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TBV™ Series

Transaction Based Validator

Integration Guide

Revision A, August 6, 2010

P/N 960-100925R_Rev. A {EDP #186705}

a RoHS Compliant Product

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REVISION HISTORY			
Rev №.	**Date**	**Reason for Update**	**Comment**
A	8-06-10	Initial Document	
1			
2			

International Compliance

- RoHS Directives or or or or
- UL/c-UL Mark
- CE Mark
- CB Scheme JPULA-03013
- FCC Directives .

FCC WARNING
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
FCC NOTICE
This equipment has been tasted and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expence.
IC NOTICE
This class A digital apparatus complies with Canadian ICES-003.
Cet appareil numerique de la classe A est conforme a la norme NMB-003 du Canada.

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TBV™ Series
Transaction Based Validator
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Revision A

1 GENERAL INFORMATION
Description
This section provides a general overview of the Transaction Based Validator Unit (TBV) pictured in Figure 1. This first section is designed to help navigation through this guide with ease and provides the following information:

- TBV Unit
- Component Names
- Primary Features
- Model Description
- Precautions
- Specifications
- Installation
- Connector Pin Assignments
- Preventive Maintenance
- Operational Flowchart.
- Standard Interface Circuit Schematics
- LED Diagnostics
- Unit Dimensions
- International Compliance
- Contact Information.

In order to make operation of this device easier and make navigation within this manual simpler, the following illustrations were used within the text:

- **Safety Instructions,** which need to be observed in order to protect the operators and equipment, have been written in bold text and have been given the pictographs: ⚠
- **Special *Notes,*** which effect the use of the Banknote Acceptor, have been written in *italic* text and have been given the pictograph: ☞
- **Steps,** requiring the operator to perform specific actions are given sequential numbers (1., 2., 3., etc).

TBV Unit

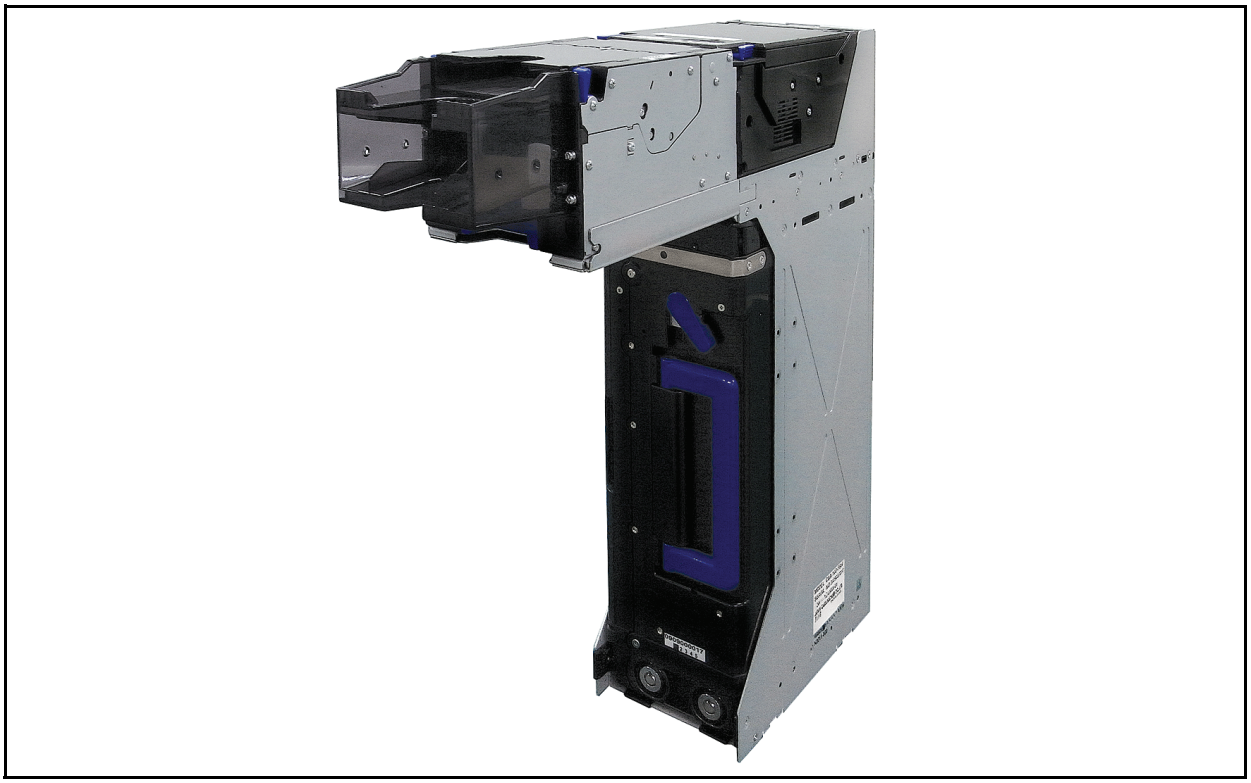
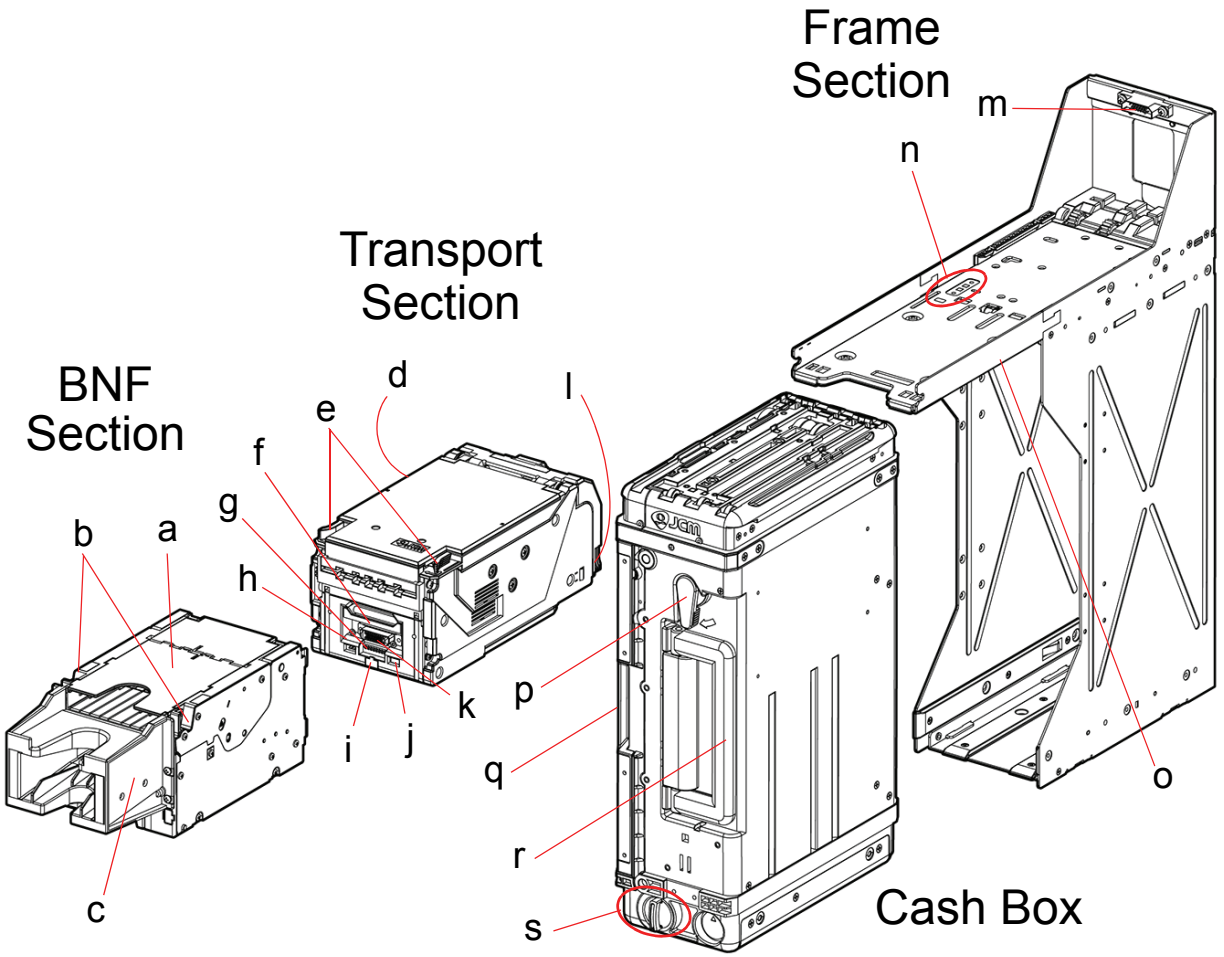


Figure 1 Transaction Based Validator Unit (TBV)

Component Names

Figure 2 illustrates the TBV Component Names and Locations.



a) Return Path Open/Close Cover
b) BNF Guide Latch
c) Bezel Section (Option)
d) Centering Release Port (Back Side)
e) Transport Section Front Guide Release Latch
f) Transport Section Release Lever
g) Denomination INHIBIT/ACCEPT Switches (DS3 [Set identical as DS1])
h) LED Indicator (Green/Yellow/Red)
i) USB Connector
j) Bezel LED Indicator Connector
k) Connector
l) Transport Section Rear Guide Latch
m) Interface Connector
n) Cash Box Lock Sensor Prism
o) Cash Box Lock Lever (Back Side)
p) Cash Box Release Lever
q) Cash Box Door Release Lever
r) Cash Box Handle
s) Thumb Twist Lock Knob
t) Pusher Plate
u) BNF Section Transport Release Lever
v) Denomination INHIBIT/ACCEPT Switches (DS1) [Set identical as DS3])
w) Set BNF Buzzer Volume Switches (DS2)
x) TBV Centering Mechanism ON/OFF & Select Communication Interface Switches (DS4)
y) TBV Photo-Coupler/RS232 Interface Selection Switch (DS5)
z) TBV Option Memory Selection Switches (DS6)

Figure 2 TBV Individual Major Component Names

Primary Features

The TBV Series of Banknote Validator contains the following primary features:

- Ability to accept 50 Banknotes at a time.
- High validation capability using the Centering Mechanism and its own high precision Sensors.
- Able to stack up to 2,000 Banknotes in the Plastic Cash Box.

Model Descriptions

Table 1 lists the Product Model Number Descriptions.

Table 1 TBV Software Number Specifications

Nº	Software: TBV - * * * - * * * Nº (1) (2)(3)(4) (5)(6)(7)
(1)	Product Series Name
(2)	Validate Sensor **1 = World Wide Type (Standard)**
(3)	Option Board **0 = None (Standard)**
(4)	Centering Unit **0 = Feature (Guide Width 60 - 85mm)** **1 = None (USA Dollar 66mm only)***
(5)	Accessory Unit **F = BNF Unit** **G = Shutter Unit** **0 = Reserved†**
(6)	Stacker Type **SH = Horizontal Stack Mechanism** **LD = No Stack Mechanism**
(7)	Box Access **0 = Front Access Frame (Standard)†** **B = Back Access Frame**

*. The width dimensions of the BNF Section's Guide, the Validation Section and the Bezel are all of an equal size.

†. "0" = can be blank or omitted.

Type Descriptions

Table 2 lists the Product Type Number Descriptions.

Table 2 TBV Type Specifications

Nº	Type: * * * * * - * * * Nº (1)(2)(3)(4)(5)(6)(7)(8)
(1)	Box Capacity **0 = No Cash Box** **K = 2,000 notes**
(2)	Box Option **0 = Thumb Twist Lock Knob (Standard)** **1 = Sealing**
(3)	ICB **0 = None (Standard)** **1 = Optical Transport Method**
(4)	Bezel Type **0 = None** **1 = Plastic (Standard)** **2 = Metal**
(5)	I/F Harness **1 = Standard**
(6)	Reserved
(7)	Reserved
(8)	Reserved

Software Descriptions

Table 3 lists the various Software Number Descriptions.

