

PREPOINT CHAMFER GRINDER MODEL 6-94

Section 1

Set up and operation

1. Installation of the proper size collet.

This machine used a 5-C style collet. This can be changed by loosening of the set screw located just in front of the main air cylinder at the back of the workhead. This screw pushes a spring loaded pin down ;into a slot in the collet tube. Care must be taken not to over tighten the screw as it may damage the spring or pin. After loosening the set screw, the knurled knob on the very back of the closer will turn counterclockwise to remove the collet. Reverse the procedure to install a new collet of the desired size. When adjusting the collet, tighten the knurled knob by hand with a blank in the collet until the blank is snug, then back off the knob two or three clicks. The blank should have a little clearance to enhance loading.

2. Run out adjustment

The nose piece in the workhead is supported by 3 screws positioned radially about the spindle centerline. They can be adjusted through an access hole in the belt guard. With the collet closer closed on a blank, one can, with the use of an indicator, remove all of the run-out from the blank by adjusting the three screws.

3. Angular adjustment for the desired point angle.

The grinding wheel slide is mounted so that it moves 45 degrees in relation to the workhead axis rotation, when the machine is at 0 degrees. This is the normal setting for chamfering blanks.

4. Installation of loader bushing

This machine is designed so that the loader system is always in line with the bore in the collet. There are adjustments both up and down movement by an adjustable gib. Screws are provided at each end of table to secure subtable. and also the component under the loader gib is slotted and keyed so it can be adjusted front to back. To install a different size bushing, just loosen the clamp screw on the front of the loader bushing support, slide the bushing out and install the desired one in its place. Do not over tighten the clamp screw as it will restrict the clearance on the bushing bore. It must be tight enough to hold the bushing in place. If the loader system gets out of alignment, a good

way to readjust it is to clamp a blank in the collet, then shut off the air supply, and push the loader slide up to the blank in the collet. By using another blank of the same size, one can easily see how far it is off and using the adjustments above, realign the loader system. The blanks should align perfectly when the adjustments are complete.

5. Automatic Hopper unit.

The hopper unit is of a straight thru design that does not require slot blocks as did the previous units. It has a slide adjustment that moves up and down to accommodate the various diameters. To adjust it , move it up slowly while trying to slide a blank under the fence that feeds the blanks into the popper section. There should be some free play between the blank and the fence, but not so much as the blanks can double up. There is also an adjustment that needs to be made on the lift popper assembly. The lifting popper must be in the middle of the last blank in order to push it up. The lifting popper unit is fixed, so one needs to move the front gate forward or back such that the blank is central to the lifting popper when it is against the back side of the gate.

Next, move the back plate forward or back so only one blank can be pushed up. Do not move the fence itself or it will cause problems at its back end where it needs to be close to the sweeper. The sweeper is moved by another air cylinder and has an adjustment on the rear of the cylinder to control its stroke length. There is a clamp that can be loosened and the sweep changed if it would be necessary. There are also flow controls provided on both the popper and sweeper to control their respective speeds. They are located on the air cylinders.

6. Ejector and back stop system

- This machine uses a backstop/ejector cylinder that is mounted inside of the collet tube and extends out the back of the collet closer. It is moved back and forth by means of a split clamping arrangement on the rear of the collet closer. It serves three purposes.

- It ejects the blanks when they are finished. This function needs no mechanical adjustments, however the function needs timed with the swing arm to work properly. This is accomplished with flow control valves both on the swing arm and the ejector cylinder. The flow control valve on the ejector cylinder is turned in to slow it down, and the flow control on the front of the swing arm cylinder is turned in to slow it down. These

need to be adjusted together to obtain the proper coordination between the two. There is a pusher end on the front of the piston rod assembly that comes in different sizes. The pusher end piece must be of smaller diameter than the blank that the machine is being set up for. It can be changed by removing the ejector/backstop cylinder from the rear of the collet closer.

7. Frontstopping: This feature is the normal use of the function when chamfering blanks of varying lengths. During the loading cycle, the backstop cylinder extends at low pressure and keeps a pressure against the blank to keep it from being pushed too deep into the collet. The point of stopping is being controlled by the pusher cylinder's maximum stroke. One must take care to insure that the adjustment of the ejector cylinder is back far enough so that the ejector cylinder does not bottom out before the loader cylinder reaches its full stroke.

