



CLICK ANYWHERE FOR MORE DETAILS

MANUAL PREVIEW

Caterpillar

Service Manual

931B Traxcavator

**S/n 25Y1, 26Y1,
29Y1 & 30Y1 & up**

Volume 1 of 3

JENSALES.COM

or Call 800-443-0625



CLICK ANYWHERE FOR MORE DETAILS

THIS IS A MANUAL PRODUCED BY JENSALES INC. WITHOUT THE AUTHORIZATION OF
CATERPILLAR OR IT'S SUCCESSORS. **CATERPILLAR** AND IT'S SUCCESSORS
ARE NOT RESPONSIBLE FOR THE QUALITY OR ACCURACY OF THIS MANUAL.

TRADE MARKS AND TRADE NAMES CONTAINED AND USED HEREIN ARE THOSE OF OTHERS,
AND ARE USED HERE IN A DESCRIPTIVE SENSE TO REFER TO THE PRODUCTS OF OTHERS.

Service Manual

CT-S-931BTX25Y

INTRODUCTION

The specifications given in this book are on the basis of information available at the time it was written. The specifications torques, pressures of operation, measurements, adjustments and other items can change at any time. These changes can effect the service given to the product. Get the complete and most current information before you start any job. Caterpillar Dealers have the most current information which is available. For a list of the most current modules and form numbers available for each Service Manual, see the SERVICE MANUAL CONTENTS MICROFICHE REG1139F.

When the words "use again" are in the description, the specification given can be used to determine if a part

can be used again. If the part is equal to or within the specification given, use the part again.

When the word "permissible" is in the description, the specification given is the "maximum or minimum" tolerance permitted before adjustment, repair and/or new parts are needed.

A comparison can be made between the measurements of a worn part, and the specifications of a new part to find the amount of wear. A part that is worn can be safe to use if an estimate of the remainder of its service life is good. If a short service life is expected, replace the part.

77200X2

NOTE: The "C" is an indication of a change from the former issue.

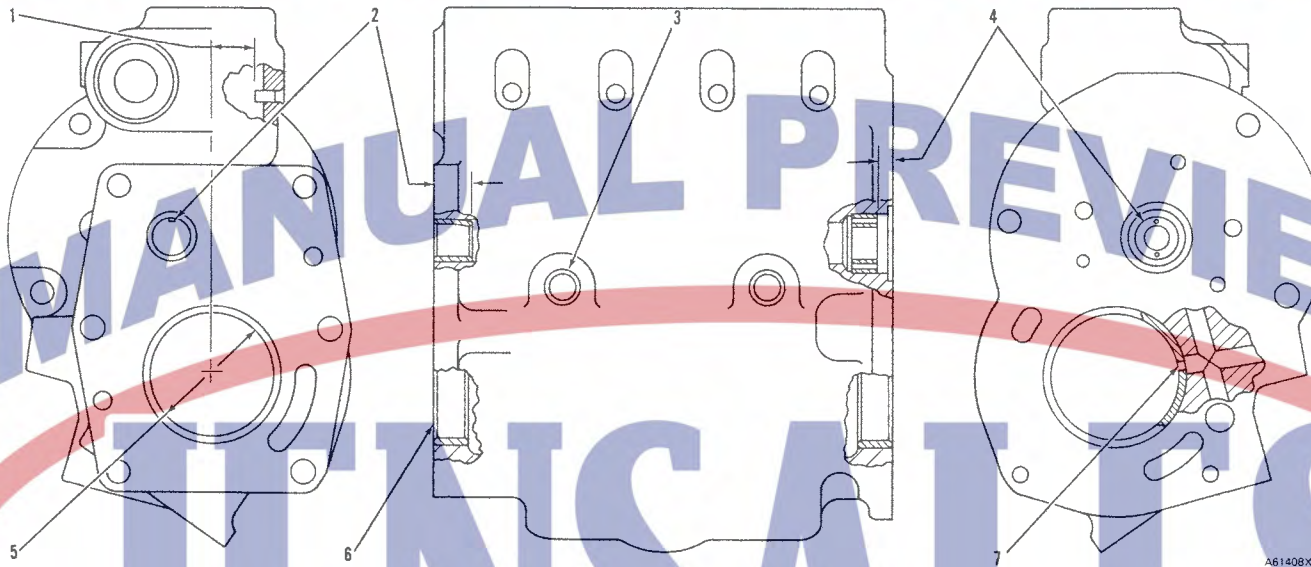
NOTE: For Systems Operation and Testing and Adjusting, make reference to the 3204 Vehicular Engine, Form No. REG01222.

INDEX

Accessory Drive Gear	15	Electrical System	
Air Induction and Exhaust System		Alternators	39
Air Cleaner	17	Alternator Installation	38
Camshaft	16	Alternator Regulator	40
Cylinder Head		Glow Plug Connection	6
DI	23	Pressure Switch	25
PC	22	Starter Solenoid	41, 42
Muffler	24	Starter Motor	41
Timing Gears	16	Vee Belts	42
Valve Cover	21	Engine Design	5
Valve Rocker Arms and Lifters	17	Fuel System	
Valves and Valve Springs	18	Fuel Injection	7, 8
Valve Seats and Inserts		Fuel Injection Lines	9
DI	20, 21	Fuel Injection Pump Housing	6
PC	19	Fuel Transfer Pump	11
Basic Engine Components		Governor	10
Connecting Rod	29	Governor Control Linkage	11, 12, 13, 14
Crankshaft	31	Nozzles	
Bearing Surface (Journal) — Connecting Rods	32	DI	8
Bearing Surface (Journal) — Mains	33	PC	8
Cylinder Block	28	Lubrication System	
Engine Supports	34	Oil Filter	25
Flywheel	34	Oil Pan	25
Flywheel Housing	34	Oil Pressure Gauge	25
Flywheel Housing Bore	35	Oil Pressure Switch	25
Flywheel Housing Runout	36	Oil Pump	24
Flywheel Runout	37	Torque for Flared and O-ring Fittings	4
Pistons and Rings	30		
Cooling System			
Pressure Cap	27		
Water Pumps	26		
Water Temperature Gauges	27		
Water Temperature Regulators (Thermostat)	27		
Vee Belts	42		

