HSL-LT/8/10/16
ALCOA Light tester
Electronic Reject Control
User's Manual

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WARNING

To ensure the equipment described by this User Manual, as well as the equipment connected to and used with it, operates satisfactorily and safely, all applicable local and national codes that apply to installing and operating the equipment must be followed. This includes the National Electric Code in the USA and other applicable legislation, regulations, and codes in practice elsewhere. Since codes can vary geographically and can change with time, it is the user's responsibility to determine which standards and codes apply, and to comply with them.

FAILURE TO COMPLY WITH APPLICABLE CODES AND STANDARDS CAN RESULT IN DAMAGE TO EQUIPMENT AND/OR SERIOUS INJURY TO PERSONNEL.

Persons supervising and performing installation or maintenance must be suitably qualified and competent in these duties, and should carefully study this User Manual and any other manuals referred to by it prior to installation and/or operation of the equipment.

The contents of the User Manual are believed to be correct at the time of printing; however, no responsibility is assumed for inaccuracies. In the interests of a commitment to a policy of continuous development and improvement, the manufacturer reserves the right to change the specification of the product or it's performance or the contents of the User Manual without notice.

CONTENTS

CONTENTS

CONTENTS

LIST OF FIGURES

APPENDICES

SECTION 1
GENERAL DESCRIPTION

This section describes the features of the HSL-LT8/10/16 Alcoa (Borden's) Light Tester electronic reject control packages. This includes the functional description, alarms detected, etc. This manual applies to the HSL-LT8, HSL-LT10, and HSL-LT16 control packages. The only difference between the packages is the number of pockets reject data is collected for. Otherwise all the packages function the same.

1.1 FEATURES

- Replaces existing odd/even mechanical reject mechanism with a reject blow-off solenoid assembly mounted in the discharge of the leak detection array receiver to the reject blow-off location in the discharge and accurately rejects leaker cans at all speeds.

- Performs high speed control functions of Alcoa Light Tester to speeds in excess of 2400 CPM (machine mechanically permitting). This includes detection of leaker cans (interfaces with existing Leak detection arrays), rejection of leaker cans, alarm detection as well as data acquisition.

- Optionally excepts reject input from Vision inspection systems to incorporate rejection of inspected cans with leaker reject blow-off solenoid as well.

- High speed front-end upgrade package which interfaces with existing control system.

- Alarm detection: leak detection array fault, tester can jam/blow-off photo eye fail, timing signal fail, no can flow, reject/can tracking fault, photo eye lenses dirty fault, and missed reject detection.

- Data Acquisition: Total number of good cans tested, total number of leaker rejects, total number of vision rejects, per pocket, etc. (for both current shift and last shift).

- Built-in 2 Line X 40 character sealed display with 24 key membrane keypad allows local viewing of collected data (can count, reject count, rejects per pocket) by operator and set-up of all user variables (passcode protected or key switch enabled) by authorized personnel.

- Interfaces directly with machine mounted resolver, existing leak detection array receiver, can presence sensor, blow-off photo eye and reject blow-off solenoid.

- Based on high performance M4503 PLC/PLS module which allows easy trouble-shooting and user customization using SYSdev (DOS-based) programming package.

1.2 FUNCTIONAL DESCRIPTION

The HSL-LT8/10/16 Alcoa (Borden's) Light Tester electronic reject control package is an electronic upgrade for the Borden's Light Tester which replaces the existing mechanical odd/even reject mechanism with a tester discharge mounted reject blow-off solenoid thus allowing significant increases in speed. The package interfaces to the existing leak detection array receiver, tracks leaker cans from the receiver to the blow-off location in the tester discharge, and accurately rejects the leaker cans regardless of machine speed. In addition, the package can be used to reject cans inspected from vision inspection systems and blow any inspected reject cans from the same reject blow-off port.

Alarm detection is provided including: leak detection array fault, tester can jam/blow-off photo eye fail, timing signal fail, no can flow, reject/can tracking fault, photo eye lenses dirty fault, and missed reject detection. Data collection includes: Total number of good cans tested, total number of leaker rejects, total number of vision rejects, rejects per pocket, etc. (both for the current shift and previous (last) shift). The package interfaces directly to the machine mounted resolver, existing leak detection array receiver, can presence sensor, blow-off photo eye and reject blow-off solenoid as well as the host PLC via discrete DC I/O.

The package is not a dedicated "black box", but is instead implemented using the high performance SYSTEMS M4503 PLC/PLS module which allows easy customization by either SEA or the end user. The M4503 module is programmed using the DOS-based SYSdev programming package which allows the module to be programmed in any combination of Ladder or High-level (subset of "C"), as well as perform on-line monitoring and trouble-shooting.

The M4503 module incorporates a built-in PLS which interfaces directly with the machine mounted resolver and provides all machine timing, eliminating the need for an external PLS.

1.3 LEAKER REJECT BLOW-OFF SYSTEM

The package incorporates a reject blow-off assembly, which is mounted in the discharge chute of the tester, to reject detected leak cans. This replaces the existing mechanical odd/even reject mechanism thus allowing significant increases in speed. The package interfaces to the existing leak detection array receiver, tracks leaker cans from the receiver to the blow-off location in the discharge, and accurately rejects the leaker cans regardless of machine speed.

By eliminating the existing mechanical reject mechanism, limitations of machine speed relating to the response time of the mechanical reject are eliminated. The blow-off reject system is capable of accurately rejecting cans at speeds in excess of 2400 CPM.

The discharge reject blow-off assembly consists of a bracket equipped with a high speed blow-off solenoid and a fiber optic photo eye. This is mounted in the discharge of the tester immediately following the discharge starwheel. The existing upper discharge can rails are removed and a deflector is mounted in this location to deflect rejected cans out of the machine.

The existing encoder is replaced with a resolver to provide the additional timing required.

A can presence sensor mounted in the discharge starwheel, along with the resolver and existing leak detection array receiver are used to track the cans to the discharge of the machine. The leaker cans are then rejected from the machine using the blow-off photo eye to accurately activate the reject solenoid regardless of machine speed.

1.4 VISION INSPECTION SYSTEM REJECT

The package can optional except a reject signal from a vision inspection system and reject these cans at the same discharge mounted reject blow-off solenoid. The vision system reject signal must occur between the infeed load location on the tester and the discharge of the tester. The vision reject signal must also be in sync with the machine.

1.5 ALARM DETECTION

The package detects the following alarms: leak detection array fault, tester can jam/blow-off photo eye fail, timing signal fail, no can flow, reject/can tracking fault, photo eye lenses dirty fault, and missed reject detection (optional).

Leak Detection Array Fault: This alarm occurs when a fault in a Leak detection array head occurs. The Leak detector array heads send an "OK" signal to the fault receiver as each head passes by. If an "OK" signal ever fails to occur from any one array head, this alarm is generated.

Tester Can Jam/Blow-off Photo Eye Fail: This alarm is generated if either a jam occurs between the Can Presence sensor and the Blow-off Photo Eye (located in the tester discharge) or if the Blow-off Photo Eye fails. In general, if cans are running into the machine but the Blow-off Photo Eye does not "see" cans coming out, this alarm occurs.

Timing Signal Fail: The timing signal fail occurs when any of the timing signals generated in the PLS section fail to change state periodically while the machine is running.

No Can Flow: This output is a status output which indicates that no cans are detected at the Can Presence sensor. This can be interlocked with the existing control system to stop the machine if desired. This signal does not de-activate the fault interlock since in some cases no cans flowing through the machine is normal (i.e. label changes, etc.).

Reject/Can Tracking Fault: This fault indicates that the system has lost track of the cans between the tester discharge and the Reject Blow-off assembly. This is generally due to a can jamming in the discharge. Once this alarm is cleared, the machine will have to be run empty of cans to reset the tracking logic.

Blow-off Photo Eye Lenses Dirty: This fault indicates that the lenses of the photo eye mounted in the tester discharge should be cleaned. This occurs when an excess film deposit of contaminants has formed over the fiber optic lenses of the Reject Blow-off Photo Eye, reducing the gain of the eye.
If the lenses are not cleaned, the eye will cease to function correctly (causing a Photo Eye Fail alarm) once too much contamination occurs.

Missed Reject Detected (optional): This alarm indicates that a rejected can was not detected in the reject chute after the reject blow-off solenoid was activated to reject a leaker can. This alarm is provided to indicate a bad can has gone down the line and that the reject blow-off port is not functioning correctly. This alarm is generated using two optional photo eyes (not provided) mounted in the user's reject chute. If these photo eyes are not mounted, this alarm will have to be by-passed by jumping the reject solenoid (wire O10) to the rejected can verification input (wire I14).

