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AD-02 Retrievable Bill Validator

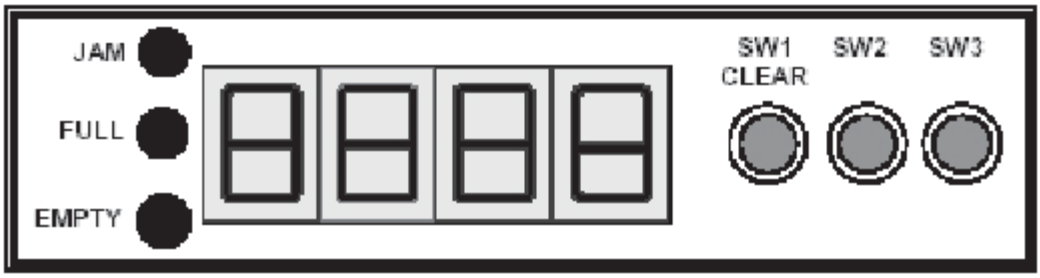
Maintenance Manual

JCM Part No. 960-000054

Table of Contents

Control Panel Overview

7-segment LED readouts and 3 test switches, SW1, SW2, SW3, plus three condition indicators, JAM, FULL, EMPTY, can be found on the control panel near the bottom of the unit.

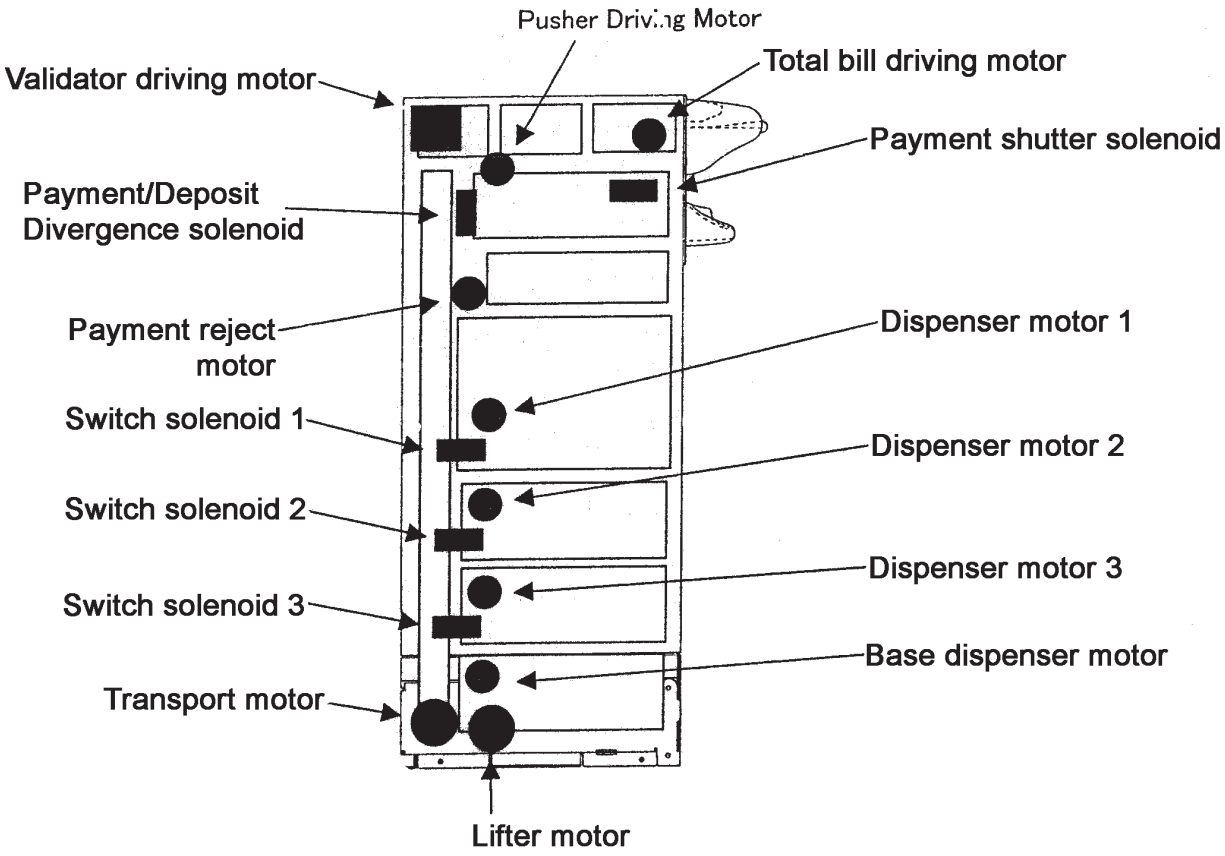


JAM	Indicates an error condition.
FULL	Indicates the storage bin is full.
EMPTY	Indicates when the storage bin is empty.

The following symbols are used to indicate the alphabet.

Letter	Display	Letter	Display	Letter	Display	Letter	Display	Letter	Display
A		G		M		S		Y	
B		H		N		T		Z	
C		I		O		U			
D		J		P		V			
E		K		Q		W			
F		L		R		X			

