AGCO®

ST60A
Compact Tractor

SERVICE MANUAL
79033002 B Rev.

CONTENTS

Part Number 79033002 B Rev. (English)

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GENERAL DIMENSIONS

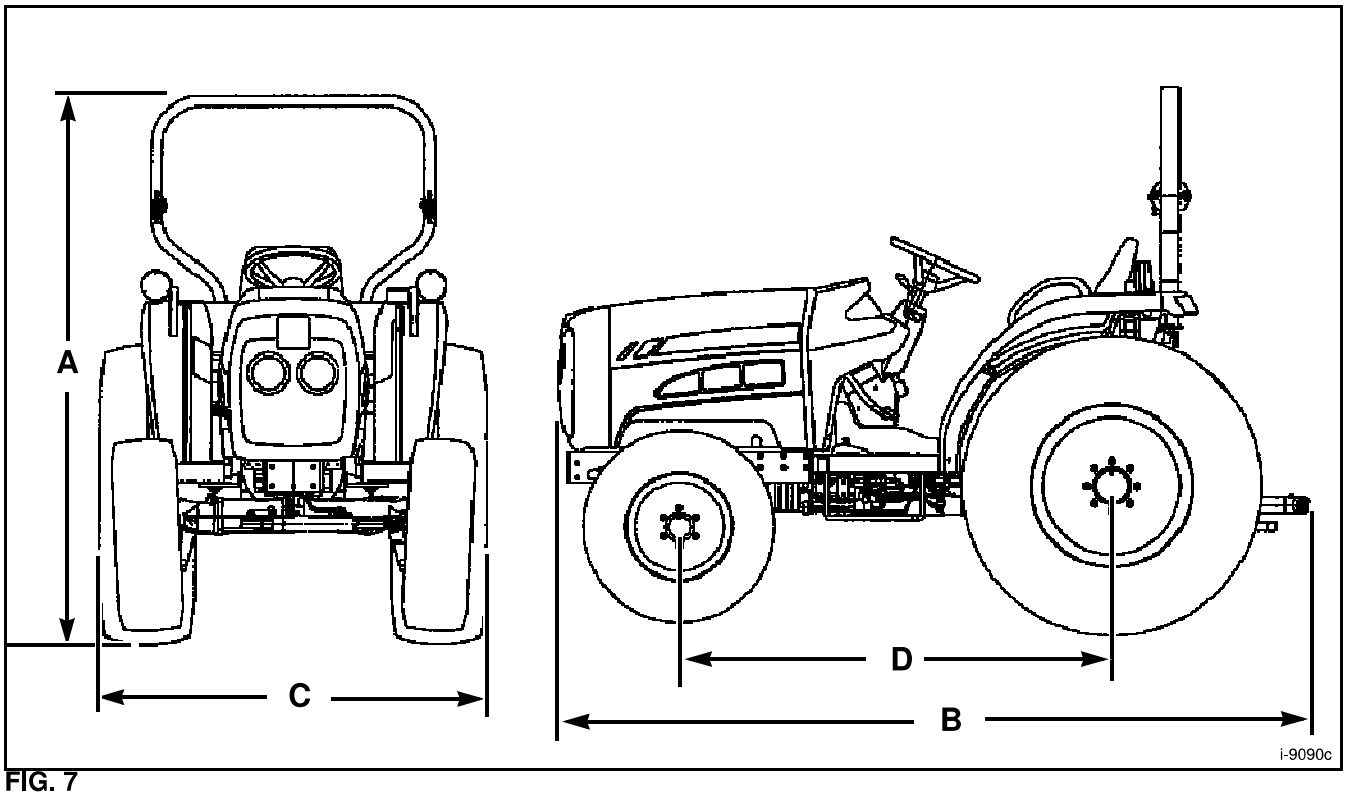

FIG. 7

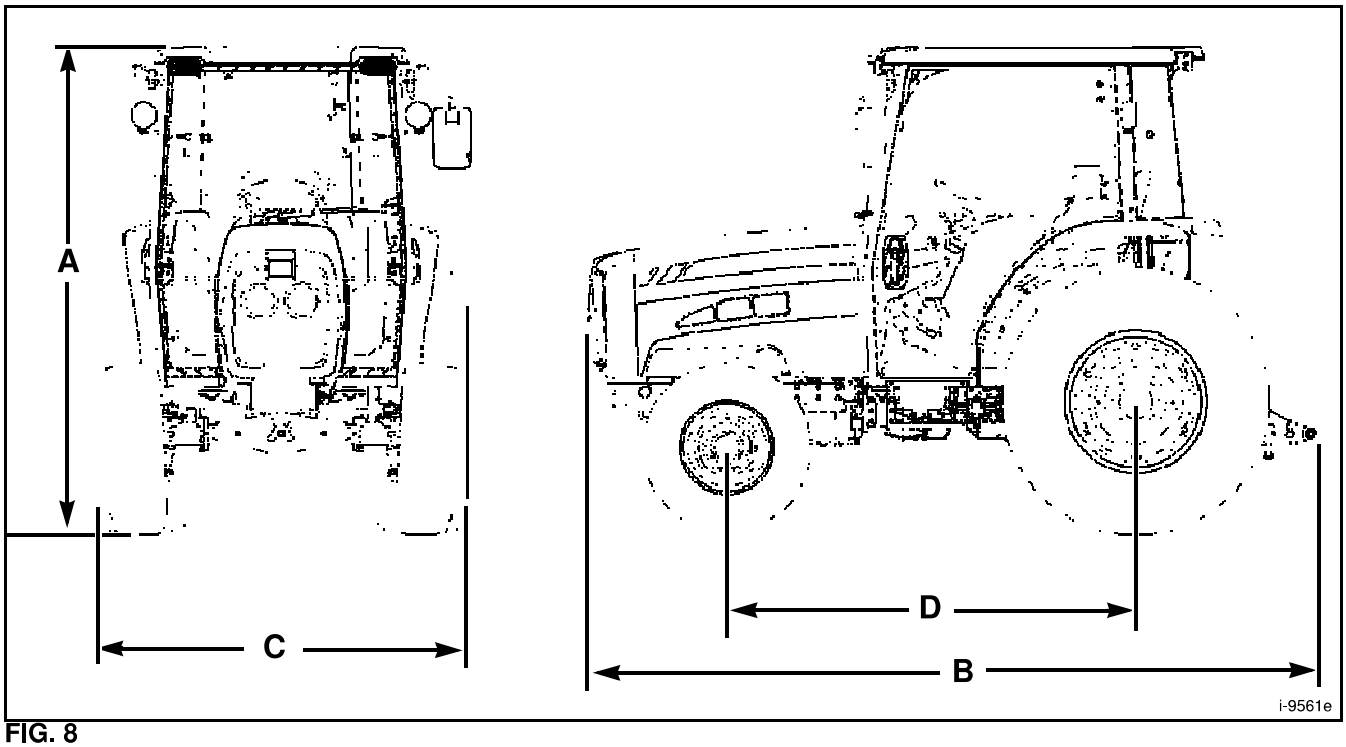

FIG. 8

Tightening Torque Chart

NOTE: Above torques are for "rigid" joints, or joints meeting the following conditions:

1. Damage will not occur to joined members of an assembly.

2. It is desirable to use a higher clamping force.

3. Fastener threads are NOT lubricated prior to assembly.

Fan Belt

FIG. 3: Correct fan belt tension helps to insure adequate coolant flow through cylinder block and radiator. Belt is correctly tensioned when belt deflection is approximately 8 mm (3/8 in) as shown at (1) when thumb pressure is exerted at center of belt span.

CAUTION: Due to muffler position, allow to cool before checking or adjusting fan belt tension.

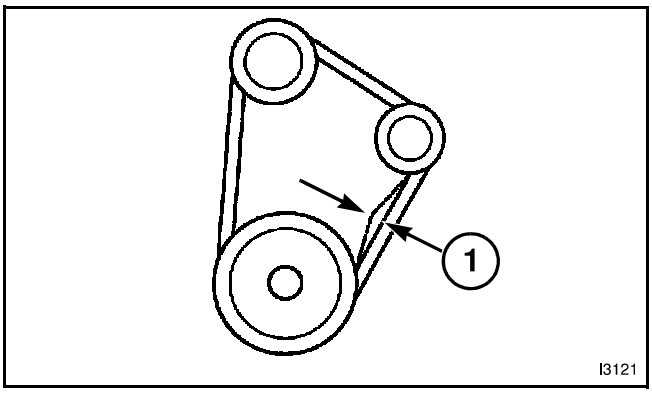

FIG. 3

FIG. 4: To adjust belt tension, loosen alternator pivot bolt and nut (1) and tensioning bracket bolt (2). Pull outward on top of alternator to correctly tension belt and tighten bolt first and then tighten pivot bolt.

IMPORTANT: Do not pry against alternator housing or pulley. Carefully pry against alternator mounting flange to prevent damage.

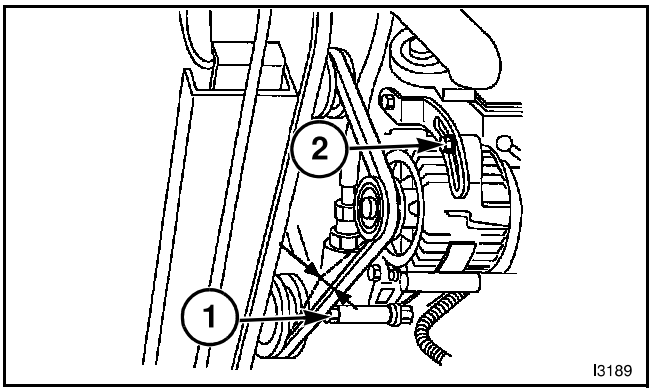

FIG. 4

Thermostat

FIG. 5: The thermostat is rated at 75 to 78 degrees C (167 to 172 degrees F).

(1) Water Outlet Pipe

(2) Thermostat

(3) Housing Gasket

(4) O-ring

(5) Thermostat Housing

(6) Flange Bolt

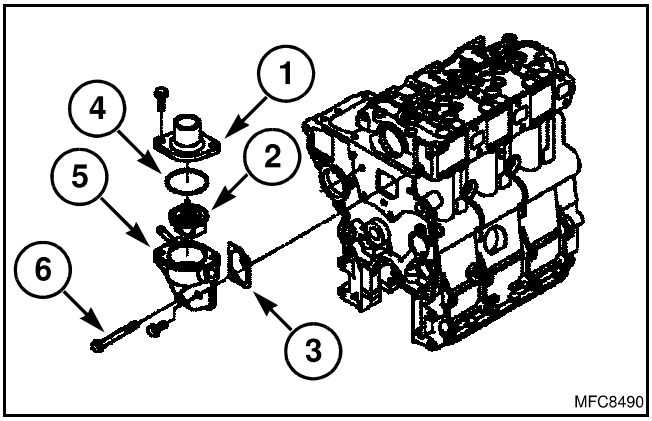

FIG. 5

Air-Bleeding Procedure

FIGS. 15–16: Fuel system should be bled of air after the following:

- Emptied fuel tank.
- Removal of fuel filter or fuel piping.
- Engine has not run for extended period of time, or, engine starts and stops (or fails to start) after short period of operation.

To bleed air from fuel systems using following procedure:

If engine still fails to start, pressure injection lines, 5, can be loosened where they attach to injectors. Turn engine over several times, until fuel spurts, out then tighten lines and stop engine.

- Fill fuel tank (1) until full.
- Turn fuel filter valve (2) to OPEN or ON position.
- Loosen filter air-bleeding screw (3) and let air bubbles out.
- Loosen air-bleeding screw (4) for fuel injection pump and let air bubbles out of the pump.

CAUTION: CAUTION: Fuel emitted from injection lines is high pressure. Keep hands and face away when engine is cranked. Clean all spilled fuel following air-bleeding procedure(s).

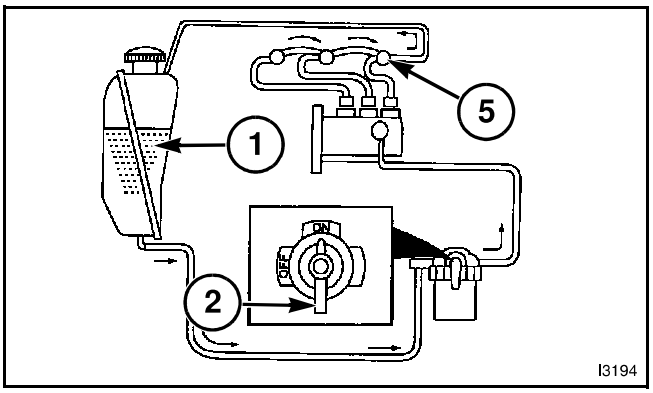

FIG. 15

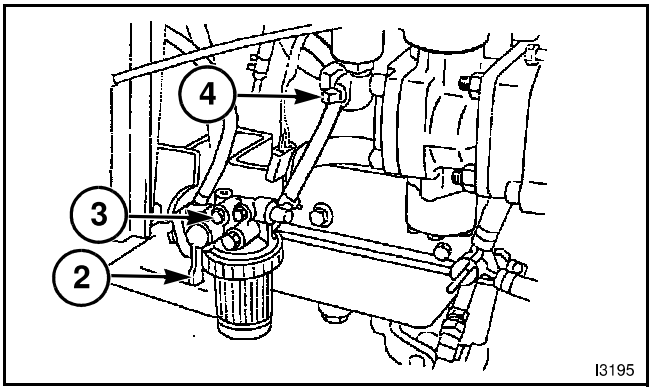

FIG. 16

Throttle Lever

FIG. 17: Hand throttle lever should remain in position selected by operator. Through normal use, friction against lever may decrease, causing lever to move out of selected position. Turn adjusting nut (1) as required to retain throttle lever in position selected.

NOTE: Throttle lever friction adjustment is accessed by removing steering column cover and instrument panel.

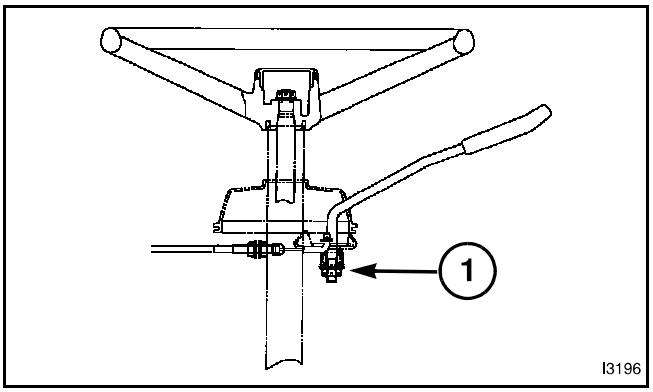

FIG. 17

TROUBLESHOOTING

Poor Output			
Problem	**Inspection**	**Causes**	**Countermeasures**
Engine mechanism	Check for air trapping in the fuel system.	Trapped air	Bleed air
	Check strainer for clogging.	Clogged strainer	Clean or replace
	Check electromagnetic pump	Clogged pump	Clean or replace
	Check fuel injection pipes.	Clogged or bent	Replace
	Check nozzles	Defective	Repair or replace.
	Check injection timing.	Abnormal	Correct
	Check governor	Defective	Adjust
	Check air cleaner.	Clogged	Clean or replace air cleaner element.
	Check air intake	Abnormally hot	Improve ventilation
	Check for valve clearance and cam lift.	Defective	Correct or replace.
	Check for low compression	Leaking valve or gasket:	Correct or replace
		Excessive blow by gases	Overhaul engine
Overheating	Check fuel system	Poor fuel or heavy oil is used.	Correct and replace parts as necessary
	Check handling	Too high operating engine speeds	Excessive load
	Check cooling system	engine air ports clogged	Correct
	Check radiator for clogging	Clogged radiator	Clean or replace
	Check coolant level	Coolant level is low	Fill coolant
	Check fan belt tension for slipping	Defective fan belt	Replace
	Check thermostat	Defective thermostat	Replace

Main Components	Name of Parts to be Tightened	Tightening Torque		Size	Quantity
		Nm	lbf ft		
Others	Water Pump	13.7 to 23.5	10.1 to 17.3	M8 X 1.25	4
	Thermostat Housing	13.7 to 23.5	10.1 to 17.3	M8 X 1.25	2
	Water Outlet Pipe	13.7 to 23.5	10.1 to 17.3	M8 X 1.25	2
	Intake Manifold	13.7 to 23.5	10.1 to 17.3	M8 X 1.25	8
	Exhaust Manifold	13.7 to 23.5	10.1 to 17.3	M8 X 1.25	8
	Cooling Fan	5.9 to 9.75	4.3 to 7.2	M6 X 1.0	4
	Starter Motor	74.5 to 90.1	54.95 to 66.45	M12 X 1.25	2
	Generator Fulcrum	34.3 to 46.1	25.3 to 34	M10 X 1.25	1
	Generator Adjusting Plate	13.7 to 23.5	10.1 to 17.3	M8 X 1.25	1
	Solenoid	5.9 to 9.75	4.3 to 7.2	M6 X 1.0	2
Tightening torques of standard bolts and nuts	M6 x 1.0	7.85 (5.89 to 9.81)	5.8 (4.3 to 7.2)		
	M8 x 1.25	18.6 (13.7 to 23.5)	13.7 (10.1 to 17.3)		
	M10 x 1.25	40.2 (34.3 to 46.1)	3.0 (25.3 to 34)		
	M12 x 1.25	82.4 (74.6 to 91.2)	60.8 (55 to 67.3)		

Rocker Arm Shaft Assembly

FIG. 38: The rocker arm shaft assembly is composed of the rocker arms, shaft brackets, etc.

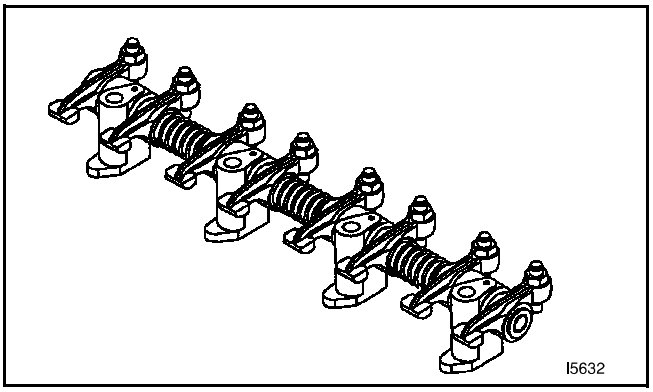

FIG. 38

FIG. 39: Measure the outside diameter (D) of the rocker shaft and the inside diameter (d) of the rocker arm. Those with a value out of the usable limit should be replaced with a new one.

Rocker Arm Shaft	D
Standard Value	16 mm (0.63 in)
Usable Limit	15.85 mm (0.62 in)

Rocker Arm Clearance	d
Standard Value	0.01 to 0.05 mm (.004 to .002 in)
Usable Limit	0.2 mm (.008 in)

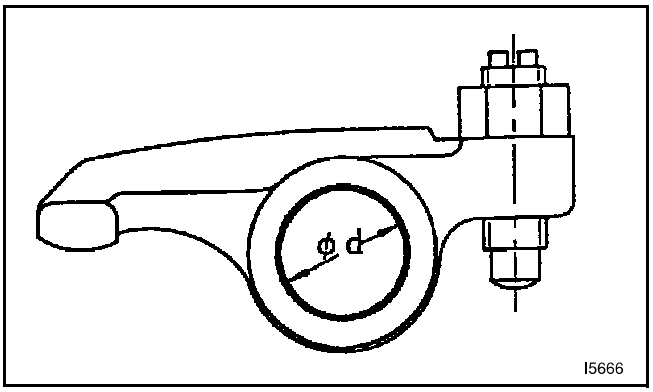

FIG. 39

Breather

FIG. 40: As illustrated, unburned fuel within the crank chamber is controlled to flow by the PVC valve (A) installed on the cylinder head, utilizing the inside pressure of the inlet manifold, which leads to low oil consumption. The unburned fuel gas having passed the PVC valve is recirculated into the inlet manifold through the hose.

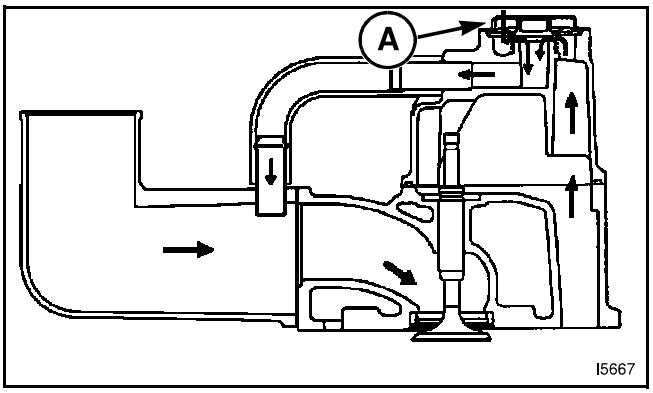

FIG. 40

Cylinder Head Gasket

The cylinder head gasket is made of a material, which is very excellent in press and heat proof properties. The gasket installed between the cylinder block and cylinder head prevents coolant and oil leakage. When the gasket is damaged or the cylinder head is removed, be sure to discard the used one and install a new gasket.

Tuning Valve Timing

FIG. 57: It is designed that the valve timing becomes proper when the markings XX are aligned to X, 00 (counter sinks) to Y, and 00 (counter sinks) to 0 between timing gears as illustrated. Before tuning the valve timing the piston in the #1 cylinder should be set at TDC, which will makes the operation easier.

Ref.	Markings:	
1	Crankshaft Gear	X-X
2	Idle Gear	X, Y, O
3	Cam Gear	O - O
4	Injection Pump Cam Gear	O - O

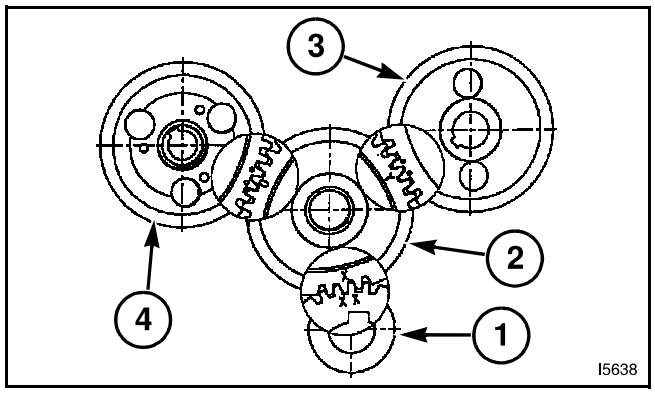

FIG. 57

The TDC position of the piston in the #1 cylinder is known by the relationship between the punched markings on the crankshaft pulley and the calibration on the gear case. Therefore valve timing should be judged from this information when checking if from the front of the engine.

Valve Clearance

FIG. 58: Parts related to the valve mechanism expand slightly due to heat. The valves and push rods expand more than the cylinder head and cylinder block. Consequently excessive expansion of the valves and push rods causes the valves to push open, which leads to leaking of compressed gases. To prevent such troubles, some clearance is provided between the rocker arm and valve stem, which is called "valve clearance" (1). This clearance should be adjusted when the engine is cold. Proper adjustment of the valve clearance is also useful to lessen the noises generated when the valve starts opening and completes closing.

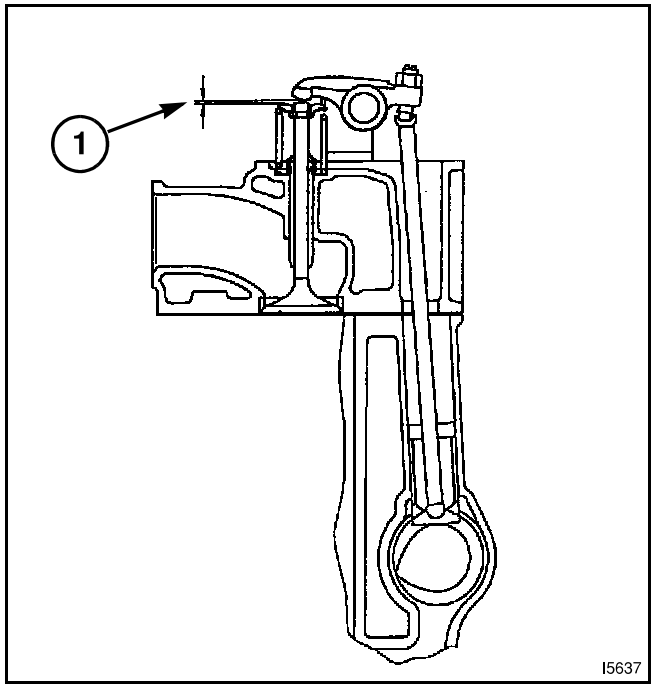

FIG. 58

Removal of Flywheel and Rear Plate

FIG. 82: Secure the flywheel to remove hardware. Remove the flywheel.

Secure the flywheel.

Check the pilot bearing surface and the ring gear for damage.

Remove the rear plate.

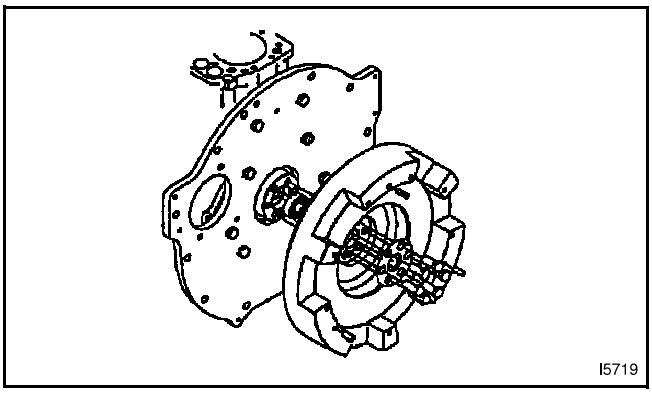

FIG. 82

Removal of Oil Pan and Strainer

FIG. 83: Remove the oil pan.

