

WSM

WORKSHOP MANUAL
TRACTOR

L3301,L3901,L4701

Kubota

TO THE READER

This Workshop Manual tells the servicing personnel about the mechanism, servicing and maintenance of the L3301, L3901 and L4701. It contains 4 parts: **"Information"**, **"General"**, **"Mechanism"** and **"Servicing"**.

■ Information

This section primarily contains information below.

- Safety First
- Safety Decal
- Specifications
- Dimensions

■ General

This section primarily contains information below.

- Engine Identification
- Model Identification
- General Precautions
- Maintenance Check List
- Check and Maintenance
- Special Tools

■ Mechanism

This section contains information on the structure and the function of the unit. Before you continue with the subsequent sections, make sure that you read this section.

Refer to the latest version of Workshop Manual (Code No. 9Y021-01870 / 9Y021-18200) for the diesel engine / tractor mechanism that this workshop manual does not include.

■ Servicing

This section primarily contains information below.

- Troubleshooting
- Servicing Specifications
- Tightening Torques
- Checking, Disassembling and Servicing

All illustrations, photographs and specifications contained in this manual are of the newest information available at the time of publication.

KUBOTA reserves the right to change all information at any time without notice.

Since this manual includes many models, information or illustrations and photographs can show more than one model.

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February, 2014

Record of Revisions

For pdf, use search function {Search word} to find all the revised locations.

Last digit of the Code No.	Month of Revision	Main Revised Point and Corrective Measures {Search word}	Reference Page
1	2016.09	Maintenance interval was introduced.	G-15 to G-77
		CCV heater equipped model was introduced. Assembling and disassembling process in ENGINE was revised and some wiring diagram, electrical circuit and components are added in ELECTRICAL SYSTEM.	1-S1, 1-S16, 1-S29, 1-S31, 1-S36, 2-S8, 2-S10, 2-S15, 2-S17, 3-S28, 3-S30, 3-S63, 9-M1, 9-M2, 9-S16, 9-S17, 9-S55
2	2018.09	Added the (3) Glow Control (Old Model).	9-M13
		Added the (4) Glow Control (New Model).	9-M13
3	2019.08	Added tightening torque of the engine and clutch housing mounting bolts and nuts for L3301 and L3901.	2-S4, 2-S20, 3-S66
		Changed the topic of "No-load test".	9-S35

I INFORMATION

INFORMATION

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1. SAFETY FIRST

SAFETY FIRST

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

DANGER

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

WARNING

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

CAUTION

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

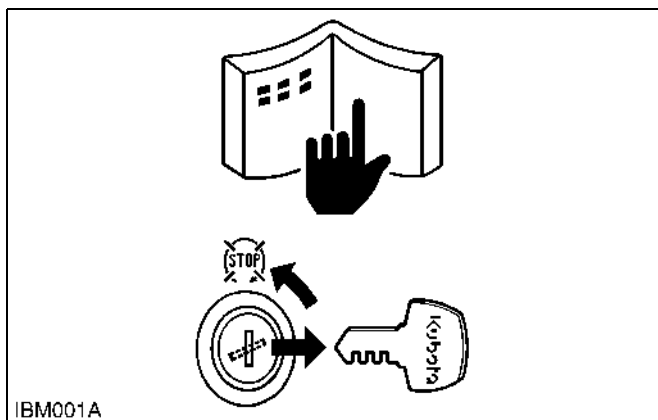
■ IMPORTANT

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

■ NOTE

- Gives helpful information.

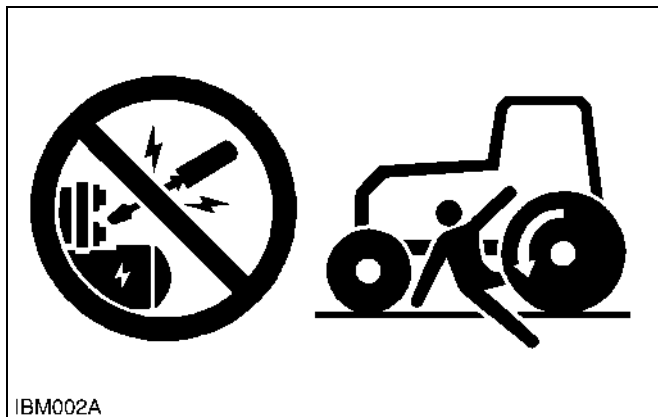
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BEFORE YOU START SERVICE

- 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 stable and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, then remove the key.
- Disconnect the battery negative cable.
- Hang a **"DO NOT OPERATE"** tag in the operator station.

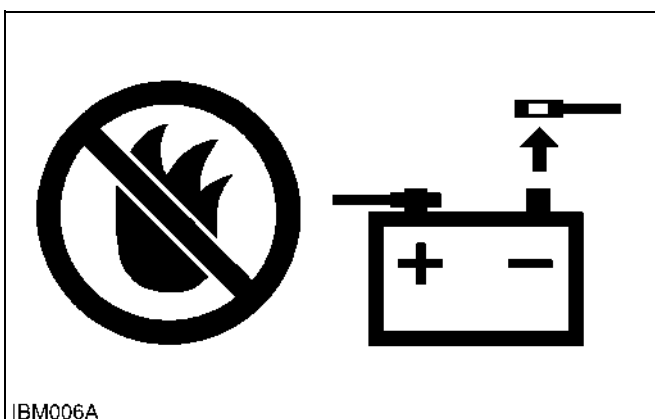
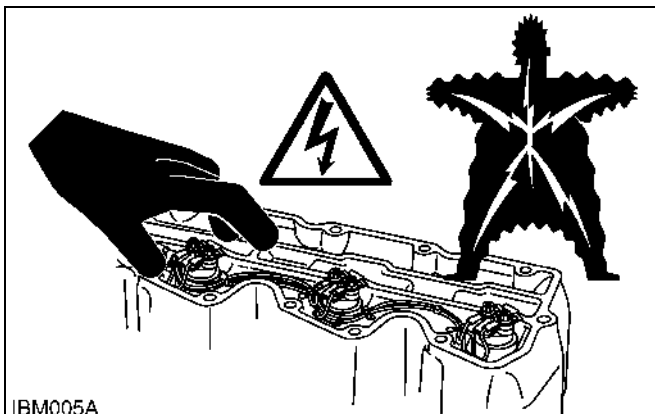
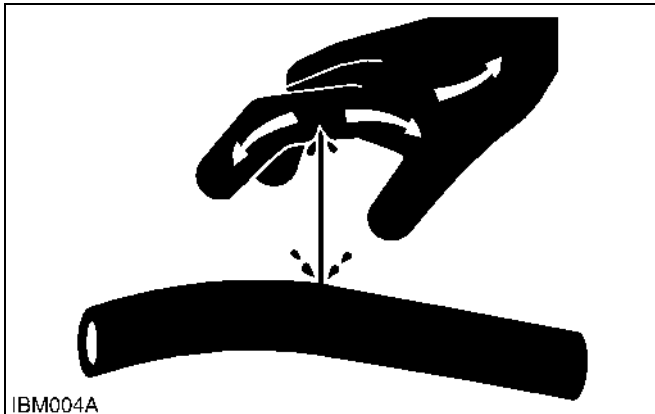
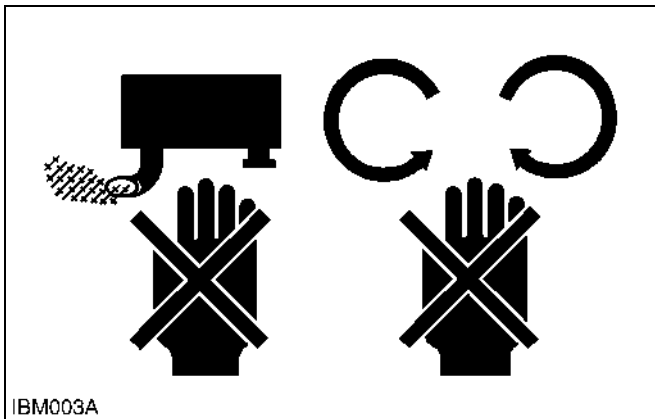
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START SAFELY

- Do not do the procedures below when you start the engine.
 - short across starter terminals
 - bypass the safety start switch
- Do not alter or remove any part of machine safety system.
- Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Do not start the engine when you stay on the ground. Start the engine only from operator's seat.

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OPERATE SAFELY

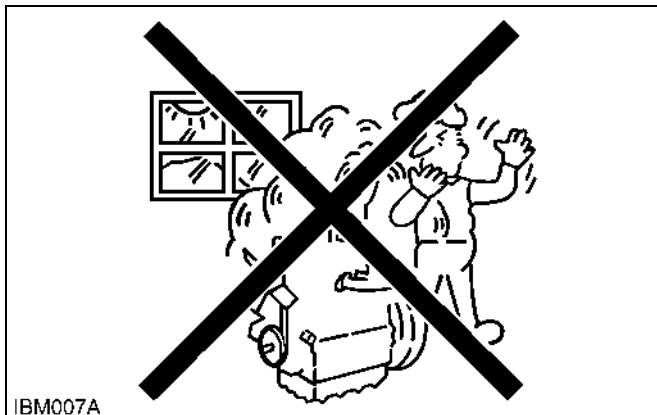
- Do not use the machine after you consume alcohol or medication or when you are tired.
- Put on applicable clothing and safety equipment.
- Use applicable tools only. Do not use alternative tools or parts.
- When 2 or more persons do servicing, make sure that you do it safely.
- Do not operate below the machine that only a jack holds. Always use a safety stand to hold the machine.
- Do not touch the hot parts or parts that turn when the engine operates.
- Do not remove the radiator cap when the engine operates, or immediately after it stops. If not, hot water can spout out from the radiator. Only remove the radiator cap when it is at a sufficiently low temperature to touch with bare hands. Slowly loosen the cap to release the pressure before you remove it fully.
- Released fluid (fuel or hydraulic oil) under pressure can cause damage to the skin and cause serious injury. Release the pressure before you disconnect hydraulic or fuel lines. Tighten all connections before you apply the pressure.
- Do not open a fuel system under high pressure. The fluid under high pressure that stays in fuel lines can cause serious injury. Do not disconnect or repair the fuel lines, sensors, or any other components between the fuel pump and injectors on engines with a common rail fuel system under high pressure.
- Put on an applicable ear protective device (earmuffs or earplugs) to prevent injury against loud noises.
- Be careful about electric shock. The engine generates a high voltage of more than DC100 V in the ECU and is applied to the injector.

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PREVENT A FIRE

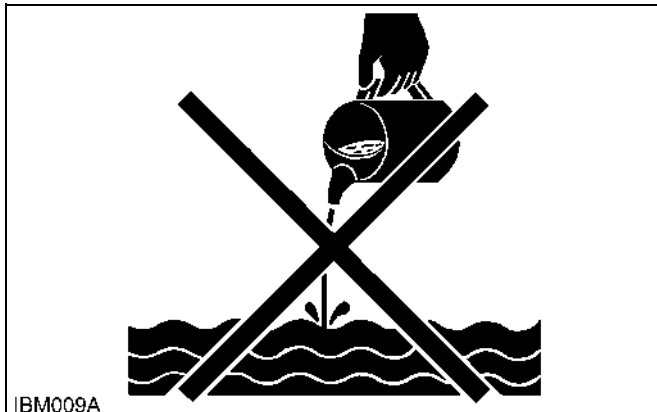
- Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.
- To prevent sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- The battery gas can cause an explosion. Keep the sparks and open flame away from the top of battery, especially when you charge the battery.
- Make sure that you do not spill fuel on the engine.

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**KEEP A GOOD AIRFLOW IN THE WORK AREA**

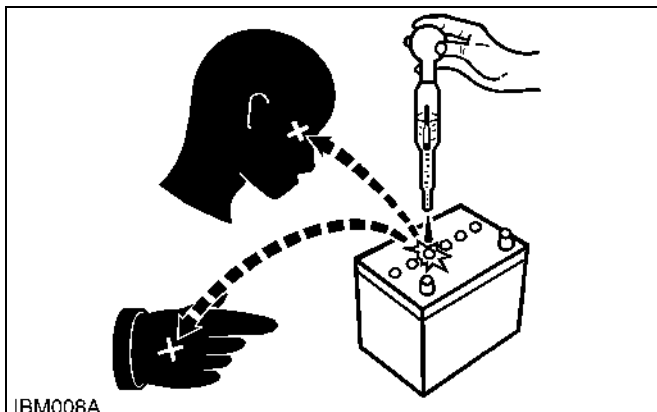
- If the engine is in operation, make sure that the area has good airflow. Do not operate the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

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**DISCARD FLUIDS CORRECTLY**

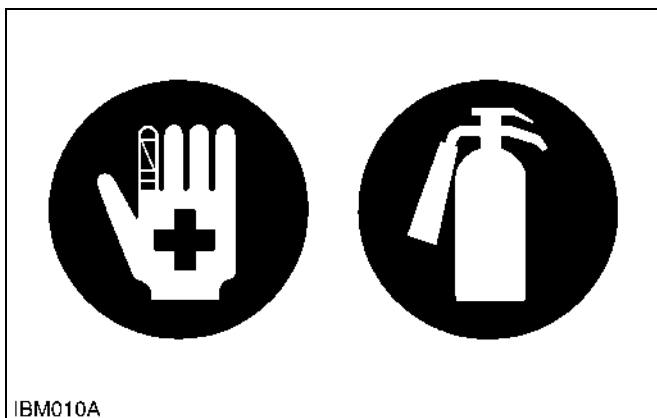
- Do not discard fluids on the ground, down the drain, into a stream, pond, or lake. Obey related environmental protection regulations when you discard oil, fuel, coolant, electrolyte and other dangerous waste.

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**PREVENT ACID BURNS**

- Keep electrolyte away from your eyes, hands and clothing. Sulfuric acid in battery electrolyte is poisonous and it can burn your skin and clothing and cause blindness. If you spill electrolyte on yourself, clean yourself with water, and get medical aid immediately.

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**PREPARE FOR EMERGENCIES**

- Keep a first aid kit and fire extinguisher ready at all times.
- Keep the emergency contact telephone numbers near your telephone at all times.

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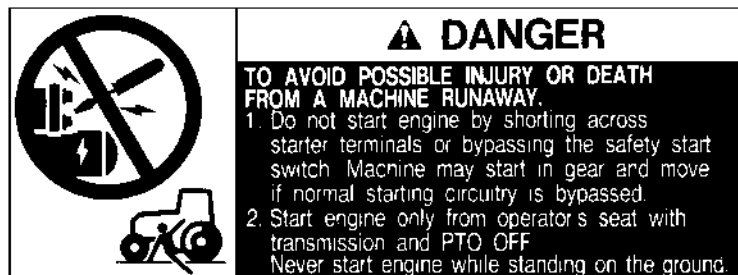
2. SAFETY DECALS

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.

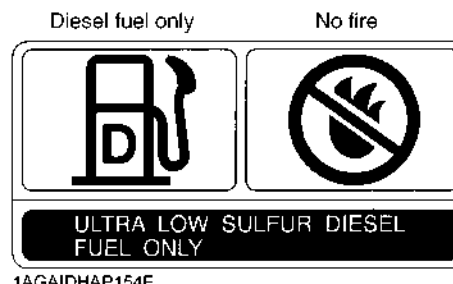
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[1] L3301/L3901

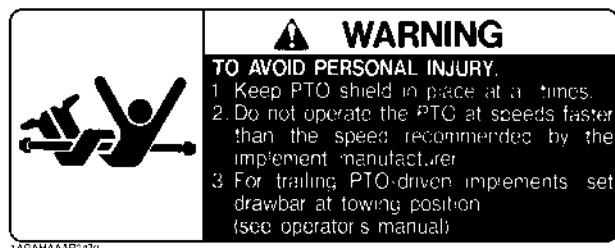
(1) Part No. TC630-4965-1



(4) Part No. TC630-4956-1



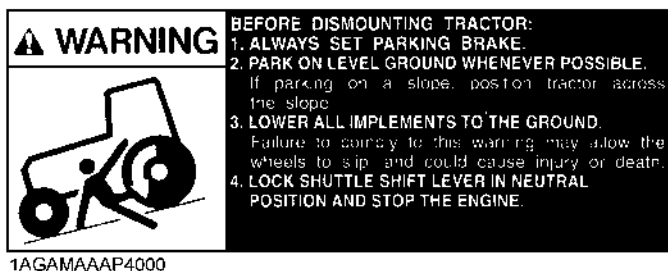
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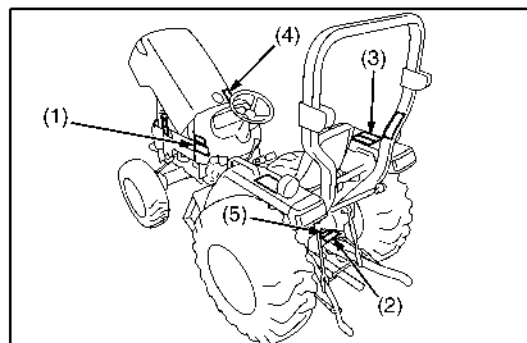
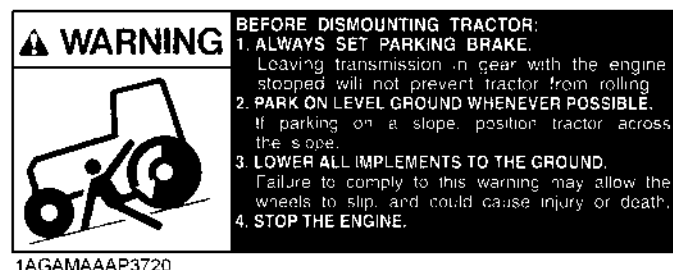
(5) Part No. TC630-4935-1



(3) Part No. TC630-4933-1 [Manual Transmission Type]



(3) Part No. TC630-5933-1 [HST Type]



9Y1211012ICI001US

9Y1211012INI0001US0

(1) Part No. TC630-4997-1

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.

1AGAMAAAP239G

(2) Part No. TC630-9554-1

WARNING

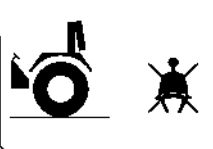
Never modify or repair a ROPS because welding, grinding, drilling or cutting any portion may weaken the structure.

CAUTION**TO AVOID INJURY WHEN RAISING OR FOLDING ROPS:**

- Set parking brake and stop engine.
- Remove any obstruction that may prevent raising or folding of the ROPS.
- Do not allow any bystanders.
- Always perform function from a stable position at the rear of the tractor.
- Hold the top of the ROPS securely when raising or folding.
- Make sure all pins are installed and locked.

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(3) Part No. TC630-9848-1

	WARNING TO AVOID INJURY OR DEATH FROM ROLL-OVER: • Keep Roll-Over Protective Structures (ROPS) in the upright and locked position. • Fasten SEAT BELT before operating.
	THERE IS NO OPERATOR PROTECTION WHEN THE ROPS IS IN THE FOLDED POSITION: • Check the operating area and fold the ROPS only when absolutely necessary. • Do not wear SEAT BELT if ROPS is folded. • Raise and lock ROPS as soon as vertical clearance allows. • Read ROPS related instructions and warnings.

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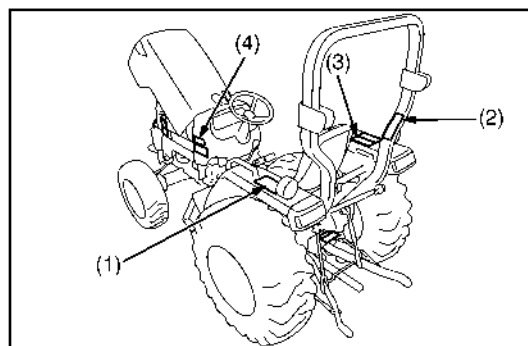
(4) Part No. TC630-9868-1

CAUTION**TO AVOID PERSONAL INJURY:**

When the Diesel Particulate Filter (DPF) is in the regenerating mode, the exhaust gas and the DPF muffler become hot.

During regeneration, take into account that the muffler will be very hot and keep the machine away from other people, animals, plants, and flammable material. Also keep the area near the DPF muffler clean and away from flammable material.

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9Y1211012ICI002US

9Y1211012INI0002US0

(1) Part No. TC520-3015-1

					
FLAMMABLE	SHIELD EYES	KEEP OUT OF THE REACH OF CHILDREN	CORROSIVE	TOXIC	EXPLOSIVE

DANGER EXPLOSIVE GASES:
QUANTITIES OF FLAMES OR SPARKS COULD CAUSE BATTERY TO EXPLODE. ALWAYS SHIELD EYES AND FACE FROM BATTERY. DO NOT CHARGE OR USE BOOSTER CABLES OR ADJUST POST CONNECTIONS WITHOUT PROPER INSTRUCTION AND TRAINING. CALIFORNIA PROPOSITION 65 WARNING: Batteries, battery packs, or their cells and related accessories contain lead and lead compounds and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.

POISON CAUSES SEVERE BURNING:
CONTAINS SULFURIC ACID. AVOID CONTACT WITH SKIN, EYES OR CLOTHING. IN EVENT OF ACCIDENT, FLUSH WITH WATER AND CALL A PHYSICIAN IMMEDIATELY. KEEP OUT OF REACH OF CHILDREN.

SMF 75D23R
PART No. TC520-30151

NOMINAL VOLTAGE	12V
COLD CRANKING AMPS	580
CRANKING AMPS	710
RESERVE CAPACITY(MINUTES)	110
AMP HOURS(@20 hr Rate)	65

FITTING DATE: 0 1 2 3 4 5 6 7 8 9 YEAR
1 2 3 4 5 6 7 8 9 10 11 12 MONTH

INDICATOR:  OK  CHARGE  REPLACE

MADE IN KOREA

1AGAFCAAP089A

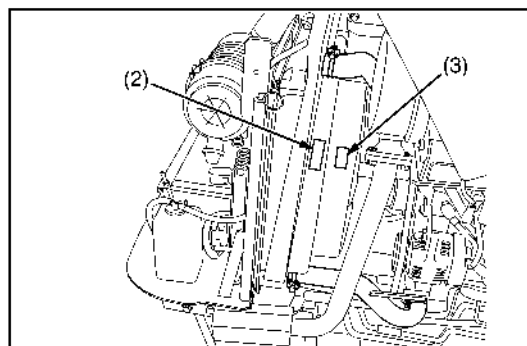
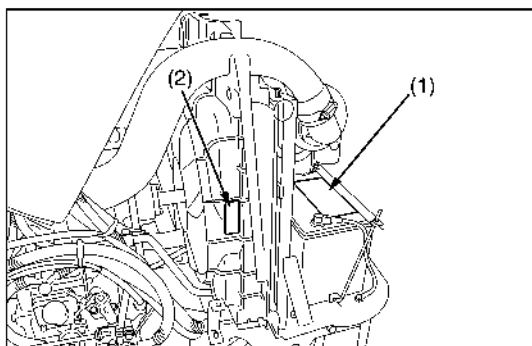
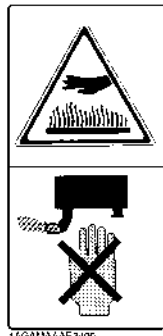
(2) Part No. TC620-4958-1

Do not get your hands close to engine fan and fan belt.



(3) Part No. TC630-4958-1

Do not touch hot surface like muffler, etc.



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9Y1211012INI0003US0

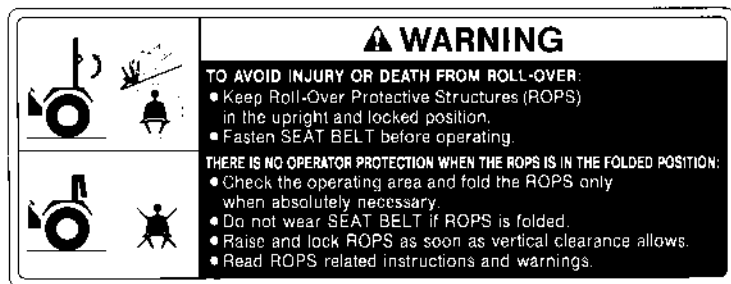
CARE OF DANGER, WARNING AND CAUTION LABELS

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.
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 replace component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

9Y1211012INI0004US0

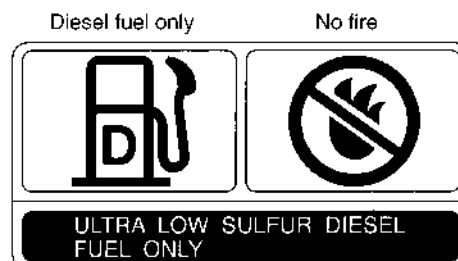
[2] L4701

(1) Part No. TC630-9848-1



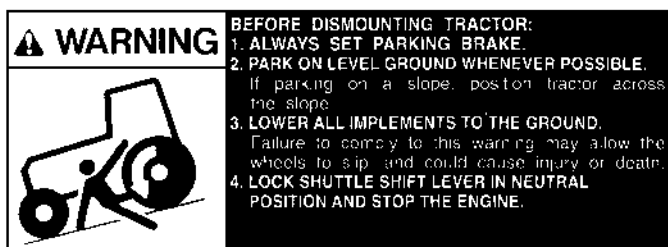
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(3) Part No. TC630-4956-1



1AGAIDHAP154E

(2) Part No. TC630-4933-1 [Manual Transmission Type]



1AGAMAAAP4000

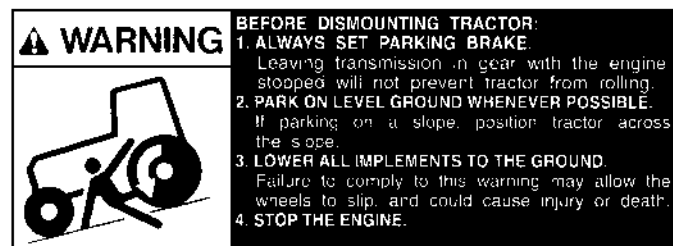
(4) Part No. TC620-4958-1

Do not get your hands close to engine fan and fan belt.

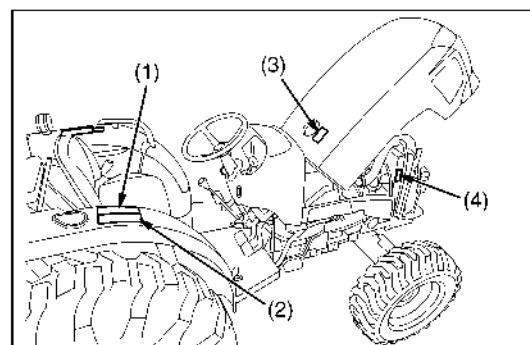


1AGAMAAAP2620

(2) Part No. TC630-5933-1 [HST Type]



1AGAMAAAP3720



9Y1211012ICI004US

9Y1211012INI0005US0

(1) Part No. TC630-4997-1

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.

1AGAMAAAP239J

(2) Part No. TC630-9868-1

CAUTION**TO AVOID PERSONAL INJURY:**

When the Diesel Particulate Filter(DPF) is in the regenerating mode, the exhaust gas and the DPF muffler become hot.

During regeneration, take into account that the muffler will be very hot and keep the machine away from other people, animals, plants, and flammable material. Also keep the area near the DPF muffler clean and away from flammable material.

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(3) Part No. TC630-4965-1



1AGAMAAAP2150

DANGER**TO AVOID POSSIBLE INJURY OR DEATH FROM A MACHINE RUNAWAY.**

1. Do not start engine by shorting across starter terminals or bypassing the safety start switch. Machine may start in gear and move if normal starting circuitry is bypassed.
2. Start engine only from operator's seat with transmission and PTO OFF. Never start engine while standing on the ground.

(4) Part No. TC620-4958-1

Do not get your hands close to engine fan and fan belt.



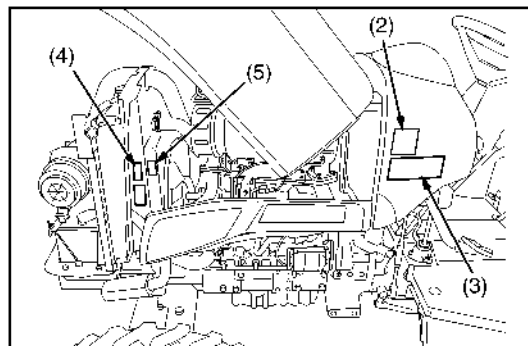
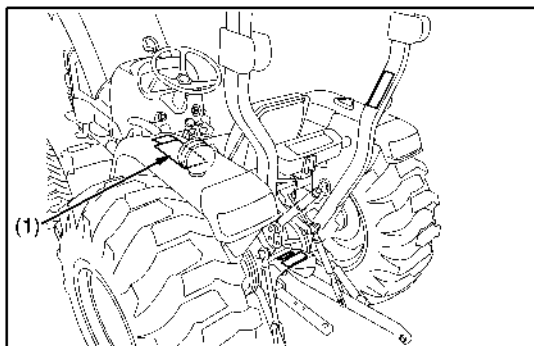
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(5) Part No. TC630-4958-1

Do not touch hot surface like muffler, etc.



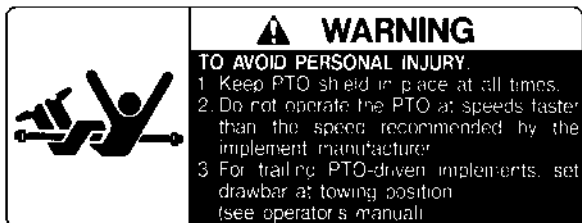
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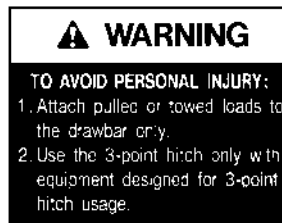
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(1) Part No. TC630-4959-1



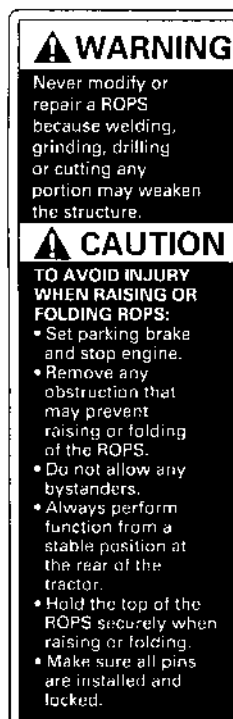
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(2) Part No. TC630-4935-1



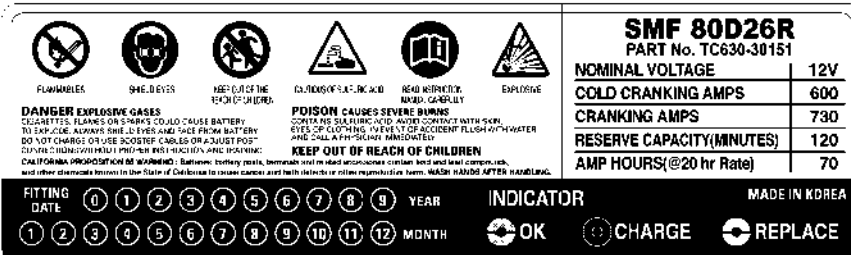
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(3) Part No. TC630-9554-1

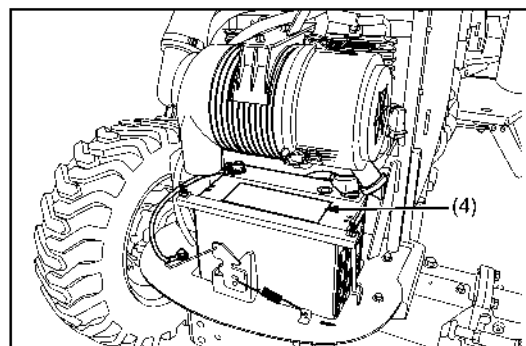
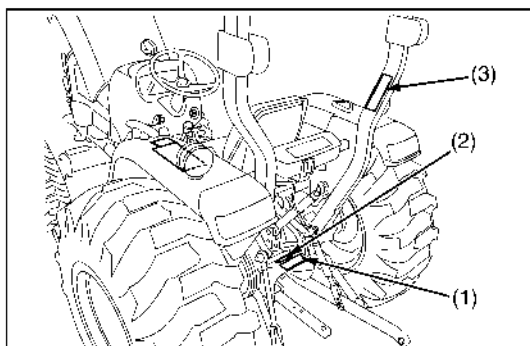


1AGAMAAAP2380

(4) Part No. TC630-3015-1



1AGAHAKAP050E



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9Y1211012INI0007US0

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.
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 replace component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

9Y1211012INI0004US0

3. SPECIFICATIONS

[1] L3301/L3901

Model			L3301			L3901		
			Manual Transmission		HST	Manual Transmission		HST
			2WD	4WD	4WD	2WD	4WD	4WD
PTO power*			20.7 kW (27.7 HP)		19.5 kW (26.2 HP)	23.9 kW (32.1 HP)		22.8 kW (30.6 HP)
Engine	Model		D1803-CR-E4					
	Type		Direct injection, vertical, water-cooled, 4-cycle diesel					
	Number of cylinders		3					
	Bore and stroke		87 × 102.4 mm (3.4 × 4.0 in.)					
	Total displacement		1.826 L (111.4 cu.in.)					
	Engine gross power*		24.6 kW (33.0 HP)			28.0 kW (37.5 HP)		
	Engine net power*		23.4 kW (31.4 HP)			27.1 kW (36.3 HP)		
	Rated revolution		45.0 rps (2700 rpm)					
	Low idling revolution		15.0 rps (900 rpm)					
	Maximum torque		101.7 N·m (75.0 lbf·ft)			115.8 N·m (85.4 lbf·ft)		
	Battery		[75D23R] 12 V, RC: 110 min, CCA: 580 A					
Capacities	Fuel tank		42.0 L (11.0 U.S.gals, 9.24 Imp.gals)					
	Engine crankcase (with filter)		6.7 L (7.1 U.S.qts, 5.9 Imp.qts)					
	Engine coolant		6.0 L (6.3 U.S.qts, 5.3Imp.qts)					
	Transmission case		28.0 L (7.4 U.S.gals, 6.16 Imp.gals)	28.5 L (7.5 U.S.gals, 6.27 Imp.gals)	23.5 L (6.2 U.S.gals, 5.17 Imp.gals)	28.0 L (7.4 U.S.gals, 6.16 Imp.gals)	28.5 L (7.5 U.S.gals, 6.27 Imp.gals)	23.5 L (6.2 U.S.gals, 5.17 Imp.gals)
Dimensions	Overall length (without 3p)		2810 mm (110.6 in.)	2740 mm (107.9 in.)		2810 mm (110.6 in.)	2740 mm (107.9 in.)	
	Overall width (min. tread)		1400 mm (55.1 in.)					
	Overall height (with ROPS)		2330 mm (91.7 in.)					
	Overall height (Top of steering wheel)		1475 mm (58.1 in.)					
	Wheel base		1610 mm (63.3 in.)					
	Min. ground clearance		345 mm (13.6 in.)	340 mm (13.4 in.)		345 mm (13.6 in.)	340 mm (13.4 in.)	
	Tread	Front	1050 mm (41.3 in.)	1095 mm (43.1 in.)		1050 mm (41.3 in.)	1095 mm (43.1 in.)	
		Rear	1115 mm (43.8 in.), 1195 mm (47.1 in.), 1290 mm (50.8 in.)					
Weight (with ROPS)			1160 kg (2557 lbs)	1240 kg (2734 lbs)	1260 kg (2778 lbs)	1175 kg (2590 lbs)	1255 kg (2767 lbs)	1260 kg (2778 lbs)
Traveling system	Tire	AG Front	5.00-15	7.2-16		5.00-15	7.2-16	
		AG Rear	11.2-24					
	Industrial (option)	Front	—	27 × 8.50-15		—	27 × 8.50-15	
		Rear	—	15-19.5R4		—	15-19.5R4	
	Clutch		Dry type single stage			Dry type dual stage		Dry type single stage
	Steering		Integral type power steering					
	Transmission		Gear shift, 8 forward and 8 reverse		Hydrostatic transmission, 3 range speed	Gear shift, 8 forward and 8 reverse		Hydrostatic transmission, 3 range speed
	Brake		Wet disk type					
	Min. turning radius (with brake)		2.4 m (7.9 feet)	2.5 m (8.2 feet)		2.4 m (7.9 feet)	2.5 m (8.2 feet)	
	Hydraulic unit	Hydraulic control system		Position control				
Pump capacity (main)		23.9 L/min (6.3 gals/min., 5.26 Imp.gals/min.)						
Pump capacity (PS)		14.5 L/min (3.8 gals/min, 3.19 Imp.gals/min.)						
Three point hitch		Category 1						
Max. lift force		At lift points	906 kg (1998 lbs)					
		24 in. behind lift points	651 kg (1435 lbs)					
System pressure		16.2 MPa (165 kgf/cm ² , 2349 psi)						

Model			L3301			L3901		
			Manual Transmission		HST	Manual Transmission		HST
			2WD	4WD	4WD	2WD	4WD	4WD
PTO	Rear PTO	PTO shaft size	SAE 1-3/8, 6 splines					
	Rear PTO	Type	Transmission driven with overrunning		Live-continuous running PTO			
	PTO / Engine speed		540 min ⁻¹ (rpm) / 2430 min ⁻¹ (rpm)		540 min ⁻¹ (rpm) / 2580 min ⁻¹ (rpm)	540 min ⁻¹ (rpm) / 2425 min ⁻¹ (rpm)		540 min ⁻¹ (rpm) / 2580 min ⁻¹ (rpm)

■ **NOTE**

- *Manufacturer's estimate. The company reserve the right to change the specifications without notice.

9Y1211012INI0008US0

[2] L4701

Model			L4701		
			Manual Transmission		HST
			2WD	4WD	
Engine	Model		V2403-CR-E4		
	Type		Direct injection, vertical, water-cooled, 4-cycle diesel		
	Number of cylinders		4		
	Total displacement		2.434 L (148.5 cu.in.)		
	Bore and stroke		87 × 102.4 mm (3.4 × 4.0 in.)		
	Rated revolution		2600 min ⁻¹ (rpm)		
	Low idling revolution		800 min ⁻¹ (rpm)		
	Net power*		33.4 kW (44.8 HP) / 2600 min ⁻¹ (rpm)		
	PTO power* (factory observed)		29.3 kW (39.3 HP) / 2600 min ⁻¹ (rpm)	28.2 kW (37.8 HP) / 2600 min ⁻¹ (rpm)	
	Maximum torque: Gross		146.2 N·m (107.8 lbf·ft)		
	Battery capacity		12 V, RC: 120 min, CCA: 600 A		
Capacities	Fuel tank		51 L (13.5 U.S.gals, 11 Imp.gals)		
	Engine crankcase (with filter)		8.2 L (8.7 U.S.qts, 7.2 Imp.qts)		
	Engine coolant		6.5 L (6.9 U.S.qts, 5.7 Imp.qts)		
	Transmission case		40 L (10.6 U.S.gals, 8.8 Imp.gals)		
Dimensions	Overall length (without 3p)		3120 mm (122.8 in.)	3035 mm (119.5 in.)	
	Overall width (min. tread)		1585 mm (62.4 in.)		
	Overall height (with ROPS)		2330 mm (91.7 in.)		
	Wheel base		1850 mm (72.8 in.)	1845 mm (72.6 in.)	
	Min. ground clearance		385 mm (15.2 in.)		
	Tread	Front	1280 mm (50.4 in.), 1380 mm (54.3 in.), 1480 mm (58.3 in.), 1580 mm (62.2 in.)	1155 mm (45.5 in.)	
		Rear	1180 mm (46.5 in.), 1200 mm (47.2 in.), 1300 mm (51.2 in.), 1450 mm (57.1 in.),1545 mm (60.8 in.)		
Weight (with ROPS)			1460 kg (3219 lbs)	1495 kg (3296 lbs)	1500 kg (3307 lbs)
Traveling system	Standard tire size	Front	7.5L-15	8.3-16	
		Rear	14.9-24		
	Clutch		Dry type single stage		—
	Steering		Hydrostatic power steering		
	Transmission		Gear shift, 8 forward and 8 reverse		Hydrostatic transmission 3 range speed
	Braking system		Mechanical, Wet disk type		
	Min. turning radius (with brake)		2.7 m (8.9 feet)	2.6 m (8.5 feet)	
Hydraulic unit	Hydraulic control system		Position control		
	Pump capacity		29.4 L (7.8 U.S.gals, 6.47 Imp.gals) /min.		
	Three point hitch		Category 1		
	Max. lift force	At lift points	1300 kg (2870 lbs)		
		24 in. behind lift points	1053 kg (2320 lbs)		
System pressure		17.7 MPa (180 kgf/cm ² , 2560 psi)			
PTO	Rear PTO	PTO shaft size	SAE 1-3/8, 6 splines		
	PTO / Engine speed		540 min ⁻¹ (rpm) / 2475 min ⁻¹ (rpm)		540 min ⁻¹ (rpm) / 2640 min ⁻¹ (rpm)

■ NOTE

- *Manufacturer's estimate. The company reserve the right to change the specifications without notice.

9Y1211012INI0009US0

4. TRAVELING SPEEDS

[1] L3301/L3901

[Manual Transmission Type]

(At rated engine rpm)

Model			L3301/L3901
Tire size (Rear)			11.2-24
	Range gear shift lever	Main gear shift lever	km/h (mph)
Forward	Low	1	1.7 (1.1)
		2	2.2 (1.4)
		3	3.8 (2.3)
		4	5.6 (3.5)
	High	1	6.6 (4.1)
		2	8.5 (5.3)
		3	14.4 (8.9)
		4	21.2 (13.2)
Reverse	Low	1	1.7 (1.1)
		2	2.2 (1.4)
		3	3.8 (2.3)
		4	5.6 (3.4)
	High	1	6.5 (4.1)
		2	8.5 (5.3)
		3	14.3 (8.9)
		4	21.1 (13.1)

The company reserves the right to change the specifications without notice.

9Y1211012INI0010US0

[HST Type]

(At rated engine rpm)

Model		L3301/L3901
Tire size (Rear)		11.2-24
	Range shift lever	km/h (mph)
Forward	L	6.3 (3.9)
	M	10.9 (6.8)
	H	22.7 (14.1)
Reverse	L	5.6 (3.5)
	M	9.9 (6.1)
	H	20.5 (12.7)

The company reserves the right to change the specifications without notice.

9Y1211012INI0011US0

[2] L4701**[Manual Transmission Type]**

(At rated engine rpm)

Model			L4701
Tire size (Rear)			14.9-24
	Range gear shift lever	Main gear shift lever	km/h (mph)
Forward	Low	1	2.2 (1.4)
		2	2.8 (1.7)
		3	4.6 (2.8)
		4	6.7 (4.2)
	High	1	8.0 (5.0)
		2	10.0 (6.2)
		3	16.3 (10.1)
		4	24.0 (14.9)
Reverse	Low	1	2.1 (1.3)
		2	2.7 (1.7)
		3	4.4 (2.7)
		4	6.4 (4.0)
	High	1	7.7 (4.8)
		2	9.6 (6.0)
		3	15.6 (9.7)
		4	23.0 (14.3)

The company reserves the right to change the specifications without notice.

9Y1211012INI0012US0

[HST Type]

(At rated engine rpm)

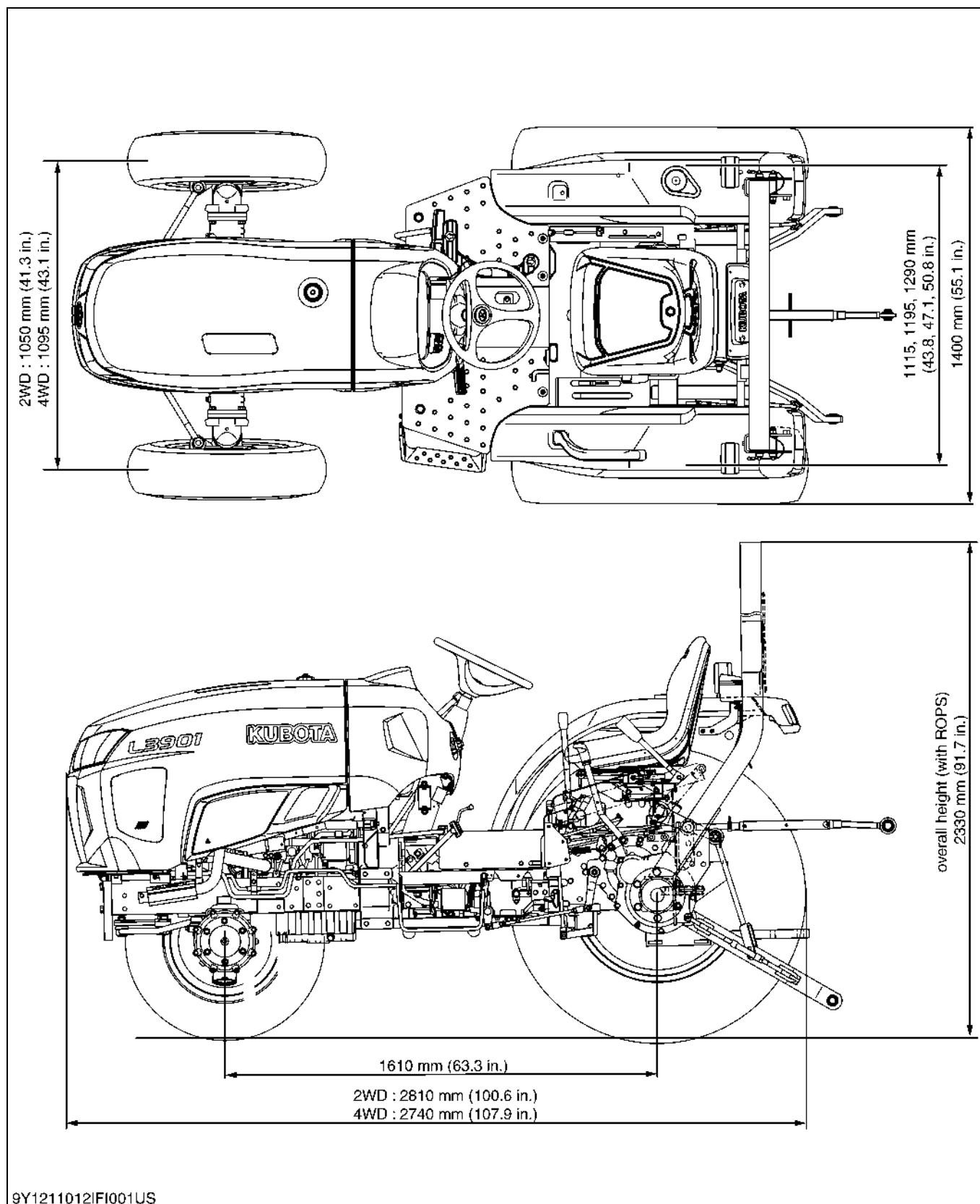
Model		L4701
Tire size (Rear)		14.9-24
	Range shift lever	km/h (mph)
Forward	L	5.9 (3.7)
	M	12.2 (7.6)
	H	25.4 (15.8)
Reverse	L	5.3 (3.3)
	M	11.0 (6.8)
	H	22.9 (14.2)

The company reserves the right to change the specifications without notice.

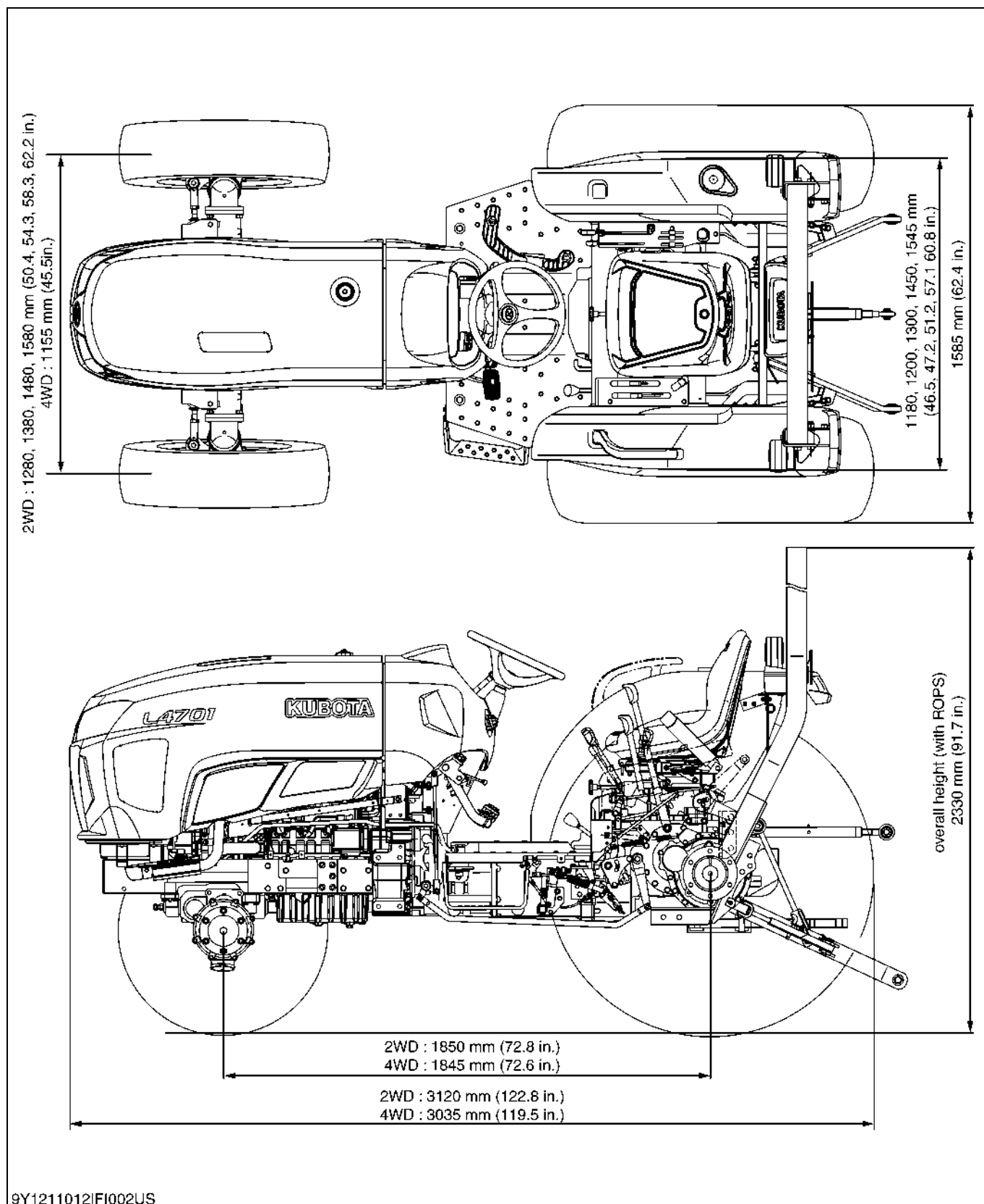
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5. DIMENSIONS

[1] L3301/L3901



9Y1211012/INI0014US0

[2] L4701

9Y1211012INI0015US0

G GENERAL

GENERAL

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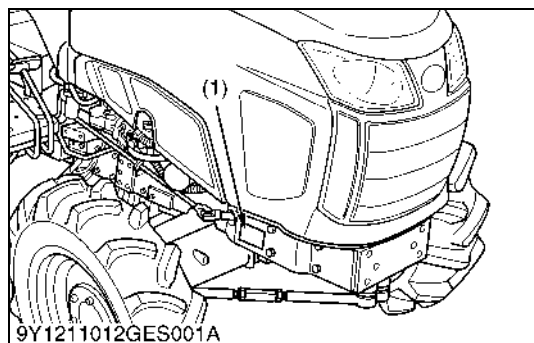
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1. TRACTOR IDENTIFICATION

[1] MODEL NAME AND SERIAL NUMBERS

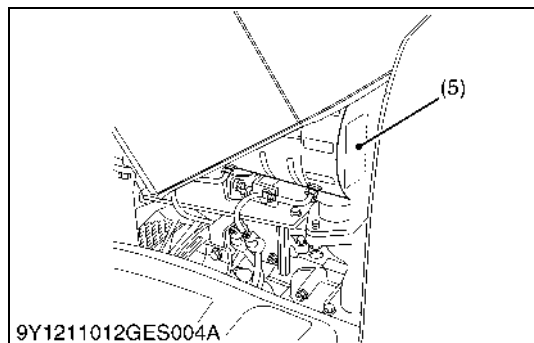
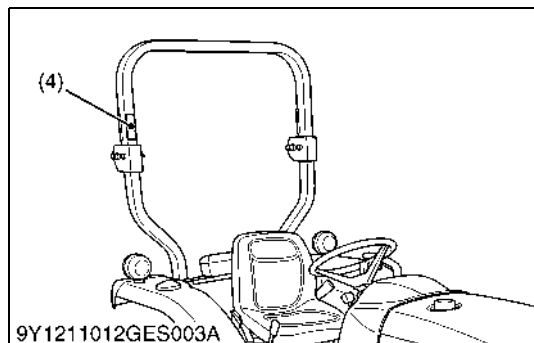
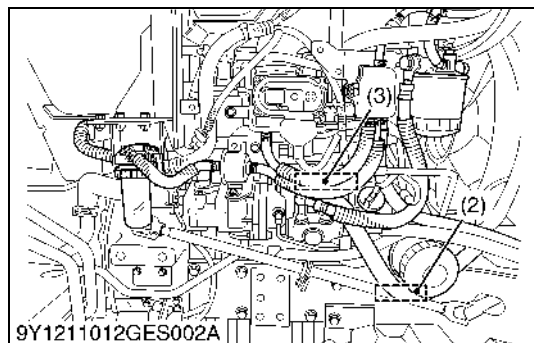
(1) L3301/L3901

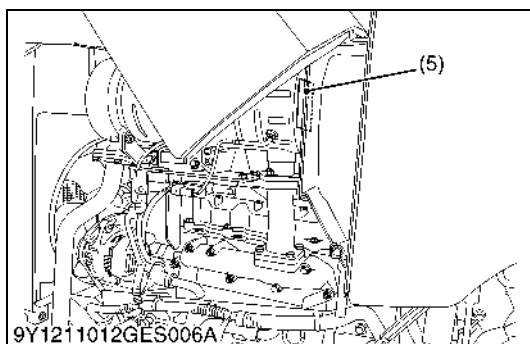
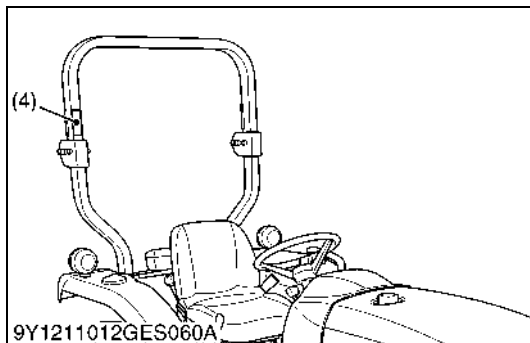
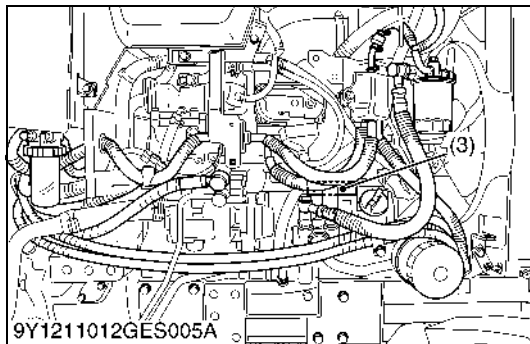
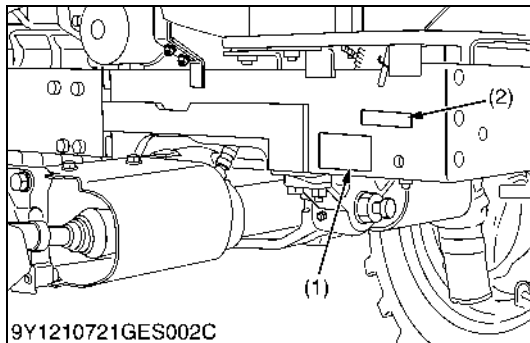


When contacting your local KUBOTA distributor, always specify engine serial number, tractor serial number and hour meter reading.

(1) Tractor Identification Plate	(4) ROPS Identification Plate (ROPS Serial Number)
(2) Tractor Serial Number	(5) Diesel Particulate Filter (DPF) Serial Number
(3) Engine Serial Number	

9Y1211012GEG0001US0



(2) L4701

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

(1) Tractor Identification Plate	(4) ROPS Identification Plate (ROPS Serial Number)
(2) Tractor Serial Number	(5) Diesel Particulate Filter (DPF) Serial Number
(3) Engine Serial Number	

9Y1211012GEG0002US0

[2] E4B ENGINE

[Example: Engine Model Name V2403-CR-TE4]

The emission controls previously implemented in various countries to prevent air pollution will be stepped up as Nonroad Emission Standards continue to change. The timing or applicable date of the specific Nonroad Emission regulations depends on the engine output classification.

Over the past several years, KUBOTA has been supplying diesel engines that comply with regulations in the respective countries affected by Nonroad Emission regulations. For KUBOTA Engines, E4B will be the designation that identifies engine models affected by the next emission phase (See the table below).

When servicing or repairing ###-E4B series engines, use only replacement parts for that specific E4B engine, designated by the appropriate E4B KUBOTA Parts List and perform all maintenance services listed in the appropriate KUBOTA Operator's Manual or in the appropriate E4B KUBOTA Workshop Manual. Use of incorrect replacement parts or replacement parts from other emission level engines (for example: E3B engines), may result in emission levels out of compliance with the original E4B design and EPA or other applicable regulations. Please refer to the emission label located on the engine head cover to identify Output classification and Emission Control Information. E4B engines are identified with "EF" at the end of the Model designation, on the US EPA label. Please note: E4B is not marked on the engine.

TYPE : #####
 FAMILY : #####
 APPROVAL NUMBER: #####/#####/#####
Kubota KUBOTA Corporation
 #####

(1) (2)

EMISSION CONTROL INFORMATION

THIS ENGINE MEETS 2012 EMISSION REGULATIONS
 FOR U.S. EPA AND CALIFORNIA NONROAD CYCLES.

Kubota KUBOTA Corporation

MODEL : ###-EF ENGINE DISP. : ###
 FAMILY : C ###
 POWER : ## kW / ### rpm CATEGORY : ## - ## kW
 VALVE CLEARANCE (COLD) : IN ## mm EX ## mm
 ECU : ### ###
 ULTRA LOW SULFUR DIESEL FUEL ONLY
 DEL. ASSY. : #####

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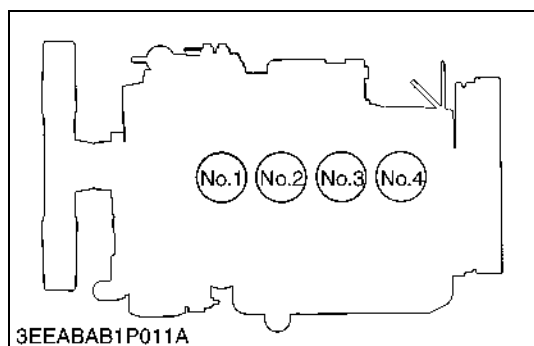
Category (1)	Engine output classification	EU regulation
K	From 19 to 37 kW	STAGE IIIB
P	From 37 to less than 56 kW	STAGE IIIB
N	From 56 to less than 75 kW	STAGE IIIB
M	From 75 to less than 130 kW	STAGE IIIB

Category (2)	Engine output classification	EPA regulation
EF	Less than 19 kW	Tier 4
	From 19 to less than 56 kW	Interim Tier 4
	From 56 to less than 75 kW	Interim Tier 4
	From 75 to less than 130 kW	Interim Tier 4

- (1) EU regulation engine output classification category
 (2) "E4B" engines are identified with "EF" at the end of the Model designation, on the US EPA label.
 "E4B" designates some Interim Tier 4 / Tier 4 models, depending on engine output classification.

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[3] CYLINDER NUMBER

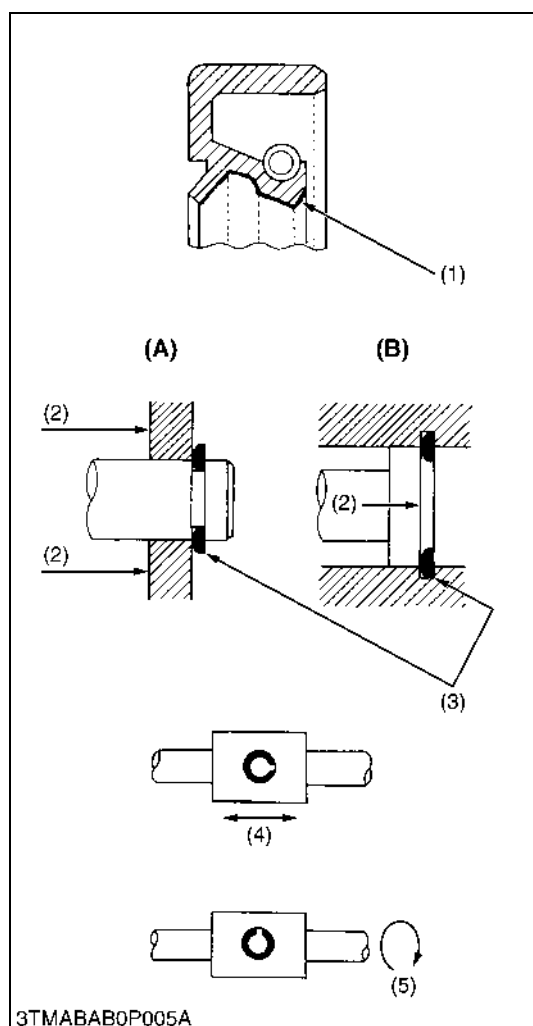


The cylinder numbers of KUBOTA diesel engine are designated as shown in the figure.

The sequence of cylinder numbers is given as No.1, No.2, No.3 and No.4 starting from the gear case side.

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2. GENERAL PRECAUTIONS



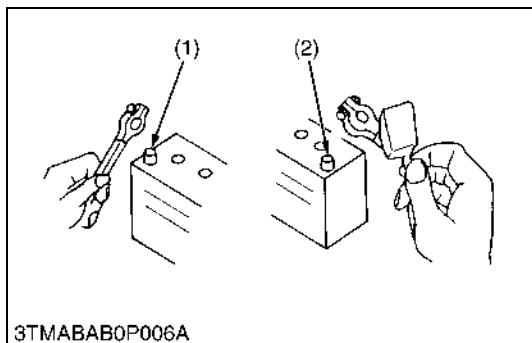
- When you disassemble, carefully put the parts in a clean area to make it easy to find the parts. You must install the screws, bolts and nuts in their initial position to prevent the reassembly errors.
- When it is necessary to use special tools, use KUBOTA special tools. Refer to the drawings when you make special tools that you do not use frequently.
- Before you disassemble or repair machine, make sure that you always disconnect the ground cable from the battery first.
- Remove oil and dirt from parts before you measure.
- Use KUBOTA genuine parts for replacement to keep the machine performance and to make sure of safety.
- You must replace the gaskets and O-rings when you assemble again. Apply grease (1) to new O-rings or oil seals before you assemble.
- When you assemble the external or internal circlips, make sure that the sharp edge (3) faces against the direction from which force (2) is applied.
- When inserting spring pins, their splits must face the direction from which a force is applied. See the figure on the left side.
- To prevent damage to the hydraulic system, use only specified fluid or equivalent.
- Clean the parts before you measure them.
- Tighten the fittings to the specified torque. Too much torque can cause damage to the hydraulic units or the fittings. Not sufficient torque can cause oil leakage.
- When you use a new hose or pipe, tighten the nuts to the specified torque. Then loosen (approx. by 45°) and let them be stable before you tighten to the specified torque (This is not applied to the parts with seal tape).
- When you remove the two ends of a pipe, remove the lower end first.
- Use two pliers in removal and installation. One to hold the stable side, and the other to turn the side you remove to prevent twists.
- Make sure that the sleeves of flared connectors and tapers of hoses are free of dust and scratches.
- After you tighten the fittings, clean the joint and apply the maximum operation pressure 2 to 3 times to check oil leakage.

- (1) Grease
- (2) Force
- (3) Sharp Edge
- (4) Axial Force
- (5) Rotating Movement

- (A) External Circlip
- (B) Internal Circlip

WSM000001GEG0106US0

3. HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING



To ensure safety and prevent damage to the machine and surrounding equipment, obey the following precautions in handling electrical parts and wiring.

■ IMPORTANT

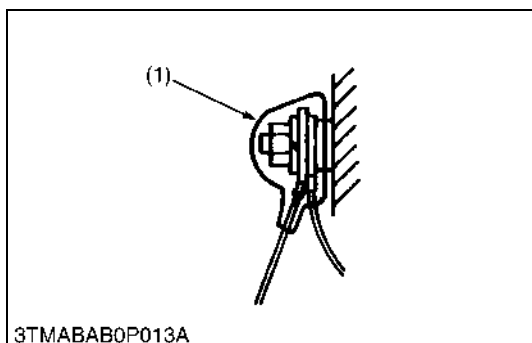
- Check electrical wiring for damage and loosened connection every year.
- When removing the battery cables, disconnect the negative cable first. When installing the battery cables, connect the positive cable first.

(1) Negative Terminal

(2) Positive Terminal

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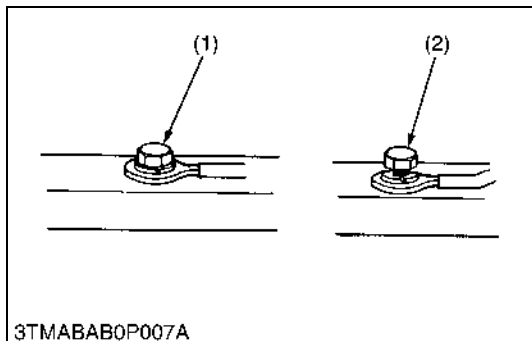
[1] WIRING



- After installing wiring, check protection of terminals and clamped condition of wiring.

(1) Cover
(Securely Install Cover)

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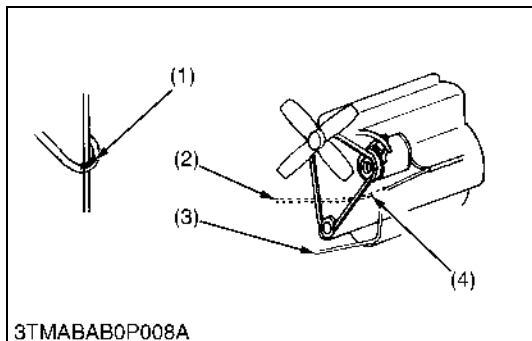


- Securely tighten wiring terminals.

(1) Correct
(Securely Tighten)

(2) Incorrect
(Loosening Leads to damaged Contact)

WSM000001GEG0063US0



- Do not let wiring contact dangerous part.

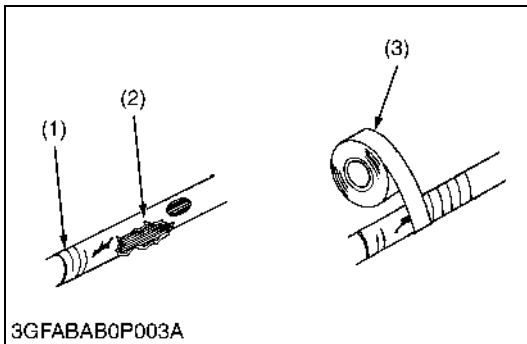
(1) Dangerous Part (Sharp Edge)

(2) Wiring (Incorrect)

(3) Wiring (Correct)

(4) Dangerous Part

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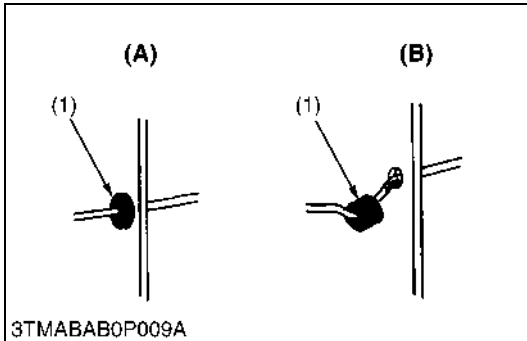


- Repair or change torn or aged wiring immediately.

(1) Aged
(2) Torn

(3) Electrical Tape

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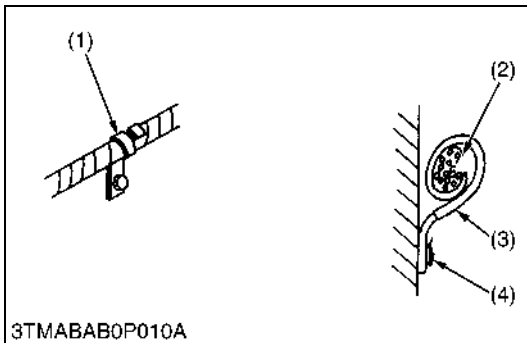


- Securely insert grommet.

(1) Grommet

(A) Correct
(B) Incorrect

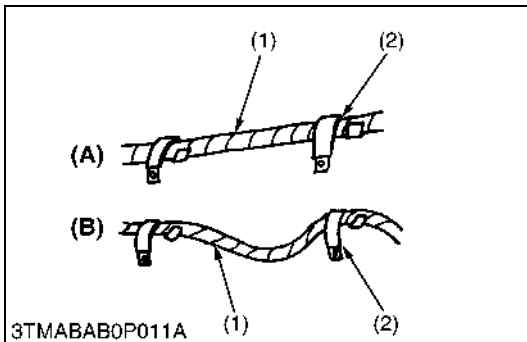
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- Securely clamp, being careful not to damage wiring.

(1) Clamp
(2) Wire Harness
(3) Clamp
(4) Welding Dent

WSM000001GEG0067US0

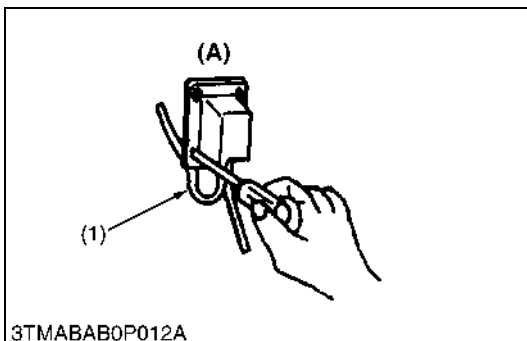


- Clamp wiring so that there is no twist, unnecessary sag, or excessive tension, except for movable part, where sag be required.

(1) Wiring
(2) Clamp

(A) Correct
(B) Incorrect

WSM000001GEG0068US0



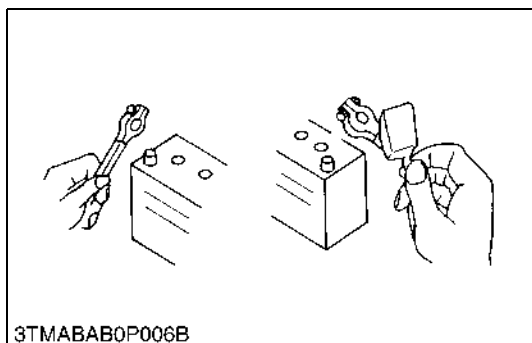
- In installing a part, be careful not to get wiring caught by it.

(1) Wiring

(A) Incorrect

WSM000001GEG0069US0

[2] BATTERY



- Be careful not to confuse positive and negative terminal posts.
- When you remove battery cables, disconnect negative cable first. When you install battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After you connect cables to battery terminal posts, apply high temperature grease to them and securely install terminal covers on them.
- Do not allow dirt and dust to collect on battery.



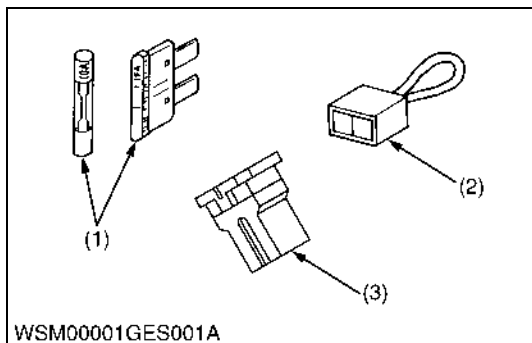
DANGER

To avoid serious injury or death:

- Be careful not to let battery liquid spill on your skin and clothes. If contaminated, wash it off with water immediately.
- Before you recharge the battery, remove it from the machine.
- Before you recharge, remove cell caps.
- Recharge in a well-ventilated place where there is no open flame nearby, as hydrogen gas and oxygen are formed.

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[3] FUSE



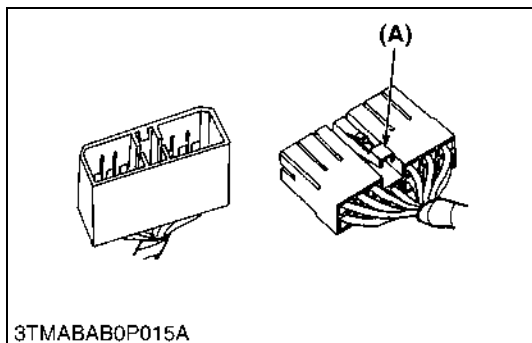
- Use fuses with specified capacity. Neither too large nor small capacity fuse is acceptable.
- Never use steel nor copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine which is not provided with reserve power supply.
- Do not install accessories if fuse capacity of reserve power supply is exceeded.

(1) Fuse
(2) Fusible Link

(3) Slow Blow Fuse

WSM000001GEG0072US0

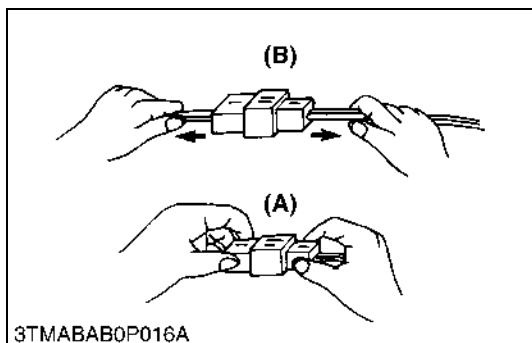
[4] CONNECTOR



- For connector with lock, push lock to separate.

(A) Push

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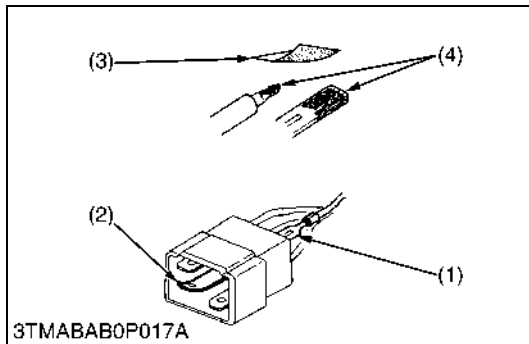


- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct

(B) Incorrect

WSM000001GEG0074US0

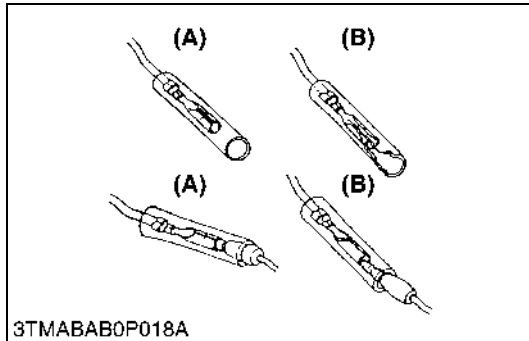


- Use sandpaper to remove rust from terminals.
- Repair deformed terminal. Make sure that there is no terminal being exposed or displaced.

(1) Exposed Terminal
(2) Deformed Terminal

(3) Sandpaper
(4) Rust

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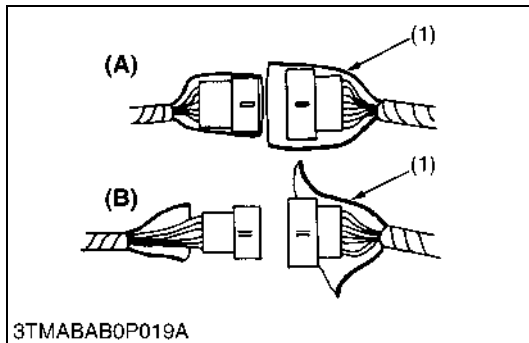


- Make sure that there is no female connector being too open.

(A) Correct

(B) Incorrect

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- Make sure that plastic cover is large enough to cover whole connector.

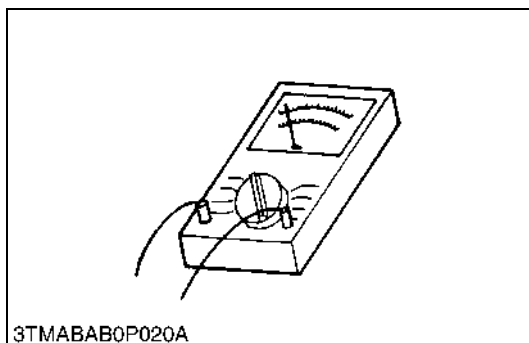
(1) Cover

(A) Correct

(B) Incorrect

WSM000001GEG0077US0

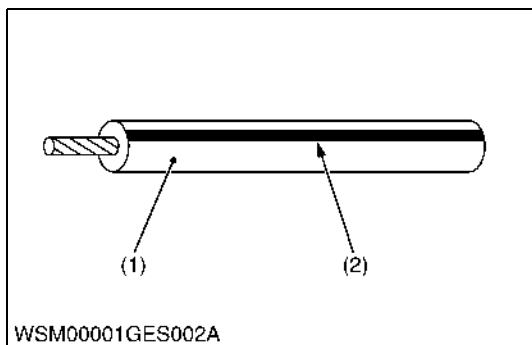
[5] CIRCUIT TESTER



- Use tester correctly following manual provided with tester.
- Check for polarity and range.

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[6] COLOR OF WIRING



- Colors of wire are specified to the color codes.
- This symbol of "/" shows color with stripe (s).

(An example)

Red stripe on white color: W/R

Color of wiring	Color code
Black	B
Brown	Br
Green	G
Gray	Gy or Gr
Blue	L
Light Green	Lg
Orange	Or
Pink	P
Purple	Pu or V
Red	R
Sky Blue	Sb
White	W
Yellow	Y

(1) Wire Color

(2) Stripe

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4. LUBRICANTS, FUEL AND COOLANT

[1] L3301/L3901

No.	Place		Capacity		Lubricants, fuel and coolant
			L3301	L3901	
1	Fuel		42.0 L 11.0 U.S.gals 9.24 Imp.gals		• No. 2-D S15 diesel fuel • No. 1-D S15 diesel fuel if temperature is below –10 °C (14 °F)
2	Coolant		6.0 L 6.3 U.S.qts 5.3 Imp.qts		Fresh clean soft water with anti-freeze
3	Engine crankcase (with filter)		6.7 L 7.1 U.S.qts 5.9 Imp.qts		Engine oil: Refer to G-12. • Above 25 °C (77 °F) SAE30, SAE10W-30 or 15W-40 • –10 to 25 °C (14 to 77 °F) SAE20, SAE10W-30 or 15W-40 • Below –10 °C (14 °F) SAE10W-30
4	Transmission case	Manual Transmission, 2WD	28.0 L 7.4 U.S.gals 6.16 Imp.gals		KUBOTA SUPER UDT-2 fluid
		Manual Transmission, 4WD	28.5 L 7.5 U.S.gals 6.27 Imp.gals		
		HST, 4WD	23.5 L 6.2 U.S.gals 5.17 Imp.gals		
5	Front axle case [4WD]		4.5 L 4.8 U.S.qts 4.0 Imp.qts		KUBOTA SUPER UDT-2 fluid or SAE80, 90 gear oil

■ NOTE

- KUBOTA UDT or SUPER UDT fluid: KUBOTA original transmission hydraulic fluid.

Greasing				
	Place	No. of greasing point	Capacity	Type of grease
6	Front wheel hub	2 [2WD only]	A small amount	Bearing grease
	Knuckle shaft	2 [2WD only]	Until grease overflows	Multipurpose type grease NLGI-2 or NLGI-1 (GC-LB)
	Front axle support	2 [4WD only]		
	Clutch pedal	1		
	Brake pedal	1		
	Pedal shaft	1		
	Battery terminals	2		
	Lift rod	2		
	Tie rod end	4 [4WD only]		
	Top link	2		

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[2] L4701

No.	Place	Capacity	Lubricants, fuel and coolant
		L4701	
1	Fuel	51.0 L 13.5 U.S.gals 11.2 Imp.gals	- No. 2-D S15 diesel fuel - No. 1-D S15 diesel fuel if temperature is below -10°C (14°F)
2	Coolant	6.5 L 6.9 U.S.qts 5.7 Imp.qts	Fresh clean soft water with anti-freeze
3	Engine crankcase (with filter)	8.2 L 8.7 U.S.qts 7.2 Imp.qts	Engine oil: Refer to G-12. - Above 25°C (77°F) SAE30, SAE10W-30 or 15W-40 -10 to 25°C (14 to 77°F) SAE20, SAE10W-30 or 15W-40 - Below -10°C (14°F) SAE10W-30
4	Transmission case	40.0 L 10.6 U.S.gals 8.80 Imp.gals	KUBOTA SUPER UDT-2 fluid
5	Front axle case [4WD]	6.5 L 6.9 U.S.qts 5.7 Imp.qts	KUBOTA SUPER UDT-2 fluid or SAE80, 90 gear oil

■ NOTE

- KUBOTA UDT or SUPER UDT fluid: KUBOTA original transmission hydraulic fluid.

Greasing				
	Place	No. of greasing point	Capacity	Type of grease
6	Front wheel hub	2 [2WD only]	A small amount	Bearing grease
	Knuckle shaft	2 [2WD only]	Until grease overflows	Multipurpose type grease NLGI-2 or NLGI-1 (GC-LB)
	Front axle support	2 [4WD only]		
	Tie-rod ends	2 [4WD only]		
	Battery terminals	2		
	Lift rod	2		
	Top link	2		
	Hydraulic arm shaft	2		

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■ **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 temperatures as shown above.
- Refer to the following table for the suitable API classification engine oil according to the engine type (with DPF (Diesel Particulate Filter) type engines) and the fuel.

Fuel used	Engine oil classification (API classification)
	Oil class of engines with DPF
Ultra Low Sulfur Fuel [< 0.0015 % (15 ppm)]	CJ-4

Fuel:

- Use the ultra low sulfur diesel fuel only [below 0.0015 % (15 ppm)] for these engines.
- Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20 °C (-4 °F) or elevations above 1500 m (5000 ft).
- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87).

Transmission Oil:

*KUBOTA Super UDT-2: For an enhanced ownership experience, we highly recommend Super UDT-2 to be used instead of standard hydraulic/transmission fluid.

Super UDT-2 is a proprietary KUBOTA formulation that delivers superior performance and protection in all operating conditions.

Regular UDT is also permitted for use in this machine.

- Indicated capacities of water and oil are manufacturer's estimate.

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5. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLTS AND NUTS

Tighten screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual according to the table below.

Indication on top of bolt	 No-grade or 4T						 7T						 9T		
Indication on top of nut	  No-grade or 4T												   6T		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15	30 to 34	3.0 to 3.5	22 to 25
M10	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32	61 to 70	6.2 to 7.2	45 to 52
M12	63 to 72	6.4 to 7.4	47 to 53	—	—	—	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53	103 to 117	10.5 to 12.0	76.0 to 86.7
M14	108 to 125	11.0 to 12.8	79.6 to 92.5	—	—	—	124 to 147	12.6 to 15.0	91.2 to 108	—	—	—	167 to 196	17.0 to 20.0	123 to 144
M16	167 to 191	17.0 to 19.5	123 to 141	—	—	—	197 to 225	20.0 to 23.0	145 to 166	—	—	—	260 to 304	26.5 to 31.0	192 to 224
M18	246 to 284	25.0 to 29.0	181 to 209	—	—	—	275 to 318	28.0 to 32.5	203 to 235	—	—	—	344 to 402	35.0 to 41.0	254 to 296
M20	334 to 392	34.0 to 40.0	246 to 289	—	—	—	368 to 431	37.5 to 44.0	272 to 318	—	—	—	491 to 568	50.0 to 58.0	362 to 419

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[2] STUD BOLTS

Material of opponent part	Ordinariness			Aluminum		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	12 to 15	1.2 to 1.6	8.7 to 11	8.9 to 11	0.90 to 1.2	6.5 to 8.6
M10	25 to 31	2.5 to 3.2	18 to 23	20 to 25	2.0 to 2.6	15 to 18
M12	30 to 49	3.0 to 5.0	22 to 36	31	3.2	23
M14	62 to 73	6.3 to 7.5	46 to 54	–	–	–
M16	98.1 to 112	10.0 to 11.5	72.4 to 83.1	–	–	–
M18	172 to 201	17.5 to 20.5	127 to 148	–	–	–

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[3] METRIC SCREWS, BOLTS AND NUTS

Grade	 Property class 8.8			 Property class 10.9		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	24 to 27	2.4 to 2.8	18 to 20	30 to 34	3.0 to 3.5	22 to 25
M10	48 to 55	4.9 to 5.7	36 to 41	61 to 70	6.2 to 7.2	45 to 52
M12	78 to 90	7.9 to 9.2	58 to 66	103 to 117	10.5 to 12.0	76.0 to 86.7
M14	124 to 147	12.6 to 15.0	91.2 to 108	167 to 196	17.0 to 20.0	123 to 144
M16	197 to 225	20.0 to 23.0	145 to 166	260 to 304	26.5 to 31.0	192 to 224

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[4] AMERICAN STANDARD SCREWS, BOLTS AND NUTS WITH UNC OR UNF THREADS

Grade	 SAE GR.5			 SAE GR.8		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
1/4	11.7 to 15.7	1.20 to 1.60	8.63 to 11.5	16.3 to 19.7	1.67 to 2.00	12.0 to 14.6
5/16	23.1 to 27.7	2.36 to 2.82	17.0 to 20.5	33 to 39	3.4 to 3.9	25 to 28
3/8	48 to 56	4.9 to 5.7	36 to 41	61 to 73	6.3 to 7.4	45 to 53
1/2	110 to 130	11.3 to 13.2	81.2 to 95.8	150 to 178	15.3 to 18.1	111 to 131
9/16	150 to 178	15.3 to 18.1	111 to 131	217 to 260	22.2 to 26.5	160 to 191
5/8	204 to 244	20.8 to 24.8	151 to 179	299 to 357	30.5 to 36.4	221 to 263

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[5] PLUGS

Shape	Size	Material of opponent part					
		Ordinariness			Aluminum		
		N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
Tapered screw 	R1/8	13 to 21	1.3 to 2.2	9.4 to 15	13 to 19	1.3 to 2.0	9.4 to 14
	R1/4	25 to 44	2.5 to 4.5	18 to 32	25 to 34	2.5 to 3.5	18 to 25
	R3/8	49 to 88	5.0 to 9.0	37 to 65	49 to 58	5.0 to 6.0	37 to 43
	R1/2	58.9 to 107	6.00 to 11.0	43.4 to 79.5	59 to 78	6.0 to 8.0	44 to 57
Straight screw 	G1/4	25 to 34	2.5 to 3.5	18 to 25	—	—	—
	G3/8	62 to 82	6.3 to 8.4	46 to 60	—	—	—
	G1/2	49 to 88	5.0 to 9.0	37 to 65	—	—	—

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6. MAINTENANCE CHECK LIST

[1] L3301/L3901

No.	Item		Indication on hour meter														Interval	Reference page	Important	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700				
1	Engine start system	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-27		
2	Wheel bolt torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-28		
3	Greasing	—	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-26		
4	Battery condition	Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-32	*4	
5	Fan belt	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-29		
6	Brake	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-31		
7	Clutch	Adjust	★	☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-30		
8	Air cleaner element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-29	*1	@
		Replace															every 1000 Hr or 1 year	G-29	*2	
9	Fuel line	Check															every 1 year	G-41	*5	@
		Replace															every 4 years	G-41	*5	
10	Fuel grommet	Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-30		@
		Replace															every 2 years	G-30		
11	Transmission oil filter [HST]	Replace	★			☆				☆				☆			every 200 Hr	G-34		
12	Toe-in	Adjust				☆				☆				☆			every 200 Hr	G-35		
13	Power steering oil line [Manual Transmission]	Check															every 1 year	G-43	*5	
		Replace															every 4 years	G-43	*5	
14	Oil cooler line [HST]	Check															every 1 year	G-42	*5	
		Replace															every 4 years	G-42	*5	
15	Radiator hose and clamp	Check															every 1 year	G-42	*5	
		Replace															every 4 years	G-42	*5	
16	Intake air line	Check															every 1 year	G-42	*5	@
		Replace															every 4 years	G-42	*5	
17	Oil separator hose	Check															every 1 year	G-42	*5	
		Replace															every 4 years	G-42	*5	
18	Engine oil	Change	★							☆							every 400 Hr	G-36		
19	Engine oil filter	Replace	★							☆							every 400 Hr	G-36		
20	Water separator	Clean								☆							every 400 Hr	G-39		

No.	Item		Indication on hour meter														Interval	Reference page	Important	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700				
21	Fuel filter	Replace								☆							every 400 Hr	G-39		@
22	Hydraulic oil filter	Replace								☆							every 400 Hr	G-37		
23	Transmission fluid	Change								☆							every 400 Hr	G-37		
24	Front axle case oil (4WD)	Change															every 800 Hr	G-40		
25	Greasing (2WD front wheel hub)	—								☆							every 400 Hr	G-39		
26	Front axle pivot	Adjust												☆			every 600 Hr	G-39		
27	Engine valve clearance	Adjust															every 800 Hr	G-40		
28	Fuel injector nozzle tip	Clean															every 1500 Hr	G-40		@
29	Oil separator element	Replace															every 1500 Hr	G-40		@
30	PCV (Positive Crankcase Ventilation) valve (Oil separator)	Check															every 1500 Hr	G-40		@
31	EGR cooler	Check Clean															every 1500 Hr	G-40		@
32	EGR system	Check Clean															every 3000 Hr	G-41		@
33	Supply pump	Check															every 3000 Hr	G-41		
34	DPF muffler	Clean															every 3000 Hr	G-41		@
35	Exhaust manifold	Check															every 1000 Hr or 1 year	G-41	*2	
36	DPF differential pressure sensor pipe	Check															every 1 year	G-41		
37	EGR pipe	Check															every 1 year	G-41		
38	Antifrost heater for oil separator (if equipped)	Check															every 1 year	G-41		
39	DPF differential pressure sensor hose	Replace															every 2 years	G-45		
40	Cooling system	Flush															every 2000 Hr or 2 years	G-43	*3	
41	Coolant	Change															every 2000 Hr or 2 years	G-43	*3	
42	Fuel system	Bleed															Service as required	G-46		
43	Clutch housing	Drain																G-46		
44	Fuse	Replace																G-47		
45	Light bulb	Replace																G-48		
46	Fuel line	Replace																G-48	*5	
47	Radiator hose and clamp	Replace																G-48	*5	
48	Intake air line	Replace																G-48	*5	
49	Power steering oil line	Replace																G-48	*5	
50	Oil cooler line [HST]	Replace																G-48	*5	
51	Oil separator hose	Replace																G-49	*5	

■ 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 1,000 hours or every 1 year, whichever comes first.
- *3: Every 2,000 hours or every 2 years, whichever comes first.
- *4: When the battery is used for less than 100 hours per year, check the battery condition by reading the indicator annually.
- *5: Replace if any deterioration (crack, hardening, scar or deformation) or damage occurred. However, must be replaced every 4 years regardless of the condition.
- The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in U.S.EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.

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[2] L4701

No.	Item		Indication on hour meter														Interval	Reference page	Important	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700				
1	Engine start system	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-56		
2	Wheel bolt torque	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-57		
3	Greasing	—	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr	G-55		
4	Battery condition	Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-60	*4	
5	Fan belt	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-58		
6	Brake	Adjust		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-59		
7	Clutch [Manual Transmission]	Adjust	★	☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-59		
8	Air cleaner element Primary element	Clean		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-58	*1	@
		Replace															every 1000 Hr or 1 year	G-58	*2	
	Secondary element	Replace															every 1000 Hr or 1 year	G-58	*2	
9	Fuel line	Check															every 1 year	G-68	*5	@
		Replace															every 4 years	G-68	*5	
10	Fuel grommet	Check		☆		☆		☆		☆		☆		☆		☆	every 100 Hr	G-59		@
		Replace															every 2 years	G-59		
11	Transmission oil filter [HST]	Replace	★			☆				☆				☆			every 200 Hr	G-62		
12	Toe-in	Adjust				☆				☆				☆			every 200 Hr	G-63		
13	Power steering oil line	Check															every 1 year	G-70	*5	
		Replace															every 4 years	G-70	*5	
14	Oil cooler line [HST]	Check															every 1 year	G-69	*5	
		Replace															every 4 years	G-69	*5	
15	Radiator hose and clamp	Check															every 1 year	G-69	*5	
		Replace															every 4 years	G-69	*5	
16	Intake air line	Check															every 1 year	G-69	*5	@
		Replace															every 4 years	G-69	*5	
17	Oil separator hose	Check															every 1 year	G-69	*5	
		Replace															every 4 years	G-69	*5	
18	Engine oil	Change	★							☆							every 400 Hr	G-64		
19	Engine oil filter	Replace	★							☆							every 400 Hr	G-64		

No.	Item		Indication on hour meter														Interval	Reference page	Important	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700				
20	Water separator	Clean								☆							every 400 Hr	G-66		
21	Fuel filter	Replace								☆							every 400 Hr	G-66		@
22	Hydraulic oil filter	Replace								☆							every 400 Hr	G-65		
23	Transmission fluid	Change								☆							every 400 Hr	G-65		
24	Front axle case oil (4WD)	Change															every 800 Hr	G-67		
25	Greasing (2WD front wheel hub)	—								☆							every 400 Hr	G-66		
26	Front axle pivot	Adjust												☆			every 600 Hr	G-66		
27	Engine valve clearance	Adjust															every 800 Hr	G-67		
28	Fuel injector nozzle tip	Clean															every 1500 Hr	G-67		@
29	Oil separator element	Replace															every 1500 Hr	G-67		@
30	PCV (Positive Crankcase Ventilation) valve (Oil separator)	Check															every 1500 Hr	G-67		@
31	EGR cooler	Check Clean															every 1500 Hr	G-67		@
32	EGR system	Check Clean															every 3000 Hr	G-68		@
33	Supply pump	Check															every 3000 Hr	G-68		
34	DPF muffler	Clean															every 3000 Hr	G-68		@
35	Exhaust manifold	Check															every 1000 Hr or 1 year	G-68	*2	
36	DPF differential pressure sensor pipe	Check															every 1 year	G-68		
37	EGR pipe	Check															every 1 year	G-68		
38	Antifrost heater for oil separator (if equipped)	Check															every 1 year	G-68		
39	DPF differential pressure sensor hose	Replace															every 2 years	G-68		
40	Cooling system	Flush															every 2000 Hr or 2 years	G-71	*3	
41	Coolant	Change															every 2000 Hr or 2 years	G-71	*3	
42	Fuel system	Bleed															Service as required	G-74		
43	Clutch housing	Drain																G-74		
44	Fuse	Replace																G-75		
45	Light bulb	Replace																G-76		
46	Fuel line	Replace																G-48	*5	
47	Radiator hose and clamp	Replace																G-48	*5	
48	Intake air line	Replace																G-48	*5	
49	Power steering oil line	Replace																G-48	*5	
50	Oil cooler line [HST]	Replace																G-48	*5	
51	Oil separator hose	Replace																G-49	*5	

■ 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 1,000 hours or every 1 year, whichever comes first.
- *3: Every 2,000 hours or every 2 years, whichever comes first.
- *4: When the battery is used for less than 100 hours per year, check the battery condition by reading the indicator annually.
- *5: Replace if any deterioration (crack, hardening, scar or deformation) or damage occurred.
However, must be replaced every 4 years regardless of the condition.
- The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in U.S.EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.

9Y1211012GEG0009US0

7. CHECK AND MAINTENANCE

[1] L3301/L3901



CAUTION

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

9Y1211012GEG0054US0

(1) Daily Check

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



CAUTION

To avoid personal injury:

Take the following precautions when checking the tractor.

- Park the machine on firm and level ground.
- Set the parking brake.
- Lower the implement to the ground.
- All residual pressure of the hydraulic system released.
- Stop the engine and remove the key.

9Y1211012GEG0055US0

Walk Around Inspection

Look around and under the tractor for such items as loose bolts, trash build-up, oil or coolant leaks, broken or worn parts.

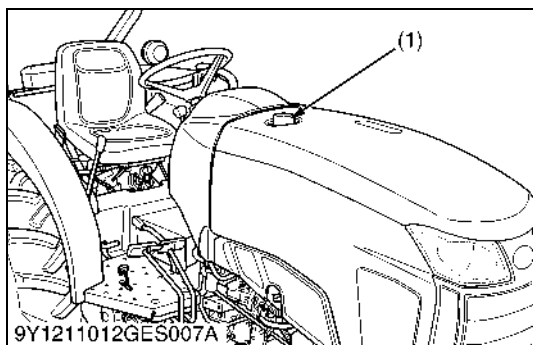
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Checking and Refueling



CAUTION

- Do not smoke while refueling.
 - Be sure to stop the engine before refueling.
1. Turn the key switch to "ON", check the amount of fuel by fuel gauge.
 2. Fill fuel tank when fuel gauge shows 1/4 or less fuel in tank.



9Y1211012GES007A

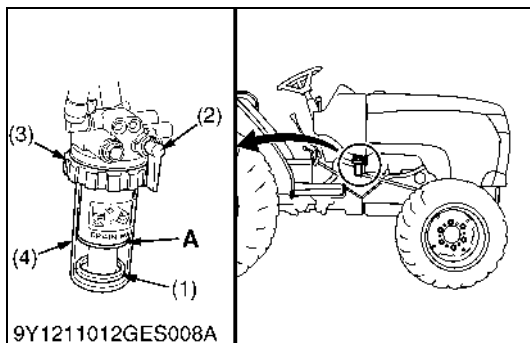
Fuel tank	Capacity	42.0 L 11.0 U.S.gals 9.24 Imp.gals

■ IMPORTANT

- Do not permit dirt or trash to get into the fuel system.
- Be careful not to let the fuel tank become empty, otherwise air will enter the fuel system, necessitating bleeding before next engine start.
- Be careful not to spill during refueling. If a spill should occur, wipe it off at once, or it may cause a fire.
- To prevent condensation (water) accumulation in the fuel tank, fill the tank before parking overnight.

(1) Fuel Tank Cap

9Y1211012GEG0059US0



Checking Water Separator

1. As water is collected in the water separator, the red float is raised.
2. When the red float has reached the white line, close the fuel valve, loosen the retainer ring, take out the cup, and clean the cup. Be careful not to break the element.
3. Place the cup back into position. Bleed the fuel system.

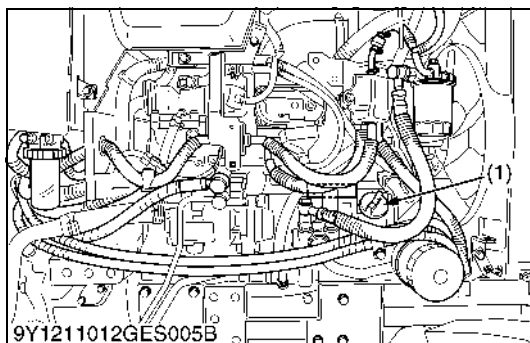
■ IMPORTANT

- If water is drawn through to the fuel pump, extensive damage will occur.

- (1) Red Float
(2) Fuel Valve
(3) Retainer Ring
(4) Cup

A: White Line

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Checking Engine Oil Level



CAUTION

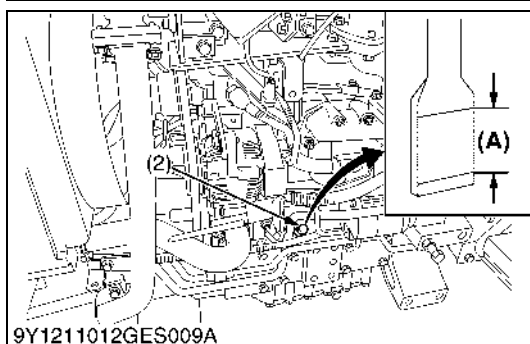
- Be sure to stop the engine before checking the oil level.
1. Park the machine on a flat surface.
 2. Check engine oil before starting the engine or 5 minutes or more after the engine has stopped.
 3. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the 2 notches. If the level is too low, add new oil to the prescribed level at the oil inlet.
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.)

■ IMPORTANT

- When using an oil of different maker or viscosity from the previous one, remove all of the old oil. Never mix two different types of oil.
- If oil level is low, do not run engine.

■ NOTE

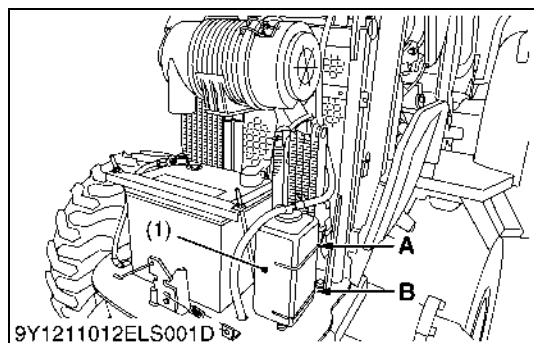
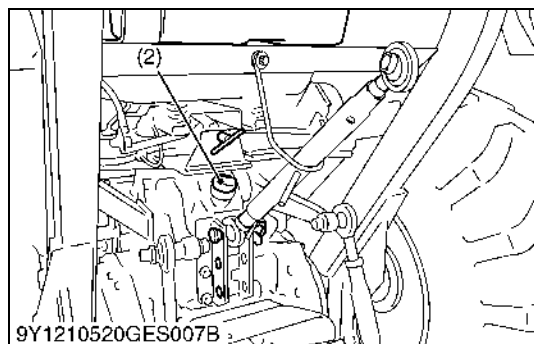
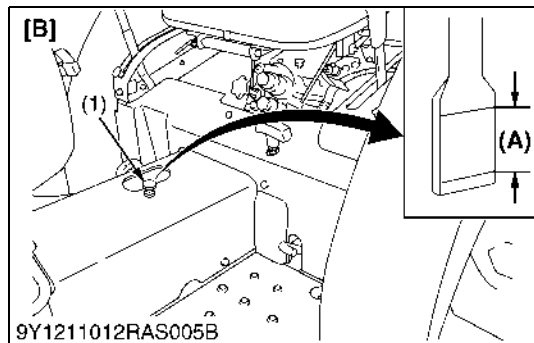
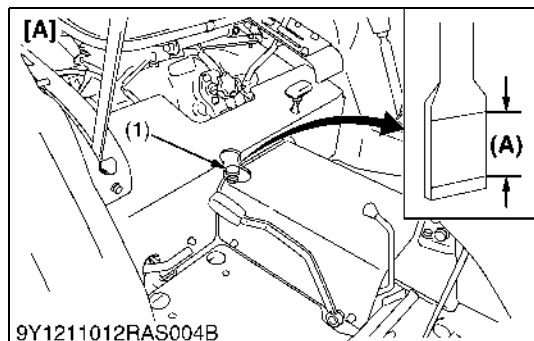
- At times a small amount of fuel, which is used to regenerate the DPF, may get mixed with the engine oil and the engine oil may increase in volume.



- (1) Oil Inlet
(2) Dipstick

(A) Oil level is acceptable within this range.

9Y1211012GEG0061US0



Checking Transmission Fluid Level

1. Park the machine on a flat surface, lower the implement and shut off engine.
2. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the 2 notches. If the level is too low, add new oil to the prescribed level at the oil inlet.
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.)

■ IMPORTANT

- If oil level is low, do not run engine.

- (1) Dipstick
(2) Oil Inlet

- [A] Manual Transmission Type
[B] HST Type

- (A) Oil level is acceptable within this range

9Y1211012GEG0062US0

Checking Coolant Level



CAUTION

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

1. Check to see that the coolant level is between the "FULL" and "LOW" marks of recovery tank.
2. When the coolant level drops due to evaporation, add soft water only up to the full level. In case of leakage, add anti-freeze and soft water in the specified mixing ratio up to the full level.
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.)
3. When the coolant level is lower than "LOW" mark of recovery tank, remove the radiator cap and check to see that the coolant level is just below the port. If level is low, add coolant.

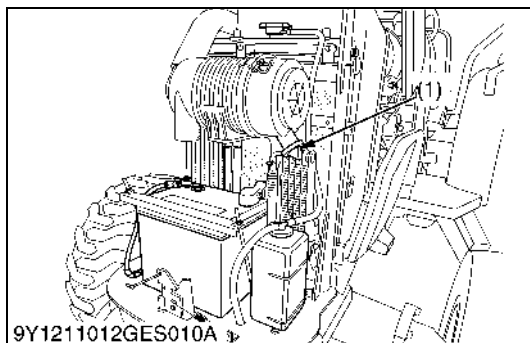
■ IMPORTANT

- If the radiator cap has to be removed, follow the caution above and securely retighten the cap.
- Use clean, fresh soft water and anti-freeze to fill the radiator.

- (1) Recovery Tank

- A: Full
B: Low

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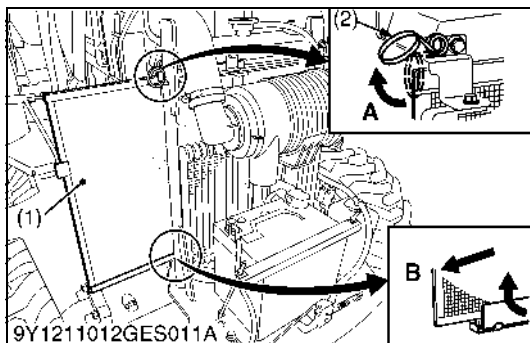


Cleaning Evacuator Valve

1. Open the evacuator valve to get rid of large particles of dust and dirt.

(1) Evacuator Valve

9Y1211012GEG0064US0



Cleaning Grill and Radiator Screen

CAUTION

- Be sure to stop the engine before removing the screen.
- Before checking or cleaning the radiator screen, stop the engine and wait long enough until it is cooled down.

1. Check front grill and side screens to be sure they are clean of debris.
2. Detach the screen with the fixed spring being held up and remove all foreign materials and clean the front of radiator completely.

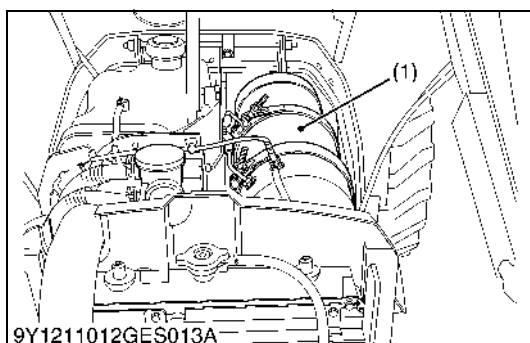
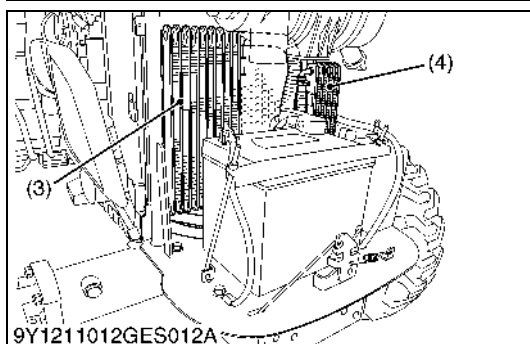
IMPORTANT

- Grill and screen must be clean from debris to prevent engine from overheating and to allow good air intake for the air cleaner.

- (1) Radiator Screen
 (2) Fixed Spring
 (3) Oil Cooler [HST Type]
 (4) Fuel Cooler

A: Hold Up
 B: Detach

9Y1211012GEG0065US0



Checking DPF Muffler

CAUTION

- Before checking or cleaning the DPF muffler, stop the engine and wait long enough until it is cooled down.

1. Check the DPF muffler and its surroundings for build-up of anything flammable. Otherwise a fire may result.

(1) DPF Muffler

9Y1211012GEG0066US0

Checking Brake Pedals and Clutch Pedal

CAUTION

- Be sure brake pedals have equal adjustment when using locked together. Incorrect or unequal brake pedal adjustment can cause the tractor to swerve or roll-over.

1. Inspect the brake and clutch pedals for free travel, and smooth operation.
2. Adjust if incorrect measurement is found:
 (See page "Adjusting Brake Pedal" on page G-31 or "Adjusting Clutch Pedal" on page G-30.)

9Y1211012GEG0067US0

Checking Gauges, Meter and Easy Checker™

1. Inspect the instrument panel for broken gauge(s), meter(s) and Easy Checker™ lamps.
2. Replace if broken.

9Y1211012GEG0068US0

Checking Head Light, Turn Signal / Hazard Light etc.

1. Inspect the lights for broken bulbs and lenses.
2. Replace if broken.

9Y1211012GEG0069US0

Checking Seat Belt and ROPS

1. Always check condition of seat belt and ROPS attaching hardware before operating tractor.
2. Replace if damaged.

9Y1211012GEG0070US0

Checking and Cleaning of Electrical Wiring and Battery Cables**CAUTION**

- A loosened terminal or connector, or damaged wire may affect the performance of electrical components or cause short circuits. Leakage of electricity could result in a fire hazard, a dead battery or damage to electrical components.
- Replace damaged wires or connections promptly.
- If a fuse blows soon after replacement, **DO NOT USE A LARGER THAN RECOMMENDED FUSE OR BYPASS THE FUSE SYSTEM.**
- Many wiring connections are protected by waterproof plugs, plug and unplug these connections carefully and make sure they are sealed correctly after assembly.
- Accumulation of dust, chaff and spilled fuel deposits around the battery, electrical wiring, engine or exhaust system are fire hazards. **CLEAN THESE AREAS BEFORE STARTING WORK.**

To avoid premature electrical malfunctions **DO NOT APPLY** high pressure water directly to battery, wiring, connectors, electrical components or instrument panel.

Inspect the following regularly:

1. Check wiring for chafed or cracked insulation.
2. Check wiring harness clamps. Replace if necessary.
3. Check connectors and terminals for looseness, contamination or overheated (discolored) connections.
4. Check instrument panel for correct operation of switches and gauges.

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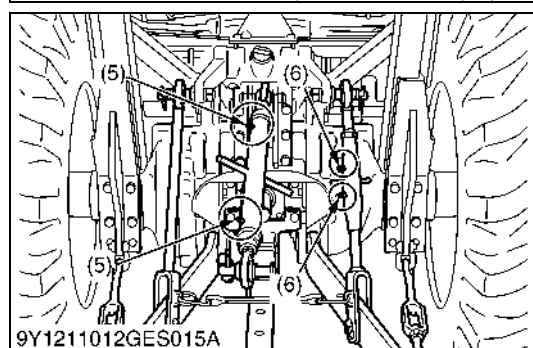
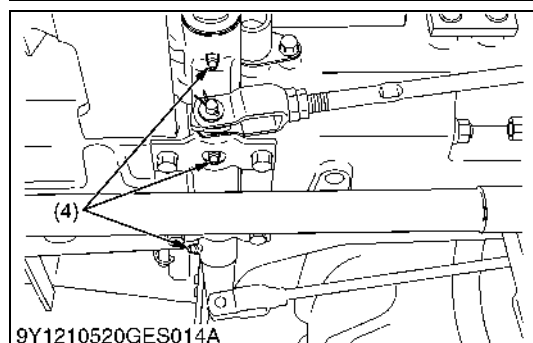
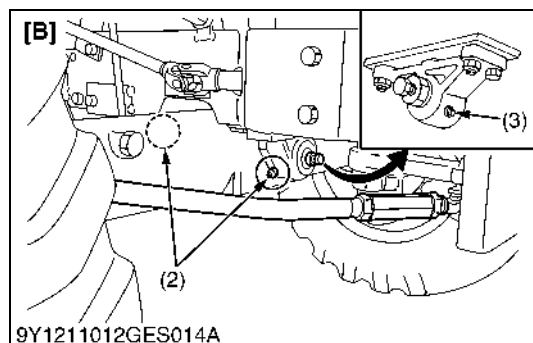
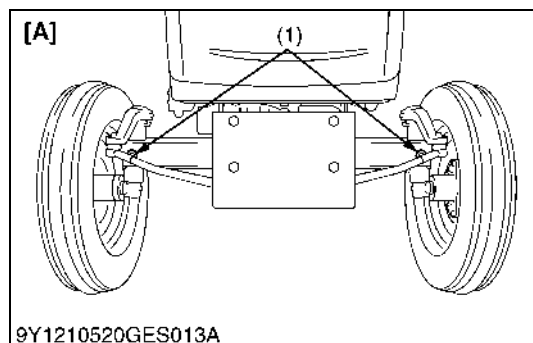
Checking Movable Parts

If any of the movable parts, such as levers and pedals, is not smoothly moved because of rust or sticky material, do not attempt to force it into motion.

In the above case, remove the rust or the sticky material, and apply oil or grease on the relevant spot. Otherwise, the machine may get damaged.

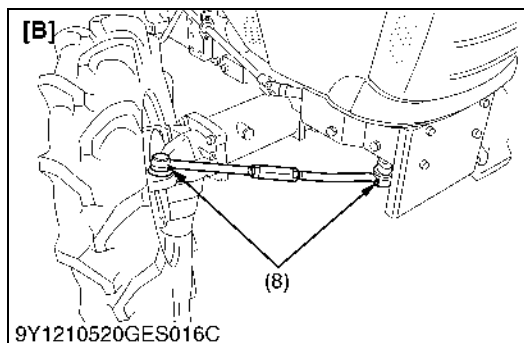
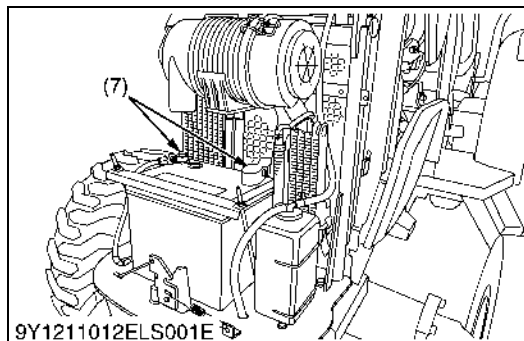
9Y1211012GEG0072US0

(2) Check Points of Every 50 Hours



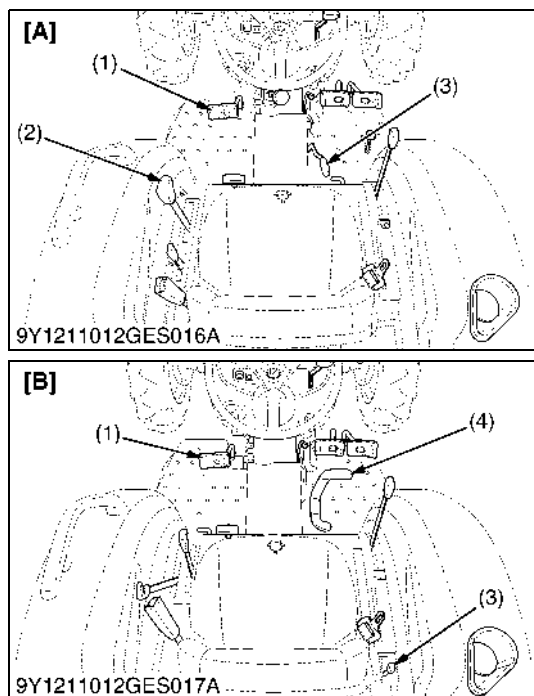
Lubricating Grease Fittings

1. Apply a small amount of multipurpose grease to the following points every 50 hours:
If you operated the machine in extremely wet and muddy conditions, lubricate grease fittings more often.
2. When apply grease to forward front axle support, remove the breather plug and apply grease until grease overflows from breather plug port. After greasing reinstall the breather plug.



(1) Grease Fitting (Knuckle Shaft) [RH, LH]	(7) Battery Terminals
(2) Grease Fitting (Front axle support)	(8) Grease Fitting (Tie-rod Ends)
(3) Breather Plug	[A] 2WD
(4) Grease Fitting (Pedal Shaft)	[B] 4WD
(5) Grease Fitting (Top Link)	
(6) Grease Fitting (Lifting Rod) [RH]	

9Y1211012GEG0073US0



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 control levers in the "NEUTRAL" position.
2. Set the parking brake and stop the engine.

[Manual Transmission Type]

■ Test: Switch for the shuttle shift lever.

1. Sit on the 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 gear shift lever.
5. Turn the key to "START" position.
6. The engine must not crank.

■ Test: Switch for the PTO gear shift lever.

1. Sit on the operator's seat.
2. Engage the PTO gear shift lever.
3. Depress the clutch pedal fully.
4. Shift the shuttle shift lever to the neutral position.
5. Turn the key to "START" position.
6. The engine must not crank.

[HST Type]

■ Test: Switch for the speed control pedal.

1. Sit on the operator's seat.
2. Depress the speed control pedal to the desired direction.
3. Depress the clutch pedal fully.
4. Disengage the PTO gear shift lever.
5. Turn the key to "START" position.
6. The engine must not crank.

■ Test: Switch for the PTO gear shift lever.

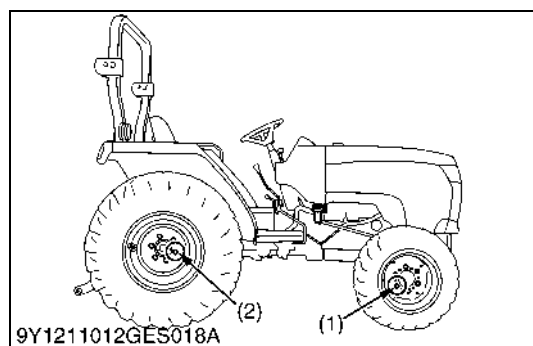
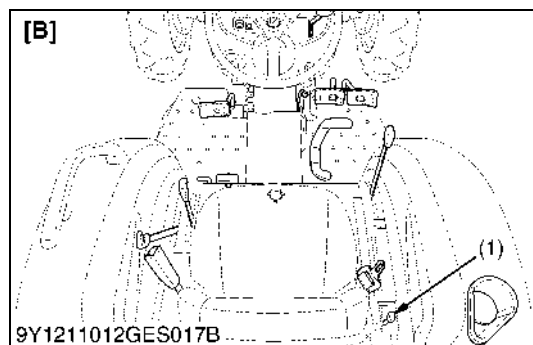
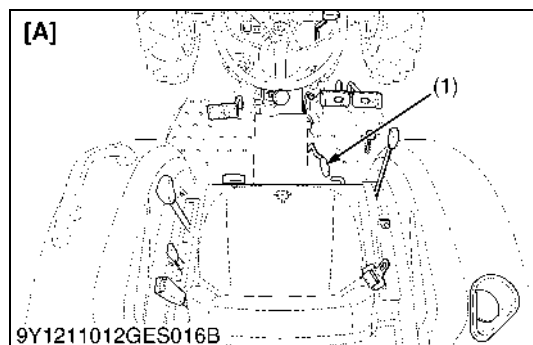
1. Sit on the operator's seat.
2. Engage the PTO gear shift lever.
3. Depress the clutch pedal fully.
4. Place the speed control pedal in neutral position.
5. Turn the key to "START" position.
6. The engine must not crank.

- (1) Clutch Pedal
 (2) Shuttle Shift Lever
 (3) PTO Gear Shift Lever
 (4) Speed Control Pedal

[A] Manual Transmission Type

[B] HST Type

9Y1211012GEG0074US0



Checking Operator Presence Control



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 control levers in the "NEUTRAL" position.
2. Set the parking brake and stop the engine.

■ Test: Switch for the operator's seat.

1. Sit on the operator's seat.
2. Start the engine.
3. Engage the PTO gear shift lever.
4. Stand up. (Do not get off the machine.)
5. The engine must shut off after approximately 1 second.

(1) PTO Gear Shift Lever

[A] Manual Transmission Type

[B] HST Type

9Y1211012GEG0075US0

Checking Wheel Bolt Torque



CAUTION

- Never operate tractor with a loose rim, wheel, or axle.
 - Any time bolts and nuts are loosened, retighten to specified torque.
 - Check all bolts and nuts frequently and keep them tight.
1. Check wheel bolts and nuts regularly especially when new. If they are loose, tighten them as follows.

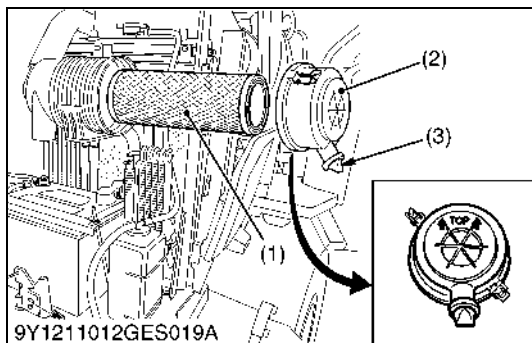
Tightening torque	Front wheel mounting nut	137 N·m 14 kgf·m 100 lbf·ft
	Rear wheel mounting screw and nut	215 N·m 22 kgf·m 160 lbf·ft

(1) Front Wheel Mounting Nut

(2) Rear Wheel Mounting Screw and Nut

9Y1211012GEG0076US0

(3) Check Points of Every 100 Hours



Cleaning Air Cleaner Element [Single Element Type]

1. Remove the element.
2. Clean the element:
 - When dry dust adheres to the element, blow compressed air from the inside, turning the element. Pressure of compressed air must be under 205 kPa (2.1 kgf/cm², 30 psi).
 - When carbon or oil adheres to the element, soak the element in detergent for 15 minutes then wash it several times in water, rinse with clean water and dry it naturally. After element is fully dried, inspect inside of the element with a light and check if it is damaged or not. (referring to the instructions on the label attached to the case.)
3. Replace air cleaner element:
Once yearly or after every sixth cleaning, whichever comes first.

■ NOTE

- Check to see if the evacuator valve is blocked with dust.

■ IMPORTANT

- The air cleaner uses a dry element, never apply oil.
- Do not run the engine with filter element removed.
- Be sure to refit the cover with the arrow ↑ (on the rear) upright. If the cover is improperly fitted, dust passed by the baffle and directly adheres to the element.

