H-01a: Program Boring Mill (Giddings & Lewis 5-axis Mill)

SAFETY FIRST

- ☐ Follow all Caterpillar facility safety standards when performing this task.

EQUIPMENT

- ☐ CNC horizontal boring mill
- ☐ A penny may be needed to turn some of the buttons on the control panel.

RESOURCES

- ☐ CNC boring mill manual
- ☐ part print
- ☐ Process Sheet
- ☐ prepared operating program
- ☐ Pro E

Program Boring Mill (Giddings & Lewis 5-axis Mill)

1. Prepare a CNC program.

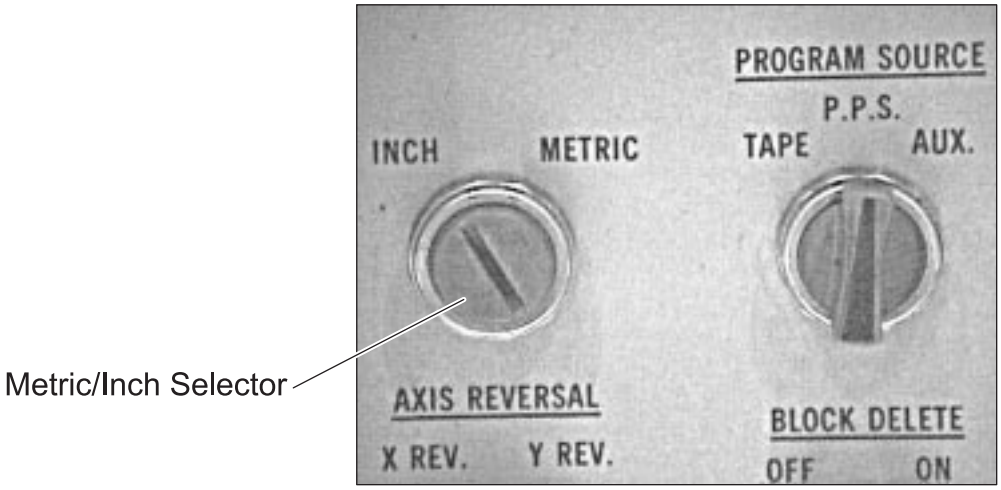
- ☐ Consult the part print and Process Sheet.
- ☐ Chart the necessary dimensions.
- ☐ Write out the CNC program with N codes. In each block use up to a maximum of four preparatory G codes and a maximum of four miscellaneous function M codes.
- ☐ Include axis, feed, spindle speed (*e.g.* X-00047500, E012.5, S100), and other operating data in each block.

Note: E is used for inch/rev and F is used for inch/min.

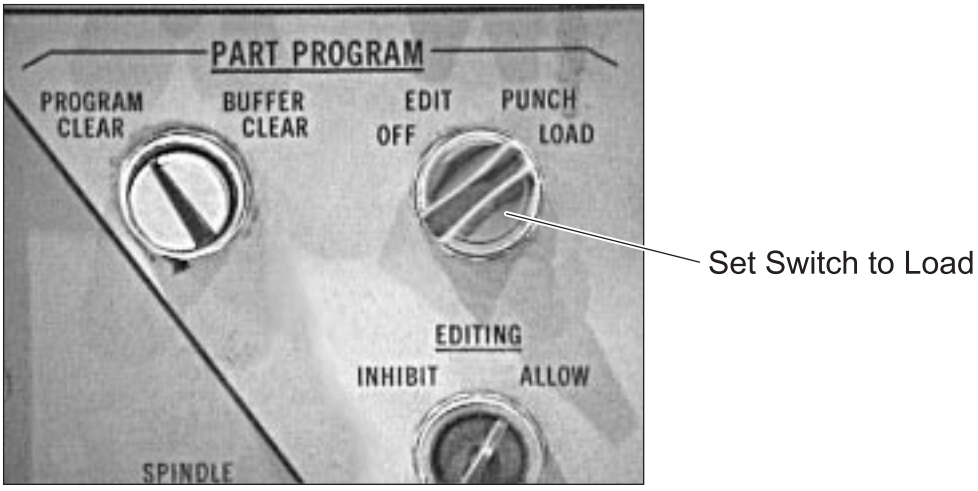
- ☐ Consult the boring mill manual for descriptions of G and M codes and operating data format.

