

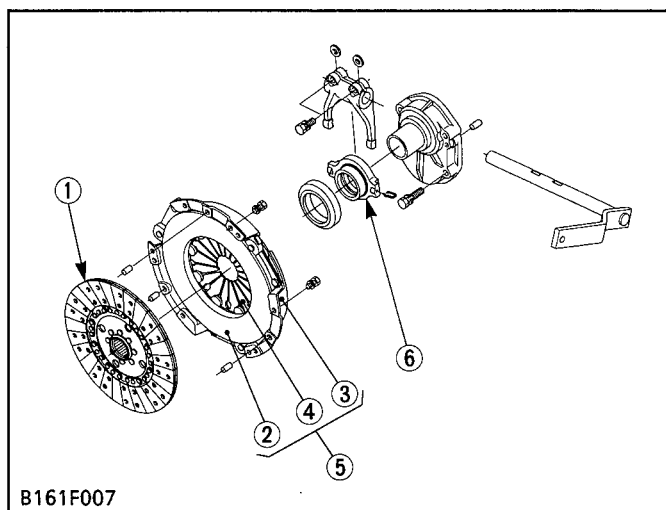
2 CLUTCH

MECHANISM

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[1] FEATURES



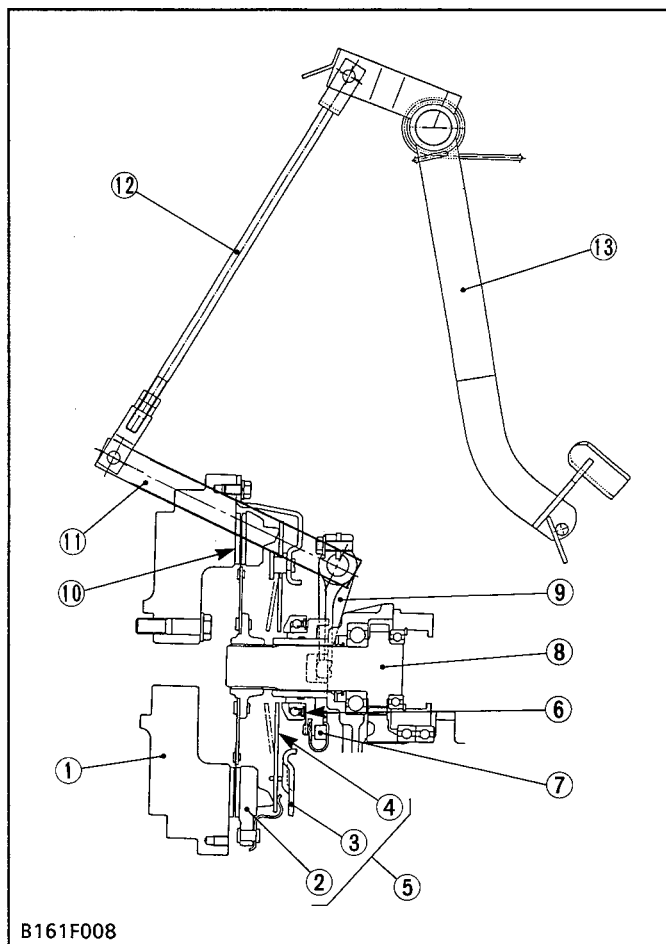
This tractor is used dry single plate type clutch.

The clutch is located between the engine and transmission and is operated by stepping on the clutch pedal.

When the clutch pedal is depressed, the clutch is disengaged and when it is released, the clutch is engaged and power from the engine is transmitted to the transmission.

- | | |
|--------------------|-----------------------------|
| (1) Clutch Disc | (4) Diaphragm Spring |
| (2) Pressure Plate | (5) Pressure Plate Assembly |
| (3) Clutch Cover | (6) Release Hub |