8. Backstopping: This feature is used if one wishes to keep all of the blanks at uniform overall length. To set this feature up, Put the machine in manual operation. Load a blank with the loader function, close the collet, then loosen the 2 clamp screws that hold the ejector cylinder and push it forward by hand until you see it push the loader rod back about 1/8 of an inch, clamp down the 2 screws on the ejector cylinder. Check then to see if the indicator light on the loader prox switch is on. If not, then adjust the switch back until the light is on. (NOTE) If the blanks are still inconsistent on the overall length, sometimes the switch is acting to quick and you need to add more dwell time to the collet delay timer.

9. Automatic rest assembly

This unit is necessary to keep chatter from developing in the diamond wheel for smaller blanks. Its use for blanks above 1/4" in diameter is not necessary. Its air pressure is normally set about 8 to 10 pounds. The pressure control is located on the back of the rest cylinder. The sensor switch for this unit is mounted on top of the cylinder and is there to detect if a blank is present. If the cylinder extends too far, the switch will interrupt the cycle. The switch must be on for the machine to run. If the wear pad gets worn too much, the switch will detect this condition and will stop the cycle. Sometimes it might become necessary to move it forward a small amount if it gets out of operating range.

10. The Grinder head assembly.

This machine is equipped with a direct drive spindle that needs no attention for its life. It is fitted with a 6" by 1/2 by 1 1/4" diamond wheel. The

wheel will form its own wear angle after some use and maintain it until it is used up. A small 45 degree lead angle is sometimes used on the front of the wheel to break the sharp edge so that the wheel edge won't chip. The wheel adapter and spindle both have right hand threads. The wheel rotation should be checked after installation to insure that the wheel is turning CCW as viewed from the end. There is a speed control adjustment for the feed stroke . This is located on the main table and is adjusted by the brass nut on the end of the cylinder. There is also an adjustment screw in front of it that can be moved to control the start of the feed stroke. The stroke length is controlled by a prox switch on the back of the table. It is triggered by a target that can be moved fore or aft. As required. Length of the working stroke is controlled by a timer in the set up screens.

11. Lubrication and other maintenance requirements.

The machine is equipped with a central lubrication system that should be operated about once a day. The receiver should be filled with high quality lubricating oil as required. Note. If industrial oil can not be obtained easily, use 30 weight engine oil. The machine should be cleaned frequently and all ground powder removed, especially around the loader bellows and the loader slide system.

PREPOINT AND CHAMFER 6-94
SETUP AND OPERATION
SECTION II

1.1 FAULT

FAULT
RESET CLEAR

After power up, while E-Stop is depressed, or upon fault condition, the operator interface unit (OIU) will display the following screen.

If E-Stop is not depressed, the "Cycle Stop/Fault Flashing" light will be flashing. To reset a fault condition, press "clear" on the OIU. Some faults will require more than one press of the clear button.

Note: Pressing "CLEAR" during a fault will return all machine functions to their home positions.

1.2 MANUAL FUNCTIONS

To manually control machine functions, select "Manual" with the "Single Cycle/ Manual/ Auto three position selector switch. The IOU will display "Manual" and the "Cycle Done Light" will be off.

Each machine function may now be performed by pressing the appropriate function key as labeled on the placard at the left of the OIU. (First press, "ON"; Second press "OFF". Wheel cross slide may be jogged by using "JOG IN" or "JOG OUT" push buttons (These are only active when in manual).

Note: Some manual functions have programmed interlocks to prevent possible machine damage or endanger operating personnel .