The previous alarms are available to the host PLC via encoded (3-bit) alarm outputs. In addition, the above alarms all de-activate the "FLT" interlock relay which should be interlocked to the existing system to stop the tester (the "FLT" relay is normally "on" with no fault and "off" when a fault occurs).

1.6 DATA COLLECTION

The following data is collected for both the current shift and the previous (last) shift:

1) Total number of good cans tested
2) Total number of leaker rejects
3) Total number of vision inspection rejects
4) Total leaker rejects per pocket (for each pocket)

This data can either be viewed locally on the display by the operator or production control personnel. This information is updated ("current" shift transferred to "Last" shift) based on the change of state of a discrete input. This input can be activated on an 8 or 12 hour shift basis or alternatively could be activated manually on a label run basis depending on the user's preference. This data is also available to the host PLC via discrete count outputs.

In addition to the shift data collection, a separate buffer is available to collect rejects per pocket counts as a diagnostics aid to the operator for trouble-shooting a bad seal on a specific pocket. Unlike the shift data, these counts can be reset manually by the operator at will. This allows the operator to note an abnormally high count on a specific pocket, attempt to correct the problem, reset the counts and then check the counts at a later time to determine if the problem is corrected. This data is viewed on the HSL-LT8/10/16 display.

SECTION 2
INSTALLATION

The HSL-LT8/10/16 enclosure is provided for wall mounting in the vicinity of the existing user's control cabinet or tester.

2.1 WHAT'S INCLUDED

Verify that the following items are included when unpacking the HSL-LT8/10/16:

1ea. HSL-LT8/10/16 Enclosure (14" X 12" X 8") with M4503 Reject Control Module.
1ea. BRK-LTB-SOL Reject Blow-off Assembly with blow-off solenoid and Fiber Optic Photo Eye.
1ea. BRK-LTB-PRX Can Presence Sensor Assembly.
1ea. BRK-LTB-HD Hardware Kit including reject deflector and mounting brackets
1ea. RSV34-MS1 Resolver
1ea. RSV-RSCBLE-100 Resolver Cable
1ea. HSL-LT8/10/16 User's Manual
1ea. M4500 User's Manual
1ea. HSL-LT8/10/16 Program Disk

2.2 SERVICES REQUIRED

Electrical Power:

The HSL-LT8/10/16 is powered from 115VAC/230VAC 50/60HZ at 2.0/1.0 Amps and +24VDC at 2.0 Amps. The 115VAC/230VAC is used to power the M4503 module while the +24VDC is used to power the +24VDC I/O (sensors and blow-off solenoid). The +24VDC current required by the HSL-LT8/10/16 is no more than the existing systems +24VDC current requirement, therefore the existing +24VDC power supply should be adequate.

Compressed Air:

Compressed Air is used for the reject blow-off. Clean dry air at 80 to 100 psi, 0.25 SCFM is required.

SECTION 2
INSTALLATION

2.3 MOUNTING THE HSL-LT8/10/16 ENCLOSURE

The HSL-LT8/10/16 enclosure should be mounted in close proximity to the tester and/or tester discharge. The enclosure can either be mounted on the side of the existing tester control cabinet or wall mounted. Four sets of 1/4-20 hardware should be used to mount the enclosure.

2.4 MOUNTING THE REJECT PHOTO EYE LENSES AND REJECT DEFLECTOR

1) Remove the middle and upper can guide rails used by the old mechanical odd/even reject mechanism.

2) Remove the 3/8 spacer closest to the discharge starwheel of the left lower can guide rail and replace with the BRK-LTB-1 Photo Eye Fiber lens bracket as shown in figure 2.1 and 2.2.

3) Install BRK-LTB-4 (2ea.) brackets to existing 3/8-16 holes as shown in figures 2.1 and 2.2.

4) Install BRK-LTB-5 Deflector plate and BRK-LTB-2 and BRK-TB-3 brackets using 1/4-20 and 3/8-16 hardware as shown in figures 2.1 and 2.2. Note that the BRK-LTB-2 Photo Eye Fiber lens must be adjusted to "look" directly at the BRK-LTB-1 Photo Eye Fiber Lens.

5) Adjust the BRK-LTB-5 Deflector approximately as shown in figure 2.1.

6) Route the Photo Eye Fiber cables to the Q23SP6FPY Photo Eye mounted on the junction box of the BRK-LTB-SOL assembly making sure to route the cables clear of the discharge starwheel or the path of good and rejected cans. The notch and clamp in the BRK-LTB-4 on the left side should be used as a strain relief for the upper fiber optic cable. Install the cable from the BRK-LTB-1 into the Transmit receptacle of the Q23SP6FPY and install the cable from the BRK-LTB-2 into the Receive receptacle of the Q23SP6FPY.

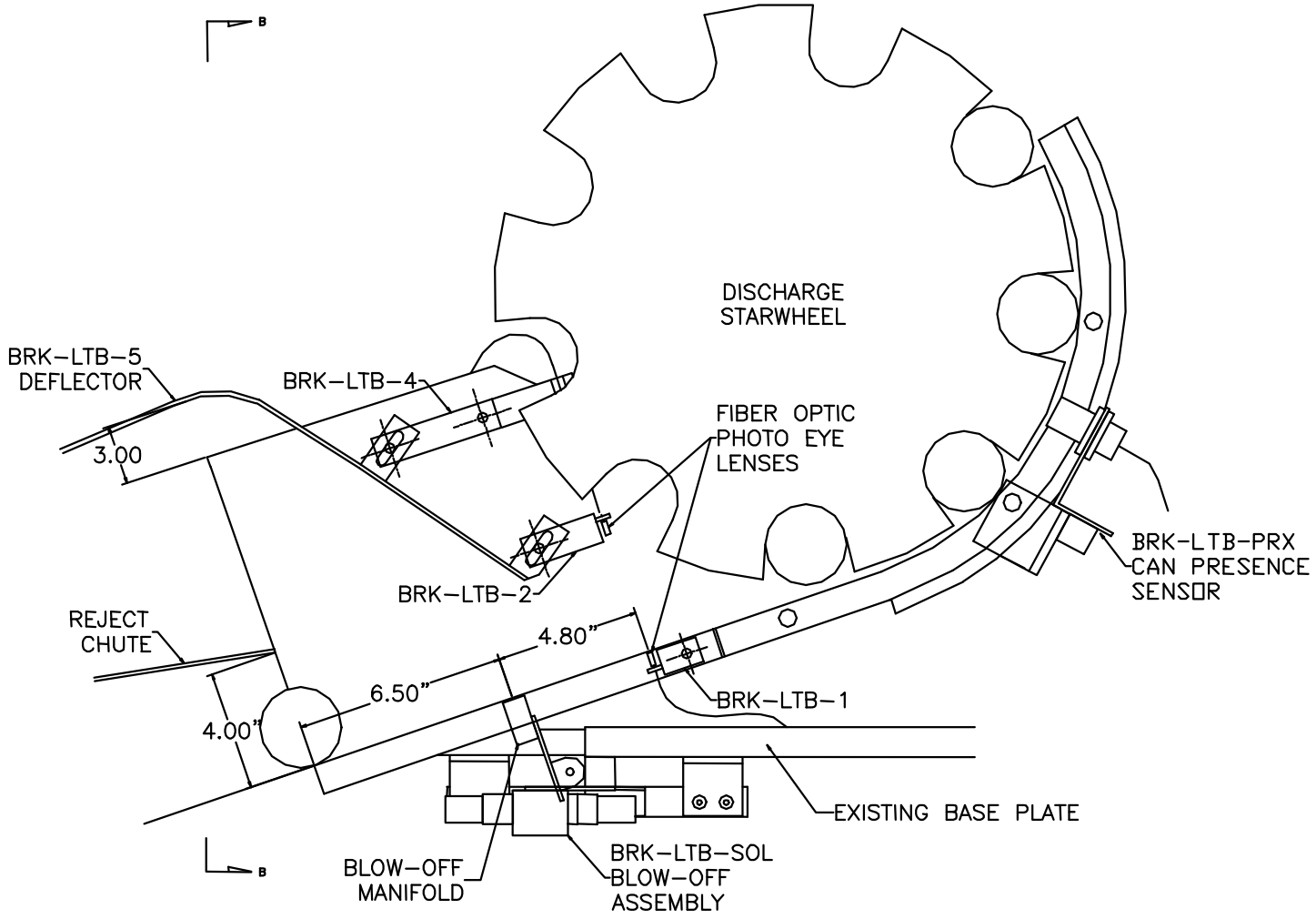

Figure 2.1 - Tester Discharge Detail (View A-A)