2. Prepare the boring mill operator station.

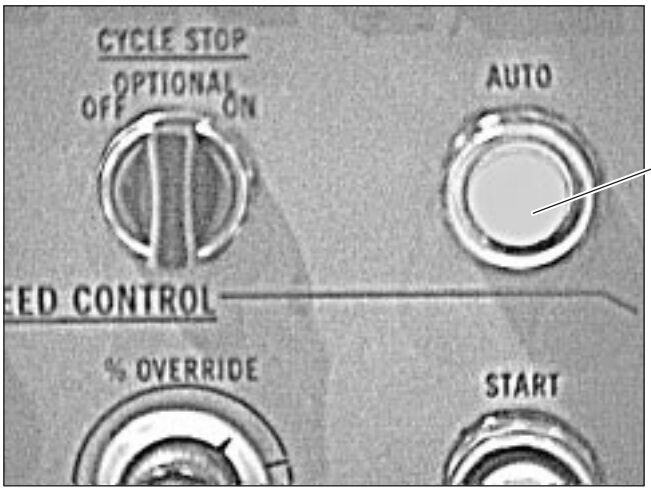
☐ Select either inch or metric dimensions.



☐ Set the PART PROGRAM selector to LOAD.



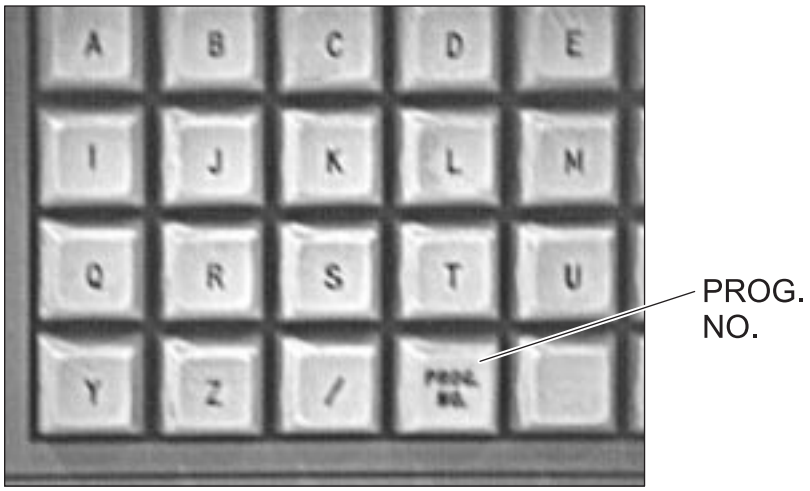
☐ Push the AUTO button, if necessary, to put the machine in automatic control mode (if it was in MANUAL mode).



3. Assign a program number.

☐ Press the KEY BOARD button.

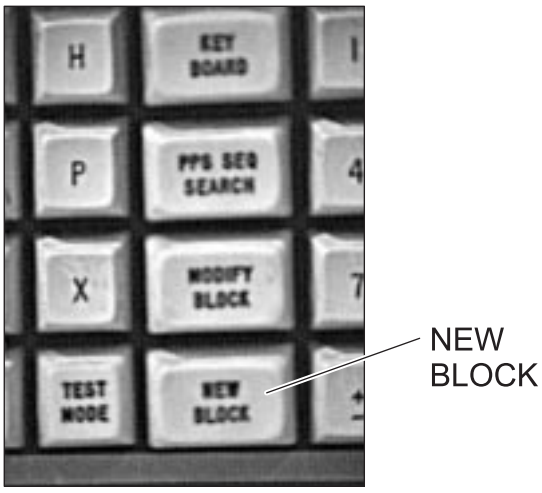
- ☐ Enter the program number using the number keys.
- ☐ Press the PROG NO.



Note: If a program number you chose already exists, it will appear on the screen. Choose another number for the new program to be entered.

4. Load the program prepared in step 1.

- ☐ AUTO and KEY BOARD must be on.
- ☐ Press NEW BLOCK.



- ☐ Enter 10 N to establish the sequence number of the first program block.

Note: Always enter the numerical number first.

- ☐ Enter the G codes and M codes for the block.

Note: Always enter the numerical number first.

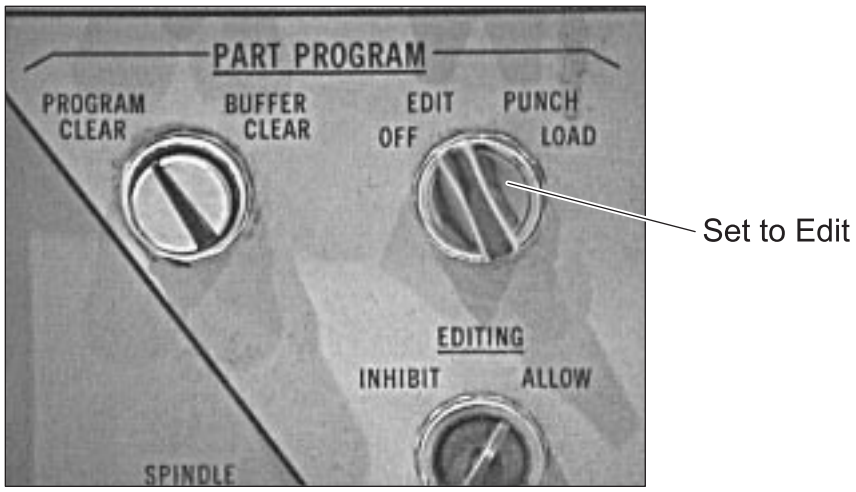
- ☐ Enter the operating data for the block.