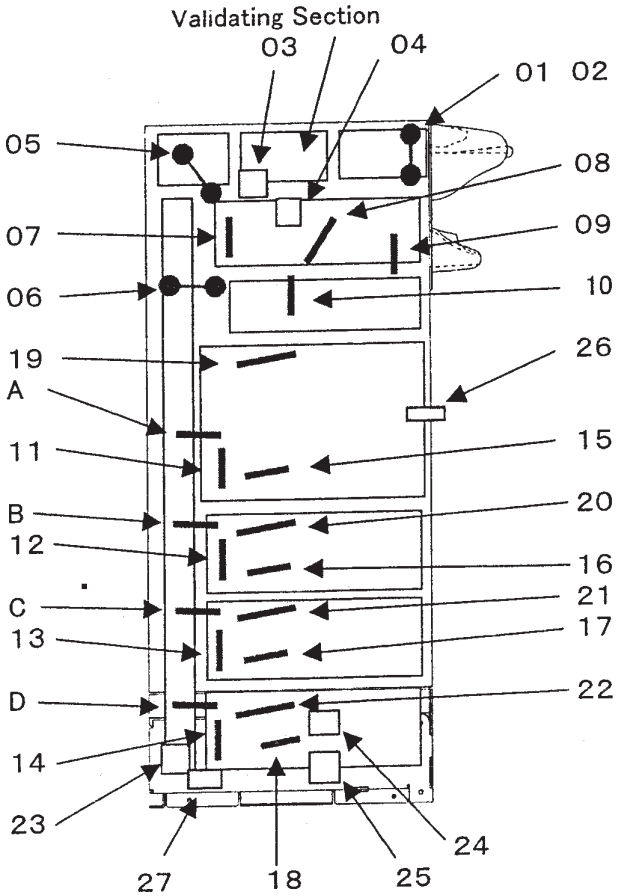
Actuator Layout

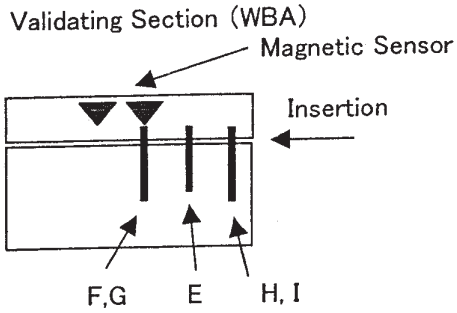


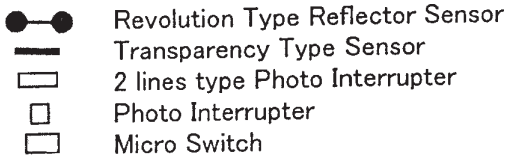
Sensor Layout

Sensor #	Sensor Name
01	Lump-sum right entrance sensor
02	Lump-sum left entrance sensor
03	Upper Pusher Sensor
04	Lower Pusher Sensor
05	Upper Passing Sensor
06	Lower Passing Sensor
07	Stack In Sensor
08	Stacker Residual Sensor
09	Dispense Sensor
10	Reject Box Empty Sensor
11	Storage Sensor 1
12	Storage Sensor 2
13	Storage Sensor 3
14	Storage Sensor Base
15	Unit 1 Near End Sensor
16	Unit 2 Near End Sensor
17	Unit 3 Near End Sensor
18	Base Unit Near End Sensor
19	Unit 1 Full Sensor
20	Unit 2 Full Sensor

Sensor #	Sensor Name
21	Unit 3 Full Sensor
22	Base Unit Full Sensor
23	Transport Pulse Sensor
24	Upper Lifter Sensor
25	Lower Lifter Sensor
26	Door Sensor
27	Unit Set Switch
A	Unit 1 Counting Sensor
B	Unit 2 Counting Sensor
C	Unit 3 Counting Sensor
D	Base Unit Counting Sensor
E	Inside Validating Section Sensor
F	Left Validating Section Sensor
G	Right Validating Section Sensor
H	Left Entrance Validating Section Sensor
I	Right Entrance Validating Section Sensor

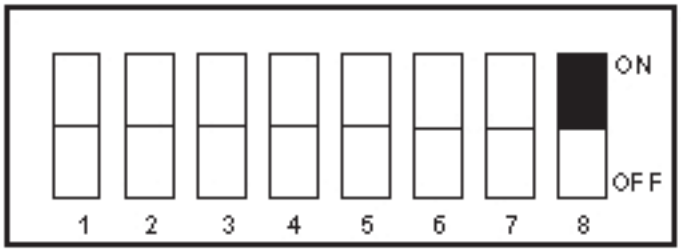


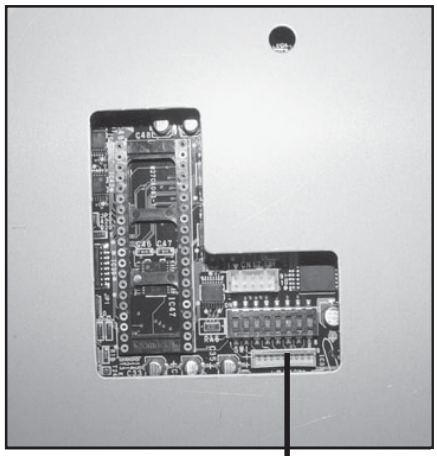




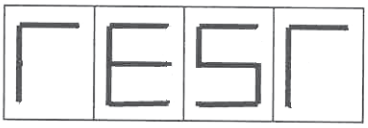
Test Mode Startup

With the power turned off, turn DIP switch 8 ON. Apply power.

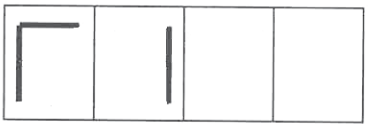




Sequence through the test items by pushing SW1.



Test Mode Screen

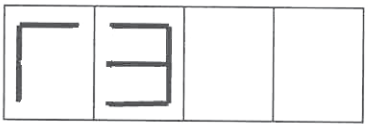


SW1 SW2 SW3
Clear

Display Test

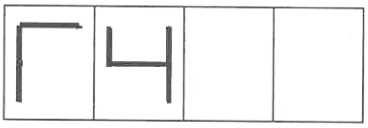
SW1 SW2 SW3
Clear

Sensor Test



SW1 SW2 SW3
Clear

Motor Test



SW1 SW2 SW3
Clear

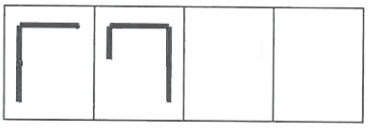
Solenoid Test

SW1 SW2 SW3
Clear

Operation Test

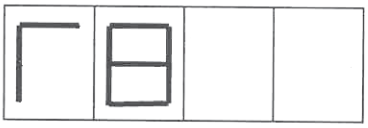
SW1 SW2 SW3
Clear

Overall Test



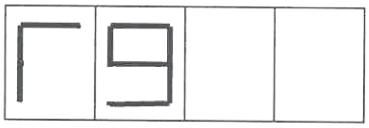
SW1 SW2 SW3
Clear

Error Log Indicator



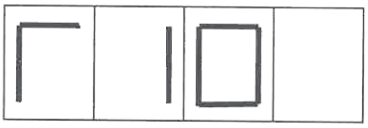
SW1 SW2 SW3
Clear

Counting Sensor Calibration



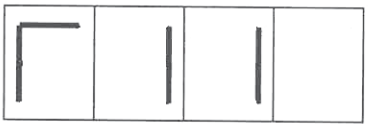
SW1 SW2 SW3
Clear

Loop Back Transmission Test



SW1 SW2 SW3
Clear

Aging Test



SW1 SW2 SW3
Clear

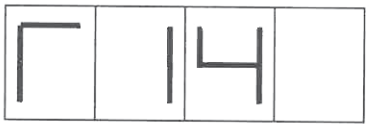
Unused

SW1 SW2 SW3
Clear

Circuit Calibration Counting Sensor Test

SW1 SW2 SW3
Clear

Software Version Indicator



SW1 SW2 SW3
Clear

Data Set up

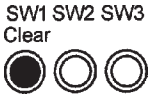
SW1 SW2 SW3
Clear

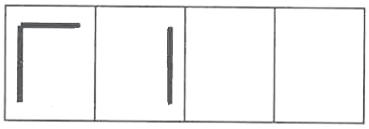
Cleaning Mode

Aftert all tests are completed, turn off power to the AD-02.

