

500 Series Diesel Tractors and Engines

Service Manual

5675



SECTION

A

**Profit Through
"Qualified Case Diesel Service"**



**Requirements For a
"Qualified Case Diesel Service Department"**



**Service and Warranty Policy
Between Case Dealers and
Official American Bosch Diesel Fuel
Injection Service Stations**



**Outline For Performing a Periodic Check-Up
On a "500" Series Case Diesel Tractor**

Model "500" Case Diesel Tractor

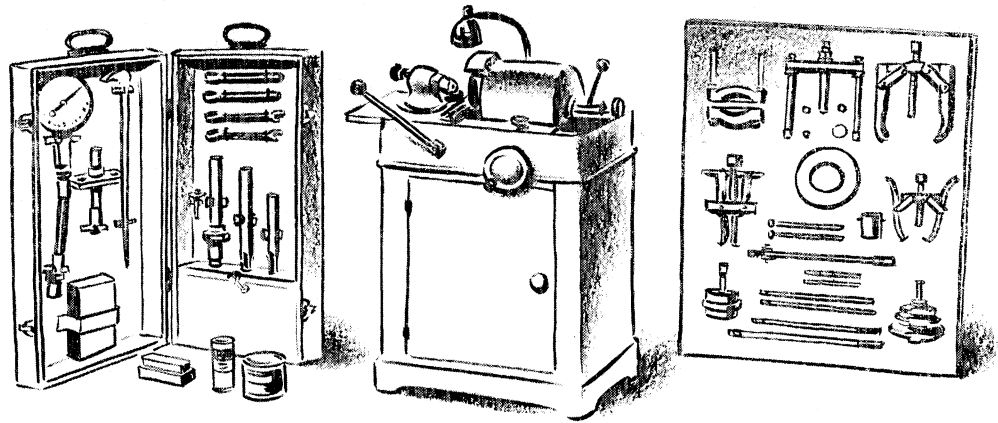
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SPECIAL SERVICE TOOLS



This section of the dealer's service manual contains descriptive and ordering information for the **Special Tools** items that are **REQUIRED** when servicing or overhauling "500" Series Case Diesel Tractors.

The tools listed on the following pages have been divided into four groups:

1. Special tool items that must be ordered directly from the manufacturer listed. (CD 500 Diagnosis Kit, Fuel Injector Testers and Lapping Plates, etc.)
2. Special Tool items that can be purchased through your local tool supplier who sells the listed manufacturer's line of tools. (Owatonna Tool Sets, Waldes Snap Ring Pliers, etc.)
3. Recommended items that can be purchased locally under more than one brand name. (Valve Refacers, Valve Seat Grinders, Reamers, etc.)
4. Special Tool items that can be purchased only through the J. I. Case Co.

Your Case Branch Supervisor of Service will provide you with additional tool information and with tool catalogs periodically as they become available. He will also be glad to assist you in determining the General Shop Service Tools that are needed by your Service Department.

PROPER TOOL EQUIPMENT PLUS TRAINED MECHANICS	- - Equals - -	\$ -SHOP PROFITS-\$ AND \$-INCREASED SALES VOLUME-\$
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MODEL: "500" CASE DIESEL ENGINE DIAGNOSIS AND SERVICE TOOL KIT

The CD 500 Engine Diagnosis Kit has been especially designed to provide the Case dealer with the precision instruments, gauges, reamers, and special tools necessary to perform many of the essential service operations on the Model "500" Case diesel tractor. The CD 500 Diagnosis Kit is a **required** special tool item in the Case Dealer's Service Department.

Ordering Information

The CD 500 Engine Diagnosis and Service Tool Kit must be purchased from the Diesel Gauge and Tool Company, 4101 Barham, Detroit 24, Michigan.

NOTE: The Case Company does not stock these tools. They must be ordered directly from the Diesel Gauge and Tool Company.

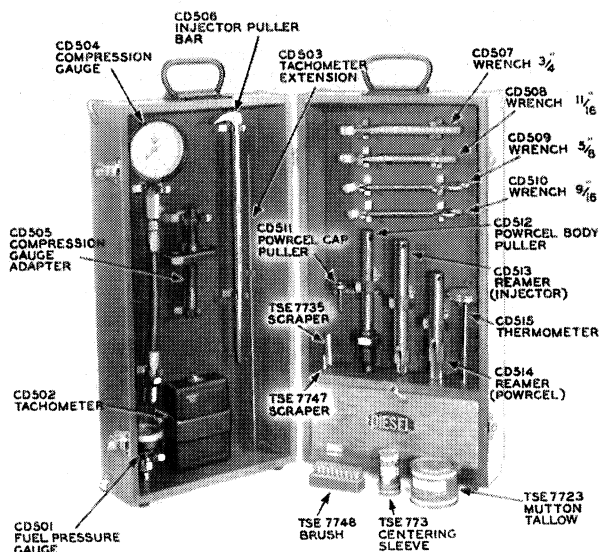


Figure B-1. CD-500 Engine Diagnosis and Service Kit

THE COMPLETE CD 500 ENGINE DIAGNOSIS KIT INCLUDES THE FOLLOWING ITEMS:

Part Number	Description	Purpose
CD 501	Fuel Pressure Gauge (0-60 PSI) (Complete with Snubber)	To check condition of first and second stage filters.
CD 502	Tachometer (Jagabi) — (Includes Carrying Case, Two Rubber Tips)	To check engine RPM.
CD 503	Tachometer Extension	To allow engine RPM to be taken from front of crankshaft.
CD 504	Compression Gauge (0-800 PSI)	To check cylinder compression with engine running.
CD 505	Compression Gauge Adapter	Replaces fuel injector in cylinder being tested for compression.
CD 506	Injector Puller Bar	To remove fuel injectors from cylinder head.
CD 507	Wrench ($\frac{3}{4}$ " — Open End Box)	Used to remove high pressure fuel lines from pump and injectors.
CD 508	Wrench ($\frac{11}{16}$ " — Open End Box)	Used to remove low pressure fuel line from 1st stage filter to transfer pump.
CD 509	Wrench ($\frac{5}{8}$ " Open End and Open End Box)	Used to remove low pressure fuel lines — second and third stage filters.
CD 510	Wrench ($\frac{9}{16}$ " Open End and Open End Box)	Used to remove 1st stage filter by-pass line, fuel return lines, etc.
CD 511	Puller (Powrcel Cap)	To remove the Powrcel cap from the cylinder head for servicing.
CD 512	Puller (Powrcel Body)	To remove the Powrcel body from the cylinder head for servicing.
CD 513	Carbon Reamer (Injector Seat)	To remove carbon deposits from the cylinder head to insure that the injector will seat in the cylinder head without compression leakage.
CD 514	Carbon Reamer (Powrcel Seat)	To remove carbon deposits from Powrcel seat in cylinder head to insure proper seating of the Powrcel when it is replaced.
CD 515	Thermometer (Weston — 50°-300°)	To accurately check coolant temperature.
TSE 773	Nozzle Centering Sleeve	To center nozzle when reassembling injector.
TSE 7723	Mutton Tallow	Used in cleaning nozzle body and lapped surfaces of nozzle body, nozzle holder and Powrcel.
TSE 7735	Nozzle Valve Seat Scraper	Removing deposits from nozzle body.
TSE 7747	Nozzle Body Pressure Chamber Scraper	Removing deposits from nozzle body.
TSE 7748	Brass Wire Brush	Cleaning outside surface of nozzle body.

The CD 500 Engine Diagnosis and Service Tool Kit is essential to the servicing of the Model "500" Case Diesel. Use it to increase the efficiency of your service department.