Note: If something is typed in error, press KEY BOARD to erase what you have typed in wrong, retype. If you forget to type some needed information, and the program won't take if you do (e.g. forgot N 20), press NEW BLOCK, enter it in now, and press NEW BLOCK.

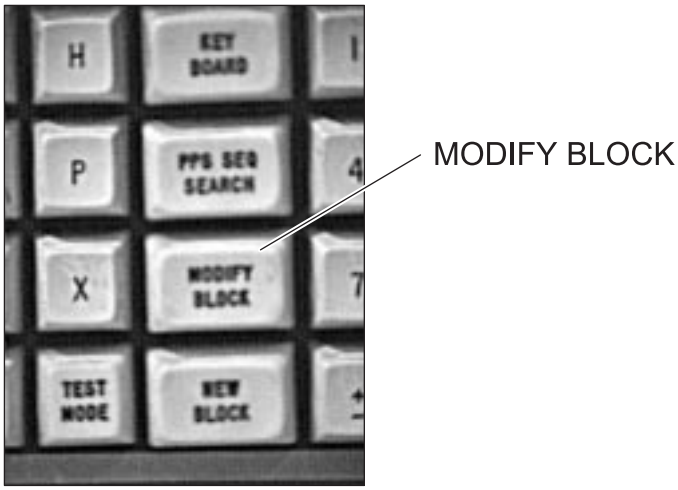
- ☐ Press NEW BLOCK twice (once to enter the N sequence number and once to move to the next N sequence number).
- ☐ Enter 20, N, and codes and data in the second program block.
- ☐ Press NEW BLOCK twice.
- ☐ Repeat the same steps for all program blocks.
- ☐ Enter in the last program block, M 02 (end of program) command.
- ☐ Press NEW BLOCK.

5. Edit a program.

- ☐ Set the PART PROGRAM switch to EDIT.



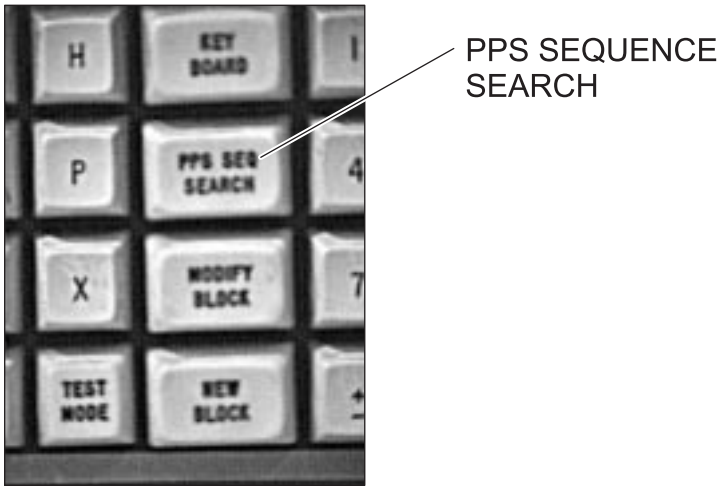
- ☐ MODIFY BLOCK must come on.



- ☐ Press KEY BOARD.

Note: If not on the proper program number, enter the number and press PROG. NO. button.

- ☐ Enter the sequence number of the block to be edited (*e.g.* 30).
- ☐ Press PPS SEQ SEARCH to bring up the program block.



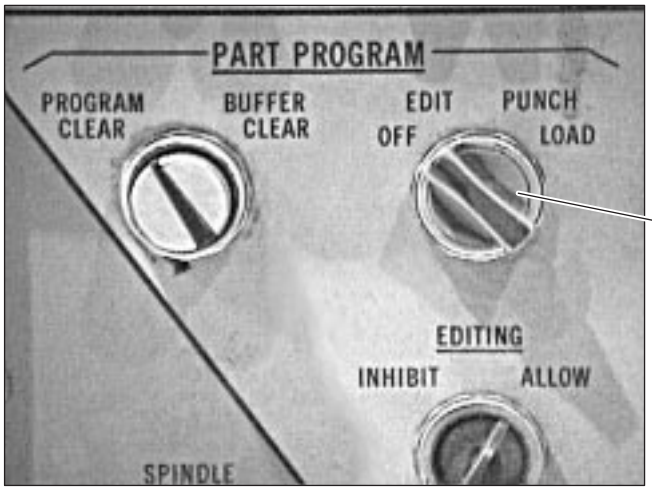
- ☐ Enter the changed G or M codes or data, number first.