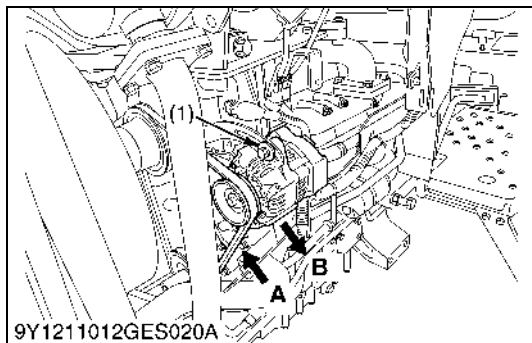
■ Evacuator Valve

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

(1) Elements
(2) Cover

(3) Evacuator Valve

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Adjusting Fan Belt Tension



CAUTION

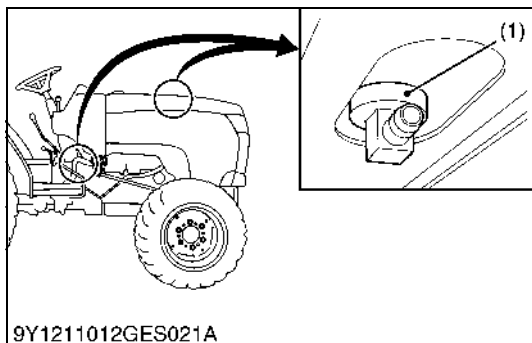
- Be sure to stop the engine before checking belt tension.
1. Stop the engine and remove the key.
 2. Apply moderate thumb pressure to belt between pulleys.
 3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the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

Fan belt tension	Factory specification	A deflection is 7 to 9 mm (0.28 to 0.35 in.) when the belt is pressed 98 N (10 kgf, 22 lbf) in the middle of the span

(1) Bolt

A: Check the belt tension
B: To tighten

9Y1211012GEG0078US0

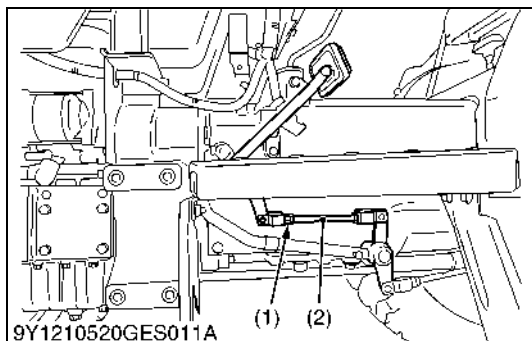


Checking Fuel Grommet

1. Check the grommets for cracks and fuel leak.
2. If any of such problems is found, replace the grommet(s) with new one(s).

(1) Fuel Grommet

9Y1211012GEG0080US0

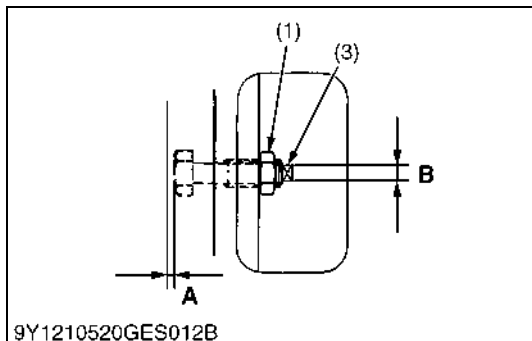


Adjusting Clutch Pedal

■ Adjusting procedure [with single clutch] [L3301 Manual Transmission Type], [HST Type]

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

Brake pedal free travel	Factory specification	20 to 30 mm (0.8 to 1.2 in.) on the pedal



■ Adjusting procedure [with Dual Clutch] [L3901 Manual Transmission Type]

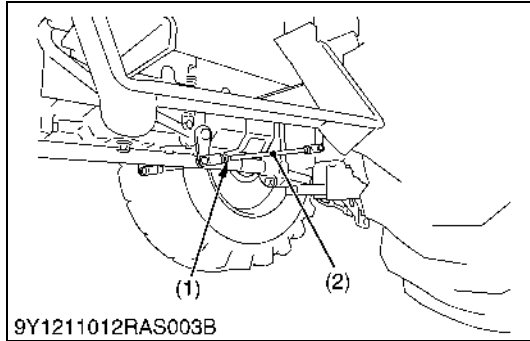
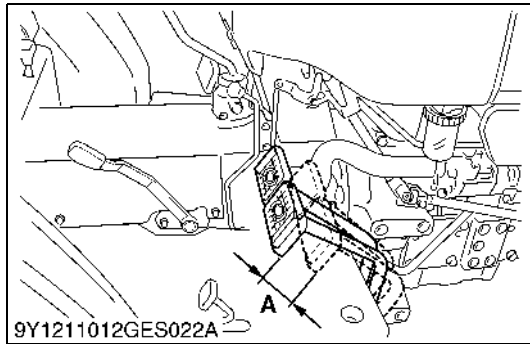
1. At first adjust clutch play, same as with single disc clutch.
2. Remove the cover located on the right side of flywheel housing case.
3. Loosen the lock nut, tighten the adjust bolt by using 7 mm (0.28 in.) spanner until head of the bolt contacts pressure plate slightly. Make 3/4 turn counterclockwise to give 0.9 to 1.0 mm (0.035 to 0.039 in.) clearance.
4. Tighten the lock nut, holding the adjusting bolt.
5. Turn the flywheel to adjust the clearance of other adjusting bolts. (3 bolts).
6. Repeat step (3) and readjust free travel of clutch pedal if necessary.

- (1) Lock Nut
(2) Clutch Rod
(3) Adjusting Bolt

A: 7 mm (0.28 in.)

B: 0.9 to 1.0 mm (0.035 to 0.039 in.)

9Y1211012GEG0081US0



Adjusting Brake Pedal

CAUTION

- Stop the engine and chock the wheels before checking brake pedal.

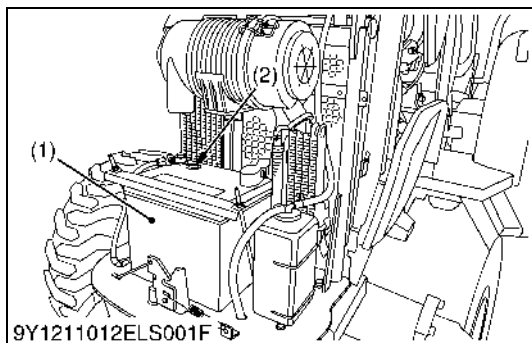
1. Release the parking brake.
2. Slightly depress the brake pedals and measure free travel at top of pedal stroke.
3. If adjustment is needed, loosen the lock nut and turn the brake rod to adjust the rod length within acceptable limits.
4. Retighten the lock nut.

Brake pedal free travel "A"	Factory specification	15 to 20 mm (0.6 to 0.8 in.) on the pedal
		Keep the free travel in the right and left brake pedals equal.

- (1) Lock Nut
- (2) Brake Rod

A: Free Travel

9Y1211012GEG0082US0



Checking Battery Condition



DANGER

To avoid the possibility of battery explosion:

For the refillable type battery, follow the instructions below.

- Do not use or charge the refillable type battery if the fluid level is below the **LOWER** (lower limit level) mark. Otherwise, the battery component parts may prematurely deteriorate, which may shorten the battery's service life or cause an explosion. Check the fluid level regularly and add distilled water as required so that the fluid level is between the **UPPER** and **LOWER** levels.



CAUTION

- Never remove the battery cap while the engine is running.
- Keep electrolyte away from eyes, hands and clothes. If you are spattered with it, wash it away completely with water immediately and get medical attention.
- Keep open sparks and flames away from the battery at all times. Hydrogen gas mixed with oxygen becomes very explosive.
- Wear eye protection and rubber gloves when working around battery.

NOTE

- The factory-installed battery is of non-refillable type. If the indicator turns white, do not charge the battery but replace it with new one.
- Mishandling the battery shortens the service life and adds to maintenance costs.
- The original battery is maintenance free, but needs some servicing.

If the battery is weak, the engine will be difficult to start and the lights will be dim. It is important to check the battery periodically.

How to read the indicator

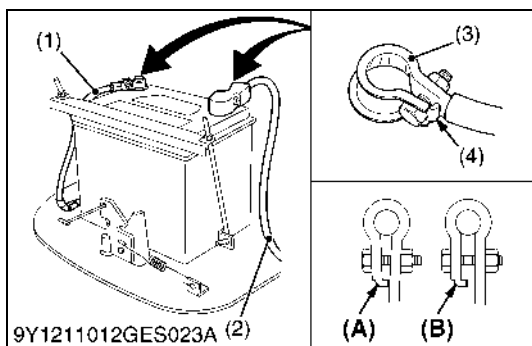
Check the battery condition by reading the indicator.

State of indicator display	
Green	Specific gravity of electrolyte and quality of electrolyte are both in good condition.
Black	Needs charging battery.
White	Needs replacing battery.

(1) Battery

(2) Indicator

9Y1211012GEG0083US0



Battery Cable Connections

1. Be sure to wire the battery cable as shown in the figure.
2. Tighten the terminal until the stopper comes in contact.

(1) Negative Cable

(A) Correct

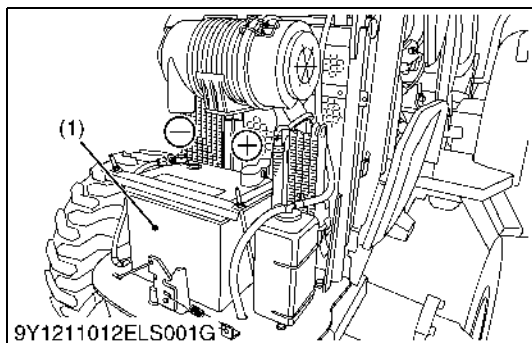
(2) Positive Cable

(B) Incorrect

(3) Terminal

(4) Stopper

9Y1211012GEG0057US0



Battery Charging

⚠ CAUTION

- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.
- When charging the battery, ensure the vent caps are securely in place. (if equipped)
- When disconnecting the cable from the battery, start with the negative terminal first.
When connecting the cable to the battery, start with the positive terminal first.
- **Never check battery charge by placing a metal object across the posts.**

Use a voltmeter or hydrometer.

1. To slow charge the battery, connect the battery positive terminal to the charger positive terminal and the negative to the negative, then recharge in the standard fashion.
2. A boost charge is only for emergencies. It will partially charge the battery at a high rate and in a short time.
When using a boost-charged battery, it is necessary to recharge the battery as early as possible.
Failure to do this will shorten the battery's service life.
3. The battery is charged if the indicator display turns green from black.
4. When exchanging an old battery for a new one, use battery of equal specification shown in table 1.

Table 1

Battery Type	Volt (V)	Reserve capacity (min.)	Cold Cranking Ampere (SAE) (A)	Normal Charging Rate (A)
75D23R	12	110	580	6.5

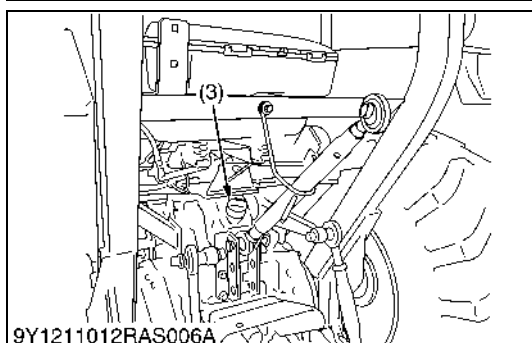
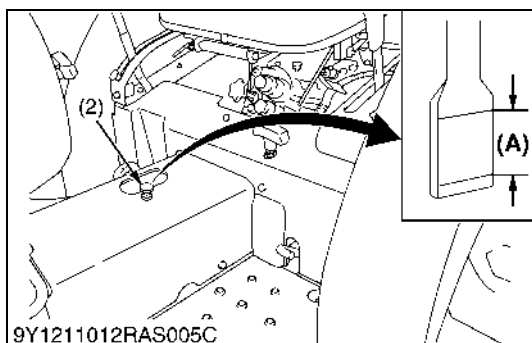
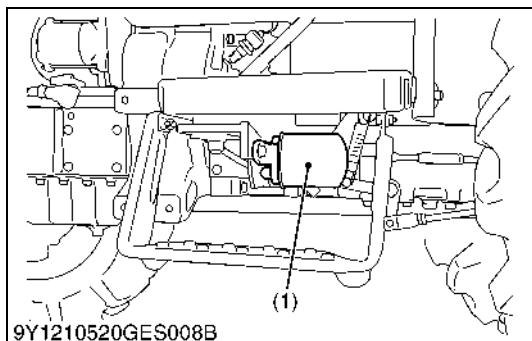
■ Direction for Storage

1. When storing the tractor for long periods of time, remove the battery from tractor, adjust the electrolyte to the proper level and store in a dry place out of direct sunlight.
2. The battery self-discharges while it is stored.
Recharge it once every 3 months in hot seasons and once every 6 months in cold seasons.

(1) Battery

9Y1211012GEG0084US0

(4) Check Points of Every 200 Hours



Replacing Transmission Oil Filter [HST Type]

⚠ CAUTION

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and can burn.

1. Place the oil pan underneath the transmission oil filter and remove the filter.
Do not remove the hydraulic oil filter. Otherwise, the oil comes out.
2. Put a film of clean transmission oil on the rubber seal of the new filter.
3. Quickly tighten the filter until it contacts the mounting surface, then, with a filter wrench, tighten it an additional 1 turn only.
4. After the new filter has been replaced, fill the transmission oil up to the upper notch on the dipstick.
5. After running the engine for a few minutes, stop the engine and check the oil level again, add oil to the prescribed level.
6. Make sure that the transmission fluid doesn't leak past the seal on the filter.

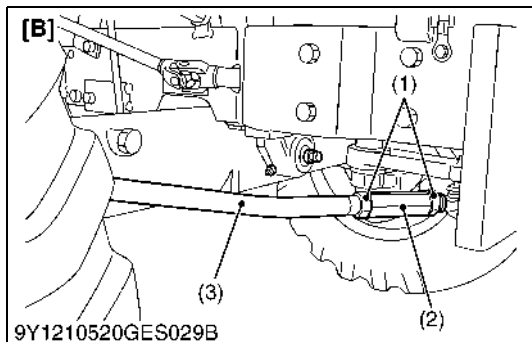
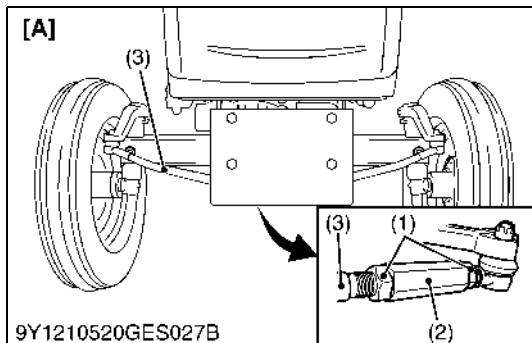
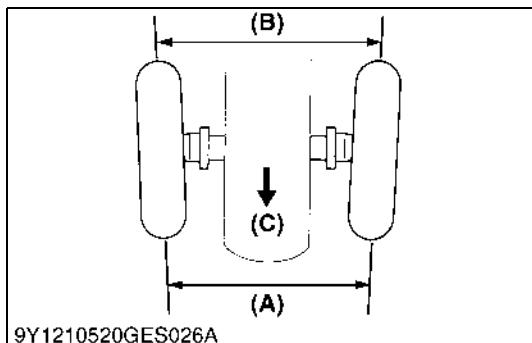
■ IMPORTANT

- To prevent serious damage to the hydraulic system, use only a KUBOTA genuine filter.
- Do not operate the tractor immediately after changing the transmission fluid.

Run the engine at medium speed for a few minutes to prevent damage to the transmission.

- (1) Transmission Oil Filter [HST Type] (A) Oil level is acceptable within this range.
 (2) Dipstick
 (3) Oil Inlet

9Y1211012GEG0085US0



Adjusting Toe-in

1. Park tractor on a flat place.
2. Turn steering wheel so front wheels are in the straight ahead position.
3. Lower the implement, lock the park brake and stop the engine.
4. Measure distance between tire beads at front of tire, at hub height.
5. Measure distance between tire beads at rear of tire, at hub height.
6. Front distance should be shorter than rear distance. If not, adjust tie rod length.

Toe-in ((B) - (A))	Factory specification	2 to 8 mm 0.08 to 0.31 in.

Adjusting procedures

1. Loosen the lock nut and turn the turnbuckle to adjust the rod length until the proper toe-in measurement is obtained.
2. Retighten the lock nut.

Tightening torque	Tie-rod lock nut	112.7 to 122.5 N·m 11.5 to 12.5 kgf·m 83.2 to 90.4 lbf·ft

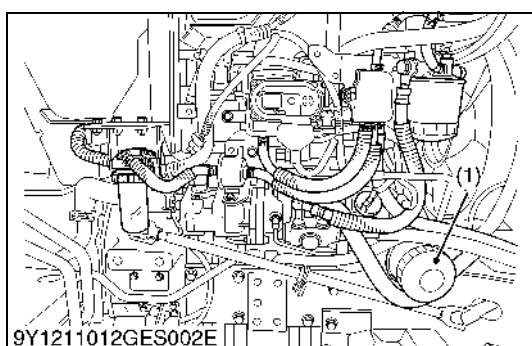
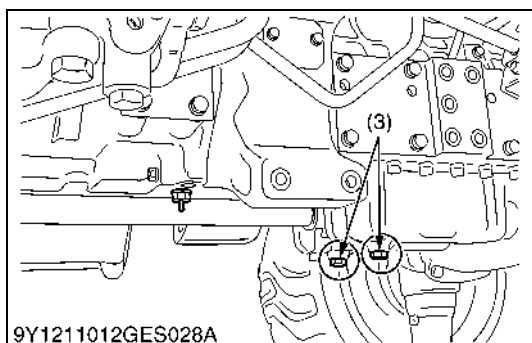
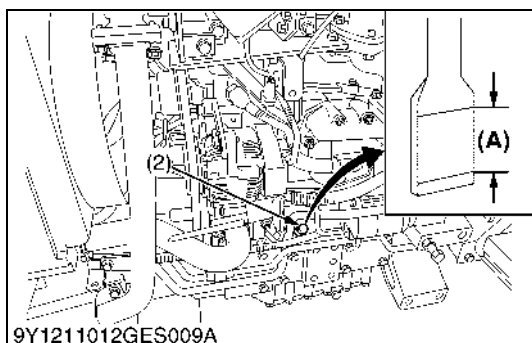
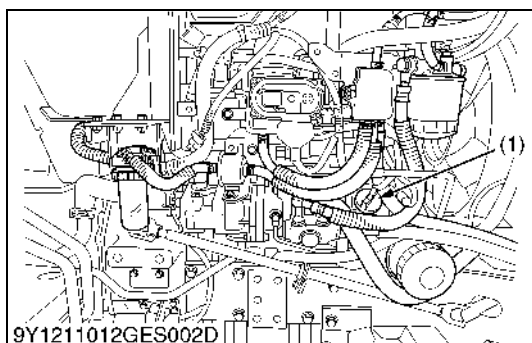
- (1) Lock Nuts
(2) Turnbuckle
(3) Tie-rod

- (A) Wheel to wheel distance at front
(B) Wheel to wheel distance at rear
(C) Front

- [A) 2WD
[B) 4WD

9Y1211012GEG0091US0

(5) Check Points of Every 400 Hours



Changing Engine Oil

⚠ CAUTION

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

1. To drain the used oil, remove the drain plug at the bottom of the engine and drain the oil completely into the oil pan.
All the used oil can be drained out easily when the engine is still warm.
2. After draining reinstall the drain plug.
3. Fill with the new oil up to the upper notch on the dipstick.
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.)

Engine oil (with filter)	Capacity	6.7 L 7.1 U.S.qts 5.9 Imp.qts

■ IMPORTANT

- Use DPF-compatible oil (CJ-4) for the engine.

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

(A) Oil level is acceptable within this range.

9Y1211012GEG0092US0

Replacing Engine Oil Filter

⚠ CAUTION

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and can burn.

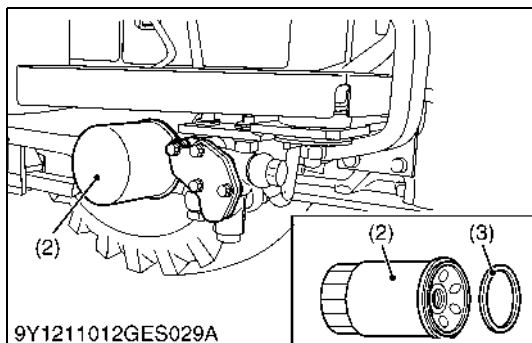
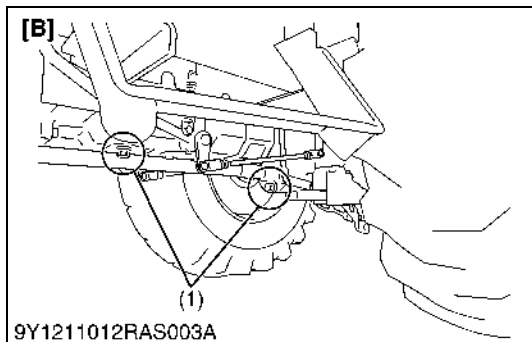
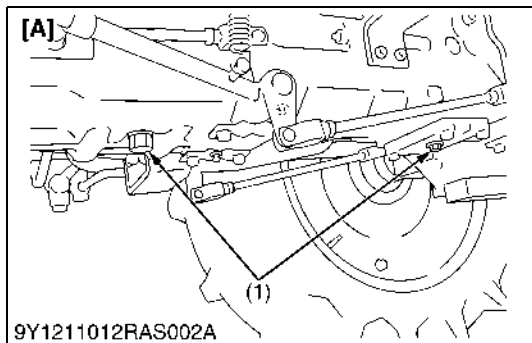
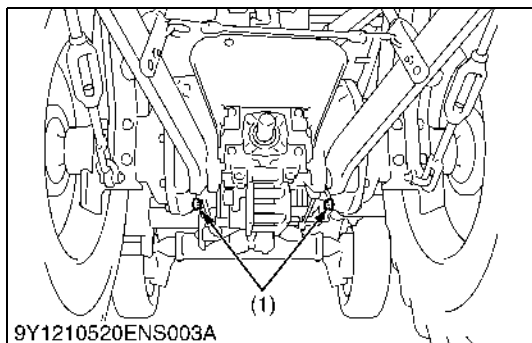
1. Remove the oil filter.
2. Put a film of clean engine oil on the rubber seal of the new filter.
3. Tighten the filter quickly until it contacts the mounting surface.
Tighten filter by hand an additional 1/2 turn only
4. After the new filter has been replaced, the engine oil normally decreases a little. Make sure that the engine oil does not leak through the seal and be sure to check the oil level on the dipstick. Then, replenish the engine oil up to the prescribed level.

■ IMPORTANT

- To prevent serious damage to the engine, use only a KUBOTA genuine filter.

- (1) Engine Oil Filter

9Y1211012GEG0093US0



Changing Transmission Fluid / Replacing Hydraulic Oil Filter

■ Cleaning Magnetic Filter

⚠ CAUTION

- Be sure to stop the engine before changing the oil filter cartridge.
 - Allow engine to cool down sufficiently, oil can be hot and can burn.
1. Remove the drain plugs at the bottom of the transmission case and drain the oil completely into the oil pan.
 2. After draining reinstall the drain plugs.
 3. Remove the oil filter.
 4. Wipe off metal filings from the magnetic filter with a clean rag.
 5. Put a film of clean transmission oil on the rubber seal of the new filter.
 6. Quickly tighten the filter until it contacts the mounting surface, then tighten it by hand an additional 1/2 turn only.
 7. Fill with the new KUBOTA SUPER UDT fluid up to the upper notch on the dipstick. (Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.)
 8. After running the engine for a few minutes, stop the engine and check the oil level again, add oil to the prescribed level.
 9. Make sure that the transmission fluid does not leak past the seal on the filter.

■ IMPORTANT

- To prevent serious damage to the hydraulic system, use only a KUBOTA genuine filter.
- Do not operate the tractor immediately after changing the transmission fluid.

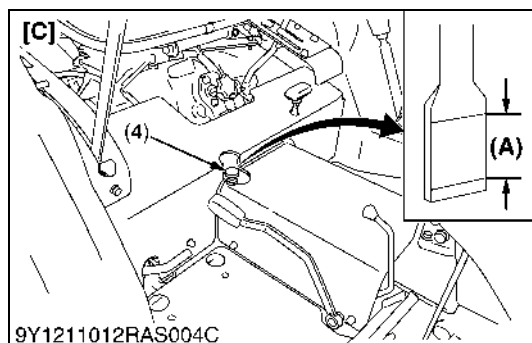
Run the engine at medium speed for a few minutes to prevent damage to the transmission.

Transmission oil capacity	Manual Transmission	2WD	28.0 L 7.4 U.S.gals 6.16 Imp.gals
		4WD	28.5 L 7.5 U.S.gals 6.27 Imp.gals
	HST	4WD	23.5 L 6.2 U.S.gals 5.17 Imp.gals

- (1) Drain Plug
 (2) Hydraulic Oil Filter
 (3) Magnetic Filter
 (Wipe Off Metal Filings)

[A] 2WD
 [B] 4WD

(To be continued)

(Continued)

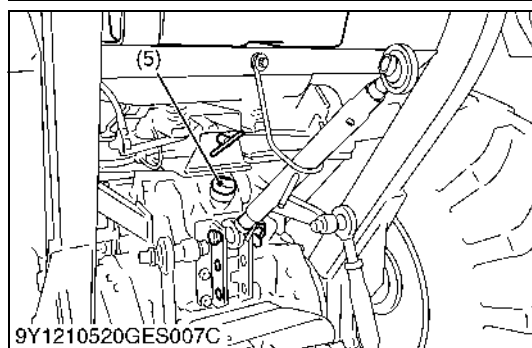
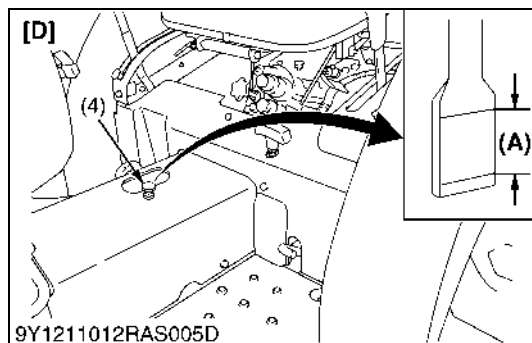
- (4) Dipstick
- (5) Oil Inlet

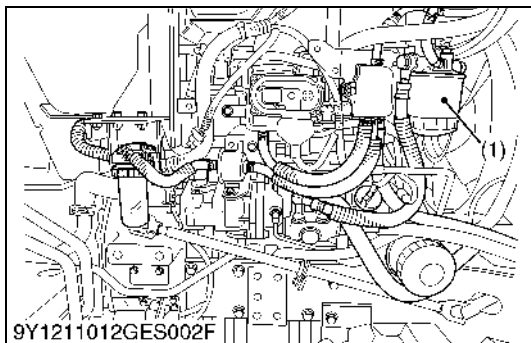
[C] Manual Transmission Type

[D] HST Type

(A) Oil level is acceptable within this range.

9Y1211012GEG0094US0



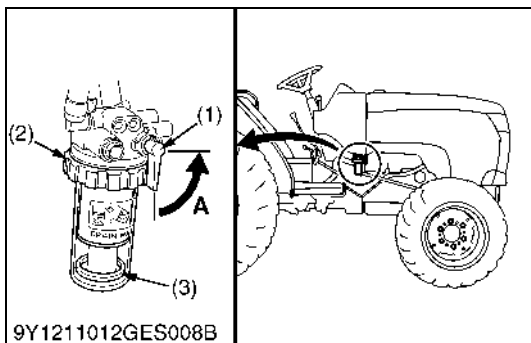


Replacing Fuel Filter

1. Remove the fuel filter.
2. Put a film of clean fuel on rubber seal of new filter.
3. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
4. Bleed the fuel system. (See "Bleeding Fuel System" on page G-46.)

(1) Fuel Filter

9Y1211012GEG0096US0



Cleaning Water Separator

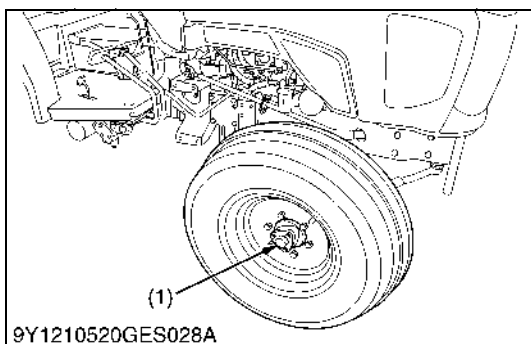
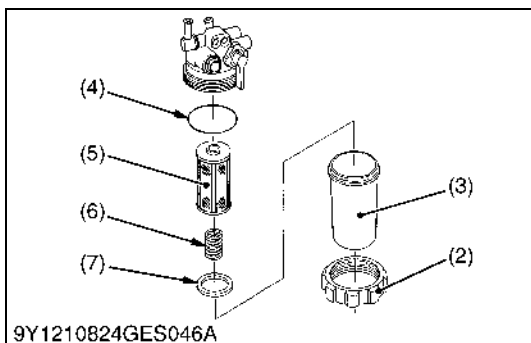
This job should not be done in the field, but in a clean place.

1. Close the fuel valve.
2. Unscrew the retainer ring and remove the cup, and rinse the inside with kerosene.
3. Take out the element and dip it in the kerosene to rinse.
4. After cleaning, reassemble the water separator, keeping out dust and dirt.
5. Bleed the fuel system. (See "Bleeding Fuel System" on page G-46.)

- (1) Fuel Valve
- (2) Retainer Ring
- (3) Cup
- (4) O-ring
- (5) Element
- (6) Spring
- (7) Red Float

A: Close

9Y1211012GEG0097US0



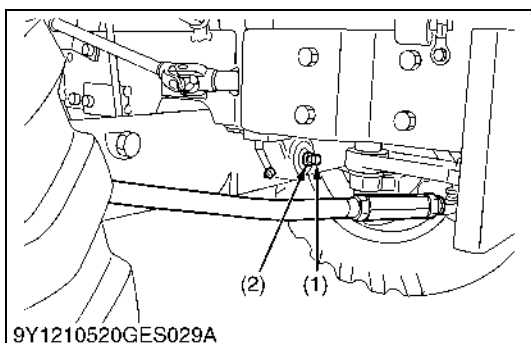
Lubricating Grease Fitting [2WD Model]

Detach the cover, and apply bearing grease.

- (1) Front Wheel Hub Cover

9Y1211012GEG0098US0

(6) Check Point of Every 600 Hours



Adjusting Front Axle Pivot

If the front axle pivot pin adjustment is not correct, front wheel vibration can occur causing vibration in the steering wheel.

■ Adjusting procedure

Loosen the lock nut, screw-in the adjusting screw until seated, then tighten the screw with an additional 1/6 turn. Re-tighten the lock nut

- (1) Adjusting Screw

- (2) Lock Nut

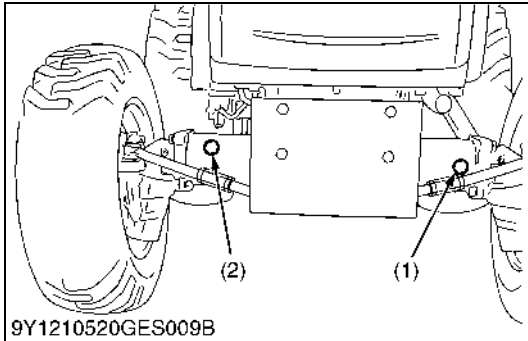
9Y1211012GEG0099US0

(7) Check Point of Every 800 Hours

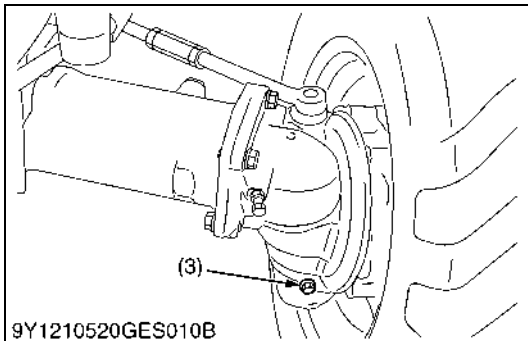
Adjusting Engine Valve Clearance

- See "Valve Clearance" on page 1-S12.

9Y1211012GEG0100US0



9Y1210520GES009B



9Y1210520GES010B

Changing Front Axle Case Oil

[4WD]

1. To drain the used oil, remove the right and left drain plugs and filling plug at the front axle case and let out the oil completely into the oil pan.
2. After draining, reinstall the drain plugs.
3. Gently pour new oil through the filling port. Required oil quantities are written in the table below. Make sure to pour the specified amounts. If oil overflows before pouring any of the specified amounts, wait a couple of minutes and try again. (Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.)
4. After filling, reinstall the filling plug.
5. Run the vehicle a few minutes in order for the oil to flow through the front axle case.
6. Remove the oil level check plug and check to see if the oil flows out of its port. If not, add the oil through the filling port until it flows out of the oil level check port.
7. Reinstall and tighten the oil level check plug and filling plug.

Front axle case oil	Capacity	4.5 L 4.8 U.S.qts 4.0 Imp.qts

- (1) Check Plug
(2) Filling Plug

- (3) Drain Plug

9Y1211012GEG0095US0

(8) Check Points of Every 1500 Hours

Cleaning Fuel Injector Nozzle Tip

- See "Overflow Pipe and injectors" on page 1-S43.

9Y1211012GEG0101US0

Replacing Oil Separator Element



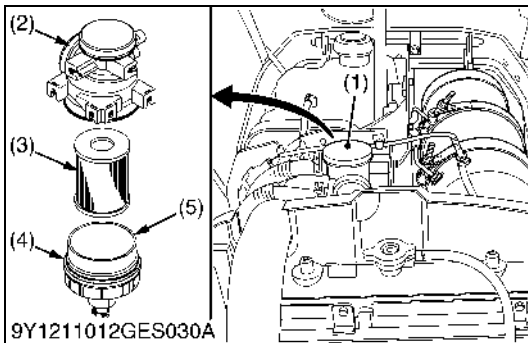
CAUTION

- Be sure to stop the engine before replacing the oil separator element.

1. Remove the cover and take out the element. Wipe off oil and the carbon in the case with a clean rag.
2. Fit a new oil separator element.
3. Tighten the cover.

- (1) Oil Separator
(2) Body
(3) Oil Separator Element

- (4) Gasket
(5) Cover



9Y1211012GES030A

9Y1211012GEG0102US0

Checking PCV (Positive Crankcase Ventilation) Valve

- See "PCV (Positive Crankcase Ventilation) Valve (Oil Separator)" on page 1-S16.

9Y1211012GEG0103US0

Checking and Cleaning EGR Cooler

- See "EGR Cooler" on page 1-S16.

9Y1211012GEG0104US0

(9) Check Points of Every 3000 Hours

Checking Supply Pump

- See page "Supply Pump" on page 1-S48.

9Y1211012GEG0105US0

Checking and Cleaning EGR System

- See "EGR Valve" on page 1-S39.

9Y1211012GEG0106US0

Cleaning DPF Muffler

■ Removal of ash

The longer the DPF operates, the more ash (burnt residue) is collected in the filter. Too much ash build-up adversely affects the DPF performance.

■ IMPORTANT

- The DPF needs cleaning with a specific cleaning device. Do not clean the DPF by disassembling, and attempt by yourself.

9Y1211012GEG0058US0

(10) Check Points of Every 1000 Hours or 1 year

Replacing Air Cleaner Element

- See "Cleaning Air Cleaner Element [Single Element Type]" on page G-29.

9Y1211012GEG0107US0

Checking Exhaust Manifold

- See "EGR Related Parts" on page 1-S39.

9Y1211012GEG0108US0

(11) Check Points of Every 1 Year

Checking Antifrost Heater for Oil Separator (if equipped)

- See "Heater Resistance (for Reference)" on page 9-S55.

9Y1211012GEG0198US0

Checking DPF Differential Pressure Sensor Pipe

- See "DPF Muffler" on page 1-S19.

9Y1211012GEG0109US0

Checking EGR Pipe

- See "EGR Related Parts" on page 1-S39.

9Y1211012GEG0110US0

Checking Fuel Line

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

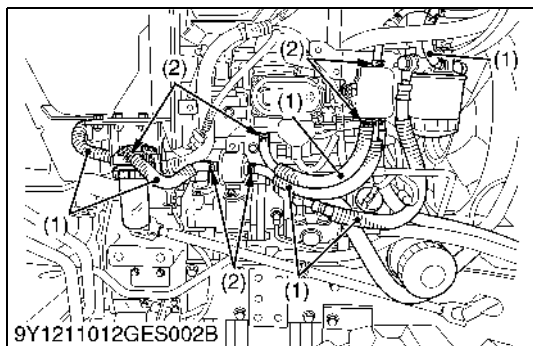
■ NOTE

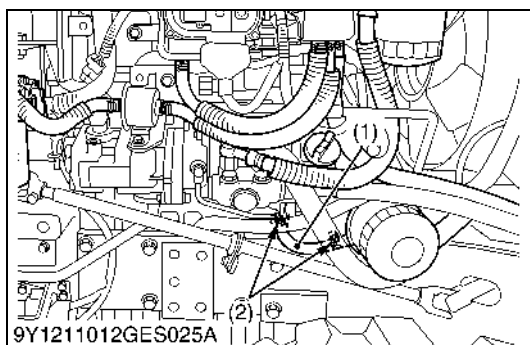
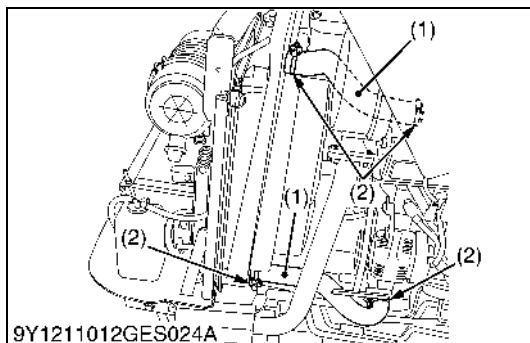
- If the fuel line is removed, be sure to properly bleed the fuel system. (See page G-46.)

(1) Fuel Lines

(2) Clamp Bands

9Y1211012GEG0079US0





Checking Radiator Hose and Clamp

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten bands securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.

Replace hoses and hose clamps every 2 years or earlier if checked and found that hoses are swollen, hardened or cracked.

■ Precaution at Overheating

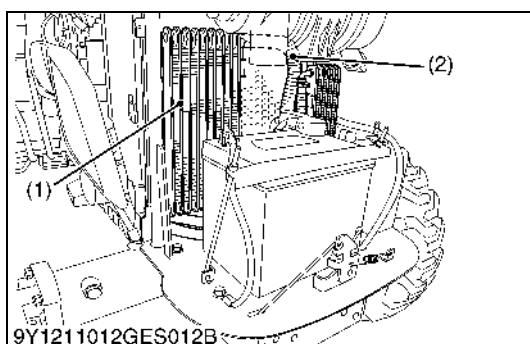
Take the following actions in the event the coolant temperature is nearly or more than the boiling point, what is called "Overheating"

1. Park the tractor in a safe place and keep the engine unloaded idling.
2. Do not stop the engine suddenly, but stop it after about 5 minutes of unloaded idling.
3. Keep yourself well away from the machine for further 10 minutes or while the steam blows out.
4. Check that there are no dangers such as burns. Get rid of the causes of overheating according to the manual, see "TROUBLESHOOTING" section, and then, start again the engine.

(1) Radiator Hoses

(2) Clamp Bands

9Y1211012GEG0086US0



Checking Oil Cooler Line

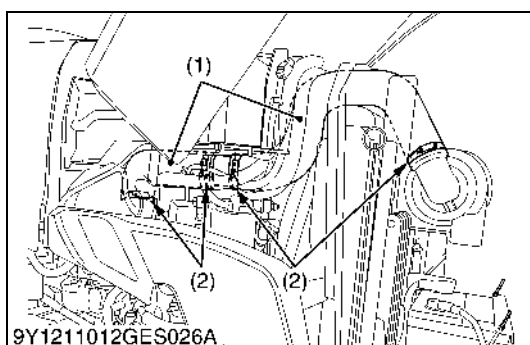
[HST Type]

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

(1) Oil Cooler

(2) Oil Cooler Line

9Y1211012GEG0087US0



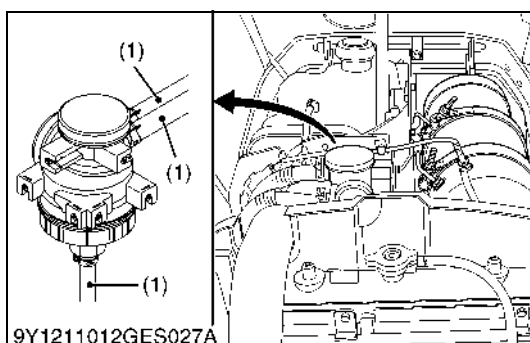
Checking Intake Air Line

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

(1) Hose

(2) Hose Clamps

9Y1211012GEG0088US0

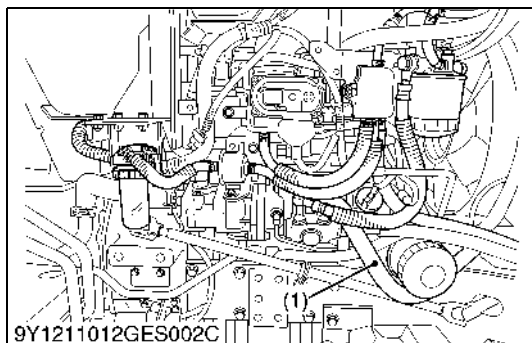


Checking Oil Separator Hose

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

(1) Oil Separator Hoses

9Y1211012GEG0089US0



Checking Power Steering Line

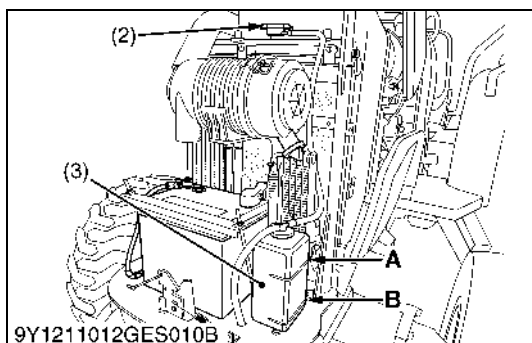
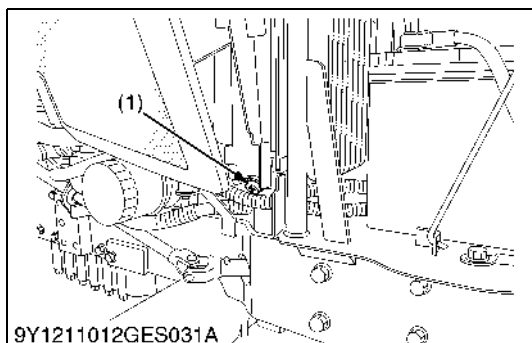
[Manual Transmission Type]

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

- (1) Power Steering Pressure Hoses

9Y1211012GEG0090US0

(12) Check Points of Every 2000 Hours or 2 Years



Flushing Cooling System and Changing Coolant



CAUTION

To avoid personal injury:

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

1. Stop the engine, remove the key and let it cool down.
2. To drain the coolant, open the radiator drain plug and remove radiator cap. The radiator cap must be removed to completely drain the coolant.
3. After all coolant is drained, reinstall the drain plug.
4. Fill with clean soft water and cooling system cleaner.
5. Follow directions of the cleaner instruction.
6. After flushing, fill with clean soft water and anti-freeze until the coolant level is just below the radiator cap. Install the radiator cap securely.
7. Fill with coolant up to the "FULL" mark of recovery tank.
8. Start and operate the engine for a few minutes.
9. Stop the engine, remove the key and let cool.
10. Check coolant level of recovery tank and add coolant if necessary.
11. Properly dispose of used coolant.

■ IMPORTANT

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

Radiator coolant	Capacity	6.0 L 6.3 U.S.qts 5.3 Imp.qts
Recovery tank coolant		0.6 L 0.6 U.S.qts 0.5 Imp.qts

- (1) Drain Plug
- (2) Radiator Cap
- (3) Recovery Tank

A: FULL
B: LOW

9Y1211012GEG0111US0

Anti-Freeze**CAUTION**

To avoid personal injury:

- When using antifreeze, put on some protection such as rubber gloves. (Antifreeze contains poison.)
- If it is swallowed, seek immediate medical help. Do NOT make a person throw up unless told to do so by poison control or a health care professional. Use standard first aid and CPR for signs of shock or cardiac arrest. Call your local Poison Control Center or your local emergency number for further assistance.
- When antifreeze comes in contact with the skin or clothing, wash it off immediately.
- Do not mix different types of antifreeze.
The mixture can produce chemical reaction causing harmful substances.
- Antifreeze is extremely flammable and explosive under certain conditions. Keep fire and children away from antifreeze.
- When draining fluids from the engine, place some container underneath the engine body.
- Do not pour waste onto the grounds, down a drain, or into any water source.
- Also, observe the relevant environmental protection regulations when disposing of antifreeze.

Always use a 50/50 mix of long-life coolant and clean soft water in KUBOTA engines.

1. Long-life coolant (hereafter LLC) comes in several types. Use ethylene glycol (EG) type for this engine.
2. Before employing LLC-mixed cooling water, fill the radiator with fresh water and empty it again.
Repeat this procedure 2 or 3 times to clean up the inside.
3. Mixing the LLC
Premix 50 % LLC with 50 % clean soft water. When mixing, stir it up well, and then fill into the radiator.
4. The procedure for the mixing of water and antifreeze differs according to the make of the antifreeze and the ambient temperature. Refer to SAE J1034 standard, more specifically also to SEA J814c.

Vol % Anti-freeze	Freezing Point		Boiling Point*	
	°C	°F	°C	°F
50	-37	-34	108	226

*At 1.013×10^5 Pa (760 mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within cooling system.

(To be continued)

(Continued)

5. Adding the LLC
 - a) Add only water if the mixture reduces in amount by evaporation
 - b) If there is a mixture leak, add the LLC of the same manufacturer and type in the same mixture percentage.
*Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
6. When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anticorrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
7. Kubota's genuine long-life coolant has a service life of 2 years. Be sure to change the coolant every 2 years.

■ NOTE

- The above data represent industry standards that necessitate a minimum glycol content in the concentrated antifreeze.

9Y1211012GEG0112US0

(13) Check Points of Every 2 Years**Replacing Fuel Grommet**

- Refer to "Checking Fuel Grommet". (See page G-30.)

9Y1211012GEG0116US0

Replacing DPF Differential Pressure Sensor Hose

- Refer to "DPF Muffler". (See page 1-S19.)

9Y1211012GEG0120US0

(14) Check points of Every 4 Years**Replacing Radiator Hose (Water pipes)**

- Replace the hoses and clamps.
Refer to "Checking Radiator Hose and Hose Clamp". (See page G-42.)

9Y1211012GEG0113US0

Replacing Power Steering Hose**[Manual Transmission Type]**

- Replace the hoses and clamps.
Refer to "Checking Oil Cooler Line". (See page G-42.)

9Y1211012GEG0114US0

Replacing Fuel Hose

- Replace the fuel hoses and clamps.
Refer to "Checking Fuel Line". (See page G-41.)

9Y1211012GEG0115US0

Replacing Oil Cooler Line**[HST Type]**

- Refer to "Checking Oil Cooler Line". (See page G-42.)

9Y1211012GEG0117US0

Replacing Intake Air Line

- Replace the intake hoses and clamps.
Refer to "Checking Intake Air Line". (See page G-42.)

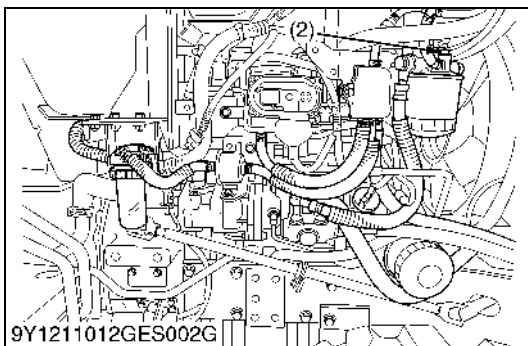
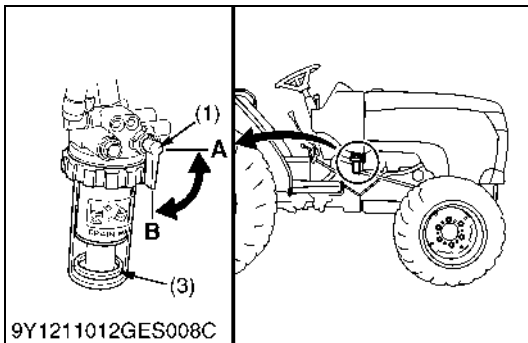
9Y1211012GEG0118US0

Replacing Oil Separator Hose

- Refer to "Checking Oil Separator Hose". (See page G-42.)

9Y1211012GEG0119US0

(15) Others



Bleeding Fuel System

Air must be removed:

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

■ Bleeding procedure is as follows:

1. Fill the fuel tank with fuel, and open the fuel valve (1).
2. Loosen the air vent plug on the fuel filter 2 turns or so.
3. Turn on the key switch and wait for about 1 minute. Then tighten up the air vent plug.
4. Set the hand throttle lever at the minimum speed position and turn the key to **"START"** position.
If the engine does not start, try it several times at 30 second intervals.

■ IMPORTANT

- Do not hold key switch at engine start position for more than 10 seconds continuously. If more engine cranking is needed, try again after 30 seconds.
5. Accelerate the engine to remove the small portion of air left in the fuel system.
 6. If air still remains and the engine stops, repeat the above steps.

(1) Fuel Valve	A: Close
(2) Air Vent Valve	B: Open

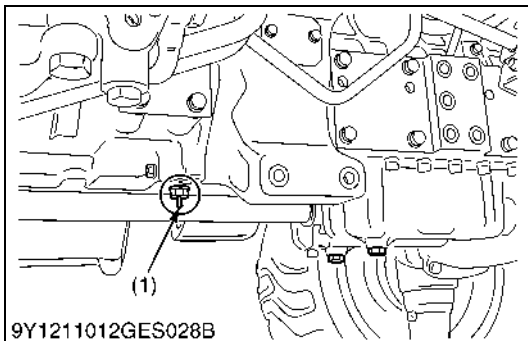
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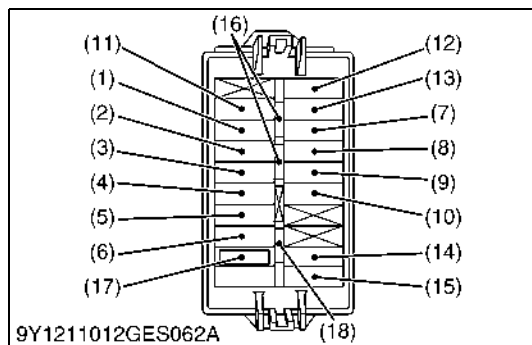
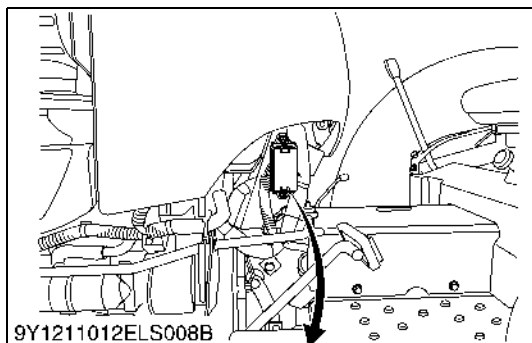
Draining Clutch Housing Water

1. The tractor is equipped with split pin plug (1) under the clutch housing.
After operating in rain, snow or tractor has been washed, water may get into the clutch housing.
Check it by pushing in the split pin plug (1).
2. If water has entered into the clutch housing, remove the split pin plug (1) and drain the water, then reinstall the plug again.

- (1) Split Pin Plug

9Y1211012GEG0122US0





Replacing Fuse

- 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.
- 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 "1. TROUBLESHOOTING" on page 9-S1.

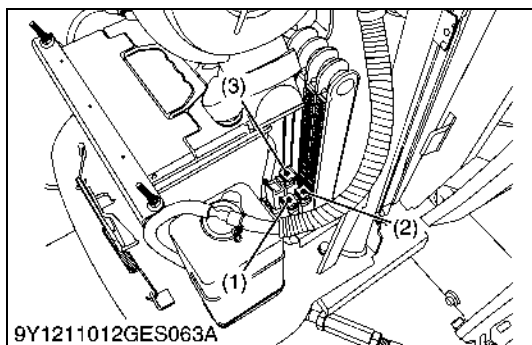
If any of them should blow, replace with a new one of the same capacity.

Fuse No.	Capacity (A)	Protected circuit
(1)	5	Engine ECU (Ignition key)
(2)	5	Main ECU (Ignition key)
(3)	5	Meter panel (Ignition key)
(4)	10	Combination switch
(5)	10	Work light
(6)	5	Starter relay
(7)	20	Engine ECU (Battery)
(8)	5	Main ECU (Battery)
(9)	5	Meter panel (Battery)
(10)	10	Hazard
(11)	5	Heater relay (if equipped)
(12)	10	Heater (Oil separator, IN 1) (if equipped)
(13)	10	Heater (Oil separator, IN 2) (if equipped)
(14)	10	Heater (Oil separator, OUT 1) (if equipped)
(15)	10	Heater (Oil separator, OUT 2) (if equipped)

(16) Spare Fuse
(17) Fuse Puller

(18) Spare fuse

9Y1211012GEG0123US0



Replacing Slow-Blow Fuses

- The slow-blow fuses are intended to protect the electrical cabling. If any of them has blown out, be sure to pinpoint the cause. Never use any substitute, use only a KUBOTA genuine part.

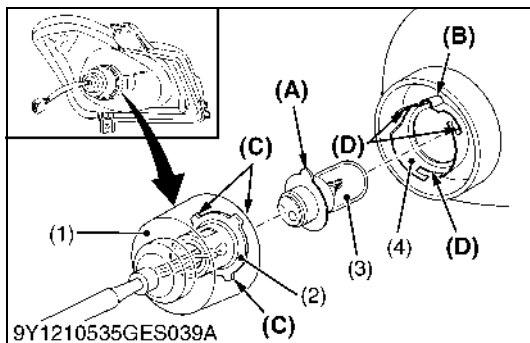
No.	Capacity (A)	Protected circuit
(1)	40	Load
(2)	50	Battery
(3)	40	Heater (Oil separator) (if equipped)

9Y1211012GEG0124US0

Replacing Light Bulb

Light	Capacity
Head lights	25 W / 25 W
Tail light	5 W
Turn signal / Hazard light (rear)	21 W
Turn signal / Hazard light (front)	23 W

9Y1211012GEG0125US0



Replacing Head Lamp



To avoid personal injury:

- Be careful not to drop the bulb, hit anything against the lamp, apply excess force, and get the lamp scratched. If broken, glass may cause injury.
- Before replacing the lamp, be sure to turn off the light and wait until the bulb cools down, otherwise, you may get burned.

■ Removing Bulb

1. Remove the rubber boot.
2. Turn the socket counterclockwise while pressing and remove it.
3. Remove the bulb.

■ Attaching Bulb

1. Align (A) of the bulb with (B) of the lamp case and attach the bulb.
2. Align (C) of the socket with (D) of the lamp case and attach the socket.
3. Attach the rubber boot.

■ IMPORTANT

- Be sure to use a new bulb of the specified wattage.
- Never touch the bulb surface (glass) with bare hands. Fingerprints, for example, may break the bulb.

(1) Rubber Boot

(2) Socket

(3) Bulb

(4) Lamp Case

(A) Align to (B)

(C) Align to (D)

9Y1211012GEG0126US0

Replacing Radiator Hose (Water pipes)

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking Radiator Hose and Hose Clamp". (See page G-42.)

9Y1211012GEG0199US0

Replacing Fuel Lines

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking Fuel Line". (See page G-41.)

9Y1211012GEG0200US0

Replacing Intake Air Line

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking Intake Air Line". (See page G-42.)

9Y1211012GEG0201US0

Replacing Power Steering Hose

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking HST Oil Line and Power Steering Oil Line". (See page G-42.)

9Y1211012GEG0202US0

Replacing Oil Cooler Line

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking HST Oil Line and Power Steering Line". (See page G-42.)

9Y1211012GEG0203US0

Replacing Oil Separator Hose

- Replace if any deterioration (crack, hardening, scar or deformation) or damage occurred. (See page G-42.)

9Y1211012GEG0204US0

[2] L4701

CAUTION

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

9Y1211012GEG0054US0

(1) Daily Check

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

CAUTION

To avoid personal injury:

Take the following precautions when checking the tractor.

- Park the machine on firm and level ground.
- Set the parking brake.
- Lower the implement to the ground.
- All residual pressure of the hydraulic system released.
- Stop the engine and remove the key.

9Y1211012GEG0055US0

Walk Around Inspection

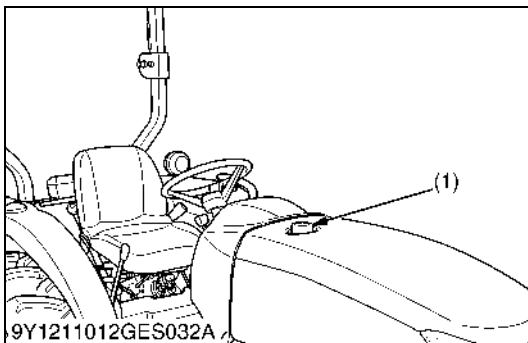
Look around and under the tractor for such items as loose bolts, trash build-up, oil or coolant leaks, broken or worn parts.

9Y1211012GEG0056US0

Checking and Refueling

CAUTION

- Do not smoke while refueling.
 - Be sure to stop the engine before refueling.
1. Turn the key switch to "ON", check the amount of fuel by fuel gauge.
 2. Fill fuel tank when fuel gauge shows 1/4 or less fuel in tank.



9Y1211012GES032A

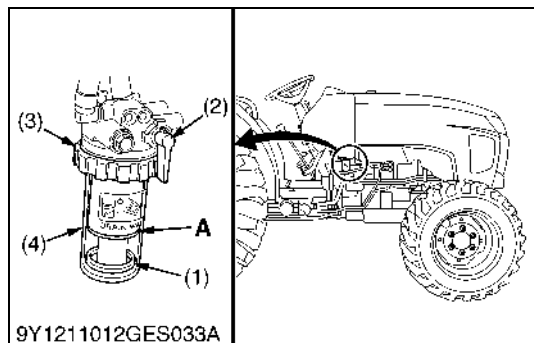
Fuel tank	Capacity	51 L 13.5 U.S.gals 11.2 Imp.gals

■ IMPORTANT

- Do not permit dirt or trash to get into the fuel system.
- Be careful not to let the fuel tank become empty, otherwise air will enter the fuel system, necessitating bleeding before next engine start.
- Be careful not to spill during refueling. If a spill should occur, wipe it off at once, or it may cause a fire.
- To prevent condensation (water) accumulation in the fuel tank, fill the tank before parking overnight.

(1) Fuel Tank Cap

9Y1211012GEG0127US0



Checking Water Separator

1. As water is collected in the water separator, the red float is raised.
2. When the red float has reached the white line, close the fuel valve, loosen the retainer ring, take out the cup, and clean the cup. Be careful not to break the element.
3. Place the cup back into position. Bleed the fuel system.

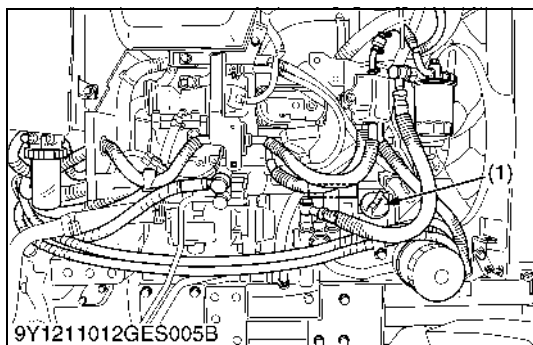
■ IMPORTANT

- If water is drawn through to the fuel pump, extensive damage will occur.

- (1) Red Float
- (2) Fuel Valve
- (3) Retainer Ring
- (4) Cup

A: White Line

9Y1211012GEG0128US0



Checking Engine Oil Level



CAUTION

- Be sure to stop the engine before checking the oil level.

1. Park the machine on a flat surface.
2. Check engine oil before starting the engine or 5 minutes or more after the engine has stopped.
3. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the 2 notches. If the level is too low, add new oil to the prescribed level at the oil inlet.

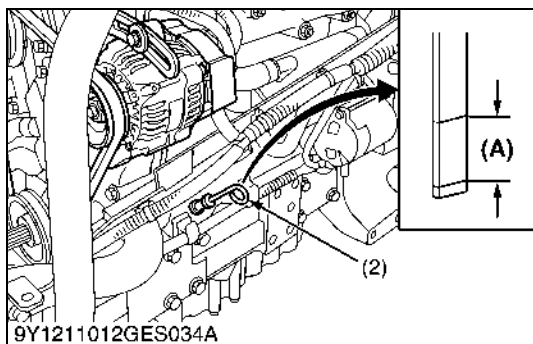
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.)

■ IMPORTANT

- When using an oil of different maker or viscosity from the previous one, remove all of the old oil. Never mix two different types of oil.
- If oil level is low, do not run engine.

■ NOTE

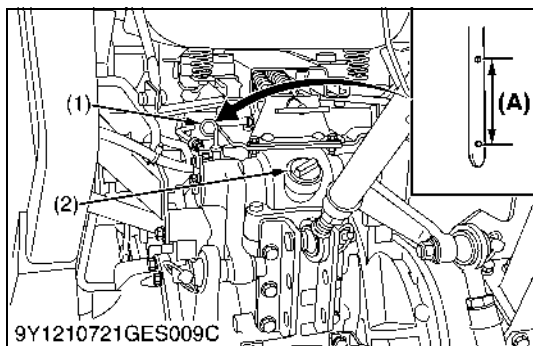
- At times a small amount of fuel, which is used to regenerate the DPF, may get mixed with the engine oil and the engine oil may increase in volume.



- (1) Oil Inlet
- (2) Dipstick

(A) Oil level is acceptable within this range.

9Y1211012GEG0129US0



Checking Transmission Fluid Level

1. Park the machine on a flat surface, lower the implement and shut off engine.
 2. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the 2 notches. If the level is too low, add new oil to the prescribed level at the oil inlet.
- (Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.)

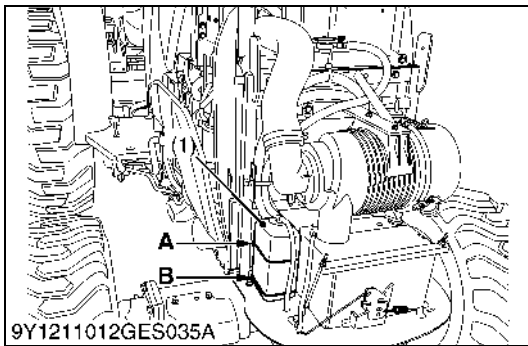
■ IMPORTANT

- If oil level is low, do not run engine.

- (1) Dipstick
- (2) Oil Inlet

(A) Oil level is acceptable within this range.

9Y1211012GEG0130US0



Checking Coolant Level

⚠ CAUTION

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

- Check to see that the coolant level is between the "FULL" and "LOW" marks of recovery tank.
- When the coolant level drops due to evaporation, add soft water only up to the full level. In case of leakage, add anti-freeze and soft water in the specified mixing ratio up to the full level. (Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.)
- When the coolant level is lower than "LOW" mark of recovery tank, remove the radiator cap and check to see that the coolant level is just below the port. If level is low, add coolant.

■ IMPORTANT

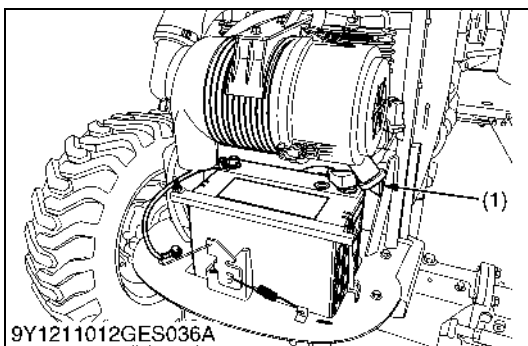
- If the radiator cap has to be removed, follow the caution above and securely retighten the cap.
- Use clean, fresh soft water and anti-freeze to fill the radiator.

(1) Recovery Tank

A: Full

B: Low

9Y1211012GEG0131US0

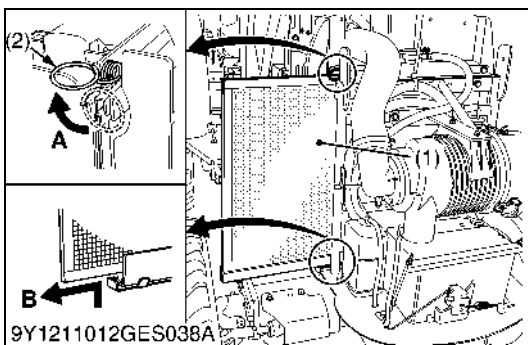


Cleaning Evacuator Valve

- Open the evacuator valve to get rid of large particles of dust and dirt.

(1) Evacuator Valve

9Y1211012GEG0132US0



Cleaning Grill and Radiator Screen

⚠ CAUTION

- Be sure to stop the engine before removing the screen.
- Before checking or cleaning the radiator screen, stop the engine and wait long enough until it is cooled down.

- Check front grill and side screens to be sure they are clean of debris.
- Detach the screen with the fixed spring being held up and remove all foreign materials and clean the front of radiator completely.

■ IMPORTANT

- Grill and screen must be clean from debris to prevent engine from overheating and to allow good air intake for the air cleaner.

(1) Radiator Screen

A: Hold Up

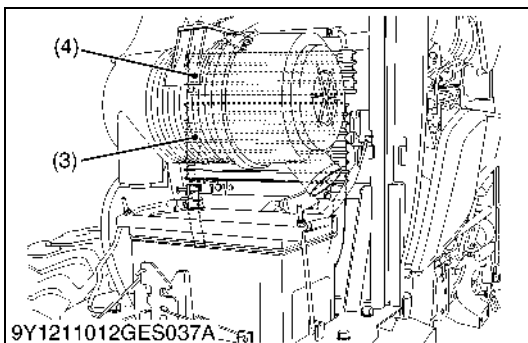
(2) Fixed Spring

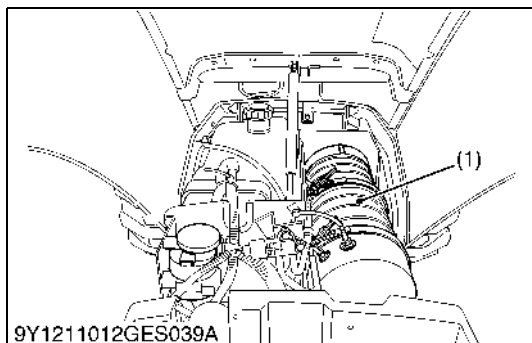
B: Detach

(3) Oil Cooler [HST Type]

(4) Fuel Cooler

9Y1211012GEG0133US0





9Y1211012GES039A

Checking DPF Muffler

⚠ CAUTION

- Before checking or cleaning the DPF muffler, stop the engine and wait long enough until it is cooled down.
1. Check the DPF muffler and its surroundings for build-up of anything flammable. Otherwise a fire may result.

(1) DPF Muffler

9Y1211012GEG0134US0

Checking Brake Pedal

[HST Type]

⚠ CAUTION

- Be sure brake pedals have equal adjustment when using locked together. Incorrect or unequal brake pedal adjustment can cause the tractor to swerve or roll-over.
1. Inspect the brake pedals for free travel, and smooth operation.
 2. Adjust if incorrect measurement is found. (See page G-59.)

9Y1211012GEG0135US0

Checking Brake Pedals and Clutch Pedal

[Manual Transmission Type]

⚠ CAUTION

- Be sure brake pedals have equal adjustment when using locked together. Incorrect or unequal brake pedal adjustment can cause the tractor to swerve or roll-over.
1. Inspect the brake and clutch pedals for free travel, and smooth operation.
 2. Adjust if incorrect measurement is found. (See "Adjusting Clutch Pedal" on page G-59 or "Adjusting Brake Pedal" on page G-59.)

9Y1211012GEG0136US0

Checking Gauges, Meter and Easy Checker™

1. Inspect the instrument panel for broken gauge(s), meter(s) and Easy Checker™ lamps.
2. Replace if broken.

9Y1211012GEG0137US0

Checking Head Light, Turn Signal / Hazard Light etc.

1. Inspect the lights for broken bulbs and lenses.
2. Replace if broken.

9Y1211012GEG0138US0

Checking Seat Belt and ROPS

1. Always check condition of seat belt and ROPS attaching hardware before operating tractor.
2. Replace if damaged.

9Y1211012GEG0139US0

Checking and Cleaning of Electrical Wiring and Battery Cables



CAUTION

- A loosened terminal or connector, or damaged wire may affect the performance of electrical components or cause short circuits. Leakage of electricity could result in a fire hazard, a dead battery or damage to electrical components.
- Replace damaged wires or connections promptly.
- If a fuse blows soon after replacement, **DO NOT USE A LARGER THAN RECOMMENDED FUSE OR BYPASS THE FUSE SYSTEM.**
- Many wiring connections are protected by waterproof plugs, plug and unplug these connections carefully and make sure they are sealed correctly after assembly.
- Accumulation of dust, chaff and spilled fuel deposits around the battery, electrical wiring, engine or exhaust system are fire hazards. **CLEAN THESE AREAS BEFORE STARTING WORK.**

To avoid premature electrical malfunctions **DO NOT APPLY** high pressure water directly to battery, wiring, connectors, electrical components or instrument panel.

Inspect the following regularly:

1. Check wiring for chafed or cracked insulation.
2. Check wiring harness clamps. Replace if necessary.
3. Check connectors and terminals for looseness, contamination or overheated (discolored) connections.
4. Check instrument panel for correct operation of switches and gauges.

9Y1211012GEG0140US0

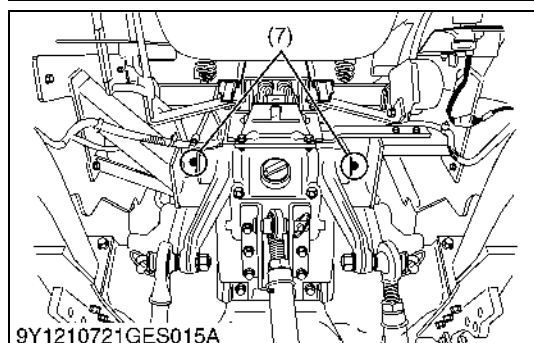
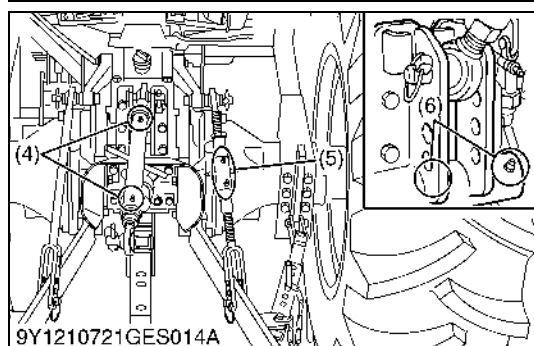
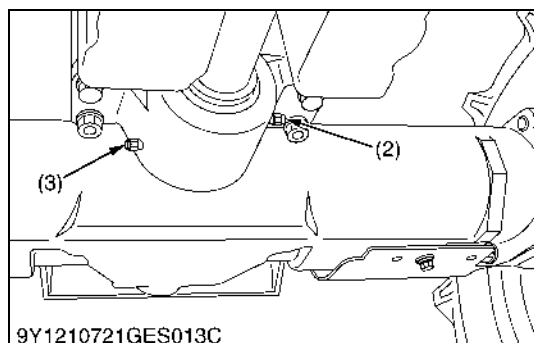
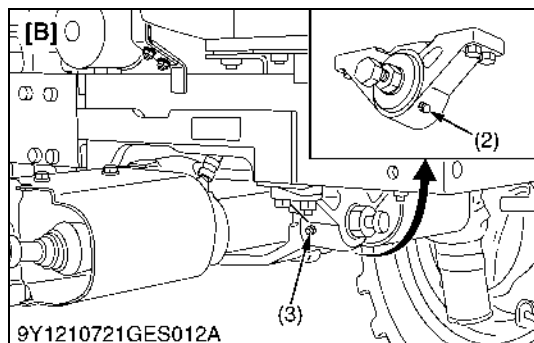
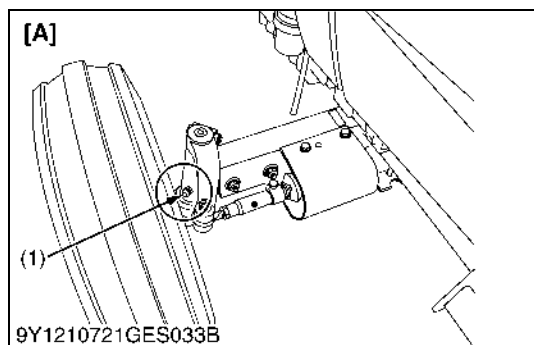
Checking Movable Parts

If any of the movable parts, such as levers and pedals, is not smoothly moved because of rust or sticky material, do not attempt to force it into motion.

In the above case, remove the rust or the sticky material, and apply oil or grease on the relevant spot. Otherwise, the machine may get damaged.

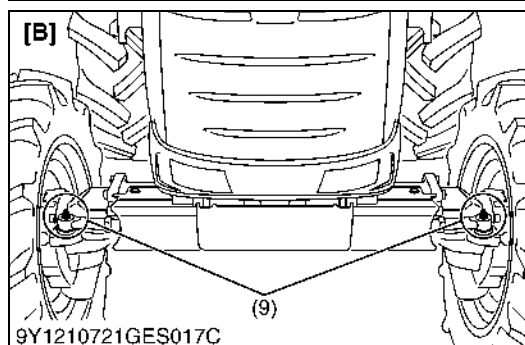
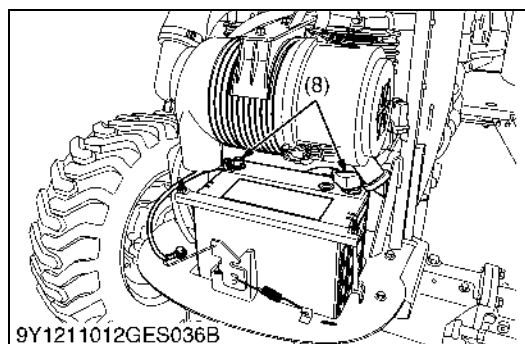
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(2) Check Points of Every 50 Hours



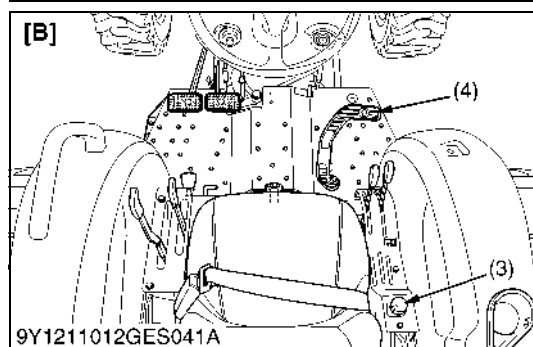
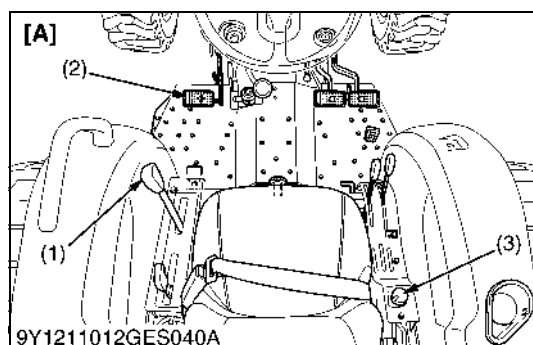
Lubricating Grease Fittings

1. Apply a small amount of multipurpose grease to the following points every 50 hours:
If you operated the machine in extremely wet and muddy conditions, lubricate grease fittings more often.
2. When apply grease to forward front axle support, remove the breather plug and apply grease until grease overflows from breather plug port.



(1) Grease Fitting (Knuckle Shaft) [RH, LH]	(7) Grease fitting (Hydraulic arm axle)
(2) Grease Fitting (Front axle support)	(8) Battery terminals
(3) Breather	(9) Grease fitting (Tie-rod ends)
(4) Grease Fitting (Top Link)	[A] 2WD
(5) Grease Fitting (Lifting Rod) [RH]	[B] 4WD
(6) Grease Fitting (Top link bracket) (with draft control) (if equipped)	

9Y1211012GEG0142US0



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 control levers in the "NEUTRAL" position.
2. Set the parking brake and stop the engine.

[Manual Transmission Type]

■ Test: Switch for the shuttle shift lever.

1. Sit on the 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 switch or lever.
5. Turn the key to "START" position.
6. The engine must not crank.

■ Test: Switch for the PTO clutch control switch or lever.

1. Sit on the operator's seat.
2. Engage the PTO clutch control switch or lever.
3. Depress the clutch pedal fully.
4. Shift the shuttle shift lever to the neutral position.
5. Turn the key to "START" position.
6. The engine must not crank.

[HST Type]

■ Test: Switch for the speed control pedal.

1. Sit on the operator's seat.
2. Depress the speed control pedal to the desired direction.
3. Disengage the PTO clutch control switch or lever.
4. Turn the key to "START" position.
5. The engine must not crank.

■ Test: Switch for the PTO clutch control switch or lever.

1. Sit on the operator's seat.
2. Engage the PTO clutch control switch or lever.
3. Place the speed control pedal in neutral position.
4. Turn the key to "START" position.
5. The engine must not crank.

(1) Shuttle Shift Lever

(2) Clutch Pedal

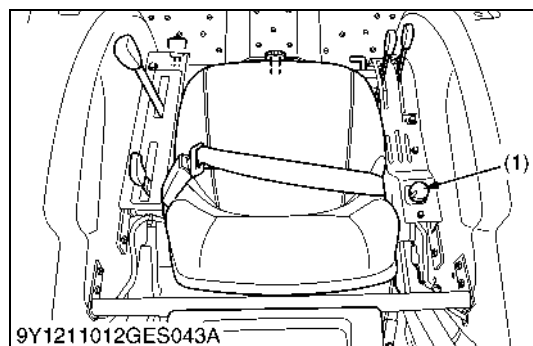
(3) PTO Clutch Control Switch

(4) Speed Control Pedal

[A] Manual Transmission Type

[B] HST Type

9Y1211012GEG0143US0



Checking Operator Presence Control

⚠ 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

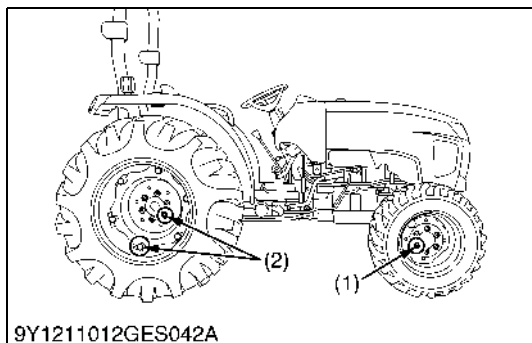
1. Place all control levers in the "NEUTRAL" position.
2. Set the parking brake and stop the engine.

■ Test: Switch for the operator's seat.

1. Sit on the operator's seat.
2. Start the engine.
3. Engage the PTO clutch control switch or lever.
4. Stand up. (Do not get off the machine.)
5. The engine must shut off after approximately 1 second.

(1) PTO clutch control switch

9Y1211012GEG0144US0



Checking Wheel Bolt Torque

CAUTION

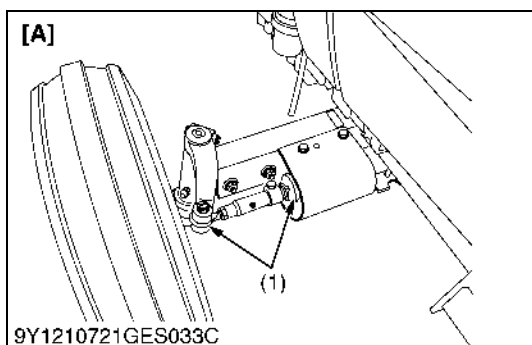
- Never operate tractor with a loose rim, wheel, or axle.
 - Any time bolts and nuts are loosened, retighten to specified torque.
 - Check all bolts and nuts frequently and keep them tight.
1. Check wheel bolts and nuts regularly especially when new. If they are loose, tighten them as follows.

Tightening torque	Front Wheel Mounting Nut	124.0 to 147.0 N·m 12.6 to 15.0 kgf·m 91.5 to 108.4 lbf·ft
	Rear Wheel Mounting Screw and Nut	196.0 to 225.0 N·m 20.0 to 23.0 kgf·m 144.6 to 166.0 lbf·ft

(1) Front Wheel Mounting Nut

(2) Rear Wheel Mounting Screw and Nut

9Y1211012GEG0145US0



Checking Tie-rod Dust Cover

1. Check to see that dust covers are not damaged.

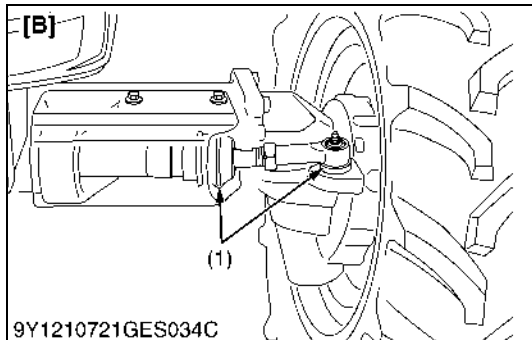
IMPORTANT

- If dust covers are cracked, water and dust invade into tie-rod and it will be early wear.

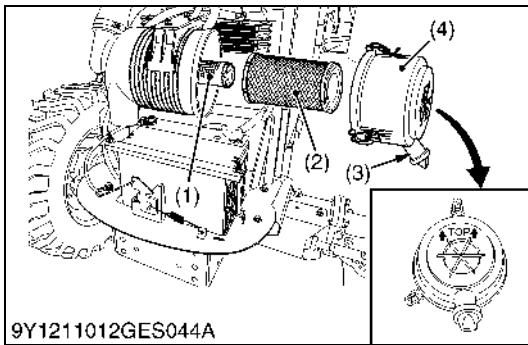
(1) Dust Cover

[A] 2WD
[B] 4WD

9Y1211012GEG0146US0



(3) Check Points of Every 100 Hours



Cleaning Air Cleaner Primary Element

1. Remove the air cleaner cover and primary element.
2. Clean the primary element:
 - When dry dust adheres to the element, blow compressed air from the inside, turning the element. Pressure of compressed air must be under 205 kPa (2.1 kgf/cm², 30 psi).
 - When carbon or oil adheres to the element, soak the element in detergent for 15 minutes then wash it several times in water, rinse with clean water and dry it naturally. After element is fully dried, inspect inside of the element with a light and check if it is damaged or not
3. Replace air cleaner primary element:
Once yearly or after every sixth cleaning, whichever comes first.

■ NOTE

- Check to see if the evacuator valve is blocked with dust.

■ IMPORTANT

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

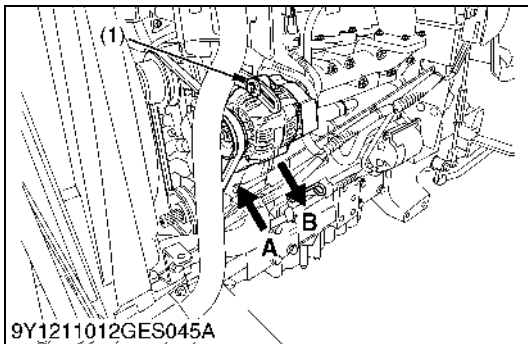
(See "Replacing Air Cleaner Secondary Element" in "Check Points of Every 1 year" on page G-68.)

■ Evacuator Valve

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

(1) Secondary (Safety) Element	(3) Evacuator Valve
(2) Primary Element	(4) Cover

9Y1211012GEG0147US0



Adjusting Fan Belt Tension



CAUTION

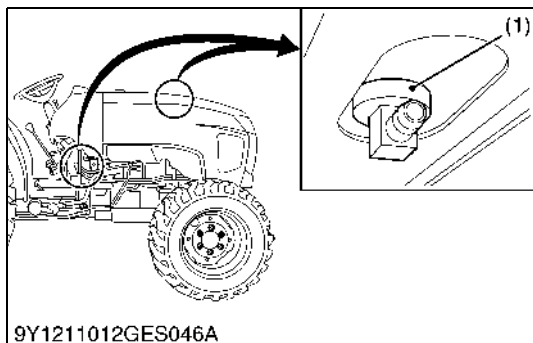
- Be sure to stop the engine before checking belt tension.
1. Stop the engine and remove the key.
 2. Apply moderate thumb pressure to belt between pulleys.
 3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the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

Fan belt tension	Factory specification	A deflection is 12 mm (0.48 in.) when the belt is pressed 68.6 N (7 kgf, 15.4 lbf) in the middle of the span.

- (1) Bolt

A: Check the belt tension
B: To tighten

9Y1211012GEG0148US0

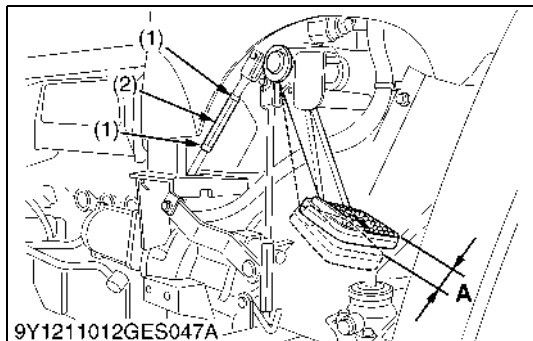


Checking Fuel Grommet

1. Check the grommets for cracks and fuel leak.
2. If any of such problems is found, replace the grommet(s) with new one(s).

(1) Fuel Grommet

9Y1211012GEG0150US0



Adjusting Clutch Pedal

[Manual Transmission Type]

■ Adjusting procedure

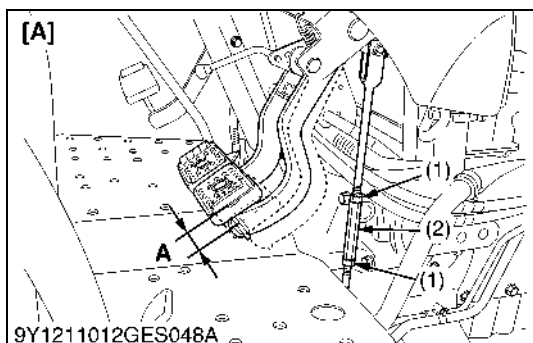
1. Stop the engine and remove the key.
2. Slightly depress the clutch pedal and measure free travel at the top of pedal stroke.
3. If adjustment is needed, loosen the lock nut and turn the turnbuckle to adjust the rod length within acceptable limits.
4. Retighten the lock nut.

Clutch pedal free travel "A"	Factory specification	20 to 30 mm (0.8 to 1.2 in.) on the pedal

- (1) Lock Nut
(2) Turnbuckle

A: Free Travel

9Y1211012GEG0151US0



Adjusting Brake Pedal



CAUTION

- Stop the engine and chock the wheels before checking brake pedal.
1. Release the parking brake.
 2. Slightly depress the brake pedals and measure free travel at top of pedal stroke.
 3. If adjustment is needed, loosen the lock nut and turn the turnbuckle to adjust the rod length within acceptable limits.
 4. Retighten the lock nut.

Brake pedal free travel "A"	Factory specification	15 to 20 mm (0.6 to 0.8 in.) on the pedal
		Keep the free travel in the right and left brake pedals equal.

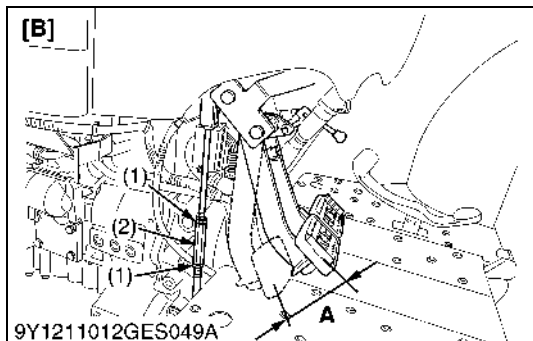
- (1) Lock Nut
(2) Brake Rod

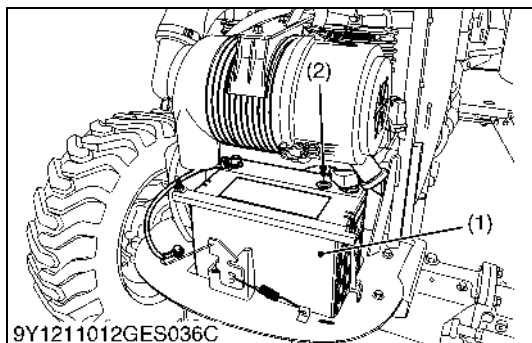
[A] Manual Transmission Type

[B] HST Type

A: Free Travel

9Y1211012GEG0152US0





Checking Battery Condition

⚠ DANGER

To avoid the possibility of battery explosion:

For the refillable type battery, follow the instructions below.

- Do not use or charge the refillable type battery if the fluid level is below the **LOWER** (lower limit level) mark. Otherwise, the battery component parts may prematurely deteriorate, which may shorten the battery's service life or cause an explosion. Check the fluid level regularly and add distilled water as required so that the fluid level is between the **UPPER** and **LOWER** levels.

⚠ CAUTION

- Never remove the battery cap while the engine is running.
- Keep electrolyte away from eyes, hands and clothes. If you are spattered with it, wash it away completely with water immediately and get medical attention.
- Keep open sparks and flames away from the battery at all times. Hydrogen gas mixed with oxygen becomes very explosive.
- Wear eye protection and rubber gloves when working around battery.

■ NOTE

- The factory-installed battery is of non-refillable type. If the indicator turns white, do not charge the battery but replace it with new one.
- Mishandling the battery shortens the service life and adds to maintenance costs.
- The original battery is maintenance free, but needs some servicing.

If the battery is weak, the engine will be difficult to start and the lights will be dim. It is important to check the battery periodically.

■ How to read the indicator

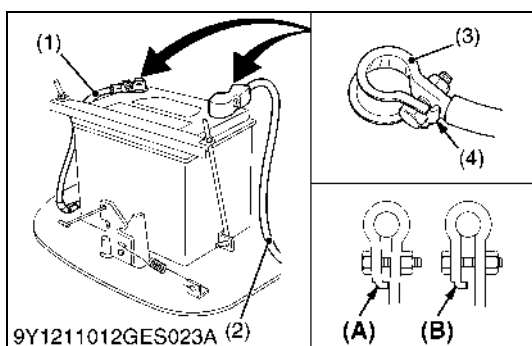
Check the battery condition by reading the indicator.

State of indicator display	
Green	Specific gravity of electrolyte and quality of electrolyte are both in good condition.
Black	Needs charging battery.
White	Needs replacing battery.

(1) Battery

(2) Indicator

9Y1211012GEG0153US0



Battery Cable Connections

1. Be sure to wire the battery cable as shown in the figure.
2. Tighten the terminal until the stopper comes in contact.

(1) Negative Cable

(A) **Correct**

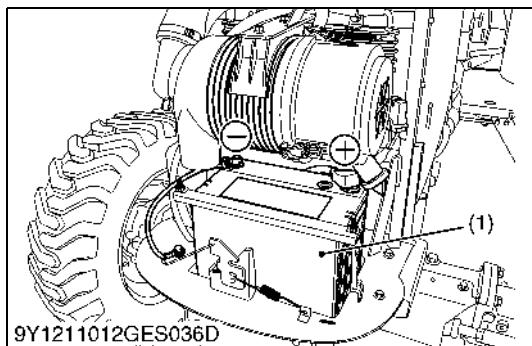
(2) Positive Cable

(B) **Incorrect**

(3) Terminal

(4) Stopper

9Y1211012GEG0057US0



Battery Charging

⚠ CAUTION

- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.
- When charging the battery, ensure the vent caps are securely in place. (if equipped)
- When disconnecting the cable from the battery, start with the negative terminal first.
When connecting the cable to the battery, start with the positive terminal first.
- **Never check battery charge by placing a metal object across the posts.**

Use a voltmeter or hydrometer.

1. To slow charge the battery, connect the battery positive terminal to the charger positive terminal and the negative to the negative, then recharge in the standard fashion.
2. A boost charge is only for emergencies. It will partially charge the battery at a high rate and in a short time.
When using a boost-charged battery, it is necessary to recharge the battery as early as possible.
Failure to do this will shorten the battery's service life.
3. The battery is charged if the indicator display turns green from black.
4. When exchanging an old battery for a new one, use battery of equal specification shown in table 1.

Table 1

Battery Type	Volt (V)	Reserve capacity (min.)	Cold Cranking Ampere (SAE) (A)	Normal Charging Rate (A)
80D26R	12	120	600	7.5

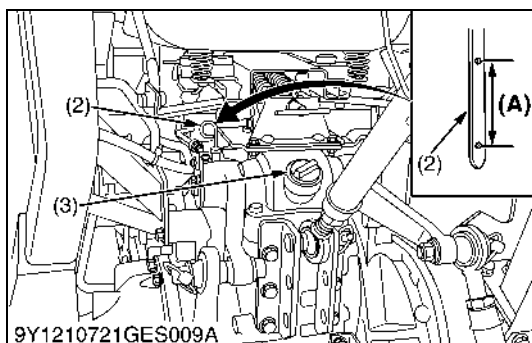
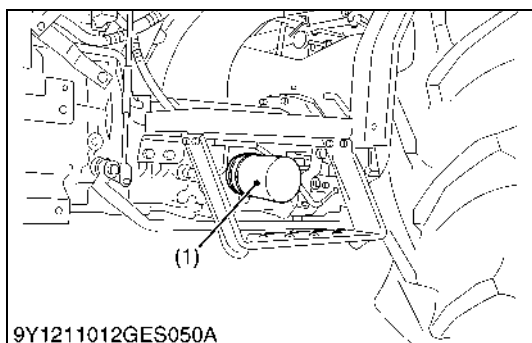
■ Direction for Storage

1. When storing the tractor for long periods of time, remove the battery from tractor, adjust the electrolyte to the proper level and store in a dry place out of direct sunlight.
2. The battery self-discharges while it is stored.
Recharge it once every 3 months in hot seasons and once every 6 months in cold seasons.

(1) Battery

9Y1211012GEG0154US0

(4) Check Points of Every 200 Hours



Replacing Transmission Oil Filter [HST Type]



CAUTION

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and can burn.

1. Place the oil pan underneath the transmission oil filter and remove the filter.
Do not remove the hydraulic oil filter. Otherwise, the oil comes out.
2. Put a film of clean transmission oil on the rubber seal of the new filter.
3. Quickly tighten the filter until it contacts the mounting surface, then, with a filter wrench, tighten it an additional 1 turn only.
4. After the new filter has been replaced, fill the transmission oil up to the upper notch on the dipstick.
5. After running the engine for a few minutes, stop the engine and check the oil level again, add oil to the prescribed level.
6. Make sure that the transmission fluid does not leak past the seal on the filter.

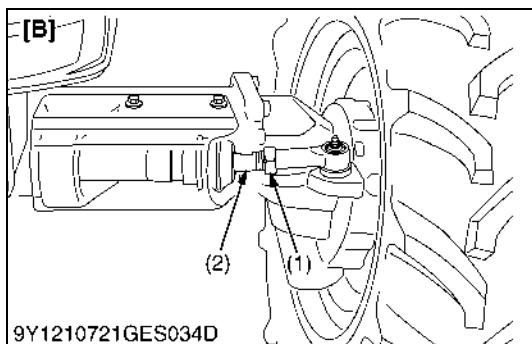
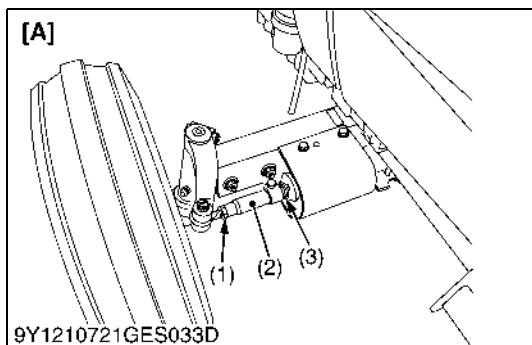
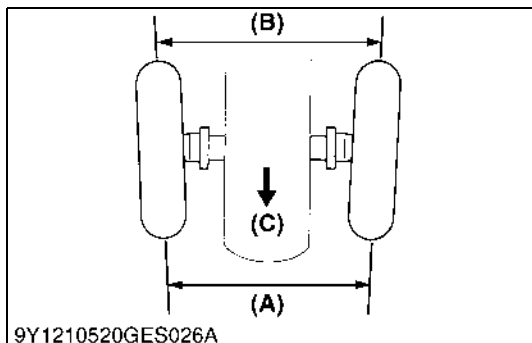
■ IMPORTANT

- To prevent serious damage to the hydraulic system, use only a KUBOTA genuine filter.
- Do not operate the tractor immediately after changing the transmission fluid.

Run the engine at medium speed for a few minutes to prevent damage to the transmission.

- (1) Transmission Oil Filter [HST Type] (A) Oil level is acceptable within this range.
 (2) Dipstick
 (3) Oil Inlet

9Y1211012GEG0155US0



Adjusting Toe-in

1. Park tractor on a flat place.
2. Turn steering wheel so front wheels are in the straight ahead position.
3. Lower the implement, lock the park brake and stop the engine.
4. Measure distance between tire beads at front of tire, at hub height.
5. Measure distance between tire beads at rear of tire, at hub height.
6. Front distance should be shorter than rear distance. If not, adjust tie rod length.

Toe-in ((B) - (A))	Factory specification	2 to 8 mm 0.08 to 0.31 in.

■ Adjusting procedures [2WD]

1. Detach the snap ring.
2. Loosen the tie-rod nut.
3. Turn the tie-rod joint to adjust the rod length until the proper toe-in measurement is obtained.
4. Retighten the tie-rod nut.
5. Attach the snap ring of the tie-rod joint.

■ Adjusting procedures [4WD]

1. Loosen the tie-rod nut.
2. Turn the tie-rod joint to adjust the rod length until the proper toe-in measurement is obtained.
3. Retighten the tie-rod nut.

Tightening torque	Tie-rod nut	2WD	83.3 to 88.2 N·m 8.5 to 9.0 kgf·m 61.4 to 65 lbf·ft
		4WD	167 to 196 N·m 17 to 20 kgf·m 123.2 to 144.6 lbf·ft

- (1) Tie-rod nut
(2) Tie-rod joint
(3) Snap ring

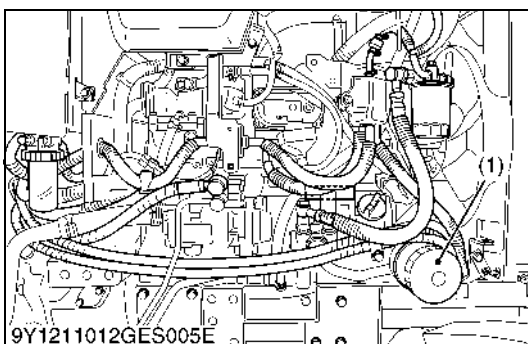
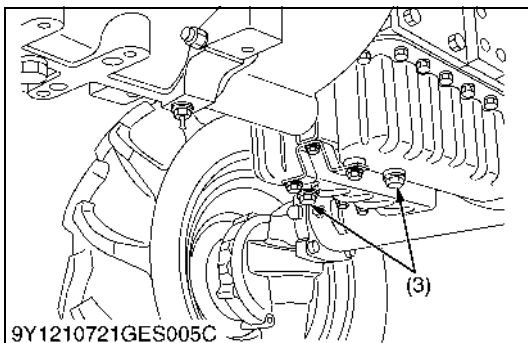
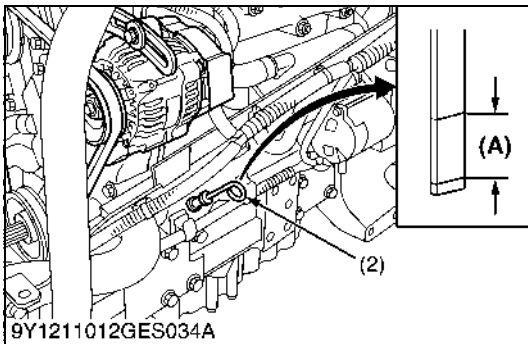
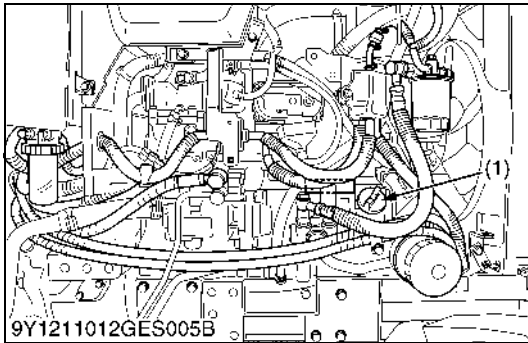
- (A) Wheel to wheel distance at front
(B) Wheel to wheel distance at rear
(C) Front

[A] 2WD

[B] 4WD

9Y1211012GEG0161US0

(5) Check Points of Every 400 Hours



Changing Engine Oil



CAUTION

- Be sure to stop the engine before changing the oil.
 - Allow engine to cool down sufficiently, oil can be hot and can burn.
1. To drain the used oil, remove the drain plug at the bottom of the engine and drain the oil completely into the oil pan.
All the used oil can be drained out easily when the engine is still warm.
 2. After draining reinstall the drain plug.
 3. Fill with the new oil up to the upper notch on the dipstick.
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.)

Engine oil with filter	Capacity	8.2 L 8.7 U.S.qts 7.2 Imp.qts

■ IMPORTANT

- Use DPF-compatible oil (CJ-4) for the engine.

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

(A) Oil level is acceptable within this range.

9Y1211012GEG0162US0

Replacing Engine Oil Filter



CAUTION

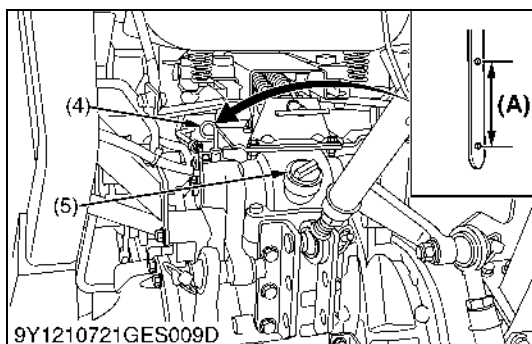
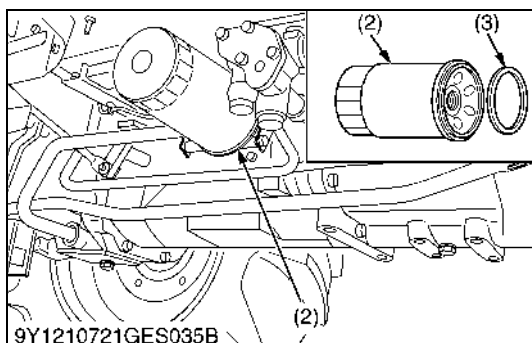
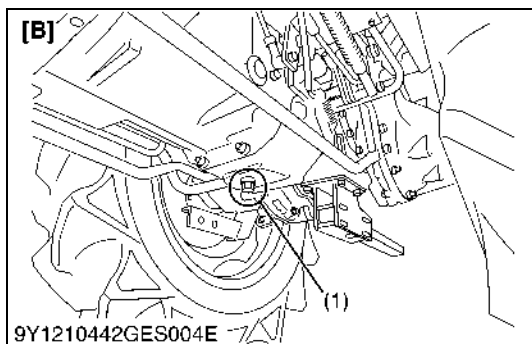
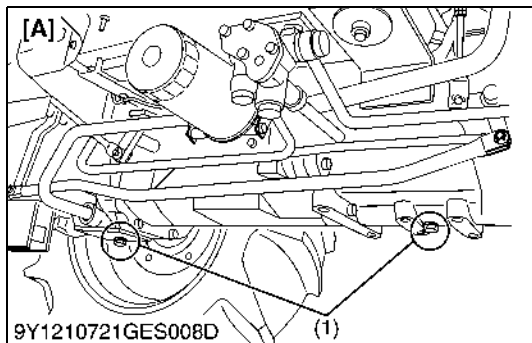
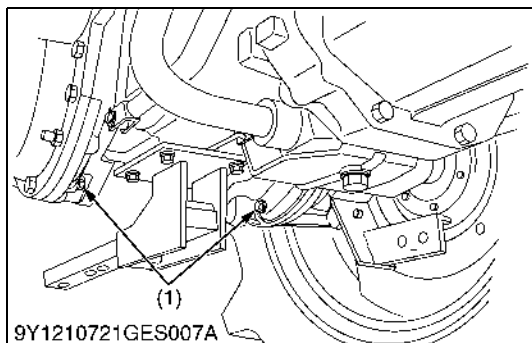
- Be sure to stop the engine before changing the oil filter cartridge.
 - Allow engine to cool down sufficiently, oil can be hot and can burn.
1. Remove the oil filter.
 2. Put a film of clean engine oil on the rubber seal of the new filter.
 3. Tighten the filter quickly until it contacts the mounting surface.
Tighten filter by hand an additional 1/2 turn only
 4. After the new filter has been replaced, the engine oil normally decreases a little. Make sure that the engine oil does not leak through the seal and be sure to check the oil level on the dipstick. Then, replenish the engine oil up to the prescribed level.

■ IMPORTANT

- To prevent serious damage to the engine, use only a KUBOTA genuine filter.

- (1) Engine Oil Filter

9Y1211012GEG0163US0



Changing Transmission Fluid / Replacing Hydraulic Oil Filter

■ Cleaning Magnetic Filter

⚠ CAUTION

- Be sure to stop the engine before changing the oil filter cartridge.
 - Allow engine to cool down sufficiently, oil can be hot and can burn.
1. Remove the drain plugs at the bottom of the transmission case and drain the oil completely into the oil pan.
 2. After draining reinstall the drain plugs.
 3. Remove the oil filter.
 4. Wipe off metal filings from the magnetic filter with a clean rag.
 5. Put a film of clean transmission oil on the rubber seal of the new filter.
 6. Quickly tighten the filter until it contacts the mounting surface, then tighten it by hand an additional 1/2 turn only.
 7. Fill with the new KUBOTA SUPER UDT fluid up to the upper notch on the dipstick. (Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.)
 8. After running the engine for a few minutes, stop the engine and check the oil level again, add oil to the prescribed level.
 9. Make sure that the transmission fluid does not leak past the seal on the filter.

■ IMPORTANT

- To prevent serious damage to the hydraulic system, use only a KUBOTA genuine filter.
 - Do not operate the tractor immediately after changing the transmission fluid.
- Run the engine at medium speed for a few minutes to prevent damage to the transmission.

Transmission oil	Capacity	40.0 L 10.6 U.S.gals 8.80 Imp.gals

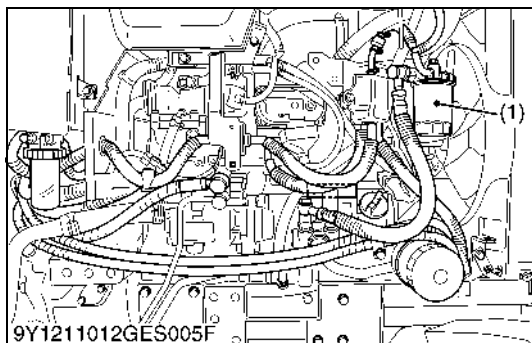
- (1) Drain Plug
- (2) Hydraulic Oil Filter
- (3) Magnetic Filter
(Wipe Off Metal Filings)
- (4) Dipstick
- (5) Oil Inlet

[A] Manual Transmission Type

[B] HST Type

(A) Oil level is acceptable within this range.

9Y1211012GEG0164US0

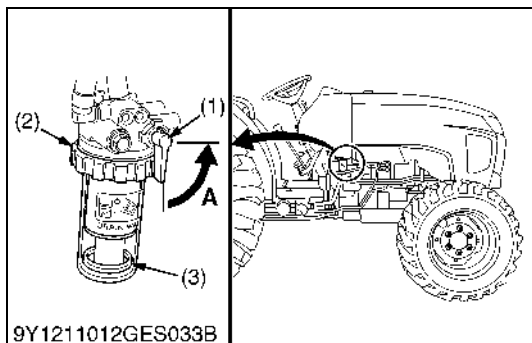


Replacing Fuel Filter

1. Remove the fuel filter.
2. Put a film of clean fuel on rubber seal of new filter.
3. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
4. Bleed the fuel system. (See "Bleeding Fuel System" on page G-74.)

(1) Fuel Filter

9Y1211012GEG0166US0



Cleaning Water Separator

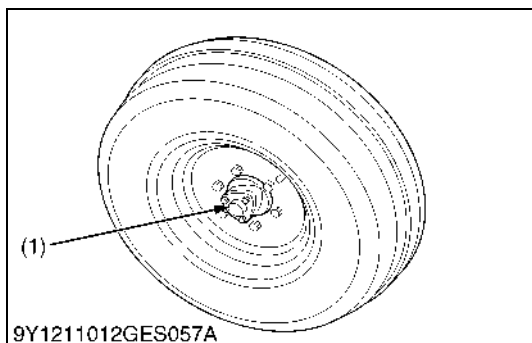
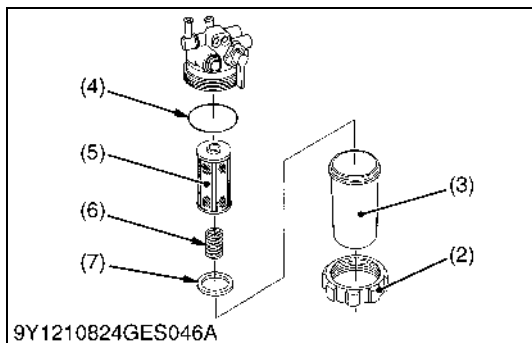
This job should not be done in the field, but in a clean place.

1. Close the fuel valve.
2. Unscrew the retainer ring and remove the cup, and rinse the inside with kerosene.
3. Take out the element and dip it in the kerosene to rinse.
4. After cleaning, reassemble the water separator, keeping out dust and dirt.
5. Bleed the fuel system. (See "Bleeding Fuel System" on page G-74.)

- (1) Fuel Valve
- (2) Retainer Ring
- (3) Cup
- (4) O-ring
- (5) Element
- (6) Spring
- (7) Red Float

A: Close

9Y1211012GEG0167US0



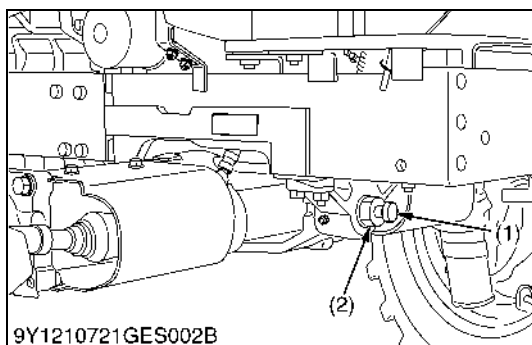
Lubricating Grease Fitting [2WD Model]

Detach the cover, and apply bearing grease.

- (1) Front Wheel Hub Cover

9Y1211012GEG0168US0

(6) Check Point of Every 600 Hours



Adjusting Front Axle Pivot

If the front axle pivot pin adjustment is not correct, front wheel vibration can occur causing vibration in the steering wheel.

■ Adjusting procedure

Loosen the lock nut, screw-in the adjusting screw until seated, then tighten the screw with an additional 1/6 turn. Re-tighten the lock nut

- (1) Adjusting Screw

- (2) Lock Nut

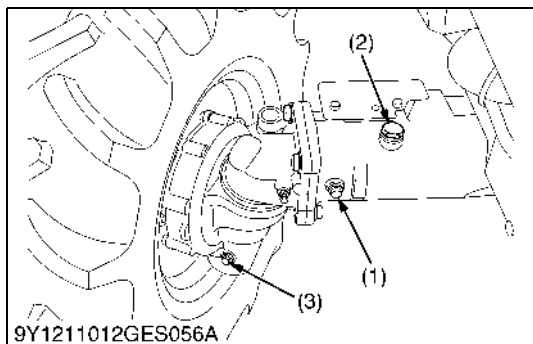
9Y1211012GEG0169US0

(7) Check Point of Every 800 Hours

Adjusting Engine Valve Clearance

- See "Valve Clearance" on page 1-S12.

9Y1211012GEG0100US0



Changing Front Axle Case Oil

[4WD]

1. To drain the used oil, remove the right and left drain plugs and filling plug at the front axle case and drain the oil completely into the oil pan.
2. After draining, reinstall the drain plugs.
3. Remove the oil level check plug
4. Fill with the new oil up to the check plug port.
(Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.)
5. After filling reinstall the filling plug and check plug.

Front axle case oil	Capacity	6.5 L 6.9 U.S.qts 5.7 Imp.qts

- (1) Check Plug (3) Drain Plug
(2) Filling Plug

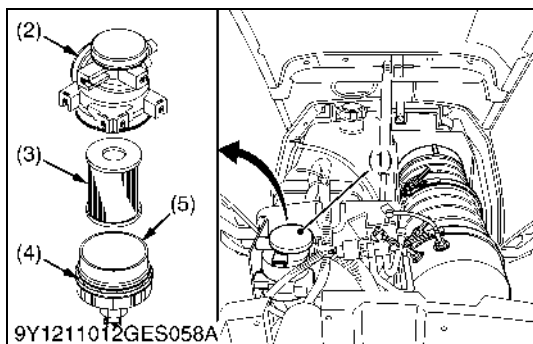
9Y1211012GEG0165US0

(8) Check Points of Every 1500 Hours

Cleaning Fuel Injector Nozzle Tip

- See "Overflow Pipe and injectors" on page 1-S43.

9Y1211012GEG0101US0



Replacing Oil Separator Element

 CAUTION

- **Be sure to stop the engine before replacing the oil separator element.**

1. Remove the cover and take out the element. Wipe off oil and the carbon in the case with a clean rag.
2. Fit a new oil separator element.
3. Tighten the cover.

- (1) Oil Separator (4) Gasket
(2) Body (5) Cover
(3) Oil Separator Element

9Y1211012GEG0172US0

Checking PCV (Positive Crankcase Ventilation) Valve

- See "PCV (Positive Crankcase Ventilation) Valve (Oil Separator)" on page 1-S16.

9Y1211012GEG0103US0

Checking and Cleaning EGR Cooler

- See "EGR Cooler" on page 1-S16.

9Y1211012GEG0104US0

(9) Check Points of Every 3000 Hours

Checking Supply Pump

- See page "Supply Pump" on page 1-S48.

9Y1211012GEG0105US0

Checking and Cleaning EGR System

- See "EGR Valve" on page 1-S39.

9Y1211012GEG0106US0

Cleaning DPF Muffler

■ Removal of ash

The longer the DPF operates, the more ash (burnt residue) is collected in the filter. Too much ash build-up adversely affects the DPF performance.

■ IMPORTANT

- The DPF needs cleaning with a specific cleaning device. Do not clean the DPF by disassembling, and attempt by yourself.

9Y1211012GEG0058US0

(10) Check Points of Every 1000 Hours or 1 year

Replacing Air Cleaner Primary Element and Secondary Element

- See "Cleaning Air Cleaner Primary Element" on page G-58.

9Y1211012GEG0177US0

Checking Exhaust Manifold

- See "EGR Related Parts" on page 1-S39.

9Y1211012GEG0108US0

(11) Check Points of Every 1 Year

Checking DPF Differential Pressure Sensor Pipe

- See "DPF Muffler" on page 1-S19.

9Y1211012GEG0109US0

Checking EGR Pipe

- See "EGR Related Parts" on page 1-S39.

9Y1211012GEG0110US0

Checking Antifrost Heater for Oil Separator (if equipped)

- See "Heater Resistance (for Reference)" on page 9-S55.

9Y1211012GEG0205US0

Checking Fuel Line

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

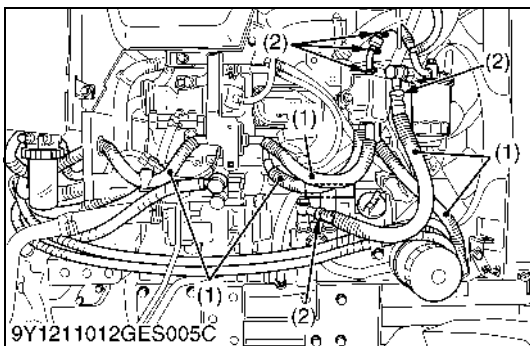
■ NOTE

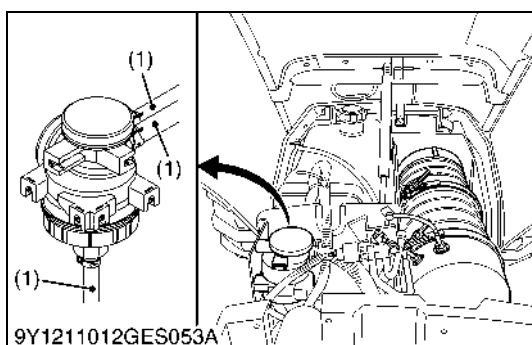
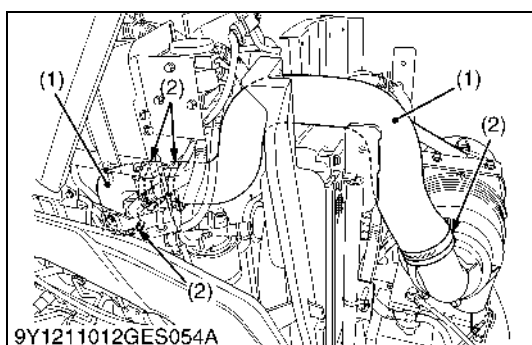
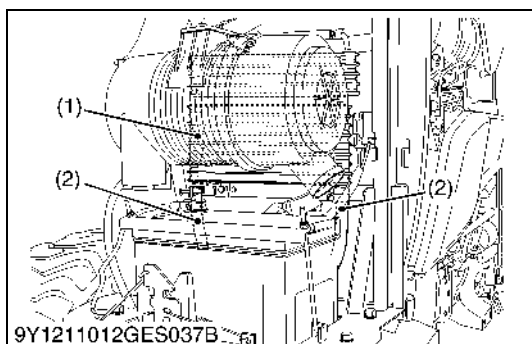
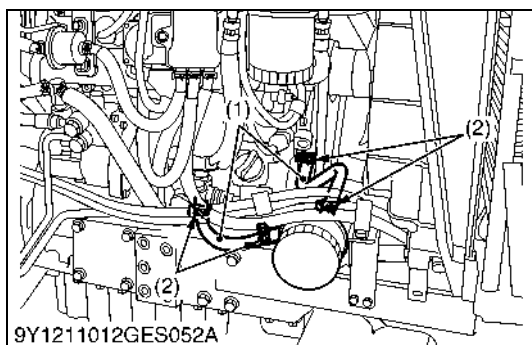
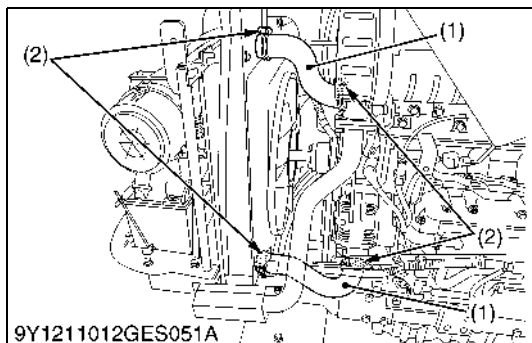
- If the fuel line is removed, be sure to properly bleed the fuel system. (See page G-74.)

(1) Fuel Lines

(2) Clamp Bands

9Y1211012GEG0149US0





Checking Radiator Hose and Clamp

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten bands securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.

Replace hoses and hose clamps every 2 years or earlier if checked and found that hoses are swollen, hardened or cracked.

■ Precaution at Overheating

Take the following actions in the event the coolant temperature is nearly or more than the boiling point, what is called "Overheating"

1. Park the tractor in a safe place and keep the engine unloaded idling.
2. Do not stop the engine suddenly, but stop it after about 5 minutes of unloaded idling.
3. Keep yourself well away from the machine for further 10 minutes or while the steam blows out.
4. Check that there are no dangers such as burns. Get rid of the causes of overheating according to the manual, refer to "1. TROUBLESHOOTING" on page 1-S1, and then, start again the engine.

