



J.I. Case

Service Manual

4490 & 4690

4WD

Volume 1 of 4

Service Manual

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CA-S-4490,4690

DIESEL ENGINE SPECIFICATIONS

General

Type	Six Cylinder, Four Stroke Cycle, Turbocharged, Valve in Cylinder Head, Intercooled
Firing Order	1-5-3-6-2-4
Bore	4-5/8 Inches (117.5 mm)
Stroke	5 Inches (127 mm)
Piston Displacement	504 Cubic Inches (8 259 cm ³)
Compression Ratio	15.75 to 1
Cylinder Sleeves	Wet Type, Can be Removed
Governor Engine Speed Without Load	2340 to 2380 RPM
Rated Engine Speed	2200 RPM
Engine Idle Speed	725 to 775 RPM
Rocker Arm-to-Valve Clearance (Exhaust)	0.025 Inch (0.635 mm)
(Intake)	0.015 Inch (0.381 mm)

IMPORTANT: *Rocker Arm-to-Valve clearance adjustment must be made when the engine is not running.*

Piston and Rod

Rings Per Piston	3
Compression Rings Per Piston	2
Oil Rings Per Piston	1
Type Piston Pin	Full Float
Type Bearings	Replacement Bearings Available, Steel Back with Aluminum or Copper and lead liners.

Main Bearings

Quality of Bearings	7
Type of Bearings	Replacement Bearings Available, Steel Back With Aluminum or Copper and Lead Liners.

Engine Lubrication System

Oil Pressure	45 to 60 PSI (310 to 414 kPa)(3.1 to 4.14 bar) with Engine Warm and Operating at Rated Speed.
Type System	Pressure and Spray with Piston Oil Cooling
Oil Pump	Gear Type
Oil Filters (2)	Full Flow, Turn on Type, ByPass Valve in Filter Base.
Oil Capacity	With Filters, 28 U.S. Quarts (27 litres) Without Filters, 24 U.S. Quarts (23 litres)
Oil Cooler	Engine Oil

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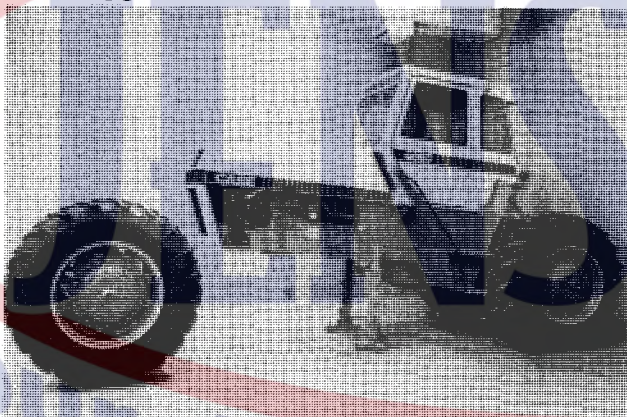
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STEP 82

Use the frame jacks and raise the tractor frame off the front axle until there is clearance between the oil pan and differential housing. Install the safety pins in the jack stands.

STEP 84

Axle assembly removed from tractor. For service work on axle assembly see your Case Service Manual.

STEP 83

Remove the front axle assembly.

Front Axle Installation**STEP 85**

Install the front axle to the tractor frame by following the reverse order of Steps 83 through 76 and Steps 40 through 32.

STEP 86

Tighten the 7/8" axle retaining bolts to a torque of 600 to 720 ft. lbs. (814 to 976 Nm) (81.4 to 97.6 kgm). Tighten the 1-1/8" bolts to a torque of 1300 to 1400 ft. lbs. (1 763 to 1 898 Nm) (176.3 to 189.8 kgm).