Note: New G and M codes insert along with existing codes; operating data (feed, axis, speed, etc.) overwrites.

- ☐ Press MODIFY BLOCK to enter the edited block into the program and memory.

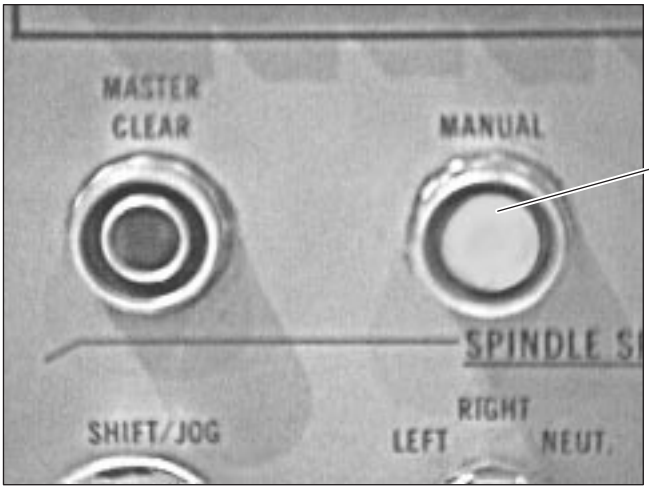
6. Enter cutter radius compensation or tool length.

- ☐ Switch from EDIT of OFF.



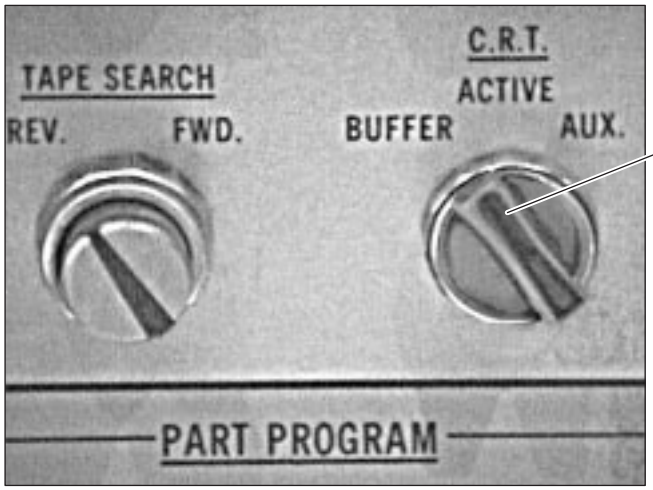
Set to Off Position

- ☐ Press MANUAL.



Press Manual

- ☐ Switch to BUFFER.



- ☐ Press KEY BOARD, then 1 (one), then H.
- ☐ Under "R" value, you will enter cutter radius compensation. It will always be a "+".

Note: Other machines do have "-".

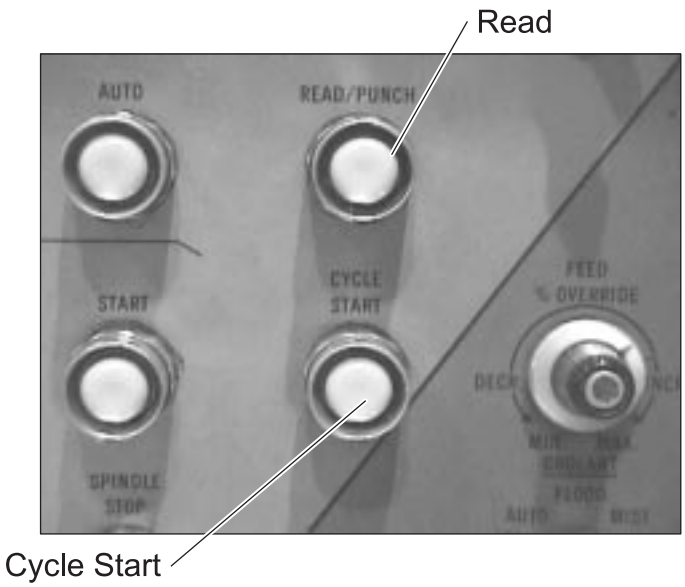
- ☐ Under "Z" value, enter the tool length.

7. Perform a dry run of the program.

- ☐ Press AUTO.
- ☐ Press MASTER STOP, MASTER CLEAR (usually a couple times).
- ☐ Press KEY BOARD. Enter 5.P.

Note: "W" is a depth. "P" code is the "W" offset. By entering 5.P, this temporarily changes the offset 5 inches.

- ☐ Press CYCLE START.



- ☐ Press READ. See the figure above.
- ☐ Press CYCLE START.

Note: After the M 02, on the "dry run," the computer automatically reverts back to the original program.

Note: If something is not right in the program, press FEED HOLD, check the error, and ask for assistance.