Remove the strainer.

Remove and discard the O-ring.

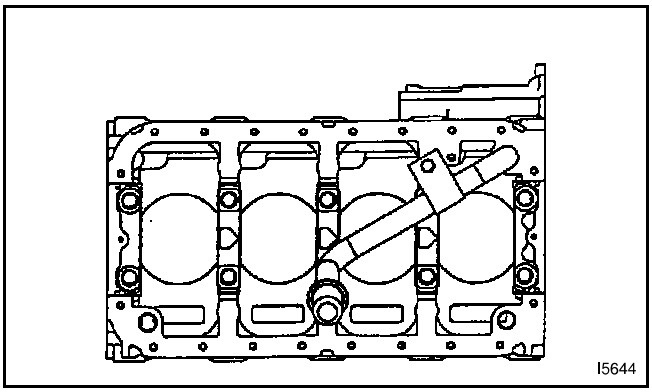

FIG. 83

Removal of Connecting Rods and Pistons

FIG. 84: Remove carbon from the upper part of the cylinders using carbon remover.

NOTE: Take care not to damage the cylinder wall.

Make a note of the installed position and direction of each rod bearing cap.

Make a note of the installed position and direction of each connecting rod and piston.

Remove the connecting rod bearing cap.

Turn the crankshaft so that the piston comes to TDC. Tap the piston up from the bottom of the cylinder block using the handle of the plastic mallet or something similar.

Remove the piston using a plastic hammer.

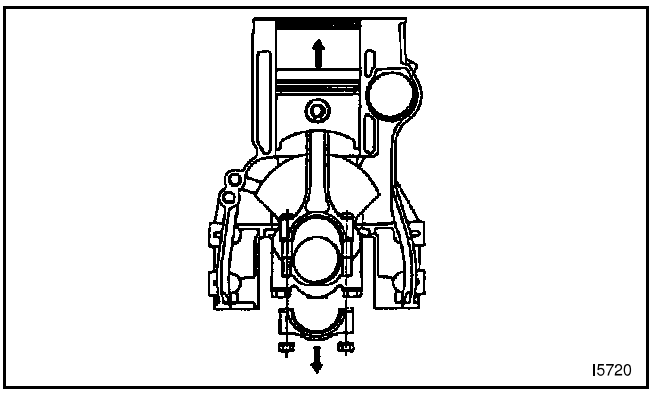

FIG. 84

Install the Gear Case

FIG. 106: Install the thrust piece (1).

Apply engine oil to the thrust piece ahead of time.

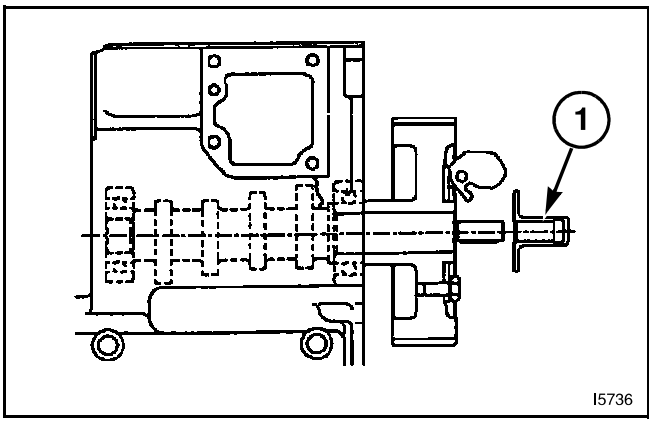

FIG. 106

FIG. 107: Install the gear case.

When installing the oil pump after having been washed, prime the rotor section with engine oil ahead of time.

A damaged seal should be replaced with a new one.

Make sure that the hydraulic pump gear assembly is installed.

Set the control link (1) on the control rack pin (2) of the injection pump.

Check that the oil pump gear and hydraulic pump gear are engaged properly to each other.

Gear case bolts and nuts should be tightened in the order illustrated.

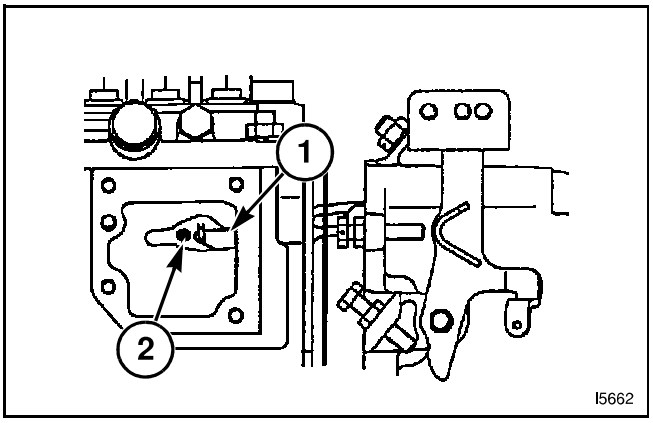

FIG. 107

Tightening Torque	18.5 Nm (13.7 lbf ft)

The center flange bolt should be tightened along with a gasket.

FIG. 108: Install the hydraulic spacer.

Check the O-ring for damage.

Do not to allow the O-ring to fall or to be pinched.

Fit the spacer on the bearing carefully.

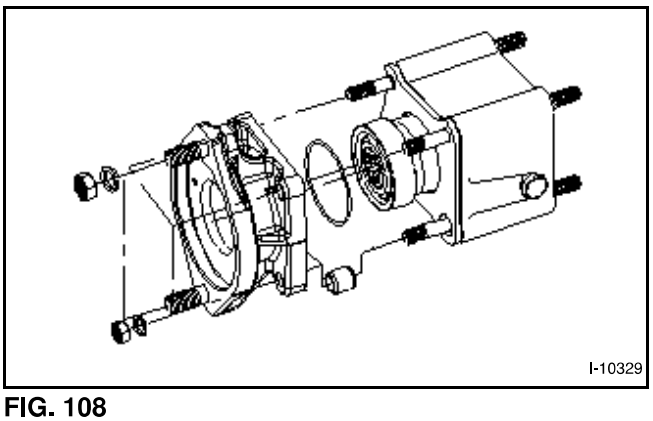

FIG. 108

Tightening Torque	18.57 Nm (13.7 lbf ft)

Oil Pump

FIG. 129: The pump is a trochoid type and installed inside the engine gear case. The pump is driven by the crankshaft gear and turns clockwise as viewed from the pump gear. Both the inner rotor and outer rotor are made of sintered iron alloy and housed in the aluminum alloy pump body and installed on the pump cover, which forms a part of the gear case. The pump gear is press fitted onto the pump shaft, while the inner rotor is fitted on the pump shaft and retained with a pin. When the oil pump does not turn smoothly, it should be replaced with a new one as an assembly.

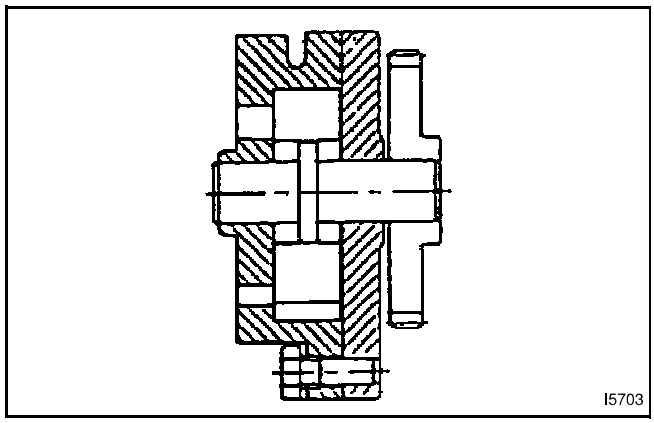

FIG. 129

Specifications

Type ..... Trochoid pump

Delivery volume ..... 25 liters/min (6.6 gal/min) @ 2300 rpm

Delivery pressure ..... 337.8 to 441.3 kPa (49 to 64 psi)

Oil temperature ..... 47 to 53 degrees C (116.6 to 127.4 degrees F)

Oil to be used ..... SAE 10W30 or SAE 30

Minimum allowable oil pressure ..... 68.9 kPa (10 psi)

Oil Filter

Specifications

Type ..... Full flow type

Oil capacity ..... 225 cc

Filtering area ..... 1200 cc

Opening pressure of overflow valve ..... 77.9 to 117.21 kPa (11.3 to 17 psi)

Construction and Operation

FIG. 130: The oil filter on this engine is a cartridge type. The oil delivered from the oil pump is reduced in pressure to the specified level by the relief valve built in the gear case and enters the outer part of the filter after flowing through the oil galleries. The oil is cleaned while passing the filter element and comes out of the filter through the center outlet and goes to each part of the engine.

If the element is clogged, the oil enters the outer part of the filter and does not come out of the center outlet which is clogged with debris preventing the lubricant supply to each part. In order to prevent each part from seizure, the over flow valve opens, bypassing the filters, to allow the oil to go to each part.

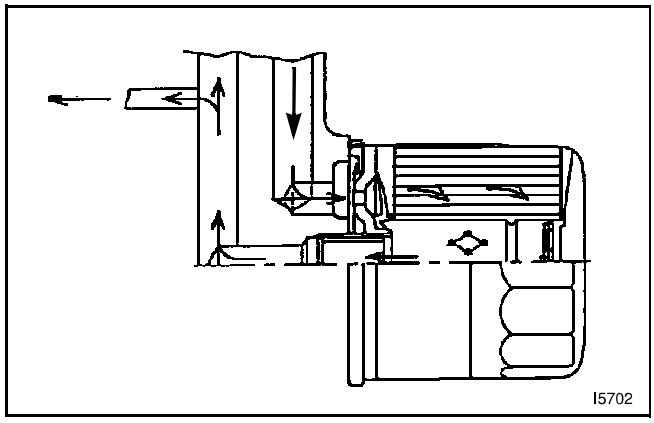

FIG. 130

Functions

The CTD pump has three functions.

1. Speed Timing
2. Load Timing
3. Varying the Injection Rate

Speed Timer Function

FIG. 143: The difference of the initial delivering pressure between low speed and high speed, (difference in pre flow effect) caused by the sub port in the plunger barrel and CDT cut in the plunger, is utilized.

At low speed, fuel escapes through the sub port and thus pressure does not rise. As the lifting speed is also slow, the pressure starts rising only when the bottom of the CTD cut blocks the sub port. At high speed, the plunger starts delivering fuel because of choking due to orifice effect even while the sub port is open, as the lifting speed is also fast.

1. Starting forced delivery of fuel with sub-port closed at low speed.
2. Starting forced delivery of fuel with main port closed at high speed.
3. Advanced angle.

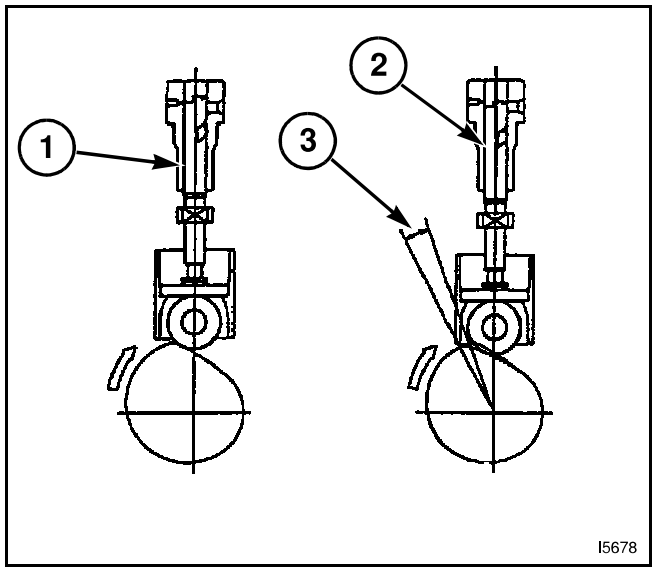

FIG. 143

Load Timer Function

FIG. 144: Load timer function is to vary plunger lift by means of the lead provided in the top of the plunger when the main port is closed in order to control the injection starting. The Illustration shows the development of the lead for obtaining timing delay in the high load side.

Injection Rate Variable Function

The injection rate variable function is to let the engine approach an ideal injection pattern for emission control. The injection rate decreases on the initial stage of injection and increases on the middle to late stage.

At high speed, fuel injection starts as soon as the plunger closes the main port. But on the initial stage as the sub port is not closed yet and a part of fuel leaks through the sub port, fuel delivery rate decreases accordingly. When the plunger rises further, the sub-port is closed completely and delivery rate increases accordingly on the middle and late stage.

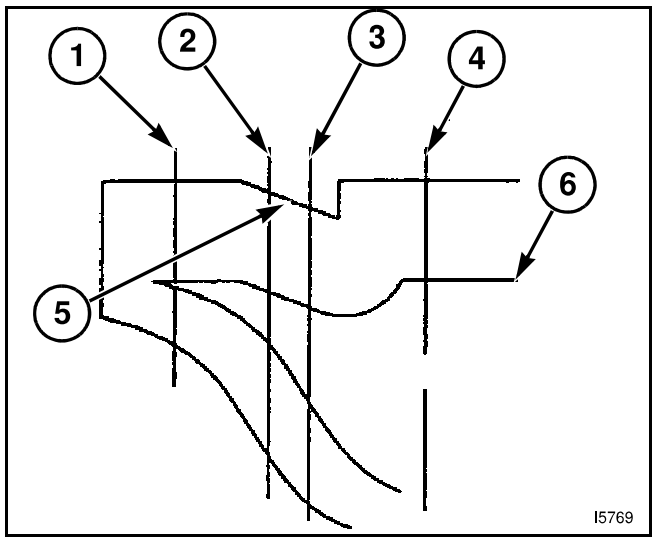

FIG. 144

(1) Unloaded

(2) Rated

(3) Maximum Torque

(4) Start

(5) Upper Lead

(6) Effective Stroke

FIG. 164: When performing nozzle test, use diesel fuel of specific gravity from 0.82 to 0.84 and warmed at about 20 degrees C. The tested nozzle is judged from the shape of fuel spray, injection angles, sharply defined injection, and dripping from the valve seat.

The injection tester, as shown, is required to perform the following nozzle test. The fuel tank, fuel feeding pipe, nozzle holder and the test nozzle should all be free from dust. Use a filter and pour dust free fuel into the fuel tank. Before tightening the nozzle into the nozzle holder, make sure that the contacting surfaces of both parts should be free from dust and flaw.

Test for injection starting pressure. The injection starting pressure is 120 kgf/sq cm (1706.4 psi). The pressure is adjusted by shimming.

NOTE: Keep yourself away from fuel injection. As it is very highly pressurized, it can penetrate the skin, which is very dangerous. Therefore always perform the test paying attention to the direction of injection.

Oil tight test for valve seat.

No dripping from the nozzle hole in the nozzle should occur at 20 kgf/sq cm (284.4 psi) below the specified injection starting pressure.

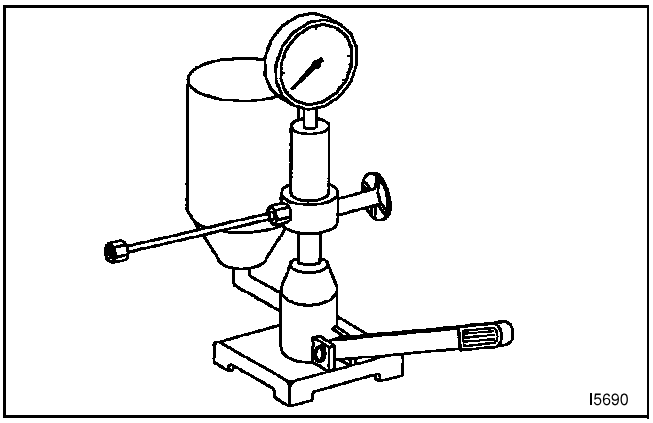

FIG. 164

Inspection by Sight

Wash the nozzle and check the exterior for the following items:

- Damaged needle valve seat
- Carbon deposit
- Clogged nozzle hole

Test for Smooth Movement of Needle Valve

After the inspection by sight, check all the nozzles for the needle valve to move smoothly. Pull out and push in the needle valve for several times within the nozzle body in clean fuel. While holding the nozzle body vertically, pull the needle valve out of the body by about one third the length and make sure the valve comes down smoothly only by its own weight.

New Nozzle Installation

Warm up fuel at 50 degrees to 60 degrees C. move the needle valve sufficiently within the body in the fuel until the nozzle inside is cleaned of rust proof oil completely.

FIG. 176: Removal of the IC regulator.

Remove the three screws securing the IC regulator (1).

Then remove the regulator.

NOTE: As screws of different length are used for respective terminals, they should be set aside for later reference during assembly. A wrongly used screw may come into contact with the end frame grounding the regulator, which will lead to battery overcharging and result in serious damage in the end.

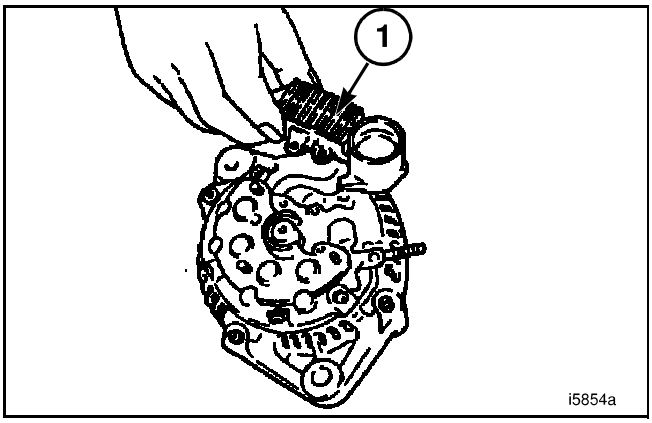

FIG. 176

FIG. 177: Removal of the rectifier.

Remove the four screws which tighten the leads for the rectifier and stator. Then remove the rectifier (1).

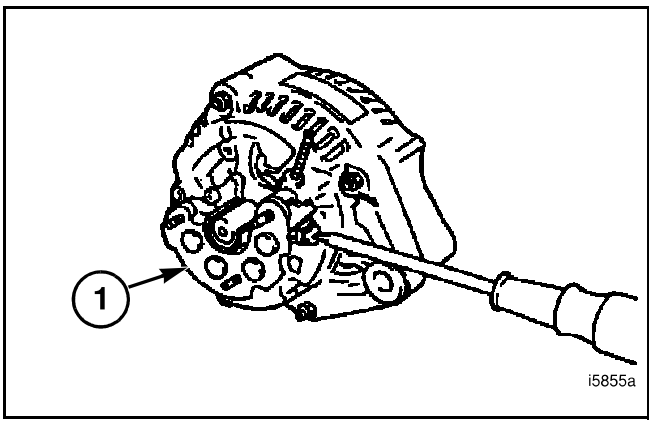

FIG. 177

FIG. 178: Removal of the brushes.

Remove the four nuts and bushes which tighten the drive end frame and rear end frame. Then remove the brush assembly.

NOTE: When removing the bushes, take care not to stretch the wire from the stator.

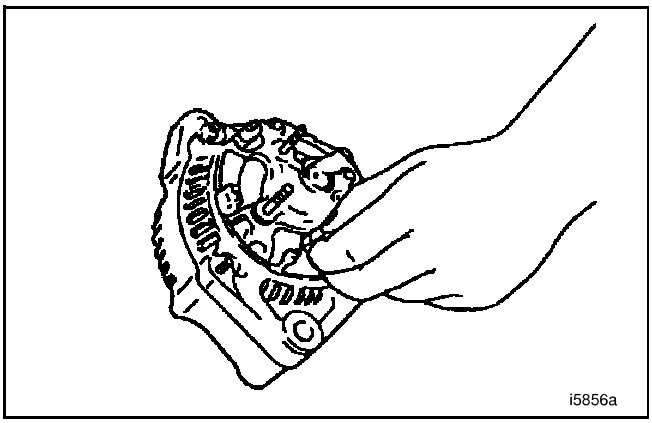

FIG. 178

FIG. 179: Removal of the rear end frame.

Remove the rear end frame using a puller as illustrated.

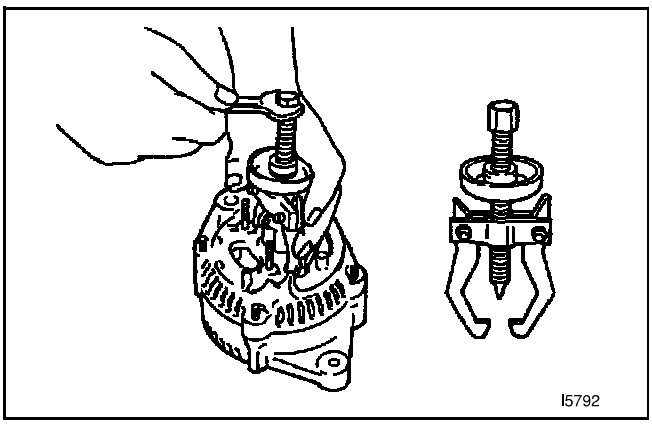

FIG. 179

NOTES

Assembly of Starter

FIG. 224: Installation of the armature.

Apply grease to the armature bearing and then install the armature on the starter yoke.

Installation of the brushes and brush holder.

Lift up and hold the spring and install the brush.

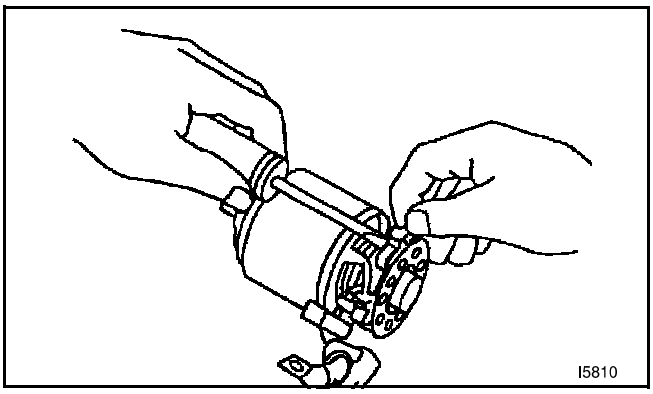

FIG. 224

FIG. 225: Install the commutator end frame using an O-ring.

Install the starter yoke on the magnetic switch using an O-ring.

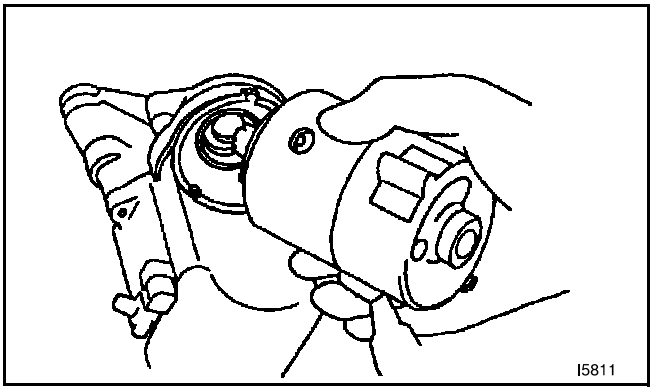

FIG. 225

FIG. 226: Install the steel ball and spring.

Apply grease to the ball ahead of time and install the ball and spring.

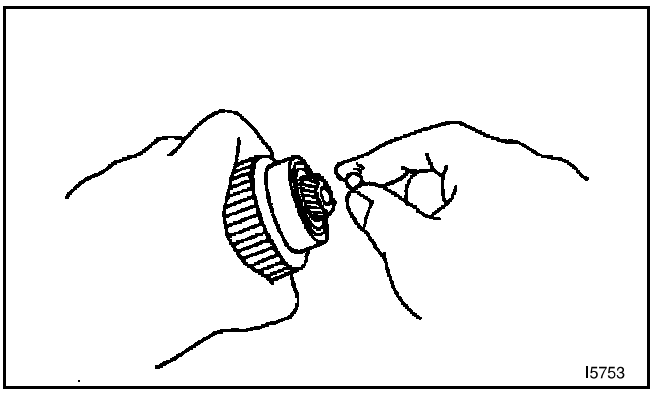

FIG. 226

FIG. 227: Installation of the gear and clutch.

Install the clutch assembly on the starter housing.

Apply grease to the roller/retainer assembly and idle gear and then install.

Install the drive pinion on the armature shaft.

Apply grease to each gear.

Install the starter housing on the magnetic switch.

Install the two through bolts.

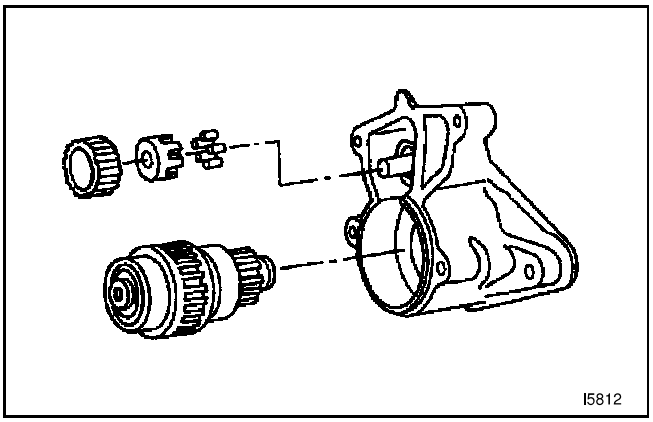

FIG. 227

NOTES

Separation of the Engine From the Clutch Housing

FIG. 22: Remove bolt from steering column u-joint (1) located beside the starter motor.

