

# **TDR/SRD Drill Grinders**

## **Model 80-R**



### **Instructions & Engineering Data**

- ~ **Sharpen drills in 60 seconds**
- ~ **Adjusts automatically between drill sizes**
- ~ **Radial relief on all tools**
- ~ **Simple to learn ~ simple to operate**

**Manufactured by:**

#### **Service Precision Grinding Co., Inc.**

Distributed by

Novatech, Inc.

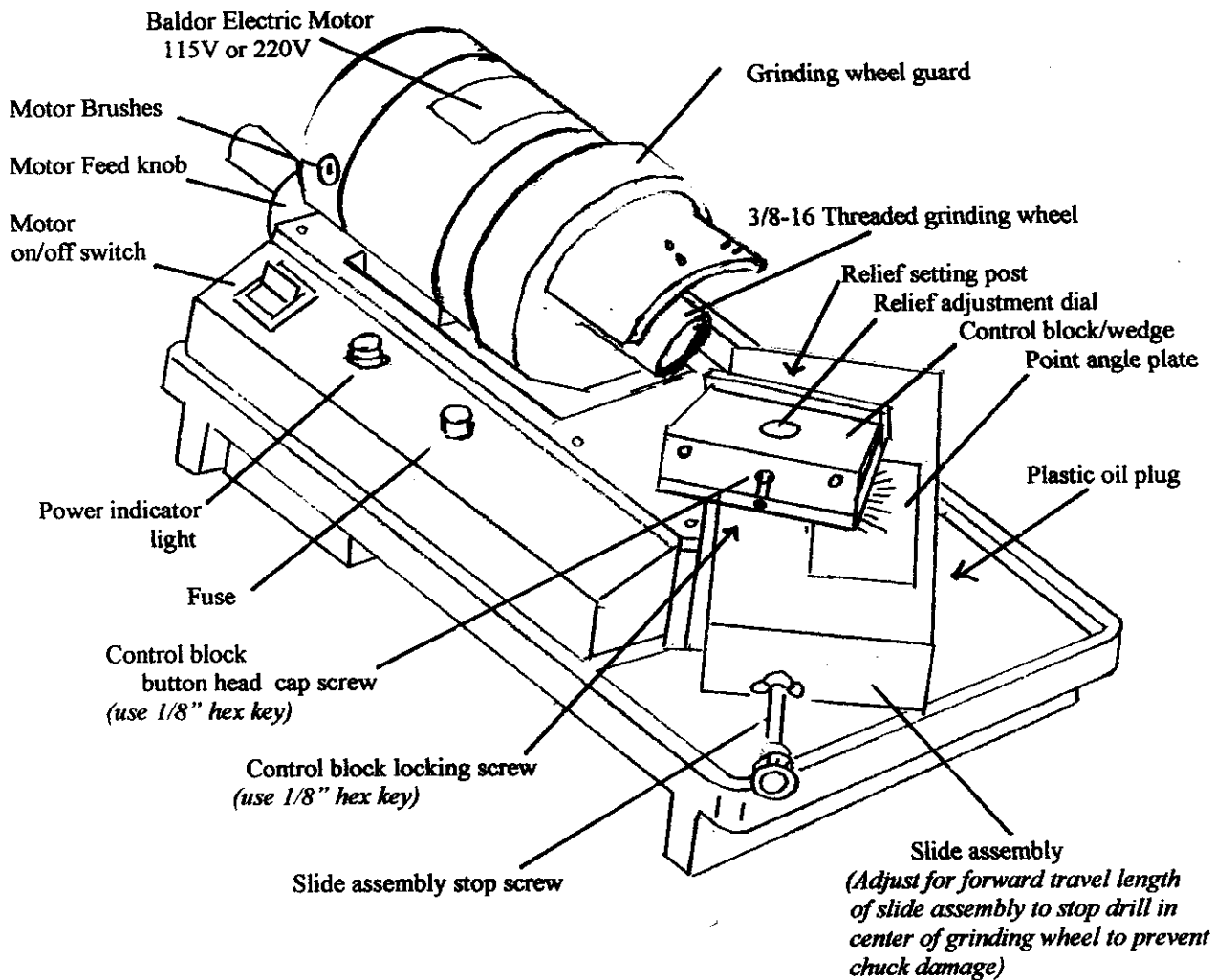
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## Model 82-R TDR/SRD DRILL GRINDER



**(FIG #1)**

Dimensions 10"Wx16"Lx8"H ~ Weight 50 Lbs. ~ Cast iron, aluminum & steel construction ~ All models built to satisfy industrial quality ~ Totally enclosed Baldor motor 115V or 220V ~ Hardened and ground slide rails ~ All movable parts are kept free of grinding dust ~ Serialized and inspected drill chucks ~ Drill point concentricity is .001" lip to lip ~ Hardcoated aluminum fixtures for extended life ~ Increased versatility with additional fixtures ~ Precise results ~ Angle range 85 degrees to 160 degrees ~ Relief angles 0 degrees to 20 degrees ~ Made in the USA

**Customize point angles and clearances to achieve the most efficient feed rates for your job.**

*Add on accessories & grinding wheels are listed on page 7*

## NEED TO KNOW & SETUP

### **WARRANTY:**

All machines manufactured by Service Precision Grinding Co., Inc. carry a one year warranty against defective parts or workmanship. Technical and service information is available directly from the manufacturer.