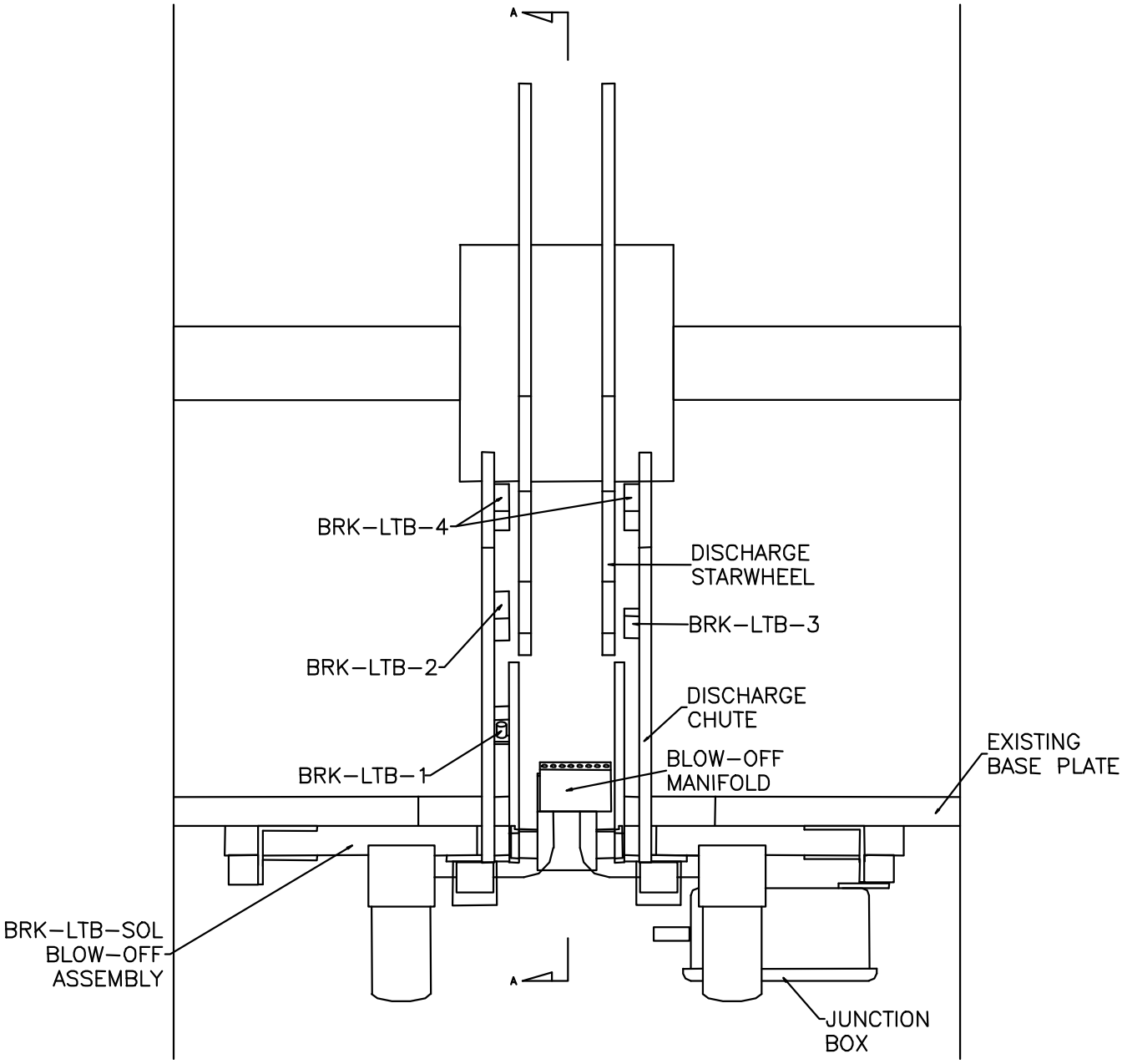

Figure 2.2 - Reject Blow-off Mounting Detail (View B-B)

2.5 MOUNTING THE BRK-LTB-SOL REJECT BLOW-OFF ASSEMBLY

The BRK-LTB-SOL Reject Blow-off assembly is mounted below the discharge chute of the tester. Refer to figures 2.1 and 2.2 through-out the following steps. Follow the steps below to mount the BRK-LTB-SOL.

1) The BRK-LTB-SOL assembly is mounted underneath the discharge chute with the blow-off manifold protruding through the opening in the existing horizontal base plate up to the plane that the cans roll down in the chute (refer to figure 2.1).

2) Drill and tap 4ea. 1/4-20 holes for the four mounting L-brackets of the BRK-LTB-SOL assembly into the existing base plate of the tester. Mount the BRK-LTB-SOL assembly with 4ea. 1/4-20 X 1" bolts and lock washers.

3) Pipe clean dry compressed air (80-100 psi @ 0.25 SCFM) to the BRK-LTB-SOL pneumatic inlet.

4) Adjust the BRK-LTB-SOL assembly such that the dimension between the center of the reject manifold and the lip of the reject chute is 6.50" and the dimension between the Photo Eye Lens in the BRK-LTB-1 and the center of the reject manifold is 4.80" as shown in figure 2.1.

2.6 MOUNTING THE BRK-LTB-PRX CAN PRESENCE SENSOR

The BRK-LTB-PRX Can Presence sensor is mounted in the can guides of the tester discharge starwheel as shown in figure 2.1. To mount the sensor, perform the following:

1) Remove one 3/8-16 bolt on each can guide (both left and right) at the location shown in figure 2.1.

2) Mount the BRK-LTB-PRX bracket at this location such that the bracket spans the can guides.

3) Adjust the sensing distance of the sensor to be .125" with a can directly in front of the sensor.

4) Route the sensor cable to the junction box on the BRK-LTB-SOL assembly and wire the sensor to the terminals of the junction box per the schematic at the back of this manual.

5) Verify that the angular degrees the sensor first turns "on" is not coincident with the Sync Timing position. The sensor must first "see" the can at least 20 degrees prior to the Sync Timing or 20 degrees after the Sync Timing.

2.7 MOUNTING THE RSV34-MS1 RESOLVER

The HSL-LT8/10/16 is designed to interface to a resolver (not encoder) for machine timing. The resolver shaft can be coupled to either the infeed starwheel shaft, main wheel shaft, discharge starwheel shaft or mounted in place of the existing encoder, whichever is more convenient. An adapter plate is provided if the resolver is to be mounted in place of the encoder. If this is the case, perform the following to mount the resolver in place of the encoder:

1) Remove the existing encoder.

2) Mount the BRK-LTB-6 Resolver Adapter plate to the encoder mounting holes on the tester.

3) Install the machine side coupler half to the timing shaft on the tester.

4) Install the resolver side coupler half to the resolver shaft.

5) Mount the resolver to the BRK-LTB-6 Adapter using the supplied stand-offs and 1/4-20 bolts, aligning the resolver coupler with the tester coupler.

6) Connect the supplied RSV-RSCBLE-100 cable to the MS connector on the resolver. Route the resolver cable in a separate conduit, away from all other high voltage (motor leads) and control wiring. Wire the cable directly to the 8-pin resolver connector on the M4503 (see section 2.9)

2.8 MOUNTING THE OPTIONAL REJECT VERIFICATION PHOTO EYES

If the Reject Verification feature is to be used, the optional photo eyes PE2 and PE3 will have to be mounted in the user's reject chute. Since user installations vary from one site to the next, no mounting hardware is provided, the user must provide the mounting as necessary. The photo eyes should be mounted in the reject chute as shown in figure 2.3 and should be located as close the discharge of the tester as is practical. The photo eye through beams should be set such that the distance from one sensor to the other sensor and the bottom of the chute and top of the chute is less than the diameter of the can. This assures that either one or the other sensor will see the can pass as the can is rejected.

