

**TECHNICAL MANUAL**

**OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT  
AND GENERAL SUPPORT MAINTENANCE  
MANUAL INCLUDING REPAIR PARTS LIST  
FOR  
HONING MACHINE, GENERAL AUTOMOTIVE  
(3419-00-812-1591)  
DESERT LABORATORIES, INC.**

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**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**OCTOBER 1981**

TECHNICAL MANUAL

NO. 9-3419-231-14 & P

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 20 October 1981

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT  
AND GENERAL SUPPORT MAINTENANCE  
FOR  
**HONING MACHINE, GENERAL AUTOMOTIVE**  
**(NSN 3419-00-812-1591)**

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Armament Material Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.

**NOTE**

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this honing machine is issued.

Manufactured by: Century Hone Division  
Desert Laboratories, Inc.  
3136 E. Columbia Street  
Tucson, Arizona 85714  
Procured under Contract No. DAAA09-76-C-6923

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

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## INSTRUCTIONS FOR REQUISITIONING PARTS

### NOT IDENTIFIED BY NSN

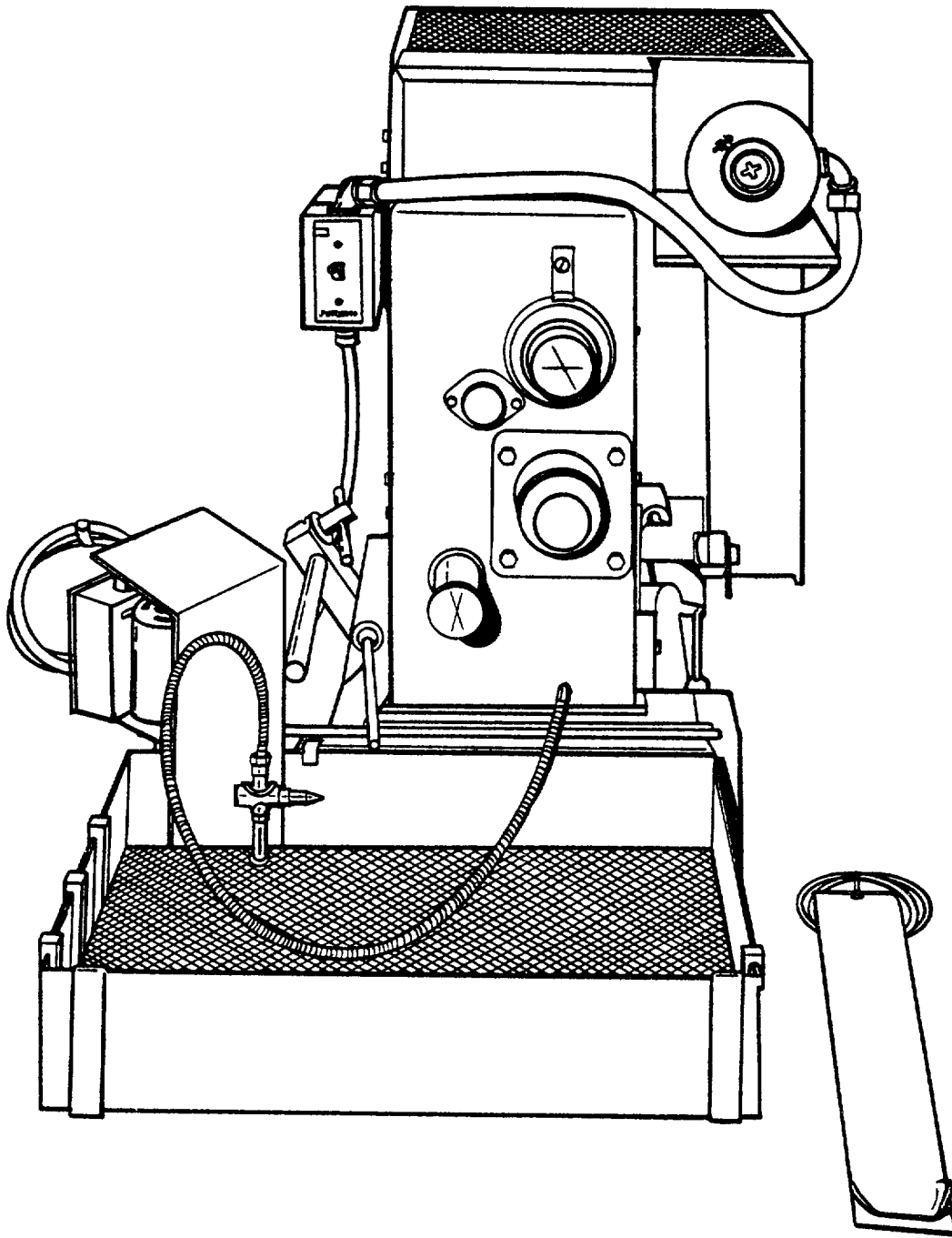
When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

- 1 - Manufacturer's Federal Supply Code Number - 23148
- 2 - Manufacturer's Part Number exactly as listed herein.
- 3 - Nomenclature exactly as listed herein, including dimensions, if necessary.
- 4 - Manufacturer's Model Number -
- 5 - Manufacturer's Serial Number (End Item)
- 6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.
- 7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows;

- (a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number - 23148 followed by a colon and manufacturer's Part Number for the repair part.
- (b) Complete Remarks field as follows:  
Noun: (nomenclature of repair part)  
For: NSN: 3419-00-812-1591  
Manufacturer: Desert Laboratories, Inc.  
3136 E. Columbia Street  
Tucson, AZ 85714  
Model:  
Serial: (of end item)

Any other pertinent information such as Frame Number, Type. Dimensions, etc.



*MODEL CHY -B BENCH HONING MACHINE*

## TABLE OF CONTENTS

	Page
Installation of the machine.....	1
Instructions .....	4
Supplemental operating instructions for larger than usual sizes and for cylinders.....	12
Maintenance instructions.....	23
Parts list.....	30

## INSTALLATION OF THE MACHINE

1. Assembly Machines are shipped completely assembled - ready to go to work. Should special equipment be ordered it will be shipped completely assembled with any instructions necessary. If domestic pack (slats) was used small items ordered will be wrapped in a sealed carton placed in the reservoir tank.

When the machine has been placed in the desired position, the hone base pedestal should be shimmed at the lowest point on the floor to steady it if necessary. Do Not Tilt The Machine To Make The Spindle Run At Horizontal. The spindle slopes to make the operator's job easier and to give a better flow of oil through the workpiece.

2. Honing Oil System. Fill resevoir tank (holds 12 gallons). Use a good grade of honing oil. Cutting or water soluble oils are not satisfactory. They may cause galling, scoring, and stone glazing, etc.

3. Adjustable Work Support (AC-24). Used when needed for honing large or bulky parts which prevents operator fatigue by supporting the weight of the part and absorbing the honing torque. The Connecting Rod Tool Guide (Part No. ACB-20) is essentially the same as the adjustable work support but is used in production of connecting rods for industrial and automotive use.

4. Adjustable Work Stop (ACH-61-accessory item) (Point of attachment shown only). Limits honing stroke and is principally used when honing blind holes and dual surface finishes.

5. Oil Flow Control with flexible honing oil lines.

This control regulates flow of honing oil through flexible line to the workpiece. A longer line set is available for extremely long work flow condition (3 two foot sections with couples-ACB-53). Actual flexible line set is available (ACB-54) for normal dual holes (e.g. automobile pistons). On most larger horizontal machines and some bench machines both lines will retract into the machine when desired.

The controls on this page are described for larger and converted Bench Machines and apply to all CHY-B machines to the extent that they are attached or used.

6. Adjustable Flow-Back Pan. Adjustable for foot controls, handicapped personnel, and safety reasons. Hose is removable for outside-of-machine use. Extension pans are available for extra long work.

7. Foot Pedal is reversible to accommodate operator in standing or sitting position, the length adjustable for comfort and length of work. Depress pedal, spindle begins rotation and expands the honing stone to cutting position in the work.

Releasing pedal stops spindle and retracts stone in order that work can be removed from the honing tools.

8. Flexible Pan Return Line. Slips but for use externally with separate corrosion and lubricant systems for honing spaceage materials, contaminant removal, Etc.

9. Removable Splash Guard Set to make an almost flush or table top pan for certain workpieces, shifting and holding pieceparts close by, Etc.

10. Tip-Toe Foot Pedal Adjustment. For handicapped operator for exacting toolmaker for day in, day out machine operator. An easy or a tight foot pedal control is adjustable here. Variable adjustment features are completely compatible to other muscle actuation linkages and handicapped systems. Wide range of adjustability eliminates much of the operators fatigue on long jobs.



## SET UP BEFORE HONING AS FOLLOWS

1. SELECT THE HONING UNIT AND STONE. (Page 4)
  2. ASSEMBLE THE HONING MANDREL. See information supplied with mandrel and adapter and elsewhere herein. (Page 5)
  3. INSERT THE HONING MANDREL IN THE MACHINE. Be sure to use the recommended mandrel adapter for mandrel selected. See literature supplied with the mandrel kit (accessories section). (Page 5)
  4. SELECT THE SPEED. (Page 5)
  5. FOLLOW THE STROKING PROCEDURE. (Page 6)
  6. TRUE THE STONE AND MANDREL. (Page 6)
  7. CENTER THE HONING UNIT. (reduce run-out if necessary) (Page 7)
  8. ADJUST THE STROKING STOP. (if used) (Page 7)
  9. ADJUST THE WORK SUPPORT (if used) Use the type support necessary for the job. (e.g. connecting rod support) (Page 7)
  10. HONE THE PARTS. (Page 7)
- A. SELECT THE STONES AND MANDRELS REQUIRED (Page 22)
- It should be determined whether a single honing operation will be sufficient, or if a roughing operation followed by a finishing operation is necessary to remove stock and then obtain the desired surface finish.
- Grit Size and Hardness will determine the rate of stock removal and the surface finish produced. See STONE ORDERING DATA chart. (Page 9)
- Stone hardness is important; too soft a Stone will wear too rapidly; too hard a Stone will glaze or load and fail to cut properly.
- Generally, for below 3/4" diameters use a hardened steel Mandrel (black) in hard metals. Use a soft steel mandrel in soft medals.

## B. ASSEMBLE THE STONE AND MANDREL UNIT

(Don't forget the wedge) Detailed instructions on the assembly of different types of honing units are found with the mandrel stone assortment furnished (see back of this book).

## C. INSERT THE HONING UNIT IN THE MACHINE.

1. Back off feed control knob all the way (counterclockwise); advance it clockwise slightly to move feed not more than eight turns usually.

2. With stone mandrell, pull wedge back as far as is easily possible. Don't forget run-out compensator sleeve device, which should be properly in place (some machines are equipped with accessory run-out compensation control which is special equipment for this type machine).

3. Rotate spindle until larger set screw points upward. With stone of honing unit turned 90° to the right of the large set screw, insert honing unit into the spindle as far as it will go, then rotate it 1/4 turn clockwise (to engage with spindle feed) and push unit in until it bottoms. Then tighten the large set screw.

4. With the motor at OFF check your set-up by depressing and releasing the foot pedal. If the wedge does not move forward and backward, it did not engage with the feed link. In that case, remove honing unit and repeat insertion steps.

## **SELECTION OF THE SPINDLE SPEEDS**

As with other metalworking operations, there are proper spindle speeds for honing. These can be found best by experience, because not exact rules of surface feet per minute can be followed. Heavier parts usually require slower speeds, regardless of hole diameter. Use your chart Honing Guide for Honing Machines and Portable Hones.

## STROKING PROCEDURE INTERNAL HONING

Put part at the center of the assembled mandrel unit and depress foot pedal slowly. Stoke part forward and back unit and release foot pedal before removing part from honing unit.

Length of stroke is influenced by relation of the stone length to the length of the surface to be honed.

Parts should be stroked over the ends of the stone, by 1/4 to 1/2 the length of the part.

Proper stroking assures that the entire length of stones and mandrel shoes wear uniformly. It keeps both stone and shoes true and make accurate holes easy to produce. Using too long a stroke or not overstroking consistently extends farther over one end of the stone than the other, it will result in tapered holes and will tend to taper the honing unit. Excessive truing will then be constantly required.

*Note.* The cross hatch surface pattern can be varied by changing the rate of stroking or the RPM of the honing unit. Varying the frequency of stroking will speed stock removal in hard materials.

Blind Holes - see brochure supplied with item to be used.

## TRUE IN THE STONE AND MANDREL

1. Slightly advance pressure control knob (to the left and below the spindle) depending upon the size of the honing unit, predetermined by trial or as desired. Knob control is manufactured to run stiff. Do not try to loosen stiffness of knob under normal use.

2. Turn feed knobs (calibrated know above spindle) counterclockwise to end of range. Adjust oil line to direct oil down into drain pan. Apply honing oil sparingly to the stone, using a brush. The truing sleeve should be as near as possible to the size of the hole to be honed in order that shoes seat in proper radius (never use a truing sleeve after it has become larger than the range of the stone and mandrel unit). Slide the truing sleeve on unit and depress foot pedal until foot pedal arm hits stop screw (attached to right front head bolt down screw). Next advance feed knob dial slightly. Release foot pedal. Start motor, and while stroking truing sleeve forward and back on the unit, depress foot pedal slowly until arm hits stop screw. Overstroke each end of the stone by 1/4 to 1/2 the length of the truing sleeve. Reverse truing sleeve frequently. Always release foot pedal to stop rotation of honing unit before removing the truing sleeve. As part trues in advance feed knob. Cutting pressure control can then be increased or decreased to suit feel and make proper contact.

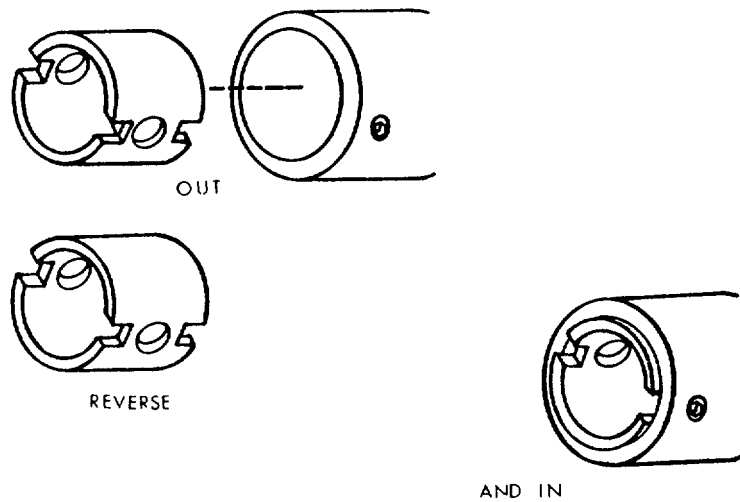
3. Use the truing sleeve sparingly. Excessive use of the truing sleeve causes undue wear. After a few reversals of the sleeve, stop the machine and visually inspect the mandrel and stones. High spots on the stone will be loaded. Use a diamond dresser or an abrasive dressing stick to remove high spots. High spots on guide shoes will be bright and shiny. A few light strokes with a file will true most guide shoes; use an abrasive stick on hardened shoes. The truing sleeve thus used acts as a straightedge and will last longer, and truing time will be reduced.

**Next printed page is 7**

4. Special instructions for truing other honing. units see literature supplied with the unit.

### REDUCE RUN-OUT OF HONING UNIT

To reduce run-out simply reverse the position in the spindle chuck, screwing chuck screw into opposite side of compensator thus: ,



### ADJUST THE STROKING STOP (Optional extra equipment Part No. AC 42., if used)

The stroking stop is adjustable and can be set to limit the depth of the honing stroke, as is necessary when honing blind holes. With motor turned OFF, place work piece on honing unit and adjust stroking stop to allow desired stroke. Tighten thumb screw.

### ADJUST THE WORK SUPPORT (if used)

With the work support mounted on honing machines one is assured of more accurate results when honing long unbalanced parts such as rotor housings, connecting rods, links, etc. It absorbs torque surges caused by out-of-round holes, reduces operator fatigue, and speeds the honing procedure. It is a must for external honing, except honed parts of less than 1 inch with tolerances of 10 - 50 millionths, etc. Three separate adjustments provide quick setting of the bar to handle work of different lengths. The bar should be placed approximately under center of gravity of work if hole is considerably off center.

### HONE THE PARTS

1. Being sure the motor switch is OFF, back off feed knob dial all the way (counterclockwise). (Do not force it, however, as it has been precision calibrated.) Place the work piece on honing unit so that it is centered on stone. Depress foot pedal and adjust feed knob dial to bare contact. Seat part on stone by turning it slightly clockwise. Adjust feed knob dial again until slight contact is made, but not more than amount of stock to be removed. Release foot pedal.

Note: Many operators prefer a square contact when honing in a new part to provide a y stone effect. Stone may be squared on a stone dresser, Part No. TS 2750-3. The leading edge should be slightly broken to prevent slide galling. Stones may be ordered square cut and broken.

2. Occasionally the cutting pressure used in the truing operation may not be right for honing the parts. It may be necessary to reset the cutting pressure, depending on the part (material, length of part, roughness of hole, etc.). The pressure should be just enough to produce good cutting action.

Note: Too heavy pressure can cause excessive stone wear; too light a pressure occasionally may result in stone glazing instead of cutting. The cutting pressure control should not be moved more than a very slight amount at a time until the most efficient pressure is established.

3. Turn motor ON and direct the oil stream on the honing unit so that the flow of oil will enter the hole being honed. Depress foot pedal slowly until lever arm hits stop screw. At the same time proceed to stroke the part forward and back on the honing unit. Be sure to overstroke each end of stone by  $1/4$  to  $1/2$  the hole length. Reverse the part on the honing unit frequently and be sure that spindle is stopped before putting work on or taking it off the stone. Hone for feel and continue to gage the hole size. Advance feed dial for amount of stock to be removed, hone in and gage. Repeat if necessary until desired hole size is reached.

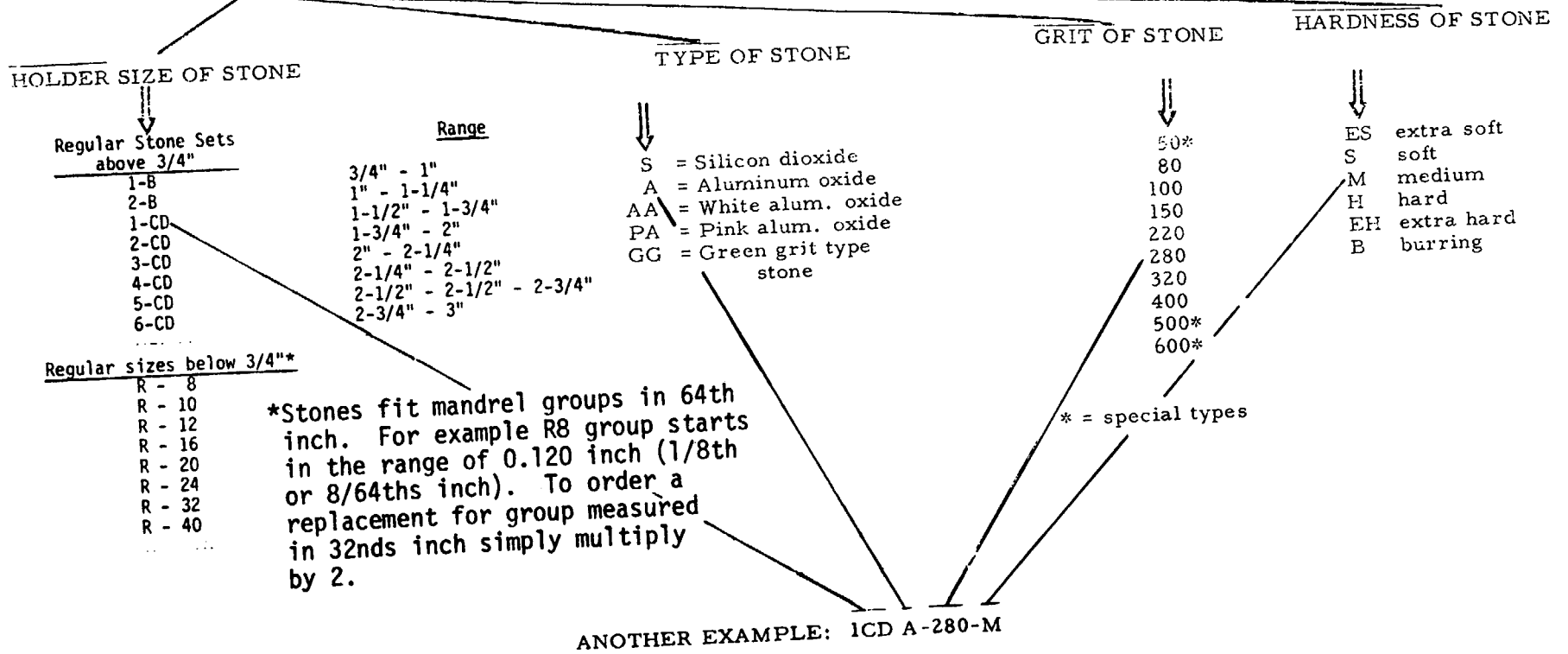
4. Hone each part (if several identical parts are to be honed), working for a feel and a timing. This will in a short time become very easy. Diameter will, of course, be undersize by amount that stone wears. Therefore, advance feed knob as necessary to compensate for the stone wear.