FUEL INJECTION PUMP HOUSING

CLICK ANYWHERE FOR MORE DETAILS



- (1) Install dowel to get a dimension from centerline of fuel injection pump bore to dowel (seal dowel hole with aluminum ball) $.584 \pm .002$ in. (14.83 ± 0.05 mm)
- (2) Rack bearing alignment — the center of the rack bearing tab must be within $.002$ in. (0.05 mm) of a vertical line that:
- (a) goes through the center of the rack bearing.
 - (b) is parallel to the vertical centerline thru the injection pump bores and camshaft bearing bores.

NOTE: The following tools are available to position the rack bearings correctly: 5P1665 Alignment Plate and 9S6329 Driver.

The correct bearing depth is controlled when driver is stopped by plate.

- (3) Install pins until they contact bottom of housing casting.

- (4) Install rear rack bearing to a depth of $.195 \pm .005$ in. (4.95 ± 0.13 mm)

NOTE: Small holes in bearing must be positioned as shown (parallel to the vertical centerline thru the pump).

- (5) Bore in bearings for the camshaft (new) $1.8775 \pm .0005$ in. (47.638 ± 0.013 mm)

Diameter of bearing surfaces of the camshaft (new) $1.8730 \pm .0005$ in. (47.574 ± 0.013 mm)

Maximum permissible clearance between the bearings and the camshaft $.010$ in. (0.25 mm)

- (6) Install camshaft bearings flush with front and rear face of housing.
- (7) Camshaft bearing oil hole. Position front bearing with oil hole in alignment with drilled oil passages in block.

GLOW PLUG CONNECTION (PC ENGINES)



- (1) Torque for the glow plugs (put 9M3710 Anti-Seize Compound on threads) 120 ± 24 lb. in. (13.6 ± 2.8 N·m)
- (2) Torque for the plug for electrical connection (put 5P3931 Anti-Seize Compound on threads):

Step 1. Tighten the plug by hand.

Step 2. Tighten the plug $2\frac{1}{4}$ to $2\frac{3}{4}$ turns beyond hand tight.

NOTE: FOR TORQUE VALUES NOT GIVEN, SEE THE FIRST PAGE OF SPECIFICATIONS FOR GENERAL TIGHTENING TORQUES

SYSTEMS OPERATION

Air Inlet and Exhaust System	9, 10
Valves and Valve System Components	10
Basic Block	15
Camshaft	15
Connecting Rods	15
Crankshaft	15
Pistons and Rings	15
Cooling System	14
Electrical System	16-19

Charging System Components	16
Other Components	17
Starting Circuit Components	17
Wiring Diagrams	17-19
Engine Design	4
Fuel System	5-8
Fuel Injection Pump	6
Fuel Injection Valves (Nozzles)	6, 7
Governor (Hydra-Mechanical)	7, 8
Lubrication System	11, 13

TESTING AND ADJUSTING

Air Inlet and Exhaust System	71-74
Compression	72
Crankcase (Crankshaft Compartment) Pressure	72
Cylinder Head	72
Exhaust Temperature	71
Measurement of Camshaft Lobes	74
Measurement of Pressure in Inlet Manifold	71
Restriction of Air Inlet and Exhaust	71
Valve Clearance Setting	73, 74
Basic Block	81-83
Connecting Rod and Main Bearings	81
Connecting Rods and Pistons	81
Cylinder Block	81
Flywheel and Flywheel Housing	82, 83
Piston Rings	81
Cooling System	77-80
Testing the Cooling System	77-80
Vee Belt Tension Chart	80
Visual Inspection of the Cooling System	77
Fuel System	32-70
Adjustment and Cleaning of 9L6969 Fuel Injection Nozzles	39-41
Adjustment and Cleaning of 9N3979 and 1W5829 Fuel Injection Nozzles	47-49
Checking Engine Cylinders Separately	32
Engine Timing (Dynamic Test)	58, 59
Finding Top Center Compression Position For No. 1 Piston	57, 58
Flow Checking Fuel Injection Pump Timing DI Engines	61, 62
PC Engines	62-64
Fuel Injection Lines	57
Fuel Injection Service	53-57
Fuel Injection Valve Capsule-Type Nozzle	53
Fuel Nozzle Test Sequence	51

Fuel Pressure Control	57
Fuel Rack Setting	66-68
Fuel System Adjustments (Off Engine)	64-66
Fuel System Adjustments (On Engine)	61-64
Fuel System Inspection	32
Governor Adjustments	69, 70
Installation of Injection Pump	55-57
Measuring Engine Speed	70
Removal of Injection Pump	54, 55
Setting Fuel Injection Pump Timing Dimension (Off Engine)	64-66
Testing Capsule-Type Fuel Injection Nozzles For PC Engines	50, 51
Testing 9L6969 Fuel Injection Nozzles For DI Engines	33-37
Testing 9N3979 and 1W5829 Fuel Injection Nozzles For DI Engines	41-46
Timing the Accessory Drive Shaft	59, 60
Troubleshooting of 9L6969 Fuel Injection Nozzles	37, 38
Troubleshooting of 9N3979 and 1W5829 Fuel Injection Nozzles	46