### **CAUTION:**

Safety glasses must be worn when using this grinding machine. Safety Regulations normally required must be adhered to when using this machine as any other machine you operate.

### **WARNING:**

To avoid the affects of dust from grinding please follow normally required procedures for health and safety. Grinding generates dust which can affect breathing functions.

### **MACHINE MAINTENANCE:**

The top slide oil has been drained for shipment. Remove the plastic oil reservoir plug (Fig #2) Replace oil with standard S.A.E. 30 weight oil. (*correct level is bottom of refill hole*).

Weeping oil from the slide assembly rails (Fig #2) is normal and serves to keep slide rails free of grinding dust. It is not necessary to maintain the oil level at all times. The slide assembly will be lubricated as long as there is some oil in the reservoir.

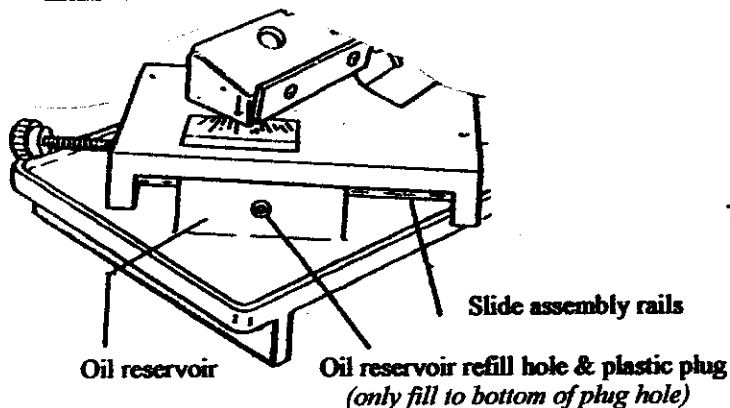
Occasional lubrication of the motor lead screw can be done by dropping oil thru the  $\frac{1}{4}$ " hole in the sheet metal (Fig #1) near the motor feed knob. The motor feed knob can be lubricated directly by dripping oil between the knob and the base casting then rotating the knob several times.

Disconnect the power supply before inspecting motor brushes (Fig #1) for possible replacement. Motor brushes should be replaced when length is less than  $\frac{1}{4}$ " long.

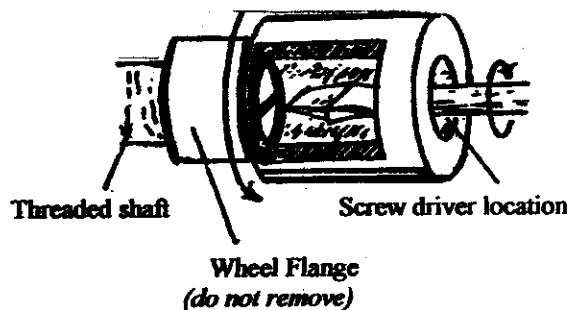
### **GRINDING WHEELS:**

With the machine power off, locate a screw drive in the slot at the end of the motor shaft found inside the grinding wheel (Fig #3). Hold the wheel with your free hand and unscrew it from the shaft. This is a right threaded motor shaft. Screw on the replacement wheel till it butts up against the wheel flange (Fig #3). Vitrified wheels require that a paper blotter be in place between the wheel and the flange. Paper blotters are not used for diamond wheels. During normal grinding operations there is no need to dress the grinding wheels. Use only abrasive wheels designed and made for TDR/SRD Drill Grinders.

