A6&V6&N6&S6
Bill Validator
Service Manual

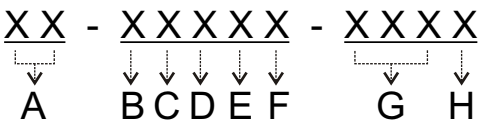
International Currency Technologies
www.ictgroup.com.tw

Contents

Model Number :

A6/V6/S6/N6 Model Number Detail

Model Number Configuration :



A : Model Number
B : Voltage & Interface (Hardware)
C : Stacker Size
D : Bezel
E : Mounting Kit
F : Protocol (Software)
G : Currency
H : Number of Denomination

Example : A 6 - 1 3 S 0 P - USD 4

1. Model Number :

(A).

Code	Product Name
V6	Vending BA
A6	Amusement BA
S6	POWER SAVING BA

Code	Product Name
N6	NISR BA

(B). Voltage & Interface (Hardware) :

Code	Voltage & Interface
1	AC 110V + Pulse
2	DC 12V + Pulse
3	AC 24V / DC 34V + MDB
4	AC 110V + RS232
5	DC 12V + RS232
6	DC 12V + MDB
7	AC 24V / DC 34V + RS232
8	AC 24V / DC 34V + Pulse
9	

(C). Stacker Size :

Code	Stacker Size	Code	Stacker Size
0	No Cassette	8	800 Note
3	250 Note		
5	500 Note		

(D). Bezel :

Code	Bezel
O	No Bezel
S	Standard Bezel
X	Extended Bezel
F	Fitted Bezel
D	Down stacker Bezel
H	Horizontal Bezel

(E). Mounting Kit :

Code	Mounting Kit
F	Frame
C	Cover
O	N/A

(F). Protocol (for software) :

Code	Protocol
P	Pulse 12V . 110V
M	MDB (Pulse + MDB)
R	RS-232 (Pulse + ICT002)
N	NISR
V	For Valley Pulse
1	Pulse + ICT004 (P)
2	Pulse + EBDS
3	
4	Pulse + Phone Card Protocol (ICT001)
5	Pulse + Parallel Board
6	Pulse + MDB for Power Save
7	Pulse + 5V Enable
8	Pulse + ICT003
9	

(G). Currency (For Example : USD=US Dollar, EUR= Euro) :

(H). Number of Denomination :

Code	Currency Denomination	Code	Currency Denomination
1	1	4	4
2	2	5	5
3	3		

General Specification :

Acceptance Rate

96% or greater

Bill insertion

4-way Acceptance

Acceptance Speed

Approx. 3 seconds
(including bill stacking)

Interfaces

Pulse
MDB (Multi-Drop Bus)
NISR

Bill box Capacity

Approx. 300 bills (200~300)
500 bills (300~500)
800 bills (750~800)

Weight

Approx. 2.5kg (shipping)

Power Sources

34V DC 1.5Amp (M.D.B)
12V DC 3 Amp
117V AC 0.2Amp (60HZ)
24V AC 1.5Amp (60HZ)

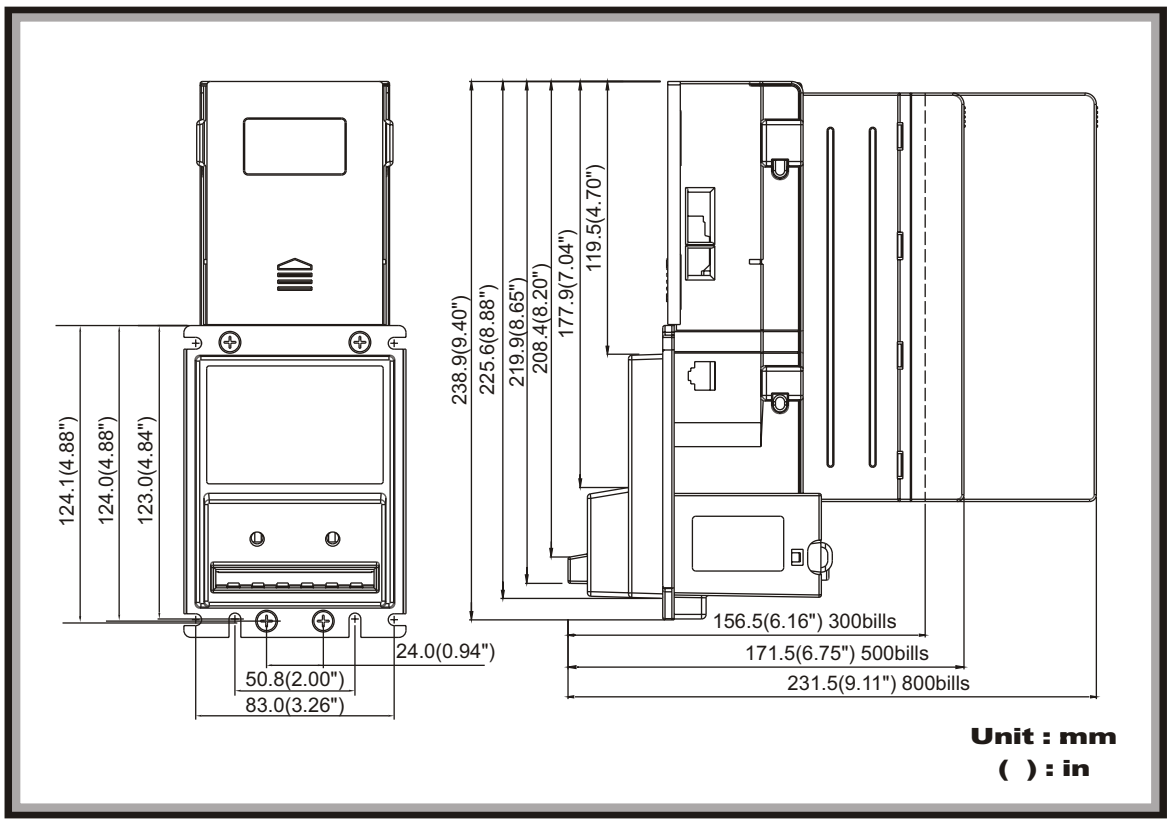
Power Consumption

Max 50 watts

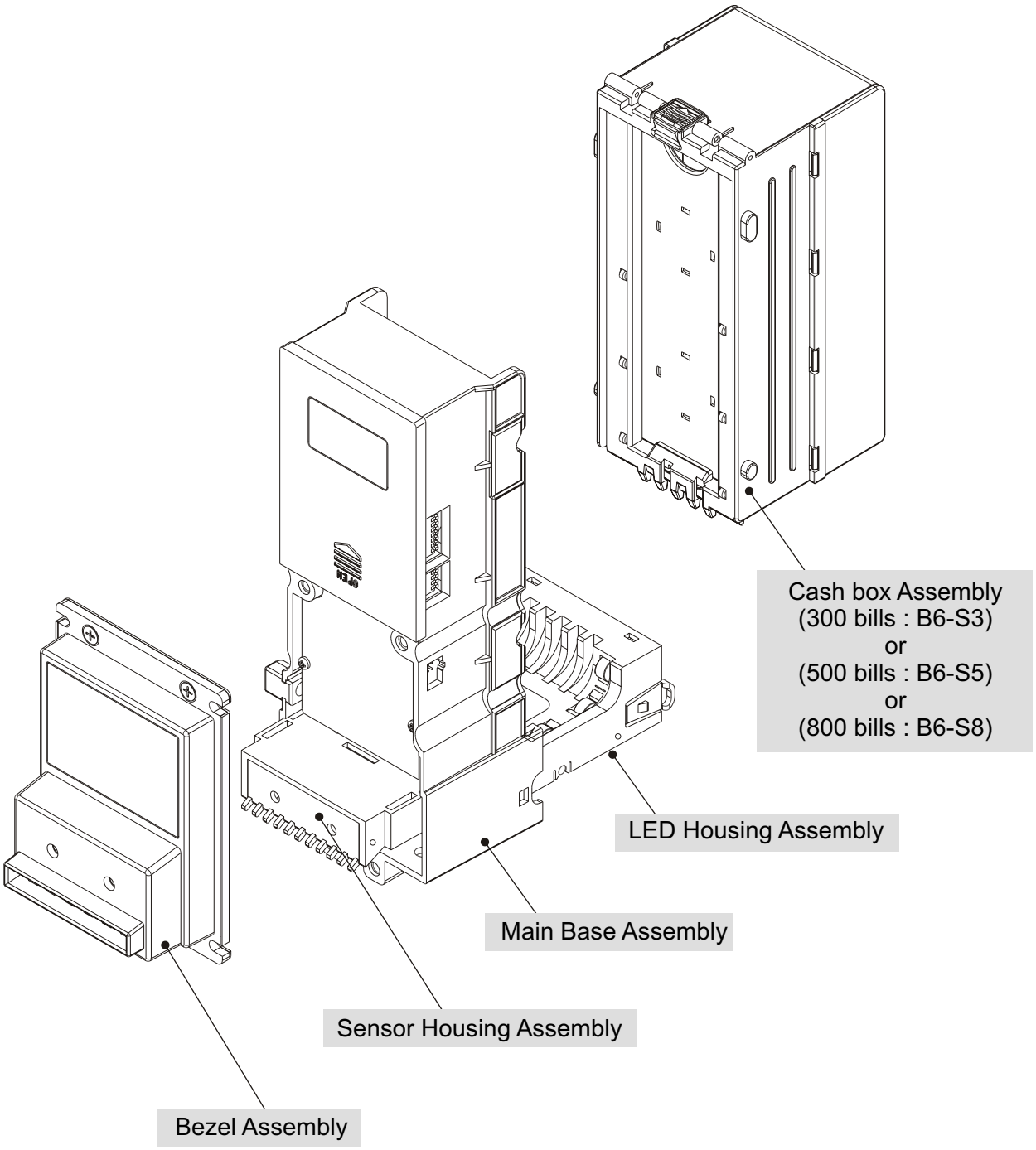
Environment Range

Operating Temperature -15°C~60°C
Storage Temperature -30°C~70°C
Humidity : 30%~85% RH (no condensation)

Dimensions :

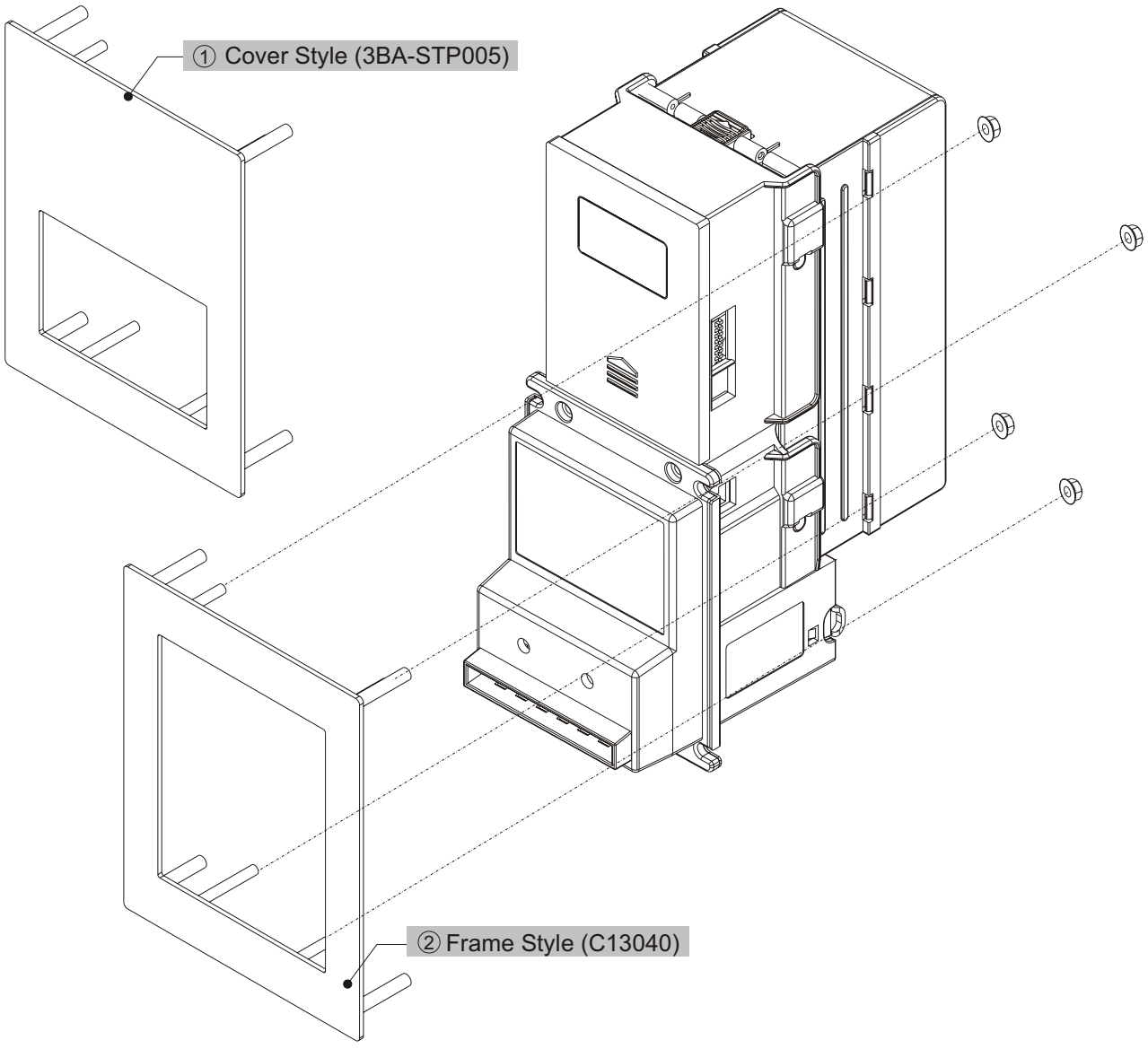


Component Names :



Installation :

There are two kinds of mounting kits.

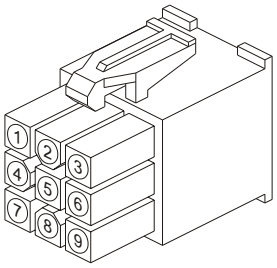


A6 Pin-out Assignments (Pulse for 12V DC) :

For the ***12V DC*** version of the A6 bill validator, the harness ***(part number WEL-M007A)*** has a dual-in-line 30-pin peripheral connector at one end and a 9-pin mating connector at the other end. Connect the 30-pin connector to the side of the bill validator and the 9-pin connector to the 12V DC power cable (part no. CU-961-1, see pg. 16 for pin-out info).

◎ 9-pin connector pin-out assignments:

Pin 1 INHIBIT +
Pin 2 INHIBIT -
Pin 3 Reserved
Pin 4 Reserved
Pin 5 12V DC (Power)
Pin 6 Reserved
Pin 7 CREDIT +(N.O.)
Pin 8 CREDIT - (Common)
Pin 9 GND (Power)



◎ Dual-in-line 30-pin peripheral connector (A6, 12V DC) pin-out assignments:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Pin 1 - CREDIT(-)(Common)
Pin 2 - 12VDC (Power)
Pin 3 - ENABLE(-)
Pin 4 - Reserved
Pin 5 - INHIBIT (+)
Pin 6 - KEY
Pin 7 - Reserved
Pin 8 - Reserved
Pin 9 - Reserved
Pin 10 - GND (Power)
Pin 11 - Reserved
Pin 12 - Reserved
Pin 13 - Reserved
Pin 14 - Reserved
Pin 15 - Reserved
Pin 16 - CREDIT(+)(N.O.)
Pin 17 - Reserved
Pin 18 - ENABLE (+)
Pin 19 - KEY
Pin 20 - INHIBIT (-)
Pin 21 - Reserved
Pin 22 - Reserved
Pin 23 - Reserved
Pin 24 - Reserved
Pin 25 - Reserved
Pin 26 - Reserved
Pin 27 - Reserved
Pin 28 - Reserved
Pin 29 - Reserved
Pin 30 - Reserved

Caution

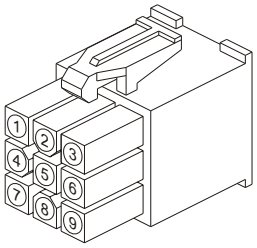
Turn off power before connecting or disconnecting the bill validator.

A6 Pin-out Assignments (Pulse for 117V AC) :

For the ***117V AC*** version of the A6 bill validator, connect the 30-pin peripheral connector on one end of the harness ***(part no. WEL-M008-A)*** to the side of the unit and the 9-pin connector to the 117V AC power cable (WEL-M012, see pg. 13 for pin-out info).

◎ 9-pin connector pin-out assignments:

Pin 1 NEUTRAL INHIBIT
Pin 2 NEUTRAL ENABLE
Pin 3 HOT ENABLE
Pin 4 117V AC HOT (Power)
Pin 5 **Earth - Ground**
Pin 6 117V AC NEUTRAL(Power)
Pin 7 CREDIT RELAY (N.O.)
Pin 8 CREDIT RELAY (Common)
Pin 9 Reserved



IMPORTANT: On 117V AC units, the Earth Ground must be located inside the machine.

◎ Dual-in-line 30-pin peripheral connector (A6, 117V AC) pin-out assignments:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

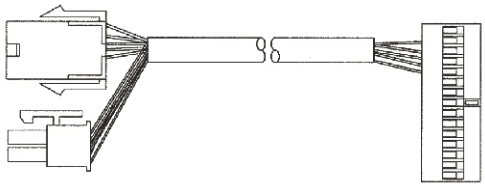
Pin 1 - CREDIT_ RELAY(COM)
Pin 2 - Reserved
Pin 3 - NEUTRAL ENABLE
Pin 4 - 117VAC NEUTRAL(Power)
Pin 5 - NEUTRAL INHIBIT
Pin 6 - KEY
Pin 7 - Reserved
Pin 8 - Reserved
Pin 9 - Reserved
Pin 10 - Reserved
Pin 11 - Reserved
Pin 12 - Reserved
Pin 13 - Reserved
Pin 14 - Reserved
Pin 15 - Reserved
Pin 16 - CREDIT RELAY(N.O.)
Pin 17 - Reserved
Pin 18 - HOT ENABLE
Pin 19 - KEY
Pin 20 - 117VAC HOT(Power)
Pin 21 - EARTH GROUND
Pin 22 - Reserved
Pin 23 - Reserved
Pin 24 - Reserved
Pin 25 - Reserved
Pin 26 - Reserved
Pin 27 - Reserved
Pin 28 - Reserved
Pin 29 - Reserved
Pin 30 - Reserved

Caution

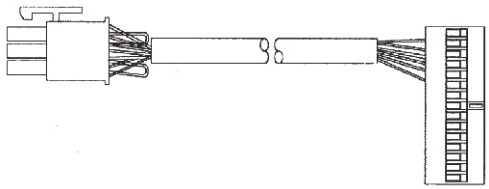
Turn off power before connecting or disconnecting the bill validator.

