1125 / 1140 / 1145 / 1240 / 1250 / 1260 TRACTORS WORKSHOP SERVICE MANUAL 1449249M2 TABLE OF CONTENTS

TITLE	SECTION
INTRODUCTION & SPECIFICATIONS	01
SHEET METAL AND THREE-POINT LINKAGE	01A
MAJOR COMPONENTS	01B
ENGINE GENERAL INFORMATION	02A
ENGINE SERVICE SPECIFICATIONS	02B
ENGINE	02C
ENGINE FUEL SYSTEM	02D
ENGINE DROP IN	02E
COOLING SYSTEM AND AIR CLEANER	03A
CLUTCH	04A
CLUTCH	04B
TRANSMISSION	05A
POWER SHUTTLE	05B
FRONT AXLE (2 WD)	06A
FRONT AXLE (4 WD)	06B
REAR AXLE AND BRAKES	07A
POWER ASSIST STEERING	08A
HYDRAULIC SYSTEM	09A
ELECTRICAL SYSTEM	10A
STARTER - HATACHI	10B
STARTER - NOPPON DENSO	10C
ALTERNATOR	10D

Lubrication/Fill Points

FIG. 0-06: General layout of lubrication, fill and drain locations on Tractor:

Ref.	Description:	Type:
1	Crankcase	Engine Oil
2	Radiator	Engine Coolant
3	Fuel Tank	Diesel Fuel
4	Rear Housing	Hydraulic Oil
5	Power Steering	Hydraulic Oil
6	4-WD Axle	Hydraulic Oil
7	Axle Pivot	(2-WD)Grease
8	Front Spindles	(2-WD)Grease
9	Axle Pivots	(4-WD)Grease
10	Front Spindles	(4-WD)Grease
11	Clutch Shaft	Grease
12	Brake Pivots	Grease
*13	Draft Pivots	Grease
14	Leveling Crank	Grease

NOTE: Accessory Mid-PTO has drain plug in housing (not shown in figure).

**Draft pivots, 13, are an accessory on MF 1125-1140 and MF 1240-1250 models. Standard equipment on MF 1145 and MF 1260.*

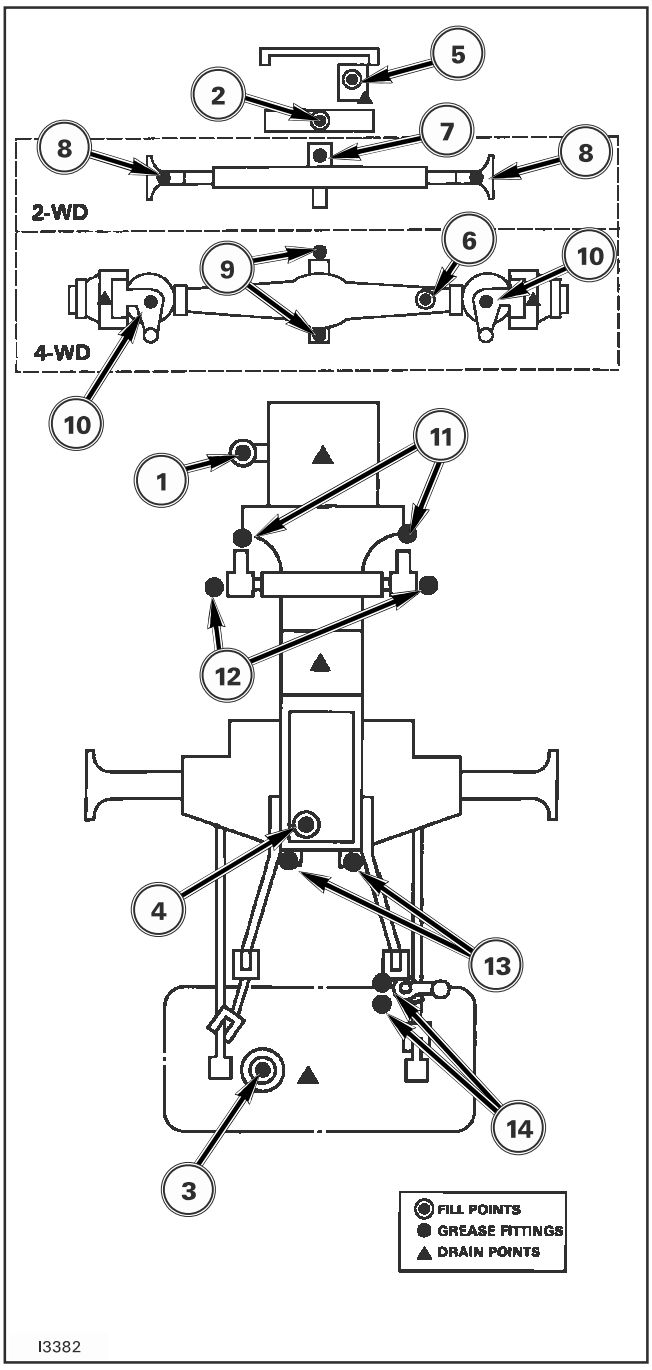

FIG. 0-06

	MULTIPLY:	BY:		To Get: MULTIPLY	BY:		To Get:
LINEAR	inches	x 25.4	=	millimeters (mm)	x 0.03037	=	inches
	feet	x 0.3048	=	meters (m)	x 1.0936	=	feet
	yards	x 0.9144	=	meters (m)	x 1.0936	=	yards
	miles	x 1.6093	=	kilometers (km)	x 0.6214	=	miles
	inches	x 2.54	=	centimeters (cm)	x 0.3937	=	inches
	microinches	x 0.0254	=	micrometers (um)	x 39.37	=	microinches
AREA	inches²	x 645.16	=	millimeters² (mm²)	x 0.00155	=	inches²
	inches²	x 645.16	=	centimeters² (cm²)	x 0.155	=	inches²
	feet²	x 0.0929	=	meters² (m²)	x 10.764	=	feet²
	yards²	x 0.8361	=	meters² (m²)	x 1.196	=	yards²
	acres	x 0.4047	=	hectometers² (hm²)	x 2.471	=	acres
			=	hectares (ha)			
VOLUME	inches³	x 16387	=	millimeters³ (mm³)	x 0.000061	=	inches³
	inches³	x 16.387	=	centimeters³ (cm³)	x 0.06102	=	inches³
	inches³	x 0.01639	=	liters	x 61.024	=	inches³
	quarts	x 0.94635	=	liters	x 1.0567	=	quarts
	gallons	x 3.7854	=	liters	x 0.2642	=	gallons
	feet³	x 28.317	=	liters	x 0.03531	=	feet³
	feet³	x 0.02832	=	meters³ (m³)	x 35.315	=	feet³
	fluid oz.	x 29.57	=	milliliters (ml)	x 0.03381	=	fluid oz.
	yards³	x 0.7646	=	meters³ (m³)	x 1.3080	=	yards³
	teaspoons	x 4.929	=	milliliters (ml)	x 0.2029	=	teaspoons
	cups	x 0.2366	=	liters	x 4.227	=	cups
	bushel	x 35.239	=	liters	x 0.02838	=	bushels
	bushel	x 0.03524	=	meters³ (m³)	x 28.378	=	bushels
MASS	ounces (av)	x 28.35	=	grams (g)	x 0.03527	=	ounces (av)
	pounds (av)	x 0.4536	=	kilograms (kg)	x 2.2046	=	pounds (av)
	tons (2000 lbs)	x 907.18	=	kilograms (kg)	x 0.001102	=	tons (2000 lbs)
	tons (2000 lbs)	x .90718	=	metric tons(t)	x 1.1023	=	tons(2000 lbs)
	tons (long) (2240 lbs)	x 1016.05	=	kilograms (kg)	x .000984	=	tons (long) (2240 lbs)
FORCE	ounces - f (av)	x 0.278	=	newtons (N)	x 3.597	=	ounces - f (av)
	pounds - f (av)	x 4.488	=	newtons (N)	x 0.2248	=	pounds - f (av)
	kilograms - f	x 9.807	=	newtons (N)	x 0.10197	=	kilograms - f
PRESSURE OR STRESS	pounds/sq.in.	x 6.895	=	kilopascals (kPa)	x 0.145	=	pounds/sq. in.
	pounds/sq.in.	x 0.0689	=	bar	x 14.512	=	pounds/sq. in.
POWER	horsepower	x 0.746	=	kilowatts (kW)	x 1.34	=	horsepower
	ft-lbf/min.	x 0.0226	=	watts (W)	x 44.25	=	ft - lbf/min.
TORQUE	pound - inches	x 0.11298	=	newton-meters (N.m)	x 8.851	=	pound-inches
	pound - feet	x 1.3558	=	newton-meters (N.m)	x 0.7376	=	pound-feet
VELOCITY	miles/hour	x 1.6093	=	kilometers/hour (km/h)	x 0.6214	=	miles/hour
	feet/sec.	x 0.3048	=	meters/sec. (m/s)	x 3.281	=	feet/sec.
	kilometers/hr.	x 0.27778	=	meters/sec. (m/s)	x 3.600	=	kilometers/hr.
	miles/hours	x 0.4470	=	meters/sec. (m/s)	x 2.237	=	miles/hour

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TOP LINK

Removal and Installation

FIG. 1A-20: Linkage provides three positions of connecting top link, 1, to Tractor.

For most implements securing top link, 1, in upper hole, A, is satisfactory, but position may be varied to provide increased implement height during transport.

If draft control is installed, these positions are also used to adjust draft sensitivity:

- Use upper hole, A, for implements with low draft, or for more sensitivity.

- Use middle position, B, for average implements.

- Use lower hole, C, for high draft implements, or for less sensitivity.

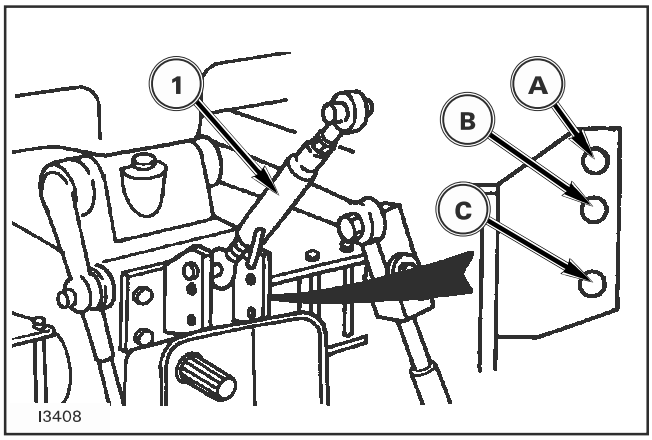


FIG. 1A-20

LIFT ROD OR LOWER LINK (ONE SIDE)

Removal and Installation

FIG. 1A-21: Lift rods, 1, and lower links, 2, have multiple positions. Normally, lower hole, B, in each lift rod is attached to forward hole, X, in lower link.

Selecting upper hole, A, will provide increased lift height, reduced depth.

Selecting rear hole, Y, will provide increased lift capacity, reduced lift range.

CAUTION: Secure all pins after adjustment is made. Always use pins supplied with Tractor.

To remove lift rod, remove cotter pin and pin at lower hole "X", and remove nut holding rod to lift arm. Remove lift rod, 1.

To remove lower link, Remove nut, 3, and remove check chain. Remove cotter pin and pin holding lift rod to lower link. Remove linch pin holding front of lower link to pin. Remove lower link.

Reverse procedures to install lower link, or lift rod.

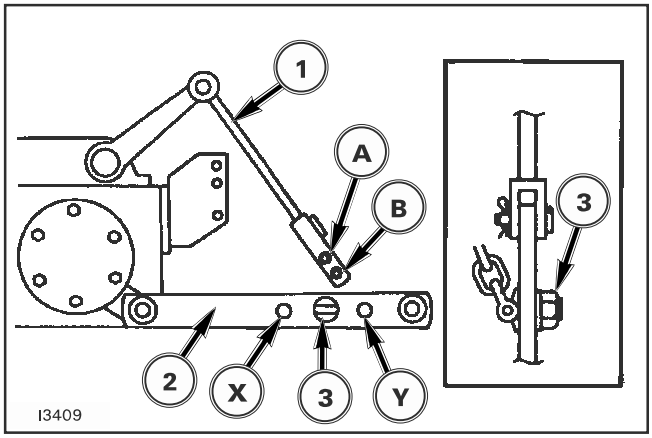


FIG. 1A-21

CHECK CHAIN

Removal and Installation

FIG. 1A-22: To remove check chain remove nut, 1, holding chain to lower link. Remove cotterpin and pin, 2. Remove check chain.

Reverse procedure to install check chain.

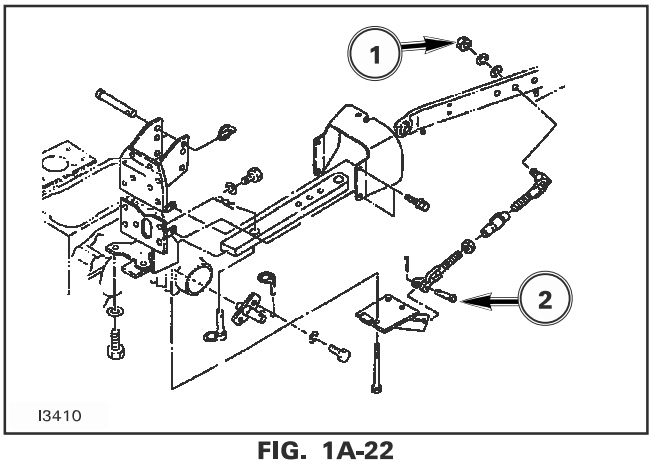


FIG. 1A-22

FIG. 1B-15: Remove top and bottom steering column covers.

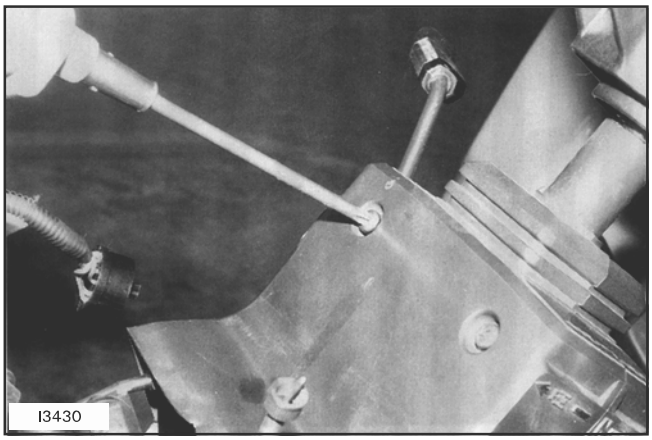


FIG. 1B-15

FIG. 1B-16: Disconnect and remove both brake rods, 1, (RH and LH), by removing the retaining pins from the upper ends.

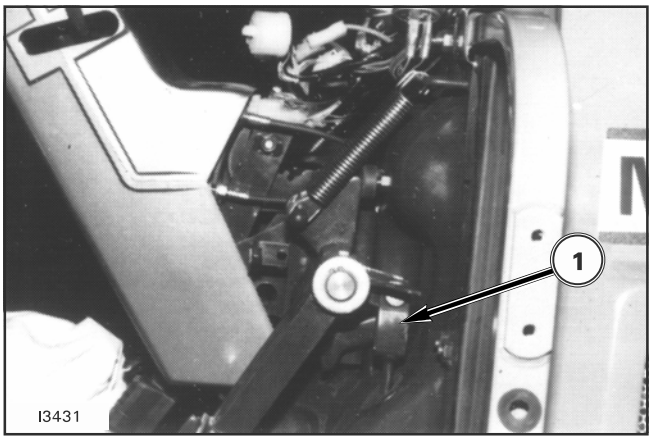


FIG. 1B-16

FIG. 1B-17: Remove the clutch rod, 2, by removing top retaining pin or by loosening the turnbuckle completely.

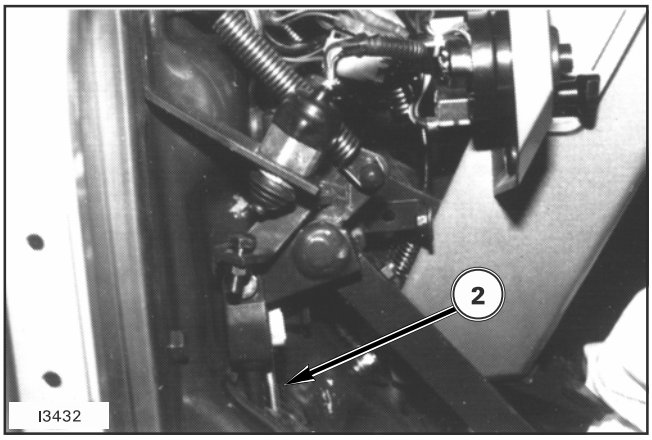


FIG. 1B-17

FIG. 1B-18: Disconnect shuttle shift control cable, 3, from the reverse shift (bearing) on the left-hand side of the clutch housing.

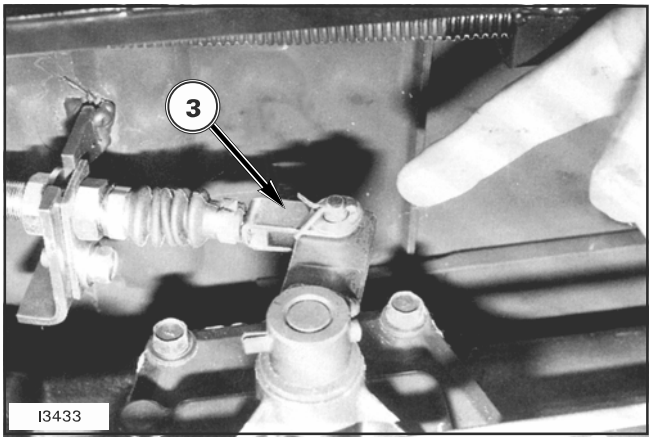


FIG. 1B-18

ENGINE GENERAL INFORMATION

GENERAL ENGINE SPECIFICATIONS

		MF 1145	MF 1140	MF 1125
Items	Models	E3AD1-HT01 Turbo Charged	E3AD1-H05K	E3AG1-B04K
Type		Water-cooled, 4 cycle, indirect injection		
Cylinders		3 in line		
Bore x Stroke	mm (in.)	86 x 86 (3.39 x 3.39)	86 x 86 (3.39 x 3.39)	84 x 86 (3.31 x 3.39)
Total displacement	cc (cu. in.)	1498 (91.38)	1498 (91.38)	1429 (87.17)
Rated output	PS/rpm (kW/rpm)	35/2600 (26.8/2600)	30/2600 (22.1/2600)	25/2600 (18.4/2600)
Maximum torque	kgf-m/rpm (ft-lb/rpm)	11.4/1800 (111/1800)	10.1/1600 (73.1/1600)	9.2/1600 (66.5/1600)
Compression ratio		21.4	21.4	21.5
Fuel consumption	(g/PS-h)	225	205	210
Weight (dry)	kg (lb)	158 (370)	171 (377)	171 (377)
Piston	Type	Full floating		
	No. of compression ring	2		
	No. of oil ring	1		
Valve timing	Intake open	BTDC 11°		
	Intake close	ABDC 37°		
	Exhaust open	BBDC 51°		
	Exhaust close	ATDC 9°		
Valve clearance	Intake mm (in.)	Cold 0.45 (0.0177)		
	Exhaust mm (in.)	Cold 0.45 (0.0177)		
Injection	Order	1 - 3 - 2		
	Timing	BTDC 18°	BTDC 18°	BTDC 20°
Injection pump	Type	Bosch		
	Plunger diameter mm (in.)	6.5 (0.2561)	6.5 (0.2561)	6 (0.2364)
	Cam lift mm (in.)	7 (0.276)		
	Governor type	Mechanical all-speed governor		
Injection nozzle	Type	Bosch throttle type		
	Injection orifice mm (in.)	1 (0.0394)		
	Spray angle	0°		
	Injection pressure kgf/cm² (psi)	175 (2487)		120 (1706)

Applicable models	Inspection items	Nominal dimensions	Values requiring services	Rebuilt values	Usable limit	Servicing† and remarks‡
	Oil control ring			.20-.40 (.0079 - .0158)	1.0	E3AD1: 86.000 (3.386 in.) E3AG1: 86:000 (3.386 in.)
E3AD1	Tensile force kg (lb) Compression ring: 1st			1.52-2.08 (9.97-4.59)	0.5 (1.1)	†Replace.
E3AG1				1.38-1.92 (3.04-4.23)		
E3AD1	Compression ring: 2nd			1.02-1.48 (2.25-3.26)		
E3AG1				1.00-1.50 (2.21-3.31)		
E3AD1	Oil control ring			3.15-5.15 (6.95-11.36)	0.6 (1.3)	
E3AG1				3.00-5.00 (6.62-11.03)		
All	Clearance between piston ring groove and ring Compression ring: 1st			0.60 - 0.095 (0.0024 - 0.0037)	0.3 (0.012)	†Replace piston ring or piston ‡Should be mounted in position with notch mark turned upwards.
All	Compression ring: 2nd			0.030 - 0.065 (0.0012 - 0.0026)	0.3 (0.012)	†Should be mounted in position with notch mark turned upwards. ‡Replace piston ring or piston.
All	Oil control ring			0.02 - 0.06 (0.008 - 0.0024)	0.15 (0.006)	
All	Over-size piston ring			[0.50] [1.00]		
All	**CONNECTING ROD** Tension of connecting rod bearing		P kg(lb) 300 (662)	C mm(in.) 0.04 - 0.065 (.0016 - .0026)		†Use bearing with clamping margin and sufficient tensile force. Outer face of the bearing should be brought into good contact with bearing cap.
All	Clearance between connecting rod bearing and crankpin			0.038 - 0.073 (.0015 - .0029)	0.12 (.0047)	†Replace bearing.
All	Clearance between piston pin and small end bushing		0.008 - 0.020 (.0003 - .0008)	0.05 (0.0020)		†Replace bush or piston pin. ‡Clearance should be such that piston pin rotates freely in the small end bush when big-end is held with fingers.