Display Test

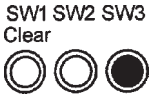
Press SW1 to move to Test 1, Display Test





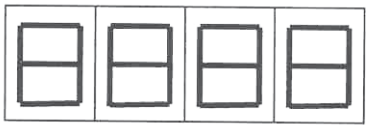
Test 1. Display Test

Press SW3



Test begins (Pushing SW3 will pause the test. Pushing SW3 again resumes the test):

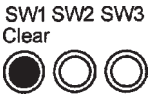
Deposit, Dispense, and 7-segment displays light.

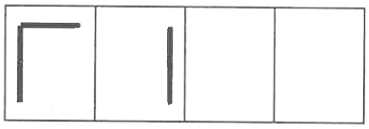


All display lights go off.

The 7-segment LED display sequences through each segment. During this sequence, the three (3) Status lights also go on for a half-second.

Test ends by pushing SW1.

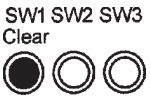




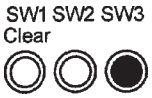
Sensor Test

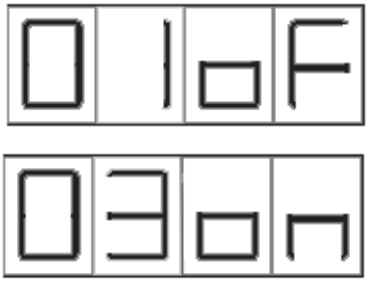
Indicates operating condition of each sensor.

Push SW1.



Push SW3 to sequence through the sensors.





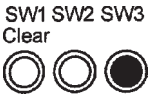
In the case of sensors 1 through 27 and E through I, the first two LED's display the sensor ID. The third and fourth LED's display the sensor's condition, ON or OFF.

In the case of sensors A through D, the first LED displays the sensor ID, the other three display the sensor level, 0 through 255, the numerical value. 0 = 0V, 255 = 5V.

When testing sensors A through D, push SW2 to obtain the following information:

The first LED indicates Gain Switching Value, 3 through 6.
LED 3 and 4 indicate the D/A output (light emission amount).

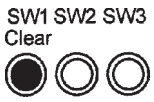
Push SW3 to resume sequencing.

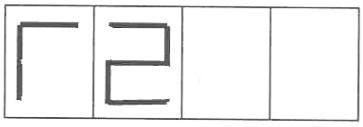


Sensor No.	Sensor Name
01	Insert right entrance sensor
02	Insert left entrance sensor
03	Upper Pusher Sensor
04	Lower Pusher Sensor
05	Upper Passing Sensor
06	Lower Passing Sensor
07	Stack In Sensor
08	Stacker Residual Sensor
09	Dispense Sensor
10	Reject Box Empty Sensor
11	Storage Sensor 1
12	Storage Sensor 2
13	Storage Sensor 3
14	Storage Sensor Base
15	Bin 1 Near End Sensor
16	Bin 2 Near End Sensor
17	Bin 3 Near End Sensor
18	Bin 4 Near End Sensor

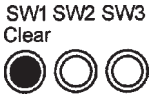
Sensor # No.	Sensor Name
19	Bin 1 Full Sensor
20	Bin 2 Full Sensor
21	Bin 3 Full Sensor
22	Bin 4 Full Sensor
23	Transport Pulse Sensor
24	Upper Lifter Sensor
25	Lower Lifter Sensor
26	Door Sensor
27	Unit Set Switch
A	Bin 1 Counting Sensor
B	Bin 2 Counting Sensor
C	Bin 3 Counting Sensor
D	Bin 4 Counting Sensor
E	Inside Validating Section Sensor
F	Left Validating Section Sensor
G	Right Validating Section Sensor
H	Left Insert Validating Section Sensor
I	Right Insert Validating Section Sensor

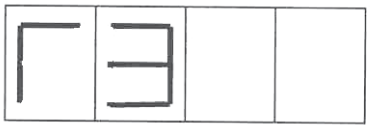
End the sensor tests by pushing SW1.





Push SW1 to begin Motor Operation tests.

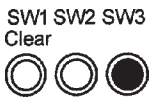




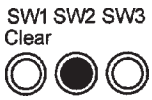
Motor Test

Motor	Function
01	Validator drive motor, fwd. rotation (insert direction)
02	Validator drive motor, rev. rotation (dispense direction)
03	Dispenser motor, bin 1, fwd. rotation (dispense direction)
04	Dispenser motor, bin 1, rev. rotation (insert direction)
05	Dispenser motor, bin 2, fwd. rotation (dispense direction)
06	Dispenser motor, bin 2, rev. rotation (insert direction)
07	Dispenser motor, bin 3, fwd. rotation (dispense direction)
08	Dispenser motor, bin 3, rev. rotation (insert direction)
09	Dispenser motor, bin 4, fwd. rotation (dispense direction)
10	Dispenser motor, bin 4, rev. rotation (insert direction)
11	Transport motor, fwd. rotation (insert direction)
12	Transport motor, rev. rotation (dispense direction)
13	Dispenser/reject motor, fwd. rotation (dispense direction)
14	Dispenser/reject motor, rev. rotation (insert direction)
15	Lifter motor, reg. rotation
16	Bulk loader drive motor, fwd. rotation (insert direction)
17	Bulk loader drive motor, rev. rotation (dispense direction)
18	Pusher drive motor, reg. rotation

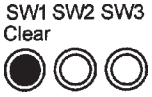
Press SW3 to select motor for testing.



Press SW2 to test the motor.

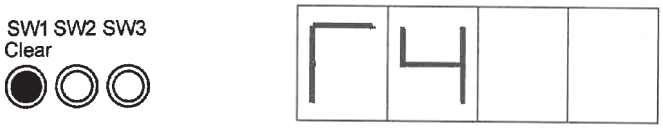


Push SW1 to end the tests.

