

Model EDP
**Eccentric Valve
Seat Grinder**
for Diesel Engines

**Operating and
Servicing
Instructions**

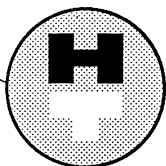


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Introduction

An Explanation of The HALL-TOLEDO Eccentric Seat Grinding Principle

The Hall-Toledo Model EDP Diesel Grinder employs the Hall-Toledo eccentric grinding principle:

- a high-speed grinding wheel which revolves on an axis $3/64$ " from the center of the grinding seat
- a wheel center that moves at a much slower speed in planetary fashion around the seat center

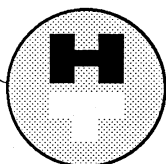
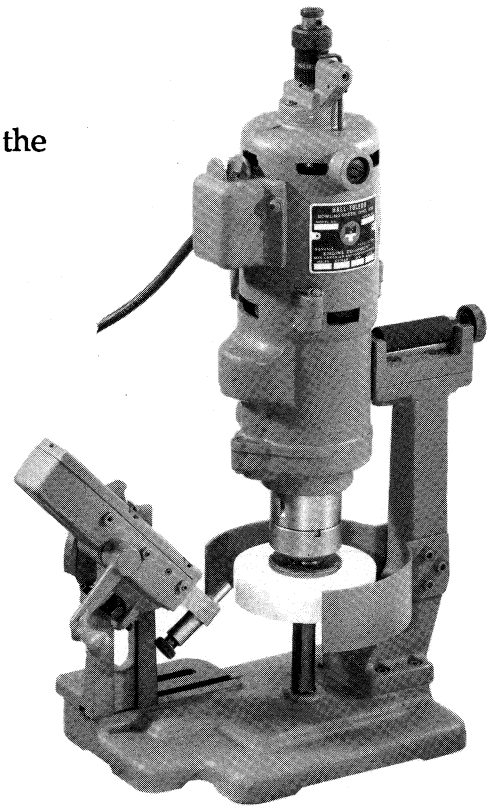
While the grinding proceeds point by point around the seat, the rest of the seat does not contact the wheel. This allows the metal cuttings and wheel chips to freely escape.

A $1\frac{1}{2}$ H.P. universal current motor drives the grinding wheel at 3800 R.P.M. through double reduction gearing and operates the planetary motion at 15 R.P.M. through a two-step worm and gear train.

The Hall-Toledo pilot guides the grinder so that it produces a true seat, one which is properly centered on the valve guide. One end of the pilot accurately fits the valve guide while the other end has a close running fit in the central bore of the tool. At this point, a replaceable hardened bushing or "eccentric shaft" takes the wear.

A micrometer feed screw in the top of the grinder controls the grinding speed by adjusting the wheel's position relative to the seat. A feed rod, which is set for position and then locked in the feed nut, extends downward to rest on top of the pilot and carries the weight of the grinder during operation.

In eccentric grinding, only one point of the grinding wheel contacts the seat at any moment. However, with concentric grinders, the high-speed wheel contacts the whole seat all at once. With the latter, the accuracy of the finished seat is diminished by any of the following three conditions: 1. a hard spot which, when struck, might cause the wheel to dig in or gouge the seat at a point opposite the hard spot 2. a wheel which when loaded or glazed, could make grooves or ridges in the seat because of remaining



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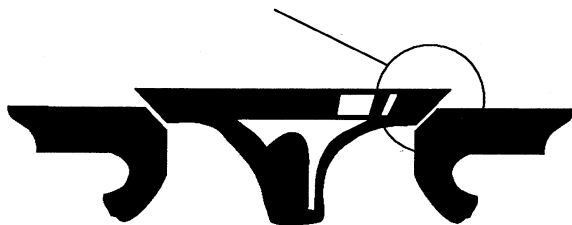
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and undispersed cuttings 3. the rapid wear of the grinding wheel. Eccentric grinding eliminates all of these problems with its point contact method.

The Hall-Toledo Eccentric Valve Seat Grinder is a precision grinder employing the latest and most approved practice of "point contact" precision grinding. Its operation is simple and mechanics can use it correctly when following the instructions.