TAPPET CLEARANCE - ADJUST

FIG. 2C-02: Adjust valve clearance. (Flat-blade screw driver, box-type wrench, thickness gauge).

When No. 1 piston is at TDC, that is, the aligning mark of the timing gear can be seen through the opening in the timing gear case side, adjust the valve clearance of No. 1, 2, 4, and 6 valves. Then turn the crankshaft 360° and adjust the valve clearance of No. 3 and 5.

Install the oil pipe. (12 mm wrench)

	mm (in)
Intake valves	0.45 (0.0177)
Exhaust valves	0.45 (0.0177)

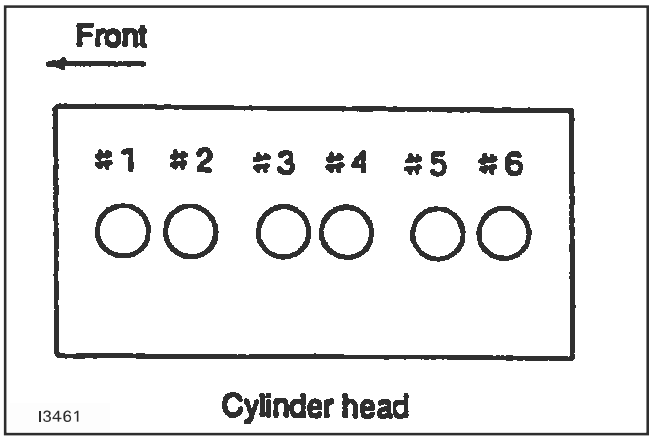


FIG. 2C-02

ROCKER ARMS

Removal and Installation

FIG. 2C-03: Remove valve cover. Remove bolts holding rocker arms to cylinder head.

Remove rocker arm assembly. Reverse procedures to install rocker arm assembly. Adjust tappets. Install valve cover.

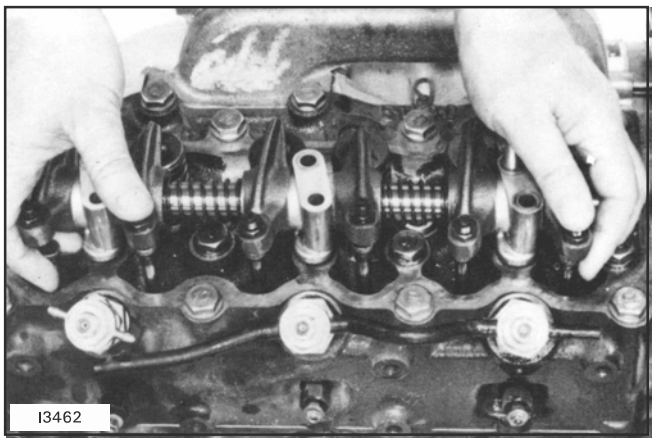


FIG. 2C-03

Disassembly and Reassembly

FIG. 2C-04: Remove rocker arms. Remove the snap ring from each end of the rocker arm shaft. Remove the springs, rocker arms, rocker arm shaft brackets and rocker arm shaft.

NOTE: Keep the rocker arms from each cylinder separate to prevent their being interchanged.

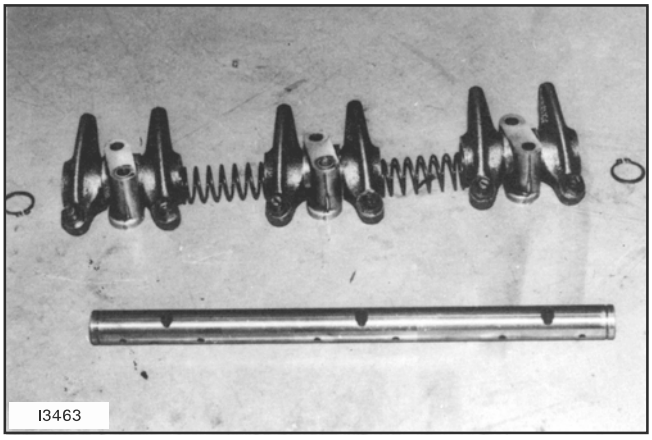


FIG. 2C-04

HOT PLUG INSTALLATION

FIG. 2C-33: Align the ball of the hot plug with the corresponding groove in the cylinder head and install the hot plug in position by tapping the circumference of the hot plug lightly with a copper hammer.

Place a soft metal plate with a smooth surface on the hot plug to protect the surface against damage.

Press the hot plug into position by gradually applying a maximum pressure of 4 tons (4.4 US tons).

NOTE: Avoid the use of excessive pressure.

When a new hot plug is installed, grind the end of the hot plug flush with the cylinder head surface, using a surface grinder.

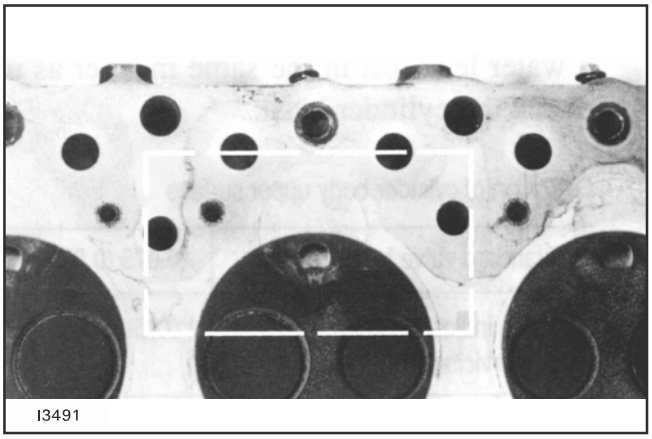


FIG. 2C-33

mm (in)

Maximum allowable depression of hot plugs	0.02 (0.0008)

CRANKSHAFT PULLEY

Removal and Installation

FIG. 2C-34: Remove front axle bracket at engine.

Remove bolt holding crankshaft pulley to crankshaft. Use a suitable puller to remove pulley.

Reverse procedures to install pulley.

The center bolt should be tightened to an initial torque of 117 Nm (86.8 ft.-lbs.) and then an additional 90 + 30 degrees with the wrench. Average tightening torque is 357 Nm (263.9 ft.-lbs.).

NOTE: Apply a thin coat of oil to oil seal surface on pulley, before installing pulley.

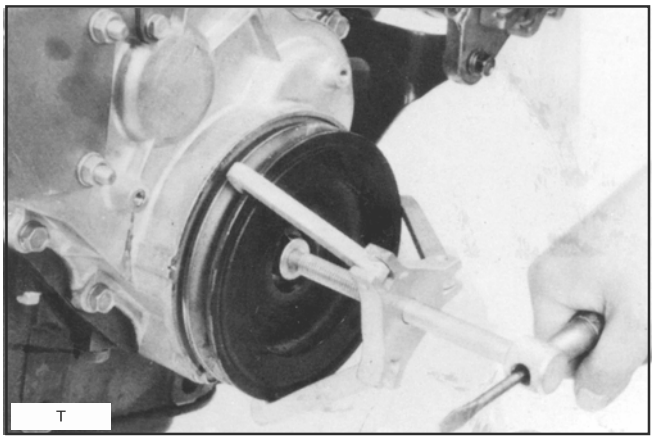


FIG. 2C-34

INSPECTION OF CRANKSHAFT

FIG. 2C-53: Visually check the crank journals, crankpins, and oil seal fitting faces for scores or wear, and check the oil ports for clogging.

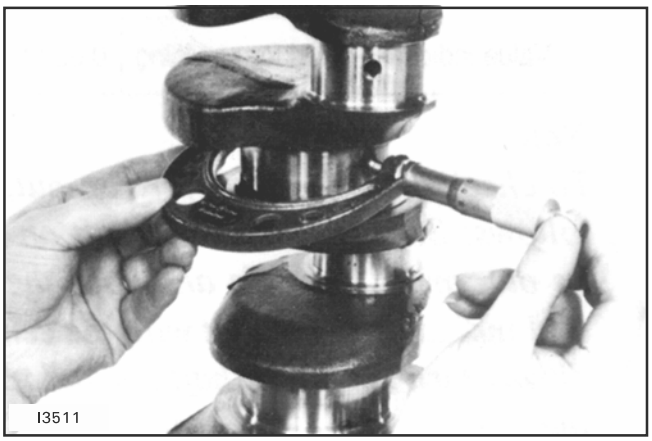


FIG. 2C-53

FIG. 2C-54: With an outside micrometer, measure the outside diameter of the crank journals and crank- pins. Take measurements at several sections of the crank journals and crankpins to determine the amount of uneven wear and the degree of out-of-roundness.

If the amount of uneven wear or out-of-roundness is in excess of 0.05 mm (0.0020 in.), have the crank journals and crankpins ground to the sizes indicated in the table and install undersize bearings.

mm (in)

Nominal diameter of crank journals	70 (2.758)
Nominal diameter of crankpins	49 (1.9306)
Crank journal and crankpin finishing accuracy	0.0025 (0.0001) or less

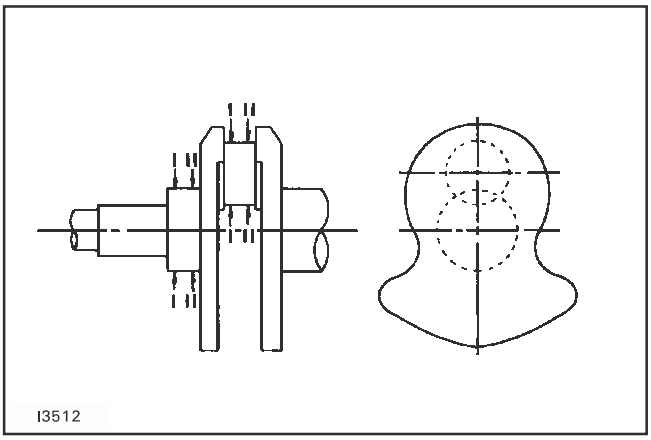


FIG. 2C-54

FIG. 2C-55: Check the crankshaft for run-out and correct if the amount of run-out is in excess of the value indicating a need for servicing.

mm (in)

Standard value for assembly	0.03 (0.0012) or less
Value indicating need for servicing	0.06 (0.0024) or more

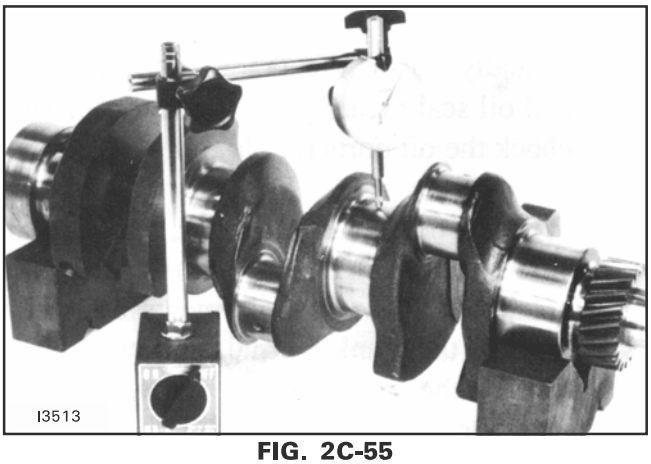


FIG. 2C-55

NOTE: To check the crankshaft for run-out, proceed as follows: Support the crankshaft on V blocks at its outermost journals and hold the probe of a dial indicator in contact with the center journal. Slowly turn the crankshaft one full turn and note the reading of the dial indicator. (1/2 of the dial indicator reading corresponds to the actual crankshaft run-out.)

SUBASSEMBLY OF PISTON AND CONNECTING ROD

FIG. 2C-72: With a piston heater, heat the piston to about 70-100°C (158-212°F). Align the connecting-rod small-end hole with the piston hole and install the piston pin.

NOTE: Assemble the connecting-rod with the piston so that the side of the connecting-rod with the cylinder number mark is turned toward the camshaft side.

Install the piston with the front mark on the head turned forwards.

Install the snap rings.

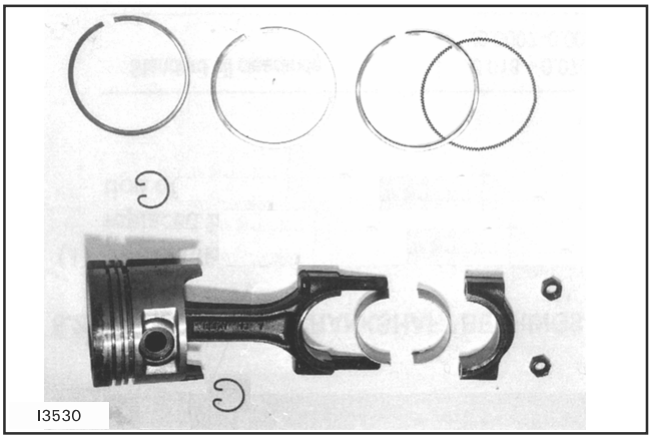


FIG. 2C-72

INSPECTION OF PISTON RINGS

FIG. 2C-73: Replace the piston rings with new ones if they are found to be worn or broken, or if the cylinders have been rebored.

Inspection of piston ring gaps:

Insert the piston ring into the cylinder bore and push it with the piston head, so that it is held at a right angle to the cylinder wall. Measure the ring gap with a feeler gauge.

Piston ring gaps:

mm (in)

	Standard value	Usable limit
1st and 2nd rings	0.20-0.40 (0.0079-0.0158)	1.5 (0.059)
Oil ring	0.20-0.40 (0.0079)	1.0 (0.039)

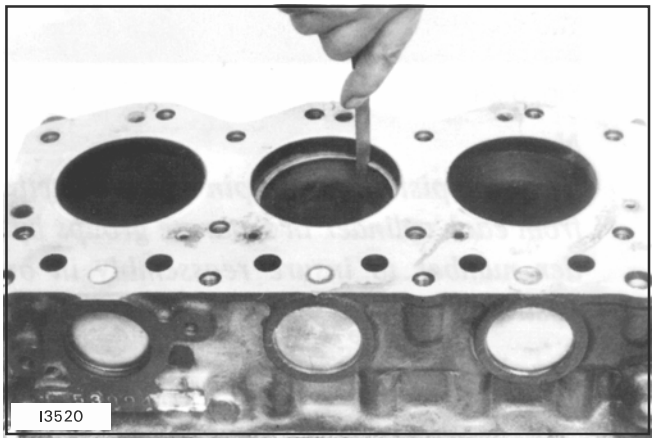


FIG. 2C-73

NOTE: When installing new piston rings on the pistons without reboring the cylinder, measure the piston ring gaps with the piston rings held at the lower portion of the cylinder: the lower portion of the cylinder is generally smallest in bore diameter because it experiences the lowest rate of wear.

Problems	Presumable causes	Correction
Effect of exhaust gas resistance	● The turbocharger does not speed up due to a deformed exhaust system pipe	● Correct
Exhaust fumes are white	● Excessively worn support	● Replace
Oil is consumed too quickly	● Clogged or deformed oil return pipe ● Excessively worn support	● Correct or replace ● Replace
Lowered output	● Exhaust gas is leaking from the exhaust system ● Exhaust gas is leaking from the delivery side ● Clogged air cleaner ● Contaminated or broken turbocharger	● Check and correct ● Check and correct ● Clean or replace the element ● Repair or replace
Turbocharger not responsive	● Carbon is accumulated and hardened on the turbine side making the turbine hard to turn ● Incomplete combustion	● Clean and replace oil ● Check fuel system
Abnormal noise and vibration	● The nozzle of the turbine housing is clogged and gas passage is excessively narrow or the delivery port of the blower is clogged ● Revolving parts interfere with other parts	● Disassemble and clean ● Disassemble and repair, or replace
Vibration	● Loose intake pipe and oil pipe on the turbocharger ● Broken support, rotor's interference with other parts, or a broken part due to trapped dirt ● Unbalanced rotor	● Check and repair ● Disassemble and repair or replace ● Repair or replace

AIR-BLEEDING FUEL SYSTEM

If any of the following conditions have occurred, system should be bled:

- Fuel tank has been permitted to run dry.
- Fuel lines, filter element(s) and other components within system have been disconnected or removed.
- If engine has not been operated for a considerable period of time.
- If engine fails to start, or if it starts but stops again after a few minutes of operation.

FIG. 2D-15: Make sure fuel tank is full to provide gravity flow of fuel to filter.

Turn valve, 2, on fuel filter to AIR position (handle to front).

Allow air bubbles and fuel to drain from overflow pipe, 3, until air bubbles disappear and only fuel drains out.

Turn valve, 2, to ON position (handle down).

No.	Description	Location
1	Fuel Filter	Right front
2	Filter Valve	On filter
3	Overflow Pipe	Right front
4	Electric Pump	Right front
5	Injection Pump	Engine, right
6	Fuel Tank	Rear

NOTE: Normally, further air-bleeding is not required due to electric fuel pump operating when main switch in instrument panel is ON.

If engine will not start after several attempts, check fuel pump fuses (see "Electrical System") and then proceed, if necessary.

FIG. 2D-16: With main switch ON, loosen hex head bolt, 1, on right side of injection pump. Do not completely remove screw. When air bubbles disappear and only fuel drains out, retighten screw.

Start engine.

IMPORTANT: DO NOT turn engine over in attempt to start it while bleed screw is loose.

If engine still fails to start after a reasonable cranking period, air may be in the high pressure injection lines. Partially loosen the high pressure lines, 2, where they attach to injectors and turn engine over several times. Tighten lines and start engine.

CAUTION: Fuel emitted from loosened injection lines is high pressure. Keep hands and face away when engine is cranked.

Clean all spilled fuel following air-bleeding procedure(s).

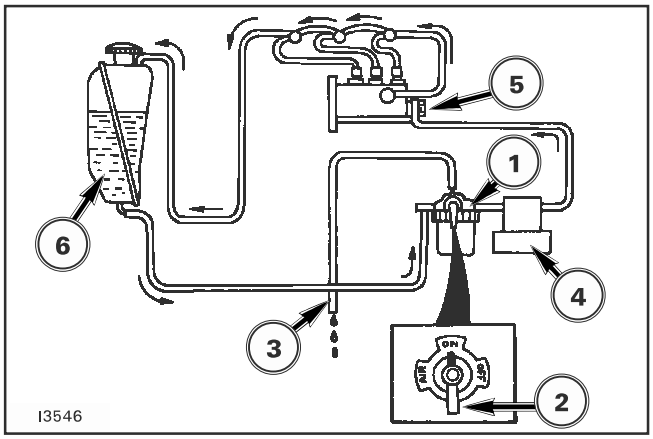


FIG. 2D-15

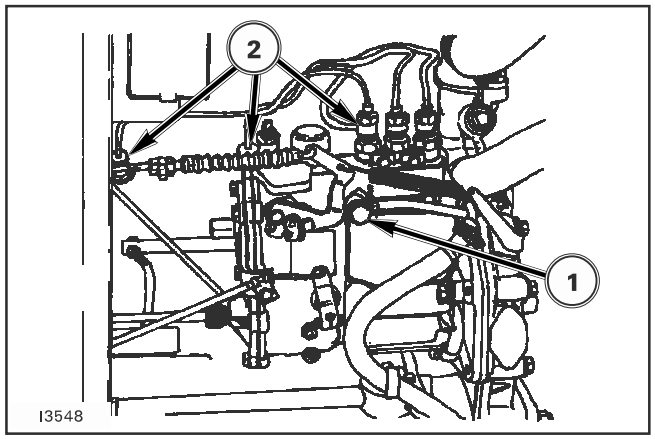


FIG. 2D-16

Inspection For Radiator Clogging

To inspect the radiator cores to see if they are clogged with rust, remove the radiator cap and check for transparency of the coolant, and for rust formation around the radiator throat inside the radiator.

If some rust has formed or the coolant transparency is very poor, the radiator should be cleaned.