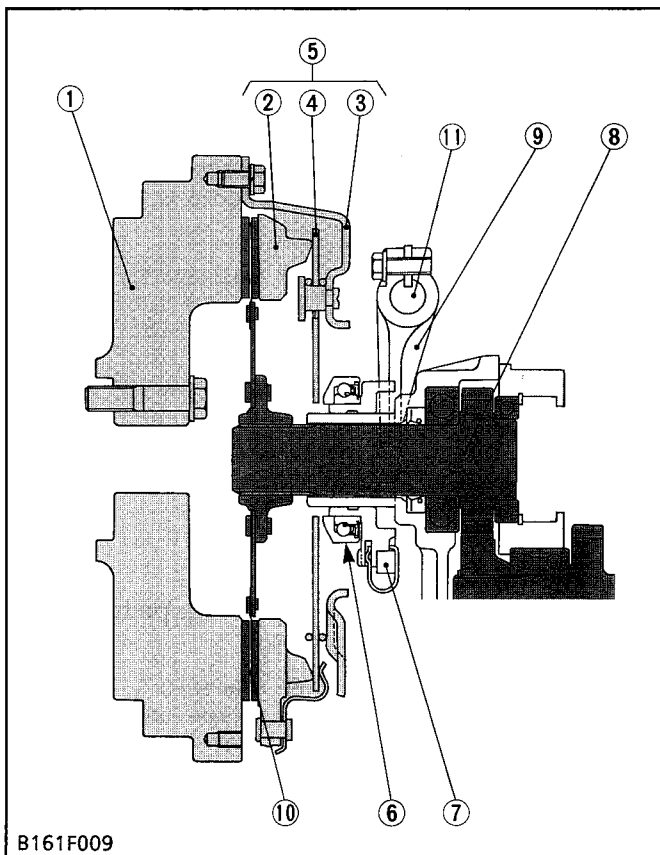
[2] LINKAGE MECHANISM



This tractor uses hanging type clutch pedal to have wider space about the platform.

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

[3] OPERATION

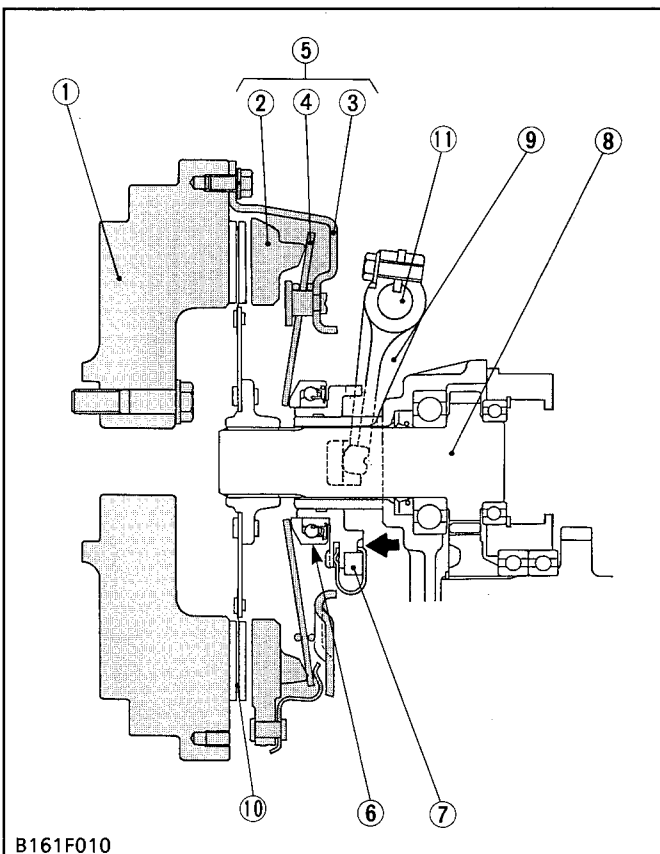


■ Clutch "Engaged"

When the clutch pedal is not depressed, the clutch release bearing (6) and the fingers of diaphragm spring (4) are not connected to each other.

Accordingly, the pressure plate (2) is tightly pressed against the flywheel (1) by the diaphragm spring (4). As a result, rotation of the flywheel (1) is transmitted to the transmission through the gear shaft (8) due to the frictional force among the flywheel (1), clutch disc (10) and pressure plate (2).

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



■ Clutch "Disengaged"

When the clutch pedal is depressed, the clutch rod is pulled to move the clutch lever (11). Then, the release fork (9) pushes the release hub (7) and release bearing (6) toward the flywheel. Simultaneously, the release bearing (6) pushes the diaphragm spring (4).

As the pressure plate (2) is pulled by the diaphragm spring (4), the frictional force among the flywheel (1), clutch disc (10) and pressure plate (2) disappears.

Therefore, rotation of the flywheel (1) is not transmitted to the clutch disc (10), and then the rotation of the gear shaft (8) stops.