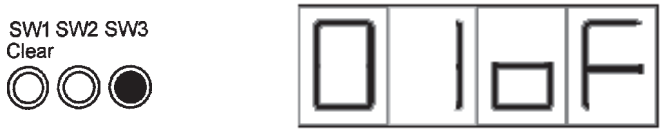


Solenoid Tests

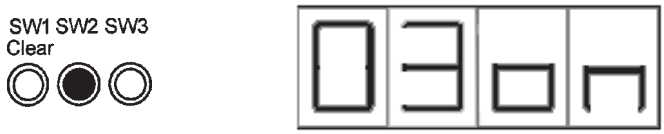
Push SW1 to start solenoid tests.



Push SW3 to sequence through the solenoids.

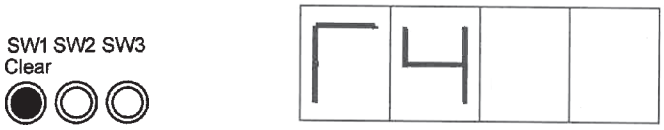


Push SW2 to test each solenoid.



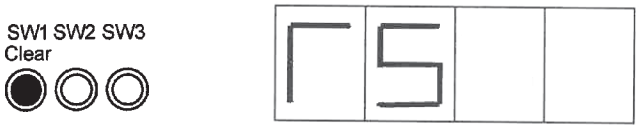
No.	Solenoid Name
01	Switch Solenoid 1
02	Switch Solenoid 2
03	Switch Solenoid 3
04	Dispense Shutter Solenoid
05	Dispense/Deposit Divert Solenoid

Push SW1 to end the tests.

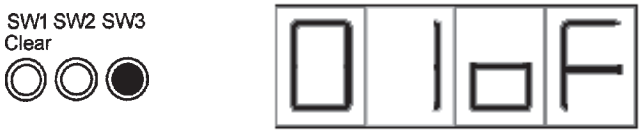


Motor Function Test
Test detachment operation, bill-pressing operation, and dispense/reject operation.

Press SW1 to start tests.



Push SW3 to select the Operation for testing.

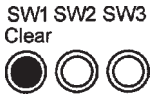


Op. No.	Operation Name
01	Upper Lifter Operation (Up)
02	Upper Lifter Operation (Down)
03	Lower Lifter Operation (Up and Down)
04	Dispensing Pusher Operation
05	Dispensing Pusher Operation (Up)
06	Dispensing Pusher Operation (Down)
07	Dispenser Belt Home (Dispense Direction)
08	Dispenser Belt Home (Reject Direction)

Push SW2 to test the Operation.

IMPORTANT NOTE: If Operation 01 does not turn ON when SW2 is pushed, go to Operation 02. After performing that test, cycle SW3 back to Test 1 and push SW2. Then proceed to Test 3 by pushing SW3.

End the tests by pushing SW1.



11. Operational Test

Push SW1 to start the test.

Push SW3 and select M1 = Normal Mode, or M2 = Automatic Mode. Push SW1 after selecting the desired mode. In Normal mode, the machine dispenses the number of bills requested. Pushing SW3 dispenses another group of the same number of bills unless the number of bills requested is changed by pushing SW1 or SW2. In automatic mode, the machine dispenses the number of bills requested. When those bills are removed from the dispenser slot, the machine automatically dispenses the same number of bills. It will keep repeating this process until the bin is empty. If the last bills dispensed are less than the total amount requested, the bills will go into the holding tray. The only way to change the mode selection is to turn off the power, then turn it back on and cycle SW1 to Test 6.

Use SW1 and SW2 to increase or decrease the number of bills dispensed from the bin selected by the DIP switch settings 1 through 4. A maximum of 20 bills can be dispensed at one time.

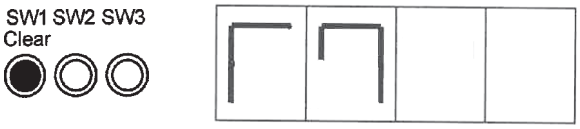
This indicates 18 bills will be dispensed from the bin selected.

Push SW3 to dispense the bills. If there are not 18 bills in the selected bin, all of the bills in that bin will be placed in the holding tray.

Turn off the power to end this test.

Error Log Indicator

When display indicates TEST, use SW1 to sequence through the test to Test 7.



Select the mode by pushing SW3.

d1	Indicates total number of times error occurs.
d2	Indicates the number of occurances at initial operation.
d3	Indicates the number of occurances at insertion operation.
d4	Indicates the number of occurances at dispense operation.
d5	Indicates the total number of insertion/dispense bills.
d6	Indicates Error Log details.

In the case of Mode d1 through d4, push SW1 to start displaying the errors (0 errors will not be displayed). For example, in d1 mode the error code and number of times it occured are displayed for 1 second periods.

Indicates error 10
A indicates total number of times it occured.

Indicates error 10 occured 3 times.

Pushing SW1 progresses to the next error.

Indicates error 16.

Indicates error 16 occured 14 times.

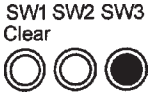
A Total number of times error occured.
B Number of times error occured at initial operation.
C Number of times error occured at bill insertion.
D Number of times error occured at bill dispensing.

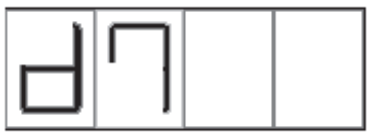
d5 indicates total number of inserted/dispensed bills.

Push SW1 to sequence through the following items:

Item	Data
A	$1, total number of bills inserted (first 3 digits)
B	$1, total number of bills inserted (last 3 digits)
C	$5, total number of bills inserted (first 3 digits)
D	$5, total number of bills inserted (last 3 digits)
E	$10, total number of bills inserted (first 3 digits)
F	$10, total number of bills inserted (last 3 digits)
G	$20, total number of bills inserted (first 3 digits)
H	$20, total number of bills inserted (last 3 digits)
I	$50, total number of bills inserted (first 3 digits)
J	$50, total number of bills inserted (last 3 digits)
K	$100, total number of bills inserted (first 3 digits)
L	$100, total number of bills inserted (last 3 digits)
M	Total number of inserted bills rejected (first 3 digits)
N	Total number of inserted bills rejected (last 3 digits)
O	Bin 1, total number of bills dispensed (first 3 digits)
P	Bin 1, total number of bills dispensed (last 3 digits)
Q	Bin 2, total number of bills dispensed (first 3 digits)
R	Bin 2, total number of bills dispensed (last 3 digits)
S	Bin 3, total number of bills dispensed (first 3 digits)
T	Bin 3, total number of bills dispensed (last 3 digits)
U	Bin 4, total number of bills dispensed (first 3 digits)
V	Bin 4, total number of bills dispensed (last 3 digits)

Push SW3 to proceed to Test d7.