Cleaning the radiator inside

FIG. 3A-06: Place the radiator upside down and supply pressurized water from a faucet to the lower tank, 1, draining through the upper tank, 1, as shown in the figure to wash out accumulated deposits.

Cleaning with a detergent

When cleaning the radiator with a detergent, follow the instructions given by its manufacturer. Different detergents have different characteristics.

Cleaning the radiator exterior

Cleaning the wire mesh.

After the tractor has been operated in dusty conditions, check the wire mesh daily and clean it if necessary.

Clean the radiator cores

Clean the radiator cores by applying water spray or compressed air so as to form a right angle with the radiator cores, moving water application in parallel.

NOTE: When cleaning the radiator cores with pressurized water, be sure to apply it at a right angle to the cores. Slanted application might deform the cooling fins.

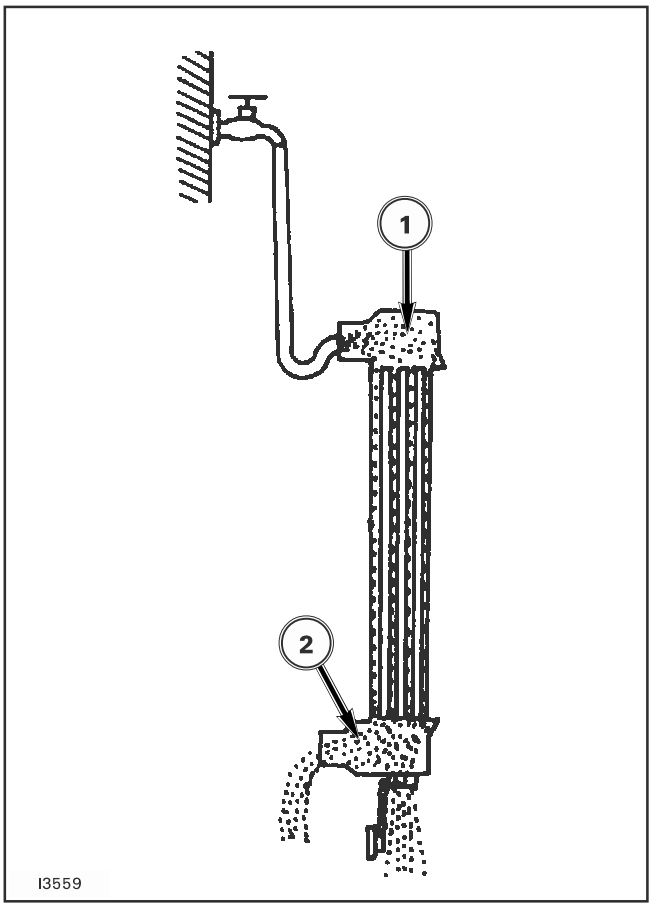


FIG. 3A-06

Visual Inspection Of The Exterior Parts

When the radiator exterior is corroded, cracked, or badly damaged and the radiator core fins are crushed or damaged, replace the radiator. Also replace damaged or fatigued water hoses. Retighten loose hose clamps securely if water is leaking through the hose clamps, or replace them if necessary.

Inspection Of The Radiator Cap

FIG. 3A-07: Check the radiator cap to see if it functions normally, using a radiator cap tester as follows:

Pressure valve opening pressure	1.05 kgf/cm² (14.93 psi)
Vacuum valve opening pressure	0.04-0.05 kgf/cm² (0.57-0.71 psi)

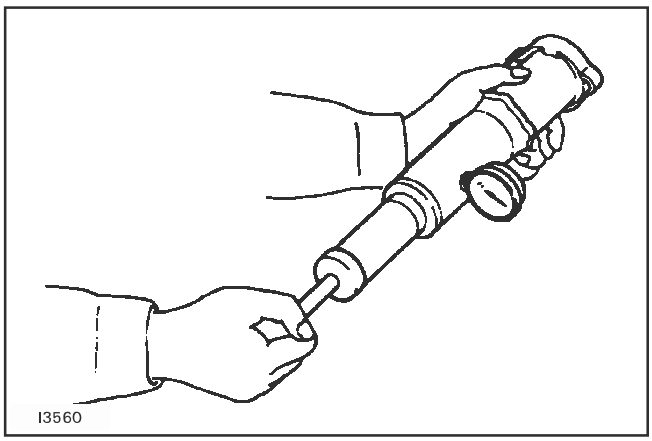


FIG. 3A-07

CLUTCH

GENERAL DESCRIPTION **4A-02**

SPECIFICATIONS **4A-03**

MAIN CLUTCH **4A-04**
Removal and Installation 4A-04
Overhaul 4A-04
Inspection 4A-06
Reassembly 4A-08

RELEASE BEARING **4A-10**
Removal and Installation 4A-10

CLUTCH SHAFT AND RELATED PARTS **4A-10**
Removal and Installation 4A-10
Disassembly 4A-10
Inspection 4A-10
Reassembly 4A-11

CLUTCH FREE-PLAY ADJUSTMENT **4A-11**

CLUTCH ROD LINKAGE **4A-11**
Removal and Installation 4A-11

TROUBLESHOOTING **4A-12**

FIG. 4A-23: The clutch shaft, 1, must revolve smoothly.

Reassembly

Reassemble the disassembled parts in reverse order of disassembly, pursuant to the following instructions.

Each sliding part should be coated with heat-proof grease.

The clutch fork taper pin, 2, should be locked securely with wire.

Smooth movement of each part should be confirmed.

The release bearing must be installed in correct direction.

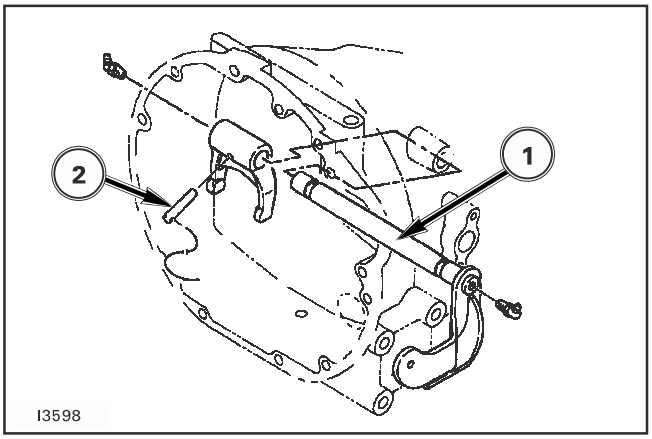


FIG. 4A-23

CLUTCH FREE-PLAY ADJUSTMENT

FIG. 4A-24: Check clutch pedal free-play regularly and adjust as necessary. Correct clutch pedal free-play, A, is 7/8 to 1-1/8 (20 to 30 mm) when measured at the end of the pedal as shown.

NOTE: Through use, clutch free-play will be reduced.

IMPORTANT: Correct free play must be maintained to reduce wear on clutch and release bearing, and allow complete disengagement when pedal is depressed.

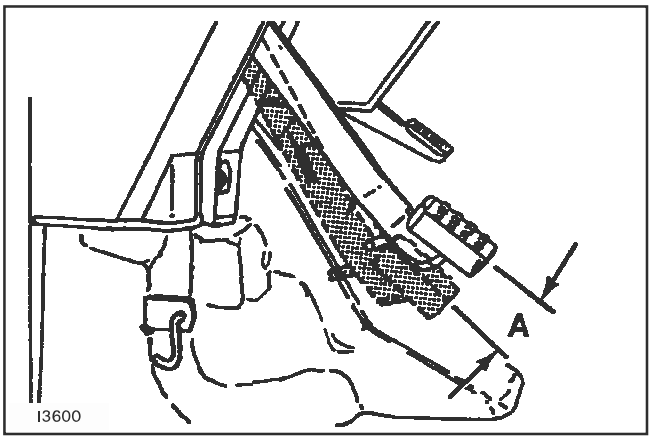


FIG. 4A-24

FIG. 4A-25: To adjust clutch pedal free-play, remove hood left side panel and loosen lock nut, 1 (right-hand thread), and lock nut, 2 (left-hand thread). Adjust turnbuckle, 3, on linkage until free-play is correct. Lengthening linkage will increase free-play, shortening linkage will reduce free-play.

Secure by retightening lock nuts.

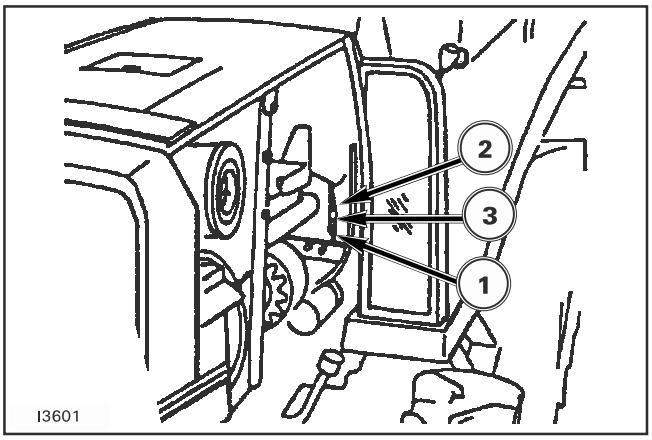


FIG. 4A-25

CLUTCH ROD LINKAGE

Removal and Installation

FIG. 4A-26: Remove instrument panel and cover. Remove cotter pins, 1, and remove pins, 2. Remove clutch rod linkage. Reverse procedure to install clutch rod.

Adjust clutch free play.

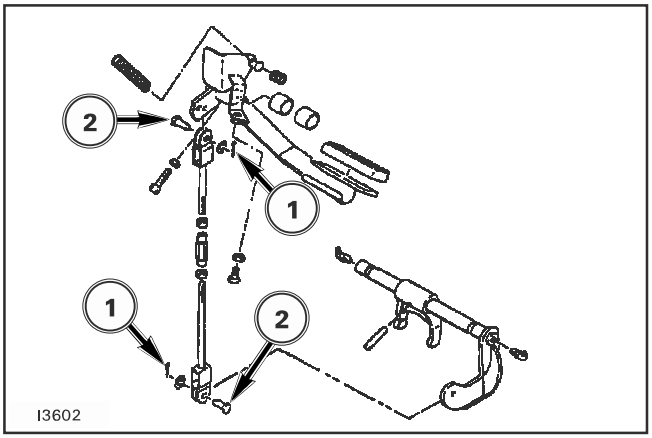


FIG. 4A-26

Repair of Friction Surface

FIG. 4B-12: The friction surface should be ground down or machines to finish it to 12u (4.7 x 10) to 25u (9.8 x 10) in surface smoothness. The machining limit of the pressure plate surface in thickness is 1.0 mm (0.039 in.) as shown at "X".

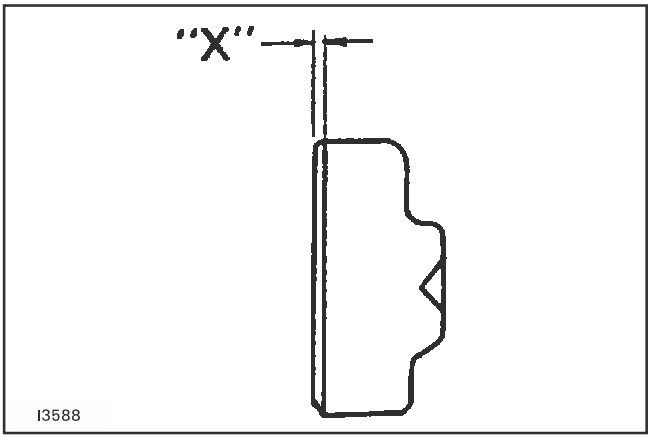


FIG. 4B-12

Adjustment of Pressure Springs

FIG. 4B-13: When the friction surface of the pressure plate and the flywheel are repaired by grinding or machining, the installation height of the pressure springs increases by the ground-off value both on the flywheel and the friction plate resulting in decreased spring tension. Consequently, adjusting washers equivalent to the ground-off value, must be inserted between the spring seat and the pressure spring, as shown at "A".

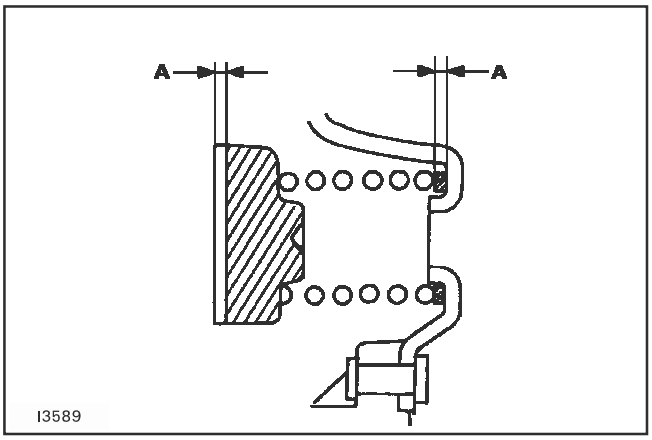


FIG. 4B-13

Inspection of the Pressure Springs

FIG. 4B-14: Check the pressure springs for free length, deviation from vertical and tension, and replace them if they are fatigued or deformed.

Measure their free length with vernier calipers. Excessively fatigued ones should be replaced.

MF 1240/1250/ST35

Free length:	Usable limit
68.8 mm (2,709 in.)	64 mm (2.52 in.)

MF 1260/ST40

Free length	Usable limit
63.1 mm (2.48 in.)	38.6 mm (2.30 in.)

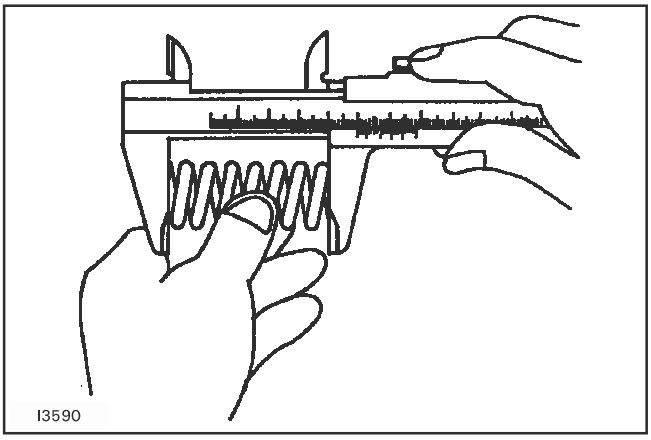


FIG. 4B-14

FIG. 4B-15: Measure the deviation from vertical using a square. Replace springs which are slanted more than approximately 2 degrees, as shown at "X".

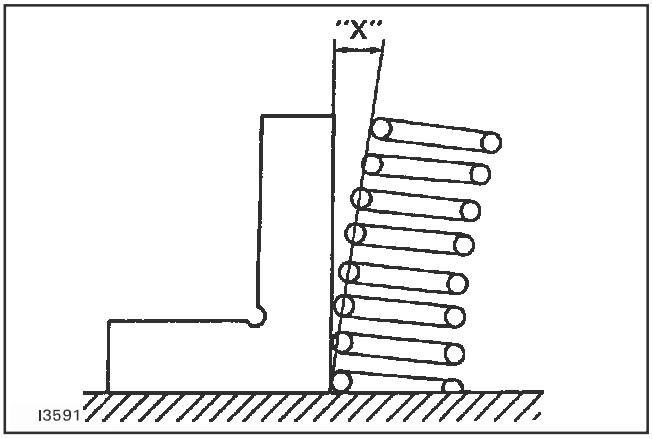


FIG. 4B-15

TRANSMISSION

GENERAL DESCRIPTION

The wheel driving system is composed of the following major components:

Transmission	Front Transmission	Forward/Reverse Gears (Shuttle shift mechanism)
	Spacer Transmission	Main Gears (Main Shift) Range gears (Speed range shift) Front drive gears (4WD)
	Differential	Ring gear Differential Differential lock

The transmission is of constant-mesh design and produces 16 speeds forward and 16 speeds reverse; forward/reverse gears shuttle; 4 speeds by main gears; and 4 speed ranges by range gears.

Synchronizer assemblies, located between forward/reverse shuttle and third/fourth gears, permit shifting into these positions to be permitted while the Tractor is in motion.

The PTO drive system is composed of the independent PTO clutch and the PTO change gears. The PTO change gears are housed behind the ring gear.

NOTE: Tractors are equipped with two PTO gear sets to provide two rear PTO speeds. However, the higher speed does not meet ASAE standards for North American specification. On MF 1125/1140/1145 Tractors the higher speed is locked out by a blanking plate installed in the shifting lever slot.

CAUTION: The higher PTO speed must NOT be used for implements requiring 540 rpm PTO speed. Operating these implements at higher speed may result in personal injury and/or equipment damage.

TRANSMISSION INPUT SECTION

Removal and Installation

FIG. 5A-20: Removal of input shaft and related parts. Separate engine from front transmission.

Remove input section, 6, as an assembly using two push bolts, (M8x20).

NOTE: Be sure to screw bolts in evenly.

Remove plate, 8, (the retaining bolts are installed with Locktite).

Pull out input shaft and 19T gear, (MF 1125/1140/1240/1250), 16T gear (MF 1145), item 10, to the rear.

Remove input section bolts, and remove input section, 1.

If only input seal, 3, or input shaft, 10, are being replaced, refer to page 5A-18 and reassemble.

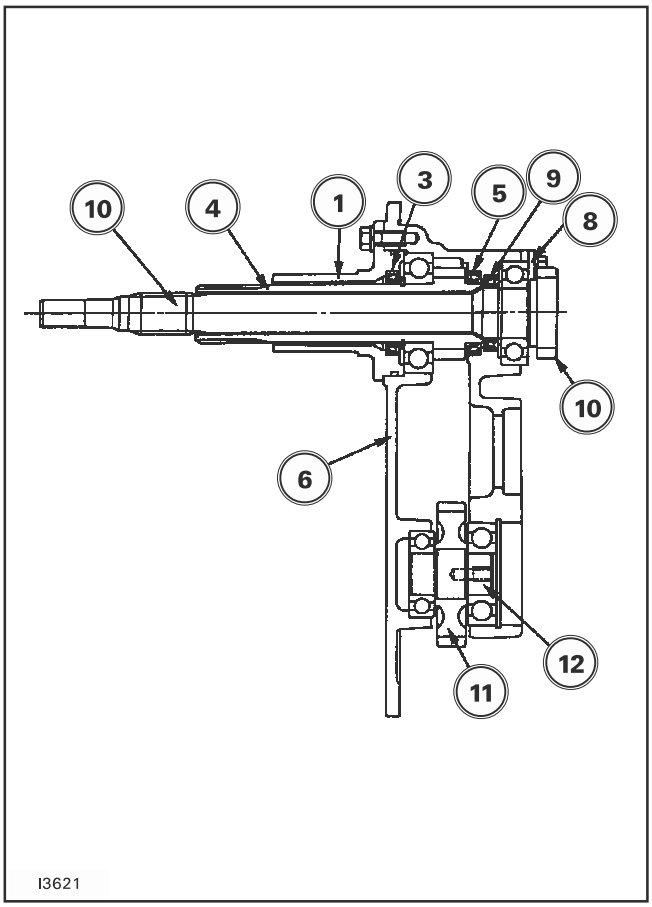


FIG. 5A-20

INPUT HOUSING AND GEARS

Removal and Installation

FIG. 5A-21: & 5A-22: Remove transmission input section and remove input shaft and input section.

Remove snap ring, where shaft has a tapped hole, at rear of idler shaft.

Pull out idler shaft using tapped hole at rear of stub shaft. If shaft is not drilled remove shaft with gear out to rear.

Refer to page 5A-18 for reassembly.

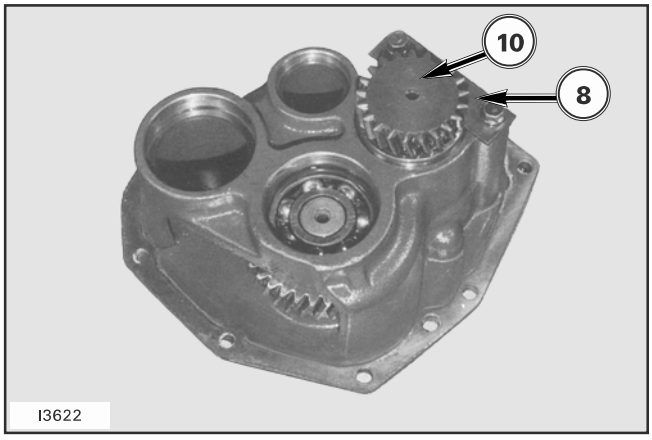


FIG. 5A-21

INPUT HOUSING

Replace

Remove input housing and gears.

Replace housing.

Reassemble, refer to page 5A-18.