**(FIG # 2)**

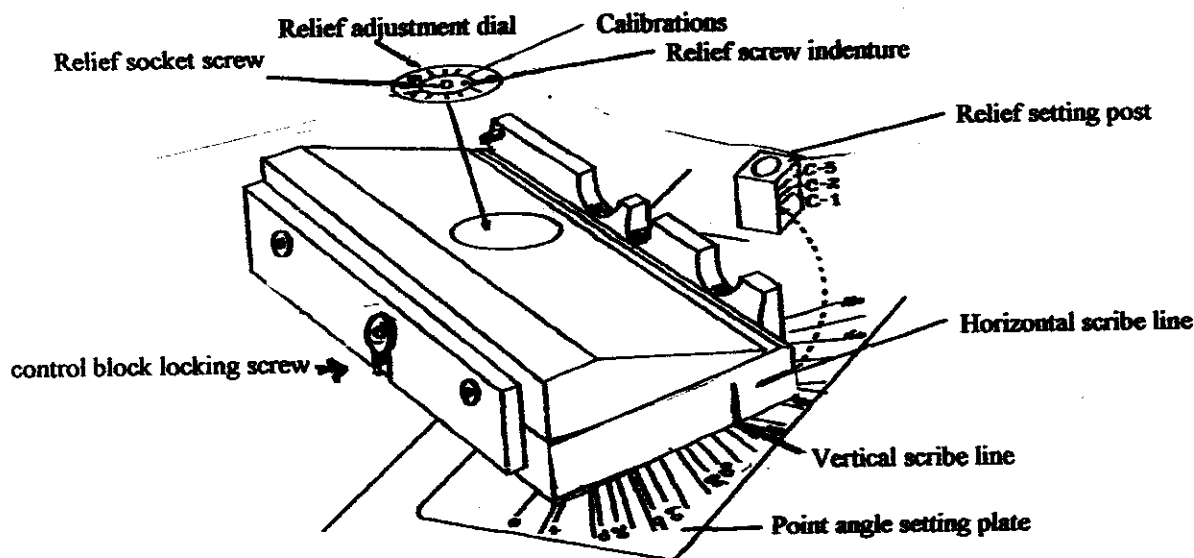


**(FIG # 3)**



## CONTROL BLOCK SETTINGS

The control block raises, lowers and rotates. Different settings change the relationship of the drill cutting edge to the wheel. The 1/8" hex key is used to loosen the control block locking screw. When the control block is unlocked point angles can be changed by aligning the vertical scribe line on the side of the block with the desired point angle on the point angle setting plate. Turn the control block to choose point angles from 85 degrees to 160 degrees. The horizontal line and the relief setting post are used, in combination, to set approximate clearance angles for tool sharpening. The calibrations on the relief adjustment dial allows for precise adjustments to the cutting edge clearance on tooling to be sharpened. The small indenture on the relief screw is lined up with the appropriate calibration on the dial by inserting the 1/8" hex key down into the relief screw socket, holding the control block, and turning the hex key. The figure below shows the setting for sharpening a standard twist drill at 118 degrees point angle with a standard 10 degrees clearance; C on the dial and C-1 on the relief post. The figure shows the three settings in their "home" positions and all setting changes start from that home position. All TDR/SRD drill sharpeners are shipped at the standard settings. The control block locking screw also locks the relief dial settings.



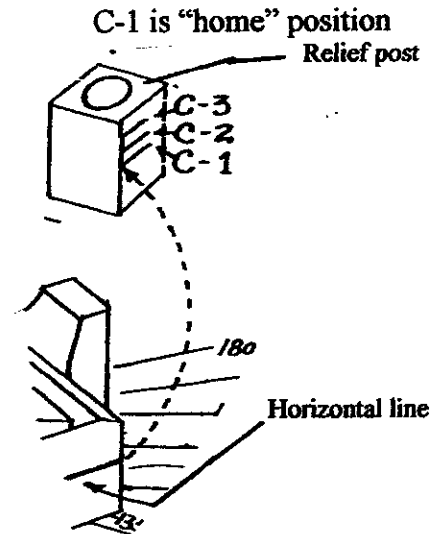
( FIG # 5 )

### ADJUSTING POINT ANGLES & CLEARANCES

There is no need to adjust the settings every time you change drill sizes. To get the proper clearance settings, for various tooling, the relief adjustment dial, may at times, work in combination with the relief post. All adjustments are made from the "home" positions. Unlocking the control block screw also unlocks the relief adjustment screw. To raise the control block to the C-2 position, use the 1/8" hex key and turn the relief screw clockwise one full turn. The relief scribe line will now line up with C-2 on the relief post. Turn again and the relief line will be at the C-3 setting. To return to "home" turn the relief screw two turns counter clockwise. The C-1, C-2 & C-3 settings are approximate. The relief adjustment dial allows for precision relief adjustments. Turning the relief screw clockwise the tooling will have less clearance. Starting from "home" on the dial, C position, turn the screw indenture clockwise to the first

calibration beyond C on the dial. Always rotate the relief screw in a clockwise direction from the C setting when counting calibrations. This position is +1. The +2 position is the second calibration beyond C on the dial. Every calibration is a + number and may work in combination with the relief post settings. Used in combination a setting may be C-2 (relief post) +2 (relief dial) or C-1+A, C-1 (relief post) and +A (relief dial). Turn the screw indenture counter clockwise to return to "home" or go below C for more clearance. The control block locking screw also locks the relief dial.

