	117.7 to 127.5 N·m 12 to 13 kgf·m 86.8 to 94.0 ft-lbs

(Reference)

- Thickness of adjusting collar (1) :
  1.00 mm (0.039 in.) 2.00 mm (0.079 in.)
  1.50 mm (0.059 in.) 2.10 mm (0.083 in.)
  1.70 mm (0.067 in.) 2.20 mm (0.087 in.)
  1.75 mm (0.069 in.) 2.25 mm (0.089 in.)
  1.80 mm (0.071 in.) 2.30 mm (0.091 in.)
  1.90 mm (0.075 in.)



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■ NOTE

- **Stake the staking nut after performing adjustments described in the following pages.**

(1) Collar 1 (2) Staking Nut

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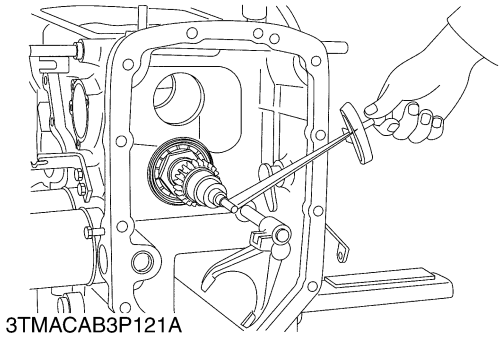

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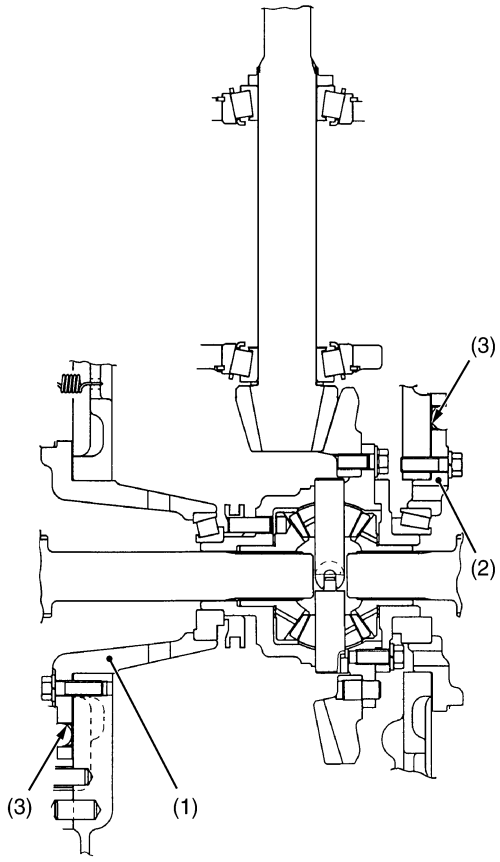

3TMACAD3P142A

Turning Torque of Spiral Bevel Pinion Shaft and Differential Assembly Combined

1. Reassemble the differential assembly with left and right shims (3) same as before disassembling.
2. Check that there is backlash. If there is no backlash, move a left shim to the right.

(Reference)

- If the thickness of shims is not known, refer to the following.
- Reassemble the differential assembly with no shim at bearing support **L** (1) side and with an adequate number of shim at bearing support **R** (2) side. And proceed to the next step.

3. Measure the turning torque by turning the spiral bevel pinion shaft, and then add a shim to the bearing support **R** (2) if the turning torque exceeds the factory specifications, or remove a shim from there if the turning torque is less than the factory specifications.
4. And repeat the above procedure until the turning torque becomes the factory specifications.

Turning torque	Factory spec.	4.22 to 5.88 N·m 0.43 to 0.60 kgf·m 3.11 to 4.34 ft-lbs

(When reassembling)

Tightening torque	Staking nut	117.7 to 127.5 N·m 12 to 13 kgf·m 86.8 to 94.0 ft-lbs

(Reference)

- Thickness of adjusting shims :
  0.1 mm (0.004 in.) 0.5 mm (0.020 in.)
  0.3 mm (0.012 in.)

(1) Bearing Support **L** (3) Shim
(2) Bearing Support **R**

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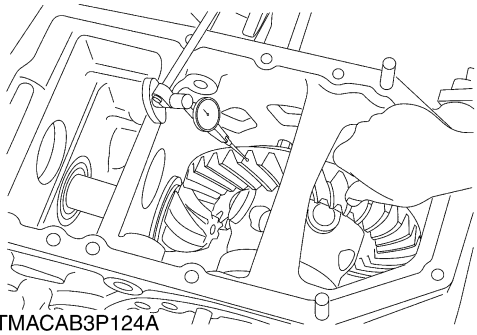
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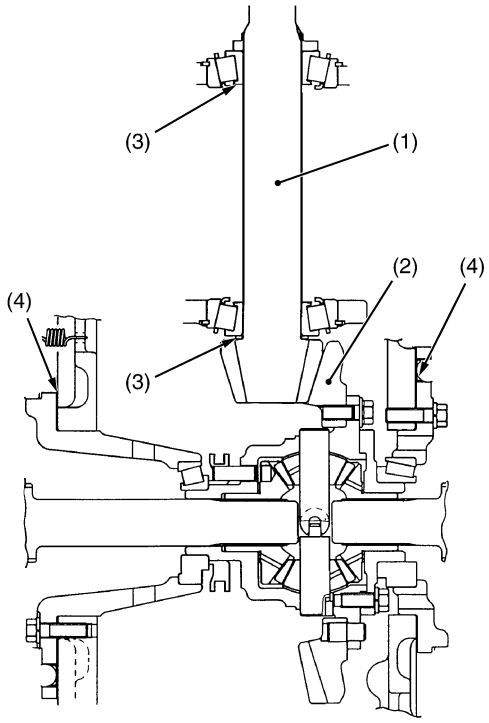

3TMACAD3P143A

Backlash and Tooth Contact between Spiral Bevel Gear and Spiral Bevel Pinion Shaft

1. Set the dial indicator (lever type) with its finger on the tooth surface.
2. Measure the backlash by fixing the spiral bevel pinion shaft (1) and moving the spiral bevel gear (2) by hand.
3. When the backlash is too large, decrease the number of shims in the side of the spiral bevel gear, and insert removed shims in opposite side. When the backlash is too small, decrease the number of shims in the side of the differential case, and insert removed shims in the opposite side.
4. Adjust the backlash properly by repeating the above procedure.
5. Apply red lead lightly over several teeth at three positions equally spaced on the spiral bevel gear.
6. Turn the spiral bevel pinion shaft, while pressing a wooden piece against the periphery on the spiral bevel gear.
7. Check the tooth contact. If not proper, adjust according to the instructions next page.

Backlash between spiral bevel gear and spiral bevel pinion shaft	Factory spec.	0.20 to 0.30 mm 0.0079 to 0.0118 in.
	Allowable limit	0.4 mm 0.016 in.

(Reference)

- Thickness of shims (4) :
  0.1 mm (0.004 in.) 0.5 mm (0.020 in.)
  0.3 mm (0.012 in.)
- Thickness of collar (3) :
  1.00 mm (0.039 in.) 2.00 mm (0.079 in.)
  1.50 mm (0.059 in.) 2.10 mm (0.083 in.)
  1.70 mm (0.067 in.) 2.20 mm (0.087 in.)
  1.75 mm (0.069 in.) 2.25 mm (0.089 in.)
  1.80 mm (0.071 in.) 2.30 mm (0.091 in.)
  1.90 mm (0.075 in.)

(1) Spiral Bevel Pinion Shaft
(2) Spiral Bevel Gear
(3) Adjusting Collar 1
(4) Shim

0000003619E

(A)

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More than 35 % red lead contact area on the gear tooth surface.

The center of tooth contact at 1/3 of the entire width from the small end.

(A) Proper Contact

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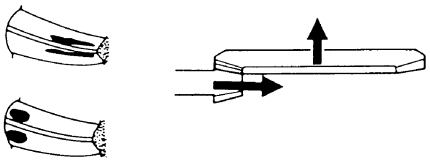
(B)

(C)



3TMABAB3P044A

Replace the adjusting collar 1 (3) with thicker one to move the spiral bevel pinion shaft backward.

And place the left side shims to the right side to move the spiral bevel gear rightward.

Repeat above until the proper tooth contact and backlash are achieved.

(B) Shallow Contact **(C) Heel Contact**

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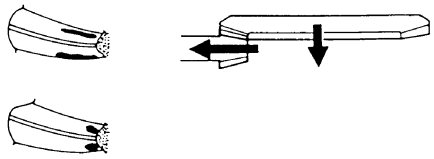
(D)

(E)



3TMABAB3P045A

Replace the adjusting collar 1 (3) with a thinner one to move the spiral bevel pinion shaft forward.

And place the right side shims to the left side to move the spiral bevel gear leftward.

Repeat above until the proper tooth contact and backlash are achieved.

(D) Deep Contact **(E) Toe Contact**

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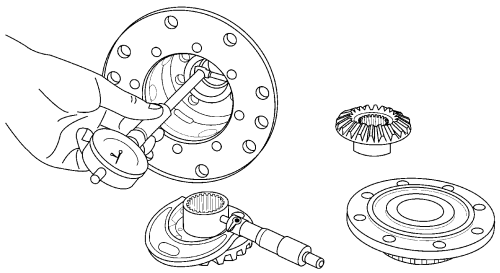

3TMABAB3P046A

Clearance between Differential Case Bore (Differential Case Cover Bore) and Differential Side Gear Boss

1. Measure the bore I.D. of the differential case and differential case cover.
2. Measure the differential side gear boss O.D. and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace them.

Clearance between differential case bore and differential side gear boss	Factory spec.	0.050 to 0.151 mm 0.00197 to 0.00594 in.
	Allowable limit	0.35 mm 0.014 in.

Differential case bore I.D.	Factory spec.	40.500 to 40.550 mm 1.59449 to 1.59646 in.
Differential side gear boss O.D.	Factory spec.	40.388 to 40.450 mm 1.59008 to 1.59252 in.

Clearance between differential case cover bore and differential side gear boss	Factory spec.	0.050 to 0.151 mm 0.00197 to 0.00594 in.
	Allowable limit	0.35 mm 0.014 in.

Differential case cover bore I.D.	Factory spec.	40.500 to 40.550 mm 1.59449 to 1.59646 in.
Differential side gear boss O.D.	Factory spec.	40.388 to 40.450 mm 1.59008 to 1.59252 in.

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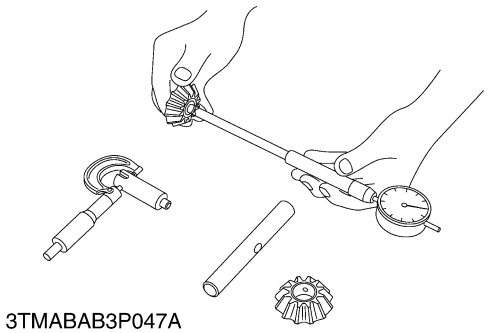
3TMABAB3P047A

Clearance between Differential Pinion Shaft and Differential Pinion

1. Measure the differential pinion shaft O.D.
2. Measure the differential pinion I.D. and calculate the clearance.
3. If the clearance exceed the allowable limit, replace them.

Clearance between differential pinion shaft and differential pinion	Factory spec.	0.060 to 0.102 mm 0.00236 to 0.00402 in.
	Allowable limit	0.25 mm 0.010 in.

Differential pinion shaft O.D.	Factory spec.	19.959 to 19.980 mm 0.78579 to 0.78661 in.
Differential pinion I.D.	Factory spec.	20.040 to 20.061 mm 0.78898 to 0.78980 in.

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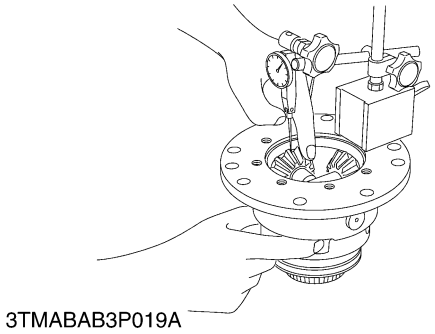
3TMABAB3P019A

Backlash between Differential Pinion and Differential Side Gear

1. Set a dial indicator (lever type) on the tooth of the differential pinion.
2. Hold the differential side gear and move the differential pinion to measure the backlash.
3. If the measurement is not within the factory specifications, adjust with the differential side gear washer.

Backlash between differential pinion and differential side gear	Factory spec.	0.15 to 0.30 mm 0.0059 to 0.0118 in.
	Allowable limit	0.4 mm 0.016 in.

(Reference)

- Thickness of differential side gear washer :
  1.5 mm (0.059 in.) 1.7 mm (0.067 in.)
  1.6 mm (0.063 in.) 1.8 mm (0.079 in.)
  2.0 mm (0.079 in.)

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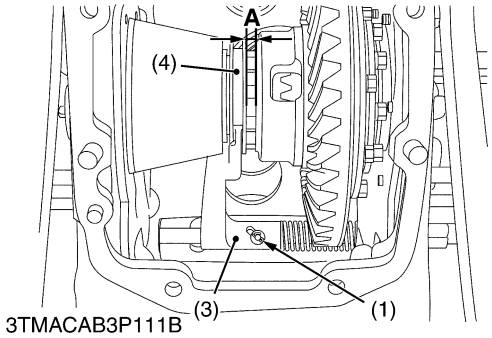
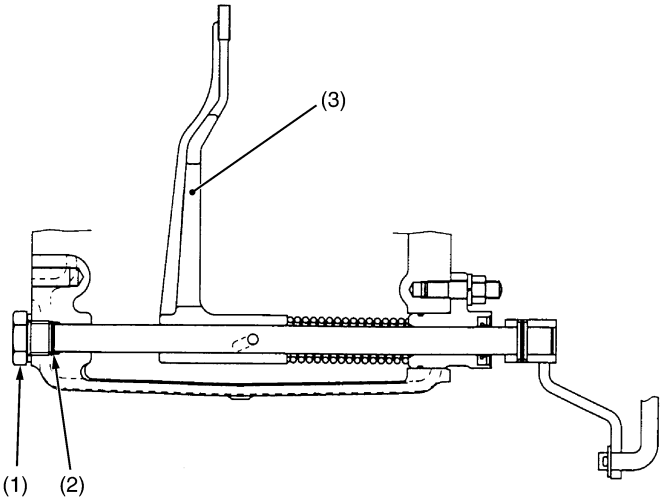


3TMACAB3P111B

Displacement of Differential Lock Shifter

1. Measure the clearance (**A**) between the differential lock shifter (4) and differential case while pushing down the differential lock pedal.
2. If the measurement is not within the factory specifications, adjust with the differential lock adjusting shim (2).

Clearance (**A**)	Factory spec.	0 to 0.7 mm 0 to 0.028 in.



3TMACAB3P114B

(1) Plug
(2) Adjusting Shim
(3) Shift Fork
(4) Differential Lock Shifter

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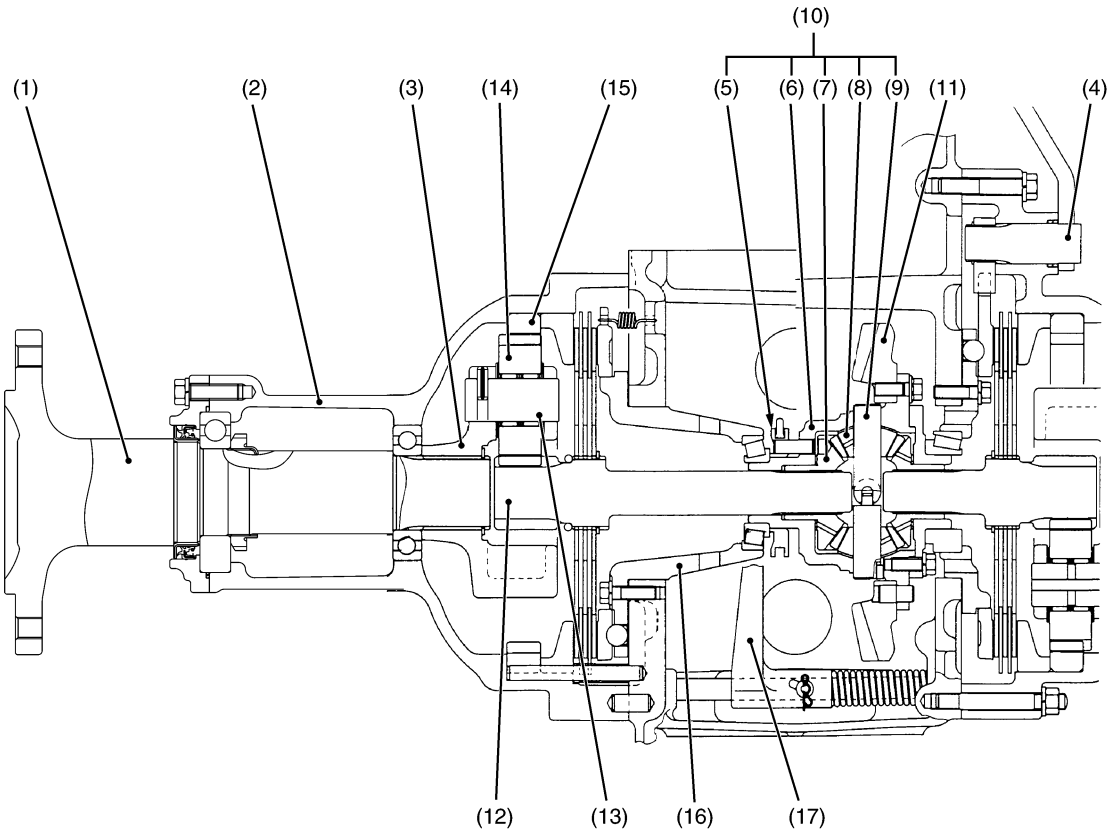
N4 REAR AXLE

CONTENTS

1. STRUCTURE



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(1) Rear Axle
(2) Rear Axle Case
(3) Planetary Gear Support
(4) Brake Cam Shaft
(5) Differential Lock Shifter
(6) Differential Case
(7) Differential Side Gear
(8) Differential Pinion Gear
(9) Differential Pinion Shaft
(10) Differential Gear
(11) 39T Bevel Gear
(12) Brake Shaft (13T Gear)
(13) Planetary Gear Pin
(14) 25T Planetary Gear
(15) 65T Internal Gear
(16) Differential Bearing Support
(17) Differential Lock Shift Fork

The rear axles are the final mechanism which transmit power from the transmission to the rear wheels. Direction of power transmitted is changed at a right angle by the differential gear (10) and, at the same time, speed is reduced. It is further reduced by the planetary gear to drive the rear axles.

The rear axles (1) are semi-floating type with the ball bearing between the rear axle (1) and rear axle case (2), which support the rear wheel load as well as transmitting power to the rear wheel. They withstand all the forces caused by tire rotation and side skidding.

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CONTENTS

1. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Internal Gear to Planetary Gear	Backlash	0.08 to 0.30 mm 0.0032 to 0.0118 in.	0.5 mm 0.020 in.
Planetary Gear Thrust Collar	Thickness	1.55 to 1.65 mm 0.0610 to 0.0650 in.	1.2 mm 0.047 in.
Planetary Gear to Planetary Gear Shaft	Clearance	0.009 to 0.048 mm 0.00035 to 0.00189 in.	0.30 mm 0.0118 in.
	Planetary Gear Shaft O.D.	31.989 to 32.000 mm 1.25941 to 1.25984 in.	—
	Planetary Gear I.D.	39.000 to 39.025 mm 1.53543 to 1.53641 in.	—
	Needle O.D.	3.494 to 3.500 mm 0.13756 to 0.13780 in.	—

0000003501E

2. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See page G-10.)

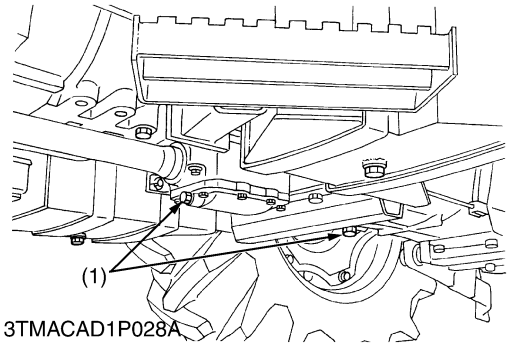
Item	N·m	kgf·m	ft-lbs
Rear wheel mounting nut	260 to 304	26.5 to 31.0	192 to 224
Rear ROPS mounting U-bolt	196 to 225	20 to 23	144.7 to 166.4
Rear axle case mounting screw and nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Rear axle cover mounting screw	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Rear axle nut	539 to 637	55 to 65	398 to 470

0000003502E

3. CHECKING, DISASSEMBLING AND SERVICING

[1] DISASSEMBLING AND ASSEMBLING

(1) Separating Rear Axle Case from Transmission Case



3TMACAD1P028A

Draining Transmission Fluid

1. Place oil pans underneath the transmission case.
2. Remove the drain plugs (1).
3. Drain the transmission fluid.
4. Reinstall the drain plugs (1).

(When reassembling)

- Fill up from filling port after removing the filling plug until reaching the dipstick.
- After running the engine for few minutes, stop it and check the fluid level again, add the fluid to prescribed level if it is not correct level.

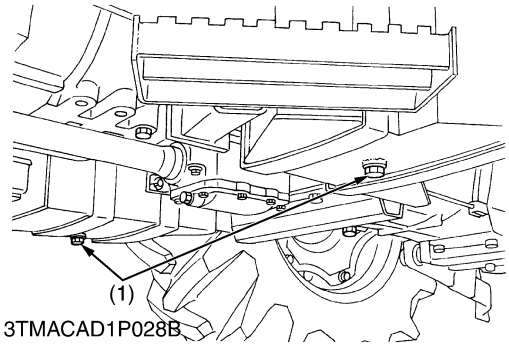
Transmission fluid	Capacity	33.0 L 34.88 U.S.qts 29.04 Imp.qts

■ IMPORTANT

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system.**
- **Refer to "LUBRICANTS, FUEL AND COOLANT" (See page NG-2.)**
- **Do not mix different brands fluid together.**

(1) Drain Plug

0000003403E



3TMACAD1P028B

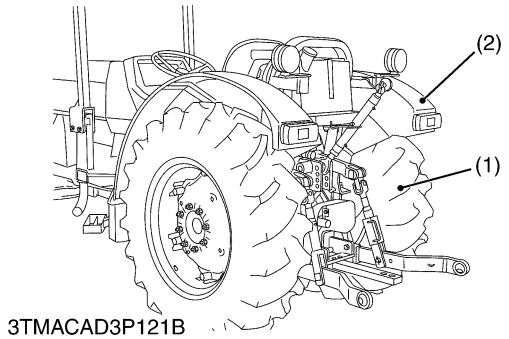
Draining Fuel

1. Place oil pans under the fuel tank.
2. Remove the drain plugs (1).
3. Drain the fuel.
4. Reinstall the drain plugs (1).

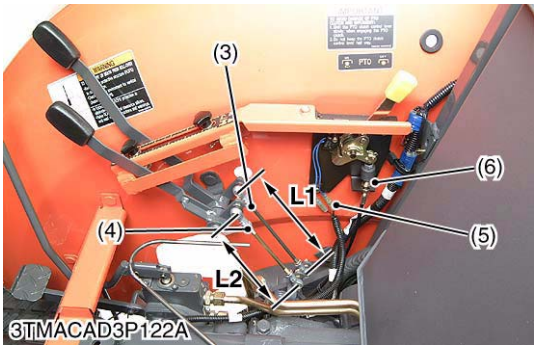
Fuel	Capacity	60 L 15.9 U.S.gals 13.2 Imp.gals

(1) Drain Plug

0000003461E



3TMACAD3P121B



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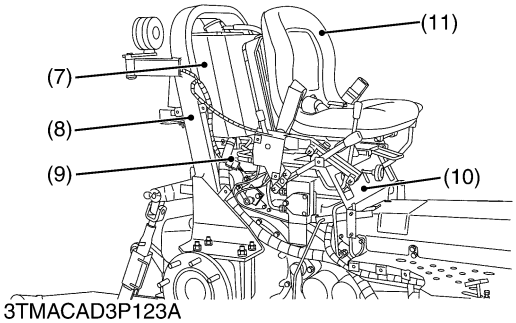

3TMACAD3P123A

Rear Wheel, Fender and ROPS

1. Remove the seat (11).
2. Check the transmission case are securely mounted on the disassembly stands.
3. Disconnect the connector (9) for hazard and tail lights.
4. Disconnect the connectors (5) for PTO safety switch.
5. Remove the rear wheels (1).
6. Disconnect the position rod (3) and draft rod (4).
7. Remove the PTO control wire (6).
8. Remove the fender (2) and center cover (10).
9. Remove the rear ROPS (8) with fuel tank (7).

(When reassembling)

Length of position rod (**L1**)	Factory spec.	206 mm 8.11 in.
Length of draft rod (**L2**)	Factory spec.	172 mm 6.77 in.

Tightening torque	Rear wheel mounting nut	260 to 304 N·m 26.5 to 31.0 kgf·m 192 to 224 ft-lbs
	Rear ROPS mounting U-bolt	196 to 225 N·m 20 to 23 kgf·m 144.7 to 166.4 ft-lbs

■ NOTE

- **Adjust the hydraulic control levers after reassembly when you remove the right fender and the lever guide.**

(1) Rear Wheel
(2) Fender
(3) Position Rod
(4) Draft Rod
(5) Connector
(6) PTO Control Wire
(7) Fuel Tank
(8) Rear ROPS
(9) Connector
(10) Center Cover
(11) Seat

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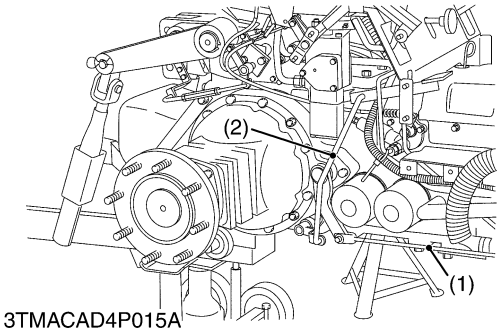


3TMACAD4P015A

Rear Axle Case

1. Remove the brake rod (R.H.) (1).
2. Remove the differential lock rod (R.H.) (2).
3. Remove the rear axle case mounting screws and nuts.
4. Support the rear axle case with nylon lift strap and hoist.
5. Separate the rear axle case from transmission case.