Error log details

Push SW1 to display the latest error code and number of times it occurred.

Push SW1 to cycle through error code occurance in reverse order.

Indicates the last error to occur was error 42, and it occured 2 times.

Error Code	Description
10	Bin 1 bill counting jam
11	Bin 2 bill counting jam
12	Bin 3 bill counting jam
13	Bin 4 bill counting jam
14	Stuck in sensor bill jam
15	Holding tray bill jam
16	Dispenser bill jam
17	Bulk loader jam
18	Validator bill jam
19	Upper dispenser transport bill jam
20	Lower dispenser transport bill jam
21	Bin 1 storage bill jam
22	Bin 2 storage bill jam
23	Bin 3 storage bill jam
24	Bin 4 storage bill jam
25	Bin 1 deposit error
26	Bin 2 deposit error
27	Bin 3 deposit error
28	Bin 4 deposit error
30	Bin 1 dispensing error
31	Bin 2 dispensing error
32	Bin 3 dispensing error
33	Bin 4 dispensing error
34	Bin 1 solenoid switch error
35	Bin 2 solenoid switch error

Error Code	Description
36	Bin 3 solenoid switch error
37	Lifter motion error
38	Pusher motion error
39	Dispenser belt home motion error
40	Error in holding tray - full
41	Bin 1 empty
42	Bin 2 empty
43	Bin 3 empty
44	Bin 4 empty
45	Transport motor lock
46	Dispenser reject error
47	Dispenser motion error
48	Lifter motor lock
50	Function check error
51	Validator head error
52	Bin 1 level error
53	Bin 2 level error
54	Bin 3 level error
55	Bin 4 level error
56	Open door error
57	Unit drawn out error
60	Long note error
61	Short note error
62	Overlap note error
63	Linked note error

Downloading the AD-02 Error Log

1. Connect a serial cable between the AD-02 and a Windows PC.

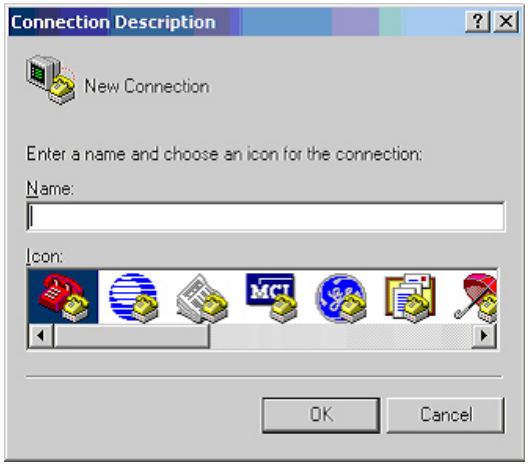
2. Set DIP switches 1, 2, and 8 ON. Apply power to the unit.

3. On the Windows desktop, click on the Start button.

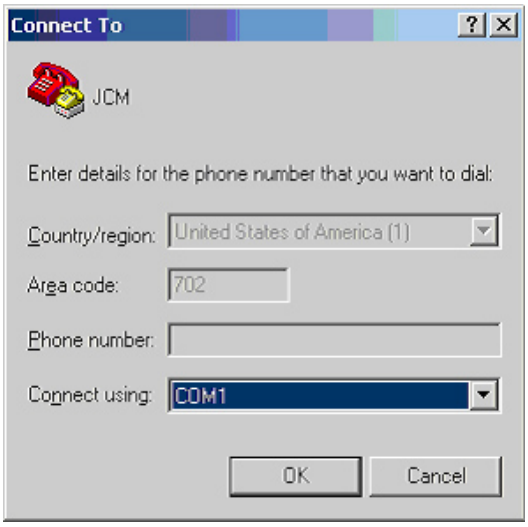
4. Go to Programs, then Accessories, then Communications. Click on Hyper Terminal.

NOTE: If the PC does not have Hyper terminal installed, contact your IS Department and have them install it from the Windows disk.

5. On the opening screen, type a name. The first icon is already selected, and it can be used. Click OK.

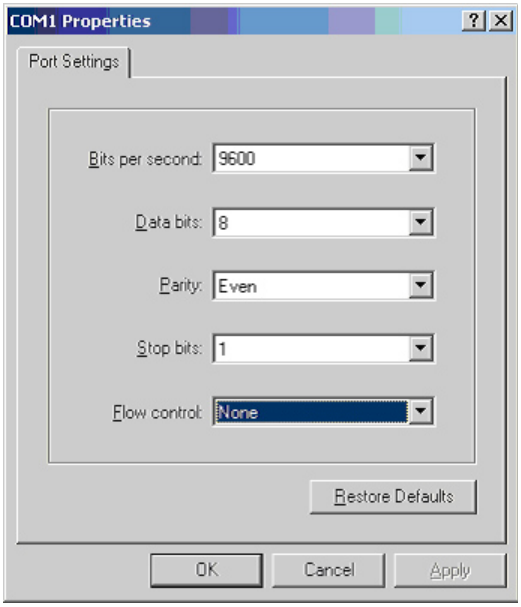


6. On the next screen ignore all of the boxes except the “Connect Using” box. If you are using a port other than COM1, select the new port from the drop down menu. Click OK.



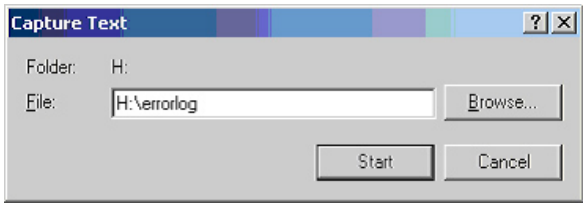
7. Change the port settings as shown.
   a. Bits per second = 9600
   b. Data bits = 8
   c. Parity = Even
   d. Stop Bits = 1
   e. Flow control = None

   Click OK



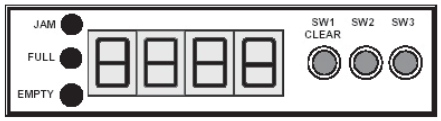
8. Go to the "Transfer" drop down menu and select "Capture Text."