ENGINE TUNE-UP

A COMPLETE ENGINE TUNE-UP MUST INCLUDE ALL OF THE FOLLOWING ITEMS:

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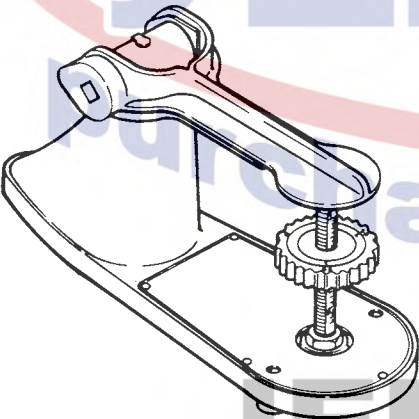
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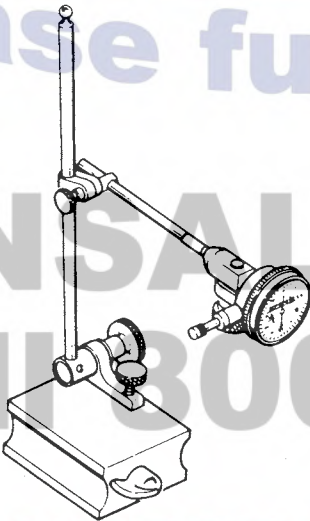
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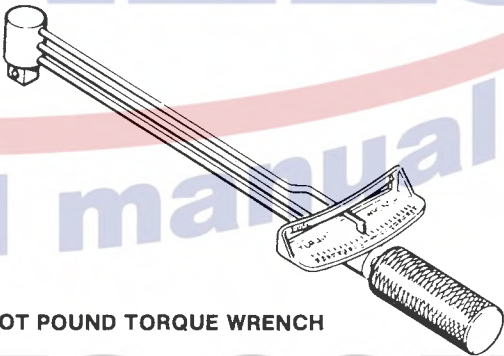
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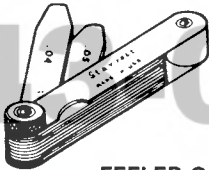
CAS-1357
SPRING TESTER



DIAL INDICATOR



FOOT POUND TORQUE WRENCH



FEELER GAUGE

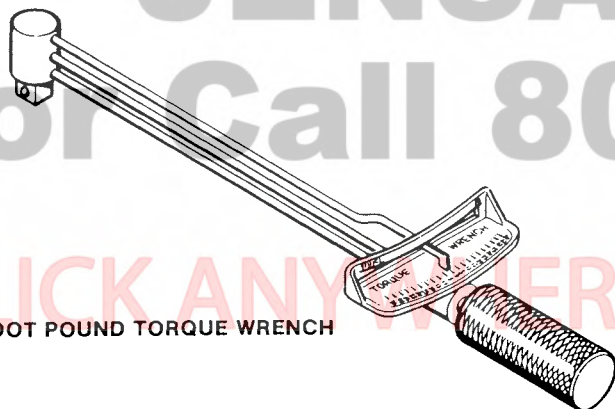
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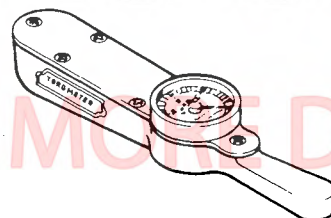
SPECIFICATIONS

Type	Pressure System, Thermostat Controlled By-Pass, Impeller Type Pump
Pressure Cap	10 PSI (69 kPa)
Thermostats	Start To Open At Approximately 175° F (79° C) Fully Open At Approximately 202° F (94° C)
System Capacity	(4490 Tractors) 44 U.S. Quarts (41.6 Litres) (4690 Tractors) 48 U.S. Quarts (45.4 Litres)

SPECIAL TOOLS



FOOT POUND TORQUE WRENCH



CAS-10066
INCH POUND TORQUE WRENCH

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SPECIFICATIONS

	U.S. Value	Metric Value
Turbine Wheel Horizontal Movement	0.001 to 0.004"	0.0254 to 0.1016 mm
Turbine Wheel Vertical Movement	0.003 to 0.006"	0.0762 to 0.1524 mm
Back Plate Seal Bore Maximum ID	0.5010"	12.725 mm
Thrust Collar Ring Groove Width	0.066"	1.676 mm
Thrust Collar Bearing Groove Width	0.1752"	4.450 mm
Center Housing Bearing Bore Maximum ID	0.6228"	15.819 mm
Turbine Wheel Bearing Journal Minimum ID		
Standard	0.3994"	10.145 mm
0.005" (0.127 mm) Undersize Shaft	0.3944"	10.018 mm
0.010" (0.254 mm) Undersize Shaft	0.3894"	9.891 mm
Turbine Wheel Blade Top Thickness (Minimum)	0.025"	0.635 mm
Turbine Wheel Ring Groove Width (Maximum)	0.0735"	1.867 mm

SPECIAL TORQUES

	U.S. Value	Metric Value
Back Plate To Center Housing Mounting Bolt	75 to 90 in. lbs.	8.5 to 10.2 Nm
Compressor Wheel Lock nut	18 to 20 in. lbs.	2.0 to 2.3 Nm
Turbine Housing Mounting Bolt	100 to 130 in. lbs.	11.3 to 14.7 Nm
Compressor Housing Mounting Bolt	110 to 130 in. lbs.	12.4 to 14.7 Nm

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SPECIFICATIONS

ASPIRATED STRATA TUBE:

Service Interval One time per year minimum.