Table 3 TBV Software Number Specifications

Nº	Software: TBV-100 FSH * * * - * * * - V * .* * Nº (A) (B) (C) (D)
(A)	Software Model Name
(B)	Denomination (Country)*
(C)	Interface Protocol Name
(D)	Software Version

*. The Country Code is indicated by three (3) Alphabetical Characters following the JIS Standard.

Precautions

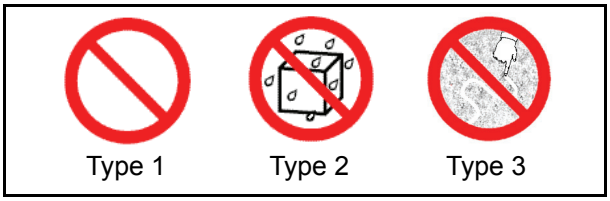


Figure 3 Precautionary Symbols

The Figure 3 symbols are defined as follows:

1. (Type 1) Do not insert a torn, folded, or wet Banknote, as this action may cause a Banknote jam inside the Unit.
2. (Type 2) Do not expose the Unit to water. The Unit contains several precision electronic devices which can be damaged if water or liquid of any kind is sprayed or spilled into the Unit.
3. (Type 3) Do not install the Unit into a dusty environment. Dust may affect and degrade the various Sensor's performance.

User Cautions

Careful measures are taken in this product design to ensure its quality, however, the following cautions should be read and understood by all users in order to confirm safe operation.

Installation Cautions

1. Do not allow the Unit to endure or operate at a high temperature, in high humidity and/or in a dusty environment.
2. Do not install the Unit into an area where excessive vibration or shocks are present.
3. This equipment is not full warranted for outdoor use. Be sure that the Host Machine contains enough protection to avoid wet or dusty conditions when installing it in both open-air and indoor spaces.
4. Avoid exposing the Unit to direct Sunlight and/or an incandescent Lamp illumination having a Gradient Angle of 15 Degree or more, and an illumination index of 3,000 Lux or less.
5. Insure that the Host Machine is designed for daily operational access such as maintenance and/or clearing a Banknote Jam.

6. When installing the equipment, connect the Frame Unit to the Frame Ground of the Host Machine.
7. Be sure to connect the Ground Wire of the Interface Connector to the Chassis Frame Ground.

Mounting, Dismounting & Transportation

1. Be sure to turn the Power OFF before mounting or removing the Unit from its permanent location. Plugging or unplugging Connector Plugs from their receptacles while the Power is ON may cause damage to the Unit.
2. When reassembling a disassembled Unit Section, ensure that each part is properly placed in its original correct location.
3. Be sure to carry the Unit by both hands when transporting it. Holding the Unit with one hand may cause personal injury if the Unit accidently becomes disassembled and falls apart.
4. Be careful not to use excessive outside pressure on the Unit, or subject it to excessive vibration during transportation.
5. Be careful not to exert external pressure on the equipment without the Cash Box in place. Strong pressure on the Frame may cause it to distort.

Preventive Maintenance

1. Be sure to turn the Power OFF before beginning a Maintenance Procedure. The equipment produces improper operating signals while in maintenance mode that may cause personal injury.
2. If the Validator Section is dirty due to dust, foreign objects or other such debris adhering to it, the Banknote acceptance rate will degrade. Clean the Unit once a month to keep its performance optimal and stable.
3. Use a soft, lint-free cloth, Cotton swab or Compressed Air spray to clean dust and debris from the Banknote transportation path.
4. Perform cleaning and maintenance regularly when using the equipment in places where excessive Automobile exhaust emission or Cigarette Smoke may exist.

> ⚠ **Caution: Do not use Alcohol, thinner or citrus based products for cleaning any surfaces. The Lenses can become clouded by chemical effect that may cause acceptance errors.**
> **Use a lint-free cloth soaked with purified water and wrung dry to clean the internal surfaces and BNF Rollers only.**

5. Be sure that the Guide or individual Unit Sections are properly replaced in their correct location following a maintenance procedure.
6. Do not redesign or disassemble the Unit. Unauthorized use by inadequately trained personnel, or use outside the original manufacture's intended use for operation voids the warranty.

Banknote Fitness Requirements

1. The following Banknote types may not validate correctly, or can cause a Banknote jam and/or damage to the Unit's Transport path.

   Banknotes exhibiting the conditions listed below and illustrated in Figure 4 should be avoided:
   - Having perforated or torn areas
   - Having excessive folds
   - Wet or damp
   - Having excessive wrinkles
   - Shabby/warn condition
   - Adhering foreign objects and/or oil.

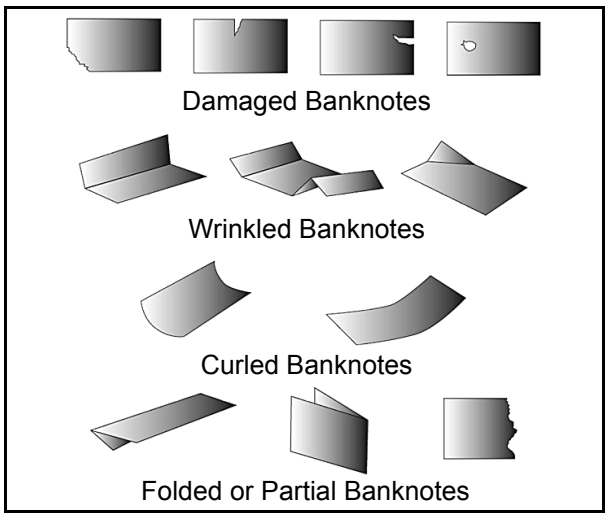


Figure 4 Unacceptable Banknotes

2. When inserting a bundle of Banknotes, Flip-over and Fan-Flip the Banknotes; especially the new or nearly new Banknotes in order to insert air in-between them so they do not stick each other prior to Bezel insertion (See Figure 5).

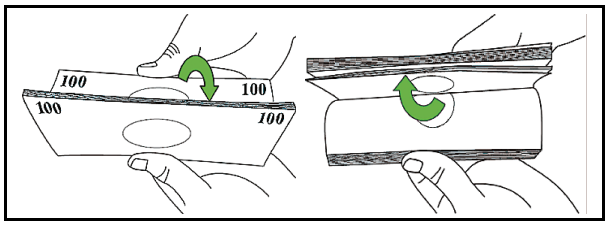


Figure 5 Fan-Flipping Banknotes

3. When inserting mixed, different sized Banknotes into the Bezel, align one side of their rough edges smoothly to one side of the bundle before inserting them (See Figure 6).

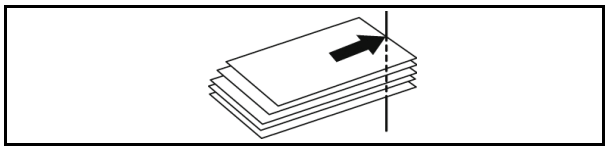


Figure 6 Aligning Banknotes Edges

2 SPECIFICATIONS

Technical Specifications

Table 4 TBV Technical Specification

Acceptance Rate:	98% or greater Note: The following banknote types are excluded: a) Worn, dirty wet, stained, torn or excessively wrinkled Banknotes b) Double (dual) Banknotes c) Banknotes adhering Oil or Iron powder d) Banknotes having folded corners or edges e) Banknotes with excessive or inadequate magnetism or unclear graphics f) Banknotes having the wrong cut dimensions or a printing displacement g) Banknotes having excessive fold lines or specific Banknote processing machine markings.
Bill Types Accepted:	Long side: 110-170mm (4.33-6.69 in.) Short side: 60-85mm (2.36-3.35 in.)
Barcode Coupon*:	Standard Specification a) Read code interleaved: 2 of 5 b) Narrow Bar: 0.5mm-0.6mm (0.019-0.023 in.) c) Wide Bar/Narrow Bar = 3:1 d) Characters: 18 Characters e) Print Position: Middle (Divide a Coupon equally on the left, right, top and bottom of the Coupon's center) f) Print Width: Wider than 10mm (0.39 in.)
Batch	Up to 50 Notes
Insertion Direction:	Banknote: Four-way Barcode Coupon: Two-way (Only with Surface facing upward)
Processing Speed†:	Fixed Type: • Banknote – Approximately 1.3 seconds/note from Banknote insertion to Escrow. – Approximately 1.7 seconds/note between the first and next Banknote insertion during a sequential insertion operation. • Barcode Coupon/Double Read‡ – Approximately 3.0 seconds/note from Banknote insertion to Escrow. – Approximately 3.7 seconds/note between the next Banknote insertion during a sequential insertion operation. • Barcode Coupon/Single Read‡ – Approximately 1.3 seconds/note from Banknote insertion to Escrow. – Approximately 2.0 seconds/note between the next Banknote insertion during a sequential insertion operation. Centering Model: • Banknote – Approximately 1.6 seconds/note from Banknote insertion to Escrow. – Approximately 2.0 seconds/note between the next Banknote insertion during a sequential insertion operation. • Barcode Coupon/Double Read‡ – Approximately 3.5 seconds/note from Banknote insertion to Escrow. – Approximately 4.2 seconds/note between the next Banknote insertion during a sequential insertion operation. • Bar-code Coupon/Single Read‡ – Approximately 1.6 seconds/note from Banknote insertion to Escrow. – Approximately 2.3 seconds/note between the next Banknote insertion during a sequential insertion operation.
Validation Method:	Optical (6 Illumination, [Transmissive/Reflective]) and Magnetic
Diagnostic Indicators:	LED Full Color
Escrow:	1 Note
Anti-stringing Mechanism:	Optical Sensor & Pusher Mechanism
Interface:	Photo-Coupler Isolation, RC232C, ccTalk, USB (Full Speed)

*. Refer to the specific "Bar Code Coupon Specification" Sheet for more details.

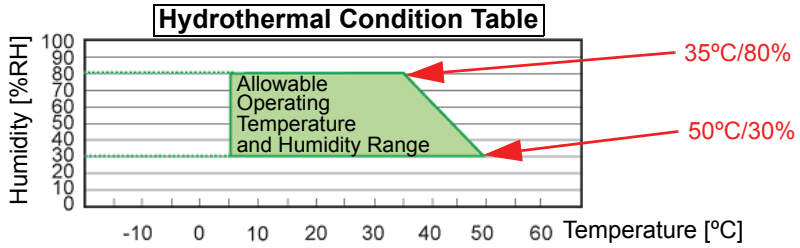
†. The time between the first Banknote insertion to the next Banknote sequential insertion operation.

‡. The Barcode Coupon Reading Specification can be changed by DIP Switch Settings.

Environmental Specifications

Table 5 TBV Environmental Specification

Operating Temperature:	+5ºC to +50ºC (41ºF to 122ºF)
Storage Temperature:	-20ºC to +60ºC (-4ºF to 140ºF)
Relative Operating Humidity:	30% to 80% RH (non-condensed)
Relative Storage Humidity:	30% to 80% RH (non-condensed)
Visible Light Sensitivity:	Avoid contact with direct sunlight (Interior lighting must be incandescent with a Radiant Angle of 15 Degree or more having an Illumination index of 3000 Lux or less).
Installation:	Indoors Only



Electrical Specifications

Table 6 TBV Electrical Specification

Supply Voltage:	24VDC ±5% (Greater than 4.1A [100W] Recommend)
Current Consumption:	Standby = Approximately 0.2 A Operation = Approximately 2.0 A Peak = Approximately 3.3 A (Maximum 3 seconds)

Structural Specifications

Table 7 TBV Structural Specification

Weight:	Approximately 12kg (26.46lbs)
Mounting:	Horizontal
Outside Dimensions:	See “TBV Entire Unit Outside Dimensions” on page 27 of this Guide.