- 2.1 SETUP (Assuming power on and faults cleared) Load hopper (See Section 1) Tighten wheel slide decelerator counterclockwise approximately 1/2 of a turn.
- 2.2 SELECT "MANUAL"
- 2.3 Press **F-4** twice to load tool from the hopper to the shuttle. (Skip to 2.4 if shuttle is already loaded.)
- 2.4 Press **F-3** Shuttle extends
- 2.5 Press **F-4** Load rod extends
- 2.6 Press **F-11** Collet Closes
- 2.7 Press **F-3** Shuttle retracts
- 2.8 Press **F-4** Load rod retracts and hopper loads shuttle.
- 2.9 Press **F-2** Tool Rest extends (If tool rest fail to extend, setting of air pressure regulator may be necessary, It is mounted below the operator work station. It should read between 5 and 25 PSI, depending on the size of the tool.
- 2.10 Press **F-6** Workhead rotation starts. Workhead speed may be adjusted with "Work Head Speed" Pot. On operator console.
- 2.11 Press **F-1** Wheel rotation starts.
- 2.12 Press **F-7** Wheel slide extends until decelerator engages adjustable "Start-Stop"
- 2.13 Slowly loosen wheel slide decelerator until wheel slide begins to extend. When heel of tool is centered on wheel, quickly tighten decelerator to stop its forward motion.

- 2.14 Press "JOG IN" push-button. (Wheel cross slide will advance towards tool while push-button is held in and stops when it is released.

1ST Grind Pos	F-9
0.00000	0.00000

- 2.15 Pressing "Jog In" triggers the OIU. To display the following screen. Note: This screen is accessible only in the manual mode.

The cross slide position for the first grind may only be set while this screen is displayed. The 6 digits on the lower left of the screen represent the current setting for the first grind position. (In inches from the cross slide home position.) If the desired "First Grind Position" is known, it may be directly entered here by use of the numeric keys on the OIU. (If this method is used, skip to 2.20.

The 6 digits on the lower right of the screen represent the current cross slide position. This is also in inches from the cross slide home position.

- 2.16 Continue pressing "JOG IN" until wheel is approximately 1/16 inches from tool.
- 2.17 Press **F-5** This switches to the "Slow Jog" speed. Warning: Pressing it twice will switch it back to "Fast Jog".
- 2.18 Carefully press "JOG IN" push-button until the wheel contacts tool. "JOG IN" or "JOG Out" until wheel is at the desired "First Grind Position".
- 2.19 While wheel is at the desired "First Grind Position", press **F-9**. This will set the "First Grind Position" into the memory. After pressing **F-9**, both values on the lower line of the display should be the same, This confirms a successful entry.
Note: Wheel cross slide has a programmed overtravel limit of .75 inches in from the home position. If this limit is exceeded, a fault will occur and "JOG IN" becomes inactive "Jog Out" will still be active.
- 2.20 After setting "First Grind Position", Jog cross slide out, clear of the wheel. Select desired mode of operation, either "Single Cycle" or "Auto".
Note: Changing mode selection will always return all machine functions to their respective home positions.

DISABLE	AUTOLOAD
YES F-2	NO F-3

- 3.1 Upon selection of "Single Cycle", the following screen is displayed on the OIU.

If hand loading of large tools is desired, press **F-2**. This will disable the auto loading system, including the hopper, the shuttle, and the Unloader. If Auto Loading is desired press **F-3**. If you elect to do this, you can skip to para. 3.3

COLLET	
OPEN/CLOSE	F-11

- 3.2 After pressing **F2**, the following screen is displayed on the OIU.

At this time, the operator will hand load a tool into the collet and press **F11** to close the collet. (If the wrong selection was made at 3.1, press "CLEAR". Display will change back to 3.1.

Note: If using the machine in hand load function, some type of tool stop or locator may be necessary to establish the front location of the tool.

- 3.3 Upon pressing **F-11**, the following screen is displayed on the OIU.

<p>CYCLE START F-1 CYCLE STOP F-12</p>

Note: While in "Single Cycle" with auto load disabled, collet may still be opened by pressing F-11. If "Cycle Start" (F1) has not been pressed. Display will change back to 3.2

3.4 If it is first run after set-up procedure, use the "UP" or "DOWN" arrow keys of the OIU to set the following parameters.

<p>PRODUCTION COUNT 0000000 RESET F-4</p>

3.4A This screen displays the total number of cycles completed in single cycle and auto modes. This counter may be

reset to zero by pressing **F-4** while this screen is displayed.

