

SECTION 3

USING THE HSL-SM8 KEYPAD/DISPLAY

The spray gun times ("on" delay and "spray" time), Can Sensor-to-Gun Number of Indexes as well as the gun life expectancy limit are all set through the keypad of the M4500. The following sections describe the steps in setting these variables as well as using the M4500 keypad and display in general.

3.1 OVERVIEW OF KEYPAD AND DISPLAY

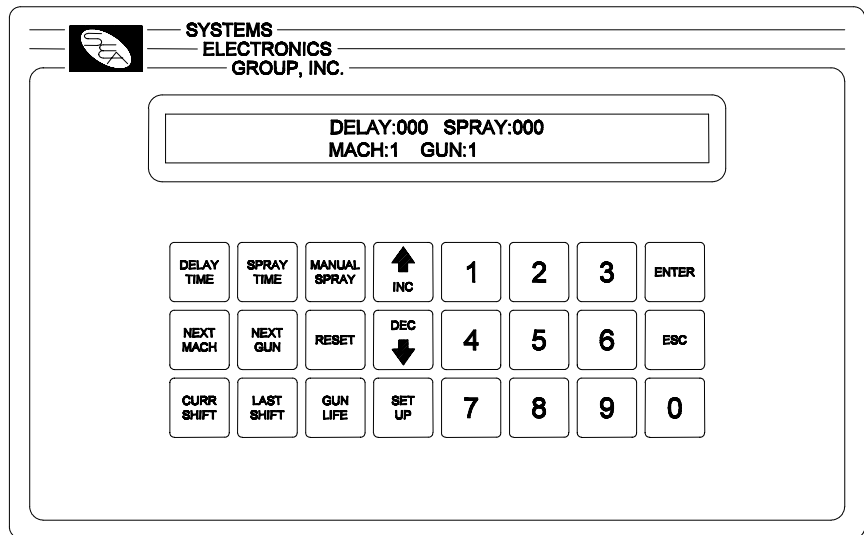


Figure 3.1 – HSL-SM8 Keypad Lay-out

The M4500 keypad is comprised of a 3 row by 8 column keypad. The group of 12 keys on the right side are used for numeric entry, which includes the "ENTER" and "ESC" keys. The group of 12 keys on the left side are defined as follows:

DELAY TIME: Used to adjust the "On" delay of for the selected gun.

SPRAY TIME: Used to adjust the "Spray" duration for the selected gun.

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- NEXT MACH:** Used to select the next machine. Pressing this key increments the machine number by one. If the machine number was 8 when this key is pressed, the machine number will roll over to 1 again. The gun times and gun counts displayed are for the selected machine and gun number which is selected with this key.
- NEXT GUN:** Used to select the next gun. Pressing this key increments the gun number by one. If the machine number was 8 when this key is pressed, the gun number will roll over to 1 again. The gun times and gun counts displayed are for the selected machine and gun number which is selected with this key.
- MAN SPRAY:** Used to fire the selected gun when the machine is stopped for test purposes. The selected gun will fire once for the "spray" time of that gun every time this key is depressed.
- RESET:** Used to reset the "can jam/sensor fail" alarms and the "gun life expectancy exceeded" alarm as well as reset the gun spray counts for the selected gun.
- INCR:** Increment key used to increment the selected field by one. This is used to increment by one any of the following provided it is selected (the selected field is the field that contains the cursor): "on" delay, "spray" time, or any of the set-up parameters. Holding this key for one second will increment the currently selected field continuously.
- DECR:** Decrement key used to decrement the selected field by one. This is used to decrement by one any of the following provided it is selected (the selected field is the field that contains the cursor): "on" delay, "spray" time, or any of the set-up parameters. Holding this key for one second will decrement the currently selected field continuously.
- CURR SHIFT:** Used to display the number of coated cans for each machine so far into the current shift.