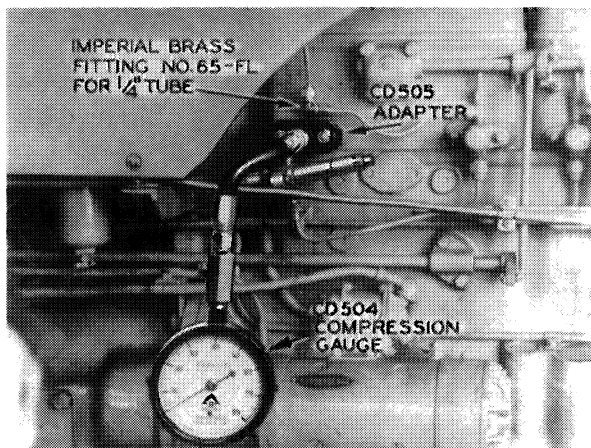


Figure B-2

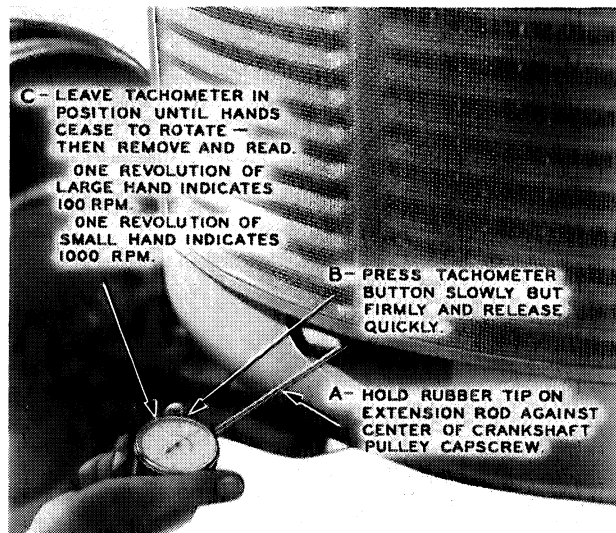


Figure B-5

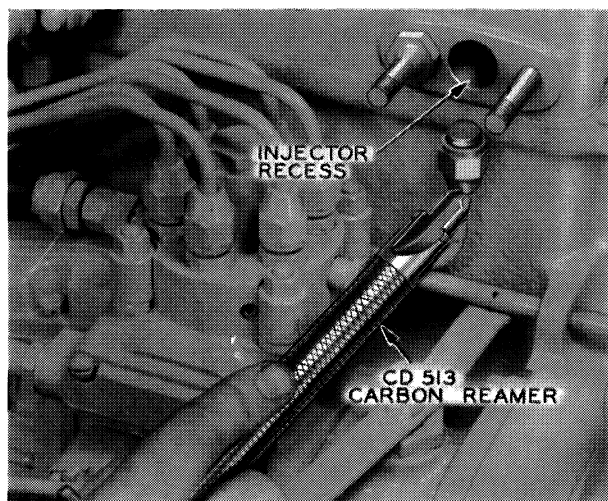


Figure B-3

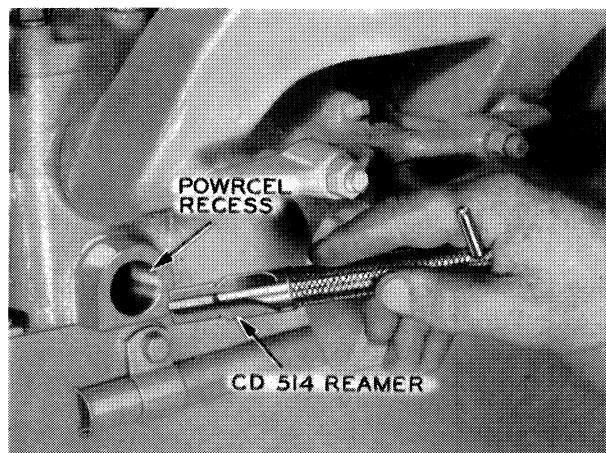


Figure B-6

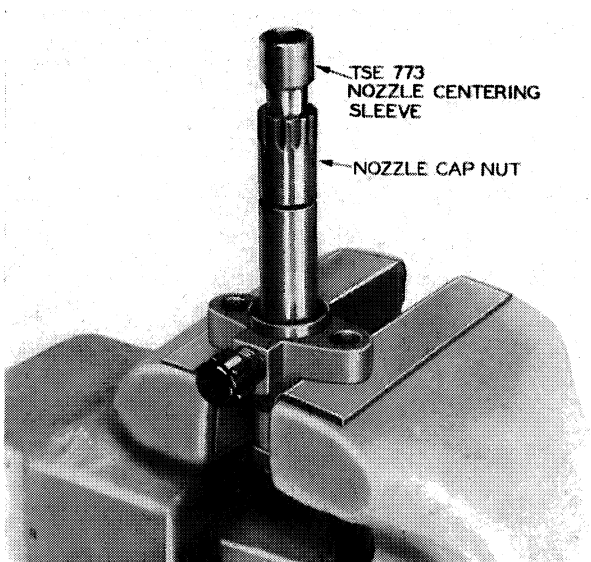


Figure B-4

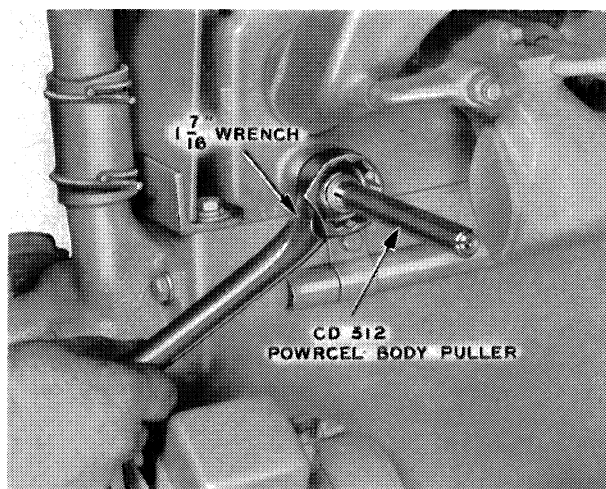


Figure B-7

FUEL INJECTOR TEST STANDS AND LAPPING PLATES

The Injector Nozzle Test Stands shown in Figures B-8 and B-9 are precision instruments especially designed to test the performance of the Fuel Injectors.

The Fuel Injector Test Stand (together with lapping plates and cleaning tools) is a **required** special tool item in the authorized Case Dealers Service Department.

The following Injector Test Stands, Adaptors, and Lapping Plates are approved for use by Authorized Case dealers.

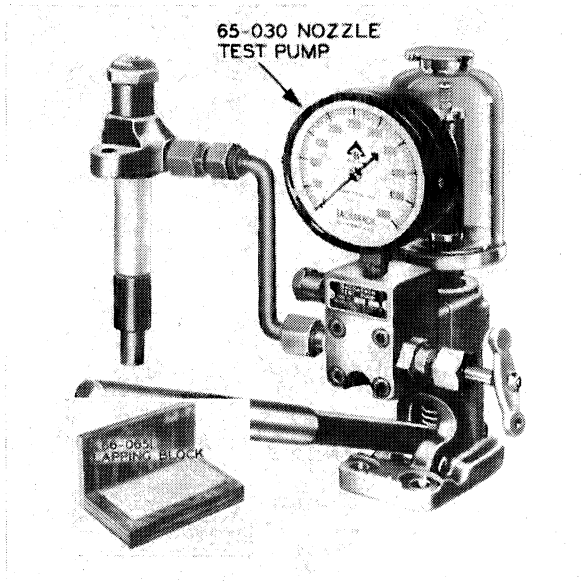


Figure B-8. Bacharach Nozzle Test Pump (Code 65-030) and Lapping Block (Code 66-0651)

ORDERING INSTRUCTIONS

The Bacharach Nozzle Test Pump (code 65-030) and Lapping Block (code 66-0651) must be ordered from the Bacharach Industrial Instrument Company 7301 Penn Ave., Pittsburg 8, Pa.

Price information can be obtained from the descriptive pamphlet which has been distributed to you by your Case Branch.

IMPORTANT

Be sure to order the N7 — N16 — N-1 — N4 connector combination with the Bacharach Nozzle Test Pump (Code 65-030)

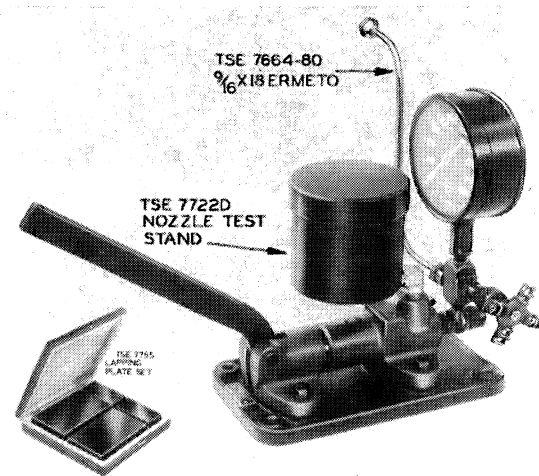


Figure B-9. American Bosch TSE 7722D Nozzle Test Stand (complete with tubing and TSE 7664-80 $\frac{9}{16}$ x 18 ERMETO Adaptor) and TSE 7755 Lapping Plate

ORDERING INSTRUCTIONS

The American Bosch TSE 7722D Nozzle Test Stand and TSE 7755 Lapping Plate Set can be ordered in one of the following two ways:

1. From: your local American Bosch Central Distributor. (Your Branch Supervisor of Service can give you the correct name and address.)
2. From: The American Bosch Corporation Springfield 7, Mass.

IMPORTANT

Be sure and order the TSE 7664-80 $\frac{9}{16}$ x 18 ERMETO Adaptor with the TSE 7722D Nozzle Test Stand.

NOTE: The Case Company does not stock these tools.

THE NOZZLE TEST STAND IS USED TO PERFORM THE FOLLOWING CHECKS ON FUEL INJECTORS

- Check and adjust the nozzle opening pressure.
- Check the nozzle holder and nozzle assembly for leakage.
- Accurately check the spray pattern.

