SAFETY FIRST

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

DANGER : Immediate hazards which WILL result in severe personal injury or death.

WARNING : Hazards or unsafe practices which COULD result in severe personal injury or death.

CAUTION : Hazards or unsafe practices which COULD result in minor personal injury.

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

■ **NOTE** : Gives helpful information.

SAFETY SERVICING AND REPAIRING

(1) Before working on the machine :
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement or mower to the ground.
- Stop the engine, and remove the spark plug cap and the key.
- Disconnect the battery's ground cable.
- Clean the work area and machine.

(2) Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.

(3) Do not wear a necktie, scarf, necklace, loose or bulky clothing when you work near machine tools or moving parts.

(4) Use tools appropriate to the work. Makeshift tools, parts, and procedures will not make good repairs.

(5) When servicing is performed together by two or more persons, take care to perform all work safely.

(6) Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.

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SPECIFICATIONS

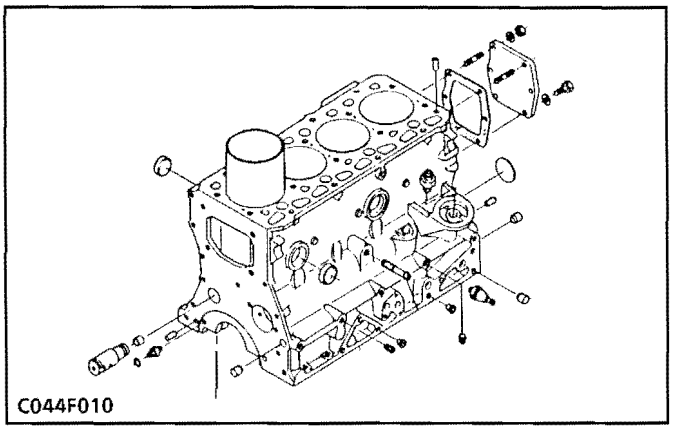
Model			M7580 (4WD) (ROPS)	M7580 (4WD) (CABIN)
P.T.O. power (Factory observed)			72 HP (53.7 kW)*1 70 HP (52.2 kW) *2 71 HP (53.0 kW)*3	
Engine	Model		V4302-A	V4302-AQ
	Type		Direct injection, vertical, water-cooled, 4-cycle diesel	
	Number of cylinders		4	
	Total displacement		4329 cm³ (264.2 cu.in.)	
	Bore and stroke		105 x 125 mm (4.13 x 4.92 in.)	
	Net power/rpm (Rated engine speed)		77 HP (57.4 kW)/2400 rpm	
	Maximum torque		275 N·m (28 kgf·m, 203 ft-lbs.)	
	Battery		12 V, 200 Ah	
	Fuel		Diesel fuel No. 1-D [below – 10°C (15°F)] Diesel fuel No. 2-D [above – 10°C (15°F)] (ASTM-D975)	
	Fuel tank capacity		105 ℓ (27.7 U.S.gal., 23.1 Imp.gal.)	
	Engine crankcase capacity		16.3 ℓ (4.3 U.S.gal., 3.59 Imp.gal.)	
	Engine coolant capacity		14.5 ℓ (3.83 U.S. gal., 3.19 Imp.gal.)	
Dimensions	Overall length		3926 mm (154.6 in.)	
	Overall width (Minimum tread)		2010 mm (79.1 in.)	
	Overall height		2624 mm (103.3 in.)	
	Wheel base		2300 mm (90.6 in.)	
	Tread	Front	1540 to 1740 mm (60.6 to 68.5 in.)	
		Rear	1520 to 2020 mm (59.8 to 79.5 in.)	
	Minimum ground clearance		470 mm (18.5 in.)	
	Crop clearnace		560 mm (22.0 in.)	
Weight			3100 kg (6834 lbs.)	3370 kg (7429 lbs.)
Travelling system	Tire size	Front	11.2 – 24 6PR, 12.4 – 24 6PR, 12.4 – 24 8PR, 13.6 – 24 8PR	
		Rear	18.4 – 30 6PR, 16.9 – 34 6PR, 18.4 – 34 6PR, 15.5 – 38 6PR	
	Clutch		Dry, Single plate [325 mm (12.8 in.)]	
	Steering		Full hydrostatic power steering, load reaction type	
	Transmission oil capacity		50.0 ℓ (13.2 U.S.gal., 11.0 Imp.gal.)	
	Transmission		Full synchromesh. 12 forward and 12 reverse	
	Brake	Travelling	Wet type, multiple discs (hydraulic)	
		Parking	Wet, discs	
	Minimum turning radius (with brake)		3.3 m (10.8 ft)	
	Differential		Bevel gears (with differential lock)	
Hydraulic system	Hydraulic control system		Position, draft and mix control	
	Total pump capacity		112 ℓ/min. (29.6 U.S.gal./min., 24.6 Imp. gal./min.)	
	Three point hitch		Category Ⅱ	
	Maximum lifting force		2635 kg (5809 lbs.) at lower link end 2093 kg (4615 lbs.) at 610 mm (24 in.) behind lifting point	
	System pressure		19.61 MPa (200 kgf/cm², 2845 psi)	
	Remote hydraulic control		Two remote valves and quick couplers	
	Max. hydraulic flow at remote outlet		80 ℓ/min. (21.1 U.S.gal./min., 17.6 Imp.gal./min.)	
	Remote hydraulic system pressure		18.14 MPa (185 kgf/cm², 2631 psi)	
P.T.O.	Independent clutch		Wet, multiple plates (hydraulic)	
	Live P.T.O.	Direction of turning	Clockwise, viewed from tractor rear	
		P.T.O. speed	6 spline shaft 540 rpm (9 r/s)/ Engine 2035 rpm (33.9 r/s)	
Traction system			Swing drawbar, adjustable in direction	

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[2] ENGINE BODY

(1) Cylinder Block

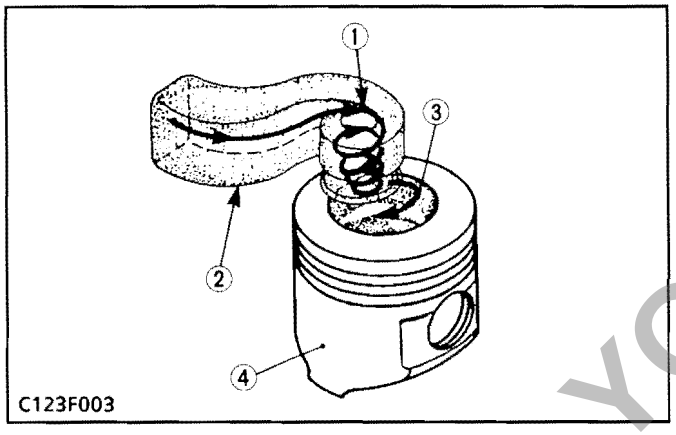

C044F010

The cylinder block is made of cast iron, containing dry liners.

The crankshaft is supported by the crankshaft bearings and the bearing cases.

Furthermore, dry-type cylinder liners pressed into the cylinders allow effective cooling, less distortion and greater wear-resistance.

(2) Cylinder Head



C123F003

The cylinder head is made of high performance cast iron which can resist high temperature and pressure caused by combustion.

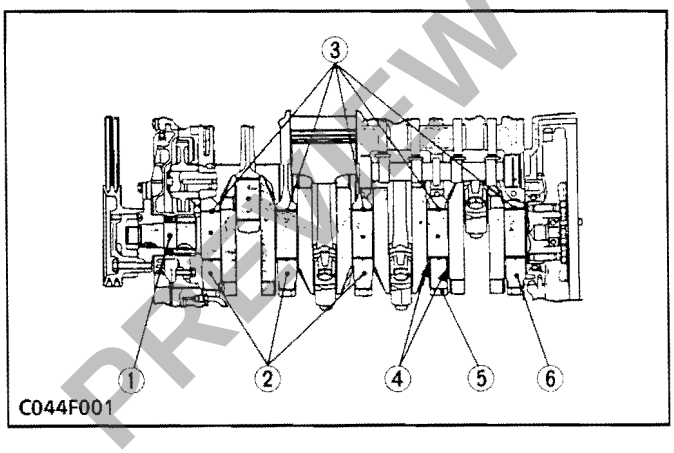
The cylinder head, in which injection nozzles and glow plugs are installed, has the air intake ports, gas exhaust ports and water jacket surrounding the valve system.

The intake port of a cylinder head is made to have helical shape which accounts for forcing to create swirl of intake air.

The V4702-T has a mark **"HT"** on the cylinder head to discriminate against the V4702

(1) Swirls
(2) Intake Port
(3) Cavity
(4) Piston

(3) Crankshaft and Bearings



C044F001

The crankshaft is a chrominum-molybdenum steel forging. Its journals, pins and oil seal sliding surfaces are induction hardened to increase wear resistance.

The crankshaft journal is supported by the main bearing case having a bearing inside. At the both sides of the forth main bearing case (5), thrust bearings (4) are installed. The crankshaft bearings and thrust bearings are plated with a special alloy to increase the wear resistance.