(1) Radiator Hoses

(2) Clamp Bands

9Y1211012GEG0156US0

Checking Oil Cooler Line

[HST Type]

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

(1) Oil Cooler

(2) Oil Cooler Line

9Y1211012GEG0157US0

Checking Intake Air Line

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

(1) Hose

(2) Hose Clamps

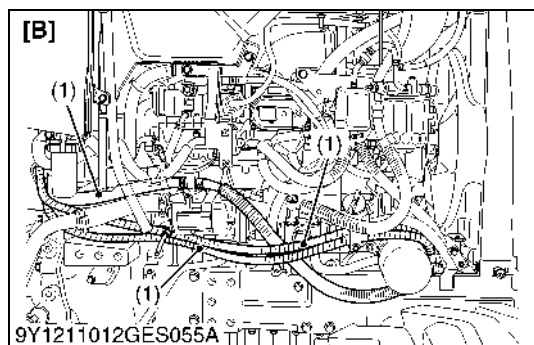
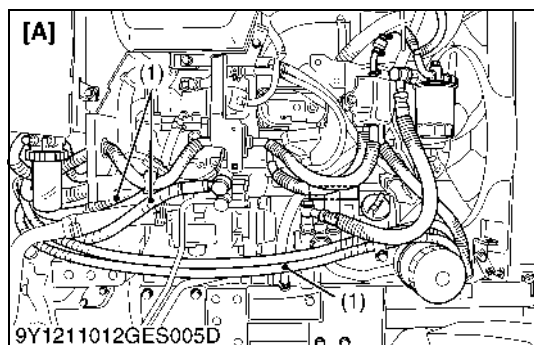
9Y1211012GEG0158US0

Checking Oil Separator Hose

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

(1) Oil Separator Hoses

9Y1211012GEG0159US0



Checking Power Steering Line

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

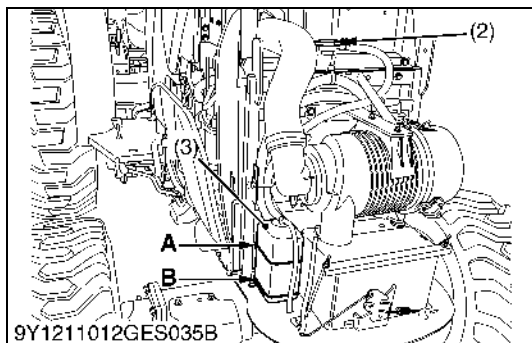
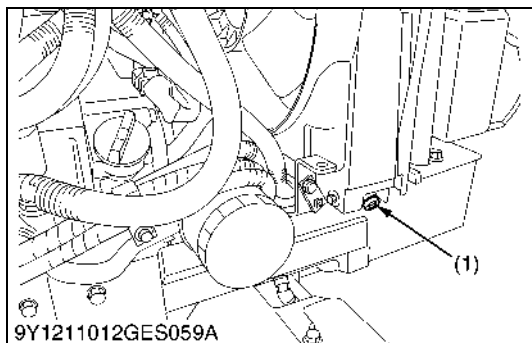
(1) Power Steering Pressure Hoses

[A] Manual Transmission Type

[B] HST Type

9Y1211012GEG0160US0

(12) Check Points of Every 2000 Hours or 2 Years



Flushing Cooling System and Changing Coolant



CAUTION

To avoid personal injury:

- Do not remove radiator cap while coolant is hot. When cool, slowly rotate cap to the first stop and allow sufficient time for excess pressure to escape before removing the cap completely.
1. Stop the engine, remove the key and let it cool down.
 2. To drain the coolant, open the radiator drain plug and remove radiator cap. The radiator cap must be removed to completely drain the coolant.
 3. After all coolant is drained, reinstall the drain plug.
 4. Fill with clean soft water and cooling system cleaner.
 5. Follow directions of the cleaner instruction.
 6. After flushing, fill with clean soft water and anti-freeze until the coolant level is just below the radiator cap. Install the radiator cap securely.
 7. Fill with coolant up to the "**FULL**" mark of recovery tank.
 8. Start and operate the engine for a few minutes.
 9. Stop the engine, remove the key and let cool.
 10. Check coolant level of recovery tank and add coolant if necessary.
 11. Properly dispose of used coolant.

■ IMPORTANT

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

Radiator coolant	Capacity	6.5 L 6.9 U.S.qts 5.7 Imp.qts
Recovery tank coolant		0.6 L 0.6 U.S.qts 0.5 Imp.qts

- (1) Drain Plug
(2) Radiator Cap
(3) Recovery Tank

A: FULL
B: LOW

9Y1211012GEG0181US0

Anti-Freeze**CAUTION**

To avoid personal injury:

- When using antifreeze, put on some protection such as rubber gloves. (Antifreeze contains poison.)
- If it is swallowed, seek immediate medical help. Do NOT make a person throw up unless told to do so by poison control or a health care professional. Use standard first aid and CPR for signs of shock or cardiac arrest. Call your local Poison Control Center or your local emergency number for further assistance.
- When antifreeze comes in contact with the skin or clothing, wash it off immediately.
- Do not mix different types of antifreeze.
The mixture can produce chemical reaction causing harmful substances.
- Antifreeze is extremely flammable and explosive under certain conditions. Keep fire and children away from antifreeze.
- When draining fluids from the engine, place some container underneath the engine body.
- Do not pour waste onto the grounds, down a drain, or into any water source.
- Also, observe the relevant environmental protection regulations when disposing of antifreeze.

Always use a 50/50 mix of long-life coolant and clean soft water in KUBOTA engines.

1. Long-life coolant (hereafter LLC) comes in several types. Use ethylene glycol (EG) type for this engine.
2. Before employing LLC-mixed cooling water, fill the radiator with fresh water and empty it again.
Repeat this procedure 2 or 3 times to clean up the inside.
3. Mixing the LLC
Premix 50 % LLC with 50 % clean soft water. When mixing, stir it up well, and then fill into the radiator.
4. The procedure for the mixing of water and antifreeze differs according to the make of the antifreeze and the ambient temperature. Refer to SAE J1034 standard, more specifically also to SEA J814c.

Vol % Anti-freeze	Freezing Point		Boiling Point*	
	°C	°F	°C	°F
50	-37	-34	108	226

*At 1.013×10^5 Pa (760 mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within cooling system.

(To be continued)

(Continued)

5. Adding the LLC
 - a) Add only water if the mixture reduces in amount by evaporation
 - b) If there is a mixture leak, add the LLC of the same manufacturer and type in the same mixture percentage.
*Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
6. When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anticorrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
7. Kubota's genuine long-life coolant has a service life of 2 years. Be sure to change the coolant every 2 years.

■ NOTE

- The above data represent industry standards that necessitate a minimum glycol content in the concentrated antifreeze.

9Y1211012GEG0182US0

(13) Check Points of Every 2 Years**Replacing Fuel Grommet**

- Refer to "Checking Fuel Grommet". (See page G-59.)

9Y1211012GEG0186US0

Replacing DPF Differential Pressure Sensor Hose

- Refer to "DPF Muffler". (See page 1-S19.)

9Y1211012GEG0120US0

(14) Check points of Every 4 Years**Replacing Radiator Hose (Water pipes)**

- Replace the hoses and clamps.
Refer to "Checking Radiator Hose and Hose Clamp". (See page G-69.)

9Y1211012GEG0183US0

Replacing Power Steering Hose**[Manual Transmission Type]**

- Replace the hoses and clamps.
Refer to "Checking Power Steering Line". (See page G-70.)

9Y1211012GEG0184US0

Replacing Fuel Hose

- Replace the fuel hoses and clamps.
Refer to "Checking Fuel Line". (See page G-68.)

9Y1211012GEG0185US0

Replacing Oil Cooler Line**[HST Type]**

- Refer to "Checking Oil Cooler Line". (See page G-69.)

9Y1211012GEG0187US0

Replacing Intake Air Line

- Replace the intake hoses and clamps.
Refer to "Checking Intake Air Line". (See page G-69.)

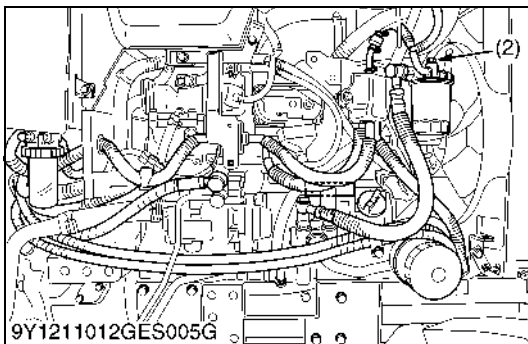
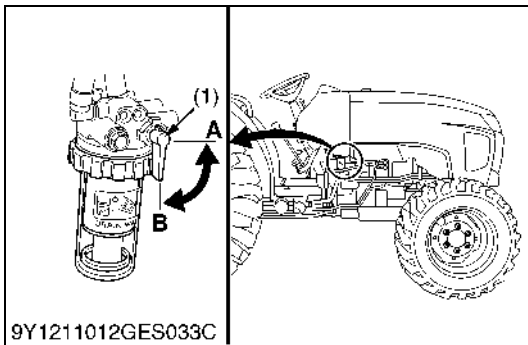
9Y1211012GEG0188US0

Replacing Oil Separator Hose

- Refer to "Checking Oil Separator Hose". (See page G-69.)

9Y1211012GEG0189US0

(15) Others



Bleeding Fuel System

Air must be removed:

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

■ **Bleeding procedure is as follows:**

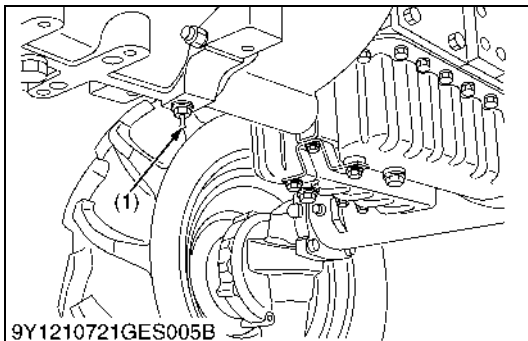
1. Fill the fuel tank with fuel, and open the fuel valve (1).
2. Loosen the air vent plug on the fuel filter 2 turns or so.
3. Turn on the key switch and wait for about 1 minute. Then tighten up the air vent plug.
4. Set the hand throttle lever at the minimum speed position and turn the key to **"START"** position.
If the engine does not start, try it several times at 30 second intervals.

■ **IMPORTANT**

- **Do not hold key switch at engine start position for more than 10 seconds continuously. If more engine cranking is needed, try again after 30 seconds.**
5. Accelerate the engine to remove the small portion of air left in the fuel system.
 6. If air still remains and the engine stops, repeat the above steps.

(1) Fuel Valve	A: Close
(2) Air Vent Valve	B: Open

9Y1211012GEG0191US0

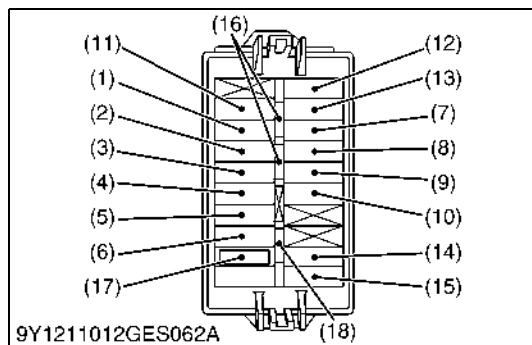
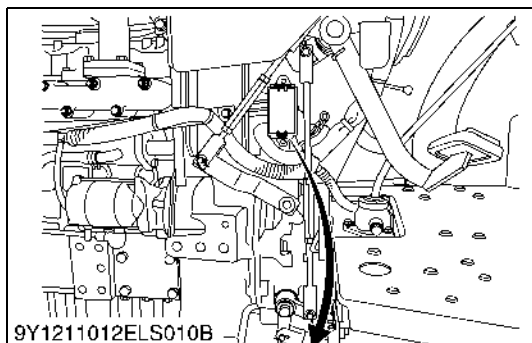


Draining Clutch Housing Water

1. The tractor is equipped with split pin 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. Check it by pushing in the split pin plug (1).
4. If water has entered into the clutch housing, remove the split pin plug (1) and drain the water, then reinstall the plug again.

- (1) Split Pin Plug

9Y1211012GEG0192US0



Replacing Fuse

- 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.
- 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 "1. TROUBLESHOOTING" on page 9-S1.

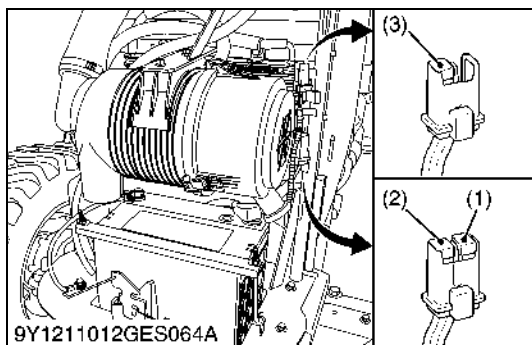
If any of them should blow, replace with a new one of the same capacity.

Fuse No.	Capacity (A)	Protected circuit
(1)	5	Engine ECU (Ignition key)
(2)	5	Main ECU (Ignition key)
(3)	5	Meter panel (Ignition key)
(4)	10	Combination switch
(5)	10	Work light
(6)	5	Starter relay
(7)	20	Engine ECU (Battery)
(8)	5	Main ECU (Battery)
(9)	5	Meter panel (Battery)
(10)	10	Hazard
(11)	5	Heater relay (if equipped)
(12)	10	Heater (Oil separator, IN 1) (if equipped)
(13)	10	Heater (Oil separator, IN 2) (if equipped)
(14)	10	Heater (Oil separator, OUT 1) (if equipped)
(15)	10	Heater (Oil separator, OUT 2) (if equipped)

(16) Spare Fuse
(17) Fuse Puller

(18) Spare Fuse

9Y1211012GEG0193US0



Replacing Slow-Blow Fuses

- The slow-blow fuses are intended to protect the electrical cabling. If any of them has blown out, be sure to pinpoint the cause. Never use any substitute, use only a KUBOTA genuine part.

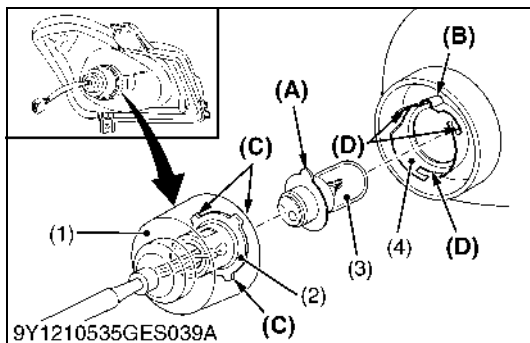
No.	Capacity (A)	Protected circuit
(1)	40	Load
(2)	60	Battery
(3)	40	Heater (Oil separator) (if equipped)

9Y1211012GEG0194US0

Replacing Light Bulb

Light	Capacity
Head lights	25 W / 25 W
Tail light	5 W
Turn signal / Hazard light (rear)	21 W
Turn signal / Hazard light (front)	23 W

9Y1211012GEG0195US0



Replacing Head Lamp

■ NOTE

To avoid personal injury:

- Be careful not to drop the bulb, hit anything against the lamp, apply excess force, and get the lamp scratched. If broken, glass may cause injury. Pay more attention to halogen lamps in particular, which have high pressure inside.
- Before replacing the lamp, be sure to turn off the light and wait until the bulb cools down, otherwise, you may get burned.

■ Removing Bulb

1. Remove the rubber boot.
2. Turn the socket counterclockwise while pressing and remove it.
3. Remove the bulb.

■ Attaching Bulb

1. Align (A) of the bulb with (B) of the lamp case and attach the bulb.
2. Align (C) of the socket with (D) of the lamp case and attach the socket.
3. Attach the rubber boot.

■ IMPORTANT

- Be sure to use a new bulb of the specified wattage.
- Never touch the bulb surface (glass) with bare hands. Fingerprints, for example, may break the bulb.

- (1) Rubber Boot
(2) Socket
(3) Bulb
(4) Lamp Case

- (A) Align to (B)
(C) Align to (D)

9Y1211012GEG0196US0

Replacing Radiator Hose (if equipped)

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking Radiator Hose and Hose Clamp". (See page G-69.)

9Y1211012GEG0206US0

Replacing Fuel Lines

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking Fuel Line". (See page G-68.)

9Y1211012GEG0207US0

Replacing Intake Air Line

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking Intake Air Line". (See page G-69.)

9Y1211012GEG0208US0

Replacing Power Steering Hose

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking HST Oil Line and Power Steering Oil Line". (See page G-70.)

9Y1211012GEG0209US0

Replacing Oil Cooler Line

- Replace if any deterioration (crack, hardening, scar of deformation) or damage occurred.
Refer to "Checking HST Oil Line and Power Steering Line". (See page G-69.)

9Y1211012GEG0210US0

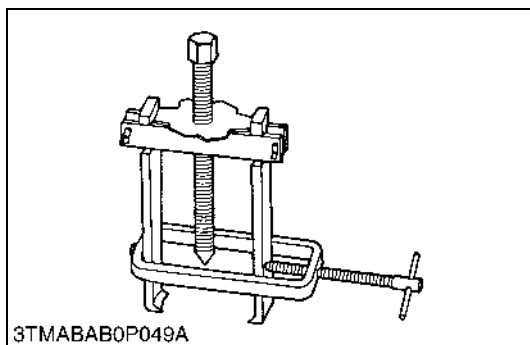
Replacing Oil Separator Hose

- Replace if any deterioration (crack, hardening, scar or deformation) or damage occurred. (See page G-69.)

9Y1211012GEG0211US0

8. SPECIAL TOOLS

[1] SPECIAL TOOLS FOR ENGINE



Special Use Puller Set

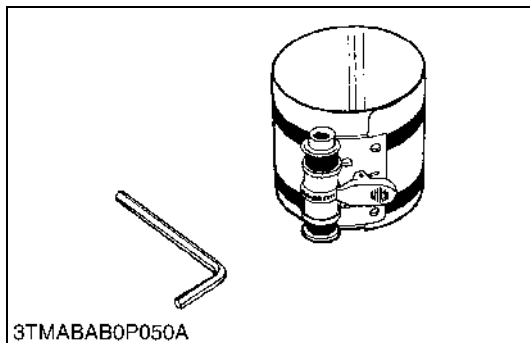
Code No.

- 07916-09032

Application

- Use exclusively to pull out bearing, gears and other parts with ease.

WSM000001GEG0011US0

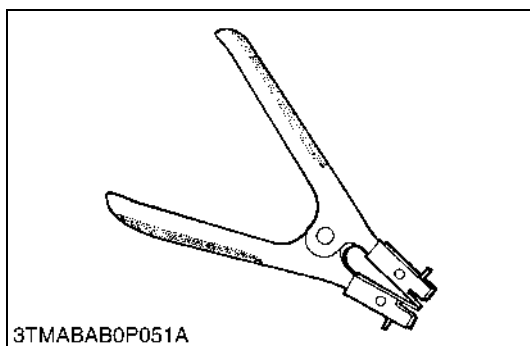


Piston Ring Compressor

Application

- Use exclusively to push in the piston with piston rings into the cylinder.

WSM000001GEG0012US0

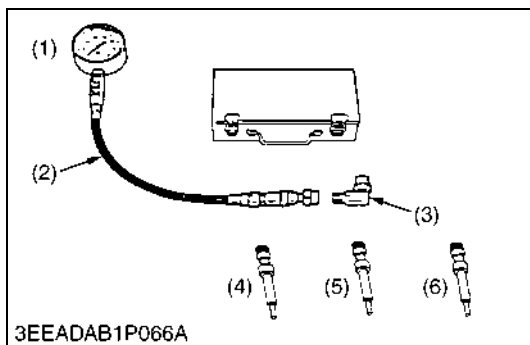


Piston Ring Tool

Application

- Use exclusively to remove or install the piston ring with ease.

WSM000001GEG0013US0



Diesel Engine Compression Tester (for Glow Plug)

Code No.

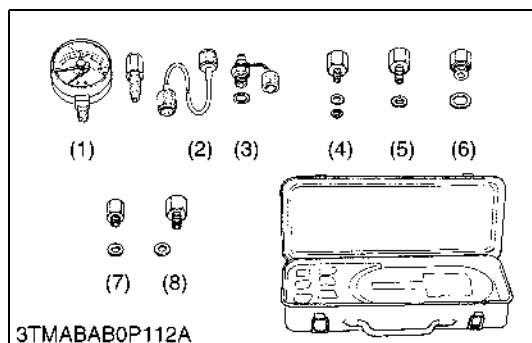
- 07909-39081 (Assembly)
- 07909-31291 (**K**)
- 07909-31301 (**L**)
- 07909-31311 (**M**)

Application

- Use to measure diesel engine compression and diagnosis of need for major overhaul.

(1) Gauge	(4) Adaptor K
(2) Hose Assembly	(5) Adaptor L
(3) L Joint	(6) Adaptor M

WSM000001GEG0096US0



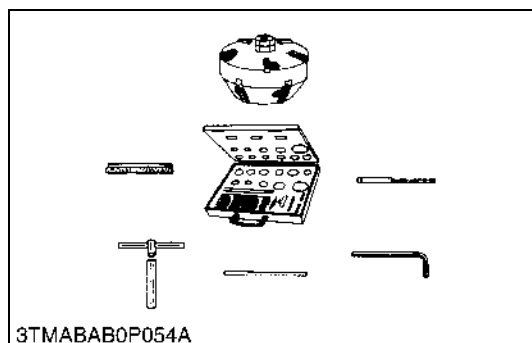
Oil Pressure Tester

Application

- Use to measure lubricating oil pressure.

(1) Gauge	(5) Adaptor 2
(2) Cable	(6) Adaptor 3
(3) Threaded Joint	(7) Adaptor 4
(4) Adaptor 1	(8) Adaptor 5

WSM000001GEG0015US0



Valve Seat Cutter

Application

- Use to reseal valves.

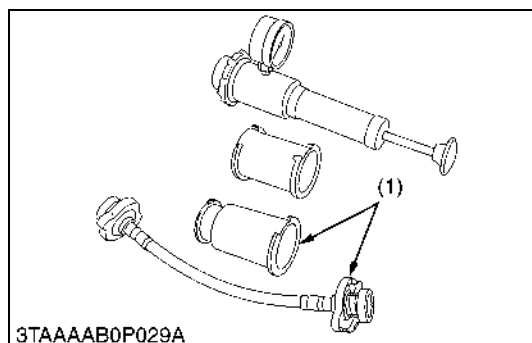
Angle

- 0.79 rad (45°)
- 0.26 rad (15°)

Diameter

- 28.6 mm (1.13 in.)
- 31.6 mm (1.24 in.)
- 35.0 mm (1.38 in.)
- 38.0 mm (1.50 in.)
- 41.3 mm (1.63 in.)
- 50.8 mm (2.00 in.)

WSM000001GEG0016US0



Radiator Tester

Application

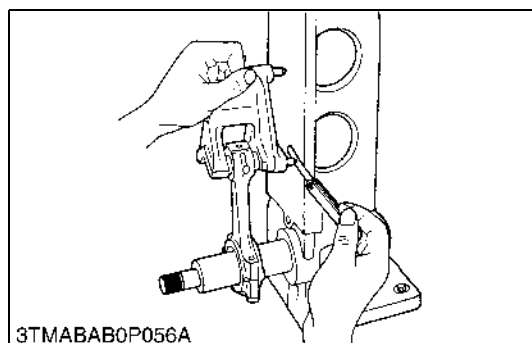
- Use to check of radiator cap pressure, and leaks from cooling system.

Remarks

- Adaptor (1) BANZAI Code No. RCT-2A-30S.

- (1) Adaptor

WSM000001GEG0017US0



Connecting Rod Alignment Tool

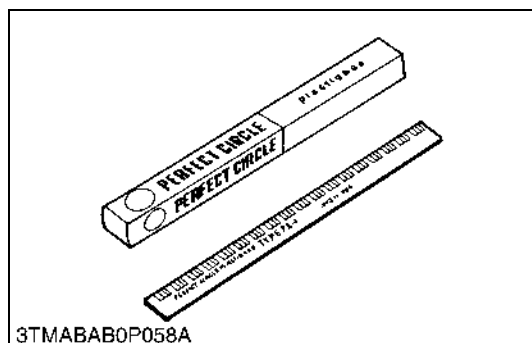
Application

- Use to check the connecting rod alignment.

Applicable range

- Connecting rod big end I.D.
30 to 75 mm dia. (1.2 to 2.9 in. dia.)
- Connecting rod length
65.0 to 300 mm (2.56 to 11.8 in.)

WSM000001GEG0020US0



Plastigauge

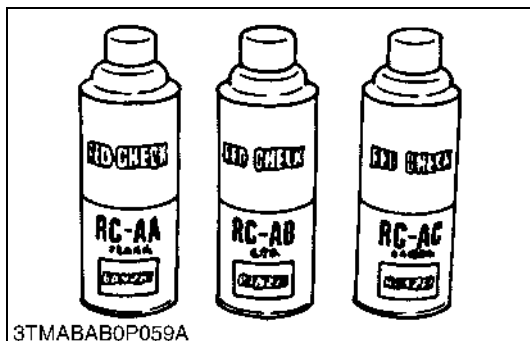
Application

- Use to check the oil clearance between crankshaft and bearing, etc..

Measuring range

- Green: 0.03 to 0.07 mm (0.001 to 0.003 in.)
- Red: 0.05 to 0.1 mm (0.002 to 0.006 in.)
- Blue: 0.1 to 0.2 mm (0.004 to 0.009 in.)

WSM000001GEG0022US0

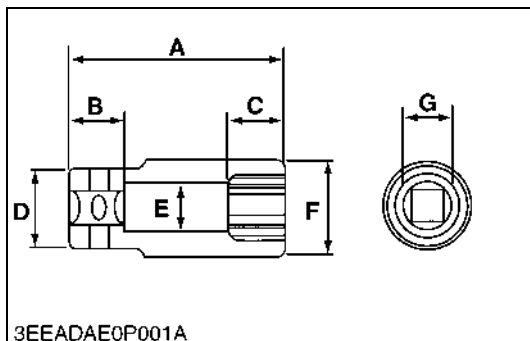


Red Check

Application

- Use to check cracks on cylinder head, cylinder block, etc..

WSM000001GEG0023US0



Socket Wrench for Crank Pulley Nut (46 mm Deep Socket Wrench)

Application

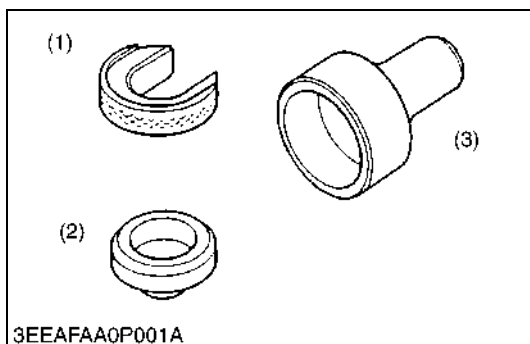
- Use to loosen and tighten the fan drive pulley mounting nut.

NOTE

- The special tool is not available, so make it. Refer to the figure.

A	100 mm (3.94 in.)
B	25.0 mm (0.98 in.)
C	27.0 mm (1.06 in.)
D	45.0 mm dia. (1.77 in. dia.)
E	35.0 mm dia. (1.38 in. dia.)
F	62.5 mm dia. (2.46 in. dia.)
G	46.0 mm (1.81 in.)

9Y1211012GEG0010US0

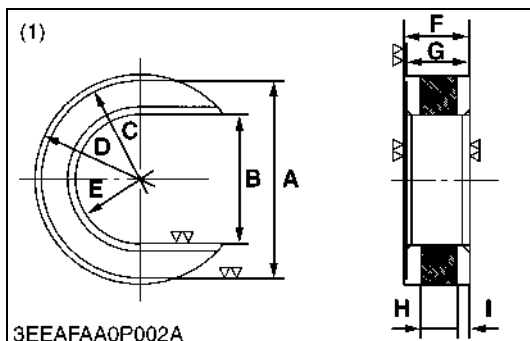


Auxiliary Socket for Fixing Crankshaft Sleeve

Application

- To fix the crankshaft sleeve of the diesel engine.

A	80.0 mm (3.15 in.)
B	60.10 to 60.30 mm (2.367 to 2.374 in.)
C	80.0 mm dia. (3.15 in. dia.)
D	85.0 mm dia. (3.35 in. dia.)
E	60.10 to 60.30 mm dia. (2.367 to 2.374 in. dia.)
F	26.30 to 26.40 mm (1.036 to 1.039 in.)
G	25.85 to 25.90 mm (1.018 to 1.019 in.)
H	15.0 mm (0.591 in.)
I	5.0 mm (0.20 in.)

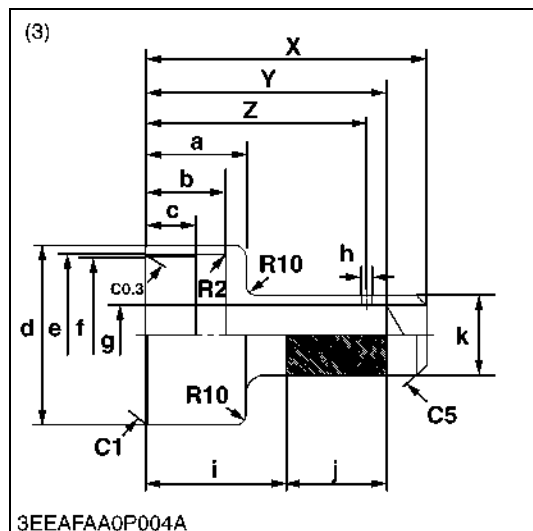
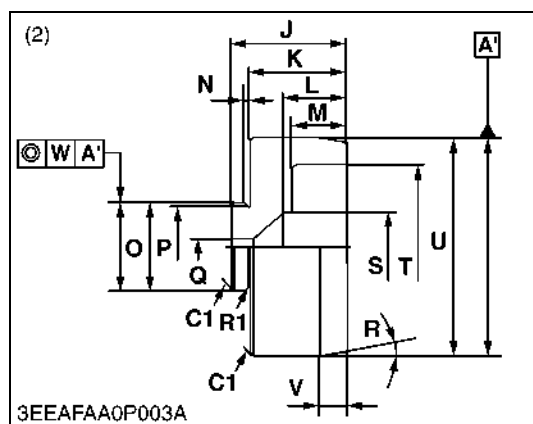


- (1) Stopper
(2) Sleeve Guide

- (3) Auxiliary Socket for Pushing

(To be continued)

(Continued)



Application

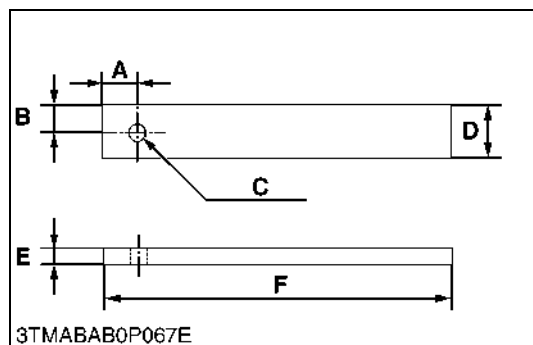
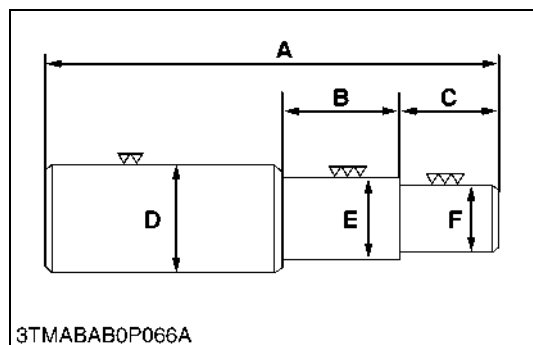
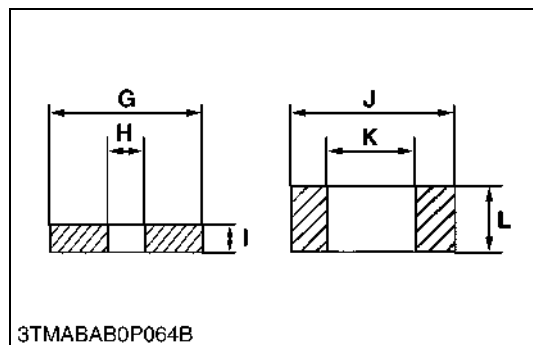
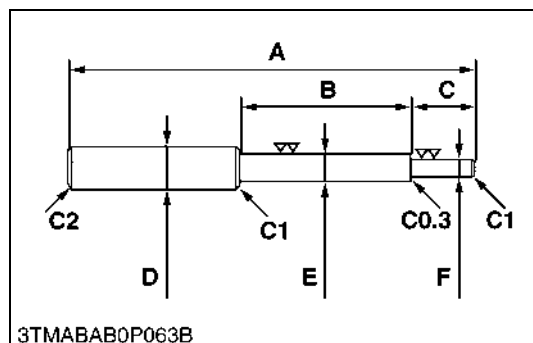
- To fix the crankshaft sleeve of the diesel engine.

J	42.0 mm (1.65 in.)
K	30.50 to 30.60 mm (1.201 to 1.204 in.)
L	23.0 mm (0.906 in.)
M	20.0 mm (0.787 in.)
N	2.0 mm (0.079 in.)
O	31.911 to 31.950 mm dia. (1.2564 to 1.2578 in. dia.)
P	30.0 mm dia. (1.18 in. dia.)
Q	5.0 mm dia. (0.20 in. dia.)
R	0.09 rad (5°)
S	25.0 mm dia. (0.984 in. dia.)
T	60.0 mm dia. (2.36 in. dia.)
U	79.80 to 79.85 mm dia. (3.142 to 3.143 in. dia.)
V	10.0 mm (0.394 in.)
W	0.04 mm dia. (0.002 in. dia.)
X	140 mm (5.51 in.)
Y	120 mm (4.72 in.)
Z	110 mm (4.33 in.)
a	50.0 mm (1.97 in.)
b	39.90 to 40.00 mm (1.571 to 1.574 in.)
c	25.0 mm (0.984 in.)
d	90.0 mm dia. (3.54 in. dia.)
e	81.0 mm dia. (3.19 in. dia.)
f	80.10 to 80.15 mm dia. (3.154 to 3.155 in. dia.)
g	30.0 mm dia. (1.18 in. dia.)
h	5.0 mm dia. (0.20 in. dia.)
i	70.0 mm (2.76 in.)
j	50.0 mm (1.97 in.)
k	40.0 mm dia. (1.57 in. dia.)
C1	Chamfer 1.0 mm (0.039 in.)
C5	Chamfer 5.0 mm (0.20 in.)
C0.3	Chamfer 0.3 mm (0.01 in.)
R1	1.0 mm radius (0.039 in. radius)
R2	2.0 mm radius (0.079 in. radius)
R10	10.0 mm radius (0.394 in. radius)

(2) Sleeve Guide

(3) Auxiliary Socket for Pushing

9Y1211012GEG0011US0



Valve Guide Replacing Tool

Application

- To press out and press fit the valve guide.

A	225 mm (8.86 in.)
B	70 mm (2.8 in.)
C	45 mm (1.8 in.)
D	20 mm dia. (0.79 in. dia.)
E	12.7 to 12.9 mm dia. (0.500 to 0.507 in. dia.)
F	7.50 to 7.60 mm dia. (0.296 to 0.299 in. dia.)
G	25 mm dia. (0.98 in. dia.)
H	7.70 to 8.00 mm dia. (0.304 to 0.314 in. dia.)
I	5 mm (0.2 in.)
J	20 mm dia. (0.79 in. dia.)
K	13.5 to 13.8 mm dia. (0.532 to 0.543 in. dia.)
L	8.90 to 9.10 mm (0.351 to 0.358 in.)
C1	Chamfer 1.0 mm (0.039 in.)
C2	Chamfer 2.0 mm (0.079 in.)
C0.3	Chamfer 0.3 mm (0.01 in.)

9Y1211012GEG0012US0

Bushing Replacing Tools

Application

- To press out and press fit the bushing.

1) For small end bushing

A	162 mm (6.38 in.)
B	35 mm (1.4 in.)
C	27 mm (1.1 in.)
D	35 mm dia. (1.4 in. dia.)
E	27.90 to 27.95 mm dia. (1.099 to 1.100 in. dia.)
F	25.00 to 25.01 mm dia. (0.9843 to 0.9846 in. dia.)

2) For idle gear bushing

A	175 mm (6.89 in.)
B	40 mm (1.6 in.)
C	38 mm (1.5 in.)
D	45 mm dia. (1.8 in. dia.)
E	41.90 to 41.95 mm dia. (1.650 to 1.651 in. dia.)
F	37.950 to 37.970 mm dia. (1.4941 to 1.4948 in. dia.)

9Y1211012GEG0013US0

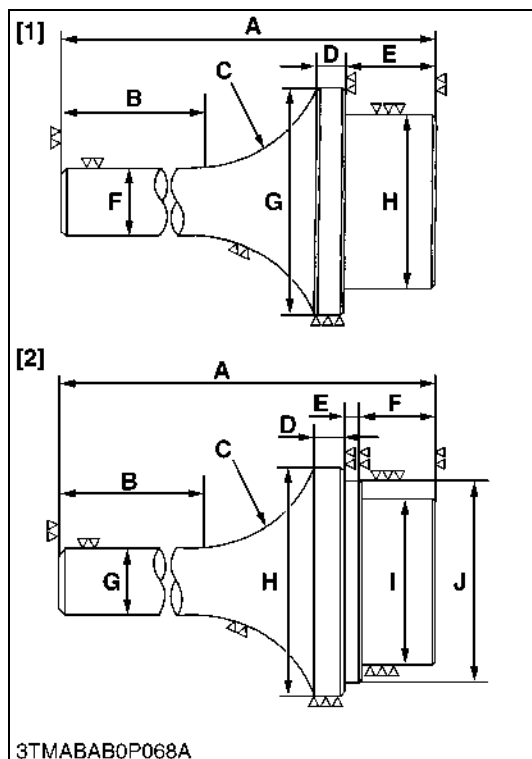
Flywheel Stopper

Application

- To loosen and tighten the flywheel screw.

A	20 mm (0.79 in.)
B	15 mm (0.59 in.)
C	10 mm dia. (0.39 in. dia.)
D	30 mm (1.2 in.)
E	8 mm (0.3 in.)
F	200 mm (7.87 in.)

9Y1211012GEG0014US0



Crankshaft Bearing 1 Replacing Tool

Application

- To press out and press fit the crankshaft bearing 1.

[1] Extracting tool

A	135 mm (5.31 in.)
B	72 mm (2.8 in.)
C	40 mm radius (1.6 in. radius)
D	10 mm (0.39 in.)
E	20 mm (0.79 in.)
F	20 mm dia. (0.79 in. dia.)
G	64.80 to 64.90 mm dia. (2.552 to 2.555 in. dia.)
H	59.80 to 59.90 mm dia. (2.355 to 2.358 in. dia.)

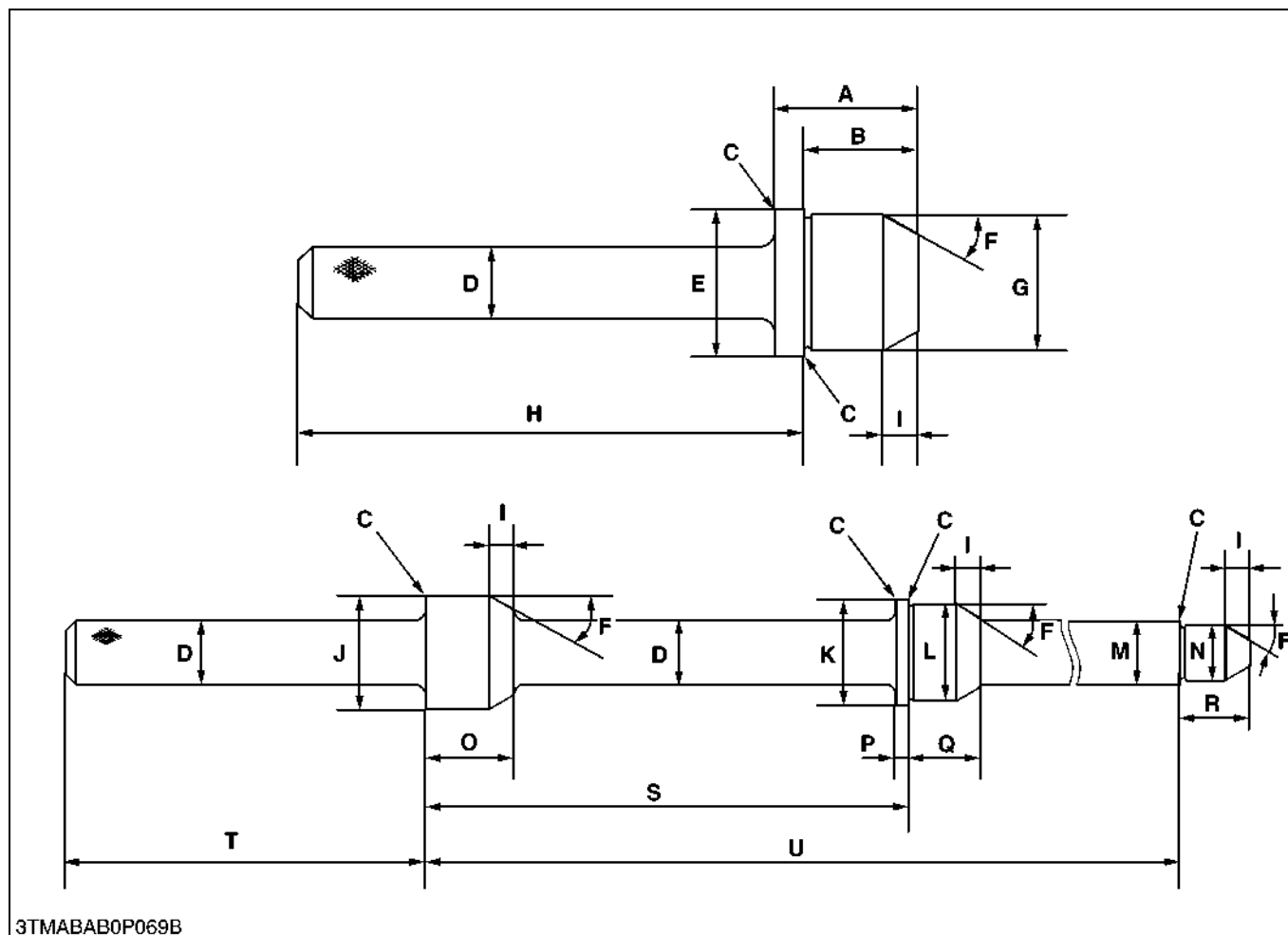
[2] Inserting tool

A	130 mm (5.12 in.)
B	72 mm (2.8 in.)
C	40 mm radius (1.6 in. radius)
D	9 mm (0.4 in.)
E	4 mm (0.2 in.)
F	20 mm (0.79 in.)
G	20 mm dia. (0.79 in. dia.)
H	68 mm dia. (2.7 in. dia.)
I	59.80 to 59.90 mm dia. (2.355 to 2.358 in. dia.)
J	64.80 to 64.90 mm dia. (2.552 to 2.555 in. dia.)

9Y1211012GEG0015US0

Balancer Metal Replacing Tool (for Removing)**Application**

- To remove the metal bearing.

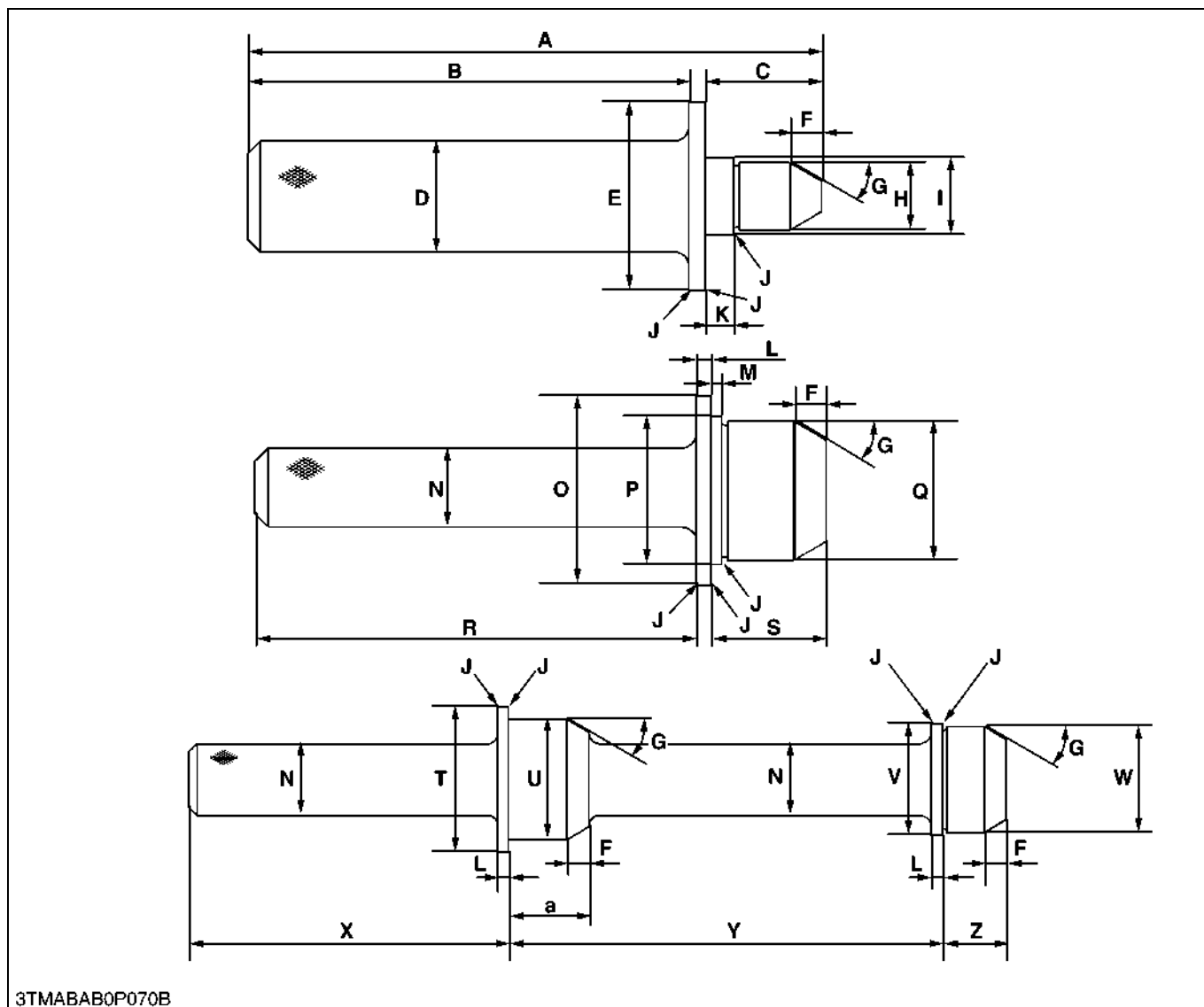


A	41 mm (1.6 in.)	L	41.934 to 41.950 mm dia. (1.6510 to 1.6515 in. dia.)
B	32.5 mm (1.28 in.)	M	24.959 to 24.980 mm dia. (0.98264 to 0.98346 in. dia.)
C	Chamfer 0.3 mm (0.01 in.)	N	21.947 to 21.960 mm dia. (0.86406 to 0.86456 in. dia.)
D	25 mm dia. (0.98 in. dia.)	O	36 mm (1.4 in.)
E	46.950 to 46.975 mm dia. (1.8485 to 1.8494 in. dia.)	P	5 mm (0.2 in.)
F	0.52 rad (30°)	Q	29.0 mm (1.14 in.)
G	43.934 to 43.950 mm dia. (1.7297 to 1.7303 in. dia.)	R	28.0 mm (1.10 in.)
H	148.5 mm (5.846 in.)	S	195.25 to 195.75 mm (7.6870 to 7.7066 in.)
I	10 mm (0.39 in.)	T	145 mm (5.71 in.)
J	46.50 to 46.75 mm dia. (1.831 to 1.840 in. dia.)	U	384.75 to 385.25 mm (15.148 to 15.167 in.)
K	44.950 to 44.975 mm dia. (1.7697 to 1.7706 in. dia.)		

9Y1211012GEG0016US0

Balancer Metal Replacing Tool (for Fitting)**Application**

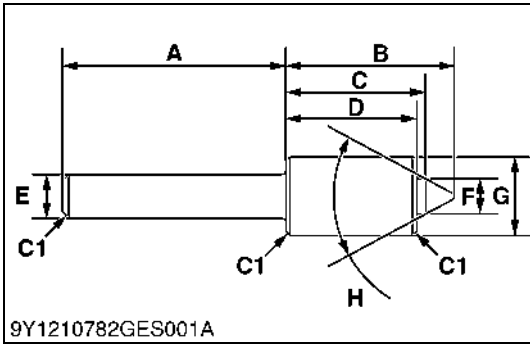
- To press fit the metal bearing.



3TMABAB0P070B

A	182 mm (7.17 in.)	O	60 mm dia. (2.4 in. dia.)
B	140 mm (5.51 in.)	P	46.950 to 46.975 mm dia. (1.8485 to 1.8494 in. dia.)
C	37 mm (1.5 in.)	Q	43.934 to 43.950 mm dia. (1.7297 to 1.7303 in. dia.)
D	35 mm dia. (1.4 in. dia.)	R	140 mm (5.51 in.)
E	60 mm dia. (2.4 in. dia.)	S	36 mm (1.4 in.)
F	10 mm (0.39 in.)	T	60 mm dia. (2.4 in. dia.)
G	0.52 rad (30°)	U	46.950 to 46.975 mm dia. (1.8485 to 1.8494 in. dia.)
H	21.947 to 21.960 mm dia. (0.86406 to 0.86456 in. dia.)	V	44.950 to 44.975 mm dia. (1.7697 to 1.7706 in. dia.)
I	24.959 to 24.980 mm dia. (0.98264 to 0.98346 in. dia.)	W	41.934 to 41.950 mm dia. (1.6510 to 1.6515 in. dia.)
J	Chamfer 0.3 mm (0.01 in.)	X	145 mm (5.71 in.)
K	8.8 to 9.2 mm (0.35 to 0.36 in.)	Y	195.25 to 195.75 mm (7.6870 to 7.7066 in.)
L	5 mm (0.2 in.)	Z	29 mm (1.1 in.)
M	3.3 to 3.7 mm (0.13 to 0.14 in.)	a	36 mm (1.4 in.)
N	25 mm dia. (0.98 in. dia.)		

9Y1211012GEG0017US0



Injection Top Correction Jig

Application

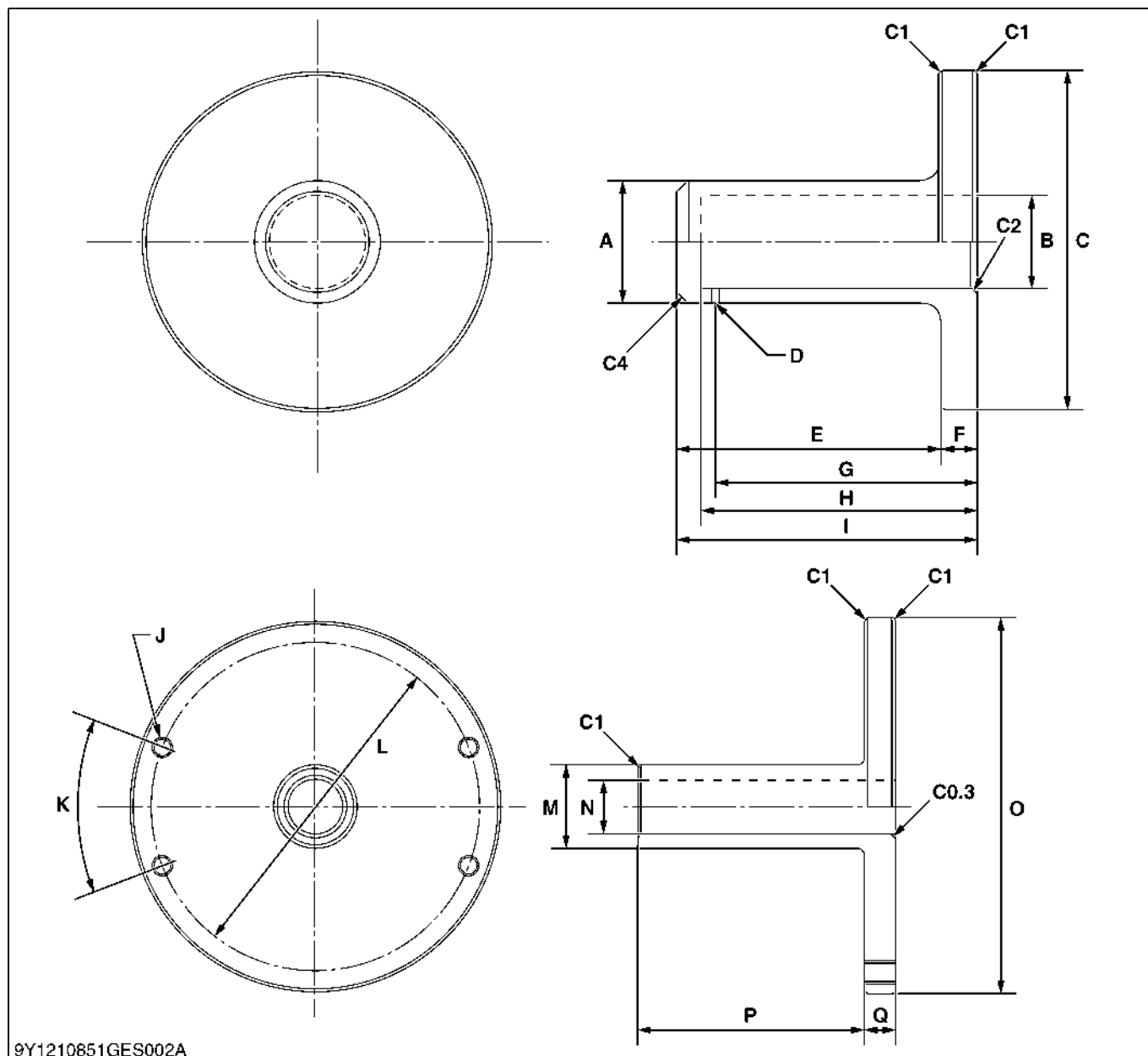
- To detects and position the sensor in top-dead center position.

A	60 mm (2.4 in.)
B	45 mm (1.8 in.)
C	37.3 mm (1.47 in.)
D	3.5 mm (1.4 in.)
E	12 mm dia. (0.47 in. dia.)
F	10 mm dia. (0.39 in. dia.)
G	20.34 to 20.50 mm dia. (0.8008 to 0.8070 in. dia.)
H	1.0 rad (60°)
C1	Chamfer 1.0 mm (0.079 in.)

9Y1211012GEG0018US0

Bearing Case Cover Oil Seal Replacing Tool**Application**

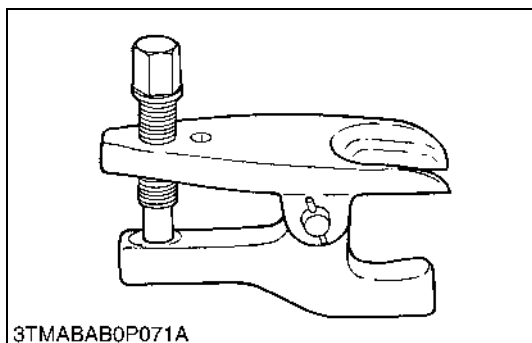
- To install bearing case cover oil seal.



A	42 mm dia. (1.7 in. dia.)	L	129 mm dia. (5.08 in. dia.)
B	32 to 32.025 mm dia. (1.260 to 1.261 in. dia.)	M	31.950 to 31.975 mm dia. (1.2579 to 1.2588 in. dia.)
C	116 mm dia. (4.57 in. dia.)	N	22 mm dia. (0.87 in. dia.)
D	3 mm dia. (0.1 in. dia.)	O	145 mm dia. (5.71 in. dia.)
E	88 mm (3.5 in.)	P	90 mm (3.5 in.)
F	12 mm (0.47 in.)	Q	12 mm (0.47 in.)
G	88 mm (3.5 in.)	C0.3	Chamfer 0.3 mm (0.01 in.)
H	92 mm (3.6 in.)	C1	Chamfer 1.0 mm (0.039 in.)
I	100 mm (3.94 in.)	C2	Chamfer 2.0 mm (0.079 in.)
J	M8 × Pitch	C4	Chamfer 4.0 mm (0.2 in.)
K	0.70 rad (40°)		

9Y1211012GEG0019US0

[2] SPECIAL TOOLS FOR TRACTOR



3TMABAB0P071A

Tie-rod End Lifter

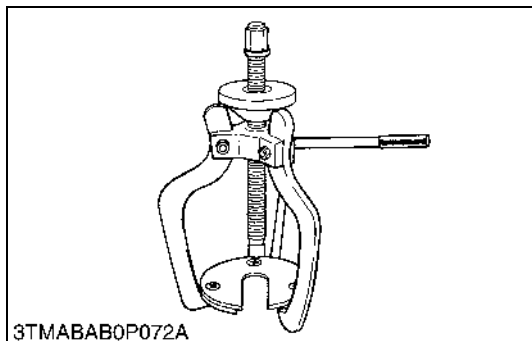
Code No.

- 07909-39051

Application

- Use to remove the tie-rod end with ease.

WSM000001GEG0029US0



3TMABAB0P072A

Steering Wheel Puller

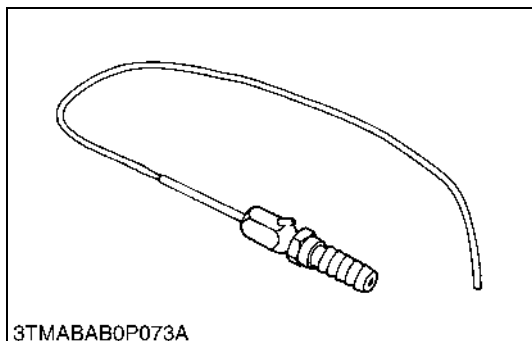
Code No.

- 07916-51090

Application

- Use to remove the steering wheel without damage to the steering shaft.

WSM000001GEG0030US0



3TMABAB0P073A

Injector CH3

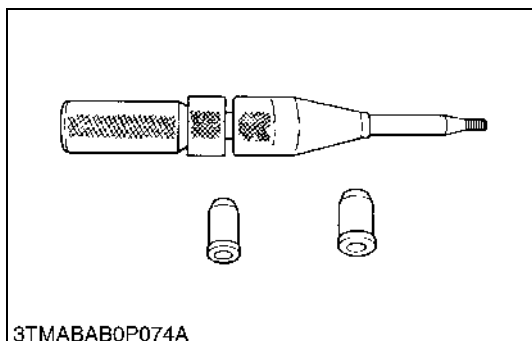
Code No.

- 07916-52501

Application

- Use to put calcium chloride solution into a rear wheel and to remove it.

WSM000001GEG0031US0



3TMABAB0P074A

Clutch Center Tool (For B and L Series Tractors)

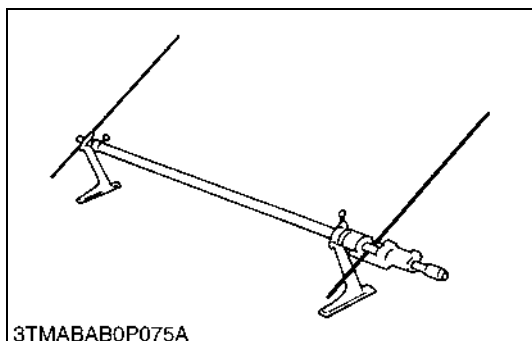
Code No.

- 07916-80410

Application

- The clutch center tool is for all B and L series tractors with a diaphragm clutch by changing tip guides. Center piece diameter is 20 mm (0.79 in.).

WSM000001GEG0032US0



3TMABAB0P075A

Toe-in Gauge

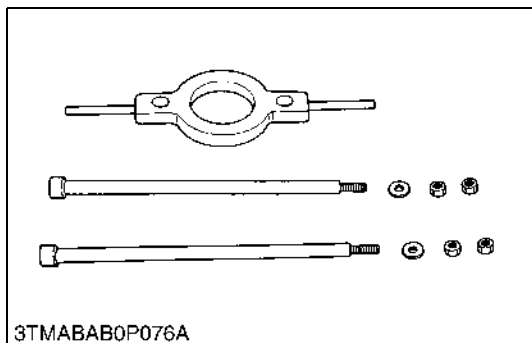
Code No.

- 07909-31681

Application

- This allows easy measurement of toe-in for all machine models.

WSM000001GEG0034US0



Rear Axle Cover Puller

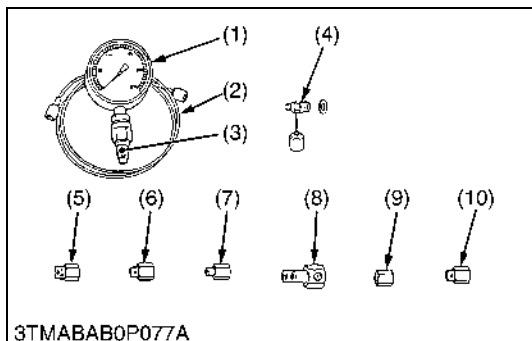
Code No.

- 07916-51041

Application

- Use to remove a rear axle cover from rear axle.

WSM000001GEG0035US0



Relief Valve Pressure Tester

Code No.

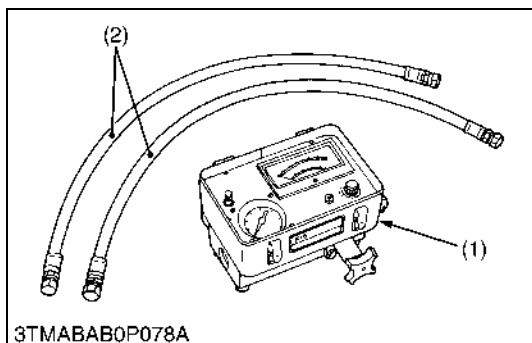
- 07916-50045

Application

- This allows easy measurement of relief set pressure.

(1) Gauge (07916-50322)	(6) Adaptor C (PS3/8) (07916-50371)
(2) Cable (07916-50331)	(7) Adaptor D (PT1/8) (07916-50381)
(3) Threaded Joint (07916-50401)	(8) Adaptor E (PS3/8) (07916-50392)
(4) Threaded Joint (07916-50341)	(9) Adaptor F (PF1/2) (07916-62601)
(5) Adaptor B (M18 × P1.5) (07916-50361)	(10) Adaptor 58 (PT1/4) (07916-52391)

WSM000001GEG0027US0



Flow Meter

Code No.

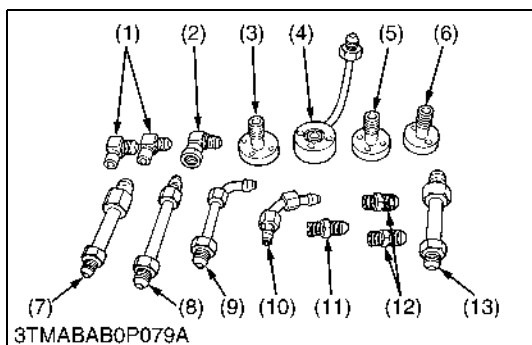
- 07916-52791 (Flow Meter)
- 07916-52651 (Hydraulic Test Hose)

Application

- This allows easy testing of hydraulic system.

(1) Flow Meter	(2) Hydraulic Test Hose

WSM000001GEG0036US0



Adaptor Set for Flow Meter

Code No.

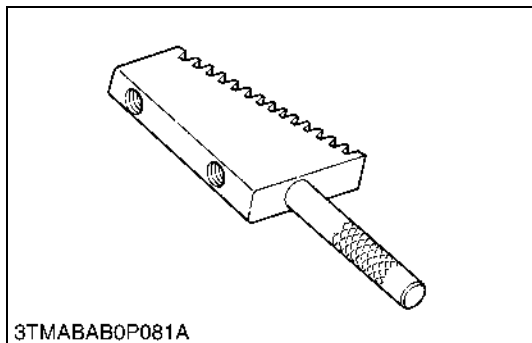
- 07916-54031

Application

- Use for test of the hydraulic system.

(1) Adaptor 52	(8) Adaptor 65
(2) Adaptor 53	(9) Adaptor 66
(3) Adaptor 54	(10) Adaptor 67
(4) Adaptor 61	(11) Adaptor 68
(5) Adaptor 62	(12) Adaptor 69
(6) Adaptor 63	(13) Hydraulic Adaptor 1
(7) Adaptor 64	

WSM000001GEG0037US0



Pinion Locking Tool

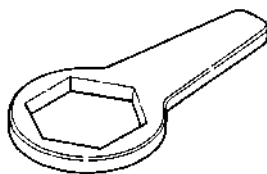
Code No.

- 07916-55311

Application

- Use to prevent the shaft from turning when you remove or tighten a staking nut of a bevel pinion shaft.

WSM000001GEG0039US0



3TMABAB0P082A

Rear Axle Nut Wrench 71

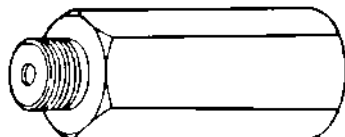
Code No.

- 07916-52531

Application

- Use to remove and tighten a rear axle nut.

WSM000001GEG0040US0



3TMABAB0P083A

Relief Valve Setting Pressure Adaptor G

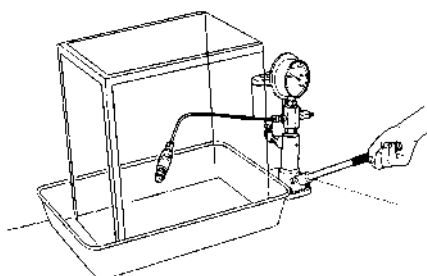
Code No.

- 07916-52751

Application

- This allows easy measurement of relief valve setting pressure from the hydraulic coupler. This is available with the relief valve setting pressure tester.

WSM000001GEG0041US0



3TLABAB1P041A

Safety Valve Tester

Code No.

- 07909-31361

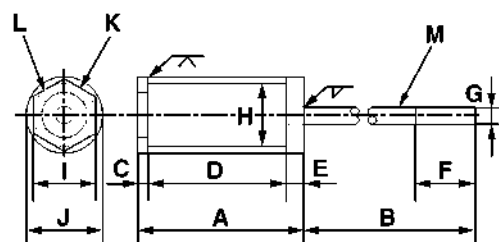
Application

- Use to check the safety valve setting pressure.

Measuring range

- 0 to 50 MPa (0 to 500 kgf/cm², 0 to 7200 psi)

9Y1210447GEG0092US0



3TMABAB0P084A

Pinion Shaft Remover

Application

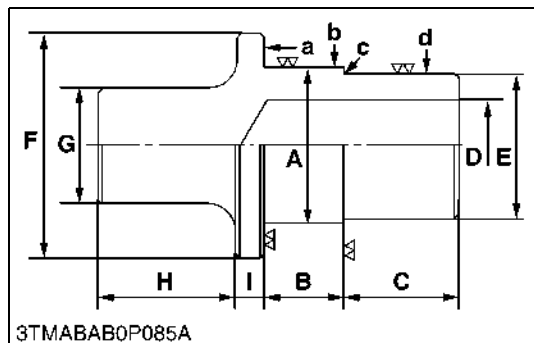
- Use for removing a pinion shaft.

NOTE

- The special tool is not available, so make it. Refer to the figure.

A	106 mm (4.17 in.)
B	350 mm (13.78 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 × P1.5
M	M10 × P1.25

9Y1211012GEG0022US0



Hydraulic Arm Shaft Bushing Press-Fitting Tool

Application

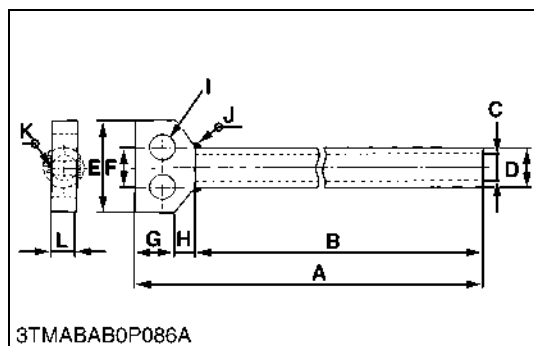
- Use for replacing the hydraulic arm shaft bushings in the hydraulic cylinder body.

NOTE

- The special tools are not available, so make them. Refer to the figure.

	Right	Left
A	54.7 to 54.9 mm (2.1535 to 2.1614 in.)	49.7 to 49.9 mm (1.9567 to 1.9646 in.)
B	24.5 to 25.5 mm (0.9646 to 1.0039 in.)	21.5 to 22.5 mm (0.8465 to 0.8858 in.)
C	40 mm (1.57 in.)	40 mm (1.57 in.)
D	32 mm (1.26 in.)	30 mm (1.18 in.)
E	49.7 to 49.9 mm (1.9567 to 1.9646 in.)	44.7 to 44.9 mm (1.7598 to 1.7677 in.)
F	70 mm dia. (2.76 in. dia.)	
G	40 mm dia. (1.57 in. dia.)	
H	50 mm (1.97 in.)	
I	10 mm (0.39 in.)	
a	6.3 μ m (250 μ in.)	
b	6.3 μ m (250 μ in.)	
c	6.3 μ m (250 μ in.)	
d	6.3 μ m (250 μ in.)	

9Y1211012GEG0023US0



Draft Control Test Bar

Application

- Use for checking the lift range and floating range of hydraulic draft control.

NOTE

- The special tool is not available, so make it. Refer to the figure.

A	1045 mm (41.14 in.)
B	1000 mm (29.37 in.)
C	20 mm dia. (0.79 in. dia.)
D	30 mm dia. (1.18 in. dia.)
E	90 mm (3.54 in.)
F	30 mm (1.18 in.)
G	30 mm (1.18 in.)
H	15 mm (0.59 in.)
I	20 mm dia. (0.79 in. dia.)
J	Weld all around
K	Weld all around
L	20 mm (0.79 in.)

9Y1211012GEG0024US0

Pump Adaptor

Application

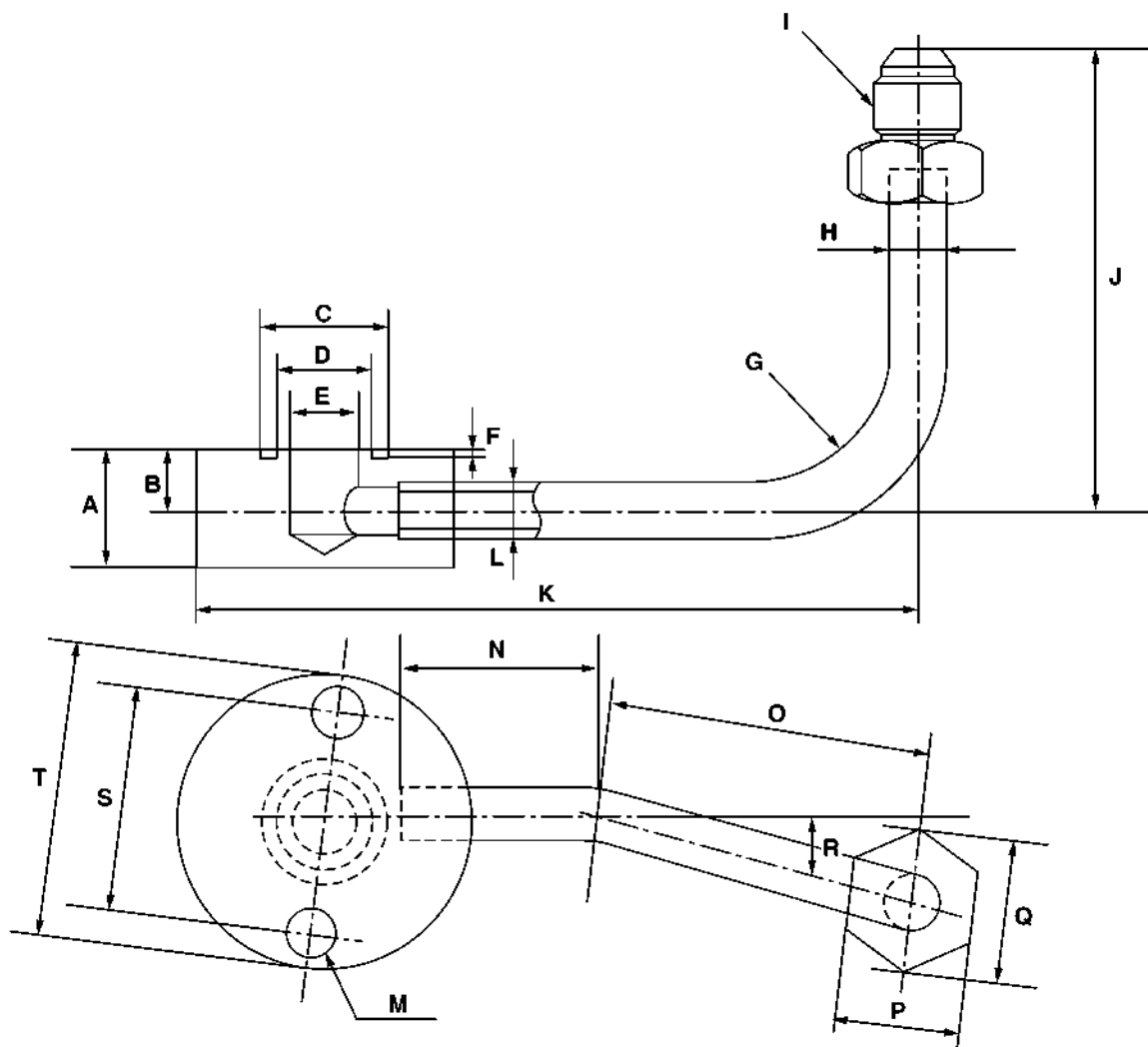
- Use for examining the main hydraulic pump.

NOTE

- When you use, attach with following parts.
O-ring: 04811-00180
- This adaptor is changed from Adaptor 61 of flowmeter adaptor set (see page G-89).
- This special tool is not available, so make it. Refer to the figure.

(Reference)

- From size "A" to size "R" are same size as adaptor 61.



3TLABAB0P055A

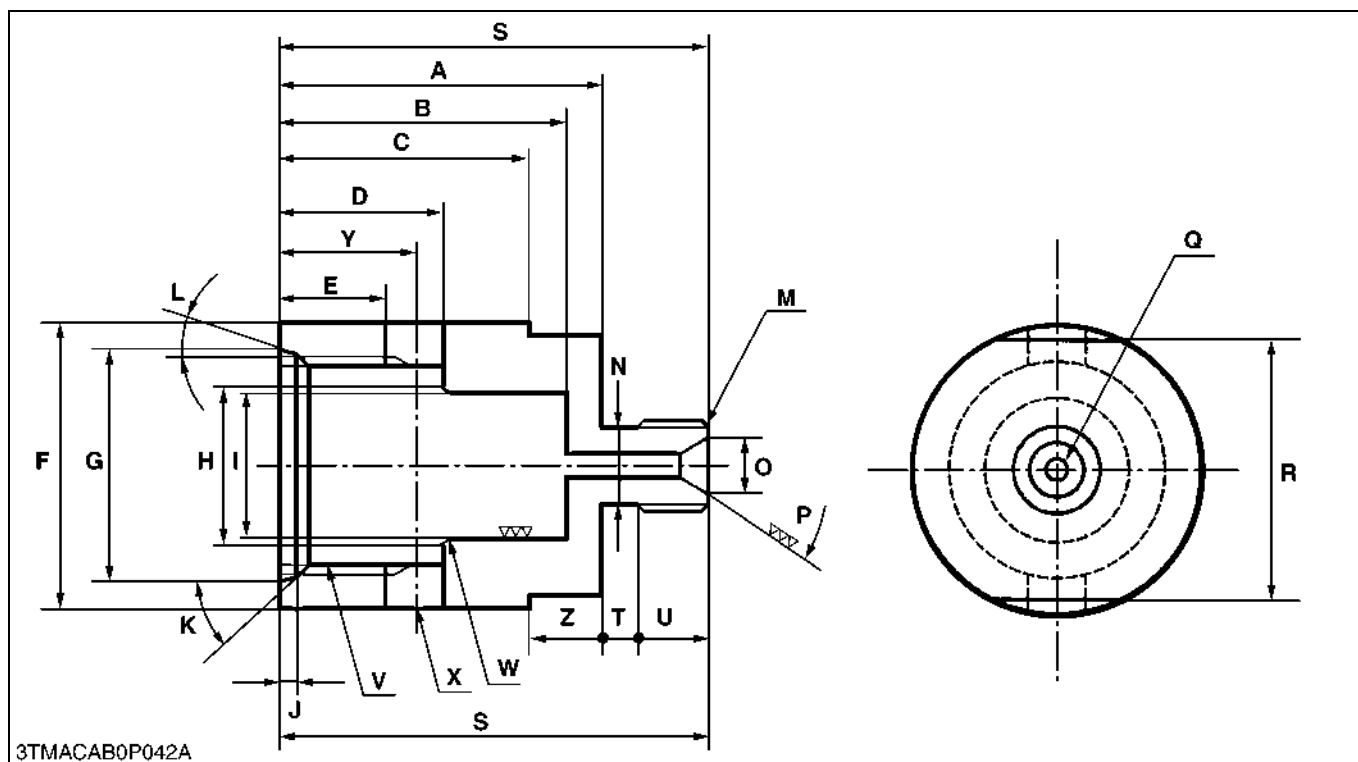
A	22 mm (0.872 in.)	K	135 mm (5.31 in.)
B	11 mm (0.437 in.)	L	7 mm dia. (0.28 in. dia.)
C	24 mm dia. (0.94 in. dia.)	M	8.5 mm dia. (0.33 in. dia.)
D	18 mm dia. (0.71 in. dia.)	N	37 mm (1.46 in.)
E	12 mm dia. (0.47 in. dia.)	O	61.5 mm (2.42 in.)
F	1.7 to 1.9 mm (0.067 to 0.075 in.)	P	24 mm (0.94 in.)
G	30 mm Round (1.18 in. Round)	Q	27.7 mm (1.09 in.)
H	10 mm dia. (0.39 in. dia.)	R	0.244 rad (14°)
I	G 3/8	S	40 mm (1.57 in.)
J	89 mm (3.50 in.)	T	60 mm dia. (2.36 in. dia.)

Cylinder Safety Valve Setting Pressure Adaptor**Application**

- Use for setting the safety valve to the nozzle tester to measure cracking pressure and check oil tightness of the safety valves.

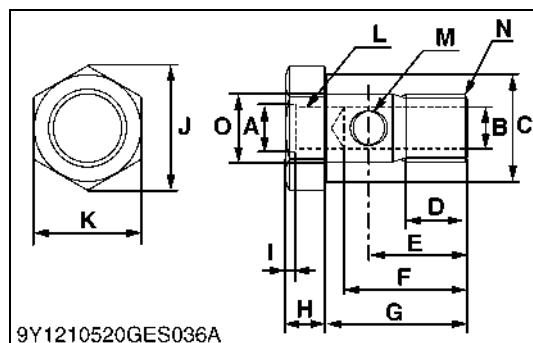
NOTE

- This special tool is not provided, so make it referring to the figure.



A	45 mm (1.77 in.)	N	10 mm dia. (0.39 in. dia.)
B	40 mm (1.58 in.)	O	7.5 mm dia. (0.3 in. dia.)
C	35 mm (1.38 in.)	P	1.05 rad (60°)
D	23.0 to 23.3 mm (0.9055 to 0.9713 in.)	Q	3 mm dia. (1.18 in. dia.)
E	16 mm (0.63 in.)	R	36 mm (1.18 in.)
F	40 mm dia. (1.58 in. dia.)	S	60 mm (2.36 in.)
G	32.4 to 32.7 mm dia. (1.2756 to 1.2874 in. dia.)	T	5 mm (0.20 in.)
H	21 mm dia. (0.83 in. dia.)	U	10 mm (0.39 in.)
I	20.00 to 20.05 mm dia. (0.7874 to 0.7894 in. dia.)	V	M30 × P1.5
J	2.50 to 2.59 mm (0.0984 to 0.1097 in.)	W	0.52 rad (30°)
K	0.79 rad (45°)	X	8 mm dia. (0.32 in. dia.)
L	0.26 rad (15°)	Y	19 mm (0.75 in.)
M	M12 × P1.5	Z	10 mm (0.39 in.)

9Y1211012GEG0026US0



Pump Adaptor 2

Application

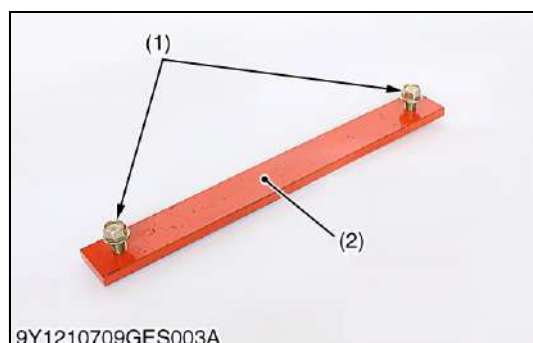
- Use for checking the relief valve of power steering.

NOTE

- This special tool is not provided, so make it referring to the figure.

A	11 mm dia. (0.43 in. dia.)
B	10 mm dia. (0.39 in. dia.)
C	24 mm dia. (0.94 in. dia.)
D	15 mm (0.59 in.)
E	14 mm (0.55 in.)
F	24 mm (0.94 in.)
G	29 mm (1.1 in.)
H	8.5 mm (0.33 in.)
I	3 mm (0.1 in.)
J	30 mm (1.2 in.)
K	26 mm (1.0 in.)
L	PF 1/8
M	8 mm dia. (0.3 in. dia.)
N	PT 3/8
O	17 mm dia. (0.67 in. dia.)

9Y1211012GEG0027US0



Front Axle Rocking Plate

Application

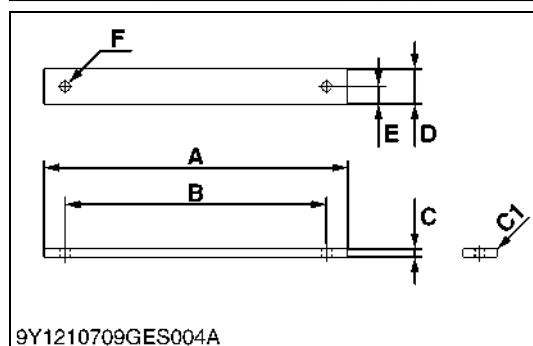
- Use for restricting front axle rocking.

A	430 mm (16.9 in.)
B	370 mm (14.6 in.)
C	11.5 mm (0.45 in.)
D	50 mm (1.97 in.)
E	25 mm (0.98 in.)
F	M14 × 1.5 (φ12)
C1	Chamfer 1 mm (0.04 in.)

(1) Bolt M14 × 30

(2) Front Axle Rocking Plate

9Y1211012GEG0028US0

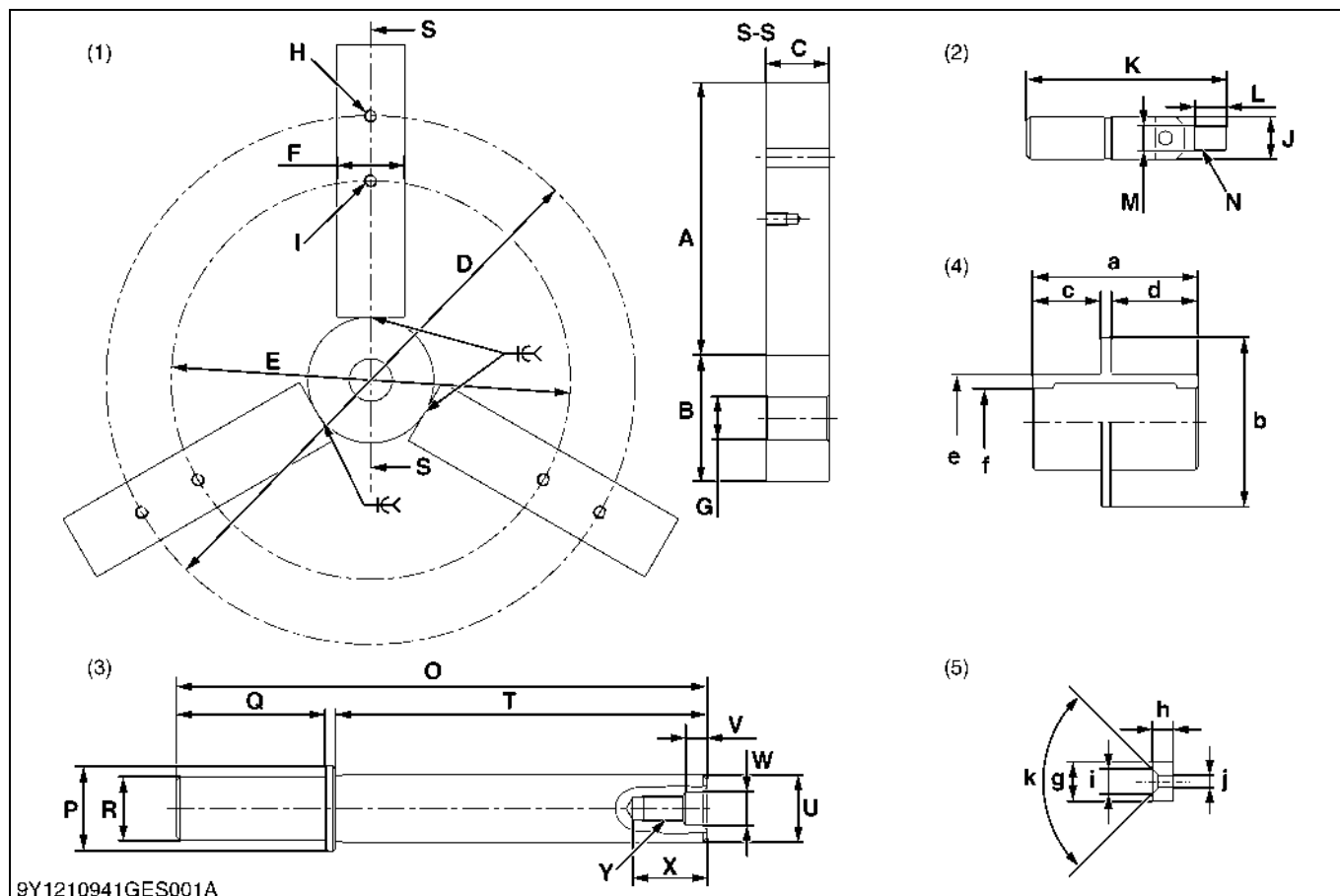


Dual Clutch Assembling Tool**Application**

- Use for disassembling and assembling dual clutch assembly.

NOTE

- When using, attach 3 spacers (5) to "I" part of table (1) by using M6 × 1.0 flat head screw.



9Y1210941GES001A

A	130 mm (5.12 in.)	T	175 mm (6.89 in.)
B	60 mm dia. (2.4 in. dia.)	U	31.6 mm dia. (1.24 in. dia.)
C	30 mm (1.2 in.)	V	10 mm (0.39 in.)
D	252 mm dia. (9.92 in. dia.)	W	16 mm dia. (0.63 in. dia.)
E	190 mm dia. (7.48 in. dia.)	X	35 mm (1.4 in.)
F	32 mm (1.3 in.)	Y	M12 × 1.25
G	20.4 mm dia. (0.803 in. dia.)	a	78 mm (3.1 in.)
H	M8 × 1.25	b	80 mm dia. (3.1 in. dia.)
I	M 6 × 1.0 × 10 / 5 mm dia. (0.2 in. dia.) × 15 mm (0.59 in.)	c	32.2 mm (1.27 in.)
J	20 mm dia. (0.79 in. dia.)	d	40.7 mm (1.60 in.)
K	95 mm (3.7 in.)	e	45 mm dia. (1.8 in. dia.)
L	15 mm (0.59 in.)	f	31.6 mm dia. (1.24 in. dia.)
M	12 mm dia. (0.47 in. dia.)	g	19 mm dia. (0.75 in. dia.)
N	M12 × 1.25	h	10 mm (0.39 in.)
O	250 mm (9.84 in.)	i	12 mm dia. (0.47 in. dia.)
P	40 mm dia. (1.6 in. dia.)	j	6 mm dia. (0.2 in. dia.)
Q	70 mm (2.8 in.)	k	90° (1.6 rad)
R	30 mm dia. (1.2 in. dia.)		

(1) Table

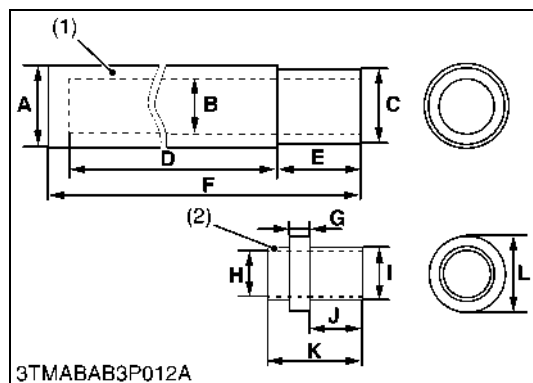
(3) Center Bar

(4) Gauge Ring

(5) Spacer

(2) Tip Guide

9Y1211012GEG0029US0



Rear Propeller Shaft Tool

Application

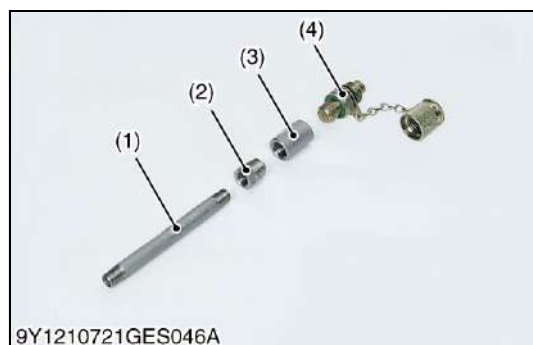
- For installing bearing, oil seals and sleeves on rear propeller shaft.

Bearing and oil seal: (1)

Sleeves: (1) and (2)

A	40 mm dia. (1.57 in. dia.)
B	26 mm dia. (1.02 in. dia.)
C	36 mm dia. (1.42 in. dia.)
D	200 mm (7.87 in.)
E	40 mm (1.57 in.)
F	250 mm (9.84 in.)
G	10 mm (0.39 in.)
H	22 mm dia. (0.87 in. dia.)
I	25 mm dia. (0.98 in. dia.)
J	25 mm (0.98 in.)
K	45 mm (1.77 in.)
L	36 mm dia. (1.42 in. dia.)

9Y1211012GEG0030US0



PTO Adaptor and Cable

Application

- Use for measuring PTO clutch operating pressure.

1) Adaptor Assembly

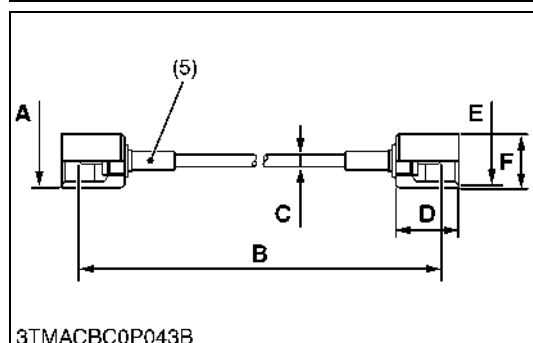
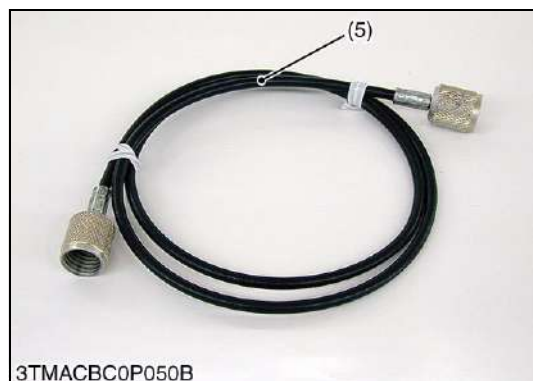
(1)	Pipe	R1/8 × 150 mm
(2)	Adaptor	G1/4 × G1/8
(3)	Socket	G1/4 × 25 mm
(4)	Threaded Joint (07916-50341)	PS1/4 – M16 × 1.5

2) Code No.: 07916-50330

A	M16 × 1.5
B	1000 mm (39.37 in.)
C	4.5 mm dia. (0.18 in. dia.)
D	21 mm (0.83 in.)
E	M16 × 1.5
F	18 mm dia. (0.71 in. dia.)

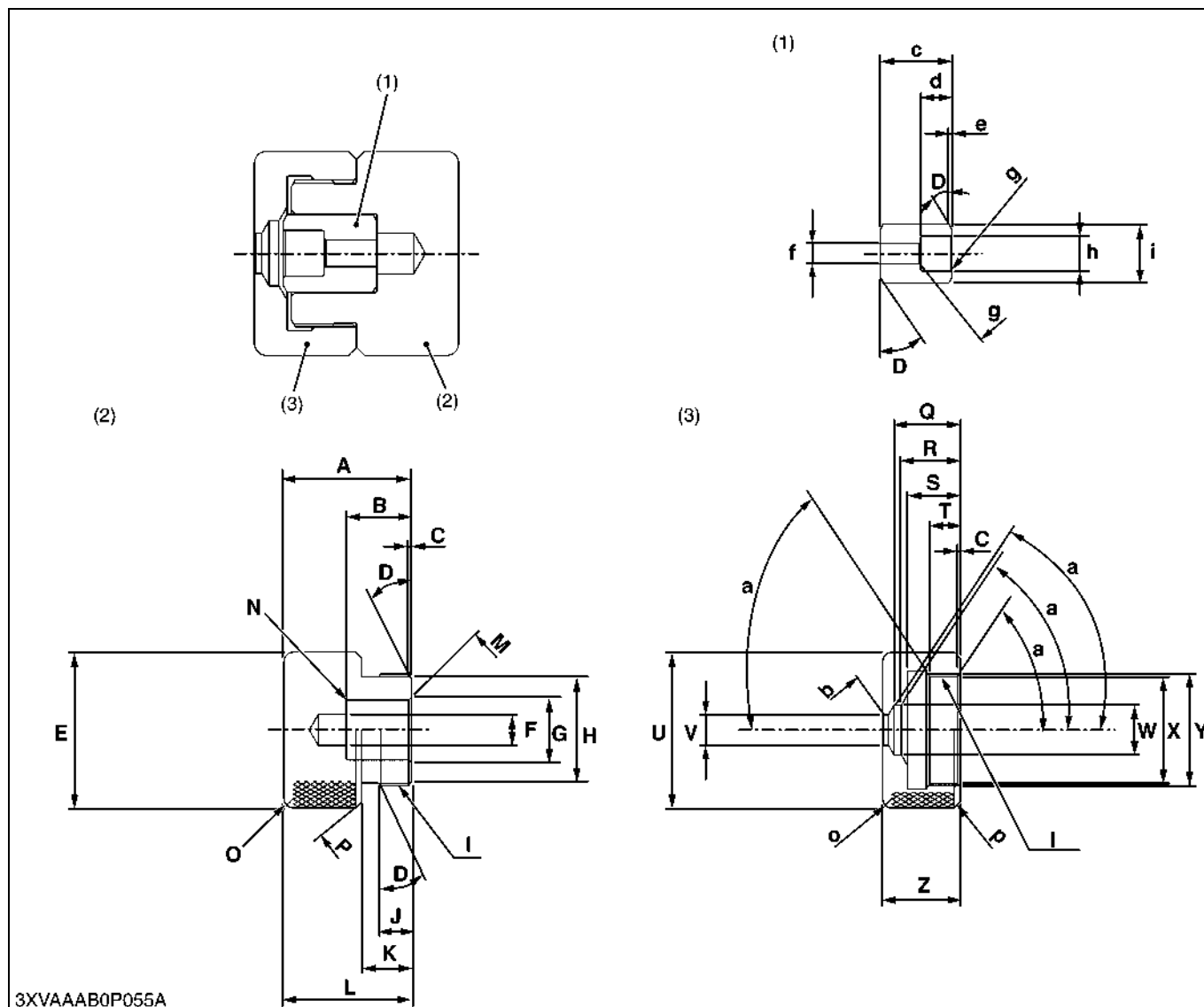
(5) Cable

9Y1211012GEG0031US0



Check and High Pressure Relief Valve Assembly Tool**Application**

- Use for readjusting relief valve pressure.



A	30 mm (1.2 in.)	N	Chamfer 0.4 mm (0.02 in.)	a	0.17 rad (10°)
B	21 mm (0.83 in.)	O	Chamfer 3 mm (0.1 in.)	b	Chamfer 0.3 mm (0.01 in.)
C	1 mm (0.04 in.)	P	Chamfer 2 mm (0.08 in.)	c	23 mm (0.91 in.)
D	0.52 rad (30°)	Q	21.4 mm (0.843 in.)	d	10 mm (0.39 in.)
E	50 mm dia. (2.0 in. dia.)	R	19 mm (0.75 in.)	e	1 mm (0.04 in.)
F	10 mm dia. (0.39 in. dia.)	S	17 mm (0.67 in.)	f	6.5 mm (0.26 in.)
G	9.10 to 9.30 mm dia. (0.359 to 0.366 in. dia.)	T	10 mm (0.39 in.)	g	Chamfer 0.5 mm (0.02 in.)
H	34 mm dia. (1.3 in. dia.)	U	50 mm dia. (2.0 in. dia.)	h	11.1 to 11.3 mm (0.437 to 0.444 in.)
I	M36 × 1.5 mm Pitch	V	9.8 mm dia. (0.39 in. dia.)	j	18.8 to 19.0 mm (0.741 to 0.748 in.)
J	10 mm (0.39 in.)	W	16 mm dia. (0.63 in. dia.)		
K	16 mm (0.63 in.)	X	34.5 mm dia. (1.36 in. dia.)	(1)	Spacer
L	41 mm (1.6 in.)	Y	38 mm dia. (1.5 in. dia.)	(2)	Block
M	Chamfer 1 mm (0.04 in.)	Z	25 mm (0.98 in.)	(3)	Cap

9Y1211012GEG0197US0

9. TIRES

[1] TIRE PRESSURE



WARNING

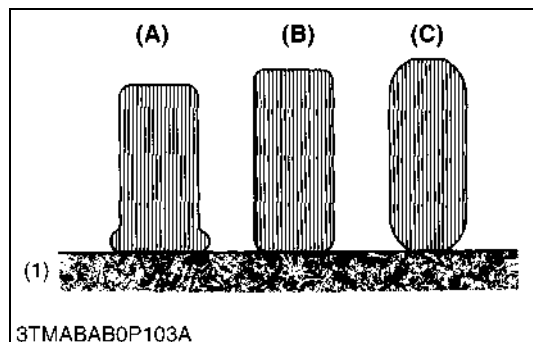
To avoid personal injury:

- Do not attempt to mount a tire on a rim. This should be done by a qualified person with the proper equipment.
- Always maintain the correct tire pressure.
Do not inflate tires above the recommended pressure shown in the operator's manual.

IMPORTANT

- Do not use tires other than those approved by KUBOTA.

9Y1211012GEG0032US0



Inflation Pressure

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

NOTE

- Maintain the maximum pressure in front tires, if using a front loader or when equipped with a full load of front weights.

L3301/L3901

	Tire Sizes	Inflation Pressure
Rear	11.2-24, 4PR	100 kPa (1.0 kgf/cm ² , 14 psi)
	13.6-16, 4PR	100 kPa (1.0 kgf/cm ² , 14 psi)
	15-19.5, 6PR	210 kPa (2.1 kgf/cm ² , 30 psi)
Front	5.00-15, 4PR	220 kPa (2.2 kgf/cm ² , 32 psi)
	7-16, 6PR	180 kPa (1.8 kgf/cm ² , 26 psi)
	23 × 8.50-12, 4PR	160 kPa (1.6 kgf/cm ² , 23 psi)
	25 × 8.50-14, 6PR	160 kPa (1.6 kgf/cm ² , 23 psi)
	27 × 8.50-15, 6PR	210 kPa (2.1 kgf/cm ² , 30 psi)

L4701

	Tire Sizes	Inflation Pressure
Rear	14.9-24, 6PR	140 kPa (1.4 kgf/cm ² , 20 psi)
	44 × 18-20, 4PR	140 kPa (1.4 kgf/cm ² , 20 psi)
	17.5L-24, 6PR	140 kPa (1.4 kgf/cm ² , 20 psi)
Front	6.00-16, 4PR	220 kPa (2.2 kgf/cm ² , 32 psi)
	8.3-16, 6PR	150 kPa (1.5 kgf/cm ² , 22 psi)
	27 × 8.50-15, 4PR	80 kPa (0.8 kgf/cm ² , 11 psi)
	10-16.5, 6PR	140 kPa (1.4 kgf/cm ² , 20 psi)
	7.5L-15, 6PR	220 kPa (2.2 kgf/cm ² , 32 psi)
	27-10.50LL15, 4PR	80 kPa (0.8 kgf/cm ² , 11 psi)
	305R343	140 kPa (1.4 kgf/cm ² , 20 psi)

(1) Ground

(A) Insufficient
(B) Standard
(C) Excessive

9Y1211012GEG0033US0

Dual Tires

Dual tires are not approved.

9Y1211012GEG0034US0

[2] TREADS ADJUSTMENT



CAUTION

To avoid personal injury:

- When working on slopes or working with trailer, set the wheel tread as wide as practice for the job for maximum stability.
- Support tractor securely on stands before removing a wheel.
- Do not work under any hydraulically supported devices. They can settle, suddenly leak down, or be accidentally lowered. If necessary to work under tractor or any machine elements for servicing or adjustment, securely support them with stands or suitable blocking beforehand.
- Never operate tractor with a loose rim, wheel, or axle.

9Y1211012GEG0035US0

(1) L3301/L3901

[A] Front Wheels

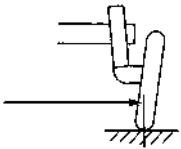
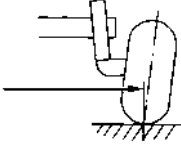
Front tread can not be adjusted.

■ IMPORTANT

- Do not turn front discs to obtain wider tread.
- When re-fitting or adjusting a wheel, tighten the bolts to the following torques then recheck after driving the tractor 200 m (200 yards) and 10 times of shuttle movement by 5 m (5 yards), and thereafter according to service interval. (See page G-15.)

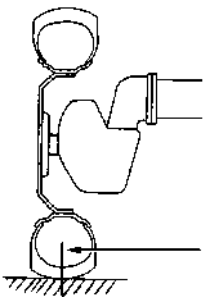
9Y1211012GEG0039US0

2WD Front Wheel

5 - 15 Farm	23 × 8.5 - 12 Turf
	
3TLAAAB0P037A	3TLAAAB0P038A
1050 mm (41.3 in.)	1175 mm (46.3 in.)

9Y1211012GEG0037US0

4WD Front Wheel

	Tire	7.2-16 Farm	25 × 8.5-14 Turf	27 × 8.5-15 Industrial
	Tread	1095 mm (43.1 in.)	1105 mm (43.5 in.)	1115 mm (43.9 in.)

9Y1211012GEG0038US0

[B] Rear Wheels

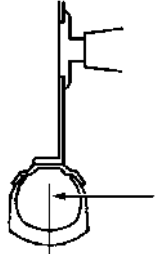
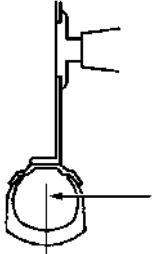
Rear tread width can be adjusted with the tires listed below.

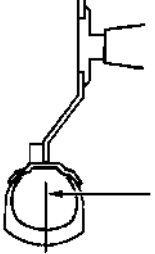
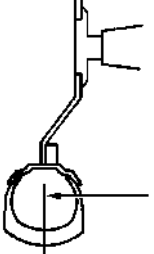
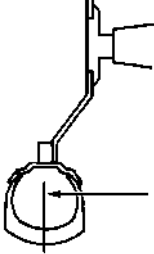
To change the tread width

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.

■ IMPORTANT

- Always attach wheels as shown in the drawings.
- If not attached as illustrated, transmission parts may be damaged.
- When re-fitting or adjusting a wheel, tighten the bolts to the following torques then recheck after driving the tractor 200 m (200 yards) and 10 times of shuttle movement by 5 m (5 yards), and thereafter according to service interval. (See page G-15.)

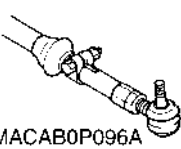
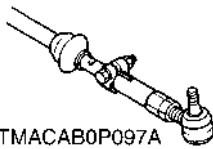
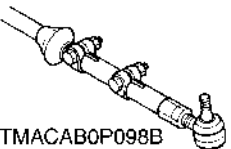
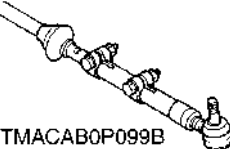
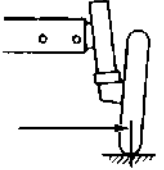
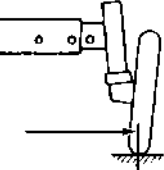
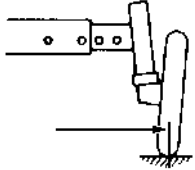
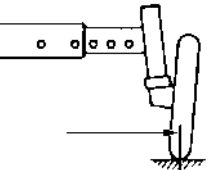
15-19.5 Industry		13.6-16 Turf	
			
3TMABAB0P101A		3TMABAB0P101A	
1145 mm (45.1 in.)		1115 mm (43.9 in.)	

11.2-24 Farm		
		
3TMABAB0P098A	3TMABAB0P099A	3TMABAB0P100A
1115 mm (43.8 in.)	1195 mm (47.1 in.)	1290 mm (50.8 in.)

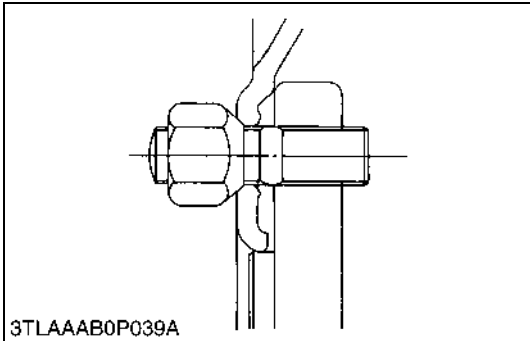
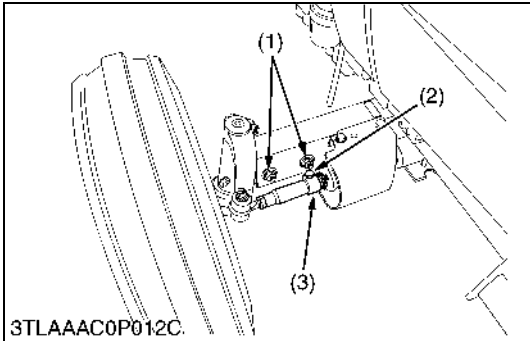
9Y1211012GEG0040US0

(2) L4701**[A] Front Wheels****Front Wheels (2WD Model)**

Front tread can be adjusted in 4 steps.

Models		 3TMACAB0P096A	 3TMACAB0P097A	 3TMACAB0P098B	 3TMACAB0P099B
		 3TMABAB0P091A	 3TMABAB0P092A	 3TMABAB0P093A	 3TMABAB0P094A
Farm	6.00-16	1210 mm (47.6 in.)	1310 mm (51.6 in.)	1410 mm (55.5 in.)	1510 mm (59.4 in.)
	7.5L-15	1280 mm (50.4 in.)	1380 mm (54.3 in.)	1480 mm (58.3 in.)	1580 mm (62.2 in.)
Turf	27 × 8.5-15	1235 mm (48.6 in.)	1335 mm (52.6 in.)	1435 mm (56.5 in.)	1535 mm (60.4 in.)

9Y1211012GEG0041US0



- To adjust the tread.
1. Lift the front of the tractor with a jack.
 2. Remove the front axle mounting bolts (1) and the tie-rod mounting bolts (2).
 3. Move the front axles (right and left) to the desired position, and tighten the bolts.

Front axle mounting bolt	Factory specification	124 to 147 N·m 12.6 to 15.0 kgf·m 91.5 to 108.4 lbf·ft
Tie-rod mounting bolt		61 to 71 N·m 6.2 to 7.2 kgf·m 44.8 to 52.1 lbf·ft

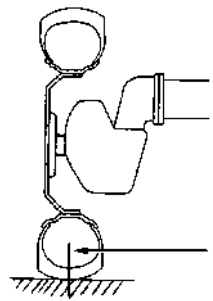
- **IMPORTANT**
- After adjusting the tread, adjust toe-in.
Toe-in: 2 to 8 mm (0.08 to 0.31 in.)
 - The front width for the front loader application on 2WD model should not be greater than 1280 mm (50.4 in.).
- **NOTE**
- Wheels with beveled or tapered holes: Use the tapered side of lug nut.

- (1) Front Axle Mounting Bolt (3) Tie-rod Clamp
(2) Tie-rod Mounting Bolt

9Y1211012GEG0042US0

Front Wheels (4WD Model)

Front tread can not be adjusted.

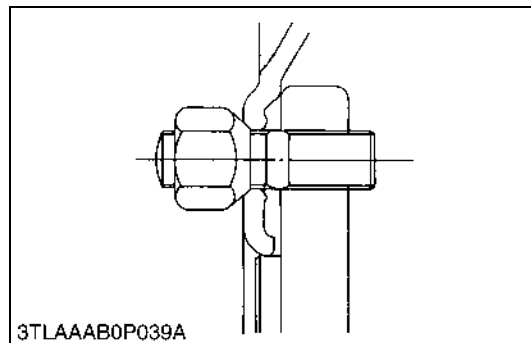
 3TMABAB0P095A	Tire	8.3-16 Farm	27 × 8.50-15 Turf	27 × 10.50LL15 Turf	10-16.5 Industrial	305R343 Turf
	Tread	1155 mm (45.5 in.)	1200 mm (47.2 in.)	1180 mm (46.5 in.)	1195 mm (47.0 in.)	1305 mm (51.4 in.)

■ **IMPORTANT**

- Do not turn front discs to obtain wider tread.

■ **NOTE**

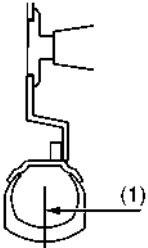
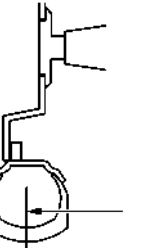
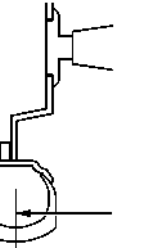
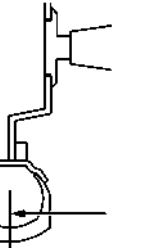
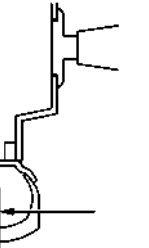
- Wheels with beveled or tapered holes: Use the tapered side of lug nut.

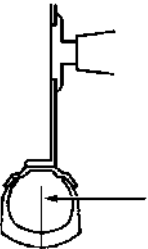


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[B] Rear Wheels

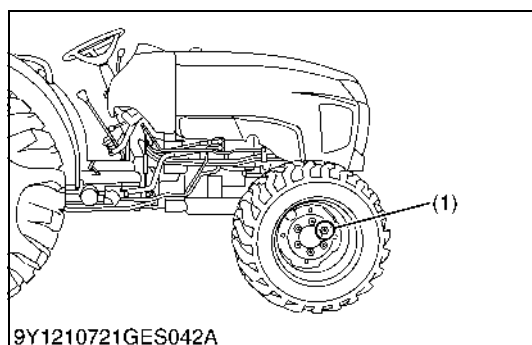
Rear tread can be adjusted in 6 steps.

Models					
14.9-24 Farm	1180 mm (46.5 in.)	1200 mm (47.2 in.)	1300 mm (51.2 in.)	1450 mm (57.1 in.)	1545 mm (60.8 in.)
17.5L-24 Industrial	—	1250 mm (49.2 in.)	1360 mm (53.5 in.)	1390 mm (54.7 in.)	1500 mm (59.1 in.)

Models	
44 × 18-20 Turf	1430 mm (56.3 in.)

(1) Tread

9Y1211012GEG0044US0



9Y1210721GES042A

To adjust the tread

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

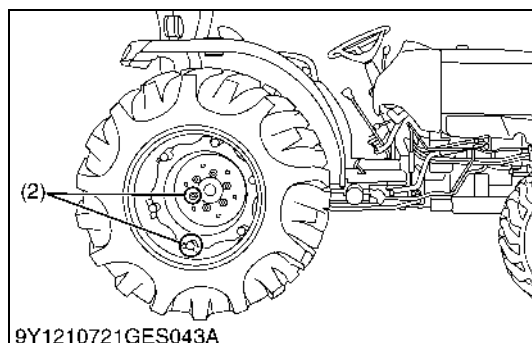
■ **IMPORTANT**

- If not attached as illustrated, transmission parts may be damaged.
- When re-fitting or adjusting a wheel, tighten the bolts to the following torques then recheck after driving the tractor 200 m (200 yards) and thereafter according to service interval.

Tightening torque	Front wheel mounting screw and nut or lug nut	124.0 to 147.0 N·m 12.6 to 15.0 kgf·m 91.5 to 108.4 lbf·ft
	Rear wheel mounting screw and nut	196.0 to 225.0 N·m 20.0 to 23.0 kgf·m 144.6 to 166.0 lbf·ft

- (1) Front Wheel Mounting Screw and Nut or Lug Nut (2) Rear Wheel Mounting Screw and Nut

9Y1211012GEG0045US0



9Y1210721GES043A

[3] TIRE LIQUID INJECTION

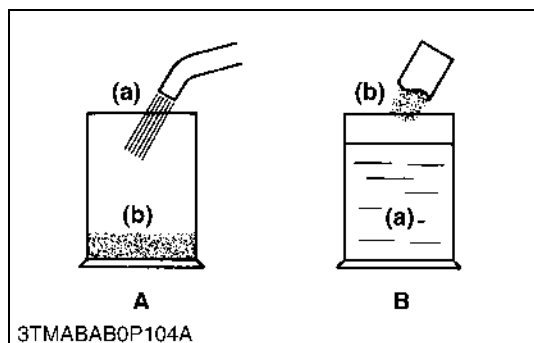
Auxiliary weights can be used to increase traction force for plowing in fields or clayey ground.

Another way is to inject water or another liquid, such as a calcium chloride solution in the tires. Water must not be used in winter since it freezes at 0 °C (32 °F). The calcium chloride solution will not freeze and moreover, affords higher effect than water since its specific gravity is higher than that of water by about 20 %. Below is an explanation of calcium chloride solution injection.

■ IMPORTANT

- Do not fill the front tires with liquid.

9Y1211012GEG0046US0



Preparation of Calcium Chloride Solution

⚠ CAUTION

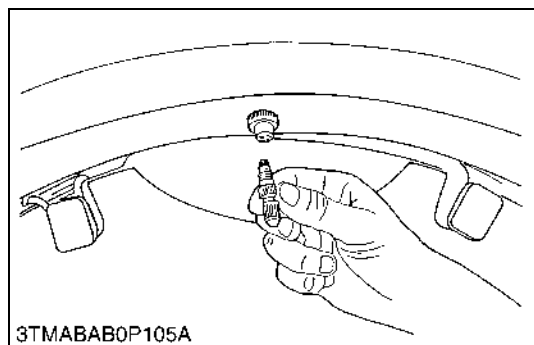
- When making a calcium chloride solution, do not pour water over calcium chloride since this results in chemical reaction which will cause high temperature. Instead add a small amount of calcium chloride to the water at a time until the desired solution is achieved.

Freezing temperature	Weight of CaCl ₂ to be dissolved in 100 L (26.5 U.S.gals, 22.0 Imp.gals) of water
-5 °C (23 °F)	12 kg (26.4 lbs)
-10 °C (14 °F)	21 kg (46.3 lbs)
-15 °C (5 °F)	28 kg (61.7 lbs)
-20 °C (-4 °F)	34 kg (75.0 lbs)
-25 °C (-13 °F)	40 kg (88.2 lbs)
-30 °C (-22 °F)	44 kg (97.0 lbs)
-35 °C (-31 °F)	49 kg (108 lbs)
-40 °C (-40 °F)	52 kg (114.6 lbs)
-45 °C (-49 °F)	56 kg (123.5 lbs)
-50 °C (-58 °F)	61 kg (134.5 lbs)

- (a) Water
(b) CaCl₂ (Calcium Chloride)

- A: Bad
B: Good

9Y1211012GEG0047US0



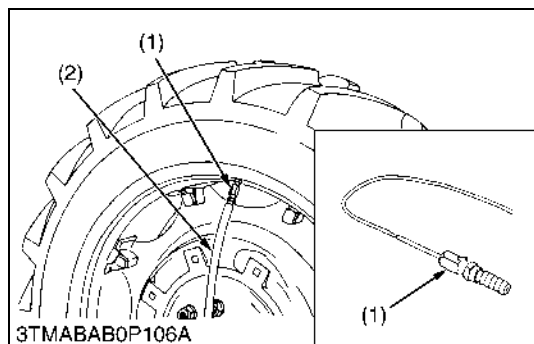
Attaching Injector

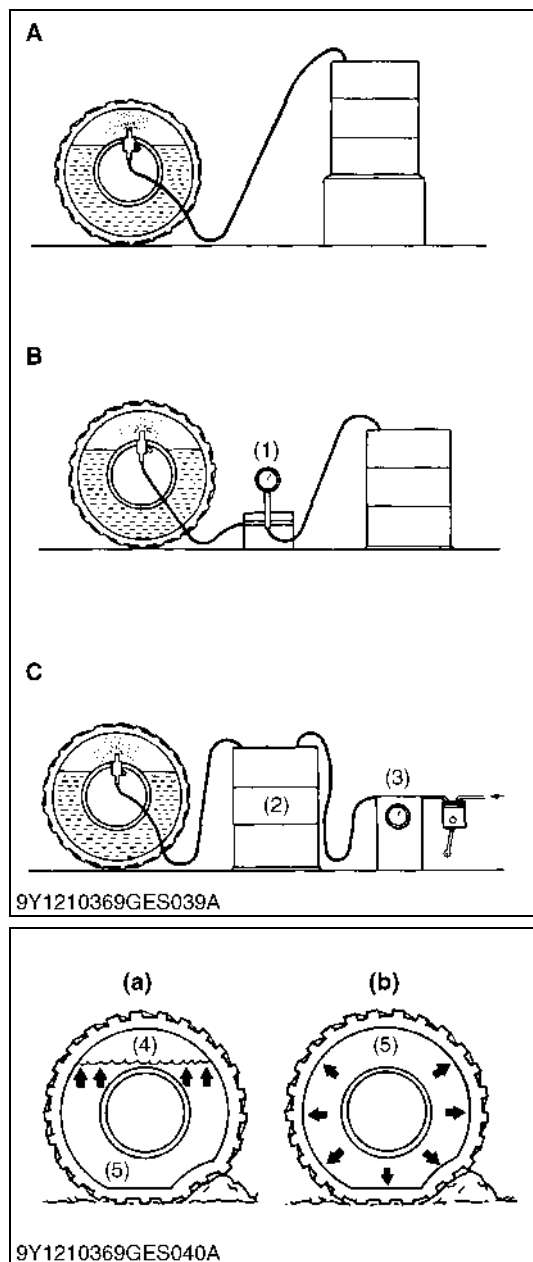
1. Lift the rear tires off the ground.
2. Turn the tire so that the air valve is at the top.
3. Remove the air valve, and attach the injector.
(Code No. 07916-52501)

(1) Injector

(2) Hose

9Y1211012GEG0048US0





Injection

⚠ CAUTION

- When a calcium chloride solution is used, cool it before pouring it into the tire.
- Do not fill tires with water or solution more than 75 % of full capacity (to the valve stem level).

The following four ways can be used to inject water or a calcium chloride solution into tires.

1. Gravity injection "A"
2. Pump injection "B"
3. Pressure tank injection "C"
4. Injection directly from tap (only when water is being used).

■ NOTE

- Once injection is completed, reset the air valve, and pump air into the tire to the specified pressure.

Weight of Calcium Chloride Solution Filling 75 % of Full Capacity of a Tire.

L3301/L3901

Tire sizes	11.2-24	15-19.5
Slush free at -10 °C (14 °F) Solid at -30 °C (-22 °F) [Approx. 1 kg (2 lbs) CaCl ₂ per 4 L (1 gal) of water]	105 kg (230 lbs)	140 kg (309 lbs)
Slush free at -24 °C (-11 °F) Solid at -47 °C (-52 °F) [Approx. 1.5 kg (3.5 lbs) CaCl ₂ per 4 L (1 gal) of water]	110 kg (240 lbs)	150 kg (331 lbs)
Slush free at -47 °C (-52 °F) Solid at -52 °C (-62 °F) [Approx. 2.25 kg (5 lbs) CaCl ₂ per 4 L (1 gal) of water]	115 kg (253 lbs)	160 kg (353 lbs)

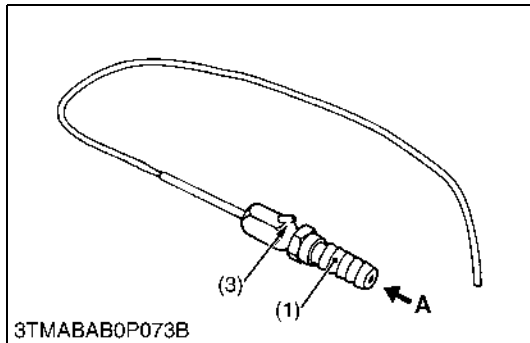
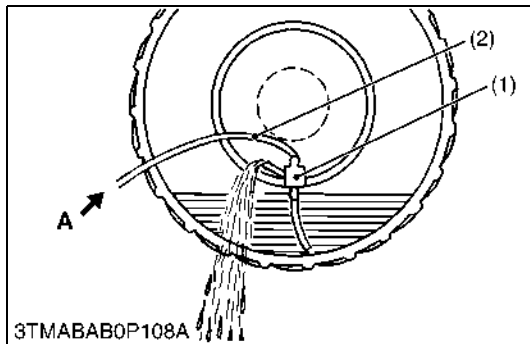
L4701

Tire sizes	14.9-24	17.5L-24
Slush free at -10 °C (14 °F) Solid at -30 °C (-22 °F) [Approx. 1 kg (2 lbs) CaCl ₂ per 4 L (1 gal) of water]	205 kg (450 lbs)	235 kg (515 lbs)
Slush free at -24 °C (-11 °F) Solid at -47 °C (-52 °F) [Approx. 1.5 kg (3.5 lbs) CaCl ₂ per 4 L (1 gal) of water]	215 kg (475 lbs)	250 kg (550 lbs)
Slush free at -47 °C (-52 °F) Solid at -52 °C (-62 °F) [Approx. 2.25 kg (5 lbs) CaCl ₂ per 4 L (1 gal) of water]	225 kg (495 lbs)	265 kg (585 lbs)

- (1) Pump
- (2) Pressure Tank
- (3) Compressor
- (4) Air
- (5) Water

- A: Gravity Injection**
B: Pump Injection
C: Pressure Tank Injection
(a) Correct: 75 %
Air Compresses Like A Cushion
(b) Incorrect: 100 % Full
Water Can Not Be Compressed

9Y1211012GEG0049US0



Draining Water or Solution

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

- (1) Injector
- (2) Hose
- (3) Vent

A: Compressed Air

9Y1211012GEG0050US0

10. IMPLEMENT LIMITATIONS

The KUBOTA Tractor has been thoroughly tested for proper performance with implements sold or approved by KUBOTA. Use with implements 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	
L3301 L3901	1050 mm (41.3 in.)	1095 mm (43.1 in.)	1290 mm (50.8 in.)	900 kg (1985 lbs)
L4701	1580 mm (62.2 in.)	1155 mm (45.5 in.)	1545 mm (60.8 in.)	1300 kg (2870 lbs)

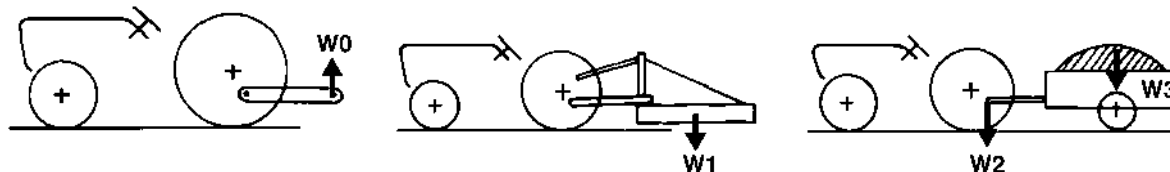
	Actual figures		
	Implement weight W1 and / or size	Max. Drawbar Load W2	Trailer loading weight W3 Max. capacity
L3301 L3901	As in the following list (Shown on the next page)	330 kg (730 lbs)	1000 kg (2200 lbs)
L4701		650 kg (1430 lbs)	3000 kg (6600 lbs)

Lower link end max. hydraulic lift capacity: **W0**

Implement weight: The implement weight which you can put on the link: **W1**

Max. drawbar load: **W2**

Trailer loading weight: The max loading weight for trailer (without trailer weight): **W3**



3TMABAB0P109A

■ NOTE

- Implement size may vary depending on soil operating conditions.