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

SERVICING

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TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Clutch Drags	<ul style="list-style-type: none"> ● Clutch pedal free play excessive ● Dust on clutch disc generated from clutch disc facing ● Release fork broken ● Clutch disc or pressure plate warped ● Wire ring of the pressure plate worn or broken 	Adjust Remove rust Replace Replace Replace (Pressure plate assembly)	2-S3 – 2-S7 2-S6, S7, S8 2-S6
Clutch Slips	<ul style="list-style-type: none"> ● Clutch pedal free play too small ● Clutch disc excessively worn ● Grease or oil on clutch disc facing ● Clutch disc or pressure plate warped ● Diaphragm spring weaken or broken ● Wire ring of the pressure plate worn or broken 	Adjust Replace Replace Replace Replace Replace (Pressure plate assembly)	2-S3 2-S7 2-S6 2-S6, S7, S8 2-S6, S8 2-S6, S8
Chattering	<ul style="list-style-type: none"> ● Grease or oil on clutch disc facing ● Clutch disc or pressure plate warped ● Clutch disc boss spline worn or rusted ● Gear shaft bent ● Pressure plate or flywheel face cracked or scored ● Clutch disc boss spline and gear shaft spline worn ● Diaphragm spring strength uneven or diaphragm spring broken 	Replace Replace Replace or remove rust Replace Replace Replace Replace	2-S6 2-S6, S7, S8 2-S6 3-S16 2-S8 1-S33 2-S6 2-S6, S8
Rattle During Running	<ul style="list-style-type: none"> ● Clutch disc boss spline worn ● Thrust ball bearing worn or sticking 	Replace Replace	2-S6 2-S7
Clutch Squeaks	<ul style="list-style-type: none"> ● Thrust ball bearing sticking or dry ● Clutch disc excessively worn 	Replace or lubricate Replace	2-S7 2-S6, S7
Vibration	<ul style="list-style-type: none"> ● Gear shaft bent ● Clutch disc rivet worn or broken ● Clutch parts broken 	Replace Replace Replace	3-S17 2-S6 2-S7

SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Clutch Pedal	Free play	20 to 30 mm 0.8 to 1.2 in.	–
Clutch Pedal Stopper Bolt	Height	18 to 22 mm 0.70 to 0.87 in.	–
Clutch Disc	Disc Surface to Rivet Top (Depth)	–	0.3 mm 0.012 in.
Clutch Disc Boss to Gear Shaft	Backlash (Displacement Around Disc Edge)	–	2.0 mm 0.079 in.
Pressure Plate	Flatness	–	0.2 mm 0.008 in.
Diaphragm Spring	Mutual Difference	–	0.5 mm 0.020 in.

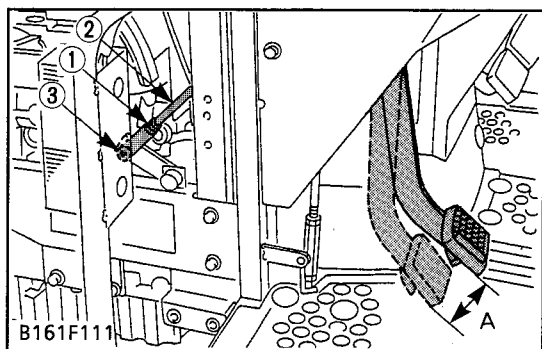
TIGHTENING TORQUES

Tightening torques of screws and nuts on the table below are especially specified.
(For general use screws and nuts : See page G-9)

Item	N·m	kgf·m	ft-lbs
Clutch mounting screws	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Release fork setting screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Power steering main delivery hose retaining nut	46.6 to 50.9	4.8 to 5.2	34.4 to 37.6
Power steering turning delivery hoses retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Joint bolt for delivery pipe and hydraulic block of three point linkage hydraulic system	49.0 to 58.8	5.0 to 6.0	36.2 to 43.4
Joint bolt for delivery pipe and regulator valve of GST system (Only GST or independent PTO type)	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Engine and clutch housing mounting screws, nuts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Engine and clutch housing mounting stud bolts	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2

CHECKING, DISASSEMBLING AND SERVICING

CHECKING AND ADJUSTING



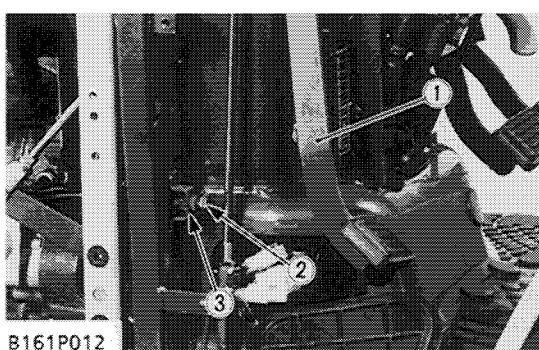
Clutch Pedal Free Play

1. Stop the engine and remove the key.
2. Slightly depress the clutch pedal and measure free travel (A) at top of pedal stroke.
3. If adjustment is needed, loosen the lock nut (1), remove the clevis pin (3) and adjust the clutch rod (2) length.
4. Retighten the lock nut (1) and split the cotter pin.

