
2.5 SET-UP

Once power is re-applied to the system and the I/O is verified, perform the following to set the parameters of the HSL-LTA/LTS. Refer to section 3, “Using the HSMLT Keypad Display”, for details of display menus and key sequences used to set the parameters.

- 1) To start with, set all the parameters to the default parameters listed for the particular tester (see section 2.10).
- 2) Verify the direction of rotation of the resolver. By hand, move the tester forward and verify the position counts up. If not, swap S1 and S3 at the HSMLT resolver connector.
- 3) Zero the resolver (see section 2.10.4).
- 4) Verify 360 degrees per pocket. Position the machine at 0 degrees. A pocket should be aligned with the reset lamp centered in the reset photo diode of the pocket. By hand, move the machine forward one pocket such that the next pocket is centered on the reset lamp, the position should count up thru 359 and again be at 0 degrees. Do this for all the pockets.

Note: The position may deviate +/-20 degrees from pocket to pocket. This is normal and is not a problem. If it does deviate significantly more than +/-20 degrees, something is wrong with the resolver or resolver wiring (refer to section 6.2, step (7), to trouble-shoot).

- 5) Determine the position the “Can Presence Sensor” turns ON. With a can in a pocket, rotate the machine forward until the Can Presence Sensor just turns “ON”.

Record can presence sensor ON position here _____.

- 6) Determine the position the “Reject Receiver” turns ON. With no cans in the tester, rotate the machine forward until IN0 of the HSMLT (M4503) module just turns “ON”.

Record reject receiver ON position here _____.

SECTION 2 INSTALLATION

- 7) Determine the position the “Array Fault Receiver” turns ON. Rotate the machine forward until IN1 of the HSMLT (M4503) module just turns “ON”.

Record array fault ON position here _____.

Note: A single can could be manually fed into the machine from the infeed through to the discharge of the machine. Viewing the “Critical Input Positions” form the “Set-up” menu will display these three positions, as well.

- 8) Set the Sync timing. With the previous information, the “Sync” timing is set such that it does not occur within +/-60 degrees of any of the above positions. For instance, on the LT-16 the above positions generally occur as follows:

| | |
|-----------------------|-------------|
| Can Presence: | 300 degrees |
| Reject Receiver: | 45 degrees |
| Array Fault Receiver: | 45 degrees |

Thus the default timing for the LT-16 has “Sync” at 180 degrees since this is furthest from all the signals.

- 9) Set the “Pocket #1” timing 90 degrees after the “Sync” timing.
- 10) Set the “Discharge” timing 30 degrees ahead of the point the can is just released from the discharge wheel. For the LT-16 this is 240 degrees, for the LT-10 this is 20 degrees.

WARNING: Do not set the “Discharge” timing any closer to the “Sync” timing than +/-20 degrees.

- 11) Set the “Can Presence Shifts”. Feed one can into the machine. Move the machine forward until the can is centered over the Can Presence Sensor. Move the machine forward to the “Sync” timing position, count this as “0”. Move the machine forward one pocket to the “Sync” position, count this as “1”. Continue doing this until the can is released. Whatever your “count” is at when the can is released is the number entered into the “Can Presence Shifts”

Note: If the Can Presence Sensor is installed where it is supposed to be (as shown in the Discharge Detail), the “Can Presence Shifts” will always be set to “1”.

SECTION 2 INSTALLATION

12) Set the “Leaker Reject Shifts”. Feed one bad can (with a big hole in it) into the machine. Move the machine forward until the pocket this can is in just turns “on” the Reject Receiver input (IN0 of the HSMLT module). Move the machine forward to the “Sync” timing position, count this as “0”. Move the machine forward one pocket to the “Sync” position, count this as “1”. Continue doing this until the can is released. Whatever your “count” is at when the can is released is the number entered into the “Leaker Reject Shifts”.

Note: For the LT-10, this is “4”; for the LT-16, this is “5”.

13) Set the “Vision Reject Shifts” to the same number as the “Leaker Reject Shifts”.

14) Set the “Can Neck Size” to the diameter of the neck at the necks smallest place.