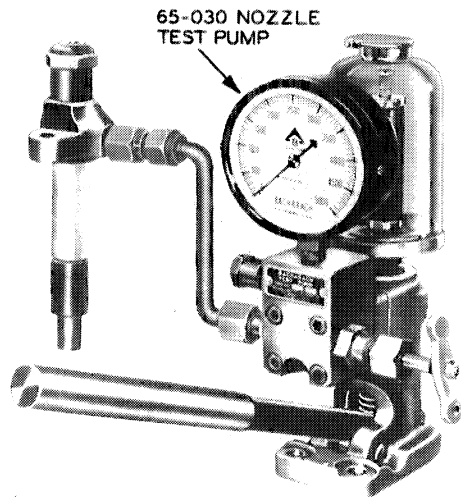


Figure B-10. Checking the Fuel Injectors with the 65-030 Bacharach Nozzle Test Stand

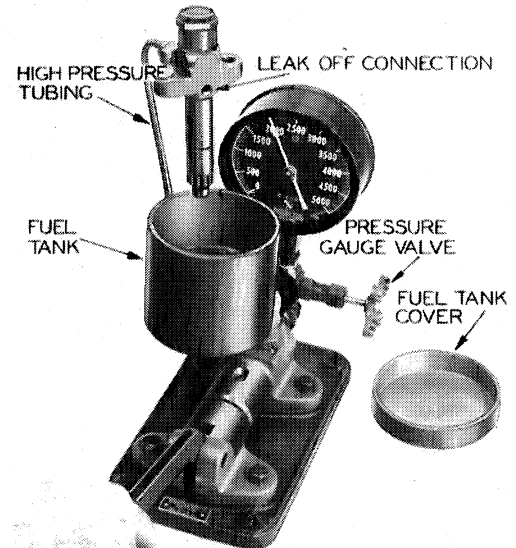


Figure B-11. Checking the Fuel Injector with the TSE 7722D Nozzle Test Stand

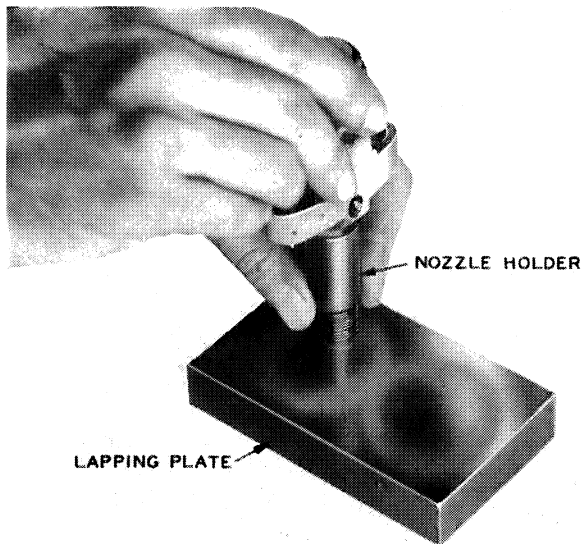


Figure B-12

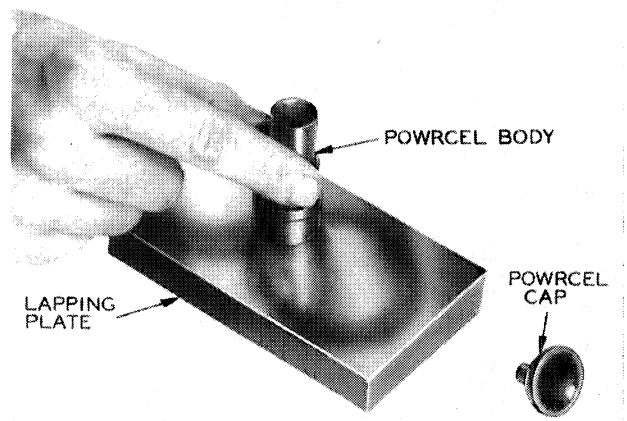


Figure B-13

The Lapping Plate is Used to Clean the Lapped Surfaces of the Fuel Injectors and Powrcel

IMPORTANT

The Lapping Plate is to be used for
CLEANING ONLY and NOT FOR
LAPPING.

OWATONNA SERVICE TOOL SET

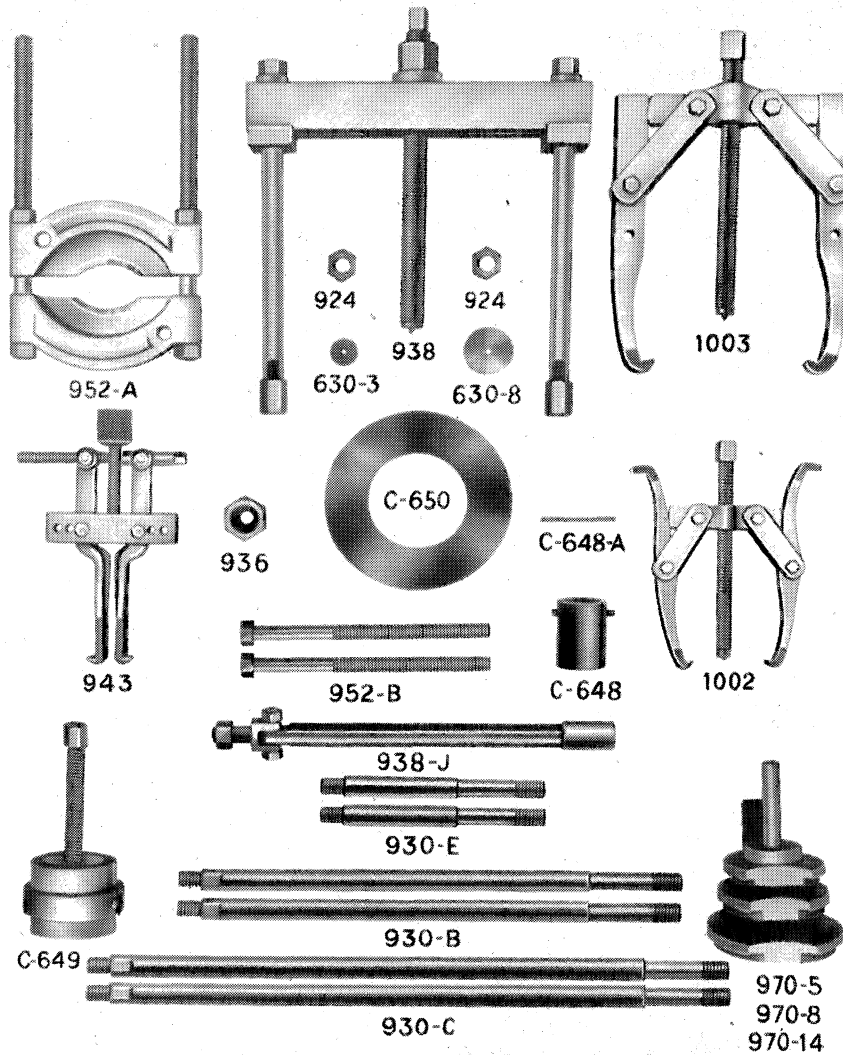


Figure B-14. Basic Owatonna Service Tool Set

Figure B-14 illustrates the basic Owatonna Service Tool Set that is required to service all Case Tractors and engines.