A COMPARISON OF GROUND VALVE SEATS

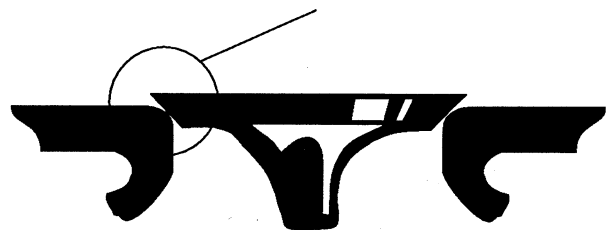
**Note Perfect Seating
Of The Valve**



With Eccentric Grinder.

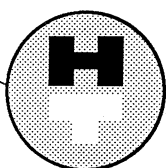
Above is a cross-section of an eccentrically ground valve in a valve seat. Note the perfect seating of the valve in contact with the flat face of the seat. Even an inexperienced operator can obtain this precision with an ECCENTRIC grinder.

**Note Rounded Or
Crowned Face Of The
Seat**



Without Eccentric Grinder.

The above shows what can happen when a valve seat is ground by the concentric method. Note the rounded or crowned face of the seat which makes only hairline contact with the valve. This happens when the grinding wheel wears rapidly and becomes grooved.

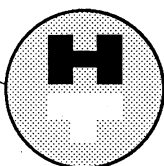
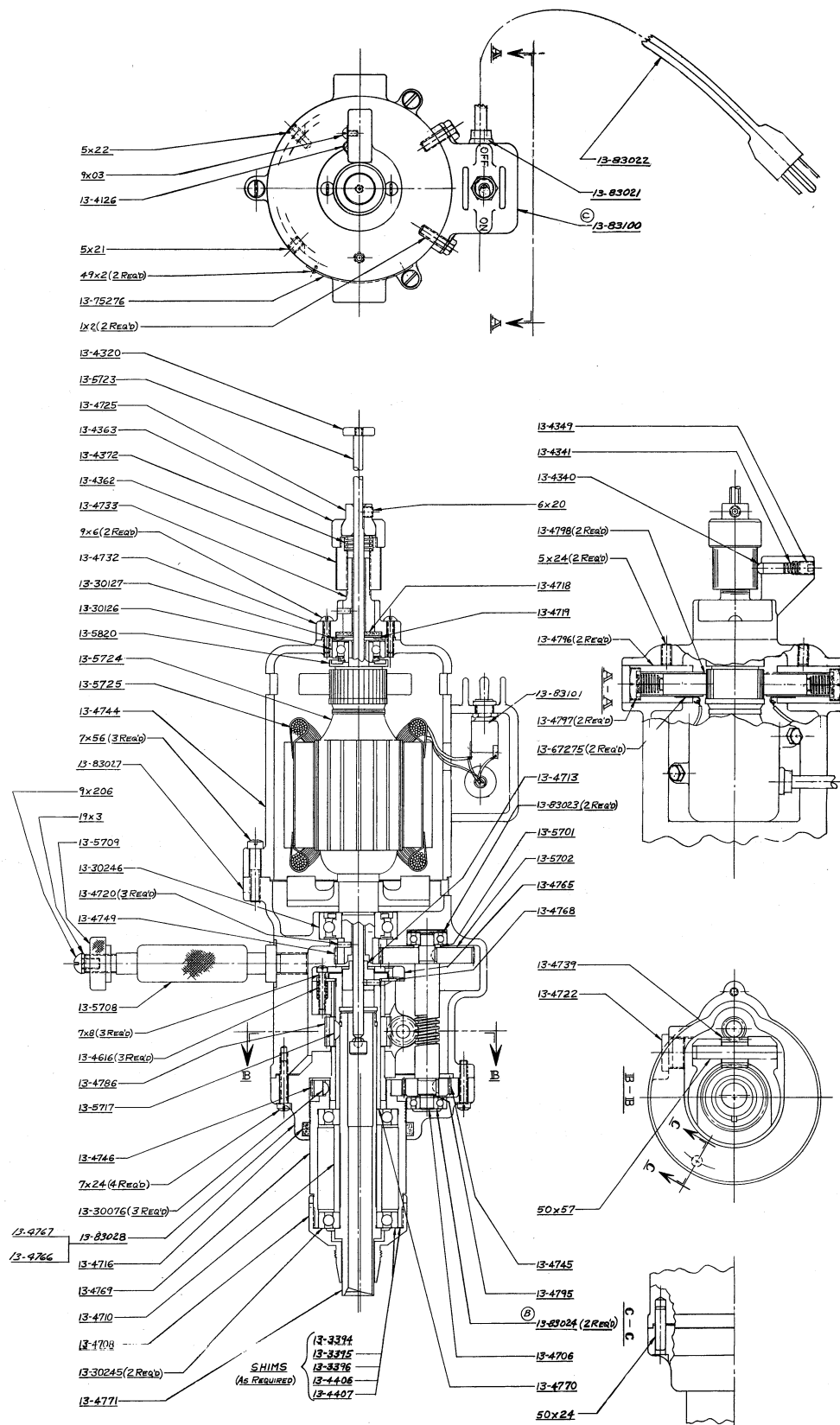