Clutch pedal free travel (A)	Factory spec.	20 to 30 mm (0.8 to 1.2 in.) on the pedal
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- (1) Lock Nut
(2) Clutch Rod

- (3) Clevis Pin



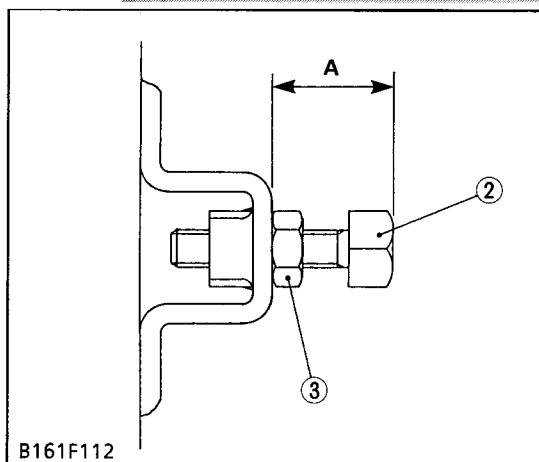
Clutch Pedal Stopper Bolt

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

Height (A) of clutch pedal stopper bolt	Factory spec.	18 to 22 mm 0.70 to 0.87 in.
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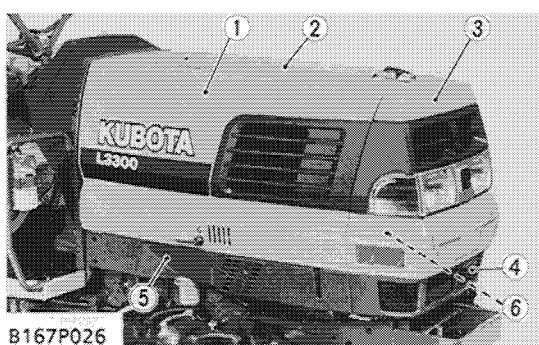
- (1) Clutch Pedal
(2) Stopper Bolt

- (3) Lock Nut



DISASSEMBLING AND ASSEMBLING

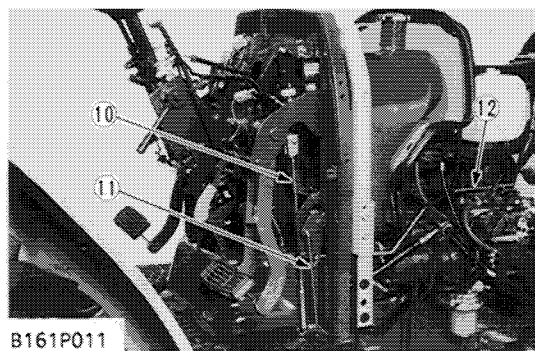
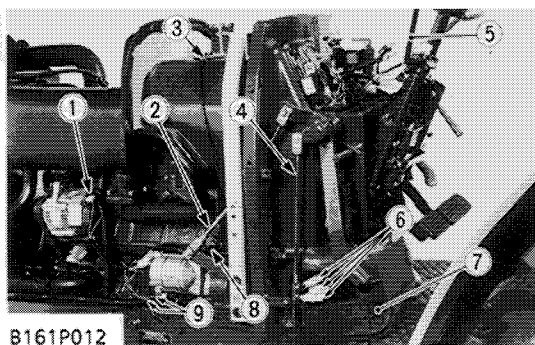
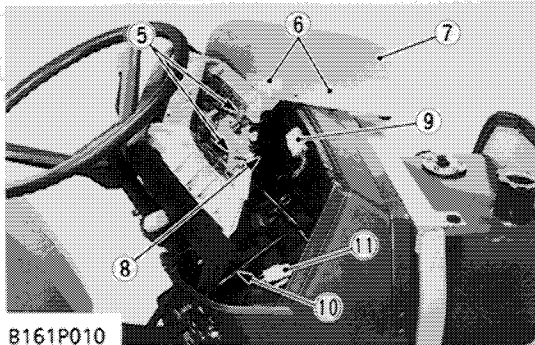
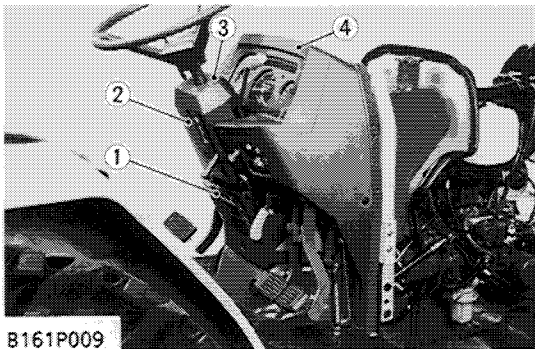
(1) Separating Panel Frame Assembly