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- LAST SHIFT:** Used to display the total number of coated cans for the previous (last) shift.
- GUN LIFE:** Used to display the total number of spray cycles and percent of used life for each gun.
- SET-UP:** Initiates the set-up menu which contains the following selections:
- 1: Set Expected Gun Life (# of Sprays)
 - 2: Preset or Reset # of Gun Sprays
 - 3: Set Can PRX-to-Gun Number of Indexes (shifts)

3.2 DEFAULT SCREEN

The default screen (displayed when no other commands are active) contains the following data:

DELAY:xxx SPRAY:xxx
MACH:x GUN:x

Where "Delay" is the "on" delay time and "Spray" is the "spray" duration. "Mach" and "Gun" specify the currently selected machine and gun for which the delay and spray times are displayed. The "on" delay and "spray" duration times are adjusted from the screen by selecting the "DELAY TIME" and "SPRAY TIME" keys respectively. This screen is always returned to when no other commands are active.

3.3 SELECTING MACHINE (GUN) TO ADJUST

The "NEXT MACH" key and "NEXT GUN" key are used to select the machine/gun for adjustment of any of the following variables: "on" delay, "spray" time, gun count, gun life expectancy limit, or Can PRX-to-Gun indexes. The "NEXT MACH" key increments the machine number as displayed in the "MACH" field by one when depressed. If the previous machine number was 8, pressing "NEXT MACH" causes the machine number to roll over to 1 again. The "NEXT GUN" key also increments the machine number by one when depressed. If the previous machine number was 8, pressing the "NEXT GUN" causes the machine number to roll over to 1 again.

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3.4 SETTING GUN TIMES ("ON" DELAY AND "SPRAY" TIME)

Two timers are used to control each gun; the "on" delay time or "DELAY TIME" and the "spray" duration time or "SPRAY TIME". The "on" delay time is used to delay when the gun is first fired after the spray timing flag has occurred while the "spray" time is used to control how long the gun is "on" once it is fired (see section 1.3 for a complete description of the spray gun control). The times entered for the "DELAY TIME" and "SPRAY TIME" are in milliseconds. The gun times can only be adjusted if the "SET-UP" switch is in the enable position.

The "DELAY TIME" key is used to set the "on" delay time while the "SPRAY TIME" key is used to set the "spray" duration time. To set the "on" delay time, simply press the "DELAY TIME" key. The cursor will be positioned in the "DELAY" field. Either enter the desired "on" delay time as a number between 0 and 999 and press the "ENTER" key or press the "INCR" or "DECR" key to increase or decrease the "on" delay time by one. To set the "spray" duration time, simply press the "SPRAY TIME" key. The cursor will be positioned in the "SPRAY" field. Either enter the desired "spray" duration time as a number between 0 and 999 and press the "ENTER" key or press the "INCR" or "DECR" key to increase or decrease the "spray" duration time by one.

3.5 "CURR SHIFT" KEY

The "CURR SHIFT" key is used to activate the current shift data display. The Current shift data menu displays the number of coated cans for each machine so far into the current shift. The number of coated cans is displayed for each machine one at a time for a time delay of 7 to 8 seconds each. The "NEXT MACH" key can also be used to advance to the next machine coated can count if desired. Once the count for all the machines have been displayed, the default screen is returned to.

The "Current shift" data is transferred to the "Last shift" data when the end of shift input transfers from a "0" to a "1". This can be at the end of either an 8 or 12 hour shift. This data cannot be reset by the operator, only at the end of shift input transition.

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3.6 "LAST SHIFT" KEY

The "LAST SHIFT" key is used to activate the last shift data display. The Last shift data menu displays the total number of coated cans for each machine for the previous (last) shift. The number of coated cans is displayed for each machine one at a time for a time delay of 7 to 8 seconds each. The "NEXT MACH" key can also be used to advance to the next machine coated can count if desired. Once the count for all the machines have been displayed, the default screen is returned to.