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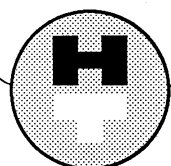
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EDP Parts List

Part No.	Name of Part	Part No.	Name Of Part
3394	Shim	5708	Handle
3395	Shim	5709	Nut
3396	Shim	5717	Key
4087	Cord Assembly	5723	Adjusting Rod Assembly
83022	Cord Assembly-New-Style- (Beginning with S/N H 14000)	5724	Armature 110V
4126	Wrench Clip	5725	Field 110V
4320	Adjusting Rod Head	5726	Armature 220V
4340	Adjusting Screw Plunger	5727	Field 220V
4341	Spring	5820	Dust Washer
4346	Cord Clip	9577	Wrench
4349	Screw	30076	Key
4362	Adjusting Nut	30078	Spring
4363	Cap	83023	Spring-New Style- (Beginning with S/N H 14000)
4372	Spring	30126	Bearing-Armature-Top End
4406	Shim	30127	Spring
4407	Shim	30155	Bearing
4706	Worm & Worm Shaft	83024	Bearing-New Style- (Beginning with S/N H 14000)
4708	Stone End		Bearing
4710	Spacer	30245	Bearing-Armature-Bottom End
4716	Washer	30246	Body & Bushing Assembly-Old Style- (Ending with S/N H 13999)
4718	Washer	75135	Body & Bushing Assembly-New Style- (Beginning with S/N H 14000)
4719	Washer Retainer		Name Plate
4720	Pin	83028	Screw Connector
4722	Shoulder Plug		Control Switch
4725	Adjusting Nut Ball	75276	Control Switch-New Style- (Beginning with S/N H 14000)
4732	Feed Ratchet Holder	77669	Switch Guard-(Obsolete 1982)
4733	Sleeve	78924	Switch Box
4739	Worm & Gear	83101	Switch Box-New Style- (Beginning with S/N H 14000)
4743	Lower Case		Strain Relief
83027	Lower Case-New Style- (Beginning with S/N H 14000)	78925	Spring
4744	Motor Housing	78926	Screw
4745	Gear	83100	Screw
4746	Spur Gear	83021	Screw
4766	Bushing	4616	Screw
4749	Spur Gear	5 x 21	Screw
4765	Thrust Plates	6 x 20	Screw
4767	Bushing	7 x 24	Screw
4769	High Speed Shaft	7 x 56	Screw
4768	Thrust Washer	9 x 03	Screw
4770	Eccentric Shaft Holder	9 x 6	Screw
4771	Eccentric Shaft	49 x 2	Screw
4786	Gear	9 x 51	Screw
4796	Brush Holder	1 x 1	Screw
4795	Washer	8 x 05	Screw
4797	Brush Cap	5 x 24	Screw
4798	Brush & Spring Assembly	5 x 22	Screw
5701	Spacer	50 x 34	Screw Pin
5702	Upper Gear	19 x 3	Washer



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Operation

PILOTS FOR MODEL EDP VALVE SEAT GRINDERS

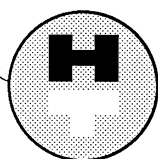
The Hall-Toledo pilot consists of an upper and a lower portion. The lower portion fits into the valve guide and the upper portion projects above the valve seat into the valve seat grinder. When selecting pilots for use with Hall-Toledo Model EDP Valve Seat Grinders, first determine the size of pilot required.