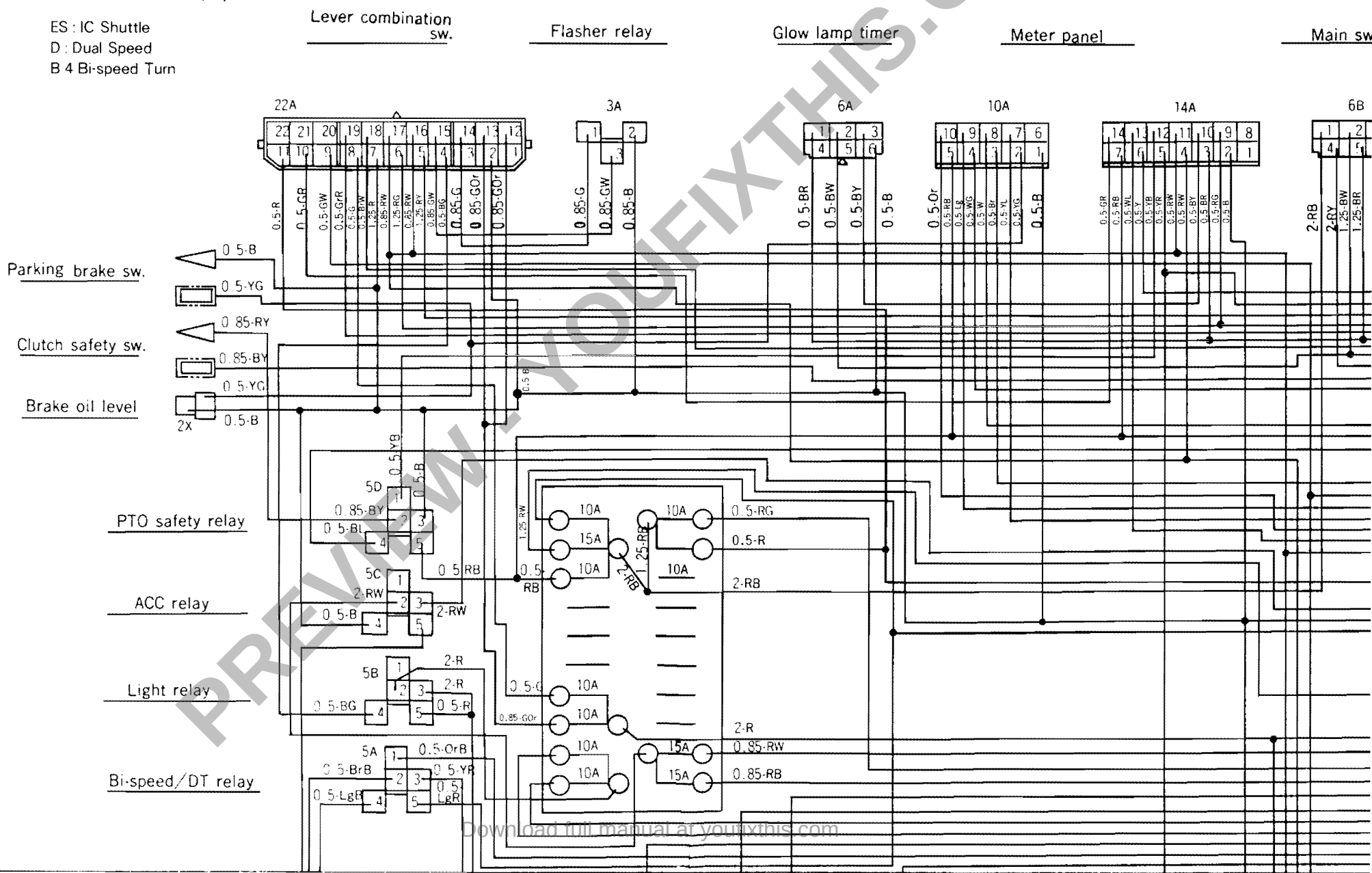
(1) Crankshaft
(2) Main Bearing Case
(3) Crankshaft Bearing
(4) Thrust Bearing
(5) Main Bearing Case
(6) Main Bearing Case

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M7580DT-ES (B)
M8580DT-ES (B)
M9580DT-DES (B)

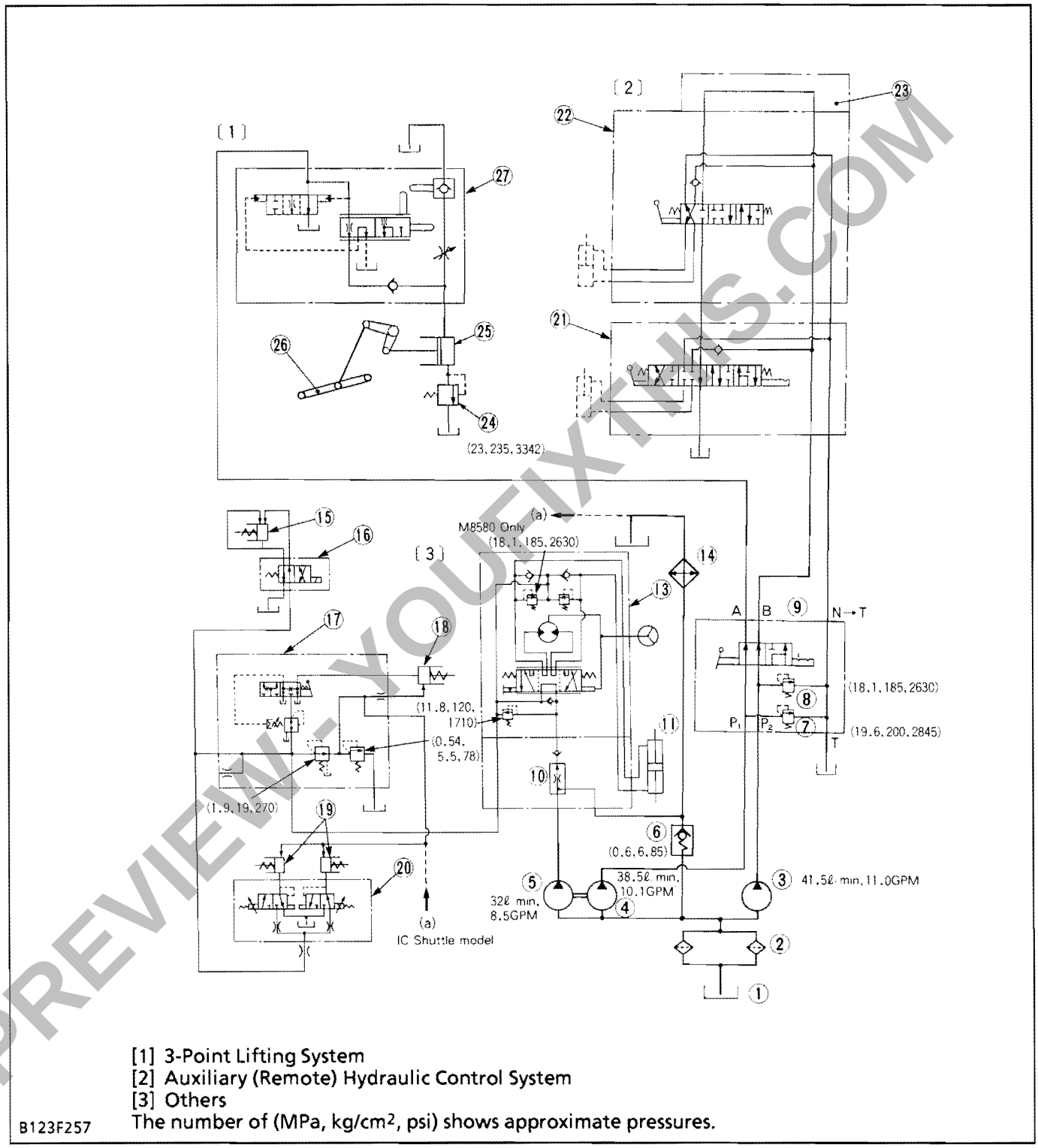
ES : IC Shuttle
D : Dual Speed
B 4 Bi-speed Turn



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[1] HYDRAULIC OIL CIRCUIT

(1) Hydraulic Oil Circuit of M7580·M8580



[1] 3-Point Lifting System
[2] Auxiliary (Remote) Hydraulic Control System
[3] Others
The number of (MPa, kg/cm², psi) shows approximate pressures.

B123F257

(1) Transmission Case
(2) Oil Filter
(3) Hydraulic Pump (for auxiliary control valve)
(4) Tandem Pump (for 3-point hitch, etc.)
(5) Tandem Pump (for power steering)
(6) Relief Valve for Lubricating
(7) Relief Valve
(8) Relief Valve
(9) Flow Dividing Valve
(10) Flow Priority Valve
(11) Steering Cylinder
(12) Steering Wheel
(13) Steering Controller
(14) Oil Cooler
(15) Dual Speed Clutch (Dual Speed Model)
(16) Dual Speed Control Valve (Dual Speed Model)
(17) PTO Clutch Valve
(18) PTO Clutch
(19) Shuttle Clutch (IC Shuttle Model)
(20) Proportional Valve (IC Shuttle Model)
(21) Double Acting Auxiliary Control Valve (floating)
(22) Double Acting Auxiliary Control Valve (standard)
(23) Cover
(24) Cylinder Safety Valve
(25) Hydraulic Cylinder
(26) 3-Point Hitch
(27) Control Valve for 3-Point Hitch

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TROUBLE-SHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No Fuel	Replenish fuel	S.G-3
	• Air in the fuel system	Bleed air	S.1-47
	• Water in the fuel system	Change fuel and Repair or Flush fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Clean or Replace	S.G-15
	• Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil	S.G-3
	• Fuel with low cetane number	Use the specified fuel	S.G-3
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	S.1-13, 15
	• Incorrect injection timing	Adjust	S.1-20
	• Injection nozzle clogged	Clean	S.1-46
	• Injection pump malfunctioning	Repair or Replace	S.1-20
	• Fuel feed pump malfunctioning	Repair or Replace	–
	• Seizure of crankshaft, camshaft, piston, cylinder liner or bearing	Repair or Replace	S.1-26 to 28, 34 to 41
	• Compression leak from cylinder	Replace head gasket, Tighten cylinder head screws glow plug and nozzle holder	S.1-16, 18
	• Improper valve seal alignment, valve spring broken, valve seized	Repair or Replace	S.1-31, 32
	• Improper valve timing	Correct or Replace timing gear	S.1-24
	• Piston ring and liner worn	Replace	S.1-27, 36
	• Excessive valve clearance	Adjust	S.1-17
(Starter Does Not Run)	• Battery discharged	Charge	S.9-9 to 12
	• Starter malfunctioning	Repair or Replace	S.9-21, 22
	• Starter relay malfunctioning	Replace	S.9-16
	• Starter switch malfunctioning	Repair or Replace	S.9-13
	• Wiring disconnected	Connect	S.9-16
Engine Revolution Is Not Smoothly	• Fuel filter clogged or dirt	Clean or Replace	S.G-15
	• Air cleaner clogged	Clean or Replace	S.G-13, 18
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	S.1-13, 15
	• Injection pump malfunctioning	Repair or Replace	S.1-20
	• Incorrect nozzle opening pressure	Adjust	S.1-45, 46
	• Injection nozzle stuck or clogged	Repair or Replace	S.1-46
	• Fuel over flow pipe clogged	Clean	–
	• Governor malfunctioning	Repair	–
Either White or Blue Exhaust Gas Is Observed	• Excessive engine oil	Reduce to the specified level	S.G-7
	• Piston ring and liner worn or stuck	Repair or Replace	S.1-27, 36
	• Incorrect injection timing	Adjust	S.1-20
	• Deficient compression	Adjust top clearance	S.1-29
	• Unsuitable fuel used	Use the specified fuel	S.G-3
	• Turbocharger oil leak on the turbine or compressor side	Repair or replace the turbocharger	S.1-48

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[3] LUBRICANTS AND FLUID

To prevent serious damage to hydraulic systems, use only specified fluid or its equivalent.