FINAL SAFETY ELEMENTS:

Primary Element Change Interval After every fourth cleaning or before if needed.

Safety Element Change Interval Long Service type element.
If the period of time between needed primary element cleanings is short, then change the safety element.

Primary Element Service Interval When warning lamp on instrument cluster illuminates.

AIR FILTER WARNING LAMP

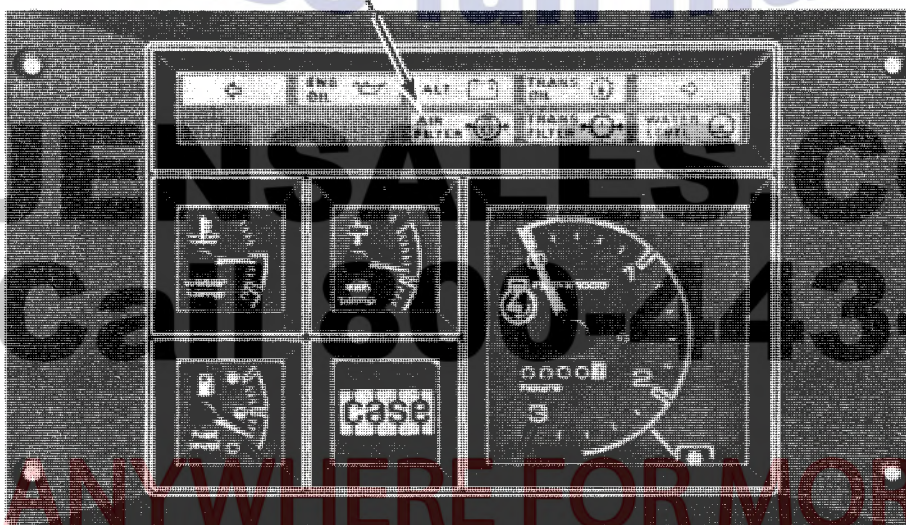


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Fuel Injection Pumps

SPECIFICATIONS

	U.S. Value	Metric Value
Type	Robert Bosch, PES, Multiple Plunger	
Rotation	Counterclockwise	
Mounting	Left Hand Side Of Engine	
Drive	Gear Driven At 1/2 Engine Speed	
Governor	Centrifugal Type Variable Speed, Flyweight-Component Part Of Pump	
Backlash, Idler Gear To Fuel Pump Gear	0.004 to 0.012"	0.102 to 0.305 mm
Lubrication	Engine Oil Under Pressure	

Timing

Timing Marks	Found On Crankshaft Pulley (0 Degrees To 35 Degrees BTC and 0 Degrees to 15 Degrees ATC).
Pump Timing	25 Degrees (BTC) Before Top Center. IMPORTANT: Do not increase past 25 degrees BTC at any time. The 25 de- grees gives minimum emissions in tractor operation.

Timing Pointer	60 to 72 in. lbs.	7 to 8 Nm (0.7 to 0.8 kgm)
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SPECIAL TORQUES

Fuel Pump Drive Hub Nut	94 to 108 ft. lbs. 128 to 146 Nm (13 to 14 kgm)
Fuel Pump Timing Pointer Screws	60 to 72 in. lbs. 7 to 8 Nm (0.7 to 0.8 kgm)



THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.



WARNING!

When testing or adjusting fuel injectors, do not place your hands or arms in front of the injector nozzle.



The fuel spray from an injector has sufficient penetrating power to puncture the flesh and destroy tissue. Should the fuel enter the blood stream, it may cause blood poisoning.