The Owatonna Tool Company has recently conducted a tool study of the Model "500" Case Diesel Tractor and is preparing a supplementary tool set that will contain additional pullers that are required for servicing the Model "500".

A new Owatonna tool catalog containing ordering and descriptive information on these additional items will be available soon and will be provided to you by your Case Branch Supervisor of Service.

SPECIAL SNAP RING TOOLS

(Purchased Locally)

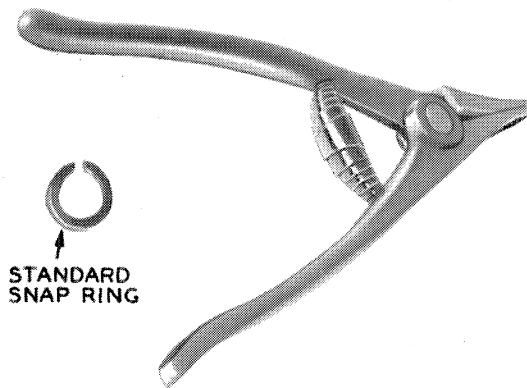


Figure B-15. Illustrates Standard Type Snap Ring and the Pliers Used To Remove and Install Them.

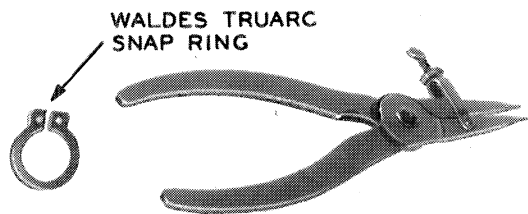


Figure B-16. Illustrates Waldes Truarc Snap Ring and Snap Ring Pliers



Figure B-17. Waldes Truarc "E" Ring and "E" Ring Applicator

Standard Type Snap Rings can be installed and removed with the type of snap ring pliers illustrated in Figure B-15. Purchase these pliers from your local tool supplier.

Waldes Truarc Snap Rings can be installed and removed more easily with the type snap ring plier illustrated in Figure B-16. In servicing the Model "500" Diesel Tractor, two different sizes will be required.

Number 2 Waldes Truarc Plier (used to remove the snap ring located on the valve Rocker Arm Shaft.)

Number 4 Waldes Truarc Snap Ring Plier (Used to remove the snap rings located at the front of the PTO drive shaft, and on the Fuel Injection Pump Drive Shaft.)

NOTE: The above Waldes Truarc pliers are also available with bent tips at angles of 30°, 45°, 60°, and 90°.

The **"E" Rings** located on the Traction Clutch and PTO Clutch assemblies can be installed more easily by using the "E" Ring Applicator, Figure B-17. In servicing the Model "500", four sizes of Waldes Truarc "E" Ring Applicators will be required.

E-25 (Used for installing "E" Ring on the PTO Clutch Pin.)

E-37 (Used for installing "E" Rings on PTO Clutch pin.)

E-43 (Used for installing "E" Rings located on the Traction Clutch Lever Guide Pin.)

E-50 (Used for installing "E" Rings located on the Traction Clutch Lever Pivot Pin.)

NOTE

If the Waldes Truarc Snap Ring Pliers and "E" Ring Applicator cannot be purchased locally, they can be ordered from the Wisconsin Bearing Company, 915 N. Market Street, Milwaukee 2, Wisconsin.

VALVE AND CYLINDER HEAD SERVICE TOOLS

Valve Refacer and Valve Seat Grinder

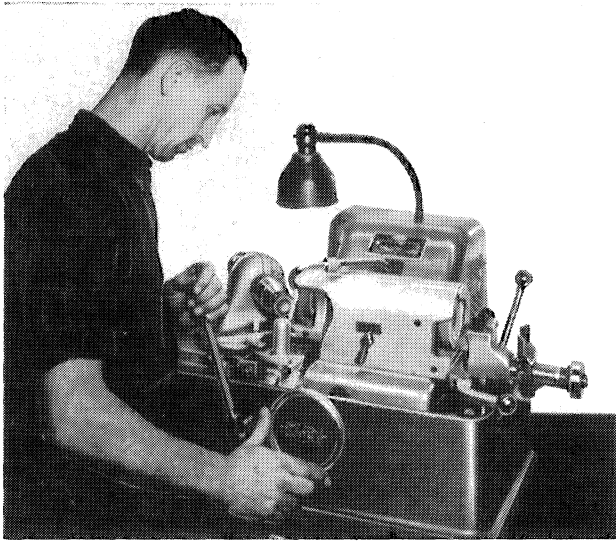


Figure B-18. Valve Refacer

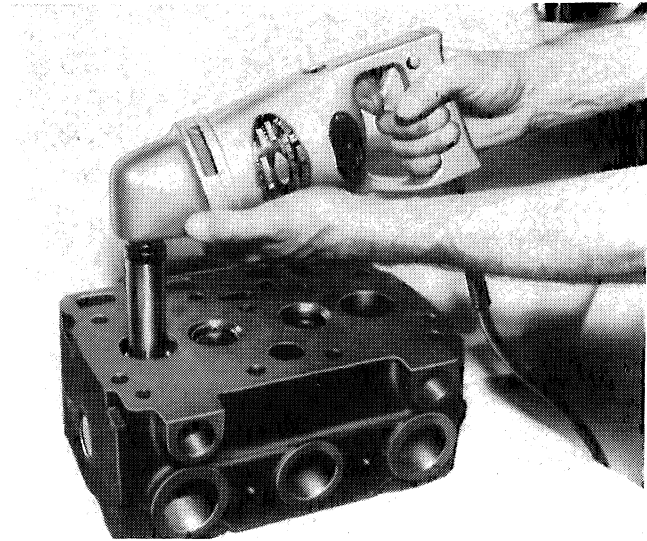


Figure B-19. Valve Seat Grinder

A **modern, precision, wet type valve refacer** similar to the one illustrated in Figure B-18 is vital to valve service.