Cable :

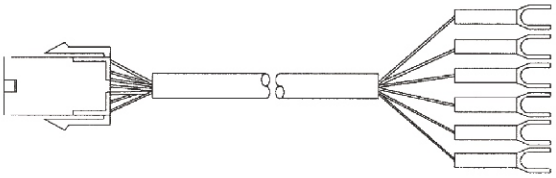
MDB BA Cable
Part Number: WEL-M006



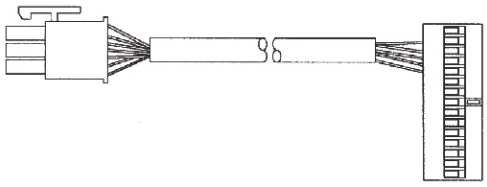
12V DC Pulse BA Cable
Part Number: WEL-M007-A



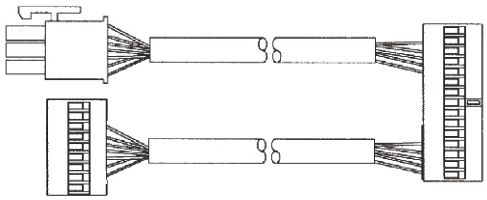
12V DC Pulse Wiring Harness
Part Number: CU-961-1



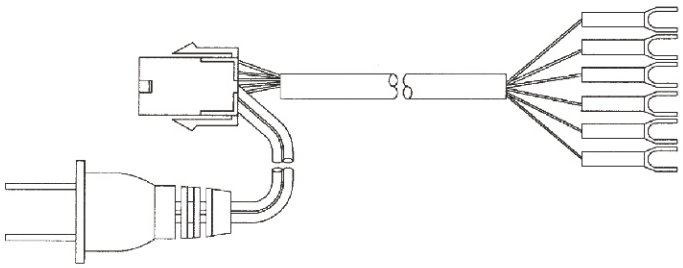
117V AC Pulse BA Cable
Part Number: WEL-M008-A



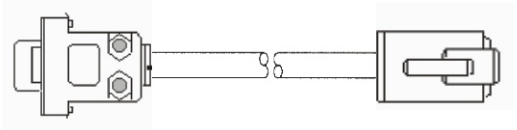
117V AC NISR BA Cable
Part Number: WEL-M013

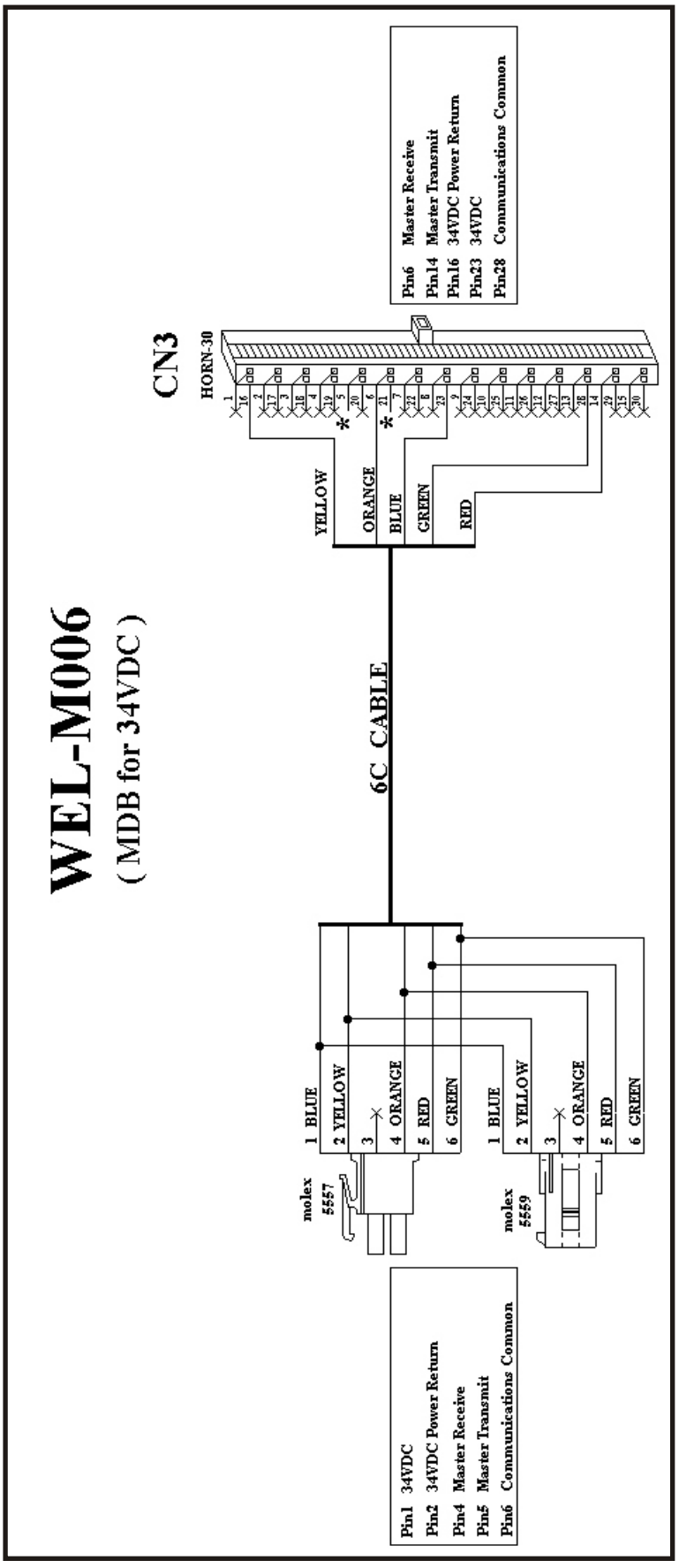


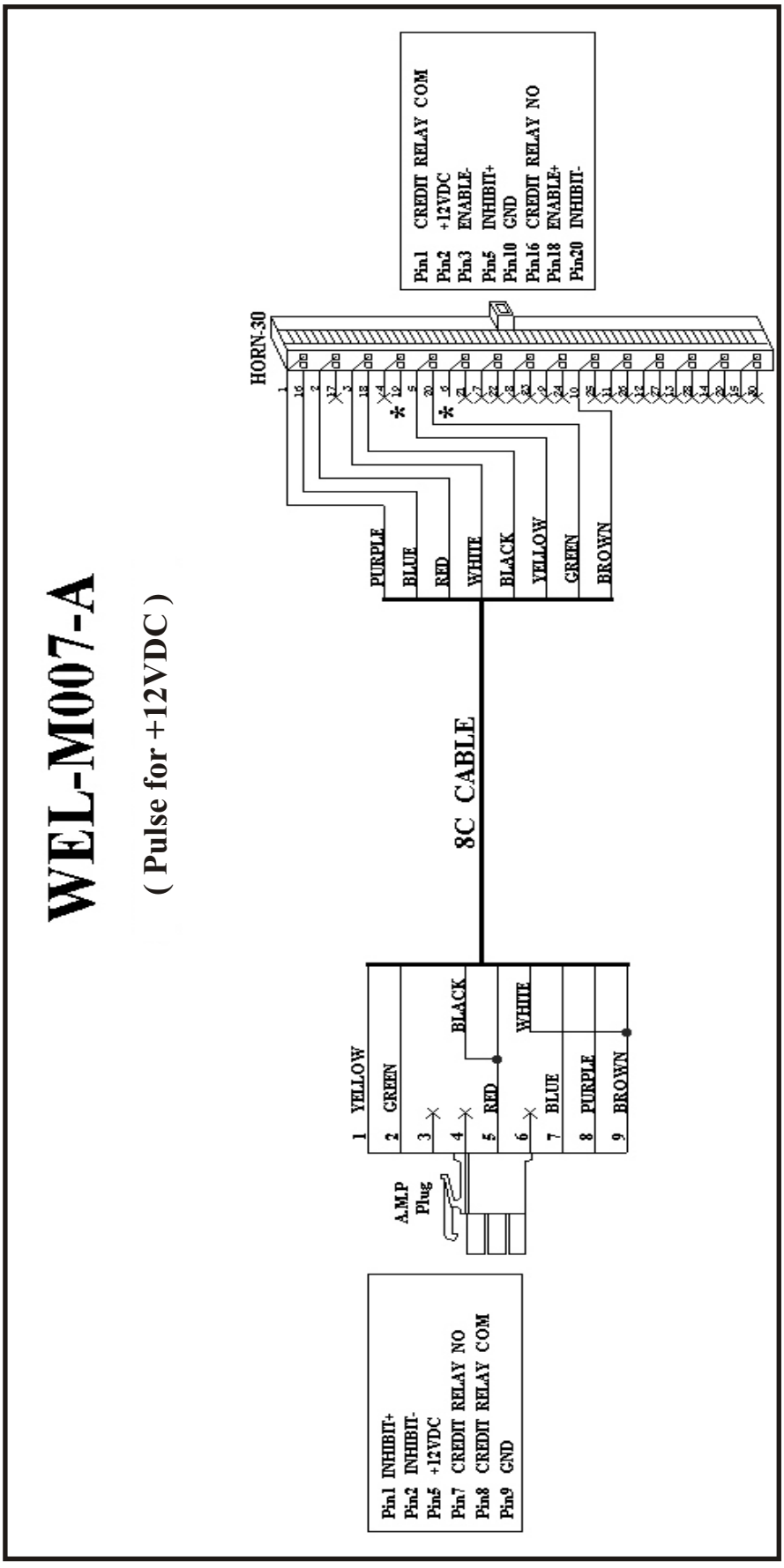
117V AC Pulse Wiring Harness
Part Number: WEL-M012



RS232 Rj45 BA→PC Wiring Harness
Part Number: WEL-V706

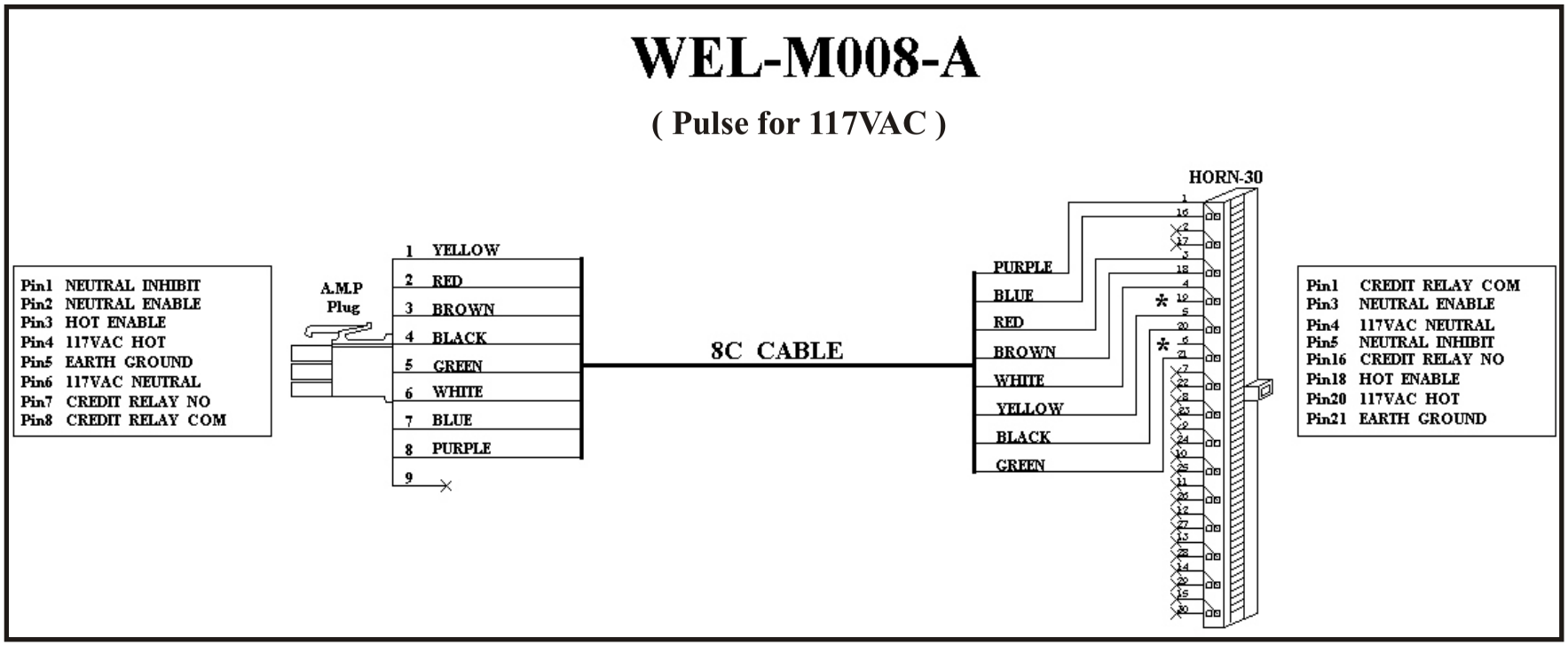



WEL-M006
(MDB for 34VDC)
CN3
HORN-30
Pin6 Master Receive
Pin14 Master Transmit
Pin16 34VDC Power Return
Pin23 34VDC
Pin28 Communications Common
YELLOW
ORANGE
BLUE
GREEN
RED
6C CABLE
molex 5557
1 BLUE
2 YELLOW
3
4 ORANGE
5 RED
6 GREEN
molex 5559
1 BLUE
2 YELLOW
3
4 ORANGE
5 RED
6 GREEN
Pin1 34VDC
Pin2 34VDC Power Return
Pin4 Master Receive
Pin5 Master Transmit
Pin6 Communications Common


WEL-M007-A
(Pulse for +12VDC)
HORN-30
Pin1 CREDIT RELAY COM
Pin2 +12VDC
Pin3 ENABLE-
Pin5 INHIBIT+
Pin10 GND
Pin16 CREDIT RELAY NO
Pin18 ENABLE+
Pin20 INHIBIT-
PURPLE
BLUE
RED
WHITE
BLACK
YELLOW
GREEN
BROWN
8C CABLE
A.M.P Plug
1 YELLOW
2 GREEN
3
4
5 RED
BLACK
6
7 BLUE
WHITE
8 PURPLE
9 BROWN
Pin1 INHIBIT+
Pin2 INHIBIT-
Pin5 +12VDC
Pin7 CREDIT RELAY NO
Pin8 CREDIT RELAY COM
Pin9 GND

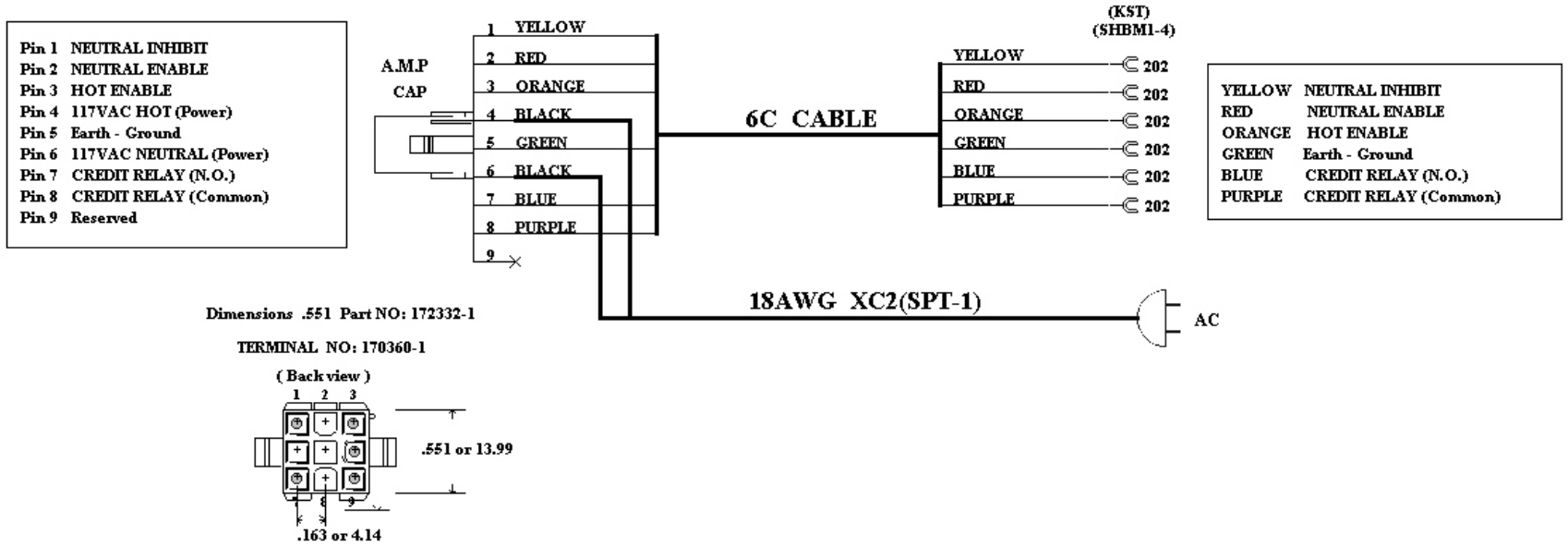
WEL-M008-A

(Pulse for 117VAC)



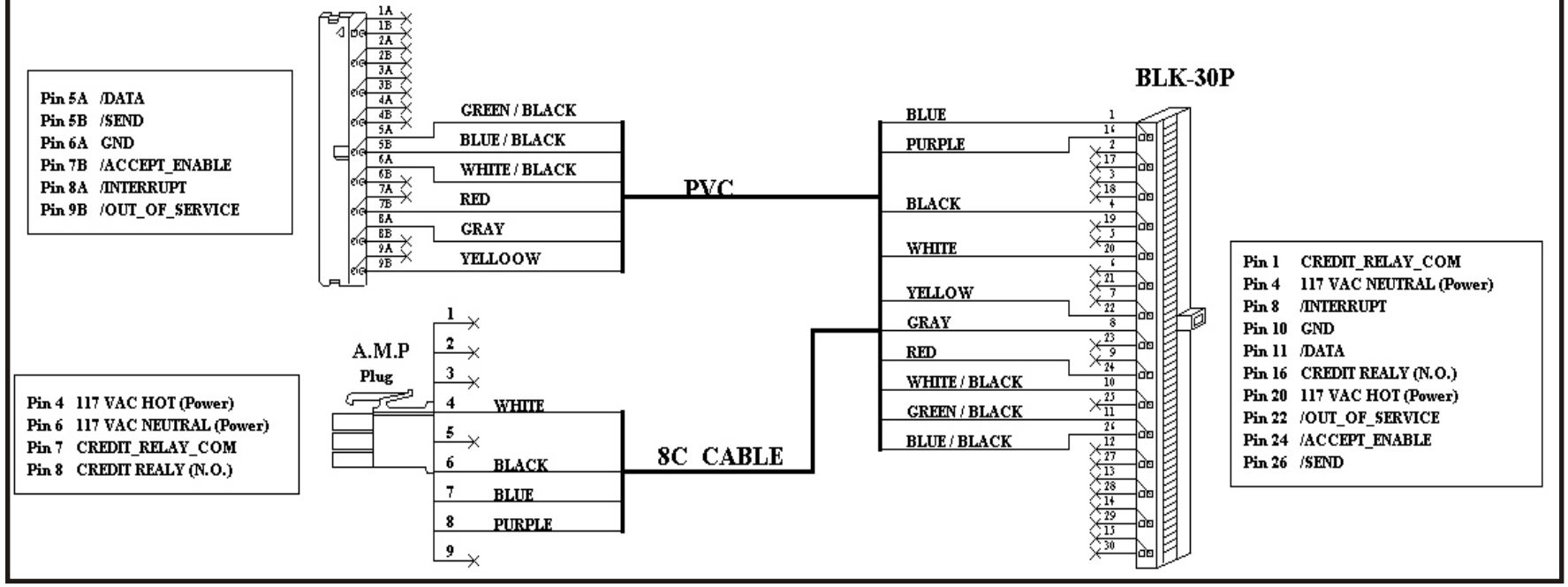
WEL-M012

(Pulse for 117VAC)



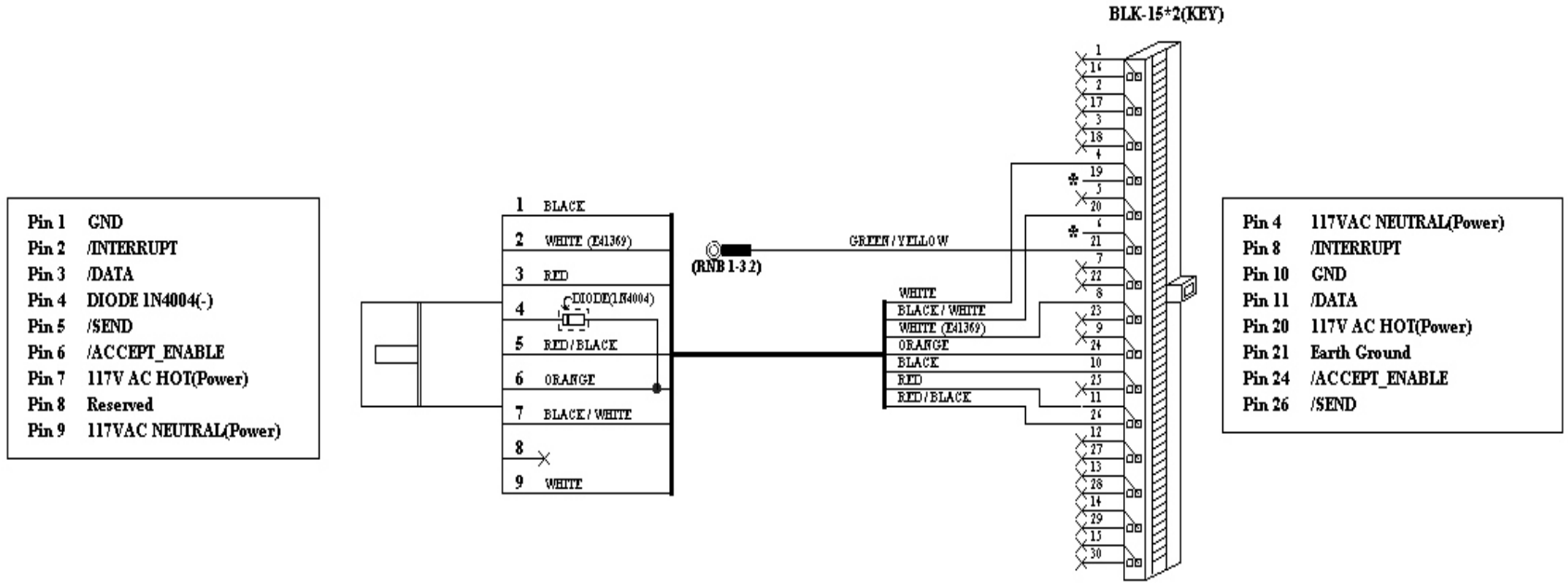
WEL-M013

(N.I.S.R. for 117VAC)