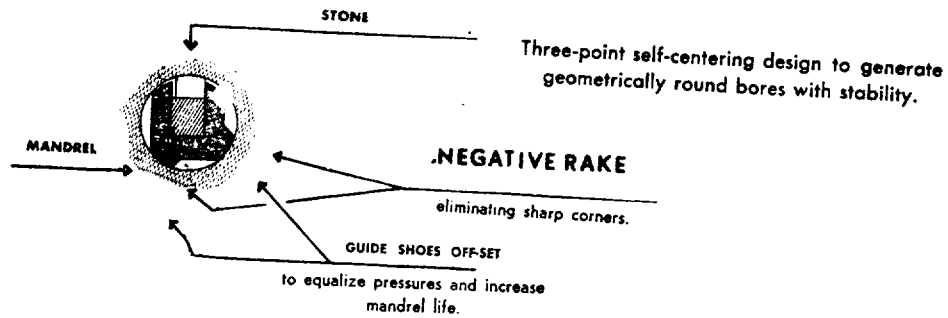
5. With a little practice you will soon be able to estimate very easily and accurately how much stone feed-up is needed.

STONE ORDERING DATA

INDIVIDUAL STONES ARE ORDERED THUSLY:

EXAMPLE: R-32A 280-ES





## MANDRELS

1. The proper off-set position of the shoe guides assure equalized pressures for balanced wear and smooth precision honing throughout the life of the mandrel.
2. The negative rake on the leading edges of the shoe guides eliminate any tendency to chatter, grab, or ream the work.
3. Extended mandrel life by greater stability and uniform coolant distribution.

## ALTERING STONES AND SHOES

The mandrels, stones, and parts can do most jobs without any alteration. Occasionally as the tolerances on the straightness of the hole decrease to .0001" or less, for example, the length of the stone in relation to the hole becomes more important. In order to hold such close tolerances on straightness, it may be necessary to shorten both stone and/or shoes. Maximum straightness is produced when stone and shoes are about 2/3 the length of the hole; however, for stability in very short holes, it may be necessary to use a stone that is 3/4 the length of the hole, or even full length. When honing to closer tolerances (e.g. 20-50 millionths range), the skilled operator can easily develop fit by deducting or removing slight amounts of shoe metal from the shoe contact area (e.g. total in square inches) and thus provide for even contact.

## TRUING SLEEVES

Truing sleeves are usually called out by the size to be honed that is .030 = .030" or 2.5 = 2.5" etc., preceded by the letters "T. C. " ie "T. C. - 312 = .312"

SPECIAL, NOTICE: Part Nos. TS 5212, TS C522, and TS CC52 have been replaced and are now supplied as Universal Truing Sleeve Kit # TS 2750.

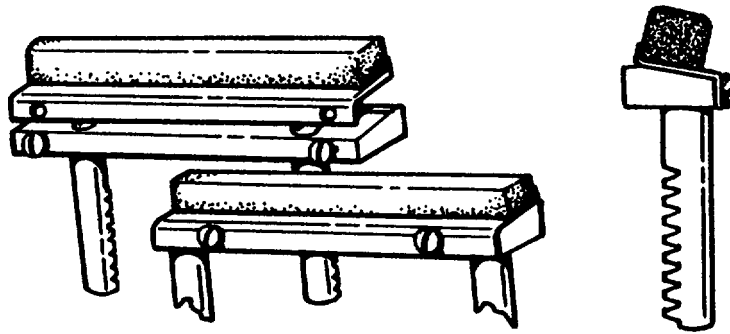


SUPPLEMENTAL OPERATING INSTRUCTIONS FOR  
LARGER THAN USUAL SIZES AND FOR CYLINDERS

Before honing, thoroughly wash out the cylinder or object to be honed with an approved solvent, removing all grease and oil. Be sure to dry the hole thoroughly with a clean rag.

Cast iron can be honed dry with both roughing and finishing stones. However, for best results, be sure to use polishing and most other stones wet. Honing of steel and aluminum must be done wet. We suggest the use of a brush to apply honing oil to the stones and work; the applications should be both frequent and generous. On machines equipped with dual single or electrically pumped oil (accessory) we suggest a plentiful supply of oil (from both ends if Honing machine is Dual Oil equipped)

The best honing results are obtained from the slowest speed in the range of 250 to 450 rpm or lower if your machine is so equipped. (CHX & CMS machines).



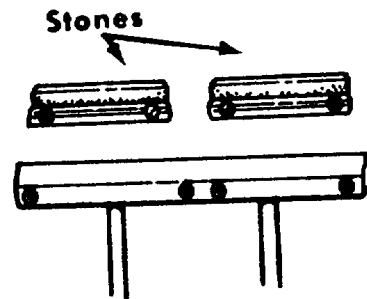
*Illustration 1*

Interchangeable CAN Stones and Holders Machine and portable Hone attachment sizes from 2-1/2" / Z-11/16 through 21". Machine use not recommended above 311 except on very light work.

(1) Assembly of Stones and Guides to the Holders

(Illus. 1 & 2). stones and guides come ready for use. Remove the two screws on the side of the holder and insert the stone (guide). Replace the screws and tighten firmly. The screw holes on the stones and guides are not in the same position; therefore the stones and guides must be matched to their proper holders.

Double length holders are assembled in the same manner with two stones or guides for each holder.



Double Length Holder  
*Illustration 2*

(2) Assembly of the Holder to the Hone Body (Illus.3)

Remove pinion assembly from hone body by pulling straight out. Insert holders in the holes marked x on

hone body, with rack teeth toward the

pinion hole. Push all holders into the

body as far as they will go and replace

the pinion assembly.

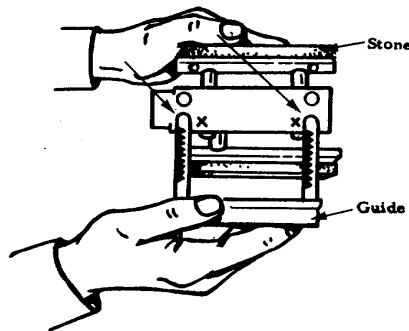
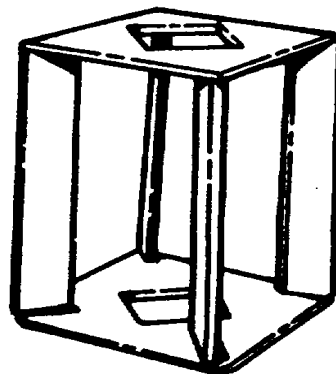


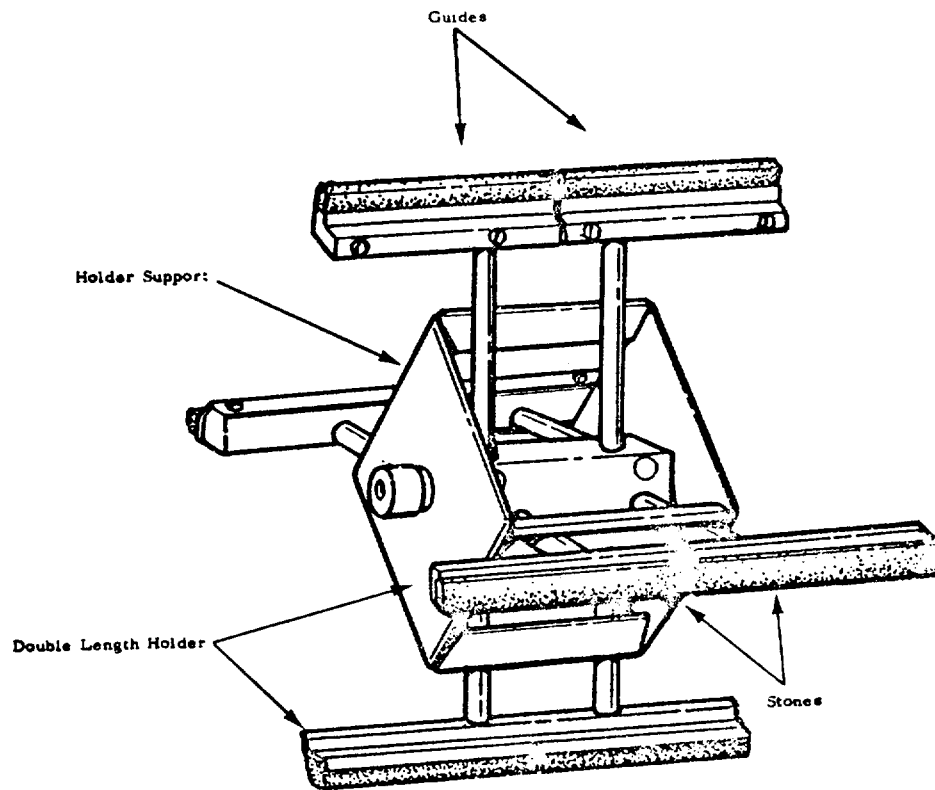
Illustration 3

(3) Assembly of Holder Supports (Illus. 4a, 4b). Re-

move pinion assembly by pulling out the hone body. Slide hone into holder support with the side of the support marked top toward the honing machine or driving yoke. Install stones and guides into the holes marked x on the body of the hone. Depress all holders into the body as far as they will go and insert pinion assembly in the usual manner.



Holder Support  
Illustration 4a



*Illustration 4b*

To adjust the hone to the cylinder to be honed move the pinion assembly counterclockwise to set stones roughly 1/8" less than the diameter of the cylinder. Fasten with wrench provided. Be sure tile pinion assembly is firmly seated. Next expand stones and guides firmly against cylinder walls by expanding the mechanism with the foot. During these and subsequent adjustments, stones should not extend more than 1/2" out of the cylinder.

Taper must be removed during the roughing operation.

Fast cutting roughing stones should always be used for sizing. Removal of a large amount of stock with finishing stones will increase the honing time appreciably.

Finishing Stones (Series 2 and 3). The roughing operation should be followed by finishing. Finishing stones are sometimes used dry also. Hone the cylinder to finished size unless a polishing operation is to follow, in which case leave 1/2 thousandth stock for polishing. If part is too heavy try to float it with special tooling or use part No. CAN 218 with an electric drill motor which is certain and safe.

Polishing Stones (Series 5 and 7). Polishing stones should always be used with lubrication. The polishing operation removes satin finish. Maintain a firm honing pressure and keep stones well lubricated with honing oil, (lard, or vegetable shortening) will suffice if machine is auxiliary powered and/or oil is not available or part # CAN 218 is used. Lubrication prevents stone glazing and keeps the stone free cutting. Twenty to 30 seconds or less per hole should often be sufficient for polishing.

4. Stone Sets. Stone 'set with 4 stones will remove stock very rapidly but requires an adequate flow of coolant for wet honing. Some stone wear is necessary in order to keep the stones in good cutting condition. Keep stones well expanded against the work and use the proper stones for the job.

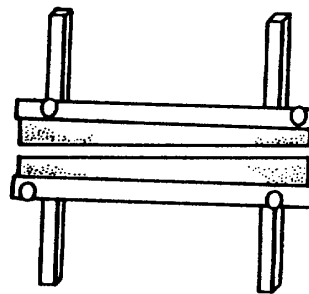
Stones Not Cutting. Generally roughing and finishing stones are used dry, and therefore any grease oil, or carbon on the stones will cause them to load and stop cutting properly. If the stones are not saturated, they can be cleaned with a wire brush; otherwise they should be discarded.

If the stone has a tendency to glaze or stop cutting, a softer stone should be used. If the stone cuts well but wears too fast, a harder stone should be used.

Tight guide blocks will cause finishing and polishing stones to cut 3nore slowly. When your hone unit is cutting properly, it will make a steady grinding noise. A high pitched squeak or chatter indicates improper operation.

### Tapered Stones (Illus. 5).

Tapered stones and guide blocks result when honing without enough stone pressure or from improper stroking in a tapered hole. To correct, keep stones cutting by frequent adjustment to maintain firm stone pressure. When honing a tapered cylinder, localize the honing in the small part of the cylinder, gradually lengthening the stroke as the cylinder straightens. Tapered Stones Illustration 5



Tapered Stones  
Illustration 5

To obtain best results in bores from 6-1/2" to 21" ( using part # CAN 218 A) in diameter, it is necessary to use a holder support with large bore hone). When a holder support is used, the hone operates as smoothly and as free chatter as when honing smaller size bores.

Truing Instructions. It's recommended that when close tolerance work is required, a truing sleeve be used to true the hone before use. After selecting the correct truing sleeve for the diameter required, mount the truing sleeve in a vise and hone in the normal manner, maintaining a constant steady stroke. Be sure to allow the stones to go through the sleeve for about one inch at both ends of the stroke. Apply honing oil liberally until the entire surface of the stone contacts the sleeve.

### Adjustment Steps

For better finish...

Increase honing speed. Decrease cutting pressure. Reduce stroking speed.

For faster stock removal...

Increase cutting pressure. Increase stroking speed. Decrease spindle speed.

For longer stone life...

Decrease cutting pressures. Reduce stroking speed.

## Common Metals to Be Honed

Cast Iron Cylinders. Including (use part if CAN ) automotive and truck engine cylinders, sleeves, etc. Most manufacturers recommend a hone finish of approximately 25 to 35 microinches for ideal setting of rings.

Step 1. Use roughing stones Series 1 to remove stock to within 2-1/2 thousandths of finished size ( should be honed dry).

Step 2. When polishing stones are not used, use finishing stone Series 3 to remove the remaining stock in 30 to 40 seconds. Produce 20 to 25 microinch RMS finish .

When finishing step is to be followed by polishing, use finishing stones Series 2 to remove stock to within 1/2 thousandth of finished size. Average finish obtained is 25 to 35 microinches RMS.

Finishing stones should be used dry.

Step 3. Use polishing stones Series 5 and 7 or a stone CANS 4 or 5 to remove last 1/2 thousandth. Average surface finish obtained is 15 to 20 microinches RMS. Polishing stones should be used wet.

Hardened Cast Iron Cylinder Sleeves. When honing hardened (chilled) cast iron sleeves, special stones are required (see Stone Selection page). Use standard honing procedure.

Steel Cylinders and Holes. Consult Stone Selection page for proper stones for honing steel.  
NOTE: when honing steel, all stones should be used wet.

Aluminum. The following special instructions should be used in honing aluminum cylinders:

Step 1. If cylinder is scored, remove all built equipment prior to honing, or stones may chip.

Step 2. Stones should be trued with the use of a truing sleeve. Due to the fast cutting action and stock removal of stones when honing aluminum, stones may not have time to become properly trued in .before final size is reached. For this reason stock must be trued in before honing (see Truing Instructions).



CAN-SZ80S  
CAN -S400S

CAN-SZ80M  
CAN-S400M

CAN-SZ80H  
CAN-S400H

Prefix:

A- aluminum) oxide  
S= silicon carbide  
Number = grit (example:  
S150M is 150 grit)

Suffix:

H= hard  
M= medium  
S = soft

4 stone sets: add S after the CAN series  
designation (example: CAN-S-A15011)

Holder Supports and Holder Sets

Single Length Holder Sets		Double Length Holder Sets		Holder	Supports
Size (inches)	Set Part No	Size (inches)	Set Part No.		Part No.
2-11/16 to 4-3/4	CAN-533	-----	Not needed		
3-3/4 to 6-1/2	CAN-543	-----	Not needed		
-----	-----	4-3/4 to 7	CAN-558		Not needed
6 to 9	CAN-563	6-1/2 to 9	CAN-568		CAN-C62
8 to 12	CAN-573	8-3/4 to 12	CAN-578		CAN-C82
11 to 15	CAN-583	11 to 15	CAN-588		CAN-C92
14 to 18	CAN-593	14 to 18	CAN-598		CAN-C43
17 to 21	CAN-514	17 to 21	CAN-519		CAN-C54

There are two removable settling filter tanks located in the reservoir, They can be removed for cleaning out the metal cuttings and abrasive grit by lifting them' out of the machine base. To drain the oil from the reservoir, use drain plug provided.

\* Typical stones are examples only  
 Sec Stone Selection Chart for specific  
 Grades and Grits of stone.

**LIST OF COMMON MANDRELS, STONES, AND PARTS USED IN WET AND DRY H<sup>1</sup>.INNG**

**WHAT IS NEEDED FOR NORMAL HONING**

Minimum Size Hole	Use Mandrel Size	With Wedge and Adapter (if required)	Truing Sleeve	Stone Size Use General Purpose	or	Specific Purpose Stones Examples
1/8" - 9/64"	R8-120 through R8-145	R8-W or K4-W	R8-A or K4-A	TS- 120 through TS-145	R8 GP	R8 A220S Coarse Grit stone recommended in normal use.
5/32" - 11/64"	R10-150 through R10-180	R10-W or K5-W	R10-A or KS-A	TS-150 through TS- 180	R10 GP	R10 A220ES Finishing press fit holes, plastic
5/16" - 15/64"	R12-185s through R12-240	R12-W or K6-W	R12-A or K6-A	TS-185 through TS-240	R12 GP	R12 GGZ20M Carbide wear strip inserted in bore, steel
1/4" - 19/64	R16-245 through R16-300	R16-W or K8 - W	RP6-A or K8 - A	TS-245 through TS-300	R16 GP	R16 S220M Regular Finish piston rod hole
15/16"-23/64"	R20-308 through R20-362	R20-W or K10-W	R20-A or K10-A	TS-308 through TS-362	R20 GP	R20 AA220S Cast Iron Small bore with hardened sleeve insert
3/8"- 15/32" hydraulic	R24-370 through R24-479	R24-W or K12-W	R24-A or K1(-A)	TS-370 through TS-479	R24 GP	R24 PA150M Tough chrome steel cylinder liner for
1/2"- 19/32" honing	R32-495 through R32-588	RL32-W or K16-W	R32-A or K16-A	TS-495 through T5-588	R32 GP	R32 A150H Deburr rebuilt actuator cylinder before final
5/8" - 3/4"	R40-619 through R40-744	R40-W or K20-W	R40-A or K20-A	T5-619 through TS-744	R40 GP	R40 S1011 Grinding hard chrome cylinders
3/4" - 1"	"B" size Part No. B-1	not required	R BCD40 or K20 (2nd R40 choice)	TS-1000 or TS- 1200	1-B 2-B	1B A2ZOEH e.g. Roughing in ring scratches for lubrication 1B A500M e.g. Mirror Polishing same as above
1" - 2"	"C" size Part No. C1-2	not required	R BCD40 or K20 (2nd R40 choice)	TS-1200 or TS-1500 TS-1700 TS-2000	1-CD 2-CD 3-CD 4-CD	1CD S400S e.g. Polishing Plastic Liners 2CD S150M e.g. True up Cast Iron Cylinders
1" - 2"	"D" size Part No. D1.5-2.5	not required	R BCD40 or K20 (2nd R40 choice)	TS-1500 or TS-1700 TS-2000 TS-2200 TS-2700	1-CD 2-CD 3-CD 4-CD 5-CD 6-CD	3CD A220H e.g. Hard stones finishing of steel actuator post 4CD S320ES e.g. Finish anodized aluminum sleeve 5CD A280B e.g. Remove roughness on alloy steel cylinder Polish after hardening
2-11/16" - 15"	CH-6 MASTER Holders replace Wedges CAN - 533 racks (Holder Support not needed) CAN-543 racks (Holder Support not needed) CAN-563 racks (CAN - C62 Holder Support) CAN-573 racks (CAN - C82 Holder Support) CAN-583 racks (CAN - C92 Holder Support)	CH - 6 Holder Support instead of Adapter	TS - 2750 Universal or TS - 2700 (generally otherwise) Specify Size	CAN - 1 roughing CAN - 2 finishing CAN - 3 medium finishing CAN - 5 polishing CAN - 6 polishing CAN - 7 mirror polishing		CAN S100M e.g. Roughing Cast Iron Cylinders CAN A 280EH e.g. Deburring a ring on chrome bore CAN S220m e.g. Finishing Cast Iron CAN S400ES e.g. Polishing Plated Cylinders SCAN A220S e.g. Medium Polishing to aircraft hard chrome cylinders

NOTES WHICH APPLY TO LIST OF COMMON MANDRELS, STONES, AND PARTS  
USED WET AND DRY HOLING

1. For most honing it's recommended wet honing with a good grade of honing oil.
2. Many other mandrels and stones are available. When ordering specify approximate diameter of bore, length and type of material to be honed for example:

Mandrel and Stone Set for 2 inch bore 7" long hardened steel

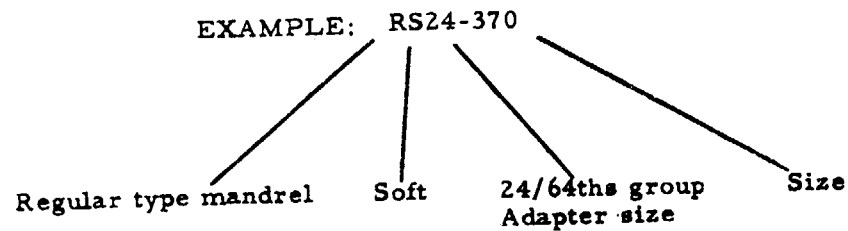
- \* Special mandrels are available below 1/8" - Specify size. Sizes 1/8" - 3/4" are indicated by minimum hole size diameter number in thousandths as follows:

120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180, 185, 190, 195, 200, 205, 210, 215, 220,  
225, 230, 235, 240, 245, 250, 255, 260, 265, 270, 275, 280, 285, 290, 295, 300, 308, 316, 323, 331, 339,  
347, 354, 362, 370, 385, 400, 416, 432, 447, 463, 479, 495, 526, 557, 588, 619, 650, 681, 713, 744

R groups in this range are measured in 64ths of an inch. It is common to simply specify the R type mandrel followed by the hole size.