A **precision power type seat grinder** equivalent to the one shown in Figure B-19 must be used to service the valve seats in the "500" Diesel Engine cylinder head. Hand grinding equipment can not be used.

Purchase this equipment from a reputable distributor that handles nationally recognized lines of tools.

Figure B-18 illustrates a Sioux Number 645A Wet Type Valve Refacer.

Figure B-19 illustrates a Sioux Number 1710 Angular High Speed Driver for grinding valve seats.

Grinding Wheels

Intake and Exhaust Valve Refacer..... (All Types)	Sioux Number 78-E Grinding Wheel or equivalent. (NOTE: This wheel is standard equipment with Sioux Valve Refacers.)
Exhaust Valve Seat Insert.....	Sioux Number SK-79 (1½ Inch) 45 Degree Roughing Wheel or Equivalent. Sioux Number SK-9 (1½ Inch) 45 Degree Finishing Wheel or Equivalent.
Intake Valve Seat.....	Sioux Number K-13 (1⅝ Inch) 45 Degree Finishing Wheel or Equivalent.
Exhaust Valve Seat Insert Narrowing Wheels	
a. Top Cut.....	Sioux Number SK-479 (1½ Inch) 30 Degree Grinding Wheel or Equivalent.
b. Bottom Cut.....	Sioux Number K-675 (1⅝ Inch) 60 Degree Grinding Wheel or Equivalent.

"Sioux" brand tools are manufactured by Albertson and Co., Sioux City, Iowa and can be purchased through your local tool supply house handling this brand.

Valve Seat Grinder Pilots

Both Intake and Exhaust Valve Seats.....

Sioux Number TS-405 — $1\frac{3}{32}$ Inch, Less .001 Inch Special Pilot or Equivalent. (Standard)

NOTE: These Grinder Pilots make excellent gauges for checking inside diameter of valve guides.

Sioux Number TS-406 — $1\frac{3}{32}$ Inch Special Pilot or Equivalent (.001 Inch Oversize)

Sioux No. TS-407 — $1\frac{3}{32}$ Inch, Plus .001 Inch Special Pilot or Equivalent. (.002 Inch Oversize)

Valve Guide Reamer

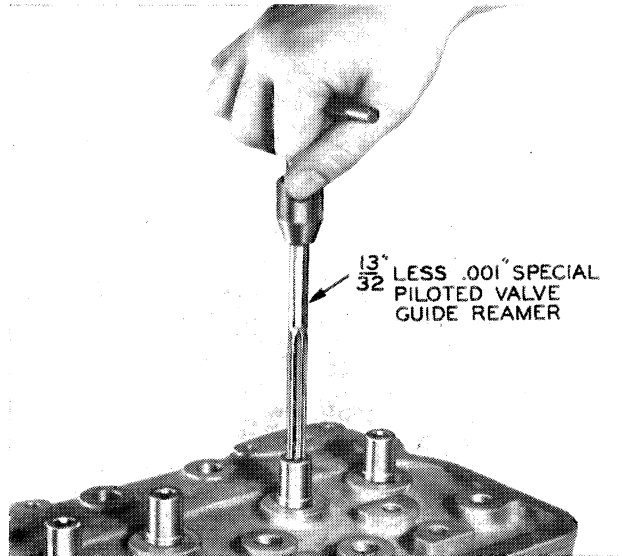


Figure B-20

Both Intake and Exhaust Valve Guides (For cleaning guide without changing size of hole.)..

Sioux No. GS-405 — $1\frac{3}{32}$ Inch Less .001 Inch Special Guide Reamer or Equivalent.

Power Driven Wire Brushes

Power driven fine wire brushes should be used to clean valves and to clean the cylinder head, both internally and externally. These brushes may be purchased through your local tool supply house in both the wheel type and the end type for cleaning hard-to-reach places, such as recesses, combustion chambers, etc.

The brushes are usually used with a $\frac{1}{4}$ inch electric drill.

Dial Indicator

An accurate dial indicator (or valve seat indicator) must be used to check valve seat run-out after grinding. The dial indicator is used with the grinder pilot as shown in Figure B-21.

The X-825 Sioux Valve Seat Indicator, shown in Figure B-21, (or the equivalent) is approved for use.