9Y1211012GEG0051US0

No.	Implement		Remarks	L3301	L3901	L4701
1	Trailer		Max. Load Capacity	1000 kg (2200 lbs)		3000 kg (6600 lbs)
			Max. Drawbar Load	330 kg (730 lbs)		650 kg (1430 lbs)
2	Mower	Rotary-cutter	Max. Cutting Width	1829 mm (72 in.)		1829 mm (72 in.)
			Max. Weight	350 kg (770 lbs)		400 kg (880 lbs)
		Flail Mower	Max. Cutting Width	1270 mm (50 in.)		1524 mm (60 in.)
			Max. Weight	350 kg (770 lbs)		400 kg (880 lbs)
		Sickle Bar	Max. Cutting Width	1829 mm (72 in.)		2133 mm (84 in.)
			Max. Weight	400 kg (880 lbs)		500 kg (1100 lbs)
3	Sprayer	Rear Mount	Max. Tank-capacity	300 L (80 U.S.gals, 66 Imp.gals)		400 L (106 U.S.gals, 88 Imp.gals)
		Pull Type	Max. Tank-capacity	800 L (210 U.S.gals, 176 Imp.gals)		1200 L (317 U.S.gals, 264 Imp.gals)
4	Rotary Tiller		Max. Tilling Width	1370 mm (54 in.)		1520 mm (60 in.)
5	Bottom Plow		Max. Size	12 in. × 2, 16 in. × 1		14 in. × 2
6	Disc-harrow: Pull Type		Max. Harrowing Width	1524 mm (60 in.)		1981 mm (78 in.)
			Max. Weight	300 kg (660 lbs)		400 kg (880 lbs)
7	Chisel Plow		Max. Width	1829 mm (72 in.)		1829 mm (72 in.)
			Max. Weight	350 kg (770 lbs)		350 kg (770 lbs)
8	Broad Caster		Max. Tank-capacity	200 L (53 U.S.gals, 44 Imp.gals)		300 L (80 U.S.gals, 66 Imp.gals)
			Max. Weight	100 kg (220 lbs)		100 kg (220 lbs)
9	Manure Spreader		Max. Capacity	1000 kg (2200 lbs)		2000 kg (4400 lbs)
10	Cultivator		Max. Width	1524 mm (60 in.)		2134 mm (84 in.)
			Number of Rows	1		2
			Max. Weight	250 kg (550 lbs)		440 kg (880 lbs)
11	Front Blade		Max. Cutting Width	1829 mm (72 in.)		1829 mm (72 in.)
			Max. Oil Pressure	15.9 MPa (162 kgf/cm ² , 2311 psi)		17.2 MPa (175 kgf/cm ² , 2490 psi)
			Sub Frame	Necessary		Necessary
12	Rear Blade		Max. Cutting Width	1829 mm (72 in.)		1829 mm (72 in.)
			Max. Oil Pressure	15.9 MPa (162 kgf/cm ² , 2311 psi)		17.2 MPa (175 kgf/cm ² , 2490 psi)

No.	Implement	Remarks	L3301	L3901	L4701
13	Front-end Loader	Max. Lifting Capacity	460 kg (1014 lbs)		700 kg (1545 lbs)
		Max. Oil Pressure	15.9 MPa (162 kgf/cm ² , 2311 psi)		18.0 MPa (184 kgf/cm ² , 2560 psi)
		Sub Frame	Necessary		Necessary
14	Box Blade	Max. Cutting Width	1321 mm (52 in.)		1651 mm (65 in.)
		Max. Weight	315 kg (694 lbs)		420 kg (925 lbs)
15	Back Hoe	Max. Digging Depth	2288 mm (90 in.)		2288 mm (90 in.)
		Max. Weight	420 kg (926 lbs)		450 kg (990 lbs)
		Sub Frame	Necessary		Necessary
16	Snow Blade	Max. Width	1524 mm (60 in.)		1829 mm (72 in.)
		Max. Weight	300 kg (660 lbs)		350 kg (770 lbs)
17	Snow Blower	Max. Working Width	1524 mm (60 in.)		1676 mm (66 in.)
		Max. Weight	250 kg (550 lbs)		280 kg (620 lbs)

■ **NOTE**

- Implement size may vary depending on soil operating conditions.

9Y1211012GEG0052US0

1 ENGINE

MECHANISM

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[2] SUPPLY PUMP	1-M8
[3] RAIL.....	1-M11
[4] INJECTOR.....	1-M12
[5] ENGINE CONTROL SYSTEM	1-M16
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1. FEATURES



The diesel engines have the features of low cost and high efficiency. On the other hand, it is said that an amount of the nitrogen oxide (NOx) and particulate matter (PM) contained in their exhaust gas is relatively large, and the emission regulation by the EPA (Environmental Protection Agency) have been gradually strengthened in North America recently.

KUBOTA, which has been positively engaging in the strict emission regulations of the world, has developed the new engine by adopting the CRS (Common Rail System), the EGR (Exhaust Gas Recirculation) and the DPF (Diesel Particulate Filter) in the course of pursuing more clean exhaust gas.

The common rail system uses a type of accumulation chamber called "a common rail" to store pressurized fuel, and injectors that contain electronically controlled solenoid valves to inject the pressurized fuel into the cylinders.

Because the engine ECU (Electronic Control Unit) controls the injection system (including the injection pressure, injection rate and injection timing), the injection system is independent and thus unaffected by the engine speed or load. Because the engine ECU can control injection quantity and timing to a high level of precision, even multi-injection (multiple fuel injections in one injection stroke) is possible also. This ensures a stable injection pressure at all times, even in the low engine speed range, and dramatically decreases the amount of black smoke ordinarily emitted by a diesel engine during start-up and acceleration.

The DPF is a device designed to remove diesel particulate matter and soot from the exhaust gas of diesel engine. This DPF is designed to burn off the accumulated PM either passively through the heat from the high-loaded engine operation or actively through the heat generated by the chemical reaction between the DOC (Diesel Oxidation Catalyst) and post injection fuel.

As a result, exhaust gas emissions are cleaner and reduced.

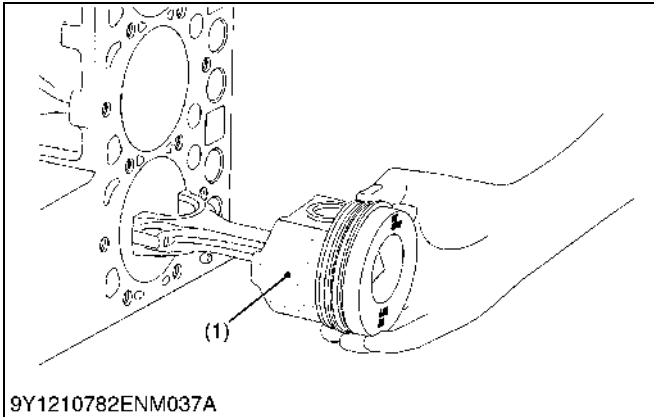
The engine models shown in the table below are adopted for this model.

Tractor Model	Engine Model
L3301	D1803-CR-E4
L3901	D1803-CR-E4
L4701	V2403-CR-E4

9Y1211012ENM0001US0

2. ENGINE BODY

[1] PISTON



The piston skirt has a layer of **molybdenum disulfide ★**, which decreases the piston slap noise and thus the all the engine noise.

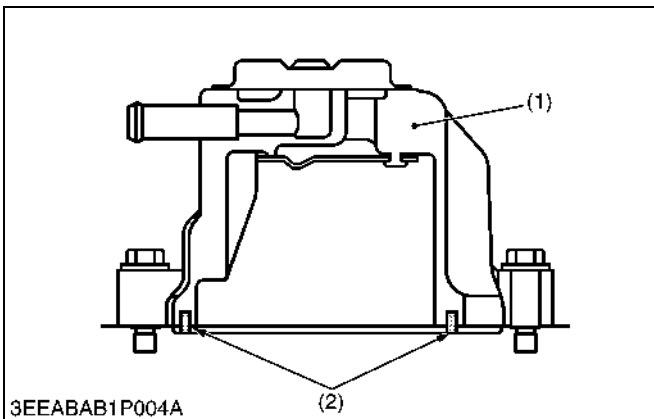
★ Molybdenum disulfide (MoS_2)

The molybdenum disulfide (1) is a solid lubricant, like Graphite or Teflon. This material helps not to wear the metal even with little lube oil.

(1) Molybdenum Disulfide

9Y1211012ENM0002US0

[2] HALF-FLOATING HEAD COVER



The rubber packing is attached to keep the cylinder head cover approximately 0.5 mm (0.02 in.) off the cylinder head. This decreases the noise from the cylinder head.

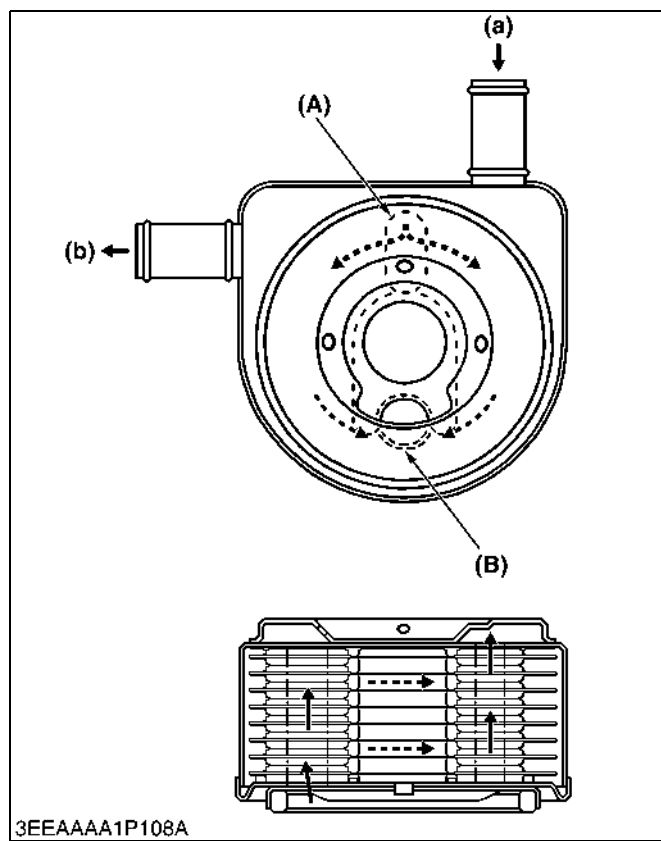
(1) Cylinder Head Cover

(2) Rubber Packing

9Y1211012ENM0003US0

3. LUBRICATING SYSTEM

[1] OIL COOLER



The engine is equipped with a water-cooled oil cooler to keep the temperature of the oil from rising while the engine is operating and provide it with proper lubrication.

The oil flows on the inside of the cooler plate and is cooled by the coolant flowing on the outside of the plate.

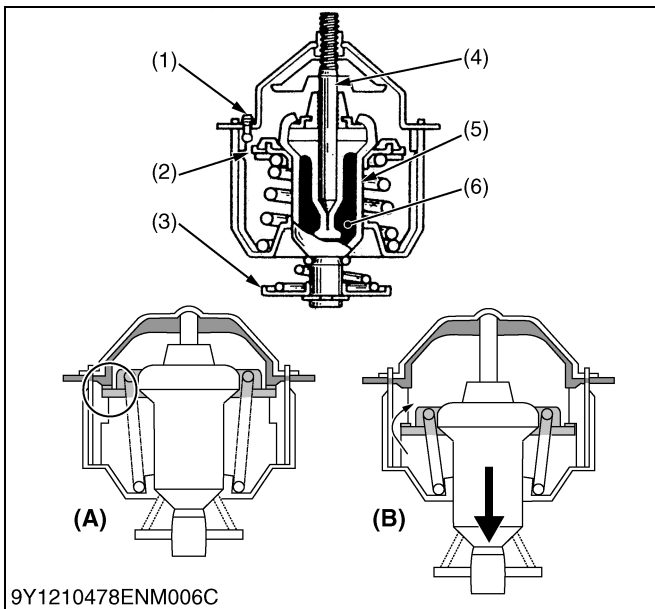
(A) Oil Inlet
(B) Oil Outlet

(a) Coolant Inlet
(b) Coolant Outlet

9Y1211012ENM0004US0

4. COOLING SYSTEM

[1] THERMOSTAT



This thermostat uses a wax-pellet type. When temperature goes up, wax in metal container (pellet) changes to a liquid from a solid.

The volume starts to expand in this process. As spindle is fixed, pellet goes down and valve goes down.

There is a jiggle valve on the top depending on the specification.

When you put coolant and thermostat is closed, coolant can not go in easily because air at the engine side can not go out.

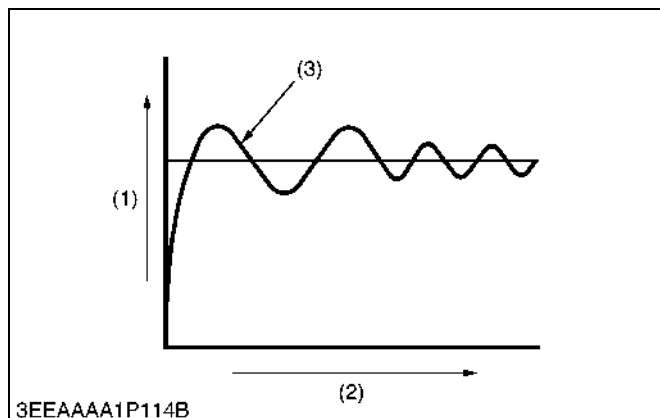
The jiggle valve helps to remove air from this hole, and then coolant can go in easily.

- (1) Jiggle Valve
- (2) Valve
- (3) Bypass Valve
- (4) Piston
- (5) Pellet
- (6) Wax

- (A) When The Valve is Closed
- (B) When The Valve is Opened

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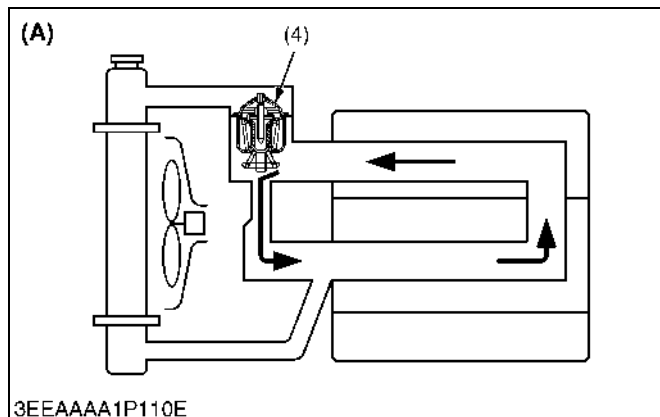
[2] BOTTOM BYPASS SYSTEM



In addition to improving the cooling performance of the radiator by using a bottom bypass system, the mechanism uses a 3-stage thermostat valve that reduces thermal shock considerably compared to previous radiators.

When the coolant inside the engine is cool, the thermostat (4) stays closed and coolant circulates inside the engine via the bypass pipe.

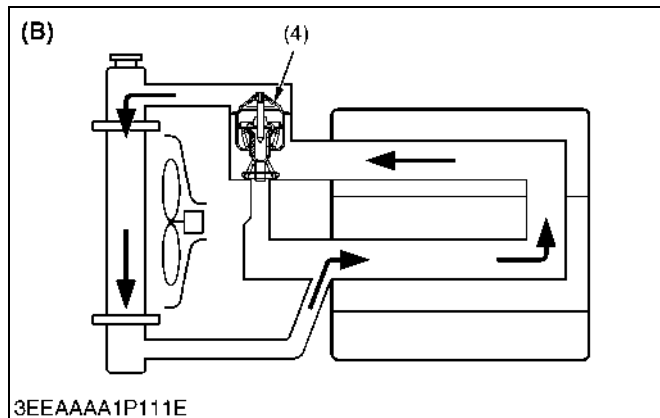
When the temperature of the coolant exceeds the opening temperature of the thermostat (4), the thermostat opens in three stages, sending the now hot coolant to the radiator. Further, when the thermostat is fully open, it is structured so the hot coolant does not flow into the engine via the bypass circuit, thus increasing the cooling performance of the system.



- (1) Coolant Temperature
- (2) Time
- (3) Overshoot
- (4) Thermostat

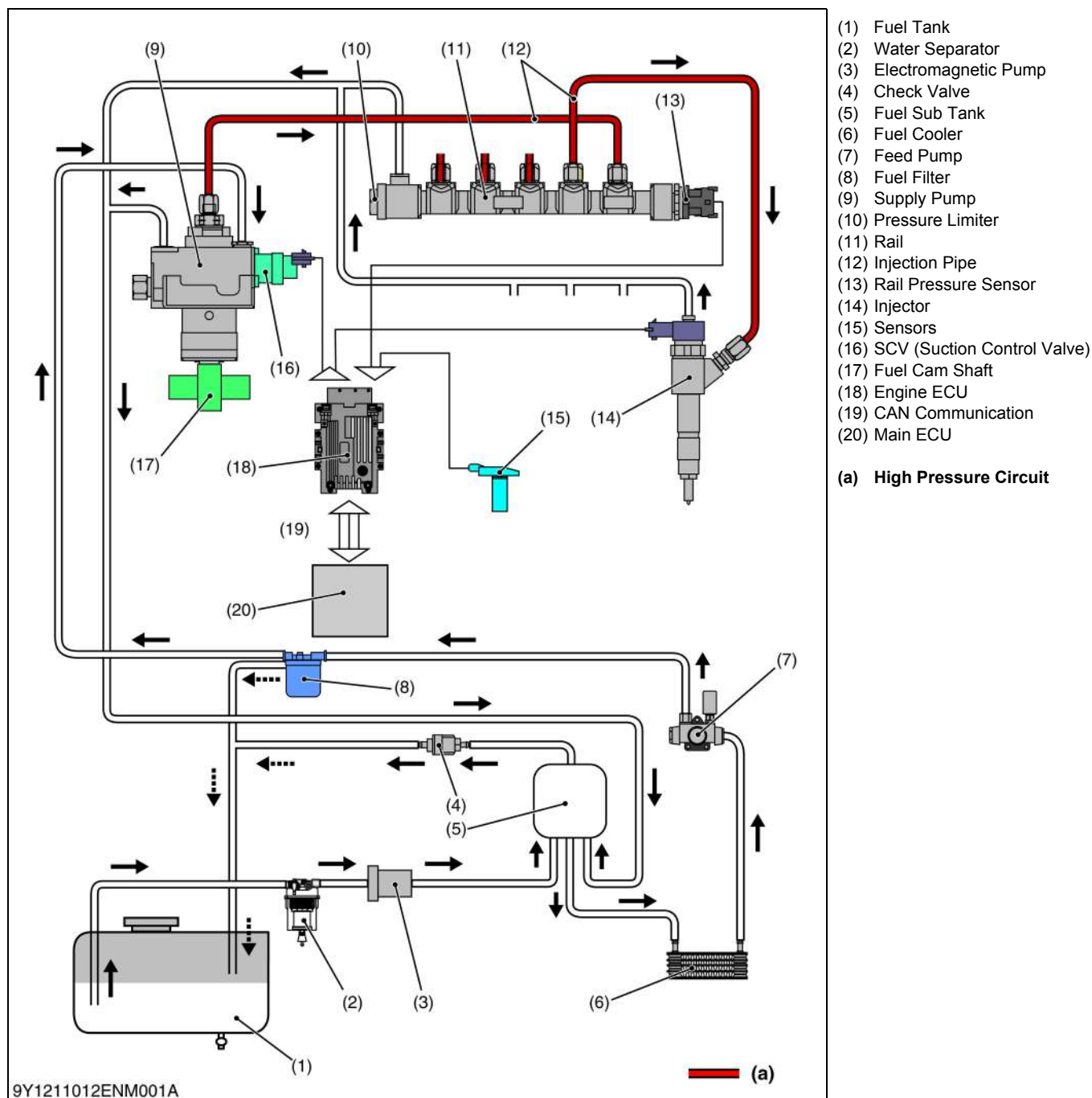
- (A) Bypass Opened
- (B) Bypass Closed

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5. FUEL SYSTEM

[1] OVERVIEW OF COMMON RAIL SYSTEM

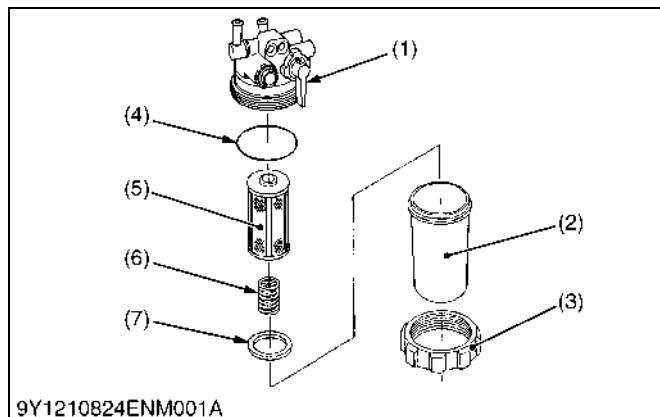


The common rail system is an electronically controlled fuel injection device, with a supply pump (9) that pressurizes the fuel, a rail (11) that stores the high-pressure fuel, injectors (14) that inject the fuel under high-pressure based on solenoid operation into each cylinder and an engine ECU that controls all of these components.

The injection amount and injection timing of the injectors (14) and pressure of fuel stored in the rail are controlled by the engine ECU (18) based on signals from each sensors (15) and instructions sent by CAN communication (19) from the main ECU (20) on the tractor.

Therefore, fuel is injected under optimal conditions at all times. This enables to suppress generation of black smoke on start up and under acceleration and to achieve reduction of exhaust gas and higher output power.

9Y1211012ENM0007US0



Separator

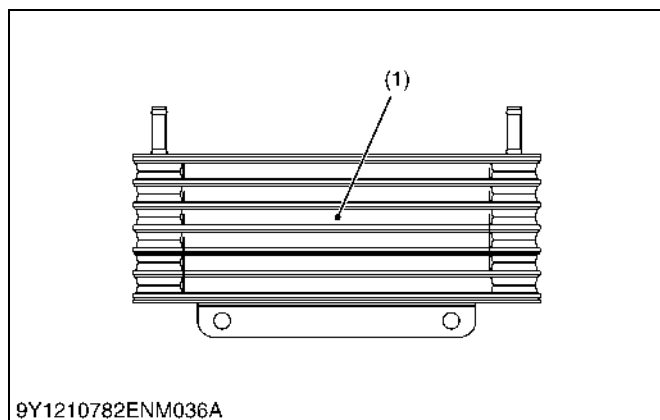
The separator has a function of separating fuel and water through difference in specific gravity. There is a read float (7) with a specific weight of 0.9 made of a polypropylene material inside that has properties in that it is heavier than diesel and lighter than water.

When fuel containing water enters the separator, water with a high specific weight pools in the bottom of a cup (2) and causes the float to float. The state of mixing in of water can be recognized by the state of the float and can be visually inspected externally.

Fuel with a low specific weight flows over the top of the cup but passes through the element (5) provided inside enabling filth to be removed from the fuel.

(1) Fuel Valve	(5) Element
(2) Cup	(6) Spring
(3) Retainer Ring	(7) Red Float
(4) O-ring	

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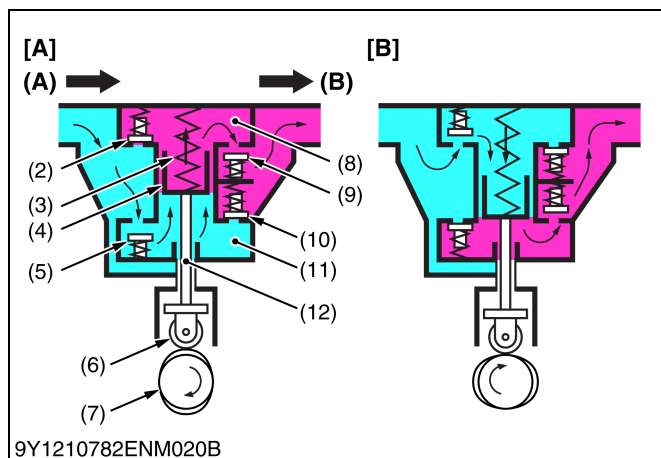
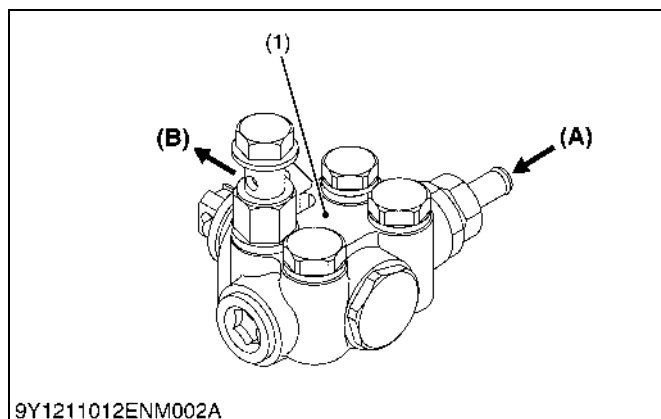
Fuel Cooler

The fuel cooler (1) is set downstream of the separator and is used to cool the fuel.

When the pressure of fuel is increased, the temperature also rises. The fuel in the common rail system is raised to high pressure so the fuel temperature also rises. If the fuel temperature rises too much, output and durability are reduced. A fuel cooler that suppresses fuel temperature rise is provided to prevent this.

- (1) Fuel Cooler

9Y1211012ENM0009US0



Feed Pump

The feed pump (1) is installed after the fuel cooler and has a function of suctioning fuel from the fuel tank and feeding it through a filter and to the supply pump.

Operating

During the up stroke, the piston (4) is pushed up by the fuel cam (7) via the tappet (6) and push rod (12). As a result, the pressure in the inner chamber (8) rises, the suction side check valve (2) closes and the discharge side check valve (9) opens. On the other hand, the pressure in the outer chamber (11) is lowered so the suction side check valve (5) opens and discharge side check valve (10) closes.

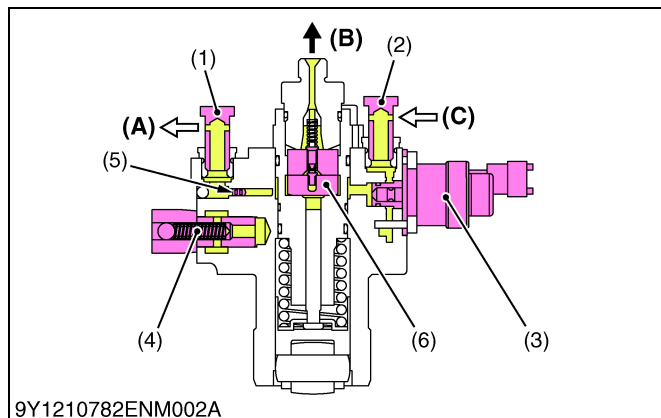
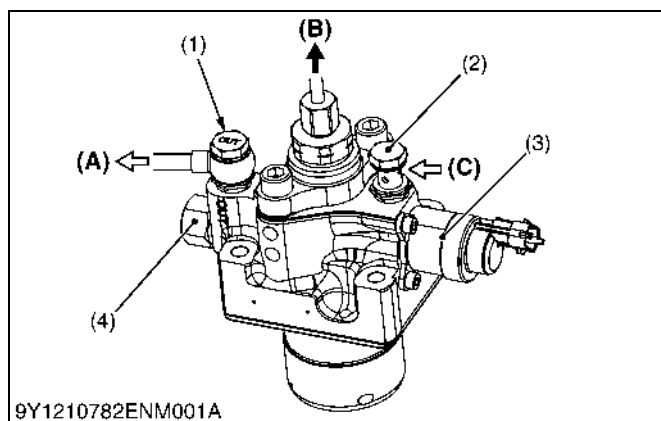
During the down stroke, the piston is lowered by a piston spring (3) and the pressure in the inner chamber is lowered so the suction side check valve (2) opens and discharge side check valve (9) closes. On the other hand, the pressure in the outer chamber rises so the suction side check valve (5) closes and discharge side check valve (10) opens.

(1) Feed Pump	(9) Discharge Side Check Valve
(2) Suction Side Check Valve	(10) Discharge Side Check Valve
(3) Piston Spring	(11) Outer Chamber
(4) Piston	(12) Push Rod
(5) Suction Side Check Valve	
(6) Tappet	
(7) Fuel Cam	
(8) Inner Chamber	

- (A) Suction Side
(B) Discharge Side
[A] Up Stroke
[B] Down Stroke

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[2] SUPPLY PUMP



The supply pump corresponds to conventional injection pumps but pressurizes the fuel to more than 2 times that of conventional pumps for delivery to the rail.

The supply pump is made up of an intake adjustment valve (SCV) (3), pressurizing part, overflow valve (4), IO valve (6), and zero delivery drain (5).

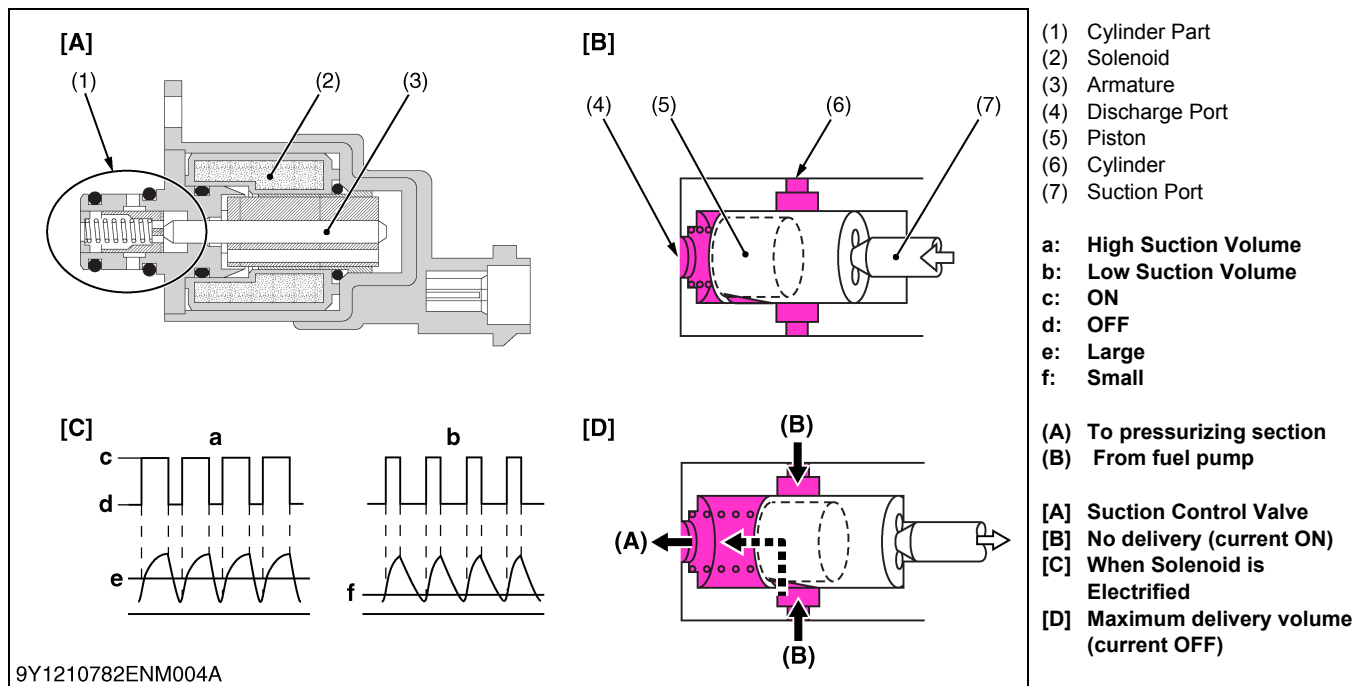
NOTE

- Rail pressure changes based on engine conditions.

Supply Pump Type	Rail pressure reference values MPa (kgf/cm ²)	
	At Idling	At Rated Speed
PF49	25 to 30 MPa 260 to 300 kgf/cm ² 3700 to 4300 psi	65 to 70 MPa 663 to 713 kgf/cm ² 9500 to 10000 psi

(1) Eye Bolt (out)	(A) To fuel tank
(2) Eye Bolt (in)	(B) To rail
(3) Suction Control Valve (SCV)	(C) From fuel filter
(4) Overflow Valve	
(5) Zero Delivery Drain	
(6) IO Valve	

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Suction Control Valve (SCV)

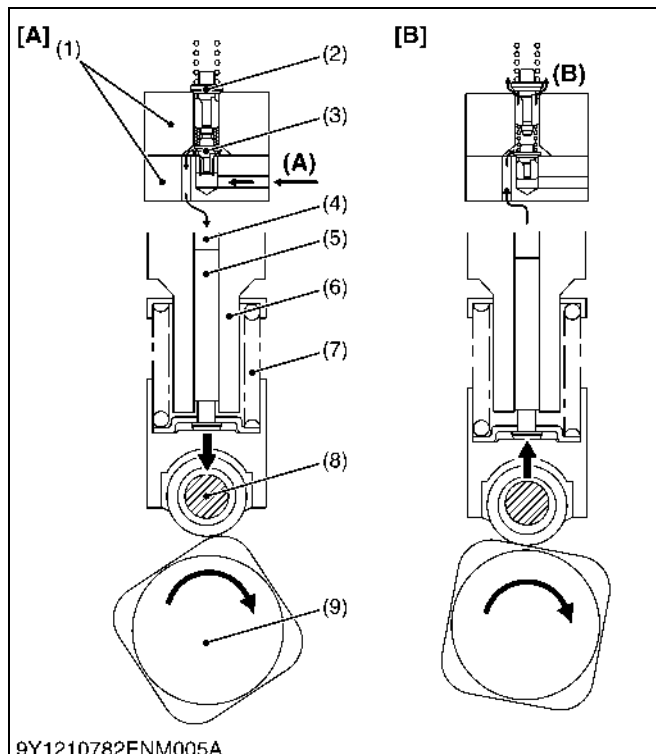
The suction control valve (SCV) is a proportional control valve that adjusts the amount of fuel delivered from the fuel pump to achieve the fuel pressure requested by the engine, has a function of delivering to the pressurizing part, and is made up of a piston (5), cylinder (6), armature (3), and solenoid (2) etc.

The SCV is a linear solenoid type electromagnetic valve and the engine ECU controls the time the solenoid is electrified (duty ratio control). When current flows through the solenoid, the armature moves based on the duty ratio and pushes on the cylinder and fuel flow changes based on position of the cylinder enabling suitable fuel flow.

NOTE

- Linear solenoid type: when voltage is applied to the coil, the moveable core moves linearly in proportion to the voltage based on the magnetic force

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**Pressurizing Part (Pump Body)**

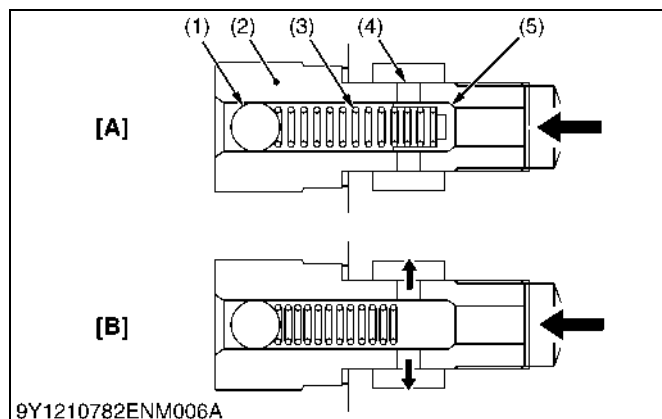
The pressurizing part (pump body) applies pressure to the fuel supplied from the suction control valve, has a function of supplying fuel to the rail, and is made up of an IO valve (1), plunger (5), plunger barrel (6), spring (7), tappet (8), and pump housing etc.

The engine side fuel camshaft (9) rotates and during the lowering stroke, the spring cause the plunger to lower. An optimal amount of fuel adjusted by the suction control valve is suctioned through the IO valve and into the plunger chamber (4).

Rotation continues and during the lift stroke of the cam the plunger rises, pressurizes the fuel, and supplies it through the IO valve to the rail.

- (1) IO Valve
(2) Outlet Valve
(3) Inlet Valve
(4) Plunger Chamber
(5) Plunger
(6) Plunger Barrel
(7) Spring
(8) Tappet
(9) Fuel Camshaft
- (A) From suction control valve
(B) To rail
[A] Suction Stroke
[B] Compression Stroke

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Overflow Valve

When the pressure of fuel delivered from the feed pump rises above a prescribed amount, the overflow valve has a function of returning fuel to the tank and is made up of a valve body (2), valve piston (5), spring (3), and ball (1).

When fuel pressure increases and exceeds the force of the spring, the valve piston is pushed. Here, the fuel passes through the port (4) provided in the valve body and returns to the fuel tank.

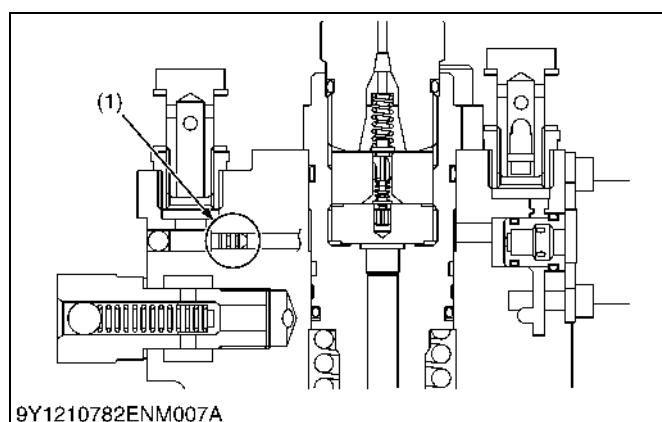
Therefore, the pressure in the suction control valve is stabilized and fuel flow is accurately adjusted.

- (1) Ball
- (2) Valve Body
- (3) Spring
- (4) Port
- (5) Valve Piston

[A] While Open

[B] While Closed

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Zero Delivery Drain

The zero delivery drain (1) has a function of preventing fuel flow to the pressurizing part when no fuel is being delivered.

Though the suction control valve is set to no flow, a small amount of fuel flows to the pressurizing part. The zero delivery drain is provided to prevent this and this small amount of fuel is returned through the zero delivery drain and returned to the fuel tank.

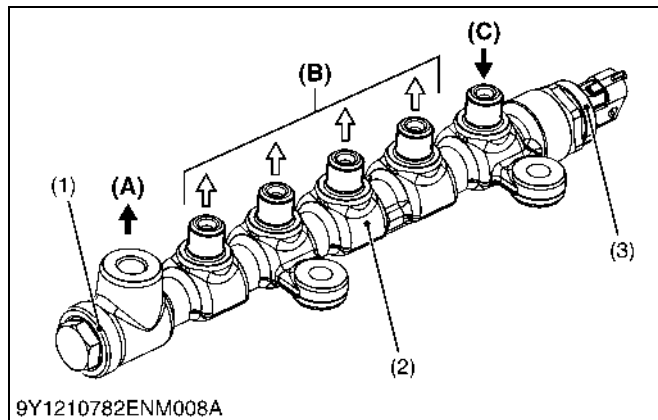
NOTE

- Other than no delivery, fuel is delivered to the pressurizing part based on the amount of throttle and very little flows to the zero delivery drain.

- (1) Zero Delivery Drain

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[3] RAIL



The rail (2) stores fuel at the high pressure applied by the supply pump and the injectors of each cylinder. The rail incorporates control parts—a rail pressure sensor (3) and a pressure limiter (1).

The pressure of the fuel in the rail is detected by the rail pressure sensor, and optimal feedback control is provided for the engine RPM and load. This greatly improves the ability to raise the pressure at low RPMs and enables high-pressure injection from low speed ranges.

Pressure Limiter

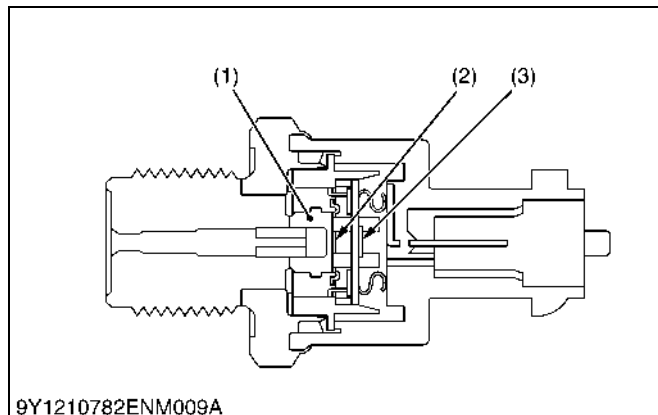
The pressure limiter operates when the pressure inside the rail becomes excessively high (valve opens), and then once the pressure drops to a certain pressure, it acts to keep the pressure (valve closes).

Fuel discharged by the pressure limiter returns to the fuel tank.

Valve opening pressure	Reference value	Approx. 170 MPa (1735 kgf/cm ² , 24700 psi)
Valve closing pressure		Approx. 40 MPa (408 kgf/cm ² , 5800 psi)

(1) Pressure Limiter	(A) To Fuel Tank
(2) Rail	(B) To Injector
(3) Rail Pressure Sensor	(C) From Supply Pump

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Rail Pressure Sensor

The rail pressure sensor is mounted on the rail, detects the fuel pressure inside the rail and converts this to an electronic signal and sends it to the ECU.

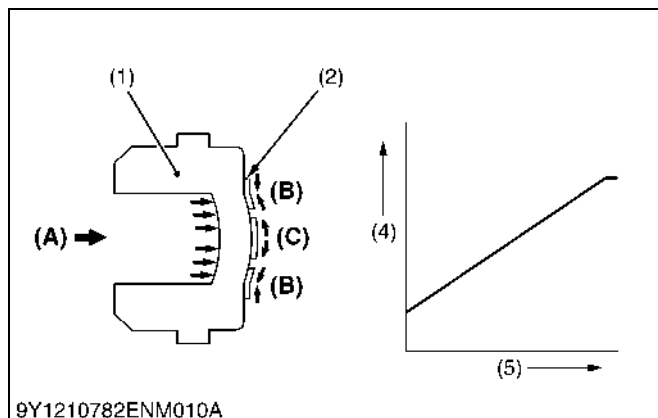
The rail pressure sensor is made up of a metal diaphragm (1), distortion detection part (metal gauge) (2), signal processing circuit (3), and housing etc.

When the fuel pressure (A) in the rail is applied to the metal diaphragm, the diaphragm is distorted. Metal gauges are set in the center and at the edge of the metal diaphragm and tensile (C) or compression (B) force is applied. A difference in resistance values is generated based on the force that is applied.

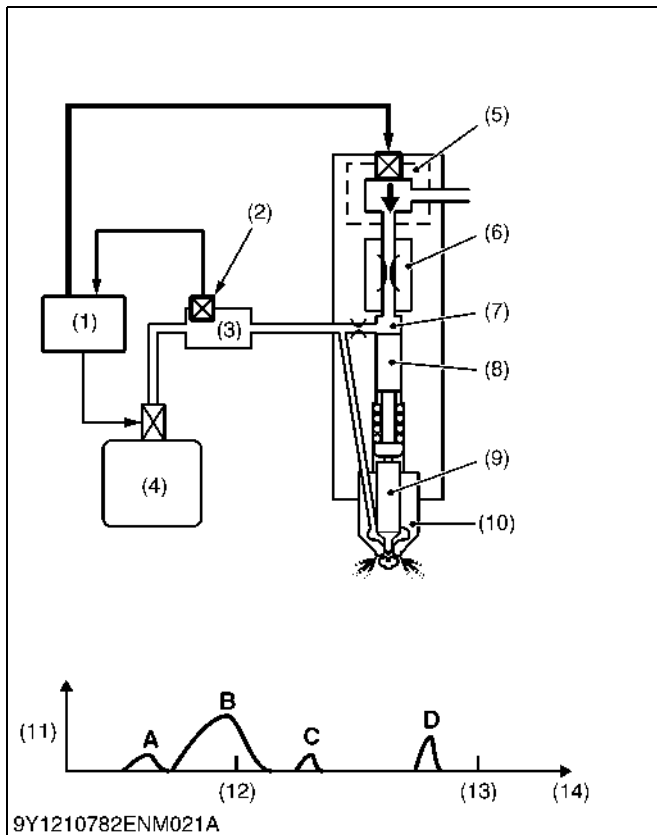
Please note that the rail pressure sensor is not available separately as a part, so replacement requires replacing the rail assembly.

(1) Metal Diaphragm	(A) Fuel pressure
(2) Distortion Sensor Part (Metal Gauge)	(B) Pressurization
(3) Signal Processing Circuit	(C) Tensile
(4) Voltage	
(5) Pressure	

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[4] INJECTOR



General

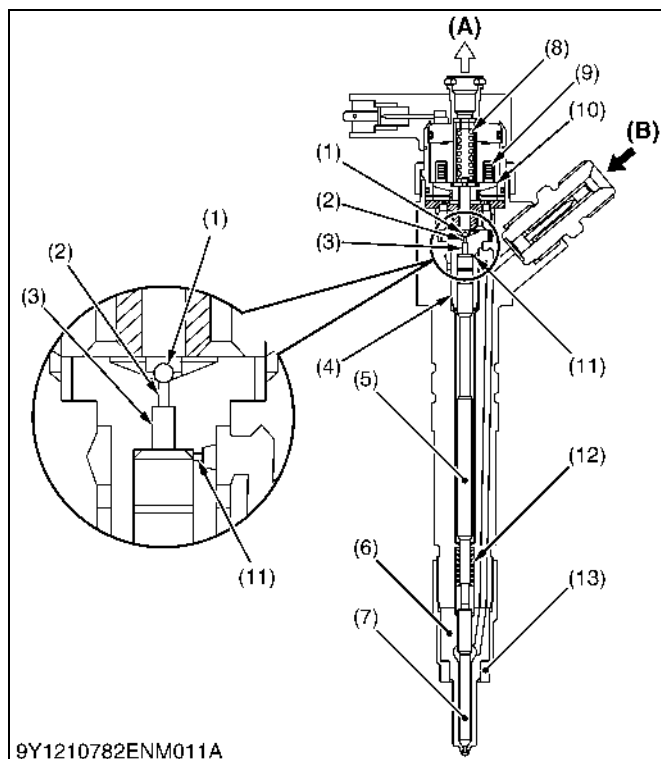
The injectors inject high-pressure fuel sent from the rail into the combustion chamber of the engine.

The injections are controlled by the signal of engine's ECU to produce the ideal timing, amount of fuel, mixture and spray.

The injector injects a finely turned spray in three pulses during the combustion stage. First a small amount is injected, mitigating the effect of the initial burn and reducing NO_x (oxides of nitrogen) and noise. The main injection follows with the real burn, and in the last stage, a diffuse combustion is induced, thus reducing particulate matter (PM) generated by the main injection.

(1) Engine ECU	A: Pre-injection
(2) Rail Pressure Sensor	B: Main Injection
(3) Rail	C: After Injection
(4) Supply Pump	D: Post Injection
(5) TWV (Two-way Valve)	
(6) Discharge Orifice	
(7) Control Chamber	
(8) Command Piston	
(9) Needle Valve	
(10) Nozzle	
(11) Injection Amount	
(12) T.D.C (Top Dead Center)	
(13) B.D.C (Bottom Dead Center)	
(14) Crank Angle	

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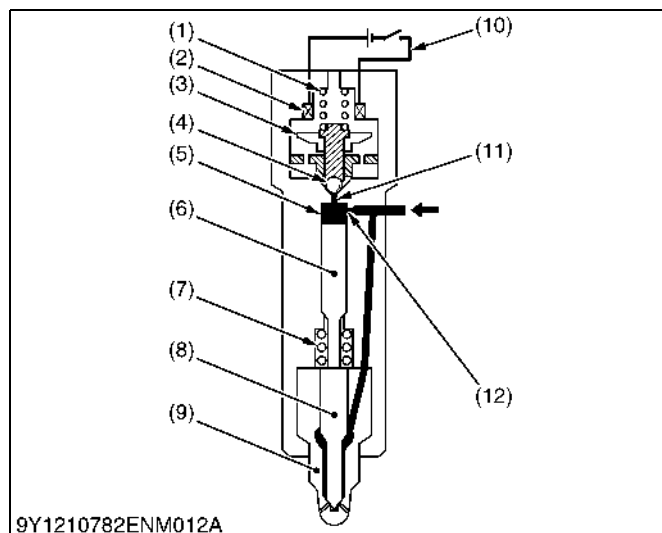
Injector Structure

Injectors consist of nozzle components (nozzle body (6), needle valve (7), nozzle spring (12), nozzle nut (13)) and control components (control chamber (3), solenoid (9), valve spring (8), TWV (Two Way Valve) (10), valve ball (1), valve body (4), command piston (5), suction orifice (11), discharge orifice (2)).

(1) Valve Ball	(9) Solenoid
(2) Discharge Orifice	(10) TWV (Two Way Valve)
(3) Control Chamber	(11) Suction Orifice
(4) Valve Body	(12) Nozzle Spring
(5) Command Piston	(13) Nozzle Nut
(6) Nozzle Body	
(7) Needle Valve	
(8) Valve Spring	
- (A) To Fuel Tank
(B) From Rail

Part	Function
Two way electromagnetic valve	Electromagnetic valve that is operated through turning current to a solenoid ON and OFF controlling flowing in and flowing out of fuel from the rail to the control chamber.
Suction, discharge orifice	This sets the raise and lower speed of the needle valve through constricting discharge and suctioning of fuel into the control chamber. Also, sets a slight delay between operation of the two way electromagnetic valve and operation of the needle valve enabling reliable injection of very low amounts.
Valve piston	Raises and lowers a nozzle needle through changing pressure in the control chamber provided on top of the piston.
Nozzle spring	Along with control chamber pressure causes the needle valve to be in close contact with the nozzle body preventing leaking of high pressure fuel from the rail.
Nozzle	Part that performs fuel injection. The needle valve is raised and lowered based on change to pressure in the control chamber, opens and closes the fuel injection port, and while the valve is open, atomizes and injects fuel from the rail.

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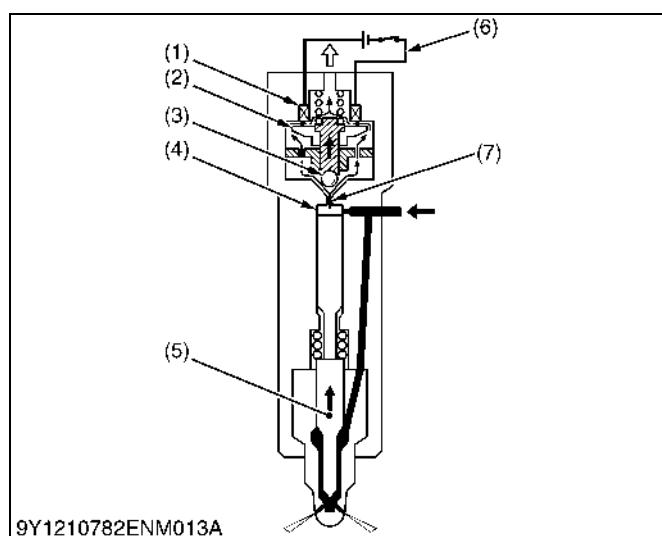
Injector Operation

■ No Injection

While the solenoid (2) is not electrified, the two way electromagnetic valve (3) is pushed down by the valve spring (1) and the discharge orifice (11) path is closed by the valve ball (4). Here, fuel pressure is applied in the control chamber (5) and to the bottom of the needle valve (8) but based on the difference in projected net area and the force of the nozzle spring (7), the needle valve is pushed into the nozzle body (9) so fuel injection is not performed.

(1) Valve Spring	(7) Nozzle Spring
(2) Solenoid	(8) Needle Valve
(3) Two Way Electromagnetic Valve	(9) Nozzle Body
(4) Valve Ball	(10) Drive Circuit
(5) Control Chamber	(11) Discharge Orifice
(6) Valve Piston	(12) Suction Orifice

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■ Injection Start

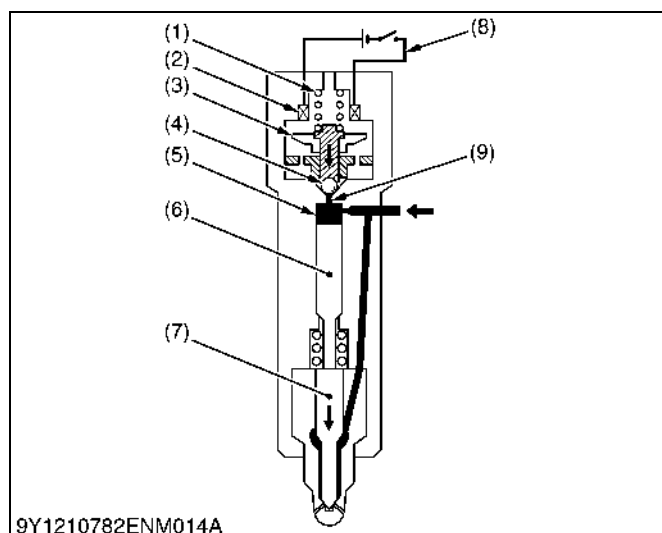
When the solenoid (1) is electrified by the drive circuit (6) the two way electromagnetic valve (2) is lifted by an electromagnetic force and the valve ball (3) is lifted by fuel pressure opening the discharge orifice (7). Here, fuel inside the control chamber (4) passes through the discharge orifice and flows to the fuel tank. As a result, the needle valve (5) is pushed up based on fuel pressure and fuel injection starts.

■ NOTE

- Longer electrification time of the solenoid leads to increased amount of fuel injected.

(1) Solenoid	(5) Needle Valve
(2) Two Way Electromagnetic Valve	(6) Drive Circuit
(3) Valve Ball	(7) Discharge Orifice
(4) Control Chamber	

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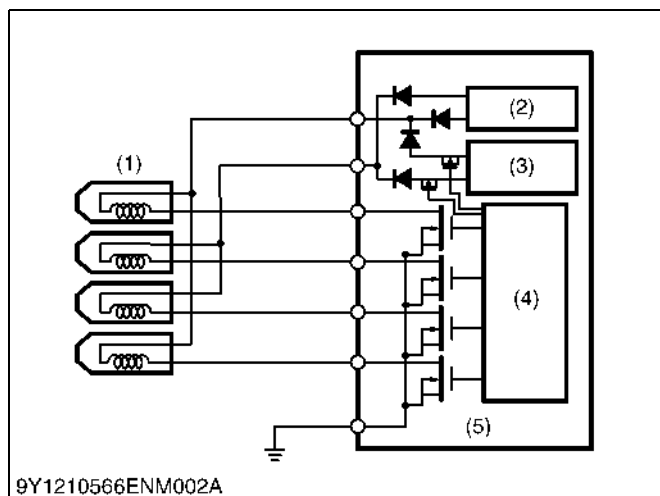


■ Injection Complete

When electrification of the solenoid (2) by the drive circuit (9) stops, the two way electromagnetic valve (3) is pushed closed by the force of the valve spring (1) and the discharge orifice (9) is closed by the valve ball (4). As a result, fuel pressure in the control chamber (5) rises and the needle valve (7) is pushed by the valve piston (6).

(1) Valve Spring	(6) Valve Piston
(2) Solenoid	(7) Needle Valve
(3) Two Way Electromagnetic Valve	(8) Drive Circuit
(4) Valve Ball	(9) Discharge Orifice
(5) Control Chamber	

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Injector Drive Circuit

To increase the responsiveness of the injector, the voltage that drives the injector is raised to a high voltage, accelerating the magnetization of the solenoid and increasing the responsiveness of the TWV.

The battery voltage is raised to about 110 V by a high-voltage generating circuit inside the ECU and that voltage is supplied to the injector to actuate it.

(1) Injector	(4) Control Circuit
(2) Rated Amperage Circuit	(5) Engine ECU
(3) High-voltage Generating Circuit	

9Y1211012ENM0023US0



Injector QR/ID Codes

Injectors are processed to exacting tolerances, but there are minute variations in the amount they inject, so to correct for these variations, a correction volume is recorded on the QR/ID codes of the injectors.

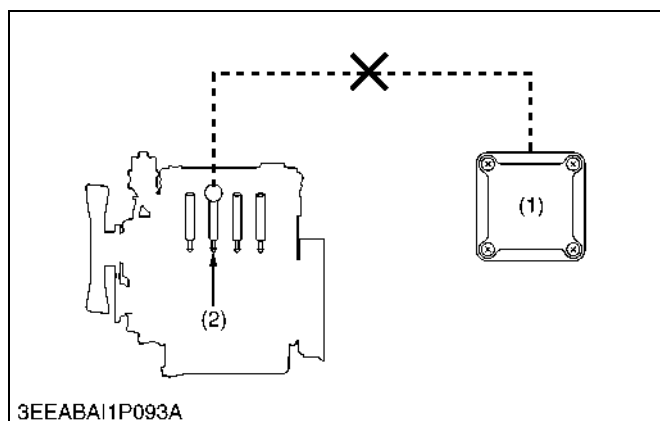
During manufacture, the QR code is read by a scanner and the correction value is registered in the ECU.

■ IMPORTANT

- In order for the engine ECU to recognize and calibrate injectors, if an injector or the engine ECU is replaced, perform "Injector calibration" using a diagnostics tool.

- (1) ID Code

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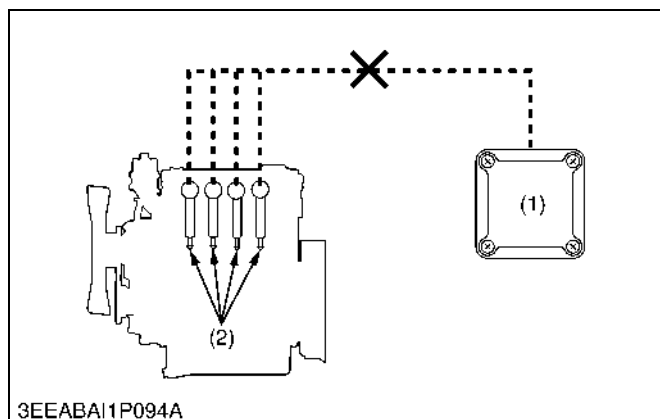


When Replacing an Injector

Register the ID code of the replacement injector into the ECU.

- (1) Engine ECU (2) Replacement Injector

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When Replacing the Engine ECU

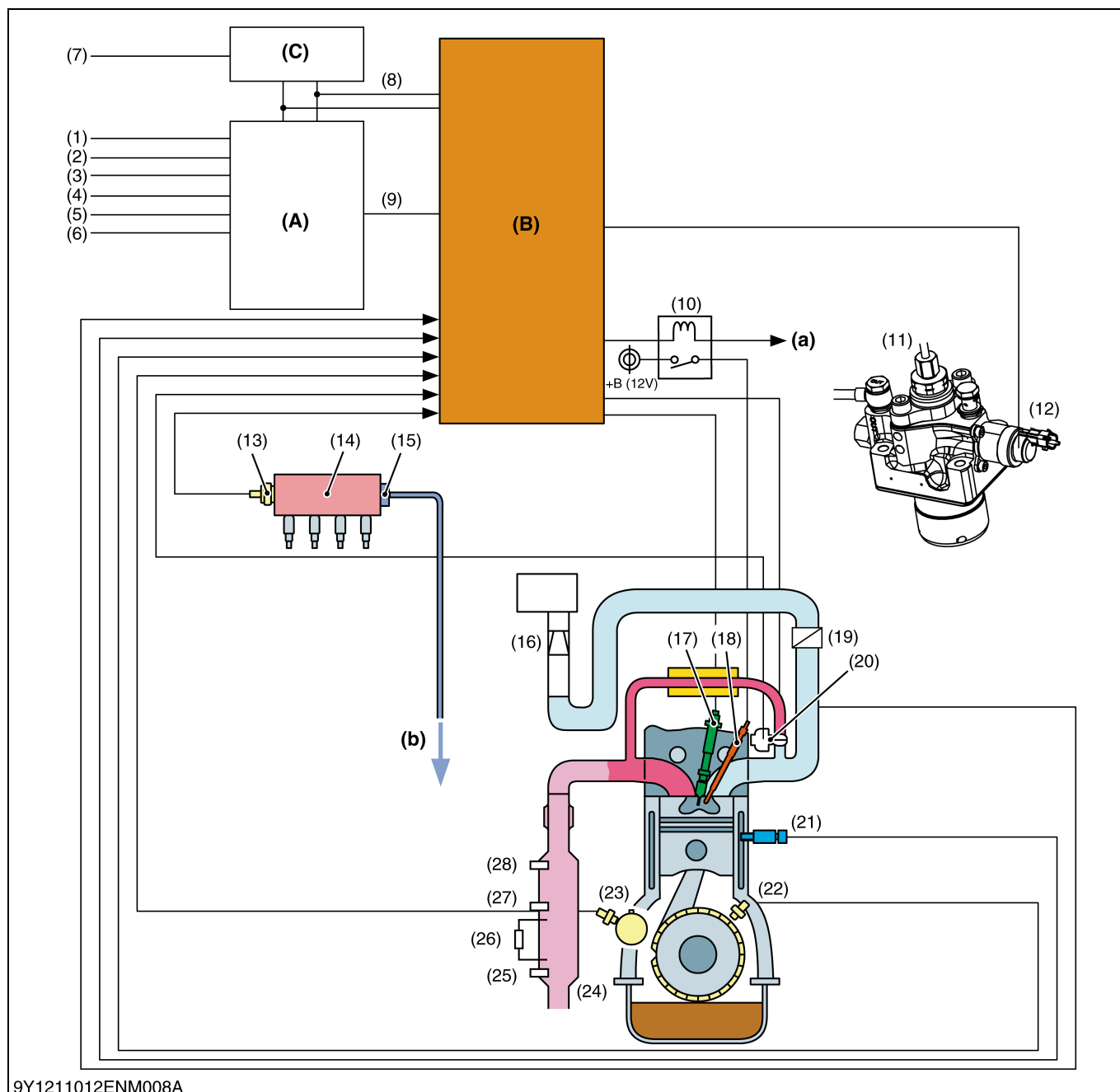
Register the ID codes of all of the injectors into the replacement engine ECU.

When replacing an ECU, as it is necessary to write all of the data, including the injector corrections, only KUBOTA can write the data to the ECU.

- (1) Replacement ECU (2) Injector

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[5] ENGINE CONTROL SYSTEM

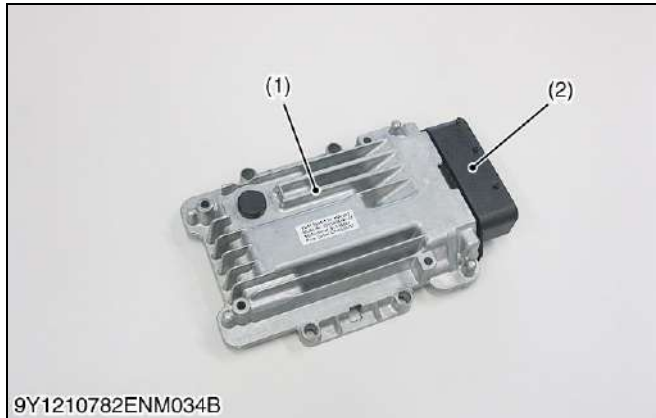


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(1) Key Switch	(14) Rail	(25) Temperature Sensor (DPF Outlet Exhaust Temperature) (T_2)	(A) Main ECU
(2) Acceleration Sensor	(15) Rail Pressure Limiter	(26) Differential Pressure Sensor (DPF Differential Pressure) (ΔP)	(B) Engine ECU
(3) DPF INHIBIT Switch	(16) Air Flow Sensor	(27) Temperature Sensor (DPF Inlet Exhaust Temperature) (T_1)	(C) Instrument Panel
(4) Parked Regeneration Switch	(17) Injector	(28) Temperature Sensor (DOC Inlet Exhaust Temperature) (T_0)	(a) From Main ECU
(5) Starter Relay	(18) Glow Plug		(b) To Fuel Tank
(6) Parking Brake Switch	(19) Intake Throttle Valve		
(7) Oil Switch	(20) EGR Valve		
(8) CAN Communication	(21) Coolant Temperature Sensor		
(9) OPC Signal	(22) Crankshaft Position Sensor		
(10) Glow Relay	(23) Camshaft Position Sensor		
(11) Supply Pump	(24) Diesel Particulate Filter (Hereinafter Referred As The "DPF") Muffler		
(12) SCV (Suction Control Valve)			
(13) Rail Pressure Sensor			

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(1) Engine ECU



The engine ECU (1) controls the amount, timing, mixture and pressure of fuel that is injected. The engine ECU (1) operates each kind of control based on the signals from each type of sensor.

The actuator for controlling the amount, timing and mixture of fuel injection is the injector, while the actuator for controlling fuel pressure is the supply pump.

■ Fuel Quantity Control

The amount of fuel to be injected is determined using a basic injection amount, which is calculated based on the state of the engine and driving conditions, with corrections added for parameters such as water temperature, intake air temperature, intake pressure, etc.

■ Injection Timing Control

The ECU controls the timing for starting to energize the injectors, first determining the timing for the main injection and then setting the timing of other injections, such as pilot injections.

■ Fuel Mixture Control

By conducting a pilot injection, the initial fuel mixture is kept to a minimum, mitigating the explosive initial combustion and reducing NOx and noise.

■ Fuel Pressure Control

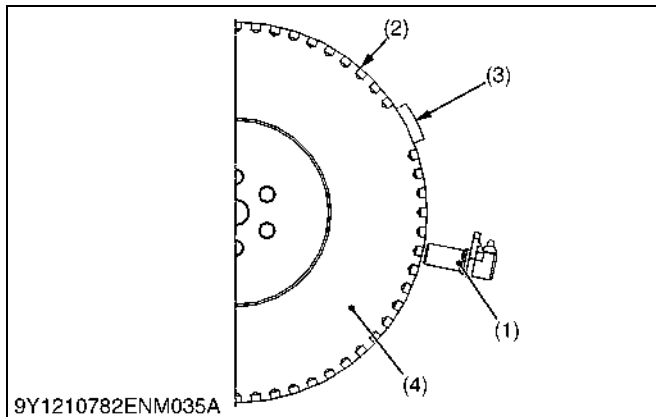
The ECU calculates the set fuel injection pressure based on the engine load (last injection amount and engine RPM) and controls the amount the supply pump supplies and the fuel pressure inside the rail.

(1) Engine ECU

(2) ECU Connector

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(2) Sensor



Crankshaft Position Sensor

The crank position sensor (1) is mounted on the flywheel housing and the sensor body uses a hall element type.

When pulse holes (2) provided on the outer edge of the flywheel (4) pass through the sensor, the internal magnetic field changes and this is output to the engine ECU.

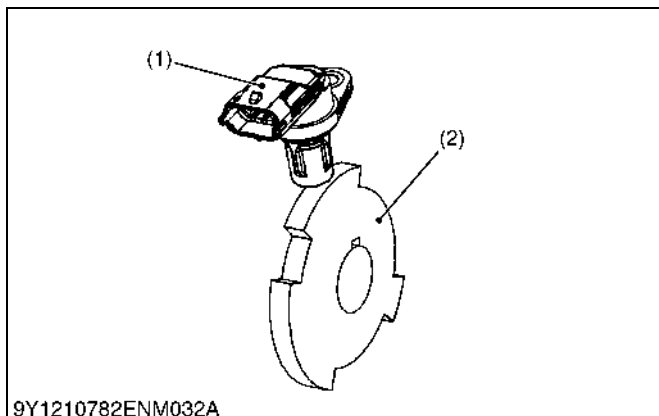
Also, a no hole part (3) is provided in a part and this detects the crank position each rotation and outputs this to the engine ECU.

The engine ECU uses the signals to calculate the crank angle and engine speed.

(1) Crankshaft Position Sensor (3) Part without a Hole
(2) Pulse Hole (4) Flywheel

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Camshaft Position Sensor

The cam position sensor (1) is mounted near the supply pump gear of the gear case and the sensor functions in the same way as the crank position sensor.

This sensor detects the teeth of the pulsar gear (2) and the engine ECU uses this signal to calculate the cam angle.

- (1) Cam Position Sensor (2) Pulsar Gear

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Coolant Sensor

The temperature sensor is mounted to the water flange and uses a thermistor in the sensor part to detect temperature.

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

- (1) Coolant Sensor

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Atmosphere Pressure Sensor

An atmosphere pressure sensor is installed in the body of the ECU and detects atmospheric pressure close to the ECU.

This is provided to prevent changes to combustion status due to changes in atmospheric pressure. (At high altitudes, air pressure is low and air volume is low making complete combustion difficult etc.)

■ NOTE

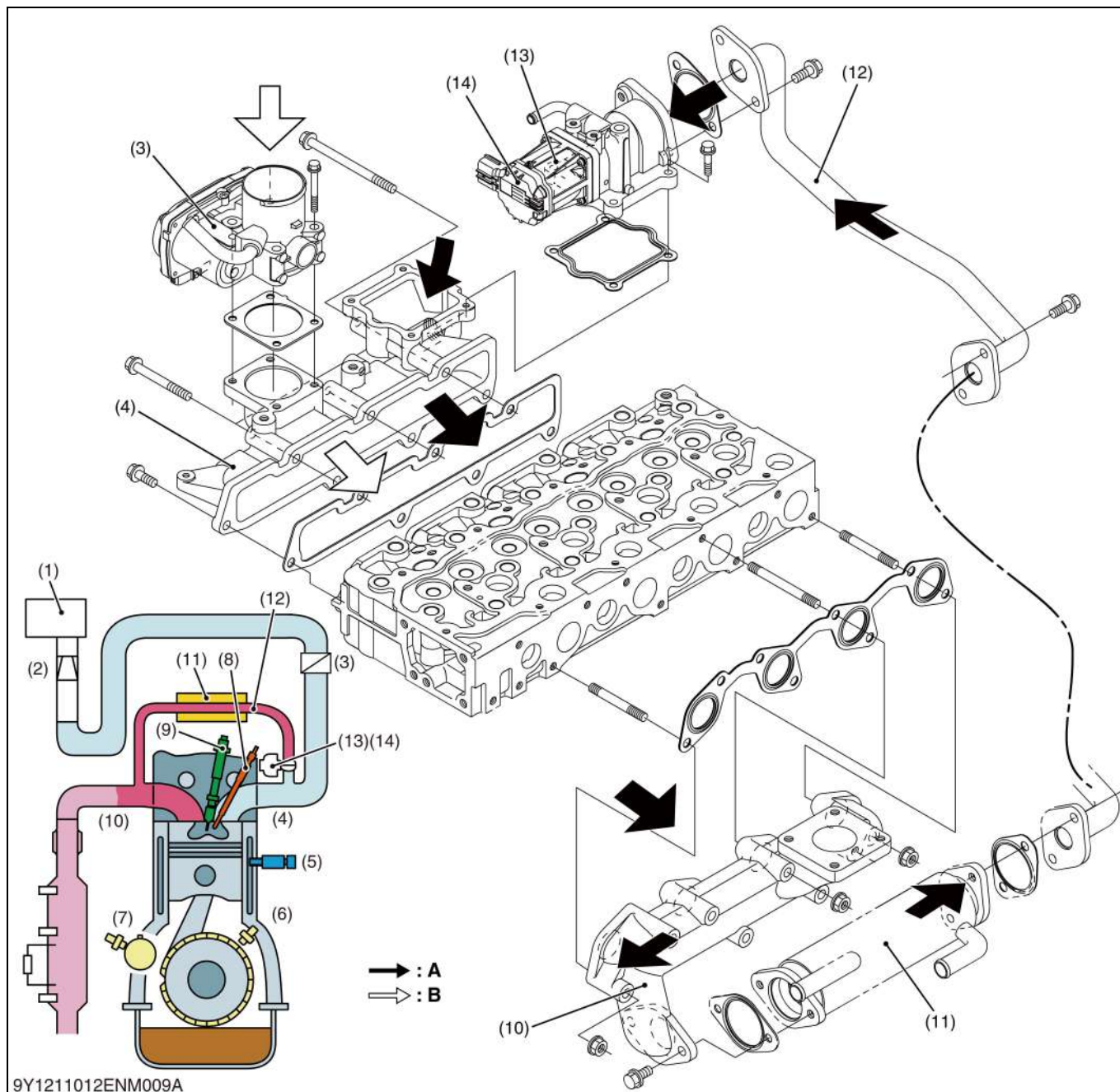
- Since the atmospheric pressure sensor has not been adopted as a part, replace the ECU assembly when the atmospheric pressure is needed to replace.

- (1) Atmosphere Pressure Sensor

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6. EGR SYSTEM

[1] OVERVIEW



(1) Air Cleaner	(6) Crankshaft Position Sensor	(11) EGR Cooler
(2) Air Flow Sensor	(7) Camshaft Position Sensor	(12) EGR Pipe
(3) Intake Throttle Valve	(8) Glow Plug	(13) EGR Valve Motor
(4) Intake Manifold	(9) Injector	(14) EGR LIFT Sensor
(5) Coolant Temperature Sensor	(10) Exhaust Manifold	

A: Exhaust Gas Flow
B: Intake Air Flow

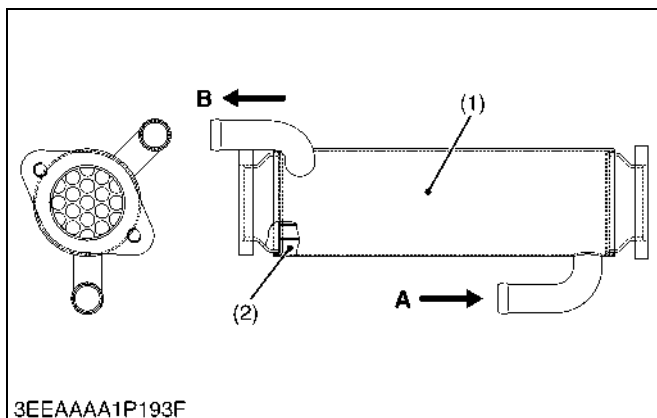
The EGR (Exhaust Gas Recirculation) system is a device that captures a part of the exhaust gas and returns it to the intake side reducing the amount of oxygen entering the engine and lowers combustion temperature suppressing generation of nitrogen oxides (NOx).

The EGR being used on this engine is electronic and is made up of an EGR cooler (11), EGR lift sensor (14), EGR valve motor (13).

The exhaust gas that is returned to the intake side (hereafter EGR gas) is cooled in the EGR cooler (11), adjusted to a suitable flow by an EGR valve motor that is controlled by the engine ECU, and is sent to the intake manifold (4).

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[2] EGR COOLER



The EGR (Exhaust Gas Recirculation) cooler (1) is used to lower combustion temperature and efficiently cool EGR gas, with the aim of reducing the NOx that is in the exhaust gas of diesel engine.

The EGR cooler (1) is placed between the cylinder head and the EGR valve and returns the cooled exhaust gases to the engine suction side.

The EGR cooler (1) has resistant to clogging up, compact and efficient tubes (2) internally.

- (1) EGR Cooler
- (2) Tube

- A: Coolant Inlet Port
- B: Coolant Outlet Port

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[3] EGR VALVE

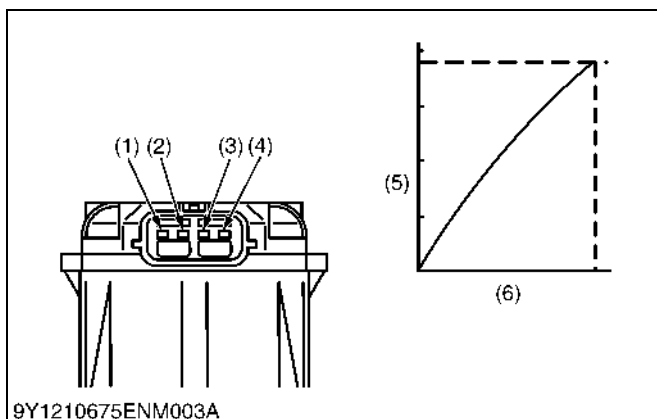


Water Cooled EGR Valve

This is a device that regulates EGR gas flow. The degree the valve is open is detected using a lift sensor and a motor is used to set this to the degree of open calculated using signals including the engine speed.

Also, passing engine coolant through the housing enables controlling temperature rise of the EGR valve.

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EGR Valve Lift Sensor

How far the EGR valve is open is detected by a contact type of position sensor that detects the movement of the motor's shaft. The motor's shaft opens and closes the valve by changing the rotation of the motor into linear motion via a screw deceleration mechanism.

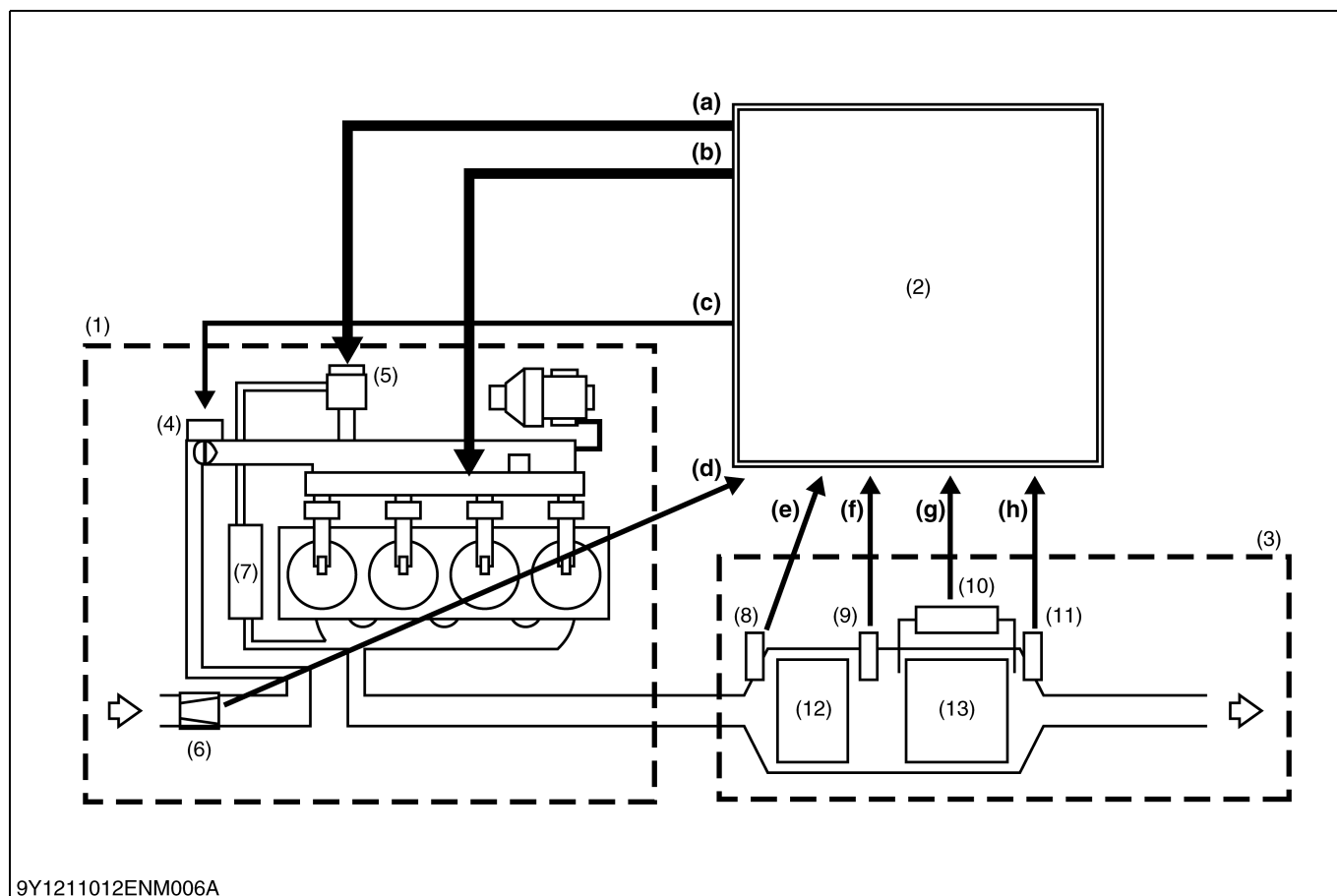
- (1) CAN H
- (2) CAN L
- (3) GND (-)

- (4) Power (+)
- (5) Exhaust Gas Flow
- (6) CAN Communication Data

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7. AFTER TREATMENT SYSTEM

[1] AFTER TREATMENT DEVICES



9Y1211012ENM006A

(1) Common Rail System	(8) Temperature Sensor (DOC Inlet Exhaust Temperature) (T_0)	(11) Temperature Sensor (DPF Outlet Exhaust Temperature) (T_2)	(a) EGR Valve Opening
(2) Engine ECU	(9) Temperature Sensor (DPF Inlet Exhaust Temperature) (T_1)	(12) Diesel Oxidation Catalyst (DOC)	(b) Injection Pattern
(3) After Treatment Devices	(10) Differential Pressure Sensor (DPF Differential Pressure) (ΔP)	(13) Diesel Particulate Filter (DPF)	(c) Inlet Throttle Valve Angle
(4) Intake Throttle Valve			(d) Air Flow Sensor Signal
(5) EGR Valve			(e) T_0 (DOC Inlet Exhaust Temperature)
(6) Air Flow Sensor			(f) T_1 (DPF Inlet Exhaust Temperature)
(7) EGR Cooler			(g) ΔP (DPF Differential Pressure)
			(h) T_2 (DPF Outlet Exhaust Temperature)

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Auto Mode

Auto Mode	REGENER- ATION INDI- CATOR	PARKED REGENER- ATION INDI- CATOR	WARNING INDICATOR	Buzzer Interval	State
Level 0 (No need Regeneration)				Not sounding	Regeneration is not required
Level 1 (Auto Regeneration)	★			Not sounding	The regeneration cycle begins and continues until cycle is complete then the indicator will turn "OFF".
Level 2 (Request parked Regeneration)	★	★		every few seconds	The parked regeneration indicator start flashing, and the parked regeneration can also be started.
Level 3 (Parked Regeneration)		★	★	every 1 second	At this PM warning level, the Auto Regeneration Mode does not function. If the tractor is operated further, the regeneration cycle will be disabled. Output of tractor is restricted.
Level 4 (Regeneration with service tools)			●	every 1 second	Parked regeneration is impossible. Regeneration is possible with service tools only. (Service tools are available among all levels without level 5)
Level 5 (DPF Cleaning)			●	every 1 second	Regeneration is impossible even with service tools. DPF cleaning is necessary.

●: Lighting, ★: Flashing

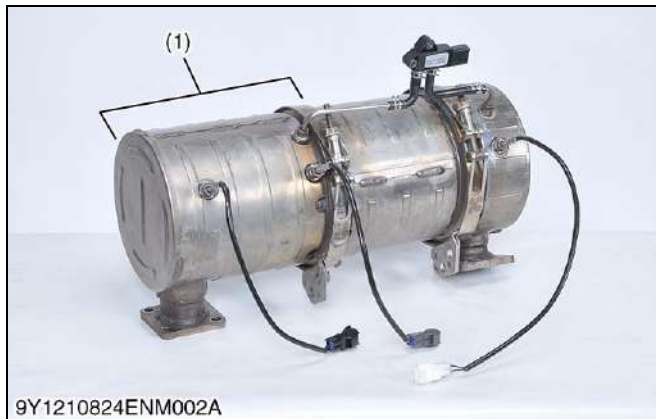
9Y1211012ENM0039US0

Regeneration INHIBIT Mode

INHIBIT Mode	REGENER- ATION INDI- CATOR	PARKED REGENER- ATION INDI- CATOR	WARNING INDICATOR	Buzzer Interval	State
Level 0 (No need Regeneration)				Not sounding	Regeneration is not required
Level 1 (Auto Regeneration)	★			Not sounding	A specific level of PM has built up in the DPF muffler.
Level 2 (Request parked Regeneration)	★	★		every few seconds	Move the tractor to a safe area, then do the Parked Regeneration.
Level 3 (Parked Regeneration)		★	★	every 1 second	Immediately stop working the tractor, move the tractor to a safe area, then do the Parked Regeneration. If the tractor is operated further and the operator ignores the warning signs, then regeneration will be disabled.
Level 4 (Regeneration with service tools)			●	every 1 second	Parked regeneration is impossible. Regeneration is possible with service tools only. (Service tools are available among all levels without level 5)
Level 5 (DPF Cleaning)			●	every 1 second	Regeneration is impossible even with service tools. DPF cleaning is necessary.

●: Lighting, ★: Flashing

9Y1211012ENM0040US0

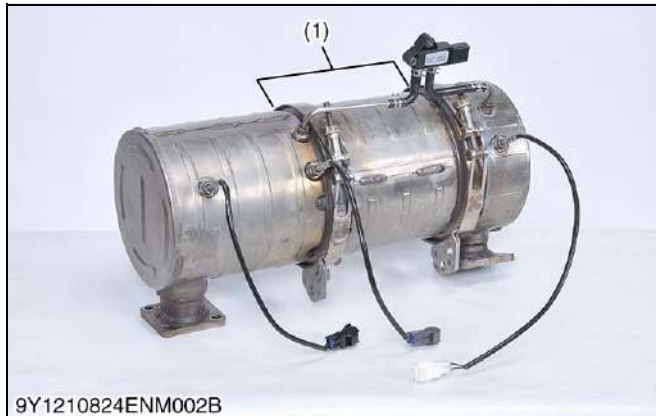


Diesel Oxidation Catalyst (DOC)

An oxidizing catalyst set in front of the Diesel Particulate Filter (DPF) step that uses post injection unburned fuel to actively regenerate the DPF.

- (1) Diesel Oxidation Catalyst (DOC)

9Y1211012ENM0041US0



Diesel Particulate Filter (DPF)

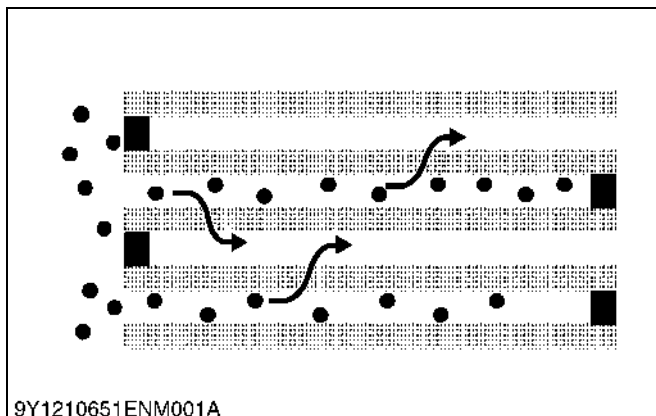
The Diesel Particulate Filter (DPF) is a device that captures and combusts PM in the exhaust gas.

Physically captures the PM using a filter which spontaneously combusts when exhaust gas temperature is high.

However, while exhaust gas temperature is low PM does not spontaneously combust the pressure differential between the inlet and outlet of the DPF is detected and the PM is combusted using a heat source generated using DOC to regenerate the filter.

- (1) Diesel Particulate Filter (DPF))

9Y1211012ENM0042US0



Intake Throttle Valve

The amount of air intake is regulated by the angle of the throttle valve and the exhaust temperature is controlled when regenerating the DPF muffler.

- (1) Intake Throttle Valve

9Y1211012ENM0043US0

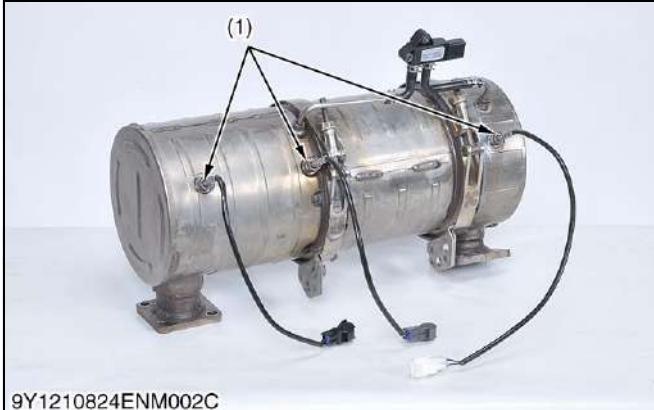


9Y1200165ENM004A

Air Flow Sensor

The amount of air intake required for control of the EGR valve used to reduce NOx is measured.

9Y1211012ENM0044US0



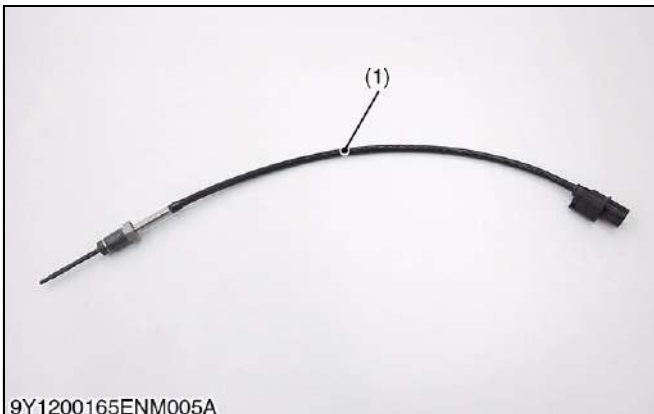
9Y1210824ENM002C

Temperature Sensor

This is mounted on the DPF muffler and the DPF muffler DOC intake, DPF intake, and DPF discharge exhaust temperature, needed for the post processing system, are measured.

(1) Temperature Sensor

9Y1211012ENM0045US0



9Y1200165ENM005A

Differential Pressure Sensor

The differential pressure sensor is a sensor that detects the pressure differential between the inlet and the outlet of the DPF.

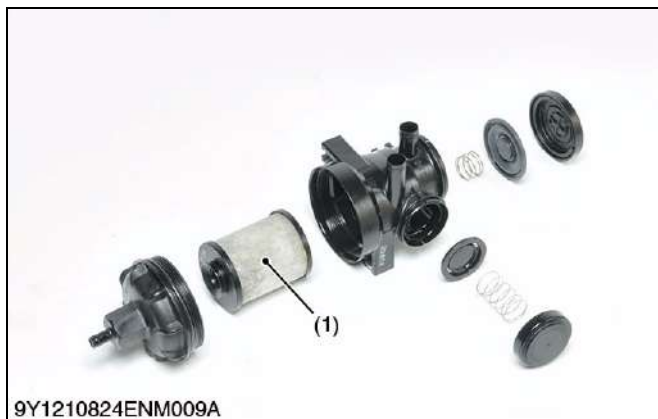
The engine ECU calculates the amount of accumulated PM in the DPF using this signal.

(1) Differential Pressure Sensor

9Y1211012ENM0046US0



9Y1211012ENM007A



Oil Separator

Removes oil in the blowby gases that pass through the element (1) and the oil is returned to the oil pan.

Blowby gases that pass through the element (1) are mixed into the intake upstream.

(1) Element

9Y1211012ENM0047US0

SERVICING

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Fill fuel	G-21, G-50
	Air in the fuel system	Bleed	G-46, G-74
	Water in the fuel system	Change fuel and repair or replace fuel system	–
	Fuel pipe clogged	Clean	–
	Fuel filter clogged	Replace	G-39, G-66
	Excessively high viscosity of fuel at low temperature	Use the specified fuel	G-10, G-11
	Fuel with low cetane number	Use the specified fuel	G-10, G-11
	Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S40
	Injector stuck or clogged	Replace	1-S43
	Fuel supply pump malfunctioning	Replace	1-S48
	Seizure of crankshaft, camshaft, piston or bearing	Repair or replace	1-S51, 1-S54, 1-S60
	Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and injector	1-S42, 1-S43, 1-S45
	Improper valve timing	Correct or replace timing gear	1-S51, 1-S51
	Piston ring and cylinder worn out	Replace	1-S55, 1-S78
	Incorrect valve clearance	Adjust	1-S12
Starter Does Not Operate	Battery discharged	Charge	G-33, G-61
	Starter malfunctioning	Repair or replace	9-S29, 9-S59
	Key switch malfunctioning	Repair or replace	9-S26
	Safety switches improperly adjusted or damaged	Adjust or replace	9-S27
	Starter relay damaged	Replace	9-S30
	Wiring disconnected	Connect	–
Engine Revolution Is Not Smooth	Fuel filter clogged or dirty	Change	G-39, G-66
	Air cleaner clogged	Clean or change	G-29, G-58
	Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S40
	Fuel supply pump malfunctioning	Replace	1-S48
	Injector stuck or clogged	Replace	1-S43
Either White or Blue Exhaust Gas Is Observed	Excessive engine oil	Reduce to the specified level	G-36, G-64
	Piston ring and cylinder worn or stuck	Repair or replace	1-S55, 1-S78

Symptom	Probable Cause	Solution	Reference Page
Either Black or Dark Gray Exhaust Gas Is Observed	Overload	Decrease the load	–
	Low grade fuel used	Use the specified fuel	G-10, G-11
	Fuel filter clogged	Change	G-39, G-66
	Air cleaner clogged	Clean or change	G-29, G-58
	Injector damaged	Replace	1-S43
Deficient Output	Engine's moving parts stuck	Repair or replace	–
	Supply pump damaged	Replace	1-S48
	Injector damaged	Replace	1-S43
	Compression leak	Check compression pressure and repair	1-S11
	Air cleaner clogged	Clean or replace element	G-29, G-58
	Breather hose or CCV clogged due to ice	Melt the ice in the breather hose or CCV, or Replace	1-S16, 1-S36
Excessive Lubricant Oil Consumption	Piston ring's gap points in the same direction	Shift ring gap direction	1-S55
	Oil ring worn or stuck	Replace	1-S55
	Piston ring groove worn out	Replace piston and piston ring	1-S54, 1-S55, 1-S73
	Valve stem and guide worn out	Replace	1-S63
	Crankshaft bearing and crankpin bearing are worn out	Replace	1-S74
Fuel Mixed Into Lubricant Oil	Injector damaged	Replace	1-S43
	Oil dilution due to regeneration	Change engine oil	G-36, G-64
Water Mixed Into Lubricant Oil	Head gasket damaged	Replace	1-S45
	Cylinder block or cylinder head flawed	Replace	1-S45
Low Oil Pressure	Engine oil insufficient	Fill	G-36, G-64
	Oil strainer clogged	Clean	1-S53
	Relief valve stuck with dirt	Repair or replace	–
	Excessive oil clearance of the bearings	Replace the metal, bushing or shaft	1-S74, 1-S75, 1-S75
	Oil passage clogged	Clean	–
	Different type of oil	Use the specified type of oil	G-10, G-11
	Oil Pump damaged	Replace	1-S52
High Oil Pressure	Difference type oil	Use the specified type of oil	G-10, G-11
	Relief valve damaged	Repair or replace	–
	Breather hose or CCV clogged due to ice	Melt the ice in the breather hose or CCV, or Replace	1-S16, 1-S36

Symptom	Probable Cause	Solution	Reference Page
Engine Overheated	Engine oil insufficient	Fill oil prescribed level	G-36, G-64
	Fan belt broken or elongated	Change or adjust	1-S13
	Coolant insufficient	Fill oil prescribed level	1-S24
	Radiator net and radiator fin clogged with dust	Clean	G-24, G-52
	Inside of radiator corroded	Clean or replace	–
	Coolant flow route corroded	Clean or replace	–
	Radiator or radiator cap damaged	Replace	1-S14
	Overload	Reduce the load	–
	Head gasket damaged	Replace	1-S45
	Unsuitable fuel used	Use the specified fuel	G-10, G-11

9Y1211012ENS0001US0

2. SERVICING SPECIFICATIONS

ENGINE BODY

Item		Factory Specification	Allowable Limit
Valve Clearance (When Cold)		0.18 to 0.22 mm 0.0071 to 0.0086 in.	—
Compression Pressure (When You Crank the Engine with the Starter)		2.95 to 3.23 MPa / 290 min ⁻¹ (rpm) 30.0 to 33.0 kgf/cm ² / 290 min ⁻¹ (rpm) 427 to 469 psi / 290 min ⁻¹ (rpm)	2.35 MPa / 290 min ⁻¹ (rpm) 24.0 kgf/cm ² / 290 min ⁻¹ (rpm) 341 psi / 290 min ⁻¹ (rpm)
Difference among Cylinders		—	10 % or less
Top Clearance		0.60 to 0.70 mm 0.024 to 0.027 in.	—
Cylinder Head Surface	Flatness	—	0.05 mm / 500 mm 0.002 in. / 19.7 in.
Valve Recessing	Recessing	0.65 to 0.85 mm 0.026 to 0.033 in.	1.20 mm 0.0472 in.
Valve Stem to Valve Guide	Clearance	0.040 to 0.070 mm 0.0016 to 0.0027 in.	0.10 mm 0.0039 in.
• Valve Stem	O.D.	7.960 to 7.975 mm 0.3134 to 0.3139 in.	—
• Valve Guide	I.D.	8.015 to 8.030 mm 0.3156 to 0.3161 in.	—
Valve Face	Angle (Intake)	0.79 rad 45°	—
	Angle (Exhaust)	0.79 rad 45°	—
Valve Seat	Width (Intake)	2.12 mm 0.0835 in.	—
	Width (Exhaust)	2.12 mm 0.0835 in.	—
Valve Seat	Angle (Intake)	0.79 rad 45°	—
	Angle (Exhaust)	0.79 rad 45°	—
Valve Timing (Intake Valve)	Open	0.2 rad (9°) before T.D.C.	—
	Close	0.68 rad (39°) after B.D.C.	—
Valve Timing (Exhaust Valve)	Open	0.72 rad (41°) before B.D.C.	—
	Close	0.2 rad (9°) after T.D.C.	—

Item		Factory Specification	Allowable Limit
Valve Spring	Free Length	41.7 to 42.2 mm 1.65 to 1.66 in.	41.2 mm 1.62 in.
	Setting Load / Setting Length	118 N / 35.0 mm 12.0 kgf / 35.0 mm 26.5 lbf / 1.38 in.	100 N / 35.0 mm 10.2 kgf / 35.0 mm 22.5 lbf / 1.38 in.
	Tilt	—	1.0 mm 0.039 in.
Rocker Arm Shaft to Rocker Arm	Oil Clearance	0.016 to 0.045 mm 0.00063 to 0.0017 in.	0.10 mm 0.0039 in.
	• Rocker Arm Shaft O.D.	13.973 to 13.984 mm 0.55012 to 0.55055 in.	—
	• Rocker Arm I.D.	14.000 to 14.018 mm 0.55119 to 0.55188 in.	—
Push Rod	Bend	—	0.25 mm 0.0098 in.
Tappet to Tappet Guide	Oil Clearance	0.020 to 0.062 mm 0.00079 to 0.0024 in.	0.07 mm 0.003 in.
	• Tappet O.D.	23.959 to 23.980 mm 0.94327 to 0.94409 in.	—
	• Tappet Guide I.D.	24.000 to 24.021 mm 0.94489 to 0.94570 in.	—
Timing Gear	• Crank Gear to Idle Gear Backlash	0.04150 to 0.1122 mm 0.001634 to 0.004417 in.	0.15 mm 0.0059 in.
	• Idle Gear to Cam Gear Backlash	0.04150 to 0.1154 mm 0.001634 to 0.004543 in.	0.15 mm 0.0059 in.
	• Idle Gear to Fuel Supply Pump Gear Backlash	0.04150 to 0.1154 mm 0.001634 to 0.004543 in.	0.15 mm 0.0059 in.
	• Crank Gear to Oil Pump Gear Backlash	0.04150 to 0.1090 mm 0.001634 to 0.004291 in.	0.15 mm 0.0059 in.
	• Idle Gear to Balancer Gear (V2403 Only) Backlash (Intake side)	0.0350 to 0.116 mm 0.00138 to 0.00456 in.	0.15 mm 0.0059 in.
		0.0350 to 0.116 mm 0.00138 to 0.00456 in.	0.15 mm 0.0059 in.
Idle Gear	Side Clearance	0.15 to 0.25 mm 0.0059 to 0.0098 in.	0.9 mm 0.04 in.
Idle Gear Shaft to Idle Gear Bushing	Oil Clearance	0.025 to 0.066 mm 0.00099 to 0.0025 in.	0.10 mm 0.0039 in.
	• Idle Gear Shaft O.D.	37.959 to 37.975 mm 1.4945 to 1.4950 in.	—
	• Idle Gear Bushing I.D.	38.000 to 38.025 mm 1.4961 to 1.4970 in.	—

Item		Factory Specification	Allowable Limit
Camshaft	Side Clearance	0.070 to 0.22 mm 0.0028 to 0.0086 in.	0.30 mm 0.012 in.
Camshaft	Bend	—	0.01 mm 0.0004 in.
Cam	Height (Intake / Exhaust)	33.90 mm 1.335 in.	33.85 mm 1.333 in.
Camshaft Journal to Cylinder Block Bore	Oil Clearance	0.050 to 0.091 mm 0.0020 to 0.0035 in.	0.15 mm 0.0059 in.
• Camshaft Journal	O.D.	39.934 to 39.950 mm 1.5722 to 1.5728 in.	—
• Cylinder Block Bore	I.D.	40.000 to 40.025 mm 1.5748 to 1.5757 in.	—
Balancer Shaft (V2403 Only)	Side Clearance	0.070 to 0.22 mm 0.0028 to 0.0086 in.	0.30 mm 0.012 in.
Balancer Shaft Journal 1 to Balancer Shaft Bearing 1 (V2403 Only)	Clearance	0.030 to 0.111 mm 0.00119 to 0.00437 in.	0.20 mm 0.0079 in.
• Balancer Shaft Journal 1	O.D.	43.934 to 43.950 mm 1.7297 to 1.7303 in.	—
• Balancer Shaft Bearing 1	I.D.	43.980 to 44.045 mm 1.7315 to 1.7340 in.	—
Balancer Shaft Journal 2 to Balancer Shaft Bearing 2 (V2403 Only)	Clearance	0.030 to 0.111 mm 0.00119 to 0.00437 in.	0.20 mm 0.0079 in.
• Balancer Shaft Journal 2	O.D.	41.934 to 41.950 mm 1.6510 to 1.6515 in.	—
• Balancer Shaft Bearing 2	I.D.	41.980 to 42.045 mm 1.6528 to 1.6553 in.	—
Balancer Shaft Journal 3 to Balancer Shaft Bearing 3 (V2403 Only)	Clearance	0.020 to 0.094 mm 0.00079 to 0.0037 in.	0.20 mm 0.0079 in.
• Balancer Shaft Journal 3	O.D.	21.947 to 21.960 mm 0.86406 to 0.86456 in.	—
• Balancer Shaft Bearing 3	I.D.	21.980 to 22.041 mm 0.86536 to 0.86775 in.	—
Piston Pin Bore	I.D.	25.000 to 25.013 mm 0.98426 to 0.98476 in.	25.05 mm 0.9862 in.
Top Ring to Ring Groove	Clearance	0.050 to 0.090 mm 0.0020 to 0.0035 in.	0.20 mm 0.0079 in.
Second Ring to Ring Groove	Clearance	0.0780 to 0.110 mm 0.00307 to 0.00433 in.	0.20 mm 0.0079 in.
Oil Ring to Ring Groove	Clearance	0.030 to 0.070 mm 0.0012 to 0.0027 in.	0.15 mm 0.0059 in.
Top Ring	Ring Gap	0.20 to 0.35 mm 0.0079 to 0.013 in.	1.25 mm 0.0492 in.
Second Ring	Ring Gap	0.30 to 0.45 mm 0.012 to 0.017 in.	1.25 mm 0.0492 in.

Item		Factory Specification	Allowable Limit
Oil Ring	Ring Gap	0.20 to 0.40 mm 0.0079 to 0.015 in.	1.25 mm 0.0492 in.
Connecting Rod	Alignment	–	0.05 mm 0.002 in.
Piston Pin to Small End Bushing	Oil Clearance	0.014 to 0.036 mm 0.00056 to 0.0014 in.	0.15 mm 0.0059 in.
• Piston Pin	O.D.	25.004 to 25.011 mm 0.98441 to 0.98468 in.	–
• Small End Bushing	I.D.	25.025 to 25.040 mm 0.98524 to 0.98582 in.	–
Crankshaft	Bend	–	0.03 mm 0.0001 in.
Crankshaft Journal to Crankshaft Bearing 1	Oil Clearance	0.0400 to 0.118 mm 0.00158 to 0.00464 in.	0.20 mm 0.0079 in.
• Crankshaft Journal	O.D.	59.921 to 59.940 mm 2.3591 to 2.3598 in.	–
• Crankshaft Bearing 1	I.D.	59.980 to 60.039 mm 2.3615 to 2.3637 in.	–
Replacement of Crankshaft Bearing 1	Dimension	3.90 to 4.10 mm 0.154 to 0.161 in.	–
Crankshaft Journal to Crankshaft Bearing 2	Oil Clearance	0.0400 to 0.104 mm 0.00158 to 0.00409 in.	0.20 mm 0.0079 in.
• Crankshaft Journal	O.D.	59.921 to 59.940 mm 2.3591 to 2.3598 in.	–
• Crankshaft Bearing 2	I.D.	59.980 to 60.025 mm 2.3615 to 2.3631 in.	–
Crankpin to Crankpin Bearing	Oil Clearance	0.025 to 0.087 mm 0.00099 to 0.0034 in.	0.20 mm 0.0079 in.
• Crankpin	O.D.	46.959 to 46.975 mm 1.8488 to 1.8494 in.	–
• Crankpin Bearing	I.D.	47.000 to 47.046 mm 1.8504 to 1.8522 in.	–
Crankshaft	Side Clearance	0.15 to 0.31 mm 0.0059 to 0.012 in.	0.5 mm 0.02 in.
Cylinder Bore	I.D.	87.000 to 87.022 mm 3.4252 to 3.4260 in.	87.170 mm 3.4319 in.
Cylinder Bore (Oversize)	I.D.	87.250 to 87.272 mm 3.4351 to 3.4359 in.	87.420 mm 3.4417 in.
Cylinder Maximum I.D. to Cylinder Minimum I.D.	Difference	–	0.15 mm 0.0059 in.

LUBRICATING SYSTEM

Item		Factory Specification	Allowable Limit
Engine Oil Pressure	At Idle Speed	More than 98 kPa 1.0 kgf/cm ² 14 psi	50 kPa 0.5 kgf/cm ² 7 psi
	At Rated Speed	300 to 440 kPa 3.0 to 4.5 kgf/cm ² 43 to 64 psi	250 kPa 2.5 kgf/cm ² 36 psi
Engine Oil Pressure Switch	Working Pressure	50 kPa 0.5 kgf/cm ² 7 psi	—
Inner Rotor to Outer Rotor	Clearance	0.030 to 0.14 mm 0.0012 to 0.0055 in.	0.2 mm 0.008 in.
Outer Rotor to Pump Body	Clearance	0.11 to 0.19 mm 0.0044 to 0.0074 in.	0.25 mm 0.0098 in.
Inner Rotor to Cover	Clearance	0.105 to 0.150 mm 0.00414 to 0.00590 in.	0.20 mm 0.008 in.

COOLING SYSTEM

Item		Factory Specification	Allowable Limit
Fan Belt [L3301/L3901]	Tension	7 to 9 mm (0.28 to 0.35 in.) deflection at 98 N (10 kgf, 22 lbf) of force	—
Fan Belt [L4701]	Tension	12 mm (0.48 in.) deflection at 68 N (7 kgf, 15.4 lbs) of force	—
Thermostat Valve	Opening- Temperature (When the valve starts to open)	80.5 to 83.5 °C 167.9 to 182.3 °F	—
	Opening- Temperature (When the valve opened completely)	95 °C 203 °F	—
Radiator	Water Tightness	No leak at 137 kPa 1.4 kgf/cm ² 20 psi	—
Radiator Cap	Pressure Decreasing Time	More than 10 seconds for pressure decrease from 90 to 60 kPa from 0.9 to 0.6 kgf/cm ² from 10 to 9 psi	—

ELECTRICAL SYSTEM

Item		Factory Specification	Allowable Limit
Acceleration Wire	Clearance	1 to 3 mm 0.04 to 0.1 in.	—

3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

[Tractor]

Item	N·m	kgf·m	lbf·ft
Acceleration wire adjusting nut	12 to 13	1.2 to 1.4	8.7 to 10
Exhaust pipe mount bolt	29.4 to 34.3	3.0 to 3.5	22 to 25
Flange mount bolt and nut	49.0 to 55.9	5.0 to 5.7	37 to 41
Filter comp (DPF) mounting clamp band	16 to 20	1.7 to 2.0	12 to 14
Temperature sensor	25 to 34	2.5 to 3.5	18 to 25
Differential pressure pipe	16 to 22	1.6 to 2.3	12 to 16
Steering wheel mounting nut	48 to 55	4.9 to 5.7	36 to 41
Oil cooler return pipe bolt	92 to 101	9.0 to 10.0	6.7 to 7.3
Delivery pipe joint screw	49 to 69	5.0 to 7.0	37 to 50

[L3301/L3901]

Item	N·m	kgf·m	lbf·ft
Steering shaft universal joint bolt	23.5 to 27.4	2.4 to 2.8	17.3 to 20.2
Steering bearing flange bolt	23.5 to 27.4	2.4 to 2.8	17.3 to 20.2
Front Axle Frame Mounting Bolt (M10)	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5

[L4701]

Item	N·m	kgf·m	lbf·ft
Front Axle Frame Mounting Bolt (M10)	60.8 to 70.6	6.2 to 7.2	45 to 52
Front Axle Frame Mounting Bolt (M12)	103.0 to 117.7	10.5 to 12.0	76 to 86

[ENGINE]

Item	Dimension × Pitch	N·m	kgf·m	lbf·ft
B terminal nut of starter	M8 × 1.25	5.9 to 11	0.60 to 1.2	4.4 to 8.6
Injector clamp screw	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
Cylinder head cover screw	M6 × 1.0	6.86 to 11.3	0.700 to 1.15	5.06 to 8.33
Oil pressure switch screw	R 1/8	15 to 19	1.5 to 2.0	11 to 14
Common rail mounting screw	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
Coolant temperature sensor taper screw	—	16 to 23	1.6 to 2.4	12 to 17
Camshaft position sensor mounting screw	—	4 to 5	0.4 to 0.6	3 to 4
Crankshaft position sensor mounting screw	—	4 to 6	0.4 to 0.6	3 to 4
Glow lead mounting nut	M4 × 0.7	0.98 to 1.7	0.10 to 0.18	0.73 to 1.3
Glow plug	M10 × 1.25	15 to 19	1.5 to 2.0	11 to 14
Injector clamp screw	—	24 to 27	2.4 to 2.8	18 to 20
Injection pipe cap nut	M12 × 1.5	24.5 to 29.4	2.5 to 3.0	18.1 to 21.6
Rocker arm bracket screw	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
*Cylinder head mounting screw	M11 × 1.25	93.2 to 98.0	9.50 to 10.0	68.8 to 72.3
Supply pump mounting nut	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
Injection pipe retaining nut	—	24.5 to 29.4	2.5 to 3.0	18.1 to 21.6
Oil cooler joint screw	M20 × 1.5	40 to 44	4.0 to 4.5	29 to 32
Mounting nut of fan drive pulley	M30 × 1.5	138 to 156	14.0 to 16.0	102 to 115
Camshaft set screw	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
Camshaft set bolt	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
Balancer shaft set bolt	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
*Connecting rod screw	M8 × 1.25	40 to 45	4.1 to 4.5	30 to 33
*Flywheel screw	M12 × 1.25	98.1 to 107	10.0 to 11.0	72.4 to 79.5
Mounting screw of bearing case cover	M8 × 1.25	24 to 27	2.4 to 2.8	18 to 20
Screw 2 of main bearing case	M10 × 1.25	69 to 73	7.0 to 7.5	51 to 54
Screw 1 of main bearing case	M9 × 1.25	46 to 50	4.7 to 5.2	34 to 37

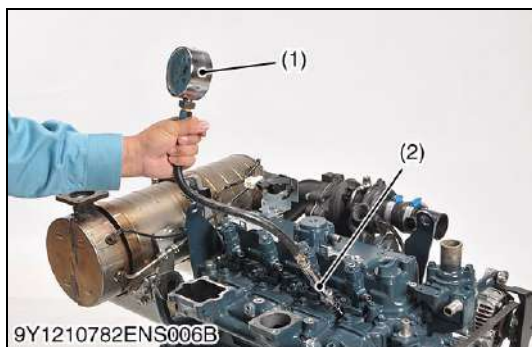
■ NOTE

- For the screws, bolts and nuts with the mark "***", apply engine oil to their threads and seats before you tighten.
- The alphabet "M" in Dimension × Pitch shows that the screw, bolt or nut dimensions are in the metric system. The dimension is the nominal external diameter in mm of the threads. The pitch is the nominal distance in mm between 2 threads.

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4. CHECKING AND ADJUSTING

[1] ENGINE BODY



Compression Pressure

1. After warming-up the engine, remove the air cleaner, muffler, glow lead, and glow plugs.
2. Set a compression tester (1) (Code No.: 07909-39081) with the adaptor (2) to the glow plug hole.
3. Crank the engine with the starter to operate the engine approx. 200 to 300 min⁻¹ (rpm).
4. Measure a maximum value of the compression pressure. Do the same steps for each cylinder.

■ NOTE

- Check the compression pressure with the specified valve clearance.
- Always use a fully charged battery for this test.
- Variances in each cylinder compression value must be less than 10 %.

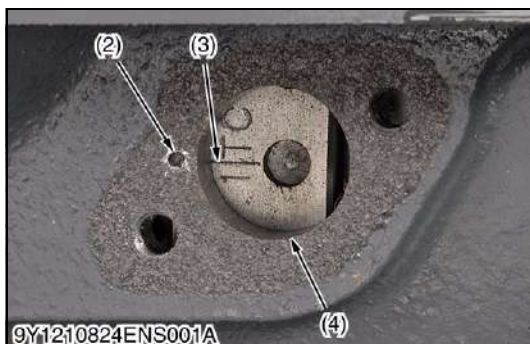
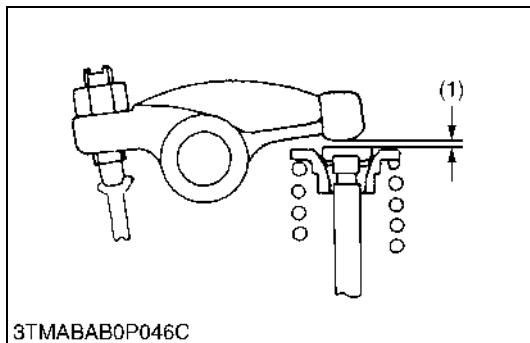
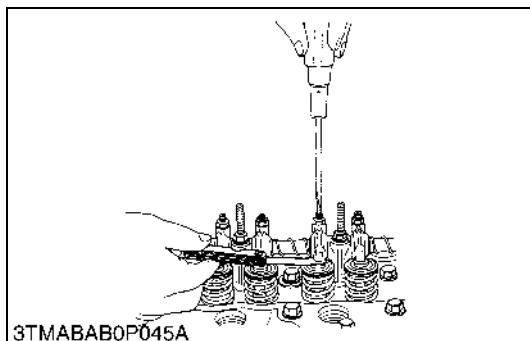
Compression pressure	Factory specification	2.95 to 3.23 MPa 30.0 to 33.0 kgf/cm ² 427 to 469 psi
	Allowable limit	2.35 MPa 24.0 kgf/cm ² 341 psi

Tightening torque	Injector clamp screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Cylinder head cover screw	6.86 to 11.3 N·m 0.700 to 1.15 kgf·m 5.06 to 8.33 lbf·ft
	Injection pipe retaining nut	24.5 to 29.4 N·m 2.50 to 2.99 kgf·m 18.1 to 21.6 lbf·ft

(1) Compression Tester

(2) Glow Plug Adaptor

9Y1211012ENS0004US0



Valve Clearance

■ IMPORTANT

- You must check and adjust the valve clearance when the engine is cold.
1. Remove the head cover.
 2. Align the "1TC" mark line (3) on the flywheel and timing mark (2) on the housing. Make sure that the No. 1 piston comes to the compression or overlap top dead center.
 3. Check the subsequent valve clearance (1) at the mark "☆" with a feeler gauge.
 4. If the clearance is out of the factory specifications, adjust with the adjusting screw.

Valve clearance	Factory specification	0.18 to 0.22 mm 0.0071 to 0.0086 in.

■ NOTE

- The "1TC" mark line on the flywheel is only for the No. 1 cylinder. There is no "TC" mark for the other cylinders.
- Align the "TC" mark with the center of timing mark (2) on the flywheel-housing. No. 1 piston is on the top dead center position at this time. Turn the flywheel 0.26 rad (15 °) to see if the piston is at the compression top dead center or the overlap position. Refer to the table below to adjust the valve clearance (1) again. (The piston is at the compression top dead center when both the IN. and EX. valves do not move. The piston is at the overlap position when both the valves move.)
- Turn the flywheel 6.28 rad (360°) and align the "1TC" mark line with the timing mark (2) correctly. Adjust all the other valve clearance if necessary.
- After you turn the flywheel counterclockwise 2 or 3 times, check the valve clearance (1) again.
- After you adjust the valve clearance (1), tighten the lock nut of the adjusting screw.

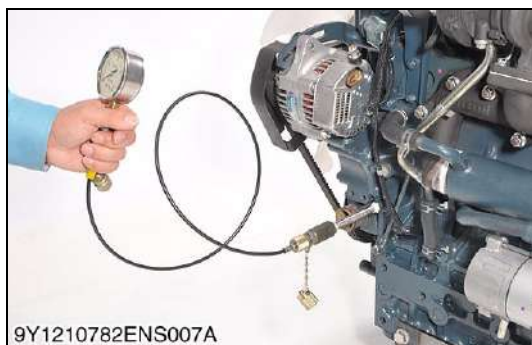
Adjustable Cylinder Location of Piston		Valve Arrangement			
		3 Cylinder		4 Cylinder	
		IN.	EX.	IN.	EX.
When No. 1 piston is at compression top dead center	No. 1	☆	☆	☆	☆
	No. 2		☆	☆	
	No. 3	☆			☆
	No. 4	—	—		
When No. 1 piston is at overlap position	No. 1				
	No. 2	☆			☆
	No. 3		☆	☆	
	No. 4	—	—	☆	☆

- (1) Valve Clearance
(2) Timing Mark

- (3) 1TC Mark Line
(4) Timing Window

9Y1211012ENS0005US0

[2] LUBRICATING SYSTEM



Engine Oil Pressure

1. Remove the engine oil pressure switch, and set the oil pressure tester (Code No.: 07916-32032). (Adaptor screw: PT 1/8)
2. Operate the engine for warming-up.
3. Measure the oil pressure at the idle speed and rated speed.
4. If the oil pressure is less than the allowable limit, do a check below.
 - Engine oil level
 - Oil pump
 - Oil strainer
 - Oil filter cartridge
 - Oil passage
 - Oil clearance
 - Relief valve

Engine oil pressure	At idle speed	Factory specification	More than 98 kPa 1.0 kgf/cm ² 14 psi
		Allowable limit	50 kPa 0.5 kgf/cm ² 7 psi
	At rated speed	Factory specification	300 to 440 kPa 3.0 to 4.5 kgf/cm ² 43 to 64 psi
		Allowable limit	250 kPa 2.5 kgf/cm ² 36 psi

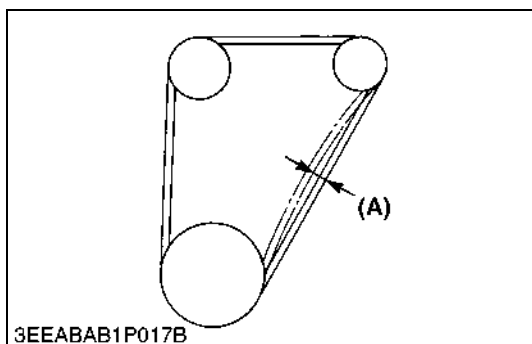
(When reassembling)

- After you check the oil pressure of the engine, tighten its oil pressure switch to the specified torque.

Tightening torque	Oil pressure switch	15 to 19 N·m 1.5 to 2.0 kgf·m 11 to 14 lbf·ft

9Y1211012ENS0006US0

[3] COOLING SYSTEM



3EEABAB1P017B

Fan Belt Tension

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

Moderate Pressure:

[L3301/L3901]

- 98 N (10 kgf, 22 lbs)

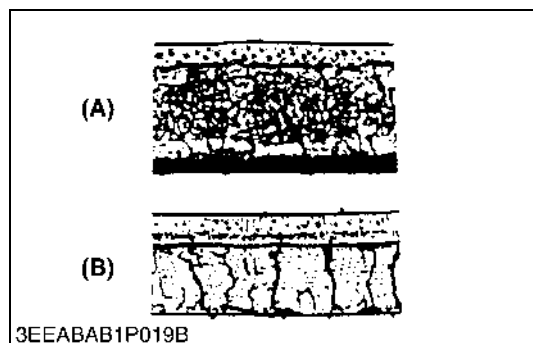
[L4701]

- 68 N (7 kgf, 15.4 lbs)

Deflection (A)	Factory specification	L3301/L3901	7 to 9 mm 0.28 to 0.35 in.
		L4701	12 mm 0.48 in.