15) With the machine stopped, disable the FIFO Error Correction (see section 2.10.6). The “ChkSpd” should be set at 4800CPM, “min” at 0.0 and “max” at 9.9.

For the remainder of the set-up, the machine needs to be run in normal production including the top speed the machine will run at.

WARNING: Until the set-up is complete, bad cans and calibrated test cans may go down the line.

With the machine running with cans, perform the following.

16) Press the “Test Blow-off” key and verify one can is cleanly rejected, without disturbing the can ahead or behind the rejected can. Adjust the “Reject Solenoid Pulse Time” if necessary to get a strong pulse of air to reject the can. Too short of time will result in the can not being fully rejected (jamming). Too long of time will disturb the following can at high speeds also causing jamming.

17) Verify a calibrated leak can is correctly rejected. If not adjust the “Leaker Reject Shifts” parameter until it is.

SECTION 2 INSTALLATION

- 18) With the tester running at top speed and rejecting the correct leaker test can, enable the “FIFO Error Correction” by pressing the “1” key while in the “Calibrate FIFO Error Detection” menu. The “ChkSpd” will be set to about 60% of the top speed. Generally for the LT-16, “min” will be set at 1.8-2.2, “max” will be set to 2.7-3.1.
- 19) If the tester is equipped with a vision system, verify the position the vision “reject” signal is coming in. Run a visually defective can through the machine. From the “View Critical Inputs Position” menu observe the position the vision reject signal comes “on” at in the “Vision Reject” field. This position must not be within +/-60 degrees of the “Sync” timing. Verify that a vision test can is correctly rejected.

Note: Depending on where the vision system sends it’s “reject” signal out, the “Vision Reject Shifts” may have to be adjusted anywhere from 4 to 16 in order to get the correct defective vision can. Keep adjusting the “Vision Reject Shift” until the correct can is rejected.
- 20) If the system is equipped with the optional leaker/vision diverter, adjust the “Diverted Solenoid Pulse” time until a rejected leak can is diverted out the leakers only reject chute correctly.
- 21) Verify the “Pocket #1 Offset” parameter. Place a piece of electrical tape over the “Array Reset Pickup” (center of the array head) on array head number 1. Run cans through the machine. Verify that “Pocket #1” is the pocket incrementing on the “Rejects per Pocket” screen. A can from pocket #1 should be rejected every revolution of the main wheel. Continue to increment this parameter until the rejects for pocket number 1 is continuously incrementing. Remove the tape from the array head.
- 22) Verify the “Array Fault Offset” parameter. Place a piece of electrical tape over the “Array Fault Pickup” (located between reject LED and array reset pickup) on array head number 1. Jog the machine through several revolutions. A “Leak Detection Array Fault” alarm will be generated with the corresponding array head number indicated on the Keypad/Display. Reset the alarm, adjust the offset and jog the machine again. Continue to adjusting this parameter until array head number 1 is displayed. Remove the tape from the array head.

SECTION 2 INSTALLATION

23) The set-up is now complete. If problems are encountered in any of the previous set-up steps, refer to the trouble-shooting section 6.2. Once all the parameters are set as required, save them to disk using the “HSMLT” set-up program (see section 5.8 –Upload (Save) Set-up Data).

2.6 HSMLT SET-UP SOFTWARE INSTALLATION

Follow the steps below to install the HSMLT Set-up software package and the HSMLT application programs onto the IBM PC or compatible, used to support the HSL-LTA/LTS package.

The HSMLT set-up software is used to download the program to the HSMLT module, tune (set-up) the user adjustable variables of the HSL-LTA/LTS, download and upload (save) the user set-up variables to disk, and view rejects per pocket and shift data.

2.6.1 WINDOWS INSTALLATION

The Windows based HSMLT set-up program is compatible with Windows 95, 98, NT, ME, 2000 and XP. If the operating system of your computer is either an earlier version of Windows or DOS based, follow the steps described in section 2.6.2, DOS installation.

To install the Windows based set-up program, run “setup.exe” located in the HSMLT subdirectory of the program disk. Follow the onscreen instructions to complete the process.