3 INSTALLATION

Installation Process

Perform the following steps to install the TBV Unit:

1. Place the TBV in its intended mounting location.
2. Bolt both the right and left sides of the TBV Frame into its intended location using 8 Pan Head Screws (4 on each side) from outside of the Frame when this particular mounting configuration is preferred (See Figure 7).

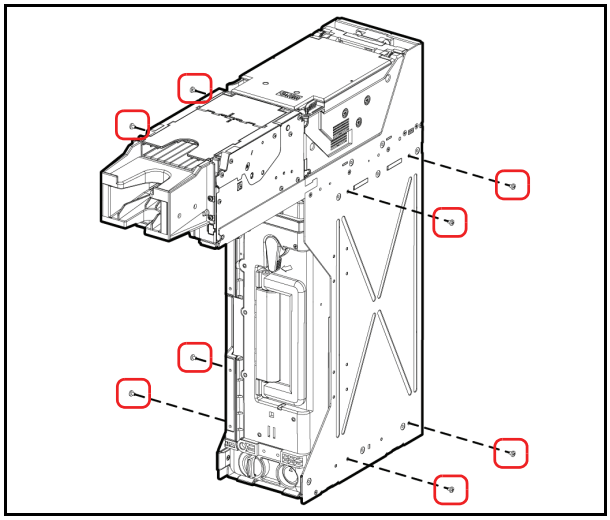


Figure 7 M4 Screw Locations (Right & Left Sides)

3. Remove the Cash Box and bolt the back side and bottom side of the TBV Frame into its intended location using 8 (eight) M4 Pan Head Screws from the outside of the frame when this mounting configuration is preferred (See Figure 8).

NOTE: The maximum length of the M4 Pan Head Screws should be 4mm plus the thickness of the Cabinet or mounting Bracket (See "TBV Entire Unit Outside Dimensions" on page 27 of this Guide to confirm each Screw pitch condition).

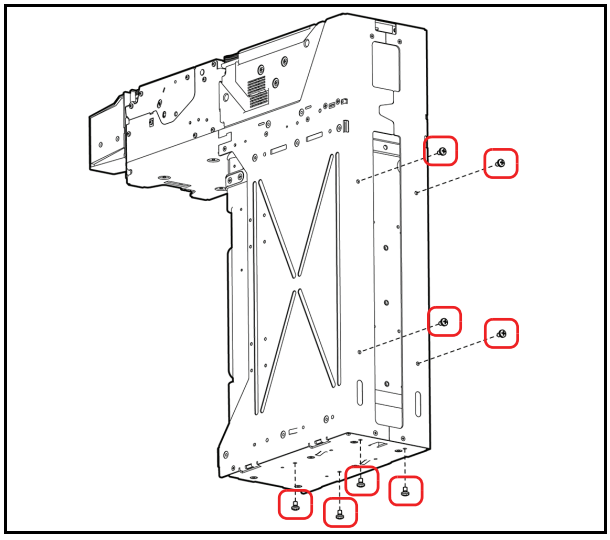


Figure 8 M4 Screw Locations (Bottom & Rear Sides)

4. Connect the TBV Unit to the Host Machine using a packaged Harness, and then supply the power.

NOTE: To install the TBV Unit into a Host Machine, affix at least two of the four side dimension in place.

DIP Switch Configurations

This portion provides the denomination value DIP Switch Block settings for the TBV Unit.

Table 8 BNF Set Vend Denomination Switches DS1

ON ↕ OFF 

DS1

Switch No.	Switch ON	Switch OFF
1	VEND 1 INHIBIT	VEND 1 ACCEPT
2	VEND 2 INHIBIT	VEND 2 ACCEPT
3	VEND 3 INHIBIT	VEND 3 ACCEPT
4	VEND 4 INHIBIT	VEND 4 ACCEPT
5	VEND 5 INHIBIT	VEND 5 ACCEPT
6	VEND 6 INHIBIT	VEND 6 ACCEPT
7	VEND 7 INHIBIT	VEND 7 ACCEPT
8	N/A*	OFF (Fixed)

*. Not Applicable (N/A). Never Switched to ON.

Table 9 Set BNF Buzzer Volume Switches DS2

ON ↕ OFF 

DS2

Switch No.	Switch ON	Switch OFF
1	N/A*	OFF (Fixed)
2	Performance Buzzer ON	Performance Buzzer OFF
3	ON Fixed	N/A*
4	N/A*	OFF (Fixed)

*. Not Applicable (N/A). Never Switched to ON.

Table 10 TBV Set Vend Denomination Switches DS3

ON ↕ OFF 

DS3

Switch No.	Switch ON	Switch OFF
1	VEND 1 INHIBIT	VEND 1 ACCEPT
2	VEND 2 INHIBIT	VEND 2 ACCEPT
3	VEND 3 INHIBIT	VEND 3 ACCEPT
4	VEND 4 INHIBIT	VEND 4 ACCEPT
5	VEND 5 INHIBIT	VEND 5 ACCEPT
6	VEND 6 INHIBIT	VEND 6 ACCEPT
7	VEND 7 INHIBIT	VEND 7 ACCEPT
8	N/A*	OFF (Fixed)

*. Not Applicable (N/A). Never Switched to ON.

NOTE: When installing the BNF Section onto the TBV-100 Unit, DIP Switch #3 settings will have no effect. In this case, DIP Switch #1 on the BNF Section must therefore be used for setting the required denomination.

Table 11 TBV Centering Mechanism & Select Comm Interface Switches DS4

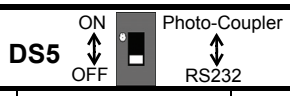
Switch No.	Switch ON	Switch OFF
1	Fixed Model	Centering Model
2	Barcode Coupon Single Read*	Barcode Coupon Double Read*
3†	I/F Selection / Switch #3 / Switch #4 (see below)	
4†		

I/F Selection	Switch #3	Switch #4
RS232	OFF	OFF
Photo-Coupler	ON	OFF
ccTalk	OFF	ON
ccTalk with Encryption	ON	ON

*. When using the "Single Read" Barcode Coupon setting, its Checksum may have to be changed to improve reading accuracy. The "Double Read" setting however, has a higher reliability and read accuracy by the TBV Validation System.

†. Match each setting to equal the setting of DIP Switch DS5 Switch #1.

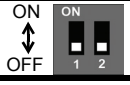
Table 12 TBV Photo-Coupler/RS232 Interface Selection Switch DS5



Switch No.	Switch ON	Switch OFF
1*	Photo-Coupler	RS232

*. Match each setting to DIP Switch DS4 Switches #3 & #4.

Table 13 TBV Option Memory Selection Switches DS6



Switch No.	Switch ON	Switch OFF
1	N/A*	OFF (Fixed)
2	N/A*	OFF (Fixed)

*. Not Applicable (N/A). Never Switched to ON.

Primary LED Indications

The following Table 14 Color LED indications occur during various TBV operating and error conditions.

Table 14 LED Error Pattern Indications

Mode	TBV LED Indication	TBV Condition
Normal Mode	Lit Blue	Stand-by (Waiting for a Banknote insertion)
	Lit Yellow	Waiting for a Host Machine Command
	OFF (Extinguished)	BUSY (Processing Validation) or an INHIBIT Command
	Lit Green	Cash Box Near Full detection
	Yellow Flashes	Internal processing (Self download: Transport Section → BNF Section)
	Yellow Flashes*	Banknote Jam or Setting malfunction
	Red Flashes†	Abnormal (ABN) Error
Download Mode	Green Flashes	Waiting for a Download
	Yellow Flashes	Downloading
	Lit Blue	Download completed

*. Returns to Stand-by Mode after clearing the error condition (See "Standard Error Codes" on page 22 of this Guide to resolve the error type).

†. Returns to Stand-by Mode from a RESET Command, or after clearing the error condition (See "Standard Error Codes" on page 22 of this Guide to resolve the error type).

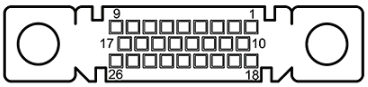
4 CONNECTOR PIN ASSIGNMENTS

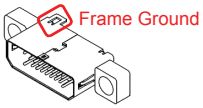
Table 15 through Table 18 list the TBV Pin Assignments respectively.

Table 15 lists the TBV USB Interface Pin Assignments.

Table 15 TBV USB Interface Pin Assignments

Back Side View





Socket (Transport Unit Side): DR1P026SA1 (JCM)
Socket (Frame Unit Side): DR1R026PA1 (JCM)
Contact (Frame Unit Side): D02-22-22P-10000 (JAE) (Pole# 1,9,18 & 26)
UL3443 AWG#24 Ø1.3mm or less
D02-22-26P-10000 (JAE) (Poles except 1,9,18 & 26)
UL1061 AWG#26 Ø1.1mm or less

Pin No.	Signal Name	I/O*	Function
1	24V DC (POWER)	-	+24V DC Power Supply
2	M-RESET	IN	Acceptor Reset Signal Input Line
3	USB+	IN/ OUT	USB Communication Input/Output Signal Line
4	USB-	IN/ OUT	USB Communication Input/Output Signal Line
5	USB GND		USB Communication Ground (0V DC)
6	-		No Connection
7	-		No Connection
8	-		No Connection
9	24V DC (POWER)		+24V DC Power Supply
10	-		No Connection
11	-		No Connection
12	+12V (Opto)		+12V DC (or +5V DC)
13	USB Vbus		USB Communication Vbus Signal Line (+5V DC)
14	-		No Connection
15	-		No Connection
16	-		No Connection
17	-		No Connection
18	Power GND		0V DC Power Supply
19	-		No Connection
20	-		No Connection
21	-		No Connection
22	-		No Connection
23	-		No Connection
24	-		No Connection
25	-		No Connection
26	Power GND		0V DC Power Supply
Frame GND	Frame Ground		(Be sure to connect it to the Chassis Frame)

*. I/O (input/output) is the Terminal as viewed from the Banknote Validator's backside.

Table 16 lists the TBV Photo-Coupler Interface Pin Assignments

Table 16 TBV Photo-Coupler Interface Pin Assignments

Back Side View

Socket (Transport Unit Side): DR1P026SA1 (JCM)
Socket (Frame Unit Side): DR1R026PA1 (JCM)
Contact (Frame Unit Side): D02-22-22P-10000 (JAE) (Pole# 1,9,18 & 26)
UL3443 AWG#24 Ø1.3mm or less
D02-22-26P-10000 (JAE) (Poles except 1,9,18 & 26)
UL1061 AWG#26 Ø1.1mm or less

Pin No.	Signal Name	I/O*	Function
1	24V DC (POWER)	-	+24V DC Power Supply
2	M-RESET	IN	Acceptor Reset Signal Input Line
3	-		No Connection
4	-		No Connection
5	-		No Connection
6	-		No Connection
7	-		No Connection
8	-		No Connection
9	24V DC (POWER)		+24V DC Power Supply
10	-		No Connection
11	Serial OUT	OUT	Serial Communication Output Signal Line TXD
12	+12V (Opto)		Interface Power Supply (+12V DC)
13	-		No Connection
14	-		No Connection
15	-		No Connection
16	-		No Connection
17	-		No Connection
18	Power GND		0V DC Power Supply
19	Opto GND		Photo-coupler Communication Ground
20	Serial IN	IN	Serial Communication Input Signal Line RXD
21	-		No Connection
22	-		No Connection
23	-		No Connection
24	-		No Connection
25	-		No Connection
26	Power GND		0V DC Power Supply
Frame GND	Frame Ground		(Be sure to connect it to the Chassis Frame)

*. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

Table 17 lists the TBV RS232 Interface Pin Assignments

Table 17 TBV RS232 Interface Pin Assignments

Back Side View

Socket (Transport Unit Side): DR1P026SA1 (JCM)
Socket (Frame Unit Side): DR1R026PA1 (JCM)
Contact (Frame Unit Side): D02-22-22P-10000 (JAE) (Pole# 1,9,18 & 26)
UL3443 AWG#24 Ø1.3mm or less
D02-22-26P-10000 (JAE) (Poles except 1,9,18 & 26)
UL1061 AWG#26 Ø1.1mm or less

Pin No.	Signal Name	I/O*	Function
1	24V DC (POWER)	-	+24V DC Power Supply
2	M-RESET	IN	Acceptor Reset Signal Input Line
3	-		No Connection
4	-		No Connection
5	-		No Connection
6	-		No Connection
7	-		No Connection
8	-		No Connection
9	24V DC (POWER)		+24V DC Power Supply
10	GND		RS232 Interface Ground
11	Serial OUT	OUT	Serial Communication Output Signal Line TXD
12	+12V (Opto)		+12V DC (or +5V)
13	-		No Connection
14	-		No Connection
15	-		No Connection
16	-		No Connection
17	-		No Connection
18	Power GND		0V DC Power Supply
19	-		No Connection
20	Serial IN	IN	Serial Communication Input Signal Line RXD
21	-		No Connection
22	-		No Connection
23	-		No Connection
24	-		No Connection
25	-		No Connection
26	Power GND		0V DC Power Supply
Frame GND	Frame Ground		(Be sure to connect it to the Chassis Frame)

*. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

Table 18 lists the TBV ccTalk Interface Pin Assignments.