EXAMPLE: R-.308 or RZ0-308

If a soft or hard mandrel is required add an S (soft) or H (hard) before the size needed. An ES (extra soft) may be used for honing plastics, plated holes, Etc.



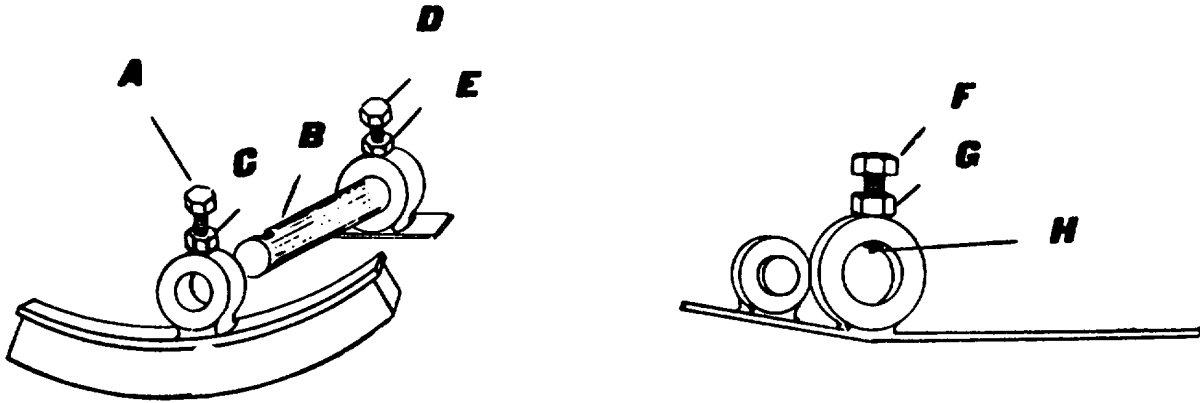
Black mandrels are Hard - Brite plate mandrels are soft and extra soft.

## STANDARD MODELS

### HELPFUL HINTS

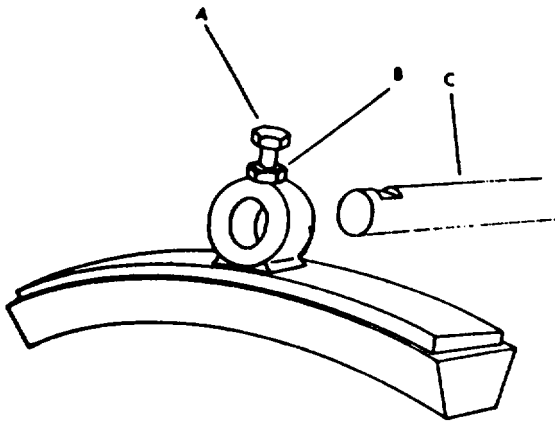
#### INSTALLATION OF BRAKE SHOE

Do not tighten bolt A down tight to shaft B . Back off bolt A until brake rocks in flat on shaft B . Then tighten lock nut C . Tighten shaft B on opposite end with bolt D and lock nut E on large bolt F next to bolt D . Do not tighten all the way down on shaft. Back off until pin H on end of bolt F is just riding inside groove on shaft freely. Then tighten lock nut G securing in place.



Bolt D is a set screw on some models

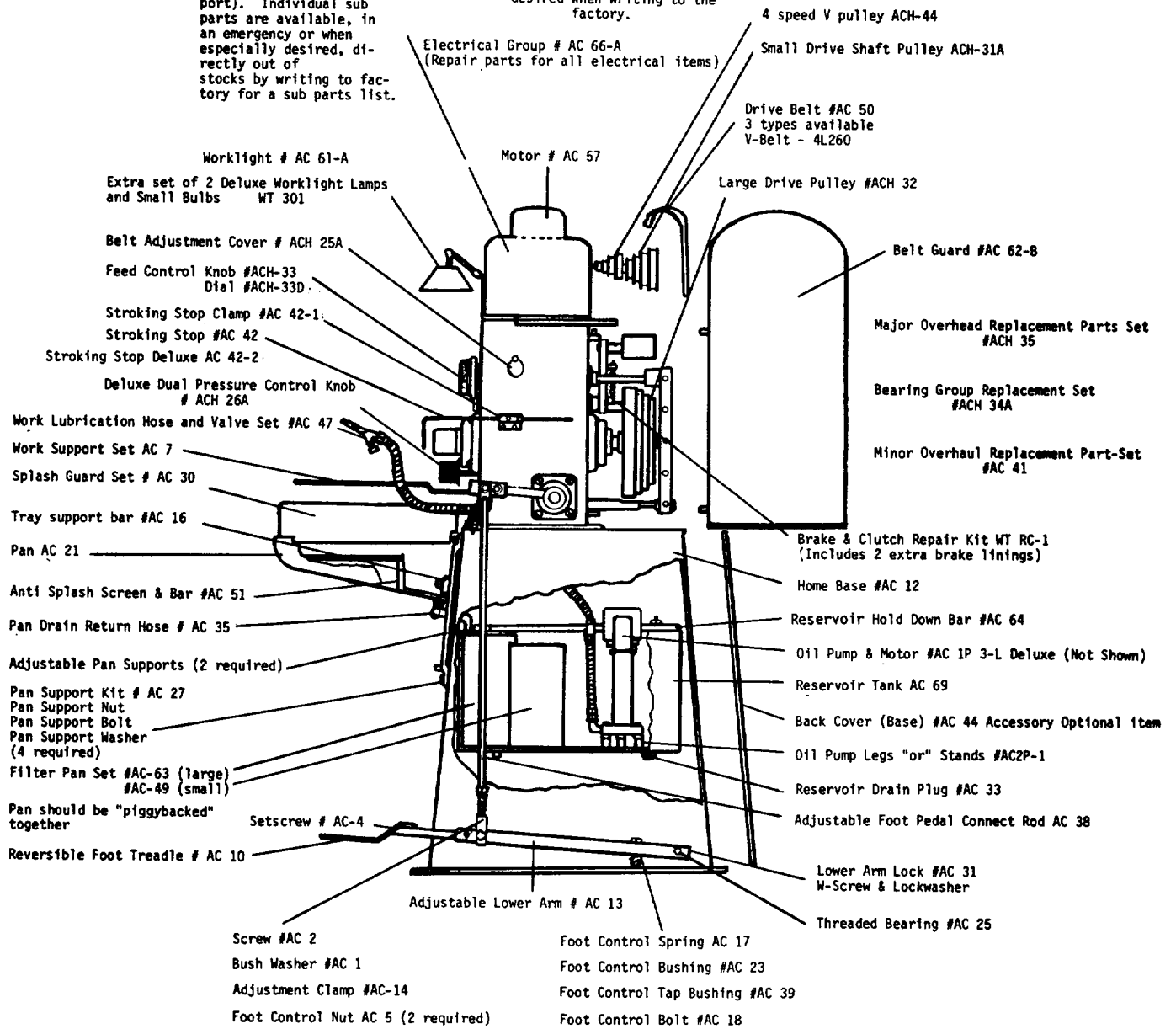
#### INSTALLATION OF BRAKE SHOE (CHY-BA)



Position Shaft C so the flat portion is facing bolt A with the brake shoe in position on the pulley. Tighten bolt A then back it off one full turn. Tighten lock nut B securely.

Honing Head Unit with Arm  
# AC 43-A  
Honing heads with arms are sold and served as a separate unit (less motor, foot control rod, base bolts, & work support). Individual sub parts are available, in an emergency or when especially desired, directly out of stocks by writing to factory for a sub parts list.

Overload Protection Set #WT-94  
Overload protector elements, etc. See manufacturer's literature or give part number desired when writing to the factory.



**MODEL CHY  
PARTS LIST**

When ordering parts give serial number and model number of your machine.

Honing head with arm  
# AC 43  
Honing heads with arms  
are sold and serviced as  
a separate unit (less)  
motor, foot control rod,  
base bolts, & work sup-  
port). Individual sub  
parts are available, in  
an emergency or when  
especially desired di-  
rectly out of  
stocks by writing to fac-  
tory for a sub parts list.

Electrical Group # AC 66  
Repair parts for all electrical items

Overload Protector Set # WT-94

Overload protector elements,  
etc. See manufacturer's lit-  
erature or give part number  
desired when writing to the  
factory.

Drive Belt # AC 50  
(3 types available)

Small Drive Pulley  
# ACH-31

Large Drive Pulley # ACH-32

Motor # AC 5k 409

Belt Adjustment Cover # ACH-25

Belt Guard AC 62

Feed Control Knob # ACH-33  
Dial # ACH-33D

Dual Pressure Control Knob # ACH-26

Minor Overhaul Replacement Parts Set  
# AC 41

Bearing Group Replacement Set  
# ACH-34

Work Lubrication Hose & Valve Set # AC-47

Tray Support Bar AC 16

Major Overhaul Replacement Parts Set  
# ACH-35

Splash Guard Set # AC 30

Pan AC 21

Brake Lining (bonded with arm) # AC 100

Anti-Splash Screen and Bar # AC 51

Pan Drain Return Hose AC 35

Reservoir Hold-Down Bar # AC 64

Adjustable Pan Supports AC 19 (2 required)

Pump, Electric Bracket and Box # AC 45-1

Pan Support Kit AC 27  
Pan support nut  
Pan support bolt  
Pan support washer  
(4 required)

Pump Stand Legs AC 24-2

Back cover (Base) # AC 44 Accessory optional item

Filter pan set # AC-63 (large)  
# AC-49 (small)

Reservoir Tank # AC 69

Reservoir Drain Plug AC 33

Set Screw # AC 4

Adjustable Foot Pedal Connecting Rod  
# AC 38

Reversible Foot Treadle # AC 10

Lower Arm Lock # AC 31

Hone Base AC 12

Adjustable Lower Arm  
# AC 13

Threaded bearing # AC 25

Nut AC 3 (2 required)

Screw AC 2

Foot Control Washer AC 23

Bush Washer AC 1

Foot Control Bolt AC 18

Adjustment Clamp AC 14

Foot Control Spring AC 17

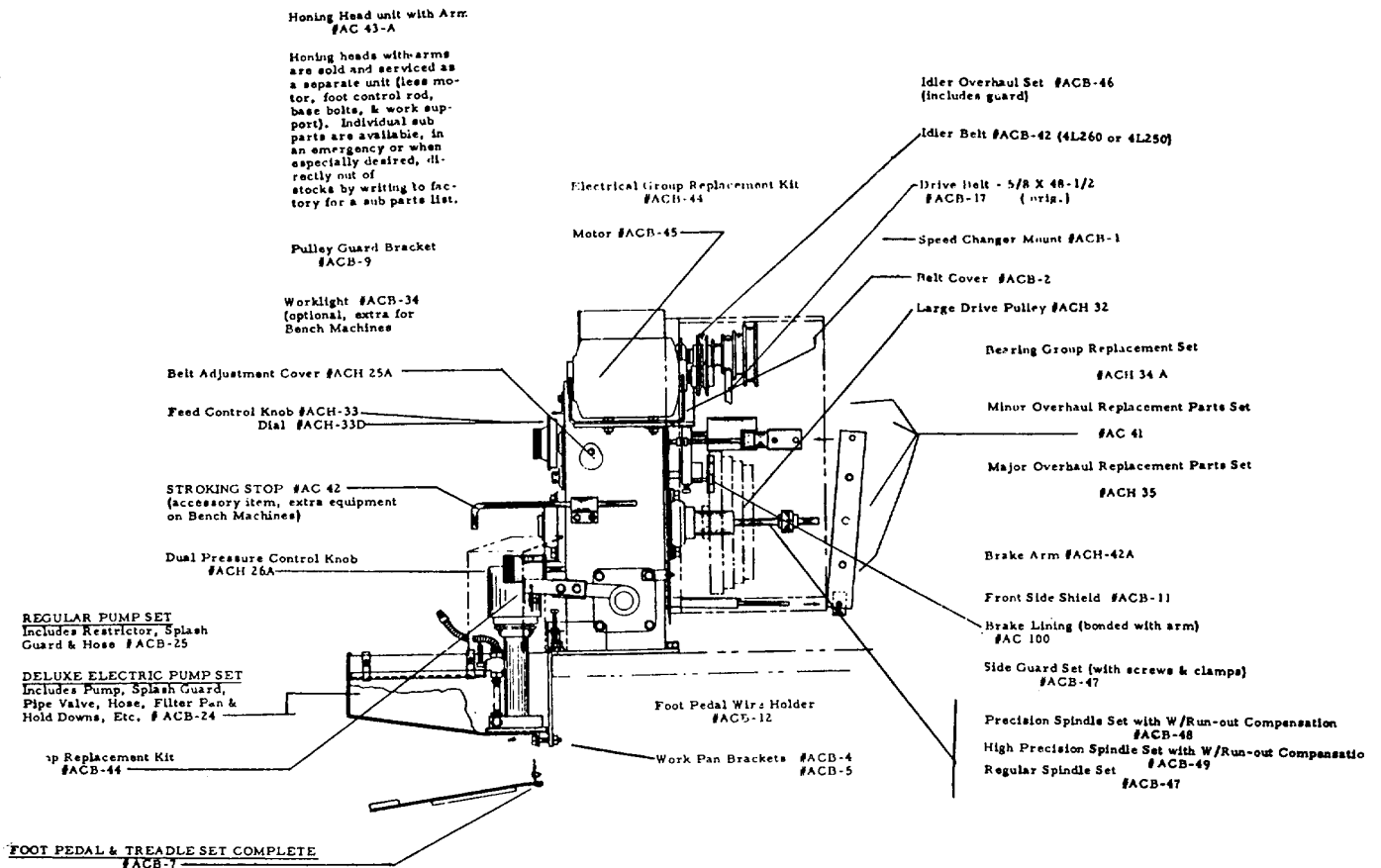
Foot Control Nut # AC 5 (2 required)

Foot Control Tap Bushing AC 39

### PARTS LIST

### MODEL CHX

When ordering parts give serial number and model number of your machine.