**( FIGS # 6 )**

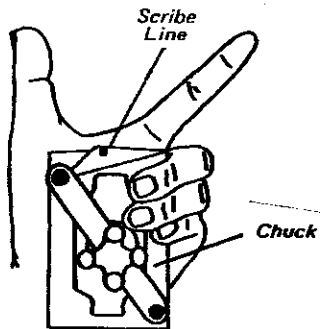


**Common Drill Point Angles & Clearance Settings**

<u>Drill Types</u>	<u>Control Block Settings</u>	<u>Lip Relief Settings</u>
Standard Twist Drill 118 degree point angle 10 degrees clearance	point angle at 118 degrees	C-1 C
Cobalt Drills 135 degree point angle 8 degrees clearance	point angle at 135 degrees	C-1 +A
Parabolic Drills 130 degree point angle 2 degrees clearance	point angle at 130 degrees	C-2 +2

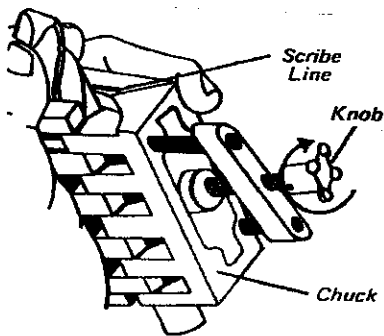
It is generally agreed that less clearance on the tool the more accurate and rounder the hole. It will require more torque to cut but the tool will last longer. Make a note of favorite settings for repeating grinding geometry.

**LOADING & GRINDING DRILLS**  
**1/16" to 13/16"~(1.5mm-20.5mm)**



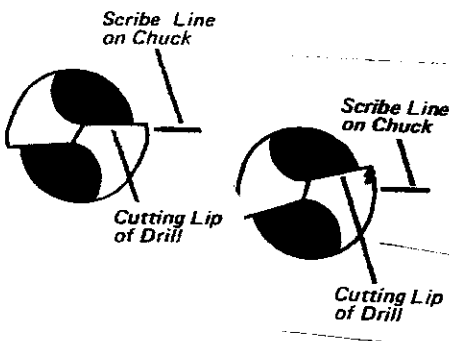
**Step -1-**

The scribed lines on the face of the chuck are used to align the drill for sharpening. The alignment is done by eye. If the alignment is off it is not a concern as it affects the heel angle only. To load the drill hold the chuck in an upright position.



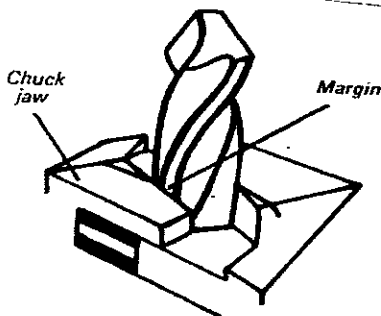
**Step -2-**

The chuck is opened by turning the chuck knob counter clockwise then inserting the drill into the chuck face shank first.



**Step -3-**

Turn the drill in the chuck to align the cutting edges slightly above the scribed lines on the face of the chuck. For badly worn or broken drills it may be necessary to have the cutting edge set beyond the scribe line.



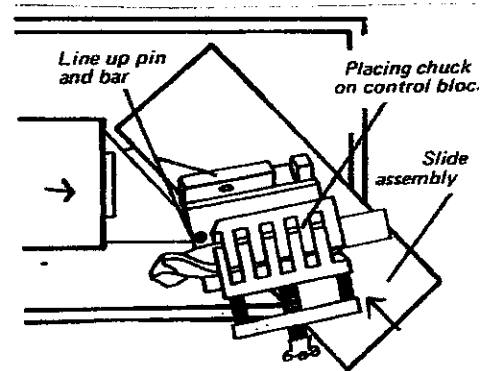
**Step -4-**

Move the drill in or out of the chuck till the first margin of the drill is firmly engaged with the chuck. Clamping on the margin of the drill assures concentricity and absolute stability of the drill. Drills 1/4" and larger are clamped on the first margin, smaller drills are clamped on the second margin. Using the chuck knob lock the drill in place with a light touch.

## LOADING & GRINDING DRILLS 1/16" to 13/16"~(1.5mm-20.5mm)

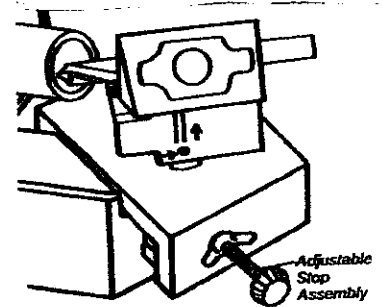
### Step -5-

Position the side of the chuck on the control block with the knob facing the operator. While holding the chuck against the pin and back bar move the slide assembly forward and turn the motor knob to bring the wheel forward. Until the drill is just clearing the inside edge of the grinding wheel.