Table 18 TBV ccTalk Interface Pin Assignments

Back Side View

Socket (Transport Unit Side): DR1P026SA1 (JCM)
Socket (Frame Unit Side): DR1R026PA1 (JCM)
Contact (Frame Unit Side): D02-22-22P-10000 (JAE) (Pole# 1,9,18 & 26)
UL3443 AWG#24 Ø1.3mm or less
D02-22-26P-10000 (JAE) (Poles except 1,9,18 & 26)
UL1061 AWG#26 Ø1.1mm or less

Pin No.	Signal Name	I/O*	Function
1	24V DC (POWER)	-	+24V DC Power Supply
2	M-RESET	IN	Acceptor Reset Signal Input Line
3	-		No Connection
4	-		No Connection
5	-		No Connection
6	-		No Connection
7	-		No Connection
8	-		No Connection
9	24V DC (POWER)		+24V DC Power Supply
10	GND		ccTalk Interface Ground
11	-		No Connection
12	+12V (Opto)		Interface Power Supply +12V DC
13	-		No Connection
14	-		No Connection
15	-		No Connection
16	-		No Connection
17	ccTalk PULL UP		ccTalk Communication Signal Line Pull Up
18	Power GND		0V DC Power Supply
19	-		No Connection
20	-		No Connection
21	-		No Connection
22	-		No Connection
23	-		No Connection
24	-		No Connection
25	ccTalk	IN/ OUT	ccTalk Communication SIgnal Line
26	Power GND		0V DC Power Supply
Frame GND	Frame Ground		(Be sure to connect it to the Chassis Frame)

*. I/O (input/output) is the terminal as viewed from the Banknote Validator's backside.

5 PREVENTIVE MAINTENANCE

Retrieving Banknotes

To retrieve TBV Cash Box deposited Banknotes, perform the following steps:

1. Rotate the Cash Box Release Lever Clockwise (See Figure 9 a), and
2. Remove the Cash Box from the TBV Frame Unit (See Figure 9 b).

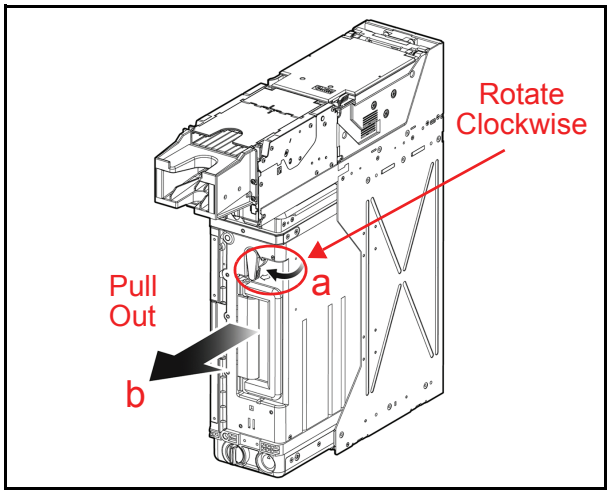


Figure 9 Removing the Cash Box

3. Rotate the Thumb Twist Lock Knob with User Key at the bottom of the Cash Box to unlock its Door (See Figure 10 a).
4. Open the Cash Box Door (See Figure 10 b).

NOTE: A Security Key may be required to unlock the Cash Box prior to opening it (See Figure 10 c).

5. Press the Pusher Plate down (See Figure 10 d) to Retrieve the Banknotes (See Figure 10 e).

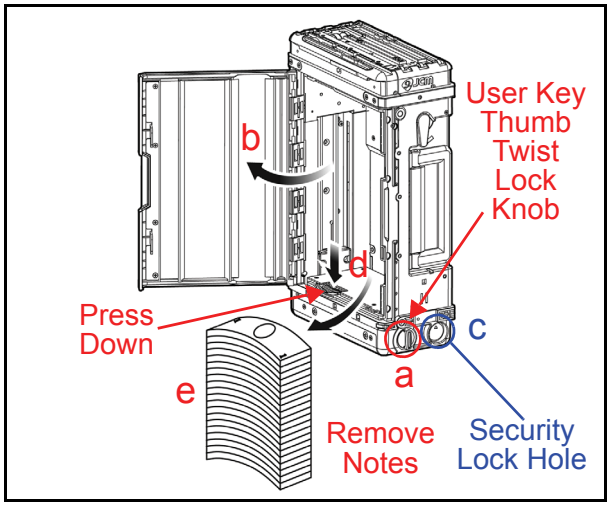


Figure 10 Opening the Cash Box Door

The Banknote retrieval operation is now complete.

Clearing a Banknote Jam

To retrieve a jammed Banknote located inside the Banknote Acceptor, proceed as follows:

1. Open the Return Path Open/Close Cover, and remove the jammed Banknote (See Figure 11 a).
2. If the Banknote jam location is not evident, open the BNF Section's Upper Guide by simultaneously pressing in on the BNF Guide Latches (See Figure 11 b) located on each side of the BNF Unit Upper Guide, and lift the Acceptor's Top Door up and open. These latches are indicated by the Blue Arrows in Figure 11b.
3. Remove the jammed Banknote.
4. If the Banknote jam location is still not evident, open the Transport Section's Upper Guide by simultaneously pressing in on its Front Guide Latches (See Figure 11 c) located on each side of the Transport Section's Upper Guide, and lift the Transport's Top Door up and open. These latches are indicated by the Green Arrows in Figure 11c.
5. Remove the jammed Banknote.

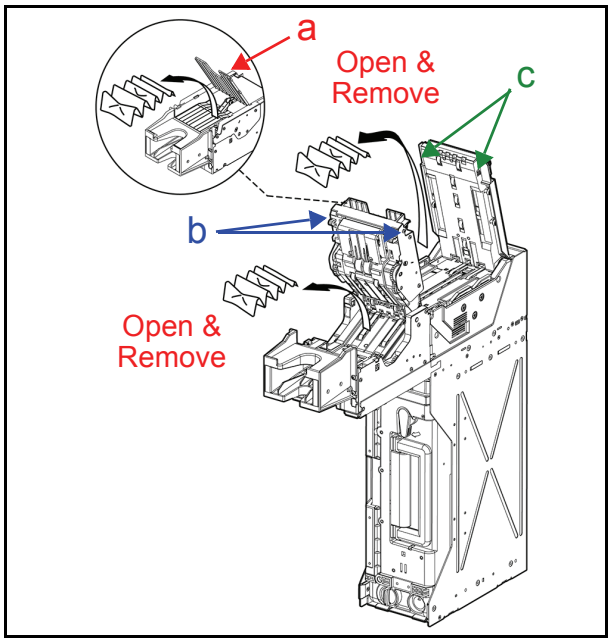


Figure 11 Removing a Jammed Banknote 1

6. If the Banknote jam location is still not evident, remove the TBV Unit from its Frame.
7. Open the Transport Section's Rear Guide by simultaneously pressing in on each Rear Guide Latch (See Figure 12 a) located on each side of the of the Transport Units Rear Guide and lift the Guide up and open. These latches are indicated the Blue Arrows in Figure 12a.

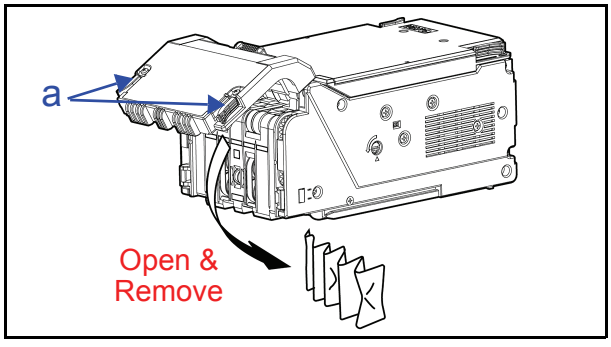


Figure 12 Removing a Jammed Banknote 2

8. If necessary, remove the Cash Box (See Figure 13 a) from the Frame, and remove the jammed Banknote as shown in Figure 13b (Review Figure 9 “Removing the Cash Box” on page 13 of this Guide if necessary to properly remove the Cash Box).

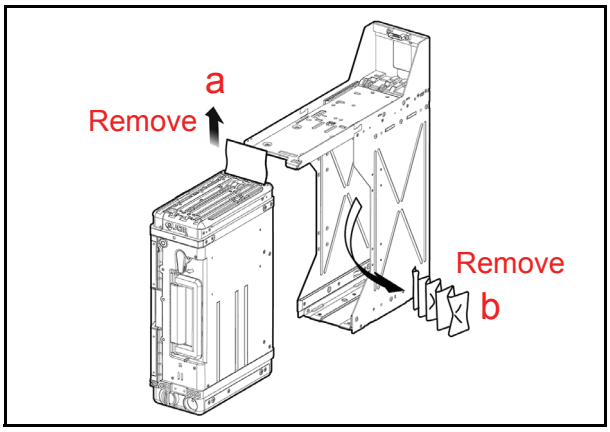


Figure 13 Removing a Jammed Banknote 3

The Banknote jam clearing operation is now complete.

Cleaning Procedure

To clean the TBV Validation Section, gently rub the Sensors and Rollers clean using a dry, soft, lint-free cloth.

Do not use any Alcohol, solvents, citrus based products or scouring agents that may cause damage to the Validation Section Sensors and Rollers.

Sensor and Roller Cleaning Procedure:

1. Turn the TBV and Host Machine’s Power Supply’s **OFF**.
2. Open the Upper Chassis.
3. Clean the appropriate path and Lens of each Sensor (See Figure 14 areas “a” through “y” and the corresponding Table 18 descriptions to locate each Sensor and Roller that require cleaning.

Caution: Do not use Alcohol, thinner or citrus based products for cleaning any surfaces. The Lenses can become clouded by chemical effect that may cause acceptance errors.
Use a lint-free cloth soaked with purified water and wrung dry to clean the internal surfaces and BNF Rollers only.

6 TBV SENSOR AND ROLLER LOCATIONS

Figure 14 illustrated the various TBV Sensor and Roller cleaning locations, and Table 19 lists the TBV Sensor and Roller Type Cleaning Methods respectively.