(A) Deflection

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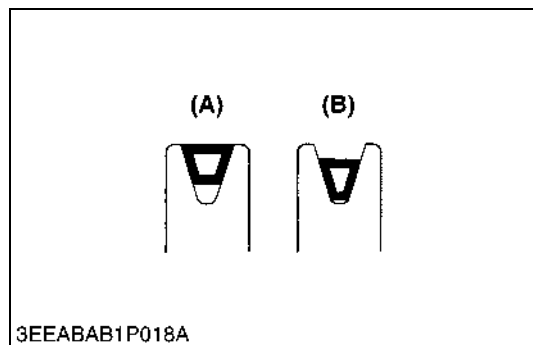
Fan Belt Damage and Wear

1. Check the fan belt for damage.
2. If the fan belt has a damage, replace it.
3. Check if the fan belt is worn out and sunk in the pulley groove.
4. If it is, replace it.

(A) Good

(B) Bad

9Y1211012ENS0008US0



Radiator Cap Air Leakage



CAUTION

- Remove the radiator cap only after you stop the engine for a minimum of 10 minutes to decrease its temperature. If not, hot water can gush out and cause injury.
1. Set a radiator tester and an adaptor on the radiator cap.
 2. Apply the specified pressure 90 kPa (0.9 kgf/cm², 10 psi).
 3. Measure the time for the pressure to decrease to 60 kPa (0.6 kgf/cm², 9 psi).
 4. If the measurement is less than the factory specification, replace the radiator cap.

Pressure decreasing time	Factory specification	More than 10 seconds for pressure decrease from 90 to 60 kPa (from 0.9 to 0.6 kgf/cm ² , from 10 to 9 psi)

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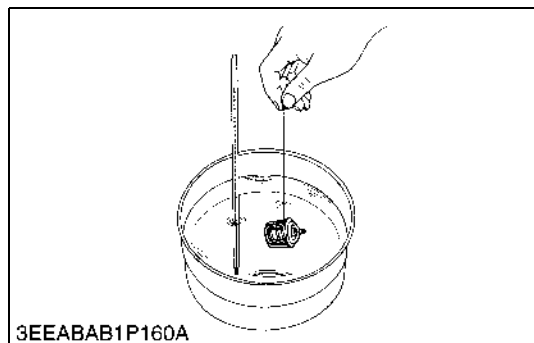


Radiator Water Leakage

1. Fill a specified quantity of water into the radiator.
2. Set a radiator tester and an adaptor on the radiator. Increase the water pressure to the specified pressure with the radiator tester and adaptor.
3. Check the radiator for water leakage.
4. For water leakages from the pinhole, replace the radiator or repair with the radiator cement. When water leak is too much, replace the radiator.

Radiator water leakage test	Factory specification	No leak at 137 kPa 1.4 kgf/cm ² 20 psi

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Opening-temperature of Thermostat Valve

1. Push down the thermostat valve and put the thread between the valve and the valve seat.
2. Put the thermostat and the thermometer in the container and increase the temperature of the water gradually.
3. Take the thread, and float the thermostat in the water. As the water temperature rises, the valve will open, and the thermostat will separate from the thread. Measure the temperature at this moment.
4. Continue to increase the temperature and read the temperature when the valve opens approximately 8 mm (0.3 in.).
5. If the measurement is out of the factory specifications, replace the thermostat.

Thermostat valve opening temperature	Factory specification	80.5 to 83.5 °C 176.9 to 182.3 °F
Full opening temperature		95 °C 203 °F

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[4] PCV VALVE



PCV (Positive Crankcase Ventilation) Valve (Oil Separator)

1. Remove the cover (1) and PCV valve (spring and diaphragm) (2).
2. Check whether there is no damage of the spring and/or no breaking or damage of the diaphragm.
If there are any damage or breaking, replace the oil separator kit with a new one.

■ NOTE

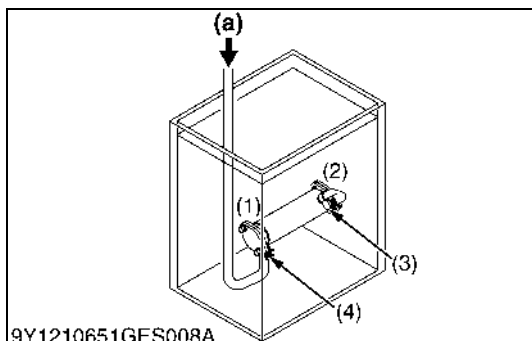
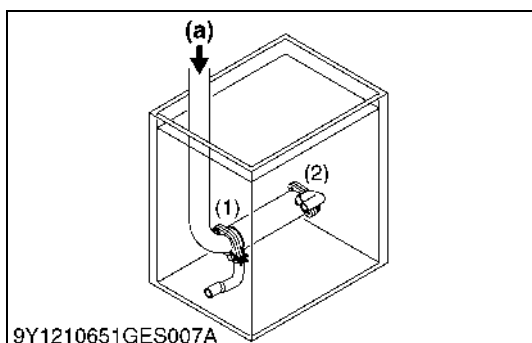
- If you find ice inside of PCV or breather hose, there is an option to install "Antifrost Heater Kit". Contact sales company to confirm the kit number.

(1) Cover

(2) PCV Valve

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[5] EGR COOLER



EGR Cooler

(Exhaust gas passage)

1. Block the EGR cooler exhaust gas outlet (2).
2. Attach an air hose to the EGR cooler exhaust gas inlet (1) and then submerge it in a water tank.
3. Check that the coolant passage is full of water.
4. Apply the specified amount of air pressure (a) (290 kPa, 3.0 kgf/cm², 43 psi) to the air hose side, and check that there are no air leaks in any of the EGR cooler parts.
5. If there are air leaks, replace the EGR cooler.

(Coolant passage)

1. Block the EGR cooler exhaust gas inlet (1), EGR cooler exhaust gas outlet (2), and the coolant outlet (3).
2. Attach an air hose to the EGR cooler coolant inlet (4), and then submerge it in a water tank.
3. Apply the specified amount of air pressure (a) (250 kPa, 2.5 kgf/cm², 36 psi) to the air hose side, and check that there are no air leaks in any of the EGR cooler parts.
4. If there are air leaks, replace the EGR cooler.

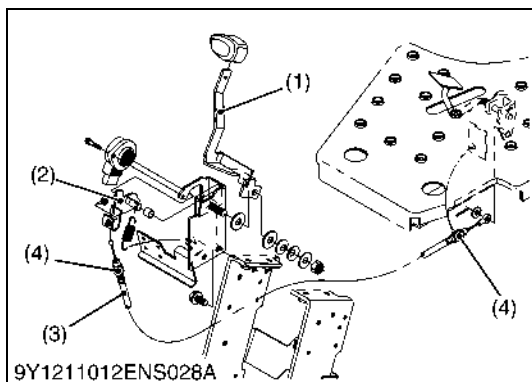
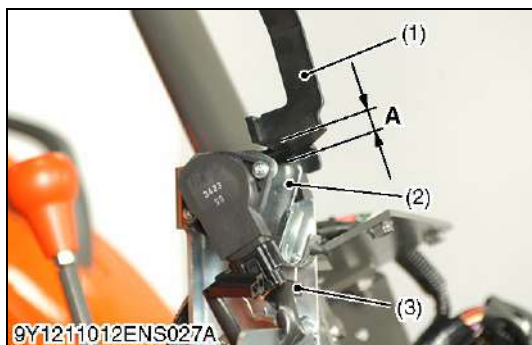
EGR cooler leakage test pressure	Factory specification	Exhaust gas passage	300 kPa 3.0 kgf/cm ² 43 psi
		Coolant passage	250 kPa 2.5 kgf/cm ² 36 psi

- (1) Exhaust Gas Inlet
- (2) Exhaust Gas Outlet
- (3) Coolant Outlet
- (4) Coolant Inlet

(a) Air Pressure

9Y1211012ENS0013US0

[6] ACCELERATION SENSOR



Acceleration Sensor Wire Adjustment

1. Turn the key switch to **OFF** position and stop the engine.
2. Set the acceleration lever (1) to **MAX** rpm position.
3. Measure the clearance "**A**" between acceleration lever (1) and the sensor lever (2).
4. If measurement is not within factory specification, adjust the adjusting nut (4).

■ NOTE

- If adjusting the acceleration sensor wire, be sure to perform mode "c" adjustment (See page 9-S14).

Clearance "A"	Factory specification	1 to 3 mm 0.04 to 0.1 in.

(When reassembling)

Tightening torque	Acceleration wire adjusting nut	12 to 13 N·m 1.2 to 1.4 kgf·m 8.7 to 10 lbf·ft

- (1) Acceleration Lever
(2) Sensor Lever

- (3) Acceleration Wire
(4) Adjusting Nut

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5. PREPARATION

[1] SEPARATING DPF MUFFLER FROM TRACTOR

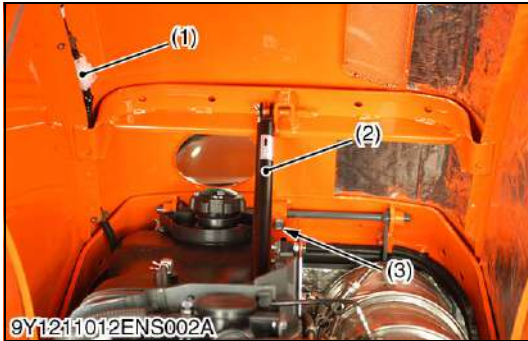


Battery Negative Cable Connector

1. Open bonnet.
2. Disconnect battery negative cable connector (1).

(1) Battery Negative Cable Connector

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Bonnet and Side Covers

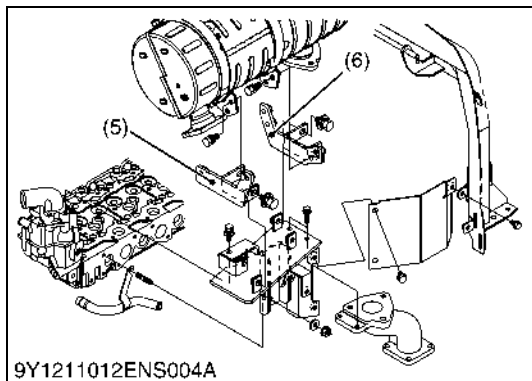
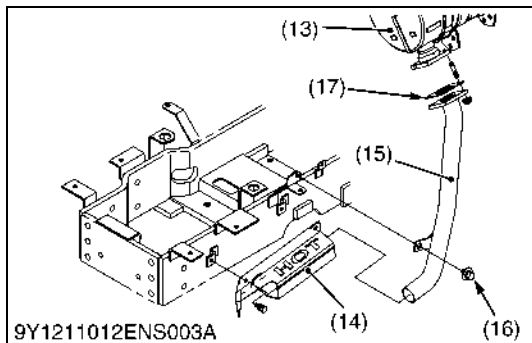
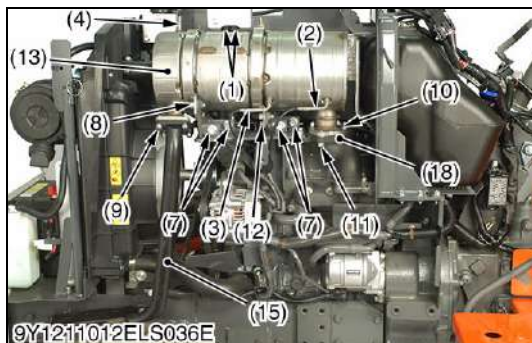
1. Disconnect the headlight connector (1).
2. Remove the damper (2) from the bonnet.
3. Disconnect the bolt (3) from the bonnet.
4. Remove the bonnet (4).
5. Remove the R.H. and L.H. side covers (5).

(1) Headlight Connector
(2) Damper
(3) Bolt

(4) Bonnet
(5) Side Cover

9Y1211012ENS0014US0





DPF Muffler

1. Disconnect connectors for differential pressure sensor (1) and DPF temperature sensors (2), (3), (4).
2. Remove front exhaust pipe (14).
3. Remove exhaust pipe (15).
4. Remove flange mount bolts (10) and flange mount nut (11).
5. Remove bracket mount bolts (7) and remove DPF muffler assembly (13).
6. Remove DPF bracket 1 (5) and DPF bracket 2 (6) from DPF muffler assembly (13).

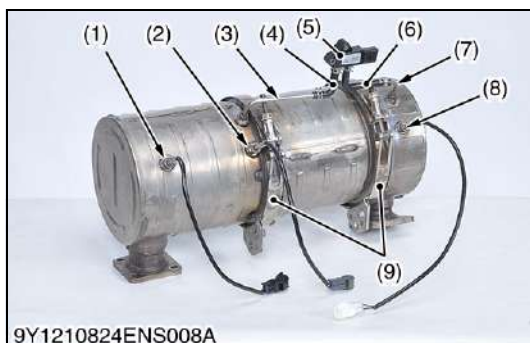
(When reassembling)

- Be sure to change gasket (17), (18) into new one.
 - When mounting DPF muffler assembly (13), be sure to follow procedure below.
1. Assemble front exhaust pipe (14) to front axle frame.
 2. Tighten bracket 1 mount bolt (8) and bracket 2 mount bolt (12) temporarily.
 3. Tighten exhaust pipe mount bolt (9) splitting twice.
 4. Tighten bracket mount bolt (7) temporarily.
 5. Tighten Flange mount bolt (10) and Flange mount nut (11) splitting twice.
 6. Tighten exhaust pipe mount bolt 2 (16).
 7. Tighten bracket mount bolt (7).
 8. Tighten bracket 1 mount bolt (8) and bracket 2 mount bolt (12) with specified torque.

Tightening torque	Exhaust pipe mount bolt (1st)	23.6 to 27.5 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Exhaust pipe mount bolt (2nd)	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 22 to 25 lbf·ft
	Flange mount bolt and nut (1st)	39.2 to 44.8 N·m 4.0 to 4.6 kgf·m 29 to 33 lbf·ft
	Flange mount bolt and nut (2nd)	49.0 to 55.9 N·m 5.0 to 5.7 kgf·m 37 to 41 lbf·ft

(1) Differential Pressure Sensor	(10) Flange Mount Bolt
(2) DPF Temperature Sensor (T0)	(11) Flange Mount Nut
(3) DPF Temperature Sensor (T1)	(12) Bracket 2 Mount Bolt
(4) DPF Temperature Sensor (T2)	(13) DPF Muffler Assembly
(5) DPF Bracket 1	(14) Front Exhaust Pipe
(6) DPF Bracket 2	(15) Exhaust Pipe
(7) Bracket Mount Bolt	(16) Exhaust Pipe Mount Bolt 2
(8) Bracket 1 Mount Bolt	(17) Gasket
(9) Exhaust Pipe Mount Bolt 1	(18) Gasket

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Filter Comp (DPF) (If necessary)

■ IMPORTANT

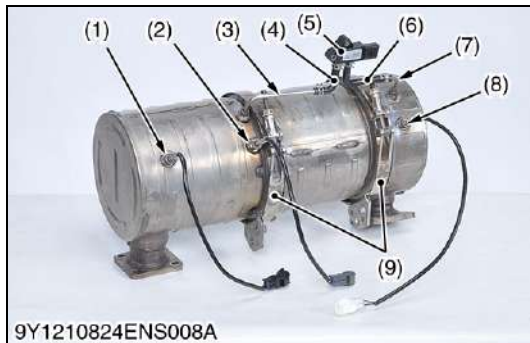
- Always work in the workshop equipped with a electric hoist (including mobile hoist).
- Put a product (engine) on a stable ground, and set the parking brake.
- As the DPF muffler full assembly is hot just after the engine shutdown, make sure to start operation after it gets cool.
- Make sure not to let any foreign substances enter the opening section during the operation.
- Make sure not to damage the DPF muffler full assembly by falling or impact as it contains a ceramic filter.
- Before removing the DPF for cleaning or replacing, keep the records of the engine serial number, DPF muffler full assembly part number, DPF muffler full assembly serial number, and engine operating time, which are required in preparing the DPF cleaning order form.

Since the engine operating time is recorded in the ECU, check the operating time by connecting the service tool (Diagmaster).

- When installing and removing the DPF muffler full assembly, make sure that the temperature sensor, differential pressure sensor, and differential pressure pipe do not make contact with surrounding parts.
 - Be sure to loosen the temperature sensor tightening nut or the differential pressure pipe tightening nut with crowfoot wrench to prevent the damage of the sensor or pipe. If it is still hard to loosen, apply the lubricant spray to threaded portion and soak it with lubricant.
1. Remove the hoses (4), (6) from the differential pressure pipes (3), (7).
 2. Remove the differential pressure sensor (5).
 3. Remove the DPF mounting clamp band (9).
 4. Separate the Diesel Oxidation Catalyst (DOC) (10), Diesel Particulate Filter (DPF) (12), DPF outlet body (13) respectively.

(1) Temperature Sensor (T_0)	(8) Temperature Sensor (T_2)
(2) Temperature Sensor (T_1)	(9) Filter Comp (DPF) Mounting Clamp Band
(3) Differential Pressure Pipe	(10) Diesel Oxidation Catalyst (DOC)
(4) Hose	(11) Gasket
(5) Differential Pressure Sensor	(12) Diesel Particulate Filter (DPF)
(6) Hose	(13) DPF Outlet Body
(7) Differential Pressure Pipe	

(To be continued)

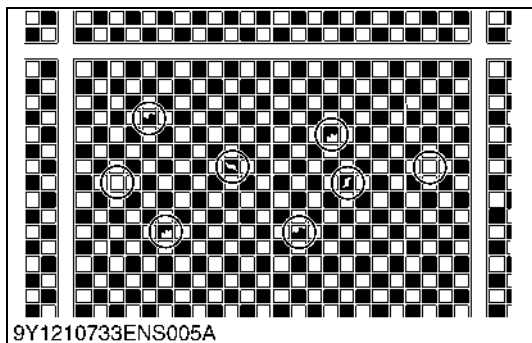
(Continued)**(When reassembling)****■ IMPORTANT**

- Replace the gaskets (11) with new ones.
- If the differential pressure hoses (4), (6) are damaged or cracked, replace it.
- When the differential pressure pipes (3), (7) and temperature sensors (1), (2), (8) are removed, wipe off the anti-seize and lubricating compound, apply a anti-seize and lubricating compound (Bostik, NEVER SEEZ, Pure Nickel Special Grade), and then attach them to their correct position.
- When replacing the differential pressure pipes (3), (7) apply a anti-seize and lubricating compound (Bostik, NEVER SEEZ, Pure Nickel Special Grade), and then attach it to its correct position.
- When replacing the temperature sensor, check that it is coated with anti-seize and lubricating compound, and then attach it to its correct position.
- Tighten bolts and nuts to their specified torque. Also tighten the temperature sensor tightening nut or the differential pressure pipe tightening nut to the specified torque with crowfoot wrench.
- After attaching the assembly, start the engine and make sure that there are no gas leaks.
- Reassemble the Diesel Particulate Filter (DPF) (12) in the correct direction.

Tightening torque	Filter comp (DPF) mounting clamp band	16 to 20 N·m 1.7 to 2.0 kgf·m 12 to 14 lbf·ft
	Temperature sensor	25 to 34 N·m 2.5 to 3.5 kgf·m 18 to 25 lbf·ft
	Differential pressure pipe	16 to 22 N·m 1.6 to 2.3 kgf·m 12 to 16 lbf·ft

(1) Temperature Sensor (T_0)	(8) Temperature Sensor (T_2)
(2) Temperature Sensor (T_1)	(9) Filter Comp (DPF) Mounting Clamp Band
(3) Differential Pressure Pipe	(10) Diesel Oxidation Catalyst (DOC)
(4) Hose	(11) Gasket
(5) Differential Pressure Sensor	(12) Diesel Particulate Filter (DPF)
(6) Hose	(13) DPF Outlet Body
(7) Differential Pressure Pipe	

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Judgment of Reuse of Filter Comp (DPF) Before Cleaning (Service Dealer)

■ IMPORTANT

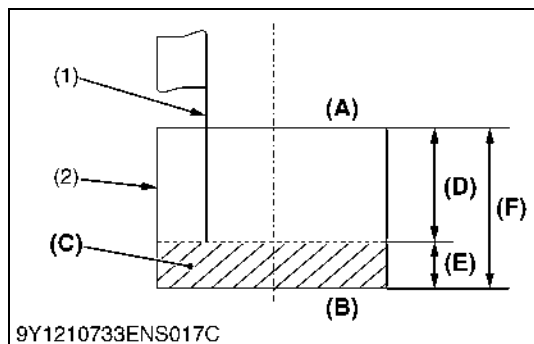
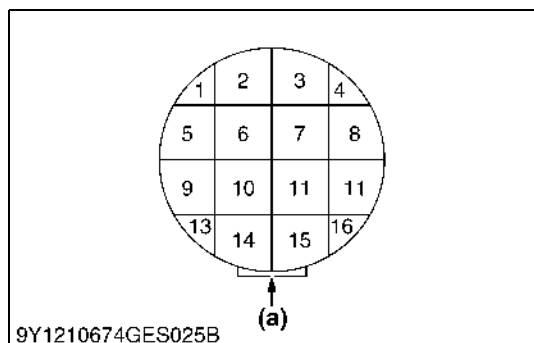
- Before ordering to a cleaning contractor, follow the procedure below to make a judgment on whether the DPF is reusable.

1. Check to see that the exhaust gas outlet side on the removed DPF is not darkened.
2. Check whether there is no crack or failure of the sealing wall on both ends of the cell (inlet side and outlet side) of DPF.
If the number of cells with failure sealing wall exceeds the allowable limit, the DPF cannot be reused even after cleaning.

Judgment of non-reusability of DPF	Allowable limit	Number of cells with failure sealing wall 10 or more

3. Check whether there is no crack and loss of the ceramic element.
If there are any crack or losses of the ceramic element, the DPF cannot be reused even if it is cleaned.
4. If it is judged that the DPF is not reusable, report the result of the evaluation to the customer that requested the DPF cleaning, and replace the DPF with a new one.

9Y1211012ENS0017US0



Judgment of Reuse of Filter Comp (DPF) After Cleaning by Cleaning Contractor

■ IMPORTANT

- After the cleaning contractor has cleaned the filter comp DPF, they should measure the quantity of remaining ash in the following procedure, and evaluate the reusability.
- After having cleaned the filter comp (DPF), measure the actual cell depth (D) with a pin gauge in the each block shown in the figure. One cell (The measurement point is not specified) is measured in each block.

Model	Measurement total
All model	16 blocks

- If the actual cell depth (D) is less than the allowable limit, the DPF cannot be reused.
If the DPF is judged as non-reusable, report the result of the judgment to the customer that requested the filter cleaning via the service dealer, and replace the DPF with a new one.

(Reference)

Actual Cell Depth (D) = Cell Depth (F) – Accumulated Ash Depth (E)

■ NOTE

- Select a metal pin gauge having a wire size slightly thinner than the cell width (0.60 to 0.80 mm dia., 0.024 to 0.031 in. dia.).
- When the pin gauge is inserted into the cell hole, insert it by lightly tapping on the gage end with a finger tip.
- If the pin gauge is forcibly pushed in, the pin pierces through the accumulated ash and it cannot be measured accurately. So be careful not to push the pin forcibly.

Actual cell depth (Average of all measurement blocks)	Allow- able limit	L3301/L3901	85 mm 3.3 in.
		L4701	102 mm 4.02 in.

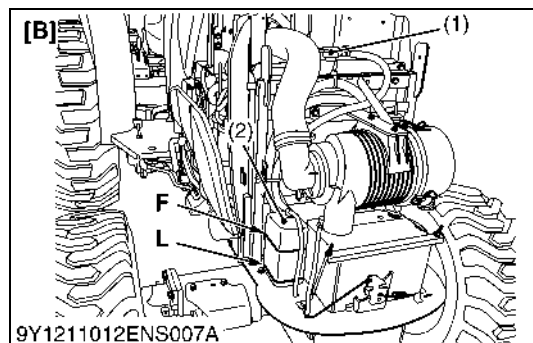
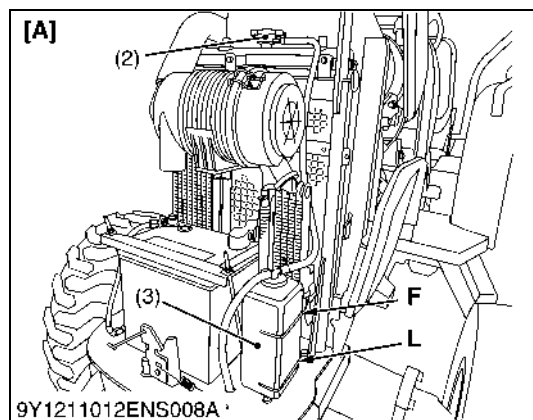
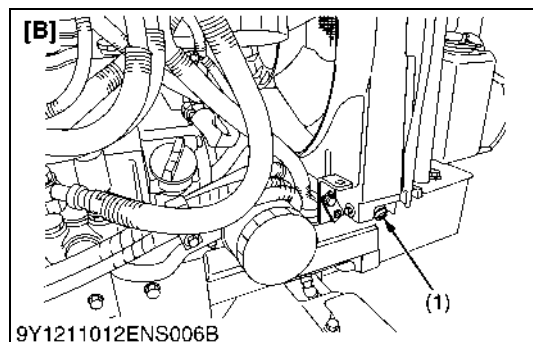
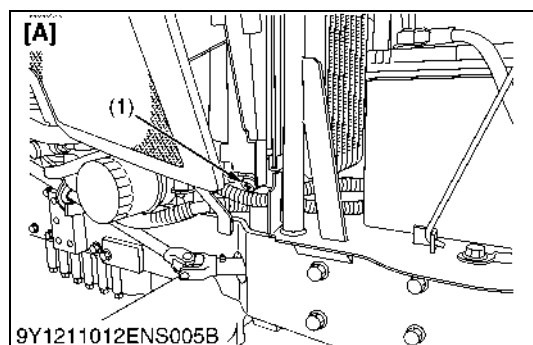
- Pin Gauge (0.60 to 0.80 mm dia., 0.024 to 0.031 in. dia.)
- DPF

(a) Serial Number

- Exhaust Inlet Side
- Exhaust Outlet Side
- Accumulated Ash
- Actual Cell Depth
- Accumulated Ash Depth
- Cell Depth

9Y1211012ENS0018US0

[2] SEPARATING ENGINE FROM CLUTCH HOUSING



Draining Coolant



CAUTION

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

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

(When refilling)

- Fill with clean water and anti-freeze until the coolant level is just below the port. Install the radiator cap (2) securely.
- Fill with coolant up to "**FULL**" mark on the recovery tank.
- Start and operate the engine for a few minutes.
- Stop the engine and let cool. Check coolant level of recovery tank (3) and add coolant if necessary.

■ IMPORTANT

- Do not start engine without coolant.
- Use clean, fresh water and anti-freeze to fill the radiator and recovery tank.
- When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50 %.
- Securely tighten radiator cap. If the cap is loose or improperly fitted, water may leak out and the engine could overheat.
- Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-10.

Coolant (with recovery tank)	Capacity	L3301/L3901	6.6 L 7.0 U.S.qts 5.8 Imp.qts
		L4701	7.1 L 7.5 U.S.qts 6.2 Imp.qts

- Drain Plug
- Radiator Cap
- Recovery Tank

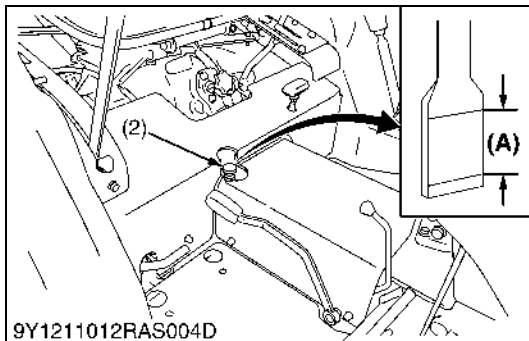
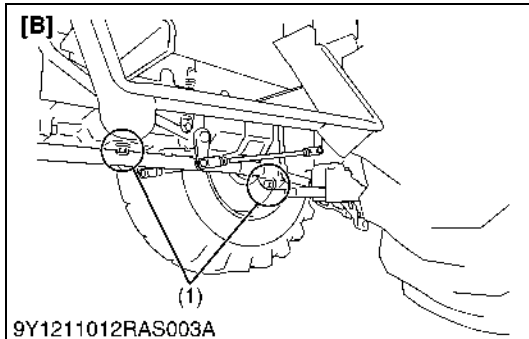
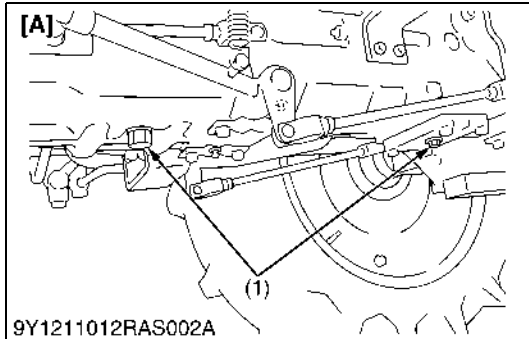
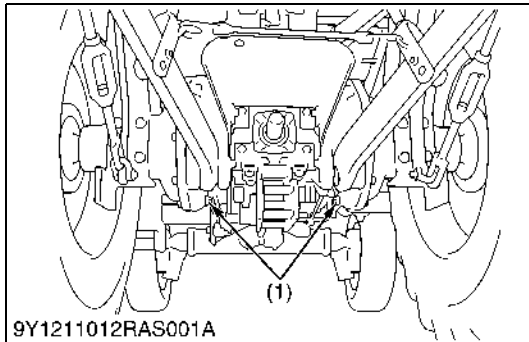
[A] L3301/L3901

[B] L4701

F: FULL

L: LOW

9Y1211012ENS0019US0



Draining Transmission Fluid (L3301/L3901)

CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil filter cartridge.
 - Allow engine to cool down sufficiently, oil can be hot and can burn.
1. Remove the drain plugs (1) at the bottom of the transmission case and drain the oil completely into the oil pan.
 2. After draining reinstall the drain plugs.

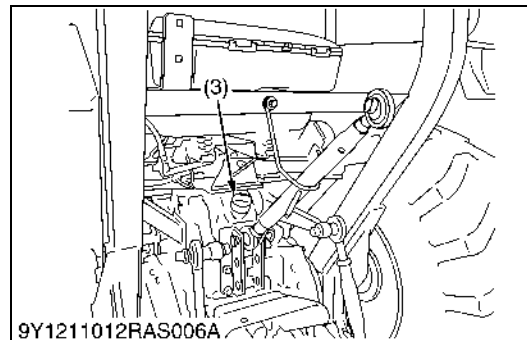
(When reassembling)

- Fill up new oil to the upper line of the gauge (2) from the oil inlet port after removing the oil inlet plug (3).
- Operate the engine at medium speed for a few minutes, stop it and check the fluid level again, if low, add fluid prescribed level (A).

IMPORTANT

- Use only multi-grade transmission fluid. Use of other fluids may damage the transmission or hydraulic system.
- Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.
- Never work the tractor immediately after changing the transmission fluid. Keeping the engine at medium speed for a few minutes to prevent damage to the transmission.
- Do not mix different brands oil together.

Transmission fluid	Capacity	2WD	28.0 L 7.4 U.S.gals 6.1 Imp.gals
		4WD	28.5 L 7.5 U.S.gals 6.2 Imp.gals
		HST	23.5 L 6.2 U.S.gals 5.2 Imp.gals



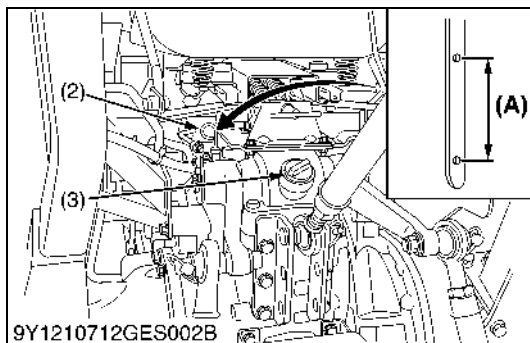
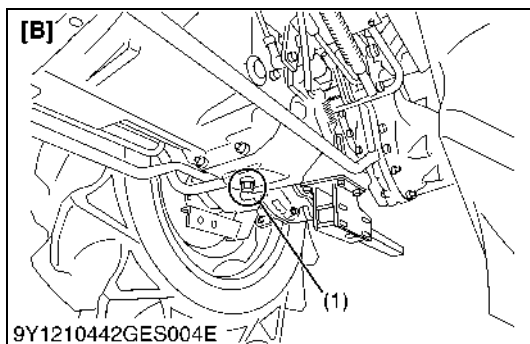
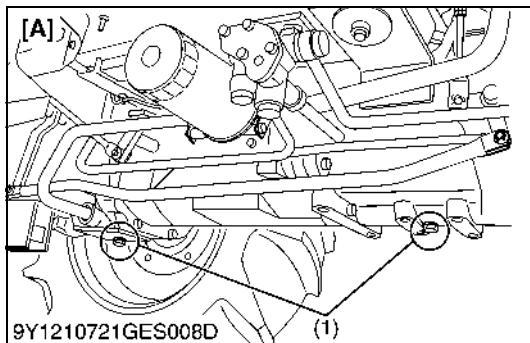
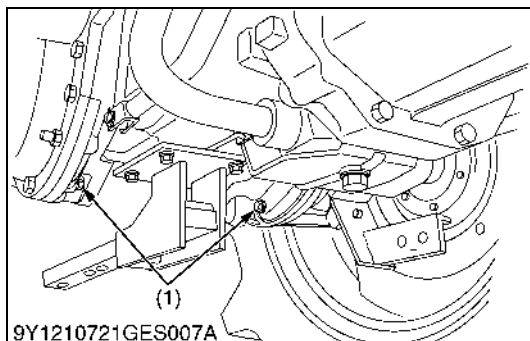
- (1) Drain Plug
(2) Gauge
(3) Oil Inlet Plug

[A] 2WD Model

[B] 4WD Model

(A) Oil level is acceptable within this range.

9Y1211012RAS0003US0



Draining Transmission Fluid (L4701)



CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and can burn.

1. Remove the drain plugs (1) at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plugs.

(When reassembling)

- Fill up new oil to the upper line of the gauge (2) from the oil inlet port after removing the oil inlet plug (3).
- Operate the engine at medium speed for a few minutes, stop it and check the fluid level again, if low, add fluid prescribed level (A).

■ IMPORTANT

- Use only multi-grade transmission fluid. Use of other fluids may damage the transmission or hydraulic system.
- Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.
- Never work the tractor immediately after changing the transmission fluid. Keeping the engine at medium speed for a few minutes to prevent damage to the transmission.
- Do not mix different brands oil together.

Transmission fluid	Capacity	40.0 L 10.6 U.S.gals 8.8 Imp.gals

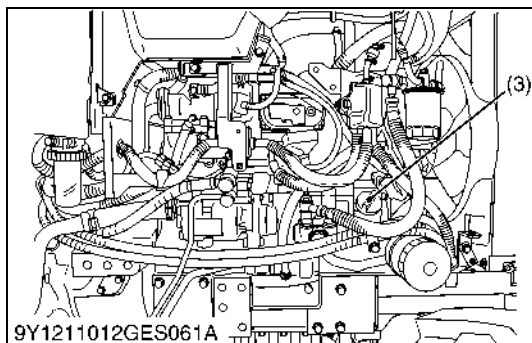
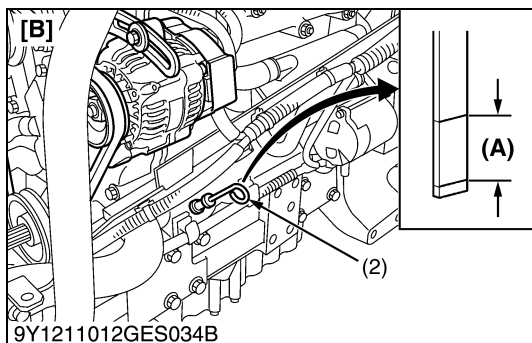
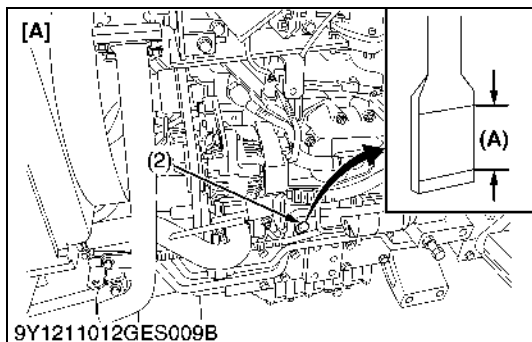
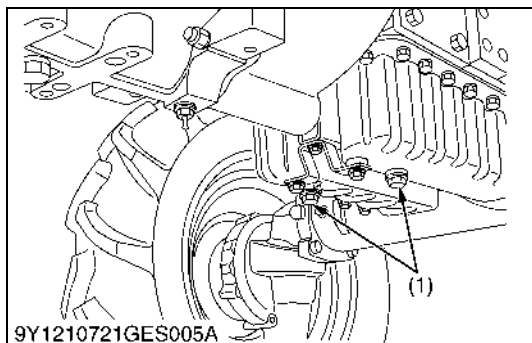
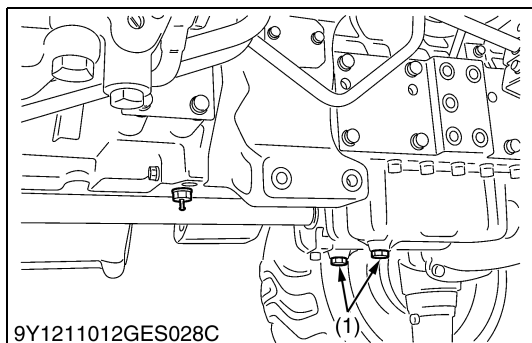
- (1) Drain Plug
(2) Gauge
(3) Oil Inlet Plug

[A] Manual Transmission Model

[B] HST Model

(A) Oil level is acceptable within this range.

9Y1211012RAS0004US0



Draining Engine Oil



CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil.
 - 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 engine and drain the oil completely into the oil pan.
 2. After draining, reinstall the drain plug (1).
 3. Fill with the new oil up to the upper notch on the dipstick (2).

IMPORTANT

- Use DPF-compatible oil (CJ-4) for the engine.
- Never mix two different types of oil.

Engine oil (with filter)	Capacity	L3301/L3901	8.2 L 8.7 U.S.qts. 7.2 Imp.qts
		L4701	6.7 L 7.1 U.S.qts. 5.9 Imp.qts

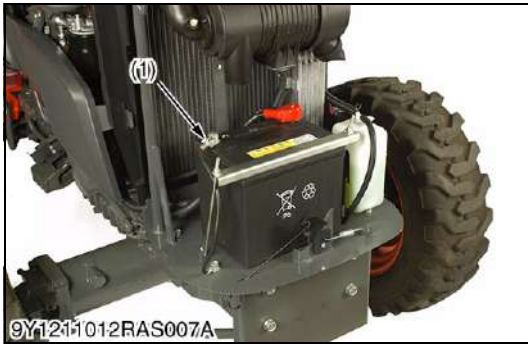
- (1) Drain Plug
(2) Dipstick
(3) Oil Inlet

[A] L3301/L3901

[B] L4701

(A) Oil level is acceptable within this range.

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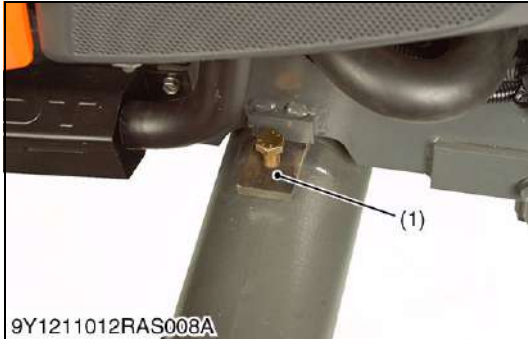


Battery Negative Cable Connector

1. Open bonnet.
2. Disconnect battery negative cable connector (1).

(1) Battery Negative Cable Connector

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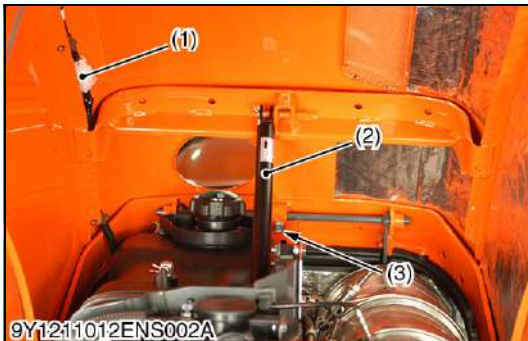


Front Axle Rocking Restrictor

1. Install the front axle rocking restrictor (1) (refer to "SPECIAL TOOLS" (see page G-94.)) to the front axle bracket and chock wheels.

(1) Front Axle Rocking Restrictor

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Bonnet and Side Covers

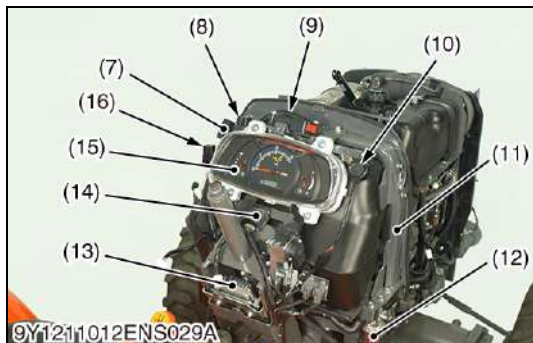
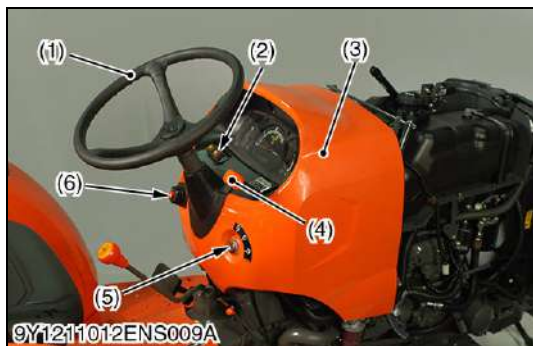
1. Disconnect the headlight connector (1).
2. Remove the damper (2) from the bonnet.
3. Disconnect the bolt (3) from the bonnet.
4. Remove the bonnet (4).
5. Remove the R.H. and L.H. side covers (5).

(1) Headlight Connector
(2) Damper
(3) Bolt

(4) Bonnet
(5) Side Cover

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Steering Wheel and Rear Bonnet

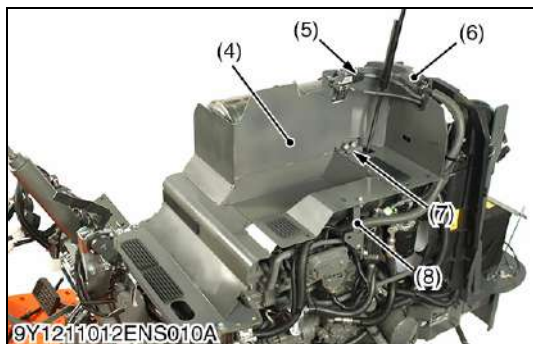
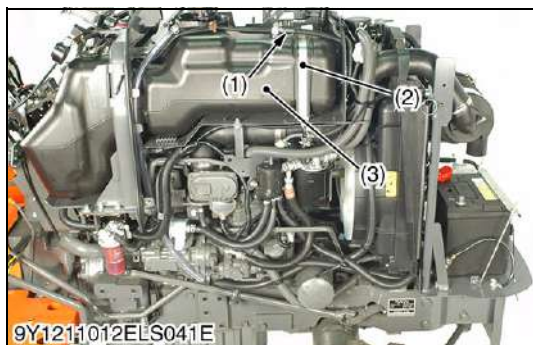
1. Remove the steering wheel (1) with a steering wheel puller.
2. Remove the throttle grip (4).
3. Disconnect the main switch (5).
4. Disconnect the combination switch (6).
5. Disconnect the DPF switches (2).
6. Remove the rear bonnet (3).
7. Remove the meter panel (15).
8. Disconnect the DPF buzzer (10).
9. Disconnect the flasher unit (14).
10. Disconnect the starter relay (7), glow relay (8) and CCV heater relay (16).
11. Disconnect the engine ECU (13).
12. Remove the separator (12).
13. Remove the rear bonnet stay (11).

(When reassembling)

Tightening torque	Steering wheel mounting nut	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft

(1) Steering Wheel	(9) Main ECU
(2) DPF Switch	(10) DPF Buzzer
(3) Rear Bonnet	(11) Rear Bonnet Stay
(4) Throttle Grip	(12) Separator
(5) Main Switch	(13) Engine ECU
(6) Combination Switch	(14) Flasher Unit
(7) Starter Relay	(15) Meter Panel
(8) Glow Relay	(16) CCV heater relay

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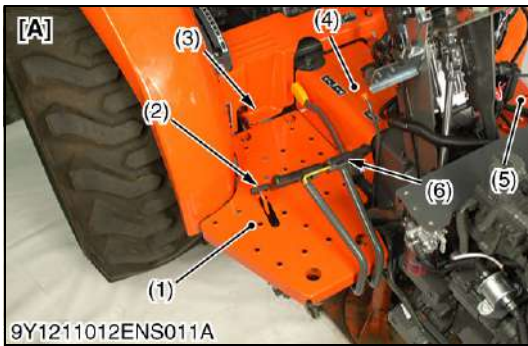


Fuel Tank and Base

1. Disconnect the fuel return line (1).
2. Remove the fuel tank band (2).
3. Remove the fuel tank (3).
4. Remove the damper bracket (7).
5. Disconnect the connector and hoses from the differential pressure sensor (5).
6. Disconnect the oil separator (6) from the fuel tank base.
7. Disconnect the fuel reserve tank bracket (8) from the fuel tank base.
8. Remove the fuel tank base (4).

(1) Fuel Return Line	(5) Differential Pressure Sensor
(2) Fuel Tank Band	(6) Oil Separator
(3) Fuel Tank	(7) Damper Bracket
(4) Fuel Tank Base	(8) Fuel Reserve Tank Bracket

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Step and Center Cover (L3301/L3901)

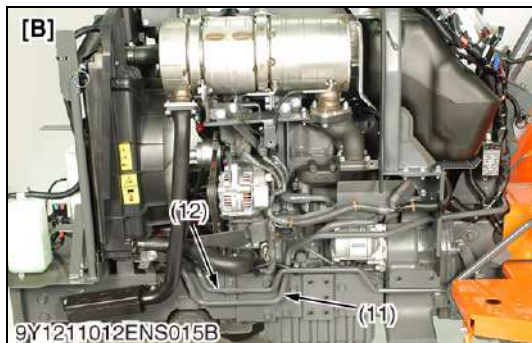
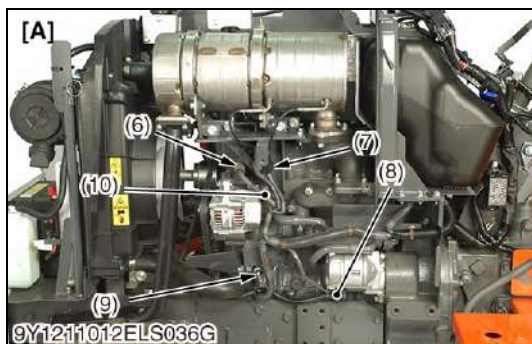
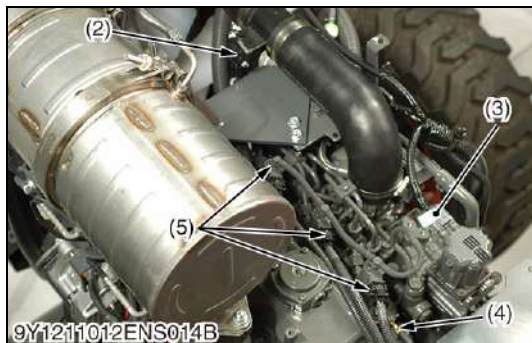
1. Remove the center cover (4).
2. Disconnect the throttle cable from the throttle pedal (2).
3. Remove the HST pedal (7).
4. Disconnect the differential lock spring and rod from the differential lock lever (3).
5. Remove the brake pedal springs from the brake pedals (6).
6. Remove the R.H. step (1).
7. Remove the clutch pedal spring from the clutch pedal.
8. Remove the L.H. step (5).

(1) R.H. Step	(6) Brake Pedal
(2) Throttle Pedal	(7) HST Pedal
(3) Differential Lock Lever	
(4) Center Cover	
(5) L.H. Step	

[A] FW and DW Model

[B] DHW Model

9Y1211012ENS0022US0



Hydraulic Pipes and Electrical Wiring (Under Fuel Tank Base and Left Side)

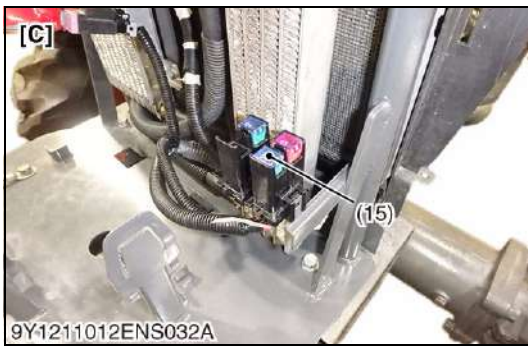
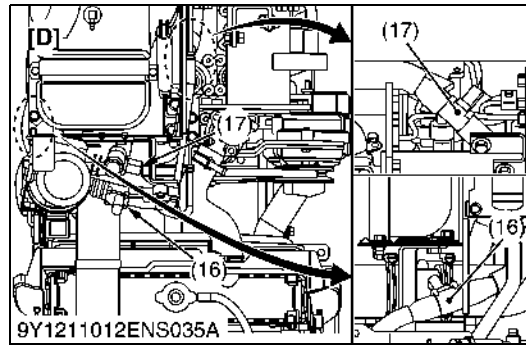
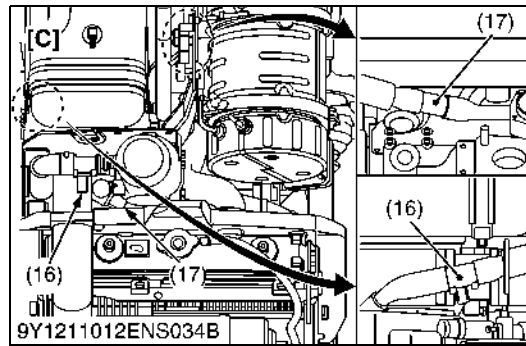
1. Disconnect the connectors of injector (5).
2. Disconnect the glow plug (4).
3. Disconnect the EGR valve (3).
4. Disconnect the air flow sensor (2).
5. Disconnect the rail pressure sensor.
6. Remove the slow blow fuses (1).
7. Disconnect the positive battery cable.
8. Disconnect the water temperature sensor (6).
9. Disconnect the DPF temperature sensors (7).
10. Disconnect the alternator (10).
11. Disconnect the starter (8).
12. Disconnect the oil switch (9).
13. Disconnect CCV heater relay (14), CCV heater fuse (15), CCV slow blow fuse (16) and CCV heater (17) (18). (If equipped)
14. Remove the oil cooler return pipe (11).
15. Remove the power steering return pipe (12).

Tightening torque	Oil cooler return pipe bolt	92 to 101 N·m 9.0 to 10.0 kgf·m 67 to 73 lbf·ft

(1) Slow Blow Fuse	(10) Alternator
(2) Air Flow Sensor	(11) Oil Cooler Return Pipe
(3) EGR Valve	(12) Power Steering Return Pipe (L3301/L3901)
(4) Glow Plug	
(5) Injector	
(6) Water Temperature Sensor	[A] FW and DW Model
(7) DPF Temperature Sensor	[B] DHW Model
(8) Starter	
(9) Oil Switch	

(To be continued)

(Continued)

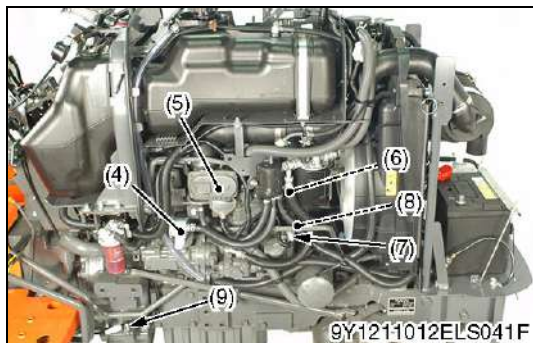
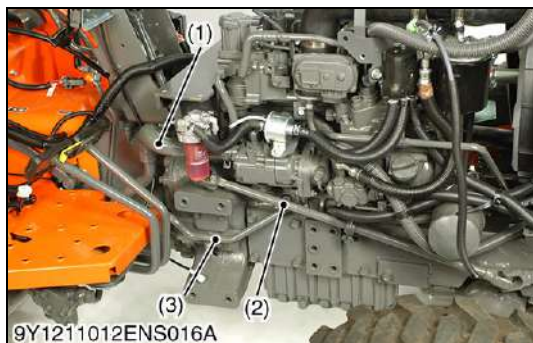


- (13) CCV Heater relay
- (14) CCV Heater Fuse
- (15) CCV SB Fuse
- (16) CCV Heater (OUT)
- (17) CCV Heater (IN)

[C] L3301/L3901
[D] L4701

9Y1211012ENS0115US0





Hydraulic Pipes, Steering Joint, and Electrical Wiring (Right Side)

1. Remove the suction hose (1).
2. Remove the delivery pipe (3).
3. Remove the steering shaft (2).
4. Disconnect the crank shaft position sensor (9).
5. Disconnect the parking brake sensor.
6. Disconnect the fuel pump (4).
7. Disconnect the intake throttle valve (5).
8. Disconnect the rail pressure sensor (6).
9. Disconnect the supply pump (7) connector.
10. Disconnect the camshaft position sensor (8).

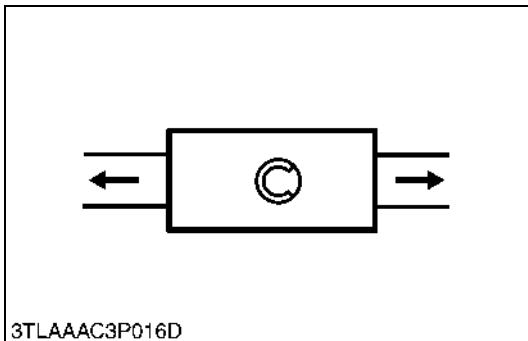
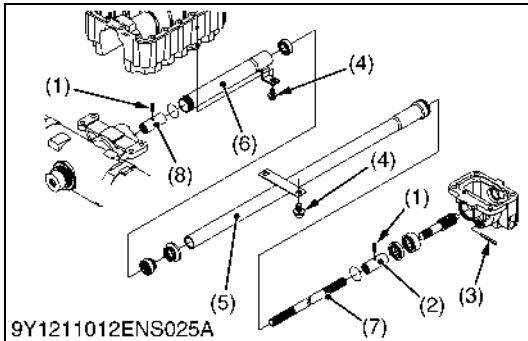
(When reassembling)

- Be sure that the steering joint shaft (2) does not contact with both hydraulic pump and flywheel housing.

Tightening torque	Delivery pipe joint bolt	49 to 69 N·m 5.0 to 7.0 kgf·m 37 to 50 lbf·ft
	Steering shaft universal joint bolt (L3301/L3901)	23.5 to 27.4 N·m 2.4 to 2.8 kgf·m 17.3 to 20.2 lbf·ft
	Steering bearing flange bolt (L3301/L3901)	23.5 to 27.4 N·m 2.4 to 2.8 kgf·m 17.3 to 20.2 lbf·ft

(1) Suction Hose	(6) Rail Pressure Sensor
(2) Steering Joint Shaft (L3301/L3901)	(7) Supply Pump
(3) Delivery Pipe	(8) Camshaft Position Sensor
(4) Fuel Pump	(9) Crank Shaft Position Sensor
(5) Intake Throttle Valve	

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Propeller Shaft (L3301/L3901)

1. Remove the screw (4) then tap out the spring pin (3).
2. Slide the propeller shaft cover 1 (5) to the front and the cover 2 (6) to the rear.
3. Tap out the spring pins (1) and then slide the coupling (2) to the front and coupling (8) to the rear.

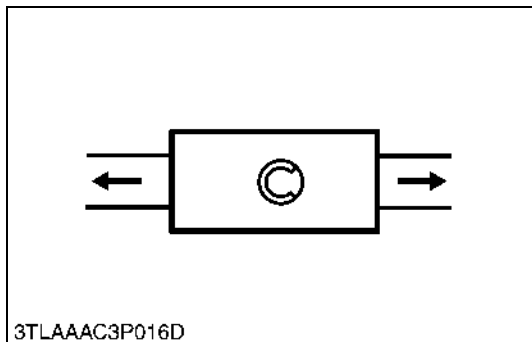
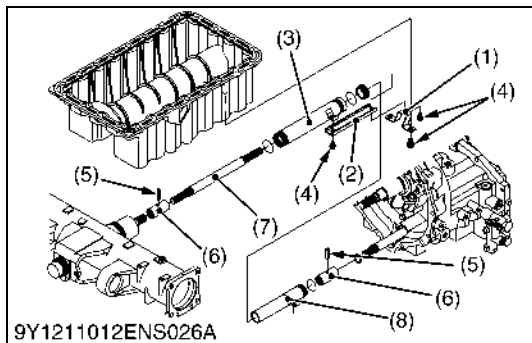
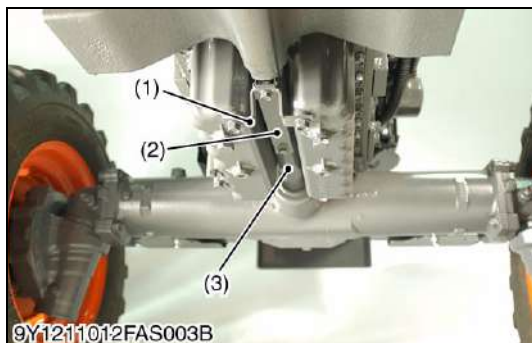
(When reassembling)

- Apply greasing to the splines of the propeller shaft (7) and pinion shaft.
- Tap in spring pins (1) as shown in the figure.

- (1) Spring Pin
- (2) Coupling
- (3) Spring Pin
- (4) Screw

- (5) Propeller Shaft Cover 1
- (6) Propeller Shaft Cover 2
- (7) Propeller Shaft
- (8) Coupling

9Y1211012ENS0112US0



Propeller Shaft (L4701)

1. Remove the bracket 1 (1).
2. Remove the bracket 2 (2).
3. Slide the propeller shaft cover 2 (8) to the front and the propeller shaft cover 1 (3) to the rear.
4. Tap out the spring pins (5) and then slide the coupling (6) to the front and rear.

(When reassembling)

- Apply grease to the splines of the propeller shaft (8) and pinion shaft.
- Tap in spring pins (5) as shown in the figure.

(1) Bracket 1	(5) Spring Pin
(2) Bracket 2	(6) Coupling
(3) Propeller Shaft Cover 1	(7) Propeller Shaft
(4) Screw	(8) Propeller Shaft Cover 2

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Separating Engine from Clutch Housing Case

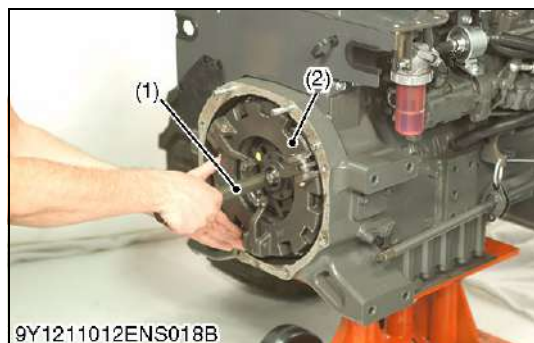
1. Place the disassembling stands under the engine and clutch housing case.
2. Remove the engine and clutch housing mounting screws and nuts.
3. Separate the engine and clutch housing.

(When reassembling)

- Apply grease to the splines.
- Apply liquid gasket (Three Bond 1206C or equivalent) to joint face of the engine and clutch housing case.

9Y1211012ENS0026US0

[3] SEPARATING ENGINE FROM FRONT AXLE FRAME



Clutch Assembly

1. Insert the clutch center tool (1).
2. Remove the clutch assembly (2) together with the clutch center tool.

(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.
- Insert the pressure plate, noting the position of straight pins.
- After docking the engine and the clutch housing case, assemble the outer parts, referring to the picture.

■ **IMPORTANT**

- **Be sure to align the center of disc and flywheel by inserting the clutch tool set.**

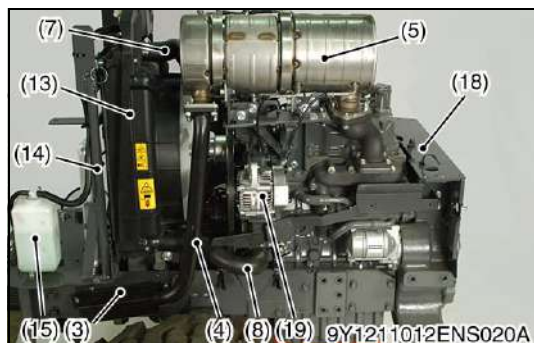
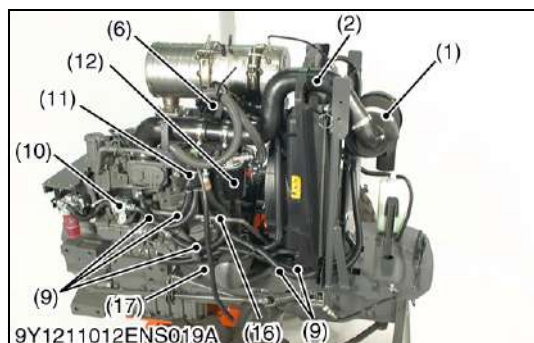
■ **NOTE**

- **Be sure to align the center of disc and flywheel by inserting the clutch tool set.**

(1) Clutch Center Tool

(2) Clutch Assembly

9Y1211012ENS0027US0



Radiator Assembly

1. Remove battery.
2. Remove air cleaner (1) together with air cleaner hoses (2).
3. Remove front exhaust pipe (3) and exhaust pipe (4).
4. Remove DPF muffler assembly (5).
5. Remove the cramps and hoses of oil separator (6), then remove the oil separator (6).
6. Remove radiator hoses (7), (8).
7. Remove fuel hoses (9) together with fuel pump (10), fuel sub tank (11), fuel filter (12).
8. Remove radiator (13) together with front support (14), reserve tank (15).
9. Remove power steering delivery pipe (16) and return hose (17).
10. Remove plate (18).
11. Remove alternator (19) and fan belt.

(When reassembling)

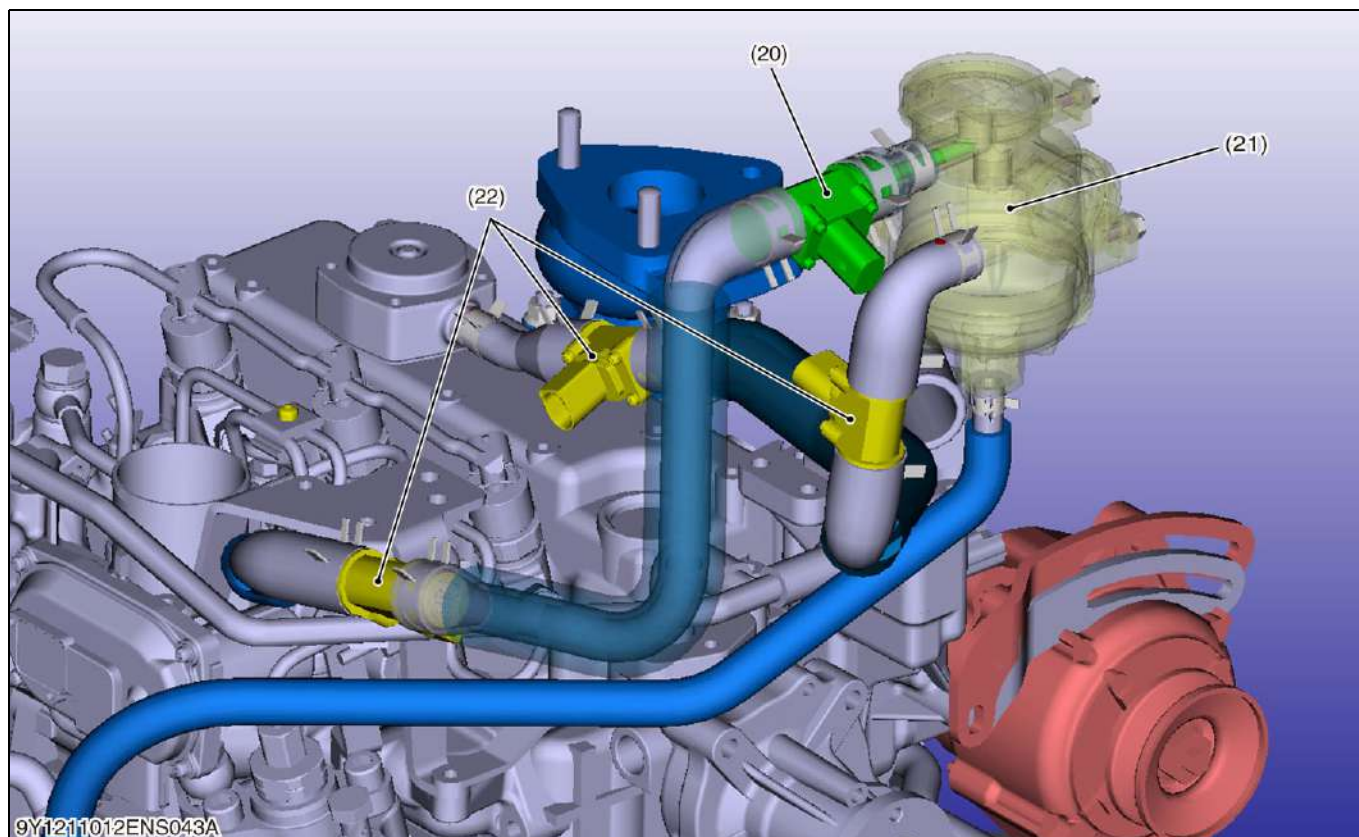
- When reassembling DPF muffler assembly to tractor, follow the provided procedure (See page 1-S19).
- If CCV Heater is equipped, be careful not to assemble in the wrong direction. Refer to the images shown below.

- (1) Air Cleaner
- (2) Air Cleaner Hose
- (3) Front Exhaust Pipe
- (4) Exhaust Pipe
- (5) DPF Muffler Assembly
- (6) Oil Separator
- (7) Radiator Hose (Upper)
- (8) Radiator Hose (Lower)
- (9) Fuel Hose
- (10) Fuel Pump

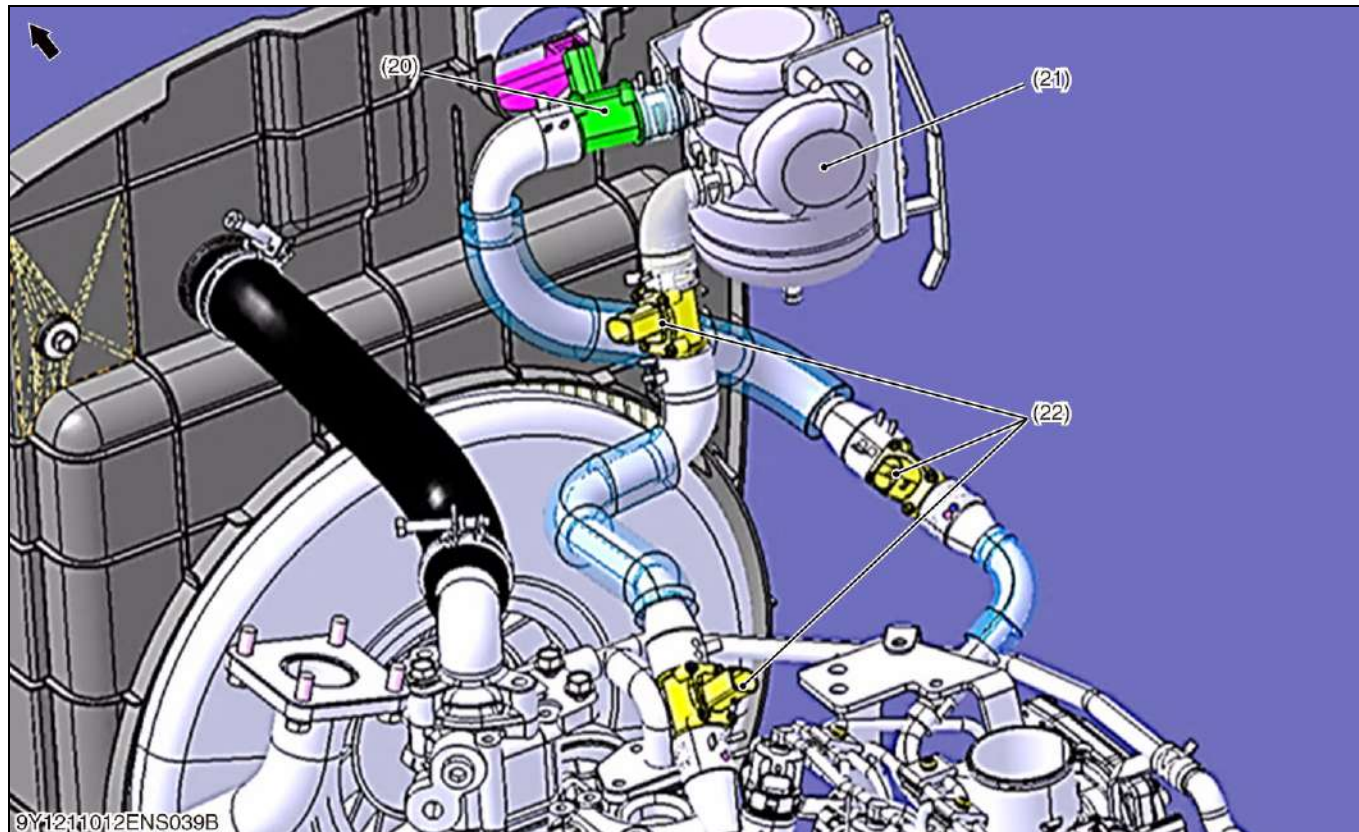
- (11) Fuel Sub Tank
- (12) Fuel Filter
- (13) Radiator
- (14) Front Support
- (15) Reserve Tank
- (16) Power Steering Delivery Pipe
- (17) Return Hose
- (18) Plate
- (19) Alternator

(To be continued)

(Continued)
[L3301, L3901]



[L4701]



(20) CCV Heater 1

(21) Separator (CCV)

(22) CCV Heater 2

9Y1211012ENS0028US0



Front Axle Frame

- 1. Remove one of two engine hooks attached on the flywheel side of engine and install it on left side of the engine.
- 2. Hold the engine by using hoist and engine hooks (1).
- 3. Remove engine mounting bolts.
- 4. Separate the engine from front axle frame (2).

L3301/L3901

Tightening torque	Front axle frame mounting bolt (M10)	77.5 to 90.2 N·m 7.91 to 9.19 kgf·m 57.2 to 66.5 lbf·ft

L4701

Tightening torque	Front axle frame mounting bolt (M10)	60.8 to 70.6 N·m 6.2 to 7.2 kgf·m 45 to 52 lbf·ft
	Front axle frame mounting bolt (M12)	103.0 to 117.7 N·m 10.5 to 12.0 kgf·m 76 to 86 lbf·ft

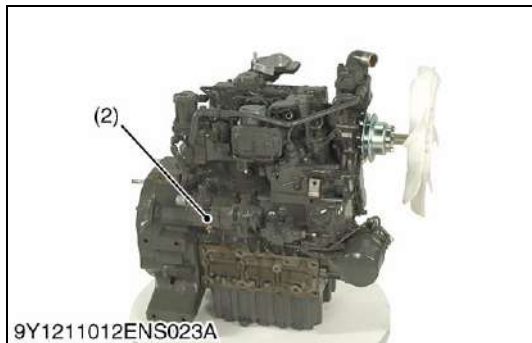
(1) Engine Hook

(2) Front Axle Frame

9Y1211012ENS0029US0

6. DISASSEMBLING AND ASSEMBLING

[1] OUTER PARTS



Outer Parts

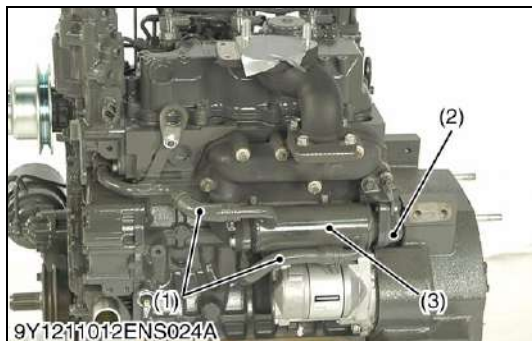
1. Remove starter motor (1).
2. Remove hydraulic pump (2) with pump holder and regulator valve (L4701 only).

(1) Starter Motor

(2) Hydraulic Pump

9Y1211012ENS0030US0

[2] EGR



EGR Related Parts

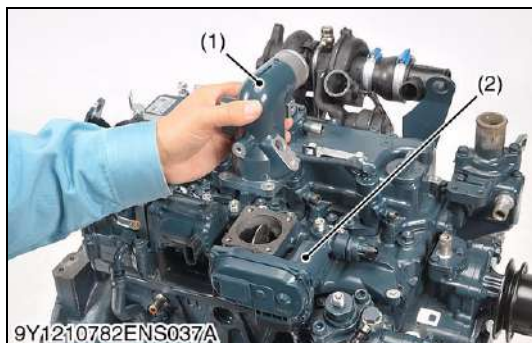
1. Remove EGR cooler hose (1).
2. Remove EGR pipe (2).
3. Remove EGR cooler (3).

(1) EGR Cooler Hose

(3) EGR Cooler

(2) EGR Pipe

9Y1211012ENS0031US0



Intake Throttle Valve

1. Remove the air cleaner flange (1).
2. Remove the intake throttle valve (2).

■ NOTE

- Do not disassemble the intake throttle valve.

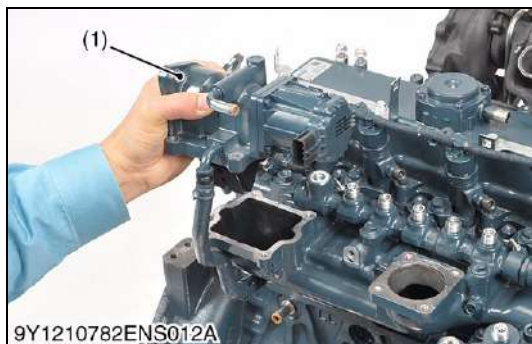
(When reassembling)

- Replace the gaskets with new ones.

(1) Air Cleaner Flange

(2) Intake Throttle Valve

9Y1211012ENS0032US0



EGR Valve

1. Disconnect the cooler pipe of EGR valve.
2. Remove the EGR valve (1).

■ NOTE

- Do not disassemble the EGR valve assembly.

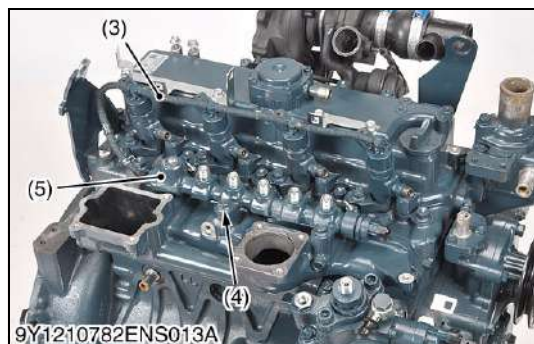
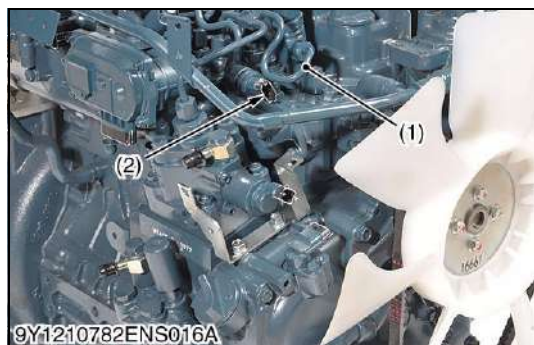
(When reassembling)

- Replace the gaskets with new ones.

(1) EGR Valve

9Y1211012ENS0033US0

[3] COMMON RAIL



Common Rail and Injection Pipes

⚠ CAUTION

- Do not loosen the injection pipe when the fuel is under high pressure (within 5 minutes of stopping the engine).

■ NOTE

- Do not remove the pressure limiter (5) and rail pressure sensor (2) from the common rail (4).
- When removing the common rail (4), do not hold it by the pressure limiter (5) and rail pressure sensor (2).

- Remove the injection pipe (1).
- Remove the overflow pipe (3).
- Remove the common rail (4).

■ IMPORTANT

- Store the injection pipes (1) so it does not get any dust in it.
- Store the common rail (4) so it does not get any dust in it.

(When reassembling)

■ NOTE

- Tighten the injection pipes securely to their specified torques.

Tightening torque	Common rail mounting screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Injection pipe retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.6 lbf·ft

(1) Injection Pipe	(4) Common Rail
(2) Rail Pressure Sensor	(5) Pressure Limiter
(3) Overflow Pipe	

9Y1211012ENS0034US0

Coolant Temperature Sensor

- Remove the coolant temperature sensor (1).

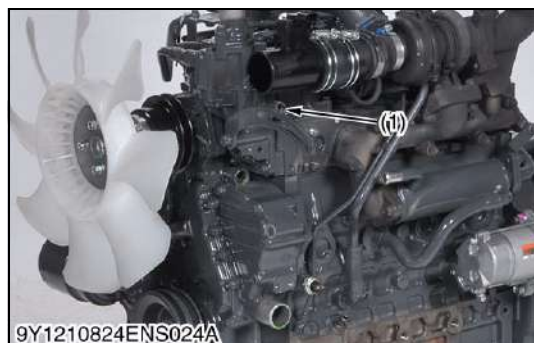
(When reassembling)

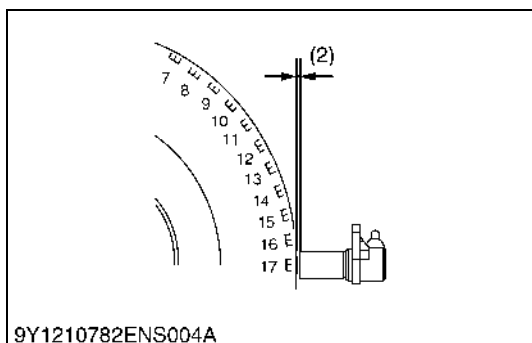
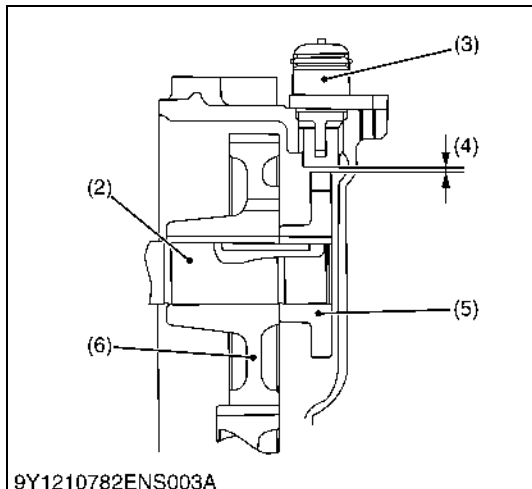
- Replace the O-ring with new ones.

Tightening torque	Coolant temperature sensor taper screw	16 to 23 N·m 1.6 to 2.4 kgf·m 12 to 17 lbf·ft

- Coolant Temperature Sensor

9Y1211012ENS0035US0





Camshaft Position Sensor

1. Remove the camshaft position sensor mounting screw.
2. Remove the camshaft position sensor (1).

(When reassembling)

- Replace the O-ring with a new one.

Air Gap	Factory specification	0.2 to 1.3 mm 0.008 to 0.059 in.
Tightening torque	Camshaft position sensor mounting screw	4 to 5 N·m 0.4 to 0.6 kgf·m 3 to 4 lbf·ft

■ IMPORTANT

- If you drop the sensor, do not reuse it.

(1) Camshaft Position Sensor	(4) Air Gap
(2) Fuel Camshaft	(5) Pulse Cam
(3) Sensor	(6) Supply Pump Gear

9Y1211012ENS0036US0

Crankshaft Position Sensor

1. Remove the crankshaft position sensor mounting screw.
2. Remove the crankshaft position sensor (1).

(When reassembling)

- Replace the O-ring with a new one.

■ IMPORTANT

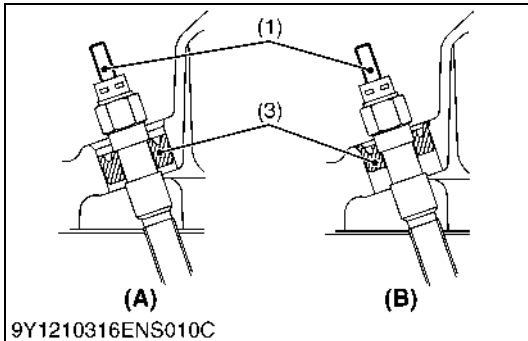
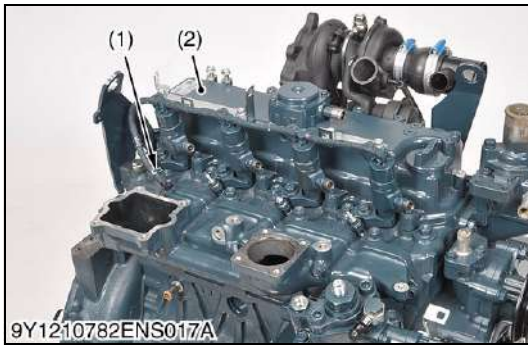
- If you drop the sensor, do not reuse it.

Air Gap	Factory specification	0.3 to 1.5 mm 0.002 to 0.059 in.
Tightening torque	Crankshaft position sensor mounting screw	4 to 6 N·m 0.4 to 0.6 kgf·m 3 to 4 lbf·ft

(1) Crankshaft Position Sensor	(2) Air Gap

9Y1211012ENS0037US0

[4] CYLINDER HEAD AND VALVES



Cylinder Head Cover and Glow Plug

1. Remove the glow lead and the glow plugs (1).
2. Remove the cylinder head cover (2).

(When reassembling)

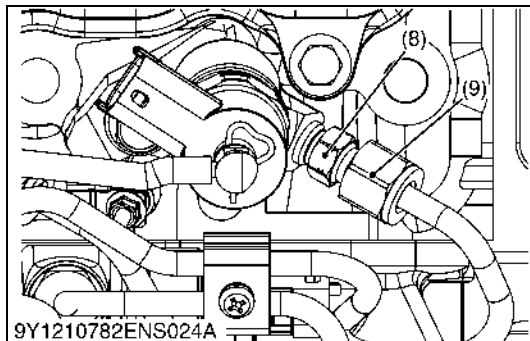
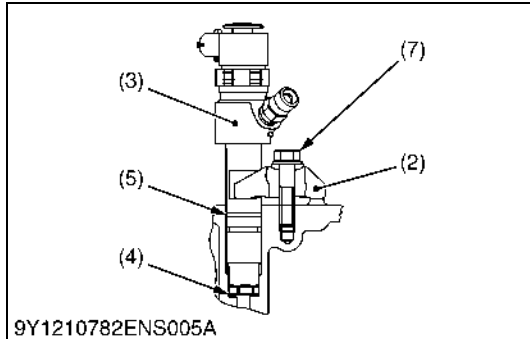
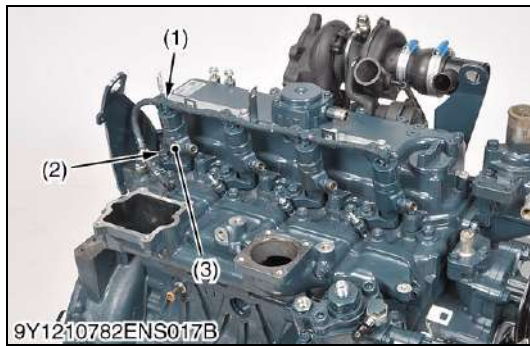
- Check to see that the cylinder head cover gasket is not damaged.
- Tighten the head cover mounting screws to specified torque.
- Replace the gasket of cylinder head cover with a new one.
- Adjust the direction of the ditch to the terminal side when the seal (3) is installed in the glow plug (1).
- After installing the glow plug (1), make sure that the seal (3) was set to the specified position.

Tightening torque	Cylinder head cover screw	6.86 to 11.3 N·m 0.700 to 1.15 kgf·m 5.06 to 8.33 lbf·ft
	Glow lead mounting nut	0.98 to 1.7 N·m 0.10 to 0.18 kgf·m 0.73 to 1.3 lbf·ft
	Glow plug	15 to 19 N·m 1.5 to 2.0 kgf·m 11 to 14 lbf·ft

- (1) Glow Plug
(2) Cylinder Head Cover
(3) Seal

- (A) Good
(B) Bad

9Y1211012ENS0038US0



Overflow Pipe and Injectors

1. Remove the overflow pipe (1).
2. Remove the injector clamp (2).
3. Remove the injector (3) and its gasket (4).

■ IMPORTANT

- Do not disassemble the injector (3).
- Do not remove the injector ID code (6).
- Do not damage the injector IDcode (6).
- Do not get the injectors out of order. If the injectors get out of order, it is necessary to perform injector correction (writing the injector ID codes (6) to the engine ECU).
- Store the injectors so they do not get any dust in them.

(When reassembling)

1. Attach the O-ring (5) to the correct position on the injector (3).
2. After attaching gasket (4) to the injector (3), attach the injector (3) to the cylinder head.
3. Correctly set the clamp (2) as shown in the drawing.
4. Attach the injector with screws (7) as shown in the drawing.
5. Check that the injector (3) is attached securely.

■ NOTE

- Do not remove the injector dust protection cap until just before you attach the injection pipe.
- To prevent the injector inlet connector from turning when removing the injection pipe cap nut (9), use a counter wrench.

When the inlet connector (8) becomes loose, replace the injector.

■ NOTE

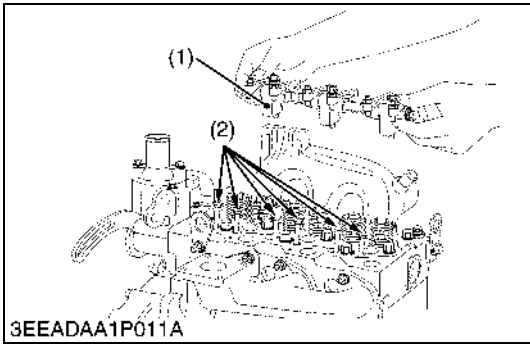
- If you replace the injectors, it is necessary to perform injector correction (writing the injector ID codes (6) to the engine ECU).

Tightening torque	Injector clamp screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Injection pipe cap nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.6 lbf·ft

- (1) Overflow Pipe
- (2) Injector Clamp
- (3) Injector
- (4) Gasket
- (5) O-ring

- (6) Injector ID Code
- (7) Injector Clamp Screw
- (8) Inlet Connector
- (9) Injection Pipe Cap Nut

9Y1211012ENS0039US0



Rocker Arm and Push Rods

- 1. Remove the screws of the rocker arm bracket.
- 2. Remove the rocker arm assembly (1).
- 3. Remove the push rods (2).

(When reassembling)

- When you put the push rods (2) on the tappets (3), make sure that their ends are correctly engaged with the grooves.

■ IMPORTANT

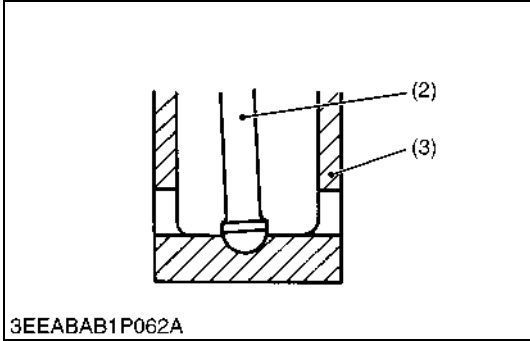
- **After you install the rocker arm, adjust the valve clearance.**

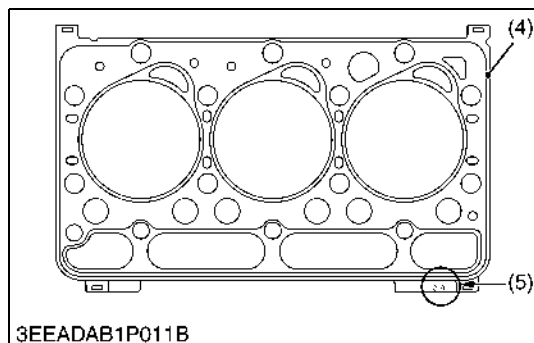
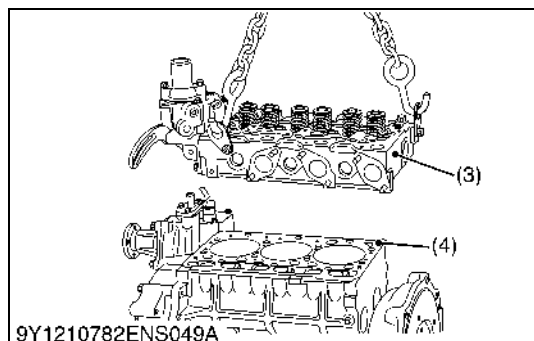
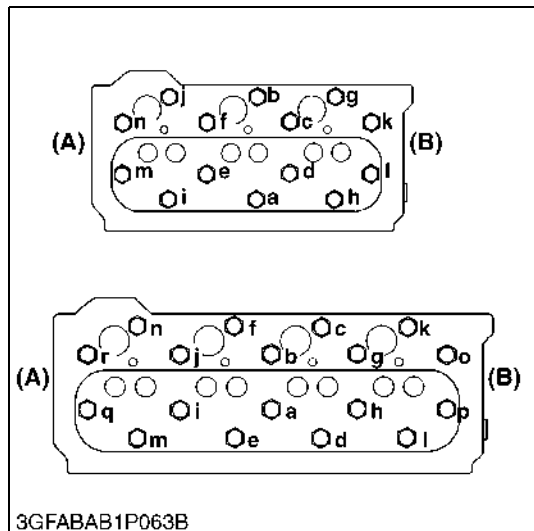
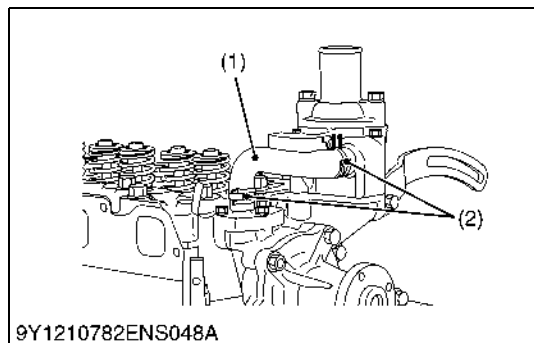
Tightening torque	Rocker arm bracket screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

- (1) Rocker Arm Assembly
- (2) Push Rod

- (3) Tappet

9Y1211012ENS0040US0





Cylinder Head

1. Remove the cylinder head screw in the sequence of **(n or r)** to **(a)**.
2. Lift up the cylinder head (3) to remove.
3. Remove the cylinder head gasket (4).

(When reassembling)

- Replace the cylinder head gasket (4) with a new one.
- Apply sufficient oil and tighten the cylinder head screws.
- Tighten the cylinder head screws in a diagonal sequence. Start from the center in the sequence of **(a)** to **(n or r)**.
- Tighten them equally, or the shape of the head changes after some time.

Tightening torque	Cylinder head mounting screw	93.2 to 98.0 N·m 9.50 to 10.0 kgf·m 68.8 to 72.3 lbf·ft

■ IMPORTANT

- Before you replace the cylinder head gasket (4), record the mark (5) on the cylinder head gasket of the engine. Then replace a cylinder head gasket with same mark.

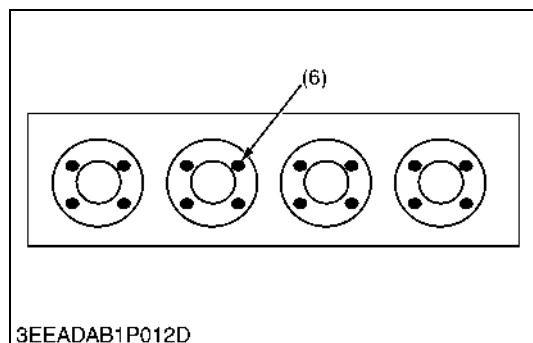
Gasket Mark and Code Number	Model	
	D1803-CR-E4	V2403-CR-E4
15	1G750-03600	1G790-03600
20	1G750-03310	1G790-03310
25	1G750-03610	1G790-03610
30	1G750-03620	1G790-03620
35	1G750-03630	1G790-03630

- (1) Water Return Pipe
- (2) Pipe Clamp
- (3) Cylinder Head
- (4) Cylinder Head Gasket
- (5) Mark

- (n or r) to (a): To Loosen**
(a) to (n or r): To Tighten
(A) Gear Case Side
(B) Flywheel Side

(To be continued)

(Continued)



■ IMPORTANT

- After you replace an item below, you have to select a cylinder head gasket.
 - Piston
 - Piston pin
 - Small end bushing
 - Connecting rod
 - Crankpin bearings

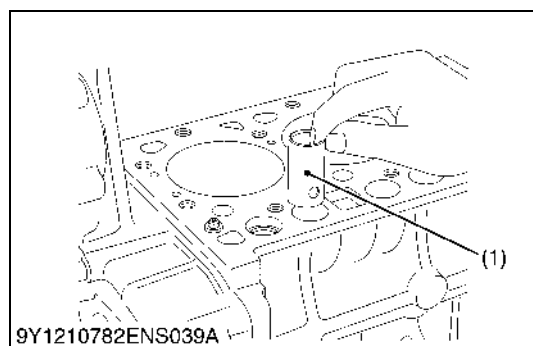
To select the cylinder head gasket

1. Measure the protrusion or recess of the piston head from the level of crankcase cylinder face at 4 points per each piston with a dial gauge.
2. Get the average of the measurements.
3. Use the table below to select an applicable cylinder head gasket.

Gasket Dimension (Number)	Piston Protrusion
15	0.475 to 0.525 mm 0.0187 to 0.0206 in.
20	0.525 to 0.575 mm 0.0206 to 0.0227 in.
25	0.575 to 0.625 mm 0.0227 to 0.0246 in.
30	0.625 to 0.675 mm 0.0246 to 0.0266 in.
35	0.675 to 0.725 mm 0.0266 to 0.0285 in.

(6) Points of Measurement

9Y1211012ENS0041US0



Tappets

1. Remove the tappets (1) from the crankcase.

(When reassembling)

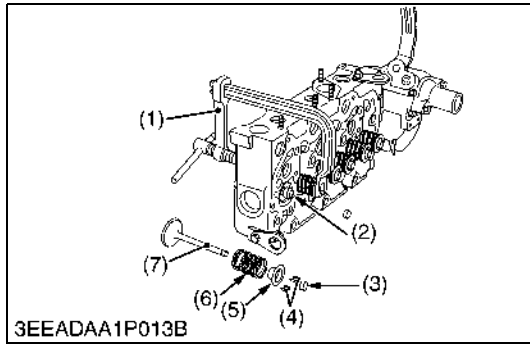
- Before you install the tappets, apply a thin layer of engine oil around them.
- Check the contact between tappets and cams that it turns correctly. If it is damaged, replace the tappets.

■ IMPORTANT

- Do not change the combination of tappet and tappet guide.

(1) Tappet

9Y1211012ENS0042US0



Valves

1. Remove the valve caps (3).
2. Push the valve spring retainer with the valve spring replacer (1) and remove the valve spring collets (4).
3. Remove the valve spring retainer (5) and valve spring (6).
4. Remove the valve (7).

(When reassembling)

- Clean the valve stem and the valve guide hole, and apply engine oil sufficiently.
- After you install the valve spring collets (4), lightly tap the stem tip to attach it correctly with the plastic hammer.

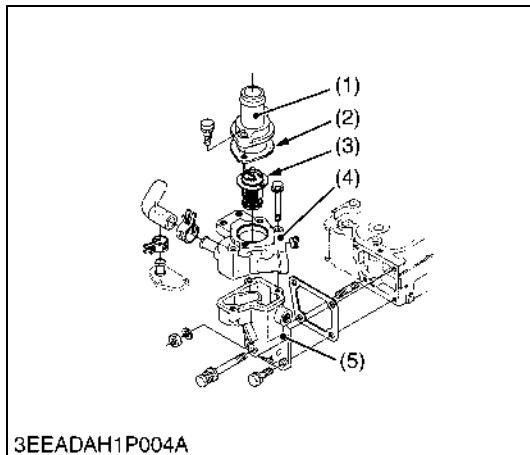
■ IMPORTANT

- **Do not change the combination of valve and valve guide.**

(1) Valve Spring Replacer	(5) Valve Spring Retainer
(2) Valve Stem Seal	(6) Valve Spring
(3) Valve Cap	(7) Valve
(4) Valve Spring Collet	

9Y1211012ENS0043US0

[5] THERMOSTAT



Thermostat Assembly

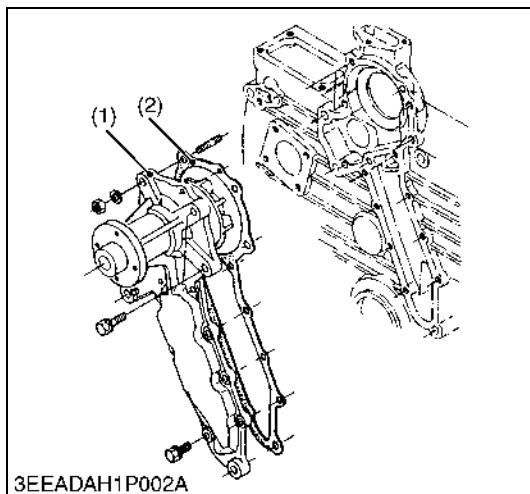
1. Remove the thermostat cover mounting screws, and remove the thermostat cover (1).
2. Remove the thermostat assembly (3).

(When reassembling)

- Replace the thermostat cover gasket (2) with a new one.
- Apply a liquid gasket (Three Bond 1215 or equivalent) to the water flange 1 (4) and flange 2 (5).

(1) Thermostat Cover	(4) Water Flange 1
(2) Thermostat Cover Gasket	(5) Water Flange 2
(3) Thermostat Assembly	

9Y1211012ENS0044US0



Water Pump Assembly (If Necessary)

1. Remove the water pump assembly (1) from the gear case.

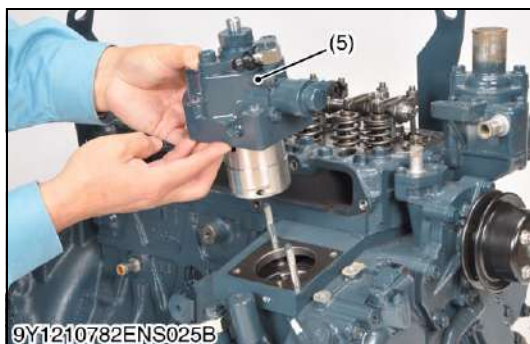
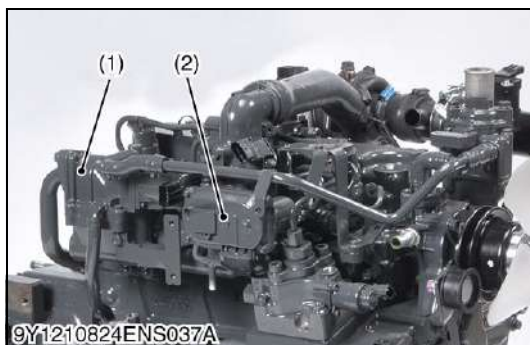
(When reassembling)

- Replace the gasket (2) with a new one.

(1) Water Pump Assembly	(2) Gasket

9Y1211012ENS0045US0

[6] SUPPLY PUMP



Supply Pump

CAUTION

- Do not loosen the injection pipe when the fuel is under high pressure (Within 5 minutes of stopping the engine).

- Remove the intake throttle valve assembly (2).
- Remove the EGR valve assembly (1).
- Remove the rail (3).
- Remove the intake manifold (4).
- Remove the supply pump (5).

NOTE

- Do not disassemble the supply pump.
- Store the supply pump so it does not get any dust in it.

(When reassembling)

NOTE

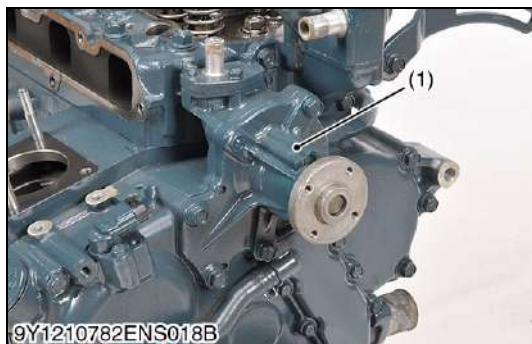
- When attaching the supply crank case, do not put force on the MPRP and overflow sections of the part.
- Do not remove the dust protection cap until immediately before you attach the part.

Tightening torque	Supply pump mounting nut	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Injection pipe retaining nut	24.5 to 29.0 N·m 2.5 to 3.0 kgf·m 18.1 to 21.3 lbf·ft

- (1) EGR Valve Assembly (4) Intake Manifold
(2) Intake Throttle Valve Assembly (5) Supply Pump
(3) Rail

9Y1211012ENS0046US0

[7] WATER PUMP AND OIL COOLER



Water Pump

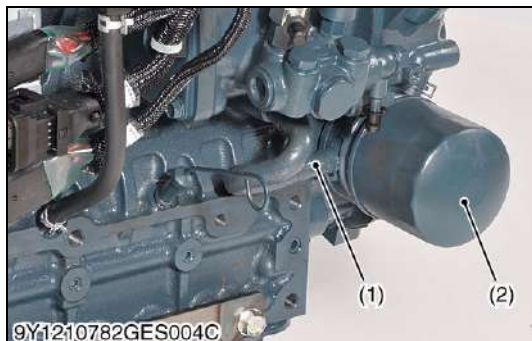
1. Remove the pipe band and the water pipe (water pump side).
2. Remove the water pump (1).

(When reassembling)

- When mounting the water pump, be careful not to forget mounting the O-ring and not to let it out of position.

(1) Water Pump

9Y1211012ENS0047US0



Oil Cooler

1. Remove the water pipe (1).
2. Remove the oil filter cartridge (2).
3. Remove the oil cooler joint screw (4).
4. Remove the oil cooler (3).

Tightening torque	Oil cooler joint screw	40 to 44 N·m 4.0 to 4.5 kgf·m 29 to 32 lbf·ft

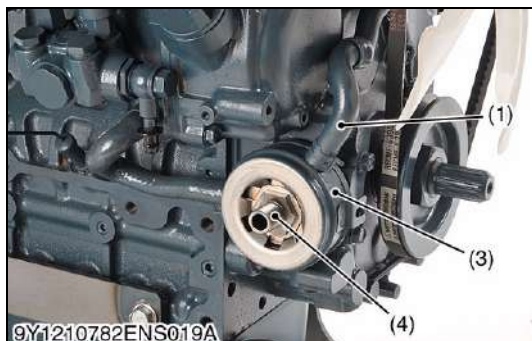
(1) Water Pipe

(3) Oil Cooler

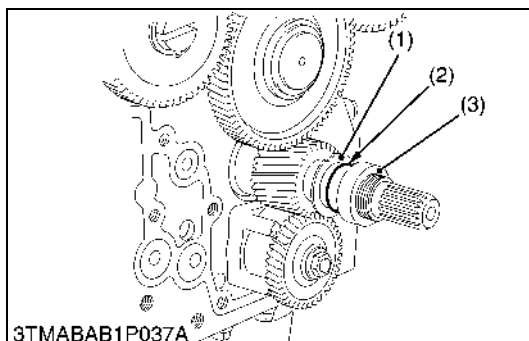
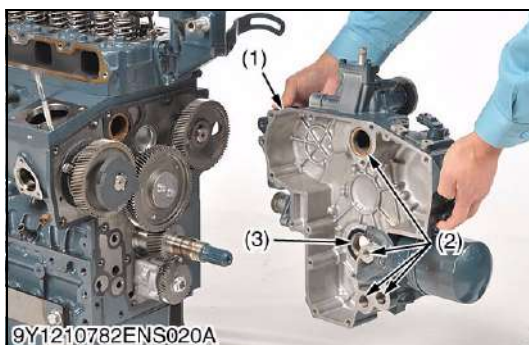
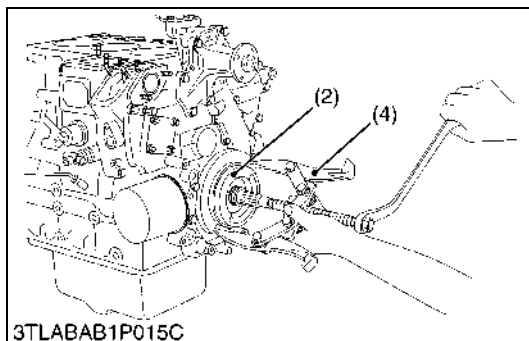
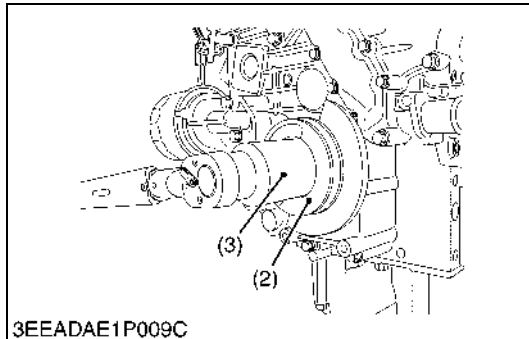
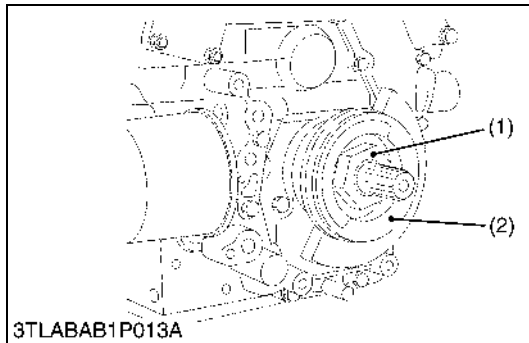
(2) Oil Filter Cartridge

(4) Oil Cooler Joint Screw

9Y1211012ENS0048US0



[8] GEAR CASE AND TIMING GEAR



Fan Drive Pulley

1. Lock the flywheel with the flywheel stopper.
2. Remove the mounting nut (1) of the fan drive pulley with a 46 mm (1.8 in.) deep socket wrench (3).
3. Remove the fan drive pulley (2) with a gear puller (4).
4. Remove the feather key.

(When reassembling)

- Apply grease to the splines of coupling.

Tightening torque	Mounting nut of fan drive pulley	138 to 156 N·m 14.0 to 16.0 kgf·m 102 to 115 lbf·ft

- (1) Nut
(2) Fan Drive Pulley

- (3) 46 mm (1.8 in.) Deep Socket Wrench
(4) Gear Puller

9Y1211012ENS0049US0

Gear Case

1. Remove the gear case (1).
2. Remove the O-rings (2).

(When reassembling)

- Replace the gear case gasket and O-rings (2).
- Replace the hour meter gear case gasket with a new one.
- Make sure that there are 4 O-rings (2) in the gear case (1).
- Apply a thin layer of engine oil to the oil seal. Then install the oil seal not to come off the lip.
- Before you install the gear case gasket, apply an adhesive that does not become dry.

- (1) Gear Case
(2) O-ring

- (3) Oil Seal

9Y1211012ENS0050US0

Crankshaft Oil Slinger

1. Remove the crankshaft collar (3).
2. Remove the O-ring (2).
3. Remove the crankshaft oil slinger (1).

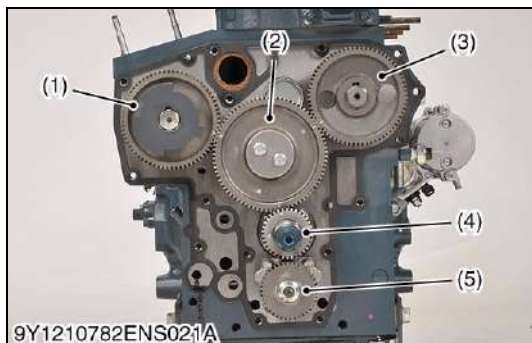
(When reassembling)

- Attach the crankshaft collar (3) after you install the gear case to the cylinder body.

- (1) Crankshaft Oil Slinger
(2) O-ring

- (3) Crankshaft Collar

9Y1211012ENS0051US0



Idle Gear (D1803-CR-E4)

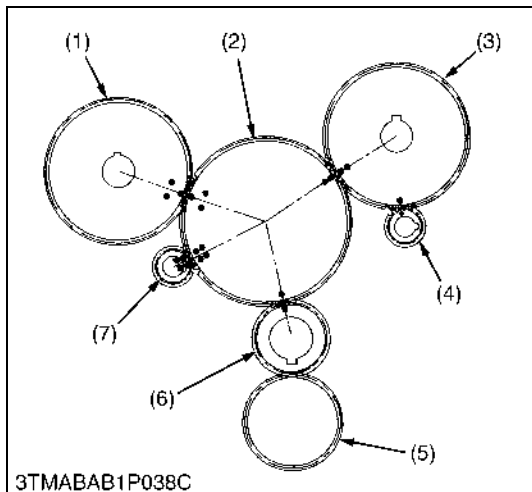
1. Remove the external snap ring.
2. Remove the idle gear collar.
3. Remove the idle gear (2).

(When reassembling)

- Align each gear with its mark.
 - Idle gear (2) and crank gear (4)
 - Idle gear (2) and cam gear (3)
 - Idle gear (2) and fuel supply pump gear (1)

(1) Fuel Supply Pump Gear	(4) Crank Gear
(2) Idle Gear	(5) Oil Pump Drive Gear
(3) Cam Gear	

9Y1211012ENS0052US0



Idle Gear (V2403-CR-E4)

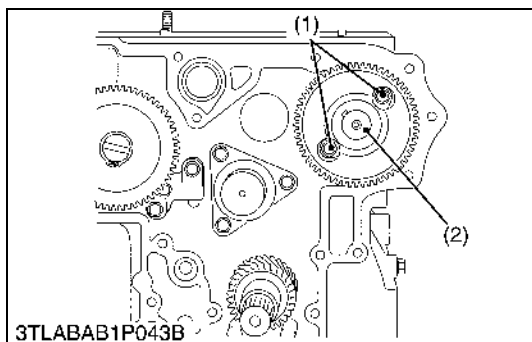
1. Remove the external snap ring.
2. Remove the idle gear collar.
3. Remove the idle gear (2).

(When reassembling)

- Check to see each gear is aligned with its aligning mark:
 - Idle gear (2) and crank gear (6), cam gear (3) and balancer gear (4)
 - Cam gear (3) and idle gear (2)
 - Idle gear (2) and fuel supply pump gear (1)
 - Idle gear (2) and balancer gear (7)

(1) Fuel Supply Pump Gear	(5) Oil Pump Drive Gear
(2) Idle Gear	(6) Crank Gear
(3) Cam Gear	(7) Balancer Gear
(4) Balancer Gear	

9Y1211012ENS0053US0



Camshaft (D1803-CR-E4)

1. Remove the camshaft set screws (1) and pull out the camshaft (2).

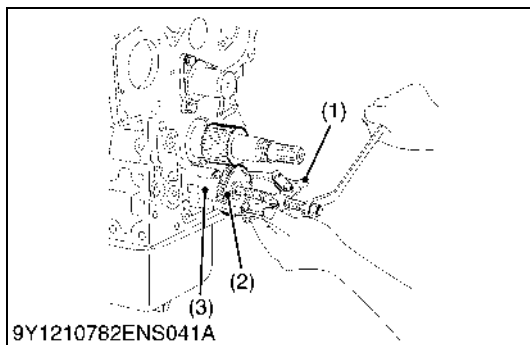
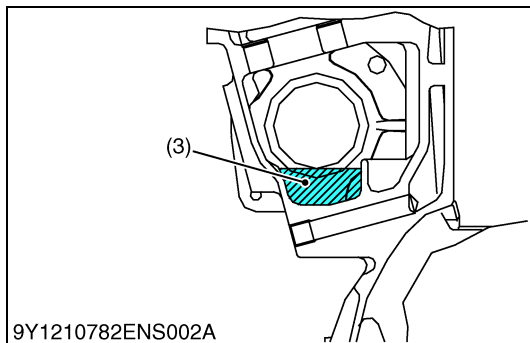
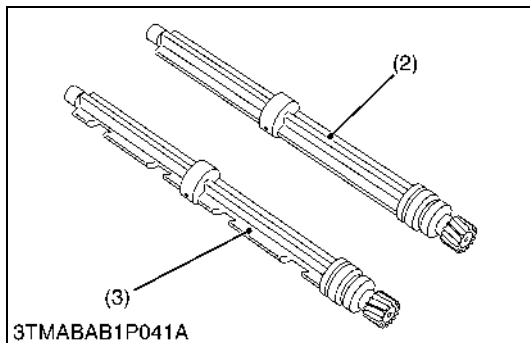
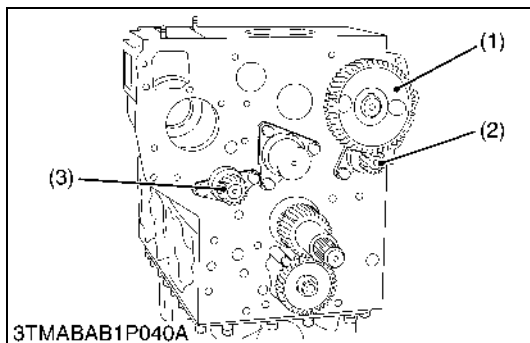
(When reassembling)

- When you install the idle gear, align the marks on the gears.

Tightening torque	Camshaft set screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

(1) Camshaft Set Screw	(2) Camshaft

9Y1211012ENS0054US0



Camshaft and Balancer Shaft (V2403-CR-E4)

1. Remove the camshaft set bolts and draw out the camshaft (1).
2. Remove the balancer shaft 1 (2) set bolts and draw out the balancer shaft 1 (2).
3. Remove the balancer shaft 2 (3) set bolts and draw out the balancer shaft 2 (3).

(When reassembling)

- When install the balancer shaft 1 and 2, be sure to place the 4th cylinders piston at the top dead center in compression then, align all mating marks on each gear to assemble the timing gears, set the idle gear last.

Tightening torque	Camshaft set bolt	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	Balancer shaft set bolt	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

(1) Camshaft

(3) Balancer Shaft 2

(2) Balancer Shaft 1

9Y1211012ENS0055US0

Fuel Camshaft

1. Remove the fuel feed pump.
2. Remove the fuel camshaft stopper (1).
3. Pull out the fuel camshaft (2).

(When reassembling)

- After attaching the fuel camshaft, store oil in the pump room as shown in drawing on the left.
- Recommended oil amount about 110 cc.

(1) Fuel Camshaft Stopper

(3) Oil

(2) Fuel Camshaft

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Oil Pump

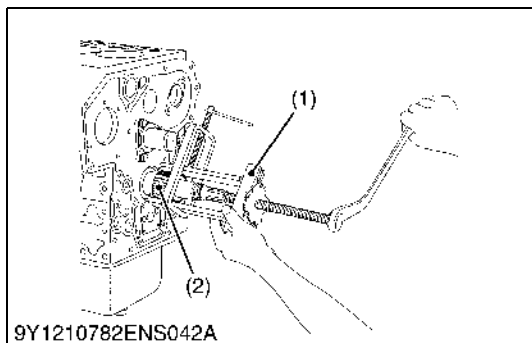
1. Remove the nut.
2. Pull out the oil pump drive gear (2) with a gear puller (1).
3. Remove the 4 mounting screws of the oil pump. Remove the oil pump (3).

(1) Gear Puller

(3) Oil Pump

(2) Oil Pump Drive Gear

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Crank Gear

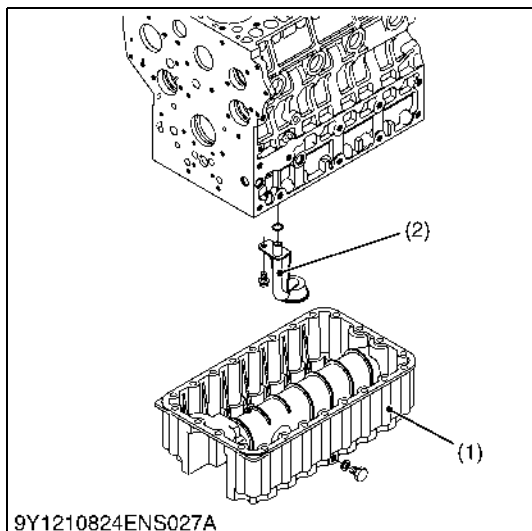
1. Pull out the crank gear (2) with a puller (1).
2. Remove the feather key.

(1) Puller

(2) Crank Gear

9Y1211012ENS0058US0

[9] PISTON AND CONNECTING ROD



Oil Pan and Oil Strainer

1. Remove the oil pan mounting screws and remove the oil pan (1).
2. Remove the oil strainer mounting screw, and remove the oil strainer (2).

(When reassembling)

- When installing the oil strainer, be careful not to damage the O-ring.
- Apply liquid gasket (3) (Three Bond 1217H) to the oil pan as shown in the figure.
- Make sure that the liquid gasket coating surface is free of water, dust and oil in order to keep sealing effect.
- Carefully apply the adhesive evenly.

■ NOTE

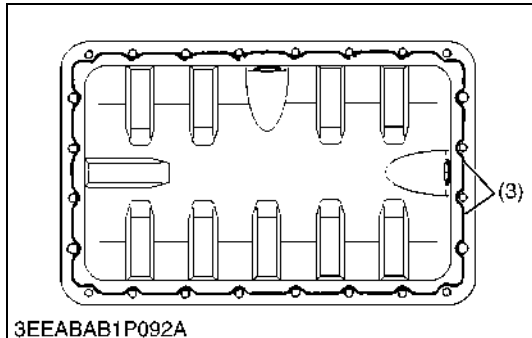
- **Make sure the surfaces align when mounting parts with a liquid gasket applied to them.**
- **Mount parts with a liquid gasket within 10 minutes of application.**
- **Tighten the mounting screws of the oil pan in diagonal sequence from the center to tighten equally.**
- **After cleaning the oil strainer, install it.**
- **Attach the oil pan with its central drain plug facing toward the air suction side.**

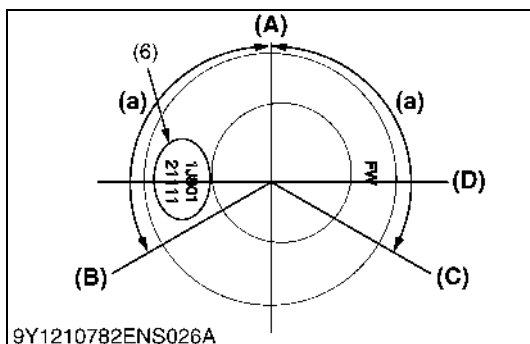
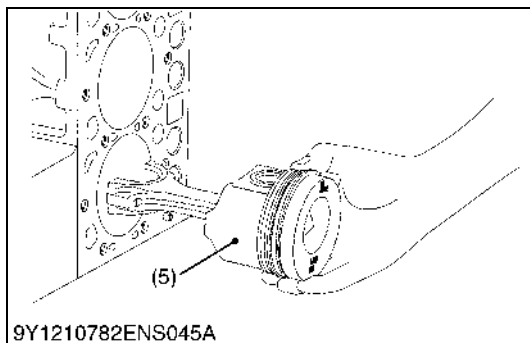
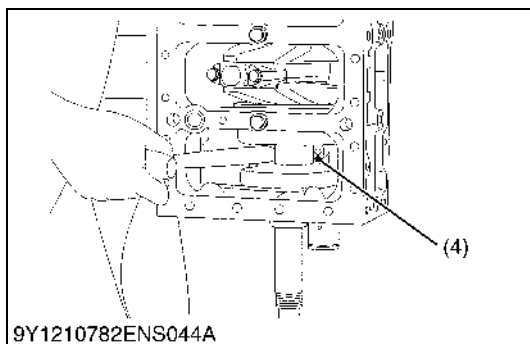
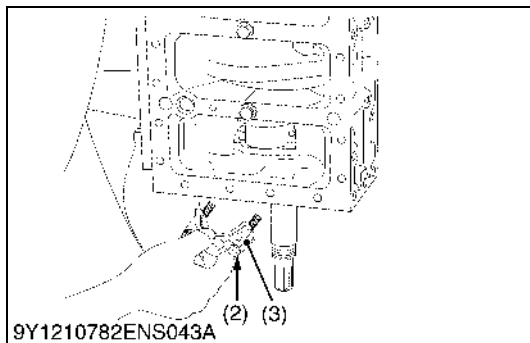
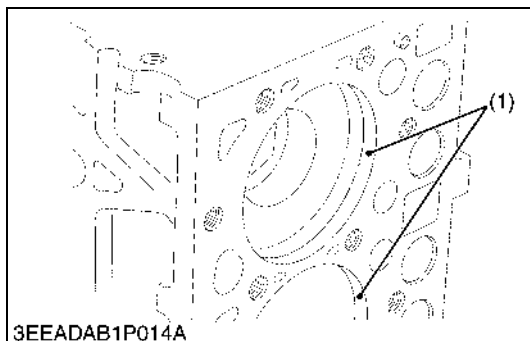
(1) Oil Pan

(3) Liquid Gasket

(2) Oil Strainer

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Pistons

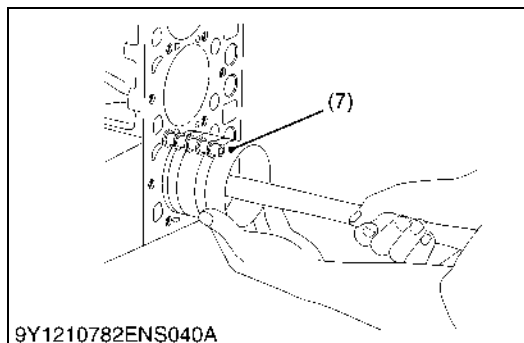
1. Fully clean the carbon (1) in the cylinders.
2. Remove the connecting rod cap (3).
3. Turn the flywheel and move the piston to top dead center.
4. Lightly tap the piston from the bottom of the crankcase with the grip of a hammer to pull the piston out.
5. Pull out the other piston in the same procedure as above.