(When reassembling)

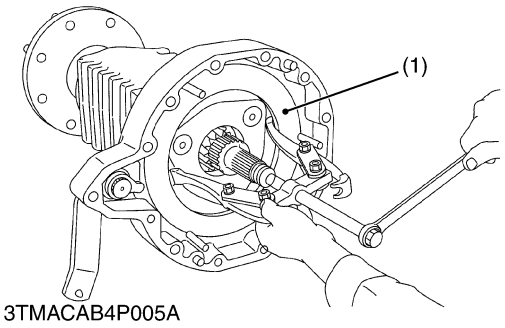
- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of the rear axle case and transmission case, after eliminating the water, oil and stuck liquid gasket.

Tightening torque	Rear axle case mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

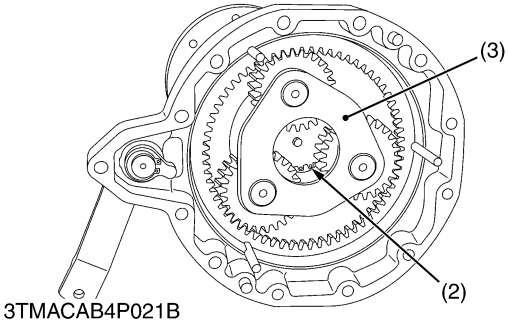
(1) Brake Rod
(2) Differential Lock Rod

0000003503E

(2) Disassembling Rear Axle Case



3TMACAB4P005A



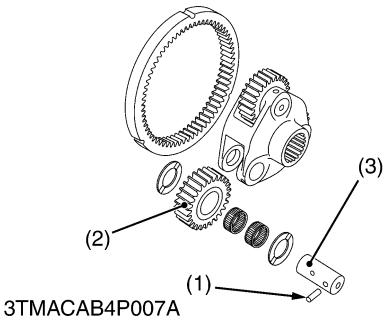
3TMACAB4P021B

Brake Plate and Planetary Gear Support

1. Remove the brake plate (1).
2. Remove the external snap ring (2).
3. Carefully remove the planetary gear support (3).

(1) Brake Plate
(2) External Snap Ring
(3) Planetary Gear Support

0000003504E



3TMACAB4P007A

Planetary Gear

1. Tap the spring pin (1) into the planetary gear shaft (3).
2. Draw out the planetary gear shaft (3), and remove the planetary gear (2).
3. Tap out the spring pin (1) from the planetary gear shaft (3).

(When reassembling)

- Apply transmission fluid to the inner surface of planetary gear (2).
- Tap in the spring pin (1) as shown in the figure.

(1) Spring Pin
(2) Planetary Gear
(3) Planetary Gear Shaft

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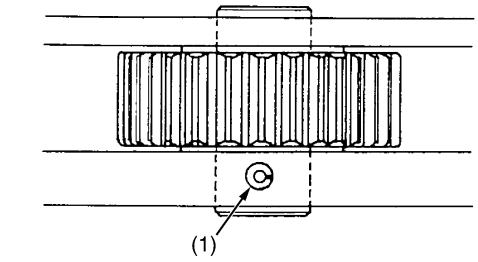
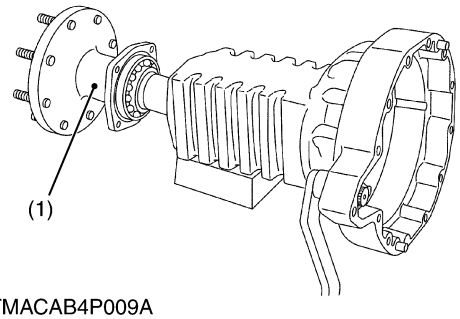


3TMACAB4P008A

(3) Rear Axle Shaft



3TMACAB4P009A

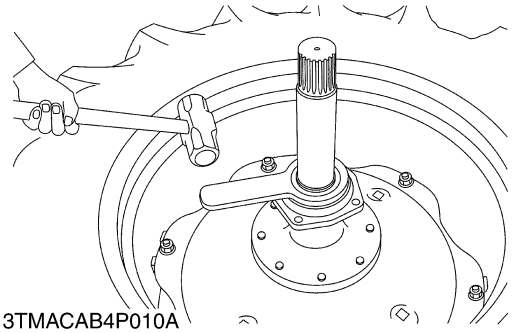
Rear Axle

1. Unscrew the rear axle cover mounting screws, and remove the rear axle (1).

Tightening torque	Rear axle cover mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

(1) Rear Axle

0000002804E



3TMACAB4P010A

Rear Axle Nut

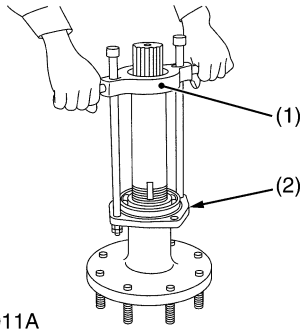
1. Fix the rear axle on the repair table or set to the rear wheel.
2. Remove the stake on the rear axle nut.
3. Remove the rear axle nut with a rear axle nut wrench 85 (Code No. 07916-52541).

(When reassembling)

- Replace the rear axle nut with a new one, and stake if firmly after tightening.

Tightening torque	Rear axle nut	539 to 637 N·m 55.0 to 65.0 kgf·m 398 to 470 ft-lbs

0000002805E



3TMACAB4P011A

Rear Axle Cover

1. Remove the rear axle cover (2) with a rear axle cover puller (1) (Code No. 07916-51041).

(When reassembling)

- Apply grease to the oil seal lips.

(1) Rear Axle Cover Puller (2) Rear Axle Cover

0000002806E

[2] SERVICING

Backlash between Internal Gear and Planetary Gear

1. Set a dial indicator (lever type) on the tooth of the planetary gear.
2. Hold the planetary gear support and move only the planetary gear to measure the backlash.
3. If the measurement exceeds the allowable limit, check the planetary gear and planetary shaft.

Backlash between internal gear and planetary gear	Factory spec.	0.08 to 0.30 mm 0.0032 to 0.0118 in.
	Allowable limit	0.5 mm 0.020 in.

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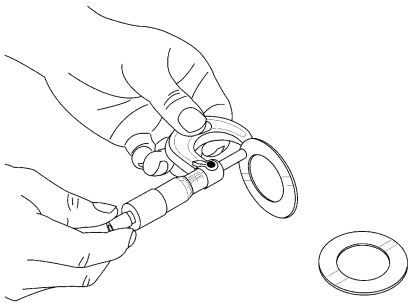
3TMACAB4P018A

Thrust Collar Thickness

1. Measure the thickness of the thrust collar.
2. If the measurement is less than the allowable limit, replace it.

Thrust collar thickness	Factory spec.	1.55 to 1.65 mm 0.0610 to 0.0650 in.
	Allowable limit	1.2 mm 0.047 in.

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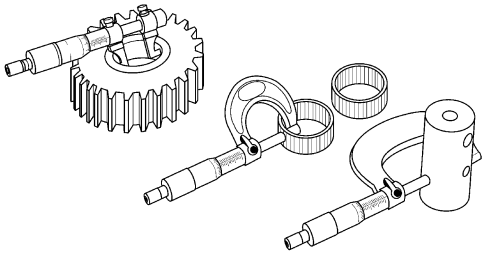

3TMACAB4P019A

Clearance between Planetary Gear and Planetary Gear Shaft

1. Measure the planetary gear shaft O.D. (rubbing surface).
2. Measure planetary gear I.D. (rubbing surface).
3. Measure the O.D. of the two needles installed diagonally in the needle bearing.
4. Calculate the clearance.
5. (Clearance = Planetary gear I.D. - {(2 x Needle O.D.) + Planetary gear shaft O.D.}).
6. If the clearance exceeds the allowable limit, replace them.

Clearance between planetary gear and planetary gear shaft	Factory spec.	0.009 to 0.048 mm 0.00035 to 0.00189 in.
	Allowable limit	0.30 mm 0.0118 in.

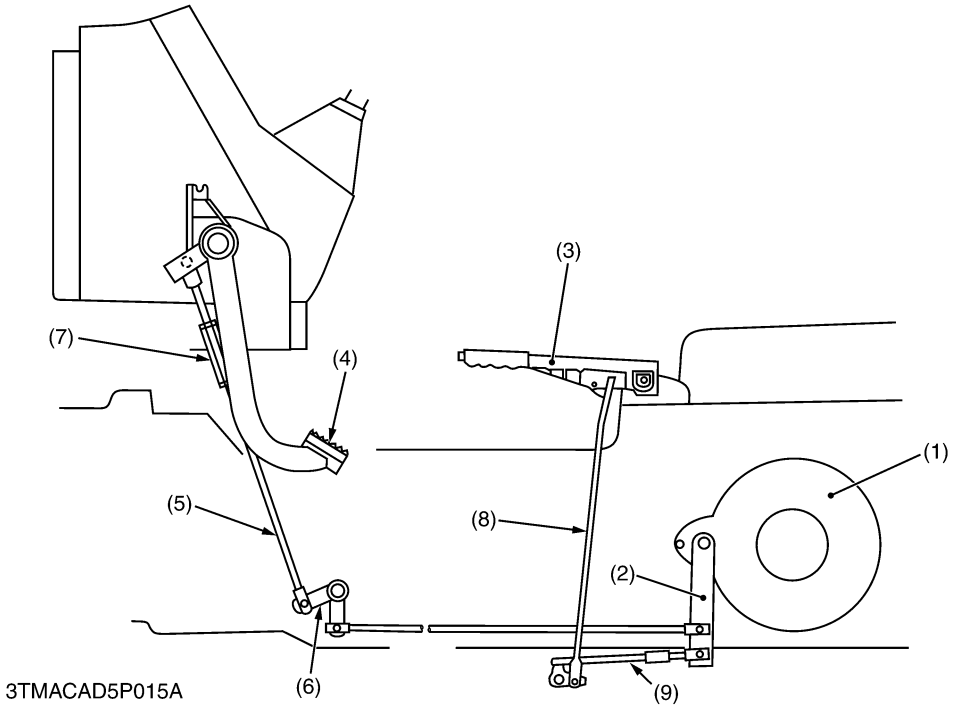
Planetary gear shaft O.D.	Factory spec.	31.989 to 32.000 mm 1.25941 to 1.25984 in.
Planetary gear I.D.	Factory spec.	39.000 to 39.025 mm 1.53543 to 1.53641 in.
Needle O.D.	Factory spec.	3.494 to 3.500 mm 0.13756 to 0.13780 in.

0000002437E

N5 BRAKES

CONTENTS

1. STRUCTURE



(1) Brake Case
(2) Brake Cam Lever
(3) Parking Brake Lever
(4) Brake Pedal
(5) Brake Rod
(6) Brake Lever
(7) Turnbuckle
(8) Parking Brake Rod 1
(9) Parking Brake Rod 2

This is used hanging type brake pedals to have wider space of the platform.

Independent mechanical wet disc brakes are used for the right and left travelling brakes. They are operated by the brake pedals through the mechanical linkages.

The parking brake is a mechanical type which is designed to actuate the travelling brakes. Pulling the parking brake lever results in the same state as that obtained when the brake pedals are pressed.

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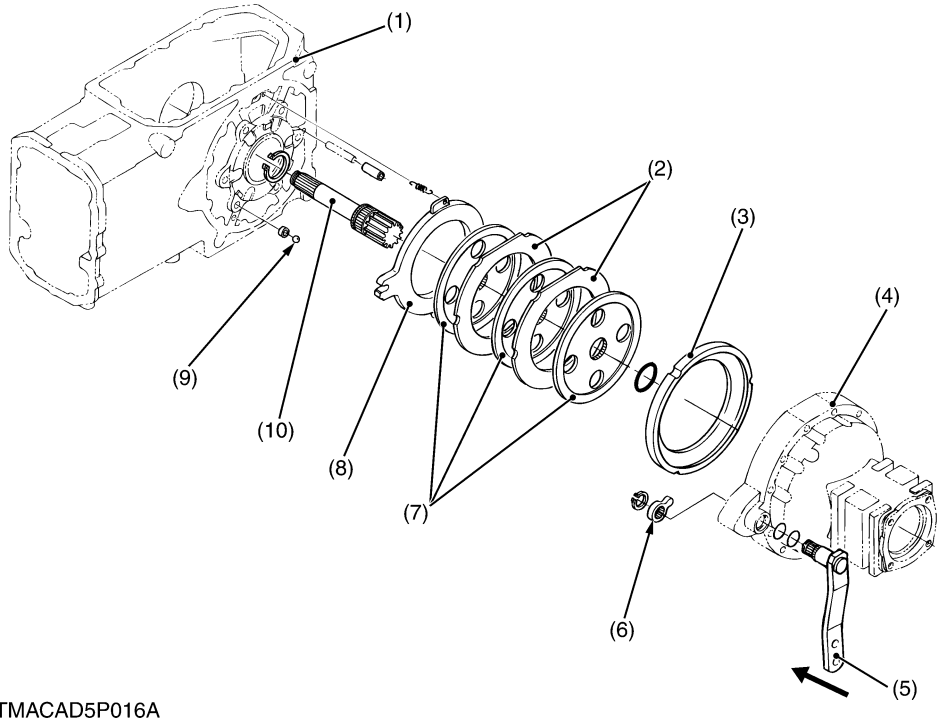

3TMACAD5P016A

(1) Transmission Case
(2) Steel Plate
(3) Stopper Plate
(4) Brake Case
(5) Brake Cam Lever
(6) Brake Cam
(7) Brake Disk
(8) Cam Plate
(9) Steel Ball
(10) Brake Shaft

In the brake case, there are three brake discs (7) splinted to the brake shaft (10), two steel plates (2) arranged between each brake discs, a stopper plate (3), a cam plate (8), and steel balls (9) set in the grooves of transmission base (1).

When the brake pedal is depressed or when the parking brake lever is set, the cam plate (8) rotates by the link mechanics and the cam lever (5). At the same time, the cam plate (8) moves to the right in the figure with the steel ball (9) and presses the brake disks (7) against the steel plates (2) and stopper plate (3).

0000003508E

CONTENTS

1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Uneven Braking Force	● Brake pedal free travel unevenly adjusted	Adjust	N5-S3
	● Brake disc worn	Replace	N5-S6
	● Cam Plate warped	Replace	N5-S5
Brake Drags	● Brake pedal free travel too small	Adjust	N5-S3
	● Ball holes of cam plate for uneven wear	Replace	N5-S5
	● Brake pedal return spring weaken or broken	Replace	—
	● Brake cam rusted	Repair	N5-S5
Poor Braking Force	● Brake pedal free travel excessive	Adjust	N5-S3
	● Brake disc worn	Replace	N5-S6
	● Cam plate worn	Replace	N5-S5
	● Brake cam or lever damaged	Replace	N5-S5
	● Transmission fluid improper	Change	NG-2
Parking Brake Drags	● Parking brake lever free play to small	Adjust	N5-S3
Poor Parking Brake Force	● Parking brake lever free play excessive	Adjust	N5-S3

0000003509E

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Brake Pedal	Free Travel	40 to 45 mm 1.6 to 1.8 in.	—
Cam Plate	Flatness	—	0.3 mm 0.012 in.
Cam Plate and Ball	Height	22.45 to 22.55 mm 0.8839 to 0.8879 in.	22.00 mm 0.8661 in.
Brake Disc	Thickness	4.15 to 4.35 mm 0.1634 to 0.1713 in.	3.3 mm 0.130 in.
Plate	Thickness	2.25 to 2.35 mm 0.0886 to 0.0925 in.	1.5 mm 0.059 in.
Stopper Plate	Flatness	—	0.3 mm 0.012 in.

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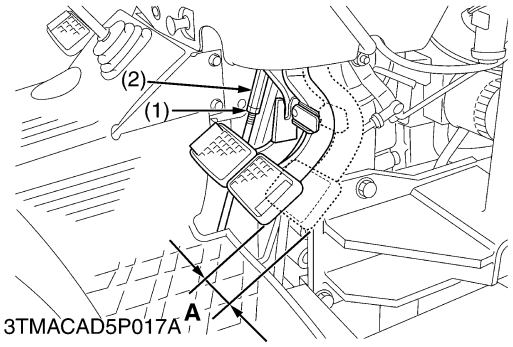
3. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING



3TMACAD5P017A

Brake Pedal Free Travel

CAUTION

- **Stop the engine and remove the key, then choke the wheel before checking brake pedal.**

1. Release the parking brake.
2. Slightly depress the brake pedals and measure free travel **(A)** at top of pedal stroke.
3. If the measurement is not within the factory specifications, loosen the lock nut (1) and turn the turnbuckle (2) to adjust the rod length within acceptable limits.

Brake pedal free travel **(A)**	Factory spec.	40 to 45 mm 1.6 to 1.8 in.

IMPORTANT

- **Keep the free travel in the right and left brake pedals equal.**

(1) Lock Nut (2) Turnbuckle

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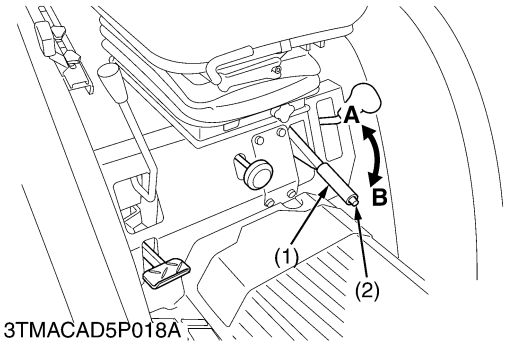

3TMACAD5P018A

Parking Brake Lever Free Play

CAUTION

- **Stop the engine and chock the wheels before checking parking brake.**

1. Release the parking brake lever (1).
2. Loosen the lock nut (2) on the parking brake rod (3).
3. Adjust the parking brake rod length to achieve the reference value.
4. Tighten the lock nut (2).
5. Pull the parking brake lever (1) just one notch and make sure the parking brake shaft (5) is activated.

Parking brake rod length (**L**)	Reference value	180 to 184 mm 7.09 to 7.25 in.

NOTE

- **After adjusting the parking brake lever free play**
  - Right and left parking brake for even braking.
  - With the parking brake released, make sure that the right and lefet tires do not drag on.

(1) Parking Brake Lever (5) Parking Brake Shaft
(2) Lock Nut **A : PULL**
(3) Parking Brake Rod **B : RELEASE**
(4) Brake Lever

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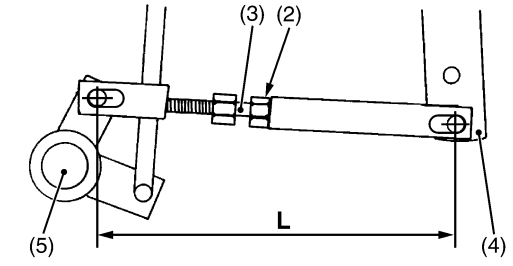

3TMACAD5P019A

[2] DISASSEMBLING AND ASSEMBLING

(1) Separating Rear Axle Case From Transmission Case

- Refer to "Separating Rear Axle Case From Transmission Case" in "4. REAR AXLE" section.

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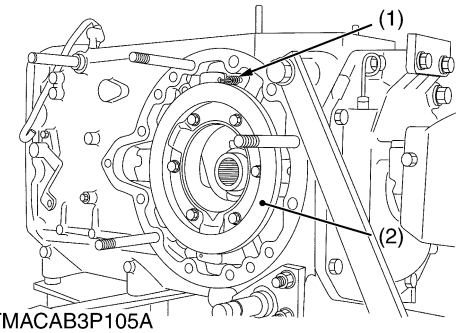
(2) Disassembling Brake Case



3TMACAB3P105A

Brake Cam Plate

1. Remove the return spring (1).
2. Remove the brake cam plate (2).

(When reassembling)

- Apply grease to the brake ball seats. (Do not grease excessively.)

(1) Return Spring
(2) Brake Cam Plate

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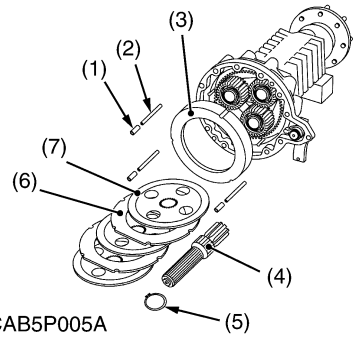
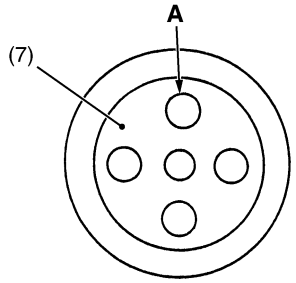


3TMACAB5P005A



3TMACAB5P013A

Brake Shaft, Brake Disc and Brake Plate

1. Draw out the brake shaft (4) with brake disc (7).
2. Remove the external snap ring (5).
3. Remove the steel plate (6).

(When reassembling)

- Place the brake discs (7) so that the holes "A" of the all discs should be overapped.

(1) Collar
(2) Pin
(3) Brake Plate
(4) Brake Shaft
(5) External Snap RIng
(6) Steel Plate
(7) Brake Disc
A : Hole

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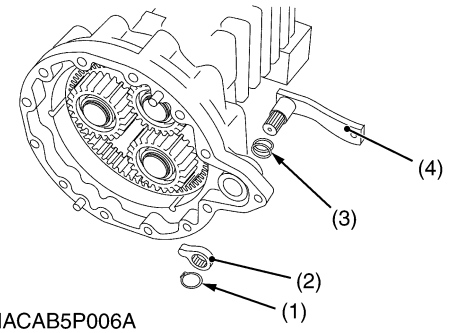
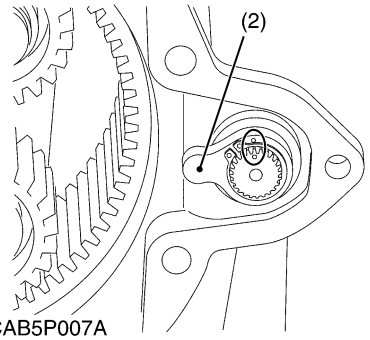


3TMACAB5P006A



3TMACAB5P007A

Brake Cam and Brake Cam Lever

1. Remove the external snap ring (1).
2. Remove the brake cam (2) and brake cam lever (4).

(When reassembling)

- Apply grease to the O-ring (3) and take care not to damage the O-ring.

■ IMPORTANT

- **Install the brake cam (2) to brake cam lever, aligning the marks on them.**

(1) External Snap Ring
(2) Brake Cam
(3) O-ring
(4) Brake Cam Lever

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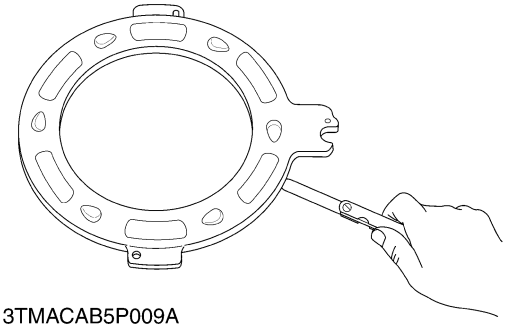
[3] SERVICING


3TMACAB5P009A

Cam Plate Flatness

1. Place the cam plate on the surface plate.
2. Measure the flatness of cam plate with a feeler gauge at four points on a diagonal line.
3. If the measurement exceeds the allowable limit, replace it.

Cam plate flatness	Allowable limit	0.3 mm 0.012 in.

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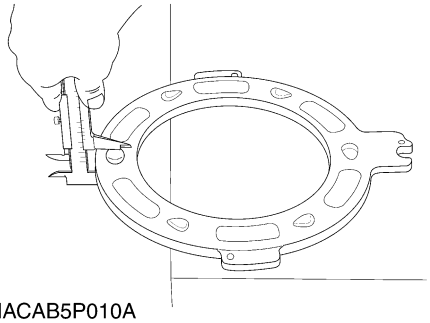
3TMACAB5P010A

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 balls.
3. Inspect the ball holes of cam plate for uneven wear. If the uneven wear is found, replace it.

Height of cam plate and ball	Factory spec.	22.45 to 22.55 mm 0.8839 to 0.8879 in.
	Allowable limit	22.00 mm 0.8661 in.

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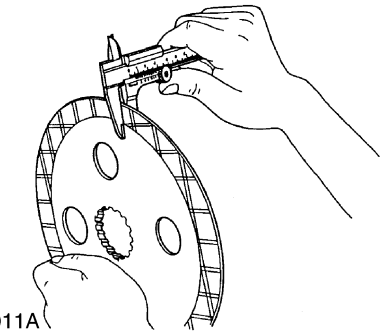

3TMABAB5P011A

Brake Disc Wear

1. Measure the brake disc thickness with vernier calipers.
2. If the measurement is less than the allowable limit, replace it.

Brake disc wear	Factory spec.	4.15 to 4.35 mm 0.1634 to 0.1713 in.
	Allowable limit	3.3 mm 0.130 in.