3.7 "GUN LIFE" KEY

The "GUN LIFE" key is used to view the actual number of spray cycles for each gun as well as the percent of life used for each gun. When the "GUN LIFE" key is depressed, the following screen is displayed:

```
MACH:x GUN:x USE:xx%  
# SPRAYS:xxx,xxx,xxx
```

Where "MACH" is the currently displayed machine, "GUN" is the currently displayed gun, "USE" is the percent of gun life that has been used, and "# SPRAY" is the actual number of times the spray gun has been fired since it was installed. The display is initialized with machine 1, gun 1 when the "GUN LIFE" key is first hit. Each gun is then displayed one at a time for a time delay. The "NEXT MACH" or "NEXT GUN" key can be used to advance to the next gun as well.

The purpose of this screen is to give the operator and maintenance personnel an idea of how much use each gun has incurred. The percentage of use is calculated as: number of actual sprays divided by expected gun life (see section 3.8.1) times 100. When the actual number of sprays exceeds the expected gun life ("use" equal to or greater than 100%), the "gun life expectancy exceeded" alarm will be displayed for that particular gun, indicating that gun should be replaced.

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The "RESET" key can be used to reset "# SPRAYS" for the currently displayed machine and gun. This should only be done when a new spray gun has been installed to allow collection of the total number of spray cycles for the gun. This key is disabled if the "SET-UP" switch is in the disabled position to prevent unauthorized personnel from resetting the gun counts.

3.8 "SET-UP" KEY

This selection is used to invoke the primary set-up menu. This consists of the following three selections:

- 1: SET EXPECTED GUN LIFE (# OF SPRAYS)
- 2: PRESET OR RESET # OF GUN SPRAYS
- 3: SET CAN PRX-TO-GUN INDEXES (SHIFTS)

The set-up menu is key switch protected such that only authorized personnel (those with the key) can activate the selection. The "Set-up Enable" input must be "on" to invoke the set-up menu. Each selection is displayed for a time delay. The "INCR" key and "DECR" key can also be used to either advance to the next selection or retard to the previous selection respectively.

When selected, each of the above selections bring up a sub-menu with the corresponding set-up parameters. The following sections describe these sub-menus and the definitions of the corresponding variables. To select the respective set-up sub-menu, simply press the corresponding numeric key (1 thru 3).

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3.8.1 SET EXPECTED GUN LIFE (# OF SPRAYS)

This menu is displayed when the "1" key (SET EXPECTED GUN LIFE) is pressed while the primary set-up menu is active. The expected gun life limit is a number that is compared to the actual number of accumulated gun spray cycles. If the number of spray cycles (counts) is greater than the expected gun life limit, the "gun life expectancy exceeded" alarm is displayed on the front of the M4500 for that gun.

Note: This alarm does not stop the machine or inhibit the spray function in any way, it simply indicates the gun may be worn out and should be replaced.

The expected gun life is also used in the calculation of percent of life used which is displayed when the "GUN LIFE" key is depressed.

When this menu is activated, the following screen is displayed:

MACH:x GUN:x EXPECTD
LIFE:xxx,xxx,xxx

The menu is initialized to machine 1, gun 1. The "NEXT MACH" or "NEXT GUN" key is used to advance to the next machine. The existing expected life is displayed for each gun as the "NEXT MACH" and "NEXT GUN" keys are depressed.

To change the expected gun life for the currently selected gun, simply enter the desired gun life in counts (up to 649,999,999) and press the "ENTER" key. The next gun will then automatically be advanced to. In addition, the "INCR" and "DECR" key can be used to increment or decrement the expected life by one. The number entered for the expected life should be based on the manufactures number of cycles rating for that particular gun.

Once all gun life expectancies have been entered, press the "ESC" key to return to the primary set-up menu. The "ESC" key can also be depressed at any time to return back to the primary set-up menu without setting or viewing all the guns.

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3.8.2 PRESET OR RESET # OF GUN SPRAYS

This menu is displayed when the "2" key (PRESET OR RESET # OF GUN SPRAYS) is pressed while the primary set-up menu is active. This is used to either reset the actual number of spray cycles for the currently selected gun or preset the actual spray count with a number.