9. Enter a file name and click "Start."



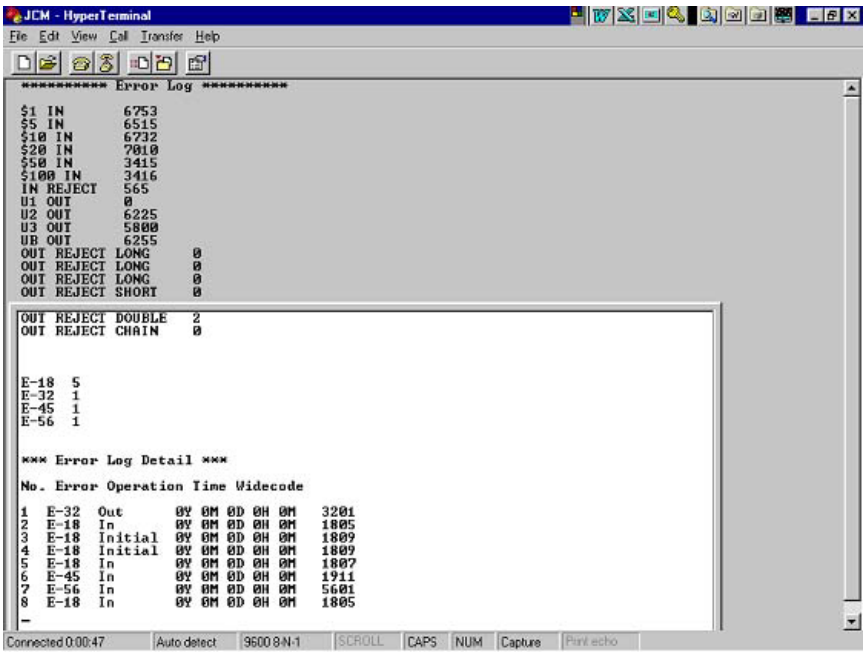
10. On the AD-02, push SW1 until T7 is displayed.

11. Push SW3 until D7 is displayed.



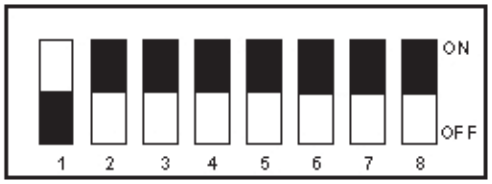
12. Push SW1 to start the error log transfer.

13. This report describes how many bills of different denominations have been inserted and distributed, any rejects and why, and the number of times for each error code. Refer to the Error Codes on Page 18 for a description of the error.

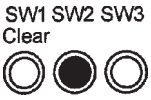


Clearing the Error Log

With the power turned off to the AD-02, set DIP switches 2 through 8 to ON. Turn on the power.



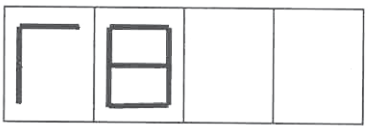
When CLR is displayed, then push SW2.

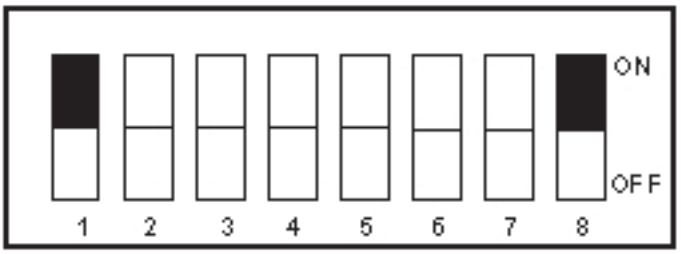


When END is displayed, the Error Log data is cleared.

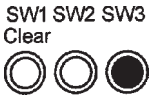
Counting Sensor Calibration
This test adjusts each counting sensor and registers the adjustment data.

During the sensor adjustment, do not expose the sensor to ambiant light. Clean any dust off the sensor before making any adjustments.

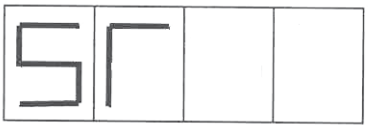




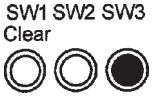
When T8 is displayed, set DIP Switch 1 to ON and press SW3.



Through beam level adjustment



When ST is displayed, press SW3.



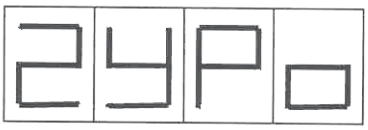
Base Unit counting sensor adjustment

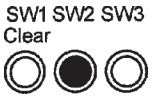
Insert Yupo #80 calibration paper between the transmitter and receiver of the base unit counting sensor, and press SW2.
(Through beam level adjustment)

Unit Three counting sensor adjustment

Insert Yupo #80 calibration paper between the transmitter and receiver of the unit three counting sensor, and press SW2.
(Through beam level adjustment)

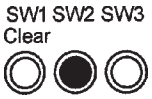
Unit Two counting sensor adjustment





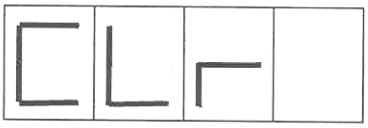
Insert Yupo #80 calibration paper between the transmitter and receiver of the unit two counting sensor, and press SW2.
(Through beam level adjustment)

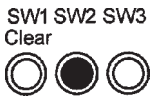
Unit One counting sensor adjustment



Insert Yupo #80 calibration paper between the transmitter and receiver of the unit one counting sensor and press SW2.
(Through beam level adjustment)

Counting sensor direct beam adjustment





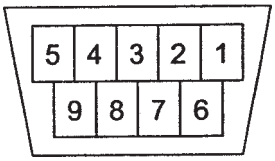
Witn nothing inserted between the transmitters and receivers of any counting sensors in any units, press SW2.
(direct beam level adjustment)

End

After all sensor adjustments are completed, write the adjustment data to memory.

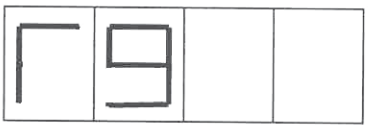
Communication Loopback Test

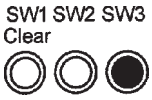
A loopback test is conducted for the serial communication port. To conduct the loopback test, short-circuit the transmission and receiving pins on the communication port.



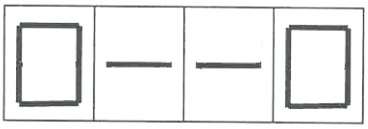
Pin No.	Name	Remarks
1	NC	Unused
2	RD	Received Data
3	SD	Transmitted Data
4	NC	Unused
5	SG	Signal Ground
6	NC	Unused
7	NC	Unused
8	NC	Unused
9	NC	Unused

When T9 is displayed press SW3.