<p>COUNT-OFF RST-- F-4 000000 000000</p>
--

3.4B This screen is an optional predetermining counter that stops machine operation after a predetermined number of tools are produced. When this function

is enabled all machine cycles in single cycle and auto mode are counted. The 6 digit number at the lower left of the display is the setpoint (preset value). The desired setpoint may be entered using the numeric keypad of the OIU. The 6 digit number at the lower right of the display represents the number of cycles completed (accumulated value). The accumulated value counts up from zero. When the accumulated value reaches the setpoint, the machine operation will stop. The machine may not be restarted again until the accumulated value is reset or this function is disabled (See3.4). To reset the accumulated value, press **F-4** while this screen is displayed (Accumulated value will return to zero).

<p>ENABLE COUNT-OFF YES- F-3 NO-F-4 N</p>

3.4 C

This screen is used to ENABLE/ DISABLE the predetermining counter. To enable this

counter, press **F-3** while this screen is displayed. The **N** at the lower right of display will change to a **Y** to indicate that "yes" was selected and the counter is enabled. Pressing **F-4** while this screen is displayed will disable the counter and change the indicator back to **N**

<p>CURRENT O.T. LIMIT 0.7500</p>

3.5 This screen displays the current cross slide over-travel limit setting. This is a read only screen. Changing of this setting will be discussed later.

3.6

<p>WHEEL WEAR COMP. F-9 RESET F-10</p>

While in "Single Cycle" or "Auto", Function keys, **F-9** and **F-10** are

used to compensate for wheel wear Each time that **F-1** is pressed, 0.0002 in. is added to the

First Grind Position and the cross slide overtravel setting. Pressing **F-10** will restore the over travel setting to 0.75 and may be verified by the screen shown at 3.5. To reset, see 2.1.

Note: Any time that the wheel is changed, be sure to reset wheel wear comp.

ADJUST 1 ST GRIND		
+F-7	-F-8	0.0000

added to the First Grind Position setting. **F-8** will subtract 0.001 in. This feature is useful to fine tune the First Grind Position.

Note: This feature does not affect the overtravel limit. Use wheel wear comp. To obtain full use of wheel.

3.7 The 6 digits at lower right of display represent the current First Grind Position setting. While in Single Cycle or Auto Cycle, each time that **F-7** is pressed, 0.001 in. is

3.8 This machine is capable of a single grinding pass or multiple grinding passes. For single grinding pass applications, the amount of the cut is controlled by the setting outlined at 2.15 thru 2.19. For multiple pass applications, three different cut amounts per tool may be used. These different cut amounts are preformed in the following order: HOG GRINDS, ROUGH GRINDS, and FINISH GRINDS. The amount of the first grind on the tool is always determined by the setting outlined at 2.15 thru 2.19. This first grind will be counted as a "HOG GRIND", if the # of HOG GRINDS is set to 1 or more. If the # of "HOG GRINDS" is set to zero, and the # of "ROUGH CUTS" is set to 1 or more, the first grind will be counted as a "ROUGH GRIND". If the # of "HOG GRINDS" and the # of ROUGH GRINDS" are both set to zero, the first grind will be counted as a FINISH GRIND.

A large amount for the FIRST GRIND may be entered using the screen at 2.15. With this screen displayed and the wheel jogged to the "SPARK OFF" position, add the desired amount for the "FIRST GRIND" to the number displayed at the lower right of the display. Enter this total using the numeric keypad of the I.O.U. **Do not press F-9.**

# of HOG GRINDS	
000	000

3.8A Use this screen to set the desired number of "Hog" grinds (the first grinds on the tool). The

current

number on the lower left represents the

setting. The number on the lower right represents the current "HOG GRIND" count.

To change the setting, enter the desired value, using the numeric keys on the O.I.U. keypad. (Value at the lower left will flash while changing). If a mistake was made, press "CLEAR") When the desired value is flashing, Press "ENTER". This feature may be used during cycle. If no "HOG GRINDS" are desired, enter Zero here.

3.8 B

HOG GRIND AMOUNT	
0.0000	

Use this screen to set the Hog Grind

Amount per pass. When making decimal entries with the O.I.U. keypad, first enter "0" , decimal point, then the desired decimal value. If the screen at 3.8A was set to Zero, than this screen may be disregarded.

