Section 7: Keyboard

Key Lock Switch (Edit Protection)

VERTICAL POSITION: Enable editing the CNC program.

HORIZONTAL POSITION: Disable editing the CNC program.

Block Skip Switch

DOWN POSITION: The down position (OFF) causes the control to ignore the

"/" symbol and execute the program block (see Section Eight, Commands, Run-time Menu).

UP POSITION: The up position (ON) causes the control to read the "/" symbol and skip the program block. The /N# line in the program will suppress the look ahead feature of the control with the switch in the up position (ON) (see Section Eight, Commands, Run-time Menu).

Optional Stop Switch

DOWN POSITION: The down position (OFF) causes the CNC to stop at the M1 function code and enter the WAITING state (see Section Two, M Functions; see Section Eight, Commands, Run-time Menu).

UP POSITION: The up (ON) position causes the CNC to ignore the M1 function code (see Section Eight, Commands, Run-time Menu).

Light On/Off Switch

This switch controls power to the work lamp.

Video On/Off Switch

This switch controls the power going to the video screen. The operation of the machine **is not** affected by this switch.

Rapid Travel Selector   This switch selects the rapid movement speed (G0, G5).

100% of maximum rapid traverse

50% of maximum rapid traverse

25% of maximum rapid traverse

**Feed Rate Override
Potentiometer**   This potentiometer controls the speed of axis motion.

1) AUTOMATIC mode: Axis motion can be increased to 150% or reduced to 0% of the programmed feed rates. Rapid moves are not affected. The maximum non-rapid feed rate is 375 ipm. A programmed feed rate above 250 ipm may only be overridden to 375 ipm. (For a 900 ipm rapid travel machine, the maximum non-rapid feed rate is 600 ipm. A programmed feed rate above 400 ipm may only be overridden to 600 ipm.)

2) SINGLE STEP mode: All AXIS motion, rapid, or feed rate is controlled by this override potentiometer.

3) DRY RUN mode: All AXIS motion, rapid, or feed rate is controlled by this override potentiometer.

4) SLIDE HOLD key:

   • After pressing the SLIDE HOLD key, the completion of the current move is subject to the override potentiometer. During a rapid move, if the Slide Hold is pressed, when the START key is pressed the feed rate potentiometer can override the rapid feed rate. If the next program block is programmed as a rapid move, the feed rate potentiometer will not override the feed rate.
   • An M49 code in the CNC program disables this potentiometer (see Section Two, M Functions, M49 Function).

Spindle Speed Override Potentiometer

This Potentiometer controls the programmed spindle RPM. The maximum override is 200% of the last programmed spindle speed (S word) executed by the CNC program or in MDI.The override percentage will not exceed the current drive RPM range (see Section 1, S Function Range).

WARNING: A setting of 0% will not stop the spindle.

Jog Key and the Hand Wheel

Pressing the JOG key while in the command mode, or during the WAITING state while in the AUTO mode, initiates the JOG mode.

Once in the JOG mode, you can select an axis by turning the axis selector switch on the control panel, or using the keyboard to select the axis to jog by pressing X, Y, Z, A, B, or C keys.

The jog direction is selected by pressing the + or - key or by the direction the hand wheel is rotated clockwise for positive and counterclockwise for negative.

The speed of axis motion is selected by pressing the H, M, or L key (High, Medium, or Low), or by turning the jog increment selector switch.

H = .01   M = .001   L = .0001

Short moves can be made by pressing the JOG key repeatedly or by turning the hand wheel. If you hold down the JOG key, continuous motion can be made.

The speed of axis motion can be modified by the feed rate override pot. This can be used only when the JOG key is held for jog motion. The feed rate override pot does not affect the speed when using the hand wheel.

To exit the JOG mode, press the MANUAL key. The keyboard uses the familiar typewriter format for alphanumeric and special characters. The special function keys are described below (see SLIDE HOLD for JOG AWAY).

Shift

This key must be pressed along with another key to get the "upper" character displayed on that key. The shift key has no effect when pressed with keys that have only a single character. This key must be depressed while pressing the Spindle On/Off key to start the spindle manually.

Enter

This key is used to indicate that you have completed the entry of your command or a line of data.

Delete

This key stops input of data on the program line. The data entered prior to the delete key is disregarded and the control is ready to receive the new data.

Backspace

This key allows you to move the cursor backward to correct a keying error. All characters to the right of the cursor, after backspacing, are disregarded by the control when the enter key is pressed. This data must be entered again to be entered in the program.

Spindle On/Off

This is an alternating switch that controls the spindle manually. As a safety feature, in order to turn the spindle on, you are required to first have the SHIFT key depressed before pressing the SPINDLE ON key. The spindle must be started manually after the external slide hold has been activated.