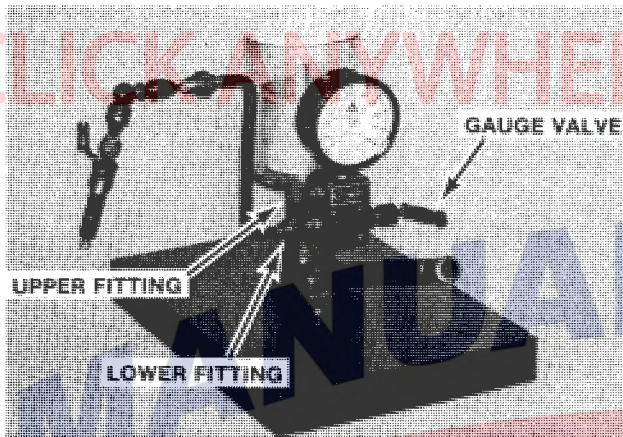
In the event the skin is punctured from the discharge of an injector, apply the following first aid immediately, then have the injury examined by a physician as quickly as possible.

Wash the injured part with boric acid solution, support the injured finger or hand with a splint and sling so the injured part will remain absolutely at rest until a physician can examine it.

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INJECTOR TEST STAND



IMPORTANT: The performance of an injector must be always checked on a test stand before the injector is disassembled. There is no need to disassemble or adjust the injector if the performance on the test stand is acceptable.

Test Stand Preparation

1. Open the gauge valve.
2. Fill the supply cup with fuel. A number of strokes of the pump handle will be necessary to remove the air that is in the system. There is a vent screw in the side of the housing. The screw is directly behind the lower discharge fitting. This screw is a priming assistance and the screw can be opened for complete ventilation.
3. The test stand has two discharge fittings to make testing easier. Connect the injector to the lower fitting when flushing the nozzle or checking the spray pattern. Close the gauge valve. This will separate the gauge and the nozzle from the test stand. The number of strokes of the pump handle can now be extended.

Connect the injector to the upper fitting when testing for leakage rates or pressure falls. Close the gauge valve. This will separate the gauge and nozzle from the test stand so that accurate measurements can be taken.

4. The lower discharge fitting is used for normal tests on hydraulically operated nozzles. The upper discharge fitting is used for leakage rate measurements.

A Diesel Fuel Injection Nozzle Tester (CAS-10091, Bench Model) is needed for checking and adjusting the injectors. The following instructions will work for all models of test stands except for descriptions on adjustments to the test stand. Operating instructions are given with the test stand.

An Injector Kit (CAS-10093) is needed for maintenance of the injectors.

The test stand is used to make the following checks:

1. Check and adjust the injector opening pressure.
2. Check the injector assembly for fuel leakage.
3. Check the injector for an accurate spray pattern.

Fuel injectors must be checked on the test stand when making the following service operations:

1. An injector that has been removed from the engine for cleaning, must be checked on the test stand before the injector can be installed in the engine.
2. A new injector assembly must be checked on the test stand before the injector can be installed in the engine.
3. All the injectors must be removed and checked on the test stand during an engine overhaul.
4. An injector must be removed and checked on the test stand before the injector is disassembled, if the injector is the cause of engine performance that is not acceptable.

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STARTER OR TURNING MOTOR SPECIFICATIONS

DELCO-REMY

PART NUMBER		NO LOAD TEST					
		VOLTS	AMPERES		RPM		PINION
CASE	DELCO		MIN.*	MAX.*	MIN.	MAX.	CLEARANCE
A34442	1114125	9	140	215	4000	7000	.33" to .39"
A36583	1107583	9	50	80	5500	9000	.010" to .140"
A36582	1107584	9	50	80	5500	9000	.010" to .140"
A38413	1107874	9	40	140	8000	13000	.010" to .140"
A39839	1109143	9	40	140	8000	13000	.010" to .140"
A51873	1109190	9	50	80	5500	9000	.010" to .140"
A59217	1113689	9	130	160	5000	7000	.010" to .140"
A59670	1113688	9	75	105	5000	7000	.010" to .140"
A59671	1108426	9	35	75	6000	9000	.010" to .140"
A64906	1113405	9	75	105	5000	7000	.010" to .070"
A64907	1113399	9	130	160	5000	7000	.010" to .070"
A75864	1114704	9	140	215	4000	7000	.33" to .39"
D45731	1108688	9	40	140	8000	13000	.10" to .140"
A149056	1113399	9	130	160	5000	7000	.010" to .070"