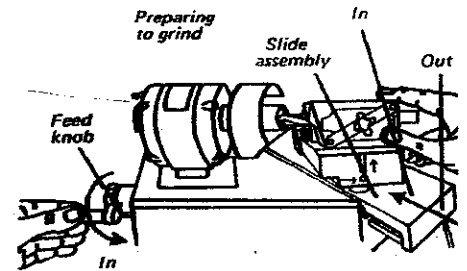
### Step -6-

Adjust the slide assembly stop screw so that the drill passes all the way across the the face of the wheel at 8-9 o'clock. Setting the stop screw prevents the chuck from hitting the wheel during the forward stroke



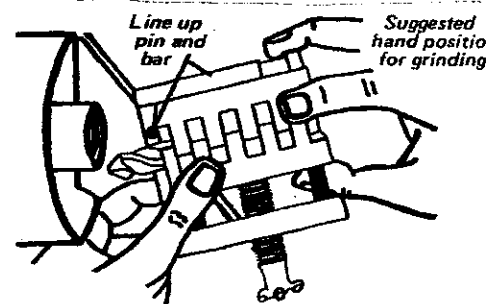
### Step -7-

Put on safety glasses! Turn the motor on and while holding the drill chuck firmly against the pin and bar move the slide assembly back and forth passing the drill in and out of the wheel. Turn the motor feed knob until the drill and the wheel engage and sparks appear.



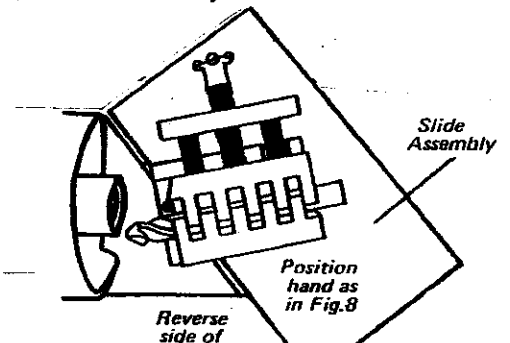
### Step -8-

Using the suggested hand positions continue moving the drill across the wheel using a series of short and quick passes until the sparks appear faint.



### Step -9-

Do not advance the feed knob and do not remove the drill from the chuck. Simply flip the chuck 180 degrees and sharpen the second lip as you did the first.



## Model 80-M TDR/SRD Drill Grinder

### **GRINDING WHEELS WITH 3/8-16THD ~ 80-M ACCESSORIES**

76-M-1790-P 1-3/8"OD ~ Std 90 grit wheel for HSS & Cobalt

76-M-1760-P 1-3/8"OD ~ Fast cut 60 grit wheel for HSS & Cobalt

76-M-1750-P 1-3/8"OD ~ 120 grit silicon/carbide wheel for Carbide

76-M-1770-P 1-3/8"OD ~ Diamond wheel for carbide

80-M-7370-P 3/4"OD ~ 120 grit wheel for HSS & Cobalt  
*(to be used with riser plate)*

~

LHOP/M Left-Hand Drill Option ~ L.H. Drills 1/16"-1/2"

80-S-7340-P Riser Plate ~ Enhances small drill relief ~ use with 80-M-7370-P

76-M-1580-P ~ Standard replacement drill chuck

76-M-1582-P ~ Taper shank drill chuck ~ 1/16" - 13/16"

## **TROP/R**

Tap-Reamer Option for Model 82-R

Taps #10 – 3/4” ~ Reamers 1/8” – 3/4”

### **Fixtures:**

~ 1 Spacer Bar

~ 1 Collet Block with Hardened Steel Sleeve & Spring Lock

~ 2 Pre-set Indexing Fingers

~ 1 Collet Nut

### **Technical Assistance**

Service Precision Grinding Co., Inc.

Phone 315-776-9602

## Model 82-R ~ TROP/R Tap-Reamer Option

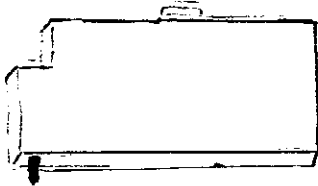
**Taps #10-3/4" ~ (5mm-19mm)**

**Reamers 1/8"-3/4" ~ (3.20mm-19mm)**

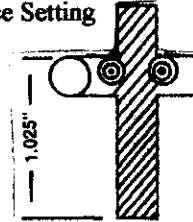
**NOTE:** The 5-C collet holder is fit with a hardened and ground steel sleeve and uses a standard 5-C collet as a tool holder (*5-C collets are not included*). Supplied with the holder is a collet nut to tighten the collet on the tooling to be ground and 2 spring steel indexing fingers for exact positioning of the flutes. The finger with the red dot can be used for your own experimental purposes if you would like to customize your own geometry. The other finger is preset to be used along with the relief settings on the chart (Page b). Should you need to reset either finger the distance setting is shown in (Fig # 1). The control block spacer bar replaces the drill sharpening wedge.