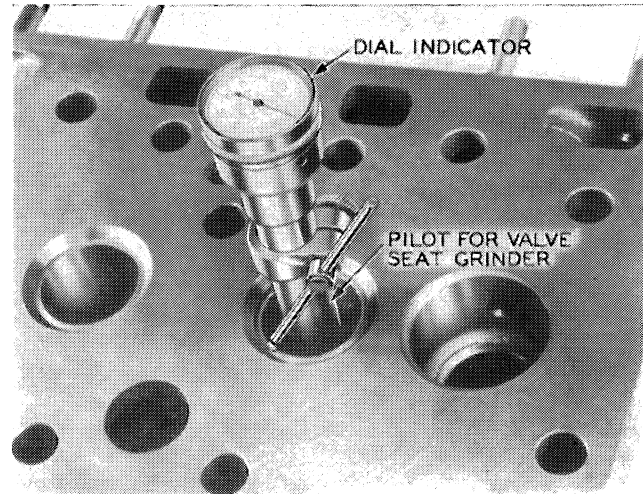


Figure B-21

Valve Stem and Valve Face Run Out Vee Block Type Gauge

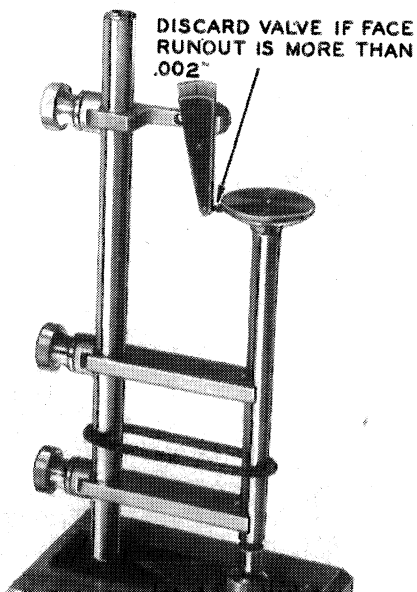


Figure B-22

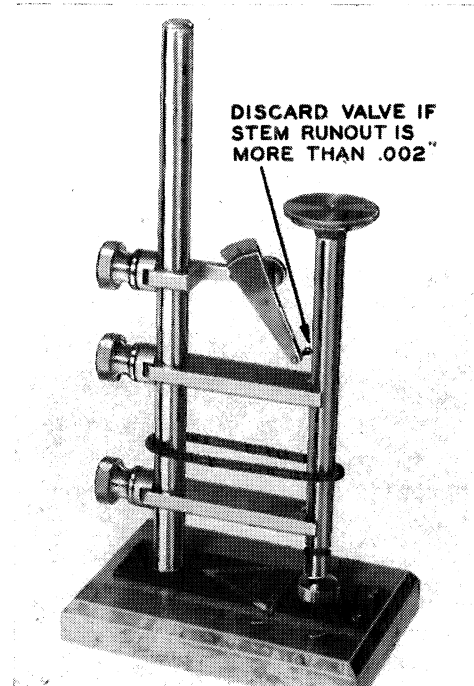


Figure B-23

A Vee Block Type Gauge must be used to check the valve stem and valve face run out. The gauge shown in Figures B-22 and B-23 is a Model TV-3 Tru-Valve Gage, manufactured by Automotive Service Tools, Inc; 618 Sheridan — Lansing, Michigan.

Micrometer

An accurate micrometer is a necessary tool for checking valve stem diameters, grinder pilot diameters, reamer diameters, and similar measurements, Figure B-24.

This tool can be purchased through your local tool supply house.

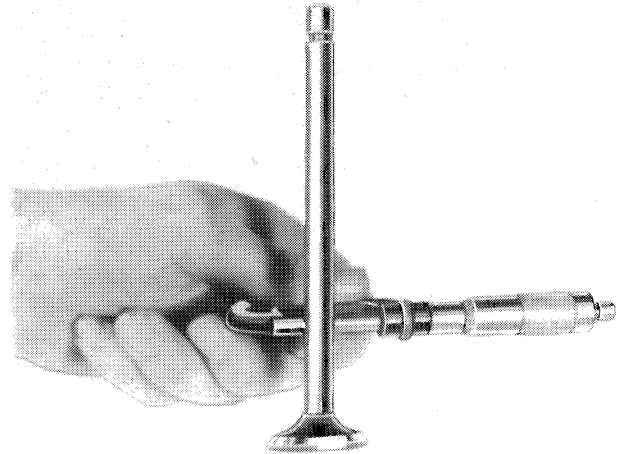


Figure B-24. Checking Valve Stem Diameter With Micrometer

Valve Spring Compressor and Valve Spring Tension Tester

Many excellent valve spring compressors and valve spring tension testers are available on the market. Consult your local tool supply house.

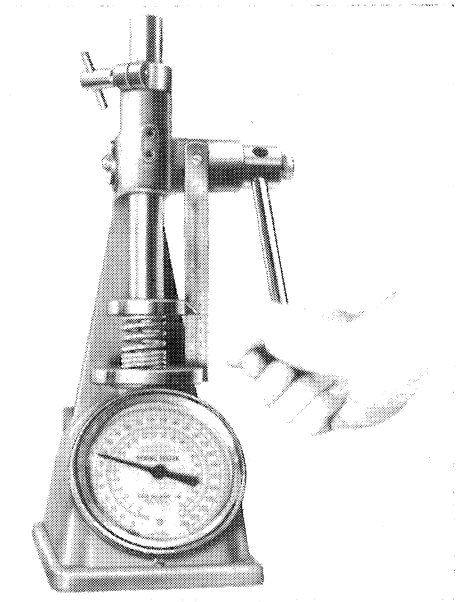


Figure B-25. A Typical Valve Spring Tension Tester

Reamer for Installing Oversize Valve Push Rod Lifters

When .010 inch oversize valve push rod lifters are to be installed, the bore in the block must be reamed out to .8215 — .8225 inch.

Consult your local tool supply house to obtain a .8225 inch reamer.

Mandrel (Pressing or Driving Tool) for Valve Guide Installation and Removal

Figure B-26 illustrates a simple tool that may be made up locally to facilitate valve guide installation and removal.