SPINDLE OFF does not require the use of the SHIFT key.

Spindle speed may be changed by an S word in the program or in MDI (see Section Nine, MDI command). The spindle orientation may be released by pressing the SPINDLE ON/OFF key. This will place the spindle in neutral by releasing the orientation arm.

Auto

This key initiates execution of the current CNC program.

Pressing this key in the command mode the CNC displays the AUTO MODE screen. Pressing AUTO again initiates program processing. The control continues to process the program until the buffer is filled. If the AUTO key is not pressed the control enters the WAITING state when the buffer is filled.

When the machine enters the WAITING state, the program may be executed by pressing the START key or returning to the COMMAND mode by pressing the MANUAL key.

The AUTO key is also used to end the WAITING state or when you want to end the SINGLE STEP mode.

Typing MU during the machining cycle causes the CNC to display the BACKGROUND EDIT MENU. This allows the operator to select dry run options (run time menu), the offset menu or the functions menu. The changes made in the BACKGROUND EDIT MENU are not effective until after the last program block that was processed prior to the change being entered.

Pressing the space bar toggles between the BACKGROUND EDIT MENU and the AUTO MODE screen (see Background Editing).

Slide Hold

The SLIDE HOLD button stops the movement of the X,Y, Z, A, & B. The Spindle and coolant are not affected by the SLIDE HOLD. The CNC will resume motion after the START or AUTO button is pressed.

> ⚠ *WARNING:* Before continuing AUTO, check to see if the Spindle or Coolant was shut off. If so, manually turn on the Spindle by depressing the SHIFT and SPINDLE ON button. To turn on the Coolant, press the COOLANT button.

Slide Hold, JOG AWAY

By pressing the **JOG button** while in SLIDE HOLD, any axis can be moved away from its current position. This Jog Away feature allows an optional automatic return of the jogged axes to that position to complete the machining cycle. The MANUAL key exits JOG and returns the CNC to SLIDE HOLD.After pressing the MANUAL key the CNC prompts the operator:

```
X      .7075   0
Y            0   0
Z            0   0  C

 X  0.2856      S5000    T1   G0 G17 G70 G91   H0 =0
 Y       0      F3   /M49      G8 G40 G80 G98   D0 =0
 Z       0 C  0   M9           E0               00:00:07
             09998 SPINDLE BREAK IN
N15 X1.
N16 S7000 M3
N17 X-0.5
N18 M5
-------------------------------PRESS MANUAL TO ABORT--
JOG----------------------------PRESS MANUAL TO ABORT--
1-RETURN AXES
2-REMAIN & SHIFT COORDINATES
3-REMAIN & NO SHIFT
```

Figure 7-1 Slide Hold, JOG AWAY

Pressing 1: The CNC will return the axes to the position before the JOG was initiated. This motion is accomplished at a rapid feedrate. Make sure the Z axis is in a position to clear work and fixturing.

> ⚠ *WARNING:* Slide Hold or Feedrate Override Pot will not function while the CNC is returning the axis to original location! The Rapid Travel selector will change the return speed.

Pressing 2: The CNC will continue the machining operation, change the position read-out to the last machined position, while retaining the JOG offset until one of the following conditions cancels the jog offset:

- aborting the AUTO mode.
- a G28 with an axis movement will return all axis to zero.
- a tool change is commanded (M6) Z axis only.

Pressing 3: The CNC will continue the machining operation, retain the JOG offset, and the position read-out will reflect the current position including the JOG offset. This will remain active until one of the following are initiated:

- aborting the AUTO mode.
- a G28 with an axis movement will return all axis to zero.
- a tool change is commanded (M6) Z axis only.

Note: A tool change is commanded (M6) **does not** cancel JOG AWAY for X or Y axis.

External Slide Hold

When the machine is running a program and the doors are opened the external slide hold is activated. The machine motion and the spindle are stopped. When the doors are closed and the start button is pressed a message to turn the spindle on will appear if the spindle is turned off manually.

**Spacebar,
Background Editing**

To use background editing, the programmer must have the control in AUTO and press the SPACE BAR at the keyboard.