If any problems are incurred during the installation process, try restarting your computer and running “setup.exe” again. Make sure all programs have been exited prior to installation.

SECTION 2 INSTALLATION

2.6.2 DOS INSTALLATION

To install the DOS Based set-up program, perform the following:

- 1) Create a directory off the root directory for each tester. For line 1 tester use "HSMLT1", for line 2 tester use "HSMLT2", for the line 3 tester use "HSMLT3", etc. These will be used to store the "HSMLT.EXE" setup programs and set-up data for each tester. Create these directories by typing the following at the DOS prompt:

```
MD \HSLT1<ENTER>
MD \HSLT2<ENTER>
MD \HSLT3<ENTER>
etc.
```

- 2) Install the disk labeled "HSL-LTA/LTS PROGRAMS" into the A: drive. For each "HSMLT" directory you created in the previous step, switch to that directory and install the "HSMLT" set-up programs by typing the following at the DOS prompt (Line 1 tester is shown):

```
CD\HSLT1<ENTER>
A:INSTALL<ENTER>
```

- 3) Add each tester's HSMLT set-up program to your computer's menu software by creating a selection for each tester called "SET-UP TESTER LINE1" for the line #1 tester, "SET-UP TESTER LINE2" for the line #2 tester, etc.. The DOS commands executed for these selections should be:

For the "SET-UP TESTER LINE1" selection:

```
CD\HSLT1
HSMLT
CD\
```

For the "SET-UP TESTER LINE2" selection:

```
CD\HSLT2
HSMLT
CD\
```

etc.

SECTION 2 INSTALLATION

- 4) To execute the respective tester's set-up program, simply select the corresponding "SET-UP TESTER LINE" selection from the menu software's menu.

2.7 SYSdev PROGRAM DEVELOPMENT SOFTWARE INSTALLATION

The SYSdev Program Development software is an optional software package to perform on-line trouble-shooting and program modifications. If SYSdev was purchased with the HSL-LTA/LTS package and is not already installed on the your computer, install SYSdev onto the hard drive of your computer following the steps in section 1.5 of the SYSdev Program Development manual.

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2.8 HSMLT APPLICATION PROGRAM INSTALLATION

The HSMLT application program is a SYSdev based program, which is loaded into the HSMLT module and performs the HSL-LTA/LTS logic. The HSMLT program is written in a combination of Ladder logic and High-level.

If the user desires to make program changes or perform on-line monitoring of the program execution, the files which constitute the HSMLT program will have to be loaded onto the hard drive of the PC which is used to support the HSL-LTA/LTS. The SYSdev Program Development Software will also have to be loaded on the PC. To install this program perform the following:

- 1) If not already done, perform steps 1 through 3 of section 2.6.2. This creates the directories and menu selections, which will be used to store and select the HSMLT application programs.
- 2) Install the program disk into either the 3-1/2 floppy or compact disk drive. Copy the HSMLT application program into each of the "HSMLT" directories
- 3) The HSMLT application programs can be added to your computer's menu software or Windows desktop. The DOS commands executed for these selections should be (Line 1 tester shown):

```
CD \  
SYSDEV \HSLT1 HSMLT
```

- 4) To initiate SYSdev with the "HSMLT" program, simply select the respective "HSMLT PROGRAM". The main development menu of SYSdev will be initiated with the HSMLT program. See the SYSdev Program Development manual and the M4500 Program Development manual for complete details on on-line monitoring and program development with SYSdev.

2.9 MODIFY EXISTING PLC PROGRAM

Modify the existing control system PLC program to interface with the HSL-LTA/LTS by incorporating the following into the existing PLC ladder logic:

- 1) The HSL-LTA/LTS now controls the leak detection and rejection. If the existing host PLC was previously controlling these functions, it no longer will be with the addition of the HSL-LTA/LTS. This logic can optionally be removed from the existing host PLC if desired. In most cases this logic can be left in the program as the odd/even reject solenoids will no longer be used.
- 2) Add the "FLT" interlock relay as an input to the host PLC. This should stop the machine anytime the "FLT" relay is "off". When the "FLT" interlock is de-activated, the corresponding fault message that caused the alarm will be displayed on the HSL-LTA/LTS display. In most applications, it will be sufficient to indicate "REJECT FAULT - SEE HSL-LT" when a fault occurs. The operator can then go look at the HSL-LTA/LTS display to see what the actual fault was.
- 3) The encoded alarm outputs (O15 thru O17) from the HSL-LTA/LTS can be optionally added to the existing host PLC logic. This allows the actual fault message to be displayed on the primary (existing system) display as well as the HSL-LTA/LTS display. The alarms are encoded as follows:

| <u>(O17)</u> | <u>(O16)</u> | <u>(O15)</u> | <u>Alarm Definition</u> |
|--------------|--------------|--------------|----------------------------------|
| 0 | 0 | 0 | No Alarm |
| 0 | 0 | 1 | Leak Detection Array Fault |
| 0 | 1 | 0 | Can Jam/Back-up at Discharge |
| 0 | 1 | 1 | Timing Signal Failure |
| 1 | 0 | 0 | Excessive Lo/Hi FIFO Corrections |
| 1 | 0 | 1 | Blow-off Photo-Eye Lenses Dirty |
| 1 | 1 | 0 | Bad Can did not Reject |
| 1 | 1 | 1 | Can Presence PRX Fail |

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- 4) Add the "Good Can Count Pulse", "Leaker Reject Count Pulse", and "Vision Reject Count Pulse" outputs from the HSL-LTA/LTS to the existing host PLC if desired. The HSL-LTA/LTS accumulates all shift counts, but this allows the host PLC to accumulate the counts as well.
- 5) Add the "Machine Run" output to the PLC logic. This should be "on" when the drive is enabled (running) and should be "off" when the drive is disabled (this includes auto stop conditions). This is true for jog modes as well.
- 6) Add the "Alarm Reset" output. This signal should be "on" as long as the system reset push-button is depressed.

2.10 SET-UP REFERENCE

The following sections are provided as a reference to set-up operations performed in section 2.5.

2.10.1 DEFAULT SET-UP VARIABLES (LT-10)

The following are the default parameters for the LT-10 Tester

Reject Shift Registers:

Pocket #1 Offset (for Rejects per Pocket Counts) _____ : 6
Can Presence Shifts (Can PRX to Discharge) _____ : 1
Leaker Reject Shifts (Leak Detector to Discharge) _____ : 4
Vision Reject Shifts (Vision System to Discharge) _____ : 4

Reject Parameters:

Can Neck Size (in 0.01 inches) _____ : 215
Reject Solenoid Pulse Time (msec) _____ : 10
Diverter Solenoid Pulse Time (.01sec) _____ : 100

Machine Timing:

Sync Timing (CH00) "On" Position _____ : 000
Pocket # 1 Timing (CH01) "On" Position _____ : 090
Discharge Timing (CH02) "On" Position _____ : 020
PLC Timing (CH03) "On" Position _____ : 000

2.10.2 DEFAULT SET-UP VARIABLES (LT-12)

The following are the default parameters for the LT-12 Tester

Reject Shift Registers:

Pocket #1 Offset (for Rejects per Pocket Counts) _____ : 3
Can Presence Shifts (Can PRX to Discharge) _____ : 1
Leaker Reject Shifts (Leak Detector to Discharge) _____ : 4
Vision Reject Shifts (Vision System to Discharge) _____ : 4

Reject Parameters:

Can Neck Size (in 0.01 inches) _____ : 215
Reject Solenoid Pulse Time (msec) _____ : 10
Diverter Solenoid Pulse Time (.01sec) _____ : 100

Machine Timing:

Sync Timing (CH00) "On" Position _____ : 220
Pocket # 1 Timing (CH01) "On" Position _____ : 310
Discharge Timing (CH02) "On" Position _____ : 100
PLC Timing (CH03) "On" Position _____ : 000

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2.10.3 DEFAULT SET-UP VARIABLES (LT-16)

The following are the default parameters for the LT-16 Tester

Reject Shift Registers:

Pocket #1 Offset (for Rejects per Pocket Counts) _____ : 11
Can Presence Shifts (Can PRX to Discharge) _____ : 1
Leaker Reject Shifts (Leak Detector to Discharge) _____ : 5
Vision Reject Shifts (Vision System to Discharge) _____ : 5