Preparation 1

1. Remove the following parts.

- | | |
|-------------------------|---------------------------|
| (1) Side Cover (RH, LH) | (4) Front Grille |
| (2) Bonnet | (5) Side Skirt (RH, LH) |
| (3) Front Mask | (6) Battery Negative Code |



Preparation 2

1. Remove the steering post covers (2), (3) and panel under cover (1).
2. Disconnect the meter cable (8) at the engine side.
3. Remove the meter panel mounting screws and open the meter panel (4).
4. Remove the meter panel cover (7), and then disconnect the two connectors (5) and meter cable (8).
5. Take out the meter panel (4).
6. Disconnect the main switch connector (11), combination switch connector (9), position switch connector and hazard switch connector..
7. Disconnect the engine stop cable (10) at the engine side.

NOTE

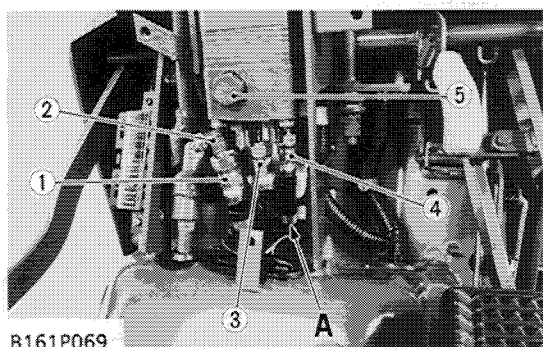
- Do not remove the seals (6) on the meter panel cover (7).

- | | |
|-------------------------|----------------------------------|
| (1) Panel Under Cover | (7) Meter Panel Cover |
| (2) Steering Post Cover | (8) Meter Cable |
| (3) Steering Post Cover | (9) Combination Switch Connector |
| (4) Meter Panel | (10) Engine Stop Cable |
| (5) Connectors | (11) Main Switch Connector |
| (6) Seals | |

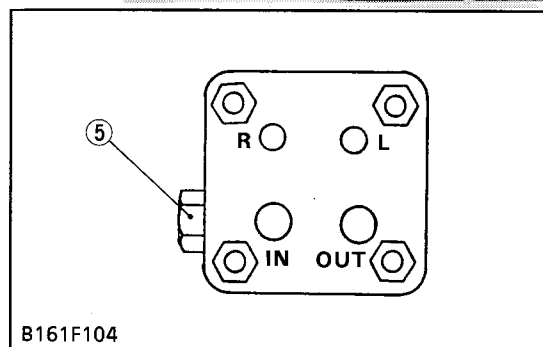
Preparation 3

1. Disconnect the brake rods (4), (10).
2. Disconnect the clutch rod (2).
3. Remove the accelerator rod (12).
4. Disconnect the foot accelerator rod (11).
5. Remove the panel frame cover (7) and disconnect the three connectors (6).
6. Remove the shuttle shift lever (5) after disconnecting the limit switch wire harness.
7. Disconnect the 2P connector for alternator (1), jumper leads for fuel level sensor (3) and starter (9).

- | | |
|---------------------------------------|--------------------------------|
| (1) 2P Connector for Alternator | (7) Panel Frame Cover |
| (2) Clutch Rod | (8) Jumper Lead for Oil Switch |
| (3) Jumper Lead for Fuel Level Sensor | (9) Jumper Lead for Starter |
| (4) Brake Rod (LH) | (10) Brake Rod (RH) |
| (5) Shuttle Shift Lever | (11) Foot Accelerator Rod |
| (6) Connectors | (12) Accelerator Rod |



B161P069



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Hydraulic Pipes

1. Disconnect the main delivery hose (1), return hose (2), right turning delivery hose (3) and left turning delivery hose (4).

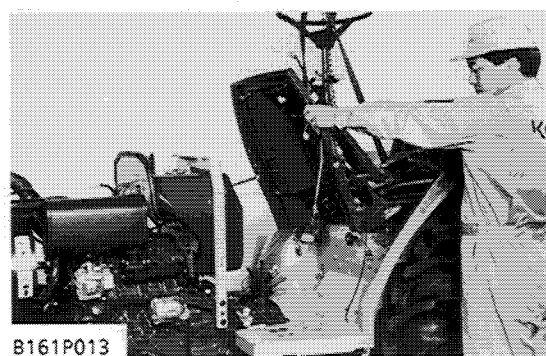
(When reassembling)

- In assembling the turning delivery hoses to the steering controller, connect the delivery hose with identification mark (tape) "A" to the L port of the steering controller. (Refer to figure left.)