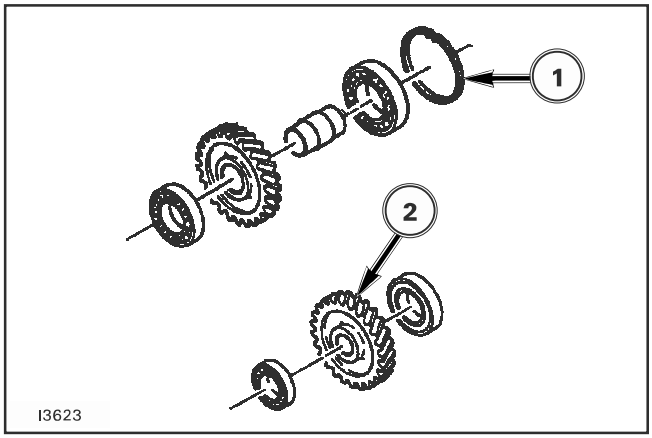


FIG. 5A-22

Brake Disc

Inspection for deformation and burning.

A seriously damaged or worn disc should be replaced.

Inspection Items	Specified values	Usable limit
Disc thickness	3.0±0.1 mm (0.114 - 0.122 in.)	2.5 mm (0.09 in.)
Surface flatness	-	0.2 mm (0.008 in.)

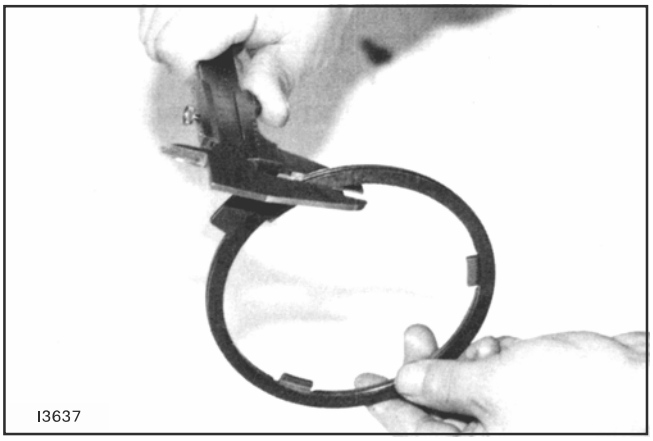


FIG. 5A-36

FIG. 5A-36: If the combined thickness of the return plate and the brake disc deviates from the speci- fied value, replace both parts.

Inspection items	Specified values	Usable limit
Combined thickness of return plate and brake disc	5.32 - 5.68 mm (0.2094 - 0.2236 in.)	5 mm (0.2 in.)

Also inspect other parts for wear and deformation and replace them if necessary.

NOTE: Seal rings, 14 and 15, and the two seal rings, 17, should be replaced as a pair. See page 5A-20, Fig. 5A-30.

Use SAE80 gear oil.

REASSEMBLY

Reassemble the parts in reverse order of disassembly, following these instructions.

NOTE: Each part should be washed clean before reassembly.

Apply multi-purpose, quality grease to needle bearings in advance.

Each bolt and nut should be tightened to the respective specified torque in accordance with the tightening torque table.

Every time a gear is installed, its smooth rotation should be checked.

Every snap ring should be seated securely in its groove.

When installing seal rings, apply fresh oil ahead of time and install them carefully so as not to damage them.

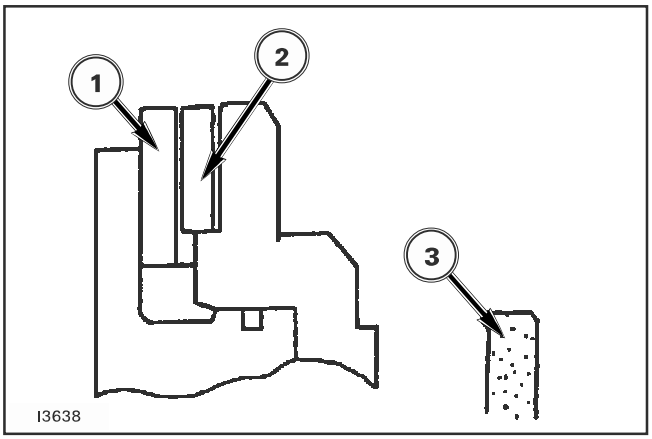


FIG. 5A-37

FIG. 5A-37: Install the return plate, 1, with the press-processed side, 3, turned towards the brake disc, 2.

When installing the return spring, use a special tool the snap ring should be securely seated in the groove. See page 5A-21, Fig. 5A-32 and 5A-33.

FIG. 5A-56: Rear Housing

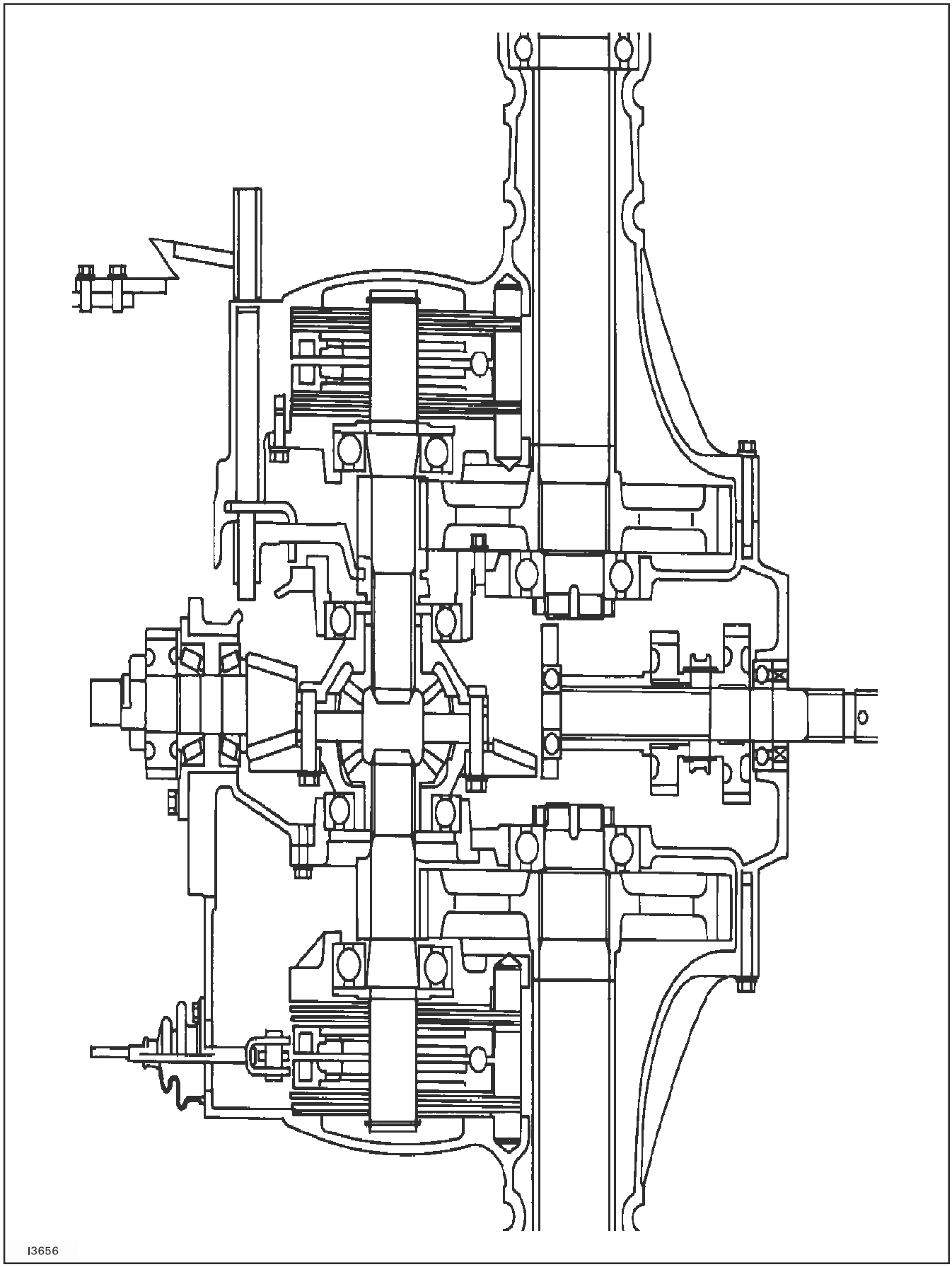


FIG. 5A-56

Removal and Installation

FIG. 5A-79: To remove mid PTO assembly select a clean container and drain transmission oil.

Remove bolts, 1, and lower mid PTO drive assembly out of rear housing.

Reverse procedures to install mid mount PTO assembly. Make certain gear teeth are clean prior to installation. Use gasket eliminator and torque bolts to 12.7-17.6 Nm (9.4-13.0 ft-lbs) torque. The output shaft should have a very slight amount of free play, indicating some gear back lash, after bolts have been torqued, if no free play exists it would be necessary to remove the mid PTO and install a thin gasket as required. Refill transmission assembly with approved oil. See introduction section.

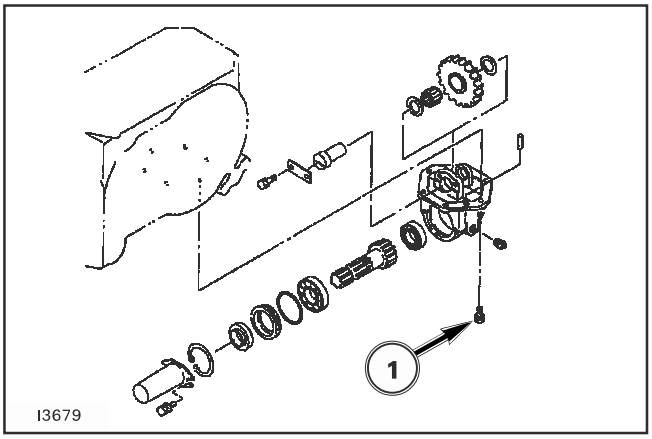


FIG. 5A-79

Overhaul

FIG. 5A-80: Remove PTO assembly.

Remove PTO cover, 19, by removing bolts, 20.

Remove snap ring, 5. Use a suitable puller to remove lower shaft, 7, out to front with bearings, 8, "O" ring, 11, insert, 10, and seal, 12.

Remove rear bearing, 9. Remove upper shaft by removing bolts, 18, and retaining strap, 17. Slide stub shaft, 14, out to front. Remove gear, 13, with bearing, 15, and washers, 16.

Inspect all parts for wear and replace if necessary.

Apply some side pressure to bearings and turn them. If they do not run smooth, replace them. Use new seals and new "O" ring.

Reverse procedures to assemble housing.

Install mid PTO.

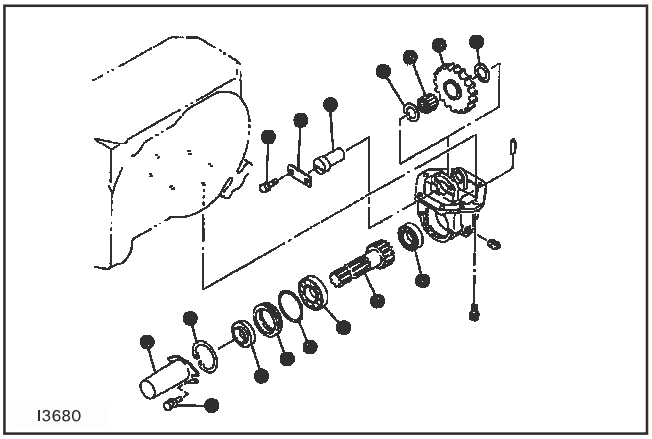


FIG. 5A-80

POWER SHUTTLE

POWER SHUTTLE 5B-2
SPECIFICATIONS 5B-2
Engine: 5B-2
Transmission: 5B-2
Power Take Off (PTO): 5B-2
Hydraulics: 5B-3
Electrical System: 5B-3
Capacities: 5B-3
Tread Width Settings: 5B-3
Maximum Axle Loading: 5B-3
GENERAL DIMENSIONS 5B-4
POWER SHUTTLE LEVER 5B-5
Operation of Power Shuttle Lever 5B-5
Precautions to Power Shuttle Operation 5B-5
INSTALLATION OF POWER SHUTTLE LEVER AND SWITCHES 5B-6
Linear Shifting Switches
for Power Shuttle 5B-6
Adjustment of Switches 5B-7
FLOWING OF HYDRAULIC FLUID 5B-8
Main Circuit 5B-8
Auxiliary Circuit 5B-8
HYDRAULIC PIPING SYSTEM 5B-8
Specified Tightening Torques of Pipe goints 5B-9
LOCATION OF REDUCING VALVE
AND PIPING 5B-10
1250/1260/ST35/ST40 ..... 5B-10
Reducing Valve Operation 5B-11
OPERATION OF PTO SOLENOID 5B-15
CONTROL OF TIMER UNIT 5B-17
LOCATION OF PTO TIMER RELAY 5B-19
Reverse Valve Operation 5B-20
MF1250/1260/ST35/ST40 Power Shuttle Wiring Harness and Component Layout 5B-28

Reducing Valve Operation

FIGS. 5B-11 & 5B-12: The reducing valve assembly controls the pressure and flow in the control circuits for PTO clutch and reverse travel for shuttle.

Maintaining the preset pressure in spite of fluctuated primary circuit pressure and relieving excessive pressure applied to the PTO clutch and shuttle clutch controlling circuits to drain port, it protects the clutches from break-down.

Port P is connected to the gear pump, the primary side to the main control valve and the secondary side to the PTO clutch and reverse travel (shuttle) control circuits.

While the control valve connected to the secondary side is not working (in neutral), no fluid flows to the secondary side. (But lubricating oil to the hydraulic clutch is delivered.)

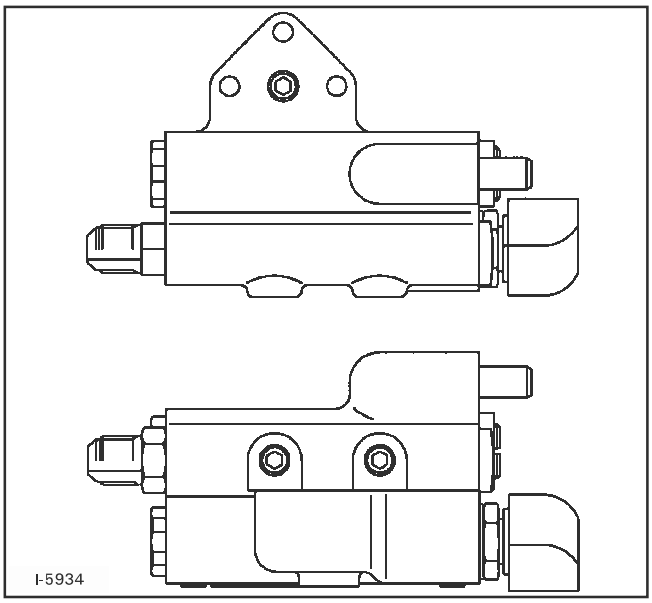


FIG. 5B-11

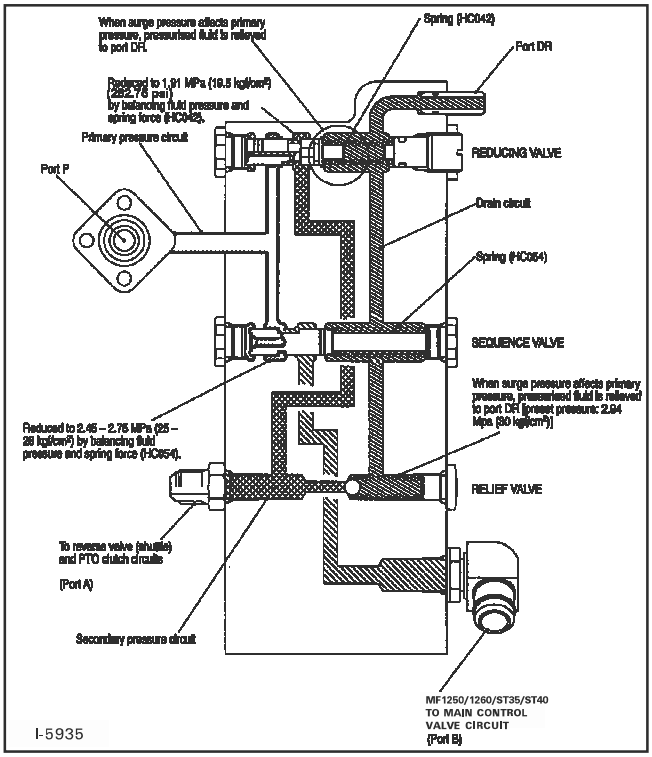


FIG. 5B-12

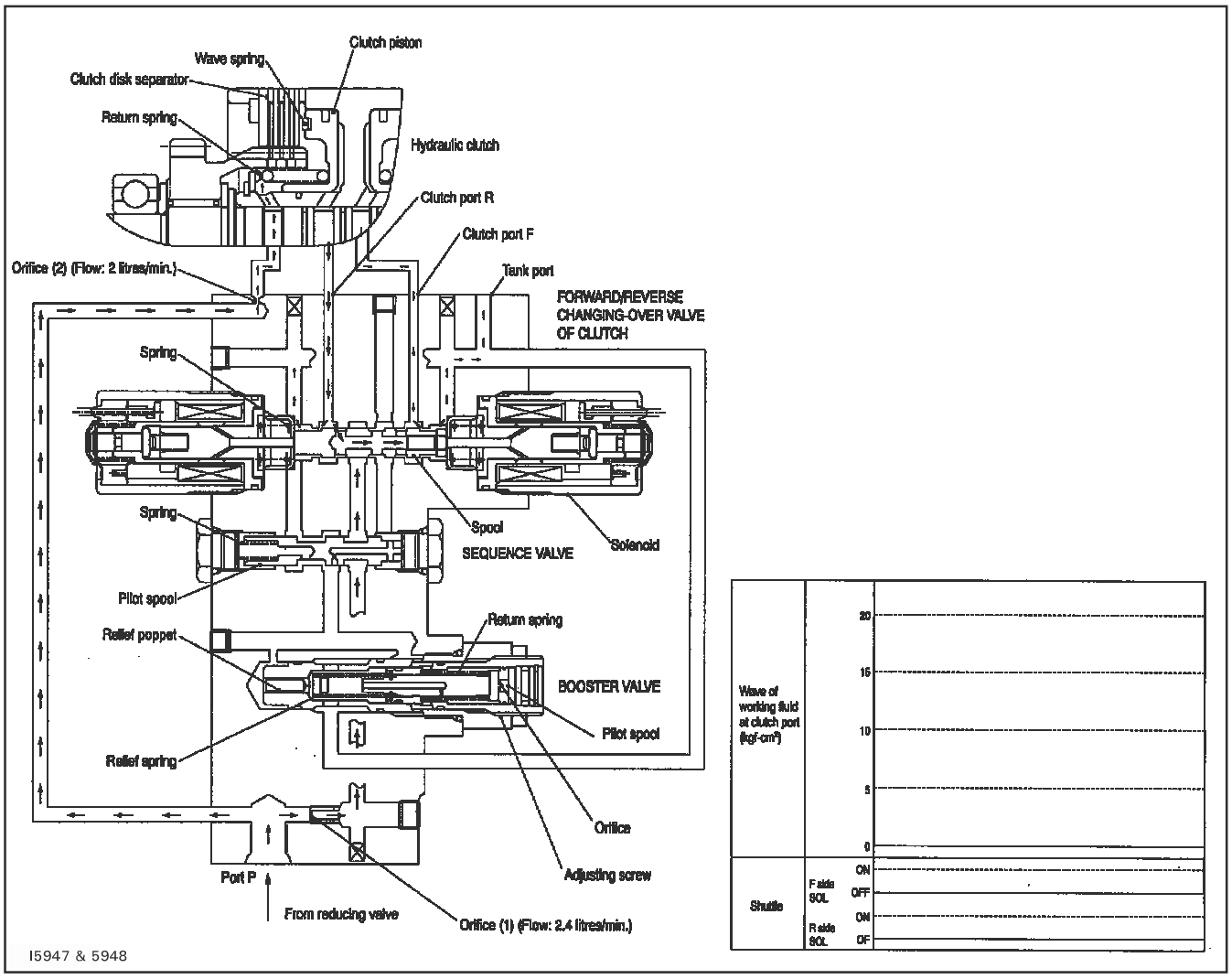


FIG. 5B-23

FIG. 5B-23: Neutral

Fluid reduced in pressure by the reducing valve is delivered to port, P, from which fluid is delivered further through orifices, 1 & 2, to the clutch lubricating circuit, forward/reverse changing-over valve of clutch, and to the inlet of the sequence valve.

With the solenoid not energized, working fluid is blocked by the forward/reverse changing-over valve through orifice, 1, and via the pilot spool of the sequence valve.

As the forward/reverse changing-over valve is in neutral, the clutch port opens to the tank port and the clutch is not activated.