Reject Parameters:

Can Neck Size (in 0.01 inches) _____ : 215
Reject Solenoid Pulse Time (msec) _____ : 10
Diverter Solenoid Pulse Time (.01sec) _____ : 100

Machine Timing:

Sync Timing (CH00) "On" Position _____ : 180
Pocket # 1 Timing (CH01) "On" Position _____ : 270
Discharge Timing (CH02) "On" Position _____ : 240
PLC Timing (CH03) "On" Position _____ : 000

2.10.4 MACHINE ZERO

The machine is located at machine zero by performing the following:

- 1) From the infeed side, rotate the machine by hand until the reject reset photo detector on the array head number 1 is exactly aligned with the reset lamp. This is the machine zero location for the tester.
- 2) With the machine located at zero, set the resolver offset through the set-up menu of the Keypad/Display, "4: Zero Machine (Set Resolver Offset)" selection.

2.10.5 MACHINE TIMING SIGNALS

Sync Timing (CH00): The Sync Timing is used to clock in the reject data from the Reject Array Receiver, Array Fault Receiver, and the vision system reject signal as well as clock the data from the Can Presence sensor. The Sync Timing should be as far as possible from the occurrence of the above four signals. For the LT-10, this is at 0 degrees, for the LT-16, the is at 180 degrees.

Pocket #1 Timing (CH01): The Pocket #1 Timing is used to reset the pocket count to pocket #1. Set the Pocket #1 Timing 90 degrees following the Sync Timing.

Discharge Timing (CH02): The Discharge Timing (CH02) should be set about 30 degrees before the location that the can is released from the tester. With cans in the machine, rotate the tester by hand to the location where the can is just released. Set the Discharge Timing (CH02) to the position 30 degrees before this can release position.

PLC Timing (CH03): The PLC Timing is provided as an extra timing signal, which can be used by the existing host control system. Set this timing as desired.

2.10.6 FIFO ERROR CORRECTION CALIBRATION

The “FIFO Error Correction” is used to determine when a reject FIFO error has occurred and automatically correct the FIFO such that the correct bad cans are always rejected. An error is generally due to the “Can Presence Sensor” missing a can (side wall damage on the can), or when the “Reject Photo Eye” misses a can or double clocks (neck damage). The error correction logic verifies the reject FIFO is correct by comparing the average number of cans in the FIFO to a “calibrated” average number of cans that should be in the FIFO. The FIFO is “corrected” if the average falls below a “min” threshold or above a “max” threshold.

The “5: Calibrate FIFO Error Detection” menu, accessed from the keypad/display on the HSL-LTA/LTS, is used to calibrate the error correction as well as observe the instantaneous number of cans in the FIFO, the average number of cans in the FIFO, the number of “Low” FIFO corrections, the number of “High” FIFO corrections, as well as the calibrated “Min/Max” threshold parameters.

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The “Calibrate FIFO Error Detection” menu contains the following fields:

| | | | |
|----------|--------------|------------|------------|
| CPM:xxxx | CHK SPD:xxxx | MIN:x.x | Max:x.x |
| FIFO:xx | AVG:x.x | LoCorr:xxx | HiCorr:xxx |

The above fields are defined as follows:

CPM: This is the current speed (Cans Per Minute) of the tester.

CHK SPD: This is calculated automatically when the FIFO error calibration is performed and is set to 60% of the speed of the tester when the calibration is performed. This is used to enable the error correction when the speed is greater than this value.

MIN: This is calculated automatically when the FIFO error calibration is performed and is set to 83% of the average number of cans in the FIFO at calibration. If the average number of cans in the FIFO drops below this value when running within 60% of top speed, the FIFO is “corrected” up one can and the “LoCorr” count is incremented.

MAX: This is calculated automatically when the FIFO error calibration is performed and is set to 117% of the average number of cans in the FIFO at calibration. If the average number of cans in the FIFO goes above this value when running within 60% of top speed, the FIFO is “corrected” down one can and the “HiCorr” count is incremented.