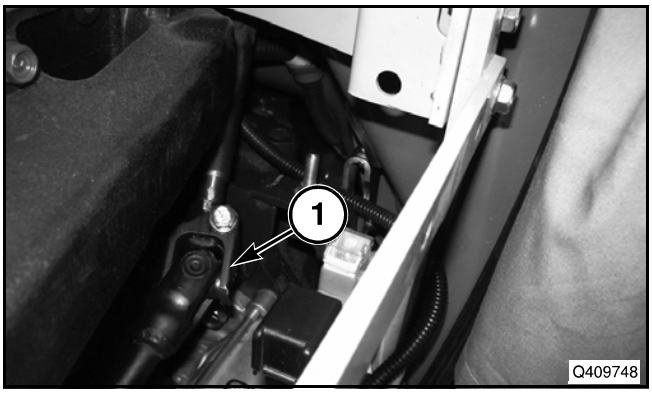

FIG. 22

FIG. 23: Insert wooden wedges between the front axle and the front frame to keep the tractor from tipping.

FIG. 23

FIG. 24: Put splitting stands under the tractor. Support the transmission case with a suitable floor jack and the engine with a suitable overhead hoist. Remove all the bolts securing the engine to the clutch housing. Separate the engine from the clutch housing carefully.

FIG. 24

FIG. 55: Disconnect the front of the left hand and right hand brake rods.

Separate the brake rods in the middle.

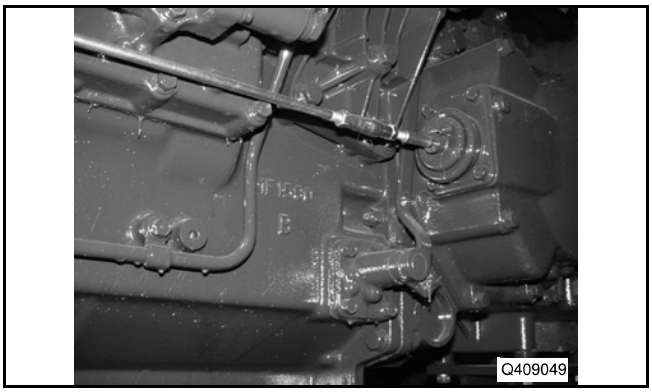

FIG. 55

FIG. 56: Disconnect all wire harness connections to switches and sensors located on the rear transmission housing.

FIG. 56

FIG. 57: Remove the bolts through the rear cab or platform mounts.

FIG. 57

FIG. 58: Loosen the front hardware on the front platform or cab mount bolts untill only a few threads engage the nut.

NOTE: Cab Models - Lift the floor mat to expose the mount bolts.

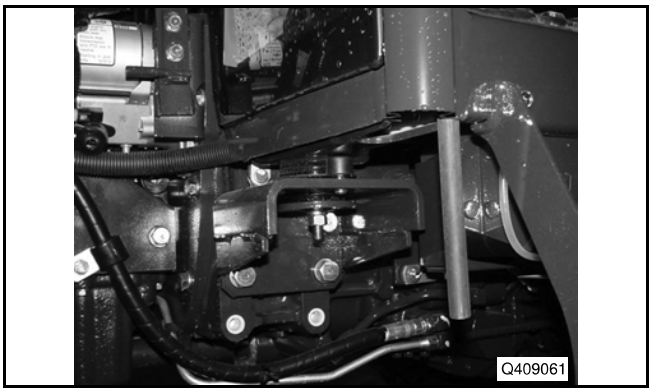

FIG. 58

NOTES

FIG. 116: Disconnect the nylon clamps under the platform on both sides.

Pull harness through to the front of the platform and fold it up on to the platform.

FIG. 116

FIG. 117: Disconnect the harness connectors for the alternator.

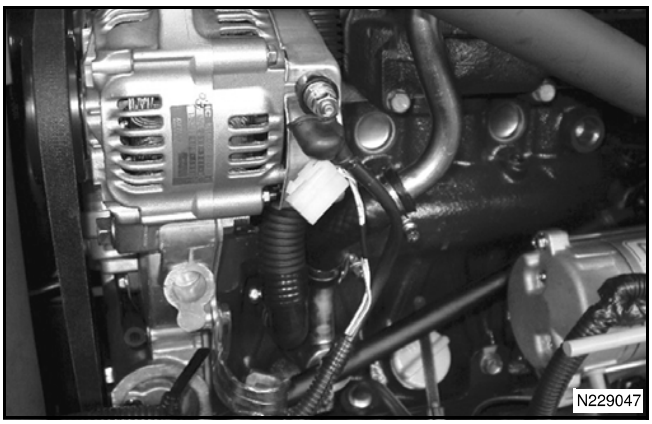

FIG. 117

FIG. 118: Disconnect the harness connectors for the alternator.

FIG. 118

FIG. 119: Disconnect the harness connectors for the starter.

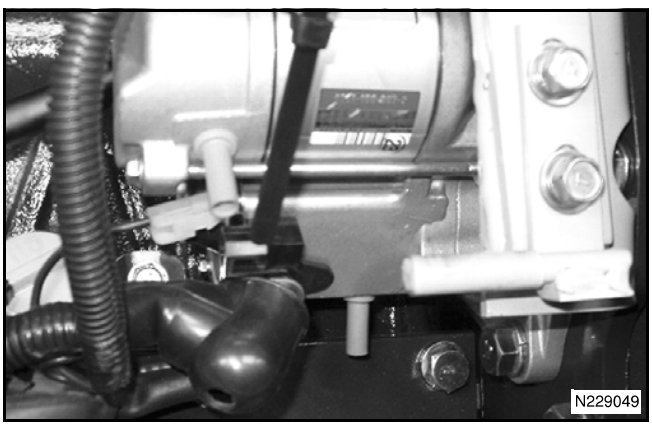

FIG. 119

FIG. 149: Lift up the floor mat to expose the front cab mount bolts. Remove the bolt from the center of the front cab mounts.

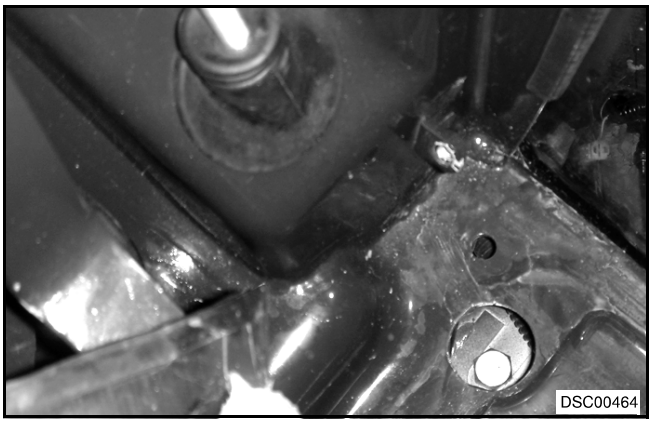

FIG. 149

FIG. 150: Lift up the floor mat to expose the front cab mount bolts. Remove the bolt from the center of the front cab mounts.

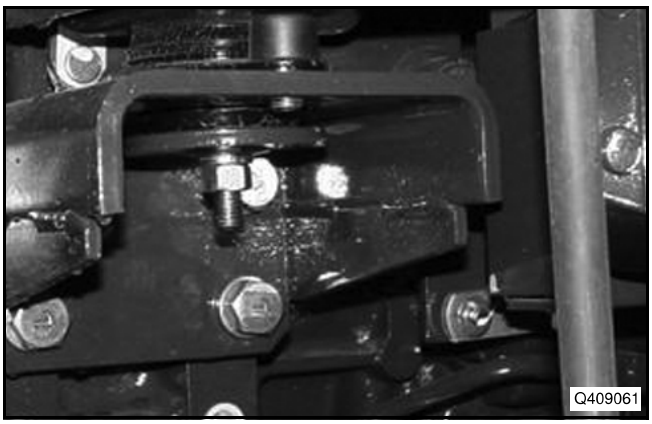

FIG. 150

FIG. 151: Remove the bolt (1) in the center of the rear cab mounts.

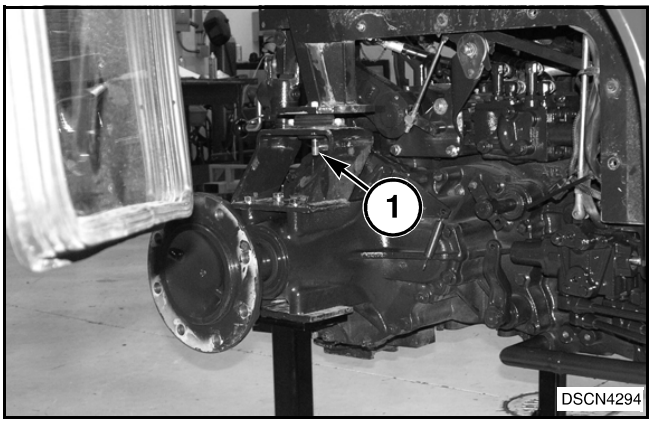

FIG. 151

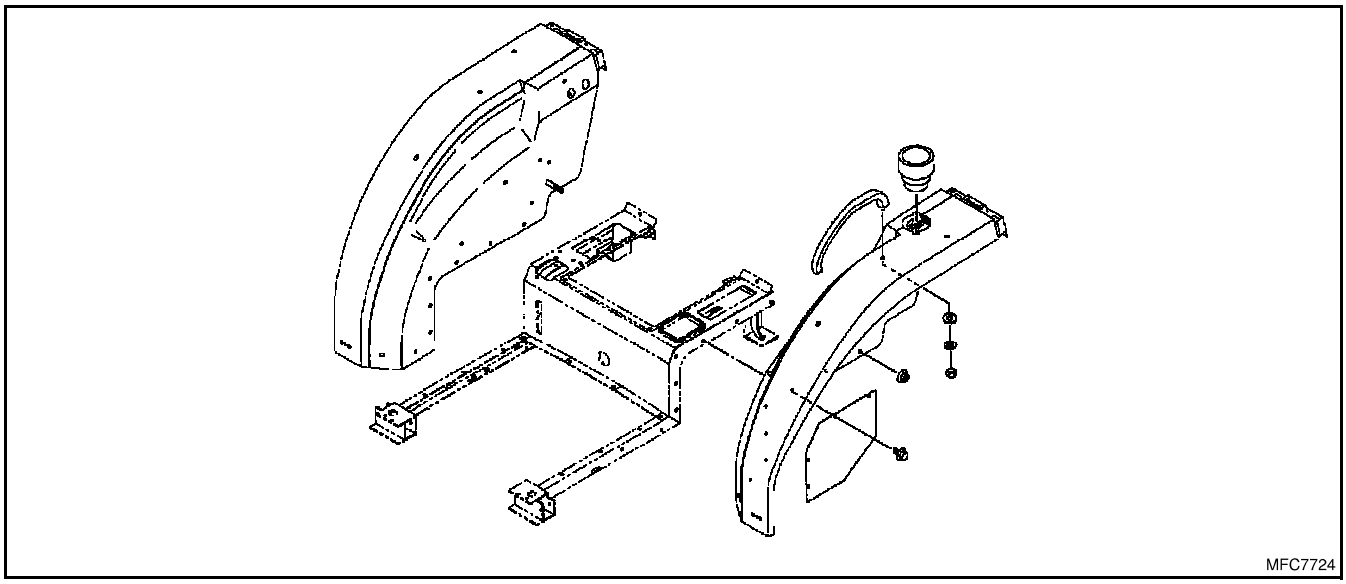

FIG. 172

FIG. 172: Remove hardware securing fender.

Assemble in reverse order to put the fender back together.

Floor Mat, Steps and Floor (Platform)

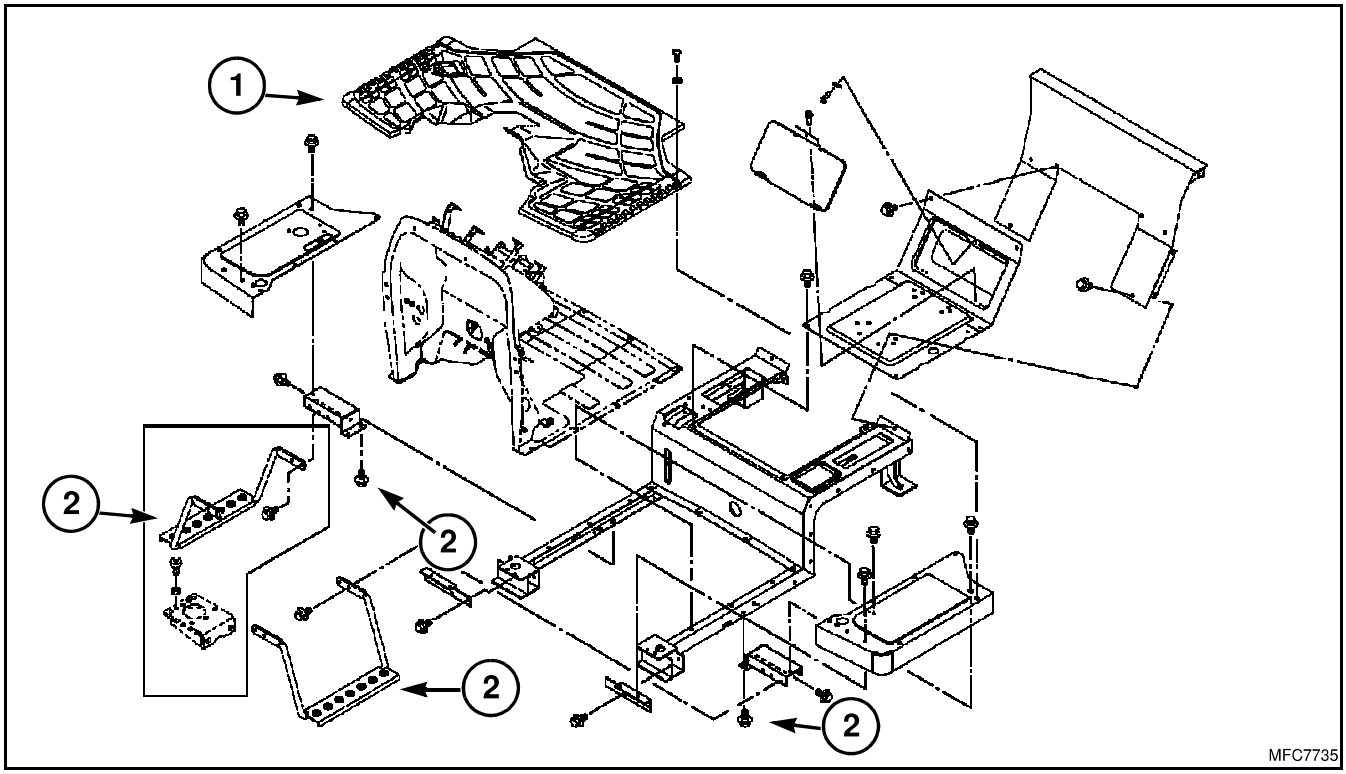

FIG. 173

FIG. 173: Remove screws securing floor mat (1) and remove floor mat. Remove hardware securing left-hand or right-hand platform (2) to platform frame.

In order to put the floor mat and steps back together, assemble in reverse order.

FIG. 188: The linkage provides four positions of adjustment. Select the top hole (1) for heavy implements. For most implements, securing the top link to the second hole (2) is satisfactory. The lower holes (3) and (4) are selected for an implement that is used high off the ground.

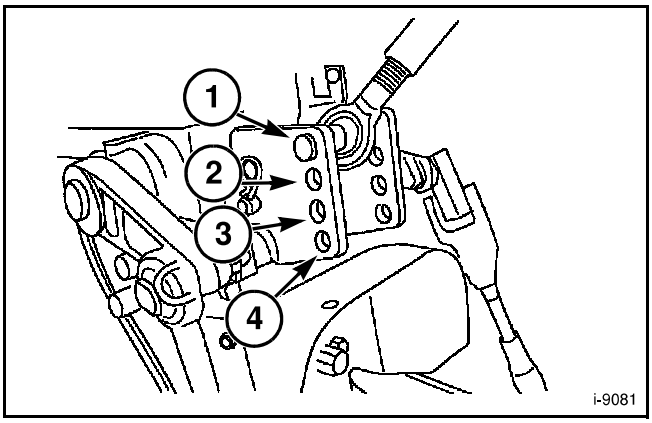

FIG. 188

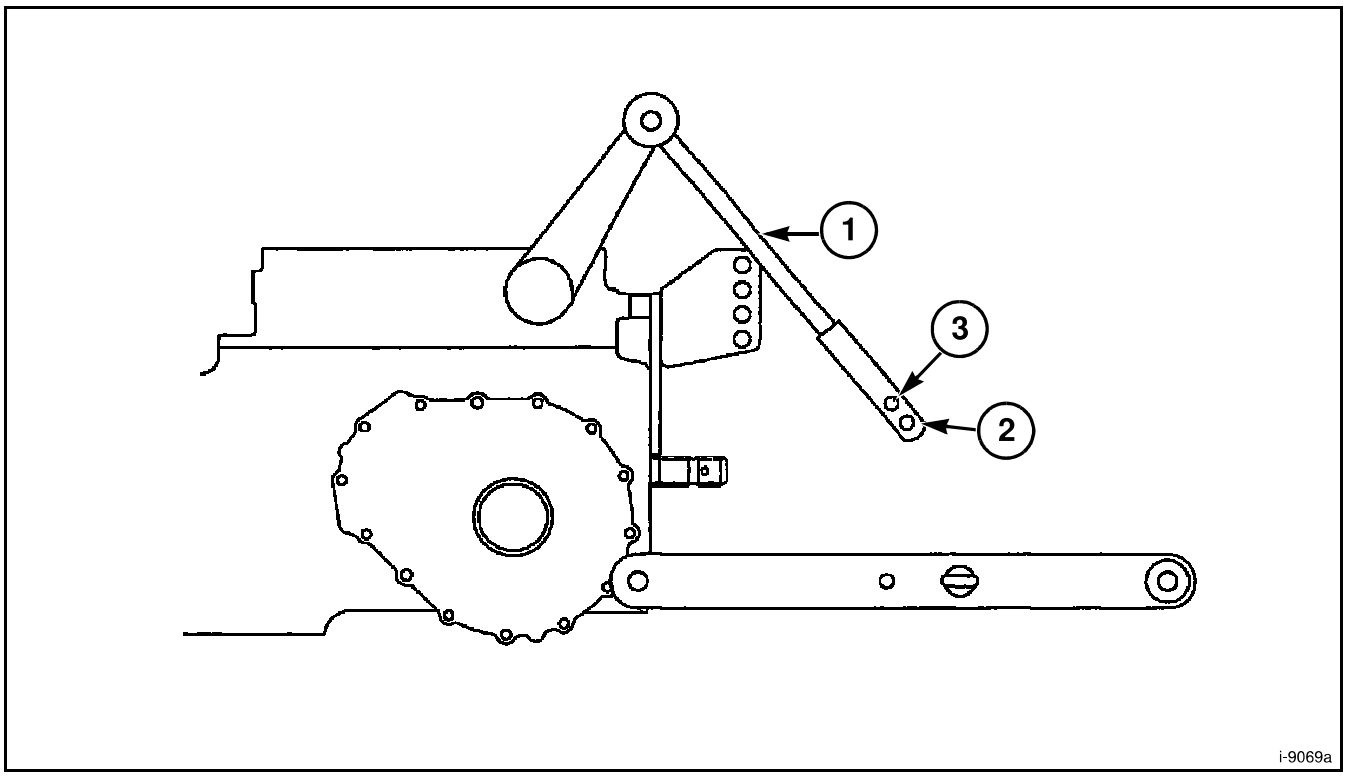

FIG. 189

FIG. 189: The lift rods (1) also have multiple positions. Normally the lower hole (2) is used. The upper hole (3) will provide increased lift height and reduced depth.

FIG. 2: Component Layout

(1) Seal Plug
(2) Snap Ring (hole)
(3) Oil Seal
(4) Shaft C-ring
(5) Helical Gear
(6) Washer
(7) R. B. B.
(8) Input Metal
(9) Seal Plug
(10) Shaft Snap Ring
(11) Gauge Needle
(12) Input Pulley Collar
(13) Bolt
(14) Input Metal
(15) Shaft C-ring
(16) Clutch Set
(17) Nut
(18) Collar
(19) Washer
(20) Collar
(21) Helical Gear
(22) Oil Seal
(23) Key
(24) Release Fork
(25) Bolt
(26) Bar Comp
(27) Lock Washer
(28) Stay Comp
(29) But
(30) Bolt
(31) Transmission Case
(32) Bolt
(33) Snap Ring Bearing

Assembly

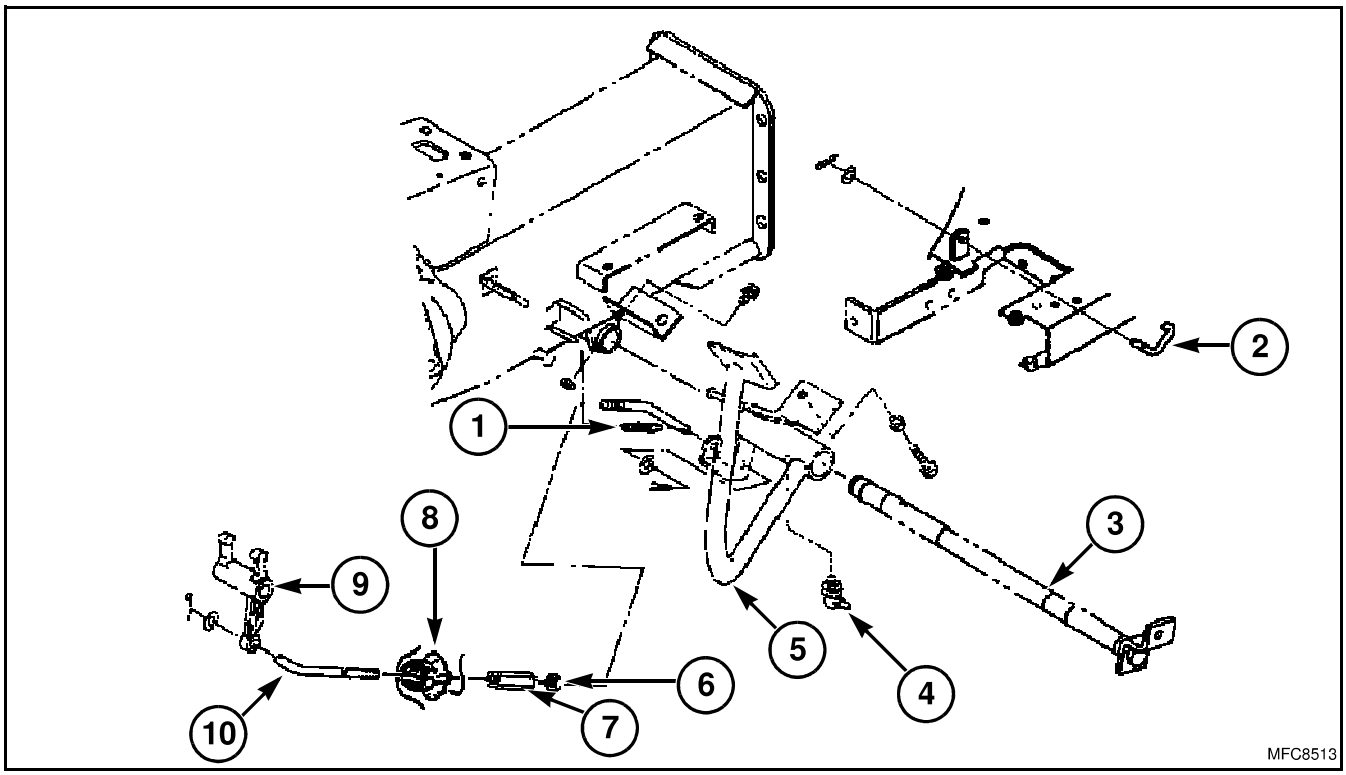

FIG. 11

FIGS. 11: Clutch Pedal System

(1) Spring HC094
(2) Hook
(3) Shaft
(4) Grease Fitting
(5) Clutch Pedal Assembly
(6) Nut
(7) Turnbuckle
(8) Boot
(9) Clutch Arm
(10) Clutch Rod

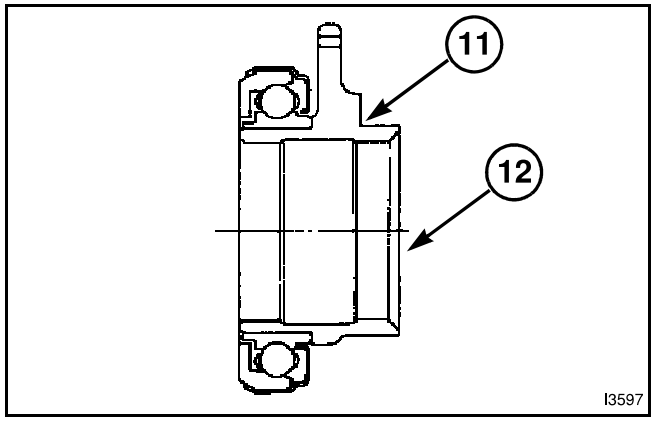

FIG. 12

Assemble disassembled parts in reverse order of disassembly, with the following additional information.

Each sliding part must be coated with heat proof grease.

Smooth movement of each part must be confirmed.

The release bearing (11) must be installed in correct direction, on sleeve (12).