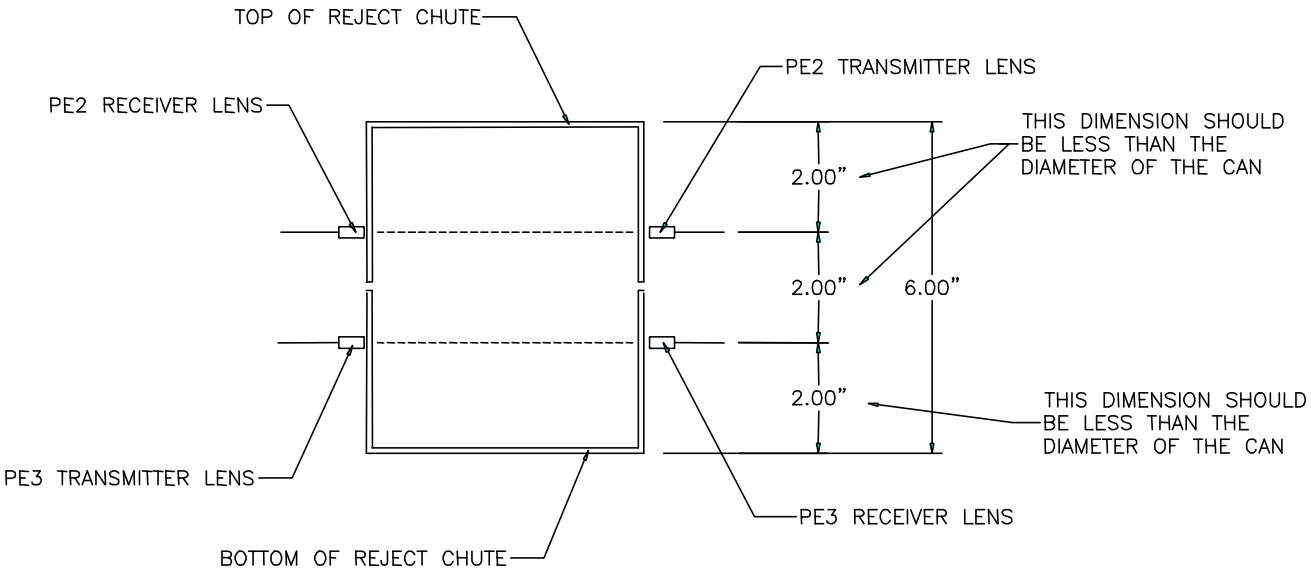

Figure 2.3 - Optional Reject Verification Photo Eye Mounting Detail

2.9 WIRING THE HSL-LT8/10/16

Referring to the electrical control schematic at the back of this manual, wire the HSL-LT8/10/16 as follows:

1) Incoming Power (115VAC-230VAC to FU1, 900, and GND on HSL-LT8/10/16 TB and +24VDC (+) to 501 and +24RET (-) to 500 on HSL-LT8/10/16 TB).

2) Interlocks from existing control system to HSL-LT8/10/16 (inputs I13, I20, I21, and I22 (if used)).

3) Interlocks to existing control system from HSL-LT8/10/16 (outputs O14 thru O17, O22 thru O25 (if used), and O31 thru O46 (if used)).

4) "FLT" Relay interlock from HSL-LT8/10/16 to existing tester control system. The "FLT" relay is normally "on" to allow the tester to run and turns "off" to stop the tester. Wire either the N.O. or N.C. "FLT" contact into the existing system as necessary to stop the machine when the "FLT" relay is "off".

5) Reject Blow-off (SOL1 and SOL2) in BRK-LTB-SOL Reject Blow-off assembly junction box.

6) Can Presence Sensor (PRX1) and Reject Blow-off Photo-Eye (PE1) using three conductor shielded cables in BRK-LTB-SOL junction box. The shields of the sensor cables should be tied to earth ground at a terminal inside the HSL-LT8/10/16 and left floating at the sensors.

7) Existing Leak Detection Reject Receiver and Array Fault Receiver using three conductor shielded cables. The shields of these cables should be tied to earth ground at a terminal inside the HSL-LT8/10/16 and left floating at the receivers.

8) Terminate the RSV-RSCBLE-100 resolver cable from the RSV34-MS1 directly to the RO-S4 connector on the M4503. The shield of the resolver cable should be tied to the "SHLD" terminal of the M4503 resolver input connector.

9) Set-Up Enable (passcode by-pass) key switch (if desired).

10) If the optional Rejected Can Verification Photo Eyes (PE2 and PE3) are used, wire them using three conductor shielded cables with the shield terminated in the HSL-LT8/10/16 enclosure.

In general, when wiring the HSL-LT8/10/16, keep all +24VDC wiring, resolver cable, and sensor cable wiring away from high voltage wiring.

2.10 HSL-LT8/10/16 SOFTWARE INSTALLATION

Follow the steps below to install the HSL-LT8/10/16 Set-up software package and the HSL-LT8/10/16 application programs onto the IBM PC or compatible which will be used to support the HSL-LT8/10/16 package.

The HSL-LT8/10/16 set-up software is used to download the program to the M4503 module, tune (set-up) the user adjustable variables of the HSL-LT8/10/16, download and upload (save) the user set-up variables to disk, and view rejects per pocket and shift data on the IBM PC used to support the HSL-LT8/10/16. To install the set-up software, perform the following steps:

1) Create one directory off the root directory of the PC for each tester the HSL-LT8/10/16 will be used on called "HSLT1" for the line 1 tester, "HSLT2" for the line 2 tester, "HSLT3" for the line 3 tester, etc. These will be used to store the "HSMLT10.EXE" setup programs and HSMLT10 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-LT8/10/16 PROGRAMS" into the A: drive. For each "HSLT" directory you created in the previous step, switch to that directory and install the "HSL-LT8/10/16" 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 HSL-LT8/10/16 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
   HSMLT10
   CD\
   ```

   For the "SET-UP TESTER LINE2" selection:

   ```
   CD\HSLT2
   HSMLT10
   CD\
   ```

   etc.

   In the above example, the HSL-LT10 package is shown. For the HSL-LT8 package, replace "HSMLT10" with "HSMLT8". For the HSL-LT16 package, replace "HSMLT10" with "HSMLT16".

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.

2.11 SYSdev PROGRAM DEVELOPMENT SOFTWARE INSTALLATION

The SYSdev Program Development software is an optional software package to perform on-line trouble-shooting and program modifications to the HSL-LT8/10/16. If SYSdev was purchased with the HSL-LT8/10/16 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.

2.12 HSL-LT8/10/16 APPLICATION PROGRAM INSTALLATION

The HSMLT10 application program is a SYSdev based program which is loaded into the M4503 module and performs the HSL-LT8/10/16 logic. The HSMLT10 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 HSMLT10 program will have to be loaded onto the hard drive of the PC which is used to support the HSL-LT8/10/16. The SYSdev Program Development Software will also have to be loaded on the PC (see section 2.11). To install this program perform the following:

1) If not already done, perform steps 1 through 3 of section 2.10. This creates the directories and menu selections which will be used to store and select the HSMLT10 application programs.

2) Install the disk labeled "HSL-LT8/10/16 PROGRAMS" into the A: drive. For each of the "HSLT" directories, switch to that directory and install the HSL-LT8/10/16 application program by typing the following at the DOS prompt (Line 1 tester is shown):

```
CD  \HSLT1<ENTER>
COPY A:HSMLT10.*<ENTER>
CD  \
```

3) Add the HSMLT10 application programs to your computer's menu software by creating selections called "HSL-LT8/10/16 PROGRAM LINE 1", etc. for each tester. The DOS commands executed for these selections should be (Line 1 tester shown):