*Includes solenoid switch

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SPECIFICATIONS



CASE PART NO.	DELCO- REMY NO.	FIELD CURRENT 80°F (27°C)		RATED COLD OUTPUT 75°F (24°C)			HOT 160°F (71°C)
		AMPERES	VOLTS	AMPERES	RPM	VOLTS	AMPERES
A47057	1102921	4.0-4.5	12	61	6000	13	56
A147159	1102928	4.0-4.5	12	61	6000	13	56
A137256	1102907	4.0-4.5	12	61	6000	13	56
A47044	1102922	4.0-4.5	12	72	6000	13	64
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CAS-1426 SEAL TOOL KIT

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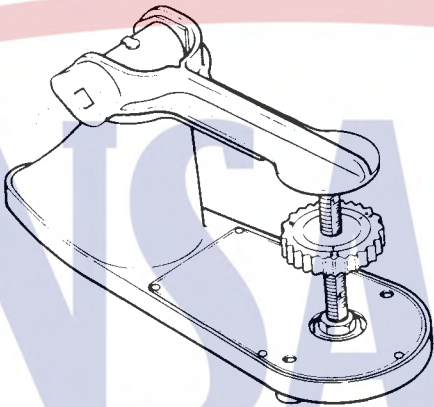
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SPECIAL TOOLS



COMPRESSION SPRING TESTER
CASE PART NO. CAS-1357

SPECIFICATIONS

	U.S. Value	Metric Value
RELIEF VALVE SPRING:		
Free Length	0.820"	20.828 mm
OD	0.256"	6.502 mm
Wire Diameter	0.045"	1.143 mm
No. of Coils	11.5	11.5
Compress to 0.627" (15.93 mm)	13.05 to 15.95 lbs.	58.05 to 70.95 N
FLOW DIVIDER SPOOL SPRING:		
Free Length	2.192"	55.68 mm
Wire Diameter	0.061"	1.55 mm
OD	0.512"	13.0 mm
No. of Coils	11.5	11.5
Compress to 1.03" (26.16 mm)	22.05 to 26.95 lbs.	98.1 to 119.9 N
RELIEF VALVE SPOOL SPRING:		
Free Length	2.217"	56.312 mm
OD	0.625"	15.875 mm
Wire Diameter	0.055"	1.397 mm
No. of Coils	11	11
Compress to 1.297" (32.94 mm)	6.79 to 8.29 lbs.	30.2 to 36.9 N

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SPECIFICATIONS

	U.S. Value	Metric Value
Valve Spool Spring:		
Free Length	2.0"	50.8 mm
OD	0.840"	21.34 mm
Wire Diameter	0.121"	3.07 mm
Number of Coils	10.5	10.5
Compress to 1.406" (35.71 mm)	54.2 to 66.2 lbs.	241 to 294 N
Compensator Check Poppet Spring:		
Free Length	0.496"	12.6 mm
OD	0.156"	3.96 mm
Wire Diameter	0.018"	0.46 mm
Number of Coils	16	16
Compress to 0.437" (11.1 mm)	0.216 to 0.264 lbs.	0.96 to 1.17 N

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 (4490 and 4690 Tractors)

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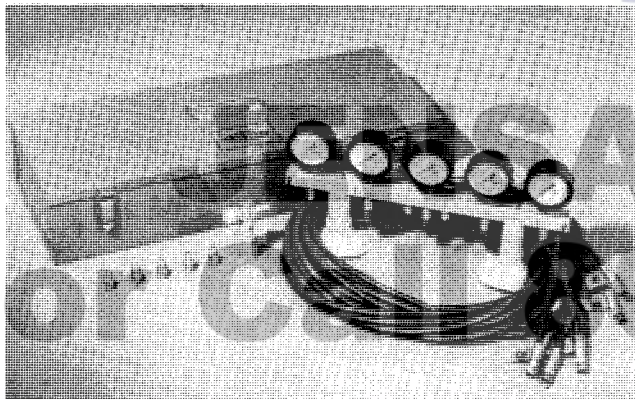
SPECIAL TOOLS

The hydraulic connectors and gauges needed for the following tests are available from Service Tools:

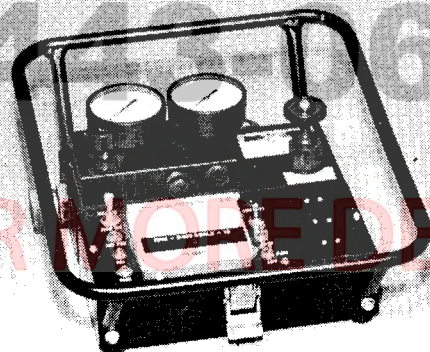
Service Tools
P.O. Box 314
Owatonna, Minnesota 55060



CAS-1072 CLUTCH MONITOR KIT



CAS-10130 PRESSURE TESTING KIT



CAS-10280 FLOWMETER

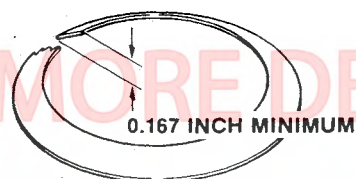
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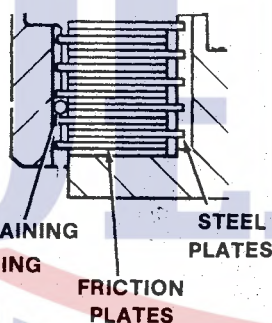
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STEP 110

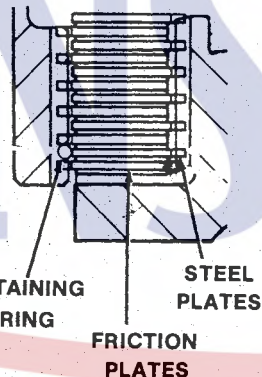
Install the ring gear (gear teeth up) on the C-3 clutch hub. The teeth of the friction clutch plates must engage the ring gear teeth. The internal retaining ring of the ring gear must rest on the teeth of the friction clutch plate.

STEP 112

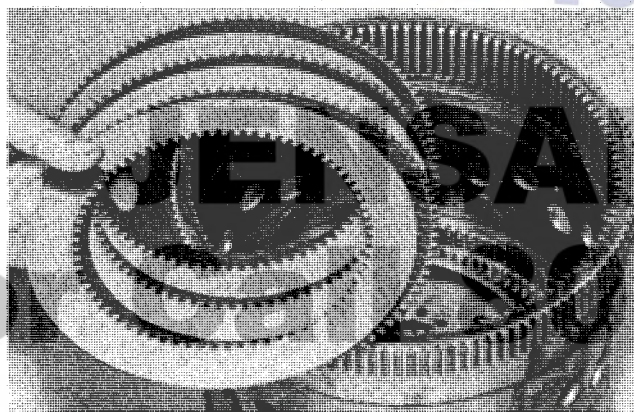
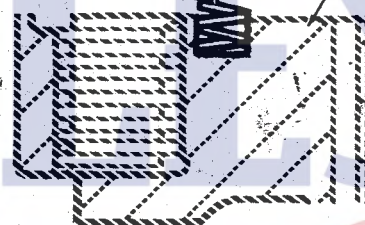
Check the Belleville springs for wear, round corners and scratches. Check the free height of the springs. Put the spring on a flat surface and measure from the upper edge of the inside diameter to the flat surface. Replace all the C-2 and C-3 Belleville springs if the height of a spring is less than 0.167" (4.242 mm).

STEP 111**4490 TRACTOR**RETAINING
RINGFRICTION
PLATESSTEEL
PLATES

TOTAL CLUTCH PLATES
FIVE FRICTION PLATES
FIVE STEEL PLATES

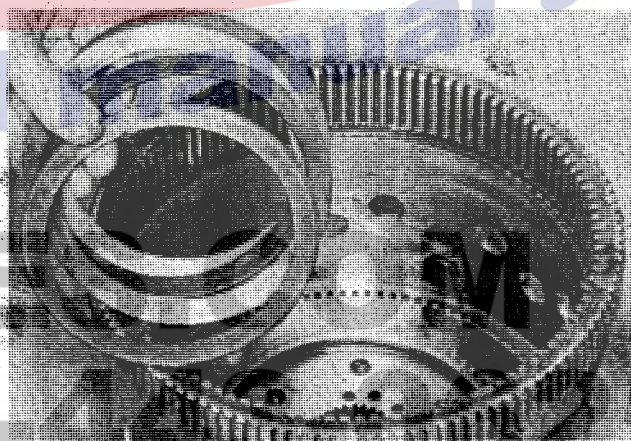
4690 TRACTORRETAINING
RINGFRICTION
PLATESSTEEL
PLATES

TOTAL CLUTCH PLATES
SIX FRICTION PLATES
SIX STEEL PLATES

STEP 113**FOUR BELLEVILLE SPRINGS****C-3 CLUTCH HUB**

Install the rest of the clutch plates into the ring gear starting with a friction plate and then a steel plate.