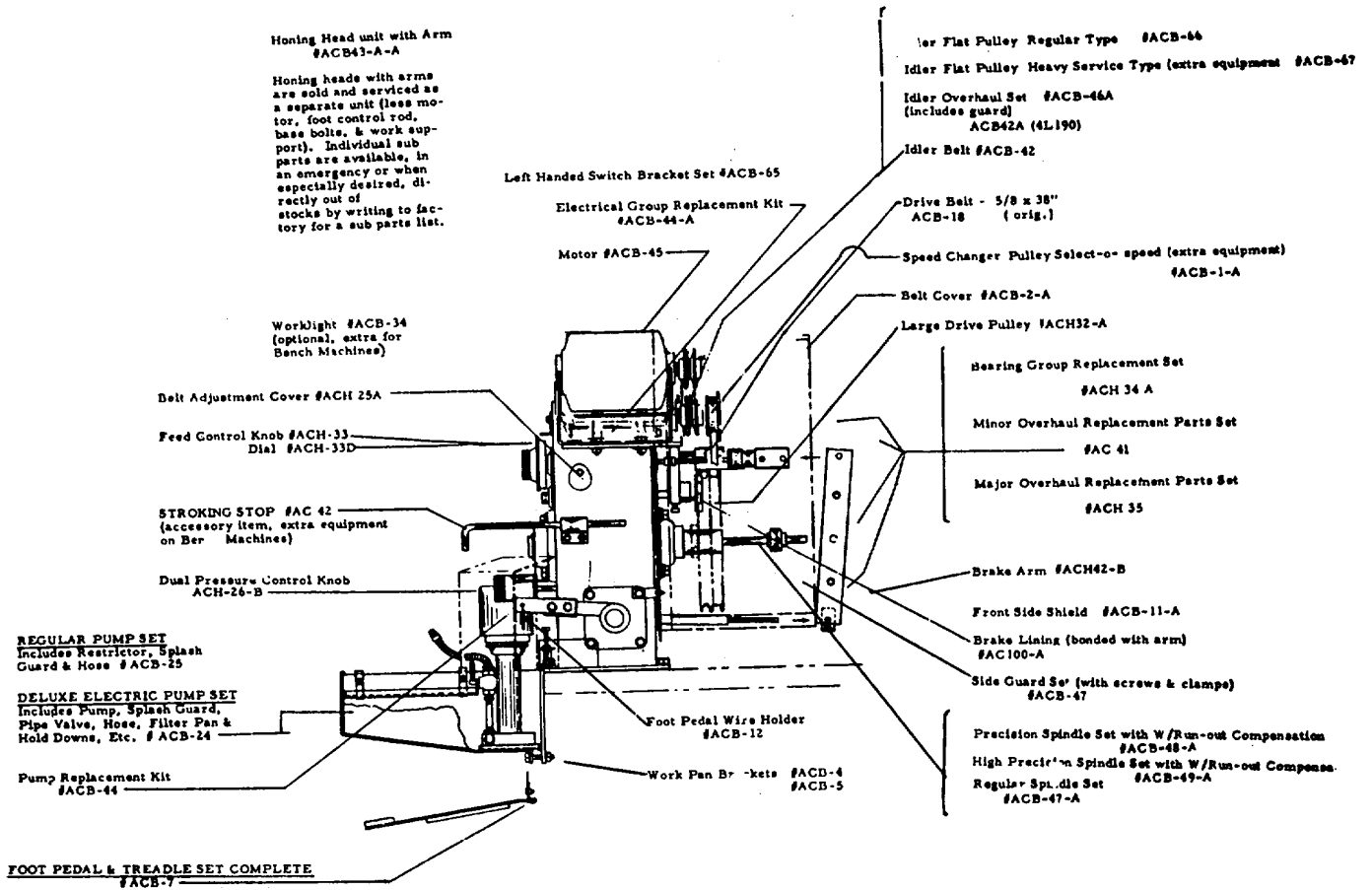


**MODEL CHY-B**

**PARTS LIST**

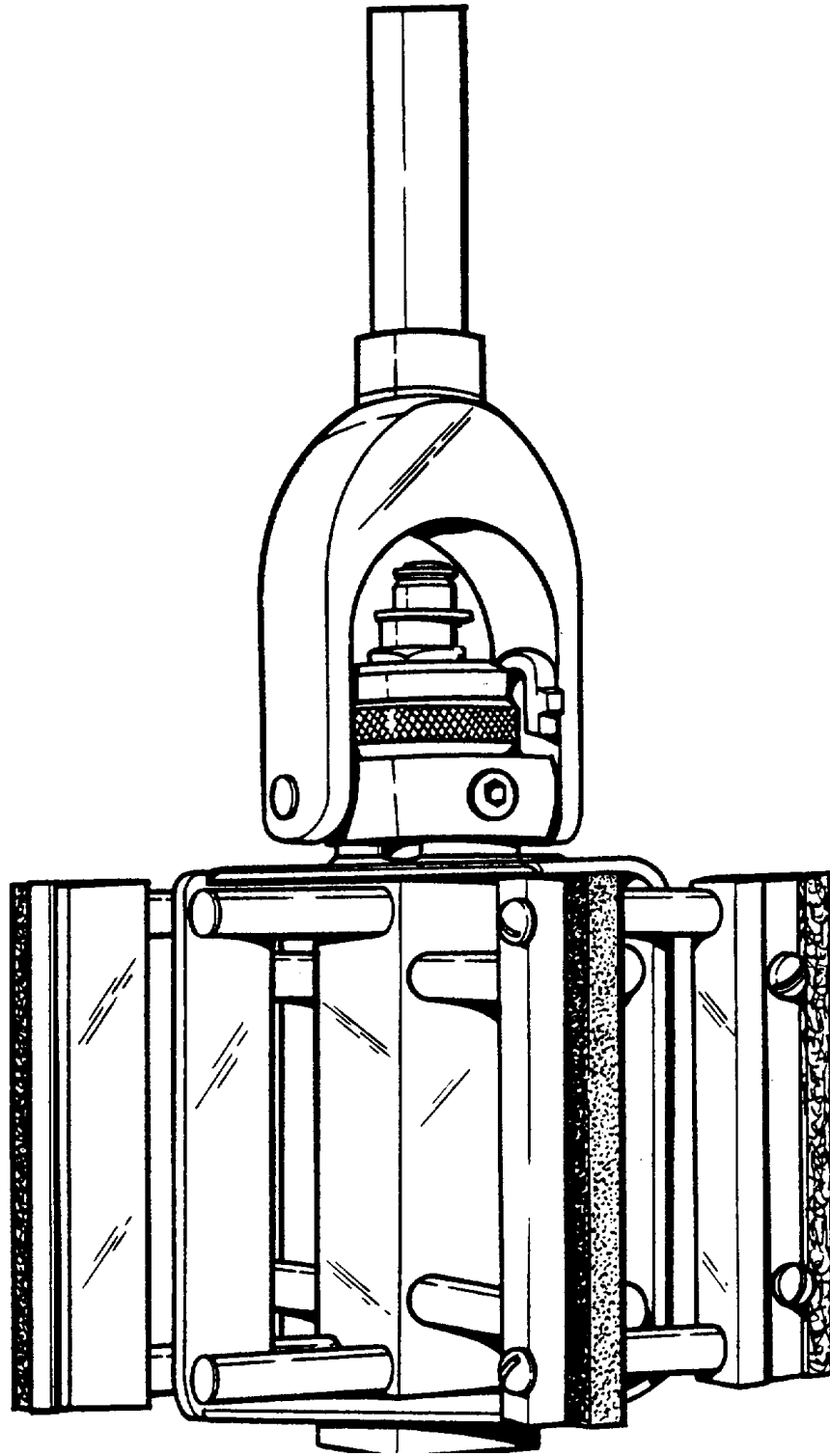
When ordering parts give serial number and model number of your machine.





**MODEL CHY-BA (osha)  
PARTS LIST**

When ordering parts give serial number and model number of your machine.



CAN TYPE STONES MAY BE USED ON HONING MACHINE MODEL CHY OR F TYPE PORTABLE HONES. USE TYPE, E OR TYPE F PORTABLE HONING UNIT (SEE ILLUSTRATION ABOVE) FOR ROUGHING IN THE BORE PRIOR TO FINISH HONING ON MACHINE.

CENTURY PART NO. HONING UNIT SET  
TYPE F.

ILLUSTRATION: PORTABLE TYPE F HORNE FOR PREPARING LARGE WORKPIECES.

NOTE: ALWAYS RUN HONES OVER 1" IN DIAMETER AT THE LOWEST SPEED ON MACHINE.

PARTS LIST AND SUPPLEMENTARY COMPONENTS  
AND ATTACHMENTS FOR CYLINDER HONES AND  
HONING MACHINES

Part # E Honing Kit (consists of the following items)

Metal box M  
Honing Body (with pinion and yoke) CAN-218  
Drive Shaft CAN-82  
Single length holder sets (2)  
CAN-533  
CAN- 543  
Stones (6 sets)  
CAN-1 2 sets  
CAN-2 2 sets  
CAN-5 2 sets

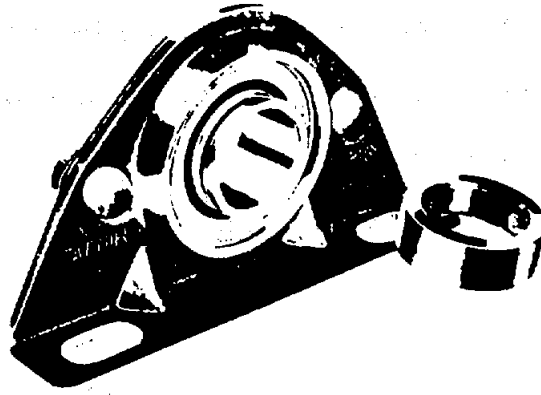
Part # F Honing Kit (consists of the following items)

Metal box L  
Honing body (with pinion and yoke) CAN-21, 8  
Drive Shaft CAN-82  
Drive Shaft extension CAN-828  
Single length holder sets (5)  
CAN-533  
CAN- 543  
CAN-563  
CAN-573  
CAN-583  
Holder supports (3)  
CAN-C62  
CAN-C82  
CAN-C92  
Stones (6 sets)  
CAN- 1 2 sets  
CAN- 2 2 sets  
CAN- 5 2 sets

Spare Parts and Replacements for machines  
and large cylinder hones.

Spare Parts

Honing Unit CAN-218  
Pinion CAN-61  
Yoke CAN-C56  
12" Drive Shaft CAN-82  
Drive Shaft Extension CAN-828  
12" Heavy Duty 3/4" Drive Shaft CAN-82  
(Extension CAN-828 also fits this shaft)  
Honing unit set CAN 218 A attachment for use of the  
equipment supplied with machines.



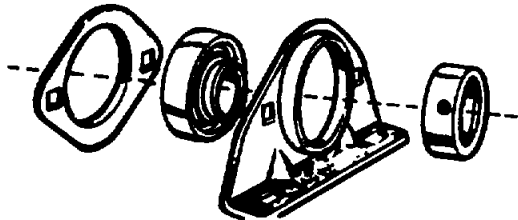
**How to assemble  
and install the  
PBS BALL BEARING**

**IMPORTANT: Read these instructions carefully before proceeding  
with installation**

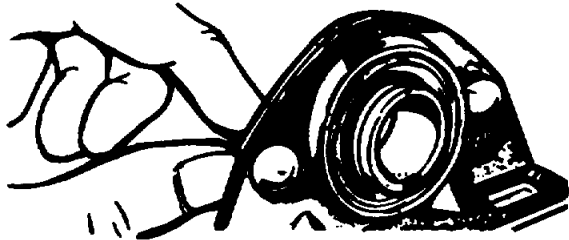
## MOUNTING AND INSTALLING REPLACEMENT BALL BEARINGS

Ball bearings used on precision honing machines are of the quick change, Self-aligning style. where ever possible. The spindle feed ball bearing is replaceable by simply removing lock, installing bearing, and replacing lock ring. The remainder of the bearings are prelubricated and should last throughout the life of the bearing. Bearings on the non-rotating shaft may be turned approximately 2/5 of a revolution semi-annually in production under extreme heavy use of the machine. Under normal use it may never be necessary to touch bearings for the life of the machine.

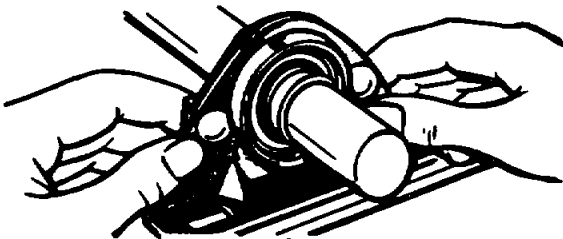
### **7 SIMPLE STEPS . . .**



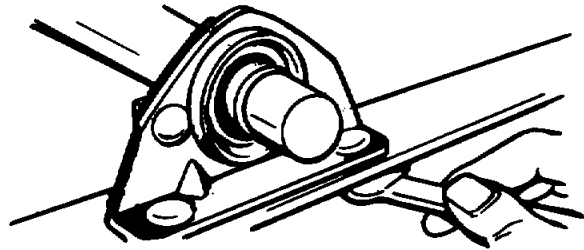
**1.** Assemble two halves of housing around bearing



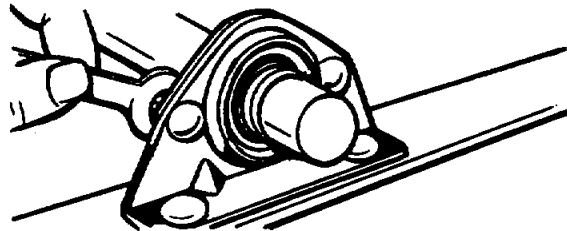
**2.** Insert and tighten housing bolts finger tight.



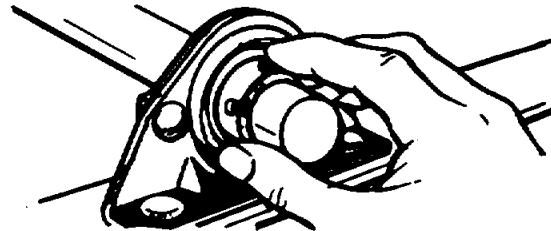
**3.** Slide assembled unit to desired position on shaft.



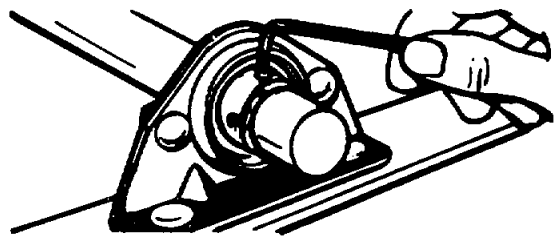
**4.** Bolt base of unit in place.



**5.** Wrench tighten two housing bolts.



**6.** Lock collar by turning in direction of shaft rotation until collar cam drops over and engages bearing cam.

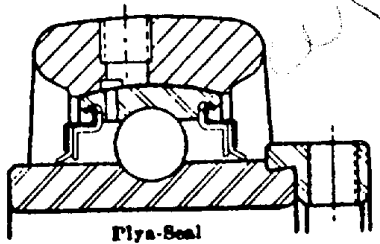
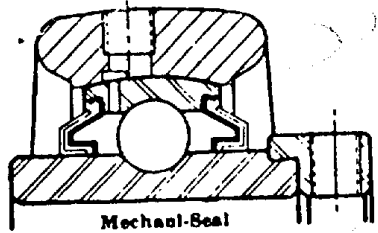


**7.** Tighten collar set screw with allen wrench.

**PRELUBRICATED MECHANICAL-SEAL AND PLYA-SEAL  
TRANSMISSION UNITS  
INSTALLATION**

**NOTE:** Shaft should be free from burn. If old shaft is used, be sure ball bearing is not seated on worn section.

1. Locate assembled unit in position, and line up shaft carefully. Self-aligning units will automatically compensate for misalignment, but shaft must be straight. Bolt unit securely to supporting structure.



2. Slide collar against cam end of inner ring. Engage cams by rotating collar until it slides over cammed end of inner ring. Lock collar by tapping lightly in direction of shaft rotation. Tighten set screw. To disassemble, loosen set screw and tap collar in direction opposite shaft rotation.

**NOTE:** After installation of this unit and determination of correct rotation, check for proper engagement of collar and tightness of set screw.

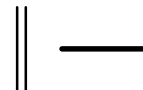
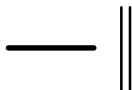
**LUBRICATION**

Bearings have been factory prelubricated with high quality grease and for Normal conditions of Service require no further lubrication.

Normal Service is considered as operation in a clean, dry, atmosphere at temperatures between -20°F and 180°F and at shaft surface speeds up to 2100 ft. per minute. This corresponds to a 1" shaft at 8000 R/1M, a 2" shaft at 4000 RPM or a 3" shaft at 2700 RPM.

Where service is Abnormal with respect to speed, temperature, exposure to moisture, dirt or corrosive chemicals, or where extremely long life is required, periodic relubrication may be advisable. To relubricate remove pipe plug and replace with a standard 1/8 pipe thread grease fitting. The Bearing Company will advise of suitable greases for abnormal service on request.

For bearing replacements, order by number on seal  
(not on inner or outer ring).



## DISASSEMBLY OF THE BEARINGS (CHY)

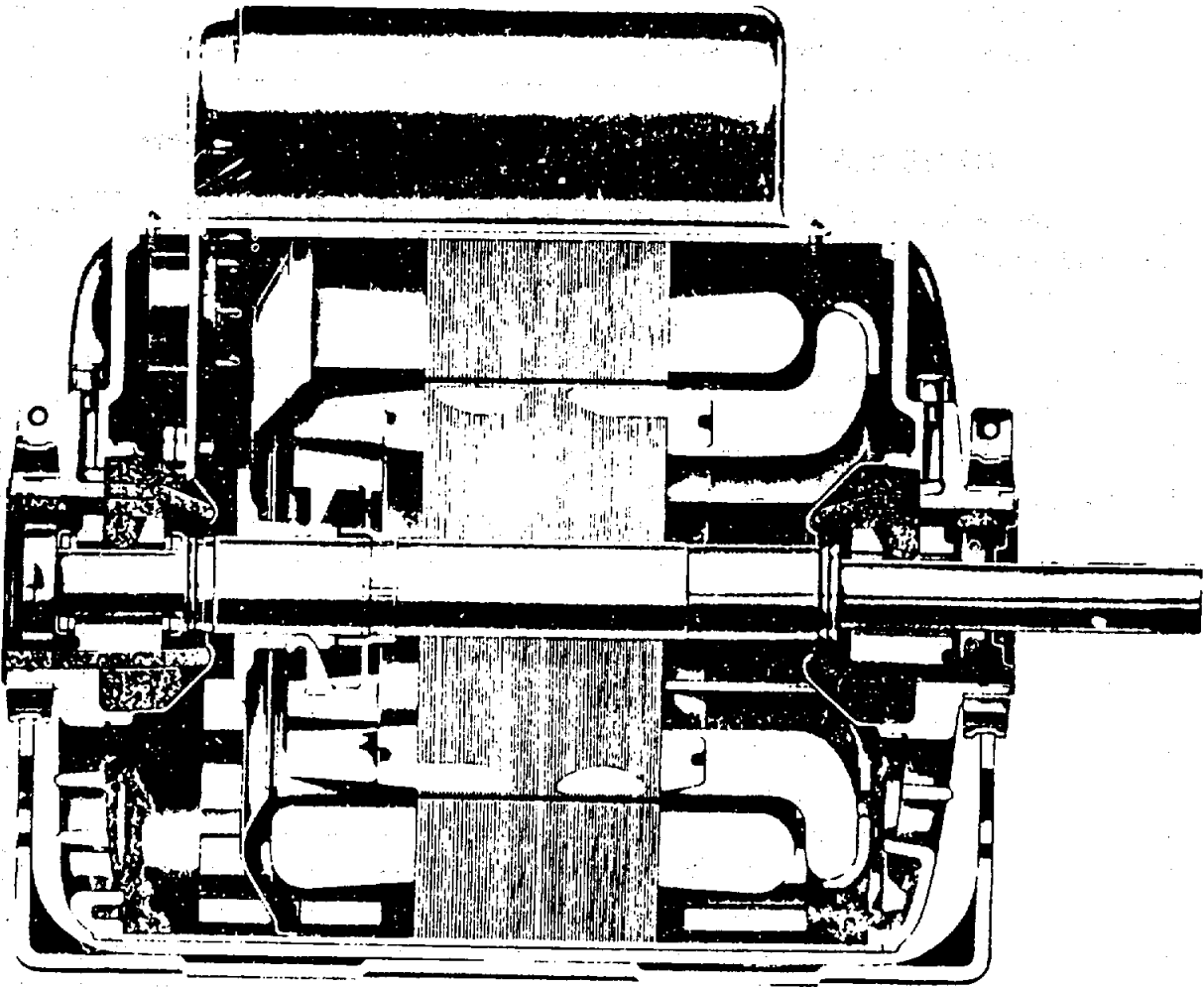
Most bearings of machines are easily replaceable; although the honing head Part #AC-43 and Part #AC-43A are sold and are serviced in a complete unit. Individual bearings may be replaced by adhering to these few simple hints-

- (1) Follow the directions given by the bearing manufacturer for the new bearings supplied.
- (2) When disassembling ball bearings and side of machine remember that bearing housings if replaced may vary slightly due to the bearing manufacturers tolerance requirements. Note: When using other than Bearing Replacement Set-Part No. ACH34A. Facing the bearing holding Parts ACH 19 and ACH 18 (The lever arm assembly on side of machine) the upper left hand screw of the 4 bolts holding bearing assembly should not exceed 2-1/8" if new bolts are used. As bolt manufacturers may vary the length of bolts in practice. Use a long 2" bolts or a short 2-1/4" bolt to prevent connecting rod from touching bolt when lever is fully depressed.