```
CD  \
SYSDEV  \HSLT1  HSMLT10
```

4) To initiate SYSdev with the "HSMLT10" program, simply select the respective "HSL-LT8/10/16 PROGRAM" selection from the menu software's menu. The main development menu of SYSdev will be initiated with the HSMLT10 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.

In the previous examples, the HSL-LT10 package is shown. For the HSL-LT8 package, replace "HSMLT10" with "HSMLT8". For the HSL-LT16 package, replace "HSMLT10" with "HSMLT16".

2.13 MODIFY EXISTING PLC PROGRAM

Modify the existing control system PLC program to interface with the HSL-LT8/10/16 by incorporating the following into the existing PLC ladder logic:

1) The HSL-LT8/10/16 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-LT8/10/16. 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-LT8/10/16 display. In most applications, it will be sufficient to indicate "REJECT FAULT - SEE HSL-LT8/10/16" when a fault occurs. The operator can then go look at the HSL-LT8/10/16 display to see what the actual fault was.

3) The encoded alarm outputs (O15 thru O17) from the HSL-LT8/10/16 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-LT8/10/16 display. The alarms are encoded as follows:

(O17)	(O16)	(O15)	Alarm Definition
0	0	0	No Alarm
0	0	1	Leak Detection Array Fault
0	1	0	Blow-off Photo Eye Fail
0	1	1	Timing Signal Failure
1	0	0	Can Tracking Fault
1	0	1	Blow-off Photo-Eye Lenses Dirty
1	1	0	Bad Can did not Reject

4) Add the "Good Can Count Pulse", "Leaker Reject Count Pulse", and "Vision Reject Count Pulse" outputs from the HSL-LT8/10/16 to the existing host PLC if desired. The HSL-LT8/10/16 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 " 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 will.

6) Add the "Alarm Reset" output. This signal should be ”on" as long as the system reset push-button is depressed.

2.14 TUNING THE HSL-LT8/10/16

The HSL-LT8/10/16 is shipped from the factory with the program "HSMLT10" loaded in the M4503 module. This is the standard program used to implement the standard HSL-LT8/10/16 tester reject blow-off algorithm.

In most cases, the following user variables and timing signals may have to be altered to tune the HSL-LT8/10/16 to the actual tester it is controlling.

Once the HSL-LT8/10/16 is installed and the control system is powered back up, perform the following to set-up and tune the HSL-LT8/10/16. The set-up is performed using either the Display/Keypad of the HSL-LT8/10/16 or an IBM PC or compatible running the "HSMLT10" set-up program.

See section 3 of this manual for a description of the Keypad commands and menu displays of the HSL-LT8/10/16 Display/Keypad. See section 4 for a description of the "HSMLT10" menus and variables and how to use the "HSMLT10" set-up program.

Warning: During the set-up and tuning procedure, leaker cans and calibrated test cans may go down the line until the set-up is completed.

2.14.1 DEFAULT SET-UP VARIABLES

As shipped, the user variables for the HSL-LT8/10/16 are set the following defaults:

Reject Shift Registers:
- Can Presence Shifts (Can PRX to Discharge) _____: 1
- Leaker Reject Shifts (Leak Detector to Discharge) _____: 4
- Vision Reject Shifts (Vision System to Discharge) _____: 0

Reject Parameters:
- Can Neck Size (in 0.01 inches) _____: 215

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

2.14.2 SET MACHINE ZERO

Position the machine at machine zero and set the HSL-LT8/10/16 offset per section 3.5 (HSL-LT8/10/16 keypad).

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

1) From the discharge side, rotate the machine by hand until the last pocket (#8 on LT-8's, #10 on LT-10s, or #16 on LT-16's) has just passed the Reject Receiver. Position the machine such that the Reject Receiver is approximately between the last pocket and pocket #1.

2) Now from the infeed side, slightly move the machine such that the reject reset photo detector of the array head that happens to be at the reset lamp is exactly aligned with the reset lamp. This is the machine zero location for the HSL-LT8/10/16.

3) Set the machine zero through the HSL-LT8/10/16 set-up menu with the machine located as described in steps (1) and (2) above.

2.14.3 SET THE MACHINE TIMING

Sync Timing (CH00): The Sync Timing is used to clock in the reject data from the Reject Array Receiver and the vision system reject signal as well as clock the data from the Can Presence sensor. The Sync Timing should be set about 90-120 degrees ahead of the location where the Reject Array Receiver input turns "on". With no cans in the machine, turn the machine forward by hand until the Reject Receiver input (IN0) just turns "on". The Sync Timing should be set about 90-120 degrees ahead of this point.

Pocket #1 Timing (CH01): The Pocket #1 Timing is used to reset the pocket count to pocket #1. The pocket count is incremented once per pocket and is used to determine which pocket a can is rejected from. Set the Pocket #1 Timing to a position 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. This signal is not used by the HSL-LT8/10/16 but is simply provided as an output to be used for whatever purpose by the existing system. Set this timing as desired.

2.14.4 SET THE REJECT SHIFT REGISTERS

Can Presence Shifts: Count the number of pockets from the Can Presence Sensor to the discharge pocket. Set the "Can Presence Shifts" equal to 1 minus this number.

Leaker Reject Shifts: Count the number of pockets from the Leaker Reject Receiver pocket to the discharge pocket. Set the "Leaker Reject Shifts" equal to 1 minus this number.

Vision Reject Shifts (optional): Count the number of pockets from the vision system inspection pocket to the discharge pocket. Set the "Vision Reject Shifts" equal to 1 minus this number.

2.14.5 SET THE REJECT PARAMETERS (CAN SIZE)

The Reject parameters consist of the can neck size. This parameter is used to calculate when to activate the reject blow-off as a function of the can speed. The can neck size is simply the diameter of the neck at it's most narrow point in 0.01 inches. For example, if the neck measures 2.15" at it's most narrow point, simply enter 215 for the can neck size.

2.14.6 VERIFY LEAKER REJECT NUMBER OF SHIFTS

Verify the "Leaker Reject Shift" value by performing the following:

1) Run the tester at normal production speeds with cans.

2) Feed a calibrated leak can into the machine and verify which can is blown off.

3) If a can ahead of the calibrated leak can is blown off, the "Leaker Reject Shift" is set too low. Increase the "Leaker Reject Shift" value by the number of cans ahead of the calibrated leak can that the can blown off was located (i.e. If the can directly ahead of the calibrated leak can is blown off, increase the value by 1. If the can two cans ahead is blown off, increase the value by 2, etc.).

4) If a can behind the calibrated leak can is blown off, the "Leaker Reject Shift" is set too high. Decrease the "Leaker Reject Shift" value by the number of cans behind the calibrated leak can that the can blown off was located.

5) If the calibrated leak can is blown off, the "Leaker Reject Shift" value is set correctly.

2.14.7 VERIFY VISION REJECT NUMBER OF SHIFTS

If the optional vision reject feature is to be used, verify the "Vision Reject Shift" value by performing the following:

1) Run the tester at normal production speeds with cans.

2) Feed a vision test can into the machine and verify which can is blown off.