- 4490 Tractor - Three Friction Plates
- Three Steel Plates
- 4690 Tractor - Five Friction Plates
- Five Steel Plates



Install four Belleville springs into the recessed area of the C-3 clutch hub. Put the first spring in the hub so that the inside diameter of the spring is higher than the outside diameter of the spring. Put the second spring on top of the first spring so that the inside diameter of the spring is lower than the outside diameter of the spring. The third spring must be installed like the first spring. The fourth spring must be installed like the second spring. See the inset.

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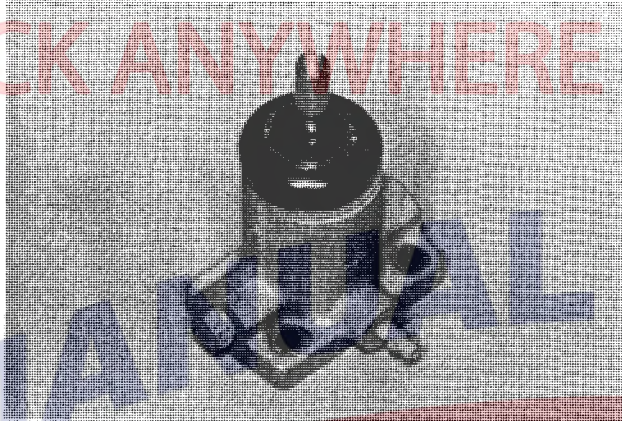
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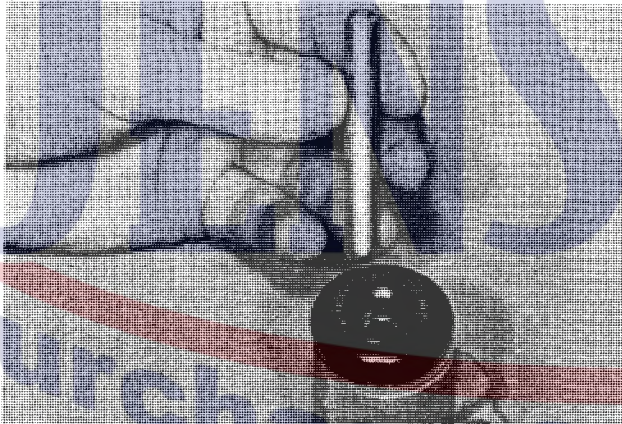
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BRAKE CYLINDER DISASSEMBLY**STEP 36**

Put the brake cylinder assembly on a clean work bench.

STEP 39

Remove the retaining snap ring for the brake piston.

STEP 37

Remove the push rod from the dust cover.

STEP 40

Remove the piston from the brake cylinder body.

STEP 38

Remove the dust cover from the brake cylinder body.

STEP 41

Remove the backup seal ring from the brake piston.