The space bar toggles the screen between the BACKGROUND EDITING MENU and the AUTO MODE screen. While in the BACKGROUND EDIT MENU the programmer now has three options to choose from. The active program currently running in AUTO will be displayed to the screen, and below it will be displayed the background edit options:

```
X     1.0000    0
Y            0    0
Z            0    0  C

 X        0       S10000      T1  G0 G17 G70 G91   H0 =0
 Y        0        F3    /M49      G8 G40 G80 G98   D0 =0
 Z        0 C  0   M9           E0                 00:00:13
 WAITING      09998 SPINDLE BREAK IN
<N1 09998 (SPINDLE BREAK IN
 N2 G70 X0 G90 Y0
 N3 G91 M49
 N4 M3 S1000
N6 S2000 (OPERATOR LOOK
BACKGROUND EDIT---------------SPACE BAR TO RETURN TO AUTO-
1-DRYRUN OPTIONS     3-HELP
2-OFFSETS
```

Figure 7-2 Spacebar, Background Editing

OPTION 1 DRYRUN OPTIONS: Selection will display the dryrun options run time menu.

OPTION 2 OFFSETS: The operator can edit the FIXTURE and TOOL OFFSETS, TOOL TIME and the MACRO VARIABLES tables (See the **DF, DT, DTT** and **FO** commands in Section 8 for a detailed description of these tables and their uses).

OPTION 3 HELP: The operator has several options that are similar to the PAGE EDIT (PA) command. The active program currently running in AUTO can be edited.

U-UPT-TOPC-CHANGES-SEARCHP-PROGRAM
D-DOWNB-BOTTOMI-INSERTR-REPLACEJOG
ENTER-PAGE DOWN BACKSPACE-PAGE UP DEL-DELETE
U KEY, move the cursor up.
D KEY, move the cursor down.
T KEY, move the cursor to the top of the program.
B KEY, move the cursor to the bottom of the program.

C KEY, change line or edit the line on which the cursor points.
I KEY, insert below the cursor line.
S KEY, search for a specified word.
R KEY, search and replace a specified word.
P KEY, change or review programs in memory.
JOG KEY, JOG away from the current position.

WARNING: Be extremely careful when making changes to the current program in auto!

Background editing will allow the programmer to change, add, or delete any line of program code other than the lines that are currently being processed by the control. If a line of code to be changed is within the LOOK AHEAD BUFFER the control will display a message "CONFLICT WITH AUTO" and the programmer must wait until the BUFFER has passed by the line to be edited. This prevents the interruption of continuous machining of the current part during AUTO. The macro WAIT will prevent the LOOK AHEAD at the M2 (see Section Eighteen, Macros).

Single Step

This key issues the SINGLE STEP command which causes the CNC to enter the WAITING state between each program block. While in the SINGLE STEP mode all rapid moves are subject to the feed rate pot override. The WAITING state is ended by pressing one of the following keys:

- **START** - executes one block of the CNC program.
- **AUTO** - exits the SINGLE STEP mode for continuous program operation.
- **JOG** - initiates the JOG Away feature (see SLIDE HOLD).
- **MANUAL** - terminates program execution and enters the COMMAND mode.

Start

This key is used to terminate a WAITING state that has been initiated in one of the following situations:

1) You have just initiated the operation of the machine by use of the AUTO, HOME or MANUAL DATA INPUT command.

2) The WAITING state has been entered to give you time to make any necessary preparations for the move.

3) The CNC program has been terminated by an M2 or M30 (end of program) instruction and the CNC is ready to begin execution from the start.

4) The SLIDE HOLD key was pressed.

5) The CNC program has issued a M0 or M1 command.

6) The CNC is in the SINGLE STEP mode. This key is also used to override a programmed dwell command (see Section 3, G4 code).

Emergency Stop

This switch is used to disconnect the control from all machine axes and the spindle. The control will be put in the COMMAND mode. To restart the program after an emergency stop, reset the EMERGENCY STOP button by turning it clockwise and press the JOG key to restart the servo amplifiers. The axes in motion and the spindle will **coast** to a stop.

Manual

This key interrupts the current activity of LIST PROGRAM, PAGE PROGRAM, SUM PROGRAM, DISPLAY TOOL TABLE, DISPLAY FIXTURE OFFSETS, MENU or JOG and returns the CNC to the COMMAND mode.

When the CNC is executing a CNC program, this key is ignored unless the CNC has been put in the WAITING state by the SLIDE HOLD command, M0 command, M1 command, a problem during tool change, the SINGLE STEP command or an M2 or M30 (end of program) function.

Coolant-1 (FLOOD)

This is an alternating switch that controls the COOLANT-1 function manually. Same as M7 or M8.

Coolant-2 (MIST)

This is an alternating switch that controls the COOLANT-2 function manually. Same as M7 or M8.

Turret CW

When this button is pressed, the turret will be rotated clockwise to the next tool station. If this button is depressed, the turret will rotate as long as the button is held down.

Turret CCW

When this button is pressed, the turret will be rotated counterclockwise to the next tool station. If this button is depressed, the turret will rotate as long as the button is held down.