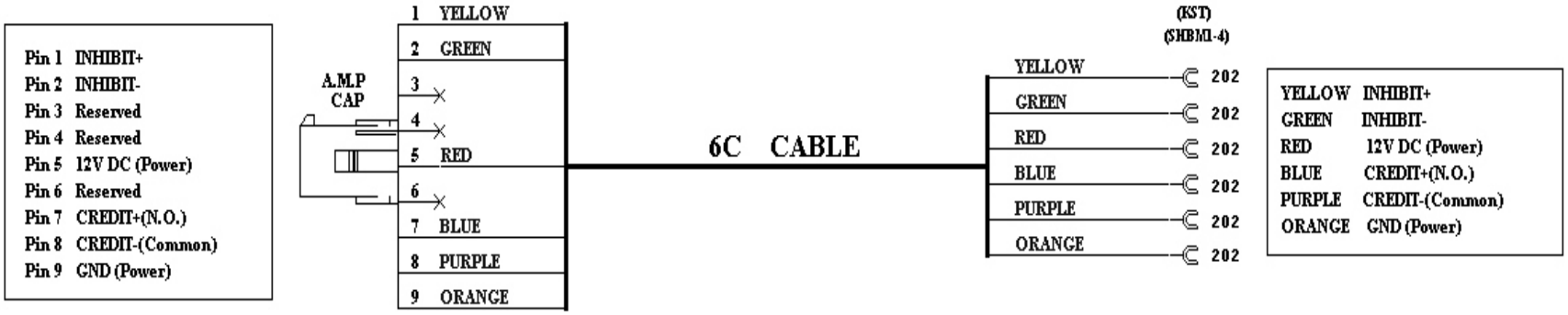
WEL-M023

(N.I.S.R. for Pot of Gold)



CU-961-1

(Pulse for 12VDC)



Dip Switch Setting :

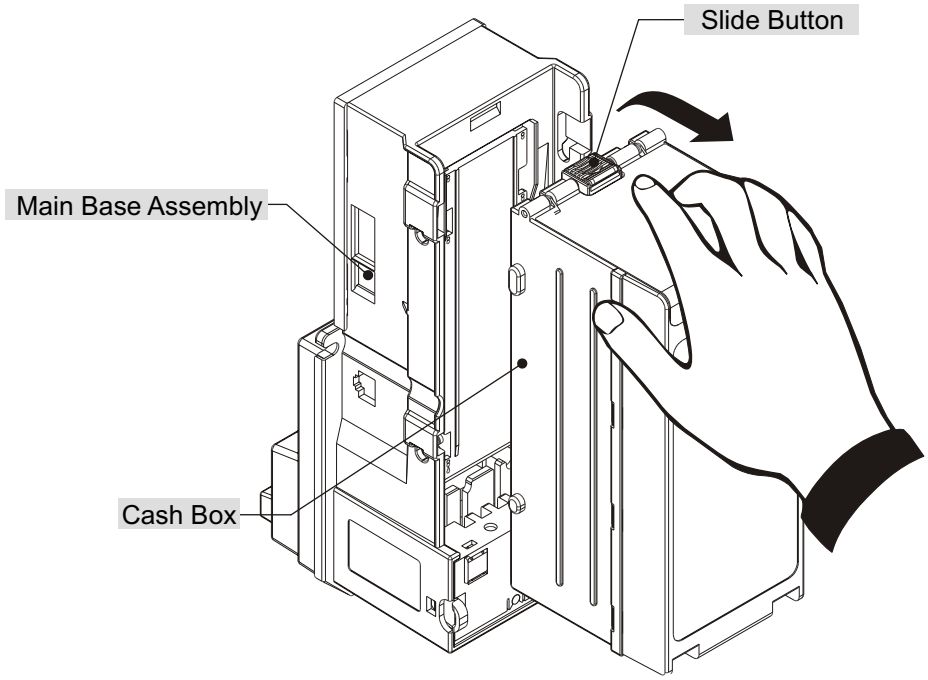
Supported bill US$ 1, 5, 10, 20, (old 5, 10, 20), (new 20) 4bills.

A6/V6 dip-switch settings and functions:

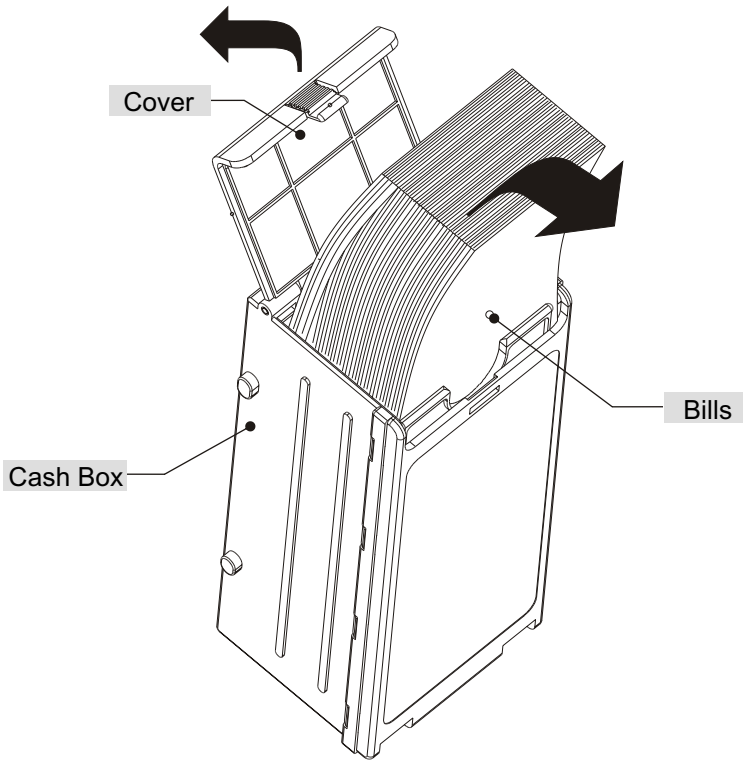
FUNCTION	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW1	SW2	SW3	SW4
Reject US$ 1	ON											
Accept US$ 1	OFF											
Reject US$ 5		ON										
Accept US$ 5		OFF										
Reject US$ 10			ON									
Accept US$ 10			OFF									
Reject US$ 20				ON								
Accept US$ 20				OFF								
Reserved					ON							
Reserved					OFF							
High Acceptance						ON						
High Security						OFF						
Harness disable							ON					
Harness enable							OFF					
Inhibit Active High								ON				
Inhibit Active Low								OFF				
1 pulse / one dollar									OFF	OFF		
2 pulse / one dollar									ON	OFF		
4 pulse / one dollar									OFF	ON		
20 pulse / one dollar									ON	ON		
Pulse Speed	50ms on / 50ms off										OFF	OFF
	60ms on / 300ms off										ON	OFF
	30ms on / 50ms off										OFF	ON
	150ms on / 150ms off										ON	ON

Collecting Bills :

◉ 1. Slide white button on top of Bill Validator. Lift up back of bill box.



◉ 2. Open the Cash box cover to take out bills.



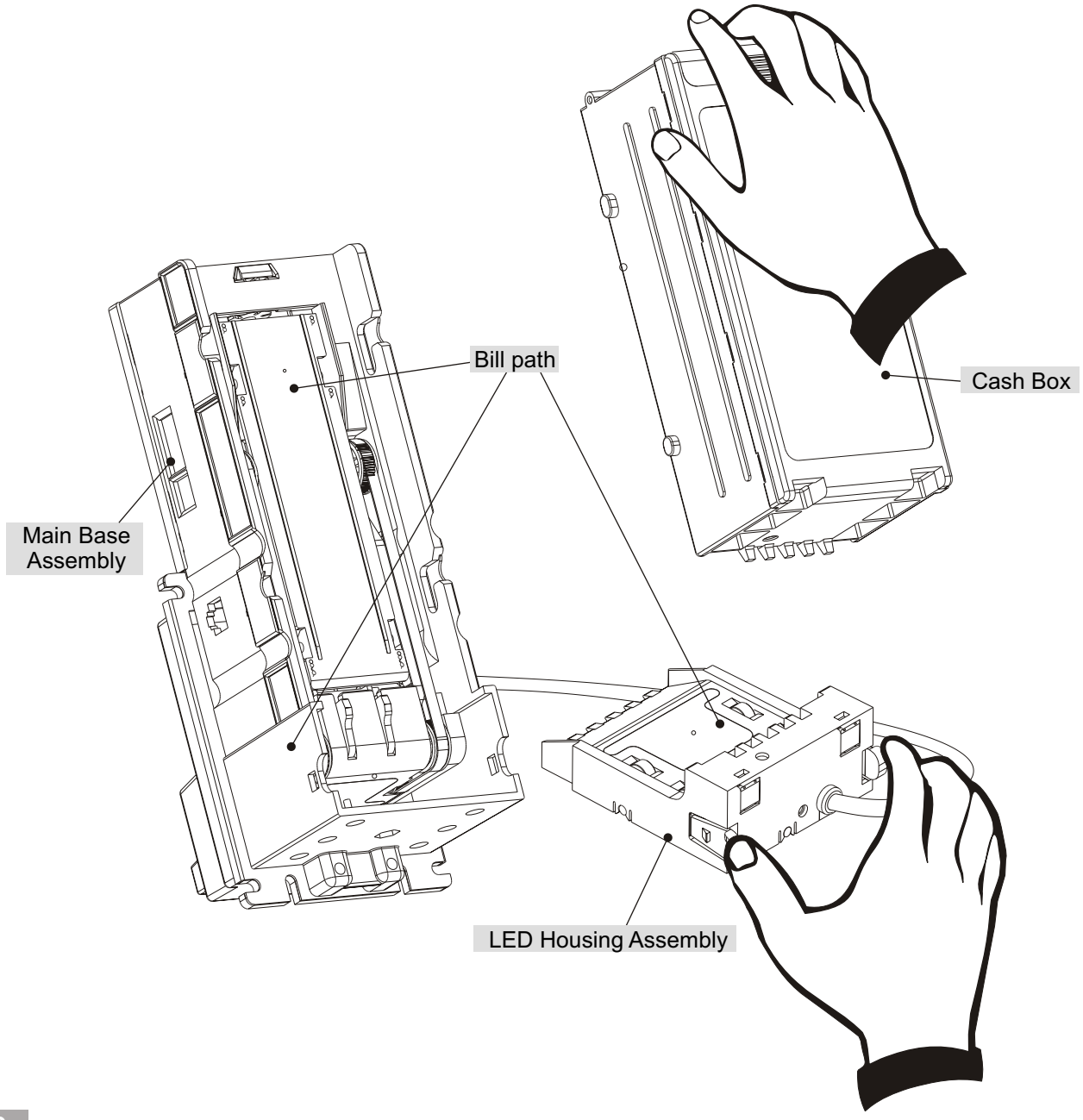
Cleaning :

Reside on LEDs and sensors can cause bill jams and decrease acceptance rates.
Clean internal parts periodically.

- 1. Turn off the power
- 2. Remove cash box & LED Assembly.
- 3. Use a soft cloth or cotton swab to clean internal parts and bill path. If the dirt cannot be removed easily, a standard head cleaner may be used.

Caution

1. Never use an organic solvent such as gasoline or paint thinner to clean the unit.
2. Replace the LED Housing Assembly first.

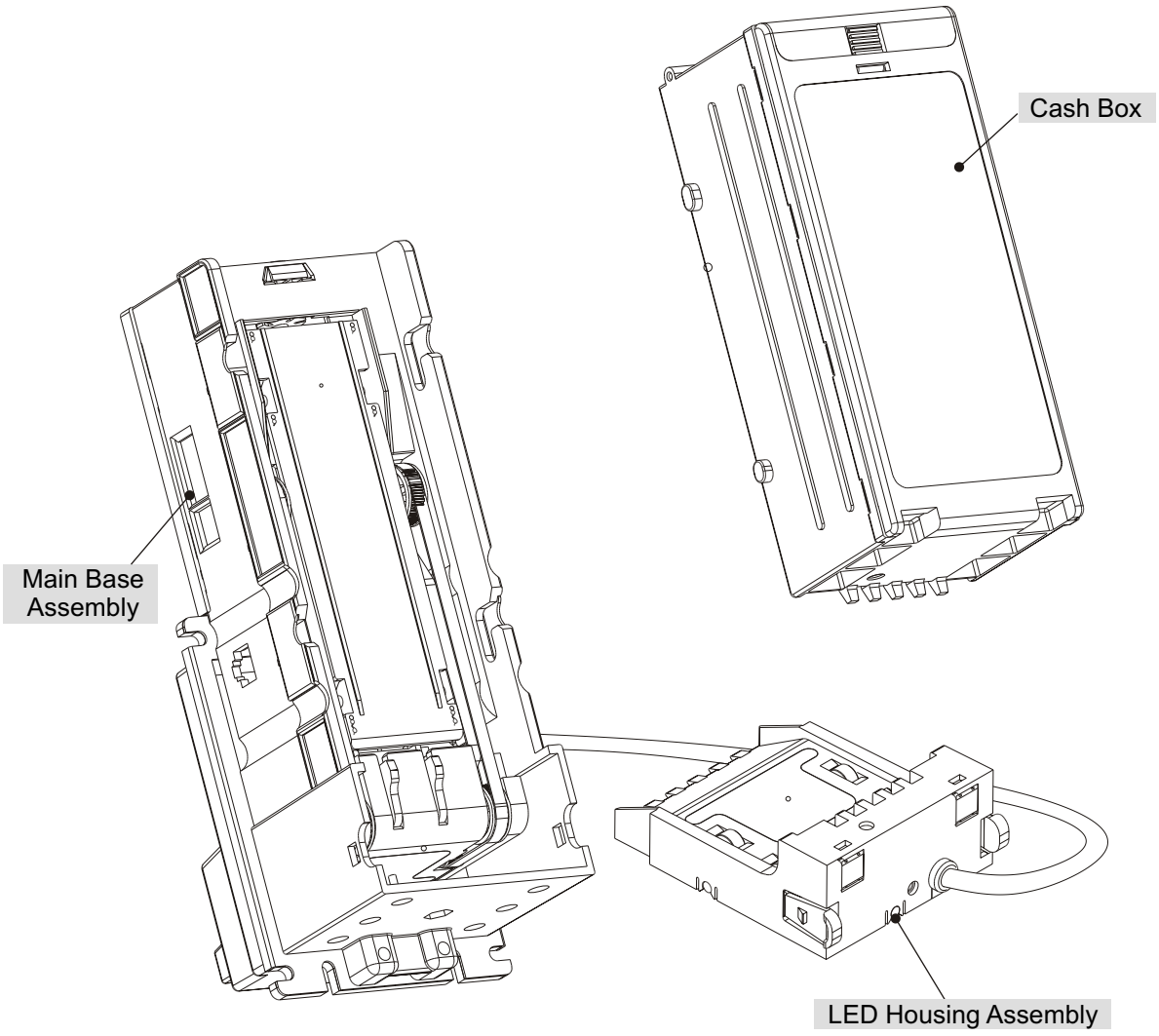


When a Bill is jammed in the Acceptor :

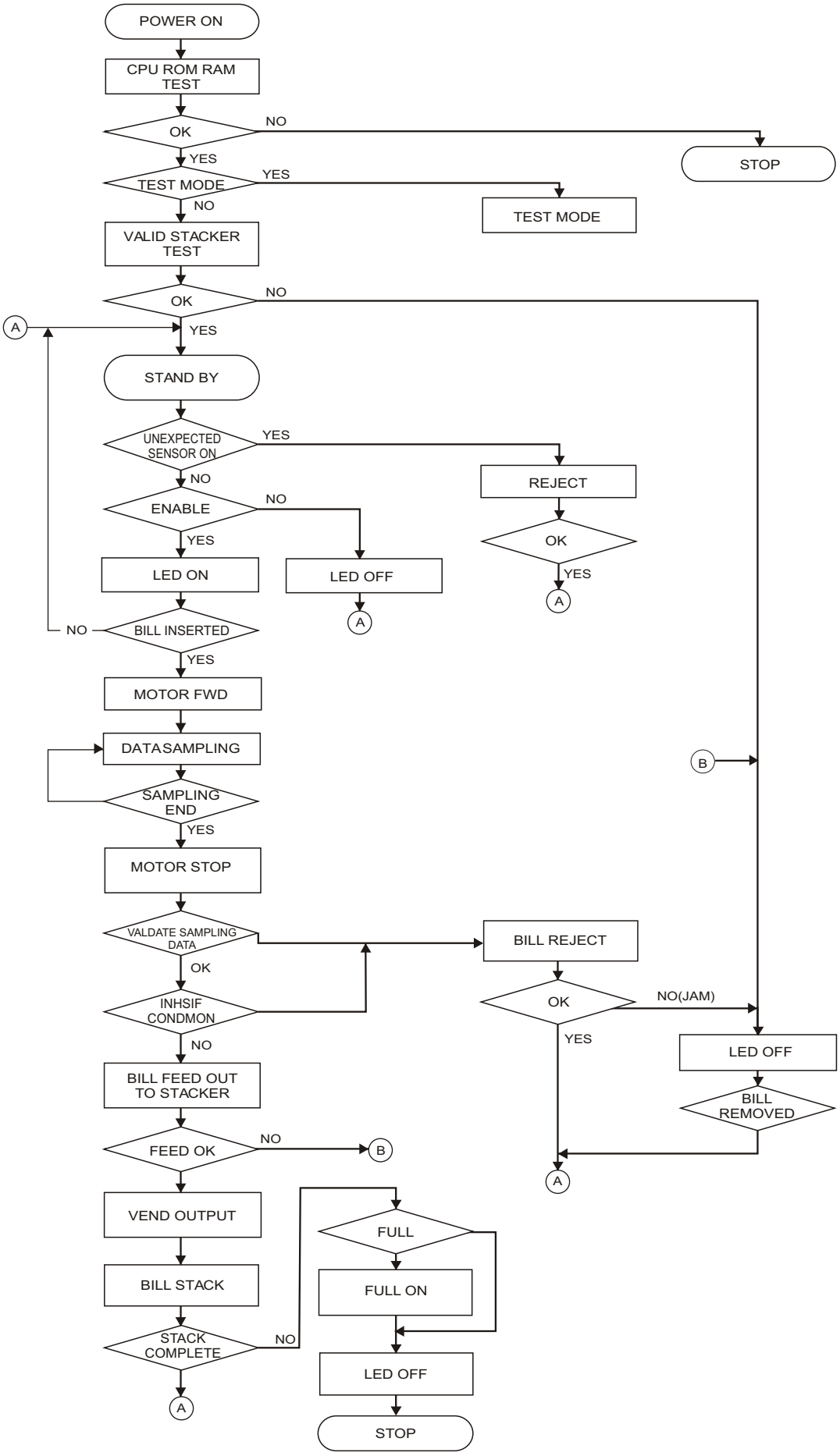
◉ 1. Take out Cash box & LED Housing Assembly.

◉ 2. Remove jammed bill.

Caution	Replace the LED Housing Assembly first.