After determining the size of pilot required, check the pilot specifications and select a pilot whose bottom length is at least 1/8" shorter, but at least 2/3 as long as the valve guide. The "length of the valve guide" is the length of the valve guide bearing against the valve stem. If the valve guides are counterbored or chamfered on the inside, the pilots will have to be correspondingly shorter.

Place the pilot in the valve guide using the special wrench furnished with this equipment. Do not wring or wind the pilot into the guide - **just gently set it against the taper.** Expand the pilot by turning the knurled knob on the top of the wrench. Do not tighten this knob excessively - merely pull it up snug with thumb and finger.

PILOT SPECIFICATIONS

Guide Size	Pilot No.	Length At "A"	Length At "B"	Pilot Type
5/16"	9523	5-1/4"	2"	C
11/32"	9246	5-1/4"	2-5/8"	C
3/8"	9266	5-1/4"	2-1/4"	C
3/8"	9245	5-1/4"	2-5/8"	C
13/32"	9244	5-1/4"	2-5/8"	C
7/16"	9267	5-1/4"	2-5/8"	C
1/2"	9274	5-1/4"	2-5/8"	C
1/2"	19249	6-7/8"	3-5/8"	C
17/32"	9565	5-1/4"	2-5/8"	C
9/16"	9675	7-1/4"	4-5/8"	C
11/16"	19456	7-1/4"	6-1/2"	C
5/8"	19424	7-5/8"	4-3/4"	C
3/4"	9367	8"	5"	C
7/8"	19014	8-1/4"	4-7/8"	E
7/8"	19259	7"	9-1/2"	E
7/8"	9559	9-5/16"	5-11/16"	E
15/16"	9661	8"	6-3/4"	E
1"	9238	8-1/4"	9-5/8"	E
1"	19301	8"	6-1/2"	E
1-1/8"	19378	9-1/4"	4-1/4"	E
1-1/4"	19094	8-11/32"	7-9/32"	E



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To avoid the necessity of using pilots of special length, pilots shorter than 2/3 the length of the valve guide can be used.

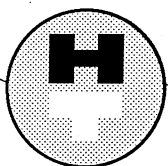
Once a pilot of the correct diameter and length has been selected, check the top length of the pilot to be sure that it projects at least 3" and not more than 6" above the combustion side of the valve seat to be ground.

Several types of **Hall-Toledo** pilots are available. Solid, wring-in-plug pilots and expanding-collet pilots are standard and may be obtained in suitable length and diameter for each job.

A pilot eccentric shaft clearance is .0001"—.0002" when new and may produce an unacceptable seat when worn to .001". It is important that both the pilot and eccentric shaft be cleaned before using, during use and protected from damage after use.

While the rotation of the eccentric shaft on the pilot is very slow — a matter of only 15-20 R.P.M. — the clearance is very small. Any abrasive matter allowed to enter the eccentric shaft could wedge and bind against the pilot and promptly cause serious wear.

Be sure that the pilot is clean, straight and fits the guide accurately. Wipe the pilot with a clean cloth before using. Do not use oil on pilots except to aid in cleaning them. Be certain to wipe free of oil. Oil on the pilot collects abrasive dust from the grinding operation and forms a lapping compound. This wears out the pilot and eccentric shaft.