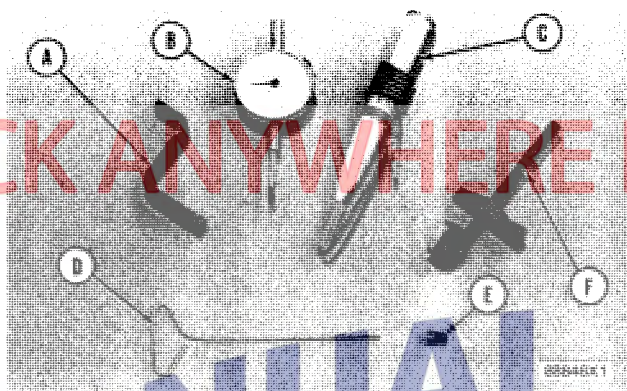
Electrical System	85, 86
Alternator Regulator	86
Battery	85
Charging System	85, 86
Starting System	86

Lubrication System	75, 76
Increased Oil Temperature	76
Measuring Engine Oil Pressure	75
Oil Pressure is High	76
Oil Pressure is Low	76
Too Much Bearing Wear	76
Too Much Oil Consumption	75, 76

Troubleshooting	20-31
-----------------------	-------

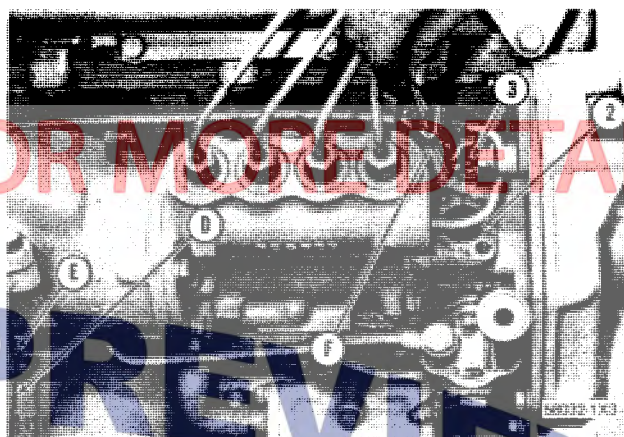
SPECIFICATIONS

NOTE: For Specifications with illustrations, make reference to SPECIFICATIONS for 3204 VEHICULAR ENGINE, Form No. REG01254. If the Specifications in Form REG01254 are not the same as in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications given in the book with the latest date.



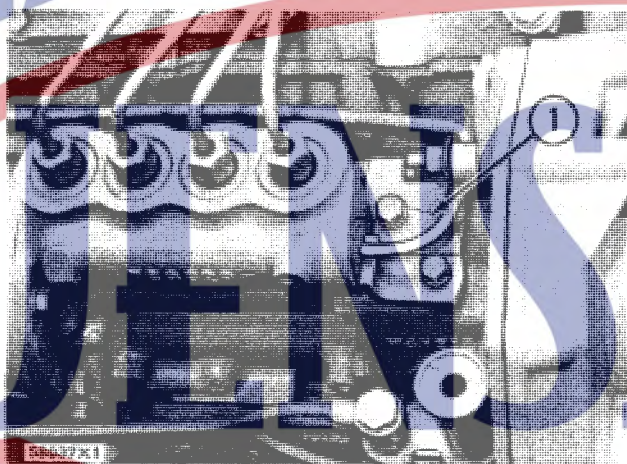
TOOLS TO SET FUEL RACK

A. 9S225 Bracket. B. 8S2283 Dial Indicator and 9S8883 Contact Point. C. 8S4627 Circuit Tester. D. 9S8521 Rod. E. 9S8518 Plug. F. 5P130 "0" Set Gauge.



INSTALLATION OF THE 5P130 GAUGE

2. Hole. 3. Slot in spacer. D. 9S8521 Rod. E. 9S8518 Plug. F. 5P130 Gauge.



REMOVAL OF COVER

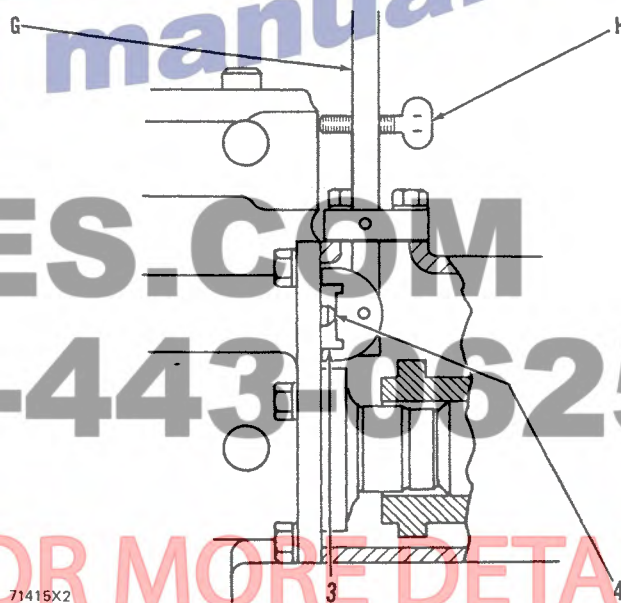
1. Cover.

1. Move the governor control to the "fuel-off" position. Remove cover (1).
2. Put 5P130 Gauge (F) down in hole (2) under cover (1) as shown. After gauge (F) is in hole (2), turn it 180° so slot (3) will face fuel rack (4). [When governor control is moved to fuel-on, end of fuel rack (4) must go in slot (3)]. Hold gauge (F) in position with two bolts through the bolt holes for cover (1).

NOTE: If the governor has a speed limiter, do Steps 3 and 4.

3. Remove the plug from the governor housing.
4. Put 9S8518 Plug (E) in place of the plug. Put 9S8521 Rod (D) through the hole in 9S8518 Plug (E). Push in on the rod to get compression of the speed limiter spring. Hold the rod in this position and tighten 9S8518 Plug (E) enough to hold 9S8521 Rod (D).

5. Remove the fuel filter element and the cover at the rear of the governor.
6. Install the 9S225 Bracket (A) to one of the cover bolt holes and install 8S2283 Dial
7. Use finger force to pull top of lever (G) of 5P130 Gauge (F) toward front of engine. Hold the lever in this position or install screw (H) in the lever. Turn governor lever in "fuel-on" direction until end of fuel rack (4) makes contact with slot (3) of 5P130 Gauge (F). Fasten the governor lever in this position.