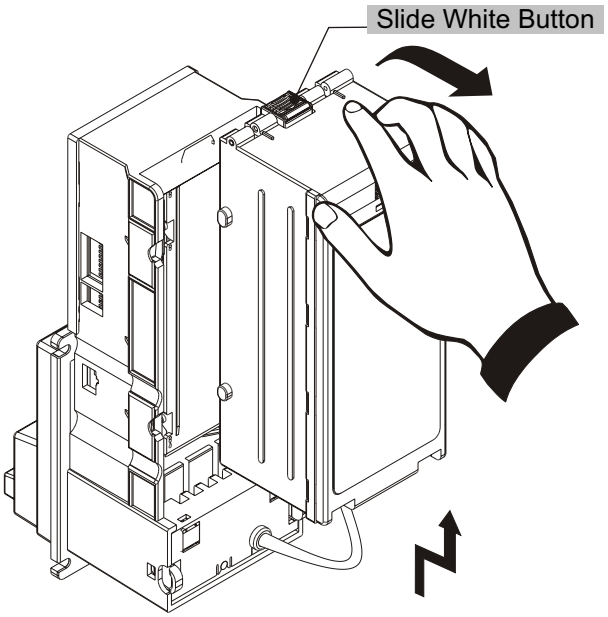


Operation Flowchart :

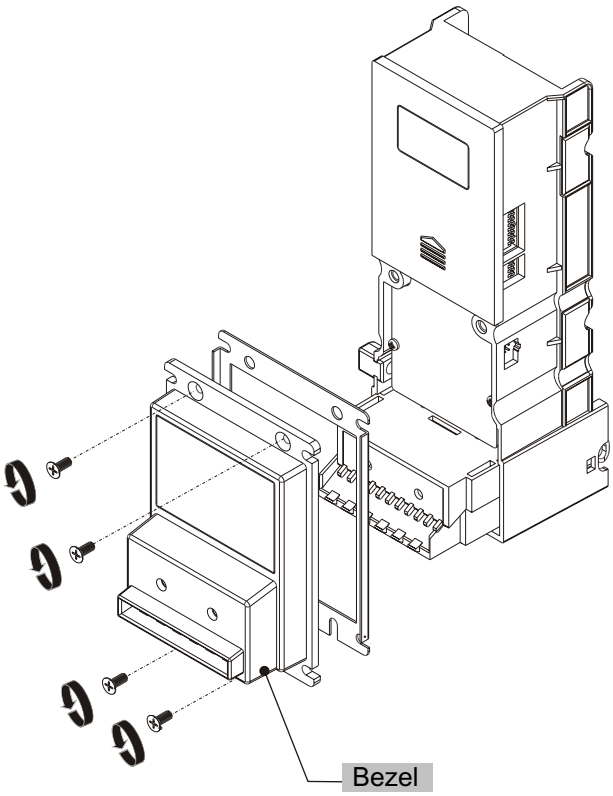


Disassembly & Assembly Procedure :

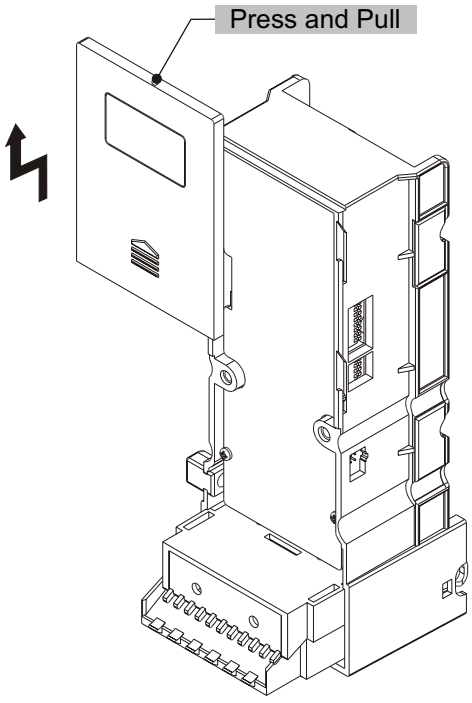
◉ 1. Remove Cash Box



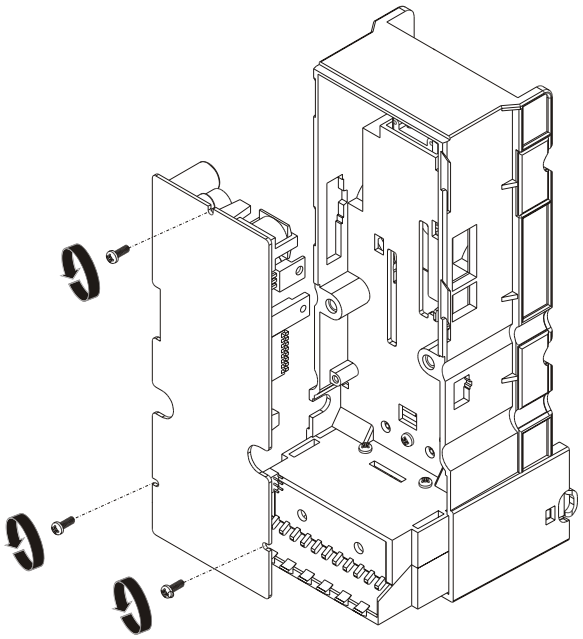
◉ 2. Remove 4 Screws on Bezel



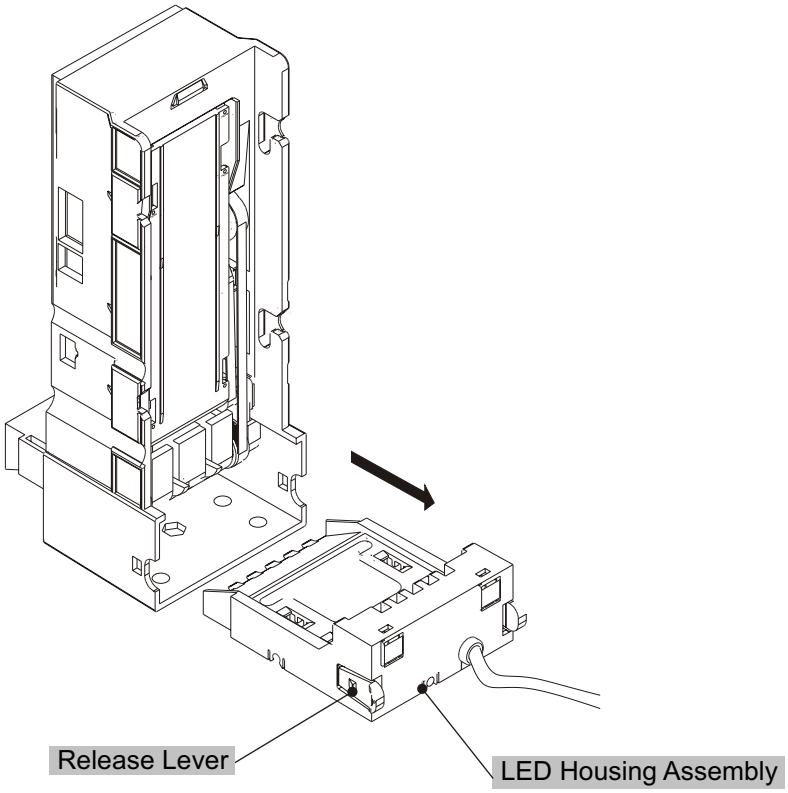
◉ 3. Remove P.C.B Cover



◉ 4. Remove 3 screws from the CPU board and disconnect the 5 connectors on the underside of the board.

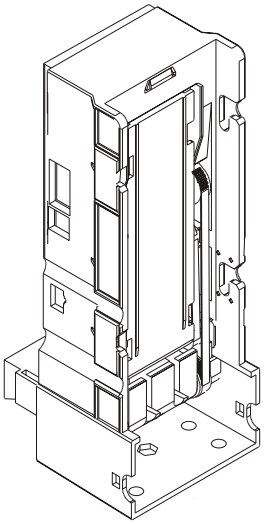


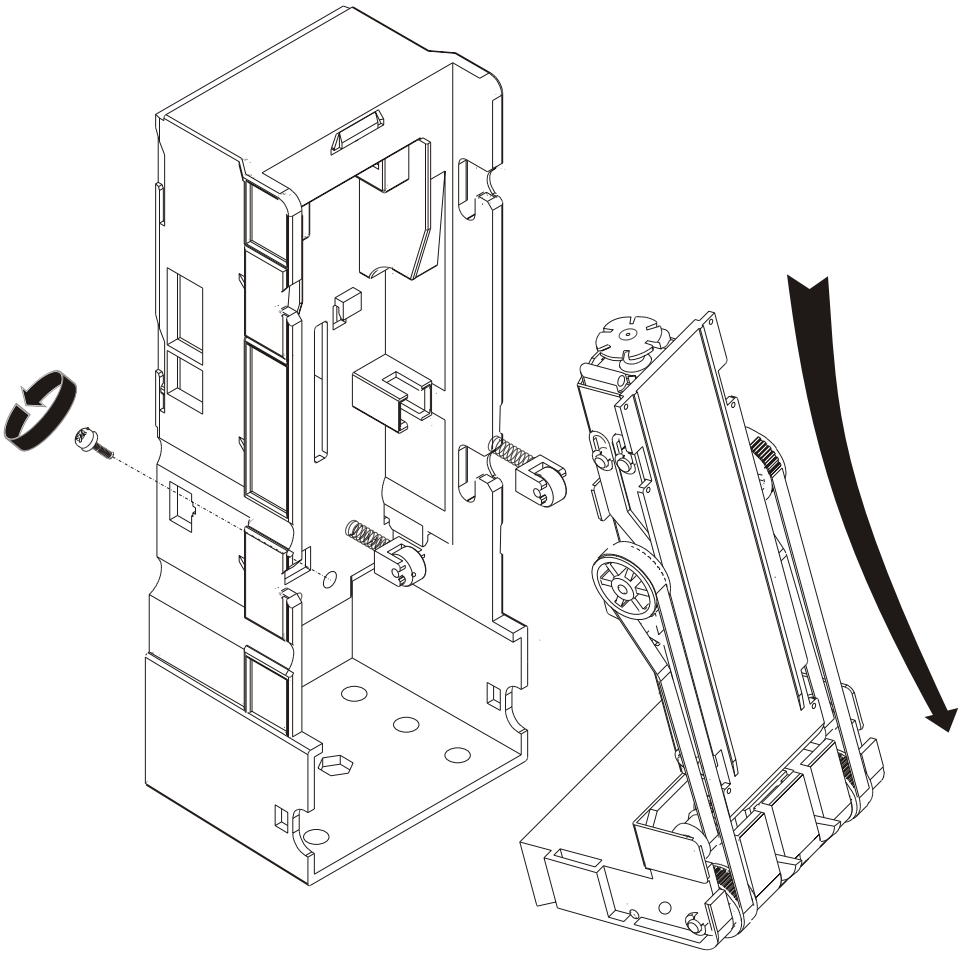
◉ 5. Press the release levers and slide out the LED Housing Assembly .



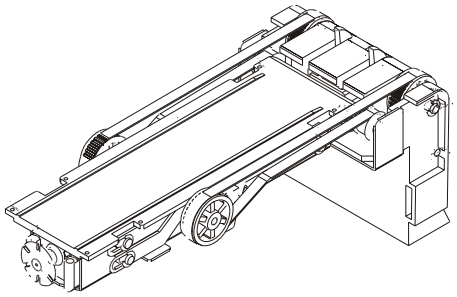
Disassembly Transfer Unit :

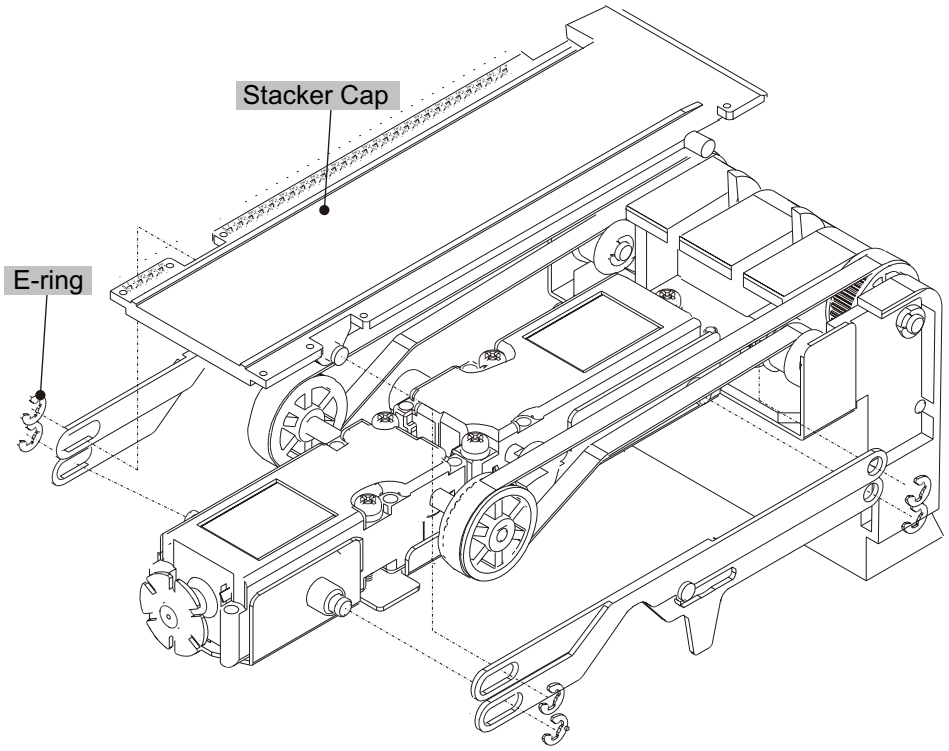
◉ 1. Remove 1 screw on the main base underside,
Then take out the transfer unit.



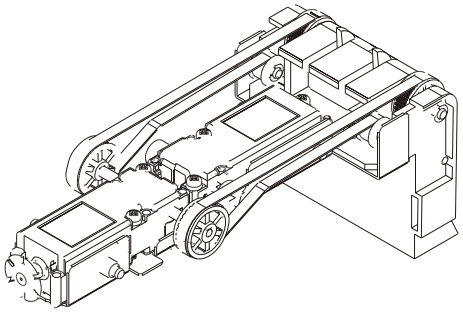


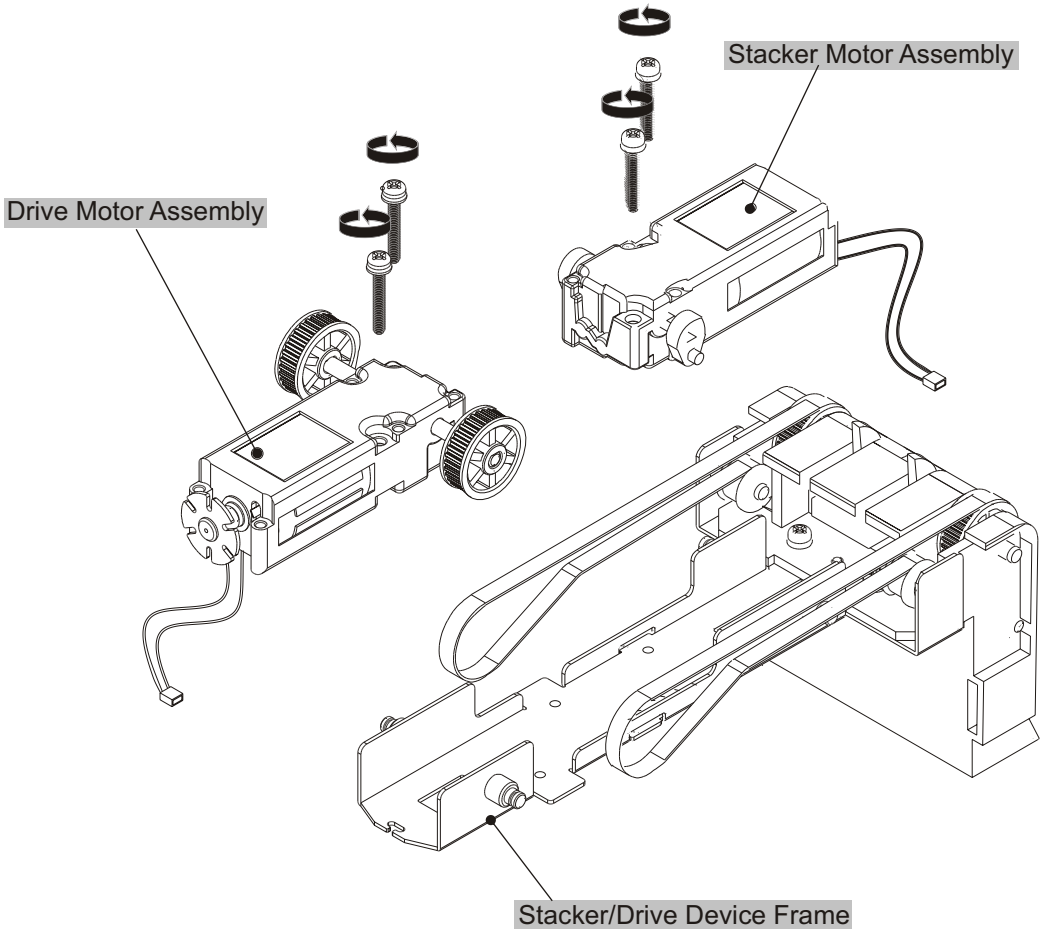
◉ 2. Remove 8 E-rings on both sides, to remove the press mechanism.





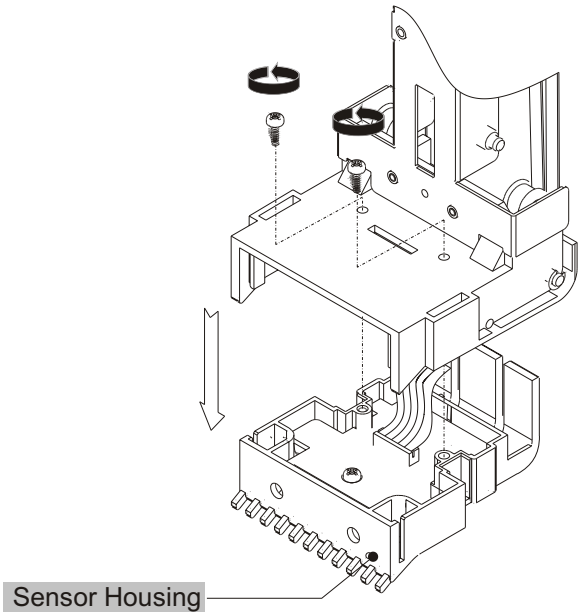
◉ 3. Remove 4 screws on top of motor, separate the motor & stacker/drive device frame.



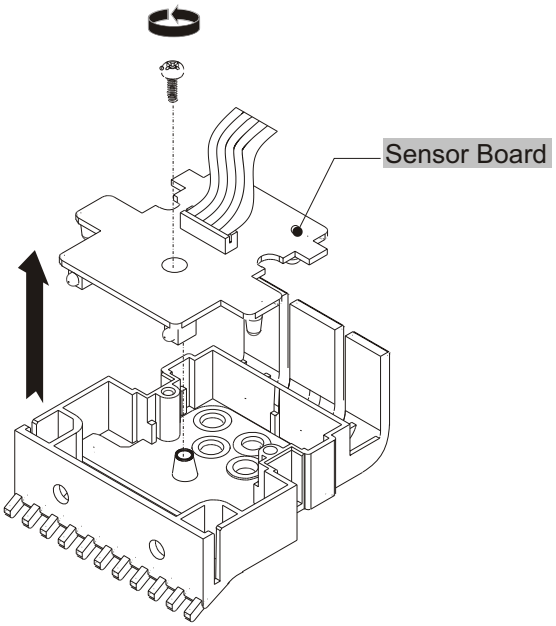


Disassembly of Sensor Housing Unit :

◉ 1. Remove 2 screws and separate them.