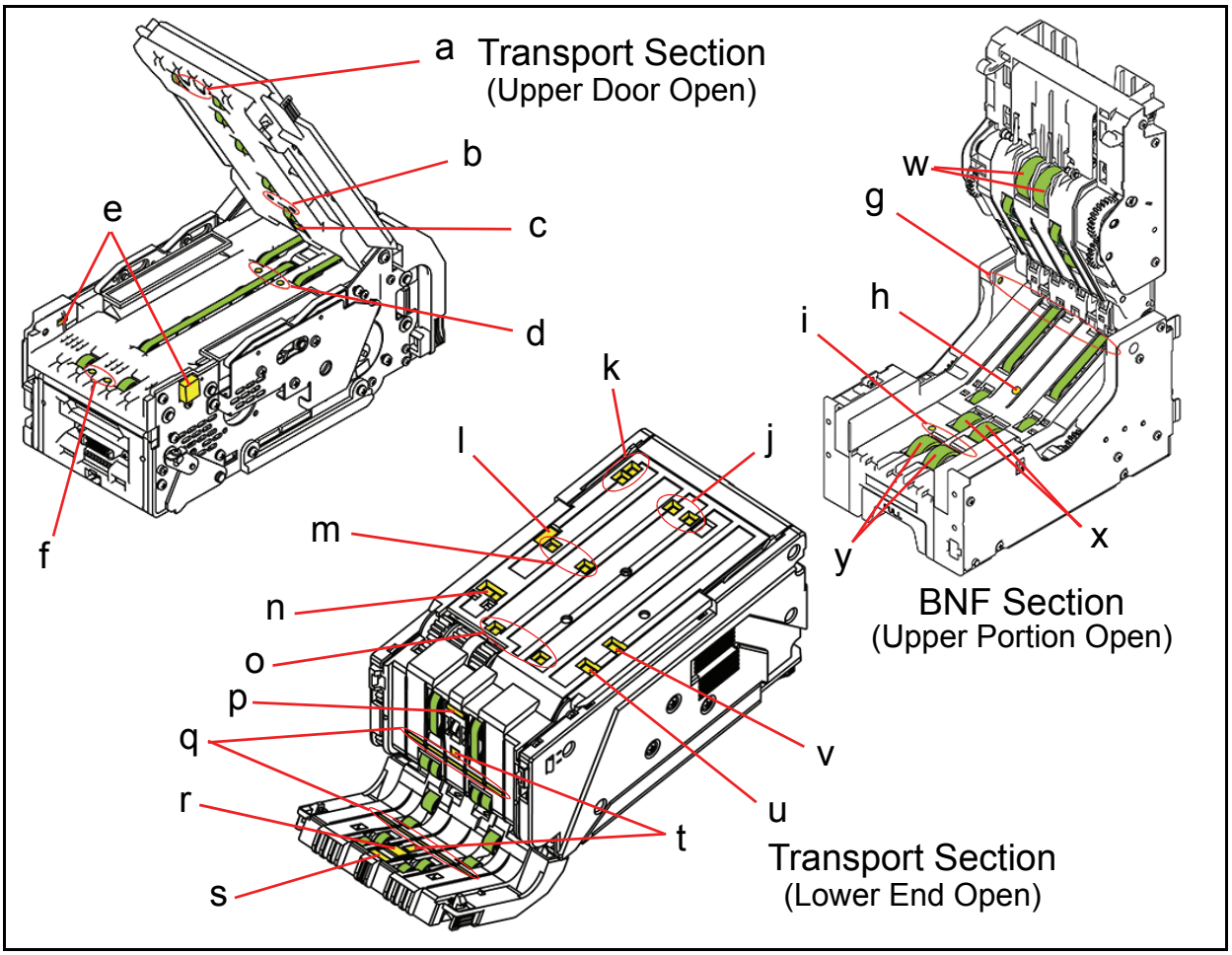


Figure 14 TBV Sensor and Roller Cleaning Locations

Table 19 TBV Sensor and Roller Type Cleaning Methods

Sym.	Sensor/Roller Type	Cleaning Method	Sym.	Sensor/Roller Type	Cleaning Method
a	Input Prism	Wipe clean using a lint-free cloth*	n	Cash Box Sensor	Wipe clean using a lint-free cloth*
b	Centering Guide Prism		o	Cash Box Feed Out Sensor	
c	Bar Sensor		p	Feed Out Prism	
d	Centering Sensor		q	Line Sensor	
e	Side Sensor		r	Magnetic Sensor	
f	Entrance Sensor		s	Feed Out Sensor	
g	Reject Sensor		t	UV Sensor	
h	Assignation Sensor		u	Cash Box Full Sensor	
i	Entrance Sensor		v	Cash Box Near Full Sensor	
j	Pusher Plate Position Sensor		w	Retard Roller	Wipe clean using a lint-free cloth†
k	Cash Box Lock Sensor		x	Feed Roller	
l	ICB (Provisional)		y	Pick Up Roller	
m	Pusher Mechanism Home Position Sensor				

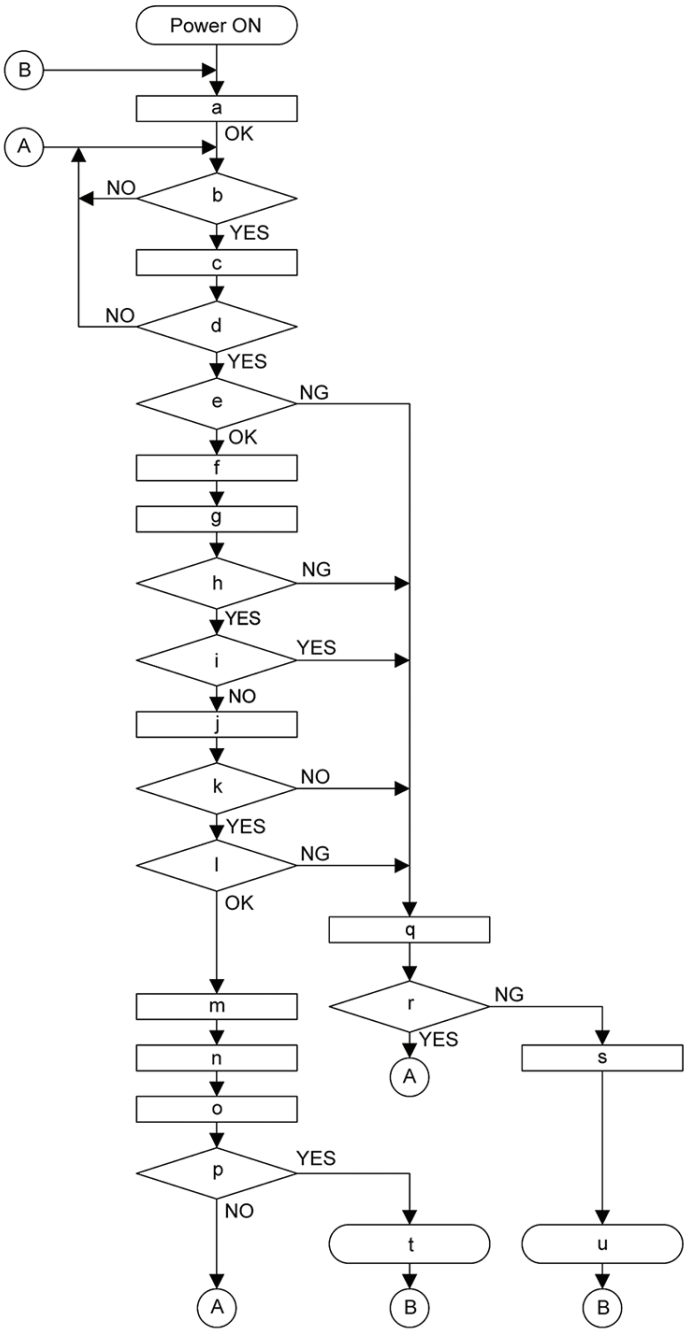
*. Wipe and clean all of the Rollers and Green Belts shown in Figure 14 using a soft lint-free cloth.

†. Use a lint-free cloth soaked with purified water and wrung dry to clean the Retard Roller, the Feed Roller and the Pick Up Roller.

NOTE: If any water adheres to the Sensor Lenses or Prism, wipe it clean using a dry lint-free cloth immediately! Then, let the area air dry for a sufficient time to allow maximum evaporative drying to take effect.

7 OPERATIONAL FLOWCHART

Figure 15 depicts a typical TBV Banknote acceptance flow process.



Power applied to the Unit.
B) Return from “t” or “u” Functions below
a) Initializing

A) Return from “p” or “r” Functions below
b) Has ENABLE Command been Received?

c) Stand-by

d) Turn the Intake Sensor ON?

e) Transport the Banknote?

f) Sampling a Banknote’s Data

g) Sampling Completed

h) Is the Banknote Authentic?

i) Is Denomination Settings un-inhibited?

j) Output the Denomination Value Signal

k) Was a STACKING Command Received?

l) Start Transporting a Banknote

q) Return the Banknote

m) Banknote Transportation Complete
r) Is the Banknote Return Complete?
n) Output a VEND Signal
s) Output a JAM ERROR Signal
o) Start Stacking

p) Is the Cash Box Full?

t) Signal to Change the Cash Box
u) Remove a Jammed Banknote

A) Return to “c” Function at top
B) Return to “a” Function at top

Figure 15 TBV Operational Flowchart

8 STANDARD INTERFACE CIRCUIT SCHEMATICS

Figure 16 illustrates the TBV USB Interface Schematic Diagram

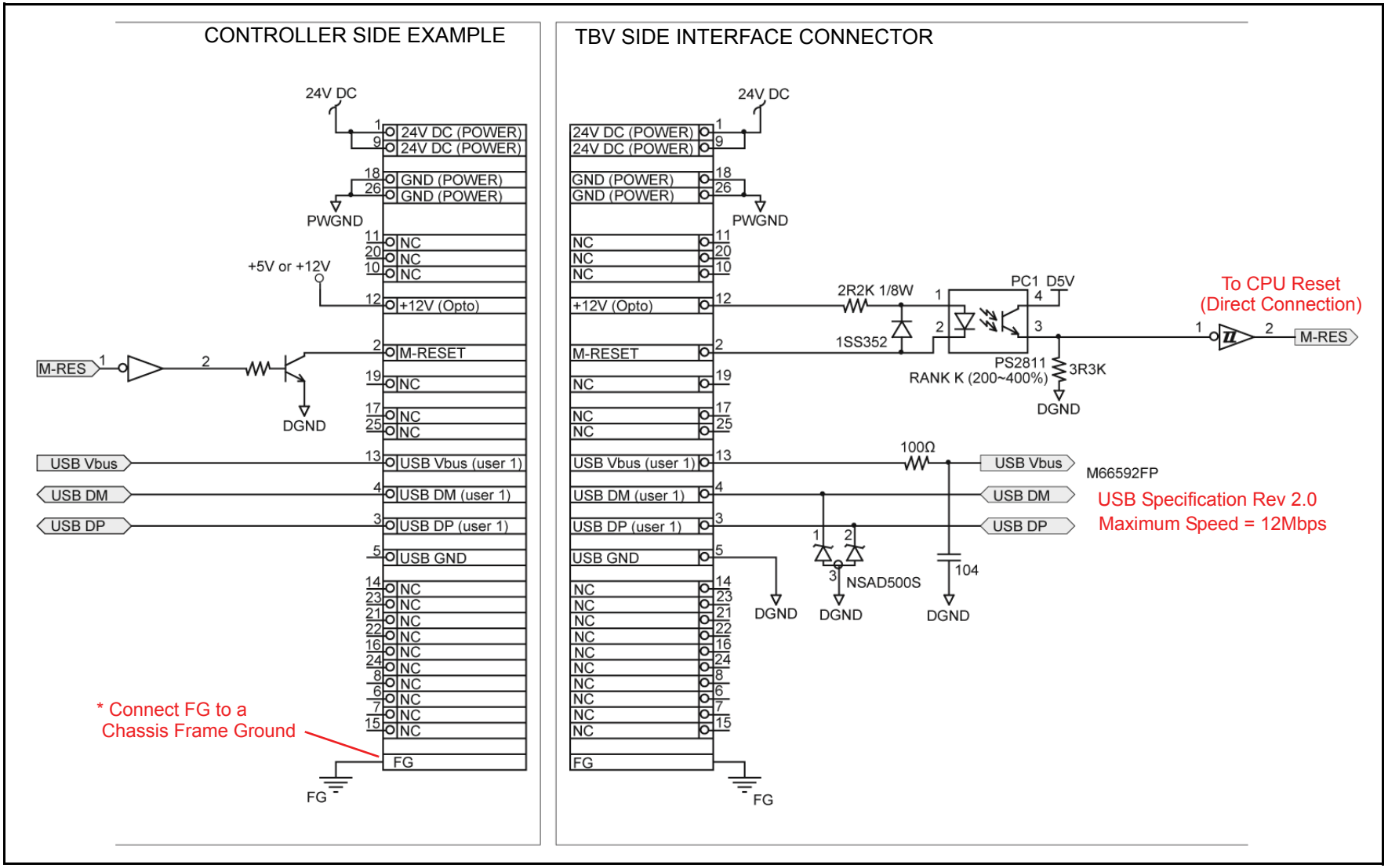


Figure 16 TBV USB Interface Schematic Diagram

STANDARD INTERFACE CIRCUIT SCHEMATICS (CONTINUED 1)