5P130 GAUGE INSTALLED

3. Slot. 4. Fuel rack. G. Lever. H. 10-32 NF Screw.

INDEX

Accessory Drive Housing	61-63
Accessory Drive Housing, Disassemble & Assemble	64-66
Air Cleaner Group	10
Alternator	19
Camshaft	74-76
Camshaft Bearings	77
Connecting Rod Bearings	42
Crankshaft Front Pulley	68,69
Crankshaft Front Seal	69
Crankshaft and Gear	84-86
Crankshaft Main Bearings	43,44
Crankshaft Rear Seal and Wear Sleeve	83
Cylinder Head	37,38
Cylinder Head, Disassemble & Assemble	39,40
Engine and Transmission (3F/3R), Separation and Connection	86
Engine and Transmission (3F/1R), Separation and Connection	87
Engine Oil Cooler	15
Exhaust Manifold	67,68
Fan and Pulley	20,21
Flywheel	81
Flywheel Housing	82
Flywheel Ring Gear	82
Fuel Injection Lines	27
Fuel Injection Nozzles	32,33
Fuel Injection Nozzles, Disassemble & Assemble	33-36
Fuel Priming Pump	16
Fuel Injection Pump Housing, Disassemble & Assemble	56-60
Fuel Injection Pump Housing and Governor	48,49
Fuel Injection Pump Housing and Governor, Separation and Connection	50,51
Fuel Transfer Pump	16
Fuel Transfer Pump, Disassemble & Assemble	17,18
Governor, Disassemble & Assemble	52-55
Hood	9
Muffler	10
Oil Pan	41
Oil Pump and Relief Valve	72-74
Pistons	44,45
Pistons, Disassemble	46,47
Radiator and Guard	11-14
Rocker Shaft, Disassemble & Assemble	30,31
Rocker Shaft and Push Rods	29,30
Starting Motor	15
Support Bracket (931B)	8
Timing Gear Cover	70,71
Timing Gear Plate	78-80
Valve Cover	28
Valve Lifters	41
Water Pump	21
Water Pump, Disassemble & Assemble	22-26
Water Temperature Regulator	19

**WARNING**

**DISCONNECT BATTERIES
BEFORE PERFORMANCE
OF ANY SERVICE WORK.**

INDEX

Angling Blade Group (D3B)	23,24
Blade Angling Cylinders (D3B)	20-22
Bucket (931B)	39,40
Bucket Positioning and Kickout (931B)	44
C-Frame (D3B)	25-27
Fuel Tank Group	54-59
Hydraulic Control Valves	60-63
Hydraulic Control Valves, Disassemble and Assemble	64-79
Hydraulic Cylinders, Disassemble & Assemble	33-37
Hydraulic Pump	8
Hydraulic Pump, Disassemble & Assemble	9-14
Hydraulic Tank Group	49-53
Lift Arms (931B)	45-48
Lift Cylinders (D3B)	15-17
Lift Cylinders (931B)	28-30
Link Assemblies (931B)	40,41
Loader Frame, Lift Arms, Tilt Levers, Link Assemblies, Bucket, Seals and Pins (931B)	38
Tilt Cylinder (D3B)	17-19
Tilt Cylinder (931B)	31-32
Tilt Levers (931B)	42,43
Support Bracket (931B)	7

⚠ WARNING

**DISCONNECT BATTERIES
BEFORE PERFORMANCE
OF ANY SERVICE WORK.**

JENSALES.COM

or Call 800-443-0625

INTRODUCTION

The specifications given in this book are on the basis of information available at the time it was written. The specifications, torques, pressures of operation, measurements, adjustments and other items can change at any time. These changes can effect the service given to the product. Get the complete and most current information before you start any job. Caterpillar Dealers have the most current information which is available. For a list of the most current modules and form numbers available for each Service Manual, see the SERVICE MANUAL CONTENTS MICROFICHE REG1139F.

When the words "use again" are in the description, the specification given can be used to determine if a part

can be used again. If the part is equal to or within the specification given, use the part again.

When the word "permissible" is in the description, the specification given is the "maximum or minimum" tolerance permitted before adjustment, repair and/or new parts are needed.

A comparison can be made between the measurements of a worn part, and the specifications of a new part to find the amount of wear. A part that is worn can be safe to use if an estimate of the remainder of its service life is good. If a short service life is expected, replace the part.

77200X2

NOTE: For Systems Operation, Testing and Adjusting, make reference to the 931B TRACK-TYPE LOADER POWER TRAIN, Form No. SENR7930. For POWER SHIFT TRANSMISSION TESTING AND ADJUSTING, see Form No. SENR7931.

INDEX

Bevel Gear and Pinion	18-20	ROPS Mounting	36
Brake Adjustment	25	Selector and Pressure Control Valve (Serial Nos. 29Y, 30Y)	10,11
Brake Drum Alignment	26	Steering Clutch	22
Control Group for Transmission Oil System (Serial Nos. 25Y, 26Y)	8	Steering Clutch Adjustment	24
Counterweight Group	37	Steering Clutch Case and Frame	21
Drive Shaft (Serial Nos. 25Y, 26Y)	16	Steering Control Valve	23
Drive Shaft (Serial Nos. 29Y, 30Y)	16	Sweep Group	37
Final Drive (Serial Nos. 25Y, 29Y)	28,29	Torque Converter (Serial Nos. 25Y, 26Y)	7
Final Drive (Serial Nos. 26Y, 30Y)	30,31	Torque Converter (Serial Nos. 29Y, 30Y)	7
Final Drive Bearing Installation	27	Track (Sealed)	34
Front Idler and Recoil Spring	32	Track (Sealed and Lubricated)	33
Hydraulic Controls (Serial Nos. 25Y, 26Y)	8	Track Adjustment	35
Lines, Plugs and Fittings	4,5	Track Carrier Rollers	32
Lubrication Relief Valve (Serial Nos. 25Y, 26Y)	9	Track Rollers	33
Oil Pump for the Transmission (Serial Nos. 25Y, 26Y)	6	Transfer Gears (Serial Nos. 25Y, 26Y)	13
Oil Pump for the Transmission (Serial Nos. 29Y, 30Y)	6	Transfer Gears (Serial Nos. 29Y, 30Y)	15
Power Take-Off Drive (Serial Nos. 25Y, 26Y)	17	Transmission (Serial Nos. 25Y, 26Y)	12,13
Power Take-Off Drive (Serial Nos. 29Y, 30Y)	17	Transmission (Serial Nos. 29Y, 30Y)	14,15
		Transmission Oil Filter Group (Serial Nos. 29Y, 30Y)	9
		Undercarriage Support	23