- (3) When Replacing Ball Bearings, After tightening down completely, loosen screw slightly and move shaft approximately 1/8 turn using a plastic hammer or other soft object such as a piece of wood. Give the shaft a slight rap. Retighten bolts of bearing and secure. This will insure an ultra smooth action and will give the machine bearing a free action. If shaft is not completely free and smooth working; repeat procedure above. This will usually be required only once on a new bearing. Bearings are self-aligning and will stay in alignment until loosened or replaced.
- (4) Should Main Pulley Bearing ever be disassembled or replaced, it should be indicated in with a good shop indicator.
- (5) When replaced, Idler shaft bearings should be tapped into alignment as described above and run in for perfect service at high speed. If bearings are used continuously at high speed, follow manufacturers recommendation for changing (due to lessened bearing life). Heavy duty Idler Shaft Part # ACH 40-B should be replaced at that time also.
- (6) Special bearings for extreme hot and cold climates are available

TYPE KC FORM G FRACTIONAL-HORSEPOWER MOTORS



(NEG 1087615)

REPRESENTATIVE OF TYPE KC FORM G DRIPPROOF SLEEVE-BEARING MOTORS



RENEWAL PARTS

**PRINCIPAL RENEWAL PARTS**

GIVE QUANTITY, CAT. NO., AND DESCRIPTION OF EACH ITEM REQUIRED

Ref. No.	No. Req.	Description	Cat. No.
1, 2	1	(Ball) (Sleeve) pulley end	113A617AGP1
		Bearings—	
	1	(Ball) (Sleeve) end opposite pulley	
3	1	Switch	114A840CAG1
4	1	Centrifugal mechanism	11 5A8 CAG3
5	1	Capacitor	8753704ARP10
6	1	Thermal protector (when used)	

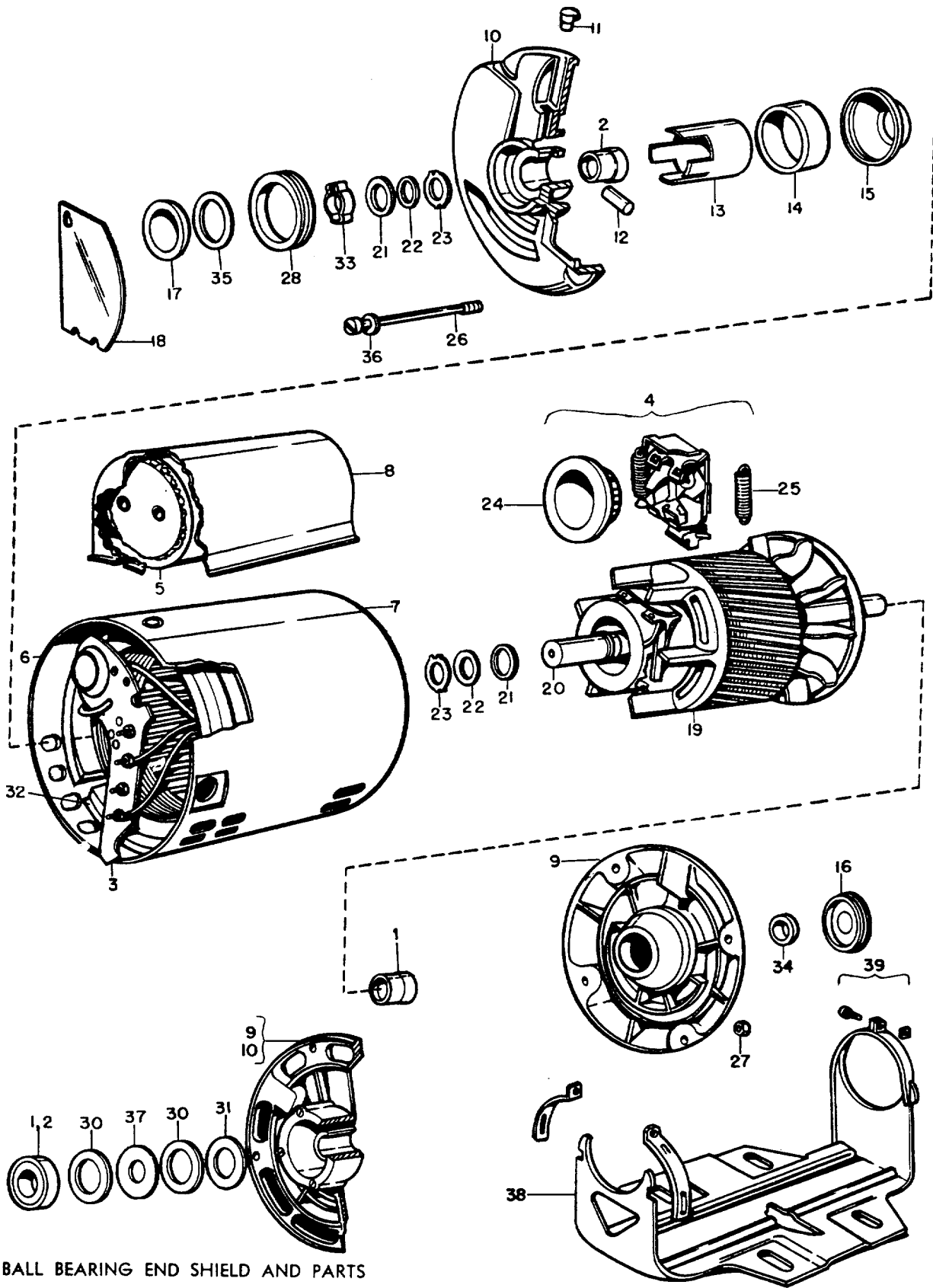
**RENEWAL PARTS AVAILABLE IF REQUIRED**

When ordering parts for which catalog numbers are not listed, refer to Bulletin GEZ-724, giving reference number, quantity, and description of each item required (as listed below), and the model number of the Motor.

Ref. No.	No. Req.	Description	Cat. No.
7	1	Stator	
8	1	Capacitor cover	11B279ACP1
9, 10	1	(Pulley end)	114D812ANA2
		◆ End shield—	
	1	(Opposite pulley end)	14D813AAP2
11	2	Oil cup	
12	2	Cylindrical wick	
13	2	Finger wick	
14	2	Straight wick	
15	2	Oil well cover	
16, 17	1	(Pulley end)	
		End cap—	
	1	(Opposite pulley end)	
18	1	Terminal box cover	
19	1	Rotor with shaft and centrifugal mechanism	
20	1	Shaft	
21	2	Cup washer	
22	2	Cushion washer	
23	2	Thrust washer	
24	1	Push collar for centrifugal mechanism	115B942AAP1
25	2	Spring	112A309P1
26	4	Clamping screw	
27	4	Nut for clamping screw	
28	2	Cushion ring (when used)	
30	2	Conical washer (for ball bearing motors)	
31	†	Shim washer (when ordering, give thickness required)	
32	1	Baffle (switch end)	
33	1	Locking clip	
34	1	Oil slinger	
35	1	Ring seal for end cap	
36	4	Insulation washer for clamping screw	
37	1	Spacer washer	
38	1	Base (includes latches)	114B936AB2
39	2	Latches	161L110AA4

◆ Sleeve bearing end shield furnished with bearing and parts  
 Ball bearing end shield furnished less bearing and parts  
 † Quantity variable

REPRESENTATIVE EXPLODED VIEW OF TYPE KC FORM G DRIPPROOF SLEEVE-BEARING MOTORS



BALL BEARING END SHIELD AND PARTS

**PRINCIPAL RENEWAL PARTS**

GIVE QUANTITY, CAT. NO., AND DESCRIPTION OF EACH ITEM REQUIRED

Ref. No.	No. Req.	Description	Cat. No.
1, 2	1	(Ball) (Sleeve) pulley end	113A617ABP-1
	1	Bearings— (Ball) (Sleeve) end opposite pulley	113A617ABP-1

**RENEWAL PARTS AVAILABLE IF REQUIRED**

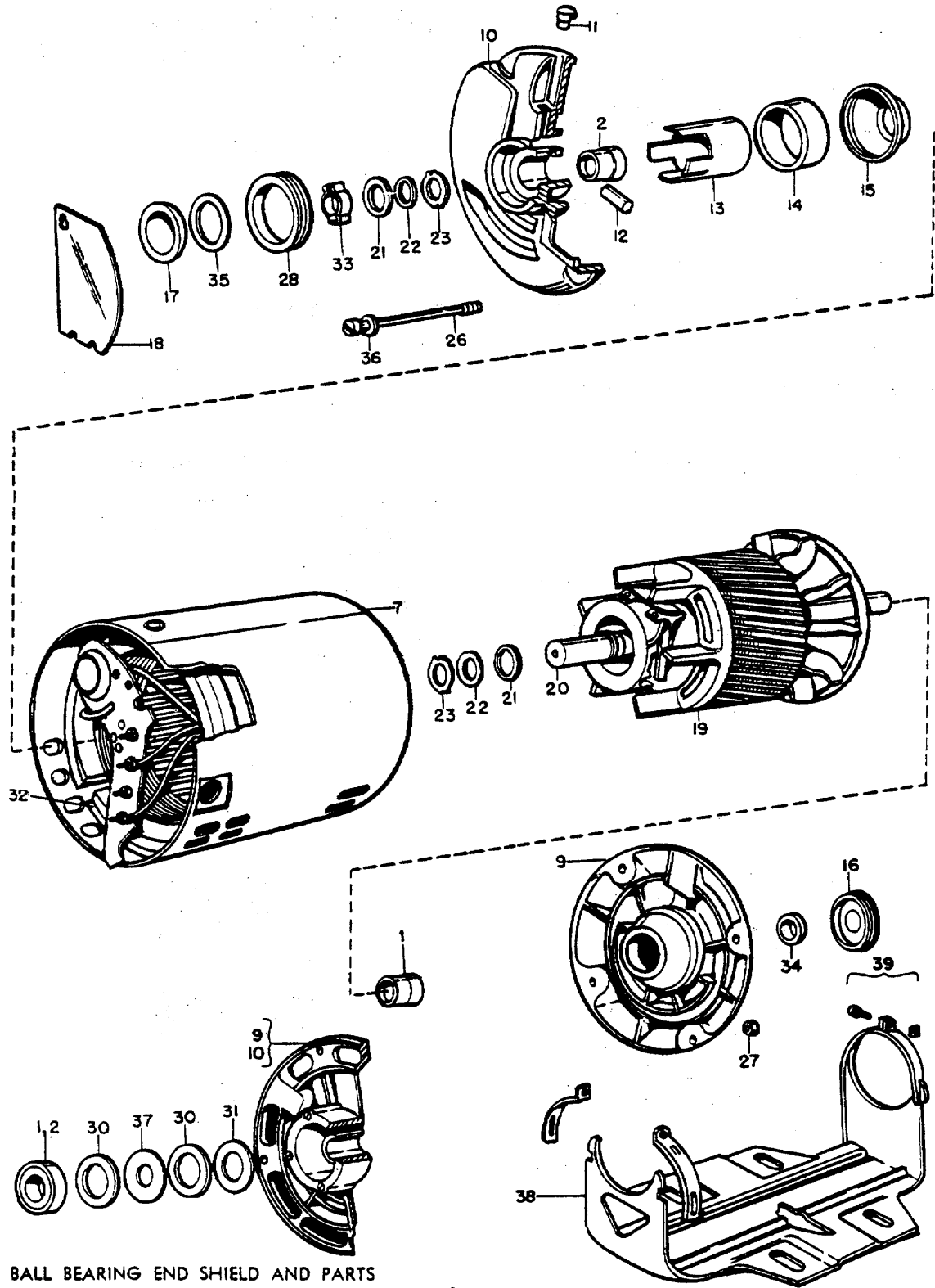
When ordering parts for which catalog numbers are not listed, refer to Bulletin GEZ-724, giving reference number, quantity, and description of each item required (as listed below), and the model number of the Motor.

Ref. No.	No. Req.	Description	Cat. No.
7	1	Stator	114D811AAP-2
9, 10	1	(Pulley end)	114D812AAP-2
	1	◆ End shield— (Opposite pulley end)	114D813AAP-2
11	2	Oil cup	114D814AAP-2
12	2	Cylindrical wick	114D815AAP-2
13	2	Finger wick	114D816AAP-2
14	2	Straight wick	114D817AAP-2
15	2	Oil well cover	114D818AAP-2
16, 17	1	(Pulley end)	114D819AAP-2
	1	End cap— (Opposite pulley end)	114D820AAP-2
18	1	Terminal box cover	114D821AAP-2
19	1	Rotor with shaft	114D822AAP-2
20	1	Shaft	114D823AAP-2
21	2	Cup washer	114D824AAP-2
22	2	Cushion washer	114D825AAP-2
23	2	Thrust washer	114D826AAP-2
26	4	Clamping screw	114D827AAP-2
27	4	Nut for clamping screw	114D828AAP-2
28	2	Cushion ring (when used)	114D829AAP-2
30	2	Conical washer (for ball bearing motors)	114D830AAP-2
31	†	Shim washer (when ordering, give thickness required)	114D831AAP-2
32	1	Baffle (switch end)	114D832AAP-2
33	1	Locking clip	114D833AAP-2
34	1	Oil slinger	114D834AAP-2
35	1	Ring seal for end cap	114D835AAP-2
36	4	Insulation washer for clamping screw	114D836AAP-2
37	1	Spacer washer	114D837AAP-2
38	1	Base (includes latches)	114B936AB-2
39	2	Latches	161L11OAA-4

◆ Sleeve bearing end shield furnished with bearing and parts  
 { Ball bearing end shield furnished less bearing and parts

† Quantity variable

REPRESENTATIVE EXPLODED VIEW OF TYPE K FORM G DRIPPROOF SLEEVE-BEARING MOTORS



BALL BEARING END SHIELD AND PARTS

**FORM G2 MOTOR  
EASY-SERVICE FEATURES**

1. Relay and centrifugal switch points are pre-set at the factory for proper operation and quick installation.
2. Shaft de-burring is unnecessary to remove the rotor, thus reducing disassembly time. New 5/8-inch diameter bearings and 1/2- or 5/8-inch shaft extensions make replacement easier.
3. Machining of the bearing hub OD is not required to change the motor from a solid- to a resilient-cradle base mounting.
4. An easy-to-read connection indicator is imprinted on the outside of the terminal-box cover for ready reference.
5. Leads of braidless neoprene material have a clear color coding for motor lifetime. This simplifies lead identification during hookup.
6. A new thrust washer is simply constructed for easy removal.
7. Oilers aligned on perimeter of motor shell simplify relubrication.

**GENERAL DISASSEMBLY**

1. Remove the base if it is still on the motor.
2. Take out through-bolts.
3. Remove pulley-end end shield.
4. Pull rotor out the pulley end.

**CAUTION: Use care in handling the rotor to prevent bending of fan blades.**

5. Notice how thrust washers are assembled to the shaft. Three thicknesses of these washers are available for endplay adjustment.
6. Take the other end shield off the stator.

**CAUTION: Do not damage winding guards.**

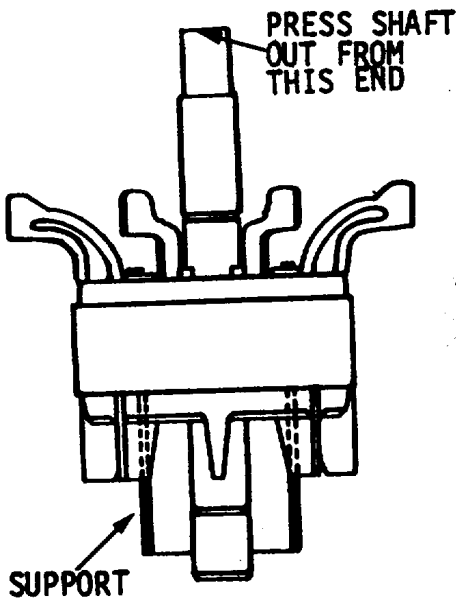


Fig. 1. Shaft rotor assembly

**SHAFT AND CENTRIFUGAL  
MECHANISM REPLACEMENT**

**TO REMOVE SHAFT**

1. Remove thrust washers and snap rings.
2. Check and record the position of the rotor on the shaft.
3. Support the rotor on the opposite-pulley end, on a tube with square ends. Support should be as close as possible to the aluminum end ring (see Fig. 1). Press against the pulley end of shaft, at the step in the shaft if possible.

**TO REASSEMBLE SHAFT**

1. Support the rotor in the same way as in removal and press the shaft to the original or recorded position by pressing on the step between the extension and the bearing diameter.
2. Reassemble snap rings and thrust washers.

**TO REPLACE CENTRIFUGAL MECHANISM**

When the centrifugal mechanism is at standstill, the push collar stops against the thrust washer snap ring. The backplate is held onto the shaft by pressing it over a serrated bushing, which is prevented from moving along the shaft by another snap ring.

Remove snap rings from shaft with a plier No. 2 or with a plier No. P 102.

Assemble mechanism to shaft by pressing against the end of the push collar, not on the face. Press until the end of push collar is 1.56 inches (plus or minus 1/64 inch) from the switch end of shaft when the mechanism is in the running position (see Fig. 2).

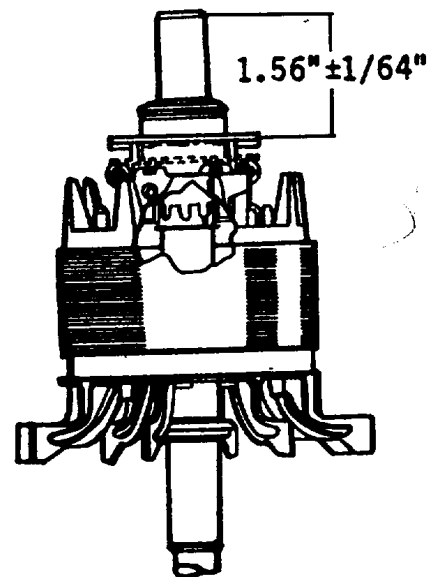


Fig. 2. Shaft rotor assembly with centrifugal mechanism

## SWITCH OR RELAY REPLACEMENT

The relay (see Fig. 3) used in Form G2 motors for cutting-in and -out of the start winding requires no field adjustment. A non-position sensitive, low-potential device, it operates from a sensing coil, wound on the stator core in the same axis as the start winding (see Fig. 4).

Voltage is induced into the coil from the start winding. This voltage causes current to flow through the magnet coil in the relay assembly, activating the relay armature, and thereby removing the start winding from the line. When the motor circuit is opened, the relay armature returns to the start position.

The relay has a built-in cam which mechanically separates the contacts, relieving any tendency for contacts to stick or weld together.

### TO REMOVE RELAY

1. The relay may be removed by sliding it out the end of the shell.

**CAUTION: Do not break wires coming from the pick-up coil.**

2. After the relay is removed from the shell, wire connections from the stator pick-up coil should be cut close to the relay assembly, leaving all wire possible coming from the pick-up coil.

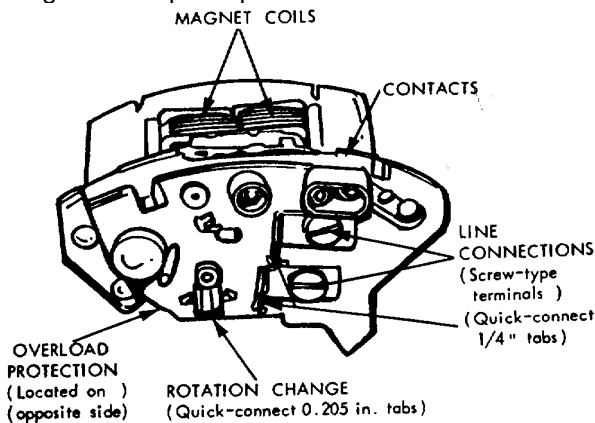


Fig. 3. Motor relay

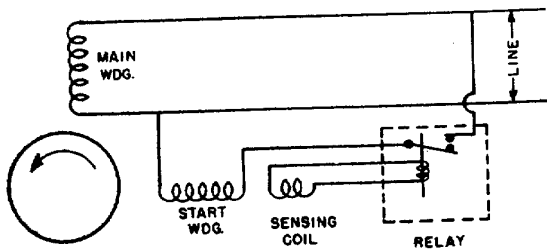


Fig. 4. Motor relay schematic

3. If the relay should fail, replace it with a new one, since no adjustment is possible.

### TO REASSEMBLE RELAY

1. Connect the coil wires of the new relay to the stator pick-up coil wires.

2. Replace the relay in the shell, making certain that connections are properly placed in the cavities of the relay housing and that the insulation strip is in position between the relay and the shell.

### SWITCH SETTING

The starting switch on G2 motors has only one movable arm and wear pad compared to previous motors with two arms and pads. This switch arm is operated by the centrifugal mechanism to open and close the contacts.

For proper switch setting, the flat back of the spring must be 1.03/1.01 inches from the edge of the shell (see Fig 5). The switch is designed to virtually eliminate any need for adjustment. If adjustment is necessary, adjust support bracket so that the back side of terminal board is .730/.720 inches from end of shell.

### TO REMOVE SWITCH

1. Disconnect switch from two brackets in shell and remove.

2. Remove internal leads with quick-connects from terminal board.

### TO REASSEMBLE SWITCH

1. Reconnect internal leads to back of terminal board and fasten terminal board to shell with the two clamps.

2. A recess in the perimeter of the oil well cover (see Fig. 7) provides electrical clearance for the switch and allows the switch arm and wear pad to move freely.