Contents

Precautions for Assembly

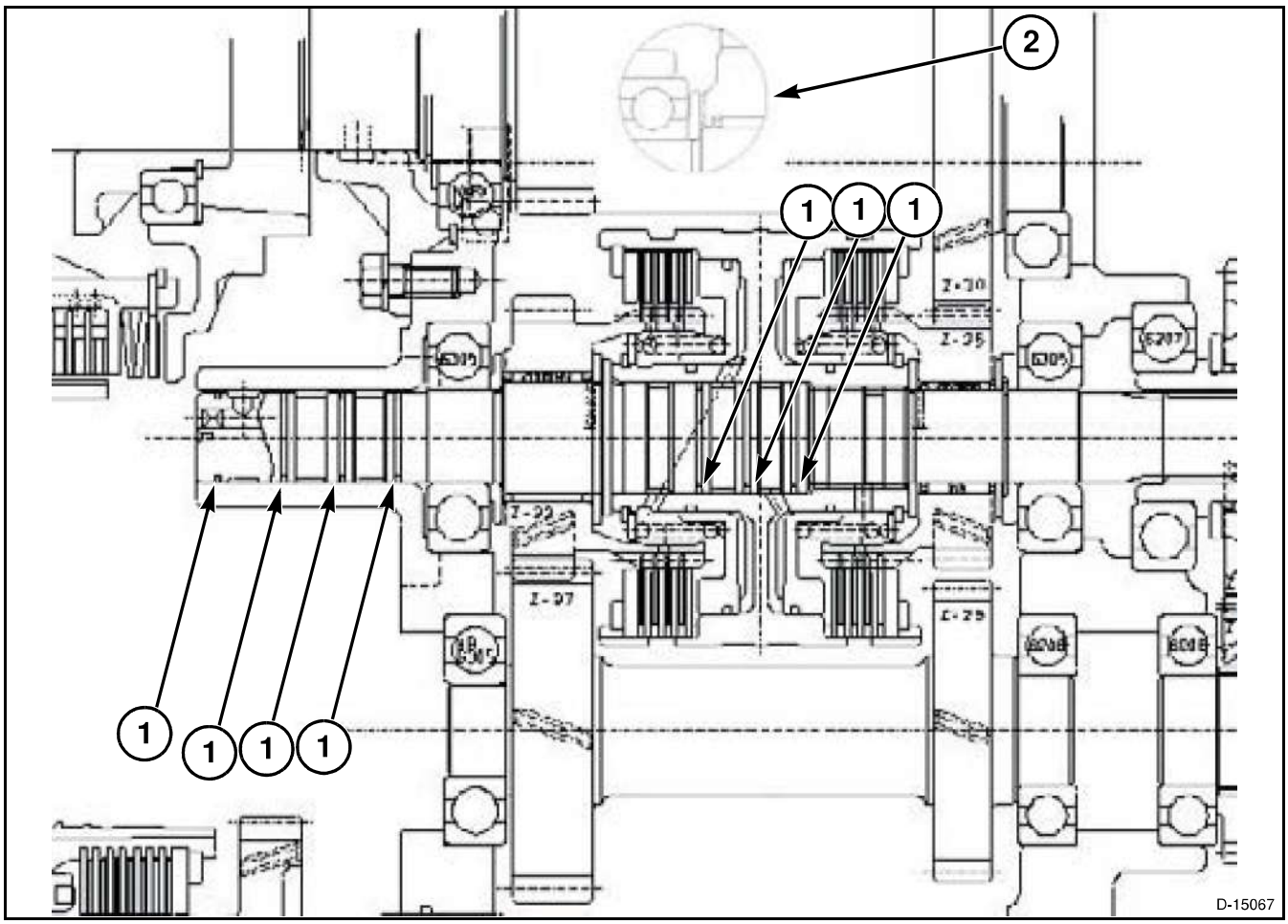

FIG. 7

FIG. 7: Power Shift and Power Shuttle Assembly Precautions

Seal Ring check for any damages. Apply grease.

O-ring (1) check for any damages. Apply grease.

NOTE: Attention: Direction of washer (2).

PRECAUTIONS FOR ASSEMBLY

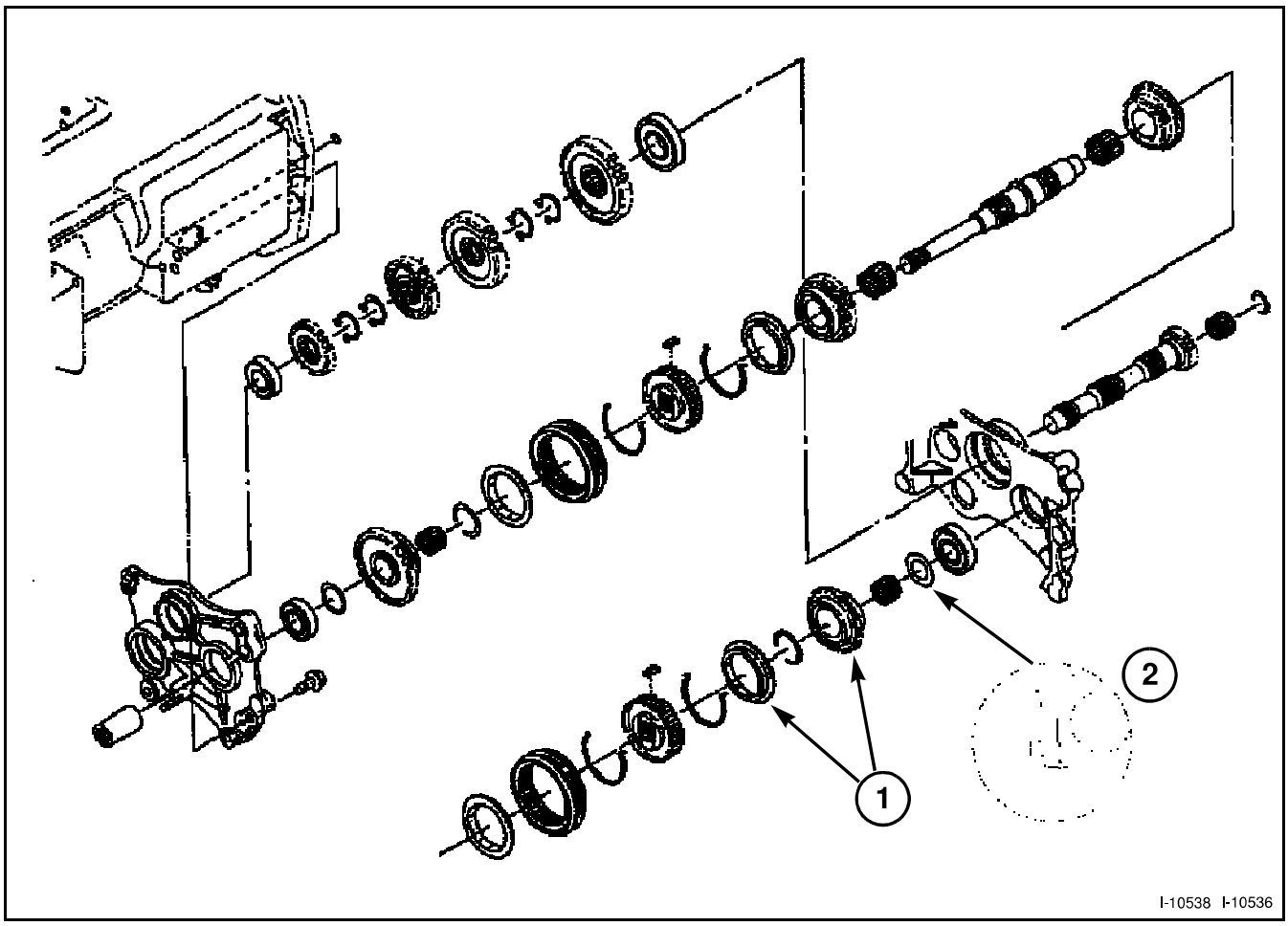

FIG. 21

FIG. 21: Precautions for assembly

(1) Apply Oil to Synchro Mesh

(2) Installed Direction of Washer

FIG. 27: The ECU is located under the cab on the left-hand side.

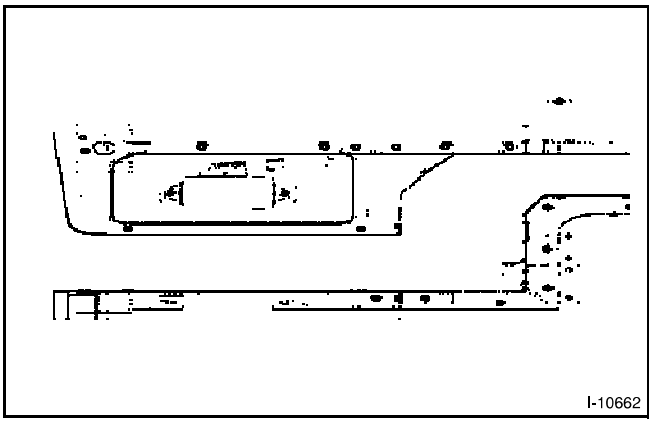

FIG. 27

FIG. 28: Quadra Shift ECU (Harness Side) See the following pages for pin identification on the harness.

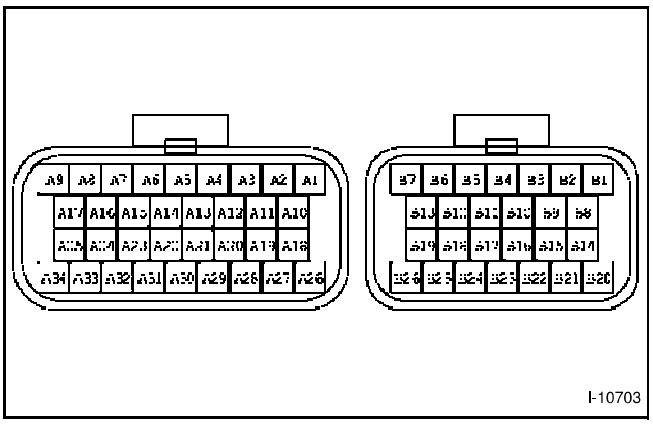

FIG. 28

The following information refers to figFig. 43

Abbreviation	Description
ON	On
OFF	Off
Judged that 2nd is disengaged	Judged that 2nd is disengaged
Output for quick disengagement of 2nd (output of the valve in the opposite side)	Output for quick disengagement of 2nd (output of the valve in the opposite side)
Time to wait for the 1st and 2nd side to be in the neutral state	Time to wait for the 1st and 2nd side to be in the neutral state
The output start for engaging to 3rd	The output start for engaging to 3rd
100 msec	100 msec
Judges that the 3rd is engaged	Judges that the 3rd is engaged
Clutch pressure (check port)	Clutch pressure (check port)
F	Forward
Power Shuttle	Power Shuttle
Clutch Solenoid	Clutch Solenoid
Main gear shift valve	Main gear shift valve
The main gear shift directions occur	The main gear shift directions occur

Basic operation when operating the range change gear shift lever.

FIG. 44: Fundamental operation

When the sub-gear shift lever is operated, it moves so that the difference of traveling speed at the time of the gear shift decreases.

When the sub-gear shift lever is operated to make the speed to slowdown: The main gear shift changes the speed automaticallyto 4th gear shift position.

When the sub-gear shift lever is operated so as to increase the speed: The main gear shift changes the speed automaticallyto 1st gear shift position.

NOTE: When shifting from high range to low range or low range to high range, the range speed is changed through medium range. If the ECU senses that the change through medium range occurred in less than one second, the transmission main gear shift position will not change.

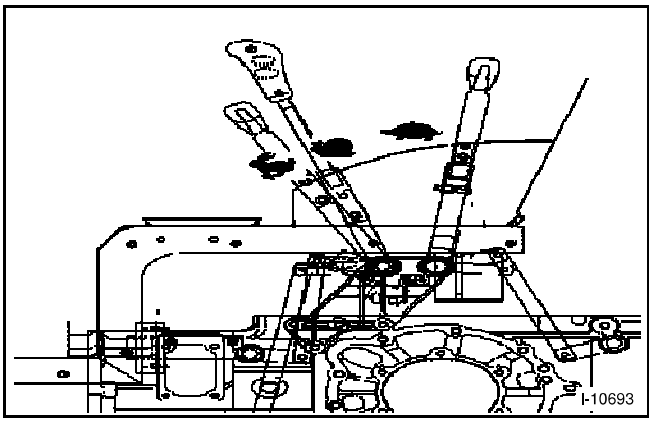

FIG. 44

NO	Abnormalities Displayed on the Digital Panel	Note
3	Shift position* malfunction	When the main gear shift or gear shift is not engaged or disengaged.
		1. When the gear shift cannot be perform.
		2. The gear shift will not function appropriately within one second.
		NOTE: X mark will indicate the gear shift position.
		1. Poor assembly of the main gear shift sensors.
		* A gap of the sensor caused by the slack of the sensor fitting tools.
		* The omission and / or the gap of the plate by the slack of the nut inside the sensors.
		2. Poor main gear shift sensor itself.
		3. The main gear shift valve cannot be changed over.
		4. The pressure of the hydraulic circuit is very low. Approximately 980 kPa (142 psi).
		The drop in pressure is due to the oil leak in the clutch.
		A lot of air mixing to the circuit.
		5. Disconnection of solenoid coils of the solenoid valve.
		6. Removal and / or poor contact of solenoid coupler, and / or disconnection or wiring.
		7. The inadequate concordance of the synchronization gear part.
		* Immediately after exchanging the main shift gear etc., poor gear shift may occur caused by inadequate concordance. In this case, repeat gear shift operation while traveling two or more times--then, the taper part of a synchronizer ring and gear will become concordant with each other.

PTO CLUTCH

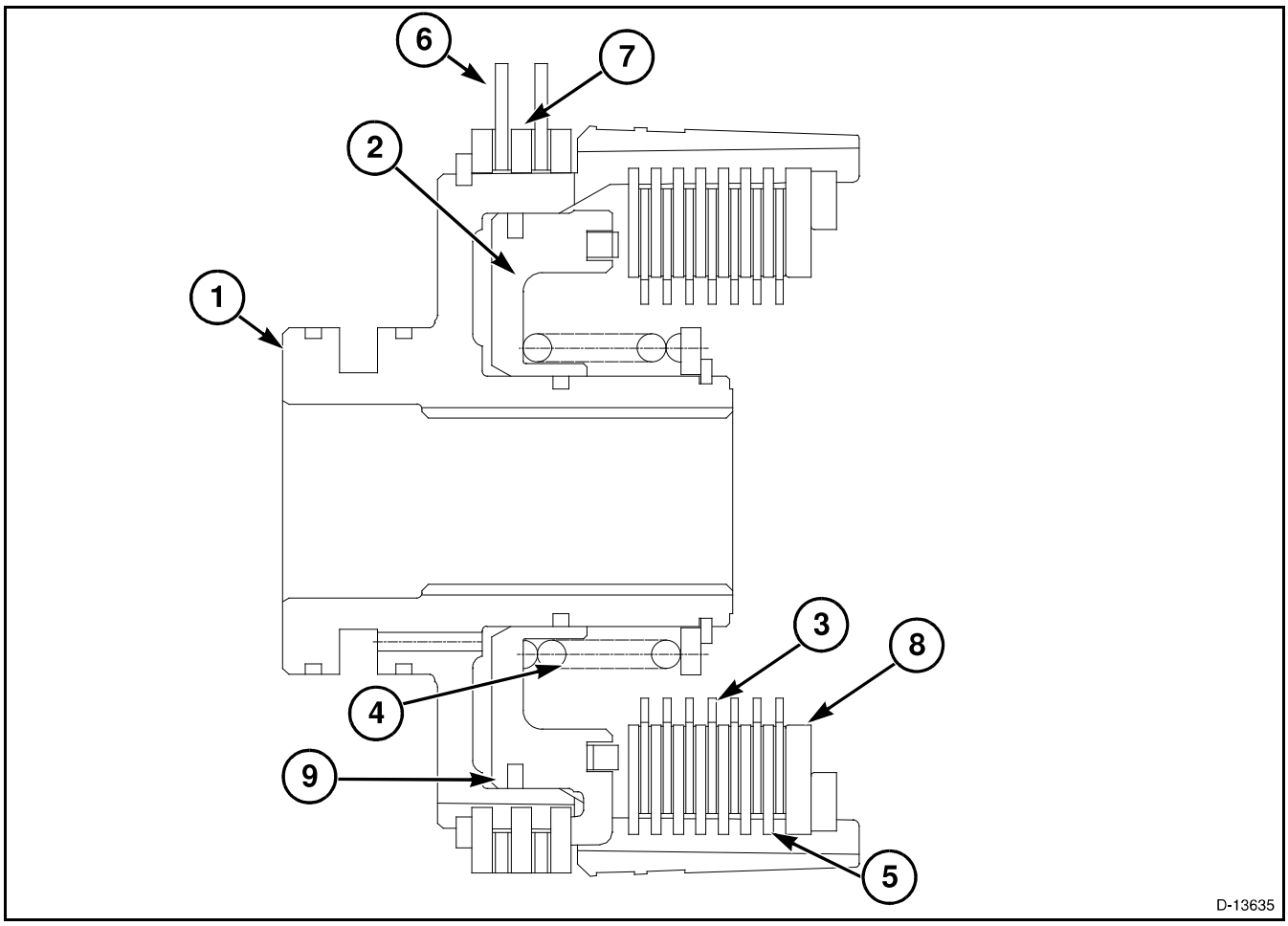

FIG. 65

FIG. 65: PTO clutch pack

(1) Clutch Case

(2) Piston

(3) Separate Plate

(4) Spring

(5) Friction Plate Qty-7

(6) Brake Disk

(7) Brake Pressure

(8) Back Plate

(9) Wave Spring

NOTE: The clutch cases have the following identification markings:

Two grooves each have a width of 5 mm (0.20 in).

The PTO clutch case is made of die-cast aluminum.

Please be careful in handling the clutch case and be careful not to damage or deform it.

NOTES

FIG. 20: Be sure that starting torque of drive pinion meets the specified level.

Starting Torque	0.81 to 1.22 Nm (7.2 to 10.8 lbf in)

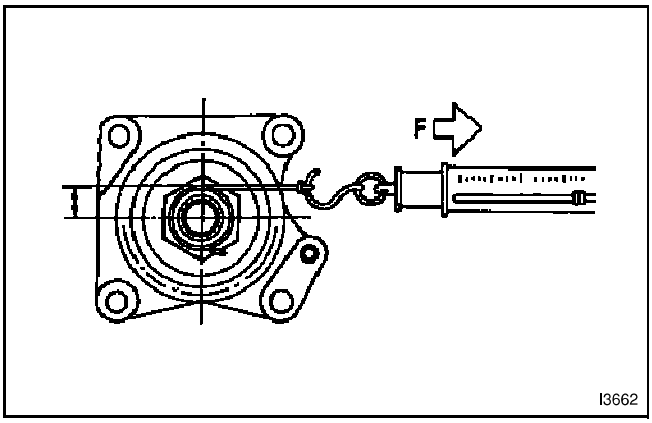

FIG. 20

FIG. 21: Be sure that starting torque of drive pinion meets the specified level.

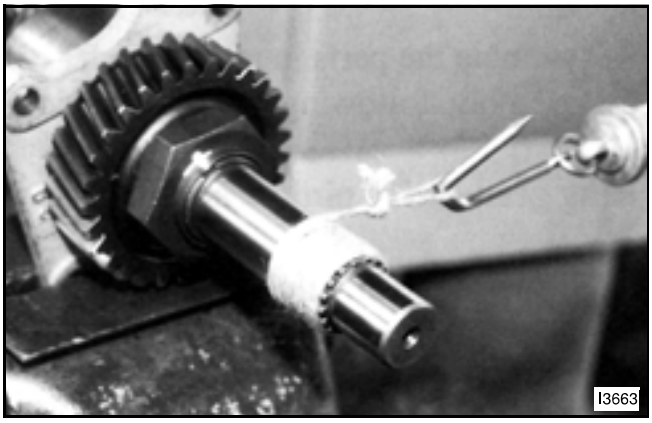

FIG. 21

FIG. 22: After the starting torque has been adjusted to the specified level, crimp nut (1) as illustrated.

NOTE: Crimp lock until crimped part touches bottom of groove.

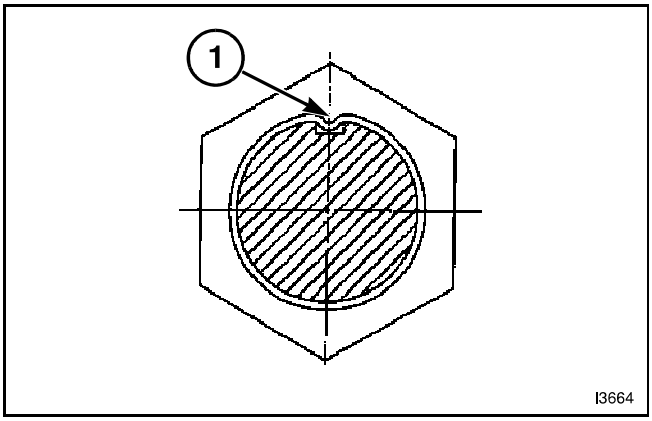

FIG. 22

Parking Brake Lever

FIG. 42: Right and Left hand views.

By adjusting the length of the rod, the brake pedals can be adjusted.

Adjust the length of the rod to 415 mm (16.4 in) (1).

After adjusting the length of the rod, tighten the lock nuts (2) firmly.

Adjust the right hand side of the rod, repeating the same process as for the left hand side of the rod.

After adjusting the brake system, make sure that the systems function well. Make sure that the left and right hand side of the brake system are operating normally.

Make sure that the brake system is not working when the brake pedals and the parking brake lever are in release position.

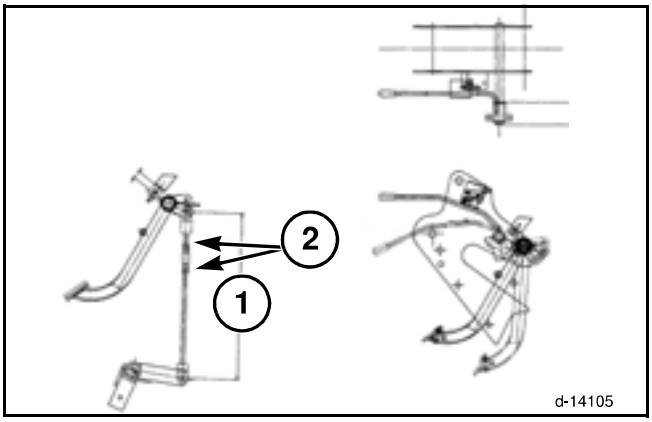

FIG. 42

FIG. 43: Right and Left hand views.

By adjusting the length of the rod, the brake pedals can be adjusted.

Adjust the length of the rod to 415 mm (16.4 in) (1).

After adjusting the length of the rod, tighten the lock nuts (2) firmly.

Adjust the right hand side of the rod, repeating the same process as for the left hand side of the rod.

After adjusting the brake system, make sure that the systems function well. Make sure that the left and right hand side of the brake system are operating normally.

Make sure that the brake system is not working when the brake pedals and the parking brake lever are in release position.

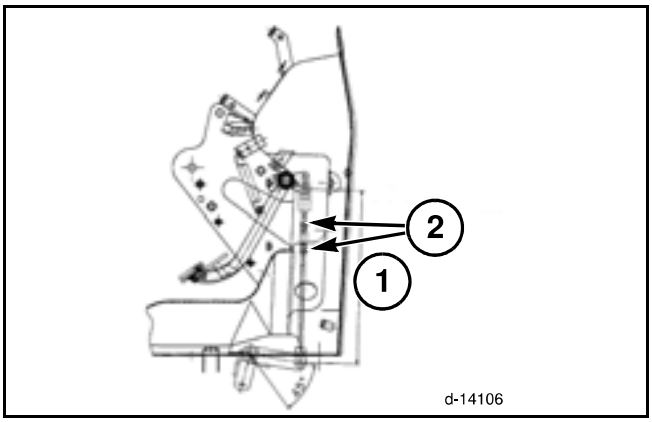

FIG. 43

FRONT AXLE

SPECIFICATIONS

Wheel Alignment

- Toe-in ..... 2 to 6 mm (0.08 to 0.24 in)

Front Axle

- Center Pivot Axle Diameter ..... 55 mm (2.17 in)
- Front Differential Housing Width ..... 98 mm (3.858 in)
- Pivot Housing Bushing Bore ..... 65 mm (2.559 in)
- Bearing Cover Shaft Diameter ..... 35mm (1.378 in)
- Housing Shaft Diameter ..... 55 mm (2.17 in)
- Housing Bushing Bore ..... 55 mm (2.17 in)
- Front Wheel Steering Angles To Stop Bolt ..... 58 Degrees
- Front Wheel Bolt Torques ..... 163 Nm (120 lbf ft)
- Front Axle End Float ..... 0 to 0.2 mm (0 to 0.008 in)
- Front Axle Oscillation ..... 7 degrees
- Front Ring and Pinion Backlash ..... 0.1 to 0.2 mm (.004 to 0.008 in)

Overhaul

FIG. 16: End play of bevel pinion should be checked before disassembly. End play should be 0.008 mm (.0003 in)

If end play exceeds specified value, correct it by shimming, when reassembling.

Available shims:

Shim A 0.2 mm (.008 in)

Shim B 0.1 mm (.004 in)

Remove snap ring.

Remove pinion and bearings as an assembly.