(When reassembling)

- Before you install the piston into the cylinder, apply sufficient engine oil to the piston.
- When you install the piston into the cylinder, point the mark on the connecting rod to the fuel supply pump side.

■ IMPORTANT

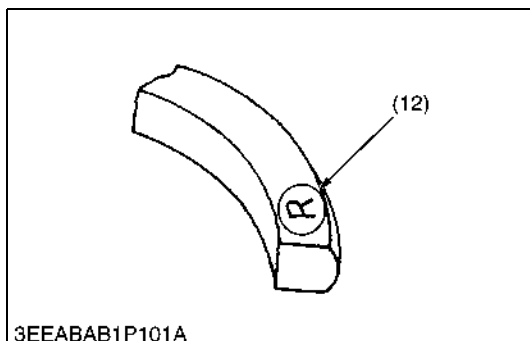
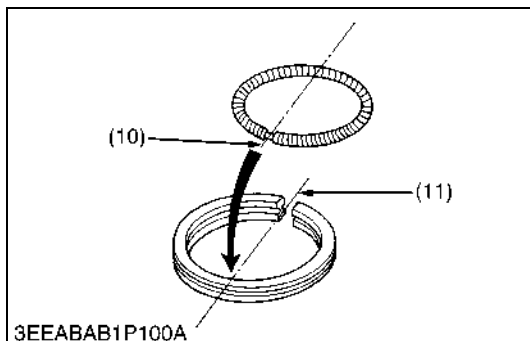
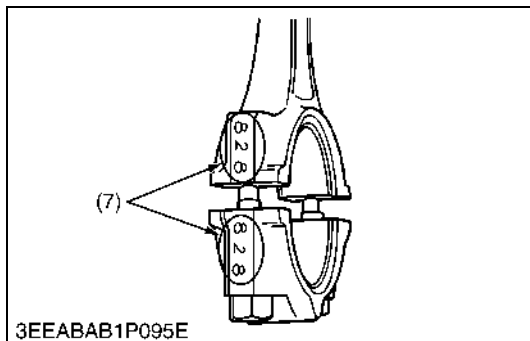
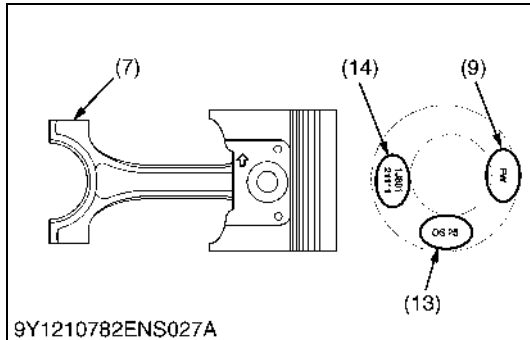
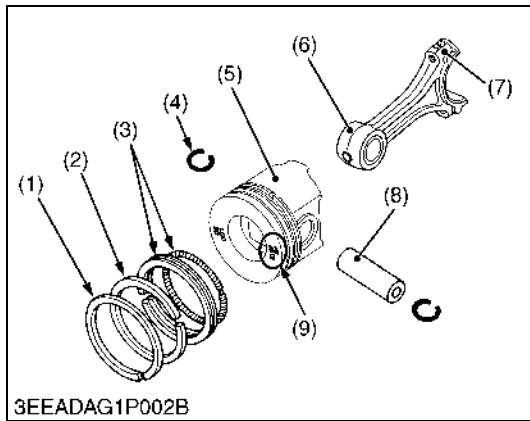
- **Do not change the combination of cylinder and piston. Align the position of each piston by its mark. For example, mark "1" on the No. 1 piston.**
- **Set the top ring with its gap (A) at 1.6 rad (90°) from the direction of the piston pin.**
Then set the second ring and the oil ring with their gaps (B), (C) at 2.09 rad (120°) from the top ring gap (A). (See the figure.)
- **Install the pistons with a piston ring compressor (7) carefully.**
- **When you install the piston in position, do not give a damage to the layer of molybdenum disulfide on the piston skirt. This layer can decrease the clearance with the cylinder liner. Immediately after you press-fit the piston pin, the piston is hot and the layer comes off easily. Only put in the piston after its temperature decreases.**
- **When you replace the piston, look at the code number (6) on top of the piston. Use a replacement piston with the same code number.**



Tightening torque	Connecting rod screw	40 to 45 N·m 4.1 to 4.5 kgf·m 30 to 33 lbf·ft

(1) Carbon	(A) Top Ring Gap
(2) Connecting Rod Bolt	(B) Second Ring Gap
(3) Connecting Rod Cap	(C) Oil Ring Gap
(4) Connecting Rod	(D) Piston Pin Hole
(5) Layer of Molybdenum Disulfide	
(6) Code Number	(a) 2.09 rad (120°)
(7) Piston Ring Compressor	
(8) Serration (Spiral)	
(9) Serration (Axial Direction)	

9Y1211012ENS0060US0



Piston Ring and Connecting Rod

1. Remove the piston rings (1), (2) and (3) with a piston ring tool.
2. Remove the piston pin (8) to disconnect the connecting rod (6) from the piston (5).

(When reassembling)

- When you install the rings to the piston (5), set the manufacturer mark (12) upward.
- When you install the oil ring (3) on the piston (5), set the expander joint (10) on the opposite side of the oil ring gap (11).
- When you install the piston pin, put the piston fully in 80 °C (176 °F) oil for 10 to 15 minutes.
- Apply engine oil to the piston pin (8).
- When you connect the piston and connecting rod, set the FW mark (9) on the piston head to the flywheel side. When you install the piston into the cylinder, point the mark on the connecting rod to the fuel supply pump.

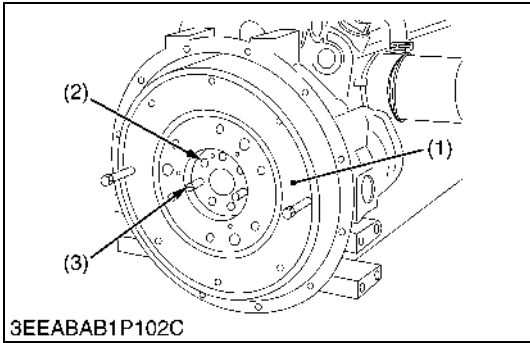
NOTE

- Put a mark on the connecting rod (6) and the piston (5) with the same number to keep the same combination.

(1) Top Ring	(8) Piston Pin
(2) Second Ring	(9) FW Mark
(3) Oil Ring	(10) Expander Joint
(4) Piston Pin Snap Ring	(11) Oil Ring Gap
(5) Piston	(12) Manufacturer Mark
(6) Connecting Rod	(13) Over Size Mark
(7) Mark	(14) Part Number

9Y1211012ENS0061US0

[10] FLYWHEEL AND CRANKSHAFT



Flywheel

- 1. Attach the stopper to the flywheel (1).
- 2. Remove 2 flywheel screws (2).
- 3. Put the 2 flywheel guide screws (3) in the holes.
- 4. Remove all the flywheel screws (2).
- 5. Remove the flywheel (1) slowly along the flywheel guide screws (3).

NOTE

- Do not use an impact wrench. Serious damage will occur.

IMPORTANT

- The flywheel is very heavy, so securely hold the flywheel when removing.

(When reassembling)

- Put in 2 flywheel guide screws (3).
- Check that there are no metal particles that remain on the flywheel mounting surfaces.
- Apply engine oil to the threads and the flange seat face of the flywheel screw. Then attach the screw.

Tightening torque	Flywheel screw	98.1 to 107 N·m 10.0 to 11.0 kgf·m 72.4 to 79.5 lbf·ft

- (1) Flywheel

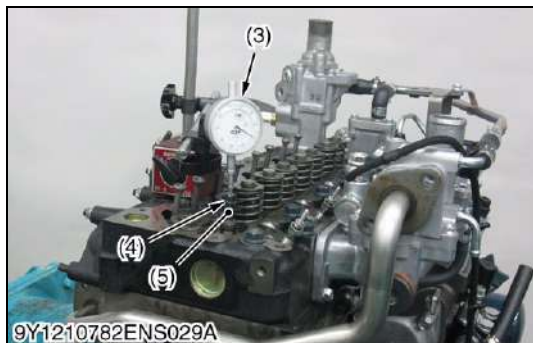
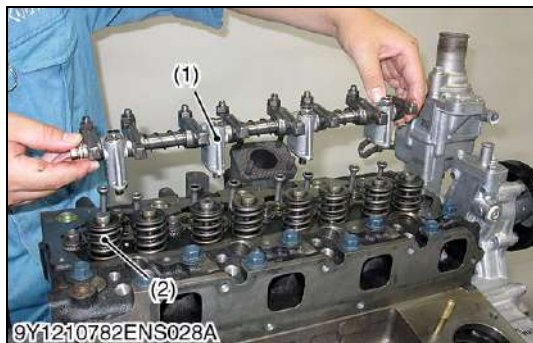
(2) Flywheel Screw
- (3) Flywheel Guide Screw

9Y1211012ENS0062US0

Measuring Angular Deviation between Crankshaft TDC and Crank Position Sensor Detected TDC**■ IMPORTANT**

- Perform this correction every time the crank shaft or flywheel is replaced.

9Y1211012ENS0063US0

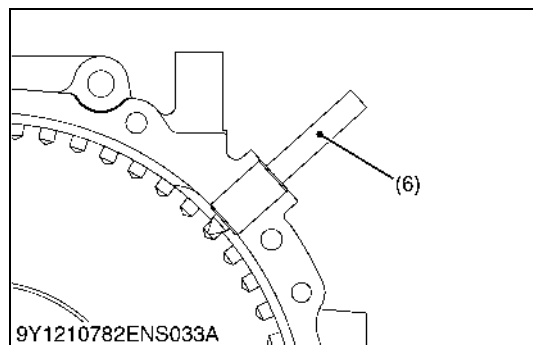
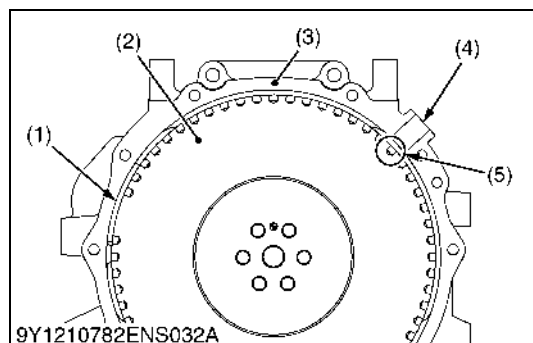
**Confirmation of Top Dead Center**

1. Remove the rocker arm (1). (See page 1-S44.)
2. Align the #4 piston with top dead center and remove the valve spring (2) of the #4 cylinder
3. Insert an O-ring (4) to prevent the exhaust valve (5) from falling into the cylinder and position the dial gauge (3) at the tip of the valve.
4. While turning the flywheel to the left, the largest deflection of the needle on the gauge indicates top dead center, so stop the flywheel in this position and set a tri-square (6) as shown in the picture to the left. Mark the reference line (8) on the engine body side and put a mark for top dead center (7) on the flywheel side. Note, in the case the flywheel is turned too far, return it by turning to the right and start over.

- (1) Rocker Arm
- (2) Valve Spring
- (3) Dial Gauge
- (4) O-Ring

- (5) Exhaust Valve
- (6) Tri-square
- (7) Mark for Top Dead Center
- (8) Reference Line

9Y1211012ENS0064US0



Confirmation of Crank Position Sensor Top Dead Center Detection Position

1. Align the 20th pulsar hole (5) from the area where there is no pulsar hole (1) on the outer circumference of the flywheel (2) with the crank position sensor mounting hole (4) on the flywheel housing (3).
2. Insert a special tooling injection timing top correction handle (6) into the crank position sensor mounting hole and align the center of handle and pulsar.
3. This position is the crank position sensor top dead center detection position, so set the tri-square (7) on the reference line (9) as mentioned in the previous item and put a mark for crank position sensor detecting top dead center position (10) on the flywheel.

(1) Area where there is no pulsar hole	(7) Tri-square
(2) Flywheel	(8) Reference Line
(3) Flywheel Housing	(9) Mark for Top Dead Center
(4) Crank Position Sensor Mounting Hole	(10) Mark for Crank Position Sensor Detecting Top Dead Center Detection Position
(5) 20th Pulsar Hole	
(6) Injection Timing Top Correction Handle	

9Y1211012ENS0065US0



Fuel Injection Timing Correction Amount

The difference **A** between the top dead center mark (1) and the crank position sensor top dead center detection position mark (2) is the correction amount for fuel injection timing.

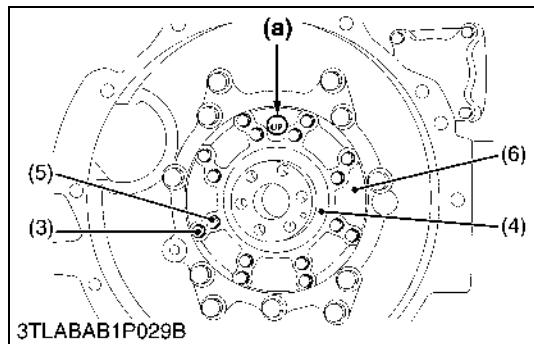
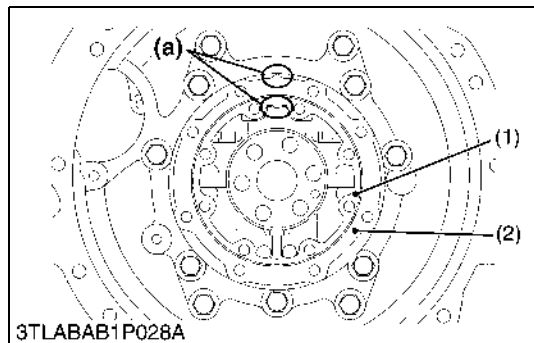
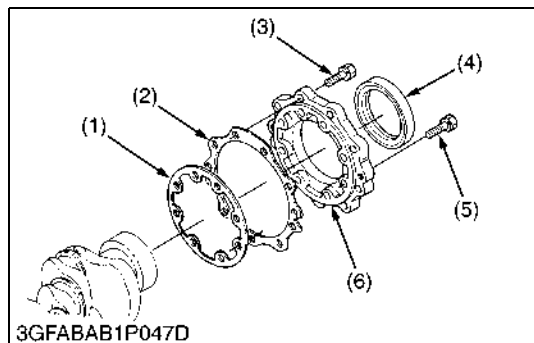
Calculate the correction value referencing the following and using a diagnostics tool, overwrite the injection timing correction amount in the "data overwrite/confirmation".

(Reference)

- 1 mm: 0.28°
- If the crank position sensor top dead center detection position is in front of top dead center, enter a negative value.
- If the crank position sensor top dead center detection position is in back of top dead center, enter a positive value.

(1) Mark for Top Dead Center	(2) Mark of Crank Position Sensor Top Dead Center Detection Position

9Y1211012ENS0066US0



Bearing Case Cover

1. Remove the mounting screws of the bearing case cover. First, remove inner screws (5) and then external screws (3).
2. Remove the bearing case cover (6).

■ IMPORTANT

- The length of inner screws (5) and external screws (3) are different. Make sure that you use the correct one at the correct position.

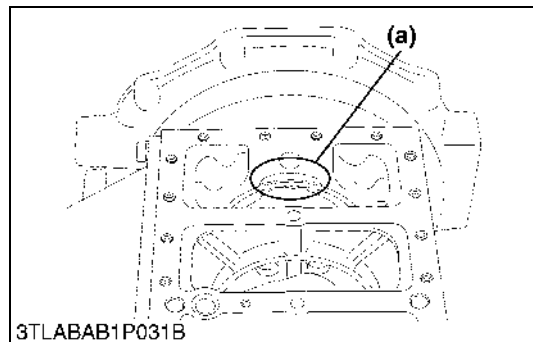
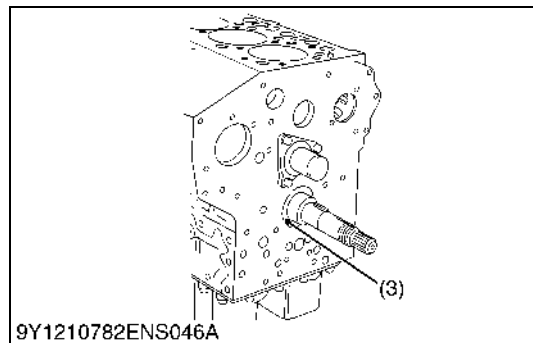
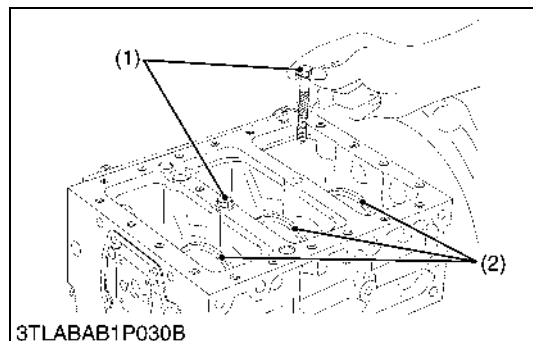
(When reassembling)

- Attach the bearing case gasket (1) and the bearing case cover gasket (2) in the correct directions.
- Put the casting mark "UP" of the bearing case cover (6) upward, then install the bearing case cover.
- Apply a thin layer of engine oil to the oil seal. Then install the oil seal not to come off the lip.
- Tighten the mounting screws of the bearing case cover with an equal force on the diagonal line.

Tightening torque	Mounting screw of bearing case cover	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

(1) Bearing Case Gasket	(5) Inner Screw (Mounting Bolt of Bearing Case Cover)
(2) Bearing Case Cover Gasket	(6) Bearing Case Cover
(3) External Screw (Mounting Bolt of Bearing Case Cover)	
(4) Oil Seal	(a) Upside

9Y1211012ENS0067US0



Crankshaft

NOTE

- Before you disassemble, measure the side clearance of crankshaft. Measure it when you assemble again.

[D1803-CR-E4]

- Remove the screw 2 (1) of the main bearing case.
- Turn the crankshaft to set the crankpin of the third cylinder to the bottom dead center.
- Pull out the crankshaft until the crankpin of the second cylinder comes to the center of the third cylinder.
- Turn the crankshaft by 2.09 rad (120°) counterclockwise to set the crankpin of the second cylinder to the bottom dead center.
- Pull out the crankshaft until the crankpin of the first cylinder comes to the center of the third cylinder.
- Do the above steps again to pull out the crankshaft completely.

[V2403-CR-E4]

- Remove the screw 2 (1) of the main bearing case.
- Turn the crankshaft to set the crankpin of the fourth cylinder to the horizontal directions (right or left).
- Hold the crankpins to the horizontal directions (right or left) and pull out the crankshaft completely.

(When reassembling)

IMPORTANT

- When you install the crankshaft assembly, align the screw hole of the main bearing case 2 (2) with the screw hole of the cylinder block.
- Apply oil to the screw 2 (1) of the main bearing case and tighten the screw by hand.

If you cannot turn the screw 2 smoothly, align the screw holes between the cylinder block and the main bearing case correctly.

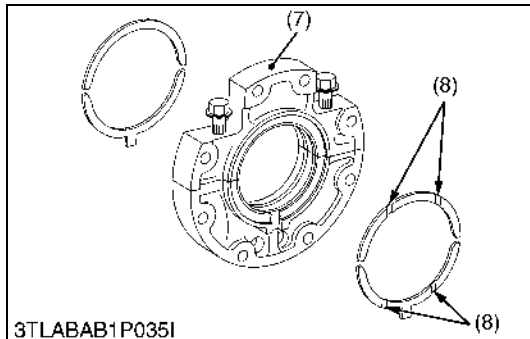
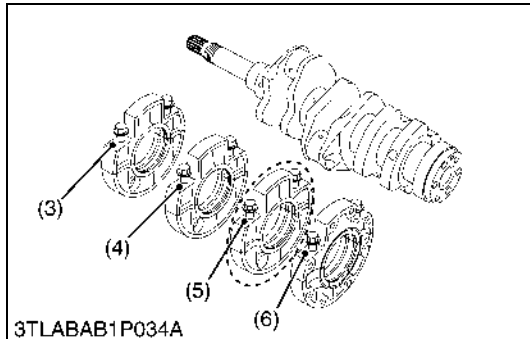
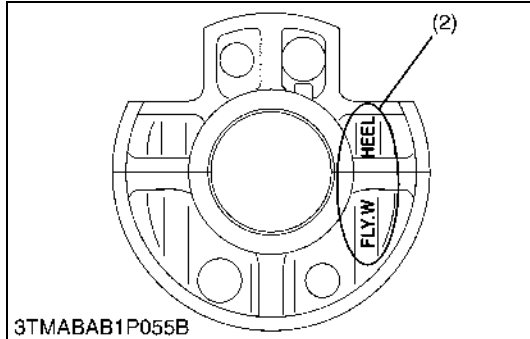
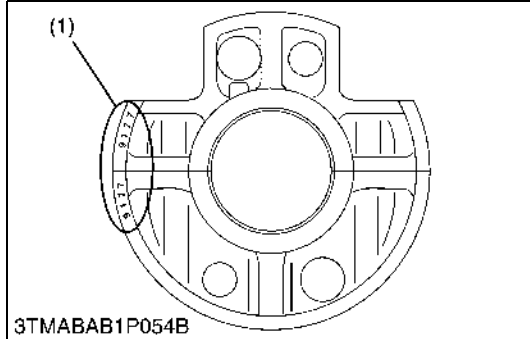
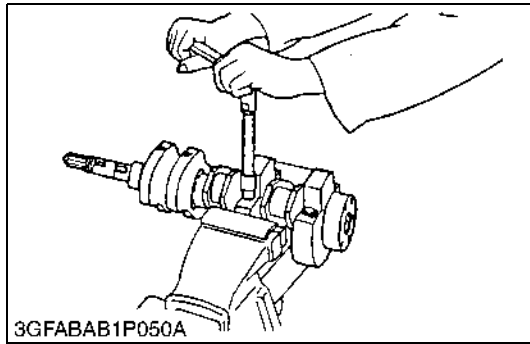
Then tighten the screw 2 to the specified tightening torque with a torque wrench.

Tightening torque	Screw 2 of main bearing case	69 to 73 N·m 7.0 to 7.5 kgf·m 51 to 54 lbf·ft

- (1) Screw 2 of Main Bearing Case
(2) Main Bearing Case 2
(3) Crankshaft Bearing 1

(a) Cut place to remove and install the crankshaft

9Y1211012ENS0068US0



Main Bearing Case Assembly

1. Remove the screws 1 of the main bearing case (7). Then remove the main bearing case.
2. Remove other main bearing cases as above.

(When reassembling)

- Clean the oil channel in the main bearing case.
- Apply clean engine oil on the bearings.
- Align the numbers (1) and mark (2) on the main bearing case.
- When you install the main bearing case 1 and 2, point the mark "FLYWHEEL" to the flywheel.
- When you install the thrust bearing, point the oil groove (8) externally.
- Install the main bearing case assemblies in the initial positions. Since the diameters of the main bearing cases are different, install them in the sequence of their marks (A, B for 3 cylinders and A, B, C for 4 cylinders) from the gear case side.
- After you tighten the screw 1 of the main bearing case (7) to the specified torque, make sure that the main bearing case moves smoothly.

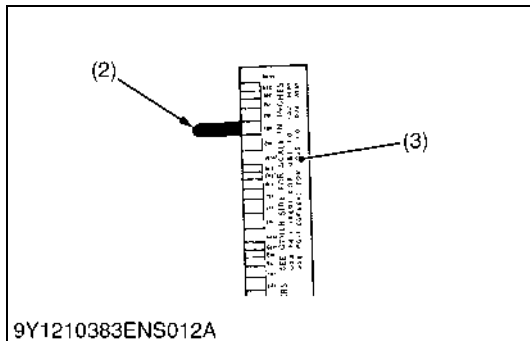
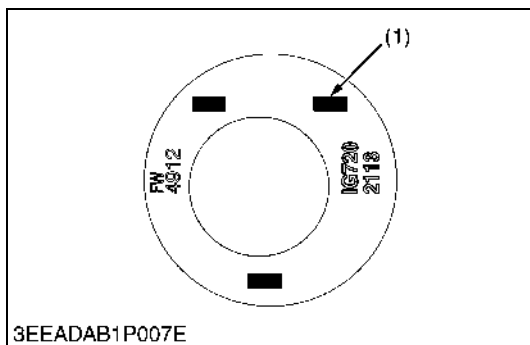
Tightening torque	Screw 1 of main bearing case	46 to 50 N·m 4.7 to 5.2 kgf·m 34 to 37 lbf·ft

(1) Alignment Number	(5) C
(2) Alignment Mark	(6) No Mark
(3) A	(7) Screw 1 of Main Bearing Case
(4) B	(8) Oil Groove

9Y1211012ENS0069US0

7. SERVICING

[1] CYLINDER HEAD AND VALVES



Top Clearance

1. Remove the cylinder head.
2. With the piston at TDC, use grease to affix three or four plastigauges (1) of a diameter 1.5 mm (0.059 in.) × 5.0 to 7.0 mm (0.20 to 0.27 in.) long to the crown of the piston; keep the gauges away from the intake valve and combustion chamber fittings.
3. Take the piston to an intermediate position, install the cylinder head and tighten the head screws to the specified torque.
4. Turn the crankshaft so the piston goes through TDC.
5. Remove the cylinder head and compare the width of the crushed plastigauges (2) with the scale (3).
6. If they are out of spec, check the oil clearance of the crank pin, journals and piston pin.

NOTE

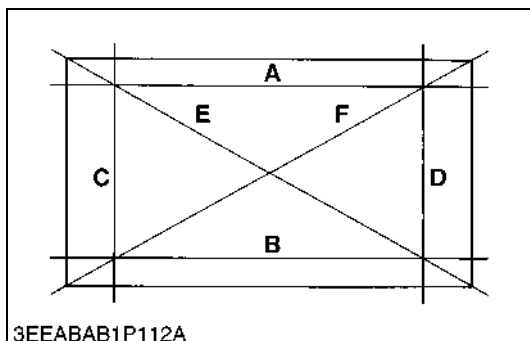
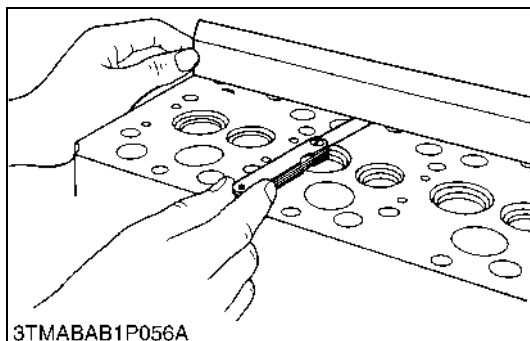
- Top clearance = Width of the crushed plastigauge (2).

Top clearance	Factory specification	0.60 to 0.70 mm 0.024 to 0.027 in.
Tightening torque	Cylinder head mounting screw	93.2 to 98.0 N·m 9.50 to 10.0 kgf·m 68.8 to 72.3 lbf·ft

- (1) Plastigauge
(2) Crushed Plastigauge

- (3) Scale

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Cylinder Head Surface Flatness

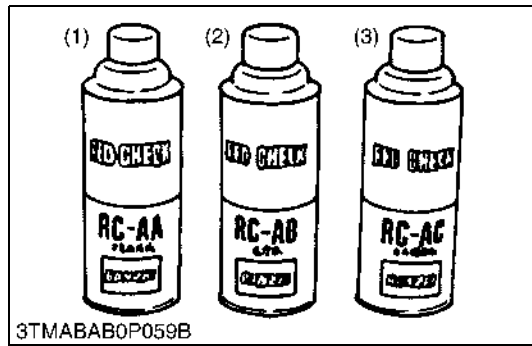
1. Clean the cylinder head surface.
2. Put a straightedge on the cylinder head.
3. Measure the clearance with a feeler gauge at the 6 places (see the figure).
4. If the measurement is more than the allowable limit, make it straight with a surface grinder.

IMPORTANT

- Do not put a straightedge on the combustion chamber.
- Check the valve recessing after you correct.

Cylinder head surface flatness	Allowable limit	0.05 mm 0.002 in.

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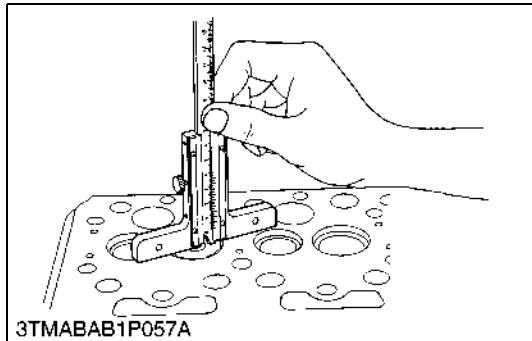
Cylinder Head Flaw

1. Prepare an air spray red check.
2. Clean the surface of the cylinder head with detergent (2).
3. Apply some red permeative liquid (1) on the cylinder head surface. After you apply, do not touch it for 5 to 10 minutes.
4. Clean away the red permeative liquid on the cylinder head surface with detergent (2).
5. Apply the white developer (3) on the cylinder head surface.
6. If you found a red flaw, replace the cylinder head.

(1) Red Permeative Liquid
(2) Detergent

(3) White Developer

9Y1211012ENS0072US0



Valve Recessing

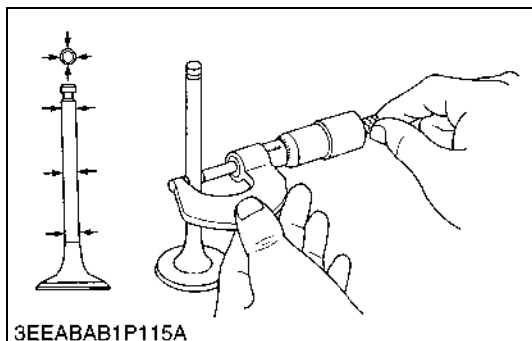
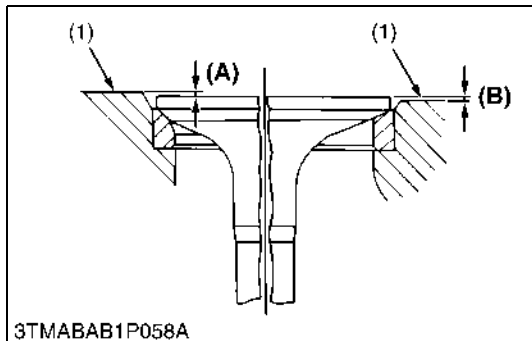
1. Clean the cylinder head surface, valve face and valve seat.
2. Set the valve into the valve guide.
3. Measure the valve recessing with a depth gauge.
4. If the measurement is more than the allowable limit, replace the valve.
5. If it stays more than the allowable limit after you replace the valve, replace the cylinder head.

Valve recessing	Factory specification	0.65 to 0.85 mm 0.026 to 0.033 in.
	Allowable limit	1.20 mm 0.0472 in.

(1) Cylinder Head Surface

(A) Recessing
(B) Protrusion

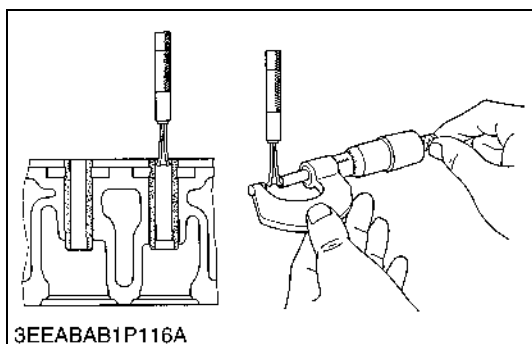
9Y1211012ENS0073US0



Clearance between Valve Stem and Valve Guide

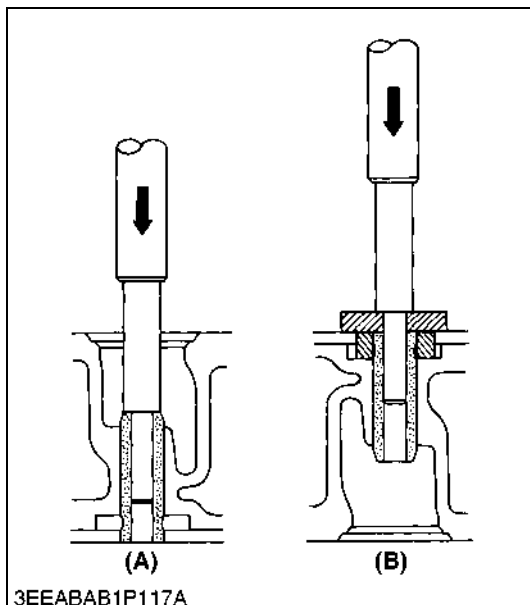
1. Remove carbon from the valve guide section.
2. Measure the valve stem O.D. with an external micrometer.
3. Measure the valve guide I.D. with a small hole gauge, and calculate the clearance.
4. If the clearance is more than the allowable limit, replace the valves.
5. If the clearance stays more than the allowable limit, replace the valve guide also.

Clearance between valve stem and valve guide	Factory specification	0.040 to 0.070 mm 0.0016 to 0.0027 in.
	Allowable limit	0.10 mm 0.0039 in.



Valve stem O.D.	Factory specification	7.960 to 7.975 mm 0.3134 to 0.3139 in.
Valve guide I.D.	Factory specification	8.015 to 8.030 mm 0.3156 to 0.3161 in.

9Y1211012ENS0074US0



Replacement of Valve Guide

(When removing)

1. Press out the used valve guide with the valve guide replacing tool. (See page G-82.)

(When installing)

1. Clean the new valve guide and valve guide bore, and apply engine oil to them.
2. Press fit the new valve guide with the valve guide replacing tool.
3. Ream accurately the I.D. of the valve guide to the specified dimension.

Valve guide I.D. (Intake and exhaust)	Factory specification	8.015 to 8.030 mm 0.3156 to 0.3161 in.

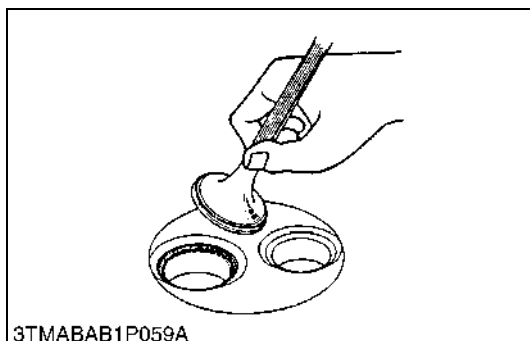
■ IMPORTANT

- Do not hit the valve guide with a hammer during replacement.

(A) When Removing

(B) When Installing

9Y1211012ENS0075US0



Valve Seating

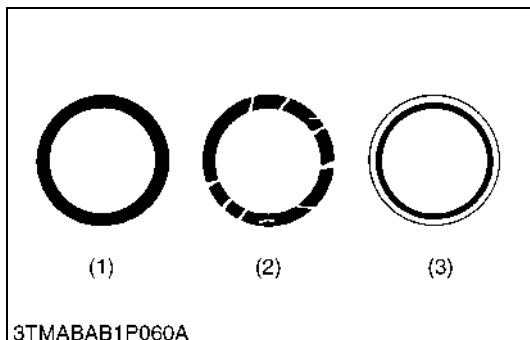
1. Apply a thin layer of Prussian Blue on the valve face. Then put the valve on its seat to check the contact.
2. If the valve is not fully around the seat or the contact is less than 70 % of the factory specification, correct the valve seat. See the next section.
3. If the valve contact width cannot get the factory specification, replace the valve or correct the contact of the valve seat.

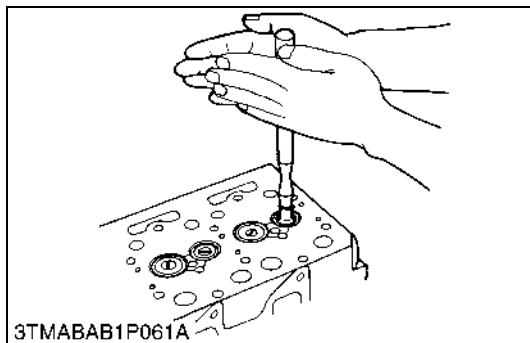
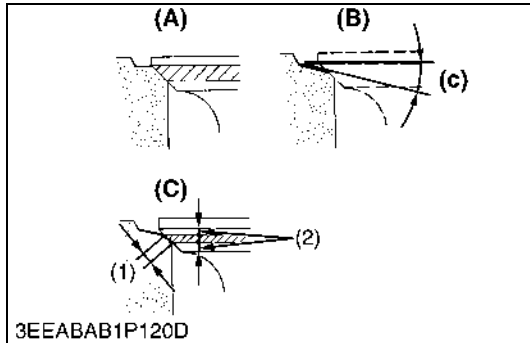
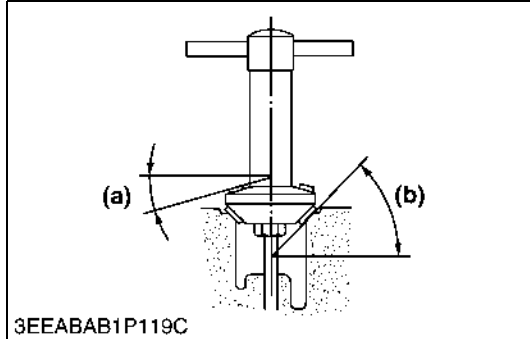
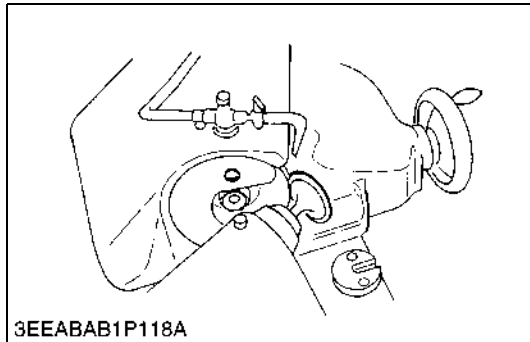
Valve contact width	Factory specification	2.12 mm 0.0835 in.

- (1) Correct
(2) Incorrect

(3) Incorrect

9Y1211012ENS0076US0





Correction of Valve and Valve Seat

NOTE

- Before you correct the valve and seat, check the valve stem and measure the I.D. of the valve guide section. Repair them if necessary.
- After you correct the valve seat, be sure to check the valve recessing.

1) Correction of valve

- Correct the valve with a valve refacer.

Valve face angle	Factory specification	Intake	0.79 rad 45°
		Exhaust	0.79 rad 45°

2) Correction of valve seat

- Slightly correct the seat surface with a 1.0 rad (60°) or 0.79 rad (45°) valve seat cutter.
- Correct the seat surface with a 0.52 rad (30°) or 0.26 rad (15°) valve seat cutter. The width must be near the specified valve seat width (2.12 mm, 0.0835 in.).
- After you correct the seat, check that the valve seating is flat. Apply a thin layer of compound between the valve face and valve seat, and lap them with a valve lapping tool.
- Check the valve seating with Prussian Blue. The valve seating surface must show good contact on all sides.

Valve seat angle	Factory specification	Intake	0.79 rad 45°
		Exhaust	0.79 rad 45°

- Valve Seat Width
- Identical Dimensions

- Check the Contact
- Correct Seat Width
- Check the Contact
- 0.26 rad (15°) or 0.52 rad (30°)
- 0.79 rad (45°) or 1.0 rad (60°)
- 0.52 rad (30°) or 0.26 rad (15°)

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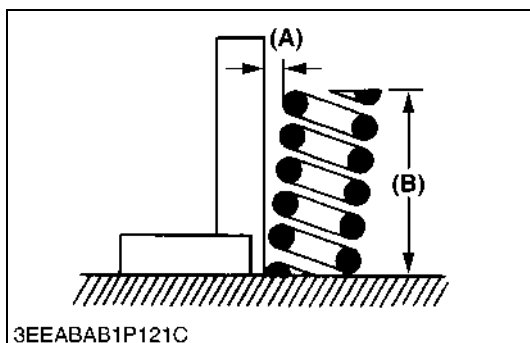
Valve Lapping

- Apply the compound equally to the valve lapping surface.
- Put the valve into the valve guide. Lap the valve on its seat with a valve lapping tool.
- After you lap the valve, clean away the compound and apply oil, then lap the valve again with oil.
- Apply Prussian Blue to the contact surface to measure the seated rate.
- If the seated rate is less than 70 %, lap the valve again.

IMPORTANT

- After you complete the valve lapping and assemble the valve, check the valve recessing and adjust the valve clearance.

9Y1211012ENS0078US0



Free Length and Tilt of Valve Spring

1. Measure the free length **(B)** of valve spring with a vernier calipers.
2. If the measurement is less than the allowable limit, replace it.
3. Put the valve spring on a surface plate, and put a square on the side of the valve spring.
4. Make sure that the full side is in contact with the square.
5. Turn the valve spring to measure the maximum tilt **(A)**.
6. If the measurement is more than the allowable limit, replace it.
7. Check the full surface of the valve spring for scratches.
8. If there is a problem, replace it.

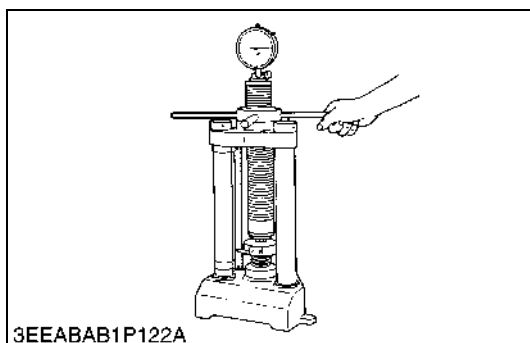
Tilt (A)	Allowable limit	1.0 mm 0.039 in.

Free length (B)	Factory specification	41.7 to 42.2 mm 1.65 to 1.66 in.
	Allowable limit	41.2 mm 1.62 in.

(A) Tilt

(B) Free Length

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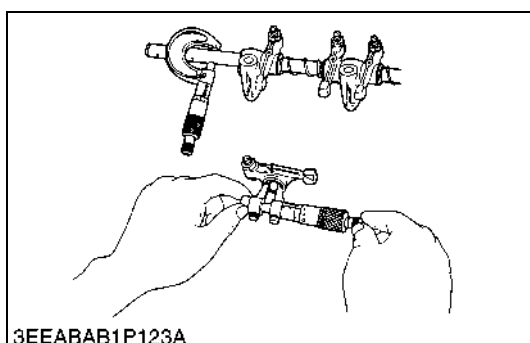


Setting Load of Valve Spring

1. Put the valve spring on a tester.
2. Compress the valve spring to the specified setting length.
3. Read the compression load on the gauge.
4. If the measurement is less than the allowable limit, replace the valve spring.

Setting load / Setting length	Factory specification	118 N / 35.0 mm 12.0 kgf / 35.0 mm 26.5 lbf / 1.38 in.
	Allowable limit	100 N / 35.0 mm 10.2 kgf / 35.0 mm 22.5 lbf / 1.38 in.

9Y1211012ENS0080US0



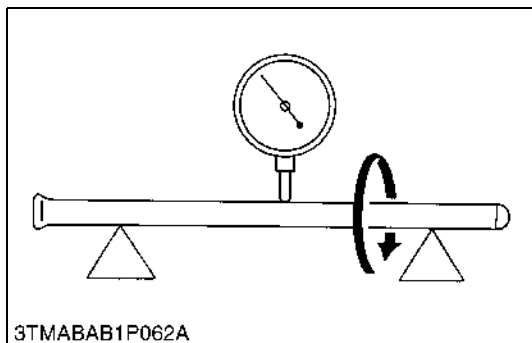
Oil Clearance between Rocker Arm and Rocker Arm Shaft

1. Measure the rocker arm shaft O.D. with an external micrometer.
2. Measure the rocker arm I.D. with an internal micrometer.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the rocker arm and measure the oil clearance again.
5. If the oil clearance stays more than the allowable limit, replace the rocker arm shaft also.

Oil clearance between rocker arm and rocker arm shaft	Factory specification	0.016 to 0.045 mm 0.00063 to 0.0017 in.
	Allowable limit	0.10 mm 0.0039 in.

Rocker arm shaft O.D.	Factory specification	13.973 to 13.984 mm 0.55012 to 0.55055 in.
Rocker arm I.D.	Factory specification	14.000 to 14.018 mm 0.55119 to 0.55188 in.

9Y1211012ENS0081US0

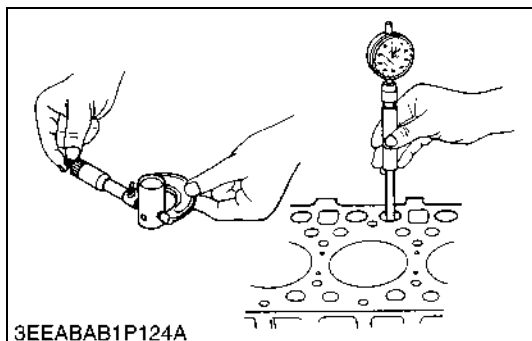


Push Rod Bend

1. Put the push rod on V blocks.
2. Set a dial indicator with its point on the middle of the push rod.
3. Turn the push rod slowly and read the variation on the indicator.
4. If the measurement is more than the allowable limit, replace the push rod.

Push rod bend	Allowable limit	0.25 mm 0.0098 in.

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Oil Clearance between Tappet and Tappet Guide Bore

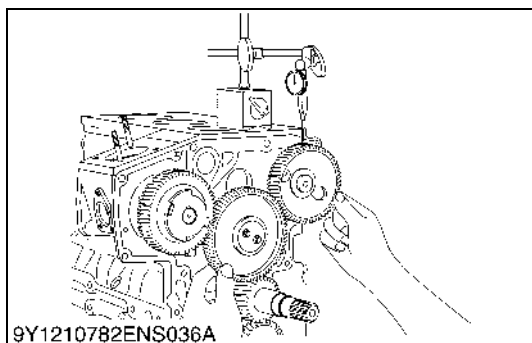
1. Measure the tappet O.D. with an external micrometer.
2. Measure the tappet guide bore I.D. with a cylinder gauge.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit or the tappet has a damage, replace the tappet.

Oil Clearance between tappet and tappet guide bore	Factory specification	0.020 to 0.062 mm 0.00079 to 0.0024 in.
	Allowable limit	0.07 mm 0.003 in.

Tappet O.D.	Factory specification	23.959 to 23.980 mm 0.94327 to 0.94409 in.
Tappet guide bore I.D.	Factory specification	24.000 to 24.021 mm 0.94489 to 0.94570 in.

9Y1211012ENS0083US0

[2] TIMING GEARS



Timing Gear Backlash

1. Set a dial indicator (lever type) with its point on the gear tooth.
2. Hold the mating gear and move the gear to measure the backlash.
3. If the backlash is more than the allowable limit, measure the oil clearance in the journal part of each shaft.
4. If the oil clearance is correct, replace the gear.

Backlash between idle gear and crank gear	Factory specification	0.04150 to 0.1122 mm 0.001634 to 0.004417 in.
	Allowable limit	0.15 mm 0.0059 in.

Backlash between idle gear and cam gear	Factory specification	0.04150 to 0.1154 mm 0.001634 to 0.004543 in.
	Allowable limit	0.15 mm 0.0059 in.

Backlash between idle gear and fuel supply pump gear	Factory specification	0.04150 to 0.1154 mm 0.001634 to 0.004543 in.
	Allowable limit	0.15 mm 0.0059 in.

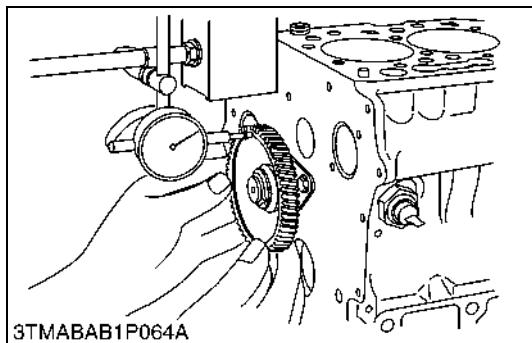
Backlash between crank gear and oil pump gear	Factory specification	0.04150 to 0.1090 mm 0.001634 to 0.004291 in.
	Allowable limit	0.15 mm 0.0059 in.

[V2403-CR-E4]

Backlash between idle gear and balancer gear (IN. side)	Factory specification	0.0350 to 0.116 mm 0.00138 to 0.00456 in.
	Allowable limit	0.15 mm 0.0059 in.

Backlash between cam gear and balancer gear (EX. gear)	Factory specification	0.0350 to 0.116 mm 0.00138 to 0.00456 in.
	Allowable limit	0.15 mm 0.0059 in.

9Y1211012ENS0084US0

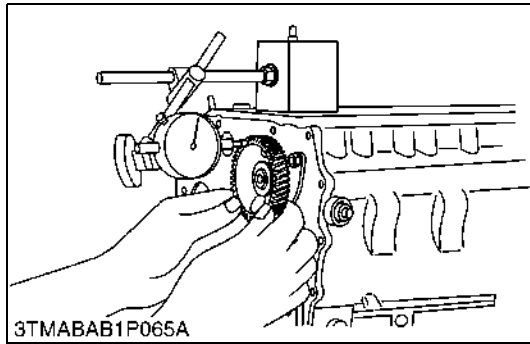


Side Clearance of Idle Gear

1. Set a dial indicator with its point on the idle gear.
2. Move the idle gear to the front and rear to measure the side clearance.
3. If the measurement is more than the allowable limit, replace the idle gear collar.

Side clearance of idle gear	Factory specification	0.15 to 0.25 mm 0.0059 to 0.0098 in.
	Allowable limit	0.9 mm 0.04 in.

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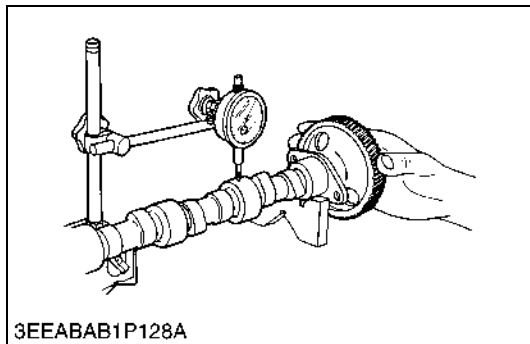


Side Clearance of Camshaft

1. Set a dial indicator with its point on the camshaft.
2. Move the cam gear to the front and rear to measure the side clearance.
3. If the measurement is more than the allowable limit, replace the camshaft stopper.

Side clearance of camshaft	Factory specification	0.070 to 0.22 mm 0.0028 to 0.0086 in.
	Allowable limit	0.30 mm 0.012 in.

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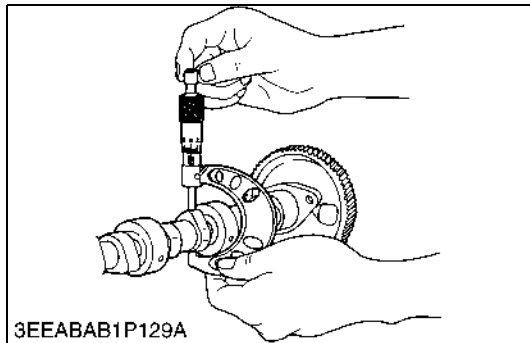


Camshaft Bend

1. Hold the 2 end journals of camshaft with V blocks on the surface plate.
2. Set a dial indicator with its point on the middle journal.
3. Turn the camshaft slowly and read the variation on the indicator.
4. If the measurement is more than the allowable limit, replace the camshaft.

Camshaft bend	Allowable limit	0.01 mm 0.0004 in.

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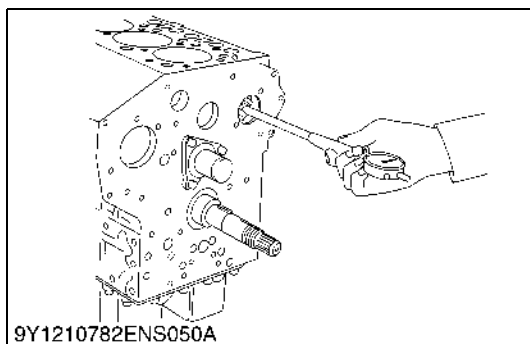
Cam Height

1. Measure the height of the cam at its highest point with an external micrometer.
2. If the measurement is less than the allowable limit, replace the camshaft.

Cam height of intake	Factory specification	33.90 mm 1.335 in.
	Allowable limit	33.85 mm 1.333 in.

Cam height of exhaust	Factory specification	33.90 mm 1.335 in.
	Allowable limit	33.85 mm 1.333 in.

9Y1211012ENS0088US0



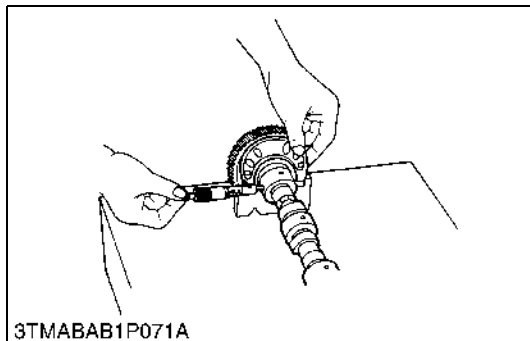
Oil Clearance of Camshaft Journal

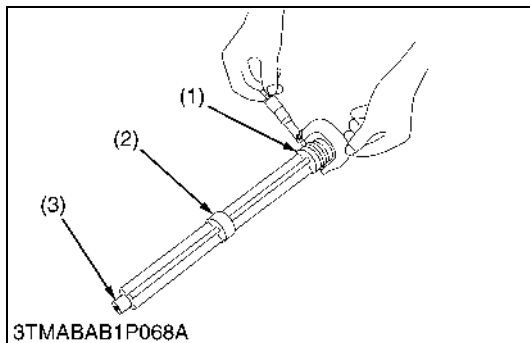
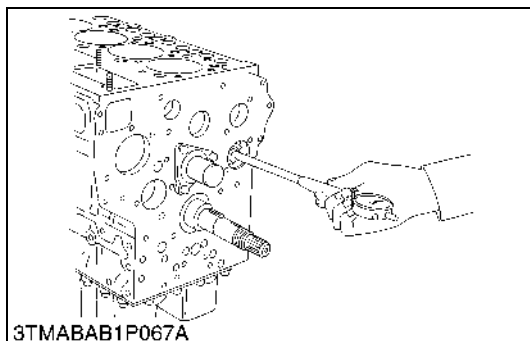
1. Measure the camshaft journal O.D. with an external micrometer.
2. Measure the cylinder block bore I.D. for the camshaft with a cylinder gauge.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the camshaft.

Oil clearance of camshaft journal	Factory specification	0.050 to 0.091 mm 0.0020 to 0.0035 in.
	Allowable limit	0.15 mm 0.0059 in.

Camshaft journal O.D.	Factory specification	39.934 to 39.950 mm 1.5722 to 1.5728 in.
Cylinder block bore I.D.	Factory specification	40.000 to 40.025 mm 1.5748 to 1.5757 in.

9Y1211012ENS0089US0





Oil Clearance of Balancer Shaft Journal (V2403-CR-E4)

1. Measure the balancer shaft journal O.D. with an outside micrometer.
2. Measure the cylinder block bore I.D. for balancer shaft with an inside micrometer or cylinder gauge.
3. If the clearance exceeds the allowable limit, replace the balancer shaft.

Oil clearance of balancer shaft journal 1	Factory specification	0.030 to 0.111 mm 0.00119 to 0.00437 in.
	Allowable limit	0.20 mm 0.0079 in.

Balancer shaft journal 1 O.D.	Factory specification	43.934 to 43.950 mm 1.7297 to 1.7303 in.
Balancer shaft bearing 1 I.D.	Factory specification	43.980 to 44.045 mm 1.7315 to 1.7340 in.

Oil clearance of balancer shaft journal 2	Factory specification	0.030 to 0.111 mm 0.00119 to 0.00437 in.
	Allowable limit	0.20 mm 0.0079 in.

Balancer shaft journal 2 O.D.	Factory specification	41.934 to 41.950 mm 1.6510 to 1.6515 in.
Balancer shaft bearing 2 I.D.	Factory specification	41.980 to 42.045 mm 1.6528 to 1.6553 in.

Oil clearance of balancer shaft journal 3	Factory specification	0.020 to 0.094 mm 0.00079 to 0.0037 in.
	Allowable limit	0.20 mm 0.0079 in.

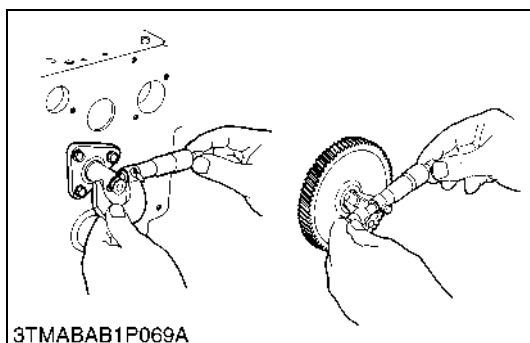
Balancer shaft journal 3 O.D.	Factory specification	21.947 to 21.960 mm 0.86406 to 0.86456 in.
Balancer shaft bearing 3 I.D.	Factory specification	21.980 to 22.041 mm 0.86536 to 0.86775 in.

(1) Balancer Shaft Journal 1

(3) Balancer Shaft Journal 3

(2) Balancer Shaft Journal 2

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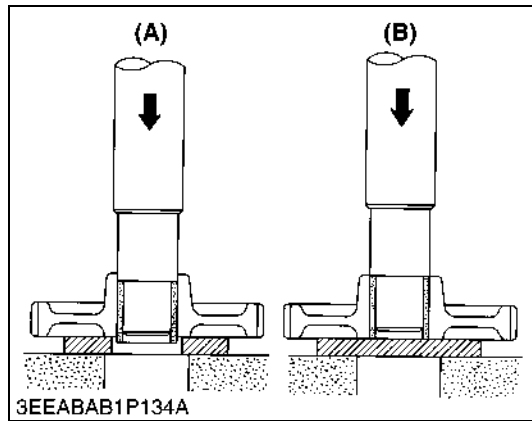
Oil Clearance between Idle Gear Shaft and Idle Gear Bushing

1. Measure the idle gear shaft O.D. with an external micrometer.
2. Measure the idle gear bushing I.D. with an internal micrometer.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the bushing.
5. If the oil clearance stays more than the allowable limit, replace the idle gear shaft also.

Oil clearance between idle gear shaft and idle gear bushing	Factory specification	0.025 to 0.066 mm 0.00099 to 0.0025 in.
	Allowable limit	0.10 mm 0.0039 in.

Idle gear shaft O.D.	Factory specification	37.959 to 37.975 mm 1.4945 to 1.4950 in.
Idle gear bushing I.D.	Factory specification	38.000 to 38.025 mm 1.4961 to 1.4970 in.

9Y1211012ENS0091US0



Replacement of Idle Gear Bushing

(When removing)

1. Press out the used idle gear bushing with the replacing tool.
(See page G-82.)

(When installing)

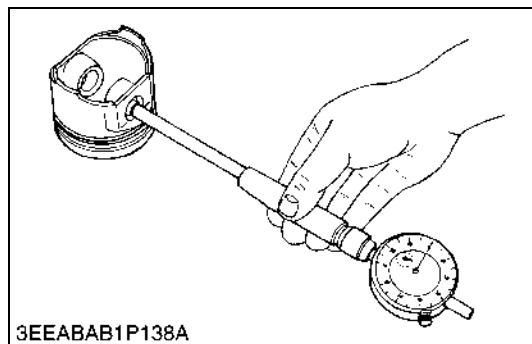
1. Clean a new idle gear bushing and idle gear bore, and apply engine oil to them.
2. Press fit the new bushing with the replacing tool.
Make sure that the bushing end aligns the end of the idle gear.

(A) When Removing

(B) When Installing

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[3] PISTON AND CONNECTING ROD

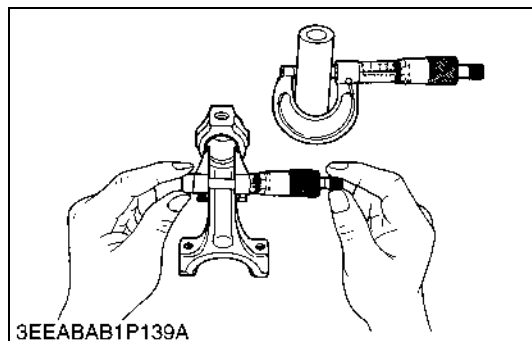


Piston Pin Bore I.D.

1. Measure the piston pin bore I.D. in the horizontal and vertical directions with a cylinder gauge.
2. If the measurement is more than the allowable limit, replace the piston.

Piston pin bore I.D.	Factory specification	25.000 to 25.013 mm 0.98426 to 0.98476 in.
	Allowable limit	25.05 mm 0.9862 in.

9Y1211012ENS0093US0



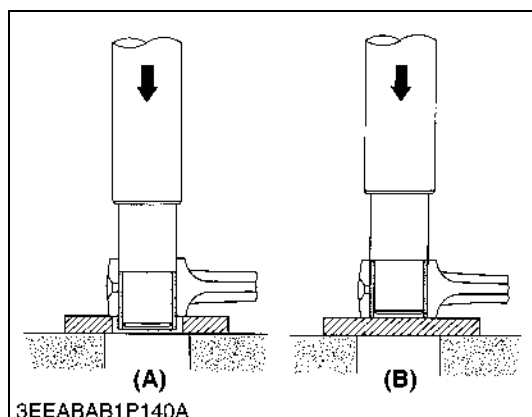
Oil Clearance between Piston Pin and Small End Bushing

1. Measure the piston pin O.D. where it touches the bushing with an external micrometer.
2. Measure the small end bushing I.D. with an internal micrometer.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the bushing.
5. If the oil clearance stays more than the allowable limit, replace the piston pin also.

Oil clearance between piston pin and small end bushing	Factory specification	0.014 to 0.036 mm 0.00056 to 0.0014 in.
	Allowable limit	0.15 mm 0.0059 in.

Piston pin O.D.	Factory specification	25.004 to 25.011 mm 0.98441 to 0.98468 in.
Small end bushing I.D.	Factory specification	25.025 to 25.040 mm 0.98524 to 0.98582 in.

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Replacement of Small End Bushing

(When removing)

1. Press out the used small end bushing with the replacing tool.
(See page G-82.)

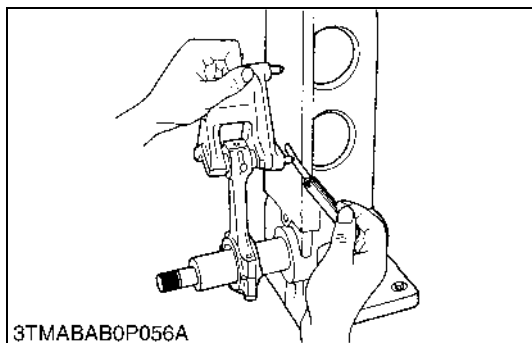
(When installing)

1. Clean a new small end bushing and bore, and apply engine oil to them.
2. Make sure that the oil hole of the connecting rod aligns the bushing hole. Then press fit the new bushing with the replacing tool.

(A) When Removing

(B) When Installing

9Y1211012ENS0095US0



Connecting Rod Alignment

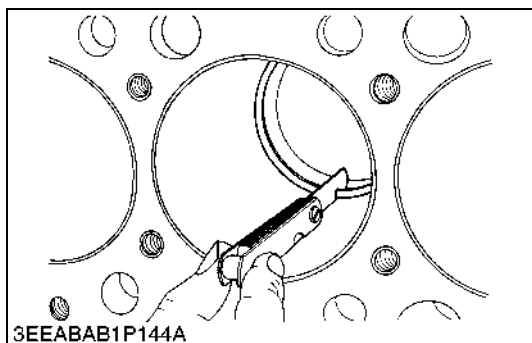
■ NOTE

- Make sure that the oil clearance of the small end bushing is less than the allowable limit.

1. Install the piston pin into the connecting rod.
2. Install the connecting rod on the alignment tool of the connecting rod.
3. Put a gauge on the piston pin, and move it against the face plate.
4. If the gauge does not touch fully against the face plate, measure the space between the gauge pin and face plate.
5. If the measurement is more than the allowable limit, replace the connecting rod.

Connecting rod alignment	Allowable limit	0.05 mm 0.002 in.

9Y1211012ENS0096US0



Piston Ring Gap

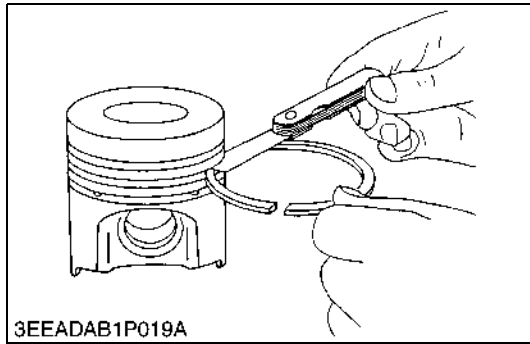
1. Put the piston ring into the lower part of the liner (the least worn out part) with the piston.
2. Measure the ring gap with a feeler gauge.
3. If the ring gap is more than the allowable limit, replace the ring.

Top ring	Factory specification	0.20 to 0.35 mm 0.0079 to 0.013 in.
	Allowable limit	1.25 mm 0.0492 in.

Second ring	Factory specification	0.30 to 0.45 mm 0.012 to 0.017 in.
	Allowable limit	1.25 mm 0.0492 in.

Oil ring	Factory specification	0.20 to 0.40 mm 0.0079 to 0.015 in.
	Allowable limit	1.25 mm 0.0492 in.

9Y1211012ENS0097US0



Clearance between Piston Ring and Groove

1. Clean the rings and the ring grooves, and install each ring in its groove.
2. Measure the clearance between the ring and the groove with a feeler gauge or depth gauge.
3. If the clearance is more than the allowable limit, replace the piston ring.
4. If the clearance stays more than the allowable limit with new ring, replace the piston also.

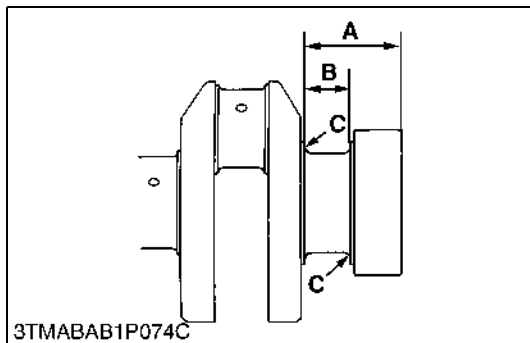
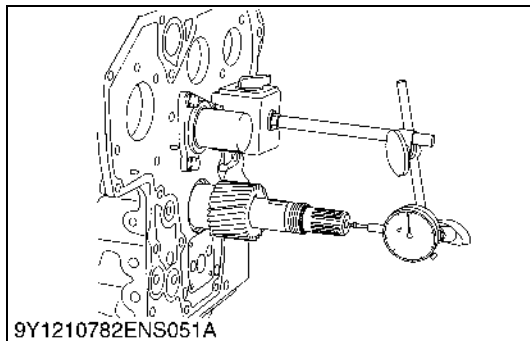
Top ring	Factory specification	0.050 to 0.090 mm 0.0020 to 0.0035 in.
	Allowable limit	0.20 mm 0.0079 in.

Second ring	Factory specification	0.0780 to 0.110 mm 0.00307 to 0.00433 in.
	Allowable limit	0.20 mm 0.0079 in.

Oil ring	Factory specification	0.030 to 0.070 mm 0.0012 to 0.0027 in.
	Allowable limit	0.15 mm 0.0059 in.

9Y1211012ENS0098US0

[4] CRANKSHAFT



Side Clearance of Crankshaft

1. Set a dial indicator with its point on the end of the crankshaft.
2. Move the crankshaft to the front and rear to measure the side clearance.
3. If the measurement is more than the allowable limit, replace the thrust bearings.
4. If the same dimension bearing is not applicable because of the crankshaft journal wear, replace it with an oversize one. Refer to the table and figure.

Side clearance of crankshaft	Factory specification	0.15 to 0.31 mm 0.0059 to 0.012 in.
	Allowable limit	0.5 mm 0.02 in.

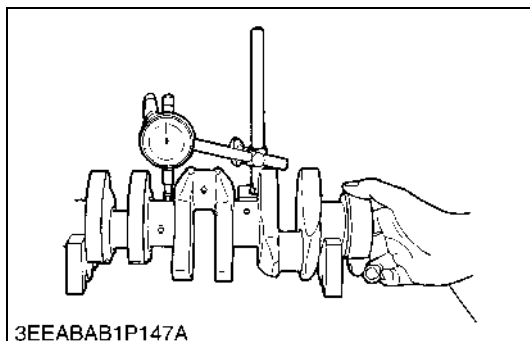
(Reference)

- Oversize dimensions of crankshaft journal

Oversize	0.2 mm 0.008 in.	0.4 mm 0.02 in.
Dimension A	54.50 to 54.70 mm 2.146 to 2.153 in.	54.60 to 54.80 mm 2.150 to 2.157 in.
Dimension B	26.20 to 26.25 mm 1.032 to 1.033 in.	26.40 to 26.45 mm 1.040 to 1.041 in.
Dimension C	2.8 to 3.2 mm radius 0.11 to 0.12 in. radius	2.8 to 3.2 mm radius 0.11 to 0.12 in. radius

The crankshaft journal must be fine-finished to higher than $R_{max} = 0.4S$

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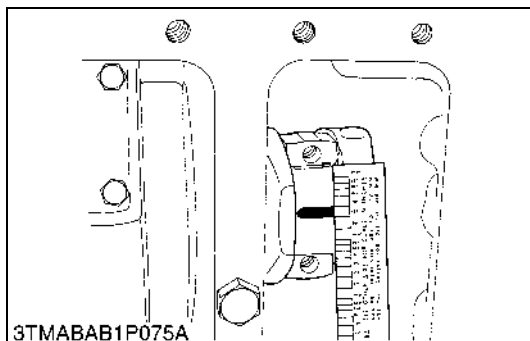


Crankshaft Bend

1. Hold the 2 end journals of crankshaft with V blocks on the surface plate.
2. Set a dial indicator with its point on the middle journal.
3. Turn the crankshaft slowly and read the variation on the indicator.
4. If the measurement is more than the allowable limit, replace the crankshaft.

Crankshaft bend	Allowable limit	0.03 mm 0.001 in.

9Y1211012ENS0100US0



Oil Clearance between Crankpin and Crankpin Bearing

1. Clean the crankpin and crankpin bearing.
2. Put a strip of plastigauge on the center of the crankpin.
3. Install the connecting rod cap and tighten the connecting rod screws to the specified torque, and remove the cap again.
4. Measure the width that it becomes flat with the scale to get the oil clearance.
5. If the oil clearance is more than the allowable limit, replace the crankpin bearing.
6. If the same dimension bearing is not applicable because of the crankpin wear, replace it with an undersize one. Refer to the table and figure.

NOTE

- Do not put the plastigauge into the crankpin oil hole.
- When you tighten the connecting rod screws, do not move the crankshaft.

Oil clearance between crankpin and crankpin bearing	Factory specification	0.025 to 0.087 mm 0.00099 to 0.0034 in.
	Allowable limit	0.20 mm 0.0079 in.

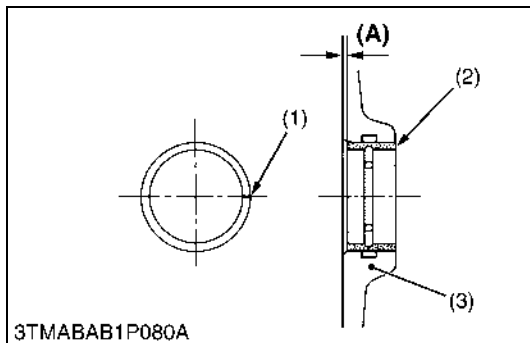
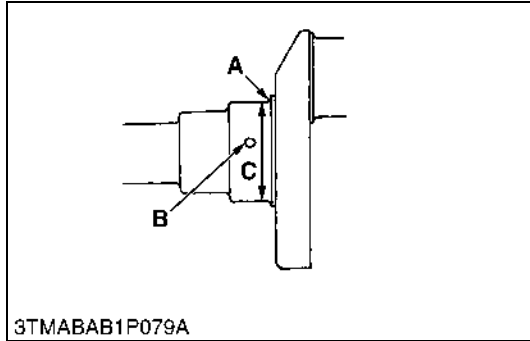
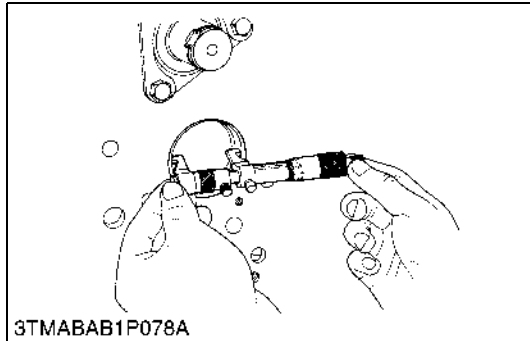
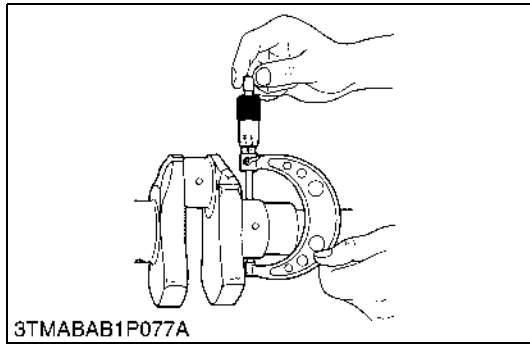
Crankpin O.D.	Factory specification	46.959 to 46.975 mm 1.8488 to 1.8494 in.
Crankpin bearing I.D.	Factory specification	47.000 to 47.046 mm 1.8504 to 1.8522 in.

(Reference)

- Undersize dimensions of crankpin

Undersize	0.2 mm 0.008 in.	0.4 mm 0.02 in.
Dimension A	3.3 to 3.7 mm radius 0.13 to 0.14 in. radius	3.3 to 3.7 mm radius 0.13 to 0.14 in. radius
*Dimension B	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief
Dimension C	46.759 to 46.775 mm dia. 1.8409 to 1.8415 in. dia.	46.559 to 46.575 mm dia. 1.8331 to 1.8336 in. dia.
The crankpin must be fine-finished to higher than Rmax = 0.4S *Holes to be de-burred and edges rounded with 1.0 to 1.5 mm (0.040 to 0.059 in.) relief.		

9Y1211012ENS0101US0



Oil Clearance between Crankshaft Journal and Crankshaft Bearing 1

1. Measure the O.D. of the crankshaft journal with an external micrometer.
2. Measure the I.D. of the crankshaft bearing 1 with an internal micrometer.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the crankshaft bearing 1.
5. If the same dimension bearing is not applicable because of the crankshaft journal wear, replace it with an undersize one. Refer to the table and figure.

Oil clearance between crankshaft journal and crankshaft bearing 1	Factory specification	0.0400 to 0.118 mm 0.00158 to 0.00464 in.
	Allowable limit	0.20 mm 0.0079 in.

Crankshaft journal O.D.	Factory specification	59.921 to 59.940 mm 2.3591 to 2.3598 in.
Crankshaft bearing 1 I.D.	Factory specification	59.980 to 60.039 mm 2.3615 to 2.3637 in.

(Reference)

- Undersize dimensions of crankshaft journal

Undersize	0.2 mm 0.008 in.	0.4 mm 0.02 in.
Dimension A	2.8 to 3.2 mm radius 0.11 to 0.12 in. radius	2.8 to 3.2 mm radius 0.11 to 0.12 in. radius
*Dimension B	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief
Dimension C	59.721 to 59.740 mm dia. 2.3513 to 2.3519 in. dia.	59.521 to 59.540 mm dia. 2.3434 to 2.3440 in. dia.
The crankshaft journal must be fine-finished to higher than Rmax = 0.4S *Holes to be de-burred and edges rounded with 1.0 to 1.5 mm (0.040 to 0.059 in.) relief.		

9Y1211012ENS0102US0

Replacement of Crankshaft Bearing 1

(When removing)

1. Press out the used crankshaft bearing 1 with the replacing tool.
(See page G-83.)

(When installing)

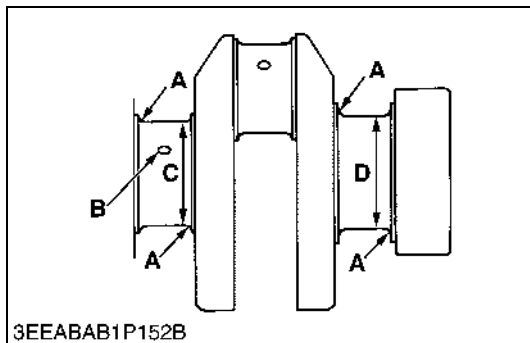
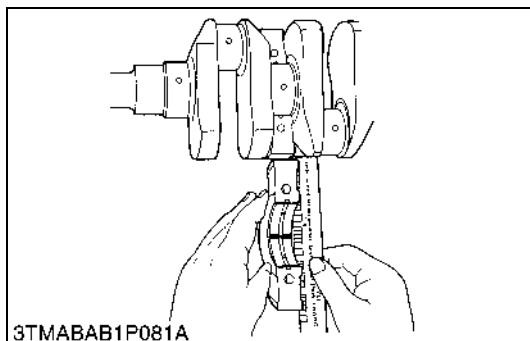
1. Clean a new crankshaft bearing 1 and crankshaft journal bore, and apply engine oil to them.
2. Make sure that the seam (1) of the new bearing 1 (2) points to the exhaust manifold side (see the figure). Then press fit the new bearing 1 (2) with the replacing tool.

Dimension (A)	Factory specification	3.90 to 4.10 mm 0.154 to 0.161 in.

- (1) Seam
(2) Crankshaft Bearing 1
(3) Cylinder Block

(A) Dimension

9Y1211012ENS0103US0



Oil Clearance between Crankshaft Journal and Crankshaft Bearing 2

1. Put a strip of plastigauge on the center of the journal.
2. Install the bearing case and tighten the bearing case screws 1 to the specified torque, and remove the bearing case again.
3. Measure the width that it becomes flat with the scale to get the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the crankshaft bearing 2.
5. If the same dimension bearing is not applicable because of the crankshaft journal wear, replace it with an undersize one. Refer to the table and figure.

NOTE

- When you tighten the bearing case screws, do not move the crankshaft.

Oil clearance between crankshaft and crankshaft bearing 2	Factory specification	0.0400 to 0.104 mm 0.00158 to 0.00409 in.
	Allowable limit	0.20 mm 0.0079 in.

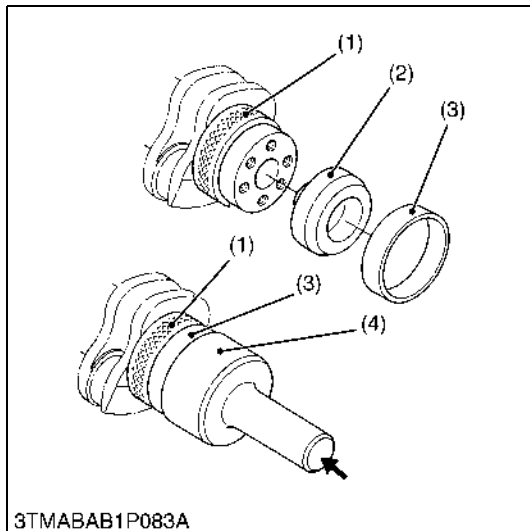
Crankshaft journal O.D.	Factory specification	59.921 to 59.940 mm 2.3591 to 2.3598 in.
Crankshaft bearing 2 I.D.	Factory specification	59.980 to 60.025 mm 2.3615 to 2.3631 in.

(Reference)

- Undersize dimensions of crankshaft journal

Undersize	0.2 mm 0.008 in.	0.4 mm 0.02 in.
Dimension A	2.8 to 3.2 mm radius 0.11 to 0.12 in. radius	2.8 to 3.2 mm radius 0.11 to 0.12 in. radius
*Dimension B	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief
Dimension C, D	59.721 to 59.740 mm dia. 2.3513 to 2.3519 in. dia.	59.521 to 59.540 mm dia. 2.3434 to 2.3440 in. dia.
The crankshaft journal must be fine-finished to higher than Rmax = 0.4S *Holes to be de-burred and edges rounded with 1.0 to 1.5 mm (0.040 to 0.059 in.) relief.		

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Replacement of Crankshaft Sleeve

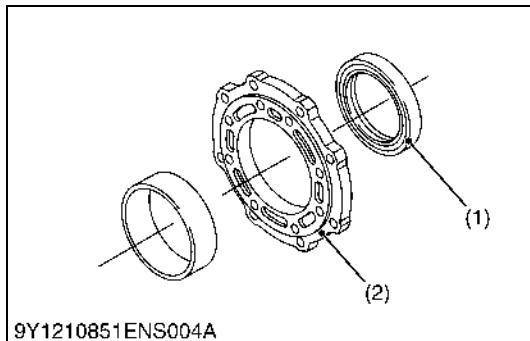
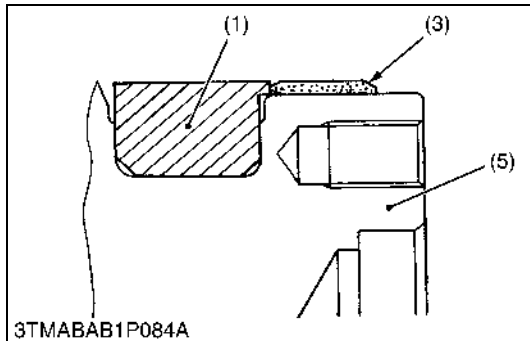
1. Remove the used crankshaft sleeve (3).
2. Set the sleeve guide (2) to the crankshaft (5).
3. Set the stopper (1) to the crankshaft (5) (see the figure).
4. Increase the temperature of a new sleeve to between 150 and 200 °C (302 and 392 °F).
5. Install the sleeve to the crankshaft with the auxiliary socket for pushing (4) (see the figure). (See page G-80.)

NOTE

- Make sure that the large chamfer of the sleeve points to outward.
- If the temperature of the sleeve is not enough to install, the sleeve can get a damage when you install.

(1) Stopper	(4) Auxiliary Socket for Pushing
(2) Sleeve Guide	(5) Crankshaft
(3) Crankshaft Sleeve	

9Y1211012ENS0105US0



Replacement of Bearing Case Cover Oil Seal

(When removing)

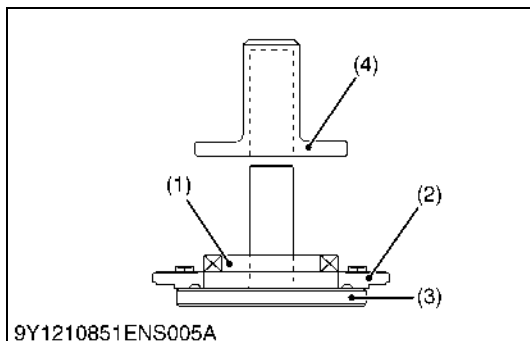
1. Remove the used oil seal by using appropriate tool and be careful not to scratch the bearing case cover.

(When installing)

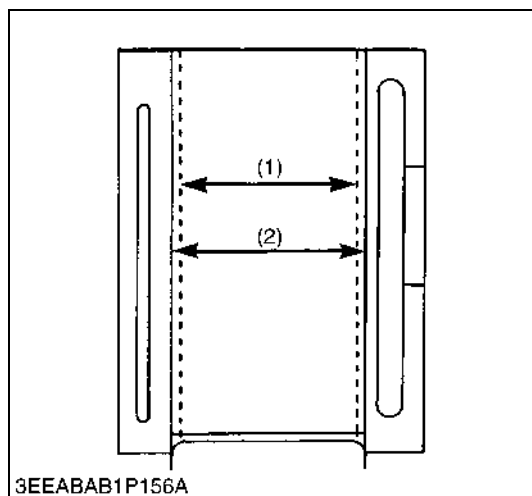
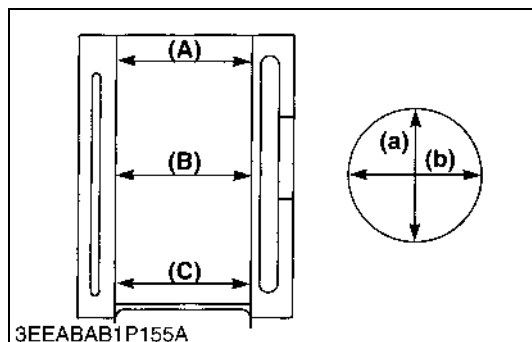
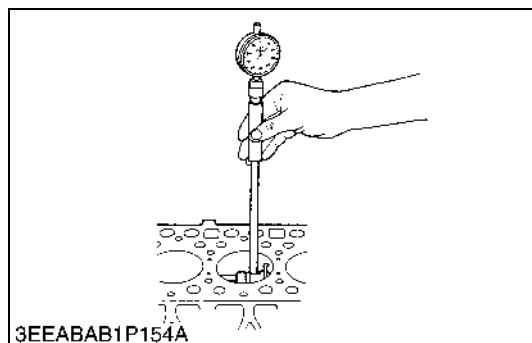
1. Clean a new oil seal (1) and bearing case cover (2).
2. Set the bearing case cover on the replacing tool 1 (3) and fix it with bolts.
3. Apply a layer of engine oil to the seal outer periphery.
4. Install the oil seal into the bearing case cover by using the replacing tool 2 (4) as shown in the figure, until it is flush with the bearing case cover.

(1) Oil Seal	(3) Replacing Tool 1
(2) Bearing Case Cover	(4) Replacing Tool 2

9Y1211012ENS0106US0



[5] CYLINDER



Cylinder Wear

1. Measure the I.D. of the cylinder at the 6 positions (see figure) with a cylinder gauge.
2. Find the maximum and minimum inner diameters.
3. Find the difference between the maximum and the minimum inner diameters.
4. If the maximum I.D. or the difference is more than the allowable limit, bore and hone it to the oversize dimension. (Refer to "**Cylinder Correction (Oversize)**" on page 1-S78.).
5. Check the cylinder wall for scratches. If you find deep scratches, bore the cylinder. (Refer to "**Cylinder Correction (Oversize)**" on page 1-S78.)

Cylinder I.D.	Factory specification	87.000 to 87.022 mm 3.4252 to 3.4260 in.
	Allowable limit	87.170 mm 3.4319 in.
Difference between maximum I.D. and minimum I.D.	Allowable limit	0.15 mm 0.0059 in.

- (A) Top
(B) Middle
(C) Bottom (Skirt)

- (a) Right-angled to Piston Pin
(b) Piston Pin Direction

9Y1211012ENS0107US0

Cylinder Correction (Oversize)

1. If the cylinder wear is more than the allowable limit, bore and hone it to the specified dimension.

Oversize cylinder I.D.	Factory specification	87.250 to 87.272 mm 3.4351 to 3.4359 in.
	Allowable limit	87.420 mm 3.4417 in.
Difference between maximum I.D. and minimum I.D.	Allowable limit	0.15 mm 0.0059 in.
Finishing	Hone to 2.2 to 3.0 μ mRz. (0.000087 to 0.000118 in.Rz)	

2. Replace the piston and piston rings with oversize ones.
Oversize: 0.25 mm (0.0098 in.)

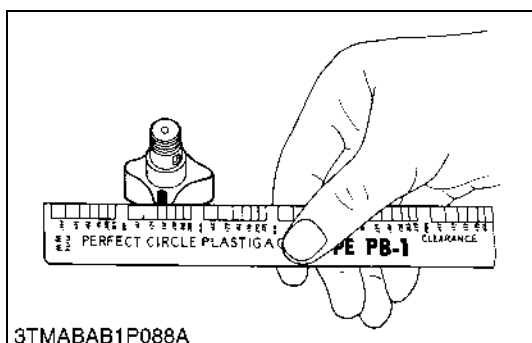
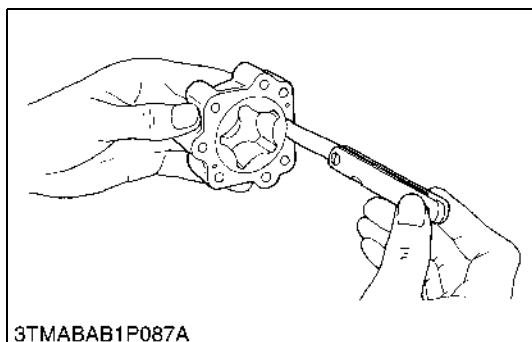
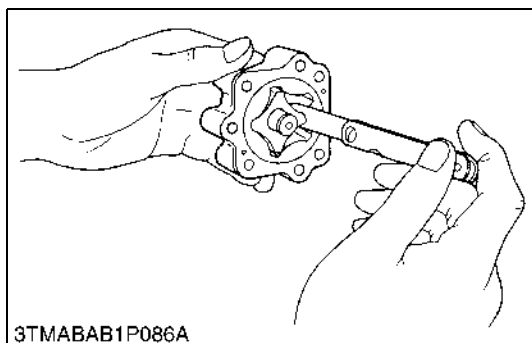
NOTE

- If the maximum I.D. or the difference for the oversize cylinder is more than the allowable limit, replace the cylinder block with a new one.

- (1) Cylinder I.D. (Before Correction) (2) Cylinder I.D. (Oversize)

9Y1211012ENS0108US0

[6] OIL PUMP



Rotor Lobe Clearance

1. Measure the clearance between the lobes of the inner rotor and the outer rotor with a feeler gauge.
2. Measure the clearance between the outer rotor and the pump body with a feeler gauge.
3. If the clearance is more than the allowable limit, replace the rotor assembly of the oil pump.

Clearance between inner rotor and outer rotor	Factory specification	0.030 to 0.14 mm 0.0012 to 0.0055 in.
	Allowable limit	0.2 mm 0.008 in.

Clearance between outer rotor and pump body	Factory specification	0.11 to 0.19 mm 0.0044 to 0.0074 in.
	Allowable limit	0.25 mm 0.0098 in.

9Y1211012ENS0109US0

Clearance between Rotor and Cover

1. Put a strip of plastigauge on the rotor face with grease.
2. Install the cover and tighten the screws.
3. Remove the cover carefully.
4. Measure the width that plastigauge becomes flat with the scale to get the oil clearance.
5. If the clearance is more than the allowable limit, replace the rotor assembly of the oil pump.

Clearance between inner rotor and cover	Factory specification	0.105 to 0.150 mm 0.00414 to 0.00590 in.
	Allowable limit	0.20 mm 0.008 in.

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2 CLUTCH

MECHANISM

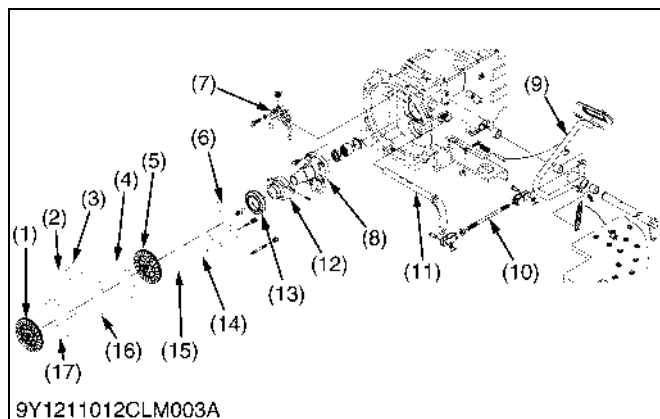
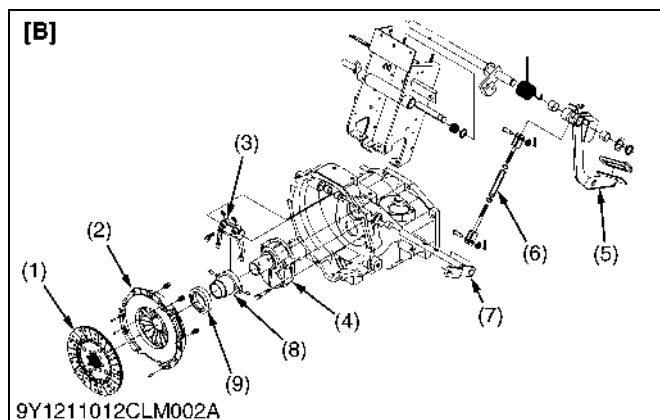
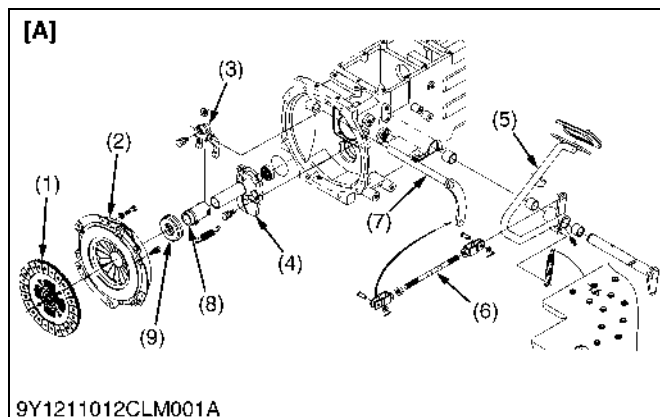
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1. FEATURE

[1] TRAVELING CLUTCH

(1) Manual Transmission Model



Single Stage Clutch (L3301, L4701)

Manual Transmission Model (L3301, L4701) are equipped with the single stage clutch.

The clutch is located between the engine and the transmission and is operated by stepping on the clutch pedal.

When the clutch pedal is depressed, the clutch is disengaged. And when the clutch pedal is released, the clutch is engaged and power from the engine is transmitted to the transmission.

(1) Clutch Disc	(7) Clutch Lever
(2) Pressure Plate Assembly	(8) Release Hub
(3) Release Fork	(9) Release Bearing
(4) Shaft Case	
(5) Clutch Pedal	
(6) Clutch Rod	

[A] L3301
[B] L4701

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Dual Stage Clutch (L3901)

Manual Transmission Model (L3901) is equipped with dual stage clutch.

The clutch is located between the engine and the transmission and is operated by stepping on the clutch pedal.

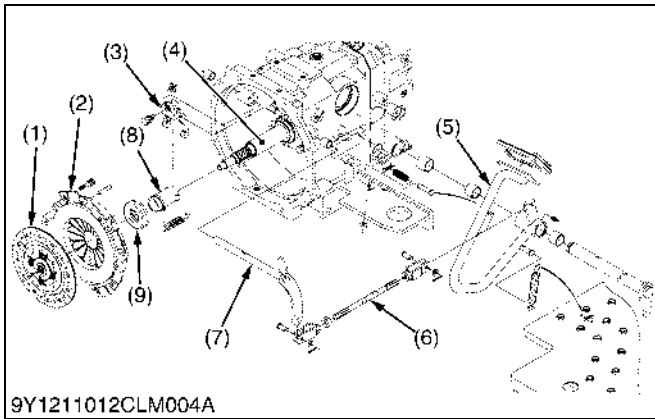
When the clutch pedal is depressed, the clutch is disengaged. And when the clutch pedal is released, the clutch is engaged and power from the engine is transmitted to the transmission.

Tractors equipped with dual stage clutch have a live PTO function which enables stoppage of the power transmission to the traveling system while the PTO is in rotation.

(1) Clutch Disc 1 (Traveling)	(10) Clutch Rod
(2) Release Rod	(11) Clutch Lever
(3) Release Lever	(12) Release Hub
(4) Clutch Cover 1	(13) Release Bearing
(5) Clutch Disc 2 (PTO)	(14) Diaphragm Spring
(6) Clutch Cover 2	(15) Pressure Plate 1
(7) Release Fork	(16) Diaphragm Spring
(8) Shaft Case	(17) Pressure Plate 2
(9) Clutch Pedal	

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(2) Hydrostatic Transmission (HST) Model



Single Stage Clutch (L3301, L3901)

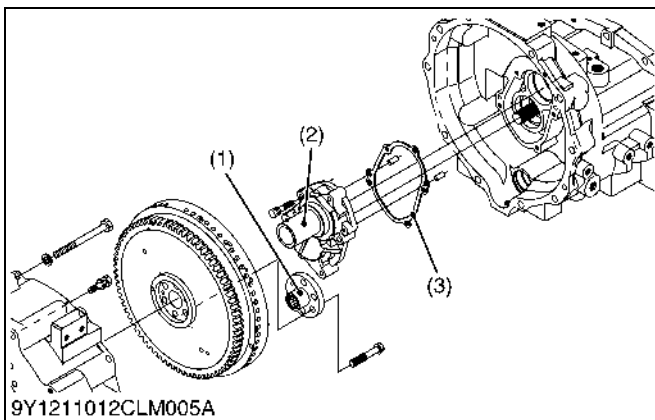
HST models (L3301, L3901) are equipped with the single stage clutch.

The clutch is located between the engine and the transmission and is operated by stepping on the clutch pedal.

When the clutch pedal is depressed, the clutch is disengaged. And when the clutch pedal is released, the clutch is engaged and power from the engine is transmitted to the transmission.

(1) Clutch Disc	(6) Clutch Rod
(2) Pressure Plate Assembly	(7) Clutch Lever
(3) Release Fork	(8) Release Hub
(4) Shaft Case	(9) Release Bearing
(5) Clutch Pedal	

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Clutch Less (L4701)

Unlike the other models, HST model of L4701 is not equipped with a clutch. Only clutch coupling is adopted.

(1) Clutch Coupling	(3) Gasket
(2) Shaft Case	

9Y1211012CLM0004US0

SERVICING

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Clutch Drags	Clutch pedal free travel excessive	Adjust	2-S5
	Clutch disc boss spline sticking or rusted	Replace or remove dust	2-S21
	Dust on clutch disc generated from clutch disc facing	Remove rust	–
	Release fork broken	Replace	2-S21
	Grease or oil on clutch disc facing	Replace	2-S21
	Clutch disc or pressure plate warped	Replace	2-S21
	Pilot bearing sticking or worn	Replace	2-S23
	Release lever improperly adjusted (Dual stage clutch)	Adjust	2-S5
Clutch Slips	Clutch disc excessively worn	Replace	2-S21, 2-S22
	Grease or oil on clutch disc facing	Replace	2-S21
	Clutch disc or pressure plate warped	Replace	2-S21
	Diaphragm spring weaken or broken	Replace	2-S21
	Release lever improperly adjusted (Dual stage clutch)	Adjust	2-S5
Chattering	Grease or oil on clutch disc facing	Replace	2-S21
	Clutch disc or pressure plate warped	Replace	2-S21
	Clutch disc boss spline worn or rusted	Replace or remove rust	2-S21
	Main shaft bent	Replace	3-S39, 3-S48, 3-S74, 3-S86
	Pressure plate or flywheel face cracked or scored	Replace	2-S21
	Clutch disc boss spline and gear shaft spline worn	Replace	2-S21
	Diaphragm spring strength uneven or diaphragm spring broken	Replace	2-S21
Rattle During Operating	Clutch disc boss spline worn	Replace	2-S21
	Release bearing worn or sticking	Replace	2-S21
	Pilot bearing worn or sticking	Replace	2-S21
Clutch Squeaks	Release bearing worn or sticking	Replace	2-S21
	Pilot bearing worn or sticking	Replace	2-S21
	Clutch disc excessively worn	Replace	2-S21, 2-S22

Symptom	Probable Cause	Solution	Reference Page
Vibration	Main shaft bent	Replace	3-S39, 3-S48, 3-S74, 3-S86
	Clutch disc rivet worn or broken	Replace	2-S21, 2-S22
	Clutch parts broken	Replace	—

9Y1211012CLS0001US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Clutch Pedal	Free Travel	20 to 30 mm 0.8 to 1.2 in.	—
Pressure Plate to Adjusting Bolt	Clearance	0.9 to 1.0 mm 0.035 to 0.039 in.	—
Clutch Disc Boss to Main Shaft (Travelling)	Backlash (Displacement Around Disc Edge)	—	2.0 mm 0.079 in.
Clutch Disc	Disc Surface to Rivet Top (Depth)	—	0.3 mm 0.01 in.
Diaphragm Spring	Mutual Difference	—	0.5 mm 0.02 in.
Pressure Plate to Straightedge	Clearance	—	0.2 mm 0.008 in.
Belleville Spring	Free Height	7.24 mm 0.285 in.	6.76 mm 0.266 in.
Release Lever	Mutual Difference	0 to 0.2 mm 0 to 0.008 in.	—
Gauge Ring to Adjusting Screw	Clearance	0 to 0.7 mm 0 to 0.003 in.	—
Pressure Plate 2 to Adjusting Screw	Clearance	0.90 to 1.0 mm 0.036 to 0.039 in.	—

9Y1211012CLS0002US0

3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

Item	N·m	kgf·m	lbf·ft
Steering wheel mounting nut	48 to 55	4.9 to 5.7	36 to 41
Oil cooler return pipe bolt	92 to 101	9.0 to 10.0	67 to 73
Delivery pipe joint bolt	49 to 69	5.0 to 7.0	37 to 50
Release fork mounting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
HST return pipe bolt	79.2 to 88.2	8.1 to 9.0	58.4 to 65.1
Delivery pipe mounting screw	18 to 20	1.8 to 2.0	13 to 15
Main delivery hose retaining nut	46.6 to 50.9	4.8 to 5.2	35 to 37
Turning delivery hoses retaining nut	24.5 to 29.4	2.5 to 3.0	18 to 21
Adjusting screw lock nut	16 to 21	1.6 to 2.2	12 to 15
Pressure plate 2 height adjusting screw lock nut	16 to 21	1.6 to 2.2	12 to 15

[L3301/L3901]

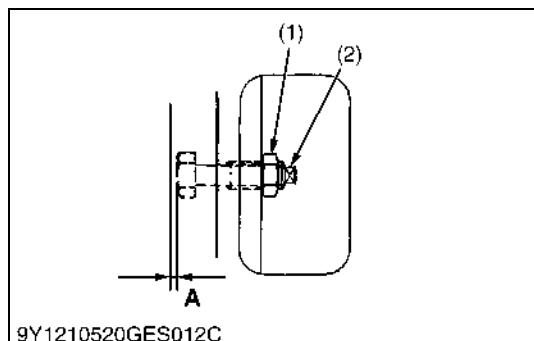
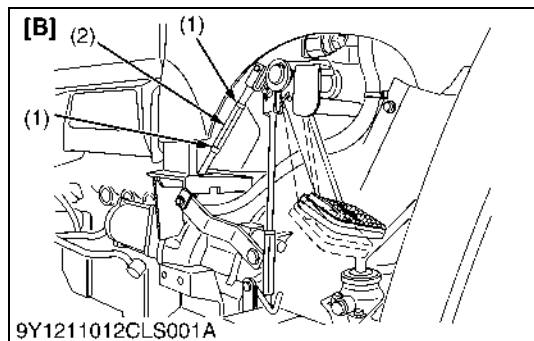
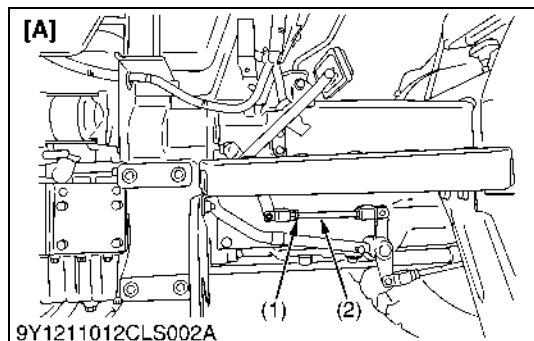
Item	N·m	kgf·m	lbf·ft
Steering shaft universal joint bolt	23.5 to 27.4	2.4 to 2.8	17.3 to 20.2
Steering bearing flange bolt	23.5 to 27.4	2.4 to 2.8	17.3 to 20.2
Engine and clutch housing mounting bolt and nut	48 to 55	4.9 to 5.7	36 to 41

[L4701]

Item	N·m	kgf·m	lbf·ft
Engine and clutch housing mounting bolt and nut	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5

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4. CHECKING AND ADJUSTING



Adjusting Clutch Pedal (Single Clutch)

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

Clutch pedal free travel	Factory specification	20 to 30 mm 0.8 to 1.2 in.

- (1) Lock Nut
(2) Clutch Rod
(3) Turnbuckle

[A] L3301/L3901
[B] L4701

9Y1211012CLS0004US0

Adjusting Clutch Pedal (Dual Stage Clutch)

1. At first adjust clutch play, same as with single disc clutch.
2. Remove the cover located on the right side of flywheel housing case.
3. Loosen the lock nut (1), tighten the adjust bolt (2) by using 7 mm spanner until head of the bolt contacts pressure plate slightly. Make 3/4 turn counterclockwise to give 0.9 to 1.0 mm (0.035 to 0.039 in.) clearance.
4. Tighten the lock nut (1), holding the adjust bolt (2).
5. Turn the flywheel to adjust the clearance of other adjusting bolts (3 bolts).
6. Repeat step 3. and readjust free travel of clutch pedal if necessary.

Clutch pedal free travel	Factory specification	20 to 30 mm 0.79 to 1.1 in.
Clearance "A" between pressure plate and adjusting bolt	Factory specification	0.9 to 1.0 mm 0.035 to 0.039 in.

- (1) Lock Nut
(2) Adjust Bolt

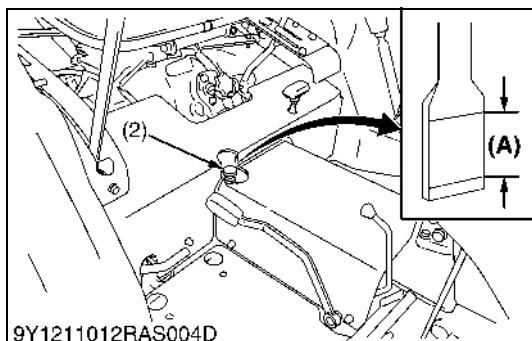
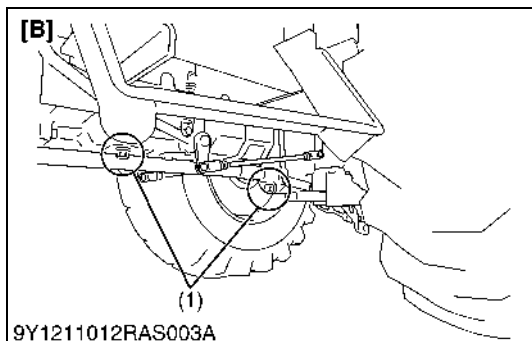
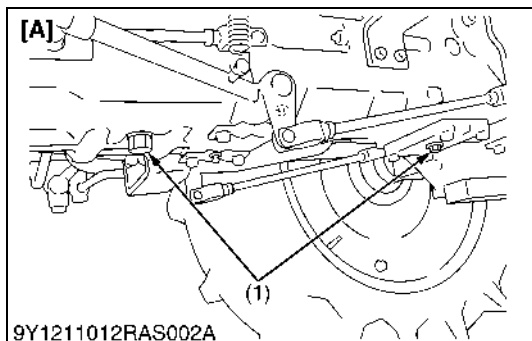
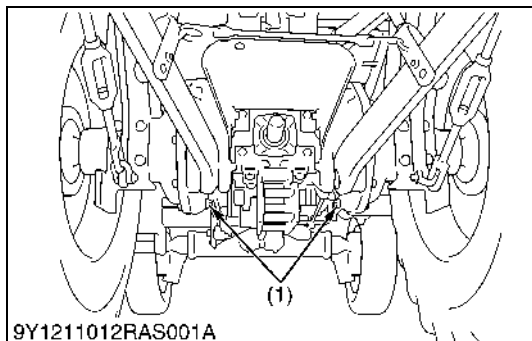
A: Clearance

9Y1211012CLS0005US0

5. DISASSEMBLING AND ASSEMBLING

[1] L3301/L3901

(1) Separating Engine and Clutch Housing



Draining Transmission Fluid (L3301/L3901)



CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and can burn.

1. Remove the drain plugs (1) at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plugs.

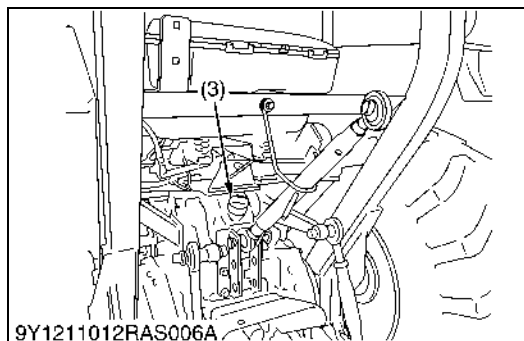
(When reassembling)

- Fill up new oil to the upper line of the gauge (2) from the oil inlet port after removing the oil inlet plug (3).
- Operate the engine at medium speed for a few minutes, stop it and check the fluid level again, if low, add fluid prescribed level (A).

■ IMPORTANT

- Use only multi-grade transmission fluid. Use of other fluids may damage the transmission or hydraulic system.
- Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-10.
- Never work the tractor immediately after changing the transmission fluid. Keeping the engine at medium speed for a few minutes to prevent damage to the transmission.
- Do not mix different brands oil together.

Transmission fluid	Capacity	2WD	28.0 L 7.4 U.S.gals 6.1 Imp.gals
		4WD	28.5 L 7.5 U.S.gals 6.2 Imp.gals
		HST	23.5 L 6.2 U.S.gals 5.2 Imp.gals



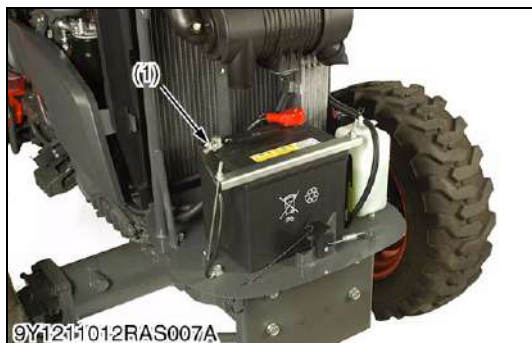
- (1) Drain Plug
(2) Gauge
(3) Oil Inlet Plug

[A] 2WD Model

[B] 4WD Model

(A) Oil level is acceptable within this range.

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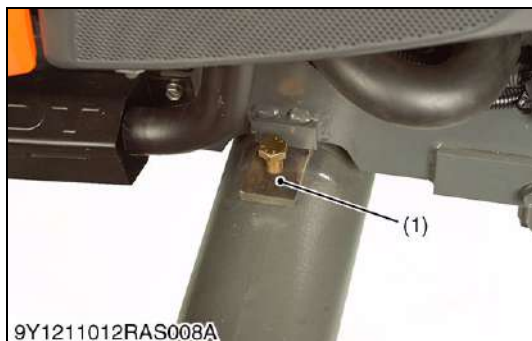


Battery Negative Cable Connector

1. Open bonnet.
2. Disconnect battery negative cable connector (1).

(1) Battery Negative Cable Connector

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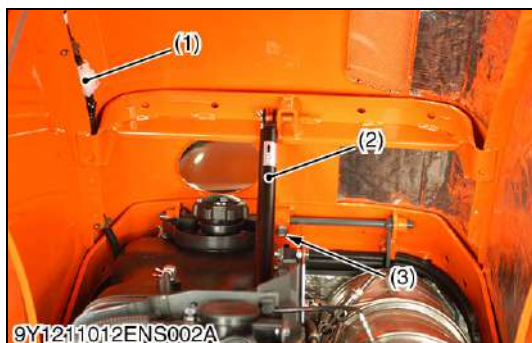


Front Axle Rocking Restrictor

1. Install the front axle rocking restrictor (1) (refer to "SPECIAL TOOLS" (see page G-94.)) to the front axle bracket and chock wheels.

(1) Front Axle Rocking Restrictor

9Y1211012RAS0006US0



Bonnet and Side Covers

1. Disconnect the headlight connector (1).
2. Remove the damper (2) from the bonnet.
3. Disconnect the bolt (3) from the bonnet.
4. Remove the bonnet (4).
5. Remove the R.H. and L.H. side covers (5).

(1) Headlight Connector

(4) Bonnet

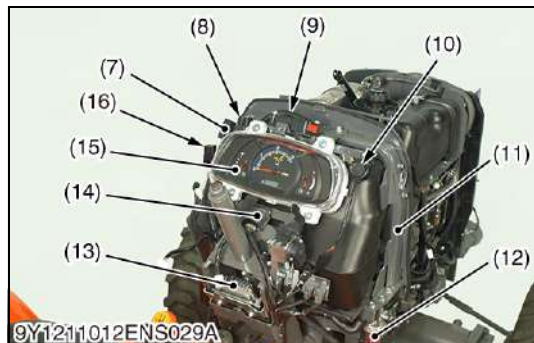
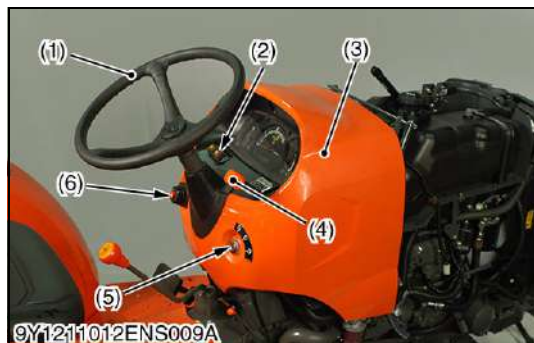
(2) Damper

(5) Side Cover

(3) Bolt

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Steering Wheel and Rear Bonnet

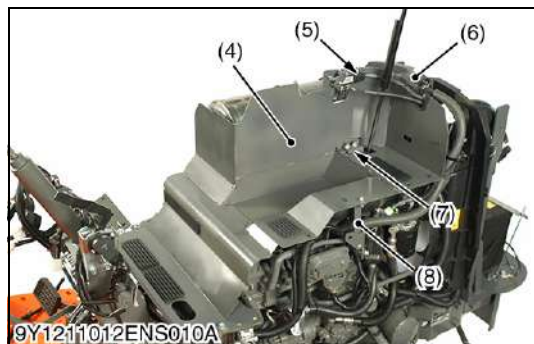
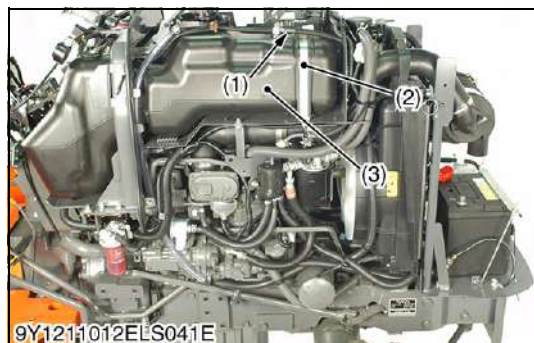
1. Remove the steering wheel (1) with a steering wheel puller.
2. Remove the throttle grip (4).
3. Disconnect the main switch (5).
4. Disconnect the combination switch (6).
5. Disconnect the DPF switches (2).
6. Remove the rear bonnet (3).
7. Remove the meter panel (15).
8. Disconnect the DPF buzzer (10).
9. Disconnect the flasher unit (14).
10. Disconnect the starter relay (7), glow relay (8) and CCV heater relay (16).
11. Disconnect the engine ECU (13).
12. Remove the separator (12).
13. Remove the rear bonnet stay (11).

(When reassembling)

Tightening torque	Steering wheel mounting nut	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft

(1) Steering Wheel	(9) Main ECU
(2) DPF Switch	(10) DPF Buzzer
(3) Rear Bonnet	(11) Rear Bonnet Stay
(4) Throttle Grip	(12) Separator
(5) Main Switch	(13) Engine ECU
(6) Combination Switch	(14) Flasher Unit
(7) Starter Relay	(15) Meter Panel
(8) Glow Relay	(16) CCV heater relay

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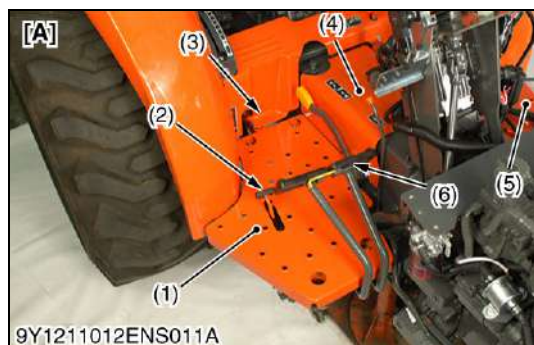


Fuel Tank and Base

1. Disconnect the fuel return line (1).
2. Remove the fuel tank band (2).
3. Remove the fuel tank (3).
4. Remove the damper bracket (7).
5. Disconnect the connector and hoses from the differential pressure sensor (5).
6. Disconnect the oil separator (6) from the fuel tank base.
7. Disconnect the fuel reserve tank bracket (8) from the fuel tank base.
8. Remove the fuel tank base (4).

(1) Fuel Return Line	(5) Differential Pressure Sensor
(2) Fuel Tank Band	(6) Oil Separator
(3) Fuel Tank	(7) Damper Bracket
(4) Fuel Tank Base	(8) Fuel Reserve Tank Bracket

9Y1211012ENS0021US0



Step and Center Cover (L3301/L3901)

1. Remove the center cover (4).
2. Disconnect the throttle cable from the throttle pedal (2).
3. Remove the HST pedal (7).
4. Disconnect the differential lock spring and rod from the differential lock lever (3).
5. Remove the brake pedal springs from the brake pedals (6).
6. Remove the R.H. step (1).
7. Remove the clutch pedal spring from the clutch pedal.
8. Remove the L.H. step (5).

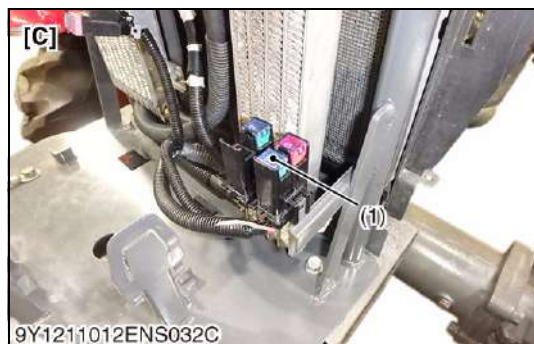
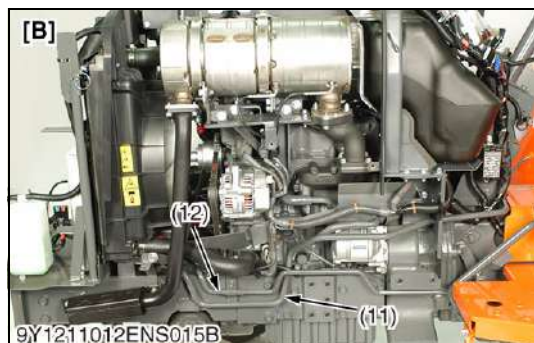
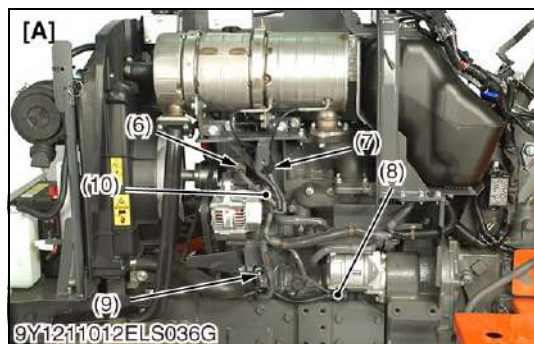
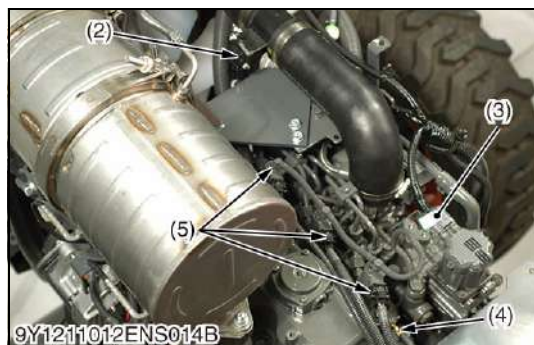
- (1) R.H. Step
 (2) Throttle Pedal
 (3) Differential Lock Lever
 (4) Center Cover
 (5) L.H. Step

- (6) Brake Pedal
 (7) HST Pedal

[A] FW and DW Model

[B] DHW Model

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Hydraulic Pipes and Electrical Wiring (Under Fuel Tank Base and Left Side)

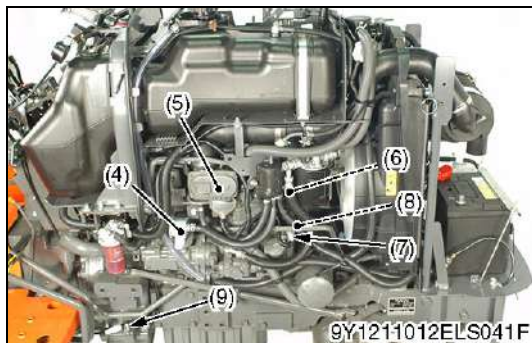
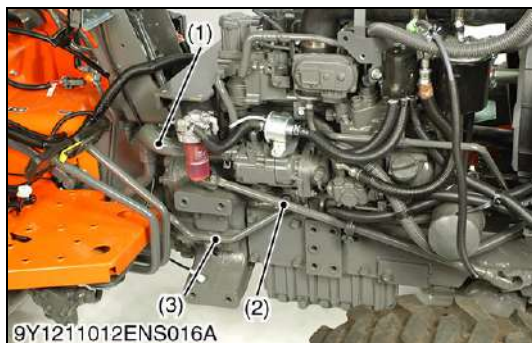
1. Disconnect the connectors of injector (5).
2. Disconnect the glow plug (4).
3. Disconnect the EGR valve (3).
4. Disconnect the air flow sensor (2).
5. Disconnect the rail pressure sensor.
6. Remove the slow blow fuses (1).
7. Disconnect the positive battery cable.
8. Disconnect the water temperature sensor (6).
9. Disconnect the DPF temperature sensors (7).
10. Disconnect the alternator (10).
11. Disconnect the starter (8).
12. Disconnect the oil switch (9).
13. Remove the oil cooler return pipe (11).
14. Remove the power steering return pipe (12).