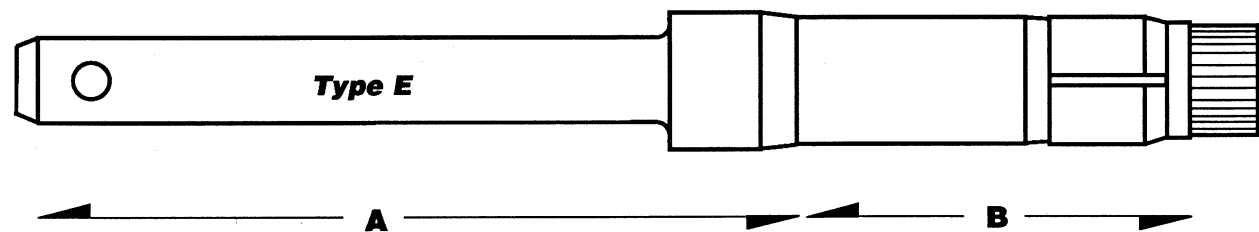
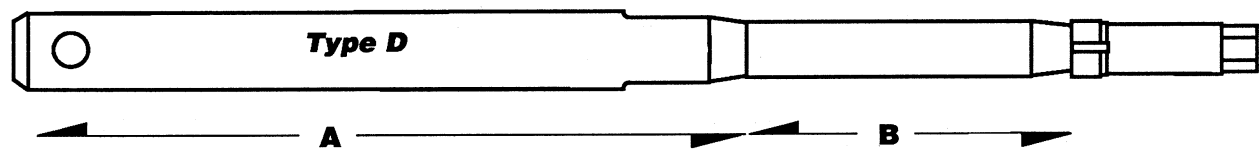
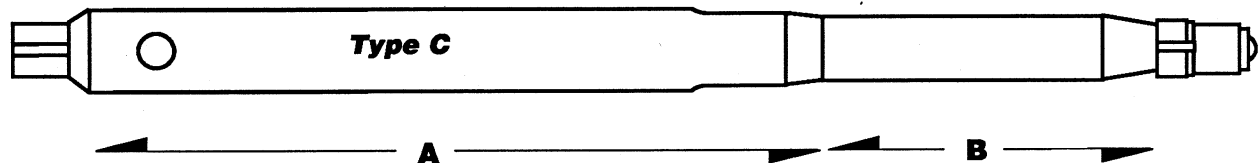
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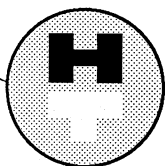
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NOTE: If there is doubt as to the proper pilot required for any particular job, advise us of engine make, model and serial number and we will recommend the best pilot to use.



NOTE: For a pilot price quote, blueprints should be submitted showing:

- inside diameter of valve guide
- over-all length of valve guide
- distance of valve seat from top of guide
- position of valve seat in cylinder head or block
- clearance around valve seat to combustion chamber
- type of valve seat insert, if any, giving alloy and hardness
- diameter and angle of valve seat
- Also, give make, model and serial number of engines



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SETTING THE GRINDER

Remove the grinder from the dressing stand and place it over the pilot installed in the valve guide. Loosen the allen set screw and push the feed rod down until it stops. This is then located on the top of the pilot. Tighten the set screw against the feed rod.

Turn the feed adjustment to the right (clockwise) as indicated by the arrow stamped above "release", until the grinding wheel is free and clears the seat. Check this adjustment by rotating the grinder around the pilot. Another method sometimes used is to rotate the spindle by hand to check whether or not it is clear of the seat.

GRINDING THE SEAT

First, be certain that the valves are accurate and properly faced. The complete valve job is dependent on both accurate seats and accurate valves.

Second, grind the seats with your **Model EDP** grinder according to the following procedure:

Place metal particle ring over seat area to be ground. Start the motor. Hold handle. Turn the feed screw to the left (counter-clockwise) as indicated by the arrow at "Grind." Feed one notch at a time until the seat is cleaned up. Generally, a show of sparks around the entire seat during one eccentric revolution indicates a finished, true seat. This is one of the many advantages of **Hall-Toledo** eccentric grinding. Allow the grinding wheel to continue running until it grinds itself free. Turn the feed screw to the right (clockwise) to release the grinding wheel. Shut off the motor and allow the grinder to stop before removing it from the pilot.

If the valve seat must be narrowed, this can be done by using the 30° grinding wheel on 45° seats, narrowed from the top. Use 15° narrowing the wheel on 30° seats. For "Choke" narrowing, or narrowing from the inside of the seat, use a 60° grinding wheel.



GRINDING WHEEL DRESSING

A grinding wheel is properly dressed as follows:

Clean taper on grinder spindle and inside taper of wheel insert. Screw wheel onto grinding spindle using a grinding wheel adapter if required. Place the grinder in the saddle stand being certain to firmly locate the grinding wheel end of the spindle over the dresser stand. Tighten the screw of the handle so the grinder is held firmly. Properly locate the quadrant assembly to assure full diamond traverse across the angle of the wheel. Start the motor and pass the diamond back and forth across the face of the operation until the stone has been dressed across its entire width.