**(Fig # 1)**

Tap/Reamer Spacer Bar



Proper Distance Setting



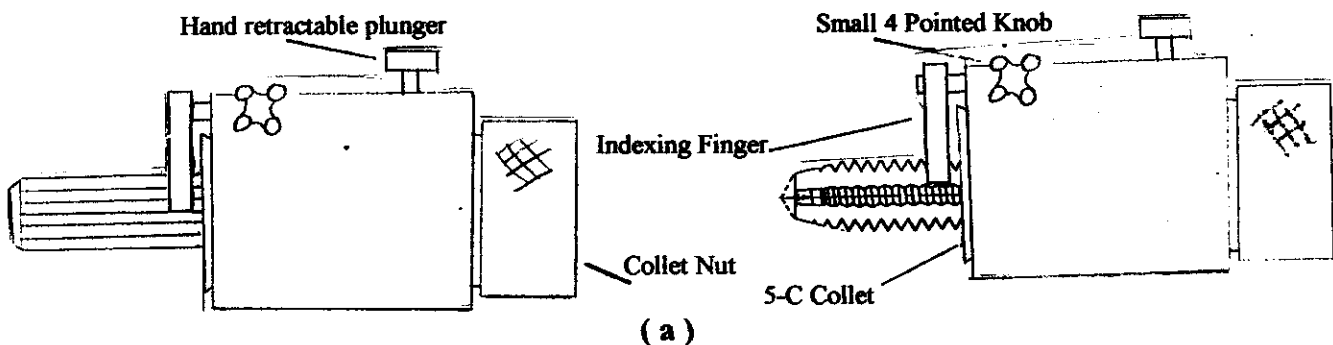
### Step -1-

Select the proper size 5-C collet for the diameter of the tool being sharpened. Insert the tool into the collet making sure that the flutes of the tool are not in line with the splits in the collet. Put the collet into the end of the collet block nearest the 4 pointed knob (Fig #2). Attach the collet nut to the threaded end of the collet protruding from the end of the collet. Raise the hand retractable plunger pin and turn 1/4 turn to snap it into the down position. While the collet nut is being tightened the pin will drop into 1 of 2 holes in the steel sleeve. Once the sleeve has been kept from rotating the collet can be tightened to assure a firm hold on the tool. Once done, lift the hand retractable plunger 1/4 turn to the upright position to allow the collet to turn freely.

### Step -2-

Insert the preset indexing finger in the hole closes to the center of the block. (*The offset hole is used only for extreme situations with large taps*). After the finger is put into the hole position the finger to be resting on the cutting edge of the flute (*behind the flute*) and as close to the block as possible (Fig # 2). Turn the small 4 pointed knob to tighten the finger into position. Using the collet nut rotate the tool counter clockwise so that the indexing finger will snap onto the next flute. Reverse the collet nut just enough to insure that the finger is up against the cutting edge of the tool.

**(FIG # 2)**



**( a )**

**Step -3-**

Remove the drill sharpening wedge by loosening the button head cap screw and lifting the wedge off of the control block. Refer to the "Relief Settings for Taps & Reamers" chart and adjust the control block to the suggested relief post setting and the relief adjustment dial to the correct calibration setting. (*Control block changes are done similar to changing drill relief settings.*) Loosen the control block locking screw, rotate the control block so that the horizontal scribe line is pointing at the bottom line on the relief post and the relief indenture dot is on C on the relief dial, this is home. Relief settings are counted from C in a clockwise direction.

**Relief Settings for Taps & Reamers**

<b>Tap Type</b>	<b>Size</b>	<b>Relief Setting</b>	<b>Reamer</b>	<b>Size</b>	<b>Relief Setting</b>
Bottom.....	#10 - 3/8.....	C-2		1/8.....	C-1 + B
				1/4.....	C-2
4 Flute	7/16-9/16.....	C-2 + A		5/16.....	C-2 + 3
	5/8-7/8.....	C-3		3/8.....	C-2 + A
			<b>Straight</b>	7/17.....	C-2 + B
Plug	#10 - 5/16.....	C-1 + 10		1/2.....	C-2 + 9
4 Flute	3/8-1/2.....	C-2		9/16.....	C-2 + 10
	9/16-7/8.....	C-2 + A		5/8.....	C-3
				3/4.....	C-3 + 6
Taper	#10-5/16.....	C-1 + 10		<b>*some reamers require a reduced clearance to avoid touching a previous flute. Should the reamer cut oversize, reduce the relief.</b>	
4 Flute	3/8-1/2.....	C-2			
	9/16-3/4.....	C-2 + A			
3 Flutes – Increase relief					

**Angle Settings for Taps & Reamers**

Using the vertical scribe line on the side of the block:

Taper Taps.....t	Reamers .....90 degrees
Bottom Taps.....b	Straight
Plug Taps.....p	

Using TDR/SRD Drill Grinders allows you the flexibility to make adjustments to any of these settings to meet your own requirements. Record the customized settings for repeated use.