SYSTEMS OPERATION

Bevel Pinion and Bevel Gear	38	Transmission:	
General Information:		Serial Nos. 25Y, 26Y	11
Serial Nos. 25Y, 26Y	4	Power Flows	13
Serial Nos. 29Y, 30Y	18	Serial Nos. 29Y, 30Y	29
		Power Flows	31
Lubrication System for the Transmission:		Transmission Hydraulic Controls:	
Serial Nos. 25Y, 26Y	6	Serial Nos. 25Y, 26Y	8
Serial Nos. 29Y, 30Y	20	Serial Nos. 29Y, 30Y	23
Oil Filter	21	Transmission Hydraulic Pump:	
Torque Converter:		Serial Nos. 25Y, 26Y	6
Serial Nos. 25Y, 26Y	5	Serial Nos. 29Y, 30Y	20
Serial Nos. 29Y, 30Y	19	Transmission Oil Cooler:	
Transfer Gears:		Serial Nos. 25Y, 26Y	7
Serial Nos. 25Y, 26Y	17	Serial Nos. 29Y, 30Y	22
Serial Nos. 29Y, 30Y	37	Undercarriage	43
Steering Clutches, Brakes and Final Drives	39	Hydraulic Track Adjuster	45
Steering and Brake Control	40	Recoil Spring and Mechanism for Track Adjustment	44
Brakes	42	Track Carrier Rollers	43
Steering	40	Track Rollers	43
		Front Idlers	44
		Sealed and Lubricated Track	45
		Sealed Track	45

TESTING AND ADJUSTING

Bevel Gear and Pinion:		Steering and Brakes	49
Adjustment of Bearings for Bevel Gear Shaft	*	Torque Converter	49
Adjustment of Free Movement (Backlash)	*	Transmission	47
Adjustment of Tooth Contact Pattern	*	Visual Checks	47
Power Shift Transmission Testing and		Troubleshooting:	
Adjusting	See Form No. SENR7931	Serial Nos. 29Y, 30Y	50
Steering Clutches, Brakes and Final Drives:		Check List During Operation	50
Adjustment of Brakes	*	Steering and Brakes	53
Adjustment of Control Linkage for Steering Clutches	*	Torque Converter	52
Adjustment of Final Drive Bearings	*	Transmission	50
Troubleshooting:		Visual Checks	50
Serial Nos. 25Y, 26Y	47	Undercarriage:	
Check List During Operation	47	Adjustment of Track	*
*See SPECIFICATIONS, Form No. SENR7929.			

SPECIFICATIONS

NOTE: For Specifications with illustrations, make reference to the SPECIFICATIONS for 931B TRACK-TYPE LOADER POWER TRAIN, Form No. SENR7929. If the Specifications in Form SENR7929 are not the same as in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications in the book with the latest date.

INDEX

Bevel Gear and Pinion	87-93
Drive Shaft	55
Engine and Transmission (3F/1R)	114-121
Engine and Transmission (3F/3R)	159-166
Engine and Transmission (3F/1R), Separation and Connection	122
Engine and Transmission (3F/3R), Separation and Connection	166
Final Drive Pinions	83-86
Front Idlers	29,30
Front Idlers, Disassemble & Assemble	31-36
Hydraulic Control Valves	94-97
Hydraulic Control Valves, Disassemble & Assemble	98-113
Hydraulic Track Adjuster Seals	37,38
Pinion Flanges	81,82
Recoil Springs	39,40
Sprockets	43-46
Sprocket Shaft, Gear and Cover	47-54
Steering Clutches	62-72
Steering Clutches, Disassemble & Assemble	73-80
Steering Clutch Control Valves	56,57
Steering Clutch Control Valves, Disassemble & Assemble	58-61
Steering Clutch Hub Couplings	82
Support Bracket (931B)	9
Torque Converter (3F/3R)	178
Torque Converter (3F/3R), Disassemble & Assemble	179-185
Torque Converter Clearance Checks (3F/3R)	186,187
Torque Converter and Transmission (3F/1R), Disassemble & Assemble	140
Torque Converter, Transmission and Transfer Gears (Remove and Install from Case)	139-151
Tracks (Separation and Connection)	24-26
Track Adjustment (D3B)	27
Track Adjustment (931B)	28
Track Carrier Rollers	10,11
Track Carrier Rollers, Disassemble & Assemble	11-14
Track Roller Frames	41,42
Track Roller Guards	15,16
Track Rollers	17,18
Track Rollers, Disassemble & Assemble	19-23
Transfer Gears (3F/1R)	154
Transfer Gears (3F/3R)	188
Transfer Gears (3F/3R), Disassemble & Assemble	189-195
Transmission (3F/3R), Disassemble & Assemble	196-225
Transmission Hydraulic Control Valves (3F/1R-931B), Disassemble & Assemble	126-132
Transmission Hydraulic Control Valves (3F/1R-D3B), Disassemble & Assemble	132-138
Transmission Hydraulic Control Valves (3F/3R)	167,168
Transmission Hydraulic Control Valves (3F/3R), Disassemble & Assemble	169-177
Transmission Oil Filter	226
Transmission Oil Filter, Disassemble & Assemble	228
Transmission Oil Pump, Disassemble & Assemble	125
Transmission Oil Pump and Transmission Hydraulic Control Valve (3F/1R)	123,124
Transmission Oil Pump and Pump Drive Gear (3F/3R)	155
Transmission Oil Pump and Pump Drive Gear (3F/3R), Disassemble & Assemble	156-158