The operator must be certain that the valve seat angle matches the valve face angle in accordance with the engine manufacturer's specification. Final adjustment to a specific angle, for example 45° , is obtained by blueing the valve to show proper contact with the valve seat. This should be done when installing new valves as well as when refacing present valves. Slight final adjustment of dresser angle to obtain proper valve to valve seat blue-in contact may be necessary. Once adjusted, the setting is permanent until the dresser quadrant is moved to another angle.



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Maintenance

PREVENTIVE MAINTENANCE

The **Model EDP** is a grinder. There will be a certain amount of dry abrasive dust in the air when the tool is in operation. This abrasive dust will cause considerable damage and excessive wear if the tool and pilots are not cleaned frequently and well. After each job, the pilot should be carefully washed in a **SOLVENT** solution and thoroughly wiped. This cleaning will prevent abrasives from entering the eccentric shaft and prevent undue wear to either pilot or shaft. The eccentric shaft should be swabbed out occasionally with a clean cloth on the end of a stick or wire.

Pilots should always be kept clean and the collets should be removed from time to time and thoroughly cleaned so that accurate centering is possible.

Grinding wheels should always be kept away from oil. If grinding wheels do become soaked, they will not cut properly. If, by accident, some wheels become soaked with oil, allow them to stand in carbon tetrachloride for a few minutes. Then screw the wheel onto the grinder and let it spin dry. This should be repeated several times until, in most cases, the oil will be washed from the wheel so that it will again cut freely.

The **Hall-Toledo Model EDP Eccentric Grinder** is equipped with a fan mounted on the lower end of the armature which blows air through the motor case and keeps the machine cool. This is the **first place to look for trouble** when the operator notices the machine is beginning to heat excessively.

LUBRICATION

Do not add additional lubricant to the gear box if the machine begins to operate above normal temperature. Because of the high speed gear construction, excessive lubrication causes more heat to be generated. Each machine is sent out from the factory packed with enough lubricant to last for approximately 1,000 hours of operation. If lubricant must be added to the gear chamber, only about 1/2 teaspoon should be added, and then it should only be special lubricant, **Hall-Toledo No. 4475, No. 76 grease**, furnished in 6 ounce tubes. This must be obtained from **Hall-Toledo**.



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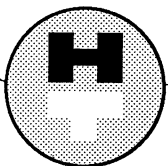
ECCENTRIC SHAFT REPLACEMENT

The eccentric shaft, (Part No. 4771), is very easily replaced in your shop by loosening the shaft with the two spanner wrenches included, (Part No. 5704). Insert one wrench into the flats on the high speed shaft, (Part No. 4769), and the other wrench into the flats on the nose-end, (Part No. 4708). A slight rap with a rubber mallet or block of wood may be required to loosen it. Unscrew the nose end counter-clockwise. Pull out the spindle assembly and remove eccentric shaft from spindle. Replace with the new eccentric shaft and reverse the above steps. Make sure gears are meshed properly, tighten high speed shaft, and tighten nose end snugly.

After removing the spindle, it may appear that the gear on top of the spindle is dry. This is a normal condition as the gear operates only on a film of lubricant. The outside of the spindle should be dry at reassembly time. It is also important to remember that the housing of this machine does not serve as a bearing for the spindle.

FACTORY REPAIRS

Sometimes it may be necessary to make repairs other than those described in the preceding pages. Our Maumee factory maintains complete service facilities with experienced workmen, special tools and test equipment. Your Model EDP may be returned directly for an estimate of the cost of repair. Repairs to obtain new operating conditions are made only after you authorize us to proceed at the estimated cost. All shipments must be made on a postage or freight prepaid basis to our factory at 525 W. Sophia, Maumee, Ohio 43537-1847.



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Troubleshooting

EDP TROUBLESHOOTING REFERENCE GUIDE

Pre-Staging

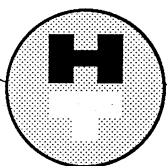
New **Hall-Toledo** machines are run at least eight hours or more in order to:

1. run in the bearings
2. check for any problems with gear meshing
3. check for any electrical problems concerning fields and armature switches

All machines are then tested on our seat-testing equipment which will in turn show minor wear on the adjusting nut. The machines are released only after they produce a seat with a run-out of .001 inch.

Your **Hall-Toledo** eccentric valve seat grinder is a precision tool which should give years of excellent performance when cared for properly. Care should be taken not to drop or otherwise mishandle it. When not in use, the grinder should be stored in a clean, dry place where it will not be damaged by surrounding objects.