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

[A] Identification Mark (Tape)

- | | |
|---------------------------------|--------------------------------|
| (1) Main Delivery Hose | (4) Left Turning Delivery Hose |
| (2) Return Hose | (5) Relief Valve Plug |
| (3) Right Turning Delivery Hose | |



B161P013

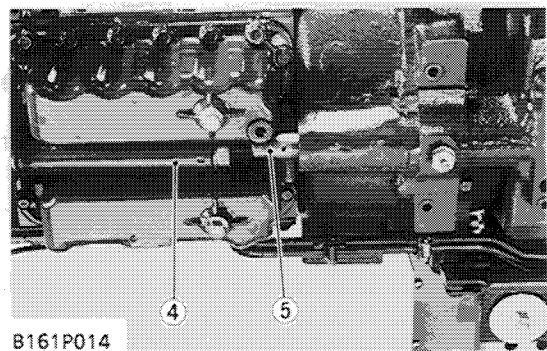
Panel Frame and Steering Assembly

1. Remove the panel frame mounting screws. (Two screws at upper part. Seven screws at lower part.)
2. Take out the panel frame and steering assembly as a unit.

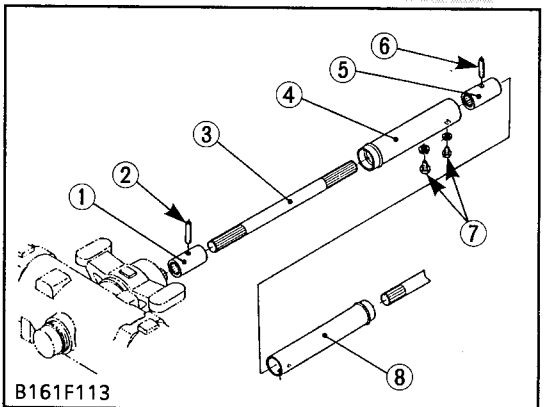
(When reassembling)

- Do not get in the wiring harness between panel frame and platform.

(2) Separating Engine and Clutch Housing Case



B161P014



B161F113

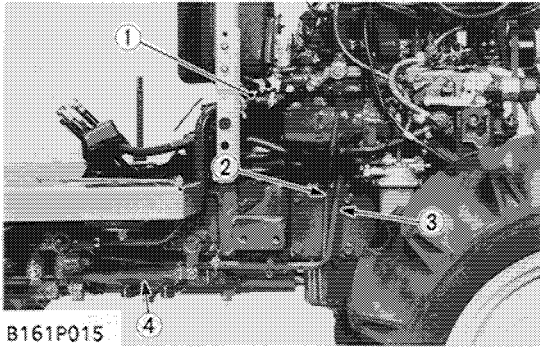
Propeller Shaft

1. Slide the propeller shaft covers (4), (8) after removing the screws (7).
2. Tap out the spring pin (6), and then slide the coupling (5) to the front.

(When reassembling)

- Apply grease to the splines of the propeller shaft.

- | | |
|---------------------------|---------------------------|
| (1) Coupling | (5) Coupling |
| (2) Spring Pin | (6) Spring Pin |
| (3) Propeller Shaft | (7) Screws |
| (4) Propeller Shaft Cover | (8) Propeller Shaft Cover |



(1) Rubber Hose (3) Delivery Pipe
(2) Delivery Pipe (4) Brake Rod

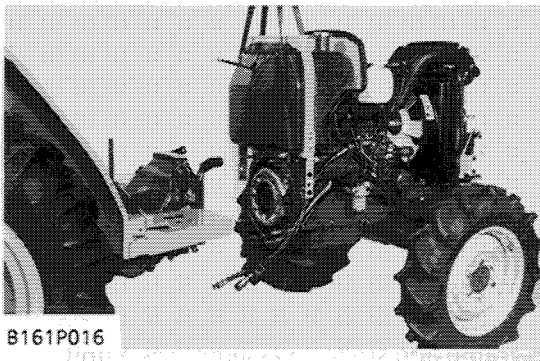
Hydraulic Pipes

1. Remove the brake rod (4) and delivery pipe (3).
2. Remove the delivery pipe (2). (Only GST or independent PTO type)
3. Slide the rubber hose (1).

(When reassembling)

- Reinstall the pipe clamp securely.