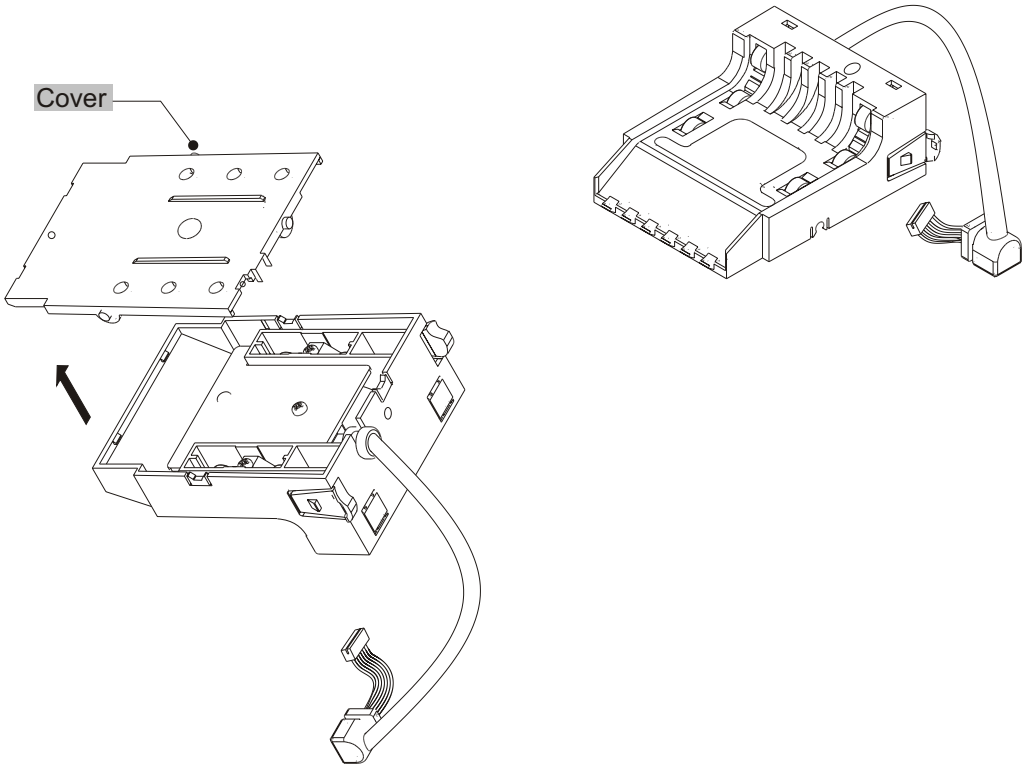


◉ 2. Remove 1 screw on sensor board then take out the board.

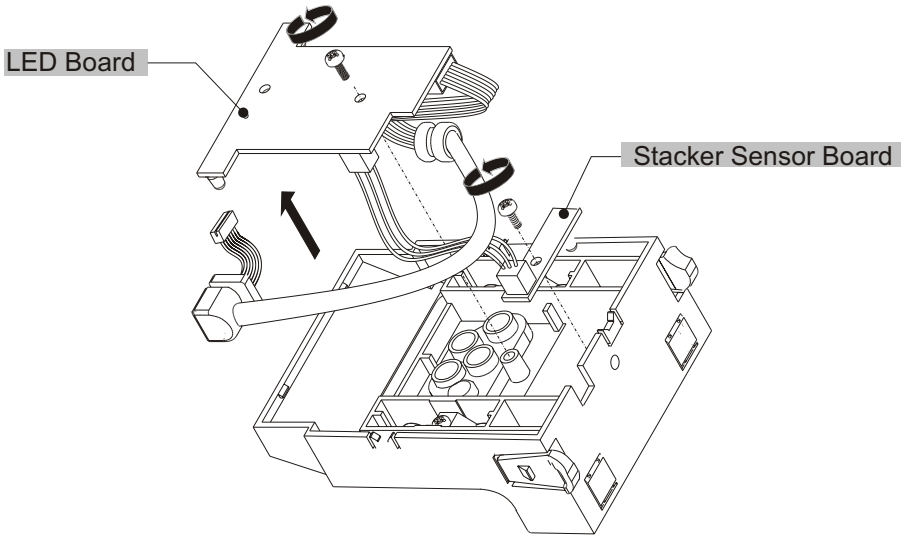


Disassembly of Sensor Housing Unit :

◉ 1. Use a flat screw driver to pop open the cover.



◉ 2. Remove 2 screws on the LED board & Stacker Sensor Board,
Then take out the 2 boards.



Trouble Shooting :

Introduction

Most failures in ICT bill acceptors occur from minor, easily corrected issues. Prior to doing any kind of maintenance it is important to make sure that the bill acceptor is completely disconnected from the machine and is not powered for safety reasons. Please keep safety in mind while doing repair work on any electrical apparatus.

Please keep in mind the following whenever repairs are effected on ICT products :

(1). If the validator is not powering up, make sure that all cables and harnesses are correctly connected and that the unit is receiving power of the correct voltage from a functioning power supply.

(2). Before updating firmware to correct a low acceptance rate error clean the LED housing to remove any dust, oils, or microscopic particles that may be interfering with the function of the validator.

(3). It is important to remember that even though the A6 has automatically calibrating sensors, any time a board is changed the unit must manually be told to calibrate the sensor in order to ensure reliable acceptance.

(4). All repairs should be performed following the repair manual, wiring diagrams, and disassembly procedures in the ICT RMA guide.

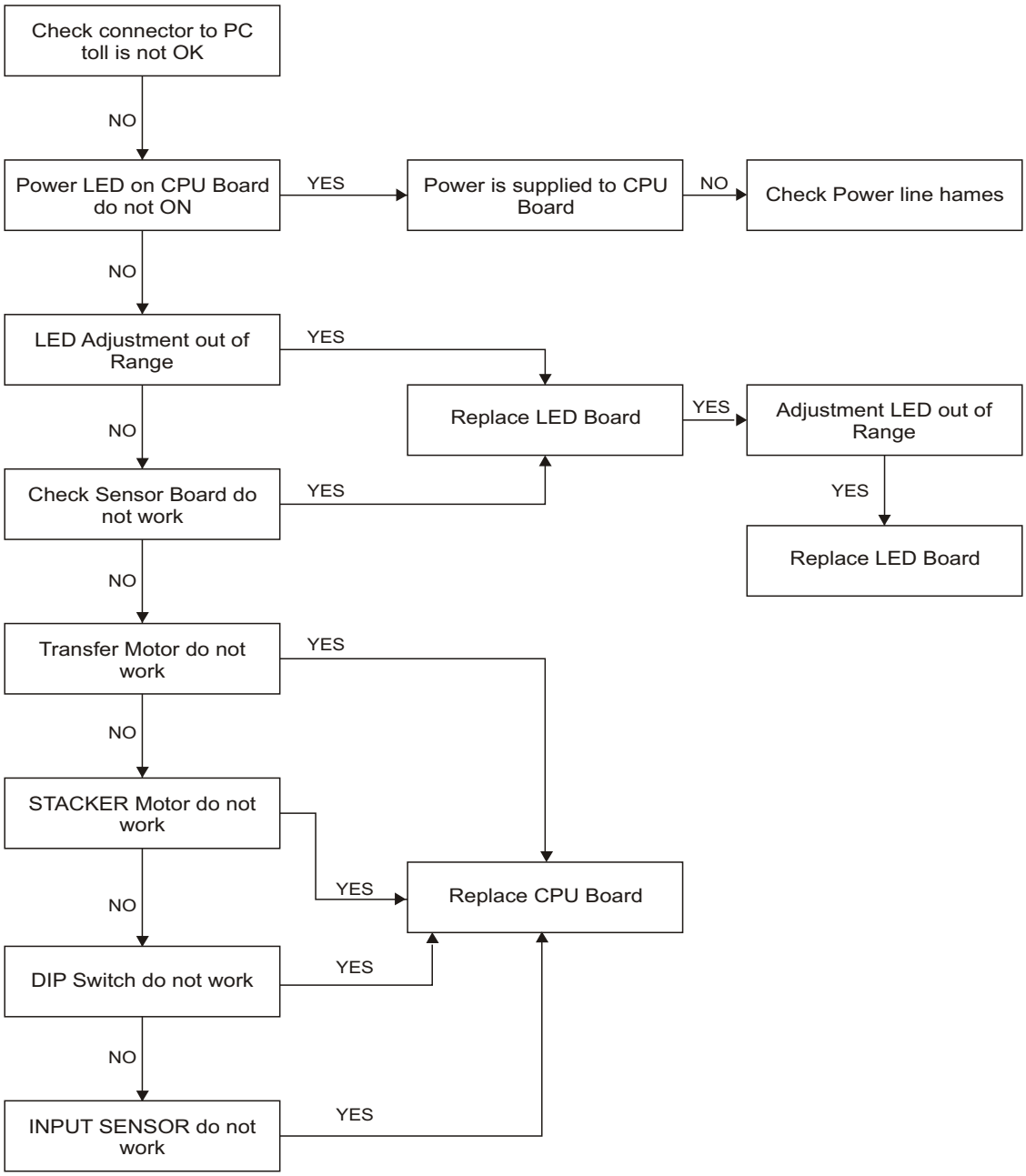
Classification of Failure

Bill acceptor failure can be broadly classified into the four following areas based off of observation of the operation state startup.

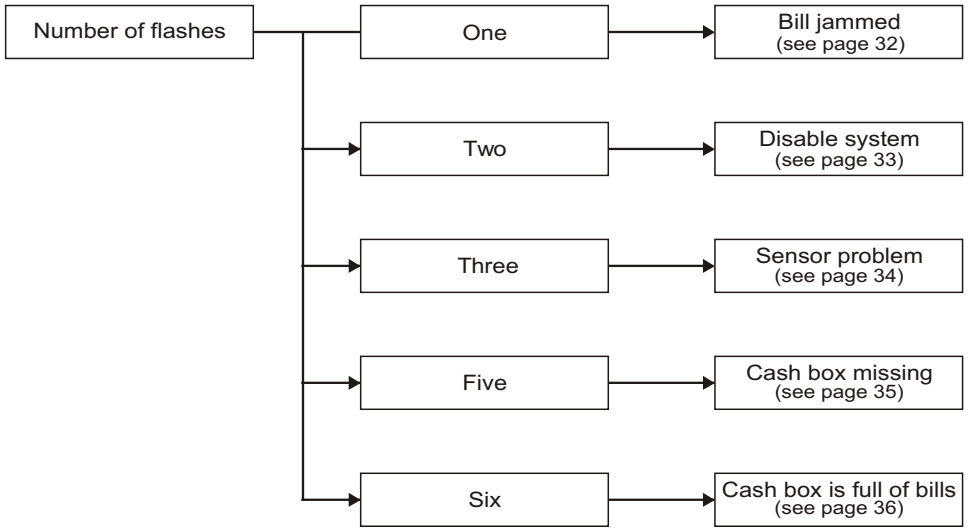
(1). Entry into test mode fails.
(2). Bill acceptor fails to completely initialize or power up.
(3). Low acceptance rate.
(4). The bills fail to follow the bill path smoothly.