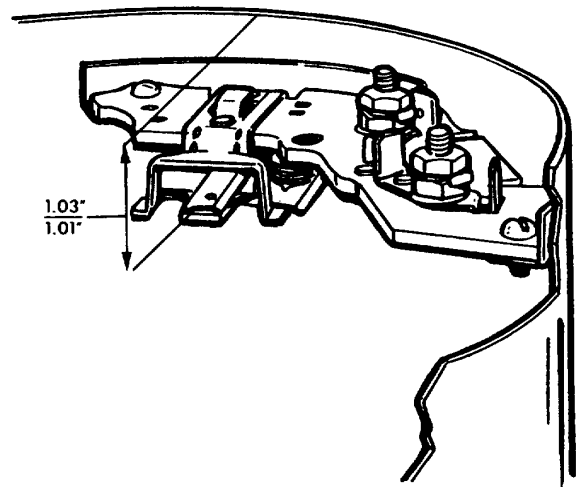


Fig. 5. Switch located in shell

## BEARING REPLACEMENT

### REMOVAL

1. Pry off the oil-well cover on the inner side of the end shield. Notice how the spring-steel thrust plate is keyed to the end shield at four points.
2. Remove the end cap.
3. When removing the felt packing, notice its arrangement for proper reassembly.
4. On the outer side of the end shield (see Fig. 6), support the bearing-hub inside nose with a smooth collar which has a hole slightly larger than the outside diameter of the bearing.
5. From the inner side, press out the bearing with a tool having a guide to fit into the bearing and an outside diameter slightly smaller than the outside diameter of the bearing.

NOTE FIG: 8: The large wick A is a reservoir; the P shaped double feeder wick B supplies the sleeve and thrust bearings; the narrow wick C returns oil from the outboard end of bearing to the main storage wick.

### REASSEMBLY

1. Support the outer face of the hub (see Fig. 6) the same as in removal, except use a support plate without a hole.
2. Press the bearing from the inner side of the end shield until it stops against the support plate.
3. Place the felt packing in its original position.
4. On the pulley-end end shield; place the oil slinger in the outside cavity; the sharp edge should be toward the end cap.
5. Press on the news end cap and oil-well cover. Align the locating mark on the oil-well cover with the locating boss on end shield (see rig. 7). Use a sealing compound on those surfaces where the cap and the cover mate with the end shield. Be sure the spring-steel thrust plate is properly located before assembling the oil-well cover.
6. Check for any wobble of the end shield face fitting against the stator shell. If wobble is over 0.004 inch gage reading, reface this surface. 00 NOT ream the bearing to eliminate wobble. Follow the same refacing procedure when repairing tight motors.

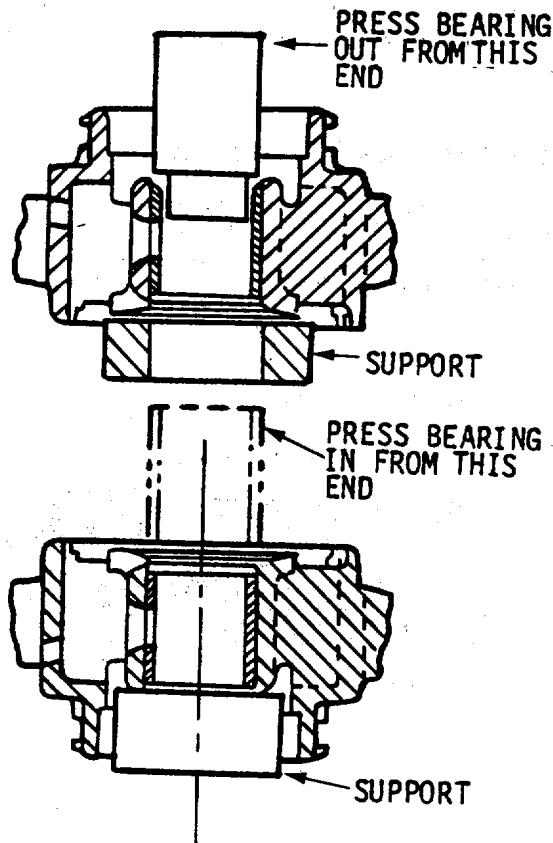


Fig. 6. Bearing replacement

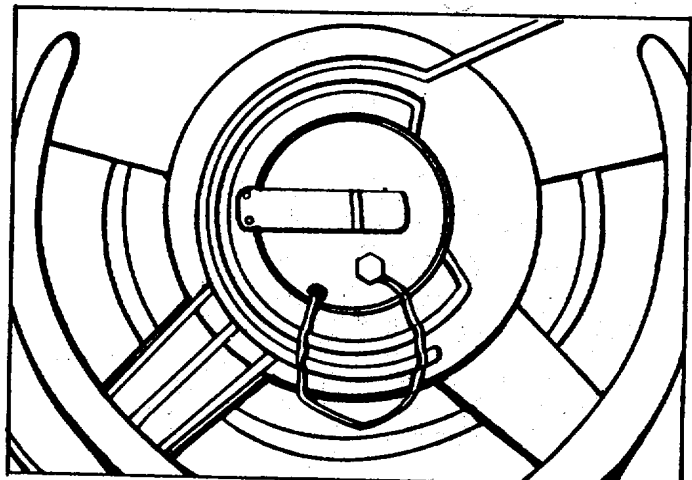


Fig. 7. Proper alinement of oil well cover on end shield

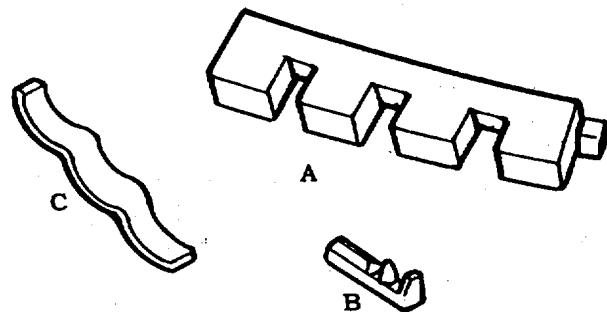
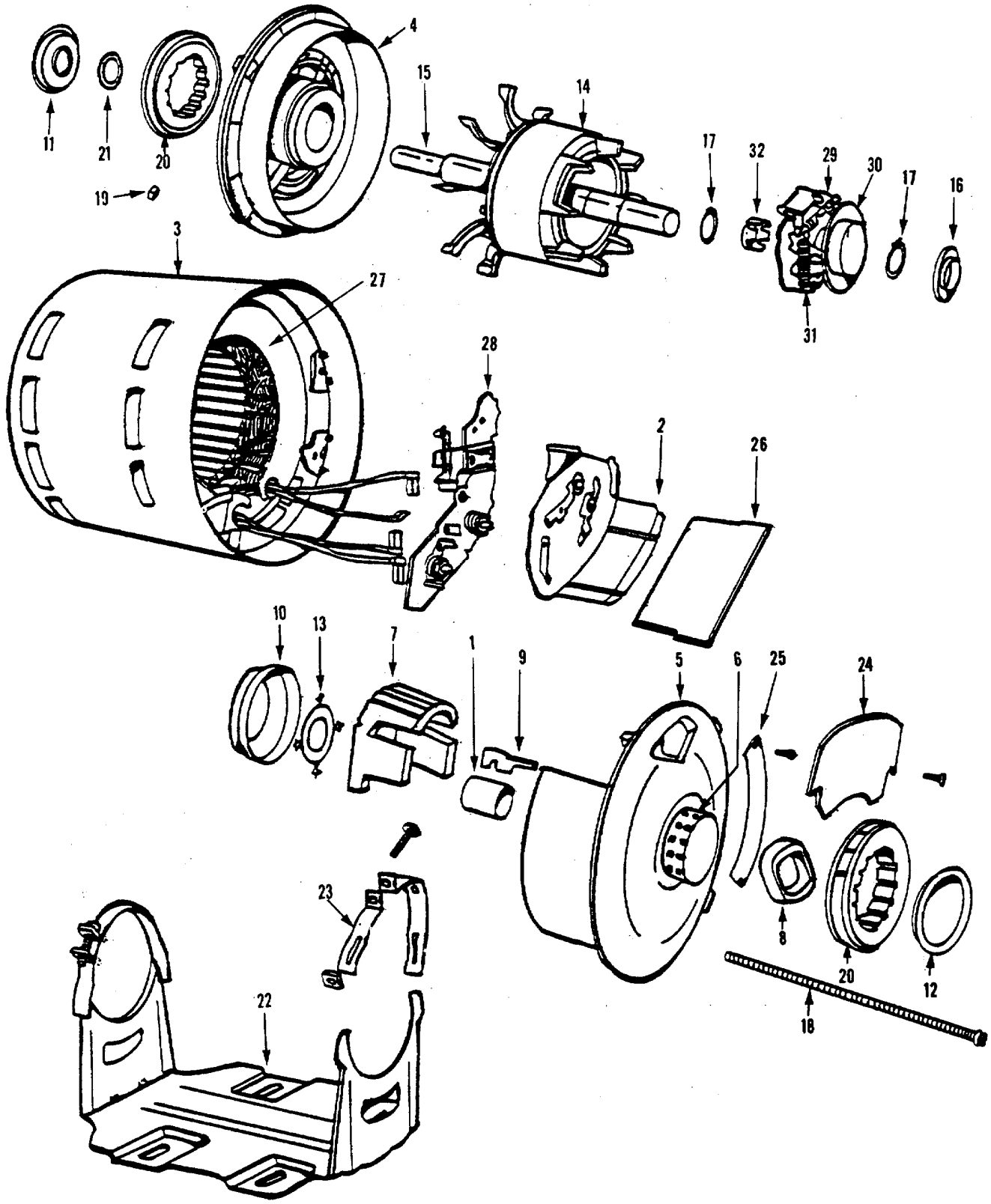


FIG. 8. Oil reservoir and feeder wick

EXPLODED VIEW OF TYPICAL FORM G2 MOTOR  
(SPLIT-PHASE, SLEEVE-BEARING, DRIPPROOF)



G-2 ACTOR FOR MODEL CHY-B--BENCH HONES



## RENEWAL PARTS FOR SPLIT-PHASE FORM G2 MOTOR

**NOTE**



To order parts for which you have no Catalog Numbers, refer to this publication GET- 3192A. Give the motor model number, the description and the quantity of each item required.

REF. NO.	QUAN. REQ'D	DESCRIPTION	
1	2	Sleeve Bearing (Pulley end and opposite-pulley end)	
2	1	Relay (Includes thermal protector when needed)	
3	1	Stator	
4	1	*End shield (Pulley end complete)	
5	1	#*End shield (Opposite-pulley end complete)	
6	2	.O1 Cup (When called for)	
7	2	Oil Wick (Finger)	
8	2	Oil Wick (Outer)	
9	2	Oil Wick ( F -shaped)	
10	2	Oil Well cover	
11	1	End Cap (Pulley end)	
12	1	End Cap (Opposite-pulley end)	
13	2	Thrust Plate	
14	1	Rotor (Includes shaft & washers)	
15	1	Shaft only	
16	2	Thrust washer	
17	3	Retaining ring	
18	4	Through-bolt	
19	4	Nut for through-bolt	
20	2	Resilient ring (When used)	
21	1	Oil-thrower	
22	1	Base (Includes latches)	
23	2	Latches	
24	1	Terminal box cover	
25	1	Nameplate	
26	1	Relay insulator	
27	1	Baffle (Switch end)	} Used in place of relay
28	1	Switch (Does not include thermal protector.)	
29	1	Centrifugal mechanism (Complete)	
30	1	Push collar for centrifugal mechanism	
31	2	Spring for centrifugal mechanism	
32	1	Bushing	

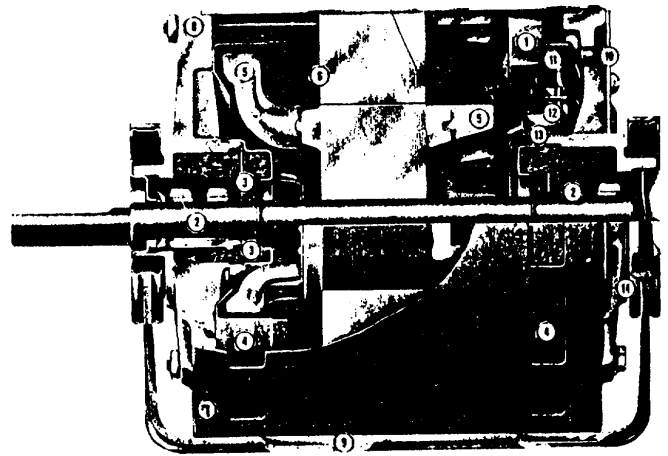
\* Replacement end shield includes bearing and parts.

# Opposite-pulley-end end shield for relay motors includes winding guard. On motors with a switch the winding guard is not used. Instead, a baffle, Item 27, is pressed into the shell.

G-2 MOTOR FOR MODEL CHY-B--BENCH HONES

NEW

FORM G2



### NEW FORM

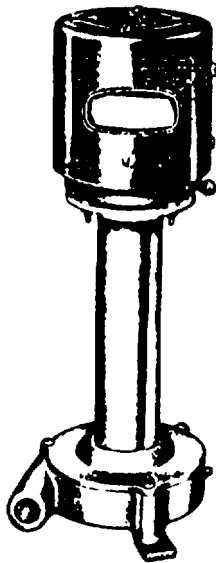
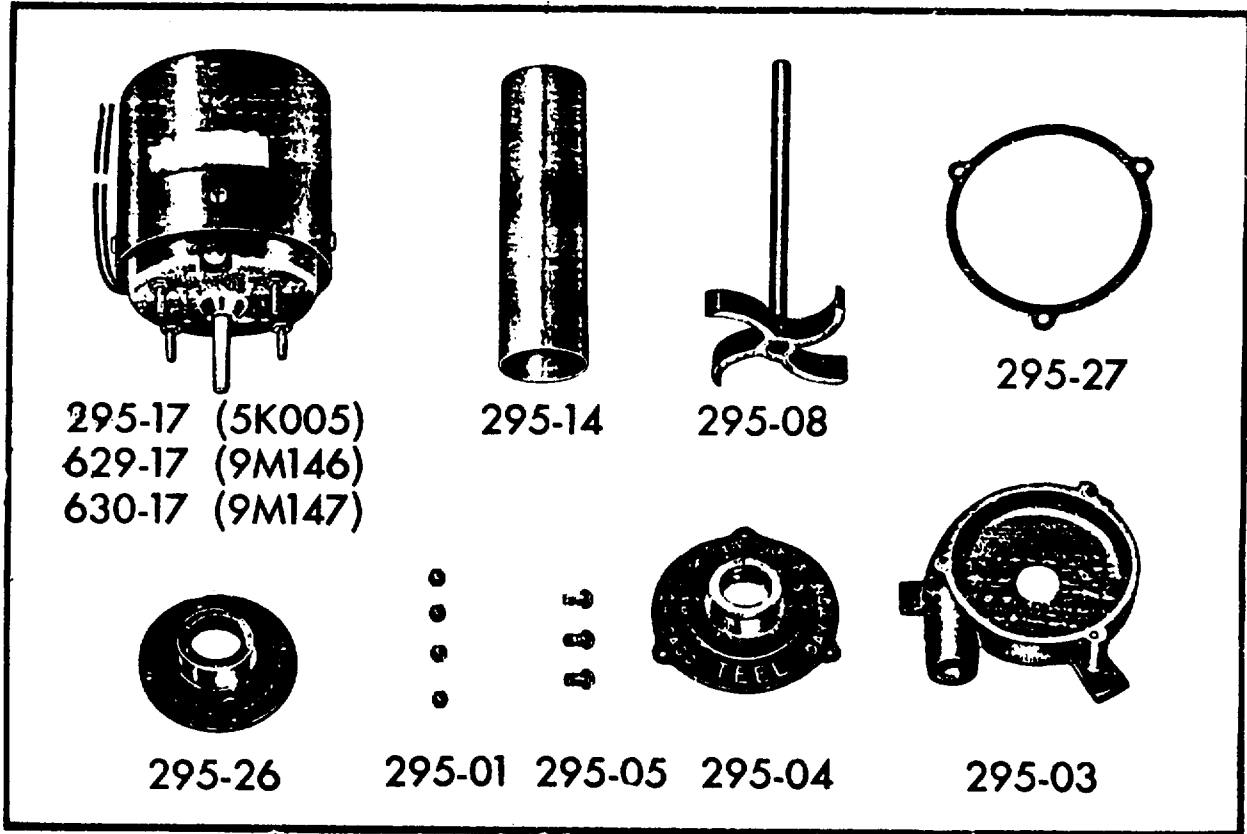
1. **NEW START WINDING CUT-OFFS** provide quiet, dependable operation. Motors have either built-in relay or compact centrifugal mechanism and switch.
2. **NEW QUIET ALL-ANGLE SLEEVE BEARING HAS GREATER** load carrying ability. Double feeder wicks supply new  $\frac{1}{8}$ -inch diameter shaft-bearing surfaces assuring long bearing life.
3. **NEW PRE-TEMPERED SPRING-STEEL THRUST PLATE** and molded end thrust washer with positive lubrication have extremely low coefficient of friction. They permit 23 lbs end thrust for heavier loads, and lengthen motor life.
4. **NEW WINDING GUARDS** give Form G2 motor extra dripproof protection, shield windings from dirt and water.
5. **NEW VENTILATION SYSTEM** provides balanced cooling at both ends of motor for long life. All air enters through end shields, exhausts through shell.
6. **NEW INTEGRAL INSULATION** has outstanding temperature and moisture resistance. Material and method of application are U.L. recognized.
7. **NEW FLAT END SHIELDS** have heavy ribbing for extra rigidity. Die-cast aluminum construction resists corrosion.

8. **NEW RAISED END-SHIELD BOSSES** and machined OD are held to close tolerances for accurate mounting of customer's adapter. Throughbolt nuts are easily accessible.
9. **NEW HEAVY RIBBED STEEL BASE** gives motor extra rigidity. Either resilient or solid cradle base mounting available.
10. **NEW TERMINAL BOX LOCATION** is easily accessible and slotted conduit box cover slides off easily by simply loosening two screws. Easy-to-read cover has indicator for rotation change and lubrication instructions.
11. **NEW TERMINAL BOARD** is provided with both conventional studs and quick connects for easy hookup.
12. **NEW CONDUIT CONNECTION**-Formed shell has extra strong thread. Knock-out plug in located 300 above centerline for easy access.
13. **NEW GUIDE-CHUTE** channel leads in straight line to terminals, simplifying line connection.
14. **NEW PROTECTED GROUNDING STRIP** in resilient base motors provides greater safety. 2 1/2-inch cushion ring minimizes vibration.