No.	Locations		Capacities	Lubricants
1	Fuel	M7580 M8580	105 ℓ (27.7 U.S. gal) (23.1 Imp.gal)	No.2-D diesel fuel No.1-D diesel fuel if temperature is below – 10 °C (14 °F)
		M9580	120 ℓ (31.7 U.S. gal) (26.4 Imp.gal)	
2	Coolant	M7580 M8580	14.5 ℓ (3.8 U.S. gal) (3.19 Imp.gal)	Fresh clean water with anti-freeze
		M9580	14.1 ℓ (3.7 U.S. gal) (3.1 Imp.gal)	
3	Engine crankcase (with filter)		16.3 ℓ (17.2 U.S. qts.) (14.3 Imp.qts.)	● Engine oil: API Service CC or CD (CD for M9580) Below – 23 °C (– 10 °F) SAE 5W or 5W-20 – 23 to 0 °C (– 10 to 32 °F) SAE 10W or 10W-30 0 to 25 °C (32 to 77 °F) SAE 20 or 10W-30 Above 25 °C (77 °F) SAE 30 or 10W-30 ● MIL-L46152 or MIL-L2104C
4	Trans-mission oil	M7580 M8580	50 ℓ (52.9 U.S. qts.) (44.0 Imp.qts.)	The oil used to lubricate the transmission is also used as hydraulic fluid. To insure proper operation of the hydraulic system and complete lubrication of the transmission, it is important that a multi-grade transmission fluid be used in this system. The following are recommended oils, by brand name, that may be used in the transmission hydraulic system. ● Multi-grade transmission fluid Atlantic Richfield Arco Tractor Fluid Chevron Tractor Hydraulic Fluid Exxon Torque Fluid 56 Penzoil Hydra-Trans and Wet Br. Phillips H. T. Fluid Shell Donax TD.TT, TM Texaco T. D. H. Oil Union Hydraulic / Tractor Fluid Valvoline Uni-Trac Gulf Universal Fluid 425,350 Mobil Mobil Fluid 423
		M9580	56 ℓ (59.2 U.S. qts.) (49.3 Imp.qts.)	
5	Front axle differential case		12 ℓ (12.6 U.S. qts.) (10.6 Imp.qts.)	
6	Front wheel case (right and left)		4.6 ℓ (4.9 U.S. qts.) (4.0 Imp.qts.)	
7	Brake oil (reservoir and lines)		0.3 ℓ (0.3 U.S. qts.) (0.26 Imp.qts.)	● Kubota UDT Oil or Turbine oil 32 regular type, multipurpose straight mineral oil Mobile DTE Oil #32 TEXACO Regal Oil #32 CHEVRON-GST Oil #32 TERESSO Oil #32

8	Greasing	No. of greasing points	Capacity	Type of grease
	● Steering joint shaft	1	Until grease overflows	Multipurpose type grease
	● Front axle support	2		
	● Front wheel case support	2		
	● Top link	1		
	● Top link support	[M7580 Only] 2		
	● Lift rod (Upper right, lower right, lower left)	3		
	● Battery terminal	2	A small amount	
	● Clutch release hub	1	Grease when disassembled	

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[5] MAINTENANCE CHECK LIST

Service Interval	No.	Check points	Reference Page
Initial 50 Hours	1	Cheking clutch pedal free play	S.G-7
	2	Changing engine oil	S.G-7
	3	Changing line filter element (M9580 IC shuttle model only)	S.G-8
	4	Replacing hydraulic oil filter cartridge	S.G-8
	5	Cleaning magnetic filter	S.G-8
	6	Replacing engine oil filter cartridge	S.G-8
	7	Cleaning fuel line filter (at water separator)	S.G-9
	8	Changing transmission oil	S.G-9
	9	Changing front differential case oil	S.G-10
	10	Changing front wheel case oil	S.G-10
E very 50 Hours	11	Injection grease	S.G-11
Every 100 Hours	1	Cheking clutch pedal free play	S.G-7
	12	Checking brake pedal free play	S.G-12
	13	Checking parking brake lever travel	S.G-12
	14	Cleaning primary (Outer) air filter element	S.G-13
Every 200 Hours	2	Changing engine oil	S.G-7
	3	Changing line filter element (M9580 IC shuttle model only)	S.G-8
	4	Replacing hydraulic oil filter cartridge	S.G-8
	5	Cleaning magnetic filter	S.G-8
	15	Brake system bleeding	S.G-13
	16	Cheking toe-in	S.G-13
	17	Checking radiator hose and cap	S.G-14
	18	Checking fan belt tension	S.G-14
	19	Cleaning air filters (CAB)	S.G-14
	20	Cleaning air conditioner condenser (CAB)	S.G-15
	21	Checking air conditioner drive belt tension (CAB)	S.G-15
Every 400 Hours	6	Replacing engine oil filter cartridge	S.G-8
	7	Cleaning fuel line filter (at water separator)	S.G-9
	22	Replacing fuel filter cartridge	S.G-15

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TIGHTENING TORQUES

Tightening torques of screws and nuts on the table below are especially specified.
(For general use screws and nuts: See page S.G-4)

Section	Item	N·m	kgf·m	ft-lbs
Front Axle	Front wheel mounting nut	255.9 to 304.0	26.5 to 31.0	191.7 to 224.2
	Front bracket and rear bracket mounting screw	166.7 to 196.1	17.0 to 20.0	123.0 to 144.7
	Front bracket and rear bracket mounting nut	123.6 to147.1	12.6 to 15.0	91.1 to 108.5
	Front axle bracket mounting screw	274.6 to 318.7	28.0 to 32.5	202.5 to 235.1
	Front axle bracket mounting nut	343.2 to 402.1	35.0 to 41.0	253.2 to 296.6
	Front pump bracket mounting screw	60.8 to 70.5	6.2 to 7.2	44.9 to 52.1
	Coupling shaft mounting bolt and nut	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
Engine	Engine mounting screw and nut	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5
PTO Clutch Valve	PTo clutch valve mounting screw	48.1 to 55.9	4.9 to 5.7	10.8 to 12.6
Clutch Housing	Clutch housing mounting screw and nut 7T	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	9T	103 to 117	10.5 to 12.0	76.0 to 86.8
M9580 Mid Case	Mid Case mounting screw and nut 7T	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	9T	103 to 117	10.5 to 12.0	76.0 to 86.8
Hydraulic Cylinder Assembly	Hydraulic cylinder assembly mounting screw and nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Rear Axle	Rear wheel mounting nut	259.9 to 304.0	26.5 to 31.0	191.7 to 224.2
	Rear axle case mounting screw and nut	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5
	Rear bracket mounting bolt and nut	196.1 to 225.6	20.0 to 23.0	144.7 to 166.4
3 Point Hitch	Cross member mounting screw and nut	367.7 to 431.5	37.5 to 44.0	271.2 to 318.3
Steering	Steering wheel mounting nut	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
	Tie rod end mounting nut	156.8 to 176.4	16.0 to 18.0	115.7 to 130.1
	Hydraulic hose nut to derivery pipe	22.54 to 27.44	2.3 to 2.8	16.66 to 20.20
PTO Rear Cover	PTO rear cover mounting screw	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5
Cross Member	Cross member mounting bolt [M9580] and nut M20 Bolt	367.7 to 431.5	37.5 to 44.0	271.2 to 318.3
	M16 Nut	259.8 to 304.0	26.5 to 31.0	191.7 to 224.2
Air Conditioner Pipe	Low pressure pipe	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
	High pressure pipe	11.76 to 14.7	1.2 to 1.5	8.68 to 10.85
Cabin	Cabin mounting bolt and nut	68.6 to 88.3	7.0 to 9.0	50.6 to 65.1