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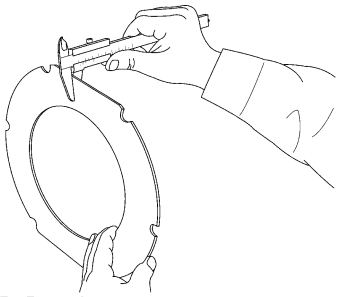

3TMACAB5P011A

Brake Plate Wear

1. Measure the brake plate thickness with vernier calipers.
2. If the measurement is less than the allowable limit, replace it.

Brake plate wear	Factory spec.	2.25 to 2.35 mm 0.0886 to 0.0925 in.
	Allowable limit	1.5 mm 0.059 in.

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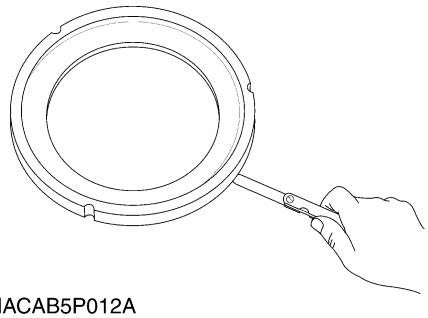

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Stopper Plate Flatness

1. Place the stopper plate on the surface plate.
2. Measure the flatness of stopper plate with a feeler gauge at four points on a diagonal line.
3. If the measurement exceeds the allowable limit, replace it.

Stopper plate flatness	Allowable limit	0.3 mm 0.012 in.

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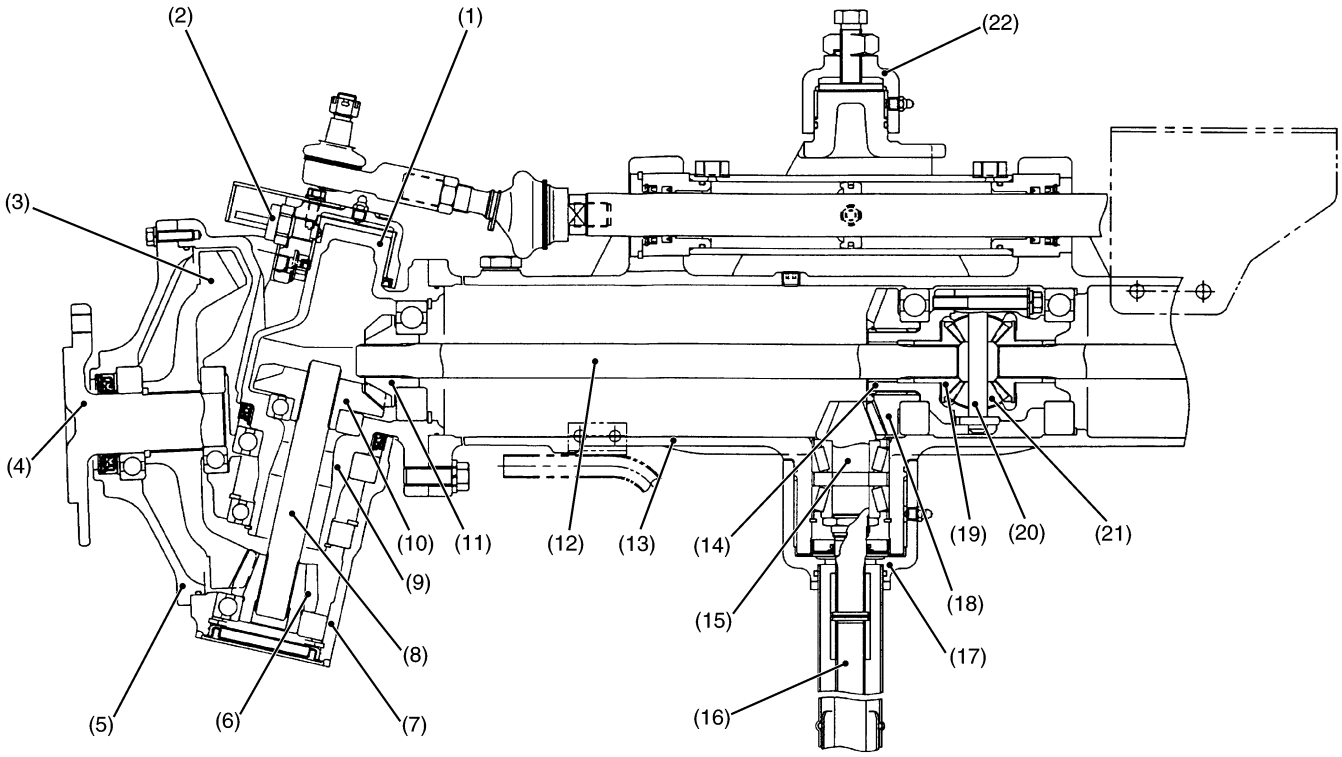
N6 FRONT AXLE

CONTENTS

1. STRUCTURE



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(1)	Front Axle Case Support	(7)	Front Axle Case	(13)	Front Differential Case	(18)	21T Bevel Gear
(2)	Bi-speed Turn Switch	(8)	Bevel Gear Shaft	(14)	Differential Case	(19)	Differential Side Gear
(3)	43T Bevel Gear	(9)	Bevel Gear Case	(15)	8T Bevel Pinion Shaft	(20)	Pinion Shaft
(4)	Front Axle	(10)	17T Bevel Gear	(16)	Propeller Shaft	(21)	Differential Pinion Gear
(5)	Front Axle Case Cover	(11)	10T Bevel Gear	(17)	Bracket (Rear)	(22)	Bracket (Front)
(6)	9T Bevel Gear	(12)	Differential Yoke Shaft				

The front axle of the 4WD is constructed as shown above. Power is transmitted from the transmission through the propeller shaft (16) and to the bevel pinion shaft (15), then to the bevel gear (18) after that to the differential gear.

The power through the differential is transmitted to the differential yoke shaft (12), and to the bevel gear shaft (8) in the front axle case (7).

The revolution is greatly reduced by the bevel gears (6), (3), then the power is transmitted to the axle (4).

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

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CONTENTS

1. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Front Wheel	Steering Angle	0.593 to 0.628 rad. 34 to 36 °	—
Differential Case, Differential Case Cover to Differential Side Gear	Clearance	0.040 to 0.123 mm 0.00157 to 0.00484 in.	0.20 mm 0.0079 in.
	Differential Case (I.D.)	32.000 to 32.062 mm 1.25984 to 1.26228 in.	—
	Differential Case Cover (I.D.)	32.000 to 32.062 mm 1.25984 to 1.26228 in.	—
	Differential Side Gear (O.D.)	31.939 to 31.960 mm 1.25744 to 1.25827 in.	—
Pinion Shaft to Differential Pinion	Clearance	0.064 to 0.100 mm 0.00252 to 0.00394 in.	0.25 mm 0.0096 in.
	Pinion Shaft (O.D.)	13.950 to 13.968 mm 0.54921 to 0.54992 in.	—
	Differential Pinion (I.D.)	14.032 to 14.050 mm 0.55244 to 0.55315 in.	—
Differential Pinion to Differential Side Gear	Backlash	0.2 to 0.3 mm 0.0079 to 0.0118	0.4 mm 0.016 in.
Spiral Bevel Pinion Shaft	Turning Torque	0.98 to 1.18 N·m 0.10 to 0.12 kgf·m 0.72 to 0.87 ft-lbs	—
Spiral Bevel Pinion Shaft to Spiral Bevel Gear	Backlash	0.2 to 0.3 mm 0.0079 to 0.0118	0.4 mm 0.016 in.
10T Bevel Gear to 17T Bevel Gear	Backlash	0.2 to 0.3 mm 0.0079 to 0.0118	0.6 mm 0.024 in.
9T Bevel Gear to 43T Bevel GearBacklash	Backlash	0.25 to 0.35 mm 0.0098 to 0.138 in.	0.6 mm 0.024 in.
Front Axle Case Boss (Front) to Bracket Bushing	Clearance	0.025 to 0.160 mm 0.00098 to 0.00630 in.	0.35 mm 0.0138 in.
	Front Axle Case Boss (Front) (O.D.)	49.950 to 49.975 mm 1.96653 to 1.97283 in.	—
	Bushing (I.D.)	50.000 to 50.110 mm 1.96850 to 1.97283 in.	—
Front Axle Case Boss (Rear) to Bracket Bushing	Clearance	0.025 to 0.190 mm 0.00098 to 0.00748 in.	0.35 mm 0.0138 in.
	Front Axle Case Boss (Rear) (O.D.)	70.000 to 70.035 mm 2.75590 to 2.75728 in.	—
	Bushing (I.D.)	70.060 to 70.190 mm 2.75826 to 2.76338 in.	—

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Item		Factory Specification	Allowable Limit
Bevel Gear Case Boss to Front Axle Support Bushing	Clearance	0.060 to 0.220 mm 0.00236 to 0.00866 in.	0.50 mm 0.0197 in.
	Bevel Gear Case Boss (O.D.)	54.970 to 55.000 2.16417 to 2.16535 in.	—
	Front Axle Support Bushing (I.D.)	55.060 to 55.190 mm 2.16772 to 2.17283 in.	—

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2. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See page G-10.)

Item	N·m	kgf·m	ft-lbs
Power steering hose retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Cylinder cover	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Tie-rod joint and steering cylinder mounting screw	166.7 to 196.1	17.0 to 20.0	122.9 to 144.6
Front wheel mounting nut	166.7 to 196.1	17.0 to 20.0	122.9 to 144.6
Front bracket and rear bracket mounting screw	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Front bracket and rear bracket mounting nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Tie-rod end nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Bevel gear case mounting screw	166.7 to 196.1	17.0 to 20.0	122.9 to 144.6
Front axle rocking force adjusting screw	19.6 to 29.4	2.0 to 3.0	14.5 to 21.7
Front axle rocking force adjusting lock nut	98.1 to 147.1	10.0 to 15.0	72.3 to 108.5
Front wheel case support mounting screw	127.5 to 142.2	13.0 to 14.5	94.0 to 104.9
Front wheel case cover mounting screw	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
Differential case cover mounting screw	60.8 to 70.6	6.2 to 7.2	44.8 to 52.1

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3. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING

Toe-in

1. See page 6-S4 of ME8200 · ME9000 Workshop Manual.

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Axial Sway of Front Wheel

1. See page 6-S4 of ME8200 · ME9000 Workshop Manual.

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Adjusting Front Axle Pivot

1. See page 6-S5 of ME8200 · ME9000 Workshop Manual.

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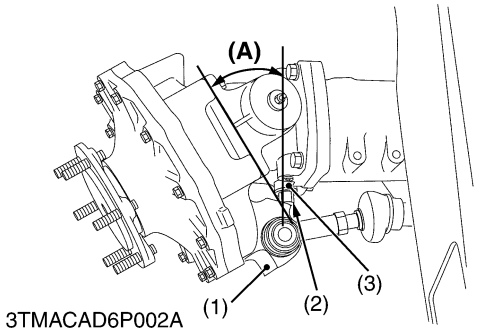

Front Wheel Steering Angle

1. Inflate the tires to the specified pressure.
2. Steer the wheels to the extreme left until the front gear case (1) contacts with the stopper bolt (2) at right hand side of the front axle and measure the steering angle **(A)**.
3. If the steering angle is not within the factory specifications, be sure to adjust it by changing the number of the adjusting washers (3).

Steering angle **(A)** between front gear case and stopper bolt	Factory spec.	0.593 to 0.628 rad 34 to 36 °

(1) Front Gear Case
(2) Stopper Bolt
(3) Adjusting Washer

(A) Steering Angle

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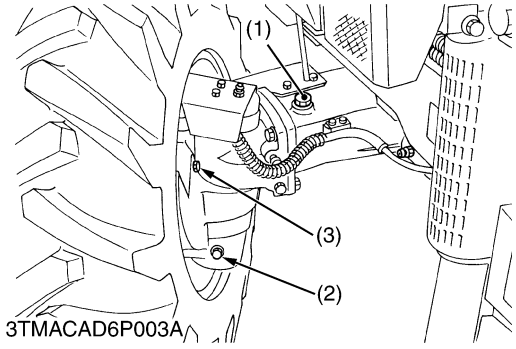
[2] DISASSEMBLING AND ASSEMBLING

(1) Separating Front Axle



Draining Front Axle Case Oil

1. Place oil pans underneath the front wheel case.
2. Remove the drain plug (2) and filling plug (1) to drain the oil.
3. After draining, reinstall the drain plug (2) and filling plug (1).

Front axle case oil	Capacity	6.0 L 6.3 U.S.qts 5.3 Imp.qts

(1) Filling Plug
(2) Drain Plug
(3) Breather Plug

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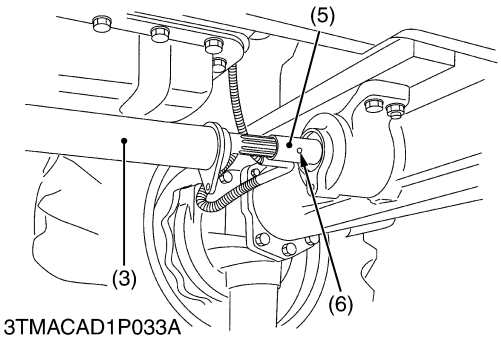

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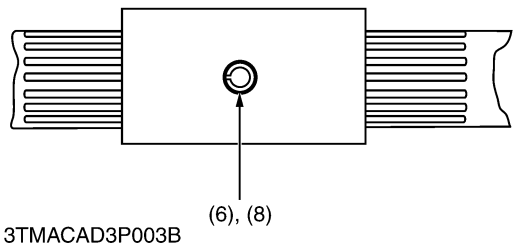


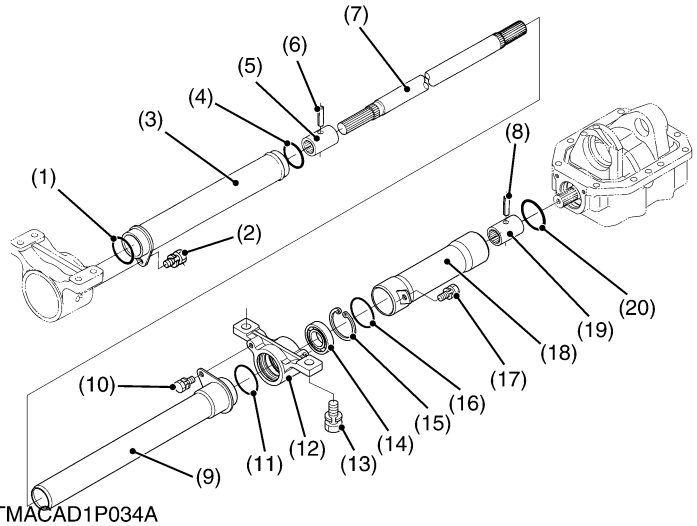
3TMACAD3P003B

Propeller Shaft

1. Slide the propeller shaft covers (3), (18) after removing the screw (2), (13).
2. Tap out the spring pins (6), (8) and then slide the couplings (5), (19) to the front and rear to take out the propeller shaft (7).

(When reassembling)

- Apply grease to the O-rings, propeller shaft and pinion shaft.
- Tap in the spring pins (6), (8) as shown in figure.



3TMACAD1P034A

(1)	O-ring	(11)	O-ring
(2)	Screw	(12)	Cover Bracket
(3)	Front Shaft Cover	(13)	Screw
(4)	O-ring	(14)	Bearing
(5)	Coupling	(15)	Internal Snap Ring
(6)	Spring Pin	(16)	O-ring
(7)	Propeller Shaft	(17)	Screw
(8)	Spring Pin	(18)	Rear Shaft Cover
(9)	Middle Shaft Cover	(19)	Coupling
(10)	Screw	(20)	O-ring

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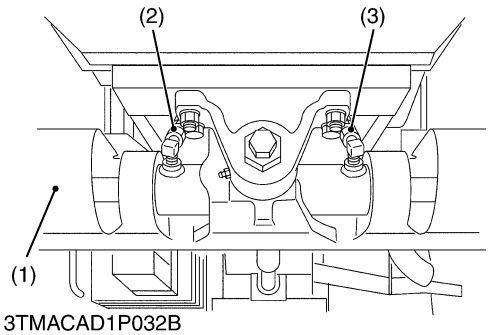

3TMACAD1P032B

Power Steering Hoses

1. Disconnect the power steering hoses (2), (3) from steering cylinder.
2. Remove the cylinder cover (1).

(When reassembling)

Tightening torque	Power steering hose retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 ft-lbs
	Cylinder cover	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1)	Cylinder Cover	(3)	Power Steering Hose 2
(2)	Power Steering Hose 1		

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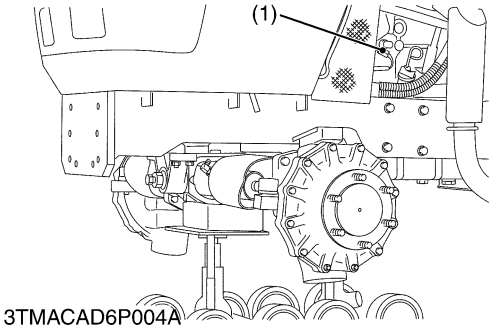

3TMACAD6P004A

Front Wheel and Front Axle

1. Check the front axle and engine are securely mounted on the disassembly stand.
2. Loosen the front wheel mounting nuts.
3. Lift the front axle and remove the front wheels.
4. Disconnect the 4WD / Bi-speed turn connector (1).
5. Remove the bracket (front) mounting screws and nuts.
6. Remove the bracket (rear) mounting screws and nuts.
7. Separate the front axle from front axle bracket.

(When reassembling)

- Connect the power steering hose 1 with green tape to the RH.

Tightening torque	Front wheel mounting nut	166.7 to 196.1 N·m 17.0 to 20.0 kgf·m 122.9 to 144.6 ft-lbs
	Bracket mounting nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

■ IMPORTANT

- **Be sure to adjust the front axle rocking force.**

(1) 4WD / Bi-speed Turn Connector

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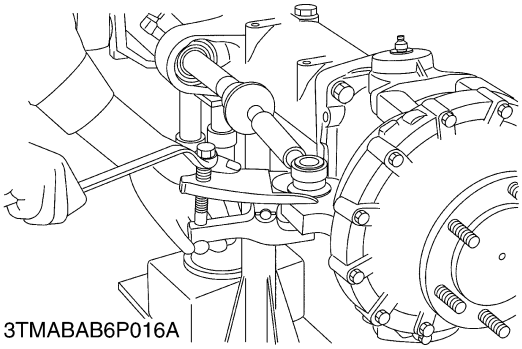
(2) Disassembling Front Axle


3TMABAB6P016A

Tie-rod

1. Pull out the cotter pin and loosen the tie-rod end slotted nut.
2. Disconnect the tie-rod with a tie-rod end lifter (Code No. 07909-39051).

(When reassembling)

- After tightening the tie-rod end nut to the specified torques, install a cotter pin as shown in the figure.

Tightening torque	Tie-rod end slotted nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

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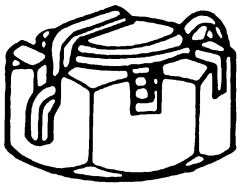
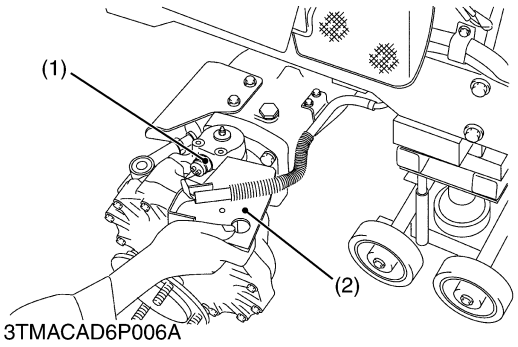

3TMABAB6P017A



3TMACAD6P006A

Bi-speed Turn Switch

1. Remove the cover (1).
2. Remove the bi-speed turn switch (2).

(1) Cover (2) Bi-speed Turn Switch

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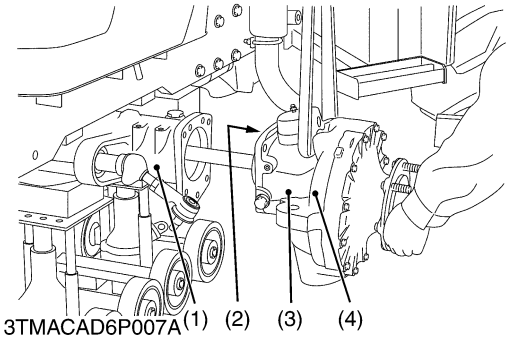

3TMACAD6P007A

Separation of Front Axle Case and Bevel Gear Case

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

(When 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.

Tightening torque	Bevel gear case mounting screw	166.7 to 196.1 N·m 17.0 to 20.0 kgf·m 122.9 to 144.6 ft-lbs

(1) Front Axle Case (3) Bevel Gear Case
(2) O-ring (4) Front Wheel Case

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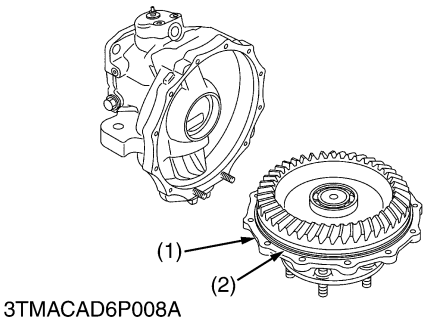

3TMACAD6P008A

Front Wheel Case Cover

1. Remove the mounting screws and remove the front case cover (1).

(When reassembling)

- Apply grease to the O-ring (2).
- Tighten the mounting screws and nuts diagonally in several steps.

Tightening torque	Front wheel case cover mounting screw	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 ft-lbs

(1) Front Wheel Case Cover (2) O-ring

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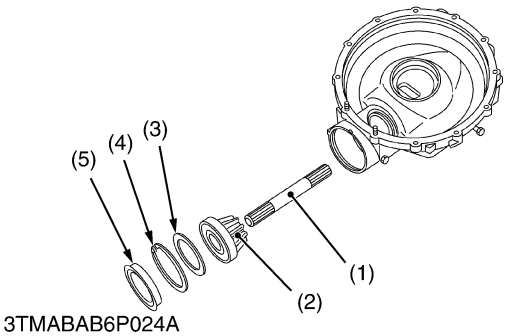

3TMABAB6P024A

Bevel Gear and Bevel Gear Shaft

1. Remove the plug (5).
2. Remove the internal snap ring (4) and shim (3).
3. Tap out the bevel gear (2) with ball bearing.
4. Draw out the bevel gear shaft (1).

(1) Bevel Gear Shaft (4) Internal Snap Ring
(2) Bevel Gear (5) Plug
(3) Shim

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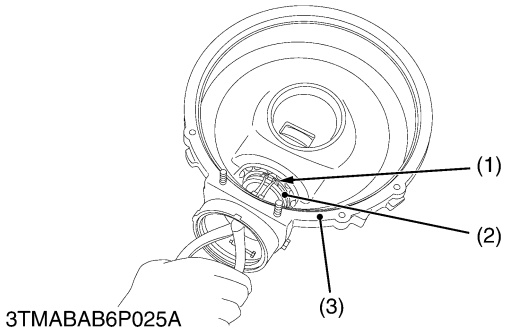

3TMABAB6P025A

Separating Bevel Gear Case

1. Remove the external snap ring (1).
2. Tap the bevel gear case (2) and separate it from the front wheel case (3).

(1) External Snap Ring
(2) Bevel Gear Case
(3) Front Wheel Case

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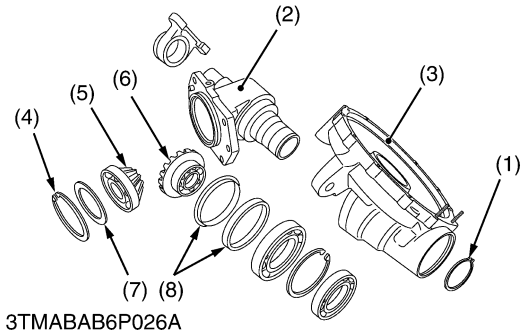

3TMABAB6P026A

Bevel Gear Case

1. Remove the internal snap ring (4).
2. Take out the bevel gears (5), (6) with ball gearings, and shims(7).

(When reassembling)

- Install the shims (7) to their original position.
- Install the oil seal (8) of bevel gear case, noting its direction.

Tightening torque	Front wheel case support mounting screw (M12, UBS screw)	127.5 to 142.2 N·m 13.0 to 14.5 kgf·m 94.0 to 104.9 ft-lbs

(1) External Snap Ring
(2) Bevel Gear Case
(3) Front Wheel Case
(4) Internal Snap Ring
(5) Bevel Gear
(6) Bevel Gear
(7) Shim
(8) Oil Seal

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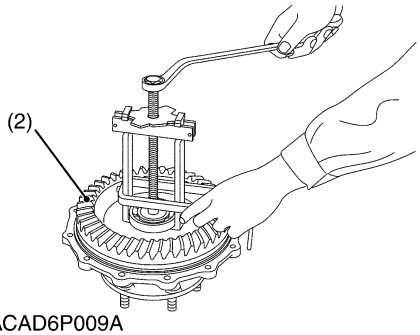

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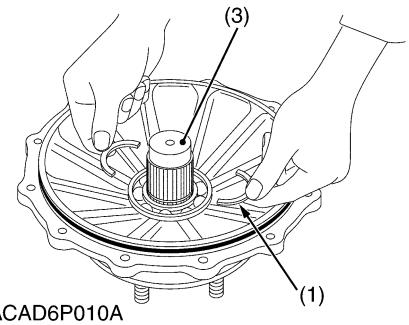

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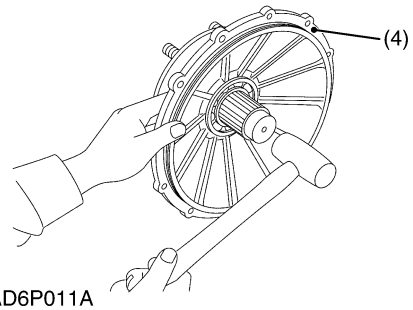

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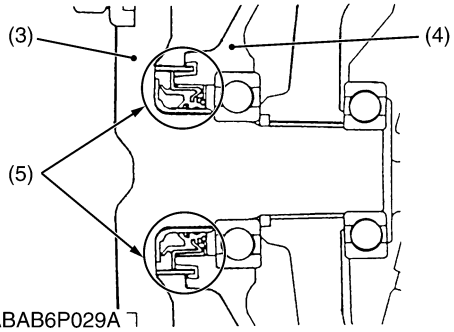

3TMABAB6P029A

Axle

1. Remove the bearing with a special use puller set (Code No. 07916-09032)
2. Take out the bevel gears (2).
3. Take out the collar (1).
4. Tap out the axle (3).