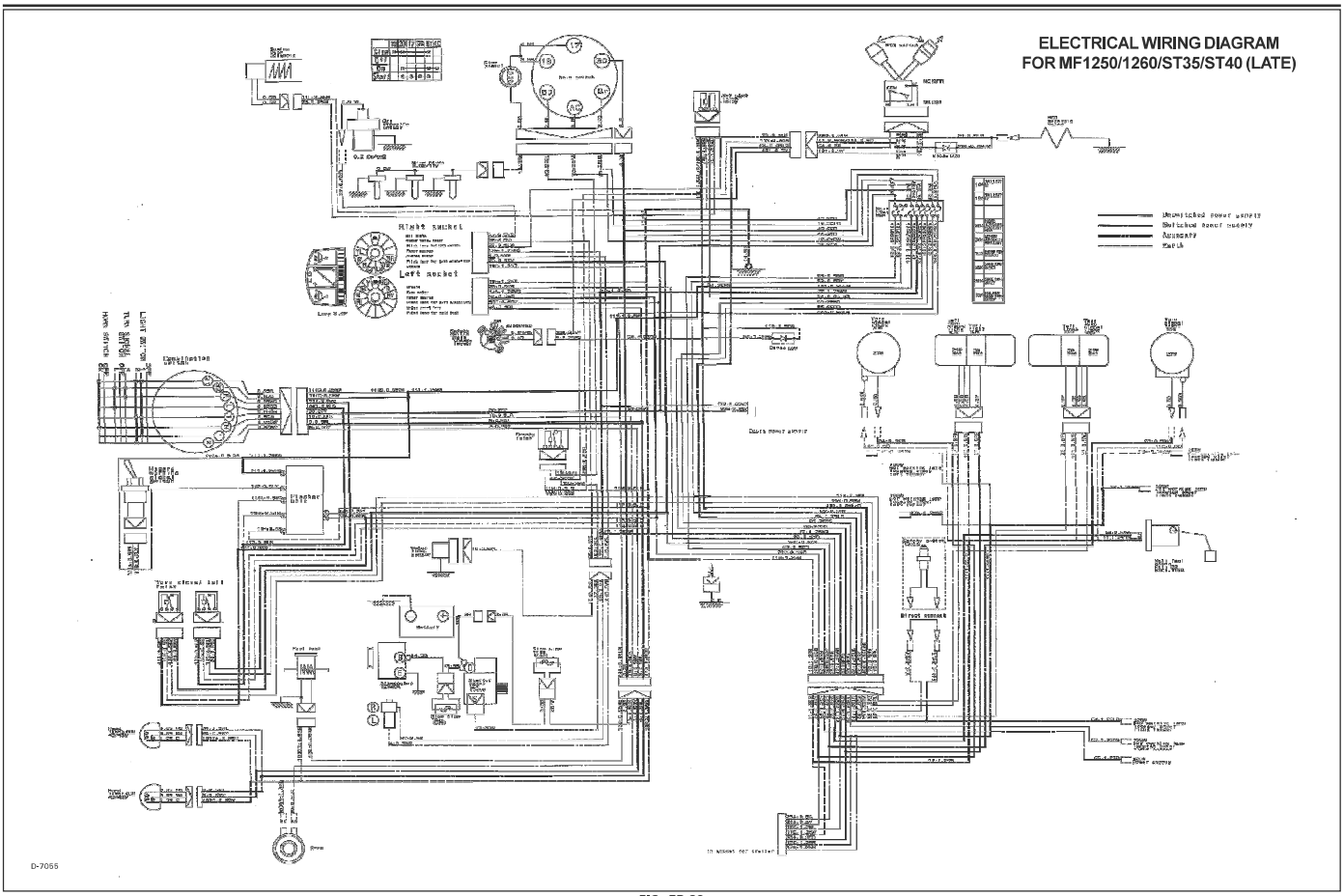


FIG. 5B-32

1449249M2

SPINDLE BUSHING - (ONE)

Removal and Installation

FIG. 6A-16: Measure the bore diameter of the bushing with a vernier calipers. If the measured value exceeds the usable limit, replace the bush.

	1125	1240
Standard values as assembled	30 mm (1.181 in.)	30 mm (1.18 in.)
Usable limit	29.9 mm (1.177 in.)	29.9 mm (1.189 in.)

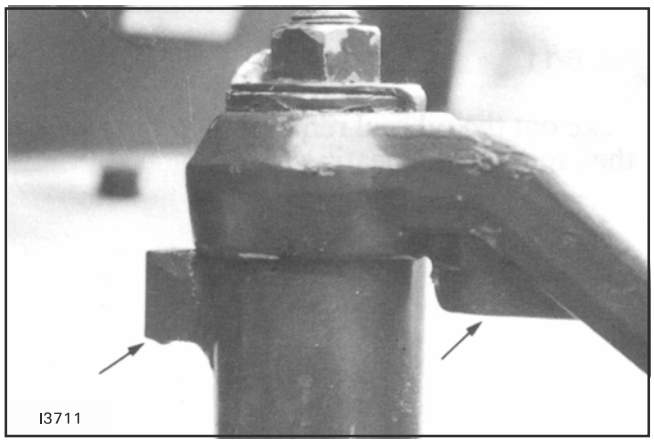


FIG. 6A-16

Reassembly

Reassemble in reverse order of disassembly, following these instructions.

INSTALLATION OF SPINDLE

FIG. 6A-17: Install the bushing using a bushing installation tool and a press.

The spindle should be coated with grease in advance. And install it carefully so as not to damage the oil seal lips.

Check for axial play of the spindle.

Specified play of spindle	0.2 - 0.8 mm (0.008 - 0.031 in.)

When the measured play exceeds the specified value, correct the play by shimming at 1.

Available shims: mm (in.)	0.5, 1.0 (0.020, 0.039)

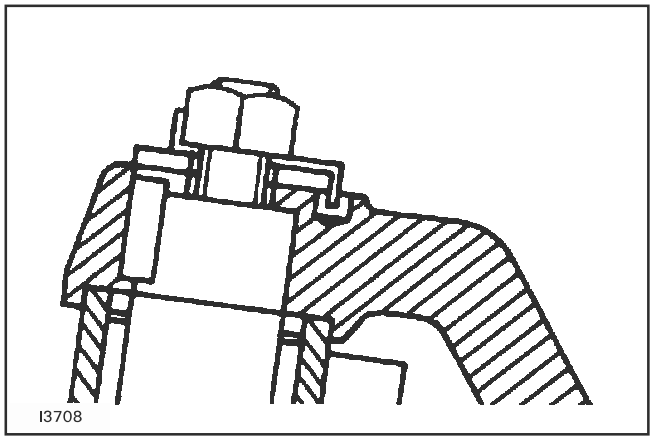


FIG. 6A-17

WHEEL HUB

Disassembly and Reassemble

FIG. 6A-18: Pay attention to the installed direction of the oil seal.

The wheel bearings should be packed with wheel bearing grease.

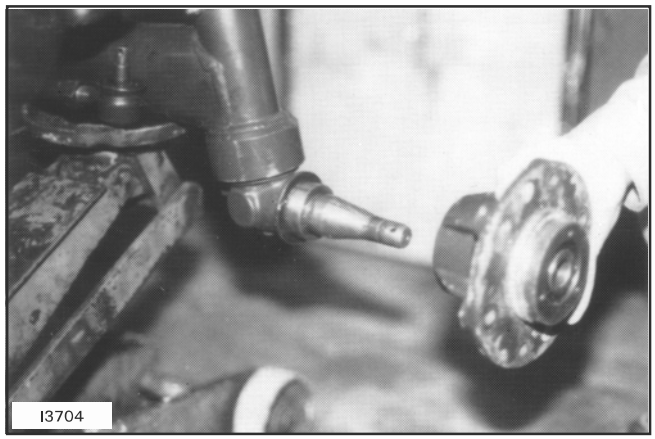


FIG. 6A-18

FRONT WHEEL DRIVE SHAFT (4WD)

FIG. 6B-04: Front Drive Shaft Component List

1. Drive Shaft
2. Snap Ring
3. Coupling
4. Tube
5. Tube
6. "O"-ring
7. "O"-ring
8. Clamp
9. Clamp Bolt
10. Bolts

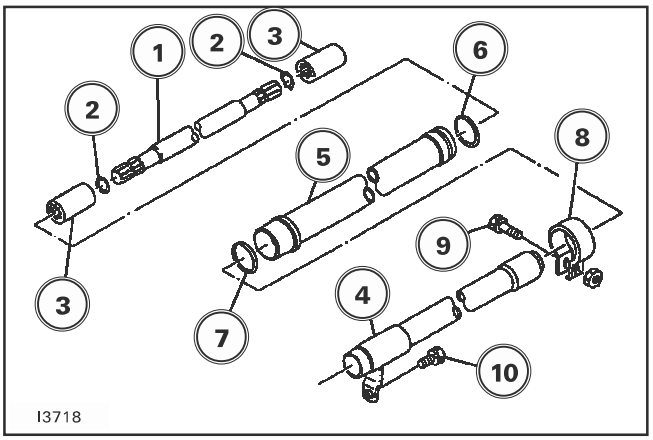


FIG. 6B-04

Removal and Installation

FIG. 6B-04: & 6B-05: Loosen clamp bolt, 9, holding telescoping drive tubes.

Remove bolt, 10.

Slide tubes, 4 and 5, together to expose couplers, 3, and snap rings, 2.

Move snap rings up toward center of shaft.

Slide couplers, 3, up on shaft and remove shaft.

Reverse procedures to install drive shaft, making certain snap rings are located in groove.

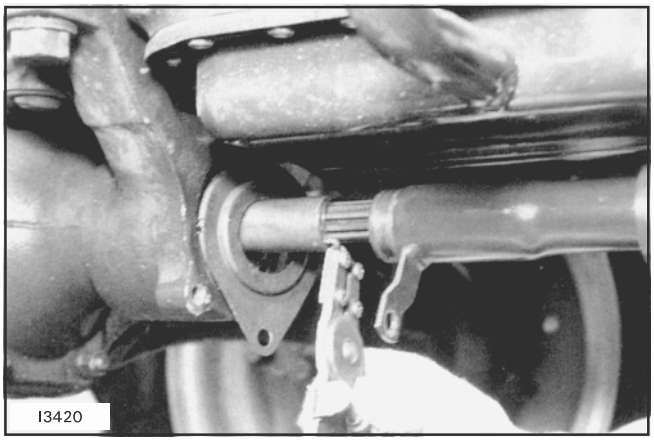


FIG. 6B-05

WHEEL SHAFT SEAL OR COVER (ONE)

Removal and Installation

FIG. 6B-26: To remove wheel shaft cover assembly, proceed as follows:

Block front axle up on side where cover will be removed.

Remove wheel and tire.

Position an oil pan under housing and remove drain plug, to drain oil.

Remove cover bolts, 2, and nuts, and remove stub axle, 3, with cover, 1, gear 4, and bearings, 5.

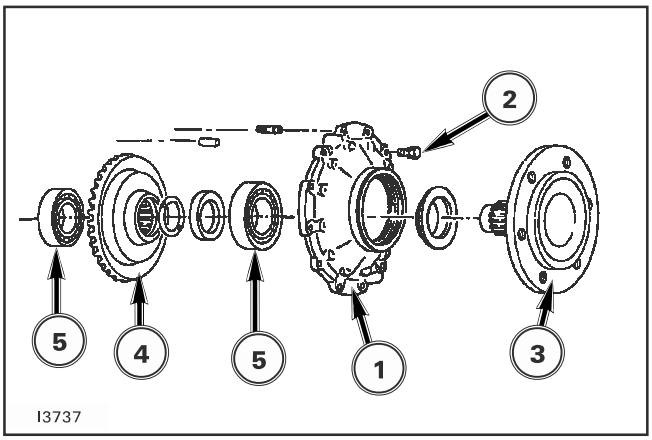


FIG. 6B-26

FIG. 6B-27: Use a suitable puller to remove gear, 2, with bearing, 1.

Remove snap ring, 3, spacer washer, 4, and cover, 6, with bearing, 5, and seal, 7.

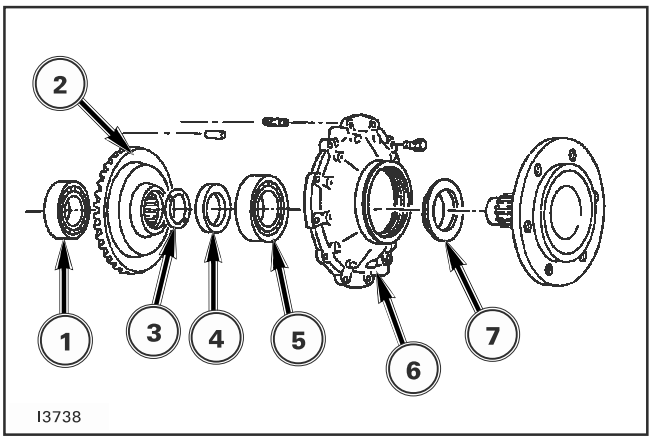


FIG. 6B-27

FIG. 6B-28: Check inner and outer bearings, 1, and replace, if they have excessive play or are rough.

Install sealant on outside of seal housing, and install seal, 2.

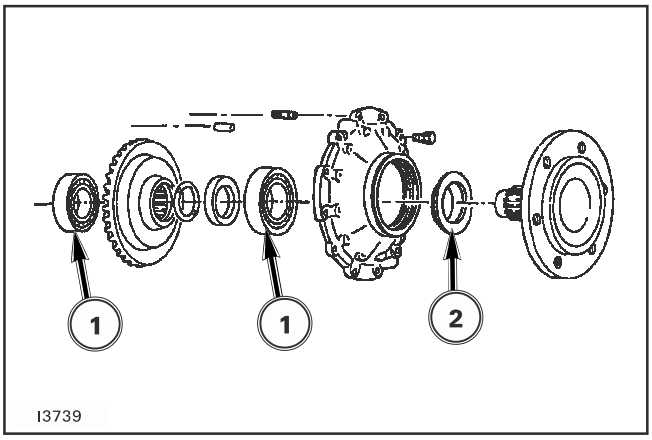


FIG. 6B-28

FIG. 6B-29: Check surface where seal seats on hub, 1.

If surface is damaged, hub will have to be replaced.

Grease inside of seal and install cover, 2, with bearing, 3, and seal, 4. Install spacer, 5, snap ring, 6, bevel gear, 7, and bearing, 8. Apply Form-a-Gasket sealant to housing, and install cover, 2, carefully on dowel pins, 10, and studs, 12.

Install bolts, 11, and torque to 18-29 Nm (14-22 ft-lbs).

NOTE: Snap ring, 6, will be a two piece snap ring when replaced on later front axles.

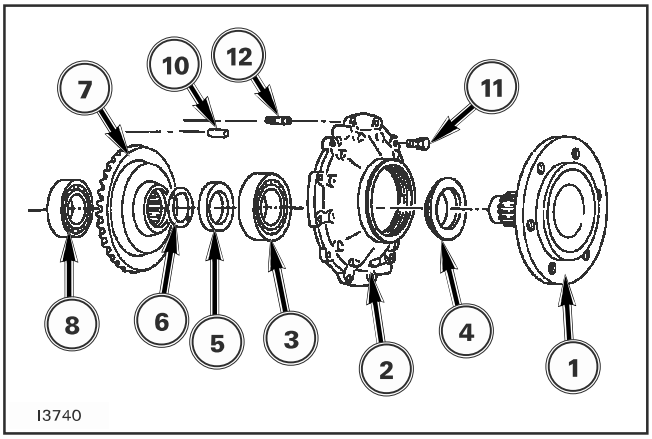


FIG. 6B-29

SPECIFICATIONS

Final reduction gears	Type	Helical gears
	Reduction ratio	5.4
Brake system	Type	Wet, multi-disc, mechanically operated
	Friction plate	
	Outer diameter	153 mm (6.02 in.)
	Thickness	3.3 - 3.5 mm (0.130 - 0.138 in.)
	Lining material	Paper base
	Lining dimensions	150x110x0.4 (t) mm [5.91x4.33x0.016 (t)]
	Involute spline	
	Large diameter	40 mm (1.58 in.)
	Small diameter	36.7 mm (1.445 in.)
	Module	1.667
	Number of teeth	22
	Number of plates	3 on each side
	Separator plate	
	Outer diameter	158 mm (6.22 in.)
	Thickness	2.41 - 2.59 mm (0.0949 - 0.1020 in.)
	Number of plates	1 on each side
	Actuator assembly	
	Installed thickness	35.9 - 36.1 mm (1.413 - 1.421 in.)
	Arm length	110 mm (4.33 in.)
	Link length	80 mm (3.15 in.)
	Total brake thickness	48.7 (1.917 in.)
	Torque pin	
	Location	90 mm (3.54 in.) from center
	Pin diameter	22 mm (0.87 in.)

BRAKE ADJUSTMENT

FIG. 7A-20: Unlatch pedals and check free-play of each brake pedal. Correct free-play, A, of each individual brake pedal is (1-1/81-9/16) 30 to 40 mm.

NOTE: Through use, free-play will increase and brake balance will be affected. Adjust and balance brakes before free-play is excessive.

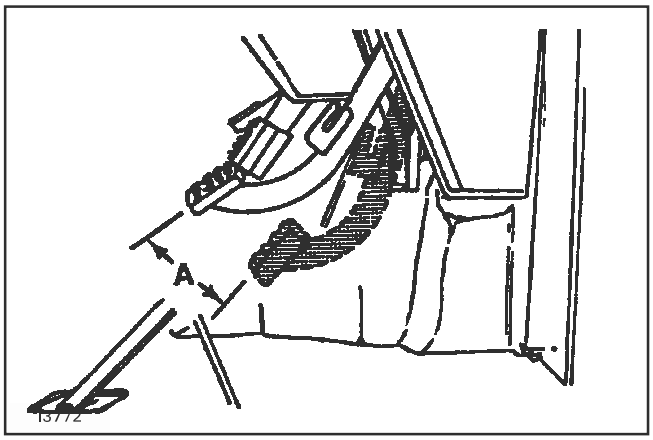


FIG. 7A-20

FIG. 7A-21: Loosen lock nut, 1 (right-hand thread) and lock nut, 2 (left-hand thread). Adjust turnbuckle, 3, so free-play is correct for respective brake pedal.

Repeat procedure for other brake so free-play in pedals is equal. Secure lock nuts against turnbuckles.

When adjustment is complete, latch pedals together and operate Tractor at low speed. Depress pedals. If Tractor has tendency to "pull" to one side, slight readjustment of one brake is required.

Make sure lock nuts are secured when brake adjustment is complete. Check operation of parking brakes after adjustment is made.

CAUTION: Brakes must be adjusted evenly to permit equal braking action at both rear wheels when brake pedals are latched together.

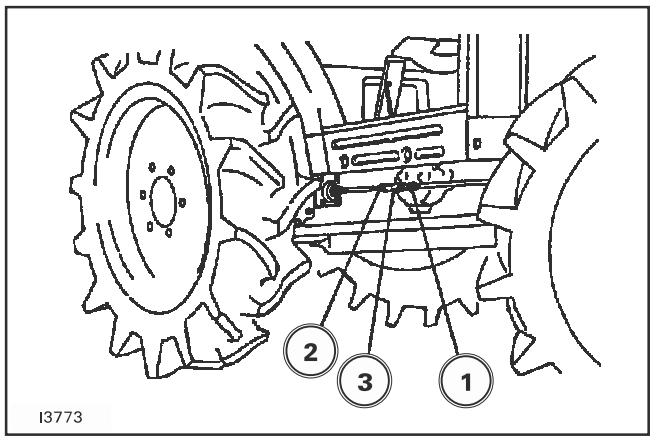


FIG. 7A-21

BRAKE ROD (ONE)

Removal and Installation

FIG. 7A-22: Remove instrument panel and cover.

Remove brake rod, 1, (right-or-left) by removing cotter pins, and pins, 2.

Reverse procedure to install new brake rod, installing washers, 3, on each pin, 2, as shown. Spread cotter pins.

Make certain pins will not catch on surrounding linkage as brakes are applied.