**WARNING**

**DISCONNECT BATTERIES
BEFORE PERFORMANCE
OF ANY SERVICE WORK.**

CLICK ANYWHERE FOR MORE DETAILS

MANUAL PREVIEW

JENSALES®

purchase full manual at



JENSALES.COM
or Call 800-443-0625

B5190X1

CLICK ANYWHERE FOR MORE DETAILS

TRANSMISSION OIL PUMP (3F/1R)

DISASSEMBLE TRANSMISSION OIL PUMP (3F/1R)

3153-15

	Tools Needed	A	B
1P510	Driver Group	1	
1P2320	Puller Assembly		1

start by:

a) remove transmission oil pump and transmission hydraulic control valve as a unit (3F/1R)

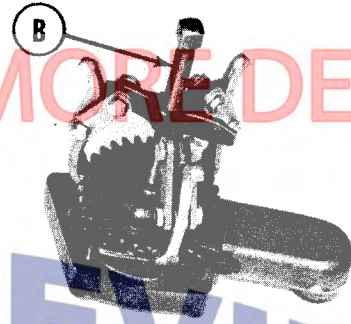
1. Remove the three bolts that hold the pump on the valve. Remove the pump.
2. Remove the drive gear from the pump with tool (B).
3. Remove the four bolts that hold the cover to the body.
4. Remove body (1) from cover (2). Remove the two gears from the cover.
5. Remove bushings (3) from the cover and the body with tooling (A).

ASSEMBLE TRANSMISSION OIL PUMP (3F/1R)

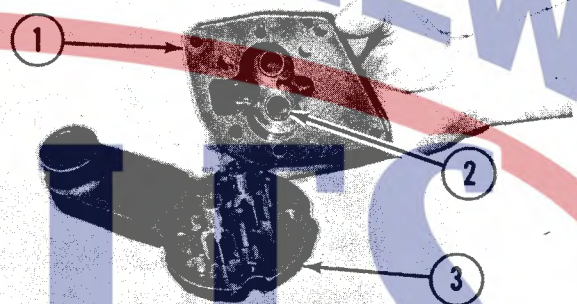
3153-16

	Tools Needed	A
1P510	Driver Group	1

1. Install the bushing in the cover and body with tooling (A). Put lubricant on the bushings.
2. Install the gears in the cover. Install the body on the cover. Install the four bolts that hold the cover and body together.
3. Heat the drive gear to a maximum temperature of 275°F (135°C). Install gear (1) on the shaft. The pump must turn freely and have a minimum clearance of .060 in. (1.52 mm) between gear and housing.
4. Install the pump on the control valve. Install the three bolts that hold the pump to the valve.
end by:
a) install transmission oil pump and transmission hydraulic control valve as a unit (3F/1R)



59616X1



57649X1



57663X1



58140X1

INTRODUCTION

The specifications given in this book are on the basis of information available at the time it was written. The specifications torques, pressures of operation, measurements, adjustments and other items can change at any time. These changes can effect the service given to the product. Get the complete and most current information before you start any job. Caterpillar Dealers have the most current information which is available. For a list of the most current modules and form numbers available for each Service Manual, see the SERVICE MANUAL CONTENTS MICROFICHE REG1139F.

When the words "use again" are in the description, the specification given can be used to determine if a part

can be used again. If the part is equal to or within the specification given, use the part again.

When the word "permissible" is in the description, the specification given is the "maximum or minimum" tolerance permitted before adjustment, repair and/or new parts are needed.

A comparison can be made between the measurements of a worn part, and the specifications of a new part to find the amount of wear. A part that is worn can be safe to use if an estimate of the remainder of its service life is good. If a short service life is expected, replace the part.

77200X2

NOTE: For Systems Operation, Testing and Adjusting, make reference to 931B LOADER HYDRAULIC SYSTEM, Form No. SENR7934.

NOTE: The "C" is an indication of a change from the former issue.

INDEX

Bucket Control Group	18
Control Valve	10, 11
Cylinders:	
Lift	12
Multi-Purpose Bucket	13, 16, 17
Ripper	15
Tilt	13, 14
Filter	11
Pump, Hydraulic (3G2873)	8
Pump, Hydraulic (3G5046)	9
Pump, Hydraulic (8J4515, 3G5386)	7
Servo valve	8

SYSTEMS OPERATION

Bucket Positioner and Lift Kickout (Electric)	17	Hydraulic Pump (Axial Piston-Type)	10
Bucket Positioner (Visual)	16	Hydraulic System	4
Control Valve Section for Lift	8	Main Relief Valve and Tilt Relief Valves	12
FLOAT Position	9	Make-Up Valve	10
HOLD Position	8	Multi-Purpose Bucket	15
LOWER Position	9	Ripper Hydraulics	13
RAISE Position	15	Valve Section for Ripper in HOLD Position	14
Control Valve Section for Tilt	5	Valve Section for Ripper in LOWER Position	15
DUMP Position	7	RAISE Position	15
HOLD Position	5		
TILT BACK Position	7		

TESTING AND ADJUSTING

Bucket Positioner (Visual)	26	Pump Efficiency Check	20
Hydraulic System	19	Relief Valves	21
Lift Cylinder Rod Drift	21	Relief Valve Test (Off the Machine)	23
Lift Cylinder Travel Time	20	Relief Valve Test (On Machine with Gear-Type Pump)	22
Lift Kickout and Bucket Positioner	27	Ripper Relief Valve and Multi-Purpose Bucket	
Bucket Positioner Adjustment	28	Relief Valve Adjustment	24
Electrical System	29	Servo Valve (Axial Piston-Type Pump)	25
Lift Kickout Adjustment	27	Servo Valve Pressure Setting Adjustment	25
Main Relief Valve and Tilt Relief Valve Adjustment	24	Tilt Cylinder Rod Drift	21
Oil Leakage Test for		Visual Checks	19
Axial Piston-Type Pump	25		
Operation Checks	20		

SPECIFICATIONS

NOTE: For Specifications with illustrations, make reference to the SPECIFICATIONS FOR 931B LOADER HYDRAULIC SYSTEM, Form No. SENR7933. If the Specifications in Form SENR7933 are not the same as in the Systems Operation and the Testing and Adjusting, look at the printing date on the back cover of each book. Use the Specifications in the book with the latest date.