(When reassembling)

- Install the oil seal (5) of front wheel case cover (4), noting its direction as shown in the figure left.

(1) Collar
(2) Bevel Gear
(3) Axle
(4) Front Wheel Case Cover
(5) Oil Seal

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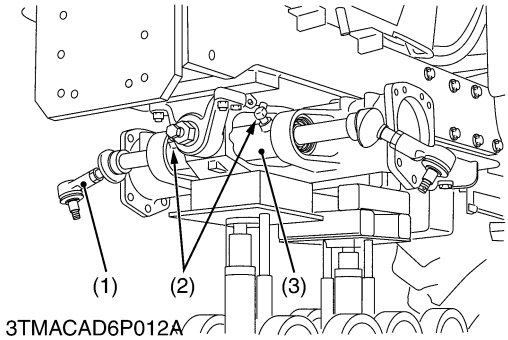

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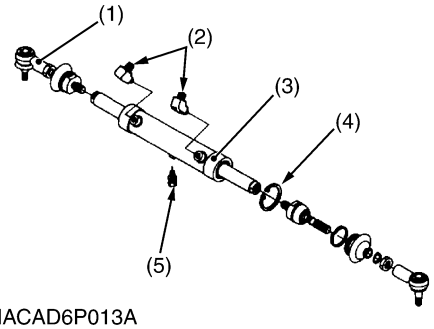

3TMACAD6P013A

Steering Cylinder

1. Remove the tie-rod joint (1) (right side).
2. Remove the cylinder set screw (5).
3. Remove the elbows (2) from steering cylinder.
4. Remove the internal snap ring (4).
5. Draw out the steering cylinder (3).

(When reassembling)

- Apply liquid lock (Three Bond 1372 or equivalent) to the tie-rod joint.

Tightening torque	Tie-rod joint and steering cylinder mounting screw	166.7 to 196.1 N·m 17.0 to 20.0 kgf·m 122.9 to 144.6 ft-lbs

(1) Tie-rod Joint
(2) Elbow
(3) Steering Cylinder
(4) Internal Snap Ring
(5) Cylinder Set Screw

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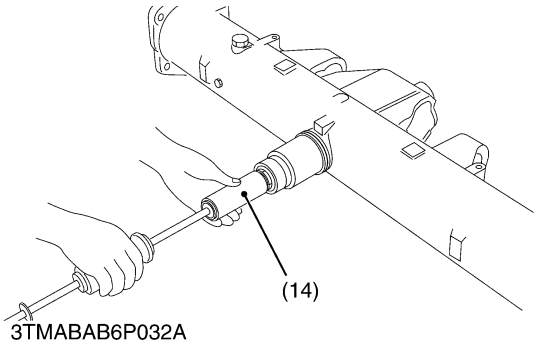

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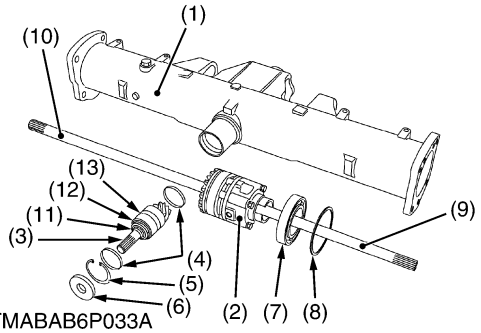

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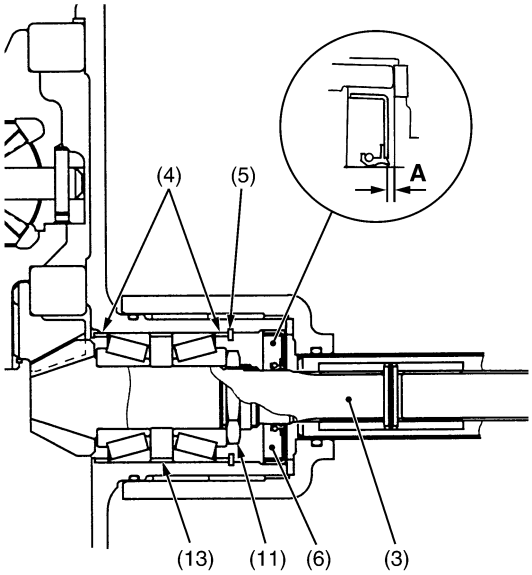

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Spiral Bevel Pinion Shaft and Differential Gear Assembly

1. Take out the differential yoke shaft (9), (10) both sides.
2. Remove the oil seal (6) and internal snap ring (5).
3. Remove the collar (4).
4. Remove the spiral bevel pinion shaft (3) by the pinion shaft remover (14). (See page NG-13.)
5. Take out the differential gear assembly (2), ball bearing (7) and shim (8) from left side of front axle case (1).
6. Remove the stake of lock nut (11), and then remove the lock nut (11).
7. Remove the taper roller bearings (12).

(When reassembling)

- Replace the lock nut (11) and oil seal (6) with new ones.
- Apply grease to the oil seal (6).
- Install the shims and collars to their original position.
- Install the taper roller bearings correctly, noting their direction and apply gear oil to them.
- When press-fitting an oil seal (6), observe the dimension "**A**" described in the figure.

IMPORTANT

- **After adjusting the turning torque, stake the lock nut (11) firmly.**

Turning torque of spiral bevel pinion shaft	Factory spec.	0.98 to 1.18 N·m 0.10 to 0.12 kgf·m 0.72 to 0.87 ft-lbs

(1) Front Axle Case
(2) Differential Gear Assembly
(3) Spiral Bevel Pinion Shaft
(4) Adjusting Collar
(5) Internal Snap Ring
(6) Oil Seal
(7) Ball Bearing
(8) Shim
(9) Differential Yoke Shaft R.H.
(10) Differential Yoke Shaft L.H.
(11) Lock Nut
(12) Taper Roller Bearing
(13) Collar
(14) Pinion Shaft Remover

A : Dimension A : 1.0 mm (0.039 in.)

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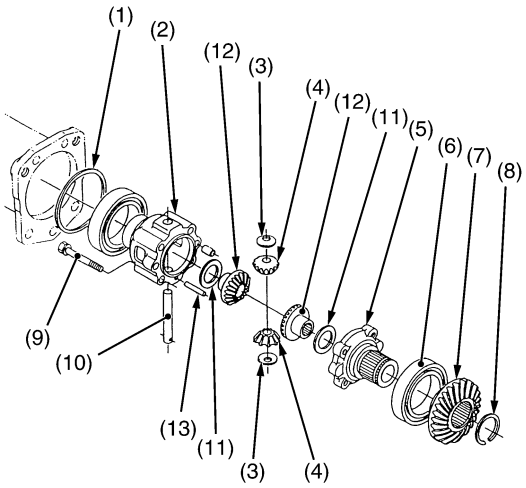

3TMABAB6P035A

Differential Gear

1. Remove the differential case cover mounting screws (9) and then take out the differential case cover (5), ball bearing (6) and spiral bevel gear (7) as a unit.
2. Remove the external snap ring (8), and then remove the ball bearing (6) and spiral bevel gear (7) as a unit with a puller.
3. Remove the straight pin (13).
4. Pull out the pinion shaft (10) and take out the differential pinions (4) and differential side gears (12).

(When reassembling)

- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of the differential side gears (12) and differential pinions (4).

■ IMPORTANT

- **After adjusting the turning torque stake the lock nut (11) firmly.**

Tightening torque	Differential case cover mounting screw	60.8 to 70.6 N·m 6.2 to 7.2 kgf·m 44.8 to 52.1 ft-lbs

(1) Shim
(2) Differential Case
(3) Thrust Collar
(4) Differential Pinion
(5) Differential Case Cover
(6) Ball Bearing
(7) Spiral Bevel Gear
(8) External Snap Ring
(9) Differential Case Cover Mounting Screw
(10) Pinion Shaft
(11) Shim
(12) Differential Side Gear
(13) Straight Pin

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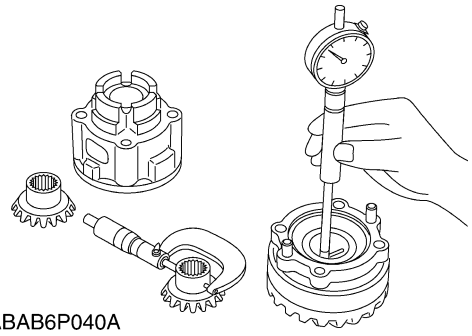
[3] SERVICING



3TMABAB6P040A

Clearance between Differential Case (Differential Case Cover) and Differential Side Gear

1. Measure the differential side gear O.D..
2. Measure the differential case bore I.D. and calculate the clearance.
3. Measure the differential case cover bore I.D. and calculate the clearance.
4. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential case (differential case cover) and differential side gear	Factory spec.	0.040 to 0.123 mm 0.00157 to 0.00484 in.
	Allowable limit	0.20 mm 0.0079 in.

Differential case bore I.D.	Factory spec.	32.000 to 32.062 mm 1.25984 to 1.26228 in.
Differential case cover bore I.D.	Factory spec.	32.000 to 32.062 mm 1.25984 to 1.26228 in.
Differential side gear O.D.	Factory spec.	31.939 to 31.960 mm 1.25744 to 1.25827 in.

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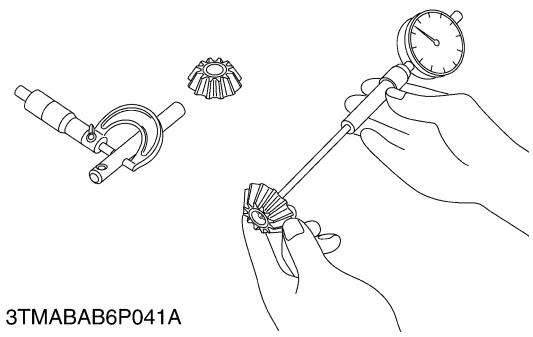

3TMABAB6P041A

Clearance between Pinion Shaft and Differential Pinion

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

Clearance between pinion shaft and differential pinion	Factory spec.	0.064 to 0.100 mm 0.00252 to 0.00394 in.
	Allowable limit	0.25 mm 0.0096 in.

Pinion shaft O.D.	Factory spec.	13.950 to 13.968 mm 0.54921 to 0.54992 in.
Differential pinion I.D.	Factory spec.	14.032 to 14.050 mm 0.55244 to 0.55315 in.

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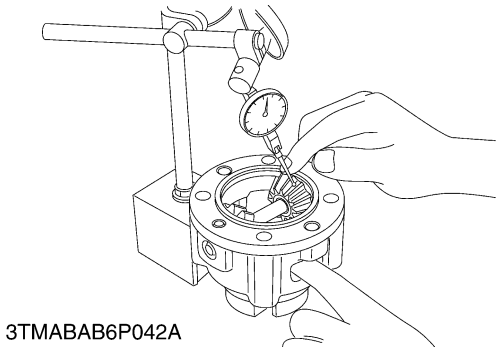

3TMABAB6P042A

Backlash between Differential Pinion and Differential Side Gear

1. Set a dial gauge (lever type) on a tooth of the differential pinion.
2. Fix the differential side gear and move the differential pinion to measure the backlash.
3. If the measurement exceeds the factory specifications, adjust with the differential side gears shims.

Backlash between differential pinion and differential side gear	Factory spec.	0.20 to 0.30 mm 0.0079 to 0.0118 in.
	Allowable limit	0.40 mm 0.016 in.

(Reference)

- Thickness of adjusting shims
  0.4 mm (0.016 in.) 1.0 mm (0.039 in.)
  0.6 mm (0.024 in.) 1.2 mm (0.047 in.)
  0.8 mm (0.031 in.)
- Tooth contact : More than 35 %

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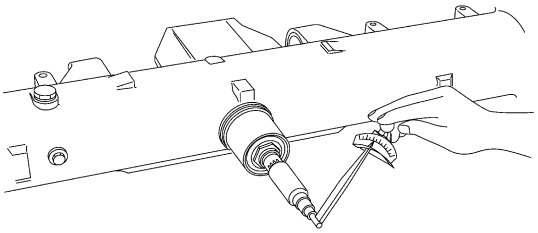

3TMABAB6P043A

Turning Torque of Spiral Bevel Pinion Shaft (Pinion Shaft Only)

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

Turning torque of spiral bevel pinion shaft	Factory spec.	0.98 to 1.18 N·m 0.10 to 0.12 kgf·m 0.72 to 0.87 ft-lbs

■ **NOTE**

- **After turning torque adjustment, be sure to stake the lock nut.**

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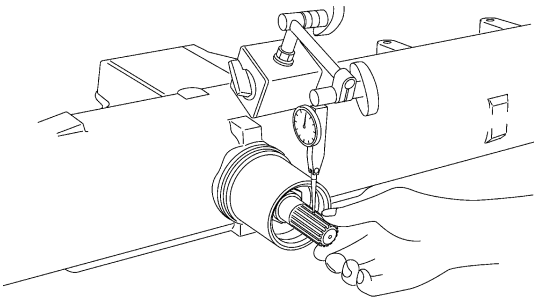

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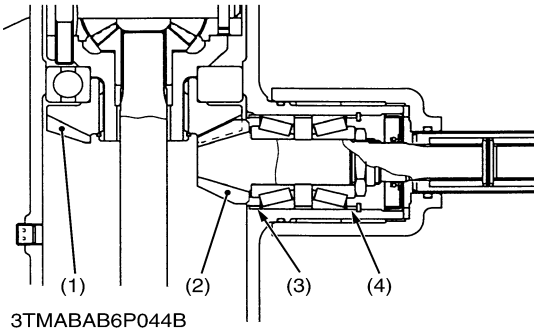

3TMABAB6P044B

Backlash between Spiral Bevel Pinion Shaft and Spiral Bevel Gear

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

Backlash between spiral bevel pinion shaft and spiral bevel gear	Factory spec.	0.20 to 0.30 mm 0.0079 to 0.0118 in.
	Allowable limit	0.40 mm 0.0157 in.

(1) Spiral Bevel Gear
(2) Spiral Bevel Pinion Shaft
(3) Adjusting Collar
(4) Adjusting Collar

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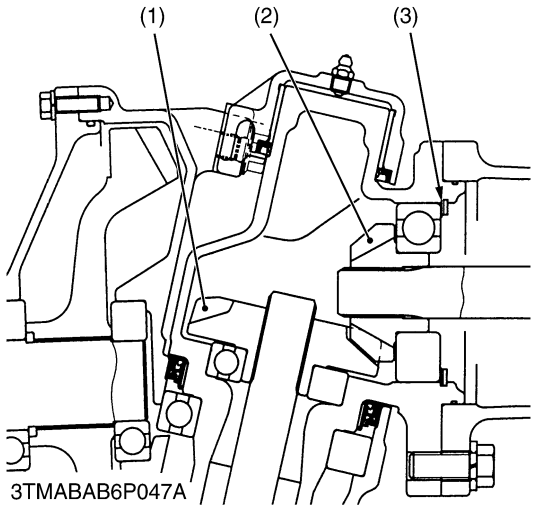

3TMABAB6P047A

Backlash between 10T Bevel Gear and 17T Bevel Gear

1. Stick a strip of fuse spots on the 17T 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 within the factory specifications, adjust with shim (3).

Backlash between 10T bevel gear and 17T bevel gear	Factory spec.	0.20 to 0.30 mm 0.0079 to 0.0118 in.
	Allowable limit	0.60 mm 0.024 in.

(Reference)

- The thickness of shim (3) uses 1.0 mm (0.039 in.) by the standard. There are some difference in the production lot.
- Thickness of adjusting shims
  0.4 mm (0.016 in.) 1.0 mm (0.039 in.)
  0.6 mm (0.024 in.) 1.2 mm (0.047 in.)
  0.8 mm (0.031 in.)
- Tooth contact : More than 30 %

(1) 17T Bevel Gear
(2) 10T Bevel Gear
(3) Shim

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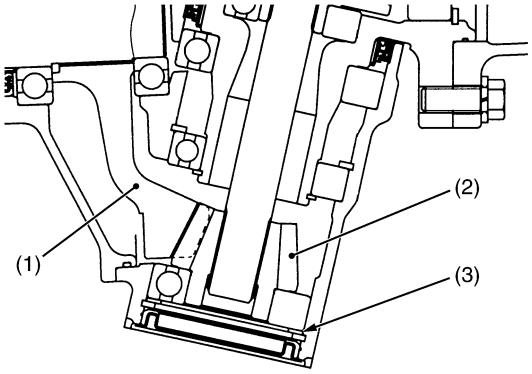

3TMABAB6P048A

Backlash between 9T Bevel Gear and 43T Bevel Gear

1. Stick a strip of fuse to three spots on the 43T bevel gear (1) with grease.
2. Fix the axle flange and front gear case.
3. Turn the axle.
4. Remove the axle flange from front gear case and measure the thickness of the fuse with an outside micrometer.
5. If the backlash is not within the factory specifications, adjust with shim (3).

Backlash between 9T bevel gear and 43T bevel gear	Factory spec.	0.25 to 0.35 mm 0.0098 to 0.0138 in.
	Allowable limit	0.60 mm 0.024 in.

(Reference)

- Thickness of adjusting shims (3)
  1.0 mm (0.039 in.) 1.8 mm (0.071 in.)
  1.2 mm (0.047 in.) 2.0 mm (0.079 in.)
  1.6 mm (0.063 in.)
- Tooth contact : More than 35 %

(1) 43T Bevel Gear
(2) 9T Bevel Gear
(3) Shim

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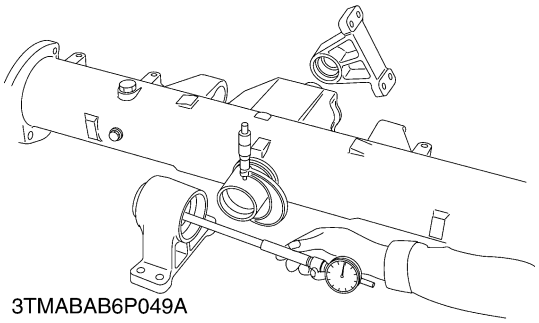
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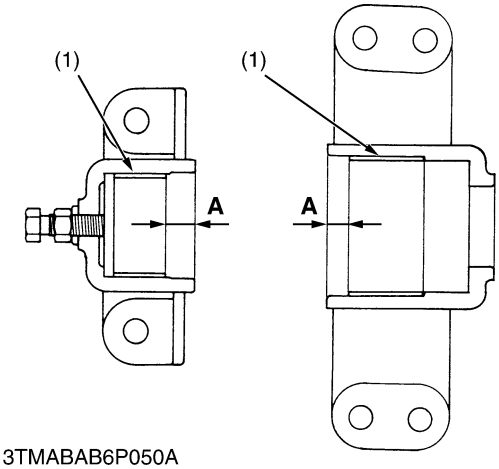

3TMABAB6P050A

Clearance between Front Axle Case Bosses and Bracket Bushings

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

Clearance between front axle case boss (front) and bracket bushing (front)	Factory spec.	0.025 to 0.160 mm 0.00098 to 0.00630 in.
	Allowable limit	0.35 mm 0.0138 in.

Front axle case boss (front) O.D.	Factory spec.	49.950 to 49.975 mm 1.96653 to 1.96752 in.
Bracket bushing (front) I.D.	Factory spec.	50.000 to 50.110 mm 1.96850 to 1.97283 in.

Clearance between front axle case boss (rear) and bracket bushing (rear)	Factory spec.	0.025 to 0.190 mm 0.00098 to 0.00748 in.
	Allowable limit	0.35 mm 0.0138 in.

Front axle case boss (rear) O.D.	Factory spec.	70.000 to 70.035 mm 2.75590 to 2.75728 in.
Bracket bushing (rear) I.D.	Factory spec.	70.060 to 70.190 mm 2.75826 to 2.76338 in.

■ **Press-fitting Bushing**

- When press-fitting a new bushing, observe the dimension described in the figure.

Press-fit depth of bushing (**A**)	Reference value	12.0 to 13.0 mm 0.47 to 0.51 in.

■ **NOTE**

- **After replacing the bushing, be sure to adjust the front axle pivot. (See page 6-S5.)**

(1) Bushing

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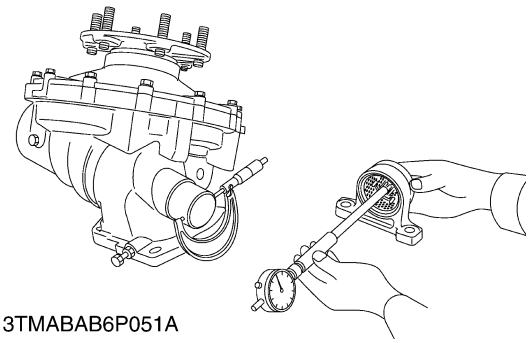
3TMABAB6P051A

Clearance between Bevel Gear Case Boss and Front Axle Support Bushing

1. Measure the bevel gear case boss O.D. with an outside micrometer.
2. Measure the support bushing I.D. and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace it.

Clearance between bevel gear case boss and front axle support bushing	Factory spec.	0.060 to 0.220 mm 0.00236 to 0.00866 in.
	Allowable limit	0.50 mm 0.0197 in.

Bevel gear case boss O.D.	Factory spec.	54.970 to 55.000 mm 2.16417 to 2.16535 in.
Front axle support bushing I.D.	Factory spec.	55.060 to 55.190 mm 2.16772 to 2.17283 in.

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N7 STEERING

CONTENTS

1. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See page G-10.)

Item	N·m	kgf·m	ft-lbs
Hydraulic pipe mounting screw	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2
Hydraulic pump assembly mounting screw and nut	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2
Main delivery pipe and return pipe retaining nut	46.6 to 50.9	4.8 to 5.2	34.4 to 37.6
Turning delivery hose retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Steering controller mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Tie-rod end nut	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5
Power steering hose retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Cylinder cover	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Tie-rod joint and steering cylinder mounting screw	166.6 to 196.0	17.0 to 20.0	122.9 to 144.6

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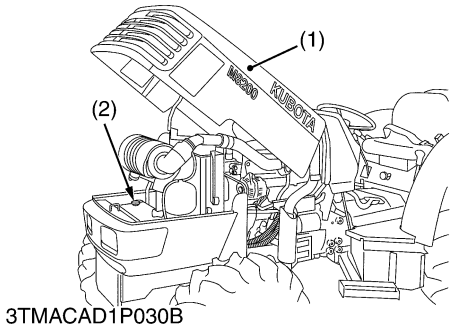
2. CHECKING, DISASSEMBLING AND SERVICING

[1] DISASSEMBLING AND ASSEMBLING

(1) Removing Steering Controller



3TMACAD1P030B

Bonnet

1. Remove the bonnet (1).
2. Disconnect the battery's cable.

(1) Bonnet (2) Battery

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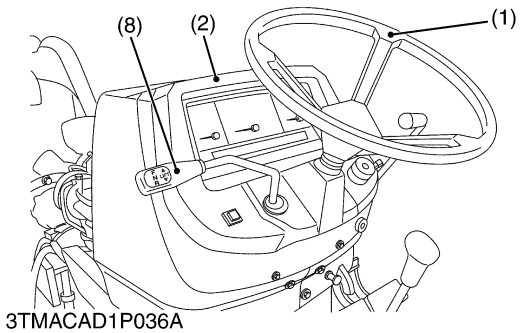

3TMACAD1P036A

Steering Wheel, Meter Panel and Rear Bonnet

1. Remove the steering wheel (1) with a steering wheel puller (Code No. 07916-51090).
2. Remove the shuttle lever grip (8).
3. Remove the meter panel mounting screws and open the meter panel (2).
4. Disconnect the two connectors (3) and meter cable (4).
5. Disconnect the main switch connector (5) and combination switch connector (6).
6. Disconnect the hazard switch connector (9), 4WD / Bi-speed switch connector (12) and 4WD indicator connector (13).
7. Disconnect the engine stop cable (7) at the engine side.
8. Remove the rear bonnet (10) and lower cover (11).

(1) Steering Wheel
(2) Meter Panel
(3) Connector
(4) Meter Cable
(5) Main Switch Connector
(6) Combination Switch Connector
(7) Engine Stop Cable
(8) Shuttle Lever Grip
(9) Hazard Switch Connector
(10) Rear Bonnet
(11) Lower Cover
(12) 4WD / Bi-speed Switch Connector
(13) 4WD Indicator Connector

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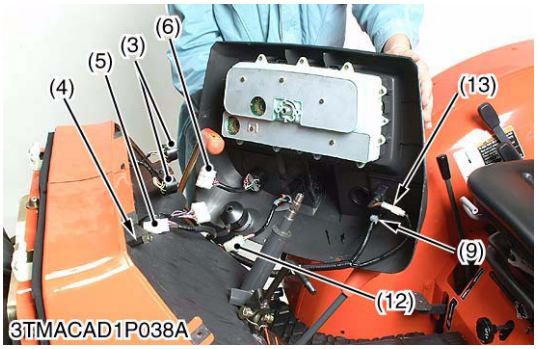

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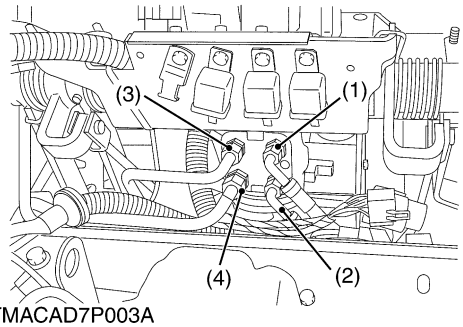

3TMACAD7P003A

Hydraulic Hoses and Pipes

1. Disconnect the turning delivery hoses (1) and (2).
2. Disconnect the return pipe (3).
3. Disconnect the main delivery pipe (4).