Trouble Shooting Flow Charts

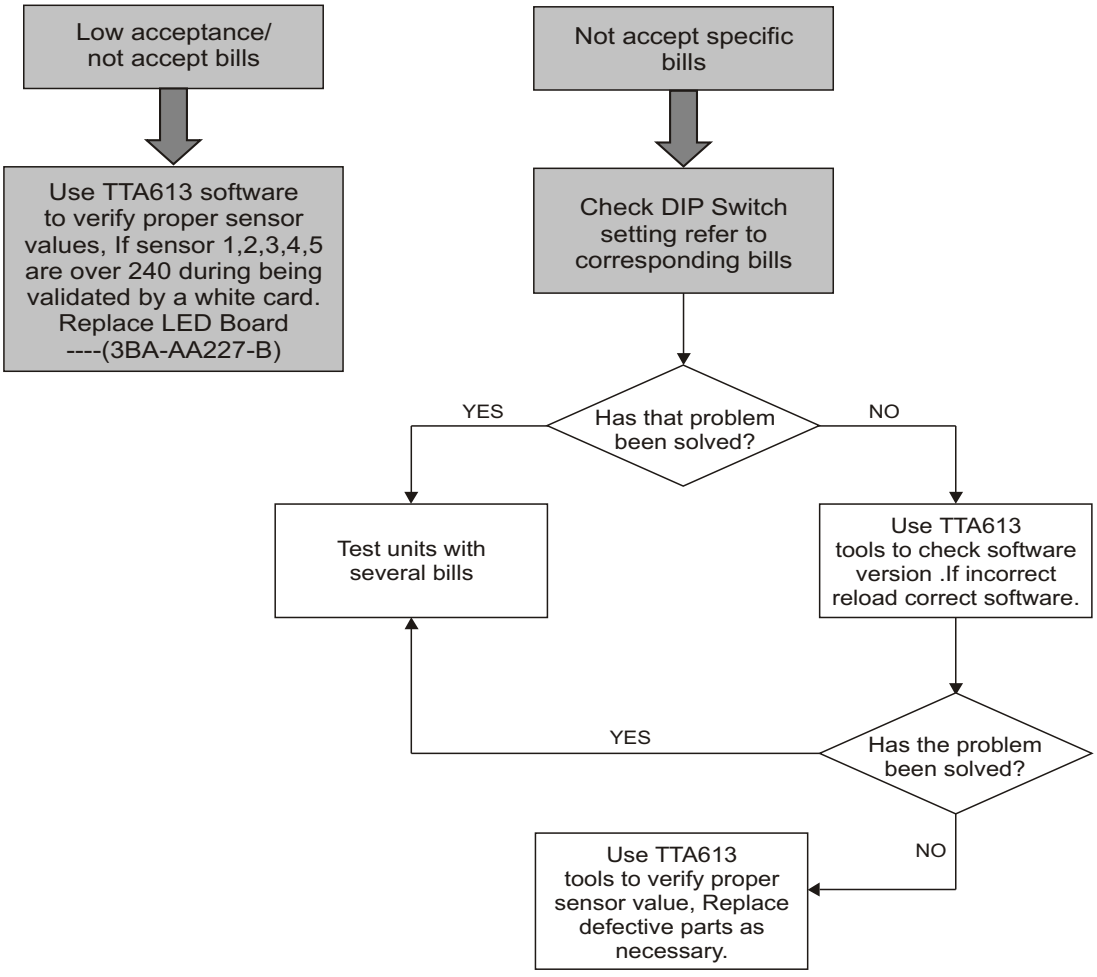
(1). Test mode fails to be entered



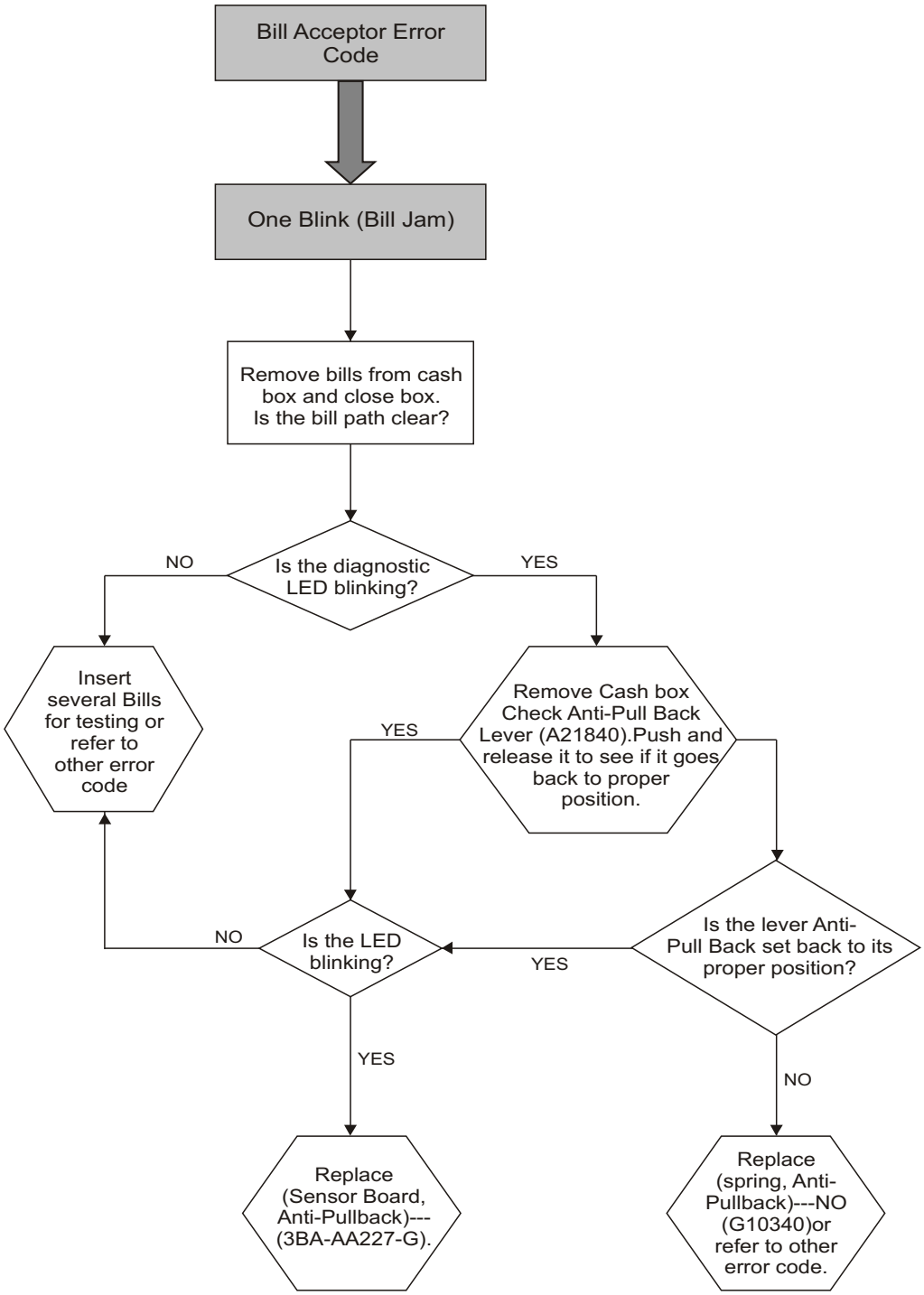
(2). Bill acceptor error code



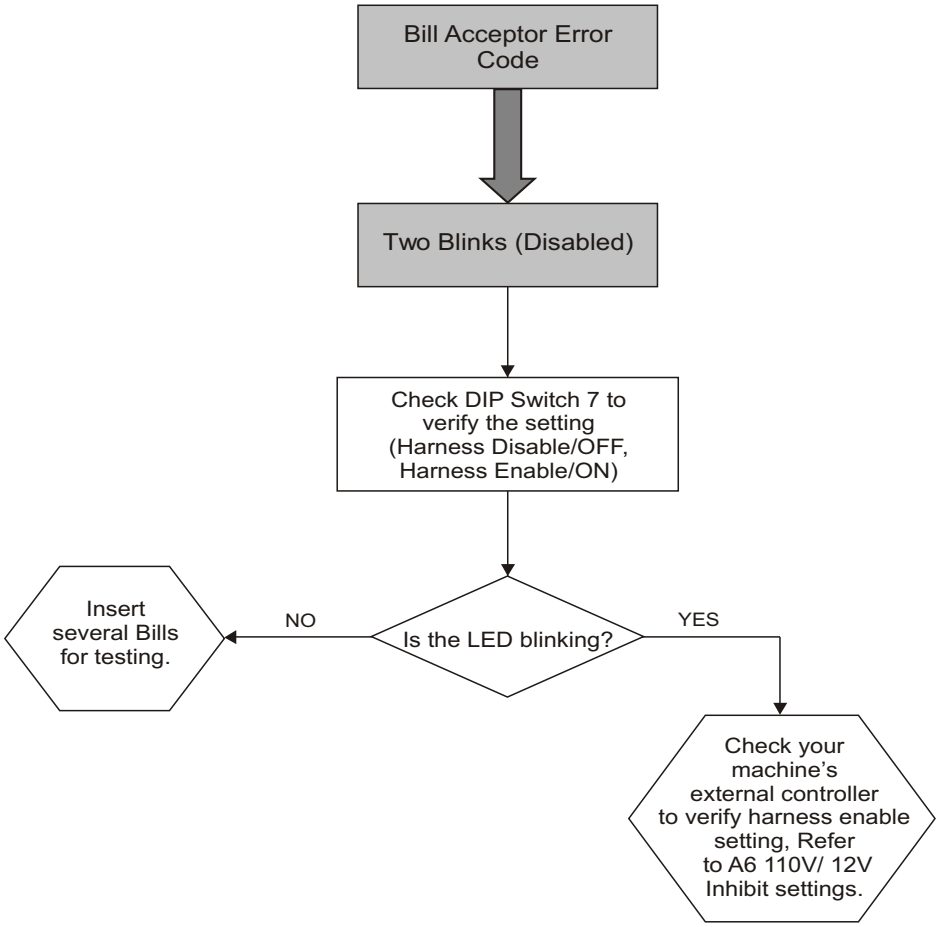
(3). Low acceptance rate



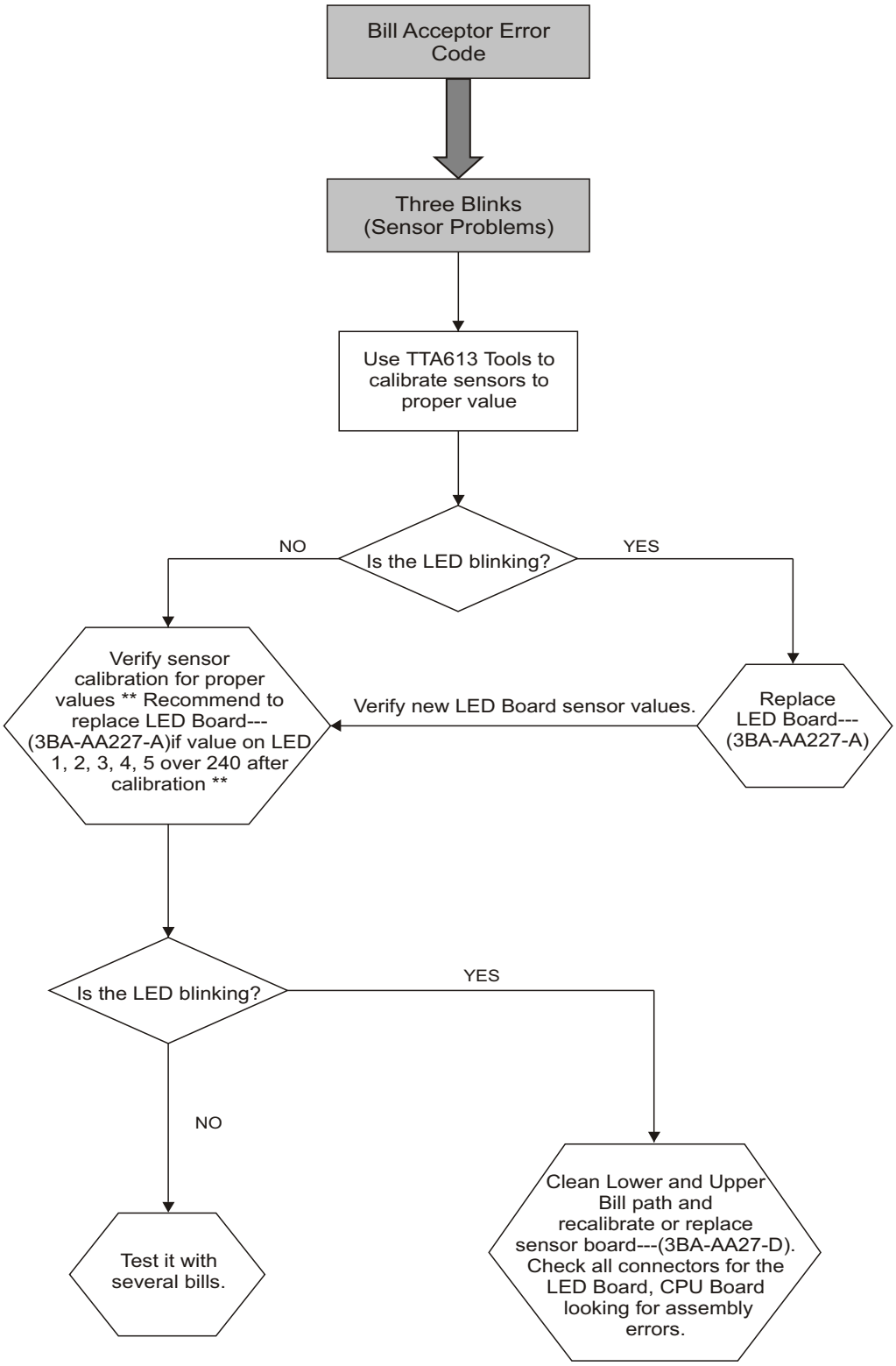
Bill Acceptor Error Code (One Blink)



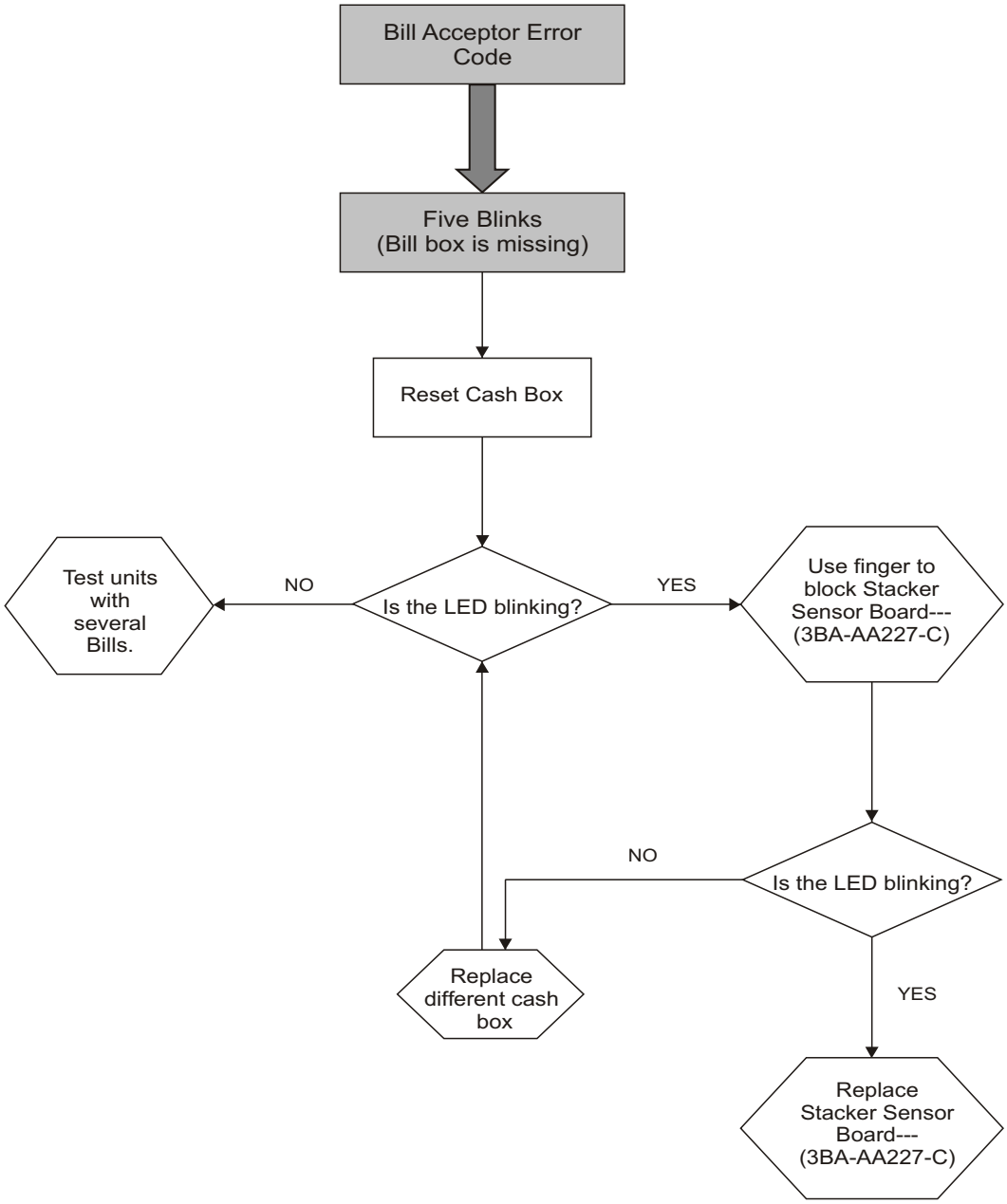
Bill Acceptor Error Code (Two Blinks)



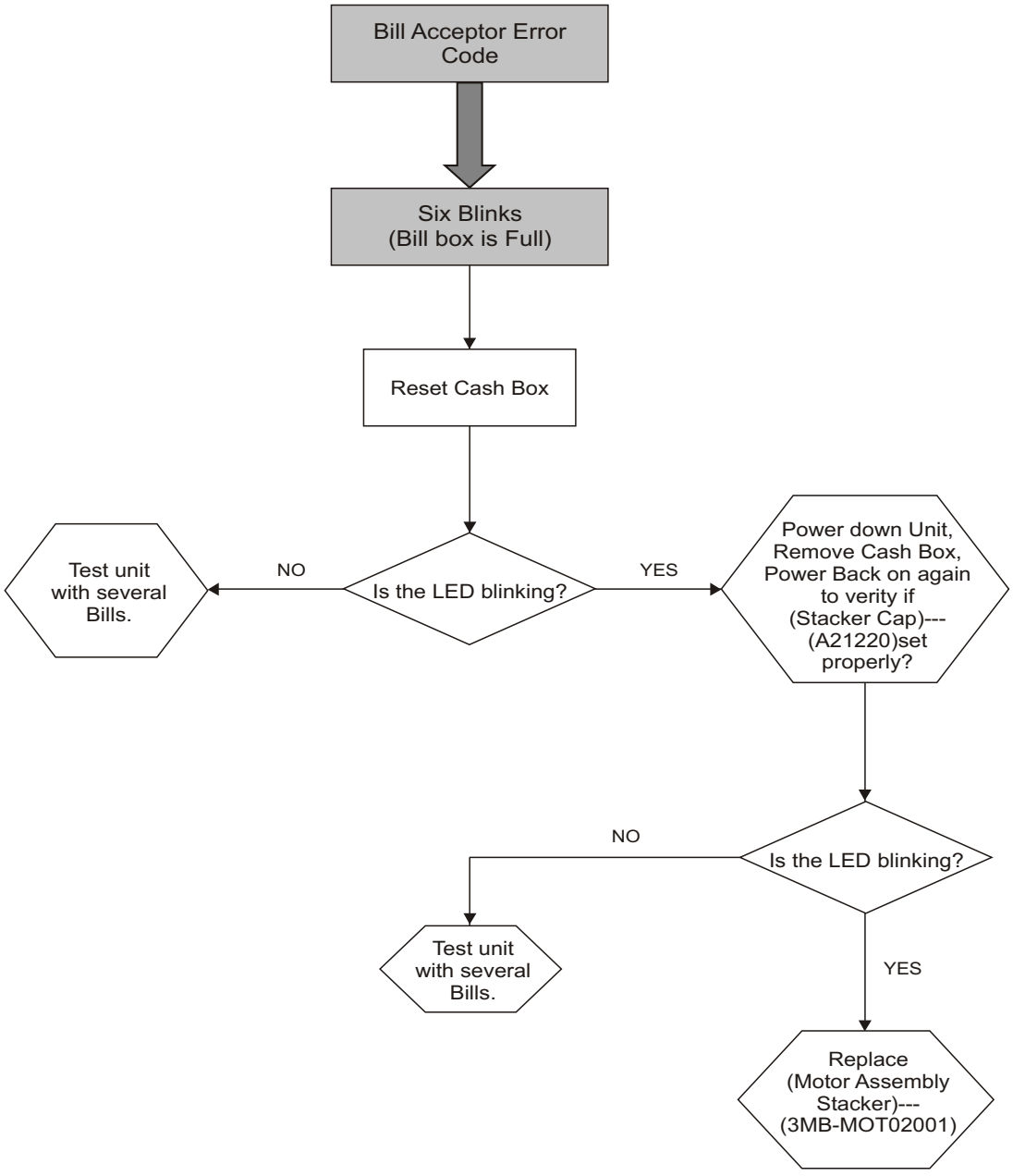
Bill Acceptor Error Code (Three Blinks)



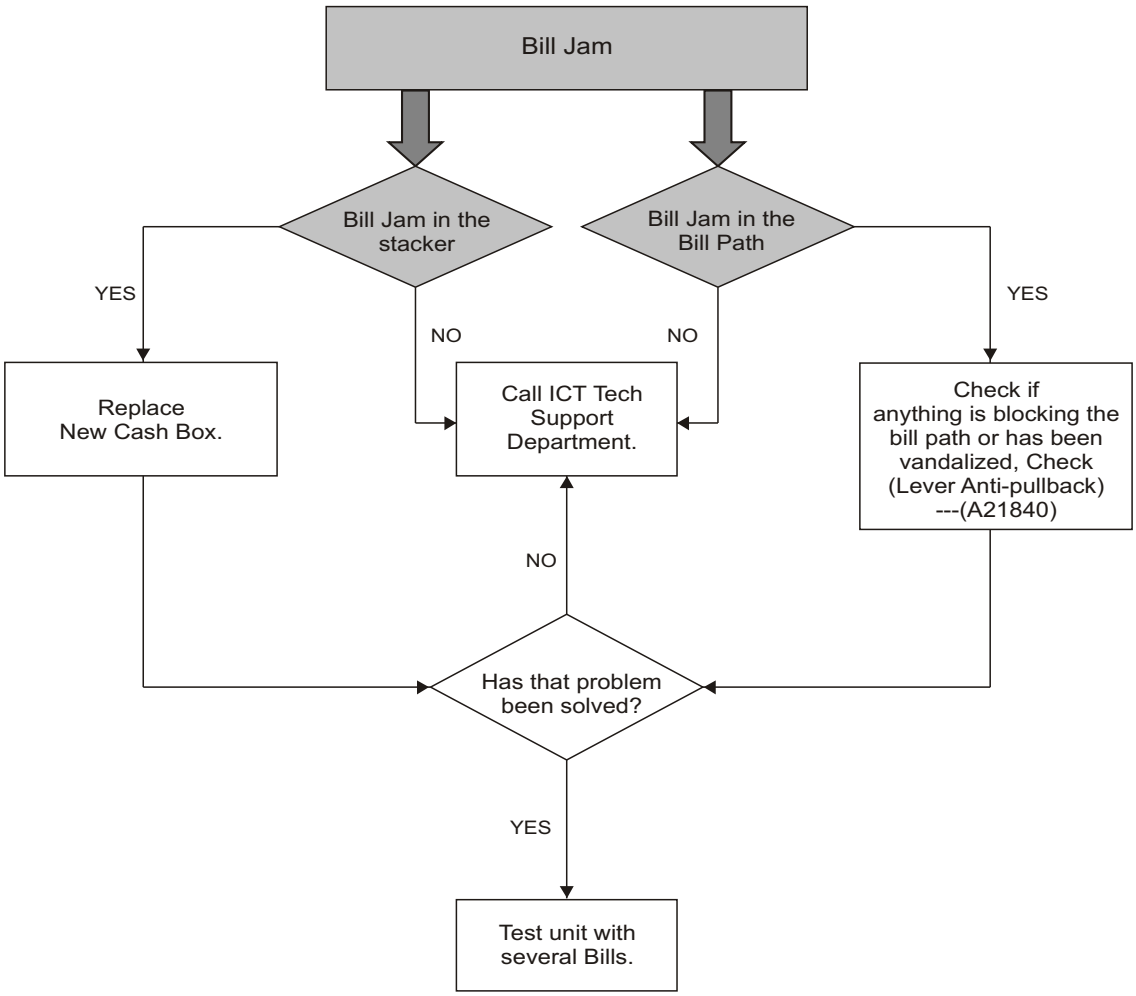
Bill Acceptor Error Code (Five Blinks)



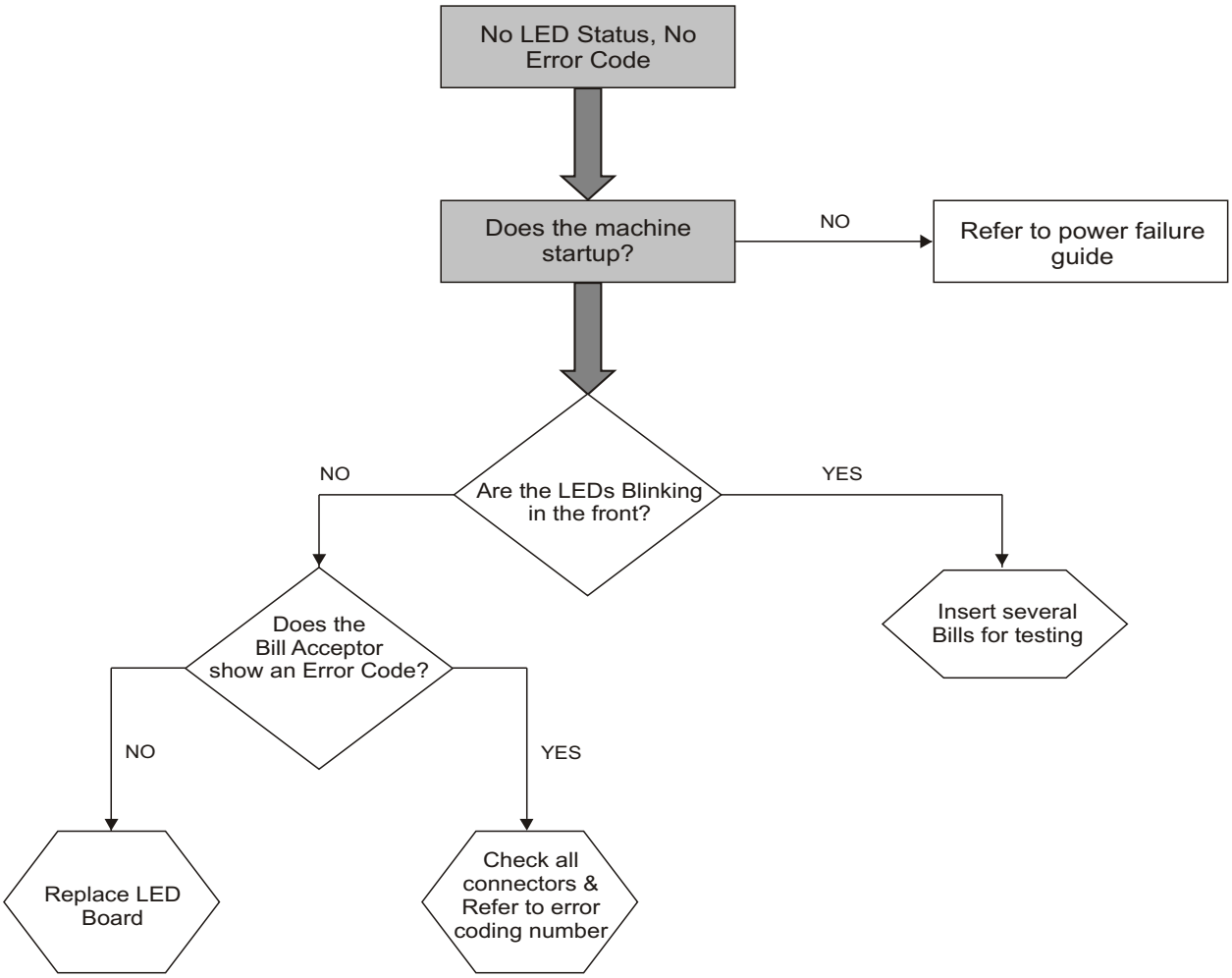
Bill Acceptor Error Code (Six Blinks)



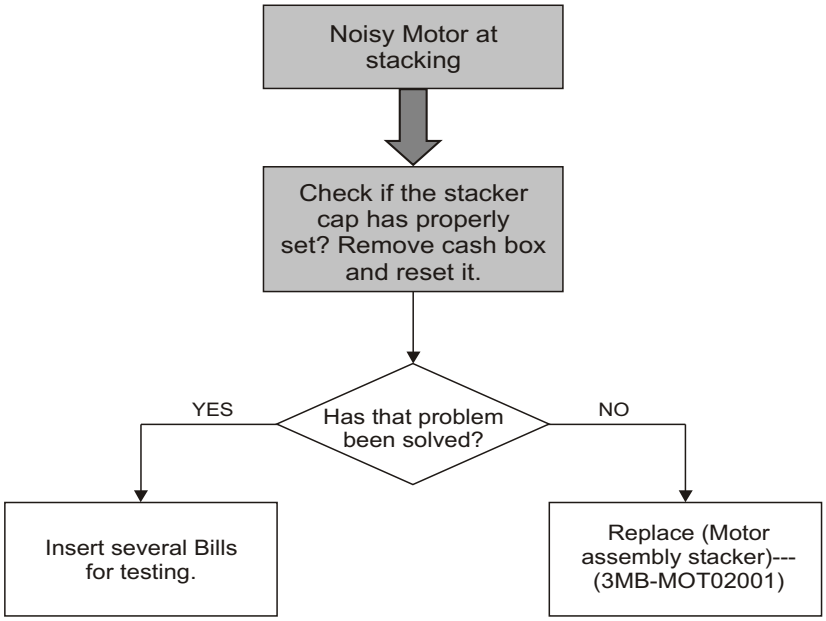
(4). Bill Jam


Bill Jam
Bill Jam in the stacker
Bill Jam in the Bill Path
YES
NO
NO
YES
Replace New Cash Box.
Call ICT Tech Support Department.
Check if anything is blocking the bill path or has been vandalized, Check (Lever Anti-pullback) ---(A21840)
NO
Has that problem been solved?
YES
Test unit with several Bills.