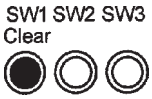




Data is transmitted at intervals of approximately 0.5 seconds.

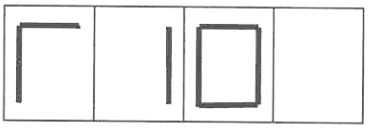


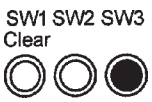
Press SW1 to end the test.



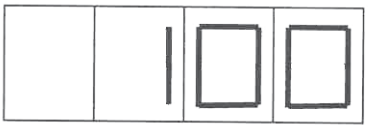
4-11. Aging Test

When T10 is displayed press SW3.





Aging count display

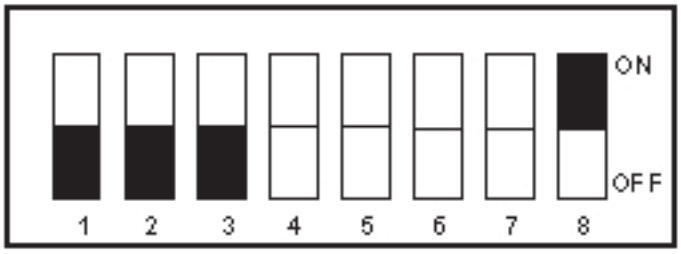


Note: If an error occurs, the display shows the existing aging count after the error is reset by pressing SW2.

Press SW1 to end the test.

Sensor Adjustment Circuit Test

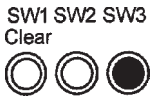
This test makes it capable to select the mode and gain of the sensor adjustment circuit by changing DIP switch settings. The mode and gain switching operations are enabled even while executing a test.



DIP Switch			
1		2	3
ON*	OFF*		
Gain 0	Gain 0	OFF	OFF
Gain 1	Gain 1	ON	OFF
Gain 2	Gain 2	OFF	ON
Unused	Gain 3	ON	ON

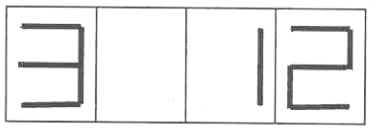
*ON Direct beam mode
*OFF Through beam mode

Press SW1 until T12 is displayed, then press SW3.



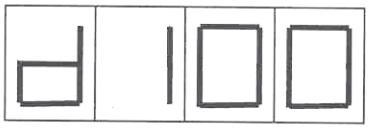
Press SW3 again to select the sensor to be tested.

Sensor Number	Sensor Name
1	Bin 1 counting sensor
2	Bin 2 counting sensor
3	Bin 3 counting sensor
4	Bin 4 counting sensor

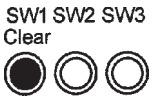


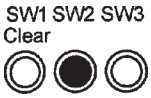
Sensor No. Sensor Level

Pressing SW2 displays the D/A output value for the selected sensor adjustment circuit for approximately one second. Use SW1 (reduces the output value) and SW2 (increases the output value) to adjust the selected sensor's D/A output value.



D/A output value

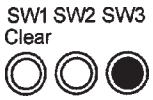




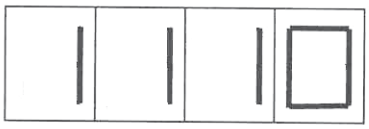
Power down the unit to end this test, then power it back up to run the next test.

16. Software Version Display

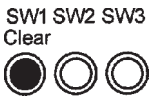
Press SW1 until T13 is displayed, then press SW3.



The software version is displayed at approximately 0.5 sec. intervals, scrolling from right to left.

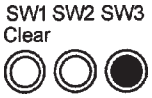


Press SW1 to end the test.



17. Cleaning Mode

Press SW1 until T15 is displayed, then press SW3.

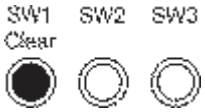


After the unit goes through an initialization, the display reads CLn and the Insertion slot lights up.

Insert one piece of the dedicated cleaning paper. After cycling through all the bins, the cleaning paper will appear in the dispenser slot.

Remove the cleaning paper.

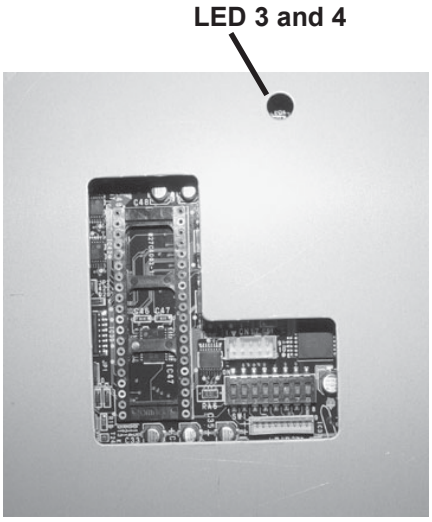
Press SW1 to end the test.



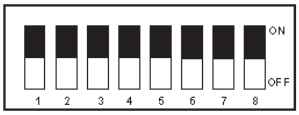
19. Upgrading the Program Version

Use the following procedure to copy data to the built-in Flash memory.

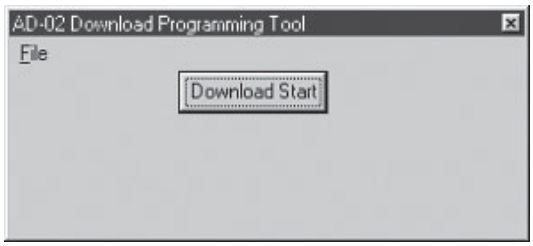
Turn off power to the machine.



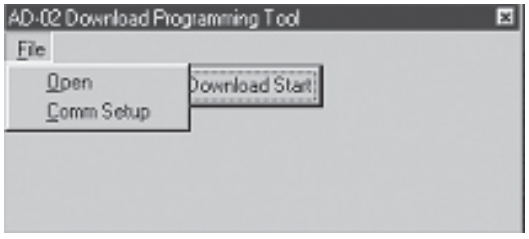
1. Connect a serial cable between a PC and the AD-02.



3. Turn ON all DIP Switches.
4. Power up the machine.
5. Confirm that LED 3 and LED 4 are lit.
6. Put the floppy disk in Drive A: of the PC
7. To speed up the download time, use "My Computer" to create a new folder on the hard drive, then copy the two files from the floppy disk into that folder. Access the application and download files from the new location.
8. Open the Download file, Ad_Bt_DwLD(US).