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SERVICING SPECIFICATIONS

[1] EXTERNAL COMPONENTS

[2] ENGINE BODY

CYLINDER HEAD

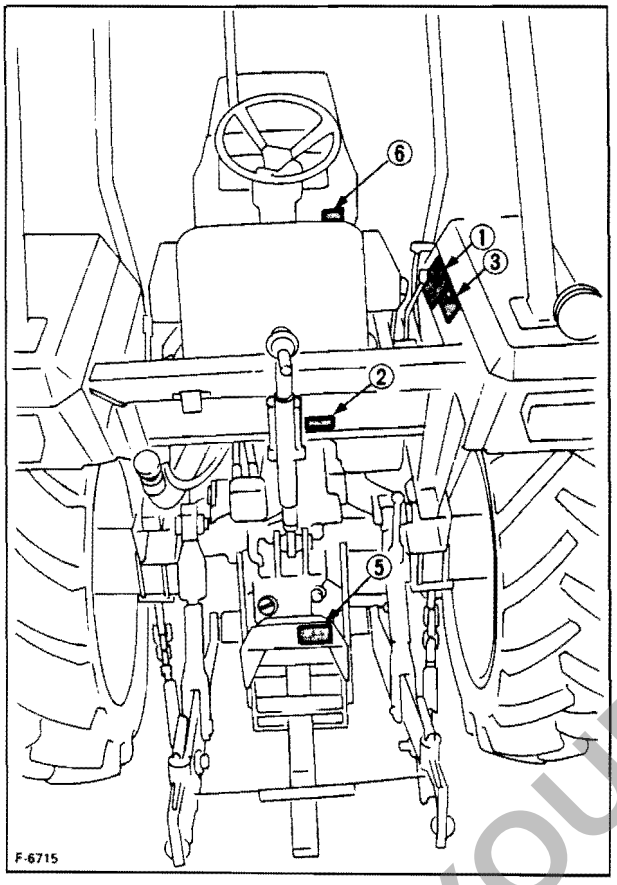
Item	Factory Specification	Allowable Limit
Cylinder Head Surface Flatness	—	0.05 mm/100 mm 0.0020 in./3.94 in.
Top Clearance	0.75 to 0.95 mm 0.030 to 0.037 in.	—
Cylinder Head Gasket Shim Thickness	0.20 mm (0.0079 in.)	—
Cylinder Head Gasket Thickness Free	1.53 to 1.66 mm 0.060 to 0.065 in.	—
Tightened	1.30 to 1.40 mm 0.0512 to 0.0551 in.	—
Compression Pressure (When cranking with starting motor)	2.94 MPa 30 kgf/cm^2 427 psi	2.16 MPa 22 kgf/cm^2 313 psi
Difference among cylinders	within 10%	—

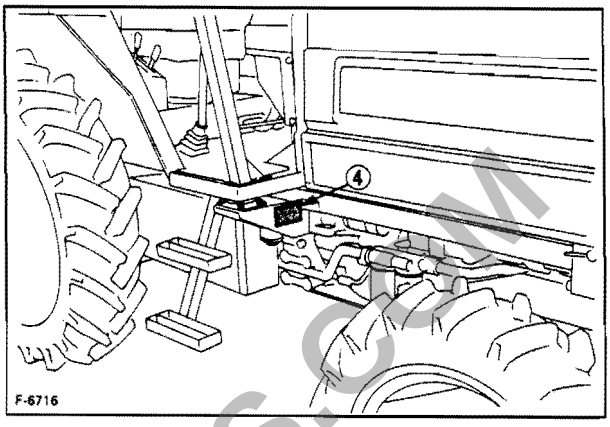
VALVES

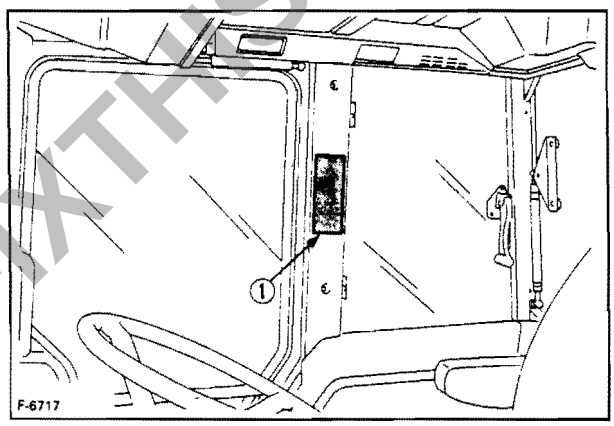
Valve Clearance	(When cold)	0.25 mm 0.0098 in.	—
Valve Seat Angle	IN.	1.05 rad. 60°	—
	EX.	0.79 rad. 45°	—
Valve Face Angle	IN.	1.06 rad. 60.5°	—
	EX.	0.794 rad. 45.5°	—
Valve Head O.D.	IN.	48.7 mm 1.92 in.	—
	EX.	41.0 mm 1.61 in.	—
Valve Recessing	IN.	0.8 to 1.2 mm 0.032 to 0.047 in.	—
	EX.	0.7 to 1.1 mm 0.028 to 0.043 in.	1.4 mm 0.055 in.
Clearance Between Valve Stem and Valve Guide		0.025 to 0.055 mm 0.00098 to 0.00217 in.	0.1 mm 0.004 in.
	Valve Stem O.D.	9.960 to 9.975 mm 0.39213 to 0.39272 in.	—
	Valve Guide I.D.	10.000 to 10.015 mm 0.39370 to 0.39429 in.	—

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B123F203

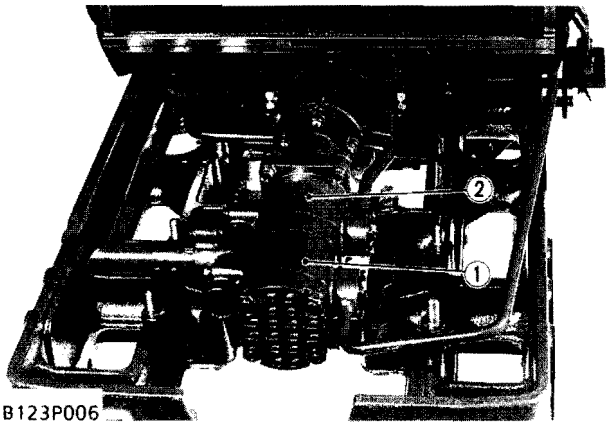
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[2] TANDEM PUMP (POWER STEERING)

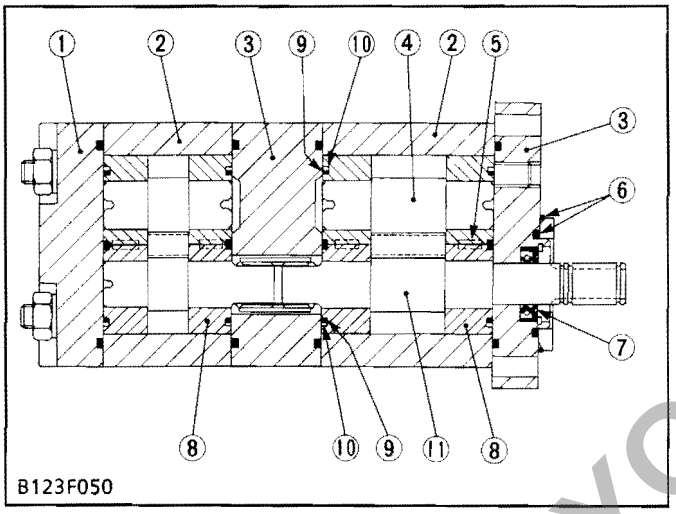


B123P006

The tandem pump for power steering pressure-feeds the oil sucked from the transmission case to the steering cylinder through the steering controller. This pressure loading type gear pump has high volumetric efficiency.

It is driven by the engine crankshaft.

(1) Tandem Pump (for power steering)
(2) Tandem Pump (for 3P and etc.)

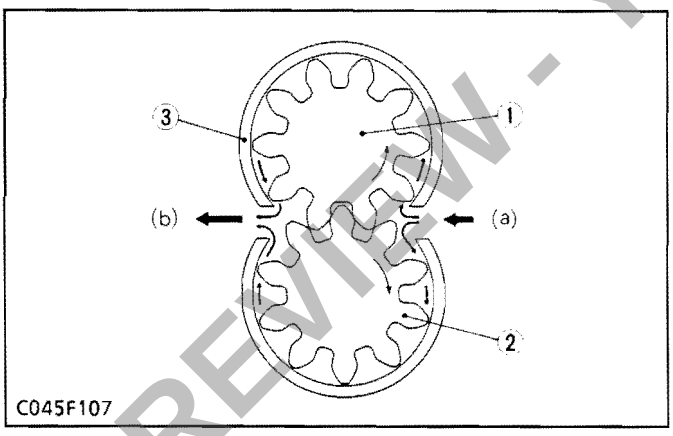


B123F050

(Reference)

- Pump discharge per revolution
  For Power steering -- approx. 12.7 cc/rev.
  (13.4 U.S.qts., 11.2 Imp. qts.)
  For 3P ---------- approx. 16.3 cc/rev.
  (17.2 U.S.qts., 14.3 Imp. qts.)

(1) Cover
(2) Housing
(3) Flange
(4) Driven Gear
(5) Key
(6) O-ring
(7) Oil Seal
(8) Bushing
(9) Seal Element
(10) Backup Element
(11) Drive Gear



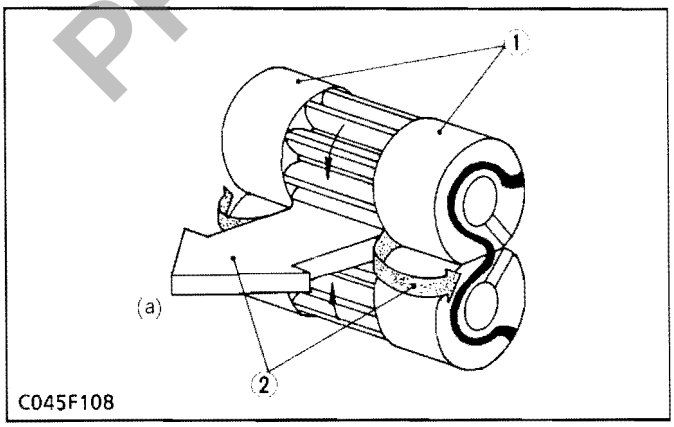
C045F107

■ Operation of Hydraulic Pump

The hydraulic pump has two meshing gears (1), (2) whose teeth run close to the casing (3). One gear is a drive gear (1) which drives the driven gear (2).

When the drive gear is driven in the direction of the arrow by the crankshaft the gears trap oil between the gear teeth and the casing. The trapped oil is carried around to the outlet. The higher the engine speed, the more the pump discharge.