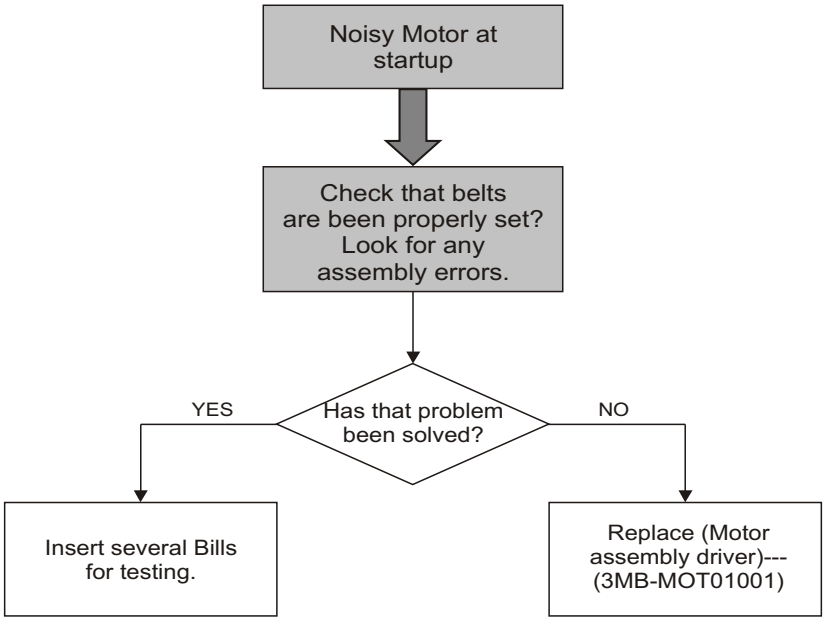
(5). No Led Status, No Error Code



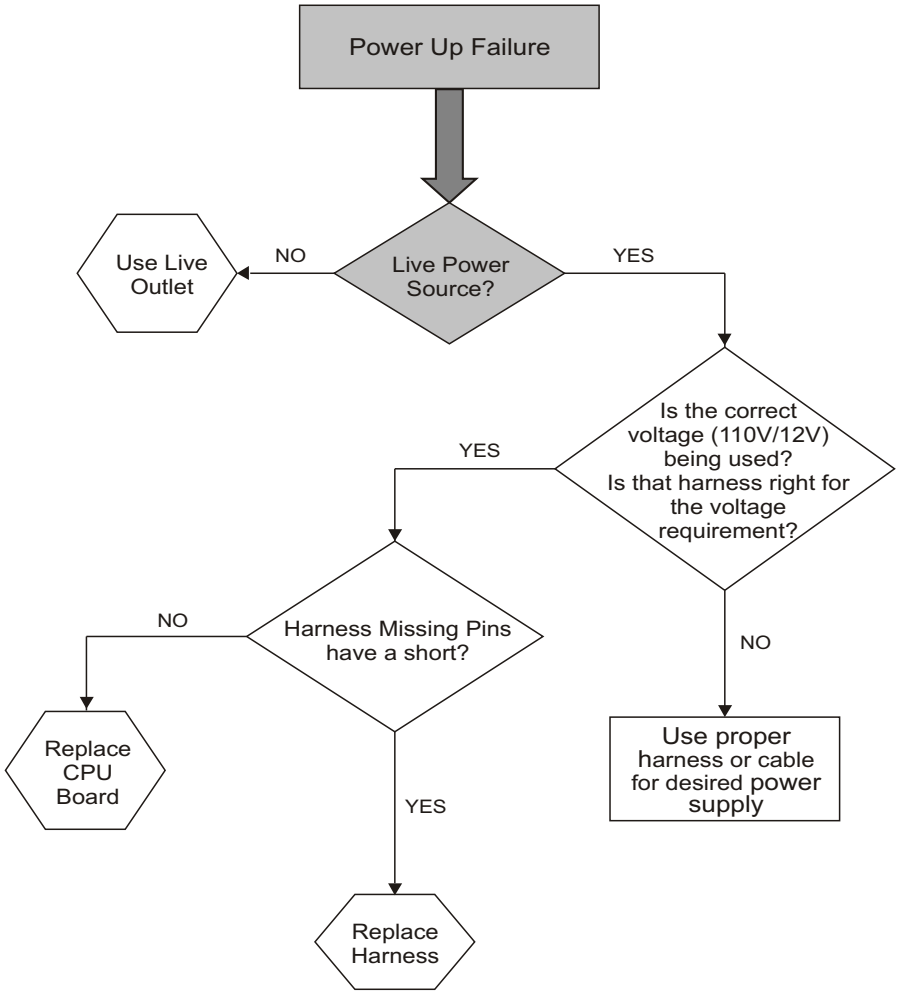
(6). Noisy Motor at stacking



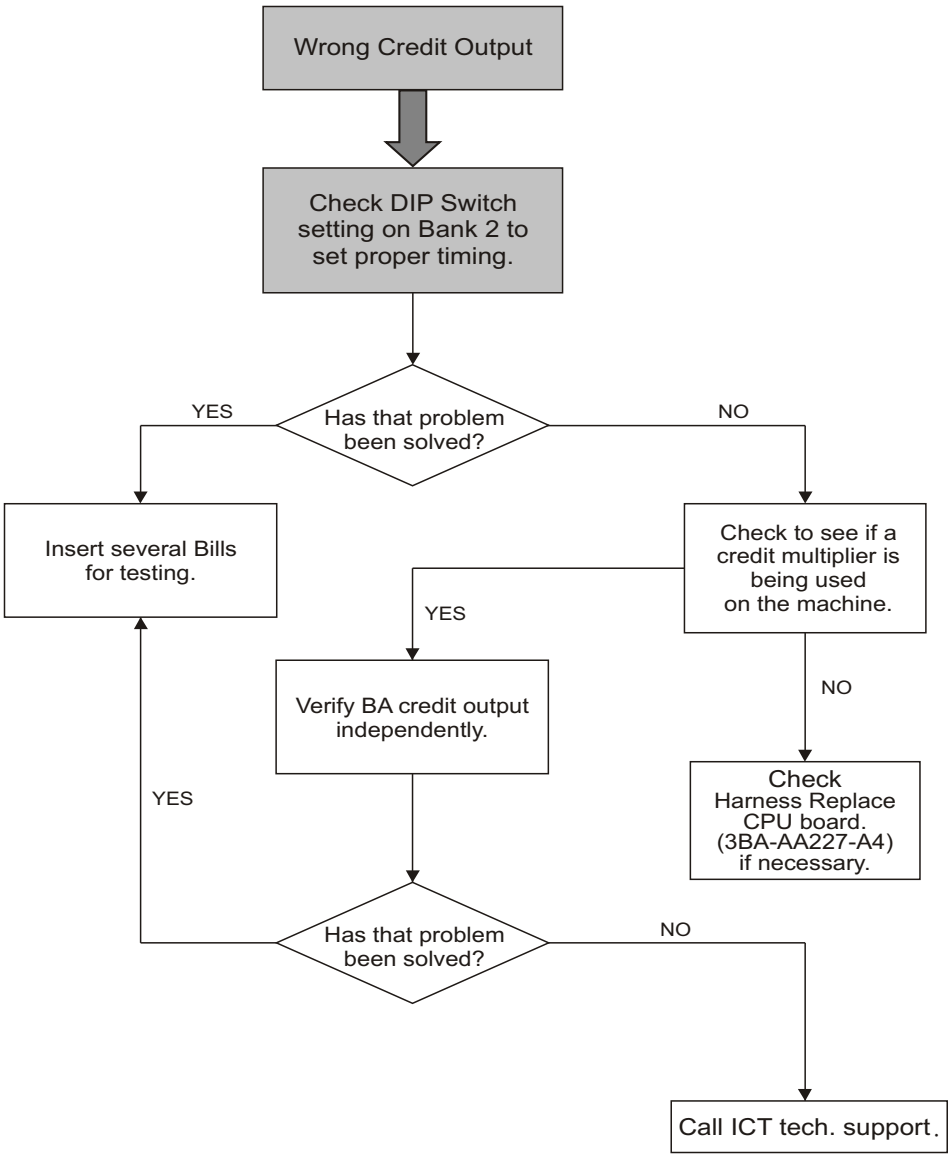
(7). Noisy Motor at startup



(8). Power Up Failure



(9). Wrong Credit Output



Adjustment Manual & Download Firmware :

FP-001 Programmer User Manual

Product Overview :

The ICT FP-001 Programmer is designed to easily update the A6/A7 Series Bill Acceptor Flash ROM.

Cable Connection :

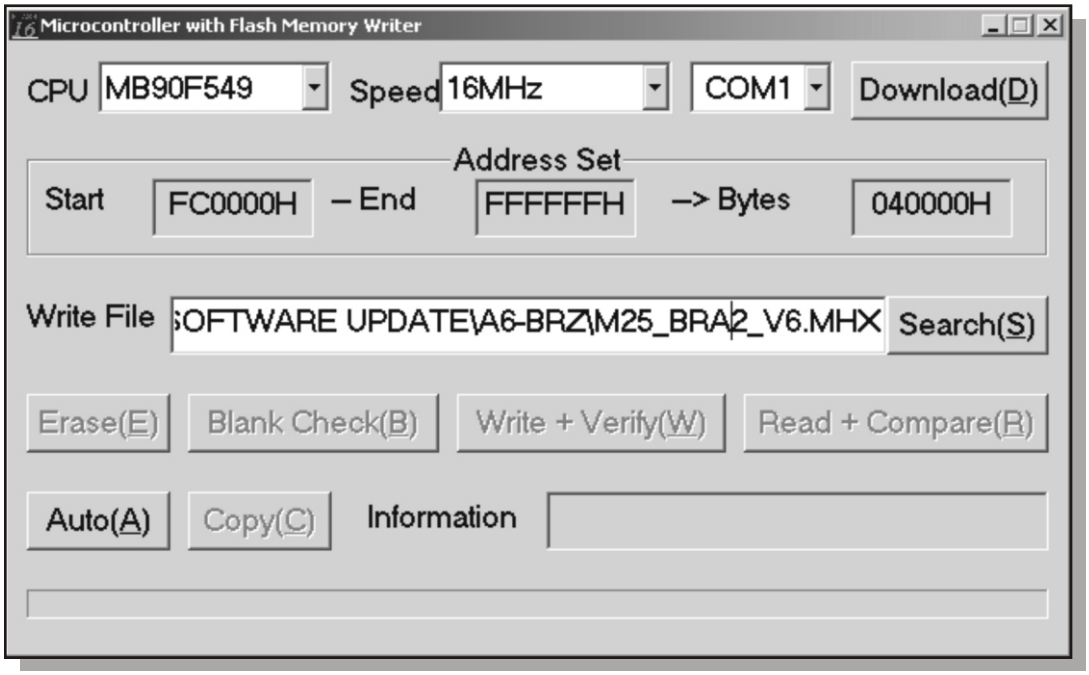
1.Connect RS-232 cable to PC & Programmer.
(PC-------COM1 Port) (Programmer---------COM2 Port)

2.Connecting RJ-45 cable from PH port on the Programmer to Bill Acceptor's RJ-45 port.

Operation Manual :

Function 1 : (PC---------Programmer)

1. Switch the programmer to L1 position, the L1 on the top LED will stay green (PC ⇨ Programmer)
2. The L4 LED will be flashing. If not, Please push the Reset/Start key to reset Programmer. Also make sure the programming dipswitch is on Normal Position.
3. Launch application software Flash16.exe. located on your floppy/CD. Make sure Choose the CPU type is MB90F549, Speed as 16MHZ, COM1 port (or COM2 depends on your computer configurations). Press 〝Search〞 to load the Currency Flash File that you want to use. Click Auto.



4. Remember During the download, the L4 LED will become orange and flash. When it's finished. The L4 LED will stay orange. Press Reset/Start key to reset the Programmer. The LED will now flash as normal green. The new Flash File will be stored on the FP-001 Programmer Now.

Function 2 : (PC---------Target)

1. Switch the programmer to L2 position, L2 LED on the top will stay green (PCTarget)
2. The L4 LED will be flashing. If not, Please push the Reset/Start key to reset Programmer and Bill Acceptor. Also make sure programming dipswitch is on Program position.
3. Repeat Step 3 as shown function 1 to launch application software Flash16.exe located on your floppy/CD to download new Flash File directly to Bill Acceptor. That means at this time. The FP-001 Programmer just like a path to communicate between you PC and Bill Acceptor. No Flash file will stores on FP-001 Programmer.

Function 3 : (Programmer---------Target)

1. Switch the programmer to L3 position, the L3 on the top LED will stay green (Programmer ⇨ Target)
2. The L4 LED will be flashing, if not please switch to L1 and push the Reset/Start key to reset download programmer to make sure it flashes. Switch back to L3 after it is flashing. Also make sure Programming dipswitch is on Normal position.
3. At this time it's ready to program the Bill Acceptor by using FP-001 Programmer.
4. Press the Start Switch one time, Wait a few seconds. The L4 will turn red and flashes. It means it's programming, erasing and verifying.

   LED Display As Follow :

   (1). RED (Starts)

   (2). OFF (Erasing)

   (3). RED Flashing (Verifying)

   (4). ORANGE (Finish)

   (5). When it is finished. L4 LED will stay orange. Now, Press Start switch again to let the Bill Acceptor auto adjust sensor. Remember in the front of the Bill Acceptor LED will stay green. Insert a testing white card; The BA will eject the Card after finished adjusting.

   (6). Press Start key one more time , The Bill Acceptor will automatically power cycle it. The Bill Acceptor just finished Updating new flash.

(7). Now you can take this pre-programmed FP-001 Programmer to another Bill Acceptor. Just simply connecting the RJ-45 cable from PH port on the Programmer to Bill Acceptor's RJ-45 port. Just repeat Function 3 (Programmer---------Target) to program every Bill Acceptor on this time.

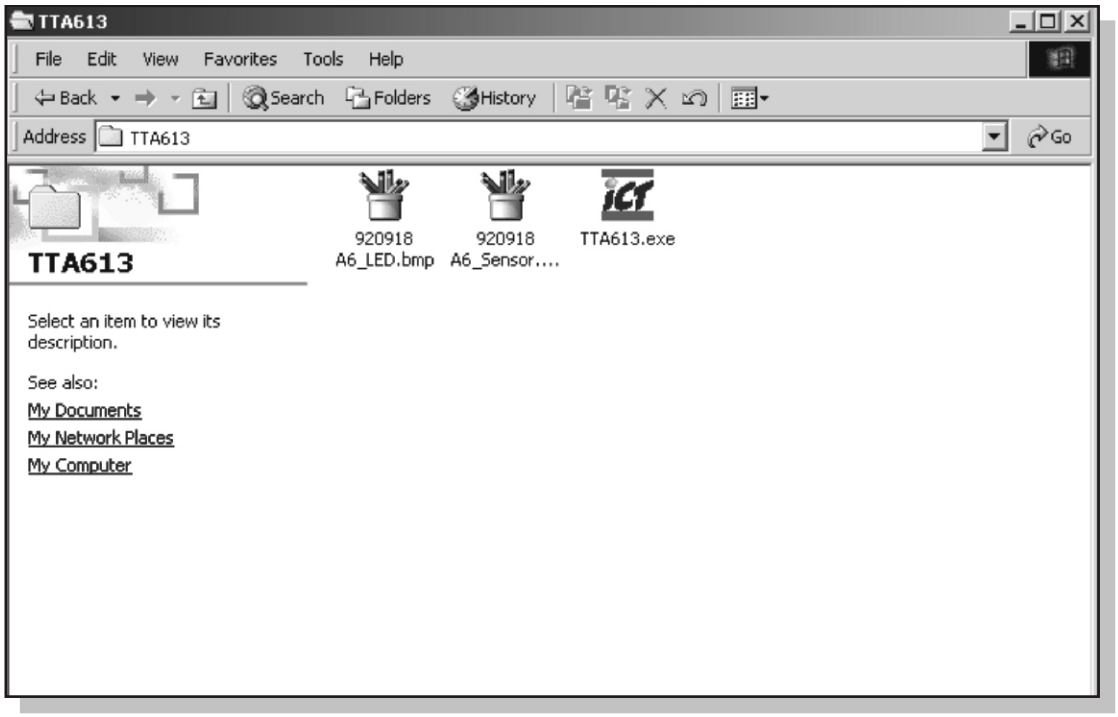
(For Most Customer, just go to Function 3 for updating units. Because all the programmers has been pre-programmed at factory) For Download & Debug Units :

If there is any issue happened after update new software. Please check out the floppy/CD came with the download device. Insert floppy/CD into the computer and open disk A.

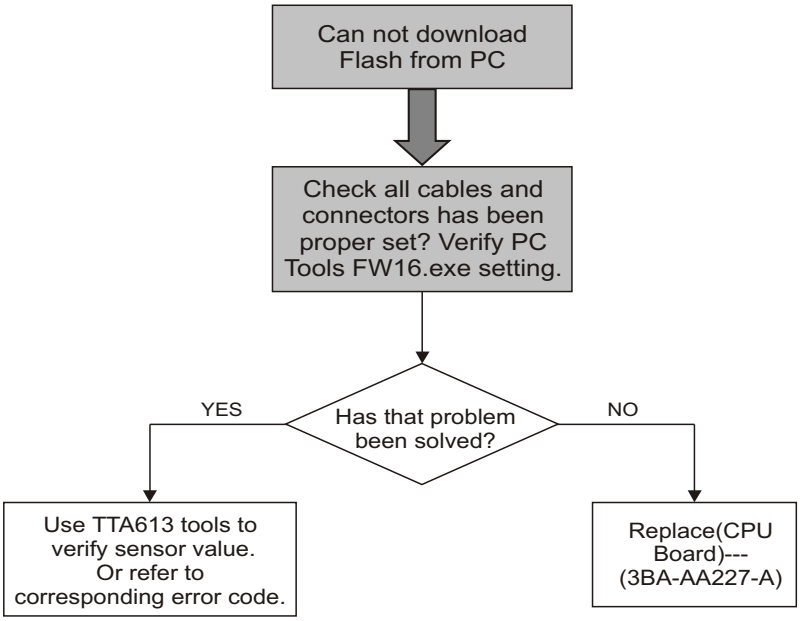
We recommend you copy the entire disk to your local hard drive before running it.