3) If a can ahead of the vision test can is blown off, the "Vision Reject Shift" is set too low. Increase the "Vision Reject Shift" value by the number of cans ahead of the vision test can that the can blown off was located (i.e. If the can directly ahead of the vision test can is blown off, increase the value by 1. If the can two cans ahead is blown off, increase the value by 2, etc.).

4) If a can behind the vision test can is blown off, the "Vision Reject Shift" is set too high. Decrease the "Vision Reject Shift" value by the number of cans behind the vision test can that the can blown off was located.

5) If the vision test can is blown off, the "Vision Reject Shift" value is set correctly.

2.14.8 VERIFY CAN PRESENCE NUMBER OF SHIFTS

Verify the "Can Presence Shift" value by performing the following:

1) With the machine running with cans, stop the machine and let the logic reset (about 2-3 seconds).

2) Restart the machine. Then, with the machine still running, stop the flow of cans and then restart the flow of cans. If a can or cans is blown off consistently either at the beginning when the can flow is first started or as the last cans flow through when the can flow is stopped, then the "Can Presence Shift" is not correct (proceed to step (3)). If no cans are blown off either at the beginning or end of can flow, then the "Can Presence Shift" is set correctly (skip the following steps).

3) If the "Can Presence Shift" is not correct, then set the “Can Presence Shift" to value a couple of stations higher than expected.

4) With the machine running with cans, stop the machine and let the logic reset (about 2-3 seconds).

5) Restart the machine. Then, with the machine still running, stop the flow of cans and observe the number in the "Can Tracking Count" field of the Reject Set-up menu of "HSMLT10".

6) With no cans flowing, the "Can Tracking Count" represents the amount that the "Can Presence Shift" is too high. Subtract this number from the current value of the "Can Presence Shift".

7) Repeat step (4) and (5) above and verify that the "Can Tracking Count" is zero when no cans are flowing. With this done, repeat steps (1) and (2) above.

2.14.9 SAVE SET-UP DATA TO DISK

Once all set-up variables have been set as necessary, save the variables to disk using the "HSMLT10" set-up program selection "7: Upload (Save) Set-up data from Module" (see section 4.1). This allows these set-up variables to quickly be downloaded to the M4503 module if the module has to be replaced in the future without having to go through the set-up steps again. The machine is now set-up and ready to run.

2.15 M4503 MODULE REPLACEMENT

The following is provided only as a reference. These steps need only be performed in the event the M4503 module or I/O boards needs to be replaced once installed. To replace the module, perform the following:

1) Turn both 115VAC and +24VDC power to the HSL-LT8/10/16 system "off" and remove all the field wiring connectors from the M4503 module.

2) Remove the 8-32 nuts and lock washers (7ea.) which retain the module in the door and remove the module.

3) On the new M4503 module, remove the I/O cover (retained with 6ea. 6-32 phillips SEM screws.)

4) **Install S4568 (SLOT0-0):** Set the slot address dip switches (SW1) on the S4568 to the following positions:

   S4568: SW1 switch1 = "OFF"
   SW1 switch2 = "OFF"

   Install the S4568 in Slot0-0 (furthest left I/O slot) of the M4503 chassis.

5) **Install S4568 (SLOT0-1):** Set the slot address dip switches (SW1) on the S4568 to the following positions:

   S4568: SW1 switch1 = "ON"
   SW1 switch2 = "OFF"

   Install the S4568 in Slot0-1 (middle I/O slot) of the M4503 chassis.

6) **Install S4573 (SLOT0-2):** Set the slot address dip switches (SW1) on the S4573 to the following positions:

   S4573: SW1 switch1 = "OFF"
   SW1 switch2 = "ON"

   Install the S4573 in Slot0-1 (furthest right I/O slot) of the M4503 chassis.

7) Install the I/O cover back on the M4503 over the S4568s and S4573 just installed using the 6ea. 6-32 phillips SEM screws.

8) Remove the supplied field wiring connectors from the new M4503 module and install the new M4503 module in the door cut-out from the front and re-install the 8-32 nuts and lock washers (7ea).

9) 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 all the field wiring connectors are fully mated in the module.

10) Apply 115VAC and +24VDC power to the HSL-LT8/10/16 and verify that the "PWR" and "RUN" LEDs on the M4503 module are "on" and the "FLT" LED is "off".

11) Connect an RS-232 cable from the computer COM port to the "PROG" port on the M4503.

12) From the computer's menu program, select the respective tester's "SET-UP TESTER" selection (this was set in section 2.10). The "HSMLT10" set-up program will be invoked with the corresponding HSMLT10 application program for that tester.

13) Download the HSMLT10 application program to the module by selecting "5: Download Program to Module" from the HSL-LT8/10/16 main menu. Press the <ENTER> key to start the download. Press any key to return back to the HSL-LT8/10/16 main menu.

14) Download the previously saved to disk set-up data to the module by selecting "6: Download Set-up data to Module" from the HSL-LT8/10/16 main menu. Press the <ENTER> key to start the download. Once the download is complete, press any key to return to the HSL-LT8/10/16 main menu. See section 4.1 for complete details.

15) The HSL-LT8/10/16 is now ready to run, loaded with the HSMLT10 program, and set-up data that was previously saved for the respective tester. Press <ESC> to return back to the computer's menu software program.

SECTION 3
USING THE HSL-LT8/10/16 KEYPAD/DISPLAY

The keypad of the HSL-LT8/10/16 contains 24 keys consisting of data display commands, set-up commands, and a numeric keypad. The display of the HSL-LT8/10/16 is a 2 line by 40 character back-lit LCD display which displays the selected data and set-up menus. The keypad/display can be used by the operator to view data or can be used by authorized personnel (passcode or key switch protected) to adjust the timing and all set-up parameters.

The display/keypad allows the following to be viewed or adjusted:

1) Set Reject Shift Registers
2) Set Reject Parameters
3) Set Machine Timing
4) Set Machine Zero
5) View the Number of Rejects per Pocket
6) View the Current Shift Data
7) View the Last Shift Data
8) Test the Reject Blow-off Solenoid

The definitions of the keypad commands and menus are described in the following sections. Note for virtually all the menus, the "NEXT" and "PREV" keys can be used to advance to the next item of the menu or retard to the previous item on the menu.

3.1 DEFAULT SCREEN

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

MACHINE SPEED (CPM):xxxx
GOOD CANS:xxxxxxx REJECTS:xxxxxx

Where the "Machine Speed" is the current speed of the tester, the "Good Cans" field is the total number of good cans tested so far into the current shift, and the "Rejects" field is the total number of leaker cans rejected from the machine (scrap) so far into the current shift. This display effectively replaces a speed meter, and two can counters. This screen is always returned to when no commands are active.

3.2 "REJECTS PER POCKET" KEY

The Number of Rejects per Pocket menu is provided to aid in the trouble-shooting of a light seal problem with a pocket or pockets.

The total number of leaker rejects for each pocket since the last reset or end of shift is displayed. The operator can reset these counts at any time to aid in the trouble-shooting process. The data can be viewed simply be pressing this key. The display shows a series of screens each with four pockets from 1 through 10 as shown below:

```
-- DIAGNOSTICS (REJECTS PER POCKET) --
  1:xxxx    2:xxxx    3:xxxx    4:xxxx
```

Where the numbers 1 through 4 are the first 4 pockets and the "xxxx" would be the actual counts for the respective pockets. Screens for pockets 5 thru 8, and 9 thru 10, are shown in this fashion each for a time delay of 10 seconds. In addition, the user can advance to the next screen or retard to the previous screen by pressing the "NEXT" or "PREV" key respectively.

The final screen of this menu, prompts the user to reset the counts by pressing "0" or not by pressing "ESC". This provides the operator with the opportunity to reset the counts if desired for trouble-shooting. If the counts are to be reset, press the "0" key, if not, press the "ESC" key. The default screen will now be displayed again.

The "ESC" key can also be used at any time to abort the rejects per pocket data display and return back to the default screen.

3.3 "CURRENT SHIFT" KEY

The "Current Shift" key is used to view the current shift data. This data is the totals so far into the shift. This 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 or alternatively could be done at label changes such that the data collected would be for label runs rather than complete shifts. This data cannot be reset by the operator, only at the "end of shift" input transition. Note that the Current shift "Good Cans" and "Rejects" is displayed as part of the default screen (see section 3.1).

The Current Shift data is defined as follows:

Good Cans: This is the total number of good cans tested so far into the shift. This is essentially a can counter.

Rejects: This is the total number of leaker cans rejected from the machine so far into the shift. This also is essentially a can counter.

Vision Inspection Rejects: This is the total number of cans rejected by the vision system (if used) so far into the shift.

Rejects per Pocket (1:-16:): This is the total leaker rejects for each pocket. A disproportionately high count for a particular pocket indicates a light seal problem for that pocket.

3.4 "LAST SHIFT" KEY

The "Last Shift" data is identical to the current shift data except it is the totals for the previous 8 or 12 hour shift or previous label run, however the shift collection is set-up. This allows data collection and diagnostics to take place automatically over a two shift period. Refer to section 3.3 for definitions of the data fields in the "Last Shift" data menu.

3.5 "SET-UP" KEY

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

1: SET REJECT SHIFT REGISTERS
2: SET REJECT BLOW-OFF PARAMETERS
3: SET MACHINE TIMING (SET-POINTS, ETC.)
4: ZERO MACHINE (SET RESOLVER OFFSET)

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 4).

Note: The primary set-up menu is passcode protected. When the set-up key is first depressed, an "ENTER PASSCODE:" prompt is displayed. At this point, the 5-digit passcode must be entered followed by pressing the <ENTER> key. If the passcode entered is correct, the primary set-up menu is then displayed and any of the parameters accessed by this menu may be changed. If the passcode entered is incorrect, the message "INCORRECT PASSCODE" will be displayed. At this time the passcode may be entered again or the <ESC> key can be pressed to return back to the main menu.

When the passcode is entered, the digits entered are not displayed. Instead "*" characters are displayed as each digit is entered. This prevents unauthorized personnel from observing the passcode as it is entered. In addition, the "ENTER PASSCODE" prompt is only displayed for a maximum of 60 seconds. The correct passcode must be entered within this 60 second period otherwise the set-up mode is aborted and the main menu is re-displayed.

Refer to section 3.7 (Set Keypad/Display "Set-up" passcode) for details on setting the passcode as desired.

For user's that would prefer to use a keyed switch to prevent unauthorized access instead of a passcode, the "Set-Up Enable" input can be used. When this input is "on", the passcode prompt is bypassed and access to the primary set-up menu is provided immediately. If the "Set-Up Enable" input is "off", then the normal passcode prompt is displayed. A keyed switch can then be wired to the "Set-Up Enable" input such that when the switch is in the enable position, the input is "on".

"SET-UP" KEY
1: Set Reject Shift Registers

This menu is activated when the "1" key (SET REJECT SHIFT REGISTERS) is pressed while the primary set-up menu is active. The following three set-up parameters may then be adjusted or viewed:

Can Presence Shifts (0-44): This is the number of pockets from the Can Presence Sensor to the tester discharge (pocket where cans are released from the machine).

Leaker Reject Shifts (0-44): This is the number of pockets from the Reject Array Receiver pocket to the tester discharge (pocket where cans are released from the machine).

Vision Reject Shifts (0-44): This is the number of pockets from the vision inspection system reject pocket to the tester discharge (pocket where cans are released from the machine).

The "NEXT" and "PREV" keys can be used to advance to the next shift register or the previous register respectively. To change the currently displayed register, simply enter the new value on the numeric keypad and press <ENTER>.
The value will be entered and the next register variable will automatically be displayed. When the last register (Vision Reject Shifts) is entered, the primary set-up menu is again displayed. Pressing <ESC> at anytime will also exit you back to the primary set-up menu. Note that all shift register values entered must be in the range of 0 to 44.

"SET-UP" KEY
2: Set Reject Blow-off Parameters

This menu is activated when the "2" key (SET REJECT BLOW-OFF PARAMETERS) is pressed while the primary set-up menu is active. The following blow-off set-up parameters may then be adjusted or viewed:

Can Neck Size (in 0.01 inches): This parameter is used to calculate when to activate the reject blow-off as a function of the can speed. The can neck size is simply the diameter of the neck at it's most narrow point in 0.01 inches. For example, if the neck measures 2.15" at it's most narrow point, simply enter 215 for the can neck size. The valid range of this value is 180 to 300

To change the Can Neck Size, simply enter the new value on the numeric keypad and press <ENTER>. The value will be entered and the primary set-up menu will again be displayed. Pressing <ESC> at anytime will also exit you back to the primary set-up menu.

"SET-UP" KEY
3: Set Machine Timing (Set-Points, etc.)

This menu is activated when the "3" key (SET MACHINE TIMING) is pressed while the primary set-up menu is active. The following timing set-up parameters may then be adjusted or viewed:

Sync Timing (CH00) "On" Position: The Sync Timing is used to clock in the reject data from the Reject Array Receiver and the vision system reject signal as well as clock the data from the Can Presence sensor. The Sync Timing should be set about 90-120 degrees ahead of the location where the Reject Array Receiver input turns "on" for a leak can.

Pocket #1 Timing (CH01) "On" Position: The Pocket #1 Timing is used to reset the pocket count which is used to determine which pocket a can is rejected from. Set the Pocket #1 Timing to a position 90 degrees following the Sync Timing.

Discharge Timing (CH02) "On" Position: The Discharge Timing (CH02) should be set about 30 degrees before the location that the can is released from the tester.

PLC Timing (CH03) "On" Position: The PLC Timing is provided as an extra timing signal which can be used by the existing host control system. This signal is not used by the HSL-LT8/10/16 but is simply provided as an output to be used for whatever purpose by the existing system.

In addition to showing what the currently selected timing channel is set to, the display will also show the current angular position of the resolver. Note that 360 degrees are used for each pocket, 3600 degrees for one revolution of the resolver.

The "NEXT" and "PREV" keys can be used to advance to the next parameter or the previous parameter respectively. To change the currently displayed parameter, simply enter the new value on the numeric keypad and press <ENTER>. The value will be entered and the next parameter will automatically be displayed. When the last parameter (PLC Timing (CH03)) is entered , the primary set-up menu is again displayed. Pressing <ESC> at anytime will also exit you back to the primary set-up menu.

"SET-UP" KEY
4: Zero Machine (Set Resolver Offset)

This selection is used to auto zero the resolver. To set the machine zero (resolver offset) perform the following:

1) Select "3: SET MACHINE TIMING" and observe the "POS:" field. Verify that as the machine is rotated forward (either jogged or by hand) that the position increases linearly from 0 through 359. If not, swap the S1 and S3 leads of the resolver at the M4503 resolver connector. Then verify that the position then indeed does increase with forward movement. Press <ESC> to exit back to the primary set-up menu.

2) Position the machine at machine zero. This location is where the Reject Receiver is approximately between the last pocket (#8, #10, or #16 on LT-8, LT-10, and LT-16 respectively) and pocket #1and the pocket that happens to be at the reject reset lamp has it's reject reset photo detector perfectly aligned with the reset lamp (see section 2.14.2)

3) Auto zero the resolver by selecting "4: ZERO MACHINE" from the primary set-up menu. Enter "0" to zero the resolver. The timing set-up menu will be displayed, now showing the "POS:" at zero.

4) Exit back to the primary set-up menu by pressing <ESC>. Exit back to the default screen by pressing <ESC> again.

3.6 "TEST BLOW-OFF" KEY

This key is used to test the reject blow-off solenoid both while the machine is running with cans and with the machine stopped. Testing the blow-off with the machine running with cans verifies that the blow-off delay and pulse times are calculated correctly. When de-pressed, the next can detected by the blow-off photo-eye will be rejected. The solenoid is activated with the same delay and pulse times used when a leaker reject can is blown-off.

With the machine stopped, de-pressing the "Test Blow-off" key will activate the reject blow-off immediately for the pulse time. This can be used to verify that the solenoid does indeed activate.

"SET-UP" KEY
3.7 SET KEYPAD/DISPLAY "SET-UP" KEY PASSCODE

The "Set Passcode" input to the HSL-LT8/10/16 is used to actually set or view the passcode of the set-up menu. Normally this input should be "off". When the passcode is to be set, jumper this input to +24VDC (501) and press the "Set-Up" key. The "ENTER PASSCODE" prompt will be displayed and the current 5-digit passcode will be displayed with the prompt. This allows the passcode to be viewed if necessary.

If the passcode is to be changed, enter any number between 0 and 64999 and press <ENTER>. Note that if passcode protection is not to be used, set the passcode to "0".

Then when the passcode is prompted for after the "Set-up" key is pressed, simply press <ENTER> to proceed to the set-up menu. If the passcode protection is to be used, set the passcode to a number between 1 and 64999. Then when the "Set-up" key is pressed, the actual valid passcode number will have to be entered in order to gain access to the set-up menu.

Once the passcode is set, turn the "Set Passcode" input back "off" and now the set-up menu will be passcode protected with the number you have entered as the passcode.

3.8 DISPLAY MESSAGE DEFINITIONS

In addition to the default and set-up messages described in the previous sections, alarm and status messages are displayed on the HSL-LT8/10/16 display as well. The definitions of these messages are as follows:

"Leak Detection Array Fault": This message occurs when a fault in the Leak detection array occurs.

"Can Jam/Blow-off Photo Eye Fail": This message is displayed if either a jam occurs between the Can Presence sensor and the Blow-off Photo Eye (located on the Reject Blow-off assembly) or if the Blow-off Photo Eye fails. In general, if cans are running into the machine but the Blow-off Photo Eye does not "see" cans coming out, this alarm occurs.

"Timing Resolver Fail": The timing resolver fail occurs when any of the timing signals generated in the PLS section fail to change state periodically while the machine is running.

"Reject Tracking Fault": This message indicates that the system has lost track of the cans between the tester discharge and the Reject Blow-off assembly. This is generally due to a can jamming in the tester discharge. Once this alarm is cleared, the machine will have to be run empty of cans to reset the tracking logic.

"Clean Blow-off Photo Eye Lenses (Dirty)": This message indicates that the lenses of the photo eye mounted on the Reject Blow-off assembly should be cleaned. This occurs when an excess film deposit of contaminants has formed over the fiber optic lenses of the Reject Blow-off Photo Eye, reducing the gain of the eye.