Figure 17 illustrates the TBV Photo-Coupler Interface Schematic Diagram

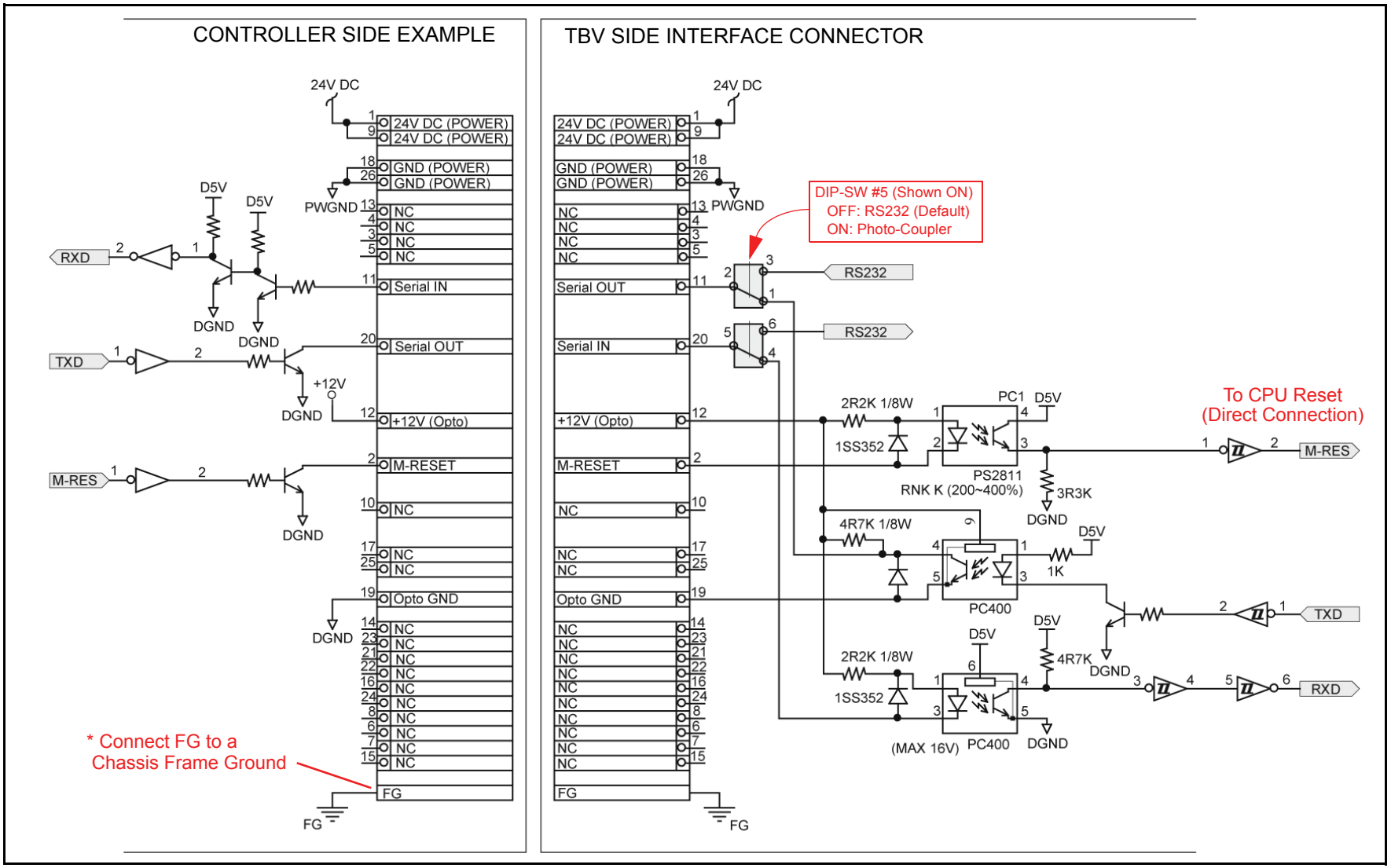


Figure 17 TBV Photo-Coupler Interface Schematic Diagram

STANDARD INTERFACE CIRCUIT SCHEMATICS (CONTINUED 2)

Figure 18 illustrates the TBV RS232 Interface Schematic Diagram

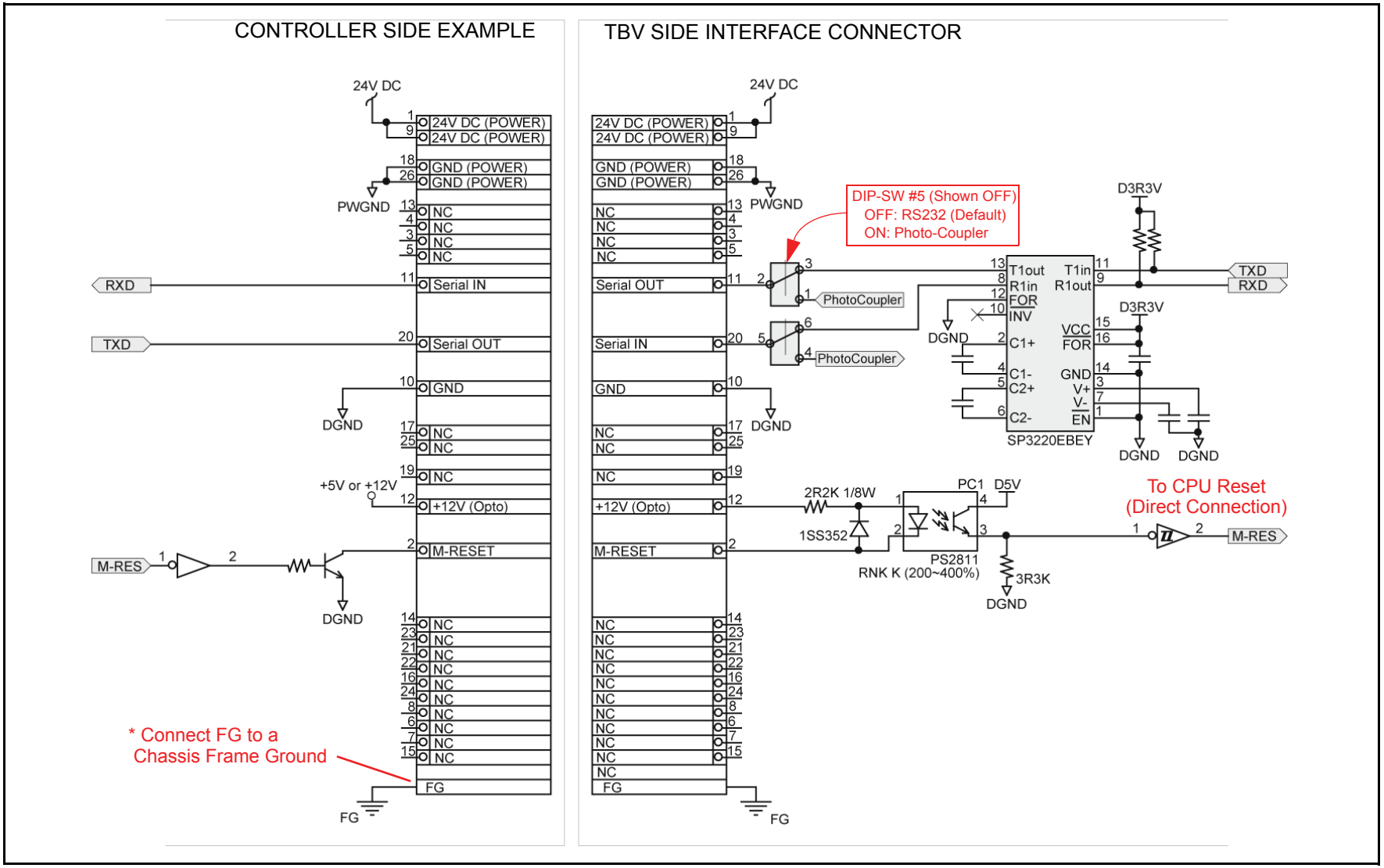


Figure 18 TBV RS232 Interface Schematic Diagram

STANDARD INTERFACE CIRCUIT SCHEMATICS (CONTINUED 3)

Figure 19 illustrates the TBV ccTalk Interface Schematic Diagram.

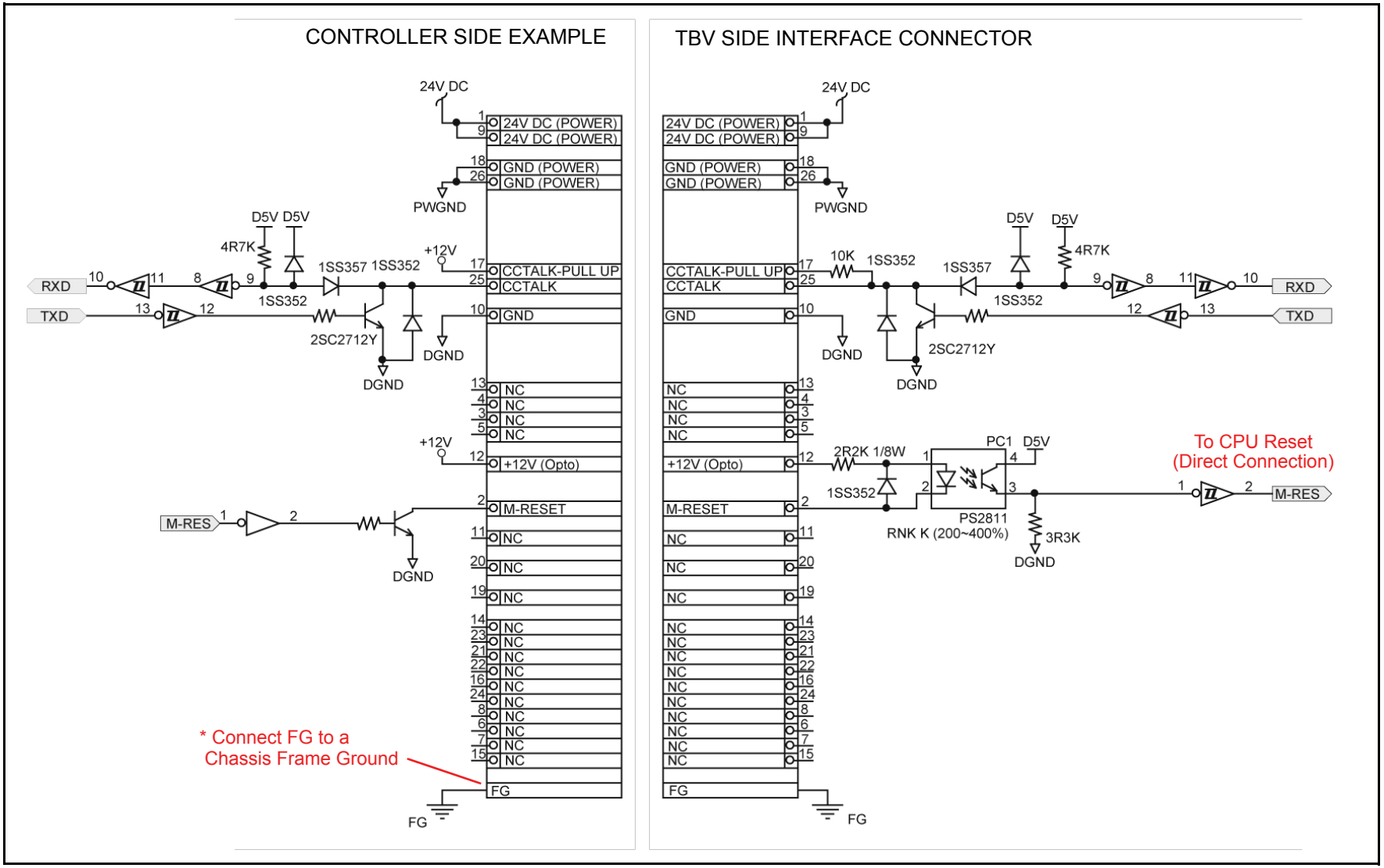


Figure 19 TBV ccTalk Interface Schematic Diagram

9 LED DIAGNOSTIC CODES

Malfunction LED Error Codes

The TBV Bezel LEDs light a solid Color, or flash a combination of three (3) different Colors when errors, Banknote jams or a Note Reject Error occurs. The TBV Status, Error Codes, Banknote Jam Code or Bank-note Reject Codes are indicated by the number and/or Color of the Status LED's solid or flashing light condition.