(1) Drive Gear
(2) Driven Gear
(3) Casing
(a) Inlet
(b) Outlet



C045F108

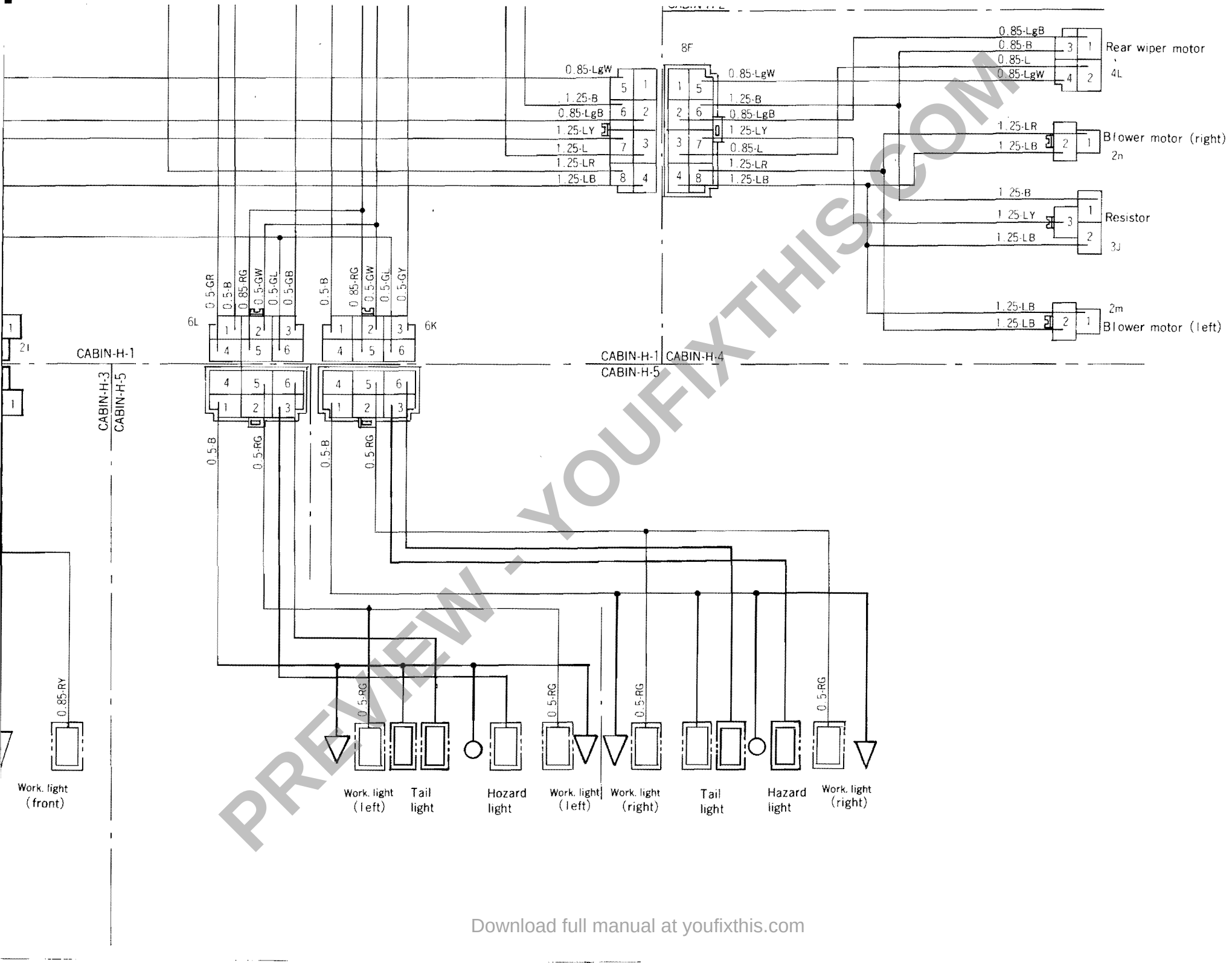
■ Pressure Loading System

The pressure loading system automatically decreases the clearance between the gear and the bushing (1). A small amount of pressure oil is fed behind the bushings, pressing them against the gears and forming a tighter seal against leakage.

Therefore, leakage from the delivery side (high pressure) to the inlet side (low pressure) does not increase even if the pressure on the delivery side increases.

(1) Bushing
(2) Loading Pressure
(a) Outlet

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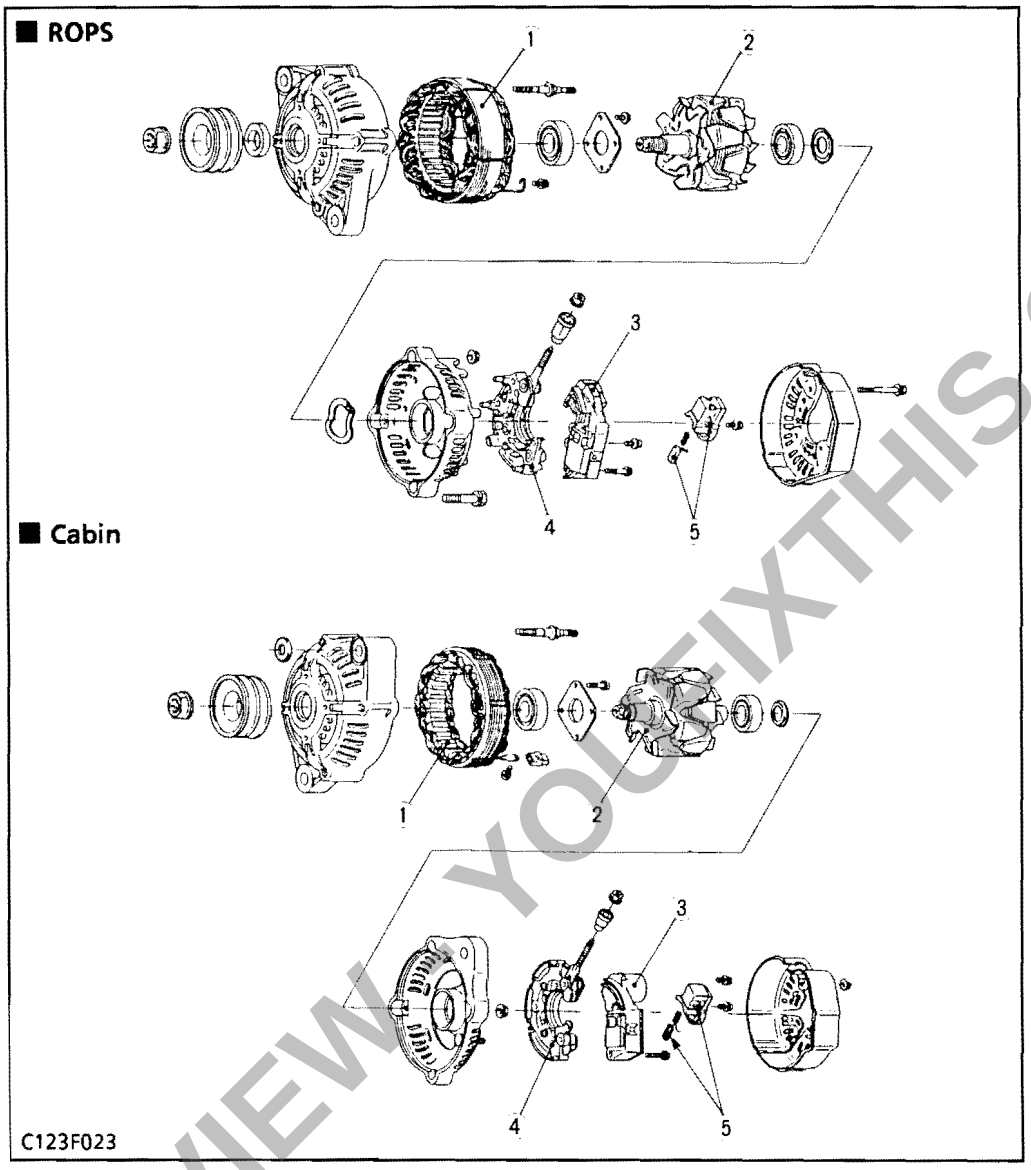


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[4] CHARGING SYSTEM

(1) Alternator



(1) Stataor
(2) Rotor
(3) I.C. Regulator
(4) Rectifier
(5) Brush Holder

This alternator is a small alternator equipped with an IC regulator and has the following features:

1. Compared with the standard alternator, this alternator is compact and lightweight, about 15 % smaller in size and about 30 % lighter in weight.
2. Its cooling property and safety have been improved by building in of the cooling fan as integrated in front of and behind the rotor.
3. An IC regulator has been built in the alternator interior.
4. Serviceability has been improved by easy detaching of the rectifier and IC regulator.
5. Environmental resistance has been improved through waterproof construction of the brush holder, painting of the rear cover, etc.

Specification of alternator is as follows.

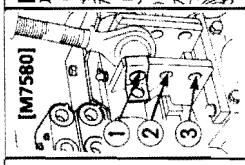
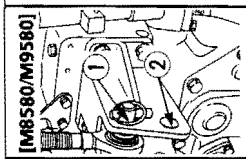
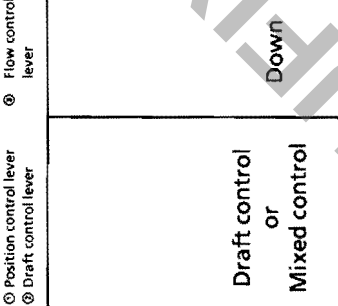
Type	Output	Alternator Revolution
mounted on ROPS	13.5 Vollts, 49 A (when cold)	less than 5000 rpm
mounted on Cabin	13.5 Vollts, 67 A (when cold)	less than 5000 rpm
	13.5 Vollts, 90 A (when cold)	less than 5000 rpm

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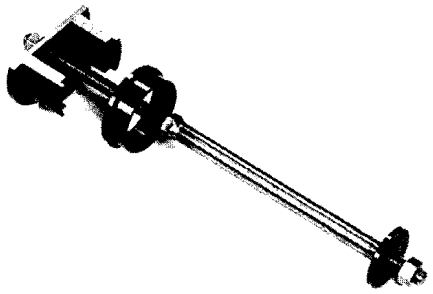
[3] HYDRAULIC CONTROL UNIT USE REFERENCE CHART

In order to handle the hydraulic unit properly, the operator must be familiar with the following. Though this information may not be applicable to all types of implements and soil conditions, it is useful for most general situations.