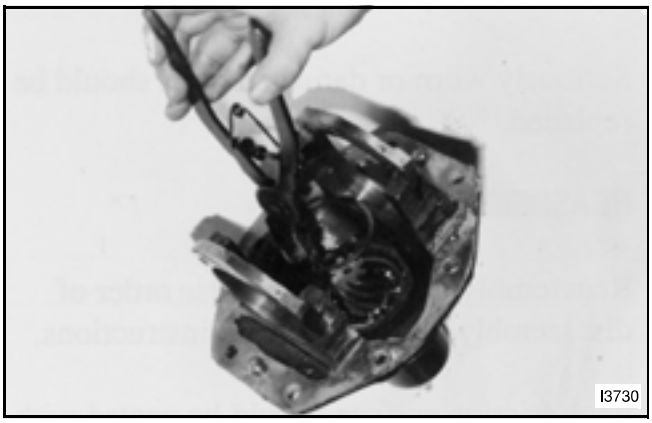

FIG. 16

Inspection

FIG. 17: Inspect pinion teeth for wear or damage.

Inspect bearings for wear or roughness.

Replace parts if necessary.

NOTE: Ring gear and pinion gear must be replaced in a matched set.

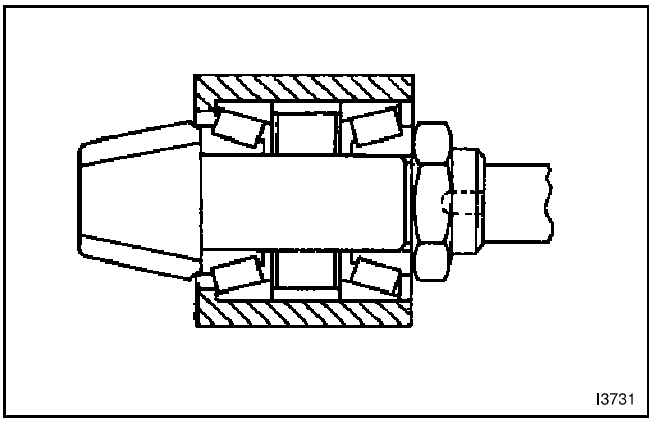

FIG. 17

Assembly

Adjust bearing preload with nut on rear end of pinion shaft.

Specified starting torque is 0.5 to 0.7 Nm (4.3 to 6 lbf in).

Specified end play 0 to 0.2 mm (0 to .008 in).

FIG. 18: Install bearing cone (1) on pinion shaft. Make sure bearing cone is seated at pinion.

Install cups (2) and spacer (3).

Install cone (4).

Install nut (5) and tighten until all endplay is removed between bearing cups (2) and cones (1) and (4).

Cups (2) and spacers (3) should still roll easily on cones (1) and (4).

Install assembly in housing.

Install spacer (6) and snap ring (7).

Measure endplay between snap ring (7) and spacer (6).

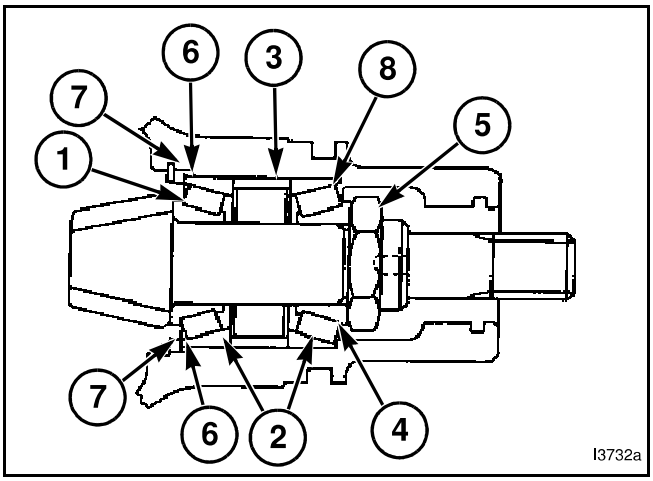

FIG. 18

FIG. 36: Remove wheel shaft bearing with bevel gear using a puller.

Remove stop ring and remove wheel shaft.

Remove countershaft.

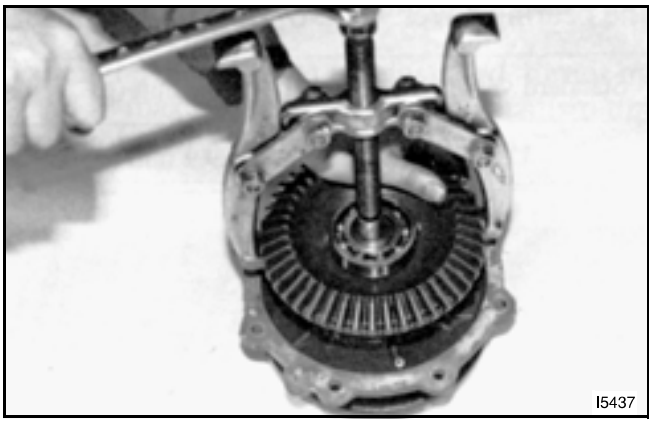

FIG. 36

FIG. 37: Remove expansion plug from bottom of final housing and remove snap ring. Then remove bearing.

Discard expansion plug, and install a new one on reassembly.

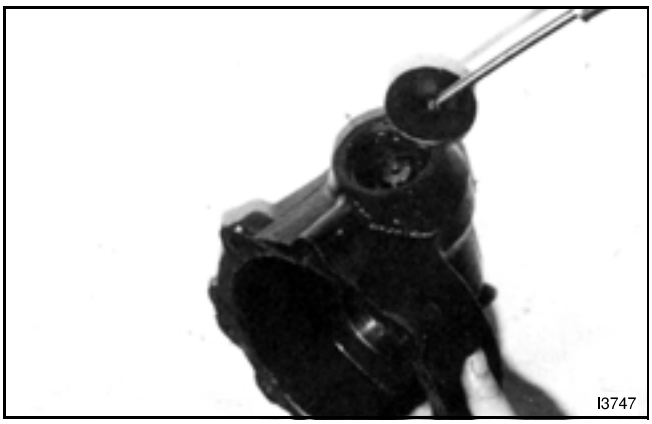

FIG. 37

Inspection

Bearing Cover Shaft

FIG. 38: Measure diameter of hub which contacts bushing in drag arm. The standard value is 35 mm (1.378 in). If measured value is less than the usable limit 34 mm (1.338 in), replace bearing cover.

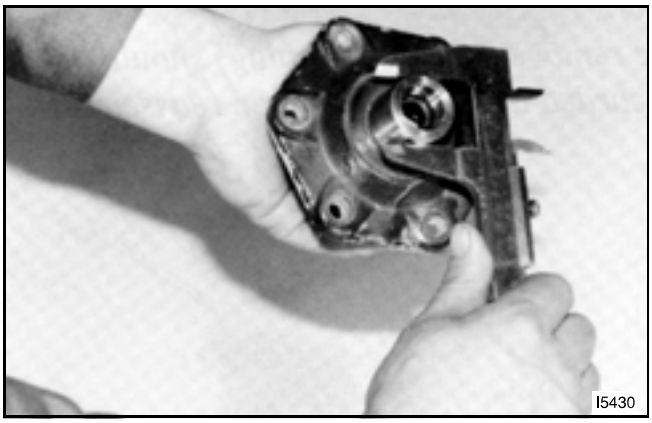

FIG. 38

KNUCKLE SPINDLE

Removal

Jack up the front axle and remove the wheel.

Remove the cap of wheel hub and remove the castle nut.

Remove the front wheel boss. If it is hard to pull out, use a bearing puller.

Disconnect the tie rod end.

Remove the nut on the top of the knuckle spindle. Support the knuckle spindle and extract the drag arm.

Installation of the Knuckle Spindle

FIGS. 53–54: Install the bushing with a correct sized driver and a press.

The knuckle spindle must be coated with grease in advance. Do NOT damage the oil seal lips while installing the spindle.

Install bearings and oil seals in the correct location and direction.

(A) - Install upper seal 1 mm below spindle housing as shown.

(B) - Install lower seal 4 mm above spindle housing as shown.

Adjust the axial play of the knuckle spindle to 0.2 to 0.8 mm (.008 to 0.032 in) by tightening the nut on the top of the knuckle spindle. The specified tightening torque is 81 to 115 Nm (60 to 85 ft lbs).

Turn up the spindle nut locking device.

Make sure the knuckle spindle turns smoothly.

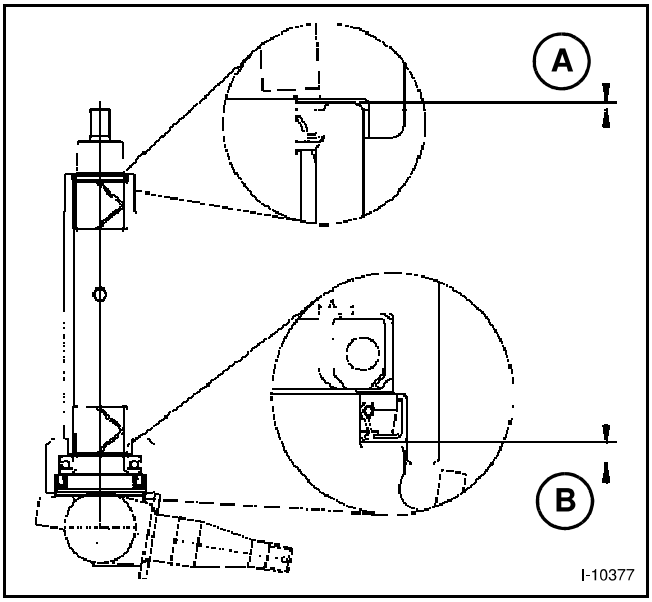

FIG. 53

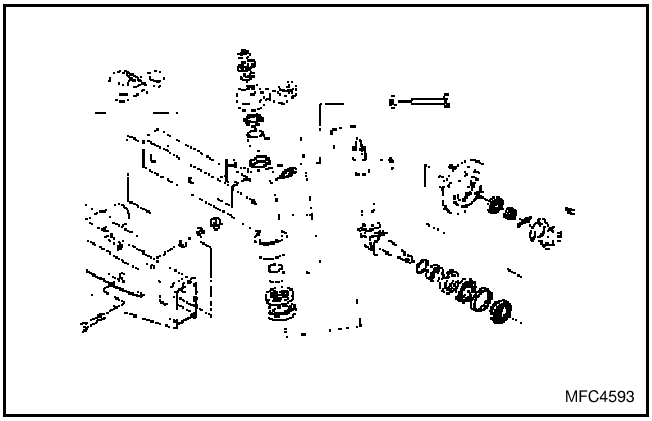

FIG. 54

Contents

NOTES

Power Steering Cylinder

Power Shuttle and Q Version

FIG. 20: Power Steering Circuit

(1) Power Steering Cylinder
(2) Orbit Roll Assembly
(3) Reduce Valve
(4) L/C Filter
(5) Sub Pump
(6) to Control Circuit
(7) Relief Valve
(8) Oil Cooler
(9) Main Clutch

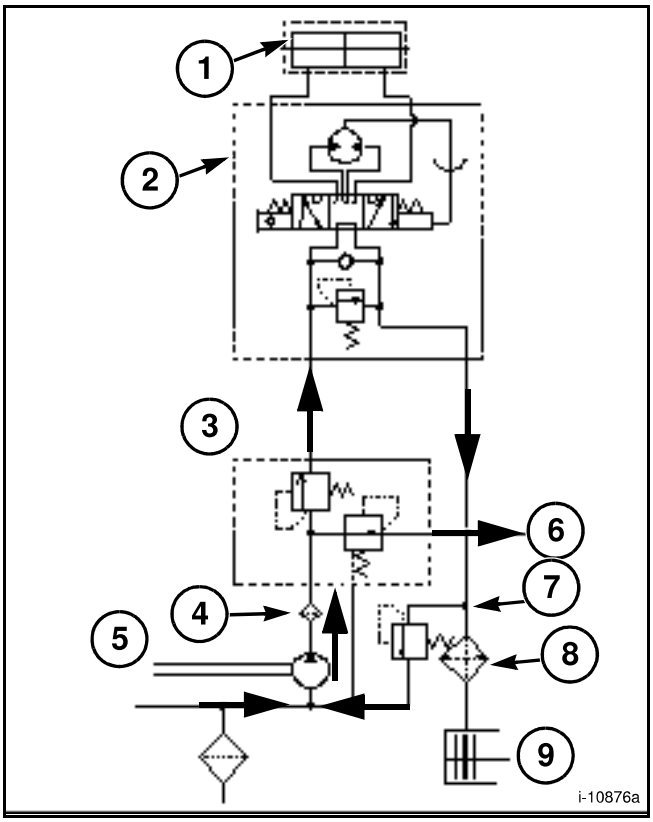

FIG. 20

Detail View and Specifications

FIG. 21: Steering Cylinder

Rod Diameter x Bore x Stroke = 32 x 50 x 231

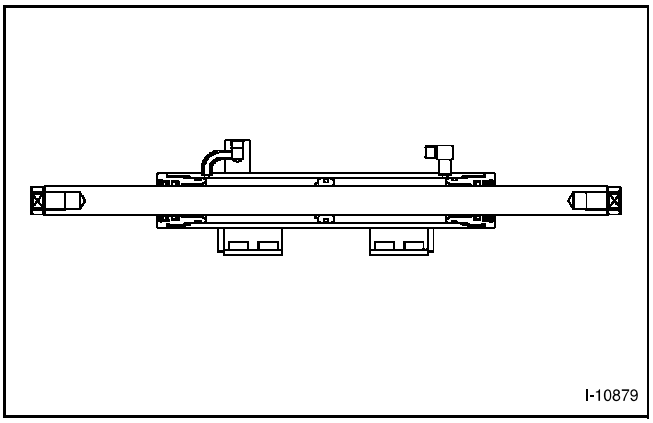

FIG. 21

PTO CONTROL VALVE

FIG. 37: PTO Control Valve

(1) Power Shuttle And PTO Valve
(2) Pressure Proportional Valve Of Power Shuttle
(3) Pressure Proportional Valve Of PTO
(4) To PTO Clutch
(5) Adapter With L/C Filter
(6) Adapter With L/C Filter
(7) From Reduce Valve

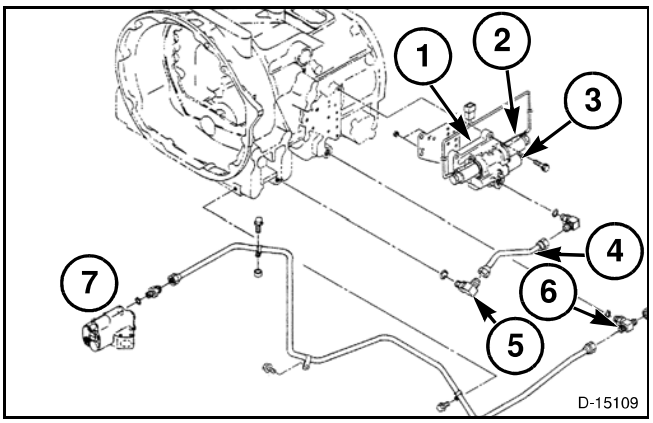

FIG. 37

FIG. 38: PTO Control Valve Circuit

(1) PTO Clutch
(2) L/C Filter
(3) Reduce Valve
(4) Pressure Proportional Valve of PTO
(5) L/C Filter

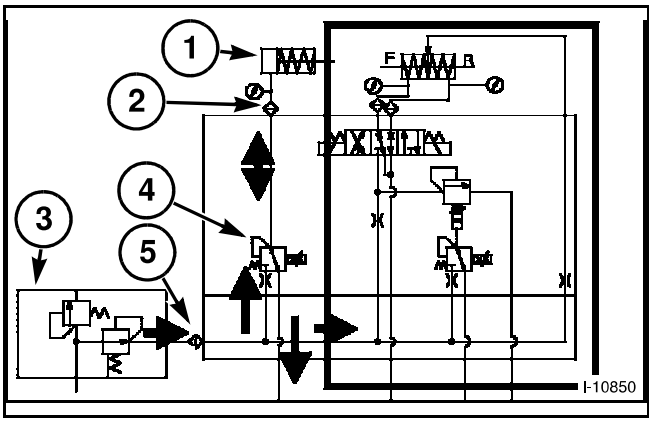

FIG. 38

FIG. 39: PTO Control Valve

(1) To PTO Clutch
(2) Pressure Proportional Valve Of PTO
(3) To Tank
(4) From Reduce Valve
(5) Office

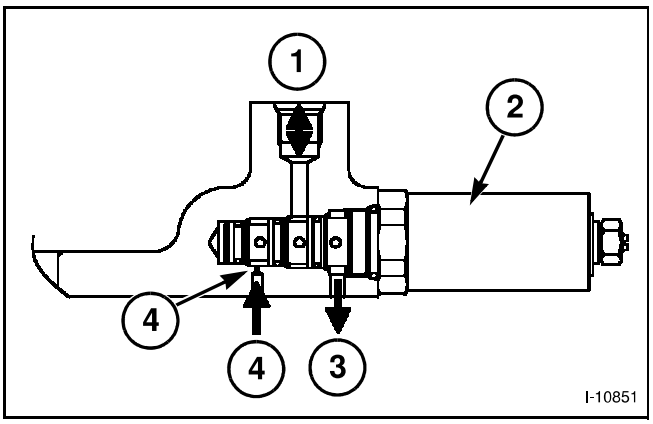

FIG. 39

Assembly Precautions

The tightening torque of the PTO control valve is 39.5 to 49.5 Nm (29.13 to 36.51 lbf ft).

NOTE: During disassembly, clean the adapter with the last chance filter.

Specifications

Control Flow at 50 degrees ..... 3.0 l/min (0.79 gal/min)
Control Pressure at 50 degrees ..... 0-2.06 MPa (299 psi)
Control Current
- Symmetrical Triangle ..... 0-1.6 A DC
- Amplitude ..... ± 0.25 A
- Frequency ..... 100 Hz
- Coil Resistance at 20 degrees ..... 3.20 ohms

Mantenance

FIG. 54: The binding torque of the Solenoid (1st, 2nd, 3rd and 4th gear) Valve is 4.9 to 5.9 Nm (3.61 to 4.35 lbf ft).

Attach the side with the identification groove to the 1st and 3rd solenoids.

Clean the installation surface and replace the gasket each time.

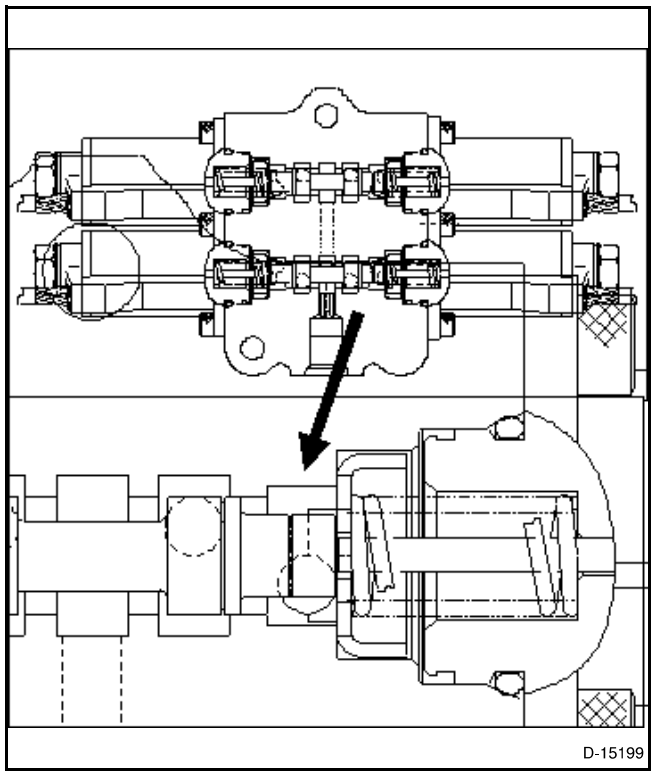

FIG. 54

Specifications

Control Flow at 50 degrees ..... 5.0 l/min (1.32 gal/min)

Coil Resistance at 20 degrees ..... 9.6 ohms

Valve for Bucket

FIG. 78: Neutral

When spool is in neutral position, hydraulic circuit between port (P) and port (N) is open constantly.

Hydraulic circuit of port (P2) is not connected with port (C),(D).

(1) N - Neutral

(2) P - Pressure

(3) Outlet of auxiliary hydraulic valve

(4) Neutral position

(5) C - Port

(6) P2 - Power Beyond

(7) D - Port

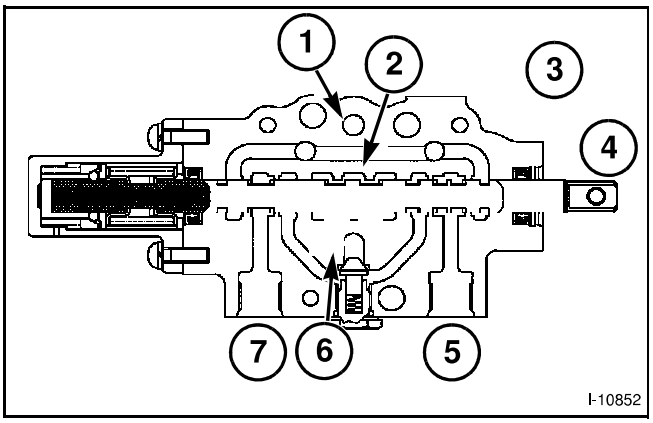

FIG. 78

FIG. 79: Neutral

When spool is in neutral position, hydraulic circuit between port (P) and port (N) is open constantly.

Hydraulic circuit of port (P2) is not connected with port (C),(D).

(1) N - Neutral

(2) P - Pressure

(3) Outlet of auxiliary hydraulic valve

(4) Neutral position

(5) C - Port

(6) P2 - Power Beyond

(7) D - Port

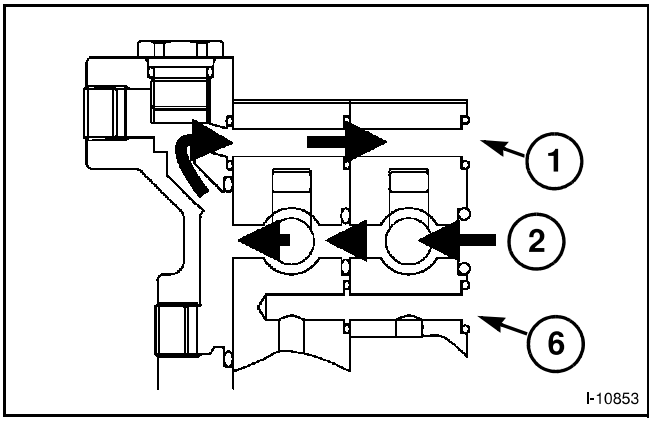

FIG. 79

External Hydraulics Pressure Removal

Tightening torque of Cut-off plug: 34.3 to 39.2 Nm (25.3 to 28.9 lbf ft)

Apply fresh grease to O-ring.

When removing the external hydraulic pressure unit, reverting to the original state, replace the cut-off plug with the original plug. Failure to do so might result in continuous operation of the main relief which can damage the hydraulic components. The entire hydraulic unit might not operate properly.

When removing the implement connecting with outlet of auxiliary hydraulics, change the plug to normal plug certainly. If you default on change, the main relief work constantly and the hydraulic parts will seriously damage. Hydraulic system does not work.

When removing and installing adapters, remove the sealed tape completely. If you default on changing, the hydraulic system will seriously damage.

Adjustment

Set adjustable rod so that free play of position lever is 0-1 mm (at top of position lever). Make sure that relief valve will not work.

FIG. 119: Tighten lock nut.

(1) Lift Arm

(2) Adjustable Rod

(3) Lock Nuts

(4) Arm A

(5) Arm B

(6) Position Control Lever

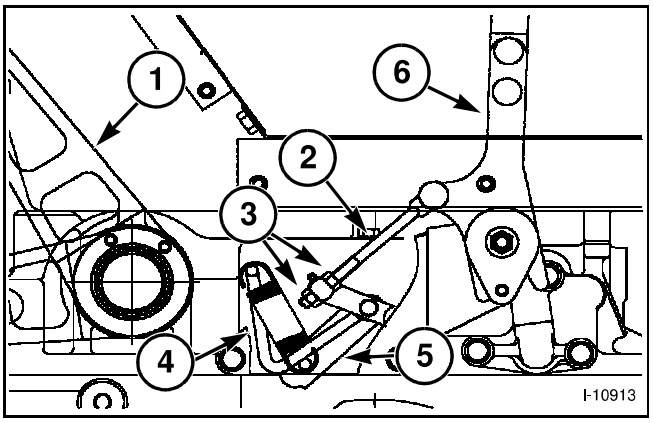

FIG. 119

FIG. 120: Stroke of 3P linkage could be adjusted by stopper.