LED INDICATION CONDITIONS

Table 20 lists the Bezel LED Status/Error Code indications for the TBV Unit.

Table 20 LED Status/Error Code Condition

Symptoms	Causes	Solutions
The TBV is not working. (TBV's Bezel LED and CPU Board LED are not lighting).	Power is not supplied to the Unit.	Check that the Interface Connectors are properly fitted. Verify that the Power Supply meets its specification.
	The Program is not activate. (The Software download has not completed correctly).	Re-download the correct Software. (Refer to the TBV Service Manual for details regrading proper "Software Download" procedures).
	The CPU Board is malfunctioning.	Check that the TBV's internal Harnesses and Connectors are properly fitted.
	Unit is not communicating with the Host Machine. Different Interface DIP Switches are set on the TBV and/or the Host Machine. Interface DIP Switch settings are not correct.	Check that the Interface settings and the DIP Switch settings meet their design specifications. (See "DIP Switch Configurations" on page 7 of this Guide).
The TBV is not working. (TBV's CPU Board LED is not lit).	RAM malfunctioning.	Check that the TBV's internal Harnesses and Connectors are properly fitted.
The TBV is not working. (TBV's cooling fan goes ON and OFF alternately).	ROM malfunctioning.	Check that the TBV's internal Harnesses and Connectors are properly fitted.
The TBV is not working. Banknote Jam has occurred. (TBV's Bezel LED is flashing Red or Yellow).	A Unit setting malfunctioning. An improper assembly and/or Harness connection exists. Banknote Jam or poor condition occurred due to foreign object in path interference.	Check that the Unit, Assembly and Connections are properly set in place. Check that there is not a Banknote Jam or a foreign object interfering inside the TBV Unit Banknote Transport Path. Check that the flashing pattern is correct, and identify the indicated error by referring to the Error Codes Table; then perform the necessary action required (See "Standard Error Codes" on page 22 or the "Reject Error Codes" on page 25 of this Guide).
Most Banknotes are rejected. (TBV's Bezel LED is flashing Green).	The current Software is not designed to accept the current Banknotes.	Check that the acceptable denomination values are correct. Download the correct Software Program (Refer to the TBV Service Manual for details regrading the proper "Software Download" procedures).
	DIP Switch settings are incorrect.	Check that the DIP Switch settings are properly set. (See "DIP Switch Configurations" on page 7 of this Guide).
	The Banknote accept/inhibit setting is being made by command from the Host Machine.	Check that the command from the Host Machine is correct, and change the setting to be acceptable for use with the TBV Unit.
	Dirt or foreign objects are adhering to the Sensors.	Clean the Sensors by referring to See "Cleaning Procedure" on page 14 of this Guide.
	Improper validation process performance. Improper assembly and/or Harness connection. The CPU Board and/or the Sensors are malfunctioning.	Check that all assembly and connections are properly set. Identify the LED error flashing pattern, and identify the error by referring to the Error Codes Table; then perform the necessary action required (See "Standard Error Codes" on page 22 or the "Reject Error Codes" on page 25 of this Guide).
Banknote reject occurs sometimes, and the Banknote acceptance rate is low. (TBV's Bezel LED is flashing Green)	The Software version is old. Banknotes require proper denomination from the specific Country's Software being validated.	Confirm that the required denomination and/or issued year is correct by referring to the specific Country's Software Information Sheet.
	Foreign objects are adhering to the Sensors.	Clean the Sensors by referring to See "Cleaning Procedure" on page 14 of this Guide.
	Need to perform to the Sensor Calibration Tests (Did not perform Sensor Calibration Tests after Unit disassembly or repair).	Identify the LED error flashing pattern and locate the error by referring to the Error Codes Table; then perform the necessary action required. Perform a Vibration Test if necessary. (Refer to TBV Service Manual for details regrading proper "Calibration and Testing" procedures).

Standard Error and Reject Codes

The Bezel LED indicates various solid/flashing Color lighting conditions when any of the Standard Errors listed in Table 21 occur. Identify the cause and solutions for these indications from each Table listing and ensure that the relative assembles are properly connected and/or harnessed, and that all of the Unit's Sensors are clean.

STANDARD ERROR CODES

Table 21 lists the various LED Flash Error Code causes & solutions.

Table 21 Standard LED Error Codes

On-line LED Color (Flash Sequence)	Off-line LED Color (Flash Sequence)	Error	Causes and Solutions
Yellow (1)	Yellow (1)	Banknote Jam (in the Cash Box)	When transporting a Banknote to the Cash Box, the Sensors are not detecting a Banknote present condition when the time interval taken is too long or the number of the Banknotes stuck is greater than specified value for that function. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Feed Motor, Stack Sensor, Feed-out Sensor. If the error is not resolved, change the above related part or parts.
Yellow (2)	Yellow (2)	Banknote Jam (in the Transport Section)	When transporting or returning a Banknote in the Transport Section, the Sensors do not detect a Banknote present condition when the time interval taken is too long or the number of the Banknotes stuck is greater than specified value for that function. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Feed Motor, BNF Entrance Sensor, BNF Assignation Sensor, Entrance Sensor, Centering Sensor, Line Sensor, Feed-out Sensor. If the error is not resolved, change the above related part or parts.
Yellow (3)	Yellow (3)	Banknote Chain	While performing a BNF Banknote assignation, the Sensors do not detected a Banknote present condition when the time interval taken is too long or the number of the Banknotes stuck is greater than specified value for that function. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] BNF Feed Roller, BNF Retard Roller, BNF Assignation Sensor, Entrance Sensor, Feed-out Sensor. If the error is not resolved, change the above related part or parts.
Yellow (4)	Yellow (4)	Cash Box Removal	The Cash Box has been removed. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Cash Box Sensor. If the error is not resolved, change the above related part or parts.
Yellow (5)	Yellow (5)	Fraud Detection	Sensors detect Banknotes remaining in path or none exist during an abnormal timing operation. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor, Feed-out Sensor, Cash Box Feed-out Sensor, Side Sensor. If the error is not resolved, change the above related part or parts.
Yellow (6)	Yellow (6)	Cash Box Lock Released	Sensors detect that the Cash Box Lock has been opened. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Cash Box Lock Sensor. If the error is not resolved, change the above related part or parts.
Yellow (7)	Yellow (7)	Transport Section Upper Cover Open	Sensors detect that the Upper Cover of the Transport Section has been opened. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Entrance Sensor, Centering Sensor. If the error is not resolved, change the above related part or parts.
Red (1)	Red (1)	Cash Box Full	While stacking a Banknote, the Cash Box Full Sensors detect that the Cash Box is full. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and sensors. [Relative Parts] Cash Box Full Sensor, Pusher Mechanism, Pusher Plate. If the error is not resolved, change the above related part or parts.
Red (2)	Red (2)	Feed Motor Lock-up Problem	While operating the Feed Motor, no pulse inputs exist greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Feed Motor, Feed Encoder. If the error is not resolved, change the above related part or parts.

Table 21 Standard LED Error Codes (Continued)

On-line LED Color (Flash Sequence)	Off-line LED Color (Flash Sequence)	Error	Causes and Solutions
Red (3)	Red (3)	Stack Motor Lock-up Problem	While operating the Stack Motor, no pulse inputs exist greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Stack Motor, Stack Motor Encoder, Pusher Mechanism, Pusher Plate. If the error is not resolved, change the above related part or parts.
Red (4)	Red (4)	Centering Motor Lock-up Problem	While the Centering Motor is operating, no pulse inputs exist greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Centering Motor, Centering Guide, Centering Home Sensor. If the error is not resolved, change the above related part or parts.
Red (5)	Red (5)	BNF Unit Problem	While operating the BNF Section, no pulse inputs exist greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] BNF Feed Motor, Banknote Press Motor. If the error is not resolved, change the above related part or parts.
Red (6)	Red (6)	Shutter Error	While the Shutter Motor is operating, Sensors detect abnormal movement. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Shutter Motor, Shutter Sensor If the error is not resolved, change the above related part or parts.
Red (7)	Red (7)	Banknote Jam at the Pusher Mechanism Home Position	The Pusher Mechanism Home Position Sensor detects that the Pusher Mechanism has not moved to the Home end position. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Pusher Mechanism, Stack Motor, Stack Home Sensor, Stack Motor Encoder. If the error is not resolved, change the above related part or parts.
Red (8)	Red (8)	Pusher Mechanism Home Position Problem	When stacking Banknotes, the Pusher Mechanism is not returning to the Home end position. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Pusher Mechanism, Stack Motor, Stack Home Position Sensor, Stack Encoder Sensor. If the error is not resolved, change the above related part or parts.
Red (9)	Red (9)	Pusher Mechanism Half-way Position Problem	The Pusher Mechanism is not returning to the Pusher Mechanism Half-way Position. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Pusher Mechanism, Stack Motor, Pusher Mechanism Half Sensor, Stack Motor Encoder If the error is not resolved, change the above related part or parts.
Red (10)	Red (10)	Centering Home Position Problem	The Centering Mechanism is not presently seated at its Home end position. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Centering Motor, Centering Guide, Centering Home Sensor If the error is not resolved, change the above related part or parts.
Red (11)	Red (11)	Feed Motor Speed Problem	While Initializing, no pulse inputs exist greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Feed Motor, Feed Motor Encoder. If the error is not resolved, change the above related part or parts.
Red (12)	Red (12)	BNF Section Communication Error	While the BNF is communicating, no communication data exists that is longer than the expected rated time. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] BNF Communication Harness. If the error is not resolved, change the above related part or parts.
Red (13)	Red (13)	ICB Communication Error	While the ICB is communicating, no communication data exists that is longer than the expected rated time. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] ICB Board. If the error is not resolved, change the above related part or parts.