Implement	 B123F138 Soil Condition	[M7580]  B123F292 Top link mounting holes	[M8580/M9580]  B123F139 Top link mounting holes	 B123F081 ① Position control lever ② Draft control lever ③ Flow control lever	 B123F140 Gauge wheel	 B123F141 Check chains	Remarks
Moldboard plow: One-bottom (ordinary or rollover) ···	Light soil Medium soil Heavy soil	③ ③ ② or ③	②	Draft control or Mixed control	YES/NO	Loose	Adjust the check chains so that the implement can move 5 to 6 cm (2.0 to 2.4 in.) laterally. Check chains should be tight enough to prevent excessive implement movement when implement is in raised position.
Two-bottom (ordinary or rollover) ···	Light soil Medium soil Heavy soil	③ ② or ③ ②					
Three-bottom ·····	Light soil Medium soil Heavy soil	② or ③ ② ②					
Disc plow: Two-bottom (ordinary or rollover) ··· Three-bottom ·····	—	③ ②					
Harrower (spike,spring-tooth, disk type) ·····	—	②					
Sub-soiler ·····							
Weeder, ridger ·····	—	①	①	Position control	YES	Tighten	Hold the position control lever at the lowest position during operation.
Earthmover, digger, scraper, manure fork, rear carrier ·····				Down	YES/NO		With implements with gauge wheels, lower the position control lever all the way.
Mower (mid-and rear-mount type) Hay rake, tedder ·····					NO		
Front loader	—	—	—	Down	—	—	With attachment on 3-point hitch
				Up			Without attachment on 3-point hitch

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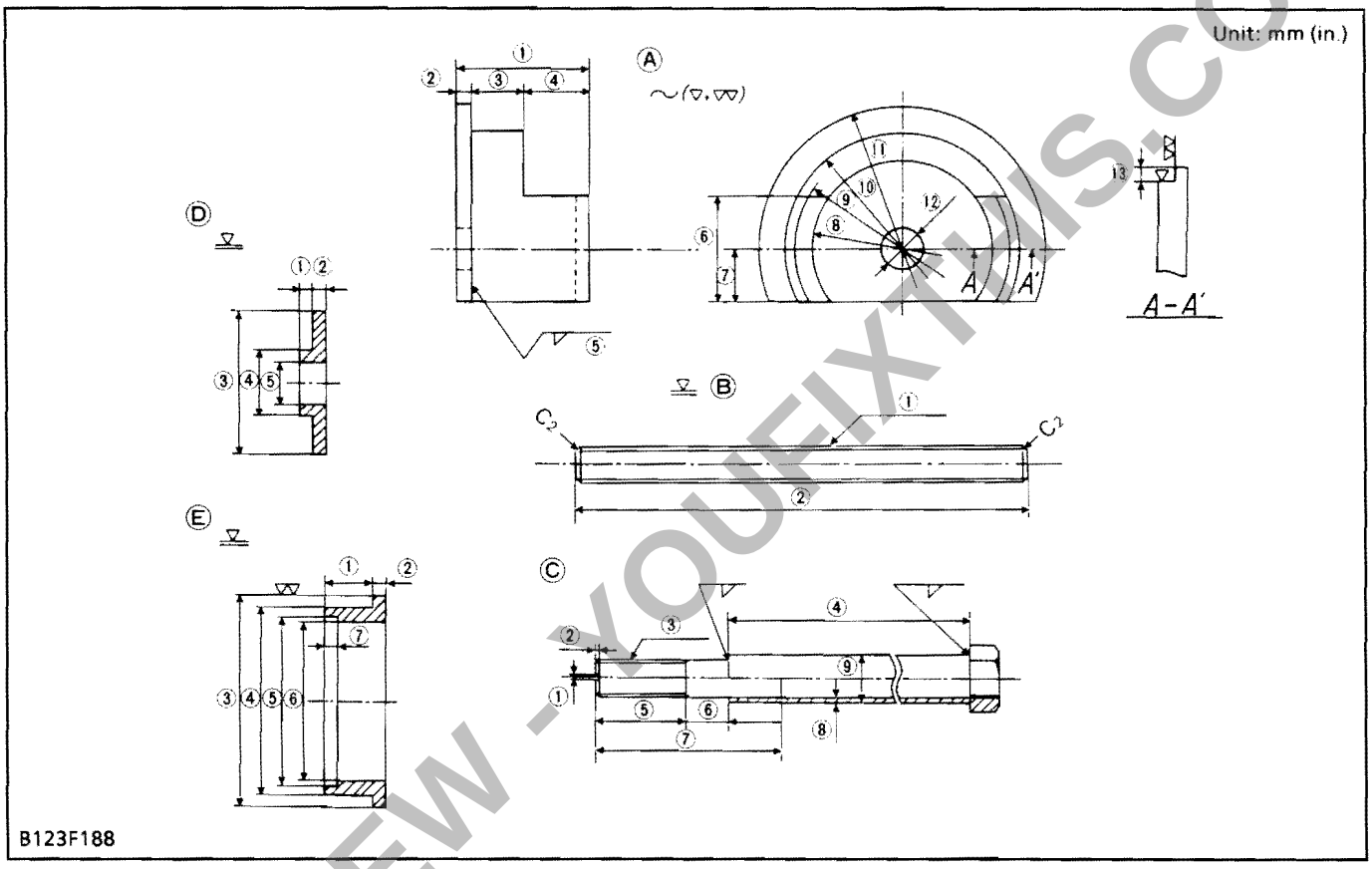
B123P031

Clutch Compression Tool

Application: This tool is indispensable for over-hauling the PTO hydraulic clutch and IC shuttle clutch.

■ **NOTE**

- **The following special tools are not provided, so make them referring to the figures.**



B123F188

Dimensions of Clutch Compression Tool

	No.	mm	in.
A	1	51	2.00
	2	6	0.24
	3	20	0.79
	4	25	0.98
	5	20 (3) 75	—
	6	40	1.57
	7	20	0.79
	8	67.1 DIA	2.642 DIA
	9	81.0 to 81.5 DIA.	3.189 to 3.209 DIA.
	10	89.1 DIA.	3.508 DIA.
	11	110 DIA.	4.330 DIA.
	12	16 DIA.	0.63
	13	5	0.20

	No.	mm	in.
B	1	M14×Pitch 1.5	—
	2	170	6.69
C	1	1	0.039
	2	1	0.039
	3	M14×Pitch 1.5	—
	4	210	8.268
	5	34	1.34
	6	16	0.63
	7	70	2.76
	8	1.8	0.07
	9	18 DIA.	0.70 DIA.

	No.	mm	in.
D	1	5	0.20
	2	5	0.20
	3	55 DIA.	2.17 DIA.
	4	24.5 DIA.	0.965 DIA.
	5	16 DIA.	0.63 DIA.
E	1	18	0.70
	2	5	0.20
	3	81.0 to 81.5 DIA.	3.189 to 3.209 DIA.
	4	72 DIA.	2.83 DIA.
	5	65 DIA.	2.56 DIA.
	6	61 DIA.	2.40 DIA.
	7	5	0.20

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CONNECTING ROD

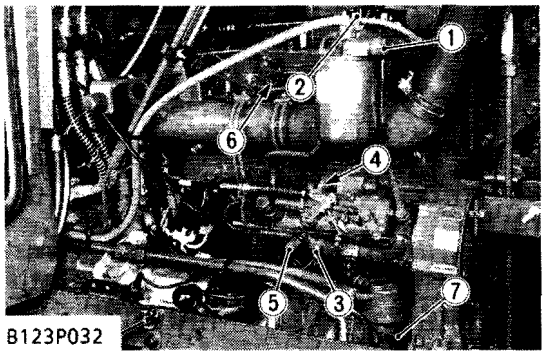
Item	Factory Specification	Allowable Limit
Connecting Rod Alignment	—	0.05 mm 0.0020 in.
Clearance between Piston Pin and Small End Bushing	0.015 to 0.038 mm 0.00059 to 0.00150 in.	0.15 mm 0.0059 in.
Piston Pin O.D.	34.983 to 34.990 mm 1.3773 to 1.3776 in.	—
Small End Bushing I.D.	35.005 to 35.012 mm 1.3781 to 1.3788 in.	—
Connecting Rod End Play	0.1 to 0.3 mm 0.004 to 0.012 in.	0.8 mm 0.031 in.

CRANKSHAFT

Crankshaft Misalignment	—	0.08 mm 0.0031 in.
Oil Clearance between Crankshaft and Crankshaft Bearing	0.044 to 0.105 mm 0.00173 to 0.0413 in.	0.20 mm 0.0079 in.
Crankshaft Journal O.D.	75.977 to 75.990 mm 2.99122 to 2.99173 in.	—
Crankshaft Bearing I.D.	76.034 to 76.082 mm 2.99347 to 2.99536 in.	—
Oil Clearance between Crankpin and Crankpin Bearing	0.030 to 0.088 mm 0.00118 to 0.00346 in.	0.20 mm 0.0079 in.
Crankpin O.D.	63.977 to 63.990 mm 2.51878 to 2.51929 in.	—
Crankpin Bearing I.D.	64.020 to 64.065 mm 2.52047 to 2.52224 in.	—
Crankshaft Side Clearance	0.082 to 0.332 mm 0.00323 to 0.01307 in.	0.50 mm 0.0197 in.
Crankshaft Thrust Bearing Thickness	3.379 to 3.429 mm 0.13303 to 0.13500 in.	—
Under-sizes of Crankshaft Bearing and Crankpin Bearing	– 0.25 mm (– 0.0098 in.) – 0.50 mm (– 0.0197 in.) – 0.75 mm (– 0.0295 in.)	—
Over-sizes of Thrust Bearing	+ 0.125 mm + 0.00492 in.	—

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B123P032

(1) Eye Joint Bolt
(2) Eye Joint Bolt
(3) Bleed Plug
(4) Bleed Plug
(5) Cap Nut of High Pressure Air Venting Device
(6) Box Nut
(7) Fuel Lift Pump Lever

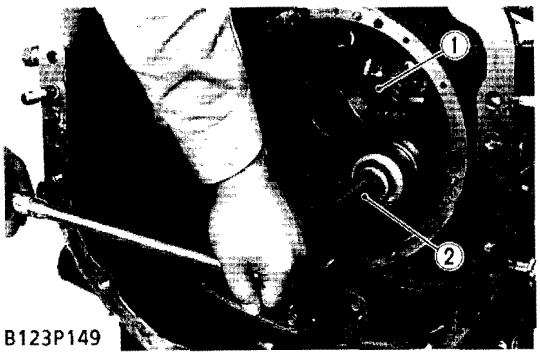
Bleeding Fuel System

Bleed air according to fuel flow in the order of (1) → (2) → (3) → (5) → (4).