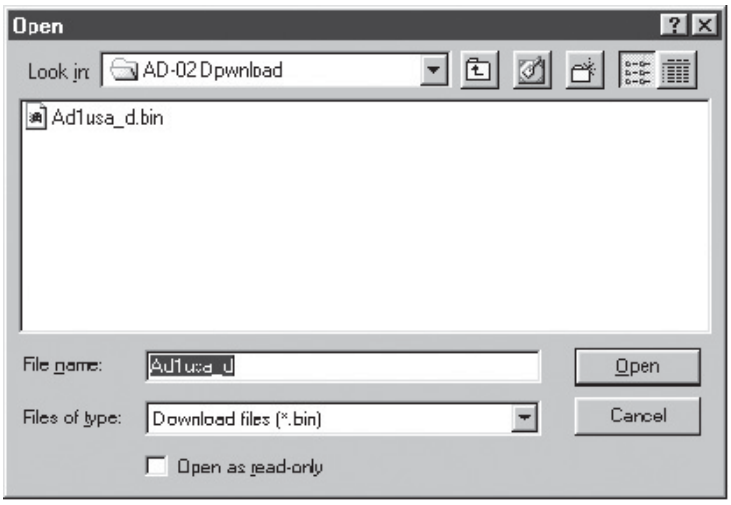


9. Click on File, then click on Open

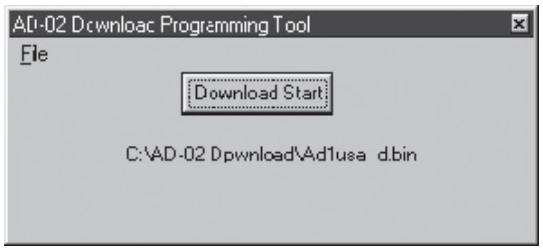


Note: Click on Comm Setup to verify or change communications settings.

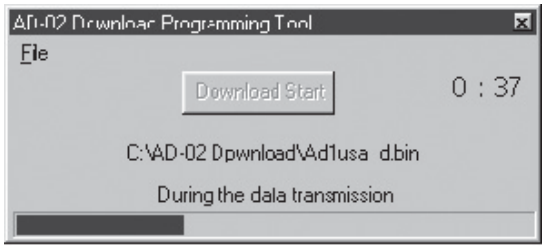
10. This should open the folder where you stored the files downloaded from the floppy. If it doesn't, then click on the down arrow beside the file name and find the appropriate folder. Highlight the .bin file, then click on open.



11. When the file name appears on the main screen, click on "Download Start."

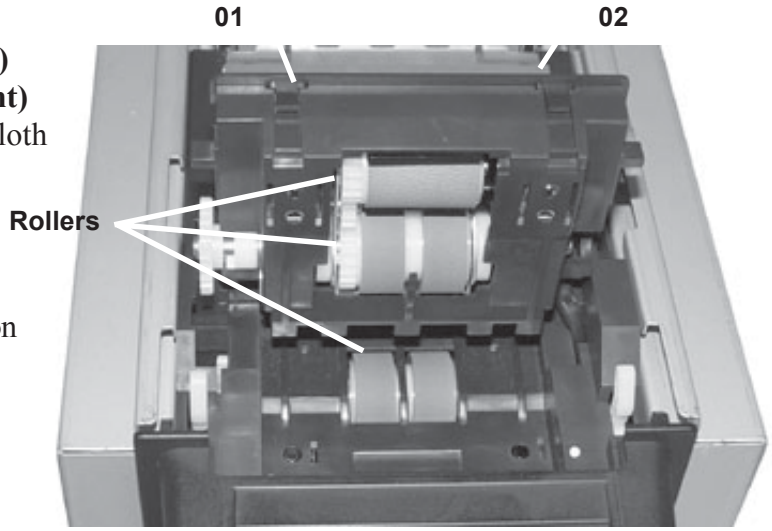


12. The software will begin downloading. The screen will display the elapsed time and a bar indicating the download transmission.



Cleaning Procedure

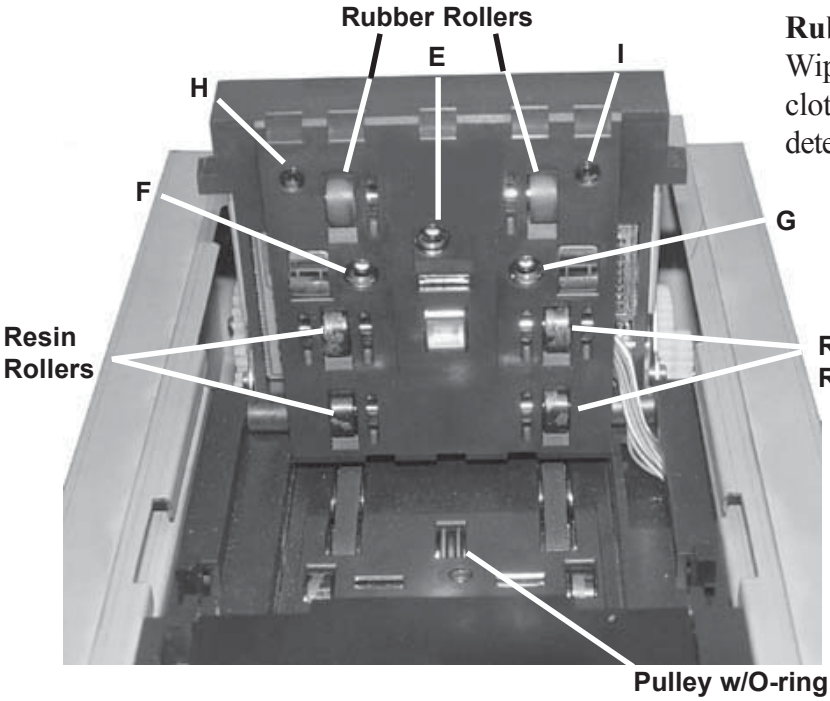
Cleaning the Bulk Note Feeder:



01: Bulk note feeder sensor (Left)
02: Bulk note feeder sensor (Right)
Wipe dust off with cotton cloth or swab.

Rubber rollers
Dampen a cotton cloth with a mild detergent/water solution and wipe off dust.

Cleaning the Validator Section:



Sensors E, F, G, H, I
Wipe dust off using a cotton cloth or swab.

Rubber Rollers
Wipe dust off using a cotton cloth or swab soaked in a mild detergent/water solution.

Pulley w/O-ring
Wipe dust off using a cotton cloth or swab soaked in a mild detergent/water solution.

Resin Rollers
Wipe dust off using a cotton cloth or swab.

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