(When reassembling)

Tightening torque	Main delivery pipe and return pipe retaining nut	46.6 to 50.9 N·m 4.8 to 5.2 kgf·m 34.4 to 37.6 ft-lbs
	Turning delivery hose retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 ft-lbs

(1) Turning Delivery Hose L
(2) Turning Delivery Hose R
(3) Return Pipe
(4) Main Delivery Pipe

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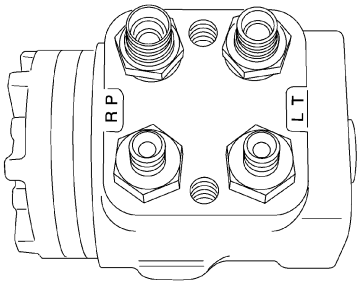

3TMACAD7P004A

Steering Controller

1. Remove the steering controller mounting screws.
2. Take out the steering controller.

(When reassembling)

Tightening torque	Steering controller mounting screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs

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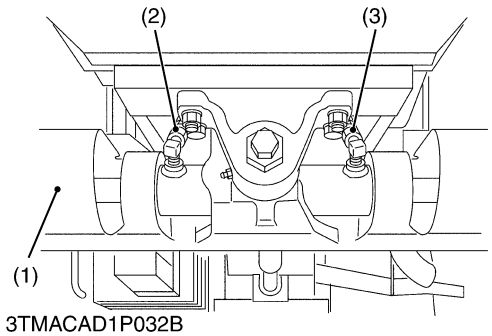
(2) Removing Steering Cylinder



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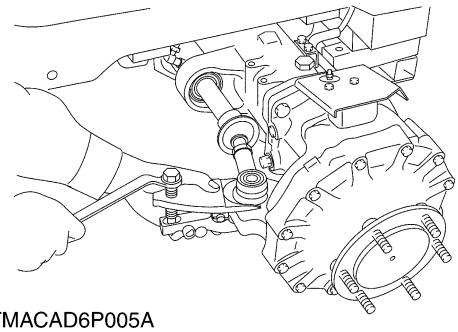
3TMACAD6P005A

Tie-rod

1. Remove the cylinder cover (1).
2. Disconnect the power steering hoses (2), (3) from cylinder.
3. Remove the set screw.
4. Place a disassembly stand under the engine and support it with a jack.
5. Pull out the cotter pin and remove the tie-rod end nuts.
6. Disconnect the tie-rod end with a tie-rod end lifter (Code No. 07909-39051).

(When reassembling)

- After tightening the tie-rod end nut to the specified torque, install a cotter pin as shown in the figure left.

Tightening torque	Tie-rod end nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 ft-lbs
	Power steering hose retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 ft-lbs
	Cylinder cover	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1) Cylinder Cover
(2) Power Steering Hose 1
(3) Power Steering Hose 2

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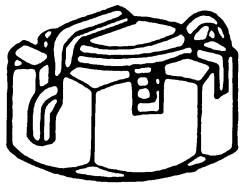
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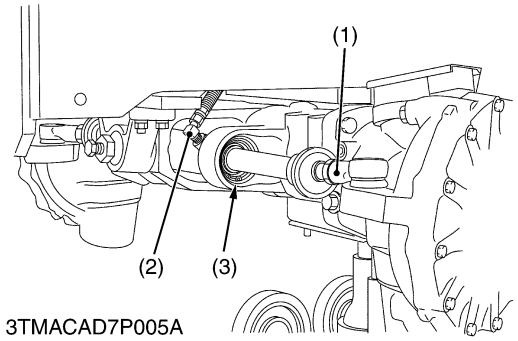

3TMACAD7P005A

Steering Cylinder

1. Remove the tie-rod joint (1) (right and left).
2. Remove the elbows (2) from steering cylinder.
3. Remove the internal snap ring (3).
4. Draw out the steering cylinder to the left.

(When reassembling)

- Apply liquid lock (Three Bond 1372 or equivalent) to the tie-rod joint.

Tightening torque	Tie-rod joint and steering cylinder mounting screw	166.6 to 196.0 N·m 17.0 to 20.0 kgf·m 122.9 to 144.6 ft-lbs

(1) Tie-rod Joint
(2) Elbow
(3) Internal Snap Ring

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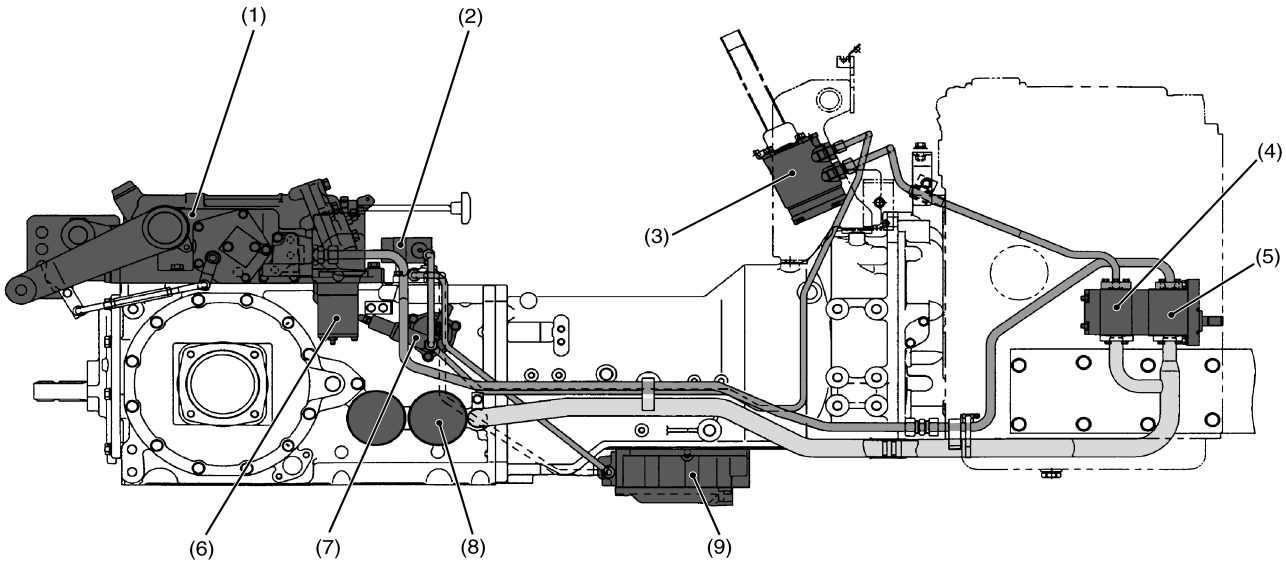
N8 HYDRAULIC SYSTEM

CONTENTS

1. STRUCTURE



3TMACAD8P065A

(1) Hydraulic Control Valve
(2) 4WD / Bi-speed Turn Solenoid Valve
(3) Power Steering Controller
(4) Hydraulic Pump for Power Steering
(5) Hydraulic Pump for Three Point Hydraulic System
(6) Auxiliary Control Valve
(7) PTO Clutch Valve
(8) Oil Filter Cartridge
(9) 4WD / Bi-speed Turn Clutch Pack

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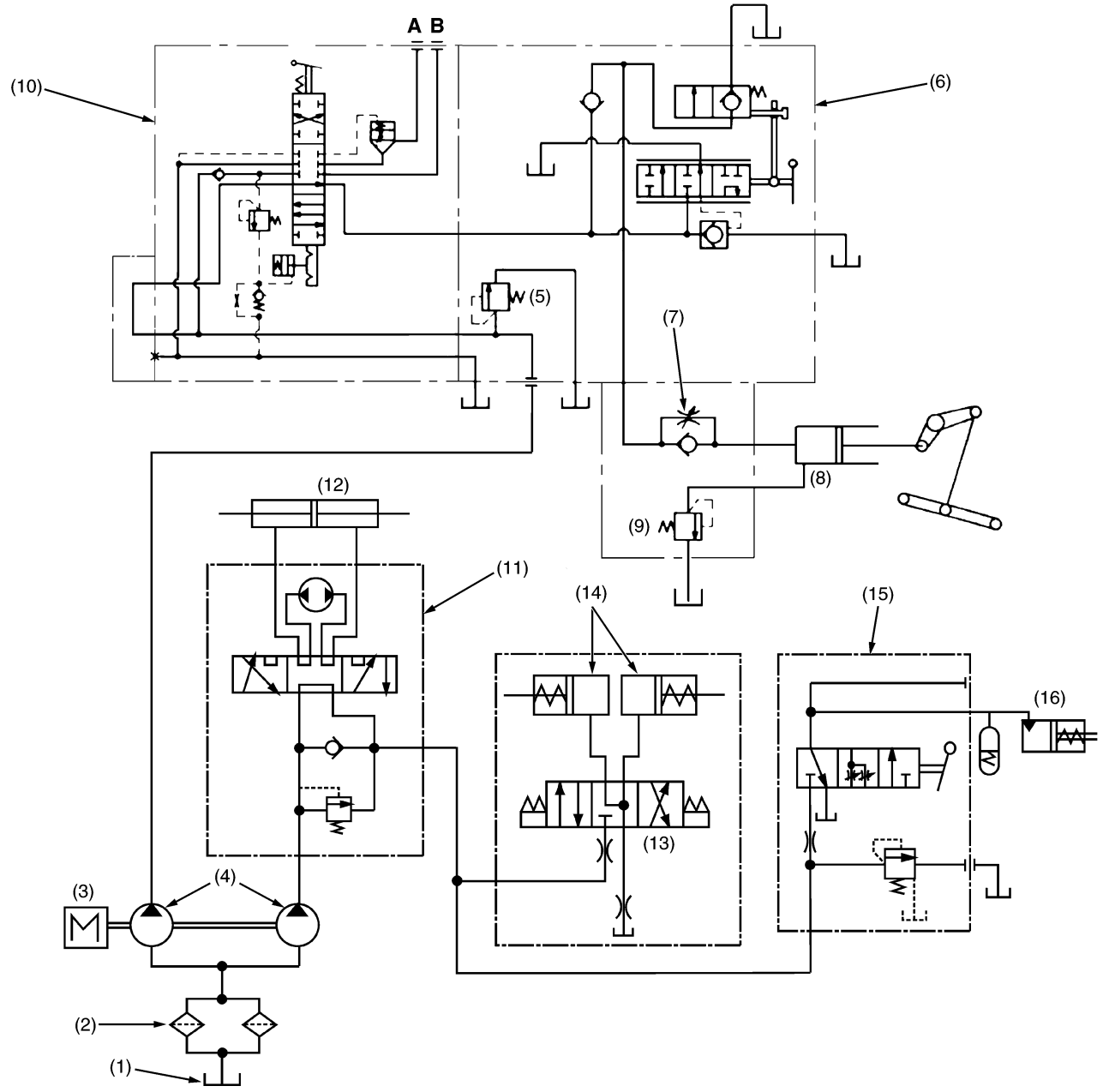
2. HYDRAULIC CIRCUIT



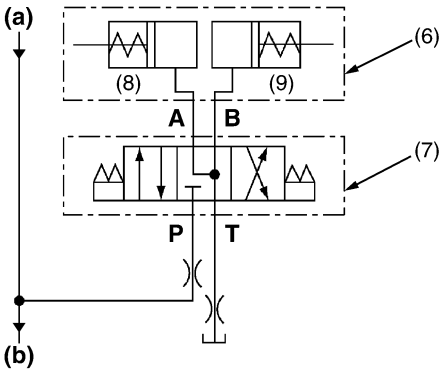
3TMACAD8P066A

(1) Oil Tank (Transmission Case)
(2) Hydraulic Oil Filter Cartridge
(3) Engine
(4) Hydraulic Pump
(5) Relief Valve
(6) Control Valve
(7) Lowering Speed Adjusting Valve
(8) Hydraulic Cylinder
(9) Cylinder Safety Valve
(10) Auxiliary Control Valve
(11) Steering Controller
(12) Steering Cylinder
(13) 4WD / Bi-speed Valve
(14) 4WD / Bi-speed Clutch
(15) PTO Clutch Valve
(16) PTO Clutch

A : To Implement Cylinder
B : To Implement Cylinder

0000003456E

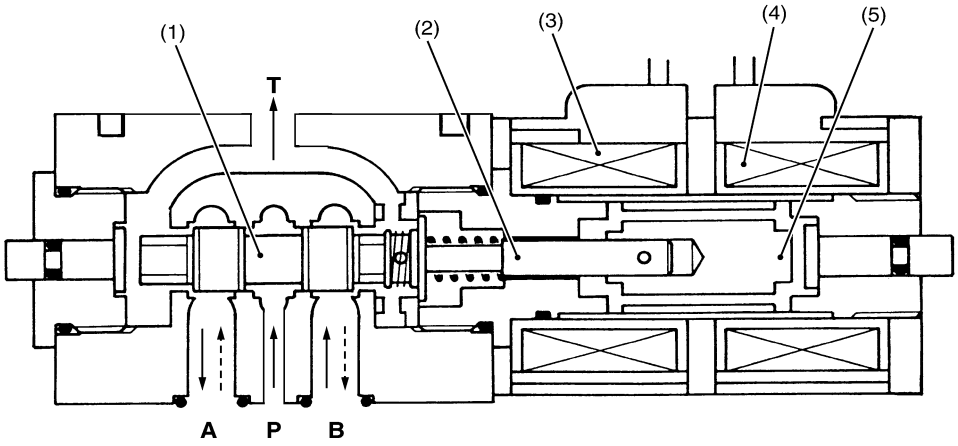
3. 4WD / BI-SPEED VALVE



3TMACAD8P058A

This solenoid valve is a double acting solenoid type of 4-ports and 3-positions one. Being not electrified, it is kept in neutral position. Therefore, oil is flowed to neither Bi-speed clutch nor 4WD clutch when the 4WD / Bi-speed turn switch is switched to **OFF** position.

When the solenoid A (4) or solenoid B (3) is electrified, the plunger (5) is pulled by its electromagnetic force and its position is switched. Then, oil pressure-fed from the hydraulic pump to **P** port is flowed from **A** or **B** port to 4WD side (8) or Bi-speed turn side (9) of the clutch (6). The return oil from the other side is flowed to the transmission case through **T** port.



3TMACAD8P063A

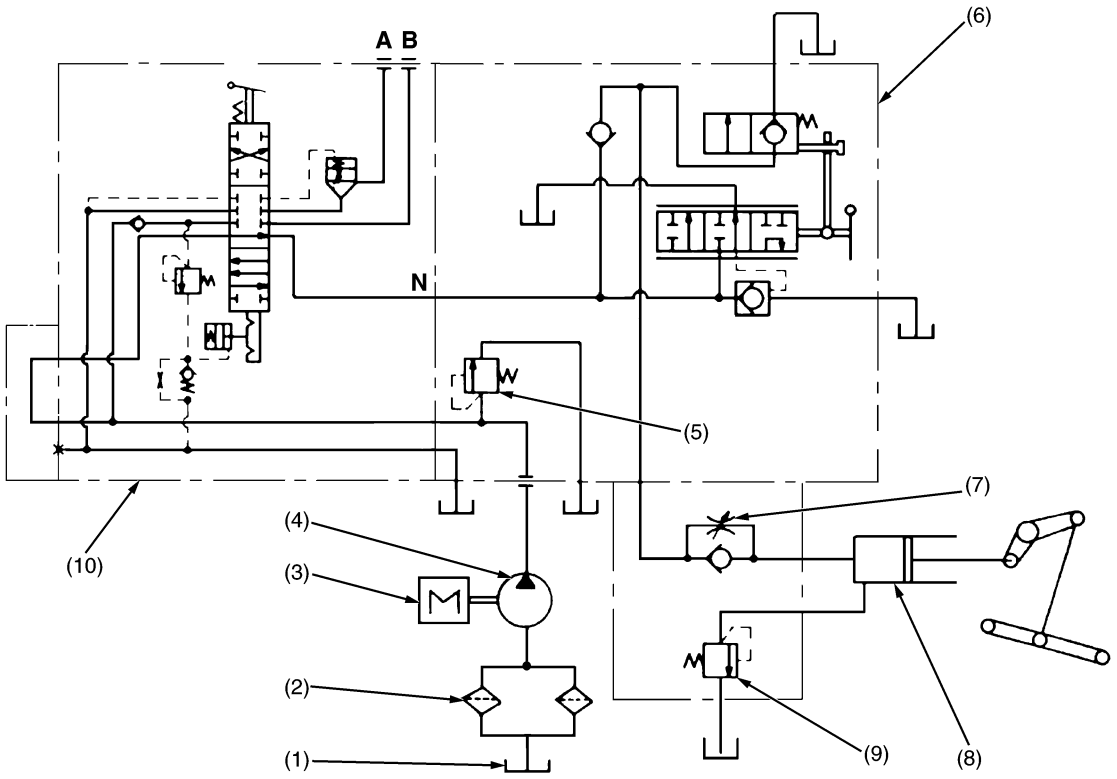
(1) Spool
(2) Push Rod
(3) Solenoid B
(4) Solenoid A
(5) Plunger
(6) 4WD / Bi-speed Clutch
(7) 4WD / Bi-speed Valve
(8) 4WD Side
(9) Bi-speed Turn Side

A : 4WD Port
B : Bi-speed Turn Port
P : From Power Steering Pump
T : To Tank

(a) From Power Steering Controller
(b) To PTO Clutch Valve

0000003360E

4. THREE POINT HYDRAULIC SYSTEM



3TMACAD8P067A

(1)	Oil Tank (Transmission Case)	(4)	Hydraulic Pump	(8)	Hydraulic Cylinder	**A :**	**To Implement Cylinder**
(2)	Hydraulic Oil Filter Cartridge	(5)	Relief Valve	(9)	Cylinder Safety Valve	**B :**	**To Implement Cylinder**
(3)	Engine	(6)	Control Valve	(10)	Auxiliary Control Valve	**N :**	**N Port**
		(7)	Lowering Speed Adjusting Valve				

1. When the engine is started, the hydraulic pump (4) is rotated to suck oil from transmission case (1) through the suction pipe.
   Supplied oil is filtered by the hydraulic oil filter cartridge (2).
2. Filtered oil is forced out by the hydraulic pump to the auxiliary control valve (10) through the delivery pipe.
3. With the auxiliary control valve (10) in neutral position, oil is channelled from "**N**" port to the control valve (6).
4. The hydraulic system has a relief valve (5) which restricts the maximum pressure in the circuit.
   The hydraulic cylinder (8) has a cylinder safety valve (9) to relieve shock pressure due to heavy implement bounce.
5. The control valve is actuated by the mechanical linkage for **"Position control"** or **"Draft control"** or both **"Mix control"**.
6. The position control valve is type 5 (Code No. 38240-39143), refer to "Tractor Mechanism" Workshop Manual.
7. This tractor has one single / double acting auxiliary control valve (Code No. 3A031-82350) as standard equipment.

0000003547E

CONTENTS

1. SERVICING SPECIFICATIONS

HYDRAULIC PUMP FOR POWER STEERING

Item		Factory Specification	Allowable Limit
Hydraulic Pump	Delivery	Above 16.3 L/min. 4.3 U.S.gals/min. 3.6 Imp.gals/min.	13.4 L/min. 3.5 U.S.gals/min. 2.9 Imp.gals/min.
Housing Bore	Depth of Scratch	—	0.09 mm 0.0035 in.
Bushing to Gear Shaft	Clearance	—	0.15 mm 0.0059 in.
Gear Shaft	O.D.	—	17.968 mm 0.7074 in.
Bushing	Length	—	18.965 mm 0.74665 in.

0000003548E

HYDRAULIC PUMP FOR THREE POINT HYDRAULIC SYSTEM

Item		Factory Specification	Allowable Limit
Hydraulic Pump	Delivery	Above 38.0 L/min. 10.0 U.S.gals/min. 8.4 Imp.gals/min.	31.0 L/min. 8.2 U.S.gals/min. 6.8 Imp.gals/min.
Housing Bore	Depth of Scratch	—	0.09 mm 0.0035 in.
Bushing to Gear Shaft	Clearance	—	0.15 mm 0.0059 in.
Gear Shaft	O.D.	—	17.968 mm 0.7074 in.
Bushing	Length	—	18.965 mm 0.74665 in.

0000003549E

STEERING CYLINDER

Item		Factory Specification	Allowable Limit
Steering Cylinder	I.D.	50.000 to 55.062 mm 1.96850 to 1.97094 in.	50.100 mm 1.97244 in.
Rod to Bushing	Clearance	0.009 to 0.127 mm 0.00035 to 0.00500 in.	0.135 mm 0.00531 in.

0000003550E

RELIEF VALVE FOR THREE POINT HYDRAULIC SYSTEM

Item		Factory Specification	Allowable Limit
Releif Valve	Setting Pressure	18.6 to 19.1 MPa 190 to 195 kgf/cm^2 2702 to 2773 psi	—

0000003624E

POSITION CONTROL AND DRAFT CONTROL LINKAGE

Item		Factory Specification	Allowable Limit
Position Rod	Length	206 mm 8.11 in.	—
Draft Rod	Length	172 mm 6.77 in.	—
Stopper to Top Link Bracket	Clearance	7.0 to 8.0 mm 0.276 to 0.315 in.	—
Position Control Feedback Rod	Length	Approx. 125 mm 4.92 in.	—
Draft Control Rod.	Length	Approx. 215 mm 8.46 in.	—

0000003551E

POSITION CONTROL VALVE

Item		Factory Specification	Allowable Limit
Plate to Spool Joint	Distance	62 to 63 mm 2.44 to 2.48 in.	—

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CYLINDER SAFETY VALVE

Item		Factory Specification	Allowable Limit
Cylinder Safety Valve	Operating Pressure	21.1 to 22.6 MPa 215 to 230 kgf/cm^2 3058 to 3271 psi	—

0000003553E

HYDRAULIC CYLINDER

Item		Factory Specification	Allowable Limit
Cylinder Bore	I.D.	90.000 to 90.050 mm 3.54330 to 54527 in.	90.15 mm 3.5492 in.
Hydraulic Arm Shaft to Bushing	Clearance (Right)	0.049 to 0.154 mm 0.00193 to 0.00606 in.	0.50 mm 0.0197 in.
	Clearance (Left)	0.049 to 0.149 mm 0.00193 to 0.00587 in.	0.50 mm 0.0197 in.
	Hydraulic Arm Shaft (O.D.) (Right)	49.950 to 49.975 mm 1.96653 to 1.96752 in.	—
	Hydraulic Arm Shaft (O.D.) (Left)	44.950 to 44.975 mm 1.76968 to 1.77067 in.	—
	Bushing (I.D.) (Right)	50.024 to 50.104 mm 1.96944 to 1.97259 in.	—
	Bushing (I.D.) (Left)	45.024 to 45.099 mm 1.77259 to 1.77555 in.	—

0000003554E

2. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts : See page G-10.)

Item	N·m	kgf·m	ft-lbs
Rear wheel mounting nut	260 to 304	26.5 to 31.0	192 to 224
Rear ROPS mounting U-bolt	196 to 225	20 to 23	144.7 to 166.4
Delivery pipe retaining nut	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2
Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Control valve mounting screw	19.6 to 23.5	2.0 to 2.4	14.5 to 17.4
Lock nut for poppet valve	17.7 to 21.6	1.8 to 2.2	13.0 to 15.9
Seat plug for poppet valve	68.6 to 88.3	7.0 to 9.0	50.6 to 65.1
Plug for unload valve	68.6 to 88.3	7.0 to 9.0	50.6 to 65.1
Set plug for check valve	49.0 to 58.8	5.0 to 6.0	36.2 to 43.4
Bracket guide mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Hydraulic arm setting screw	39.2 to 45.0	4.0 to 4.6	29.0 to 33.3
Relief valve for three point hydraulic system	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Cylinder safety valve assembly	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2
Cylinder safety valve lock nut	58.8 to 78.5	6.0 to 8.0	43.4 to 57.9

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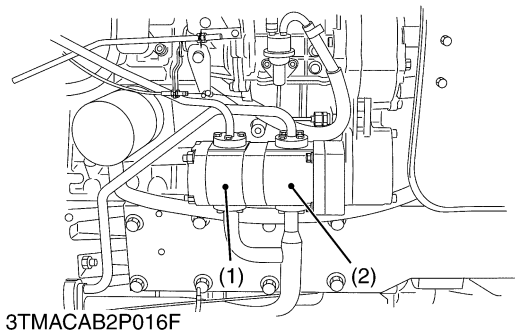
3. CHECKING, DISASSEMBLING AND ASSEMBLING

[1] CHECKING AND ADJUSTING

(1) Hydraulic Pump for Power Steering



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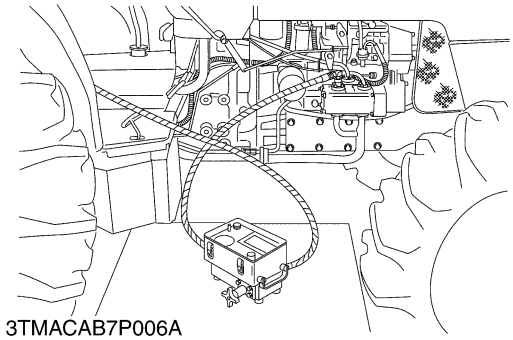
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Hydraulic Flow Test

■ IMPORTANT

- **When using flowmeter other than KUBOTA specified flowmeter, be sure to use the instructions with the flowmeter.**
- **Do not close the flowmeter loading valve completely, before testing, because it has no relief valve.**

1. Disconnect the delivery pipe which is connected from hydraulic pump to steering controller.
2. Install the adaptor **53** and **54** to the pump discharge port. [Adaptor **53** and **54** are included in adaptor set (Code No. 07916-54301).]
3. Connect the other hydraulic test hose to the adaptor **53** and flowmeter inlet port.
4. Connect the other hydraulic test hose to the flowmeter outlet and put the end of hose into the transmission oil port
5. Open the flowmeter loading valve completely. (Turn counterclockwise.)
6. Start the engine and set the engine speed at 2000 to 2200 min^{-1} (rpm).
7. Slowly close the loading valve to generate pressure approx. 9.8 MPa (100 kgf/cm^2, 1422 psi). Hold in this condition until oil temperature reaches approx. 50 ℃ (122 ℉).
8. Open the loading valve completely.
9. Set the engine speed. (Refer to condition.)
10. Read and note the pump delivery at no pressure.
11. Slowly close the loading valve to increase rated pressure. (Refer to condition.) As the load is increased, engine speed drops, therefore, reset the engine speed.
12. Read and note the pump delivery at rated pressure.
13. Open the loading valve completely and stop the engine.
14. If the pump delivery does not reach the allowable limit, check the pump suction line, oil filter or hydraulic pump.