When this menu is activated, the following screen is displayed:

MACH:x GUN:x ACTUAL
SPRAYS:xxx,xxx,xxx

The menu is initialized to machine 1, gun 1. The "NEXT MACH" or "NEXT GUN" key is used to advance to the next machine. The actual number of accumulated spray cycles is displayed for each gun as the "NEXT MACH" and "NEXT GUN" keys are depressed.

To reset the actual number of sprays for the currently selected gun, simply press the "RESET" key. The actual number of sprays will be reset to zero. To preset the actual number of sprays to a count, simply enter the number of sprays in counts (up to 649,999,999) and press the "ENTER" key. The next gun will then automatically be advanced to. The actual number of spray counts can be preset to a number in the case where a previously used gun is installed on the machine. When a new gun is installed, the actual number of sprays would be reset to zero.

Once all gun actual sprays are reset or preset, press the "ESC" key to return to the primary set-up menu. The "ESC" key can also be depressed at any time to return back to the primary set-up menu without resetting or viewing all the guns.

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3.8.3 SET CAN PRX-TO-GUN INDEXES (SHIFTS)

This menu is displayed when the "3" key (SET CAN PRX-TO-GUN INDEXES) is pressed while the primary set-up menu is active. This is used to set the number of indexes from the Can Body sensor to the spray gun for the currently selected gun.

When this menu is activated, the following screen is displayed:

MACH:x GUN:x INDEXES
CAN PRX-TO-GUN:x

The menu is initialized to machine 1, gun 1. The "NEXT MACH" and "NEXT GUN" key is used to advance to the next machine. The number of indexes from the Can sensor to the gun is displayed for each gun as the "NEXT MACH" and "NEXT GUN" keys are depressed.

The HSL-SM8 package supports between 0 and 3 indexes between the location of the can body sensor and the spray gun. If the Can Body sensor is located at the same station as the spray gun, the index would be set to zero. If the spray gun was located at the next station following the Can Body sensor, the index would be set to 1, and so on.

To set the number of indexes for the currently selected gun, simply enter the number of indexes (0 to 3) and press the "ENTER" key. The next gun will then automatically be advanced to. In addition, the "INCR" and "DECR" key can be used to increment or decrement the number of indexes by one.

Once the indexes for all the guns have been entered, press the "ESC" key to return to the primary set-up menu. The "ESC" key can also be depressed at any time to return back to the primary set-up menu without setting or viewing all the guns.

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3.9 MANUAL GUN ACTUATION

The "MAN SPRAY" key can be used to fire the currently selected gun for test purposes while the machine is stopped. Only one gun is fired (the one that is selected in the "MACH" and "GUN" field) and it is fired for the "spray" time entered for that gun. The gun is fired every time the "MAN SPRAY" key is depressed. This is generally done to verify that the gun is operating properly. The spray gun can also be fired from the respective manual spray push-button located on the operators PB station.

3.10 RESETTING ALARMS

The "can jam", "timing sensor fail", and the "gun life expectancy exceeded" alarms are reset by pressing the "RESET" key. The "can jam" alarm indicates both a legitimate can jam and a can body sensor fail. In either case, the alarm is activated when no change of state is detected at the can body sensor after the can gate has been opened. The timing sensor is activated "on" when the timing flag is in front of the sensor. The can sensor is activated "on" when the can is in front of the can sensor. Verify that both of these conditions occur and press "RESET" to clear the alarm. If the condition persists, the alarm will simply occur as soon as the machine is running with cans again.

In the case of the "gun life expectancy exceeded" alarm, the gun counts will have to either be reset to zero or the life expectancy limit increased (see sections 3.8.1 and 3.8.2) above the gun counts in order to be able to reset the alarm by pressing the "RESET" key. Of course the gun counts should not be reset unless the gun is replaced.