FIFO: This is the instantaneous number of cans in the FIFO.

AVG: This is the average number of cans in the FIFO when the machine is running above 800CPM (when the machine is running below 800, this is set to 0.0).

LoCorr: Low Correction: This is the number of times the “AVG” dropped below “MIN” when running above 60% of top speed. A “low correction” is caused by either the “Can Presence” sensor missing a can or the Reject Photo Eye double clocking a can. “LoCorr” can be reset by pressing the “0” key while the “Calibrate FIFO Error Detection” menu is displayed.

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HiCorr: High Correction: This is the number of times the “AVG” went above “MAX” when running above 60% of top speed. A “high correction” is caused by either the “Can Presence” sensor double clocking a can (unlikely) or the Reject Photo Eye missing a can. “HiCorr” can be reset by pressing the “0” key while the “Calibrate FIFO Error Detection” menu is displayed.

To calibrate the FIFO error correction, perform the following:

- 1) First disable the FIFO error detection as follows:
 - a) With the machine stopped, press the “SET-UP” key.
 - b) Press “5: Calibrate FIFO Error Detection”.
 - c) With the “FIFO Error Calibration” menu displayed, press the “1” key.
 - d) This disables the FIFO error correction by setting the “CHKSPD” to 4800CPM, “MIN” to 0.0, and “MAX” to 9.9.
- 2) Run the machine at top speed continuously with cans.
- 3) Verify the FIFO average is correct by verifying that the correct bad can is being blown “off”. In general the FIFO average will be about equal to: (discharge distance)/6” per can, where “discharge distance” is the distance, in inches, from where the can is first released from the discharge star wheel to the reject photo eye.
- 4) Enable the FIFO error correction as follows:
 - a) With the machine running at top speed, press the “SET-UP” key.
 - b) Press “5: Calibrate FIFO Error Detection”.
 - c) With the “FIFO Error Calibration” menu displayed, press the “1” key.
 - d) This enables the FIFO error correction by setting the “CHKSPD” to 60% of the current speed (top speed), “MIN” to 83% of “AVG”, and “MAX” to 117% of “AVG”.

The FIFO error correction is now calibrated and enabled. If the FIFO average deviates either lower than “MIN” or higher than “MAX” while the machine is running at greater than 60% of top speed, the FIFO will automatically be corrected and the respective LoCorr or HiCorr count will be incremented. In general, the system should always be operated with the FIFO error correction calibrated and enabled.

SECTION 2 INSTALLATION

2.10.7 VIEW CRITICAL INPUT POSITIONS MENU

The “View Critical Input Positions” menu is used to view the position, in degrees, that the Reject Receiver, Array Fault Receiver, Can Presence Sensor, and Vision Reject signals are coming in at while the machine is running. Primarily this is to verify that none of these signals are coming in within +/-60 degrees of the “Sync” timing. If any of them do, the system could potentially miss clock the FIFO causing the wrong can to be intermittently rejected.

The “6: View Critical Input Positions” menu is accessed from the main set-up menu when the “SET-UP” key has been depressed.

2.11 HSMLT MODULE REPLACEMENT

The following is provided only as a reference. These steps need only be performed in the event the HSMLT module needs to be replaced once installed. To replace the module, perform the following:

- 1) Turn both 115VAC and +24VDC power to the HSL-LTA/LTS system "off" and remove the field wiring connectors from the HSMLT module.
- 2) Remove the 8-32 nuts and lock washers (7ea.) which retain the module in the door and remove the module.
- 3) Remove the supplied field wiring connectors from the new HSMLT module and install the new HSMLT module in the door cut-out from the front and re-install the 8-32 nuts and lock washers (7ea).
- 4) Install the existing pre-wired field wiring connectors on all the I/O boards of the module (115VAC power connector, I/O slots0, 1, and 2, resolver connector, and IN0/IN1 connector). Make sure the field wiring connectors are fully mated in the module.
- 5) Apply 115VAC and +24VDC power to the HSL-LTA/LTS and verify that the "PWR" and "RUN" LEDs on the HSMLT module are "on" and the "FLT" LED is "off".