Tightening torque	Oil cooler return pipe bolt	92 to 101 N·m 9.0 to 10.0 kgf·m 67 to 73 lbf·ft

(1) Slow Blow Fuse	(10) Alternator
(2) Air Flow Sensor	(11) Oil Cooler Return Pipe
(3) EGR Valve	(12) Power Steering Return Pipe (L3301/L3901)
(4) Glow Plug	
(5) Injector	
(6) Water Temperature Sensor	[A] FW and DW Model
(7) DPF Temperature Sensor	[B] DHW Model
(8) Starter	[C] L3301/L3901
(9) Oil Switch	[D] L4701

9Y1211012ENS0023US0



Hydraulic Pipes, Steering Joint, and Electrical Wiring (Right Side)

1. Remove the suction hose (1).
2. Remove the delivery pipe (3).
3. Remove the steering shaft (2).
4. Disconnect the crank shaft position sensor (9).
5. Disconnect the parking brake sensor.
6. Disconnect the fuel pump (4).
7. Disconnect the intake throttle valve (5).
8. Disconnect the rail pressure sensor (6).
9. Disconnect the supply pump (7) connector.
10. Disconnect the camshaft position sensor (8).

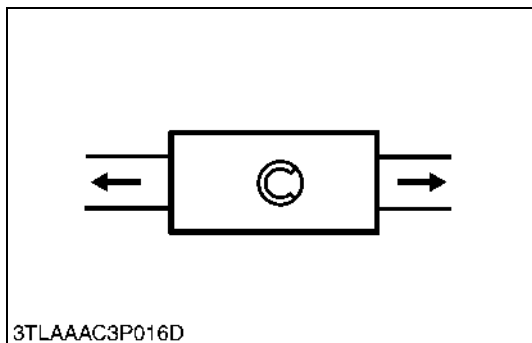
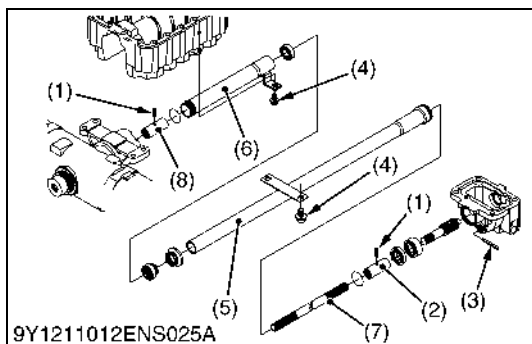
(When reassembling)

- Be sure that the steering joint shaft (2) does not contact with both hydraulic pump and flywheel housing.

Tightening torque	Delivery pipe joint bolt	49 to 69 N·m 5.0 to 7.0 kgf·m 37 to 50 lbf·ft
	Steering shaft universal joint bolt (L3301/L3901)	23.5 to 27.4 N·m 2.4 to 2.8 kgf·m 17.3 to 20.2 lbf·ft
	Steering bearing flange bolt (L3301/L3901)	23.5 to 27.4 N·m 2.4 to 2.8 kgf·m 17.3 to 20.2 lbf·ft

(1) Suction Hose	(6) Rail Pressure Sensor
(2) Steering Joint Shaft (L3301/L3901)	(7) Supply Pump
(3) Delivery Pipe	(8) Camshaft Position Sensor
(4) Fuel Pump	(9) Crank Shaft Position Sensor
(5) Intake Throttle Valve	

9Y1211012ENS0024US0



Propeller Shaft (L3301/L3901)

1. Remove the screw (4) then tap out the spring pin (3).
2. Slide the propeller shaft cover 1 (5) to the front and the cover 2 (6) to the rear.
3. Tap out the spring pins (1) and then slide the coupling (2) to the front and coupling (8) to the rear.

(When reassembling)

- Apply greasing to the splines of the propeller shaft (7) and pinion shaft.
- Tap in spring pins (1) as shown in the figure.

(1) Spring Pin	(5) Propeller Shaft Cover 1
(2) Coupling	(6) Propeller Shaft Cover 2
(3) Spring Pin	(7) Propeller Shaft
(4) Screw	(8) Coupling

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Separating Engine from Clutch Housing Case

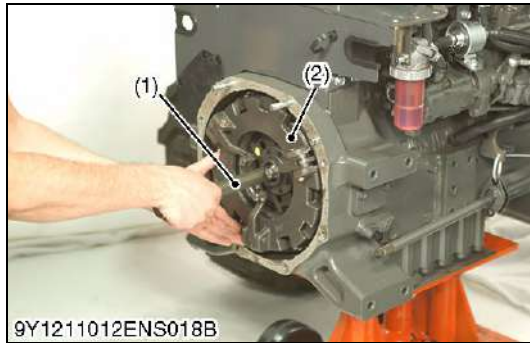
1. Place the disassembling stands under the engine and clutch housing case.
2. Remove the engine and clutch housing mounting screws and nuts.
3. Separate the engine and clutch housing.

(When reassembling)

- Apply grease to the splines.
- Apply liquid gasket (Three Bond 1206C or equivalent) to joint face of the engine and clutch housing case.

9Y1211012ENS0026US0

(2) Separating Clutch Assembly



Clutch Assembly

1. Insert the clutch center tool (1).
2. Remove the clutch assembly (2) together with the clutch center tool.

(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.
- Insert the pressure plate, noting the position of straight pins.
- After docking the engine and the clutch housing case, assemble the outer parts, referring to the picture.

■ IMPORTANT

- **Be sure to align the center of disc and flywheel by inserting the clutch tool set.**

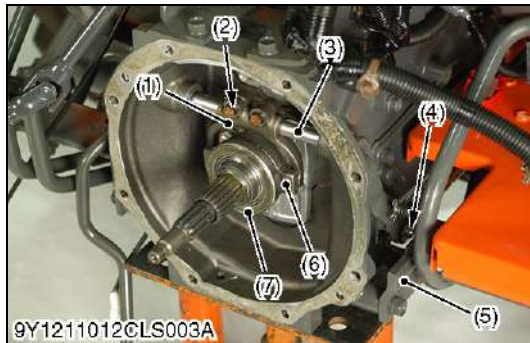
■ NOTE

- **Be sure to align the center of disc and flywheel by inserting the clutch tool set.**

(1) Clutch Center Tool

(2) Clutch Assembly

9Y1211012ENS0027US0



Release Hub and Clutch Lever

1. Remove the step brackets (5).
2. Disconnect the clutch rod (4) from the clutch lever (3).
3. Remove the release fork mounting screws (2).
4. Draw out the clutch lever (3) and remove the release fork (1).
5. Remove the thrust bearing (7) and clutch holder (6) as a unit.

(When reassembling)

- Inject grease to the clutch holder (6).
- Make sure the direction of the clutch release fork (1) is correct.
- Apply grease to contact face of the clutch release fork and clutch holder.
- Apply grease to the clutch lever (3).

Tightening torque	Release fork mounting screw	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 lbf·ft

(1) Clutch Release Fork

(2) Screw

(3) Clutch Lever

(4) Clutch Rod

(5) Step Bracket

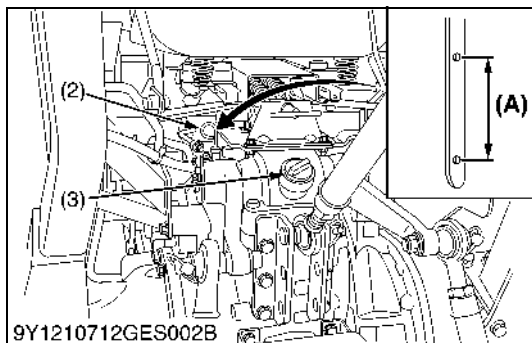
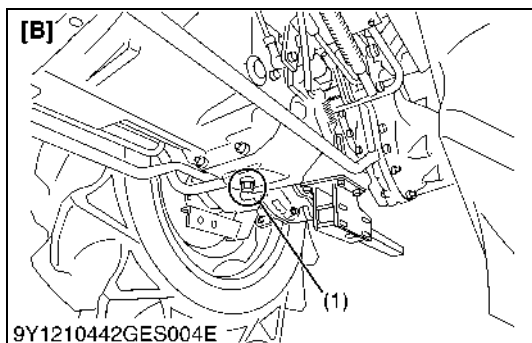
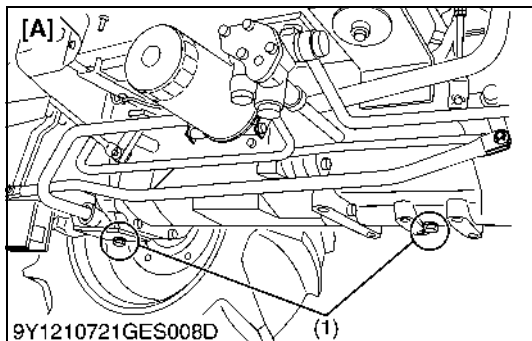
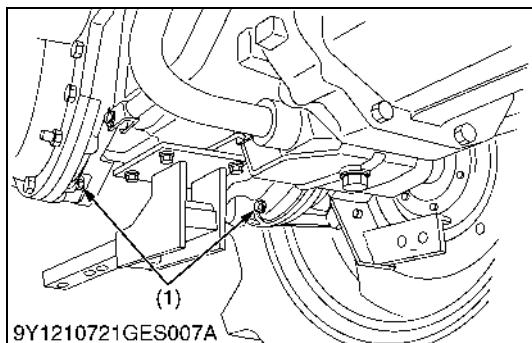
(6) Clutch Holder

(7) Thrust Bearing

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[2] L4701

(1) Separating Engine and Clutch Housing



Draining Transmission Fluid (L4701)



CAUTION

To avoid personal injury:

- Be sure to stop the engine before changing the oil filter cartridge.
- Allow engine to cool down sufficiently, oil can be hot and can burn.

1. Remove the drain plugs (1) at the bottom of the transmission case and drain the oil completely into the oil pan.
2. After draining reinstall the drain plugs.

(When reassembling)

- Fill up new oil to the upper line of the gauge (2) from the oil inlet port after removing the oil inlet plug (3).
- Operate the engine at medium speed for a few minutes, stop it and check the fluid level again, if low, add fluid prescribed level (A).

■ IMPORTANT

- Use only multi-grade transmission fluid. Use of other fluids may damage the transmission or hydraulic system.
- Refer to "LUBRICANTS, FUEL AND COOLANT" on page G-11.
- Never work the tractor immediately after changing the transmission fluid. Keeping the engine at medium speed for a few minutes to prevent damage to the transmission.
- Do not mix different brands oil together.

Transmission fluid	Capacity	40.0 L 10.6 U.S.gals 8.8 Imp.gals

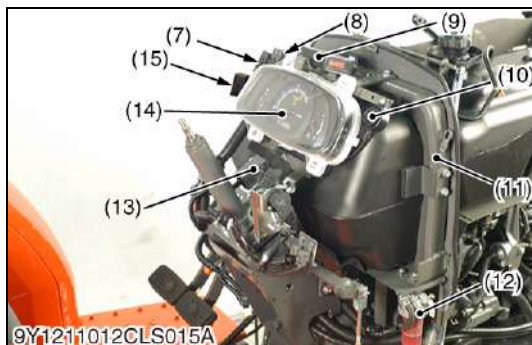
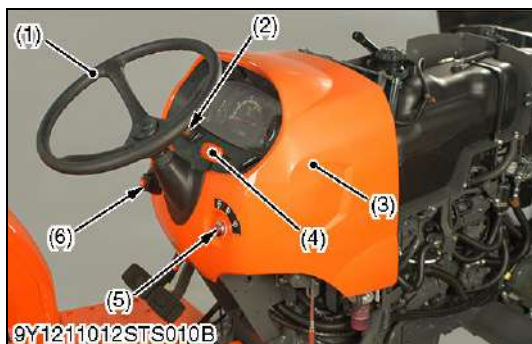
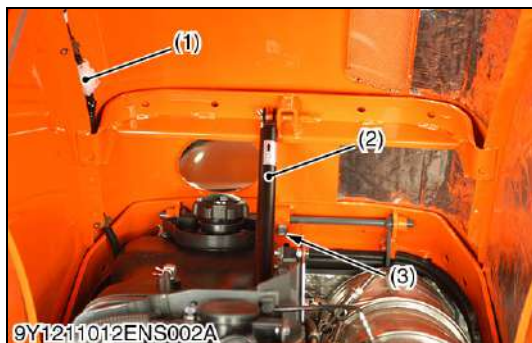
- (1) Drain Plug
- (2) Gauge
- (3) Oil Inlet Plug

[A] Manual Transmission Model

[B] HST Model

(A) Oil level is acceptable within this range.

9Y1211012RAS0004US0



Bonnet and Side Covers

1. Disconnect the headlight connector (1).
2. Remove the damper (2) from the bonnet.
3. Disconnect the bolt (3) from the bonnet.
4. Remove the bonnet (4).
5. Remove the R.H. and L.H. side covers (5).

(1) Headlight Connector	(4) Bonnet
(2) Damper	(5) Side Cover
(3) Bolt	

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Rear Bonnet and Stay

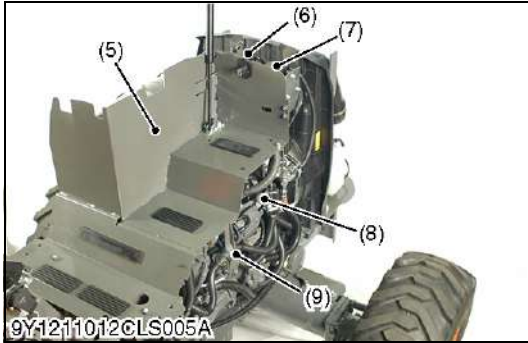
1. Remove the steering wheel (1) with a steering wheel puller.
2. Remove the throttle grip (4).
3. Disconnect the main switch (5).
4. Disconnect the combination switch (6).
5. Disconnect the DPF switches (2).
6. Remove the rear bonnet (3).
7. Remove the meter panel (14).
8. Disconnect the DPF alarm (10).
9. Disconnect the flasher unit (13).
10. Disconnect the starter (8), glow plug relays (7) and CCV heater relay (15).
11. Disconnect the ECU (9).
12. Remove the separator (12).
13. Remove the rear bonnet stay (11).

(When reassembling)

Tightening torque	Steering wheel mounting nut	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft

(1) Steering Wheel	(9) ECU
(2) DPF Switch	(10) DPF Alarm
(3) Rear Bonnet	(11) Rear Bonnet Stay
(4) Throttle Grip	(12) Separator
(5) Main Switch	(13) Flasher Unit
(6) Combination Switch	(14) Meter Panel
(7) Glow Plug Relay	(15) CCV Heater Relay
(8) Starter Relay	

9Y1211012CLS0007US0

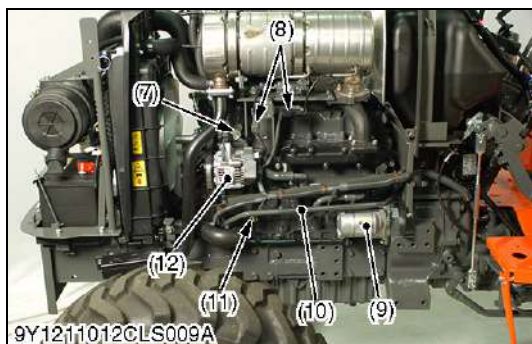
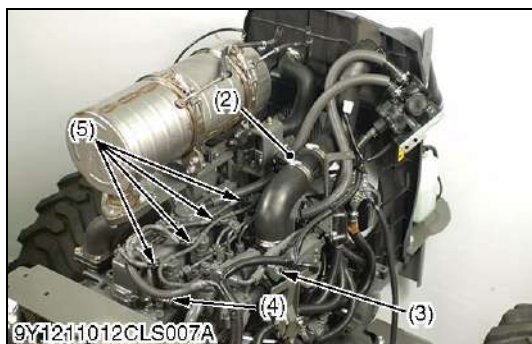
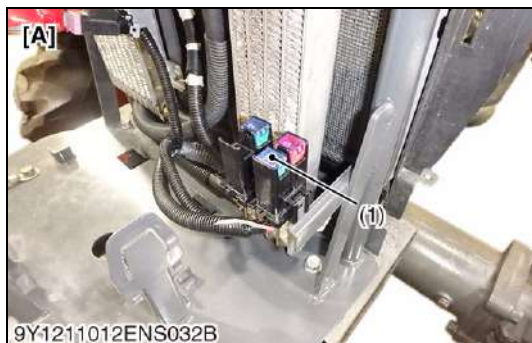


Fuel Tank and Base

1. Disconnect the fuel sensor (4).
2. Disconnect the fuel return line (1).
3. Remove the fuel tank band (2).
4. Remove the fuel tank (3).
5. Disconnect the connector and hoses from the differential pressure sensor (6).
6. Disconnect the oil separator (7) from the fuel tank base.
7. Disconnect the fuel reserve tank bracket (8) from the fuel tank base.
8. Disconnect the fuel pump bracket (9) from the fuel tank base.
9. Remove the fuel tank base (5).

(1) Fuel Return Line	(6) Differential Pressure Sensor
(2) Fuel Tank Band	(7) Oil Separator
(3) Fuel Tank	(8) Fuel Reserve Tank Bracket
(4) Fuel Sensor	(9) Fuel Pump Bracket
(5) Fuel Tank Base	

9Y1211012CLS0020US0



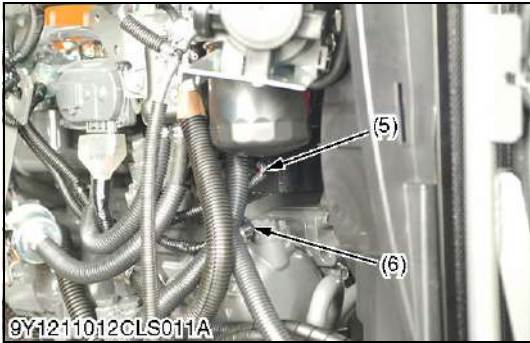
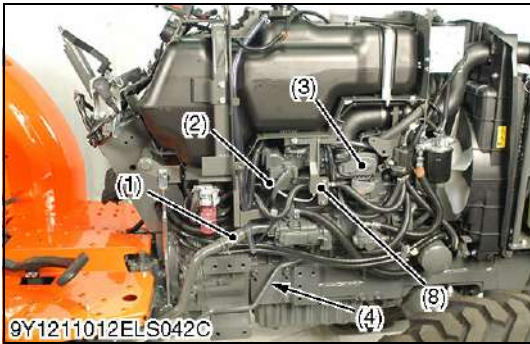
Hydraulic Pipes and Electrical Wiring (Under Fuel Tank Base and Left Side)

1. Disconnect the injector connectors (5).
2. Disconnect the glow plug (4).
3. Disconnect the EGR valve (3) connector.
4. Disconnect the air flow sensor (2) connector.
5. Disconnect the rail pressure sensor (6) connector.
6. Remove the slow blow fuses (1).
7. Disconnect the coolant temperature sensor (7) connector.
8. Disconnect the DPF temperature sensors (8).
9. Disconnect the alternator (12).
10. Disconnect the starter (9).
11. Disconnect the oil switch (11).
12. Remove the HST return pipe (10).

Tightening torque	HST return pipe bolt	79.2 to 88.2 N·m 8.1 to 9.0 kgf·m 58.4 to 65.1 lbf·ft

(1) Slow Blow Fuse	(9) Starter
(2) Air Flow Sensor	(10) HST Return Pipe
(3) EGR Valve	(11) Oil Switch
(4) Glow Plug	(12) Alternator
(5) Injector Connector	(13) HST Return Pipe
(6) Rail Pressure Sensor	
(7) Coolant Temperature Sensor	[A] L3301/L3901
(8) DPF Temperature Sensor	[B] L4701

9Y1211012CLS0008US0



Hydraulic Pipes and Electrical Wiring (Right Side)

- 1. Remove the suction hose (1).
- 2. Remove the delivery pipe (4).
- 3. Remove the EGR valve (2) connector.
- 4. Disconnect the crank position sensor (7).
- 5. Disconnect the fuel pump (8).
- 6. Disconnect the intake throttle valve (3).
- 7. Disconnect the camshaft position sensor (6).
- 8. Disconnect the rail pressure sensor (5).
- 9. Disconnect supply pump connector.

(When reassembling)

Tightening torque	Delivery pipe mounting screw	18 to 20 N·m 1.8 to 2.0 kgf·m 13 to 15 lbf·ft
	Delivery pipe joint bolt	49.0 to 69.0 N·m 5.0 to 7.0 kgf·m 37 to 50 lbf·ft

- (1) Suction Hose

(2) EGR Valve

(3) Intake Throttle Valve

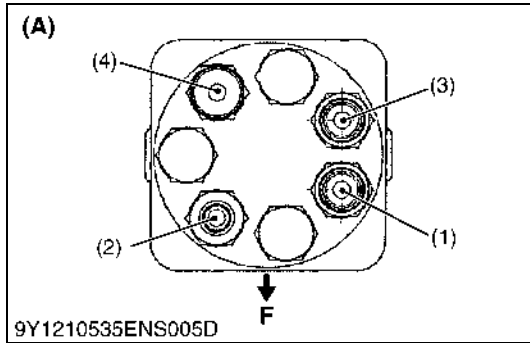
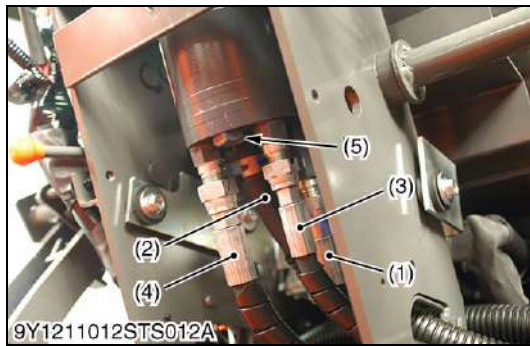
(4) Delivery Pipe
- (5) Rail Pressure Sensor

(6) Camshaft Position Sensor

(7) Crankshaft Position Sensor

(8) Fuel Pump

9Y1211012CLS0009US0



Power Steering Controller Hoses

1. Since identification tapes are not installed to the hoses, mark the hoses as shown in the picture.
2. After marking, disconnect the left delivery hose (3) and the right delivery hose (1).

Tightening torque	Main delivery hose retaining nut	46.6 to 50.9 N·m 4.8 to 5.2 kgf·m 35 to 37 lbf·ft
	Turning delivery hoses retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18 to 21 lbf·ft

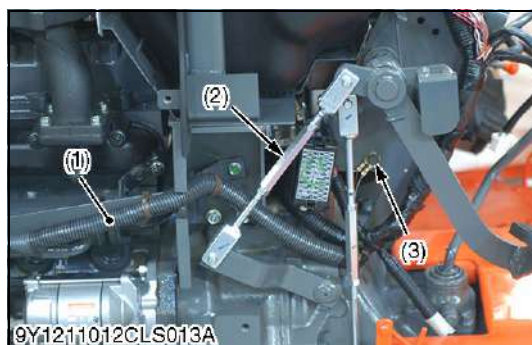
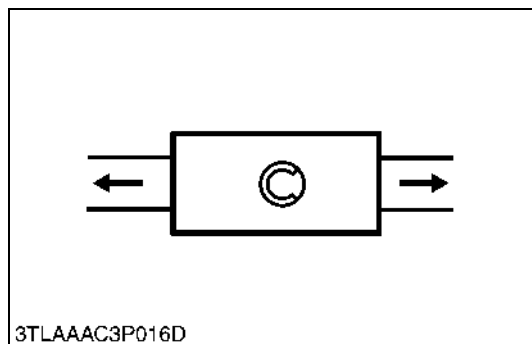
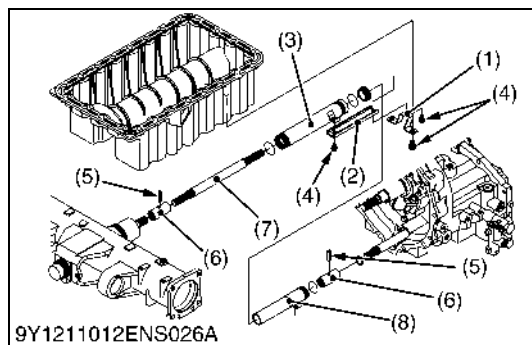
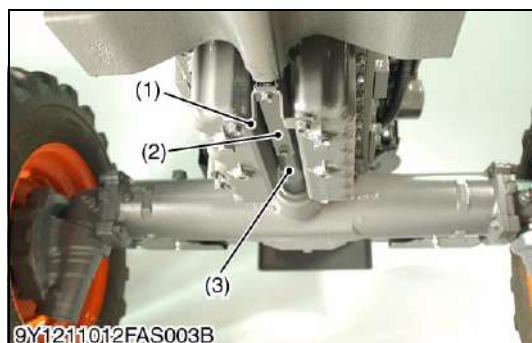
- (1) Delivery Hose (R.H.)
- (2) Return Hose
- (3) Delivery Hose (L.H.)
- (4) Main Delivery Hose
- (5) Plug

(A) Steering controller viewing from the bottom side

F: Front

M: Marking

9Y1211012CLS0010US0



Propeller Shaft (L4701)

1. Remove the bracket 1 (1).
2. Remove the bracket 2 (2).
3. Slide the propeller shaft cover 2 (8) to the front and the propeller shaft cover 1 (3) to the rear.
4. Tap out the spring pins (5) and then slide the coupling (6) to the front and rear.

(When reassembling)

- Apply grease to the splines of the propeller shaft (8) and pinion shaft.
- Tap in spring pins (5) as shown in the figure.

(1) Bracket 1	(5) Spring Pin
(2) Bracket 2	(6) Coupling
(3) Propeller Shaft Cover 1	(7) Propeller Shaft
(4) Screw	(8) Propeller Shaft Cover 2

9Y1211012ENS0025US0

Separating Engine from Clutch Housing

1. Disconnect the clutch rod (2).
2. Place the disassembling stands under the engine and clutch housing case.
3. Remove the engine and clutch housing mounting screws and nuts.
4. Separate the engine and clutch housing.

(When reassembling)

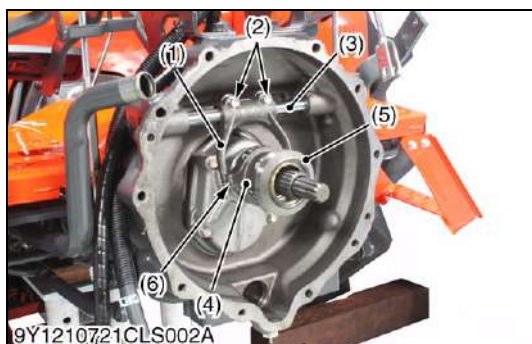
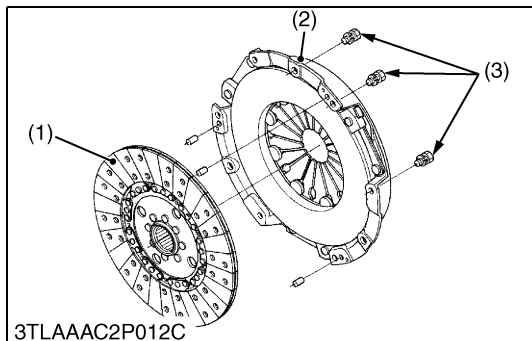
- Apply grease to the spline of clutch shaft.
- Apply liquid gasket (Three Bond 1206C or equivalent) to joint face of the engine and clutch housing.
- Install the ground cable to the steering support securely.

Tightening torque	Engine and clutch housing mounting bolt and nut [L3301/L3901]	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft
	Engine and clutch housing mounting bolt and nut [L4701]	77.5 to 90.2 N·m 7.91 to 9.19 kgf·m 57.2 to 66.5 lbf·ft

(1) Main Wiring Harness	(3) Ground Cable
(2) Clutch Rod	

9Y1211012CLS0011US0

(2) Separating Clutch Assembly



Clutch Assembly

1. Insert the clutch center tool.
2. Remove the clutch assembly together with the clutch center tool.

(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.
- Insert the pressure plate, noting the position of straight pins.

■ **IMPORTANT**

- **Be sure to align the center of disc and flywheel by inserting the clutch tool set.**

(1) Clutch Disc	(3) Clutch Mounting Screw
(2) Pressure Plate Assembly	

9Y1211012CLS0012US0

Release Fork and Clutch Lever

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

(When reassembling)

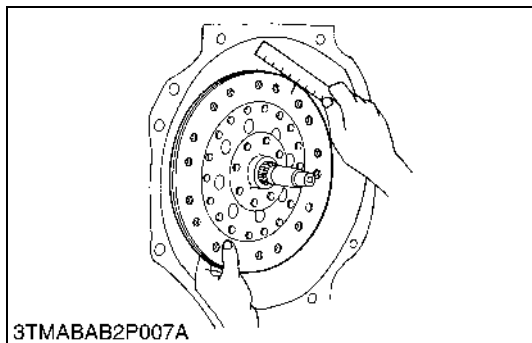
- Make sure the direction of the release fork (1) is correct.
- Inject grease to the release hub (4).
- Be sure to set the snap pins (6) on both sides.

(1) Release Fork	(4) Release Hub
(2) Setting Screw	(5) Release Bearing
(3) Clutch Lever	(6) Snap Pin

9Y1211012CLS0013US0

6. SERVICING

[1] SINGLE STAGE CLUTCH

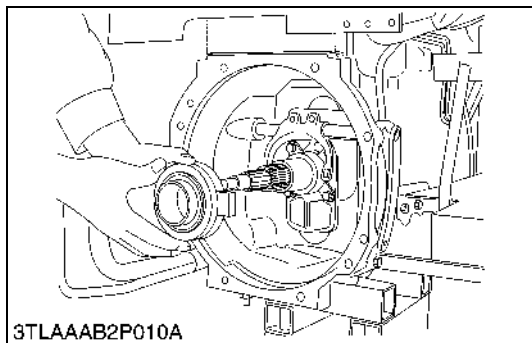


Backlash between Clutch Disc Boss and Shaft

1. Mount the clutch disc to the main shaft.
2. Hold the main 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.

Backlash (Displacement around disc edge)	Allowable limit	2.0 mm 0.079 in.

9Y1211012CLS0014US0



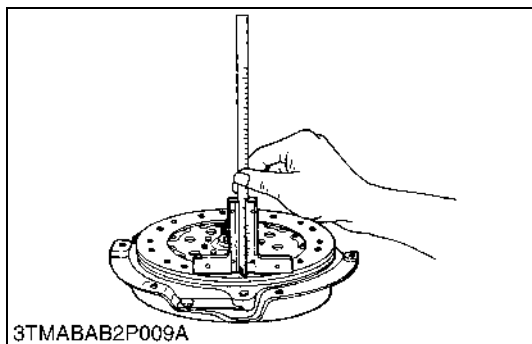
Release Bearing

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 the release bearing.
- Do not wash the release bearing with a cleaning solvent.

9Y1211012CLS0015US0

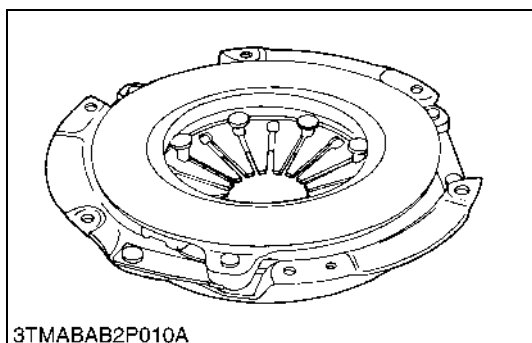


Clutch Disc Wear

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 0.01 in.

9Y1211012CLS0016US0

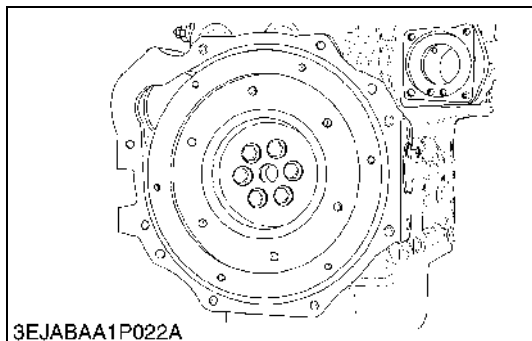


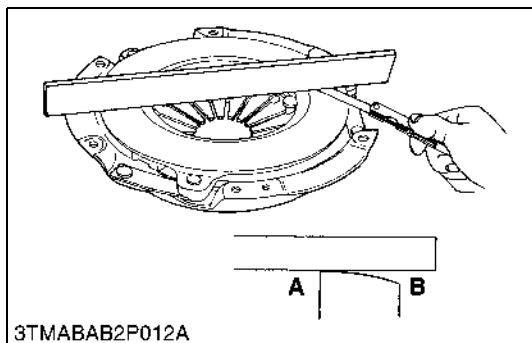
Checking Pressure Plate Assembly and Flywheel

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 0.02 in.

9Y1211012CLS0017US0



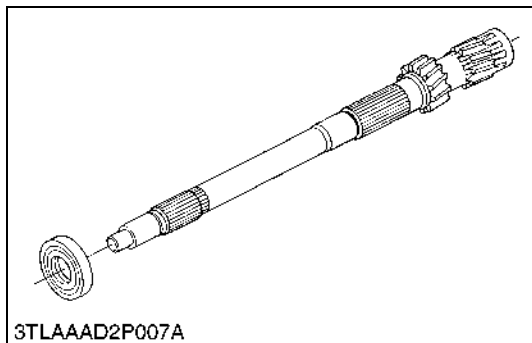


Pressure Plate Flatness

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 allowable limit.

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

9Y1211012CLS0018US0

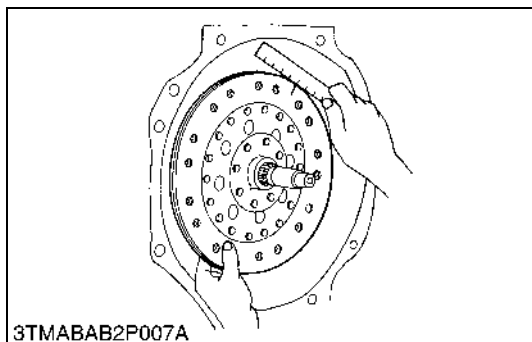


Pilot Bearing

1. Remove the pilot bearing in crank shaft with a puller.
2. Check for abnormal wear of pilot bearing.
3. Hold bearing inner race and rotate outer race. If the bearing rotation is not smooth or it is noisy, replace bearing.

9Y1211012CLS0019US0

[2] DUAL STAGE CLUTCH



Backlash between Clutch Disc Boss and Shaft

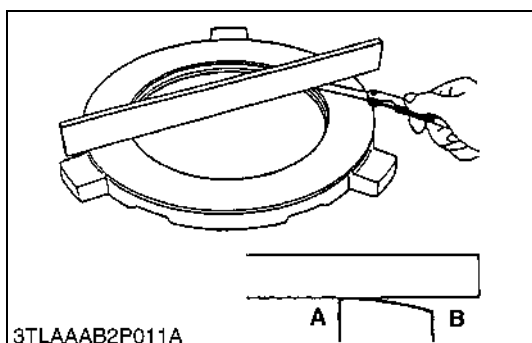
1. Mount the PTO clutch disc to the 16T gear shaft.
2. Hold the gear 16T gear shaft so that it does not turn.
3. Rotate disc lightly and measure the displacement around the disc edge.
4. If the measurement exceeds the allowable limit, replace.

Backlash (Displacement around disc edge (PTO))	Allowable limit	2.0 mm 0.079 in.

5. Perform measurement for the traveling clutch disc and the main shaft in the same way as a above.

Backlash (Displacement around disc edge (Travelling))	Allowable limit	2.0 mm 0.079 in.

9Y1211012CLS0021US0



Pressure Plate Flatness

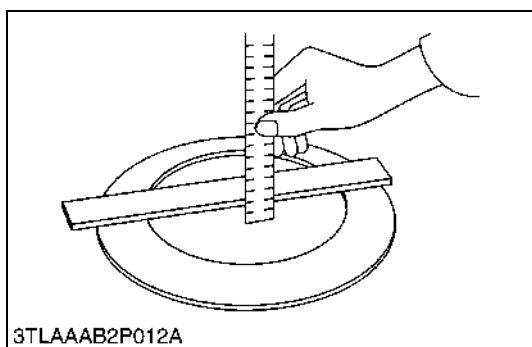
1. Place a straightedge on the pressure plate and measure clearance with a feeler gauge at several points.
2. If the clearance exceeds the allowable limit, replace it.
3. When the pressure plate is worn around its outside and its inside surface only is in contact with the straightedge, replace even if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

Clearance between pressure plate and straightedge	Allowable limit	2.0 mm 0.008 in.

A: Inside

B: Outside

9Y1211012CLS0022US0

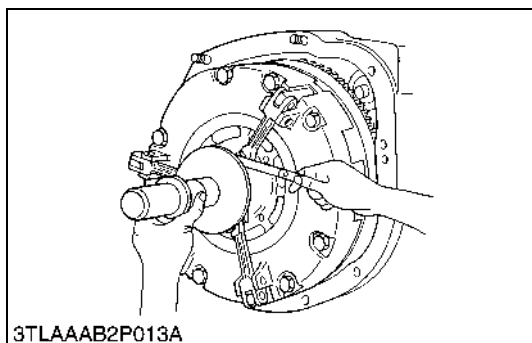


Belleville Spring Free Height

1. Put the belleville spring on the surface plate.
2. Place a straightedge on the belleville spring and measure the free height.
3. If the measurement is less than the allowable limit, replace.
4. Check for cracks, if problems are found, replace.

Belleville spring free height	Factory specification	7.24 mm 0.285 in.
	Allowable limit	6.76 mm 0.266 in.

9Y1211012CLS0023US0

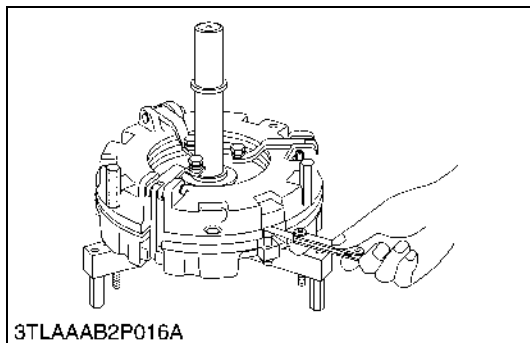
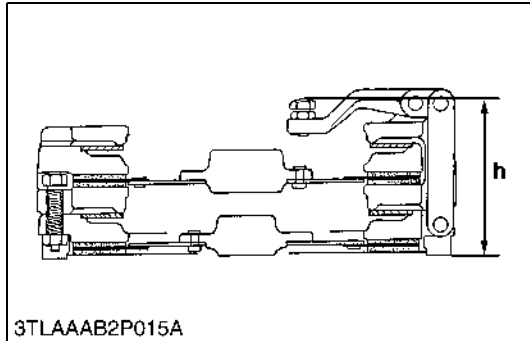
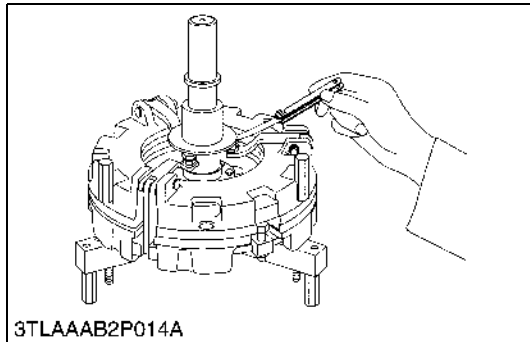


Mutual Difference of Release Lever

1. Insert the dual stage clutch exclusive tool (Code No, 07916-90052).
2. Measure the clearance between gauge ring and the top of adjusting screw with a feeler gauge.
3. If the clearance is not within the factory specifications, adjust with the adjusting screws.

Mutual difference of release lever	Factory specification	0 to 0.2 mm 0 to 0.008 in.

9Y1211012CLS0024US0



Release Lever Height

1. Mount the dual stage clutch exclusive tool (Code No. 07916-90052).
2. Measure the clearance between gauge ring and the top of adjusting screw with a feeler gauge.
3. If the clearance is not within the factory specifications, adjust with the adjusting screws.

Clearance between gauge ring and the top of adjusting screw	Factory specification	0 to 0.7 mm 0 to 0.003 in.

Tightening torque	Adjusting screw lock nut	16 to 21 N·m 1.6 to 2.2 kgf·m 12 to 15 lbf·ft

■ **IMPORTANT**

- Be sure to adjust the mutual difference of release lever to within the factory specifications.

■ **NOTE**

- Apply adhesive (Cemdine No. 110 by Cemdine Industry Co., Ltd. or equivalent) to the adjusting screws, replace lever and lock nuts.

(Reference)

Release lever height h	Reference value	97.8 to 99.2 mm 3.85 to 3.90 in.

9Y1211012CLS0025US0

Clearance between Pressure Plate 2 and Adjusting Screw

1. Measure the clearance between pressure plate 2 and the top of adjusting screw with a feeler gauge.
2. If the clearance is not within the factory specifications, rotate adjusting screw to adjust.

Clearance between pressure plate 2 and adjusting screw	Factory specification	0.90 to 1.0 mm 0.036 to 0.039 in.

Tightening torque	Pressure plate 2 height adjusting screw lock nut	16 to 21 N·m 1.6 to 2.2 kgf·m 12 to 15 lbf·ft

9Y1211012CLS0026US0

3 TRANSMISSION

MECHANISM

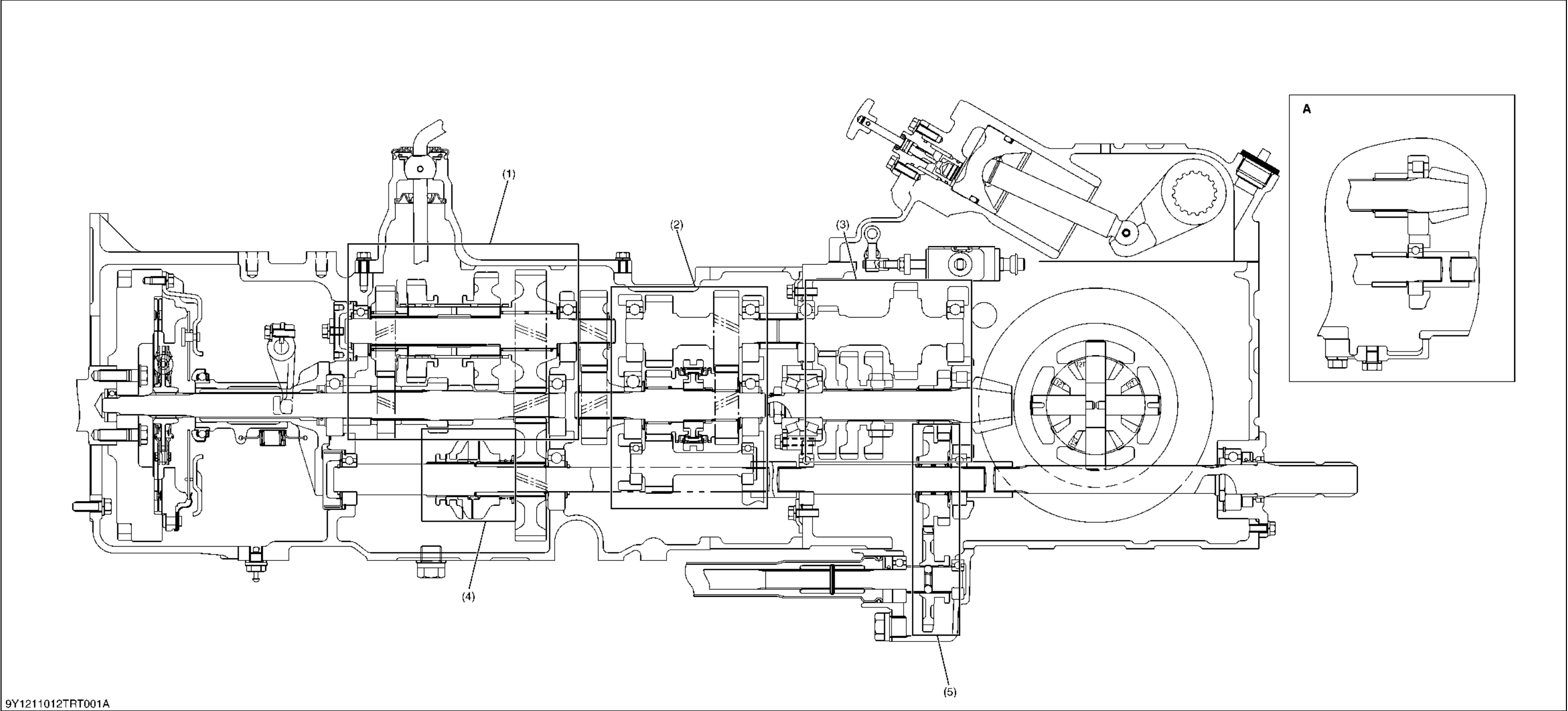
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1. STRUCTURE

[1] MANUAL TRANSMISSION MODEL

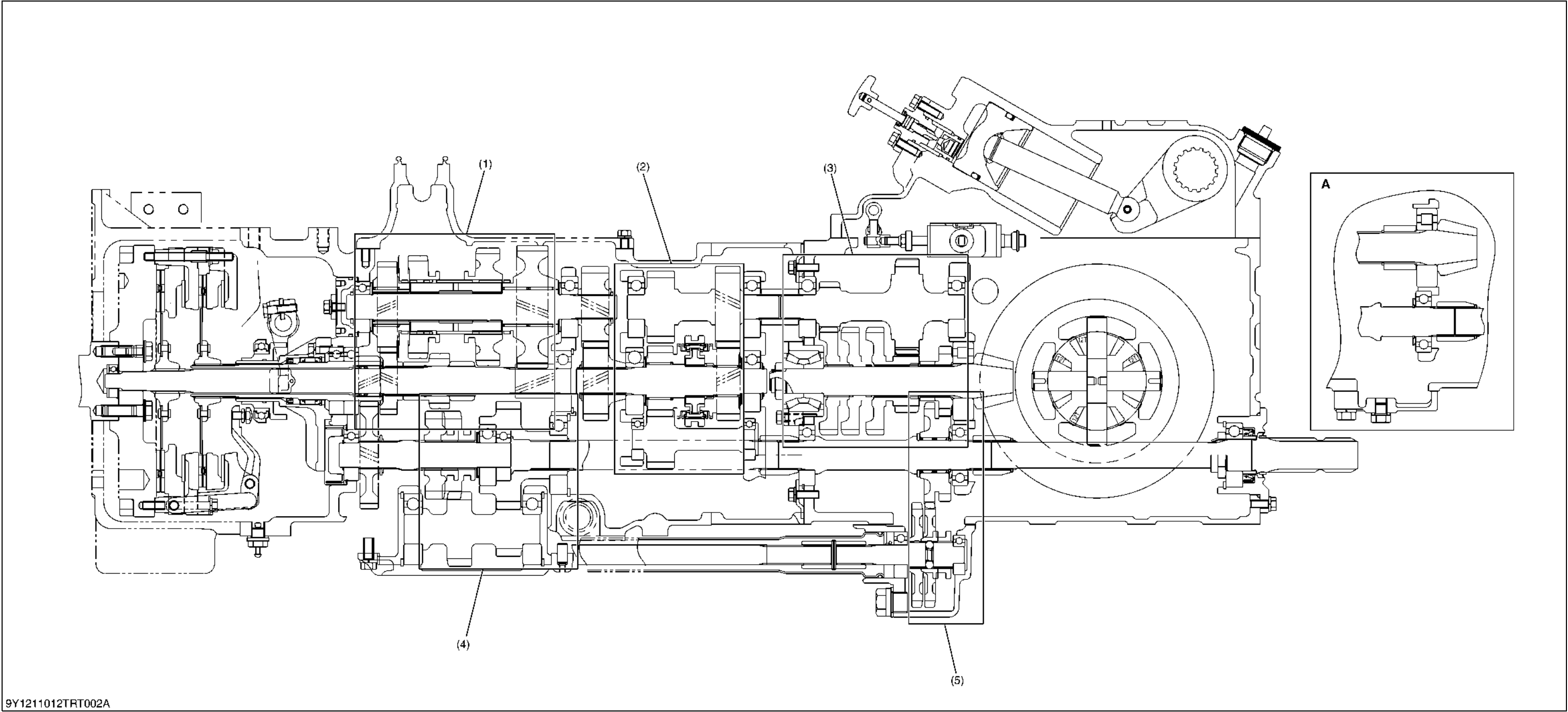
(1) L3301



9Y1211012TRT001A

(1) Main Gear Shift Section (2) Synchro-shuttle Gear Shift Section (3) Range Gear Shift Section (4) PTO Clutch Section (5) Front Wheel Drive Section (4WD Model Only) A: 2WD Model

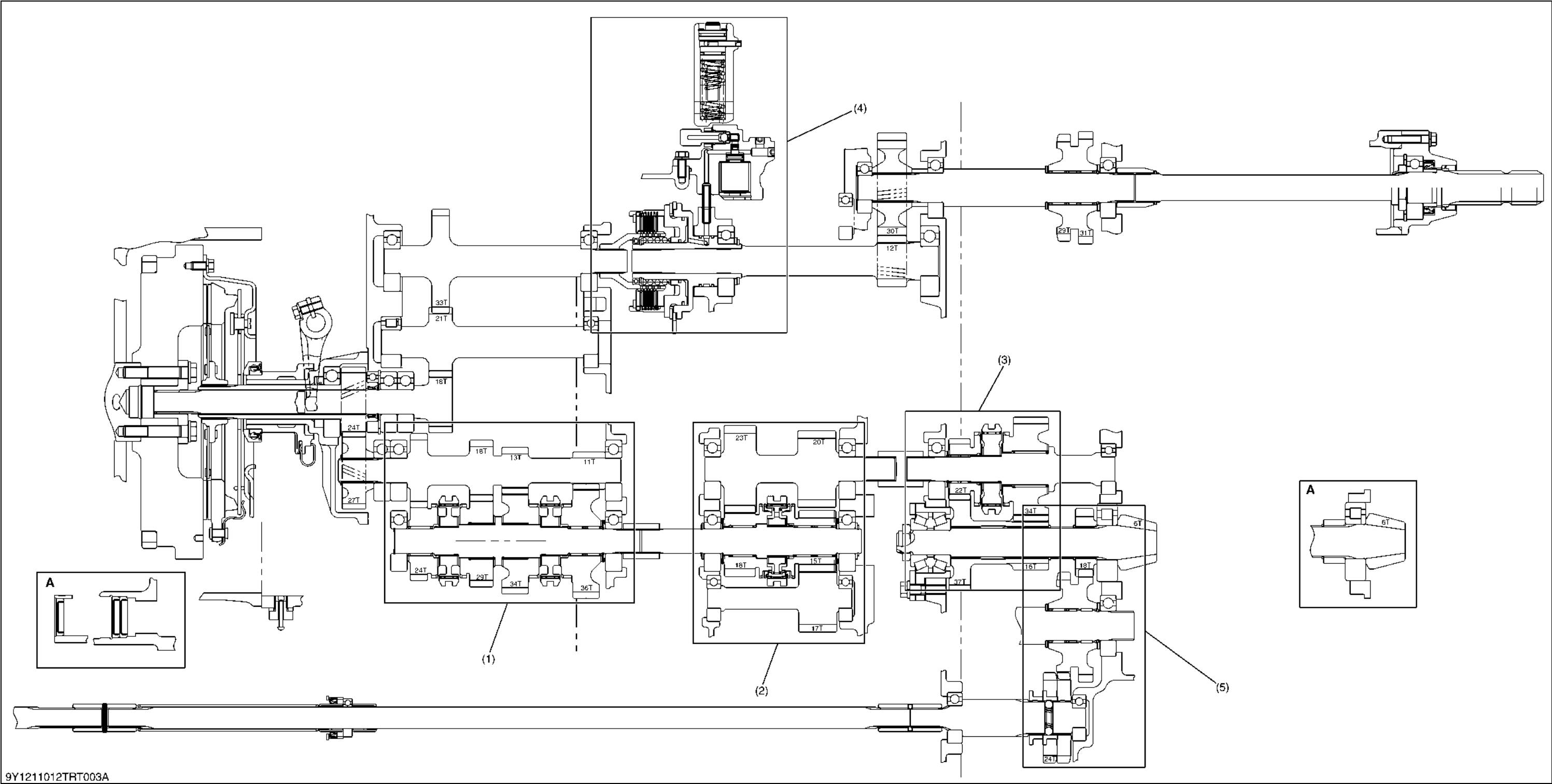
(2) L3901



9Y1211012TRT002A

(1) Main Gear Shift Section (2) Synchro-shuttle Gear Shift Section (3) Range Gear Shift Section (4) PTO Gear Shift Section (5) Front Wheel Drive Section (4WD Model Only) A: 2WD Model

(3) L4701



9Y1211012TRT003A

(1) Main Gear Shift Section

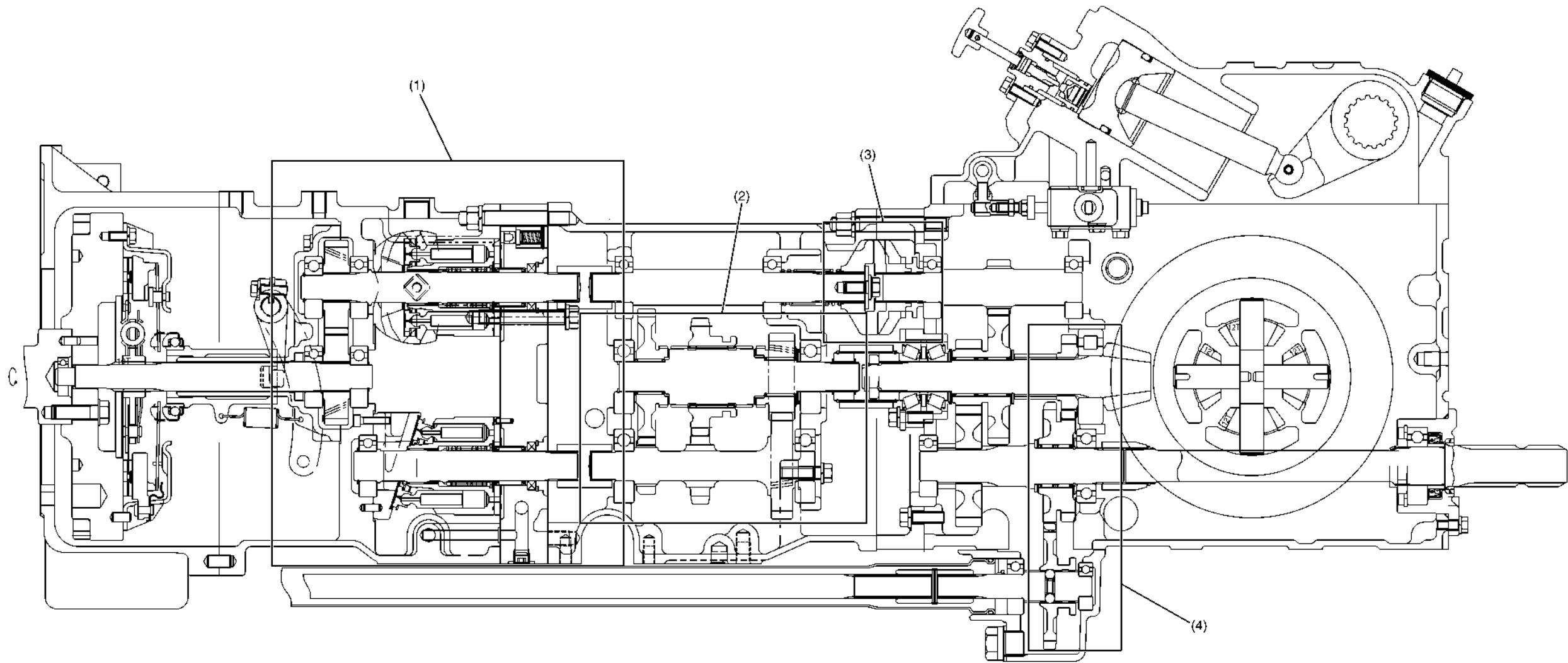
(2) Synchro-shuttle Gear Shift Section

(3) Lo Range Gear Shift Section

(4) PTO Clutch Section

(5) Front Wheel Drive Section (4WD Model Only) A: 2WD Model

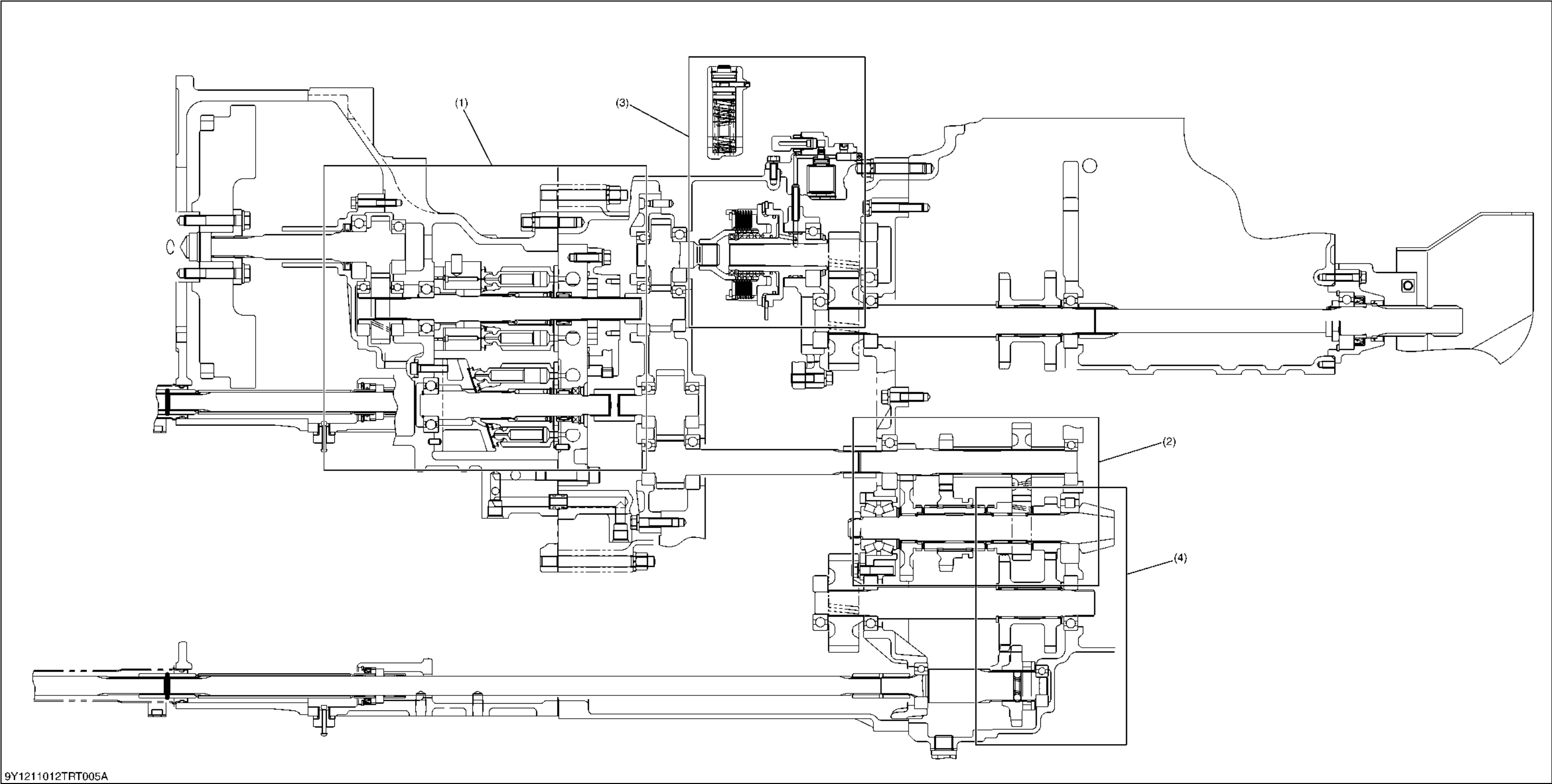
[2] HYDROSTATIC TRANSMISSION (HST) MODEL
(1) L3301/L3901



9Y1211012TRT004A

- (1) Hydrostatic Transmission Section
- (2) Range Gear Shift Section
- (3) PTO Clutch Section
- (4) Front Wheel Drive Section

(2) L4701



9Y1211012TRT005A

(1) Hydrostatic Transmission Section

(2) Range Gear Shift Section

(3) PTO Clutch Section

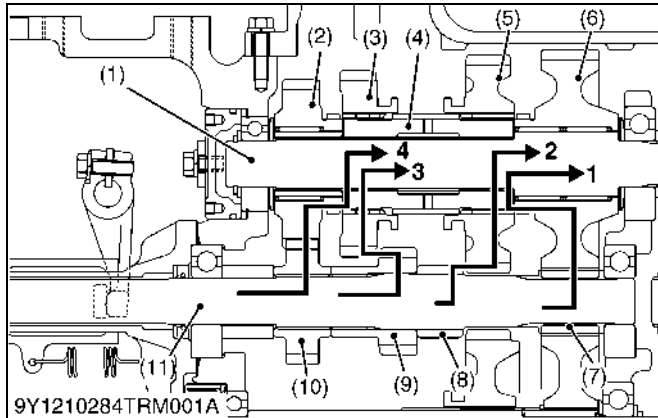
(4) Front Wheel Drive Section

2. MANUAL TRANSMISSION MODEL

[1] POWER TRAIN FOR TRAVELING GEARS

(1) Main Gear Shift Section

L3301/L3901



Besides neutral, four ways of power train from the main gear shaft (11) to the counter shaft (1) are available by operating the **1, 2, 3, 4** range shift lever.

Power is transmitted as follows.

1: 1st Speed

Main Gear Shaft (11) → **10T** Gear (7) → **45T** Gear (6) → **45T** Shift Gear (5) → Spline Boss (4) → Counter Shaft (1).

2: 2nd Speed

Main Gear Shaft (11) → **13T** Gear (8) → **45T** Shift Gear (5) → Spline Boss (4) → Counter Shaft (1).

3: 3rd Speed

Main Gear Shaft (11) → **19T** Gear (9) → **39T** Shift Gear (3) → Spline Boss (4) → Counter Shaft (1).

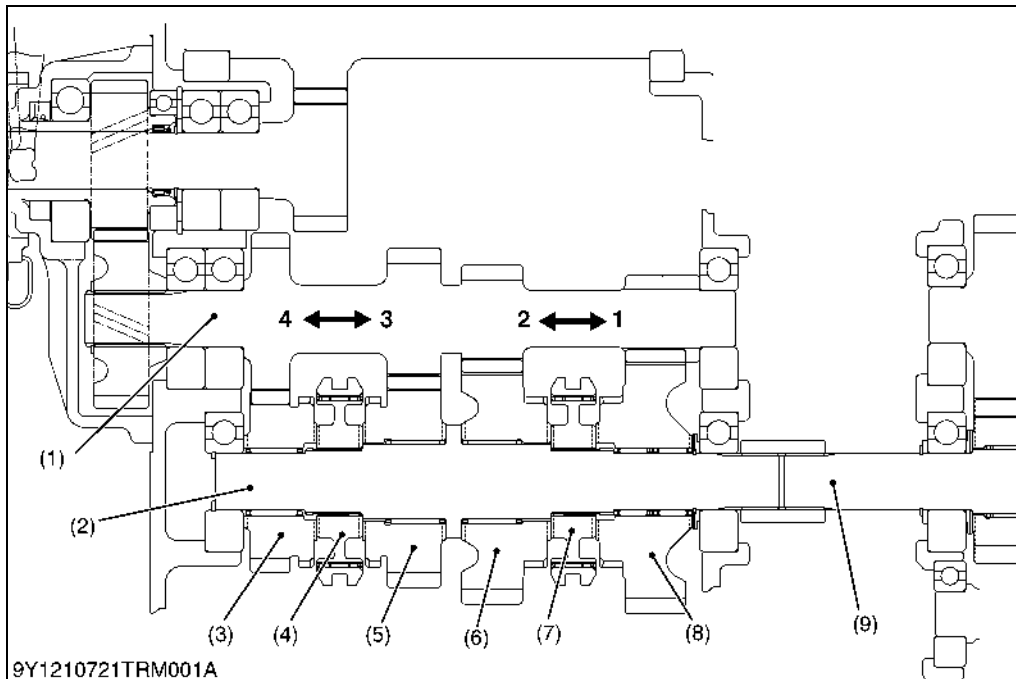
4: 4th Speed

Main Gear Shaft (11) → **23T** Gear (10) → **32T** Gear (2) → **39T** Shift Gear (3) → Spline Boss (4) → Counter Shaft (1).

(1) Counter Shaft	(7) 10T Gear
(2) 32T Gear	(8) 13T Gear
(3) 39T Shift Gear	(9) 19T Gear
(4) Spline Boss	(10) 23T Gear
(5) 45T Shift Gear	(11) Main Gear Shaft
(6) 45T Gear	

9Y1211012TRM0001US0

L4701



- | |
|-------------------|
| (1) Gear Shaft |
| (2) Counter Shaft |
| (3) Gear for 4th |
| (4) Shifter |
| (5) Gear for 3rd |
| (6) Gear for 2nd |
| (7) Shifter |
| (8) Gear for 1st |
| (9) Shuttle Shaft |

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

The main gear shift section is located in the clutch housing, and it uses a constant mesh.

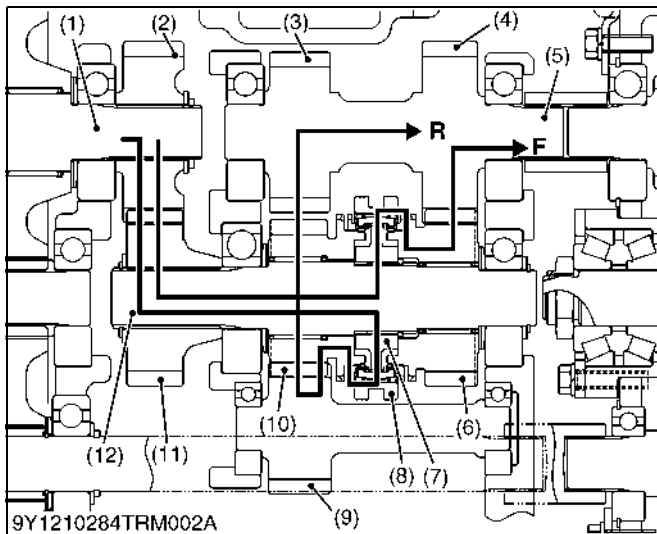
Power is transmitted from the engine to the gear shaft (input) (1) and the counter shaft (2) through the main shaft.

Gear shifting is done by sliding the shifters (4), (7).

9Y1211012TRM0002US0

(2) Synchro-Shuttle Section

L3301/L3901



Besides neutral, forward and reverse of power train from counter shaft (1) are available by operating the synchro-shuttle lever.

Power is transmitted as follows.

F: Forward

Counter Shaft (1) → **23T** Gear (2) → **22T** Gear (11) → Shuttle Shaft (12) → Coupling (7) → Shifter (8) → **22T** Gear (6) → **23T** Gear (4) → Shuttle Gear Shaft (5).

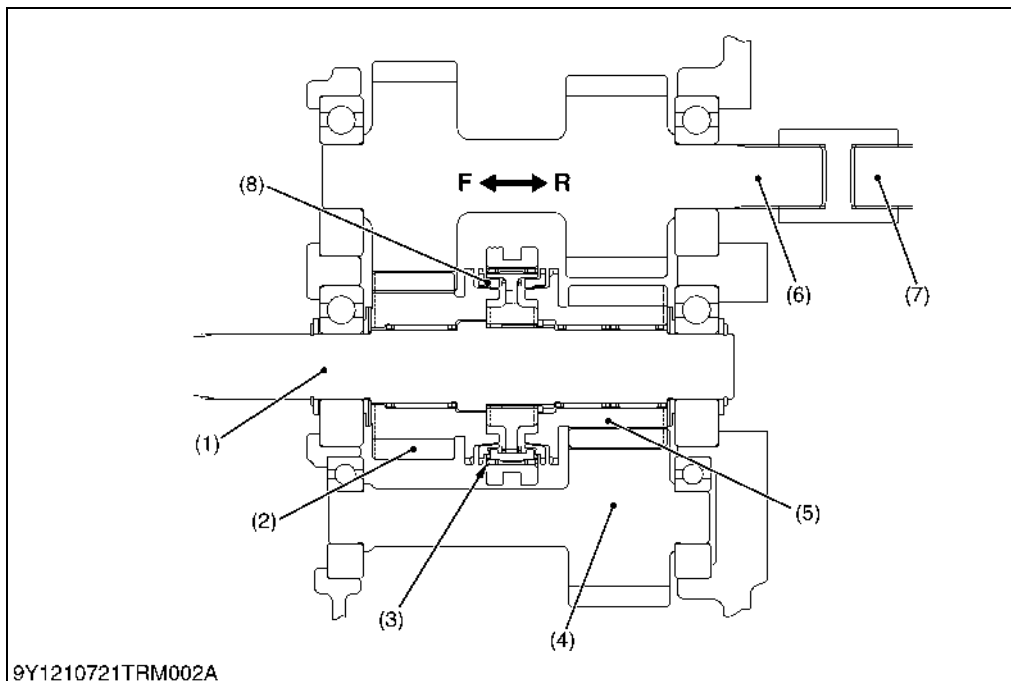
R: Reverse

Counter Shaft (1) → **23T** Gear (2) → **22T** Gear (11) → Shuttle Shaft (12) → Coupling (7) → Shifter (8) → **21T** Gear (10) → **17T** Gear (9) → **22T** Gear (3) → Shuttle Gear Shaft (5).

(1) Counter Shaft	(7) Coupling
(2) 23T Gear	(8) Shifter
(3) 22T Gear	(9) 17T Gear
(4) 23T Gear	(10) 21T Gear
(5) Shuttle Gear Shaft	(11) 22T Gear
(6) 22T Gear	(12) Shuttle Shaft

9Y1211012TRM0003US0

L4701



- | |
|--|
| (1) Shuttle Gear Shaft
(Connected to Counter Shaft) |
| (2) Gear for Forward |
| (3) Single Cone Type Synchro Mesh |
| (4) Reverse Gear Shaft |
| (5) Gear for Reverse |
| (6) Shuttle Counter Shaft
(Connected to Range Gear Shaft) |
| (7) Range Gear Shaft |
| (8) Synchronizer Ring |

F: Forward
R: Reverse

The shuttle shift section is located in the mid case.

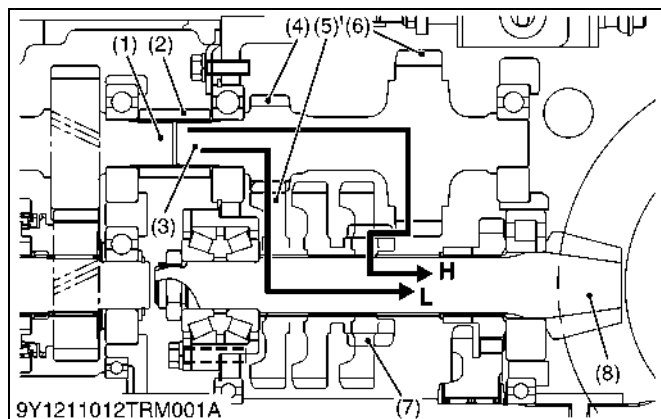
It uses a single cone type synchro mesh. It allows the operator to change forward and reverse with one shuttle shift lever.

One synchronizer ring (8) is installed on one side as shown in the figure.

9Y1211012TRM0004US0

(3) Range Gear Shift Section

L3301/L3901



Two ways of power train from the shuttle gear shaft (1) to the spiral bevel pinion shaft (8) are available by operating the range gear shift lever.

Power is transmitted as follows.

L: Lo-Range

Shuttle Gear Shaft (1) → Coupling (2) → Range Gear Shaft (3) → **18T** Gear (4) → **42T** Gear (5) → Spiral Bevel Pinion Shaft (8).

H: Hi-Range

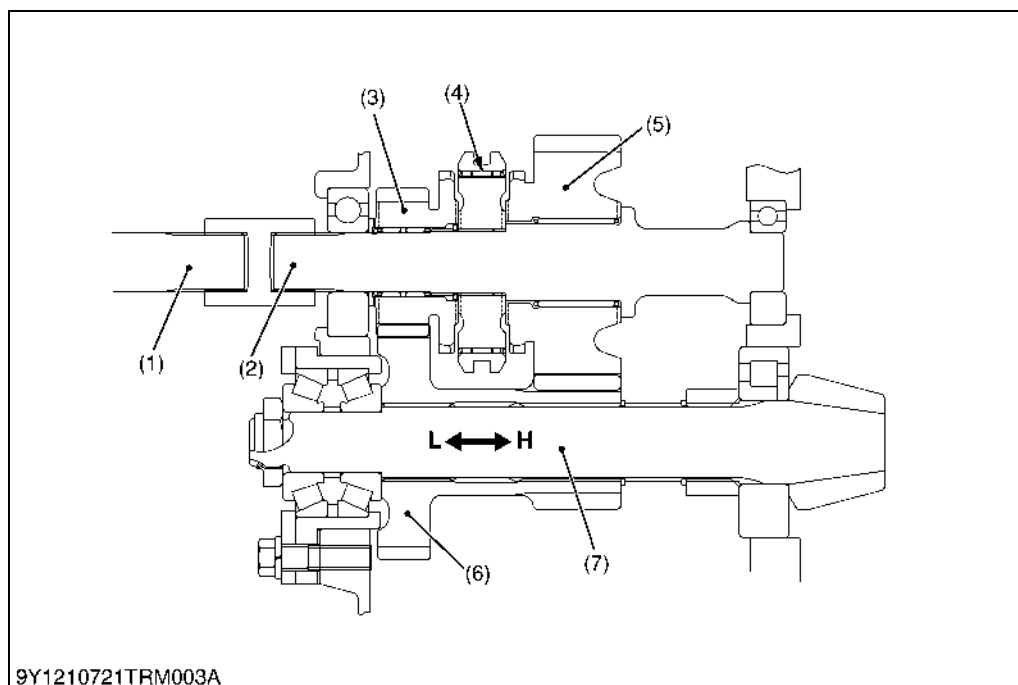
Shuttle Gear Shaft (1) → Coupling (2) → Range Gear Shaft (3) → **31T** Gear (6) → **19T** Gear (7) → Spiral Bevel Pinion Shaft (8).

- (1) Shuttle Gear Shaft
- (2) Coupling
- (3) Range Gear Shaft
- (4) **18T** Gear

- (5) **42T** Gear
- (6) **31T** Gear
- (7) **19T** Gear
- (8) Spiral Bevel Pinion Shaft

9Y1211012TRM0005US0

L4701



- (1) Shuttle Gear Shaft
- (2) Range Gear Shaft
- (3) Gear for Low Speed
- (4) Shifter
- (5) Gear for High Speed
- (6) Counter Gear
- (7) Spiral Bevel Pinion Gear

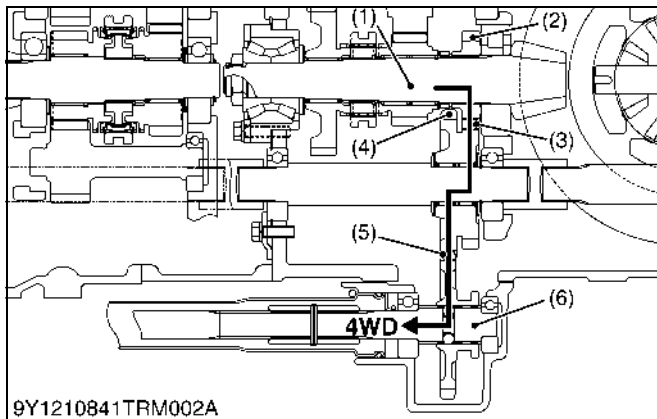
L: Low Speed
H: High Speed

The Hi-Lo range gear shift section is located in the differential gear case. It uses constant mesh gears.

9Y1211012TRM0006US0

(4) Front Wheel Drive Section (4WD Model Only)

L3301/L3901



2-wheel drive or 4-wheel drive is selected by operating the front wheel drive lever to shift the 33T shift gear (5).

When the front wheel drive lever is set to disengage, 33T shift gear (5) is neutral.

When the front wheel drive lever is set to engage, 33T shift gear splined with front axle drive shaft side to the left side to engage with **34T** gear.

Then, power is transmitted as follows.

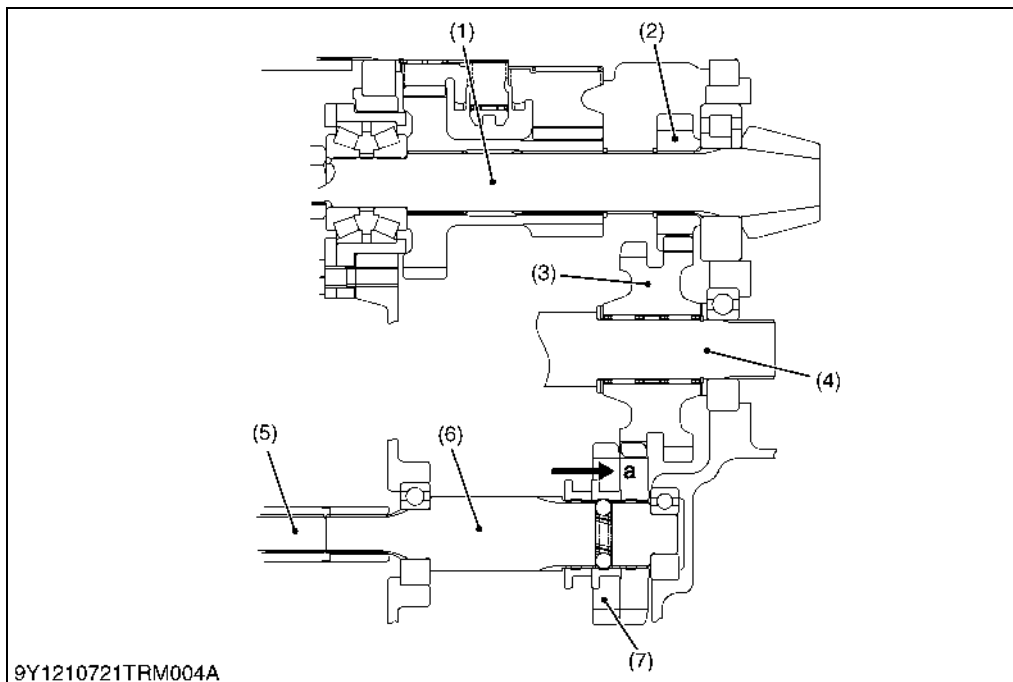
■ Engage

Spiral Bevel Pinion Shaft (1) → **18T** Gear (2) → **25T** Gear (3) → **34T** Gear (4) → 33T Shift Gear (5) → Front Wheel Drive Shaft (6).

(1) Spiral Bevel Pinion Shaft	(4) 34T Gear
(2) 18T Gear	(5) 33T Shift Gear
(3) 25T Gear	(6) Front Wheel Drive Shaft

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L4701



- | |
|--|
| (1) Spiral Bevel Pinion Gear |
| (2) Gear |
| (3) Front Wheel Drive Gear |
| (4) Rear PTO Shaft |
| (5) Propeller Shaft |
| (6) Front Wheel Drive Shaft
(Connected to Propeller
Shaft) |
| (7) Shifter Gear |

a: Four Wheel Drive Position

Front wheel drive shift section is located in the differential gear case.

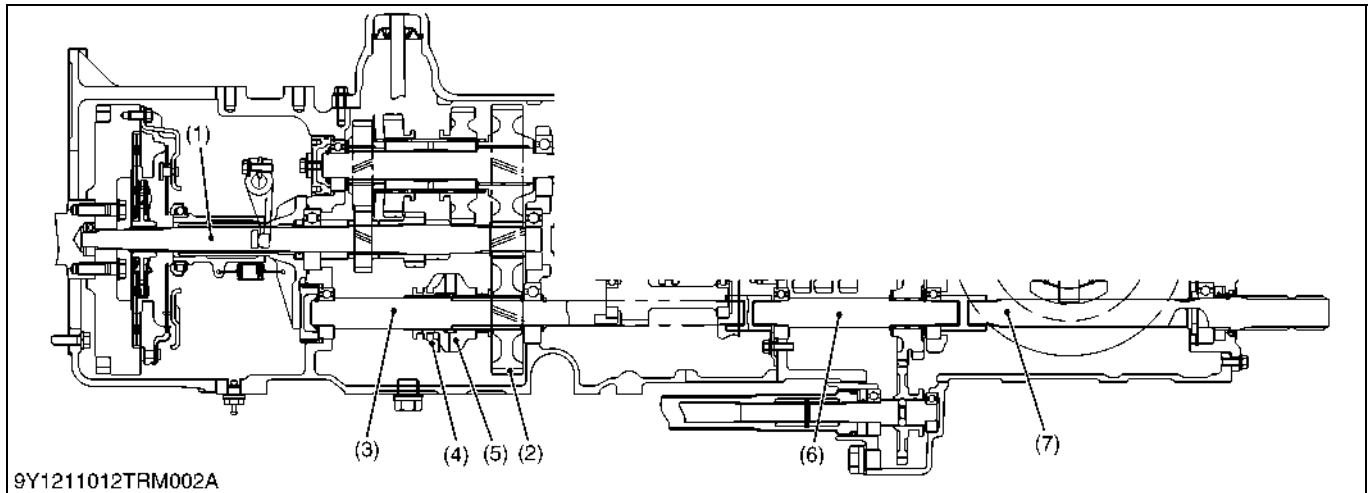
Two wheel drive or four wheel drive is selected by operating the front wheel drive lever to shift the shifter gear (7).

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[2] PTO SYSTEM

(1) Structure

L3301



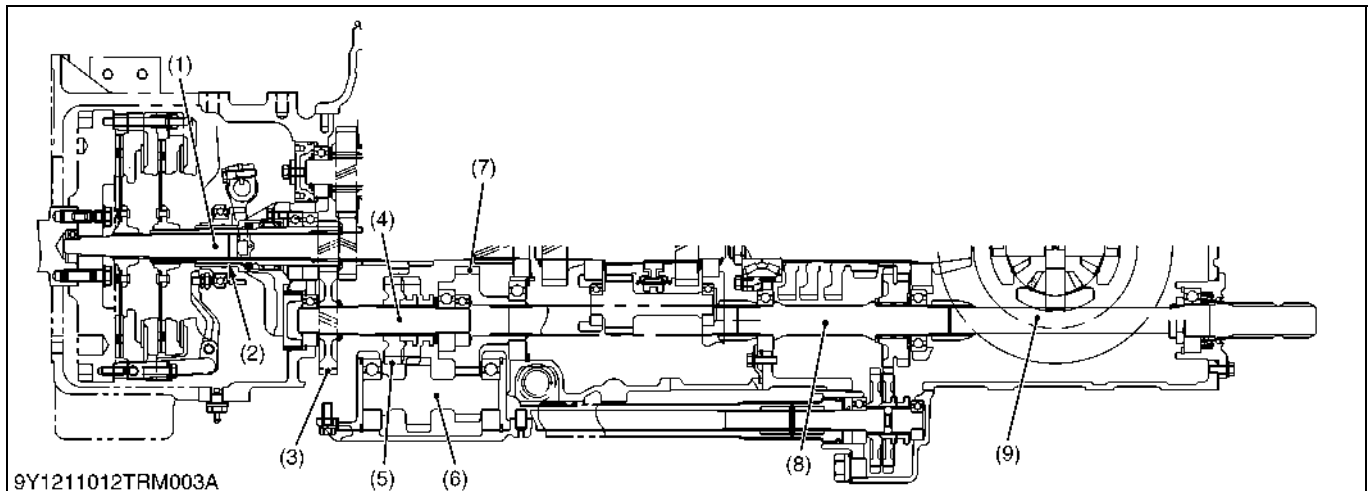
9Y1211012TRM002A

(1) Main Gear Shaft	(3) PTO Counter Shaft	(5) PTO Clutch	(7) PTO Shaft
(2) 45T Gear	(4) PTO Clutch Shifter	(6) PTO Drive Shaft	

PTO is "**ENGAGED**" or "**DISENGAGED**" by operating the shift lever of the PTO shifter.
The power train from the main gear shaft to PTO shaft is composed as shown in figure above.

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L3901

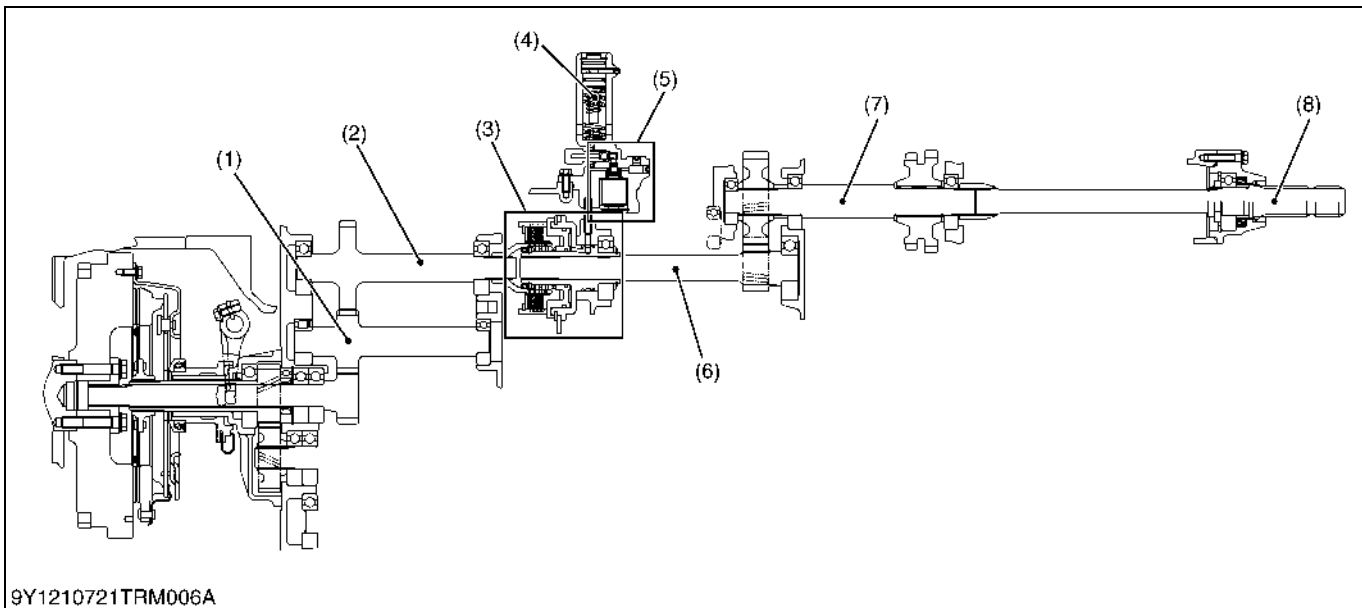


9Y1211012TRM003A

(1) Input Gear Shaft 1	(4) PTO Counter Shaft	(6) 19T-13T Gear Shaft	(8) PTO Drive Shaft
(2) Input Gear shaft 2	(5) 23T Shift Gear	(7) 29T Gear	(9) PTO Shaft
(3) 39T Gear			

PTO is "**ENGAGED**" or "**DISENGAGED**" by operating the shift lever of the PTO 23T shift gear (5).
The power train from the 16T input gear shaft to PTO shaft is composed as shown in figure above.

9Y1211012TRM0010US0

L4701

(1) PTO Gear Shaft 1	(4) Accumulator	(6) PTO Gear Shaft	(7) PTO Drive Shaft
(2) PTO Gear Shaft 2	(5) PTO Clutch Valve	(PTO Clutch Shaft)	(8) Rear PTO Shaft
(3) PTO Clutch Pack			

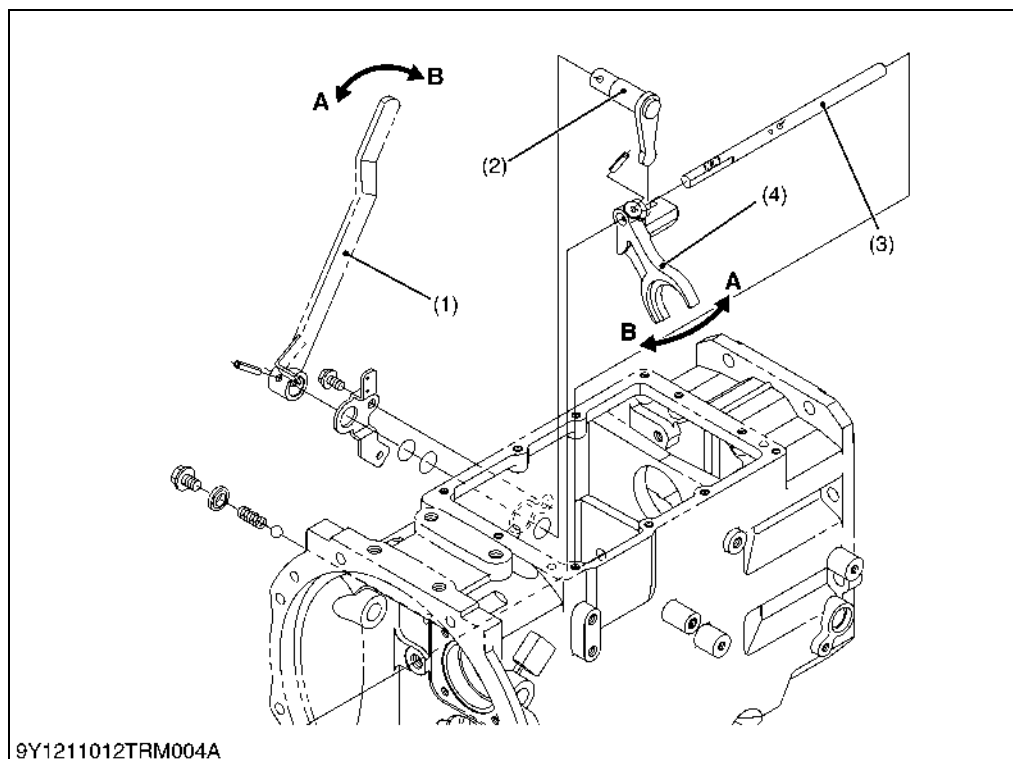
The independent PTO operated by PTO clutch pack (3) is adopted to L4701.

The rear PTO is **"ENGAGED"** or **"DISENGAGED"** by pushing the PTO clutch control switch.

The PTO power train from the clutch to the rear PTO shaft is composed as shown in the figure above.

9Y1211012TRM0011US0

(2) Shift Linkage (L3301/L3901)



- (1) PTO Shift Lever
- (2) PTO Shift Range Arm
- (3) PTO Fork Rod
- (4) PTO Shift Fork

A: Disengaged
B: Engaged

The PTO shift lever (1) to the PTO shift fork (4) are connected by the PTO shift range arm (2) as shown in the figure above.

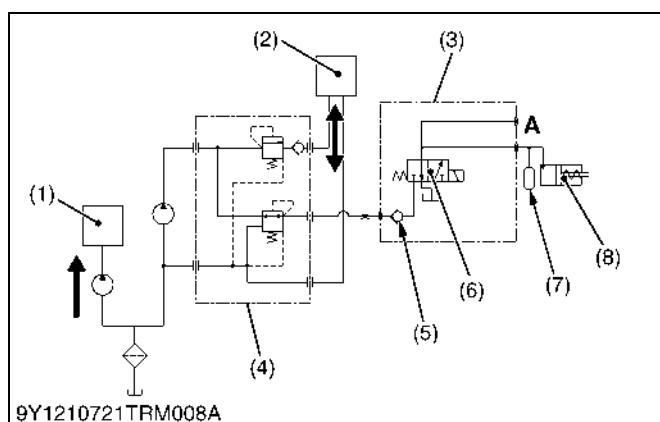
When the PTO shift lever (1) is moved to the **"A"** side or the **"B"** side, the PTO shift fork (4) is moved by means of the PTO shift lever (1).

When the PTO shift lever (1) is moved to the **"A"** side, the PTO is shifted to the **"Disengaged"** position.

When the PTO shift lever (1) is moved to the **"B"** side, the PTO is shifted to the **"Engaged"** position.

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(3) System of PTO Clutch (L4701)



The pressured oil adjusted by the regulator valve flows into the PTO clutch valve (6).

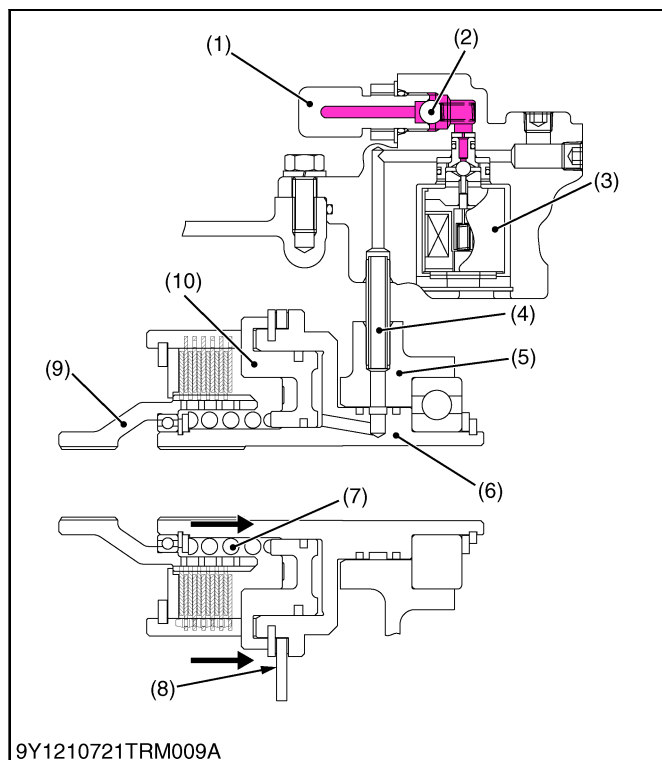
When the PTO clutch control switch is at the **"ON"** position, PTO clutch solenoid valve is opened and the oil flows through the PTO clutch valve (6) to the accumulator (7) and the PTO clutch pack (8) to engage it.

- (1) 3P Hydraulic Control Valve and Cylinder
- (2) Power Steering Controller and Cylinders
- (3) PTO Valve
- (4) Regulator
- (5) Check Valve
- (6) PTO Clutch Valve
- (7) Accumulator
- (8) PTO Clutch Pack

A: PTO Clutch Operating Pressure Check Port

9Y1211012TRM0012US0

■ PTO Clutch Control Switch "OFF" Position



When the PTO control switch is set at **"OFF"** position, the coil is not a magnetic.

The spring pushes the rod and the ball (12) is pushed by the plunger (11).

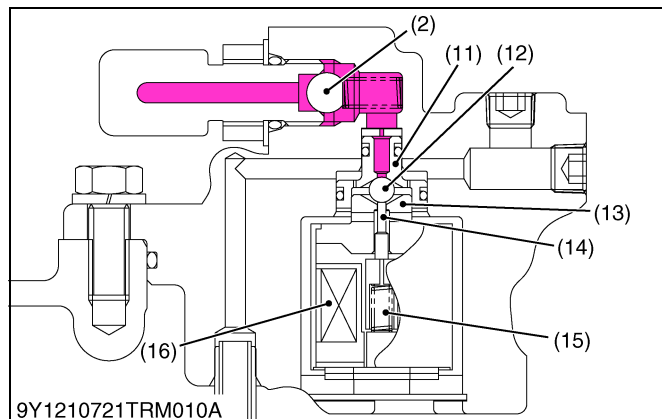
Since oil passage between the ball (12) and the plunger (11) is closed, oil from the pump port is blocked at the PTO clutch solenoid valve (3).

Since the pressured oil is not supplied to the PTO clutch, the PTO clutch is not engaged.

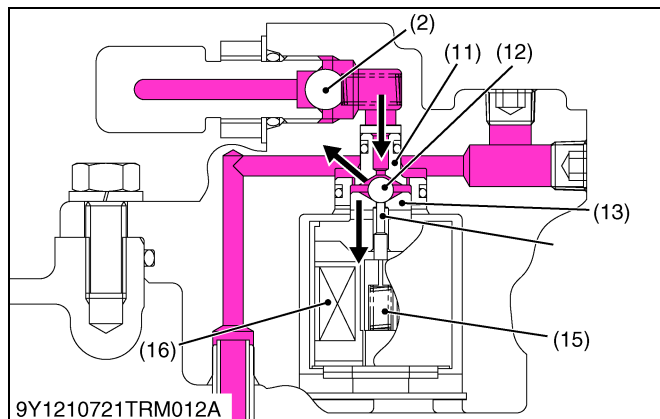
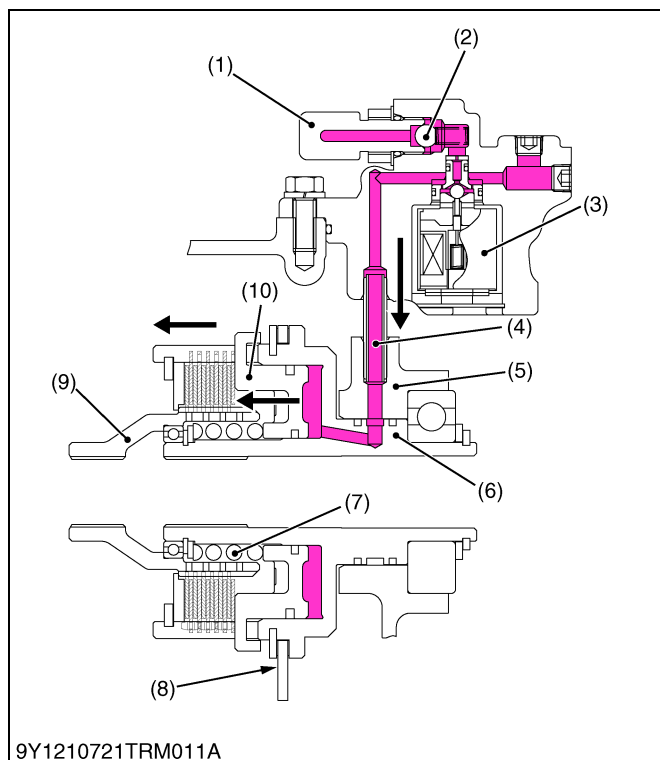
In this condition, the return spring (7) pushes the brake disk (8), and PTO clutch assembly does not rotate.

(1) Joint	(9) Clutch HUb
(2) Ball	(10) Piston
(3) PTO Clutch Solenoid Valve	(11) Plunger
(4) Hydraulic Pipe	(12) Ball
(5) Mid Case	(13) Seat
(6) I-PTO Clutch	(14) Rod
(7) Return Spring	(15) Spring
(8) Brake Disk	(16) Coil

9Y1211012TRM0014US0



■ PTO Clutch Control Switch "ON" Position



When the PTO control switch is set at **"ON"** position the coil (16) of the solenoid valve (3) is excited.

The rod (14) is pulled in to the solenoid valve (3) by the excited coil (16).

The ball (9) is pushed to the seat (13) by the pressured oil from pump port.

The pressured oil flows through the oil passage between the ball (2) and the plunger (11) to the PTO clutch pack.

The pressured oil in the PTO clutch pack pushes the piston (10).

As a result, PTO clutch disks and clutch plates are attached and the PTO clutch engages.

The power from the engine is transmitted through PTO clutch to the rear PTO shaft.

The spring (15) pushes the rod and the ball (12) is pushed to the plunger (11).

Since oil passage between the ball (12) and the plunger (11) is closed, oil from the pump port is blocked at the PTO clutch solenoid valve (3).

(1) Joint	(9) Clutch Hub
(2) Ball	(10) Piston
(3) PTO Clutch Solenoid Valve	(11) Plunger
(4) Hydraulic Pipe	(12) Ball
(5) Mid Case	(13) Seat
(6) I-PTO Clutch	(14) Rod
(7) Return Spring	(15) Spring
(8) Brake Disk	(16) Coil

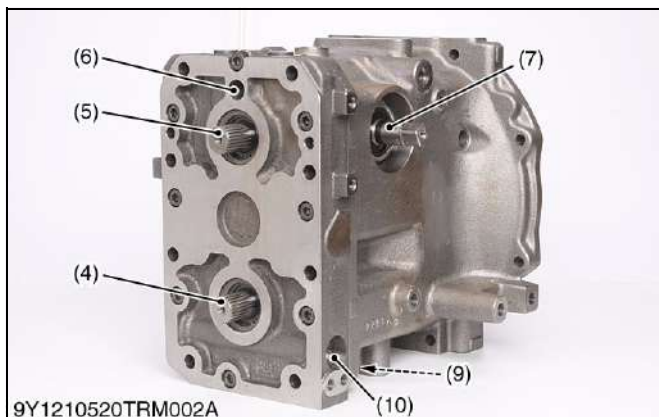
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3. HYDROSTATIC TRANSMISSION (HST) MODEL

[1] Hydrostatic Transmission Assembly

(1) Structure

[A] L3301/L3901



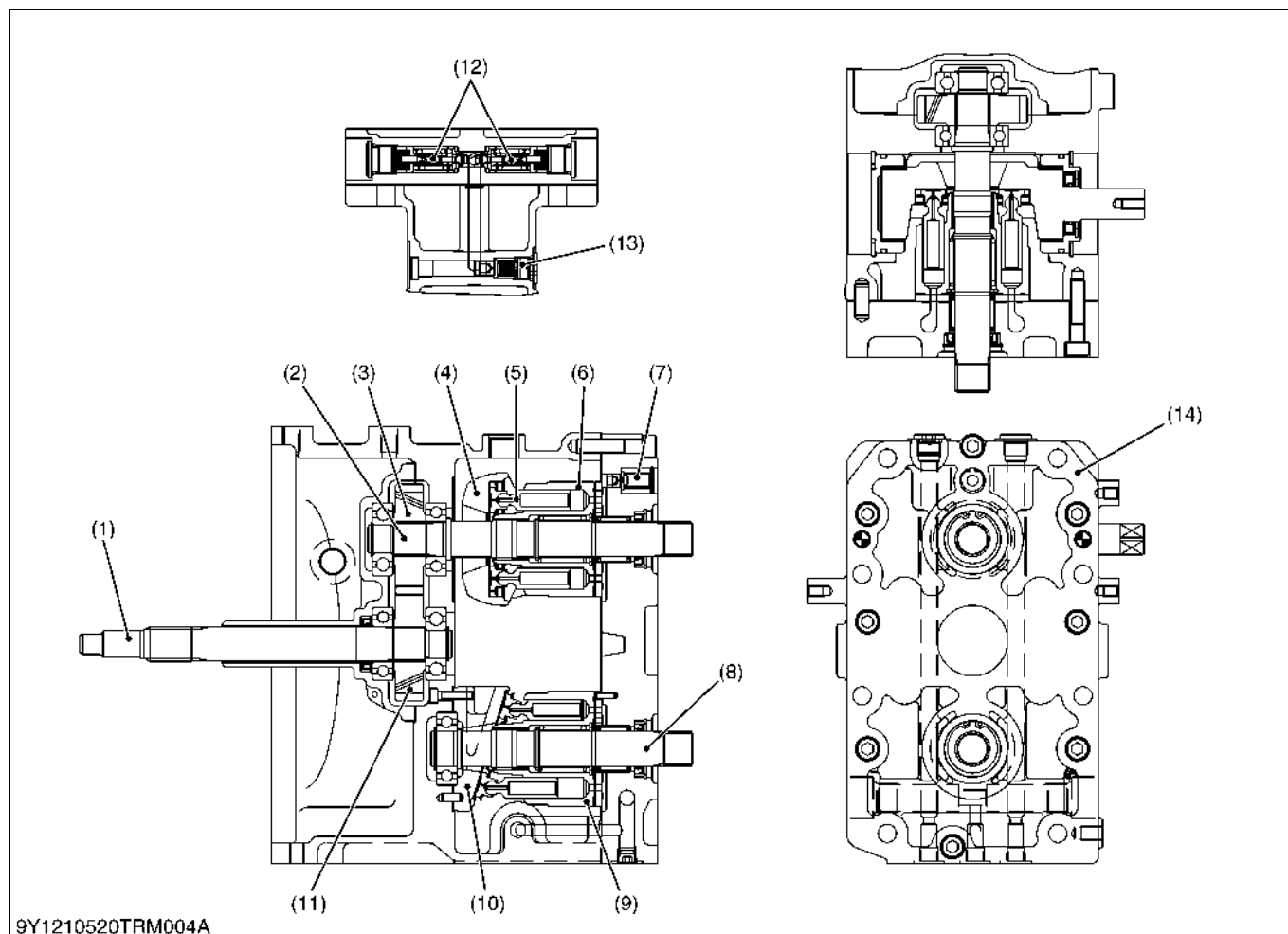
The HST of this tractor is a built-in type to the clutch housing.

HST assembly chiefly consists of HST case (clutch housing case), variable displacement piston pump, fixed displacement piston motor, charge pump and various valves.

Refer to the next page for detailed parts in HST.

(1) Input Shaft	(6) Case Relief Valve
(2) HST Case	(7) Trunnion Shaft
(Clutch Housing Case)	(8) Neutral Holder
(3) Check and High Pressure Relief Valve	(9) Charge Relief Valve
(4) Output Shaft (Motor Shaft)	(10) Check and High Pressure Relief Valve
(5) Pump Shaft	

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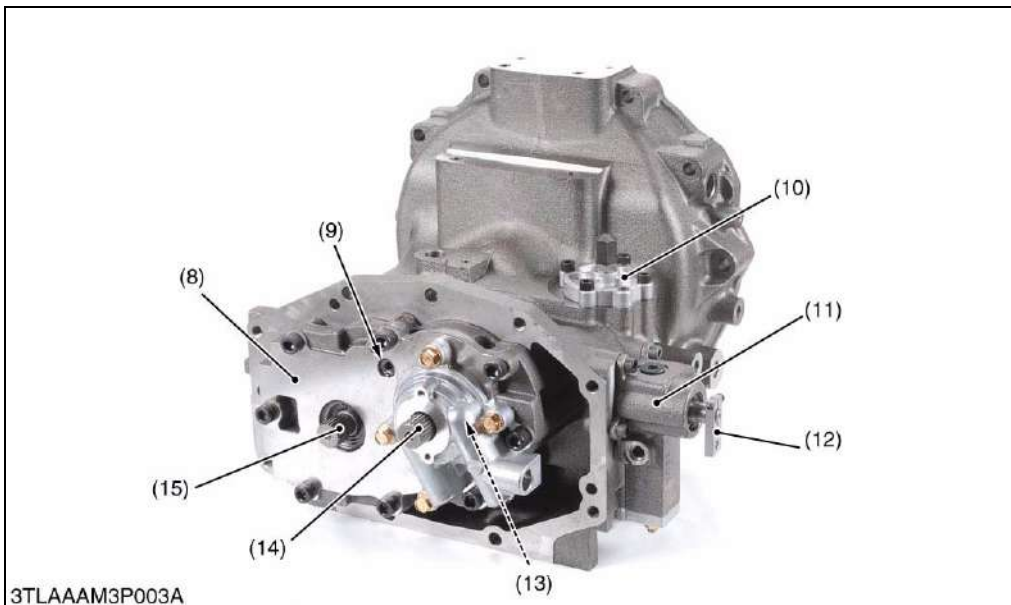
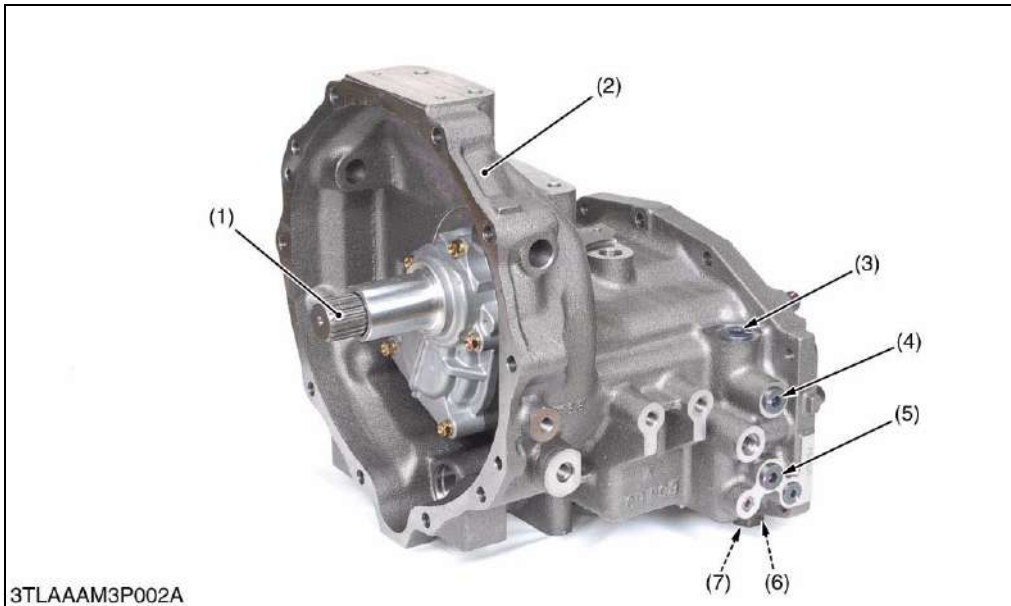
- (1) Input Shaft
- (2) Pump Shaft
- (3) 27T Gear
- (4) Variable Swashplate

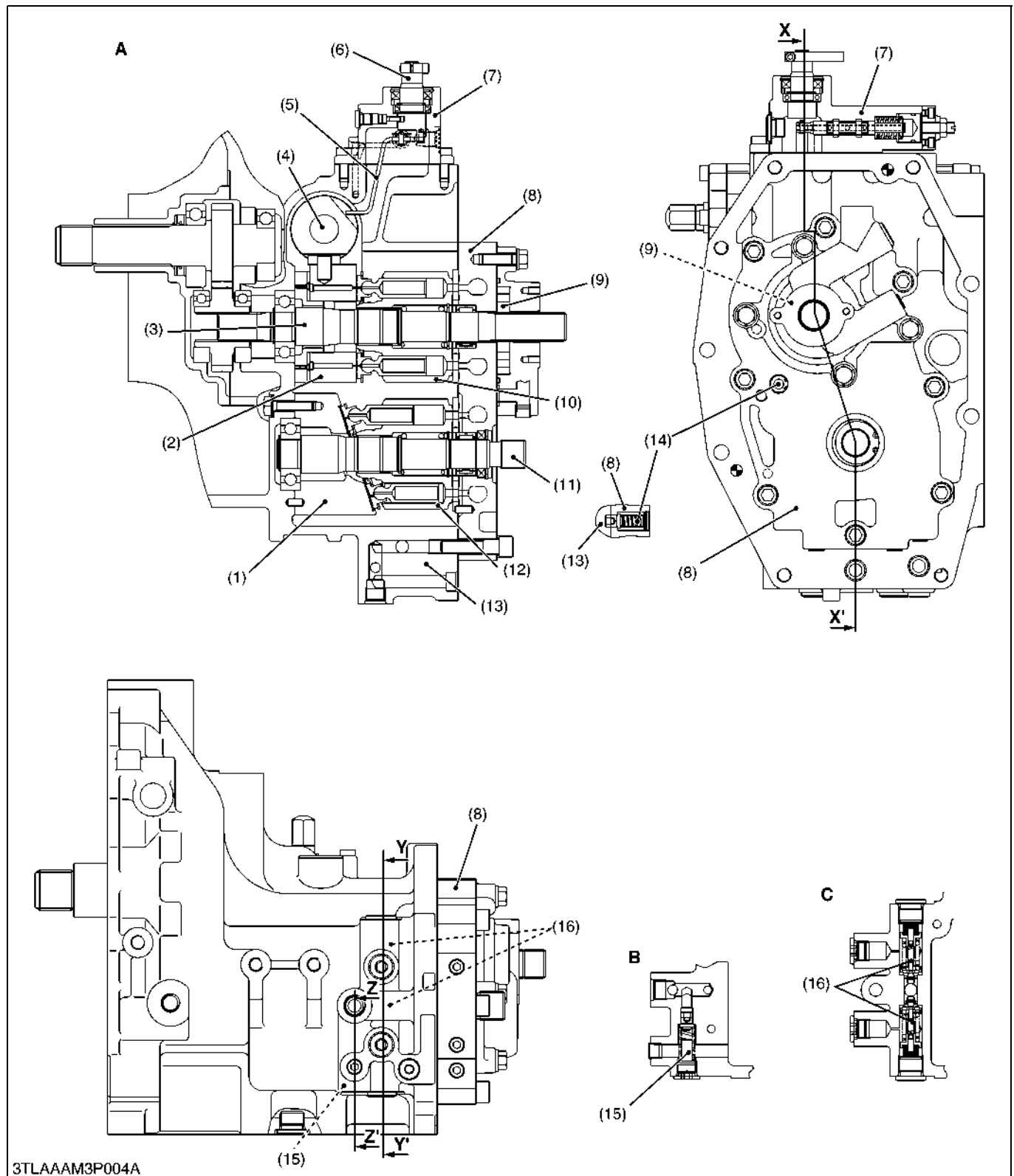
- (5) Piston (Pump)
- (6) Cylinder Block (Pump)
- (7) Case Relief Valve
- (8) Output Shaft (Motor Shaft)

- (9) Cylinder Block (Motor)
- (10) Fixed Swashplate
- (11) 28T Gear

- (12) Check and High Pressure Relief Valve
- (13) Charge Relief Valve
- (14) Port Block

9Y1211012TRM0017US0

[B] L4701



- (1) Fixed Swashplate
- (2) Variable Swashplate
- (3) Pump Shaft
- (4) Servo Piston
- (5) Feedback Lever
- (6) Control Shaft

- (7) Regulator Assembly
- (8) Port Block Cover
- (9) Charge Pump
- (10) Cylinder Block (Pump)
- (11) Motor Shaft
- (12) Cylinder Block (Motor)

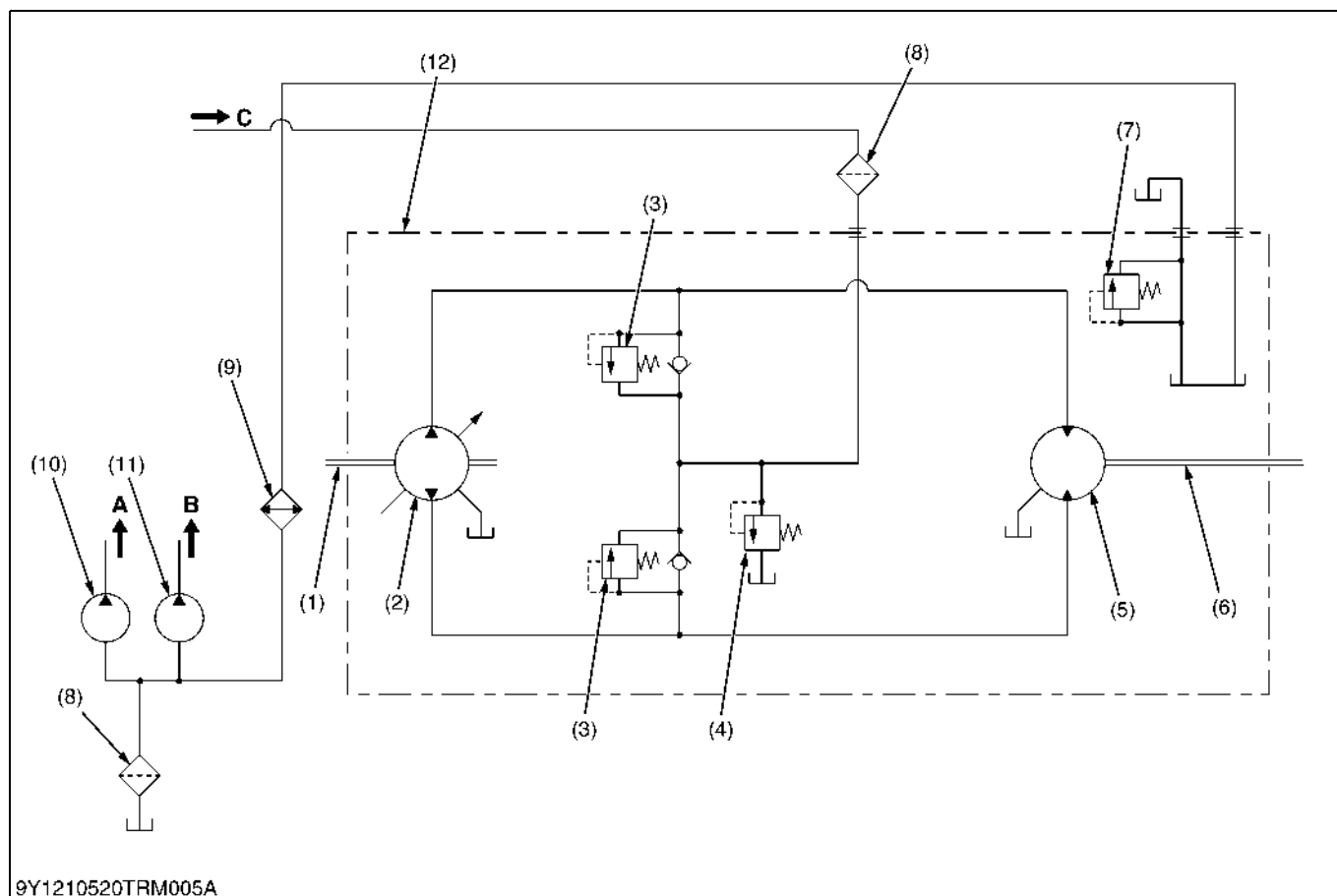
- (13) HST Case
- (14) Case Relief Valve
- (15) Charge Relief Valve
- (16) Check and High Pressure Relief Valve

- A: Sectional View X-X'**
- B: Sectional View Z-Z'**
- C: Sectional View Y-Y'**

9Y1211012TRM0019US0

(2) Oil Flow

L3301/L3901



9Y1210520TRM005A

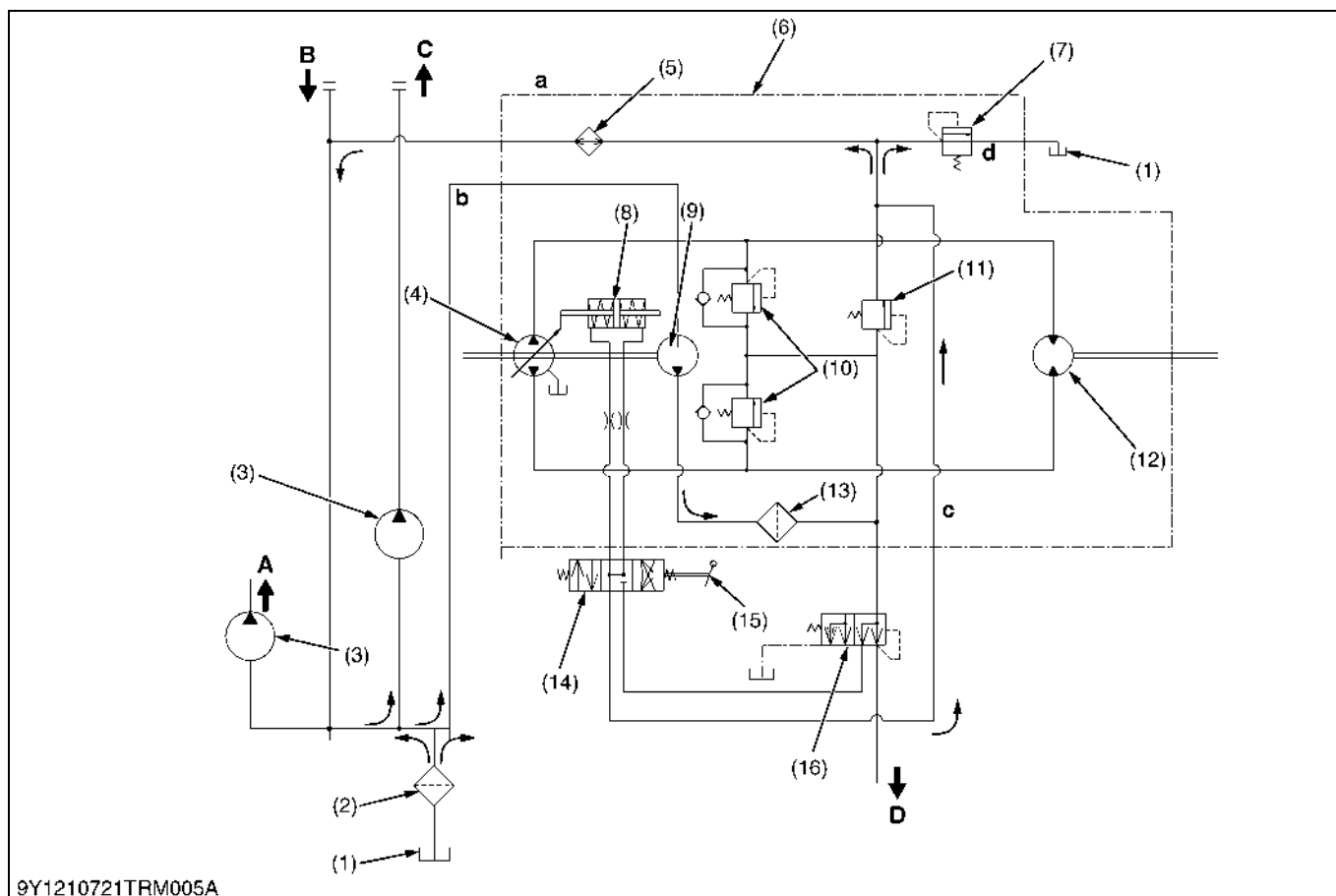
(1) Pump Shaft	(5) Fixed Displacement Motor	(9) Oil Cooler	A: To Hydraulic Block
(2) Variable Displacement Pump	(6) Output Shaft (Motor Shaft)	(10) Hydraulic Pump (Main Circuit)	B: To Power Steering
(3) Check and High Pressure Relief Valve	(7) Case Relief Valve	(11) Hydraulic Pump (Power Steering)	C: From Power Steering
(4) Charge Relief Valve	(8) Oil Filter	(12) HST Unit	

The pump (2) and motor (5) are joined in a closed hydraulic loop and most of oil circulates within the main oil circuit. When the variable swash-plate is at right angle to the pump piston, the oil is not send to the motor (5). When the variable swash-plate is tilted to forward or reverse, oil forced out of pump (2) at high pressure and send to the motor.