(1) Power Steering Pump (2) Three Point Hydraulic Pump

0000003557E

Hydraulic Flow Test (Continued)

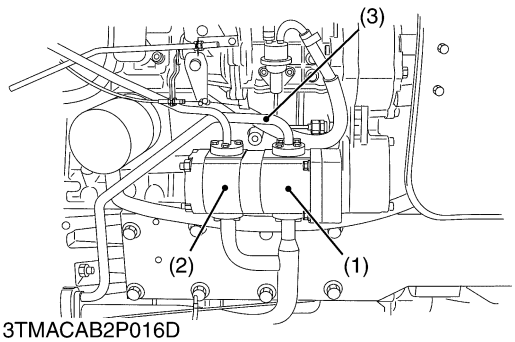
Condition

- Engine speed : Approx. 2600 min^{-1} (rpm)
- Rated speed : 15.7 MPa
  160 kgf/cm^2
  2276 psi
- Oil temperature : 45 to 55 ℃
  113 to 131 ℉

Hydraulic pump delivery at no pressure	Factory spec.	17.4 L/min. 4.6 U.S.gals/min. 3.8 Imp.gals/min.
Hydraulic pump delivery at rated pressure	Factory spec.	16.3 L/min. 4.3 U.S.gals/min. 3.6 Imp.gals/min.
	Allowable limit	13.4 L/min. 3.5 U.S.gals/min. 2.9 Imp.gals/min.

0000003558E

(2) Hydraulic Pump for Three Point Hydraulic System



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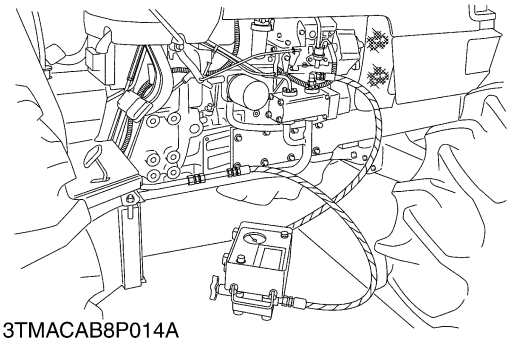
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Hydraulic Flow Test

■ IMPORTANT

- **When using flowmeter other than KUBOTA specified flowmeter, be sure to use the instructions with the flowmeter.**
- **Do not close the flowmeter loading valve completely, before testing, because it has no relief valve.**

1. Disconnect the delivery pipe (3) which is connected from hydraulic pump (1) to hydraulic cylinder.
2. Install the adaptor **53** and **54** to the pump discharge port. [Adaptor **53** and **54** are included in adaptor set (Code No. 07916-54301).]
3. Install the adaptor **64** to the delivery pipe joint. [Hydraulic adaptor **64** is included in adaptor set (Code No. 07916-54031.)]
4. Connect the hydraulic test hose to the adaptor **53** and flowmeter inlet port.
5. Connect the other hydraulic test hose to the flowmeter outlet port and to hydraulic adaptor **64**.
6. Open the flowmeter loading valve completely. (Turn counterclockwise.)
7. Start the engine and set the engine speed at 2000 to 2200 min^{-1} (rpm).
8. Slowly close the loading valve to generate pressure approx. 9.8 MPa (100 kgf/cm^2, 1422 psi). Hold in this condition until oil temperature reaches approx. 50 ℃ (122 ℉).
9. Open the loading valve completely.
10. Set the engine speed. (Refer to condition.)
11. Read and note the pump delivery at no pressure.
12. Slowly close the loading valve to increase rated pressure. (Refer to condition.) As the load is increased, engine speed drops, therefore, reset the engine speed.
13. Read and note the pump delivery at rated pressure.
14. Open the loading valve completely and stop the engine.
15. If the pump delivery does not reach the allowable limit, check the pump suction line, oil filter or hydraulic pump.

(1) Pump (for 3P Hydraulic)
(2) Pump (for Power Steering)
(3) Delivery Pipe

0000003560E

Hydraulic Flow Test (Continued)

Condition

- Engine speed ..... Approx. 2600 min^{-1} (rpm)
- Rated pressure ..... 18.6 MPa (190 kgf/cm^2, 2702 psi)
- Oil temperature ..... 45 to 55 ℃
  113 to 131 ℉

Hydraulic pump delivery at no pressure	Factory spec.	Above 40.5 L/min. 10.7 U.S.gals/min. 8.9 Imp.gals/min.
Hydraulic pump delivery at rated pressure	Factory spec.	38.0 L/min. 10.0 U.S.gals/min. 8.4 Imp.gals/min.
	Allowable limit	31.0 L/min. 8.2 U.S.gals/min. 6.8 Imp.gals/min.

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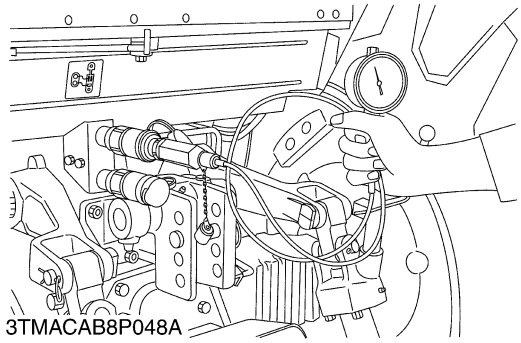
(3) Three Point Hydraulic System



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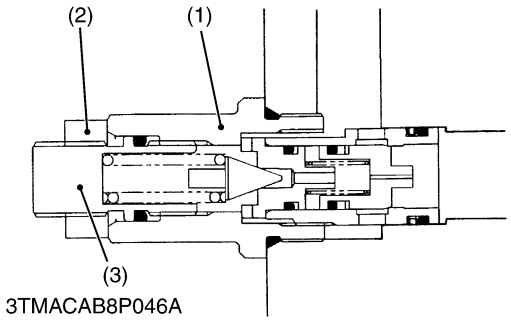

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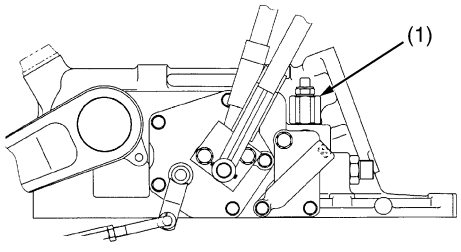

3TMACAB8P049A

Relief Valve Setting Pressure

1. Set the Relief Valve Set Pressure Adaptor **G** (Code No. 07916-52751) to the half male of the quick coupler and then set a pressure gauge (Code No. 07916-50321), Cable (Code No. 07916-50331).
2. Start the engine, set at maximum speed.
3. Set the auxiliary control valve operation lever to the **UP** position and read the pressure gauge when the relief valve is actuated.
4. If the pressure is not within the factory specification, adjust the relief valve adjuster (3).

Condition

- Engine speed ..... Maximum
- Oil temperature ..... 45 to 55 ℃
  113 to 131 ℉

Relief valve setting pressure	Factory spec.	18.6 to 19.1 MPa 190 to 195 kgf/cm^2 2702 to 2773 psi

(1) Relief Valve
(2) Lock Nut
(3) Adjuster

0000003625E

Adjusting the Position Rod and Draft Rod

1. Be sure to adjust the position rod length and draft rod length.

Position rod length (**A**)	Factory spec.	206 mm 8.11 in.
Draft rod length (**B**)	Factory spec.	172 mm 6.77 in.

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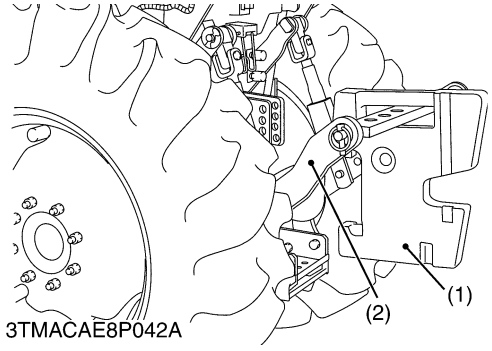

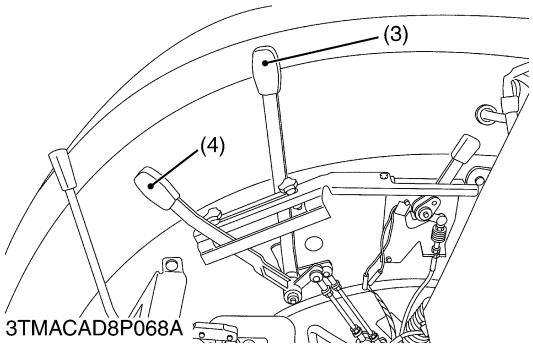

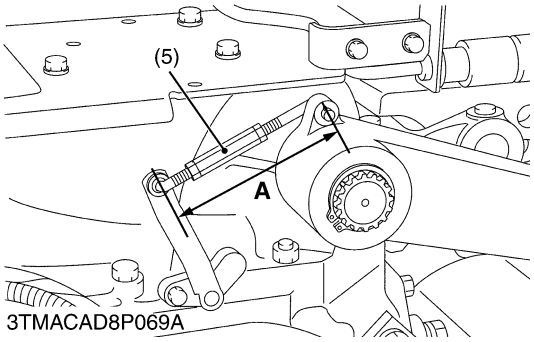

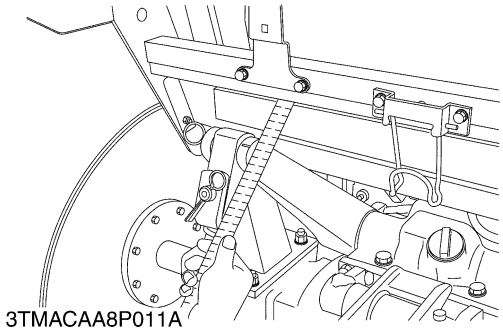

Adjusting Uppermost Position

1. Attach the weight (1) of 490 N (50 kgf, 110 lbs) to the end of lower link (2).
2. Set the position control lever (3) and draft control lever (4) to the lowest position.
3. Start the engine, and set the engine speed at the 1000 rpm.
4. Set the position control lever (3) to the uppermost position.
5. Shorten the feedback rod by turning the turnbuckle (5) until the relief valve begins to be operated.
6. From the feedback rod position obtained above 5, turn the turnbuckle by 1.5 turn to lengthen the feedback rod, then tighten the lock nut.
7. Move the position control lever down then all the way up. Stop the engine and check that the lift arm has 5 to 20 mm (0.20 to 0.79 in.) play upward on its edge.
8. If the specified play is not obtained, repeat from 4 again.

Position control feedback rod **A**	Factory spec.	Approx. 125 mm 4.92 in.

(1) Weight
(2) Lower Link
(3) Position Control Lever
(4) Draft Control Lever
(5) Turnbuckle

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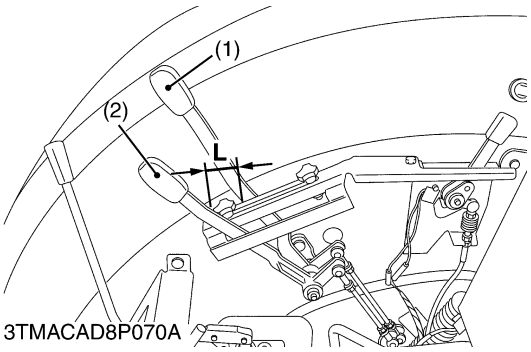

3TMACAD8P070A

Checking Floating Position

1. Attach the weight of 490 N (50 kgf, 110 lbs) to the end of lower link.
2. Set the position control lever (1) and draft control lever (2) to the lowest position, and set the engine speed at the maximum.
3. Gradually move the position control lever (1) until the lower link begins to rise.
4. Check the distance **L**.
5. If the specified play is not obtained, readjust the feedback rod. (Refer to "Adjusting Uppermost Position", page N8-S9.)

Distance **L**	Factory spec.	25 to 35 mm 0.98 to 1.38 in.

(1) Position Control Lever (2) Draft Control Lever

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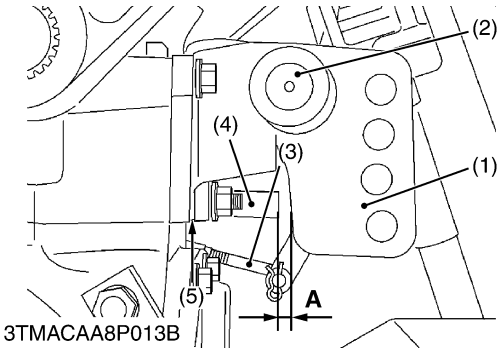


3TMACAA8P013B

Adjusting Top Link Bracket

1. Measure the clearance **A** between the stopper (4) and top link bracket (1).
   If the clearance is not within the factory specifications, adjust with the shims (5) between the stopper (4) and top link bracket (1).

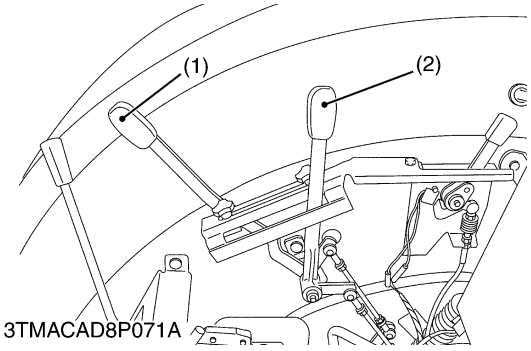
Clearance **A**	Factory spec.	7.0 to 8.0 mm 0.276 to 0.315 in.

(Reference)

- Thickness of shim (5) : 0.5 mm (0.020 in.)

(1) Top Link Bracket (4) Stopper
(2) Torsion Bar (5) Shim
(3) Draft Control Rod

0000003565E



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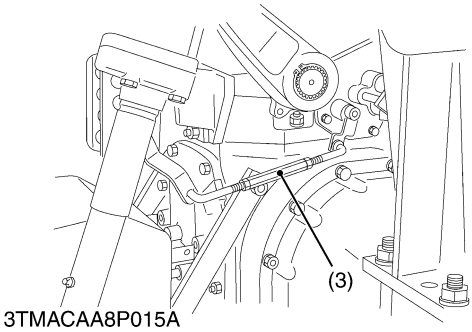


3TMACAA8P015A

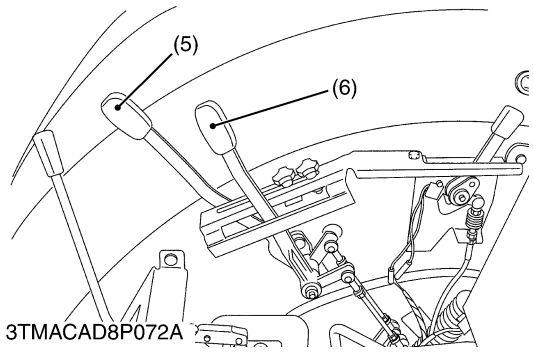
Adjusting Draft Control Rod

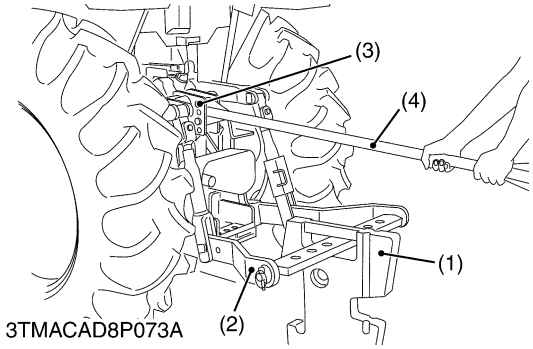
1. Attach a weight of approx. 490 N (50 kgf, 110 lbs) to the end of the lower link.
2. Set the position control lever (1) to the lowest position
3. Start the engine and set the speed at 1000 min^{-1} (rpm).
4. Set the draft control lever (2) to the uppermost position.
5. Lengthen the draft control rod (3) by turning the turnbuckle until the relief valve begins to be operated.
6. From the draft control rod position obtained above 5, turn the turnbuckle by 1/2 turn to shorten the draft control rod, then tighten the lock nut.

Draft control rod length	Factory spec.	Approx. 215 mm 8.46 in.

(1) Position Control Lever (3) Draft Control Rod
(2) Draft Control Lever

0000003294E





Checking Floating Position (Draft Control)

1. Attach the weight (1) of 490 N (50 kgf, 110 lbs) to the end of lower link (2).
2. Set the position control lever (5) and draft control lever (6) to the lowest position.
3. Attach the test bar (4) to the top link bracket (3).
4. Start the engine, and set the engine speed at the maximum.
5. Set the draft control lever upward by approx. 10 mm (0.39 in.) from the lowest position.
6. Press the test bar (4) downward until the top link bracket (3) comes in contact with the stopper.
7. Confirm that the lower link (draft control) will not operate.
8. Set the draft control lever upward by approx. 25 mm (0.98 in.) from the lowest position.
9. Press the test bar (4) downward until the top link bracket (3) comes in contact with the stopper.
10. Confirm that the lower link begin to rise.
11. After adjustment, tighten the lock nut firmly.
12. If the lower link does not move properly, readjust the feedback rod. (Refer to "Adjusting Draft Control Rod", page N8-S10.)

(1) Weight
(2) Lower Link
(3) Top Link Bracket
(4) Test Bar
(5) Position Control Lever
(6) Draft Control Lever

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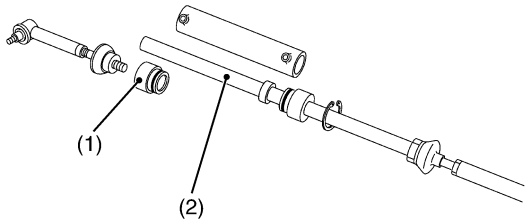
[2] DISASSEMBLING AND ASSEMBLING

(1) Steering Cylinder



3TMACAD8P074A

Disassembling Steering Cylinder

1. Remove the guide assembly (1) and draw out the piston rod (2).

(When reassembling)

- Apply transmission fluid to the oil seal and O-ring.

(1) Guide Assembly (2) Piston Rod

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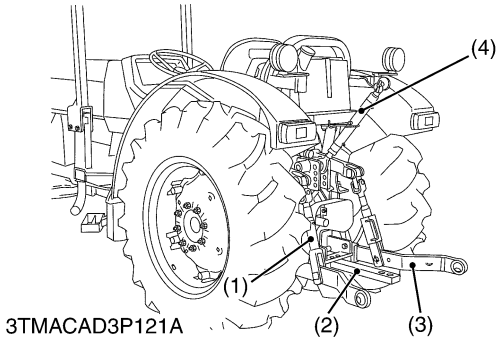
(2) Three Point Hydraulic System

(A) Separating Hydraulic Cylinder Assembly



3TMACAD3P121A

Lift Rods and Lower Links

1. Remove the lift rods (1).
2. Remove the lower links (3).
3. Remove the drawbar (2).
4. Remove the top link (4).

(1) Lift Rod (3) Lower Link
(2) Drawbar (4) Top Link

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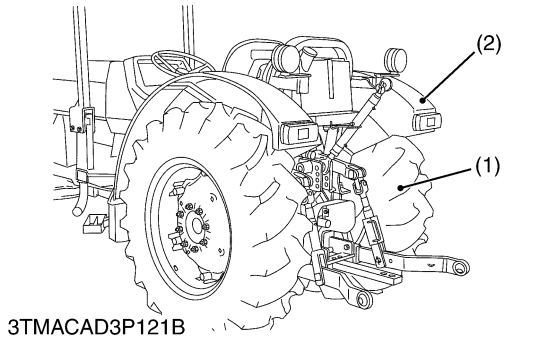
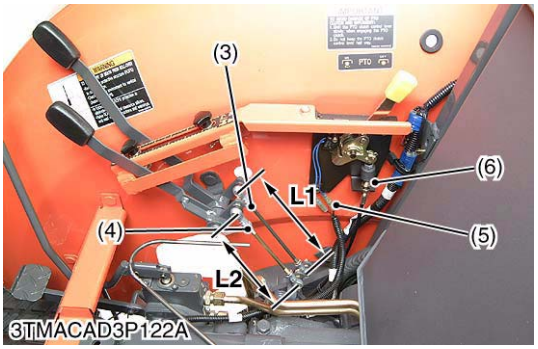


3TMACAD3P121B



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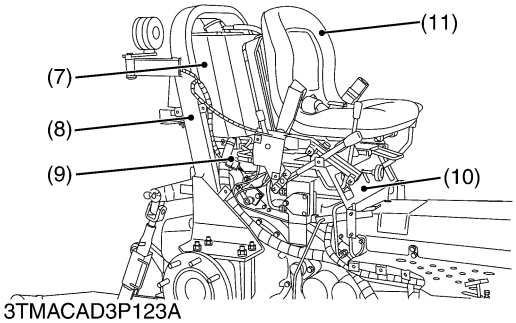
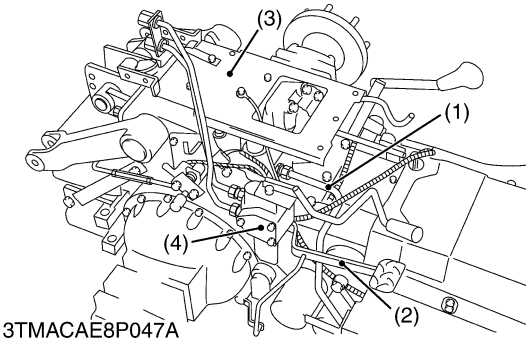


3TMACAD3P123A



3TMACAE8P047A

Rear Wheel, Fender and ROPS

1. Remove the seat (11).
2. Check the transmission case are securely mounted on the disassembly stands.
3. Disconnect the connector (9) for hazard and tail lights.
4. Disconnect the connectors (5) for PTO safety switch.
5. Remove the rear wheels (1).
6. Disconnect the position rod (3) and draft rod (4).
7. Remove the PTO control wire (6).
8. Remove the fender (2) and center cover (10).
9. Remove the rear ROPS (8) with fuel tank (7).

(When reassembling)

Length of position rod (**L1**)	Factory spec.	206 mm 8.11 in.
Length of draft rod (**L2**)	Factory spec.	172 mm 6.77 in.

Tightening torque	Rear wheel mounting nut	260 to 304 N·m 26.5 to 31.0 kgf·m 192 to 224 ft-lbs
	Rear ROPS mounting U-bolt	196 to 225 N·m 20 to 23 kgf·m 144.7 to 166.4 ft-lbs

■ NOTE

- **Adjust the hydraulic control levers after reassembly when you remove the right fender and the lever guide.**

(1) Rear Wheel
(2) Fender
(3) Position Rod
(4) Draft Rod
(5) Connector
(6) PTO Control Wire
(7) Fuel Tank
(8) Rear ROPS
(9) Connector
(10) Center Cover
(11) Seat

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Hydraulic Pipe and Differential Lock Pedal

1. Remove the delivery pipe (1) for the three point hydraulic system.
2. Remove the differential lock pedal (2).
3. Remove the seat frame (3).
4. Remove the auxiliary control valve (4).

(When reassembling)

Tightening torque	Delivery pipe retaining nut	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

(1) Delivery Pipe
(2) Differential Lock Pedal
(3) Seat Frame
(4) Auxiliary Control Valve

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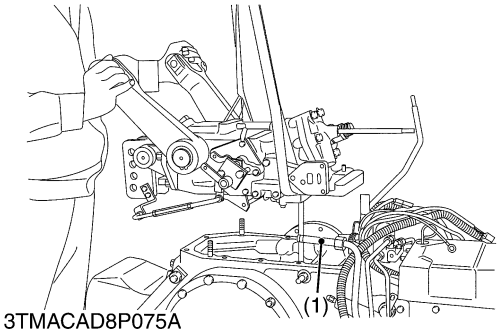

3TMACAD8P075A

Hydraulic Cylinder Assembly

1. Remove the delivery pipe (1).
2. Remove the hydraulic cylinder assembly mounting screws and nuts.
3. Support the hydraulic cylinder assembly with nylon lift strap and hoist, and take out it.

(When reassembling)

- Apply liquid gasket (Three Bond 1216 or equivalent) to joint face of the hydraulic cylinder assembly and transmission case after eliminate the water, oil and stuck liquid gasket.