NOTE: The "C" is an indication of a change from the former issue.

JENSALES.COM

or Call 800-443-0625

CLICK ANYWHERE FOR MORE DETAILS

CLICK ANYWHERE FOR MORE DETAILS

SPECIFICATIONS

Actuator for Boom Swing	15	Cylinder for Stick	16
Control Valve (3G646)	13	Pump, Hydraulic (3G2873, 3G4096)	10
Control Valve (3G5634)	14	Pump, Hydraulic (8J4515, 3G5386)	12
Cylinder for Boom	15	Servo Valve (3G3710)	11
Cylinder for Bucket	16	Servo Valve (3G7421)	11
Cylinder for Stabilizer (Fixed Pivot)	17	Torque Chart	7
Cylinder for Stabilizer (Side Shift)	17		

SYSTEMS OPERATION

Backhoe Hydraulic System	18	Swing Actuator	28
Control Valve for Backhoe	20	Valve Section for Boom, Stick and Swing	24
Cushion Valve in Swing Actuator	28	Valve Section for Bucket in CLOSE Position	23
Hydraulic Pump (Axial Piston-Type)	26	Valve Section for Bucket in DUMP Position	22
Relief Valves	25	Valve Section for Bucket, Left and Right Stabilizers	20
		Valve Section for Swing in SWING RIGHT Position	24

TESTING AND ADJUSTING

Backhoe Hydraulic System	30	Relief Valve Adjustment	35 [®]
Checking Pump Efficiency	30	Relief Valve Test	34
Hydraulic Pump (Axial Piston-Type)	32	Servo Valve Adjustment	33
Oil Leakage Test for Axial Piston-Type Pump	35	Servo Valve Pressure Test	32
Operation Times	31	Tests for Drifts of Cylinder Rods	31
Performance Test List	30	Stabilizer Cylinders	31
Relief Valves	34	Stick and Boom Cylinders	31
		Too Much Cylinder Rod Drift	31
		Visual Checks	30

DISASSEMBLY AND ASSEMBLY

Index for Disassembly and Assembly	37
--	----

JENSALES.COM

or Call 800-443-0625

CLICK ANYWHERE FOR MORE DETAILS

INDEX

SPECIFICATIONS

Actuator Groups:		Mounting and Control Groups	21
Rotary	18	Pins and Bearings for Bucket Linkage	22-25
Swing	17	Pump, Hydraulic:	
Backhoe Frame	17	Backhoe	10
Cylinders:		D3B Implement	13
Boom	19	931B Implement	12
Bucket	20	Torque Chart	7
Stabilizer (Fixed Pivot)	21	Valves:	
Stabilizer (Side Shift)	20	Control Valve for Backhoe	14
Stick	19	Main Relief Valve	16
Lines, Plugs and Fittings	8	Relief Valve Adjustment	16
		Sections of the Backhoe Control Valve	15
		Servo Valve	11

SYSTEMS OPERATIONS

Backhoe Hydraulic System	26	Section for Bucket in CLOSE Position	32
Introduction - Backhoe Hydraulic System	26	Section for Bucket in DUMP Position	31
Pump, Hydraulic	36	Section for Stick in IN Position	35
Swing Actuator	39	Section for Stick in OUT Position	34
Valves:		Section for Swing	35
Control Valve for Backhoe	29	Section for Swing in Swing Left Position	35
Section for Boom and Stick	33	Section for Swing in Swing Right Position	35
Section for Bucket and Left and Right Stabilizers	30	Relief Valve	35
		Main Relief Valve	36
		Protective Relief Valve	36
		Relief Valve for Swing Actuator	36
		Servo Valve for D3B	38
		Servo Valve for 931B	37

TESTING AND ADJUSTING

Backhoe Hydraulic System	40	Release of Pressure in the Hydraulic System	43
Checking Pump Efficiency	41	Relief Valves	44
Operation Checks	42	Boom, Stick and Main Pressure Adjustment	47
Operation Times	42	Boom, Stick and Main Pressure Test	46
Performance Test List	41	Swing Adjustment	46
Pump, Hydraulic	43	Swing Test	45
Oil Leakage Test for Axial Piston-Type Pump	47	Tests for Drifts of Cylinder Rods	42
Servo Valve	43	Stabilizer Cylinders	42
Servo Valve Adjustment	43	Stick and Boom Cylinders	42
		Too Much Cylinder Rod Drift	43

DISASSEMBLY AND ASSEMBLY

Index for Disassembly and Assembly	49
------------------------------------	----

INDEX

Backhoe Stabilizers (FP)	89	Piston Hydraulic Pump	106
Backhoe Service Warning	50	Piston Hydraulic Pump, Disassemble & Assemble	110
Boom and Boom Cylinder (FP)	59		
Boom and Boom Cylinder (SS)	64	Sideshift Lock Cylinder (SS)	101
Bucket (Backhoe)	52	Sideshift Lock Cylinder Control Valve (SS)	98
Bucket Cylinder	55	Stabilizer Cylinders (FP)	70
Bucket Linkage	53	Stabilizer Cylinders (SS)	71
		Stick Cylinder	69
Console	89	Swing Actuator	80
		Swing Actuator, Disassemble & Assemble	82
Frame (FP)	103	Swing Frame (FP)	86
Frame (SS)	104	Swing Frame and Sliding Frame	87
Hoe Stick	57	Tips and Sidecutters	51
Hydraulic Control Valves	92	FP - Fixed Pivot Backhoe	
Hydraulic Cylinders, Disassemble & Assemble	73	SS - Side Shift Backhoe	
Hydraulic Oil Cooler	121		