Table 21 Standard LED Error Codes (Continued)

On-line LED Color (Flash Sequence)	Off-line LED Color (Flash Sequence)	Error	Causes and Solutions
Red (14)	Red (14)	Voltage Problem	Input Voltage is too low. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Power Supply Unit. If the error is not resolved, change the above related part or parts.
Red (15)	Red (15)	Fraud Detection	Sensors detect Banknotes remain in path, or none existed during an abnormal timing condition. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor, Feed-out Sensor, Box Feed-out Sensor, Side Sensor. If the error is not resolved, change the above related part or parts.
Red (16)	Red (16)	I2C Access Error	While communicating with each device on the CPU Board, Sensors detect an abnormal operating condition. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] CPU Board. If the error is not resolved, change the above related part or parts.
Red (18)	Red (18)	SDRAM Error	SDRAM reading and/or writing is not properly performed. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] CPU Board. If the error is not resolved, change the above related part or parts.
Red (19)	Red (19)	EEPROM Reading Error	EEPROM reading is not properly performed. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] CPU Board. If the error is not resolved, change the above related part or parts.
Red (20)	Red (20)	EEPROM Writing Error	EEPROM writing is not properly performed. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] CPU Board. If the error is not resolved, change the above related part or parts.
Red (21)	Red (21)	Feed Motor Over Current Problem	While operating the Feed Motor, Sensors detect an over current condition. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Feed Motor. If the error is not resolved, change the above related part or parts.
Red (22)	Red (22)	Stack Motor Over Current Problem	While the Stack Motor is operating, Sensors detect an over current condition. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Stack Motor. If the error is not resolved, change the above related part or parts.
Red (23)	Red (23)	Feed Motor Overheat Problem	While the Feed Motor is operating, Sensors detect an overheating condition. [Solution] Clean that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Feed Motor. If the error is not resolved, change the above related part or parts.

Reject Error Codes

Table 22 lists the various LED Flash Reject Code causes & solutions.

Table 22 LED Flash Reject Error Codes

On-line LED Color (Lit)	Off-line LED Color (Flash Sequence)	Error	Causes and Solutions
Blue	Green (1)	Skew Insertion Error	The Banknote has been inserted in an incorrect direction. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Centering Guide, Centering Sensor, Belts Rollers. If the error is not resolved, change the above related part or parts.
Blue	Green (2)	Abnormal Magnetic Detection	The Magnetic Sensor detects an abnormal Banknote Type. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Magnetic Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (3)	Remaining Banknotes Returned	While Initializing, Sensors detect that Banknotes remain in the TBV Unit. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] BNF Entrance Sensor, BNF Assignation Sensor, Entrance Sensor, Line Sensor, Feed-out Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (4)	Magnification Problem	When adjusting Banknote data, Sensors detect an abnormal Banknote magnification condition. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (5)	Banknote Transportation Problem	Sensors detect Banknotes remain in path, or none exist during an abnormal timing interval. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] BNF Assignation Sensor, Entrance Sensor, Centering Sensor, Line Sensor, Feed-out Sensor, Box Feed-out Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (6)	UV Sensor Problem	The UV Sensor detects an abnormal Banknote Type. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] UV Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (7)	Pattern Error	The Line Sensor detects an abnormal Banknote Type. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (8)	Double Banknotes Detected	The Line Sensor's transparency level is less than the accepted value. Dirt, stickers, or foreign object may be present on the Banknote. [Solution] Confirm the Banknote's condition. If the error is not resolved, change the above related part or parts.
Blue	Green (9)	Inhibit Setting Problem	The Banknote accept/inhibit setting is being made by a command from the Host Machine. [Solution] Check that the Commands from the Host Machine are correct, and change its setting to be acceptable for use with the TBV Unit. DIP Switch settings are incorrect. [Solution] Check that the DIP Switch settings are properly set.
Blue	Green (10)	Reject Order	The TBV received a Reject command form the Host Machine. [Solution] Check that the Command from the Host Machine is correct.
Blue	Green (11)	Cash Box Removal	While transporting a Banknote, Sensors detect a Cash Box removal. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Box Sensor, Box Lock Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (12)	Fraud Detection	The Side Sensor Level interval between before, and after, a Banknote has passed the Side Sensors is greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Side Sensor. If the error is not resolved, change the above related part or parts.

Table 22 LED Flash Reject Error Codes (Continued)

On-line LED Color (Lit)	Off-line LED Color (Flash Sequence)	Error	Causes and Solutions
Blue	Green (13)	Banknote Length Problem	The Line Sensors calculated a Banknote length longer or shorter than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (14)	2-Color Margin Problem	The Line Sensors calculated that the 2-Color margin of a Banknote is greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (15)	Counterfeiting Banknote Action	The Banknote has been validated as a Counterfeiting Banknote. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor. If the error is not resolved, change the above related part or parts.
Blue	Green (16)	3-Color Comparison Problem	The Line Sensors calculated a 3-Color comparison that is greater than the rated value. [Solution] Check that the following parts are properly assembled and/or Harness connected. Clean or adjust the following parts and Sensors. [Relative Parts] Line Sensor. If the error is not resolved, change the above related part or parts.

10 UNIT DIMENSIONS

TBV Entire Unit Outside Dimensions

Figure 20 illustrates the TBV Unit's entire outside dimensions.

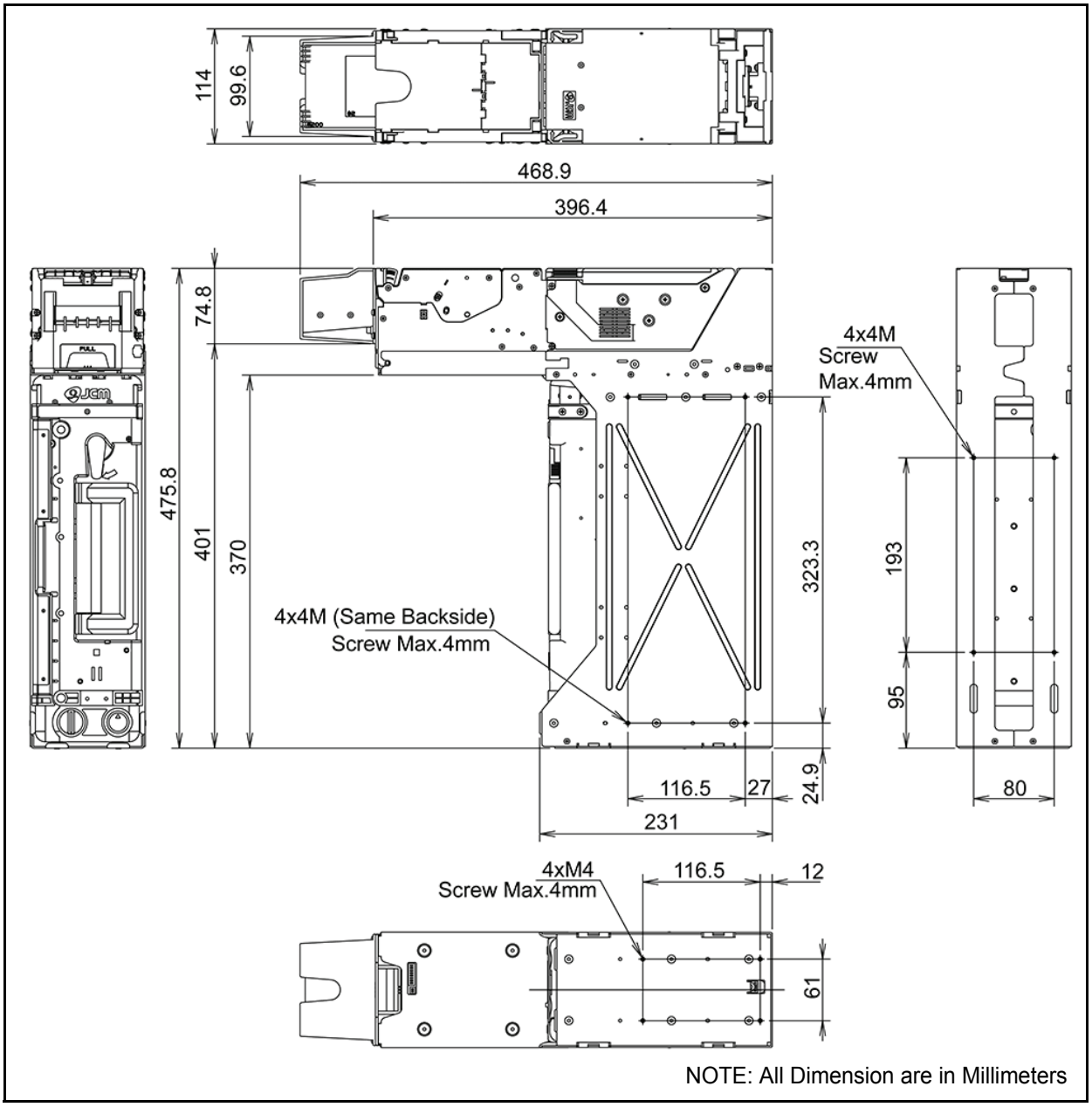


Figure 20 TBV Banknote Acceptor's Outside Dimensions

TBV UNIT CLEARANCE DIMENSIONS

Figure 21 illustrates the TBV Unit clearance dimensions.

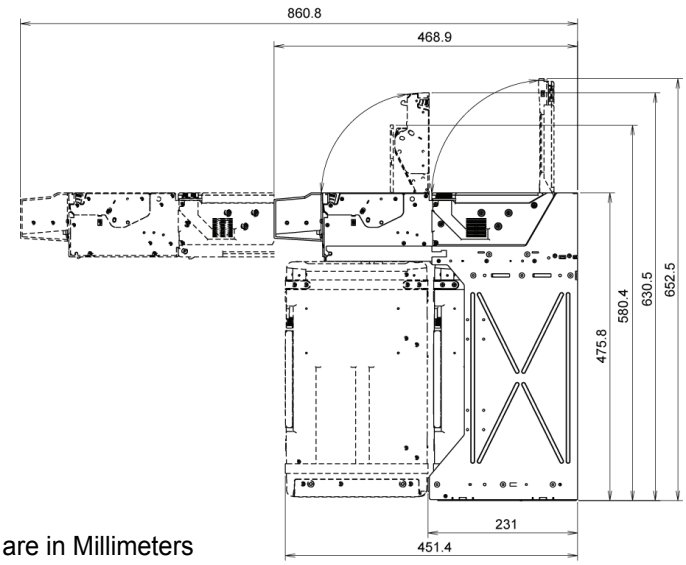


Figure 21 TBV Banknote Acceptor's Clearance Dimensions

TBV Cash Box Outside Dimensions

Figure 22 illustrates the TBV entire Unit outside dimensions.

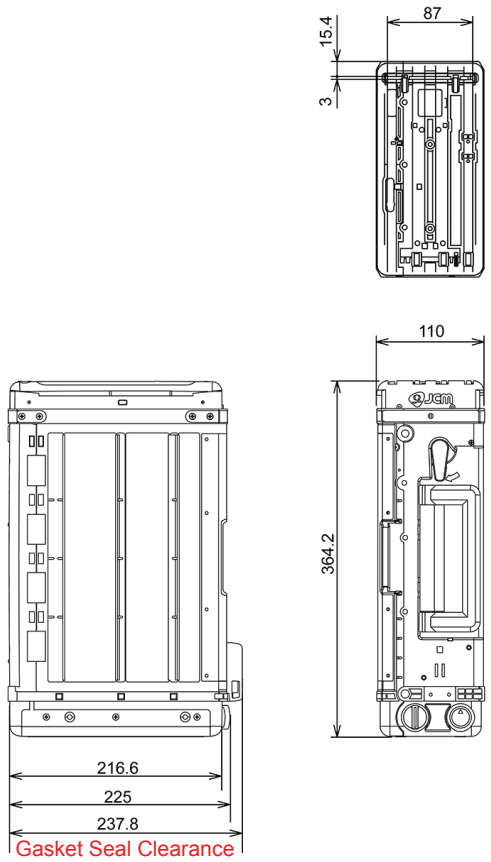


Figure 22 TBV Banknote Acceptor Cash Box Outside Dimensions

11 INTERNATIONAL COMPLIANCE

- RoHS Directives or or or or
- UL/c-UL Mark
- CE Mark
- CB Scheme JPULA-03013
- FCC Directives

FCC WARNING
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC NOTICE
This equipment has been tested and found to comply with the limits for a Class "A" Digital Device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IC NOTICE
This Class "A" Digital Apparatus complies with Canadian ICES-003.
Cet appareil numerique de la Classe "A" est conforme a la norme NMB-003 du Canada.

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