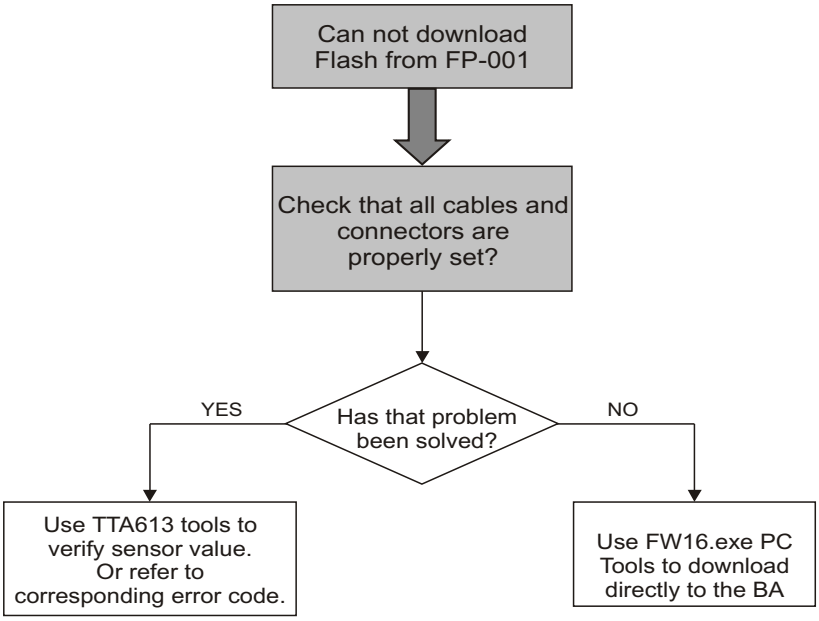
Go into Sensor Adjusting Tools folder. There is a self-executable file called TTA613.

After you run this software, it will bring up the following screen :



FP-001 Trouble Shooting Flow Chart





Diagnostic Software :

To use this software with your ICT A6/V6 Bill Acceptor, you will need the following :

1. An available serial port on your computer

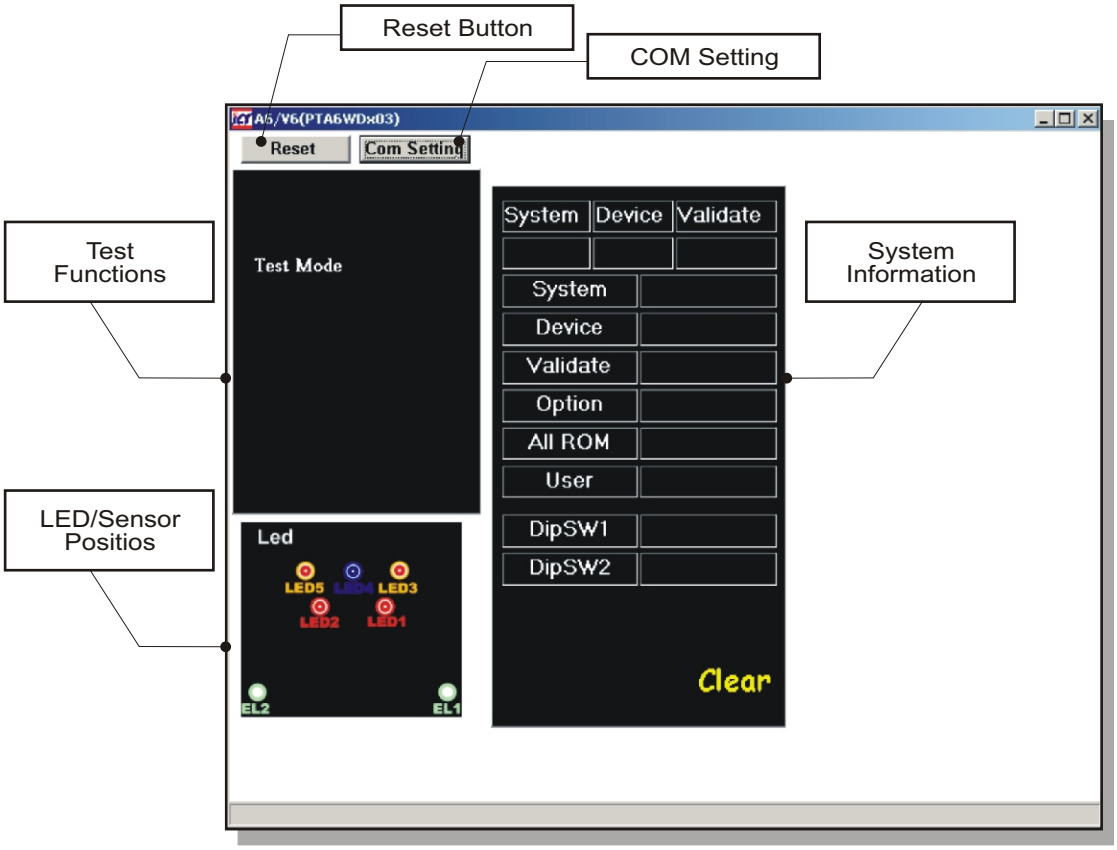
2. ICT Programmer (Part Number FP-001)

Wiring

1. Connect the female end of the download cable (WEL-087) to your computer
2. Connect the male end of the download cable to COM2 on the FP-001
3. Connect the RJ45 Cable to FP-001 and the Bill Acceptor

**** Make sure that on the FP-001 switch setting is on L2 and Normal****

Main Screen



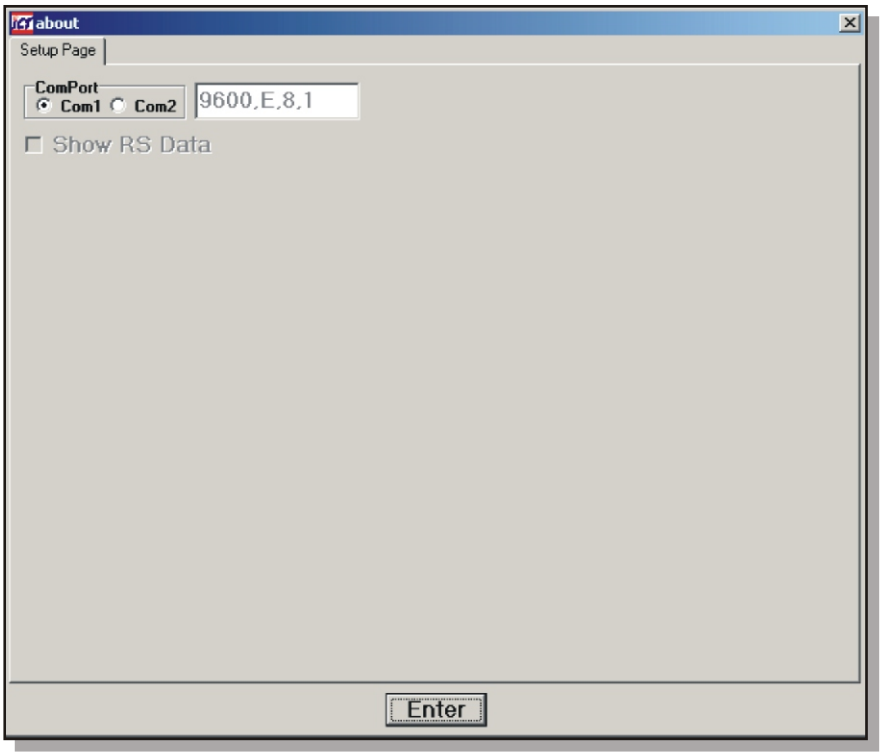
Reset

Resets the testing sofware. To reset the bill acceptor, press the PSEST/START button on FP-001.

System Information

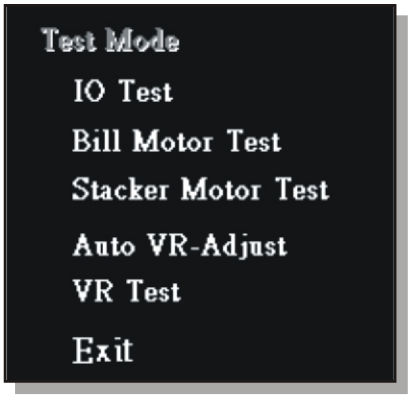
This area will show the current firmware version of your bill acceptor. Press the RESET/START button to retrieve the information.

COM Setting



Changes the COM port which the computer uses.

Test Mode



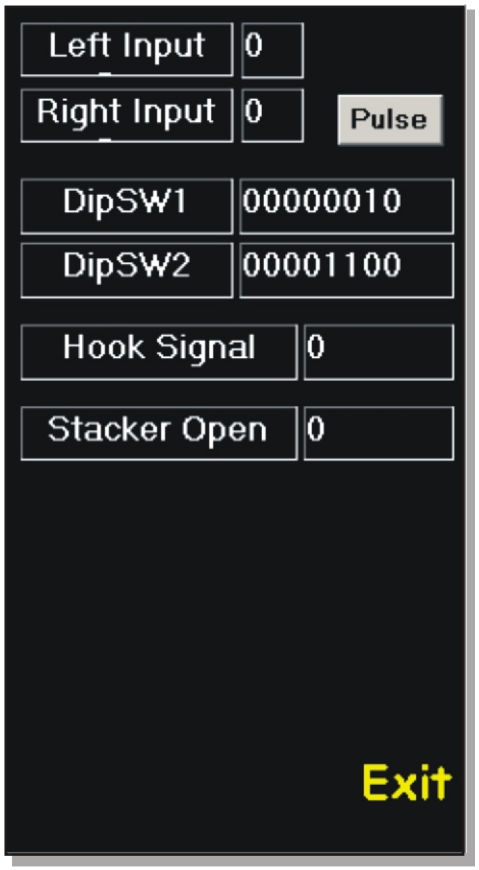
When you click on Test Mode, these options will appear.

Exit

Click here to exit test mode.

IO TEST

When you click IO Test, this box will appear on the right hand corner of the program window :



Left/Right Input
The bill insertion sensors. When an object is in blocking them, they will display 1.

Pulse
Generate a pulse to emulate credit output.

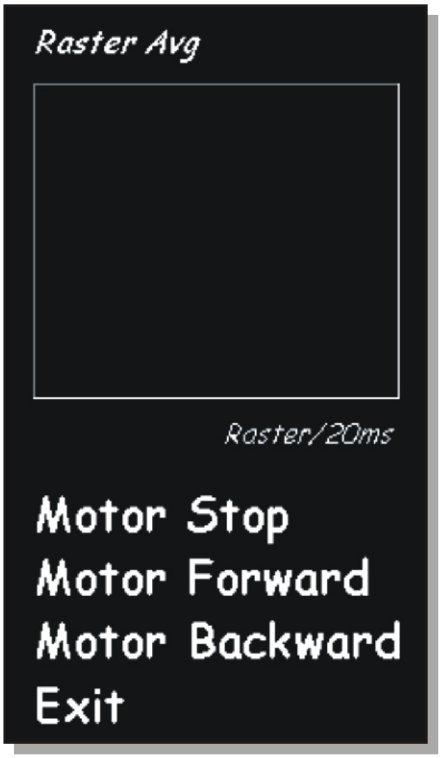
DipSW1
The dipswitch settings for the bank of eight dipswitches on the side of the bill acceptor.

DipSW2
The dipswitch settings for the bank of four dipswitches on the side of the bill acceptor.

Hook Signal
The hook sensor in the back of the bill acceptor. When the sensor is open and unblocked, it will display 0. When an object is blocking the sensor and depressing the teeth, it will display 1.

Stacker Open
When the stacker is correctly attached, it will display 0. Otherwise, it will display 1.

Exit
Click here to close this dialogue box.



BILL MOTOR TEST

When the Bill Motor Test is pressed, this box will appear on the right side of the program window.

Motor Stop
Stop the motor.

Motor Forward
Move the motor forwards. The speed of the motor per 20ms will appear in the top of the window.

Motor Backward
Move the motor backwards. The speed of the motor per 20ms will appear in the top of the window.

Exit
Click here to close this dialogue box.

STACKER MOTOR TEST

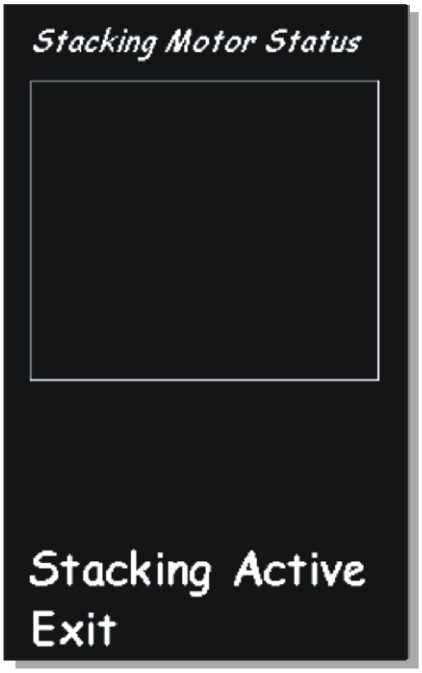
When Stacker Motor Test is pressed, this box will appear on the right of the program window.

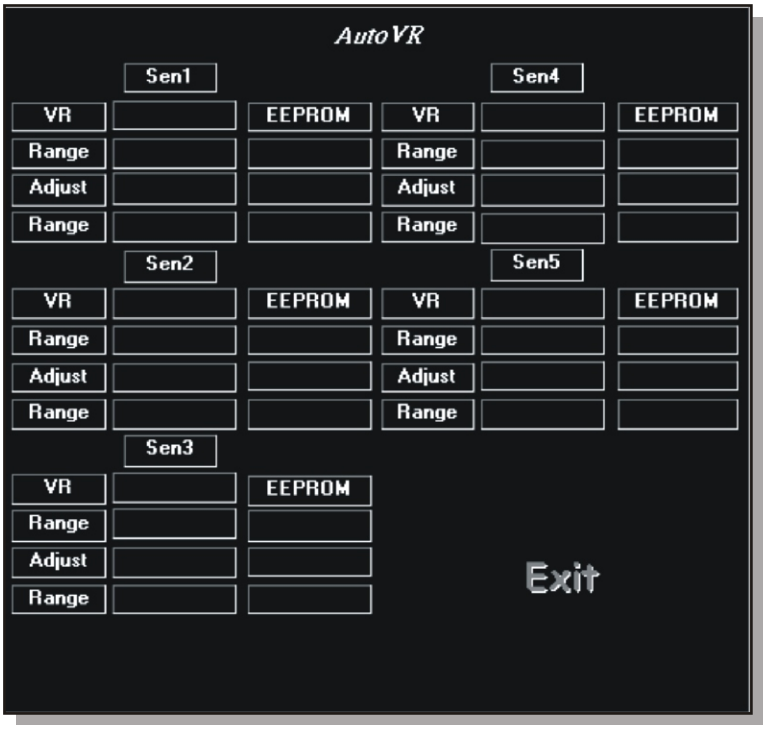
Stacking Active

Stacking motor test. When a successful stack is complete, a 0 will appear in the top window, otherwise a 1 will appear.

Exit

Click here to close this dialogue box.





AUTO VR-ADJUST

When Auto VR-Adjust is pressed, this box will appear on the right of the program window.

Insert the white calibration card to start the adjusting process. The bill acceptor will draw the card in one inch, and return the white calibration card automatically when it is finished.

Any defective sensors will be noted by a red background in the sensor window.

Exit

Click here to close this dialogue box.

VR TEST

When Auto VR Test is pressed, this box will appear on the right side of the program window.

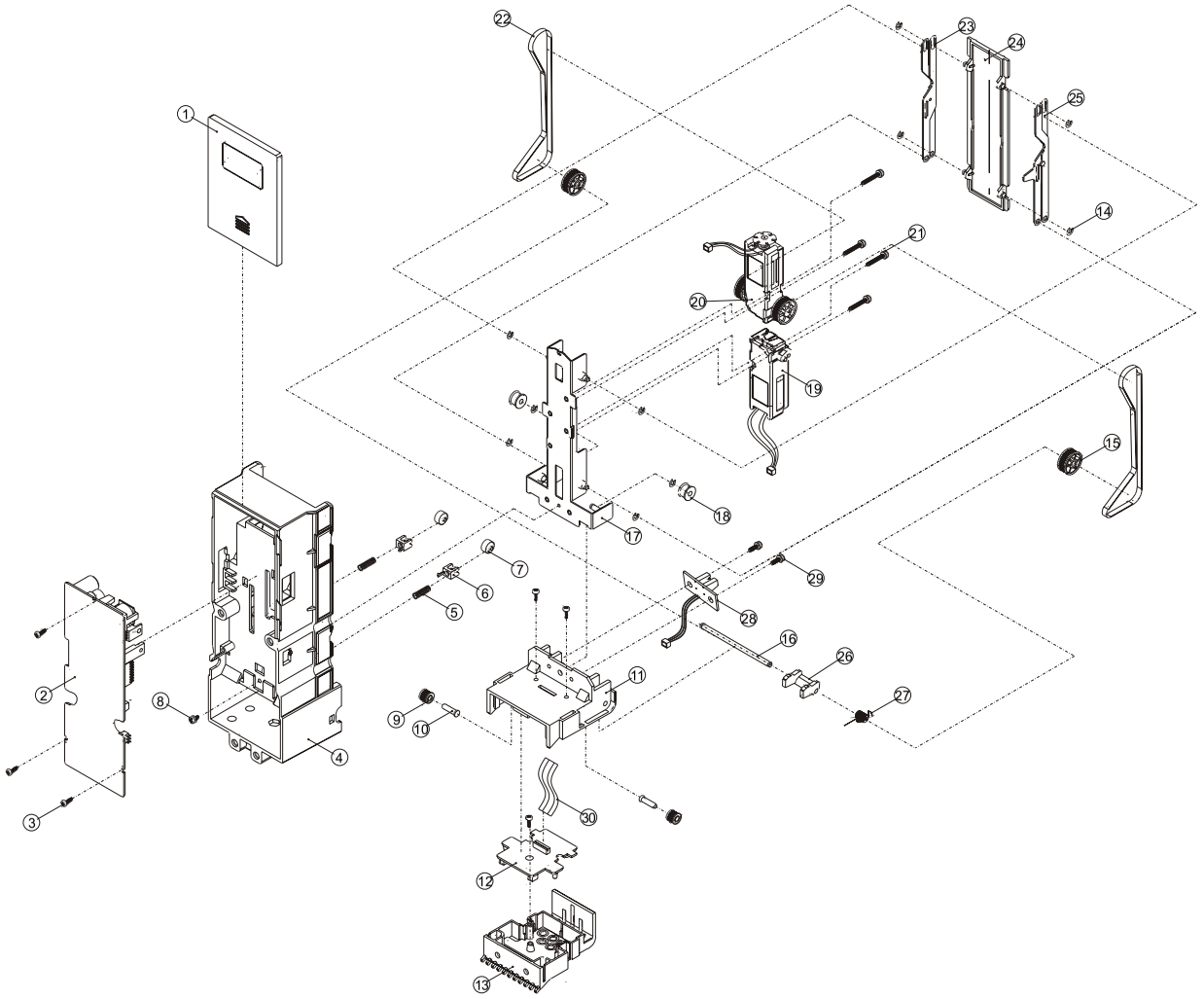
All LED Light

When this button is pressed, all LEDs will be turned on inside of the bill acceptor. You will see the screen on the left. Any one of the sensors (SEN1 SEN5) that has a value of less than 255 indicates defective sensor.

Exit

Click here to close this dialogue box.

Parts and Assembly Diagram :



Order	Part numder	Appellation	Quantity
1	A21210	CPU Board cover	1
2	3BA-AA227-A3	CPU board(A6)	1
	3BA-AA227-F3	CPU board(V6)	
3	BA-060	Ø3x8 Screw,TP2	6
4	A22000	Main base	1
5	G1022A	Spring	2
6	A22210	Roller holder	2
7	A21820	Roller	2
8	BA-041-1	M3x6 Screw with washer	1
9	A21270	Belt pulley(O style,14t)	2
10	B10670	Pulley shaft	2
11	A21530	Frame,drive	1
12	3BA-AA227-D3	Sensor board	1
13	A2154B00	Sensor board housing	1
14	A25750	Nylon retainting ring	10
15	A20750	Belt,pulley(O style,30t)	2
16	B10660	Pulley shaft	1
17	C12070	Stacker/Drive device frame	1
18	A22130	Pulley,idler	2
19	3MB-MOT02001	Motor assembly,stacker	1
20	3MB-MOT01001	Motor assembly,drive	1
21	M10080	M3x20 Screw with washer	4
22	E50070	Belt(MXL162t)	2
23	C1210000	Lever-A,Stacker	1
24	A21220	Stacker cap	1
25	C1211000	Lever-B, stacker	1
26	A21840	Lever,anti-pullback	1
27	G10340	Spring,anti-pullback	1
28	3BA-AA227-G1	Lever,anti-pullback	1
29	M10200	M3x15 Screw with washer	2
30	WEL-M003	Flexible Flat Cable,10pin	1

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