 WARNING

**DISCONNECT BATTERIES
BEFORE PERFORMANCE
OF ANY SERVICE WORK.**

purchase full manual at

JENSALES.COM
or Call 800-443-0625

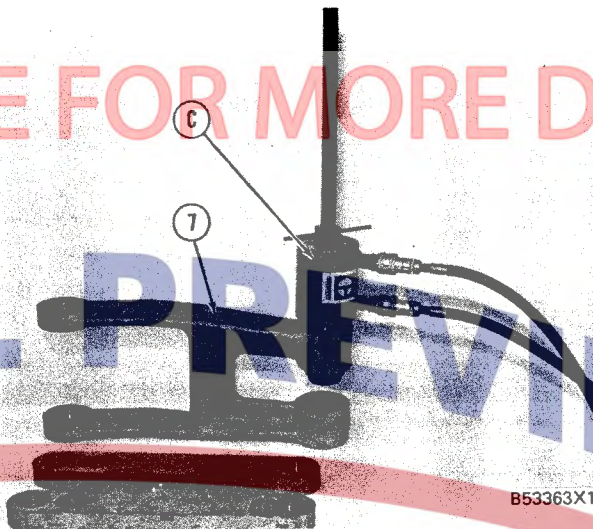
CLICK ANYWHERE FOR MORE DETAILS

BUCKET LINKAGE

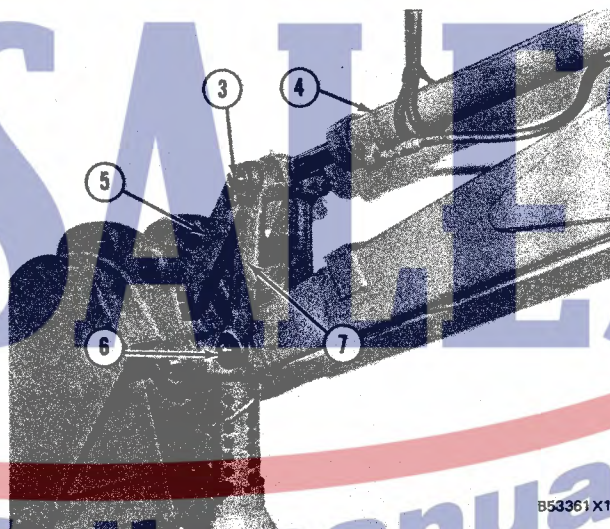
10. Use tooling (C) to install the bearings.

NOTE: Lower the temperature of the bearings to -40°C (-40°F) before installation.

11. Install the two large bearings in link (7) even with the outside edge of the link.



12. Put link assembly (7) in position on the stick frame and install pin (6), washers and cotter pins.



13. Make an alignment of the hole in link assembly (7) with rod eye in cylinder (4).

14. Install pin (3) with a link assembly (5) on either side of link assembly (7).

15. Install the washers and cotter pins.

16. Fasten a nylon strap and hoist to the bucket.

17. Move the bucket to permit pin (2) and spacer (8) to be installed through the bucket and links (5).



CONTENTS

COMFORT ITEMS	
Operator's Seat	4
Pressurizer	4
Air Conditioner	5
Heater	5
PROTECTIVE ITEMS	
Horn	6
Windshield Wiper/Washers	6
Parking Brake	6
Backup Alarm	7
OPERATOR COMPARTMENT	
CONTROL GROUPS	
Hydraulic Controls (931B)	9
Hydraulic Controls (D3B)	9
Ripper Control	10
Governor Control	10
Governor Control—Attachment	11
Transmission Selector Control	11
Transmission Lock Lever	11
Steering Controls	12
Brakes	12
ELECTRICAL SYSTEMS	
Instrument Panel	14
ELECTRICAL TROUBLESHOOTING	17-45
ELECTRICAL SCHEMATICS	47

MANUAL PREVIEW

JENSALES®

purchase full manual at

JENSALES.COM
or Call 800-443-0625

CLICK ANYWHERE FOR MORE DETAILS

INDEX

Backup-Warning Alarm	32
Battery, D3B	28,29
Battery and Battery Frame, 931B	30,31
Cab, D3B	78-83
Cab Door Latch	74-77
Cab Pressurizer Group, D3B	71,72
Cab Window Glass	17,18
Dome Light	8,9
Doors	14
Fan Blower Switch	7
Horn and Horn Switch	7
Hydraulic Control Levers (3F/3R-D3B)	54-59
Hydraulic Control Levers (3F/1R-931B)	60-65
Instrument Panel	19-21
Instrument Panel, Disassemble & Assemble	22-27
Mirror	8
Roll-Over Protective Structure	73
Seat and Seat Frame	10,11
Seat Belt	12
Sound Suppression	33
Steering and Brake Pedals	66,67
Steering and Brake Pedals, Disassemble & Assemble	67-70
Transmission and Governor Control Linkage, D3B	34-43
Transmission and Governor Control Linkage, 931B	44,45
Transmission and Governor Control Linkage, 931B, Disassemble & Assemble	46-53
Windshield Washer Group	12
Windshield Wiper Motor	15,16
Wiper Arm Linkage Assembly	13
Wiper Blades	14

⚠ WARNING

**DISCONNECT BATTERIES
BEFORE PERFORMANCE
OF ANY SERVICE WORK.**

JENSALES.COM
or Call 800-443-0625