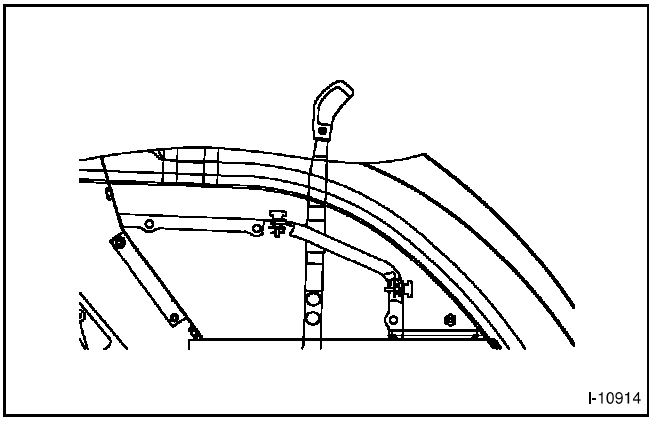

FIG. 120

Problem	Possible Cause	Correction
No pressure rise, no pressure decrease.	The main relief valve is always in operation.	Clean the oil passage.
	The main pump is not discharging and fluid.	Check the diverting unit and replace parts if necessary.
		Check the O-rings located at the couplings of the pipe and replace if necessary.
Lever cannot be set back to neutral.	The return spring is damaged.	Replace the return spring.
	The main spool is not running smoothly.	Correctly torque the installation bolt.
		Clean the interior of the valve.
Free flow of fluid lever cannot be locked.	The detent spring is damaged.	Replace the detent spring.
Considerable leakage.	Leakage inside the joystick valve.	Disassemble and clean the valve, if damaged replace.
	Leakage inside the loader cylinder.	Replace the O-ring and the backup ring.
		Replace the cylinder case assembly.
Joystick Control Valve for Bucket		
Cannot be salvaged; dumping is possible; other controls are normal.	The check valve inside the joy stick valve is stuck.	Clean the check valve.
		If there are any significant scratches and damage due to the presence of contaminants, replace the joy stick valve assembly.
	The main relief valve is always in operation.	Clean the oil passage.
	The main pump is not discharging any fluid.	Check the driving unit and replace parts if necessary.
		Check the O-rings located at the couplings of the pipe and replace if necessary.
Cannot be salvaged; dumping is impossible.	The main relief valve is always in operation.	Clean the oil passage.
	The main pump is not discharging and fluid.	Check the diverting unit and replace parts if necessary.
		Check the O-rings located at the couplings of the pipe and replace if necessary.
Lever cannot be set back to neutral.	The return spring is damaged.	Replace the return spring.
	The main spool is not running smoothly.	Correctly torque the installation bolt.
		Clean the interior of the valve.
Considerable leakage.	Leakage inside the joystick valve.	Disassemble and clean the valve, if damaged replace.
	Leakage inside the loader cylinder.	Replace the O-ring and the backup ring.
		Replace the cylinder case assembly.
Notes:		

Contents

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FIG. 26: Check the power supply from the wiring harness. Disengage the coupler from the solenoid valve and turn the main switch ON. Check the voltage between coupler and GND.

(Between 300 and GND)

Normal	11 to 12 VDC

When starting the engine, expect about 14 V.

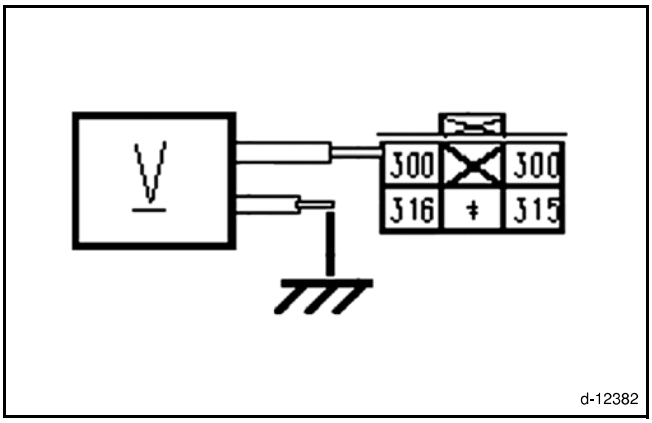

FIG. 26

FIG. 27: Power shuttle clutch (control).

(Solenoid Side)

Check the coil for solenoid valve (wire of solenoid: Blue).

Disengage coupler from the harness and check the resistance between P+ and P.

Normal	3.2 ohm at 20 degrees C (68 degrees F)

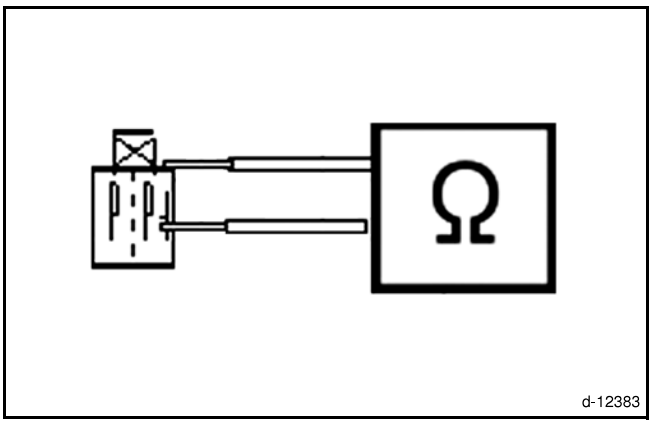

FIG. 27

FIG. 28: Check insulation of solenoid valve. Disengage the coupler from the harness and check the resistance between P+ and GND.

(Between P+ and GND)

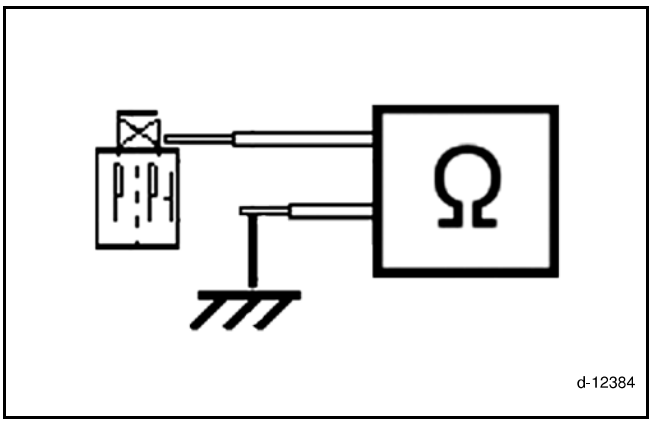

FIG. 28

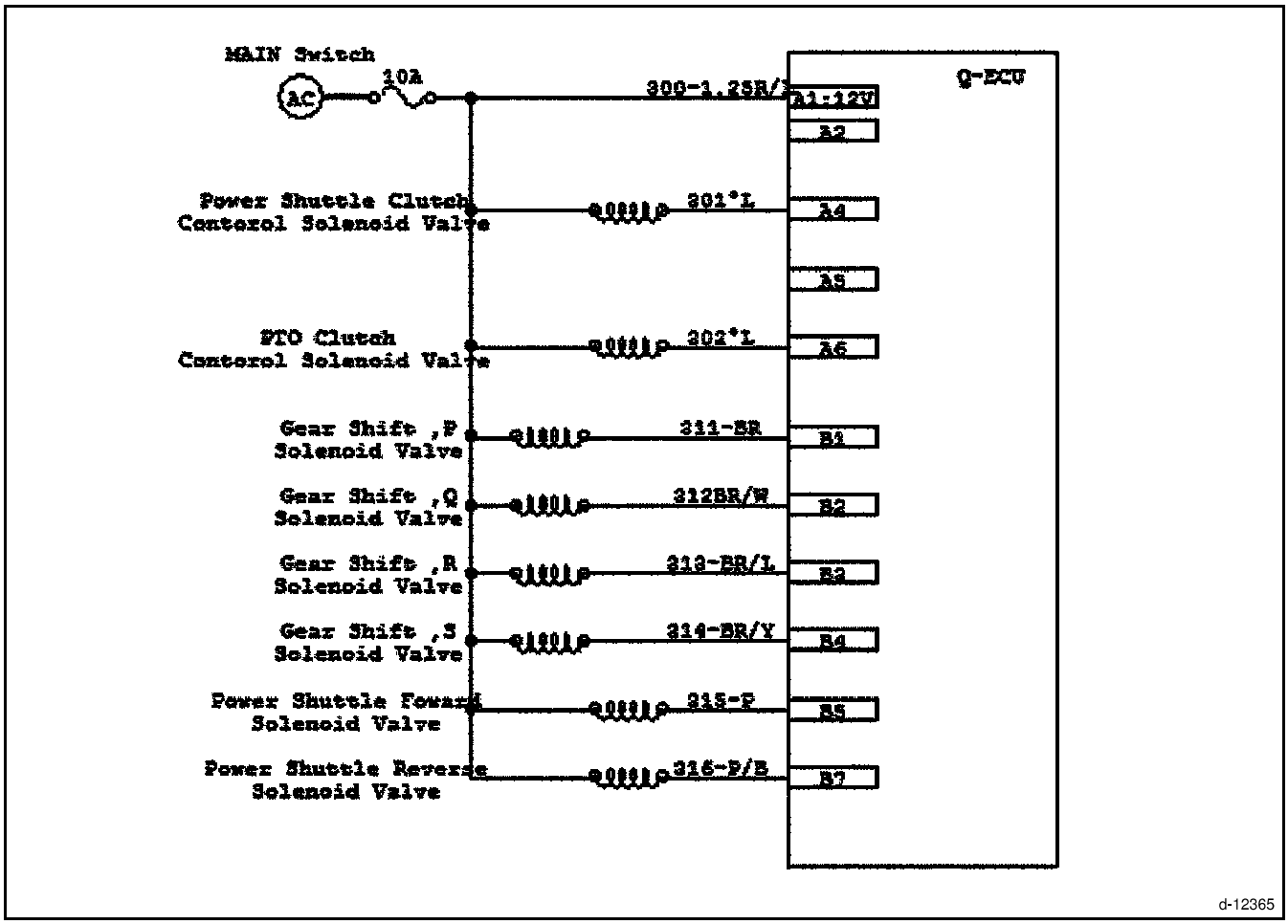

FIG. 53

FIG. 53: Wiring Harness

FIG. 54: Coupler of power shift: Pin location in coupler harness

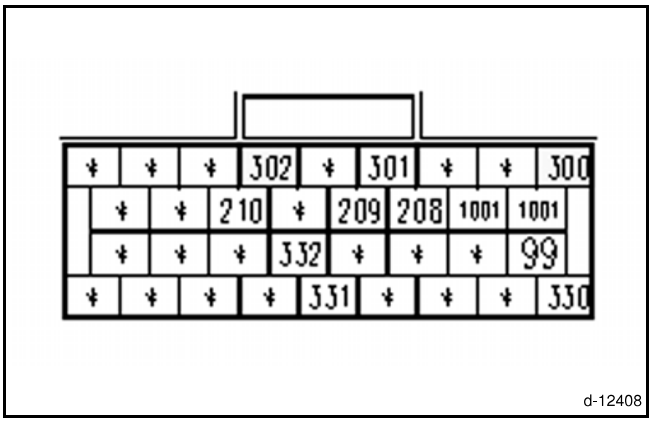

FIG. 54

FIG. 78: Check power supply from the wiring harness

Disengage coupler from solenoid valve and turn the main switch ON. Check voltage between coupler and GND. (between 30 and GND).

Normal	11 to 12 VDC

When starting the engine, expect about 14V.

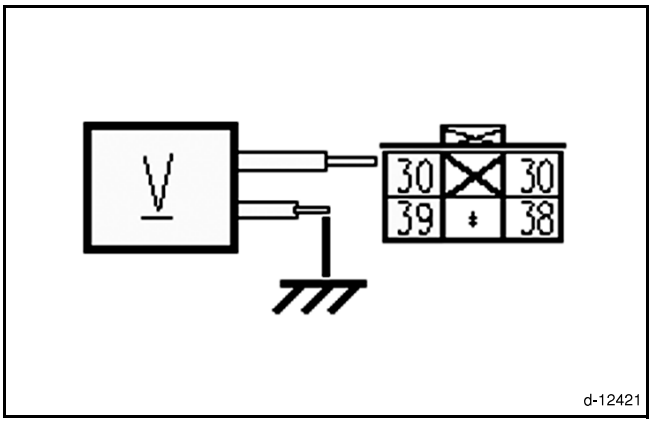

FIG. 78

FIG. 79: Power shuttle clutch control solenoid. (Solenoid-side)

Check coil of solenoid valve (tube: blue)

Disengage coupler from harness and check resistance between P+ and P.

Normal	3.2 ohm at 20 degrees C (68 degrees F)

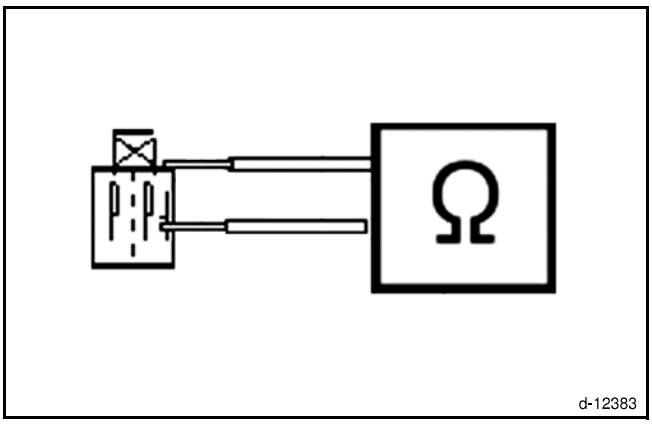

FIG. 79

FIG. 80: Check insulation of the solenoid valve. Disengage coupler from the harness and check resistance between P+ and GND (or P and GND).

(Between P+ and GND)

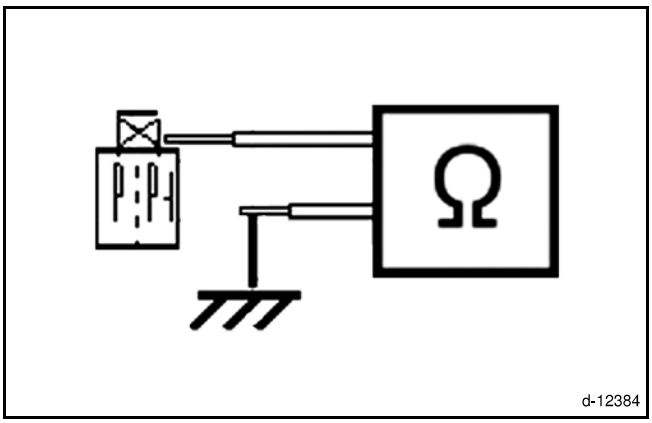

FIG. 80

Inspection Solenoid Valves

FIG. 103: Check power supply to the wiring harness. Disconnect the coupler of the solenoid valve and turn the main switch to the ON position.

Measure voltages between 30 and GND.

Normal	11 to 12 VDC

When stating the engine, expect approximately 14 V.

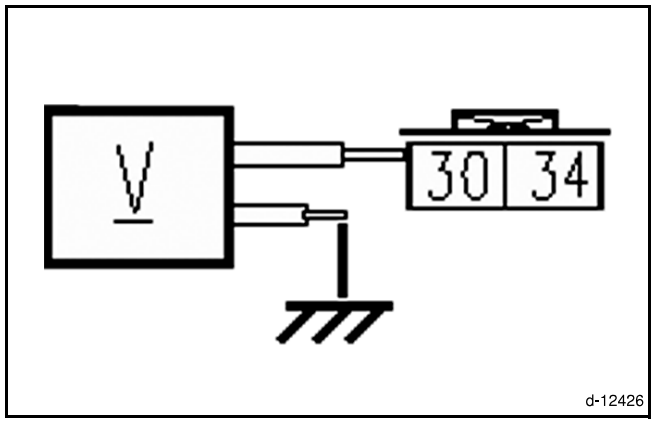

FIG. 103

Resistance of Solenoid Valves

Number	Description	Terminal		Normal Resistance 0hm	Applicable Model			
1-1		F+	F	9.6	Q	P		
1-2		R+	R	9.6	Q	P		
1-3		P+	P	3.2	Q	P		
2-1		1+	1	9.6	Q			
2-2		2+	2	9.6	Q			
2-3		3+	3	9.6	Q			
2-4		4+	4	9.6	Q			
3		PTO+	PTO	3.2	Q	P	H	S

FIG. 130: Identify the cause of the problem through the monitor. Check sensor generating values in the, Check Mode.

Turn the main switch to ON and remove the check fuse. The screen is switched to CHECK MODE.

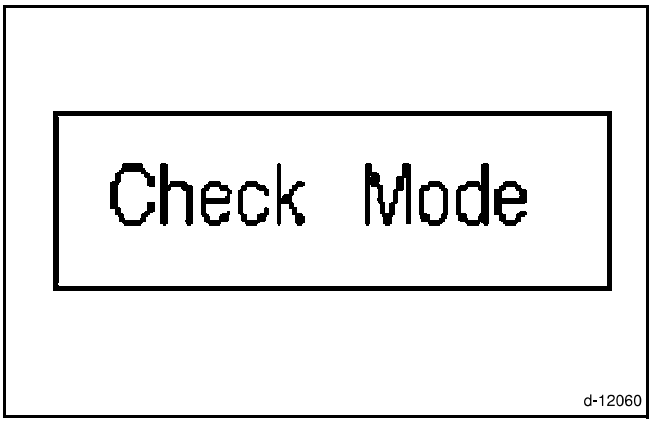

FIG. 130

FIG. 131: Check Fuse 5A (1)

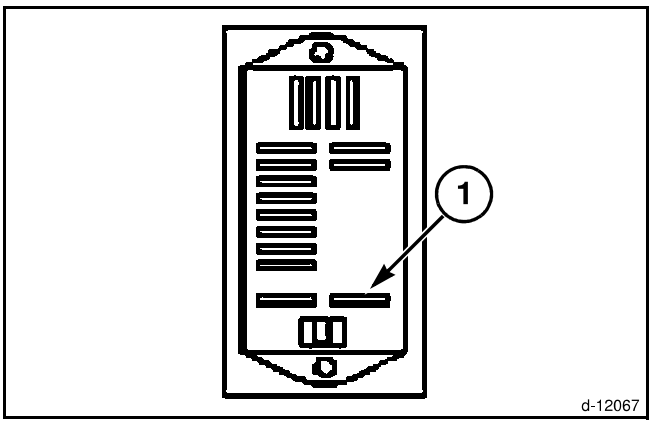

FIG. 131

FIG. 132: Select SENSOR by the display mode switch.

Select a screen where the characters “Sensor” is shown white in black background by operating the display mode switch promptly.

Hold down the display mode switch for more than two seconds while the screen is showing the white characters in black ground, and the alarm will sound it and the screen will switch to Sensor Check.

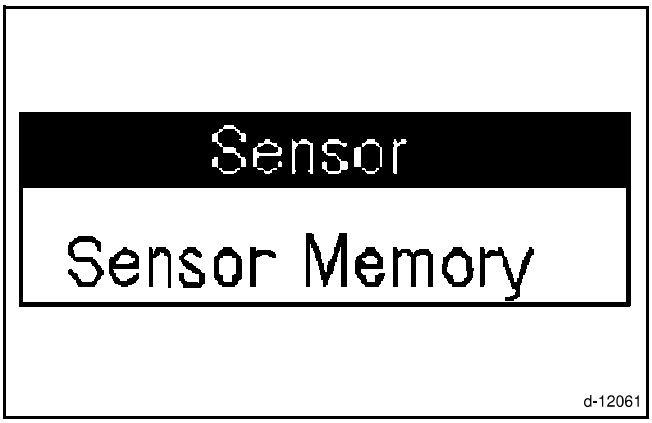

FIG. 132

FIG. 133: Analogue sensor value indicator (Potentiometers).

Sensor values should be checked through this screen.

NOTE: The indicator mentioned above shows values in 1st and 2nd speed stages. Successive indicators appear by depressing the display mode switch promptly. Values of Shift Position (3-4) should also be checked.

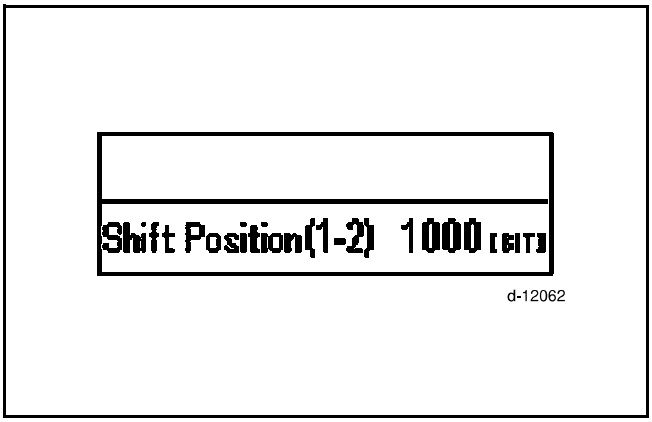

FIG. 133

No.	Description	Wire Color
	Power Shift Type	
27		
28	Engine Oil Pressure Sensor	Y/B
29		B
30	MAIN Switch (19) Glow Position)	P
31		
32	Light Switch	BR
33	Turn Switch (RH)	G
34	Turn Switch (LH)	Y
35	MAIN Switch AC On Position)	W/B
36	Light Switch (High Beam Position)	R/G

FIG. 159: Indication-Selection of tire size.

If tractor has no error in the past, digital panel will indicate check on sensor.

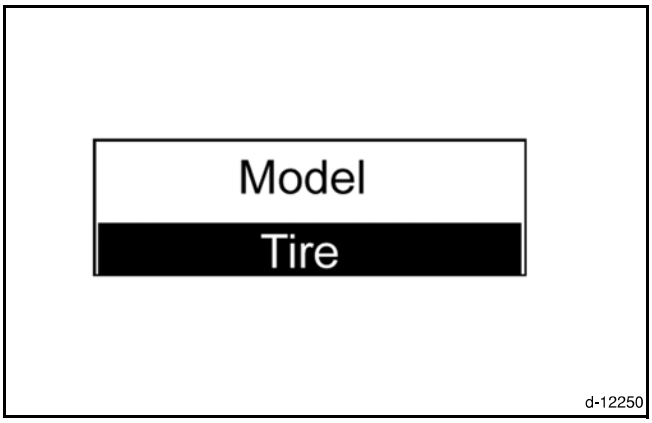

FIG. 159

FIG. 160: Display will be changed by pushing selectable switch within two seconds.

If the tractor has error in the past, digital panel will indicate error history

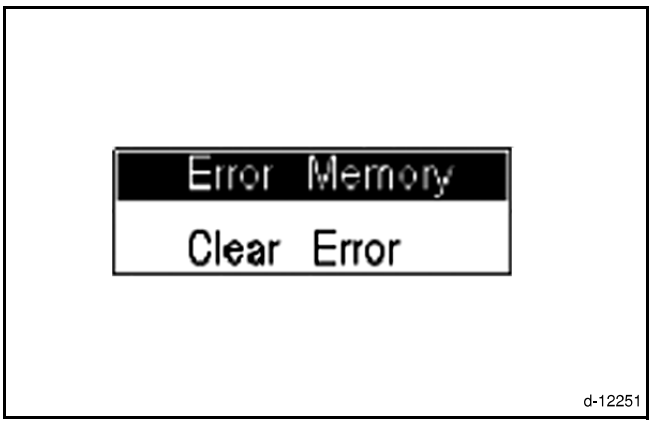

FIG. 160

FIG. 161: Indication-Clear error history.

Display will be changed by pushing selectable switch within two seconds.

In check mode, Please use only selectable switch to choose some function.

There are two ways of pushing selectable switch.

(1) Pushing selectable switch for short time (within two seconds). Push selectable switch for short time to change indication of digital panel.

(2) Pushing selectable switch for long time (more than 2 seconds).Push selectable switch for long time to choose item.

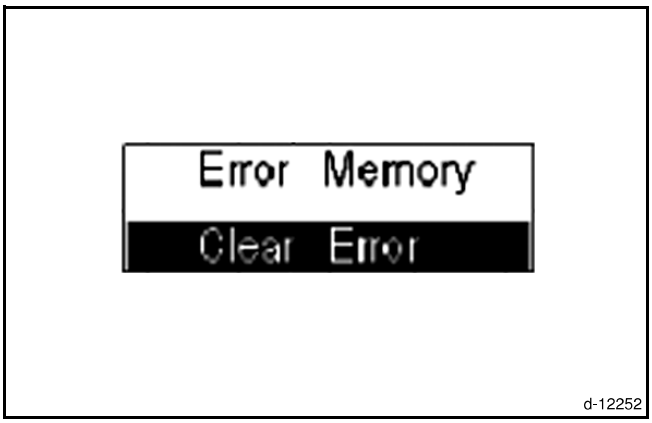

FIG. 161

FIG. 190: Indication must be changed by pushing selectable switch within two seconds.

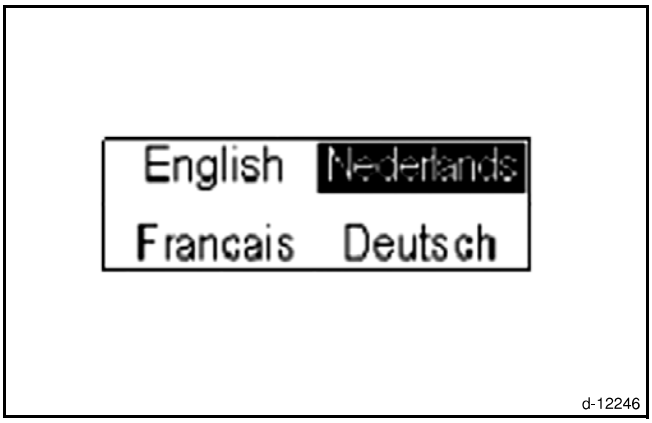

FIG. 190

FIG. 191: Choose, Francais, and then push selectable switch more than two seconds.

FIG. 191

FIG. 192: Press the selectable switch within two seconds to select OK for Francais.

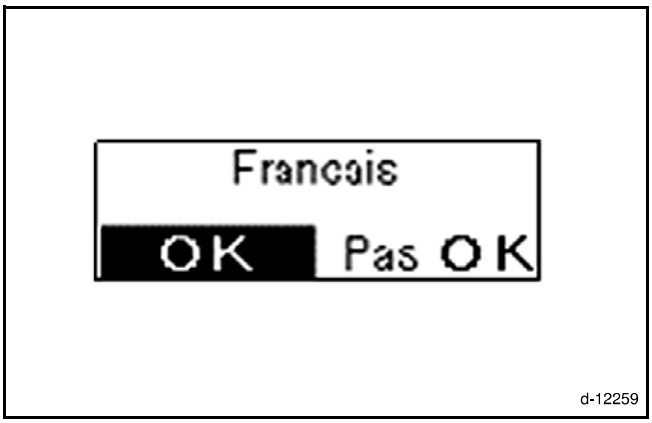

FIG. 192

FIG. 193: Push the selectable switch for more than two seconds to choose, pas OK. This screen will take you back to the screen that gives you the option to choose another language format.