Tightening torque	Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

■ NOTE

- **Reassemble the hydraulic cylinder assembly to the tractor, be sure to adjust the position control feedback rod and draft control rod.**

(1) Delivery Pipe

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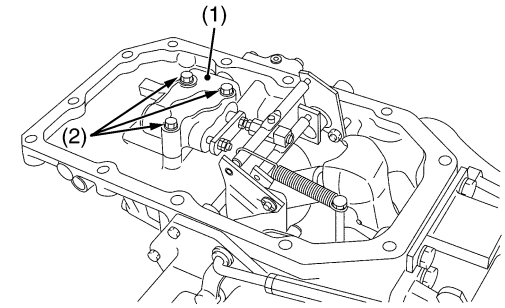
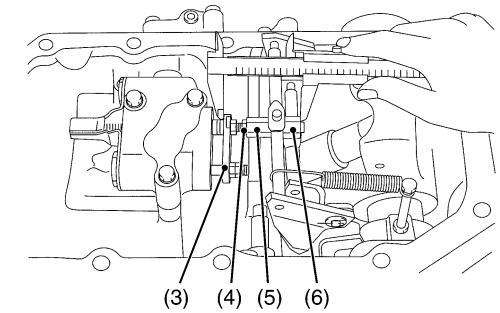
(B) Disassembling Position Control Valve



3TMACAE8P036A



3TMACAE8P037A

Removing Control Valve

1. Remove the return pipe.
2. Remove the control valve mounting screws (2).
3. Remove the control valve (1).

■ NOTE

- **Do not loosen adjusting section at the end of the spool unless necessary.**

(When reassembling)

- If the spool joint (6) is removed, be sure to adjust its position according to the following procedure.

Tightening torque	Control valve mounting screw	19.6 to 23.5 N·m 2.0 to 2.4 kgf·m 14.5 to 17.4 ft-lbs

■ Adjusting Spool Joint

1. Measure the distance between plate (3) and spool joint (6).
2. If the measurement is not within the factory specifications, loosen the lock nut (4) and adjust by the turnbuckle (5).

Distance between plate and spool joint	Factory spec.	62.0 to 63.0 mm 2.44 to 2.48 in.

(1) Control Valve
(2) Control Valve Mounting Screw
(3) Plate
(4) Lock Nut
(5) Turnbuckle
(6) Spool Joint

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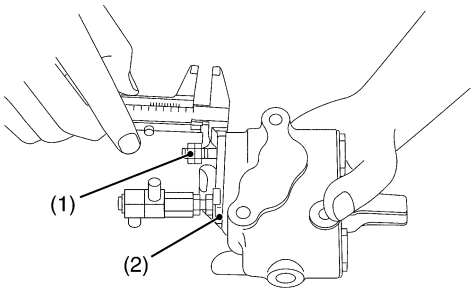

3TMACAB8P054A

Recording Distance between Plate and Lock Nut

■ **NOTE**

- **Before disassembling spool, be sure to record the lock nut position.**

1. Press the plate (2) on to the valve body, and measure the distance between the plate (2) and lock nut (1) for poppet valve.

(When reassembling)

- After assembling the control valve, be sure to check the function of it by air-blowing.
  If neutral, lift and down circuit can not be obtained properly, adjust the position of lock nut following the instructions given below.
  If the function is proper, stake the lock nut with a punch.

■ **Adjusting Lock Nut**

1. Turn the adjusting nuts all the way in, apply compressed air to the pump port while covering the cylinder port.
2. Move the adjusting nuts slowly out until you hear a loud hiss of air (unload valve opens).
3. Turn the nuts another 1/4 turn and lock.

Tightening torque	Lock nut	17.7 to 21.6 N·m 1.8 to 2.2 kgf·m 13.0 to 15.9 ft-lbs

(1) Lock Nut (2) Plate

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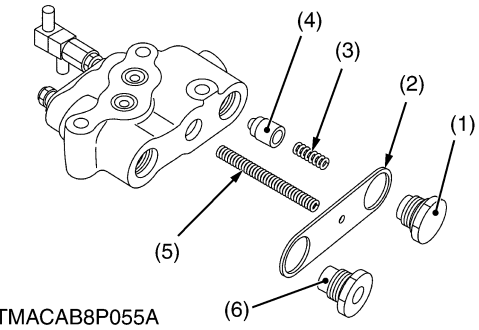

3TMACAB8P055A

Plug and Unload Valve

1. Secure the control valve with a vise.
2. Remove the seat plug (6) for poppet valve.
3. Remove the plug (1) for unload valve (4).
4. Remove the plate (2) and return spring (5).
5. Draw out the spring (3) and unload valve (4).

(When reassembling)

- Install the plug, nothing O-ring.

Tightening torque	Plug	68.6 to 88.3 N·m 7.0 to 9.0 kgf·m 50.6 to 65.1 ft-lbs

(1) Plug (4) Unload Valve
(2) Plate (5) Return Spring
(3) Spring (6) Plug

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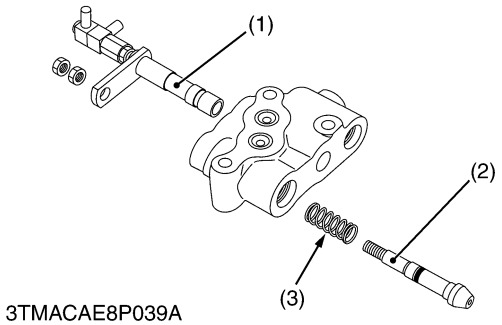

3TMACAE8P039A

Spool and Poppet Valve

1. Remove the lock nut for poppet valve (2).
2. Draw out the spool (1).
3. Push the poppet valve toward the seat plug to remove.

(When reassembling)

- Install the poppet valve, noting O-ring and backup ring.
- Install the lock nut so that the distance between the plate and lock nut is same as the recorded valve before disassembling the spool.

Tightening torque	Lock nut	17.7 to 21.6 N·m 1.8 to 2.2 kgf·m 13.0 to 15.9 ft-lbs

(1) Spool
(2) Poppet Valve
(3) Spring

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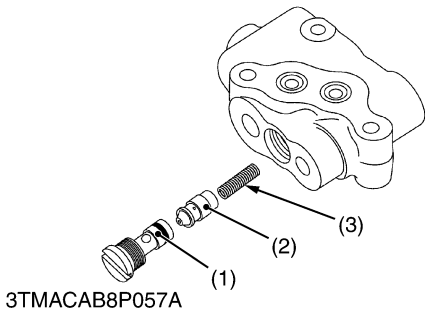

3TMACAB8P057A

Check Valve

1. Remove the seat plug (1).
2. Draw out the check valve (2) and spring (3).

(When reassembling)

- Install the seat, noting O-ring.
- After tightening the seat plug, stake it with a punch.

Tightening torque	Seat plug	49.0 to 58.8 N·m 5.0 to 6.0 kgf·m 36.2 to 43.4 ft-lbs

(1) Seat Plug
(2) Check Valve
(3) Spring

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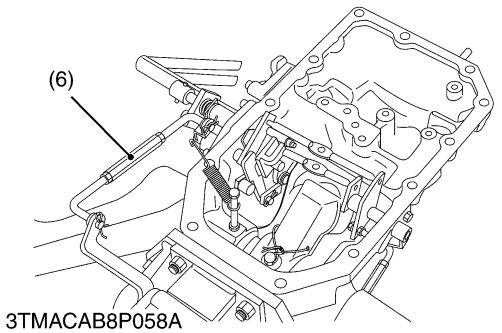

3TMACAB8P058A

Position and Draft Linkage

1. Remove the draft feedback rod (6).
2. Remove the spool drive levers (1), (2) and links (3), (4), (5).
3. Remove the bracket guide mounting screws.
4. Remove the bracket guide assembly (7).

(When reassembling)

Tightening torque	Bracket guide mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs

(1) Spool Drive Lever
(2) Spool Drive Lever
(3) Link
(4) Link
(5) Link
(6) Draft Feedback Rod
(7) Bracket Guide Assembly

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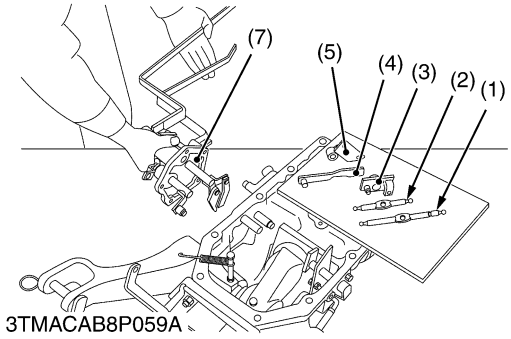
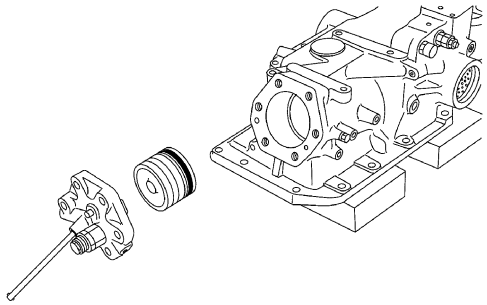


3TMACAB8P059A

(C) Disassembling Hydraulic Cylinder Assembly



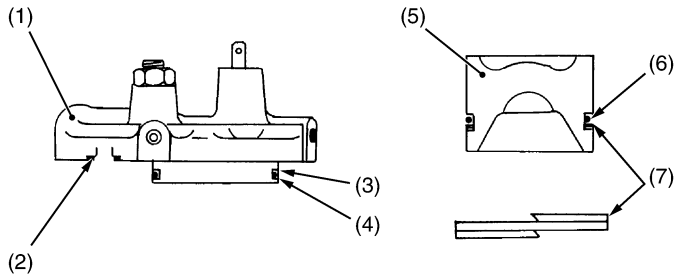
3TMACAB8P078A

Hydraulic Cylinder Cover and Hydraulic Piston

1. Remove the hydraulic cylinder cover (1).
2. Push out the hydraulic piston (5) from the hydraulic cylinder.

(When reassembling)

- Install the hydraulic piston, noting O-ring (6) and backup ring (7).
- Install the hydraulic cylinder cover, noting O-ring (2), (4) and backup ring (3).
- Apply grease to the hydraulic piston bottom contacts with hydraulic rod.



3TMACAB8P079A

(1) Hydraulic Cylinder Cover
(2) O-ring
(3) Backup Ring
(4) O-ring
(5) Hydraulic Piston
(6) O-ring
(7) Backup Ring

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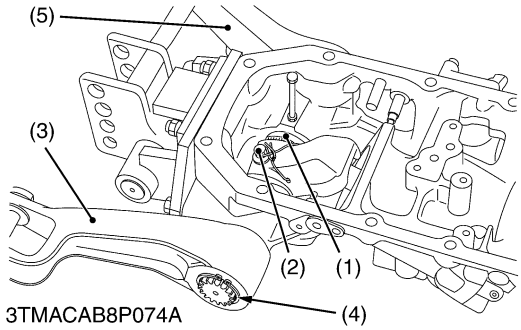

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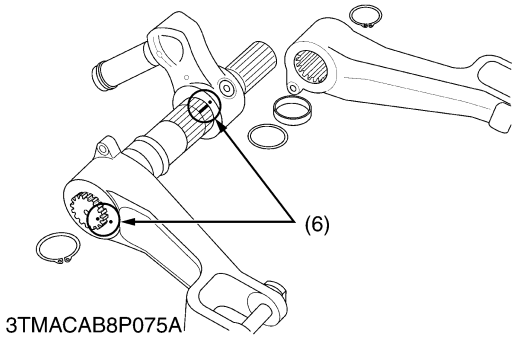

3TMACAB8P075A

Lift Arm and Hydraulic Arm Shaft

1. Disconnect the feedback rod from the lift arm L.H. (3).
2. Remove the wire and unscrew the setting screw (2).
3. Remove the external snap ring (4).
4. Draw out the hydraulic arm shaft (1) and lift arm R.H. (5) as a unit.
5. Remove the collar and O-ring.

(When reassembling)

- Align the alignment marks of the hydraulic arm and hydraulic arm shaft.
- Align the alignment marks of the lift arm and hydraulic arm shaft.
- Apply grease to the right and left bushings of hydraulic cylinder body and O-ring.
- Take care not to damage the O-ring.
- After tightening the hydraulic arm setting screw to the specified torque, insert a wire through the holes of the screw head and hydraulic arm.

Tightening torque	Hydraulic arm setting screw	39.2 to 45.1 N·m 4.0 to 4.6 kgf·m 28.9 to 33.3 ft-lbs

(1) Hydraulic Arm Shaft
(2) Setting Screw
(3) Lift Arm L.H.
(4) External Snap Ring
(5) Lift Arm R.H.
(6) Alignment Mark

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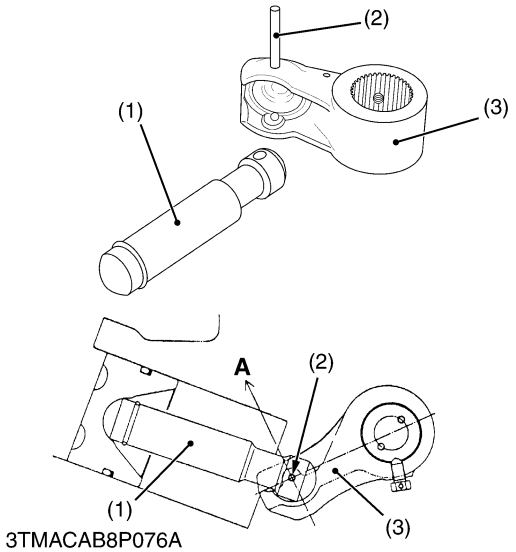

3TMACAB8P076A

Hydraulic Arm and Hydraulic Rod

1. Remove the spring pin (2), and separate the hydraulic arm (3) and the hydraulic rod (1).

(When reassembling)

- Apply grease to the joints of the hydraulic arm, hydraulic rod, set pin and piston.
- Be sure to fix the spring pin (2), its sprits must face the direction **A** as shown in figure.

(1) Hydraulic Rod
(2) Spring Pin
(3) Hydraulic Arm

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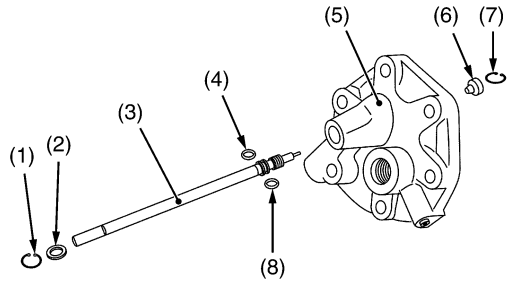


3TMACAB8P077A

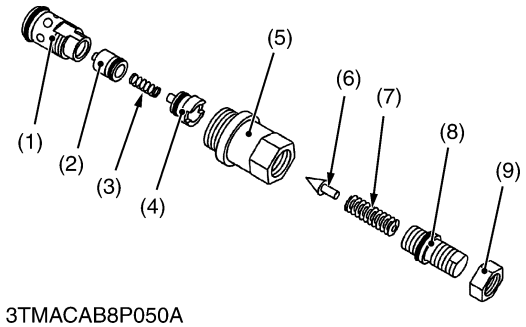
Lowering Speed Adjusting Valve

1. Remove the internal snap ring (1) and adjusting screw (3).
2. Remove the internal snap ring (7), and draw out the poppet valve (6).

(1) Internal Snap Ring
(2) Plane Washer
(3) Adjusting Screw
(4) O-ring
(5) Hydraulic Cylinder Cover
(6) Poppet Valve
(7) Internal Snap Ring
(8) O-ring

0000002670E

(D) Relief Valve



3TMACAB8P050A

Relief Valve

1. Remove the lock nut (9).
2. Remove the adjuster (8), and draw out the spring (7) and the pilot valve (6).
3. Remove the valve seat (1), and draw out the valve seat (4), the spring (3) and the main valve (2).

(When reassembling)

- Take care not to damage the O-rings.

Tightening torque	Relief valve	34.3 to 39.2 N·m 3.5 to 4.0 kgf·m 25.3 to 28.9 ft-lbs

■ IMPORTANT

- **After disassembling and assembling the relief valve, be sure to adjust the relief valve setting pressure.**

(1) Valve Seat
(2) Main Valve
(3) Spring
(4) Valve Seat
(5) Valve Body
(6) Pilot Valve
(7) Spring
(8) Adjuster
(9) Lock Nut

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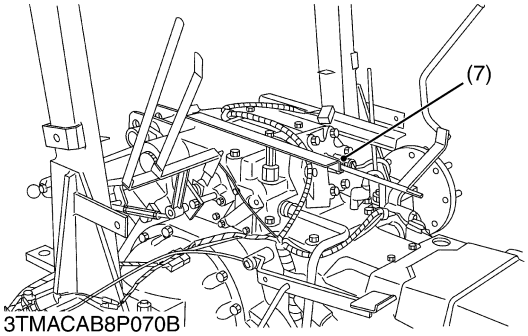
(E) Cylinder Safety Valve



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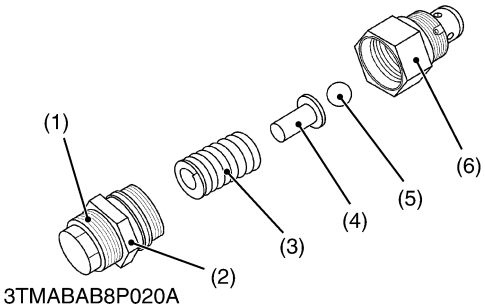

3TMABAB8P020A

Cylinder Safety Valve

1. Remove the cylinder safety valve assembly (7).
2. Secure the cylinder safety valve assembly in a vise.
3. Loosen the lock nut (2), and remove the adjust screw (1).
4. Draw out the spring (3), seat (4), and ball (5).

(When reassembling)

- Install the cylinder safety valve to the hydraulic cylinder block, taking care not to damage the O-ring.

Tightening torque	Cylinder safety valve assembly	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs
	Cylinder safety valve lock nut	58.8 to 78.5 N·m 6.0 to 8.0 kgf·m 43.4 to 57.9 ft-lbs

■ IMPORTANT

- **After disassembling and assembling the cylinder safety valve assembly, be sure to check the operating pressure.**

(1) Adjust Screw
(2) Lock Nut
(3) Spring
(4) Seat
(5) Ball
(6) Housing
(7) Safety Valve Assembly

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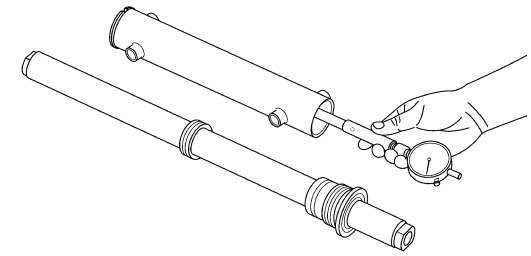
[3] SERVICING

(1) Steering Cylinder


3TMABAB7P070A

Steering Cylinder I.D.

1. Measure the steering cylinder I.D. with a cylinder gauge.
2. If the cylinder I.D. exceed the allowable limit, replace the cylinder barrel.

Steering cylinder I.D.	Factory spec.	50.000 to 50.062 mm 1.96850 to 1.97094 in.
	Allowable limit	50.100 mm 1.97244 in.

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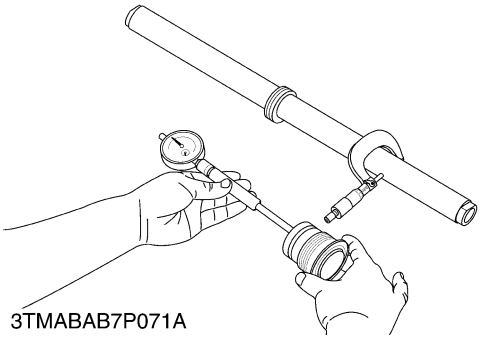
3TMABAB7P071A

Clearance between Rod and Bushing

1. Measure the bushing I.D. with a cylinder gauge.
2. Measure the rod O.D. with a outside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace as a unit.

Clearance between rod and bushing	Factory spec.	0.009 to 0.127 mm 0.00035 to 0.00500 in.
	Allowable limit	0.135 mm 0.00531 in.

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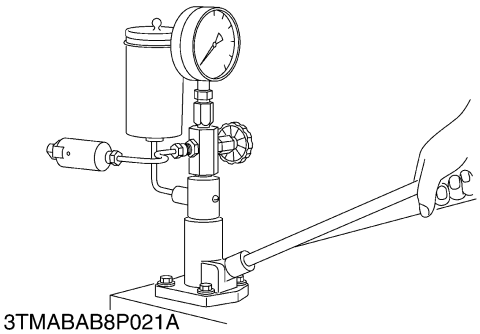
(2) Three Point Hydraulic System


3TMABAB8P021A

Operating Pressure of Cylinder Safety Valve

1. Attach the cylinder safety valve to an injection nozzle tester with a safety valve setting adaptor. (See page G-61.)
2. Measure the operating pressure of the cylinder safety valve.
3. If the operating pressure is not within the factory specifications, adjust by turning the adjusting screw. (See page N8-S20.)
4. After adjustment, tighten the lock nut firmly.

Cylinder safety valve operating pressure	Factory spec.	21.1 to 22.6 MPa 215 to 230 kgf/cm^2 3058 to 3271 psi

■ NOTE

- **Use specified transmission fluid (see page G-8) to test the operating pressure of the cylinder safety valve.**

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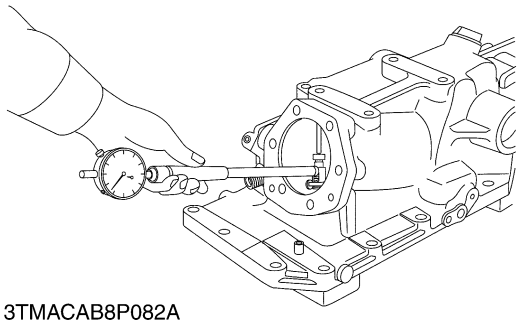
3TMACAB8P082A

Hydraulic Cylinder Bore

1. Check the cylinder internal surface for scoring or damage.
2. Measure the cylinder I.D. with a cylinder gauge.
3. If the measurement exceeds the allowable limit, replace it.

Cylinder I.D.	Factory spec.	90.000 to 90.050 mm 3.54330 to 3.54527 in.
	Allowable limit	90.15 mm 3.5492 in.

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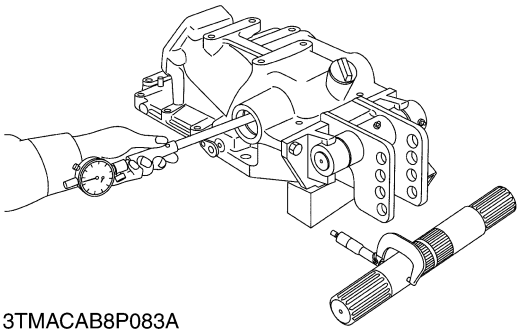

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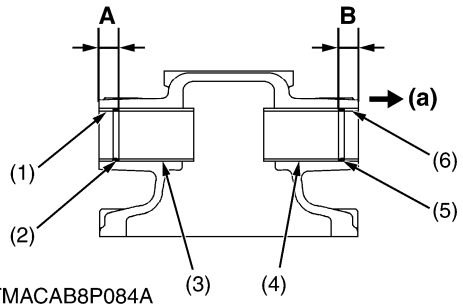

3TMACAB8P084A

Clearance between Hydraulic Arm Shaft and Bushing

1. Measure the hydraulic arm shaft O.D. with an outside micrometer.
2. Measure the bushing I.D. with a cylinder gauge, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace the bushing.

(When reassembling)

- When press-fitting a new bushing with a press-fitting tool (see page G-59), observe the dimensions described in the figure.
- When press-fitting a new bushing, apply transmission fluid to the hydraulic cylinder liner boss and bushing.
- When press-fitting a new bushing, press-fit it so that each seam faces up.

Clearance between hydraulic arm shaft and bushing (Right side)	Factory spec.	0.049 to 0.154 mm 0.00193 to 0.00606 in.
	Allowable limit	0.50 mm 0.0197 in.

Hydraulic arm shaft O.D. (Right side)	Factory spec.	49.950 to 49.975 mm 1.96653 to 1.97259 in.
Bushing I.D. (After press-fitted) (Right side)	Factory spec.	50.024 to 50.104 mm 1.96944 to 1.97259 in.

Clearance between hydraulic arm shaft and bushing (Left side)	Factory spec.	0.049 to 0.149 mm 0.00193 to 0.00587 in.
	Allowable limit	0.50 mm 0.0197 in.

Hydraulic arm shaft O.D. (Left side)	Factory spec.	44.950 to 44.975 mm 1.76968 to 1.77067 in.
Bushing I.D. (After press-fitted) (Left side)	Factory spec.	45.024 to 45.099 mm 1.77259 to 1.77555 in.

Press-fit location of bushing (**A**)	Factory spec.	14.5 to 15.5 mm 0.5708 to 0.6102 in.
Press-fit location of bushing (**B**)	Factory spec.	22.5 to 23.5 mm 0.8858 to 0.9252 in.