**Spiral Taps & Reamers**

The indexing finger must be located at the very tip of the flute and tighten the collet to secure the tool. Then remove the finger and relocate further down the tool to the next aligning flute. If there is no aligned flute in position it may be necessary to remove the finger from the tool tip position for each cut to avoid damage to the finger.

**Step -4-**

Place the tap/reamer stop bar on the control block with the button head screw in the back position, tighten the screw. Hold the collet block against the pin and space bar with the 4 pointed knob facing the operator. Feed the grinding wheel to the tool and grind the first flute using the same methods as sharpening a drill. Continue rotating the collet nut in a counter clockwise rotation then slightly reverse it so the finger is snug against the back of the cutting edge. Continue till all flutes spark out.

## **PBOP/R**

Point-Splitting Option for Model 82-R

Point-Split Drills ~ 1/8" – 3/4"

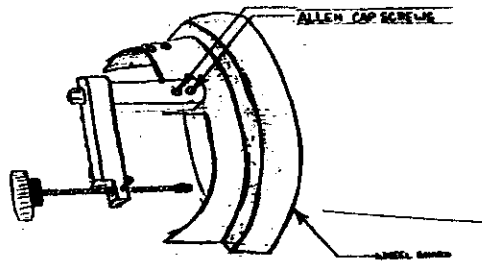
### **Fixtures:**

~ Point Splitting Plate

~ 120 Grit Wheel P/N 80-M-7370-P

~ Diamond Dresser

*(mounting instructions, if not pre-mounted)*



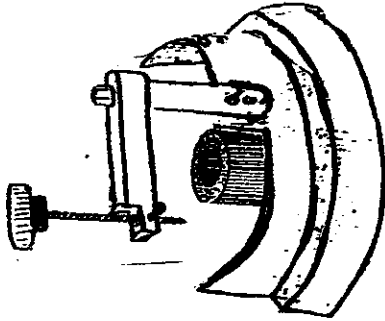
### **Technical Assistance**

Service Precision Grinding Co., Inc.

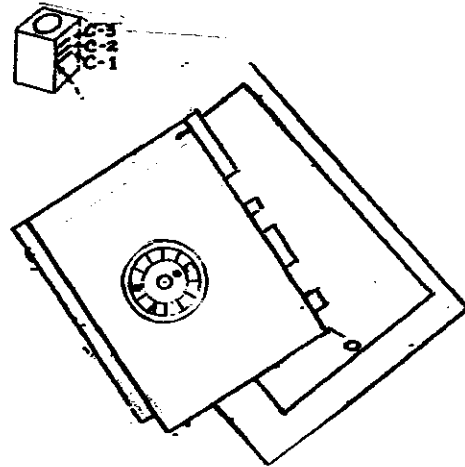
Phone 315-776-9602

**Model 82-R ~ PBOP/R Point Splitting Option**  
**Point Split Drills 1/8"-1/2"**

The common drill types to be split are standard HSS twist drills, cobalt drills and parabolic drills. Before point splitting, sharpen the drills to be split following one of the three procedures on page 5 of the 82-R instruction book, or sharpen to any other desired point geometry. Before point splitting any drills remove the grinding wheel that you have been using to sharpen drills and replace it with the 3/4"OD 120 grit wheel, supplied with the PBOP/R. This smaller wheel is flat fully across the face and should be kept that way (*it is not used to sharpen drills*). When that wheel needs to be redressed move the dresser diamond point forward and directly in line with the face of the wheel. Feed the wheel closer to the diamond point. If necessary, use the knob on the diamond point screw to move the diamond inwards until the tip touches the wheel. Put on safety glasses and hold the dresser with your left hand and swing the diamond across the wheel with your right (Fig #1). When the edge is cleanly dressed to 90 degrees push the dresser arm back and out of the way. Remove the wedge from the control block. Set the control block height to C-1 (on the relief post) and +4 (on the relief dial). Turn the control block clockwise until the corner of the block is on zero degrees (Fig #2). Tighten the control block screw to set all relief and angle settings.