1. Move the fuel lift pump lever (7) up and down, and check that fuel is press fed. If no fuel is press fed (reaction is small), turn the starter **ON** momentarily up to the position in which the pump is actuated most significantly, and rotate the crankshaft slightly.
2. Turn main switch **ON**. (Render the stop solenoid valve conductive so that fuel flows.)
3. Loosen eye joint bolts (1), (2) of fuel filter and bleed plugs (3), (4) of injection pump by about 2 turns respectively, and loosen the cap nut of high pressure air venting device (5) until stopped by hand, and box nut (6) of injection pipe fully.
4. Move the fuel lift pump lever (7) up and down slowly, and if fuel without bubbles comes out of eye joint bolt (1), tighten the eye joint bolt (1).
5. Then, move the lift pump lever up and down slowly, and if fuel without bubbles comes out of eye joint bolt (2) and bleed plug (3), tighten the eye joint bolt (2) and bleed plug (3).
6. Set the accelerator lever to the maximum speed range, and rotate the engine, using the starter. If fuel comes out of the high pressure air venting device, tighten the cap nut (5). After that, If fuel comes out of injection pipe, tighten the box nut (6). (Turning the starter continuously for 10 seconds, repose for 30 seconds. Repeat this operation 2 or 3 times.)
7. Start the engine with the accelerator lever at top speed, and then return the lever to the intermediate speed range position (approx. 1500 rpm.) (Turn the starter continuously for 10 seconds, then repose for 30 seconds. Repeat this operation 2 or 3 times.)
8. If fuel free of bubbles comes out of bleed plug (4), tighten the bleed plug (4).
9. Operate the engine idly at high speed in order to bleed a small amount of air which remains in the fuel system.
10. If air still remains and the engine stops even after the above steps, repeat air bleeding operation according to steps 1 to 9 above.

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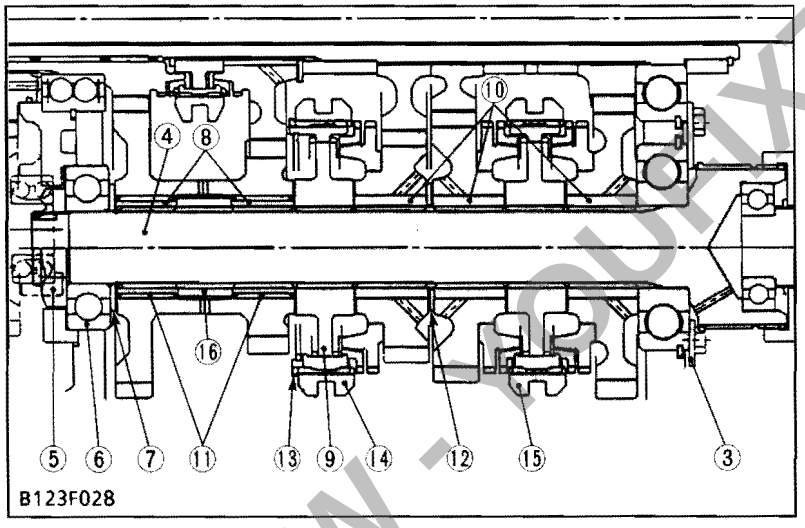
Counter Shaft

1. Shift any gear to engage position and set the pinion locking tool (Code No: 07916-52311) (1).
2. Remove the stake of the staking nut and remove the staking nut using a counter shaft nut socket 50 (Code No: 07916-52301) (2).
3. Remove the bearing retainer (3).
4. Tap out the counter shaft (4) to the rear.

(When reassembling)

- When installing the synchronizer, be careful not to drop the synchronizer keys.
- Be sure to direct the grooved side of the thrust collar (7), (12) to the gear.
- Take care of the direction of 3rd speed shifter coupling (14).
- Assemble the shift fork 1-2 and shift fork 3 after reassembling the counter shaft.

Tightening torque	Counter shaft staking nut	147.1 to 196.1 N·m 15 to 20 kgf·m 108.5 to 144.7 ft-lbs

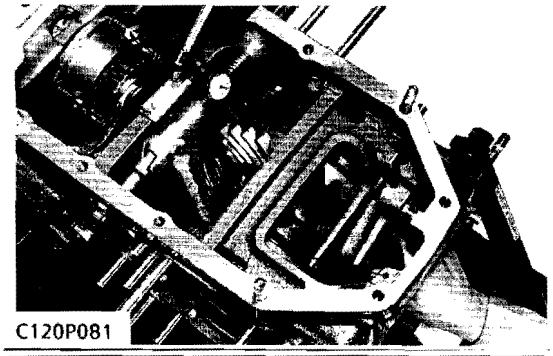


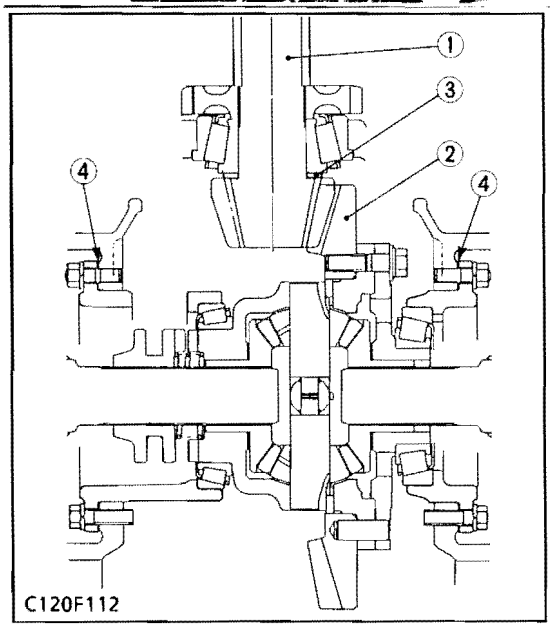
B123F028

(1) Pinion Locking Tool
(2) Counter Shaft Nut Socket 50
(3) Bearing Retainer
(4) Counter Shaft
(5) Staking Nut
(6) Ball Bearing
(7) Thrust Collar 1
(8) Inner Ring
(9) Clutch Hub
(10) Inner Ring
(11) Needle Bearing
(12) Thrust Collar 3
(13) Stopper
(14) Shifter 3
(15) Shifter 1-2
(16) Spacer

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C120P081



C120F112

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

Backlash and Tooth Contact between Bevel Gear and Bevel Pinion Shaft

1. Set the dial indicator (lever type) with its finger on the tooth surface.
2. Measure the backlash by fixing the bevel pinion shaft (1) and moving the bevel gear (2) by hand.
3. When the backlash is too large, decrease the number of shims in the side of the spiral bevel gear, and insert the removed shims in the opposite side. When the backlash is too small, decrease the number of shims in the side of the differential case, and insert the removed shims in the opposite side.
4. Adjust the backlash properly by repeating the above procedure.

Backlash	Factory spec.	0.20 to 0.30 mm 0.0079 to 0.0118 in.
	Allowable limit	0.4 mm 0.016 in.

5. Apply red lead lightly over several teeth at three positions equally spaced on the bevel gear.
6. Turn the bevel pinion shaft, while pressing a wooden piece against the periphery of the bevel gear.
7. Check the tooth contact. If not proper, adjust according to the instructions below.

(Reference)

- Thickness of adjusting shims (4) :
  0.1 mm (0.004 in.) 0.5 mm (0.020 in.)
  0.3 mm (0.012 in.)
- Thickness of adjusting collar 2 (3) :
  0.80 mm (0.031 in.) 1.40 mm (0.055 in.)
  1.00 mm (0.039 in.) 1.60 mm (0.063 in.)
  1.20 mm (0.047 in.)

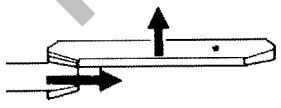
Proper Contact



More than 35 % red lead contact area on the gear tooth surface. The center of tooth contact at 1/3 of the entire width from the small end.

Shallow Contact



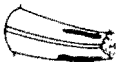


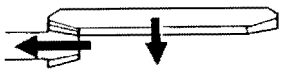
Replace adjusting collar 2 with thicker one to move the bevel pinion shaft backward.
And place the left side shim to the right to move the bevel gear rightward.
Repeat above until the proper tooth contact and backlash are achieved.

Heel Contact



Deep Contact



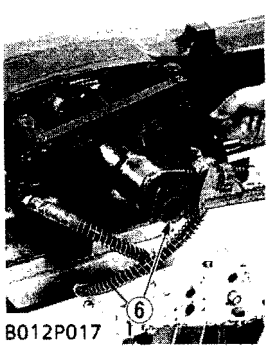


Replace adjusting collar 2 with thinner one to move the bevel pinion shaft forward.
And place the right wide shim to the left to move the bevel gear leftward.
Repeat above until the proper tooth contact and backlash are achieved.