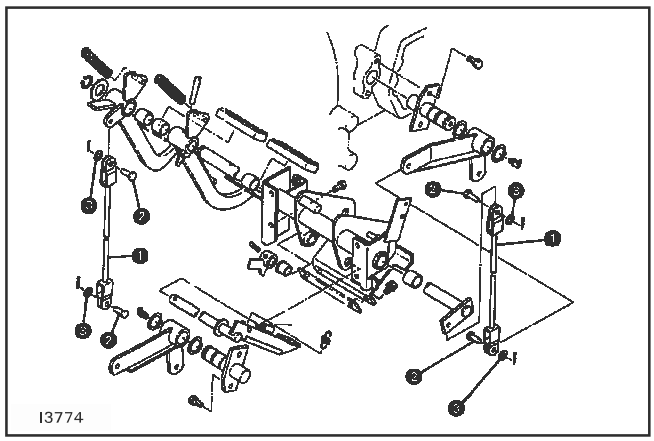


FIG. 7A-22

FIG. 8A-05: & 8A-06: Power Steering Component List

1. Valve housing
2. Pin (spool)
3. Thrust bearing
4. O-ring
5. Slipper seal
6. Pin
7. O-ring
8. Slipper seal
9. Pin
10. O-ring
11. Pin (sleeve)
12. O-ring
13. Worm
14. Ball
15. O-ring
16. Slipper seal
17. Thrust race
18. Thrust bearing
19. Thrust race
20. Front cover
21. Lock nut
22. Torsion bar
23. O-ring
24. Pin
25. Stub shaft
26. Oil seal
27. Snap ring
28. Oil seal
29. Radial ball bearing
30. Lock nut
31. Adjust screw
32. O-ring
33. Spring
34. Poppet
35. Spool
36. Bush
37. Gear case
38. Plug
39. O-ring
40. Slipper seal
41. Bleeder cap
42. Bleeder
43. O-ring
44. Side cover
45. Radial ball bearing
46. U-packing
47. Oil seal
48. Sealing lock nut
49. Sector shaft
50. Adjust screw
51. Adjustor
52. U-packing
53. Radial ball bearing
54. Bolt
55. Bolt
56. Plug

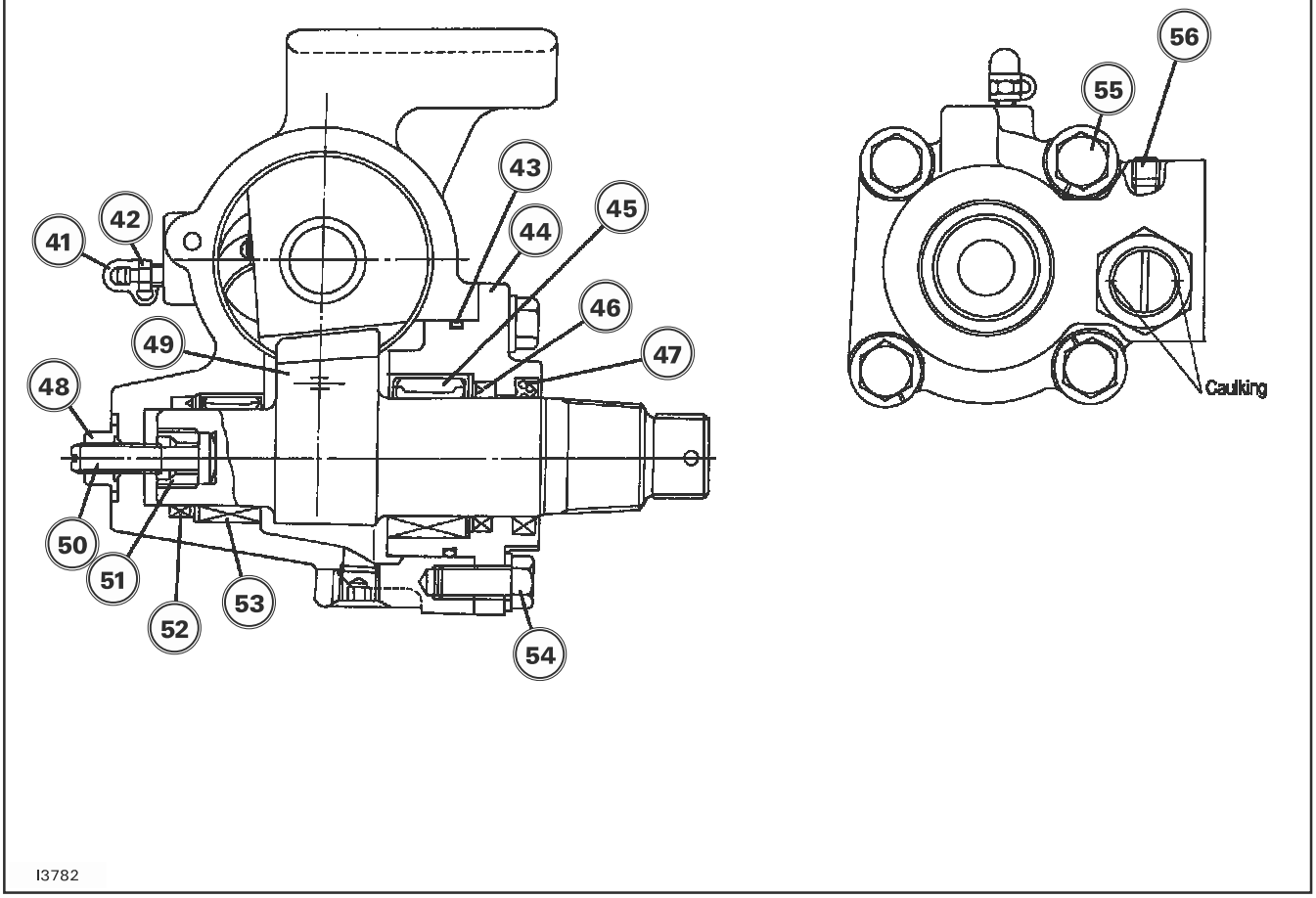


FIG. 8A-05

Inspection and Repair

Check all disassembled parts for damage and wash undamaged or usable parts in clean diesel fuel or kerosene. Inspect all parts referring to these points, and repair or replace defective parts.

FIG. 8A-23: The gear pump is originally designed so that the gears come into light contact with the side of the pump body. Maximum efficiency is attained only after sufficient break-in. Therefore some evidence of contact can be found around the intake port, 1, of a pump once used. The normal contact tracing is less than half the length of the gear housing bore and less than 0.05 mm (0.0020 in.) in width. If

1 Suction side of pump

2 Delivery side of pump

width, A, is more than 0.1 mm (0.004 in.), replace the gear pump set.

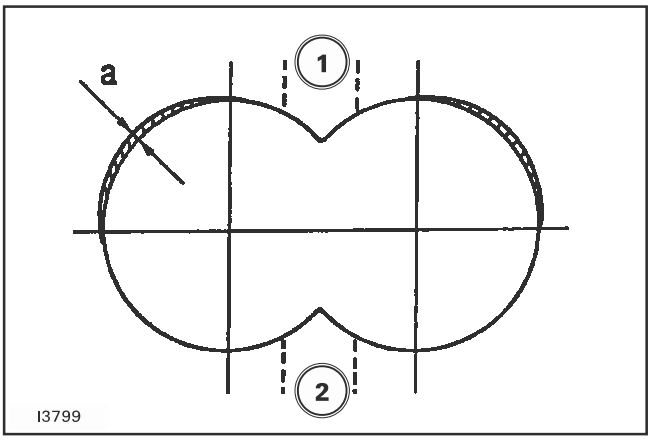


FIG. 8A-23

Pump gears A and B

FIG. 8A-24: With clean working fluid, the shaft and gear surfaces are rarely scratched and should be smooth. However, if roughness can be felt by a finger nail, they are darkened, or the shaft diameter is less than 13.88 mm (0.5465 in.), replace the gear pump set.

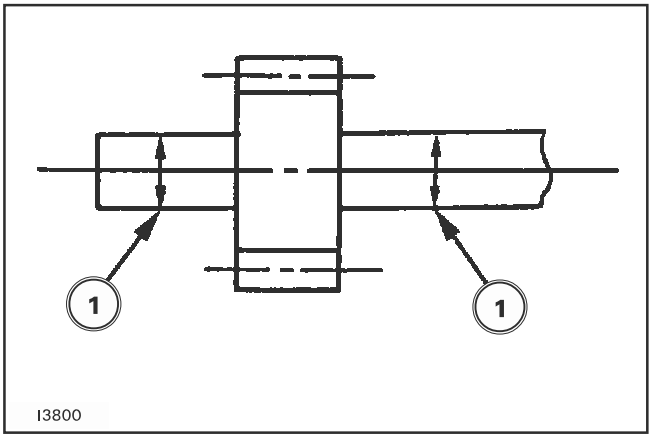


FIG. 8A-24

Bushing A and B (Supports)

If there are many scratches on the bore walls, or on parts which are in contact with the gears, which can be readily felt or when the latter parts are darkened, the gear pump set should be replaced.

O-rings

Disassembled O-rings should be replaced with new ones during reassembly.

Oil seal

FIG. 8A-25: The oil seal, 1, prevents oil leaks by its inner seal lip, 2, and dust from entering the outer dust lip, 3. Therefore if an oil seal has damaged or deformed lips, it should be replaced.

To assist with seal installation, 4 is located outside pump. Number 5 is located inside pump.

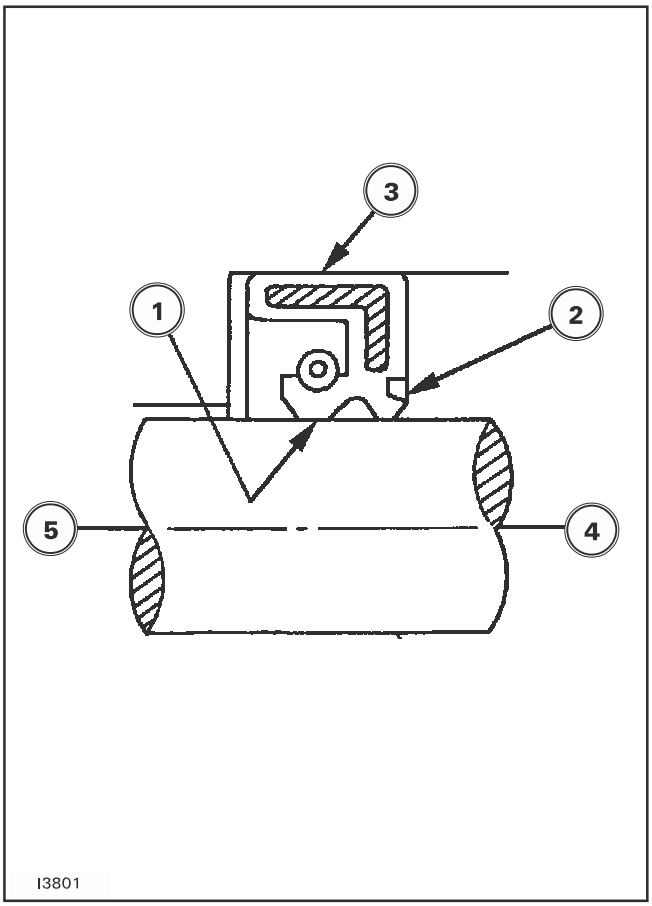


FIG. 8A-25

SPECIFICATIONS

Piston and cylinder	Lift (at lower link top end)	1300 kgf (2866.0 lbs)
Control valve	Cylinder port leaks [under a pressure of 9800 kPa (100 kgf/cm²) with gear oil of SAE 80]	5 cc (0.305 cu.in.)/min. or less
Safety valve (installed outside cylinder head)	Cracking pressure	16181 kPa (2347 psi)
	Relief Pressure	19119 kPa (1849 psi)
Relief valve (installed on RH of front transmission)	Cracking pressure	12748 kPa (1849 psi)
	Relief Pressure	14706 kPa (2133 psi)
Gear pump	Delivery (91% efficiency): litre (U.S. Qts.)/rpm	23.7 (22)
	Fluid	Permatran III or Gear oil SAE80
Suction filter	Rated flow: liter (U.S. Qts)	35 (33)/min.
	Filtration density	150-mesh
	Filtration area	754 cm² (117 sq. in.)
Line filter	Rated flow	20.5 liters/19.4 U.S. qts./min.
	Filtration density	0.01 mm (0.0004 in.)
	Filtration area	2200 cm² (341 sq.in.)

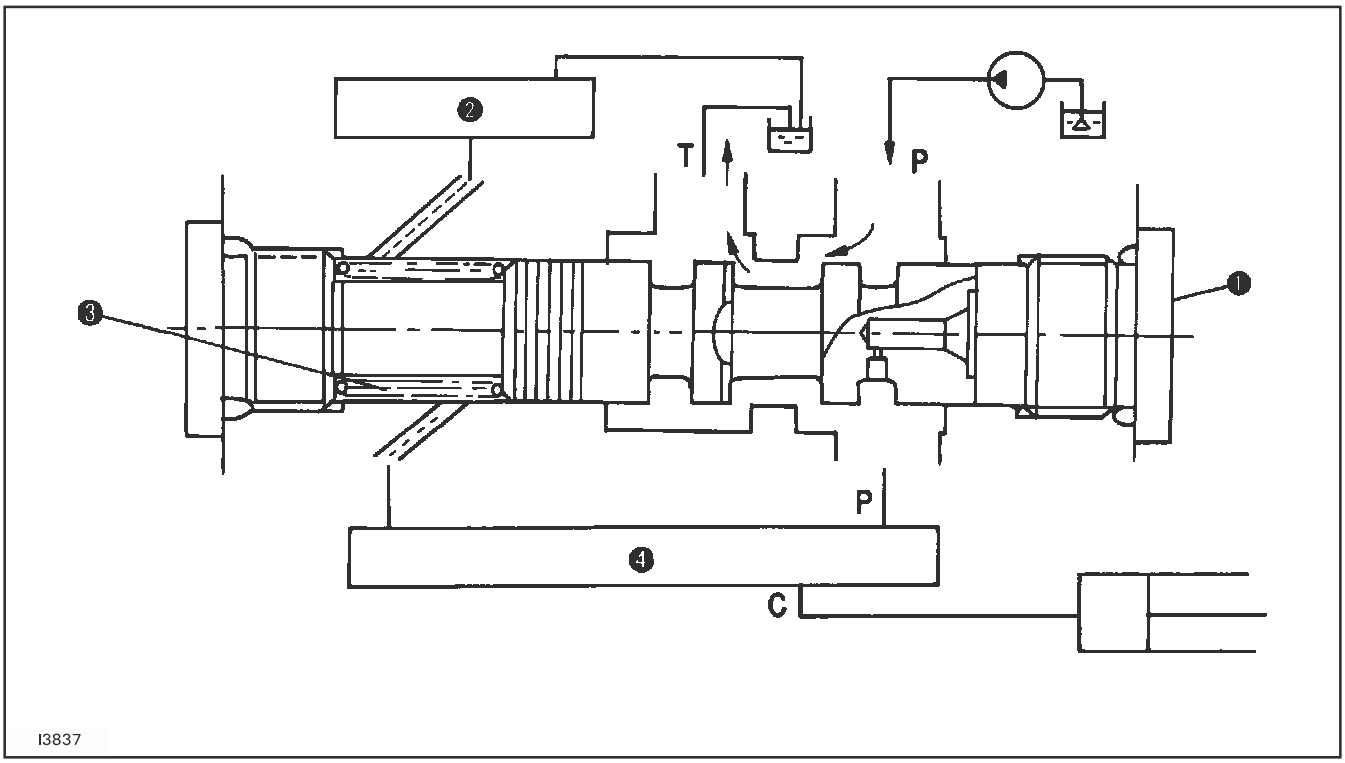


FIG. 9A-26

Unloading valve (1) (Compensator)

FIG. 9A-26: It consists of the spool and spring. While the main spool is neutral or in the lowering position, it diverts all the fluid from the pump directly to the tank. In this state, the pump delivery pressure is regulated to 7-8 kgf/cm (100-114 psi) to prevent engine power loss and fluid temperature rise.

When the main spool is set in the lifting position, it delivers the fluid whose volume is in proportion to the opening to the port-P-to-C passage and the surplus is diverted to the tank. Consequently only fluid with volume corresponding to main spool displacement is allowed into the cylinder through port C, independent from fluctuations in cylinder pushing pressure and pump delivery pressure, which making it possible to perform very subtle operations such as inching. More- over, as the pump delivery pressure never exceeds the value of cylinder pushing pressure 7 8 kgf/cm (100- 114 psi), pump power loss is minimized.

1. Valve
2. Unloading valve
3. Spring
4. Main spool

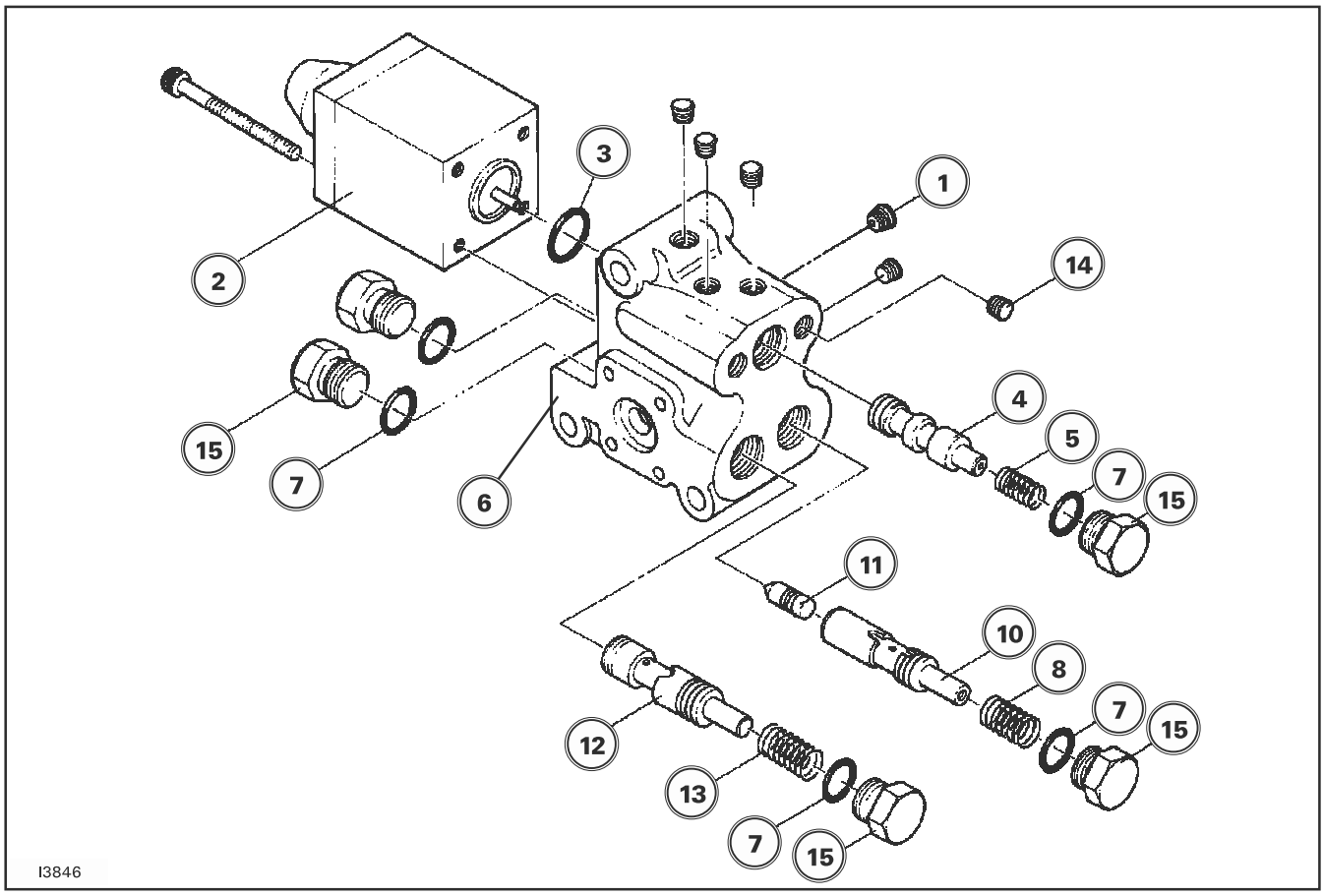


FIG. 9A-36

PTO VALVE (FLOW DIVIDER)

FIG. 9A-36: Valve Component List:

1.Orifice (choke)
2. Solenoid
3. O-ring
4. Changeover valve spool
5. Changeover valve spring
6. Casing
7. O-ring
8. Pressure-reducing spring
9. Shim (optional)
10. Pressure-reducing valve spool
11. Piston
12. Sequential valve spool
13. Sequential valve spring
14. Blank plugs
15. Plugs

FIG. 9A-37: PTO Valve (Flow divider)