As with any machine, its performance may sometimes fall below its normal, high standards. **Hall-Toledo** provides a complete factory service facility for repairs and/or rebuilds. However, to avoid unnecessary expense for simple problems, the following is recommended on the next page:



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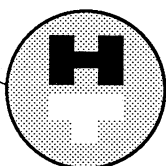
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● BEFORE CALLING FOR SERVICE - CHECK THE FOLLOWING ●

PROBLEM	CHECK FIRST/SOLUTION
Machine will not start	Brushes are holding up in brush holder (i.e. new paint, carbon build-up from brushes, etc.). Inspect, wipe off with a clean rag and replace.
Machine runs hot	The Model EDP Grinder requires time for the bearings to settle into place after shipping. The machine will run hot until they settle in. Allow 8-10 hours of working time to do this.
New machine losing accuracy	Old and/or worn-out pilots.
Not producing a good seat	<p>a) Check feed rod. Unscrew nut at top of rod, let feed rod drop through nose end. If the link is worn or not there at all, replace.</p> <p>b) Check pilots. They should have a top outside diameter of 9/16" (.5625). If they indicate less than that, replace.</p> <p>c) Check eccentric shaft. This is the area of greatest wear. With proper use, the eccentric shaft should be replaced after 1000 hours of use,</p>
Recessed seats	Allow more room for wheels to work. Wheels that are too large will hit the side of the recess and interfere with operation.

If the operation of your Hall-Toledo precision grinder is still not satisfactory after you have completed the troubleshooting steps as outlined above, contact our factory at 525 W. Sophia, Maumee, Ohio 43537-1847 for additional service information.



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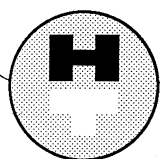
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Safety

SAFE OPERATING RECOMMENDATIONS

1. **USE THE PROPER ELECTRICAL CURRENT:** Standard United States and Canadian currents are 110 to 120 volt, 60 HZ, alternating current. Other countries may use different currents. If in doubt, check the electrical rating label affixed to the unit. The wrong kind of current could cause an electrical short circuit, possible over-heating or shocks.
2. **GUARD AGAINST SHOCK HAZARDS:** Do not, for any reason, cut or remove the grounding prong from the power cord. Be sure it is plugged into a properly-installed grounding receptacle.
3. **AVOID ELECTRICAL SHOCK:** Never insert metal objects such as screwdrivers inside the electrical components of the unit.
4. **TURN UNIT OFF AND UNPLUG:** Turn the Power Switch OFF when finished grinding. Unplug the unit if it will not be used for an extended period.
5. **WEAR EYE PROTECTION:** Grinders should not be operated without appropriate eye protection (i.e. goggles or safety glasses).
6. **USE HEARING PROTECTION:** For prolonged use, hearing protection is recommended.
7. **ABRASIVE PARTICLE RING:** Each EDP Basic Set comes with an abrasive particle ring that is used to contain the grinding materials released during seat grinding. We recommended that this ring be placed on the head that surrounds the valve seat during all grinding operations.



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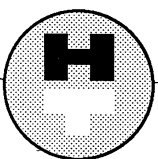
Model EDP Eccentric Valve Seat Grinder Instructions

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Parts & Accessories



1. **Spanner Wrench:** Part No. 5704. Two are required to loosen nose end on EDP so eccentric shaft can be taken out.
2. **Replacement Diamond:** Part No. 3551. For use with any EDP grinder dresser, Part No. 4793.
3. **Replacement Eccentric Shaft:** Part No. 4771. For use on any EDP Grinder.
4. **Pilot Wrench:** Part No. 19090. Used for inserting or removing pilot from guide.
5. **EDP Valve Seat Dial Gauge:** Part No. 9329. For checking run-out of valve seat; a must for precision accuracy.
6. **Model AVG Air Operated Vacuum Gauge:** Part No. 83170. Automatic air-operated gauge for a precise check of the seal between the valve seat and the valve.
7. **Model PVSVG Power Vacuum Gauge:** Part No. 77123. Simply the best way to check valve assembly seals. In seconds, the PVSVG can check a complete cylinder head and test individual valve assemblies.



**HALL
TOLEDO**

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