(1) Collar (Left)
(2) O-ring
(3) Bushing (Left)
(4) Bushing (Right)
(5) O-ring
(6) Collar (Right)

(a) Right Side
*** Flush the end of collar with the end of hydraulic cylinder body.**

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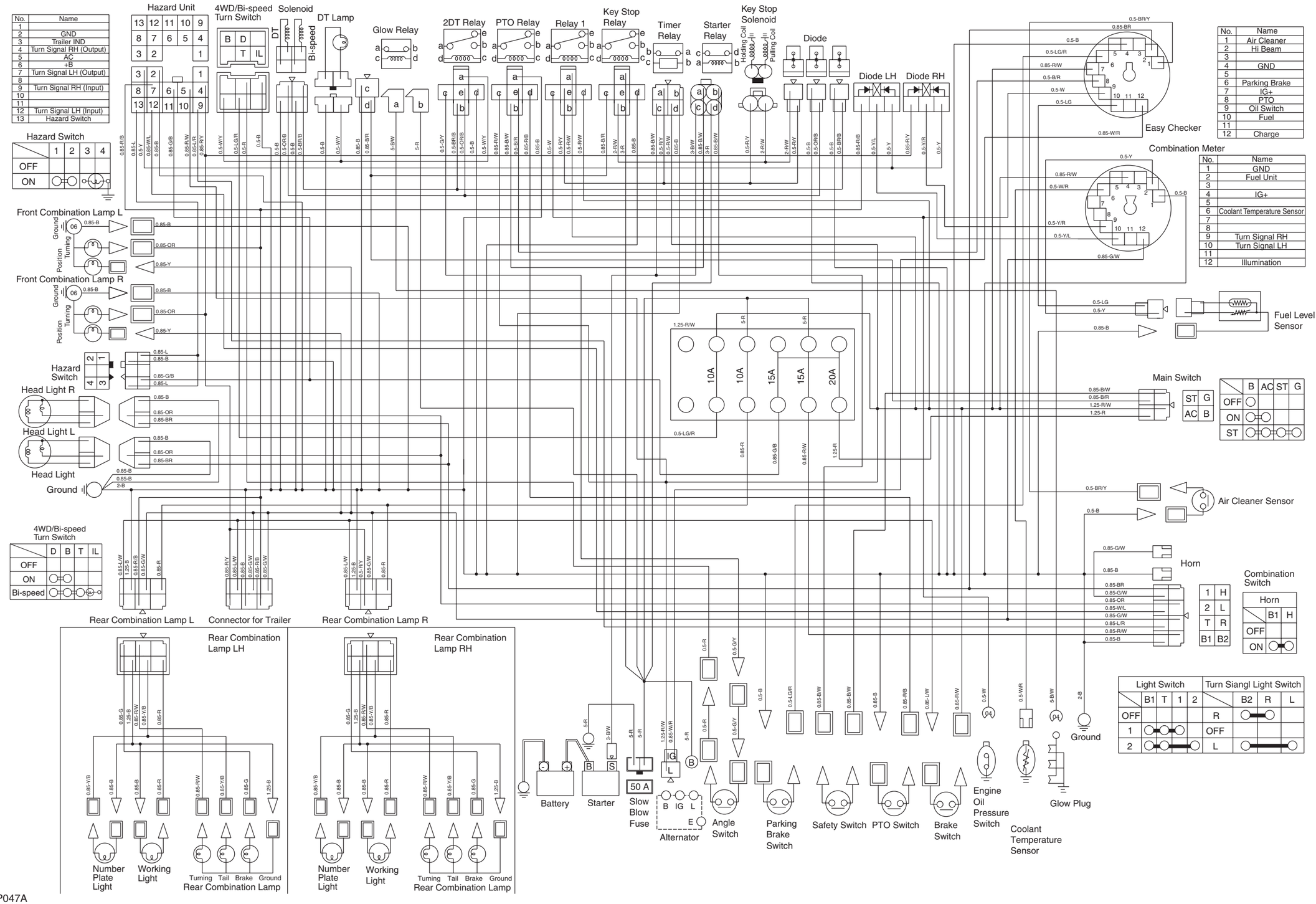
N9 ELECTRICAL SYSTEM

CONTENTS

1. WIRING DIAGRAM



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2. COLOR OF WIRING

B ..... Black	B/Y ..... Black / Yellow	Lg/Y ..... Light Green / Yellow
G ..... Green	Br/B ..... Brown / Black	Or/W ..... Orange / White
L ..... Blue	Br/Y ..... Brown / Yellow	R/B ..... Red / Black
P ..... Pink	G/B ..... Green / Black	R/G ..... Red / Green
R ..... Red	G/L ..... Green / Blue	R/L ..... Red / Blue
W ..... White	G/R ..... Green / Red	R/W ..... Red / White
Y ..... Yellow	G/W ..... Green / White	R/Y ..... Red / Yellow
Br ..... Brown	G/Y ..... Green / Yellow	W/B ..... White / Black
Lg ..... Light Green	L/B ..... Blue / Black	W/G ..... White / Green
Or ..... Orange	L/G ..... Blue / Green	W/L ..... White / Blue
Sb ..... Sky Blue	L/Or ..... Blue / Orange	W/R ..... White / Red
B/G ..... Black / Green	L/R ..... Blue / Red	W/Y ..... White / Yellow
B/L ..... Black / Blue	L/W ..... Blue / White	Y/B ..... Yellow / Black
B/P ..... Black / Pink	L/Y ..... Blue / Yellow	Y/G ..... Yellow / Green
B/Pu ..... Black / Purple	Lg/B ..... Light Green / Blue	Y/L ..... Yellow / Blue
B/R ..... Black / Red	Lg/R ..... Light Green / Red	Y/R ..... Yellow / Red
B/W ..... Black / White	Lg/W ..... Light Green / White	

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CONTENTS

1. TROUBLESHOOTING

4WD / BI-SPEED TURN

Symptom	Probable Cause	Solution	Reference Page
Front Wheel Can Not Drive Bi-speed Turn	● 4WD / Bi-speed switch or wiring harness is defective	Replace	N9-S2
	● Turning angle inspection switch or wiring harness is defective	Repair or Replace	N9-S3
	● 4WD / Bi-speed relay defective	Replace	N9-S3
	● 4WD / Bi-speed solenoid valve defective	Replace	N9-S4
Front Wheel Drive Can Not Be Cancelled Bi-speed Turn	● 4WD / Bi-speed switch or wiring harness is defective	Repair or Replace	N9-S2
	● Turning angle inspection switch or wiring harness is defective	Repair or Replace	N9-S3
	● 4WD / Bi-speed relay defective	Replace	N9-S3
	● 4WD / Bi-speed solenoid **ON** / **OFF** valve defective	Replace	N9-S4

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2. CHECKING, DISASSEMBLING AND SERVICING

[1] 4WD / BI-SPEED TURN SYSTEM

(1) Checking

4WD / Bi-speed Turn Switch

1. Turn the main switch (1) off.
2. Remove the steering wheel.
3. Disconnect the meter panel (3).
4. Disconnect the 4WD / Bi-speed switch connector (4).
5. Perform the following checkings **1)** and **2)**.

(1) Main Switch
(2) 4WD / Bi-speed Turn Switch
(3) Meter Panel
(4) 4WD / Bi-speed Switch Connector

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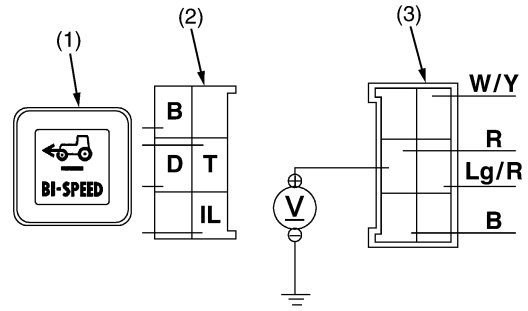

3TMACAD9P039A

1) Connector Voltage

1. Turn the main switch to **ON** position.
2. Measure the voltage with a voltmeter across the connector **Lg/R** terminal and chassis.
3. If the voltage differs from the battery voltage, the wiring harness is faulty.

Voltage	**Lg/R** terminal — Chassis	Battery voltage (11 to 14 V)

(1) 4WD / Bi-speed Turn Switch
(2) 4WD / Bi-speed Switch Connector (Switch Side)
(3) 4WD / Bi-speed Switch Connector (Wiring Harness Side)

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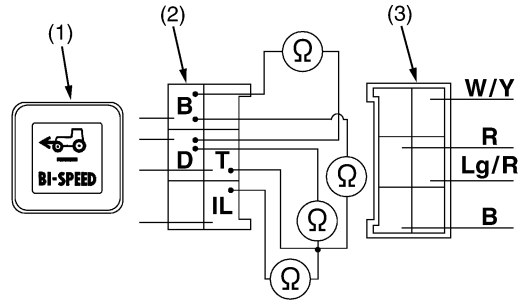

3TMACAD9P040A

2) 4WD / Bi-speed Turn Switch

1. Check the continuity through switch with an ohmmeter.
2. If continuity specified below are not indicated, the switch is faulty.

Terminal / Position	D	B	T	IL
OFF	●			
DT	●	●		
Bi-speed	●	●	●	●

(1) 4WD / Bi-speed Turn Switch
(2) 4WD / Bi-speed Switch Connector (Switch Side)
(3) 4WD / Bi-speed Switch Connector (Wiring Harness Side)

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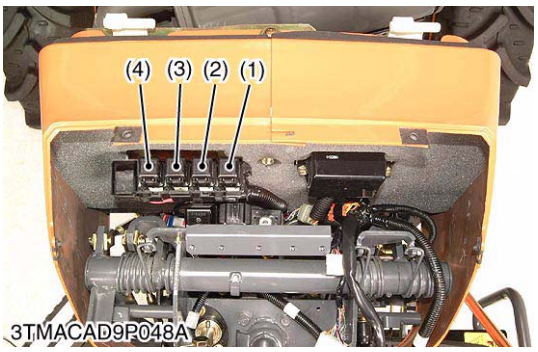

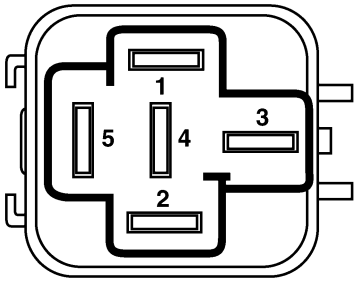

3TMACAD9P022B

4WD / Bi-speed Relay

1. Remove the 4WD / Bi-speed relay (4).
2. Apply battery voltage across **1** and **2** terminals, and check for continuity across **3** and **5** terminals.
3. If continuity is not established across **3** and **5** terminals, relay is faulty.

■ NOTE

- **The 4WD / Bi-speed relay (4), PTO relay (3), relay 1 (2) and key stop relay (1) are interchangeable each other.**

(1) Key Stop Relay
(2) Relay 1
(3) PTO Relay
(4) 4WD / Bi-speed Relay

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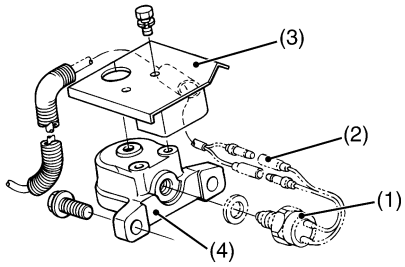

3TMACAD9P049A

Turning Angle Inspection Switch

1. Remove the switch cover (3) from the left side front case support (4).
2. Disconnect the turning angle inspection switch connector (2) after turning the main switch off.
3. Perform the following checking **1)** and **2)**.

(1) Turning Angle Inspection Switch
(2) Connector
(3) Switch Cover
(4) Front Case Support

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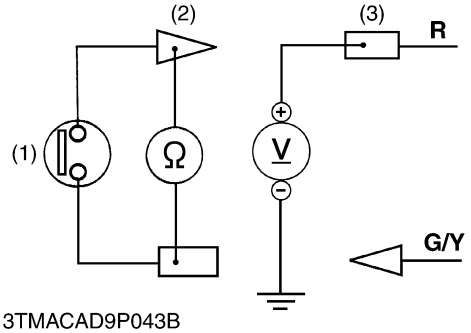

3TMACAD9P043B

1) Connector Voltage

1. Turn the main switch **ON** position.
2. Set the 4WD / Bi-speed switch to Bi-speed position.
3. Measure the voltage with a voltmeter across the wiring harness connector **B** terminal and chassis.
4. If the voltage differs from the battery voltage (11 to 14 volts), check the 4WD / Bi-speed switch or wiring harness.

Voltage	Connector **B** terminal — Chassis	Battery voltage

(1) Turning Angle Inspection Switch
(2) **1P** Connector (Switch Side)
(3) **1P** Connector (Wiring Harness Side)

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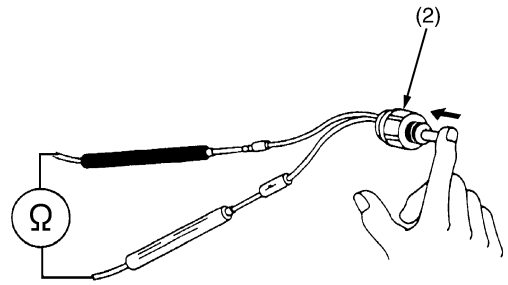
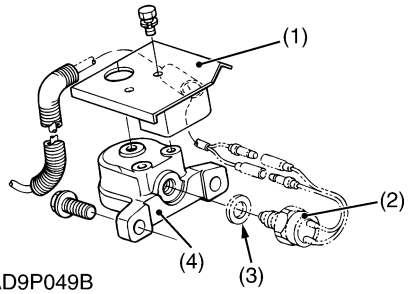


3TMACAD9P044A



3TMACAD9P049B

2) Turning Angle Inspection Switch

1. Remove the switch cover (1).
2. Disconnect the two **1P** connectors, and remove the turning angle inspection switch (2) from the front case support (4).
3. Measure the resistance with an ohmmeter across the two **1P** connectors.
4. If infinity is not indicated, the turning angle inspection switch is faulty.
5. Measure the resistance with an ohmmeter across the two **1P** connectors while pushing the push rod of switch.
6. If 0 ohm is not indicated, the turning angle inspection switch is faulty.

Resistance across two **1P** connectors	Factory spec.	When the push rod is normal position	Infinity
		When the push rod is pushed	0 ohm

■ IMPORTANT

- **After reassembling the Bi-speed turn sensor, be sure to check its operation.**

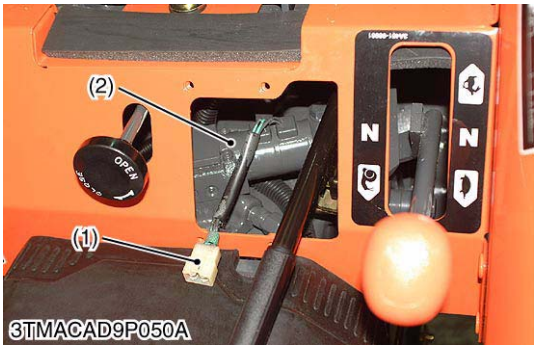
1. **When the front wheels are straight ahead, the resistance value of the turn angle inspection switch is infinity.**
2. **When the turning angle exceeds approximately 34° (0.59 rad.), the resistance value of the turning angle inspection switch is o ohm.**
   If the resistance values specified above are not indicated, adjust with the shim (3).

(Reference)

- **Thickness of adjusting shims : 0.5 mm (0.020 in.)**
  1.0 mm (0.039 in.)

(1) Switch Cover
(2) Turning Angle Inspection Switch
(3) Shim
(4) Front Case Support

0000003382E

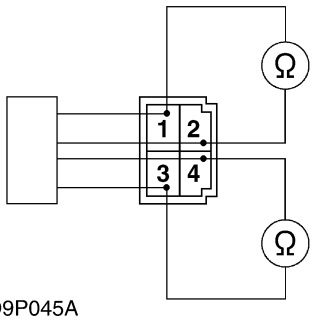


4WD / Bi-speed Valve

1. Disconnect the **4P** connector (1) after turning the main switch off.
2. Perform the following checks.

(1) **4P** Connector
(2) 4WD / Bi-speed Valve

0000003567E



3TMACAD9P045A

1) 4WD / Bi-speed Valve

1. Measure the resistance with an ohmmeter between **1** terminal and **2** terminal.
2. Measure the resistance with an ohmmeter between **3** terminal and **4** terminal.
3. If the measurement greatly differs from specified value, replace the 4WD / Bi-speed valve.

Resistance	**1** terminal — **2** terminal	Approx. 5.7 Ω
	3 terminal — **2** terminal	Approx. 5.7 Ω

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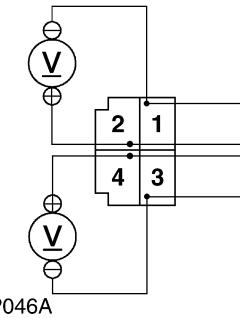

3TMACAD9P046A

2) Connector Voltage

1. Turn the main switch on and set the 4WD / Bi-speed turn switch to "4WD" position.
2. Measure the voltage between **1** terminal and **2** terminal.
3. If the measurement differs from the battery voltage, 4WD / Bi-speed turn switch or wiring harness is faulty.
4. Set the 4WD / Bi-speed turn switch to "Bi-speed" position, and steer the front wheel to 34 degrees or more.
5. Measure the voltage between **3** terminal and **4** terminal.
6. If the measurement differs from the battery voltage, 4WD / Bi-speed turn switch or turning angle inspection switch or wiring harness is faulty.

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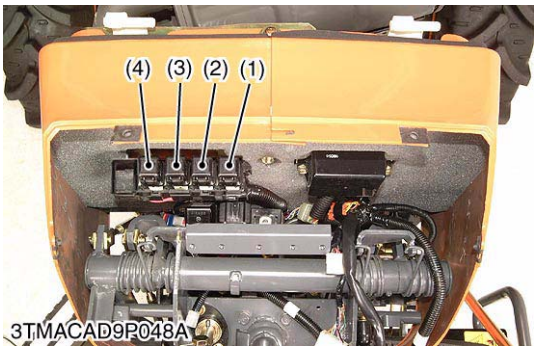
[2] STARTING SYSTEM

(1) Checking



3TMACAD9P048A

PTO Relay

1. Remove the PTO relay (3).
2. Apply battery voltage across **1** and **2** terminals, and check for continuity across **3** and **5** terminals.
3. If continuity is not established across **3** and **5** terminals, relay is faulty.

■ NOTE

- **The 4WD / Bi-speed relay (4), PTO relay (3), relay 1 (2) and key stop relay (1) are interchangeable each other.**

(1) Key Stop Relay
(2) Relay 1
(3) PTO Relay
(4) 4WD / Bi-speed Relay

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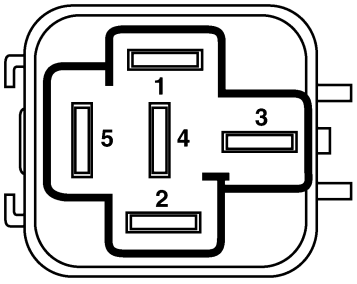

3TMACAD9P022B

Relay 1

Relay **1** is the same parts as the PTO relay, see checking "PTO" relay.

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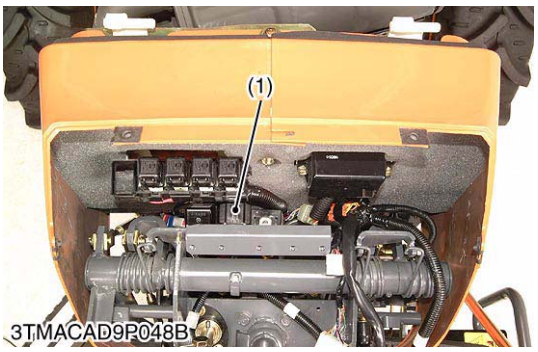

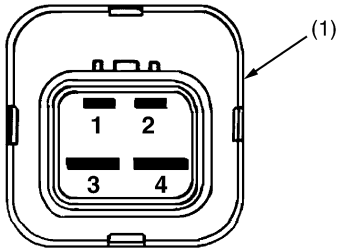

3TMACAB9P038A

Starter Relay

1. Remove the starter relay (1).
2. Apply battery voltage across **3** and **4** terminals, and check for continuity across **1** and **2** terminals.
3. If continuity is not established across **1** and **2** terminals, renew the starter relay.

(1) Starter Relay

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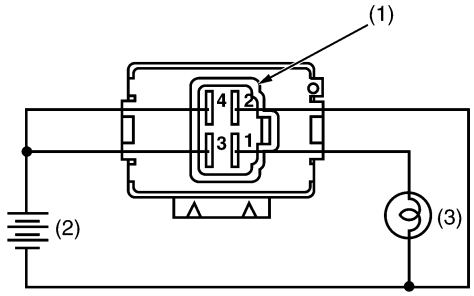

3TMACAD9P023A

Timer Relay

1. Remove the timer relay (1).
2. Connect the jumper leads across the battery positive terminal and **3** and **4** terminal.
3. Connect the jumper leads across the battery negative terminal and **2** terminal.
4. Connect the jumper leads across the **1** terminal and the bulb (3) as shown in figure.
5. The bulb (3) lights up when disconnecting a jumper lead from **3** terminal and goes off six to thirteen seconds late, the timer relay is proper.

(1) Timer Relay
(2) Battery
(3) Bulb

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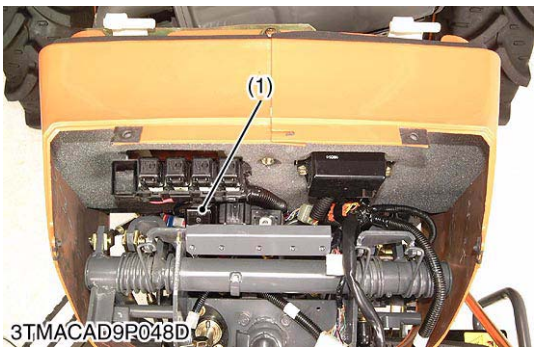

Glow Relay

1) Connector Voltage

1. Turn the main switch off.
2. Disconnect the **1P** connectors and **2P** connector from glow relay (1).
3. Measure the voltage with a voltmeter across the **1P** connector **R** terminal (Positive) and chassis (Negative).
4. If the voltage differs from the battery voltage, the wiring harness is faulty.
5. Turn the main switch on.
6. Measure the voltage with a voltmeter across the **2P** connector **RW** terminal (Positive) and chassis (Negative).
7. If the voltage differs from the battery voltage, the wiring harness is faulty.

(1) Glow Relay

0000003571E

2) Glow Relay Test

1. Remove the glow relay (1).
2. Apply battery voltage across **3** and **4** terminals, and check for continuity across **1** and **2** terminals.
3. If continuity is not established across **1** and **2** terminals, replace the glow relay (1).

(1) Glow Relay

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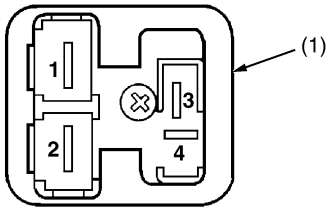

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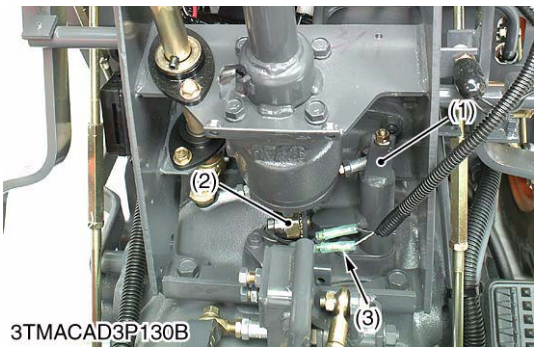

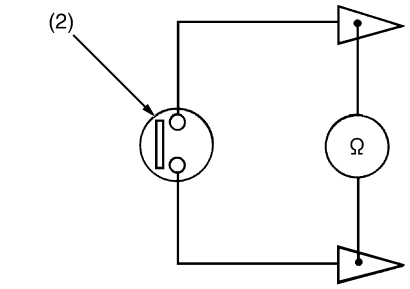

Shuttle Neutral Switch

1. Disconnect the two **1P** connector (3).
2. Connect the circuit tester to the safety switch (shuttle neutral switch) leads.
3. Measure the resistance between leads.
4. If the safety switch (shuttle neutral switch) is defective, replace it.

Resistance (Across switch terminal)	When operate the shuttle lever to the forward or reverse	0 Ω
	Shuttle lever at neutral	Infinity

(1) Shuttle Lever
(2) Safety Switch
(3) **1P** Connector

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■ **NOTE**

- **As for the main switch, glow plug, PTO clutch safety switch and starter motor, refer to the ME8200 · ME9000 Workshop Manual.**

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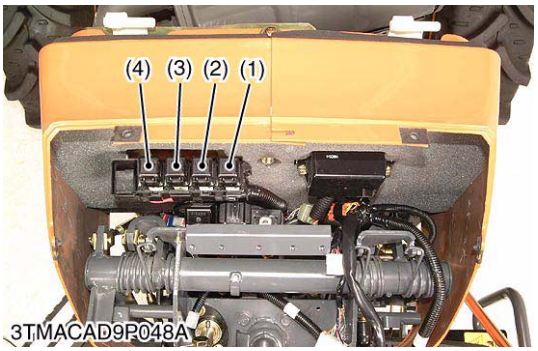
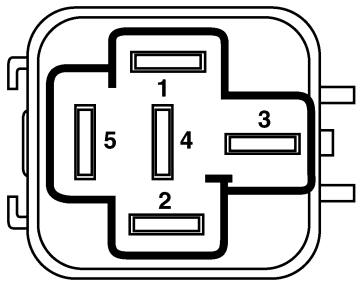
[3] STOPPING SYSTEM

(1) Checking





Key Stop Relay

1. Remove the key stop relay (1).
2. Apply battery voltage across **1** and **2** terminals, and check for continuity across **3** and **5** terminals.
3. If continuity is not established across **3** and **5** terminals, relay is faulty.

■ **NOTE**

- **The 4WD / Bi-speed relay (4), PTO relay (3), relay 1 (2) and key stop relay (1) are interchangeable each other.**

(1) Key Stop Relay
(2) Relay 1
(3) PTO Relay
(4) 4WD / Bi-speed Relay

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■ **NOTE**

- **As for the engine stop solenoid, refer to the ME8200 · ME9000 Workshop Manual.**

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