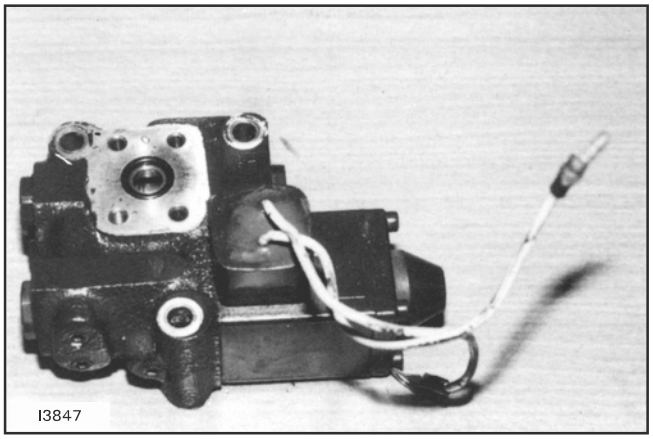


FIG. 9A-37

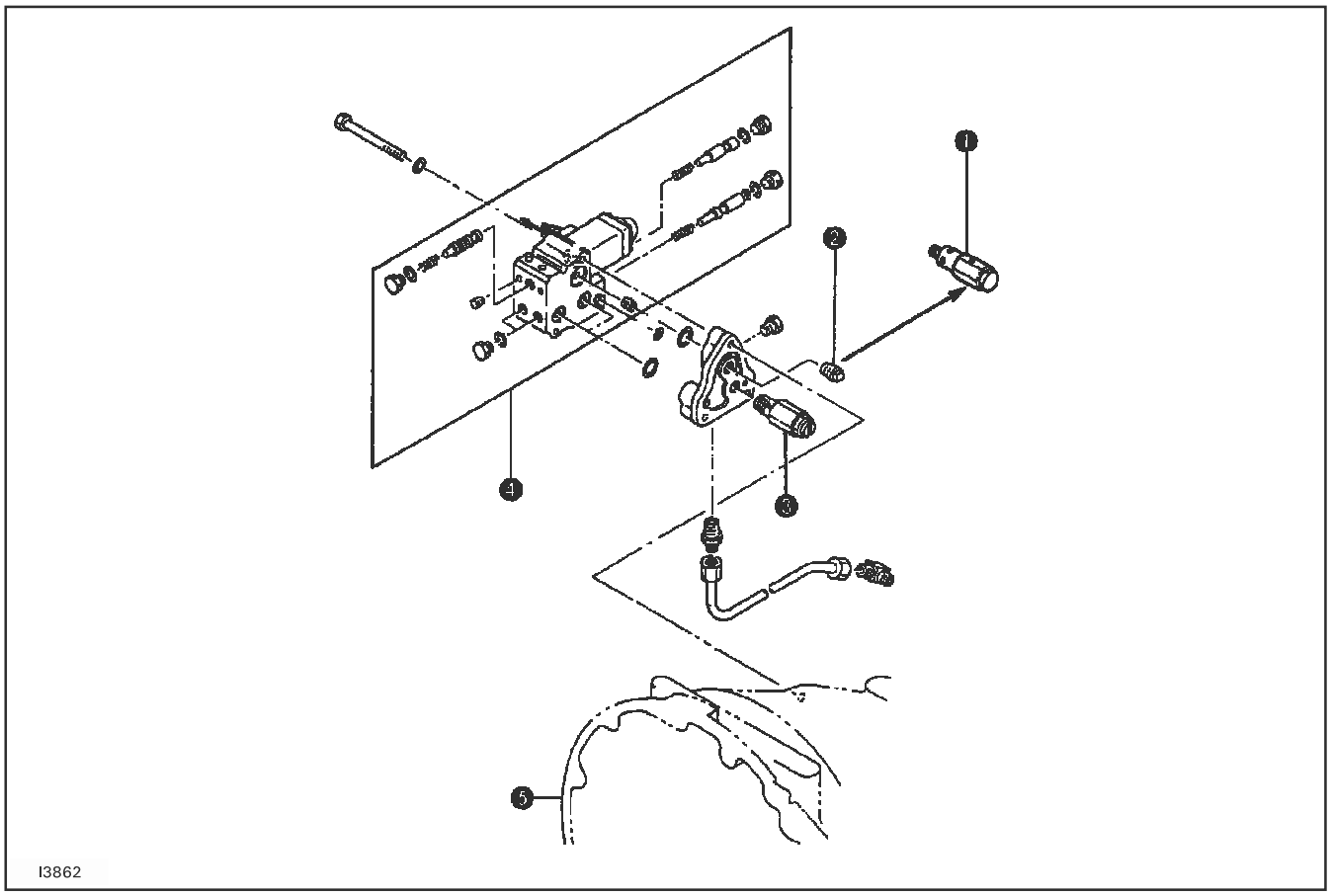


FIG. 9A-52

PRESSURE CONTROL VALVE

General Description

FIG. 9A-52: This valve is composed of the body, plunger, piston, springs, and plug. It serves to absorb shocks which are given when the PTO clutch engages.

1. Pressure control valve
2. Plug
3. Relief valve
4. Flow-divider (PTO clutch valve)
5. Front transmission case

SLOW DROP CHECK VALVE

Removal and Installation

FIG. 9A-72: The valve, 1, is threaded into cylinder head, 2.

If removed, new "O"-rings, 3, and 4, should be installed.

If oil is leaking out front of valve, seal, 5, can be replaced.

Reverse procedure to install valve, using new "O"-rings.

Tighten valve to 97-117 Nm (72-87 ft-lbs).

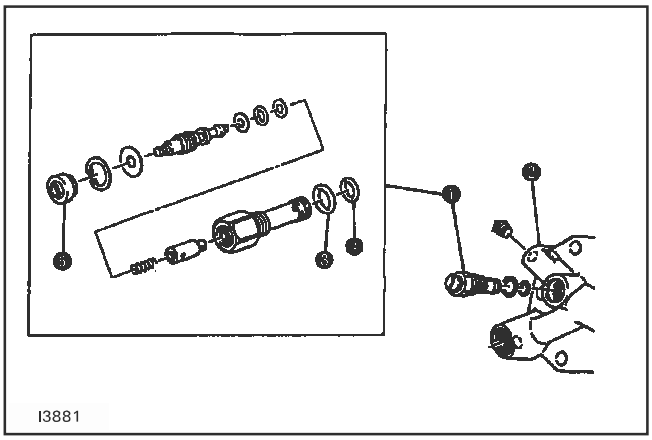


FIG. 9A-72

HYDRAULIC LINKAGE SYSTEM

Overhaul

FIG. 9A-73: Remove lift cover.

Check linkage carefully and replace any that is damaged or worn excessively.

Check adjustments.

Reinstall lift cover.

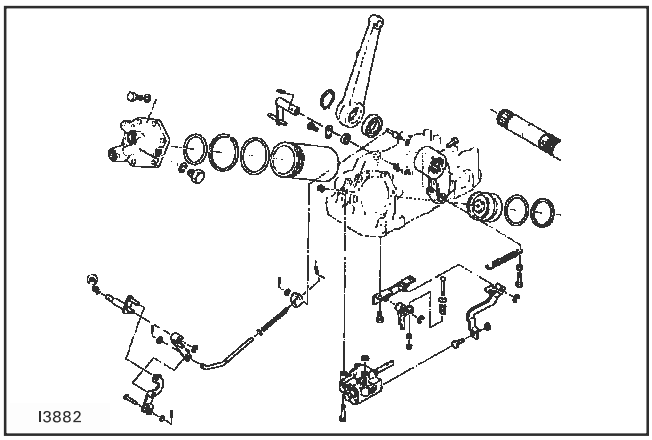


FIG. 9A-73

LIFT COVER

Replace

FIG. 9A-74: Remove lift cover.

Remove cartridge filter.

Remove lift shaft and lift crank.

Remove control valve.

Remove PTO valve and pressure control valve.

Remove hydraulic lift cover.

Reverse procedures to install parts on new lift cover.

Use only new "O"-rings and gaskets, lubricate "O"-rings prior to assembly.

Reinstall lift cover.

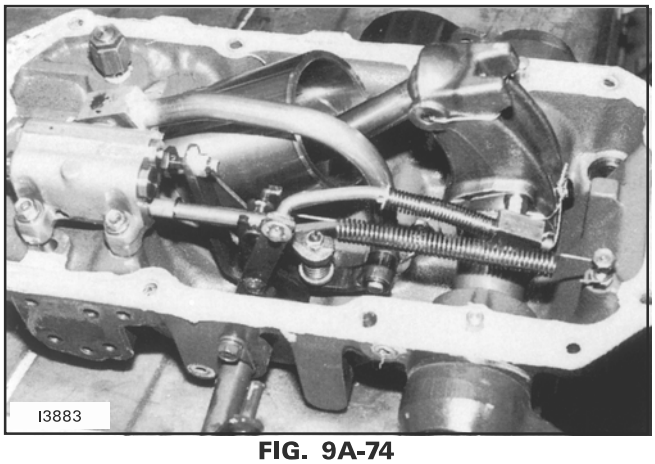


FIG. 9A-74

PISTON LIFT ROD (DOG BONE)

Removal and Installation

FIG. 9A-75: Remove lift cover.

Remove roll pin holding lift rod to crank arm.

Remove piston lift rod.

Reverse procedures to install lift rod.

Reinstall lift cover.

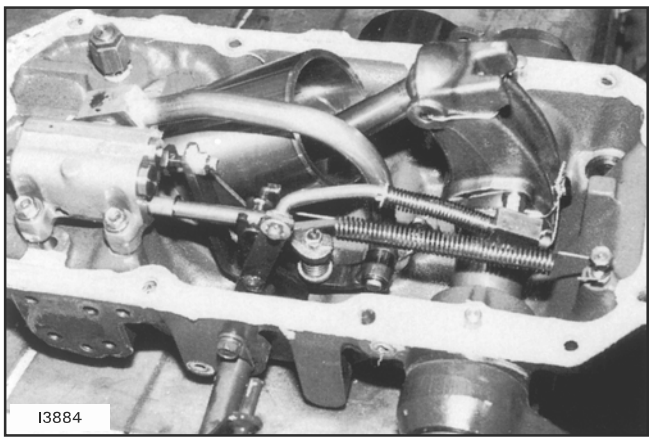


FIG. 9A-75

ELECTRICAL SYSTEM

ELECTRICAL SYSTEM 10A-3
GENERAL INFORMATION 10A-3
SPECIFICATIONS 10A-3
BATTERY 10A-4
Inspection of Electrolyte Level 10A-4
Inspection of Electrolyte Specific Gravity 10A-5
Battery Charging 10A-5
INSTRUMENT PANEL 10A-6
Removal and Installation 10A-6
TACHOMETER 10A-6
Removal and Installation 10A-6
Inspection 10A-6
FUEL GAUGE AND FUEL GAUGE SENSOR 10A-7
Removal and Installation 10A-7
Fuel Meter Inspection 10A-7
Fuel Gauge Sensor Inspection 10A-7
COOLANT TEMPERATURE GAUGE 10A-8
Removal and Installation 10A-8
Inspection 10A-8
MAIN (STARTER) SWITCH 10A-8
Removal and Installation 10A-8
Inspection 10A-8
TURN SIGNAL/HAwARD LIGHT SWITCH
PRIOR TO "g" S/N 10A-9
Removal and Installation 10A-9
Inspection 10A-9
COMBINATION SWITCH
EFFECTIVE "g" S/N 10A-11
Removal 10A-11
Inspection 10A-12
PTO SWITCH 10A-13
Removal and Installation 10A-13
LIGHT SWITCH PRIOR TO "g" S/N 10A-14
Removal and Installation 10A-14
HORN SWITCH 10A-15
Removal and Installation 10A-15
WIRING HARNESS 10A-15
Removal and Installation 10A-15
Alternator Harness 10A-17
Starter Motor Harness 10A-18
Rear Frame Harness 10A-18
Panel Front Face (Left) 10A-18
Panel Front Face (Right) 10A-18
Inside Panel Harness 10A-19
PTO Switch Harness 10A-20
Floor and Fuel Tank Harness 10A-20
Fender Harness 10A-21
Other Harness Connections 10A-21
FUSES EFFECTIVE "E" S/N 10A-22

COMBINATION SWITCH EFFECTIVE "J" S/N

Removal

Remove the meter panel.

FIG. 10A-21: Remove the light switch knob and turn signal switch lever.

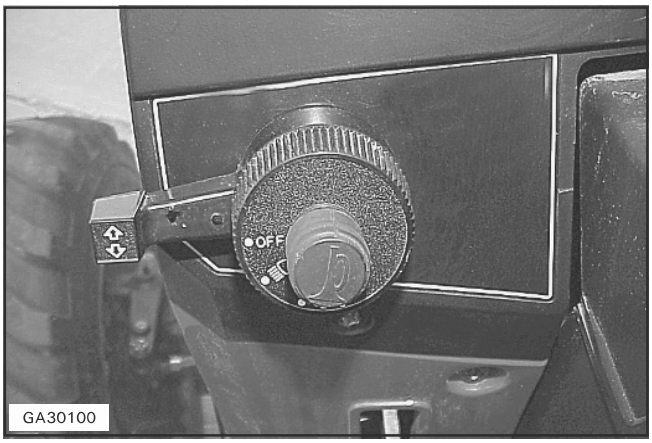


FIG. 10A-21

FIGS. 10A-22 & 10A-23: Release the ring nut with a conventional screwdriver (-) and remove the combination switch.

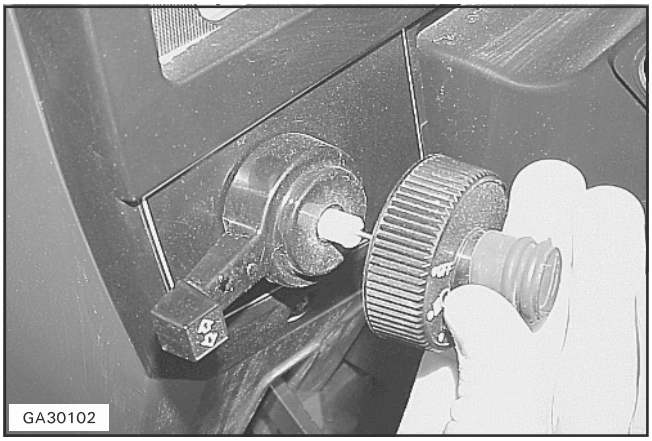


FIG. 10A-22

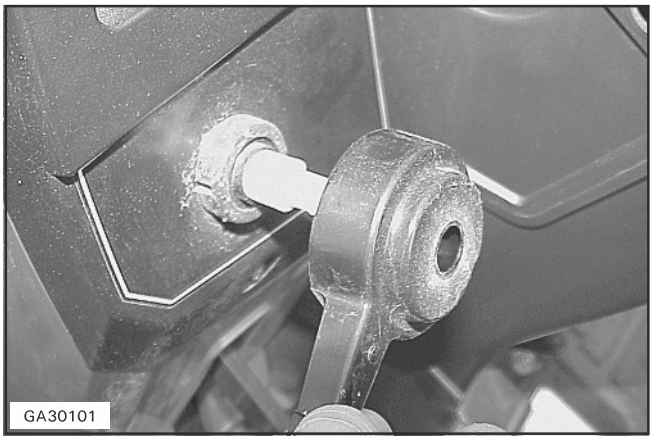


FIG. 10A-23

Fender Harness

FIG. 10A-55: Install wiring harness on fenders and clamp as shown, 1.

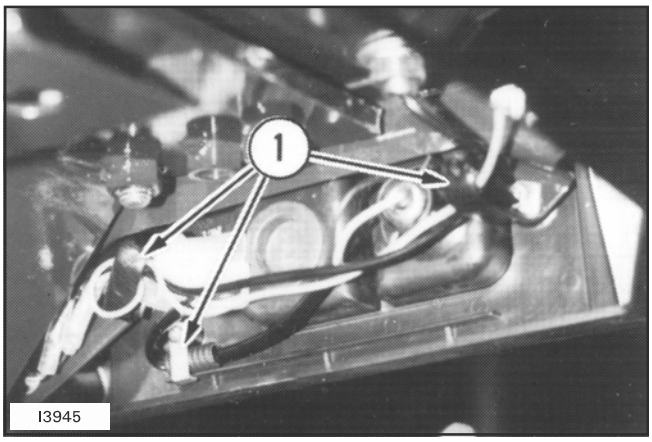


FIG. 10A-55

Other Harness Connections

FIG. 10A-56: Route the tachometer cable above the panel brace.

Position the wire harnesses for the main (starter) switch, hazard switch, parking light switch, and main beam switch under the panel brace.

Connect the coupler securely to the meter panel.

After connecting each part, check to see that each connection is secure and no possibility of being caught between other parts. Then install and tighten the instrument panel with M6 screws and washers.

NOTE: When assembling the instrument panel, it is recommended to tilt the steering wheel column to its rearward limit for easy operation.

When storing or moving the instrument panel, be sure to keep its top (fitted with the plate glass) turned upward. When it has to be turned upside down during operation, this should be limited to within 15 minutes. If not, the oil in the tachometer may leak out.

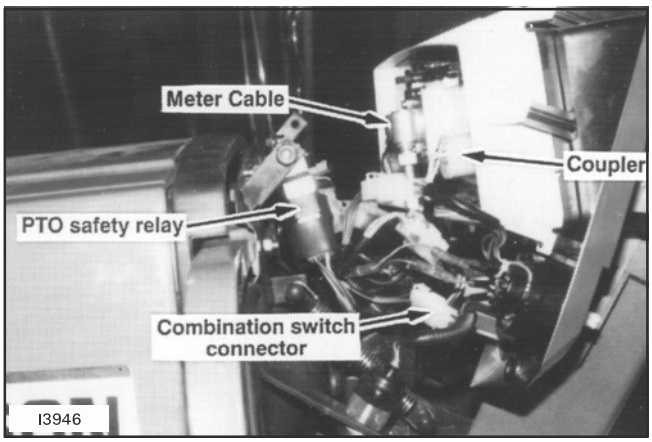


FIG. 10A-56

Glow System

Problems	Presumable Causes	Counter Measures
All glow plugs do not heat red.	Discharged battery	Check battery and charge or renew.
	Loose or defective battery cable connections	Inspect, clean, and tighten connections.
	Loose wire harness connectors	Check and ensure connectors securely engaged.
	Burnt-out fusible link	Inspect and renew. Check circuit before re-connecting power.
	Faulty wiring	Check glow plug circuit wiring and repair or renew.
	Defective main switch	Check and renew.
Individual glow plug does not glow.	Defective glow plug	Check and renew.
	Defective or corroded glow plug	Inspect, clean, or renew.
	Loose or broken wires	Inspect, secure, repair, or renew wiring.

Starting System

Problems	Presumable Causes	Counter Measures
Starter motor does not spin.	Discharged battery	Check battery and charge or renew.
	Defective safety switch	Check and renew.
	Defective main switch	Check and renew.
	Defective starter motor connections or loose battery connections	Check, clean, and tighten connections.
	Faulty starter motor	Inspect, repair, or renew.
Engine cranks slowly.	Discharged battery	Check battery and charge or renew.
	Excessive resistance in starter circuit	Check circuit connections and repair or renew faulty wiring.
	Defective starter motor	Refer to starter section.
	Tight or seized engine	Refer to engine section.

FIG. 10B-22: Check the brush springs for tension. If the tension is less than the standard value, replace the spring with a new one.

kg (lb)

	Standard
Brush spring tension	1.6-2.0 (3.5-4.4)

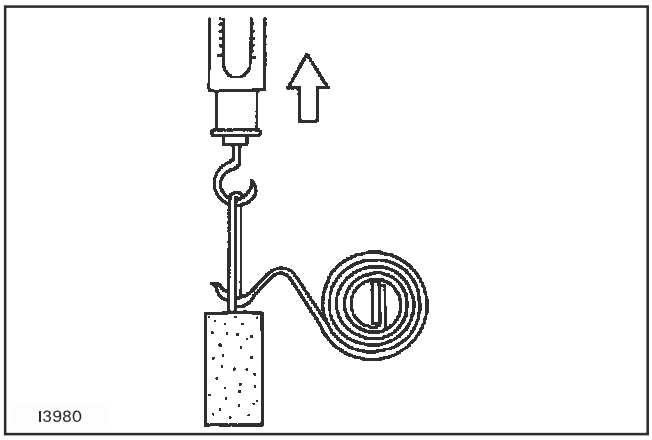


FIG. 10B-22

FIG. 10B-23: Check for normal operation of the overrunning clutch by spinning the pinion manually. The pinion should turn smoothly without any locking in direction of operation and it should be locked in reverse direction. If the pinion is abnormal, replace the pinion clutch with a new one.

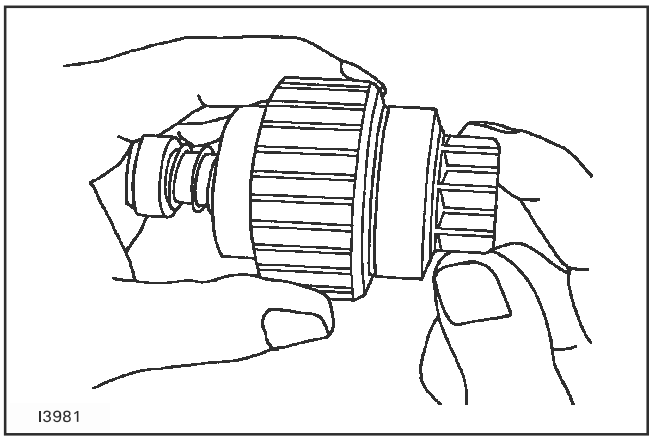


FIG. 10B-23

FIG. 10B-24: Check to see if the pinion shifts smoothly in an axial direction. If the shifting is sluggish due to flaws or rusting, correct. Too much application of grease to the pinion shaft will also cause sluggish movement.