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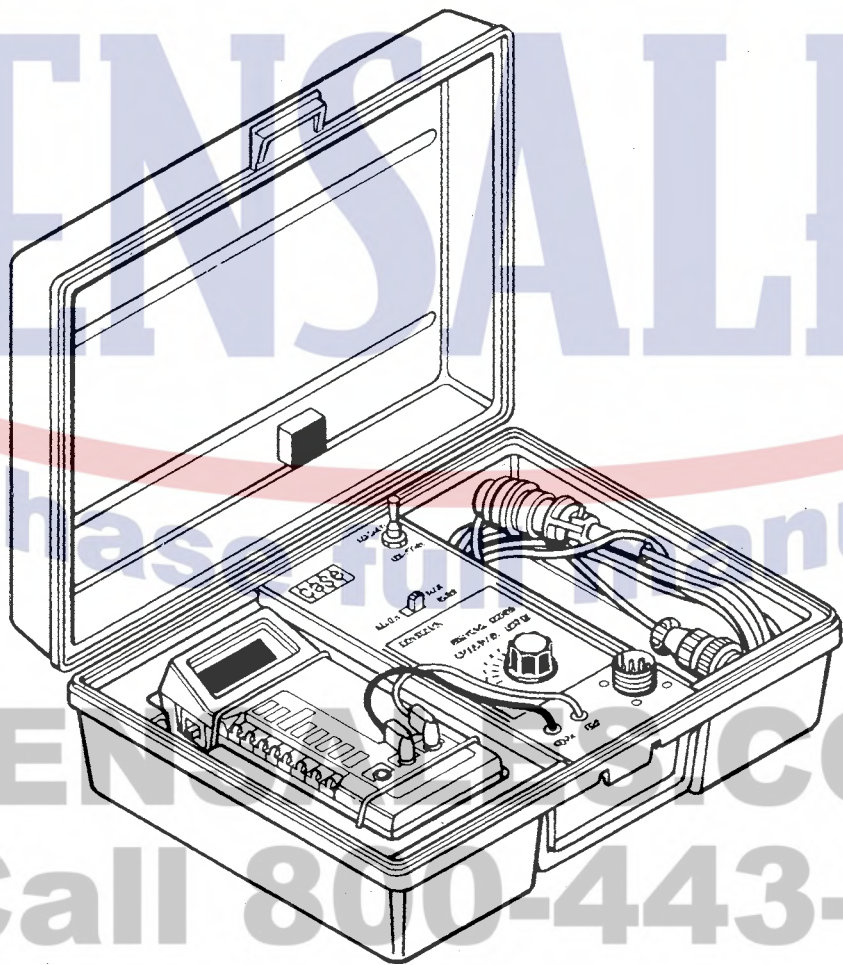
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HITCH/STEERING ELECTRONIC TESTER CAS-1638-1

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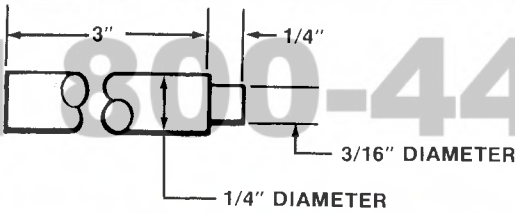
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SPECIAL TORQUES

	U.S. Value	Metric Value
Primary Shuttle Housing	3 to 6 ft. lbs.	4 to 8 Nm (0.4 to 0.8 kgm)
Detent Pivot Coupling	6 to 10 ft. lbs.	8 to 14 Nm (0.8 to 1.4 kgm)
Detent Housing Capscrews	6 to 10 ft. lbs.	8 to 14 Nm (0.8 to 1.4 kgm)
Secondary Shuttle Seat	3 to 5 ft. lbs.	4 to 7 Nm (0.4 to 0.7 kgm)
Flow Control Tube Capscrew	6 to 10 ft. lbs.	8 to 14 Nm (0.8 to 1.4 kgm)
Flow Control Assembly	18 to 22 ft. lbs.	24 to 30 Nm (2.4 to 3.0 kgm)
Filter Flange Screws	6 to 10 ft. lbs.	8 to 14 Nm (0.8 to 1.4 kgm)
End Cover Stud Nuts	18 to 20 ft. lbs.	24 to 27 Nm (2.4 to 2.7 kgm)

SPECIAL TOOLS

TOOL TO REMOVE SEAT FROM INLET COVER



NYLON ROD TO REMOVE DETENT PISTON



(7/16 x 6")

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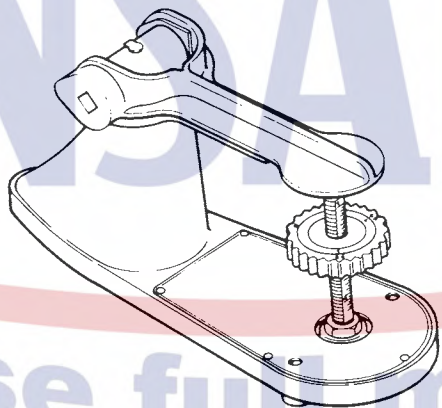
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SPECIAL TOOLS



COMPRESSION SPRING TESTER
CASE PART NO. CAS-1357

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