Tightening torque	Joint bolt for delivery pipe (3) and hydraulic block	49.0 to 58.8 N·m 5.0 to 6.0 kgf·m 36.2 to 43.4 ft-lbs
	Joint bolt for delivery pipe (2) and regulator valve (Only GST or independent PTO type)	34.3 to 39.2 N·m 3.5 to 4.0 kgf·m 25.3 to 28.9 ft-lbs



Separating the Engine from Clutch Housing

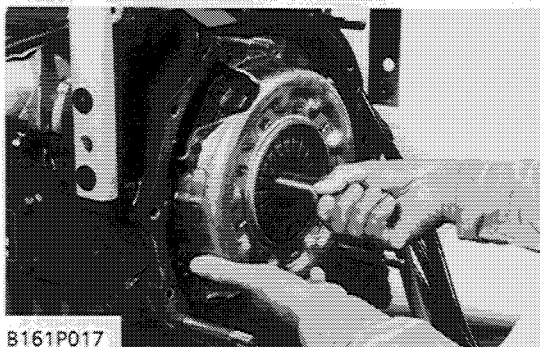
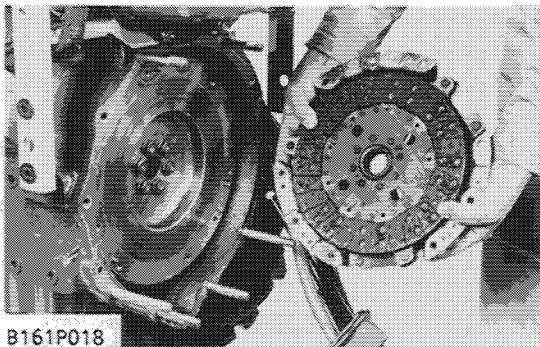
1. Place the jack under the clutch housing case.
2. Hoist the engine by the nylon lift strap at the tank support.
3. Remove the engine mounting screws, and then pull the engine to the front.

(When reassembling)

- Apply grease to the splines.
- Apply liquid gasket (Three Bond 1208D or equivalent) to joint face of the engine and clutch housing.

Tightening torque	Engine and clutch housing mounting screws, nuts	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs
	Engine and clutch housing mounting stud bolts	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

(3) Removing Clutch



Removing Clutch

1. Remove the clutch from the flywheel.

(When reassembling)

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

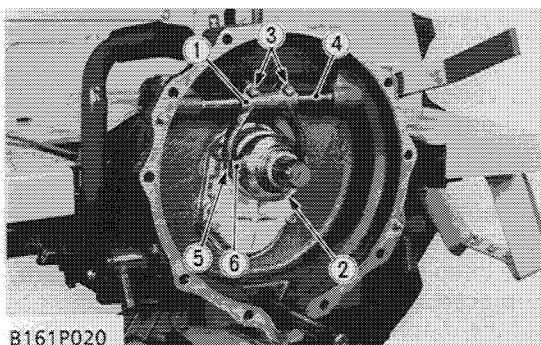
■ IMPORTANT

- Align the center of disc and flywheel by inserting the clutch center tool. (See page G-34.)

■ NOTE

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

Tightening torque	Clutch mounting screws	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs
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- (1) Release Fork (4) Clutch Lever
 (2) Release Bearing (5) Snap Pins
 (3) Setting Screws (6) Release Holder

Release Holder and Clutch Lever

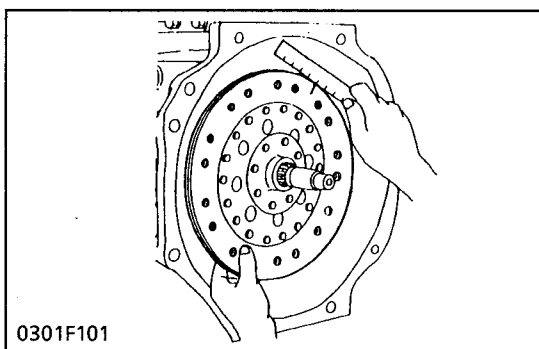
1. Draw out the clutch release holder (6) and the release bearing (2) as a unit.
2. Remove the release fork setting screws (3).
3. Draw out the clutch lever (4) to remove the release fork (1).

(When reassembling)

- Make sure the direction of the release fork (1) is correct.
- Inject grease to the release holder (6).
- Be sure to set the snap pins (5).