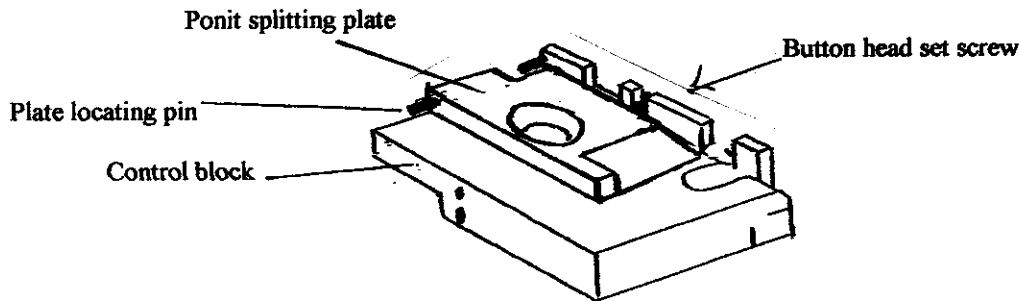


**(FIG #1)**



**(FIG #2)**

Replace the wedge with the point splitting plate. Slip the button head set screw, on the plate, into the same notch in the control block bar that was used for the wedge.



**( a )**

## **PBOP/R**

**Point-Splitting Option for Model 82-R**

**Point-Split Drills ~ 1/8" – 3/4"**

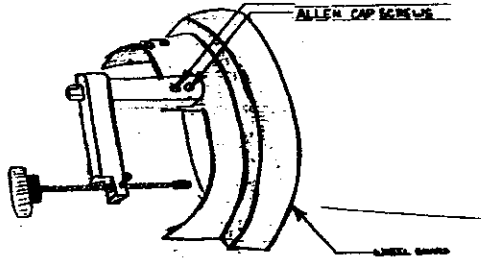
### **Fixtures:**

~ Point Splitting Plate

~ 120 Grit Wheel P/N 80-M-7370-P

~ Diamond Dresser

*(mounting instructions, if not pre-mounted)*



### **Technical Assistance**

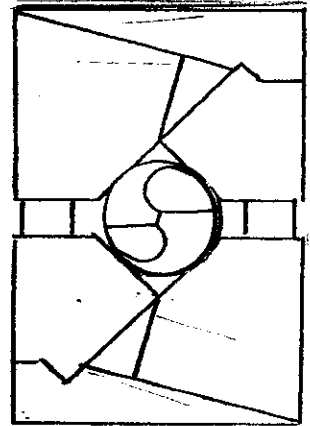
**Service Precision Grinding Co., Inc.**

**Phone 315-776-9602**

## PBOP/R ~ Drill Alignment

### Step -1-

To align the drill for point splitting the chisel point of the drill must be parallel with the scribe lines on the face of the chuck.

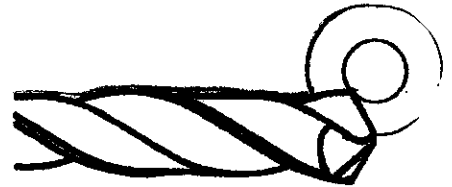


### Step -2-

Position the side of the chuck, similar to drill sharpening, on the point splitting plate and hold it firmly against the plate and plate pin.

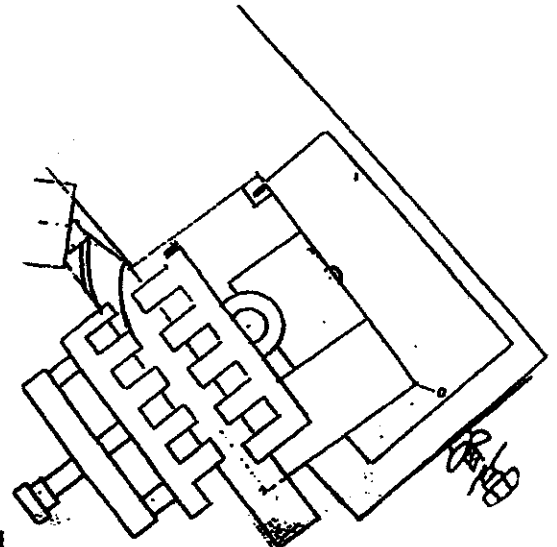
### Step -3-

With the motor off, slide the control block forward enough to make contact with the lower outside edge of the grinding wheel with the chisel point of the drill. Once the outer edge of the wheel, dressed at 90 degrees, makes contact with the center of the chisel point, set the slide assembly stop screw. Setting the stop limits the forward stroke.



### Step -4-

Put on safety glasses. Hold the chuck firmly, carefully bring the drill into contact with the grinding wheel. Plunge the drill into the wheel with several quick moves. After that side has sparked out, flip the chuck and repeat for the other split.



**NOTE:** The calibration settings on the relief dial may change when you put on a new grinding wheel. The OD of the wheel is not exact from wheel to wheel. Resetting the relief screw will readjust the control block height to the center of the chisel point and the bottom of the wheel. Make a note of the new calibration setting for future point splitting.