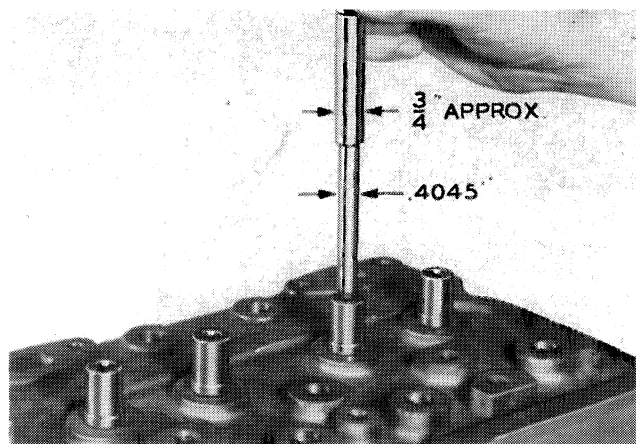


Figure B-26

Arbor for Rocker Arm Bushing Removal and Installation

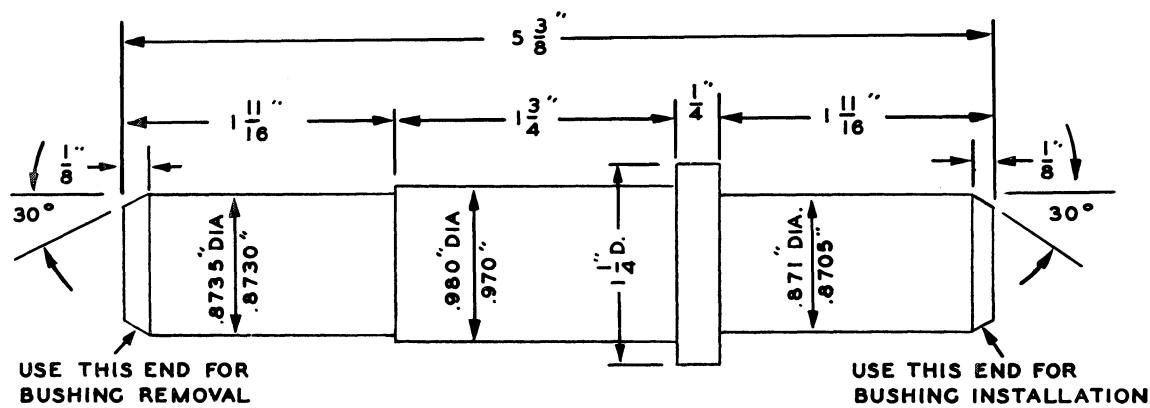


Figure B-27

Since the rocker arm bushings in the "500" Diesel Engine are precision bushings, they must be installed with an arbor. Figure B-27 illustrates a suitable arbor that can be made up locally.

Exhaust Valve Seat Insert Driver

The Sioux Number 910 Driver with the Number 988-A Driver Extension (Or equivalent) is approved for installing exhaust valve seat inserts.

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Power Driven Valve Guide Cleaner

A power driven valve guide cleaner, equivalent to the one illustrated in Figure B-28, should be used to remove all loose carbon from the guide prior to using the reamer.

A Sioux Number C-118 Expanding Valve Guide Cleaner or the equivalent is approved.

Use with a $\frac{1}{4}$ inch Electric Drill.

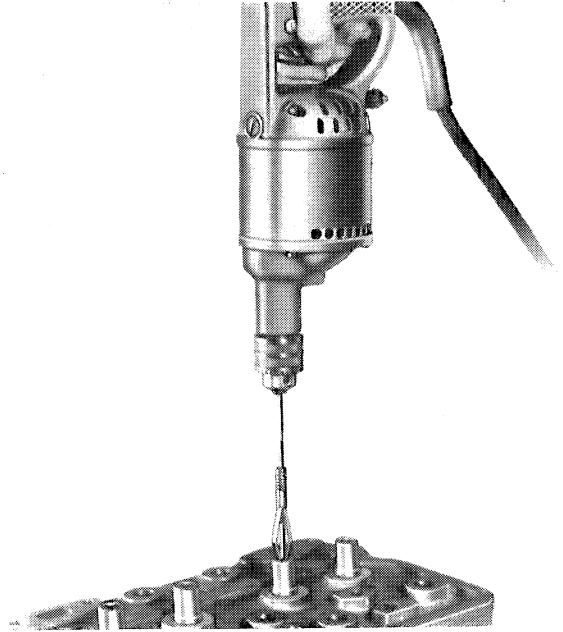


Figure B-28

Exhaust Valve Seat Puller

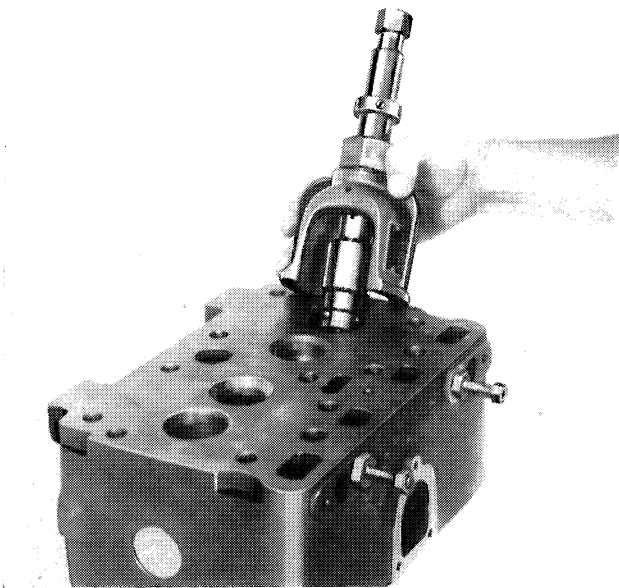


Figure B-29

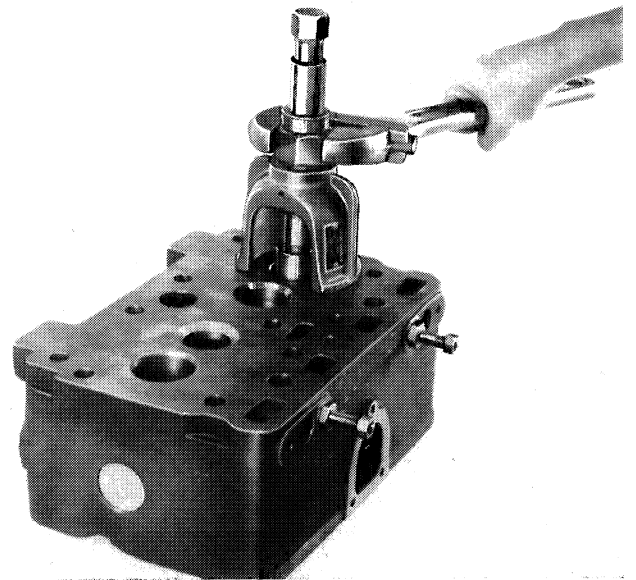


Figure B-30

Figures B-29 and B-30 illustrate the Bishman Number 810 Valve Seat Puller Set that is approved for pulling exhaust valve seat inserts. This puller set is manufactured by the Bishman Mfg. Co., Osseo, Minnesota and can be ordered directly from their factory, or purchased from any tool distributor handling the Bishman line.