FIG. 193

FIG. 224: Indication will be changed by pushing selectable switch within two seconds.

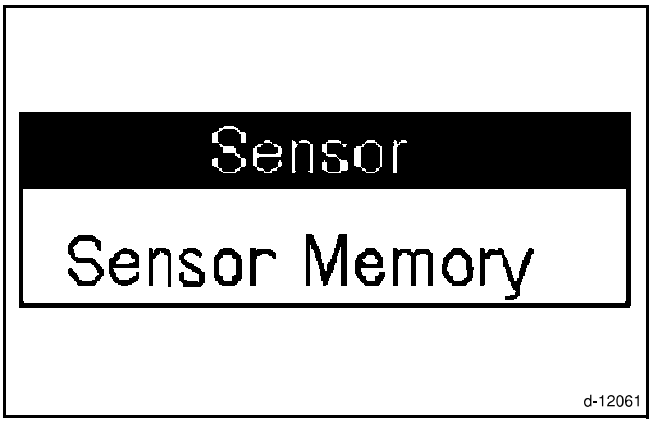

FIG. 224

FIG. 225: Indication will be changed by pushing selectable switch within two seconds.

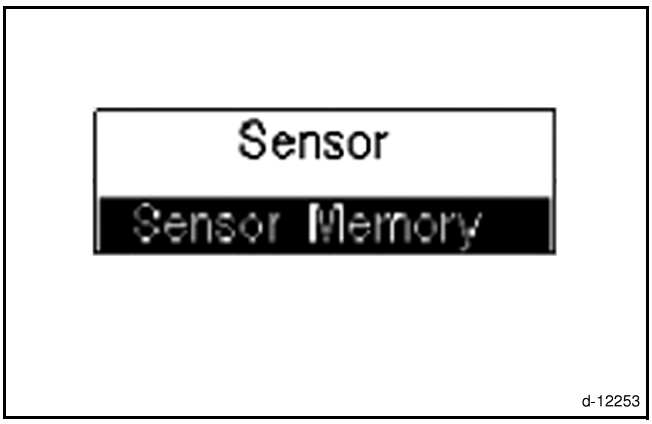

FIG. 225

FIG. 226: Indication will be changed by pushing selectable switch within two seconds.

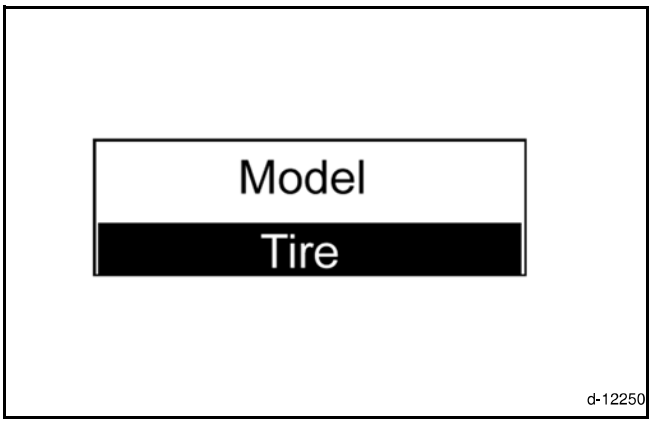

FIG. 226

FIG. 227: Press the selectable switch within two seconds to move to the next screen.

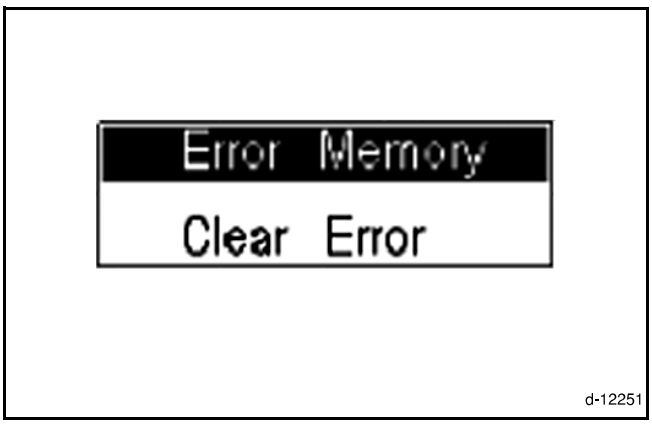

FIG. 227

FIG. 259: Meter Panel

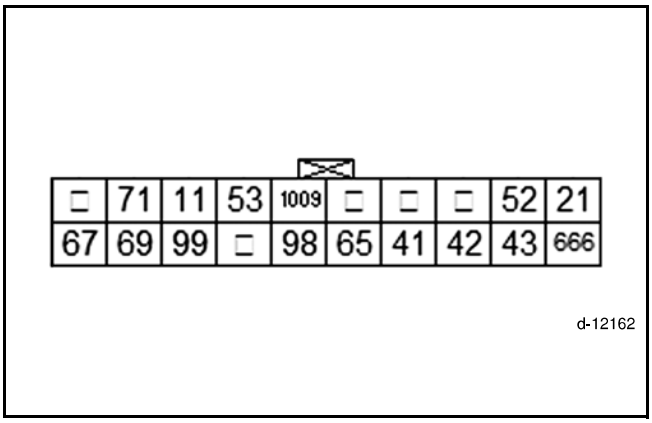

FIG. 259

FIG. 260: Output Shaft Sensor

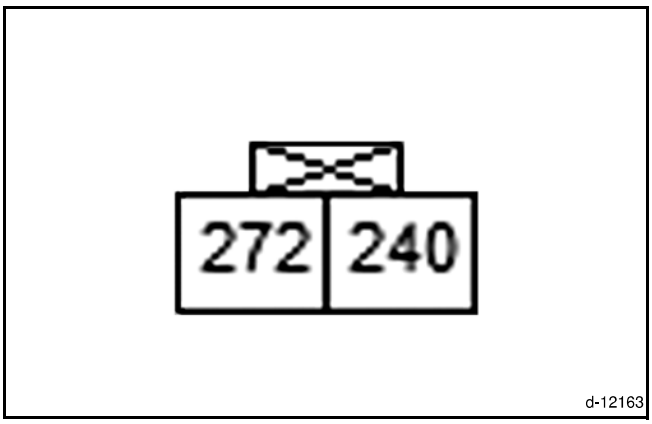

FIG. 260

FIG. 261: Accelerator Sensor

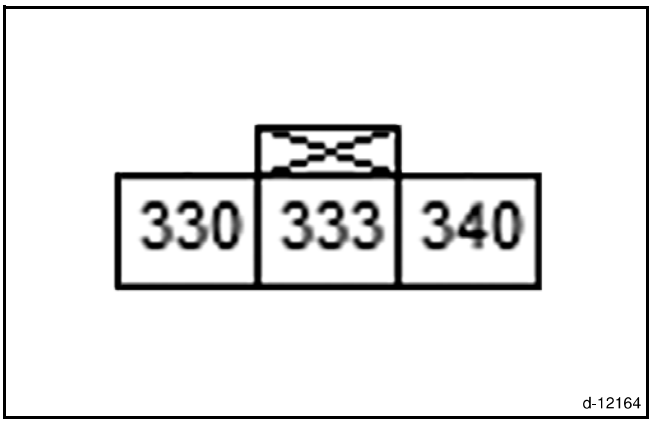

FIG. 261

FIG. 262: Button for Speed Fluctuation

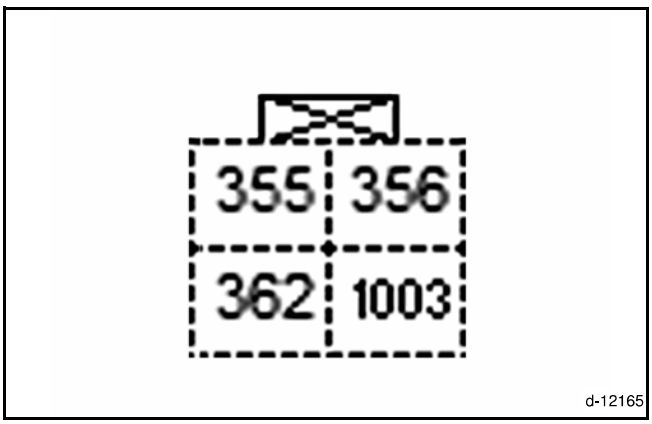

FIG. 262

Instrument Panel Switches and Relays

No.	Description	Wire Color	Circuit No.
1	Battery Charge	W/R	21
2	Turn Signal Monitor lamp (left-hand)	Y	46
3	Internal Light (Backlight)	BR	63
4	GLOW monitor	P	12
5	-	-	-
6	-	-	-
7	-	-	-
8	12V MAIN Switch AC (ON Position)	W/B	20
9	Fuel Gauge	Y/R	22
10	-	-	-
11	-	-	-
12	-	-	-
A	Internal Light (backlight)	BR	63
B	Oil Pressure Warning	Y/B	24
C	-	-	-
D	-	-	-
E	-	-	-
F	-	-	-
G	GND	B	1000
H	Coolant Temperature Gauge	Y/L	23
I	High Beam Monitor Lamp	R/G	61
J	PTO Power Take Off	L/Y	33
K		-	-
L	Turn Signal Monitor lamp (right-hand)	G	44

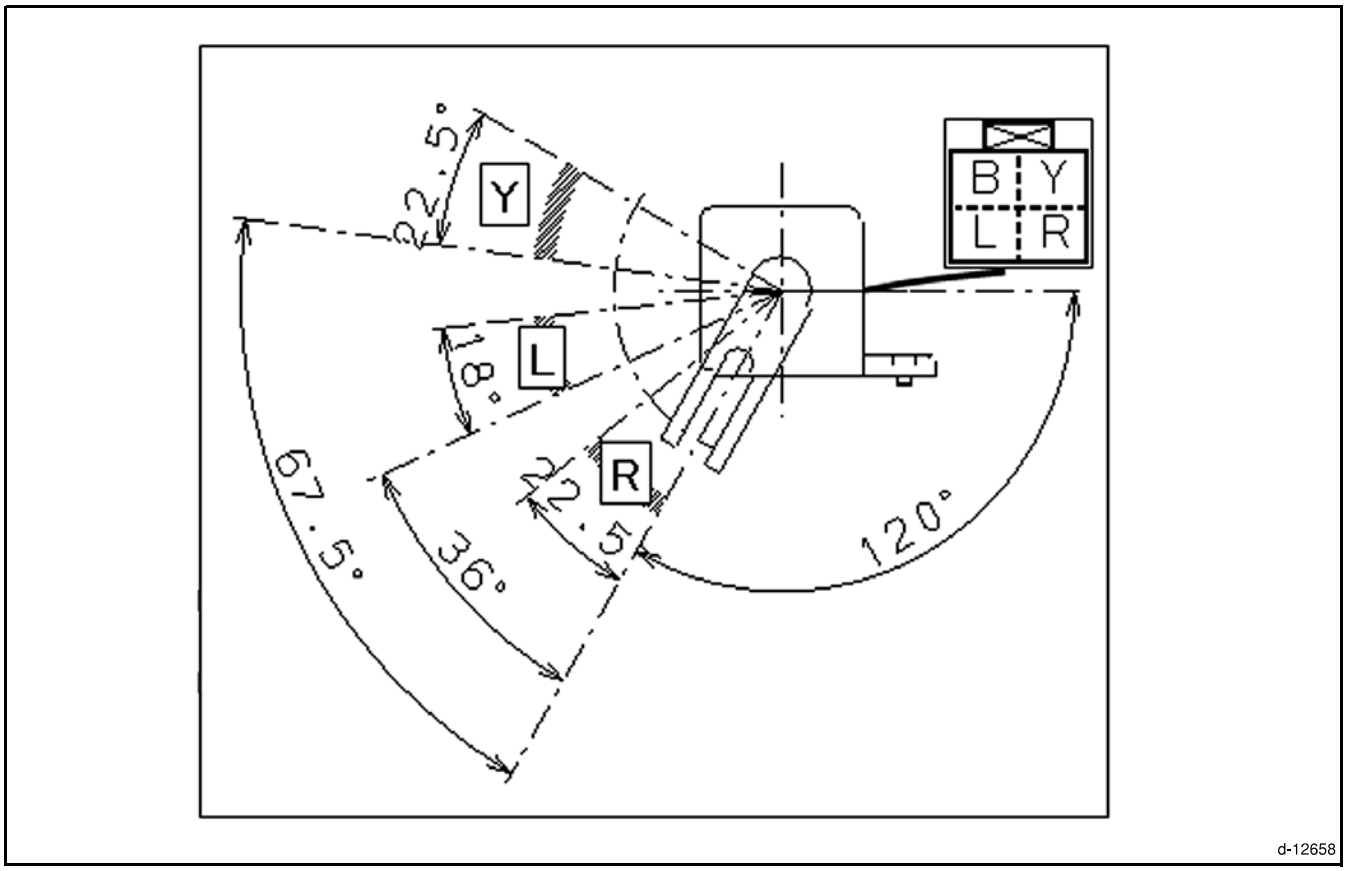

FIG. 301

FIG. 301: Range Shift Sensor

FIG. 302: Harness Side DynaQPS

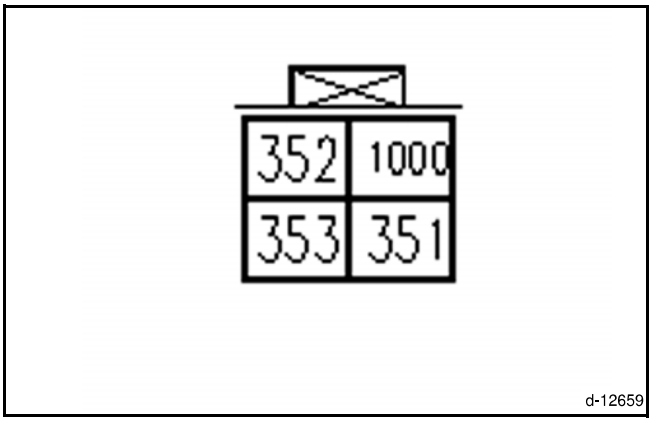

FIG. 302

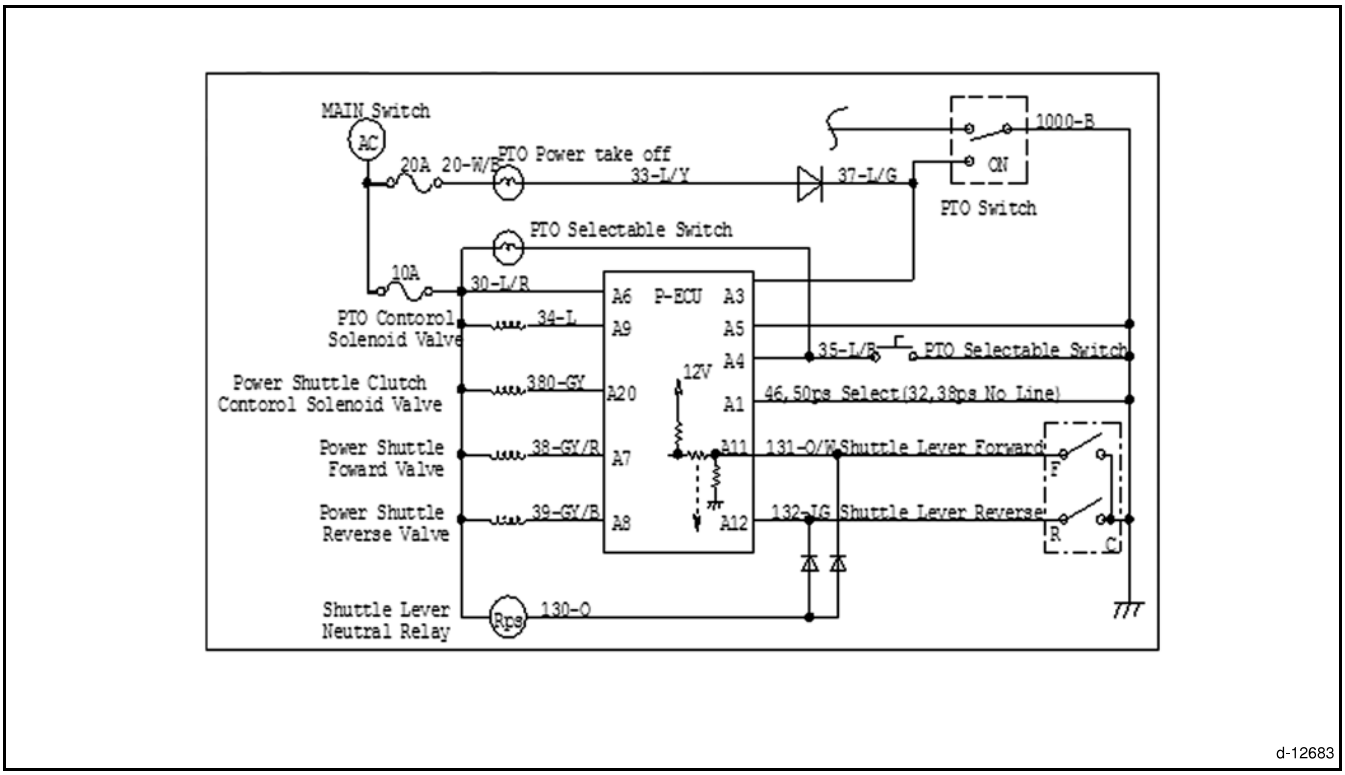

FIG. 314

FIG. 314: P Type Schematic

Abbreviation	Description
MAIN Switch	Main Switch
PTO Power take off	Power Take Off (Power Take Off)
PTO Selectable Switch	Power Take Off Selectable Switch
PTO Switch	Power Take Off Switch
Shuttle Lever Forward	Shuttle Lever Forward
Shuttle Lever Reverse	Shuttle Lever Reverse
Shuttle Lever Neutral Relay	Shuttle Lever Neutral Lever
Power Shuttle Reverse Valve	Power Shuttle Reverse Valve
Power Shuttle Forward Valve	Power Shuttle Forward Valve
Power Shuttle Clutch Control Solenoid Valve	Power Shuttle Clutch Solenoid Valve
PTO Control Solenoid Valve	Power Take Off Control Solenoid Valve
W/B	White/Black
L/Y	Blue/Yellow
L/R	Blue/Red
L/G	Blue/Green
L	Blue
GY	Gray
GY/R	Gray/Red

FIG. 329: Harness of the digital panel side

(1) Travel Speed Sensor Coupler, on the Sensor Side

Terminal		Normal Range
Panel Side	**Sensor Side**	**Resistance**
291	291	Approximately 0 Ohms
207	207	Approximately o Ohms

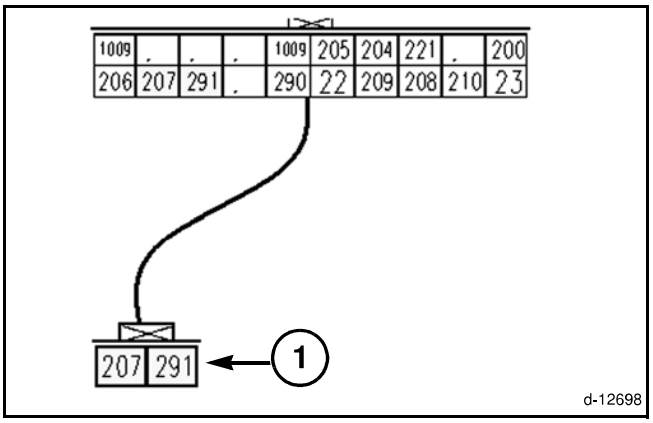

FIG. 329

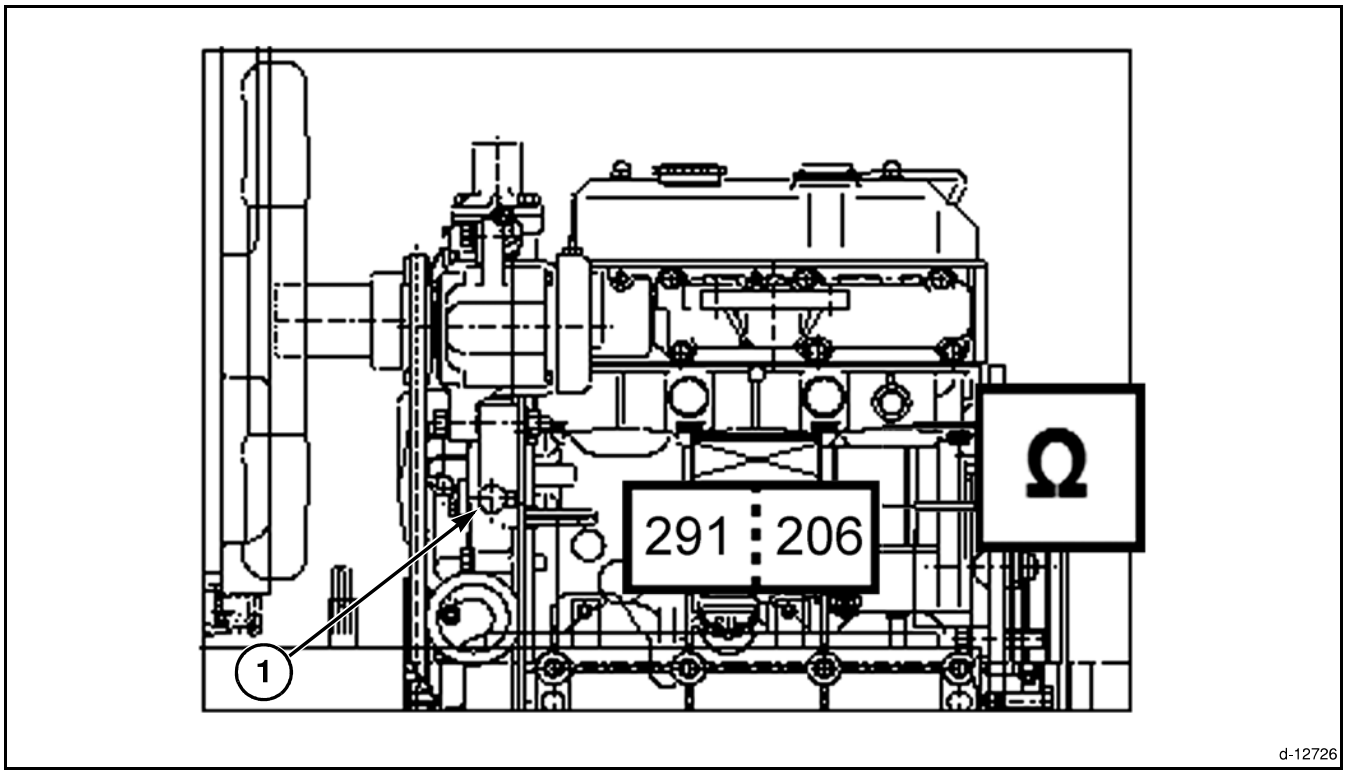

FIG. 330

FIG. 330: Engine Reverse Sensor

(1) Engine Reverse Sensor

		Normal range
Terminal		**Resistance**
291	206	Approximately 480 to 550 Ohms

Instrument Panel Switches and Relays

Abbreviation	Description
Shuttle Lever Neutral Switch	Shuttle Lever Neutral Switch
Fuel Pump	Fuel Pump
PTO Switch	Power take Off Switch
Neutral = ON	Neutral = On
TIMER	Timer
AC	Air Conditioner
Start	Start
Glow	Glow
Off	Off
On	On
ECU	Electronic Control Unit
Mass production article	Mass Production Article
ENGINE STOP SOLENOID	Engine Stop Solenoid
PULL COIL	PULL COIL
HOLD COIL	HOLD COIL
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
L/B	Blue/Black
L/G	Blue/Green
W	White
R	Red
B	Black
L	Blue

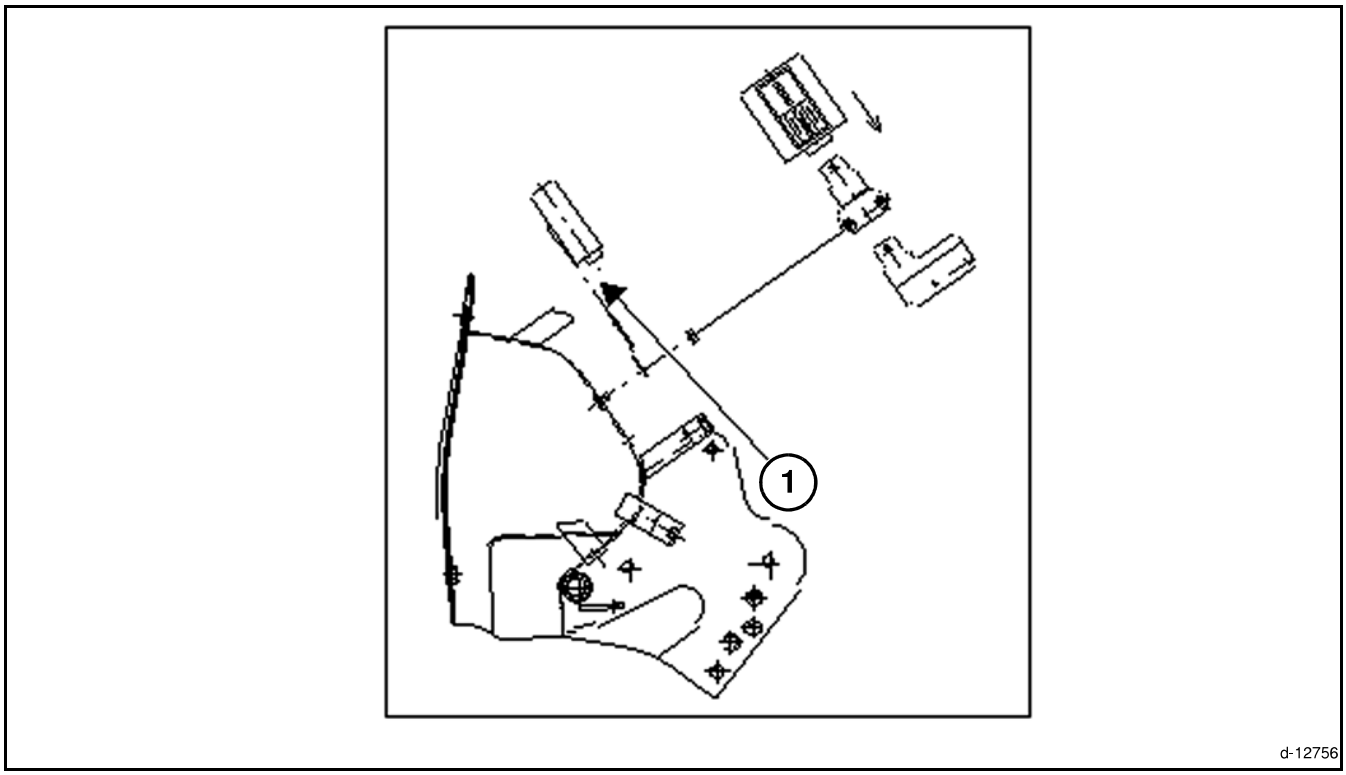

FIG. 365

FIG. 365: Backside of instrumental panel

(1) PTO and Power Shuttle Control UNIT (Except Q Type)