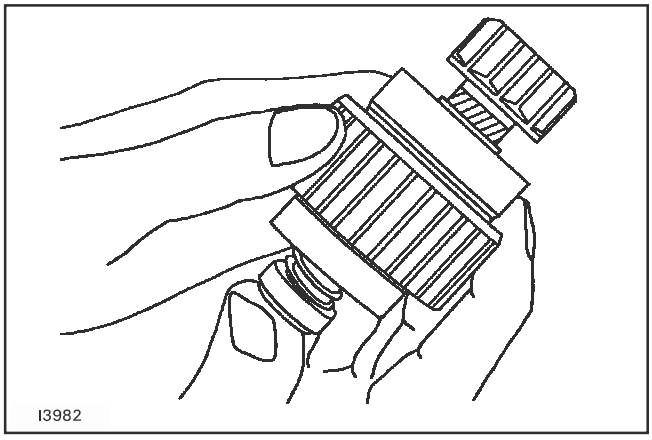


FIG. 10B-24

FIG. 10B-25: There should be no roughness when the ball bearing is turned manually while applying some axial force to the outer race with fingers.

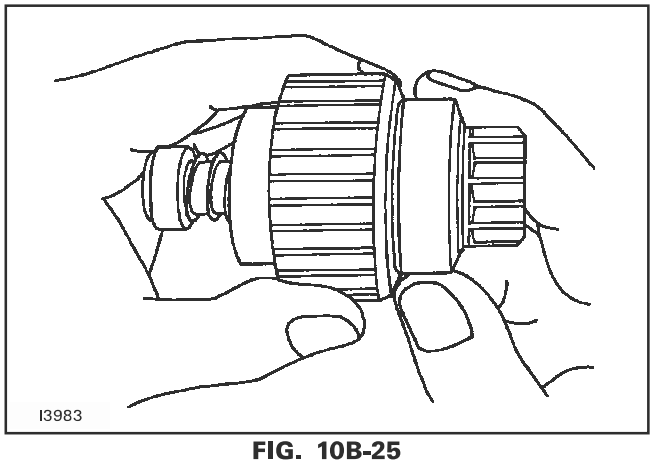


FIG. 10B-25

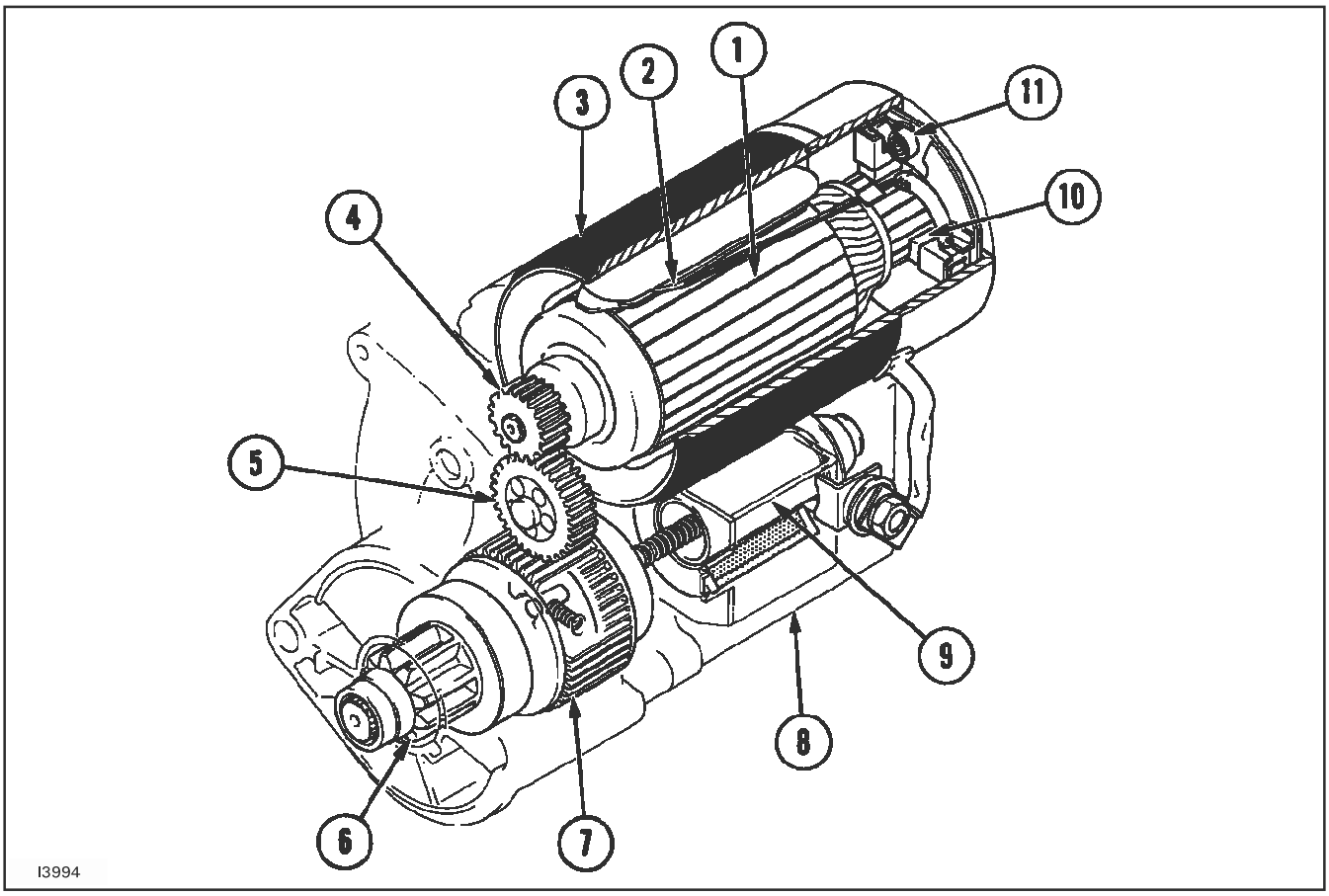


FIG. 10C-01

FIG. 10C-01: Component list:

1. Armature
2. Field Coil
3. Yoke
4. Drive Gear
5. Idler Gear
6. Pinion Gear
7. Over-running Clutch
8. Magnetic Switch
9. Plunger
10. Brush
11. Brush Spring

ALTERNATOR

SPECIFICATIONS **10D-03**

ALTERNATOR **10D-03**
Removal and Installation 10D-03
Overhaul 10D-04
Inspection and Servicing 10D-07
Reassembly 10D-09

REGULATOR **10D-09**
Removal and Installation 10D-09
IC Regulator Testing 10D-10

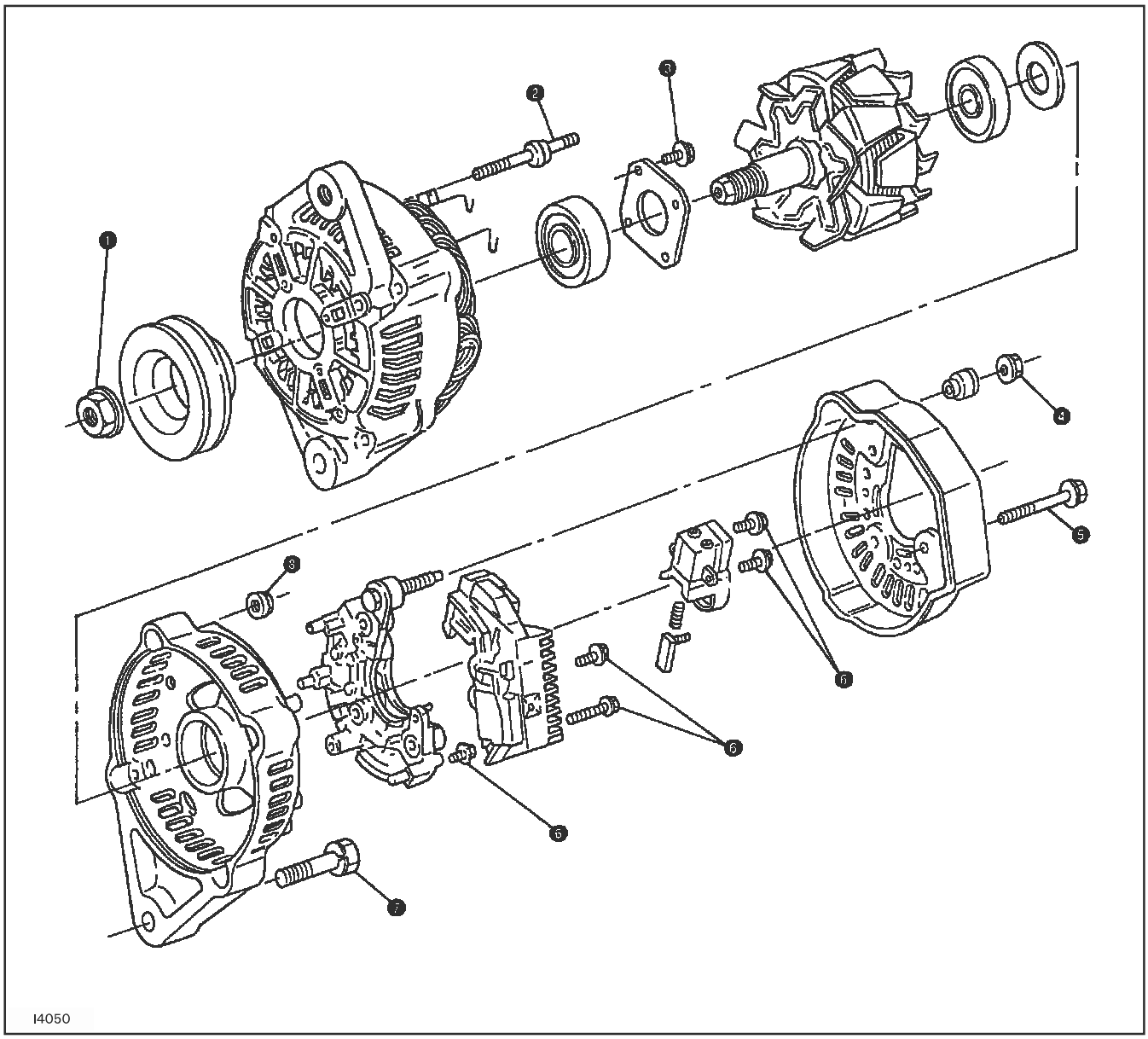


FIG. 10D-26

FIG. 10D-26: Alternator Torques

1. Pulley Nut - 58-83 Nm (43.02-61.46 ft-lbs)
2. Through Studs - 6.8-8.6 Nm (5.06-6.36 ft-lbs)
3. Retainer Plate Bolts - 2.06-3.13 Nm (1.52-2.31 ft-lbs)
4. End Nuts - 3.2-4.9 Nm (2.39-3.62 ft-lbs)
5. End Bolts - 2.06-3.13 Nm (1.52-2.31 ft-lbs)
6. Regulator and Diode Bolts - 1.57-2.35 Nm (1.16-1.74 ft-lbs)
7. End Bolts - 3.63-5.39 Nm (2.68-3.98 ft-lbs)
8. End Nuts - 3.63-5.39 Nm (2.68-3.98 ft-lbs)

OPERATION OF PTO SOLENOID

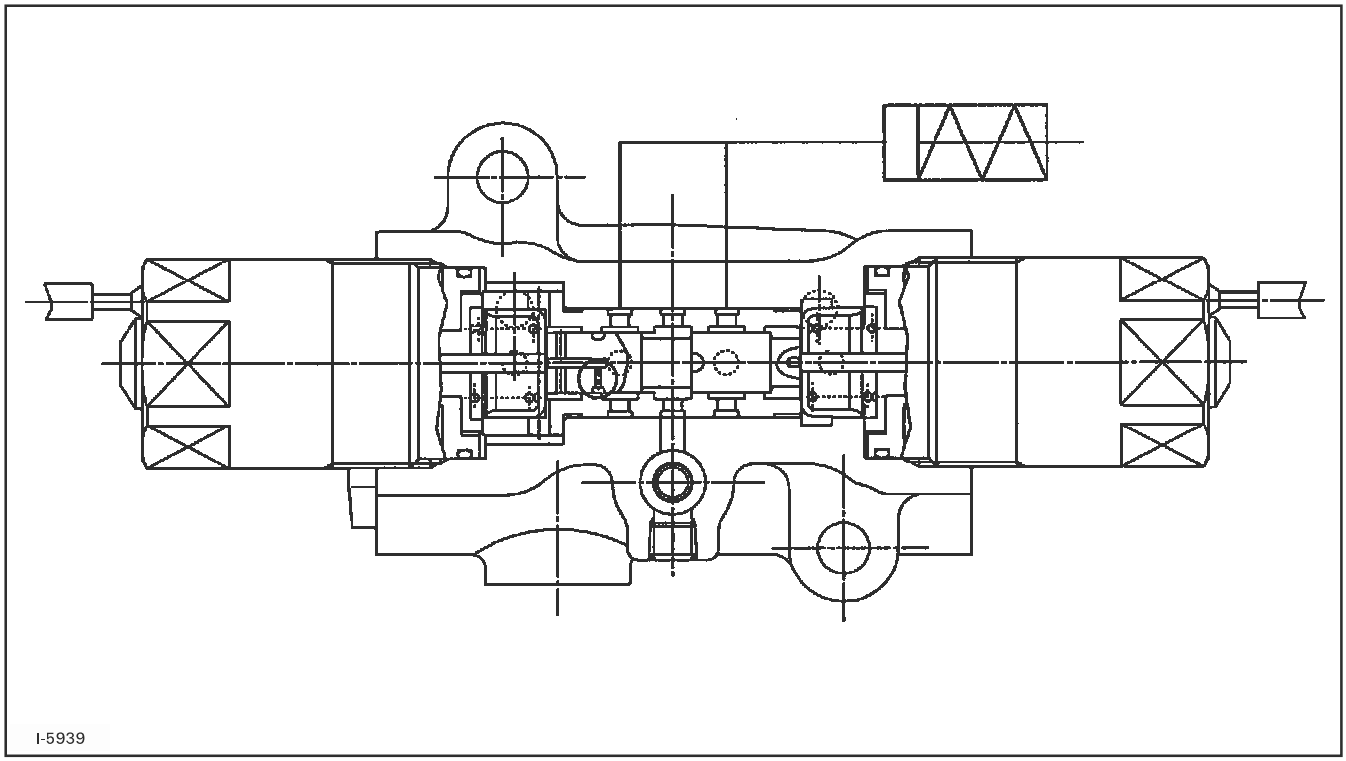


FIG. 5C-09

FIG. 5C-09: This solenoid valve turns on and off the PTO output by engaging the clutch smoothly without shock by controlling the flow and pressure of the fluid whose pressure is regulated at a constant level by the reducing valve to the PTO clutch.

The fluid regulated by the reducing valve flows to port P of the solenoid valve. While the solenoid valve is in neutral, no fluid flows to the clutch.

When the solenoid on "SOL a" side is energized by the signal from the timer unit, spool, 1, shifts to the right and fluid flows to port, B, which is connected to port A. The flow from port B interconnected with port A brings about half clutch engagement because part of the fluid escapes to the drain port through orifice, 2, in spool, 1, relevant to port A when clutch discs are met to each other by means of the clutch piston.

NOTE: $Kgf/cm^2 \times 14.223 = psi$

MF1260 HST, ST40 HST MODEL

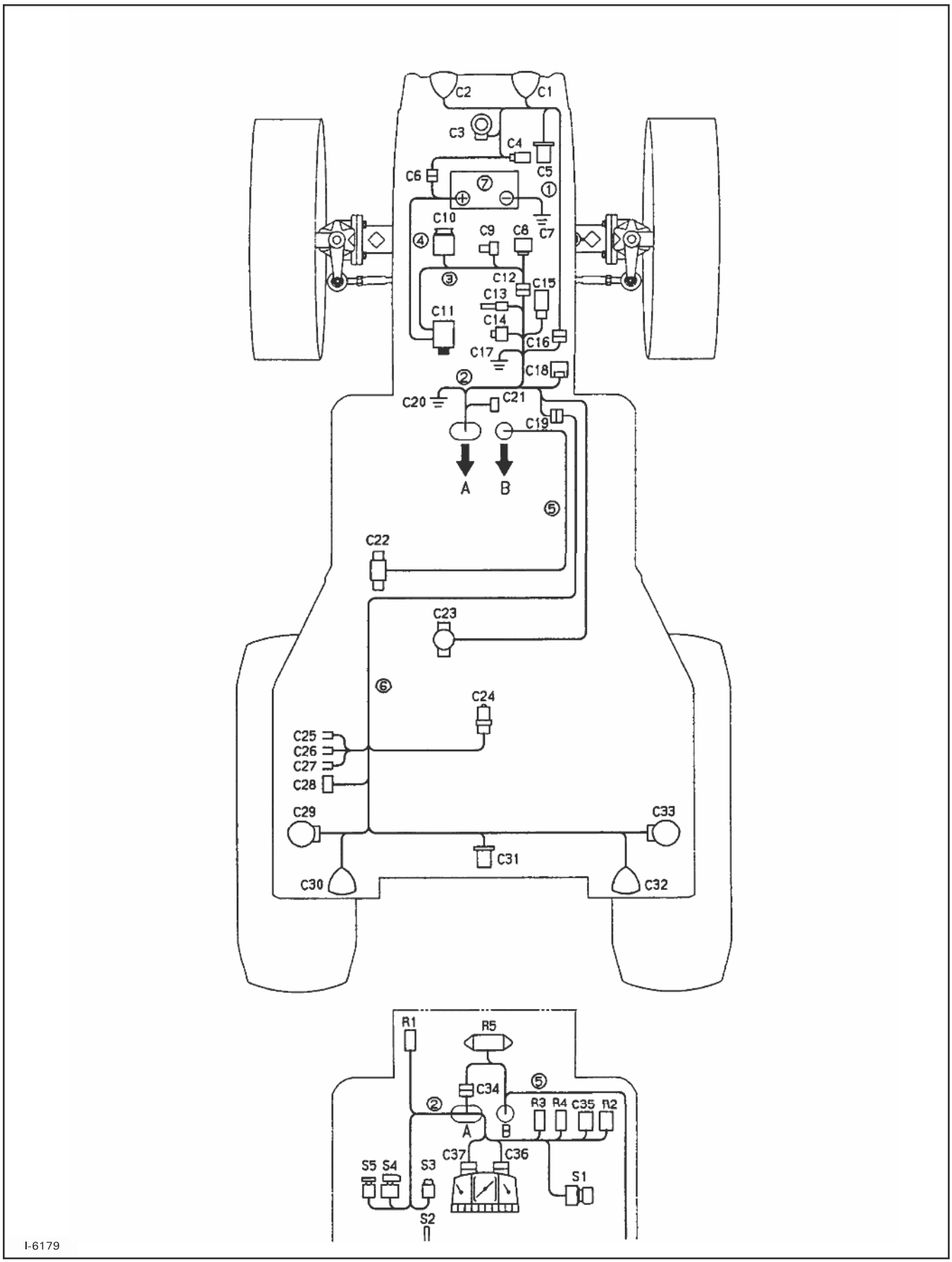
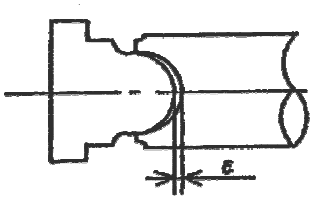
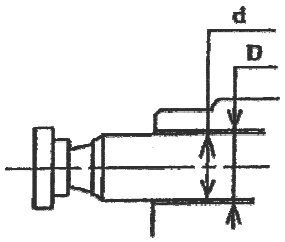
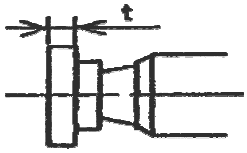


FIG. 5C-18

ALLOWABLE LIMIT OF WEAR

Check the components. If measurement is less than the allowable limit, replace.

No.	Parts name	Inspection item	Factory Spec.	Allowable limit
1	Piston Assembly	a. Clearance between piston and piston slipper: ε 	0.01 ~ 0.15mm	ε < 0.4 mm
		b. Clearance between piston and cylinder block δ = D- d 	0.02 mm	δ < 0.03 mm
		c. Thickness of the piston slipper: t 	Pump 3.0 mm Motor 4.0 mm	 t < 2.9 mm t < 3.9 mm
		d. Surface roughness of the piston slipper.	0.2 a	< 0.4 a
2	Cylinder block	Roughness of the surface contacted to the valve plate.	0.2 a	< 0.4 a
3	Valve plate	Roughness of the surface contacted to the Cylinder block.		
4	Pump thrust plate	Roughness of the surface contacted to the piston assembly.		
5	Motor swashplate	Roughness of the surface contacted to the assembly.		

CAUTION: Before assembling;

Wash the parts with the flushing oil, and blow with the clean air.

Take care not to damage the part, or stick dust to the parts.

When reassembling, replace oil seals, O-rings and gasket.

Tighten bolts and screws to specified torque.

Apply lithium grease to oil seals and O-rings.