If the lenses are not cleaned, the eye will cease to function correctly (causing a Photo Eye Fail alarm) once too much contamination occurs.

"Tester did not Reject Defective Can": This message indicates that when the reject blow-off was activated, a can was not detected being rejected into the reject chute. This indicates that a problem with the blow-off solenoid, air, or blow-off photo-eye may exist. Verify the operation of the blow-off solenoid by depressing the "Test Blow-off" key on the HSL-LT8/10/16 while the machine is running. A single can should be rejected when the key is depressed. If not, trouble-shoot the reject blow-off system.

"Run Tester Empty of Cans to Reset Can/Reject Tracking": This message indicates that the can tracking logic needs to be reset. When displayed, stop the flow of cans into the machine and run the machine empty of cans. The tester will stop once the machine is empty at which time the following message will be displayed:

Can Tracking Logic Resetting - Please Standby": This message is displayed after the "Run Tester Empty of Cans" message has been displayed and the machine has been emptied of cans and stopped. This allows the last cans to travel out the discharge of the tester before the tracking logic is reset (about 2-3 seconds). The message will automatically clear once the tracking logic is reset. The machine can be restarted in normal production once this message clears.

SECTION 3
USING THE HSL-LT8/10/16
KEYPAD/DISPLAY

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SECTION 4
"HSMLT10" SET-UP PROGRAM REFERENCE

The "HSMLT10" set-up program is a DOS based menu driven program which allows the user to easily view the HSL-LT8/10/16 data or alter the HSL-LT8/10/16 set-up variables using an IBM PC or compatible. The set-up variables are used to configure and tune the HSL-LT8/10/16 to match the configuration and performance of the specific tester (see section 2.14).

Note: The "HSMLT10" program is an on-line communications program used to interface with the M4503 module. The data displayed in the menus and set in the menus is communicated directly to the module. Therefore, prior to selecting any of the above selections, make sure an RS-232 cable is connected from the COM port on the computer running "HSMLT10" to the "PROG" port on the M4503.

The following sections are a complete description of the "HSMLT10" selections and menus.

4.1 MAIN MENU

The main menu of the "HSMLT10" set-up program incorporates the following menu selections:

1: Reject Set-up Parameters
2: Number of Rejects per Pocket data
3: Current Shift Data
4: Last Shift Data
5: Download Program to module
6: Download Set-up data to module
7: Upload (Save) Set-up data from module

Main Menu
1: Reject Set-up

This selection is used to set all the set-up variables in the HSL-LT8/10/16. When selected, the "Reject Set-up" menu is invoked. Note: Prior to selecting this selection, make sure the RS-232 cable is connected from the COM port on the computer to the PROG PORT on the M4503.

The "Reject Set-up" menu contains the following selections:

1: Set Reject Shift Registers
2: Set Can Neck Size
3: Set Machine Timing

The following selections set the corresponding parameters:

Reject Set-up Menu
1: Set Reject Shift Registers

Can Presence Shifts (0-44): This is the number of pockets from the Can Presence Sensor to the tester discharge (pocket where cans are released from the machine).

Leaker Reject Shifts (0-44): This is the number of pockets from the Reject Array Receiver pocket to the tester is charge (pocket where cans are released from the machine).

Vision Reject Shifts (0-44): This is the number of pockets from the vision inspection system reject pocket to the tester discharge (pocket where cans are released from the machine).

Reject Set-up Menu
2: Set Can Neck Size

Can Neck Size (in 0.01 inches): This parameter is used to calculate when to activate the reject blow-off as a function of the can speed. The can neck size is simply the diameter of the neck at it's most narrow point in 0.01 inches. For example, if the neck measures 2.15" at it's most narrow point, simply enter 215 for the can neck size. The valid range of this value is 180 to 300.

Reject Set-up Menu
3: Set Machine Timing

Sync Timing (CH00) "On" Position: The Sync Timing is used to clock in the reject data from the Reject Array Receiver and the vision system reject signal as well as clock the data from the Can Presence sensor. The Sync Timing should be set about 90-120 degrees ahead of the location where the Reject Array Receiver input turns "on".

Pocket #1 Timing (CH01) "On" Position: The Pocket #1 Timing is used to reset the pocket count which is used to determine which pocket a can is rejected from. Set the Pocket #1 Timing to a position 90 degrees following the Sync Timing.

Discharge Timing (CH02) "On" Position: The Discharge Timing (CH02) should be set about 30 degrees before the location that the can is released from the tester.

PLC Timing (CH03) "On" Position: The PLC Timing is provided as an extra timing signal which can be used by the existing host control system. This signal is not used by the HSL-LT8/10/16 but is simply provided as an output to be used for whatever purpose by the existing system.

Main Menu
2: Number of Rejects per Pocket data

The number of leaker rejects per pocket menu is provided to aid in the trouble-shooting of a light seal problem with a pocket or pockets. The total number of rejects for each pocket since the last reset or end of shift is displayed.

Note: Prior to selecting this selection, make sure the RS-232 cable is connected from the COM port on the computer to the "PROG" port on the M4503.

The following data is displayed in the "Rejects per Pocket" menu:

Pocket #xx Leaker Rejects: This is the total number of leaker rejects for each pocket. This data is displayed and updated continuously in the respective field for each pocket. A disproportionately high count for a particular pocket indicates a light seal problem for that pocket.

Main Menu
3: Current Shift Data

This selection is used to view the Current Shift data. This data is the totals so far into the shift. This 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 or alternatively could be done at label changes such that the data collected would be for label runs rather than complete shifts. This data cannot be reset either from this menu or by the operator, only at the "end of shift" input transition. To exit back to the main menu, press <ESC>.

Note: Prior to selecting this selection, make sure the RS-232 cable is connected from the COM port on the computer to the PROG PORT on the M4503. The following data is displayed in the "Current Shift (Totals so far)" menu:

Total Good Cans Tested: This is the total number of good cans tested so far into the shift. This is essentially a can counter.

Total Leaker Rejects: This is the total number of leaker cans rejected by the machine so far into the shift.

Total Vision Inspection Rejects: This is the total number of cans rejected by the vision inspection system (if used).

Pocket #01 Leaker Rejects thru Pocket #10 Leaker Rejects: This is the total leaker rejects for each pocket. A disproportionately high count for a particular pocket indicates a light seal problem for that pocket.

Main Menu
4: Last Shift Data

The "Last Shift" data is identical to the current shift data except it is the totals for the previous 8 or 12 hour shift or previous label run, how ever the shift collection is set-up. This allows data collection and diagnostics to take place automatically over a two shift period. Refer to the previous section for definitions of the data fields in the "Last Shift" data menu.

Main Menu
5: Download Program to Module

This selection is used to download the HSMLT10 application program to the M4503 module. This should only be performed when either replacing the module or when the program has been changed. To download the program, perform the following:

Note: Program download cannot be performed while the tester is running. All outputs on the M4503 are turned "off" and no program execution is performed. The tester should therefore be stopped before the download takes place. In addition, the tester will have to be run without cans after the download is complete in order to reset the can tracking logic. Therefore stop the flow of cans to the tester prior to stopping the tester for the program download.

1) Connect the RS-232 cable from the COM port on the computer to the "PROG" port on the M4503.

2) Select "5: Download Program to Module" from the Main Menu. The current program ident, revision, and checksum for both the program on disk and already loaded in the module will be displayed. A prompt will be displayed asking to continue or abort. To continue, press any key except the <ESC> key. To abort, press the <ESC> key. If a prompt stating that the "HSMLT10" file could not be opened is displayed, then the "HSMLT10" application program is not installed in the current directory.

3) Once program download is initiated, M4503 program execution will cease, the current address being downloaded will be displayed, and the "RUN" LED on the module will flash continuously.

4) Once the download is complete, the "RUN" LED on the module will illuminate solid and program execution in the M4503 will resume. Press any key to return back to the "HSMLT10" main menu.

5) Once the download is complete, a message stating "Run Tester Empty of Cans" will be displayed. Run the tester without any cans until the default message ("Machine Speed:") is displayed. This is required to reset the can tracking logic.

6) This selection can also be used to verify the program ident, revision, and checksum without downloading the program. Perform steps 1 thru 3 above but instead of initiating the download in step 3, simply press the <ESC> key to abort the download once the ident, revision, and checksum have been displayed.

Main Menu
6: Download Set-up data to Module

This selection is used to download the previously uploaded (saved) set-up variables to the M4503 module. This should only be performed when replacing the module. Note: the set-up data consists of the can presence/leaker reject/vision reject shift register presets, the can neck size, and the timing signal set-points. To download the set-up data, perform the following:

1) Connect the RS-232 cable from the COM port on the computer to the "PROG" port on the M4503.

2) Select "6: Download Set-up data to Module". A prompt will be displayed asking to continue or abort. To continue, press any key except the <ESC> key. To abort, press the <ESC> key.

3) Once data download is initiated, the current address being downloaded will be displayed. Note that HSL-LT8/10/16 program execution is not ceased, therefore data download can be performed while the machine is running.

4) Once set-up data download is complete, press any key to return to the "HSMLT10" main menu.

Main Menu
7: Upload (Save) Set-up data from Module

This selection is used to save the set-up variables from the M4503 module to the hard drive (current directory selected). This should be performed anytime any of the set-up variables have been changed.

Note: When the set-up variables are changed, they are changed directly in the module, not on the file in the computer. By uploading (saving) the set-up variables to disk, they can be downloaded to the module in the event the module must be replaced.

The set-up data consists of the can presence/leaker reject/vision reject shift register presets, the can neck size, and the timing signal set-points. To upload the set-up data, perform the following:

1) Connect the RS-232 cable from the COM port on the computer to the "PROG" port on the M4503.

2) Select "7: Upload (Save) Set-up data from Module". A prompt will be displayed asking to continue or abort. To continue, press any key except the <ESC> key. To abort, press the <ESC> key.

3) Once data upload is initiated, the current address being uploaded will be displayed. Note that HSL-LT8/10/16 program execution is not ceased, therefore data upload can be performed while the machine is running.

4) Once set-up data upload is complete, press any key to return to the "HSMLT10" main menu.

SECTION 4
"HSMLT10" SET-UP
PROGRAM REFERENCE

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SECTION 5
RECOMMENDED SPARE PARTS

The following are recommended spares for the HSL-LT8/10/16. These parts are available through Systems Engineering Assoc. Inc.

Quantity	Part Number	Description
1ea.	HSM-LT8	Reject Control Module (LT-8 Testers)
	or	
	HSM-LT10	Reject Control Module (LT-10 Testers)
	or	
	HSM-LT16	Reject Control Module (LT-16 Testers)
1ea.	RSV34-MS1	Resolver (SEG)
1ea.	Q23SP6FPY	Photo Eye (Banner)
1ea.	PIT43TSSS	Sheathed Fiber Cable (Banner)
2ea.	L2	Plastic Fiber Lenses (Banner)
1ea.	Bi10U-G30-AP4X	Proximity Sensor (Turck)
1ea.	711C-12-PI-551BA	Solenoid (Mac)