NOTES

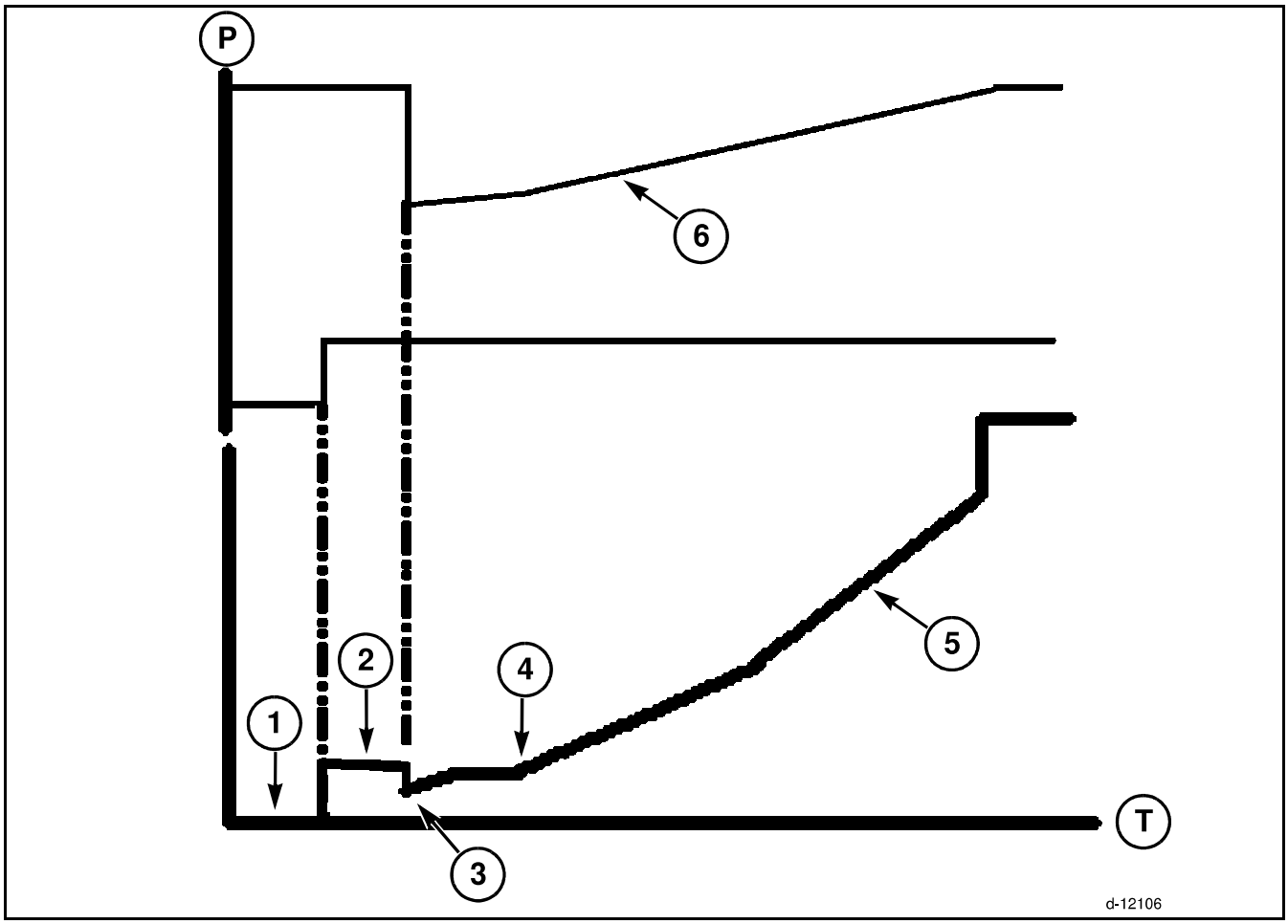

FIG. 402

FIG. 402: Detailed Explanation of the Valve Operation

(1) After Engine Start (Forward, Reverse, Neutral)

(2) Immediately after Forward Gear Change

(3) 180 ms after Forward Gear Change

(4) Mech-Relief Stabilization after Forward Gear Change

(5) Proportional Pressure Valve Control after Forward Gear Change

(6) Pressure Control Valve Control Current

(T) Time

(P) Pressure

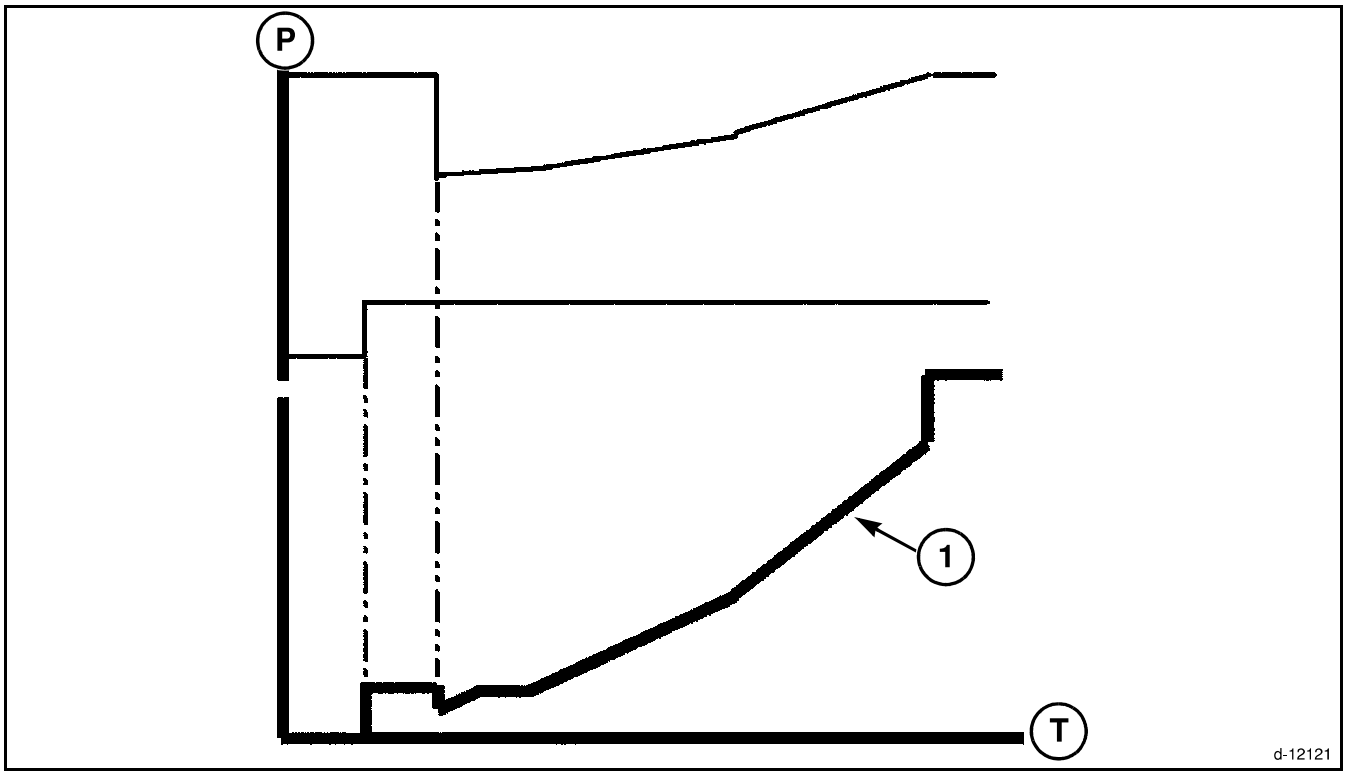

FIG. 417

FIG. 417: If the proportional pressure control valve is in control, increase the driving current of the valve up to the maximum pressure level to gradually increase the pressure inside the clutch chamber and continuously increase the torque of the clutch.

(1) Control Timing Of The Proportional Pressure Control Valve After Gear Change

4. Digital Panel

   Displays the values of the sensors used on the digital dash panel.

5. Configuration

   Allows operating language, computer communication port and password to be modified.

NOTE: A password is required to change the setting of IQ Shift and PTO values.

6. Help

   Displays program version, copyright of software and program user guide.

Check output data (IQ Shift)

From the IQ Shift menu window, click on Check Output Data.

FIG. 446: Click on the Output button to send a signal to the appropriate solenoid. The button will be highlighted when the solenoid energizes. With the engine off and the key in the ON position, it is possible to hear the solenoid(s) energize when pressing energizes. With the engine off and the key in the ON position, it is possible to hear the solenoid(s) energize when pressing the Output buttons.

IMPORTANT: Place range lever in Neutral prior to clicking Output buttons.

Screen 1 of 1 - Check Output Data

FIG. 446

Solenoid Valve for Gear Shift 1	Sends output signal to 1st gear solenoid valve.
Solenoid Valve for Gear Shift 2	Sends output signal to 2nd gear solenoid valve.
Solenoid Valve for Gear Shift 3	Sends output signal to 3rd gear solenoid valve.
Solenoid Valve for Gear Shift 4	Sends output signal to 4th gear solenoid valve.
Solenoid Valve for Power Shuttle (Forward)	Sends output signal to Forward shuttle solenoid valve.
Solenoid Valve for Power Shuttle (Reverse)	Sends output signal to Reverse shuttle solenoid valve.
Solenoid Valve for Power Shuttle Engagement	Sends output signal to Power Shuttle engagement (proportional) solenoid valve.

To Change Setting of Controller (IQ Shift)

From the IQ Shift menu window, click on To change setting of controller. From the To change setting of controller window, the IQ controller settings can be viewed or changed.

The controller setting can be modified from the factory setting to:

- Change the amount of (fill) time required for oil to reach operating pressure in the power shuttle clutch.
- Change the initial oil pressure available when the power shuttle clutch first starts to engage.
- change the amount of time required for the controller to recognize when the main shift gears are engaging or disengaging.

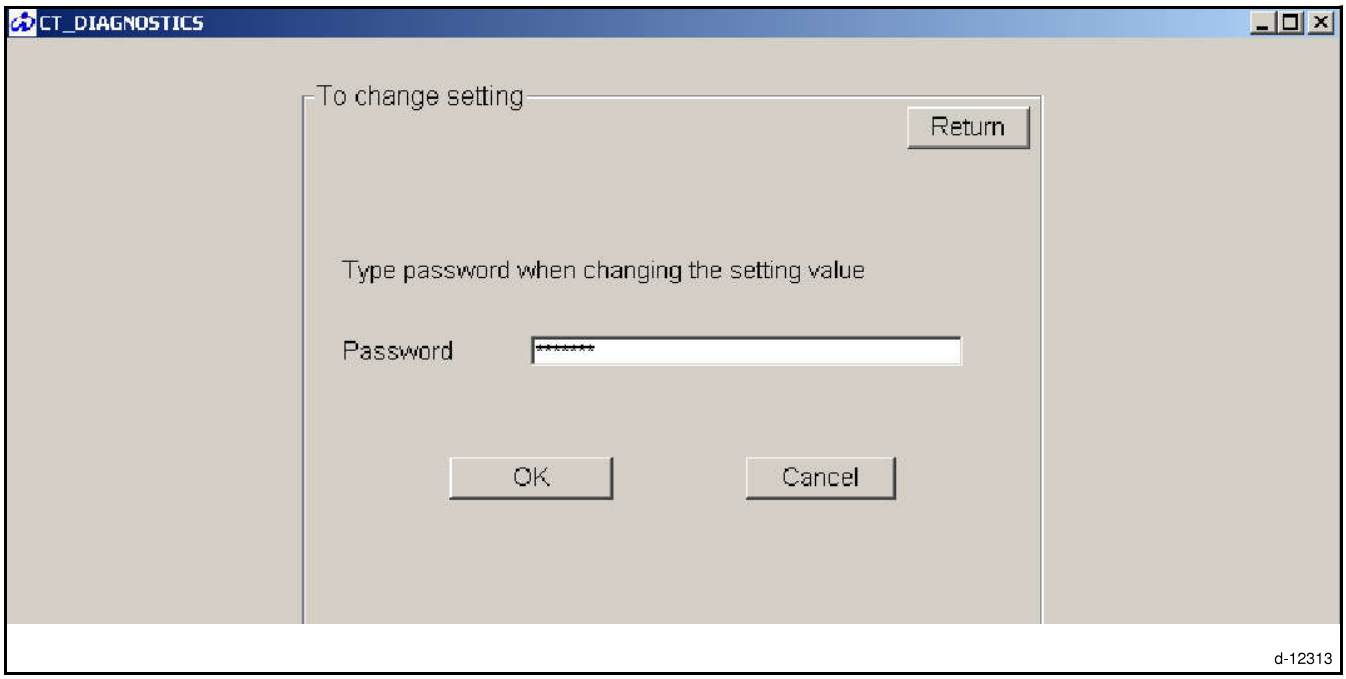

FIG. 457

FIG. 457: A password is required to change the controller settings. The default password is tractor. The password can be changed as outlined in the SETTINGS section of this User Guide. Click OK after typing in the password. If the wrong password is entered, an error message will appear. To simply view the current settings, click on the Cancel button.

Standard: 90

Adjustable range: 80 to 95

Charge Lamp Signal	Displays ON whenever the Charge lamp in the dash panel is lit.
Buzzer Signal	Displays ON when the audible signal is heard. NOTE: Duration of audible signal is very short, so ON is only displayed when 3 or more consecutive audible beeps are heard.
	Display OFF when audible signal is quite.
Oil Pressure	Displays ON when oil pressure is normal.
	Displays OFF when oil pressure is below normal.
Hour Meter (Check Mode Only)	Displays actual engine hours.
Trip Meter (Check Mode Only)	Displays engine hours.
Fuel Sensor (Check Mode Only)	Displays fuel level sensor reading as a digital value. Refer to approximate values: Full Tank = 25 Half Tank = 95 Empty Tank = 205
Coolant Temperature Sensor (Check Mode Only)	Displays engine coolant temperature sensor reading as a digital value. Refer to approximate values: -30°C = 248 0°C = 229 30°C = 188 50°C = 150 75°C = 104 100°C = 67 120°C = 46

NOTE: The Check Mode fuse (5A) located in the lower RH corner of the fuse box must be removed to view the Hour Meter, Trip Meter, Fuel Sensor and Coolant Temperature Sensor values.

NOTES

FIG. 17: Pull off spool out of sleeve.

NOTE: Pull off the spool in the direction shown by the arrowhead while turning it right and left.

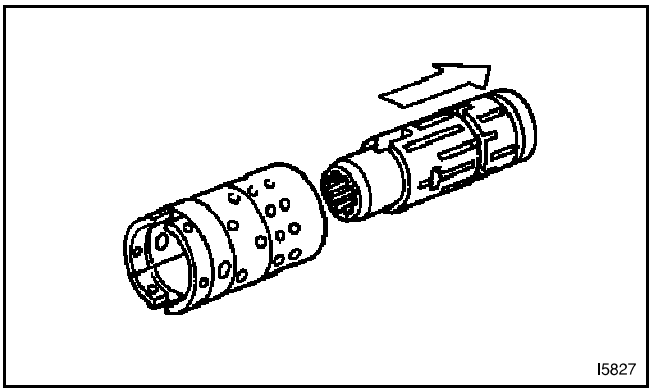

FIG. 17

FIG. 18: Remove O-ring from housing.

NOTE: Never adjust the relief valve. When it is defective, replace control valve assembly.

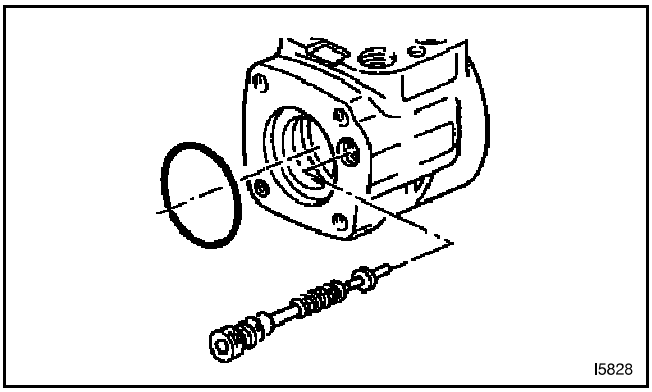

FIG. 18

Inspection

Check the contact surfaces of all components. Replace defective ones. Wash all metal parts in clean solvent and dry them with pressurized air.

Do not dry them with cloth or paper, or lint and paper waste contaminate the hydraulic system, which will lead to system trouble. Never file parts or polish them with coarse sandpaper.

NOTE: Apply fresh grease to O-rings ahead of time.

We recommend used O-rings and seals be replaced with new ones whenever possible

NOTES

FIG. 17: Air Conditioner Control Panel

The control panel is fixed on the right upper frame, the air conditioner unit, and the inner roof.

It is fixed to the inner roof with screws and nuts in order of the panel and the control panel.

(1) Air Conditioner Unit Mounting Point

(2) Fixing Point to Inner Roof

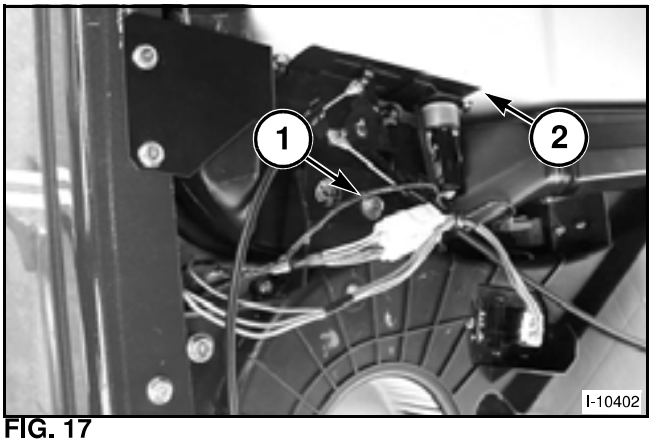

FIG. 17

Air Conditioner Dual Pressure Switch

FIG. 18: The dual pressure switch (1) is installed on the right side front of the roof.

Refer to the following explanation about the air conditioner for the function and the structure.

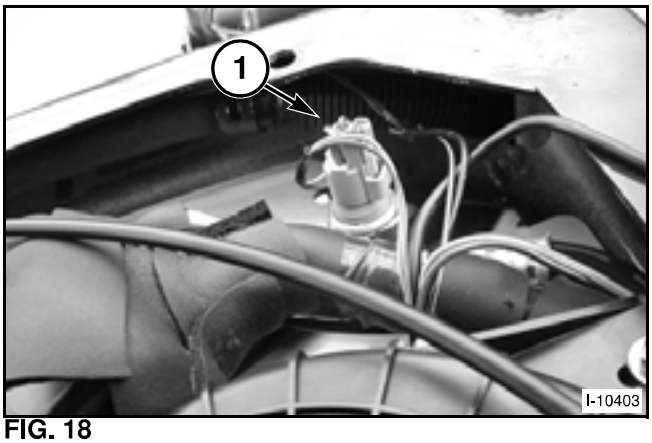

FIG. 18

Cabin Wire Harness

FIG. 19: The cabin wire harness is supplied from the engine room running through the dash panel and under the left fender via the underside of the step into the cabin.

Inside the cabin it runs from above the left fender and through the pillar into both sides of the upper frame.

FIG. 19

OPERATION AND CONTROL OF AIR CONDITIONER

Operation

Start the engine.

Turn on the fan switch. The blower turns.

Turn on the air conditioner switch (A/C). The clutch is energized.

Select the air outlet by the air outlet changeover lever.

Move the temperature-adjusting lever.

Chill wind blows out through the air outlet grille.

Turn off the air conditioner switch and move the temperature-adjusting lever to the right, which leads to heating.

Turn on the air conditioner switch and move the temperature-adjusting lever to the left, which leads to cooling and dehumidification.

Control

When the gas pressure exceeds 3.14 MPa (455.42 psi)

The magnetic clutch of the compressor is turned off by the high-pressure switch.

When the gas pressure becomes 0.2 MPa (29.01 psi)

The magnetic clutch of the compressor is turned off by the low-pressure switch, and the compressor is thus protected.

FIG. 49: Adjustment of temperature control cable.

Insert a end of the temperature control cable (shorter one) into the hole in the temperature control lever.

(1) Temperature Control Cable

(2) Temperature Control Lever

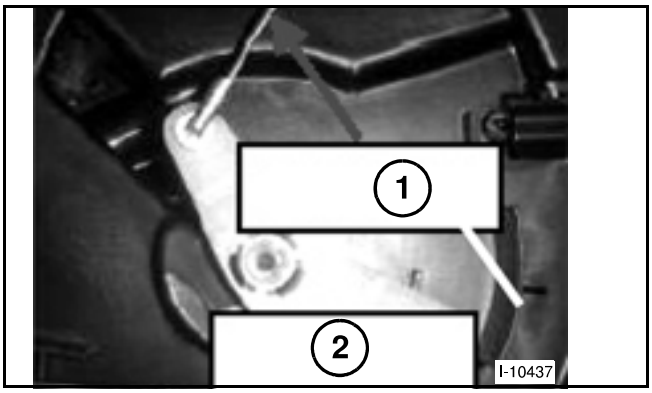

FIG. 49

FIG. 50: Align the end face of the outer cover of the cable with the case rib and hold the cable in the clamp. Shift the control lever to MAXCOOL position.

(1) Outer Cable End

(2) Case Rib

(3) Clamp

(4) Temperature Control Lever

(5) MAXCOOL

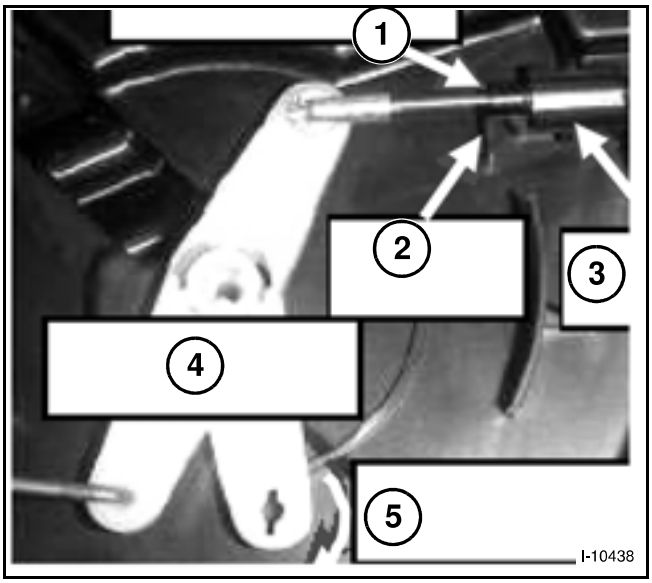

FIG. 50

FIG. 51: Insert the terminal of the cable onto the pin of the control panel lever.

(1) Pull Outer Cover In This Way

(2) Clamp

(3) Control Panel Lever

(4) COOL Side

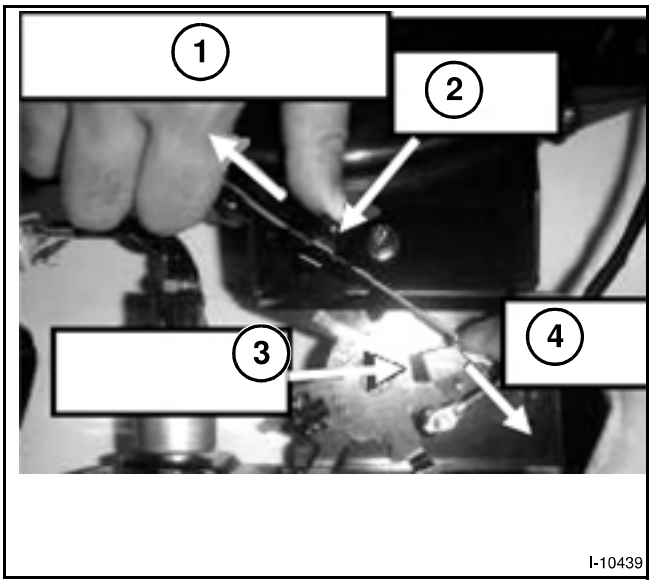

FIG. 51