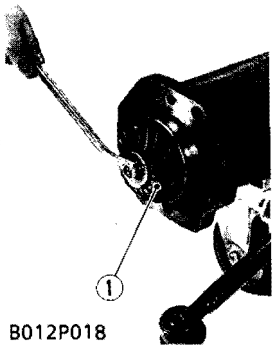
Toe Contact



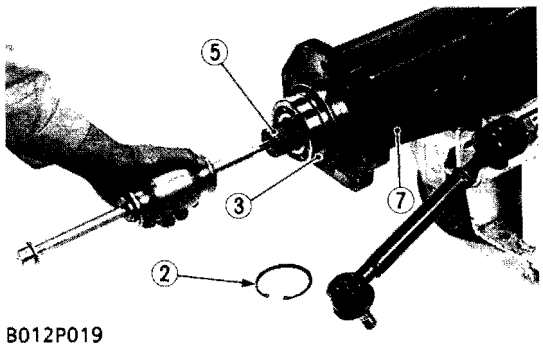
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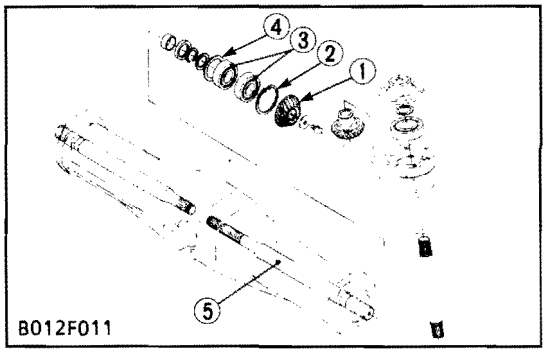
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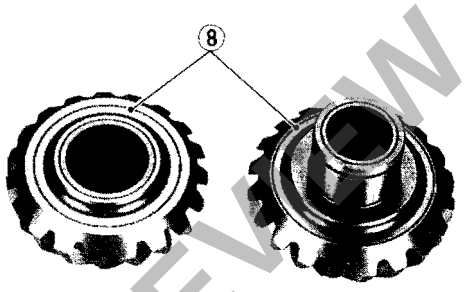
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B012P019



B012F011



B012P040

Bevel Gear and Yoke Shaft

1. Install the coupling (6) to the bevel pinion shaft.
2. Put the differential lock, and fix the bevel pinion shaft holding coupling with a pipe wrench.
3. Loosen the bevel gear mounting screw, and remove the bevel gear (1).
4. Remove the internal snap ring (2), and draw out the bearing (3) and differential yoke shaft (5) as a unit from the front differential case (7).

(When reassembling)

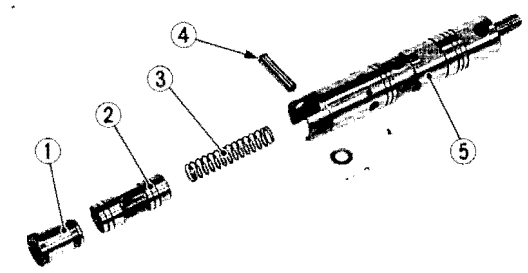
- Install the adjusting shims (4) correctly noting their location.
- Install the oil seal to the front differential case so that its lip faces the outward.
- Apply grease to the oil seal.
- Apply grease to the O-ring.
- When reassembling, check the marks (8) identifying left sides of the bevel gears.
- These two gears in the photograph are mating gears on the same side.

Tightening torque	Bevel gear mounting UBS screw	70.5 to 90.1 N·m 7.2 to 9.2 kgf·m 52.1 to 66.5 ft-lbs

(1) Bevel Gear (19T)
(2) Internal Snap Ring
(3) Ball Bearing
(4) Shim
(5) Differential Yoke Shaft
(6) Coupling
(7) Front Differential Case
(8) Marks

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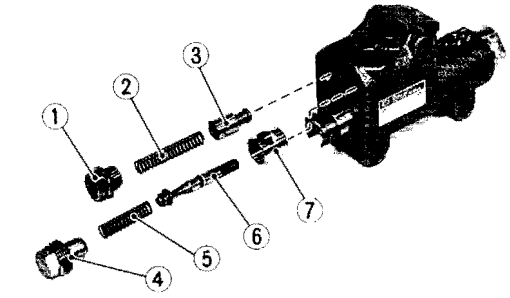


C120P130

2) Shut-off Spool

1. Draw out the pin (4), and remove the spool end (1).
2. Draw out the spring (3) and shut-off spool (2).

(1) Spool End
(2) Shut-off Spool
(3) Spring
(4) Pin
(5) Pilot Spool



C120P131

3) Check Valve and Lowering Valve

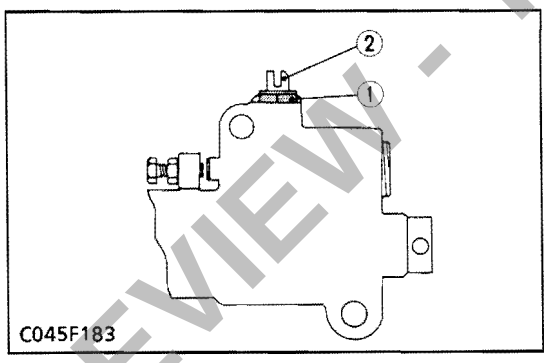
1. Remove the plug (1) and draw out the spring (2) and check valve (3).
2. Remove the plug (4) and draw out the spring (5), lowering valve (6) and collar (7).

(When reassembling)

- Clean all part with a suitable solvent, and dry with a line-free cloth or air.
- Visually inspect all parts for signs of scoring or damage.
- Use care not to damage the O-ring and backup ring.

Tightening torque	Plug (1)	19.61 to 24.52 N·m 2.0 to 2.5 kgf·m 14.47 to 18.08 ft-lbs
	Plug (4)	14.71 to 24.52 N·m 1.5 to 2.5 kgf·m 10.85 to 18.08 ft-lbs

(1) Plug
(2) Spring
(3) Check Valve
(4) Plug
(5) Spring
(6) Lowering Valve
(7) Collar



C045F183

4) Throttle Valve

1. Loosen the bushing (1) and draw out the throttle valve (2).

(When reassembling)

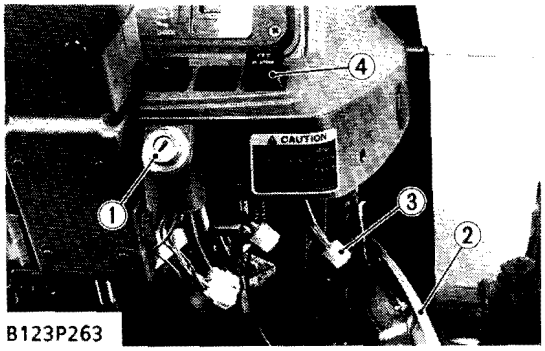
- Use care not to damage the O-ring.
- Install the throttle valve (2) noting its groove direction and its chamfer direction as shown in the figure.

Tightening torque	Bushing	4.90 to 6.86 N·m 0.5 to 0.7 kgf·m 3.62 to 5.06 ft-lbs

(1) Bushing
(2) Throttle Valve

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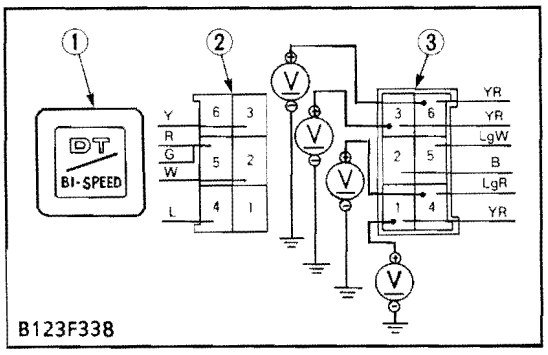


B123P263

DT / Bi-speed Switch [M9580 Only]

1. Turn the main switch (1) off.
2. Remove the right lower rear bonnet (2) and disconnect the DT /Bi-speed switch connector (3).
3. Perform the following checkings **1)** and **2)**.

(1) Main Switch
(2) Rear Bonnet (Right lower side)
(3) DT / Bi-speed Switch Connector
(4) DT / Bi-speed Switch



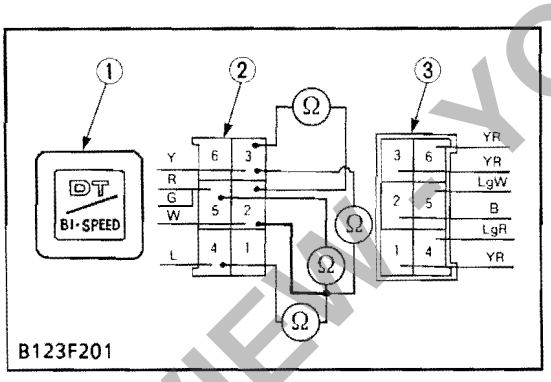
B123F338

1) Connector Voltage

1. Turn the main switch to **ON** position.
2. Measure the voltage with a voltmeter across the connector (3) **6E-1** terminal and chassis, and across **6E-3** terminal and chassis, and across **6E-4** terminal and chassis, and across **6E-6** terminal and chassis.
3. If the voltage differs from the battery voltage (11 to 14 V), the wiring harness is faulty.

Voltage	Connector **6E-1** terminal – Chassis	Battery voltage
	Connector **6E-3** terminal – Chassis	
	Connector **6E-4** terminal – Chassis	
	Connector **6E-6** terminal – Chassis	

(1) DT / Bi-speed Switch
(2) DT / Bi-speed Switch Connector (Switch side)
(3) DT / Bi-speed Switch Connector (Wiring harness side)



B123F201

2) DT /Bi-speed Switch

1. Test the continuity through switch with an ohmmeter.

Position \ Terminal	2 (D)	3 (B)	5 (T)	4 (IL)
OFF	●			
DT	● —	— ●		
↕				
BI-SPEED	● —	— ● —	— ●	●

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