Tightening torque	Release fork setting screws	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft·lbs
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SERVICING

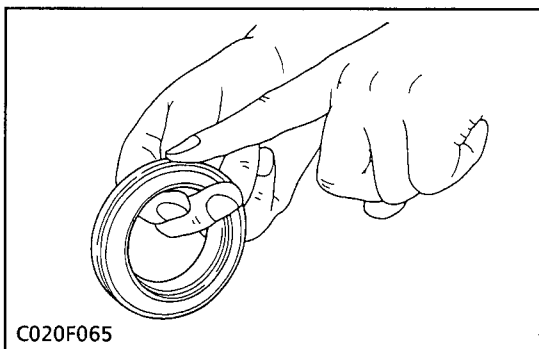


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Backlash between Clutch Disc Boss and Gear Shaft

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

Displacement around disc edge	Allowable limit	2.0 mm 0.079 in.
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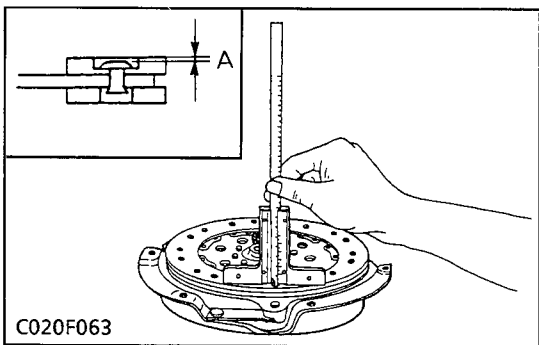
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Thrust Ball Bearing

1. Remove the thrust ball bearing from release holder with a puller.
2. Check for abnormal wear on contact surface.
3. Hold bearing inner race and rotate outer race, while applying pressure to it.
4. If the bearing rotation is rough or noisy, replace the bearing.

■ NOTE

- Do not depress outer race, when installing thrust ball bearing.



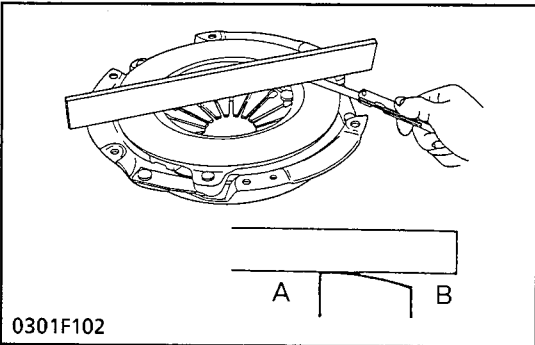
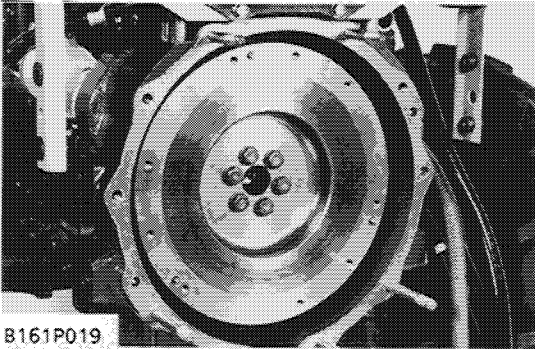
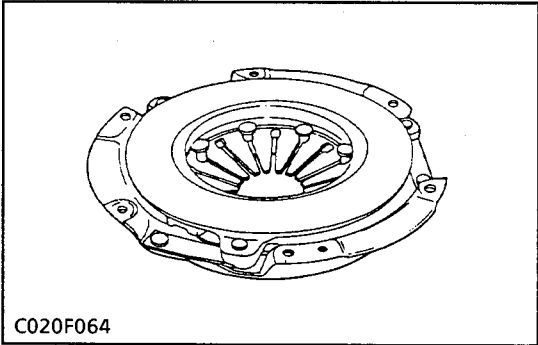
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Clutch Disc Wear

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 disc.
- In this case, inspect transmission gear shaft oil seal, engine rear oil seal and other points for oil leakage.

Disc surface to rivet top (Depth)	Allowable limit	0.3 mm 0.012 in.
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[A] More than 0.3 mm (0.012 in.)



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. Check 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. Check the surface of the diaphragm spring for wear. If excessive wear is found, replace clutch cover assembly.
4. Inspect thrust rings (wire ring) for wear or damage. As these parts are invisible from outside, shake pressure plate assembly up and down to listen for chattering noise, or lightly hammer on rivets for a slightly cracked noise. Any of these noises indicates need of replace as a complete assembly.

Diaphragm spring mutual difference	Allowable limit	0.5 mm 0.020 in.
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Pressure Plate Flatness

1. Place a straight edge 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 straight edge, replace even if the clearance is within the allowable limit.

Clearance between pressure plate and straight edge	Allowable limit	0.2 mm 0.008 in.
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[A] Inside

[B] Outside