G-2 MOTOR FOR MODEL CHY-B--BENCH HONES

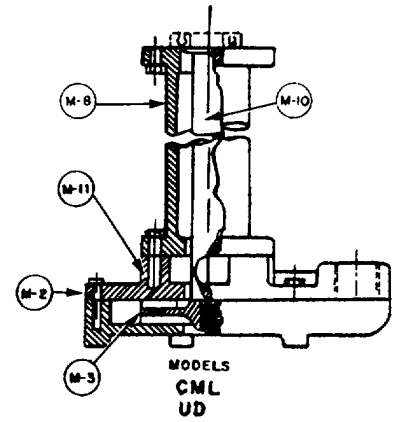
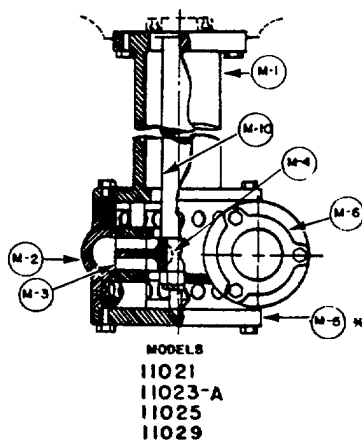
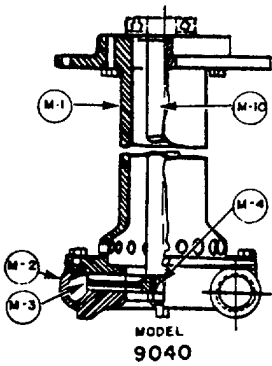
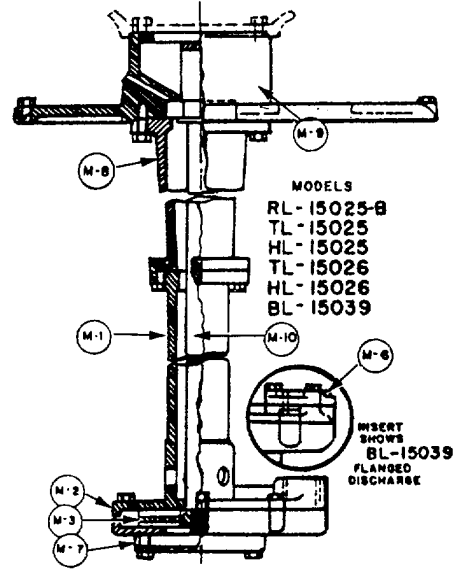
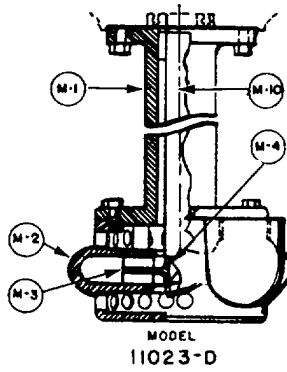
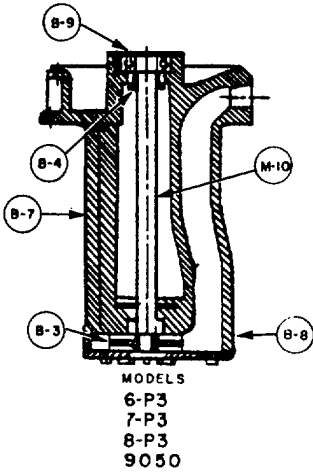
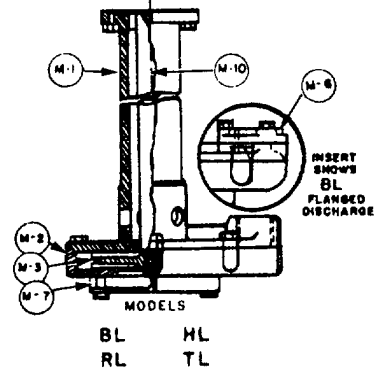
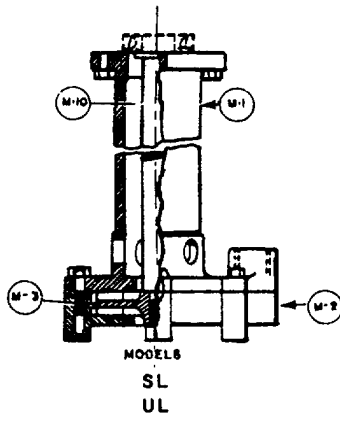
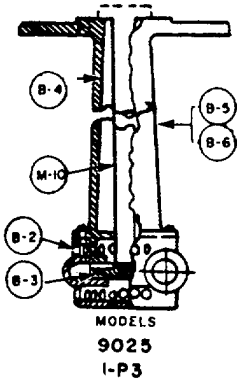
# RECIRCULATING PUMPS PARTS LIST

MODELS 1P295, IP629 & 1P630



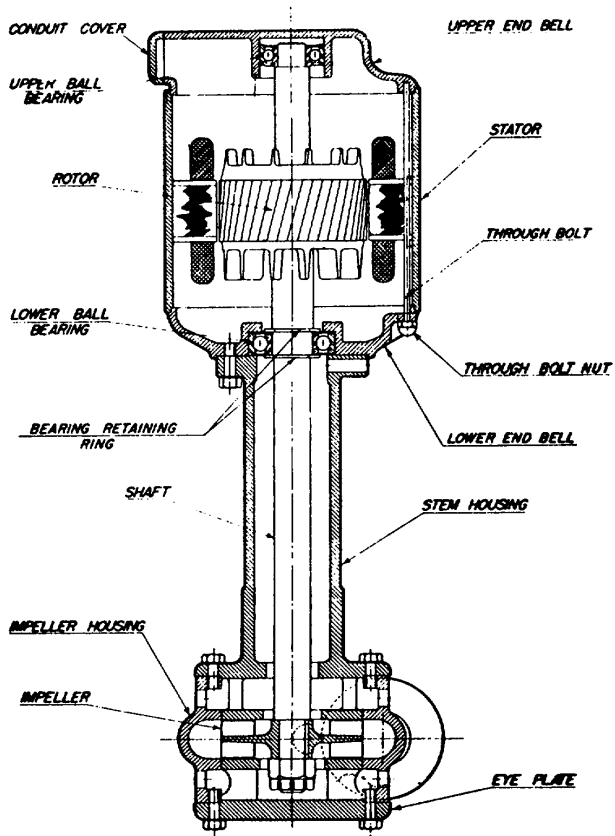
Part No.	Part Description	No. Used
295-01	Motor Mtg. Nuts, set of 4	4
295-03	Base Impeller Housing	1
295-04	Top Impeller Housing	1
295-05	Mtg. Screws, set of 3	3
295-08	Impeller & Shaft	1
295-26	Motor Flange	1
295-27	Base Gasket	1
295-14	Tube Column	1
295-17 (5K005)	Motor for No. IP295	1
629-17 (9M146)	Motor for No. IP629	1
630-17 (9M289)	Motor for No. IP630	1

# PUMPS



The following list of PUMPS illustrate the comparison between new model numbers and what they were formerly known as. Together with the model number it is necessary to state whether (x-long, long, or short) where variable, on the models where the suffix numbers were eliminated.

<b>NEW MODEL NO.</b>	<b>FORMERLY KNOWN AS</b>
1 -P3	1-P3-9020      1/30 HP
1 -P3	1-P3-9030      1/10 HP
6-P3	6-P3 -9031
7-P3	7-P3-9029
8-P3	
9025	
9040	
9050	
11021	
11023-A	
11023-D	
11025	
11029	
BL	BL-7520
BL- 15039	
CML	
HL (Long)	HL-7420
HL - 15025	
HL - 15026	
RL-15025 B	
RL	RL-7620
SL (Long)	SL-7220
TL (Long)	TL-7320
TL -15025	
TL -15026	
UD (Long)	UD-8110
UL (Short)	UL-2106
UL (Long)	UL-7120
UL (X-Long)	UL-2



TYPICAL CROSS SECTION COOLANT PUMP.

## MODELS

1-P3  
 6-P3  
 7-P3  
 8-P3  
 9025  
 9040  
 9050  
 11021  
 11023-A  
 11023-D  
 11025  
 11029  
 BL  
 BL-15039  
 CML  
 HL  
 HL-15025  
 HL-1 5026  
 RL 15025-B  
 RL  
 SL  
 TL  
 TL-15025  
 TL-15026  
 UD  
 UL

**Instructions for Manual Starter  
2 Pole Single-Phase, Toggle  
Operated.**

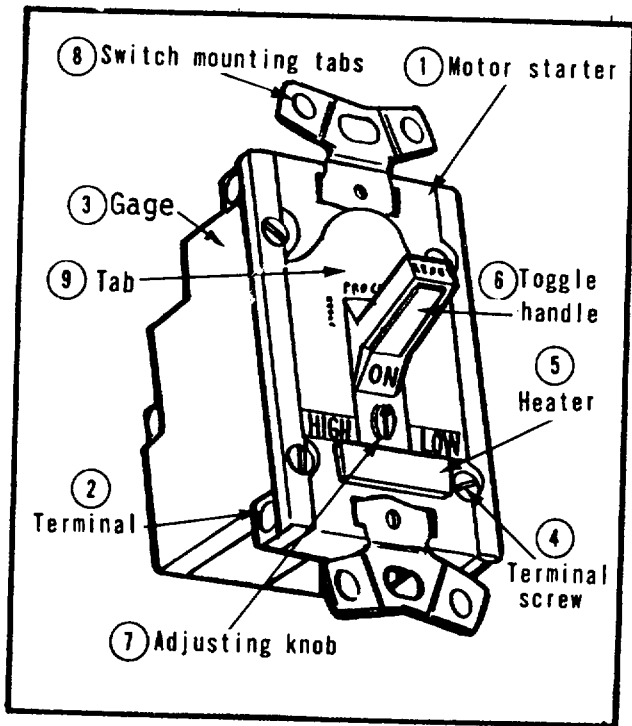


Figure 1. Manual Starter, Toggle Operated.

**Installation, Toggle or Key Operated Manual Starter**

1. Select proper enclosure. See Table 2.
  2. Strip connecting wires to depth indicated by gage (3) on side of switch. (See Figure 1) Insert stripped wires straight into terminals (2) and tighten terminal screws (4).
- See wiring diagrams (Figure 2) or on sides of switch.
3. Mount starter switch to enclosure base tabs with 2 screws furnished.

**Adjustments--Heater**

Heater is of the plug-in type which is keyed for proper positioning and requires no screws. Heater (5) is inserted in rectangular opening in front of switch directly below

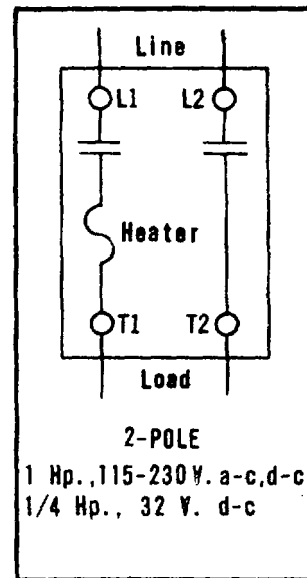
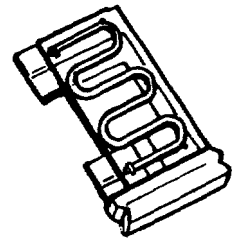


Figure 2. Wiring Diagram

the adjusting knob (7). (See Figure 1.) Heater can easily be installed by hand, no tools required. Heater rating is clearly marked on heater for easy identification. See Table 1.



**Adjustments--Adjustment Knob**

Adjustment knob (7) is located directly below the toggle handle (6) on the front of the switch. (See Figure 1.)

Switch is calibrated for 125% of full load motor current range indicated in Table 1.

For closer protection, turn knob clockwise toward low. Depending on motor characteristics, this setting may be less than full load motor current. If switch opens, turn counterclockwise until satisfactory operation is obtained.

If ambient conditions or motor characteristics result in nuisance tripping, turn toward high until condition is corrected





## MISCELLANEOUS ACCESSORIES AND PRODUCTS(CON'T.)

An Economy Gaging Device designed to fit most regular shop small type indicators. The device is directly designed and tested to fit most standard shop indicators

Economy Gaging Device Adapter  
(see above)

PART NO. WT 412

Indicator for above - 005

PART NO. WT 408

Indicator for above - 0005

PART NO. WT 409

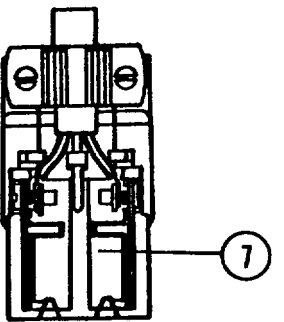
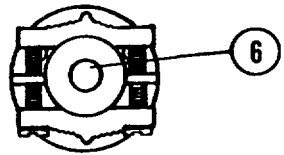
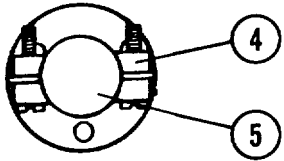
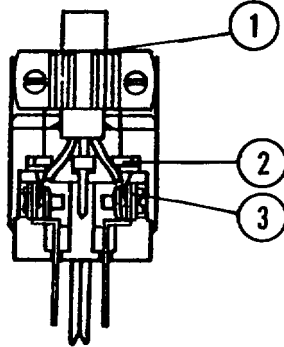
Indicator for above - 00005

PART NO. WT 410

Setting Masters for above

PART NO. WT 411

SAFETY-GRIP CONNECTORS AND CAPS



**SAFETY-GRIP  
EXCLUSIVE FEATURES**

**TRIPLE-LOCK CORD GRIP**

1. Cord clamp grips cable jacket.
2. Internal pressure clamp grips conductor covering.
3. Terminal clamp grips the bare conductor.

Triple-Lock Cord Grip reduces wire slippage as all flexible cord components are secured. Internal grip prevents insulation from creeping up under severe use and shorting out when loose strands co.-tact each other.

**DUAL RANGE CORD CLAMP**

4. Small size clamp (red) for No. 16 and No. 18 wire.
5. Large size clamp (black) for No. 12 and No. 14 wire.

New design clamp reduces cord crushing which can short out internal wires. Red clamp is used with small cord and can be removed when No. 14 or No. 12 wire is required.

**NEOPRENE SEAL**

6. Neoprene gasket under cord grip seals cord entering cap or connector body.

Prevents dust, moisture or metal chips from sharing power contacts.

**NEMA RETENTION CONTACTS**

7. Power contacts backed by spring steel clip.

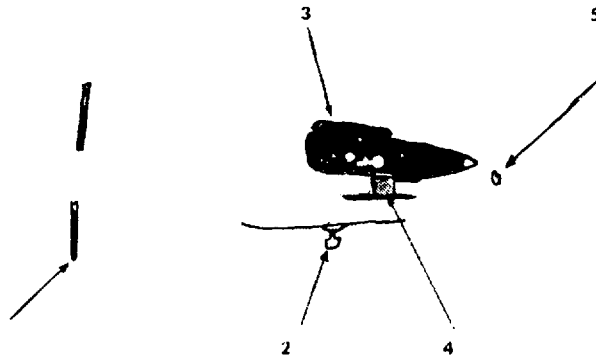
Heavy duty contacts backed by steel clip meets NEMA WD 1-1965 plug retention requirements. Inadequate retention can cause overheating and other operating inefficiencies. In addition poor retention can allow plugs to disconnect from the connector and interrupt service.

Economy Bore Gaging Device  
Part No. WT EB6-1X

-INSTRUCTIONS-

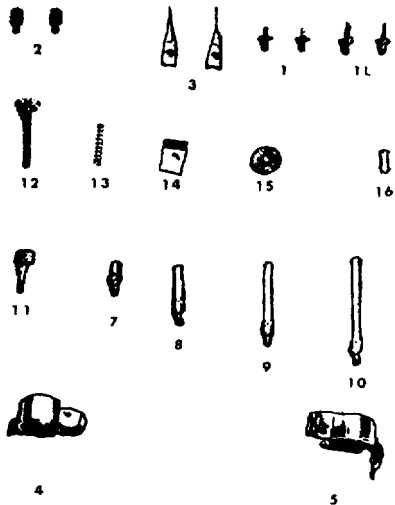
TO SET

1. Assemble caliper points and extensions 1 ) to approximately '8s" larger than size to be checked.
2. ALWAYS ADJUST THE FRAME STOP FIRST, using micrometers adjust frame stop (2) so that caliper points are set at .015 - 1/2 of indicator travel - larger than dimension to be checked.



3. Slide indicator (3) into place and lock in place using clamp and screw (4).
4. Turn indicator button (5) until indicator hand has made full travel .030.
5. Set micrometer to size and check the setting; adjust indicator dial to 0

3 pairs of points and 8 extensions and will check .200 to 6.000 diameters.



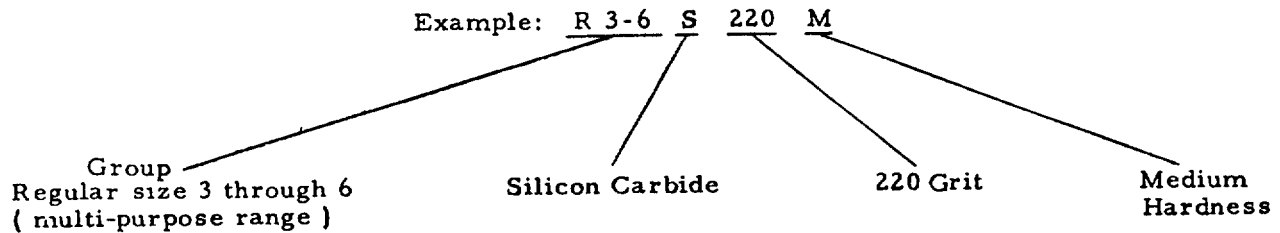
1. Standard Point, pair
- 1L. Standard Point Long, pair
2. Ball Point, pair
3. Offset points, pair
4. Last Word Adapter
5. Gem Adapter
6. Pearson Adapter
7. 1/4" Extension
8. 1/2" Extension
9. 3/4" Extension
10. 1" Extension
11. Clamp Screw
12. Indicator Button & Stop
13. Spring
14. Indicator Clamp
15. Lock Nut
16. Rocker Pin
17. Stand

## R 3-6 Mandrels and Stones

### INSTRUCTIONS

The R 3-6 Honing Unit is a wide range Honing Unit for use on all competitive industrial manually stroked Honing Machines

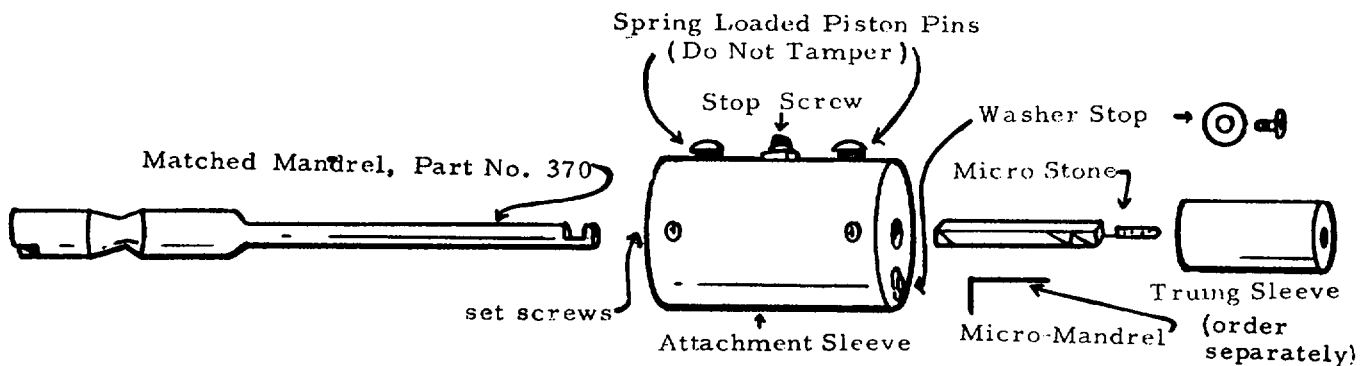
It is designed for multi-purpose use in the production watchmaker range ( below .100 inch diameter). It is especially designed to give a wide range of size use without requiring the large investment in Stones ( and Mandrels and Wedges ) required for replacement to cover the wide range of hole enlargement and finishing occurring in many shops and factories. It is ideal for polishing and achieving the desired micro-inch finish. This Honing Unit is capable of removing stock and correcting taper and out-of-round (if a production requirement exists, order the heavy-duty Mandrel, example: R 6100H to exact hole size required ). Stones for this mandrel may be ordered by the box or package of One Dozen. When ordering designate the mandrel group ( 3-6 ) followed by the stone size, Grit and Grade desired.



#### How To Set Up This Unit

We believe this Micro-Bore Hone Set has the widest range and is the most economical in the industry. The wide range of this unit requires more care in setting, but requires no investment in special units. Therefore to obtain accuracy with greatest economy and prevent ruining stones through incorrect use please note carefully the following:

1. Note the current diagram of your Honing Unit . It may differ from previous ones used within this size range.



2. Carefully place Micro-Stone into Part No. 370.

3. Carefully insert Micro-Stone Holder and Part No. 370 into Attachment Sleeve.

Carefully line the slot up with spring loaded Piston Pins. Slight force is needed to pass by the spring loaded Piston Pins. Push firmly up against Washer Stop and withdraw approximately 1/8 inch. Lock Part No. 370 in place using set screws.

4. Attach Micro-Mandrel to Attachment Sleeve using mark on Washer outward with grain on opposite side of washer perpendicular to the Micro-Mandrel. This makes it hold better and makes it easier to have exact stone alignment.

5. Realign Micro-Mandrel to be parallel to Stone using wrench and slightly bending parallel if necessary. Stone will have a slight bow and may be dressed to the type of honing operation.

6. Dress stones as desired. Micro-Mandrels and/or Micro-Stones May easily be ground off for Blind Holes. Micro-Mandrels are soft and may be hardened by heating to a cherry red color and quenching or may be ordered Hard by using the letter H after the size designation. Micro-Stones and Micro-Mandrels may be trimmed any desired way but remember the Micro-Mandrel must be opposite the stone in the hole and the Micro-Mandrel should be undercut of regular stroking and stock removal is desired.