3.8C

OF ROUGH GRINDS
000 000

Use this screen to set the desired number of "ROUGH GRINDS" (second grind on tool). Use the same procedure as outlined at 3.8A to make this setting. If no "ROUGH GRINDS" are desired, Enter Zero here.

3.8D

ROUGH GR AMOUNT	Use this screen to set the "ROUGH GRIND" amount per pass. Use the same procedure outlined at 3.8B to make this setting. If the
0.0000	screen at 3.8C was set to zero, this screen may be disregarded.

screen at 3.8C was set to zero, this screen may be disregarded.

3.8E

# OF FIN GRINDS	Use this screen to set the desired number of "FINISH GRINDS" (3rd Grind on tool)
000 000	Use the same procedure outlined at 3.8A to make this setting. For single grind applications, set "# OF HOG GRINDS" and "# of ROUGH GRINDS" to zero and set "# OF FINISH GRINDS" to one.

3.8F

FINISH GRIND AMOUNT	000000	Use this screen to set the finish cut amount per pass. Use the same procedure outlined at 3.8B to make this setting. For single pass applications, this screen will be disregarded.
---------------------	--------	---

applications, this screen will be disregarded.

3.8G

of DWELL PASSES
000 000

Making additional passed without advancing the wheel towards the tool are Dwell Passes. These are always the last passes on the tool. Use this screen to set the desired number of "DWELL" grinds. Use the same procedure as outlined at 3.8A to make this setting, If no "Dwell" passes are desired, Enter zero here.

4.1 AUTO CYCLE Upon selection of AUTO, the following screen is displayed on the I.O.U. Pressing F-1 will start the Auto-Cycle and the machine will run

CYCLE START	F-1
CYCLE STOP	F-12

continually until Cycle Stop, (F-12), Pre-determining Counter, E-Stop, or Fault interrupts it.

5.1 CYCLE START **F-1** If single cycle is selected, pressing **F-1** will start machine cycle. Machine will run for one full cycle. Wheel motor and coolant will remain on, and and wheel cross slide will return to First Grind Position at completion of cycle. (If

Autoload is disabled, coolant will stop after each cycle). If Auto Cycle is selected, pressing **F-1** will start the machine. Machine will run continually.

- 5.2 **CYCLE STOP F-12** If Single Cycle was selected, pressing F-12 during or after the completion of a cycle will stop wheel motor, coolant, and return the cross slide when the cycle is done. If Auto-Cycle is selected, pressing **F-12** will stop continuous cycling at the end of current cycle and return all machine functions to their "HOME" positions.
- 5.3 **IN CYCLE LIGHT** "OFF" while in manual, "ON" during cycle and when in Single Cycle or Auto.
- 5.4 **CYCLE DONE/ FAULT FLASHING LIGHT**
Flashes when fault occurs in all modes. "OFF" in manual, while in Single Cycle. "ON" when cycle is complete, while in Auto, when cycle is complete, and after cycle stop.
- 5.5 **EMERGENCY STOP** It must be pulled out to clear a fault. It will return all machine functions and set fault when pushed in.
- 6.0 **TO ACCESS HIGH LEVEL OIU SCREENS**
Many PLC registers containing fault timer settings, cross travel and over travel limits, grind rate limits, step motor speed settings, ect, may be accessed and altered from the OIU. This should only be attempted by qualified personnel with a through knowledge and understanding of the PLC program. If it becomes necessary to view or alter these parameters.
 - 6.1 Set three position selector switch to "AUTO"
 - 6.2 Press Mode key on OIU
 - 6.3 Enter screen number that you wish to access (See OIU Program Printout), Using numeric keys on OIU. When entry is correct, then press "ENTER"
 - 6.4 When desired screen is displayed, alter, using numeric keys on OIU. If a mistake press "CLEAR" and reenter. When values are correct, press "ENTER".
 - 6.5 Press "MODE"
 - 6.6 Enter "0"
 - 6.7 Press "ENTER"

See Horner Electric Operator Interface Unit Manual for more details on OIU.