And then the output shaft (6) rotates with the motor and oil is forced out of motor at low pressure and return to the pump (2). On the other hand, oil is send to the main circuit through the filter (8) and excessive oil passes to the case through the charge relief valve (4). The case relief valve (7) controls pressure in the HST case.

The check and high pressure relief valve (3) between the two lines in the main oil circuit monitors the oil pressure in each line, it opens and close the oil into another line.

9Y1211012TRM0020US0

L4701

- (1) Transmission Case
- (2) Hydraulic Filter
- (3) Hydraulic Pump
- (4) Pump Cylinder Block
- (5) Oil Cooler
- (6) HST Assembly
- (7) Case Relief Valve
- (8) Servo Piston

- (9) Charge Pump
- (10) Check and High Pressure Relief Valve
- (11) Charge Relief Valve
- (12) Motor Cylinder Block
- (13) Filter
- (14) Regulator Valve

- (15) HST Pedal
- (16) PTO Clutch Pressure Priority Valve

- A: To Hydraulic Block and 3-point Hitch**
- B: From Power Steering Controller**

- C: To Power Steering Controller**
- D: To PTO Clutch Valve**
- a: a port**
- b: b port**
- c: c port**
- d: d port**

Oil flows in HST case from **b**-port and is sent to **c**-port with the charge pump (9). Oil from **c**-port is sent to HST circuit and the PTO clutch valve.

The oil in the regulator valve (14) is used for the movement of the servo piston (8) which is operated by the regulator valve (14) and the HST pedal (15). And the oil in the HST main circuit gets circulated between the variable displacement pump cylinder block (4) and the fixed displacement motor cylinder block (12), which forms a closed circuit.

The case relief valve (7) controls pressure in the HST case.

The PTO pressure priority valve (16) switches the pressurized oil from the charge pump (9) to the PTO clutch and HST regulator valve (HST servo valve) (14). When the oil pressure at the PTO pressure priority valve (16) is below the setting pressure, approx. 14.0 to 15.0 kgf/cm² (1.38 to 1.47 MPa, 199 to 213 psi) at engine idling speeds, the PTO pressure priority valve (16) delivers preferentially the oil from the charge pump (9) to the PTO clutch valve to operate the PTO clutch.

(Reference)

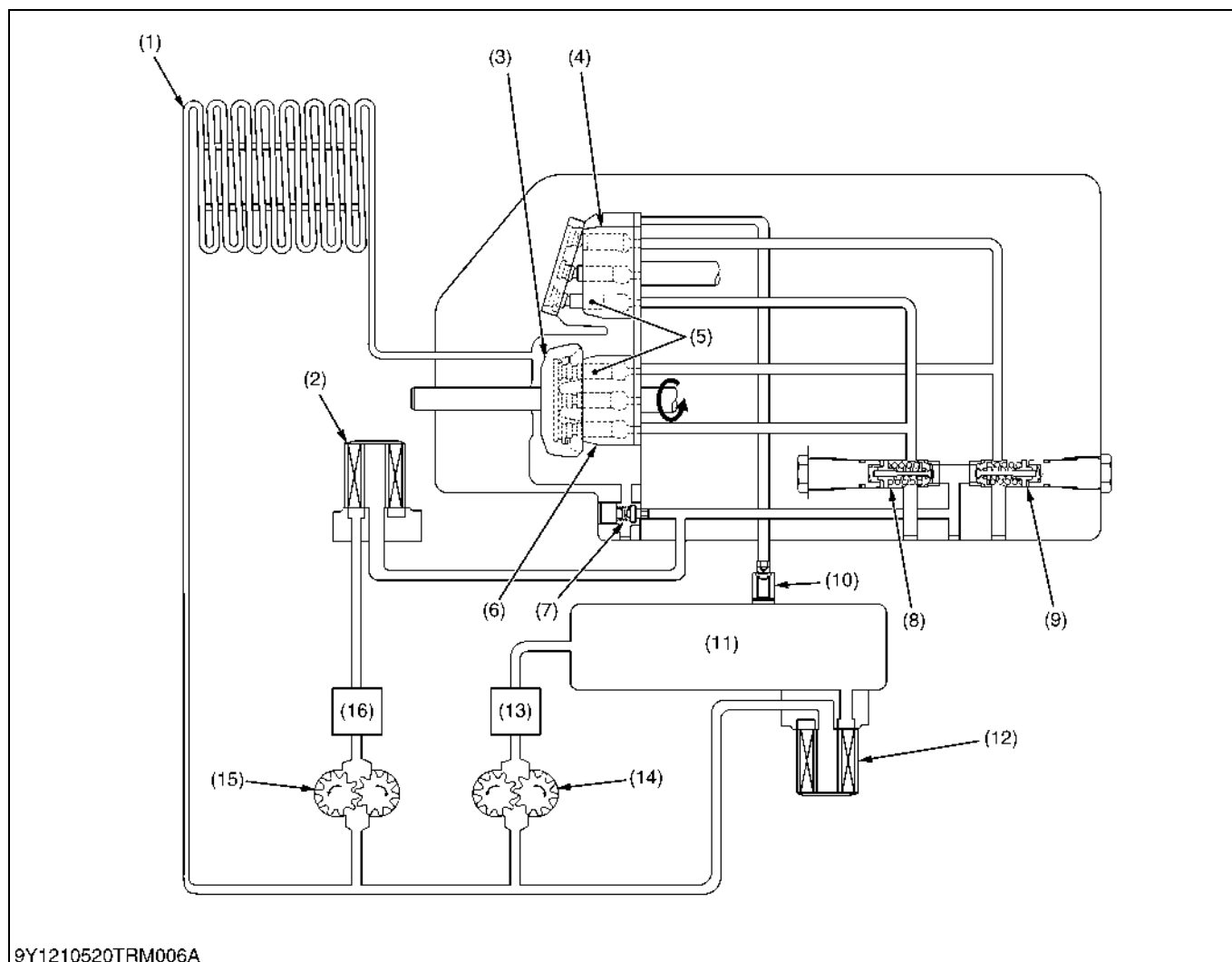
- Valve Setting Pressure [Oil temperature: 40 to 60 °C (104 to 140 °F)]
 - Charge Relief Valve: 2.3 to 2.6 MPa (23.5 to 27.0 kgf/cm², 334 to 384 psi)
 - Check and High Pressure Relief Valve: 33.3 to 36.3 MPa (340 to 370 kgf/cm², 4836 to 5262 psi)
 - Case Relief Valve: 0.29 MPa (3.0 kgf/cm², 42.7 psi)

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(3) Operation

[A] L3301/L3901

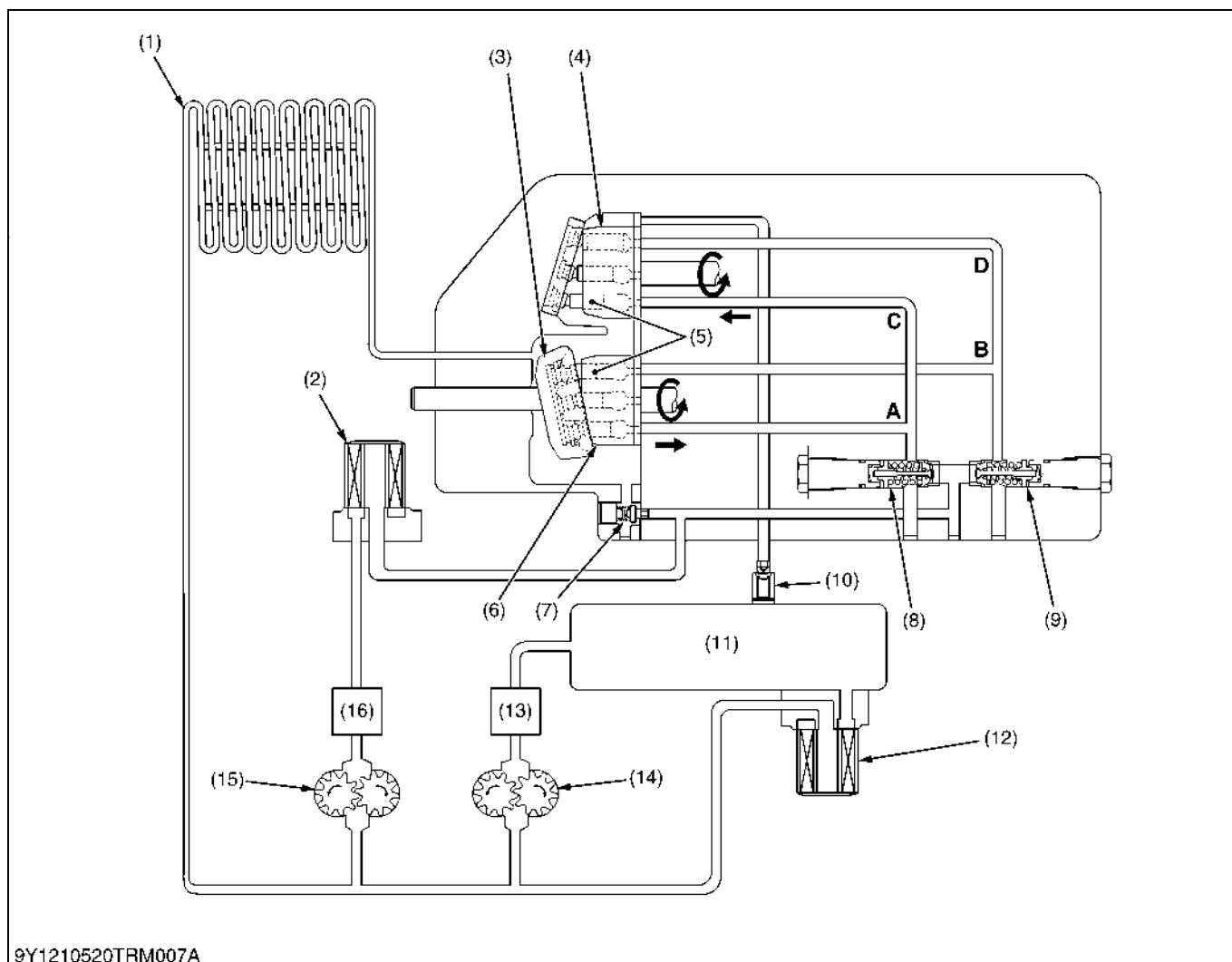
When the HST pedal is in the neutral position



(1) Oil Cooler	(7) Charge Relief Valve	(10) Case Relief Valve	(14) Hydraulic Pump (Main Circuit)
(2) Oil Filter (HST)	(8) Check and High Pressure Relief Valve (Forward)	(11) Transmission Case	(15) Hydraulic Pump (Power Steering)
(3) Swash plate	(9) Check and High Pressure Relief Valve (Reverse)	(12) Oil Filter	(16) Power Steering Controller
(4) Cylinder Block (Motor)		(13) Hydraulic Control Valve	
(5) Piston			
(6) Cylinder Block (Pump)			

When the speed control pedal is in neutral, the variable swash-plate is at right angles to the pump piston and they only rotate with cylinder block without reciprocating. Since the oil is not being pumped to the motor, the cylinder block in the motor is stationary and the output shaft does not move.

9Y1211012TRM0022US0

When the HST pedal is pressed toward the forward side

9Y1210520TRM007A

(1) Oil Cooler	(8) Check and High Pressure Relief Valve (Forward)	(13) Hydraulic Control Valve	A: Pump Port A
(2) Oil Filter (HST)	(9) Check and High Pressure Relief Valve (Reverse)	(14) Hydraulic Pump (Main Circuit)	B: Pump Port B
(3) Swash plate	(10) Case Relief Valve	(15) Hydraulic Pump (Power Steering)	C: Motor Port C
(4) Cylinder Block (Motor)	(11) Transmission Case	(16) Power Steering Controller	D: Motor Port D
(5) Piston	(12) Oil Filter		
(6) Cylinder Block (Pump)			
(7) Charge Relief Valve			

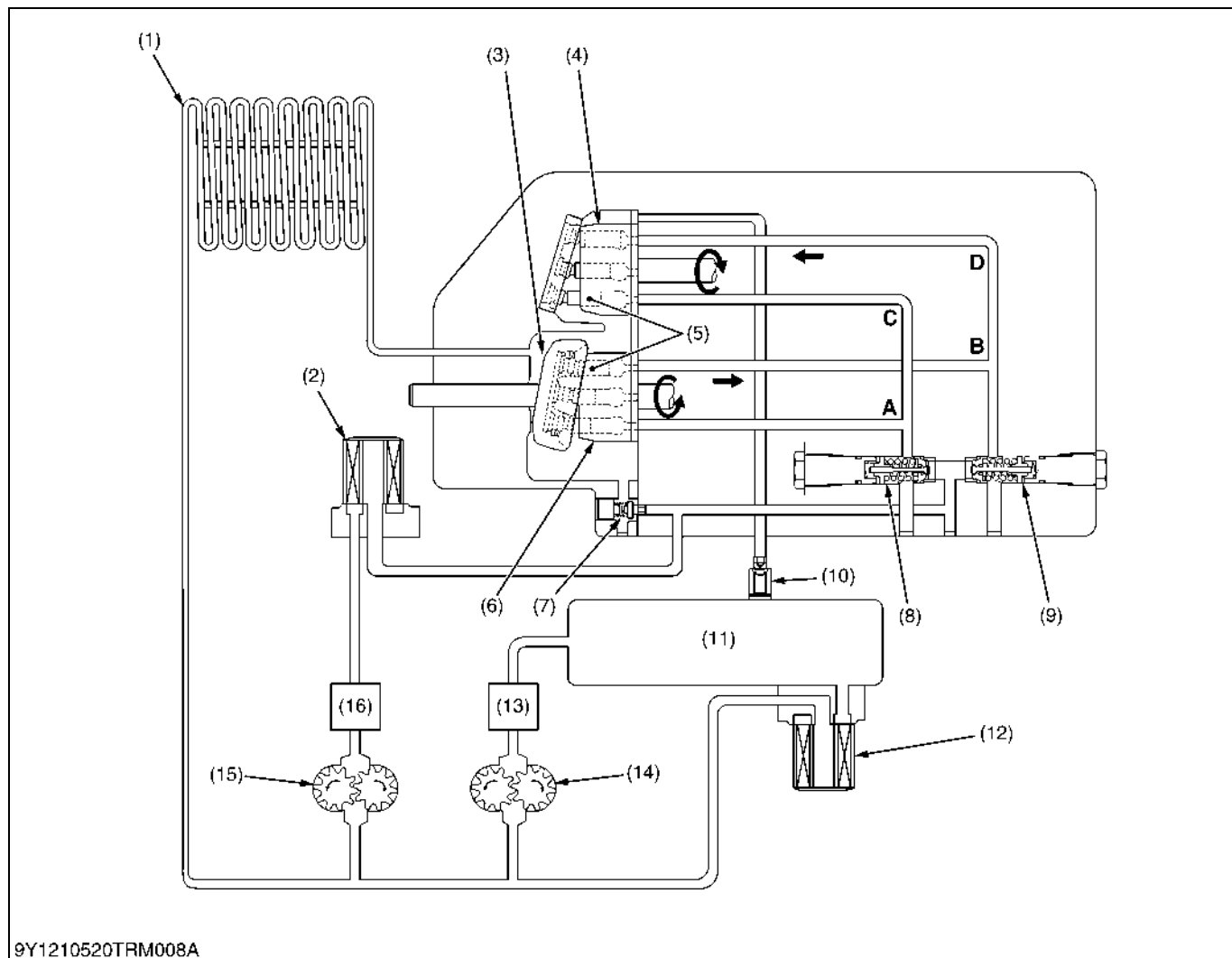
When the speed control pedal is stepped on and in forward, the variable swash-plate is tilted as shown in figure above.

As the pump cylinder block rotates with the input shaft, oil is forced out of pump port **A** at high pressure. As pressure oil enters motor port **C**, the pistons, which align with port **C**, are pushed against the swash-plate and slide down the inclined surface.

Then the output shaft rotates with the motor cylinder block. This drives the machine forward and the angle of pump swash-plate determines the output shaft speed.

As the motor cylinder block continues to rotate, oil is forced out of motor port **D** at low pressure and returns to the pump port **B**.

9Y1211012TRM0023US0

When the HST pedal is pressed toward the reverse side

(1) Oil Cooler	(8) Check and High Pressure Relief Valve (Forward)	(13) Hydraulic Control Valve	A: Pump Port A
(2) Oil Filter (HST)	(9) Check and High Pressure Relief Valve (Reverse)	(14) Hydraulic Pump (Main Circuit)	B: Pump Port B
(3) Swash plate	(10) Case Relief Valve	(15) Hydraulic Pump (Power Steering)	C: Motor Port C
(4) Cylinder Block (Motor)	(11) Transmission Case	(16) Power Steering Controller	D: Motor Port D
(5) Piston	(12) Oil Filter		
(6) Cylinder Block (Pump)			
(7) Charge Relief Valve			

When the speed control pedal is stepped on and in reverse, the variable swash-plate is tilted as shown in figure above.

As the pump cylinder block rotates with the input shaft, oil is forced out of pump port **B** at high pressure. As pressure oil enters motor port **D**, the pistons, which align with port **D**, are pushed against the swash-plate and slide down the inclined surface.

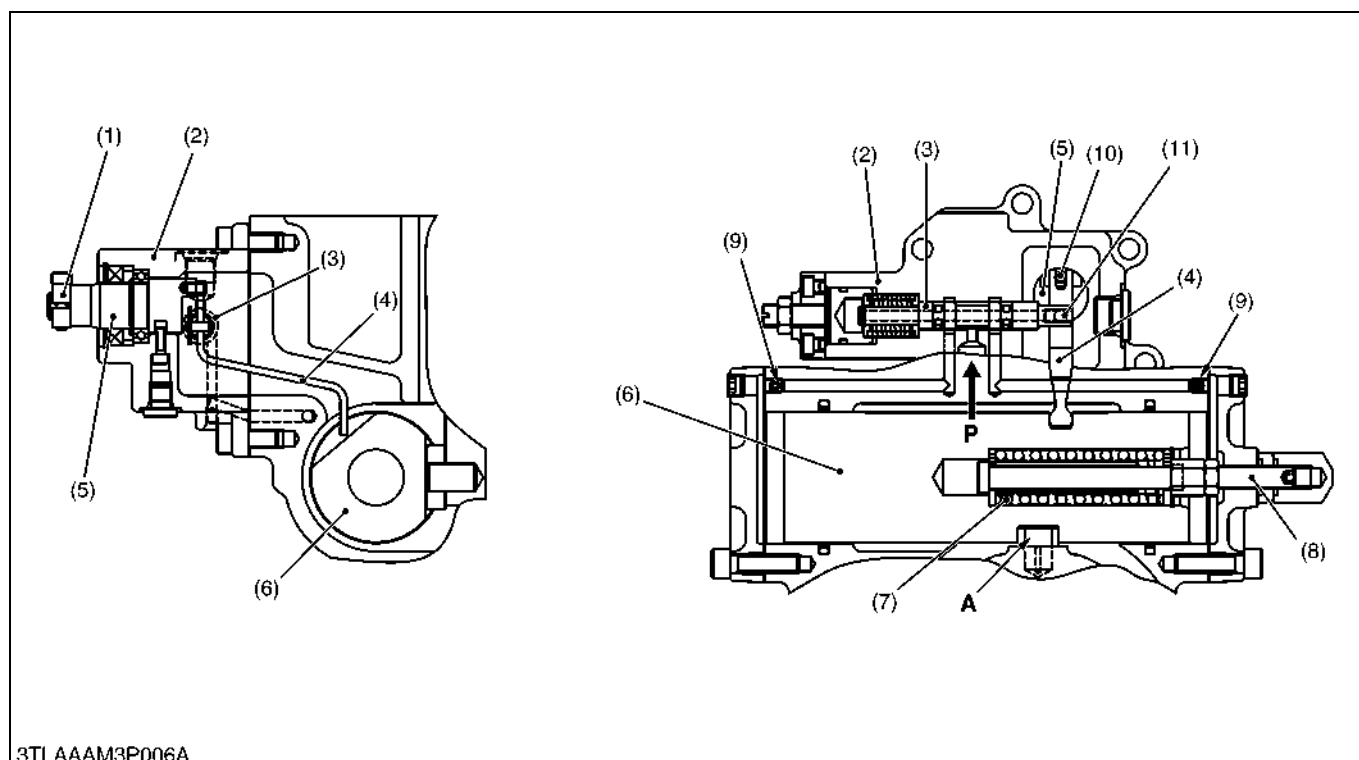
Then the output shaft rotates with the motor cylinder block. This drives the machine rearward and the angle of pump swash-plate determines the output shaft speed.

As the motor cylinder block continues to rotate, oil is forced out of motor port **C** at low pressure and returns to the pump port **A**.

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[B] L4701

Servomechanism



3TLAAAM3P006A

(1) Control Lever (Connected to HST Pedal)	(5) Control Shaft	(9) Orifice	A: Slit for Connection of Swashplate
(2) Regulator Valve Assembly	(6) Servo Piston	(10) Pin A (Fixed with Control Shaft)	P: IN Port (From Bypass Pipe)
(3) Spool	(7) Spring	(11) Pin B	
(4) Feedback Lever	(8) Piston Adjusting Screw		

As for the servomechanism, the regulator (2) and servo piston (6) are chiefly composed. The regulator is connected to the HST pedal through linkages, and controls the flow of oil to the servo piston by the pedal operation.

The servo piston moved by hydraulic force, is connected to the pump cylinder swashplate. Therefore, a tilt angle of swashplate is varied by servo piston movement.

As for the regulator and the servo piston, it is connected with feedback lever (4), and the movement of the piston is restricted according to the amount of depressing of the HST pedal.

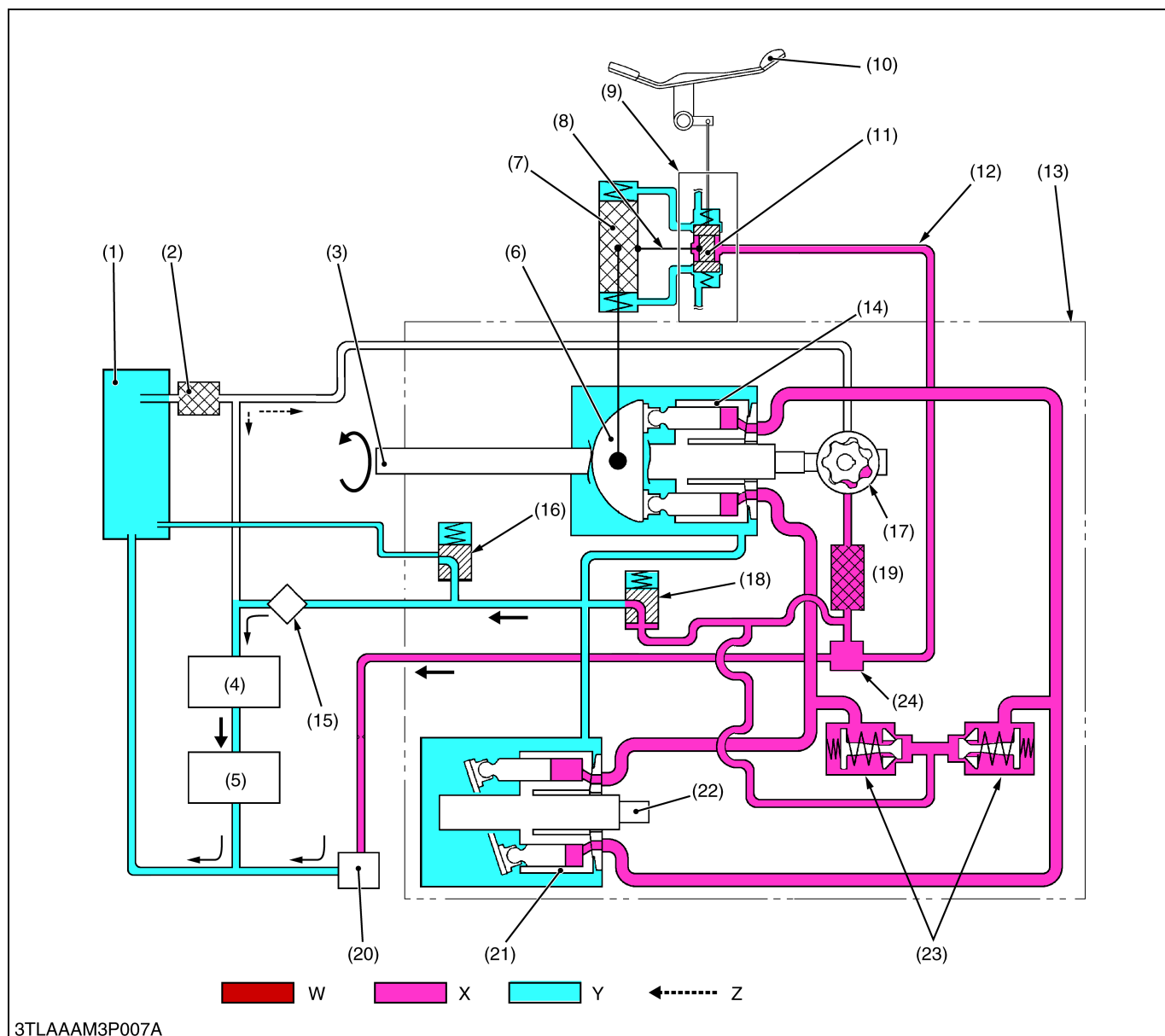
Refer to Workshop Manual of **"TRACTOR MECHANISM" (Code No. 97897-18200)** for the operation of the servomechanism, that is, the operation of regulator and servo piston.

■ Valves

As for the mechanism and function of check and high pressure relief valve, charge relief valve and case relief valve, refer to Workshop Manual of **"TRACTOR MECHANISM" (Code No. 97897-18200)**.

9Y1211012TRM0025US0

Neutral

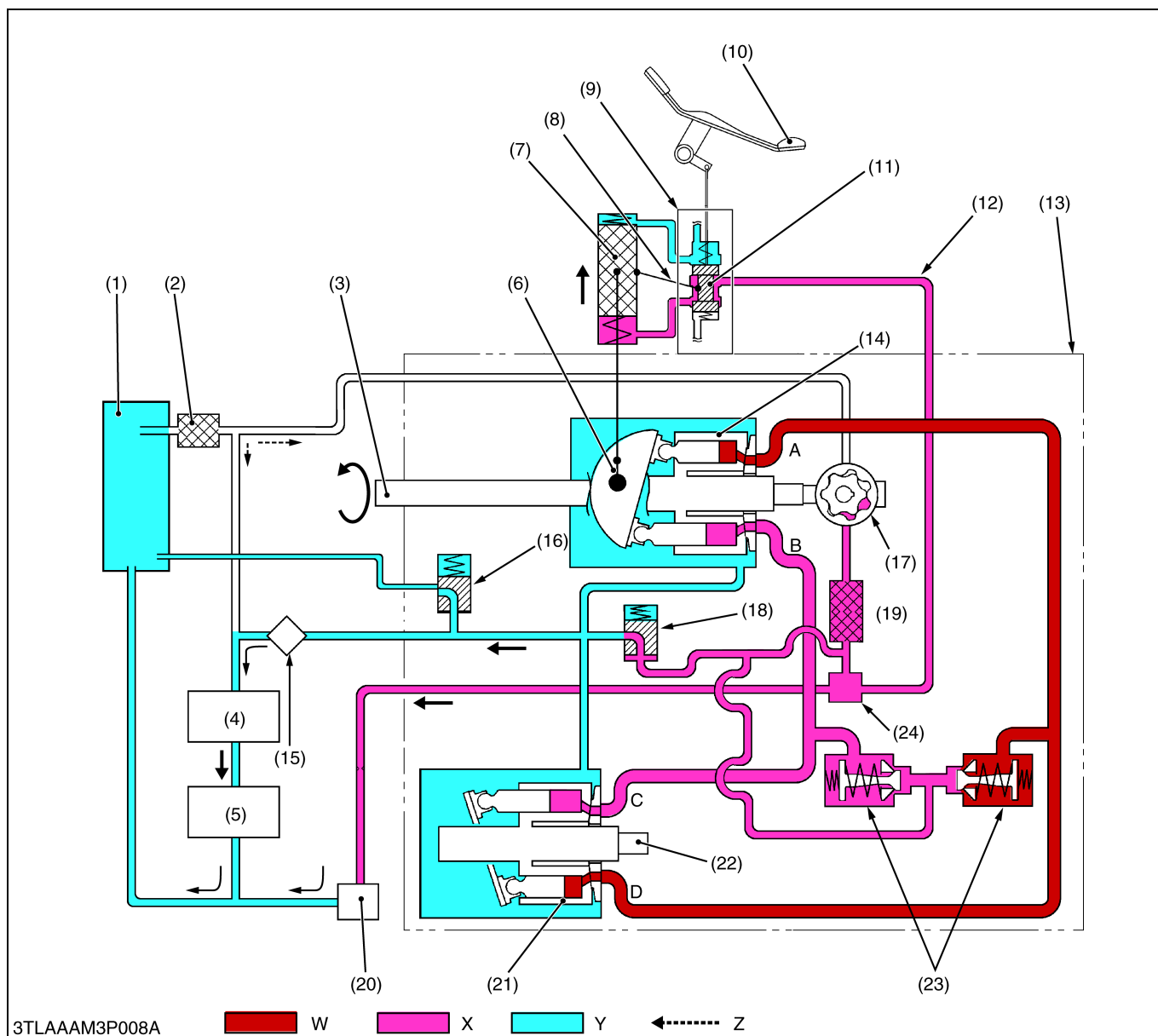


(1) Transmission Case	(9) Regulator Valve Assembly	(16) Case Relief Valve	(23) Check and High Pressure Relief Valve
(2) Filter	(10) HST Pedal	(17) Charge Pump	(24) PTO Clutch Pressure Priority Valve
(3) Input Shaft	(11) Spool	(18) Charge Relief Valve	
(4) Hydraulic Pump	(12) Bypass Pipe	(19) Oil Filter	
(5) Power Steering Circuit	(13) HST Assembly	(20) PTO Clutch Valve Circuit	W: High Pressure Oil
(6) Variable Swashplate	(14) Pump Cylinder Block	(21) Motor Cylinder Block	X: Low Pressure Oil
(7) Servo Piston	(15) Oil Cooler	(22) Output Shaft	Y: Free Oil
(8) Feedback Lever			Z: Suction Oil

The sucked oil from the transmission case (1) by the charge pump (17) flows into the HST assembly (13) and the regulator valve (9) through the oil filter (19) and the charge relief valve (18). Overflow oil from HST assembly (13) flows to hydraulic pump (4) through the oil cooler (15).

When the HST pedal (10) is in neutral, regulator valve (9) is not activated, so the variable swashplate (6) is at right angle to the pump pistons and they only rotate with the pump cylinder block (14) without reciprocation. Since the oil is not being pumped to motor, the cylinder block in the motor cylinder block (21) is stationary and the output shaft (22) does not rotate.

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Forward

- (1) Transmission Case
- (2) Filter
- (3) Input Shaft
- (4) Hydraulic Pump
- (5) Power Steering Circuit
- (6) Variable Swashplate
- (7) Servo Piston
- (8) Feedback Lever
- (9) Regulator Valve Assembly

- (10) HST Pedal
- (11) Spool
- (12) Bypass Pipe
- (13) HST Assembly
- (14) Pump Cylinder Block
- (15) Oil Cooler
- (16) Case Relief Valve
- (17) Charge Pump
- (18) Charge Relief Valve

- (19) Oil Filter
- (20) PTO Clutch Valve Circuit
- (21) Motor Cylinder Block
- (22) Output Shaft
- (23) Check and High Pressure Relief Valve
- (24) PTO Clutch Pressure Priority Valve

- A: Pump Port A**
- B: Pump Port B**
- C: Motor Port C**
- D: Motor Port D**
- W: High Pressure Oil**
- X: Low Pressure Oil**
- Y: Free Oil**
- Z: Suction Oil**

When the HST pedal (10) is stepped on and in forward, so the variable swashplate (6) is tilted by the servo piston (7) and the regulator valve (9) as shown in figure above.

As the pump cylinder block (14) rotates with the input shaft (3), the oil is forced out of pump port **A** at high pressure.

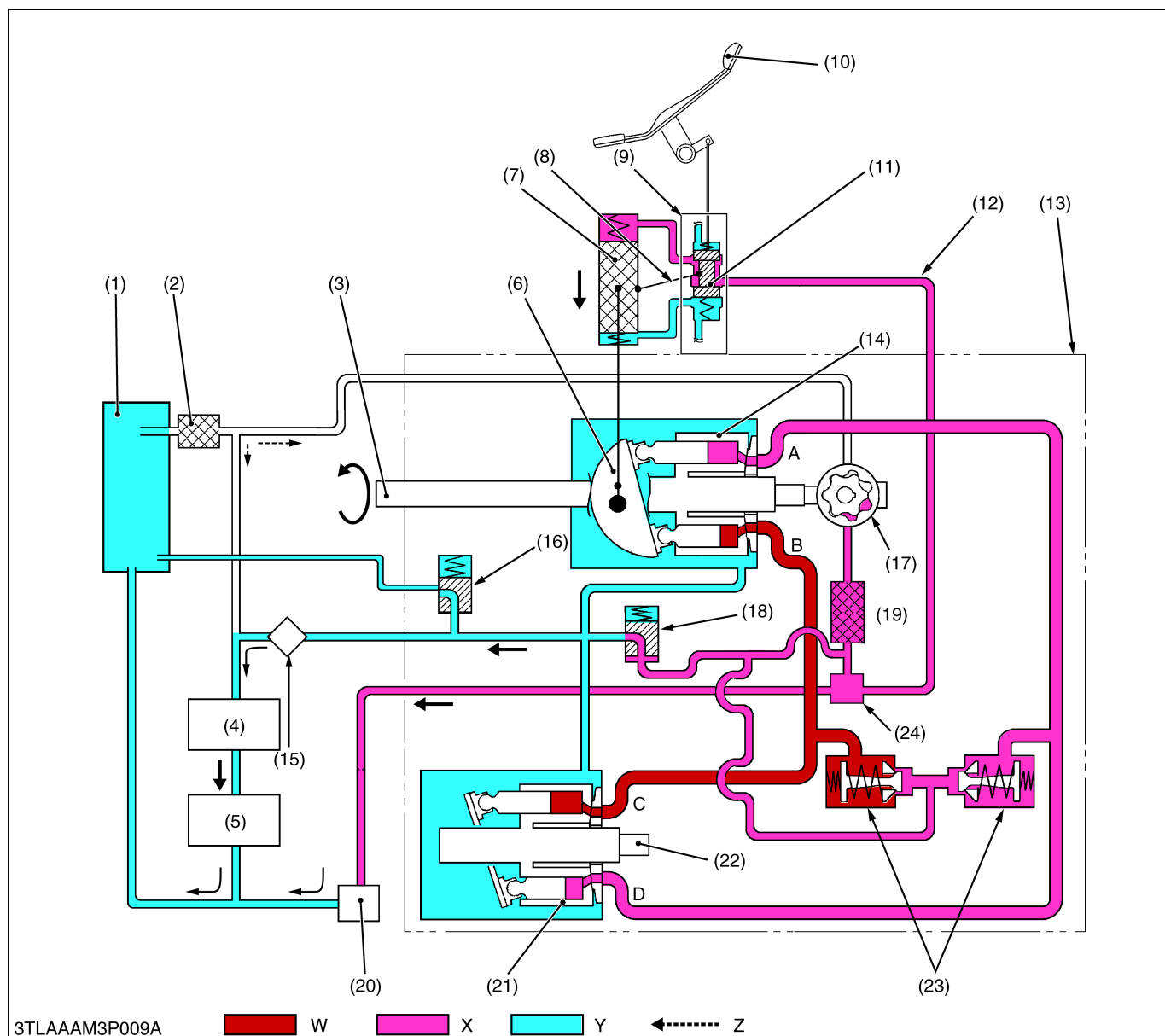
As the pressured oil enters to motor port **D**, the pistons, which align with port **D**, are pushed against the thrust plate and slide down inclined surface.

Then the output shaft (22) rotates with the motor cylinder block (21). This drives the machine forward and the angle of pump swashplate determines the output shaft speed.

As the motor cylinder block (21) continues to rotate, oil is forced out of motor port **C** at low pressure and returns to the pump port **B**.

9Y1211012TRM0027US0

Reverse



(1) Transmission Case	(10) HST Pedal	(19) Oil Filter	A: Pump Port
(2) Filter	(11) Spool	(20) PTO Clutch Valve Circuit	AB: Pump Port
(3) Input Shaft	(12) Bypass Pipe	(21) Motor Cylinder Block	BC: Motor Port
(4) Hydraulic Pump	(13) HST Assembly	(22) Output Shaft	CD: Motor Port
(5) Power Steering Circuit	(14) Pump Cylinder Block	(23) Check and High Pressure Relief Valve	DW: High Pressure Oil
(6) Variable Swashplate	(15) Oil Cooler	(24) PTO Clutch Pressure Priority Valve	X: Low Pressure Oil
(7) Servo Piston	(16) Case Relief Valve		Y: Free Oil
(8) Feedback Lever	(17) Charge Pump		Z: Suction Oil
(9) Regulator Valve Assembly	(18) Charge Relief Valve		

When the HST pedal (10) is stepped on and in reverse, the variable swashplate (6) is tilted by the servo piston (7) and the regulator valve (9) as shown in figure above.

As the pump cylinder block (14) rotates with the input shaft (3), the oil is forced out of pump port B at high pressure. As the pressured oil enters motor port **C**, the pistons, which align with port **C**, are pushed against the thrust plate and slide down inclined surface.

Then the output shaft (22) rotates with the motor cylinder block (21). This drives the machine rearward and the angle of pump swashplate determines the output shaft speed.

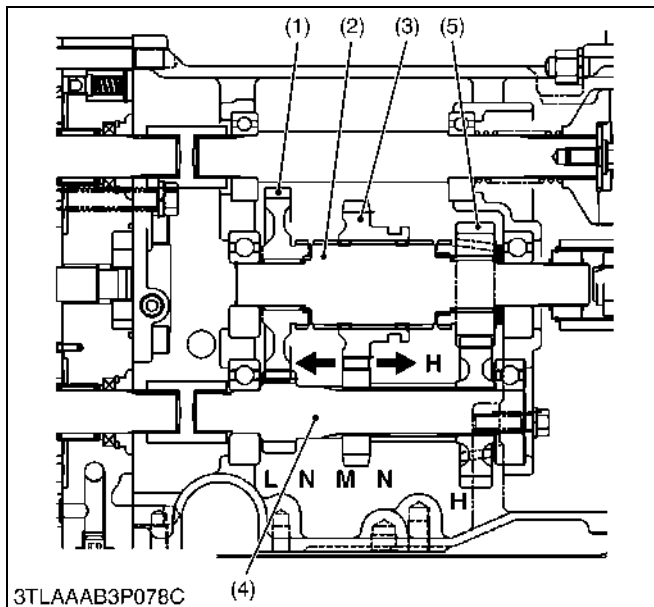
As the motor cylinder block (21) continues to rotate, oil is forced out of motor port **D** at low pressure and returns to the pump port **A**.

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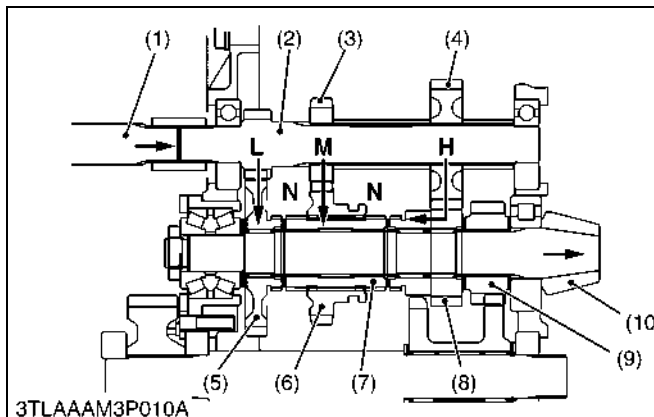
[2] POWER TRAIN FOR TRAVELING GEARS

(1) Range Gear Shift Section

L3301/L3901



L4701



The range gear shift section is located in the mid case.

It changes the speed to five position (**L**, **N**, **M**, **N** and **H**) by shifting of shift gear (3) in the straight line on shaft (2).

- (1) 37T Gear
- (2) Shaft
- (3) 31T Gear
- (4) 13T-13T-28T Gear Shaft
- (5) 22T Gear

- L: Low Speed Position**
- N: Neutral Position**
- M: Middle Speed Position**
- H: High Speed Position**

9Y1211012TRM0029US0

The Hi-Mid-Lo range gear shift section is located in the differential gear case.

It changes the speed to five positions (**L**, **N**, **M**, **N** and **H**) by shifting of shifter gear (6) in the straight line on 6T spiral bevel pinion shaft (10).

- (1) 18T Gear Shaft
- (2) 11T Sub Shaft
- (3) 19T Sub Gear
- (4) 28T Sub Gear
- (5) 37T Gear (Low Speed)
- (6) 31T Gear (Middle Speed, Shifter Gear)
- (7) Spline Boss

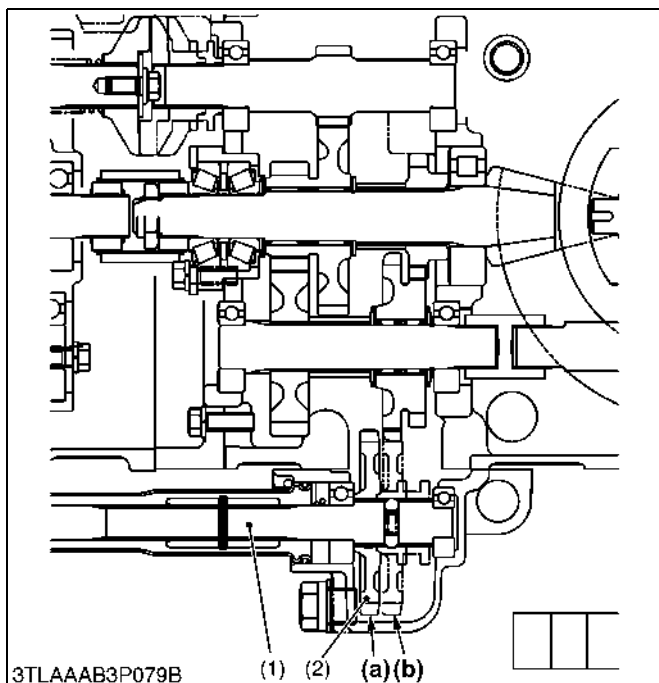
- (8) 22T Gear (High Speed)
- (9) 18T Gear (DT)
- (10) 6T Spiral Bevel Pinion Shaft

- L: Low Speed Position**
- N: Neutral Position**
- M: Middle Speed Position**
- H: High Speed Position**

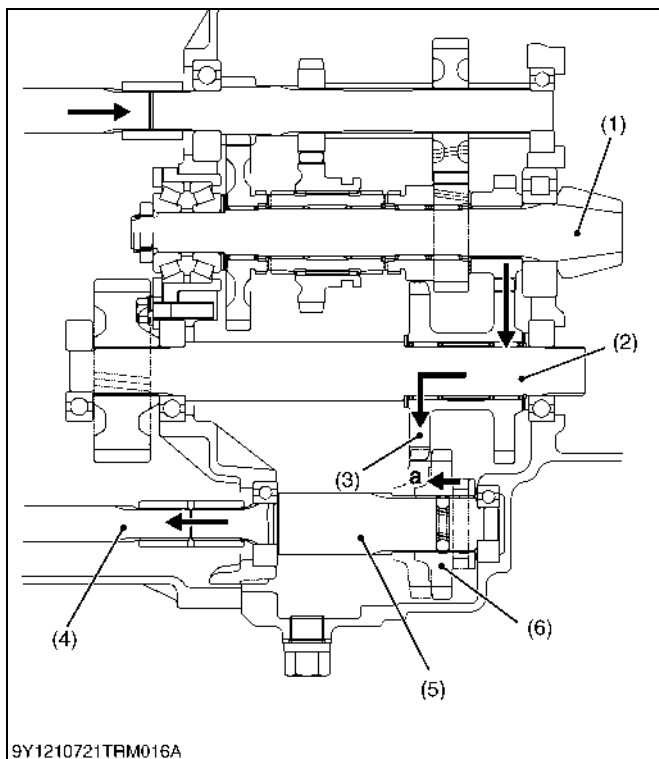
9Y1211012TRM0030US0

(2) Front Wheel Drive Section

L3301/L3901



L4701



Front wheel drive section is located in the differential gear case.

2 wheel drive or 4 wheel drive is selected by operating the front wheel drive lever to shift the shift gear (2).

(1) Front Wheel Drive Shaft	(a) 2 Wheel Drive Position
(2) Shift Gear	(b) 4 Wheel Drive Position

9Y1211012TRM0031US0

Front wheel drive section is located in the differential gear case.

2 wheel drive or 4 wheel drive is selected by operating the front wheel drive lever to shift the DT shift gear (6).

(1) 6T Spiral Bevel Pinion Shaft	(5) DT Shaft
(2) PTO Drive Shaft	(6) DT Shift Gear
(3) 29T-31T DT Gear	
(4) Propeller Shaft	

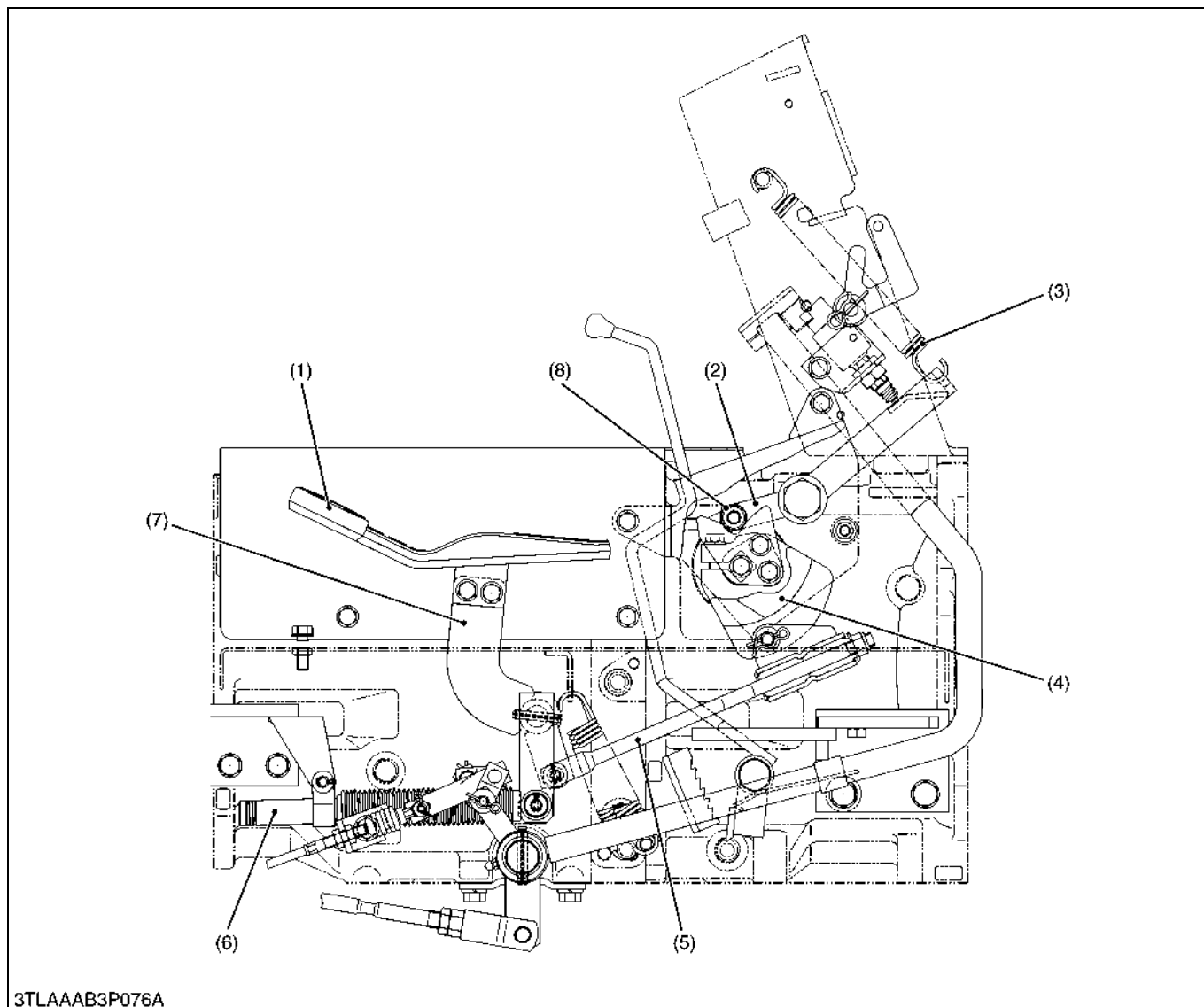
a: 4 Wheel Drive (DT) Position

9Y1211012TRM0032US0

[3] LINKAGE MECHANISM

(1) HST PEDAL CONTROL LINKAGE

L3301/L3901



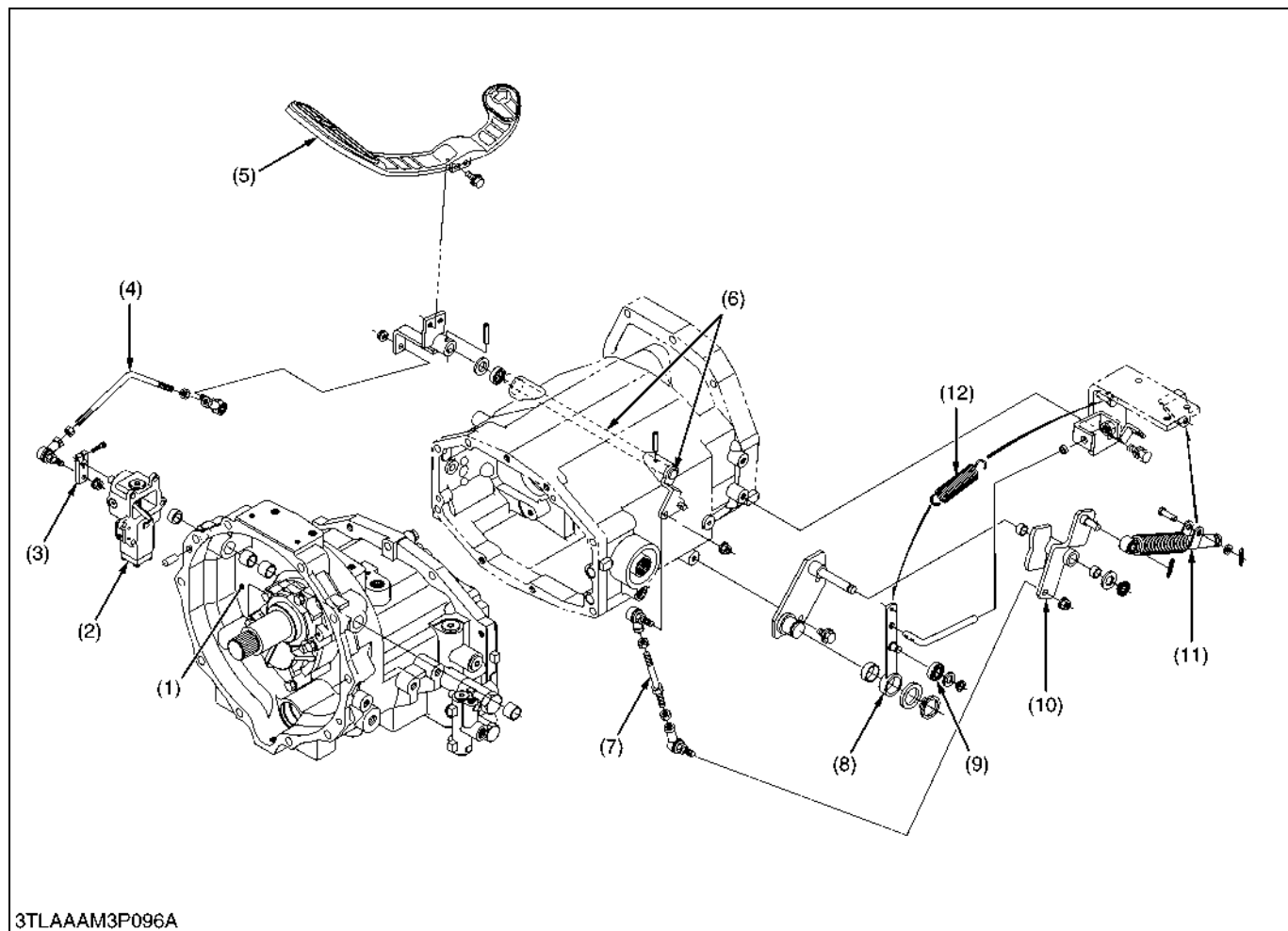
(1) HST Pedal	(3) Spring	(5) Neutral Rod	(7) Pedal Bracket
(2) Neutral Holder Arm	(4) Neutral Holder	(6) Damper	(8) Ball Bearing

The speed control pedal (HST pedal) (1) and the holder (Trunnion) are linked with the pedal bracket and HST neutral rod (5).

As the HST pedal (1) is depressed to forward, the neutral holder (4) is rotated, then the swash-plate is tilted by trunnion shaft and forward travelling speed increases. Then, the swash-plate is returned to neutral with the neutral holder arm (2), when the pedal is released. The ball bearing (8) on the neutral holder (2) pulled with the neutral spring (3) seats the detent of the neutral holder arm (4) so that the neutral holder arm returns to neutral.

The damper (6) is connected to the HST pedal (1) and restricts the movement of the linkage to prevent abrupt operation or reversing.

9Y1211012TRM0033US0

L4701

(1) HST Assembly	(4) HST Control Rod	(7) Neutral Rod	(10) Neutral Holder Arm
(2) Regulator Valve Assembly	(5) HST Pedal	(8) Neutral Holder	(11) Damper
(3) HST Control Lever	(6) Connecting Shaft	(9) Ball Bearing	(12) Neutral Spring

The speed control pedal (HST pedal) (5) and the regulator valve assembly (2) are linked with the pedal bracket and HST control rod (4). And HST pedal (5) and the neutral holder arm (10) are linked with pedal bracket and neutral rod (7) through connecting shaft (6).

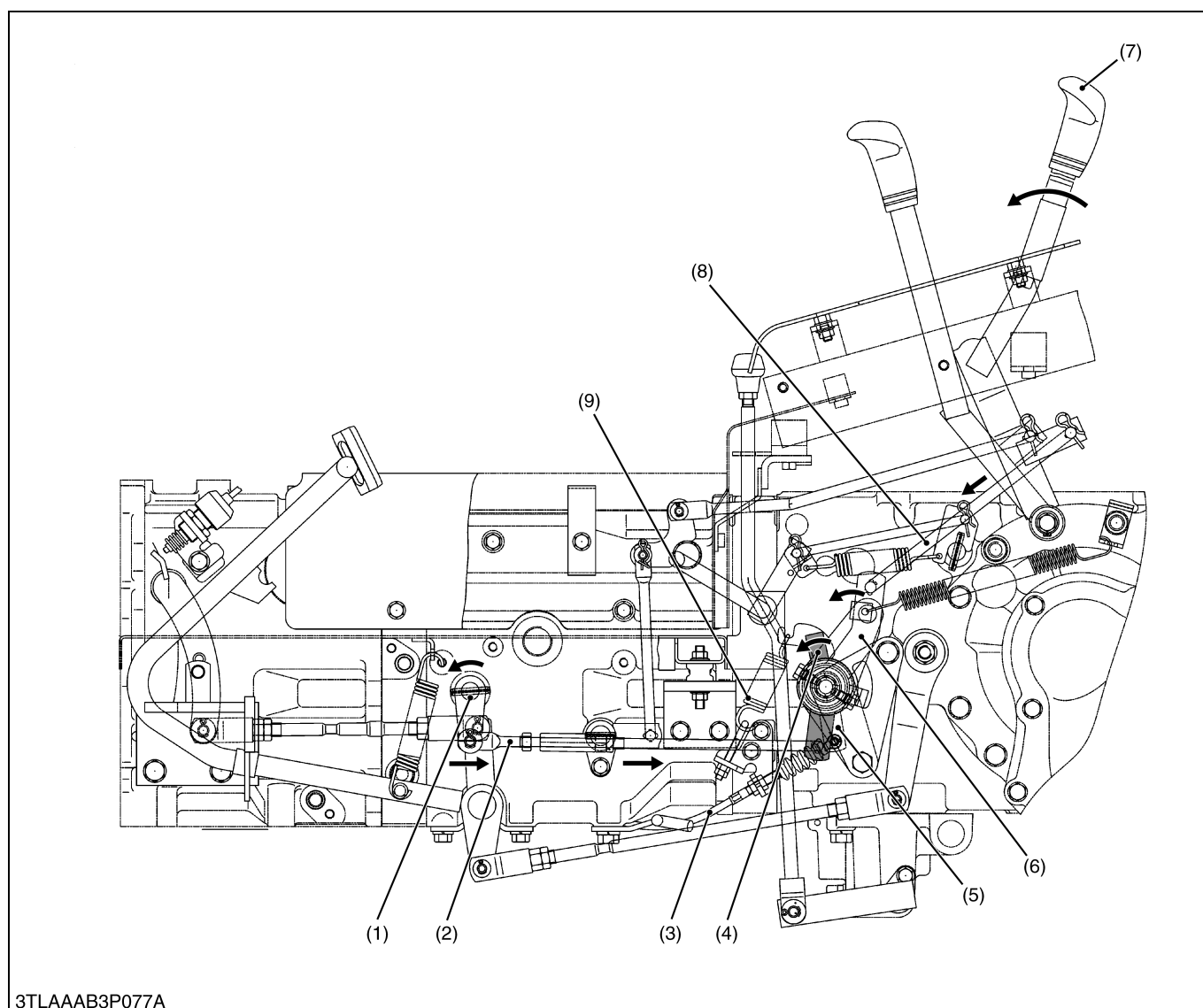
As the HST pedal (5) is depressed to forward, the HST control lever (3) is rotated, then the swashplate is tilted by servomechanism and forward travelling speed increases. Then, the swashplate is returned to neutral with the neutral holder arm (10), when the pedal is released. The ball bearing (9) on the neutral holder (8) pulled with the neutral spring (12) seats the detente of the neutral holder arm (10) so that the neutral holder arm returns to neutral.

The damper (11) is connected to the HST pedal (5) through the connecting shaft (6), the neutral rod (7) and the neutral holder arm (10), restricts the movement of the linkage to prevent abrupt operation or reversing.

9Y1211012TRM0034US0

(2) Cruise Control

L3301/L3901 (Option)



3TLAAAB3P077A

(1) Connecting Shaft	(4) Cruise Lever 1	(6) Cruise Lever 2	(8) Lever Rod
(2) Cruise Adjusting Rod	(5) Release Lever	(7) Cruise Control Lever	(9) Release Spring
(3) Release Wire			

The cruise control lever (7) and HST pedal are linked with the lever rod (8), cruise lever 1 (4), cruise lever 2 (6), cruise adjusting rod (2) and connecting shaft (1).

When the cruise control lever (7) is moved to forward direction, cruise lever 2 (6) is moved to arrow direction by the lever rod (8). The cruise lever 1 (4) is moved forward by being pushed to the cruise lever 2 (6), and cruise adjusting rod (2) is pulled backward. Because cruise adjusting rod (2) and the HST pedal are connected by the connecting shaft (1), the HST pedal is moved and HST becomes forward position.

The cruise control can be returned to neutral automatically when brake pedals are depressed.

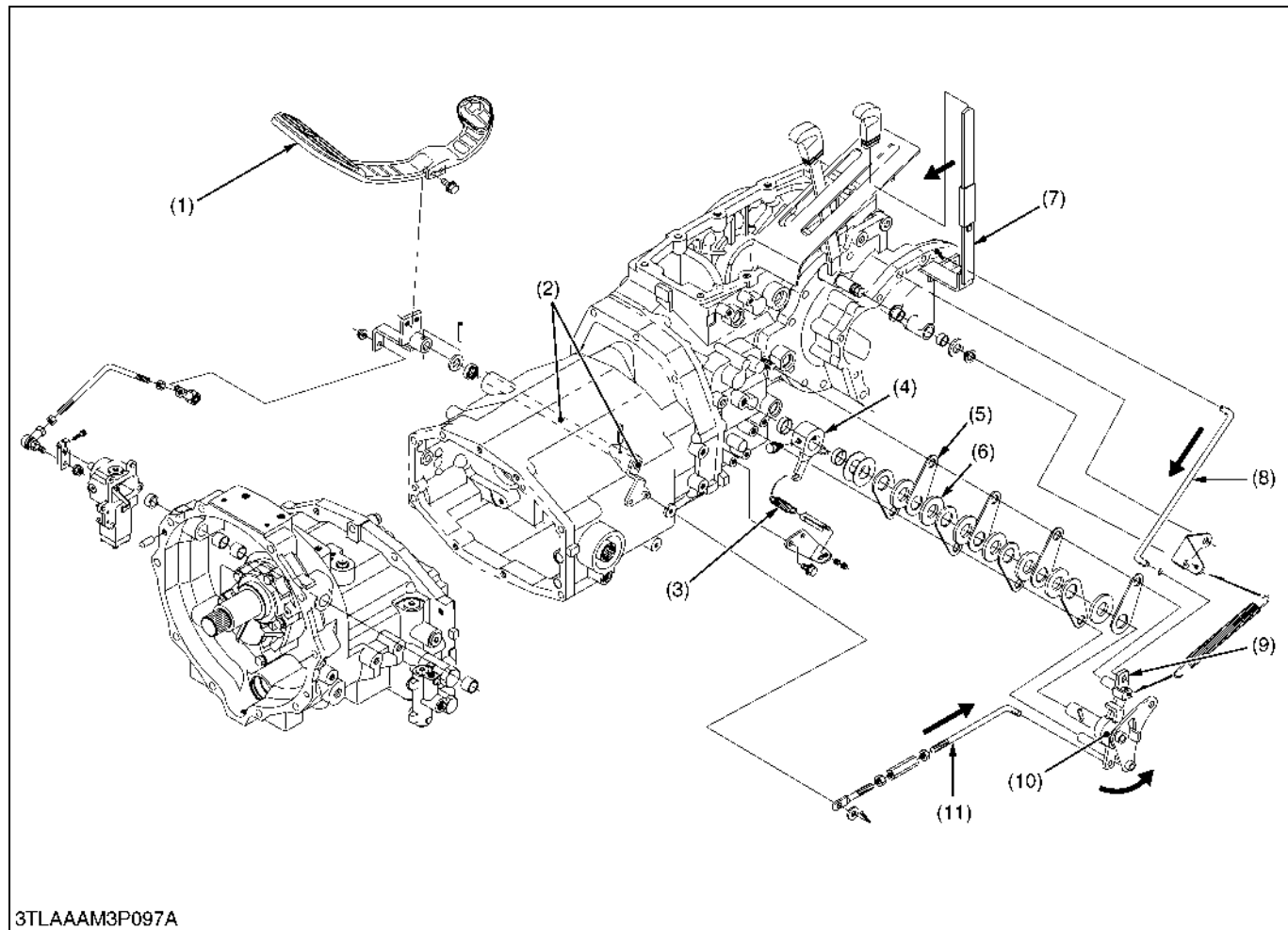
When brake pedals are depressed, release wire pull the release lever (5) to forward.

As result, the holding force of cruise control lever (7) is lost and the cruise control lever (7) return to neutrality by force of release spring (9).

9Y1211012TRM0035US0

L4701

■ Speed Set



(1) HST Pedal	(4) Release Lever	(7) Cruise Control Lever	(10) Cruise Lever 1
(2) Connecting Shaft	(5) Friction Plate	(8) Lever Rod	(11) Cruise Adjusting Rod
(3) Cruise Spring	(6) Friction Disk	(9) Cruise Lever 2	

The cruise control lever (7) and the HST pedal (1) are linked with the lever rod (8), the cruise lever 1 (10), the cruise lever 2 (9), the cruise adjusting rod (11) and the connecting shaft (2).

When the cruise control lever (7) is moved to forward direction, the cruise lever 2 (9) is moved to arrow direction by the lever rod (8). The cruise lever 1 (10) is moved forward by being pushed to the cruise lever 2 (9), and the cruise adjusting rod (11) is pulled backward. Because the cruise adjusting rod (11) and the HST pedal (1) are connected by the connecting shaft (2), the HST pedal is moved and HST becomes forward position.

On the other hand, because the friction plate (5) and the friction disk (6) are suppressed outside by the release lever (4) and the cruise spring (3), the cruise lever 1 (10) and the cruise lever 2 (9) are fixed at the position. As a result, the cruise control lever position can be infinitely set.

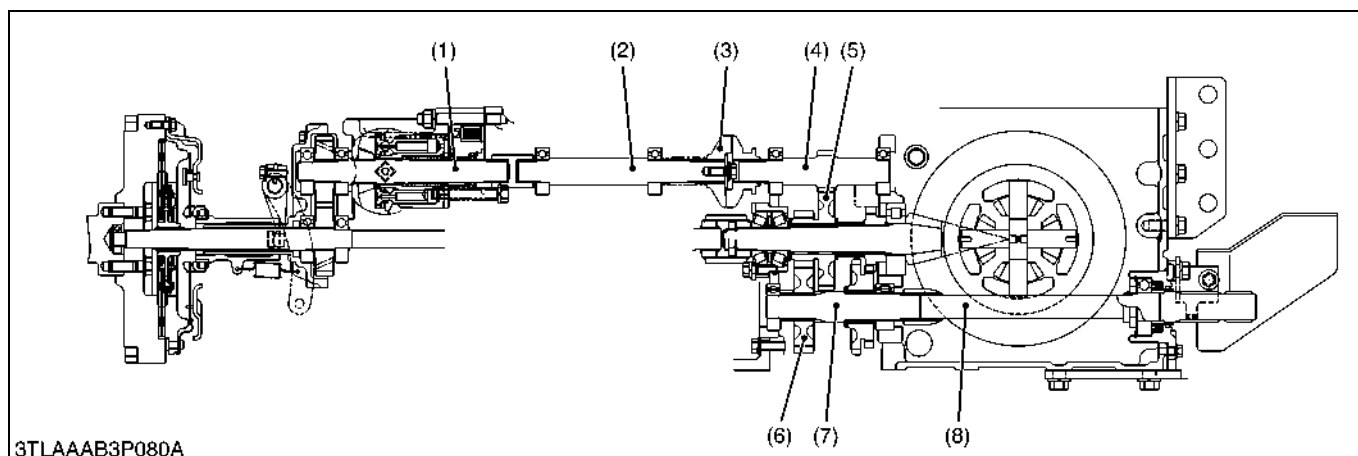
In addition, because the movement of the cruise lever 1 (10) is restricted by the cruise lever 2 (9), the backward pedal operation cannot be done while the cruise control lever (7) is operating.

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[4] PTO SYSTEM

(1) Structure

L3301/L3901



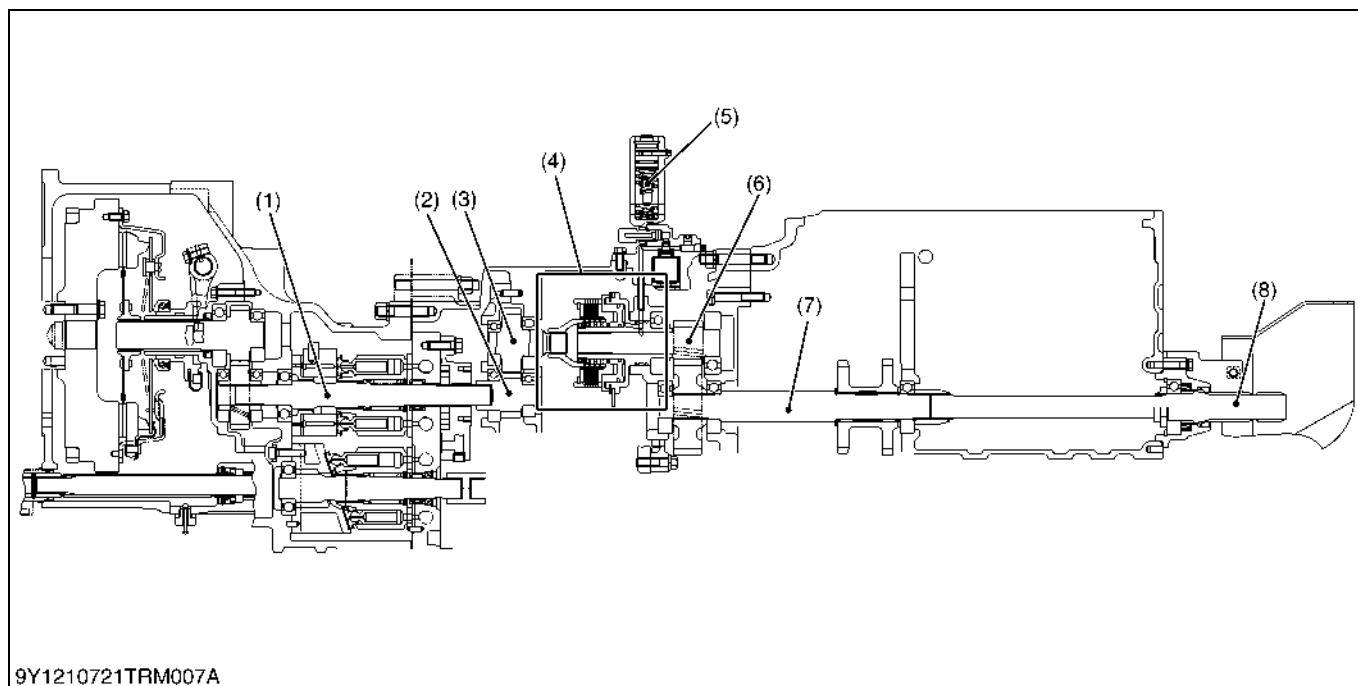
(1) Pump Shaft (HST)	(3) PTO Clutch	(5) 15T-44T Gear	(7) PTO Drive Shaft
(2) PTO Counter Shaft	(4) 16T Gear Shaft	(6) 27T Gear	(8) PTO Shaft

PTO is **"ENGAGED"** or **"DISENGAGED"** by operating the shift lever of the PTO clutch (3).

The power train from the clutch to PTO shaft is composed as shown in figure above.

9Y1211012TRM0037US0

L4701



(1) HST Motor Shaft	(3) PTO Counter Gear Shaft	(5) Accumulator	(7) PTO Drive Shaft
(2) PTO Gear Shaft 1	(4) PTO Clutch Pack	(6) PTO Counter Shaft	(8) Rear PTO Shaft

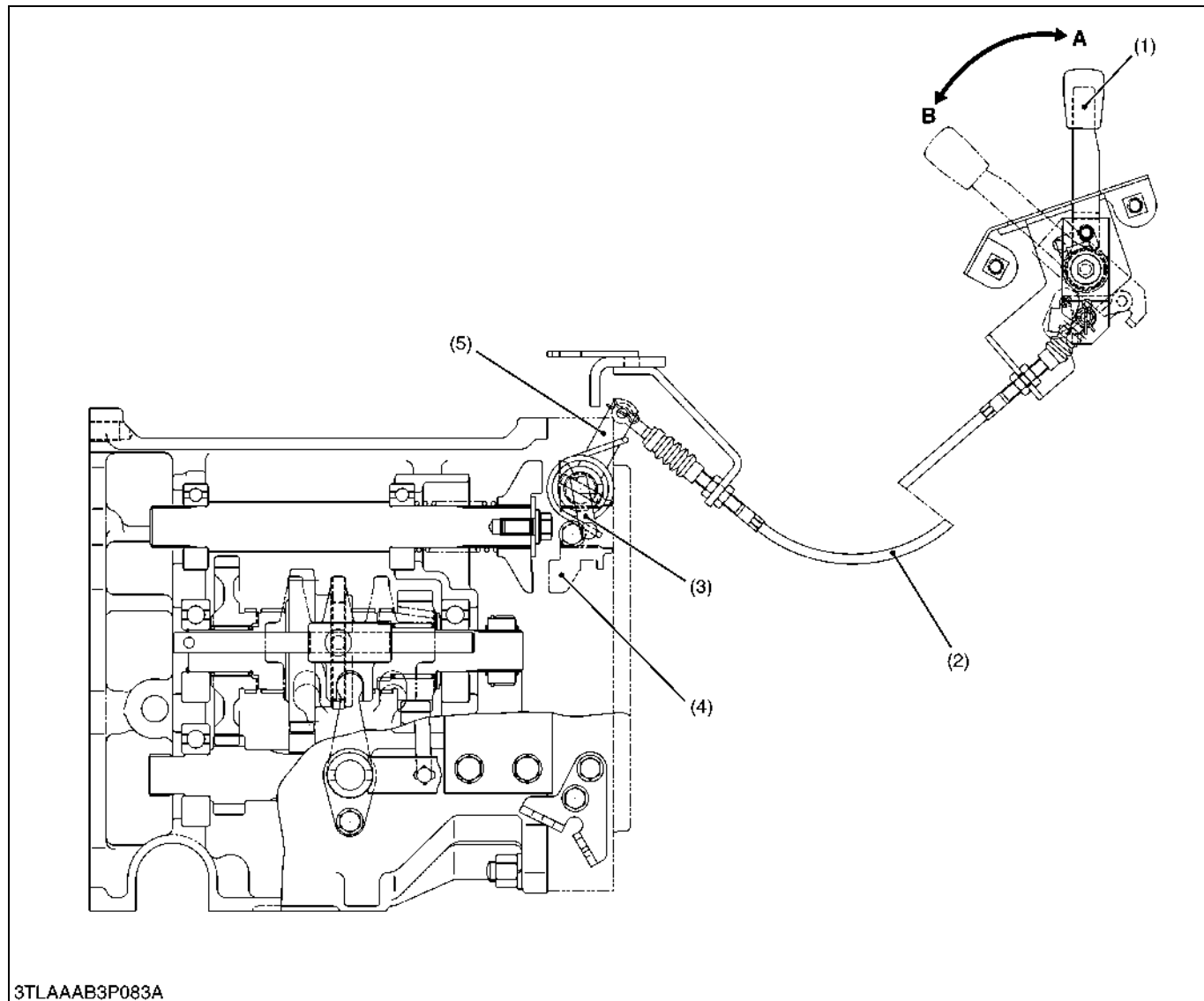
The independent PTO operated by PTO clutch pack (4) is adopted to L4701.

The rear PTO is **"ENGAGED"** or **"DISENGAGED"** by operating the PTO clutch control switch.

Mid PTO is not adopted.

The PTO power train from the clutch to the rear PTO shaft is composed as shown in the figure above.

9Y1211012TRM0038US0

(2) Mechanism**[A] L3301/L3901****Shift Linkage**

(1) PTO Lever	(3) PTO Shift Fork	(5) Lever
(2) PTO Shift Cable	(4) 16T PTO Clutch	

A: Disengaged
B: Engaged

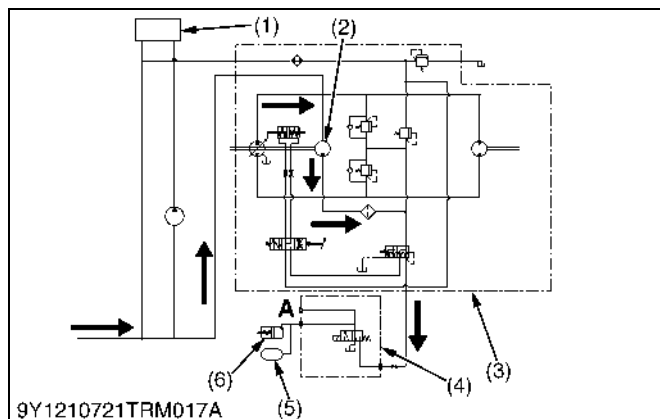
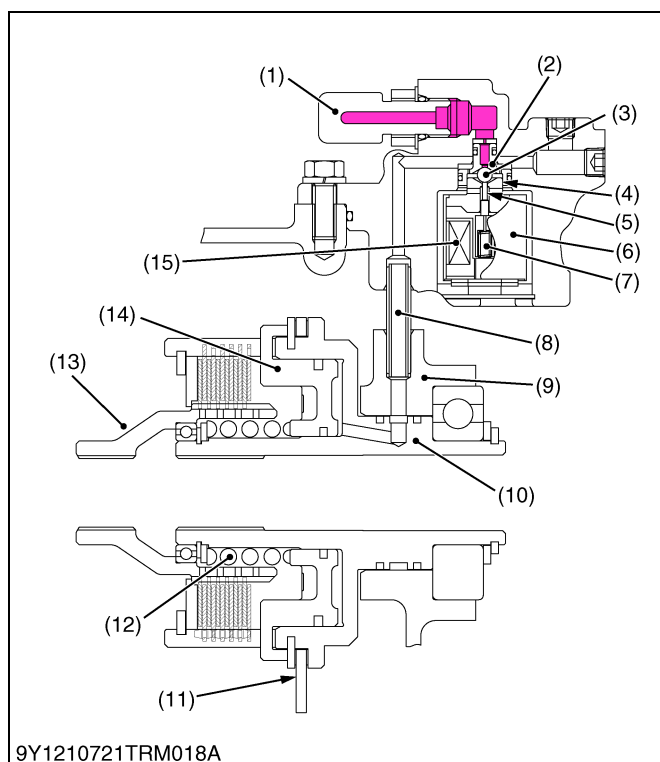
The PTO lever (1) through the shift fork (3) are connected by shift cable (2), as shown in the figure above.

When the shift lever (1) is moved to the "A" side or the "B" side, the shift fork (3) is moved by means of the shift cable (2) and lever (5).

When the shift lever (1) is moved to the "A" side, the PTO is shifted to the "Disengaged" position.

When the shift lever (1) is moved to the "B" side, the PTO is shifted to the "Engaged" position.

9Y1211012TRM0039US0

[B] L4701**Oil Flow****Function of PTO Clutch****■ PTO Clutch Control Switch "OFF" Position**

The pressured oil from the charge pump (2) located in the HST assembly (3) flows into the PTO clutch valve (4).

When the PTO clutch control switch is at the **"ON"** position, PTO clutch solenoid valve is opened and the oil flows through the PTO clutch pack (6) to the accumulator (5) and the PTO clutch pack (6) to engage it.

(1) Power Steering Controller and Cylinders	(5) Accumulator
(2) Charge Pump	(6) PTO Clutch Pack
(3) HST Assembly	
(4) PTO Valve	

A: PTO Clutch Operating Pressure Check Port

9Y1211012TRM0040US0

When the PTO control switch is set at **"OFF"** position, the coil is not a magnetic.

The spring pushes the rod (5) and the ball (3) is pushed the plunger (2).

Since oil passage between the ball (3) and the plunger (2) is closed, oil from the pump port is blocked at the PTO clutch solenoid valve (6).

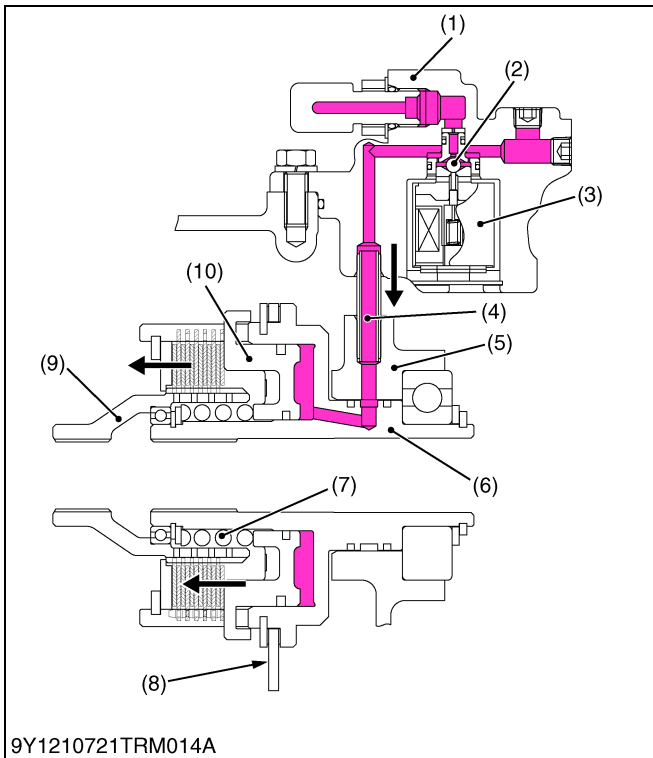
Since the pressured oil is not supplied to the PTO clutch, the PTO clutch is not engaged.

In this condition, the return spring (12) pushes the brake disk (11), and PTO clutch assembly does not rotate.

(1) Joint	(9) Mid Case
(2) Plunger	(10) I-PTO Clutch
(3) Ball	(11) Brake Disk
(4) Seat	(12) Return Spring
(5) Rod	(13) Clutch Hub
(6) PTO Clutch Solenoid Valve	(14) Piston
(7) Spring	(15) Coil
(8) Hydraulic Pipe	

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■ PTO Clutch Control Switch "ON" Position



When the PTO control switch is set at **"ON"** position the coil of the PTO solenoid valve (3) is excited.

The spring (15) under the ball (2) is pushed into the solenoid valve (3).

The ball is pushed to the seat (13).

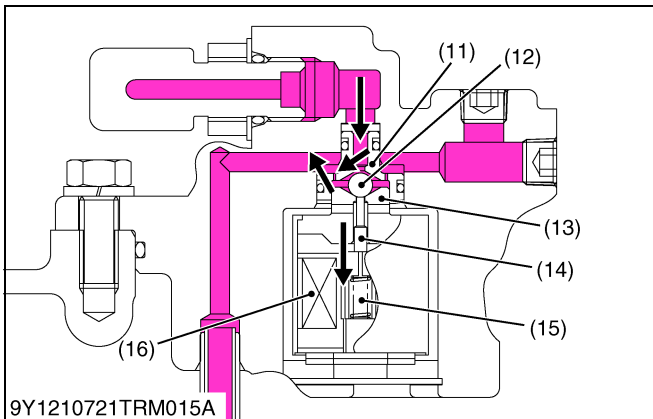
Since oil passage between the ball (12) and the plunger (11) is opened, oil from the pump port flows to the PTO clutch pack.

Since the pressured oil pushes the piston (10) to the clutch plates and the clutch disks side, the PTO clutch is engaged.

In this condition, the return spring (7) is pushed by the piston (10), the brake disk separates from the I-PTO case (6), and PTO brake is not engaged.

(1) Joint	(9) Clutch Hub
(2) Ball	(10) Piston
(3) PTO Clutch Solenoid Valve	(11) Plunger
(4) Hydraulic Pipe	(12) Ball
(5) Mid Case	(13) Seat
(6) I-PTO Clutch	(14) Rod
(7) Return Spring	(15) Spring
(8) Brake Disk	(16) Coil

9Y1211012TRM0042US0



SERVICING

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Excessive Transmission Noise	Transmission fluid insufficient	Fill	G-37, G-65
	Gear worn or backlash improper	Replace	3-S100, 3-S104, 3-S108, 3-S113
	Bearing worn or broken	Replace	3-S104, 3-S108, 3-S113
	Shift fork worn	Replace	3-S100, 3-S104, 3-S108, 3-S114
	Spline worn	Replace	3-S100, 3-S104, 3-S108, 3-S113
	Snap rings on the shaft come off	Repair or replace	–
	Spiral bevel pinion staking nut improperly tightened	Tighten	3-S46, 3-S80, 3-S96
	Improper backlash between spiral bevel pinion and spiral bevel gear	Adjust	3-S105, 3-S115
	Improper backlash between differential pinion and differential side gear	Adjust	3-S107, 3-S117
	Synchronizer unit damaged	Repair or replace	3-S101
Gear Slip Out of Mesh	Shift linkages rusted	Repair	–
	Shifter or shift fork damaged	Replace	3-S100, 3-S104, 3-S108, 3-S114
	Shift fork interlock ball spring weaken or damaged	Replace	–
	Interlock ball fallen	Reassemble	–
	Gears worn or broken	Replace	3-S100, 3-S104, 3-S108, 3-S113
	Synchronizer unit damaged	Repair or replace	3-S101

Symptom	Probable Cause	Solution	Reference Page
Hard Shifting	Shifter or shift fork worn or damaged	Replace	3-S100, 3-S104, 3-S108, 3-S114
	Shift fork bent	Replace	3-S100, 3-S104, 3-S108, 3-S114
	Shift linkage rusted	Repair	–
	Shaft part of shift arms rusted	Repair	–
	Synchronizer unit damaged	Repair or replace	3-S101
Gears Clash When Shifting	Clutch does not release	Adjust or repair	2-S5
	Gears worn or damaged	Replace	3-S100, 3-S104, 3-S108, 3-S113
Differential Lock Can Not Be Set	Differential lock shift fork damaged	Replace	–
	Differential lock shift fork mounting spring pin damaged	Replace	–
	Differential lock shifter pin bent or damaged	Replace	–
	Differential lock fork shaft bent or damaged	Replace	–
Differential Lock Pedal Does Not Return	Differential lock pedal return spring weaken or damaged	Replace	–
	Differential lock shifter pin bent or damaged	Replace	–
	Differential lock fork shaft bent	Replace	–
Excessive or Unusual Noise at All Time	Improper backlash between spiral bevel pinion and spiral bevel gear	Adjust	3-S105, 3-S115
	Improper backlash between differential pinion and differential side gear	Adjust	3-S107, 3-S117
	Bearings worn	Replace	3-S104, 3-S108, 3-S113
	Insufficient or improper type of transmission fluid used	Fill or replace	G-37, G-65
Noise While Turning	Differential pinions or differential side gears worn or damaged	Replace	–
	Differential lock binding (does not disengage)	Replace	–
	Bearing worn	Replace	3-S104, 3-S108, 3-S113

HST

Symptom	Probable Cause	Solution	Reference Page
System Will Not Operate in Either Direction	Oil level is low	Check oil level or fill oil to propeller level	G-37, G-65
	Speed control pedal linkage damaged	Repair or linkage	3-S16, 3-S23
	Charge pressure is too low	Solution order 1. Replace oil filter cartridge	G-34, G-62
		2. Check charge pressure	3-S15, 3-S22
		3. Inspect or flush charge relief valve	3-S15, 3-S22
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	3-S14, 3-S21
	Component parts damaged	Replace hydraulic transmission assembly	3-S48, 3-S86
Vibration and Noise	Oil level is too low	Check oil level or fill oil to proper level	G-37, G-65
	Speed control pedal linkage damaged	Repair linkage	3-S16, 3-S23
	Charge pressure is too low	Solution order 1. Replace oil filter cartridge	G-34, G-62
		2. Check charge pressure	3-S15, 3-S22
		3. Inspect or flush charge relief valve	3-S15, 3-S22
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	3-S14, 3-S21
	Component parts damaged	Replace hydrostatic transmission assembly	3-S48, 3-S86

Symptom	Probable Cause	Solution	Reference Page
Loss of Power	Oil level is low	Check oil level or fill oil to proper level	G-37, G-65
	Speed control pedal linkage damaged	Repair linkage	3-S16, 3-S23
	Charge pressure is too low	Solution order 1. Replace oil filter cartridge	G-34, G-62
		2. Check charge pressure	3-S15, 3-S22
		3. Inspect or flush charge relief valve	3-S15, 3-S22
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	3-S14, 3-S21
	Neutral valve damaged	Inspect or replace neutral valve	–
	Component parts damaged	Replace hydrostatic transmission assembly	3-S48, 3-S86
Transmission Oil Over Heats	Low transmission oil level	Fill transmission oil level up to proper level	G-37, G-65
	Radiator net clogged	Clean radiator net	G-24, G-52
	Excessive machine load	Reduce machine load	–
	Improper charge pressure	1. Check high relief pressure	3-S14, 3-S21
		2. Replace transmission oil filter cartridge	G-34, G-62
		3. Replace check and high pressure relief valve	3-S14, 3-S21
		4. Inspect and replace charge relief valve	3-S15, 3-S22
Machine Will Not Stop in Neutral Position	Speed control linkage is out of adjustment or sticking	Repair or replace linkage	–
		Adjust neutral adjuster	3-S16, 3-S23
	Neutral valve damaged	Inspect or replace neutral valve	–
System Operates in One Direction Only	Speed control linkage damaged	Repair or replace linkage	3-S16, 3-S23
	Check and high pressure relief valve damaged	Replace check and high pressure relief valve	3-S14, 3-S21

PTO CLUTCH

Symptom	Probable Cause	Solution	Reference Page
PTO Clutch Slips	Operating pressure is low	Adjust	3-S19, 3-S20
	PTO clutch valve malfunctioning	Repair or replace	3-S78
	Clutch disc or drive plate excessively worn	Replace	3-S80
	Deformation of piston or return plate	Replace	3-S80
PTO Shaft Does Not Rotate	PTO clutch malfunctioning	Repair or replace	3-S78
	PTO coupling left behind	Install	—
PTO Clutch Operating Pressure Is Low	Transmission oil improper or insufficient	Fill or change	G-37, G-65
	Relief valve malfunctioning	Adjust or replace	3-S19, 3-S20
PTO Clutch Drags	Brake plate excessively worn	Replace	3-S80
	Return spring weaken or broken	Replace	3-S80
	Deformation or return plate or steel plate	Replace	3-S80

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2. SERVICING SPECIFICATIONS

[1] L3301/L3901

Item		Factory Specification	Allowable Limit
Gear	Backlash	0.1 to 0.3 mm 0.0040 to 0.011 in.	0.4 mm 0.02 in.
Gear to Spline	Clearance	0.030 to 0.078 mm 0.0012 to 0.0030 in.	0.20 mm 0.008 in.
Shift Fork and Shift Gear Groove	Clearance	0.15 to 0.40 mm 0.0059 to 0.015 in.	0.6 mm 0.02 in.
Shift Fork to Shifter Groove	Clearance	0.15 to 0.40 mm 0.0059 to 0.015 in.	0.6 mm 0.02 in.
Shift Fork Spring	Free Length	22.0 mm 0.87 in.	20.0 mm 0.79 in.
Differential Gear	Rotating Torque	3.9 to 6.3 N·m 0.40 to 0.6 kgf·m 2.9 to 4.6 lbf·ft	—
Bevel Gear to 8T Spiral Bevel Pinion	Backlash	0.15 to 0.30 mm 0.0059 to 0.011 in.	—
Differential Case Bore to Differential Side Gear Boss	Clearance	0.0500 to 0.151 mm 0.00197 to 0.00594 in.	0.350 mm 0.014 in.
• Differential Case Bore	I.D.	40.500 to 40.562 mm 1.5945 to 1.5969 in.	—
• Differential Side Gear Boss	O.D.	40.411 to 40.450 mm 1.5910 to 1.5925 in.	—
Differential Case Cover Bore to Differential Side Gear Boss	Clearance	0.090 to 0.169 mm 0.00355 to 0.00665 in.	0.350 mm 0.014 in.
• Differential Case Cover Bore	I.D.	40.540 to 40.580 mm 1.5961 to 1.5976 in.	—
• Differential Side Gear Boss	O.D.	40.411 to 40.450 mm 1.5910 to 1.5925 in.	—
Differential Pinion Shaft to Differential Pinion	Clearance	0.0800 to 0.122 mm 0.00315 to 0.00480 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.	20.060 to 20.081 mm 0.78977 to 0.79059 in.	—
Differential Pinion to Differential Side Gear	Backlash	0.15 to 0.30 mm 0.0059 to 0.011 in.	0.4 mm 0.02 in.

HST

Item		Factory Specification	Allowable Limit
Check and High Pressure Relief Valve Condition	Setting Pressure	33.4 to 36.2 MPa 340 to 370 kgf/cm ² 4840 to 5260 psi	—
• Engine Speed: Maximum • Oil Temperature 45 to 55 °C (113 to 131 °F) • Range Gear Shift Lever: H Position • HST Pedal: Depress Forward or Reverse with Brake			
Charge Relief Valve Condition	Setting Pressure	0.5 to 0.6 MPa 5 to 8 kgf/cm ² 80 to 90 psi	—
• Engine Speed: Maximum • Oil Temperature: 45 to 55 °C (113 to 131 °F) • HST Pedal: Neutral			
HST Pedal to Stopper Bolt	Clearance	2 to 5 mm 0.08 to 0.1 in.	—
	Height (A)	20 mm 0.79 in.	—
	Height (B)	13 mm 0.51 in.	—
Cruise Control Rod	Length	315 mm 12.4 in.	—

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[2] L4701

Item		Factory Specification	Allowable Limit
Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.012 in.	0.4 mm 0.02 in.
Gear to Spline	Clearance	0.030 to 0.078 mm 0.0012 to 0.0030 in.	0.2 mm 0.008 in.
Shift Fork and Shift Gear Groove	Clearance	0.15 to 0.40 mm 0.0059 to 0.0015 in.	0.6 mm 0.02 in.
Shift Fork Spring	Free Length	22 mm 0.87 in.	20 mm 0.79 in.
Spiral Bevel Gear to Spiral Bevel Pinion Shaft	Backlash	0.15 to 0.30 mm 0.006 to 0.012 in.	0.4 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 40.562 mm 1.5945 to 1.5969 in.	–
• Differential Side Gear Boss	O.D.	40.411 to 40.450 mm 1.5910 to 1.5925 in.	–
Differential Case Cover Bore to Differential Side Gear Boss	Clearance	0.090 to 0.169 mm 0.00355 to 0.00665 in.	0.35 mm 0.014 in.
• Differential Case Cover Bore	I.D.	40.540 to 40.580 mm 1.5961 to 1.5976 in.	–
• Differential Side Gear Boss	O.D.	40.411 to 40.450 mm 1.5910 to 1.5925 in.	–
Differential Pinion Shaft to Differential Pinion	Clearance	0.0800 to 0.122 mm 0.00315 to 0.00480 in.	0.25 mm 0.0098 in.
	O.D.	19.959 to 19.980 mm 0.78579 to 0.78661 in.	–
	I.D.	20.060 to 20.081 mm 0.78977 to 0.79059 in.	–
Differential Pinion to Differential Side Gear	Backlash	0.15 to 0.30 mm 0.0059 to 0.011 in.	0.4 mm 0.02 in.

HST

Item		Factory Specification	Allowable Limit
High Pressure Relief Valve Condition • Oil Temperature 40 to 60 °C (104 to 140 °F)	Setting Pressure	33.4 to 36.3 MPa 340.0 to 370.0 kgf/cm ² 4836 to 5263 psi	—
			—
Charge Relief Valve	Setting Pressure	2.3 to 2.6 MPa 23.5 to 27.0 kgf/cm ² 334 to 384 psi	—
HST Pedal to Stopper Bolt	Clearance	2 to 6 mm 0.08 to 0.2 in.	—
	Height (A)	25 mm 0.98 in.	—
	Height (B)	15 mm 0.59 in.	—
Cruise Control Lever	Operating Force	60 to 100 N 6.2 to 10.1 kgf 14 to 22.4 lbf	—

PTO CLUTCH

Item		Factory Specification	Allowable Limit
PTO Clutch Valve Condition • Engine Speed: Idling • Oil Temperature: 40 to 60 °C (104 to 140 °F)	When PTO Clutch Control Switch is Set to "ON" Position	[Manual Transmission Model] 2.25 to 2.45 MPa 23.0 to 25.0 kgf/cm ² 327 to 356 psi	—
		[HST Model] 2.3 to 2.6 MPa 23.5 to 27.0 kgf/cm ² 335 to 384 psi	—
	When PTO Clutch Control Switch is Set to "OFF" Position	No pressure	—
PTO Clutch Disc	Thickens	1.70 to 1.90 mm 0.067 to 0.075 in.	1.55 mm 0.061 in.
PTO Steel Plate	Thickness	1.15 to 1.25 mm 0.045 to 0.049 in.	1.10 mm 0.043 in.
PTO Piston	Flatness	—	0.15 mm 0.006 in.
PTO Steel Plate	Flatness	—	0.30 mm 0.0012 in.
PTO Return Spring	Free Length	42.5 to 43.5 mm 1.67 to 1.71 in.	38.3 mm 1.51 in.
Seal Ring	Thickness	2.45 to 2.5 mm 0.096 to 0.098 in.	2.0 mm 0.079 in.

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3. TIGHTENING TORQUES

[1] L3301/L3901

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

Item	N·m	kgf·m	lbf·ft
HST trunnion plate mounting screw	24 to 27	2.4 to 2.8	18 to 20
Steering wheel mounting nut	48 to 55	4.9 to 5.7	36 to 41
Oil cooler return pipe bolt	92 to 101	9.0 to 10.0	6.7 to 7.3
Delivery pipe joint screw	49 to 69	5.0 to 7.0	37 to 50
Steering shaft universal joint bolt	23.5 to 27.4	2.4 to 2.8	17.3 to 20.2
Steering bearing flange bolt	23.5 to 27.4	2.4 to 2.8	17.3 to 20.2
Delivery pipe mounting joint bolt	49 to 69	5.0 to 7.0	37 to 50
Clutch housing and transmission case mounting nut	103 to 117	10.5 to 12.0	76.0 to 86.7
ROPS mounting screw	166.7 to 196.1	17.0 to 20.0	123 to 144
ROPS fulcrum screw	118 to 137	12 to 14	87 to 101
Rear wheel mounting screw and nut	215	22	160
Hydraulic cylinder assembly mounting screw and nut	78 to 90	7.9 to 9.2	58 to 66
Rear axle case mounting screw and nut	48 to 55	4.9 to 5.7	36 to 41
Brake case mounting stud bolt	39 to 45	3.9 to 4.6	29 to 33
Bearing holder mounting screw	48 to 55	4.9 to 5.7	36 to 41
PTO shaft staking nut	147 to 196	15.0 to 20.0	109 to 144
Differential bearing case mounting screw	48 to 55	4.9 to 5.7	36 to 41
Spiral bevel pinion shaft lock nut	147 to 196	15.0 to 20.0	109 to 144
Pinion bearing case mounting screw	40 to 44	4.0 to 4.5	29 to 32
Spiral bevel gear UBS screw	69 to 88	7.0 to 9.0	51 to 65
Release fork mounting screw	24 to 27	2.4 to 2.8	18 to 20
Plate mounting screw	24 to 27	2.4 to 2.8	18 to 20
Neutral holder mounting screw	24 to 27	2.4 to 2.8	18 to 20
Port block mounting hex. socket screw	61 to 70	6.2 to 7.2	45 to 52
Hex. head plug (Check and high pressure relief valve)	59 to 78	6.0 to 8.0	44 to 57
Hex. head plug (Charge relief valve)	31 to 37	3.1 to 3.8	23 to 27
Hex. socket head screw	25 to 29	2.5 to 3.0	18 to 21
Swashplate mounting hex. head screw	29 to 35	2.9 to 3.6	21 to 26
Clutch cam mounting screw	61 to 70	6.2 to 7.2	45 to 52
Bearing holder mounting screw	48 to 55	4.9 to 5.7	36 to 41
Hydraulic cylinder assembly mounting screws and nut	78 to 90	7.9 to 9.2	58 to 66
Lock nut	150 to 190	15 to 20	110 to 140
Pinion bearing holder mounting screw	40 to 44	4.0 to 4.5	29 to 32
Spacer mounting screw	48 to 55	4.9 to 5.7	36 to 41
Rear axle case mounting screws and nuts	48 to 55	4.9 to 5.7	36 to 41
Brake case mounting stud bolts	39 to 45	3.5 to 5.0	26 to 36
Differential bearing case mounting screw	48 to 55	4.9 to 5.7	36 to 41

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[2] L4701

Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: "5. TIGHTENING TORQUES" on page G-13.)

Item	N·m	kgf·m	lbf·ft
HST control lever setting hex. head screw	6.9 to 8.3	0.7 to 0.85	5.06 to 6.15
Steering wheel mounting nut	48 to 55	4.9 to 5.7	36 to 41
HST return pipe bolt	79.2 to 88.2	8.1 to 9.0	58.4 to 65.1
Delivery pipe mounting screw	18 to 20	1.8 to 2.0	13 to 15
Delivery pipe joint bolt	49.0 to 69.0	5.0 to 7.0	37 to 50
Main delivery hose retaining nut	46.6 to 50.9	4.8 to 5.2	35 to 37
Turning delivery hoses retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Engine and clutch housing case mounting screws and nuts	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5
3P delivery pipe joint bolt	49.0 to 69.0	5.0 to 7.0	36.2 to 50.6
3P delivery pipe mounting M8 bolt	23.5 to 24.7	2.4 to 2.8	18 to 20
Clutch housing case and mid case mounting nuts	102.9 to 117.6	10.5 to 12.0	76.9 to 86.8
Clutch housing case and mid case mounting screws	78 to 90	7.9 to 9.2	57.1 to 66.5
Mid case and transmission case mounting stud bolts	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2
ROPS mounting M14 screws	166.7 to 196.1	17.0 to 20.0	123 to 144
ROPS fulcrum screws	118 to 137	12.0 to 14.0	87 to 101
Rear wheel mounting screw and nut	196.0 to 225.0	20.0 to 23.0	144.6 to 166.0
Hydraulic cylinder assembly mounting screws and nut	77.4 to 90.2	7.9 to 9.2	57.1 to 66.5
Rear axle case mounting M10 nuts	60.8 to 70.5	6.2 to 7.2	44.9 to 52.1
Rear axle case mounting M12 screws and nuts	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5
Brake case mounting stud bolts	38.2 to 45.1	3.9 to 4.6	28.2 to 33.3
Brake case mounting screws, and nuts	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5
Brake case lever mounting screw	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5
Release fork mounting screw	23.5 to 27.4	2.4 to 2.8	17.4 to 20.2
Shaft case mounting screw	23.5 to 27.4	2.4 to 2.8	17.4 to 20.2
Clutch housing bearing holder mounting screws	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Stopper screw	34.3 to 44.1	3.5 to 4.5	25.3 to 32.5
PTO clutch valve mounting screws	23.5 to 27.4	2.4 to 2.8	17.4 to 20.2
PTO clutch holder mounting screw	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5
Lock nut	147 to 196	15 to 20	109 to 145
Pinion bearing case mounting screw	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5
Bearing case mounting screw	23.5 to 27.4	2.4 to 2.8	17.4 to 20.2
Differential support mounting screws	48.1 to 55.9	4.9 to 5.7	35.5 to 41.2
Differential case cover mounting screw	48.1 to 55.9	4.9 to 5.7	35.5 to 41.2
Spiral bevel gear UBS screws	68.6 to 88.3	7.0 to 9.0	50.6 to 65.1
Charge pump case mounting bolt (M10)	48 to 56	4.9 to 5.7	35.4 to 41.2
Port block mounting hex. head screw (without seal washer)	103 to 118	10.5 to 12.0	76.0 to 86.7
Port block mounting hex. head screw (with seal washer)	31 to 36	3.2 to 3.7	23.1 to 26.8
Swashplate setting bolt	24 to 28	2.4 to 2.8	17.4 to 20.3

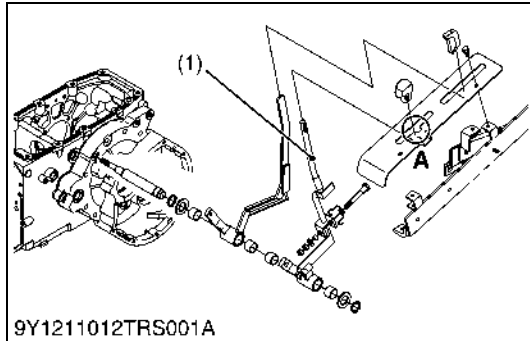
Item	N·m	kgf·m	lbf·ft
Cradle bearing bracket mounting hex. head screw	61 to 71	6.2 to 7.2	44.8 to 52.1
Check and high pressure relief valve hex. head plug (G1/2)	59 to 78	6.0 to 8.0	43.4 to 57.9
Charge relief valve hex. head plug (G3/8)	49 to 59	5.0 to 6.0	36.2 to 43.4
Servo regulator assembly mounting hex. head screw (M8)	29 to 34	3.0 to 3.5	21.7 to 25.3
Servo piston and under cover mounting hex. head screw (M10)	61 to 71	6.2 to 7.2	44.7 to 52.1

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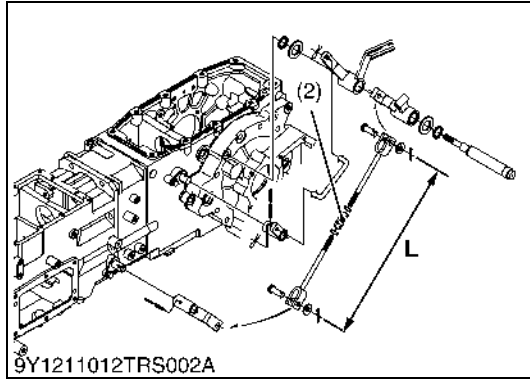
4. CHECKING AND ADJUSTING

[1] L3301/L3901

(1) MANUAL TRANSMISSION MODEL



9Y1211012TRS001A



9Y1211012TRS002A

Checking Shuttle Shift Lever Neutral Position

1. Check if the shuttle shift lever (1) is in position "A" when lever is released at position "N".
2. If the lever is not in position "A", adjust shuttle shift lever position with the turnbuckle (2).
3. Also check if neutral switch is pressed when the shuttle shift lever (1) is in "N" position.

(Reference)

- Turnbuckle length "L": 363 mm (14.3 in.)

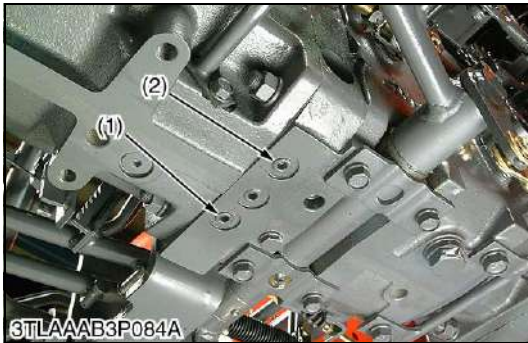
(1) Shuttle Shift Lever

(2) Turnbuckle

A: Groove For Shuttle Lever**L: Turnbuckle Length**

9Y1211012TRS0006US0

(2) HST Model



Checking High Pressure Relief Valve Pressure

⚠ CAUTION

- **When checking, park the machine on flat ground, apply the parking brake.**
1. Remove the hex. socket head plug from **P1** or **P2** port. (**P2** is for forward and **P1** is for reverse.)
 2. Assemble long adaptor **C** (07916-60831) and threaded joint (07916-50341) with the gasket between them.
 3. Install the assemble long adaptor **C** and threaded joint to **P2** (forward) or **P1** (reverse) port.
 4. Install the cable, threaded joint in relief valve set pressure tester and high pressure gauge to threaded joint in order.
 5. Check to see that parking brake is applied.
 6. Operate the engine at maximum speed.
 7. Place the range gear shift lever in **H** position.
 8. Depress the HST pedal, and measure the high pressure relief valve pressure.
 9. If the measurement is not within the factory specification, check the high pressure relief valve assembly. (See page 3-S49.)

(When reassembling)

- Install the hex. socket head plug to the port with O-ring.

Check high pressure relief valve	Factory specification	33.4 to 36.2 MPa 340 to 370 kgf/cm ² 4840 to 5260 psi

Condition

- Engine speed:
Maximum
- Oil temperature:
45 to 55 °C (113 to 131 °F)

■ IMPORTANT

- **Measure quickly so that the relief valve may not be in operation more than 10 seconds.**

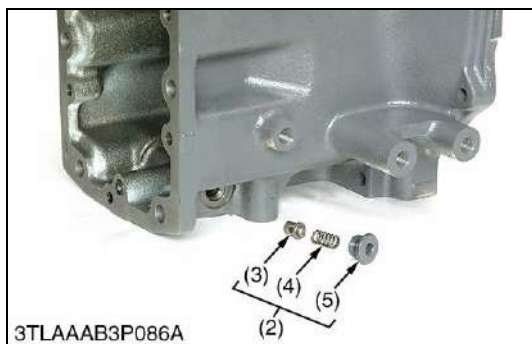
■ NOTE

- **Be sure to use a pressure gauge with over 39.2 MPa (400 kgf/cm², 5690 psi) capacity.**

(1) **P1** Port (for Reverse)

(2) **P2** Port (for Forward)

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Checking Charge Relief Pressure

⚠ CAUTION

- **When parking, park the machine on flat ground, apply the parking brake.**
1. Remove the brake rod and the propeller shaft. (See page 1-S34.)
 2. Remove the hex. socket head plug from **P** port (1).
 3. Assemble long adaptor **C** (07916-60831) and thread joint (07916-50341) with the gasket between them.
 4. Install the assembled long adaptor **C** and thread joint to **P** port (1).
 5. Install the cable, thread joint in relief valve set pressure tester and low pressure gauge to threaded joint in order.
 6. Place the range gear shift lever in neutral.
 7. Operate the engine at maximum speed.
 8. Release the HST pedal to set in neutral, and measure the charge pressure.
 9. If the measurement is not within the factory specifications, check charge relief valve (2). (See page 3-S53.)

(When reassembling)

- Apply liquid lock (Three Bond 1324 or its equivalent) to the hex. socket head plug.

Charge relief pressure	Factory specification	0.5 to 0.6 MPa 5 to 8 kgf/cm ² 80 to 90 psi

Condition

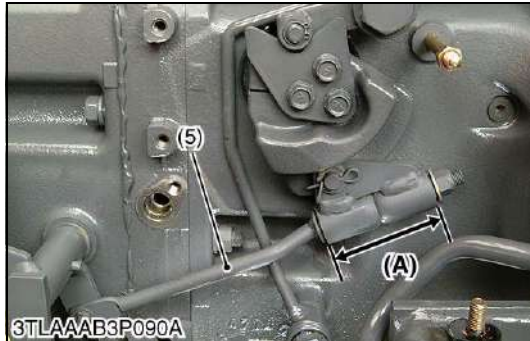
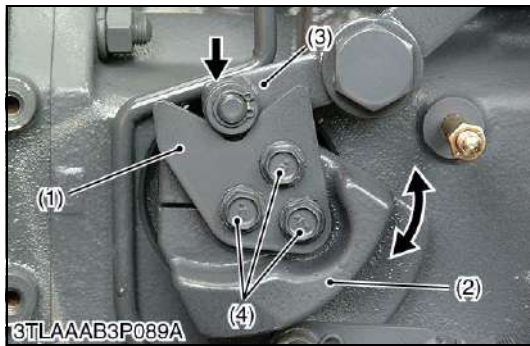
- Engine speed:
Maximum
- Oil temperature:
45 to 55 °C (113 to 131 °F)

■ NOTE

- **Use a new transmission oil filter.**
- **Be sure to use a pressure gauge with over 2.9 MPa (30 kgf/cm², 430 psi) capacity.**

(1) P Port	(4) Spring
(2) Charge Relief Valve	(5) Plug (GPF 3/8)
(3) Poppet	

9Y1211012TRS0008US0



Adjusting Neutral

1. Disengage the front wheel drive lever. (Drive only rear wheels.)
2. Set the cruise control to "OFF" position. (HST pedal is neutral position.)
3. Check to see that the length **(A)** of HST neutral rod (5) is specified length.
If not, adjust as follows
Length **(A)**: 73.0 to 74.0 mm (2.88 to 2.91 in.).
4. Lift the rear of the tractor so that the rear wheels are off the ground and operate the engine at maximum speed and drive only rear wheels.
5. Slightly loosen the plate mounting screws (4).
6. Press the neutral holder arm (3) to the HST trunnion plate (1).
7. Then rotate the neutral holder (2) clockwise or counter clockwise until wheels stop completely.
8. Hold the neutral holder (2) and tighten the plate mounting screws (4).

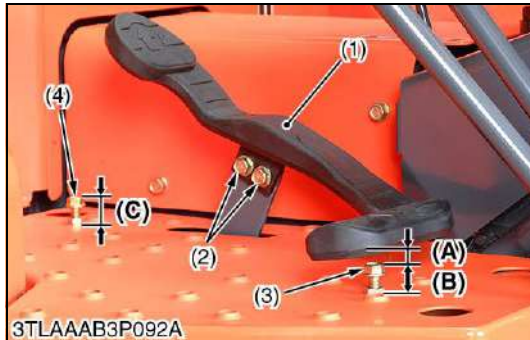
NOTE

- Be sure to tighten the plate mounting screw with specified torque.

Tightening torque	HST trunnion plate mounting screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

- (1) HST Trunnion Plate
(2) Neutral Holder
(3) Neutral Holder Arm
(4) Screws
(5) HST Neutral Rod
- (A) Length**

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Adjusting HST Pedal and Stopper Bolt

NOTE

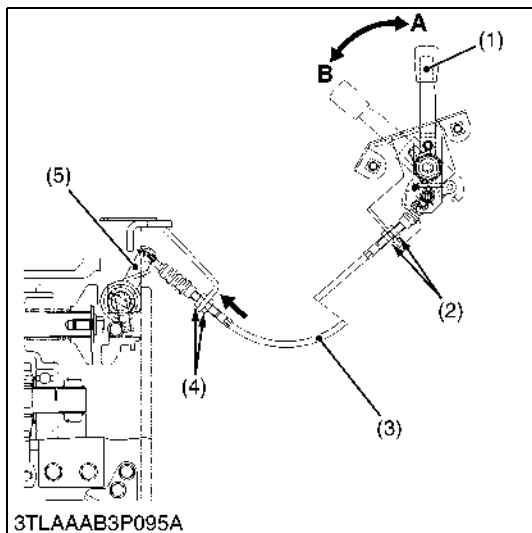
- Stop the engine when adjusting the pedal stroke.
- Be sure to adjust the HST neutral position.

1. Adjust the height **(B)** and **(C)** of the pedal stopper bolt (3), (4).
2. Loosen the HST pedal mounting screws (2).
3. Tighten the HST pedal mounting screws (2) so that the clearance **(A)** between HST pedal and stopper bolt (3) may become specified value.

Clearance (A)	Factory specification	2 to 5 mm 0.08 to 0.1 in.
Height (B)	Factory specification	20 mm 0.79 in.
Height (C)	Factory specification	13 mm 0.51 in.

- (1) HST Pedal
(2) Screws
(3) Stopper Bolt (Forward)
(4) Stopper Bolt (Reverse)

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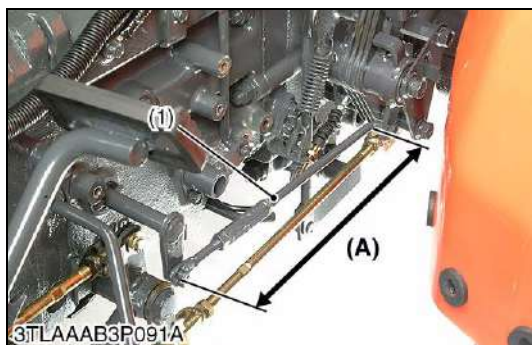
Adjusting PTO Wire

1. Check to see that the threaded portion of PTO wire (3) rear side is set at center position.
If not, set by lock nuts (2).
2. Set the PTO lever (1) at the "OFF" position "A".
3. The lock nut (4) is tightened in the direction of the arrow. Then stop it before the lever (5) moves.
4. Retighten the lock nut securely.

- (1) PTO Lever
(2) Lock Nuts (Rear Side)
(3) PTO Wire
(4) Lock Nuts (Front Side)
(5) Lever

A: OFF Position
B: ON Position

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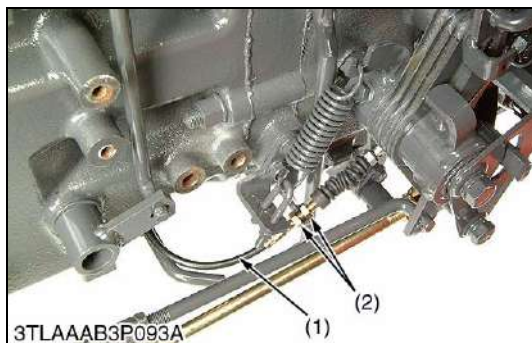
Adjusting Cruise Control Rod (Option)

1. Set the cruise control lever to fully forward.
2. Adjust the cruise control rod (1) so that trunnion shaft may maximum incline forward.

Length of cruise control rod (A)	Factory specification	315 mm 12.4 in.

- (1) Cruise Control Rod (A) Length

9Y1211012TRS0012US0



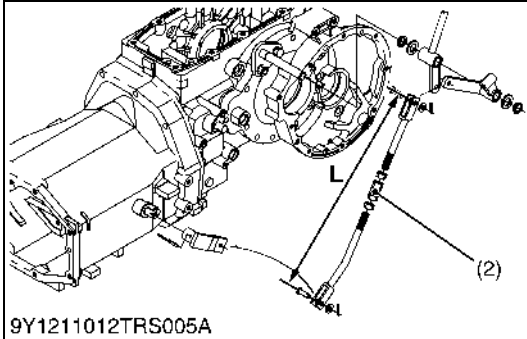
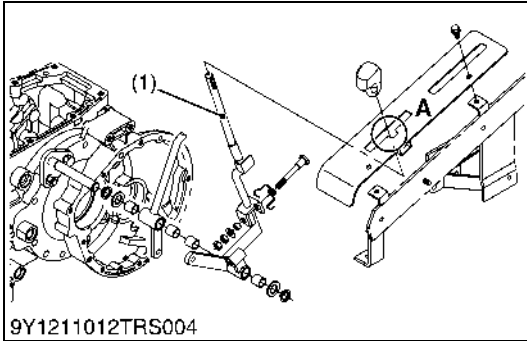
Adjusting Cruise Control Release Linkage (Option)

1. Adjust the brake pedals play first.
2. Depress one of the brake pedals to make sure the cruise control is not released. Also depress both the brake pedals coupled together to make sure that the cruise control is released.
3. If the cruise control does not work as above adjust with release wire (1) as follows.
 - Check to see that the threaded portion of the wire (1) rear side is set at the center position. If not, set by lock nuts (2).
4. In the end of the play of the brake pedal, adjust the lock nuts (3) so that slack of the wire may become 0.
 - Make sure whether to move as above-mentioned 2. If not, adjust by lock nut (3).

- (1) Release Wire (3) Lock Nut (Front)
(2) Lock Nut (Rear)

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[2] L4701**(1) MANUAL TRANSMISSION MODEL****Checking Shuttle Shift Lever Neutral Position**

1. Check if the shuttle shift lever (1) is in position "A" when lever is released at position "N".
2. If the lever is not in position "A", adjust shuttle shift lever position with the turnbuckle (2).
3. Also check if neutral switch is pressed when the shuttle shift lever (1) is in "N" position.

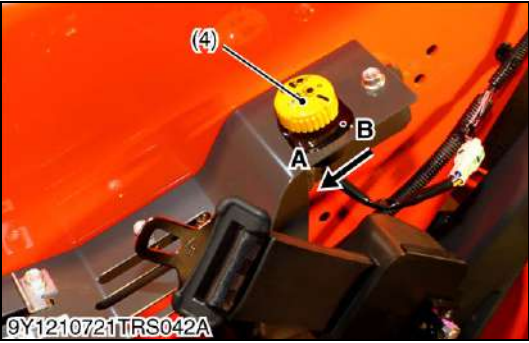
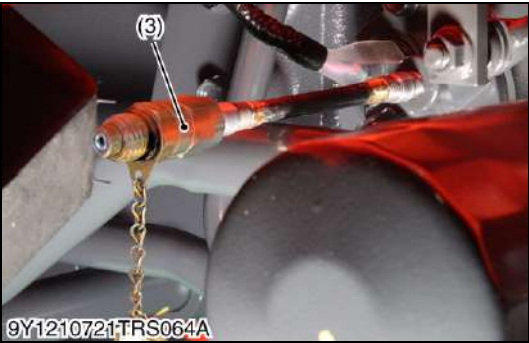
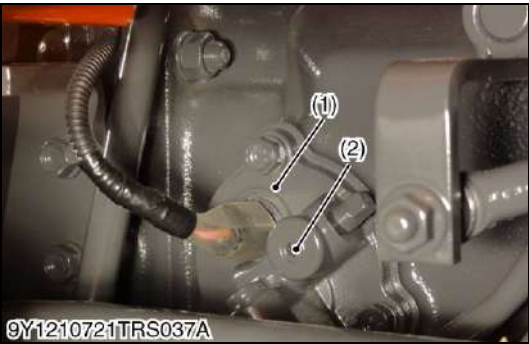
(Reference)

- Turnbuckle length "L": 389 mm (15.3 in.)

- (1) Shuttle Shift Lever
(2) Turnbuckle

A: Groove For Shuttle Lever**L: Turnbuckle Length**

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PTO Clutch Oil Operating Pressure

- 1. Remove the plug (2) from the PTO clutch solenoid valve (1).
- 2. Install the adaptor (3) to the PTO clutch solenoid valve (1).
- 3. Install the hydraulic cable and the gauge to the adaptor (3).
- 4. Start the engine.
- 5. Set the engine revolution to the idling speed.
- 6. Set the PTO clutch control switch (4) to **"ON"** position.
- 7. Measure the PTO clutch operation pressure.

PTO clutch pressure	When PTO clutch control switch is set to "ON" position	2.25 to 2.45 MPa 23.0 to 25.0 kgf/cm ² 327 to 356 psi
	When PTO clutch control switch is set to "OFF" position	No pressure

Condition

- Engine speed:
Idling speed
- Oil temperature:
40 to 60 °C (104 to 140 °F)

- (1) Solenoid Valve
- (2) Plug (1/8)
- (3) Adaptor
- (4) PTO Clutch Control Switch

- A: ON Position**
- B: OFF Position**

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