7. Set stop screw to prevent stone from over expanding and bending. This is often necessary because of the extremely wide range limits of this hone.
8. Insert an R-Z4 or K- 12 wedge into Part No. 370 and attach to Honing Machine just as you would an P-Z4 or K-12 Mandrel, using an R-24 or K-1Z Adapter.(See literature supplied with Adapter.)
9. Set machine to Light Pressure. Honing Machines ( Models CHY and equipped CHX) may be set to extremely light pressures using the Honing Dial (and Counter Springs ( Set # AAC49)if desired).
10. Hone the work. Hone carefully and remember that this instrument has been designed for precision work and must be handled as carefully as you would handle any precision watchmaking device.

INSTRUCTIONS FOR  
Range 3/4" - 2-11/16"

HONING MANDRELS

Type RB-.750" - .25"

Also B-1

Type RC-1.0" - 2.0"

Also C 1-2

Type RD-1.5" - 2.5"

Also D 1.5 - 2.5

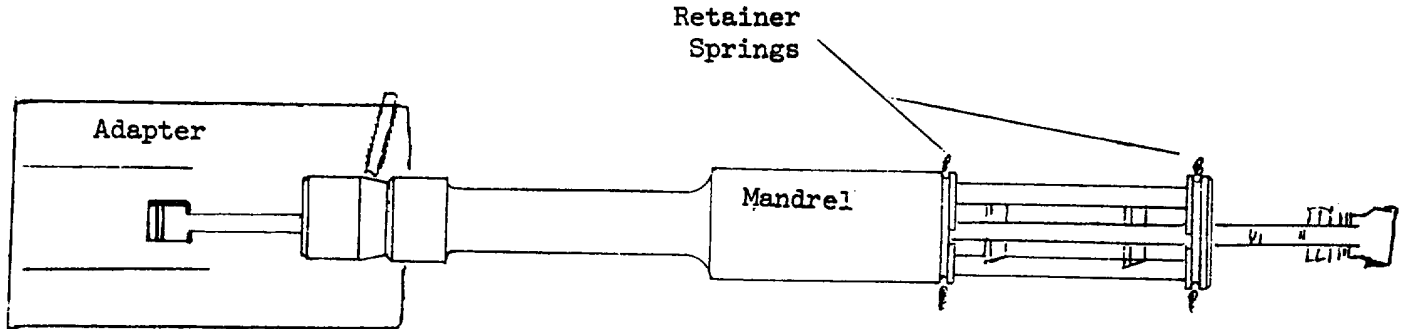


Figure #I. Typical Quick-Change Mandrel  
INSTRUCTIONS:

- (1) INSERT MANDREL and adapter (see below) into machine (or into machine adapter #SC-1 in certain machines see below) and place wedge drive member in contact with machine drive member just as with any ordinary mandrel.

**NOTE:** If necessary, screw out wedge rod to extend just beyond adapter. **DO NOT DISASSEMBLE THIS MANDREL.** Mandrel itself may be turned to desired wedge contact ranges prior to locking the screw of adapter. (When inserting in a test machine, adjust to size range necessary.)

(2) HONE THE PART Use a truing sleeve. Finish hone by simply changing the stone (and truing if necessary). REMEMBER, mandrel will take several ranges of stones as well as many different grits and grades. Never allow machine to force the drive wedges out of their normal range. Use the lock nuts provided on the mandrel for jobs requiring great accuracy and/or size control. MANDREL IS FACTORY ADJUSTED. DO NOT DISASSEMBLE.

(3) CHECK THE WORK. If stone is too short for length of work, use a blind hold stone or a double stone mandrel. If a double stone mandrel is used, finish with a truing sleeve. If stone is too long for length of work, simply grind off to the desired length using a feather edge if extreme accuracy or size correction is desired.

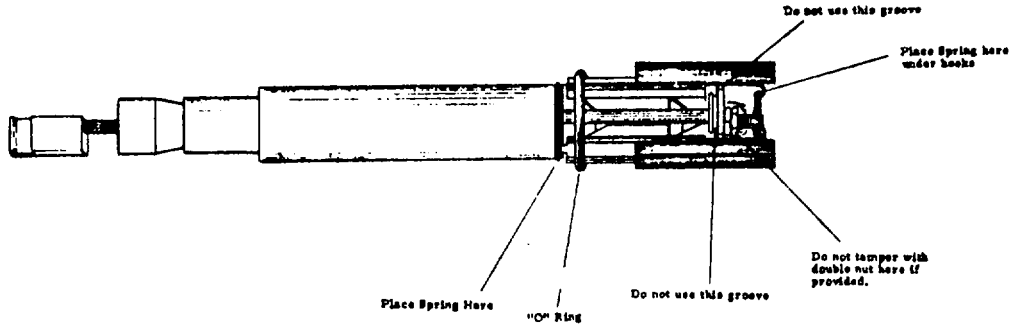


## BLIND HOLE MANDRELS WITH COUNTER PRESSURE STONE SAVER FEATURE

Assemble and use in similar manner to regular B C or D Mandrels. Follow #2 below. BCD Blind Hole stones are Cantilever type stones and must have counter pressure O ring on opposite (inside) an of holder. This counter pressure may be varied and will prevent much breakage on initial honing of uneven blind bores. O ring may be placed at end for maximum counter pressure. One or more O rings may be added (not usually necessary). Move O ring toward center for stone saver feature if hole is rough.

NOTE: Counter pressure must never be less than the pressure of stone at end. End groove if provided is not used. Stone Pressure I Gage .Kit #ACB-51 can be used if desired.

Assemble to BCD type adapter giving adapter 1/4 turn to lock in usual manner with wedge slot inside adapter facing the right with screw on spindle down in the locked position.



Remember Mandrels will break if overloaded (Safety feature). Use H.S. (Heavy Service) type Mandrels if a heavy load is to be put upon a Mandrel. Specify H.S. after part when ordering.

### Range of Blind Hole Mandrel

C1-2BL

Nominal Size of Truing 2-3/4"

1CD BL	1" - 1-1/4"
2CD BL	1-1/4" - 1-1/2"
3CD BL	1-1/2" - 1-3/4"
4CD BL	1-3/4" - 2"
5CD BL	2" - 2-1/4"
6CD BL	2-1/4" - 2-1/2"

All regular stones will work for a step cylinder in all mandrels.  
For Blindhole use blind hole stones in Blindhole mandrels only.

## TOOL MOVEMENT INDICATOR

(Gage system method of parts readout)

Multiply by ratio of tool movement to type dial indicator used to actual stone displacement for type mandrel used. For long run production, etc. extremely fine adjustments to ratios may be made by slightly adjusting bearings to provide the desired reading. (not normally necessary).

EXAMPLE: Using a 0.001" Shop Dial Indicator

The ratio of approximately 10 to 1 would read directly to the stone for an R series mandrel (regular). Therefore a dial indicator numbers (not graduations) can read directly. Do not forget to compensate for stone wear. Special Direct Reading Indicator Sets are available.

Multiply by stone movement (in bore radius or diameter) to determine movement in bore diameter to obtain parts readout less the stone wear. Adaptable to all commercial Honing units.

EXAMPLE: Using a .001" indicator read by standard (.010) numbers on the dial multiply by the ratio. For 10 to 1 some conventional honing units will require twice this multiple. Some will require this 3 times and some will be the multiple divided by 3. Multiplying by 10 gives a reading directly from the numbers on the dial. Next verify the tool movement of the stone against the change of the actual diameter of the work to be honed. Determine the ratio desired for the type of honing unit in the spindle chuck either an exact ratio or one that compensates for the estimated stone wear (especially useful in production honing). If production job is long and stones are of the exact same composition; the honing dial can be used to great advantage in keeping this ratio constant. Multiply ratio by indicating reading in hundredths of an inch.

Indicator must be set to read the movement of the Feed Screwdevice at the rear of machine. The Feed Screw has an intricate pressure control system which will maintain feed pressure against the stone by the Feed Screw. Indicator may be set to measure this movement normally by allowing only five thousandths (.005) play or take-up travel on feed screw which floats depending on lateral motion for spring tension or pressure to the stone.

## MISCELLANEOUS ACCESSORIES AND PRODUCTS

ACCESSORIES AND PRODUCTS WHICH MAY BE OF SOME VALUE IN ACHIEVING BETTER HONING RESULTS OR NECESSARY TO COMPLETE A SPECIAL JOB.

Dual Hose (Work Lubrication) Set (not provided on some machines as original equipment). Includes all parts and equipment to convert Honing Machines to Dual Oil Flow (puts the oil in two places). Good for many jobs but of great value to those who Hone special equipment. Eg: Bearing fitting is a must for Tandem Honing.

Dual Hose (Work Lubrication) Set (for CHX machines) with standard 1-1/20 hp pump. PART NO. WT 100

Dual Oil Line Set (for CHX machines) with H-D 1/6 hp pump. PART NO. WT 102

Dual Oil Line Set (for CHY machines). PART NO. WT 103

Truing Sleeve Kit is a general purpose Truing Sleeve Set for sizes over 2-11/16". Includes Honing Sponge and Stone Dresser Truing Sleeve Kit

Truing Sleeve Kit PART NO. 2700 A

Conversion Sets from Government Model machines to conventional reading tool movement indicator replacement kit.

Conversion Set Codes not include indirect). PART NO. WT 110

Conversion Set (includes direct reading in inch system to the honing tool). PART NO. WT 111

Conversion Set (includes direct reading in the metric system). PART NO. WT 112

Stone Dresser A speed type dresser to accurately dress stones for the type hole to be Honed. Ideal for special jobs, production, Etc. (110 volt 60 cy AC). Directions included (give special voltage required)

Stone Dresser PART NO. WT 113

**MISCELLANEOUS ACCESSORIES AND PRODUCTS(CON'T.)**

Spare Motor for CHY machines

Spare Motor  
(Give Serial No. of machine)

PART NO. CHY MO-1

Spindle Runout Compensator Kit - Makes possible easier run-out compensation for Honing machines.

Spindle Runout Compensator Kit

PART NO. WT CH-2

Handicapped Worker Conversion Kit - Makes easy-to-work controls of the Machines for the handicapped. Contains dual foot controls and easy-to-control hand adapters.

Handicapped Worker Conversion  
Kit

PART NO. WT CK-1

Touch-up Kit and Dial Set - Contains necessary equipment: original color touchup paint, Aerosol type sprayer set, lubricating oils and grease, new dials, etc. to keep machines working accurately and well.

- Touch-up Kit and  
Deluxe Dials

PART NO. WT CT-2

## MISCELLANEOUS ACCESSORIES AND PRODUCTS(CON'T.)

Metric Conversion Kit - Equipment necessary for conversion of CHY machines to the metric system.

Metric Conversion Kit

PART NO. WT-M-100

Heavy Duty Oil Pump for CHX machines.

Heavy Duty Oil Pump

PART NO. WT-CHY-AC

Heavy Duty Oil Filter for CHY machines.

Heavy Duty Oil Filter

PART NO. WT-CHY-AC-2

Special Polishing Attachment

Special Polishing Attachment

PART NO. WT-CHY-AC-3

Economy Bore , Gaging , Device

Bore Gage

PART NO. WT EB6-1

Bore Gage Master Set

PART NO. WT EB6-2

Bore Gage Indicator  
(thousandths)

PART NO. WT EB6-3

Bore Gage Indicator  
(10 thousandths)

PART NO. WT EB6 4

Deluxe Bore Gage - An extensive kit, invaluable gauge for production.

Deluxe Bore Gage - .00005

PART NO. WT EB6-5

Deluxe Bore (Gage , Setting  
Masters

PART NO. WT DB6-1

Deluxe Work Stop (with adjustable end piece).

Deluxe Work Stop

PART NO. WT DB6-2

Brake and Clutch Repair Kit - contains set of brake shoes and clutch parts most likely to wear.

Brake and Clutch Repair Kit

PART NO. WT BC- 1

Spare Motor for CHX machines

Spare Motor  
(Give Serial No. of machine  
if possible)

PART NO. CHX-MO-1

## MISCELLANEOUS ACCESSORIES AND PRODUCTS(CON'T.)

Set Of Mandrels & Stones for .30" to . 100" range.

Set Of Mandrels & Stones

PART NO. WT 120

Assortment of Hones, Stones and Truing Sleeves.  
.60" to 3/4"

Assortment of Hones, Stones  
and Truing Sleeves .60"to 3/4"

PART NO. WT 230

.744 (3/4") to 2-11/16"

PART NO. WT 240

All sizes from 2-11/16"  
to 15".

PART NO. WT 250

A Portable Hone for use  
with an electric drill (included)

PART NO. WT 252

---

Deluxe Work Light supplied on many CHY machines  
as original equipment.

Deluxe Work Light

PART NO AC-61 A

Extra Set of 2 Deluxe Work  
Light Lamps and Small) Bulbs.

PART NO. WT 301

---

Multi Speed Kit (supplied factory original on many CHY  
machines.)

Multi Speed Kit

PART NO. WT 400

Extra Set of Belts, Flat and  
Vee; both types.

PART NO. WT 402

Spare Multi Speed (12 speed)  
Bearing Set with Heavy Duty  
Shaft for CHY machines

PART NO.' WT 403

Spare Set of Ball Bearings  
for ACH head complete with  
instructions for installation,  
Etc. for CHY machines.

PART NO. WT 405

Set of Stones

PART NO. WTA .60-. 125"

PART NO. WTA .125 - .744"

PART NO. WTA .744 (3/4")-

**MISCELLANEOUS ACCESSORIES AND PRODUCTS(CONT.)**

PART 0. WTA 2-1/Z" -  
2-11/16"

(same stone set fits all this range).

PART NO. WTA Z-11/16" -  
1.5:

Master Holder Set; less stones above.

PART NO. WT 406

Set of Stones, Truing Sleeves, and Mandrels for range above.

Set of Stones, Truing Sleeves, Mandrels (. 60" - . 125"

PART NO. WT.60" - .125"

(. 125" - .744")  
(.744 - 2-11/16")

PART NO. WT.125 - .744"  
PART NO. WT .744" -  
2-11./16"

(2-11/16" - 15" )

PART NO. WT -11/16" - 15"

General Purpose Portable Machine Hone Set to rough in and finish work before machine use. Fits 1/4" or 1/2" electric drill. Complete Set 3/4" 15".

General Purpose Portable Machine Hone Set

PART NO. WT 1 - BCDF

Conversion from Mil Spec dials to direct reading dials, Adaptable and direct reading to most type honing tools used.

Commercial Dial Set

PART NO. WT 407

Premium Set of Mandrels

RANGE  
.60 - .100

PART NO. WTM .60 - .100

100 - .270

PART NO. WTM .100 - .270

270 - .744 (3/4")  
(3 /4r)

PART NO. WTM .270 - .744

.744 - 2.500 (Z-11/16")

PART NO. WTM .744 - 2.500

2 - 11/16

PART NO. WTM 2-714 /16"-15'

2-11/16" - 15"

Other Sets Furnished Upon Request.

Extra CH-6 Honing Head Adapter for stones above 2-11/16". Fits on Honing machine connects to rack type Honing.

CH-6 Honing Head Adapter

PART NO. WT CH6-1

## J. I. C. INSTALLATIONS

Part No. W 260 Pump Set

(Natural gas, gasoline, diesel compressed air, hydraulic motor, alternate power source, Etc.)

For J. I. C. Installation -where power connections are limited or where an Alternate or Auxiliary (other than electric) power is used, the auxiliary pump is provided. The pump requires no electricity but operates off of the Main Idler Shaft and may be used directly on all model CHY-2 machines. For older machines and CHX machines the idler set # W342 must be used. When ordering be sure to state model number and serial number of Honing Machine to be converted.

A neoprene impeller is provided which is compatible with most Honing fluids and is resistant to the deterioration action of abrasives and other stray particles in suspension. A Buena N impeller is available for use with special honing fluids or fluids containing strong solvents, Etc.

### INSTRUCTIONS

1. Disregard other pumping system provided and use J. I. C. pump in place of the regular pump outlet with fitting provided using instructions supplied.
2. Start Honing Machine and use oil in the ordinary manner.(NOTE : If machine has stood pump should prime immediately and oil should flow. If slow prime, impeller is swollen or worn and a new impeller should be installed.

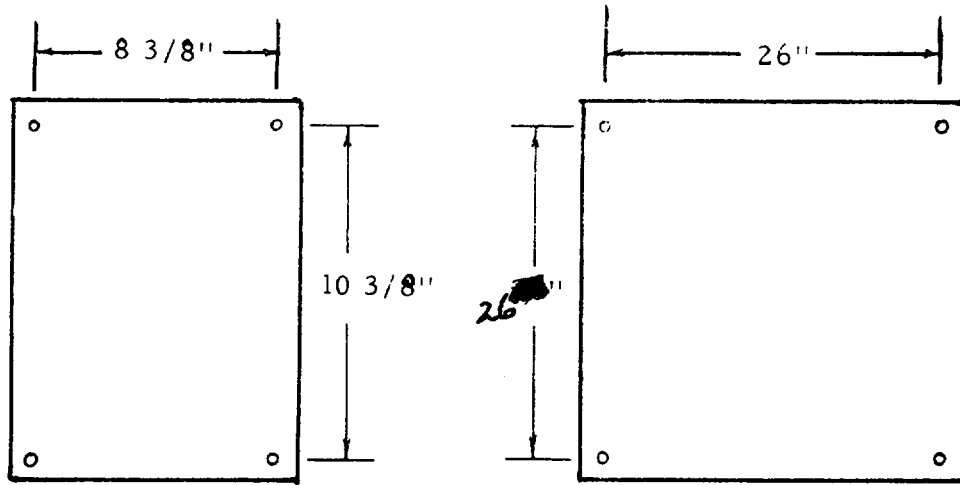
Part No. W 301 Regular Impeller

Part No. W 300 Buena N Impeller

3. For high speed operation be sure screws to shaft are very tight. Do not allow oil to heat excessively at the pump. Attach an ordinary relief or flow control to the line if required (for high production use).

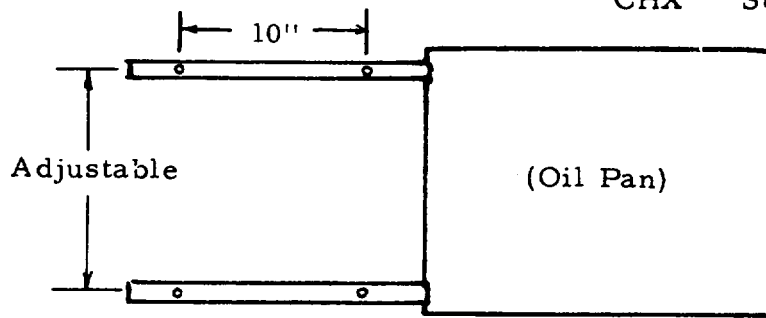


MODEL CH SERIES ANCHOR BOLT PLAN  
use 1/4" bolts (minimum)



BENCH UNITS  
CHY-B Series  
CHY-B A Series (OSHA)

FLOOR UNITS  
CHY-2 Series  
CHY-3 Series  
CHX Series



OIL PAN - BENCH UNITS

On CHY-B and CHYB A (OSHA) machines which are used primarily as bench machines, the oil pan may be attached or built into the bench as required. Hangers have been provided which may be clamped to the head and the bench on the left-hand side or may be adjusted in any manner to suit the conditions or the requirements of the operator. Additional holes may be drilled in the hangers should it be necessary to do so.

Although it is generally not necessary to anchor the honing machine because of its rugged construction and weight factor, at times it may be desirable to do so.

Whenever possible it is suggested preset bolts not be placed until delivery of the machine allows actual bolt hole measurement to assure exact fit.

**NOTE:** To convert a bench unit to a pedestal mounted floor unit, order ADAPTER SET BASE PEDESTAL PART NO. W115.

**By Order of the Secretary of the Army:**

E.C. MEYER  
General, United States Army  
Chief of Staff

Official:

ROBERT M. JOYCE  
Brigadier General, United States Army  
The Adjutant General

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